A Leader and Partner in Automation Solutions

Moxa's commitment to execution, innovation, and collaboration with our partners has fueled our transformative journey to leadership as a solution provider and partner in automation.

Moxa: Your Trusted Partner in Automation

Founded in 1987, Moxa is now one of the leading manufacturers of industrial networking, computing, and automation solutions. Moxa provides thousands of hardware and software products and draws upon 23 years of accumulated expertise. Moxa's products reflect our constant zeal for improvement, keen eye for innovation, and respect for proven solutions and expertise. We harness these qualities to create solutions that deliver a competitive edge for our customers and partners in adapting to fast-changing network and market environments.

Moxa delivers network-centric automation solutions that integrate automation and IT systems into a single network platform that simplifies management, reduces costs, and achieves greater reliability and efficiency.

Mission and Vision

As a world-class leader and a trusted partner in industrial-grade device networking solutions for automation, Moxa proudly provides quality products and value-added service to establish win-win business relationships based on mutual trust and integrity. Moxa works closely as a team with our customers, channel-partners, and solution-partners to achieve and share success.

Delivering on Commitments

Moxa offers quick, flexible, and comprehensive R&D service to meet our customers' specific expectations and exact requirements with a talented design team experienced in networking technology and solution development. Moxa has close collaborations with our customers to drive advancements and faster time-to-market product delivery. These partnerships keep Moxa in touch with emerging technologies and ensure that new developments and successes are shared with all of Moxa's partners.

Integrating Automation by Enabling Convergence

Industrial automation users have long anticipated the integration of computer, controller, I/O, video, and audio systems into a single easy-to-manage network. This vision of network-centric automation is possible today, thanks to Moxa's two decades of accumulated knowledge in industrial networking and wide selection of automation solutions that enable the convergence of I/O, audio, and video data over Ethernet networks. Improve the efficiency and reliability of your industrial process by transforming a hodgepodge of controller-centric operations into a single network-centric operation. Moxa provides communication interoperability across the full range of automation devices and modules to seamlessly integrate them with the industrial Ethernet network.

Industrial Networking Solutions

Moxa offers a wide array of device networking products that feature open Ethernet infrastructure, industry-proven standards, extended temperature tolerance, environmental protection, and network redundancy to ensure network availability and reliability. Product lines range from industrial Ethernet switches, industrial wireless devices, serial cards, serial device servers, and embedded device servers, to USB and fieldbus components. All of our products are designed to stand up to harsh environments and are ideal for deploying mission critical applications in fields such as maritime, oil and gas, power and utilities, rail, and factory automation.

Industrial Computing Solutions

Moxa's industrial embedded solutions are used to construct powerful front-end controllers that can execute onsite data collection and control at widely distributed remote sites through industrial Ethernet or wireless backbones. All of the computers feature rugged reliability and fanless operations with a wide operating temperature range of -40 to 85°C. Our products feature a user-friendly environment that makes application development easy. Moxa provides prompt and extensive customization services in addition to a wide selection of ready-to-run products such as industrial computers, wireless computers, and wide temperature computers.

Remote Automation Solutions

Active Ethernet I/O solutions featuring intelligent I/O data transmission are the cutting edge of IP-based data acquisition and control technology. Moxa's Active Ethernet I/O and Cellular I/O solutions maximize the real-time accessibility of remote site measurement and control applications. Moxa also offers SCADA-compatible IP surveillance solutions that integrate network video monitoring to implement real-time visual management for SCADA/RTU applications. Our vast selection of automation products includes programmable automation controllers, cellular wireless I/Os, Active Ethernet I/Os, remote Ethernet I/Os, and IP-based video servers and cameras.

Table of Contents

Industrial Ethernet

Device Connectivity

Industrial Computing

Remote Automation

Complete Automation Solutions

Moxa empowers integrated network-centric operations that are more efficient, reliable, and manageable than systems that use a patchwork collection of industrial devices and modules.

Vertical Solutions for Mission Critical Applications

Moxa provides solutions for vertical industrial markets tailored to meet industry-specific requirements and certifications, such as IEC 61850 certification for substation automation, NEMA TS2 for traffic control systems, EN50155/EN50121 for railway applications, DNV/GL for marine and offshore applications, Class I, Div 2/Zone 2 for hazardous locations, and more. We have led the way in overcoming the major challenges of developing vertical industrial solutions: interoperability, reliability, and environmental suitability. Moxa builds specific solutions consistent with industry-proven standards to operate reliably and consistently in the harshest of environments. With 23 years of combined expertise, Moxa is experienced in the integration of diverse automation infrastructures, protocols, and interfaces into one interoperable system.

Diverse Products for Complete Solutions

Moxa's diverse product line includes industrial Ethernet, serial connectivity/networking, industrial computing, and remote automation solutions. Moxa provides over a thousand different products in these four product groups to help you overcome any automation challenges. Select from Moxa's comprehensive portfolio of hardware and software solutions to find the product tailored to meet your needs. The breadth of this product line is bolstered by the depth of Moxa's technical expertise and accumulated technologies. Moxa combines these extensive products and services to provide a one-stop-shop for industrial automation solutions.

The Convergence of IT and Automation Technology

Moxa focuses on diversified information and communication technologies (ICT) that help customers build automation systems around a universal communication platform of off-the-shelf IT technology and open network communications. For ultimate efficiency, reliability, and interoperability, Moxa stresses seamlessly integrated network-centric solutions. Possible solution architectures can consist of any combination of advanced Ethernet switches, industrial embedded computers, gateways, IP surveillance products, and secure terminal servers. This versatile suite of devices enables us to bring the power and flexibility of information technology to the industrial automation world and transform the way you do business.

Transportation
🚄 EN50155
🛤 EN50121

Fieldbus Solutions
Industrial Ethernet
Routers/Switches
Industrial Wireless

Industrial Ethernet

- Routers, Switches, Firewall, VPN, NMS
- Wireless Ethernet, GPRS, Edge, HSPDA
- IP67, M12, PoE
- Turbo Ring and Turbo Chain Redundancy, Turbo Wireless Roaming
- OPC, Industrial Ethernet Protocol Support

Turbo Ring   Turbo Chain   Turbo Roaming

Solutions

Moxa Certified Solutions

Maritime

Power IEC 61850-3

Oil / Gas

Products

Serial, USB

RISC Computers

Remote I/O

Device Connectivity

RS-232/422/485

Serial-to-Ethernet

Industrial Computing

x86 Computers

Wireless Computers

Remote Automation

Video Networking

Automation Controllers

Technologies

Device Connectivity

- **RS-232/422/485, USB, Fiber**
- **Serial-to-Ethernet**
- **Serial-to-USB**
- **Serial-to-Wifi**
- **Serial Boards**
- **USB-IF and WHQL Certifications**
- **ProCOM and NetEZ Technology**

ProCOM   NetEZ™

Industrial Computing

- **RISC/x86-based Platforms**
- **DIN-Rail/Rackmount/Wallmount Form Factors**
- **Wireless LAN and Cellular Computers**
- **Windows and Linux Embedded Software Platforms**

Rcore

Remote Automation

- **Industrial Ethernet, Cellular I/O**
- **Push-based Active I/O Technology**
- **IEC-61131 Automation Controllers**
- **IP Cameras, Industrial Video/Audio Servers**
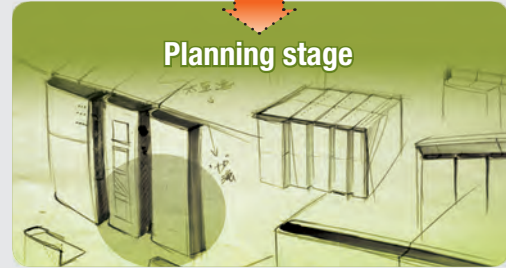- **Click&Go, Active OPC Server, and Video Gadget for SCADA/RTU**

CLICK&GO LOGIC   Active OPC

New Product Development Process »

How innovation and quality are integrated into our development process.

1 Use customer feedback and input to inspire new product ideas.

Idea stage

Planning stage

At Moxa, we approach every new product as an opportunity to further refine our development process and ultimately deliver a better solution to you. ISO 9001:2008 and 14001:2004 certifications confirm our commitment to quality and the environment.

2 Harness the creativity of the entire team to find innovative solutions.

ISO 9001

ISO 14001

The Moxa Process

Enhancing Customer Value with Every Step

Guiding Moxa's new product development process is an underlying commitment to deliver the best products possible to our customers. We consider excellence a moving target and are always adjusting our sights higher. To continually improve we constantly refine and evolve all of our processes to enhance value, verify reliability, and foster innovation.

Innovating to Maximize Customer Value

At Moxa, we foster constant innovation and creativity to fulfill our mission of finding new ways to simplify management, reduce costs, and increase operations reliability and efficiency for our customers. To achieve this we devote nearly half of our manpower to R&D. Our in-house engineering team is dedicated to developing creative solutions that improve the capabilities of our products. Recent successes include power modules that can run on extremely low power for resource-scarce environments and elegant thermal solutions for fanless wide temperature operations.

Moxa continually fine-tunes and optimizes our designs to achieve the perfect combination of cost-effectiveness and performance. We've long made it part of our culture to nurture the creativity and ambition that makes it possible to reduce costs without compromising on performance. In 1996, Moxa internally developed an ASIC chip for serial boards to eliminate the costs of outsourcing this key component. For our EDS-600 series of compact modular Ethernet switches, we improved on the efficiency of conventional case design by creating a heat-dissipating vented aluminum case. This allows us to deliver devices capable of operating in extreme temperatures at competitive prices.

Global Recognition »

Engineer's Choice Award, Control Engineering Magazine
- ToughNet TN-5518 EN50155 Ethernet switch (2010)
- W345 RISC-based wireless computer (2007)
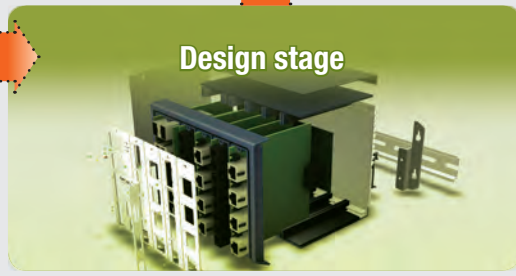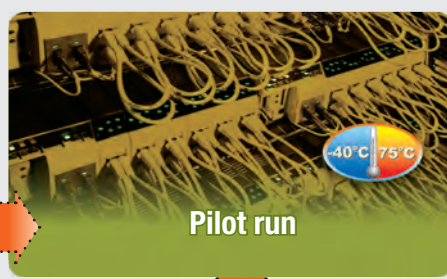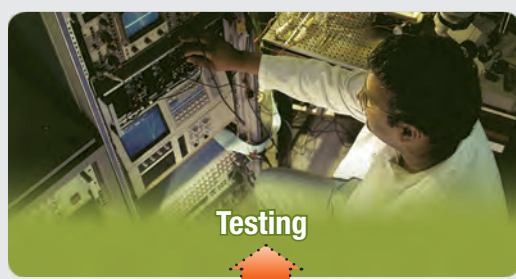- ioLogik E2210 Active Ethernet I/O (2006)

2010 ENGINEERS' CHOICE AWARDS

Embedded Award 2007, Embedded World Exhibition and Conference
- W315/325/345 wireless embedded computers

embedded AWARD 2007

4 Test all functions in a simulated industrial networking environment.

5 Plan production and rigorously test product samples.

Service ≫

Annual MTSC Training includes hands-on exercises.

Engineers receive MTSCs for specific product lines.

Testing

Pilot run

-40°C 75°C

Design stage

Mass production

3 Explore all opportunities to improve existing solutions for greater efficiency and performance.

6 Every product is tracked, verified, and traced throughout production with a unique bar code identifier.

A Meticulous Commitment to Product Quality

Moxa's commitment to quality products begins from the moment they are conceived. Our quality assurance teams contribute to the very earliest planning stages of our new product development process by setting the engineering, hardware, and software testing plan of all proposed functions. These solid, tangible benchmarks are verified during the development process with a rigorous testing regimen. For example, before the pilot run, all products must pass an integrated test stage that simulates a network environment and confirms the product can succeed in real world applications. All pilot run samples of wide-temperature models run for 48 hours with eight -40 to 75°C cycles.

A consistent manufacturing process ensures that the products that go out the door conform to the specified design. Even a product designed for perfect reliability can be crippled by shoddy manufacturing. Moxa uses a barcode system to increase production efficiency, reduce errors, and deliver products on time. Each individual product serial number can be traced from initial work order to shipping, and every step in between. This production system allows us to scan and confirm the product's conformity with specifications at any stage of production.

Moxa continues to elevate and refine quality and efficiency. In 2009, we implemented "Total Quality Management" (TQM) to further channel our drive to deliver high quality, cost efficient products to users in a timely way. As a result, the production lead time of incomplete products has been reduced from 7.3 days to 6 days, and product failure rate and cost were reduced by 24%. Ultimately, Moxa realizes that excellence in industrial technology is a moving target that constantly demands higher standards to achieve. We evolve and improve our processes to persist in reaching and surpassing that goal.

Prompt and Professional Technical Service

Moxa products are a complete package that encompasses more than just the solution itself. Moxa confidently offers an exceptional 5-year warranty that includes real-time service. With offices in Taiwan, the US, Germany, and China, the sun never sets on Moxa's technical support network. Deployed all over the world, our technical support engineers form a global relay of on-call expertise so that your service needs can be fulfilled promptly and professionally.

Above this global service backbone, Moxa has nurtured a capable local repair network by partnering with distributors and certifying their engineers with the Moxa Technical Support Certification (MTSC) program. MTSC gives engineers the opportunity to gain hands-on experience servicing Moxa's products at three-day training programs, and then verifies their expertise with annual exams.

Trend 100 Products, SPS Magazine
- PT-7828 IEC 61850-3 rackmount Ethernet switch (2008/2009)

Product of the Year Finalist, Plant Engineering Magazine
- EDS-P308 industrial PoE switch

Good Design Award
- EDS-728 industrial Gigabit modular Ethernet switch (2008)

Red Dot Award
- EDS-619 compact modular Ethernet switch (2009)
- EDS-728 industrial Gigabit modular Ethernet switch (2008)

iF design
- ToughNet TN-5518 EN50155 Ethernet switch (2010)
- EDS-726 industrial Gigabit modular Ethernet switch (2006)

Connect to Moxa Anytime, Anywhere

Take advantage of Moxa's professionalism and 23 years of experience in industrial automation to empower your applications and business. Our global distribution network includes branch offices in China, the United States, Europe, and the Asia Pacific region. The Moxa.com site is an additional knowledge resource that can be accessed globally at any time.

Americas Headquarters
Los Angeles, USA

Global Sales and Service Network »

Moxa has built a global network of professional sales staff to discover and fulfill customer needs. Our distributor network extends throughout the Americas, Europe, Asia Pacific, and China. For your convenience, Moxa's worldwide distribution and marketing network reaches more than 60 countries.

You can receive the highest level of support from our teams of specially trained and certified staff wherever you are in the world. Moxa's experienced and professional engineering team is ready to analyze your specific requirements and offer product and solution recommendations. Clients can also dictate detailed project specifications, testing requirements, and network architecture. In addition, all Moxa distributors are required to meet rigorous standards for quality, and technical proficiency.

www.moxa.com »

A Rich Knowledge Resource

Global Online Service

You can easily find the latest product information and news about Moxa at www.moxa.com. In addition to real-time information about Moxa's products, the site is a rich resource for acquiring knowledge, technical know-how, and new solution ideas. With decades of experience in networking and industrial automation, Moxa can assist you in selecting the perfect solution for your application. Register as a site member to gain access to our library of white papers and guidebooks.

In addition to information and resources, the www.moxa.com website is a quick and convenient way to reach our technical support engineers, who stand ready to respond to your inquiries within 24 hours. You may also find answers to your questions in our FAQ section or track product RMA status online. Information is also available in German, Chinese, and Japanese on the respective regional websites.

Europe Headquarters
Munich, Germany

China Headquarters
Shanghai, Beijing, Shenzhen, China

Global and Asia Headquarters
Taipei, Taiwan

■ Global Headquarters   ■ Regional Headquarters   ■ Distributors

Moxa Online—A Convenient Ordering Service for Sample Products

In 2009, Moxa launched Moxa Online for USA customers at store.moxa.com. Moxa Online makes it possible to conveniently order evaluation units directly from Moxa and receive them within 48 hours. This service allows you to dramatically reduce transaction costs during the testing phase of your project. Instead of being required to request a quote, wait for a response, and then put everything on hold until delivery, you can just use Moxa Online and focus on developing your project. Moxa Online customers have the added confidence of a 30-day warranty and a standard lifetime warranty in the USA, or a 5-year warranty for customized products.

Moxa Partner Zone—Exclusive News, Marketing Resources, and Sales Tools

Moxa's authorized distributors can access Partner Zone to get the latest marketing material, sales tools, and technical documents. Registered partners receive a monthly newsletter to stay current with product news. Moxa also provides integrated marketing programs and promotions to assist partners in promoting Moxa products and services.

Moxa Newsletters—Keep Your Industrial Automation Knowledge Base Up-to-date

Every month, Moxa Connection explores a new hot topic in industrial automation and networking. With Moxa Connection, you have access to insider industry know-how and can explore the optimal solutions for your specific problems. Moxa Spotlight showcases the latest Moxa products and their potential applications, so you never miss any of the exciting emerging technologies that are transforming industry. Join the over 70,000 industrial engineers who have already tapped this rich knowledge source and subscribe at www.moxa.com.

Substation Automation

⚡ IEC 61850-3

IEC61850 Compliant Communication Networks for Substation Automation

A reliable and intelligent network is a key success factor for modern substations that transmit and distribute electric power over large areas. Since substations are often located in areas subjected to high electromagnetic interference and extreme temperature conditions, the substation infrastructure must be capable of providing EMC protection, network redundancy, high reliability, and flexible deployment options for future upgrades.

In addition to reliability, coordination between the many standards and proprietary protocols used in substations is also a major requirement in developing power automation systems. Since Ethernet technology is used to provide better extensibility and interoperability, adherence to IEC 61850 communication standards is required to achieve compatibility between different intelligent electronic devices (IEDs).

Strengths of Moxa's Industrial Networking Solutions

Facilitates Data Communication Between Legacy Devices Using Different Protocols

In front-end communication applications for power substations, the front-end processor requires a variety of communication interfaces to act as a protocol gateway. Moxa's x86-based embedded computers feature multiple connection options for greater networking versatility.

Moxa's PowerTrans Switches are Tailor-made for Substation Automation

Moxa's PowerTrans Ethernet switches are designed to withstand all of the EMI type tests required by IEC 61850-3 without experiencing any communications loss. The full product line has passed IEC 61850-3 and IEEE1613 certification testing conducted by KEMA. The series also supports the IEEE 1588 protocol for timing accuracy over substation LANs, which is used for large-scale distributed power grids.

Gigabit Fiber Optic Cable
Fiber Optic Cable
Twisted Pair Cable
Serial

3 PTC-101

IED IED IED IED IED
Low Voltage

PT-7710

Merging Unit CT/VT
Protection Relay
Modbus Serial
Power Meter
Protection Relay
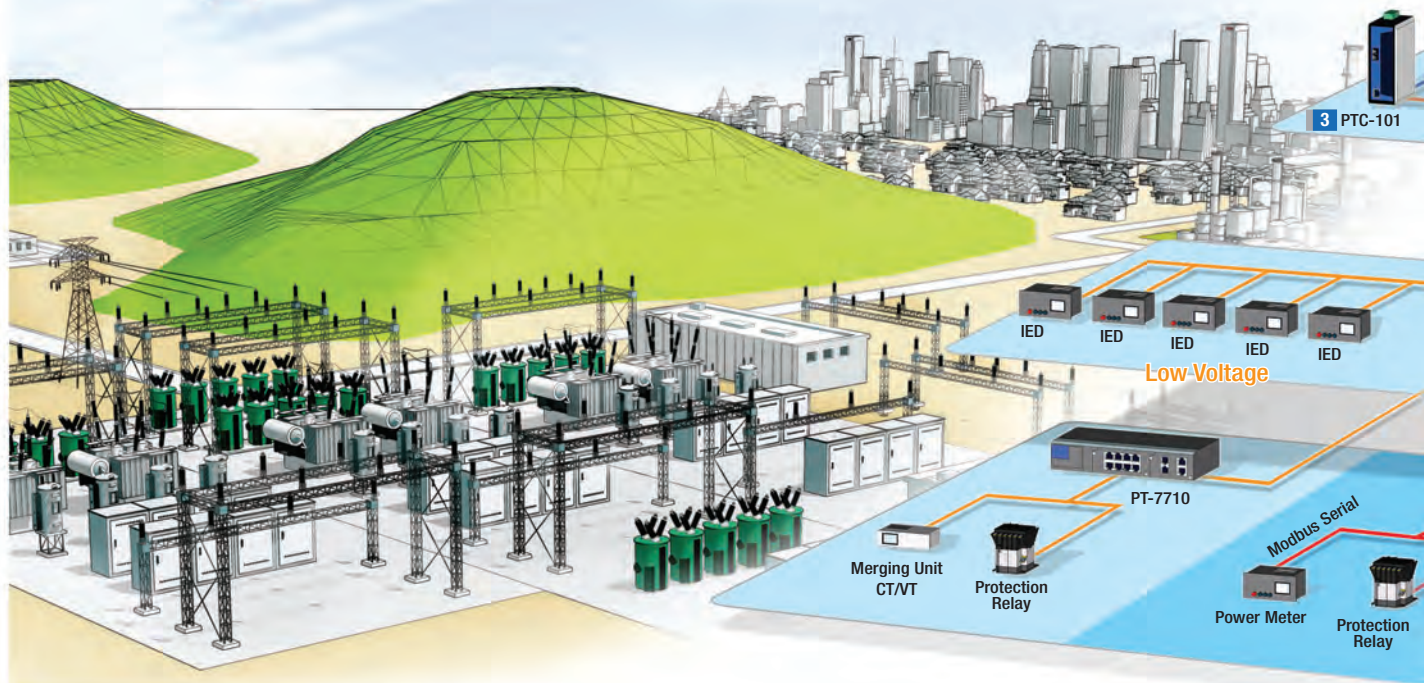
Build a Stable and Reliable Backbone for Power Substations

- Verified zero packet loss under harsh EMI conditions

- IEEE 1588 precision time protocol enabled

- Turbo Ring media redundancy with faster ring recovery (20 ms with 250 switches)

- Isolated redundant power inputs at 24/48 VDC or 110/220 VDC/VAC

Industrial-grade Solutions

- -40 to 85°C operating temperatures and 19-inch rackmount installation

- Flexible modular interface configuration with up to 28 fiber ports (24+4G ports) for long-haul transmission and scalable Gigabit bandwidth

- L3 Ethernet switch supporting IP routing protocols for better traffic flow

1 DA-681

SCADA HIM

Remote Dispatch Control Center

2 PT-7728

Station Level

Moxa Gigabit Turbo Ring

PT-7728

PT-7728

IED   IED   IED

High Voltage

Bay Level

5 MB3170

Modbus TCP

4 CN2600

Power Meter

Protection Relay

Process Level
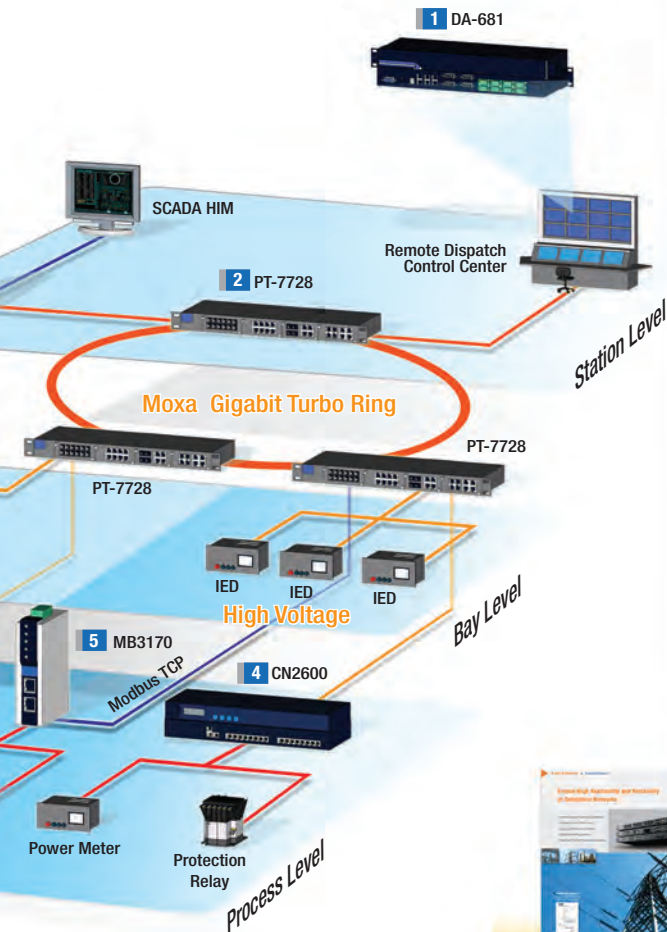
Key Products

1 DA-681
x86-based rackmount embedded computer

- Dual power for network redundancy (DP/DPP models only)
- 6 10/100 Mbps Ethernet ports for network redundancy
- IEC 61850-3 certified (DPP model only)

IEC 61850-3 Embedded Computer

Page 13-44

2 PT-7728
IEC 61850-3 24+4G-port Gigabit modular managed Ethernet switch

- Zero packet loss under harsh EMI stress
- IEEE 1588 Precision Time Protocol for precise time synchronization
- Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC inputs

IEC 61850-3 Ethernet Switches

Page 2-27

3 PTC 101
IEC 61850-3 Ethernet-to-fiber media converter

- 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
- Link Fault Pass-Through (LFP)
- Power failure alarm by relay output (LV model only)

IEC 61850-3 Media Converter

Page 4-9

4 CN2600 Series
8/16-port RS-232/422/485 terminal servers with LAN redundancy

- Redundant COM function available when both LANs are active
- Dual-LAN cards with two independent MAC addresses and IP addresses
- Dual AC power inputs

Page 7-24

5 MGate™ MB3170/MB3270
1 and 2-port advanced serial-to-Ethernet Modbus gateways

- Configuration is exceptionally easy
- Slave mode supports 16 TCP masters and up to 62 serial slaves at the same time
- Master mode supports 32 TCP slaves at the same time
- Emergency request tunnels ensure QoS control

Page 3-9

Learn more about subatation automation solutions on Moxa's website:

Visit: www.moxa.com/VerticalMarketSolutions

Renewable Energy

A Complete Renewable Energy Solution

The move from traditional coal-fired and other fossil fuel plants to renewable energy sources is well underway and is expected to accelerate considerably over the next decades. In particular, wind and solar power have been recognized as viable energy alternatives. Moxa's products have been used in a number of renewable energy applications around the world. Some typical applications are illustrated below for renewable energy systems, such as wind farms, solar transportation grids, and solar tracking systems.

Strengths of Moxa's Industrial Networking Solutions

Wind Power

Communication between wind turbine towers is a major issue since wind farms typically span vast distances that can go on for miles. Wind turbines are also prone to electrical interference, so that highly reliable anti-interference capabilities are also required to prevent unstable transmissions and data loss. Given these circumstances, it is essential for wind farms to employ rugged networking devices with long distance transmission capability for remote monitoring in harsh environments.

Industrial-grade Reliability for Harsh Environments

Wind power generation systems are installed in harsh environments subjected to extreme temperatures, dust, and wind. Under these conditions, using network devices (e.g., industrial Ethernet switches, embedded computers, and device servers offered by Moxa) with fanless design, high MTBF, wide operating temperature range, redundant power, and rugged housing protection, allows system integrators to build highly reliable networking and computing solutions.

Uninterrupted Redundant Networking

Network uptime is extremely critical to a wind farm. To ensure high network availability, Moxa's managed Ethernet switches support proprietary Turbo Ring™ and Turbo Chain™ redundant mechanisms featuring a fast recovery time of under 20 ms to ensure that your network runs non-stop. In particular, Turbo Chain™ is an ideal wind power solution for creating multiple redundant connections with the best flexibility and endless expansion, and is a cost-effective solution that saves both time and money.

Long Distance Solutions

Optical fiber offers reliable communication over long distances and saves on installation and cabling costs.

Gigabit Fiber Optic Cable
Fiber Optic Cable
Twisted Pair Cable
Serial
I/O
Coaxial Cable

Wind Power

Wind Farm

Solar Energy

Solar Community

Tracking & Transportation System

Control Center

Control Center — OnCell G3150

UC-7112 — Temperature Sensor

Meter — Meter — Pyranometer 0 to 5V

Control Center

V468 — EDS-608 — CN2610-16

Turbo Ring (Recovery Time < 20 ms)

Temperature Sensor — Digital Compass — Solar Panel Motor — Signal — PV Inverter (DC/AC) — Recharger (DC/AC)

Solar Power

In response to the need for greener power sources, solar energy communities are springing up all over the place, and it is important that these communities set up stable and reliable remote monitoring systems. Solar tracking systems, transportation systems, solar power plants, and other sophisticated solar power solutions use solar tracking systems to maximize the amount of solar energy that can be absorbed from the Sun's rays. The plants require embedded computers to serve as the central controller for mapping and tracking the Sun. In addition, solar power can also be used to operate traffic signals, roadside displays, and various peripheral transportation devices.

Compact Form Factor for Easy Installation

Solar applications require low power solutions, and Moxa's RISC-based embedded computers, with their energy efficient design and compact form factor, are a cost-effective and easy to install option.

### Stable and Reliable Hardware and Software Computing Platform

Moxa's x86-based embedded computers are extremely stable and reliable and can be used as high performance solar tracking systems for mapping and tracking the Sun. Use Moxa's embedded computers for data acquisition and front-end computing, and Moxa's Rcore embedded platform for faster and easier programming.
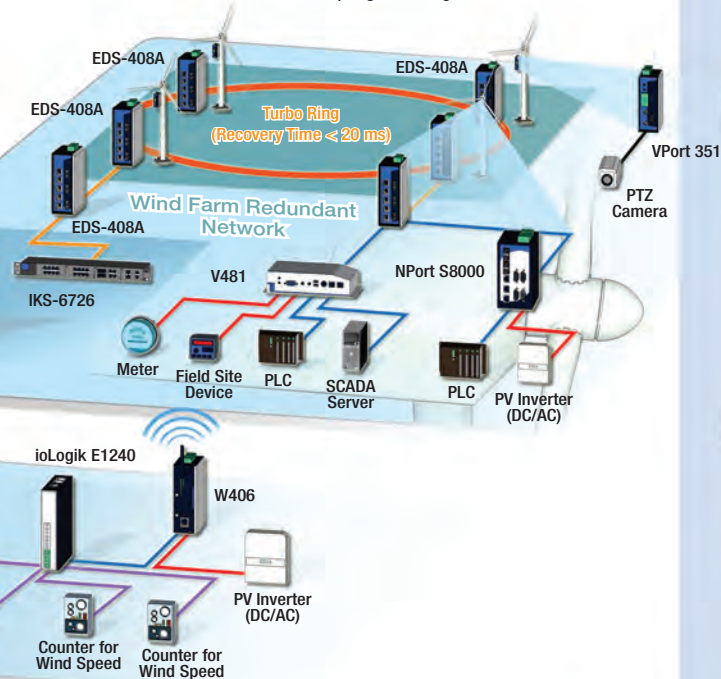
Key Products

1 V481
x86-based communication embedded computer

- 8 software-selectable RS-232/422/485 serial ports
- Serial port speed from 50 bps to 921.6 Kbps (non-standard baudrates supported)
- 10/100 and 10/100/1000 Mbps LANs for network redundancy

Page 13-22

2 EDS-408A
8-port industrial managed Ethernet switch with 3 fiber ports

- 3 fiber optic ports (single/multi-mode, SC/ST connectors)
- Turbo Ring™, Turbo Chain™, and RSTP/STP for Ethernet redundancy
- -40 to 75°C operating temperature

Page 1-36

3 NPort® S8000
Combo Switch / Serial Device Server

- 4-port RS-232/422/485 serial device server with 2 KV (DC) isolation protection
- 5-port managed Ethernet switch with Turbo Ring® (recovery time < 20 ms) or RSTP/STP (IEEE 802.1w/D) supported
- Surge protection for serial, power, and Ethernet

Page 8-12

4 W406
RISC-based GSM/GPRS/EDGE wireless embedded computer

- GSM 850/900/1800/1900 MHz supported, GPRS/EDGE Class 12 supported
- Two software selectable RS-232/422/485 serial ports
- 4 DIs, 4 DOs

Page 14-4

5 OnCell G3150-HSDPA
Industrial five-band IP gateway

- UMTS/HSDPA and GSM/GPRS/EDGE compliant
- Connect both Ethernet and serial devices to cellular networks
- Centralize private IP management software with OnCell Central Manager

Page 6-15

Learn more about renewable energy solutions on Moxa's website:

Visit: www.moxa.com/VerticalMarketSolutions

info@moxa.com   www.moxa.com   MOXA®   13

Railway Automation

EN50155   EN50121

Industrial Ethernet Leads the Way

Industrial Ethernet-based communication networks allow the introduction of new services, such as Passenger Information Systems and Passenger Entertainment Systems, that improve passenger comfort and enhance train operation. A high-bandwidth Ethernet backbone facilitates high quality video surveillance and real-time emergency intercom systems. In addition, advanced wireless roaming technology can be used to establish non-stop, two-way communication between the ground and trains. In light of safety considerations, the communication infrastructure must meet or exceed the high standards of vibration resistance, network redundancy, industrial ruggedness, and electromagnetic compatibility.

Strengths of Moxa's Industrial Networking Solutions

EN50155/50121-3-2/50121-4 and e-Mark Certified

Moxa's industrial Ethernet switches, wireless Ethernet products, and IP video solutions provide M12 anti-vibration interfaces for on-board railway applications. All of these solutions comply with strict railway standards.

Rugged PAC for Harsh Environments

Programmable Automation Controllers (PACs), which combine more features than traditional PLCs, are designed for complex applications. Key features of PACs include an open platform, support for PC programming languages, VGA, large storage, powerful calculation functions, protocol conversion, and various communication interfaces. PACs bring greater possibilities to your industrial automation applications.

Moxa's ioPAC products are the first programmable automation controllers for harsh environments. ioPAC products feature a wide operating temperature, an anti-vibration design, a metal housing, high availability, and isolation protection.

Extensive Selection of Railway Ethernet Switches

Over 100 models of ToughtNet series switches are offered to provide users with more precise solutions. The TN series provides a variety of features tailored for rolling stock, including Gigabit Ethernet for data-intensive networks, and Power-over-Ethernet to simplify the train-wide cabling and bypass relay function to guarantee data transmission in a linear topology.

EN50155 IP Camera for Rolling Stock

Moxa's VPort 15 EN50155 IP camera has a compact design and surface mounting system for stable and robust installation, and is ideal for mounting on the curved surfaces and soft padding of trains. The cameras feature M12 connections and IP66 protection to stand up to incessant vibrations, humidity, and the dust found in buses and trains.

Fiber Optic Cable
Twisted Pair Cable
PoE Cable
Serial
I/O

3 AWK-6222

Transit Vehicle

TTN-5508-4PoE

VPort 25

Transportation Information System

AWK-4121

AWK-6222

Platform

VoIP Phone

Rolling Stock

AWK-5222

AWK-5222

Backbone

2 AWK-5222

Cabinet 1

Turbo Chain (Recovery Time < 20 ms)

Cabinet 3

Cabinet 2

EDS-608

Wayside Control Cabinet
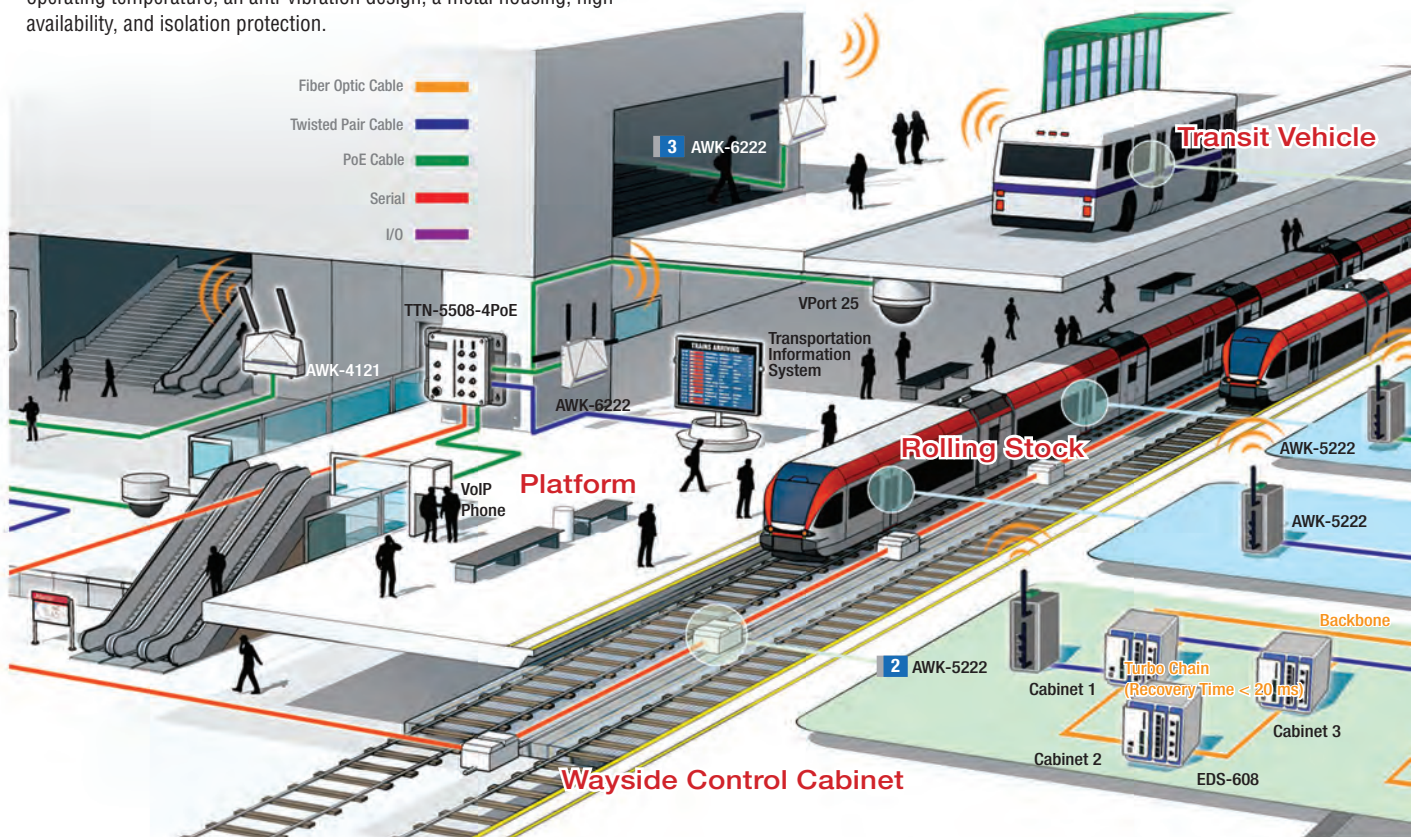
Industrial-grade Indoor/Outdoor Wireless Communication

Moxa's Turbo Roaming technology, which enables seamless connections to wireless networks, provides ready access to an IEEE 802.11a/b/g wireless LAN. An IP68-rated housing, wide operating temperature, and redundant power options provide high availability for railway applications.

Integrate Legacy Devices into an Ethernet Infrastructure

Moxa's NPort serial device servers offer a fast and economical way to connect legacy serial devices to Ethernet LANs. The built-in real-time OS and TCP/IP protocol suite allow users to access, manage, and configure remote facilities and equipment from any location over the Internet.

Innovative "Chain" Topology Enables Cost-effective Network Connections for Wayside Communications

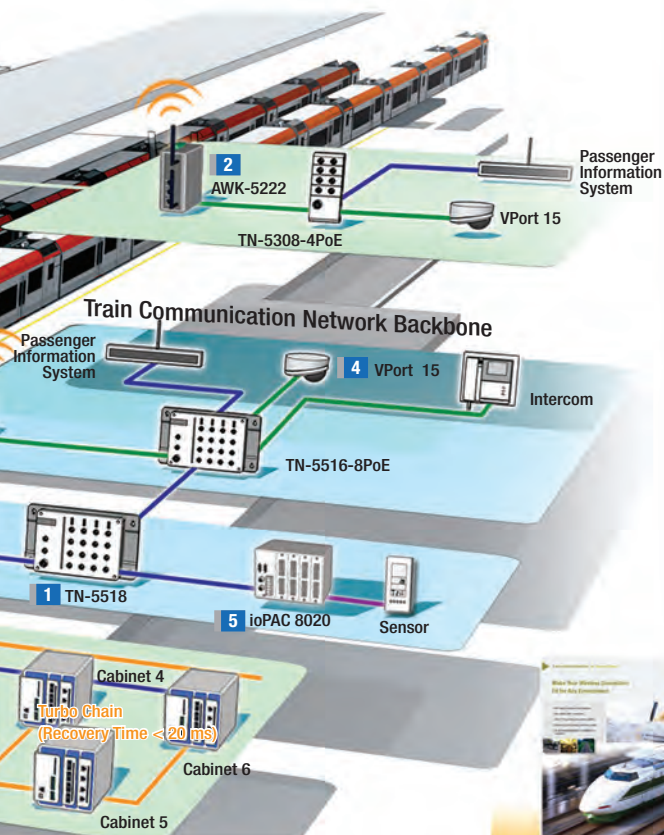Moxa's innovative Turbo Chain™ technology dramatically simplifies the construction of wayside networks and allows easy and quick scale-up whenever the network needs expansion. Instead of creating another sub-ring for the new network or re-configuring the existing network, administrators can simply chain-up the new nodes, and then connect the chain to the current network.

Passenger Information System

AWK-5222

TN-5308-4PoE

VPort 15

Train Communication Network Backbone

Passenger Information System

VPort 15

Intercom

TN-5516-8PoE

TN-5518

ioPAC 8020

Sensor

Cabinet 4

Turbo Chain (Recovery Time < 20 ms)

Cabinet 6

Cabinet 5

Key Products

1 TN-5518
16+2G-port M12 managed Ethernet switch
- 2G-port flexibility with bypass relay
- Wide power input range from 12 to 110 VDC
- Fanless design, -40 to 75°C operating temperature

| EN50155 | EN50121-3-2 | EN50121-4 | e-Mark |

Page 2-7

2 AWK-5222
Industrial IEEE 802.11a/b/g dual-RF wireless AP/Bridge/Client
- IEEE 802.11a/b/g compliant
- Turbo Roaming for seamless wireless connections
- Dual-RF design for redundant wireless communication and high-performance wireless bridging

Page 5-13

3 AWK-6222
IEEE 802.11a/b/g outdoor dual-RF wireless AP/Bridge/Client
- Dual RF design for redundant WLAN connections
- Turbo roaming for seamless handover
- Long-distance wireless transmission over 10 km
- IP68 rating, anti-vibration M12 design

| EN50155 | EN50121-1 | EN50121-4 | e-Mark |

Page 5-7

4 VPort 15
EN50155 certified IP dome camera
- Built-in Power over Ethernet interface, IEEE 802.3af compliant
- M12 connectors
- Featuring 1/3.8", 1.3 M progressive CMOS sensor IP66-rated protection

| EN50155 |

Page 18-22

5 ioPAC 8020
Rugged programmable automation controller
- I/O module with hot-swap capability
- -40 to 75°C operating temperature
- Anti-vibration design

Page 16-7

Learn more about railway automation solutions on Moxa's website:

Visit: www.moxa.com/VerticalMarketSolutions

Oil and Gas

Ensures Safe and Reliable Communications for the Oil and Gas Industry

The oil and gas industry today faces a variety of challenges in areas such as daily operational efficiency, future integration flexibility, as well as improved production availability, process reliability, and safety. Safety is always the first priority wherever potentially explosive substances are produced, processed, stored, or transported. To ensure the highest standard of hazard protection in the industry, most devices require a rugged design in accordance with the ATEX directive. Moxa has a proven ability to provide solutions that enable optimum integration in process control systems, and Moxa's products ensure that interconnections between corporate, SCADA, and DCS networks are highly reliable and secure.

Strengths of Moxa's Industrial Networking Solutions

Improved Flexibility

Ethernet is gaining popularity in the oil and gas industry due to its interoperability, flexibility, cost-effectiveness, and adaptability to industrial environments, and to improve operational efficiency and safety in vast, inhospitable oil fields, remote monitoring has become a necessity for 21st century oil and gas operations. The remote operation system depends on a high-bandwidth Ethernet network for transferring high volumes of data in real time. Moxa provides a wealth of products, such as industrial Ethernet switches, IP video solutions, and Ethernet I/O products, which help engineers build efficient monitoring networks at unmanned and isolated sites. Ethernet products support 10 Mbps, 100 Mbps, and 1 Gbps speeds, and come with a mixture of fiber, copper, and SFP ports. Highly integrated solutions connect serial devices, LANs, and WLANs to ensure easy integration with existing and future control systems.

Enhanced Reliability

Harsh environmental factors, such as wide temperature fluctuations, vibration, rain, dust, and EMI noise, have the potential to interrupt normal operations in the oil and gas industry. Other criteria include a hardened design for field operations and data transmission over long distances between field devices and SCADA hosts. To address these issues, Moxa offers heavy-duty networking features, including models that operate reliably in extreme temperatures, an anti-vibration and weatherproof design, high MTBF ratings with fanless design, high immunity to EMI noise, fiber optic support, and robust metal housings.

Proven Performance

Gigabit bandwidth networks with superior networking capability enable efficient network monitoring and traffic determinism, which is ideal for creating high-performance IP video surveillance solutions for oil and gas applications. Moxa's managed Gigabit Ethernet switches provide high-bandwidth performance for real-time video, voice, and data transmission throughout oil sites, and support advanced network management and security features, such as IGMP snooping, QoS, SCADA/HMI, VLAN, IEEE 802.1X, and HTTPS/SSH.
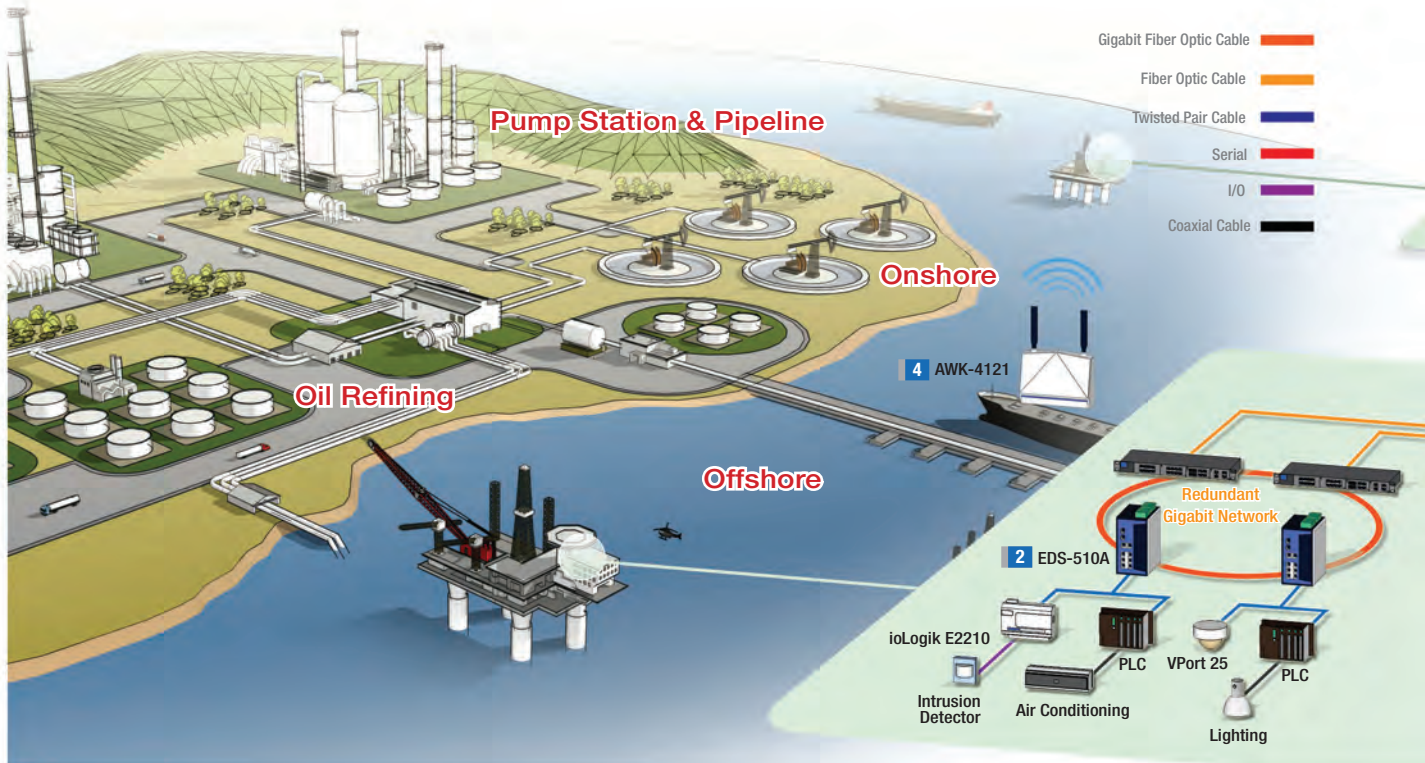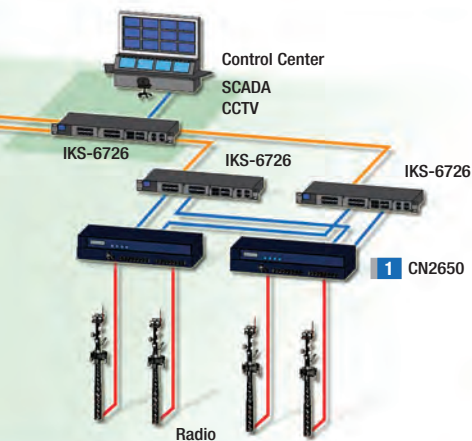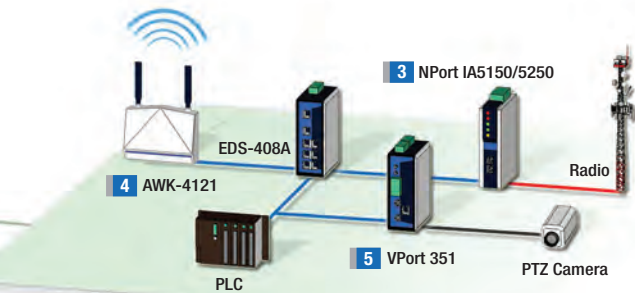
Increased Redundancy and Availability

Oil and gas production must operate continuously to maximize profit, and unexpected downtime and failure to respond effectively to critical situations can be very costly in the industrial sector. For this reason, data availability must never be compromised for critical process control networks. Designing a non-stop network between field RTUs and SCADA hosts relies primarily on redundant technologies. Moxa's Ethernet switches and serial device servers support the Moxa Turbo Ring™ and/or Turbo Chain™ topology, which ensure a super-fast recovery time (less than 20 ms with up to 250 Ethernet switches). Turbo Ring™ supports multiple ring functions, such as ring coupling, dual homing, and dual ring, and Turbo Chain™ allows users to interconnect multiple redundant networks. Moxa's products also feature dual redundant VAC/VDC power inputs to ensure high availability of process control networks.

Added Safety

Safety is a non-negotiable factor for oil and gas facilities surrounded by environmentally hazardous substances. Sites are classified by the types of hazards present at the site. Careful assessment must be made before locating facilities in potentially explosive areas to ensure compliance with a number of different safety standards. For example, many of Moxa's Ethernet-enabled products have received DNV/GL and UL/cUL Class I Division 2, ATEX Zone 2 certifications to guarantee safe operation in hazardous conditions.

3 NPort IA5150/5250

EDS-408A

4 AWK-4121

Radio

5 VPort 351

PLC

PTZ Camera

Control Center
SCADA
CCTV

IKS-6726

IKS-6726

IKS-6726

1 CN2650

Radio

Key Products

1 CN2650
8 or 16-port dual-LAN RS-232/422/485 terminal servers
- LCD control panel for easy on-site management
- Dual LAN with 2 IP addresses and 2 MAC addresses
- Redundant COM with two active LAN connections
- Dual host redundancy

Page 7-24

2 EDS-510A
7+3G-port Gigabit managed Ethernet switch
- Class I Div. 2/Zone 2 and DNV/GL standards
- -40 to 75°C operating temp. range
- Turbo Ring™ and Turbo Chain™ media redundancy (recovery time < 20 ms)
- 2 Gigabit ports for redundant ring and 1 Gigabit port for uplink

Page 1-31

3 NPort IA5150/5250
1 and 2-port industrial serial device servers
- Class 1 Div. 2/Zone 2 and DNV/GL ratings
- Cascading Ethernet ports for easy wiring (RJ45 ports only)
- Fiber optic support and -40 to 75°C operating temp. range
- Patented ADDC® (automatic data direction control) for 2-wire and 4-wire RS-485

Page 8-33

4 AWK-4121
IEEE 802.11a/b/g outdoor wireless AP/Bridge/Client
- IP68-rated, -40 to 75°C operating temp. range
- ATEX Class 1 Zone 2 and ULC1D2 certifications
- Turbo Roaming for seamless wireless connections

Page 5-13

5 VPort 351
Full motion, 1-channel MJPEG/MPEG4 industrial video encoder
- Class I Div. 2 ratings
- Fiber optic support and -40 to 75°C operating temp. range
- Video stream up to 30 FPS at full D1 (720 x 480) resolution
- Pre/post-alarm video recording function

Page 18-9

Learn more about oil and gas solutions on Moxa's website:

Visit: www.moxa.com/VerticalMarketSolutions

Flexible Network Planning With High-Density Fiber Connectivity

- Flexible, modular expansion
- Hot swappable media modules
- Space-efficient compact design
- Media and power redundancy

reddot design award
winner 2009

EDS-608/611/616/619 Series
Cost-effective compact modular Ethernet switches

- Up to 19 optical fiber connections in a small size (EDS-619)
- 3 Gigabit ports for high-bandwidth transmission and uplink service (EDS-611/619)
- Modular form factor with rich combination of 4-port copper/fiber modules
- Turbo Ring and Turbo Chain (recovery time < 20 ms), and RSTP/STP for network redundancy
- Fully managed functionality: IEEE 1588 PTP, Modbus/TCP, LLDP, DHCP Option 82, SNMP Inform, QoS, VLAN, and more
- Integrated security features: IEEE 802.1X, HTTPS, SSH, SNMPv3, and port security
- -40 to 75°C operating temperature range

Unrivaled in Flexibility and Reliability

| SFP | Copper | Fiber |

Modular design with rich media configurations

Compact size ideal for limited cabinet space

-40°C 75°C
Survival at extreme heat and cold temperatures

Establish Reliable Ruggedized Large-Scale Networks

- Integrated redundancy from control to field network (recovery time < 20 ms)
- Industrial design—redundant power and wide temperature
- Flexible copper/fiber configuration with Gigabit uplink
- Meets industrially recognized standards

Field Networks

Control Center

Control Network

IKS-6524/6526 Series
24 and 24+2G-port rackmount managed Ethernet switches

- 2 combo Gigabit RJ45/SFP ports (IKS-6526-2GTXSFP)
- Up to 8 fiber connections (IKS-6526-8SFP)
- Meets industrial approvals for transportation, process automation, and maritime applications
- Turbo Ring and Turbo Chain (recovery time < 20 ms), and RSTP/STP for network redundancy
- Isolated redundant power inputs with 110/220 VAC power supply and standardized power inlets
- Fanless design and -40 to 75°C operating temperature range
- Fixed-typed instrument

Industrial Rackmount Ethernet Switch Family

IKS-6726 Series
24+2G-port Gigabit modular managed Ethernet switches

IKS-6524/6526 Series
24 and 24+2G-port managed Ethernet switches

IKS-6324 Series
22+2G-port Gigabit modular unmanaged Ethernet switches

Upgrade To Next-Generation Ethernet Train Backbones

- Future-proof Gigabit Ethernet
- Power-over-Ethernet simplifies wiring
- Turbo Ring and bypass relay for fast recovery

EN50155

EN50155 Gigabit Ethernet Switches
TN-5510/TN-5518 series (managed)

EN50155 PoE Switches
TN-5508-4PoE/TN-5516-8PoE series (managed)

TN-5308-4PoE (unmanaged)

- 2 Gigabit ports with optional bypass relay function
- Universal power supply range
- Provides up to 15.4 watts at 48 VDC per PoE port
- Turbo Ring (recovery time < 20 ms)
- -40 to 75°C operating temperature range
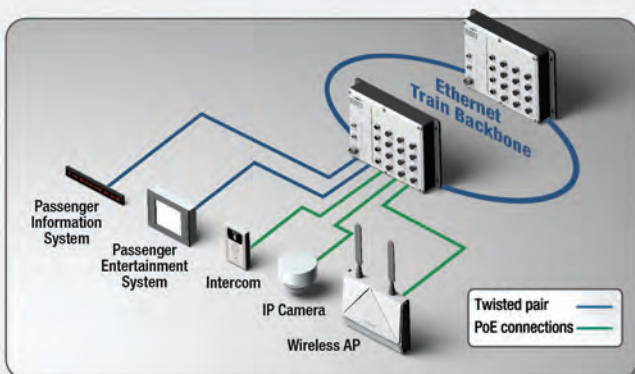
Full Gigabit Substation Communications

- 9 Gigabit ports
- Zero packet loss
- IEEE 1588 PTP support
- High network availability

IEC 61850-3
Ethernet Switches

PT-G7509 Series
IEC 61850-3 9G-port full Gigabit managed Ethernet switches

- 9 combo 10/100/1000BaseT(X) or 100/1000BaseSFP slot Gigabit ports
- Turbo Ring, Turbo Chain (recovery time < 20 ms) and IEEE 802.1D-2004 RSTP/STP for Ethernet Redundancy
- Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- -40 to 85°C operating temperature range
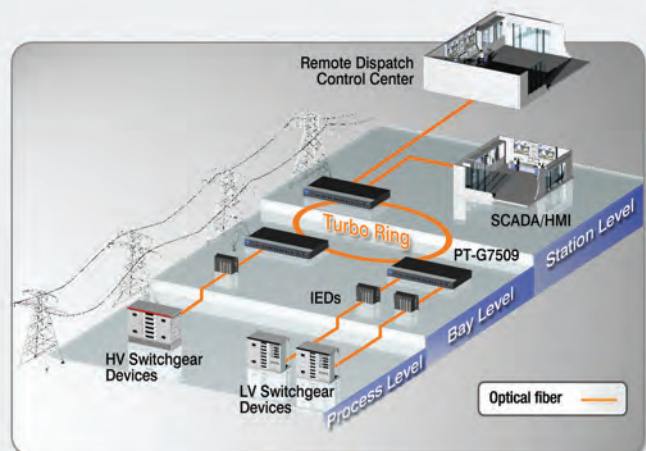
Build High Performance, Secure Industrial Networks

- All in one: Firewall/VPN/Router
- High speed Gigabit performance
- Redundant dual WAN ports for high availability
- Quick Automation Profile, PolickCheck, and SettingCheck functionality

Trusted Industrial Network

WAN 1

WAN 2 or DMZ

Modbus/TCP, EtherNet/IP, EtherCAT, PROFINET, FOUNDATION Fieldbus...

LAN

GIGA SPEED

> Page 1-64

EDR-G903 Series
Industrial Gigabit Firewall/VPN secure routers

- High performance Gigabit copper and fiber combo port
- Supports 1 WAN, 1 LAN, and 1 user-configurable WAN or DMZ interface
- Redundant WAN backup for critical industrial applications
- Firewall with Quick Automation Profile for common Fieldbus protocols (over 25 protocols)
- Network Address Translation (N-to-1, 1-to-1, and port forwarding)
- Intelligent PolicyCheck and SettingCheck tools
- -40 to 75°C operating temperature (T models)

Trusted VPN Tunnel

Internet connection (modem, ADSL, ...)

Remote VPN Client

WAN
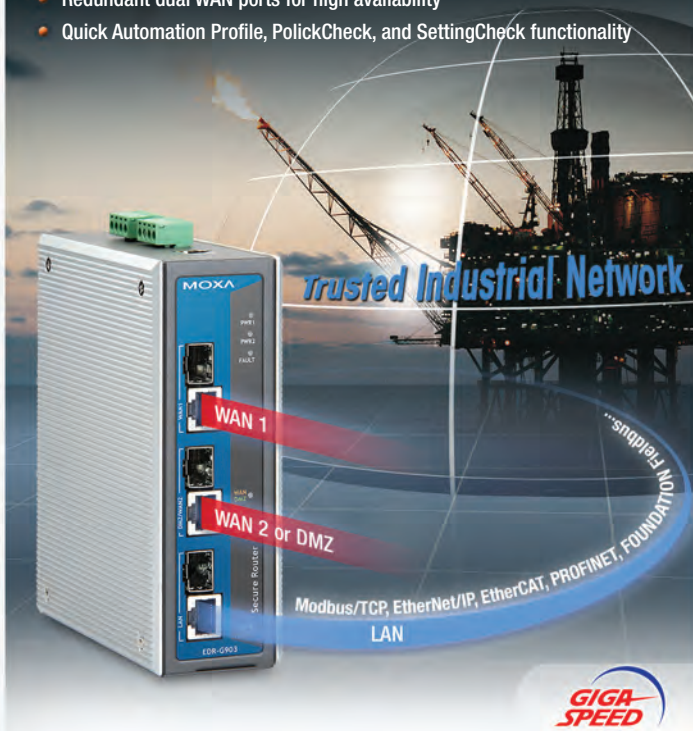
EDR-G903 Firewall/VPN Secure Router

Trusted Industrial Network

Router

Enterprise

Public Network

Ethernet-To-Fiber Solutions Certified For Rugged Reliability

IEC 61850-3 and EN50155 Certified

- Wide temperature for harsh environments
- Redundant dual DC power inputs
- High-reliability power supply

EN50155

IEC 61850-3 Media Converter
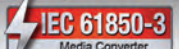
> Page 4-9

PTC-101 Series
IEC 61850-3 and EN50155 Ethernet-to-fiber media converters

- 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
- Link Fault Pass-Through (LFP)
- Power failure alarm by relay output (LV model only)
- -40 to 85°C operating temperature range
- Redundant dual DC power inputs
- Integrated high-reliability power supply eliminates the need for external power transformer

Related Product -

IMC-P101 Series
IEEE 802.3af PoE Ethernet-to-fiber media converters

- 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
- IEEE 802.3af compliant PoE
- Power failure alarm by relay output
- Store-and-Forward mode and Cut Through mode
- -40 to 75°C operating temperature range (T models)
- Redundant dual DC power inputs

PoE Power over Ethernet

> Page 4-12

Redundant Dual RF Design
Ensures Outdoor Mobile Connectivity With Absolute Reliability

- Wireless Redundancy
- Reliable Mobility
- Seamless Roaming
- Proven Ruggedness

Turbo Roaming

Dual RF Wireless Redundancy

Redundant Dual RF Design

- Two independent RF modules for redundancy and flexibility
- Turbo roaming for seamless handover
- Long-distance wireless transmission over 10 km
- IP68 housing, -40 to 75°C operating temperature, and anti-vibration design
- EN50155 and e/E-mark certified

AWK-6222
IEEE 802.11a/b/g outdoor dual-RF wireless AP/Bridge/Client

AWK-5222
IEEE 802.11a/b/g indoor dual-RF wireless AP/Bridge/Client

Dual RF for Wireless Redundancy
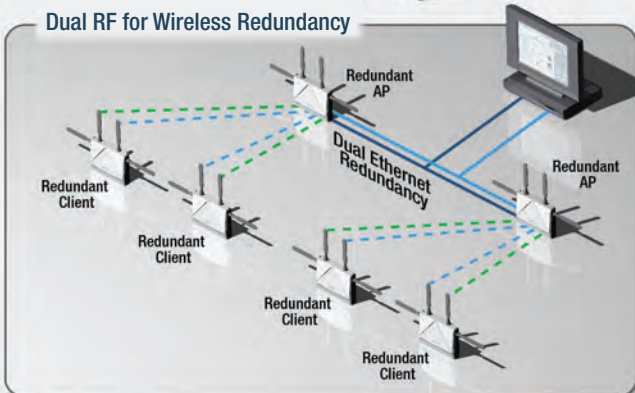
Industrial-grade IEEE 802.11n
The Perfect Balance Of Mobility And Throughput

- Turbo Roaming for seamless mobility
- High-speed 802.11n wireless transmission for video and voice data
- Faster and wider range support of wireless connectivity
- Fiber optic options for easy deployment
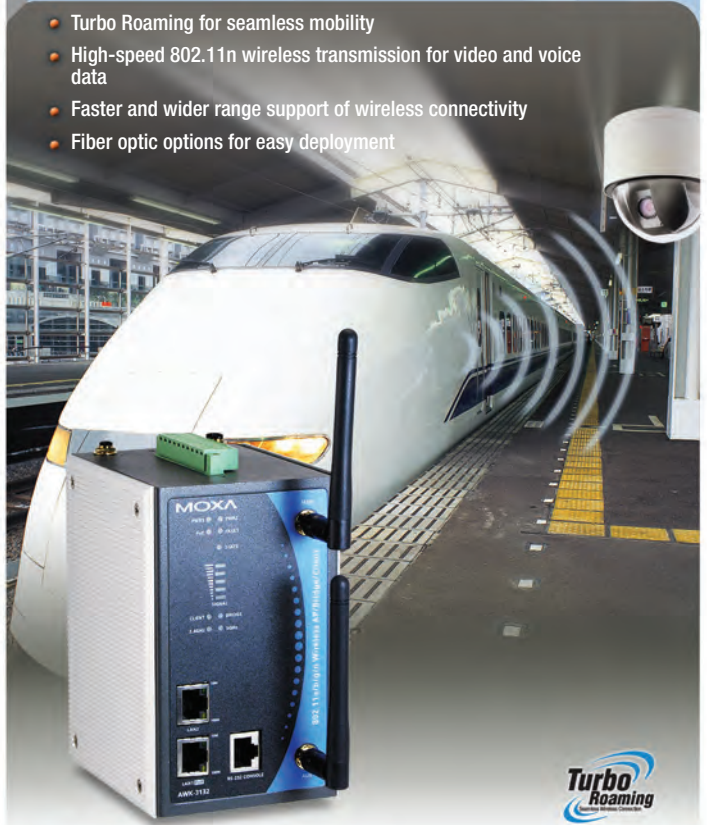
Turbo Roaming

Industrial-grade IEEE 802.11n

- Industrial wireless AP/bridge/Client with IEEE 802.11a/b/g/n compliance
- 10/100BaseT(X) or 100/1000Base SFF slot
- Turbo Roaming for seamless handover
- Dual 24 VDC power inputs and PoE
- -40 to 75°C operating temperature range (T models)
- Outdoor IP68-rated housing (AWK-4132 series only)
- Long-distance wireless transmission over 10 km
- Advanced security with WEP/WPA/WPA2/802.11X

Product Family

AWK-3132 Series
Industrial IEEE 802.11a/b/g/n Wireless AP/Bridge/Client

AWK-4132 Series
Industrial IEEE 802.11a/b/g/n Outdoor Wireless AP/Bridge/Client

MGate™ EIP3000 Adds Intelligence To EIP/DF1 Gateways

- Smart routing table
- Two IP connections
- Four additional virtual serial channels

Simplify Your Industrial Network

- Compact size and low power consumption
- Ring redundancy at the device level
- Rugged industrial design

MGate™ EIP3000 Series
1 and 2-port DF1 to EtherNet/IP gateways

- PCCC objects for Rockwell Automation networks supported
- ProCOM provides a virtual serial port for multiple DF1 and EtherNet/IP device communication
- 16 simultaneous EtherNet/IP clients/servers with up to 16 simultaneous requests per client
- Embedded EtherNet/IP and DF1 protocol analyzer
- Redundant dual DC power inputs
- Built-in Ethernet cascading for easy wiring

Use ProCOM to Generate Four Additional Virtual Serial Channels

Virtual Serial Channels

HMI/SCADA

ProCOM

NPort® S8000 Series
Combo switch / serial device servers

- Rugged industrial design (UL508, full surge protection, Level 4 ESD, 2 KV of isolation on each serial port)
- Serial QoS for configuring serial data transmission priority
- Adjustable pull high/low resistor for RS-485 communications
- Ethernet redundancy with Turbo Ring (recovery time < 20 ms) or RSTP/STP supported
- Wide operating temperature from -40 to 75°C

*The First Serial/Ethernet Device Server with Advanced Ring Redundancy at the Device Level*

For network redundancy, the NPort® S8000 series supports standard STP/RSTP, as well as Moxa's own proprietary Turbo Ring and Turbo Ring 2 ring redundancy protocols to achieve the highest possible network reliability.

Ethernet

NPort® S8000 Series

Serial

Fiber Ring

Meter

Ethernet

PLC

Control Center

Device Floor

Thumb-sized Embedded Serial-To-Ethernet Solutions

- Powerful yet cost-effective in thumb-sized package
- NetEZ technologies enable effortless intergration
- Extremely low power consumption
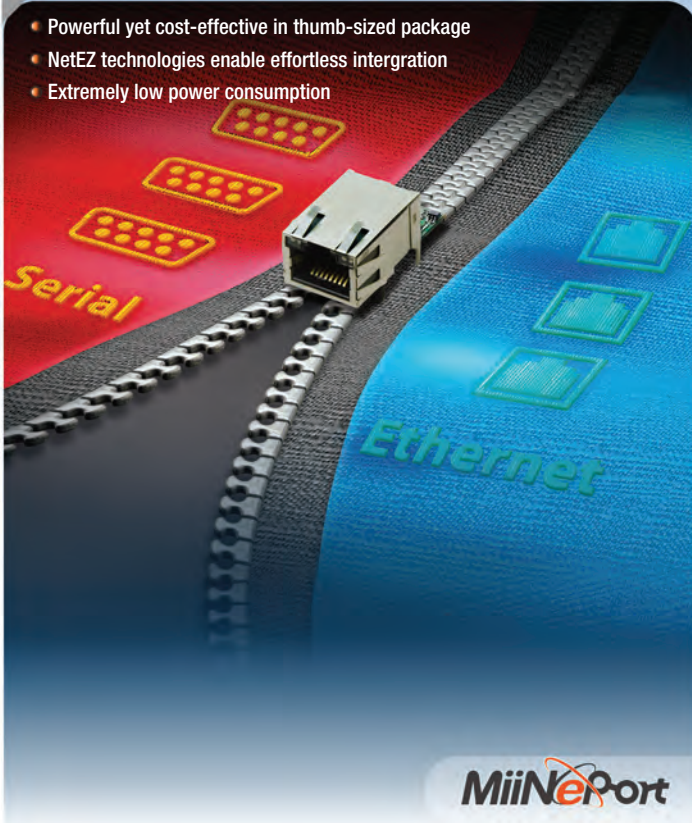
Serial

Ethernet

MiiNePort

MiiNePort E1 Series
10/100 Mbps embedded serial device servers

- Same size as an RJ45 connector—only 33.9 x 16.25 x 13.5 mm
- Extremely low power consumption—only 160 mA @ 3.3 VDC input
- Uses the MiiNe, Moxa's second generation SoC
- NetEZ technology makes integration incredibly easy
- Versatile choice of operation modes: Real COM, RFC2217, TCP, TCP, and UDP

Embedded Serial-to-Ethernet Made Easy

MOXA
MiiNe
BGA-121-AAA
DJ35A79
S001 TAIWAN

Moxa's 2nd Generation SoC

Other Brands   MOXA
Power Consumption
Battery Life
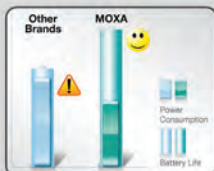
Low Power Consumption

NetEZ

NetEZ Technology

Design Flexibility

USB-IF Certified Industrial USB Hubs

- USB-IF certification guarantees
  - 100% device accessibility
  - 100% power for connected devices
  - 100% USB 2.0 high-speed connections
- ESD level 4 protection offers maximum safety
- -40 to 85°C operating temperature for any environment

BILLETS

UPort 404
UPort 407

HI-SPEED CERTIFIED USB

UPort® 404/407
4 and 7-port industrial-grade USB hubs

- Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
- Dual power supply (power jack and terminal block)
- 15 KV ESD Level 4 protection for all USB ports
- Rugged metal housing
- DIN-Rail and wall mountable
- Comprehensive diagnostic LEDs
- Choose bus power or external power (UPort® 404)

Related Product

UPort® 204/207
4 and 7-port entry-level USB hubs

- Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
- 15 KV ESD Level 4 protection for all USB ports
- Comprehensive diagnostic LEDs
- Full 500 mA of power per port
- Choose bus power or external power (UPort® 204)

Plastic housing

Wall mountable

HI-SPEED CERTIFIED USB

Modularize Your Computer System

- Intel Celeron M 2.0 GHz processor
- 4 PCI slots for expansion modules
- Dual 100 to 240 VAC/VDC wide range power inputs

DA-710

Page 13-40

x86-based rackmount embedded computer

- Intel Celeron M 2.0 GHz processor
- 4 PCI slots for expansion modules
- Dual 100 to 240 VAC/VDC wide range power inputs
- 1 x 200-pin DDR2 SODIMM socket, supporting DDR2 533 up to 2 GB
- Quad 10/100/1000 Mbps Ethernet ports for network redundancy
- 1 CompactFlash socket, 1 EIDE, and 2 serial ATA-150 connectors for storage expansion
- 4 USB 2.0 ports for high speed peripherals
- 4 DIs and 4 DOs
- Ready-to-Run Linux or Windows Embedded Standard 2009 platform
- 19-inch rackmount model, 4U high
- Fanless Design

Product Family

DA-681
x86-based rackmount embedded computer with IEC 61850-3 certification
Page 13-44

DA-682
x86-based rackmount embedded computer with modular flexibility
Page 13-48

DA-660/661/662/662-I
RISC-based rackmount embedded computers
Page 13-52

A Tiny And Mighty Embedded Computer

- Intel Menlow XL 1.1 GHz processor
- Dual independent displays (VGA + LVDS)
- -40 to 85°C wide operating temperature

V2101

Page 13-10

x86-based communication embedded computer

- Intel Atom Z510PT 1.1 GHz processor
- Dual independent displays (VGA + LVDS)
- DDR2 SODIMM socket, supporting DDR2 400/533 up to 2 GB (1 GB onboard)
- 2 Gigabit Ethernet ports
- 4 USB 2.0 ports for high speed peripherals
- 3 DIs and 3 DOs
- 2 RS-232/422/485 ports
- Built-in CompactFlash for storing the OS
- Ready-to-run Embedded Linux, WinCE 6.0, or Windows Embedded Standard 2009 platform
- -40 to 85°C wide operating temperature

Product Family

V2401/V2402
x86-based communication embedded computers
Page 13-14

V462/V464/V466/V468
x86-based communication embedded computers with multiple connection options
Page 13-18

V481
x86-based communication embedded computer
Page 13-22

Communication and Management - Anytime, Anywhere

- GSM 850/900/1800/1900 MHz and GPRS/EDGE Class 12 supported
- SMS tunnel mode
- 4 DIs and 4 DOs

W406

RISC-based wireless embedded computer

- Cirrus Logic EP9302 32-bit ARM9 processor
- On-board 32 MB RAM (maximum 64 MB)
- Built-in 16 MB Flash (maximum 32 MB)
- Built-in GSM/GPRS/EDGE cellular communication
- Two software selectable RS-232/422/485 serial ports
- Serial port speed from 50 bps to 921.6 Kbps, supporting nonstandard baudrates
- 10/100M Ethernet for network redundancy
- SD socket for storage expansion
- WinCE 6.0 or Linux 2.6 platform
- Robust, fanless design
- -40 to 70°C wide temperature models available

Product Family

W311/W321/W341

RISC-based wireless embedded computers with WLAN

W315/W325/W345

RISC-based wireless embedded computers with GSM/GPRS

Expansion On Your Own Terms

- Built-in PCI-104 bus for flexible customized expansion
- Multiple connection options
- -40 to 75°C wide temperature models for harsh environments

UC-8400 Series

RISC-based communication embedded computers

- Built-in PCI-104 bus for flexible expansion
- XScale IXP435 533 MHz processor
- 256 Kb SRAM with battery backup
- 8 RS-232/422/485 serial ports, supporting non-standard baudrates
- 8 Ethernet switch ports
- 2 CAN ports
- 12 digital input channels + 12 digital output channels
- CompactFlash socket for storage expansion
- Ready-to-run Linux platform
- -40 to 75°C wide temperature models for harsh environments

Product Family
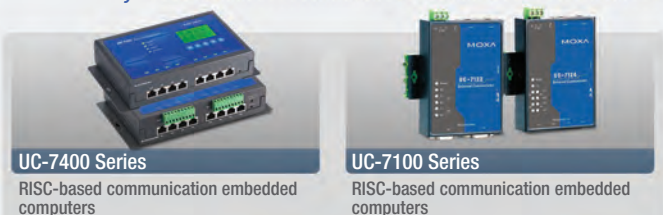
UC-7400 Series

RISC-based communication embedded computers

UC-7100 Series

RISC-based communication embedded computers

Daisy-Chain Topology Saves Wiring Costs

- 2 embedded Ethernet switch ports
- Reduces wiring costs and effort
- Push-based Active OPC Server
- User-defined Modbus/TCP Addressing

H.264 Industrial Video Encoder
Upgrade From CCTV To IP Surveillance

- 3 simultaneous video streams
- Latency under 200 ms
- SD/SDHC supported

---

ioLogik E1200 Series
Remote Ethernet I/O

Page 17-8

- Built-in 2-port Ethernet switch for daisy-chain topology
- Free Active OPC Server Lite for seamless connection to SCADA systems
- User-defined Modbus/TCP addressing
- MXIO programming library for Windows/WinCE VB/VC.NET and Linux C APIs
- Web configuration with Import/Export function

Daisy-chain Topology

SCADA or Controller
ioLogik E1200
ioLogik E1200
ioLogik E1200
ioLogik E1200

Benefits:
- Easy cabling and expansion
- Reduces wiring costs and saves space
- Reduces the number of failure points

VPort 461 Series
1-channel H.264 Industrial Video Encoders

Page 18-7

- 3 simultaneous H.264 and MJPEG streams
- Video latency under 200 ms
- 2 Ethernet ports for cascade and Ethernet port redundancy
- Local storage with SD card slot to record video when the network is down
- -40 to 75°C operating temperature

H.264 Video
Engine 2
Analog Video
MJPEG Video
Engine 1
Video Record
H.264 Video
Video Analysis
Live View

Industrial Ethernet Switches

1

Industrial Ethernet Switches

DIN-Rail Ethernet Switches

Managed DIN-Rail Switches							

	EDS-828	EDS-728	EDS-619	EDS-616	EDS-611	EDS-608	EDS-G509
Supported Modules							
Gigabit Ethernet Modules	✓	✓	–	–	–	–	–
Fast Ethernet Modules	✓	✓	✓	✓	✓	✓	–
SFP Gigabit Ethernet Modules	✓	✓	✓	–	✓	–	✓
SFP Fast Ethernet Modules	–	–	✓	–	✓	–	✓
Number of Ports							
Max. Number of Ports	28	28	19	16	11	8	9
Gigabit Ethernet, 10/100/1000 Mbps	up to 4	up to 4	3	–	3	–	9
Fast Ethernet, 10/100 Mbps	up to 24	up to 24	up to 16	up to 16	up to 8	up to 8	–
Available Power Supplies							
3.3 VDC	–	–	–	–	–	–	–
24 VDC	✓	✓	–	–	–	–	–
12/24/48 VDC	–	–	✓	✓	✓	✓	✓
Installation Options							
DIN-Rail Mounting	✓	✓	✓	✓	✓	✓	✓
Panel Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Rack Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures							
0 to 60°C	✓	✓	✓	✓	✓	✓	✓
-40 to 75°C	–	–	✓	✓	✓	✓	✓
Redundancy and Backup Options							
Turbo Ring (Recovery Time < 20 ms)	✓	✓	✓	✓	✓	✓	✓
Turbo Chain (Recovery Time < 20 ms)	✓	✓	✓	✓	✓	✓	✓
STP/RSTP	✓	✓	✓	✓	✓	✓	✓
Automatic Backup Configurator (ABC-01)	✓	✓	✓	✓	✓	✓	✓
Network Management and Control							
Layer 3 Switching	✓	–	–	–	–	–	–
Port Trunking	✓	✓	✓	✓	✓	✓	✓
Modbus/TCP	✓	✓	✓	✓	✓	✓	✓
IEEE 1588 PTP	✓	✓	✓	✓	✓	✓	✓
SNMP/RMON	✓	✓	✓	✓	✓	✓	✓
LLDP	✓	✓	✓	✓	✓	✓	✓
DHCP Option 66/67/82	✓	✓	✓	✓	✓	✓	✓
IGMP Snooping/GMRP	✓	✓	✓	✓	✓	✓	✓
QoS	✓	✓	✓	✓	✓	✓	✓
IEEE 802.1Q VLAN	✓	✓	✓	✓	✓	✓	✓
Port-based VLAN	–	–	✓	✓	✓	✓	✓
IEEE 802.1X	✓	✓	✓	✓	✓	✓	✓
Port Lock	✓	✓	✓	✓	✓	✓	✓
IPv6	–	✓	✓	✓	✓	✓	✓
Relay Warning	✓	✓	✓	✓	✓	✓	✓
Regulatory Approvals							
CE/FCC	✓	✓	✓	✓	✓	✓	✓
UL/cUL 60950-1	✓	✓	Pending	Pending	Pending	Pending	✓
UL508	✓	✓	Pending	Pending	Pending	Pending	✓
UL/cUL Class I, Div. 2	Pending	Pending	Pending	Pending	Pending	Pending	Pending
ATEX Zone 2	Pending	Pending	Pending	Pending	Pending	Pending	Pending
DNV, GL	✓	✓	Pending	Pending	Pending	Pending	✓
ABS, LR, NK	✓	✓	Pending	Pending	Pending	Pending	✓
EN50121-4	–	–	✓	✓	–	–	✓

DIN-Rail Ethernet Switches

Managed DIN-Rail Switches						
	EDS-518A	EDS-510A	EDS-516A	EDS-508A	EDS-505A	EDS-408A	EDS-405A
Supported Modules							
Gigabit Ethernet Modules	–	–	–	–	–	–	–
Fast Ethernet Modules	–	–	–	–	–	–	–
SFP Gigabit Ethernet Modules	✓	✓	–	–	–	–	–
SFP Fast Ethernet Modules	–	–	–	–	–	–	–
Number of Ports							
Max. Number of Ports	18	10	16	8	5	8	5
Gigabit Ethernet, 10/100/1000 Mbps	2	3	–	–	–	–	–
Fast Ethernet, 10/100 Mbps	16	7	16	8	5	8	5
Available Power Supplies							
3.3 VDC	–	–	–	–	–	–	–
24 VDC	✓	✓	✓	✓	✓	✓	✓
12/24/48 VDC	–	–	–	–	–	–	–
Installation Options							
DIN-Rail Mounting	✓	✓	✓	✓	✓	✓	✓
Panel Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Rack Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures							
0 to 60°C	✓	✓	✓	✓	✓	✓	✓
-40 to 75°C	✓	✓	✓	✓	✓	✓	✓
Redundancy and Backup Options							
Turbo Ring (Recovery Time < 20 ms)	✓	✓	✓	✓	✓	✓	✓
Turbo Chain (Recovery Time < 20 ms)	✓	✓	✓	✓	✓	✓	✓
STP/RSTP	✓	✓	✓	✓	✓	✓	✓
Automatic Backup Configurator (ABC-01)	✓	✓	✓	✓	✓	✓	✓
Network Management and Control							
Layer 3 Switching	–	–	–	–	–	–	–
Port Trunking	✓	✓	✓	✓	✓	–	–
Modbus/TCP	✓	✓	✓	✓	✓	✓	✓
IEEE 1588 PTP	✓	✓	✓	✓	✓	–	–
SNMP/RMON	✓	✓	✓	✓	✓	✓	✓
LLDP	✓	✓	✓	✓	✓	✓	✓
DHCP Option 66/67/82	✓	✓	✓	✓	✓	✓	✓
IGMP Snooping/GMRP	✓	✓	✓	✓	✓	–	–
QoS	✓	✓	✓	✓	✓	✓	✓
IEEE 802.1Q VLAN	✓	✓	✓	✓	✓	–	–
Port-based VLAN	✓	✓	✓	✓	✓	✓	✓
IEEE 802.1X	✓	✓	✓	✓	✓	–	–
Port Lock	✓	✓	✓	✓	✓	–	–
IPv6	✓	✓	✓	✓	✓	✓	✓
Relay Warning	✓	✓	✓	✓	✓	✓	✓
Regulatory Approvals							
CE/FCC	✓	✓	✓	✓	✓	✓	✓
UL/cUL 60950-1	✓	✓	✓	✓	✓	✓	✓
UL508	✓	✓	✓	✓	✓	✓	✓
UL/cUL Class I, Div. 2	✓	✓	✓	✓	✓	✓	✓
ATEX Zone 2	✓	✓	✓	✓	✓	✓	✓
DNV, GL	✓	✓	✓	✓	✓	✓	✓
ABS, LR, NK	–	–	–	–	–	EDS-408A 3 Fiber series only	–
EN50121-4	–	–	–	–	–	✓	–

1

Industrial Ethernet Switches › Product Selection Guides

DIN-Rail Ethernet Switches

Unmanaged DIN-Rail Switches										
	EDS-G308	EDS-G205	EDS-316	EDS-309	EDS-308	EDS-305	EDS-208A	EDS-205A	EDS-208	EDS-205
Supported Modules										
SFP Gigabit Ethernet Modules	✓	–	–	–	–	–	–	–	–	–
SFP Fast Ethernet Modules	✓	–	–	–	–	–	–	–	–	–
Number of Ports										
Max. Number of Ports	8	5	16	9	8	5	8	5	8	5
Gigabit Ethernet, 10/100/1000 Mbps	8	5	–	–	–	–	–	–	–	–
Fast Ethernet, 10/100 Mbps	–	–	16	9	8	5	8	5	8	5
Available Power Supplies										
24 VDC	–	–	✓	✓	✓	✓	–	–	✓	✓
24 VAC	–	–	–	–	–	–	✓	✓	✓	✓
12/24/48 VDC	✓	✓	–	–	–	–	✓	✓	–	–
Installation Options										
DIN-Rail Mounting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Panel Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	–	–
Rack Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Supported Operating Temperatures										
0 to 60°C	✓	✓	✓	✓	✓	✓	–	–	–	–
-10 to 60°C	–	–	–	–	–	–	✓	✓	✓	✓
-40 to 75°C	✓	✓	✓	✓	✓	✓	✓	✓	–	–
Regulatory Approvals										
CE/FCC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UL/cUL 60950-1	–	–	✓	✓	✓	✓	–	–	✓	–
UL508	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UL/cUL Class I, Div. 2	✓	✓	✓	✓	✓	✓	Pending	Pending	–	–
ATEX Zone 2	Pending	Pending	✓	✓	✓	✓	Pending	Pending	–	–
DNV/GL	✓	✓	✓	✓	✓	✓	✓	Pending	–	–
ABS/LR/NK	✓	✓	–	–	–	–	✓	Pending	–	–
EN50121-4	–	–	–	–	–	–	✓	✓	–	–

MOXA® ▶ www.moxa.com ▶ info@moxa.com

Rackmount Ethernet Switches

	Managed Rackmount Switches			Unmanaged Rackmount Switches
	IKS-6726	IKS-6526	IKS-6524	IKS-6324
Supported Modules				
Gigabit Ethernet Modules	✓	–	–	✓
Fast Ethernet Modules	✓	–	–	✓
SFP Gigabit Ethernet Modules	✓	✓	–	✓
SFP Fast Ethernet Modules	✓	–	IKS-6524-8SFP series only	–
Number of Ports				
Max. Number of Ports	26	26	24	24
Gigabit Ethernet, 10/100/1000 Mbps	up to 2	2	–	up to 2
Fast Ethernet, 10/100 Mbps	up to 24	24	24	up to 24
Available Power Supplies				
24 VDC	✓	–	–	–
24 VAC	–	–	–	–
48 VDC	✓	–	–	–
12/24/48 VDC	–	–	–	✓
85-264 VAC	–	✓	✓	–
88-300 VDC or 85-264 VAC, isolated	✓	–	–	✓
Installation Options				
DIN-Rail Mounting	–	–	–	–
Panel Mounting	–	–	–	–
Rack Mounting	✓	✓	✓	✓
Supported Operating Temperatures				
0 to 60°C	–	–	–	–
-40 to 75°C	✓	✓	✓	✓
Redundancy and Backup Options				
Turbo Ring (Recovery Time < 20 ms)	✓	✓	✓	–
Turbo Chain (Recovery Time < 20 ms)	✓	✓	✓	–
STP/RSTP	✓	✓	✓	–
Automatic Backup Configurator (ABC-01)	✓	✓	✓	–
Network Management and Control				
Layer 3 Switching	–	–	–	–
Port Trunking	✓	✓	✓	–
Modbus/TCP	✓	✓	✓	–
IEEE 1588 PTP	✓	✓	✓	–
SNMP/RMON	✓	✓	✓	–
LLDP	✓	✓	✓	–
DHCP Option 66/67/82	✓	✓	✓	–
IGMP/GMRP	✓	✓	✓	–
QoS	✓	✓	✓	–
VLAN	✓	✓	✓	–
IEEE 802.1X	✓	✓	✓	–
Port Lock	✓	✓	✓	–
IPv6	✓	✓	✓	–
Relay Warning	✓	✓	✓	–
Regulatory Approvals				
CE/FCC	✓	✓	✓	✓
UL/cUL 60950-1	Pending	Pending	Pending	Pending
UL508	–	–	–	–
DNV/GL	Pending	Pending	Pending	Pending
ABS, LR, NK	Pending	Pending	Pending	Pending
NEMA TS2	✓	✓	✓	✓
EN50121-4	✓	✓	✓	✓

1

Industrial Ethernet Switches > Product Selection Guides

PoE Switches

	Managed DIN-Rail PoE Switches	Unmanaged DIN-Rail PoE Switches	Managed Rackmount PoE Switches
	EDS-P510	EDS-P308	IKS-6726-8PoE
Supported Modules			
Gigabit Ethernet Modules	–	–	✓
Fast Ethernet Modules	–	–	✓
SFP Gigabit Ethernet Modules	✓	–	✓
SFP Fast Ethernet Modules	✓	–	✓
Number of Ports			
Max. Number of Ports	10	8	26
Gigabit Ethernet, 10/100/1000 Mbps	3	–	up to 2
Fast Ethernet, 10/100 Mbps	3	4	up to 16
PoE, Fast Ethernet, 10/100 Mbps	4	4	up to 8
Available Power Supplies			
24 VDC	–	–	–
48 VDC	✓	✓	✓
12/24/48 VDC	–	–	–
88-300 VDC or 85-264 VAC, isolated	–	–	✓
Installation Options			
DIN-Rail Mounting	✓	✓	–
Panel Mounting	w/ optional kit	w/ optional kit	–
Rack Mounting	w/ optional kit	w/ optional kit	✓
Supported Operating Temperatures			
0 to 60°C	✓	✓	–
-40 to 75°C	✓	✓	✓
Redundancy and Backup Options			
Turbo Ring (Recovery Time < 20 ms)	✓	–	✓
Turbo Chain (Recovery Time < 20 ms)	✓	–	✓
STP/RSTP	✓	–	✓
Automatic Backup Configurator (ABC-01)	✓	–	✓
Network Management and Control			
Port Trunking	✓	–	✓
Modbus/TCP	✓	–	✓
IEEE 1588 PTP	✓	–	✓
SNMP/RMON	✓	–	✓
LLDP	✓	–	✓
DHCP Option 66/67/82	✓	–	✓
IGMP Snooping/GMRP	✓	–	✓
QoS	✓	–	✓
VLAN	✓	–	✓
IEEE 802.1X	✓	–	✓
Port Lock	✓	–	✓
IPv6	✓	–	✓
Relay Warning	✓	–	✓
Regulatory Approvals			
CE/FCC	✓	✓	✓
UL/cUL 60950-1	–	–	Pending
UL508	✓	✓	–
UL/cUL Class I, Div. 2	Pending	Pending	–
ATEX Zone 2	Pending	Pending	–
DNV/GL	✓	✓	–
ABS/LR/NK	✓	✓	–
NEMA TS2	Pending	–	Pending
EN50121-4	–	–	Pending

Introduction to Industrial Ethernet Switches

: The Broadest Portfolio of Industrial Ethernet Switch Solutions

1

WAN1

Enterprise Intranet

WAN2

Control Network

EDR-G903
Secure Router

EDS-828
Layer 3 DIN-Rail Managed Switch

MXview Industrial NMS

IKS-6000
Rackmount Ethernet Switches

EDS-728
DIN-Rail Managed Switch

Turbo Ring
Recovery Time < 20 ms

Turbo Ring

Field Network

Turbo Chain
Recovery Time < 20 ms

Turbo Chain

EDS-600
DIN-Rail Managed Switches

EDS-400A
DIN-Rail Managed Switches

EDS-G509
DIN-Rail Full Gigabit Managed Switches

EDS-P510
DIN-Rail Gigabit Managed PoE Switches

EDS-500A
DIN-Rail Managed Switches

EDS-510A/518A
DIN-Rail Gigabit Managed Switches

EDS-300
DIN-Rail Unmanaged Switches

EDS-200A
DIN-Rail Unmanaged Switches

EDS-G205/G308
DIN-Rail Full Gigabit Unmanaged Switches

EDS-P308
DIN-Rail Unmanaged PoE Switches

Remote Devices

Remote Devices

Gigabit Devices

PoE IP Camera

Full Gigabit Solutions

PoE Solutions

— Gigabit Fiber Optic Cable (1000BaseSX/LX/LHX/ZX/EZX)
— Fiber Optic Cable (100BaseFX)
— Twisted Pair Cable (10/100BaseT(X) or 10/100/1000BaseT(X))
— Power-over-Ethernet

Solutions Tailored for Industrial Infrastructures

Industrial automation applications require industrial-grade solutions that ensure availability, real-time operation, security, and reliability. Building a fully rugged infrastructure that is stable enough to ensure smooth system operations is even more challenging. In this case, solutions that support resilient and flexible network redundancy, real-time monitoring and control, seamless integrated security, and rugged parameters are needed. Moxa offers a full spectrum of industrial Ethernet switches that fit all industrial requirements.

Network Requirements for Industrial Applications

Absolute Network Availability and Resilience
- Rapid recovery capability eliminating single points of failure to ensure continuous operations
- Easy and flexible redundant network planning

Real-time Network Monitoring and Control
- Powerful network management platform to supervise networks, ensuring optimal operations and minimal system downtime
- Dynamic device status reports by email warning or signal outputs (e.g., digital output, relay contact) prevent system damages and losses

Advanced Network Management and Security
- Seamlessly integrate with industrial automation networks
- Intelligent implementations to optimize network performance
- Easily migrate to next generation networking standards
- Secure data transmission across networks

Rugged Design with Reliability and Durability
- Redundant power inputs to reduce vulnerability to power failures
- Ring topology to provide a backup path
- Fanless and high MTBF
- Withstands extreme temperature, shock, drops, and vibrations
- A rugged high strength housing to keep out harmful substances
- Strict industrial regulatory approval to ensure safe operation

Moxa's Solutions

- Moxa Turbo Ring™ self-healing technology for network redundancy (recovery time < 20 ms)
- Line-swap fast recovery for quick response when devices change ports
- Innovative Turbo Chain™ technology for flexible redundant network planning (recovery time < 20 ms)

- MXview industrial network management software for visualizing and troubleshooting your networks
- Automatic email warnings and relay output alarms for port breaks and power failures

- Modbus/TCP, IEEE 1588 PTP, LLDP, DHCP Option 82, SNMP Inform, QoS, IGMP snooping, and VLAN supported
- IPv6 compliant for next generation Internet technologies
- Integrated security features: IEEE 802.1X, HTTPS, SSH, SNMPv3, and port security supported

Strict industry standards (Class I, Div. 2/ATEX Zone 2, DNV/GL/ABS/ LR/NK, NEMA TS2, EN50121-4, etc.) and rigorous EMI/EMS tests confirm that Moxa's switches are ideal for harsh environments. Other industrial-grade features include dual power inputs, completely fanless designs, -40 to 75°C operating temperature range, hardened housings, and a 5-year warranty.

⦂ Product Portfolio

Moxa is your one-stop shop for industrial DIN-Rail mounted and rack mounted Ethernet switches, allowing you to choose the right products for your applications. All of Moxa's network switches have an optimal price-to-performance ratio for building robust Ethernet platforms in industrial environments.

DIN-Rail managed and unmanaged Ethernet switches
See Page 1-17

Rackmount managed and unmanaged Ethernet switches
See Page 1-47

PoE managed and unmanaged Ethernet switches
See Page 1-54

Embedded Ethernet switches
See Page 1-62

Firewall/VPN secure router
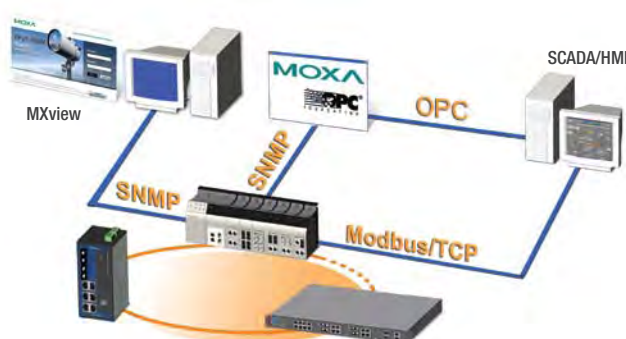See Page 1-64

Network management software
See Page 1-66

: Multiple Industrial Network Management Solutions

- **MXview iNMS**
- **EDS-SNMP OPC Server**
- **Modbus/TCP**

The SCADA/HMI system is the supervisory core of industrial control systems. It connects to RTUs, PLCs, and the network infrastructure for complicated data acquisition, monitoring, and control to ensure efficient and safe operations. Moxa provides several network management solutions, including SNMP OPC server and Modbus/TCP-enabled network devices, to easily and directly integrate network status into SCADA/HMI systems. In addition, users now have a new option for network supervision with Moxa's industrial network management software, which supports SNMP devices and Moxa's Ethernet switches installed on industrial networks.

MXview Live Network Topology Visualization for Easy Troubleshooting

Moxa's MXview industrial network management software is designed to analyze, monitor, configure, and troubleshoot the remote network connections formed by Moxa's managed Ethernet switches, wireless AP/Bridge/Client solutions, and other SNMP networked devices for industrial automation. It visualizes the physical wiring map of your network via a simple, user-friendly Web Browser UI for remote management. You can easily track real-time network status, identify failure points quickly, and reduce the troubleshooting response time of complex and critical network operations with MXview.

MXview
Industrial Network Management Software

NEW Convenient Advantage: Automatic Topology Mapping

Moxa MXview provides live-view topology maps by using the LLDP data-link protocol to rapidly map network links. This innovative topology visualization creates network diagrams automatically to give users a real-time, accurate map of entire infrastructures with ease!

SCADA/HMI System Integration with EDS-SNMP OPC Server and Modbus/TCP

#### Easy Network Management with EDS-SNMP OPC Server

Easily integrate network management SCADA/HMI systems with Moxa's SNMP OPC server software. This OPC server software package can convert the SNMP MIB files of Moxa's managed Ethernet switches to tag files that can seamlessly communicate with an OPC compatible SCADA/HMI system. This valuable software enables users to link an HMI subsystem or SCADA system to the field site network and remotely monitor the network traffic and status. Integrating a network in this way allows industrial engineers to scrutinize infrastructure networks in real time and minimize system downtime.

Direct Modbus/TCP Data Communication to Automation and Control Systems

The Modbus/TCP standard enables SCADA/HMI systems to determine the basic status and properties of networked devices. Moxa's managed Ethernet switches are Modbus/TCP compatible network devices that can directly connect to existing SCADA/HMI systems for immediate network monitoring.


Modbus/TCP-compatible
Ethernet Switch

Modbus/TCP

HMI

SCADA

1

Industrial Ethernet Switches ∨ Introduction to Industrial Ethernet Switches
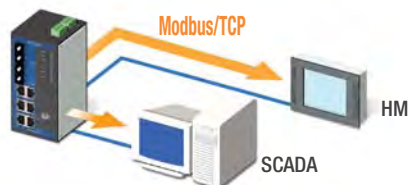
⁝ High-performance Layer 3 Switching Capability

▌ Optimum Network Efficiency through LAN Segmentation

Layer 3 switches use the IP address to make switching decisions, as routers do, but are hardware optimized to transmit data just as fast as Layer 2 switches. The 802.1Q VLAN of a Layer 2 switch allows network operators to configure and maintain their network more effectively, but cross VLAN communication still relies on traditional Layer 3 routers. Both routers and Layer 3 switches use a routing protocol and routing table to determine the best path. However, compared to routers, which are usually software-based, Layer 3 switches are faster and less expensive. This is due to their built-in switching hardware with optimized chips and full-wire speed IP frame forwarding performance suitable for interconnecting VLANs. Moxa now offers high-performance Layer 3 switches (including the EDS-828 and PT-7828) with prevalent routing technology to partition a large-scale LAN into multiple subnets for improved network performance.

LAN A

LAN B

LAN C

LAN D

EDS-828
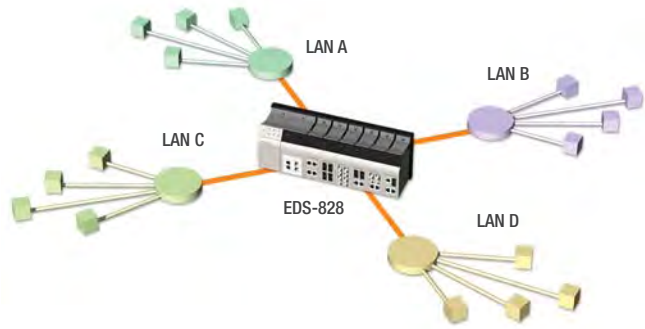
▌ Layer 3 Switching Supported by Moxa

- Static Routing
- RIP v1/v2 (Routing Information Protocol)

- OSPF (Open Shortest Path First)
- DVMRP (Distance Vector Multicast Routing Protocol)

⁝ Versatile Layer 2 Industrial Network Management

| • Reliable Network Redundancy • Efficient Network Performance • Easy Network Management • Advanced Network Security |

Reliable Network Redundancy

Ethernet network redundancy is essential to today's industrial Ethernet infrastructures. When a highly integrated system experiences a connection failure, the consequences are costly and even disastrous. In order to maximize system reliability and uptime during network failures so that your networks run non-stop, Moxa industrial managed Ethernet switches support enhanced Turbo Ring™ and Turbo Chain™ redundant technology in addition to standard RSTP/STP and port trunking.

## ▌ Turbo Ring™ for Ring and Media Redundancy

Moxa Turbo Ring™ is a proprietary self-healing technology that enables fast fault recovery of under 20 ms (at a full load of 250 switches). Turbo Ring™ supports three topology options—ring coupling, dual-ring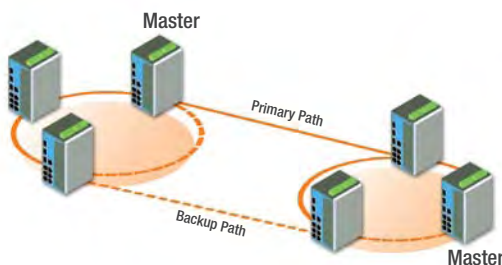, and dual homing—to reduce redundant network cabling and network planning costs and to ensure the high reliability of your industrial network applications.

Ring Coupling—helps you separate distributed devices into different smaller redundant rings, without a control line, but in such a way that the smaller rings at different remote sites will still be able to communicate with each other.

Dual-Homing—involves coupling two separate rings with a single EDS switch connecting to two independent connection points. The back-up path will be activated if the operating connection (or main path) fails.

Turbo Ring
(Recovery Time < 20 ms)
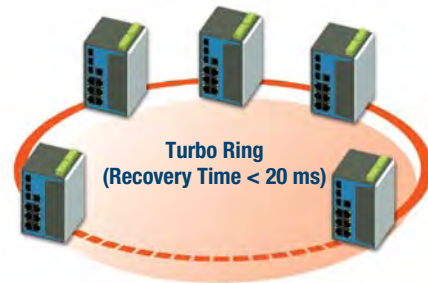
Dual-Ring—adds reliability by using a single EDS switch to connect two separate rings for applications that present cabling difficulties.

Master

Primary Path

Backup Path

Master

Ring Coupling

Master

Primary Path

Backup Path

Master

Dual-Homing

Master

Master
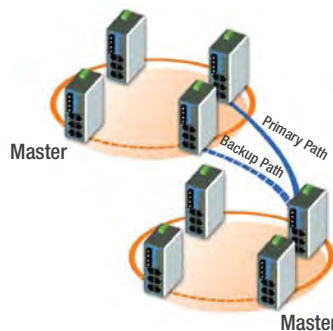
Dual-Ring

Use Turbo Chain™ to Create Redundant Connections for Large-scale Networks

Beyond Redundant Rings

Turbo Chain

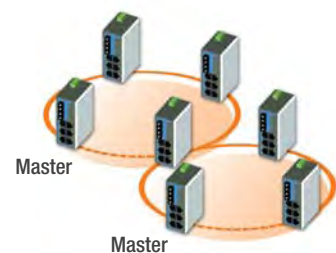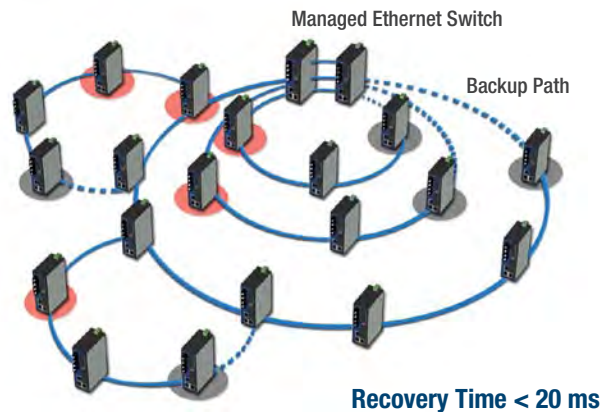Moxa's Turbo Chain™ is an innovative breakthrough that unlocks the ability to create multiple redundant networks beyond the current limitations of redundant ring technology. Turbo Chain™ is easily configured by linking two user-configured end ports with the same segment. Turbo Chain™ easily connects and extends existing redundant networks by enabling high network availability with its self-healing capability (recovery time < 20 ms). In addition, Turbo Chain™ supports standard IEEE 802.1w/D RSTP and STP protocols. Compared with ring coupling solutions or a network re-design, Moxa Turbo Chain™ is more flexible and cost-efficient and has the potential to save a significant amount on development costs, time, effort, cabling, and Ethernet ports.

Turbo Chain™: Beyond Redundant Ring

- Flexible network topology
- Unlimited and easy network expansions
- Fast fault recovery (recovery time < 20 ms)
- Cost-effective configurations
- Moxa's industrial managed Ethernet switches supported

Managed Ethernet Switch

Backup Path

Recovery Time < 20 ms

● Head switch: Edge switch is assigned the forwarding state
● Tail switch: Edge switch is assigned the blocked state

Port Trunking for Flexible Network Connections

IEEE 802.3ad (LACP, Link Aggregation Control Protocol) provides flexible network connections and a redundant path for critical devices. For example, the EDS-518A allows users to set up a wider communication path by aggregating a trunk group. A maximum of eight ports can be assigned to one trunk group to optimize your network connection and redundant paths. When selected ports are grouped for trunking, LACP will exchange information to determine whether or not the ports selected in a group can be trunked together.

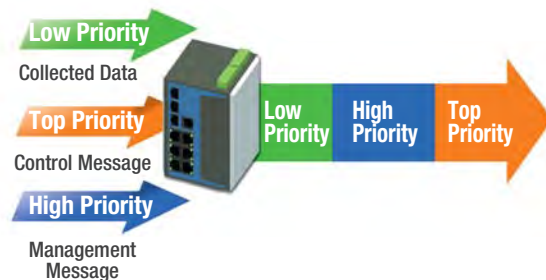Up to 8 ports can be assigned to one trunk group
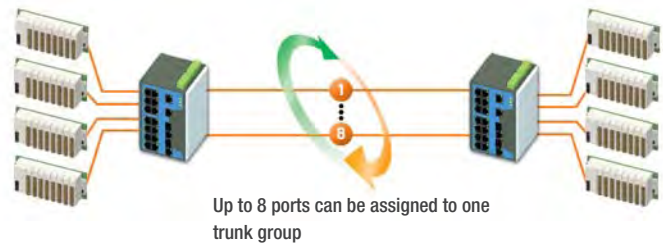
Efficient Network Performance

Transition to Next Generation IPv6 Networks

IPv6 was introduced to increase the number of available IP addresses. Available IPv4 addresses will soon be completely exhausted, so support for IPv6 (128-bit IP addresses) is important to secure the future of your network. Moxa's managed Ethernet switches have been certified as IPv6 ready by the global IPv6 Forum. They can support IPv6 and IPv4 dual stack service to offer better addressing and security for large networks to protect your future investments.

IPv4

IPv6

QoS Increases Data Determinism

Quality of Service (QoS) provides a traffic prioritization capability to ensure that important data is delivered consistently and predictably. Moxa's managed Ethernet switches can inspect IEEE 802.1p/1Q layer 2 CoS tags, and even layer 3 TOS information, to provide a consistent classification of the entire network. The QoS capability of the managed Ethernet switches improve your industrial network's performance and determinism for mission-critical applications.

Low Priority
Collected Data

Top Priority
Control Message

High Priority
Management Message

Low Priority | High Priority | Top Priority

1

Industrial Ethernet Switches ＞ Introduction to Industrial Ethernet Switches

VLAN Eases Network Planning

A VLAN is a group of devices that can be located anywhere on a network, but which communicate as if they are on the same physical segment. VLANs can be used to segment your network without being restricted by physical connections—a limitation 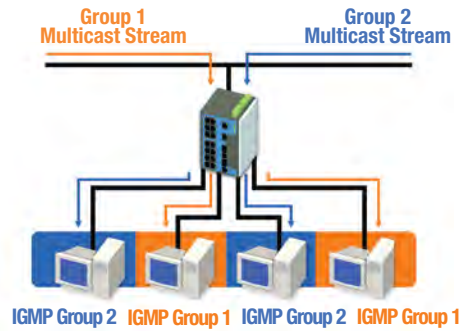imposed by traditional network design. Since all automation systems incorporate sensitive devices that must be protected from unauthorized access, it is essential to have an authentication system set up that only allows authorized users to access the system. If devices belong to different VLANs, they cannot communicate with each other, providing extra security and protection from unwanted invasion or traffic. The IEEE 802.1Q standard and GVRP protocol can exchange the same interoperable parameters to keep consistent VLAN settings over the entire network.
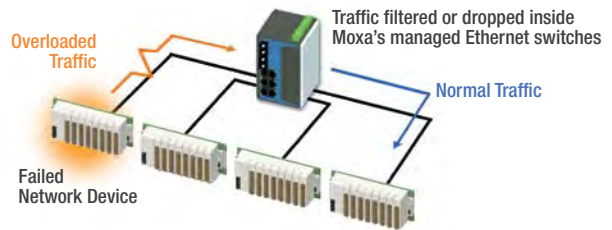

Department 1   Department 2   Department 3
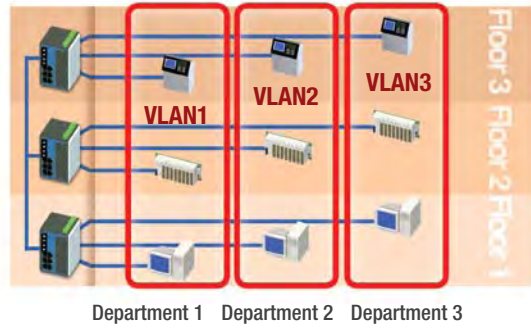
IGMP Snooping and GMRP for Filtering Multicast Traffic

Moxa's managed Ethernet switches (not including the EDS-400A) support IEEE 802.1D-1998 GMRP (GARP Multicast Registration Protocol) and IGMP snooping, which provide the ability to prune multicast traffic so that it travels only to those end destinations that require it. The overall effect is to reduce the amount of traffic on the Ethernet LAN.
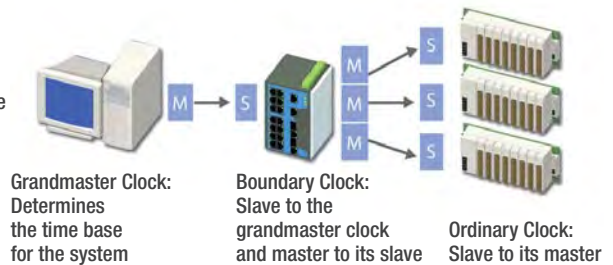

Group 1 Multicast Stream   Group 2 Multicast Stream

IGMP Group 2   IGMP Group 1   IGMP Group 2   IGMP Group 1

Bandwidth Management Maintains Network Predictability

Unlimited bandwidth should not be granted to any single device on a network, particularly in light of what could happen if that device malfunctions. The most well-known problem is broadcast storms caused by a faulty topology, or by devices that malfunction. Moxa's managed Ethernet switches not only prevent broadcast storms, but in addition, the ingress/egress rate of unicast/multicast/broadcast packets can also be configured to give administrators full control of over bandwidth limitations to prevent unpredictable faults.

Overloaded Traffic

Traffic filtered or dropped inside Moxa's managed Ethernet switches

Normal Traffic

Failed Network Device

IEEE 1588 PTP Enhances Clock Synchronization of Automation Devices

IEEE 1588 PTP, also known as Precision Time Protocol (PTP), is designed to synchronize the real-time clocks located at the nodes of a distributed system that communicates over a network. Moxa's managed Ethernet switches with IEEE 1588 PTP are well suited for applications such as motion control that require distributed clocks to be synchronized with great accuracy.

Grandmaster Clock: Determines the time base for the system

Boundary Clock: Slave to the grandmaster clock and master to its slave

Ordinary Clock: Slave to its master

Easy Network Management

SNMP Inform Enables Reliable Event Management

SNMP Inform is used to acknowledge receipt of event notifications. If you use SNMP to monitor your network systems, you can use this event action to send an SNMP Inform notification in response to the specified critical event. Moxa's managed Ethernet switches can ask an SNMP manager to send an SNMP response to confirm that notification has been received. This means that the SNMP Inform message can be resent several times if a response is not initially received.

SNMP Manager
(e.g., Network Management Software)



SNMP Inform

SNMP Response

Got it!

Modbus/TCP Easily Integrates with SCADA/HMI Systems

Modbus/TCP is an international industrial communication protocol that provides a direct connection to automation and control systems. Moxa's managed Ethernet switches support communication with SCADA/HMI systems using the Modbus/TCP protocol. SCADA/HMI systems can monitor the status of managed Ethernet switches to provide industrial applications with seamless process and real-time data acquisition.
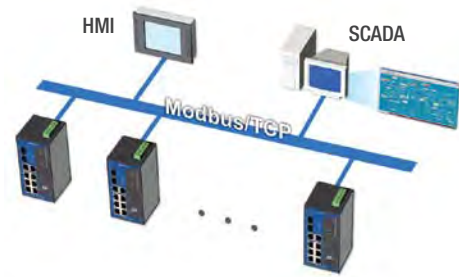
Automated Topology Discovery with LLDP

The Link Layer Discovery Protocol or LLDP (IEEE 802.1AB) is a data-link layer protocol that advertises device information, such as IP address, description, and system capabilities, to neighboring devices over the network. Moxa's managed Ethernet switches fully implement LLDP. Network management software, such as Moxa's MXview, can easily discover and manage LLDP-enabled devices to create accurate network topologies and maintain the information used by access devices.
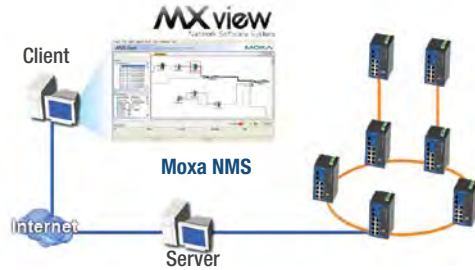
Intelligent DHCP Option 82 IP Address Allocation

DHCP Option 82 refers to the "DHCP Relay Agent Information Option," which allows a DHCP Relay Agent to insert detailed information, such as port information and MAC addresses of relay agents, to a request being transmitted to a DHCP server. DHCP servers can use this information to allocate IP addresses and other assignment settings that are mapped to its MAC address table. Moxa's managed Ethernet switches support DHCP Option 82, and play the role of DHCP relay agent to communicate a DHCP request. When a new device replaces a device connected to a Moxa switch, the DHCP server can offer the same assigned IP address to reduce system downtime and maintenance requirements.

Efficient Network Monitoring and Proactive Management with RMON

RMON (Remote Network Monitoring) is an Internet Engineering Task Force (IETF) standard monitoring specification that allows various network agents and console systems to exchange network monitoring data. RMON provides you with comprehensive network fault diagnosis, planning, and performance-tuning information, and helps you manage your network in a more proactive manner. If configured correctly, RMON probes deliver information before problems occur. This means that you can take action before the problems affect users.

Immediate Event Notifications with Real-time Alarms

Warning by E-mail

Moxa's managed Ethernet switches send out a warning e-mail when an exception is triggered, providing system managers with real-time alarm messages.

Switch Events		Port Events
Cold Start	Warm Start	Link On
Power On/Off	Authentication Failure	Link Off
Topology Change	Configuration Change	Traffic Overload

Warning by Relay Output

The managed Ethernet switches provide relay outputs that can be configured to indicate the importance of events when notifying or warning engineers in the field. In response, engineers can respond to higher priority messages quickly and with the appropriate emergency maintenance procedures.

DI for Integrating Other Important Sensors

Moxa's managed Ethernet switches (not including the EDS-400A or IKS series switches) have two digital inputs for integrating sensors into the Ethernet switches' automatic alarm mechanism. This is done by redirecting warning messages to an IP network by e-mail notification.

1

Industrial Ethernet Switches ∨ Introduction to Industrial Ethernet Switches
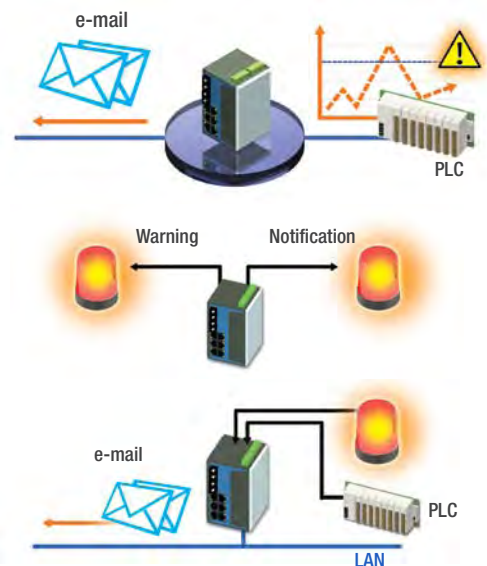
Easy Browser-based Configuration

Moxa's managed Ethernet switches can be configured easily over the network using IE or Firefox web browsers, Telnet console, or the provided Moxa Windows utility. It is a simple matter to back up configuration parameters and update firmware in the managed Ethernet switches with these user-friendly tools.

Advanced Network Security

Seamlessly Integrated Network Security

Security is one of the most important requirements for protecting the infrastructure of mission-critical networks. Moxa's managed Ethernet switches support IEEE 802.1X (port-based network access control) to restrict port access to authorized users only. Authentication is done using the local user database or an external RADIUS server. To further protect data interception, HTTPS and SSH protocols are supported for transferring encrypted data over the Internet. With IEEE 802.1X, HTTPS, SSH, SNMPv3, and port lock limited access by MAC address, Moxa's managed switches offer a seamless integrated network security solution to secure your industrial network data.

⋮ Rugged Industrial Design for Outstanding Reliability

Industrial environments have many hazards, and have exacting requirements for ruggedized equipment:

- Reliable power inputs for maximum network uptime
- Ability to withstand exposure to extreme temperatures
- Immunity from electromagnetic interference
- Ability to withstand vibration, impacts, dust, humidity, and corrosive environments
- Compliant with certification standards
- Long-term durability

Moxa's solutions satisfy all of these industrial requirements. Moxa's rugged industrial-grade Ethernet switches can be used to build automation infrastructures for applications—such as traffic control, marine and offshore operations, and oil and gas process control—that operate in harsh industrial environments.

Stable and Versatile Power Inputs for Industrial Applications

The redundant power inputs on Moxa's industrial Ethernet switches can be a life saver; if one power source fails, the redundant power input will kick in and keep the entire system operating safely. Some models feature a wide range of 12/24/48 VDC power inputs, and can handle large power fluctuations (e.g., 48 VDC can handle voltage increases of up to +20%, and 12 VDC can handle voltage decreases down to -20%). If your application is restricted to VAC input power, choose a Moxa Ethernet switch (such as the EDS-200A/200 series) that is specially designed to handle AC power. With these switches you can use either a 24 VDC or 24 VAC power input.

- DC input: wide power range from 9.6 to 60 VDC
- AC input: 18 to 30 VAC

PWR2

PWR1

Back-up Power Supply

DIN-Rail
12/24/48 VDC Power Supply
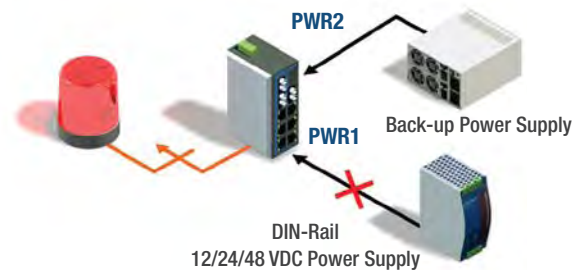
Designed to Withstand Extreme Temperatures

Industrial environments can be extremely hot or unbearably cold, and require network devices that operate reliably when subjected to wide temperature fluctuations. Moxa's Ethernet switches are rigorously tested beyond industry standards to ensure they will operate in a -40 to 75ºC operating temperature range. For example, whereas regulatory standards require only a temperature change of 1ºC/minute throughout the cycling examination, Moxa conducts stricter testing with 3ºC/minute.

Intolerable packet-loss requirements are also defined to ensure that Moxa's Ethernet switches function robustly. Moxa's switches also feature passive cooling schemes, so that reliability can be further assured under excessive heat.

-40°C   75°C
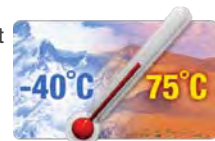
Outstanding Electromagnetic Immunity

The rugged design of Moxa's industrial Ethernet switches includes excellent electromagnetic immunity that often surpass the requirements stipulated by EN50121-4, DNV, and IEC 61000. For example, to provide immunity against magnetic fields induced by power frequencies, Moxa designs for 300 A/m applied continuously and 1000 A/m applied for 1 to 3 second intervals, which is three times stricter than EN50121-4.

Network Connections Well-protected against Harsh Environmental Conditions

Moxa's Ethernet switches are built to endure harsh environmental conditions. For example, vibration is a significant challenge for maritime and transportation applications. Moxa's switches conform to the IEC60068-2-6 standard and are tested at over 1 g of acceleration for an extended time period. When it comes to shock impacts, some of Moxa's Ethernet switches are designed to exceed other standards, such as NEMA TS2, by an additional 5 g's of acceleration. Moreover, all Moxa products feature a rugged and high strength housing to protect against the dust and spills that are commonplace at manufacturing locations.

ESD Test

Surge/EFT Test

Vibration Test

Shock Test
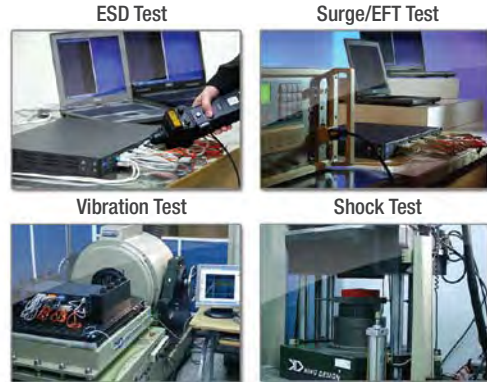
Networking Solutions Certified to Meet Industrial Standards

Several certifications confirm the reliability of Moxa's industrial Ethernet switches:

- UL508 and UL60950-1 certifications for safe use in hazardous locations
- Class I, Division 2/ATEX Zone 2 for use in mining and oil and gas industries
- DVN/GL/ABS/LR/NK for maritime environments

- NEMA TS2 for traffic control applications
- EN50121-4 for railway wayside applications

Relay Output Alarm, Broadcast Storm Protection, 5-year Warranty

- Many of Moxa's Ethernet switches feature relay output alarms, which provide relay contact outputs to warn engineers on the shop floor when the power fails or a port link breaks, so that they can respond quickly with appropriate emergency procedures.
- Moxa's unmanaged Ethernet switches are protected from receiving too many broadcast packets. These Ethernet switches have an option to discard broadcast or multicast packets if the number of

those packets exceeds a threshold in a preset period of time. When the preset time period expires, the switch will resume receiving broadcast or multicast packets until the threshold is reached again.
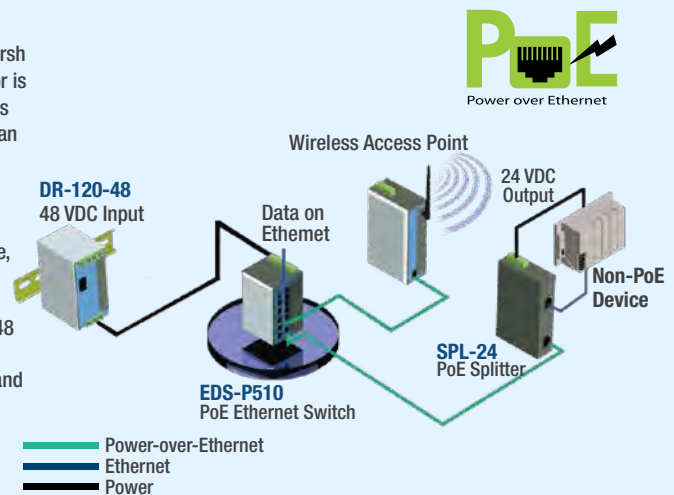
- All of Moxa's Ethernet switches are fanless and feature high MTBF (Meantime Between Failures) ratings for long-term operation. In addition, Moxa's switches carry a solid 5-year warranty.

Power-over-Ethernet Solution for Simple and Flexible Connections

Moxa provides a complete range of solutions for any IEEE 802.3af PoE compliant units that are ideal for hard-to-reach outdoor or harsh environments where a power installation is not readily available or is cost-prohibitive. These PoE products provide PoE powered devices (PDs) with a stable and cost-effective electric power source over an Ethernet cable.

PoE Portfolio

- **Managed PoE Switches** support advanced network management, PoE management functionality, and Gigabit performance, and are used to form reliable Gigabit ring backbones and downlink PoE connections.
- **Unmanaged PoE Switches** are equipped with convenient 24/48 VDC power inputs, without an extra 48 VDC power supply.
- **PoE Splitters** separate the power and data from a PoE input, and distribute the power to non-PoE devices.

DR-120-48
48 VDC Input

Data on Ethernet

Wireless Access Point

24 VDC Output

Non-PoE Device

SPL-24
PoE Splitter

EDS-P510
PoE Ethernet Switch

—— Power-over-Ethernet
—— Ethernet
—— Power

1

Industrial Ethernet Switches ∨ Introduction to Industrial Ethernet Switches

⦂ Industrial Ethernet Switch Comparison Chart

Managed Ethernet Switches

Model	Interface						Features											
	Total Number of Ports	Gigabit Ethernet (10/100/1000 Mbps)	Fast Ethernet (10/100 Mbps)	PoE, Fast Ethernet (10/100 Mbps)	Digital Output/Digital Input	Turbo Ring DIP Switch	Layer 3 Switching	Turbo Ring/TurboChain/STP/STP	Modbus/TCP	IEEE 1588 PTP	SNMP/RMON	LLDP	IGMP Snooping/GMRP	QoS	802.1Q VLAN	Port-based VLAN	IEEE 802.1X/HTTPS/SSH/Port Lock	IPv6
Managed DIN-Rail Ethernet Switches																		
EDS-828	28	up to 4	up to 24	–	2/2	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	–
EDS-728	28	up to 4	up to 24	–	2/2	–	–	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓
EDS-619	19	3	16	–	1/1	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-616	16	–	16	–	1/1	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-611	11	3	8	–	1/1	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-608	8	–	8	–	1/1	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-G509	9	9	–	–	2/2	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-518A	18	2	16	–	2/2	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-516A	16	–	16	–	2/2	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-510A	10	3	7	–	2/2	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-508A	8	–	8	–	2/2	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-505A	5	–	5	–	2/2	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EDS-408A	8	–	8	–	1/–	✓	–	✓	✓	–	✓	✓	–	✓	–	✓	–	✓
EDS-405A	5	–	5	–	1/–	✓	–	✓	✓	–	✓	✓	–	✓	–	✓	–	✓
Managed Rackmount Ethernet Switches																		
IKS-6726	26	up to 2	up to 24	–	1/–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IKS-6526	26	2	24	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IKS-6524	24	–	24	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PoE Managed Switches																		
EDS-P510	10	3	3	4	2/2	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IKS-6726-8PoE	26	up to 2	up to 16	8	1/–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Unmanaged Ethernet Switches

Model	Interface						Features			Approvals				
	Total Number of Ports	Gigabit Ethernet (10/100/1000 Mbps)	Fast Ethernet (10/100 Mbps)	PoE, Fast Ethernet (10/100 Mbps)	Digital Output	Power Redundancy	-40 to 75°C	UL/cUL 60950-1	UL508	Class I, Div. 2	ATEX Zone 2	DNG/GL	ABS/LR/NK	EN50121-4
DI-Rail Unmanaged Ethernet Switches														
EDS-G308	8	8	–	–	✓	✓	✓	–	✓	✓	P	✓	✓	–
EDS-G205	5	5	–	–	✓	✓	✓	–	✓	✓	P	✓	✓	–
EDS-316	16	–	16	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–
EDS-309	9	–	9	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–
EDS-308	8	–	8	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–
EDS-305	5	–	5	–	✓	✓	✓	✓	✓	✓	✓	✓	–	–
EDS-208A	8	–	8	–	–	✓	✓	–	✓	P	P	✓	✓	✓
EDS-205A	5	–	5	–	–	✓	✓	–	✓	P	P	P	P	✓
EDS-208	8	–	8	–	–	–	–	✓	✓	–	–	–	–	–
EDS-205	5	–	5	–	–	–	–	–	✓	–	–	–	–	–
Rackmount Managed Ethernet Switches														
IKS-6324	24	up to 2	up to 24	–	✓	✓	✓	–	–	–	–	P	P	✓
PoE Unmanaged Switches														
EDS-P308	8	–	4	4	✓	✓	✓	–	✓	P	P	✓	✓	–

P = Pending

EDS-828

24+4G-port Layer 3 Gigabit modular managed Ethernet switch

> Layer 3 routing interconnects multiple LAN segments
> 4 Gigabit plus 24 fast Ethernet ports for copper and fiber
> Gigabit Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, DHCP Option 82, SNMP Inform, QoS, IGMP snooping, VLAN, and more
> SNMPv3, HTTPS, SSH, IEEE 802.1X, and port security supported

Turbo Ring *Self-Healing Ethernet*
Turbo Chain *Beyond Redundant Ring*

: Introduction

The EDS-828 is a high-performance Layer 3 Ethernet switch designed for network routing. The improved hardware technology built into the EDS-828 replaces the software logic used by traditional routers, offering better performance, and making the switch ideal for large-scale local area networks (LANs). In addition to Layer 3 features, the

EDS-828 also supports advanced management and security features. In order to meet the demands of any industrial application, the EDS-828 uses a modular design that allows users to install up to 4 Gigabit Ethernet ports and 24 fast Ethernet ports, providing a high degree of flexibility for network expansion.

Features and Benefits

- Layer 3 switching functionality to move data and information across networks
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Redundant Gigabit Turbo Ring, Turbo Chain, and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- IEEE 802.1Q VLAN and GVRP protocol to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security

- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output
- Digital inputs for integrating sensors and alarms with IP networks
- Redundant, dual DC power inputs
- Configurable by Web browser, Telnet/Serial console, Windows utility, and ABC-01 automatic backup configurator

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, LLDP, IEEE 1588 PTP, Modbus/TCP, SNMP Inform

Layer 3 Modular Managed Ethernet Switch System, EDS-82810G

Layer 3 Switching: Static routing, RIP V1/V2, OSPF, VRRP for router redundancy
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 16 K
Packet Buffer Size: 32 MB

Interface

Fast Ethernet: 6 slots for any combination of 4-port interface modules, 10/100BaseT(X) or 100BaseFX
Gigabit Ethernet: 2 slots for any combination of 2-port interface modules, 10/100/1000BaseT(X) or 1000BaseSFP slot
Console Port: RS-232 (RJ45 connector)
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, T.RING
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
• +13 to +30V for state "1"
• -30 to +3V for state "0"
• Max. input current: 8 mA

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current: 0.96 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection
Dimensions: 362.4 x 142.5 x 128 mm (14.27 x 5.61 x 5.04 in)
Weight: 1950 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 4; EN61000-4-5 (Surge), level 4; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-12
Maritime: DNV, GL, ABS, LR, NK
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

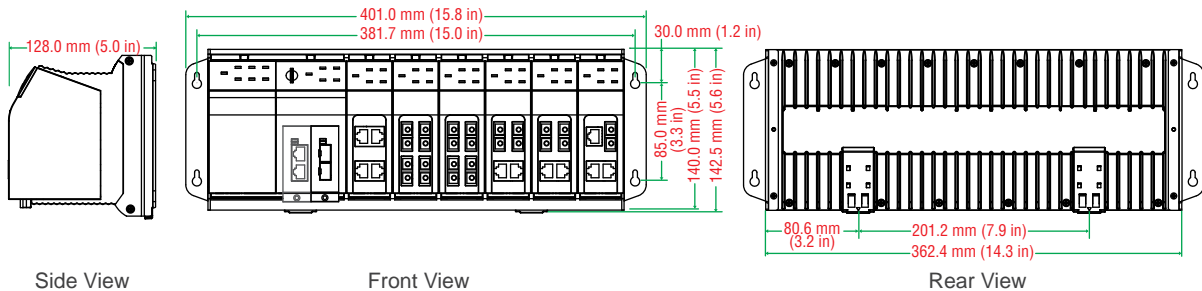**Time:** 160,000 hrs
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View

: Ordering Information

Step 1: Select Ethernet switch system

EDS-82810G

Step 2: Select interface modules

IM series
(Gigabit or fast Ethernet)

Note: The EDS-82810G switch system is delivered without interface modules. Please see page 1-21 for product information related to the IM series Gigabit and fast Ethernet interface modules.

Available Models

EDS-82810G: Layer 3 modular managed Ethernet switch system with 6 slots for 4-port fast Ethernet interface modules and 2 slots for 2-port Gigabit interface modules, for up to 24+4G ports

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-32: Wall mounting kit for the EDS-728/828 series
RK-4U: 4U-high 19" rack mounting kit

EDS-728

24+4G-port Gigabit modular managed Ethernet switch

> 4 Gigabit plus 24 fast Ethernet ports for copper and fiber
> Gigabit Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, DHCP Option 82, SNMP Inform, QoS, IGMP snooping, VLAN, and more
> SNMPv3, HTTPS, SSH, IEEE 802.1X, and port security supported
> ABC-01 (Automatic Backup Configurator) for system configuration backup (optional accessory)

: Introduction

The EDS-728 modular Gigabit Ethernet switch features a versatile modular design that allows different combinations of fiber and copper modules, creating a wide array of connection options ideal for any automation network. The modular design lets you install up to 4 Gigabit ports and 24 fast Ethernet ports. The EDS-728 is specially designed for redundant Gigabit network backbones and uses a modular configuration to provide a high degree of flexibility for network expansion. Top network performance, security, and reliability is assured through the EDS-728's advanced management and security features. The EDS-728 also features industrial-grade construction, a console port for automatic configuration backup, and an angled LED troubleshooting panel that can be conveniently viewed from both horizontal and vertical orientations.

Features and Benefits

• IPv6 Ready logo awarded (IPv6 Logo Committee certified)
• IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
• DHCP Option 82 for IP address assignment with different policies
• Modbus/TCP industrial Ethernet protocol supported
• Redundant Gigabit Turbo Ring, Turbo Chain, and RSTP/STP (IEEE 802.1w/D)
• IGMP snooping and GMRP for filtering multicast traffic
• IEEE 802.1Q VLAN and GVRP protocol to ease network planning
• QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
• Port Trunking for optimum bandwidth utilization
• SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security

• SNMPv1/v2c/v3 for different levels of network management
• RMON for efficient network monitoring and proactive capability
• Bandwidth management prevents unpredictable network status
• Lock port for only authorized MAC address access
• Port mirroring for online debugging
• Automatic warning by exception through e-mail, relay output
• Digital inputs to integrate sensors and alarms with IP networks
• Redundant, dual DC power inputs
• Configurable by Web browser, Telnet/Serial console, Windows utility, and ABC-01 automatic backup configurator

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6

Modular Managed Ethernet Switch System, EDS-72810G

MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control
Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094

IGMP Groups: 256
MAC Table Size: 16 K
Packet Buffer Size: 32 MB

Interface
Fast Ethernet: 6 slots for any combination of 4-port interface modules, 10/100BaseT(X) or 100BaseFX
Gigabit Ethernet: 2 slots for any combination of 2-port interface modules, 10/100/1000BaseT(X) or 1000BaseSFP slot
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, T.RING
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
• +13 to +30V for state "1"
• -30 to +3V for state "0"
• Max. input current: 8 mA

Power Requirements
Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current: 0.96 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics
Housing: IP30 protection
Dimensions: 362.4 x 142.5 x 128 mm (14.27 x 5.61 x 5.04 in)
Weight: 1950 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 4; EN61000-4-5 (Surge), level 4; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-12
Maritime: DNV, GL, ABS, LR, NK
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
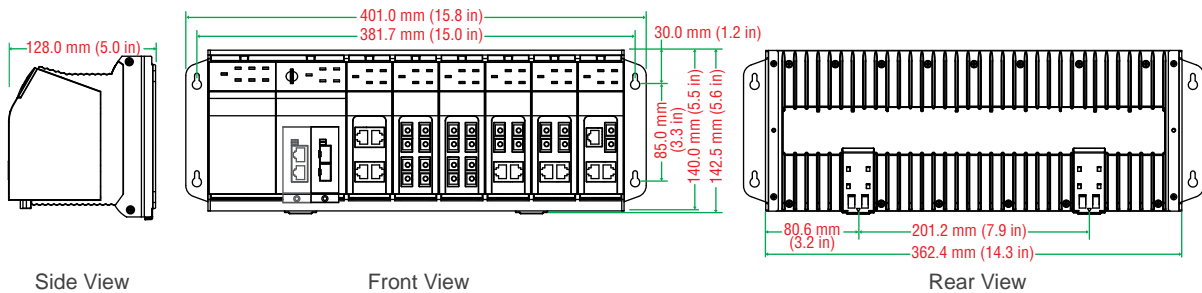**Time:** 160,000 hrs
Database: Telcordia (Bellcore), GB

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View

: Ordering Information

Step 1: Select Ethernet switch system

> EDS-72810G

Step 2: Select interface modules

> IM series
> (Gigabit or fast Ethernet)

Note: The EDS-72810G switch system is delivered without interface modules. Please see page 1-21 for product information related to the IM series Gigabit and fast Ethernet interface modules.

Available Models
EDS-72810G: Modular managed Ethernet switch system with 6 slots for 4-port fast Ethernet interface modules and 2 slots for 2-port Gigabit interface modules, for up to 24+4G ports

Optional Accessories (can be purchased separately)
MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-32: Wall mounting kit for the EDS-728/828 series
RK-4U: 4U-high 19" rack mounting kit

IM Series

2-port Gigabit Ethernet and 4-port fast Ethernet interface modules for EDS-728/828 series Ethernet switches

∷ Specifications

Gigabit Ethernet Interface Modules, IM-2G Series

IM-2GTX   IM-2GSFP

Interface
Fiber Ports: 1000BaseSFP slot
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed and auto MDI/MDI-X connection

LED Indicators: Port status
Note: Please see page 1-69 for product information related to the SFP-1G series of Gigabit Ethernet SFP modules.

Power Requirements
Power Consumption (@ 24 V):
IM-2GTX: 2.96 W
IM-2GSFP: 3.04 W

Physical Characteristics
Dimensions: 24 x 65.9 x 101.1 mm (0.94 x 2.59 x 3.98 in)
Weight:
IM-2GTX: 150 g
IM-2GSFP: 148 g

Fast Ethernet Interface Modules, IM Series

IM-4TX   IM-2MSC/2TX IM-2SSC/2TX   IM-2MST/2TX   IM-1LSC/3TX   IM-4MSC IM-4SSC   IM-4MST

Interface
Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
LED Indicators: PWR, P1, P2, P3, P4 port status

Optical Fiber

	100BaseFX		
	Multi Mode	**Single Mode**	**Single Mode, 80 km**
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm single-mode fiber optic cable
d. 9/125 μm single-mode fiber optic cable (80 km)

Power Requirements
Power Consumption (@ 24 V):
IM-4TX: 1.52 W
IM-2MSC/2TX: 2.43 W
IM-2MST/2TX: 2.43 W
IM-2SSC/2TX: 2.43 W
IM-1LSC/3TX: 2.5 W
IM-4MSC: 6.6 W
IM-4MST: 6.6 W
IM-4SSC: 6.6 W

Physical Characteristics
Housing: IP30 protection
Dimensions: 40 x 127.8 x 100 mm (1.57 x 5.03 x 3.94 in)
Weight:
IM-4TX: 215 g
IM-2MSC/2TX: 245 g
IM-2MST/2TX: 250 g
IM-2SSC/2TX: 245 g
IM-1LSC/3TX: 235 g
IM-4MSC: 250 g
IM-4MST: 270 g
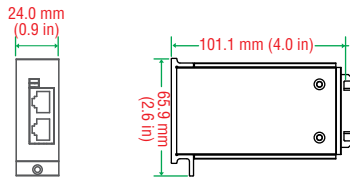IM-4SSC: 270 g

MTBF (meantime between failures)
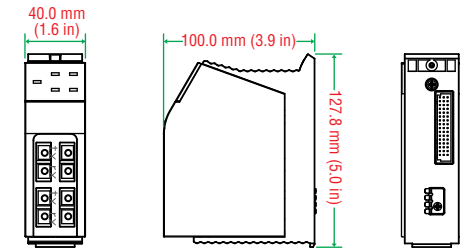**Time:** 620,000 hrs
Database: MIL-HDBK-217F, GB 25°C

1

Industrial Ethernet Switches › IM Series

Dimensions

Gigabit Ethernet Interface Modules

24.0 mm (0.9 in)

101.1 mm (4.0 in)

65.9 mm (2.6 in)

Front View   Side View

Fast Ethernet Interface Modules

40.0 mm (1.6 in)

100.0 mm (3.9 in)

127.8 mm (5.0 in)

Front View   Side View   Rear View

: Ordering Information

Available Models (0 to 60°C)	Port Interface						
	Gigabit Ethernet		Fast Ethernet				
			10/100BaseT(X)	100BaseFX			
	10/100/1000BaseT(X)	1000BaseSFP*		Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
IM-2G Series							
IM-2GTX	2	–	–	–	–	–	–
IM-2GSFP	–	2	–	–	–	–	–
IM Series							
IM-4TX	–	–	4	–	–	–	–
IM-4MSC	–	–	–	4	–	–	–
IM-4MST	–	–	–	–	4	–	–
IM-2MSC/2TX	–	–	2	2	–	–	–
IM-2MST/2TX	–	–	2	–	2	–	–
IM-4SSC	–	–	–	–	–	4	–
IM-2SSC/2TX	–	–	2	–	–	2	–
IM-1LSC/3TX	–	–	3	–	–	–	1

* Please see page 1-69 for product information related to the SFP-1G series Gigabit Ethernet SFP modules.

EDS-608/611/616/619 Series

8, 8+3G, 16, 16+3G-port compact modular managed Ethernet switches

> Up to 19 optical fiber connections in a small switch (EDS-619)
> Modular form factor lets you choose from several 4-port copper/fiber combination modules
> Hot swap media modules for continuous operation
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
> -40 to 75˚C operating temperature (T models)

Introduction

The versatile modular design of the compact EDS-600 series Ethernet switch allows users to combine fiber and copper modules to create switch solutions suitable for any automation network. The EDS-600's modular design lets you install up to 3 Gigabit Ethernet ports and 16 Fast Ethernet ports, and the advanced Turbo Ring and Turbo Chain (recovery time < 20 ms) technology and RSTP/STP (IEEE 802.1w/D) helps increase the reliability and availability of your industrial Ethernet network. Models with an extended operating temperature range of -40 to 75°C are also available. The EDS-600 series supports several reliable and intelligent functions, including IEEE 1588 PTP, Modbus/TCP, LLDP, DHCP Option 82, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SSH, SNMPv3, and more, making the Ethernet switches suitable for any harsh industrial environment.

Features and Benefits

- Hot swap media modules for continuous operation (available in Q2, 2010)
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- SNMP Inform for ensuring reliable event management
- LLDP for automated topology discovery
- DHCP Option 82 for IP address assignment with different policies
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- Modbus/TCP industrial Ethernet protocol supported
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning

- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output
- Digital inputs to integrate sensors and alarms with IP networks

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit

Interface

Fast Ethernet: 2 or 4 slots for any combination of 4-port interface modules, 10/100BaseT(X) or 100BaseFX
Gigabit Ethernet: 3 10/100/1000BaseT(X) or 100/1000BaseSFP slots (EDS-611 and EDS-619 only)
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, G1/G2/G3 (EDS-611 and EDS-619 only)
Mode LED Indicators: 10/100M for TP port, 100M for Fiber port
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 1 input with the same ground, but electrically isolated from the electronics.
• +13 to +30V for state "1"
• -30 to +3V for state "0"
• Max. input current: 8 mA

Power Requirements

Input Voltage: 12/24/48 VDC, redundant dual inputs
Input Current:
EDS-608: 0.16A @ 24 V
EDS-611: 0.31A @ 24 V
EDS-616: 0.25A @ 24 V
EDS-619: 0.31A @ 24 V
Overload Current Protection: Present
Connection: 1 removable 5-contact and 1 removable 6-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions:
EDS-608/611 Series: 124.9 x 151 x 157.2 mm (4.92 x 5.95 x 6.19 in)
EDS-616/619 Series: 185 x 151 x 157.2 mm (7.28 x 5.95 x 6.19 in)
Weight:
EDS-608: 2080 g
EDS-611: 2260 g
EDS-616: 2780 g
EDS-619: 2950 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending), EN60950-1 (Pending)
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, EN61000-6-4
EMS: EN61000-6-2
  EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
  EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
  EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-29
Maritime: DNV (Pending), GL (Pending), ABS (Pending), LR (Pending), NK (Pending)
Rail Traffic: EN50121-4 (EDS-616 and EDS-619 series only)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.
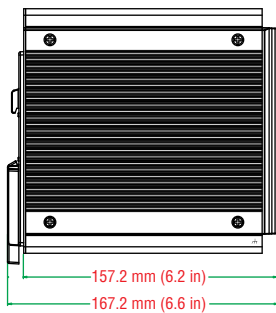
Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

EDS-608/611 Series

157.2 mm (6.2 in)
167.2 mm (6.6 in)

Side View

124.9 mm (4.9 in)
151.0 mm (5.9 in)

Front View

Side View

157.2 mm (6.2 in)

Top View

50.0 mm (2.0 in)
72.0 mm (2.8 in)
120.0 mm (4.7 in)
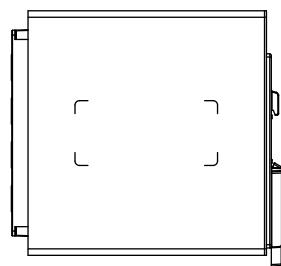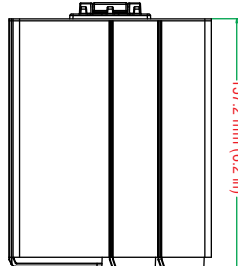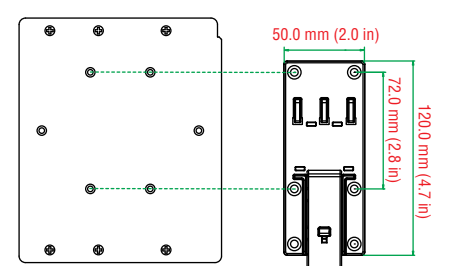
Rear View   DIN-Rail Mounting Kit

Dimensions

EDS-616/619 Series

157.2 mm (6.2 in)
167.2 mm (6.6 in)

Side View

185.0 mm (7.3 in)

151.0 mm (5.9 in)

Front View

Side View

Top View

Rear View

DIN-Rail Mounting Kit

50.0 mm (2.0 in)
72.0 mm (2.8 in)
120.0 mm (4.7 in)
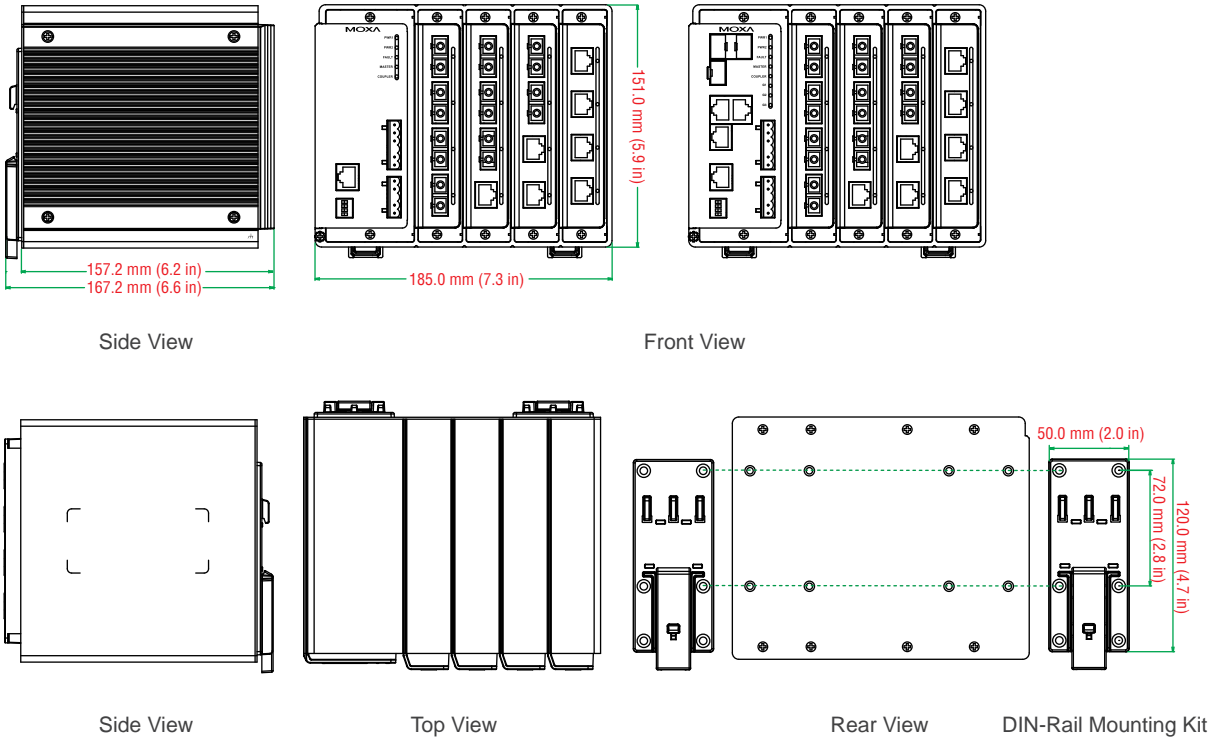
Ordering Information

Step 1: Select Ethernet switch system

EDS-608/611/616/619

Step 2: Select interface modules

CM Series

Note: The EDS-600 switch system is delivered without interface modules. Please see page 1-26 for product information related to the CM series fast Ethernet interface modules.

Available Models		Total No. of Ports	Port Interface		
			Gigabit Ethernet	Fast Ethernet	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)		10/100/1000BaseT(X) or 100/1000BaseSFP*	Slots	10/100BaseT(X) and/or 100BaseFX
EDS-608	EDS-608-T	8	–	2	up to 8
EDS-611	EDS-611-T	11	3	2	up to 8
EDS-616	EDS-616-T	16	–	4	up to 16
EDS-619	EDS-619-T	19	3	4	up to 16

*The EDS-600 series supports 3 100/1000BaseSFP slots. See pages 1-69 and 1-71 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-75: Wall mounting kit
AVK-17: Anti-vibration wiring Kit

CM-600 Series

4-port fast Ethernet interface modules for EDS-600 series Ethernet switches

⋮ Specifications

Fast Ethernet Interface Modules, CM-600 Series

| CM-600-4TX | CM-600-4MSC CM-600-4SSC | CM-600-4MST | CM-600-3MSC/1TX CM-600-3SSC/1TX | CM-600-3MST/1TX | CM-600-2MSC/2TX CM-600-2SSC/2TX | CM-600-2MST/2TX |

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
LED Indicators: 10/100 for TP port, 100M for fiber port

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm single-mode fiber optic cable

Power Requirements

Power Consumption:
CM-600-4TX: 0.72 W
CM-600-4MSC, -4MST, -4SSC: 2.64 W
CM-600-3MSC/1TX, -3MST/1TX, -3SSC/1TX: 2.16 W
CM-600-2MSC/2TX, -2MST/2TX, -2SSC/2TX: 1.68 W

Physical Characteristics

Housing: IP30 protection
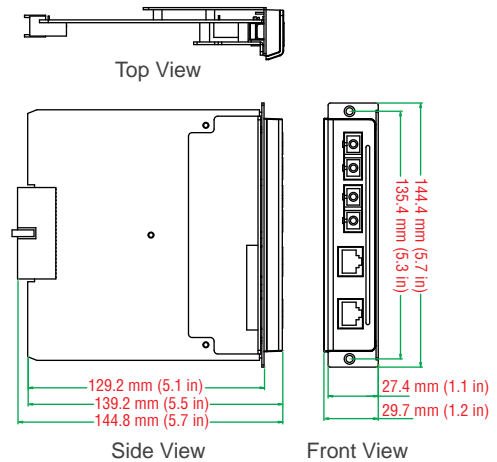**Dimensions:** 29.7 x 144.4 x 144.8 mm (1.17 x 5.69 x 5.7 in)
Weight:
CM-600-4TX: 190 g
CM-600-4MSC, -4MST, -4SSC: 240 g
CM-600-3MSC/1TX, -3MST/1TX, -3SSC/1TX: 230 g
CM-600-2MSC/2TX, -2MST/2TX, -2SSC/2TX: 230 g

Dimensions

Top View

129.2 mm (5.1 in)
139.2 mm (5.5 in)
144.8 mm (5.7 in)

144.4 mm (5.7 in)
135.4 mm (5.3 in)

27.4 mm (1.1 in)
29.7 mm (1.2 in)

Side View   Front View

⋮ Ordering Information

Available Models (-40 to 75°C)	Port Interface			
	10/100BaseT(X)	100BaseFX		
		Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector
CM-600-4TX	4	–	–	–
CM-600-4TX-BP*	4	–	–	–
CM-600-4MSC	–	4	–	–
CM-600-4MST	–	–	4	–
CM-600-4SSC	–	–	–	4
CM-600-3MSC/1TX	1	3	–	–
CM-600-3MST/1TX	1	–	3	–
CM-600-3SSC/1TX	1	–	–	3
CM-600-2MSC/2TX	2	2	–	–
CM-600-2MST/2TX	2	–	2	–
CM-600-2SSC/2TX	2	–	–	2

* The CM-600-4TX-BP supports bypass relay function on each port.

EDS-G509 Series

9G-port full Gigabit managed Ethernet switches

> 4 10/100/1000BaseT(X) ports plus 5 combo (10/100/1000BaseT(X) or 100/1000BaseSFP slot) Gigabit ports
> Fiber optic options for extending distance and improving electrical noise immunity
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported

1

Industrial Ethernet Switches > EDS-G509 Series

: Introduction

The EDS-G509 is equipped with 9 Gigabit Ethernet ports and up to 5 fiber optic ports, making it ideal for upgrading an existing network to Gigabit speed or building a new full Gigabit backbone. Gigabit transmission increases bandwidth for higher performance and transfers large amounts of video, voice, and data across a network quickly. Redundant Ethernet Turbo Ring, Turbo Chain, and

RSTP/STP increase system reliability and the availability of your network backbone. The EDS-G509 series is designed especially for communication demanding applications, such as video and process monitoring, shipbuilding, ITS, and DCS systems, all of which can benefit from a scalable backbone construction.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism

- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output
- ABC-01 (Automatic Backup Configurator) for system configuration backup

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, Modbus/TCP, SNMP Inform, LLDP, IEEE 1588 PTP, IPv6

MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit

Interface
Fiber Ports: 100/1000BaseSFP slot
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve
LED Indicators: PWR1, PWR2, FAULT, 10/100/1000M, MSTR/HEAD, CPLR/TAIL

Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC

Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
• +13 to +30V for state "1"
• -30 to +3V for state "0"
• Max. input current: 8 mA

Power Requirements
Input Voltage: 12/24/48 VDC, redundant dual inputs
Input Current: 0.81 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 87.1 × 135 × 107 mm (3.43 × 5.31 × 4.21 in)
Weight: 1510 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F) for T models
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime: DNV, GL, ABS, LR, NK
Rail Traffic: EN50121-4
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time: 330,000 hrs
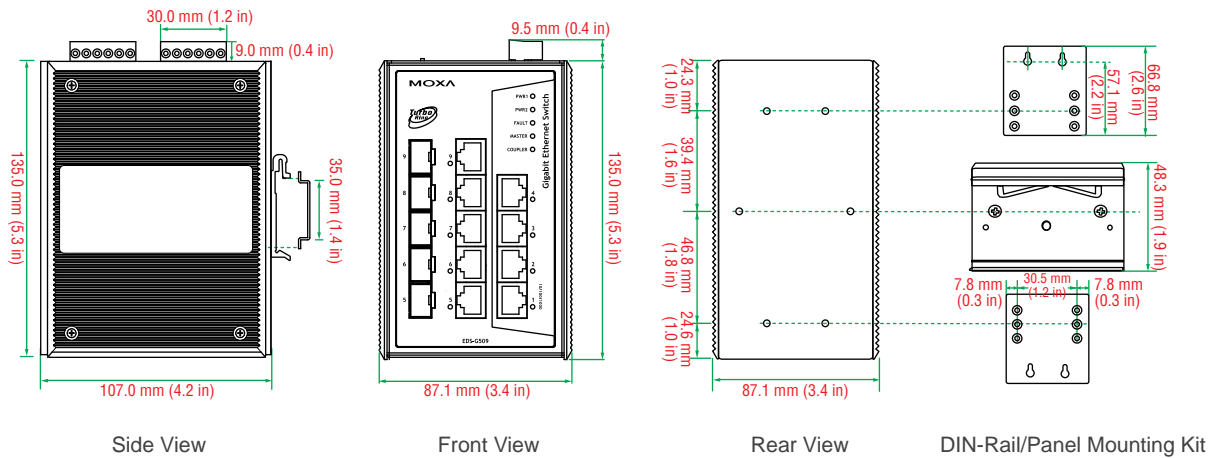**Database:** Telcordia (Bellcore), GB

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View · Front View · Rear View · DIN-Rail/Panel Mounting Kit

Ordering Information

Available Models
EDS-G509: Industrial full Gigabit managed Ethernet switch with 4 10/100/1000BaseT(X) ports, and 5 10/100/1000BaseT(X) or 100/1000BaseSFP slot combo ports, 0 to 60°C operating temperature

EDS-G509-T: Industrial full Gigabit managed Ethernet switch with 4 10/100/1000BaseT(X) ports, and 5 10/100/1000BaseT(X) or 100/1000BaseSFP slot combo ports, -40 to 75°C operating temperature

Note: The EDS-G509 series switches support up to 5 100/1000BaseSFP slots. See pages 1-69 to 1-71 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)
MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

EDS-518A Series

16+2G-port Gigabit managed Ethernet switches

> 2 Gigabit plus 16 fast Ethernet ports for copper and fiber
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported
> ABC-01 (Automatic Backup Configurator) for system configuration backup (optional accessory)

Introduction

The EDS-518A is a standalone 18-port managed Ethernet switch that provides 2 combo Gigabit ports with built-in RJ45 or SFP slots for Gigabit fiber optic communication. The Ethernet redundant Turbo Ring and Turbo Chain (recovery time < 20 ms) increases the reliability and speed of your network backbone. The EDS-518A also supports advanced management and security features.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- ABC-01 (Automatic Backup Configurator) for system configuration backup
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 2 Mbit

Interface
Fiber Ports: 100BaseFX (SC/ST connector) and 1000BaseSFP slot
RJ45 Ports: 10/100BaseT(X) or 10/100/1000BaseT(X) auto negotiation speed
Console Port: RS-232 (RJ45 connector)
LED Indicators: PWR1, PWR2, FAULT, 10/100M (TP port), 100M (fiber port), MSTR/HEAD, CPLR/TAIL
Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
- +13 to +30V for state "1"
- -30 to +3V for state "0"
- Max. input current: 8 mA

Optical Fiber

	100BaseFX		
	Multi-mode	**Single-mode**	**Single-mode, 80 km**
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable
d. 9/125 µm single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current:
EDS-518A: 0.51 A @ 24 V
EDS-518A-MM/SS: 0.61 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection
Dimensions: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight: 1630 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 2; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 2; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-12
Maritime: DNV, GL
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 240,000 hrs
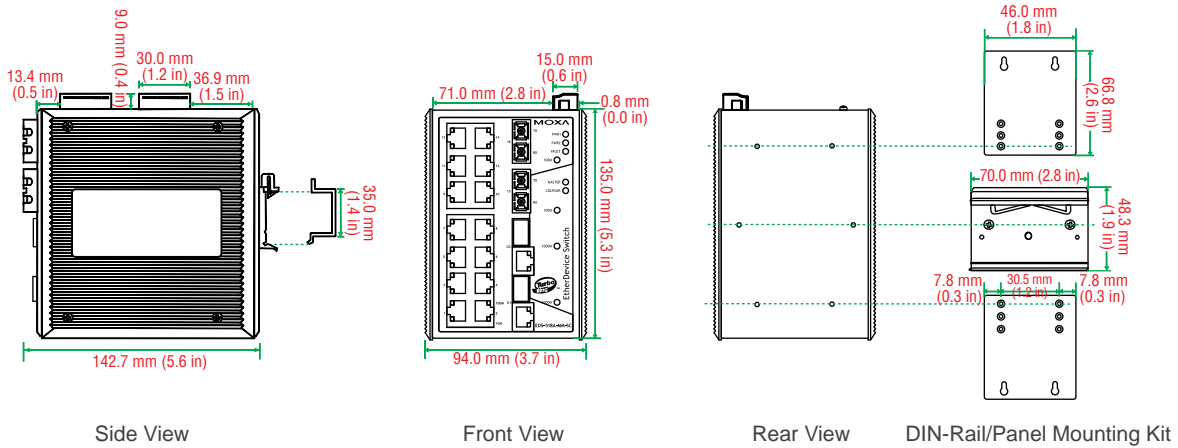**Database:** Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit

: Ordering Information

Available Models		Port Interface					
		Gigabit Ethernet	Fast Ethernet				
		Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*	10/100BaseT(X)	100BaseFX			
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 75˚C)			Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
EDS-518A	EDS-518A-T	2	16	–	–	–	–
EDS-518A-MM-SC	EDS-518A-MM-SC-T	2	14	2	–	–	–
EDS-518A-MM-ST	EDS-518A-MM-ST-T	2	14	–	2	–	–
EDS-518A-SS-SC	EDS-518A-SS-SC-T	2	14	–	–	2	–
EDS-518A-SS-SC-80	-	2	14	–	–	–	2

*The EDS-518A series supports 2 1000BaseSFP slots. See page 1-69 for SFP-1G series Gigabit Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

EDS-510A Series

7+3G-port Gigabit managed Ethernet switches

> **2 Gigabit Ethernet ports for redundant ring and 1 Gigabit Ethernet port for uplink solution**
> **Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy**
> **IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported**
> **ABC-01 (Automatic Backup Configurator) for system configuration backup (optional accessory)**

: Introduction

The EDS-510A Gigabit managed redundant Ethernet switch is equipped with up to 3 Gigabit Ethernet ports, making it ideal for building a Gigabit Turbo Ring, but leaving a spare Gigabit port for uplink use. The Ethernet redundant Turbo Ring and Turbo Chain (recovery time < 20 ms) and RSTP/STP (IEEE 802.1w/D) can increase system reliability

and the availability of your network backbone. The EDS-510A series is designed especially for communication demanding applications such as process control, shipbuilding, ITS, and DCS systems, which can benefit from a scalable backbone construction.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism

- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6

MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit

Interface
Fiber Ports: 1000BaseSFP slot
RJ45 Ports: 10/100BaseT(X) or 10/100/1000BaseT(X) auto negotiation speed
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve
LED Indicators: PWR1, PWR2, FAULT, 10/100M (TP port), 1000M (Gigabit port), MSTR/HEAD, CPLR/TAIL

Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC

Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.

- +13 to +30V for state "1"
- -30 to +3V for state "0"
- Max. input current: 8 mA

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs

Input Current:
EDS-510A-3GT: 0.65 A @ 24 V
EDS-510A-1GT2SFP: 0.44 A @ 24 V
EDS-510A-3SFP: 0.46 A @ 24 V

Overload Current Protection: Present

Connection: 2 removable 6-contact terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection

Dimensions: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)

Weight: 1170 g

Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1

Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8

Maritime: DNV, GL

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 204,000 hrs

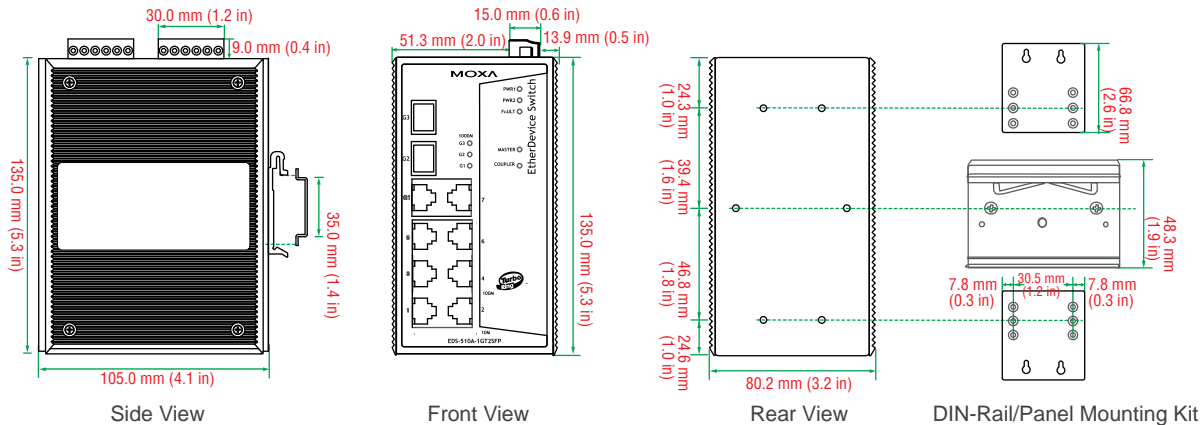**Database:** MIL-HDBK-217J, GB 25°C

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit

: Ordering Information

Available Models		Port Interface		
		Gigabit Ethernet		Fast Ethernet
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100/1000BaseT(X)	1000BaseSFP*	10/100BaseT(X)
EDS-510A-3GT	EDS-510A-3GT-T	3	–	7
EDS-510A-1GT2SFP	EDS-510A-1GT2SFP-T	1	2	7
EDS-510A-3SFP	EDS-510A-3SFP-T	–	3	7

*The EDS-510A series supports up to 3 1000BaseSFP slots. See page 1-69 for SFP-1G series Gigabit Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies

MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature

WK-46: Wall mounting kit

RK-4U: 4U-high 19" rack mounting kit

Industrial Ethernet Switches > EDS-510A Series

1

EDS-505A/508A/516A Series

5, 8, and 16-port managed Ethernet switches

> Plug-n-play Turbo Ring and Turbo Chain (recovery time < 20 ms), RSTP/STP (IEEE 802.1w/D) for Ethernet redundancy

> IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported

> -40 to 75°C operating temperature (T models)

> ABC-01 (Automatic Backup Configurator) for system configuration backup (optional accessory)

: Introduction

The EDS-505A/508A/516A are standalone 5, 8, and 16-port managed Ethernet switches. With their advanced Turbo Ring and Turbo Chain technology (recovery time < 20 ms) and RSTP/STP (IEEE 802.1w/D), the EDS-505A/508A/516A switches increase the reliability and availability of your industrial Ethernet network. Models with an wide

operating temperature range of -40 to 75°C are also available, and the switches support advanced management and security features, making the EDS-505A/508A/516A switches suitable for any harsh industrial environment.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning

- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- RMON for efficient network monitoring and proactive capability
- SNMPv1/v2c/v3 for different levels of network management
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Bandwidth management to prevent unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6

MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9

Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit (EDS-505A/508A), 2 Mbit (EDS-516A)

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve (EDS-505A/508A series only)
LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M

Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC

Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
- +13 to +30V for state "1"
- -30 to +3V for state "0"
- Max. input current: 8 mA

Optical Fiber

	100BaseFX		
	Multi-mode	**Single-mode**	**Single-mode, 80 km**
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable
d. 9/125 µm single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current:
EDS-505A: 0.24 A @ 24 V
EDS-505A-MM/SS: 0.35 A @ 24 V
EDS-508A: 0.26A @ 24 V
EDS-508A-MM/SS: 0.36 A @ 24 V
EDS-516A: 0.41 A @ 24 V
EDS-516A-MM: 0.51 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection
Dimensions:
EDS-505A/508A Series: 80.2 x 135 x 105 mm
(3.16 x 5.31 x 4.13 in)
EDS-516A Series: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight:
EDS-505A/508A Series: 1040 g
EDS-516A Series: 1586 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), EDS-505A/508A: level 3; EDS-516A: level 2;
EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 2;
EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3;
EN61000-4-8
Maritime: DNV, GL
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time:
EDS-505A Series: 352,000 hrs
EDS-508A Series: 339,000 hrs
EDS-516A Series: 247,000 hrs
Database: Telcordia (Bellcore), GB
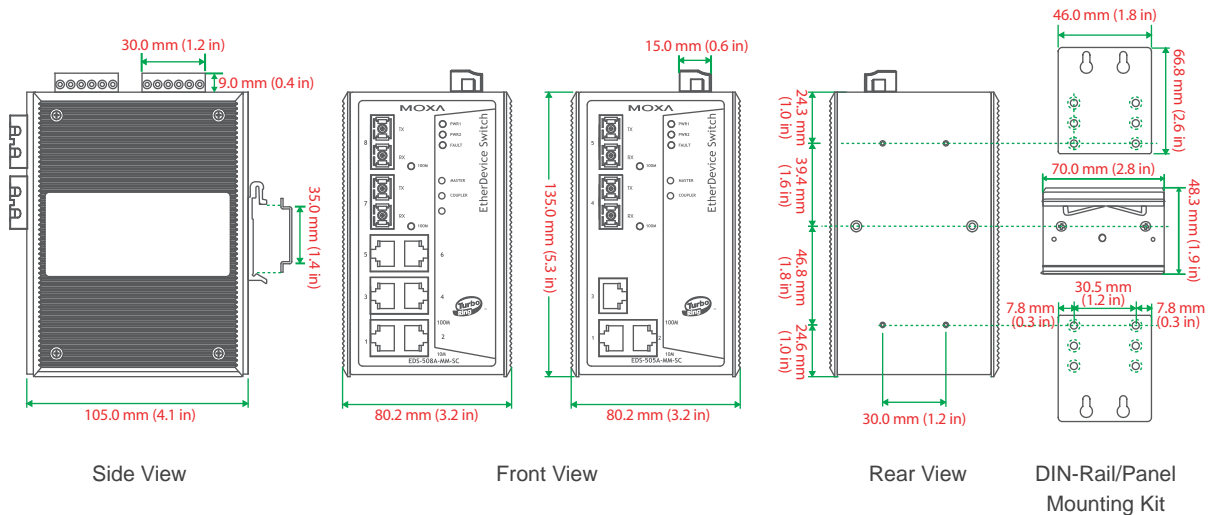
Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

EDS-505A/508A Series

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit

Dimensions

EDS-516A Series

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit

⁞ Ordering Information

Available Models		Port Interface				
			100BaseFX			
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100BaseT(X)	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
EDS-505A/508A Series						
EDS-505A/508A	EDS-505A/508A-T	5/8	–	–	–	–
EDS-505A/508A-MM-SC	EDS-505A/508A-MM-SC-T	3/6	2	–	–	–
EDS-505A/508A-MM-ST	EDS-505A/508A-MM-ST-T	3/6	–	2	–	–
EDS-505A/508A-SS-SC	EDS-505A/508A-SS-SC-T	3/6	–	–	2	–
EDS-505A/508A-SS-SC-80*	EDS-508A-SS-SC-80-T**	3/6	–	–	–	2
EDS-516A Series						
EDS-516A	EDS-516A	16	–	–	–	–
EDS-516A-MM-SC	EDS-516A-MM-SC-T	14	2	–	–	–
EDS-516A-MM-ST	EDS-516A-MM-ST-T	14	–	2	–	–

* The EDS-505A-SS-SC-80 is only available as a standard temperature model.
** EDS-508A-SS-SC-80-T: -40 to 60°C operating temperature

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

1

Industrial Ethernet Switches › EDS-505A/508A/516A Series

EDS-405A/408A Series

5 and 8-port entry-level managed Ethernet switches

> Plug-n-Play Turbo Ring and Turbo Chain with fast recovery time (under 20 ms)
> QoS, port-based VLAN, SNMPv1/v2c/v3, RMON supported
> Automatic warning by exception through e-mail, relay output
> User-friendly web-based configuration and management
> ABC-01 (Automatic Backup Configurator) for system configuration backup (optional accessory)

Introduction

The EDS-405A/408A are entry-level 5 and 8-port managed Ethernet switches designed especially for industrial applications. The switches support a variety of useful management functions, such as Turbo Ring, Turbo Chain, ring coupling, port-based VLAN, QoS, RMON, bandwidth management, port mirroring, and warning by email or relay. The ready-to-use Turbo Ring can be set up easily using the web-based management interface, or with the DIP switches located on the top panel of the EDS-405A/408A switches.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- Port-based VLAN to ease network planning
- QoS (IEEE 802.1p and TOS/DiffServ) to increase determinism
- RMON for efficient network monitoring and proactive capability
- SNMPv1/v2c/v3 for different levels of network management security
- Bandwidth management to prevent unpredictable network status
- Port mirroring for online debugging

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1p for Class of Service
Protocols: SNMPv1/v2c/v3, DHCP Server/Client, TFTP, SNTP, SMTP, RARP, RMON, HTTP, Telnet, Syslog, DHCP Option 66/67/82, BootP, LLDP, Modbus/TCP, IPv6
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 2 K (EDS-405A), 8 K (EDS-408A)
Packet Buffer Size: 1 Mbit

Interface
Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve
LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable

Power Requirements
Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current:
EDS-405A: 0.24 A @ 24 V
EDS-405A-MM/SS: 0.32 A @ 24 V
EDS-408A: 0.26 A @ 24 V
EDS-408A-MM/SS: 0.35 A @ 24 V
EDS-408A-3M/3S/2M1S/1M2S: 0.32 A @ 24 V
Overload Current Protection: Present
Connection: 1 removable 6-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection
Dimensions: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight:
EDS-405A, EDS-405A-MM, EDS-405A-SS: 650 g
EDS-408A, EDS-408A-MM, EDS-408A-SS: 650 g
EDS-408A-3M/3S/2M1S/1M2S: 890 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (EDS-408A-3M/3S/2M1S/1M2S Pending); ATEX Zone 2, Ex nC IIC (EDS-408A-3M/3S/2M1S/1M2S Pending)
EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8
Maritime:
EDS-405A, EDS-405A-MM, EDS-405A-SS: DNV, GL
EDS-408A, EDS-408A-MM, EDS-408A-SS: DNV, GL
EDS-408A-3M/3S/2M1S/1M2S: DNV, GL, ABS, LR, NK
Rail Traffic: EN50121-4 (EDS-408A series only)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.
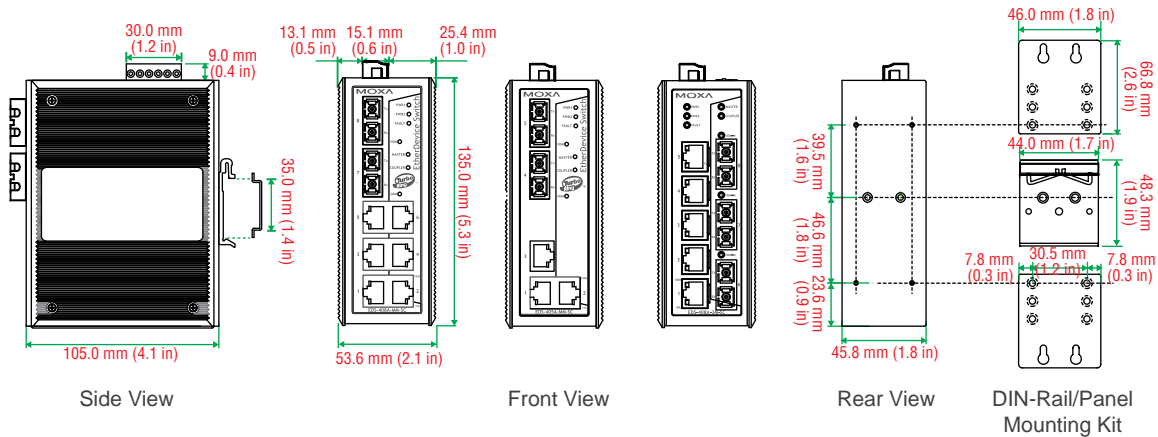
MTBF (meantime between failures)

Time:
EDS-405A Series: 392,000 hrs
EDS-408A Series: 363,000 hrs
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit

Ordering Information

Available Models		Port Interface			
			100BaseFX		
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100BaseT(X)	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector
EDS-405A/408A	EDS-405A/408A-T	5/8	–	–	–
EDS-405A/408A-MM-SC	EDS-405A/408A-MM-SC-T	3/6	2	–	–
EDS-405A/408A-MM-ST	EDS-405A/408A-MM-ST-T	3/6	–	2	–
EDS-408A/405A-SS-SC	EDS-408A/405A-SS-SC-T	3/6	–	–	2
EDS-408A-3M-SC	EDS-408A-3M-SC-T	5	3	–	–
EDS-408A-3M-ST	EDS-408A-3M-ST-T	5	–	3	–
EDS-408A-3S-SC	EDS-408A-3S-SC-T	5	–	–	3
EDS-408A-2M1S-SC	EDS-408A-2M1S-SC-T	5	2	–	1
EDS-408A-1M2S-SC	EDS-408A-1M2S-SC-T	5	1	–	2

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

1

Industrial Ethernet Switches ˃ EDS-405A/408A Series

EDS-G205/G308 Series

5G and 8G-port full Gigabit unmanaged Ethernet switches

> Fiber optic options for extending distance and electrical noise immunity (EDS-G308 series)
> Redundant dual 12/24/48 VDC power inputs
> Relay output warning for power failure and port break alarm
> Broadcast storm protection
> -40 to 75°C operating temperature range (T models)

: Introduction

The EDS-G205 and EDS-G308 switches are equipped with 5 and 8 Gigabit Ethernet ports, respectively, and up to 2 fiber optic ports, making them ideal for applications that demand high bandwidth. The EDS-G205/G308 switches provide an economical solution for your industrial Gigabit Ethernet connections, and the built-in relay warning function alerts network managers when power failures or port breaks occur. Two models are available in this series. One model has an operating temperature range of 0 to 60°C, and the other model has an extended operating temperature range of -40 to 75°C. Both models undergo a 100% burn-in test to ensure that they fulfill the special needs of industrial automation control applications. The EDS-G205/G308 switches can be installed easily on a DIN-Rail or in distribution boxes.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 8 K
Packet Buffer Size: 1088 Kbit (EDS-G205), 1408 Kbit (EDS-G308)

Interface
Fiber Ports: 100/1000BaseSFP slot (EDS-G308 series only)
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches: One for port break alarm, one for Enable/Disable broadcast storm protection
LED Indicators: PWR1, PWR2, FAULT, 10/100/1000M
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Power Requirements
Input Voltage: 12/24/48 VDC (9.6 to 60 VDC), redundant dual inputs
Input Current:
EDS-G205: 0.20 A @ 24 V
EDS-G308: 0.32 A @ 24 V
EDS-G308-2SFP: 0.34 A @ 24 V
Connection: 1 removable 6-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions:
EDS-G205: 35 x 130 x 105 mm (1.37 x 5.12 x 4.13 in)
EDS-G308: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight:
EDS-G205: 290 g
EDS-G308: 630 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3
Maritime: DNV, GL, ABS, LR, NK
Shock: IEC 60068-2-27
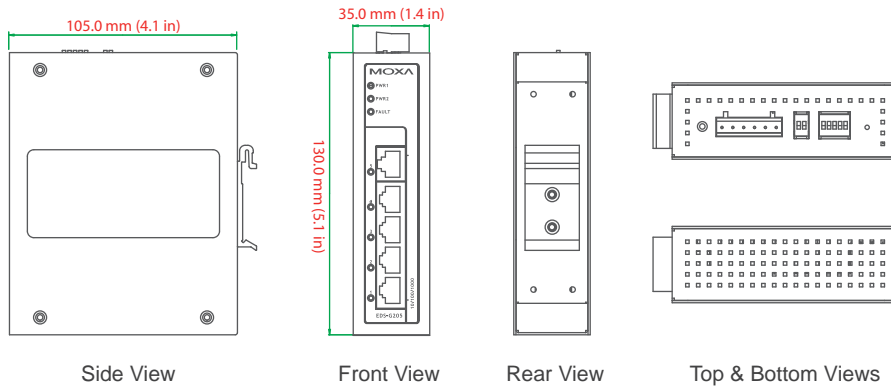**Freefall:** IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time: 325,000 hrs (EDS-G308 series)
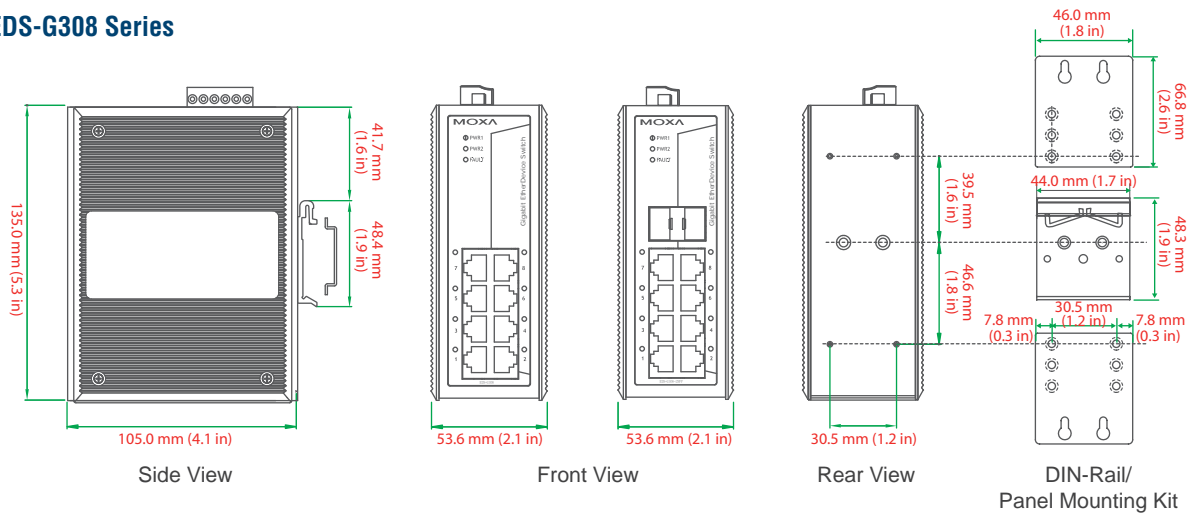**Database:** Telcordia (Bellcore), GB (EDS-G308 series)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

EDS-G205

105.0 mm (4.1 in) 35.0 mm (1.4 in) 130.0 mm (5.1 in)

Side View   Front View   Rear View   Top & Bottom Views

EDS-G308 Series

135.0 mm (5.3 in) 105.0 mm (4.1 in) 41.7 mm (1.6 in) 48.4 mm (1.9 in) 53.6 mm (2.1 in) 53.6 mm (2.1 in) 30.5 mm (1.2 in) 39.5 mm (1.6 in) 46.6 mm (1.8 in) 46.0 mm (1.8 in) 66.8 mm (2.6 in) 44.0 mm (1.7 in) 48.3 mm (1.9 in) 30.5 mm (1.2 in) 7.8 mm (0.3 in) 7.8 mm (0.3 in)

Side View   Front View   Rear View   DIN-Rail/ Panel Mounting Kit

:: Ordering Information

Product Model		Port Interface	
		Gigabit Ethernet	
Standard Temperature (0 to 60˚C)	**Wide Temperature (-40 to 75˚C)**	**10/100/1000BaseT(X)**	**Combo Port, 10/100/1000BaseT(X) or 100/1000BaseSFP***
EDS-G205	EDS-G205-T	5	–
EDS-G308	EDS-G308-T	8	–
EDS-G308-2SFP	EDS-G308-2SFP-T	6	2

*The EDS-G308-2SFP and EDS-G308-2SFP-T support up to 2 100/1000BaseSFP slots. See pages 1-69 and 1-71 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-30: Wall mounting kit (EDS-G205 series only)
WK-46: Wall mounting kit (EDS-G308 series only)
RK-4U: 4U-high 19" rack mounting kit

1

Industrial Ethernet Switches > EDS-G205/G308 Series

EDS-305/308/309/316 Series

5, 8, 9, and 16-port unmanaged Ethernet switches

> Redundant dual 24 VDC power inputs
> Relay output warning for power failure and port break alarm
> Broadcast storm protection
> Transparent transmission of VLAN tagged packets
> -40 to 75°C operating temperature range (T models)

: Introduction

The EDS-305/308/309/316 are 5, 8, 9, and 16-port Ethernet switches that provide an economical solution for your industrial Ethernet connections. The built-in relay warning function alerts network engineers when power failures or port breaks occur, and the switches are designed for harsh industrial environments, such as in hazardous locations (Class I, Div. 2/ATEX). The switches comply with FCC, UL, and CE standards, and come in two model types: standard operating temperature range models (0 to 60°C) and wide operating temperature range models (-40 to 75°C). Both models undergo a 100% burn-in test to ensure that they fulfill the special needs of industrial automation control applications. The EDS-305/308/309/316 switches can be installed easily on a DIN-Rail or in a distribution box.

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

MAC Table Size: 1 K (EDS-305/308/309), 4 K (EDS-316)
Packet Buffer Size: n/a (EDS-305), 512 Kbit (EDS-308/309), 1.5 Mbit (EDS-316)

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches: Port break alarm mask
LED Indicators: PWR1, PWR2, FAULT, 10/100M (TP port), 100M (fiber port)
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber

	100BaseFX		
	Multi-mode	**Single-mode**	**Single-mode, 80 km**
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km, 2 km (EDS-316-T)[a] 4 km, 2 km (EDS-316-T)[b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm single-mode fiber optic cable
d. 9/125 μm single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage:
EDS-305/308: 24 VDC (12 to 48 VDC), redundant dual inputs
EDS-309/316: 24 VDC (12 to 45 VDC), redundant dual inputs

Input Current:
EDS-305: 0.13 A @ 24 V
EDS-305-M/S: 0.17 A @ 24 V
EDS-308: 0.13 A @ 24 V
EDS-308-M/S: 0.21 A @ 24 V
EDS-308-MM/SS: 0.26 A @ 24 V
EDS-309-3M: 0.31 A @ 24 V
EDS-316: 0.27 A @ 24 V
EDS-316-M/S/MM/SS/MS: 0.44 A @ 24 V

Overload Current Protection:
EDS-305, EDS-305-M, EDS-305-S, EDS-308: 1.1 A
EDS-308-M/S/MM/SS, EDS-309 series, EDS-316 series: 1.6 A

Connection: 1 removable 6-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection

Dimensions:
EDS-305/308/309 Series:
53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
EDS-316 Series:
80.5 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)

Weight:
EDS-305/308/309 Series: 630 g
EDS-316 Series: 1140 g

Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety:
EDS-305/308/309 Series: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
EDS-316 series: UL508, UL60950-1, EN60950-1

Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), EDS-305/308: level 2; EDS-309/316: level 3

Maritime: DNV, GL
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6

Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time:
EDS-305 series: 422,000 hrs
EDS-308 series: 255,000 hrs
EDS-309 series: 396,000 hrs
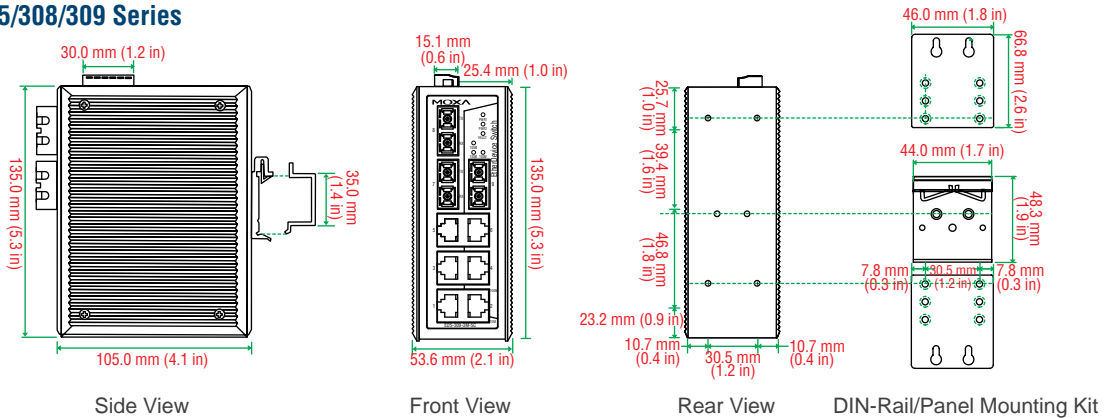EDS-316 series: 257,000 hrs

Database: MIL-HDBK-217F, GB 25°C
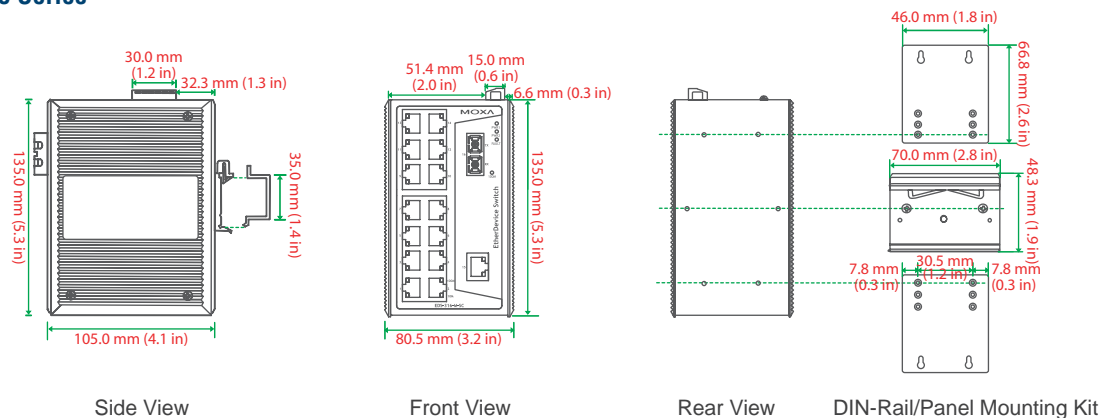
Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

EDS-305/308/309 Series

Side View

Front View

Rear View

DIN-Rail/Panel Mounting Kit

EDS-316 Series

Side View

Front View

Rear View

DIN-Rail/Panel Mounting Kit

: Ordering Information

Available Models		10/100BaseT(X)	Port Interface			
			100BaseFX			
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 75˚C)		Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
EDS-305 Series						
EDS-305	EDS-305-T	5	–	–	–	–
EDS-305-M-SC	EDS-305-M-SC-T	4	1	–	–	–
EDS-305-M-ST	EDS-305-M-ST-T	4	–	1	–	–
EDS-305-S-SC	EDS-305-S-SC-T	4	–	–	1	–
EDS-305-S-SC-80	–	4	–	–	–	1
EDS-308 Series						
EDS-308	EDS-308-T	8	–	–	–	–
EDS-308-M-SC	EDS-308-M-SC-T	7	1	–	–	–
EDS-308-MM-SC	EDS-308-MM-SC-T	6	2	–	–	–
EDS-308-MM-ST	EDS-308-MM-ST-T	6	–	2	–	–
EDS-308-S-SC	EDS-308-S-SC-T	7	–	–	1	–
EDS-308-SS-SC	EDS-308-SS-SC-T	6	–	–	2	–
EDS-308-S-SC-80	EDS-308-S-SC-80-T*	7	–	–	–	1
EDS-308-SS-SC-80	EDS-308-SS-SC-80-T*	6	–	–	–	2
EDS-309 Series						
EDS-309-3M-SC	EDS-309-3M-SC-T	6	3	–	–	–
EDS-309-3M-ST	EDS-309-3M-ST-T	6	–	3	–	–
EDS-316 Series						
EDS-316	EDS-316-T	16	–	–	–	–
EDS-316-M-SC	EDS-316-M-SC-T	15	1			–
EDS-316-M-ST	EDS-316-M-ST-T	15	–	1	–	–
EDS-316-MM-SC	EDS-316-MM-SC-T	14	2	–	–	–
EDS-316-MM-ST	EDS-316-MM-ST-T	14	–	2	–	–
EDS-316-MS-SC	EDS-316-MS-SC-T	14	1	–	1	–
EDS-316-S-SC	EDS-316-S-SC-T	15	–	–	1	–
EDS-316-SS-SC	EDS-316-SS-SC-T	14	–	–	2	–
EDS-316-MS-SC-80	–	14	1	–	–	1
EDS-316-S-SC-80	–	15	–	–	–	1
EDS-316-SS-SC-80	–	14	–	–	–	2
EDS-316-SS-SC-40/80	–	14	–	–	1	1

* EDS-308-S-SC-80-T/EDS-308-SS-SC-80-T: -40 to 60˚C operating temperature

Optional Accessories (can be purchased separately)
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

EDS-205A/208A Series

5 and 8-port unmanaged Ethernet switches

> 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi/single-mode, SC or ST connector)
> Redundant dual 12/24/48 VDC, 18 to 30 VAC power inputs
> IP30 aluminum housing
> Rugged hardware design well suited for hazardous locations (Class I Div. 2 /ATEX) and maritime environments (DNV/GL)
> -40 to 75°C operating temperature range (T models)

: Introduction

The EDS-205A/208A series are 5 and 8-port industrial Ethernet switches that support IEEE 802.3 and IEEE 802.3u/x with 10/100M full/half-duplex, MDI/MDI-X auto-sensing. The EDS-205A/208A switches provide 12/24/48 VDC (9.6 to 60 VDC), 18 to 30 VAC redundant power inputs that can be connected simultaneously to live AC/DC power sources. These switches have been designed for harsh industrial environments, such as in maritime (DNV/GL) or hazardous locations (Class I Div. 2, ATEX Zone 2) that comply with FCC, UL, and CE standards.

The EDS-205A/208A switches are available with a standard operating temperature range from -10 to 60°C, or with a wide operating temperature range from -40 to 75°C. All models are subjected to a 100% burn-in test to ensure that they fulfill the special needs of industrial automation control applications. In addition, the EDS-205A/208A switches have DIP switches for enabling or disabling broadcast storm protection, providing another level of flexibility for industrial applications.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 1 K
Packet Buffer Size: 512 Kbit

Interface
Fiber Ports: 100BaseFX ports (SC/ST connector, multi-mode, single-mode)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches: Enable/Disable broadcast storm protection
LED Indicators: Power, 10/100M (TP port), 100M (fiber port)

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm single-mode fiber optic cable

Power Requirements
Input Voltage: 12/24/48 VDC (9.6 to 60 VDC), 18 to 30 VAC (47 to 63 Hz), redundant dual inputs
Input Current:
EDS-205A: 0.1 A @ 24 V
EDS-205A-M/S: 0.11 A @ 24 V
EDS-208A: 0.13 A @ 24 V
EDS-208A-M: 0.17 A @ 24 V
EDS-208A-MM/SS: 0.22 A @ 24 V
Overload Current Protection: 1.1 A
Connection: 1 removable 4-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Aluminum, IP30 protection
Dimensions:
EDS-205A: 30 x 115 x 70 mm (1.18 x 4.52 x 2.76 in)
EDS-208A: 50 x 115 x 70 mm (1.96 x 4.52 x 2.76 in)
Weight:
EDS-205A: 175 g
EDS-208A: 275 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-11
Maritime: DNV, GL, ABS, LR, NK (EDS-205A, all Pending)
Rail Traffic: EN50121-4
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 425,000 hrs
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View | Front Views | Rear Views | Top & Bottom Views
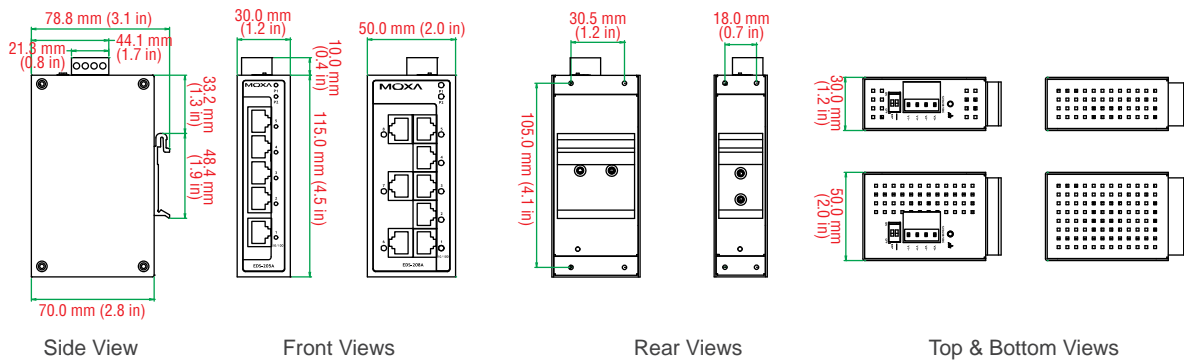
Ordering Information

Available Models			Port Interface		
			100BaseFX		
Standard Temperature (-10 to 60˚C)	Wide Temperature (-40 to 75˚C)	10/100BaseT(X)	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector
EDS-205A	EDS-205A-T	5	–	–	–
EDS-205A-M-SC	EDS-205A-M-SC-T	4	1	–	–
EDS-205A-M-ST	EDS-205A-M-ST-T	4	–	1	–
EDS-205A-S-SC	EDS-205A-S-SC-T	4	–	–	1
EDS-208A	EDS-208A-T	8	–	–	–
EDS-208A-M-SC	EDS-208A-M-SC-T	7	1	–	–
EDS-208A-M-ST	EDS-208A-M-ST-T	7	–	1	–
EDS-208A-MM-SC	EDS-208A-MM-SC-T	6	2	–	–
EDS-208A-MM-ST	EDS-208A-MM-ST-T	6	–	2	–
EDS-208A-S-SC	EDS-208A-S-SC-T	7	–	–	1
EDS-208A-SS-SC	EDS-208A-SS-SC-T	6	–	–	2

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-30: Wall mounting kit (EDS-205A series only)
WK-46: Wall mounting kit (EDS-208A series only)
RK-4U: 4U-high 19" rack mounting kit

MOXA® www.moxa.com info@moxa.com

EDS-205/208 Series

5 and 8-port entry-level unmanaged Ethernet switches

> 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi-mode, SC/ST connectors)
> IEEE802.3/802.3u/802.3x support
> Broadcast storm protection
> DIN-Rail mounting ability
> -10 to 60°C operating temperature range

Introduction

The EDS-205/208 series of industrial Ethernet switches are entry-level industrial 5 and 8-port Ethernet switches that support IEEE 802.3/802.3u/802.3x with 10/100M, full/half-duplex, MDI/MDIX auto-sensing RJ45 ports. The EDS-205/208 switches are rated to operate at temperatures ranging from -10 to 60°C, and are rugged enough for

any harsh industrial environment. The switches can be easily installed on a DIN-Rail as well as in distribution boxes. The DIN-Rail mounting capability, wide operating temperature, and the the IP30 housing with LED indicators make the plug-and-play EDS-205/208 switches easy to use and reliable.

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 1 K
Packet Buffer Size: 512 Kbit

Interface
Fiber Ports: 100BaseFX ports (SC/ST connector, multi-mode)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
LED Indicators: Power, 10/100M (TP port), 100M (fiber port)

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable

Power Requirements
Input Voltage:
EDS-205: 12 to 48 VDC, 18 to 30 VAC (47 to 63 Hz)
EDS-208 series: 12 to 45 VDC, 18 to 30 VAC (47 to 63 Hz)
Input Current:
EDS-205: 0.12 A @ 24 V
EDS-208: 0.14 A @ 24 V
EDS-208-M: 0.23 A @ 24 V
Overload Current Protection: 1.1 A
Connection: 1 removable 3-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Plastic, IP30 protection
Dimensions:
EDS-205: 24.9 x 100 x 86.5 mm (0.98 x 3.94 x 3.41 in)
EDS-208: 40 x 100 x 86.5 mm (1.57 x 3.94 x 3.41 in)
Weight:
EDS-205: 135 g
EDS-208: 170 g
Installation: DIN-Rail mounting

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety:
EDS-205: UL508
EDS-208: UL508, UL60950-1
EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 2; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), EDS-205: level 3; EDS-208: level 2;
EN61000-4-8; EN61000-4-11
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time:
EDS-205: 323,000 hrs
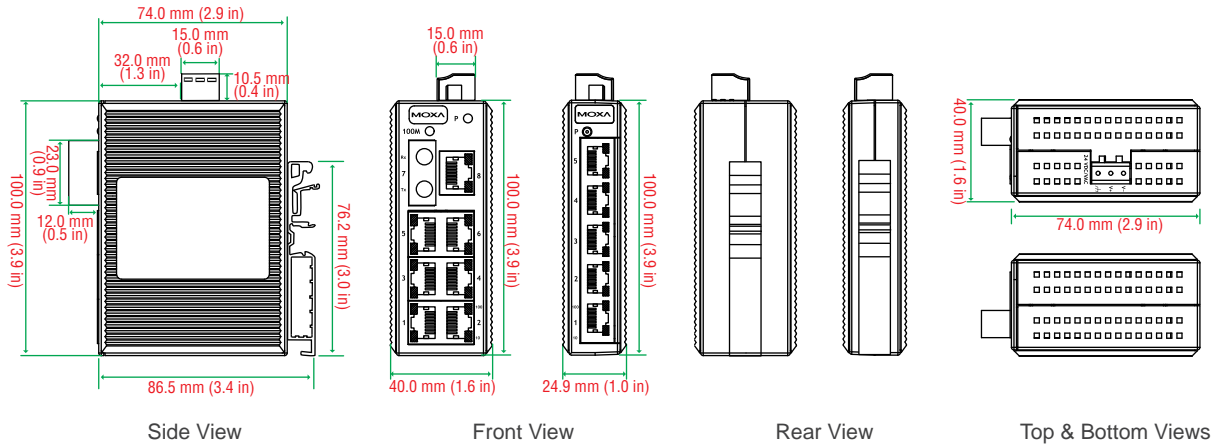EDS-208: 368,000 hrs
Database:
EDS-205: Telcordia (Bellcore), GB
EDS-208: MIL-HDBK-217F, GB 25°C
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   Top & Bottom Views

Ordering Information

Available Models	Port Interface			Housing Material	Power Range
		100BaseFX			
Standard Temperature (-10 to 60°C)	10/100BaseT(X)	Multi-mode, SC Connector	Multi-mode, ST Connector	Housing Material	Power Range
EDS-205	5	–	–	Plastic	12 to 48 VDC
EDS-208	8	–	–	Plastic	12 to 45 VDC
EDS-208-M-SC	7	1	–	Plastic	12 to 45 VDC
EDS-208-M-ST	7	–	1	Plastic	12 to 45 VDC

Optional Accessories (can be purchased separately)
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
RK-4U: 4U-high 19" rack mounting kit

IKS-6726 Series

24+2G-port Gigabit modular rackmount managed Ethernet switches

> Meets UL60950-1, NEMA TS2, EN50121-4, and maritime certifications
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply
> Modular design lets you choose from a variety of media combinations
> -40 to 75°C operating temperature range

Turbo Ring Self-Healing Ethernet
Turbo Chain *Beyond Redundant Ring*

R6 READY   CE   FC

Introduction

The IKS-6726 series of industrial rackmount Ethernet switches are designed to meet the rigorous demands of mission critical applications for industry and business, such as traffic control systems (NEMA TS2) and maritime applications. The IKS-6726's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling and wiring costs. The modular design of the IKS-6726 also makes network planning easy, and allows greater flexibility by letting you install up to 2 Gigabit ports and 24 fast Ethernet ports.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status with "Lock port" to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMP v1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6

Modular Rackmount Ethernet Switch System, IKS-6726

Slot 1   Slot 2   Slot 3

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094

IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 2 Mbit
Interface
Fast Ethernet: Slots 1 and 2 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP
Gigabit Ethernet: Slot 3 for 2-port PM-7200 Gigabit Ethernet combo module with 10/100/1000BaseT(X) or 1000BaseSFP slots
Note: See page 2-39 for PM-7200 Gigabit and fast Ethernet module product information.
Console Port: RS-232 (RJ45 connector)
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC
Power Requirements
Input Voltage: 24 VDC (18 to 36 V), or 48 VDC (36 to 72 V), or 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)
Input Current: (all ports are equipped with fiber)
• Max. 1.11 A @ 24 VDC
• Max. 0.56 A @ 48 VDC
• Max. 0.56/0.28 A @ 110/220 VDC
• Max. 0.56/0.28 A @ 110/220 VAC

Overload Current Protection: Present
Connection: 10-contact terminal block
Reverse Polarity Protection: Present
Physical Characteristics
Housing: IP30 protection
Dimensions: 440 x 44 x 349.3 mm (17.32 x 1.73 x 13.75 in)
Weight: 4200 g
Installation: 19'' rack mounting
Environmental Limits
Operating Temperature: -40 to 75°C (-40 to 167°F), cold start requires min. of 100 VAC at -40°C
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Regulatory Approvals
Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
Maritime: DNV (Pending), GL (Pending), ABS (Pending), LR (Pending), NK (Pending)
Traffic Control: NEMA TS2
Rail Traffic: EN50121-4
Note: Please check Moxa's website for the most up-to-date certification status.
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Rear View

Top View

Side View

Front View

: Ordering Information

Step 1: Select Ethernet switch system **Step 2: Select interface modules**

IKS-6726 with power supply ➜ **PM-7200 modules (Gigabit or fast Ethernet)**

Note: The IKS-6726 Ethernet switch system is delivered without interface modules. Please see pages 2-39 to determine which PM-7200 interface modules are suitable for your application.

IKS-6726 Modular Rackmount Ethernet Switch System

Modular managed rackmount Ethernet switch systems with 8 fixed 10/100BaseT(X) ports, 2 slots for fast Ethernet modules, and 1 slot for a Gigabit Ethernet module. Supports up to 24+2G ports, -40 to 75°C operating temperature.

Available Models	Power Supply					
	Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
IKS-6726-F-24-T	1	–	–	–	–	–
IKS-6726-F-24-24-T	1	–	–	1	–	–
IKS-6726-F-24-48-T	1	–	–	–	1	–
IKS-6726-F-24-HV-T	1	–	–	–	–	1
IKS-6726-F-48-T	–	1	–	–	–	–
IKS-6726-F-48-48-T	–	1	–	–	1	–
IKS-6726-F-48-HV-T	–	1	–	–	–	1
IKS-6726-F-HV-T	–	–	1	–	–	–
IKS-6726-F-HV-HV-T	–	–	1	–	–	1

Gigabit/Fast Ethernet Module Compatibility Chart for the IKS-6726

	Interface Module																							
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓
Slot 2	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓
Slot 3	–	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

1

Industrial Ethernet Switches > IKS-6726 Series

IKS-6524/6526 Series

24 and 24+2G-port rackmount managed Ethernet switches

> Turbo Ring and Turbo Chain redundancy integrating control networks and field networks (Recovery time < 20 ms)
> Isolated redundant power inputs with 110/220 VAC power supply and standardized power inlets
> -40 to 75°C operating temperature range
> Flexible copper/fiber configuration with Gigabit uplink
> Meets industrially recognized standards for transportation, process automation, and maritime applications

Introduction

The IKS-6500 series fixed-type industrial managed rackmount switches are designed to seamlessly integrate your control networks and field networks. The switches can operate in extreme operating temperatures ranging from -40 to 75°C, and are equipped with up to two AC power inputs for conventional usage as well as advanced Ethernet switching functionality to ensure the reliability of your communication network. The IKS-6500 switches are designed to meet the rigorous demands of mission critical applications, including traffic control systems (NEMA TS2), networks along railway tracks (EN50121-4), maritime applications (DNV/GL and other maritime certifications), and mining and oil/gas industry applications (Class I Division 2).

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status with "Lock port" to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMP v1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 2 Mbit

Interface

Fiber Ports: 100BaseSFP slot (IKS-6524-8SFP series) or 1000BaseSFP slot (IKS-6526-2GTXSFP series)

RJ45 Ports: 10/100BaseT(X) and/or 10/100/1000BaseT(X) auto negotiation speed

Console Port: RS-232 (RJ45 connector)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL

Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Power Requirements

Input Voltage: 110/220 VAC (85 to 264 VAC)

Input Current:
- IKS-6524-F-HV-T: Max. 333/222 mA @ 110/230 VAC
- IKS-6524-F-HV-HV-T: Max. 402/324 mA @ 110/230 VAC
- IKS-6524-8SFP-F-HV-T: Max. 501/295 mA @ 110/230 VAC
- IKS-6524-8SFP-F-HV-HV-T: Max. 555/390 mA @ 110/230 VAC
- IKS-6526-2GTXSFP-F-HV-T: Max. 398/254 mA @ 110/230 VAC
- IKS-6526-2GTXSFP-F-HV-HV-T: Max. 465/350 mA @ 110/230 VAC

Overload Current Protection: Present

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 342.5 mm (17.32 x 1.73 x 13.48 in)

Weight:
IKS-6524 series: 4780 g
IKS-6524-8SFP series: 4850 g
IKS-6526-2GTXSFP series: 4820 g

Installation: 19" rack mounting

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F), cold start requires min. of 100 VAC at -40°C

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1 (Pending), CSA C22.2 No. 60950-1, EN60950-1 (Pending)

Hazardous Locatoin: UL/cUL Class I, Division 2, Groups A, B, C, D (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

Maritime: DNV (Pending), GL (Pending), ABS (Pending), LR (Pending), NK (Pending)

Traffic Control: NEMA TS2

Rail Traffic: EN50121-4

Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

IKS-6524

44 mm (1.7 in)

IKS-6524-8SFP

44 mm (1.7 in)

IKS-6526-2GTXSFP

44 mm (1.7 in)

Front View

342.5 mm (13.5 in)

44 mm (1.7 in)

Side View

Rear View

440 mm (17.3 in)

Top View
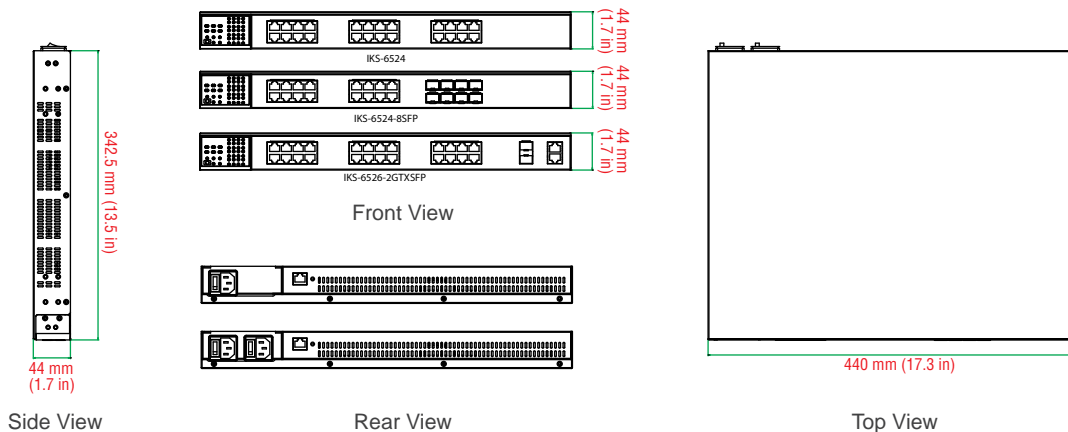
⁝ Ordering Information

Available Models (-40 to 75°C)	Port Interface			Power Supply	
	Gigabit Ethernet	Fast Ethernet		Isolated Power Supply 1	Isolated Power Supply 2
	Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*	10/100BaseT(X)	100BaseSFP*	HV: 85 to 264 VAC	HV: 85 to 264 VAC
IKS-6524-F-HV-T	–	24	–	1	–
IKS-6524-F-HV-HV-T	–	24	–	1	1
IKS-6524-8SFP-F-HV-T	–	16	8	1	–
IKS-6524-8SFP-F-HV-HV-T	–	16	8	1	1
IKS-6526-2GTXSFP-F-HV-T	2	24	–	1	–
IKS-6526-2GTXSFP-F-HV-HV-T	2	24	–	1	1

*The IKS-6500 series switches support 2 1000BaseSFP slots or 8 100BaseSFP slots. See pages 1-69 and 1-71 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

Power Cords and Adaptors: See Appendix A for details

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

IKS-6324 Series

22+2G-port Gigabit rackmount unmanaged Ethernet switches

> Meets UL60950-1, NEMA TS2, EN50121-4, and DNV/ GL certifications
> Universal power supply range, 12/24/48 VDC or 110/220 VDC/VAC
> Redundant dual 12/24/48 VDC power inputs
> -40 to 75˚C operating temperature range

CE FC

: Introduction

The IKS-6324 industrial rackmount Ethernet switches are designed to meet the demands of industrial application networks such as traffic control systems (NEMA TS2), and maritime applications (DNV/ GL). The IKS-6324 is a 24-port industrial 19" rackmount Ethernet switch series that provides a rugged and economical solution for your industrial Ethernet connections. Up to two fast Ethernet fiber optic ports and combo Gigabit Ethernet TP or fiber optic ports can be chosen to make the construction of a reliable Ethernet network easy. A universal power supply range of 12/24/48 VDC or 110/220 VDC/VAC give users greater flexibility in choosing power inputs. The Ethernet switches comply with UL standards and support a wide operating temperature range of -40 to 75°C. All models undergo a 100% burn-in test to ensure that they fulfill the special needs of industrial automation control applications.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 8 K
Packet Buffer Size: 2.5 Mbit

Interface
Fiber Ports: 100BaseFX (SC/ST connector) or 1000BaseSFP slots
RJ45 Ports: 10/100BaseT(X) or 10/100/1000BaseT(X) auto negotiation speed, Full/Half duplex mode and auto MDI/MDI-X connection
LED Indicators: STAT, PWR1, PWR2, FAULT, LNK/ACT, FDX/HDX, SPEED
Note: Slot 1 is for a 2-port PM-7200 Gigabit Ethernet combo module, or 1 or 2-port PM-7200 fast Ethernet module. See page 2-39 for details.

Power Requirements
Input Voltage: 12/24/48 VDC (9 to 60 V), or 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)
Input Current: (all ports are equipped with fiber)
• Max. 0.68 A @ 24 VDC
• Max. 0.35 A @ 48 VDC
• Max. 0.17/0.11 A @ 110/220 VDC
• Max. 0.33/0.23 A @ 110/220 VAC
Overload Current Protection: Present
Connection: 10-contact terminal block
Reverse Polarity Protection: Present

Unmanaged Rackmount Ethernet Switch System, IKS-6324

Slot 1

Physical Characteristics
Housing: IP30 protection
Dimensions: 440 x 44 x 278.3 mm (17.32 x 1.73 x 10.96 in)
Weight: 4300 g
Installation: 19'' rack mounting

Environmental Limits
Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
Maritime: DNV (Pending), GL (Pending), ABS (Pending), LR (Pending), NK (Pending)
Traffic Control: NEMA TS2
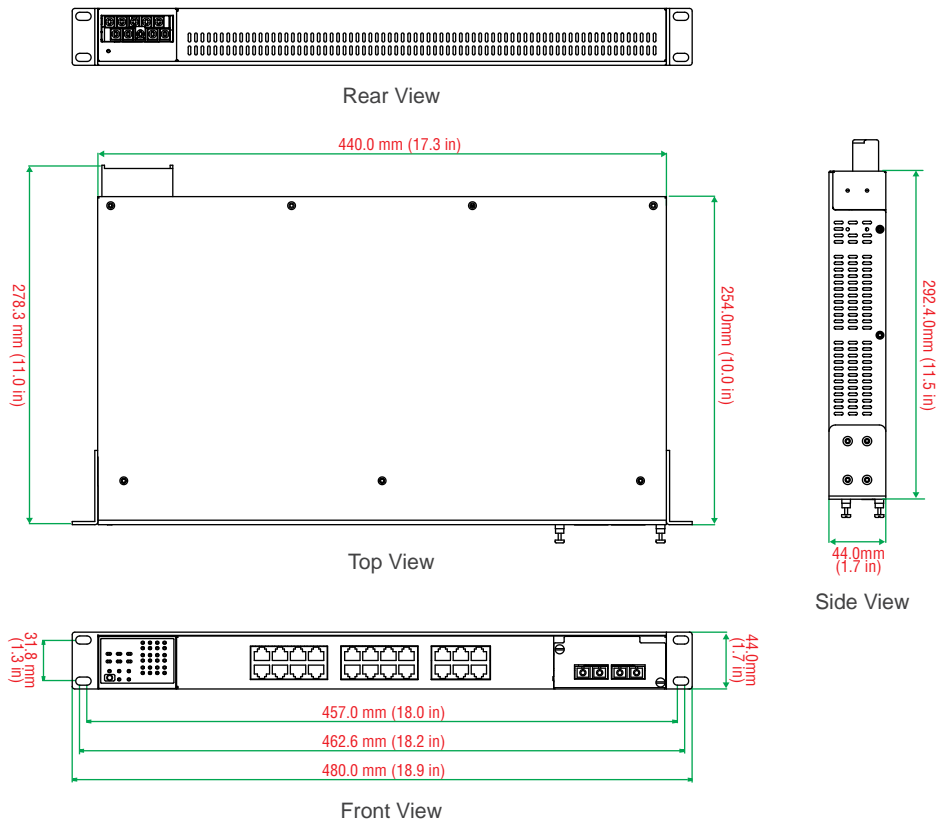**Rail Traffic:** EN50121-4
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Rear View

440.0 mm (17.3 in)

278.3 mm (11.0 in)

254.0mm (10.0 in)

Top View

292.4.0mm (11.5 in)

44.0mm (1.7 in)

Side View

31.8 mm (1.3 in)

44.0mm (1.7 in)

457.0 mm (18.0 in)

462.6 mm (18.2 in)

480.0 mm (18.9 in)

Front View

: Ordering Information

Step 1: Select Ethernet switch system

IKS-6324 with power supply

Step 2: Select interface modules

PM-7200 modules
(Gigabit or fast Ethernet)

Note: The IKS-6324 Ethernet switch system is delivered without interface modules. Please see page 2-39 to determine which PM-7200 interface modules are suitable for your application.

IKS-6324 Unmanaged Rackmount Ethernet Switch System

The IKS-6324 switch system consists of 2 unmanaged rackmount Ethernet switch systems with 22 10/100BaseT(X) ports, and 1 slot for fast Ethernet or Gigabit Ethernet modules. A total of up to 24 or 22+2G ports can be installed, and the switch can be used in a temperature range from -40 to 75°C.

Product Model	Power Supply	
Front Cabling, Front Display	LV: 12/24/48 VDC (9 to 60 V)	HV: 88 to 300 VDC and 85 to 264 VAC,isolated
IKS-6324-F-LV-T	1	–
IKS-6324-F-HV-T	–	1

Gigabit/Fast Ethernet Module Compatibility Chart for the IKS-6324

	Interface Module						
	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-1SSC	PM-7200-2MSC	PM-7200-2MST	PM-7200-2SSC
Slot 1	✓	✓	✓	✓	✓	✓	✓

EDS-P510 Series

7+3G-port Gigabit PoE managed Ethernet switches

PoE
Power over Ethernet

> 4 IEEE 802.3af-compliant PoE and Ethernet combo ports
> Provides up to 15.4 watts at 48 VDC per PoE port
> Intelligent power consumption detection, PD failure check, and PoE scheduling function
> 3 combo (10/100/1000BaseT(X) or 100/1000BaseSFP slot) Gigabit ports; 2 ports for redundant ring and 1 port for uplink
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> IEEE 1588 PTP, Modbus/TCP, LLDP, SNMP Inform, QoS, IGMP snooping, VLAN, IEEE 802.1X, HTTPS, SNMPv3, and SSH supported

Turbo Ring
Self-Healing Ethernet

Beyond Redundant Ring
Turbo Chain

RoHS
c UL us LISTED CE FC

: Introduction

The EDS-P510 series Gigabit managed redundant Ethernet switches come standard with 4 10/100BaseT(X) 802.3af (PoE) compliant Ethernet ports and 3 combo Gigabit Ethernet ports. The EDS-P510 switches provide up to 15.4 watts of power per PoE port, and allow power to be supplied to connected devices (such as surveillance cameras, wireless access points, and IP phones) when AC power is not readily available or is cost-prohibitive to provide locally. The

EDS-P510 switches are highly versatile, and their SFP fiber port can transmit data up to 80 km from the device to the control center with high EMI immunity. The Ethernet switches support advanced management and security features. The EDS-P510 series is designed especially for security automation applications such as IP surveillance, and gate of entry systems, which can benefit from a scalable backbone construction and Power-over-Ethernet support.

Features and Benefits

- Advanced PoE management function (PoE port setting, PD failure check, and PoE scheduling)
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning

- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Lock port function for blocking unauthorized access based on MAC address
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management to prevent unpredictable network status
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output

: Specifications

Technology
Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, Modbus/TCP, SNMP Inform, LLDP, IEEE 1588 PTP, IPv6
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit

Interface

Fiber Ports: 100/1000BaseSFP slot

RJ45 Ports: 10/100BaseT(X) or 10/100/1000BaseT(X) auto negotiation speed

Console Port: RS-232 (RJ45 connector)

DIP Switches: Turbo Ring, Master, Coupler, Reserve

LED Indicators: PWR1, PWR2, FAULT, 10/100/1000, 10/100, MSTR/HEAD, CPLR/TAIL, PoE

Alarm Contact: 2 relay outputs with current carrying capacity of 0.5 A @ 48 VDC

Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
• +13 to +30V for state "1"
• -30 to +3V for state "0"
• Max. input current: 8 mA

Power Requirements

Input Voltage: 48 (46 to 50V) VDC, redundant dual inputs

Input Current: Max. 1.62 A @ 48 VDC (supports up to 4 ports at 15.4 W per PoE port)

Overload Current Protection: Present

Connection: 2 removable 6-contact terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection

Dimensions: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)

Weight: 1170 g

Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Operating Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508

Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3; EN61000-4-8

Maritime: DNV, GL, ABS, LR, NK

Traffic Control: NEMA TS2 (Pending)

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 203,000 hrs

Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   DIN-Rail/Panel Mounting Kit
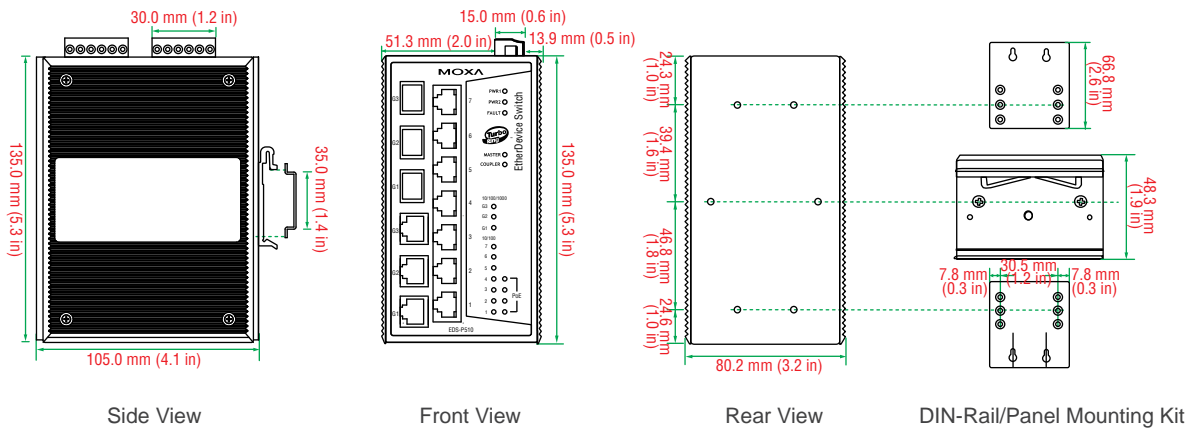
: Ordering Information

Available Models		Port Interface		
		Gigabit Ethernet	Fast Ethernet	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	Combo Port, 10/100/1000BaseT(X) or 100/1000BaseSFP*	PoE, 10/100BaseT(X)	10/100BaseT(X)
EDS-P510	EDS-P510-T	3	4	3

*The EDS-P510 series supports up to 3 100/1000BaseSFP slots. See page pages 1-69 and 1-71 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Optional Accessories (can be purchased separately)

SPL-24: PoE splitter, maximum output of 12.95 W at 24 VDC, 0 to 60°C operating temperature (see page 1-61 for details)

SPL-24-T: PoE splitter, maximum output of 12.95 W at 24 VDC, -40 to 75°C operating temperature (see page 1-61 for details)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

DR-75-48/120-48: 75/120 W DIN-Rail 48 VDC power supplies

WK-46: Wall mounting kit

RK-4U: 4U-high 19" rack mounting kit

1

Industrial Ethernet Switches > EDS-P510 Series

EDS-P308 Series

8-port PoE unmanaged Ethernet switches

PoE
Power over Ethernet

> 4 IEEE 802.3af compliant PoE and Ethernet combo ports
> Up to 15.4 watts at 48 VDC per PoE port
> Intelligent power consumption detection and classification
> Redundant dual VDC power inputs
> -40 to 75°C operating temperature range (T models)

c(UL)us LISTED   CE   FC

: Introduction

The EDS-P308 switches are smart, 8-port, unmanaged Ethernet switches supporting PoE (Power-over-Ethernet) on ports 1 to 4. The switches are classified as power source equipment (PSE), and when used in this way, the EDS-P308 switches enable centralization of the power supply and provide up to 15.4 watts of power per port. The switches can be used to power IEEE 802.3af compliant powered devices (PD), eliminating the need for additional wiring, and support IEEE 802.3/802.3u/802.3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing to provide an economical solution for your industrial Ethernet network. In addition, the built-in relay warning function alerts network engineers when power failures or port breaks occur.

: Specifications

Technology
Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
MAC Table Size: 1 K
Packet Buffer Size: 512 Kbit

Interface
Fiber Ports: 100BaseFX ports (SC connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches: Port break alarm mask
LED Indicators: PWR1, PWR2, FAULT, 10/100M, PoE
Alarm Contact: 1 relay output with current carrying capacity of 0.5 A @ 48 VDC

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable

Power Requirements
Input Voltage: 48 (46 to 50 V) VDC, redundant inputs
Input Current: 1.6 A @ 48 V (supports up to 4 ports at 15.4 W per PoE port)
Overload Current Protection: 2.5 A @ 48 VDC
Connection: 1 removable 6-contact terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 53.6 × 135 × 105 mm (2.11 x 5.31 x 4.13 in)
Weight: 840 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508

Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 4; EN61000-4-5 (Surge), level 4;
EN61000-4-6 (CS), level 3; EN61000-4-8

Maritime: DNV, GL, ABS, LR, NK
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 360,000 hrs
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View Front View Rear View DIN-Rail/Panel Mounting Kit Top and Bottom Views
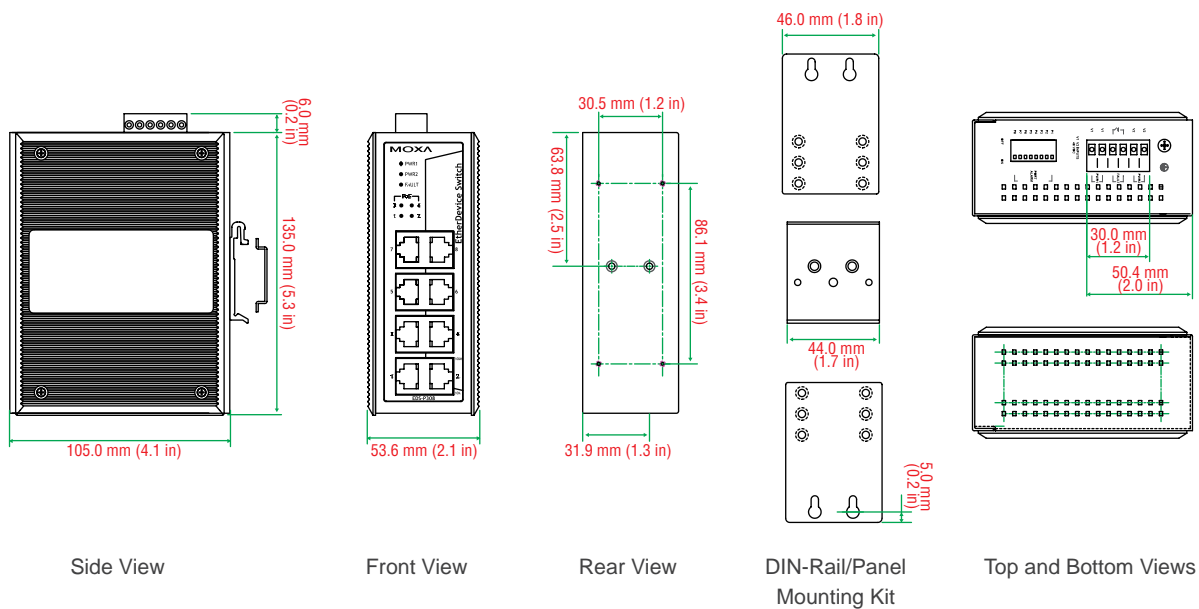
Ordering Information

Available Models		Port Interface			
				100BaseFX	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100BaseT(X)	PoE, 10/100BaseT(X)	Mulit-mode, SC Connector	Single-mode, SC Connector
EDS-P308	EDS-P308-T	4	4	–	–
EDS-P308-M-SC	EDS-P308-M-SC-T	3	4	1	–
EDS-P308-S-SC	EDS-P308-S-SC-T	3	4	–	1
EDS-P308-MM-SC	EDS-P308-MM-SC-T	2	4	2	–
EDS-P308-SS-SC	EDS-P308-SS-SC-T	2	4	–	2

Optional Accessories (can be purchased separately)

SPL-24: PoE splitter, maximum output of 12.95 W at 24 VDC, 0 to 60°C operating temperature (see page 1-61 for details)
SPL-24-T: PoE splitter, maximum output of 12.95 W at 24 VDC, -40 to 75°C operating temperature (see page 1-61 for details)
DR-75-48/120-48: 75W/120W DIN-Rail 48 VDC power supplies
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

1

Industrial Ethernet Switches > EDS-P308 Series

IKS-6726-8PoE Series

24+2G-port Gigabit modular rackmount PoE managed Ethernet switches

PoE
Power over Ethernet

> Supports a total of 120W by smart PoE power management
> Meets UL60950-1, NEMA TS2, EN50121-4, and DNV/GL certifications
> Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
> Modular design lets you choose from a variety of media combinations
> -40 to 75°C operating temperature range

Turbo Ring Self-Healing Ethernet
Beyond Redundant Ring **Turbo Chain**

R6 READY   CE   FC

∷ Introduction

The IKS-6726-8PoE series of industrial rackmount Ethernet switches are designed to meet the demands of mission critical applications for business and industry, such as traffic control systems (NEMA TS2), power automation, and critical facility surveillance. The IKS-6726-8PoE comes standard with 8 10/100BaseT(X) ports and 8 10/100BaseT(X) 802.3af (PoE) compliant Ethernet ports. The IKS-6726-8PoE Ethernet switches provide two kinds of power input source: 48 VDC and 110/220 VDC/VAC. The IKS-6726-8PoE supports a total of 120 W PoE power supply. With a limit of 120 W, the IKS-6726-8PoE models can

supply power to up to 16 PoE ports. The switches support advanced management and security features, and are designed especially for security automation applications such as IP surveillance and gate of entry systems, which can benefit from a scalable backbone construction and Power-over-Ethernet support. In addition, the modular design of the IKS-6726-8PoE makes network planning easy, and allows greater flexibility by letting you install up to 16 PoE ports, 2 Gigabit ports, and 24 fast Ethernet ports.

Features and Benefits

- Advanced PoE management function
- IEEE 802.3af-compliant PoE and Ethernet combo ports
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms at full load), and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism

- IEEE 802.3ad, LACP for optimum bandwidth utilization
- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management to prevent unpredictable network status with "Lock port" to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by Web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

∷ Specifications

Technology
Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

IKS-6726-8PoE Modular Rackmount Ethernet Switch System

Slot 1   Slot 2

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, Modbus/TCP, LLDP, IEEE 1588 PTP, IPv6

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9

Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4

Max. Number of Available VLANs: 64

VLAN ID Range: VID 1 to 4094

IGMP Groups: 256

MAC Table Size: 8 K

Packet Buffer Size: 2 Mbit

Interface

Fast Ethernet: Slot 1 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/PoE/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP

Gigabit Ethernet: Slot 2 for 2-port PM-7200 Gigabit Ethernet combo module with 10/100/1000BaseT(X) or 1000BaseSFP ports

Note: See page 2-39 for PM-7200 Gigabit and fast Ethernet module product information.

Console Port: RS-232 (RJ45 connector)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL

Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED, PoE on module

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage: 48 VDC (36 to 72 V) or 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Input Current:
- Max. 5.8 A @ 48 VDC (120 W total for PoE ports)
- Max. 1.85/0.94 A @ 110/220 VDC (120 W total for PoE ports)
- Max. 1.54/0.78 A @ 110/220 VAC (120 W total for PoE ports)

Overload Current Protection: Present

Connection: 10-contact terminal block

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)

Weight: 4200 g

Installation: 19'' rack mounting

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F), cold start requires min. of 100 VAC at -40°C

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A (Pending)

Traffic Control: NEMA TS2 (Pending)

Rail Traffic: EN50121-4 (Pending)

Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Rear View

Top View

Side View

44.0 mm (1.7 in)

440.0 mm (17.3 in)

349.3 mm (13.8 in)

325.0 mm (12.8 in)

31.8 mm (1.3 in)

457.0 mm (18.0 in)

462.6 mm (18.2 in)

480.0 mm (18.9 in)

Front View

1

Industrial Ethernet Switches ˃ IKS-6726-8PoE Series
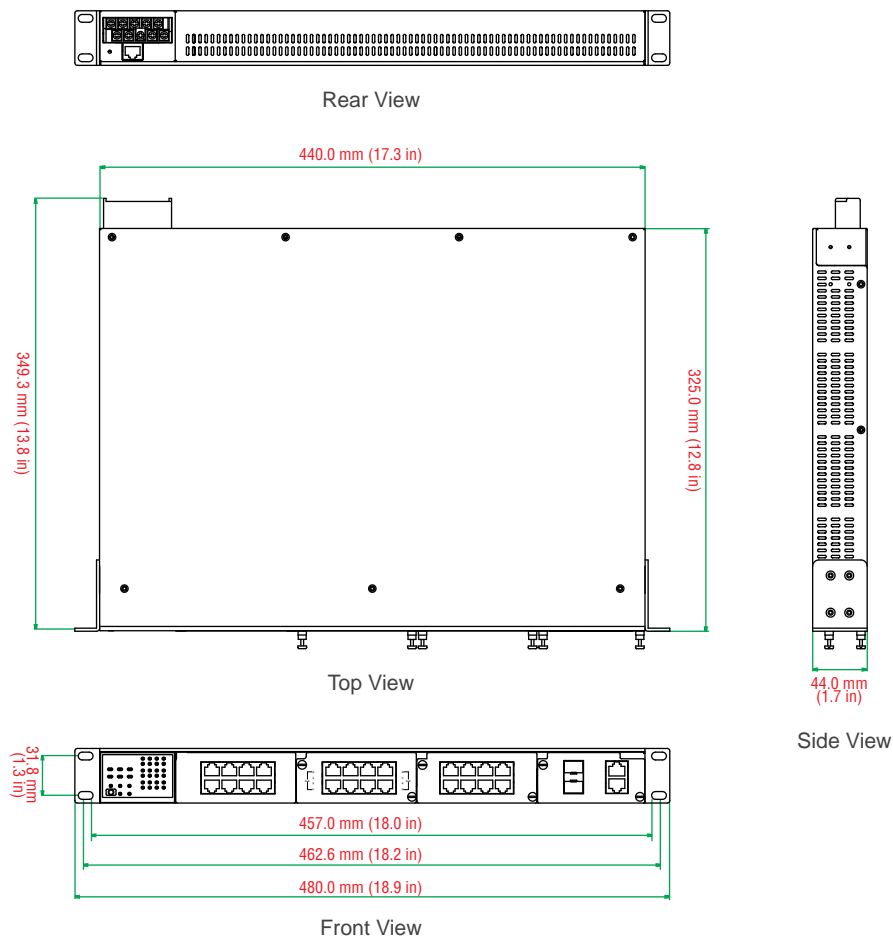
: Ordering Information

Step 1: Select Ethernet switch system

IKS-6726-8PoE with power supply

Step 2: Select interface modules

PM-7200 series
(Gigabit or fast Ethernet)

Note: The IKS-6726-8PoE Ethernet switch system is delivered without interface modules. Please see pages 2-39 to determine which PM-7200 interface modules are suitable for your application.

IKS-6726-8PoE Modular Rackmount Ethernet Switch System

Modular managed rackmount Ethernet switch system with 8 10/100BaseT(X) ports and 8 10/100BaseT(X) PoE ports, 1 slot for fast Ethernet modules, and 1 slot for Gigabit Ethernet modules. Supports up to 24+2G ports and up to 16 PoE ports, -40 to 75°C operating temperature

Available Models	Power Supply			
	Isolated Power Supply 1		Isolated Power Supply 2	
Front Cabling, Front Display	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
IKS-6726-8PoE-F-48-T	1	–	–	–
IKS-6726-8PoE-F-48-48-T	1	–	1	–
IKS-6726-8PoE-F-HV-T	–	1	–	–
IKS-6726-8PoE-F-HV-HV-T	–	1	–	1

Note: The IKS-6726-8PoE supports a total PoE power supply of 120 W.

Gigabit/Fast Ethernet Module Compatibility Chart for the IKS-6726-8PoE

	Interface Module																								
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Slot 2	–	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Optional Accessories (can be purchased separately)

SPL-24: PoE splitter, maximum output of 12.95 W at 24 VDC, 0 to 60°C operating temperature (see page 1-61 for details)
SPL-24-T: PoE splitter, maximum output of 12.95 W at 24 VDC, -40 to 75°C operating temperature (see page 1-61 for details)
MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-75-48/120-48: 75W/120W DIN-Rail 48 VDC power supplies

SPL-24 Series

PoE splitters for the EDS-P510, EDS-P308, and IKS-6726-8PoE series

> IEEE 802.3af compliant; splits power and data from PoE equipment
> Supports output power up to 12.95 W at 24 VDC
> Short circuit protection for power output
> Auto disconnection if power input voltage is too high
> -40 to 75°C operating temperature range (T models)
> DIN-Rail mounting ability

Specifications

Technology
Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)

Interface
RJ45 Ports: 10/100BaseT(X) for PoE IN and DATA OUT
LED Indicators: Power

Power Requirements
Input Voltage: 44 to 75 VDC
Output Voltage: 24 VDC
Overload Current Protection: 400 mA @ 48 VDC input
Connection: 1 removable 3-contact terminal block for output
Output Power: 12.95 W (0.54 A @ 24 VDC)

Physical Characteristics
Housing: Plastic, IP30 protection
Dimensions: 24.9 × 100 × 86.2 mm (0.98 x 3.93 x 3.39 in)
Weight: 95 g
Installation: DIN-Rail mounting

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508 (Pending)
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, and D (Pending); ATEX Zone 2, Ex nC IIC (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3; EN61000-4-8

Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time: 5,100,000 hrs
Database: MIL-HDBK-217F, GB 25°C

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

30.8 mm (1.2 in)
16.3 mm (0.6 in)
10.0 mm (0.4 in)
100.0 mm (3.9 in)
76.2 mm (3.0 in)
74.0 mm (2.9 in)
86.2 mm (3.4 in)
24.9 mm (1.0 in)
24.9 mm (1.0 in)

Side View

Side View

DATA OUT

PoE IN

Front View   Rear View   Top and Bottom Views
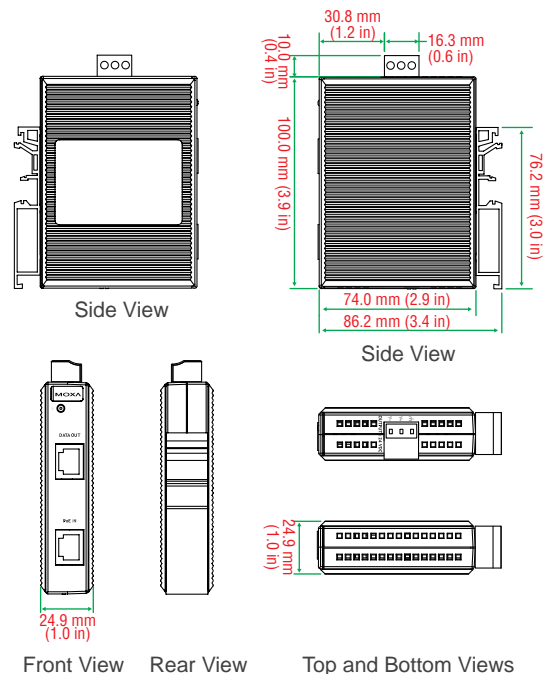
Ordering Information

Available Models

SPL-24: PoE splitter, maximum output of 12.95 W at 24 VDC, 0 to 60°C operating temperature
SPL-24-T: PoE splitter, maximum output of 12.95 W at 24 VDC, -40 to 75°C operating temperature

EOM-104 Series

4-port embedded managed Ethernet switch modules

> 10/100BaseT(X) and 100BaseFX Ethernet interfaces
> Turbo Ring and RSTP/STP for Ethernet redundancy
> SNMP and e-mail alerts for event trapping and notification
> Two-thirds the size of a business card
> Low power consumption
> -40 to 75°C operating temperature range

Turbo Ring
Self-Healing Ethernet

CE FC

: Introduction

The EOM-104 series Ethernet switch modules are designed for device manufacturers who would like to embed Ethernet modules in their products to enhance performance and reliability.

The EOM-104 series modules provide an easy and cost-effective integrated solution for adding an Ethernet switch module to an existing product. The modules support 10/100M Ethernet transmission and come with Turbo Ring's fast recovery time of under 20 ms. The EOM-104 series also provide a rich set of peripherals, such as Turbo Ring Enable and GPIO programming pins, and is an ideal solution for embedded Ethernet applications.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for flow control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1p for Class of service
Protocols: SNMPv1/v2c/v3, DHCP Client, BootP, TFTP, SMTP, RARP, RMON, HTTP, Telnet, Syslog
MIB: MIB-II, Ethernet-Like MIB, P-Bridge MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control

Switch Properties
MAC Table Size: 1 K
Packet Buffer Size: 512 Kbit

Interface
Ethernet Ports:
EOM-104: 4 10/100BaseT(X) ports
EOM-104-FO: 2 10/100BaseT(X) and 2 100BaseFX ports
Connectors: 1 connector with 2 x 20 pins, 2 connectors with 1 x 9 pins, and 1 connector with 2 x 2 pins
Console Port: RS-232 (TxD, RxD, DTR, DSR)
GPIO: 4 programmable I/O pins

Power Requirements
Input Voltage: 3.3 V
Input Current:
EOM-104: 0.59 A @ 3.3 V
EOM-104-FO: 1.22 A @ 3.3 V

Physical Characteristics
Dimensions: 54 x 60 x 8.25 mm (2.13 x 2.36 x 0.32 in)

Environmental Limits
Operating Temperature: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
**EMI:** FCC Part 15, CISPR (EN55022) class A, CE class A
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

54.0 mm (2.1 in)
48.3 mm (1.9 in)

1   39
JP1
2   40

2 4
JP3
1 3

60.0 mm (2.4 in)
48.3 mm (1.9 in)

1   J1   9 1   J2   9

MOXA®   www.moxa.com   info@moxa.com
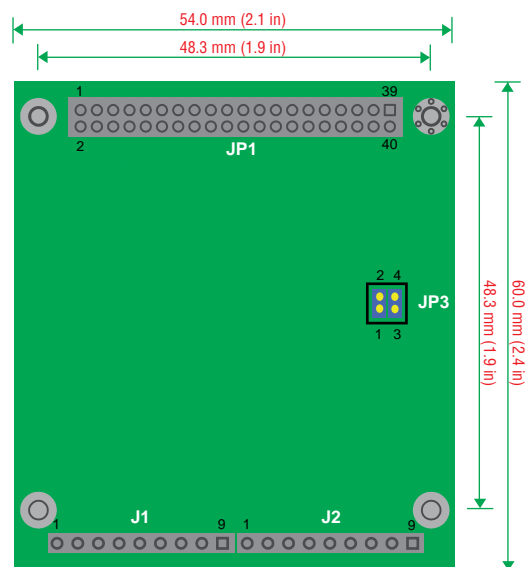
: Pin Assignment

JP1 (2 x 20 connector pin assignment)

PIN	1	3	5	7	9	11	13	15	17	19
SIGNAL	TX2 -	RX2 -	NC	RX1 +	TX1 +	NC	GND	3.3V	GND	DTR

PIN	2	4	6	8	10	12	14	15	18	20
SIGNAL	TX2 +	RX2 +	NC	RX1 -	TX1 -	NC	GND	3.3V	GND	DSR

PIN	21	23	25	27	29	31	33	35	37	39
SIGNAL	TXD	GPIO 4	GPIO 2	MASTER ENABLE	MASTER LED	PORT 1 LED	PORT 3 LED	MANUAL RESET	3.3V	GND

PIN	22	24	26	28	30	32	34	36	38	40
SIGNAL	RXD	GPIO 3	GPIO 1	TURBO RING ENABLE	TURBO RING LED	RESET DEFAULT	PORT 4 LED	PORT 2 LED	3.3V	GND

J1 (1 x 9 connector pin assignment)

PIN	1	2	3	4	5	6	7	8	9
SIGNAL	GND	TX4 +	TX4 -	3.3 V	3.3 V	FXSD	RX4 -	RX4 +	GND

J2 (1 x 9 connector pin assignment)

PIN	1	2	3	4	5	6	7	8	9
SIGNAL	GND	TX3 +	TX3 -	3.3 V	3.3 V	FXSD	RX3 -	RX3 +	GND

JP3 (2 x 2 connector pin assignment)

2   4
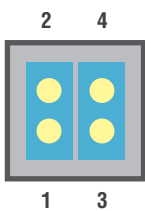
Jumpers 1 and 2 are used to enable the Ring Master
Jumpers 3 and 4 are used to enable Turbo Ring

1   3

: Evaluation Kits

The EOM Evaluation Kit includes an evaluation board, power adaptor, software CD, and serial and Ethernet cables to allow quick and easy evaluation of all embedded Ethernet switch functions. The evaluation board is equipped with Ethernet ports, console port, and Turbo Ring DIP switch to help you test your modules and applications.

Cross-over Ethernet Cable
Null Modem Cable
Power Cord (US or Euro plug)
Document & Software CD
Application Board
Power Adaptor (90 to 240 VAC, 12 VDC)
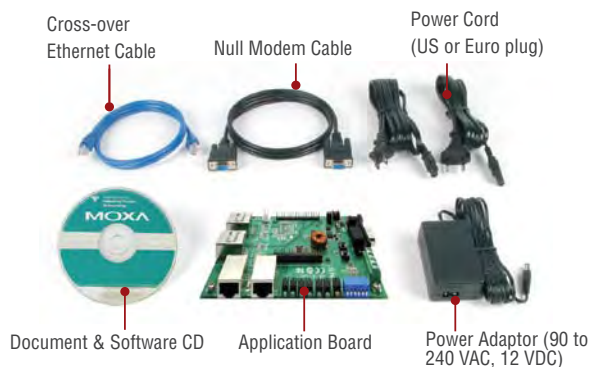
: Ordering Information

Available Models
EOM-104: Embedded managed Ethernet switch module with 4 10/100BaseT(X) ports, -40 to 75°C operating temperature
EOM-104-FO: Embedded managed Ethernet switch module with 2 10/100BaseT(X) and 2 100BaseFX ports, -40 to 75°C operating temperature

Evaluation Kits (must be purchased separately)
EOM-104 Evaluation Kit: Includes an EOM-104 switch module and evaluation board with 4 10/100BaseT(X) ports for testing and application development
EOM-104-FO Evaluation Kit: Includes an EOM-104-FO switch module and evaluation board with 2 10/100BaseT(X) ports and 2 100BaseFX multi-mode ports (SC connectors) for testing and application development

1

Industrial Ethernet Switches > EOM-104 Series

EDR-G903 Series

Industrial Gigabit Firewall/VPN secure router

> Router/Firewall/VPN all-in-one
> High performance Gigabit copper/fiber combo port
> Supports 1 WAN, 1 LAN, and 1 user-configurable WAN or DMZ interface
> Firewall with Quick Automation Profile for Fieldbus protocols
> Network address translation (N-to-1, 1-to-1, and port forwarding)
> Intelligent PolicyCheck and SettingCheck tools
> -40 to 75°C operating temperature (T models)

CE FC

: Introduction

The EDR-G903 series is a Gigabit performance, all-in-one Firewall/ VPN/Router device for Ethernet security applications in sensitive remote control or monitoring networks and critical industrial assets. The EDR-G903 supports one WAN, one LAN, and a user-configurable WAN/DMZ interface that provides high flexibility in different applications such as WAN redundancy or Data/FTP server

security protection. The EDR-G903's Quick Automation Profile function supports most common Fieldbus protocols, including EtherCAT, EtherNet/IP, FOUNDATION Fieldbus, Modbus/TCP, and PROFINET. Users can easily create a secure Ethernet Fieldbus network from a user-friendly web UI with a single click operation. In addition, wide temperature models are available that operate reliably in hazardous, -40 to 75°C environments.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
Protocols: SNMPv1/v2c/v3, DHCP Server/Client, TFTP, NTP, HTTP, HTTPS, Telnet, SSH, Syslog, SMTP, LLDP, PPPoE, PPTP, Dynamic DNS, QoS (Quality of Service)
Flow Control: IEEE 802.3x flow control, back pressure flow control

Interface
WAN 1: 1 RJ45/fiber combo port
WAN 2 / DMZ: 1 RJ45/fiber combo port
LAN: 1 RJ45/fiber combo port
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed
Fiber Ports: 100/1000BaseSFP slot
LED Indicators: PWR1, PWR2, FAULT, 10/100/1000M, DMZ/WAN
DIP Switches: N/A
Alarm Contact: One relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 1 input
• +13 to +30 V for state "1"
• -30 to +3 V for state "0"
• Max. input current: 8 mA

Security Function
Firewall:
• Stateful inspection
• Filter: IP and MAC address, ports, protocol
Quick Automation Profile: EtherCAT, EtherNet/IP, FOUNDATION Fieldbus, LonWorks, Modbus/TCP, PROFINET, IEC 60870-104, DNP, FTP, SSH, Telnet, HTTP, IPSec, L2TP, PPTP, RADIUS
NAT: N-to-1, 1-to-1, and port forwarding
VPN: IPsec (available soon)

Power Requirements
Input Voltage: 12/24/48 VDC redundant dual inputs
Overload Current Protection: Present
Connection: Removable terminal block
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal
Dimensions: 51.2 x 152 x 131.1 mm (2.02 x 5.98 x 5.16 in)
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH (non-condensing)
Storage Temperature: -40 to 85°C (-40 to 185°F)

Industrial Ethernet Switches ∨ EDR-G903 Series

Regulatory Approvals

Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
IEC 61000-4-2 (ESD), level 3; IEC 61000-4-3 (RS), level 3;
IEC 61000-4-4 (EFT), level 3; IEC 61000-4-5 (Surge), level 3;
IEC 61000-4-6 (CS), level 3

Shock: IEC60068-2-27
Freefall: IEC60068-2-32
Vibration: IEC60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   DIN-Rail Mounting Kit
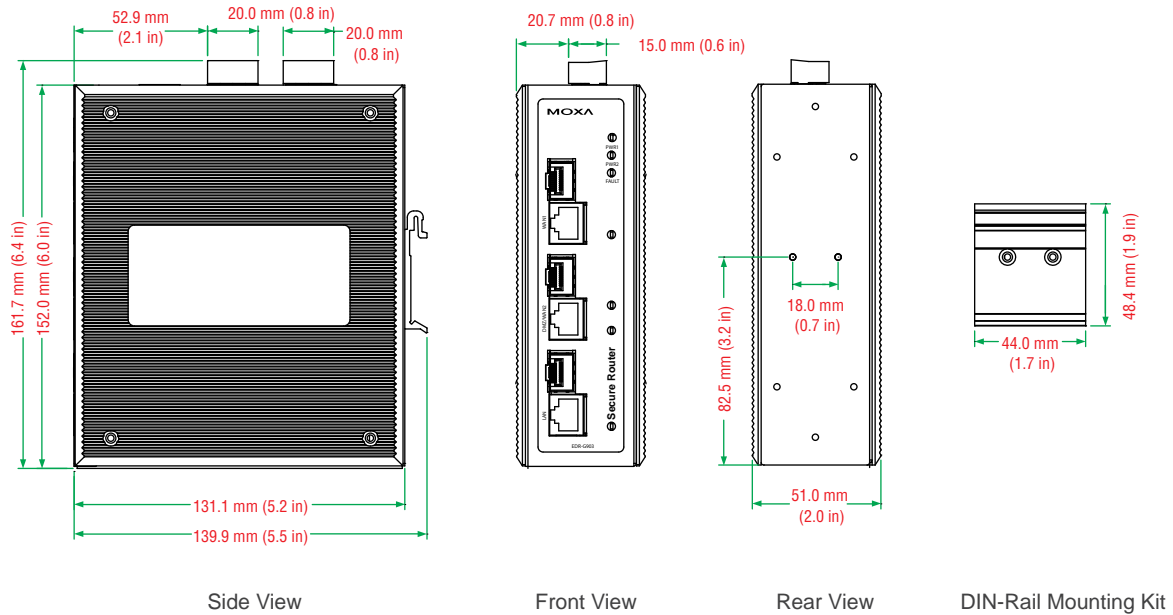
: Ordering Information

Available Models

EDR-G903: Industrial Gigabit firewall/VPN secure router with 3 combo 10/100/100BaseT(X) ports or 100/1000BaseSFP slots, 0 to 60°C operating temperature
EDR-G903-T: Industrial Gigabit firewall/VPN secure router with 3 combo 10/100/100BaseT(X) ports or 100/1000BaseSFP slots, -40 to 75°C operating temperature
Note: The EDR-G903 series secure routers support up to 2 100/1000BaseSFP slots. See pages 1-69 and 1-71 for information about SFP-1G/1FE series Gigabit/fast Ethernet SFP modules.

1

Industrial Ethernet Switches ⟩ EDR-G903 Series

MXview

Industrial network management software designed for Moxa's networking solutions
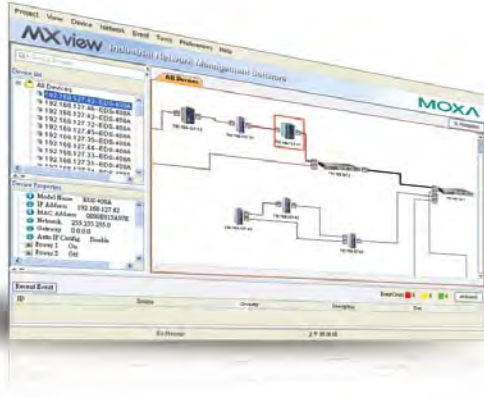
> Discovers and visualizes network devices automatically
> Monitors 500 network devices and notifies users in real time when events occur
> Provides central management of configurations and firmware for Moxa devices
> Presents historical traffic statistics and comprehensive event logs for troubleshooting
> Generates OPC tags automatically to integrate with SCADA/HMI applications*
> Allows users to manage networks via web browser anytime
> English and Simplified Chinese user interfaces

: Introduction

Moxa's MXview network management software is designed for configuring, monitoring, and troubleshooting Moxa networking devices in industrial networks. MXview provides an integrated management platform that can discover Moxa networking devices and SNMP/IP devices installed in subnets. All selected network components can be managed graphically via web browser from both local and remote sites—anytime and anywhere.

Automatic Topology Discovery and Visualization

- Discovers Moxa devices and SNMP/ICMP devices within scan ranges
- Maps physical wiring automatically for LLDP devices
- Provides a tool to draw topologies manually
- Initializes the IP addresses of Moxa devices

- Visualizes trunking link, wireless link*, and VLAN*
- A background image can be embedded into the map for reference
- Topology map can be migrated from site to site
- Supports Unicode for internationalization

Real-time Event Notification

- Detects problems by SNMP Inform* or Trap in real time
- Periodical polling for comprehensive problems
- Abnormal devices and links are highlighted in maps with specified colors

- Notifies users based on events, including link down, power down, SNMP failure, bandwidth utilization, packet error rate and collision rate
- Event notification can be sent remotely via SMS and email
- Event can be alarmed locally by beep and program

Centralized Configuration and Firmware Management

- Automatic backup of device configurations and user-selectable rollback
- Remote deployment of device configurations and firmware

- Backup of configurations to local computers

Traffic Reports and Event Logs

- Collect statistics of bandwidth utilization, error packet rate, and collision rate
- Provides comprehensive event history for troubleshooting

- Traffic report and event log can be stored

Integration with Other Systems

- Acts as OPC server for SCADA/HMI integration*

* Available in Q2, 2010

: System Requirements

Server Requirements	
CPU	Intel Core 2 Duo 2.4 Ghz or higher
RAM	1 G or higher
Hard Disk Space	10 G or higher
Operating System	Windows XP Professional, 2000, Server 2003
Client Requirements	
Browser	IE 6/7/8 and Firefox 3

: Ordering Information

Commercial Versions

MXview-500: Industrial network management software with a license for 500 nodes (by IP address)
MXview-250: Industrial network management software with a license for 250 nodes (by IP address)
MXview-100: Industrial network management software with a license for 100 nodes (by IP address)
MXview-50: Industrial network management software with a license for 50 nodes (by IP address)

License Upgrade

MXview Upgrade-50: License expansion of MXview industrial network management software by 50 nodes (by IP address)

Trial Version

MXview Trial Version: A free trial version of MXview is available for download from Moxa's website

: Supported Devices

Model Name	Required Firmware Version
EDS-400A	2.6 or higher
EDS-500A	2.6 or higher
EDS-G509	2.6 or higher
EDS-P510	2.6 or higher
EDS-600	2.6 or higher
EDS-728	2.6 or higher
EDS-828	2.6 or higher
IKS-6726	2.6 or higher
PT-7710	1.2 or higher
PT-7728	2.6 or higher
PT-7828	2.6 or higher
PT-G7509	1.1 or higher
TN-5508/5510	1.1 or higher
TN-5516/5518	1.2 or higher
AWK-3000*	1.4 or higher
AWK-4000*	1.4 or higher

* Available in Q2, 2010

Note: Additional model names will be added in the near future. Please check Moxa's website for the most up-to-date information.

1

Industrial Ethernet Switches > MXview

EDS-SNMP OPC Server Pro

OPC server for integrating SNMP devices into HMI/SCADA systems
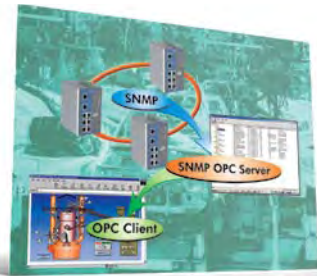
Seamlessly integrate EDS-SNMP OPC Server Pro with the leading HMI/SCADA software to create a comprehensive Ethernet network management solution for SNMP devices.

: Introduction

Moxa's EDS-SNMP OPC Server Pro provides a user-editable Tag file for any SNMP device. Use the default MIB file, or create and edit a standard or private MIB to generate a dedicated Tag file. This powerful function lets operators use an existing HMI software environment to create a customized and real time view of the integrity of all Ethernet network devices, the overall Ethernet network traffic volume, and overall Ethernet network status. Moxa's managed Ethernet switches are ideally suited for connecting Ethernet-enabled industrial devices

in your mission critical applications. Combined with EDS-SNMP OPC Server Pro software, your HMI (Human Machine Interface) packages and SCADA (Supervisory Control And Data Acquisition) software will be turned into a complete remote network traffic and status monitoring tool. This solution gives control engineers the power to monitor the network from a central location with existing and familiar visualization and control applications.

Features and Benefits

- "Broadcast Search" the network for Moxa's managed Ethernet switches and any SNMP device

- Easy to create and edit the configuration of connected devices in advance
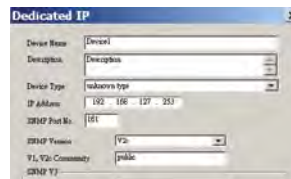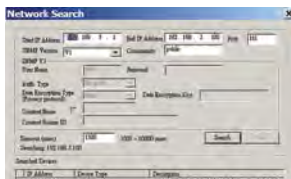
- Easy to create and edit the MIB Template for dedicated tag file of any SNMP device

- User-definable tag file meets the requirements of many different applications
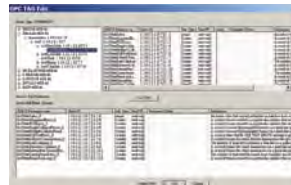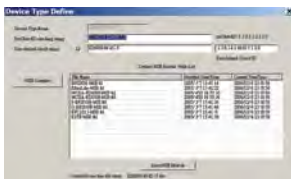
System Requirements

Windows NT/2000/XP, Administrator Privileges, Ethernet Card

: Ordering Information

Available Models
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

SFP-1G Series

1G-port Gigabit Ethernet SFP modules

> Compliant with IEEE 802.3z
> Differential LVPECL inputs and outputs
> TTL signal detect indicator
> Hot pluggable LC duplex connector
> Class 1 laser product, complies with EN60825-1

EN : 60825

c **ᴿU** us

1

Industrial Ethernet Switches > SFP-1G Series

: Specifications

Interface
Ethernet Ports: 1
Connectors: Duplex LC Connector or Simplex LC Connector (WDM-type only)
Note: WDM-type SFP modules must be used in pairs (e.g., SFP-1GXXALC and SFP-1GXXBLC)

Optical Fiber

	Gigabit Ethernet												
	SFP-SX	SFP-LSX	SFP-LX	SFP-LH	SFP-LHX	SFP-ZX	SFP-EZX	SFP-10A	SFP-10B	SFP-20A	SFP-20B	SFP-40A	SFP-40B
Wave-length	850 nm	1310 nm	1310 nm	1310 nm	1310 nm	1550 nm	1550 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm
Max. TX	-4 dBm	-1 dBm	-3 dBm	-2 dBm	1 dBm	5 dBm	5 dBm	-3 dBm		-2 dBm		2 dBm	
Min. TX	-9.5 dBm	-9 dBm	-9.5 dBm	-8 dBm	-4 dBm	0 dBm	0 dBm	-9 dBm		-8 dBm		-3 dBm	
RX Sensitivity	-18 dBm	-19 dBm	-20 dBm	-23 dBm	-24 dBm	-24 dBm	-30 dBm	-21 dBm		-23 dBm		-23 dBm	
Link Budget	8.5 dB	10 dB	10.5 dB	15 dB	20 dB	24 dB	30 dB	12 dB		15 dB		20 dB	
Typical Distance	550 m[a]	2 km[b]	10 km[c]	30 km[c]	40 km[c]	80 km[c]	110 km[c]	10 km[c]		20 km[c]		40 km[c]	
Saturation	0 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-1 dBm		-1 dBm		-1 dBm	

a. 50/125 μm, 400 MHz * km or 62.5/125 μm, 500 MHz * km @ 850 nm multi-mode fiber optic cable
b. 62.5/125 μm, 750 MHz * km @ 1310 nm multi-mode fiber optic cable
c. 9/125 μm single-mode fiber optic cable

Note: The actual communication distance depends on many factors, including connector loss, cable deployment, and the age of the cabling system. We recommend doing a link budget analysis and reserving a 3 dB margin for such factors.

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Operating Temp. Models: -40 to 85°C (-40 to 185°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
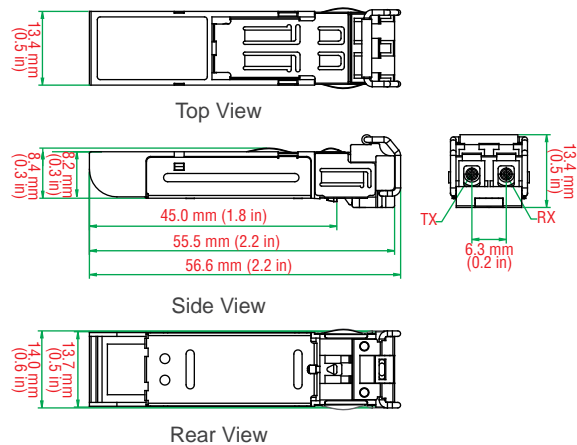**Ambient Relative Humidity:** 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL, TÜV

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

Dimensions

Top View
13.4 mm (0.5 in)

Side View
8.2 mm (0.3 in)
8.4 mm (0.3 in)
45.0 mm (1.8 in)
55.5 mm (2.2 in)
56.6 mm (2.2 in)
13.4 mm (0.5 in)
TX — RX
6.3 mm (0.2 in)

Rear View
13.7 mm (0.5 in)
14.0 mm (0.6 in)
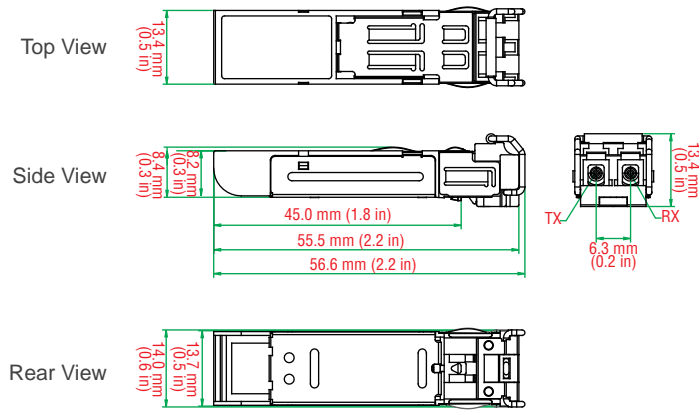
: Ordering Information

SFP Modules

Available Models		Port Interface						
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 85˚C)	1000BaseSX, LC Connector, 0.5 km	1000BaseLSX, LC Connector, 2 km	1000BaseLX, LC Connector, 10 km	1000BaseLH, LC Connector, 30 km	1000BaseLHX, LC Connector, 40 km	1000BaseZX, LC Connector, 80 km	1000BaseEZX, LC Connector, 110 km
SFP-1GSXLC	SFP-1GSXLC-T*	1	–	–	–	–	–	–
SFP-1GLSXLC	SFP-1GLSXLC-T	–	1	–	–	–	–	–
SFP-1GLXLC	SFP-1GLXLC-T	–	–	1	–	–	–	–
SFP-1GLHLC	SFP-1GLHLC-T	–	–	–	1	–	–	–
SFP-1GLHXLC	SFP-1GLHXLC-T	–	–	–	–	1	–	–
SFP-1GZXLC	SFP-1GZXLC-T	–	–	–	–	–	1	–
SFP-1GEZXLC	–	–	–	–	–	–	–	1

* SFP-1GSXLC-T: -20 to 75˚C operating temperature

WDM-type (BiDi) SFP Modules

Availabe Models		Port Interface					
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 85˚C)	1000BaseSFP, LC Connector, 10 km		1000BaseSFP, LC Connector, 20 km		1000BaseSFP, LC Connector, 40 km	
		TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm
SFP-1G10ALC	SFP-1G10ALC-T	1	–	–	–	–	–
SFP-1G10BLC	SFP-1G10BLC-T	–	1	–	–	–	–
SFP-1G20ALC	SFP-1G20ALC-T	–	–	1	–	–	–
SFP-1G20BLC	SFP-1G20BLC-T	–	–	–	1	–	–
SFP-1G40ALC	SFP-1G40ALC-T	–	–	–	–	1	–
SFP-1G40BLC	SFP-1G40BLC-T	–	–	–	–	–	1

The SFP-1G series modules can be used with the following products

EDS-728/828 series: IM-2GSFP series Gigabit Ethernet interface modules
EDS-611/619 series: 8+3G/16+3G-port compact modular managed Ethernet switches
EDS-G509 series: 9G-port full Gigabit managed Ethernet switches
EDS-518A series: 16+2G-port Gigabit managed Ethernet switches
EDS-510A series: 7+3G-port Gigabit managed Ethernet switches
EDS-P510 series: 7+3G-port Gigabit PoE managed Ethernet switches
IKS-6526-2GTXSFP series: 24+2G-port rackmount managed Ethernet switches
PT and IKS series: PM-7200-2G/4G series Gigabit Ethernet interface modules
EDS-G308 series: 8G-port full Gigabit unmanaged Ethernet switches
EDR-G903 series: Industrial Gigabit Firewall/VPN secure router
IMC-101G series: Industrial Gigabit media converters

1

Industrial Ethernet Switches > SFP-1G Series

SFP-1FE Series

1-port fast Ethernet SFP modules

> Compliant with IEEE 802.3u
> Differential PECL inputs and outputs
> TTL signal detect indicator
> Hot pluggable LC duplex connector
> Class 1 laser product; complies with EN60825-1

EN : 60825

c **UL** us

: Specifications

Interface
Ethernet Ports: 1
Connectors: Duplex LC Connector

Optical Fiber

	Fast Ethernet		
	SFP-M	SFP-S	SFP-L
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-18 dBm	0 dBm	0 dBm
Min. TX	-8 dBm	-5 dBm	-5 dBm
RX Sensitivity	-34 dBm	-34 dBm	-34 dBm
Link Budget	26 dB	29 dB	29 dB
Typical Distance	4 km [a]	40 km [b]	80 km [b]
Saturation	0 dBm	-3 dBm	-3 dBm

a. 50/125 μm or 62.5/125 μm, 800 MHz * km @ 1300 nm
   multi-mode fiber optic cable
b. 9/125 μm single-mode fiber optic cable

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL, TÜV

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

Dimensions

Top View

13.4 mm (0.5 in)

8.2 mm (0.3 in)
8.4 mm (0.3 in)

45.0 mm (1.8 in)
55.5 mm (2.2 in)
56.6 mm (2.2 in)

13.4 mm (0.5 in)

TX   RX

6.3 mm (0.2 in)

Side View

14.0 mm (0.6 in)
13.7 mm (0.5 in)

Rear View

: Ordering Information

Available Models	Port Interface		
Wide Temperature (-40 to 85˚C)	100BaseFX, Multi-mode, LC Connector, 4 km	100BaseFX, Single-mode, LC Connector, 40 km	100BaseFX, Single-mode, LC Connector, 80 km
SFP-1FEMLC-T	1	–	–
SFP-1FESLC-T	–	1	–
SFP-1FELLC-T	–	–	1

The SFP-1FE series modules can be used with the following products
EDS-611/619 series: 8+3G/16+3G-port compact modular managed Ethernet switches
EDS-G509 series: 9G-port full Gigabit managed Ethernet switches
EDS-G308 series: 8G-port full Gigabit unmanaged Ethernet switches
EDS-P510 series: 7+3G-port Gigabit PoE managed Ethernet switches
IKS-6524-8SFP series: 24-port rackmount managed Ethernet switches
PT and IKS series: PM-7200-8SFP fast Ethernet interface modules
EDR-G903 series: Industrial Gigabit Firewall/VPN secure router

ABC-01

Configuration backup and restoration tool for managed switches

> Reduce system downtime, without an additional power input
> Plug-n-Play system backup and restoration
> Front label for writing identification information
> Compact, rugged, reliable design
> Supports Moxa's managed Ethernet switches

CE FC

: Features

- RS-232 RJ45 console port connection
- Store the complete configuration of one switch
- Load the system configuration automatically after system reboot
- Manually load and save the system configuration through the web console

- Portable low-power design requires no power supply
- CE and FCC approval

: Introduction

The ABC-01 configuration backup and restoration tool can be used to save and load the configuration of Moxa's managed Ethernet switches through the switches' RS-232 console port. This simple yet powerful tool makes it much easier to back up a switch's system parameters, or even replace an existing switch with a new switch. With the ABC-01, you can quickly re-install a substitute switch (of the same model) or recover the entire system configuration, including IP address, if a switch failure occurs.

: Specifications

Basic Operation
Connector: RS-232 RJ45 port
Configuration: Use the web console of Moxa's managed switches

Power Requirements
Input Voltage: 3 to 5 VDC (through the RS-232 port's RTS signal)

Physical Characteristics
Housing: PVC molding, IP40 protection
Dimensions: 32.5 x 97 x 12 mm (8.07 x 3.82 x 0.47 in)
Weight: 50 g
On-switch Installation: M4 screw (< 4 mm)
Cable Length: 35 cm (including connector)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -20 to 70°C (-4 to 158°F)
Ambient Relative Humidity: 5 to 95 % (non-condensing)

Regulatory Approvals
EMI: FCC Part 15, CISPR (EN55022) Class A
EMS:
EN61000-4-2 (ESD), level 2; EN61000-4-3 (RS), level 3;
EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3;
EN61000-4-6 (CS), level 3

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

Industry-specific Ethernet Switches

2

Industry-specific Ethernet Switches

EN50155 Ethernet Switches

	Managed Ethernet Switches Series			Unmanaged Ethernet Switches Series		
	Gigabit Ethernet Series	Fast Ethernet Series	Power-over-Ethernet Series	Fast Ethernet Series		Power-over-Ethernet Series
	TN-5510/5518 Series	TN-5508/5516 Series	TN-5508-4PoE/5516-8PoE Series	TN-5308 Series	TN-5305 Series	TN-5308-4PoE Series
Number of Ports						
Max. Number of Ports	10/18	8/16	8/16	8	5	8
Gigabit Ethernet, 10/100/1000 Mbps	2	–	–	–	–	–
Fast Ethernet, 10/100 Mbps	8/16	8/16	8 (4 PoE)/16 (8 PoE)	8	5	8 (4 PoE)
Power Supply						
12/24/36/48 VDC	✓	✓	–	✓	–	–
72/96/110 VDC	✓	✓	–	✓	–	–
80-300 VDC, 85-264 VAC	✓	✓	✓	–	–	–
24 VDC	–	–	✓	–	✓	–
48 VDC	–	–	✓	–	–	✓
24 VAC	–	–	–	–	✓	–
Installation Options						
DIN-Rail Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Panel Mounting	✓	✓	✓	✓	✓	✓
Operating Temperature						
0 to 60°C	✓	✓	✓	✓	✓	✓
-40 to 75°C	✓	✓	✓	✓	✓	✓
Redundancy and Backup Options						
Turbo Ring (Recovery Time < 20 ms)	✓	✓	✓	–	–	–
Turbo Chain (Recovery Time < 20 ms)	✓	✓	✓	–	–	–
STP/RSTP	✓	✓	✓	–	–	–
Bypass Relay	✓	–	–	–	–	–
Network Management and Control						
IPv6	✓	✓	✓	–	–	–
DHCP Option 66/67/82	✓	✓	✓	–	–	–
IEEE 1588 PTP	✓	✓	✓	–	–	–
LLDP	✓	✓	✓	–	–	–
Modbus/TCP	✓	✓	✓	–	–	–
IGMP/GMRP	✓	✓	✓	–	–	–
Port Trunking	✓	✓	✓	–	–	–
IEEE 802.1X	✓	✓	✓	–	–	–
Port Lock	✓	✓	✓	–	–	–
SNMP/RMON	✓	✓	✓	–	–	–
VLAN	✓	✓	✓	–	–	–
QoS	✓	✓	✓	–	–	–
Relay Warning	✓	✓	✓	–	–	–
Regulatory Approvals						
CE/FCC	✓	✓	✓	✓	✓	✓
UL508	Pending	Pending	Pending	Pending	✓	Pending
Railway Applications: EN50155	Pending	Pending	Pending	Pending	✓	Pending
EN50121-3-2	Pending	Pending	Pending	Pending	Pending	Pending
EN50121-4	Pending	Pending	Pending	Pending	Pending	Pending
Traffic Control Systems: NEMA TS2	Pending	Pending	Pending	Pending	–	Pending
Road Traffic: e-Mark	Pending	Pending	Pending	Pending	–	–

IEC 61850-3 Ethernet Switches

	PT-7828	PT-G7509	PT-7728	PT-7710
Supported Modules				
Gigabit Ethernet Modules	✓	–	✓	✓
Fast Ethernet Modules	✓	–	✓	✓
SFP Gigabit Ethernet Modules	✓	✓	✓	✓
SFP Fast Ethernet Modules	✓	✓	✓	✓
Number of Ports				
Max. Number of Ports	28	9	28	10
Gigabit Ethernet, 10/100/1000 Mbps	Up to 4	9	Up to 4	Up to 2
Fast Ethernet, 10/100 Mbps	Up to 28	9	Up to 28	Up to 10
Power Supply				
24 VDC, isolated	✓	✓	✓	–
48 VDC, isolated	✓	✓	✓	–
12/24/48 VDC	–	–	–	✓
88-300 VDC or 85-264 VAC, isolated	✓	✓	✓	✓
Installation Options				
Rack Mounting	✓	✓	✓	✓
Panel Mounting	–	–	–	✓
Operating Temperature				
-40 to 85°C	✓	✓	✓	✓
Redundancy and Backup Options				
Turbo Ring (Recovery Time < 20 ms)	✓	✓	✓	✓
Turbo Chain (Recovery Time < 20 ms)	✓	✓	✓	✓
STP/RSTP	✓	✓	✓	✓
Automatic Backup Configurator (ABC-01)	✓	✓	✓	✓
Network Management and Control				
Layer 3 Switching	✓	–	–	–
IPv6	–	✓	✓	✓
DHCP Option 66/67/82	✓	✓	✓	✓
IEEE 1588 PTP	✓	✓	✓	✓
LLDP	✓	✓	✓	✓
Modbus/TCP	✓	✓	✓	✓
IGMP/GMRP	✓	✓	✓	✓
Port Trunking	✓	✓	✓	✓
IEEE 802.1X	✓	✓	✓	✓
Port Lock	✓	✓	✓	✓
SNMP/RMON	✓	✓	✓	✓
VLAN	✓	✓	✓	✓
QoS	✓	✓	✓	✓
Relay Warning	✓	✓	✓	✓
Regulatory Approvals				
CE/FCC	✓	✓	✓	✓
UL/cUL 60950-1	✓	✓	✓	✓
IEC 61850-3 (Power Substation)	✓	✓	✓	✓
IEEE 1613 (Power Substation)	✓	✓	✓	✓
EN50155/EN50121-4 (Railway Applications)	✓	✓	✓	✓
NEMA TS2 (Traffic Control System)	✓	✓	✓	✓

2

Industry-specific Ethernet Switches ⌄ Product Selection Guides

Introduction to EN50155 Ethernet Switches

Designed for Rolling Stock and Rail Networks

TN-5508-4PoE
8-port Managed
PoE Switch

**Train Ethernet Backbone
Turbo Ring
(recovery < 20 ms)**

TN-5516-8PoE
16-port Managed PoE Switch

TN-5508
8-port Managed
Ethernet Switch

TN-5510
8+2G-port
Gigabit Managed
Ethernet Switch

TN-5516
16-port Managed
Ethernet Switch

TN-5518
16+2G-port Gigabit Managed
Ethernet Switch

TN-5308
8-port Unmanaged
Ethernet Switch

TN-5308-4PoE
8-port Unmanaged
PoE Switch

Public Address

Passenger
Information
System

Wireless
Access
Point

Intercom

EN50121   EN50155

—— Twisted Pair Cable
—— PoE Connections

MOXA® ▶ www.moxa.com ▶ info@moxa.com

Extensive Selection of EN50155 Switches for Onboard Train Communications

Moxa's ToughNet series of Ethernet switches is specially designed to meet EN50155, the onboard standard for electronic equipment, which encompasses not just EMC requirements but also shock, vibration, extended temperature range, humidity, and power supply variations. To let users choose a precise solution to fit their railway networks, over 100 models are offered. The product line supports the comprehensive features for next-generation train networks, including 10/100/1000 Mbps transmission rate, Power-over-Ethernet, Turbo Ring, bypass relay, and various mounting options.

Rotary Switch for IP Address Configuration
Easier Maintenance
• Configure IP address without a PC

Wide Power Input Range
For universal applications
• Supports 12/24/36/48 VDC, 72/96/110 VDC, 110/220 VDC/VAC
• Redundant power inputs

Gigabit Bandwidth
For a higher level of passenger comfort and security
• Gigabit TP ports with or without bypass relay function
• Gigabit/Fast Ethernet FO ports with circular connectors

Certified Industry Standards
• EN50155
• EN50121-4
• NEMA TS2
• e-Mark

M12 Connectors
Robust vibration-proof connections
• Circular connection solution
• M12 connectors
• M23 connector

Tough Design
Withstands Harsh Environments
• -40 to 75°C operating temp.
• Die-cast metal housing
• IP54/67 protection
• Panel or DIN-Rail mounting
• Fan-less design

Future-proof Gigabit Solution Enables Next-generation Train Networks

Many new applications in the railway industry, such as video surveillance, emergency intercom, and web-like entertainment require large amounts of bandwidth. The Moxa TN-5518/5510 provides 2 Gigabit ports to allow video, audio, and data transmission over a single network.

Power-over-Ethernet Simplifies Network Connections

All applications can benefit from the ToughNet series' PoE function. Network designers can take advantage of the Power-over-Ethernet technology to power networked devices in difficult to reach locations and to simplify field wiring to reduce installation costs.

Enable High Network Availability with Excellent Redundancy

Turbo Ring™ for Ring Redundancy
All of Moxa's managed Ethernet switches support Turbo Ring™, which has a super fast fault recovery of under 20 ms at a full load of 250 Ethernet switches to minimize downtime caused by network failure. If a path in the network fails, the system will return to normal communication in under 20 ms.

Bypass Relay Function for Linear Topologies
In a linear topology, a failure in any of the upstream links will result in the failure of the downstream links as well. For railway communication systems with interconnected networks, such a failure will cause chaos. To prevent such a failure, Moxa's TN-5510/5518 series provides 2 optional Gigabit Ethernet ports with bypass relay function. If one of the Ethernet switches fails due to power loss, its ports are bypassed with the relay circuit, and the transmission lines will interconnect automatically to assure continuous system operation.

2

Industry-specific Ethernet Switches ∨ Introduction to EN50155 Ethernet Switches
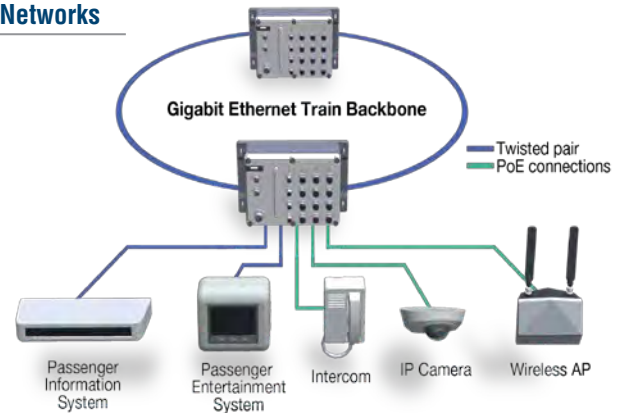
⋮ Moxa's Products are Certified to Meet Industrial Standards

▍Railway Application Standards

EN50155

EN50155 addresses the conditions of operation, design, construction, and testing of electronic equipment used on rail vehicles (rolling stock) in railway applications. The ToughNet series of M12 Ethernet switches are compliant with both the performance tests and environmental tests dictated by EN50155. Reliable performance can be assured under different power supply conditions, such as voltage variations, power interruption, supply change over, and other conditions. The switches can also withstand environmental disturbances such as vibration, shock, and temperature variations.

EN50121-3-2

EN50121-3-2 defines the electromagnetic compatibility (EMC) of an apparatus installed on rolling stock in railway applications. The TN series switches are compliant with this standard.

EN50121-4

EN50121-4 defines the emission and immunity standards for a signaling and telecommunications apparatus. The TN series switches are EN50121-4 compliant.

▍Road Traffic Control System Standards

NEMA TS2

The National Electrical Manufacturers Association (NEMA) established the TS1 standard to define technically adequate and safe traffic control equipment. The TS2 standard was later introduced to overcome the limitations of TS1. Section 2 contains the environmental and testing requirements, including guidelines for temperature, humidity, voltage, vibration, and shock. The TN series switches are compliant with the NEMA TS2 traffic control system standards.

e-Mark

Compliance with the EU's Automotive EMC Directive (95/54/EC) is indicated by the "e" mark, which is fitted to a vehicle's sub-assembly. Moxa's TN series switches meet the EMC requirements of this directive.

⋮ EN50155 Compliant Ethernet Switches

	Gigabit Ethernet				
	Managed				
	TN-5510	TN-5518	IKS-6726	PT-7728	PT-7710
No. of Ports	8 FE + 2 GE	16 FE + 2 GE	up to 2 GE + 24 FE	up to 4 GE + 24 FE	up to 2 GE + 8 FE
Power Input Range	12 to 110 VDC or 110 to 220 VDC/VAC		24 VDC or 48 VDC or 110 to 220 VDC/VAC		
IP Rating	IP54		IP30		
Installation	Panel or DIN-Rail Mounting		Rack Mounting		Rack or Panel Mounting
Temp. Range	0 to 60°C or -40 to 75°C		-40 to 75°C		-40 to 85°C

	Fast Ethernet				Power-over-Ethernet		
	Managed		Unmanaged		Managed		Unmanaged
	TN-5508	TN-5516	TN-5308	TN-5305	TN-5508-4PoE	TN-5516-8PoE	TN-5308-4PoE
No. of Ports	8 FE	16 FE	8 FE	5 FE	4 FE + 4 PoE	8 FE + 8 PoE	4 FE + 4 PoE
Power Input Range	12 to 110 VDC or 110 to 220 VDC/VAC		12 to 48 VDC or 72 to 110 VDC	12 to 45 VDC 18 to 30 VDC	24 to 48 VDC or 110 to 220 VDC/VAC		48 VDC
IP Rating	IP54		IP40	IP67	IP54		IP40
Installation	Panel or DIN-Rail Mounting				Panel or DIN-Rail Mounting		
Temp. Range	0 to 60°C or -40 to 75°C				0 to 60°C or -40 to 75°C		

TN-5510/5518 Series

EN50155 8+2G/16+2G-port Gigabit managed Ethernet switches

> M12 connectors for robust links
> 2 Gigabit ports with optional bypass relay function
> Wide power input range from 12 to 110 VDC (LV-MV model)
> Isolated redundant power inputs with universal 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC power supply range
> EN50155/50121-3-2/50121-4, NEMA TS2, and e-Mark compliant
> -40 to 75°C operating temperature range (T models)
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet redundancy

2

Industry-specific Ethernet Switches ˅ TN-5510/5518 Series

: Introduction

The ToughNet TN-5510/5518 series M12 managed Ethernet switches are designed for industrial applications, such as rolling stock, vehicle, and railway applications. The TN series switches use M12 and other circular connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-5500-LV-MV switches provide the wide power input range of 12/24/36/48/72/96/110 VDC that allows you to use the same type of power source at different sites around the globe. In addition, the 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC dual, isolated redundant power supply increases the reliability of

your communications system and saves on cabling/wiring costs. The TN-5510/5518 switches provide up to 8 or 16 fast Ethernet M12 ports, and 2 ports on the down side to provide the Gigabit Ethernet interface with an optional bypass relay function. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5500 series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e-Mark (vehicles) requirements, making the switches suitable for a variety of industrial applications.

Features and Benefits

- Three rotary switches for setting the last 3 digits of the IP address makes maintenance even easier
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Leading EN50155-compliant Gigabit Ethernet switches for rolling stock applications
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port allows access by only authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Line-swap fast recovery
- Automatic recovery of connected device's IP addresses
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, and Windows utility
- Panel mounting or DIN-Rail mounting installation capability

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2C/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telent, SSH, Syslog, LLDP, IEEE 1588 PTP, Modbus/TCP, IPv6
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE802.3x flow control, back pressure flow control
Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Front cabling, M12 connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Gigabit Ethernet: Down cabling, circular connector (RJ45 inside), 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, auto MDI/MDI-X connection, with or without bypass relay function
Console Port: M12 A-coding 5-pin male connector
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Port LED Indicators: 10/100M (fast Ethernet port), 10/100/1000M (Gigabit Ethernet port)
Alarm Contact: 2 relay outputs in one M12 A-coding 5-pin male connector with current carrying capacity of 3 A @ 30 VDC
Rotary Switches: For setting the last 3 digits of the IP address

Power Requirements

Input Voltage:
• LV: 12/24/36/48 VDC (8.4 to 60 VDC)
• MV: 72/96/110 VDC (50.4 to 154 VDC)
• HV: 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
• TN-5510-2GTX Series
  0.416 A @ 24 VDC, 0.187 A @ 72 VDC, 0.129 A @ 110 VDC, 0.316 A @ 110 VAC, 0.208 A @ 220 VAC
• TN-5510-2GTXBP Series
  0.52 A @ 24 VDC, 0.218 A @ 72 VDC, 0.150 A @ 11 VDC, 0.369 A @ 110 VAC, 0.243 A @ 220 VAC
• TN-5518-2GTX Series
  0.635 A @ 24 VDC, 0.28 A @ 72 VDC, 0.19 A @ 110 VDC, 0.37 A @ 110 VAC, 0.238 A @ 220 VAC
• TN-5518-2GTXBP Series
  0.667 A @ 24 VDC, 0.296 A @ 72 VDC, 0.202 A @ 11 VDC, 0.387 A @ 110 VAC, 0.244 A @ 220 VAC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP54 protection (optional protective caps available for unused ports)
Dimensions:
TN-5510 Series: 185 x 183 x 70.3 mm (7.28 x 7.20 x 2.77 in)
TN-5518 Series: 250 x 183 x 69.8 mm (9.84 x 7.20 x 2.75 in)
Weight:
TN-5510 Series: 1700 g
TN-5518 Series: 2550 g
Installation: Panel mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), Level 3
EN61000-4-3 (RS), Level 4
EN61000-4-4 (EFT), Level 3
EN61000-4-5 (Surge), Level 3
EN61000-4-6 (CS), Level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12
Traffic Control: NEMA TS2 (Pending), e-Mark (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)
Shock: IEC61373
Freefall: IEC60068-2-32
Vibration: IEC61373
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TN-5510 Series
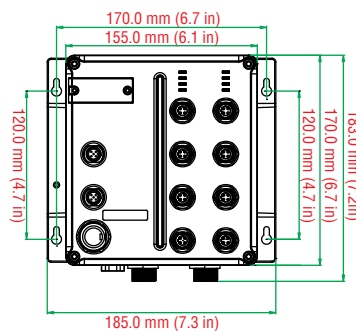
Front View
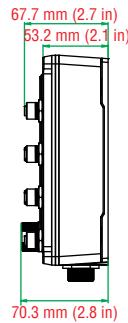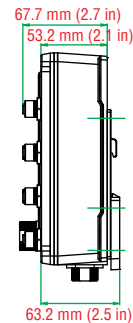
Side View

Side View (including DIN-Rail Mounting Kit)
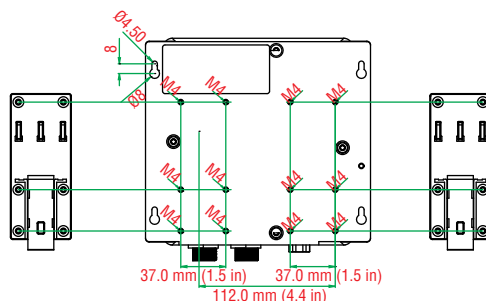
DIN-Rail Mounting Kit

Rear View
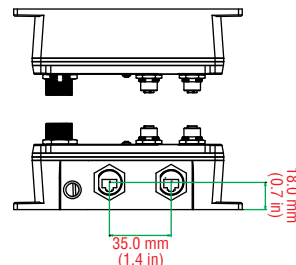
Top & Bottom Views

Dimensions

TN-5518 Series
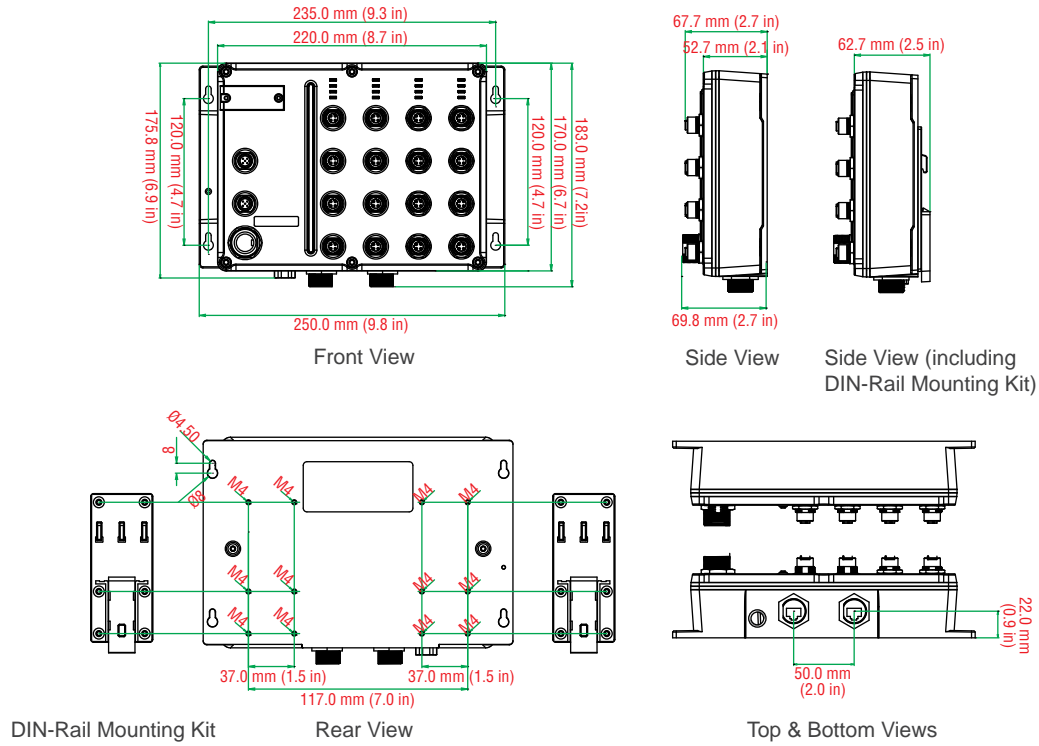
Front View

Side View

Side View (including DIN-Rail Mounting Kit)

DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

:: Ordering Information

Available Models		Port Interface			Power Supply					
		Front Cabling	Down Cabling		Power Supply 1			Power Supply 2		
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100 BaseT(X) M12 connector	10/100/1000 BaseT(X) Circular RJ45 connector	10/100/1000 BaseT(X) Circular RJ45 connector , bypass relay function	LV 12/24/36/48 VDC (8.4 to 60 V), non-isolated	MV 72/96/110 VDC (50.4 to 154 V), isolated	HV 88 to 300 VDC and 85 to 264 VAC, isolated	LV 12/24/36/48 VDC (8.4 to 60 V), non-isolated	MV 72/96/110 VDC (50.4 to 154 V), isolated	HV 88 to 300 VDC and 85 to 264 VAC, isolated
TN-5510 Series										
TN-5510-2GTX-LV-LV	TN-5510-2GTX-LV-LV-T	8	2	–	1	–	–	1	–	–
TN-5510-2GTX-LV-MV	TN-5510-2GTX-LV-MV-T	8	2	–	1	–	–	–	1	–
TN-5510-2GTX-LV-HV	TN-5510-2GTX-LV-HV-T	8	2	–	1	–	–	–	–	1
TN-5510-2GTXBP-LV-LV	TN-5510-2GTXBP-LV-LV-T	8	–	2	1	–	–	1	–	–
TN-5510-2GTXBP-LV-MV	TN-5510-2GTXBP-LV-MV-T	8	–	2	1	–	–	–	1	–
TN-5510-2GTXBP-LV-HV	TN-5510-2GTXBP-LV-HV-T	8	–	2	1	–	–	–	–	1
TN-5518 Series										
TN-5518-2GTX-LV-LV	TN-5518-2GTX-LV-LV-T	16	2	–	1	–	–	1	–	–
TN-5518-2GTX-LV-MV	TN-5518-2GTX-LV-MV-T	16	2	–	1	–	–	–	1	–
TN-5518-2GTX-LV-HV	TN-5518-2GTX-LV-HV-T	16	2	–	1	–	–	–	–	1
TN-5518-2GTX-MV-MV	TN-5518-2GTX-MV-MV-T	16	2	–	–	1	–	–	1	–
TN-5518-2GTX-MV-HV	TN-5518-2GTX-MV-HV-T	16	2	–	–	1	–	–	–	1
TN-5518-2GTX-HV-HV	TN-5518-2GTX-HV-HV-T	16	2	–	–	–	1	–	–	1
TN-5518-2GTXBP-LV-LV	TN-5518-2GTXBP-LV-LV-T	16	–	2	1	–	–	1	–	–
TN-5518-2GTXBP-LV-MV	TN-5518-2GTXBP-LV-MV-T	16	–	2	1	–	–	–	1	–
TN-5518-2GTXBP-LV-HV	TN-5518-2GTXBP-LV-HV-T	16	–	2	1	–	–	–	–	1
TN-5518-2GTXBP-MV-MV	TN-5518-2GTXBP-MV-MV-T	16	–	2	–	1	–	–	1	–
TN-5518-2GTXBP-MV-HV	TN-5518-2GTXBP-MV-HV-T	16	–	2	–	1	–	–	–	1
TN-5518-2GTXBP-HV-HV	TN-5518-2GTXBP-HV-HV-T	16	–	2	–	–	1	–	–	1

*GTX: Giga Ethernet Copper port
*GTXBP: Giga Ethernet Copper port with bypass relay

2

Industry-specific Ethernet Switches > TN-5510/5518 Series

TN-5508/5516 Series

EN50155 8/16-port managed Ethernet switches

> M12 connectors for robust links
> Wide power input range from 12 to 110 VDC (LV-MV model)
> Isolated redundant power inputs with universal 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC power supply range
> EN50155/50121-3-2/50121-4, NEMA TS2, and e-Mark compliant
> -40 to 75°C operating temperature range (T models)
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet redundancy

: Introduction

The ToughNet TN-5508/5516 series M12 managed Ethernet switches are designed for industrial applications in harsh environments. The TN series switches use M12 and other circular connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-5500-LV-MV switches provide the wide power input range of 12/24/36/48/72/96/110 VDC that allows you to the same type of power source at different sites around the globe. In addition, the 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC dual, isolated redundant

power supply increases the reliability of your communications and saves on cabling/wiring costs. The TN-5508/5516 switches provide up to 8 or 16 fast Ethernet M12 ports. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5500 series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e-Mark (vehicles) requirements, making the switches suitable for a variety of industrial applications.

Features and Benefits

- Three rotary switches for setting the last 3 digits of the IP address makes maintenance even easier
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Leading EN50155-compliant industrial Ethernet switches for rolling stock applications
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port allows access by only authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Line-swap fast recovery
- Automatic recovery of connected device's IP addresses
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, and Windows utility
- Panel mounting or DIN-Rail mounting installation capability

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2C/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telent, SSH, Syslog, LLDP, IEEE 1588 PTP, Modbus/TCP, IPv6
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Front cabling, M12 connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console Port: M12 A-coding 5-pin male connector
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Port LED Indicators: 10/100M
Alarm Contact: 2 relay outputs in one M12 A-coding 5-pin male connector with current carrying capacity of 3 A @ 30 VDC
Rotary Switches: For setting the last 3 digits of the IP address

Power Requirements

Input Voltage:
• LV: 12/24/36/48 VDC (8.4 to 60 VDC)
• MV: 72/96/110 VDC (50.4 to 154 VDC)
• HV: 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
• TN-5508 Series: 0.234 A @ 24 VDC, 0.104 A @ 72 VDC, 0.072 A @ 110 VDC, 0.18 A @ 110 VAC, 0.12 A @ 220 VAC
• TN-5516 Series: 0.338 A @ 24 VDC, 0.133 A @ 72 VDC, 0.089 A @ 110 VDC, 0.270 A @ 110 VAC, 0.170 A @ 220 VAC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP54 protection (optional protective caps available for unused ports)
Dimensions:
TN-5508 Series: 185 x 170 x 69.8 mm (7.28 x 6.69 x 2.75 in)
TN-5516 Series: 250 x 170 x 69.8 mm (9.84 x 6.69 x 2.75 in)
Weight:
TN-5508 Series: 1650 g
TN-5516 Series: 2500 g
Installation: Panel mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), Level 3
EN61000-4-3 (RS), Level 4
EN61000-4-4 (EFT), Level 3
EN61000-4-5 (Surge), Level 3
EN61000-4-6 (CS), Level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12
Traffic Control: NEMA TS2 (Pending)
Road Traffic: e-Mark (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)
Shock: IEC61373
Freefall: IEC60068-2-32
Vibration: IEC61373
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

2

Industry-specific Ethernet Switches > TN-5508/5516 Series

Dimensions

TN-5508 Series

Front View

Side View

Side View (including DIN-Rail Mounting Kit)

DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

Dimensions

TN-5516 Series

235.0 mm (9.3 in)
220.0 mm (8.7 in)
120.0 mm (4.7 in)
170.0 mm (6.7 in)
120.0 mm (4.7 in)
250.0 mm (9.8 in)

Front View

67.7 mm (2.7 in)
52.7 mm (2.1 in)
69.8 mm (2.7 in)

Side View

62.7 mm (2.5 in)

Side View (including DIN-Rail Mounting Kit)

Ø4.50
37.0 mm (1.5 in) 37.0 mm (1.5 in)
177.0 mm (7.0 in)

DIN-Rail Mounting Kit   Rear View

Top & Bottom Views

Ordering Information

Available Models		Port Interface	Power Supply					
			Power Supply 1			Power Supply 2		
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100 BaseT(X) M12 connector	LV	MV	HV	LV	MV	HV
			12/24/36/48 VDC (8.4 to 60 V), non-isolated	72/96/110 VDC (50.4 to 154 V), isolated	88 to 300 VDC and 85 to 264 VAC, isolated	12/24/36/48 VDC (8.4 to 60 V), non-isolated	72/96/110 VDC (50.4 to 154 V), isolated	88 to 300 VDC and 85 to 264 VAC, isolated
TN-5508 Series								
TN-5508-LV-LV	TN-5508-LV-LV-T	8	1	–	–	1	–	–
TN-5508-LV-MV	TN-5508-LV-MV-T	8	1	–	–	–	1	–
TN-5508-LV-HV	TN-5508-LV-HV-T	8	1	–	–	–	–	1
TN-5516 Series								
TN-5516-LV-LV	TN-5516-LV-LV-T	16	1	–	–	1	–	–
TN-5516-LV-MV	TN-5516-LV-MV-T	16	1	–	–	–	1	–
TN-5516-LV-HV	TN-5516-LV-HV-T	16	1	–	–	–	–	1
TN-5516-MV-MV	TN-5516-MV-MV-T	16	–	1	–	–	1	–
TN-5516-MV-HV	TN-5516-MV-HV-T	16	–	1	–	–	–	1
TN-5516-HV-HV	TN–5516–HV–HV–T	16	–	–	1	–	–	1

TN-5508-4PoE/5516-8PoE Series

EN50155 8/16-port IEEE 802.3af PoE managed Ethernet switches

> M12 connectors for robust links
> 4 or 8 IEEE 802.3af compliant PoE and Ethernet combo ports
> Provides up to 15.4 watts at 48 VDC per PoE port
> Isolated redundant power inputs with universal 24/48 VDC, or 110/220 VDC/VAC power supply range
> EN50155/50121-3-2/50121-4, NEMA TS2, and e-Mark compliant
> -40 to 75°C operating temperature range (T models)
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet redundancy

: Introduction

The ToughNet TN-5500 series M12 PoE managed Ethernet switches are designed for industrial applications, such as rolling stock, vehicle, and railway. The TN series switches use M12 and other circular connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-5500-PoE series Ethernet switches provide 8 or 16 fast Ethernet M12 ports with 4 or 8 IEEE 802.3af compliant PoE (Power-over-Ethernet) ports. The switches are classified as power source equipment (PSE) and provide up to 15.4 watts of power per port, and can be used to power IEEE 802.3af compliant powered devices

(PDs) (such as surveillance cameras, wireless access points, and IP phones) when AC power is not readily available or is cost-prohibitive to provide locally for rolling stock. In addition, the 24/48 VDC, or 110/220 VDC/VAC dual, redundant power supply increases the reliability of your communications and saves on cabling/wiring costs. Wide temperature models with an extended operating temperature range of -40 to 75°C are also available. The TN-5500-PoE series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e-Mark (vehicles) requirements, making the switches suitable for a variety of industrial applications.

Features and Benefits

- Advanced PoE management function
- Three rotary switches for setting the last 3 digits of the IP address makes maintenance even easier
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Leading EN50155-compliant PoE switches for rolling stock applications
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port allows access by only authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Line-swap fast recovery
- Automatic recovery of connected device's IP addresses
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, and Windows utility
- Panel mounting or DIN-Rail mounting installation capability

: Specifications

Technology
Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2C/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telent, SSH, Syslog, LLDP, IEEE 1588 PTP, Modbus/TCP, IPv6
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Front cabling, M12 connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console Port: M12 A-coding 5-pin male connector
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Port LED Indicators: 10/100M (fast Ethernet port), PoE
Alarm Contact: 2 relay outputs in one M12 A-coding 5-pin male connector with current carrying capacity of 3 A @ 30 VDC
Rotary Switches: For setting the last 3 digits of the IP address

Power Requirements

Input Voltage:
• 24 VDC (16.8 to 36 V)
• 48 VDC (46 to 50 V)
• 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
• TN-5508-4PoE Series
   Max. 3.5 A @ 24 VDC
   Max. 1.8 A @ 48 VDC
   Max. 0.92/0.47 A @ 110/220 VDC
   Max. 0.77/0.39 A @ 110/220 VAC
• TN-5516-8PoE Series
   Max. 7.5 A @ 24 VDC
   Max. 3 A @ 48 VDC
   Max. 1.95/0.975 A @ 110/220 VDC
   Max. 1.83/0.91 A @ 110/220 VAC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP54 protection (optional protective caps available for unused ports)

Dimensions:
TN-5508-4PoE series: 185 x 170 x 110 mm (7.28 x 6.69 x 4.33 in)
TN-5516-8PoE series: 250 x 170 x 110 mm (9.84 x 6.69 x 4.33 in)
Installation: Panel mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), Level 3
EN61000-4-3 (RS), Level 4
EN61000-4-4 (EFT), Level 3
EN61000-4-5 (Surge), Level 3
EN61000-4-6 (CS), Level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12
Traffic Control: NEMA TS2 (Pending)
Road Traffic: e-Mark (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)
Shock: IEC61373
Freefall: IEC60068-2-32
Vibration: IEC61373
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TN-5508-4PoE Series

170.0 mm (6.7 in)
155.0 mm (6.1 in)
120.0 mm (4.7 in)
170.0 mm (6.7 in)
120.0 mm (4.7 in)
185.0 mm (7.3 in)
Front View

108.0 mm (4.3 in)
93.5 mm (3.7 in)
110.6 mm (4.4 in)
Side View

103.5 mm (4.1 in)
Side View (including DIN-Rail)

Ø4
8
Ø8
M4
37.0 mm (1.5 in) 37.0 mm (1.5 in)
127.0 mm (5.0 in)
DIN-Rail Mounting Kit
Rear View

Top & Bottom Views

Dimensions

TN-5516-8PoE Series

235.0 mm (9.3 in)
220.0 mm (8.7 in)
175.8 mm (6.9 in)
120.0 mm (4.7 in)
170.0 mm (6.7 in)
120.0 mm (4.7 in)
250.0 mm (9.8 in)

Front View

108.0 mm (4.3 in)
93.0 mm (3.7 in)
110.6 mm (4.3 in)

Side View

103.0 mm (4.1 in)

Side View
(including DIN-Rail)

ⵁ4.50
8
9.0

M4 M4 M4 M4
M4 M4 M4 M4

37.0 mm (1.5 in)   37.0 mm (1.5 in)
177.0 mm (7.0 in)

DIN-Rail
Mounting Kit

Rear View

Top & Bottom Views

: Ordering Information

Available Models		Port Interface		Power Supply					
				Power Supply 1			Power Supply 2		
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	PoE, 10/100BaseT(X) M12 Connector	10/100BaseT(X) M12 Connector	24 VDC (16.8 to 36 V)	48 VDC (46 to 50 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (16.8 to 36 V)	48 VDC (46 to 50 V)	HV: 88 to 300 VDC and 85 to 264 VAC
TN-5508-4PoE Series									
TN-5508-4PoE-24	TN-5508-4PoE-24-T	4	4	1	–	–	–	–	–
TN-5508-4PoE-48	TN-5508-4PoE-48-T	4	4	–	1	–	–	–	–
TN-5508-4PoE-HV	TN-5508-4PoE-HV-T	4	4	–	–	1	–	–	–
TN-5516-8PoE Series									
TN-5516-8PoE-24	TN-5516-8PoE-24-T	8	8	1	–	–	–	–	–
TN-5516-8PoE-24-24	TN-5516-8PoE-24-24-T	8	8	1	–	–	1	–	–
TN-5516-8PoE-24-48	TN-5516-8PoE-24-48-T	8	8	1	–	–	–	1	–
TN-5516-8PoE-24-HV	TN-5516-8PoE-24-HV-T	8	8	1	–	–	–	–	1
TN-5516-8PoE-48	TN-5516-8PoE-48-T	8	8	–	1	–	–	–	–
TN-5516-8PoE-48-48	TN-5516-8PoE-48-48-T	8	8	–	1	–	–	1	–
TN-5516-8PoE-48-HV	TN-5516-8PoE-48-HV-T	8	8	–	1	–	–	–	1
TN-5516-8PoE-HV	TN-5516-8PoE-HV-T	8	8	–	–	1	–	–	–
TN-5516-8PoE-HV-HV	TN-5516-8PoE-HV-HV-T	8	8	–	–	1	–	–	1

TN-5308 Series

EN50155 8-port unmanaged Ethernet switches

> Universal 12/24/36/48 or 72/96/110 VDC power supply range
> M12 connectors and IP40 metal housing
> Supports IEEE 802.3/802.3u/802.3x
> EN50155/50121-3-2/50121-4, NEMA TS2, and e-Mark compliant
> -40 to 75°C operating temperature range (T models)

CE FC

: Introduction

The ToughNet TN-5308 series M12 unmanaged Ethernet switches are designed for industrial applications in harsh environments. The TN series switches use M12 connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-5308 series Ethernet switches provide 8 fast Ethernet M12 ports, support IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X

auto-sensing, and provide an economical solution for your industrial Ethernet network. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5308 series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e-Mark (vehicles) requirements, making the switches suitable for a variety of industrial applications.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE802.3x flow control, back pressure flow control

Interface
M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection
LED Indicators: PWR, 10/100M

Power Requirements
Input Voltage:
• TN-5308-LV: 12/24/36/48 VDC (7 to 60 VDC)
• TN-5308-MV: 72/96/110 VDC (50.4 to 154 VDC)
Input Current:
• TN-5308-LV: 0.19A @ 12 VDC,
  0.10A @ 24 VDC, 0.054A @ 48 VDC
• TN-5308-MV: 0.033A @ 72 VDC,
  0.024A @ 96 VDC, 0.021A @ 110 VDC
Overload Current Protection: Present
Connection:
• TN-5308-LV: M12 connector
• TN-5308-MV: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Metal, IP40 protection
Dimensions:
TN-5308-LV: 60 x 216.6 x 36.1 mm (2.36 x 8.53 x 1.42 in)
TN-5308-MV: 60 x 216.6 x 53.8 mm (2.36 x 8.53 x 2.12 in)
Weight:
TN-5308-LV: 485 g
TN-5308-MV: 685 g

Installation: Panel mounting, DIN-Rail mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals
Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12
Traffic Control: NEMA TS2 (Pending)
Road Traffic: e-Mark (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Pending), EN50121-3-2 (Pending),
EN50121-4 (Pending)
Shock: IEC61373
Freefall: IEC60068-2-32
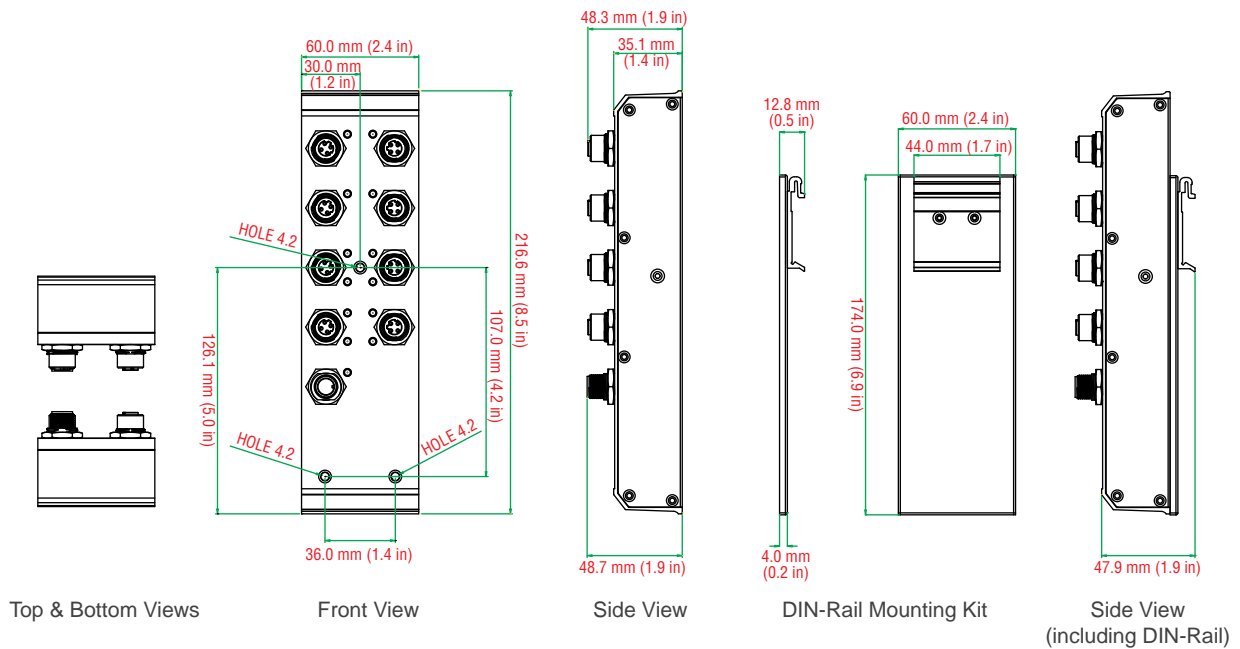**Vibration:** IEC61373
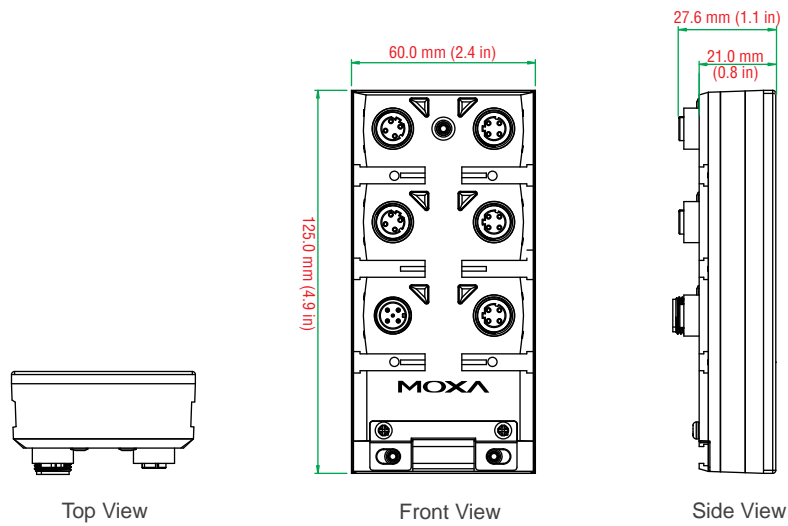Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TN-5308-LV Series
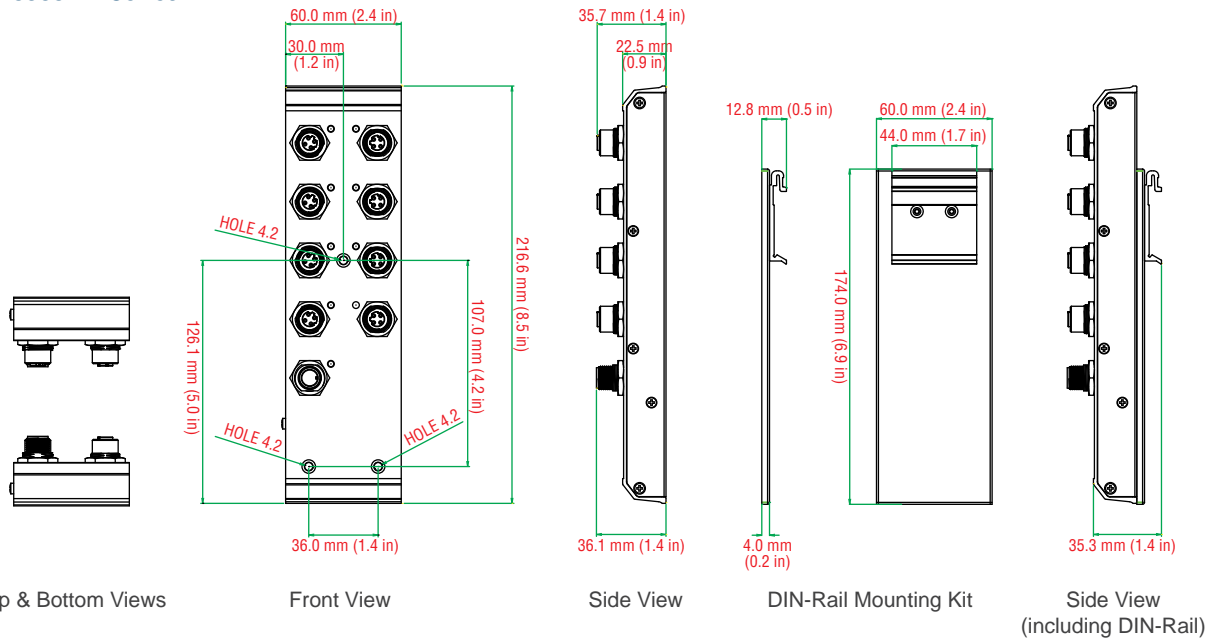
| Top & Bottom Views | Front View | Side View | DIN-Rail Mounting Kit | Side View (including DIN-Rail) |

TN-5308-MV Series
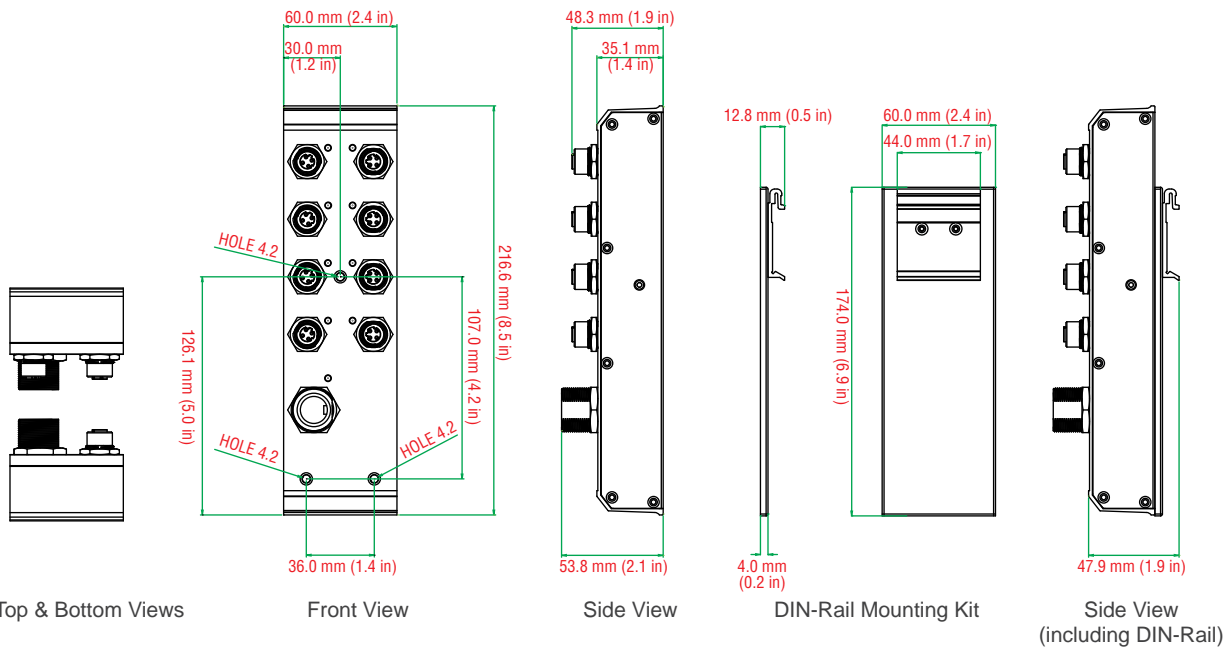
| Top & Bottom Views | Front View | Side View | DIN-Rail Mounting Kit | Side View (including DIN-Rail) |

2

Industry-specific Ethernet Switches > TN-5308 Series

Ordering Information

Available Models		Power Interface	Power Supply	
			LV	MV
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100BaseT(X) M12 connector	12/24/36/48 VDC (7 to 60 V)	72/96/110 VDC (50.4 to 154V)
TN-5308-LV	TN-5308-LV-T	8	1	–
TN-5308-MV	TN-5308-MV-T	8	–	1

TN-5308-4PoE Series

EN50155 8-port IEEE 802.3af PoE unmanaged Ethernet switches

PoE
Power over Ethernet

> M12 connectors and IP40 metal housing
> 4 IEEE 802.3af compliant PoE and Ethernet combo ports
> Provides up to 15.4 watts at 48 VDC per PoE port
> EN50155/50121-3-2/50121-4, and NEMA TS2 compliant
> -40 to 75°C operating temperature range (T models)

CE FC

: Introduction

The ToughNet TN-5308-4PoE series M12 unmanaged Ethernet switches are designed for industrial applications in harsh environments. The M12 connectors ensure tight, robust connections, and guarantee reliable operation, even for applications that are subject to high vibration and shock. The TN-5308-4PoE series Ethernet switches provide 8 fast Ethernet M12 ports with 4 IEEE 802.3af compliant PoE (Power-over-Ethernet) ports. The switches are classified as power source equipment (PSE) and provide up to 15.4 watts of power per port.

The TN-5308-4PoE switches can be used to power IEEE 802.3af compliant powered devices (PDs), eliminating the need for additional wiring. The switches support IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provide an economical solution for your industrial Ethernet network. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5308-4PoE switches are compliant with EN50155/50121-3-2/50121-4 (railway applications) and NEMA TS2 (traffic control systems), making them suitable for a variety of industrial applications.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.3af for Power-over-Ethernet
Processing Type: Store and Forward
Flow Control: IEEE802.3x flow control, back pressure flow control

Interface
M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection
LED Indicators: PWR, LNK/ACT, PoE

Power Requirements
Input Voltage: 48 VDC (46 to 50 V)
Input Current: 1.6 A @ 48 VDC
Overload Current Protection: 3 A @ 48 VDC
Connection: M12 connector
Reverse Polarity Protection: Present

PoE (per port)
Max. Output Power: 15.4 W
Output Voltage: 44 to 48.5 VDC
Max. Output Current: 350 mA
Max. Overload Protection: 400 mA

Physical Characteristics
Housing: Metal, IP40 protection
Dimensions: 60 x 216.6 x 48.7 mm (2.36 x 8.53 x 1.91 in)
Installation: Panel mounting, DIN-Rail mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals
Safety: UL508 (Pending)
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12
Traffic Control: NEMA TS2 (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Pending), EN50121-3-2 (Pending),
EN50121-4 (Pending)
Shock: IEC61373
Freefall: IEC60068-2-32
Vibration: IEC61373
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Top & Bottom Views   Front View   Side View   DIN-Rail Mounting Kit   Side View (including DIN-Rail)

Dimensions shown:
- 60.0 mm (2.4 in)
- 30.0 mm (1.2 in)
- HOLE 4.2
- HOLE 4.2
- HOLE 4.2
- 126.1 mm (5.0 in)
- 216.6 mm (8.5 in)
- 107.0 mm (4.2 in)
- 36.0 mm (1.4 in)
- 48.3 mm (1.9 in)
- 35.1 mm (1.4 in)
- 48.7 mm (1.9 in)
- 12.8 mm (0.5 in)
- 174.0 mm (6.9 in)
- 4.0 mm (0.2 in)
- 60.0 mm (2.4 in)
- 44.0 mm (1.7 in)
- 47.9 mm (1.9 in)

: Ordering Information

Available Models		Port Interface	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	PoE, 10/100BaseT(X) M12 connector	10/100BaseT(X) M12 connector
TN-5308-4PoE-48	TN-5308-4PoE-48-T	4	4

Optional Accessories (must be purchased separately)
DR-75-48/DR-120-48: 75/120 W DIN-Rail 48 VDC power supplies

2

Industry-specific Ethernet Switches > TN-5308-4PoE Series

TN-5305 Series

EN50155 5-port IP67 unmanaged Ethernet switches

> M12 connectors and IP67 rated housing
> 10/100BaseT(X), 4-pin M12 (D-coding), F/H duplex mode, and auto MDI/MDI-X connection
> Power input: 12 to 45 VDC, 18 to 30 VAC
> -40 to 75°C operating temperature range (T models)

: Introduction

The TN-5305 series Ethernet switches are IP67 rated for the toughest industrial applications, which means that the rugged housing and connectors guard against dust, water, and oil. By using M12 connectors, you can rest assured that Ethernet cables will connect tightly to the switch, and will be robust enough to protect your applications from external disturbances, such as the vibration and shock encountered in the transportation industry. The space-saving TN-5305 switches can be mounted virtually anywhere, and wide operating temperature (-40 to 75°C) models are also available for use in the extremest of conditions.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
Processing Type: Store and Forward
Flow Control: IEEE 802.3x full duplex, back pressure flow control

Interface
M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
LED Indicators: Power, LNK/ACT

Power Requirements
Input Voltage:
• 12 to 45 VDC
• 18 to 30 VAC (47 to 63 Hz)
Input Current:
• 0.12A @ 24 VDC
• 0.28A @ 24 VAC
Overload Current Protection: 1.1 A (Limited Current)
Connection: 1 M12 socket (A-coding), single power input
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Plastic, IP67 protection
Dimensions: 60 x 125 x 27.6 mm (2.36 x 4.92 x 1.09 in)
Weight: 250 g
Installation: Field-style mounting, DIN-Rail mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 4
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 2
EN61000-4-8
EN61000-4-11
Maritime: DNV (Pending), GL (Pending)
Rail Traffic: (for panel mounting installations)
EN50155 (Environmental), EN50121-3-2 (Pending),
EN50121-4 (Pending)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

27.6 mm (1.1 in)

21.0 mm (0.8 in)

60.0 mm (2.4 in)

125.0 mm (4.9 in)

MOXA

Top View   Front View   Side View

: Ordering Information

Available Models

TN-5305: Industrial M12/IP67 unmanaged Ethernet switch with 5 10/100BaseT(X) ports, 0 to 60°C operating temperature
TN-5305-T: Industrial M12/IP67 unmanaged Ethernet switch with 5 10/100BaseT(X) ports, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies

2

Industry-specific Ethernet Switches > TN-5305 Series

Accessories

∷ M12/M23 Power Cords

CBL-M12D(MM4P)/RJ45-100 IP67
1-meter M12-to-RJ45 Cat-5E UTP Ethernet cable with
IP67-rated male 4-pin D-coded M12 connector

CBL-M12(FF5P)/OPEN-100 IP67
1-meter M12-to-5-pin power cable with IP67-rated
female 5-pin A-coded M12 connector

CBL-M23(FF5P)/Open-BK-100 IP67
1-meter M23-to-5-pin power cable with
IP67-rated female 5-pin M23 connector

∷ M12 Connectors

CBL-M23(FF5P)/Open-BK-100 IP67
1-meter M23-to-5-pin power cable with
IP67-rated female 5-pin M23 connector

M12A-5P-IP68
Field-installable M-12 A-coded screw-in
sensor connector, female 5-pin, IP68-rated

∷ M12 IP67 Protective Caps

A-CAP-M12F-MIP67-PAK04
Cap for M12 D-coded female 4-pin connector,
metal, IP67, 4 pieces in one pack

A-CAP-M12M-MIP67-PAK02
Cap for M12 A-coded male 5-pin connector,
metal, IP67, 2 pieces in one pack

Introduction to IEC 61850-3 Ethernet Switches

: Suitable for All Demanding Power Utility Applications

Remote Dispatch
Control Room

SCADA HMI

PT-7828
L3 24+4G-port
IEC 61850-3 Ethernet Switch

Station Level

Non-IEEE 1588
Compliant Devices

Gigabit Turbo Ring

PT-G7509
9G-port IEC-61850-3
L2 Ethernet Switch

PT-7728
L2 24+4G-port
IEC 61850-3 Ethernet Switch

SNTP Server

IED   IED   IED   IED   IED   IED   IED   IED   IED

Bay Level

IEEE 1588
Compliant Devices

Ring Coupling

PT-7710
8+2G-port IEC 61850-3
L2 Ethernet Switch

Turbo Ring

PT-7728   PT-7710

Grandmaster Clock

Merging
Unit CT/VT

Protection
Relay

Merging
Unit CT/VT

Protection
Relay

Merging
Unit CT/VT

Protection
Relay

Process Level

—— Gigabit Fiber Optic Cable (1000BaseSX/LX/LHX/ZX)
—— Fiber Optic Cable (100BaseFX)
—— Fiber Optic Cable with IEEE 1588 packets
------ Fiber Optic Cable without IEEE 1588 packets

2

Industry-specific Ethernet Switches › Introduction to IEC 61850-3 Ethernet Switches

: IEC 61850-3 Ethernet Switches for Substation Automation

Industrial Ethernet is not only being used in a wide range of vertical markets, but is also finding uses in different facets of each market. For example, IEC 61850-3 industrial Ethernet networks are applied as the physical medium for power substation automation, which means that a host of legacy field buses must be connected to the Ethernet network. When used as a unified communication protocol in power automation, the IEC 61850 standard provides benefits that help power automation designers construct a complete, Ethernet-based communication system. These benefits include:

Integrated Protocol: The costs associated with setting up a monitoring system in a substation that uses different communication protocols

(e.g., DNP3.0, UCA, and IEC 870-5) can be prohibitive. The IEC 61850 protocol is preferred since programmers only need to use one protocol to develop the required monitoring applications.

Maintenance and Implementation: System designers find it easier to select components and controllers that have been designed specifically to meet the standard requirements of the IEC 61850 protocol, saving on both implementation and system maintenance.

Time-to-Market: The fact that leading manufacturers such as ABB, Siemens, and Schneider Electric are producing integrated IEC 61850-based products saves time, since system integrators can design systems with products right off the shelf.

: Enabling High Availability, Reliability, and Scalability of Power Transmission and Distribution Networks

Rugged Design Suitable for Harsh Environments

Verified Overall Reliability and Zero Packet Loss under Harsh EMI Interference

The EMI stress in high-voltage substations may cause errors or equipment damage in electronic communications. Moxa's PowerTrans Ethernet switches are designed to withstand all of the EMI type tests required by IEC 61850-3 without experiencing any loss in communications. The full product line has passed IEC 61850-3 and IEEE1613 certification testing conducted by KEMA, a well respected testing laboratory in the energy and utility markets. Further tests, including GOOSE messaging, EMC tests, extreme temperature tests,

and mechanical tests for vibration and shock resistance, were conducted to verify the overall durability of the PowerTrans series.

Unaffected by extreme temperatures

To perform flawlessly in the exposed climate of utility substations and industrial environments, Moxa's IEC 61850-3 substation Ethernet switches are designed for completely fanless operations in a wide temperature range of -40 to 85°C.

Redundancy for Higher Network Availability

Media Redundancy

- **Turbo Ring™ for Ring Redundancy**

Managed Ethernet switches come with the world's fastest Turbo Ring redundancy (20 ms @ 250 switches), and the standard STP/RSTP redundancy protocol. To reduce redundant network cabling and network planning costs, and to ensure high network reliability, three topology options are supported: ring coupling, dual-ring, and dual homing.

- **Turbo Chain™ Builds Complex Redundant Networks for Power Electricity Distribution**

Electric power distribution is the final stage in the delivery of electricity to end users. The distribution system carries electric power from the transmission system and delivers it to large numbers of consumers. Consequently, a typical electric power distribution system consists of a complex network that allows various connections by the power utilities.

Moxa's Turbo Chain™ is an innovative breakthrough that allows the creation of multiple redundant networks beyond the current limitations of redundant ring technology. Turbo Chain™ is easy to configure by linking two user-configured end ports within the same segment. Turbo Chain™ easily connects and extends existing redundant networks by enabling high network availability with its self-healing capability (recovery time < 20 ms). Moreover, compared with Turbo
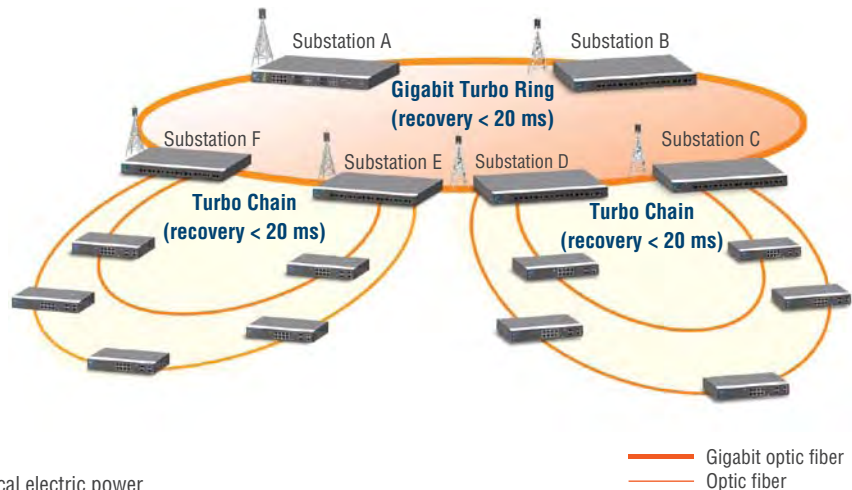
Ring in power distribution systems, Turbo Chain is more flexible and cost-efficient and has the potential to save a significant amount on development costs, time, effort, cabling, and Ethernet ports.

Isolated Power Input Redundancy

Non-stop operation is the key criterion for mission-critical applications. The PT-7828 , PT-G7509, and PT-7728 support dual, isolated, redundant power supplies with different power sources (24/48 VDC or 110/220 VAC/VDC input voltage). For example, you can choose 110/200 VAC/VDC as your main power source, and 48 VDC from a battery as your back up power source.

Redundant power supplies (88-300-VDC/85-264-VAC, and 24/48 VDC)

Configuration Redundancy

The ABC-01 backup configuration tool can both save and load configurations automatically when connected to a Moxa managed Ethernet switch. This novel management tool helps reduce downtime, and can be used for fast configuration duplication of large-scale networks.

SAVE   LOAD

ABC-01   ABC-01

2

Industry-specific Ethernet Switches ➤ Introduction to IEC 61850-3 Ethernet Switches

IEEE 1588 Precision Time Protocol for the PowerTrans Series

Time synchronization can be accomplished using the IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems (IEEE 1588-2008) to synchronize real-time clocks incorporated within each component of the electrical power system in power automation applications. Moxa's PowerTrans products are designed to operate in tough power substation environments and provide highly accurate time synchronization for each process utility. To ensure the best time synchronization network design for power automation, substation designers must consider the convenience of IEEE 1588 deployment for Ethernet switches.

End Device w/ IEEE 1588

PowerTrans Series Ethernet Switch w/ IEEE 1588

Grandmaster Clock:
Determines the time base for the system

Boundary or Transparent Clock:
Slave to the grandmaster clock and master to its slave

Ordinary Clock:
Slave to its master
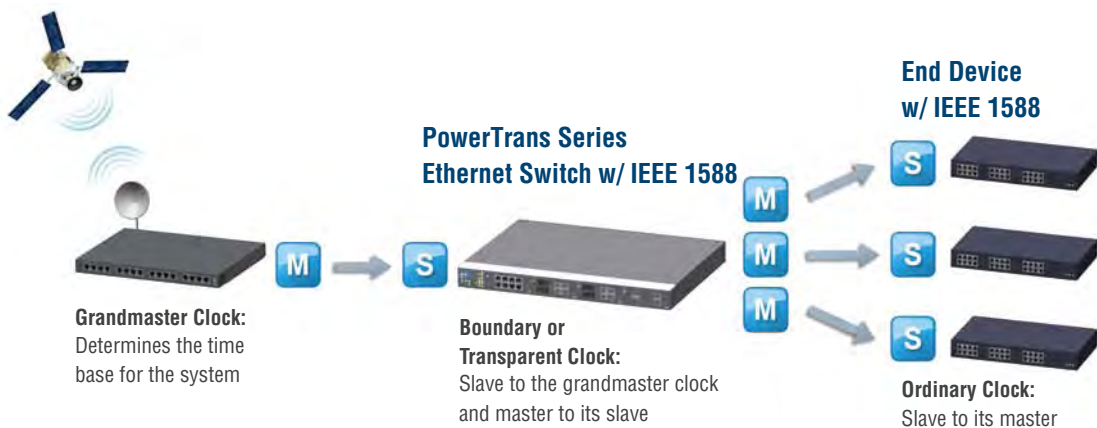
Scalable Network Infrastructure Capability

Substation and transportation automation networks can be extremely large and cover expansive territories. Moxa's PowerTrans Ethernet switches satisfy the scalable network requirements with long-haul fiber solutions from Layer 3 to Layer 2 Ethernet switches.

- The PT-7828 Layer 3 Ethernet switch can divide a large network into hierarchical subnets. Controlling network traffic on separate subnets can improve the performance of the entire network.

- The PT-7728 and PT-7710 are Layer 2 modular managed Ethernet switches that support advanced network management and control functions, including VLAN, QoS, IGMP snooping, LACP, and GMRP to optimize and prioritize network communications.
- The PT-G7509 is equipped with 9 combo Gigabit Ethernet ports, making it ideal for upgrading an existing network to Gigabit speeds and building a new full Gigabit backbone.

Note: Please check PowerTrans Ethernet Switch selection guide on page 2-3 for detailed features supported by each product model.

Future-proof Flexibility

Up to 9 Gigabit Ports for Backbone and Uplink

Demand is growing for applications in industrial networks that consist of multiple, interconnected Gigabit backbones among different network centers. Moxa offers a range of Gigabit managed Ethernet solutions that can be used to form a Gigabit backbone that connects to control centers, video-over-IP servers, Ethernet-enabled devices, or other Ethernet switches. These Gigabit Ethernet switches support fault-tolerant rings with fiber-optic ports, allowing operation in the toughest industrial environments.

Moxa's IEC 61850-3 Ethernet switches come with up to 9 Gigabit combo ports for the PT-G7509 series. Other modular Ethernet switches include the managed PT-7728/7828 Ethernet switches and the PT-7710 Ethernet switch, all of which support 2 or 4 Gigabit combo ports. Any combination of twisted pair and fiber optic ports can be chosen to form a redundant Gigabit Turbo Ring or for connecting to a Gigabit HMI/SCADA system in the control room.

Media Configuration Flexibility

The PT series of modular Ethernet switches supports different numbers of Gigabit and fast Ethernet interface modules, which allow users to choose from a variety of copper/fiber media combinations. The modular design benefits users in three ways:

- Higher flexibility for system design and fast network changes
- Easy maintenance and lower cost of spare parts
- Reduced cost of future upgrades

Cabling Flexibility

Moxa's rackmount Ethernet switches support two cabling options. Front cabling is ideal for maintenance, whereas rear cabling is neater and results in an arrangement that is safer in the event that a cable gets disconnected.

⦂ Certifications to Ensure Reliable Operation

Power Substation Certifications

IEC 61850-3

IEC 61850-3 specifically addresses immunity from certain environmental conditions and electromagnetic interference (EMI) for communication networks and systems in substations. The EMI immunity requirements are based on IEC 61000-6-5, which establishes performance criteria for key functions within the substation. To be compliant with the standard, critical functions, such as protection relay and control functions, on-line processing and regulation, as well as metering and network communication, must experience no delays or data loss when exposed to various EMI phenomena.

IEEE 1613

IEEE 1613 is another industry standard that establishes EMI immunity requirements for networking devices in electric power substations. Included in this standard are ratings, environmental performance requirements, and testing requirements for compliant communication devices.

According to the IEEE 1613 standard, compliant devices may not experience permanent damage under EMI stress. Two different classes of devices are defined in the standard according to how EMI stress affects performance.

Class 1

Compliant devices in this class may experience some data errors, losses, or delays under EMI stress conditions.

Class 2

Compliant devices in this class must not experience any data errors, delays, or losses under EMI stress conditions.

The PowerTrans PT series is compliant with IEC 61850-3 and IEEE 1613 certifications specifying a high level of EMC, shock, and vibration in power substations.

Road Traffic Control System Standard

NEMA TS2

The National Electrical Manufacturers Association (NEMA) established the TS1 standard to define technically adequate and safe traffic control equipment. The TS2 standard was later introduced to address some drawbacks of the original guidelines. NEMA TS2 defines controllers, cabinets, and systems more completely than TS1, promotes better interchangeability, and allows for future expansion. Section 2 contains the environmental and testing requirements, including guidelines for temperature, humidity, voltage, vibration, and shock. PT series and IKS series switches are compliant with the NEMA TS2 traffic control system standard.

Test	NEMA TS2
Temperature	-34 to 74°C
Humidity	18% to 90% RH, non-condensing
Voltage	120 to 135 VAC @ 57 to 63 Hz
Vibration	0.5 g @ 5 to 30 Hz
Shock	10 g's for 11 ms

Railway Industry Standards

EN50155

All PowerTrans series switches are certified according to the EN50155 standard, ensuring safe deployment for railway applications.

EN50121-4

EN50121-4 defines emission and immunity standards for signaling and telecommunication devices..

PT-7828 Series

IEC 61850-3 24+4G-port Layer 3 Gigabit modular managed rackmount Ethernet switches

> Layer 3 routing interconnects multiple LAN segments
> IEC 61850-3, IEEE 1613 (power substations), and EN50121-4 (railway applications) compliant
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet Redundancy
> IEEE 1588 PTP for precise time synchronization of networks
> Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
> Modular design for various media options
> -40 to 85°C operating temperature range

2

Industry-specific Ethernet Switches ∨ PT-7828 Series

: Introduction

The PowerTrans PT-7828 switches are high performance Layer 3 Ethernet switches that support Layer 3 routing functionality to facilitate the deployment of applications across networks. The PT-7828 switches are also designed to meet the strict demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4).

The PT-7828's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling and wiring costs. The modular design of the PT-7828 makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 fast Ethernet ports. Optional front or rear wiring makes the PT-7828 switches suitable for a variety of applications.

Features and Benefits

• Layer 3 switching functionality to divide a large network into hierarchical subnets and allow data and information to communicate across networks
• IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
• DHCP Option 82 for IP address assignment with different policies
• Modbus/TCP industrial Ethernet protocol supported
• Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP
• IGMP snooping and GMRP for filtering multicast traffic
• IEEE 802.1Q VLAN and GVRP protocols to ease network planning
• QoS (IEEE802.1p/1Q) and TOS/DiffServ to increase determinism
• IEEE 802.3ad, LACP for optimum bandwidth utilization

• SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
• SNMPv1/v2c/v3 for different levels of network management
• RMON for efficient network monitoring and proactive capability
• Bandwidth management prevents unpredictable network status
• Lock port to restrict access to authorized MAC addresses
• Port mirroring for online debugging
• Automatic warning by exception through email, relay output
• Automatic recovery of connected devices' IP addresses
• Line-swap fast recovery
• Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, RIP V1/V2, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP, SNMP Inform

Layer 3 Modular Rackmount Ethernet Switch System, PT-7828

Slot 1 Slot 2 Slot 3 Slot 4
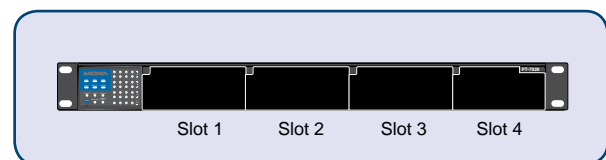
Layer 3 Switching: Static routing, RIP V1/V2, OSPF, DVMRP, PIM-DM, VRRP for router redundancy
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface
Fast Ethernet: Slots 1, 2, and 3 for combinations of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP.
Slot 4 for 4-port PM-7200 fast Ethernet modules with 100BaseFX (SC/ST connector).
Gigabit Ethernet: Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP
Console Port: RS-232 (RJ45)
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements
Input Voltage:
• 24 VDC (18 to 36 V)
• 48 VDC (36 to 72 V)
• 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
• Max. 2.58 A @ 24 VDC
• Max. 1.21 A @ 48 VDC
• Max. 0.64/0.33 A @ 110/220 VDC
• Max. 0.53/0.28 A @ 110/220 VAC
Overload Current Protection: Present
Connection: 10-pin terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics
Housing: IP30 protection
Dimensions: 440 x 44 x 325 mm (17.32 x 1.73 x 12.80)
Weight: 5900 g
Installation: 19'' rack mounting

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
EMI: FCC Part 15, CISPR (EN55022) class A
Power Automation: IEC 61850-3, IEEE 1613
Traffic Control: NEMA TS2
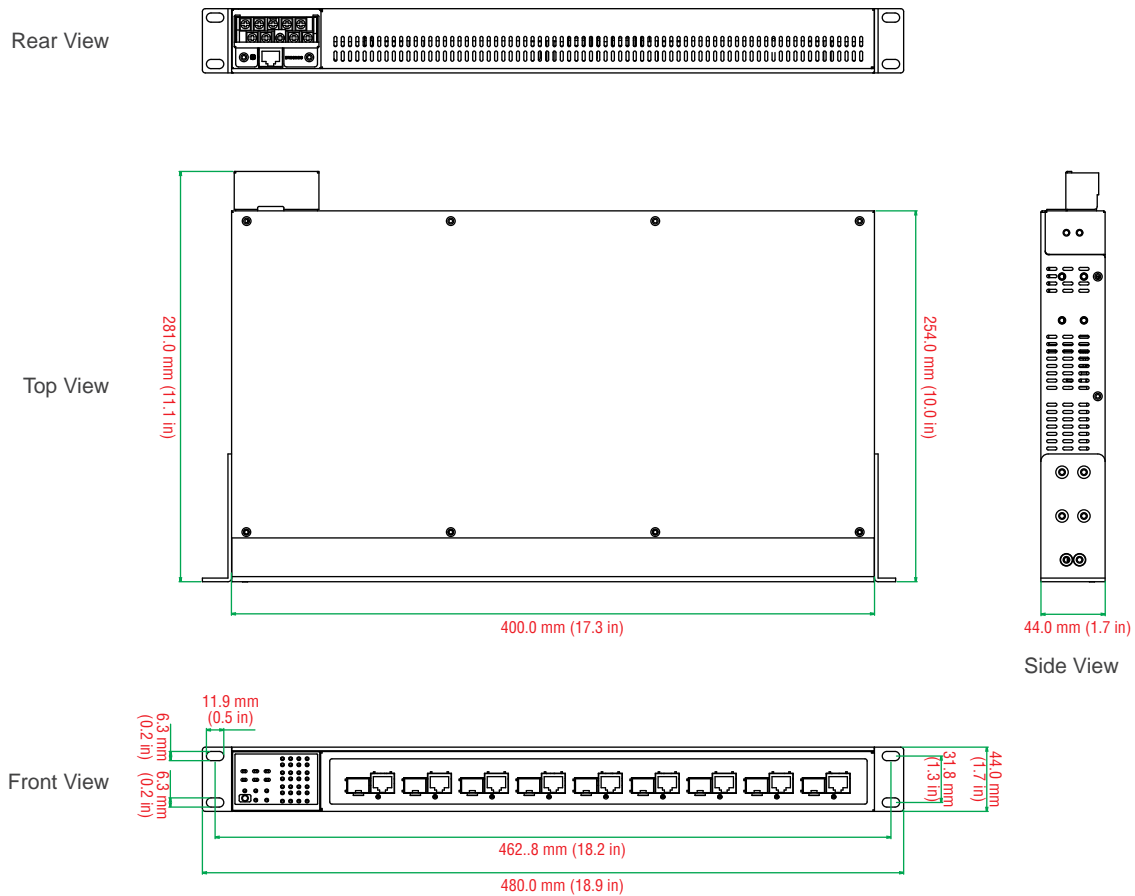**Rail Traffic:** EN50155, EN50121-4
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Industry-specific Ethernet Switches ∨ PT-7828 Series

: Ordering Information

Step 1: Select Ethernet switch system

PT-7828 with power supply

Step 2: Select interface modules

PM-7200 module
(Gigabit or fast Ethernet)

Note: The PT-7828 Ethernet switch system is delivered without interface modules. See page 2-39 to choose PM-7200 interface modules.

PT-7828 Layer 3 Modular Rackmount Ethernet Switch System

The PT-7828 switch system consists of 18 Layer 3 modular managed rackmount Ethernet switch systems, each with 3 slots for fast Ethernet modules, 1 slot for a Gigabit Ethernet module, or 4 slots for fast Ethernet modules. A total of 28 or 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply					
		Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	Rear Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-7828-F-24	PT-7828-R-24	1	–	–	–	–	–
PT-7828-F-24-24	PT-7828-R-24-24	1	–	–	1	–	–
PT-7828-F-24-48	PT-7828-R-24-48	1	–	–	–	1	–
PT-7828-F-24-HV	PT-7828-R-24-HV	1	–	–	–	–	1
PT-7828-F-48	PT-7828-R-48	–	1	–	–	–	–
PT-7828-F-48-48	PT-7828-R-48-48	–	1	–	–	1	–
PT-7828-F-48-HV	PT-7828-R-48-HV	–	1	–	–	–	1
PT-7828-F-HV	PT-7828-R-HV	–	–	1	–	–	–
PT-7828-F-HV-HV	PT-7828-R-HV-HV	–	–	1	–	–	1

Note: The PT-7828 Layer 3 Ethernet switch systems provide combinations of 1 slot for a Gigabit Ethernet interface module, 3 slots for fast Ethernet interface modules, or 4 slots for fast Ethernet interface modules. See page 2-39 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules for your own application.

PT-7828-F series
(Front Cabling, Front Display)

PT-7828-R series
(Rear Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7828

	Interface Modules																											
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12	PM-7200-4MST	PM-7200-4MSC	PM-7200-4SSC
Slot 1	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 2	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 3	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 4	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PT-G7509 Series

IEC 61850-3 9G-port full Gigabit managed rackmount Ethernet switches

> 9 combo 10/100/1000BaseT(X) or 100/1000BaseSFP slot Gigabit ports
> IEC 61850-3, IEEE 1613 (power substations), and EN50155/EN50121-4 (railway applications) compliant
> IEEE 1588 PTP for precise time synchronization of networks
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet Redundancy
> Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
> -40 to 85°C operating temperature range

: Introduction

The PowerTrans PT-G7509 is equipped with 9 combo Gigabit Ethernet ports, making it ideal for upgrading an existing network to Gigabit speeds and building a new full Gigabit backbone. The PT-G7509 is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS 2), and railway applications (EN50155/EN50121-4). Gigabit transmission increases bandwidth to provide higher performance and transfer large amounts of video, voice, and data across a network quickly. The redundant Ethernet Turbo Ring, Turbo Chain, and RSTP/STP (IEEE 802.1w/D) functions increase system reliability and the availability of your network backbone. The choice of either front or rear wiring makes the PT-G7509 suitable for different types of application.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.1Q VLAN and GVRP protocols to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port limits access to authorized MAC addresses only
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by Web browser, Telnet/Serial console, Windows utility, and ABC-01 automatic backup configurator

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6, SNMP Inform
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed
Fiber Ports: 100/1000BaseSFP slot
Console Port: RS-232 (RJ45)
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
• 24 VDC (18 to 36 V)
• 48 VDC (36 to 72 V)
• 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current: (all ports are equipped with fiber)
• Max. 1.17 A @ 24 VDC
• Max. 0.59 A @ 48 VDC
• Max. 0.27/0.16 A @ 110/220 VDC
• Max. 0.61/0.35 A @ 110/220 VAC
Overload Current Protection: Present
Connection: 10-pin terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection
Dimensions: 440 x 44 x 254 mm (17.32 x 1.73 x 10.00 in)
Weight: 3300 g
Installation: 19'' rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
EMI: FCC Part 15, CISPR (EN55022) class A
Power Automation: IEC 61850-3, IEEE 1613
Traffic Control: NEMA TS2
Rail Traffic: EN50155, EN50121-4
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

2

Industry-specific Ethernet Switches ⌄ PT-G7509 Series

Dimensions

Rear View

Top View

281.0 mm (11.1 in)

254.0 mm (10.0 in)

400.0 mm (17.3 in)

44.0 mm (1.7 in)

Side View

Front View

11.9 mm (0.5 in)

6.3 mm (0.2 in)

6.3 mm (0.2 in)

31.8 mm (1.3 in)

44.0 mm (1.7 in)

462..8 mm (18.2 in)

480.0 mm (18.9 in)

: Ordering Information

PT-G7509 Full Gigabit Managed Rackmount Ethernet Switch System

The PT-G7509 switch system consists of 9 combo 10/100/1000BaseT(X) or 100/1000BaseSFP slot Gigabit ports and the switch can be used in a temperature range from -40 to 85°C.

Note: See page 1-69 for SFP-1G/1FE series Gigabit/fast Ethernet SFP module product information.

Available Models		Power Supply					
		Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	Rear Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-G7509-F-24	PT-G7509-R-24	1	–	–	–	–	–
PT-G7509-F-24-24	PT-G7509-R-24-24	1	–	–	1	–	–
PT-G7509-F-24-48	PT-G7509-R-24-48	1	–	–	–	1	–
PT-G7509-F-24-HV	PT-G7509-R-24-HV	1	–	–	–	–	1
PT-G7509-F-48	PT-G7509-R-48	–	1	–	–	–	–
PT-G7509-F-48-48	PT-G7509-R-48-48	–	1	–	–	1	–
PT-G7509-F-48-HV	PT-G7509-R-48-HV	–	1	–	–	–	1
PT-G7509-F-HV	PT-G7509-R-HV	–	–	1	–	–	–
PT-G7509-F-HV-HV	PT-G7509-R-HV-HV	–	–	1	–	–	1

PT-G7509-F series
(Front Cabling, Front Display)

PT-G7509-R series
(Rear Cabling, Front Display)

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PT-7728 Series

IEC 61850-3 24+4G-port Gigabit modular managed rackmount Ethernet switches

> IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
> IEEE 1588 PTP for precise time synchronization of networks
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet Redundancy
> Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
> Modular design for various media options
> -40 to 85°C operating temperature range

: Introduction

The PowerTrans PT-7728 is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4). The PT-7728's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling/wiring costs.

The modular design of the PT-7728 also makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 fast Ethernet ports. Along with the optional front or rear wiring, these features together make the PT-7728 suitable for a variety of industrial applications.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.1Q VLAN and GVRP protocols to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port limits access to authorized MAC addresses only
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by Web browser, Telnet/Serial console, Windows utility, and ABC-01 automatic backup configurator
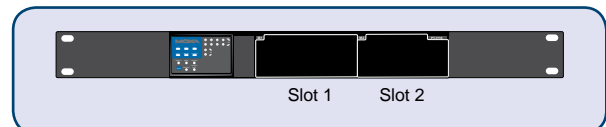
: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6, SNMP Inform

Modular Rackmount Ethernet Switch System, PT-7728

| | Slot 1 | Slot 2 | Slot 3 | Slot 4 |

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Slots 1, 2, and 3 for combinations of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP.
Slot 4 for 4-port PM-7200 fast Ethernet modules with 100BaseFX (SC/ST connector).

Gigabit Ethernet: Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP

Console Port: RS-232 (RJ45)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL

Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
• 24 VDC (18 to 36 V)
• 48 VDC (36 to 72 V)
• 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
• Max. 2.58 A @ 24 VDC
• Max. 1.21 A @ 48 VDC
• Max. 0.64/0.33 A @ 110/220 VDC
• Max. 0.53/0.28 A @ 110/220 VAC

Overload Current Protection: Present

Connection: 10-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 325 mm (17.32 x 1.73 x 12.80)

Weight: 5900 g

Installation: 19'' rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1

EMI: FCC Part 15, CISPR (EN55022) class A

Power Automation: IEC 61850-3, IEEE 1613

Traffic Control: NEMA TS2

Rail Traffic: EN50155, EN50121-4

Note: Please check Moxa's website for the most up-to-date certification status.
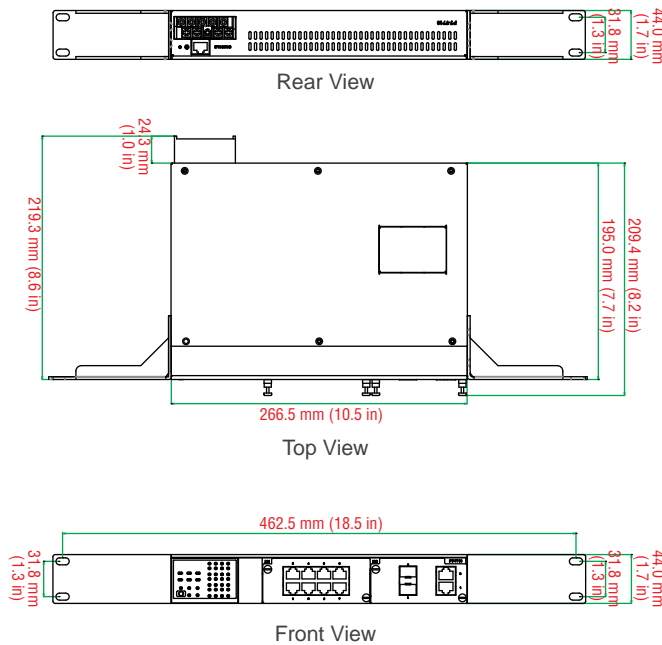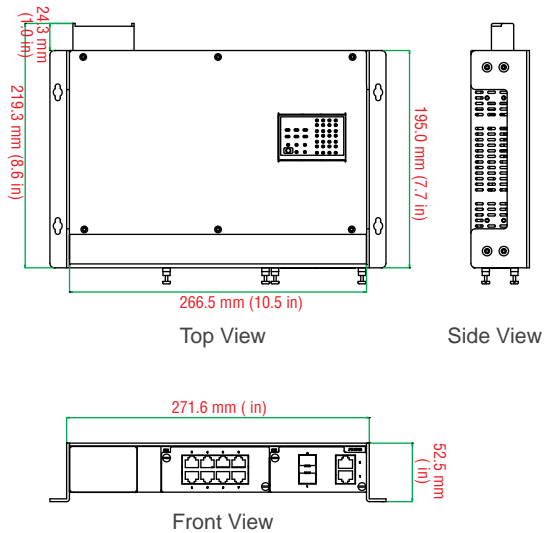
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions

Rear View

440.0 mm (17.3 in)

349.3 mm (13.8 in)

Top View

325.0 mm (12.8 in)

31.8 mm (1.3 in)

Front View

457.0 mm (18.0 in)
462.6 mm (18.2 in)
480.0 mm (18.9 in)

44.0 mm (1.7 in)

Side View

: Ordering Information

Step 1: Select Ethernet switch system

PT-7728 with power supply

Step 2: Select interface modules

PM-7200 modules
(Gigabit or fast Ethernet)

Note: The PT-7728 Ethernet switch system is delivered without interface module. See page 2-39 to choose PM-7200 interface modules.

PT-7728 Modular Rackmount Ethernet Switch System

The PT-7728 switch system consists of 18 modular managed rackmount Ethernet switch systems with 3 slots for fast Ethernet modules, 1 slot for a Gigabit Ethernet module, or 4 slots for fast Ethernet modules. A total of 28 or 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply					
		Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	Rear Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-7728-F-24	PT-7728-R-24	1	–	–	–	–	–
PT-7728-F-24-24	PT-7728-R-24-24	1	–	–	1	–	–
PT-7728-F-24-48	PT-7728-R-24-48	1	–	–	–	1	–
PT-7728-F-24-HV	PT-7728-R-24-HV	1	–	–	–	–	1
PT-7728-F-48	PT-7728-R-48	–	1	–	–	–	–
PT-7728-F-48-48	PT-7728-R-48-48	–	1	–	–	1	–
PT-7728-F-48-HV	PT-7728-R-48-HV	–	1	–	–	–	1
PT-7728-F-HV	PT-7728-R-HV	–	–	1	–	–	–
PT-7728-F-HV-HV	PT-7728-R-HV-HV	–	–	1	–	–	1

Note: The PT-7728 Ethernet switch systems provide combinations of 1 slot for a Gigabit Ethernet interface module, 3 slots for fast Ethernet interface modules, or 4 slots for fast Ethernet interface modules. See page 2-39 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

PT-7728-F series
(Front Cabling, Front Display)

PT-7728-R series
(Rear Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7728

	Interface Modules																											
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12	PM-7200-4MST	PM-7200-4MSC	PM-7200-4SSC
Slot 1	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 2	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 3	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
Slot 4	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	✓

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

2

Industry-specific Ethernet Switches ➤ PT-7728 Series

PT-7710 Series

IEC 61850-3 8+2G-port Gigabit modular managed rackmount Ethernet switches

> IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
> IEEE 1588 PTP for precise time synchronization of networks
> Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP for Ethernet redundancy
> Universal power supply range, 12/24/48 VDC or 110/220 VDC/VAC
> Modular design for various media options
> -40 to 85°C operating temperature range

: Introduction

The PowerTrans PT-7710 is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4). The PT-7710's Gigabit and fast Ethernet backbone, redundant ring, and 12/24/48 VDC dual redundant power supplies or 110/220 VDC/

VAC power supplies increase the reliability of the communications and reduce cabling and wiring costs. The modular design of the PT-7710 makes network planning easy, and allows greater flexibility by letting you install up to 2 Gigabit ports and 8 fast Ethernet ports, or 10 fast Ethernet ports.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring, Turbo Chain, and IEEE 802.1D-2004 RSTP/STP
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP protocol to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization

- SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port to limit access to authorized MAC addresses only
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6, SNMP Inform

Modular Rackmount Ethernet Switch System, PT-7710

Slot 1   Slot 2

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties
Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Slot 1 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP; Slot 2 for 1 or 2-port interface modules with 100BaseFX (SC/ST connector)
Gigabit Ethernet: Slot 2 for 2-port PM-7200 Gigabit Ethernet combo module, 100/1000BaseT(X) or 1000BaseSFP
Console Port: RS-232 (RJ45)
System LED Indicators: STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Mode LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED
Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
• 12/24/48 VDC (9 to 60 V)
• 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)
Input Current: (all ports are equipped with fiber)
• Max. 0.81 A @ 24 VDC
• Max. 0.42 A @ 48 VDC
• Max. 0.17/0.10 A @ 110/220 VDC
• Max. 0.20/0.12 A @ 110/220 VAC
Overload Current Protection: Present
Connection: 10-pin terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection
Dimensions: 266.5 x 44 x 195 mm (10.5 x 1.7 x 7.7 in)
Weight: 2200 g
Installation: 19'' rack mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F); cold start requires min. of 100 VAC at -40°C
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
EMI: FCC Part 15, CISPR (EN55022) class A
Power Automation: IEC 61850-3, IEEE 1613
Traffic Control: NEMA TS2
Rail Traffic: EN50155, EN50121-4
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Rack Mounting

Rear View

Top View

Front View

Wall Mounting

Top View

Side View

Front View

2

Industry-specific Ethernet Switches ❯ PT-7710 Series

: Ordering Information

Step 1: Select Ethernet switch system

PT-7710 with power supply

Step 2: Select interface modules

PM-7200 modules
(Gigabit or fast Ethernet)

Note: The PT-7710 Ethernet switch system is delivered without interface module. See page 2-39 to choose PM-7200 interface modules.

PT-7710 Modular Rackmount Ethernet Switch System

The PT-7710 switch system consists of 4 modular managed rackmount Ethernet switch systems with 1 slot for a fast Ethernet module, and 1 slot for a fast Ethernet or Gigabit Ethernet module. A total of 10 or 8+2G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply	
Rackmounting, Front Cabling, Front Display	Wall mounting, Down Cabling, Front Display	LV: 12/24/48 VDC (9 to 60 V) (Dual power inputs)	HV: 88 to 300 VDC and 85 to 264 VAC, isolated
PT-7710-F-LV	PT-7710-D-LV	1	–
PT-7710-F-HV	PT-7710-D-HV	–	1

Note: The PT-7710 Ethernet switch systems provide 1 slot for a Gigabit Ethernet interface module and 1 slot for a fast Ethernet interface module. See page 2-39 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

PT-7710-F series
(Rackmounting, Front Cabling, Front Display)

PT-7710-D series
(Wall mounting, Down Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7710

	Interface Modules																								
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	–	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓
Slot 2	–	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, or 500 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PM-7200 Series

Gigabit and fast Ethernet modules for PT and IKS series switches

: Specifications

Gigabit Ethernet Interface Modules, PM-7200-2G/4G series
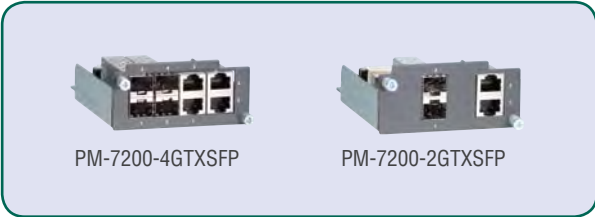
PM-7200-4GTXSFP   PM-7200-2GTXSFP

Interface
RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection
Fiber Ports: 1000BaseSFP slots
Note: The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots. See page 1-69 to select the SFP-1G series Gigabit Ethernet modules for your application.

Fast Ethernet Interface Modules, PM-7200 series

PM-7200-8TX

PM-7200-6MSC
PM-7200-6SSC

PM-7200-6MST

PM-7200-4MSC2TX
PM-7200-4SSC2TX

PM-7200-4MST2TX

NEW
PM-7200-4MT

NEW
PM-7200-4MSC
PM-7200-4SSC

PM-7200-2MSC4TX
PM-7200-2SSC4TX

PM-7200-2MST4TX

PM-7200-1LSC6TX

PM-7200-2MSC
PM-7200-2SSC

PM-7200-2MST

PM-7200-1MSC
PM-7200-1SSC

PM-7200-1MST

PM-7200-1MST6TX

PM-7200-1MSC6TX
PM-7200-1SSC6TX

COMING SOON
PM-7200-8PoE

PM-7200-8SFP*

PM-7200-4M12

* See page 1-69 to select SFP-1G/1FE series Gigabit Ethernet and fast Ethernet modules.

2

Industry-specific Ethernet Switches ❯ PM-7200 Series

Interface

RJ45 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Fiber Ports: 100BaseFX ports (SC/ST or SFP LC connector)
PoE Ports: IEEE 802.3af Power-over-Ethernet Technology, provide up to 15.4 watts per port
M12 Ports: 10/100BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

Optical Fiber

	100BaseFX		
	Multi-mode	**Single-mode**	**Single-mode, 80 km**
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km a 4 km b	40 km c	80 km d
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm single-mode fiber optic cable
d. 9/125 μm single-mode fiber optic cable (80 km)

: Ordering Information

Rackmount Ethernet Switch System and Interface Module Compatibility Chart

	Interface Modules																											
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1MSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1LSC6TX	PM-7200-8PoE	PM-7200-8SFP*	PM-7200-4M12	PM-7200-4MST	PM-7200-4MSC	PM-7200-4SSC
PT-7828	✓	✓	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
PT-7728	✓	✓	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	✓	✓
PT-7710	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
IKS-6726	–	✓	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	–
IKS-6726-PoE	–	✓	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–
IKS-6324	–	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

* If you are using an SFP-1FELLC module, the operating temperature is limited to -40 to 75°C (-40 to 167°F).

Gigabit Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200-2G/4G Series

Available Models	Port Interface
	Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*
PM-7200-2GTXSFP	2
PM-7200-4GTXSFP	4

*The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots.

MOXA® ▶ www.moxa.com ▶ info@moxa.com

2

Industry-specific Ethernet Switches ˅ PM-7200 Series

Fast Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200 Series

Available Models	Port Interface							
	10/100BaseT(X)			100BaseFX				100BaseSFP
	TP	PoE	M12	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km	
PM-7200-8TX	8	–	–	–	–	–	–	–
PM-7200-6MSC	–	–	–	6	–	–	–	–
PM-7200-6MST	–	–	–	–	6	–	–	–
PM-7200-6SSC	–	–	–	–	–	6	–	–
PM-7200-4MSC2TX	2	–	–	4	–	–	–	–
PM-7200-4MST2TX	2	–	–	–	4	–	–	–
PM-7200-4SSC2TX	2	–	–	–	–	4	–	–
PM-7200-2MSC4TX	4	–	–	2	–	–	–	–
PM-7200-2MST4TX	4	–	–	–	2	–	–	–
PM-7200-2SSC4TX	4	–	–	–	–	2	–	–
PM-7200-1LSC6TX	6	–	–	–	–	–	1	–
PM-7200-2MSC	–	–	–	2	–	–	–	–
PM-7200-2MST	–	–	–	–	2	–	–	–
PM-7200-2SSC	–	–	–	–	–	2	–	–
PM-7200-1MSC	–	–	–	1	–	–	–	–
PM-7200-1MST	–	–	–	–	1	–	–	–
PM-7200-1SSC	–	–	–	–	–	1	–	–
PM-7200-1MSC6TX	6	–	–	1	–	–	–	–
PM-7200-1MST6TX	6	–	–	–	1	–	–	–
PM-7200-1SSC6TX	6	–	–	–	–	1	–	–
PM-7200-8PoE	–	8	–	–	–	–	–	–
PM-7200-8SFP	–	–	–	–	–	–	–	8
PM-7200-4M12	–	–	4	–	–	–	–	–
PM-7200-4MST	–	–	–	–	4	–	–	–
PM-7200-4MSC	–	–	–	4	–	–	–	–
PM-7200-4SSC	–	–	–	–	–	4	–	–

2

Industry-specific Ethernet Switches > PM-7200 Series

This page intentionally left blank.

Industrial Ethernet Gateways

Ethernet Fieldbus Gateways

3

	MGate™ MB3170 MGate™ MB3170-T	MGate™ MB3170I MGate™ MB3170I-T	MGate™ MB3270 MGate™ MB3270-T	MGate™ MB3270I MGate™ MB3270I-T	MGate™ MB3180	MGate™ MB3280	MGate™ MB3480
Ethernet Interface							
Number of Ports	2 (1 IP)	2 (1 IP)	2 (1 IP)	2 (1 IP)	1	1	1
Speed	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps
Connector	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface							
Number of Ports	1	1	2	2	1	2	4
Serial Standards	RS-232/422/485	RS-232/422/485	RS-232/422/485	RS-232/422/485	RS-232/422/485	RS-232/422/485	RS-232/422/485
Connectors	RS-232: DB9-M; RS-422/485: Terminal Block	DB9-M	DB9-M	DB9-M	DB9-M	DB9-M	DB9-M
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®
Serial Communication Parameters	Data Bits: 7, 8; Stop Bits: 1, 2; Parity: None, Even, Odd, Space, Mark						
Parity	None, Even, Odd, Space, Mark						
Flow Control	RTS/CTS, DTR/DSR (RS-232 only)						
Baudrate	50 bps to 921.6 Kbps						
Isolation	–	✓	–	✓	–	–	–
Software							
Operation Modes	RTU Slave, RTU Master, ASCII Slave, ASCII Master						
Utilities	MGate™ Manager Suite for Windows 98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64						
Smart Routing	✓	✓	✓	✓	✓	✓	✓
Serial Redirection	✓	✓	✓	✓	–	–	–
ProCOM	✓	✓	✓	✓	✓	✓	✓
Priority Control	✓	✓	✓	✓	–	–	–
Ethernet Protocol	Modbus TCP		–	–	–	–	–
Serial Protocol	–	–	Modbus RTU/ASCII		–	–	–
Physical Characteristics							
Housing	Plastic	Plastic	Plastic	Plastic	Metal	Metal	Metal (IP30)
Dimensions	29 x 89.2 x 118.5 mm				22 x 52 x 80 mm	22 x 77 x 111 mm	35.5 x 103 x 158 mm
Environmental Limits							
Operating Temperature	0 to 55°C or -40 to 75°C				0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements							
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Power Connector	Terminal block	Terminal block	Terminal block	Terminal block	Power jack	Power jack and terminal block	
Regulatory Approvals							
EMC	CE (EN55022 Class A and EN55024), FCC Part 15 Subpart B Class A						
Safety	UL (UL60950-1), TÜV (EN60950-1)						
Hazardous Location	UL/cUL Class 1 Division 2 Groups A, B, C, D; ATEX Class 1 Zone 2				–	–	–
Shock	IEC 60068-2-27				–	–	–
Freefall	IEC 60068-2-23				–	–	–
Vibration	IEC 60068-2-6				–	–	–
Marine	DNV				–	–	–
EMS	EN61000-4-2 (ESD): Level 3 EN61000-4-3 (RS): Level 3 EN61000-4-4 (EFT): Level 4 EN61000-4-5 (Surge): Level 3 EN61000-4-6 (CS): Level 3 EN61000-4-8: Passed EN61000-4-11: Passed EN61000-4-12: Passed				EN61000-4-2 (ESD): Level 2 EN61000-4-3 (RS): Level 2 EN61000-4-4 (EFT): Level 2 EN61000-4-5 (Surge): Level 2 EN61000-4-6 (CS): Level 2 EN61000-4-8: Passed EN61000-4-11: Passed EN61000-4-12: Passed		
Reliability							
Warranty	5 years (see www.moxa.com/warranty)						

Ethernet Fieldbus Gateways

	MGate™ EIP3170 MGate™ EIP3170-T	MGate™ EIP3170I MGate™ EIP3170I-T	MGate™ EIP3270 MGate™ EIP3270-T	MGate™ EIP3270I MGate™ EIP3270I-T
Ethernet Interface				
Number of Ports	2 (2 IPs)	2 (2 IPs)	2 (2 IPs)	2 (2 IPs)
Speed	10/100 Mbps	10/100 Mbps	10/100 Mbps	10/100 Mbps
Connector	RJ45	RJ45	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface				
Number of Ports	1	1	2	2
Serial Standards	RS-232/422	RS-232/422	RS-232/422	RS-232/422
Connectors	DB9-M (RS-232), TB (RS-422)	DB9-M (RS-232), TB (RS-422)	DB9-M	DB9-M
ESD Protection	15 KV	15 KV	15 KV	15 KV
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®
Serial Communication Parameters	Data Bits: 7, 8; Stop Bits: 1, 2; Parity: None, Even, Odd, Space, Mark			
Parity	None, Even, Odd, Space, Mark			
Flow Control	RTS/CTS, DTR/DSR			
Baudrate	1200 bps to 921.6 Kbps			
Isolation	–	✓	–	✓
Software				
Operation Modes	–	–	–	–
Utilities	MGate™ Manager Suite for Windows 98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64			
Smart Routing	✓	✓	✓	✓
Serial Redirection	–	–	✓	✓
ProCOM				
Priority Control	–	–	–	–
Ethernet Protocol	CIP (PCCC) on Ethernet/IP	CIP (PCCC) on Ethernet/IP	CIP (PCCC) on Ethernet/IP	CIP (PCCC) on Ethernet/IP
Serial Protocol	DF1 Full-duplex	DF1 Full-duplex	DF1 Full-duplex	DF1 Full-duplex
Physical Characteristics				
Housing	Plastic	Plastic	Plastic	Plastic
Dimensions	29 x 89.2 x 118.5 mm	29 x 89.2 x 118.5 mm	29 x 89.2 x 118.5 mm	29 x 89.2 x 118.5 mm
Environmental Limits				
Operating Temperature	0 to 55°C or -40 to 75°C	0 to 55°C or -40 to 75°C	0 to 55°C or -40 to 75°C	0 to 55°C or -40 to 75°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C
Power Requirements				
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Power Connector	Terminal block	Terminal block	Terminal block	Terminal block
Regulatory Approvals				
EMC	CE (EN55022 Class A and EN55024), FCC Part 15 Subpart B Class A			
Safety	UL (UL60950-1), LVD (EN60950-1)			
Hazardous Location	UL/cUL Class 1 Division 2 Groups A, B, C, D; ATEX Class 1 Zone 2			
Shock	IEC60068-2-27			
Freefall	IEC60068-2-23			
Vibration	IEC60068-2-6			
Marine	–	–	–	–
EMS	EN61000-4-2 (ESD): Level 3 EN61000-4-3 (RS): Level 3 EN61000-4-4 (EFT): Level 4 EN61000-4-5 (Surge): Level 3 EN61000-4-6 (CS): Level 3 EN61000-4-8: Passed EN61000-4-11: Passed EN61000-4-12: Passed			
Reliability				
Warranty	5 years (see www.moxa.com/warranty)			

Smart M2M Gateways

	SMG-1100	SMG-6100
Computer		
CPU Speed	200 MHz	1 GHz
DRAM	32 MB	–
Flash	16 MB	–
USB Ports	1 (USB 2.0)	2 (USB 2.0)
Relay Output	4 DIs, 4 DOs,	–
Storage		
SD Slot	✓	–
LAN Interface		
10/100 Mbps Ethernet Ports	1	4
Magnetic Isolation Protection	1.5 KV	1.5 KV
100BaseFX Fiber Ports (multi-mode)	–	–
Cellular Interface		
Cellular Modes	GSM/GPRS/EDGE	–
Radio Frequency Bands	850/900/1800/1900 MHz	–
GPRS Class	12	–
EDGE Class	12	–
Coding Schemes	CS1 to CS4	–
Serial Interface		
RS-232/422/485 Ports	2 (DB9-M)	2 RS-232 (DB9-M)
ESD Protection	15 KV	15 KV
Console Port	✓	
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark	
Flow Control	RTS/CTS, XON/XOFF, ADDC™	
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)	
LEDs		
System	Ready, Storage	Power, Storage
LAN	10M, 100M	10M, 100M
Cellular	Cellular Enabled, Signal Strength	–
Serial	TxD, RxD	TxD, RxD
Physical Characteristics		
Housing	Aluminum (1 mm)	SECC sheet metal (1 mm)
Weight	1 kg	4.5 kg
Dimensions	44 x 119 x 40 mm	440 x 315 x 450 mm
Mounting	DIN-Rail, wall	Rack
Antenna Length	85 mm	–
Environmental Limits		
Operating Temperature	-10 to 60°C	-10 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C	-20 to 80°C
Anti Vibration/Shock	2g/6g with DIN-rail/20g with wall mount	2g/20g
Regulatory Approvals		
EMC	FCC (Part 15 Subpart B, CISPR 22 Class B, ANSI C63.4)	FCC (Part 15 Subpart B, CISPR 22 Class A)
CE	EN55022 Class B, EN61000-3-2 Class A, EN61000-3-3, EN55024	CE (EN61000-3-2, EN61000-3-3, EN55024),CE (EN55022)
R&TTE	EN301 489-1, EN301 489-7, EN301 511	–
Safety	LVD: EN60950-1 UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03	UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)
Green Product	GCF-CC, RoHS, CRoHS, WEEE	
Reliability		
Buzzer, RTC, WDT	✓	✓
Warranty	5 years (see www.moxa.com/warranty)	

Introduction to Fieldbus Gateways

Seamless communication between Ethernet and Fieldbus devices

Fieldbus is an industrial network system used for real-time distributed control, and provides a way to connect devices in a manufacturing plant. Fieldbus works on a network structure that typically allows daisy-chain, star, ring, branch, and tree network topologies. In the past, computers were connected using RS-232 (serial connections), which only allows two devices to communicate with each other. This is equivalent to the currently used 4-20 mA communication scheme, which requires that each device has its own communication point at the controller level. Fieldbus, on the other hand, is equivalent to LAN-type connections, which require only one communication point at the controller level and allow multiple analog and digital points to be connected at the same time. The fact that Fieldbus works over a network is the main reason it is now widely used in industrial applications.

Moxa's own line of Fieldbus gateways is the MGate series:

*   MGate MB3000 Series: Modbus TCP to Modbus serial gateways
*   MGate EIP3000 Series: EtherNet/IP to DF1 gateways

The MGate family uses several innovative design concepts and powerful options to make the gateways easy to use. In particular, ProCOM is a user-friendly tool that simplifies implementation.

3

⋮ MGate™ MB3000 Series: Modbus TCP to Modbus Serial Gateways

Modbus is the standard protocol for communicating between a wide range of industrial devices, including PLCs, DCSs, HMIs, instruments, meters, motors, and drives. Moxa's MGate™ MB3000 is specially designed to integrate Modbus TCP and Modbus RTU/ASCII networks. MGate™ MB3000 products support one or two Ethernet connections, and up to four serial ports.

The MGate™ MB3000 series of Modbus gateway products support some or all of these advanced features:

*   Multiple masters
*   Priority control
*   Smart routing
*   Serial redirector
*   Powerful Windows Utility with multi-language support
*   Built-in protocol analyzer
*   ProCOM
*   Built-in optical isolation for industrial device protection (isolation models only)

⋮ MGate™ EIP3000 Series: EtherNet/IP to DF1 Gateways

The EtherNet/IP and DF1 protocols are used by Rockwell and AB PLC, respectively, as their main communications protocols. A problem faced by many engineers is figuring out how to connect devices that use these two different protocols. One option is to buy an expensive, budget-busting PLC communications interface module. However, a much more cost-effective option is to use Moxa's MGate™ line of products, which are specially designed to integrate EtherNet/IP and DF1 networks.

The MGate™ EIP3000 series of Modbus gateway products support some or all of these advanced features:

*   Multiple EtherNet/IP connections
*   Smart routing
*   Serial redirector
*   Powerful Windows utility with multi-language support
*   Built-in protocol analyzer
*   ProCOM
*   Built-in optical isolation for industrial device protection (Isolation models only)

∶ Features of the MGate™ MB3000 Series

Multiple Masters across Different Modbus Networks for Fully Compliant Operation

The MGate™ MB3000 supports 16 simultaneous TCP masters with up to 32 simultaneous requests per master. Serial masters are able to access up to 32 different IP addresses as TCP slaves. MGate™

MB3000 gateways have been designed so that even with multiple masters across different Modbus networks, communication remains compliant with each Modbus protocol.

Supports 16 TCP masters with up to 32 requests per master
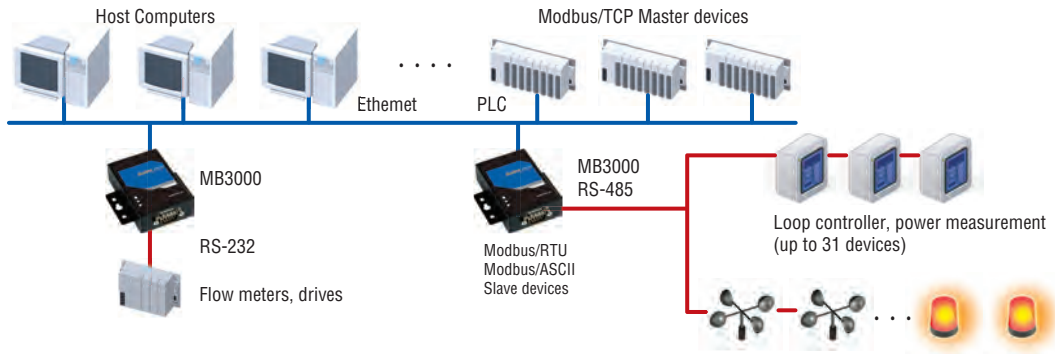
Built-in Optical Isolation for Industrial Device Protection

The MGate™ MB3000 series includes two advanced models—the MB3170 and MB3270—that offer built-in optical isolation for the serial

signals as an option. Optical isolation helps prevent dangerous ground loops, spikes, and surges.

Priority Control for Critical Commands (patent pending)

Flag urgent commands for immediate response
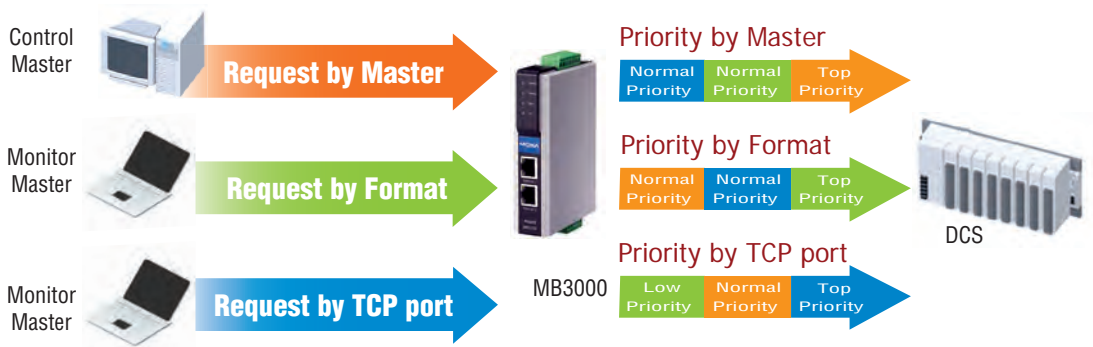
Other Modbus gateways simply transfer all requests between Modbus networks on a FIFO (first in first out) basis, with no accommodation for urgent commands that require immediate attention. The advanced models of the MGate™ MB3000 (the MB3170 and MB3270) include a patent-pending priority control feature that allows urgent commands

to be flagged for immediate response based on IP address, command type, or TCP port. The priority control feature allows the advanced models of the MB3000 series to get around the latency experienced by other Modbus gateways. With the priority control feature, the advanced MB3000 models are an ideal component of real-time control systems.

No Change to Existing Architecture with Smart Routing and Serial Redirector

Automatic Routing

Traditional Routing

Request **to Meter**

Request **to Light Bulb**

Request **to DCS**

Master

MB3000

Request **to Meter**

Request **to Light Bulb**

Request **to DCS**

Meter

Light Bulb

DCS

Smart Routing

Request **to Slaves**

Master

MB3000

Request to Meter

Request to Light Bulb

Request to DCS

Meter

Light Bulb

DCS
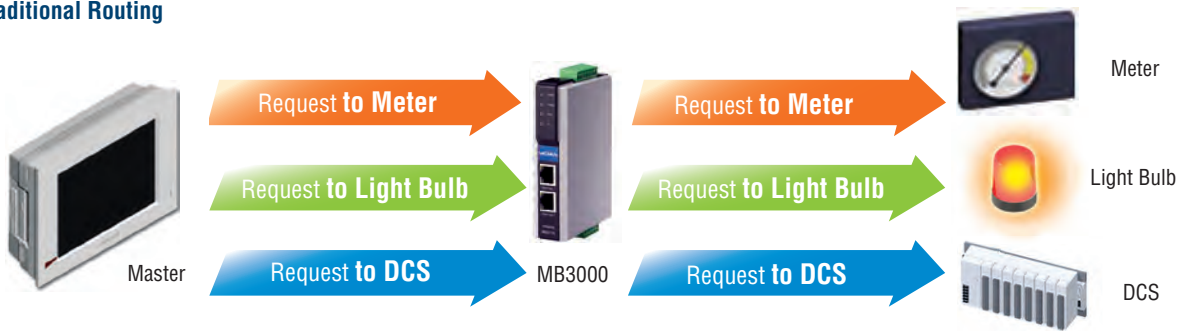
The MGate™ MB3270, MB3280, and MB3480 include smart routing for enhanced compatibility with existing Modbus networks. Other Modbus gateways require a separate socket connection for each serial port, making them useless for TCP masters that can only open one connection. With smart routing on the MB3000 Modbus gateway, a TCP master can use just one socket connection to command serial slaves on every serial port.

The MGate™ MB3270 has a serial redirector function that allows additional options for Modbus network integration. The serial redirector function allows the commands of a serial master to be redirected to serial slaves on another port. In addition, a serial master can operate simultaneously with TCP masters or other serial masters, without altering the Modbus architecture or software. Using the serial redirector function, advanced MB3000 gateways can establish redundant backup control or Ethernet monitoring of Modbus networks that were originally designed for a single serial master.

Create a backup system

MB3270

TCP Master

Serial Master

RTU Protocol

RTU Protocol

RTU Protocol

3

Industrial Ethernet Gateways > Introduction to Fieldbus Gateways

: Features of the MGate™ EIP3000 Series

Support for Multiple EtherNet/IP Connections

The MGate™ EIP3000 series products support up to 8 EtherNet/IP servers (incoming connections) and 8 EtherNet/IP clients (outgoing connections) simultaneously. Each connection can be set up for connected messaging (CM) or unconnected messaging (UCMM), and can send up to 16 requests at one time.
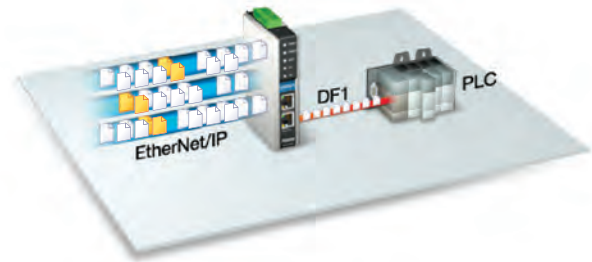
Easy-to-Use Routing Table

When using different serial port gateways, it is important to set up the "slave ID to serial port" mapping. Even when using a 1-port gateway, some legacy devices are only manufactured with one unique ID for all units. In this case, the ID must be translated before a message is sent to the same control network, and it helps the host computer to recognize all devices as individual units. The MGate™ EIP3000 is designed to meet all slave ID routing requirements. With MGate™ Manager, setting up a complete routing table is quick and easy with the graphical user interface that helps users design their "slave ID to serial port" mapping.
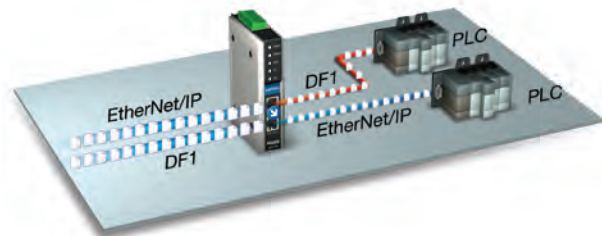
Use ProCOM to Implement Control via COM Port Mapping to Generate Four Additional Virtual Serial Channels

Most host software uses COM ports as a control interface. The MGate™ EIP3000 however, which is much more than just a device server, provides a COM mapping function and also retains DF1 connection capability. The MGate™ EIP3000 supports Windows 2000/XP/2003/Vista, and provides COM port mapping control of device servers and DF1 behavior compatibility of gateways. Each MGate™ EIP3000 gateway supports four virtual serial ports for remote control over an Ethernet connection.
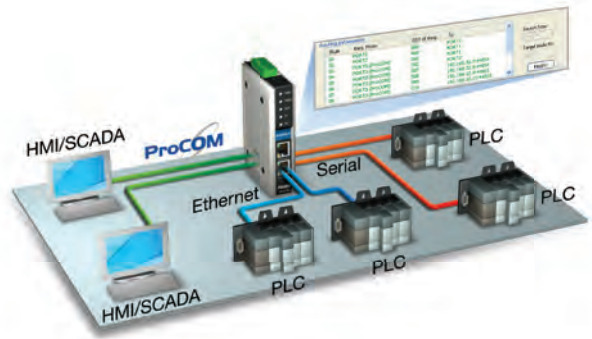
Individual IP for Each Serial Port

For some SCADA software, such as RSLinx, the slave ID for an Ethernet connection is designed as a fixed number for every IP, which poses a problem when using multiple serial port gateways. If a gateway provides only one IP on the Ethernet network, devices connected to other serial ports will never receive requests or commands from the SCADA software.

With the IP alias function, the MGate™ EIP3000 supports an individual IP for each serial port, allowing SCADA software to communicate through the gateway with DF1 devices on different serial ports at the same time.
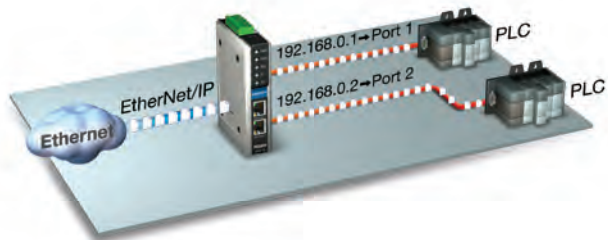
MGate™ MB3180/3280/3480

1, 2, and 4-port standard Modbus gateways

> **Convert between Modbus TCP and Modbus RTU/ASCII**
> **1 Ethernet port and 1, 2, or 4 RS-232/422/485 ports**
> **16 simultaneous TCP masters with up to 32 simultaneous requests per master**
> **Easy hardware setup and configuration**

: Overview

The MB3180, MB3280, and MB3480 are standard Modbus gateways that convert between Modbus TCP and Modbus RTU/ASCII protocols. Up to 16 simultaneous Modbus TCP masters are supported, with up to 31 RTU/ASCII slaves per serial port. For RTU/ASCII masters, up to 32 TCP slaves are supported.

: Standard Modbus Network Integration

The three standard MGate™ models (MB3180, MB3280, and MB3480) are designed for easy integration of Modbus TCP and RTU/ASCII networks. With these models, Modbus serial slave devices can be seamlessly incorporated into an existing Modbus TCP network, and Modbus TCP slaves can be made accessible to serial masters. The MB3180, MB3280, and MB3480 offer features that make network integration easy, customizable, and compatible with almost any Modbus network.

: High Density, Cost-effective Gateways

The MGate™ MB3000 gateways can effectively connect a high density of Modbus nodes to the same network. The MB3280 can manage up to 62 serial slave nodes, and the MB3480 can manage up to 124 serial slave nodes. Each RS-232/422/485 serial port can be configured individually for Modbus RTU or Modbus ASCII operation and for different baudrates, allowing both types of networks to be integrated with Modbus TCP through one Modbus gateway.

: Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, Auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports:
MB3180: 1
MB3280: 2
MB3480: 4
Serial Standards: RS-232/422/485, software selectable
Connectors: DB9 male
ESD Protection: 15 KV for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 7, 8
Stop Bits: 1, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR (RS-232 only)
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Operation Modes: RTU Slave, RTU Master, ASCII Slave, ASCII Master
Utilities: MGate™ Manager for Windows 98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64
Multi-master and Multi-drop:
Master mode: 32 TCP slaves
Slave mode: 16 TCP masters (request queue 32-deep for each master)
Bonus Feature: Smart Routing

Physical Characteristics
Housing:
MB3180/3280: Metal
MB3480: Metal, IP30 protection

Dimensions:
Without ears:
MB3180: 22 x 52 x 80 mm (0.87 x 2.05 x 3.15 in)
MB3280: 22 x 77 x 111 mm (0.87 x 3.03 x 4.37 in)
MB3480: 35.5 x 103 x 158 mm (1.40 x 4.06 x 6.22 in)
With ears:
MB3180: 22 x 75.2 x 80 mm (0.87 x 2.96 x 3.15 in)
MB3280: 22 x 100 x 111 mm (0.87 x 3.94 x 4.37 in)
MB3480: 35.5 x 103 x 181 mm (1.40 x 4.06 x 7.14 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Connector:
MGate™ MB3180: Power jack
MGate™ MB3280/3480: Power jack and terminal block
Power Consumption:
MGate™ M3180: 200 mA (max.)
MGate™ M3280: 250 mA (max.)
MGate™ M3480: 385 mA (max.)

Regulatory Approvals
EMC: CE (EN55022 Class A and EN55024), FCC Part 15 Subpart B
Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
EMS:
EN61000-4-2 (ESD): Level 2
EN61000-4-3 (RS): Level 2
EN61000-4-4 (EFT): Level 2
EN61000-4-5 (Surge): Level 2
EN61000-4-6 (CS): Level 2
EN61000-4-8: Passed
EN61000-4-11: Passed
EN61000-4-12: Passed

Reliability
MTBF (meantime between failures):
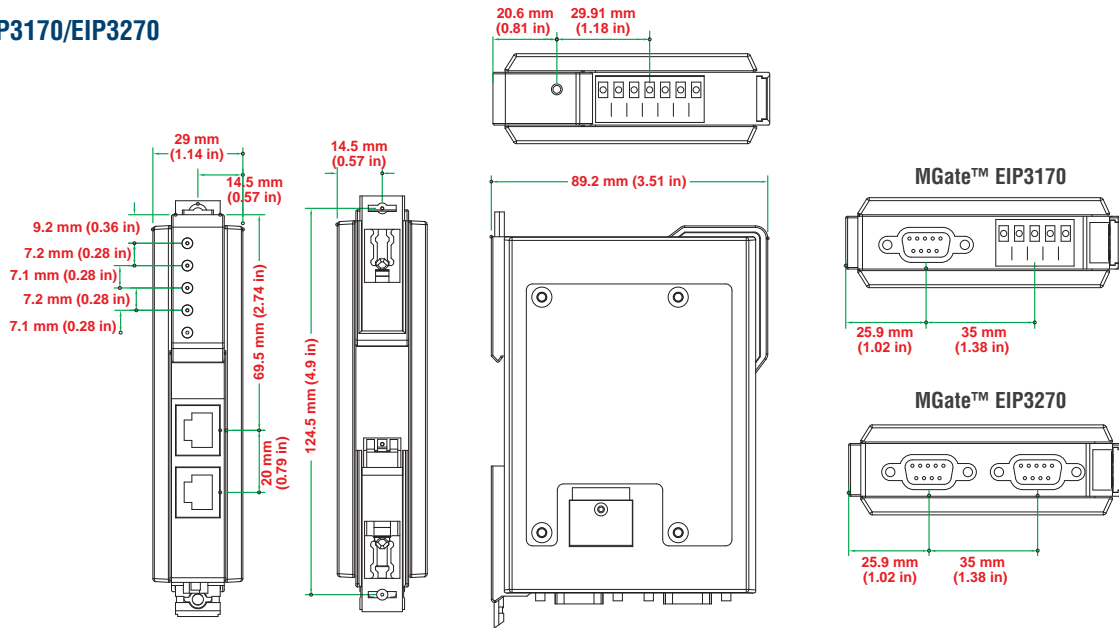MGate™ M3180: 628376 hrs
MGate™ M3280: 503029 hrs
MGate™ M3480: 295812 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
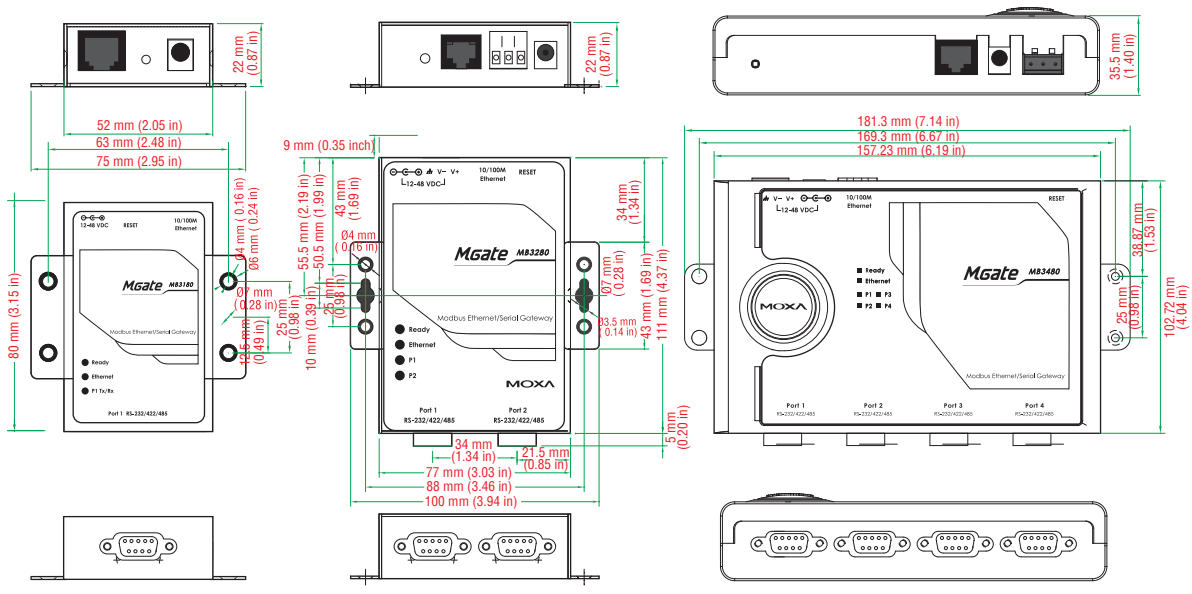
⁞ Ordering Information

Available Models
MGate™ MB3180: 1-port standard Modbus gateway
MGate™ MB3280: 2-port standard Modbus gateway
MGate™ MB3480: 4-port standard Modbus gateway

Optional Accessories (can be purchased separately)
DK-35A: Mounting kit for 35-mm DIN-rail

DK-35A

Package Checklist
- MGate™ MB3180 or MB3280 or MB3480 Modbus Gateway
- Power Adaptor
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

MGate™ MB3170/3270

1 and 2-port advanced serial-to-Ethernet Modbus gateways

> Configuration is exceptionally easy
> Slave mode supports 16 TCP masters and up to 31 or 62 serial slaves at the same time
> Master mode supports 32 TCP slaves at the same time
> Emergency request tunnels ensure QoS control
> Serial redirector function provided
> Embedded Modbus protocol analyzer
> Redundant dual DC power inputs
> Built-in Ethernet cascading for easy wiring

: Overview

The MB3170 and MB3270 are advanced Modbus gateways that provide maximum flexibility for integrating industrial Modbus networks of all types and sizes. They are designed to integrate Modbus TCP, ASCII, and RTU devices in almost any master and slave combination, including serial master to serial slave, or simultaneous serial and Ethernet masters. A special priority control feature allows urgent commands to obtain an immediate response. All models are ruggedly constructed, are DIN-rail mountable, and offer built-in optical isolation for serial signals as an option.

: Integrate TCP Masters without Altering the Modbus RTU/ASCII Network or Software

The MB3270 can integrate Modbus TCP with Modbus RTU/ASCII, without modifying the existing Modbus RTU/ASCII architecture or software. With the serial redirector function, a serial master can maintain direct access to serial slave devices through a specially mapped serial port. This allows the serial and TCP masters to access serial slaves simultaneously.

: Cascade Ethernet Ports for Easy Wiring

Advanced models of the MGate™ MB3000 series have two Ethernet ports to make network wiring easier. Dual Ethernet ports allow users to string multiple Modbus gateways together using standard RJ45 Ethernet cables, eliminating the need for a separate Ethernet switch.
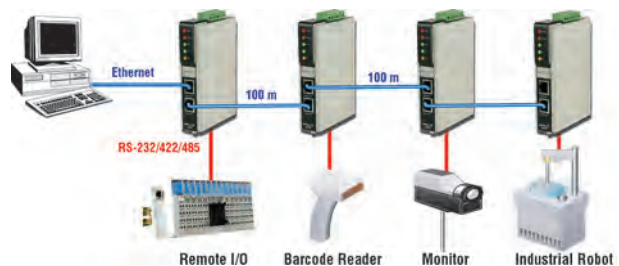
: Redundant Power Inputs

Advanced models of the MB3000 series have dual power inputs for greater reliability. The power inputs allow simultaneous connections to two live DC power sources, so that continuous operation is provided even if one power source fails. The higher level of reliability makes these advanced Modbus gateways ideal for demanding industrial applications.

: Warning by Relay Output

A relay output is provided for the Ethernet link and power input status. The relay output gives maintenance engineers an additional tool for troubleshooting and maintenance.

: Priority Control for Urgent Commands (patent pending)

As Modbus networks increase in size and complexity, the lag time between commands and responses becomes a major concern. Advanced models of the MB3000 series provide a priority control function for urgent commands, allowing users to force certain commands to get an immediate response. Depending on your system's requirements, different methods are available to define which commands receive priority.

: Specifications

Ethernet Interface
Number of Ports: 2 (1 IP)
Speed: 10/100 Mbps, Auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports:
MB3170/3170I: 1
MB3270/3270I: 2
Serial Standards: RS-232/422/485, software selectable
Connectors:
MB3170/3170I: DB9 male for RS-232, Terminal block for RS-422/485
MB3270/3270I: DB9 male x 2
ESD Protection: 15 KV for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 120 Ω

Serial Communication Parameters
Data Bits: 7, 8
Stop Bits: 1, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR (RS-232 only)
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Operation Modes: RTU Slave, RTU Master, ASCII Slave, ASCII Master
Utilities: MGate™ Manager for Windows 98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64
Multi-master and Multi-drop:
Master mode: 32 TCP slaves
Slave mode: 16 TCP masters (request queue 32-deep for each master)
Bonus Features: Smart Routing, Serial Redirection, Priority Control

Physical Characteristics
Housing: Plastic
Dimensions:
Without ears: 29 x 89.2 x 118.5 mm (1.14 x 3.51 x 4.67 in)
With ears extended: 29 x 89.2 x 124.5 mm (1.14 x 3.51 x 4.90 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Connector: Terminal block
Power Consumption:
MGate™ M3170: 435 mA (max.)
MGate™ M3170I: 555 mA (max.)
MGate™ M3270: 435 mA (max.)
MGate™ M3270I: 510 mA (max.)

Regulatory Approvals
EMC: CE (EN55022 Class A and EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
Hazardous Location:
UL/cUL Class 1 Division 2 Groups A, B, C, D
ATEX Class 1 Zone 2
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-23
Vibration: IEC 60068-2-6
Marine: DNV
EMS:
EN61000-4-2 (ESD): Level 3
EN61000-4-3 (RS): Level 3
EN61000-4-4 (EFT): Level 4
EN61000-4-5 (Surge): Level 3
EN61000-4-6 (CS): Level 3
EN61000-4-8: Passed
EN61000-4-11: Passed
EN61000-4-12: Passed

Reliability
MTBF (meantime between failures):
MGate™ M3170: 210794 hrs
MGate™ M3270: 125234 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

20.6 mm (0.81 in) **29.91 mm (1.18 in)**

29 mm (1.14 in) **14.5 mm (0.57 in)**

14.5 mm (0.57 in)

89.2 mm (3.51 in)

MGate™ MB3170

9.2 mm (0.36 in)
7.2 mm (0.28 in)
7.1 mm (0.28 in)
7.2 mm (0.28 in)
7.1 mm (0.28 in)

69.5 mm (2.74 in)

124.5 mm (4.9 in)

20 mm (0.79 in)

25.9 mm (1.02 in) **35 mm (1.38 in)**

MGate™ MB3270

25.9 mm (1.02 in) **35 mm (1.38 in)**
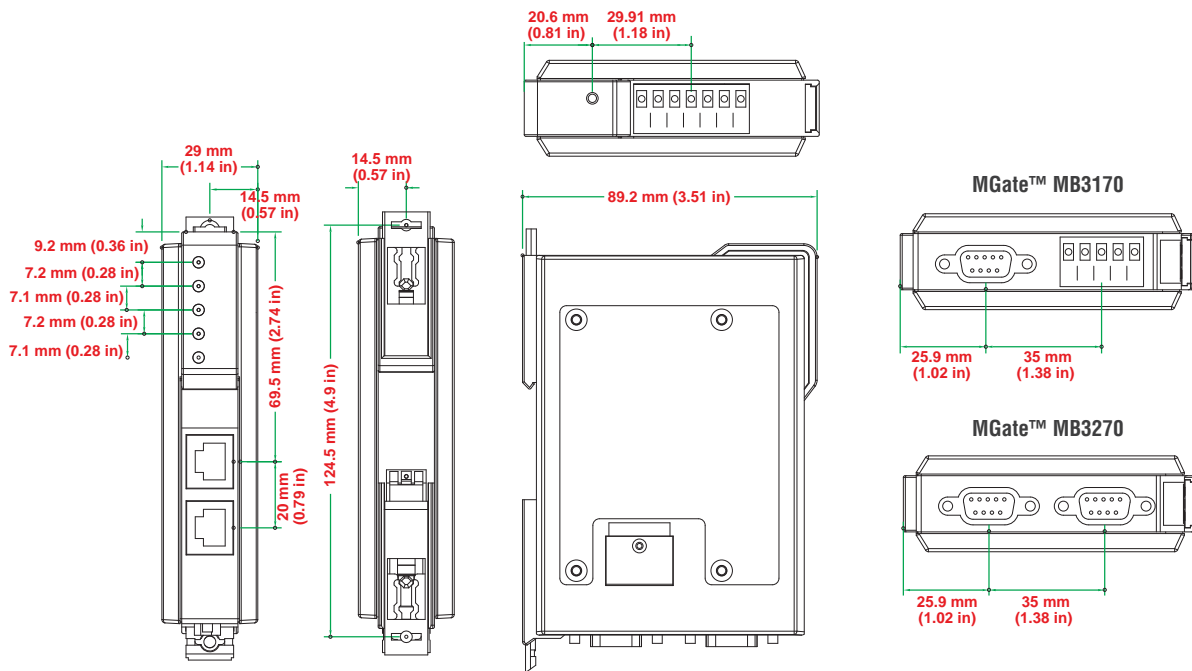
Ordering Information

Available Models

MGate™ MB3170: 1-port advanced Modbus gateway, 0 to 55°C operating temperature

MGate™ MB3170I: 1-port advanced Modbus gateway with 2 KV isolation, 0 to 55°C operating temperature

MGate™ MB3270: 2-port advanced Modbus gateway, 0 to 55°C operating temperature

MGate™ MB3270I: 2-port advanced Modbus gateway with 2 KV isolation, 0 to 55°C operating temperature

MGate™ MB3170-T: 1-port advanced Modbus gateway, -40 to 75°C operating temperature

MGate™ MB3170I-T: 1-port advanced Modbus gateway with 2 KV isolation, -40 to 75°C operating temperature

MGate™ MB3270-T: 2-port advanced Modbus gateway, -40 to 75°C operating temperature

MGate™ MB3270I-T: 2-port advanced Modbus gateway with 2 KV isolation, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DR-45-24: 24 VDC DIN-rail power supply (2 A @ 45 W) with universal 85 to 264 VAC input

DR-75-24: 24 VDC DIN-rail power supply (3.2 A @ 75 W) with universal 85 to 264 VAC input

DR-120-24: 24 VDC DIN-rail power supply (5 A @ 120 W) with switch for choosing 88 to 132 VAC, or 176 to 264 VAC input

Package Checklist

- MGate™ MB3170 or MB3170I or MB3270 or MB3270I Modbus Gateway
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

3

Industrial Ethernet Gateways > MGate™ MB3170/3270

MGate™ EIP3000 Series

1 and 2-port EtherNet/IP to DF1 gateways

> PCCC objects for Rockwell Automation networks supported
> Use ProCOM to implement control via COM port mapping
> 16 simultaneous EtherNet/IP client/server pairs with up to 16 Queued requests
> Serial redirector keeps the original serial master and slave connection while connecting devices to the Ethernet
> EtherNet/IP and DF1 protocol analyzer for easy troubleshooting
> Redundant dual DC power inputs
> Built-in Ethernet cascading for easy wiring
> -40 to 75°C wide operating temperature models available

: Overview

MGate™ EIP3000 gateways provide EtherNet/IP to DF1 protocol conversion for users who need to connect Allen Bradley PLCs to an EtherNet/IP network. With a number of innovative functions, the MGate™ series overcomes the difficulties of connecting between legacy serial devices and SCADA software. Both 1 and 2-port gateways are available for use with different sized control networks.

: Protocol Conversion between DF1 and EtherNet/IP

By supporting PCCC objects on CIP, the MGate™ EIP3000 can communicate seamlessly with SCADA software such as RSLinx. For users who develop control software based on EtherNet/IP, MGate EIP3000 offers the standard interface for connection.

: Support for Multiple EtherNet/IP Connections

MGate™ EIP3000 gateways support up to 16 EtherNet/IP clients and servers simultaneously. Each client can send up to 16 requests at a time, and the multiple connection capability can help establish redundancy for more complex control systems.

: Windows Utility for Easy Setup and Traffic Monitoring

Moxa provides a user-friendly Windows utility with multi-language support. The utility supports a traffic monitoring function for EtherNet/IP and DF1 protocols, and not only logs events initiated by the gateway, but also records all commands and responses that pass through the gateway. The utility helps users determine the root cause of failures and performance bottlenecks.

MOXA® www.moxa.com ▶ info@moxa.com
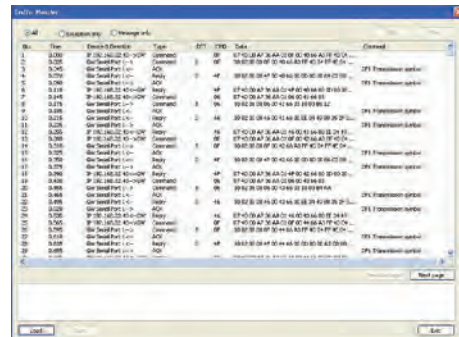
Serial Redirector Function Maintains Original Master/Slave Connections

The serial redirector function allows the commands of a serial master (command initiator) to be redirected to the serial slave (command executor) on another port. In addition, a serial master can operate simultaneously with EtherNet/IP masters without changing the DF1 architecture or software. With the serial redirector function, MGate™ EIP3000 gateways can establish redundant control of legacy slave devices that were originally designed to be controlled by a single serial master.

ProCOM Implements Control via COM Port Mapping

Each MGate™ EIP3000 gateway supports virtual serial ports for the remote PC. You can connect to the MGate™ EIP3000 through the COM port by using Moxa's Real COM driver, with the actual physical connection over the Ethernet. The gateway supports up to 4 virtual COM port connections and offers greater flexibility when designing redundant control systems.

Pull high/low Resistors and Terminator Selection

When using termination resistors to prevent serial signal reflection, it is important to set the pull high/low resistors correctly so that the electrical signal is not corrupted. Since no set of resistor values is universally compatible with all environments, the EIP3000 has DIP switches on the bottom panel for setting the termination and pull high/low resistor values.

Built-in Isolation

Complex device networks that incorporate high amperage devices could be subject to electrical signal distortion from electrical discharges, magnetic noise, or common mode transients. MGate™ series products solve this problem by using built-in optical isolation.

Specifications

Ethernet Interface
Number of Ports: 2 (2 IPs)
Speed: 10/100 Mbps, Auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports:
EIP3170/3170I: 1
EIP3270/3270I: 2
Serial Standards: RS-232/422, software selectable
Connectors:
EIP3170/3170I: DB9 male for RS-232, terminal block for RS-422
EIP3270/3270I: DB9 male x 2
ESD Protection: 15 KV for all signals

Serial Communication Parameters
Data Bits: 8
Stop Bits: 1, 2
Parity: None, Even, Odd
Flow Control: RTS/CTS, DTR/DSR (RS-232 only)
Baudrate: 1200 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
Ethernet Protocol: CIP (PCCC) on EtherNet/IP
Serial Protocol: DF1 Full-duplex

Software
Driver Support: Windows Real COM Drivers: Windows 2000, Windows XP/2003/Vista/200/8/7 x86/x64

Physical Characteristics
Housing: Plastic
Dimensions:
Without ears: 29 x 89.2 x 118.5 mm (1.14 x 3.51 x 4.67 in)
With ears extended: 29 x 89.2 x 124.5 mm (1.14 x 3.51 x 4.90 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Connector: Terminal block
Power Consumption:
MGate™ M3170: 435 mA (max.)
MGate™ M3170I: 555 mA (max.)
MGate™ M3270: 435 mA (max.)
MGate™ M3270I: 510 mA (max.)

Regulatory Approvals
EMC: CE (EN55022 Class A and EN55024), FCC Part 15 Subpart B Class A
Safety: UL-508, LVD (EN60950-1)
Hazardous Location:
UL/cUL Class 1 Division 2 Groups A, B, C, D
ATEX II 3 G (Zone 2)
Shock: IEC60068-2-27
Freefall: IEC60068-2-23
Vibration: IEC60068-2-6
EMS:
EN61000-4-2 (ESD): Level 3
EN61000-4-3 (RS): Level 3
EN61000-4-4 (EFT): Level 4
EN61000-4-5 (Surge): Level 3
EN61000-4-6 (CS): Level 3
EN61000-4-8: Passed
EN61000-4-11: Passed

Reliability
MTBF (meantime between failures):
MGate™ EIP3170: 210794 hrs
MGate™ EIP3270: 125234 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

3

Industrial Ethernet Gateways > MGate™ EIP3000 Series

Dimensions

EIP3170/EIP3270

20.6 mm (0.81 in) **29.91 mm (1.18 in)**

29 mm (1.14 in) **14.5 mm (0.57 in)**

14.5 mm (0.57 in)

9.2 mm (0.36 in)
7.2 mm (0.28 in)
7.1 mm (0.28 in)
7.2 mm (0.28 in)
7.1 mm (0.28 in)

69.5 mm (2.74 in)

124.5 mm (4.9 in)

20 mm (0.79 in)

89.2 mm (3.51 in)

MGate™ EIP3170

25.9 mm (1.02 in) **35 mm (1.38 in)**

MGate™ EIP3270

25.9 mm (1.02 in) **35 mm (1.38 in)**

: Ordering Information

Available Models

MGate™ EIP3170: 1-port EtherNet/IP to DF1 gateway, 0 to 55°C operating temperature

MGate™ EIP3170I: 1-port EtherNet/IP to DF1 gateway with 2 KV isolation, 0 to 55°C operating temperature

MGate™ EIP3270: 2-port EtherNet/IP to DF1 gateway, 0 to 55°C operating temperature

MGate™ EIP3270I: 2-port EtherNet/IP to DF1 gateway with 2 KV isolation, 0 to 55°C operating temperature

MGate™ EIP3170-T: 1-port EtherNet/IP to DF1 gateway, -40 to 75°C operating temperature

MGate™ EIP3170I-T: 1-port EtherNet/IP to DF1 gateway with 2 KV isolation, -40 to 75°C operating temperature

MGate™ EIP3270-T: 2-port EtherNet/IP to DF1 gateway, -40 to 75°C operating temperature

MGate™ EIP3270I-T: 2-port EtherNet/IP to DF1 gateway with 2 KV isolation, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DR-45-24: 24 VDC DIN-rail power supply (2 A @ 45 W) with universal 85 to 264 VAC input

DR-75-24: 24 VDC DIN-rail power supply (3.2 A @ 75 W) with universal 85 to 264 VAC input

DR-120-24: 24 VDC DIN-rail power supply (5 A @ 120 W) with switch for choosing 88 to 132 VAC, or 176 to 264 VAC input

Package Checklist

- 1 MGate™ EIP3170 or EIP3170I or EIP3270 or EIP3270I EtherNet/IP gateway
- Quick installation guide (printed)
- Document and Software CD
- Warranty Card

SMG-1100 Series

Smart machine-to-machine Modbus gateway embedded computer with 2 serial ports, 4 DIs, 4 DOs, GSM/GPRS/EDGE, Ethernet, SD, IPsec

> Built-in GSM/GPRS/EDGE cellular communication
> GSM 850/900/1800/1900 MHz supported
> SMS tunnel mode provided
> 4 DIs, 4 DOs
> 2 software selectable RS-232/422/485 serial ports
> 50 bps to 921.6 Kbps, non-standard baudrates supported
> 10/100 Mbps Ethernet for network redundancy
> Supports Modbus RTU and Modbus ASCII serial protocols
> Supports Modbus TCP
> Generate and filter out gateway exceptions
> Use Modbus addressing to route network traffic
> Automatic connection management
> Use an unlimited number of Masters on serial or network side
> Message request analyzer and simulator tool to log device data while network is down
> Supports IPsec
> User interface for Modbus & IPsec configuration

Overview

The SMG-1100 series embedded Linux computers feature two software selectable RS-232/422/485 ports, one Ethernet port, and quad-band GSM/GPRS/EDGE 900/1800/850/1900 MHz for cellular communication. It also comes with an SD socket, USB host, and 4 digital input and 4 digital output channels, making it the ideal computer for a variety of industrial applications such as data acquisition, data processing, protocol conversion, and remote device control and monitoring via wireless communication. The SMG-1100 comes pre-installed with Linux and offers a reliable and powerful computing platform for industrial environments. Programmers will find that the SMG-1100 provides a convenient programming environment for producing bug-free industrial applications at a lower cost.

The SMG-1100 series provides a sophisticated wireless M2M solution for distributed Modbus devices. The SMG-1100 networks Modbus devices with Modbus RTU/ ASCII protocols can work well via GSM/ GPRS/ EDGE or Ethernet to Modbus TCP, and can support an unlimited number of serial slaves to IP network. Implemented with the protocol conversion functionality, the SMG-1100 can serve both serial master and slave and the built-in IPsec function guarantees that data transmission is encrypted even in a wireless environment.

The SMG-1050 features a "message request analyzer and simulator tool" to temporarily log device data while the connection is down, minimizing the risk of data loss. The data is stored in a flash card and can be retrieved via FTP.

Appearance
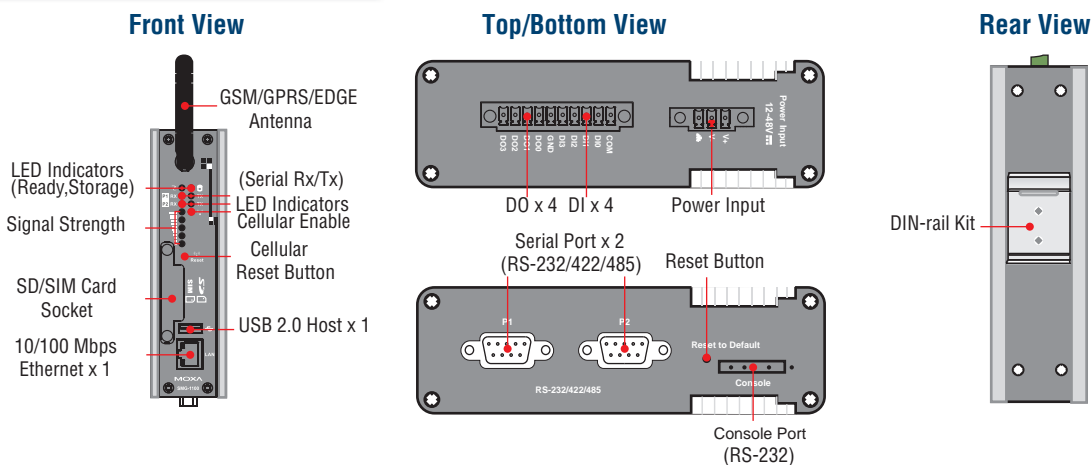
Front View

GSM/GPRS/EDGE Antenna
LED Indicators (Ready,Storage)
(Serial Rx/Tx)
LED Indicators Cellular Enable
Signal Strength
Cellular Reset Button
SD/SIM Card Socket
USB 2.0 Host x 1
10/100 Mbps Ethernet x 1

Top/Bottom View

DO x 4   DI x 4   Power Input
Serial Port x 2 (RS-232/422/485)   Reset Button
Console Port (RS-232)

Rear View

DIN-rail Kit

Dimensions (unit = mm)
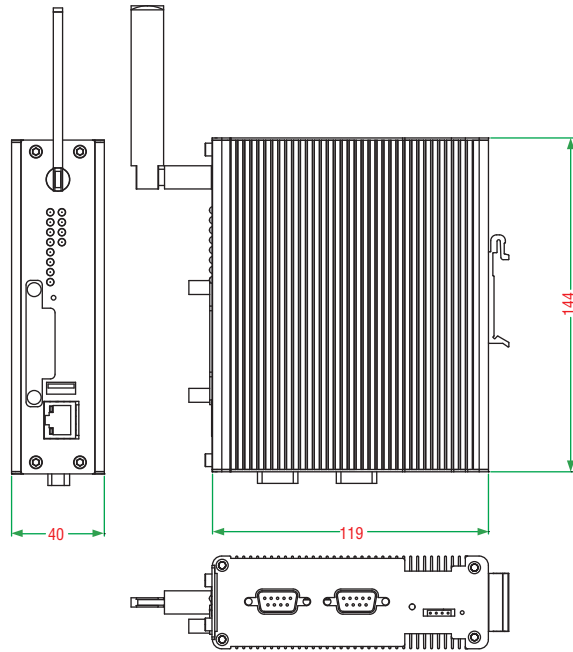
: Hardware Specifications

Computer

CPU: Cirrus Logic EP9302 ARM9 32-bit RISC CPU, 200 MHz
DRAM: 32 MB
Flash: 16 MB
USB: USB 2.0 compliant hosts x 1, type A connector

Storage

Storage Expansion: SD slot

Ethernet Interface

LAN: 1 auto-sensing 10/100 Mbps port (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Cellular Interface

Cellular Modes: GSM, GPRS, EDGE
Radio Frequency Bands: 850/900/1800/1900 MHz
GPRS Class: 12
EDGE Class: 12
Coding Schemes: CS1 to CS4

Serial Interface

Serial Standards: 2 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 15 KV ESD protection for all signals
Console Port: RS-232 interface (TxD, RxD, GND), with 4-pin pin header output

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input

Input Channels: 4, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: 10-pin screw terminal block (8 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output

Output Channels: 4, sink type
Output Current: Max. 200 mA per channel
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 9-pin screw terminal block
Isolation: 3 KV optical isolation

LEDs

System: Ready, Storage
LAN: 10M/Link, 100M/Link (on connector)
Cellular: Cellular Enable, Signal Strength (5 LEDs)
Serial: TxD, RxD

Switches and Buttons

Reset Button: Supports "Reset to Factory Default"
Cellular Reset Button: Supports cellular reset function

Physical Characteristics

Housing: Aluminum (1 mm)
Weight: 1 kg

Dimensions: (without ears or antenna)
144 x 119 x 40 mm (5.7 x 4.7 x 1.6 in)
Mounting: DIN-Rail, wall (requires optional wall mount kit)
Antenna Length: 85 mm

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-Vibration: 2 g @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis
Anti-shock:
• With DIN-Rail kit: 6 g @ IEC-68-2-27, half sine wave, 11 ms
• With optional wall mount kit: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption:
With no load on USB ports: 7.2 W
• 300 mA @ 24 VDC
• 600 mA @ 12 VDC
With full load on USB ports: 14.4 W
• 600 mA @ 24 VDC
• 1200 mA @ 12 VDC

Regulatory Approvals

EMC: FCC: Part 15, Part 24/24
CE: EN55022, EN55024
R&TTE: EN301 489-1, EN301 489-7, EN301 511
Safety: LVD: EN60950-1
UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03
Green Product: RoHS, CRoHS, WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

⋮ Ordering Information

Available Models

SMG-1100-LX: Smart machine-to-machine Modbus gateway embedded computer with 2 serial ports, 4 DIs, 4 DOs, GSM/GPRS/EDGE, Ethernet, SD, IPSec

Software Included Free of Charge

MDM2.2: For configuring and managing Moxa's smart machine-to-machine gateway series. The MDM2.2 package includes:
• MDM2.2 agent file
• MDM2.2 gateway file
• MDM2.2 tool file

Package Checklist

• 1 SMG-1100 computer
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
• GSM/GPRS/EDGE Antenna
• Document and Software CD
• Quick Installation Guide (printed)
• Product Warranty Statement (printed)

3

Industrial Ethernet Gateways > SMG-1100 Series

SMG-6100 Series

Smart machine-to-machine gateway with 2 serial ports, 4 Ethernet ports, VGA, USB, IPsec

> Secure communication platform with tunnel server (IPSec) for 2-way IP communication to distributed Modbus Gateway (SMG-1100)
> Networking host to back-end host computers and Modbus TCP Master/Slave devices
> Supports unlimited Masters on serial or network side
> Modbus and IPsec configuration with MDM 2.2

: Overview

The SMG-6100 series is based on the Intel x86 processor and supports VGA, 4 Ethernet ports, 2 RS-232 serial ports, CompactFlash, and USB. It comes in a standard 19-inch, 1U high form factor with built-in IPsec, making it an ideal communication platform for industrial applications.

The SMG-6100 Series can be used as a smart gateway with sophisticated M2M solutions to help construct a tunnel server (IPsec)

and bi-directional IP communications. When used with Moxa's SMG-1100 Series, the SMG-6100 can serve as a secure networking host over IPsec to back-end host computers and Modbus TCP Master/Slave devices. One of the key benefits of this architecture is that it can work with an unlimited number SMG-1100 units to facilitate and accelerate the remote monitoring and management of Modbus devices.

: Appearance

Front View
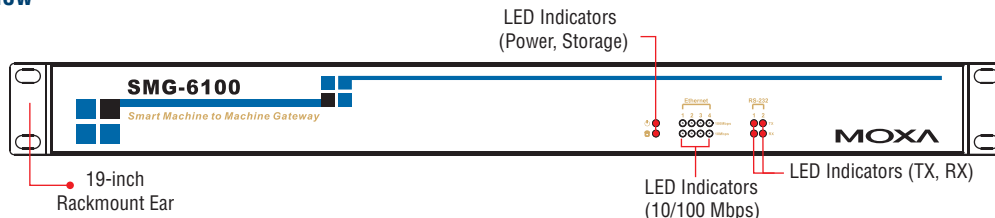
Rear View
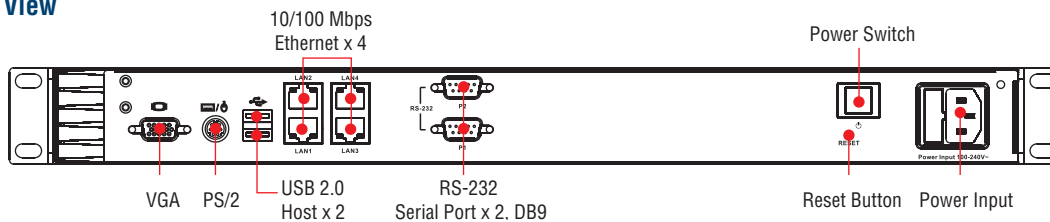
Dimensions (unit = mm)
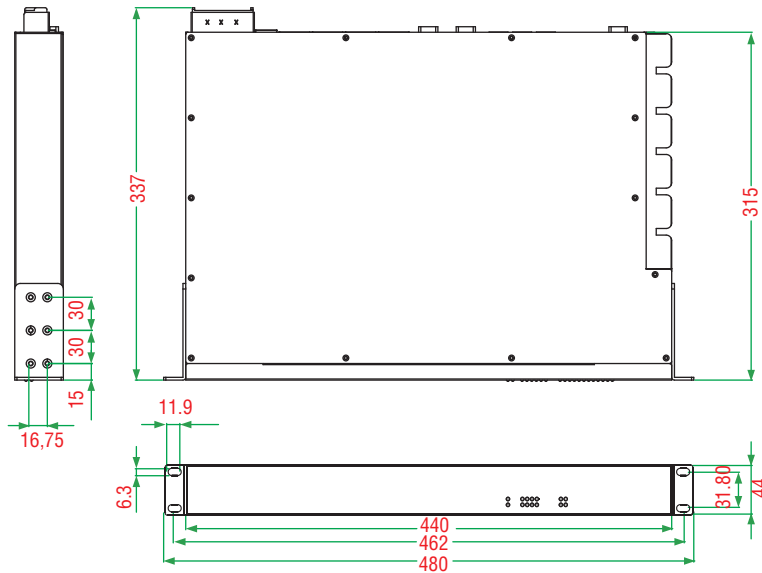
⠿ Hardware Specifications

Computer

CPU: Intel Celeron M 1 GHz processor

System Chipset: Intel 910GMLE + ICH6M chipset

BIOS: 4 mega-bit Flash BIOS, PCI Plug & Play, ACPI function support

FSB: 400/533 MHz

System Memory: 1 x 200-pin DDR2 SODIMM socket supporting DDR2 400; up to 1 GB max. (512 MB built-in)

USB: USB 2.0 compliant hosts x 2, Type A connector, supports system boot up

Storage

Built-in: 1 GB Industrial DOM onboard to store OS via IDE interface

Storage Expansion: CompactFlash socket

HDD Support: SATA connector for HDD expansion

Other Peripherals

KB/MS: 1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse

Display

Graphics Controller: Integrated graphics with built-in Intel 910GME, and built-in Intel extreme Graphics 2 technology

Display Memory: Dynamic video memory (shares up to 32 MB of system memory)

Display Interface: CRT Interface for VGA output (DB15 female connector)

Resolution: CRT display mode with pixel resolution up to 2048 x 1536 at 75 Hz

Ethernet Interface

LAN: 4 auto-sensing 10/100 Mbps ports (RJ45)

Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface

Serial Standards: 2 RS-232 ports (DB9 male)

ESD Protection: 15 KV for all signals

Serial Communication Parameters

Data Bits: 5, 6, 7, 8

Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark

Flow Control: RTS/CTS, XON/XOFF

Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

LEDs

System: Power x 1, Storage x 1

LAN: 10M x 4, 100M x 4

Serial: RS-232: 2 x Tx, 2 x Rx

Physical Characteristics

Housing: SECC sheet metal (1 mm)

Weight: 4.5 kg

Dimensions: 440 x 315 x 45 mm (19-inch 1U height)

Mounting: Standard 19-inch rackmount

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 80°C (4 to 176°F)

Power Requirements

Input Voltage: Single Input, 100 to 240 VAC auto ranging, 47 to 63 Hz for AC input

Power Consumption: 26 W

Regulatory Approvals

EMC: CE (EN55022, EN61000-3-2, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class)

Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)

Green Product: RoHS, CRoHS, WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock) with battery lithium backup

Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty

Warranty Period: 3 years

Details: See www.moxa.com/warranty

: Software Specifications

Note: The SMG-6100 includes a special package of software to enable VPN connections between a company network and a Moxa SMG-1100 wireless Modbus gateway located at a remote site.

One SMG-6100 can support an unlimited number of SMG-1100 units.

: Ordering Information

Available Models

SMG-6100-LX: Smart machine-to-machine gateway with 2 serial ports, 4 Ethernet ports, VGA, USB, IPsec, Linux 2.6 OS

Software Included Free of Charge

MDM2.2: For configuring and managing Moxa's smart machine-to-machine gateway series.
The MDM2.2 package includes:
• MDM2.2 agent file
• MDM2.2 gateway file
• MDM2.2 tool file

Package Checklist

• SMG-6100 computer
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• Power Cord
• Document and Software CD
• Quick Installation Guide (printed)
• Product Warranty Statement (printed)

3

Industrial Ethernet Gateways > SMG-6100 Series

Ethernet Media Converters

4

Ethernet Media Converters

Chassis Media Converters

	TRC-190-AC TRC-190-DC	CSM-200-1213 CSM-200-1214	CSM-200-1218
Optical Fiber Interface			
Fiber Connector	–	SC or ST	SC
Cable Requirements	–	Multi-mode: 50/125, 62.5/125, or 100/140 µm	Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 µm
Transmission Distance	–	5 km	40 km
Wavelength	–	850 nm	1310 nm
Tx Output	–	> -5 dBm	> -5 dBm
Rx Sensitivity	–	-32 dBm	-34 dBm
Point-to-Point Transmission	–	Point-to-Point Transmission: Half-duplex or full-duplex	Point-to-Point Transmission: Half-duplex or full-duplex
Fast Ethernet Interface			
Connector	–	RJ45	
Speed	–	10/100BaseT(X)	
Physical Characteristics			
Housing	SECC (1.2 mm)	SPCC	SPCC
Dimensions (mm)	440 x 260 x 77 mm	86.8 x 136.5 x 21 mm	86.8 x 136.5 x 21 mm
Weight	5.2 kg (11.4 lbs), with one power module installed	–	–
Installation	–	–	–
Number of Slots	19 slots in the front for slide-in modules, 2 slots in the back for power supply modules	–	–
Environmental Limits			
Operating Temperature	0 to 60°C	0 to 60°C	0 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 75°C	-20 to 75°C	-20 to 75°C
Power Requirements			
Input Voltage	AC model: Universal 100 to 240 VDC (47 to 63 Hz) DC model: 36 to 72 VDC	12 VDC	12 VDC
Power Consumption	5.4 A @ 12 V (max. output)	180 mA @ 12 VDC	180 mA @ 12 VDC
Regulatory Approvals			
CE	Class B	Class B	
FCC	Part 15 sub part B Class A	Part 15 sub part B Class A	
EMI	EN55022 1998, Class B	–	–
EMS	EN61000-4-2 (ESD), Criteria A, Level 4 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 3 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2 EN61000-4-8 (PFMF), Criteria A, Level 3 EN61000-4-11 (DIPS), Criteria A	EN61000-4-2 (ESD), Criteria A, Level 4 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 3 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2 EN61000-4-8 (PFMF), Criteria A, Level 3	
Freefall	–	IEC 60068-2-32	
Reliability			
Warranty	5 years (see www.moxa.com/warranty)		

Ethernet-to-Fiber Media Converters

	IMC-101G Series	IMC-101 Series	IMC-P101 Series	PTC-101 Series (LV models)	PTC-101 Series (HV models)	IMC-21 Series
IEEE Standards						
IEEE 802.3	✓	✓	✓	✓	✓	✓
IEEE 802.3u	✓	✓	✓	✓	✓	✓
IEEE 802.3ab	✓	–	–	–	–	–
IEEE 802.3z	✓	–	–	–	–	–
IEEE 802.3x	–	–	✓	✓	✓	✓
IEEE 802.3af	–	–	✓	–	–	–
Interface						
RJ45 Ports	10/100/1000BaseT(X)	10/100BaseT(X)				
Fiber Modes	Multi-mode Fiber / Single-mode Fiber					
Fiber Ports	Optional 1000BaseSX/LX/LHX/ZX (LC connector)	100BaseFX (SC or ST connectors)		100BaseFX (SC, ST, or LC connectors)		100BaseFX (SC or ST)
LED Indicators	PWR1, PWR2, FAULT, 10/100M (TP port), 1000M (TP and Fiber port)	PWR1, PWR2, FAULT, 10/100M (TP port), 100M (Fiber port), FDX/COL (Fiber port)	PWR1, PWR2, Fiber Link/Act, PSE Indicator, 10/100M (TP port)	PWR1, PWR2, Fiber Link/Act, 10/100M (TP port)	PWR, Fiber Link/Act, 10/100M (TP port)	Power, 10/100M (TP port), 100M (fiber port), FDX/COL (fiber port)
DIP Switches	Port break alarm, Fault Pass-Through, Fiber AN/Force	100BaseFX Full/Half duplex selection, Port break alarm	Auto Negotiation, Force TP Speed, Force TP Duplex, Link Fault Pass Through, Operating Mode, PSE, P.R.R. (PD Remote Reset)	Auto Negotiation, Force TP Speed, Force TP Duplex, Link Fault Pass Through, Operating Mode		TP port's 10/100M, Half/Full modes, and Force/Auto modes, fiber connection's Full/Half mode, Link Fault Pass-Through (LFP)
Alarm Contact	Relay output: 1 A @ 24 VDC					–
Multi-mode Transmission Distance						
1000BaseSX	See datasheet	–	–	–	–	–
1000BaseLX	See datasheet	–	–	–	–	–
Single-mode Transmission Distance						
1000BaseLX	See datasheet	–	–	–	–	–
1000BaseLHX	See datasheet	–	–	–	–	–
1000BaseZX	See datasheet	–	–	–	–	–
Physical Characteristics						
Housing	Metal (IP30)					Plastic (IP30)
Dimensions (mm)	53.6 x 135 x 105	53.6 x 135 x 105	51.65 x 144.45 x 110.2	66.65 x 135.1 x 101.4	66.65 x 135.1 x 101.4	25 x 109 x 97
Weight	630 g	630 g	525 g	690 g	690 g	125 g
Installation	DIN-Rail mounting, wall mounting (with optional kit)					DIN-Rail mounting
Environmental Limits						
Operating Temperature	0 to 60°C for standard models, -40 to 75°C for wide-temperature models			-40 to 85°C		-10 to 60°C
Operating Humidity	5 to 95% RH					
Storage Temperature	-40 to 85°C					-40 to 70°C
Power Requirements						
Input Voltage	24 VDC (12 to 45 VDC), redundant inputs		48 VDC (46 to 57 VDC), redundant inputs	20 VDC to 72 VDC	85 VAC to 264 VAC 88 VDC to 300 VDC	12 to 45 VDC 18 to 30 VAC (47-63 Hz)
Input Current	0.11 A @ 24 V	0.16 A @ 24 V	0.43 A @ 48 V	170 mA @ 20 VDC	73 mA @ 85 VAC 47 mA @ 88 VDC	0.15 A @ 24 V
Connection	Removable terminal block					
Overload Current Protection	1.1 A	1.1 A	1.1 A	1.6 A	1.6 A	–
Reverse Polarity Protection	✓	✓	✓	✓	✓	✓
PoE	–	–	PSE, provides up to 15.4 W for PD	–	–	–
Regulatory Approvals						
Safety	UL508	UL508 UL60950-1 CSA C22.2 No. 60950-1 EN60950-1	UL 508	UL 60950-1	UL 60950-1	UL508 UL60950-1 CSA C22.2 No. 60950-1 EN60950-1
EMI	FCC Part 15, CISPR (EN55022) class A					
EMS	EN61000-4-2 (ESD), Level 3; EN61000-4-3 (RS), Level 3; EN61000-4-4 (EFT), Level 3; EN61000-4-5 (Surge), Level 2; EN61000-4-6 (CS), Level 3; EN61000-4-8; EN61000-4-11		IEC 61000-4-2 Edition 1.2: 2001-04 (Level 4); IEC 61000-4-3: 2002+A1: 2002 (Level 3); IEC 61000-4-4: 2004 (Level 4); IEC 61000-4-5 Edition 1.1: 2001-04 (Level 3); IEC 61000-4-6 Edition 2.1: 2004-11 (Level 3); IEC 61000-4-8 Edition 1.1: 2001-03 (Level 3); IEC 61000-4-11 Second Edition: 2004-03	EN61000-4-2 Edition 1.2: 2001-04 (Level 4); EN61000-4-3: 1995+A1: 2001; IEC 61000-4-3: 2002+A1: 2002 (Level 3); EN61000-4-4: 2004 (Level 4); EN61000-4-5: 2001-04 (Level 4); EN61000-4-6: 2004-11 (Level 3); EN61000-4-8: 2001-03 (Level 5); EN61000-4-11: 2004-03 (Criteria B)		EN61000-4-2 (ESD); EN61000-4-3 (RS); EN61000-4-4 (EFT); EN61000-4-5 (Surge); EN61000-4-6 (CS)
Hazardous Location	UL/cUL Class1, Division 2, Groups A, B, C, and D, ATEX Class1, Zone 2, Ex nC IIC	–	–	–	–	–
Power Automation	–	–	–	IEC 61850-3, IEEE 1613	IEC 61850-3, IEEE 1613	–
Rail Traffc	–	–	–	EN50155/EN50121-4	EN50155/EN50121-4	–
Freefall	IEC60068-2-32					
Shock	IEC60068-2-27					
Vibration	IEC60068-2-6					
Maritime	–	DNV, GL	–	–	–	–
MTBF	500,000 hrs	401,000 hrs	Pending	Pending	Pending	353,000 hrs
Reliability						
Warranty	5 years (see http://www.moxa.com/warranty)					

4

Introduction to the NRack System™

: Introduction

Fiber converters have been widely used for FTTH and FTTP in transportation automation, power system automation, and many other automation systems. The primary advantages of fiber optic communications compared to wired cabling are ESD immunity, wide bandwidth, zero data loss, and long distance data transmission capability.

Media converters are generally used in connected pairs. That is, two media converters are used in tandem, with one converter located at the control center, and the other converter located at a remote site. This is the ideal setup from a central management point of view, in which all data is transmitted back to the control center for processing in a central computing system. For systems that require many media converters at the central site, system integrators must determine how and where to mount the converters and how to arrange power supplies.

Chassis-type media converters are a perfect choice for systems that require installing several converters in a confined space. Moxa's NRack System™ is designed to help customers who are faced with the challenge of installing a high density media converter system. The NRack System™ saves time since less mounting is required, and the power input wiring problem is much easier to handle.

An NRack System™ consists of 3 major components: Rackmount Chassis, Slide-in Modules, and Power Supply Modules. Installing the power supply module in the chassis can save quite a bit of space since you do not need to deal with numerous power adaptors connecting to the various converters installed in your control center. Two main types of slide-in modules are available. One type handles data transmission only, whereas the other type is used to manage the entire chassis system.

Moxa's Ethernet media converters provide a wide range of solutions for applications that require industrial media converters. Moxa's media converters include entry-level, industrial-grade, and power source equipment (PSE) stand-alone converters and modular chassis-based slide in series converters designed for harsh industrial environments. The Ethernet media converters feature 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X, Link Fault Pass-Through (LFP), and wide temperature support for hazardous locations.

: New Ethernet-to-Fiber Slide-in Converters with Rackmount Chassis

Moxa's NRack System™ allows you to centralize the management of your Ethernet media converters. The NRack System™ is designed for use in harsh industrial environments that are subject to extremely low or extremely high temperatures, and can be powered by either an AC or a DC power input. Users can install as many as 19 CSM-200 Ethernet-to-fiber converter modules in one NRack System™ chassis.

TRC-190 Series

Rackmount chassis for the NRack System™

> 19-inch chassis for rackmount use
> 19 slots for high density applications
> Supports hot-swap and dual power input with redundancy
> Fanless chassis design reduces repair time

: Introduction

The TRC-190 series provides 19 slots for media converter modules from the CSM-200 series of Ethernet-to-fiber modules and the TCF-142-RM series of serial-to-fiber modules. A TRC-190 chassis comes with one AC or DC power input, with an optional redundant power expansion module available for greater reliability. The TRC-190 series' power input module supports the hot-swap feature.

: Specifications

Physical Characteristics
Housing: SECC (1.2 mm)
Dimensions: 440 x 260 x 77 mm (18.6 x 11 x 3.3 in)
Weight: 5.2 kg (11.4 lbs), with one power module installed
Number of Slots: 19 slots in the front for slide-in modules, 2 slots in the back for power supply modules

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
**Storage Temperature:** -20 to 75°C (-4 to 158°F)

Power Requirements
Input Voltage: Universal 100 to 240 VAC (47 to 63 Hz) or 36 to 72 VDC
Power Consumption:
Max. Output: 5.4 A @ 12 V

Regulatory Approvals
CE: Class A
FCC: Part 15 sub part B Class A
UL/cUL: UL 60950-1
EMI: EN55022 2006, Class B
EMS:
EN61000-4-2 (ESD), Criteria A, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 3
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (PFMF), Criteria A, Level 3
EN61000-4-11 (DIPS), Criteria A

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

4

Ethernet Media Converters › TRC-190 Series

Dimensions

TRC-190-ACx2   TRC-190-DCx2   TRC-190-DCx1   TRC-190-ACx1

465.6 mm (18.33 in)

440 mm (17.32 in)
484 mm (19.06 in)

2.5 mm (0.10 in)
76.7 mm (3.02 in)

33 mm
(1.30 in)
260 mm (10.24 in)
33 mm

88 mm
(3.46 in)

: Ordering Information

Available Models

TRC-190-AC: Rack chassis, 2U, single 110 to 240 VAC input, with 19 slots on front panel
TRC-190-DC-48: Rack chassis, 2U, single 36 to 72 VDC input, with 19 slots on front panel

Available Slide-in Modules

CSM-200-1213: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode ST connector
CSM-200-1214: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode SC connector
CSM-200-1218: 10/100BaseT(X) to 100BaseFX slide-in module media converter, single-mode SC connector
TCF-142-M-SC-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, SC connector
TCF-142-M-ST-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, ST connector
TCF-142-S-SC-RM: RS-232/422/485 to single-mode fiber slide-in module converter, SC connector
TCF-142-S-ST-RM: RS-232/422/485 to single-mode fiber slide-in module converter, ST connector

Optional Accessories (can be purchased separately)

PWR-190-AC: Redundant power supply, 110 to 240 VAC
PWR-190-DC-48: Redundant power supply, 36 to 72 VDC
Plate-1: Face plate to cover unused front panel slots (required for all unused slots)

Package Checklist

- TRC-190 with single power input
- Power cord (for TRC-190-AC only)
- 18 face plates
- User's Manual (printed)
- Warranty Card

CSM-200 Series

10/100BaseT(X) to 100BaseFX slide-in modules for the NRack System™

> LFP (Link Fault Pass-through) and FEF (Far End Fault)
> Two different operation modes
  ▪ Store-and-Forward
  ▪ Pass Through
> Auto Negotiation
> Supports TS-1000 Version 2 protocol
> Supports Turbo Ring V2
> Plug and Play
> Hot-swap

: Introduction

The CSM-200 modules are slide-in Ethernet-to-fiber media converters for the NRack System™. The modules provide media conversion from 10/100BaseT(X) to 100BaseFX (SC/ST connectors), and can be installed in any NRack System™ chassis.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT,
IEEE 802.3u for 100BaseT(X), 100BaseFX

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST connectors)
LED Indicators: PWR, Fiber Link, 10/100M (TP port)
DIP Switches:

Dip	Function	ON	OFF
1	Auto Negotiation	Enable	Disable
2	Force TP Speed	100 Mbps	10 Mbps
3	Force TP Duplex	Full Duplex	Half Duplex
4	Link Fault Pass Through	Enable	Disable
5	Operating Mode	Store-and-Forward	Pass Through

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm, 3.5 PS/(nm*km) fiber optic cable

Physical Characteristics
Housing: SPCC
Dimensions: 86.8 x 124.3 x 21 mm (3.42 x 4.89 x 0.83 in)
Weight:
Product only:
  CSM-200-1213: 115 g (0.25 lb)
  CSM-200-1214/1218: 125 g (0.28 lb)
Packaged:
  CSM-200-1213: 170 g (0.37 lb)
  CSM-200-1214/1218: 180 g (0.40 lb)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 158°F)

Power Requirements
Input Voltage: 12 VDC
Power Consumption: 180 mA @ 12 VDC

Regulatory Approvals
CE: Class A
FCC: Part 15 sub part B Class A
EMS:
EN61000-4-2 (ESD), Criteria A, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 3
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (PFMF), Criteria A, Level 3
Freefall: IEC 60068-2-32

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CSM-200-1213

86.8 mm
(3.42 in)

117.1 mm (4.61 in)
124.3 mm (4.89 in)

21 mm
(0.83 in)

CSM-200-1214/CSM-200-1218

86.8 mm
(3.42 in)

117.1 mm (4.61 in)
124.3 mm (4.89 in)

21 mm
(0.83 in)
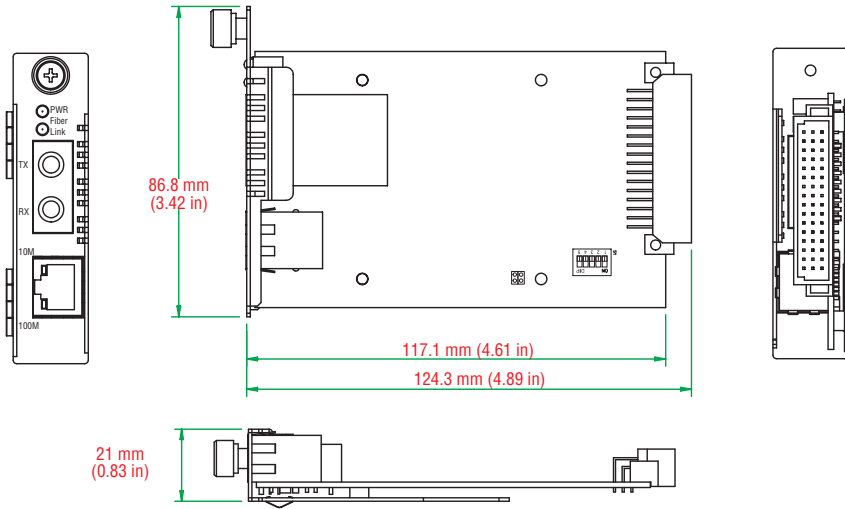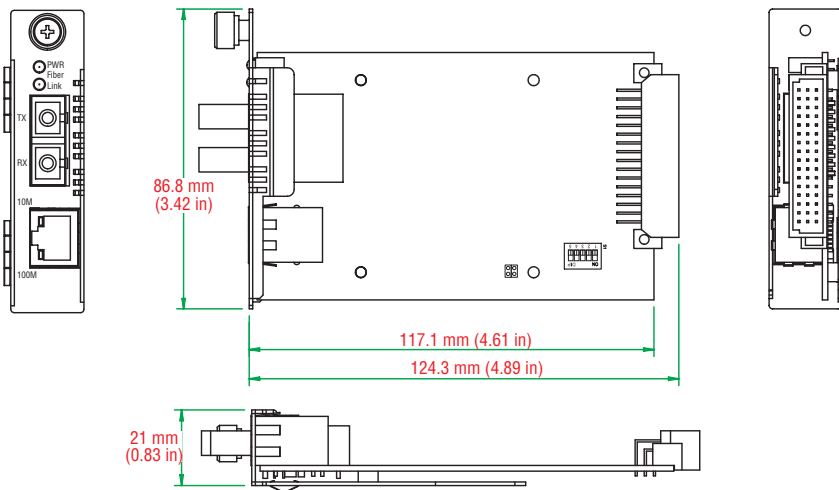
⋮ Ordering Information

Available Models

CSM-200-1213: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode ST connector
CSM-200-1214: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode SC connector
CSM-200-1218: 10/100BaseT(X) to 100BaseFX slide-in module media converter, single-mode SC connector

Package Checklist

- CSM-200 series media converter
- Quick Installation Guide (printed)
- Warranty Card

PTC-101 Series

IEC 61850-3 and EN50155 Ethernet-to-fiber media converters

> 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
> Link Fault Pass-Through (LFP)
> Power failure alarm by relay output (LV model only)
> -40 to 85°C operating temperature range
> Redundant dual DC power inputs
> Integrated high-reliability power supply eliminates the need for external power transformer

EN50155   IEC 61850-3 / IEEE 1613   c(UL)us LISTED   RoHS   CE   FC

: Introduction

The PTC-101 Ethernet-to-fiber media converters convert from 10/100BaseT(X) to 100BaseFX. Models are available with either SC, ST, or LC connectors. The PTC-101 converters eliminate the need for additional wiring, and support IEEE 802.3 and IEEE 802.3u/x protocols with 10/100M, full/half-duplex, and MDI/MDI-X auto-sensing to provide a total solution for your industrial Ethernet networks.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X), 100BaseFX

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST/LC connectors)
LED Indicators: PTC-101-HV series: PWR1, Fiber Link, 10/100M (TP port)
PTC-101-LV series: PWR1, PWR2, Fiber Link, 10/100M (TP port)
DIP Switches:

DIP No.	Function	ON	OFF
1	Auto Negotiation	Enable	Disable
2	Force TP Speed	100 Mbps	10 Mbps
3	Force TP Duplex	Full Duplex	Half Duplex
4	Link Fault Pass Throuth	Enable	Disable
5	Operating Mode	Store-and-Forward	Pass Through

The default setting for all DIP switches is ON.

Alarm Contact: One relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable
b. 62.5/125 μm, 500 MHz*km fiber optic cable
c. 9/125 μm, 3.5 PS/(nm*km) fiber optic cable

Physical Characteristics
Housing: Aluminum, IP30 protection
Dimensions: 122.5 x 90 x 20 mm (4.82 x 3.54 x 0.79 in)
Weight:
Product only: 690 g
Packaged: 875 g

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage:

	Power Supply Type	Power Consumption	Fuse Rating
LV - DC	20 to 72 VDC	170 mA @ 20 VDC	3.15A(T) 2
HV - AC	85 to 264 VAC	73 mA @ 85 VAC	3.15A(T) 2
HV - DC	88 to 300 VDC	47 mA @ 88 VDC	3.15A(T) 2

Connection: Removable terminal block
Overload Current Protection: 1.6 A (protects against two signals shorted together)
Reverse Polarity Protection: Present

Regulatory Approvals
Safety: UL 60950-1
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 Edition 1.2: 2001-04 (Level 4)
EN61000-4-3: 1995+A1: 2001
IEC 61000-4-3: 2002+A1: 2002 (Level 3)
EN61000-4-4: 2004 (Level 4)
EN61000-4-5: 2001-04 (Level 4)
EN61000-4-6: 2004-11 (Level 3)
EN61000-4-8: 2001-03 (Level 5)
EN61000-4-11: 2004-03 (Criteria B)
Power Automation: IEC 61850-3, IEEE 1613
Rail Traffic: EN50155/EN50121-4
Note: Refer to the "Environmental Type Tests" table below for more detailed information.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Environmental Type Tests			
Test	**Description**		**Test Levels**
IEC 60068-2-1	Cold, operating (power ON/OFF)	Test Ad	-40°C, 48 hours
IEC 60068-2-3	Damp heat, steady state, operating	Test Ca	85°C, 95% R.H., 24 hours
IEC 60068-2-14	Changing temperature, operating	Test Nb	-40 to 85°C, Ramp rate: 3°C/min, 8 cycles
IEC 60068-2-48 IEC 60068-2-1	Cold, storage	Test Ad	-40°C, 12 hours
IEC 60068-2-48 IEC 60068-2-3	Damp heat, steady state, storage	Test Ca	90°C, 95% R.H., 24 hours
IEC 60068-2-32 ISTA-2A	Freefall, package	Test Ed	90 cm
IEC 60068-2-34	Random vibration, package	Test Fd	3 grms (5 to 500 Hz)
IEC 61850-3 IEC 60870-2-2 IEC 60068-2-6 IEC 60721-3-3	Vibration, operating	Class Cm (3M6, 4M6)	20 m/s² (9 to 200 Hz) 15 m/s² (200 to 500 Hz)
IEC 61850-3 IEC 60870-2-2 IEC 60068-2-27 IEC 60721-3-3	Shock, operating	Class Cm (3M6, 4M6)	300 m/s², 11 ms

Dimensions

PTC-101-M-ST-HV (other models available by request)

Side View   Front View   Rear View   Panel Mounting Kit (Optional)
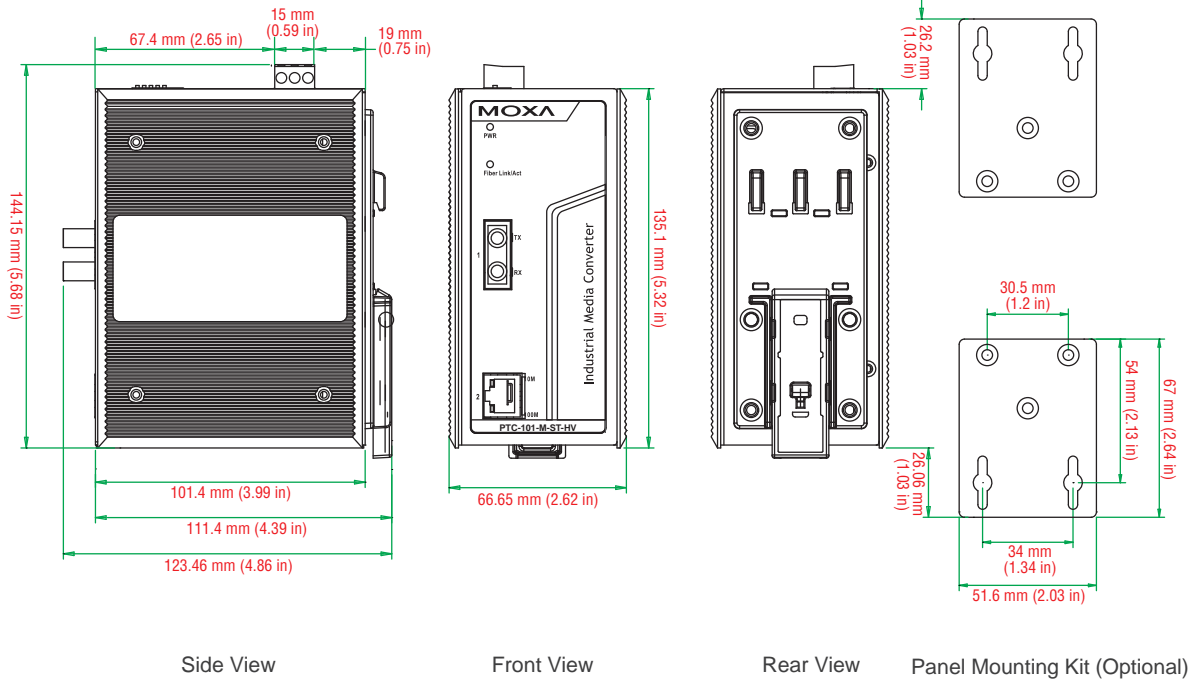
: Ordering Information

Available Models

PTC-101-M-SC-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with SC connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-M-ST-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with ST connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-M-LC-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with LC connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-S-SC-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with SC connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-S-LC-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with LC connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-S-ST-LV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with ST connector, dual redundant power inputs (20-70 VDC), -40 to 85°C operating temperature

PTC-101-M-SC-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with SC connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

PTC-101-M-ST-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with ST connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

PTC-101-M-LC-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode with LC connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

PTC-101-S-SC-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with SC connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

PTC-101-S-ST-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with ST connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

PTC-101-S-LC-HV: Industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode with LC connector, 1 isolated power supply (88-300 VDC or 85-264 VAC), -40 to 85°C operating temperature

Package Checklist

- PTC-101 series media converter
- Hardware Installation Guide (printed)
- Warranty Card

4

Ethernet Media Converters > PTC-101 Series

IMC-P101 Series

IEEE 802.3af PoE Ethernet-to-fiber media converters

> 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
> IEEE 802.3af compliant PoE
> Power failure alarm by relay output
> Store-and-Forward mode and Cut Through mode
> -40 to 75°C operating temperature range (T models)
> Redundant dual DC power inputs

Introduction

IMC-P101 series Ethernet-to-fiber media converters provide Ethernet media conversion from 10/100BaseT(X) to 100BaseFX (with SC or ST connectors). These converters are classified as power source equipment (PSE), and when used in this way provide up to 15.4 watts to IEEE 802.3af compliant powered devices (PDs), eliminating

the need for additional wiring. The IMC-P101 converters support IEEE 802.3/802.3u/802.3x with 10/100M, full/half-duplex, and MDI/MDI-X auto-sensing, providing a complete solution for your industrial Ethernet network.

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X), 100BaseFX
IEEE 802.3af for Power-over-Ethernet

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST connectors)
LED Indicators: PWR1, PWR2, Fiber Link, 10/100M (TP port), PSE Indicator
DIP Switches:

DIP No.	Function	ON	OFF
1	Auto Negotiation	Enable*	Disable
2	Force TP Speed	100 Mbps*	10 Mbps
3	Force TP Duplex	Full Duplex*	Half Duplex
4	Link Fault Pass Through	Enable*	Disable
5	Operating Mode	Store-and-Forward*	Pass Through
6	PSE	Disable	Enable*
7	P.R.R. (PD Remote Reset)	Enable	Disable*

* Default DIP switch setting.

Alarm Contact: One relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]
Saturation	-6 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm, 3.5 PS/(nm*km) fiber optic cable

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 144.45 x 110.2 x 51.65 mm (5.69 x 4.34 x 2.03 in)
Weight:
Product only: 525 g
Packaged: 710 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements

Input Voltage: 48 VDC (46 to 57 VDC), redundant inputs
Power Consumption: 430 mA @ 48 VDC (max.)
Connection: Removable terminal block
Overload Current Protection: 1.6 A (protects against two signals shorted together)
Reverse Polarity Protection: Protects against V+/V- reversal

Regulatory Approvals

Safety: UL 508
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
IEC 61000-4-2 Edition 1.2: 2001-04 (Level 4)
IEC 61000-4-3: 2002+A1: 2002 (Level 3)
IEC 61000-4-4: 2004 (Level 4)
IEC 61000-4-5 Edition 1.1: 2001-04 (Level 3)
IEC 61000-4-6 Edition 2.1: 2004-11 (Level 3)
IEC 61000-4-8 Edition 1.1: 2001-03 (Level 3)
IEC 61000-4-11 Second Edition: 2004-03

Freefall: IEC60068-2-32
Shock: IEC60068-2-27
Vibration: IEC60068-2-6

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   Panel Mounting Kit (Optional)
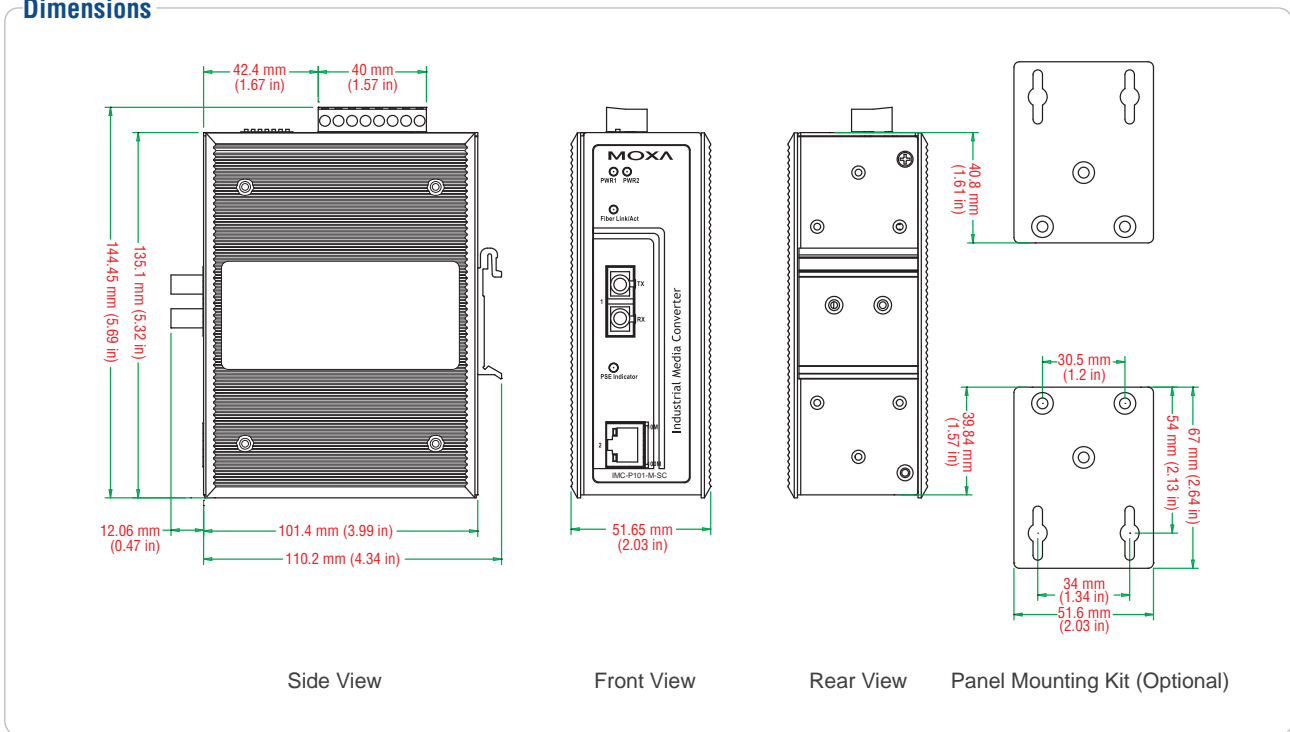
:: Ordering Information

Available Models

IMC-P101-M-SC: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode port with SC connector, 0 to 60°C operating temperature
IMC-P101-M-ST: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode port with ST connector, 0 to 60°C operating temperature
IMC-P101-S-SC: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode port with SC connector, 0 to 60°C operating temperature
IMC-P101-S-ST: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode port with ST connector, 0 to 60°C operating temperature
IMC-P101-M-SC-T: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode port with SC connector, -40 to 75°C operating temperature
IMC-P101-M-ST-T: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, multi-mode port with ST connector, -40 to 75°C operating temperature
IMC-P101-S-SC-T: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode port with SC connector, -40 to 75°C operating temperature
IMC-P101-S-ST-T: PoE industrial 10/100BaseT(X) to 100BaseFX media converter, single-mode port with ST connector, -40 to 75°C operating temperature

Package Checklist

- IMC-P101 series media converter
- Hardware Installation Guide (printed)
- Warranty Card

IMC-101G

Industrial Gigabit Ethernet to fiber media converter

> 10/100/1000BaseT(X) and 1000BaseSX/LX/LHX/ZX supported
> Link Fault Pass-Through (LFP)
> Power failure, port break alarm by relay output
> Redundant power input
> -40 to 75°C operating temperature range (T models)
> Designed for hazardous locations

: Introduction

The IMC-101G industrial Gigabit media converters are designed to provide reliable and stable 10/100/1000BaseT(X) to 1000BaseSX/LX/LHX/ZX media conversion in harsh industrial environments. The IMC-101G's industrial design is excellent for keeping your industrial automation applications running continuously, and each IMC-101G converter comes with a relay output warning alarm to help prevent damage and loss. All IMC-101G models are subjected to a 100% burn-in test, and are available in models that support a standard operating temperature range of 0 to 60°C, and an extended operating temperature range of -40 to 75°C.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST connectors)
LED Indicators: PWR1, PWR2, FAULT, 10/100M (TP port), 1000M (TP and Fiber port)
DIP Switches: Port break alarm mask, Fault Pass-Through, Fiber AN/Force
Alarm Contact: One relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber
Multi-mode Transmission Distance:
1000BaseSX:
• 0 to 500 m, 850 nm (50/125 µm, 400 MHz*km)
• 0 to 275 m, 850 nm (62.5/125 µm, 200 MHz*km)
1000BaseLX:
• 0 to 1100 m, 1310 nm (50/125 µm, 800 MHz*km)
• 0 to 550 m, 1310 nm (62.5/125 µm, 500 MHz*km)
Single-mode Transmission Distance:
1000BaseLX: 0 to 10 km, 1310 nm (9/125 µm, 3.5 PS/(nm*km))
1000BaseLHX: 0 to 40 km, 1310 nm (9/125 µm, 3.5 PS/(nm*km))
1000BaseZX: 0 to 80 km, 1550 nm (9/125 µm, 19 PS/(nm*km))

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight: 630 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 24 VDC (12 to 45 VDC), redundant inputs
Input Current: 0.11 A (@ 24 V)
Connection: Removable terminal block
Overload Current Protection: 1.1A
Reverse Polarity Protection: Present

Regulatory Approvals
Safety: UL508
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 2
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
Hazardous Location:
UL/cUL Class1, Division 2, Groups A, B, C, and D,   ATEX Class1, Zone 2, Ex nC IIC
Freefall: IEC60068-2-32
Shock: IEC60068-2-27
Vibration: IEC60068-2-6
MTBF: 500,000 hrs; Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View

Front View

Rear View

Panel Mounting Kit

4

Ethernet Media Converters > IMC-101G
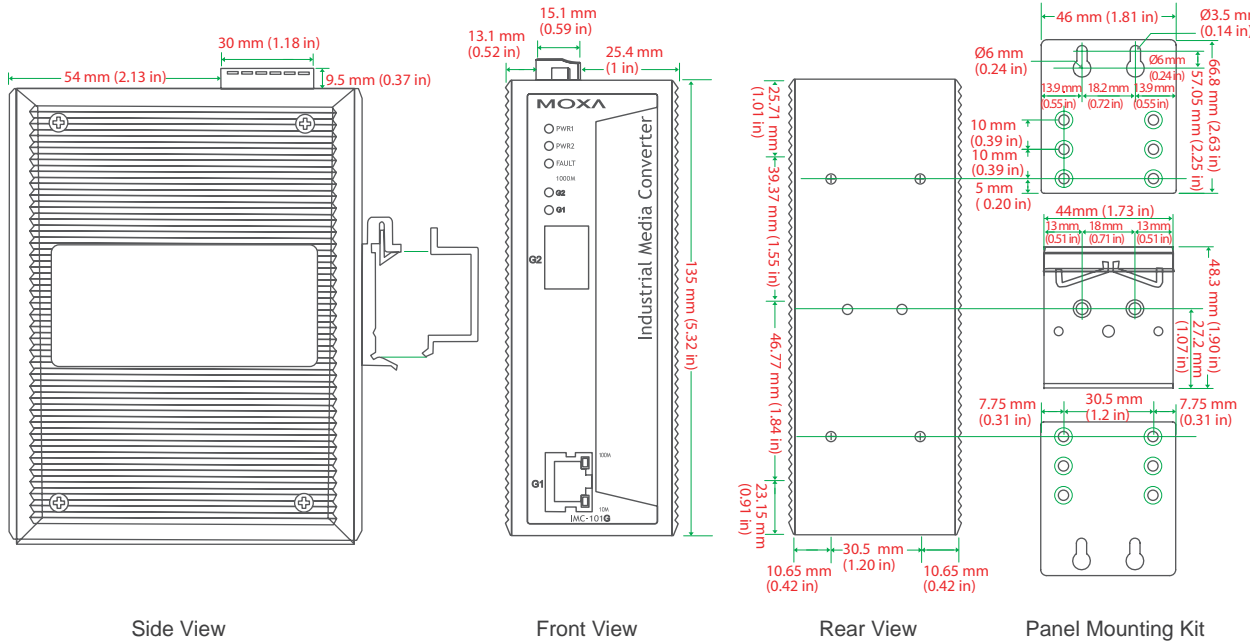
: Ordering Information

Available Models

IMC-101G: Industrial 10/100/1000BaseT(X) to 1000BaseSX/LX/LHX/ZX media converter, 0 to 60°C operating temperature
IMC-101G-T: Industrial 10/100/1000BaseT(X) to 1000BaseSX/LX/LHX/ZX media converter, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DR-4524: 45W/2A DIN-Rail 24 VDC power supply, 85 to 264 VAC input
DR-75-24: 75W/3.2A DIN-Rail 24 VDC power supply, 85 to 264 VAC input
DR-120-24: 120W/5A DIN-Rail 24 VDC power supply, 88 to 132 VAC or 176 to 264 VAC input by switch
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

Package Checklist

- IMC-101G media converter
- Quick Installation Guide (printed)
- Warranty Card

IMC-101 Series

Industrial 10/100BaseT(X) to 100BaseFX media converters

> 10/100BaseT(X) auto-negotiation and auto-MDI/MDI-X
> Link Fault Pass-Through (LFP)
> Power failure, port break alarm by relay output
> Redundant power inputs
> -40 to 75°C operating temperature range (T models)
> Designed for hazardous locations (Class 1 Div. 2/Zone 2)

Introduction

The IMC-101 industrial media converters provide industrial-grade media conversion between 10/100BaseT(X) and 100BaseFX (SC/ST connectors). The IMC-101 converters' reliable industrial design is excellent for keeping your industrial automation applications running continuously, and each IMC-101 converter comes with a relay output warning alarm to help prevent damage and loss. The IMC-101 media converters are designed for harsh industrial environments, such as in hazardous locations (Class 1, Division 2/Zone 2, DNV, and GL Certification), and comply with FCC, TV, UL, and CE standards. The IMC-101 series is available in models that support an operating temperature from 0 to 60°C, and an extended operating temperature from -40 to 75°C. All IMC-101 series converters are subjected to a 100% burn-in test.

Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST connectors)
LED Indicators: PWR1, PWR2, FAULT, 10/100M (TP port), 100M (Fiber port), FDX/COL (Fiber port)
DIP Switches: 100BaseFX Full/Half duplex selection, port break alarm mask
Alarm Contact: One relay output with current carrying capacity of 1 A @ 24 VDC

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm, 3.5 PS/(nm*km) fiber optic cable
d. 9/125 µm, 19 PS/(nm*km) fiber optic cable

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight: 630 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 24 VDC (12 to 45 VDC), redundant inputs
Input Current: 0.16A (@ 24 V)
Connection: Removable terminal block
Overload Current Protection: 1.1A
Reverse Polarity Protection: Present

Regulatory Approvals
Safety: UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
EMI: FCC Part 15, CISPR (EN55022) class A

4

EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 2
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
Hazardous Location:
UL/cUL Class1, Division 2, Groups A, B, C, and D,   ATEX Class1,
Zone 2, Ex nC IIC

Freefall: IEC60068-2-32
Shock: IEC60068-2-27
Vibration: IEC60068-2-6
Maritime: DNV, GL
MTBF: 401,000 hrs; Database: MIL-HDBK-217F: GB 25°C
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   Panel Mounting Kit

4

Ethernet Media Converters ᐳ IMC-101 Series
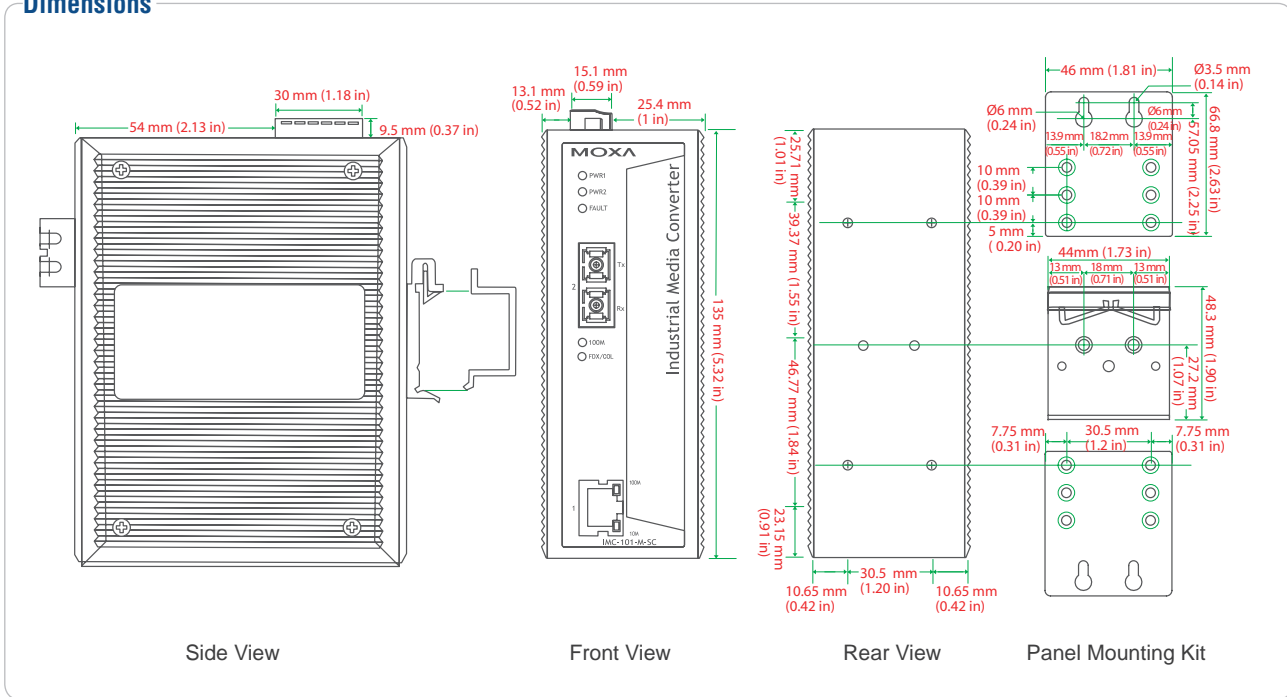
Ordering Information

Available Models

IMC-101-M-SC: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, SC connector, 0 to 60°C operating temperature

IMC-101-M-ST: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, ST connector, 0 to 60°C operating temperature

IMC-101-S-SC: Industrial 10/100BaseT(X) to 100BaseFX media converter, single mode, SC connector, 40 km, 0 to 60°C operating temperature

IMC-101-S-SC-80: Industrial 10/100BaseT(X) to 100BaseFX media converter, single mode, SC connector, 80 km, 0 to 60°C operating temperature

IMC-101-M-SC-T: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, SC connector, -40 to 75°C operating temperature

IMC-101-M-ST-T: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, ST connector, -40 to 75°C operating temperature

IMC-101-S-SC-T: Industrial 10/100BaseT(X) to 100BaseFX media converter, single mode, SC connector, 40 km, -40 to 75°C operating temperature

IMC-101-S-SC-80-T: Industrial 10/100BaseT(X) to 100BaseFX media converter, single mode, SC connector, 80 km, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DR-4524: 45W/2A DIN-Rail 24 VDC power supply, 85 to 264 VAC input
DR-75-24: 75W/3.2A DIN-Rail 24 VDC power supply, 85 to 264 VAC input
DR-120-24: 120W/5A DIN-Rail 24 VDC power supply, 88 to 132 VAC/176 to 264 VAC input by switch
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit
SC to ST, SC to SC, ST to ST Connectors: See page A-11 for details

Package Checklist

- IMC-101 series media converter
- Quick Installation Guide (printed)
- Warranty Card

IMC-21 Series

Entry-level industrial 10/100BaseT(X) to 100BaseFX media converters

> Multi-mode or single-mode, with SC or ST fiber connector
> Link Fault Pass-Through (LFP)
> Power inputs: 12 to 45 VDC, 18 to 30 VAC (47-63 Hz)
> -10 to 60°C operating temperature range
> DIP switches to select FDX/HDX/10/100/Auto/Force

c(UL)us LISTED   RoHS   CE   FC

: Introduction

The IMC-21 industrial media converters are entry-level 10/100BaseT(X) to 100BaseFX media converters designed to provide reliable and stable operation in harsh industrial environments. The converters are a cost-effective solution that run on either a 12 to 45 VDC power input or 18 to 30 VAC power input, and can operate reliably in temperatures ranging from -10 to 60°C. The rugged hardware design ensures that your Ethernet equipment can withstand demanding industrial conditions. The IMC-21 converters are easy to mount on a DIN-Rail or in distribution boxes.

: Specifications

Technology
Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control

Interface
RJ45 Ports: 10/100BaseT(X)
Fiber Ports: 100BaseFX (SC/ST connectors)
LED Indicators: Power, 10/100M (TP port), 100M (fiber port), FDX/COL (fiber port)
DIP Switches: TP port's 10/100M, Half/Full modes, and Force/Auto modes, fiber connection's Full/Half mode, Link Fault Pass-Through (LFP)

Optical Fiber

	100BaseFX	
	Multi-mode	**Single-mode**
Distance	5 km, 1300 nm	40 km, 1310 nm
Max. TX Output	-14 dBm	0 dBm
Min. TX Output	-20 dBm	-5 dBm
RX Sensitivity	-34 to -30 dBm	-36 to -32 dBm

Physical Characteristics
Housing: Plastic, IP30 protection
Dimensions: 25 x 109 x 97 mm (0.98 x 4.29 x 3.82 in)
Weight: 125 g
Installation: DIN-Rail mounting

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 70°C (-40 to 158°F)

Power Requirements
Input Voltage: 12 to 45 VDC, 18 to 30 VAC (47-63 Hz)
Input Current: 0.15A (@ 24 V)
Connection: Removable 3-contact terminal block
Overload Current Protection: 1.1 A
Reverse Polarity Protection: Present

Regulatory Approvals
Safety: UL508
EMI: FCC Part 15, CISPR (EN55022) class A
EMS:
EN61000-4-2 (ESD)
EN61000-4-3 (RS)
EN61000-4-4 (EFT)
EN61000-4-5 (Surge)
EN61000-4-6 (CS)
Freefall: IEC60068-2-32
Shock: IEC60068-2-27
Vibration: IEC60068-2-6
MTBF: 353,000 hrs; Database: MIL-HDBK-217F: GB 25°C

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

| Side View | Front View | Rear View | Top View | Bottom View |
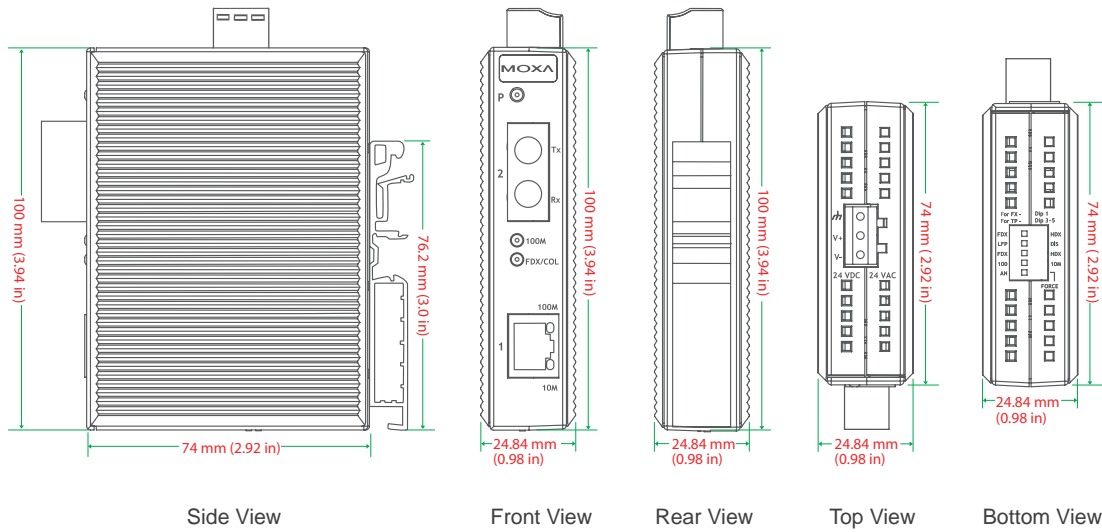
: Ordering Information

Available Models

IMC-21-M-SC: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, SC connector
IMC-21-M-ST: Industrial 10/100BaseT(X) to 100BaseFX media converter, multi mode, ST connector
IMC-21-S-SC: Industrial 10/100BaseT(X) to 100BaseFX media converter, single mode, SC connector

Optional Accessories (can be purchased separately)

RK-4U: 4U-high 19" rack mounting kit
SC to ST, SC to SC, ST to ST Connectors: See page A-11 for details

Package Checklist

- IMC-21 series media converter
- Quick Installation Guide (printed)
- Warranty Card

4

Ethernet Media Converters ❯ IMC-21 Series

This page intentionally left blank.

Industrial Wireless IEEE 802.11 Solutions

5

Industrial Wireless IEEE 802.11 Solutions

Industrial Wireless AP/Bridge/Client Solutions

	AWK-6222-T	AWK-4121-T	AWK-5222 AWK-5222-T	AWK-3121 AWK-3121-T	AWK-3132 AWK-3132-T	AWK-4132-T
WLAN						
IEEE Standards	IEEE 802.11a/b/g/h, IEEE 802.11i for wireless security, IEEE 802.3u, IEEE 802.3af, IEEE 802.1Q				IEEE 802.11a/b/g/n, IEEE 802.11i for wireless security, IEEE 802.3u for 100BaseT(X), IEEE 802.3u, IEEE 802.3af, IEEE 802.2ab	
Spread Spectrum and Modulation (typical)	• DSSS with DBPSK, DQPSK, CCK • OFDM with BPSK, QPSK, 16QAM, 64QAM • 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps • 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps				• DSSS with DBPSK, DQPSK, CCK • OFDM with BPSK, QPSK, 16QAM, 64QAM • 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps • 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps • 802.11n: 64QAM @ 300 to BPSK @ 6.5 Mbps	
Operating Channels (central frequency)	US: 2.412 to 2.462 GHz (11 channels); 5.18 to 5.24 GHz (4 channels) EU: 2.412 to 2.472 GHz (13 channels); 5.18 to 5.24 GHz (4 channels) JP: 2.412 to 2.472 GHz (13 channels, OFDM); 2.412 to 2.484 GHz (14 channels, DSSS); 5.18 to 5.24 GHz (4 channels for W52)				US: 2.412 to 2.462 GHz (11 channels); 5.18 to 5.24 GHz (4 channels) EU: 2.412 to 2.472 GHz (13 channels); 5.18 to 5.24 GHz (4 channels)	
Number of RF modules	2	1	2	1	1	1
Interfaces						
Number of Antenna Connectors	4	2	4	2	2	2
Antenna Connector Type	N-type (female)	N-type (female)	RP-SMA (female)	RP-SMA (female)	RP-SMA (female)	N-type (female)
10/100BaseT(X) LAN Ports	2, waterproof RJ45	1, waterproof RJ45	2	1	–	–
10/100/1000BaseT(X) LAN Ports	–	–	–	–	2	2, waterproof RJ45
RS-232 Console Ports	1, waterproof RJ45	1, waterproof RJ45	1, RJ45	1, RJ45	1, RJ45	1, waterproof RJ45
LED Indicators	PWR, FAULT, STATE, WLAN1, WLAN2, LAN1, LAN2	PWR, FAULT, STATE, WLAN, LAN	PWR1, PWR2, PoE, FAULT, STATE, WLAN1, WLAN2, 10M, 100M	PWR1, PWR2, PoE, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M	PWR1, PWR2, PoE, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M, 1000M LAN1/LAN2	PWR, FAULT, STATE, WLAN, LAN1, LAN2
Alarm Contact (Digital Output)	1	1	1	1	1	1
Digital Inputs	2	2	2	2	2	2
DI/DO Connector Type	8-pin M12 (A-coding)		10-pin terminal block		10-pin terminal block	8-pin M12 (A-coding)
Physical Characteristics						
Housing	Metal (IP68)	Metal (IP68)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP68)
Weight	1.8 kg	1.5 kg	1.1 kg	850 g	1.3 kg	1.8 kg
Dimensions	224 x 147.7 x 66.5 mm		62.05 x 135 x 105 mm	53.6 x 135 x 105 mm	86.58 x 135 x 105 mm	224 x 147.7 x 66.5 mm
Installation	Wall mounting (standard), DIN-Rail mounting (optional), pole mounting (optional)		DIN-Rail mounting (standard), wall mounting (optional)			Wall mounting (standard), DIN-Rail mounting (optional), pole mounting (optional)
Environmental Limits						
Operating Temperature	-40 to 75°C	-40 to 75°C	0 to 60°C or -40 to 75°C	0 to 60°C or -40 to 75°C	0 to 60°C or -40 to 75°C	-40 to 75°C
Operating Humidity	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Storage Temperature	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C
Power Requirements						
Input Voltage	Redundant dual power inputs (12 to 48 VDC)					
Connector	5-pin M12 (A-coding)		10-pin terminal block	10-pin terminal block	10-pin terminal block	5-pin M12 (A-coding)
IEEE 802.3af 48 VDC PoE	✓	✓	✓	✓	✓	✓
Reverse Polarity Protection	✓	✓	✓	✓	✓	✓
Regulatory Approvals						
Radio	EN300 328, EN301 893	EN300 328, EN301 893, ARIB STD-33/T66/T71 (Japan)	EN300 328, EN301 893	EN300 328, EN301 893, ARIB STD-33/T66/T71 (Japan)	EN300 328, EN301 893	EN300 328, EN301 893
EMC	EN301 489-1/-17, FCC Part 15, EN55022, EN55024, IEC61000-6-2/-4	EN301 489-1/-17, FCC Part 15, EN55022, EN55024, IEC61000-6-2/-4	EN301 489-1/-17, FCC Part 15, EN55022, EN55024	EN301 489-1/-17, FCC Part 15, EN55022, EN55024, IEC61000-6-2/-4	EN301 489-1/-17, FCC Part 15, EN55022, EN55024, IEC61000-6-2/-4	EN301 489-1/-17, FCC Part 15, EN55022, EN55024, IEC61000-6-2/-4
Safety	EN60950-1, UL60950-1	EN60950-1, UL60950-1	EN60950-1, UL60950-1	EN60950-1, UL60950-1	EN60950-1	EN60950-1
Rail Traffic	EN50155, EN50121-1/-4				EN50155, EN50121-1/-4 (Pending)	
Hazardous Location	–	UL/cUL Class I, Div. 2; ATEX Class I, Zone 2 (Pending)	–	UL/cUL Class I, Div. 2; ATEX Class I, Zone 2	–	–
Reliability						
Warranty	5 years (see www.moxa.com/warranty)					

Introduction to Industrial IEEE 802.11 Wireless

: Overview

Are you ready for the convenience that comes from sending your Ethernet packets over the air instead of through a wire? Wireless is not for everyone, but if your application uses mobile equipment that is controlled over a TCP/IP network, or the cost of installing wire conduits at your work site is prohibitive, then consider setting up a wireless local area network (WLAN). The IEEE 802.11 standard specifies a way to use radio frequency (RF) technology to send Ethernet packets over the air. Applications that include TCP/IP will run on 802.11-compliant WLANs the same as they do over Ethernet. By common agreement between regulatory agencies around the world (FCC, ETSI, etc.), a WLAN transmits over unlicensed spectrums, with only minor variations from country to country.

802.11 Specifications

IEEE 802.11, commonly referred to as Wi-Fi, is widely used for wireless communications. Wireless connectivity eliminates the need to install either fiber or Ethernet cable in hard-to-wire locations. IEEE 802.11 is not an alternative to broadband, but it is a fast and efficient way to distribute broadband transmissions, even in critical environments. Choosing the right WLAN technology is an important factor in determining the performance of your wireless network and overall return on investment.

Standard	IEEE 802.11b	IEEE 802.11a	IEEE 802.11g	IEEE 802.11n
Year Approved	1999	1999	2003	2009
Compatibility	IEEE 802.11b compliant	IEEE 802.11a compliant	IEEE 802.11b/g compliant	IEEE 802.11a/b/g compliant
Frequency Band	2.4 GHz	5 GHz	2.4 GHz	2.4/5 GHz
Channel Bandwidth	20 MHz	20 MHz	20 MHz	20 or 40 MHz
Number of Spatial Streams	1	1	1	1 to 4
Max. Data Rates	11 Mbps	54 Mbps	54 Mbps	600 Mbps [c]
Data Rate Configurations	4	8	12 [a]	576
Spread Spectrum	DSSS	OFDM	OFDM, DSSS	OFDM
Typical Indoor Range [b]	100 to 150 feet	30 to 50 feet	100 to 150 feet	150 to 200 feet
Typical Outdoor Range [b]	200 to 300 feet	50 to 100 feet	200 to 300 feet	450 to 600 feet

a. IEEE 802.11b includes backwards compatibility.
b. This is a general rule of thumb that can be applied when planning a wireless network.
c. Theoretical data rate with 4-stream MIMO

Operation Modes

The most common operation modes for wireless networks are AP-client mode and bridge mode. In AP-client mode, a wireless AP is required to set up a basic infrastructure service set (BSS) for wireless connectivity. The AP can be used by itself to set up a WLAN, or can be used to connect the WLAN to a wired network. In either case, all wireless communication goes through the AP. Bridge mode provides an easy way to extend a network with peer-to-peer transmission to send information between two individual APs connecting wired networks or Ethernet-enabled devices at their LAN ports.
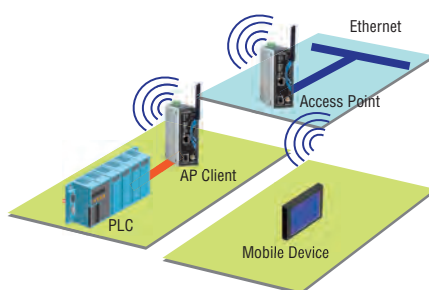
AP-Client Operation
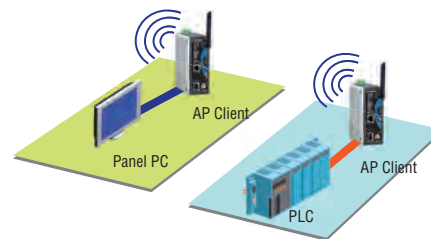
Bridge Operation

WDS

The Wireless Distribution System (WDS) provides an easy way for APs to communicate wirelessly with each other. As shown in the figure on the left below, one AP acts as a wireless access point and forwards packets to the other AP through the WDS before the packets are sent to the Ethernet LAN.

In addition, two or more LAN segments can be connected wirelessly. As illustrated in the figure below, a pair of wireless LAN-to-LAN bridges is used to connect two LAN segments. Since the AP is WDS-enabled, it can operate in bridge mode.
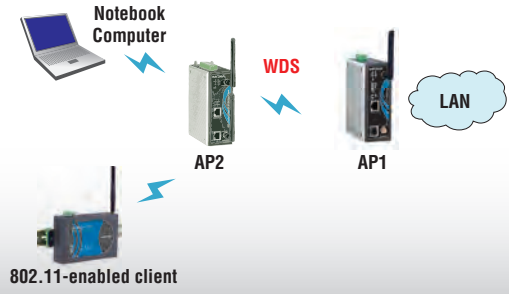
STP/RSTP

Spanning Tree Protocol (STP) was designed to help reduce link failures in a network and provide protection from loops. STP can effectively increase system reliability to allow your network to run non-stop. Networks that have a complicated architecture are prone to broadcast storms caused by unintended loops in the network. STP is part of the IEEE 802.1D standard (1998 Edition) bridge specification.

Rapid Spanning Tree Protocol (RSTP) implements the Spanning Tree algorithm and protocol defined by the IEEE 802.1w-2001 standard. RSTP is not only backwards compatible with STP, but is able to determine the topology of a bridged network much more quickly than STP.
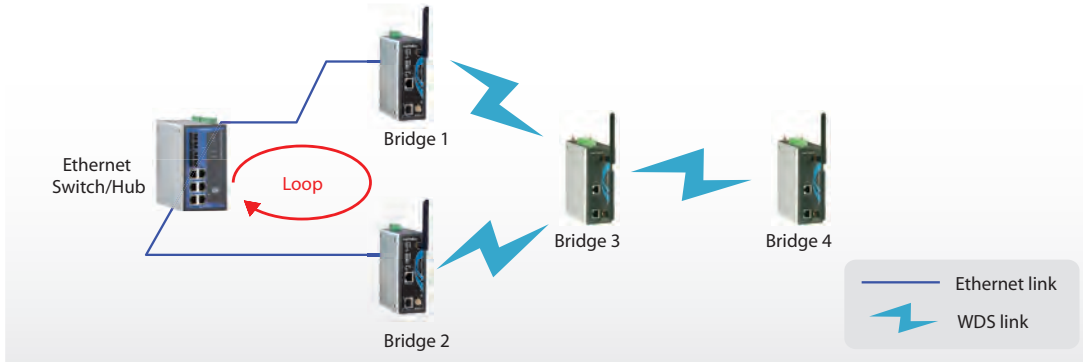
Wireless Security

Wireless networks use radio waves, which means that your data is prone to interception by other parties. A proper protection mechanism for radio transmissions on any network is always a concern for protocol designers. The right balance between security, transparency, and cost effectiveness is important when determining the type of security to use for your WLAN. You should take into account

your target environment, the security levels that your WLAN can support, and the effect that stronger security methods could have on performance. The following table summarizes implementation considerations and client requirements when using WLAN security methods.

Method	Client Support	Considerations
WEP	Built-in support on all 802.11a, basic 802.11b, and 802.11g devices	-Provides basic security -Requires manual key management
WPA	Requires WPA-enabled system and network card driver	-Provides dynamically generated keys that are periodically refreshed -Provides similar shared key user authentication -Provides robust security for small networks
WPA2	Requires WPA-enabled system and network card driver	-Provides robust security for small networks -Wireless stations may require hardware to upgrade to WAP2
802.1X	Requires WPA-enabled system and network card driver	-Provides dynamically generated keys that are backwards compatible with the original WPA

⋮ Industrial-grade Wireless LANs

Roaming for Non-stop Connections

IEEE 802.11 technology gives networks an effective range of only a few hundred meters, which means that maintaining communications between devices that are on the move requires handing access off from one access point to another. Without an advanced roaming technology, this could result in frequent handoffs and poor performance, since reconnecting must be done every five to ten seconds in a highly mobile environment. "Roaming" is a general term in wireless communications that refers to extending connectivity service to different locations. Moxa's Turbo Roaming technology provides seamless wireless connections, and enables fast Basic Service Set (BSS) transitions between APs.
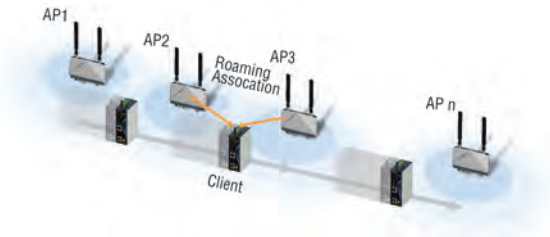
Long-distance Communication

IEEE 802.11 standards are not designed for outdoor use, and generally speaking, the standards do not cover long-distance communication. When the distance between two wireless devices is increased, packets need to travel a longer distance. Communication over such a long distance can become unstable, which leads to a drop in network performance. The AWK's support for long distance communication makes it easier to configure a long-distance solution. A proprietary algorithm developed by Moxa can be used to determine which parameters should be used to optimize performance. Practical uses of the algorithm include the deployment of long-range point-to-point and point-to-multipoint wireless networks.

DI/DO

Moxa's AWK APs are often located at remote parts of an industrial wireless LAN, making it difficult for system administrators to know the status of such devices or monitor the surrounding environment. The traditional way of determining device status is to poll devices periodically, but this is not "real-time" enough for many modern applications, and it also wastes precious computing resources. Besides, an auxiliary sub-system may be needed to support environmental monitoring, which would add an additional cost.

A more modern solution to this problem is to use industrial-grade APs that provide system maintainers with real-time alarm messages almost instantaneously when exceptions occur. In other words, warning messages are triggered actively when the events such as link up/down and power on/ off occur. Integrated with other important sensors via digital inputs (DI), the AWK can also provide an automatic alarm mechanism. This is done by redirecting warning messages to an IP network by email or log record.
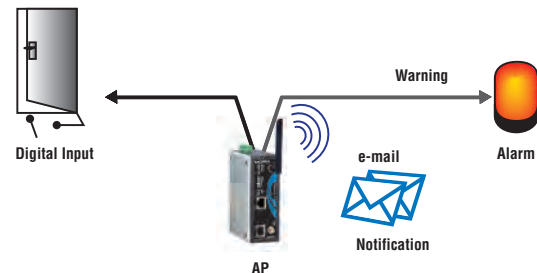
AWK series products are equipped with relay outputs (digital output, DO) that can be configured to indicate the importance of events when notifying or warning engineers in the field. In response, engineers can respond to higher priority messages quickly and with the appropriate emergency maintenance procedures.

Certified to Meet Industrial Reliability Standards

Industrial environments often involve unknown, hazardous factors that can influence the operation of Ethernet devices. In fact, some factors could cause serious disasters or the loss of life and property. Moxa's industrial products have received UL/cUL Class 1 Division 2 and ATEX C1Z2 certifications, which were developed to indicate which industrial control and information technology equipment is suitable for hazardous locations such as maritime environments, mines, oil refineries, and other industrial settings. In addition, the environmental compliancy with EN50155 and EN50121-3-2 standards is essential for testing and determining which devices can be used safely and reliably in railway-related and on-train applications.

5

Industrial Wireless IEEE 802.11 Solutions ˅ Introduction to Industrial IEEE 802.11 Wireless

Wireless VLAN (Multi-SSID)

A Virtual LAN (VLAN) is a collection of clients or hosts grouped together as if they were attached to the broadcast domains in a Layer 2 network. Based on the SSID, two or more clients can be added to a VLAN and grouped into the same LAN segment regardless of geographical location. Without additional routers, you can easily use Layer 2 switches with AWK APs and set the broadcast domain boundaries. VLANs provide network administrators with leeway in addressing network security, management, and scalability issues.
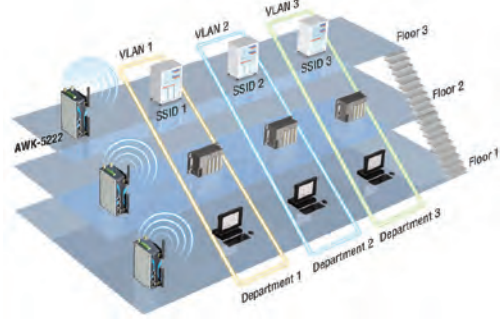
WMM for Communication Prioritization

Quality of Service (QoS) is a network term for controlling and measuring data transmission rates, throughput, and error rates, and is becoming an essential part of wireless communications when transmitting multimedia data, such as audio and video. Some important data requires a high quality of flow and throughput control and low error rates. WMM (Wi-Fi Multimedia) is based on a subset of the IEEE 802.11e protocol, which was designed to provide QoS on a WLAN. WMM allows the prioritization of data transmissions to help control the quality of communications.

: Advanced Industrial Wireless Solutions

Dual-RF solutions such as the AWK-5222 and AWK-6222 feature two independent wireless communication modules as well as multiple Ethernet ports. In addition to being ideal for wireless infrastructures, these products can also provide a more reliable connection and greater versatility for use on a variety of industrial networks.

Redundant Wireless

In most cases, radio interference occurs on a dedicated frequency or a narrow frequency band. Utilizing two or more frequencies to communicate at the same time can help to maintain non-stop data transmission, even if there is interference at one of the frequencies. This strategy greatly increases the availability of wireless links and makes the entire wireless network more reliable.
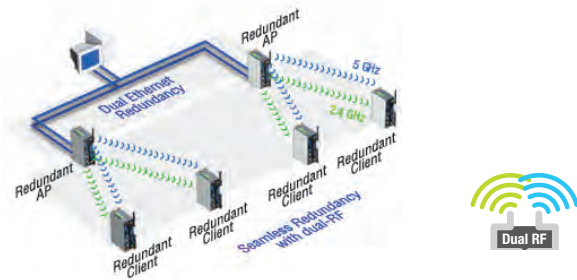
Wireless Bridging

In addition to wireless redundancy mode, "Wireless Bridge" mode is also available with Moxa's dual-RF solution. This mode is designed to provide a more optimized WDS mode that overcomes WDS mode's throughput problems, in which more nodes can cause a serious drop in throughput. With Wireless Bridge mode, the bandwidth of the wireless link will not be reduced (from using Dual RF and isolation of the overlap frequency channel), but instead will easily extend your wireless range.

Reliable Wireless Roaming

By combining the advantages of two key techniques, Turbo Roaming and Redundant Wireless, Moxa's advanced dual-RF solution can benefit from more rapid roaming with a reliable wireless connection.

AWK-6222

Industrial IEEE 802.11a/b/g outdoor dual-RF wireless AP/Bridge/Client

> **Turbo Roaming**
> Seamless Wireless Connection

> **Dual RF**

> ▷ **IEEE 802.11a/b/g compliant**
> ▷ **Long-distance communication support**
> ▷ **Multi-SSID and VLAN support**
> ▷ **Turbo Roaming for seamless wireless connections**
> ▷ **Dual-RF design for redundant wireless communication and high-performance wireless bridging**
> ▷ **QoS (WMM) support**

: Introduction

The AWK-6222 outdoor dual-RF wireless AP/Bridge/Client provides a flexible solution for industrial applications in a critical environment. The AWK-6222 is rated to operate at temperatures ranging from -40 to 75°C, and its dust-tight and weatherproof design is IP68-rated, allowing you to extend existing wired networks to outdoor locations. With two independent RF modules, the AWK-6222 supports a greater variety of wireless configurations and applications. It can also increase the reliability of an entire wireless network by enabling redundant wireless connections. The AWK-6222 has two redundant DC power inputs to increase the reliability of the power supply, and can be powered via PoE.

Redundancy to Increase System Reliability

• PoE and dual DC power inputs
• Redundant dual-RF design for rapid fail-over
• Immunity against disconnection caused by radio interference

Ruggedized Design for Critical Environments

• IP68-rated metal housing
• Waterproof and dust-tight RJ45 connections
• Hardened mounting kit for flexible outdoor installation

: Specifications

WLAN Interface
Standards:
IEEE 802.11a/b/g/h for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3u for 10/100BaseT(X)
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)
JP:
2.412 to 2.472 GHz (13 channels, OFDM)
2.412 to 2.484 GHz (14 channels, DSSS)
5.18 to 5.24 GHz (4 channels for W52)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA/WPA2 Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power:
802.11b:
Typ. 23±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
802.11a:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity:
802.11b:
-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps
802.11g:
-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps
802.11a:
-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface

Default Antenna: Dual-band omni-directional antenna, 5 dBi at 2.4 GHz, 2 dBi at 5 GHz, N-type (male)
Connector for External Antennas: N-type (female)
LAN Ports: 2, 10/100BaseT(X), auto negotiation speed (waterproof RJ45-type)
Console Port: RS-232 (waterproof RJ45-type)
LED Indicators: PWR, FAULT, STATE, WLAN1, WLAN2, LAN1, LAN2
Alarm Contact (digital output, M12 connector): 1 relay output with current carrying capacity of 1A @ 24 VDC
Digital Inputs (M12 connector): 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics

Housing: Metal, IP68 protection
Weight: 1.8 kg
Dimensions: 224 x 147.7 x 64.5 mm (8.82 x 5.82 x 2.54 in)
Installation: Wall mounting (standard), DIN-Rail mounting (optional), pole mounting (optional)

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 100% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: M12 connector with A-coding
Power Consumption:
• 0.121 to 0.494 A @ 12 to 48 VDC
• 0.3 A @ 24 VDC
Reverse Polarity Protection: Present

Regulatory Approvals

Safety: EN60950-1, UL60950-1
Radio: EN300 328, EN301 893
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
Rail Traffic: EN50155 (Environmental), EN50121-1/-4 (Environmental)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

147.7 mm (5.82 in)
224.0 mm (8.82 in)
64.5 mm (2.54 in)

⦂ Ordering Information

Available Models

AWK-6222-T: IEEE 802.11a/b/g outdoor dual-RF wireless AP/Bridge/Client, -40 to 75°C operating temperature
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

AWK-5222 Series

Industrial IEEE 802.11a/b/g dual-RF wireless AP/Bridge/Client

> IEEE 802.11a/b/g compliant
> Multi-SSID and VLAN support
> QoS (WMM) support
> Turbo Roaming for seamless wireless connections
> Dual-RF design for redundant wireless communication and high-performance wireless bridging

Turbo Roaming — Seamless Wireless Connection

Dual RF

: Introduction

The AWK-5222 dual-RF wireless AP/Bridge/Client provides a flexible and highly reliable solution for your industrial wireless networks. The AWK-5222 is rated to operate at temperatures ranging from 0 to 60°C for standard models and -40 to 75°C for extended temperature models, and it is built rugged enough for industrial applications. With two independent RF modules, the AWK-5222 supports a greater variety of wireless configurations and applications, and the redundant wireless connections increase the reliability of the entire wireless network. The AWK-5222's two DC power inputs make the power supply more reliable, and it can also be powered via PoE for easier deployment.

Redundancy to Increase System Reliability

• Dual DC power inputs and PoE
• Redundant dual-RF design for rapid fail-over
• Immunity against disconnection caused by radio interference

Advanced Security

• 64-bit and 128-bit WEP (Wired Equivalent Privacy)
• Enable/disable SSID broadcasts
• Power filters for access control
• IEEE 802.1X/RADIUS supported
• WPA/WPA2/802.11i supported

: Specifications

WLAN Interface

Standards:
IEEE 802.11a/b/g/h for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3u for 10/100BaseT(X)
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
64QAM @ 54 Mbps, 16QAM @ 24/36 Mbps, QPSK @ 12/18 Mbps,
CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBSK@ 1 Mbps
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps,
   DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps,
   QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)
JP:
2.412 to 2.472 GHz (13 channels, OFDM)
2.412 to 2.484 GHz (14 channels, DSSS)
5.18 to 5.24 GHz (4 channels for W52)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA /WPA2 Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power:
802.11b:
Typ. 23±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps,
Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
802.11a:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48
Mbps, Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity:
802.11b:
-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90
dBm @ 11 Mbps
802.11g:
-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88
dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76
dBm @ 48 Mbps, -74 dBm @ 54 Mbps
802.11a:
-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85
dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75
dBm @ 48 Mbps, -74 dBm @ 54 Mbps

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface

Default Antenna: 2 dBi, dual-band omni-directional antenna, RP-SMA (male)
Connector for External Antennas: RP-SMA (female)
LAN Ports: 2, 10/100BaseT(X), auto negotiation speed (RJ45-type)
Console Port: RS-232 (RJ45-type)
LED Indicators: PWR1, PWR2, PoE, FAULT, STATE, WLAN1, WLAN2, 10M, 100M
Alarm Contact (digital output): 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics

Housing: Metal, IP30 protection
Weight: 1.1 kg
Dimensions: 62.05 x 135 x 105 mm (2.44 x 5.31 x 4.13 in)
Installation: DIN-Rail mounting (standard), Wall mounting (optional)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: 10-pin removable terminal block
Power Consumption:
• 0.121 to 0.494 A @ 12 to 48 VDC
• 0.3 A @ 24 VDC
Reverse Polarity Protection: Present

Regulatory Approvals

Safety: EN60950-1, UL60950-1
Radio: EN300 328, EN301 893
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
**Rail Traffic:** EN50155 (Environmental), EN50121-1/-4 (Environmental)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

: Ordering Information

Available Models

AWK-5222: IEEE 802.11a/b/g dual-RF wireless AP/Bridge/Client, 0 to 60°C operating temperature
AWK-5222-T: IEEE 802.11a/b/g dual-RF wireless AP/Bridge/Client, -40 to 75°C operating temperature
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

AWK-4132

Industrial IEEE 802.11a/b/g/n outdoor wireless AP/Bridge/Client

> IEEE 802.11a/b/g/n compliant
> Gigabit Ethernet support
> Turbo Roaming for seamless wireless connections
> Multi-SSID and VLAN support
> QoS (WMM) support
> Dual 24 VDC power inputs or Power-over-Ethernet

CE FC

⫶ Introduction

The AWK-4132 industrial a/b/g/n outdoor wireless AP/Bridge/Client products are ideal wireless solutions for hard-to-wire applications that use mobile equipment connected over a TCP/IP network. The AWK-4132 provides faster and wider range transmission compared with 802.11g products and exhibits a noticeably stronger connection at longer distances. With a wide -40 to 75°C operating temperature and dust-tight/weatherproof IP68-rated design, the AWK-4132 allows you to set up a WLAN or extend existing wired networks to outdoor locations. In addition, the AWK-4132 is equipped with detachable antennas to give you the flexibility of choosing your own special-purpose antennas. The two redundant DC power inputs increase the reliability of the power supply, and the AWK-4132 can be powered via PoE to make deployment easier.

⫶ Specifications

WLAN Interface

Standards:
IEEE 802.11a/b/g/n for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps,
  DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps,
  QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps
• 802.11n: 64QAM @ 300 bps to BPSK @ 6.5 Mbps (multiple rates supported)

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA/WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n: 6 to 300 Mbps (multiple rates supported)

TX Transmit Power:
802.11b:
1 to 11 Mbps: Typ. 18 dBm (± 1.5 dBm)
802.11g:
6 to 24 Mbps: Typ. 18 dBm (± 1.5 dBm)
36 to 48 Mbps: Typ. 17 dBm (± 1.5 dBm)
54 Mbps: Typ. 15 dBm (± 1.5 dBm)
802.11a:
6 to 24 Mbps: Typ. 17 dBm (± 1.5 dBm)
36 to 48 Mbps: Typ. 16 dBm (± 1.5 dBm)
54 Mbps: Typ. 14 dBm (± 1.5 dBm)

TX Transmit Power MIMO:
802.11a/n (20/40 MHz):
MCS15 20 MHz: Typ. 13 dBm (± 1.5 dBm)
MCS15 40 MHz: Typ. 12 dBm (± 1.5 dBm)
802.11g/n (20/40 MHz):
MCS15 20 MHz: Typ. 14 dBm (± 1.5 dBm)
MCS15 40 MHz: Typ. 13 dBm (± -1.5 dBm)

RX Sensitivity:
802.11b:
-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
802.11g:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
802.11a:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps,
-80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps

RX Sensitivity MIMO:
802.11a/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz, -71 dBm @ MCS7 20 MHz
802.11g/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz,
-71 dBm @ MCS7 20 MHz

Protocol Support
General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface
Default Antenna: Dual-band omni-directional antenna, 5 dBi at 2.4 GHz, 2 dBi at 5 GHz, N-type (male)
Connector for External Antennas: N-type (male)
LAN Ports: 2, 10/100/1000BaseT(X), auto negotiation speed (RJ45-type)
Console Port: RS-232 (waterproof RJ45-type)

LED Indicators: PWR, FAULT, STATE, WLAN, LAN1, LAN2
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics
Housing: Metal, IP68 protection
Weight: 1.8 kg
Dimensions: 224 x 147.7 x 64.5 mm (8.82 x 5.82 x 2.54 in)
Installation: Wall mounting (standard), DIN-Rail mounting (optional), pole mounting (optional)

Environmental Limits
Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 100% (non-condensing)

Power Requirements
Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: M12 connector with A-coding
Reverse Polarity Protection: Present

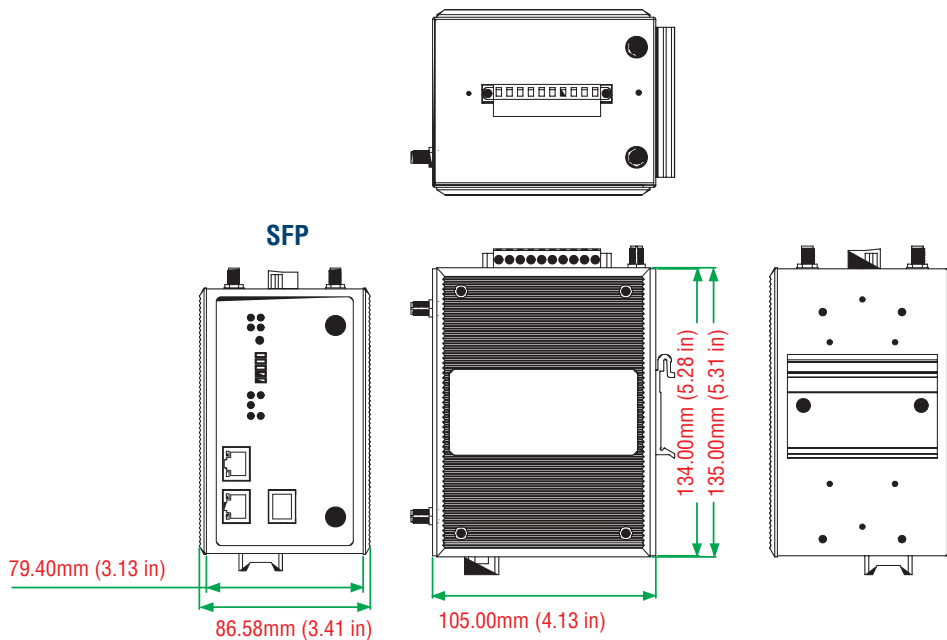### Regulatory Approvals
Safety: EN60950-1
Radio: EN300 328, EN301 893
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
Rail Traffic: EN50155 (Environmental, Pending), EN50121-1/-4 (Environmental, Pending)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

147.7 mm (5.82 in)

224.0 mm (8.82 in)

64.5 mm (2.54 in)
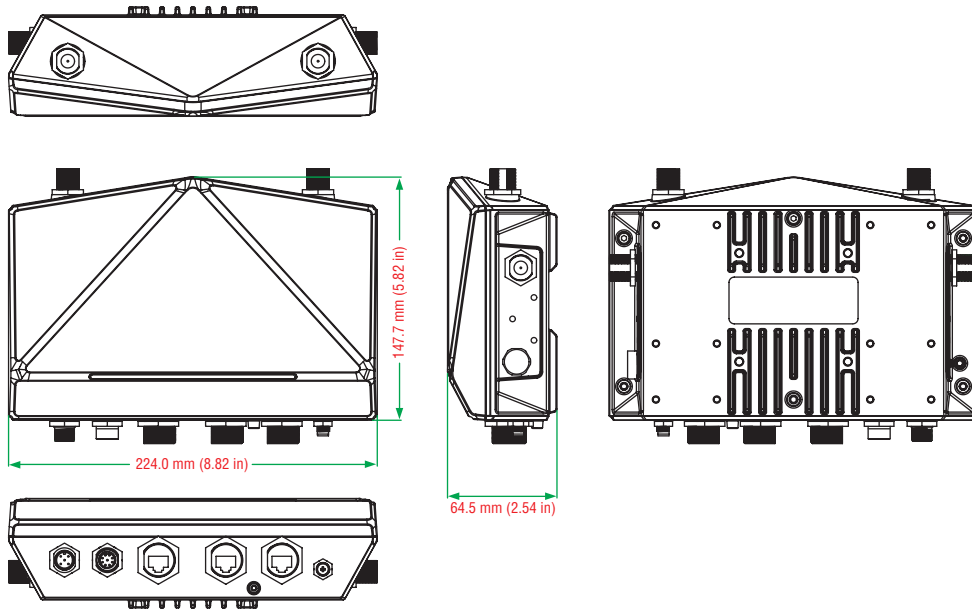
⋮ Ordering Information

Available Models
AWK-4132-T: IEEE 802.11a/b/g/n wireless AP/Bridge/Client, -40 to 75°C operating temperature

AWK-4121

Industrial IEEE 802.11a/b/g outdoor wireless AP/Bridge/Client

Turbo Roaming
Seamless Wireless Connection

> IEEE 802.11a/b/g compliant
> Redundant power inputs and PoE
> Multi-SSID and VLAN support
> Turbo Roaming for seamless wireless connections
> Long-distance communication support
> Qos (WMM) support

Introduction

The AWK-4121 outdoor wireless AP/Bridge/Client is an ideal 3-in-1 solution for industrial applications that are hard to wire, too expensive to wire, or use mobile equipment that connects to a TCP/IP network. The AWK-4121 can operate at temperatures ranging from -40 to 75°C, and its dust-tight and weatherproof design is IP68-rated and allows you to set up a WLAN, or extend existing wired networks to outdoor locations. In addition, the AWK-4121 is equipped with detachable antennas to give you the flexibility of choosing your own special-purpose antennas. The AWK-4121's two redundant DC power inputs increases the reliability of the power supply, and can be powered via PoE for easier deployment.

Ruggedized Design for Critical Environments

• IP68-rated metal housing
• Waterproof and dust-tight RJ45 connectors
• Hardened mounting kit for flexible outdoor installation

Specifications for Industrial-grade Applications

• Turbo Roaming for rapid handover during client roaming
• Long-distance data transmission over 10 km
• Integrated DI/DO for on-site monitoring and warning
• Status LED indicators for on-site monitoring and diagnosis

Specifications

WLAN Interface
Standards:
IEEE 802.11a/b/g/h for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3u for 10/100BaseT(X)
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)
JP:
2.412 to 2.472 GHz (13 channels, OFDM)
2.412 to 2.484 GHz (14 channels, DSSS)
5.18 to 5.24 GHz (4 channels for W52)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA /WPA2 Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power (for hardware revision 1.1):
802.11b:
Typ. 23±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
802.11a:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity (for hardware revision 1.1):
802.11b:
-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps
802.11g:
-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps
802.11a:
-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

TX Transmit Power (for hardware revision 1.0):
802.11b:
Typ. 18±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps
802.11a:
Typ. 16±1.5 dBm @ 6 to 24 Mbps, Typ. 14±1.5 dBm @ 36 to 48 Mbps, Typ. 13±1.5 dBm @ 54 Mbps

RX Sensitivity (for hardware revision 1.0):
802.11b:
-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
802.11g:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
802.11a:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface

Default Antenna: Dual-band omni-directional antenna, 5 dBi at 2.4 GHz, 2 dBi at 5 GHz, N-type (male)
Connector for External Antennas: N-type (female)
LAN Ports: 1, 10/100BaseT(X), auto negotiation speed (waterproof RJ45-type)
Console Port: RS-232 (waterproof RJ45-type)
LED Indicators: PWR, FAULT, STATE, WLAN, LAN
Alarm Contact (digital output, M12 connector): 1 relay output with current carrying capacity of 1 A @ 24 VDC

Digital Inputs (M12 connector): 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics

Housing: Metal, IP68 protection
Weight: 1.5 kg
Dimensions: 224 x 147.7 x 64.5 mm (8.82 x 5.82 x 2.54 in)
Installation: Wall mounting (standard), DIN-Rail mounting (optional), pole mounting (optional)

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 100% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: M12 connector with A-coding
Power Consumption:
• 0.121 to 0.494 A @ 12 to 48 VDC
• 0.3 A @ 24 VDC
Reverse Polarity Protection: Present

Regulatory Approvals

Safety: EN60950-1, UL60950-1
Radio: EN300 328, EN301 893, ARIB STD-33/T66/T71 (Japan)
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
Transportation: EN50155 (Environmental), EN50121-1/-4 (Environmental), Directive 72/245/EEC (for e/E-mark)
**Hazardous Location:** UL/cUL Class I, Div. 2; ATEX Class I, Zone 2 (pending)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

147.7 mm (5.82 in)
224.0 mm (8.82 in)
64.5 mm (2.54 in)
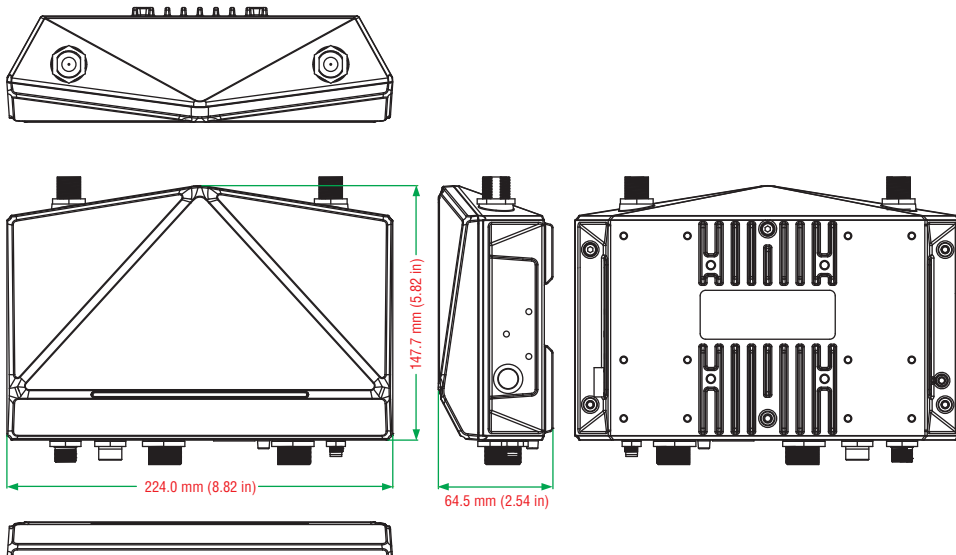
⋮ Ordering Information

Available Models

AWK-4121-T: IEEE 802.11a/b/g outdoor wireless AP/Bridge/Client, -40 to 75°C operating temperature
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.
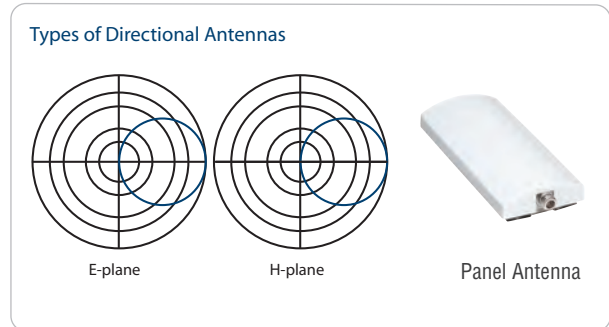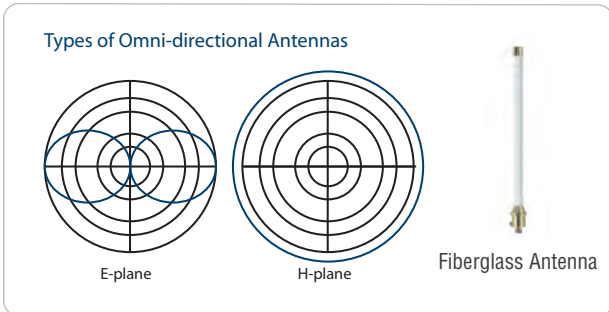
AWK-3132 Series

Industrial IEEE 802.11a/b/g/n wireless AP/Bridge/Client ─

> IEEE 802.11a/b/g/n compliant
> Gigabit Ethernet support
> Dual 24 VDC power inputs or Power-over-Ethernet
> Multi-SSID and VLAN support
> QoS (WMM) support
> -40 to 75°C operating temperature range (T model)

CE FC

: Introduction

The AWK-3132 industrial a/b/g/n outdoor wireless AP/Bridge/Client products are ideal wireless solutions for hard-to-wire applications that use mobile equipment connected over a TCP/IP network. The AWK-3132 provides faster and wider range transmission compared with 802.11g products and exhibits a noticeably stronger connection at longer distances. The AWK-3132 is rated to operate at temperatures ranging from 0 to 60°C for standard models and -40 to 75°C for wide temperature models, and is rugged enough for any harsh industrial environment. Installation is easy, with either DIN-rail mounting or distribution boxes, and the DIN-Rail mounting capability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3132 a convenient yet reliable solution for any industrial wireless application.

: Specifications

WLAN Interface
Standards:
IEEE 802.11a/b/g/n for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps
• 802.11n: 64QAM @ 300 to BPSK @ 6.5 Mbps (multiple rates supported)

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n: 6 to 300 Mbps (multiple rates supported)

TX Transmit Power:
802.11b:
1 to 11 Mbps: Typ. 18 dBm (± 1.5 dBm)
802.11g:
6 to 24 Mbps: Typ. 18 dBm (± 1.5 dBm)
36 to 48 Mbps: Typ. 17 dBm (± 1.5 dBm)
54 Mbps: Typ. 15 dBm (± 1.5 dBm)
802.11a:
6 to 24 Mbps: Typ. 17 dBm (± 1.5 dBm)
36 to 48 Mbps: Typ. 16 dBm (± 1.5 dBm)
54 Mbps: Typ. 14 dBm (± 1.5 dBm)

TX Transmit Power MIMO:
802.11a/n (20/40 MHz):
MCS15 20 MHz: Typ. 13 dBm (± 1.5 dBm)
MCS15 40 MHz: Typ. 12 dBm (± 1.5 dBm)
802.11g/n (20/40 MHz):
MCS15 20 MHz: Typ. 14 dBm (± 1.5 dBm)
MCS15 40 MHz: Typ. 13 dBm (± -1.5 dBm)

RX Sensitivity:
802.11b:
-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
802.11g:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
802.11a:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps,
-80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps

RX Sensitivity MIMO:
802.11a/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz, -71 dBm @ MCS7 20 MHz
802.11g/n:
-68 dBm @ MCS15 40 MHz, -70 dBm @ MCS7 40 MHz, -69 dBm @ MCS15 20 MHz,
-71 dBm @ MCS7 20 MHz

Protocol Support
General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface
Default Antenna: 2 dBi dual-band omni-directional antenna, RP-SMA (male)
Connector for External Antennas: RP-SMA (female)
LAN Ports: 2, 10/100/1000BaseT(X), auto negotiation speed (RJ45-type)
Console for External Antenna: RS-232 (RJ45-type)
LED Indicators: PWR1, PWR2, PoE, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M, and 1000M LAN1/LAN2
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics
Housing: Metal, IP30 protection
Weight: 1.3 kg
Dimensions: 86.58 x 135 x 105 mm (3.41 x 5.31 x 4.13 in)
Installation: DIN-Rail mounting (standard), wall mounting (optional)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 95% (non-condensing)

Power Requirements
Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: 10-pin removable terminal block
Reverse Polarity Protection: Present

Regulatory Approvals
Safety: EN60950-1
Radio: EN300 328, EN301 893
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
Rail Traffic: EN50155 (Environmental, Pending), EN50121-1/-4 (Environmental, Pending)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

SFP

79.40mm (3.13 in)
86.58mm (3.41 in)
105.00mm (4.13 in)
134.00mm (5.28 in)
135.00mm (5.31 in)

⦂ Ordering Information

Available Models
AWK-3132: IEEE 802.11a/b/g/n wireless AP/Bridge/Client, 0 to 60°C operating temperature
AWK-3132-T: IEEE 802.11a/b/g/n wireless AP/Bridge/Client, -40 to 75°C operating temperature

AWK-3121 Series

Industrial IEEE 802.11a/b/g wireless AP/Bridge/Client

> IEEE 802.11a/b/g compliant
> Power input by redundant 24 VDC power inputs or Power-over-Ethernet
> Multi-SSID and VLAN support
> Turbo Roaming for seamless wireless connections
> Long-distance communication support
> QoS (WMM) support
> -40 to 75°C operating temperature range (-T model)

: Introduction

Are your industrial applications hard to wire, or are your wiring costs out of control? Are you already using mobile equipment that connects over an IP network? If so, then what you need is the AWK-3121 Access-Point/Bridge/Client. The AWK-3121 is rated to operate at temperatures ranging from 0 to 60°C for standard models and -40 to 75°C for wide temperature models, and is rugged enough for any harsh industrial environment. Installation is easy, with either DIN-Rail mounting or distribution boxes. The DIN-Rail mounting capability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121 a convenient yet reliable solution for any industrial wireless application.

Advanced Security
• 64-bit and 128-bit WEP (Wired Equivalent Privacy)
• Enable/disable SSID broadcasts
• WPA/WPA2 (Wi-Fi Protected Access) and 802.11i support
• IEEE802.1X/RADIUS support
• Powerful filters for access control

Specifications for Industrial-grade Applications
• Turbo Roaming for rapid handover during client roaming
• Long-distance data transmission over 10 km
• Integrated DI/DO for on-site monitoring and warning
• Signal strength LEDs for easy deployment and antenna alignment

: Specifications

WLAN Interface
Standards:
IEEE 802.11a/b/g/h for Wireless LAN
IEEE 802.11i for Wireless Security
IEEE 802.3u for 10/100BaseT(X)
IEEE 802.3af for Power-over-Ethernet
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q VLAN

Spread Spectrum and Modulation (typical):
• DSSS with DBPSK, DQPSK, CCK
• OFDM with BPSK, QPSK, 16QAM, 64QAM
• 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps,
   DBPSK @ 11 Mbps
• 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps,
   QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

Operating Channels (central frequency):
US:
2.412 to 2.462 GHz (11 channels)
5.18 to 5.24 GHz (4 channels)
EU:
2.412 to 2.472 GHz (13 channels)
5.18 to 5.24 GHz (4 channels)
JP:
2.412 to 2.472 GHz (13 channels, OFDM)
2.412 to 2.484 GHz (14 channels, DSSS)
5.18 to 5.24 GHz (4 channels for W52)

Security:
• SSID broadcast enable/disable
• Firewall for MAC/IP/Protocol/Port-based filtering
• 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)

Transmission Rates:
802.11b: 1, 2, 5.5, 11 Mbps
802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power (for hardware revision 1.2):
802.11b:
Typ. 23±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps,
Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
802.11a:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48
Mbps, Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity (for hardware revision 1.2):
802.11b:
-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90
dBm @ 11 Mbps
802.11g:
-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88
dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76
dBm @ 48 Mbps, -74 dBm @ 54 Mbps
802.11a:
-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85
dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75
dBm @ 48 Mbps, -74 dBm @ 54 Mbps

TX Transmit Power (for hardware revisions 1.0 and 1.1):
802.11b:
Typ. 18±1.5 dBm @ 1 to 11 Mbps
802.11g:
Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps
802.11a:
Typ. 16±1.5 dBm @ 6 to 24 Mbps, Typ. 14±1.5 dBm @ 36 to 48 Mbps, Typ. 13±1.5 dBm @ 54 Mbps

RX Sensitivity (for hardware revisions 1.0 and 1.1):
802.11b:
-92 dBm @ 1 Mbps, -90 dBm @ 2 Mbps, -88 dBm @ 5.5 Mbps, -84 dBm @ 11 Mbps
802.11g:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps
802.11a:
-87 dBm @ 6 Mbps, -86 dBm @ 9 Mbps, -85 dBm @ 12 Mbps, -82 dBm @ 18 Mbps, -80 dBm @ 24 Mbps, -76 dBm @ 36 Mbps, -72 dBm @ 48 Mbps, -70 dBm @ 54 Mbps

Protocol Support

General Protocols: Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols: ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface

Default Antenna: 2 dBi dual-band omni-directional antenna, RP-SMA (male)
Connector for External Antennas: RP-SMA (female)
LAN Ports: 1, 10/100BaseT(X), auto negotiation speed (RJ45-type)
Console for External Antenna: RS-232 (RJ45-type)
LED Indicators: PWR1, PWR2, PoE, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1"
• +3 to -30 V for state "0"
• Max. input current: 8 mA

Physical Characteristics

Housing: Metal, providing IP30 protection
Weight: 850 g
Dimensions: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5% to 95% (non-condensing)

Power Requirements

Input Voltage: 12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet (IEEE 802.3af compliant)
Connector: 10-pin removable terminal block
Power Consumption:
• 0.121 to 0.494 A @ 12 to 48 VDC
• 0.3 A @ 24 VDC
Reverse Polarity Protection: Present

Regulatory Approvals

Safety: EN60950-1, UL60950-1
Radio: EN300 328, EN301 893, ARIB STD-33/T66/T71 (Japan)
EMC: EN301 489-1/-17, FCC Part 15, EN55022/55024, IEC61000-6-2/-4
Transportation: EN50155 (Environmental), EN50121-1/-4 (Environmental), Directive 72/245/EEC (for e/E-mark)
Hazardous Location: UL/cUL Class I, Div. 2; ATEX Class I, Zone 2
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

97 [3,82in]
45,8 [1,80in]
52,85 [2,08in]
134 [5,28in]
135 [5,31in]
151,85 [5,98in]
105 [4,13in]
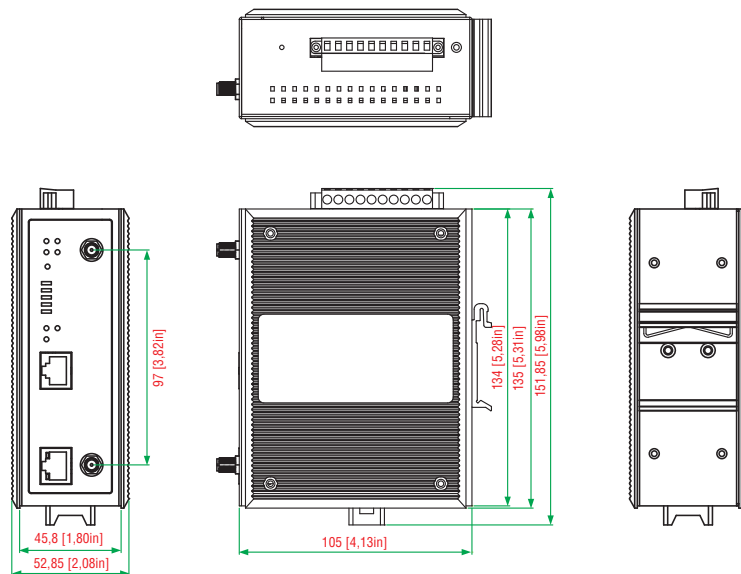
: Ordering Information

Available Models

AWK-3121: IEEE 802.11a/b/g wireless AP/Bridge/Client, 0 to 60°C operating temperature
AWK-3121-T: IEEE 802.11a/b/g wireless AP/Bridge/Client, -40 to 75°C operating temperature
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

Wireless Antennas and Accessories

There are two basic types of antennas for WLAN and cellular products: Omni-directional and directional. The two types are categorized by the direction in which they beam radio signals.

Omni-directional

Omni-directional antennas are designed to radiate signals equally in all directions. Use this type of antenna if you need to transmit from a central node, such as an access point, to users scattered all around the area.

Directional

Directional antennas provide a more focused signal than omni-directional antennas. Signals are typically transmitted in an oval-shaped pattern with a beam width of only a few degrees. With higher gain, directional antennas can also be used outdoors to extend point-to-point links over a longer transmission distance, or to form a point-to-multipoint network.

Types of Omni-directional Antennas

E-plane

H-plane

Fiberglass Antenna

Types of Directional Antennas

E-plane

H-plane

Panel Antenna

: Antenna Connectors

Before you purchase an antenna for your wireless device, you should check the type of antenna connector that your device uses. You will need to buy an antenna with a matching connector. There are several types of antenna connectors, including MCX, TNC, N-type, SMA, and

RP-SMA (RP stands for "reverse polarity" or "reverse ping"). On WLAN devices, the most commonly used antenna connector is PR-SMA and N-type for IEEE 802.11 wireless applications. Make sure you are buying an antenna with the right connector type.

N-type (male)　　N-type (female)　　RP-SMA (female)　　RP-SMA (male)　　SMA (female)　　SMA (male)

: More Information about Antennas and Power Control

If you are planning to extend the range or widen the coverage of your wireless connection, then you may need to use external high-gain antennas for your access points. In addition to the antenna type and gain, there are a few other specifications that you should consider.

Frequency Range

The most important parameter of an antenna is its working frequency. If you use a 2.4G antenna for IEEE 802.11a applications, you will find that the signal is too weak and the data rate falls back to a very low level. Be sure to use the right antenna for your planned working frequency.

Half-power Beam Width (HPBW)

This parameter is measured from the antenna's radiation pattern, and refers to the beam width at which the antenna's radiation drops to half of its peak value. It also refers to the antenna's effective coverage area. Once you get outside the half-power beam width, the signal typically drops off very quickly. A very high-gain antenna has a very narrow-angled half-power beam width, which makes the directionality high as well.

Antenna Polarity

Polarization refers to the direction in which the electromagnetic field lines point as energy radiates away from the antenna. The simplest and most common type is linear polarization. When power is sent from

transmitter to receiver, only that portion of the beam with the same polarization can be received. An improper antenna installation may decrease performance.

Equivalent Isotropically Radiated Power (EIRP)

The EIRP value is defined as the power transmitted by a theoretical isotropic antenna that distributes power evenly in all directions and emits and produces the peak power density observed in the direction of maximum antenna gain. The government makes radiation/telecommunication regulations and controls the EIRP of radio devices. You must ensure that your wireless system does not exceed legal EIRP values. The EIRP value is also used to estimate the service area of the transmitter and to coordinate transmitters on the same frequency so that their coverage areas do not overlap. EIRP is calculated by measuring the power of the transmitter, losses in transmission lines and connectors, and the gain of the antenna. The unit used for EIRP and transmitter power is dBm, cable loss is measured in dB, and antenna gain is expressed in dBi, relative to a (theoretical) isotropic reference antenna.

5

Industrial Wireless IEEE 802.11 Solutions ∨ Wireless Antennas and Accessories

Wireless Antenna Selection Guide

	IEEE 802.11b/g 2.4 GHz Wireless Antennas				IEEE 802.11a/b/g 2.4/5 GHz Dual-band Antennas		
Model Name	ANT-WSB-AHRM-05-1.5m	ANT-WSB-ANF-09	ANT-WSB-PNF-12	ANT-WSB-PNF-18	ANT-WDB-ANM-0502	ANT-WDB-ANM-0407	ANT-WDB-ANF-0407
Frequency Range	2.4 to 2.5 GHz	2.4 to 2.5 GHz	2.4 to 2.5 GHz	2.4 to 2.5 GHz	2.4 to 2.5 or 5.1 to 5.9 GHz	2.4 to 2.5 or 5.1 to 5.9 GHz	2.4 to 2.5 or 5.1 to 5.9 GHz
Antenna Type	/4 Dipole	Omni-directional	Directional, Panel	Directional, Panel	Omni-directional	Omni-directional	Omni-directional
Typical Antenna Gain	5 dBi	9 dBi	12 dBi	18 dBi	2/5 dBi	4/7 dBi	4/7 dBi
Description	2.4 GHz, omni-directional/dipole antenna, 5 dBi	2.4GHz, Omni-directional antenna, 9 dBi, N-type (female)	2.4 GHz, panel antenna, 12 dBi, N-type (female)	2.4 GHz, panel antenna, 18 dBi, N-type (female)	2.4 GHz, omni-directional antenna, 5 dBi, N-type (male)	2.4/5 GHz, dual-band omni-directional antenna, 4/7 dBi, N-type (male)	2.4/5 GHz, dual-band omni-directional antenna, 4/7 dBi, N-type (female)
Impedance	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms
Polarization	Vertical	Linear	Linear	Linear	Linear	Linear	Linear
HPBW/Horizontal	360°	360°	50°	30°	360°	360°	360°
HPBW/Vertical	–	10°	30°	20°	65°	10/8°	10/8°
V.S.W.R.	2.0	1 : 1.3 Max.	1 : 1.5 Max.	1 : 1.5 Max.	1 : 2.0 Max.	1 : 1.5 Max.	1 : 1.5 Max.
Power Handling	–	15 W Max.	10 W Max.	15 W Max.	2 W Max.	10 W Max.	10 W Max.
Connector(s)	RP-SMA (male)	N-type (female)	N-type (female)	N-type (female)	N-type (male)	N-type (male)	N-type (female)
Operating Temperature	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C
IP rating	–	IP65	IP65	IP65	IP67	IP65	IP65
Antenna Profile	–	420 mm length	215 x 90 x 30 mm	270 x 205 x 15 mm	220 mm length	220 mm length	260 mm length
Weight	300 g	430 g	560 g	310 g	72 g	115g	155 g
Related Products	AWK-5222 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series

	IEEE 802.11a/b/g 2.4/5 GHz Dual-band Antennas			IEEE 802.11a 5 GHz Wireless Antennas	
Model Name	ANT-WDB-ANM-0609	ANT-WDB-ANF-0609	ANT-WDB-PNF-1518	ANT-WSB5-ANF-12	ANT-WSB5-PNF-18
Frequency Range	2.4 to 2.5 or 5.1 to 5.9 GHz	2.4 to 2.5 or 5.1 to 5.9 GHz	2.4 to 2.5 / 5.1 to 5.9 GHz	5.1 to 5.9 GHz	5.1 to 5.9 GHz
Antenna Type	Omni-directional	Omni-directional	Directional, Panel	Omni-directional	Directional, Panel
Typical Antenna Gain	6/9 dBi	6/9 dBi	15/18 dBi	12 dBi	18 dBi
Description	2.4/5 GHz, dual-band omni-directional antenna, 6/9 dBi, N-type (male)	2.4/5 GHz, dual-band omni-directional antenna, 6/9 dBi, N-type (female)	2.4/5 GHz, dual-band panel antenna, 15/18 dBi, N-type (female)	5 GHz, omni-directional antenna, 12 dBi, N-type (female)	5 GHz, panel antenna, 18 dBi, N-type (female)
Impedance	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms	50 ± 5 ohms
Polarization	Linear	Linear	Linear	Linear	Linear
HPBW/Horizontal	360°	360°	50/10°	360°	10°
HPBW/Vertical	10/8°	10/8°	30/10°	6°	10°
V.S.W.R.	1 : 1.5 Max.	1 : 1.5 Max.	1 : 1.5 Max.	1 : 1.3 Max.	1 : 1.5 Max.
Power Handling	10 W Max.	10 W Max.	20 W Max.	10 W Max.	10 W Max.
Connector(s)	N-type (male)	N-type (female)	N-type (female)	N-type (female)	N-type (female)
Operating Temperature	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C	-40 to 80°C
IP rating	IP65	IP65	IP65	IP65	IP65
Antenna Profile	632 mm length	660 mm length	270 x 205 x 15 mm	420 mm length	270 x 205 x 15 mm
Weight	238 g	286 g	1020±10 g	430 g	990 g
Related Products	AWK-4121 series, AWK-6222 series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series	AWK-6222 series, AWK-5222 series, AWK-4121 series, AWK-3121 series, NPort W2150/2250 Plus, NPort W2004 Series

Wireless Accessories Selection Guide

Cables

Model Name	CRF-N0117SA-3M	CRF-N0429N-3M	A-CRF-NMNM-LL4-300	A-CRF-NMNM-LL4-600	A-CRF-NMNM-LL4-900	A-CRF-RMNM-L1-300	A-CRF-RMNM-L1-600	A-CRF-RMNM-L1-900	A-CRF-RFRM-S1-060
Description	CFD200 cable, N-type (male) to RP SMA (male), 3 m	CFD400 cable, N-type (male) to N-type (male), 3 m	LMR-400 Lite cable, N-type (male) to N-type (male), 3 m	LMR-400 LITE cable, N-type (male) to N-type (male), 6 m	LMR-400 LITE cable, N-type (male) to N-type (male), 9 m	LMR-195 Lite cable, N-type (male) to RP SMA (male), 3 m	LMR-195 Lite cable, N-type (male) to RP SMA (male), 6 m	LMR-195 Lite cable, N-type (male) to RP SMA (male), 9 m	S141 cable, RP-SMA (male) to RP-SMA (female), 0.6 m
Cable Type	CFD200	CFD400	LMR-400Lite	LMR-400 Lite	LMR-400 Lite	LMR-195 Lite	LMR-195 Lite	LMR-195 Lite	S141
Connector Type	N-type male to RP SMA male	N-type male to N-type male	N-type male to N-type male	N-type male to N-type male	N-type male to N-type male	N-type Male To RP SMA Male	N-type male To RP SMA male	N-type male To RP SMA male	RP-SMA male to RP-SMA female
Cable Length	3 m	3 m	3 m	6 m	9 m	3 m	6 m	9 m	0.6 m
Outer Dimension	5 mm	10.3 mm	10.29 mm	10.29 mm	10.29 mm	4.95 mm	4.95 mm	4.95 mm	5 mm
Min. Bend Radius	12.7 mm	24.5 mm	25.4 mm	25.4 mm	25.4 mm	12.7 mm	12.7 mm	12.7 mm	12.7 mm
Attenuation	55.4@2500 MHz 86.5@5800 MHz	22.2@2500 MHz 35.5@5800 MHz	22.2@2500 MHz 35.5@5800 MHz	22.2@2500 MHz 35.5@5800 MHz	22.2@2500 MHz 35.5@5800 MHz	62.4@2500 MHz 98.1@5800 MHz	62.4@2500 MHz 98.1@5800 MHz	62.4@2500 MHz 98.1@5800 MHz	75.4@3000 MHz 98.4@5000 MHz
Related Accessories	• IEEE 802.11 N-type antenna • Power amplifier	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	IEEE 802.11 N-type antenna	Power amplifier
Related Products	AWK-3121 series, AWK-5222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-3121 series, AWK-5222 series	AWK-3121 series, AWK-5222 series	AWK-3121 series, AWK-5222 series	AWK-3121 series, AWK-5222 series

Caps

Model Name	A-CAP-M12M-M	A-CAP-M12F-M	A-CAP-N-M	A-CAP-WPRJ45-MC
Description	Metal cap to cover M12-male connector	Metal cap to cover M12-female connector	Metal cap to cover N-type connector	Metal cap with chain for RJ45 connector
Related Products	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series

Connectors

Model Name	CBL-M12(FF5P)/Open-100 IP67	M12A-5P-IP68	M12A-8PMM-IP68	A-PLG-WPRJ
Description	M12 to 5-pin power cable with 5-pin A-coded M12 connector	Field-installation A-coded M12 screw-in 5-pin connector, female connector female pins	Field-installation A-coded M12 screw-in 8-pin connector, male connector male PIN	Field-installation RJ-type plug
Cable Length	1 m	–	–	–
Related Products	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series	AWK-4121 series, AWK-6222 series

5

Industrial Wireless IEEE 802.11 Solutions > Wireless Accessories Selection Guide

Mounting Kits					
Model Name	DK-DC50131	WK-HA1002SU	WK-55	PK-DC2DOF	WK-51-01
Description	Din-Rail mounting kit, 50 x 131 mm	Swivel mounting kit with 90° horizontal range and 40° vertical range	Wall mounting kit, 55 mm high	Pole mounting kit	Wall mounting kit, 55 mm wide
Related Products	AWK-4121 series	ANT-WSB-PNF-12	AWK-4121 series, AWK-6222 series	AWK-4121 series	AWK-3121 series, AWK-5222 series

Termination Resistors		
Model Name	A-TRM-50-NM	A-TRM-50-RM
Description	Termination resistor, 50 ohms, N-type male	Termination resistor, 50 ohms, RP-SMA male
Related Products	AWK-4121	AWK-3121 series, AWK-5222 series

Power Amplifiers		
Model Name	A-WPA-2410gM-IDU	A-WPA-5410gM-IDU
Description	Wireless power amplifier	Wireless power amplifier
Signal Type	2.4 GHz band antenna (included)	5 GHz band antenna (included)
Connector Type	RP-SMA connector	RP-SMA connector
Power Output	1 W	1 W
Power Consumption	12 VDC	12 VDC
Power Cable	Power plug to power jack cable (included)	Power plug to power jack cable (included)
Dimensions	92 x 60 x 31 mm	92 x 60 x 31 mm
Related Accessories	- N-type male to RP SMA male cable - RP-SMA male to RP-SMA female cable	- N-type male to RP SMA male cable - RP-SMA male to RP-SMA female cable
Related Products	AWK-3121 series, AWK-5222 series	AWK-3121 series, AWK-5222 series

Arrestor	
Model Name	A-SA-NMNF-01
Frequency	0-6 GHz
Connector Type	N-type female to N-type male
Related Products	AWK-3121 series, AWK-4121 series, AWK-5222 series, AWK-6222 series

Industrial Cellular Solutions

6

Industrial Cellular Solutions

Cellular Routers and Cellular IP Gateways

	OnCell 5004-HSDPA 5004-HSDPA-JPS	OnCell 5104-HSDPA 5104-HSDPA-JPS	OnCell 5004	OnCell 5104	OnCell G3110-HSDPA G3110-HSDPA-JPS	OnCell G3150-HSDPA G3150-HSDPA-JPS	OnCell G3110	OnCell G3150
Cellular Interface								
Standards	GSM/GPRS/EDGE/UMTS/HSDPA		GSM/GPRS		GSM/GPRS/EDGE/UMTS/HSDPA		GSM/GPRS/EDGE	
Tri-band Options	850/1900/2100 MHz		–	–	850/1900/2100 MHz		–	–
Quad-band Options	850/900/1800/1900 MHz							
EDGE Multi-slot	Class 10	Class 10	–	–	Class 10	Class 10	Class 12	Class 12
EDGE Terminal Device	Class B	Class B	–	–	Class B	Class B	Class B	Class B
GPRS Multi-slot	Class 10	Class 10	Class 10	Class 10	Class 10	Class 10	Class 12	Class 12
GPRS Terminal Device	Class B	Class B	Class B	Class B	Class B	Class B	Class B	Class B
GPRS Coding Schemes	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4
Operator Network	OnCell 5004/5104-HSDPA: Most countries OnCell 5004/5104-HSDPA-JPS: Japan Softbank		–	–	OnCell G3110/G3150-HSDPA: Most countries OnCell G3110/G3150-HSDPA-JPS: Japan Softbank		–	–
WAN Interface								
Number of Ports	1	1	1	1	–	–	–	–
Ethernet	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	–	–	–	–
LAN Interface								
Number of Ports	4	4	4	4	1	1	1	1
Ethernet	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)	10/100M (RJ45)
SIM Interface								
Number of SIMs	2	2	2	2	1	1	1	1
SIM Control	3 V	3 V	3 V	3 V	3 V	3 V	3 V	3 V
Serial Interface								
Number of Ports	–	–	–	–	1	1	1	1
Serial Standards	–	–	–	–	RS-232	RS-232/422/485	RS-232	RS-232/422/485
Connector	–	–	–	–	DB9-M	DB9-M and TB	DB9-M	DB9-M and TB
Serial Parameters	–	–	–	–	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark			
Flow Control	–	–	–	–	RTS/CTS, XON/XOFF			
Baudrate	–	–	–	–	50 bps to 921.6 Kbps			
I/O Interface								
Alarm Contacts	–	1	–	1	1	1	1	1
Digital Inputs	–	2	–	2	2	2	2	2
Software								
Network Protocols	UDP/TCP, SNTP, ICMP, DDNS, DHCP/BOOTP, PPPoE, PPP, DNS Relay, HTTPS, Telnet, IPSec				ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, SMTP, HTTPS, SNTP, ARP, SSL, IPSec			
Router/Firewall	NAT, port forwarding, routing				NAT, port forwarding			
Authentication	Local user-name and password				Local user-name and password			
Security	IP filtering				Accessible IP list			
Operation Modes	–	–	–	–	Real COM, Secure Real COM, TCP Server, Secure TCP Server, TCP Client, Secure TCP Client, UDP, RFC2217, Ethernet Modem, SMS Tunnel			
Utilities	–	–	–	–	Provided for Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64 Edition			
Windows Real COM Drivers	–	–	–	–	Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server 2008, Windows XP/2003/Vista/Server 2008 x64 Edition			
Management Software								
OnCell Central	Centralized management solution for accessing private IPs from the Internet							
Physical Characteristics								
Housing	Aluminum (IP30)	Aluminum (IP30)	Aluminum (IP30)	Aluminum (IP30)	Aluminum (IP30)			
Weight	505±5 g	645±5 g	505±5 g	645±5 g	440±5 g			
Dimensions (mm)	158 x 103 x 34	160 x 103 x 50	158 x 103 x 34	160 x 103 x 50	28 x 126 x 93			
Environmental Limits								
Operating Temperature	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C
Operating Humidity	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Storage Temperature	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C
Power Requirements								
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Connector	1 TB, 1 power jack	2 TBs	1 TB, 1 power jack	2 TBs	2 TBs	2 TBs	2 TBs	2 TBs
Regulatory Approvals								
Safety	UL60950-1							
RF	FCC part22H, FCC PART24F, EN301 489-1, EN301 489-7, EN301 511							
EMC	CE (EN55022 Class A, EN55024); FCC part 15 subpart B Class A							
Reliability								
Warranty	5 years (see www.moxa.com/warranty)							

Cellular IP Modems and Cellular Modems

	OnCell G3111	OnCell G3151	OnCell G3211	OnCell G3251	OnCell G2100 OnCell G2100-T	OnCell G2150I
Cellular Interface						
Standards	GSM/GPRS	GSM/GPRS	GSM/GPRS	GSM/GPRS	GSM/GPRS	GSM/GPRS
Quad-band Options	850/900/1800/1900 MHz					
GPRS Multi-slot Class	Class 10	Class 10	Class 10	Class 10	Class 10	Class 10
GPRS Terminal Device Class	Class B	Class B	Class B	Class B	Class B	Class B
GPRS Coding Schemes	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4	CS1 to CS4
LAN Interface						
Number of Ports	1	1	1	1	–	–
Ethernet	10/100 Mbps (RJ45)	10/100 Mbps (RJ45)	10/100 Mbps (RJ45)	10/100 Mbps (RJ45)	–	–
SIM Interface						
Number of SIMs	1	1	1	1	1	1
SIM Control	3 V	3 V	3 V	3 V	3 V	3 V
Serial Interface						
Number of Ports	1	1	2	2	1	1
Serial Standards	RS-232	RS-232/422/485	RS-232	RS-232/422/485	RS-232	RS-232/422/485
Connector	DB9-M	DB9-M	DB9-M	DB9-M	DB9-F	DB9-F and 5-pin TB
2.5 KV Optical Isolation	–	–	–	–	–	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark				Data Bits: 7, 8; Stop Bits: 1, 2; Parity: None, Even, Odd, Space, Mark	
Flow Control	RTS/CTS, XON/XOFF				RTS/CTS	
Baudrate	50 bps to 921.6 Kbps				300 bps to 115.2 Kbps	
Software						
Network Protocols	ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, HTTPS, SMTP, SNTP, ARP				–	–
Router/Firewall	NAT, port forwarding					
Authentication	Local user-name and password				–	–
Security	Accessible IP list				–	–
Operation Modes	Real COM, TCP Server, TCP Client, UDP, SMS Tunnel, Reverse Real COM				–	–
Configuration and Management Options	SNMP MIB-II, v3, DDNS, IP Report, Web/Telnet/Serial Console, Serial Logging				–	–
Utilities	Provided for Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64				–	–
Windows Real COM Drivers	Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64				–	–
Management Software						
OnCell Central	Centralized management solution for accessing private IPs from the Internet				–	–
Physical Characteristics						
Housing	Aluminum (IP30)				ABS + PC (IP30)	
Weight	165±5 g		185±5 g		150 ± 5 g	
Dimensions	111 x 77 x 26 mm				27 x 123 x 79 mm	
Environmental Limits						
Operating Temperature	-30 to 55°C	-30 to 55°C	-30 to 55°C	-30 to 55°C	0 to 55°C or -30 to 75°C	0 to 55°C
Operating Humidity	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%	5 to 95%
Storage Temperature	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C	-40 to 75°C
Power Requirements						
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Connector	1 power jack	1 power jack	1 power jack	1 power jack	1 power jack	1 power jack
Regulatory Approvals						
Safety	UL60950-1					
RF	FCC part22H, FCC PART24F, EN301 489-1, EN301 489-7, EN301 511					
EMC	CE (EN55022 Class A, EN55024), FCC part 15 subpart B Class A					
Reliability						
Warranty	5 years (see www.moxa.com/warranty)					

6

Industrial Cellular Solutions > Product Selection Guides

Introduction to Industrial Cellular

The latest development in industrial device networking is the adoption of wireless technology for industrial applications. This is a very exciting development with potentially enormous benefits for system integrators and end users. However, many users may have questions about the different technologies that are available and how best to

adapt them to specific applications. Moxa provides a complete line of cellular solutions, including cellular modems, IP modems, IP gateways, and even cellular routers.

The following table gives a good overview of the different types of cellular products:

	Cellular Modem	Cellular IP Modem	Cellular IP Gateway	Cellular Router
How to Connect	AT command	TCP/IP	TCP/IP	TCP/IP
Serial Device Connection	Requires dial-up capability	Does not require dial-up capability	Does not require dial-up capability	Not supported
Ethernet Device Connection	Not supported	Supported	Supported	Supported
Expertise Level	Good knowledge of AT command protocols	Easy to use	Easy to use	Easy to use
Ethernet Protocols	Not supported	NAT, Port-forwarding	NAT, Port-forwarding	NAT, Port-forwarding, Routing
Modem on both Ends	Required (except GPRS)	Not required	Not required	Not required
Local Memory	-	✓	✓	✓
VPN	-	-	✓	✓

: Cellular Modems

Overview

In industrial networking applications, cellular modems are used to enable communication with serial devices over a cellular network. Cellular modems only run AT commands and lack dial-up capability. Since most serial devices used in industrial applications today also lack dial-up capability, cellular modems must use an intermediary device with dial-up capability, such as an IPC or embedded computer to connect serial devices to a cellular network. If you are using a serial

device that has dial-up capability, then you do not need an intermediary device and can connect it to the cellular modem directly. In addition, you must also know how to use AT commands to program a cellular modem and construct the network architecture. This requirement also contributes to the higher integration costs associated with using cellular modems compared to IP modems.

AT Commands

The OnCell G2100 supports the standard and extended Hayes* AT command (AT stands for "attention code"). These commands form an industry standard language used to communicate with the modem. The modem can switch between one of two modes. When in "data

mode," the modem treats everything it receives from the intelligent device as data, and then sends it across the cellular network. When in "command mode," data is interpreted as commands to the local modem.

SMS Tunnel Mode

A major benefit of GSM technology is its support of short messages (SMS) for easy communication over the mobile network. With Moxa's SMS Tunnel Mode, the OnCell G2100 modems allow users to expand applications at little or no extra cost. For example, SMS Tunnel Mode can be used to update the message on a highway display panel, place refill orders for vending machines, handle maintenance for remote rental equipment, or even help create an SMS alarm by directly transforming the text, binary, or unicode data from a legacy device to short message format, without using AT Commands. SMS Tunnel Mode is particularly suitable for devices that communicate infrequently or do not have access to the local network. Although SMS Tunnel Mode converts both ASCII and binary data to short messages transparently, a caller ID (phone number identification) design has been implemented to block messages sent from uncertified users, system broadcasts, and commercial SMS advertisements
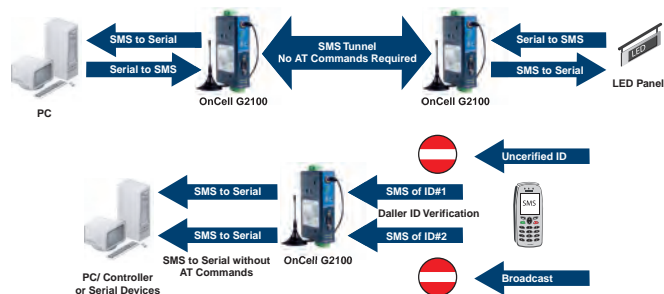
: Cellular IP Modems

Reverse Real COM Mode

Reverse Real COM mode uses a mechanism similar to port mapping to enable remote devices that are using a private IP address to remain accessible to external hosts. When this mode is enabled, the Moxa driver that comes with the device establishes a transparent connection from the device to the remote host by mapping the device's serial port to a local COM port on the remote host. Reverse Real COM mode supports up to 2 simultaneous connections that enable serial devices to send data to 2 hosts simultaneously.

Wireless carrier

Internet

Host
COM4=MAC add.
Moxa's Driver

Device
RS-232/422/485

1. Send a request for connection
2. Transparent TCP connection established

6

Industrial Cellular Solutions > Introduction to Industrial Cellular
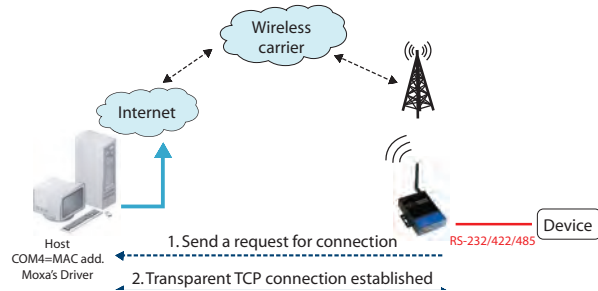
Types of Reverse Real COM Connection

1. Reverse Real COM to a PC's IP address
Most cellular service providers only provide customers with a dynamic private IP address, which means that the OnCell G3100 will only obtain an IP address once it is connected to the cellular network. Reverse Real COM is a great feature that allows a PC host to access an OnCell G3100 configured with a private IP address.

2. Reverse Real COM to a PC's domain name
With Reverse Real COM mode, you can connect to a PC host using the PC's IP address. You can also connect to your PC host with the PC's domain name (provided you have one).

data
IP address
data

Any IP
Cellular Network
Fixed public IP

data
Domain name
data

Any IP
Cellular Network
Domain Name
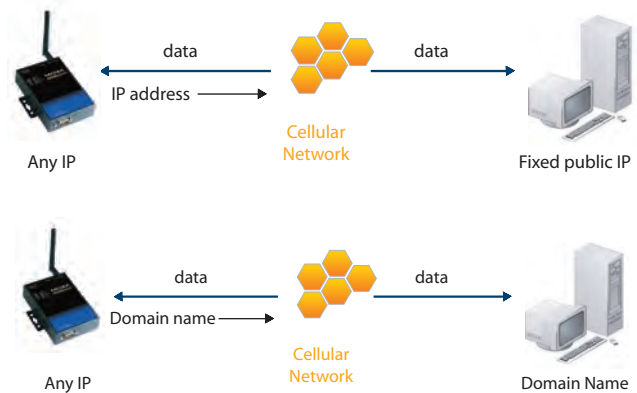
Choice of Connection Type

The OnCell G3100 supports three types of connection mode for GSM/GPRS/EDGE communication: (1) Always ON, (2) Inactivity Timeout, and (3) Remote Host Recovered. These connection modes provide users with more connection options for GSM/GPRS/EDGE, and have the potential to reduce the total cost of applications. The GPRS "Always ON" mode maintains connectivity between the OnCell G3100 and the remote device. That is, it enables a fail-safe mechanism that re-establishes the connection when the remote device is down.

Moreover, if the "Inactivity Timeout" mode is enabled, the connection will disconnect if data has not been transmitted between the serial device and cellular network during a user-specified time period, or the remote Ethernet host crashes. The OnCell 3100 will keep pinging the remote host over the Ethernet every 3 seconds after powering on. After failing to connect 5 times in a row, the data from the serial device will be sent through the GSM connection.

: Cellular Modems vs. Cellular IP Modems

Cellular modems and cellular IP modems are vital components in industrial cellular machine-to-machine (M2M) networking. However, it may be difficult to differentiate between these two devices based

on their names alone. The following pictures illustrate the differences between a cellular modem and a cellular IP modem to help you decide which device is most appropriate for your application.

Cellular Modem

An Intermediary device with dail-up capability is required to connect a serial device that LACKS dial-up capability
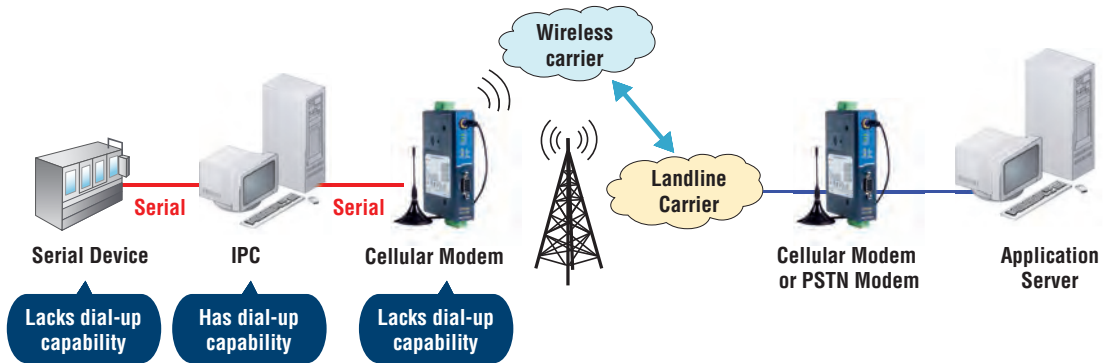
Serial — Serial

Serial Device — **IPC** — **Cellular Modem** — **Wireless carrier** — **Landline Carrier** — **Cellular Modem or PSTN Modem** — **Application Server**

Lacks dial-up capability | Has dial-up capability | Lacks dial-up capability

No Intermediary device is required to connect a serial device that HAS dial-up capability

Serial

Serial Device — **Cellular Modem** — **Wireless carrier** — **Landline Carrier** — **Cellular Modem or PSTN Modem** — **Application Server**

Has dial-up capability | Lacks dial-up capability
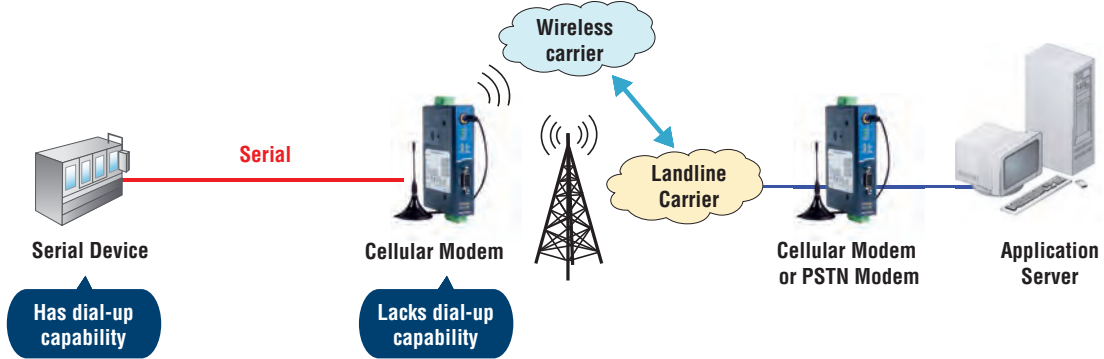
Cellular IP Modem

No Intermediary device is required to connect a serial device that HAS dial-up capability

Serial

Legacy Serial Device — **Cellular IP-Modem** — **Wireless carrier** — **Internet/ IP WAN** — **Application Server**

With dial-up ability

6 — Industrial Cellular Solutions ∨ Introduction to Industrial Cellular
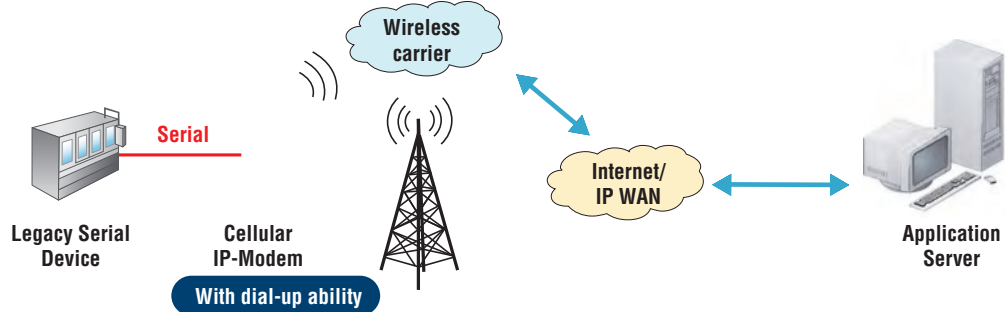
: Cellular IP Gateways

Cellular IP Gateways vs. Cellular IP Modems

Cellular IP modems and cellular IP gateways allow you to communicate with serial and Ethernet devices over a cellular network. The main difference between these two products is that cellular IP modems do not support VPN, but cellular IP gateways do support VPN. Both products are equipped with dial-up capability, which means you no longer need to worry about installing an IPC or limiting yourself to serial devices that have dial-up capability. Instead, you can connect your serial or Ethernet devices directly to the cellular IP modem. This

not only eliminates the additional cost associated with deploying an IPC, but also saves room if your application is bound by tight space constraints. In addition, a cellular IP modem is an "intelligent" device with a built-in memory and a ready-to-use TCP/IP operation mode, which allows it to connect over the Internet and be accessed via a simple web browser. This feature makes cellular IP modems easier to use than cellular modems since no knowledge of the AT command protocol is required.

Ethernet-based Device to Cellular Products

The OnCell G3100 is assigned an IP address by your service provider (your "cellular ISP"). Outgoing TCP/IP connections are handled with Network Address Translation (NAT). This allows any number of local Ethernet devices to act as outgoing TCP/IP clients to access remote servers. However, the OnCell G3100 appears as a single IP address to the "public" Internet. This means that incoming connections must be forwarded manually, based on TCP port number, to the local Ethernet devices.

Virtual Modem Mode

Virtual Modem mode is designed to run with operating systems that support AT commands to extend the distance between devices and modems that communicate through the RS-232 interface (Figure 1). In Figure 2 we show a setup that uses two device servers to extend the transmission distance. If this type of solution is not feasible, or is deemed inefficient, then greater efficiency can be achieved using Moxa's OnCell IP gateway (Figure 3). By connecting a properly configured OnCell IP gateway's Ethernet port to the computer's Ethernet port, and installing the Moxa driver in the computer, it is possible to transmit data over the cellular network, even if the software running on the computer was originally designed to transmit data through a modem.

: Cellular Routers

Overview

A cellular router is used to connect remote LANs and remote Ethernet devices to the cellular network. Cellular routers come with complete routing and network protocols that allow you to connected Ethernet devices to the cellular network. Cellular routers are typically deployed as the primary WAN link in areas or applications where using wired connections is costly or not feasible. In areas that can be wired, cellular routers can also be installed as a backup communication link in case the primary cabled link fails. Since these cellular routers are typically deployed at remote gateways, some advanced models also provide built-in network security features, such as firewalls, that are integrated into gateway devices.

Moxa's cellular routers create a secure WAN connection via an Ethernet-to-cellular interface for remote mission-critical data operations. The routers provide secure cellular GSM/GPRS or UMTS/HSDPA connections for reliable primary and backup network connectivity to industrial automation devices, such as SCADA devices, programmable logic controllers (PLCs), and remote terminal units (RTUs). The OnCell 5004 features industrial hardware components that include a terminal block for power, a screw-on type power

connector, and a wall-mount accessory. The OnCell 5004 also offers local intelligence with features such as network routing, persistent connections, firewall, and a secure integrated remote management software package. Advanced features include TCP/UDP, DHCP support, NAT, port forwarding, and access control lists.

6

Industrial Cellular Solutions ∨ Introduction to Industrial Cellular
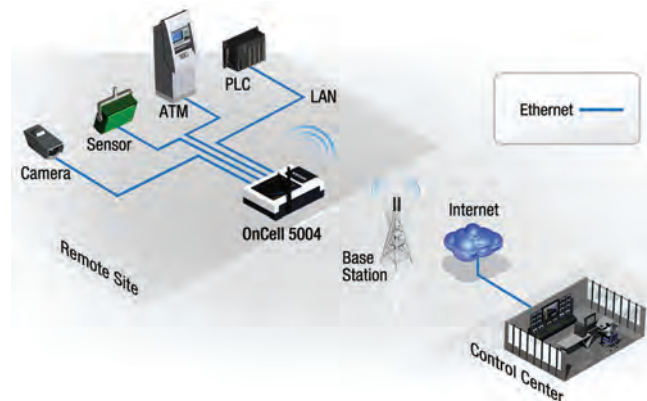
: OnCell Central Management Software

In the cellular world, most service providers only offer private IP addresses to mobile devices due to the limited availability of public addresses. Mobile devices configured with a private IP address can access resources on the Internet, but the mobile devices cannot be managed or accessed directly from the Internet since the private IP address is hidden.

The mechanism we developed uses a server configured with a public IP address to solve this private IP problem. The OnCell Central software installed in the server accepts connections from both Ethernet and serial mobile devices and remote hosts. Once a connection is established, the mobile device and the remote host can communicate with each other over the pre-established connection.
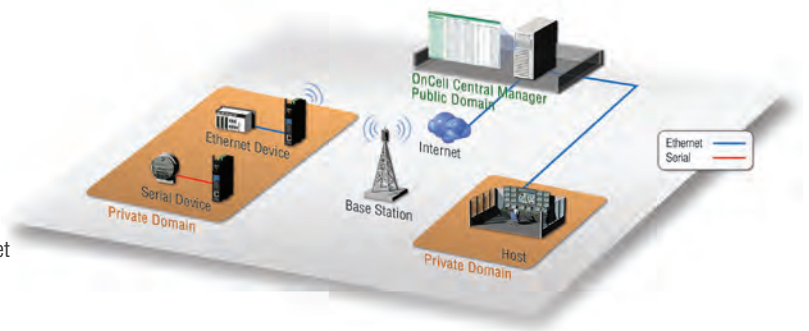
: VPN

Computers that are part of a VPN use a second, "virtual" IP address to connect to the Internet. Instead of running across a single private network, some of the links between nodes that are part of a VPN use open network connections or virtual circuits on a larger network, such as the Internet. With the help of VPNs, cellular devices acting as a VPN client can initiate a connection with a VPN server. Once the connection is established, cellular devices can communicate with other network devices on the same private network.
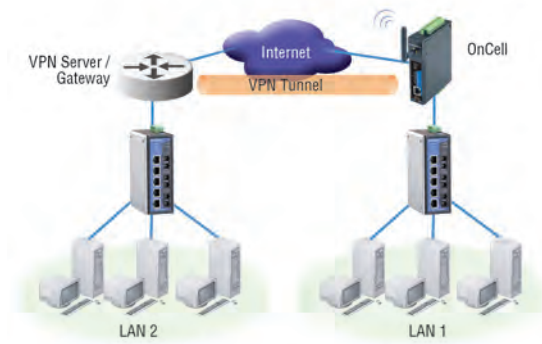
OnCell 5004/5104-HSDPA Series

Industrial five-band GSM/GPRS/EDGE/UMTS/HSDPA high speed cellular routers

> Universal tri-band UMTS/HSDPA 850/1900/2100 MHz
> Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
> Industrial primary and backup wireless WAN connectivity
> Connect to 4 10/100BaseT(X) devices over an integrated VPN
> Centralize private IP management with OnCell Central Manager
> Redundant DC power inputs
> 2 digital inputs and 1 relay output (OnCell 5104-HSDPA only)

OnCell 5004-HSDPA Series   OnCell 5104-HSDPA Series

Overview

The OnCell 5004/5104-HSDPA are high-performance industrial grade cellular routers that allow up to 4 Ethernet-based devices to simultaneously use a single cellular data account for primary or backup network connectivity to remote sites and devices. Both products provide the functionality of a cellular router, firewall, and switch in one device, and are the industry's first standalone platforms of this type. The difference between the OnCell 5004-HSDPA and OnCell 5104-HSDPA is that the OnCell 5104-HSDPA comes with a built-in relay output that can be configured to indicate the priority of

events when notifying or warning engineers in the field, and the two digital inputs allow you to connect basic I/O devices, such as sensors, to the cellular network. The OnCell 5004-HSDPA can be placed on a desktop or wall-mounted, whereas the OnCell 5104-HSDPA has an IA design and can be attached to a DIN-rail. Both products use 12 to 48 VDC power inputs with a screw-on design for greater reliability, and the Ethernet ports come with 1.5 KV magnetic isolation protection to keep your system safe from unexpected electrical discharges.

Specifications

Cellular Interface
Standards: GSM/GPRS/EDGE/UMTS/HSDPA
Band Options:
Tri-band UMTS/HSDPA 850/1900/2100 MHz
Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
EDGE Multi-slot Class: Class 10
EDGE Terminal Device Class: Class B
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
Tx Power:
GSM900: 2 W
UMTS/HSDPA: 0.25 W
EDGE900: 0.5 W
EDGE1800: 0.4 W
GSM1800: 1 W

WAN Interface
Number of Ports: 1
Ethernet: 10/100 Mbps, RJ45 connector, Auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

LAN Interface
Number of Ports: 4
Ethernet: 10/100 Mbps, RJ45 connector, auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

SIM Interface
Number of SIMs: 2
SIM Control: 3 V

I/O Interface (OnCell 5104-HSDPA only)
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1" (On)
• +3 to -30 V for state "0" (Off)

Software
Network Protocols: UDP/TCP, SNTP, ICMP, DDNS, DHCP/BOOTP, PPPoE, PPP, DNS Relay, HTTPS, Telnet, IPSec
Router/Firewall: NAT, port forwarding, static routing
Authentication: Local user-name and password
Security: IP filtering

Management Software
OnCell Central Manager: Centralized management solution for accessing private IPs from the Internet

Physical Characteristics
Housing: Aluminum, providing IP30 protection
Weight:
OnCell 5004-HSDPA, OnCell 5004-HSDPA-JPS: 505±5 g
OnCell 5104-HSDPA, OnCell 5104-HSDPA-JPS: 645±5 g
Dimensions:
OnCell 5004-HSDPA, OnCell 5004-HSDPA-JPS: 158 x 103 x 34 mm (6.22 x 4.06 x 1.34 in)
OnCell 5104-HSDPA, OnCell 5104-HSDPA-JPS: 160 x 103 x 50 mm (6.30 x 4.06 x 1.97 in)

Environmental Limits
Operating Temperature: -30 to 55°C (-22 to 131°F)
Operating Humidity: 5 to 95% RH

Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements

Number of Power Inputs: 1 terminal block, 1 power jack

Input Voltage: 12 to 48 VDC

Data Link:
OnCell 5004-HSDPA, OnCell 5004-HSDPA-JPS: 900 mA (peak) @ 12 V
OnCell 5104-HSDPA, OnCell 5104-HSDPA-JPS: 950 mA (peak) @ 12 V

Regulatory Approvals

Safety:
UL: UL60950

RF:
FCC Part22H
FCC PART24E
EN301 489-1
EN301 489-7
EN301 511

EMC:
CE: EN55022 Class A / EN55024
FCC: FCC part 15 subpart B, Class A

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

OnCell 5004-HSDPA
OnCell 5004-HSDPA-JPS
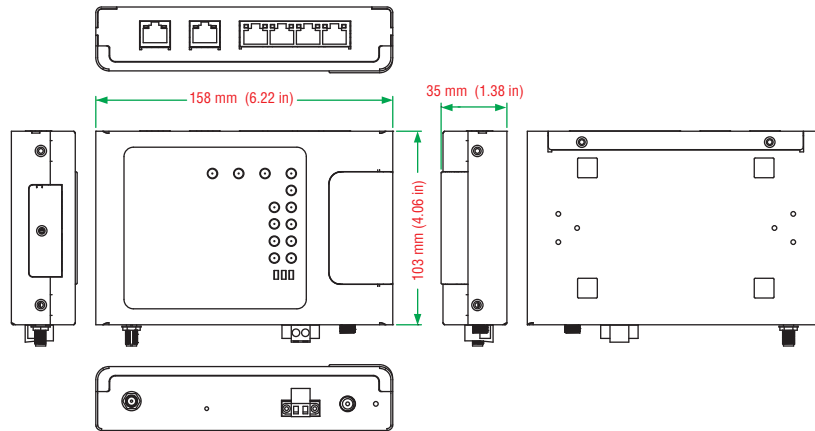
158 mm (6.22 in)   35 mm (1.38 in)   103 mm (4.06 in)

OnCell 5104-HSDPA
OnCell 5104-HSDPA-JPS

135 mm (5.315 in)   50.8 mm (2 in)   103 mm (4.16 in)
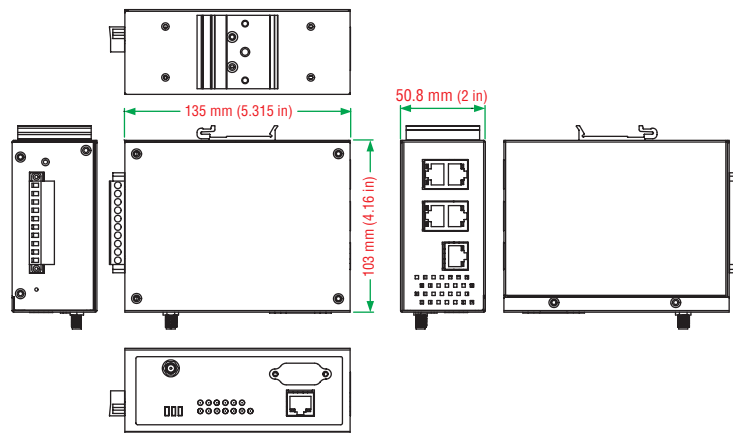
: Ordering Information

Available Models

OnCell 5004-HSDPA: 4-port 10/100M Ethernet to GSM/GPRS/EDGE/UMTS/HSDPA cellular router
OnCell 5004-HSDPA-JPS: 4-port 10/100M Ethernet to GSM/GPRS/EDGE/UMTS/HSDPA cellular router, Japan Softbank
OnCell 5104-HSDPA: 4-port 10/100M Ethernet to GSM/GPRS/EDGE/UMTS/HSDPA cellular router, IA design
OnCell 5104-HSDPA-JPS: 4-port 10/100M Ethernet to GSM/GPRS/EDGE/UMTS/HSDPA cellular router, IA design, Japan Softbank
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

OnCell 5004/5104

Industrial quad-band GSM/GPRS cellular routers

> Universal quad-band GSM/GPRS 850/900/1800/1900 MHz
> Industrial primary and backup wireless WAN connectivity
> Connect to 4 10/100BaseT(X) devices over an integrated VPN
> Centralize private IP management with OnCell Central Manager
> Redundant DC power inputs
> 2 digital inputs and 1 relay output (OnCell 5104 only)

OnCell 5004   OnCell 5104

⠿ Overview

The OnCell 5004/5104 are high-performance industrial grade cellular routers that allow up to 4 Ethernet-based devices to simultaneously use a single cellular data account for primary or backup network connectivity to remote sites and devices. Both products provide the functionality of a cellular router, firewall, and switch in one device, and are the industry's first standalone platform of this type. The difference between the OnCell 5004 and OnCell 5104 is that the OnCell 5104 comes with a built-in relay output that can be configured to indicate

the priority of events when notifying or warning engineers in the field, and the two digital inputs allow you to connect basic I/O devices, such as sensors, to the cellular network. The OnCell 5004 can be placed on a desktop or wall-mounted, whereas the OnCell 5104 has an IA design and can be attached to a DIN-rail. Both products use 12 to 48 VDC power inputs with a screw-on design for greater reliability, and the Ethernet ports come with 1.5 KV magnetic isolation protection to keep your system safe from unexpected electrical discharges.

⠿ Specifications

Cellular Interface
Standards: GSM/GPRS
Band Options: Quad-band 850/900 and 1800/1900 MHz
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
Tx Power: 1 watt GSM 1800/1900, 2 watts EGSM 850/900

WAN Interface
Number of Ports: 1
Ethernet: 10/100 Mbps, RJ45 connector, Auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

LAN Interface
Number of Ports: 4
Ethernet: 10/100 Mbps, RJ45 connector, auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

SIM Interface
Number of SIMs: 2
SIM Control: 3 V

I/O Interface (OnCell 5104 only)
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1" (On)
• +3 to -30 V for state "0" (Off)

Software
Network Protocols: UDP/TCP, SNTP, ICMP, DDNS, DHCP/BOOTP, PPPoE, PPP, DNS Relay, HTTPS, Telnet, IPSec
Router/Firewall: NAT, port forwarding, routing
Authentication: Local user-name and password
Security: IP filtering

Management Software
OnCell Central Manager: Centralized management solution for accessing private IPs from the Internet

Physical Characteristics
Housing: Aluminum, providing IP30 protection
Weight:
OnCell 5004: 505±5 g
OnCell 5104: 645±5 g
Dimensions:
OnCell 5004: 158 x 103 x 35 mm (6.22 x 4.06 x 1.38 in)
OnCell 5104: 135 x 103 x 50.8 mm (5.315 x 4.06 x 2.000 in)

Environmental Limits
Operating Temperature: -30 to 55°C (-22 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements
Number of Power Inputs: 1 terminal block, 1 power jack
Input Voltage: 12 to 48 VDC
Data Link:
OnCell 5004: 900 mA (peak) @ 12 V
OnCell 5104: 950 mA (peak) @ 12 V

Regulatory Approvals
Safety:
UL: UL60950
RF:
FCC Part22H
FCC PART24E
EN301 489-1
EN301 489-7
EN301 511

EMC:
CE: EN55022 Class A / EN55024
FCC: FCC part 15 subpart B, Class A

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

OnCell 5004

158 mm (6.22 in) 35 mm (1.38 in) 103 mm (4.06 in)

OnCell 5104

135 mm (5.315 in) 50.8 mm (2 in) 103 mm (4.16 in)
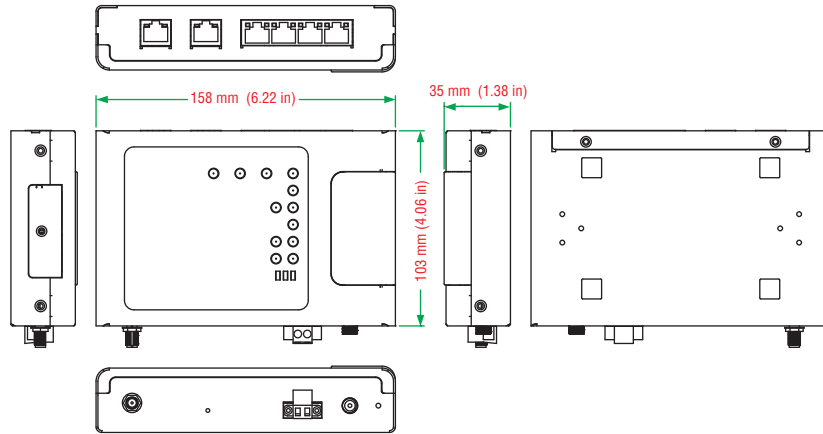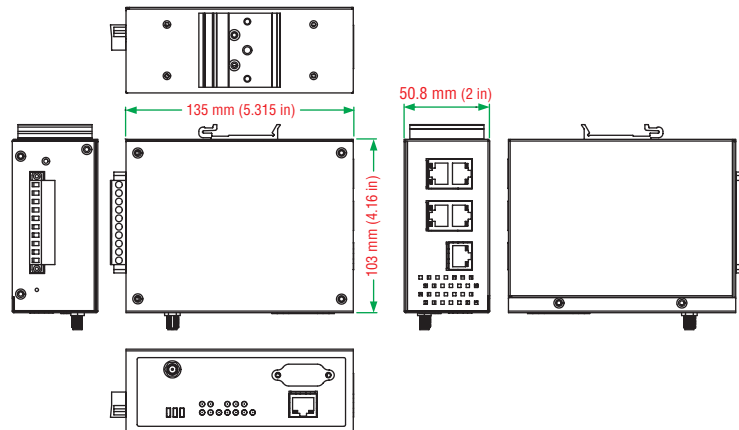
⠿ Ordering Information

Available Models
OnCell 5004: 4-port 10/100M Ethernet to GSM/GPRS cellular router
OnCell 5104: 4-port 10/100M Ethernet to GSM/GPRS cellular router, IA design
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

OnCell G3110/G3150-HSDPA Series

Industrial five-band GSM/GPRS/EDGE/UMTS/HSDPA IP gateways

> Tri-band UMTS/HSDPA 850/1900/2100 MHz
> Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
> Connect to Ethernet and serial devices over an integrated VPN
> Centralize private IP management software with OnCell Central Manager
> Redundant DC power inputs
> 2 digital inputs and 1 relay output

: Overview

The OnCell G3100-HSDPA series of high-speed industrial-grade IP gateways are intelligent and fully-featured wireless communication platforms that connect your Ethernet and serial devices over a cellular TCP/IP network. The OnCell G3100-HSDPA series offers connectivity to all tri HSDPA/UMTS frequency bands and quad GSM/GPRS/EDGE frequency bands used in Europe and the United States, allowing seamless global roaming on the best available network. The OnCell G3100-HSDPA comes with private IP management software and supports VPN for handling the IP address issue in cellular network structures. The OnCell G3100-HSDPA also comes with a built-in relay output that can be configured to indicate the priority of events when notifying or warning engineers in the field. Two digital inputs also allow you to connect basic I/O devices, and the OnCell G3100-HSDPA comes with redundant power inputs to assure non-stop operation.

: Specifications

Cellular Interface
Standards: GSM/GPRS/EDGE/UMTS/HSDPA
Band Options:
• Tri-band UMTS/HSDPA 850/1900/2100 MHz
• Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz
EDGE Multi-slot Class: Class 10
EDGE Terminal Device Class: Class B
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
Tx Power:
GSM900: 2 W
UMTS/HSDPA: 0.25 W
EDGE900: 0.5 W
EDGE1800: 0.4 W
GSM1800: 1 W

LAN Interface
Number of Ports: 1
Ethernet: 10/100 Mbps, RJ45 connector, Auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

SIM Interface
Number of SIMs: 1
SIM Control: 3 V

Serial Interface
Number of Ports: 1
Serial Standards:
G3110: RS-232 (DB9 male connector)
G3150: RS-232 (DB9 male connector), RS-422/485 (5-pin terminal block connector)

ESD Protection: 15 KV
Power EFT/Surge Protection: 2 KV

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2 (when parity = None)
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

I/O Interface
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1" (On)
• +3 to -30 V for state "0" (Off)

Software
Network Protocols: ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, SMTP, HTTPS, SNTP, ARP, SSL, IPSec
Router/Firewall: NAT, port forwarding
Authentication: Local user-name and password
Security: Accessible IP list

Operation Modes: Real COM, Secure Real COM, Reverse Real COM, Secure Reverse Real COM, TCP Server, Secure TCP Server, TCP Client, Secure TCP Client, UDP, RFC2217, Ethernet Modem, Virtual Modem, SMS Tunnel

Configuration and Management Options: SNMP MIB-II, SNMP Private MIB, SNMPv1/v2c/v3, DDNS, IP Report, Web/Telnet/Serial-Console/SSH

Utilities: Provided for Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64 Edition

Windows Real COM Drivers: Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server 2008, Windows XP/2003/Vista/Server 2008 x64 Edition

Fixed TTY Drivers: SCO Unix, SCO OpenServer 5, SCO OpenServer 6, UnixWare 7, SVR4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD 5, FreeBSD 6

Linux Real TTY Drivers: Linux kernels 2.2.x, 2.4.x, 2.6.x

Management Software

OnCell Central Manager: Centralized management solution for accessing private IPs from the Internet

Physical Characteristics

Housing: Aluminum, providing IP30 protection
Weight: 440±5 g
Dimensions: 28 x 126 x 93 mm (1.10 x 4.96 x 3.66 in)

Environmental Limits

Operating Temperature: -30 to 55°C (-22 to 131°F)

Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements

Number of Power Inputs: 2 (terminal block)
Input Voltage: 12 to 48 VDC
Data Link: 900 mA (peak) @ 12 V

Regulatory Approvals

Safety:
UL: UL60950
RF:
FCC Part22H
FCC PART24E
EN301 489-1
EN301 489-7
EN301 511
PTCRB (OnCell G3150-HSDPA only)
EMC:
CE: EN55022 Class A / EN55024
FCC: FCC part 15 subpart B, Class A

Reliability

MTBF (mean time between failures):
380,459 hours (G3110-HSDPA/G3150-HSDPA)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions & Pin Assignment (unit = mm)

DB9 male connector

1 2 3 4 5
6 7 8 9

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–

138.05 mm (5.4 in)
125.50 mm (4.9 in)
92.50 mm (3.6 in)
100.70 mm (3.96 in)
28.00 mm (1.1 in)

OnCell G3110-HSDPA Series

OnCell G3150-HSDPA Series

: Ordering Information

Available Models

OnCell G3110-HSDPA: 1-port RS-232 to GSM/GPRS/EDGE/UMTS/HSDPA IP gateway
OnCell G3110-HSDPA-JPS: 1-port RS-232 to GSM/GPRS/EDGE/UMTS/HSDPA IP gateway, Japan Softbank
OnCell G3150-HSDPA: 1-port RS-232/422/485 to GSM/GPRS/EDGE/UMTS/HSDPA IP gateway
OnCell G3150-HSDPA-JPS: 1-port RS-232/422/485 to GSM/GPRS/EDGE/UMTS/HSDPA IP gateway, Japan Softbank
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

OnCell G3110/G3150

Industrial quad-band GSM/GPRS/EDGE IP gateways

> Connect both Ethernet and serial devices to cellular networks
> Universal quad-band GSM/GPRS/EDGE-850/900/1800/1900-MHz
> Connect to Ethernet and serial devices over an integrated VPN
> Redundant DC power input
> 2 digital inputs and 1 relay output
> Centralize private IP management software with OnCell Central Manager
> DIN-Rail mounting

6

Industrial Cellular Solutions ❯ OnCell G3110/G3150

Overview

The OnCell G3110 and G3150 industrial RS-232 and RS-232/422/485 GSM/GPRS/EDGE IP gateways are designed to transmit data transparently over GSM/GPRS/EDGE cellular networks. The OnCell G3110 and G3150 can transmit data from both serial devices and Ethernet devices to a WAN interface, and come with private IP management software and VPN support for handling the IP address issue in cellular network structures. The products also comes with a built-in relay output that can be configured to indicate the priority of events when notifying or warning engineers in the field. Two digital inputs also allow you to connect basic I/O devices, and the OnCell's redundant power inputs assure non-stop operation.

Specifications

Cellular Interface
Standards: GSM/GPRS/EDGE
Band Options: Quad-band 850/900 and 1800/1900 MHz
EDGE Multi-slot Class: Class 12
GPRS Multi-slot Class: Class 12
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
Tx Power: 1 watt GSM 1800/1900, 2 watts EGSM 850/900

LAN Interface
Number of Ports: 1
Ethernet: 10/100 Mbps, RJ45 connector, Auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

SIM Interface
Number of SIMs: 1
SIM Control: 3 V

Serial Interface
Number of Ports: 1
Serial Standards:
G3110: RS-232 (DB9 male connector)
G3150: RS-232 (DB9 male connector), RS-422/485 (5-pin terminal block connector)
ESD Protection: 15 KV
Power EFT/Surge Protection: 2 KV

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2 (when parity = None)
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

I/O Interface
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 electrically isolated inputs
• +13 to +30 V for state "1" (On)
• +3 to -30 V for state "0" (Off)

Software
Network Protocols: ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, SMTP, HTTPS, SNTP, ARP, SSL, IPSec
Router/Firewall: NAT, port forwarding
Authentication: Local user-name and password
Security: Accessible IP list
Operation Modes: Real COM, Secure Real COM, Reverse Real COM, Secure Reverse Real COM, TCP Server, Secure TCP Server, TCP Client, Secure TCP Client, UDP, RFC2217, Ethernet Modem, Virtual Modem, SMS Tunnel
Configuration and Management Options: SNMP MIB-II, SNMP Private MIB, SNMPv1/v2c/v3, DDNS, IP Report, Web/Telnet/Serial-Console/SSH
Utilities: Provided for Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64 Edition
Windows Real COM Drivers: Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server 2008, Windows XP/2003/Vista/Server 2008 x64 Edition

Fixed TTY Drivers: SCO Unix, SCO OpenServer 5, SCO OpenServer 6, UnixWare 7, SVR4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD 5, FreeBSD 6

Linux Real TTY Drivers: Linux kernels 2.2.x, 2.4.x, 2.6.x

Management Software

OnCell Central Manager: Centralized management solution for accessing private IPs from the Internet

Physical Characteristics

Housing: Aluminum, providing IP30 protection

Weight: 440±5 g

Dimensions: 28 x 126 x 93 mm (1.10 x 4.96 x 3.66 in)

Environmental Limits

Operating Temperature: -30 to 55°C (-22 to 131°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements

Input Voltage: 12 to 48 VDC

Data Link: 900 mA (peak) @ 12 V

Regulatory Approvals

Safety:
UL: UL60950

RF:
FCC Part22H
FCC PART24E
EN301 489-1
EN301 489-7
EN301 511
PTCRB (OnCell G3150 only)

EMC:
CE: EN55022 Class A / EN55024
FCC: FCC part 15 subpart B, Class A

Reliability

MTBF (mean time between failures): G3110/G3150: 339045 hours

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions & Pin Assignment (unit = mm)
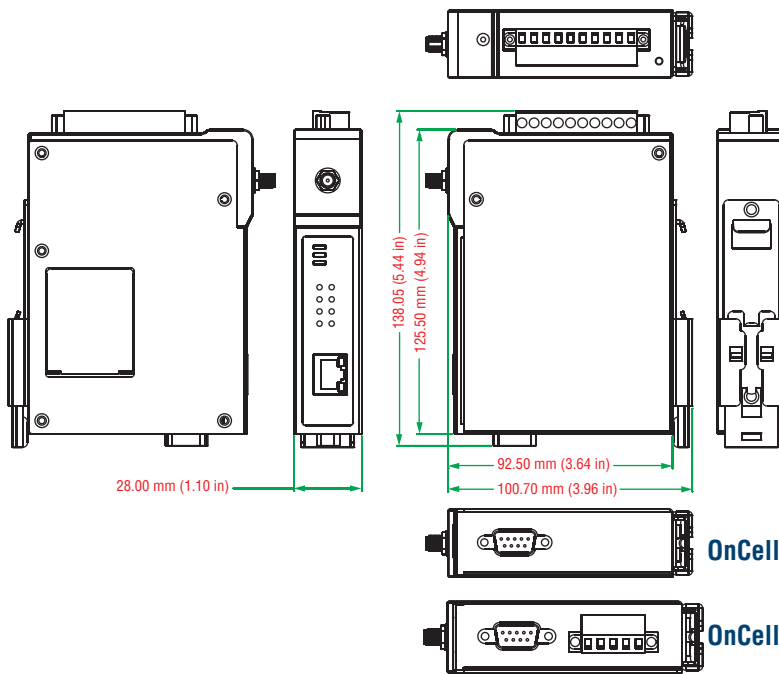
DB9 male connector
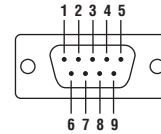
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–

OnCell G3110

OnCell G3150

:: Ordering Information

Available Models

OnCell G3110: 1-port RS-232 to GSM/GPRS/EDGE IP gateway
OnCell G3150: 1-port RS-232/422/485 to GSM/GPRS/EDGE IP gateway
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

OnCell G3111/G3151/G3211/G3251

1 and 2-port RS-232 or RS-232/422/485 cellular IP modems

> Universal quad-band GSM/GPRS 850/900/1800/1900 MHz
> Connect Ethernet and serial devices
> Choice of configuration methods, including web console, serial console, and Telnet
> Desktop or DIN-Rail installation

: Overview

The OnCell G3111/G3151/G3211/G3251 are cellular IP modems that can conveniently and transparently connect up to two devices to a cellular network, allowing you to connect to your existing Ethernet and serial devices with only basic configuration. The G3111/G3151/G3211/G3251 cellular IP modems are compact, and can be used on a desktop or mounted on a DIN-Rail. The products come with a 12 to 48 VDC power input and have 2 KV EFT/Surge protection to allow the use of different types of field power sources. The serial ports are also protected by 15 KV ESD line protection to keep your system safe from unexpected electrical discharges.

: Specifications

Cellular Interface
Standards: GSM/GPRS
Band Options: Quad-band 850/900 and 1800/1900 MHz
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
Tx Power: 1 watt GSM 1800/1900, 2 watts EGSM 850/900
SIM Control: 3 V

LAN Interface
Number of Ports: 1
Ethernet: 10/100 Mbps, RJ45 connector, Auto MDI/MDIX
Magnetic Isolation Protection: 1.5 KV built-in

SIM Interface
Number of SIMs: 1
SIM Control: 3 V

Serial Interface
Number of Ports: 1 or 2
Serial Standards:
G3111: 1 RS-232 port
G3151: 1 RS-232/422/485 port
G3211: 2 RS-232 ports
G3251: 2 RS-232/422/485 ports
ESD Protection: 15 KV
Power EFT/Surge Protection: 2 KV

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2 (when parity = None)
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, TCP/IP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, HTTPS, SMTP, SNTP, ARP
Router/Firewall: NAT, port forwarding
Authentication: Local user-name and password
Security: Accessible IP list
Operation Modes: Real COM, TCP Server, TCP Client, UDP, SMS Tunnel, Reverse Real COM
Configuration and Management Options: SNMP MIB-II, v3, DDNS, IP Report, Web/Telnet/Serial Console, Serial Logging
Utilities: Provided for Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64
Windows Real COM Drivers: Windows 95/98/ME, Windows NT, Windows 2000/XP/2003/Vista/Server-2008, Windows XP/2003/Vista/Server-2008 x64

Management Software
OnCell Central Manager: Centralized management solution for accessing private IPs from the Internet

Physical Characteristics
Housing: Aluminum, providing IP30 protection
Weight:
OnCell G3111/G3151: 165±5 g
OnCell G3211/G3251: 185±5 g

Dimensions: 111 x 77 x 26 mm (4.37 x 3.03 x 1.02 in)
Environmental Limits
Operating Temperature: -30 to 55°C (-22 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)
Power Requirements
Number of Power Inputs: 1 power jack
Input Voltage: 12 to 48 VDC
Data Link: 900 mA (peak) @ 12 V

Regulatory Approvals
RF:
EN301 489-1
EN301 489-7
EN301 511
EMC:
CE: EN55022 Class A / EN55024
FCC: FCC part 15 subpart B, Class A
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

100 mm (3.94 in)
77 mm (3.03 in)
26 mm(1.02 in)
111 mm (4.37 in)

OnCell G3111, OnCell G3151

OnCell G3211, OnCell G3251
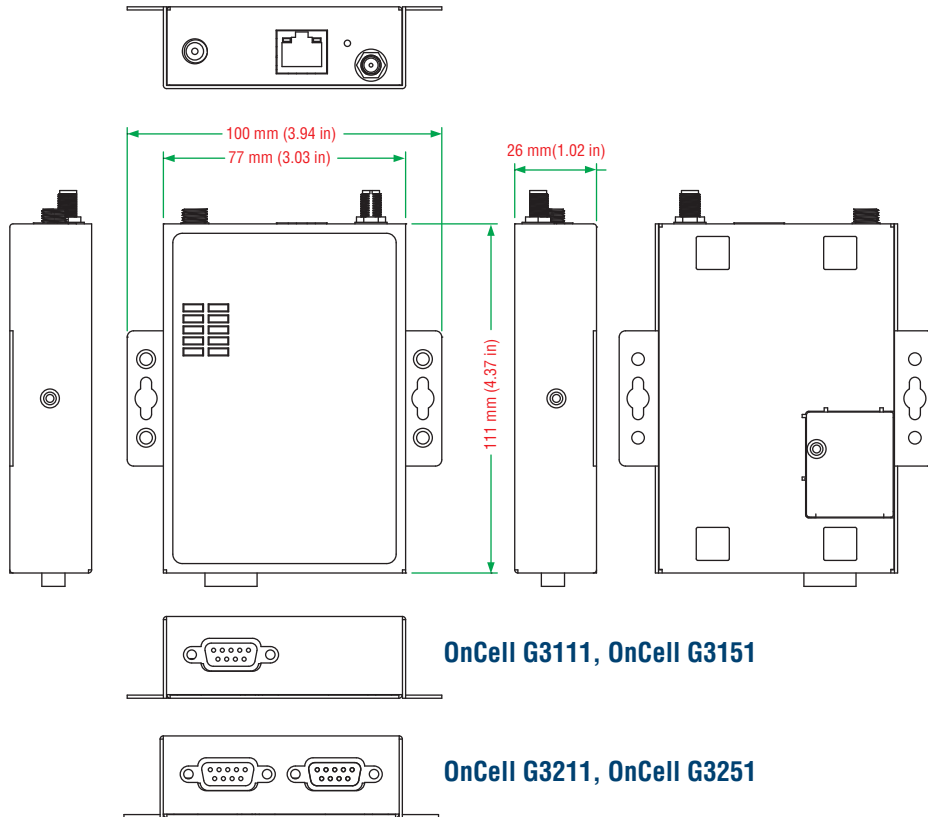
: Ordering Information

Available Models
OnCell G3111: 1-port RS-232 to GSM/GPRS IP modem
OnCell G3151: 1-port RS-232/422/485 to GSM/GPRS IP modem
OnCell G3211: 2-port RS-232 to GSM/GPRS IP Modem
OnCell G3251: 2-port RS-232/422/485 to GSM/GPRS IP Modem
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

6 | Industrial Cellular Solutions ∨ OnCell G3111/G3151/G3211/G3251

OnCell G2110/G2150I

Industrial quad-band GSM/GPRS modems

> Quad-band GSM/GPRS 850/900/1800/1900 MHz
> Separate RS-232 and RS-422/485 serial interfaces (G2150I only)
> 2.5 KV RMS isolation for 1 min. for all serial signals (G2150I only)
> Extended operating temperature from -30 to 75°C (G2110-T only)
> Vertical IP30 housing with SIM card protection
> LED indicators for GSM/GPRS, data transmission, and signal level
> DIN-Rail and wall mounting
> SMS Tunnel Mode provided

Overview

The OnCell G2100 series of industrial quad-band GSM/GPRS modems are designed to transmit data and short messages (SMS) over GSM/ GPRS mobile networks. The modems can be used to increase the efficiency of maintenance and communication, but do not require extensive training. In addition, the modems can be mounted on a DIN-Rail or wall. The OnCell G2100 modems accept a 12 to 48 VDC power input, making them suitable for use with a variety of field power sources. The serial ports feature 15 KV ESD line protection to protect the products from harmful electrical discharge, and separate

RS-232 and RS-422/485 interfaces are built into the OnCell G2150I, each with 2.5 KV RMS isolation protection for one minute. The two serial interfaces on the OnCell G2150I make it ideal for attaching all kinds of devices, such as stand-alone controllers, PC COM ports, and multi-dropped electric meters. In addition, the OnCell G2110-T has an extended operating temperature (-30 to 75°C) design that makes it suitable for heavy industrial use.

Specifications

Cellular Interface
Standards: GSM and GPRS
Band Options: Quad-band 850/900/1800/1900 MHz
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4
CSD Data Transmission Rate: Up to 14,400 bps
Tx Power: 1 watt GSM1800/1900, 2 watts EGSM 900/GSM 850

SIM Interface
Number of SIMs: 1
SIM Control: 3 V

Serial Interface
Number of Ports: 1
Serial Standards:
G2110: RS-232 (DB9 female connector)
G2150I: RS-232 (DB9 female connector), RS-422/485 (5-pin terminal block connector)
ESD Protection: 15 KV (G2110 only)
Optical Isolation: 2.5 KV (G2150I only)

Serial Communication Parameters
Data Bits: 7, 8
Stop Bits: 1, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS
Baudrate: 300 bps to 115.2 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, RI, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Physical Characteristics
Housing: ABS + PC, IP30 protected
Weight: 150 ± 5 g
Dimensions: 27 x 123 x 79 mm (1.06 x 4.84 x 3.11 in)

Environmental Limits
Operating Temperature:
G2110/2150I: -20 to 55°C (-4 to 131°F)
G2110-T: -30 to 75°C (-22 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
Idle: 50 mA @ 12 V
Data Link: 300 to 900 mA (peak) @ 12 V

Regulatory Approvals
RF: FCC Part 22H, FCC Part 24E, EN301 489-1, EN301 489-7, EN301 511
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A

Reliability

MTBF (mean time between failures):
G2110/G2110-T: 925627 hours
G2150I: 864965 hours

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

79.20 mm
75.00 mm
27.00 mm
123.00 mm
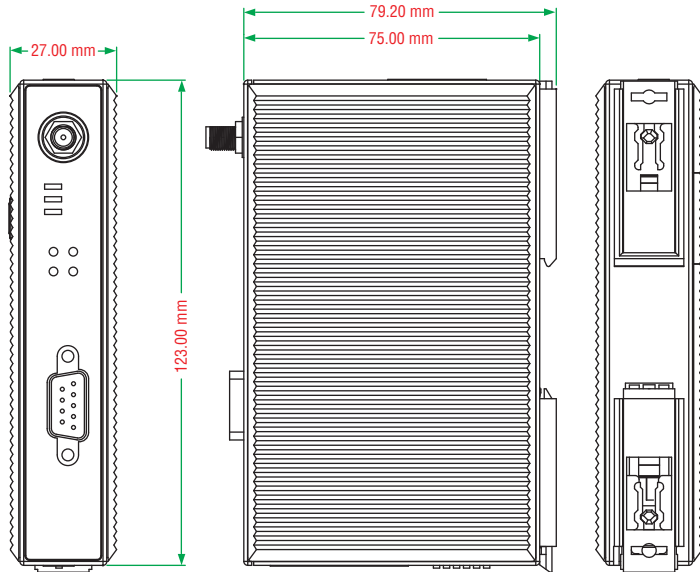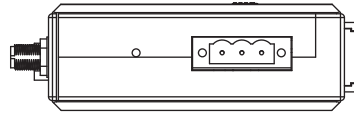
OnCell G2110

OnCell G2150I
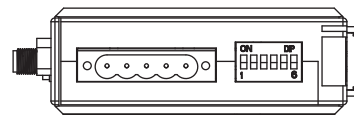
DB9 female RS-232 port
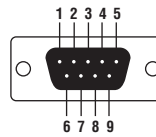
1 2 3 4 5
6 7 8 9

PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

: Ordering Information

Available Models

OnCell G2110: 1-port RS-232 to GSM/GPRS modem
OnCell G2110-T: 1-port RS-232 to GSM/GPRS modem, wide temperature (-30 to 75°C)
OnCell G2150I: 1-port RS-232/422/485 to GSM/GPRS modem, with 2.5 KV optical isolation
Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

Cellular Antennas and Accessories

: Cellular Antennas

GSM/GPRS Cellular Antennas			
Model Name	ANT-CQB-ASM-01	ANT-CQB-AHSM-00-3m	ANT-CQB-AHSM-03-3m	ANT-CQB-AHSM-05-3m
Frequency Range	850/900/1800/1900 MHz	850/900/1800/1900 MHz	850/900/1800/1900 MHz	850/900/1800/1900 MHz
Description	Quad-band GSM/GPRS, omnidirectional, 1 dBi, rubber SMA	Quad-band GSM/GPRS, omnidirectional, 0 dBi, 10 cm high, magnetic SMA, 3 m	Quad-band GSM/GPRS, omnidirectional, 3 dBi, 25 cm high, magnetic SMA, 3 m	Quad-band GSM/GPRS, omnidirectional, 5 dBi, 37 cm high, magnetic SMA, 3 m
Antenna Type	Omni-directional	Omni-directional	Omni-directional	Omni-directional
Cable Type	–	RG174/U	RG174/U	RG174/U
Typical Antenna Gain	1 dBi (Max.)	0 dBi	3 dBi	5 dBi
Impedance	50 ohms	50 ohms	50 ohms	50 ohms
Polarization Type	Linear	Linear	Linear	Linear
HPBW/horizontal	360°	360°	360°	360°
HPBW/vertical	–	–	–	–
V.S.W.R.	–	< 2	< 2	< 2
Connector(s)	SMA (male)	SMA (male)	SMA (male)	SMA (male)
Antenna Length	3.3 mm	100 mm	250 mm	370 mm
Weight	10 g	58 g	60 g	62 g
Cable Length	–	3 m	3 m	3 m
Related Products	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell 5000 series	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell 5000 series	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell 5000 series	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell 5000 series

UMTS/HSDPA Cellular Antennas		
Model Name	ANT-WCDMA-ASM-1.5	ANT-WCDMA-AHSM-04-2.5m	ANT-WCDMA-ANF-00
Frequency Range	850/900/1800/1900/2100 MHz	850/900/1800/1900/2100 MHz	850/900/1800/1900/2100 MHz
Description	Five-band GSM/GPRS/UMTS/HSDPA, omni-directional, 1.5 dBi, rubber SMA	Five-band GSM/GPRS/UMTS/HSDPA, omni-directional, 4 dBi, 11 cm high, magnetic SMA, 2.5 m	Five-band GSM/GPRS/UMTS/HSDPA, omni-directional, 0 dBi, glass fiber, N-type (female)
Antenna Type	Omni-directional	Omni-directional	Omni-directional
Cable Type	–	RG174/U	–
Typical Antenna Gain	1.5 dBi	4 dBi	0 dBi
Impedance	50 ohms	50 ohms	50±5 ohms
Polarization Type	Vertical	Vertical	Vertical
HPBW/horizontal	360°	360°	360°
HPBW/vertical	–	–	40°
V.S.W.R.	< 2	< 2	1 : 1.5 Max.
Connector(s)	SMA (male)	SMA (male)	N-type Female
Antenna Length	104 mm	110 mm	420 mm
Weight	10 g	60 g	430 g
Cable Length	–	2.5 m	–
Related Products	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell G3100-HSDPA series, OnCell 5000 series	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell G3100-HSDPA series, OnCell 5000 series	OnCell G2100 series, OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell G3100-HSDPA series, OnCell 5000 series

6

Industrial Cellular Solutions ❯ Cellular Antennas and Accessories

6

: Cellular Accessories

CRF-SMA(M)/N(M)-300

Description: CFD200 cable, SMA male to SMA (male), 3 m
Cable Type: CFD200
Connector Type: SMA male to N-type male
Length: 3 m
Outer Dimension: 4.14 mm
Min. Bend Radius: 20.32 mm
Attenuation: 55.4 @ 2500 MHz, 86.5 @ 5800 MHz
Related Accessory: Cellular 5-band N-type antenna
Related Products: OnCell G3111/G3151, OnCell G3211/G3251, OnCell G3100 series, OnCell G3100-HSDPA series, OnCell 5000 series

Terminal Servers

7

Terminal Servers

NPort® 6000 Terminal Servers

7

	NPort® 6150	NPort® 6250	NPort® 6250-M-SC	NPort® 6250-S-SC	NPort® 6450	NPort® 6610-8	NPort® 6610-8-48V	NPort® 6610-16	NPort® 6610-16-48V
LAN Interface									
10/100BaseT(X) Ports	1 port (8-pin RJ45 connector)								
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
100BaseFX Ports	–	–	1 (multi-mode)	1 (single-mode)	–	–	–	–	–
Expansion Modules									
10/100BaseT(X) (RJ45)	–	–	–	–	✓	✓	✓	✓	✓
Multi-mode Fiber (SC)	–	–	–	–	✓	✓	✓	✓	✓
Single-mode Fiber (SC)	–	–	–	–	✓	✓	✓	✓	✓
GSM/GPRS	–	–	–	–	✓	✓	✓	✓	✓
Modem	–	–	–	–	✓	✓	✓	✓	✓
Serial Interface									
RS-232 Ports	–	–	–	–	–	8	8	16	16
RS-232/422/485 Ports	1	2	2	2	4	–	–	–	–
Connectors	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	RTS/CTS, DTR/DSR, XON/XOFF								
Baudrate	50 bps to 921.6 Kbps (supports non-standard baudrates)								
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 KV isolation protection	–	–	–	–	–	–	–	–	–
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®
RS-232 Console Port	✓	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Features									
LCD Panel with 4 push buttons	–	–	–	–	✓	✓	✓	✓	✓
Serial Data Log	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB
Offline Port Buffering	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB
SD Slot	–	✓	✓	✓	✓	✓	✓	✓	✓
Software									
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, DDNS, HTTP, SMTP, HTTPS, SSL, SSH, PPPoE, RFC2217, IPv6, IPv4, Turbo Ring, Turbo Ring 2								
Security Protocols	DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+								
Configuration Options	Web Console, Telnet Console, Serial Console, Windows Search Utility								
Driver Support	Windows Real COM Drivers (for Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded), Linux Real TTY driver (for 2.4.x, 2.6.x), Fixed TTY driver (for SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i)								
Management	SNMP MIB-II								
IP Routing	Static, RIP-I, RIP-II								
Standard Operation Modes	Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled								
Secure Operation Modes	Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH								
Terminal Sessions	8 sessions per port								
Physical Characteristics									
Housing	Metal	Metal	Metal	Metal	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	700 g	730 g	730 g	730 g	1020 g	3460 g	3460 g	3580 g	3580 g
Dimensions (mm)	67 x 100.4 x 28	77 x 111 x 28	77 x 111 x 28	77 x 111 x 28	158 x 103 x 35	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44
Environmental Limits									
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 85°C	-20 to 85°C	-20 to 85°C	-20 to 85°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements									
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	100 to 240 VAC	±48 VDC	100 to 240 VAC	±48 VDC
Power Consumption	285 mA @ 12 V 150 mA @ 24 V	333 mA @ 12 V 173 mA @ 24 V	428 mA @ 12 V 219 mA @ 24 V	376 mA @ 12 V 193 mA @ 24 V	730 mA @ 12 V 330 mA @ 24 V	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V
Regulatory Approvals									
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A								
Safety	UL (UL60950-1), TÜV (EN60950-1)								
Reliability									
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓
MTBF	231709 hrs	226128 hrs	225762 hrs	225762 hrs	120354 hrs	135891 hrs	135891 hrs	102373 hrs	102373 hrs
Warranty	5 years (see www.moxa.com/warranty)								

NPort® 6000 Terminal Servers

	NPort® 6610-32	NPort® 6610-32-48V	NPort® 6650-8	NPort® 6650-8-48V	NPort® 6650-16	NPort® 6650-16-48V	NPort® 6650-32	NPort® 6650-32-48V
LAN Interface								
10/100BaseT(X) Ports	1 port (8-pin RJ45 connector)							
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
100BaseFX Ports	–	–	–	–	–	–	–	–
Expansion Modules								
10/100BaseT(X) (RJ45)	✓	✓	✓	✓	✓	✓	✓	✓
Multi-mode Fiber (SC)	✓	✓	✓	✓	✓	✓	✓	✓
Single-mode Fiber (SC)	✓	✓	✓	✓	✓	✓	✓	✓
GSM/GPRS	✓	✓	✓	✓	✓	✓	✓	✓
Modem	✓	✓	✓	✓	✓	✓	✓	✓
Serial Interface								
RS-232 Ports	32	32	–	–	–	–	–	–
RS-232/422/485 Ports	–	–	8	8	16	16	32	32
Connectors	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark							
Flow Control	RTS/CTS, DTR/DSR, XON/XOFF							
Baudrate	50 bps to 921.6 Kbps (supports non-standard baudrates)							
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓	✓
2 KV isolation protection	–	–	–	–	–	–	–	–
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®
RS-232 Console Port	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Features								
LCD Panel with 4 push buttons	✓	✓	✓	✓	✓	✓	✓	✓
Serial Data Log	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB
Offline Port Buffering	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB
SD Slot	✓	✓	✓	✓	✓	✓	✓	✓
Software								
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, DDNS, HTTP, SMTP, HTTPS, SSL, SSH, PPPoE, RFC2217, IPv6, IPv4, Turbo Ring, Turbo Ring 2							
Security Protocols	DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+							
Configuration Options	Web Console, Telnet Console, Serial Console, Windows Search Utility							
Driver Support	Windows Real COM Drivers (for Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded), Linux Real TTY driver (for 2.4.x, 2.6.x), Fixed TTY driver (for SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, \AIX 5.x, HP-UX 11i)							
Management	SNMP MIB-II							
IP Routing	Static, RIP-I, RIP-II							
Standard Operation Modes	Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled							
Secure Operation Modes	Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH							
Terminal Sessions	8 sessions per port							
Physical Characteristics								
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	3600 g	3600 g	3460 g	3460 g	3580 g	3580 g	3600 g	3600 g
Dimensions (mm)	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44	440 x 195 x 44
Environmental Limits								
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements								
Input Voltage	100 to 240 VAC	±48 VDC	100 to 240 VAC	±48 VDC	100 to 240 VAC	±48 VDC	100 to 240 VAC	±48 VDC
Power Consumption	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V	285 mA @ 100 V 190 mA @ 240 V	293 mA @ 48 V
Regulatory Approvals								
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A							
Safety	UL (UL60950-1), TÜV (EN60950-1)							
Reliability								
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓
MTBF	68707 hrs	68707 hrs	135370 hrs	135370 hrs	101783 hrs	101783 hrs	68177 hrs	68177 hrs
Warranty	5 years (see www.moxa.com/warranty)							

7

Terminal Servers › Product Selection Guides

CN2600 Terminal Servers
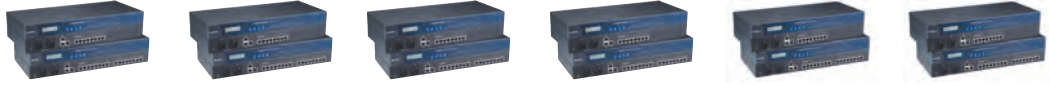
	CN2610-8	CN2610-16	CN2610-8-2AC	CN2610-16-2AC	CN2650-8	CN2650-16
LAN Interface						
10/100BaseT(X) Ports	2 ports (2 IPs, 8-pin RJ45 connectors)					
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface						
RS-232 Ports	8	16	8	16	–	–
RS-232/422/485 Ports	–	–	–	–	8	16
Connectors	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45	8-pin RJ45
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark					
Flow Control	RTS/CTS, DTR/DSR, XON/XOFF					
Baudrate	50 bps to 921.6 Kbps					
15 KV ESD Protection	✓	✓	✓	✓	✓	✓
2 KV isolation protection	–	–	–	–	–	–
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®
RS-232 Console Port	✓	✓	✓	✓	✓	✓
Advanced Features						
LCD Panel with 4 push buttons	✓	✓	✓	✓	✓	✓
Serial Data Log	128 KB	128 KB	128 KB	128 KB	128 KB	128 KB
Offline Port Buffering	128 KB	128 KB	128 KB	128 KB	128 KB	128 KB
Software						
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS					
Security Protocols	RADIUS, https, SSH, PAP, CHAP					
Configuration Options	Web Console, Telnet Console, Serial Console, Windows Search Utility					
Driver Support	Windows Real COM Drivers (for Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded), Linux Real TTY driver (for 2.4.x, 2.6.x), Fixed TTY driver (for SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i)					
Management	SNMP MIB-II					
IP Routing	Static, RIP-I, RIP-II					
Standard Operation Modes	Real COM, TCP Server, TCP Client, UDP, RFC2217, Terminal, Reverse Telnet, PPP, DRDAS, Redundant COM, Disabled					
Terminal Sessions	8 sessions per port					
Physical Characteristics						
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	3525 g	3560 g	3760 g	3980 g	3740 g	3790 g
Dimensions (mm)	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45
Environmental Limits						
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements						
Dual Power Inputs for Redundancy	–	–	✓	✓	–	–
Input Voltage	100 to 240 VAC, 47 to 63 Hz					
Power Consumption	235 mA @ 100 VAC, 145 mA @ 240 V					
Regulatory Approvals						
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A					
Safety	UL (UL60950), TÜV (EN60950)					
Reliability						
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓
MTBF	99302 hrs					
Warranty	5 years (see www.moxa.com/warranty)					

CN2600 Terminal Servers

	CN2650-8-2AC	CN2650-16-2AC	CN2650I-8	CN2650I-16	CN2650I-8-2AC	CN2650I-16-2AC
LAN Interface						
10/100BaseT(X) Ports	2 ports (2 IPs, 8-pin RJ45 connectors)					
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface						
RS-232 Ports	–	–	–	–	–	–
RS-232/422/485 Ports	8	16	8	16	8	16
Connectors	8-pin RJ45	8-pin RJ45	DB9 male	DB9 male	DB9 male	DB9 male
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark					
Flow Control	RTS/CTS, DTR/DSR, XON/XOFF					
Baudrate	50 bps to 921.6 Kbps					
15 KV ESD Protection	✓	✓	✓	✓	✓	✓
2 KV isolation protection	–	–	✓	✓	✓	✓
RS-485 Data Direction Control	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®	ADDC®
RS-232 Console Port	✓	✓	✓	✓	✓	✓
Advanced Features						
LCD Panel with 4 push buttons	✓	✓	✓	✓	✓	✓
Serial Data Log	128 KB	128 KB	128 KB	128 KB	128 KB	128 KB
Offline Port Buffering	128 KB	128 KB	128 KB	128 KB	128 KB	128 KB
Software						
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS					
Security Protocols	RADIUS, https, SSH, PAP, CHAP					
Configuration Options	Web Console, Telnet Console, Serial Console, Windows Search Utility					
Driver Support	Windows Real COM Drivers (for Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded), Linux Real TTY driver (for 2.4.x, 2.6.x), Fixed TTY driver (for SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i)					
Management	SNMP MIB-II					
IP Routing	Static, RIP-I, RIP-II					
Standard Operation Modes	Real COM, TCP Server, TCP Client, UDP, RFC2217, Terminal, Reverse Telnet, PPP, DRDAS, Redundant COM, Disabled					
Terminal Sessions	8 sessions per port					
Physical Characteristics						
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	3900 g	3980 g	3666 g	3776 g	3932 g	4022 g
Dimensions (mm)	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45	440 x 198 x 45
Environmental Limits						
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements						
Dual Power Inputs for Redundancy	✓	✓	–	–	✓	✓
Input Voltage	100 to 240 VAC, 47 to 63 Hz					
Power Consumption	235 mA @ 100 VAC, 145 mA @ 240 VAC					
Regulatory Approvals						
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A					
Safety	UL (UL60950), TÜV (EN60950)					
Reliability						
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓
MTBF	99302 hrs					
Warranty	5 years (see www.moxa.com/warranty)					

7

Terminal Servers > **Product Selection Guides**

Secure Terminal Servers

NPort® 6000 secure terminal servers provide serial-to-Ethernet connectivity that is both reliable and secure. They can be used to connect any serial device to an Ethernet network using a variety of operation modes—Real COM, TCP Server, TCP Client, UDP, RFC2217, Pair Connection, Ethernet Modem, Terminal, Reverse Terminal, Printer, and Dial in/out. For applications that require data security, such as banking, telecom, access control, and remote site management, secure modes are also available—Secure TCP Server, Secure TCP Client, Secure Pair-Connection, Secure Real COM, and Secure Terminal modes.

⦂ Safe Data Communication

Secure Data Communication with SSL

Network security is a critical issue for certain applications, and is especially important when data is transmitted over the Internet where it is vulnerable to interception by third parties. The NPort® 6000 secure terminal servers use SSL to implement secure data transmission for Secure TCP Server, Secure TCP Client, Secure Pair Connection,

and Secure Real COM modes. The NPort®'s drivers follow the SSL standard and automatically negotiate the encryption key. To prevent hacker attacks, the NPort® will automatically switch from DES/3DES to AES encryption.
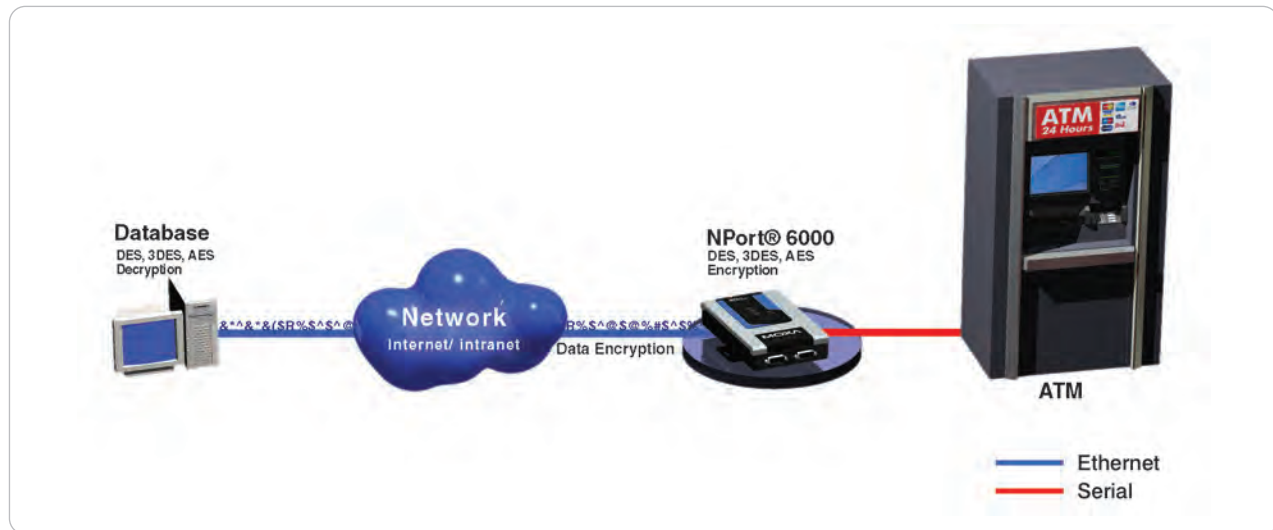
Secure Remote Management and Configuration with SSH and SSL

Unauthorized access is a major concern for system managers, and the NPort® 6000 secure terminal servers help control access by supporting IP filtering and password protection. Extra protection from hackers is also provided by SSH and SSL. Secure configuration of the NPort® 6000 is provided by opening the web console with a web browser that supports https (e.g., Internet Explorer), or by opening the Telnet console using a terminal emulator that supports SSH (e.g., PuTTY).

Powerful Hardware Encryption Engine

A powerful hardware encryption engine that supports the complete DES/3DES/AES encryption algorithms is built into the NPort® 6000. For DES and 3DES encryption, the NPort® 6000 supports ECB, CBC, CFB, and OFB modes. For AES encryption, the NPort® 6000 supports ECB, CBC, CFB, OFB, and CTR modes with a 128-bit, 192-bit, or 256-bit key.

: Reliable Data Communication

Port Buffering that Preserves Data if the Ethernet Connection Fails

For mission-critical applications, data collected from a serial Connection device must be safeguarded in case the Ethernet network gets disconnected. The NPort® 6000 provides exceptionally reliable data transmission by saving serial data to an internal 64 KB port buffer if the Ethernet connection fails. When the Ethernet network is reconnected, data in the buffer is automatically released and sent to the appropriate destination. For the NPort® 6250, 6450, and 6650, this buffer can be expanded by installing an SD card.
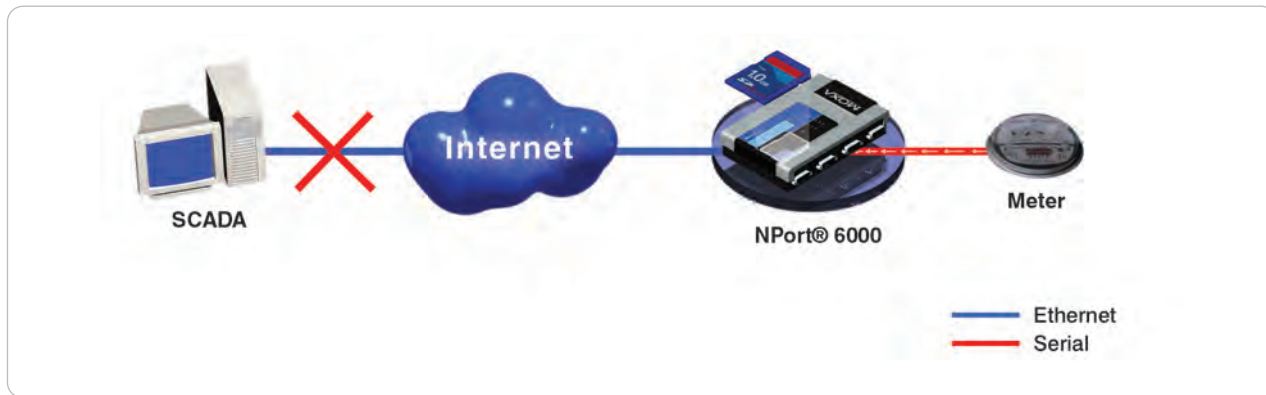
Ethernet Port Expansion (NPort® 6450/6600 only)

Although more and more devices are now Ethernet-ready, many legacy devices only provide a serial interface. The main purpose of a device server is to connect serial devices to an Ethernet network, allowing engineers to integrate all of their devices into an Ethernet environment. A problem can arise if both Ethernet-ready and legacy serial devices need to be connected at the same location. The NPort® 6000 can use the Ethernet expansion module to add additional Ethernet ports, effectively allowing operation as a combination Ethernet switch and device server. By using the NPort® 6000's Ethernet expansion modules, users no longer need to invest in a more expensive switch or hub to connect every device. Modules are available for different Ethernet media, including copper Ethernet, multimode fiber, and single-mode fiber. Ethernet expansion modules can also be used to create a cascading topology in which device servers are connected to each other in a daisy chain arrangement.

The NM-GPRS/GSM and NM-Modem network modules can be used to provide NPort® 6000 secure terminal servers with an automatic backup capability. The NPort® 6000 backup function makes data transmission safer and more reliable.

Interchangeable modules for Ethernet expansion

| 1 RJ45 Ethernet Port | 1 fiber Ethernet port (single or multi mode) | 2 fiber Ethernet ports (single or multi mode) | 2 RJ45 Ethernet Ports | NM-GPRS/GSM | NM-Modem |

7
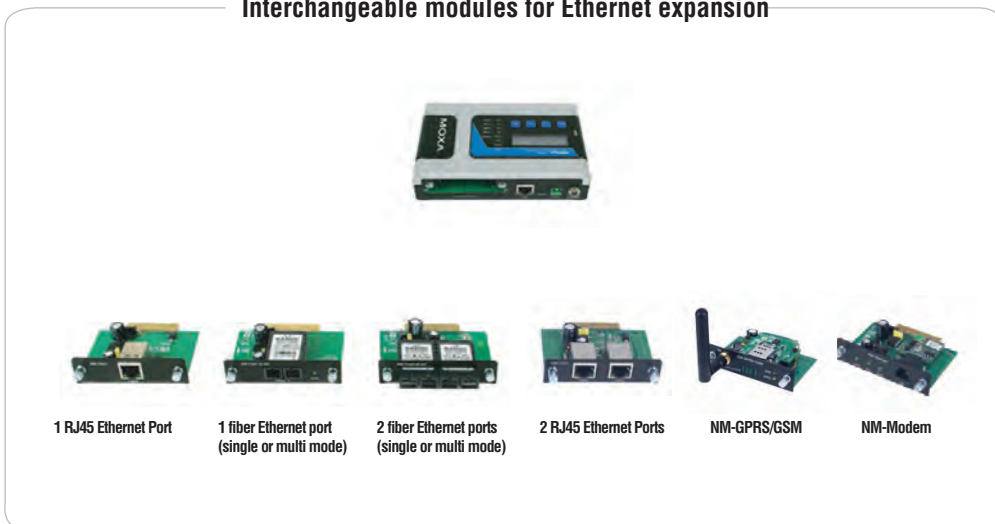
Ethernet Ring Topology with Fast Recovery (NPort® 6450/6600 only)

NPort® 6000 secure terminal servers support the Turbo Ring protocol for cascade topologies. With Turbo Ring™, if any segment of the daisy-chain ring is disconnected, the network will recover in less than 300 ms.
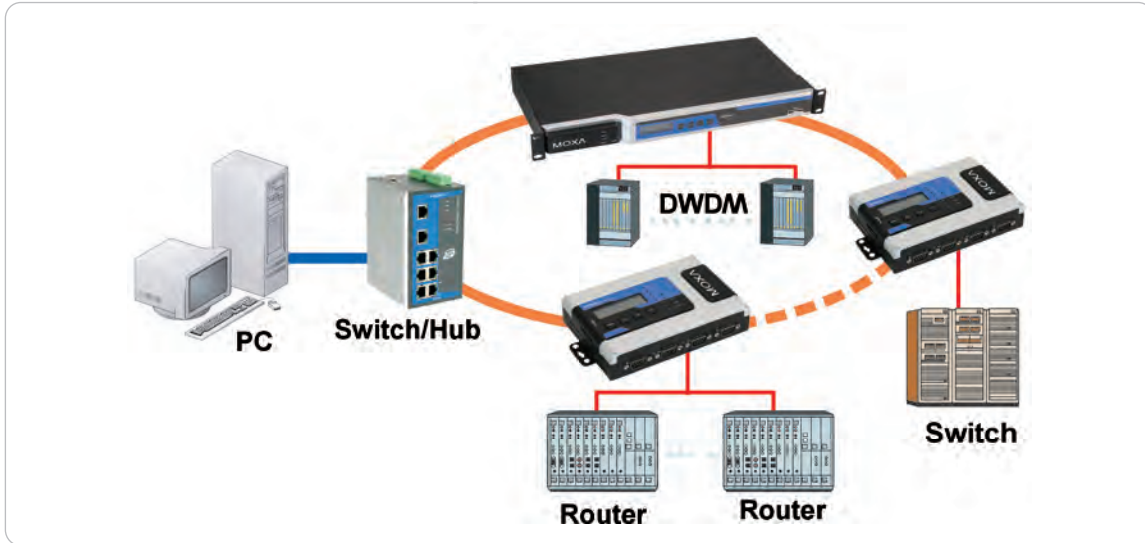
Redundant Ethernet (NPort® 6450/6600 only)

The NM-GPRS/GSM and NM-Modem network modules can be used to provide NPort® 6000 secure terminal servers with an automatic backup capability. When the backup function is enabled, the NPort® 6000 will check the remote host connection on the Ethernet side after powering on. Once a connection failure has occurred, data from the serial device will be sent out through the GSM/GPRS and PSTN network. When the remote host on the Ethernet side returns to normal status, data will again be sent through the Ethernet connection. The NPort® 6000 backup function makes data transmission safer and more reliable.
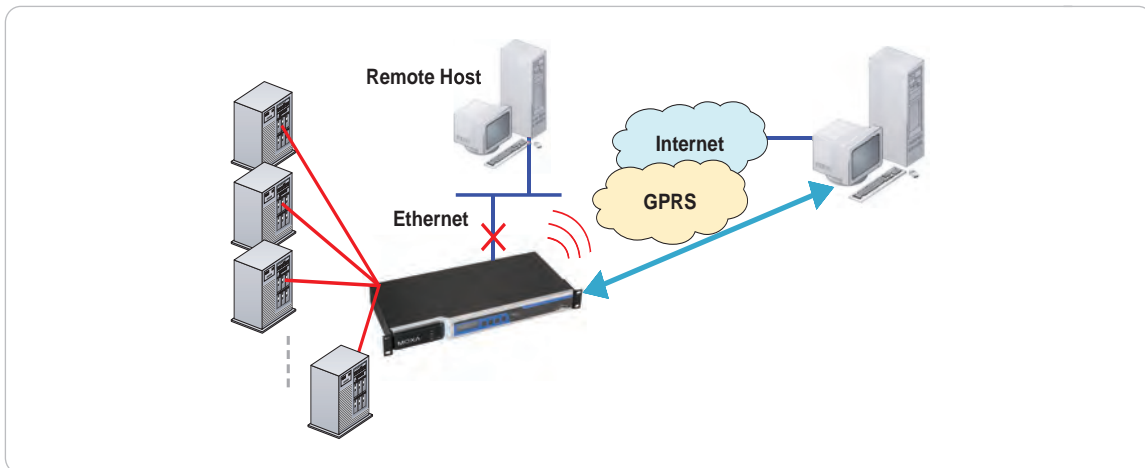
⋮ Flexible and Easy to Use Design

Supports ADSL Dial-up and DDNS

When serial devices are connected to an NPort® 6000 secure terminal server, any networked computer can be used to control the devices over an Ethernet network, intranet, or the Internet. Connections can be established using different operation modes, such as Real COM/TTY, TCP Server, and TCP Client. The NPort® 6000 also supports PPPoE for ADSL connections, and DDNS can be used to help locate NPort® 6000 secure terminal servers on the network. In addition, fiber optic models are available to extend the Ethernet connection distance.

Select Non-standard Baudrates between 50 bps and 921.6 Kbps

Engineers who use serial devices know that most device servers only support "standard" baudrates. However, some applications require special baudrates, such as 250 Kbps or 500 Kbps. One of the advantages of the NPort® 6000 device servers is that you can select any baudrate between 50 bps and 921.6 Kbps, allowing the NPort® 6000 to be used with serial devices that require special baudrates (the actual baudrate will be within 3% of the selected value; see the user's manual for details).

"Command by Command" Mode

For applications that require multiple hosts to communicate with one serial device, it is often necessary to require the NPort® to issue one command at a time. What this means is that after the NPort® issues a command, it waits for the next request before issuing another command. In other words, the NPort® issues a command, waits for a request, issues a command, waits for a request, and so on. The "command by command" mode is designed specifically for this kind of multi-host application. With command by command mode, after issuing each command, the NPort® 6000 waits for a response before sending out the next command.
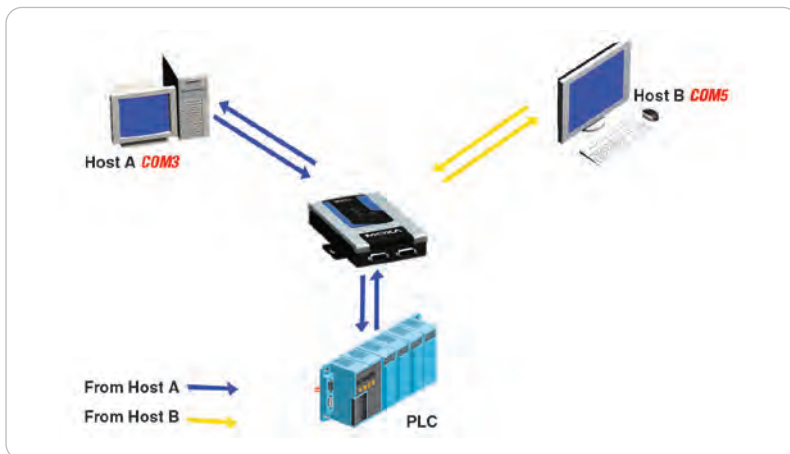
Two Powerful Utilities

The NPort® Search Utility and NPort® Windows Driver Manager make it easy for users to build a new system. After connecting the NPort® 6000 to your computer, or to a local network, use the NPort® Search Utility to search and load web console settings. After that, the NPort® Windows Driver Manager can be used to map NPort® 6000 serial ports to Windows COM ports.

NPort® Search Utility

NPort® Windows Driver Manager
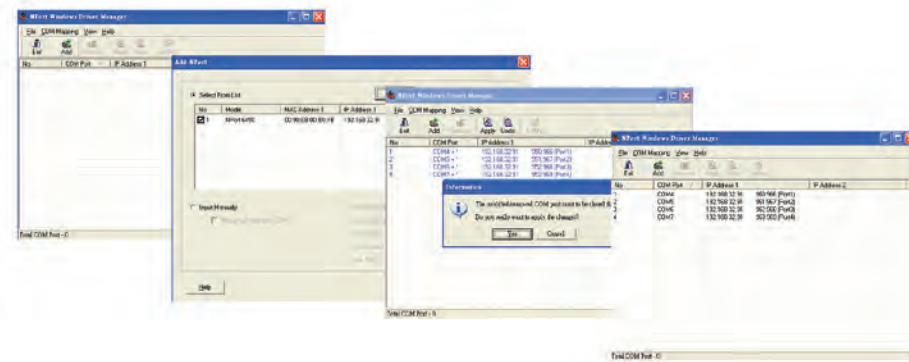
NPort® 6150

1-port RS-232/422/485 secure terminal server

> **Simple solution for connecting serial devices to a network**
> **Secure operation modes for Real COM, TCP Server, TCP Client, Pair Connection, Terminal, and Reverse Terminal**
> **Non-standard baudrates supported with high precision**
> **Automatic RS-485 data direction control with Moxa's patented ADDC®**
> **Enhanced remote configuration with HTTPS and SSH**
> **Port buffers for storing serial data when the Ethernet is off-line**
> **Supports IPv6**

Overview

The NPort® 6150 is a 1-port device server that uses the SSL and SSH protocols to transmit encrypted serial data over Ethernet. The NPort® 6150's 3-in-1 serial port supports RS-232, RS-422, and RS-485, with the interface selected from an easy-to-access configuration menu.

Secure Data Transmission

For many applications, guaranteeing secure data transmission is an important concern when connecting serial devices to a network. To answer this concern, the NPort® 6150 supports the SSL and SSH protocols, which work by encrypting data before sending it over the network. With the NPort® 6150, users can rest assured that serial data is transmitted securely over both private and public networks.

Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation: 1.5 KV built-in

Serial Interface
Number of Ports: 1
Serial Standards: RS-232/422/485
Connector: DB9 male
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)
Serial Line Protection: 15 KV ESD protection for all signals
Console Port: Serial port doubles as RS-232 console port

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS
Security Protocols: DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: 2.4.x, 2.6.x
Management: SNMP MIB-II
IP Routing: Static, RIP-I, RIP-II

Operation Modes
Standard: Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled
Secure: Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH

Applications
Terminal Sessions: 8 sessions per port

Physical Characteristics

Housing: Metal
Weight: 700 g
Dimensions:
Without ears: 67 x 100.4 x 28 mm (2.64 x 3.95 x 1.1 in)
With ears: 90 x 100.4 x 28 mm (3.54 x 3.95 x 1.1 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption: 285 mA @ 12 V, 150 mA @ 24 V
Power Line Protection: 1 KV burst (EN61000-4-4: EFT/B), 0.5 KV surge (EN61000-4-5)

Regulatory Approvals

EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
EN61000-4-2 (ESD): Level 3
EN61000-4-4 (EFT): Level 2
EN61000-4-5 (Surge): Level 2

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures): 231709 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty
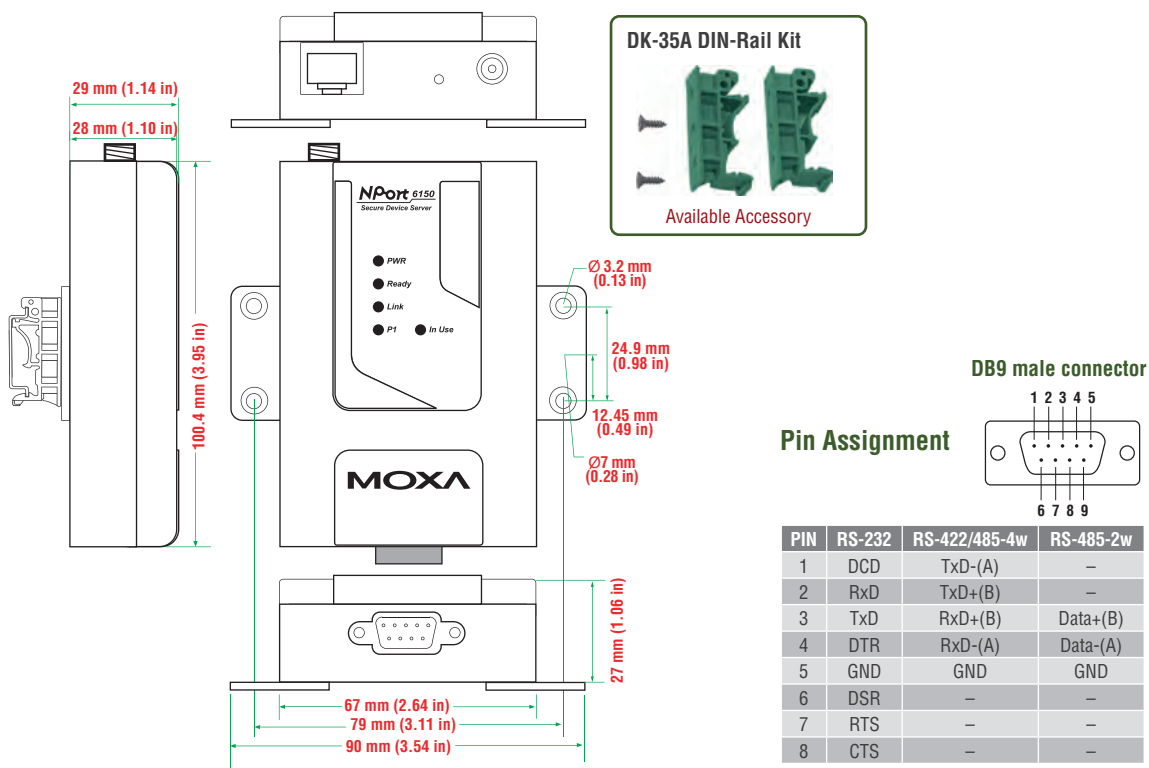
7

Terminal Servers > NPort® 6150

Dimensions

29 mm (1.14 in)
28 mm (1.10 in)

100.4 mm (3.95 in)

67 mm (2.64 in)
79 mm (3.11 in)
90 mm (3.54 in)

27 mm (1.06 in)

Ø 3.2 mm (0.13 in)
24.9 mm (0.98 in)
12.45 mm (0.49 in)
Ø7 mm (0.28 in)

DK-35A DIN-Rail Kit

Available Accessory

Pin Assignment

DB9 male connector

1 2 3 4 5
6 7 8 9

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

⁞ Ordering Information

Available Models

NPort 6150: 1-port RS-232/422/485 secure device server

Optional Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail
NP21101: DB25 male to DB9 female RS-232 cable, 30 cm

Package Checklist

- NPort® 6150 device server
- Power Adaptor
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

NPort® 6250 Series

2-port RS-232/422/485 secure terminal servers

> Simple solution for connecting serial devices to a network
> Secure operation modes for Real COM, TCP Server, TCP Client, Pair Connection, Terminal, and Reverse Terminal
> Non-standard baudrates supported with high precision
> Choice of network medium: 10/100BaseTX or 100BaseFX
> Enhanced remote configuration with HTTPS and SSH
> Port buffers for storing serial data when the Ethernet is off-line
> Supports IPv6

Overview

The 2-port NPort® 6250 device servers use the SSL and SSH protocols to transmit encrypted serial data over Ethernet. Models are available for connecting to a 10/100BaseTX copper Ethernet or 100BaseTX fiber network. Both single-mode and multi-mode fiber are supported.

Zero Data Loss if Ethernet Connection Fails

The NPort® 6250 device servers help guarantee reliability by providing users with secure serial-to-Ethernet data transmission and a customer-oriented hardware design. If the Ethernet connection fails, the NPort® 6250 will queue all serial data in its internal 64 KB port buffer. When the Ethernet connection is re-established, the NPort® 6250 will immediately release all of the data in the buffer in the order that it was received. Users can increase the port buffer size by installing an SD card.

Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation: 1.5 KV built-in

Optical Fiber Interface (NPort 6250-S-SC/6250-M-SC)
Fiber Port: 100BaseFX, SC connector
Distance:
Multi-mode: 0 to 2 km, 1310 nm (62.5/125 µm, 500 MHz*km)
Single mode: 0 to 40 km, 1310 nm (9/125 µm, 3.5 PS/(nm*km))
Min. TX Output:
Multi-mode: -20 dBm
Single-mode: -5 dBm
Max. TX Output:
Multi-mode: -14 dBm
Single-mode: 0 dBm
Sensitivity:
Multi-mode: -34 to -30 dBm
Single-mode: -36 to -32 dBm

Serial Interface
Number of Ports: 2
Serial Standards: RS-232/422/485
Connector: DB9 male
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)
Serial Line Protection: 15 KV ESD protection for all signals
Console Port: Serial port 1 doubles as RS-232 console port

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Memory Expansion Slot
Slot Type: SD socket (supports up to 1 GB)

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS
Security Protocols: DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i

Linux Real TTY Drivers: 2.4.x, 2.6.x
Management: SNMP MIB-II
IP Routing: Static, RIP-I, RIP-II

Operation Modes
Standard: Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled
Secure: Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH

Applications
Terminal Sessions: 8 sessions per port

Physical Characteristics
Housing: Metal
Weight: 730 g
Dimensions:
Without ears: 77 x 111 x 28 mm (3.30 x 4.37 x 1.1 in)
With ears: 89 x 111 x 28 mm (3.50 x 4.37 x 1.1 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort 6250: 333 mA @ 12 V, 173 mA @ 24 V
NPort 6250-M-SC: 428 mA @ 12 V, 219 mA @ 24 V
NPort 6250-S-SC: 376 mA @ 12 V, 193 mA @ 24 V
Power Line Protection: 1 KV burst (EN61000-4-4: EFT/B), 0.5 KV surge (EN61000-4-5)

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
EN61000-4-2 (ESD): Level 3
EN61000-4-4 (EFT): Level 2
EN61000-4-5 (Surge): Level 2

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort 6250: 226128 hrs
NPort 6250-M-SC: 225762 hrs
NPort 6250-S-SC: 225762 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
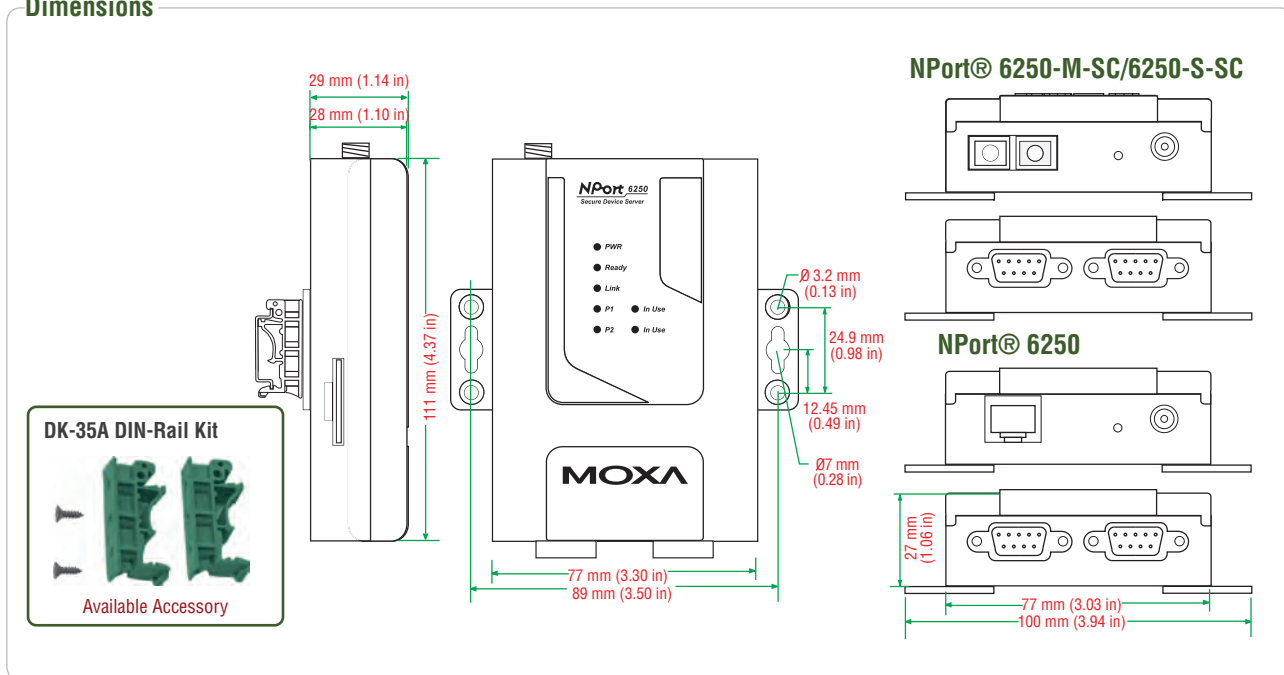
7

Terminal Servers > NPort® 6250 Series

Dimensions

NPort® 6250-M-SC/6250-S-SC

NPort® 6250

DK-35A DIN-Rail Kit

Available Accessory

Pin Assignment

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

DB9 male connector
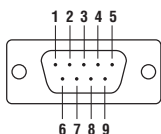
Ordering Information

Available Models
NPort 6250: 2-port secure device server, RS-232/422/485 to Ethernet
NPort 6250-M-SC: 2-port secure device server, RS-232/422/485 to multi-mode fiber (SC connector)
NPort 6250-S-SC: 2-port secure device server, RS-232/422/485 to single-mode fiber (SC connector)

Optional Accessories (can be purchased separately)
DK-35A: Mounting Kit for 35-mm DIN-Rail
NP21101: DB25 male to DB9 female RS-232 cable, 30 cm

Package Checklist
- NPort® 6250 device server
- Power Adaptor
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

NPort® 6450

4-port RS-232/422/485 secure terminal server

> LCD panel for easy IP address configuration
> Secure operation modes for Real COM, TCP Server, TCP Client, Pair Connection, Terminal, and Reverse Terminal
> Non-standard baudrates supported with high precision
> Port buffers for storing serial data when the Ethernet is off-line
> Supports IPv6
> Ethernet redundancy (STP/RSTP/Turbo Ring) with network module

Overview

The NPort® 6450 is a 4-port device server that uses the SSL and SSH protocols to transmit encrypted serial data over Ethernet. Up to 4 serial devices of any type can be connected to the NPort® 6450, with all four devices using the same IP address. The Ethernet port can be configured for a normal or secure TCP/IP connection.

No Data Loss if Ethernet Connection Fails

The NPort® 6450 is a reliable device server that provides users with secure serial-to-Ethernet data transmission and a customer-oriented hardware design. If the Ethernet connection fails, the NPort® 6450 will queue all serial data in its internal 64 KB port buffer. When the Ethernet connection is re-established, the NPort® 6450 will immediately release all data in the buffer in the order that it was received. Users can increase the port buffer size by installing an SD card.

Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation: 1.5 KV built-in

Optical Fiber Interface (with network module)
Fiber Port: 100BaseFX, SC connector
Distance:
Multi-mode: 0 to 2 km, 1310 nm (62.5/125 μm, 500 MHz*km)
Single mode: 0 to 40 km, 1310 nm (9/125 μm, 3.5 PS/(nm*km))
Min. TX Output:
Multi-mode: -20 dBm
Single-mode: -5 dBm
Max. TX Output:
Multi-mode: -14 dBm
Single-mode: 0 dBm
Sensitivity:
Multi-mode: -34 to -30 dBm
Single-mode: -36 to -32 dBm

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Connector: DB9 male
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)

Serial Line Protection: 15 KV ESD protection for all signals
Console Port: Serial port 1 doubles as RS-232 console port

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Memory Expansion Slot
Slot Type: SD socket (supports up to 1 GB)

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS
Security Protocols: DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded

Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i

Linux Real TTY Drivers: 2.4.x, 2.6.x

Management: SNMP MIB-II

IP Routing: Static, RIP-I, RIP-II

Operation Modes

Standard: Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled

Secure: Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH

Applications

Terminal Sessions: 8 sessions per port

Physical Characteristics

Housing: Metal, IP30 protection

Weight: 1020 g

Dimensions:
Without ears: 158 x 103 x 35 mm (6.22 x 4.06 x 1.38 in)
With ears: 181 x 103 x 35 mm (7.13 x 4.06 x 1.38 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 70°C (-4 to 158°F)

Power Requirements

Input Voltage: 12 to 48 VDC

Power Consumption: 730 mA @ 12 V, 330 mA @ 24 V

Power Line Protection: 1 KV burst (EN61000-4-4: EFT/B), 0.5 KV surge (EN61000-4-5)

Regulatory Approvals

EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A

Safety: UL (UL60950-1), TÜV (EN60950-1)

EN61000-4-2 (ESD): Level 3

EN61000-4-4 (EFT): Level 2

EN61000-4-5 (Surge): Level 2

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)

Automatic Reboot Trigger: Built-in WDT (watchdog timer)

MTBF (meantime between failures): 120354 hrs

Warranty

Warranty Period: 5 years
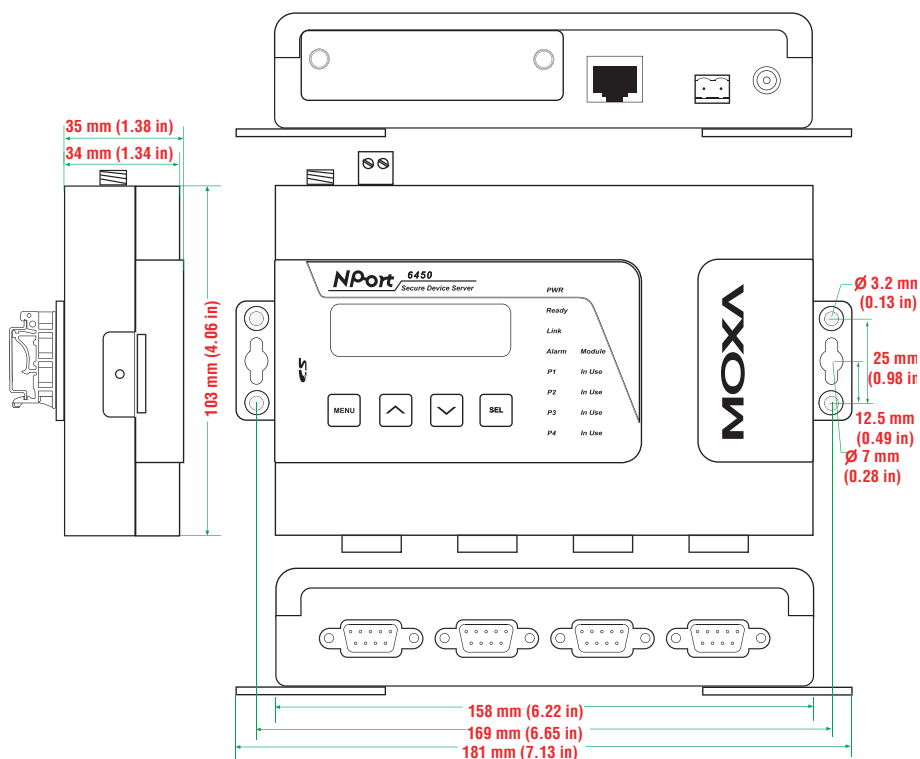
Details: See www.moxa.com/warranty

Dimensions

Pin Assignment

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

DB9 male connector

1 2 3 4 5

6 7 8 9
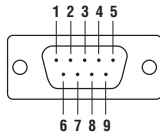
Ordering Information

Available Models

NPort 6450: 4-port secure device server, RS-232/422/485 to Ethernet

Optional Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail

Package Checklist

- NPort® 6450 secure device server
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Expansion Modules			Use with the following NPort® models					
			6150	6250	6450	6610-8 6650-8	6610-16 6650-16	6610-32 6650-32
NM-TX01		1 10/100BaseTX port	–	–	✓	✓	✓	✓
NM-TX02		2 10/100BaseTX port	–	–	✓	✓	✓	✓
NM-FX01-S-SC		1 100BaseFX port, single mode, SC connector	–	–	✓	✓	✓	✓
NM-FX01-M-SC		1 100BaseFX port, multi mode, SC connector	–	–	✓	✓	✓	✓
NM-FX02-S-SC		2 100BaseFX ports, single mode, SC connector	–	–	✓	✓	✓	✓
NM-FX02-M-SC		2 100BaseFX ports, multi mode, SC connector	–	–	✓	✓	✓	✓
NM-GPRS/GSM		1 GPRS/GSM modem module	–	–	✓	✓	✓	✓
NM-Modem		1 PSTN modem port with RJ11 connector	–	–	✓	✓	✓	✓

Note: Expansion modules can be purchased separately.

NPort® 6600 Series

8/16/32-port RS-232/422/485 rackmount terminal servers

> Up to 32 ports for high density environments
> Non-standard baudrates supported with high precision
> Port buffers for storing serial data when the Ethernet is off-line
> Supports IPv6
> Ethernet redundancy (STP/RSTP/Turbo Ring) with network module
> Modular design for network expansion
> Secure data transmission

7

Terminal Servers ‹ NPort® 6600 Series

Overview

The NPort® 6600 series of secure device servers is the right choice for applications that use large numbers of serial devices packed into a small space. If you're worried about security, you can rest assured with the NPort® 6600, since it supports DES, 3DES, and AES, the three most common standards for data encryption. Serial devices of any type can be connected to the NPort® 6600, and each serial port on the NPort® can be configured independently for RS-232, RS-422, or RS-485 transmission.

LCD Panel Makes Configuration Easy

The NPort® 6600 has a built-in LCD panel for configuration. The panel displays the server name, serial number, and IP address, and any of the device server's configuration parameters, such as IP address, netmask, and gateway address, can be updated easily and quickly.

Adjustable Resistor Values for RS-485 Communication

The NPort® 6600 provides adjustable termination, pull high, and pull low resistors for RS-485 communication. In some critical environments, termination resistors may be needed to prevent the reflection of serial signals, and the pull high and pull low resistors may need adjusting to maintain the integrity of the electrical signal. Since no set of resistor values works for every environment, the NPort® 6600 allows manual adjustment of the resistor values for each serial port using built-in DIP switches.
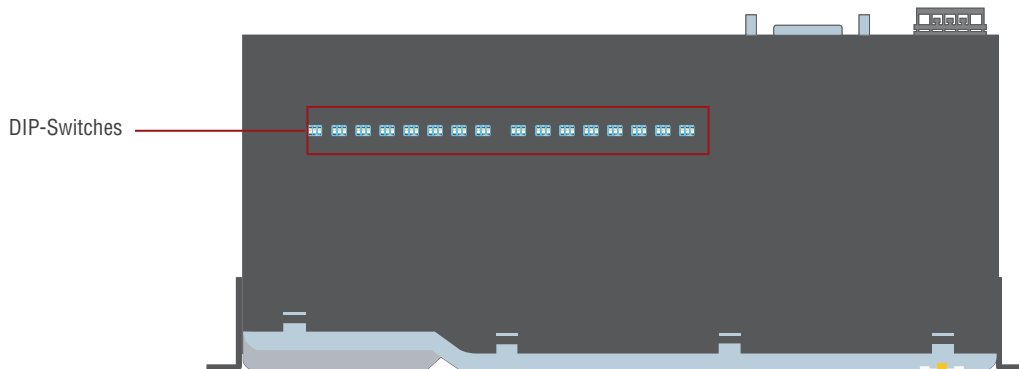
DIP-Switches

: Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation: 1.5 KV built-in

Optical Fiber Interface (with network module)
Fiber Port: 100BaseFX, SC connector
Distance:
Multi-mode: 0 to 2 km, 1310 nm (62.5/125 μm, 500 MHz*km)
Single mode: 0 to 40 km, 1310 nm (9/125 μm, 3.5 PS/(nm*km))
Min. TX Output:
Multi-mode: -20 dBm
Single-mode: -5 dBm
Max. TX Output:
Multi-mode: -14 dBm
Single-mode: 0 dBm
Sensitivity:
Multi-mode: -34 to -30 dBm
Single-mode: -36 to -32 dBm

Serial Interface
Number of Ports: 8, 16, or 32
Serial Standards:
NPort 6610: RS-232
NPort 6650: RS-232/422/485
Connector: 8-pin RJ45
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)
Serial Line Protection: 15 KV ESD protection for all signals
Console Port: Dedicated RS-232 console port on rear panel (8-pin RJ45)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 120 Ω

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Memory Expansion Slot
Slot Type: SD socket (supports up to 1 GB)

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS
Security Protocols: DES, 3DES, AES, SSH, SSL, HTTPS, RADIUS, PAP, CHAP, TACACS+
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: 2.4.x, 2.6.x
Management: SNMP MIB-II
IP Routing: Static, RIP-I, RIP-II

Operation Modes
Standard: Real COM, TCP Server, TCP Client, UDP, Pair Connection, RFC2217, Terminal, Reverse Telnet, Ethernet Modem, Printer, PPP, Disabled
Secure: Secure Real COM, Secure TCP Server, Secure TCP Client, Secure Pair Connection, SSH, Reverse SSH

Applications
Terminal Sessions: 8 sessions per port

Physical Characteristics
Housing: Metal, IP30 protection
Weight:
NPort 6600-8: 3460 g
NPort 6600-16: 3580 g
NPort 6600-32: 3600g
Dimensions:
Without ears: 440 x 195 x 44 mm (17.32 x 7.68 x 1.73 in)
With ears: 480 x 195 x 44 mm (18.9 x 7.68 x 1.73 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)

Power Requirements
Input Voltage:
AC Models: 100 to 240 VAC
DC Models: ±48 VDC (20 to 72 VDC, -20 to -72 VDC)
Power Consumption:
AC Models: 285 mA @ 100 VAC, 190 mA @ 240 VAC
DC Models: 293 mA @ 48 VDC
Power Line Protection: 1 KV burst (EN61000-4-4: EFT/B), 0.5 KV surge (EN61000-4-5)

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
EN61000-4-2 (ESD): 4 KV contact
EN61000-4-4 (EFT): 1 KV power
EN61000-4-5 (Surge): 2 KV power

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort 6610-8: 135891 hrs
NPort 6610-16: 102373 hrs
NPort 6610-32: 68707 hrs
NPort 6650-8: 135370 hrs
NPort 6650-16: 101783 hrs
NPort 6650-32: 68177 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions and Pin Assignment
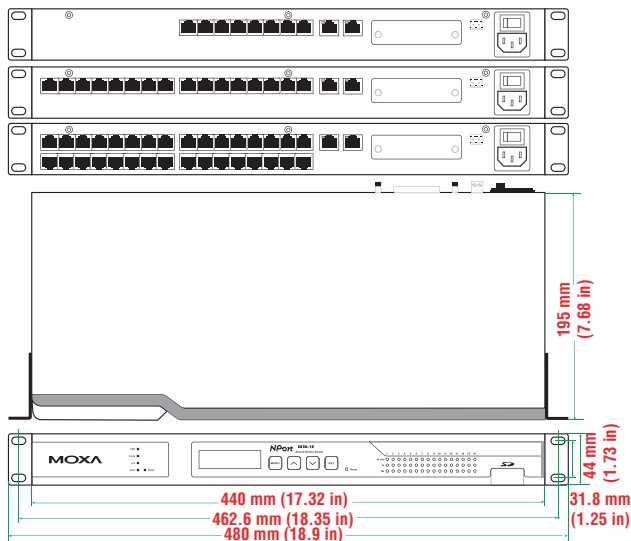
8-pin RJ45 connector
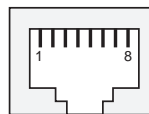
PIN	RS-232	RS-422/485-4W	RS-485-2w
1	DSR (in)	–	–
2	RTS (out)	TxD+	–
3	GND	GND	GND
4	TxD (out)	TxD-	–
5	RxD (in)	RxD+	Data+
6	DcD (in)	RxD-	Data-
7	CTS (in)	–	–
8	DTR (out)	–	–

195 mm (7.68 in)

44 mm (1.73 in)

440 mm (17.32 in)
462.6 mm (18.35 in)
480 mm (18.9 in)

31.8 mm (1.25 in)

⋮ Ordering Information

Available Models

NPort 6610-8: 8-port RS-232 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6610-8-48V: 8-port RS-232 to Ethernet secure terminal server, ±48 VDC power input
NPort 6610-16: 16-port RS-232 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6610-16-48V: 16-port RS-232 to Ethernet secure terminal server, ±48 VDC power input
NPort 6610-32: 32-port RS-232 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6610-32-48V: 32-port RS-232 to Ethernet secure terminal server, ±48 VDC power input
NPort 6650-8: 8-port RS-232/422/485 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6650-8-48V: 8-port RS-232/422/485 to Ethernet secure terminal server, ±48 VDC power input
NPort 6650-16: 16-port RS-232/422/485 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6650-16-48V: 16-port RS-232/422/485 to Ethernet secure terminal server, ±48 VDC power input
NPort 6650-32: 32-port RS-232/422/485 to Ethernet secure terminal server, 100 to 240 VAC power input
NPort 6650-32-48V: 32-port RS-232/422/485 to Ethernet secure terminal server, ±48 VDC power input

Optional Accessories (can be purchased separately)

Serial Cables and Adaptors: See Appendix A for details

Package Checklist

- NPort® 6600 device server
- CBL-RJ45M9-150: 8-pin RJ45 to DB9 male connection cable, 150 cm
- Power Cord (AC models only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Expansion Modules			Use with the following NPort® models					
			6150	6250	6450	6610-8 6650-8	6610-16 6650-16	6610-32 6650-32
NM-TX01		1 10/100BaseTX port	–	–	✓	✓	✓	✓
NM-TX02		2 10/100BaseTX port	–	–	✓	✓	✓	✓
NM-FX01-S-SC		1 100BaseFX port, single mode, SC connector	–	–	✓	✓	✓	✓
NM-FX01-M-SC		1 100BaseFX port, multi mode, SC connector	–	–	✓	✓	✓	✓
NM-FX02-S-SC		2 100BaseFX ports, single mode, SC connector	–	–	✓	✓	✓	✓
NM-FX02-M-SC		2 100BaseFX ports, multi mode, SC connector	–	–	✓	✓	✓	✓
NM-GPRS/GSM		1 GPRS/GSM modem module	–	–	✓	✓	✓	✓
NM-Modem		1 PSTN modem port with RJ11 connector	–	–	✓	✓	✓	✓

Note: Expansion modules can be purchased separately.

7

Terminal Servers › NPort® 6600 Series

NM-GPRS/GSM Module

4-port cellular NM-GPRS/GSM module (for the NPort® 6400/6600 series)

> Quad-band 900/1800, 850/1900 MHz GSM/GPRS
> Cellular Status/Signal LED indicator
> GPRS Class 10
> CSD data connection
> Up to 14,400 bps in Circuit Switched Data mode
> Short message alerts
> Real COM mode supported

Quad-band GSM/GPRS Communication

Most countries in the world use the GSM-900 and GSM-1800 cellular frequencies. However, in the United States, Canada, and other parts of the Americas, GSM-850 and GSM-1900 are used. With the NM-GPRS/GSM quad-band cellular module, you don't need to worry about selecting different products for different parts of the world. The NM-GPRS/GSM module's GSM/GPRS band is configured at 900/1800 MHz by default, but can be easily reconfigured to 850/1900 MHz.

850 MHz
The Americas
1800 MHz

900 MHz
Other Countries
1900 MHz

Real COM Mode

NPort® products come with Real COM drivers for Windows operating systems and Real TTY drivers for Linux operating systems used in a GSM/GPRS network environment. In Real COM mode, the bundled drivers are able to establish a transparent connection between a host and a serial device by mapping the serial port on the NPort® to a local COM/TTY port on the host computer. One of the major conveniences of using Real COM mode is that it allows you to use software that was written for pure serial communication applications.

COM 3=IP Port   Internet   GSM/GPRS   **Real COM mode**   RS-232/422/485   **Device**

GSM CSD Data Connection

CSD (Circuit Switched Data) provides direct modem access to remote devices, and system extensions can be used without installing cables and data lines. CSD transmits data at 9.6 to 14.4 Kbps to both GSM networks and the PSTN switching subsystem by calling direct. CSD overcomes the limitations of hard wiring and inaccessible terrain for easier, more flexible data collection and monitoring of applications that use NPort® device servers.

GPRS   Internet   GPRS

Overview

A GPRS packet-switched system can be viewed as a special IP network that offers IP connectivity to IP terminals. Devices without PPP or TCP/IP capability can be easily connected to the IP network and the Internet through GPRS by using the NPort® GSM/GPRS module.

GSM   PSTN   GSM

GSM/GPRS Backup Application

The NM-GPRS/GSM module can be used to provide the NPort® with automatic backup capability. When the backup function is enabled, the NPort® will check the remote host's connection on the Ethernet side after power-on. If a connection failure occurs, data from the serial device will be sent out through the GSM/GPRS network. When the remote host on the Ethernet side returns to normal status, data will again be sent through the Ethernet connection. The NPort® backup function makes your data transmission safer and more reliable.
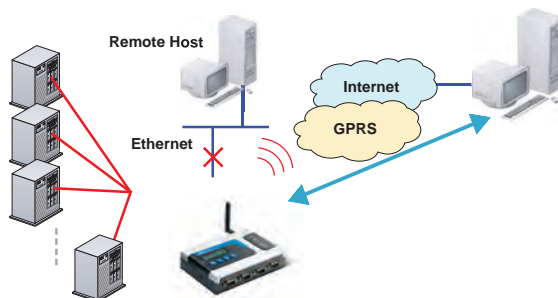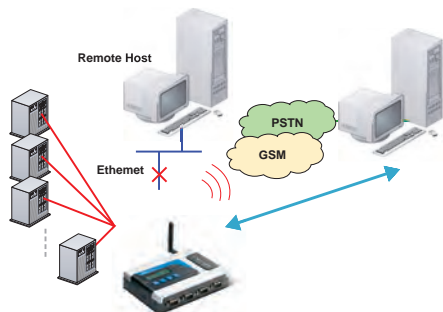
SMS Alerts by Event

The NM-GPRS/GSM module provides the NPort® device server with an SMS alert function that support up to 4 phone numbers. As shown in the table, there are four event categories (System, Network, Configure, and Serial Port), and a total of eight different options that can be configured.

System Events	Network Events	Configure Events	Serial Port Events
Cold start	Ethernet link down	Console login authentication failure	DCD changed
Warm start	–	Ethernet IP changed	DSR changed
–	–	Password changed	–
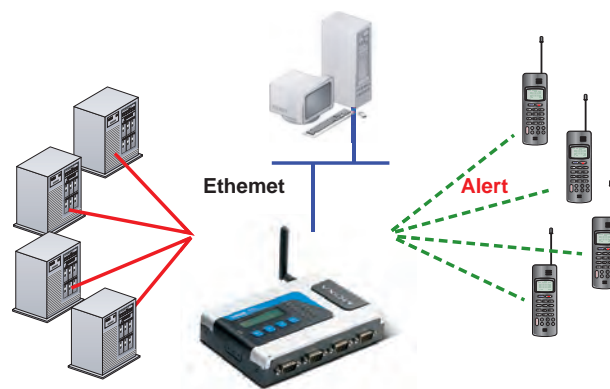
Appearance
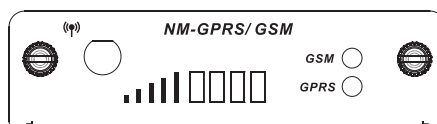
Cellular Status and Signal Strength LEDs	
GSM	Lights up when the GSM is connected
GPRS	Lights up when the GPRS is connected
Signal Strength	Number of lit LEDs indicates the signal strength

Specifications

Cellular Interface
Standards: GSM and GPRS
Band Options: 850/900 MHz and 1800/1900 MHz quad-band
GPRS Multi-slot Class: Class 10
GPRS Terminal Device Class: Class B
GPRS Coding Schemes: CS1 to CS4

CSD Data Transmission Rate: Up to 14,400 bps
SIM Control: Point-to-point Text/PDU, Mobile Originated (MO) and Mobile Terminated (MT Cell Broadcast is in accordance with GSM 07.05)
Antenna: SMA female type connecter, 50 W impedance and 1 dBm peak gain

NM-Modem Module

PSTN modem network module (for the NPort® 6400/6600 series)

> Dial-in
> Dial-out
> Auto-answer
> PSTN leased-line mode (modem always on)
> PSTN economy-line mode (modem connects periodically)
> PSTN backup mode

Overview

The NM-Modem PSTN module can be used with any of the 4, 8, 16, and 32-port models. The module enables NPort® 6000 terminal servers to transmit data over PSTN networks.

Real COM Mode Supported

NPort® 6000 device servers come with Real COM /TTY drivers for PSTN network applications. Real COM drivers are available for Windows operating systems and Real TTY drivers are available for Linux operating systems. In Real COM mode, the drivers can establish a transparent connection between a host and a serial device by mapping an NPort® 6000 serial port to a local COM/TTY port on the host computer. One of the major conveniences of using Real COM mode is that you can use software that was written for pure serial communication applications.
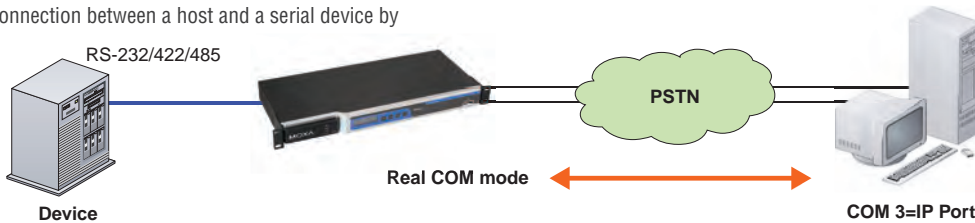
PSTN Leased-line Mode—Modem Always On

When Trunk-line mode is being used, the PSTN connection is always on, and data coming from the serial device will be sent out through the PSTN network as soon as the NPort® receives the data. In addition, the remote PC/Server will be able to manage the NPort® and poll for data from the serial device through the PSTN. Once the NPort® 6000 is powered on, the NM-Modem will always be on, making this operation mode suitable for applications that use a PSTN leased line.

PSTN Economy-line Mode

When Economy-line mode is being used, the PSTN connection is activated periodically. In this case, data coming from the serial device will be stored in the NPort's buffer until the next PSTN activation time. Only then will the data be sent out through the PSTN network. In addition, when the PSTN connection is active, the remote PC/Server will be able to manage the NPort and poll for data from the serial device through the PSTN. When in Economy-line mode, the NPort® will de-activate the PSTN line if there is no data transmission activity for a preset idle time. Economy-line mode is suitable for non-urgent data transmission and message collection applications, and for applications that use a non-leased PSTN line.
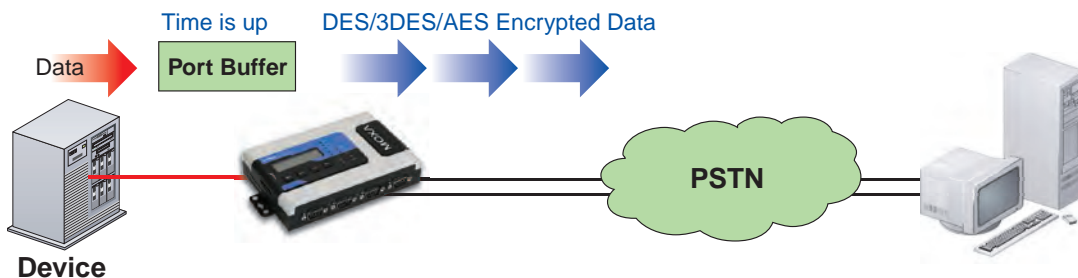
PSTN Backup Mode

The NM-Modem module can be used to provide the NPort® with an automatic backup over a PSTN. When the backup function has been enabled, the NPort® will activate the PSTN line whenever the Ethernet fails. The backup data can either be sent to the same PC/server, or to an alternate backup machine. While the PSTN is active, the NPort® will repeatedly ping the PC/Server host over the Ethernet until it receives a response. Once the NPort® determines that the Ethernet has been re-activated, the PSTN will be de-activated, and the NPort® will resume sending and receiving data over the Ethernet.

Normal Status

Backup Status

Appearance

LED Indicators

LED Name	Color	Meaning
DCD	Green	Carrier detected
	Off	No carrier detected
TxD	Green	Data is being transmitted to the PSTN
	Off	No data is being transmitted through the PSTN
RxD	Green	Data is being received from the PSTN
	Off	No data is being received through the PSTN
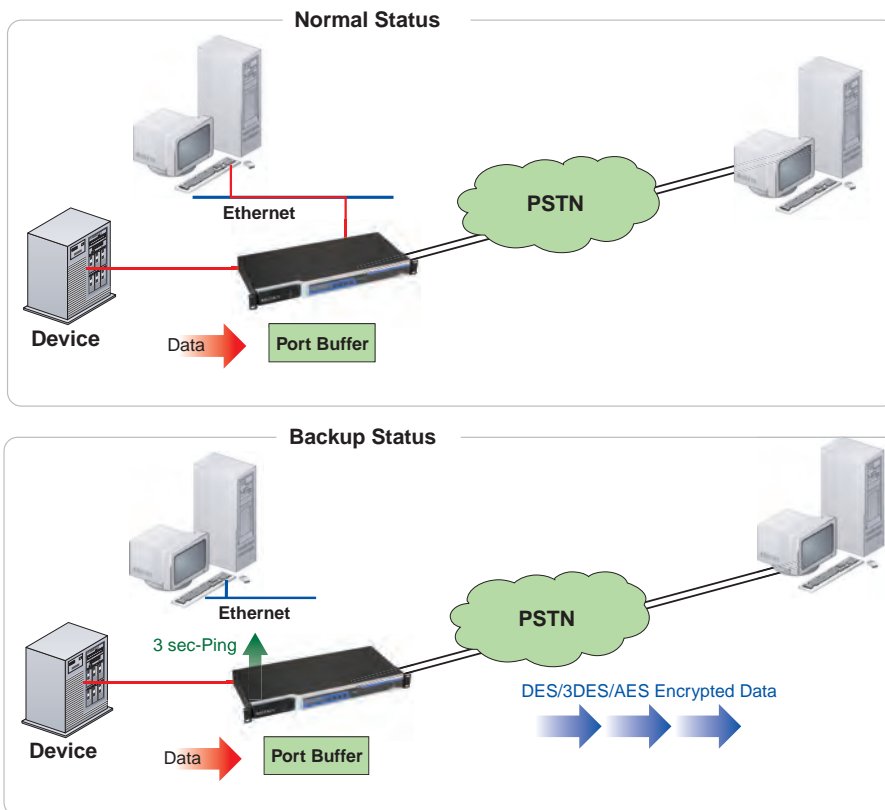
Specifications

Modem
Serial I/O Interface: 3 V TTL
Error Correction: V.42, MNP 2-4, 10-error
V92HM-RC Data Rate: 56 Kbps max.
Data Compression: V.42bis and MNP-5
336HM-RC Data Rate: 33.6 Kbps max.
FAX: 14.4K send/receive
144HM-RC Data Rate: 24.4 Kbps max.
Additional Features:
• Low Power Sleep Mode
• Caller ID and DTMF tone detection
• Digital Line Guardd Protection
• Extension Pickup, Line in Use Detection
• Completely Integrated On Board DAA

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Regulatory Approvals
Medical Device: EN60601-1
FCC/IC: FCC Part 68 and IC CS03 approved
UL: UL 60950 recognized component
Green Product: RoHS compliant
CE Certification: EN60950-1, IEC 60950-1, EN55024, EN55022, TS103 021-2

Terminal Servers > NM-Modem Module

7

CN2600 Series

8 and 16-port RS-232/422/485 terminal servers with dual LAN redundancy

> LCD panel for easy IP address configuration
> Dual-LAN cards with two independent MAC addresses and IP addresses
> Redundant COM function available when both LANs are active
> Dual-host redundancy can be used to add a backup PC to your system
> Dual AC power inputs
> Real COM/TTY drivers for Windows and Linux

: Overview

Redundancy is an important issue for industry, and several different solutions have been developed to prevent damage caused by equipment or software failures. "Watchdog" hardware is required to utilize redundant hardware, and a "Token" switching mechanism is required for software. The CN2600 terminal server uses its built-in dual-LAN ports to implement a "redundant COM" mode that keeps your applications running smoothly.

Dual-LAN Redundancy

The CN2600 has two separate LAN ports that can be connected to separate LAN networks. Dual-LAN redundancy involves setting up two separate physical networks to connect the PC host with the CN2600. In this case, the PC host must also be installed with two LAN cards. If one of the networks fails, the PC host will still be able to communicate with your serial devices over the redundant LAN.

Redundant COM

The "Redundant COM" (patent pending) operation mode can be used to set up a redundant LAN between the CN2600's COM ports and the host computer. The redundant structure involves using the CN2600's two LAN ports to set up two independent LANs that connect the CN2600 to the host computer. If either of the two LANs fails, the other LAN will continue transmitting packets between the serial devices and the host, with the data transmitted through the CN2600. One of the biggest advantages of using Moxa's Redundant COM mode is that the "switching time" is zero. What this means is that if one of the LANs fails, data transmission between the PC host the serial devices will not be interrupted.

Dual-host Redundancy

The CN2600's dual LAN cards can also be used to set up "dual-host" redundancy. In this case, both networks (LAN A and LAN B in the figure) are connected to two different hosts. If either of the two hosts shuts down unexpectedly, the other host will continue transmitting packets to (and receiving packets from) the serial devices connected to the CN2600.

Dual-LAN Redundancy

Redundant COM

Dual-host Redundancy
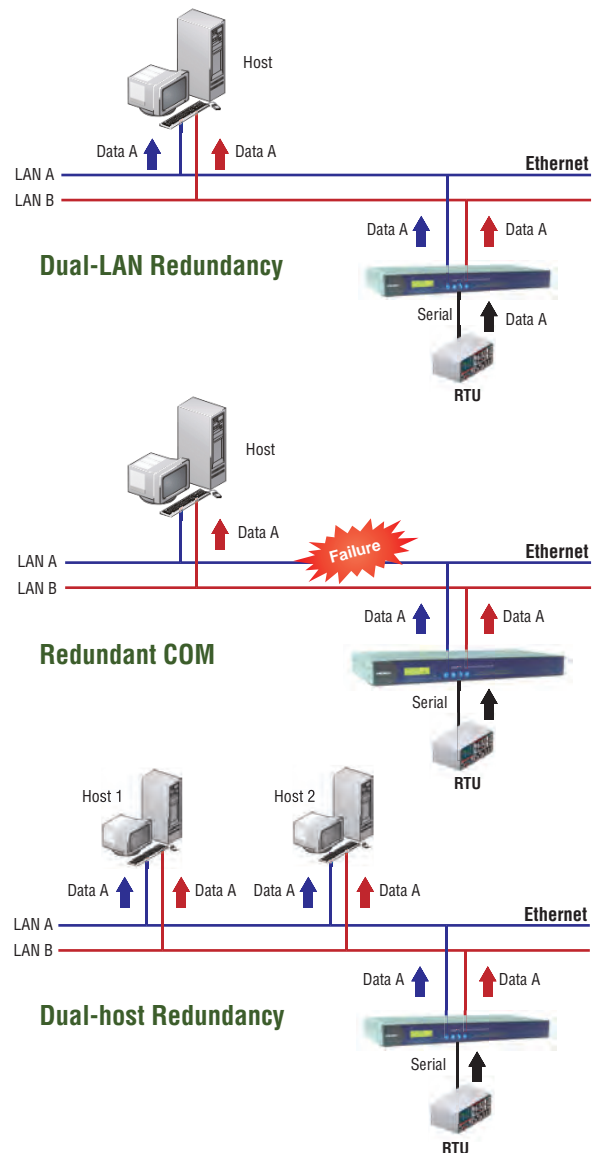
Dual-AC Model Supported

Dual-power redundancy uses two power inputs and redundant internal power supplies to ensure that all of the CN2600's functions will be available, even in the event of power circuit failures.
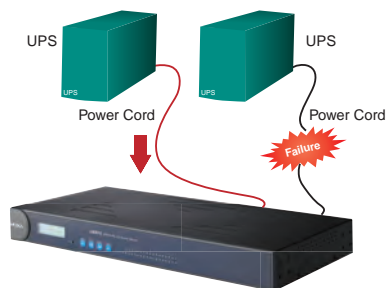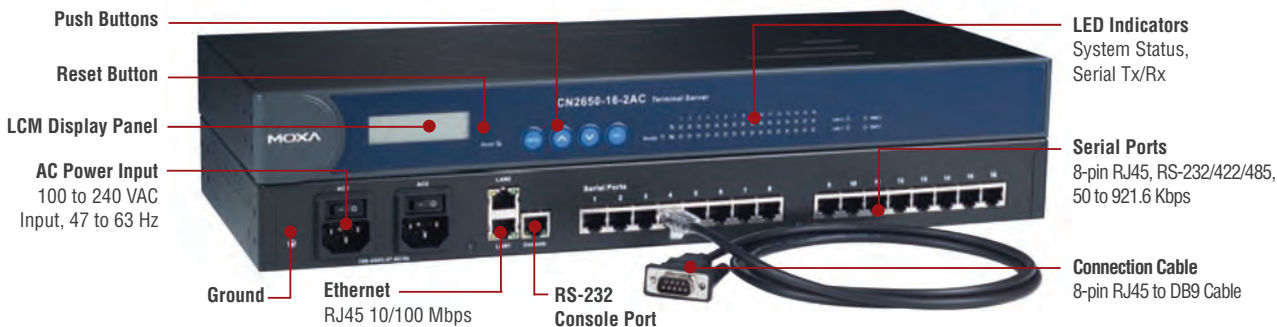
7

: Appearance

Push Buttons

Reset Button

LCM Display Panel

AC Power Input
100 to 240 VAC
Input, 47 to 63 Hz

Ground

Ethernet
RJ45 10/100 Mbps

RS-232 Console Port

LED Indicators
System Status,
Serial Tx/Rx

Serial Ports
8-pin RJ45, RS-232/422/485,
50 to 921.6 Kbps

Connection Cable
8-pin RJ45 to DB9 Cable

: Specifications

Ethernet Interface
Number of Ports: 2 (2 IPs)
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation: 1.5 KV built-in

Serial Interface
Number of Ports: 8 or 16
Serial Standards:
CN2610: RS-232
CN2650/2650I: RS-232/422/485
Connector:
CN2610/2650: 8-pin RJ45
CN2650I: DB9 male
RS-485 Data Direction Control: ADDC® (Automatic Data Direction Control)
Serial Line Protection:
15 KV ESD protection for all signals
2 KV optical isolation (CN2650I)
Console Port: Dedicated RS-232 console port on rear panel (8-pin RJ45)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 120 Ω

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, ARP, PPPoE, DDNS
Security Protocols: RADIUS, HTTPS, SSH, PAP, CHAP
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: 2.4.x, 2.6.x
Management: SNMP MIB-II
IP Routing: Static, RIP-I, RIP-II

Operation Modes
Standard: Real COM, TCP Server, TCP Client, UDP, RFC2217, Terminal, Reverse Telnet, PPP, DRDAS, Redundant COM, Disabled

Applications
Terminal Sessions: 8 sessions per port

Physical Characteristics
Housing: Metal, IP30 protection
Weight:
CN2610-8: 3525 g
CN2610-16: 3560 g
CN2610-8-2AC: 3760 g
CN2610-16-2AC: 3810 g
CN2650-8: 3740 g
CN2650-16: 3790 g
CN2650-8-2AC: 3900 g
CN2650-16-2AC: 3980 g
CN2650I-8: 3666 g
CN2650I-16: 3776 g
CN2650I-8-2AC: 3932 g
CN2650I-16-2AC: 4022 g
Dimensions:
Without ears: 440 x 198 x 45 mm (17.32 x 7.80 x 1.77 in)
With ears: 480 x 198 x 45 mm (18.9 x 7.80 x 1.77 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)

Power Requirements
Input Voltage: 100 to 240 VAC, 47 to 63 Hz
Power Consumption: 235 mA @ 100 VAC, 145 mA @ 240 VAC
Power Line Protection: 1 KV burst (EN61000-4-4: EFT/B), 2 KV surge (EN61000-4-5)

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950), TÜV (EN60950)
EN61000-4-2 (ESD): Level 3
EN61000-4-4 (EFT): Level 4
EN61000-4-5 (Surge): Level 2

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures): 99302 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
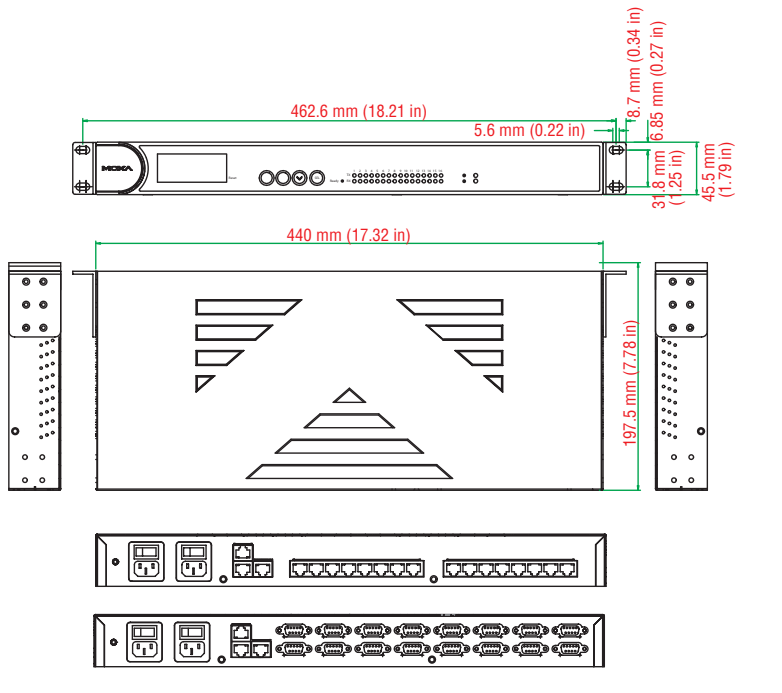
Pin Assignment

8-pin RJ45 connector
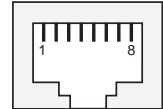
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DSR	–	–
2	RTS	TxD+(B)	–
3	GND	GND	GND
4	TxD	TxD-(A)	–
5	RxD	RxD+(B)	Data+(B)
6	DCD	RxD-(A)	Data-(A)
7	CTS	–	–
8	DTR	–	–

DB9 male connector
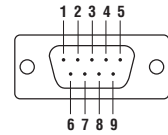
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

⁝ Ordering Information

Available Models
CN2610-8: Dual-LAN terminal server with 8 RS-232 ports
CN2610-16: Dual-LAN terminal server with 16 RS-232 ports
CN2610-8-2AC: Dual-LAN, dual-AC-power terminal server with 8 RS-232 ports
CN2610-16-2AC: Dual-LAN, dual-AC-power terminal server with 16 RS-232 ports
CN2650-8: Dual-LAN terminal server with 8 RS-232/422/485 ports
CN2650-16: Dual-LAN terminal server with 16 RS-232/422/485 ports
CN2650-8-2AC: Dual-LAN, dual-AC-power terminal server with 8 RS-232/422/485 ports
CN2650-16-2AC: Dual-LAN, dual-AC-power terminal server with 16 RS-232/422/485 ports
CN2650I-8: Dual-LAN terminal server with 8 RS-232/422/485 ports and 2 KV optical isolation
CN2650I-16: Dual-LAN terminal server with 16 RS-232/422/485 ports and 2 KV optical isolation
CN2650I-8-2AC: Dual-LAN, dual-AC-power terminal server with 8 RS-232/422/485 ports and 2 KV optical isolation
CN2650I-16-2AC: Dual-LAN, dual-AC-power terminal server with 16 RS-232/422/485 ports and 2 KV optical isolation

Optional Accessories (can be purchased separately)
Serial Cables and Adaptors: See Appendix A for details

Package Checklist
- CN2600 terminal server
- CBL-RJ45F9-150: 8-pin RJ45 to DB9 female connection cable, 150 cm
- 2 power cords (AC models only)*
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Serial-to-Ethernet Device Servers

8

Serial-to-Ethernet Device Servers

Combo Switch / Serial Device Server

NPort S8000: Ethernet Switch Specifications

Ethernet Interface	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100Base FX IEEE 802.3x for Flow Control IEEE 802.1D for Spanning Tree Protocol IEEE 802.1w for Rapid STP IEEE 802.1Q for VLAN Tagging IEEE 802.1p for Class of Service IEEE 802.1X for Authentication IEEE 802.3ad for Port Trunk with LACP
Network Protocols	ICMP, IP, TCP, UDP, ARP, Telnet, DNS, HTTP, SMTP, SNTP, IGMPv1/v2 device, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 82, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON
MIB	MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control	IEEE 802.3x flow control, back pressure flow control interface

Switch Properties	
Priority Queues	4
Max. Number of Available VLANs	64
VLAN ID Range	VID 1 to 4094
IGMP Groups	256

Switch Interface	
Optical Fiber Interface	Multi-mode or Single-mode
RJ45 Ports	10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
DIP Switches	Turbo Ring, Master, Coupler, Reserve
Alarm Contact	2 relay outputs with current carrying capacity of 1A @ 24 VDC

NPort S8000: Device Server Specifications

Serial Interface	
Number of Ports	4
Serial Standards	RS-232/422/485
Connectors	DB9 male
Serial Line Protection	15 KV ESD protection for all signals 2 KV isolation protection
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485	1 KΩ, 150 KΩ
Terminator for RS-485	55 Ω, 120 Ω
Console Port	Dedicated RS-232 console port (8-pin RJ45)

Serial Communication Parameters	
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Parity	None, Even, Odd, Space, Mark
Flow Control	RTS/CTS and XON/XOFF
Baudrate	50 bps to 921.6 Kbps

Serial Signals	
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Software	
Configuration Options	Web Console, Telnet Console, Serial Console, Windows Search Utility
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers	2.4.x, 2.6.x
Operation Modes	Real COM, TCP Server, TCP Client, UDP, RFC2217
Management	SNMP MIB-II
IP Routing	Static, RIP-I, RIP-II

Reliability	
Alert Tools	Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger	Built-in WDT (watchdog timer)

NPort S8000: General Specifications

Port Summary	
Serial Ports	4 RS-232/422/485 ports
Ethernet Switch Ports	3 RJ45 copper ports, 2 multi-mode fiber ports
Console Ports	1 (8-pin RJ45 connector)
LED Indicators	PWR1, PWR2, READY, MASTER, COUPLER, LINK4, LINK5

Physical Characteristics	
Housing	Metal
Weight	995 g
Dimensions	73.1 x 134 x 105 mm

Environmental Limits	
Operating Temperature	0 to 60°C or -40 to 75°C
Operating Humidity	5 to 95% RH
Storage Temperature	-40 to 85°C

Power Requirements	
Input Voltage	12 to 48 VDC
Power Consumption	935mA @ 12 V, 470 mA @ 24 V

Regulatory Approvals	
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety	UL-508, UL (UL60950-1), LVD (EN60950-1)
EMS	IEC 61000-4-2, Level 4 (ESD) IEC 61000-4-4, Level 4 (EFT) IEC 61000-4-5 for serial port, Level 1 (Surge) IEC 61000-4-5 for Power Line, Level 3 (Surge) IEC 61000-4-5 for LAN port, Level 2 (Surge)

Reliability	
Buzzer, RTC, WDT	✓
MTBF	200951 hrs
Warranty	5 years (see www.moxa.com/warranty)

General-purpose Device Servers

	NPort® 5110 NPort® 5110-T	NPort® 5130	NPort® 5150	NPort® DE-211	NPort® DE-311	NPort® 5210 NPort® 5210-T	NPort® 5230 NPort® 5230-T
Ethernet Interface							
10BaseT Ports	–	–	–	1	–	–	–
10/100BaseT(X) Ports	1	1	1	–	1	1	1
100BaseFX	–	–	–	–	–	–	–
Connector	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface							
RS-232 Ports	1	–	–	–	–	2	1
RS-232/422 Ports	–	1	–	–	–	–	1
RS-232/422/485 Ports	–	–	1	1	1	–	–
Connector	DB9-M	DB9-M	DB9-M	DB25-F	DB9-F	RJ45	TB
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓
2 KV Isolation Protection	–	–	–	–	–	–	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark						
Flow Control	RTS/CTS, XON/XOFF						
Baudrate	110 bps to 230.4 Kbps	50 bps to 921.6 Kbps		50 bps to 230.4 Kbps		110 bps to 230.4 Kbps	
Software							
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP			DHCP, BOOTP, Telnet, TCP, UDP, IP, ICMP, ARP		ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP	
Web Console	✓	✓	✓	–	–	✓	✓
Serial Console	✓	–	✓	✓	✓	✓	✓
Telnet Console	✓	✓	✓	✓	✓	✓	✓
Windows Utility	✓	✓	✓	✓	✓	✓	✓
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded						
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i						
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x						
Onsite Configuration							
Mini Screen with Push Buttons	–	–	–	–	–	–	–
Physical Characteristics							
Housing	Metal	Metal	Metal	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	340 g	340 g	340 g	480 g	480 g	340 g	360 g
Dimensions	52 x 80 x 22 mm			67 x 100.4 x 22 mm			
Environmental Limits							
Operating Temparture	0 to 55°C or -40 to 75°C	0 to 55°C		0 to 55°C		0 to 55°C or -40 to 75°C	
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 85°C	-20 to 85°C	-20 to 85°C	-20 to 85°C	-20 to 85°C	-40 to 85°C	-40 to 85°C
Power Requirements							
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 30 VDC	9 to 30 VDC	12 to 48 VDC	12 to 48 VDC
Power Consumption @ 12/24/48 VDC	128.7 mA / 72 mA / –	200 mA / 106 mA / –	200 mA / 106 mA / –	180 mA / 100 mA / –	– / 150 mA / –	325 mA / 190 mA / –	325 mA / 190 mA / –
Power Consumption @ 100/240 VAC	–	–	–	–	–	–	–
Regulatory Approvals							
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A			CE (EN55022 Class B, EN55024 Class B), FCC Part 15 Subpart B		CE (EN55022 and EN55024 Class A), FCC Part 15 Subpart B Class A	
Safety	UL (UL60950-1), TÜV (EN60950-1)			UL (UL60950), TÜV (EN60950)		UL (UL60950-1), TÜV (EN60950-1)	
Marine	–	–	–	–	–	DNV	
Medical	–	–	–	–	EN60601-1-2 Class B, EN55011	–	–
Reliability							
Buzzer, RTC, WDT	WDT only	WDT only	WDT only	–	–	✓	✓
MTBF	279122 hrs	246505 hrs	246034 hrs	347822 hrs	225529 hrs	134850 hrs	106955 hrs
Warranty	5 years (see www.moxa.com/warranty)						

General-purpose Device Servers

	NPort® 5232 NPort® 5232-T	NPort® 5232I NPort® 5232I-T	NPort® 5410	NPort® 5430	NPort® 5430I	NPort® 5450	NPort® 5450I
Ethernet Interface							
10BaseT Ports	–	–	–	–	–	–	–
10/100BaseT(X) Ports	1	1	1	1	1	1	1
100BaseFX	–	–	–	–	–	–	–
Connector	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface							
RS-232 Ports	–	–	4	–	–	–	–
RS-232/422 Ports	2	2	–	4	4	–	–
RS-232/422/485 Ports	–	–	–	–	–	4	4
Connector	TB	TB	DB9-M	TB	TB	DB9-M	DB9-M
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓
2 KV Isolation Protection	–	✓	–	–	✓	–	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark						
Flow Control	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF
Baudrate	110 bps to 230.4 Kbps		50 bps to 921.6 Kbps				
Software							
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP		ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, Rtelnet, ARP				
Web Console	✓	✓	✓	✓	✓	✓	✓
Serial Console	–	–	–	–	–	–	–
Telnet Console	✓	✓	✓	✓	✓	✓	✓
Windows Utility	✓	✓	✓	✓	✓	✓	✓
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded						
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i						
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x						
Onsite Configuration							
Mini Screen with Push Buttons	–	–	✓	✓	✓	✓	✓
Physical Characteristics							
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	360 g	380 g	740 g				
Dimensions	67 x 100.4 x 22 mm	67 x 100.4 x 35 mm	158 x 103 x 33 mm				
Environmental Limits							
Operating Temparture	0 to 55°C or -40 to 75°C		0 to 55°C (32 to 131°F)				
Operating Humidity	5 to 95% RH		5 to 95% RH				
Storage Temperature	-40 to 85°C		-20 to 70°C				
Power Requirements							
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Power Consumption @ 12/24/48 VDC	280 mA / 150 mA / –	509.4 mA / 200 mA / –	350 mA / 190 mA / –	320 mA / 175 mA / –	530 mA / 280 mA / –	350 mA / 190 mA / –	554 mA / 294 mA / –
Power Consumption @ 100/240 VAC	–	–	–	–	–	–	–
Regulatory Approvals							
EMC	CE (EN55022 and EN55024 Class A), FCC Part 15 Subpart B Class A						
Safety	UL (UL60950-1), TÜV (EN60950-1)						
Marine	DNV						
Medical	–	–	EN60601-1-2 Class B, EN55011				
Reliability							
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓
MTBF	102344 hrs	87083 hrs	206903 hrs	206903 hrs	206903 hrs	206903 hrs	206903 hrs
Warranty	5 years (see www.moxa.com/warranty)						

General-purpose Device Servers

	NPort® 5610-8	NPort® 5610-8-48V	NPort® 5630-8	NPort® 5650-8	NPort® 5650-8-M-SC	NPort® 5650-8-S-SC	NPort® 5610-16	NPort® 5610-16-48V
Ethernet Interface								
10BaseT Ports	–	–	–	–	–	–	–	–
10/100BaseT(X) Ports	1	1	1	1	–	–	1	1
100BaseFX Ports	–	–	–	–	1 (multi-mode)	1 (single-mode)	–	–
Connector	RJ45	RJ45	RJ45	RJ45	SC	SC	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	–	–	1.5 KV	1.5 KV
Serial Interface								
RS-232 Ports	8	8	–	–	–	–	16	16
RS-232/422 Ports	–	–	8	–	–	–	–	–
RS-232/422/485 Ports	–	–	–	8	8	8	–	–
Connector	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45	RJ45
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓	✓
2 KV Isolation Protection	–	–	–	–	–	–	–	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark							
Flow Control	RTS/CTS, XON/XOFF							
Baudrate	50 bps to 921.6 Kbps							
Software								
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, ARP, PPP, SLIP, RTelnet, RFC2217							
Web Console	✓	✓	✓	✓	✓	✓	✓	✓
Serial Console	–	–	–	–	–	–	–	–
Telnet Console	✓	✓	✓	✓	✓	✓	✓	✓
Windows Utility	✓	✓	✓	✓	✓	✓	✓	✓
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded							
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i							
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x							
Onsite Configuration								
Mini Screen with Push Buttons	✓	✓	✓	✓	✓	✓	✓	✓
Physical Characteristics								
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	3340 g	3160 g	3380 g	3360 g	3380 g	3380 g	3420 g	3260 g
Dimensions	440 x 45 x 198 mm							
Environmental Limits								
Operating Temparture	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C
Power Requirements								
Input Voltage	100 to 240 VAC, 47 to 63 hz	±48 VDC	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	±48 VDC
Power Consumption @ 12/24/48 VDC		– / – / 135 mA	–	–	–	–	–	– / – / 135 mA
Power Consumption @ 100/240 VAC	141/93 mA	–	152/98 mA	158/102 mA	174/113 mA	164/110 mA	141/93 mA	–
Regulatory Approvals								
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A, IEC61000-4-12	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A					CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A, IEC61000-4-12	
Safety	UL (UL60950-1), TÜV (EN60950-1)							
Marine	–	–	–	–	–	–	–	–
Medical	EN60601-1-2 Class B, EN55011							
Reliability								
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓
MTBF	97294 hrs	96758 hrs	118405 hrs	117584 hrs	116914 hrs	116914 hrs	94928 hrs	94417 hrs
Warranty	5 years (see www.moxa.com/warranty)							

8

Serial-to-Ethernet Device Servers › Product Selection Guides

General-purpose Device Servers

	NPort® 5630-16	NPort® 5650-16	NPort® 5650-16-M-SC	NPort® 5650-16-S-SC	NPort® 5610-8-DT	NPort® 5610-8-DT-J	NPort® 5650-8-DT	NPort® 5650I-8-DT	NPort® 5650-8-DT-J
Ethernet Interface									
10BaseT Ports	–	–	–	–	–	–	–	–	–
10/100BaseT(X) Ports	1	1	–	–	2 (1 IP)	2 (1 IP)	2 (1 IP)	2 (1 IP)	2 (1 IP)
100BaseFX Ports	–	–	1 (multi-mode)	1 (single-mode)	–	–	–	–	–
Connector	RJ45	RJ45	SC	SC	RJ45	RJ45	RJ45	RJ45	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	–	–	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface									
RS-232 Ports	–	–	–	---	8	8	–	–	–
RS-232/422 Ports	16	–	–	–	–	–	–	–	–
RS-232/422/485 Ports	–	16	16	–	–	–	8	8	8
Connector	RJ45	RJ45	RJ45	RJ45	DB9-M	RJ45	DB9-M	DB9-M	RJ45
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 KV Isolation Protection	–	–	–	–	–	–	–	✓	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	RTS/CTS, XON/XOFF								
Baudrate	50 bps to 921.6 Kbps								
Software									
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, ARP, PPP, SLIP, RTelnet, RFC2217				ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, Rtelnet, ARP, RFC2217				
Web Console	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serial Console	–	–	–	–	✓	✓	✓	✓	✓
Telnet Console	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows Utility	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded								
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i								
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x								
Onsite Configuration									
Mini Screen with Push Buttons	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physical Characteristics									
Housing	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)	Metal (IP30)
Weight	3400 g	3460 g	3440 g	3440 g	1760 g	1170 g	1770 g	1850 g	1710 g
Dimensions	440 x 45 x 198 mm				197 x 44 x 135.5 mm				
Environmental Limits									
Operating Temparture	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Power Requirements									
Input Voltage	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	100 to 240 VAC, 47 to 63 hz	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Power Consumption @ 12/24/48 VDC	–	–	–	–	611/300/140 mA	611/300/140 mA	615/300/156 mA	1066/510/200 mA	615/300/156 mA
Power Consumption @ 100/240 VAC	152/98 mA	158/102 mA	174/113 mA	164/110 mA	–	–	–	–	–
Regulatory Approvals									
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A				CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A				
Safety	UL (UL60950-1), TÜV (EN60950-1)								
Marine	–	–	–	–	–	–	–	–	–
Medical	EN60601-1-2 Class B, EN55011	EN60601-1-2 Class B, EN55011	EN60601-1-2 Class B, EN55011	EN60601-1-2 Class B, EN55011	–	–	–	–	–
Reliability									
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓
MTBF	91483 hrs	104767 hrs	87528 hrs	87528 hrs	163356 hrs	163356 hrs	163356 hrs	163356 hrs	163356 hrs
Warranty	5 years (see www.moxa.com/warranty)								

Industrial-grade Device Servers

	NPort® IA5150 NPort® IA5150-T	NPort® IA5150I NPort® IA5150I-T	NPort® IA5150-M-SC NPort® IA5150-M-SC-T	NPort® IA5150I-M-SC NPort® IA5150I-M-SC-T	NPort® IA5150-S-SC NPort® IA5150-S-SC-T	NPort® IA5150I-S-SC NPort® IA5150I-S-SC-T	NPort® IA5250 NPort® IA5250-T
Ethernet Interface							
10/100BaseT(X) Ports	2 (1 IP)	2 (1 IP)	–	–	–	–	2 (1 IP)
100BaseFX Ports	–	–	1 (multi-mode)	1 (multi-mode)	1 (single-mode)	1 (single-mode)	–
Connector	RJ45	RJ45	SC	SC	SC	SC	RJ45
Magnetic Isolation Protection	1.5 KV	1.5 KV	–	–	–	–	1.5 KV
Serial Interface							
RS-232/422/485 Ports	1	1	1	1	1	1	2
Connector	DB9-M/TB	DB9-M/TB	DB9-M/TB	DB9-M/TB	DB9-M/TB	DB9-M/TB	DB9-M
15 KV ESD Protection	✓	✓	✓	✓	✓	✓	✓
2 KV Isolation Protection	–	✓	–	✓	–	✓	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark						
Flow Control	RTS/CTS, XON/XOFF						
Baudrate	110 bps to 230.4 Kbps						
Software							
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, Rtelnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP						
Configuration Options	Web Console, Serial Console, Telnet Console, Windows Utility						
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded						
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i						
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x						
Physical Characteristics							
Housing	Plastic (IP30)						
Weight	360 g						
Dimensions	29 x 89.2 x 118.5 mm						
Environmental Limits							
Operating Temparture	0 to 55°C or -40 to 75°C						
Operating Humidity	5 to 95% RH						
Storage Temperature	-40 to 85°C						
Power Requirements							
Input Voltage	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC	12 to 48 VDC
Power Consumption	360 mA @ 12 V, 195 mA @ 24 V	420 mA @ 12 V, 215 mA @ 24 V	500 mA @ 12 V, 250 mA @ 24 V	510 mA @ 12 V, 260 mA @ 24 V	470 mA @ 12 V, 210 mA @ 24 V	490 mA @ 12 V, 250 mA @ 24 V	440 mA @ 12 V, 200 mA @ 24 V
Regulatory Approvals							
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A						
Safety	UL (UL60950-1), UL508, TÜV (EN60950-1)						
Hazardous Location	UL/cUL Class 1 Division 2 Groups A, B, C and D						
ATEX	Class I, Zone 2						
Marine	DNV						
EMS	EN61000-4-2 (ESD), Level 3; EN61000-4-3 (RS), Level 3; EN61000-4-4 (EFT), Level 4; EN61000-4-5 (Surge), Level 3; EN61000-4-6 (CS), Level 3; EN61000-4-8; EN61000-4-11						
IEC	IEC60068-2-27 (Shock); IEC60068-2-32 (Freefall); IEC60068-2-6 (Vibration)						
Dust-proof	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Reliability							
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓
MTBF	183747 hrs	195614 hrs	183747 hrs	195614 hrs	183747 hrs	195614 hrs	194765 hrs
Warranty	5 years (see www.moxa.com/warranty)						

8

Serial-to-Ethernet Device Servers › Product Selection Guides

Wireless Device Servers

	NPort® W2004	NPort® W2150 Plus NPort® W2150 Plus-T	NPort® 2250 Plus NPort® 2250 Plus-T
WLAN Interface			
IEEE 802.11b/g	✓	–	–
IEEE 802.11a/g/b	–	✓	✓
Radio Frequency Type	DSSS/OFDM	DSSS/OFDM	DSSS/OFDM
WEP	64/128-bit data encryption		
WPA, WPA2, 802.11i	Enterprise mode and Pre-Share Key (PSK) mode		
Encryption	–	128-bit TKIP/AES-CCMP EAP-TLS, PEAP/GTC, PEAP/MD5, PEAP/MSCHAPV2, EAP-TTLS/PAP, EAP-TTLS/CHAP, EAP-TTLS/MSCHAP, EAP-TTLS/MSCHAPV2, EAP-TTLS/EAP-MSCHAPV2, EAP-TTLS/EAP-GTC, EAP-TTLS/EAP-MD5, LEAP	
Max. Transmission Rate	54 Mbps	54 Mbps	54 Mbps
Max. Transmission Distance	300 m	100 m	100 m
LAN Interface			
Ethernet Ports	1 x 10/100 Mbps (RJ45)	1 x 10/100 Mbps (RJ45)	1 x 10/100 Mbps (RJ45)
1.5 KV Magnetic Isolation Protection	✓	✓	✓
Serial Interface			
Number of Ports	4	1	2
Serial Standards	RS-232/422/485	RS-232/422/485	RS-232/422/485
Connector	RJ45	DB9-M	DB9-M
Console Port	✓	–	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark
Flow Control	RTS/CTS, XON/XOFF, DTR/DSR	RTS/CTS, XON/XOFF	RTS/CTS, XON/XOFF
Baudrate	50 bps to 460.8 Kbps	50 bps to 921.6 Kbps	50 bps to 921.6 Kbps
Serial Data Log	64 KB	64 KB	64 KB
Software			
Network Protocols	ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, SSH, HTTPS		
Configuration Options	Web Console, Serial Console, Telnet Console, Windows Utility		
Management	–	SNMP MIB-II	SNMP MIB-II
Secure Configuration Options	HTTPS, SSH	HTTPS, SSH	HTTPS, SSH
Utilities	NPort® Search Utility and NPort® Windows Driver manager		
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows Embedded CE 5.0/6.0, Windows XP Embedded		
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i		
Linux Real TTY Drivers	Linux 2.4.x/2.6.x		
Physical Characteristics			
Housing	Metal (IP30)	Aluminum	
Weight	1730 g	780 g	
Dimensions	45.8 x 135 x 105 mm	77 x 111 x 26 mm	
Environmental Limits			
Operating Temperature	0 to 60°C	0 to 55°C or -40 to 75°C	
Operating Humidity	5% to 95%	5% to 95%	
Storage Temperature	-20 to 85°C	-40 to 85°C	
Power Requirements			
Input Voltage	12 to 48 VDC	12 to 48 VDC	
Power Consumption	685 mA @ 12 V, 340 mA @ 24 V, 185 mA @ 48 V	560 mA @ 12 V, 294 mA @ 24 V, 162 mA @ 48 V	
Regulatory Approvals			
Safety	UL (UL60950-1), TÜV (EN60950-1)	UL (UL60950-1), TUV (EN60950-1)	
Radio	CE (ETSI EN 300 328)	CE (ETSI EN 301 893, ETSI EN 300 328), ARIB RCR STD-33, ARIB STD-66	
EMC	CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)	CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)	
EMI	FCC (Part 15 Subpart B Class A, Subpart C)	FCC Part 15 (Subpart B Class A, Subpart C, Subpart E), VCCI	
Reliability			
MTBF	81,501 hrs	352,547 hrs	352,034 hrs
Warranty	5 years (see www.moxa.com/warranty)		

Introduction to Serial Device Servers

Device server technology makes device networking easy

Device servers are used to connect serial devices to Ethernet LANs, and are able to transmit data both to and from the serial device. Moxa's NPort® line of device servers are essentially pre-programmed computers that have a real-time OS and built-in TCP/IP protocol suite that allows you to access, manage, and configure remote facilities and equipment from anywhere in the world over the Internet.

No Restrictions on Host Type or Operating System

Any host computer that supports the TCP/IP protocol can access the NPort®'s serial ports, eliminating the need for special-purpose drivers. In addition, you will not be held back by your PC's limited number of serial bus slots.

Real COM/TTY Drivers for Existing Software

NPort® device servers also come with Real COM/TTY drivers for accessing devices through a "virtual" COM or TTY port.

: NPort® Provides a Wide Choice of Operation Modes

Socket Modes

TCP Server Mode

When the NPort® is configured for TCP Server Mode, each serial port is assigned a unique IP:Port combination on the TCP/IP network, and the NPort® waits passively for a host computer to establish a connection with the attached serial device. TCP Server mode supports up to 4 simultaneous connections, allowing multiple hosts to collect data from the same serial device at the same time.

TCP/IP Ethernet
TCP Server
RS-232
Device
① Request a connection
② Proceed with data transmission
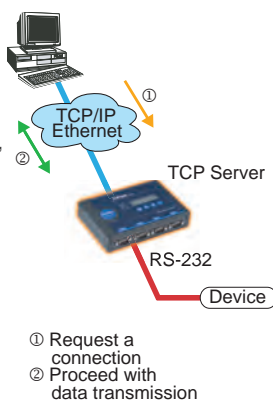
TCP Client Mode

When the NPort® is configured for TCP Client mode and data is received from the attached device the NPort® establishes a TCP connection between the attached device a specified host computer. After the data has been transferred, the NPort® automatically closes the connection. TCP Client mode supports up to 4 simultaneous connections, allowing multiple hosts to collect data from the same serial device at the same time.

TCP/IP Ethernet
TCP Client
RS-232
Device
① Request a connection
② Proceed with data transmission
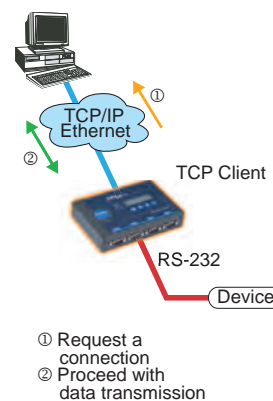
UDP Mode

UDP mode supports up to 4 IP groups. In UDP mode, the attached device can exchange data simultaneously with up to 4 network destinations, and at a higher speed than when using TCP. This mode is ideal for message display applications.

TCP/IP Ethernet
Directly proceed with data transmission (no connection required)
RS-232
Device
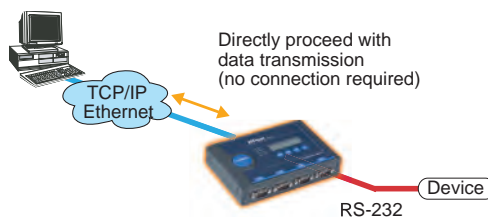
Driver Modes

Real COM Mode

When configured for Real COM mode, each serial port is assigned an IP:Port combination that is mapped to a host computer's local COM or TTY port using Moxa's NPort® drivers. Legacy applications can access the attached serial device using the host's local COM or TTY port, without the need to modify serial COM software to account for network protocols.

COM3=IP : Port

TCP/IP Ethernet

Driver Mode

RS-232

Device
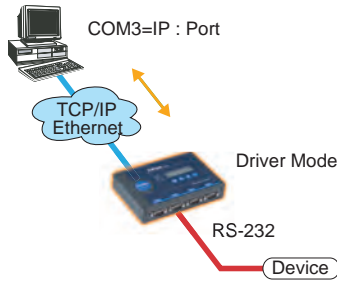
RFC2217 Mode

When the NPort® is configured for RFC2217 mode, each serial port is assigned an IP:Port combination that is mapped by RFC2217-compliant drivers to a virtual COM port. The RFC2217 protocol defines general COM port control options based on the Telnet protocol. The NPort® supports any third party driver that is RFC2217-compliant.

Other Modes

Pair Connection Mode

When configured for Pair Connection mode, two NPort® device servers can be used to transmit RS-232 signals over Ethernet, and in this way overcome the 15-meter limitation imposed by the RS-232 standard. One NPort® connects to the PC's COM port, and the other NPort® connects to the serial device. The two NPort® device servers are either connected to each other with a cross-over Ethernet cable, or are each connected to an Ethernet LAN or WAN. Both data and modem control signals can be exchanged between the PC and device over Ethernet, but DCD signals are not supported.

Ethernet Modem Mode

When configured for Ethernet Modem mode, the serial port on the NPort® behaves as if it were attached to a modem, except that data is transmitted over a network instead of over phone lines. Ethernet Modem Mode enables network access for legacy software that was originally designed to transmit data by modem.

Reverse Telnet Mode

When configured for Reverse Telnet mode, the NPort® device server's serial ports provide a connection to a server, with connections initiated by a host over Ethernet. This is similar to TCP server mode, except that Reverse Telnet mode also provides Telnet-style CR/LF conversion. Reverse Telnet mode can be used for remote console management, in which the NPort® is used to enable network access to the serial console ports of different equipment, such as routers, switches, and servers.

Reverse Telnet mode

Windows NT

TCP/IP

Unix

RS-232

NPort 5400

Telnet

Server

Server

Router
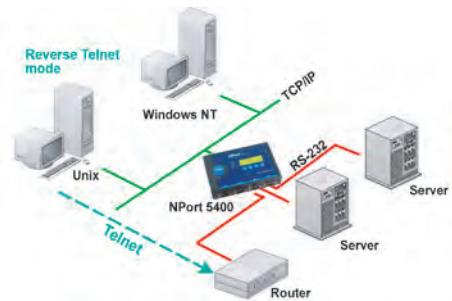
: Mode Selection Flowchart

Start

Using legacy COM-based software? Host requires more COM ports? — NO / YES

Using socket program? — YES

Need to extend serial transmission range? — NO

Using MOXA's drivers? — NO / YES

Which protocol, TCP or UDP? — TCP / UDP

Need to perform console management? — YES / NO

Host application is server or client? — Client

Server

Need serial control parameters? — NO / YES

| TCP Client Mode | TCP Server Mode | RFC2217 Mode or TCP Server Mode | UDP Mode | Pair Connection Modes | Reverse Telnet | Contact your saleperson. | RFC2217 Mode | Real COM Mode |

:: NPort® Administrator Makes Installation Easy

NPort® Administrator is designed to make it easy to install and configure NPort® 5000 device servers over the network. Five groups of functions are supported to allow off-line COM mapping, device monitoring, and searching for NPort® device severs over the network. Both NPort® Administrator and an IP Serial Library are bundled with NPort®'s integrated software suite, giving you everything you need to manage, monitor, and reconfigure your NPort® from remote locations.

Configuration Features

- Broadcast search over the LAN for NPort® device servers
- Select and configure the NPort®'s operation mode
- Upgrade the NPort®'s firmware
- Export and import the NPort®'s configurations
- Monitor the NPort®'s status
- Auto IP report
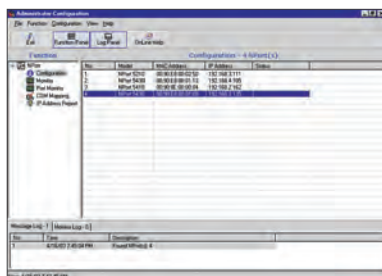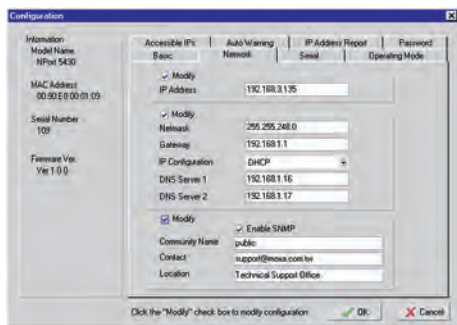
:: Web Console Provides Exceptional Convenience

NPort® 5000 device servers are easily configured over the network with the web console or Telnet console.

Network Settings

- IP, netmask, gateway
- Static IP, DHCP, BOOTP
- DNS server

Serial Settings

- Baudrate
- Data bits, stop bit, parity
- Flow control
- Communication interface
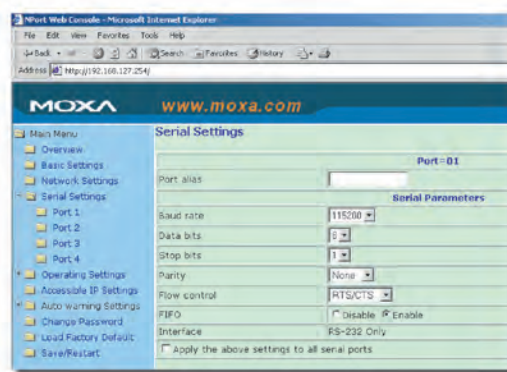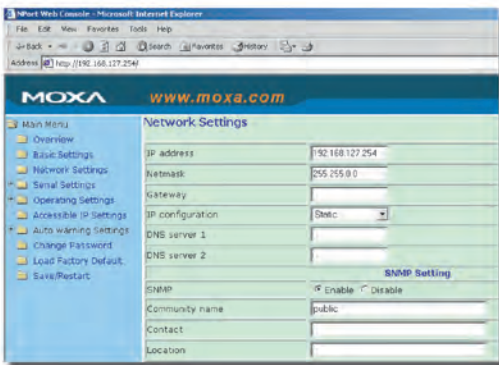
Operation Settings

- Operation mode
- TCP alive check time
- Inactivity time
- Delimiter
- Force transmit
- Packet length
- Allow driver control
- Maximum connection
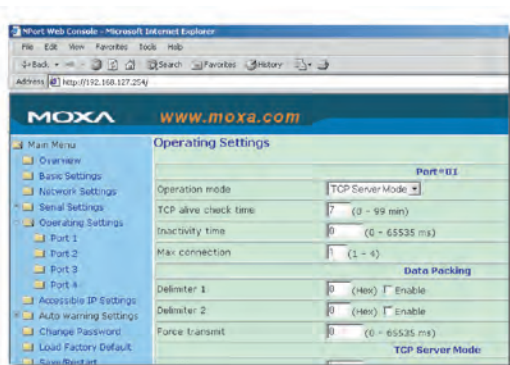
NPort® S8455 Series

Combo switch / serial device server

> **4-port RS-232/422/485 serial device server**
>   ▪ **Serial QoS for configuring serial data transmission priority**
>   ▪ **2 KV (DC) isolation protection for each serial port**
>   ▪ **Adjustable pull high/low resistor for RS-485 ports**
> **5-port managed Ethernet switch built in**
>   ▪ **Two fiber Ethernet ports and three Ethernet ports**
>   ▪ **Ethernet redundancy with Turbo Ring® (recovery time < 20 ms) or RSTP/STP (IEEE 802.1w/D) supported**
>   ▪ **QoS, IGMP-snooping/GMRP, VLAN, LACP, SNMPv1/v2c/v3, RMON supported**
>   ▪ **Surge protection for serial, power, and Ethernet**

: Overview

The NPort® S8455 series combines an industrial device server with a full-function managed Ethernet switch by integrating 2 fiber ports, 3 Ethernet ports, and 4 RS-232/422/485 serial ports, allowing you to easily install, manage, and maintain the product. Combining a device server and switch in one product allows you to save space in your cabinet, reduce overall power consumption, and reduce costs, since you will not need to purchase a switch and serial device server separately.

: Supports the Full Range of NPort® 5000 Series Device Server Functions

The NPort® S8455 series supports the complete array of NPort® 5000 series device server functions. You can network your existing serial devices by connecting up to 4 serial devices through each of the 5 Ethernet ports, with only basic configuration required. In addition, data transmission between the serial and Ethernet interfaces is bi-directional.

: Full-function Managed Ethernet Switch

The NPort® S8455 series has a built-in full-function managed Ethernet switch that supports QoS, IGMP-snooping/GMRP, VLAN, Port Trunking, SNMPv1/v2c/v3, and IEEE 802.1X, allowing you to handle virtually any kind of application. Ethernet redundancy, which is used to increase the reliability and availability of your industrial Ethernet network, is provided by Moxa's own Turbo Ring® technology (recovery time < 20 ms) or RSTP/STP (IEEE 802.1w/D).

: Ring Redundancy at the Device Level

Device level communication networks for industrial automation are very critical since they are used to control and monitor device processes. The reliability of these communications depends on ring redundancy at the device level. which is designed to provide fast network fault detection and reconfiguration in order to support the most demanding control applications.

The NPort® S8455 series integrates a full function NPort® device server with an industrial switch to carry serial and Ethernet devices at the same time. In addition, the NPort® S8455 can also achieve ring redundancy with standard STP/RSTP and Moxa's proprietary Turbo Ring or Turbo Ring 2 redundancy protocols. This all-in-one design can be used to optimize and simplify your device network, and enhance reliability.
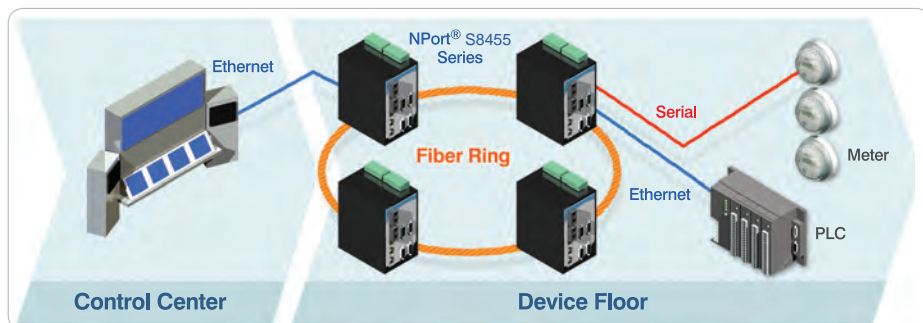
⫶ Rugged Design with Complete Protection

UL508 Safety
The NPort® S8455 series complies with the UL 508 standard, which covers safety requirements for industrial control equipment.

Level 4 ESD
The NPort® S8455 series supports high level, 8/15 KV, ESD protection to prevent damage from static electricity.

Full Surge Protection
The NPort® S8455 series is equipped with surge protection for power, Ethernet interface, and serial interface to protect against voltage spikes.

2 KV Serial Isolation
Each serial port is protected by 2 KV of isolation protection to guard against harmful currents.

Appearance

Reset Button Serial Console
4 DIP switches for Turbo Ring settings
Fiber Port
Ethernet port (RJ45)
Power input (terminal block)
Relay output, DI (terminal block)
LED indicators
Serial port (DB9 male)

⫶ General Specifications

Port Summary
Serial Ports: 4 RS-232/422/485 ports
Ethernet Switch Ports: 3 RJ45 copper ports, 2 fiber ports
Console Ports: 1 (8-pin RJ45 connector)

Physical Characteristics
Housing: Metal
Weight: 995 g
Dimensions: 73.1 x 134 x 105 mm (2.88 x 5.27 x 4.13 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption: 935 mA @ 12 V, 470 mA @ 24 V

Regulatory Approvals
EMC: FCC Class A, CE Class A
Safety: UL-508
EMS:
IEC 61000-4-2, Level 4 (ESD)
IEC 61000-4-4, Level 4 (EFT)
IEC 61000-4-5 for serial port, Level 1 (Surge)
IEC 61000-4-5 for LAN port, Level 2 (Surge)
IEC 61000-4-5 for Power Line, Level 3 (Surge)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

⫶ Device Server Specifications

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Connector: DB9 male
Serial Line Protection:
• 15 KV ESD protection for all signals
• 2 KV isolation protection
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 55 Ω, 120 Ω
Console Port: Dedicated RS-232 console port (8-pin RJ45)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS and XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND

RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Configuration Options: Web Console, Telnet Console, Serial Console, Windows Search Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x
Operation Modes: Real COM, TCP Server, TCP Client, UDP, RFC2217
Management: SNMP MIB-II
IP Routing: Static, RIP-I, RIP-II

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures): 200951 hrs

: Ethernet Switch Specifications

Ethernet Interface

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1x for Authentication
IEEE 802.3ad for Port Trunk with LACP
Network Protocols: ICMP, IP, TCP, UDP, ARP, Telnet, DNS, HTTP, SMTP, SNTP, IGMPv1/v2 device, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 82, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control interface

Optical Fiber Interface

Distance:
• Multi-mode: 0 to 2 km, 1310 nm (62.5/125 μm, 500 MHz*km)
• Single-mode: 0 to 40 km, 1310 nm (9/125 μm, 3.5 PS/(nm*km))

Min. TX Output:
• Multi-mode: -20 dBm
• Single-mode: - 5 dBm
Max. TX Output:
• Multi-mode: -14 dBm
• Single-mode: 0 dBm
Sensitivity:
• Multi-mode: -34 to -30 dBm
• Single-mode: -36 to -32 dBm

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Switch Interface

RJ45 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
DIP Switches: Turbo Ring, Master, Coupler, Reserve
Alarm Contact: 2 relay outputs with current carrying capacity of 1A @ 24 VDC

Dimensions
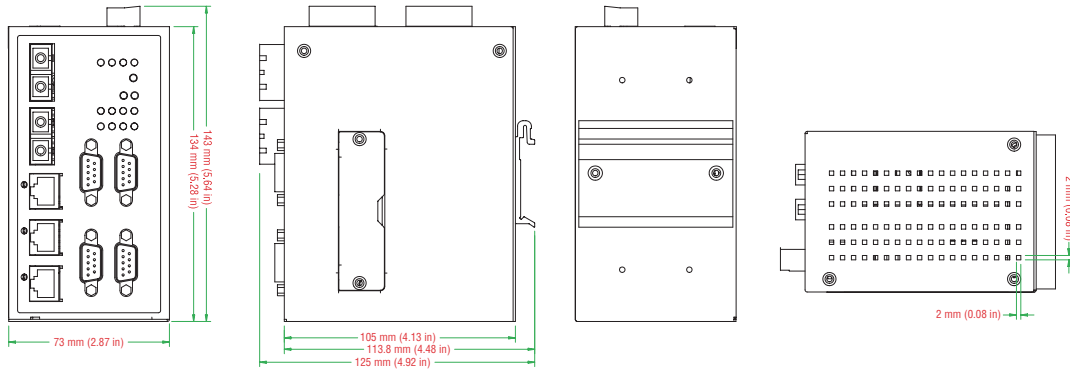
Pin Assignment
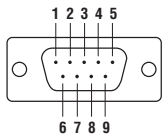
DB9 male connector

Serial Port (DB9 male connector)

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

8-pin RJ45 connector
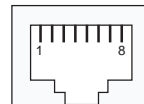
Console Port (RJ45)

PIN	RS-232
1	DSR
2	RTS
3	GND
4	TxD
5	RxD
6	DCD
7	CTS
8	RTS

Ethernet Port (RJ45)

PIN	Signal
1	RXD+
2	RXD-
3	TXD+
4	–
5	–
6	TXD-
7	
8	

: Ordering Information

Available Models

NPort® S8455I-MM-SC: 4 RS-232/422/485 ports, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with SC connector, 15 KV ESD, 12-48 VDC, 2 KV isolation protection, 0 to 60°C operating temperature
NPort® S8455I-SS-SC: 4 RS-232/422/485 ports, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with SC connector, 15 KV ESD, 12-48 VDC, 2 KV isolation protection, 0 to 60°C operating temperature
NPort® S8455I-MM-SC-T: 4 RS-232/422/485 ports, 3 10/100M Ethernet ports, 2 100M multi-mode fiber ports with SC connector, 15 KV ESD, 12-48 VDC, 2 KV isolation protection, -40 to 75°C operating temperature
NPort® S8455I-SS-SC-T: 4 RS-232/422/485 ports, 3 10/100M Ethernet ports, 2 100M single-mode fiber ports with SC connector, 15 KV ESD, 12-48 VDC, 2 KV isolation protection, -40 to 75°C operating temperature

Package Checklist

• 1 NPort S8455
• Two power jack to TB power cables
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

NPort® 5100 Series

1-port RS-232/422/485 serial device servers

> Small size for easy installation
> Real COM/TTY drivers for Windows and Linux
> Standard TCP/IP interface and versatile operation modes
> Easy-to-use Windows utility for configuring multiple device servers
> Built-in 15 KV ESD protection for all serial signals
> SNMP MIB-II for network management
> Configure by Telnet or web browser
> Adjustable termination resistor for RS-485 ports

⋮ Overview

NPort® 5100 device servers are designed to make serial devices network-ready in an instant. The small size of the servers makes them ideal for connecting devices such as card readers and payment terminals to an IP-based Ethernet LAN. Use the NPort® 5100 device servers to give your PC software direct access to serial devices from anywhere on the network.

⋮ Most Cost-effective Serial-to-Ethernet Solution

Using serial device servers to connect legacy serial devices to Ethernet is now commonplace, and users expect device servers to be cost-effective and to provide a broad selection of useful functions. With their full support of Microsoft and Linux operating systems and solid 5-year warranty, the NPort® 5100 series device servers provide the best choice for serial-to-Ethernet converters.

⋮ Standard TCP/IP Interface and Broad Choice of Operation Modes

The NPort® 5100 device servers can be configured for TCP Server, TCP Client, UDP Server/Client, Pair Connection, or Ethernet Modem mode, ensuring compatibility with software based on a standard network API (e.g., Winsock or BSD Sockets).

⋮ Real COM/TTY Drivers for Existing Software

The Real COM/TTY drivers provided with the NPort® 5100 device servers allow you to continue using software designed for communicating through COM/TTY ports. Installation and configuration is painless, and allows your serial devices and PC to communicate seamlessly over a TCP/IP network. Using Moxa's Real COM/TTY drivers is an excellent way to preserve your software investment, while still allowing you to enjoy the benefits of networking your serial devices.

⋮ Easy to Troubleshoot

NPort® 5100 device servers support SNMP V2, which can be used to monitor all units over Ethernet. Each unit can be configured to send trap messages automatically to the SNMP manager when user-defined errors are encountered. For users who do not use SNMP manager, an e-mail alert can be sent instead. Users can define the trigger for the alerts using Moxa's Windows utility, or the web console. For example, alerts can be triggered by a warm start, a cold start, or a password change.

: Appearance
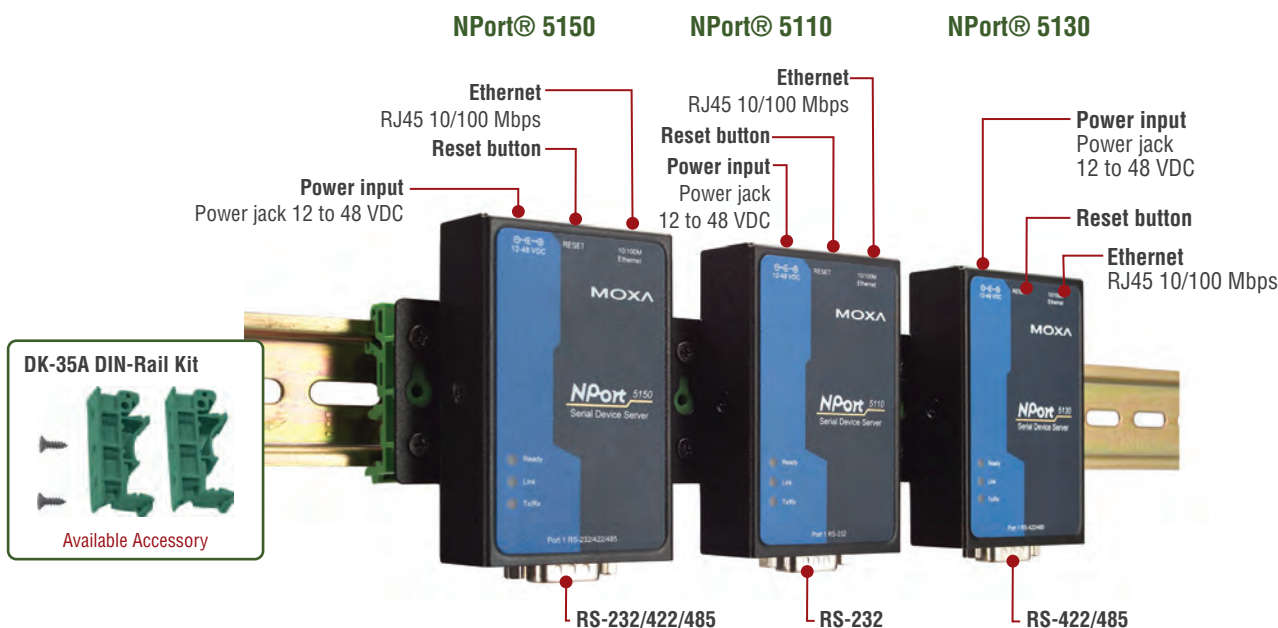
NPort® 5150   **NPort® 5110**   **NPort® 5130**

Ethernet
RJ45 10/100 Mbps

Reset button

Power input
Power jack 12 to 48 VDC

Ethernet
RJ45 10/100 Mbps

Reset button

Power input
Power jack
12 to 48 VDC

Power input
Power jack
12 to 48 VDC

Reset button

Ethernet
RJ45 10/100 Mbps

DK-35A DIN-Rail Kit

Available Accessory

RS-232/422/485   **RS-232**   **RS-422/485**

: Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 1
Serial Standards:
NPort® 5110: RS-232
NPort® 5130: RS-422/485
NPort® 5150: RS-232/422/485
Connector: DB9 male
Serial Line Protection: 15 KV ESD protection for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS and DTR/DSR (RS-232 only), XON/XOFF
Baudrate:
NPort® 5110: 110 bps to 230.4 Kbps
NPort® 5130/5150: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP
Configuration Options: Web Console, Serial Console (NPort® 5110/5150 only), Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded

Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Physical Characteristics
Housing: Metal
Weight: 340 g
Dimensions:
Without ears: 52 x 80 x 22 mm (2.05 x 3.15 x 0.87 in)
With ears: 75.2 x 80 x 22 mm (2.96 x 3.15 x 0.87 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort® 5110: 128.7 mA @ 12 V, 72 mA @ 24 V
NPort® 5130/5150: 200 mA @ 12 V, 106 mA @ 24 V

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort® 5110: 279122 hrs
NPort® 5130: 246505 hrs
NPort® 5150: 246034 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

NPort® 5110
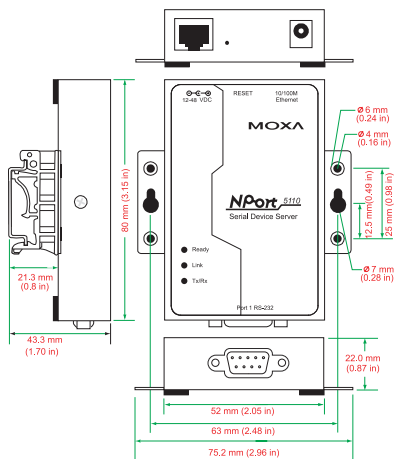
NPort® 5130
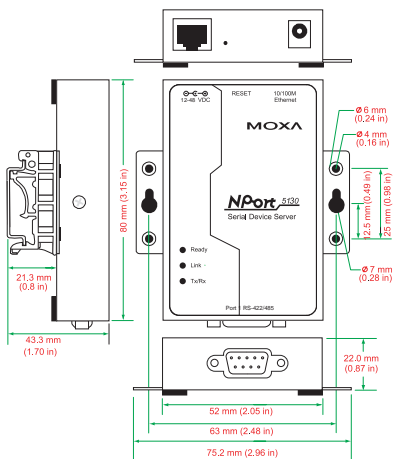
NPort® 5150

Pin Assignment

DB9 male connector

1 2 3 4 5

6 7 8 9
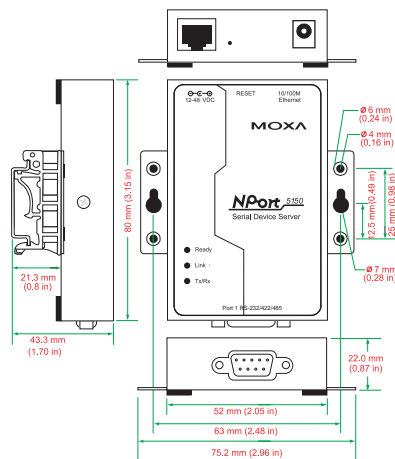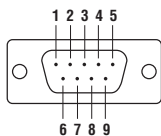
NPort® 5110 (RS-232)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

NPort® 5130 (RS-422/485)

PIN	RS-422/485-4w	RS-485-2w
1	TxD-(A)	–
2	TxD+(B)	–
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(A)
5	GND	GND
6	–	–
7	–	–
8	–	–

NPort® 5150 (RS-232/422/485)

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

⋮ Ordering Information

Available Models

NPort® 5110: 1-port RS-232 device server, 0 to 55°C operating temperature
NPort® 5130: 1-port RS-422/485 device server, 0 to 55°C operating temperature
NPort® 5150: 1-port RS-232/422/485 device server, 0 to 55°C operating temperature
NPort® 5110-T: 1-port RS-232 device server, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail

Package Checklist

- NPort® 5100 series device server
- Power Adaptor (only for non-T models)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

8

Serial-to-Ethernet Device Servers ⌄ **NPort® 5100 Series**

NPort® DE-211/311

1-port RS-232/422/485 serial device servers

NPort® DE-311

NPort® DE-211

> 3-in-1 serial port: RS-232, RS-422, or RS-485
> Versatile operation modes, including TCP Server, TCP Client, UDP, Ethernet Modem, and Pair Connection
> Real COM/TTY drivers for Windows and Linux
> 10M and 100M Ethernet speeds detected automatically
> 2-wire RS-485 with patented Automatic Data Direction Control (ADDC®)
> Built-in 15 KV ESD protection for all serial signals

: Overview

The NPort® DE-211 and DE-311 are 1-port serial device servers that support RS-232, RS-422, 4-wire RS-485, and 2-wire RS-485. The DE-211 supports 10 Mbps Ethernet connections and has a DB25 female connector for the serial port. The DE-311 supports 10/100

Mbps Ethernet connections and has a DB9 female connector for the serial port.

Both device servers are ideal for applications that involve information display boards, PLCs, flow meters, gas meters, CNC machines, and biometric identification card readers.

: Specifications

Ethernet Interface
Number of Ports: 1
Speed:
NPort® DE-211: 10 Mbps, auto MDI/MDIX
NPort® DE-311: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 1
Serial Standards: RS-232/422/485 (selectable by DIP Switch)
Connector:
NPort® DE-211: DB25 female
NPort® DE-311: DB9 female
Serial Line Protection: 15 KV ESD protection for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 230.4 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, RTS+, RTS-, CTS+, CTS-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND (DE-211 only)
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: DHCP, BOOTP, Telnet, TCP, UDP, IP, ICMP, ARP
Configuration Options: Serial Console, Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008 x86/x64, Embedded CE 5.0/6.0, XP Embedded

Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Physical Characteristics
Housing: Metal, IP30 protection
Weight: 480 g
Dimensions:
Without ears: 67 x 100.4 x 22 mm (2.64 x 3.95 x 0.87 in)
With ears: 90.2 x 100.4 x 22 mm (3.55 x 3.95 x 0.87 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage:
DE-211: 12 to 30 VDC
DE-311: 9 to 30 VDC
Power Consumption:
NPort® DE-211: 180 mA @ 12 V, 100 mA @ 24 V
NPort® DE-311: 300 mA @ 9 V, 150 mA @ 24 V

Regulatory Approvals
EMC: CE (EN55022 Class B, EN55024 Class B), FCC Part 15 Subpart B
Safety: UL (UL60950), TÜV (EN60950)
Medical: EN60601-1-2 Class B, EN55011 (DE-311 only)

Reliability
MTBF (meantime between failures):
NPort® DE-211: 347822 hrs
NPort® DE-311: 225529 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

NPort® DE-311
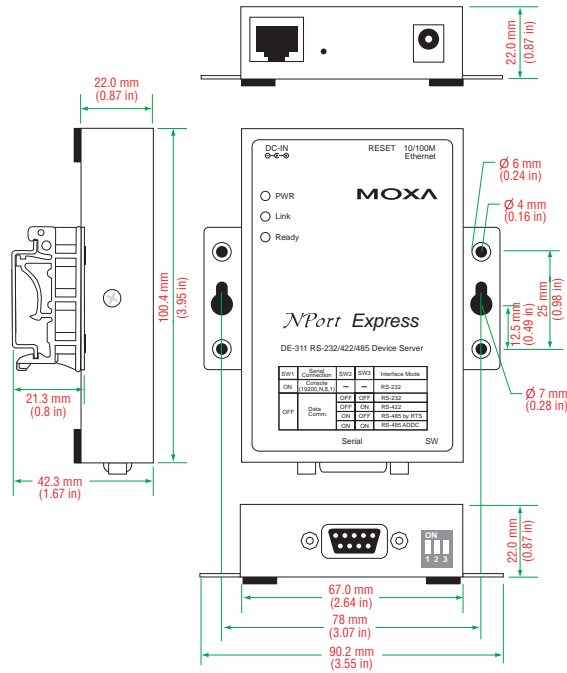
NPort® DE-211
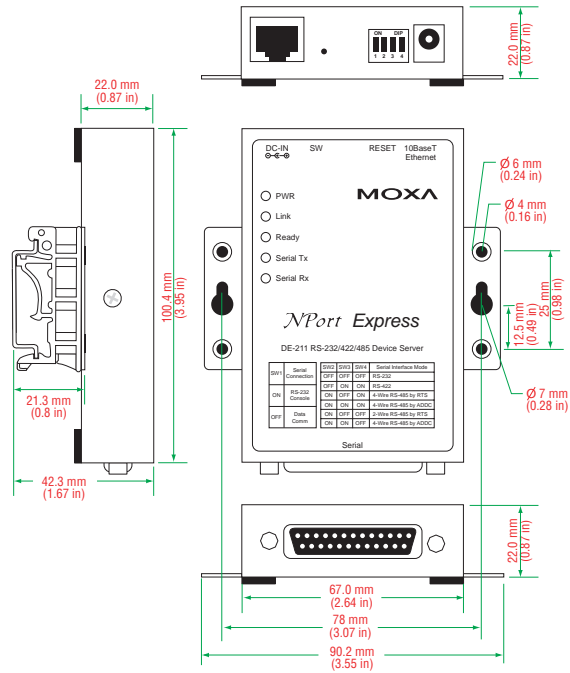
Pin Assignment

NPort® DE-211
(RS-232/422/485, DB25 female connector)

25
RXDA(-) / DATAA(-)
RXDB(+) / DATAB(-)
DSR (IN) 20
TXDA (-) 15
TXDB (+) 14

13 Power GND for 12-30 VDC
12 Unreg. 12-30 VDC (in)
10 Power GND for 5 VDC
9 Reg. +5 VDC (out)
8 DCD (in)
7 SGND
6 DTR (out)
5 RTS (out)
4 CTS (in)
3 TxD (out)
2 RxD (in)
1 Do not use this pin*
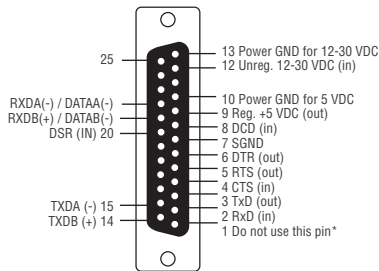
NPort® DE-311
(RS-232/422/485, DB9 female connector)

1 2 3 4 5
6 7 8 9
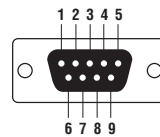
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	RxD-(A)	---
2	TxD	RxD+(B)	---
3	RxD	TxD+(B)	Data+(B)
4	DSR	TxD-(A)	Data-(A)
5	GND	GND	GND
6	DTR	CTS-(A)	---
7	CTS	CTS+(B)	---
8	RTS	RTS+(B)	---
9	---	RTS-(A)	---

: Ordering Information

Available Models
NPort® DE-211: 1-port RS-232/422/485 device server with 10 Mbps Ethernet connection
NPort® DE-311: 1-port RS-232/422/485 device server with 10/100 Mbps Ethernet connection

Optional Accessories (can be purchased separately)
NP21101: DB25 male to DB9 female cable for RS-232 transmission, 30 cm (for DE-211)
NP21102: DB25 male to DB9 male cable for RS-232 transmission, 30 cm (for DE-211)
NP21103: DB25 male terminal block kit for RS-422/485 transmission (for DE-211)
TB-M25: DB25 male DIN-Rail wiring terminal (for DE-211)
TB-M9 (for DE-311): DB9 male DIN-Rail wiring terminal (for DE-311)
DK-35A: Mounting Kit for 35-mm DIN-Rail

Package Checklist
- NPort® DE-211 or DE-311 serial device server
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

8

Serial-to-Ethernet Device Servers > NPort® DE-211/311

NPort® 5200 Series

2-port RS-232/422/485 serial device servers

> Small size for easy installation
> Versatile socket operation modes, including TCP Server, TCP Client, and UDP
> Easy-to-use Windows utility for configuring multiple device servers
> Supports 10/100M Ethernet
> Patented ADDC® (Automatic Data Direction Control) for 2-wire and 4-wire RS-485
> Built-in 15 KV ESD protection for all serial signals
> SNMP MIB-II for network management

⁞ Standard TCP/IP Protocols and Choice of Operation Modes

NPort® 5200 device servers can operate in TCP Server, TCP Client, or UDP operation mode, ensuring compatibility with software based on a standard network API (Winsock, BSD Sockets).

⁞ Real COM/TTY Drivers for Existing Software

With the Real COM/TTY drivers that are provided with each NPort®, software designed for communication with COM/TTY ports can be instantly and seamlessly integrated into a TCP/IP network. This is an excellent "no fuss" way to preserve your software investment and enjoy the benefits of networking your serial devices.

⁞ Control Remote Serial Devices with TCP/IP or Traditional COM/TTY Port

By specifying the NPort® 5200's IP address and port number, a network sockets API can obtain access to the attached serial device over the network, from any host computer that supports TCP/IP. For legacy Windows or Linux software that is COM or TTY-based, Moxa's COM/TTY drivers provide a seamless way of operating over the network.

COM Driver or Network Socket Operation
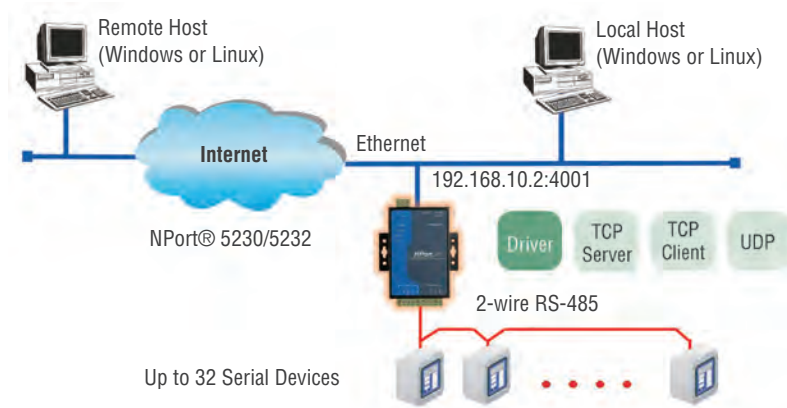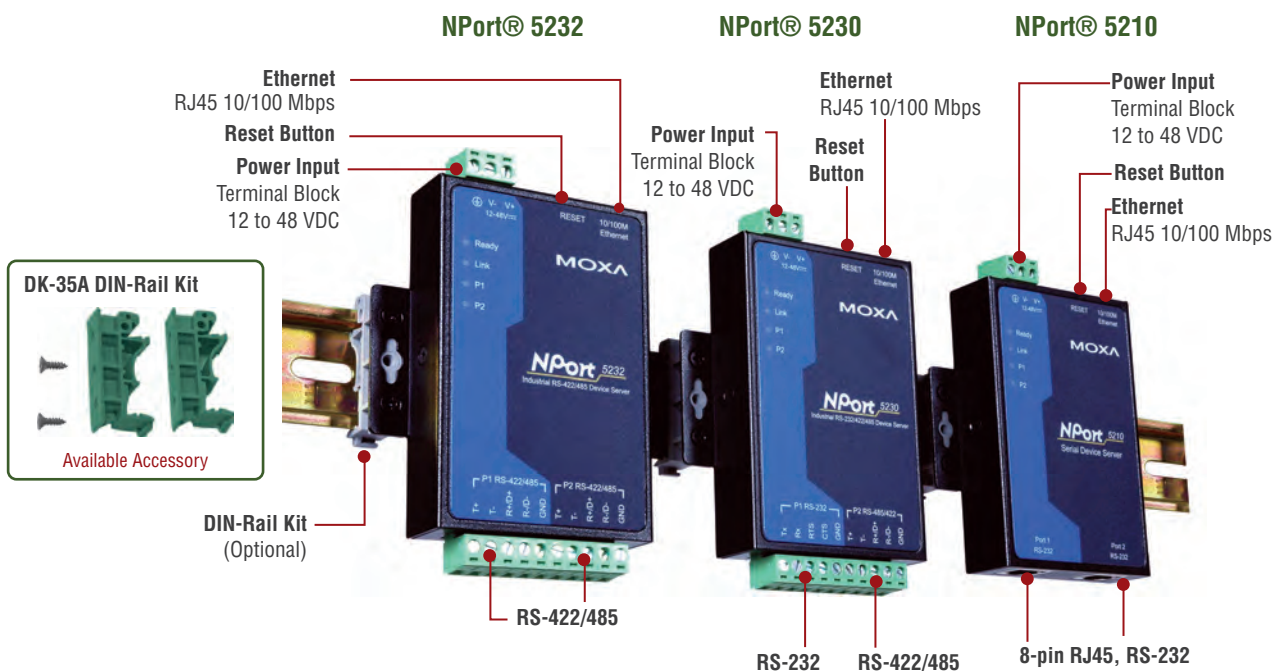
Remote Host (Windows or Linux)

Local Host (Windows or Linux)

Internet

Ethernet

192.168.10.2:4001

NPort® 5230/5232

Driver   TCP Server   TCP Client   UDP

2-wire RS-485

Up to 32 Serial Devices

⁚ Appearance

NPort® 5232   **NPort® 5230**   **NPort® 5210**

Ethernet
RJ45 10/100 Mbps

Reset Button

Power Input
Terminal Block
12 to 48 VDC

Ethernet
RJ45 10/100 Mbps

Power Input
Terminal Block
12 to 48 VDC

**Reset
Button**

Power Input
Terminal Block
12 to 48 VDC

Reset Button

Ethernet
RJ45 10/100 Mbps

DK-35A DIN-Rail Kit

Available Accessory

DIN-Rail Kit
(Optional)

RS-422/485

RS-232   RS-422/485

8-pin RJ45, RS-232

⁚ Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 2
Serial Standards:
NPort® 5210: RS-232
NPort® 5230: 1 RS-232 port, 1 RS-422/485 port
NPort® 5232/5232I: RS-422/485
Connector:
NPort® 5210: RJ45 (8 pins)
NPort® 5230/5232/5232I: Terminal Block (5 contacts per port)
Serial Line Protection:
15 KV ESD protection for all signals
2 KV isolation protection (NPort® 5232I/5232I-T)
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS (RS-232 only), DTR/DSR (NPort® 5210 only), XON/XOFF
Baudrate: 110 bps to 230.4 Kbps

Serial Signals
RS-232:
NPort® 5210: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
NPort® 5230: TxD, RxD, RTS, CTS, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP
Configuration Options: Web Console, Serial Console (NPort® 5210/5230 only), Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Physical Characteristics
Housing: Metal, IP30 protection
Weight:
NPort® 5210: 340 g
NPort® 5230/5232: 360 g
NPort® 5232I: 380 g
Dimensions:
NPort® 5210/5230/5232:
Without ears: 67 x 100.4 x 22 mm (2.64 x 3.95 x 0.87 in)
With ears: 90 x 100.4 x 22 mm (3.54 x 3.95 x 0.87 in)
NPort® 5232I:
Without ears: 67 x 100.4 x 35 mm (2.64 x 3.95 x 1.37 in)
With ears: 90 x 100.4 x 35 mm (3.54 x 3.95 x 1.37 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort® 5210: 325 mA @ 12 V, 190 mA @ 24 V
NPort® 5230: 325 mA @ 12 V, 190 mA @ 24 V
NPort® 5232: 280 mA @ 12 V, 150 mA @ 24 V
NPort® 5232I: 509.4 mA @ 12 V, 200 mA @ 24 V

8

Serial-to-Ethernet Device Servers ∨ NPort® 5200 Series

Regulatory Approvals

EMC: CE (EN55022 and EN55024 Class A), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
Marine: DNV

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort® 5210: 134850 hrs
NPort® 5230: 106955 hrs
NPort® 5232: 102344 hrs
NPort® 5232I: 87083 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
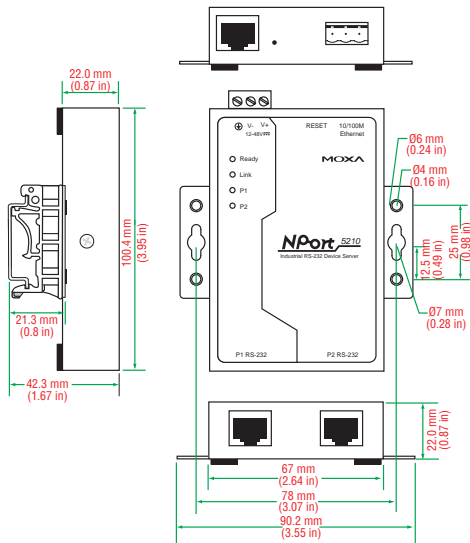
NPort® 5210

NPort® 5230
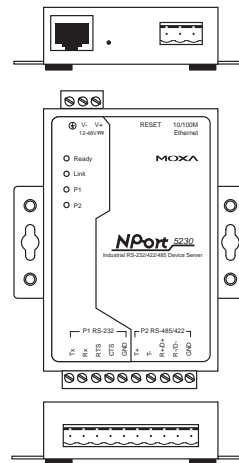
NPort® 5232
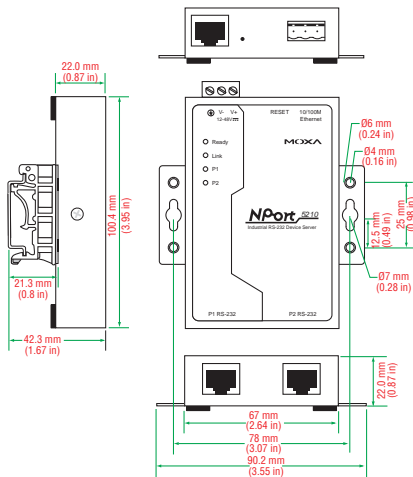
NPort® 5232I
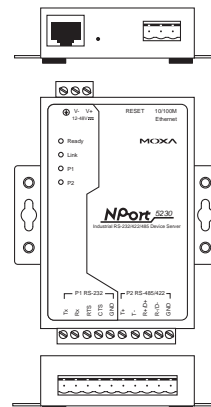
Pin Assignment

8-pin RJ45 connector
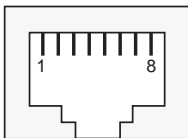
NPort® 5210/5210-T (RS-232)

PIN	RS-232
1	DSR (in)
2	RTS (out)
3	GND
4	TxD (out)
5	RxD (in)
6	DCD (in)
7	CTS (in)
8	DTR (out)

NPort® 5230/5230-T
(RS-232/422/485, terminal block connector)
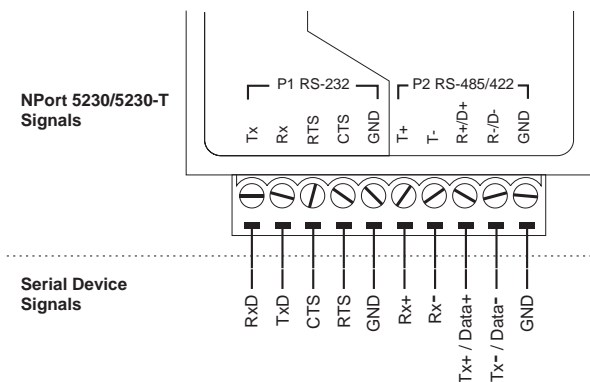
NPort® 5232/5232I/5232-T/5232I-T
(RS-422/485, terminal block connector)
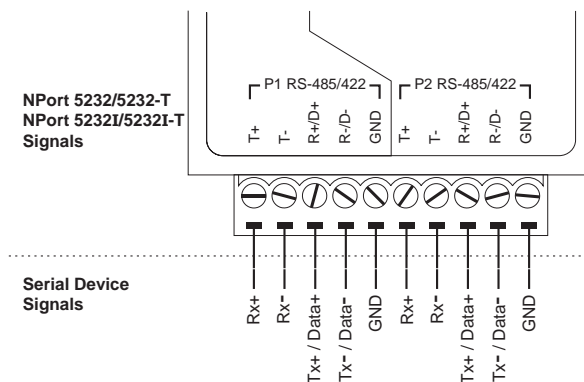
Ordering Information

Available Models

NPort® 5210: 2-port RS-232 device server, 0 to 55°C operating temperature
NPort® 5230: 2-port device server with 1 RS-232 port and 1 RS-422/485 port, 0 to 55°C operating temperature
NPort® 5232: 2-port RS-422/485 device server, 0 to 55°C operating temperature
NPort® 5232I: 2-port RS-422/485 device server with 2 KV optical isolation, 0 to 55°C operating temperature
NPort® 5210-T: 2-port RS-232 device server, -40 to 75°C operating temperature
NPort® 5230-T: 2-port device server with 1 RS-232 port and 1 RS-422/485 port, -40 to 75°C operating temperature
NPort® 5232-T: 2-port RS-422/485 device server, -40 to 75°C operating temperature
NPort® 5232I-T: 2-port RS-422/485 device server with 2 KV optical isolation, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail
DIN-Rail Power Supply: See page A-8 for details
Terminal Block: See page A-7 for details

Package Checklist

- NPort® 5200 series device server
- Power jack to 3-pin terminal block adaptor
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

8

Serial-to-Ethernet Device Servers › NPort® 5200 Series

NPort® 5400 Series

4-port RS-232/422/485 serial device servers

> 10/100M auto-sensing Ethernet
> 4 serial ports, with support for RS-232, RS-422, and RS-485
> Built-in 15 KV ESD surge protection for all serial signals
> Versatile socket operation modes, including TCP Server, TCP Client, and UDP
> Choice of configuration methods: Web console, Telnet console, and Windows utility
> SNMP MIB-II for network management
> 2 KV isolation protection for NPort® 5430I/5450I/5450I-T
> -40 to 75°C operating temperature (T model)

Network Readiness for up to Four Serial Devices

NPort® 5400 device servers can conveniently and transparently connect up to four serial devices to an Ethernet network, allowing you to network your existing serial devices with only basic configuration. Data transmission between the serial and Ethernet interfaces is bi-directional. By using NPort® device servers, you not only protect your current hardware investment, but also allow for future network expansion. You can both centralize the management of your serial devices, and distribute management hosts over the network.

Independent Operation Mode for Each Serial Port

NPort® 5400 device servers can be used to connect different devices for remote data polling or event handling over a TCP/IP network. Each serial port on the NPort® 5400 operates independently to provide maximum versatility. For example, port 1 can operate in Driver mode, port 2 in TCP Server mode, and ports 3 and 4 in TCP Client mode.

User-friendly LCD Panel for Easy Installation

An LCD panel is built into the NPort® 5400's top panel, with four buttons for inputting data, configuration, and selecting the operation mode. The LCD panel displays the server name, serial number, and IP address, and can be used to enter or modify parameters such as IP address, netmask, and gateway. (The LCD panel is not available on wide temperature models.)

Dual DC Power Inputs

NPort® 5400 device servers support dual power sources by providing both a DC terminal block input and a DC power jack input. Providing two types of power input gives users greater flexibility for use with different applications.

Adjustable Termination and Pull High/Low Resistors

The NPort 5400 series provides adjustable termination and pull high/low resistors for RS-485 applications. In some critical environments, termination resistors may be needed to prevent the reflection of serial signals, and the pull high/low resistors may need adjusting to maintain the integrity of the electrical signal. Since no set of resistor values is universally compatible with all environments, the NPort® 5400 has four sets of DIP switches on the bottom panel to set the termination and pull high/low resistor values.
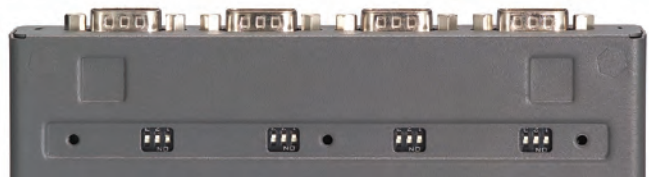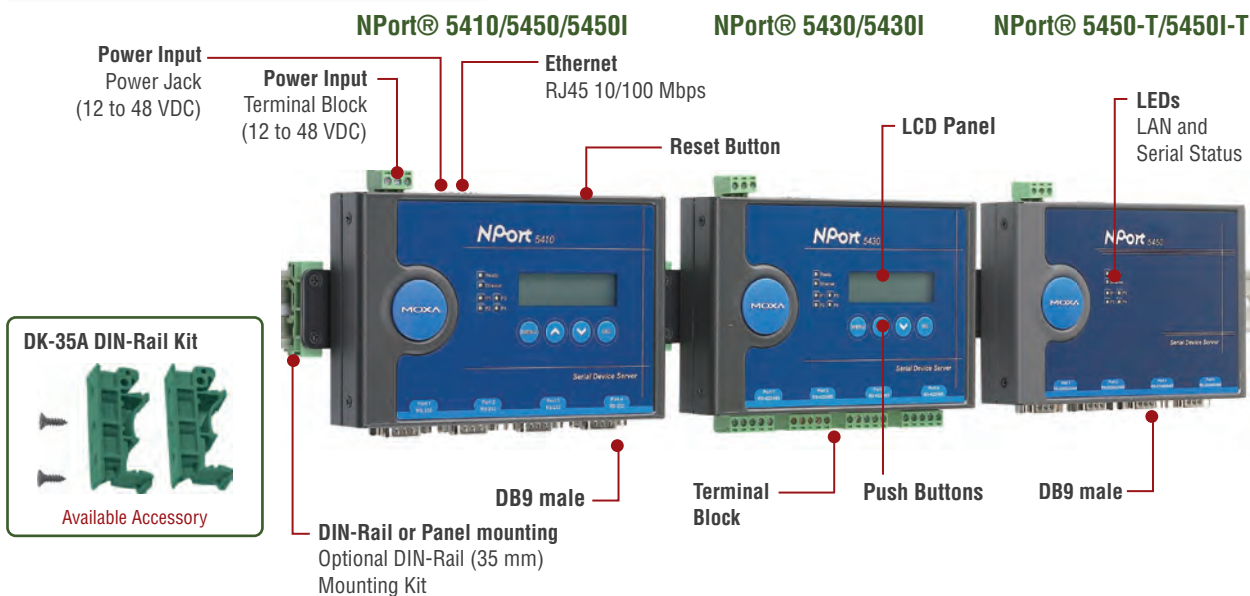
: Appearance

NPort® 5410/5450/5450I   **NPort® 5430/5430I**   **NPort® 5450-T/5450I-T**

Power Input
Power Jack
(12 to 48 VDC)

Power Input
Terminal Block
(12 to 48 VDC)

Ethernet
RJ45 10/100 Mbps

LCD Panel

LEDs
LAN and
Serial Status

Reset Button

DK-35A DIN-Rail Kit

Available Accessory

DB9 male

DIN-Rail or Panel mounting
Optional DIN-Rail (35 mm)
Mounting Kit

**Terminal
Block**

Push Buttons

DB9 male

: Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 4
Serial Standards:
NPort® 5410: RS-232
NPort® 5430/5430I: RS-422/485 (software selectable)
NPort® 5450/5450I/5450-T/5450I-T: RS-232/422/485 (software selectable)
Connector:
NPort® 5410/5450/5450I/5450-T/5450I-T: DB9 male
NPort® 5430/5430I: Terminal block
Serial Line Protection:
15 KV ESD protection for all signals
2 KV isolation protection (NPort® 5430I/5450I/5450I-T)
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 120 Ω

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS and DTR/DSR (RS-232 only), XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, Rtelnet, ARP
Configuration Options: Web Console, Telnet Console, Windows Utility

Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Mini Screen with Push Buttons (standard temp. models only)
LCD Panel: Liquid Crystal Display on the case
Push Buttons: Four push buttons for convenient on-site configuration

Physical Characteristics
Housing: Metal, IP30 protection
Weight: 740 g
Dimensions:
Without mounting kit: 158 x 103 x 33 mm (6.22 x 4.06 x 1.30 in)
With mounting kit: 176 x 103 x 33 mm (6.93 x 4.06 x 1.30 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort® 5410: 350 mA @ 12 V, 190 mA @ 24 V
NPort® 5430: 320 mA @ 12 V, 175 mA @ 24 V
NPort® 5430I: 530 mA @ 12 V, 280 mA @ 24 V
NPort® 5450/5450-T: 350 mA @ 12 V, 190 mA @ 24 V
NPort® 5450I/5450I-T: 554 mA @ 12 V, 294 mA @ 24 V

Regulatory Approvals
EMC: CE (EN55022 and EN55024 Class A), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)
Marine: DNV (standard temp. models only)
Medical: EN60601-1-2 Class B, EN55011

8

**Serial-to-Ethernet Device Servers › NPort® 5400 Series**

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
**MTBF (meantime between failures):**
NPort® 5410: 205153 hrs
NPort® 5430: 201699 hrs
NPort® 5430I: 114540 hrs
NPort® 5450/5450I: 206903 hrs
NPort® 5450-T/5450I-T: 206903 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
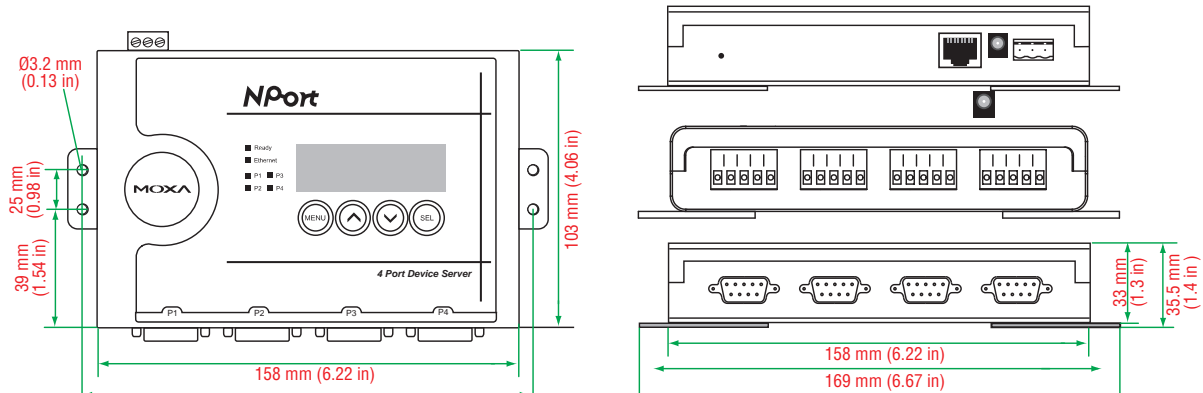
Pin Assignment

NPort® 5410
(RS-232, DB9 male connector)
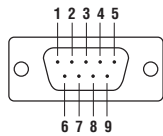
PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	–

NPort® 5450/5450I/5450-T/5450I-T
(RS-232/422/485, DB9 male connector)
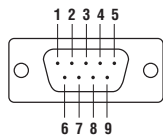
PIN	RS-232	RS-422/RS-485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

NPort® 5430/5430I
(RS-422/485, terminal block connector)

NPort 5430/5430I Terminal Block
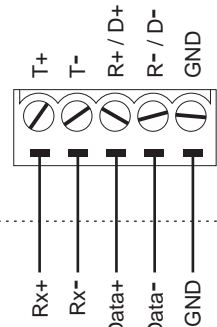
Serial Device Signals

Ordering Information

Available Models

NPort® 5410: 4-port RS-232 device server
NPort® 5430: 4-port RS-422/485 device server
NPort® 5430I: 4-port RS-422/485 device server with 2 KV isolation protection
NPort® 5450: 4-port RS-232/422/485 device server
NPort® 5450I: 4-port RS-232/422/485 device server with 2 KV isolation protection
NPort® 5450-T: 4-port RS-232/422/485 device server, -40 to 75°C operating temperature (without LCM)
NPort® 5450I-T: 4-port RS-232/422/485 device server with 2KV isolation protection, -40 to 75°C operating temperature (without LCM)

Optional Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail
DIN-Rail Power Supply: See page A-8 for details
Terminal Block: See page A-7 for details
Power Adaptor: See page A-9 for details

Package Checklist

- NPort® 5400 series device server
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

NPort® 5600 Rackmount Series

8 and 16-port RS-232/422/485 serial device servers

> 8 or 16 serial ports supporting RS-232/422/485
> Standard 19-inch rackmount size
> 10/100M auto-sensing Ethernet
> Built-in 15 KV ESD protection for all serial signals
> Easy IP address configuration with LCD panel
> Choice of configuration methods: Web console, Telnet console, and Windows utility
> Versatile socket operation modes, including TCP Server, TCP Client, UDP, and Real COM
> SNMP MIB-II for network management

: Overview

With the NPort® 5600 rackmount series, you not only protect your current hardware investment, but also allow for future network expansion by centralizing the management of your serial devices and distributing management hosts over the network.

Network Readiness for up to 16 Serial Devices
Only basic configuration is needed with the NPort® 5600 to connect up to 16 serial devices to an Ethernet network.

19-inch Rackmount Device Server
NPort® 5600 device servers come with Tx/Rx LEDs for the serial ports on the front panel, and 8 or 16 RJ45 serial port connectors on the rear panel. This makes the NPort® 5600 device servers suitable for standard 19-inch rack mounting, allowing you to simplify operational, maintenance, and administrative tasks.

Real COM/TTY Ports
Real COM/TTY drivers are provided to make the serial ports on the NPort® 5600 recognizable as Real COM ports by Windows, or Real TTY ports by Linux. In addition to supporting basic data transmission

and reception, the NPort® drivers also support the RTS, CTS, DTR, DSR, and DCD control signals.

LED Indicators to Ease Your Maintenance Tasks
The System LED, serial Tx/Rx LEDs, and Ethernet LEDs (located on the RJ45 connector) provide a great tool for basic maintenance tasks, and help engineers analyze problems in the field. The LEDs not only indicate current system and network status, but also help field engineers monitor the status of attached serial devices.

Adjustable Termination and Pull High/Low Resistors
When using termination resistors to prevent serial signal reflection, it is important to set the pull high/low resistors correctly so that the electrical signal is not corrupted. Since no set of resistor values is universally compatible for all environments, the NPort® 5600 has DIP switches on the bottom panel for setting the termination and pull high/low resistor values.

: Appearance

AC Power Input
100 to 240 VAC Input, 47 to 63 HZ

AC Power Switch

Ethernet RJ45 10/100 Mbps

Serial Ports (50 bps to 921.6 Kbps, RJ45 connectors)
NPort® 5610: RS-232
NPort® 5630: RS-422/485
NPort® 5650: RS-232/422/485

Connection Cable
RJ45 to DB9 Cable
(Optional Accessory)

Mounting Plate

LCD Panel

Reset Button

Push Buttons

LED Indicators
System Status, Serial Tx/Rx

: Specifications

Ethernet Interface

Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Optical Fiber Interface

Distance:
Multi mode: 0 to 2 km, 1310 nm (62.5/125 µm, 500 MHz*km)
Single mode: 0 to 40 km, 1310 nm (9/125 µm, 3.5 PS/(nm*km))
Min. TX Output: -20 dBm (Multi mode), -5 dBm (Single mode)
Max. TX Output: -14 dBm (Multi mode), 0 dBm (Single mode)
Sensitivity: -34 to -30 dBm (Multi mode), -36 to -32 dBm (Single mode)

Serial Interface

Number of Ports: 8 or 16
Serial Standards:
NPort® 5610: RS-232
NPort® 5630: RS-422/485
NPort® 5650: RS-232/422/485
Connector: RJ45 (8 pins)
Serial Line Protection:
15 KV ESD protection for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: DSR/DTR and RTS/CTS (RS-232 only), XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software

Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, ARP, PPP, SLIP, RTelnet, RFC2217
Configuration Options: Web Console, Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Mini Screen with Push Buttons

LCD Panel: Liquid Crystal Display on the case
Push Buttons: Four push buttons for convenient on-site configuration

Physical Characteristics

Housing: Metal, IP30 protection
Weight:
NPort® 5610-8: 3340 g
NPort® 5610-8-48V: 3160 g
NPort® 5630-8, 5650-8-S-SC, 5650-8-M-SC: 3380 g
NPort® 5650-8: 3360 g
NPort® 5610-16: 3420 g
NPort® 5610-16-48V: 3260 g
NPort® 5630-16: 3400 g
NPort® 5650-16: 3460 g
NPort® 5650-16-S-SC, 5650-16-M-SC: 3440 g
Dimensions:
Without ears: 440 x 45 x 198 mm (17.32 x 1.77 x 7.80 in)
With ears: 480 x 45 x 198 mm (18.90 x 1.77 x 7.80 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)

Power Requirements

Input Voltage:
NPort® 5610/5630/5650: 100 to 240 VAC, 47 to 63 hz
NPort® 5610-48V: ±48 VDC (20 to 72 VDC, -20 to -72 VDC)
Power Consumption:
NPort® 5610-8/16: 141 mA @ 100 VAC, 93 mA @ 240 VAC
NPort® 5630-8/16: 152 mA @ 100 VAC, 98 mA @ 240 VAC
NPort® 5610-8/16-48V: 135 mA @ 48 VDC
NPort® 5650-8/16: 158 mA @ 100 VAC, 102 mA @ 240 VAC
NPort® 5650-8/16-S-SC: 164 mA @ 100 VAC, 110 mA @ 240 VAC
NPort® 5650-8/16-M-SC: 174 mA @ 100 VAC, 113 mA @ 240 VAC

Regulatory Approvals

EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
NPort® 5610 only: IEC61000-4-12
Safety: UL (UL60950-1), TÜV (EN60950-1)
Medical: EN60601-1-2 Class B, EN55011

Reliability

Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort® 5610-8: 97294 hrs
NPort® 5610-16: 94928 hrs
NPort® 5610-8-48V: 96758
NPort® 5610-16-48V: 94417 hrs
NPort® 5630-8: 118405 hrs
NPort® 5630-16: 91483 hrs
NPort® 5650-8: 117584 hrs
NPort® 5650-16: 104767 hrs
NPort® 5650-S-SC-8: 116914 hrs
NPort® 5650-S-SC-16: 87528 hrs
NPort® 5650-M-SC-8: 116914 hrs
NPort® 5650-M-SC-16: 87528 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

198 mm (7.8 in)

45 mm (1.77 in)

440 mm (17.3 in)

480 mm (19 in)

Pin Assignment
(8-pin RJ45 connector)

1   8
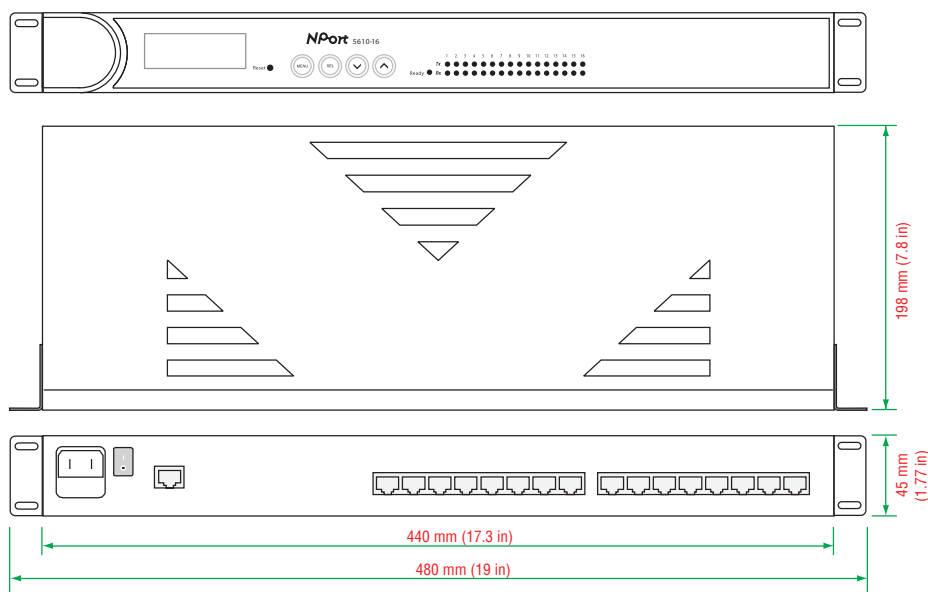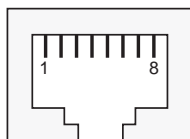
NPort® 5610: RS-232

PIN	RS-232
1	DSR
2	RTS
3	GND
4	TXD
5	RxD
6	DCD
7	CTS
8	DTR

NPort® 5630: RS-422/485

PIN	RS-422/485-4w	RS-485-2w
1	–	–
2	–	–
3	TxD+	–
4	TxD-	–
5	RxD-	Data+
6	RxD+	Data-
7	GND	GND
8	–	–

NPort® 5650: RS-232/422/485

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TXD	TxD-	–
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

Ordering Information

Available Models

NPort® 5610-8: 8-port RS-232 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5610-8-48V: 8-port RS-232 rackmount device server with RJ45 connectors and 48 VDC power input
NPort® 5630-8: 8-port RS-422/485 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5650-8: 8-port RS-232/422/485 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5650-8-M-SC: 8-port RS-232/422/485 rackmount device server with RJ45 connectors and 100BaseF(X) multi-mode fiber (SC connector)
NPort® 5650-8-S-SC: 8-port RS-232/422/485 rackmount device server with RJ45 connectors and 100BaseF(X) single-mode fiber (SC connector)
NPort® 5610-16: 16-port RS-232 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5610-16-48V: 16-port RS-232 rackmount device server with RJ45 connectors and 48 VDC power input
NPort® 5630-16: 16-port RS-422/485 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5650-16: 16-port RS-232/422/485 rackmount device server with RJ45 connectors and 100-240 VAC power input
NPort® 5650-16-M-SC: 16-port RS-232/422/485 rackmount device server with RJ45 connectors and 100BaseF(X) multi-mode fiber (SC connector)
NPort® 5650-16-S-SC: 16-port RS-232/422/485 rackmount device server with RJ45 connectors and 100BaseF(X) single-mode fiber (SC connector)

Optional Accessories (can be purchased separately)

CBL-RJ45F25-150: 8-pin RJ45 to DB25 female cable, 150 cm
CBL-RJ45M25-150: 8-pin RJ45 to DB25 male cable, 150 cm
CBL-RJ45F9-150: 8- pin RJ45 to DB9 female cable, 150 cm
CBL-RJ45M9-150: 8-pin RJ45 to DB9 male cable, 150 cm

Package Checklist

- NPort® 5600 series device server
- Power Cord (see Appendix A)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

8

Serial-to-Ethernet Device Servers ❯ NPort® 5600 Rackmount Series

NPort® 5600 Desktop Series

8-port RS-232/422/485 serial device servers

> 8 serial ports supporting RS-232/422/485
> Compact desktop design
> 10/100M auto-sensing Ethernet
> Built-in 15 KV ESD protection for all serial signals
> Easy IP address configuration with LCD panel
> Choice of configuration methods: Web console, Telnet console, and Windows utility
> Versatile socket operation modes, including TCP Server, TCP Client, UDP, and Real COM
> SNMP MIB-II for network management
> Built-in speaker: Use your own voice as the alert when exceptions occur

: Overview

NPort® 5600-8-DT device servers can conveniently and transparently connect 8 serial devices to an Ethernet network, allowing you to network your existing serial devices with only basic configuration. You can both centralize management of your serial devices and distribute management hosts over the network. Since the NPort® 5600-8-DT device servers have a smaller form factor compared to our 19-inch models, they are a great choice for applications that need additional serial ports, but for which mounting rails are not available.

Convenient Design for RS-485 Applications

The NPort® 5650-8-DT device servers support selectable 1 KΩ and 150 KΩ pull high/low resistors and a 120 Ω terminator. In some critical environments, termination resistors may be needed to prevent the reflection of serial signals. When using termination resistors, it is also important to set the pull high/low resistors correctly so that the electrical signal is not corrupted. Since no set of resistor values is universally compatible with all environments, NPort® 5600-8-DT device servers use DIP switches to allow users to adjust termination and pull high/low resistor values manually for each serial port.

Convenient Power Inputs

The NPort® 5650-8-DT device servers support both power terminal blocks and power jacks for ease of use and greater flexibility. Users can connect the terminal block directly to a DC power source, or use the power jack to connect to an AC circuit through an adaptor.

LED Indicators to Ease Your Maintenance Tasks

The System LED, Serial Tx/Rx LEDs, and Ethernet LEDs (located on the RJ45 connector) provide a great tool for basic maintenance tasks and help engineers analyze problems in the field. The NPort® 5600's LEDs not only indicate current system and network status, but also help field engineers monitor the status of attached serial devices.

Two Ethernet Ports for Convenient Cascade Wiring

The NPort® 5600-8-DT device servers come with two Ethernet ports that can be used as Ethernet switch ports. Connect one port to the network or server, and the other port to another Ethernet device. The dual Ethernet ports eliminate the need to connect each device to a separate Ethernet switch, reducing wiring costs.

: Appearance

LCD Panel

LED Indicators

Push Buttons

Ethernet Switch
RJ45 10/100 Mbps

Power Input
Both power Jack and
Terminal block 12-48VDC

Serial Ports
NPort® 5610-8-DT: DB9, RS-232
NPort® 5650-8-DT: DB9, RS-232/422/485
NPort® 5610-8-DT-J: RJ45, RS-232
NPort® 5650-8-DT-J: RJ45, RS-232/422/485

RS-232 Console Port

Reset Button

: Specifications

Ethernet Interface
Number of Ports: 2 (1 IP)
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 8
Serial Standards:
NPort® 5610-8-DT: RS-232
NPort® 5650-8-DT: RS-232/422/485
Connector:
NPort® 5610-8-DT/5650-8-DT/5650I-8-DT: DB9 male
NPort® 5610-8-DT-J/5650-8-DT-J: RJ45 (8 pins)
Serial Line Protection:
15 KV ESD protection for all signals
2 KV isolation protection (NPort® 5650I-8-DT only)
RS-485 Data Direction Control: ADDC® (automatic data direction control)
Pull High/Low Resistor for RS-485: 1 KΩ, 150 KΩ
Terminator for RS-485: 120 Ω

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: DSR/DTR and RTS/CTS (RS-232 only), XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, Rtelnet, ARP, RFC2217
Configuration Options: Web Console, Telnet Console, Serial Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i

Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Mini Screen with Push Buttons
LCD Panel: Liquid Crystal Display on the case
Push Buttons: Four push buttons for convenient on-site configuration

Physical Characteristics
Housing: Metal, IP30 protection
Weight:
NPort® 5610-8-DT: 1760 g
NPort® 5610-8-DT-J: 1170 g
NPort® 5650-8-DT: 1770 g
NPort® 5650-8-DT-J: 1710 g
NPort® 5650I-8-DT: 1850 g
Dimensions:
Without ears: 197 x 44 x 135.5 mm (7.76 x 1.73 x 5.33 in)
With ears: 229 x 46 x 135.5 mm (9.01 x 1.81 x 5.33 in)
With DIN-Rail kit on bottom panel: 197 x 53 x 135.5 mm (7.76 x 2.09 x 5.33 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort® 5610-8-DT:
  611 mA @ 12 V, 300 mA @ 24 V, 140 mA @ 48 V
NPort® 5610-8-DT-J:
  611 mA @ 12 V, 300 mA @ 24 V, 140 mA @ 48 V
NPort® 5650-8-DT:
  615 mA @ 12 V, 300 mA @ 24 V, 156 mA @ 48 V
NPort® 5650I-8-DT:
  1066 mA @ 12 V, 510 mA @ 24 V, 200 mA @ 48 V
NPort® 5650-8-DT-J:
  615 mA @ 12 V, 300 mA @ 24 V, 156 mA @ 48 V

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), TÜV (EN60950-1)

8

Serial-to-Ethernet Device Servers > NPort® 5600 Desktop Series

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures): 163356 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

197 mm
217 mm
229 mm

Pin Assignment
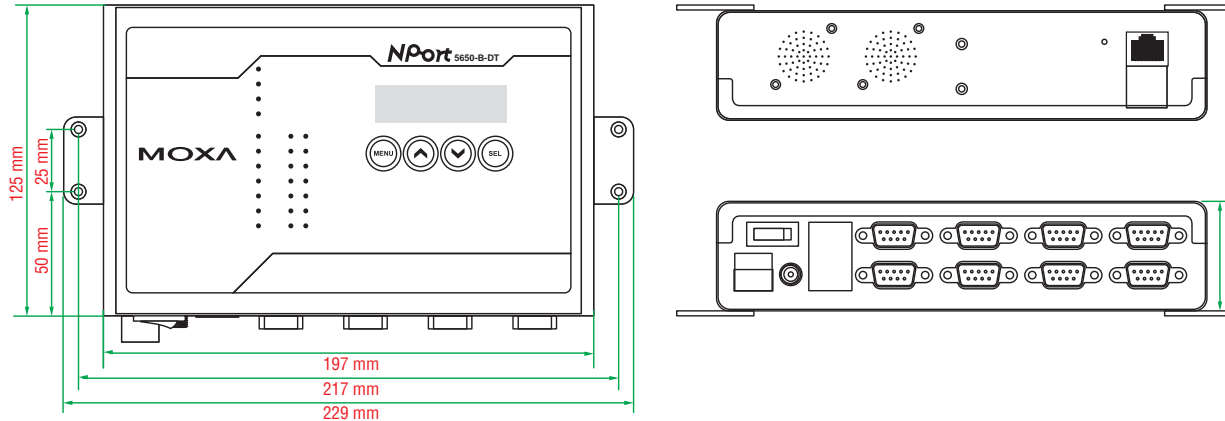
DB9 male connector

8-pin RJ45 connector
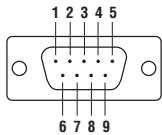
NPort® 5610-8-DT (RS-232)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

NPort® 5610-8-DT-J (RS-232)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

NPort® 5650-8-DT/5650I-8-DT (RS-232/422/485)

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

NPort® 5650-8-DT-J (RS-232/422/485)

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TXD	TxD-	–
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

: Ordering Information

Available Models

NPort® 5610-8-DT: 8-port RS-232 desktop device server with DB9 male connectors and 48 VDC power input
NPort® 5610-8-DT-J: 8-port RS-232 desktop device server with RJ45 connectors and 48 VDC power input
NPort® 5650-8-DT: 8-port RS-232/422/485 desktop device server with DB9 male connectors and 48 VDC power input
NPort® 5650-8-DT-J: 8-port RS-232/422/485 desktop device server with RJ45 connectors and 48 VDC power input
NPort® 5650I-8-DT: 8-port RS-232/422/485 desktop device server with DB9 male connectors, 48 VDC power input, and 2 KV optical isolation

Optional Accessories (can be purchased separately)

CBL-RJ45F25-150: 8-pin RJ45 to DB25 female cable, 150 cm
CBL-RJ45M25-150: 8-pin RJ45 to DB25 male cable, 150 cm
CBL-RJ45F9-150: 8-pin RJ45 to DB9 female cable, 150 cm
CBL-RJ45M9-150: 8-pin RJ45 to DB9 male cable, 150 cm

Package Checklist

- NPort® 5600 series device server
- Power Adaptor (see Appendix A)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

NPort® IA5000 Series

1 and 2-port serial device servers for industrial automation

> **Versatile socket operation modes, including TCP Server, TCP Client, UDP**
> **Patented ADDC® (automatic data direction control) for 2-wire and 4-wire RS-485**
> **Cascading Ethernet ports for easy wiring (applies only to RJ45 connectors)**
> **Redundant DC power inputs**
> **Warning by relay output and e-mail**
> **10/100BaseTX (RJ45) or 100BaseFX (single mode or multi-mode with SC connector)**
> **IP30-rated housing**

⁝ Overview

NPort® IA device servers provide easy and reliable serial-to-Ethernet connectivity for industrial automation applications. The device servers can connect any serial device to an Ethernet network, and to ensure compatibility with network software, they support a variety of port operation modes, including TCP Server, TCP Client, and UDP. The rock-solid reliability of the NPort® IA device servers makes them an ideal choice for establishing network access to RS-232/422/485 serial devices such as PLCs, sensors, meters, motors, drives, barcode readers, and operator displays. All models are housed in a compact, rugged housing that is DIN-rail mountable.
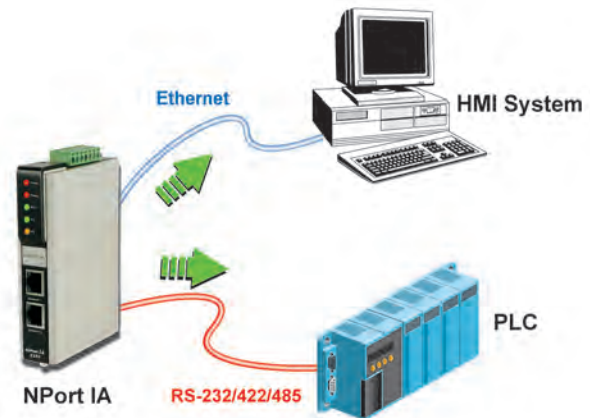
⁝ Cascading Ethernet Ports Make Wiring Easy (10/100BaseTX models only)

The NPort® IA5150 and IA5250 device servers each have two Ethernet ports that can be used as Ethernet switch ports. One port connects directly to the network or server, and the other port can be connected to another NPort® IA device server or another Ethernet device. The dual Ethernet ports help reduce wiring costs by eliminating the need to connect each device to a separate Ethernet switch.
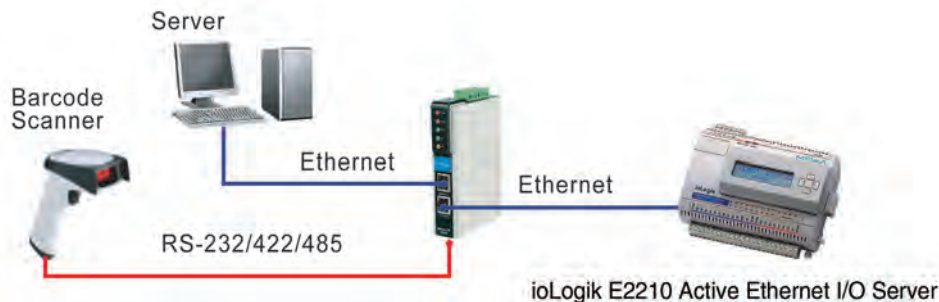
: Redundant Power Inputs

The NPort® IA5000 device servers have two power inputs that can be connected simultaneously to live DC power sources. If one power source fails, the other source takes over automatically. Redundant power inputs help assure that your device server will operate non-stop.

Dual Power Inputs
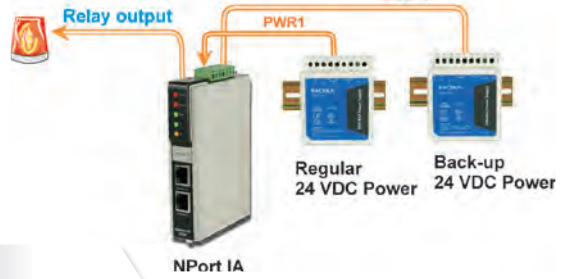
: Relay Output Warning and E-mail Alerts

The built-in relay output can be used to alert administrators of problems with the Ethernet links or power inputs, or when there is a change in the DCD or DSR serial signals. The web console indicates which Ethernet link or power input has failed, or which serial signal has changed. An e-mail warning can also be issued when an exception is detected. These functions are valuable tools that enable maintenance engineers to react promptly to emergency situations.

Power Failure Alarm
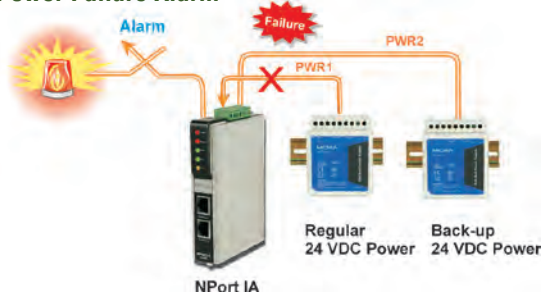
: Optical Fiber for Ethernet Communication

The NPort® IA5000 series includes 100BaseFX fiber models that support transmission distances up to 2 km for multi-mode models, and up to 40 km for single-mode models. Optical fiber is well-suited for industrial applications because it is immune to electromagnetic noise and interference. For environments that experience high ground loop voltages, fiber provides the best isolation protection, and because there is no danger of sparking, optical fiber is safer than copper wire to use in hazardous environments.

: Industrial-grade Certification

To ensure safe and reliable operation in industrial environments, the NPort® IA5000 device servers have obtained various industrial certifications, including an IP30 rating for mechanical protection, UL508 safety certification for industrial control equipment, and explosion-safe certifications for hazardous locations. Certifications include UL/cUL Class 1 Division 2 Groups A, B, C, D, and ATEX Class 1 Zone 2.

: Appearance
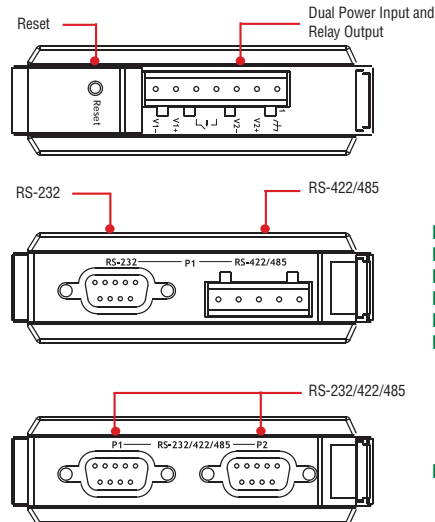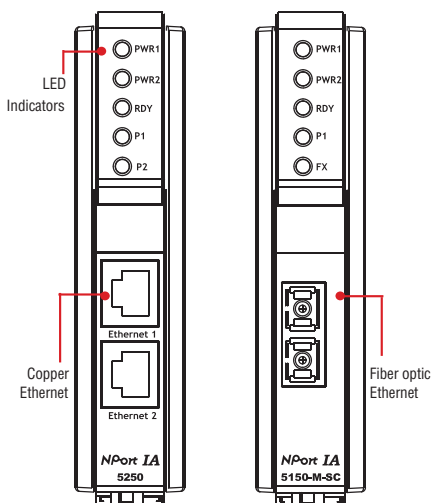
Reset

Dual Power Input and Relay Output

RS-232

RS-422/485

NPort IA5150
NPort IA5150I
NPort IA5150-S-SC
NPort IA5150-M-SC
NPort IA5150I-S-SC
NPort IA5150I-M-SC

RS-232/422/485

NPort IA5250

LED Indicators

Copper Ethernet

Fiber optic Ethernet

: Specifications

Ethernet Interface (NPort® IA5150/5150I/5250)
Number of Ports: 2
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 8-pin RJ45
Magnetic Isolation Protection: 1.5 KV built-in

Optical Fiber Interface (-M-SC and -S-SC models)
Fiber Port: 100 BaseFX, SC connector
Distance:
Multi mode: 0 to 2 km, 1310 nm (62.5/125 µm, 500 MHz*km)
Single mode: 0 to 40 km, 1310 nm (9/125 µm, 3.5 PS/(nm*km))
Min. TX Output: -20 dBm (Multi mode), -5 dBm (Single mode)
Max. TX Output: -14 dBm (Multi mode), 0 dBm (Single mode)
Sensitivity: -34 to -30 dBm (Multi mode), -36 to -32 dBm (Single mode)

Serial Interface
Number of Ports:
NPort® IA5150: 1
NPort® IA5250: 2
Serial Standards: RS-232/422/485
Connector:
NPort® IA5150: DB9 male for RS-232, terminal block for RS-422/485
NPort® IA5250: DB9 male for RS-232/422/485
Serial Line Protection:
15 KV ESD protection for all signals
2 KV isolation protection (NPort® IA5150I, NPort® 5150I-M-SC, NPort® 5150I-S-SC)
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS and DTR/DSR (RS-232 only), XON/XOFF
Baudrate: 110 bps to 230.4 Kbps

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, Rtelnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x

Physical Characteristics
Housing: Plastic, IP30 protection
Weight:
NPort® IA5150: 360 g
NPort® IA5250: 380 g
Dimensions: 29 x 89.2 x 118.5 mm (0.82 x 3.51 x 4.57 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
NPort® IA5150: 360 mA @ 12 V, 195 mA @ 24 V
NPort® IA5150I: 420 mA @ 12 V, 215 mA @ 24 V
NPort® IA5250: 440 mA @ 12 V, 200 mA @ 24 V
NPort® IA5150-S-SC: 470 mA @ 12 V, 210 mA @ 24 V
NPort® IA5150I-S-SC: 490 mA @ 12 V, 250 mA @ 24 V
NPort® IA5150-M-SC: 500 mA @ 12 V, 250 mA @ 24 V
NPort® IA5150I-M-SC: 510 mA @ 12 V, 260 mA @ 24 V

Regulatory Approvals
EMC: CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety: UL (UL60950-1), UL508, TÜV (EN60950-1)
Hazardous Location: UL/cUL Class 1 Division 2 Groups A, B, C and D
ATEX: Class I, Zone 2
Marine: DNV
EMS:
EN61000-4-2 (ESD), Level 3
EN61000-4-3 (RS), Level 3
EN61000-4-4 (EFT), Level 4
EN61000-4-5 (Surge), Level 3
EN61000-4-6 (CS), Level 3
EN61000-4-8
EN61000-4-11
Shock: IEC60068-2-27
Freefall: IEC60068-2-32
Vibration: IEC60068-2-6
Dust-proof: IP30

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NPort® IA5150 Series: 183747 hrs
NPort® IA5150I Series: 195614 hrs
NPort® IA5250 Series: 194765 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Pin Assignment
RS-232/422/485 DB9 male port
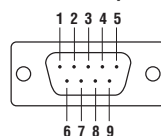
PIN	RS-232	RS-422/RS-485-4w	RS-485-2W
1	DCD	TxD-(A)	–
2	RXD	TxD+(B)	–
3	TXD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

RS-422/485 Terminal Block Wiring

PIN	RS-422/RS-485-4w	RS-485-2w
1	TxD+(B)	–
2	TxD-(A)	–
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(A)
5	GND	GND

8

Serial-to-Ethernet Device Servers > NPort® IA5000 Series

Dimensions

NPort IA5150
NPort IA5150I
NPort IA5250

NPort IA5150I-S-SC
NPort IA5150I-M-SC
NPort IA5150-S-SC
NPort IA5150-M-SC

20.6 mm (0.81 in)   29.91 mm (1.18 in)
11.5 mm (0.45 in)

29 mm (1.14 in)
14.5 mm (0.57 in)
69.5 mm (2.74 in)
20 mm (0.79 in)

29 mm (1.14 in)
14.5 mm (0.57 in)
66.6 mm (2.62 in)
79.5 mm (3.13 in)
92.4 mm (3.64 in)

89.2 mm (3.51 in)
118.5 mm (4.67 in)

14.5 mm (0.57 in)
124.5 mm (4.9 in)

NPort IA5150
NPort IA5150 I
NPort IA5150-S-SC
NPort IA5150-M-SC
NPort IA5150 I -S-SC
NPort IA5150 I -M-SC

25.9 mm (1.02 in)   35 mm (1.38 in)

NPort IA5250

25.9 mm (1.02 in)   35 mm (1.38 in)

: Ordering Information

Available Models

NPort® IA5150: 1-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP), 0 to 55°C operating temperature

NPort® IA5150I: 1-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP) and 2 KV optical isolation, 0 to 55°C operating temperature

NPort® IA5150-M-SC: 1-port RS-232/422/485 device server with 1 100BaseF(X) multi-mode fiber port (SC connectors), 0 to 55°C operating temperature

NPort® IA5150I-M-SC: 1-port RS-232/422/485 device server with 1 100BaseF(X) multi-mode fiber port (SC connectors) and 2 KV optical isolation, 0 to 55°C operating temperature

NPort® IA5150-S-SC: 1-port RS-232/422/485 device server with 1 100BaseF(X) single-mode fiber port (SC connectors), 0 to 55°C operating temperature

NPort® IA5150I-S-SC: 1-port RS-232/422/485 device server with 1 100BaseF(X) single-mode fiber port (SC connectors) and 2 KV optical isolation, 0 to 55°C operating temperature

NPort® IA5250: 2-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP), 0 to 55°C operating temperature

NPort® IA5150-T: 1-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP), -40 to 75°C operating temperature

NPort® IA5150I-T: 1-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP) and 2 KV optical isolation, -40 to 75°C operating temperature

NPort® IA5150-M-SC-T: 1-port RS-232/422/485 device server with 1 100BaseF(X) multi-mode fiber port (SC connectors), -40 to 75°C operating temperature

NPort® IA5150I-M-SC-T: 1-port RS-232/422/485 device server with 1 100BaseF(X) multi-mode fiber port (SC connectors) and 2 KV optical isolation, -40 to 75°C operating temperature

NPort® IA5150-S-SC-T: 1-port RS-232/422/485 device server with 1 100BaseF(X) single-mode fiber port (SC connectors), -40 to 75°C operating temperature

NPort® IA5150I-S-SC-T: 1-port RS-232/422/485 device server with 1 100BaseF(X) single-mode fiber port (SC connectors) and 2 KV optical isolation, -40 to 75°C operating temperature

NPort® IA5250-T: 2-port RS-232/422/485 device server with 2 10/100BaseT(X) ports (RJ45 connectors, single IP), -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

Optical Fiber Patch Cord: See page A-14
Terminal Block for RS-422/485 ports: See page A-7
Power Jack to Terminal Block Cable: See page A-7

Package Checklist

• NPort® IA series device server
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

NPort® W2150/2250 Plus

1 and 2-port RS-232/422/485 IEEE 802.11a/b/g wireless device servers

NPort® W2150 Plus   NPort® W2250 Plus

> Link any serial device to an IEEE 802.11a/b/g network
> 921.6 Kbps baudrate for RS-232/422/485 transmissions
> Web-based configuration using built-in Ethernet or WLAN
> Enhanced remote configuration with HTTPS, SSH
> Secure data access with WEP, WPA, WPA2
> Built-in WLAN site survey tool
> Wireless roaming with user-defined signal strength threshold
> Off-line port buffering and serial data log
> Dual power inputs (1 power jack, 1 terminal block)

⋮ Overview

The NPort® W2150 Plus and W2250 Plus are the ideal choice for connecting your serial devices, such as PLCs, meters, and sensors, to a wireless LAN. Your communications software will be able to access the serial devices from anywhere over a wireless LAN. Moreover, the wireless device servers require fewer cables and are ideal for applications that involve difficult wiring situations. In Infrastructure Mode or Ad-Hoc Mode, the NPort® W2150 Plus and NPort® W2250 Plus can connect to Wi-Fi networks at offices and factories to allow users to move, or "roam," between several APs (Access Points), and offer an excellent solution for devices that are frequently moved from place to place.

⋮ 802.11a/b/g Wireless Connectivity to Serial Devices

Wireless device servers require fewer cables and are ideal for applications that involve difficult wiring situations. In Infrastructure Mode or Ad-Hoc Mode, the NPort® W2150 Plus and NPort® W2250 Plus can communicate with any host computer through an access point, or with another NPort® W2150 Plus or NPort® W2250 Plus located up to 100 meters away.

⋮ Wireless Roaming Function

Wi-Fi networks at offices and factories allow users to move, or "roam," between several APs (Access Points). The NPort® W2150 Plus and NPort® W2250 Plus include a "Connect rule" setting to allow wireless roaming.
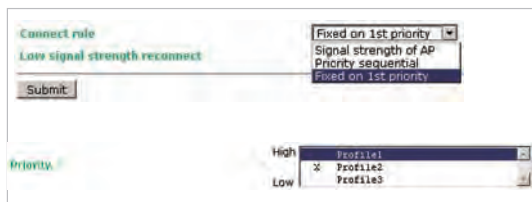
The "Connect rule" field is only available in Infrastructure Mode and is used to specify the NPort®'s roaming behavior. When "Signal strength of AP" is selected, if more than one AP is detected, the NPort® will connect to the AP that has the highest signal strength, regardless of priority as set in the Priority field. When "Priority sequential" is selected, the NPort® will always try to connect to APs in order of priority, as set in the Priority field, regardless of signal strength. When "Fixed on 1st priority" is selected, the NPort® is only allowed to connect to the first priority AP, as set in the "Priority" field.

This "Priority" field is only available in Infrastructure Mode, and is used to set the priorities of the three available profiles.

⋮ Off-line Port Buffering and Serial Data Log for Each Port

For mission-critical applications, data from the serial device must not be lost if the wireless connection goes down. The NPort® W2150 Plus and NPort® W2250 Plus are designed to continue operating if the wireless connection is disconnected temporarily. If the wireless connection is retraining, or if the connection fails, the serial data from the serial device will be queued in the 10 MB port buffer built into the device server. As soon as the wireless connection returns to normal, the data stored in the buffer will be sent to its destination. In addition, a serial data log can be enabled to make troubleshooting easier.

The serial data log buffer for both the NPort® W2150 Plus and NPort® W2250 Plus is 64 KB per port.

⋮ Built-in WLAN Site Survey Tool

The NPort® W2150 Plus and NPort® W2250 Plus both have a built-in WLAN site survey tool. Additional software is NOT required to complete the site survey.

The purpose of conducting a WLAN site survey is to determine how many access points are required, and where the access points should be placed. For most implementations, the number and placement of access points is designed to guarantee a minimum data rate. With wireless systems, it is often necessary to perform a WLAN site survey before installing the access points in order to understand how radio waves behave within the facility.

⋮ Secure Remote Management and Configuration with SSH/SSL

Unauthorized access is one of the biggest headaches for system managers. In addition to IP filtering and password protection, the NPort® W2150 Plus and NPort® W2250 Plus also support SSH and SSL to provide protection from hackers. To transmit control messages securely, open the web console using a web browser that supports https (Internet Explorer, for example). You may also open the serial or Telnet console, such as PuTTY, using a terminal emulator that supports SSH.

⋮ Select "Any Baudrate" between 50 bps and 921.6 Kbps
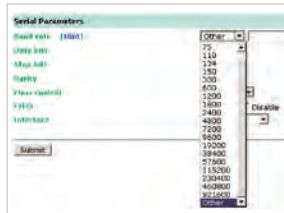
Most device servers only support a fixed number of serial baudrates. However, some applications require special baudrates, such as 250 Kbps or 500 Kbps. With the NPort® W2150 Plus and NPort® W2250 Plus, you can enter any baudrate between 50 and 921.6 Kbps.

If your device's baudrate is not a standard baudrate, select "other" from the drop-down list and then enter the baudrate.

⋮ Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: RJ45
Magnetic Isolation Protection: 1.5 KV built-in

WLAN Interface
Standard Compliance: 802.11a/b/g
Network Modes: Infrastructure, Ad-Hoc
Transmit Power:
802.11a: 14 dBm (typical)
802.11b: 17 dBm (typical)
802.11g: 15 dBm (typical)
Receive Sensitivity: -80 dBm
Radio Frequency Type: DSSS/OFDM
Transmission Rate:
802.11a: 54 Mbps
802.11b: 11 Mbps
802.11g: 54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps)
Transmission Distance: Up to 100 meters (in open areas)
Wireless Security:
• WEP: 64-bit/128-bit data encryption
• WPA, WPA2, 802.11i: Enterprise mode and
Pre-Share Key (PSK) mode
• Encryption: 128-bit TKIP/AES-CCMP EAP-TLS, PEAP/GTC, PEAP/MD5, PEAP/MSCHAPV2, EAP-TTLS/PAP, EAP-TTLS/CHAP, EAP-TTLS/MSCHAP, EAP-TTLS/MSCHAPV2, EAP-TTLS/EAP-MSCHAPV2, EAP-TTLS/EAP-GTC, EAP-TTLS/EAP-MD5, LEAP
Antenna Connector: Reverse SMA

Serial Interface
Number of Ports:
NPort® W2150 Plus: 1
NPort® W2250 Plus: 2
Serial Standards: RS-232/422/485 (DB9 male connector)
Off-line Port Buffering:
NPort® W2150 Plus: 20 MB
NPort® W2250 Plus: 10 MB

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 921.6 Kbps
Serial Data Log: 64 KB

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, SNMP V1/V2c/V3, HTTP, SMTP, SNTP, SSH, HTTPS
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Utility
Secure Configuration Options: HTTPS, SSH
Windows Real COM Drivers: Windows 95, 98, ME, NT, 2000, XP x86/x64, 2003 x86/x64, Vista x86/x64, 2008 x86/x64, 7 x86/x64, Embedded CE 5.0/6.0, XP Embedded

Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: 2.4.x/2.6.x
Utilities: NPort® Search Utility and NPort® Windows Driver manager
Management: SNMP MIB-II

Physical Characteristics

Housing: Aluminum sheet metal (1 mm)
Weight: 780 g
Dimensions:
Without ears or antenna: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
With ears, without antenna: 100 x 111 x 26 mm (3.94 x 4.37 x 1.02 in)
Antenna Length: 109 mm (4.29 in)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-4 to 185°F)

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption: 560 mA @ 12 V, 294 mA @ 24 V, 162 mA @ 48 V

Regulatory Approvals

EMC: CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)
Safety: UL (UL60950-1), TÜV (EN60950-1)
EMI: FCC Part 15 (Subpart B Class A, Subpart C, Subpart E), VCCI
Radio: CE (ETSI EN 301 893, ETSI EN 300 328), ARIB RCR STD-33, ARIB STD-66

Reliability

MTBF (mean time between failures):
NPort® W2150 Plus: 352547 hrs
NPort® W2250 Plus: 352034 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

8

Serial-to-Ethernet Device Servers ❯ NPort® W2150/2250 Plus

Dimensions
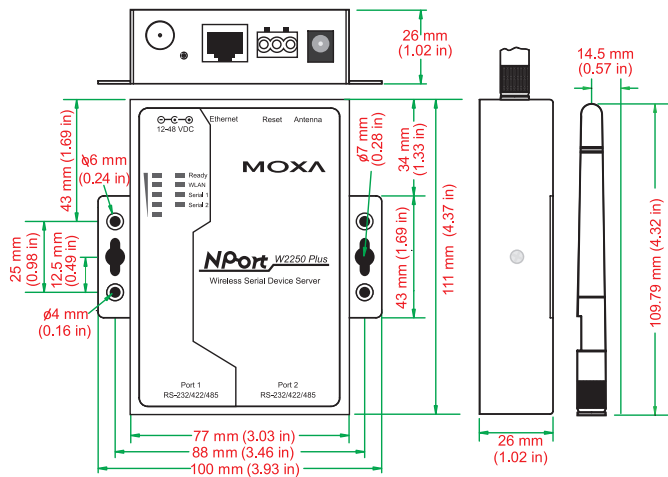
Pin Assignment, DB9 Male
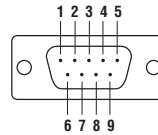
PIN	RS-232	RS-422/485-4W	RS-485-2W
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–
9	–	–	–

: Ordering Information

Available Models

NPort® W2150 Plus-US: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, US band, US plug, 0 to 55°C operating temperature

NPort® W2150 Plus-EU: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, Euro plug, 0 to 55°C operating temperature

NPort® W2150 Plus-CN: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, US plug, CCC, 0 to 55°C operating temperature

NPort® W2150 Plus-UK: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, UK plug, 0 to 55°C operating temperature

NPort® W2150 Plus-SAA: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, Australia plug, 0 to 55°C operating temperature

NPort® W2150 Plus-JP: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Japan band, Japan plug, 0 to 55°C operating temperature

NPort® W2250 Plus-US: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, US band, US plug, 0 to 55°C operating temperature

NPort® W2250 Plus-EU: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, Euro plug, 0 to 55°C operating temperature

NPort® W2250 Plus-CN: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, US plug, CCC

NPort® W2250 Plus-UK: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, UK plug, 0 to 55°C operating temperature

NPort® W2250 Plus-SAA: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Euro band, Australian plug, 0 to 55°C operating temperature

NPort® W2250 Plus-JP: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN, antenna, Japan band, Japan plug, 0 to 55°C operating temperature

NPort® W2150 Plus-T: 1-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN (includes US, Euro, Japan band), -40 to 75°C operating temperature

NPort® W2250 Plus-T: 2-port RS-232/422/485 wireless device server with 802.11a/b/g WLAN (includes US, Euro, Japan band), -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

Serial Cables and Adaptors: See page A-6 for details
DK-35A: 35 mm DIN-Rail Mounting Kit

Package Checklist

- NPort® W2150 Plus or NPort® W2250 Plus wireless device server
- Power adaptor (non-T models only)
- Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

8

Serial-to-Ethernet Device Servers › NPort® W2150/2250 Plus

NPort® W2004

4-port RS-232/422/485 IEEE 802.11b/g wireless device server

> Link any serial device to an IEEE 802.11b/g network
> 460.8 Kbps baudrate for RS-232/422/485 transmissions
> Web-based configuration using built-in Ethernet or WLAN
> Windows real COM and Linux real TTY drivers provided
> Real COM, TCP Server, TCP Client, and UDP modes
> Enhanced remote configuration with HTTPS, SSH

: 802.11b/g Wireless Connectivity to Serial Devices

The NPort® W2004 wireless device server provides a convenient means of reducing the number of cables for hard-to-wire applications. Both Infrastructure and Ad-Hoc modes are supported, and the NPort®

W2004 can connect to access points or another NPort® W2004 located up to 300 meters away.

: Works with Existing Software, Saving Time and Money

Field-proven Windows real COM and Linux real TTY drivers are provided for the NPort® W2004, ensuring that existing PC software will work with your wireless LAN infrastructure. In addition, the

NPort® W2004 supports TCP Server, TCP Client, and UDP operation modes that allow IP-based software to use the IP address and TCP port number to access devices directly.

: Secure Remote Management and Configuration with SSH/SSL

The NPort® W2004 supports several functions to help prevent unauthorized access to your wireless LAN. In addition to WEP protection, IP filtering, and password protection, the NPort® W2004 also supports SSH and SSL to thwart hacker attacks. Using web

browsers that support https (Internet Explorer, for example) provides secure access by browser to your wireless LAN. In addition, using terminal emulators that support SSH (PuTTY, for example) provides secure Telnet access.

: Specifications

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: RJ45
Magnetic Isolation Protection: 1.5 KV built-in

WLAN Interface
Standard Compliance: 802.11b/g
Network Modes: Infrastructure, Ad-Hoc
TX Transmit Power:
802.11b: 20 dBm maximum
802.11g: 18 dBm maximum
RX Sensitivity: -80 dBm
Radio Frequency Type: DSSS/OFDM
Transmission Rate: 54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps)
Transmission Distance: Up to 300 meters (at 12 Mbps in open areas)
Wireless Security: WEP: 64/128-bit data encryption
Antenna Connector: Reverse SMA

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485 (RJ45 connector)
Console Port: RS-232 console port on the front panel

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, DTR/DSR
Baudrate: 50 bps to 460.8 Kbps
Serial Data Log: 64 KB

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Software
Network Protocols: ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, SSH, HTTPS
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Utility
Secure Configuration Options: HTTPS, SSH
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/ 7 x86/x64, Embedded CE 5.0/6.0, XP Embedded

Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i

Linux Real TTY Drivers: 2.4.x/2.6.x

Utilities: NPort® Search Utility and NPort® Windows Driver manager

Physical Characteristics

Housing: SECC sheet metal (1 mm), providing IP30 protection

Weight: 1730 g

Dimensions:
Without antenna: 45.8 x 135 x 105 mm (1.80 x 5.31 x 4.13 in)
With antenna: 45.8 x 204 x 142 mm (3.94 x 8.03 x 5.59 in)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)

Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 85°C (-4 to 185°F)

Power Requirements

Input Voltage: 12 to 48 VDC

Power Consumption: 685 mA @ 12 V, 340 mA @ 24 V, 185 mA @ 48 V

Regulatory Approvals

EMC: CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)

Safety: UL (UL60950-1), TÜV (EN60950-1)

EMI: FCC (Part 15 Subpart B Class A, Subpart C)

Radio: CE (ETSI EN 300 328)

Reliability

MTBF (mean time between failures): 81501 hrs

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions
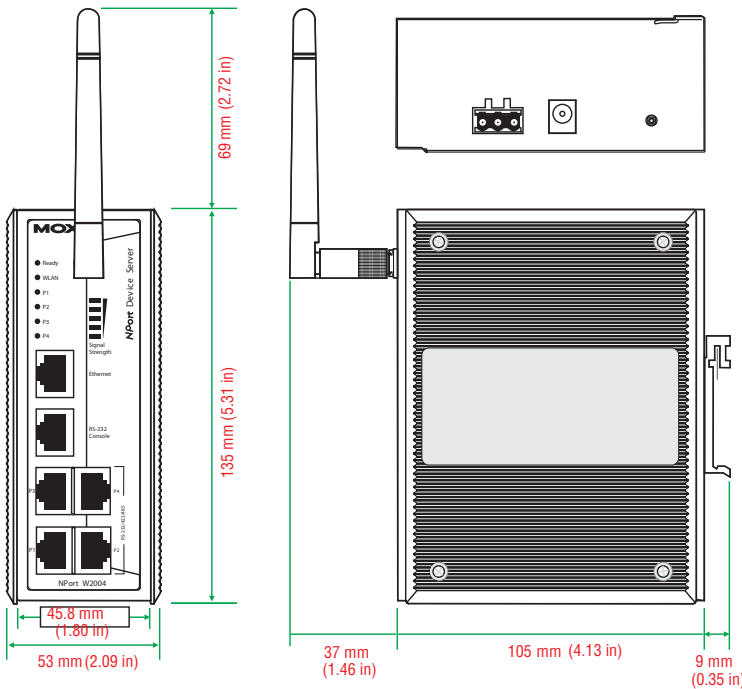
RJ45 RS-232/422/485 port

PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TxD	TxD-	–
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

Ordering Information

Available Models

NPort® W2004-US: 4-port RS-232/422/485 wireless device server with 802.11b/g WLAN, antenna, US band, US plug

NPort® W2004-EU: 4-port RS-232/422/485 wireless device server with 802.11b/g WLAN, antenna, Euro band, Euro plug

NPort® W2004-CN: 4-port RS-232/422/485 wireless device server with 802.11b/g WLAN, antenna, Euro band, US plug, CCC

NPort® W2004-UK: 4-port RS-232/422/485 wireless device server with 802.11b/g WLAN, antenna, Euro band, UK plug

NPort® W2004-SAA: 4-port RS-232/422/485 wireless device server with 802.11b/g WLAN, antenna, Euro band, Australia plug

Optional Accessories (can be purchased separately)

Serial Cables and Adaptors: See page A-6 for details

Package Checklist

- NPort® W2004 wireless device server
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-RJ45M9-150: RJ45 (8 pins) to DB9 male serial port cable, 150 cm
- Power adaptor
- Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Embedded Device Servers

9

Embedded Device Servers

Embedded Device Servers

	MiiNePort E1 MiiNePort E1-H MiiNePort E1-T MiiNePort E1-H-T	MiiNePort E2 MiiNePort E2-H MiiNePort E2-T MiiNePort E2-H-T	NE-4110S	NE-4110A	NE-4120S	NE-4120A	NE-4100T	WE-2100T
Form Factor								
Type	Drop-in module		Stand-alone module				Drop-in module	
Dimensions	33.9 x 16.25 x 13.5 mm	29 x 17 x 9 mm	57 × 40 mm	57 × 40 mm	57 × 40 mm	57 × 40 mm	45 × 36 mm	54 x 40 x 13.3 mm
Ethernet Interface								
10/100BaseT(X) Ports	1	1	1	1	1	1	1	1
Connector	RJ45	6-pin pin header	RJ45	RJ45	5-pin pin header		26-pin dual-in-line	44-pin dual-in-line
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
WLAN Interface								
Standard Compliance	–	–	–	–	–	–	–	IEEE 802.11a/b/g
Radio Frequency Type	–	–	–	–	–	–	–	DSSS, CCK, DFDM
Wireless Security	–	–	–	–	–	–	–	SEP, SPA, SPA2, 802.11i
Network Modes	–	–	–	–	–	–	–	Infrastructure (a/b/g), Ad Hoc (b/g)
Serial Interface								
TTL Ports	1 (data port)		1 (console port)				2 (1 data port, 1 console port)	
RS-232 Ports	–	–	1 (data port)	–	1 (data port)	–	–	–
RS-232/422 Ports	–	–	–	1 (data port)	–	1 (data port)	–	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark							
Flow Control	RTS/CTS, XON/XOFF							
Baudrate	MiiNePort E1/E2: 50 bps to 230.4 Kbps (non-standard baudrates supported) MiiNePort E1-H/E2-H: 50 bps to 921.6 Kbps (non-standard baudrates supported)		110 bps to 230.4 Kbps					50 bps to 921.6 Kbps
DI/DO	1 DI, 1 DO, 1 DI/DO	–	–	–	–	–	–	–
Programmable GPIO Pins	–	4	4	4	4	4	4	9
Software								
Network Protocols	ICMP, IP, TCP, UDP, DHCP, Telnet, HTTP, SNMP V1/V2c, SMTP ARP, TFTP, Auto IP, BOOTP		ARP					DNS, SNTP, SSH, HTTPS
Configuration Options	Web/Serial/Telnet Console, Windows Utility							
Serial Command Mode	✓	✓	✓	✓	✓	✓	✓	✓
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CD 5.0/6.0, XP Embedded							
Fixed TTY Drivers	SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i							
Linux Real TTY Drivers	Linux 2.4.x, 2.6.x							
Operation Modes	TCP Server, TCP Client, TCP Mixed, UDP, Real COM, Modem, RFC2217		Real COM, TCP Server, TCP Client, UDP					Real COM, TCP Server, TCP Client, UDP, RFC2217
NetEZ Technology	EZPage, ExTrigger, SCM, AutoCFG, MCSC	EZPower, EZPage, SCM, AutoCFG, MCSC	–	–	–	–	–	–
Environmental Limits								
Operating Temparture	0 to 55°C or -40 to 85°C		0 to 55°C or -40 to 75°C					0 to 55°C
Operating Humidity	5 to 95% RH							5 to 95% RH
Storage Temperature	-40 to 85°C		-20 to 70°C					-20 to 70°C
Power Requirements								
Input Voltage	3.3 VDC (±5%)	3.3 or 5 VDC (±5%)	5 VDC (±5%)	5 VDC (±5%)	5 VDC (±5%)	5 VDC (±5%)	5 VDC (±5%)	3.3 VDC (±5%)
Power Consumption	160 mA @ 3.3 VDC max.	140 mA @ 3.3 VDC input max., 92 mA @ 5 VDC input max.	290 mA @ 5 VDC max.					540 mA (at full speed)
Regulatory Approvals								
EMC	EN55022:1998, Class B (radiated & conducted emissions); EN55024:1998 (MiiNePort E1 only; MiiNePort E2 pending) (direct & indirect ESD, electrical fast-transient/burst immunity, power frequency magnetic field immunity)		CE (EN55022 Class A), FCC Part 15 Subpart B Class A					CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)
Reliability								
Watchdog Timer	✓	✓	✓	✓	✓	✓	✓	✓
MTBF	5515294 hrs	–	290276 hrs	289573 hrs	289573 hrs	289573 hrs	288173 hrs	505288 hrs
Warranty	5 years (see www.moxa.com/warranty)							

Go Ethernet with Thumb-sized Serial-to-Ethernet Solutions

Are you concerned about cost, design flexibility, and power consumption? Moxa understands what you need! To serve this demand, Moxa developed the MiiNePort E1, the world's tiniest and most innovative embedded serial-to-Ethernet device server.

Moxa's MiiNePort E1 embedded device servers are designed for manufacturers who want to add sophisticated network connectivity to their serial devices with minimal integration effort.

⦂ The MiiNe is a Lean yet Powerful Serial-to-Ethernet Solution

Moxa's second generation SoC, the MiiNe, was created to provide device manufacturers with a competitive embedded serial-to-Ethernet solution. The MiiNePort E1 and MiiNePort E2, which use the MiiNe for their SoC, are the world's tiniest embedded device servers, and have the lowest power consumption of any similar product. The MiiNe SoC has the following features:

- Designed for 1 or 2-port serial-to-Ethernet applications
- Uses a 32-bit ARM core
- Uses Moxa's own advanced UART technology
- Has 2 MB Flash and 4 MB SDRAM memory built in
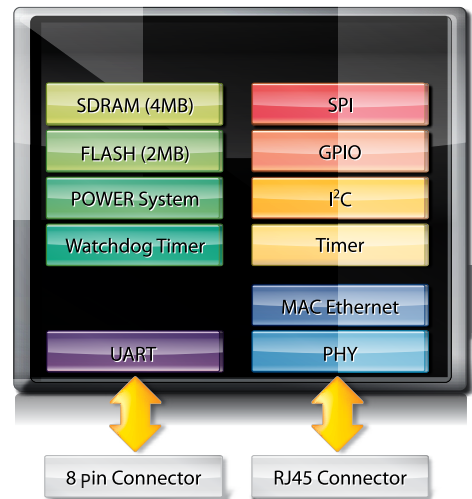
Powered by the MiiNe, Moxa's 2nd generation SoC, the MiiNePort makes your device more powerful and cost-effective.
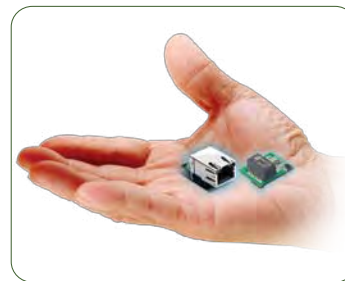
As small as an RJ45 connector, the thumb-sized MiiNePort maximizes your design flexibility.
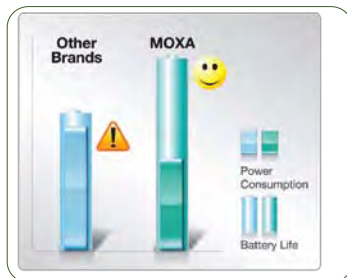
Want to minimize the power consumption of your device while maximizing its strength? The MiiNePort can help.

Moxa's NetEZ technology gives serial device manufacturers a range of powerful tools for integrating Ethernet capability into serial devices.

9

Embedded Device Servers ˅ Go Ethernet with Thumb-sized Serial-to-Ethernet Solutions

Introduction to Embedded Device Servers

Embedded device servers give serial device manufacturers a cost-effective means of making serial devices network-ready. Moxa provides a wide range of embedded device servers with products available to provide either wired or wireless Ethernet communication capability. With Moxa's embedded device servers, device manufactures can easily turn their legacy serial devices into network devices with a minimum of investment and effort. In fact, since TCP/IP expertise is not required, time-to-market can be reduced to the three to six month range. Compared with other solutions on the market, Moxa's embedded device server products give serial device manufacturers ready access to a unique set of features:

• Different form factors for different installation types
• Versatile, ready-to-use operation modes
• Thumb-sized footprint minimizes overall device size
• Low power consumption maximizes device system stability
• NetEZ technology makes device manufacturers' job and life easier
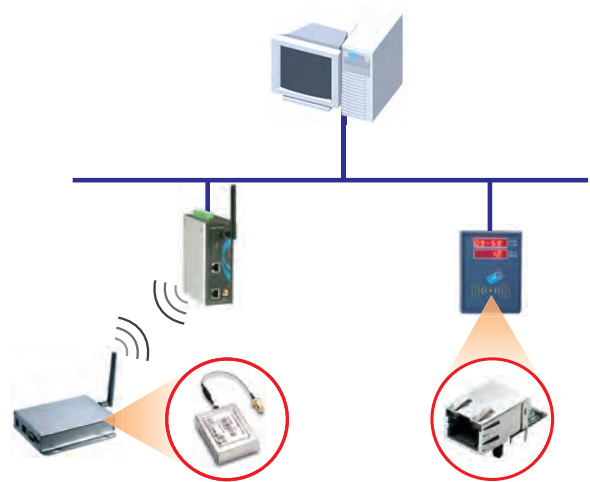
: Different form factors for different installation types

MiiNePort E1

MiiNePort E2
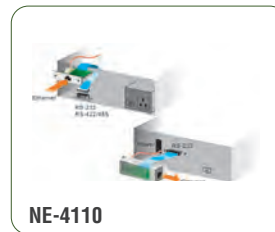
NE-4110

NE-4120

Drop-in Form Factor: Drop-in modules come with DIP pins or pin-headers to make assembly easy. This kind of module has a smaller footprint, and is perfect for device manufacturers who have size concerns for their devices.

Moxa's Drop-in Modules: MiiNePort E1, MiiNePort E2, NE-4100T, WE-2100T.

Stand-alone Form Factor: Stand-alone modules come with pin-headers and screw mounting holes for device manufactures to connect and fix the modules to the device's main board. This kind of module has a bigger footprint compared to the drop-in form factor, but still provides sufficient flexibility for placing the module in the device without making large changes to the device's original main board design.

Moxa Stand-alone Modules: NE-4110, NE-4120.

❖ NetEZ Technology

Moxa's NetEZ technology gives serial device manufacturers a range of powerful tools for integrating Ethernet capability into serial devices:

- **EZPage:** Need a module that allows direct communication with the attached serial device? Use the MiiNePort E2's EZPage Java Applet to create a visual webpage for configuring and communicating with the attached serial device.

- **EZPower:** Need a module that provides a versatile system power input voltage? Use the MiiNePort E2's EZPower to switch automatically between a 3.3 and 5 VDC system power input.

- **MCSC:** Ever wanted your device to be a server and client at the same time? The MiiNePort's MCSC (Multi-channel Serial Communication) provides dual connections and dual channels for multi-task applications.
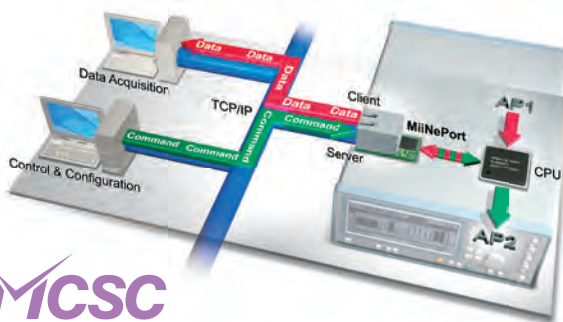
- **AutoCFG:** Tired of spending a large amount of time and effort setting up a network? Not anymore! The MiiNePort's AutoCFG makes auto-configuration during manufacturing possible.

- **SCM:** Need an easy tool to configure the network through serial communication inside the device? Try MiiNePort's friendly SCM (Serial Command Mode).

- **EXTrigger:** Want to troubleshoot your network with ease? Use the MiiNePort's EXTrigger button to reset network settings with just one push.

*Patent Pending

9

Embedded Device Servers ∨ Introduction to Embedded Device Servers

MiiNePort E1 Series

10/100 Mbps embedded serial device servers

> Same size as an RJ45 connector—only 33.9 x 16.25 x 13.5 mm
> Extremely low power consumption—only 160 mA @ 3.3 VDC input
> Uses the MiiNe, Moxa's second generation SoC
> NetEZ technology makes integration incredibly easy
> Versatile choice of operation modes: Real COM, RFC2217, TCP, and UDP

Compatible with Windows 7 | RoHS | CE | FC

Overview

Moxa's MiiNePort E1 embedded device servers are designed for manufacturers who want to add sophisticated network connectivity to their serial devices with minimal integration effort. The MiiNePort E1 is empowered by the MiiNe, Moxa's second generation SoC, which supports 10/100 Mbps Ethernet, up to 921.6 Kbps serial baudrate, a versatile selection of ready-to-use operation modes, and requires only a small amount of power. By using Moxa's innovative NetEZ technology, the MiiNePort E1 can be used to convert any device with a standard serial interface to an Ethernet enabled device in no time. In addition, the MiiNePort E1 is the size of an RJ45 connector, making it easy to fit into virtually any existing serial device.

The MiiNe—Moxa's 2nd Generation SoC

The MiiNe was created to provide manufacturers with a competitive embedded serial-to-Ethernet solution. The MiiNePort E1, which uses the MiiNe for its SoC, is one of the world's tiniest embedded device servers, and has the lowest power consumption of any similar product. The MiiNe has the following features:

- Designed for 1 or 2-port serial-to-Ethernet applications
- Uses a 32-bit ARM 7 core
- Uses Moxa's own advanced UART technology
- Has 2 MB Flash and 4 MB SDRAM memory built in

SDRAM (4MB)	SPI
FLASH (2MB)	GPIO
POWER System	I²C
Watchdog Timer	Timer
	MAC Ethernet
UART	PHY

8 pin Connector | RJ45 Connector

NetEZ Technology

Moxa's NetEZ technology gives serial device manufacturers a range of powerful tools for integrating Ethernet capability into serial devices:

It's That Easy ! EXTrigger | SCM | AutoCFG | MCSC | EZPage

- **EXTrigger:** Want to troubleshoot your network with ease? Use the MiiNePort's EXTrigger button to reset network settings with just one push.

*Patent Pending
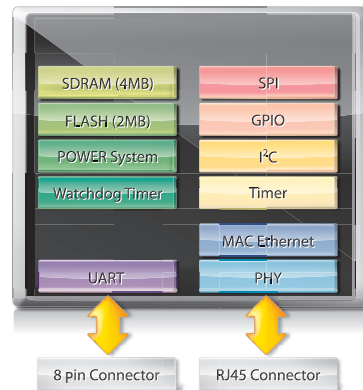
EXTrigger

- **MCSC:** Ever wanted your device to be a server and client at the same time? The MiiNePort's MCSC (Multi-channel Serial Communication) provides dual connections and dual channels for multi-task applications!.
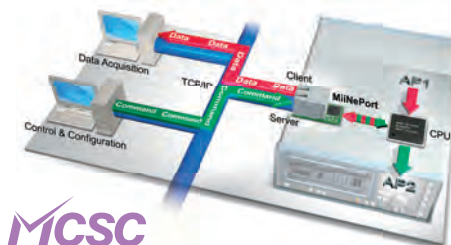
MCSC

- **SCM:** Need an easy tool to configure the network through serial communication inside the device? Try MiiNePort's friendly SCM (Serial Command Mode).

- **EZPage:** Need a module that allows direct communication with the attached serial device? Use the MiiNePort E2's EZPage Java Applet to create a visual webpage for configuring and communicating with the attached serial device.

- **AutoCFG:** Tired of spending a large amount of time setting up the device's initial network configuration? Not anymore! The MiiNePort's AutoCFG makes auto-configuration during manufacturing possible.
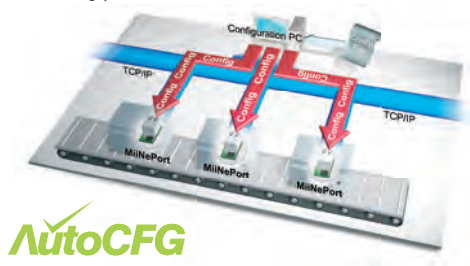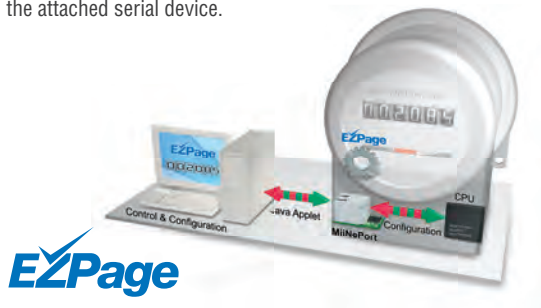
Moxa's NetEZ technology makes the MiiNePort E1 the world's most user-friendly embedded device server by promising ease-of-use with minimal integration work required.

Dimensions and Pin Assignment
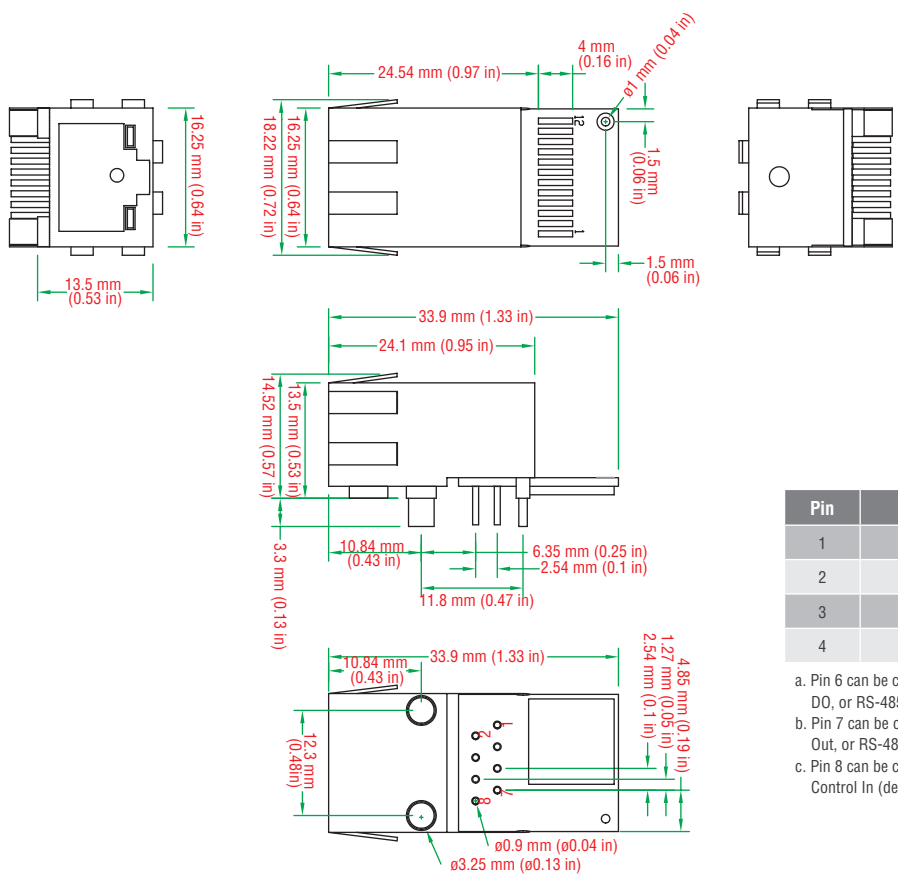
Pin	Function	Pin	Function
1	GND	5	Data In
2	VCC	6	Ready/RTSa
3	Reset	7	Reset to default[b]
4	Data Out	8	CTSc

a. Pin 6 can be configured as Ready/RTS (Request to Send), Ready/DO, or RS-485 Tx Enabled (default is Ready/RTS)
b. Pin 7 can be configured as Reset to Default, DIO, Modem Control Out, or RS-485 Tx Enable (default is Reset to Default)
c. Pin 8 can be configured as CTS (Clear to Send), DI, or Modem Control In (default is CTS)

9

: Specifications

Form Factor
Type: Drop-in module
Dimensions: 33.9 x 16.25 x 13.5 mm (13.35 x 6.4 x 5.31 in)
Weight: 9 g

System Information
CPU: 32-bit ARM Core
RAM: 4 MB built in
Flash: 2 MB built in

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: RJ45 (with magnetics)
Magnetic Isolation Protection: 1.5 KV built-in
LEDs: 10BASE-T & 100BASE-TX Link Activity, Fault/In-Use

Serial Interface
Number of Ports: 1
Transmission Format: Standard TTL

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate:
MiiNePort E1: 50 bps to 230.4 Kbps (supports non-standard baudarates)
MiiNePort E1-H: 50 bps to 921.6 Kbps (supports non-standard baudarates)

Serial Signals
TTL: TxD, RxD, RTS, CTS, RST (reset circuit), GND

Digital I/O Pins
GPIO: 3 programmable I/O pins (1 DO, 1 DI, 1 DI/O)

Software
Network Protocols: ICMP, ARP, IP, TCP, UDP, DHCP, HTTP, SNMP V1/V2c, SMTP, TFTP, Auto IP, Telnet, BOOTP
Configuration Options: Web Console, Serial Console (Serial Command Mode), Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x

Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x
Operation Modes: TCP Server, TCP Client, TCP Mixed, UDP, Real COM, Modem, RFC2217

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 3.3 VDC (±5%)
Power Consumption: 160 mA @ 3.3 VDC max.

Regulatory Approvals
EMC:
• Radiated & conducted emissions: Complies with Class B limits of EN55022:1998
• Direct & Indirect ESD: Complies with EN55024:1998
• Electrical Fast Transient/Burst Immunity: Complies with EN55024:1998
• Power Frequency Magnetic Field Immunity: Complies with EN55024:1998
Shock: 500 g's for non-operational shock
Vibration: 20 g's for non-operational vibration

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures): 5515294 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Modules
MiiNePort E1: Embedded device server for TTL devices, drop-in module, 10/100M with RJ45 connector, 50 bps to 230.4K baudrate, 0 to 55°C operating temperature
MiiNePort E1-T: Embedded device server for TTL devices, drop-in module, 10/100M with RJ45 connector, 50 bps to 230.4K baudrate, -40°C to 85°C operating temperature
MiiNePort E1-H: Embedded device server for TTL devices, drop-in module, 10/100M with RJ45 connector, 50 bps to 921.6K baudrate, 0 to 55°C operating temperature
MiiNePort E1-H-T: Embedded device server for TTL devices, drop-in module, 10/100M with RJ45 connector, 50 bps to 921.6K baudrate, -40°C to 85°C operating temperature

Available Starter Kits
MiiNePort E1-ST: Starter kit for the MiiNePort E1 Series, module included
MiiNePort E1-ST (w/o module): Starter kit for the MiiNePort E1 Series, module not included
MiiNePort E1-H-ST: Starter kit for the MiiNePort E1-H Series, module included

Package Checklist (modules)
• MiiNePort E1 Series module

Package Checklist (starter kits)
• MiiNePort E1 module (MiiNePort E1-ST only)
• MiiNePort E1 evaluation board
• Universal power adaptor
• 2 power cords
• Null modem cable
• Cross-over Ethernet cable
• Document and Software CD
• Quick Installation Guide
• Warranty Card

MiiNePort E2 Series *Preliminary*

10/100 Mbps embedded serial device servers

> **Smallest embedded device server on the market—**
> **only 29 x 17 x 9 mm**
> **Extremely low power consumption—only 140 mA @ 3.3 VDC or**
> **92 mA input @ 5 VDC input**
> **Uses the MiiNe, Moxa's second generation SoC**
> **NetEZ technology makes integration incredibly easy**
> **Versatile choice of operation modes: Real COM, RFC2217, TCP,**
> **and UDP**

: Overview

Moxa's MiiNePort E2 embedded device servers are designed for manufacturers who want to add sophisticated network connectivity to their serial devices with minimal integration effort. The MiiNePort E2 is empowered by the MiiNe, Moxa's second generation SoC, which supports 10/100 Mbps Ethernet, up to 921.6 Kbps serial baudrate, a versatile selection of ready-to-use operation modes, and requires

only a small amount of power. By using Moxa's innovative NetEZ technology, the MiiNePort E2 can be used to convert any device with a standard serial interface to an Ethernet enabled device in no time. In addition, the MiiNePort E2 is the smallest embedded device server without an RJ45 connector, making it easy to fit into virtually any existing serial device.

: The MiiNe—Moxa's 2nd Generation SoC

The MiiNe was created to provide manufacturers with a competitive embedded serial-to-Ethernet solution. The MiiNePort E2, which uses the MiiNe for its SoC, is one of the world's tiniest embedded device servers, and has the lowest power consumption of any similar product. The MiiNe has the following features:

- Designed for 1 or 2-port serial-to-Ethernet applications
- Uses a 32-bit ARM 7 core
- Uses Moxa's own advanced UART technology
- Has 2 MB Flash and 4 MB SDRAM memory built in

SDRAM (4MB)	SPI
FLASH (2MB)	GPIO
POWER System	I²C
Watchdog Timer	Timer
	MAC Ethernet
UART	PHY
	Transformer

8 pin Connector   Ehternet signals

: NetEZ Technology

Moxa's NetEZ technology gives serial device manufacturers a range of powerful tools for integrating Ethernet capability into serial devices:

It's That Easy ! | SCI™ | AutoCFG | EZPower | EZPage
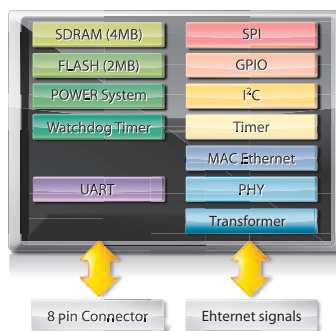
- **EZPower:** Need a module with a versatile system power input voltage? Use the MiiNePort E2's EZPower for 3.3 or 5 VDC system power input.

3.3 VDC
5 VDC

EZPower

- **EZPage:** Need a module that allows direct communication with the attached serial device? Use the MiiNePort E2's EZPage Java Applet to create a visual webpage for configuring and communicating with the attached serial device.

EZPage

- **SCM:** Need an easy tool to configure the network through serial communication inside the device? Try MiiNePort's friendly SCM (Serial Command Mode).

- **AutoCFG:** Tired of spending a large amount of time setting up the device's initial network configuration? Not anymore! The MiiNePort's AutoCFG makes auto-configuration during manufacturing possible.
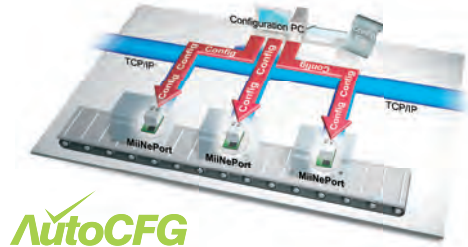
Moxa's NetEZ technology makes the MiiNePort E2 the world's most user-friendly embedded device server by promising ease-of-use with minimal integration work required.

: Specifications

Form Factor
Type: Drop-in module
Dimensions: 29 x 17 x 9 mm (11.41 x 6.69 x 3.54 in)
Weight: 5 g
System Information
CPU: 32-bit ARM Core
RAM: 4 MB built in
Flash: 2 MB built in
Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
LEDs: 10BASE-T & 100BASE-TX Link Activity, Fault/In-Use
Serial Interface
Number of Ports: 1
Transmission Format: Standard TTL
Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate:
MiiNePort E2: 50 bps to 230.4 Kbps (suports non-standard baudrates)
MiiNePort E2-H: 50 bps to 921.6 Kbps (supports non-standard baudrates)
Serial Signals
TTL: TxD, RxD, RTS, CTS, DTR, DSR, DCD, RST (reset circuit), GND
Digital I/O Pins
GPIO: 4 programmable I/O pins
Software
Network Protocols: ICMP, ARP, IP, TCP, UDP, DHCP, HTTP, SNMP V1/V2c, SMTP, TFTP, Auto IP, Telnet, BOOTP

Configuration Options: Web Console, Serial Console (Serial Command Mode), Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x
Operation Modes: TCP Server, TCP Client, TCP Mixed, UDP, Real COM, Modem, RFC2217
Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)
Power Requirements
Input Voltage: 3.3 or 5 VDC (±5%)
Power Consumption: 140 mA @ 3.3 VDC max., 92 mA @ 5 VDC input max.
Regulatory Approvals
EMC (Pending):
• Radiated & conducted emissions: Complies with Class B limits of EN55022:1998
• Direct & Indirect ESD: Complies with EN55024:1998
• Electrical Fast Transient/Burst Immunity: Complies with EN55024:1998
• Power Frequency Magnetic Field Immunity: Complies with EN55024:1998
Shock: 500 g's for non-operational shock
Vibration: 20 g's for non-operational vibration
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Modules
MiiNePort E2: Embedded device server for TTL devices, drop-in module, 10/100M without RJ45 connector, 50 bps to 230.4 Kbps baudrate, 0 to 55°C operating temperature
MiiNePort E2-H: Embedded device server for TTL devices, drop-in module, 10/100M without RJ45 connector, 50 bps to 921.6 Kbps baudrate, 0 to 55°C operating temperature
MiiNePort E2-T: Embedded device server for TTL devices, drop-in module, 10/100M without RJ45 connector, 50 bps to 230.4 Kbps baudrate, -40 to 85°C operating temperature
MiiNePort E2-H-T: Embedded device server for TTL devices, drop-in module, 10/100M without RJ45 connector, 50 bps to 921.6 Kbps baudrate, -40 to 85°C operating temperature
Available Starter Kits
MiiNePort E2-ST: Starter kit for the MiiNePort E2 Series, module included
MiiNePort E2-H-ST: Starter kit for the MiiNePort E2-H Series, module included

Package Checklist (modules)
- MiiNePort E2 Series module

Package Checklist (starter kits)
- MiiNePort E2 module (MiiNePort E1-ST only)
- MiiNePort E2 evaluation board
- Universal power adaptor
- 2 power cords
- Null modem cable
- Cross-over Ethernet cable
- Document and Software CD
- Quick Installation Guide
- Warranty Card

NE-4100 Series

10/100 Mbps embedded serial device servers

NE-4110S/4110A

NE-4120S/4120A

NE-4100T

> 10/100 Mbps Ethernet interface
> Up to 230.4 Kbps baudrate support
> Choice of operation modes: Real COM, TCP Server, TCP Client, and UDP
> DHCP, BootP, Static IP, and ARP supported
> SNMP and e-mail alerts for event trapping and notification
> Half the size of a credit card—only 57 × 40 mm
> Low power consumption at 1.5W, with single +5V input

Overview

Moxa's NE-4100 embedded device servers are designed for manufacturers who want to add sophisticated network connectivity to their serial devices. Moxa's embedded device servers can be used to convert any device with a standard serial interface to an Ethernet-enabled device in no time. The NE-4100 embedded device servers

support 10/100 Mbps Ethernet, and provide ready-to-use operation modes, including TCP Server, TCP Client, and UDP. In addition, a Real COM driver is included for backward compatibility with legacy software.

SNMP and E-mail Alerts for Event Trap and Notification

NE-4100 embedded device servers can be configured to send an SNMP trap or e-mail under the following conditions:
• Cold/warm start
• Password authentication failure

• Change in DSR/DCD line signal
• Change in IP address
• Change in password

Dimensions and Pin Assignment

NE-4110S/4110A

57 mm (2.24 in)
45 mm (1.77 in)
40 mm (1.57 in) **34 mm (1.34 in)**
J2, J1, 16-bit Micro Processor, RJ45 CN
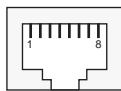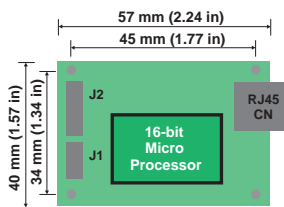
PIN	Signals
1	Tx+
2	Tx-
3	Rx+
6	Rx-

NE-4120S/4120A

57 mm (2.24 in)
45 mm (1.77 in)
40 mm (1.57 in) **34 mm (1.34 in)**
J2, J1, 16-bit Micro Processor, J3
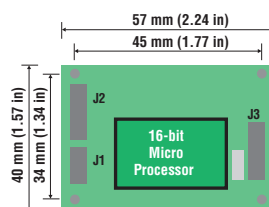
J3
Ethernet Pin-header

Pin	Signal
1	Tx+
2	Tx-
3	
4	Rx+
5	Rx-

NE-4110/4120 Series

J2

GND	14	13	VCC(+5V)
GND	12	11	VCC(+5V)
DIO0	10	9	10M_LED
DIO1	8	7	100M_LED
DIO2	6	5	Ready_LED
DIO3	4	3	Reset
TxD1	2	1	RxD1

NE-4110S/4120S

J1

NC	10	9	NC
CTS0	8	7	RTS0
DSR0	6	5	GND
DTR0	4	3	TxD0
RxD0	2	1	DCD0
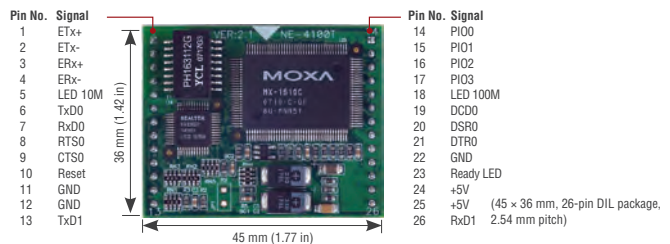
NE-4110A/4120A

J1

NC	10	9	NC
NC	8	7	NC
NC	6	5	GND
RxD- (Data-)	4	3	RxD+ (Data+)
TxD+	2	1	TxD-

For 2-wire RS-485 mode, Pin 3 is Data+, Pin 4 is Data-

NE-4110T

Pin No.	Signal	Pin No.	Signal
1	ETX+	14	PIO0
2	ETx-	15	PIO1
3	ERx+	16	PIO2
4	ERx-	17	PIO3
5	LED 10M	18	LED 100M
6	TxD0	19	DCD0
7	RxD0	20	DSR0
8	RTS0	21	DTR0
9	CTS0	22	GND
10	Reset	23	Ready LED
11	GND	24	+5V
12	GND	25	+5V
13	TxD1	26	RxD1

(45 × 36 mm, 26-pin DIL package, 2.54 mm pitch)

36 mm (1.42 in)
45 mm (1.77 in)

9

: Specifications

Form Factor
Type:
NE-4110/4120: Ready-to-go stand-alone modules
NE-4100T: 26-pin dual-in-line package
Dimensions:
NE-4110/4120: 57 × 40 mm (2.24 x 1.57 in)
NE-4100T: 45 × 36 mm (1.77 x 1.42 in)
Weight:
NE-4110S/4110A: 40 g
NE-4120S/4120A/4100T: 20 g

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector:
NE-4110 Series: RJ45
NE-4120 Series: 5-pin pin header
NE-4100T: 26-pin dual-in-line
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Number of Ports: 2
Serial Standards:
• Port 1:
  NE-4110S/4120S: RS-232
  NE-4110A/4120A: RS-422, RS-485-4w, RS-485-2w
  NE-4100T: TTL
• Port 2:
  TTL console port
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: DSR/DTR and RTS/CTS (RS-232 only), XON/XOFF
Baudrate: 110 bps to 230.4 Kbps

Serial Signals
TTL:
• Port 1: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
• Port 2: TxD, RxD, GND
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Digital I/O Pins
GPIO: 4 programmable I/O pins

Software
Network Protocols: ICMP, ARP, IP, TCP, UDP, DHCP, Telnet, HTTP, SNMP V1/V2c, SMTP
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Utility
Windows Real COM Drivers: Windows 95/98/ME/NT/ 2000, Windows XP/2003/Vista/2008/7 x86/64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x
Operation Modes: Real COM, TCP Server, TCP Client, UDP

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements
Input Voltage: 5 VDC (±5%)
Power Consumption: 290 mA @ 5 VDC max.

Regulatory Approvals
EMC: CE EN55022 Class A, FCC Part 15 Subpart B Class A

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
NE-4100T: 288173 hrs
NE-4110A: 289573 hrs
NE-4110S: 290276 hrs
NE-4120A: 289573 hrs
NE-4120S: 285874 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Modules
NE-4110S: Device server module for RS-232 devices, supports 10/100BaseT(x) with RJ45 connector
NE-4110A: Device server module for RS-422/485 devices, supports 10/100BaseT(x) with RJ45 connector
NE-4120S: Device server module for RS-232 devices, supports 10/100BaseT(x) with 5-pin Ethernet pin header
NE-4120A: Device server module for RS-422/485 devices, supports 10/100BaseT(x) with 5-pin Ethernet pin header
NE-4100T: Device server module for TTL devices, supports 10/100BaseT(x) with DIL package

Available Starter Kits
NE-4110-ST: Starter kit for the NE-4110S and NE-4110A (module not included)
NE-4120-ST: Starter kit for the NE-4120S and NE-4120A (module not included)
NE-4100-ST: Starter kit for the NE-4100T (module not included)
Note: Starter kits do not include the NE-4100 module. Please order modules and evaluation kits separately.

Package Checklist (modules)
• NE-4100 series module

Package Checklist (starter kits)
• NE-4100 or NE-4110 or NE-4120 evaluation board
• Universal power adaptor
• 2 power cords
• Null modem cable
• Cross-over Ethernet cable
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

WE-2100T Series

Wireless LAN embedded serial device servers

> Connects serial devices to IEEE 802.11a/b/g networks
> Choice of operation modes: Real COM, TCP Server, TCP Client, UDP, and RFC2217
> Windows real COM and Linux fixed TTY drivers provided
> Wireless security with WEP, WPA, and WPA2
> Select any baudrate between 50 bps and 921.6 Kbps
> 9 programmable digital I/O channels
> SSL/SSH encryption for configuration
> Compact size and easily mounted housing

9

Embedded Device Servers ˅ WE-2100T Series

Overview

The WE-2100T is a secure and compact embedded wireless module for connecting serial devices to access points in infrastructure mode, or to other WE-2100T's in ad-hoc mode. When using the WE-2100T, complex RF know-how is not needed to connect serial devices to a wireless Ethernet network. Encryption for secure data transfer is supported, along with the 802.11a/b/g radio specifications.

Operation Modes for Embedded Applications

The WE-2100T supports Real COM, TCP Server, TCP Client, UDP, and RFC 2217 operation modes, which are designed to fulfill the requirements of embedded module applications. Complete driver support for Real COM mode is included and easy to install.

On-site Configuration with Serial Command Mode

- Easy on-site configuration of network settings
- Simple command frame format
- Comprehensive command set for serial and network configuration
- Easily switch between software and hardware triggers
- Software reset

Specifications

Form Factor
Type: Small metal housing that encloses advanced ARM-based 32-bit processor; supports both wireless and Ethernet connections
Dimensions: 54 x 40 x 13.3 mm (2.13 x 1.57 x 0.52 in)
Weight: 100 g

Automatic Network Selection
Wireless or Ethernet: The WE-2100T will activate the Ethernet connection if detected at boot-up. If an Ethernet connection is not detected, the WE-2100T will choose wireless as the communication interface. Which interface to use can also be configured with the WE-2100T's configuration utilities.

Ethernet Interface
Number of Ports: 1
Speed: 10/100 Mbps, auto MDI/MDIX
Connector: 44-pin dual-in-line
Magnetic Isolation Protection: 1.5 KV built-in

WLAN Interface
Standard Compliance: IEEE 802.11a/b/g
Network Modes: Infrastructure mode (a/b/g), Ad-Hoc mode (b/g)
Spread Spectrum Technology: DSSS, CCK, OFDM
Transmit Power:
5.15 to 5.25 GHz: 15 dBm @ 6 Mbps; 12 dBm @ 54 Mbps 5.725 to 5.825 GHz: 15 dBm @ 6 Mbps; 12 dBm @ 54 Mbps
2.412 to 2.483 GHz: 17 dBm @ 6 Mbps; 15 dBm @ 54 Mbps
2.412 to 2.472 GHz: 18 dBm @ 1 to 11 Mbps

Receive Sensitivity:
5.15 to 5.25 GHz: 6 Mbps @ -90 dBm; 54 Mbps @ -72 dBm
5.725 to 5.825 GHz: 6 Mbps @ -89 dBm; 54 Mbps @ -72 dBm
2.412 to 2.483 GHz: 6 Mbps @ -90 dBm; 54 Mbps @ -73 dBm
2.412 to 2.472 GHz: 11 Mbps @ -87 dBm; 1 Mbps @ -94 dBm
Transmission Rate:
802.11a: 54 Mbps
802.11b: 11 Mbps
802.11g: 54 Mbps
Transmission Distance: Up to 100 meters (in open areas)
Wireless Security: AES, WEP 64/128-bit, WPA, WPA2, PSK, 802.11i
802.11i Authentication: TLS, PEAP/GTC, PEAP/MD5, PEAP/MSCHAPv2, TTLS/PAP, TTLS/CHAP, TTLS/MSCHAP, TTLS/MSCHAPv2, TTLS/EAP-MSCHAPv2, TTLS/EAP-GTC, TTLS/EAP-MD5, LEAP
Channels:
North America: CH1 to CH11, 5150-5825 MHz
Europe: CH1 to CH13, 5150-5875 MHz
Japan: CH1 to CH14, 5150-5350 MHz
Antenna Connector: Reverse SMA
Antenna Gain: 2 DBi

Serial Interface

Number of Ports: 1
Serial Standards:
• Port 1: TTL
• Port 2: TTL console port

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: DSR/DTR and RTS/CTS (RS-232 only), XON/XOFF
Baudrate: 50 bps to 921.6 Kbps (non-standard buadrates supported)

Serial Signals

TTL:
• Port 1: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
• Port 2: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Software

Network Protocols: ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, SNMP V1/V2c, HTTP, SMTP, SNTP, SSH, HTTPS
Configuration Options: Web Console, Serial Console, Telnet Console, Windows Utility, Serial command mode (configured through the data port)
Windows Real COM Drivers: Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Embedded CE 5.0/6.0, XP Embedded
Fixed TTY Drivers: SCO Unix, SCO OpenServer, UnixWare 7, UnixWare 2.1, SVR 4.2, QNX 4.25, QNX 6, Solaris 10, FreeBSD, AIX 5.x, HP-UX 11i
Linux Real TTY Drivers: Linux kernel 2.4.x, 2.6.x
Operation Modes: Real COM, TCP Server, TCP Client, UDP, RFC2217

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)

Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)

Surface Temperature (at full baudrate of 921.6 Kbps)

Top Panel:
43.0°C, when air temp = 25°C
55.0°C, when air temp = 55°C
Bottom Panel:
44.5°C, when air temp = 25°C
67.0°C, when air temp = 55°C

Power Requirements

Input Voltage: 3.3 VDC (±5%)
Power Consumption:
921.6 Kbps (full speed): 540 mA
Idle: 190 mA
Ethernet mode: 670 mA
Inrush current: 2100 mA

Regulatory Approvals

EMC: CE (EN55022 and EN55024 Class A, ETSI EN 301 489-17, ETSI EN 301 489-1)
Safety: UL (UL60950-1), TÜV (EN60950-1)
EMI: FCC Part 15 (Subpart B Class A, Subpart C, Subpart E)
Radio: CE (ETSI EN 301 893, ETSI EN 300 328), ARIB STD-33, ARIB STD-T66, ARIB STD-T71

Reliability

Automatic Reboot Trigger: Built-in WDT (watchdog timer)
MTBF (meantime between failures):
WE-2100T: 505288 hrs

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Dimensions and Pin Assignment
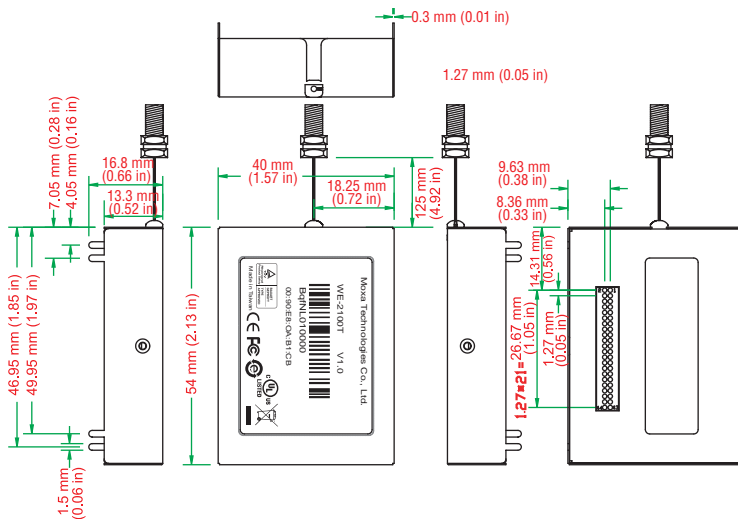
3.3V	1	2	GND
3.3V	3	4	GND
3.3V	5	6	GND
Console_TxD	7	8	Console_RxD
Console_RTS	9	10	Console_CTS
Console_DTR	11	12	Console_DSR
PIO0	13	14	Console_DCD
PIO1	15	16	PIO4(WLAN strength 1)
PIO2	17	18	PIO5(WLAN strength 2)
PIO3	19	20	PIO6(WLAN strength 3)
Data_TxD	21	22	PIO7(WLAN strength 4)
Data_RTS	23	24	Data_RxD
Data_DTR	25	26	Data_CTS
Ready_LED	27	28	Data_DSR
Fault_LED	29	30	Data_DCD
Eth_Tx+	31	32	WLAN_Active_LED
Eth_Tx-	33	34	SW_RESET
Eth_Center_TAP	35	36	HW_RESET
Eth_Center_TAP	37	38	Eth_100M_LED
Eth_Rx+	39	40	Eth_10M_LED
Eth_Rx-	41	42	Reserved
PIO8(WLAN strength 0)	43	44	Reserved

: Ordering Information

Available Modules

WE-2100T: 1-port wireless module supporting IEEE 802.11a/b/g

Available Starter Kits

WE-2100T-ST: Starter Kit for the WE-2100T

Package Checklist (module)

• WE-2100T wireless module
• IEEE 802.11a/b/g Antenna

Package Checklist (starter kit)

• WE-2100T-ST evaluation board
• Power adaptor
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

Multiport Serial Boards

10

**Multiport Serial
Boards**

PCI Express Serial Boards

	CP-118EL-A	CP-168EL-A	CP-114EL	CP-114EL-I	CP-104EL-A	CP-102E	CP-102EL	CP-132EL	CP-132EL-I
Hardware									
Comm. Controller	16C550C compatible								
Bus	PCI Express x1								
Connector	VHDCI 68		DB44 female			DB9 male	DB25 female		
Serial Interface									
RS-232 Ports	–	8	–	–	4	2	2	–	–
RS-422 Ports	–	–	–	–	–	–	–	–	–
RS-422/485 Ports	–	–	–	–	–	–	–	2	2
RS-232/422/485 Ports	8	–	4	4	–	–	–	–	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	RTS/CTS, XON/XOFF							XON/XOFF	
Baudrate	50 bps to 921.6 Kbps								
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	–	–	2 KV	–	–	–	–	2 KV
Driver Support									
Windows 9X/ME/NT	–	–	–	–	–	–	–	–	–
Windows 2000	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows CE 5.0	✓	✓	–	–	✓	–	–	–	–
Windows CE 6.0	–	–	–	–	–	–	–	–	–
Windows XP Embedded	✓	✓	✓	✓	✓	✓	✓	✓	✓
DOS	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓	✓	✓	✓	✓	✓
FreeBSD 4/5	✓	✓	–	–	✓	–	–	–	–
QNX 4	–	–	–	–	–	–	–	–	–
QNX 6	✓	✓	✓	✓	✓	✓	✓	✓	✓
SCO Open Server 5/6	✓	✓	✓	✓	✓	✓	✓	✓	✓
UnixWare 7	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental Factors									
Dimensions (mm)	64.4 x 132	62.7 x 102	67.2 x 136.9	67.2 x 136.9	62.7 x 100	85.0 x 100	67.2 x 102.0	67.2 x 102.0	67.2 x 104.0
Operating Temperature	0 to 55°C								
Operating Humidity	5 to 95% RH								
Storage Temperature	-20 to 85°C								
Regulatory Approvals									
FCC, Part 15 Class	B	B	B	B	B	B	B	B	B
EN55022 Class B	–	–	–	–	–	–	–	–	–
EN55022	–	–	–	–	–	–	–	–	–
EN55024	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-3-2	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-3-3	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-6-2	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-6-4	–	–	–	–	–	–	–	–	–
IEC 61000-4-2	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓	✓	✓	✓	✓	✓
EC 61000-4-4	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-5	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-6	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-8	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-11	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-11 (DIPS)	–	–	–	–	–	–	–	–	–
ENV5204	–	–	–	–	–	–	–	–	–
Reliability									
Warranty	5 years (see www.moxa.com/warranty)								

Universal PCI Serial Boards

	C320Turbo/PCI	C218Turbo/PCI	CP-118U CP-118U-T	CP-138U CP-138U-T	CP-118U-I CP-118U-I-T	CP-138U-I CP-138U-I-T	CP-168U CP-168U-T	CP-114UL CP-114UL-T	CP-114UL-I CP-114UL-I-T	CP-104UL CP-104UL-T
Hardware										
Comm. Controller	16C550C or compatible		MU860							
Bus	32-bit Universal PCI									
Connector	DB25 female	DB62 female			DB78 female		DB62 female	DB44 female		
Serial Interface										
RS-232 Ports	32	8	–	–	–	–	8	–	–	4
RS-422 Ports	–	–	–	–	–	–	–	–	–	–
RS-422/485 Ports	–	–	–	8	–	8	–	–	–	–
RS-232/422/485 Ports	–	–	8	–	8	–	–	4	4	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark									
Flow Control	–	RTS/CTS, XON/XOFF					RTS/CTS, XON/XOFF			
Baudrate	50 bps to 460.8 Kbps	50 bps to 921.6 Kbps								
ESD Protection	–	Optional	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	Optional	–	–	2 KV	2 KV	Optional	–	2 KV	–
Driver Support										
Windows 9X/ME/NT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP/2003/ Vista x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 2008 x86/ x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows CE 5.0	–	–	✓	✓	✓	✓	✓	✓	✓	✓
Windows CE 6.0	–	–	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP Embedded	–	–	✓	✓	✓	✓	✓	✓	✓	✓
DOS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FreeBSD 4/5	–	–	✓	✓	✓	✓	✓	✓	✓	✓
QNX 4	✓	✓	–	–	–	–	–	–	–	–
QNX 6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SCO Open Server 5/6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UnixWare 7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental Factors										
Dimensions (mm)	90 x 120	105 x 180	82 x 135	82 x 135	105 x 133	105 x 133	82 x 120	64.4 x 120	64.4 x 120	64.4 x 120
Operating Temperature	0 to 55°C	0 to 55°C or -40 to 85°C								
Operating Humidity	5 to 95% RH	5 to 95% RH								
Storage Temperature	-20 to 85°C	-40 to 85°C								
Regulatory Approvals										
FCC, Part 15 Class	A	A	B	B	B	B	B	B	B	B
EN55022 Class B	–	–	–	–	–	–	–	–	–	–
EN55022	–	–	–	–	✓	✓	✓	✓	✓	✓
EN55024	–	–	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-3-2	–	–	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-3-3	–	–	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-6-2	–	–	✓	✓	–	–	–	–	–	–
EN61000-6-4	–	–	–	–	–	–	–	–	–	–
IEC 61000-4-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-5	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-6	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-8	–	–	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-11	–	–	–	–	–	–	–	–	–	–
IEC 61000-4-11 (DIPS)	–	✓	✓	✓	✓	✓	✓	✓	✓	✓
ENV5204	✓	✓	–	–	–	–	–	–	–	–
Reliability										
Warranty	5 years (see www.moxa.com/warranty)									

10

Multiport Serial Boards ˅ Product Selection Guides

Universal PCI Serial Boards

	CP-104JU CP-104JU-T	CP-134U CP-134U-T	CP-134U-I CP-134U-I-T	CP-112UL CP-112UL-T	CP-112UL-I CP-112UL-I-T	CP-102U CP-102U-T	CP-102UL CP-102UL-T	CP-132UL CP-132UL-T	CP-132UL-I CP-132UL-I-T	POS-104UL POS-104UL-T
Hardware										
Comm. Controller	MU860									
Bus	32-bit Universal PCI									
Connector	RJ45 x 4	DB44 female		DB25 female		DB9 male x 2	DB25 female			DB44 female
Serial Interface										
RS-232 Ports	4	–	–	–	–	2	2	–	–	4
RS-422 Ports	–	–	–	–	–	–	–	–	–	–
RS-422/485 Ports	–	4	4	–	–	–	–	–	2	–
RS-232/422/485 Ports	–	–	–	2	2	–	–	–	–	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark									
Flow Control	RTS/CTS, XON/XOFF							XON/XOFF		RTS/CTS, XON/XOFF
Baudrate	50 bps to 921.6 Kbps									
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	–	2 KV	–	2 KV	–	–	–	2 KV	–
Driver Support										
Windows 9X/ME/NT	✓	✓	✓	–	–	✓	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP/2003/ Vista x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 2008 x86/ x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows CE 5.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows CE 6.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP Embedded	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DOS	✓	✓	✓	–	–	✓	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FreeBSD 4/5	✓	✓	✓	–	–	✓	✓	✓	✓	✓
QNX 4	–	–	–	–	–	–	–	–	–	–
QNX 6	✓	✓	✓	–	–	✓	✓	✓	✓	✓
SCO Open Server 5/6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UnixWare 7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Environmental Factors										
Dimensions (mm)	83 x 120	82.5 x 120	115 x 120	–	–	120 x 120	64.5 x 120	64.5 x 120	64.5 x 120	64.4 x 120
Operating Temperature	0 to 55°C or -40 to 85°C									
Operating Humidity	5 to 95% RH									
Storage Temperature	-40 to 85°C									
Regulatory Approvals										
FCC, Part 15 Class	B	B	B	B	B	B	B	B	B	B
EN55022 Class B	–	–	–	–	–	–	–	–	–	–
EN55022	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN55024	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
EN61000-3-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-3-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EN61000-6-2	–	–	–	–	–	–	–	–	–	✓
EN61000-6-4	–	–	–	–	–	–	–	–	–	✓
IEC 61000-4-2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IEC 61000-4-11	–	–	–	–	–	–	–	–	–	–
IEC 61000-4-11 (DIPS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ENV5204	–	–	–	–	–	–	–	–	–	–
Reliability										
Warranty	5 years (see www.moxa.com/warranty)									

ISA Serial Boards

	C320Turbo	C218Turbo	C168H / C168HS	C104H / C104HS	CI-134 / CI-134I / CI-134IS	CI-132 / CI-132I / CI-132IS
Hardware						
Comm. Controller	16C550C or compatible					
Bus	16-bit ISA					
Connector	DB25 female	DB62 female		DB37 female	DB37 female	DB9 male x 2
Serial Interface						
RS-232 Ports	32	8	8	4	–	–
RS-422 Ports	–	–	–	–	–	–
RS-422/485 Ports	–	–	–	–	4	2
RS-232/422/485 Ports	–	–	–	–	–	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark				Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark	
Flow Control	–	–	–	–	–	–
Baudrate	50 bps to 460.8 Kbps	50 bps to 921.6 Kbps			50 bps to 921.6 Kbps	
ESD Protection	–	Optional	– / 25 KV	– / 25 KV	– / – / 25 KV	– / – / 25 KV
Optical Isolation	–	Optional	Optional	–	– / 2 KV / 2 KV	– / 2 KV / 2 KV
Driver Support						
Windows 9X/ME/NT	✓	✓	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓
Windows CE 5.0	–	–	–	–	–	–
Windows CE 6.0	–	–	–	–	–	–
Windows XP Embedded	–	–	✓	✓	✓	✓
DOS	✓	✓	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓	✓	✓
FreeBSD 4/5	–	–	✓	✓	✓	✓
QNX 4	✓	✓	✓	✓	✓	✓
QNX 6	✓	✓	✓	✓	✓	✓
SCO Open Server 5/6	✓	✓	✓	✓	✓	✓
UnixWare 7	✓	✓	✓	✓	✓	✓
Environmental Factors						
Dimensions (mm)	107 x 158	105 x 180	93 x 157	83 x 157	85 x 160	75 x 157
Operating Temperature	0 to 55°C					
Operating Humidity	5 to 95% RH					
Storage Temperature	-20 to 85°C					
Regulatory Approvals						
FCC, Part 15 Class	A	A	A	A	B	–
EN55022 Class B	–	–	–	–	–	–
EN55022	–	–	✓	✓	✓	✓
EN55024	–	–	–	–	–	–
EN61000-3-2	–	–	–	–	–	–
EN61000-3-3	–	–	–	–	–	–
EN61000-6-2	–	–	–	–	–	–
EN61000-6-4	–	–	–	–	–	–
IEC 61000-4-2	✓	✓	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓	✓	✓
IEC 61000-4-4	✓	✓	✓	✓	✓	✓
IEC 61000-4-5	–	✓	–	–	–	–
IEC 61000-4-6	–	✓	–	–	–	–
IEC 61000-4-8	–	–	–	–	–	–
IEC 61000-4-11	–	–	–	–	–	–
IEC 61000-4-11 (DIPS)	–	✓	–	–	–	–
ENV5204	✓	✓	✓	✓	✓	✓
Reliability						
Warranty	5 years (see www.moxa.com/warranty)					

10

Multiport Serial Boards ❯ Product Selection Guides

PC/104 Modules
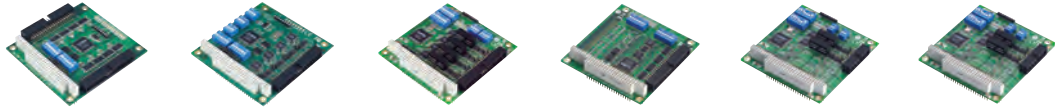
	CA-108 CA-108-T	CA-114 CA-114-T	CA-134I CA-134I-T	CA-104 CA-104-T	CA-132 CA-132-T	CA-132I CA-132I-T
Hardware						
Comm. Controller	16C550C or compatible					
Bus	PC/104 bus					
Box Header Connector	40-pin				20-pin	
Serial Interface						
RS-232 Ports	8	–	–	4	–	–
RS-422 Ports	–	–	–	–	–	–
RS-422/485 Ports	–	–	4	–	2	2
RS-232/422/485 Ports	–	4	–	–	–	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark					
Flow Control	–	–	–	–	–	–
Baudrate	50 bps to 921.6 Kbps					
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	–	2 KV	–	–	2 KV
Driver Support						
Windows 9X/ME/NT	✓	✓	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓	✓	✓	✓
Windows 2008 x86/x64	–	–	–	–	–	–
Windows CE 5.0	✓	✓	✓	✓	✓	✓
Windows CE 6.0	✓	✓	✓	✓	✓	✓
Windows XP Embedded	✓	✓	✓	✓	✓	✓
DOS	✓	✓	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓	✓	✓
FreeBSD 4/5	–	–	–	–	–	–
QNX 4	✓	✓	✓	✓	✓	✓
QNX 6	✓	✓	✓	✓	✓	✓
SCO Open Server 5/6	–	–	–	–	–	–
UnixWare 7	–	–	–	–	–	–
Environmental Factors						
Dimensions (mm)	90 x 96					
Operating Temperature	0 to 55°C or -40 to 85°C					
Operating Humidity	5 to 95% RH					
Storage Temperature	-40 to 85°C					
Regulatory Approvals						
FCC, Part 15 Class	A	A	A	A	A	A
EN55022 Class B	–	–	–	–	–	–
EN55022	✓	✓	✓	✓	✓	✓
EN55024	✓	✓	✓	✓	✓	✓
EN61000-3-2	✓	✓	✓	✓	✓	✓
EN61000-3-3	✓	✓	✓	✓	✓	✓
EN61000-6-2	✓	✓	✓	✓	✓	✓
EN61000-6-4	✓	✓	✓	✓	✓	✓
IEC 61000-4-2	✓	✓	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓	✓	✓
IEC 61000-4-4	✓	✓	✓	✓	✓	✓
IEC 61000-4-5	✓	✓	✓	✓	✓	✓
IEC 61000-4-6	✓	✓	✓	✓	✓	✓
IEC 61000-4-8	✓	✓	✓	✓	✓	✓
IEC 61000-4-11	–	–	–	–	–	–
IEC 61000-4-11 (DIPS)	✓	✓	✓	✓	✓	✓
ENV5204	–	–	–	–	–	–
Reliability						
Warranty	5 years (see www.moxa.com/warranty)					

PC/104-Plus Modules

	CB-108 CB-108-T	CB-114 CB-114-T	CB-134I CB-134I-T
Hardware			
Comm. Controller	MU860 (16C550C compatible)		
Bus	PC/104-Plus bus		
Box Header Connector	40-pin	40-pin	40-pin
Serial Interface			
RS-232 Ports	8	–	–
RS-422 Ports	–	–	–
RS-422/485 Ports	–	–	4
RS-232/422/485 Ports	–	4	–
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark		
Flow Control	–	–	–
Baudrate	50 bps to 921.6 Kbps		
ESD Protection	15 KV	15 KV	15 KV
Optical Isolation	–	–	2 KV
Driver Support			
Windows 9X/ME/NT	–	–	–
Windows 2000	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓
Windows CE 5.0	✓	✓	✓
Windows CE 6.0	✓	✓	✓
Windows XP Embedded	✓	✓	✓
DOS	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓
FreeBSD 4/5	–	–	–
QNX 4	–	–	–
QNX 6	✓	✓	✓
SCO Open Server 5/6	–	–	–
UnixWare 7	–	–	–
Environmental Factors			
Dimensions (mm)	90 x 96		
Operating Temperature	0 to 55°C or -40 to 85°C		
Operating Humidity	5 to 95% RH		
Storage Temperature	-40 to 85°C		
Regulatory Approvals			
FCC, Part 15 Class	A	A	A
EN55022 Class B	–	–	–
EN55022	✓	✓	✓
EN55024	✓	✓	✓
EN61000-3-2	✓	✓	✓
EN61000-3-3	✓	✓	✓
EN61000-6-2	✓	✓	✓
EN61000-6-4	✓	✓	✓
IEC 61000-4-2	✓	✓	✓
IEC 61000-4-3	✓	✓	✓
IEC 61000-4-4	✓	✓	✓
IEC 61000-4-5	✓	✓	✓
IEC 61000-4-6	✓	✓	✓
IEC 61000-4-8	✓	✓	✓
IEC 61000-4-11	–	–	–
IEC 61000-4-11 (DIPS)	✓	✓	✓
ENV5204	–	–	–
Reliability			
Warranty	5 years (see www.moxa.com/warranty)		

Fiber Optic Serial Boards
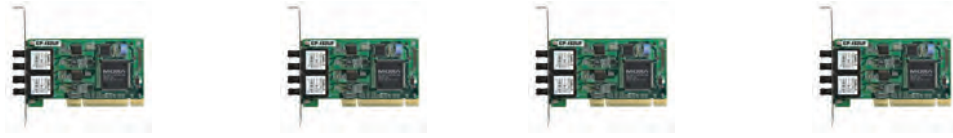
	CP-102UF-M-ST	CP-102UF-M-ST-T	CP-102UF-S-ST	CP-102UF-S-ST-T
Hardware				
Bus	32-bit Universal PCI			
Optical Fiber Interface				
Mode	Multi-mode		Single-mode	
Fiber Connectors	ST type			
Cable Requirements	50/125, 62.5/125, or 100/140 µm		8.3/125, 8.75/125, 9/125 or 10/140 µm	
Transmission Distance	Max. 5 km		Max. 40 km	
Wavelength	820 nm		1310 nm	
Tx Output	-5 dBm			
Rx Sensitivity	-20 dBm		-24 dBm	
Point-to-Point Transmission	Half or full duplex			
Ring Transmission	Half duplex			
Serial Interface				
Number of Ports	2	2	2	2
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark			
Flow Control	XON/XOFF			
Baudrate	50 bps to 921.6 Kbps			
Driver Support				
Windows 9X/ME/NT	–	–	–	–
Windows 2000	✓	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓
Windows CE 5.0	✓	✓	✓	✓
Windows CE 6.0	✓	✓	✓	✓
Windows XP Embedded	✓	✓	✓	✓
DOS	✓	✓	✓	✓
Linux 2.4/2.6	✓	✓	✓	✓
FreeBSD 4/5	–	–	–	–
QNX 4	–	–	–	–
QNX 6	✓	✓	✓	✓
SCO Open Server 5/6	✓	✓	✓	✓
UnixWare 7	✓	✓	✓	✓
Environmental Factors				
Dimensions (mm)	64.4 x 120			
Operating Temperature	0 to 55°C	-40 to 85°C	0 to 55°C	-40 to 85°C
Operating Humidity	5 to 95% RH			
Storage Temperature	-40 to 85°C			
Regulatory Approvals				
FCC, Part 15 Class	B	B	B	B
EN55022 Class B	✓	✓	✓	✓
EN55022	–	–	–	–
EN55024	✓	✓	✓	✓
EN61000-3-2	✓	✓	✓	✓
EN61000-3-3	✓	✓	✓	✓
EN61000-6-2	–	–	–	–
EN61000-6-4	–	–	–	–
IEC 61000-4-2	✓	✓	✓	✓
IEC 61000-4-3	✓	✓	✓	✓
IEC 61000-4-4	✓	✓	✓	✓
IEC 61000-4-5	✓	✓	✓	✓
IEC 61000-4-6	✓	✓	✓	✓
IEC 61000-4-8	✓	✓	✓	✓
IEC 61000-4-11	–	–	–	–
IEC 61000-4-11 (DIPS)	✓	✓	✓	✓
ENV5204	–	–	–	–
Reliability				
Warranty	5 years (see www.moxa.com/warranty)			

CAN Interface Boards/Modules

	CP-602U-I CP-602U-I-T	CP-602E-I CP-602E-I-T	CB-602I CB-602I-T
Hardware			
CAN Controller	NXP SJA1000		
CAN Transceiver	PCA82C251		
Bus	32-bit Universal PCI	PCI Express x1	PC/104-Plus bus
Connector	DB9 male	DB9 male	20-pin
CAN Interface			
CAN Specification	CAN 2.0 A/B		
Signal Support	CAN _H, CAN_L, GND		
Port	2		
Transfer Rate	1 Mbps		
Max Number of Boards per PC	4		
Optical Isolation	2 KV		
Termination Resistors	120 ohm (selected by jumper)		
Driver Support			
Windows 2000	✓	✓	✓
Windows XP/2003/Vista x86/x64	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓
Visual Basic Library	✓	✓	✓
C/C++ Library	✓	✓	✓
Environmental Factors			
Dimensions (mm)	120 x 80	120 x 80	90 x 96
Operating Temperature	0 to 55°C , or -40 to 85°C		
Operating Humidity	5 to 95% RH		
Storage Temperature	-40 to 85°C		
Regulatory Approvals			
FCC, Part 15 Class	B	B	B
EN61000-3-3	✓	✓	✓
IEC 61000-4-2	✓	✓	✓
IEC 61000-4-3	✓	✓	✓
EC 61000-4-4	✓	✓	✓
IEC 61000-4-5	✓	✓	✓
IEC 61000-4-6	✓	✓	✓
IEC 61000-4-8	✓	✓	✓
IEC 61000-4-11	✓	✓	✓
Reliability			
Warranty	5 years (see www.moxa.com/warranty)		

10

Multiport Serial Boards > Product Selection Guides

The Basics of RS-232/422/485

RS-232—the most common and easy-to-use communication interface

The RS-232 serial interface was developed for connecting a computer to common peripherals such as modems, overhead projectors, and the sensors and actuators used for industrial automation applications. Despite its limited 15 m transmission distance, RS-232 is low cost and easy-to-wire, making it the first choice for many applications.

RS-232 establishes full-duplex (2-way) communication, with signals represented by voltage levels measured with respect to a system common ground (power or logic ground). The "idle" state (MARK) is negative with respect to the common ground, and the "active" state (SPACE) is positive with respect to the common ground.

: RS-232 Data Format

Start bit: 1 bit
Data bits: 5, 6, 7, or 8 bits
Parity: None, Odd, Even, Space, Mark
Stop bits: 1, 1.5 (if data bits = 5), or 2 bits

Start	Data	Parity	Stop
1	5, 6, 7, 8	1	1, 1.5, 2

Unit: bit
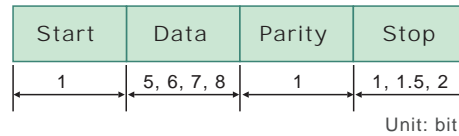
: RS-232 Specifications

Standard	Connection Type	Operation Mode	Drivers per Line	Receivers per Line	Max. Cable Length	Max. Data Rate
EIA RS-232	Point-to-point	Single-ended	1	1	50 ft (15 m)	921.6 Kbps

: RS-232 Signal Definition

The general relationship between the UART, TTL signal, transceiver, and RS-232 signal is illustrated in the following figure. UART is short for "universal asynchronous receiver transmitter," and TTL stands for "transistor to transistor logic." The UART, which is located on the serial board and stands between the computer's CPU and the transceiver, transmits signals at 0 and 5 volts. The RS-232 transceiver converts the signal voltage to +3V to +15V, and -3V to -15V.

TxD	Transmit Data
RxD	Receive Data
RTS	Request to Send
CTS	Clear to Send
DTR	Data Terminal Ready
DSR	Data Set Ready
DCD	Data Carrier Detect
GND	Ground
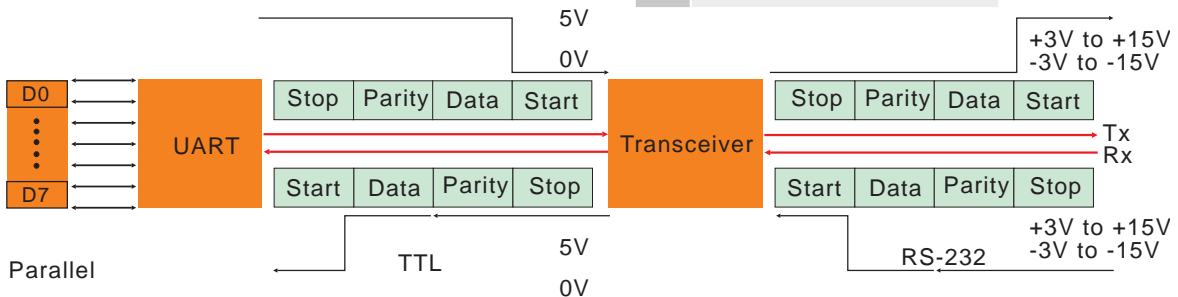
: Flow Control

In RS-232 communications, one side of the connection sends a "flow control" signal to tell the other side to stop or start transmitting. Flow control signals are sent when the sender needs to take a break, such as when a data buffer is full.

H/W Flow Control

Hardware flow control uses RS-232's RTS and CTS signals to indicate when data transmission should be paused or re-started. For example, as indicated in the figure, when PC1 is ready to receive, it raises the RTS signal to request data from PC2.
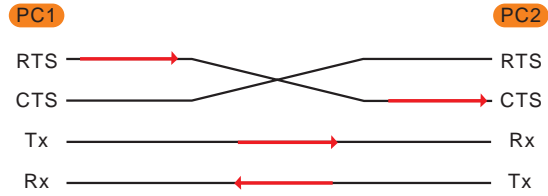
S/W Flow Control

Software flow control works by sending an XON/XOFF signal through the data channels. For example, as indicated in the following figure, PC2 sends an XON pattern when it is ready to receive, and then when its Rx buffer is almost full, it sends an XOFF pattern to request that PC1 stop transmitting.
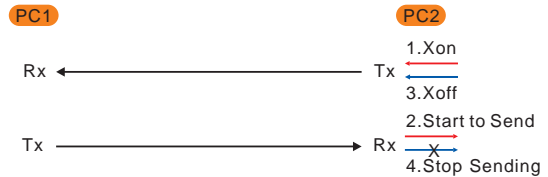
: Use Moxa PComm Library to Make Serial Programming Easy

Moxa PComm Lite provides software developers with a complete library of intuitive function calls for developing serial comm applications under Windows NT, 95, 98, 2000, ME, XP, 2003, 2008, and 7. PComm Lite requires fewer lines of code than Microsoft's more complex Win32 COMM API, allowing programmers to save time and reduce the number of bugs in their applications.

Features of Moxa PComm Library

- 50 easy-to-use API functions
- Superior troubleshooting utilities
- Supports multiple interfaces: VB, C/C++, Delphi
- Supports X/Y/ZModem, Kermit, and ASCII protocols
- Compatible with Win32 Comm API

Performance Analyzer
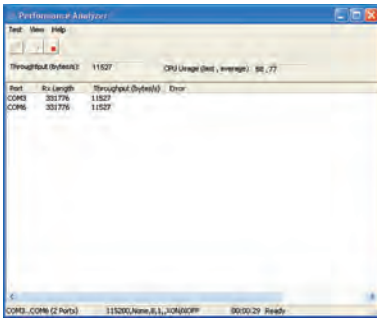
Data Scope
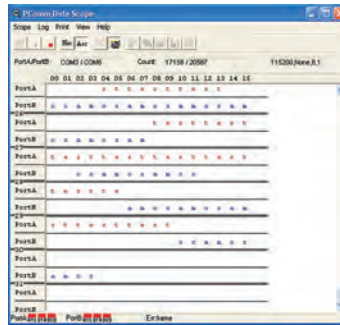
PComm Diagnostic

PComm Monitor

10

Multiport Serial Boards › The Basics of RS-232/422/485
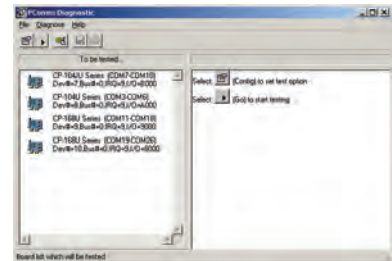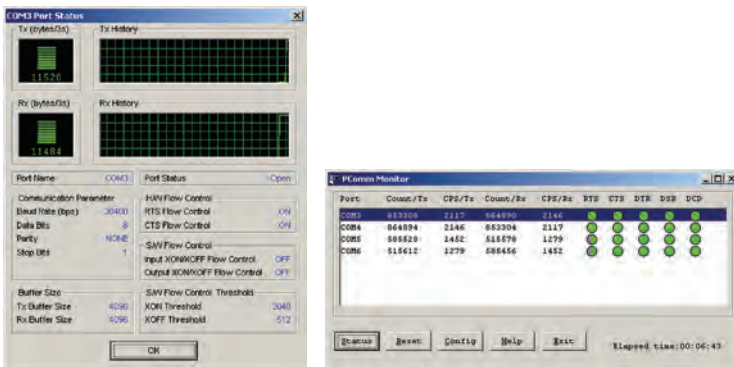
RS-422/485—tailor-made for industrial applications

Many of the devices used in today's industrial environments are designed for the RS-422 and RS-485 interfaces, both of which use "differential transmission" to "subtract out" external electronic and electromagnetic disturbances. For this reason, RS-422/485 can be used to transmit data up to 1.2 km. In addition to the need for long distance and multi-drop transmission, many industrial applications also require isolation, proper housing, heavy-duty wiring, a reliable power supply, and over-surge protection.

Differential Transmission

The RS-422 and RS-485 protocols use differential transmission to achieve high speed data transmission (up to 10 Mbps) over distances up to 4,000 feet (1.22 km). Differential transmission works by splitting each signal into two separate wires with opposite voltage states. The signals are subtracted at the receiving end, making this type of wiring configuration well-suited for noisy environments.

RS-422 Wiring
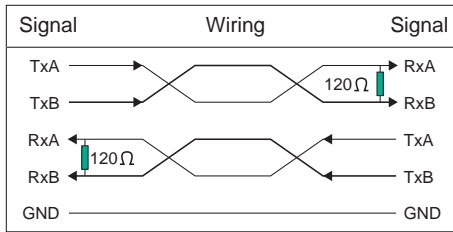
RS-485 Wiring
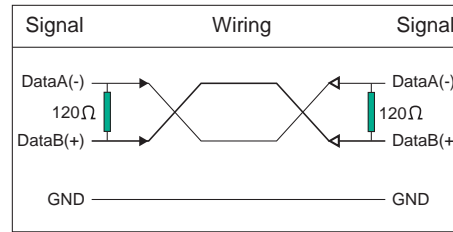
RS-422 vs. RS-485

Standard	Connection Type	Operation Mode	Drivers per Line	Receivers per Line	Max. Cable Length	Max. Data Rate
EIA RS-422	Full-duplex, Point-to-point	Differential	1	10	4000 ft (1.22 km)	10 Mbps
EIA RS-485	Half-duplex, Multi-drop	Differential	32	31	4000 ft (1.22 km)	10 Mbps

Multi-drop Networks

RS-485 was designed for applications that require connecting multiple devices to a single data line. An RS-485 multi-drop network uses a balanced transmission system that can accept up to 32 devices on the same data line. This is achieved with tri-state drivers that are controlled by a programmable handshake line to ensure that only one device acts as a driver at any given time.

Termination

In order to prevent signal reflection, termination resistors are used to match the impedance of the receive and transmit nodes. The resistance needed to match the characteristic impedance is specified by the cable manufacturer. The most common value is 120 ohms.

Multiport Serial Boards ＞ The Basics of RS-232/422/485

10
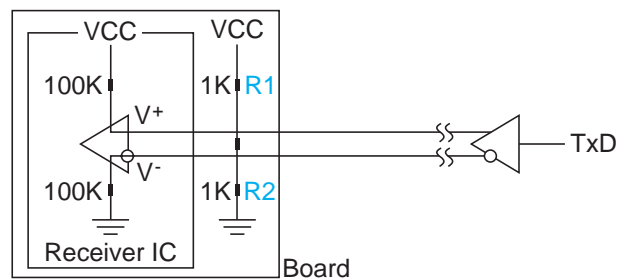
ADDC® (Automatic Data Direction Control)

RS-485 uses differential data transmission over two wires to transmit data from one station to another, and allows multiple transmitters and receivers to be used on the same data line. RS-485 uses half-duplex transmission, which means that transmission and reception share the same data channels. For this reason, only one transmitter can be active at any given time.

Moxa's serial boards have a built-in circuitry to switch transmitters on and off automatically. We call this form of switching ADDC® (automatic data direction control). ADDC® is much easier to implement than the traditional "handshaking" method that uses the RTS signal.
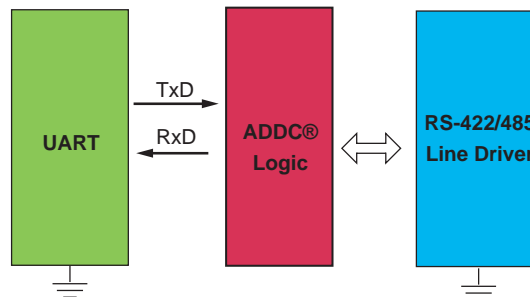
Isolation Eliminates Ground Loops!

A common problem in many industrial applications is the disturbance caused by ground loop currents that flow through the ground line when ground voltages differ between connected devices. To overcome this problem, Moxa's industrial boards and full function converters use "optical isolation" to protect the boards against as much as 2000 volts.
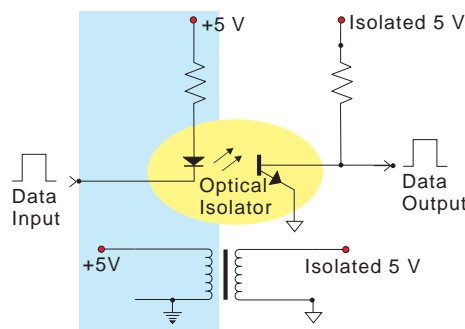
Industrial Wiring Peripherals

Moxa provides an assortment of wiring peripherals that can be used to transform DB9 and DB25 connectors into terminal block connectors. The wiring peripherals shown below are DIN-Rail mountable.

| TB-F9 | TB-M9 | TB-F25 | TB-M25 |

RS-422/485 Board Checklist

Be sure to answer the following questions before ordering your RS-422/485 board from Moxa:

1. Does your system use RS-422, 2-wire RS-485, or 4-wire RS-485?
2. Does your application require "isolation protection" and/or "surge protection?"
3. What is the resistance of the termination resistors used by your application?
4. Is it easy to modify your application's resistor setup?
5. What range of baudrates does your application support?

10

Multiport Serial Boards ∨ The Basics of RS-232/422/485

Driver Support List

	Operating System																		
	DOS	Windows 3.x	Windows 9X	Windows NT	Windows 2000/XP/2003	Windows Vista/2008	Windows XP Embedded	Windows XP/2003/Vista/2008 x64	Windows 7 x86/x64	Windows CE 5.0	Windows CE 6.0	Linux 2.4/2.6	SCO OpenServer 5	SCO OpenServer 6	UnixWare 7	FreeBSD 4	FreeBSD 5	QNX4	QNX6
C320Turbo/PCI	✓	–	✓	✓	✓	✓	–	✓	✓	–	–	✓	✓	✓	✓	–	–	✓	✓
C320Turbo	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	✓	✓	✓	✓	–	–	✓	✓
C218Turbo/PCI	✓	–	✓	✓	✓	✓	–	✓	✓	–	–	✓	✓	✓	✓	–	–	✓	✓
C218Turbo	✓	✓	✓	✓	✓	✓	–	✓	✓	–	–	✓	✓	✓	✓	–	–	✓	✓
CP-118EL-A	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-168EL-A	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-114EL	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-114EL-I	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-104EL-A	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-102E	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-102EL	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-132EL	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-132EL-I	✓	–	–	–	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	–	–	–	✓
CP-118U	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-138U	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-118U-I	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-138U-I	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-168U	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-114UL	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-114UL-I	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–
CP-104UL	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-104JU	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
POS-104UL	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-134U	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-134U-I	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-112UL	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	✓
CP-112UL-I	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	✓
CP-132UL	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-132UL-I	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-102U	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-102UL	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	✓
CP-102UF	✓	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	✓
C168H Series	✓	–	✓	✓	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
C104H Series	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
CI-134 Series	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
CI-132 Series	✓	–	✓	✓	✓	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
CA-108	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓	✓	✓	–	–	–	–	✓	✓
CA-114	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓	✓	✓	–	–	–	–	✓	✓
CA-134I	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓	✓	✓	–	–	–	–	✓	✓
CA-104	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓	✓	✓	–	–	–	–	✓	✓
CA-132/132I	✓	–	✓	✓	✓	–	✓	✓	✓	–	✓	✓	✓	–	–	–	–	✓	✓
CB-108	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	✓
CB-114	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	✓
CB-134I	✓	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	✓
CP-602E-I	–	–	–	–	✓	✓	–	✓	✓	–	–	–	–	–	–	–	–	–	–
CP-602U-I	–	–	–	–	✓	✓	–	✓	✓	–	–	–	–	–	–	–	–	–	–
CB-602I	–	–	–	–	✓	✓	–	✓	✓	–	–	–	–	–	–	–	–	–	–

Introduction to PCI Express

The PCI Express serial interface is capable of transmitting data at 2.5 Gbps. This extremely high rate of data transmission is achieved by transmitting data bit-by-bit over "lanes" that consist of 2 pairs of wires (2 wires for transmitting and 2 wires for receiving). A single connection can achieve a burst mode transmission speed of 320 Mbps.
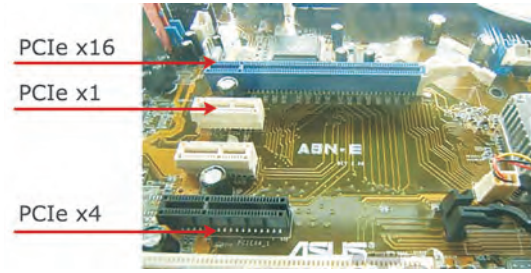
PCI Express to replace PCI, PCI-X, and AGP

The older PCI specification is based on a multi-drop parallel bus design. PCI Express, which will eventually replace PCI, PCI-X, and AGP, is a brand new I/O technology defined by the PCI-SIG. The PCI-SIG's stated goal is to create a unified standard that can handle a wide range of tasks.
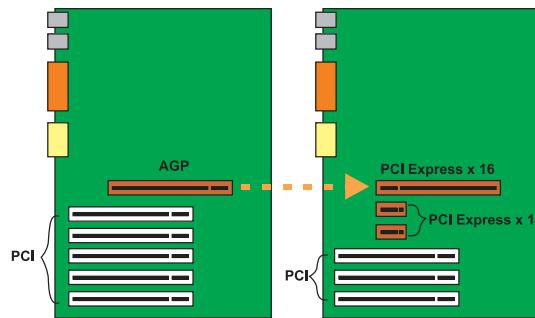
Moxa's PCI Express Boards Fit Any PCI Express Slot

Multiple lanes are combined to create a PCI Express link, with the number of lanes used to label the connection by writing x1, x2, x4, x12, x16, or x32. Note that each lane uses 4 wires (e.g., a PCI Express x1 board uses 4 wires, and a PCI Express x16 board uses 64 wires). It should come as no surprise then that different sized connections use different sized slots. However, the beauty of the PCI Express design is that a PCI Express board can be installed in larger slots. This means that you can install Moxa's PCI Express x1 boards in any PCI Express slot.

The difference between PCI and PCI Express

PCI Express is a serial interface that allows point-to-point connections between devices. This differs from the older PCI bus specification that uses a shared, parallel bus architecture.

Bus Trend

ISA → PCI → PCI-X → PCI Express (PCIe)

Bus Transmission Speeds
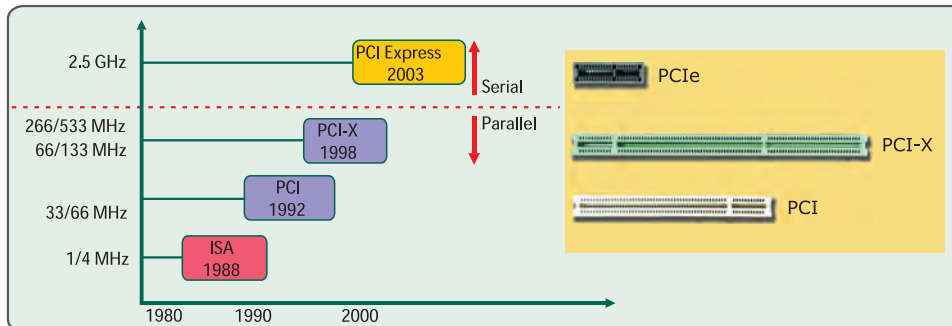
: Another World First: Moxa Launches the "One-chip" PCI Express Board

For more than 20 years, Moxa has dedicated a large percentage of its R&D effort to the design of multiport serial boards, and this effort has paid off once again to the benefit of end-users around the world. Moxa's new "one-chip" PCI Express boards stand high above the crowd compared with other PCI Express boards on the market today. In fact, Moxa is the first manufacturer in the world to use an advanced one-chip PCIe-UART chip, which combines the PCIe bridge and UART on the same chip. The one-chip PCIe boards are designed for a longer MTBF and greater performance, and provide users with baudrates up to 921.6 Kbps and 15 KV ESD protection for greater reliability. Moreover, instead of requiring users to open up the computer to set DIP switches and jumpers manually, one-chip PCIe provides a convenient software solution for configuring the serial interface and termination resistors, giving users the benefit of easy maintenance.

One-chip Solution Optimizes CPU Performance

One-chip PCIe features a 33% higher throughput and decreases CPU load by 48%, outperforming traditional boards that use separate chips for the PCIe bridge and UART.
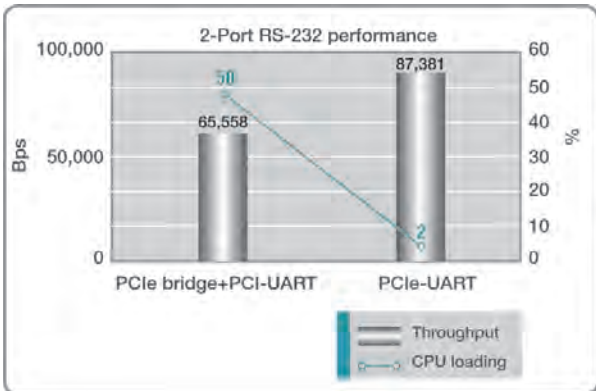
DIP Switch-less and Jumper-less Design

With this PCIe-UART, you can configure the serial interface and termination resistor by software instead of using a DIP switch and jumper. The absence of a DIP switch and jumper also makes these one-chip PCIe boards more user-friendly and easier to maintain, since there is no need to open up the computer to adjust the settings manually. Furthermore, the one-chip design reduces manufacturing time and costs since fewer components are required.

Onboard LEDs for Easy Maintenance

Moxa's multiport serial boards have onboard LEDs to clearly indicate data transmit/receive status. This is very helpful for users, especially since troubleshooting can be done without opening up the computer.
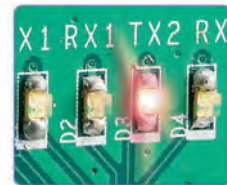
Drivers Galore

Moxa's PCI Express boards support a wide range of drivers for desktop solutions (Windows 2000, XP/Vista x86/x64) and server solutions (Windows 2003/2008, with certification). Moreover, we also provide drivers for Linux, SCO Open Server 5/6, QNX 6, Windows XP Embedded, UnixWare 7, and Windows 7.

CP-118EL-A

8-port RS-232/422/485 PCI Express serial board

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Choose from a wide range of connection cables and boxes
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, DOS, Linux 2.4/2.6,QNX 6, SCO Open Server 5/6, UnixWare 7
> 15 KV ESD protection on the board

: Overview

The CP-118EL-A is a smart, 8-port PCI Express board designed for POS and ATM applications. It is a top choice of industrial automation engineers and system integrators, and supports many different operating systems, including Windows, Linux, and even Unix. In addition, each of the board's 8 serial ports can be configured independently for RS-232, RS-422, or RS-485 (either 2-wire or 4-wire), and the ports supports a super fast 921.6 Kbps baudrate. The CP-118EL-A provides full modem control signals to ensure compatibility with a wide range of serial peripherals, and its PCI Express "x1" classification allows it to be installed in any PCI Express slot.

: Smaller Form Factor

The CP-118EL-A is a low profile board that is compatible with any PCI Express slot. The board requires only a 3.3 VDC power supply, which means that the board fits any host computer, ranging from shoebox to standard-sized PCs.

: Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-118EL-A board is no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

: Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connector: VHDCI 68

Serial Interface
Number of Ports: 8
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, 2.6 x86/x64, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 68.9 x 88 mm (2.71 x 3.46 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11

Power Requirements
Power Consumption: 1285 mA @ 3.3 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

101.36 mm (3.99 in)

88 mm (3.46 in)

120.02 mm (4.72 in)

100.36 mm (3.95 in)

56.14 mm (2.21 in)

68.9 mm (2.71 in)

59.05 mm (2.33 in)

MOXA
MUE850
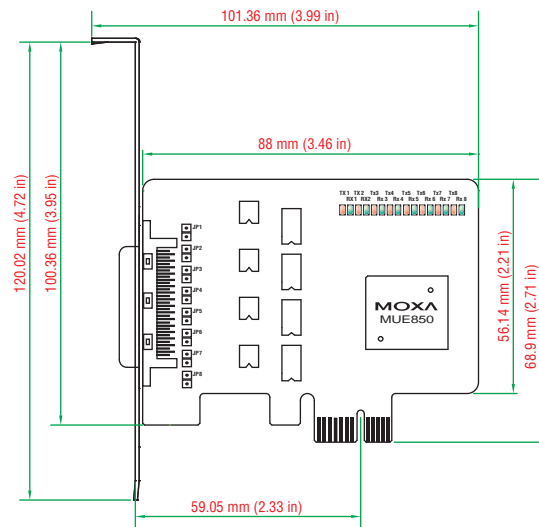
Ordering Information

Available Models

CP-118EL-A: 8-port RS-232/422/485 low profile PCI Express x1 serial board

Package Checklist

- CP-118EL-A board
- Standard bracket and low profile bracket
- Document and Software CD
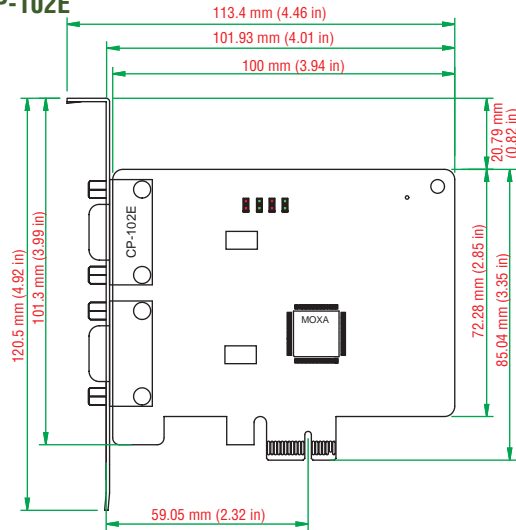- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

OPT8-M9+
DB9 male x 8 (150 cm cable)

CBL-M68M9x8-100
DB9 male x 8 (100 cm cable)

PIN	RS-232	RS-422/RS-485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

DB9 male

OPT8B+
DB25 male x 8 (150 cm cable)

CBL-M68M25x8-100
DB25 male x 8, (100 cm cable)

PIN	RS-232	RS-422/RS-485-4w	RS-485-2w
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	–
4	RTS	–	–
5	CTS	–	–
6	DSR	–	–
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DTR	RxD-(A)	Data-(A)

DB25 male
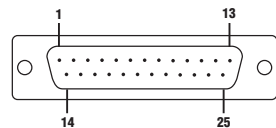
OPT8A+
DB25 female x 8 (150 cm cable)

OPT8S+
DB25 female x 8 (150 cm cable)
25 KV ESD Surge Protection

PIN	RS-232	RS-422/RS-485-4w	RS-485-2w
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	CTS	–	–
5	RTS	–	–
6	DTR	RxD-(A)	Data-(A)
7	GND	GND	GND
8	DCD	TxD-(A)	–
20	DSR	–	–

DB25 female

CP-168EL-A

8-port RS-232 PCI Express serial board

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Choose from a wide range of connection cables and boxes
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, DOS, Linux 2.4/2.6, QNX 6, SCO Open Server 5/6, UnixWare 7
> 15 KV ESD protection on the board

10

Overview

The CP-168EL-A is a smart, 8-port PCI Express board designed for POS and ATM applications. It is a top choice of industrial automation engineers and system integrators, and supports many different operating systems, including Windows, Linux, and even Unix. In addition, each of the board's 8 RS-232 serial ports supports a super fast 921.6 Kbps baudrate. The CP-168EL-A provides full modem control signals to ensure compatibility with a wide range of serial peripherals, and its PCI Express "x1" classification allows it to be installed in any PCI Express slot.

Smaller Form Factor

The CP-168EL-A is a low profile board that is compatible with any PCI Express slot. The board requires only a 3.3 VDC power supply, which means that the board fits any host computer, ranging from shoebox to standard-sized PCs.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-168EL-A board is no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connector: VHDCI 68

Serial Interface
Number of Ports: 8
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Sytems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, 2.6 x86/x64, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 64.42 x 102 mm (2.54 x 4.02 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11

Power Requirements
Power Consumption: 1225 mA @ 3.3 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

115.77 mm (4.57 in)
102 mm (4.02 in)
80 mm (3.15 in)
63.59 mm (2.5 in)
51.66 mm (2.04 in)
64.42 mm (2.54 in)
59.05 mm (2.33 in)

TX1 TX2 Tx3 Tx4 TX5 TX6 Tx7 Tx8
RX1 RX2 Rx3 Rx4 RX5 RX6 Rx7 Rx8

MOXA
MUE850
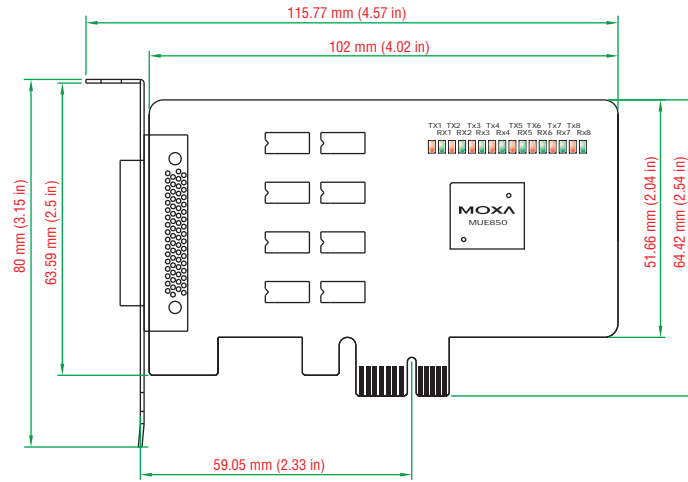
⁞ Ordering Information

Available Models

CP-168EL-A: 8-port RS-232 low profile PCI Express x1 serial board

Package Checklist

- CP-168EL-A board
- Standard bracket and low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

### Connection Options (can be purchased separately)

OPT8-M9+
DB9 male x 8 (150 cm cable)

CBL-M68M9x8-100
DB9 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male
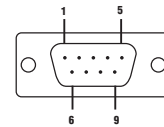
OPT8B+
DB25 male x 8 (150 cm cable)

CBL-M68M25x8-100
DB25 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male

OPT8A+
DB25 female x 8, 150 cm Cable

OPT8S+
DB25 female x 8 (150 cm cable)
25 KV ESD protection

OPT8F+/Z+ (RS-422)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor
(115.2 Kbps max. baudrate)

OPT8F+ with 500 V isolation

OPT8K+ (RS-422/485)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor

OPT8K+ with 2 KV isolation

PIN	RS-232	PIN	RS-232
2	RxD	6	DTR
3	TxD	7	GND
4	CTS	8	DCD
5	RTS	20	DSR

PIN	RS-422/RS-485-4w	RS-485-2w
2	RxD+(B)	Data+(B)
3	TxD+(B)	
7	GND	GND
14	RxD-(A)	Data-(A)
16	TxD-(A)	

DB25 female
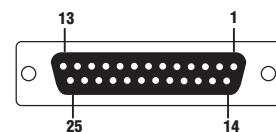
CP-114EL/EL-I

4-port RS-232/422/485 PCI Express boards with optional 2 KV isolation

CP-114EL
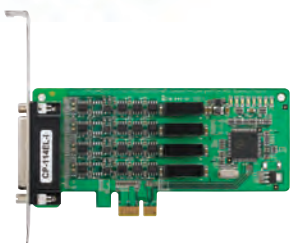
CP-114EL-I

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/ x64, 2000, Linux 2.4, Linux 2.6 (x86/x64), QNX 6, Windows XP Embedded, SCO OpenServer 5/6, UnixWare 7
> 15 KV ESD protection on the board

Overview

The CP-114EL and CP-114EL-I are smart, 4-port PCI Express boards designed for POS and ATM applications. The boards are a top choice of industrial automation engineers and system integrators, and support many different operating systems, including Windows and Linux. In addition, each of the boards' 4 RS-232/422/485 serial ports supports a super fast 921.6 Kbps baudrate. The CP-114EL and CP-114EL-I provide full modem control signals to ensure compatibility with a wide range of serial peripherals, and their PCI Express "x1" classification allows the boards to be installed in any PCI Express slot.

Smaller Form Factor

The CP-114EL and CP-114EL-I are low profile boards that are compatible with any PCI Express slot. The boards require only a 3.3 VDC power supply, which means that the boards fit any host computer, ranging from shoebox to standard-sized PCs.

Drivers Provided for Windows, Linux

Moxa continues to support a wide variety of operating systems, and the CP-114EL/EL-I boards are no exception. Reliable Windows COM and Linux TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connector: DB44 female

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-114EL-I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 6, Windows XP Embedded, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-114EL: 67.21 x 103 mm (2.69 x 4.06 in)
CP-114EL-I: 67.21 x 135 mm (2.69 x 5.31 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11

Power Requirements

Power Consumption:
CP-114EL: 835 mA @ 3.3 V
CP-114EL-I: 1170 mA @ 3.3 V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
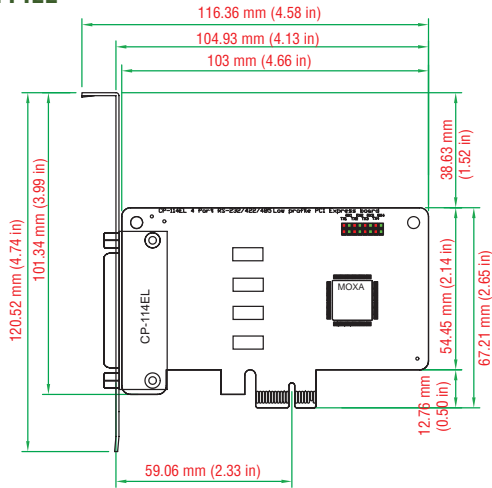
CP-114EL

CP-114EL-I
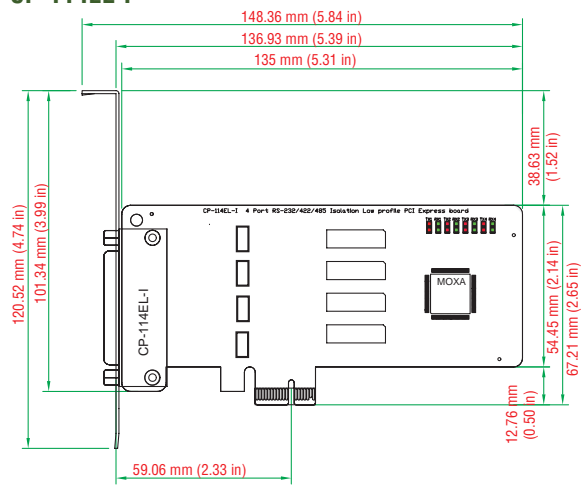
: Ordering Information

Available Models

CP-114EL: 4-port RS-232/422/485 low profile PCI Express x1 serial board
CP-114EL-I: 4-port RS-232/422/485 low profile PCI Express x1 serial board with optical isolation
CP-114EL-DB9M: 4-port RS-232/422/485 low profile PCI Express x1 serial board (includes DB9 male cable)
CP-114EL-DB25M: 4-port RS-232/422/485 low profile PCI Express x1 serial board (includes DB25 male cable)
CP-114EL-I-DB9M: 4-port RS-232/422/485 low profile PCI Express x1 serial board with optical isolation (includes DB9 male cable)

CP-114EL-I-DB25M: 4-port RS-232/422/485 low profile PCI Express x1 serial board with optical isolation (includes DB25 male cable)

Package Checklist

- CP-114EL or CP-114EL-I board
- Standard bracket and low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50
DB44 male to DB9 male x 4
(50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
1	DCD	TxD–(A)	TxD–(A)	–
2	RxD	TxD+(B)	TxD+(B)	–
3	TxD	RxD+(B)	RxD+(B)	Data+(B)
4	DTR	RxD–(A)	RxD–(A)	Data–(A)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–
9	–	–	–	–

DB9 male

CBL-M44M25x4-50
DB44 male to DB25 male x 4
(50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
2	TxD	RxD+(B)	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	TxD+(B)	–
4	RTS	–	–	–
5	CTS	–	–	–
6	DSR	–	–	–
7	GND	GND	GND	GND
8	DCD	TxD–(A)	TxD–(A)	–
20	DTR	RxD–(A)	RxD–(A)	Data–(A)
22	–	–	–	–

DB25 male

10 Multiport Serial Boards > CP-114EL/EL-I

CP-104EL-A

4-port RS-232 PCI Express serial board

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, DOS, Linux 2.4/2.6, QNX 6, SCO Open Server 5/6, UnixWare 7
> Easy maintenance with on-board LEDs and management software
> 15 KV ESD protection on the board

10

Multiport Serial Boards › CP-104EL-A

Overview

The CP-104EL-A is a smart, 4-port PCI Express board designed for POS and ATM applications. It is a top choice of industrial automation engineers and system integrators, and supports many different operating systems, including Windows, Linux, and even Unix. In addition, each of the board's 4 RS-232 serial ports supports a super fast 921.6 Kbps baudrate. The CP-104EL-A provides full modem control signals to ensure compatibility with a wide range of serial peripherals, and its PCI Express "x1" classification allows it to be installed in any PCI Express slot.

Smaller Form Factor

The CP-104EL-A is a low profile board that is compatible with any PCI Express slot. The board requires only a 3.3 VDC power supply, which means that the board fits any host computer, ranging from shoebox to standard-sized PCs.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-104EL-A board is no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connector: DB44 female
Serial Interface
Number of Ports: 4
Serial Standards: RS-232
Max. No. of Boards per PC: 4
Serial Line Protection
ESD Protection: 15 KV on the board
Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, 2.6 x86/x64, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.
Physical Characteristics
Dimensions: 67.21 x 103 mm (2.65 x 4.06 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN61000-6-2, EN61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11
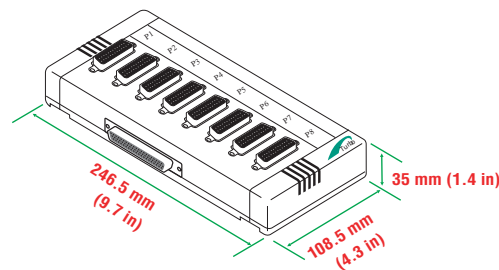
Power Requirements

Power Consumption: 805 mA @ 3.3 V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
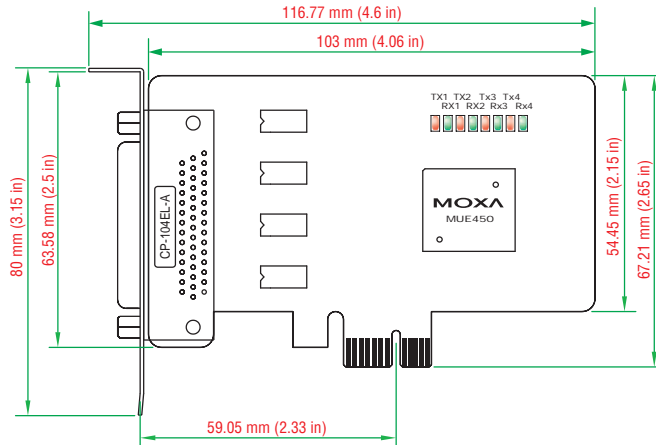
: Ordering Information

Available Models

CP-104EL-A-DB9M: 4-port RS-232 PCI low profile Express x1 serial board (includes DB9 male cable)

CP-104EL-A-DB25M: 4-port RS-232 low profile PCI Express x1 serial board (includes DB25 male cable)

Package Checklist

- CP-104EL-A board
- DB9-M or DB25-M connection cable
- Standard bracket and low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50
DB44 male to DB9 male x 4 (50 cm cable)

PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male
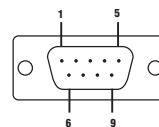
CBL-M44M25x4-50
DB44 male to DB25 male x 4 (50 cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male
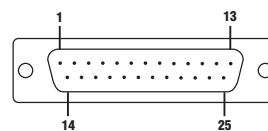
CP-102E/EL

2-port RS-232 PCI Express boards
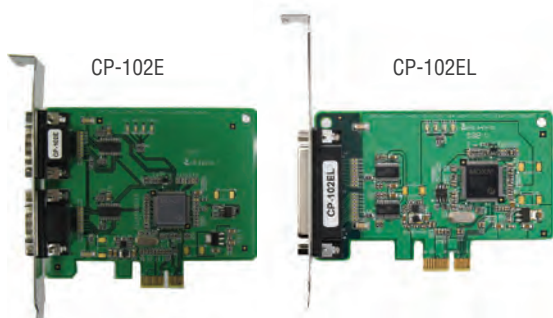
CP-102E   CP-102EL

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, Linux 2.4, Linux 2.6 (x86/x64) QNX 6, Windows XP Embedded, SCO OpenServer 5/6, UnixWare 7
> 15 KV ESD protection on the board

Overview

The CP-102E and low profile CP-102EL are 2-port PCI Express boards designed for POS and ATM applications. Moxa's PCI Express boards are a top choice of industrial automation engineers and system integrators, particularly since the boards support many different operating systems, including Windows and Linux. The CP-102E/EL's

2 RS-232 serial ports support a super fast 921.6 Kbps baudrate, and provide full modem control signals to ensure compatibility with a wide range of serial peripherals. In addition, the boards' x1 classification allows them to be installed in any PCI Express slot.

Smaller Form Factor

The CP-102EL is a low profile board that is compatible with any PCI Express slot. The CP-102EL board only requires a 3.3 VDC power

supply, which means that the board fits any host computer, ranging from shoebox to standard-sized PCs.

Drivers Provided for Windows, Linux

Moxa continues to support a wide variety of operating systems, and the CP-102E/EL boards are no exception. Reliable Windows COM and Linux TTY drivers are provided for all Moxa boards, and other

operating systems, such as WEPOS, are also supported for embedded integration applications.

Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connectors:
CP-102E: DB9 male
CP-102EL: DB25 female

Serial Interface
Number of Ports: 2
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, Linux 2.4, Linux 2.6 x86/x64, QNX 6, Windows XP Embedded, DOS, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-102E: 85.04 x 100 mm (3.40 x 4.00 in)
CP-102EL: 67.21 x 101.97 mm (2.69 x 4.08 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11

Power Requirements

Power Consumption:
CP-102E: 520 mA @ 3.3 V
CP-102EL: 552 mA @ 3.3 V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CP-102E

CP-102EL
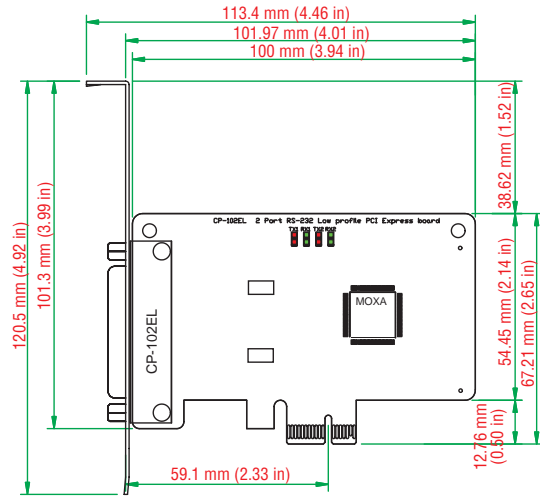
: Ordering Information

Available Models

CP-102E: 2-port RS-232 PCI Express x1 serial board
CP-102EL-DB9M: 2-port RS-232 low profile PCI Express serial board (includes DB9 male cable)

Package Checklist

- CP-102E or CP-102EL board
- Low profile bracket (CP-102EL only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (CP-102EL only, can be purchased separately)

CBL-M25M9x2-50
DB25 male to DB9 male x 2
(50 cm cable)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

DB9 male
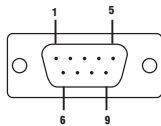
CP-132EL/EL-I

2-port RS-422/485 PCI Express boards with optional 2 KV isolation
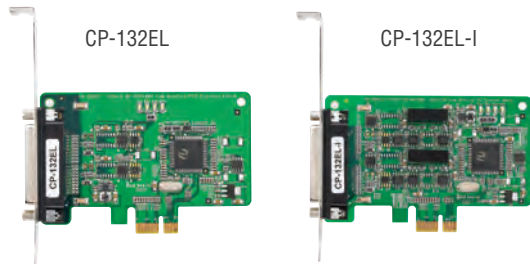
CP-132EL   CP-132EL-I

> PCI Express x1 compliant
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip S/W flow control
> Low profile form factor fits small-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, Linux 2.4, Linux 2.6 (x86/x64), Windows XP Embedded, SCO OpenServer 5/6, UnixWare 7
> 15 KV ESD protection on the board

: Overview

The CP-132EL and CP-132EL-I are 2-port PCI Express boards designed for industrial automation applications that require a long distance, multi-point, PC-based data acquisition solution.

RS-485 multidrop for up to 31 devices within 1.2 km
The CP-132EL/EL-I boards have 2 RS-422/485 serial ports, each of which can achieve data rates up to 921.6 Kbps. In RS-485 mode, the boards can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. For long distance RS-485 communication, choose the CP-132EL-I model, which comes with 2 KV optical isolation protection to prevent equipment damage.

: Drivers Provided for Windows and Linux

Moxa continues to support a wide variety of operating systems, and the CP-132EL/EL-I boards are no exception. Reliable Windows COM and Linux TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

: Specifications

Hardware
Comm. Controller: 16C550C compatible
Bus: PCI Express x1
Connector: DB25 female

Serial Interface
Number of Ports: 2
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-132EL-I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: XON/XOFF

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND

RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, Linux 2.4, Linux 2.6 x86/x64, QNX 6, Windows XP Embedded, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-132EL: 67.21 x 101.97 mm (2.65 x 4.08 in)
CP-132EL-I: 67.21 x 103.97 mm (2.65 x 4.16 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11

Power Requirements

Power Consumption:
CP-132EL: 548 mA @ 3.3 V
CP-132EL-I: 636 mA @ 3.3 V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CP-132EL
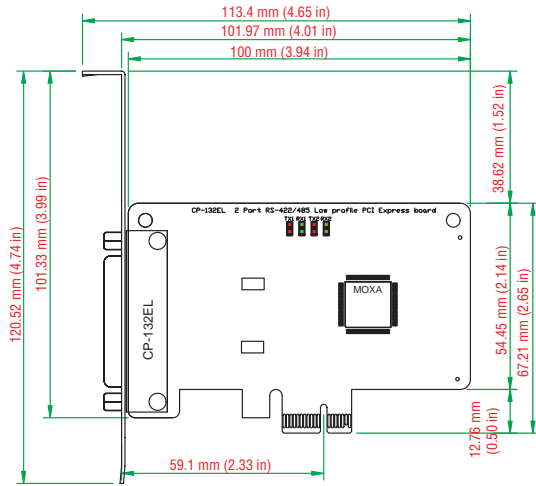
CP-132EL-I
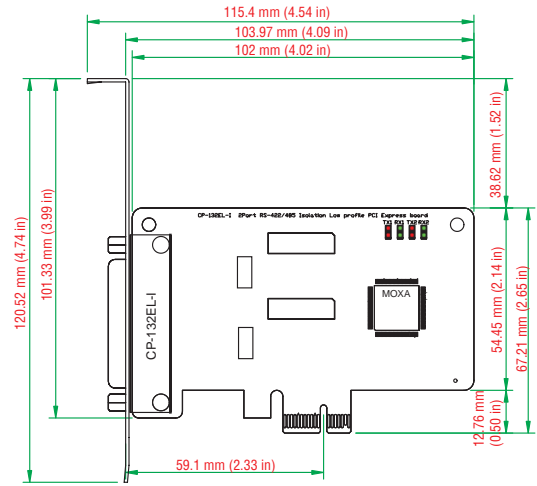
Ordering Information

Available Models

CP-132EL-DB9M: 2-port RS-422/485 low profile PCI Express x1 serial board (includes DB9 male cable)
CP-132EL-I-DB9M: 2-port RS-422/485 low profile PCI Express x1 serial board with optical isolation (includes DB9 male cable)

Package Checklist

- CP-132EL or CP-132EL-I board
- Low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M25M9x2-50
DB25 male to DB9 male x 2
(50 cm cable)

PIN	RS-422/RS-485-4w	RS-485-2w
1	TxD−(A)	–
2	TxD+(B)	–
3	RxD+(B)	Data+(B)
4	RxD−(A)	Data−(A)
5	GND	GND
6	–	–
7	–	–
8	–	–

DB9 male
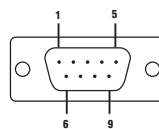
Introduction to Universal PCI

The universal PCI standard was created to give users greater versatility. Universal PCI boards can be used in either 3.3-volt or 5-volt PCI slots, which means that Moxa's universal PCI boards can be used in any PC that has a PCI slot. Choose from boards with 2, 4, or 8 independent serial ports (RS-232, RS-422, RS-485) for connecting data acquisition equipment and other serial devices to your PC.

One of the drawbacks of the original PCI bus standard is that it only supports a 32-bit bus and 5V connector key. The need for increased bandwith, reduced power consumption, and high-speed transmission gave rise to a new 64-bit/3.3V PCI standard. Moxa's universal PCI boards have it all:

- Support for both 32-bit and 64-bit PCI buses
- Suport for both 3.3V and 5V connector keys

64 bits, PCI/3.3 V

32 bits, PCI/5 V
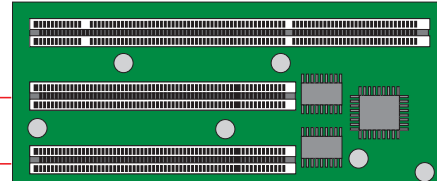
: Increased FIFO Buffer for Better Performance

The larger FIFO buffer on Moxa's universal PCI boards takes a big load off your PC's CPU, resulting in better overall performance.
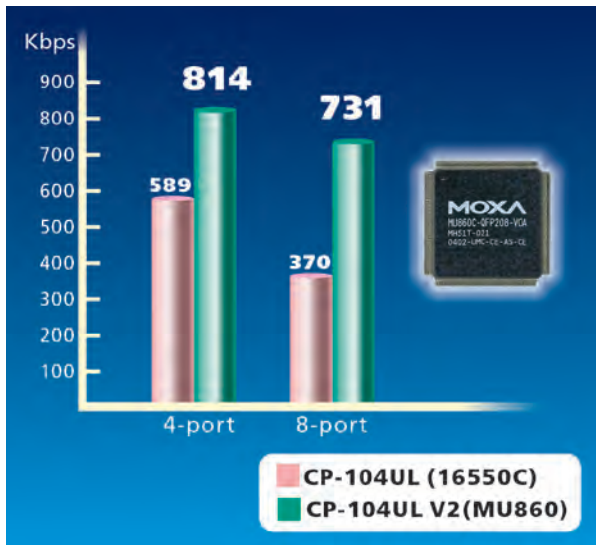
Testing Environment
CPU: AMD-K6-500
Main Board: GA-5AX
Memory: 128 MB
OS: Win2K
Products: CP-104UL (16550C), CP-104UL V2 (MU860)
Ports: 16 ports (4 boards)
Flow Control: Hardware Flow Control
Test Procedure: Performance Analyzer for burn-in test

Kbps

900
800 814
700 731
600 589
500
400 370
300
200
100

4-port   8-port

CP-104UL (16550C)
CP-104UL V2(MU860)

CPU Loading

128-byte FIFO 2%
64-byte FIFO   67%
16-byte FIFO   97%

0%   20%   40%   60%   80%   100%   120%

CPU Loading
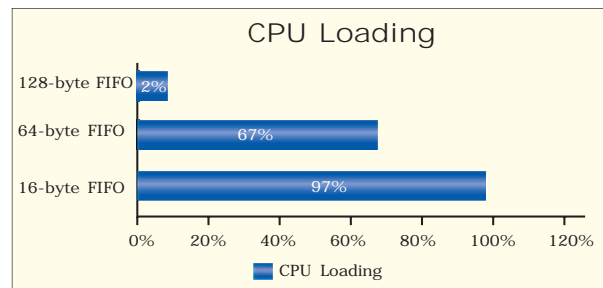
: Forward and Backward Compatibility

Compatible with all major operating systems

DOS — Win 95 — Win 98 — Win ME — Win NT

Win 2K — Win XP — Win XP Embedded — Win 2003 — Win 64-bit — WEPOS — Win Vista — Win 2008 — Win 7

Linux 2.4 — Linux 2.6 — Linux 64-bit

SCO Open Server 5 — SCO Unixware 7 — SCO Open Server 6
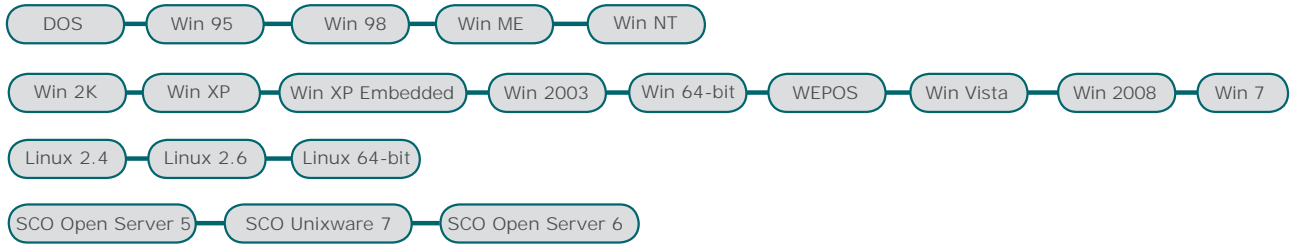
MD1 low profile boards fit most systems

Universal PCI Board

Low Profile
Universal PCI Board

65 mm
(2.56 in)

120 mm (4.72 in)
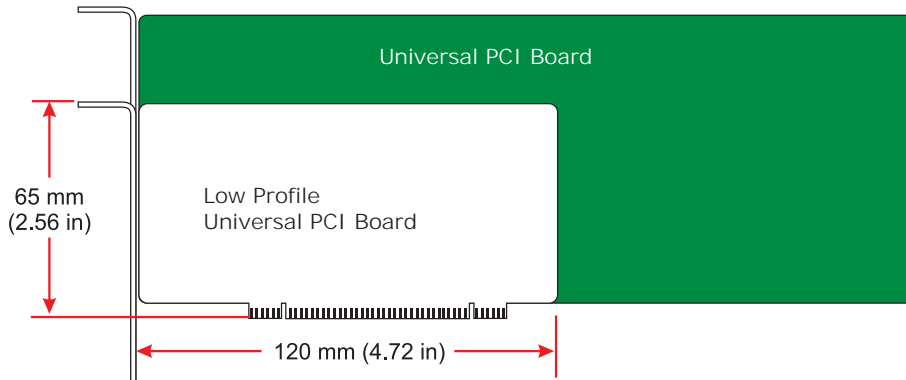
Moxa's universal PCI boards are compatible with Moxa's PCI Boards

CP-168U = C168H/PCI
CP-134U Series = CP-114 Series

CP-104UL = C104H/PCI
CP-132UL Series = CP-132 Series

: Universal PCI Board Quick Selection Guide

Interface	Ports	Product	Universal PCI	15 KV ESD Protection	2 KV Optical Isolation	Low Profile	Serial Port Power
RS-232	2	CP-102U	✓	✓	–	–	–
		CP-102UL	✓	✓	–	✓	–
	4	CP-104UL	✓	✓	–	✓	–
		CP-104JU	✓	✓	–	–	–
		POS-104UL	✓	✓	–	✓	✓
	8	CP-168U	✓	✓	–	–	–
RS-422/485	2	CP-132UL-I	✓	✓	✓	✓	–
		CP-132UL	✓	✓	–	✓	–
	4	CP-134U	✓	✓	–	–	–
		CP-134U-I	✓	✓	✓	–	–
	8	CP-138U	✓	✓	–	–	–
		CP-138U-I	✓	✓	✓	–	–
RS-232/422/485	2	CP-112UL	✓	✓	–	✓	–
		CP-112UL-I	✓	✓	✓	✓	–
	4	CP-114UL	✓	✓	–	✓	–
		CP-114UL-I	✓	✓	✓	✓	–
	8	CP-118U	✓	✓	–	–	–
		CP-118U-I	✓	✓	✓	–	–
Serial-over-Fiber	2	CP-102UF	✓	✓	–	–	–

: Wide Temperature Models of Moxa's Universal PCI Boards Fit for Harsh Industrial Applications

Industrial applications are often associated with harsh, demanding environments, and of all the features that distinguish industrial products from commercial-grade products, the "Wide Temperature" feature is considered the most important. Facilities or key devices may be located at remote sites where there is no protection from severe weather conditions. For devices that are not designed to tolerate harsh conditions, this often presents significant limitations in how they can be used for the application.

Moxa offers wide temperature Universal PCI models that can operate reliably between -40 and 85˚C. Wide temperature models present a much more reliable and affordable alternative to using regular

industrial-grade devices. They are an ideal solution for any application that involves harsh industrial environments, such as power substation automation, intelligent transportation systems, environmental monitoring, manufacturing automation, and other similar systems.

- Outdoor applications, such as deserts or mountains, where it is difficult or costly to build a climate-controlled shelter for sensitive electronic equipment
- Indoor applications, such as in factories or laboratories, where equipment must be placed near machines that generate extreme heat or cold
- Mobile or mixed applications in harsh environments, such as in the military, where machines must operate reliably in low and high temperatures

Moxa's wide temperature Universal PCI boards support an operating temperature range from -40 to 85°C, which is one more reason why Moxa is a leading provider of multiport serial boards.

Wide Temperature Universal PCI Board Quick Selection Guide

Interface	Ports	Product
RS-232	2	CP-102U-T
		CP-102UL-T
	4	CP-104UL-T
		CP-104JU-T
		POS-104UL-T*
	8	CP-168U-T
RS-422/485	2	CP-132UL-T
		CP-132UL-I-T
	4	CP-134U-T
		CP-134U-I-T
	8	CP-138U-T
		CP-138U-I-T
RS-232/422/485 Serial-over-Fiber	2	CP-112UL-T
		CP-112UL-I-T
	4	CP-114UL-T
		CP-114UL-I-T
	8	CP-118U-T
		CP-118U-I-T
	2	CP-102UF-T

* Supports power over serial

10

Multiport Serial Boards > Introduction to Universal PCI

C320Turbo Series

8 to 32-port intelligent RS-232 Universal PCI and ISA serial boards

> Supports 128 high-performance serial ports per system
> Dramatically decreases host CPU load
> Modular design makes port expansion easy
> Monitor transmission status with LEDs on the module and two 7-segment displays
> Drivers provided for a broad selection of operating systems
> 460.8 Kbps maximum baudrate

Overview

The intelligent C320Turbo serial boards are expandable and flexible COM/TTY solutions for RS-232 applications that require connecting up to 128 serial devices to one computer. The C320Turbo's on-board CPU and large dual-port memory take the load off host systems whose performance and scalability are critical for large-scale systems.

Drivers Provided for Windows and Linux

In addition to providing COM port drivers for all major operating systems, Moxa also supports the following dedicated operating systems for customers' special needs.

DOS
Windows
Windows (x64)
SCO UnixWare 7
SCO OpenServer 5/6
SCO UNIX SVR 4.2

QNX 4.2x
Linux 2.4/2.6
Linux (x64)

Dramatically Decreases Host Computer's CPU Load

The C320Turbo boards have a state-of-the-art onboard CPU that dramatically reduces the host computer's load by up to 68%* for applications that use 32 ports per board.

*Testing Environment

• Pentium 4, 1.8 GB CPU, 128 MB RAM
• Windows 2000 Professional
• Moxa PComm Pro Performance Analyzer
• 115.2 Kbps, full duplex, 24-hour burn-in

12% Load   80% Load
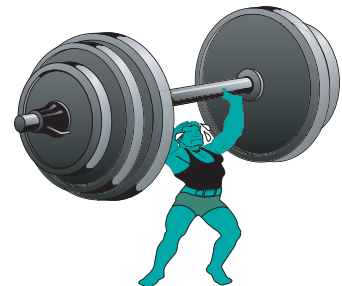
Intelligent Board   Non-Intelligent Board

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 8
Bus:
C320Turbo/PCI: 32-bit Universal PCI
C320Turbo: 16-bit ISA
Connector: DB25 female

Processor: TMS320BC52-40 RISC CPU
Memory: 512 KB
Serial Interface
Number of Ports: 32 per control board (max.)
Serial Standards: RS-232 (RS-422 available with desktop option)
Max. No. of Boards per PC: 4

Performance
Baudrate: 50 bps to 460.8 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ:
C32010T/PCI: Assigned by BIOS
C32010T: 2 (9), 3, 4, 5, 7, 10 (default), 11, 12, 15

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+/-, RxD+/-, RTS+/-, CTS+/-, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/
Vista/2008/7 x86/x64, DOS, Linux 2.4, Linux 2.6 x86/x64, SCO Open
Server 5/6, UnixWare 7, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
C32010T/PCI: 90 x 120 mm (3.54 x 4.72 in)
C32010T: 107 x 158 mm (4.21 x 6.22 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-4, ENV5204

Power Requirements
Power Consumption:
C32010T/PCI: 500 mA max. @ +5 V
C32010T: 840 mA max. @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

10

Multiport Serial Boards > C320Turbo Series

Dimensions

Desktop Solution

246.5 mm (9.7 in) — 35 mm (1.4 in) — 108.5 mm (4.3 in)

246.5 mm (9.7 in) — 35 mm (1.4 in) — 108.5 mm (4.3 in)

Rackmount Solution

43.7 mm (1.7 in) — 165 mm (6.5 in) — 276.5 mm (10.9 in)
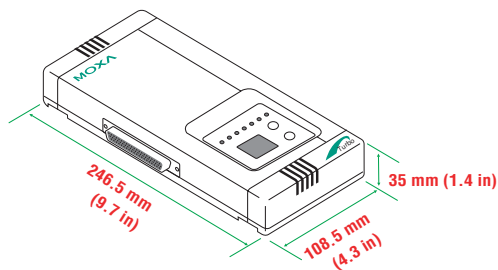
43.7 mm (1.7 in) — 165 mm (6.5 in) — 276.5 mm (10.9 in)
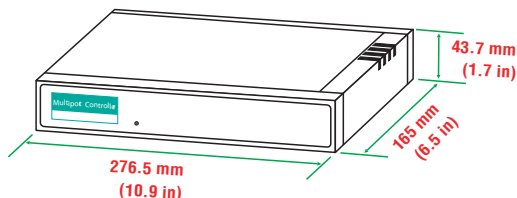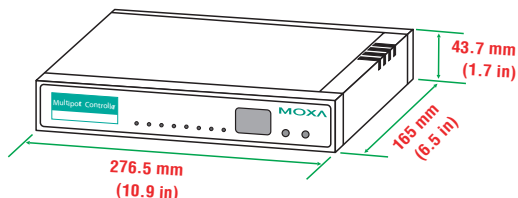
	C32010T/ PCI	C32010T	C32030T	C32045T	C32047T	C32061T
Dimensions (mm)	120 x 90 x 15	158 x 107 x 15	247 x 108 x 35	247 x 108 x 35	247 x 108 x 35	247 x 108 x 35
Weight (g)	90	120	425	500	485	488
Power Requirements	0.5A (+5V)	0.84A (+5V)	0.59A (+5V)	0.28A (+5V) 0.095A (+12V) 0.06A (-12V)	0.28A (+5V) 0.095A (+12V) 0.06A (-12V)	0.485A (+5V)

	C32065T	C32071T	C32080T	C32081T	C32082T	C32083T
Dimensions (mm)	247 x 108 x 35	247 x 108 x 35	277 x 165 x 44	277 x 165 x 44	277 x 165 x 44	277 x 165 x 44
Weight (g)	525	525	1020	1120	920	1000
Power Requirements	1.32A (+5V)	0.28A (+5V) 0.095A (+12V) 0.06A (-12V)	0.88A (+5V) 0.095A (+12V) 0.06A (-12V)	1.22A (+5V) 0.19A (+12V) 0.12A (-12V)	0.34A (+5V) 0.095A (+12V) 0.06A (-12V)	0.67A (+5V) 0.19A (+12V) 0.12A (-12V)

: Ordering Information

Package Checklist
- C320Turbo/PCI or C320Turbo board
- 2-meter DB25-M to DB25-F connection cable
- Long-range extension kit (optional)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Desktop Option
- CPU module
- One or more UART modules (32 ports maximum per board)

Rackmount Option
- Basic module
- Zero or more expansion modules (32 ports maximum per board)

Available Models

Control Boards (must choose one)

C32010T/PCI: Universal PCI board
C32010T: ISA board

External Modules

Rackmount Option

Basic Modules (must choose one)
C32080T: 8 RS-232 ports, 10-pin RJ45 connectors
C32081T: 16-port, RS-232, 10-pin RJ45

Expansion Modules (optional)
C32082T: 8 RS-232 ports, 10-pin RJ45 connectors
C32083T: 16 RS-232 ports, 10-pin RJ45 connectors

Connection Cable (required)

C32020T: 2 meter DB25-M to DB25-F cable with 25 pins for short-range usage

Desktop Option

CPU Module (required)
C32030T: Connects directly to one UART module

8-port UART Modules (choose at least one)
C32045T: RS-232, DB25-F connectors
C32047T: RS-232, DB25-M connectors
C32071T: RS-232, DB25-F connectors (25 KV ESD surge protection)
C32061T: RS-422, DB25-F connectors
C32065T: RS-422, DB25-F connectors (2 KV optical isolation)

Long-range Extension Kit (optional)

C32050T: Includes the following items
- 2 meter DB25-M to DB25-F 10-wire cable (generally used for set-up)
- 90-240 VAC switching power adaptor (0-30°C operating temperature)

NOTE: Build your own DB25-M to DB25-F 10-wire cable for connecting up to 100 meters.

: Ordering Examples

Rackmount Ordering Examples

16 RS-232 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
Basic Module: C32081T

32 RS-232 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
Basic Module: C32081T x 1
Expansion Module: C32083T x 1

10 — Multiport Serial Boards ∨ C320Turbo Series

Rackmount Setup Diagram

Optional Power Adaptor (C32050T)

Control Board — Connection Cable (Up to 100 m) — Basic Module ← Extension Module
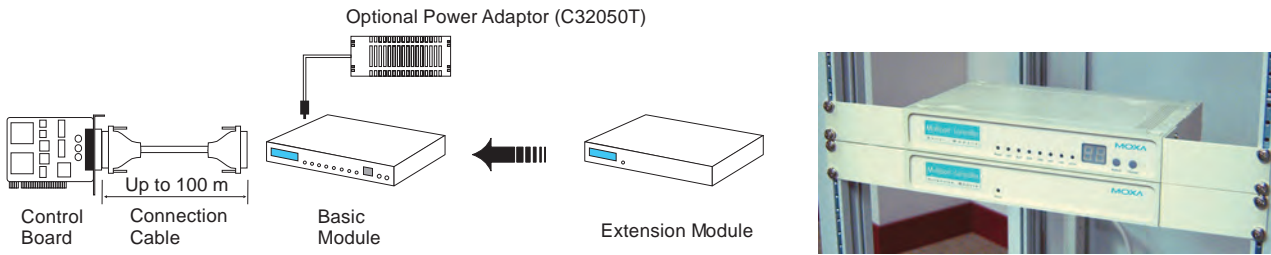
Desktop Ordering Examples

8 RS-232 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
CPU Module: C32030T
UART Module: C32045T x 1

8 RS-232 ports + 16 RS-422 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
CPU Module: C32030T
UART Module: C32045T x 1 + C32061T x 2

16 RS-232 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
CPU Module: C32030T
UART Module: C32045T x 2 or C32047T x 2

32 RS-232 ports

Control Board: C32010T/PCI
Connection Cable: C32020T
CPU Module: C32030T
UART Module: C32045T x 4 or C32047T x 4

Desktop Setup Diagram

Optional Power Adaptor (C32050T)

Control Board — Connection Cable (Up to 100 m) — CPU Module — UART Module

Multiport Serial Boards › C320Turbo Series

10
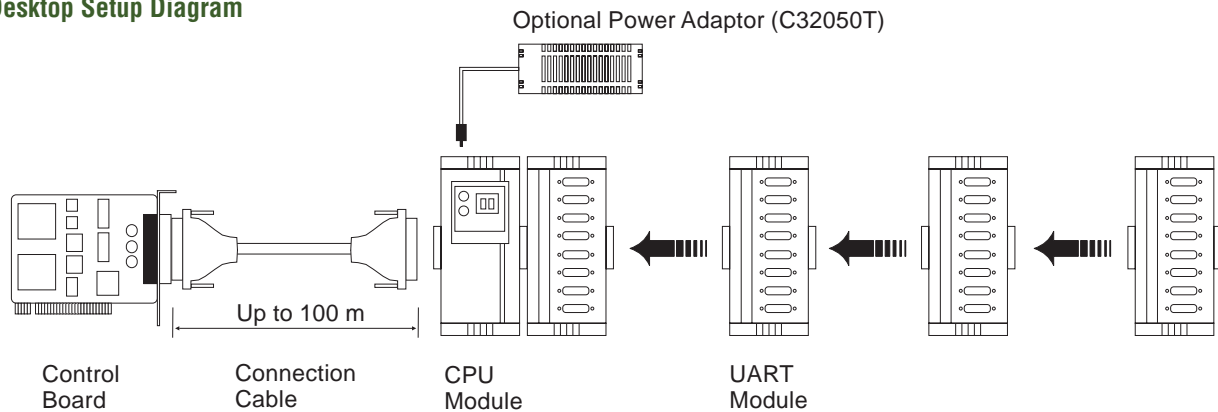
C218Turbo Series

8-port RS-232 intelligent Universal PCI and ISA serial boards

C218Turbo/PCI

C218Turbo

> Effectively reduces CPU loading
> Drivers provided for a variety of operating systems (Windows, Linux, and Unix)
> Choose from a wide range of connection cables and boxes
> 921.6 Kbps maximum baudrate for super fast data transmission
> Provides up to 512 KB of embedded memory
> High data throughput for great performance

: Introduction

The 8-port C218Turbo RS-232 universal PCI and ISA boards come with an ASIC, RISC processor, and large I/O buffer to provide a sustained high throughput on all 8 ports simultaneously. Drivers are available for Windows, Linux, and Unix, making the boards suitable for a wide range of applications. Models are available for PCI, PCI-X, and ISA buses to provide reliable, high performance solutions for multiport serial communications.

: Specifications

Hardware
Comm. Controller: 16C550C or compatible x 8
Bus:
C218Turbo/PCI: 32-bit Universal PCI
C218Turbo: 16-bit ISA
Connector: DB62 female
Processor: TMS320BC203-57 RISC CPU
Memory: 512 KB

Serial Interface
Number of Ports: 8
Serial Standards: RS-232 (RS-422/485 with optional accessory)
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 25 KV per port with connection box Opt8S (must be purchased separately)
Optical Isolation: 500 V with connection box Opt8F (must be purchased separately)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, Linux 2.6 x86/x64, SCO Open Server 5/6, UnixWare 7, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 105 x 180 mm (4.13 x 7.09 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN61000-3-2, EN-61000-3-3, EN61000-6-1, EN61000-6-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11 (DIPS)

Power Requirements
Power Consumption:
C218Turbo/PCI: 530 mA max. @ +5 V, 110 mA max. @ +12 V, 35 mA max. @ -12 V
C218Turbo: 400 mA max. @ +5 V, 100 mA max. @ +12 V, 60 mA max. @ -12 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models

C218Turbo/PCI: 8-port RS-232 intelligent Universal PCI serial board
C218Turbo: 8-port RS-232 intelligent ISA serial board

Connection Options (can be purchased separately)

OPT8-M9
DB9 male x 8 (150 cm cable)

CBL-M62M9x8-100 (OPT8D)
DB9 male x 8 (100 cm cable)
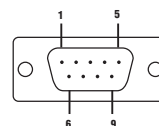
PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male

OPT8B
DB25 male x 8 (150 cm cable)

CBL-M62M25x8-100 (OPT8C)
DB25 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male

OPT8A
DB25 female x 8 (150 cm cable)

OPT8S
DB25 female x 8 (150 cm cable)
25 KV ESD Surge Protection

OPT8F/Z (RS-422)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor
(115.2 Kbps max. baudrate)
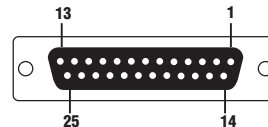
OPT8F with 500 V isolation

OPT8K (RS-422/485)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor

PIN	RS-232	PIN	RS-232
2	RxD	6	DTR
3	TxD	7	GND
4	CTS	8	DCD
5	RTS	20	DSR

PIN	RS-422/RS-485-4w	RS-485-2w
2	RxD+(B)	Data+(B)
3	TxD+(B)	–
7	GND	GND
14	RxD-(A)	Data-(A)
16	TxD-(A)	–

DB25 female

OPT8-RJ45
8-pin RJ45 x 8 (30 cm cable)

PIN	RS-232	PIN	RS-232
1	DSR	5	RxD
2	RTS	6	DCD
3	GND	7	CTS
4	TxD	8	DTR

8-pin RJ45

10

Multiport Serial Boards > C218Turbo Series

CP-118U/138U

8-port RS-232/422/485 Universal PCI serial boards

CP-118U

CP-138U

> Over 700 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000/9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
> Easy maintenance with on-board LED display, and management software
> 15 KV ESD protection on the board
> Wide temperature model available for -40 to 85°C environments

Overview

The CP-118U and CP-138U are smart, 8-port Universal PCI serial boards designed for POS and ATM applications and for use by industrial automation system manufacturers and system integrators. Both boards are compatible with all major operating systems. In addition, the CP-118U's 8 RS-232/422/485 ports and the CP-138U's

8 RS-422/485 ports support data rates up to 921.6 Kbps, and provide full modem control signals to ensure compatibility with a wide range of serial peripherals. The CP-118U and CP-138U support both 3.3V and 5V PCI buses, making them suitable for installation in most PC servers.

Drivers Provided for Windows and Linux

One of Moxa's highest priorities is to provide drivers for all mainstream operating systems. Reliable, well-tested Windows COM and Linux/Unix TTY drivers are available for use with the CP-118U and CP-138U serial

boards. Other operating systems, such as Windows XP embedded and WEPOS, are also supported to accommodate embedded integration applications.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB62 female

Serial Interface
Number of Ports: 8
Serial Standards:
CP-118U: RS-232/422/485
CP-138U: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 82 x 135 mm (3.22 x 5.31 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption:
CP-118U: 240 mA @ +5 V (RS-232), 300 mA @ +5 V (RS-422)
CP-138U: 135 mA @ +5V (RS-422)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
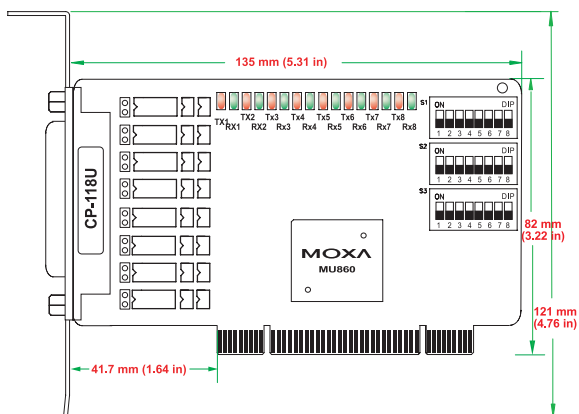
CP-118U

CP-138U
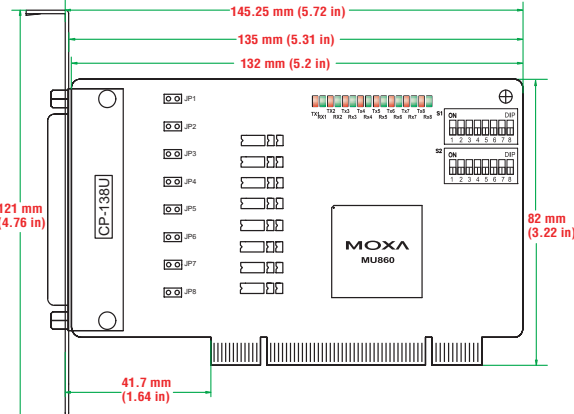
: Ordering Information

Available Models

CP-118U: 8-port RS-232/422/485 Universal PCI serial board, 0 to 55°C operating temperature
CP-138U: 8-port RS-422/485 Universal PCI serial board, 0 to 55°C operating temperature
CP-118U-T: 8-port RS-232/422/485 Universal PCI serial board, -40 to 85°C operating temperature
CP-138U-T: 8-port RS-422/485 Universal PCI serial board, -40 to 85°C operating temperature

Package Checklist

- CP-118U or CP-138U board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card
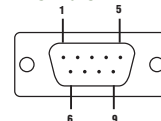
Connection Options (can be purchased separately)

OPT8-M9
DB9 male x 8 (150 cm cable)

CBL-M62M9x8-100 (OPT8D)
DB9 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male

OPT8B
DB25 male x 8 (150 cm cable)

CBL-M62M25x8-100 (OPT8C)
DB25 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male

OPT8A
DB25 female x 8 (150 cm cable)

OPT8S
DB25 female x 8 (150 cm cable)
25 KV ESD Surge Protection

OPT8F/Z (RS-422)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor
(115.2 Kbps max. baudrate)

OPT8F with 500 V isolation

OPT8K (RS-422/485)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor

PIN	RS-232	PIN	RS-232
2	RxD	6	DTR
3	TxD	7	GND
4	CTS	8	DCD
5	RTS	20	DSR

PIN	RS-422
2	RxD+(B)
3	TxD+(B)
7	GND
14	RxD-(A)
16	TxD-(A)

PIN	RS-422/RS-485-4w	RS-485-2w
2	RxD+(B)	Data+(B)
3	TxD+(B)	
7	GND	GND
14	RxD-(A)	Data-(A)
16	TxD-(A)	
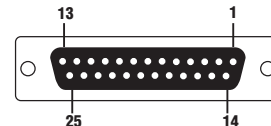
DB25 female

OPT8-RJ45
8-pin RJ45 x 8 (30 cm cable)

PIN	RS-232	PIN	RS-232
1	DSR	5	RxD
2	RTS	6	DCD
3	GND	7	CTS
4	TxD	8	DTR

8-pin RJ45
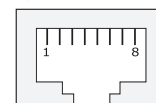
CP-118U-I/138U-I

8-port RS-232/422/485 Universal PCI serial boards with 2 KV isolation

CP-118U-I

CP-138U-I

> Over 700 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
> Easy maintenance with on-board LED display, and management software
> 15 KV ESD protection and 2 KV optical isolation on the board
> Wide temperature model available for -40 to 85°C environments

: Overview

The CP-118U-I and CP-138U-I are 8-port serial boards designed for long distance, multi-point, PC-based data acquisition applications. Industrial automation system integrators will be eager to use these boards for many of their industrial automation projects.

On-chip ADDC® for precise RS-485 communication

RS-485 communication requires precise timing control to enable and disable the line driver, and the Moxa Turbo Serial Engine™ chip that powers the CP-118U-I and CP-138U-I boards come with on-chip

ADDC® (automatic data direction control) to make RS-485 as easy to use as RS-232.

RS-485 multidrop for up to 31 devices within 1.2 km

The CP-118U-I's 8 RS-232/422/485 ports and the CP-138U-I's 8 RS-422/485 ports can achieve data rates up to 921.6 Kbps, and in RS-485 mode, one serial port can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. In addition, the 2 KV optical isolation protection on the CP-118U-I and CP-138U-I boards helps prevent equipment damage for long distance RS-485 communication.

: Top Serial Performance

With 20-plus years of experience in serial board design, Moxa is now concentrating on a new high performance serial data transmission chip. The Turbo Serial Engine™ chip provides serial boards with a 128-

byte FIFO, on-chip hardware and software flow control, and burst data mode. Thanks to the Turbo Serial Engine™, Moxa is able to offer the world's best performing smart serial boards.

: Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-118U-I and CP-138U-I boards are no exception. Reliable

Windows COM and Linux/Unix TTY drivers are provided for most Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

: Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB78 female
Serial Interface
Number of Ports: 8
Serial Standards:
CP-118U-I: RS-232/422/485
CP-138U-I: RS-422/485
Max. No. of Boards per PC: 4
Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV

Performance
Baudrate: 50 bps to 921.6 Kbps
Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS
Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support

Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7

Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics

Dimensions: 105 x 133 mm (4.13 x 5.23 in)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
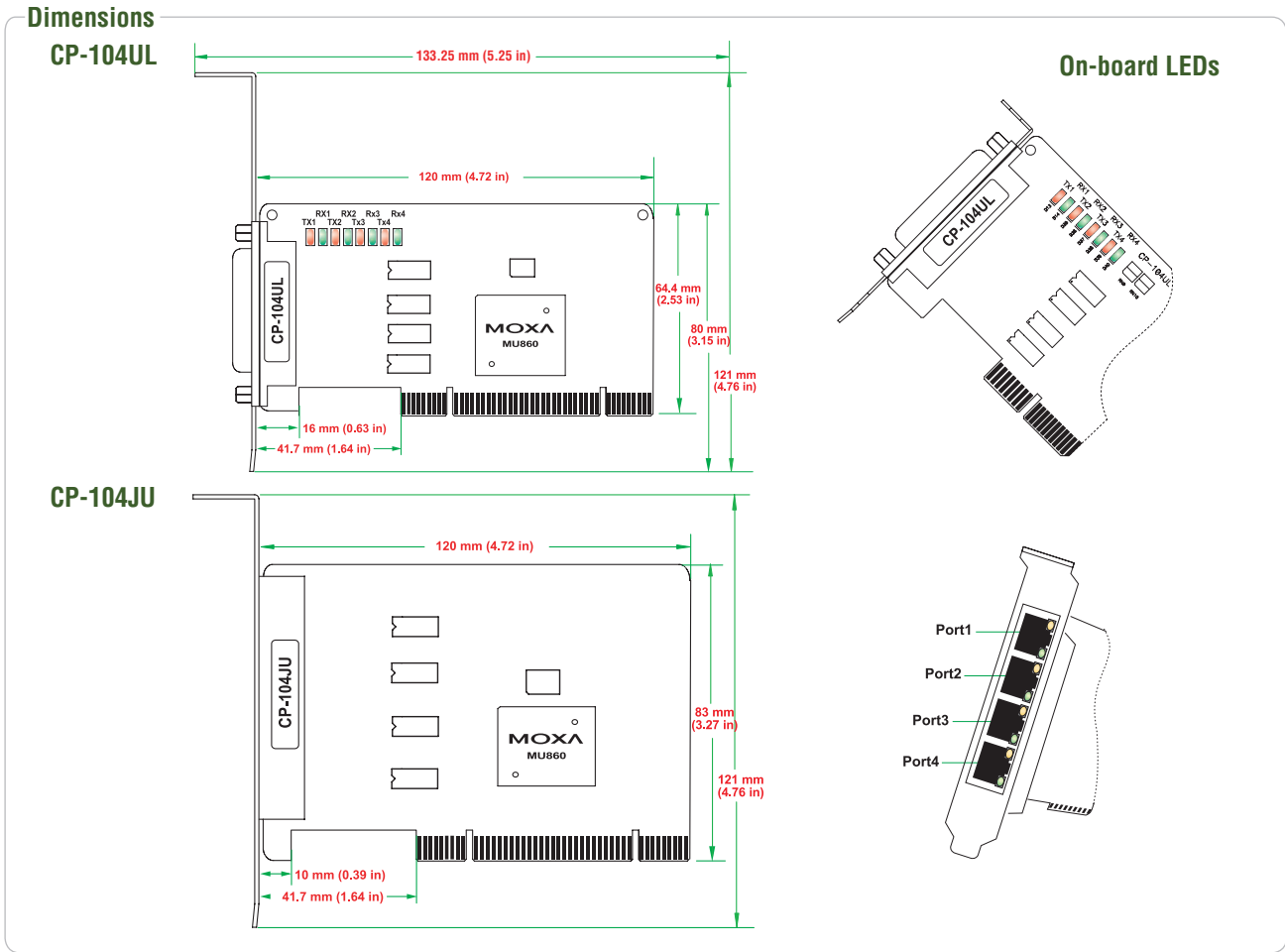
Power Consumption:
CP-118U-I: 860 mA @ +5 V
CP-138U-I: 330 mA @ +5V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CP-118U-I

CP-138U-I

Ordering Information

Available Models

CP-118U-I: 8-port RS-232/422/485 Universal PCI serial board with optical isolation, 0 to 55°C operating temperature

CP-138U: 8-port RS-422/485 Universal PCI serial board with optical isolation, 0 to 55°C operating temperature

CP-118U-I-T: 8-port RS-232/422/485 Universal PCI serial board with optical isolation, -40 to 85°C operating temperature

CP-138U-T: 8-port RS-422/485 Universal PCI serial board with optical isolation, -40 to 85°C operating temperature

Package Checklist

- CP-118U-I or CP-138U-I board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M78M9x8-100   **DB9 male**

CBL-M78M25x8-100   **DB25 male**

10

Multiport Serial Boards › CP-118U-I/138U-I
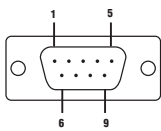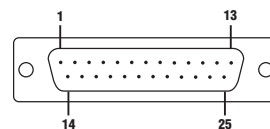
CP-168U

8-port RS-232 Universal PCI serial board

> Over 700 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Choose from a wide range of connection cables and boxes
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
> 15 KV ESD protection on the board
> Wide temperature model available for -40 to 85°C environments

: Introduction

The CP-168U is a smart, 8-port universal PCI board designed for POS and ATM applications. It is a top choice of industrial automation engineers and system integrators, and supports many different operating systems, including Windows, Linux, and even Unix. In addition, each of the board's 8 RS-232 serial ports supports a super fast 921.6 Kbps baudrate. The CP-168U provides full modem control signals to ensure compatibility with a wide range of serial peripherals, and works with both 3.3V and 5V PCI buses, allowing the board to be installed in virtually any available PC server.

: Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB62 female

Serial Interface
Number of Ports: 8
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 500 V with connection box Opt8F (must be purchased separately)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 82 x 120 mm (3.22 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)
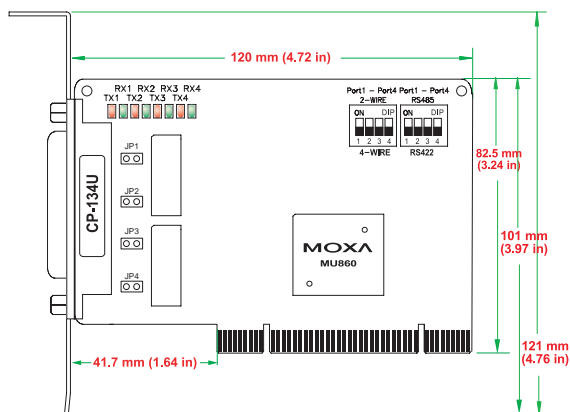
Power Requirements
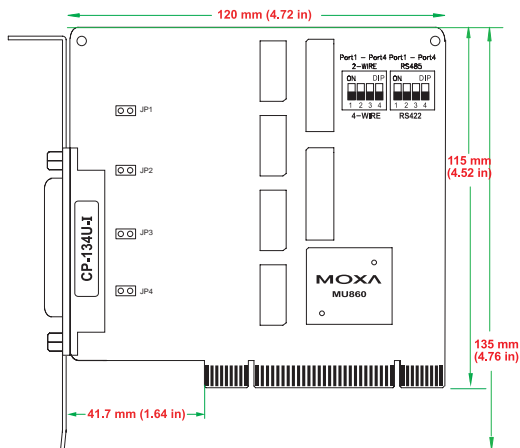**Power Consumption:** 180 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

On-board LEDs

🟧	Red--Transmit
🟩	Green--Receive
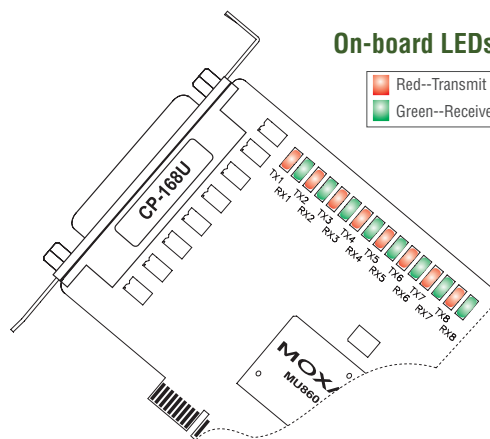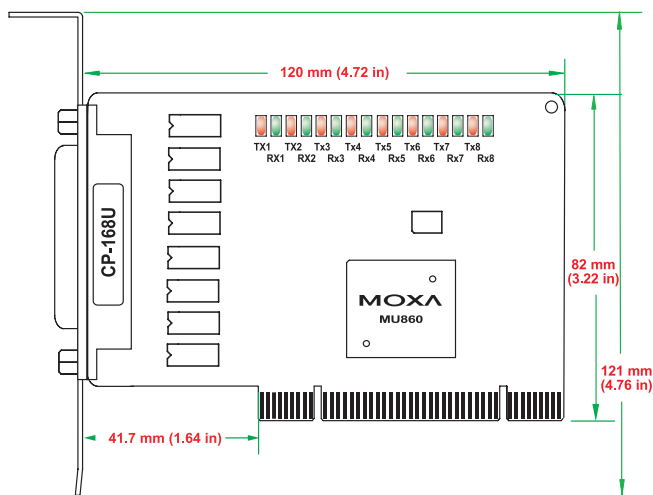
Ordering Information

Available Models

CP-168U: 8-port RS-232 Universal PCI serial board, 0 to 55°C operating temperature
CP-168U-T: 8-port RS-232 Universal PCI serial board, -40 to 85°C operating temperature

Package Checklist

- CP-168U board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

OPT8-M9
DB9 male x 8 (150 cm cable)

CBL-M62M9x8-100 (OPT8D)
DB9 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male

OPT8B
DB25 male x 8 (150 cm cable)

CBL-M62M25x8-100 (OPT8C)
DB25 male x 8 (100 cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male

OPT8A
DB25 female x 8 (150 cm cable)

OPT8S
DB25 female x 8 (150 cm cable)
25 KV ESD Surge Protection

OPT8F/Z (RS-422)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor
(115.2 Kbps max. baudrate)

OPT8F with 500 V isolation

OPT8K(RS-422/485)
DB25 female x 8 (150 cm cable)
110 or 230 VAC power adaptor

PIN	RS-232	PIN	RS-232
2	RxD	6	DTR
3	TxD	7	GND
4	CTS	8	DCD
5	RTS	20	DSR

PIN	RS-422/RS-485-4w	RS-485-2w
2	RxD+(B)	Data+(B)
3	TxD+(B)	
7	GND	GND
14	RxD-(A)	Data-(A)
16	TxD-(A)	

DB25 female

OPT8-RJ45
8-pin RJ45 x 8 (30 cm cable)

PIN	RS-232	PIN	RS-232
1	DSR	5	RxD
2	RTS	6	DCD
3	GND	7	CTS
4	TxD	8	DTR

8-pin RJ45

CP-114UL/UL-I

4-port RS-232/422/485 Universal PCI serial boards with optional 2 KV isolation

CP-114UL

CP-114UL-I

> Over 700 Kbps data throughput for top performance
> 128-byte FIFO and on-chip H/W, S/W flow control
> Universal PCI compatible with 3.3/5 V PCI and PCI-X
> Serial communication speed up to 921.6 Kbps
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Linux 2.4, Linux 2.6 (x86/x64)
> Easy maintenance with on-board LED display
> On-board 15 KV ESD and 2 KV optical isolation protection
> Wide temperature model available for -40 to 85°C environments

Overview

Moxa's CP-114UL/UL-I series of multiport serial boards are designed to be used by industrial automation system integrators for long distance, multi-point, PC-based data acquisition applications. On-chip Automatic Data Direction Control for precision RS-485 communication requires precise timing control to enable and disable the line driver. The Moxa Turbo Serial Engine™ chip that powers the CP-114UL/UL-I boards come with on-chip ADDC®, which makes RS-485 as easy to use as RS-232. In RS-485 mode, the serial port can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. For long distance RS-485 communication, 2 KV optical isolation protections are available to prevent equipment damage.

Drives Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-114UL/UL-I boards are no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB44 female

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-114UL-I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-114UL: 64.4 x 120 mm (2.53 x 4.72 in)
CP-114UL-I: 64.4 x 130 mm (2.53 x 5.12 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)
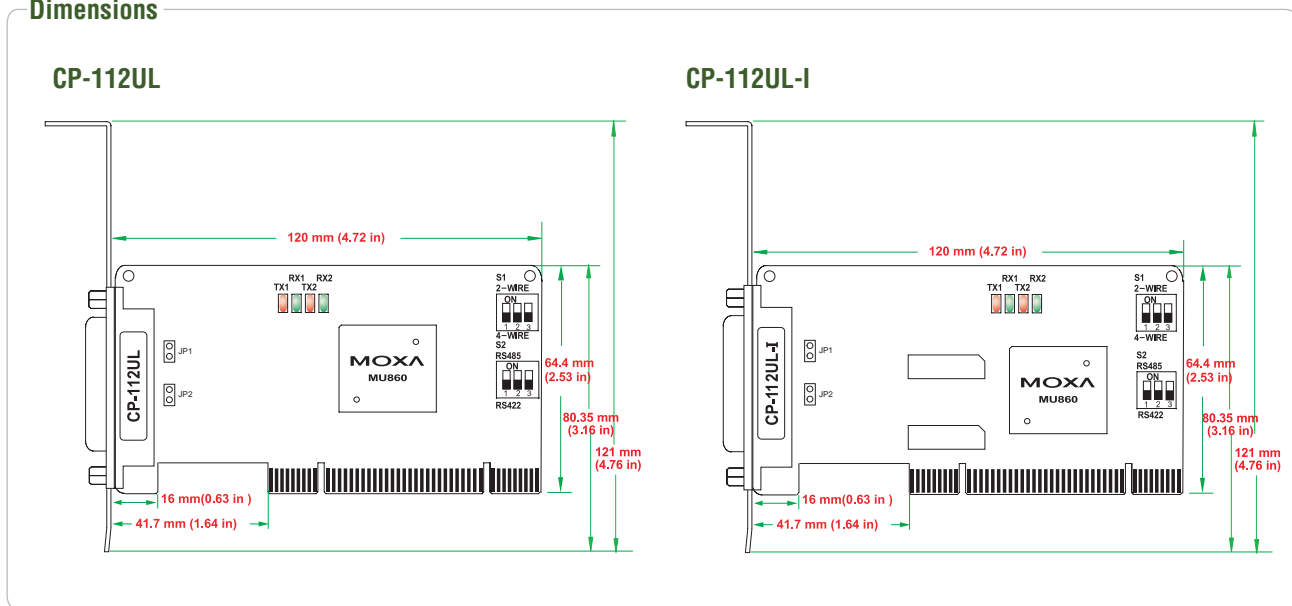
Power Requirements

Power Consumption:
CP-114UL: 320 mA @ 5 VDC
CP-114UL-I: 465 mA @ 5 VDC

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
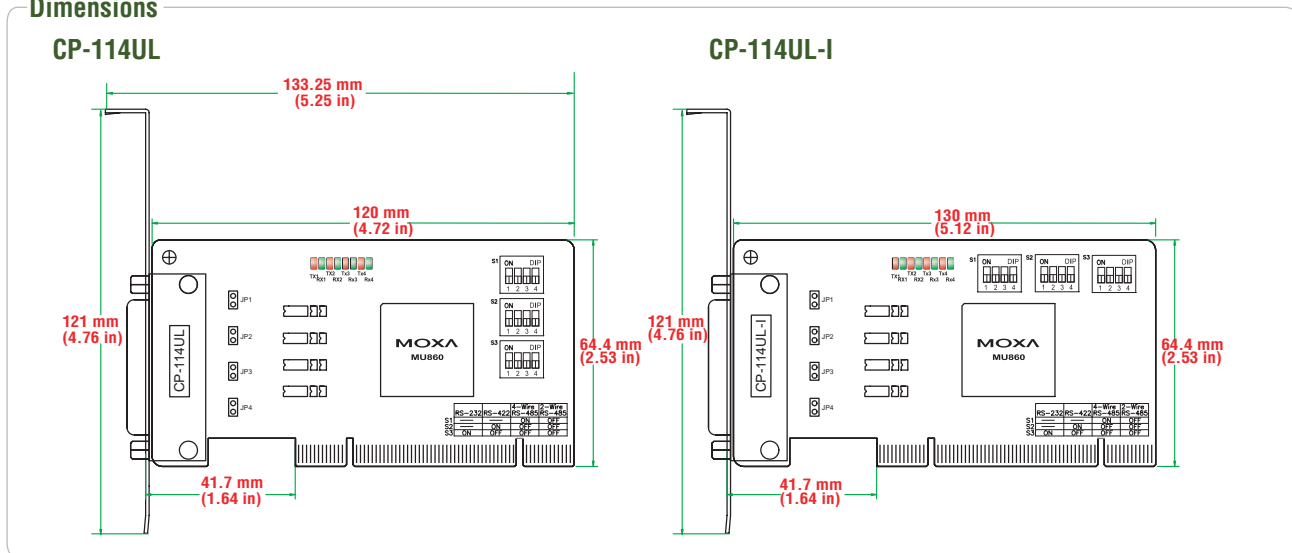
CP-114UL

CP-114UL-I

Ordering Information

Available Models

CP-114UL: 4-port RS-232/422/485 low profile Universal PCI board, 0 to 55°C operating temperature
CP-114UL-DB9M: 4-port RS-232/422/485 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB9 male cable)
CP-114UL-DB25M: 4-port RS-232/422/485 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB25 male cable)
CP-114UL-I: 4-port RS-232/422/485 low profile Universal PCI serial board with optical isolation, 0 to 55°C operating temperature
CP-114UL-I-DB9M: 4-port RS-232/422/485 low profile Universal PCI serial board with optical isolation, 0 to 55°C operating temperature (includes DB9 male cable)
CP-114UL-I-DB25M: 4-port RS-232/422/485 low profile Universal PCI serial board with optical isolation, 0 to 55°C operating temperature (includes DB25 male cable)
CP-114UL-T: 4-port RS-232/422/485 low profile Universal PCI serial board, -40 to 85°C operating temperature
CP-114UL-I-T: 4-port RS-232/422/485 low profile Universal PCI serial board with optical isolation, -40 to 85°C operating temperature

Package Checklist

- CP-114UL or CP-114UL-I board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50
DB44 male to DB9 male x 4
(50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
1	DCD	TxD-(A)	TxD-(A)	–
2	RxD	TxD+(B)	TxD+(B)	–
3	TxD	RxD+(B)	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–
9	–	–	–	–

DB9 male

CBL-M44M25x4-50
DB44 male to DB25 male x 4
(50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
2	TxD	RxD+(B)	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	TxD+(B)	–
4	RTS	–	–	–
5	CTS	–	–	–
6	DSR	–	–	–
7	GND	GND	GND	GND
8	DCD	TxD-(A)	TxD-(A)	–
20	DTR	RxD-(A)	RxD-(A)	Data-(A)
22	–	–	–	–

DB25 male

10

Multiport Serial Boards ＞ CP-114UL/UL-I

CP-104UL/JU

4-port RS-232 smart Universal PCI serial boards
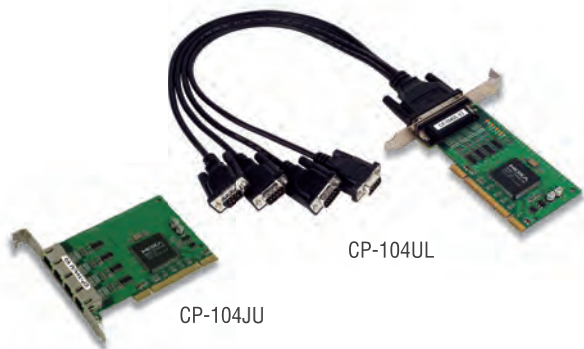
CP-104UL

CP-104JU

> Over 800 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/ x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
> 15 KV ESD protection on the board
> Wide temperature model available for -40 to 85°C environments

: Introduction

The CP-104UL and CP-104JU 4-port universal PCI boards are designed for POS and ATM applications. They are a top choice of industrial automation engineers and system integrators, and support many different operating systems, including Windows, Linux, and even Unix. In addition, each of the boards' RS-232 serial ports supports a super fast 921.6 Kbps baudrate. The CP-104UL and CP-104JU provide full modem control signals to ensure compatibility with a wide range of serial peripherals, and they work with both 3.3V and 5V PCI buses, allowing the boards to be installed in virtually any available PC server.

: Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connectors:
CP-104UL: DB44 female
CP-104JU: RJ45 x 4

Serial Interface
Number of Ports: 4
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/ Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-104UL: 64.4 x 120 mm (2.53 x 4.72 in)
CP-104JU: 83 x 120 mm (3.27 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption:
CP-104UL: 120 mA @ +5 V
CP-104JU: 135 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CP-104UL

133.25 mm (5.25 in)

120 mm (4.72 in)

RX1 RX2 Rx3 Rx4
TX1 TX2 Tx3 Tx4

CP-104UL

MOXA
MU860

64.4 mm (2.53 in)
80 mm (3.15 in)
121 mm (4.76 in)

16 mm (0.63 in)
41.7 mm (1.64 in)

On-board LEDs

CP-104UL

CP-104JU

120 mm (4.72 in)

CP-104JU

MOXA
MU860

83 mm (3.27 in)
121 mm (4.76 in)

10 mm (0.39 in)
41.7 mm (1.64 in)

Port1
Port2
Port3
Port4

Ordering Information

Available Models

CP-104UL-DB9M: 4-port RS-232 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB9 male cable)

CP-104UL-DB25M: 4-port RS-232 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB25 male cable)

CP-104JU: 4-port RS-232 Universal PCI serial board with RJ45 ports on the board, 0 to 55°C operating temperature

CP-104UL-T: 4-port RS-232 low profile Universal PCI serial board, -40 to 85°C operating temperature

CP-104JU-T: 4-port RS-232 Universal PCI serial board with RJ45 ports on the board, -40 to 85°C operating temperature

Package Checklist

- CP-104UL or CP-104JU board
- Low profile bracket (CP-104UL only)
- DB9-M or DB25-M cable included (CP-104UL only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50
DB44 male to DB9 male x 4 (50 cm cable)

CBL-RJ45M9-150
8-pin RJ45 to DB9 male (150 cm cable)

PIN	RS-232	PIN	RS-232
1	DCD	5	GND
2	RxD	6	DSR
3	TxD	7	RTS
4	DTR	8	CTS

DB9 male

1   5
6   9
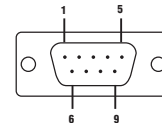
CBL-M44M25x4-50
DB44 male to DB25 male x 4 (50 cm cable)

CBL-RJ45M25-150
8-pin RJ45 to DB25 male (150-cm cable)

PIN	RS-232	PIN	RS-232
2	TxD	6	DSR
3	RxD	7	GND
4	RTS	8	DCD
5	CTS	20	DTR

DB25 male

1   13
14   25
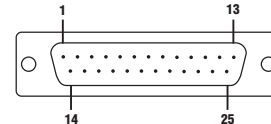
CP-134U/U-I

4-port RS-422/485 Universal PCI serial boards with optional 2 KV isolation
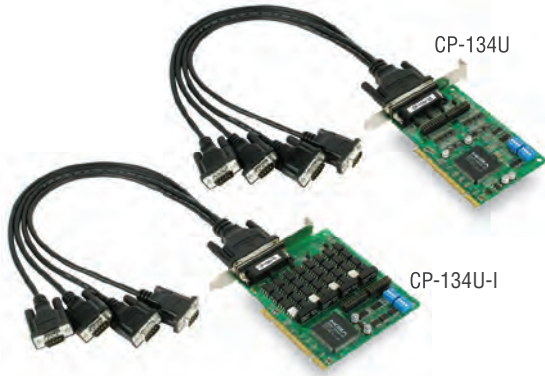
CP-134U

CP-134U-I

> Over 700 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> ADDC® provides automatic data direction control for RS-485 signals
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO OpenServer 5/6, UnixWare 7
> 15 KV ESD protection on the board
> Added bonus! Ports 1 and 2 support RS-232 and RS-422/485
> Wide temperature model available for -40 to 85°C environments

Overview

The CP-134U and CP-134U-I 4-port universal PCI boards are designed for industrial automation applications that require a long distance, multi-point, PC-based data acquisition solution.

On-chip Automatic Data Direction Control for precise RS-485 communication

RS-485 communication requires precise timing control to enable and disable the line driver. The Moxa Turbo Serial Engine™ chip that powers the CP-134U board comes with on-chip ADDC®, which makes RS-485 as easy to use as RS-232.

RS-485 multidrop for up to 31 devices within 1.2 km

The CP-134U universal PCI board has 4 RS-422/485 serial ports, each of which can achieve data rates up to 921.6 Kbps. In RS-485 mode, the board can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. For long distance RS-485 communication, choose the CP-134U-I, which comes with 2 KV optical isolation protection to prevent equipment damage.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-134U and CP-134U-I boards are no exception. Reliable

Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB44 female
Serial Interface
Number of Ports: 4
Serial Standards: 2 x RS-232/422/485, 2 x RS-422/485
Max. No. of Boards per PC: 4
Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-134U-I configured for RS-422/485 only)
Performance
Baudrate: 50 bps to 921.6 Kbps
Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.
Physical Characteristics
Dimensions:
CP-134U: 82.5 x 120 mm (3.24 x 4.72 in)
CP-134U-I: 115 x 120 mm (4.52 x 4.72 in)
Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements

**Power Consumption:**
CP-134U: 180 mA @ +5 V
CP-134U-I: 850 mA @ +5 V

Warranty

Warranty Period: 5 years
**Details:** See www.moxa.com/warranty

Dimensions

CP-134U

120 mm (4.72 in)
82.5 mm (3.24 in)
101 mm (3.97 in)
121 mm (4.76 in)
41.7 mm (1.64 in)

CP-134U-I

120 mm (4.72 in)
115 mm (4.52 in)
135 mm (4.76 in)
41.7 mm (1.64 in)

10

Multiport Serial Boards › CP-134U/U-I

Ordering Information

Available Models

CP-134U: 4-port RS-422/485 Universal PCI serial board, 0 to 55°C operating temperature
CP-134U-DB9M: 4-port RS-422/485 Universal PCI serial board, 0 to 55°C operating temperature (includes DB9 male cable)
CP-134U-DB25M: 4-port RS-422/485 Universal PCI serial board, 0 to 55°C operating temperature (includes DB25 male cable)
CP-134U-I: 4-port RS-422/485 Universal PCI serial board with optical isolation, 0 to 55°C operating temperature
CP-134U-I-DB9M: 4-port RS-422/485 Universal PCI serial board with optical isolation, 0 to 55°C operating temperature (includes DB9 male cable)
CP-134U-I-DB25M: 4-port RS-422/485 Universal PCI serial board with optical isolation, 0 to 55°C operating temperature (includes DB25 male cable)
CP-134U-T: 4-port RS-422/485 Universal PCI serial board, -40 to 85°C operating temperature
CP-134U-I-T: 4-port RS-422/485 Universal PCI serial board with optical isolation, -40 to 85°C operating temperature

Package Checklist

- CP-134U or CP-134U-I board
- DB9 or DB25 cable included
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50
DB44 male to DB9 male x 4 (50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
1	DCD	TxD-(A)	TxD-(A)	–
2	RxD	TxD+(B)	TxD+(B)	–
3	TxD	RxD+(B)	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–
9	–	–	–	–

DB9 male

1
5
6
9

CBL-M44M25x4-50
DB44 male to DB25 male x 4 (50 cm cable)

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
2	TxD	RxD+(B)	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	TxD+(B)	–
4	RTS	–	–	–
5	CTS	–	–	–
6	DSR	–	–	–
7	GND	GND	GND	GND
8	DCD	TxD-(A)	TxD-(A)	–
20	DTR	RxD-(A)	RxD-(A)	Data-(A)
22	–	–	–	–

DB25 male

1
13
14
25

CP-112UL/UL-I Series

2-port RS-232/422/485 Universal PCI serial boards with optional 2 KV isolation

CP-112UL-I

CP-112UL

> Over 700 Kbps data throughput for top performance
> 128-byte FIFO and on-chip H/W, S/W flow control
> Universal PCI compatible with 3.3/5 V PCI and PCI-X
> Serial communication speed up to 921.6 Kbps
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, Linux 2.4, and Linux 2.6 (x86/x64)
> Easy maintenance with on-board LED display
> On-board 15 KV ESD and 2 KV optical isolation protection
> Wide temperature model available for -40 to 85°C environments

Overview

Moxa's CP-112UL/UL-I series of multiport serial boards are designed to be used by industrial automation system integrators for long distance, multi-point, PC-based data acquisition applications. On-chip Automatic Data Direction Control for precision RS-485 communication requires precise timing control for enabling and disabling the line driver. Moxa's Turbo Serial Engine™ chip that powers the CP-112UL/UL-I boards comes with on-chip ADDC®, which makes RS-485 as

easy to use as RS-232. The boards come with 2 RS-422/485 serial ports, both of which can achieve data rates up to 921.6 Kbps. In RS-485 mode, the serial port can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. For long distance RS-485 communication, 2 KV optical isolation protection is available to prevent equipment damage.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-112UL/UL-I boards are no exception. Reliable Windows COM

and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB25 female

Serial Interface
Number of Ports: 2
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-112UL-I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, DOS, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 64.4 x 120 mm (2.53 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements

Power Consumption:
CP-112UL: 175 mA @ 5 VDC
CP-112UL-I: 290 mA @ 5 VDC

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

CP-112UL

CP-112UL-I

Ordering Information

Available Models

CP-112UL-DB9M: 2-port RS-232/422/485 low profile Universal PCI board, 0 to 55°C operating temperature (includes DB9 male cable)

CP-112UL-I-DB9M: 2-port RS-232/422/485 low profile Universal PCI board with optical isolation, 0 to 55°C operating temperature (includes DB9 male cable)

CP-112UL-T: 2-port RS-232/422/485 low profile Universal PCI board, -40 to 85°C operating temperature

CP-112UL-I-T: 2-port RS-232/422/485 low profile Universal PCI board with optical isolation, -40 to 85°C operating temperature

Package Checklist

- CP-112UL or CP-112UL-I board
- Low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M25M9x2-50
DB25 male to DB9 male x 2
(50 cm cable)

PIN	RS-232	RS-422	RS-485-4W	RS-485-2W
1	DCD	Txd-(A)	Txd-(A)	–
2	RxD	Txd+(B)	Txd+(B)	–
3	TxD	RxD+(B)	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	RxD-(A)	Data+(A)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–
9	–	–	–	–

DB9 male

10

Multiport Serial Boards > CP-112UL/UL-I Series

CP-102U/UL

2-port RS-232 Universal PCI serial boards
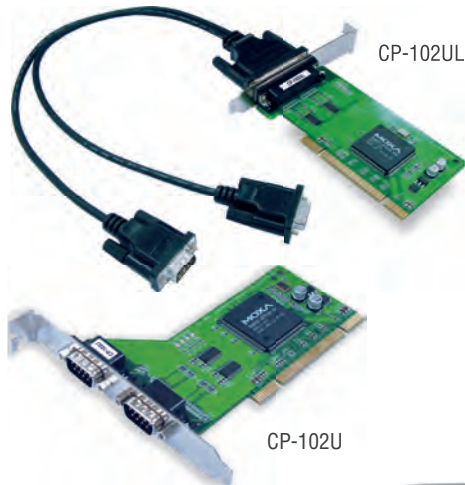
CP-102UL

CP-102U

> Over 800 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, and UnixWare 7
> 15 KV ESD protection on the board
> The CP-102UL's MD1 low profile form factor fits small-sized PCs
> Wide temperature model available for -40 to 85°C environments

Overview

The CP-102U and CP-102UL are 2-port Universal PCI boards designed for POS and ATM applications. They are a top choice of industrial automation engineers and system integrators, and support many different operating systems, including Windows, Linux, and even Unix. In addition, each of the boards' RS-232 serial ports supports a super fast 921.6 Kbps baudrate. The CP-102U and CP-102UL provide full modem control signals to ensure compatibility with a wide range of serial peripherals, and they work with both 3.3V and 5V PCI buses, allowing the boards to be installed in virtually any available PC server.

Designed for Standard and Small-sized PCs

The CP-102UL is a low profile board that only requires a 5 VDC power supply. It is compatible with both a 3.3V and 5V PCI bus, which means that the CP-102UL fits any host computer, ranging from shoebox to standard-sized PCs.

Top Serial Performance

With 20-plus years of experience in serial board design, Moxa is now concentrating on a new high performance serial data transmission chip. The Turbo Serial Engine™ chip provides serial boards with a 128- byte FIFO, on-chip hardware and software flow control, and burst data mode. Thanks to the Turbo Serial Engine™, Moxa is able to offer the world's best performing smart serial boards.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-102U/UL boards are no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connectors:
CP-102U: DB9 male x 2
CP-102UL: DB25 female

Serial Interface
Number of Ports: 2 (only one IRQ required)
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF

I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-102U: 120 x 120 mm (3.15 x 4.72 in)
CP-102UL: 64.5 x 120 mm (2.53 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption: 93 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

10

Multiport Serial Boards > CP-102U/UL

Dimensions
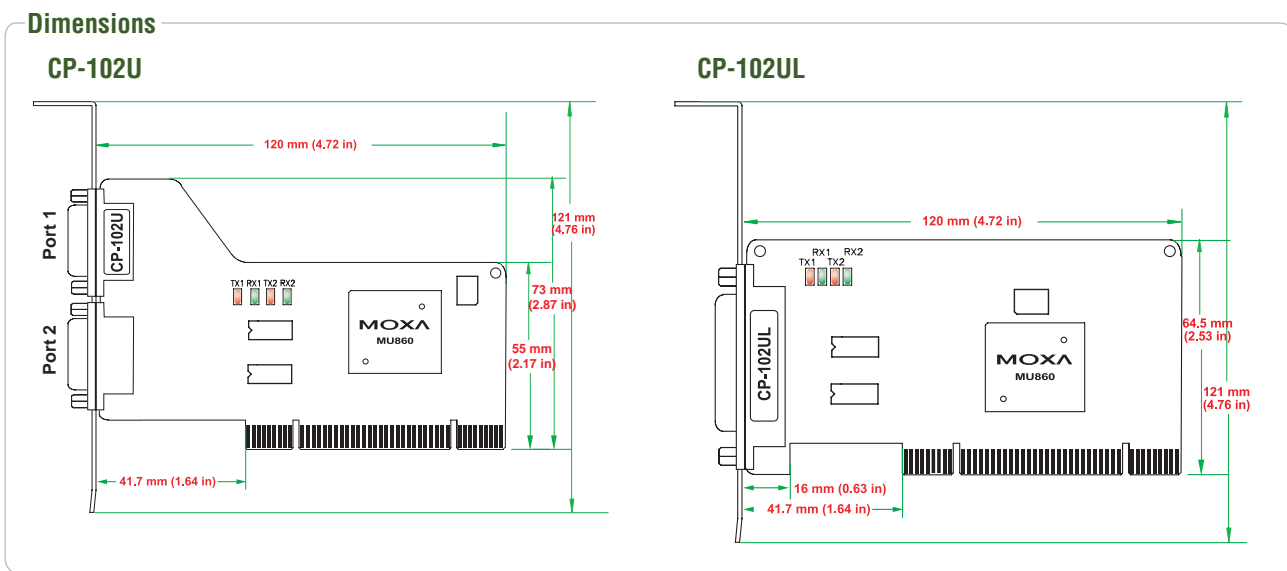
CP-102U

CP-102UL

Ordering Information

Available Models
CP-102U: 2-port RS-232 Universal PCI serial board, 0 to 55°C operating temperature
CP-102UL-DB9M: 2-port RS-232 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB9 male cable)
CP-102U-T: 2-port RS-232 Universal PCI serial board, -40 to 85°C operating temperature
CP-102UL-T: 2-port RS-232 low profile Universal PCI serial board, -40 to 85°C operating temperature

Package Checklist
- CP-102U or CP-102UL board
- Document and Software CD
- Low profile bracket (CP-102UL only)
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M25M9x2-50
DB25 male to DB9 male x 2
(50 cm cable)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

DB9 male
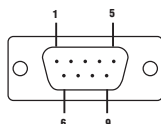
CP-132UL/UL-I

2-port RS-422/485 Universal PCI serial boards with optional 2 KV isolation
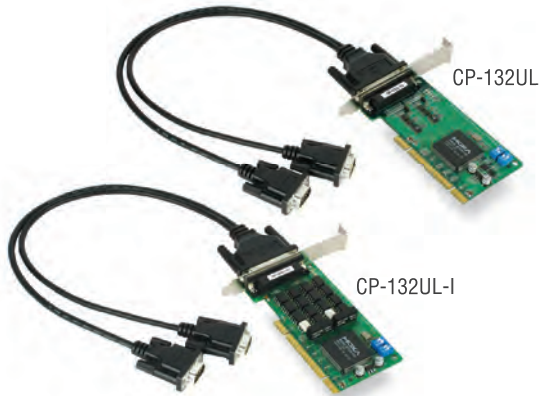
CP-132UL

CP-132UL-I

> Over 800 Kbps data throughput for top performance
> 921.6 Kbps maximum baudrate for super fast data transmission
> ADDC® provides automatic data direction control for RS-485 signals
> Transmit data up to 1.2 km with RS-422/485
> 128-byte FIFO and on-chip S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO Open Server 5/6, and UnixWare 7
> 15 KV ESD protection on the board
> MD1 low profile form factor fits small-sized PCs
> Wide temperature model available for -40 to 85°C environments

Overview

The CP-132UL and CP-132UL-I are 2-port Universal PCI boards designed for industrial automation applications that require a long distance, multi-point, PC-based data acquisition solution.

On-chip Automatic Data Direction Control for precise RS-485 communication

RS-485 communication requires precise timing control to enable and disable the line driver. Moxa's Turbo Serial Engine™ chip that powers the CP-132UL/UL-I boards comes with on-chip ADDC®, which makes RS-485 as easy to use as RS-232.

RS-485 multidrop for up to 31 devices within 1.2 km

The CP-132UL/UL-I Universal PCI boards have two RS-422/485 serial ports, both of which can achieve data rates up to 921.6 Kbps. In RS-485 mode, the boards can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km. For long distance RS-485 communication, choose the CP-132UL-I model, which comes with 2 KV optical isolation protection to prevent equipment damage.

Top Serial Performance

With 20-plus years of experience in serial board design, Moxa is now concentrating on a new high performance serial data transmission chip. The Turbo Serial Engine™ chip provides serial boards with a 128-byte FIFO, on-chip software flow control, and burst data mode. Thanks to the Turbo Serial Engine™, Moxa is able to offer the world's best performing smart serial boards.

Drivers Provided for Windows, Linux, and Unix

Moxa continues to support a wide variety of operating systems, and the CP-132UL/UL-I boards are no exception. Reliable Windows COM and Linux/Unix TTY drivers are provided for all Moxa boards, and other operating systems, such as WEPOS, are also supported for embedded integration.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB25 female

Serial Interface
Number of Ports: 2
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CP-132UL-I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark
Flow Control: XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO Open Server 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CP-132UL: 64.4 x 120 mm (2.53 x 4.72 in)
CP-132UL-I: 64.4 x 120 mm (2.53 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption:
CP-132UL: 120 mA @ +5 V
CP-132UL-I: 490 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

10

Multiport Serial Boards > CP-132UL/UL-I

Dimensions
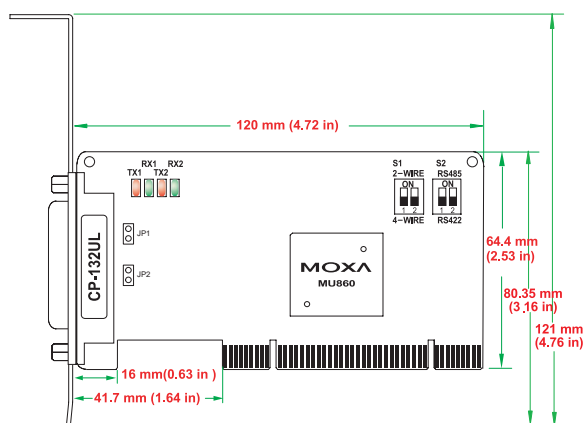
CP-132UL

CP-132UL-I
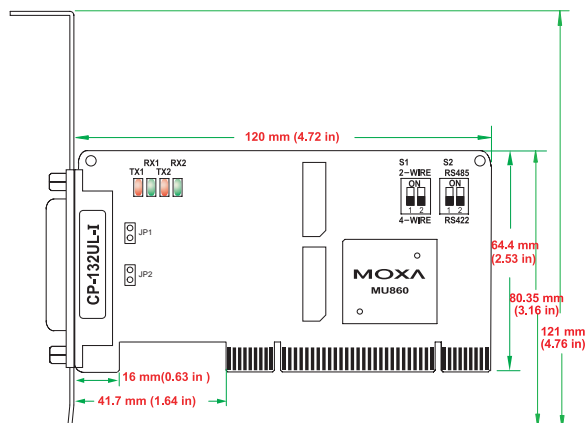
Ordering Information

Available Models

CP-132UL-DB9M: 2-port RS-422/485 low profile Universal PCI serial board, 0 to 55°C operating temperature (includes DB9 male cable)

CP-132UL-I-DB9M: 2-port RS-422/485 low profile Universal PCI serial board with optical isolation, 0 to 55°C operating temperature (includes DB9 male cable)

CP-132UL-T: 2-port RS-422/485 low profile Universal PCI serial board, -40°C to 85 operating temperature

CP-132UL-I-T: 2-port RS-422/485 low profile Universal PCI serial board with optical isolation, -40°C to 85 operating temperature

Package Checklist

- CP-132UL or CP-132UL-I board
- Low profile bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M25M9x2-50
DB25 male to DB9 male x 2
(50 cm cable)

PIN	RS-422	RS-485-4w	RS-485-2w
1	TxD-(A)	TxD-(A)	–
2	TxD+(B)	TxD+(B)	–
3	RxD+(B)	RxD+(B)	Data+(B)
4	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND
6	–	–	–
7	–	–	–
8	–	–	–
9	–	–	–

DB9 male
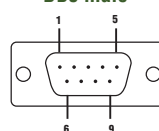
POS-104UL

4-port RS-232 Universal PCI boards with power over serial

> Over 800 Kbps data throughput, for top performance
> Power options for each port: 5V (output), 12V (output), and RI (input)
> Serial port power from bus or power supply
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> Compatible with 3.3/5V PCI and PCI-X
> Low profile board, suitable for compact-sized PCs
> Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/x64, 2000, 9X/ME/NT, Windows XP Embedded, Windows CE 5.0/6.0, DOS, Linux 2.4, Linux 2.6 (x86/x64), FreeBSD 4/5, QNX 6, SCO OpenServer 5/6, and UnixWare 7
> 15 KV ESD protection on the board
> Wide temperature model available for -40 to 85°C environments

---

: Introduction

The POS-104UL is a smart, 4-port Universal PCI serial board designed for POS and ATM applications and for use by industrial automation system manufacturers and system integrators. The POS-104UL is compatible with all major operating systems. In addition, each of the 4 RS-232 serial ports supports data rates up to 921.6 Kbps, and provides full modem control signals to ensure compatibility with a wide range of serial peripherals. The POS-104UL supplies 5 or 12 volts of power to each serial port, and works with both 3.3V and 5V PCI buses, making it suitable for installation in most PC servers.

: Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: 32-bit Universal PCI
Connector: DB44 female

Serial Interface
Number of Ports: 4
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND, RI (optional)

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows XP Embedded, Windows CE 5.0/6.0, DOS, Linux 2.4, Linux 2.6 x86/x64, FreeBSD 4/5, QNX 6, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 64.4 x 120 mm (2.53 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN61000-6-2, EN61000-6-4, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption: 145 mA @ +5 V
Power Output (per port): 1 A @ 5 V, 1 A @ 12 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
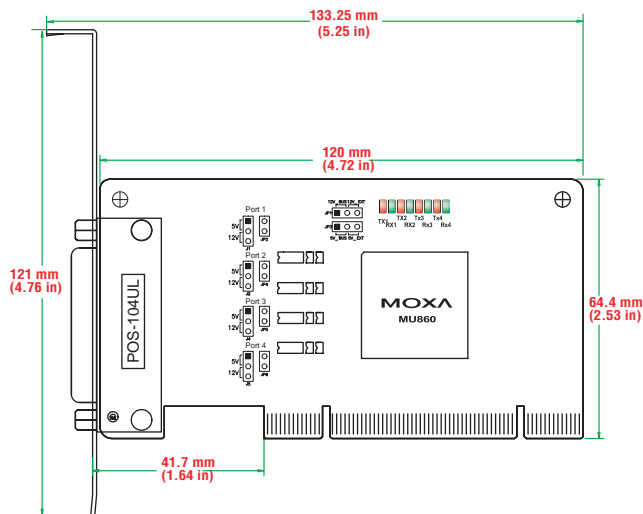
Ordering Information

Available Models

POS-104UL-DB9M: 4-port RS-232 low profile Universal PCI board with serial port power, 0 to 55°C operating temperature (DB9 male cable included)

POS-104UL-T: 4-port RS-232 low profile Universal PCI board with serial port power, -40 to 85°C operating temperature

Package Checklist

- POS-104UL board
- Low profile bracket
- DB9 male cable (POS-104UL-DB9 only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-M44M9x4-50 (POS)

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	5V/12V/RI

DB9 male

Multiport Serial Boards > POS-104UL

10
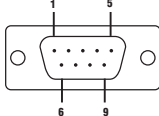
CP-102UF Series

2-port Universal PCI serial over fiber boards

> **Extend serial transmission distance up to:**
>   ▪ **40 km with single-mode (CP-102UF-S-ST)**
>   ▪ **5 km with multi-mode (CP-102UF-M-ST)**
> **Supports "Ring" and "Point-to-Point" transmission modes**
> **921.6 Kbps maximum baudrate for super fast data transmission**
> **128-byte FIFO and on-chip S/W flow control**
> **Compatible with 3.3/5V PCI and PCI-X**
> **Drivers provided for Windows 7 x86/x64, XP/2003/Vista/2008 x86/ x64, 2000, Windows XP Embedded, Windows CE 5.0/6.0, DOS, Linux 2.4, Linux 2.6 (x86/x64), QNX 6, SCO OpenServer 5/6, and UnixWare 7**
> **Easy maintenance with on-board LED display and management software**
> **Immune from signal interference**
> **Guards against electronic degradation and chemical corrosion**
> **Wide temperature model available for -40 to 85°C environments**

Overview

The CP-102UF Universal PCI boards are designed for industrial automation applications that require a long distance, multi-point, PC-based data acquisition solution. The boards are compatible with all popular operating systems, and each of the 2 serial ports support data rates up to 921.6 Kbps. In addition, the CP-102UF boards work with both 3.3V and 5V PCI buses, allowing them to be installed in virtually any available PC server. With a maximum data transmission distance

of 40 km (with the single-mode model), the CP-102UF cards beat the 15 meter maximum for RS-232, and even the 1.2 km maximum for RS-422/485. For many industrial applications, an even bigger benefit is that optical fiber isolates the data from dangerous increases in ground potential, ground loops, and electrical EMI/RFI electromagnetic radiation.

Ring Operation

With the CP-102UF board, your PC can be included as one node of a fiber ring formed using Moxa's own TCF-142 serial-to-fiber converter. Since each TCF-142 has two fiber ports and one serial port, PCs that are part of the ring will be able to communicate with all serial devices connected to the ring. Note that the Tx port of the CP-102UF connects to a neighboring converter's Rx port to form the ring. Once the ring

has been set up, simply use the DIP switches to configure the CP-102UF to "Ring mode." When one node transmits a signal, the signal travels around the ring until it returns back to the transmitting unit, which then blocks the signals. With the CP-102UF, you can set up fiber rings that are up to 100 km in total length.
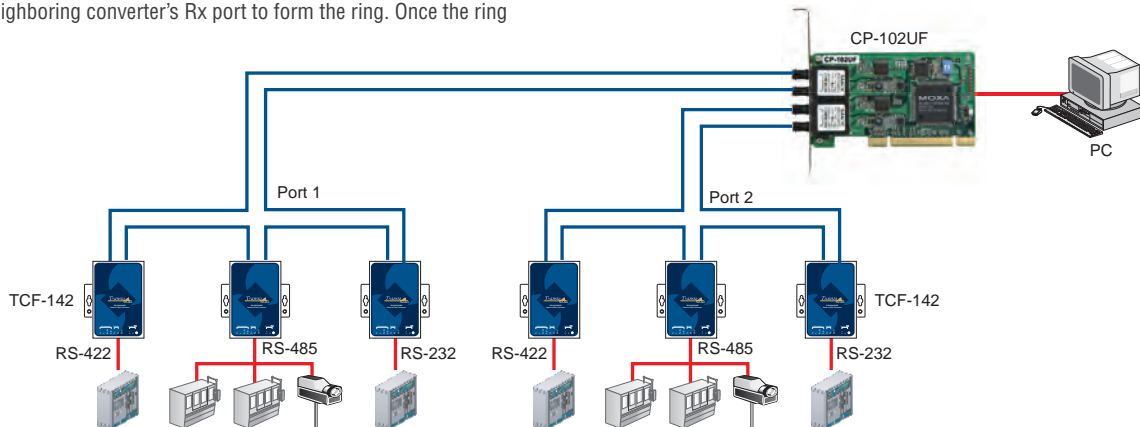
Specifications

Hardware

Bus: 32-bit Universal PCI
Number of Ports: 2
Max. Number of Boards per PC: 4

Optical Fiber Interface

Mode:
CP-102UF-M: Multi-mode
CP-102UF-S: Single-mode
Fiber Connectors: ST type
Cable Requirements:
CP-102UF-M: 50/125, 62.5/125, or 100/140 µm
CP-102UF-S: 8.3/125, 8.75/125, 9/125 or 10/140 µm
Transmission Distance:
CP-102UF-M: Up to 5 km with multi-mode fiber
CP-102UF-S: Up to 40 km with single-mode fiber
Wavelength:
CP-102UF-M: 820 nm
CP-102UF-S: 1310 nm
Tx Output: -5 dBm
Rx Sensitivity:
CP-102UF-M: -20 dBm
CP-102UF-S: -24 dBm
Point-to-Point Transmission: Half or full duplex
Ring Transmission: Half duplex

Performance

Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark
Flow Control: XON/XOFF
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS

Driver Support

Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7
x86/x64, Windows XP Embedded, DOS, Windows CE 5.0/6.0, DOS,
Linux 2.4, Linux 2.6 x86/x64, QNX 6, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.
Dimensions: 70 x 120 mm (2.76 x 4.72 in)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals

FCC: Part 15 Class B
EMS: EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, IEC
61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC
61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements

Power Consumption:
CP-102UF-M: 429 mA @ +5V
CP-102UF-S: 424 mA @ +5V

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
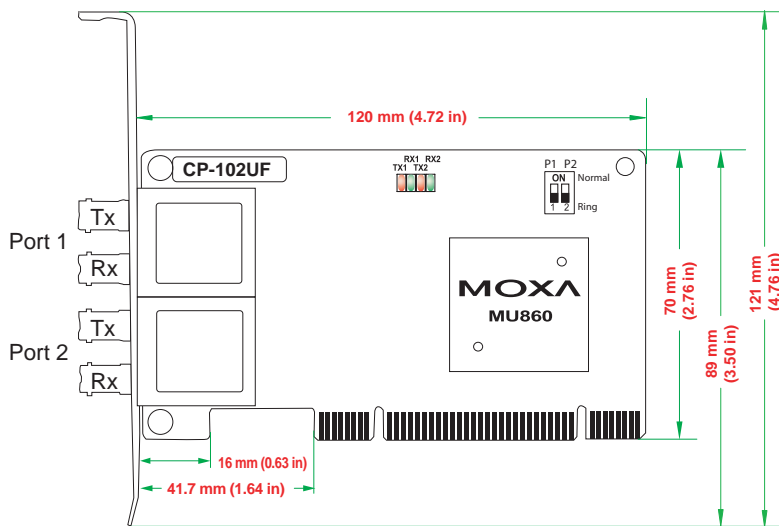
Ordering Information

Available Models

CP-102UF-M-ST: 2-port Universal PCI serial over fiber board with multi-mode fiber for 5 km
transmission (ST connector), 0 to 55°C operating temperature
CP-102UF-S-ST: 2-port Universal PCI serial over fiber board with single-mode fiber for 40 km
transmission (ST connector), 0 to 55°C operating temperature
CP-102UF-M-ST-T: 2-port Universal PCI serial over fiber board with multi-mode fiber for 5 km
transmission (ST connector), -40 to 85°C operating temperature
CP-102UF-S-ST-T: 2-port Universal PCI serial over fiber board with single-mode fiber for 40 km
transmission (ST connector), -40 to 85°C operating temperature

Package Checklist

- CP-102UF-M-ST or CP-102UF-S-ST board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Introduction to ISA

ISA, which stands for Industry Standard Architecture, is one of the original standards for PC serial boards. The original interface was developed in the early 1980s to run at an 8 Mhz speed. ISA cards were required to transmit data between the motherboard and peripheral devices in 16-bit chunks.

Since ISA boards run much more slowly than PCI boards, people buying new serial boards or designing new systems will undoubtedly choose PCI. However, many systems in use today still have ISA slots, and a wide range of ISA peripherals, such as LAN cards and sound cards, are still available on the market.
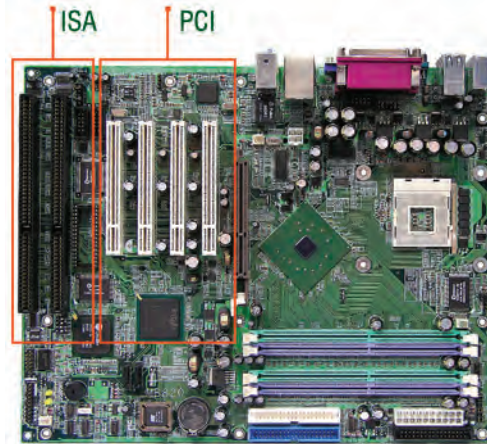
: Features of Moxa's ISA Boards

Moxa's ISA boards are smart, multiport serial I/O solutions that are used for connecting terminals, modems, printers, data acquisition equipment, and other serial devices to a PC. Both 4-port and 8-port ISA boards are available. One of the most attractive features of Moxa's ISA boards are the device drivers, which are fine-tuned to make full use of the 16-byte Tx/Rx FIFO and on-chip H/W flow control. The boards can transfer data without data loss even at speeds as high as 921.6 Kbps. Moxa's ISA boards offer a reliable and high performance solution for multiport communication applications.

Moxa's ISA boards are equipped with a custom-designed ASIC chip that combines several chips into one and results in a board that's half the size of other ISA boards. The entire family of Moxa ISA boards supports a 16-bit architecture, and a full range of I/O addresses and IRQs are available. In addition, due to the on-board EEPROM that is used for storing configuration data, the boards do not need jumpers or DIP switches. The ports on Moxa's ISA boards run independent of each other, making the boards compatible with most existing multiport boards.

: Moxa's ISA Boards are Ideal for POS and Hospitality Applications

Moxa's ISA boards are used by many of the world's top companies as part of POS (Point-Of-Sale) or POS-related systems. Moxa's products are highly successful and continue to be selected in large numbers by POS system providers.

A prime example is Delta Airlines, which uses more than 10,000 of Moxa's C168H ISA boards as part of its flight schedule display system. In addition, IBM uses thousands of Moxa's C168H ISA boards as part of their advanced MMS (Multi-Media Station) e-commerce technology that provides information about a location as well as other sales services.

Typical POS system applications are PC-based POS cash registers, PC-based kiosk machines, PC-based lottery machines, PC-based ticket vending machines, as well as any other self-service machine

connection. Since POS machines are placed at many different locations, POS system providers demand a highly reliable solution to avoid maintenance problems. Furthermore, since a large number of multiport boards are usually needed for POS projects, POS system providers are also very concerned about cost. This means that reliability and competitive price are the two key factors that POS customers consider. Moxa's ISA boards are specially designed for these POS applications, and meet customers' many needs and concerns.

Drivers are provided for use with operating systems such as Windows NT, 2000, XP, and 2003. The boards are low cost, but provide high performance, and outrank similar products from all other major multiport serial product manufacturers.

C168H/HS

8-port RS-232 ISA serial boards

> Compact ISA boards with 8 RS-232 ports
> 921.6 Kbps maximum baudrate for super fast data transmission
> 16-byte FIFO and on-chip H/W flow control
> Choose from a wide range of connection cables and boxes
> Drivers provided for Windows (2000/XP/2003/Vista/2008, 9X/ME/NT), Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), QNX 4/6, FreeBSD 4/5, SCO OpenServer 5/6, UnixWare 7, and Windows 7
> Easy configuration without switches or jumpers

RoHS   CE   FC   PComm Lite

Overview

The 8-port C168H/HS ISA boards offer users a basic, high performance multiport serial communication solution for connecting terminals, modems, printers, data acquisition equipment, and other serial devices to a PC. The boards are a top choice of industrial automation engineers and system integrators, and support many different operating systems, including Windows, Linux, and even Unix. In addition, each of the 8 RS-232 ports supports a super fast 921.6 Kbps baudrate.

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 8
Bus: 16-bit ISA
Connector: DB62 female

Serial Interface
Number of Ports: 8
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 25 KV on the board (C168HS only)
Optical Isolation: 500 V with connector Opt8F (must be purchased separately)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: 0x0000-0xFFFF (default = 0x180)
IRQ: 2 (9), 3, 4, 5, 7, 10 (default), 11, 12, 15

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6, FreeBSD 4/5, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 93 x 157 mm (3.66 x 6.18 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-4, ENV50204

Power Requirements
Power Consumption: 170 mA max. @ +5 V, 100 mA max. @ +12 V, 60 mA max. @ -12 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
C168H: 8-port RS-232 ISA serial board
C168HS: 8-port RS-232 ISA serial board with surge protection

Connection Options (can be purchased separately)
Choose from a wide selection of cables and boxes: See page 10-41 for details

Package Checklist
- C168H or C168HS board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

C104H/HS

4-port RS-232 ISA serial boards

> Cost-effective, compact ISA boards with 4 RS-232 ports
> 921.6 Kbps maximum baudrate for super fast data transmission
> 16-byte FIFO and on-chip H/W, S/W flow control
> Drivers provided for Windows (2000/XP/2003/Vista/2008, 9X/ME/NT, 3.x), Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 (x86/x64), QNX 4/6, FreeBSD 4/5, SCO OpenServer 5/6, UnixWare 7, and Windows 7
> Easy configuration without switches or jumpers

Overview

The 4-port C104H/HS ISA boards offer users an economical, high performance multiport serial communication solution for connecting terminals, modems, printers, data acquisition equipment, and other serial devices to a PC. The boards are a top choice of industrial automation engineers and system integrators, and support many different operating systems, including Windows, Linux, and even Unix. In addition, each of the 4 RS-232 ports supports a super fast 921.6 Kbps baudrate.

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 4
Bus: 16-bit ISA
Connector: DB37 female

Serial Interface
Number of Ports: 4
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 25 KV on the board (C104HS only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: 0x0000-0xFFFF (default = 0x180)
IRQ: 2 (9), 3, 4, 5, 7, 10 (default), 11, 12, 15

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/ Vista/2008/7 x86/x64, Windows 3.x, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6, FreeBSD 4/5, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 83 x 157 mm (3.27 x 6.18 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-4, ENV50204

Power Requirements
Power Consumption: 100 mA max. @ +5 V, 100 mA max. @ +12 V, 60 mA max. @ -12 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
C104H: 4-port RS-232 ISA serial board
C104H-DB9M: 4-port RS-232 ISA serial board (includes DB9 male cable)
C104H-DB25M: 4-port RS-232 ISA serial board (includes DB25 male cable)
C104HS: 4-port RS-232 ISA serial board with surge protection
C104HS-DB9M: 4-port RS-232 ISA serial board with surge protection (includes DB9 male cable)
C104HS-DB25M: 4-port RS-232 ISA serial board with surge protection (includes DB25 male cable)

Connection Options (one cable is included with each board)
CBL-M37M9x4-30: DB37 male to DB9 male x 4 connection cable, 30 cm
CBL-M37M25x4-30: DB37 male to DB25 male x 4 connection cable, 30 cm

Package Checklist
- C104H or C104HS board
- DB9 male or DB25 male connection cable
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CI-134 Series

4-port RS-422/485 ISA serial boards

> Cost-effective ISA boards with 4 RS-422/485 ports
> RS-485 data direction control with ADDC® or by RTS
> 921.6 Kbps maximum baudrate for super fast data transmission
> 16-byte FIFO and on-chip hardware flow control
> Surge protection and optical isolation available
> Built-in termination resistors

Overview

The CI-134 series ISA boards come with 4 independent RS-422/485 serial ports for connecting data acquisition equipment and other serial devices to a PC. Connect your devices over longer distances—up to 1.2 km (4000 ft)—and ensure greater reliability in industrial environments with on-board surge protection and optical isolation (available with some models). Enjoy greater versatility by using point-to-point full duplex connections, or set up a half duplex RS-485 multi-drop network.

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 4
Bus: 16-bit ISA
Connector: DB37 female

Serial Interface
Number of Ports: 4
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 25 KV on the board (CI-134IS only)
Optical Isolation: 2 KV (CI-134I/IS only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: 0x0000-0xFFFF (default = 0x180)
IRQ: 2 (9), 3, 4, 5, 7, 10 (default), 11, 12, 15

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), RTS+(B), RTS-(A), CTS+(B), CTS-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows 3.x, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, SCO Open Server 5/6, UnixWare 7, QNX 4/6, FreeBSD 4/5
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CI-134: 85 x 160 mm (3.35 x 6.30 in)
CI-134I/IS: 110 x 180 mm (4.33 x 7.09 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-4, ENV50204

Power Requirements
Power Consumption:
CI-134: 450 mA max. @ +5 V
CI-134I: 610 mA max. @ +5 V
CI-134IS: 620 mA max. @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
CI-134-DB9M: 4-port RS-422/485 ISA serial board (includes DB9 male cable)
CI-134I-DB9M: 4-port RS-422/485 ISA serial board with optical isolation (includes DB9 male cable)
CI-134IS-DB9M: 4-port RS-422/485 ISA serial board with optical isolation and surge protection (includes DB9 male cable)

Connection Options (one cable is included with each board)
CBL-M37M9x4-30: DB37 male to DB9 male x 4 connection cable, 30 cm
CBL-M37M25x4-30: DB37 male to DB25 male x 4 connection cable, 30 cm

Package Checklist
- CI-134 series board
- DB9 male or DB25 male connection cable
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CI-132 Series

2-port RS-422/485 ISA serial boards

> Economical RS-422/485 ISA boards with two DB9 male connectors on the board for easy wiring
> RS-485 data direction control with ADDC® or by RTS
> 921.6 Kbps maximum baudrate for super fast data transmission
> 16-byte FIFO and on-chip hardware flow control
> Surge protection and optical isolation available
> Built-in termination resistors

Overview

The CI-132 series ISA boards come with 2 independent RS-422/485 serial ports for connecting data acquisition equipment and other serial devices to a PC. Connect your devices over longer distances—up to 1.2 km (4000 ft)—and ensure greater reliability in industrial environments with on-board surge protection and optical isolation (available with some models). Enjoy greater versatility by using point-to-point full duplex connections, or set up a half duplex RS-485 multi-drop network.

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 2
Bus: 16-bit ISA
Connectors: DB9 male x 2

Serial Interface
Number of Ports: 2
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 25 KV on the board (CI-132IS only)
Optical Isolation: 2 KV (CI-132I/IS only)

Performance
Baudrate: 50 bps to 921.6 Kbps
Built-in Termination Resistor: 120 ohm (enabled by jumper for RS-485-2w)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: 0x0000-0xFFFF (default = 0x180)
IRQ: 2 (9), 3, 4, 5, 7, 10 (default), 11, 12, 15

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), RTS+(B), RTS-(A), CTS+(B), CTS-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

RS-485 Data Control: ADDC® (automatic data direction control), or by RTS

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6, FreeBSD 4/5, SCO OpenServer 5/6, UnixWare 7
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions:
CI-132: 75 x 157 mm (2.95 x 6.18 in)
CI-132I/IS: 105 x 157 mm (4.13 x 6.18 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-4 to 185°F)

Regulatory Approvals
FCC: Part 15 Class B
EMS: EN55022, EN61000-4-2, EN61000-4-3, EN61000-4-4, ENV50204

Power Requirements
Power Consumption:
CI-132: 240 mA max. @ +5 V
CI-132I/IS: 620 mA max. @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
CI-132: 2-port RS-422/485 ISA serial board
CI-132I: 2-port RS-422/485 ISA serial board with optical isolation
CI-132IS: 2-port RS-422/485 ISA serial board with optical isolation and surge protection

Package Checklist
- CI-132 series board
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Introduction to PC/104 and PC/104-*Plus*

Using the PC and PC/AT architectures for both desktop and non-desktop applications is now well established, but using these architectures for embedded microcomputer applications was slow to take hold. The reason is that PC and PC/AT motherboards, as well as the accompanying expansion cards, are too large to be used with embedded applications.

This is where PC/104 comes in. The PC/104 architecture differs from the P996 standard in the following ways:

- Reduced form factor: 90 x 96 mm (3.543 x 3.779 in)
- Self-stacking bus that eliminates the need for backplanes or card cages
- Reduced bus drive power required for most signals (up to 4 mA), allowing fewer components and lower power consumption (typically just 1-2 watts per module)

EBX

146 mm x 203 mm
296.4 cm^2

5.748 in x 7.992 in
45.9 in^2

EPIC

115 mm x 165 mm
189.8 cm^2

4.528 in x 6.496 in
29.4 in^2

PC/104

90 mm x 96 mm
86.4 cm^2

3.543 in x 3.779 in
13.4 in^2

The three major form factors for embedded single-board computers.

10

Multiport Serial Boards ❯ Introduction to PC/104 and PC/104-Plus

⦂ Differences between PC/104, PC/104-Plus, and PCI-104

The ISA bus architecture has been a popular choice for embedded applications for a long time, and the publication of the PC/104 standard in 1992 made the ISA bus architecture available in a small, rugged form factor. Since that time, PC/104 has become an industry standard. As technological requirements advanced, a need arose for a higher bus throughput performance. This was especially true for graphics devices and other high-speed I/O devices such as networks. The PC/104 Consortium met this challenge by incorporating a PCI bus into the PC/104 form factor. This new standard has become known as PC/104-Plus. The architecture provides a link for versatile legacy hardware, and meets the high-speed requirements for both present and future hardware.

(This content is based on information from the PC/104 Org website.)
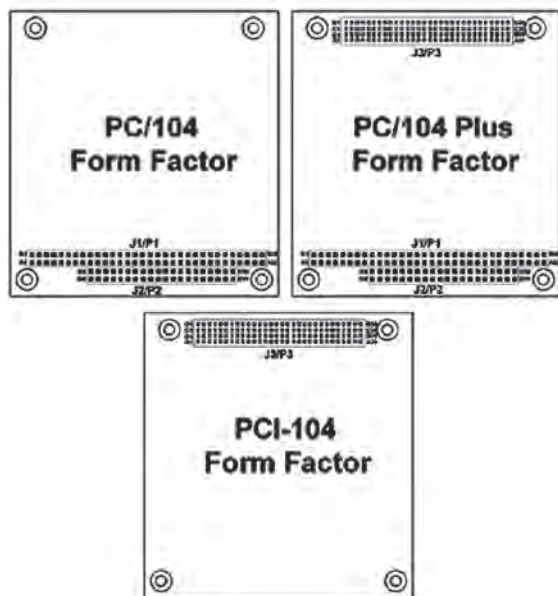
PC/104:

The PC/104 standard specifies the mechanical and electrical specifications for a compact version of the ISA (PC and PC/AT) bus, but is optimized for the unique requirements of embedded systems applications. The specification referred to here as "PC/104" is based on the 104 signal contacts on the two bus connectors (64 pins on P1, plus 40 pins on P2).

PC/104-*Plus* :

To accommodate the gradual replacement of ISA bus devices with PCI devices, the PC/104-Plus standard was approved by the PC/104 Consortium. The PC/104-Plus connector supports both ISA and PCI buses to accommodate PCI devices in small form factor embedded computers.

PCI-104:

To accommodate the gradual replacement of ISA bus devices with PCI devices, the PCI-104 standard was approved by the PC/104 Consortium. PCI-104 is a PCI-only architecture that accommodates the advances of PCI devices in a small rugged form factor.

⋮ Features of Moxa's PC/104 and PC-104-*Plus* Modules

Wide temperature for industrial applications

Industrial PCs were designed to work reliably in harsh industrial environments, and of all the features that distinguish industrial products from their commercial-grade cousins, the "wide temperature" feature is considered the most important.

Many industrial PCs now support a temperature range of -40 to 85°C, and Moxa's PC/104 and PC/104-Plus modules also support an operating temperature range of -40 to 85°C, making Moxa a leading provider of hardware for embedded systems.

Support for Windows CE 5.0 and Windows XP Embedded

Moxa's PC/104 and PC/104-Plus modules support a variety of operating systems that are used for industrial applications, including Windows CE 5.0 and Windows XP Embedded.

⋮ PC/104 Stack is Designed for Added Ruggedness

The PC/104 embedded computer standard is defined by the PC/104 Consortium, which has specified both the form factor and characteristics of the computer bus. The standard was created specifically to meet the special conditions encountered by many embedded computing applications, which require reliable data transfer in harsh, industrial-type environments.

The PC/104 stack design is one of the most recognizable differences between the PC/104 standard and PCI standard, which is the most

common standard used by PCs. Not requiring a backplane, and allowing the PC/104 boards to be stacked one on top of the other solves two major problems: several PC/104 expansion cards can be added easily to the same embedded motherboard, and the resulting structure is more stable, making it suitable for rugged environments. Stacking is achieved by using the mounting-holes in the corners of each module.

⋮ PC/104 is Designed for Embedded Applications

The PC/104 standard was developed for embedded applications, which require a smaller, more robust board. Since the main difference with standard expansion boards is size, designers can use existing software resources to reduce the time-to-market of their embedded applications.

Applications

- KIOSKs
- Vending Machines
- Instruments
- Military Equipment
- Testing Equipment
- ATMs
- POS Devices
- Industrial Control Systems

⋮ Moxa's PC/104 Module Solution

Moxa's PC/104 serial modules meet the embedded PC standard, and work with PC/104 CPU boards that accept the PC/104 expansion interface. Moxa's PC/104 modules come with 2 to 8 serial ports, built-

in 15 KV ESD protection, optional 2 KV optical isolation protection, and optional DB9 or DB25 connection cables to satisfy a variety of connection requirements.

Serial Interfae	No. of Ports	Moxa's PC/104 Models	Moxa's PC/104-Plus Models
RS-232	4	CA-104	–
	8	CA-108	CB-108
RS-422/485	2	CA-132/132I	–
	4	CA-134I	CB-134I
RS-232/422/485	4	CA-114	CB-114

CA-108 Series

8-port RS-232 PC/104 modules

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip H/W and S/W flow control
> Built-in 15 KV ESD protection
> IRQ and I/O settings are jumper and DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows CE 5.0/6.0 and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

Overview

The CA-108 PC/104 modules are reliable, high performance, multiport serial communication solutions that have 8 RS-232 ports, and can be used with PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CA-108s' versatile driver support makes the modules suitable for a wide range of applications.

Specifications

Hardware
Comm. Controller: 16C550C or compatible x 8
Bus: PC/104 bus
Connector: 40-pin box header
DIP Switches: I/O base address, interrupt vector

Serial Interface
Number of Ports: 8
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 (shared for all ports)
FIFO: 64 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
CA-108: 8-port RS-232 PC/104 module, 0 to 55°C operating temperature
CA-108-T: 8-port RS-232 PC/104 module, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CA-108 or CA-108-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CA-114 Series

4-port RS-232/422/485 PC/104 modules

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip H/W and S/W flow control
> Built-in 15 KV ESD protection
> IRQ settings, I/O settings, and serial interface are jumper and DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows CE 5.0/6.0 and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

: Overview

The CA-114 PC/104 modules are reliable, high performance, multiport serial communication solutions that have 4 RS-232/422/485 ports, and can be used with PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CA-114s' versatile driver support makes the modules suitable for a wide range of applications.

: Specifications

Hardware
Comm. Controller: 16C550C or compatible x 4
Bus: PC/104 bus
Connector: 40-pin box header
DIP Switches: I/O base address, interrupt vector, serial interface

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 (shared for all ports)
FIFO: 64 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND

RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
CA-114: 4-port RS-232/422/485 PC/104 module, 0 to 55°C operating temperature
CA-114-T: 4-port RS-232/422/485 PC/104 module, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CA-114 or CA-114-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CA-134I Series

4-port RS-422/485 PC/104 modules with 2 KV isolation

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip S/W flow control
> Built-in 15 KV ESD protection
> IRQ settings, I/O settings, and serial interface are jumper and DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows CE 5.0/6.0 and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

: Overview

The CA-134I PC/104 modules are reliable, high performance, multiport serial communication solutions that have 4 RS-422/485 ports, and can be used with PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CA-134Is' versatile driver support makes the modules suitable for a wide range of applications.

: Specifications

Hardware
Comm. Controller: 16C550C or compatible x 4
Bus: PC/104 bus
Connector: 40-pin box header
DIP Switches: I/O base address, interrupt vector, serial interface

Serial Interface
Number of Ports: 4
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 (shared for all ports)
FIFO: 64 bytes

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND

RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
CA-134I: 4-port RS-422/485 PC/104 module with optical isolation, 0 to 55°C operating temperature
CA-134I-T: 4-port RS-422/485 PC/104 module with optical isolation, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CA-134I or CA-134I-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CA-104 Series

4-port RS-232 PC/104 modules

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip software flow control
> Built-in 15 KV ESD protection
> IRQ and I/O settings are jumper and DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows CE 5.0/6.0 and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

: Overview

The CA-104 PC/104 modules are reliable, high performance, multiport serial communication solutions that have 4 RS-232 ports, and can be used with PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CA-104s' versatile driver support makes the modules suitable for a wide range of applications.

: Specifications

Hardware
Comm. Controller: 16C550C or compatible x 4
Bus: PC/104 bus
Connector: 40-pin box header
DIP Switches: I/O base address, interrupt vector

Serial Interface
Number of Ports: 4
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 (shared for all ports)
FIFO: 64 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption: 210 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
CA-104: 4-port RS-232 PC/104 module, 0 to 55°C operating temperature
CA-104-T: 4-port RS-232 PC/104 module, -40 to 85°C operating temperature
Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to male DB9 x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CA-104 or CA-104-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CA-132/132I Series

2-port RS-422/485 PC/104 modules with optional 2 KV isolation

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip software flow control
> Built-in 15 KV ESD protection
> IRQ, I/O, and serial interface jumper and DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Supports RS-485 ADDC® (Automatic Data Direction Control)
> Windows CE 5.0/6.0 and Windows XP embedded operating systems supported
> Wide temperature models available for -40 to 85°C environments

: Overview

The CA-132/132I PC/104 modules are reliable, high performance, multiport serial communication solutions that have 2 RS-422/485 ports, and can be used with PC/104 CPU boards that accept the PC/104 expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CA-132/132Is' versatile driver support makes the modules suitable for a wide range of applications.

: Specifications

Hardware
Comm. Controller: 16C550C or compatible x 2
Bus: PC/104 bus
Connector: 20-pin box header
LED Indicators: Built-in TX, RX LEDs for each port
DIP Switches: I/O base address, interrupt vector

Serial Interface
Number of Ports: 2
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV (CA-132I only)

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 (shared for all ports)
FIFO: 64 bytes

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 4/6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Power Requirements
Power Consumption:
CA-132: 155 mA @ +5 V
CA-132I: 190 mA @ +5 V

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
CA-132: 2-port RS-422/485 PC/104 module, 0 to 55°C operating temperature
CA-132I: 2-port RS-422/485 PC/104 module with optical isolation protection, 0 to 55°C operating temperature
CA-132-T: 2-port RS-422/485 PC/104 module, -40 to 85°C operating temperature
CA-132I-T: 2-port RS-422/485 PC/104 module with optical isolation protection, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F20M9x2-50: 20-pin box header to DB9 male x 2 connection cable, 50 cm
CBL-F20M25x2-50: 20-pin box header to DB25 male x 2 connection cable, 50 cm

Package Checklist
- CA-132 or CA-132I module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CB-108 Series

8-port RS-232 PC/104-Plus modules

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip H/W and S/W flow control
> Built-in 15 KV ESD protection
> Onboard Tx and Rx LED indicators for each port
> Widows (XP/Vista/7), Windows CE 5.0/6.0, and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

: Overview

The CB-108 PC/104-Plus modules come with 8 RS-232 ports, and can be used with PC/104-Plus CPU boards that accept the PC/104-Plus expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CB-108s' versatile driver support makes the modules suitable for a wide range of applications. The CB-108 modules can be used on the PC/104-Plus (PCI) bus, and provide a reliable, high performance solution for multiport serial communication.

: Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: PC/104-Plus bus
Connector: 40-pin box header

Serial Interface
Number of Ports: 8
Serial Standards: RS-232
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS
FIFO: 128 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
CB-108: 8-port RS-232 PC/104-Plus module, 0 to 55°C operating temperature
CB-108-T: 8-port RS-232 PC/104-Plus module, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CB-108 or CB-108-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CB-114 Series

4-port RS-232/422/485 PC/104-Plus modules

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip H/W and S/W flow control
> Built-in 15 KV ESD protection
> Serial interface is DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows (XP/Vista/7), Windows CE 5.0/6.0, and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

Overview

The CB-114 PC/104-Plus modules come with 4 RS-232/422/485 ports, and can be used with PC/104-Plus CPU boards that accept the PC/104-Plus expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CB-114s' versatile driver support makes the modules suitable for a wide range of applications. The CB-114 modules can be used on the PC/104-Plus (PCI) bus, and provide a reliable, high performance solution for multiport serial communication.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: PC/104-Plus bus
Connector: 40-pin box header
DIP Switches: Serial interface

Serial Interface
Number of Ports: 4
Serial Standards: RS-232/422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS
FIFO: 128 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND

RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
CB-114: 4-port RS-232/422/485 PC/104 module, 0 to 55°C operating temperature
CB-114-T: 4-port RS-232/422/485 PC/104 module, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CB-114 or CB-114-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

CB-134I Series

4-port RS-422/485 PC/104-Plus modules with 2 KV isolation

> 921.6 Kbps maximum baudrate for super fast data transmission
> On-chip S/W flow control
> Built-in 15 KV ESD protection
> Serial interface is DIP switch selectable
> Onboard Tx and Rx LED indicators for each port
> Windows XP/Vista/7, Windows CE 5.0/6.0, and Windows XP embedded operating systems supported
> Wide temperature model available for -40 to 85°C environments

Overview

The CB-134I PC/104-Plus modules come with 4 RS-422/485 ports, and can be used with PC/104-Plus CPU boards that accept the PC/104-Plus expansion interface. Optional DB9 and DB25 connection cables are available for connecting to serial devices, and the CB-134Is' versatile driver support makes the modules suitable for a wide range of applications. The CB-134I modules can be used on the PC/104-Plus (PCI) bus, and provide a reliable, high performance solution for multiport serial communication.

Specifications

Hardware
Comm. Controller: MU860 (16C550C compatible)
Bus: PC/104-Plus bus
Connector: 40-pin box header
DIP Switches: Serial interface

Serial Interface
Number of Ports: 4
Serial Standards: RS-422/485
Max. No. of Boards per PC: 4

Serial Line Protection
ESD Protection: 15 KV on the board
Optical Isolation: 2 KV

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
I/O Address: Assigned by BIOS
IRQ: Assigned by BIOS
FIFO: 128 bytes

Serial Signals
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND

RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND

Driver Support
Operating Systems: Windows 9X/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64, Windows CE 5.0/6.0, Windows XP Embedded, DOS, Linux 2.4, Linux 2.6 x86/x64, QNX 6
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Dimensions: 90 x 96 mm (3.54 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
FCC: Part 15 Class A
EMS: EN55022, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-6-2, IEC 61000-6-4, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11 (DIPS)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Ordering Information

Available Models
CA-134I: 4-port RS-422/485 PC/104 module with optical isolation, 0 to 55°C operating temperature
CA-134I-T: 4-port RS-422/485 PC/104 module with optical isolation, -40 to 85°C operating temperature

Connection Options (can be purchased separately)
CBL-F40M9x4-50: 40-pin box header to DB9 male x 4 connection cable, 50 cm
CBL-F40M25x4-50: 40-pin box header to DB25 male x 4 connection cable, 50 cm

Package Checklist
- CB-134I or CB-134I-T module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Introduction to CAN

The CAN serial bus, which was developed for the automotive industry, was introduced in 1986 as the "Automotive Serial Controller Area Network." It was soon discovered that CAN worked extremely well in other embedded systems applications, and consequently its popularity increased. The list of applications that use CAN includes weaving machines, elevator systems in large buildings, all kinds of ships, trains, aircraft, x-ray machines and other medical equipment, logging equipment, tractors and combines, coffee makers, and major appliances.

The Controller Area Network (CAN) is a serial protocol that allows multiple processors in a system to communicate with each other in an efficient manner. CAN is now the standard for high-speed, mission critical, real-time control networks for different types of machines, due to the fact that the networks are reliable, relatively simple, and inexpensive.

CAN systems are quite versatile and mechanics and technicians find it easy to repair or replace computer hardware in a CAN system, without affecting the rest of the network in any way. In addition, design engineers can easily modify existing CAN systems for other uses by adding or remove network nodes.

: The CAN Physical Layer

The CAN serial protocol covers applications that range from high speed networks to low cost multiplex wiring. Automotive electronics, engine control units, sensors, and anti-skid-systems, for example, are connected using CAN with bitrates up to 1 Mbps.

CAN signals are typically transmitted differentially through a pair of wires, since doing so greatly improves the reliability of signal transmissions even when the network is subject to low signal levels or common mode errors. The two wires are called CAN_H and CAN_L and use 120-ohm termination resistors. Many CAN systems also use twisted pair wires to reduce the effects of electromagnetic interference. CAN systems are popular since they use an inexpensive bus topology, make it easy to connect additional nodes, and are less prone to network failures.
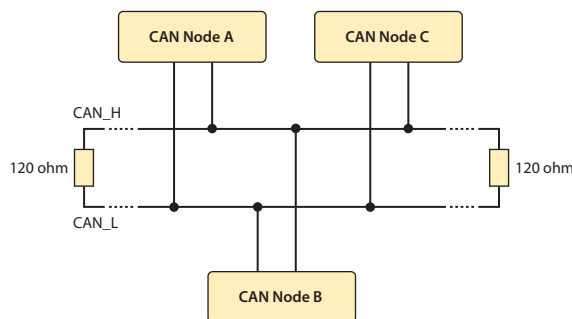
Layered Structure of a CAN Node

The specifications are designed to achieve compatibility between any two CAN implementations, where compatibility can refer to either electrical features or how transmitted data is interpreted. CAN is subdivided into different layers, as indicated in the accompanying table.

The object layer and the transfer layer comprise all services and functions of the data link layer defined by the ISO/OSI model

The physical layer specifies the physical properties for transferring bits between different nodes, and must be the same for all nodes belonging to the same network. The physical layer defines how signals are actually transmitted, but is not defined to allow transmission medium and signal level implementations to be optimized for their applications.

Application Layer
Object Layer
-Message Filtering
-Message and Status Handling
Transfer Layer
-Fault Confinement
-Error Detection and Signaling
-Message Validation
-Acknowledgement
-Arbitration
-Message Framing
-Transfer Rate and Timing
Physical Layer
-Signal Level and Bit Representation
-Transmission Medium

CP-602E-I Series

2-port CAN interface PCI Express boards with 2 KV isolation

> CAN 2.0A and CAN 2.0B supported
> Two independent CAN communication ports
> CAN transfer rate up to 1 Mbps
> 2 KV optical isolation protection
> LED for transmit/receive status on each port
> Optional 120 ohm terminal resistor for CAN bus network
> DLL library and examples included
> Windows driver provided

Overview

Moxa's new CP-602E-I CAN (Controller Area Network) interface board supports the PCI Express interface. As a stand-alone CAN controller, the CP-602E-I is a cost-effective solution that provides two active CAN controllers with a DB9 connector on the same board. The CP-602E-I CAN interface board uses the NXP SJA1000 and transceiver PCA82C251, which provide the bus arbitration and error detection. The -40 to 85°C wide operating temperature (CP-602E-I-T only) and 2 KV isolation make the boards suitable for use in harsh industrial environments.

Specifications

Hardware
Card Interface: PCI Express
Connectors: DB9 male x 2
Ports: 2
CAN Controller: NXP SJA1000
CAN Transceiver: PCA82C251
CAN Specification: CAN 2.0 A/B
Signal Support: CAN_H, CAN_L, GND
Transfer Rate: 1 Mbps
Max. Number of Boards per PC: 4
Optical Isolation: 2 KV
Termination Resistor: 120 ohm (selected by jumper)

Driver Support
Operating Systems: Windows XP/2003/Vista/2008/7 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Software
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 (x86 and x64)
Libraries: Visual Basic, C/C++

Physical Characteristics
Dimensions: 85 x 100 mm (3.35 x 3.94 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
EMS: EN61000-3-3, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11, FCC Part 15 Class B

Power Requirements
Power Consumption: 780 mA @ 5 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
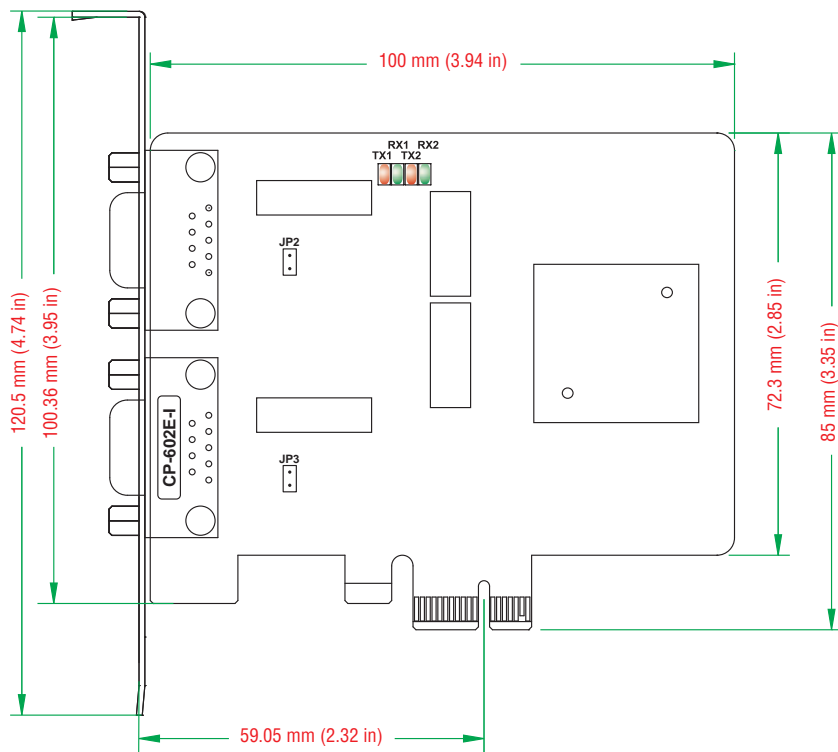
Ordering Information

Available Models

CP-602E-I: 2-port CAN interface PCI Express board, with 2 KV optical isolation protection, 0 to 55°C operating temperature

CP-602E-I-T: 2-port CAN interface PCI Express board with 2 KV optical isolation protection, -40 to 85°C operating temperature

Package Checklist

- PCI Express Board with standard bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Pin Assignment

PIN	Signal
2	CAN L
3	CAN GND
5	Shield
7	CAN H

DB9 male

10

Multiport Serial Boards > CP-602E-I Series
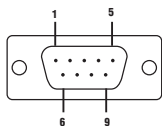
CP-602U-I Series

2-port CAN Interface Universal PCI boards with 2 KV isolation

> CAN 2.0A and CAN 2.0B supported
> Two independent CAN communication ports
> CAN transfer rate up to 1 Mbps
> 2 KV optical isolation protection
> LED for transmit/receive status on each port
> Optional 120 ohm terminal resistor for CAN bus network
> DLL library and examples included
> Windows driver provided

: Overview

Moxa's new CP-602U-I CAN (Controller Area Network) interface board supports the Universal PCI interface. As a stand-alone CAN controller, the CP-602U-I is a cost-effective solution that provides two active CAN controllers with a DB9 connector on the same board. The CP-602U-I CAN interface board uses the NXP SJA1000 and transceiver PCA82C251, which provide the bus arbitration and error detection. The -40 to 85°C wide operating temperature (CP-602U-I-T only) and 2 KV isolation make the boards suitable for use in harsh industrial environments.

: Specifications

Hardware
Card Interface: Universal PCI
Connectors: DB9 male x 2
Ports: 2
CAN Controller: NXP SJA1000
CAN Transceiver: PCA82C251
CAN Specification: CAN 2.0 A/B
Signal Support: CAN_H, CAN_L, GND
Transfer Rate: 1 Mbps
Max. Number of Boards per PC: 4
Optical Isolation: 2 KV
Termination Resistor: 120 ohm (selected by jumper)

Driver Support
Operating Systems: Windows XP/2003/Vista/2008/7 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Software
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 (x86 and x64)
Libraries: Visual Basic, C/C++

Physical Characteristics
Dimensions: 80 x 120 mm (3.15 x 4.72 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
EMS: EN61000-3-3, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11, FCC Part 15 Class B

Power Requirements
Power Consumption: 365 mA @ 5 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

120 mm (4.72 in)

120.5 mm (4.74 in)
101.07 mm (3.98 in)
72 mm (2.8 in)
80 mm (3.15 in)

CP-602U-I

58 mm (2.28 in)
106.3 mm (4.19 in)
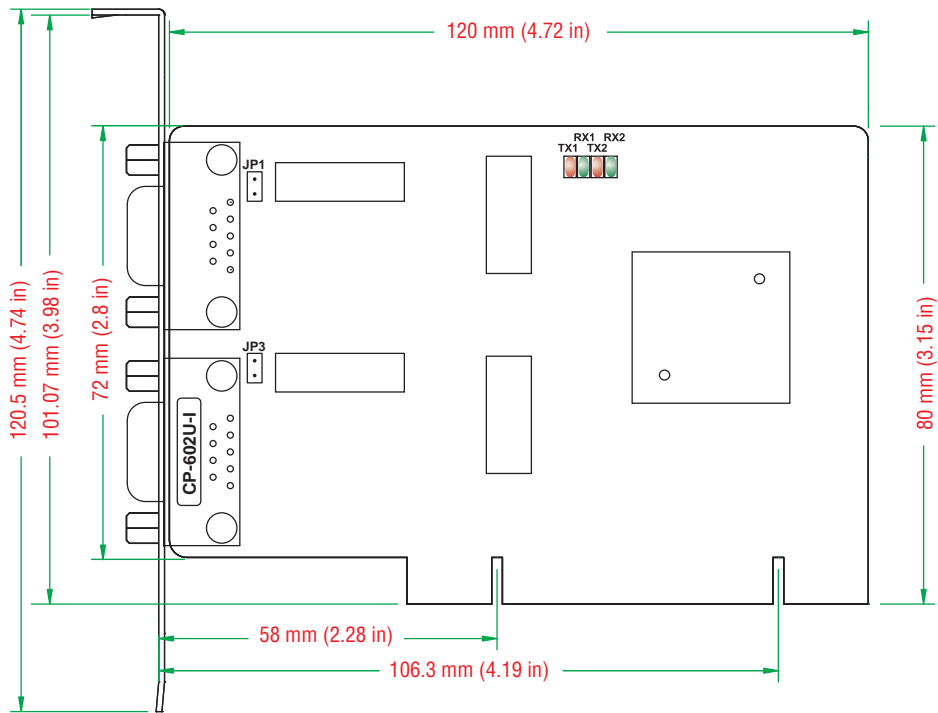
Ordering Information

Available Models

CP-602U-I: 2-port CAN interface Universal PCI board, with 2 KV isolation protection, 0 to 55°C operating temperature

CP-602U-I-T: 2-port CAN interface Universal PCI board with 2 KV optical isolation protection, -40 to 85°C operating temperature

Package Checklist

- Universal PCI Board with standard bracket
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Pin Assignment

PIN	Signal
2	CAN L
3	CAN GND
5	Shield
7	CAN H

DB9 male
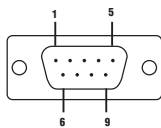
CB-602I Series

2-port CAN interface PC/104-Plus modules with 2 KV isolation

> CAN 2.0A and CAN 2.0B supported
> Two independent CAN communication ports
> CAN transfer rate up to 1 Mbps
> 2 KV optical isolation protection
> LED for transmit/receive status on each port
> Optional 120 ohm terminal resistor for CAN bus network
> DLL library and examples included
> Windows driver provided

: Overview

Moxa's new CB-602I CAN (Controller Area Network) interface board supports the PC/104-Plus interface. Optional DB9 and DB25 connection cables are available for connecting to CAN interface device. The CB-602I CAN interface board uses the NXP SJA1000 and transceiver PCA82C251, which provide the bus arbitration and error detection. The -40 to 85°C wide operating temperature (CB-602I-T only) and 2 KV isolation make the boards suitable for use in harsh industrial environments.

: Specifications

Hardware
Module Interface: PC/104-Plus bus
Connector: 20-pin box header
Ports: 2
CAN Controller: NXP SJA1000
CAN Transceiver: PCA82C251
CAN Specification: CAN 2.0 A/B
Signal Support: CAN_H, CAN_L, GND
Transfer Rate: 1 Mbps
Max. Number of Boards per PC: 4
Optical Isolation: 2 KV
Termination Resistor: 120 ohm (selected by jumper)

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Software
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 (x86 and x64)
Libraries: Visual Basic, C/C++

Physical Characteristics
Dimensions: 90 x 96 mm (3.55 x 3.78 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 55°C (32 to 131°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
EMS: EN61000-3-3, IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11, FCC Part 15 Class B

Power Requirements
Power Consumption: 380 mA @ 5 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

90.2 mm (3.55 in)

95.9 mm (3.78 in)
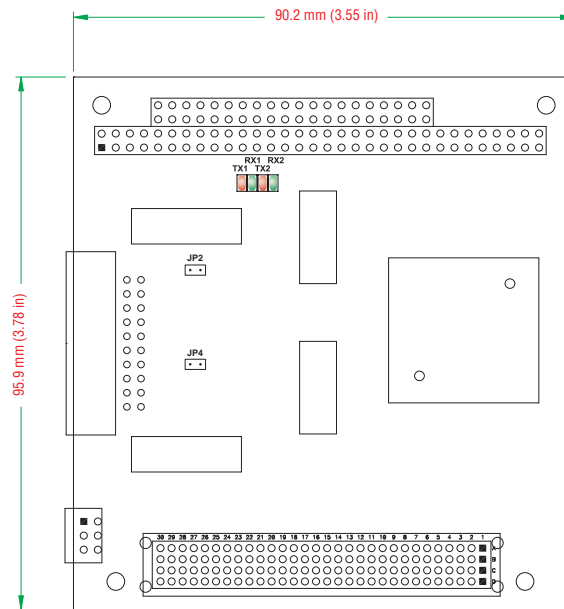
Ordering Information

Available Models

CB-602I: 2-port CAN interface PC/104-Plus module with 2 KV optical isolation protection, 0 to 55°C operating temperature

CB-602I-T: 2-port CAN interface PC/104-Plus module with 2 KV optical isolation protection, -40 to 85°C operating temperature

Package Checklist
- PC/104-Plus Module
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Connection Options (can be purchased separately)

CBL-F20M9x2-50
20-pin box header to DB9 male x 2 connection cable, 50 cm

PIN	Signal
2	CAN L
3	CAN GND
5	Shield
7	CAN H

DB9 male
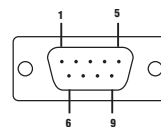
CBL-F20M25x2-50
20-pin box header to DB25 male x 2 connection cable, 50 cm

PIN	Signal
2	CAN GND
3	CAN L
4	CAN H
7	Shield

DB25 male

Multiport Serial Boards > CB-602I Series

This page intentionally left blank.

Industrial USB

USB-to-Serial Converters

	UPort® 1110	UPort® 1130 UPort® 1130I	UPort® 1150	UPort® 1150I	UPort® 1250	UPort® 1250I	UPort® 1410	UPort® 1450	UPort® 1450I
USB Interface									
Compliance	USB 1.1/2.0 compliant								
Connector	USB type A			USB type B					
Speed	12 Mbps (Full-Speed USB)			480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)					
Serial Interface									
Number of Ports	1 x RS-232	1 x RS-422/485	1 x RS-232/422/485	1 x RS-232/422/485	2 x RS-232/422/485	2 x RS-232/422/485	4 x RS-232	4 x RS-232/422/485	4 x RS-232/422/485
Connector	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	Flow Control: RTS/CTS, XON/XOFF								
FIFO	64 bytes	64 bytes	64 bytes	64 bytes	128 bytes	128 bytes	128 bytes	128 bytes	128 bytes
Baudrate	50 bps to 921.6 Kbps								
Embedded ESD Protection	15 KV								
Optical Isolation	–	2 KV (UPort 1130I)	–	2 KV	–	2 KV	–	–	2 KV
Driver Support									
Windows 98/ME	✓	✓	✓	✓	–	–	–	–	–
Windows 2000	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows XP/2003 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows Vista x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
WinCE 5.0/6.0	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux 2.4	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux 2.6 x86/x64	✓	✓	✓	✓	✓	✓	✓	✓	✓
Physical Characteristics									
Housing	ABS + PC			SECC sheet metal (1 mm), IP30 protection					
Product Weight	65 g			75 g	180 g		720 g		
Packaged Weight	200 g			370 g	370 g	680 g	1320 g		
Dimensions (mm)	38.4 x 60 x 20			52 x 80 x 22	77 x 26 x 111		204 x 30 x 125		
Environmental Limits									
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Regulatory Approvals									
EMI	FCC Part 15 Class B, EN61000-6-4				FCC, Part 15 Class A, EN61000-6-4				
Safety	–	–	–	–	UL, CUL, TÜV				
EMS	EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-2				EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-2				
Power Requirements									
Power Consumption	30 mA @ 5 VDC	90 mA @ 5 VDC	77 mA @ 5 VDC	260 mA @ 5 VDC	360 mA @ 5 VDC	200 mA @ 12 VDC	290 mA @ 5 VDC	260 mA @ 12 VDC	360 mA @ 12 VDC
Reliabilty									
Warranty	5 years (see www.moxa.com/warranty)								

USB-to-Serial Converters

	UPort® 1610-8	UPort® 1650-8	UPort® 1610-16	UPort® 1650-16	UPort® 2210	UPort® 2410
USB Interface						
Compliance	USB 1.1/2.0 compliant					
Connector	USB type B					
Speed	480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)					
Serial Interface						
Number of Ports	8 x RS-232	8 x RS-232/422/485	16 x RS-232	16 x RS-232/422/485	2 x RS-232	4 x RS-232
Connector	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male	DB9 male
Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark					
Flow Control	RTS/CTS, XON/XOFF					
FIFO	128 bytes	128 bytes	128 bytes	128 bytes	16 bytes	16 bytes
Baudrate	50 bps to 921.6 Kbps					
Embedded ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	–	–	–	–	–
Driver Support						
Windows 98/ME	–	–	–	–	–	–
Windows 2000	✓	✓	✓	✓	✓	✓
Windows XP/2003 x86/x64	✓	✓	✓	✓	✓	✓
Windows Vista x86/x64	✓	✓	✓	✓	✓	✓
Windows 2008 x86/x64	✓	✓	✓	✓	✓	✓
Windows 7 x86/x64	✓	✓	✓	✓	✓	✓
WinCE 5.0/6.0	✓	✓	✓	✓	–	–
Linux 2.4	✓	✓	✓	✓	✓	✓
Linux 2.6 x86/x64	✓	✓	✓	✓	✓	✓
Physical Characteristics						
Housing	SECC sheet metal (1 mm), IP30 protection				Polycarbonate (PC)	
Product Weight	835 g	835 g	2475 g	2475 g	120 g	210 g
Packaged Weight	1440 g	1440 g	3440 g	3440 g	325 g	455 g
Dimensions (mm)	204 x 44 x 125	204 x 44 x 125	440 x 45.5 x 198.1	440 x 45.5 x 198.1	70 x 35 x 120	80 x 35 x 185
Environmental Limits						
Operating Temperature	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C	0 to 55°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C	-20 to 70°C
Regulatory Approvals						
EMI	FCC Part 15 Class A, EN61000-6-4				FCC Part 15 Class B, EN61000-6-4	
Safety	UL, CUL, TÜV				–	
EMS	EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-2				EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-2	
Power Requirements						
Power Consumption	230 mA @ 12 VDC	340 mA @ 12 VDC	130 mA @ 100 VAC	150 mA @ 100 VAC	140 mA @ 5 VDC	240 mA @ 5 VDC
Reliabilty						
Warranty	5 years (see www.moxa.com/warranty)					

11

Industrial USB › Product Selection Guides

USB Hubs

	UPort® 404	UPort® 407	UPort® 404-T	UPort® 407-T	UPort® 204	UPort® 207
USB Interface						
Compliance	USB 1.1/2.0 compliant					
Upstream USB Ports	1 (Type B)					
Downstream USB Ports	4 (Type A)	7 (Type A)	4 (Type A)	7 (Type A)	4 (Type A)	7 (Type A)
Speed	480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)					
Supply Current	500 mA max. per channel					
Physical Characteristics						
Housing	Aluminum				Polycarbonate (PC)	
Dimensions (mm)	80 x 35 x 130	100 x 35 x 192	80 x 35 x 130	100 x 35 x 192	80 x 35 x 130	100 x 35 x 195
Environmental Limits						
Operating Temperature	0 to 60°C	0 to 60°C	-40 to 85°C	-40 to 85°C	0 to 60°C	0 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 75°C	-20 to 75°C	-40 to 85°C	-40 to 85°C	-20 to 75°C	-20 to 75°C
Regulatory Approvals						
EMI	FCC, Part 15 Class A, EN61000-6-4					
Safety	UL508, LVD					
EMS	EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, EN61000-6-2					
Power Requirements						
Power Consumption	1300 mA @ 12 VDC	2300 mA @ 12 VDC	1300 mA @ 12 VDC	2300 mA @ 12 VDC	1210 mA@ 12 VDC	2170 mA @ 12 VDC
Reliabilty						
Warranty	5 years (see www.moxa.com/warranty)					

11

Industrial USB ❯ Product Selection Guides

Introduction to USB Connectivity

Moxa's UPort® line of USB connectivity products include a wide range of solutions for connecting COM ports or USB ports to a PC through the PC's USB port. Moxa's UPort® products are designed to provide true USB 2.0 Hi-Speed 480 Mbps data transmission through each port, come with LED indicators for easy monitoring, and are even suitable for heavy-load applications. The UPort® product line includes USB-to-serial converters with 1, 2, 4, 8, or 16 independent RS-232, RS-422/485, and RS-232/422/485 serial ports for connecting data acquisition equipment and many other types of serial devices to notebooks and desktop PCs, and USB hubs with 4 or 7 USB ports for expanding the number of built-in USB ports on a host PC.

Available Products
USB-to-serial converters: UPort® 1000 and UPort® 2000 series
USB hubs: UPort® 200 and UPort® 400 series

Touch Screen Interface
Receipt Printer
Keypad
Card Reader
UPort® 404

⋮ Instant Plug & Play

UPort® products allow you to connect serial devices or USB devices to your laptop or workstation through a USB (Universal Serial Bus) port. These plug & play USB solutions are perfect for mobile, instrumentation, and point-of sale applications.

⋮ USB-IF Certified

Moxa's UPort® 200 and UPort® 400 series of USB 2.0 hubs have passed USB-IF (USB Implementers Forum) certification, which verifies that products meet a number of strict electrical requirements for Hi-Speed USB operation designed to the USB 2.0 specifications. This means that the UPort® 200/400 series support Hi-Speed USB 2.0 for up to 480 Mbps USB transmission, are fully compliant with the requirements for interoperability, provide enough power to attached devices, and can transition back to high-speed operation from the suspend state.

⋮ Reduce Short and Long Term Costs

For many applications, system integrators are moving towards using either serial-to-Ethernet or USB-to-serial products to connect serial devices to a PC. The overall costs of setting up an application is reduced, not only from a short term hardware investment perspective, but also by reducing costs associated with long term management and integration. Another big plus to using Moxa's USB-to-serial solutions is that each product supports a broad range of operating systems. Drivers are available for Windows 7 x86/x64, Windows XP/2003/Vista /2008 x86/x64, Windows 98/ME/2000, WinCE 5.0/6.0, and Linux 2.4, and Linux 2.6 x86/x64.

⋮ ESD Level 4 Protection

Electrostatic discharge (ESD) could be as severe as having more than one thousand volts of ESD with a high rise time (dv/dt) break through the junction layer of protective devices. In order to avoid serious damage, Moxa's UPort® 404/407 USB hubs provide ESD level 4 (contact 8 KV, air 15 KV) protection, which increases the quality and value of the user's end-product.

⋮ RS-232/422/485 Support

Moxa's UPort® 1000/2000 series of USB-to-serial products include models that support some or all of the RS-232/422/485 serial interfaces. The full slate of RS-232 signals (TxD, RxD, DTR, DSR, RTS, CTS, DCD) are supported, and both 2-wire and 4-wire RS-485 can be used. Many of Moxa's USB-to-serial products use DB9 male connectors for the serial ports, and for industrial applications, the DB9 female to terminal block accessory can be used. In addition, users can select baudrates up to 921.6 Kbps, and make use of the 128-byte FIFO.

⋮ Always Enough Power

Some UPort® models support both bus power and external power through the power adaptor. Bus power can be used with laptop and workstation connections that support a 500 mA output for USB devices. An external power adaptor can be used if your computer's USB port does not provide enough amperage to run the UPort®.

: Top Serial Performance

Moxa's 20-plus years of experience in serial board design is now built into a new top performance CPU called MOXA ART. This chip equips the UPort® converters with USB 2.0 (Hi-Speed 480 Mbps), a 128-byte FIFO, on-chip hardware and software flow control, and burst data mode, making Moxa's UPort® converters perform far better than the competition.

: Patented COM Preserver

Serial transmission applications use names such as COM3 and COM4 to identify COM ports. Unfortunately, most USB-to-serial products are unable to use fixed COM names on the host PC. This means that the names of the COM ports change when the USB-to-serial device is plugged into a different USB port, either on the same or a different PC, forcing the user to reconfigure the COM names manually from within the application.

Moxa's UPort® 1200/1400/1600 USB-to-serial hubs have an advanced feature that allows them to use fixed COM names. When the user enables the "COM Preserver™" function, the COM names "go with" the UPort® device. In fact, Moxa's drivers can even create the same COM port names on a different host PC. With this feature, you do not need to modify application programs, or rebuild the entire project every time you install a new operating system or upgrade the computer. Don't worry about moving the UPort® from one USB hub to another, or even from one computer to another. Once the COM Preserver™ function is enabled, the names of the USB-to-serial COM ports will go with the UPort® wherever it is used.

Note that the COM Preserver™ function is disabled by default. Users can use the traditional method of enumerating COM ports, or enable the COM Preserver™ function to make use of this great new feature.

Scenario 1
COM port assignment is maintained across different PCs

Scenario 2
COM port assignment is maintained across different USB ports
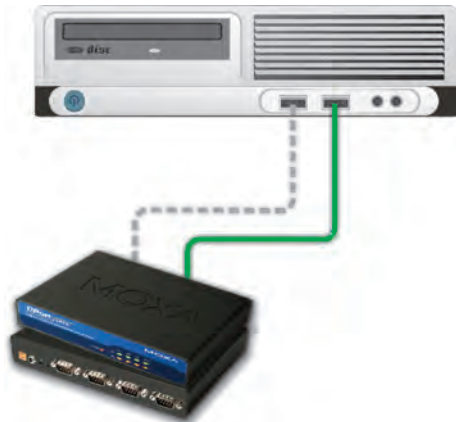
: Fixed-base COM Mode

Moxa's UPort® 1000 series, and UPort® 2000 series of products provide a unique fixed-base COM function that allows users to set a specific initial COM port number. Regardless of which UPort® is plugged into the host, the COM port numbers for the UPort®'s serial ports will be numbered sequentially starting with the initial COM port number.

For example, assume that you have set COM10 as the first COM number that will be assigned. If UPort® D1 is plugged into your computer first, your computer will assign COM10 and COM11 to the UPort®'s serial ports. When UPort® D2 is plugged in, the computer will assign COM numbers COM12 and COM13.

Scenario 3

COM10-COM11
(D1)

COM12-COM13
(D2)
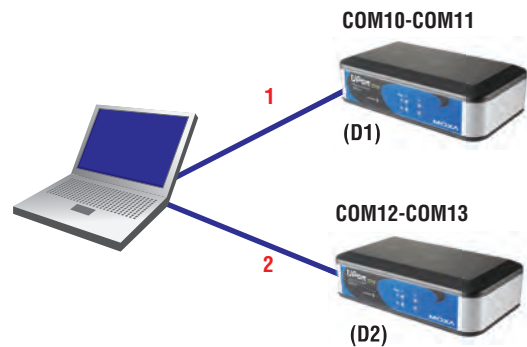
If both UPorts are unplugged from the computer, and then UPort® D2 is plugged back in, the computer will now assign COM10 and COM11 to the UPort's serial ports. When UPort® D1 is plugged back in, COM numbers COM12 and COM13 will be assigned the UPort's serial ports.

When "Fixed-base COM Mode" is enabled for the first time, all COM port numbers and serial port parameters will be reset to their default values. You can then set the COM numbers and configuration parameters to the values needed for your application.

Scenario 4

COM12-COM13

(D1)

2

COM10-COM11

1

(D2)

11

Industrial USB › Introduction to USB Connectivity
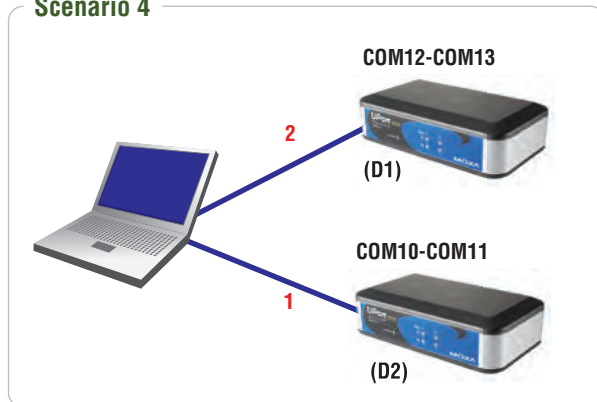
Function Support Table

Model	Fixed-based COM	COM Preserver
UPort® 1100 Series	✓	–
UPort® 1200/1400/1600 Series	✓	✓
UPort® 2000 Series	✓	–

Magnet Accessory for Attaching to PC Housing

The typical way to use a device such as the UPort® 1400/1610-8/1650-8 is to place the UPort® on the desk near the laptop or desktop PC. However, placing the UPort® in this way wastes space, and due to the nature of USB, makes it more likely that the connection between the PC and UPort® will get disconnected. The "magnet"

solution introduced by Moxa is simple, but innovative. The solution uses magnet accessories that come with the product to attach the UPort® to the host PC's housing. Not only do you save space, but you can also fix the position of the USB cable that attaches the UPort® to the PC.

COM Port Numbers Displayed in Windows System Tray

When using a UPort® to connect a serial device to your PC, it may be necessary to determine the COM port number assigned to the serial device. A new tool provided by Moxa gives engineers a handy means of monitoring the COM port number of the device. When the UPort® is plugged into your computer's USB port, a UPort® icon will be placed

in the Windows System Tray located in the lower right corner of the desktop. Simply position the cursor over the UPort® icon, and an information window showing the COM port number will pop up. When two or more UPorts are connected to the same computer, the pop-up window will show the COM numbers for all of the UPorts.

UPort® Models Listed by Interface and Number of Ports

USB-to-Serial Converters

Interface	No. of Ports	Model Name
RS-232	1	UPort® 1110
	2	UPort® 2210
	4	UPort® 1410
	4	UPort® 2410
	8	UPort® 1610-8
	16	UPort® 1610-16
RS-422/485	1	UPort® 1130/1130I
RS-232/422/485	1	UPort® 1150/1150I
	2	UPort® 1250/1250I
	4	UPort® 1450/1450I
	8	UPort® 1650-8
	16	UPort® 1650-16

USB Hubs

Interface	No. of Ports	Model Name
USB	4	UPort® 204
	4	UPort® 404
	7	UPort® 207
	7	UPort® 407
	4	UPort® 404-T
	7	UPort® 407-T

Important Considerations for USB Devices in Industrial Applications

USB (Universal Serial Bus) is the most popular interface in the IT industry today, In recent years, USB has also gained popularity in industrial applications as more and more devices support the interface. But industrial operations are more demanding than your typical office application and require additional considerations. For example, a factory floor may be subject to extreme temperatures that are too hot for a consumer-grade USB hub to handle. Industrial applications also require a higher level of reliability because system downtime is not only costly but potentially dangerous. To ensure that your USB devices meet these demands, system engineers should consider the following factors when selecting a USB device for industrial environments.

USB-IF Certification

Although any vendor can design a USB product that meets the USB specifications, the product may not have been tested for flaws. When considering which USB product to buy, you should check to make sure that the product has received USB-IF certification, and that the product is listed in the USB-IF Integrators List on the USB-IF website. Products that are certified to carry the USB logo have been tested for both reliability and interoperability.

Moxa's USB 2.0 Hubs First to Receive USB-IF Certification

Moxa's new line of industrial-grade USB hubs, the UPort® 200 and UPort® 400 series, are the world's first to receive USB-IF certification for reliable peripheral plug-and-play devices. The hubs are designed to provide true USB 2.0 Hi-Speed 480 Mbps data transmission through each port, even for heavy-load applications. As USB-IF certified products, the UPort® 200 and UPort® 400 series have passed high speed compliance testing and are eligible to bear the official USB logo.

The UPort® 200 and UPort® 400 series are external plug-and-play hubs that can be plugged into a standard USB port for instant peripheral device connectivity. For industrial networks, high reliability can never be compromised. As defined by the USB-IF (USB Implementers Forum), certification for Moxa's UPort® USB hubs guarantees:

• 480 Mbps USB 2.0 transmissions
• Device accessibility
• Full power for connected devices
• High-speed operation from suspend mode

To guard against serious damage, the UPort® 200 and UPort® 400 series have doubled their ESD protection from Level 2 (4 KV) to Level 4 (8 KV) to provide 8 KV of ESD protection for direct contact and 15 KV of ESD protection for contact through the air. Wide temperature models (UPort® 200-T and UPort® 400-T) are also available for use in extreme temperatures ranging anywhere from -40 to 85°C.

11

Industrial USB › Introduction to USB Connectivity

MOXA® www.moxa.com info@moxa.com

UPort® 1100 Series (cable-type)

1-port RS-232, RS-422/485, and RS-232/422/485 USB-to-serial converters

> Compatible with USB 2.0
> 12 Mbps USB data rate
> 921.6 Kbps maximum baudrate for super fast data transmission
> Drivers provided for Windows, WinCE, and Linux
> Mini DB9 female to terminal block adaptor for easy wiring
> LEDs for indicating USB and TxD/RxD activity
> 15 KV ESD protection for all serial ports
> 2 KV optical isolation protection (UPort® 1130I only)

Terminal Block Adaptor for
UPort® 1130/1130I/1150

⋮ Overview

The UPort® 1100 series USB-to-serial converters are the perfect accessory for laptop computers that do not have a serial port, and are essential for engineers who need to connect different serial devices in the field or separate interface converters for devices without a standard COM port or DB9 connector. The UPort® 1110 converts from USB to RS-232, the UPort® 1130/1130I from USB to RS-422/485, and the UPort® 1150 from USB to RS-232/422/485. All products are compatible with new and legacy serial devices, and can be used with mobile, instrumentation, and point-of-sale applications.

⋮ Typical Application—Surveillance Monitoring System

The most basic video surveillance setup is a single camera connected directly to a monitor and recording device. However, many businesses require video surveillance on a larger scale, which often requires a dedicated management system. These management systems are unable to include every possible type of device port, and for this reason, converters are often necessary when attaching different devices. A client that designs video surveillance systems needed USB-to-serial converters to connect devices to the management system. Their system needed to be able to connect to serial devices such as card readers, modems, video cameras, and sensors. Moxa's UPort® 1110 and UPort® 1150 USB-to-serial converters, which provide 1 RS-232 or RS-232/422/485 port for connecting devices to a PC without

needing to open the computer's chassis to install a board, fit the bill. The UPort® 1110/1150 have the following features:

• USB 2.0 compatibility
• RS-232 or RS-422/485 interface
• Stability and reliability
• Cost-effectiveness
• Plug-and-play ability
• Easy to use

In addition, a special driver allows the UPort® 1110/1150 to remember the original COM port number when the UPort® is unplugged and then re-plugged into a different USB port.
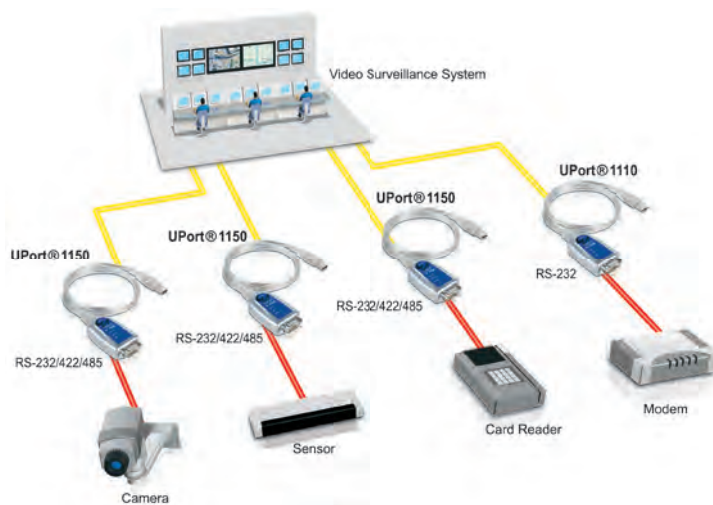
Video Surveillance System

: Specifications

USB Interface

Compliance: USB 1.0/1.1 compliant, USB 2.0 compatible
Connector: USB type A
Speed: 12 Mbps (Full-Speed USB)

Serial Interface

Number of Ports: 1
Serial Standards:
UPort® 1110: RS-232
UPort® 1130/1130I: RS-422/485
UPort® 1150: RS-232/422/485
Connector: DB9 male

Serial Line Protection

ESD Protection: 15 KV embedded
Optical Isolation: 2 KV (UPort® 1130I only)

Performance

Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 64 bytes

Serial Signals

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)

Driver Support

Operating Systems: Windows 9X/ME/2000, Windows XP/2003/Vista/2008/7 x86/x64, WinCE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics

Housing: ABS + PC
Weight:
Product only: 65 g (0.14 lb)
Packaged: 200 g (0.44 lb)

Dimensions: 38.4 x 60 x 20 mm (1.51 x 2.36 x 0.79 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 70°C (-4 to 158°F)
Regulatory Approvals: EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC-61000-4-6, IEC 61000-4-8, IEC-61000-4-11, FCC Part 15 Class B

Power Requirements

Power Consumption:
UPort® 1110: 30 mA @ 5 VDC
UPort® 1130: 60 mA @ 5 VDC
UPort® 1130I: 65 mA @ 5 VDC
UPort® 1150: 77 mA @ 5 VDC

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

60 mm (2.362 in)
20 mm (0.787 in)
38.4 mm (1.512 in)
80 mm (3.150 in)
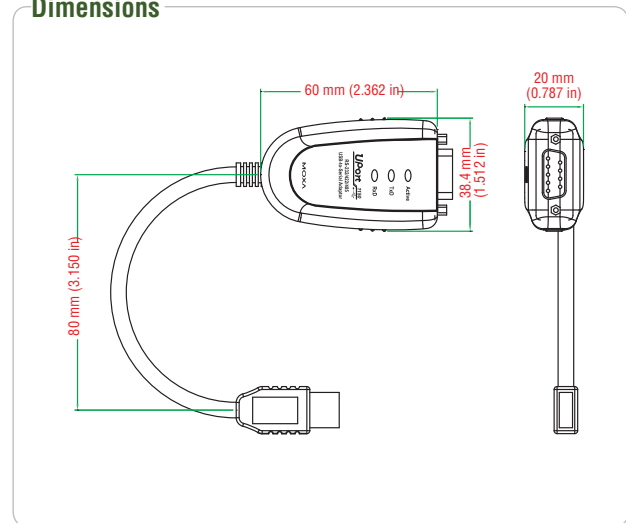
: Ordering Information

Available Models

UPort® 1110: 1-port RS-232 USB-to-serial converter
UPort® 1130: 1-port RS-422/485 USB-to-serial converter
UPort® 1130I: 1-port RS-422/485 USB-to-serial converter with 2 KV optical isolation
UPort® 1150: 1-port RS-232/422/485 USB-to-serial converter

Package Checklist

- UPort® 1110 or 1130 or 1130I or 1150 USB-to-serial converter
- 1 mini DB9 female to terminal block adaptor (UPort® 1130, 1130I, and 1150 only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

UPort® 1150I

1-port RS-232/422/485 USB-to-serial converter with 2 KV isolation

> Compatible with USB 2.0
> 12 Mbps USB data rate
> 15N high retention USB type B connector
> Software selectable RS-232, RS-422, 4-wire RS-485, and 2-wire RS-485
> Drivers provided for Windows, WinCE, and Linux
> 15 KV ESD protection for all serial ports
> 2 KV optical isolation protection
> Full modem status LEDs

Overview

The UPort® 1150I is a USB-to-serial converter with one 3-in-1 RS-232/422/485 serial port, transmission speed up to 921.6 Kbps, and 15 KV ESD protection. For industrial and commercial applications that require enhanced reliability, it is also equipped with 2 KV DC optical isolation protection, providing PCs with both COM port expansion and protection from potentially damaging electrical spikes. Adjustable RS-485 pull high/low resistors are built in for daisy-chained RS-485 networks, allowing engineers to connect to any serial device quickly and easily.

Typical Application—Mini Testers

Many engineers use a combination of USB-to-serial converter plus mini tester to check serial device connections during routine inspections. However, mini testers are inconvenient to use, particularly when you need to connect directly through a device's DB9 connector, and purchasing mini testers for all inspectors in a factory increases the overall operating expense. To get around these problems, Moxa designed the UPort® 1150I, which is an external USB-to-serial converter with 1 RS-232/422/485 DB9 connector and a built-in mini tester. The UPort® 1150I has the following features:

• USB 2.0 compatibility
• RS-232 and RS-422/485 interfaces
• Built-in mini tester function
• Built-in modem status LED indicators for easy diagnosis
• Competitive pricing

Specifications

USB Interface
Compliance: USB 1.0/1.1 compliant, USB 2.0 compatible
Connector: USB type B
Speed: 12 Mbps (Full-Speed USB)

Serial Interface
Number of Ports: 1
Serial Standards: RS-232/422/485
Connector: DB9 male

Serial Line Protection
ESD Protection: 15 KV embedded
Optical Isolation: 2 KV

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 64 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)

Driver Support
Operating Systems: Windows 9X/ME/2000, Windows XP/2003/Vista/2008/7 x86/x64, WinCE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Housing: SECC sheet metal (1 mm), IP30 protection
Weight:
Product only: 75 g (0.65 lb)
Packaged: 320 g (0.72 lb)
Dimensions: 52 x 80 x 22 mm (2.05 x 3.15 x 0.87 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 70°C (-4 to 158°F)
Regulatory Approvals: EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC-61000-4-6, IEC 61000-4-8, IEC-61000-4-11, FCC Part 15 Class B

Power Requirements
Power Consumption: 260 mA @ 5 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
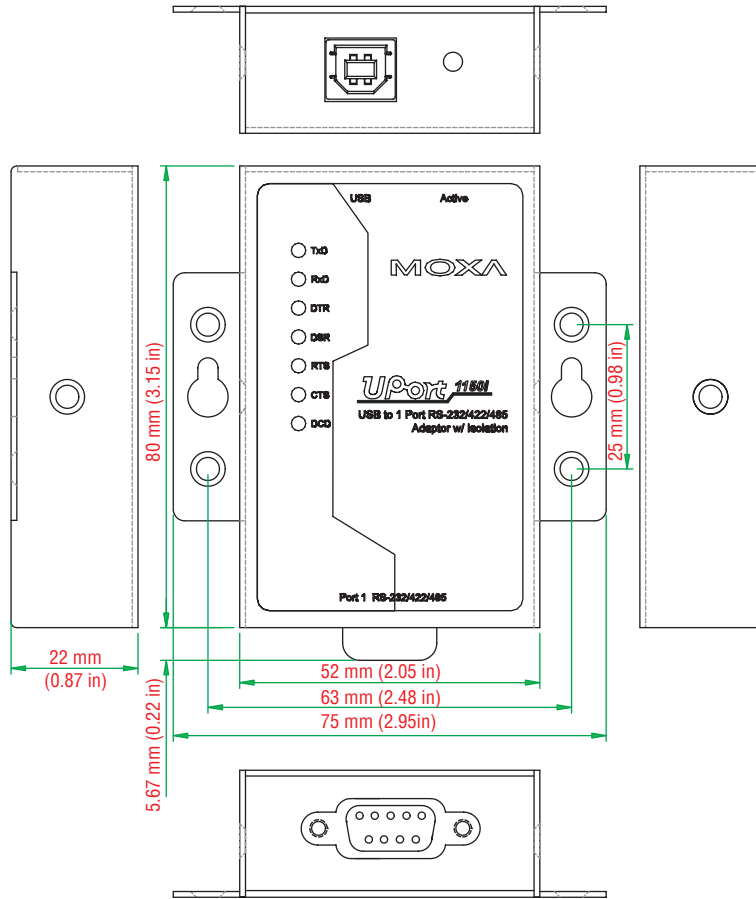
Ordering Information

Available Models
UPort® 1150I: 1-port RS-232/422/485 USB-to-serial converter with 2 KV optical isolation

Optional Accessories (can be purchased separately)
DK35A: Mounting kit for 35-mm DIN-Rail

Package Checklist
- UPort® 1150I USB-to-serial converter
- USB-IF certified cable
- 1 mini DB9 female to terminal block adaptor
- Velcro lock-down strap for the USB cable
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

Industrial USB > UPort® 1150I

UPort® 1250/1250I

2-port RS-232/422/485 USB-to-serial converters with optional 2 KV isolation

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> 921.6 Kbps maximum baudrate for super fast data transmission
> 128-byte FIFO and on-chip H/W, S/W flow control
> 15N high retention type B connector
> Drivers provided for Windows, WinCE, and Linux
> LEDs for easy monitoring
> 15 KV ESD protection for all serial ports
> Locking power cord for the UPort® 1250I

UPort® 1250

UPort® 1250I

Overview

The UPort® 1250/1250I USB-to-serial converters allow you to connect 2 RS-232/422/485 devices to your laptop or workstation through the USB (Universal Serial Bus) port. These plug & play USB solutions are perfect for mobile, instrumentation, and point-of sale applications.

Typical Application—Connecting Instruments in a Medical Lab

In medical labs, research scientists typically collect large quantities of data from many samples using a variety of different instruments. Most research devices have parameters that can be accessed via a serial port for convenient reconfiguration. Laptops are often used as convenient and space-efficient computing solutions in medical labs, but most modern laptops no longer offer serial ports and only come equipped with USB ports. This presents a connectivity issue unless the USB ports can be expanded into serial ports.

Moxa's solution is the UPort® 1250, which is an RS-232/422/485 USB-to-serial converter that can be used to connect 2 serial interface

instruments to a computer's USB port, and is particularly convenient for medical researchers since advanced technical expertise is not required. The UPort® 1250 has the following features:

• 2 serial ports for easy USB-to-serial expansion
• True USB 2.0 high-speed transmission
• 128-byte FIFO and on-chip hardware and software flow control to ensure stable data transmission
• Easy troubleshooting with LED indicators for each serial port
• Compatible with both laptops and desktop PCs

Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Connector: USB type B
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)
Serial Interface
Number of Ports: 2
Serial Standards: RS-232/422/485
Connector: DB9 male
Serial Line Protection
ESD Protection: 15 KV embedded
Optical Isolation: 2 KV (UPort® 1250I only)
Performance
Baudrate: 50 bps to 921.6 Kbps (including 500 Kbps)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 128 bytes
Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)
Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, Win CE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics

Housing: SECC sheet metal (1 mm), IP30 protection
Weight:
Product only: 180 g (0.40 lb)
Packaged:
UPort® 1250: 370 g (0.82 lb)
UPort® 1250I: 680 g (1.5 lb)
Dimensions: 77 x 26 x 111 mm (3.03 x 1.02 x 4.37 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class A, UL, CUL, TÜV

Power Requirements

Power Consumption:
UPort® 1250 (bus power): 360 mA @ 5 VDC
UPort® 1250I (12 to 48 VDC external power): 200 mA @ 12 VDC

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

UPort® 1250

77 mm (3.031 in)   26 mm (1.024 in)
111 mm (4.370 in)
5.3 mm (0.209 in)

UPort® 1250I

3.84 mm (0.151 in)
77 mm (3.031 in)   26 mm (1.024 in)
111 mm (4.370 in)
5.3 mm (0.209 in)
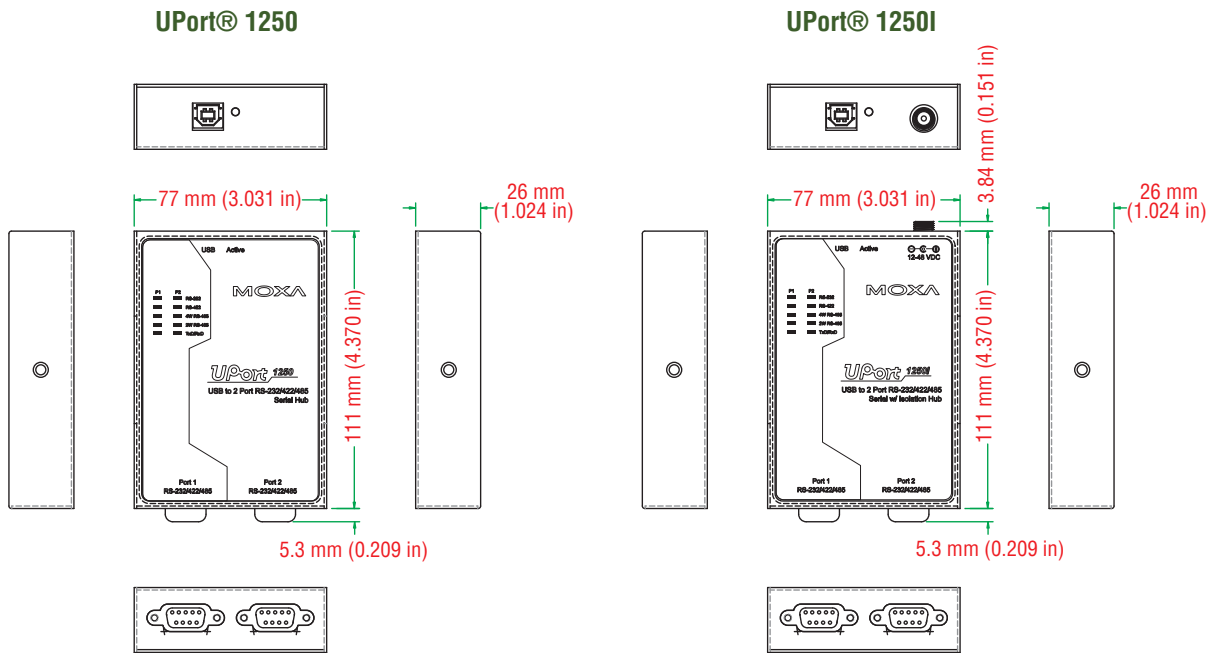
:: Ordering Information

Available Models

UPort® 1250: 2-port RS-232/422/485 USB-to-serial converter
UPort® 1250I: 2-port RS-232/422/485 USB-to-serial converter with 2 KV optical isolation, adaptor included

Optional Accessories (can be purchased separately)

Mini DB9F-to-TB Adaptor: DB9 female to terminal block adaptor for RS-422/485 applications
Wall Mount Kit: Metal plates and screws
DK35A: Mounting kit for 35-mm DIN-Rail

Package Checklist

- UPort® 1250 or 1250I USB-to-serial converter
- USB-IF certified cable
- 1 mini DB9 female to terminal block adaptor
- Power adaptor (UPort® 1250I)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

UPort® 1400 Series

4-port RS-232 and RS-232/422/485 USB-to-serial converters with optional 2 KV isolation

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> 921.6 Kbps maximum baudrate for super fast data transmission
> 15N high retention USB type B connector
> 128-byte FIFO and on-chip H/W, S/W flow control
> Built-in 15 KV ESD protection for all serial ports
> 2 KV optical isolation protection (UPort® 1450I only)
> IP30-rated, rugged metal housing
> COM port assignments maintained across different PCs
> Drivers provided for Windows, WinCE, and Linux
> Choose bus power or external power (UPort® 1410/1450 only)
> Locking power cord

11

Industrial USB › UPort® 1400 Series

: Overview

The UPort® 1400 USB-to-serial converters allow you to connect 4 RS-232 or RS-232/422/485 devices to your laptop or workstation through the USB (Universal Serial Bus) port. The UPort® 1400 converters are compatible with new and legacy serial devices, and are perfect for mobile, instrumentation, and point-of-sale applications.

: Typical Application—Military Satellite Truck

Before the arrival of mobile satellite technology, military applications relied on terrestrial communication systems to collect data in remote locations and broadcast the signals to a geostationary communications satellite. Satellite trucks, which are commonly used in modern Satellite News Gathering (SNG), allow military command centers to gather intelligence and other data with greater mobility and flexibility than before. Due to the mobile nature of SNG technology, onboard data acquisition equipment needs to be highly portable yet provide seamless and reliable communication. In addition, satellite trucks are outfitted with various degrees of video production and editing gear that need to be readily available and connected at all times. One of our military clients uses Moxa's UPort® 1450 converter as their solution of choice for reliable device connectivity in their fleet of satellite trucks. The UPort® 1450 has the following features:

• No data loss with 128-byte FIFO and on-chip flow control for hardware and software
• Electrostatic protection and LED indicators designed for critical environments
• Small form factor and wall-mountable to save space
• Easy COM port configuration and plug & play capability
• 3-in-1 RS-232/422/485 support for connecting any serial interface device
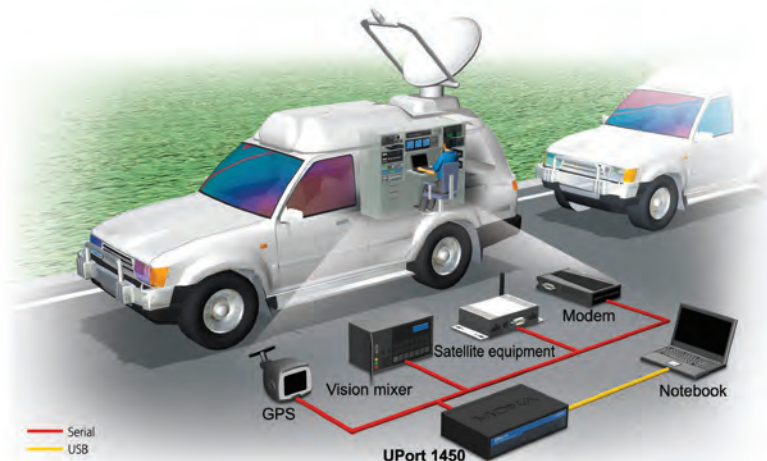
: Specifications

USB Interface

Compliance: USB 1.1/2.0 compliant
Connector: USB type B
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)

Serial Interface

Number of Ports: 4
Serial Standards:
UPort® 1410: RS-232
UPort® 1450/1450I: RS-232/422/485
Connector: DB9 male

Serial Line Protection

ESD Protection: 15 KV embedded
Optical Isolation: 2 KV (UPort® 1450I only)

Performance

Baudrate: 50 bps to 921.6 Kbps (including 500 Kbps)

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 128 bytes

Serial Signals

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)

Driver Support

Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, WinCE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics

Housing: SECC sheet metal (1 mm), IP30 protection
Weight:
Product only: 720 g (1.59 lb)
Packaged: 1320 g (2.91 lb)
Dimensions: 204 x 30 x 125 mm (8.03 x 1.18 x 4.92 in)

Environmental Limits

Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, FCC Part 15 Class A, UL, CUL, TÜV

Power Requirements

Power Consumption:
• Bus power:
  UPort® 1410: 180 mA @ 5 VDC
• 12 to 48 VDC external power:
  UPort® 1410: 180 mA @ 12 VDC
  UPort® 1450: 260 mA @ 12 VDC
  UPort® 1450I: 360 mA @ 12 VDC

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
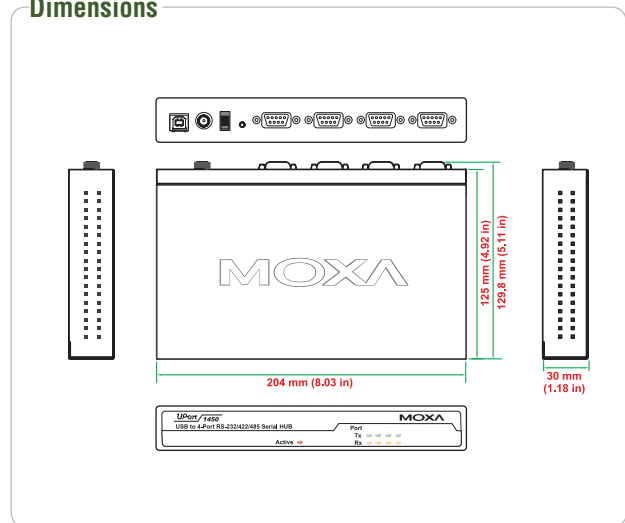
: Ordering Information

Available Models

UPort® 1410: 4-port RS-232 USB-to-serial converter
UPort® 1450: 4-port RS-232/422/485 USB-to-serial converter, adaptor included
UPort® 1450I: 4-port RS-232/422/485 USB-to-serial converter with 2 KV optical isolation, adaptor included

Optional Accessories (can be purchased separately)

Mini DB9F-to-TB adaptor: DB9 female to terminal block adaptor for RS-422/485 applications
Magnet Accessory: Magnets for attaching the UPort® 1400 to the PC's housing
Wall Mount Kit: Metal plates and screws
DIN-Rail Kit: DIN-Rail kit for the UPort® 1400 series
DK35A: Mounting kit for 35-mm DIN-Rail

Power Adaptors (can be purchased separately)

Note: Available for the UPort® 1410 if the USB port does not provide enough power. You must purchase the adaptor plus one power cord.

PWR-12120-DT-S2: 100-240 VAC to 12 VDC @ 1.2 A power adaptor
PWC-C7US-2B-183: US plug, 2-pin power cord
PWC-C7UK-2B-183: UK plug, 2-pin power cord
PWC-C7EU-2B-183: EU plug, 2-pin power cord
PWC-C7JP-2B-183: JP plug, 2-pin power cord
PWC-C7AU-2B-183: SAA plug, 2-pin power cord

Package Checklist

• UPort® 1400 USB-to-serial converter
• USB-IF certified cable
• 1 mini DB9 female to terminal block adaptor (UPort® 1450 and 1450I only)
• Power adaptor (UPort® 1450 and 1450I only)
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

UPort® 1600-8 Series

8-port RS-232 and RS-232/422/485 USB-to-serial converters

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> 921.6 Kbps maximum baudrate for super fast data transmission
> 15N high retention USB type B connector
> 128-byte FIFO and on-chip H/W, S/W flow control
> Built-in 15 KV ESD protection for all serial ports
> IP30-rated, rugged metal housing
> COM port assignments maintained across different PCs
> Mini DB9 female to terminal block adaptor for easy wiring
> Drivers provided for Windows, WinCE, and Linux
> Locking power cord

: Overview

The UPort® 1600-8 USB-to-serial converters allow you to connect 8 RS-232 or RS-232/422/485 devices to your laptop or workstation through the USB (Universal Serial Bus) port. The UPort® 1600-8 converters are compatible with new and legacy serial devices, and are perfect for instrumentation and manufacturing applications.

: Typical Application— Application Topology

Medical scientists and pharmaceutical researchers rely on sophisticated laboratory equipment to discover new treatments for patients. Most research is carried out in teams given the complex and collaborative nature of medical science. Scientists often transfer images and data from microscopes and other equipment to each other's laptops or desktop computers. Connecting all of these pieces of equipment usually requires multiple serial ports, one for each peripheral device. Since computers are only equipped with a limited number of serial ports, expanding a USB connection into multiple serial ports can provide researchers with the connectivity they need to make their next scientific breakthrough. Moxa's solution is the UPort®

1610-8, which is an RS-232 USB-to-serial converter that can be used to connect multiple serial interface microscopes and other equipment to a computer's USB port. The UPort® 1610-8 provides the following benefits:

• Up to 8 ports for easy USB-to-serial expansion
• True USB 2.0 high-speed transmission for large data transmission
• 128-byte FIFO and on-chip hardware and software flow control to ensure stable data transmission
• Easy troubleshooting with LED indicators for each serial port
• Compatibility with both laptop and desktop PCs
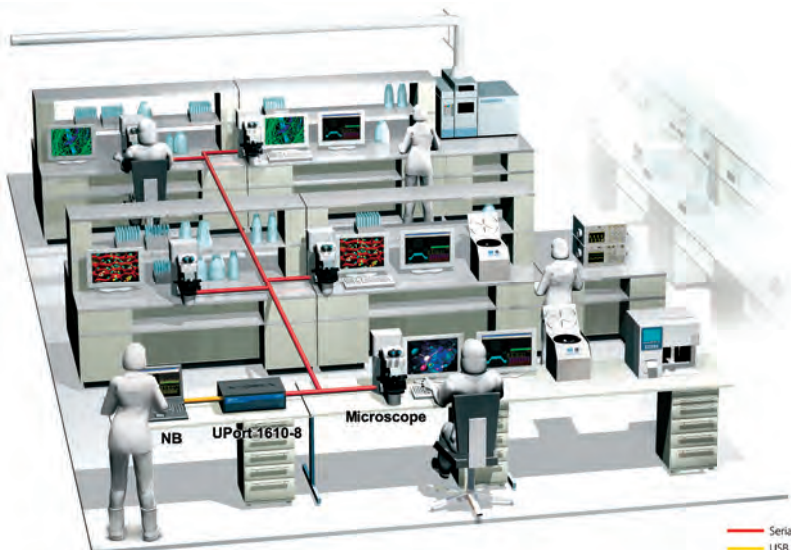
: Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Connector: USB type B
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)

Serial Interface
Number of Ports: 8
Serial Standards:
UPort® 1610-8: RS-232
UPort® 1650-8: RS-232/422/485
Connector: DB9 male

Serial Line Protection
ESD Protection: 15 KV embedded

Performance
Baudrate: 50 bps to 921.6 Kbps (including 500 Kbps)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 128 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, WinCE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Housing: SECC sheet metal (1 mm), IP30 protection
Weight:
Product only: 835 g (1.84 lb)
Packaged: 1440 g (3.17 lb)
Dimensions: 204 x 44 x 125 mm (8.03 x 1.73 x 4.92 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, FCC Part 15 Class A, UL, CUL, TÜV

Power Requirements
Power Consumption:
UPort® 1610-8 (12 to 48 VDC external power): 230 mA @ 12 VDC
UPort® 1650-8 (12 to 48 VDC external power): 340 mA @ 12 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
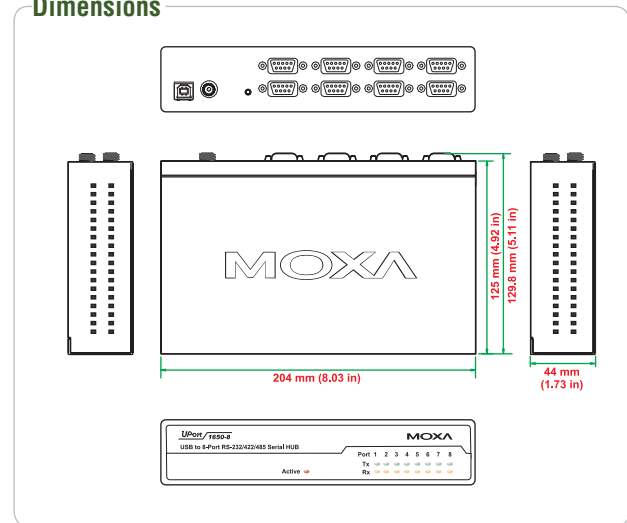
: Ordering Information

Available Models
UPort® 1610-8: 8-port RS-232 USB-to-serial converter, adaptor included
UPort® 1650-8: 8-port RS-232/422/485 USB-to-serial converter, adaptor included

Optional Accessories (can be purchased separately)
Mini DB9F-to-TB Adaptor: DB9 female to terminal block adaptor for RS-422/485 applications
Magnet Accessory: Magnets for attaching the UPort® 1600-8 to the PC's housing
Wall Mount Kit: Metal plates and screws
DIN-Rail Kit: DIN-Rail kit for the UPort® 1600-8 series
DK35A: Mounting kit for 35-mm DIN-Rail

Package Checklist
- UPort® 1600-8 USB-to-serial converter
- USB-IF certified cable
- Power adaptor
- 1 mini DB9 female to terminal block adaptor (UPort® 1650-8 only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

UPort® 1600-16 Series

16-port RS-232 and RS-232/422/485 USB-to-serial converters

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> 921.6 Kbps maximum baudrate for super fast data transmission
> 15N high retention USB type B connector
> 128-byte FIFO and on-chip H/W, S/W flow control
> Standard 19-inch rack-mountable
> Built-in 15 KV ESD protection on all serial ports
> IP30-rated, rugged metal housing
> COM port assignments maintained across different PCs
> Mini DB9 female to terminal block adaptor for easy wiring
> Drivers provided for Windows, WinCE, and Linux

11

Industrial USB > UPort® 1600-16 Series

⋮ Overview

The UPort® 1600-16 USB-to-serial converters allow you to connect 16 RS-232 or RS-232/422/485 devices to your laptop or workstation through the USB (Universal Serial Bus) port. The UPort® 1600-16 converters are compatible with new and legacy serial devices, and are perfect for instrumentation, and manufacturing applications.

⋮ Typical Application—TFT-LCD Manufacturing

Manufacturing TFT-LCD (thin film transistor liquid crystal display) panels is a complicated and highly technical process. The three major stages in TFT-LCD panel production are the array, LC cell, and module assembly processes. In addition, each finished panel must also pass a series of quality inspection tests, which include defect inspection and lighting tests. The most challenging part of the TFT-LCD manufacturing process is achieving zero fault tolerance for high quality and productivity. One of our customers needed a USB-to-serial solution to transmit data between a host and quality inspection equipment in the TFT-LCD manufacturing process. In such a demanding manufacturing environment, adopting multiple ports and Moxa's ruggedly designed UPort® 1650-16 USB-to-serial converter proved to be the best option.

The UPort® 1650-16 has the following features:

- Standard 19-inch rackmount size and metal housing for industrial-grade requirements
- Up to 16 ports for easy USB-to-serial expansion
- 3-in-1 serial ports for a cost-effective solution
- True USB 2.0 Hi-Speed transmission for greater productivity
- 128-byte FIFO and on-chip hardware and software flow control to ensure stable data transmission during inspection
- Each serial port has its own LED indicator for easy troubleshooting
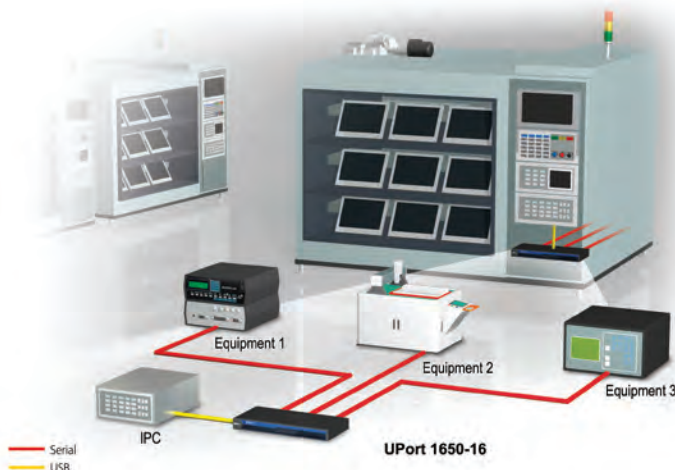
Equipment 1 · Equipment 2 · Equipment 3 · IPC · UPort 1650-16 · Serial · USB

: Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Connector: USB type B
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)

Serial Interface
Number of Ports: 16
Serial Standards:
UPort® 1610-16: RS-232
UPort® 1650-16: RS-232/422/485
Connector: DB9 male

Serial Line Protection
ESD Protection: 15 KV embedded

Performance
Baudrate: 50 bps to 921.6 Kbps (including 500 Kbps)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
FIFO: 128 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-4w: TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
RS-485-2w: Data+(B), Data-(A), GND
RS-485 Data Direction: ADDC® (Automatic Data Direction Control)

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, Win CE 5.0/6.0, Linux 2.4, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Housing: SECC sheet metal (1 mm), IP30 protection
Weight:
Product only: 2475 g (5.45 lb)
Packaged: 3440 g (7.58 lb)
Dimensions: 440 x 45.5 x 198.1 mm (17.32 x 1.79 x 7.80 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN55022 Class A, EN55024, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11, FCC Part 15 Class A, UL, CUL, TÜV
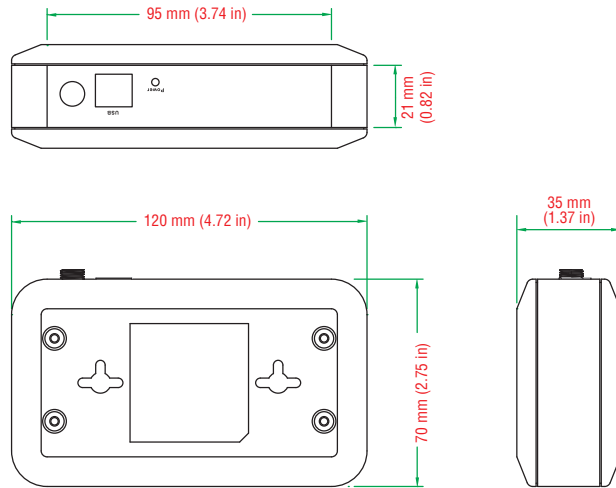
Power Requirements
Input Voltage: 100 to 240 VAC external power
Power Consumption:
UPort® 1610-16: 130 mA @ 100 VAC
UPort® 1650-16: 150 mA @ 100 VAC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
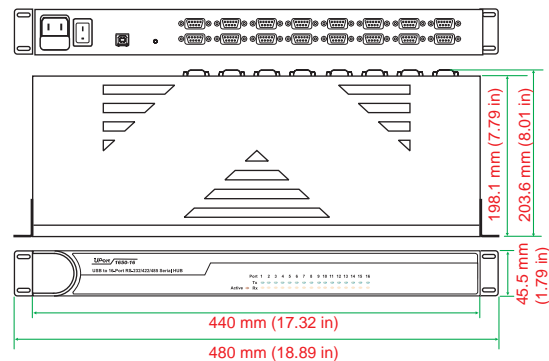
: Ordering Information

Available Models
UPort® 1610-16: 16-port RS-232 USB-to-serial converter
UPort® 1650-16: 16-port RS-232/422/485 USB-to-serial converter

Optional Accessories (can be purchased separately)
Mini DB9F-to-TB Adaptor: DB9 female to terminal block adaptor for RS-422/485 applications
Rackmount Kit: Metal plates and screws

Package Checklist
- UPort® 1600-16 USB-to-serial converter
- USB-IF certified cable
- Power cord
- 1 mini DB9 female to terminal block adaptor (UPort® 1650-16 only)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

UPort® 2210/2410

2 and 4-port RS-232 USB-to-serial converters

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> 921.6 Kbps maximum baudrate for super fast data transmission
> Built-in 15 KV ESD protection for all serial ports
> Drivers provided for Windows and Linux
> Supports Fixed-Base COM Utility for setting the initial extended COM port number
> LEDs for easy monitoring

Overview

The UPort® 2210/2410 USB-to-serial converters allow you to connect 2 or 4 RS-232 devices to your laptop or workstation through the USB (Universal Serial Bus) port. The UPort® 2210 and UPort® 2410 are cost-effective solutions for both new and legacy RS-232 devices, and are perfect for mobile, instrumentation, and point-of sale applications.

Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Connector: USB type B
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)

Serial Interface
Number of Ports:
UPort® 2210: 2
UPort® 2410: 4
Serial Standards: RS-232
Connector: DB9 male

Serial Line Protection
ESD Protection: 15 KV embedded

Performance
Baudrate: 50 bps to 921.6 Kbps

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd
Flow Control: RTS/CTS, XON/XOFF
FIFO: 16 bytes

Serial Signals
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Driver Support
Operating Systems: Windows 2000, Windows XP/2003/Vista/2008/7 x86/x64, Linux 2.6 x86/x64
Note: Please refer to Moxa's website for the latest driver support information.

Physical Characteristics
Housing: Polycarbonate (PC)
Weight:
Product only:
UPort® 2210: 120 g (0.26 lb)
UPort® 2410: 210 g (0.46 lb)
Packaged:
UPort® 2210: 325 g (0.72 lb)
UPort® 2410: 455 g (1 lb)
Dimensions:
UPort® 2210: 70 x 35 x 120 mm (2.76 x 1.38 x 4.72 in)
UPort® 2410: 80 x 35 x 185 mm (3.15 x 1.38 x 7.28 in)

Environmental Limits
Operating Temperature: 0 to 55°C (32 to 131°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, FCC Part 15 Class B

Power Requirements
Power Consumption:
UPort® 2210: 140 mA @ 5 VDC
UPort® 2410: 240 mA @ 5 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

UPort® 2210

120 mm (4.72 in)

70 mm (2.76 in)

35 mm (1.38 in)

60 mm (2.36 in)

35 mm (1.38 in)

70 mm (2.76 in)

UPort® 2410

80 mm (3.15 in)

40 mm (1.57 in)

120 mm (4.72 in)

35 mm (1.38 in)

185 mm (7.28 in)

80 mm (3.15 in)
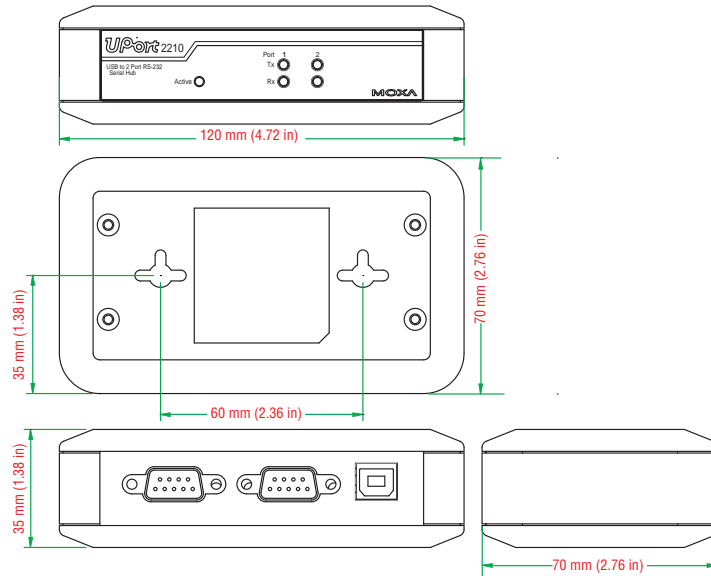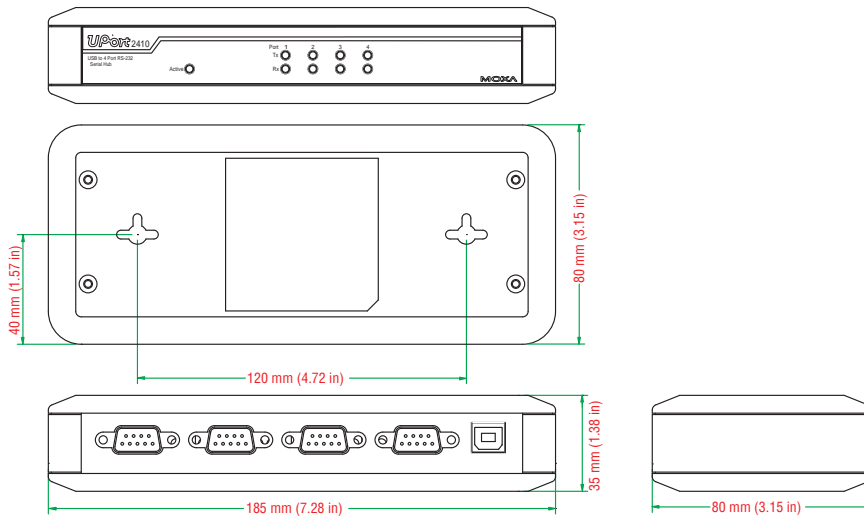
⦂ Ordering Information

Available Models
UPort® 2210: 2-port RS-232 USB-to-serial converter
UPort® 2410: 4-port RS-232 USB-to-serial converter

Package Checklist
- UPort® 2210 or UPort® 2410
- USB-IF certified cable
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

MOXA® ❯ www.moxa.com ❯ info@moxa.com

UPort® 404/407

4 and 7-port industrial-grade USB hubs

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> USB-IF certification
> Dual power inputs (power jack and terminal block)
> 15 KV ESD Level 4 protection for all USB ports
> Rugged metal housing
> DIN-Rail and wall mountable
> Comprehensive diagnostic LEDs
> Choose bus power or external power (UPort® 404)

Introduction

The UPort® 404 and UPort® 407 are industrial-grade USB 2.0 hubs that expand 1 USB port into 4 and 7 USB ports, respectively. The hubs are designed to provide true USB 2.0 Hi-Speed 480 Mbps data transmission through each port, even for heavy-load applications. The UPort® 404/407 have received USB-IF Hi-Speed certification, which is an indication that both products are reliable, high quality USB 2.0

hubs.In addition, the hubs are fully compliant with the USB Plug & Play spec and provide a full 500 mA of power per port, ensuring that your USB devices will function properly. The UPort® 404/407 hubs' support of 12-40 VDC power makes them ideal for mobile applications. Externally powered USB hubs are the only way to guarantee the broadest compatibility with USB devices.

USB-IF Certification

The UPort® 404 and UPort® 407 USB 2.0 industrial-grade USB hubs have passed USB-IF (USB Implementers Forum) certification. USB-IF verifies a number of strict electrical requirements for the high-speed USB operation of USB hubs designed to the USB 2.0 specification. This means that the UPort® 404/407 support Hi-Speed USB 2.0 for

up to 480 Mbps USB transmission, which is fully compliant with interoperability requirements, is enough power for devices to function, and provides for a successful transition back to high-speed operation from the suspend state.

ESD Level 4 Protection

Electrostatic discharge (ESD) could be as severe as having more than one thousand volts of ESD with a high rise time (dv/dt) break through the junction layer of protective devices. In order to avoid serious

damage, Moxa's UPort® 404/407 USB hubs provide ESD level 4 (contact 8 KV, air 15 KV) protection, which increases the quality and value of the user's end-product.

Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Upstream: 1 USB port, Type B connector
Downstream:
UPort® 404: 4 USB ports, Type A connectors
UPort® 407: 7 USB ports, Type A connectors
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)
Supply Current: 500 mA max. per channel
Physical Characteristics
Housing: Aluminum
Dimensions:
UPort® 404: 80 x 35 x 130 mm (3.15 x 1.38 x 5.12 in)
UPort® 407: 100 x 35 x 192 mm (3.94 x 1.38 x 7.55 in)
Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temperature Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH

Storage Temperature:
Standard Models: -20 to 75°C (-4 to 167°F)
Wide Temperature Models: -40 to 85°C (-40 to 185°F)
Regulatory Approvals: EN61000-3-2, EN61000-3-3, EN61000-4-2,EN61000-4-3,EN61000-4-4,EN61000-4-5,EN61000-4-6,EN61000-4-8, EN61000-4-11,EN61000-6-2, EN61000-6-4, FCC Part 15 Class A, UL508 (Maximum Surrounding Air Temperature: 60°C), LVD
Power Requirements
Input Voltage: 12 to 40 VDC external power
Power Consumption:
UPort® 404: 1300 mA @ 12 VDC, 690 mA @ 24 VDC, 470 mA @ 36 VDC
UPort® 407: 2300 mA @ 12 VDC, 1130 mA @ 24 VDC, 790 mA @ 36 VDC
Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

11

Dimensions
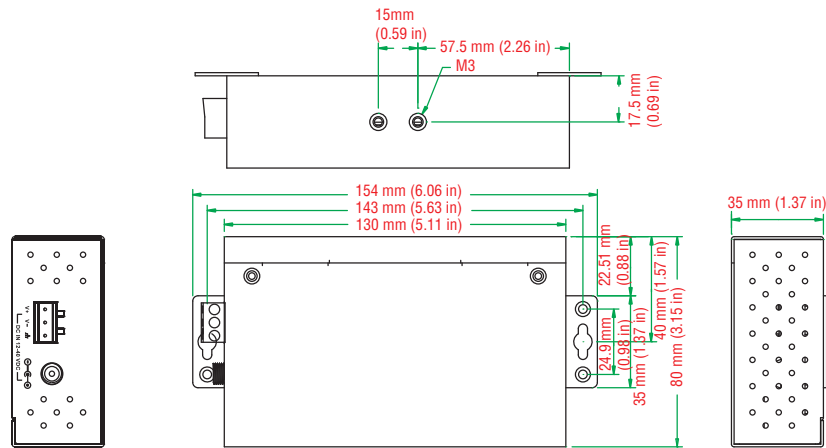
UPort® 404

UPort® 407
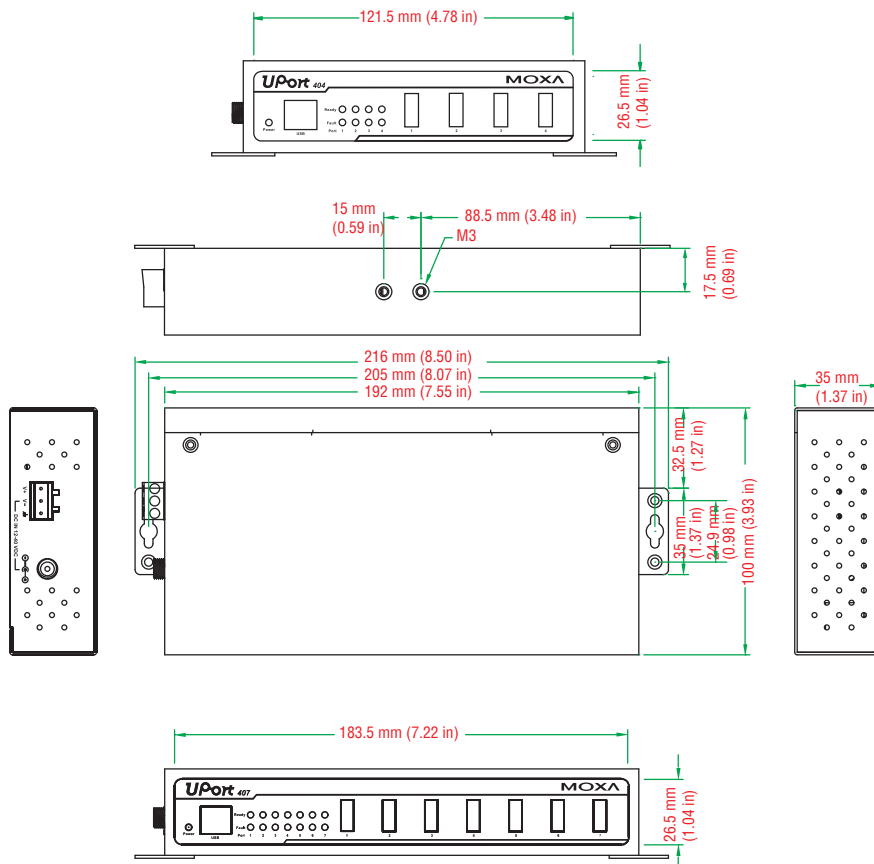
: Ordering Information

Available Models

UPort® 404: 4-port industrial USB hub, adaptor included, 0 to 60°C operating temperature
UPort® 407: 7-port industrial USB hub, adaptor included, 0 to 60°C operating temperature
UPort® 404-T: 4-port industrial USB hub, -40 to 85°C operating temperature
UPort® 407-T: 7-port industrial USB hub, -40 to 85°C operating temperature

Optional Accessories (can be purchased separately)

Wall Mount Kit: Metal plates and screws
DK-35A: Mounting Kit for 35-mm DIN-Rail
Din-Rail Kit: Din-Rail kit for the UPort® 400 Series

Package Checklist

- UPort® 404 or UPort® 407 industrial-grade USB hub
- USB-IF certified cable
- Power adaptor (UPort® 404/407 only)
- Quick Installation Guide (printed)
- Warranty Card

MOXA® ▶ www.moxa.com ▶ info@moxa.com

UPort® 204/207

4 and 7-port entry-level USB hubs

> Hi-Speed USB 2.0 for up to 480 Mbps USB transmission
> USB-IF Certification
> Compatible with USB 1.1 devices
> 15 KV ESD Level 4 protection for all USB ports
> Wall mountable
> Comprehensive diagnostic LEDs
> Full 500 mA of power per port
> Choose bus power or external power (UPort® 204 only)

: Introduction

The UPort® 204 and UPort® 207 are entry-level USB 2.0 hubs that expand 1 USB port into 4 and 7 USB ports, respectively. The hubs are designed to provide true USB 2.0 Hi-Speed 480 Mbps data transmission through each port, even for heavy-load applications. The UPort® 204/207 have received USB-IF Hi-Speed certification, which is an indication that both products are reliable, high quality USB 2.0

hubs. In addition, the hubs are fully compliant with the USB Plug & Play spec and provide a full 500 mA of power per port, ensuring that your USB devices will function properly. The UPort® 204/207 hubs' support of 12-40 VDC power makes them ideal for mobile applications. Externally powered USB hubs are the only way to guarantee the broadest compatibility with USB devices.

: USB-IF Certification

The UPort® 204/207 USB 2.0 entry-level USB hubs have passed USB-IF (USB Implementers Forum) certification. USB-IF verifies a number of strict electrical requirements for the Hi-Speed USB operation of USB hubs designed to the USB 2.0 specification. This means that the UPort® 204/207 support Hi-Speed USB 2.0 for up to 480 Mbps

USB transmission, which is fully compliant with interoperability requirements, is enough power for devices to function, and provides for a successful transition back to high-speed operation from the suspend state.

: ESD Level 4 Protection

Electrostatic discharge (ESD) could be as severe as having more than one thousand volts of ESD with a high rise time (dv/dt) break through the junction layer of protective devices. In order to avoid serious

damage, Moxa's UPort® 204/207 USB hubs provide ESD level 4 (contact 8 KV, air 15 KV) protection, which increases the quality and value of the user's end-product.

: Specifications

USB Interface
Compliance: USB 1.1/2.0 compliant
Upstream: 1 USB port, Type B connector
Downstream:
UPort® 204: 4 USB ports, Type A connectors
UPort® 207: 7 USB ports, Type A connectors
Speed: 480 Mbps (Hi-Speed USB) and 12 Mbps (Full-Speed USB)
Supply Current: 500 mA max. per channel

Physical Characteristics
Housing: Polycarbonate (PC)
Dimensions:
UPort® 204: 70 x 35 x 120 mm (2.76 x 1.38 x 4.72 in)
UPort® 207: 80 x 35 x 185 mm (3.15 x 1.38 x 4.72 in)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH

Storage Temperature: -20 to 75°C (-4 to 167°F)
Regulatory Approvals: EN61000-3-2, EN61000-3-3, EN61000-4-2,EN61000-4-3,EN61000-4-4,EN61000-4-5,EN61000-4-6,EN61000-4-8, EN61000-4-11,EN61000-6-2, EN61000-6-4, FCC Part 15 Class A, UL508, LVD

Power Requirements
Input Voltage: 12 to 40 VDC external power
Power Consumption:
UPort® 204: 1210 mA @ 12 VDC, 610 mA @ 24 VDC, 430 mA @ 36 VDC
UPort® 207: 2170 mA @ 12 VDC, 1070 mA @ 24 VDC, 730 mA @ 36 VDC

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

UPort® 204

95 mm (3.74 in)

21 mm (0.82 in)

120 mm (4.72 in)

70 mm (2.75 in)

35 mm (1.37 in)

95.1 mm (3.74 in)

21 mm (0.82 in)

UPort 204
Ready
Fault
Port 1 2 3 4
1 2 3 4
MOXA

UPort® 207

160.5 mm (6.31 in)

21 mm (0.82 in)

185 mm (7.28 in)

80.03 mm (3.15 in)

35 mm (1.37 in)

160.1 mm (6.30 in)

21 mm (0.82 in)

UPort 207
Ready
Fault
Port 1 2 3 4 5 6 7
1 2 3 4 5 6 7
MOXA
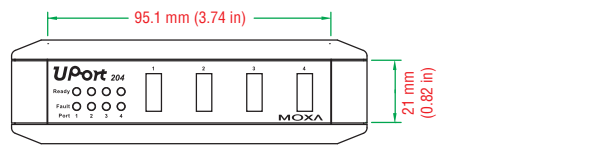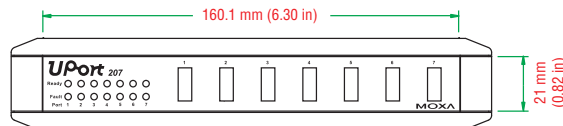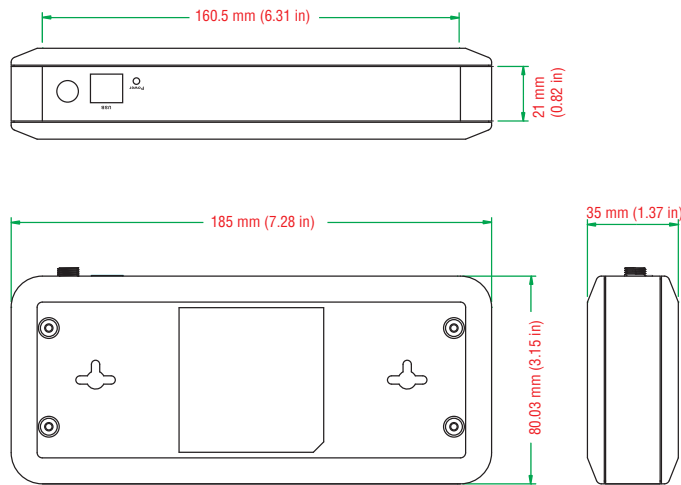
⦂ Ordering Information

Available Models

UPort® 204: 4-port entry-level USB hub, adaptor included
UPort® 207: 7-port entry-level USB hub, adaptor included

Package Checklist

- UPort® 204 or UPort® 207 entry-level USB hub
- USB-IF certified cable
- Power adaptor
- Quick Installation Guide (printed)
- Warranty Card

Serial Media Converters

Chassis Media Converters

	TRC-190-AC TRC-190-DC	TCF-142-M-SC-RM TCF-142-M-ST-RM	TCF-142-S-SC-RM TCF-142-S-ST-RM
Optical Fiber Side			
Fiber Connector	---	SC or ST	SC or ST
Cables Requirements	---	50/125, 62.5/125, or 100/140 µm	8.3/125, 8.7/125, 9/125, or 10/125 µm
Transmission Distance	---	5 km	40 km
Wavelength	---	850 nm	1310 nm
Tx Output	---	> -5 dBm	> -5 dBm
Rx Sensitivity	---	-20 dBm	-25 dBm
Point-to-Point Transmission	---	Point-to-Point Transmission: Half-duplex or full-duplex	Point-to-Point Transmission: Half-duplex or full-duplex
RS-232/422/485 Side			
Connector	---	Terminal Block	
RS-232 Signals	---	TxD, RxD, SGND	
RS-422 Signals	---	TxD+, TxD-, RxD+, RxD-, SGND	
RS-485-4w Signals	---	TxD+, TxD-, RxD+, RxD-, SGND	
RS-485-2w Signals	---	Data+, Data-, SGND	
Baudrate	---	50 bps to 921.6 Kbps	
ESD Protection	---	15 KV	15 KV
Physical Characteristics			
Housing	SECC (1.2 mm)	SPCC	SPCC
Dimensions (mm)	440 x 260 x 77 mm	86.8 x 136.5 x 21 mm	86.8 x 136.5 x 21 mm
Weight	5.2 kg (11.4 lbs), with one power module installed	---	---
Installation	---	---	---
Number of Slots	19 slots in the front for slide-in modules, 2 slots in the back for power supply modules	---	---
Environmental Limits			
Operating Temperature	0 to 60°C	0 to 60°C	0 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 75°C	-20 to 75°C	-20 to 75°C
Power Requirements			
Input Voltage	Universal 100 to 240 VAC (47 to 63 Hz)	12 VDC	12 VDC
Power Consumption	5.4 A @ 12 V (max. output) or 12 to 48 VDC	150 mA @ 12 V	150 mA @ 12 V
Regulatory Approvals			
CE	Class B	Class B	
FCC	Part 15 sub part B Class A	Part 15 sub part B Class A	
EMI	EN55022 1998, Class B	---	---
EMS	EN61000-4-2 (ESD), Criteria A, Level 4 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 3 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2 EN61000-4-8 (PFMF), Criteria A, Level 3 EN61000-4-11 (DIPS), Criteria A	EN61000-4-2 (ESD), Criteria A, Level 4 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 3 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2 EN61000-4-8 (PFMF), Criteria A, Level 3	
Freefall	---	IEC 60068-2-32	
Reliability			
Warranty	5 years (see www.moxa.com/warranty)		

Serial-to-Fiber Media Converters

	ICF-1150-M-SC/ST ICF-1150-M-SC/ST-T	ICF-1150I-M-SC/ST ICF-1150I-M-SC/ST-T	ICF-1150-S-SC/ST ICF-1150-S-SC/ST-T	ICF-1150I-S-SC/ST ICF-1150I-S-SC/ST-T	TCF-142-M-SC/ST TCF-142-M-SC/ST-T	TCF-142-S-SC/ST TCF-142-S-SC/ST-T	TCF-90-M/S
Optical Fiber Side							
Fiber Connector	SC or ST	SC or ST	SC or ST		SC or ST	SC or ST	ST
Cables Requirements	Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 µm Multi-mode: 50/125, 62.5/125, or 100/140 µm						
Transmission Distance	Single-mode: 40 km Multi-mode: 5 km						
Wavelength	Single-mode: 1310 nm Multi-mode: 850 nm						
Tx Output	Single-mode: > -5 dBm Multi-mode: > -5 dBm						
Rx Sensitivity	Single-mode: -25 dBm Multi-mode: -20 dBm						
Point-to-Point Transmission	Half-duplex or full-duplex						–
Multi-drop Transmission	Half-duplex, fiber ring						–
RS-232 Side							
Connector	DB9 female	DB9 female	DB9 female	DB9 female	–	–	DB9 female
Signals	–	–	–	–	–	–	Tx, Rx, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)
Baudrate	–	–	–	–	–	–	50 bps to 921.6 Kbps
RS-232/422/485 Side							
Connector	–	–	–	–	Terminal Block		–
RS-232 Signals	TxD, RxD, SGND						
RS-422 Signals	TxD+, TxD-, RxD+, RxD-, SGND						–
RS-485-4w Signals	TxD+, TxD-, RxD+, RxD-, SGND						–
RS-485-2w Signals	Data+, Data-, SGND						–
Baudrate	50 bps to 921.6 Kbps						–
ESD Protection	15 KV for all signals						–
Isolation	2 KV RMS isolation per I/O port for 1 minute				–	–	–
Physical Characteristics							
Housing	Aluminum (1 mm)						ABS + PC
Dimensions (mm)	30.3 x 70 x 115 mm				67 x 100 x 22 mm		42 x 80 x 22 mm
Environmental Limits							
Operating Temperature	0 to 60°C or -40 to 85°C						0 to 60°C
Operating Humidity	5 to 95% RH						5 to 95% RH
Storage Temperature	-40 to 85°C						-20 to 75°C
Power Requirements							
Source of Input Power	–	–	–	–	–	–	RS-232 port (TxD signal) or power input jack
Input Voltage	12 to 48 VDC				12 to 48 VDC		12 to 48 VDC
Power Consumption	127 mA @ 12 V	163 mA @ 12 V			140 mA @ 12 V		20 mA @ 5 V (with termination disabled)
Burst Protection (EFT)	4 KV				2 KV		–
Surge Protection	2 KV				2 KV		–
Voltage Reversal Protection	Protects against V+/V- reversal				Protects against V+/V- reversal		–
Over Current Protection	1.1 A				1.1 A		–
Regulatory Approvals							
CE	Class B				–	–	Class B
FCC	Part 15 sub Class B				Part 15 Subclass B		Class B
Safety	UL 508				–	–	–
UL/CUL	–				UL60950-1		–
EMI	EN55022 2006, Class B				EN55022 1998, Class B		–
EMS	EN61000-4-2 (ESD), Criteria A, Level 4 EN61000-4-3 (RS), Criteria A, Level 3 EN61000-4-4 (EFT), Criteria A, Level 4 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 3 EN61000-4-8 (PFMF), Criteria A, Level 5				EN61000-4-2 (ESD), Criteria A, Level 3 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria A, Level 2 EN61000-4-5 (Surge), Criteria A, Level 3 EN61000-4-6 (CS), Criteria A, Level 2 EN61000-4-8 (SFMF), Criteria A, Level 1		–
ATEX	Class 1, Zone 2, EEx nC IIC (pending)				–	–	–
Hazardous Location	UL/cUL Class 1, Div. 2, Group A, B, C and D (Pending)				–	–	–
TÜV	EN 60950-1				EN60950-1		–
Freefall	IEC 60068-2-32				–	–	–
Water and Dust Proof	IP30				–	–	–
Reliability							
Warranty	5 years (see www.moxa.com/warranty)						

12

Serial Media Converters > Product Selection Guides

Serial Converters and Repeaters

	TCC-100 TCC-100-T	TCC-100I TCC-100I-T	TCC-80	TCC-80I	TCC-120	TCC-120I	TCC-82
RS-232 Side							
Connector	DB9 female		DB9 female	–	–	–	–
Signals	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND		TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)	–	–	–	–
RS-422/485 Side							
Connector	Terminal Block		Terminal Block or DB9 male	–	–	–	–
Signals	(interface selected by DIP switch) RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w Signals: Data+, Data-, GND		(interface selected by DIP switch) RS-422: TxD+, TxD-, RxD+, RxD-, GND RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND RS-485-2w Signals: Data+, Data-, GND	–	–	–	–
RS-485 Data Direction Control	–	–	ADDC®	–	–	–	–
Serial Communication							
Connectors	–	–	–	–	Terminal Block on both ends		DB9 male/female
Baudrate	50 bps to 921.6 Kbps		50 bps to 921.6 Kbps		50 bps to 921.6 Kbps		50 bps to 921.6 Kbps
Signals	–	–	–	–	RS-422/485-4w: TxD+, TxD-, RxD+, RxD- RS-485-2w: Data+, Data-		RS-232: TxD, RxD, RTS, CTS (Loop-back wiring: DTR to DSR and DCD)
RS-485 Data Direction Control	–	–	–	–	ADDC®		
Pull High Resistance	150K ohm or 1K ohm (default)		–	–	1K ohm (default) or 150K ohm		
Pull Low Resistance							
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	2 KV	–	2.5 KV rms for 1 minute	–	2 KV for power and signal	4 KV for 1 minute
Physical Characteristics							
Housing	Aluminum		ABS + PC		Aluminum		ABS
Dimensions (mm)	67 x 100.4 x 22 mm		42 x 80 x 22 mm		67 x 100.4 x 22 mm		42 x 80 x 23.6 mm
Weight	148 ± 5 g		50 ± 5 g		148 ± 5 g		60 ± 5 g
Environmental Limits							
Operating Temperature	-20 to 60°C, or -40 to 85°C		0 to 60°C		-20 to 60°C		0 to 60°C
Operating Humidity	5 to 95% RH		5 to 95% RH		5 to 95% RH		5 to 95% RH
Storage Temperature	-20 to 85°C		-20 to 75°C		-20 to 85°C		-20 to 75°C
Power Requirements							
Source of Input Power	Power input jack		RS-232 port (TxD, RTS, DTR) or power input jack		RS-232 port (TxD signal) or power input jack		RS-232 port (TxD signal) or power input jack
Input Voltage	12 to 48 VDC		5 to 12 VDC		12 to 48 VDC		5 to 12 VDC
Power Consumption	300 mA @ 12 V	400 mA @ 12 V	10 mA @ 5 V (with termination disabled)	20 mA @ 5 V (with termination disabled)	98 mA @ 12 V, 1.18 W	234 mA @ 12 V, 2.81 W	20 mA @ 5 V
Connection	–	–	–	–	–	–	–
Overload Current Protection	–	–	–	–	–	–	–
Reverse Polarity Protection	–	–	–	–	–	–	–
Burst Protection (EFT)	–	–	–	–	–	–	–
Surge Protection	–	–	–	–	–	–	–
Voltage Reversal Protection	Protects against V+/V- reversal		–	–	Protects against V+/V- reversal		–
Over Current Protection	✓	✓	–	–	✓	✓	–
Regulatory Approvals							
CE	Class B		Class B		Class B		Class B
FCC	Class B		Class B		Class B		Class B
Reliability							
Warranty	5 years (see www.moxa.com/warranty)						

CAN-to-Fiber Converters

	ICF-1170I-M-ST	ICF-1170I-M-ST-T
Optical Fiber Side		
Fiber Connector	ST	
Cables Requirements	Multi-mode: 50/125, 62.5/125, or 100/140 µm	
Transmission Distance	Up to 2 km	
Wavelength	Multi-mode: 850 nm	
Tx Output	Multi-mode: > -5 dBm	
Rx Sensitivity	Multi-mode: -20 dBm	
CAN Interface		
Connector	3-pin removable screw terminal	
CAN Specification	CAN 2.0 A and 2.0B (ISO 11898-2)	
Signal Support	CAN _H, CAN_L, CAN_GND	
Optical Isolation	2 KV	
Transfer rate	Up to 1 Mbps	
Termination Resistors	120 ohms (selected by DIP switch)	
Physical Characteristics		
Housing	Aluminum (1 mm)	
Dimensions (mm)	30.3 x 70 x 115 mm (11.9 x 27.6 x 45.3 in)	
Environmental Limits		
Operating Temperature	0 to 60°C	-40 to 85°C
Operating Humidity	5 to 95% RH	
Storage Temperature	-40 to 85°C	
Power Requirements		
Input Voltage	12 to 48 VDC dual power inputs for redundant power	
Power Consumption	221 mA @ 12 V	
Voltage Reversal Protection	Protects against V+/V- reversal	
Over Current Protection	1.1 A (protects against two signals shorted together)	
Regulatory Approvals		
CE	Class A	
FCC	Part 15 sub Class A	
UL/CUL	UL 508	
EMI	EN55022 1998, Class A	
EMS	EN61000-4-2 (ESD), Criteria B, Level 4 EN61000-4-3 (RS), Criteria A, Level 2 EN61000-4-4 (EFT), Criteria B, Level 4 EN61000-4-5 (Surge), Criteria B, Level 2 EN61000-4-6 (CS), Criteria B, Level 2 EN61000-4-8 (PFMF), Criteria A, Level 3	
TÜV	EN 60950-1	
Freefall	IEC 60068-2-32	
Reliability		
Warranty	5 years (see www.moxa.com/warranty)	

12

Serial Media Converters > Product Selection Guides

TRC-190 Series

Rackmount chassis for the NRack System™

> 19-inch chassis for rackmount use
> 19 slots for high density applications
> Supports hot-swap and dual power input with redundancy
> Fan-less chassis design reduces repair time

: Introduction

The TRC-190 series provides 19 slots for media converter modules from the CSM-200 series of Ethernet-to-fiber modules and TCF-142-RM series of serial-to-fiber modules. A TRC-190 chassis comes with one AC or DC power input, with an optional redundant power expansion module available for greater reliability. The TRC-190 series' power input module supports the hot-swap feature.

: Specifications

Physical Characteristics
Housing: SECC (1.2 mm)
Dimensions: 440 x 260 x 77 mm (18.6 x 11 x 3.3 in)
Weight: 5.2 kg (11.4 lbs), with one power module installed
Number of Slots: 19 slots in the front for slide-in modules, 2 slots in the back for power supply modules

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 158°F)

Power Requirements
Input Voltage: Universal 100 to 240 VAC (47 to 63 Hz) or 36 to 72 VDC
Power Consumption:
Max. Output: 5.4 A @ 12 V

Regulatory Approvals
CE: Class A
FCC: Part 15 sub part B Class A
UL/cUL: UL 60950-1
EMI: EN55022 2006, Class B
EMS:
EN61000-4-2 (ESD), Criteria A, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 3
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (PFMF), Criteria A, Level 3
EN61000-4-11 (DIPS), Criteria A

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TRC-190-ACx2 TRC-190-DCx2 TRC-190-DCx1 TRC-190-ACx1

465.6 mm (18.33 in)

440 mm (17.32 in)
484 mm (19.06 in)

2.5 mm (0.10 in)
76.7 mm (3.02 in)

33 mm (1.30 in)   260 mm (10.24 in)   33 mm

88 mm (3.46 in)

: Ordering Information

Available Models
TRC-190-AC: Rack chassis, 2U, single 110 to 240 VAC input, with 19 slots on front panel
TRC-190-DC-48: Rack chassis, 2U, single 36 to 72 VDC input, with 19 slots on front panel

Available Slide-in Modules
CSM-200-1213: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode ST connector
CSM-200-1214: 10/100BaseT(X) to 100BaseFX slide-in module media converter, multi-mode SC connector
CSM-200-1218: 10/100BaseT(X) to 100BaseFX slide-in module media converter, single-mode SC connector
TCF-142-M-SC-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, SC connector
TCF-142-M-ST-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, ST connector
TCF-142-S-SC-RM: RS-232/422/485 to single-mode fiber slide-in module converter, SC connector
TCF-142-S-ST-RM: RS-232/422/485 to single-mode fiber slide-in module converter, ST connector

Optional Accessories (can be purchased separately)
PWR-190-AC: Redundant power supply, 110 to 240 VAC
PWR-190-DC-48: Redundant power supply, 36 to 72 VDC
Plate-1: Face plate to cover unused front panel slots (required for all unused slots)

Package Checklist
- TRC-190 with single power input
- Power cord (for TRC-190-AC only)
- 18 face plates
- User's Manual (printed)
- Warranty Card

12

Serial Media Converters > TRC-190 Series

TCF-142-RM Series

RS-232/422/485 to fiber slide-in modules for the NRack System™
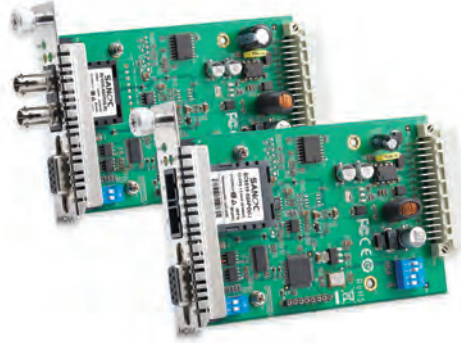
> Extend RS-232/422/485 transmission up to:
>   ▪ 40 km with single mode
>   ▪ 5 km with multi-mode
> 1K or 150K ohm adjustable pull high/low resistor
> "Ring" and "Point-to-Point" transmission supported

Introduction

The TCF-142-RM series of serial-to-fiber converters are slide-in modules that work with the TRC-190 chassis. The modules convert from the RS-232, RS-422, or RS-485 signal to a fiber optic signal.

Automatic Baudrate Detection

The TCF-142-RM series can automatically detect the serial baudrate. This is an extremely convenient feature. Even if a device's baudrate is changed, the signal will still be transmitted through the media converter without any problem.

Specifications

Optical Fiber Side
Fiber Connector: SC or ST
Cable Requirements:
Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm
Multi-mode: 50/125, 62.5/125, or 100/140 μm
Transmission Distance:
Single-mode: 40 km
Multi-mode: 5 km
Wavelength:
Single-mode: 1310 nm
Multi-mode: 850 nm
Tx Output:
Single-mode: > -5 dBm
Multi-mode: > -5 dBm
Rx Sensitivity:
Single-mode: -25 dBm
Multi-mode: -20 dBm
Point-to-Point Transmission: Half-duplex or full-duplex

RS-232/422/485 Side
Connector: Terminal Block
RS-232 Signals: TxD, RxD, SGND
RS-422 Signals: TxD+, TxD-, RxD+, RxD-, SGND
RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, SGND
RS-485-2w Signals: Data+, Data-, SGND
Baudrate: 50 bps to 921.6 Kbps
ESD Protection: 15 KV for all signals

Physical Characteristics
Housing: SPCC
Dimensions: 86.8 x 136.5 x 21 mm (3.42 x 5.37 x 0.83 in)

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-4 to 158°F)

Power Requirements
Input Voltage: 12 VDC
Power Consumption: 150 mA @ 12 V

Regulatory Approvals
FCC: Part 15 sub part B Class A
EMS:
EN61000-4-2 (ESD), Criteria A, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 3
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (PFMF), Criteria A, Level 3
Freefall: IEC 60068-2-32

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TCF-142-M/S-ST-RM Series
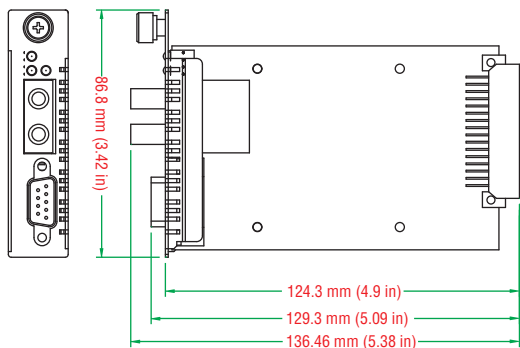
86.8 mm (3.42 in)

124.3 mm (4.9 in)
129.3 mm (5.09 in)
136.46 mm (5.38 in)

TCF-142-M/S-SC-RM Series

86.8 mm (3.42 in)

124.3 mm (4.9 in)
129.3 mm (5.09 in)

21 mm (0.83 in)

Pin Assignment

DB9 female connector

5 4 3 2 1
9 8 7 6
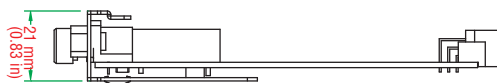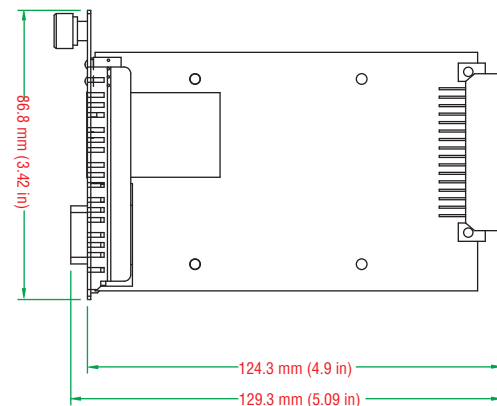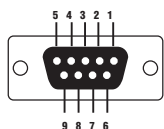
Pin	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	Tx-	–
2	RxD	Tx+	–
3	TxD	Rx+	Data+
4	DTR	Rx-	Data-
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

⠸ Ordering Information

Available Models

TCF-142-M-SC-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, SC connector
TCF-142-M-ST-RM: RS-232/422/485 to multi-mode fiber slide-in module converter, ST connector
TCF-142-S-SC-RM: RS-232/422/485 to single-mode fiber slide-in module converter, SC connector
TCF-142-S-ST-RM: RS-232/422/485 to single-mode fiber slide-in module converter, ST connector

Package Checklist

- TCF-142-RM series fiber converter
- Quick Installation Guide (printed)
- Warranty Card

12

Serial Media Converters ＞ TCF-142-RM Series

ICF-1150 Series

Industrial serial-to-fiber converters

> RS-232, fiber, and RS-422/485 3-way communication
> Rotary switch to change the pull high/low resistor value
> Extend RS-232/422/485 transmission up to:
> ▪ 40 km with single-mode
> ▪ 5 km with multi-mode
> 3-way Galvanic Isolation (for "I" model only)
> -40 to 85°C wide temperature models available
> Class I, Div. II certification

Three-Way Communication

The ICF-1150 series support 2 serial ports, with a D-sub connector for RS-232 communication and a removable terminal block for RS-422 or RS-485 communication. The 3 ports (2 serial ports and one fiber port) are completely independent. When an ICF-1150 converter receives data from any one port, it will send the data out through the other 2 ports. For example, once the ICF-1150 converter receives a command from

the remote master through the fiber port, it will convert the signal and send the command through the RS-232 and RS-422/485 ports at the same time. If the user is monitoring a system running on an RS-485 network, there is no need to use an additional RS-232 to RS-485 converter to connect the laptop computer's serial port to the RS-485 bus.

Rotary Switch for Setting the Pull High/Low Resistor

The RS-485 interface supports multi-drop or daisy-chain connections, which system engineers will use to connect serial devices such as meters, RTUs, and readers together on the same bus. Since the number of serial devices on the same bus will cause the impedance

of the data line to increase, the ICF-1150 allows users to tune the pull high/low resistor. Just rotate the switch to the appropriate value without removing the ICF-1150 from the DIN-rail.

Pull High/Low Resistor Values

Position	0	1	2	3	4	5	6	7	8	9
ohms	150K	10K	4.7K	3.3K	1K	909	822	770	500	485

Specifications

Optical Fiber Side
Fiber Connector: SC or ST
Cable Requirements:
Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm
Multi-mode: 50/125, 62.5/125, or 100/140 μm
Transmission Distance:
Single-mode: 40 km
Multi-mode: 5 km
Wavelength:
ICF-1150-S (single-mode): 1310 nm
ICF-1150-M (multi-mode): 850 nm
Tx Output:
ICF-1150-S (single-mode): > -5 dBm
ICF-1150-M (multi-mode): > -5 dBm

Rx Sensitivity:
ICF-1150-S (single-mode): -25 dBm
ICF-1150-M (multi-mode): -20 dBm
Point-to-Point Transmission: Half-duplex or full-duplex
Multi-drop Transmission: Half-duplex, fiber ring
RS-232/422/485 Side
RS-232 Signals: TxD, RxD, GND
RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND
Baudrate: 50 bps to 921.6 Kbps
ESD Protection: 15 KV for all signals
Isolation: 2 KV RMS isolation per I/O port for 1 minute

Physical Characteristics
Housing: Aluminum (1 mm)
Dimensions: 30.3 x 70 x 115 mm (1.19 x 2.76 x 4.53 in)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
ICF-1150: 127 mA @ 12 V
ICF-1150I: 163 mA @ 12 V
Voltage Reversal Protection: Protects against V+/V- reversal
Over Current Protection: 1.1 A (protects against two signals shorted together)

Regulatory Approvals
CE: Class B
FCC: Part 15 sub Class B
Safety: UL 508
EMI: EN55022 2006, Class B
EMS:
EN61000-4-2 (ESD), Criteria A, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 4
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (PFMF), Criteria A, Level 3
ATEX: Class 1, Zone 2, EEx nC IIC
Hazardous Location: UL/cUL Class 1, Div. 2, Group A, B, C and D
Freefall: IEC 60068-2-32
Water and Dust Proof: IP30

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
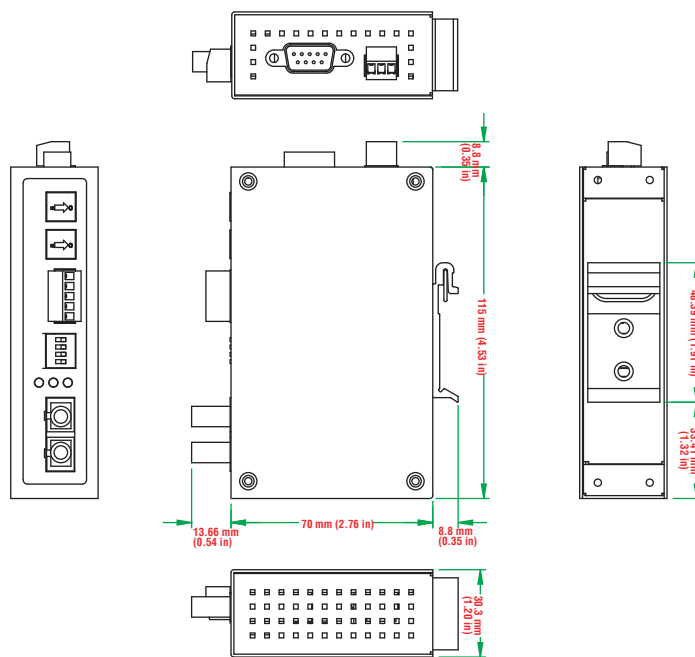
Dimensions

Pin Assignment

DB9 female connector
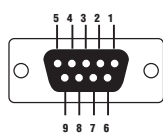
Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

: **Ordering Information**

Available Models

ICF-1150-M-SC: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 0 to 60°C operating temperature
ICF-1150-M-ST: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 0 to 60°C operating temperature
ICF-1150-S-SC: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 0 to 60°C operating temperature
ICF-1150-S-ST: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 0 to 60°C operating temperature
ICF-1150I-M-SC: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-M-ST: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-S-SC: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150I-S-ST: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 2 KV isolation, 0 to 60°C operating temperature
ICF-1150-M-SC-T: Industrial RS-232/422/485 to multimode fiber converter, SC connector, -40 to 85°C operating temperature
ICF-1150-M-ST-T: Industrial RS-232/422/485 to multimode fiber converter, ST connector, -40 to 85°C operating temperature
ICF-1150-S-SC-T: Industrial RS-232/422/485 to single mode fiber converter, SC connector, -40 to 85°C operating temperature
ICF-1150-S-ST-T: Industrial RS-232/422/485 to single mode fiber converter, ST connector, -40 to 85°C operating temperature
ICF-1150I-M-SC-T: Industrial RS-232/422/485 to multimode fiber converter, SC connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-M-ST-T: Industrial RS-232/422/485 to multimode fiber converter, ST connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-S-SC-T: Industrial RS-232/422/485 to single mode fiber converter, SC connector, 2 KV isolation, -40 to 85°C operating temperature
ICF-1150I-S-ST-T: Industrial RS-232/422/485 to single mode fiber converter, ST connector, 2 KV isolation, -40 to 85°C operating temperature

Optional Accessories

DR-4524: 45 W, 2 A Din-Rail 24 VDC power supply with universal 85 to 264 VAC input

Package Checklist

- ICF-1150 series fiber converter
- Quick Installation Guide (printed)
- Warranty Card

TCF-142 Series

RS-232/422/485 to optical fiber media converters

> "Ring" and "Point-to-Point" transmission
> Extends RS-232/422/485 transmission up to:
> ▪ 40 km with single-mode—TCF-142-S
> ▪ 5 km with multi-mode—TCF-142-M
> Compact size
> Decreases signal interference
> Protects against electrical interference and chemical corrosion
> Supports baudrates of 50 bps to 921.6 Kbps
> Wide temperature models available (-40 to 75°C)

TCF-142-S-ST   TCF-142-S-SC

Introduction

The TCF-142 media converters are equipped with a multiple interface circuit that can handle RS-232 or RS-422/485 serial interfaces and multi-mode or single-mode fiber. TCF-142 converters are used to extend serial transmission up to 5 km (TCF-142-M with multi-mode fiber) or up to 40 km (TCF-142-S with single-mode fiber). The TCF-142 converters can be configured to convert either RS-232 signals, or RS-422/485 signals, but not both at the same time.

Automatic Baudrate Detection

The TCF-142 converters can automatically detect the serial baudrate. This is an extremely convenient feature. Even if a device's baudrate is changed, the signal will still be transmitted through the media converter without any data loss.

Ring Operation

The TCF-142 converters can be used to connect serial devices to a fiber ring. To form the ring, connect the Tx port of one TCF-142 to the Rx port of a neighboring converter. Once the ring is set up, simply use the DIP switches to configure the TCF-142 converters for "ring mode." When one node transmits a signal, the signal travels around the ring until it returns back to the transmitting unit, which then blocks the signal. With the TCF-142, you can set up fiber rings that have a total circumference of up to 100 km.
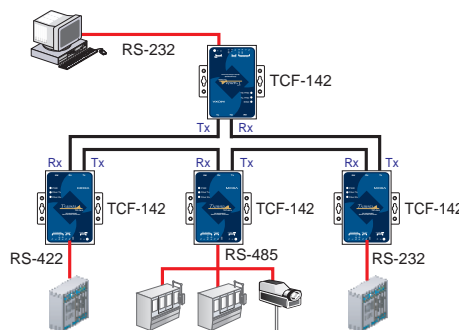
Automatic Data Direction Control (ADDC®)

ADDC® is a patented hardware data flow solution developed by Moxa to handle RS-485 data direction control. ADDC® senses and controls RS-485 data direction automatically, making it unnecessary to use the hand shaking signal.

: Specifications

Optical Fiber Side

Fiber Connector: SC or ST
Cable Requirements:
Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 μm
Multi-mode: 50/125, 62.5/125, or 100/140 μm
Transmission Distance:
Single-mode: 40 km
Multi-mode: 5 km
Wavelength:
Single-mode: 1310 nm
Multi-mode: 850 nm
Tx Output:
Single-mode: > -5 dBm
Multi-mode: > -5 dBm
Rx Sensitivity:
Single-mode: -25 dBm
Multi-mode: -20 dBm
Point-to-Point Transmission: Half-duplex or full-duplex
Ring Transmission: Half-duplex

RS-232/422/485 Side

Connector: Terminal Block
RS-232 Signals: Tx, Rx, GND
RS-422 Signals: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w Signals: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND
Baudrate: 50 bps to 921.6 Kbps
ESD Protection: 15 KV for all signals

Physical Characteristics

Housing: Aluminum (1 mm)
Dimensions:
Without ears: 67 x 100 x 22 mm (2.64 x 3.94 x 0.87 in)
With ears: 90 x 100 x 22 mm (3.54 x 3.94 x 0.87 in)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 75°C (-40 to 167°F)

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption: 140 mA @ 12 V
Power Line Protection:
2 KV Burst (EFT), EN61000-4-4
2 KV Surge, EN61000-4-5
Voltage Reversal Protection: Protects against V+/V- reversal
Over Current Protection: 1.1 A (protects against two signals shorted together)

Regulatory Approvals

FCC: Part 15 Subclass B
UL/CUL: UL60950-1
EMI: EN55022 1998, Class B
EMS:
EN61000-4-2 (ESD), Criteria A, Level 3
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria A, Level 2
EN61000-4-5 (Surge), Criteria A, Level 3
EN61000-4-6 (CS), Criteria A, Level 2
EN61000-4-8 (SFMF), Criteria A, Level 1

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

DIP Switch Settings

Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	OFF	OFF
RS-485-4w	OFF	OFF
RS-485-2w	OFF	ON

Built-in 120-ohm Terminator	SW3
Enable	ON
Disable	OFF

Fiber Mode	SW4
Ring mode	ON
Point-to-Point mode	OFF

TCF-142-M/S-ST

Dimensions

DIP Switch Settings

Serial Connection	SW1	SW2
RS-232	ON	OFF
RS-422	OFF	OFF
RS-485-4w	OFF	OFF
RS-485-2w	OFF	ON

Built-in 120-ohm Terminator	SW3
Enable	ON
Disable	OFF

Fiber Mode	SW4
Ring mode	ON
Point-to-Point mode	OFF

TCF-142-M/S-SC
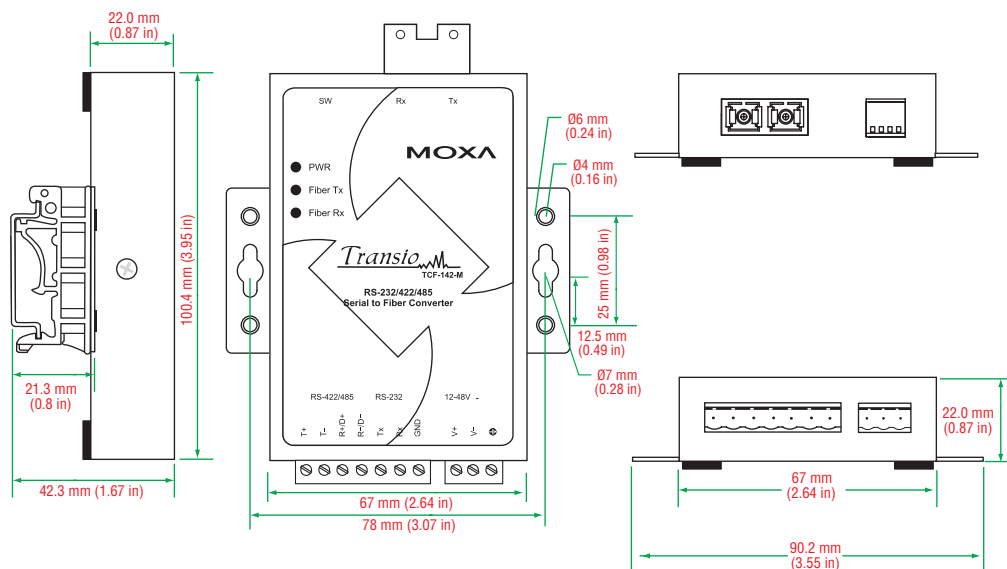
⋮ Ordering Information

Available Models

TCF-142-M-SC: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector, 0 to 60°C operating temperature

TCF-142-M-ST: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector, 0 to 60°C operating temperature

TCF-142-S-SC: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector, 0 to 60°C operating temperature

TCF-142-S-ST: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector, 0 to 60°C operating temperature

TCF-142-M-SC-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C operating temperature

TCF-142-M-ST-T: RS-232/422/485 to multi-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C operating temperature

TCF-142-S-SC-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and SC connector, -40 to 75°C operating temperature

TCF-142-S-ST-T: RS-232/422/485 to single-mode optical fiber media converter with fiber ring support and ST connector, -40 to 75°C operating temperature

Package Checklist

- TCF-142 media converter
- Power jack to 3-pin terminal block adaptor
- Quick Installation Guide (printed)
- Warranty Card

TCF-90 Series

Port-powered RS-232 to optical fiber media converters

> Use either external power or power over serial
> Extends RS-232 transmission up to:
>   ▪ 40 km with single-mode—TCF-90-S
>   ▪ 5 km with multi-mode—TCF-90-M
> Reduces signal interference
> Protects against electrical interference or chemical corrosion
> 15 KV ESD protection for serial signals
> Baudrates up to 921.6 Kbps
> Compact size

RoHS | Port Power | USB Power | Ext. Power | 15 KV ESD | CE | FC
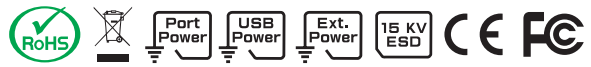
: Specifications

The TCF-90 is a compact media converter that transmits RS-232 signals over optical fiber. Power is derived from either the serial port or an external power source. The TCF-90 extends RS-232 transmission up to 5 km with multi-mode fiber, or up to 40 km with single-mode fiber. A pair of TCF-90 converters can be used to connect two RS-232 devices with optical fiber in full duplex mode. The optical fiber isolates the data signals from dangerous increases in ground potential, ground loops, and electrical EMI/RFI noise, and enhances data security by eliminating the harmful effects of RF radiation and susceptibility to electromagnetic radiation.

: Self-powered RS-232 to Optical Fiber

Connecting RS-232 devices to the TCF-90 is easy. The ST-type optical fiber connector is designed especially for data communication applications that transmit data either between or within buildings. The TCF-90 can be used for industrial applications and for applications that require secure data transfer.

The RS-232 port on the TCF-90 uses a DB9 female socket to connect directly to the host PC, with power drawn from the TxD, RTS, and DTR lines. Although the TCF-90 can obtain enough power from the three data/handshake lines whether the signal is high or low, we strongly recommend setting either the RTS or DTR signal to ON.

RS-232 Devices | Rx | Tx

Fiber Optic Connection

Tx | Rx | **RS-232 Devices**
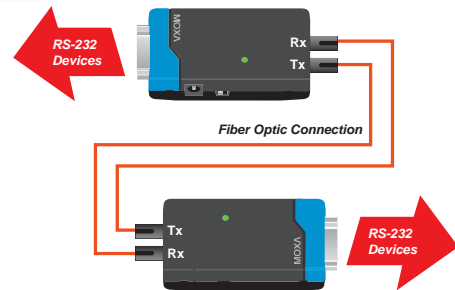
: LED Port Power Indicator

It's easy enough to use a multimeter to test if the serial device is supplying the TCF-90 with enough power through the serial connection, but why bother when the TCF-90 can do the testing for you? Connect the TCF-90 to the device's RS-232 port and set the SW4 switch to Test mode. If the port power LED indicator lights up, the TCF-90 is receiving enough power. If the LED does NOT light up, you will need to attach an external power source to the TCF-90.

SW4
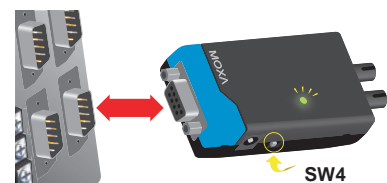
: Optional External Power Source

In most circumstances, the TCF-90 should be able to operate without using an external power source. However, an external USB power cord or DC power supply can be used in situations where the handshake lines are not available, both the RTS/DTR signals are set to OFF, or the attached device's serial interface chip provides less power than required.

Data *TxD* | *Single/Multi-mode Fiber Connection*

USB Port Power Cord

Data *TxD* | *Single/Multi-mode Fiber Connection*

5 to 12 VDC Ext. Power Adaptor
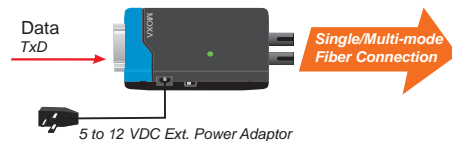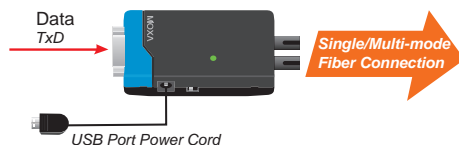
: Specifications

Optical Fiber Side

Fiber Connector: ST
Cable Requirements:
Single-mode: 8.3/125, 8.7/125, 9/125, or 10/125 µm
Multi-mode: 50/125, 62.5/125, or 100/140 µm
Transmission Distance:
Single-mode: 40 km
Multi-mode: 5 km
Wavelength:
Single-mode: 1310 nm
Multi-mode: 850 nm
Tx Output:
Single-mode: > -5 dBm
Multi-mode: > -5 dBm
Rx Sensitivity:
Single-mode: -24 dBm
Multi-mode: -20 dBm

RS-232 Side

Connector: DB9 female
Signals:
RS-232 Tx, Rx, GND (Loop-back wiring: RTS to CTS, DTR to DSR and DCD)

Baudrate: 50 bps to 921.6 Kbps

Physical Characteristics

Housing: ABS + PC
Dimensions: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements

Source of Input Power: RS-232 port (TxD signal) or power input jack
Input Voltage: 12 to 48 VDC
Power Consumption: 20 mA @ 5 V (with termination disabled)

Regulatory Approvals

CE: Class B
FCC: Class B

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

12

Serial Media Converters > TCF-90 Series

Dimensions

DB9 female connector

PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS
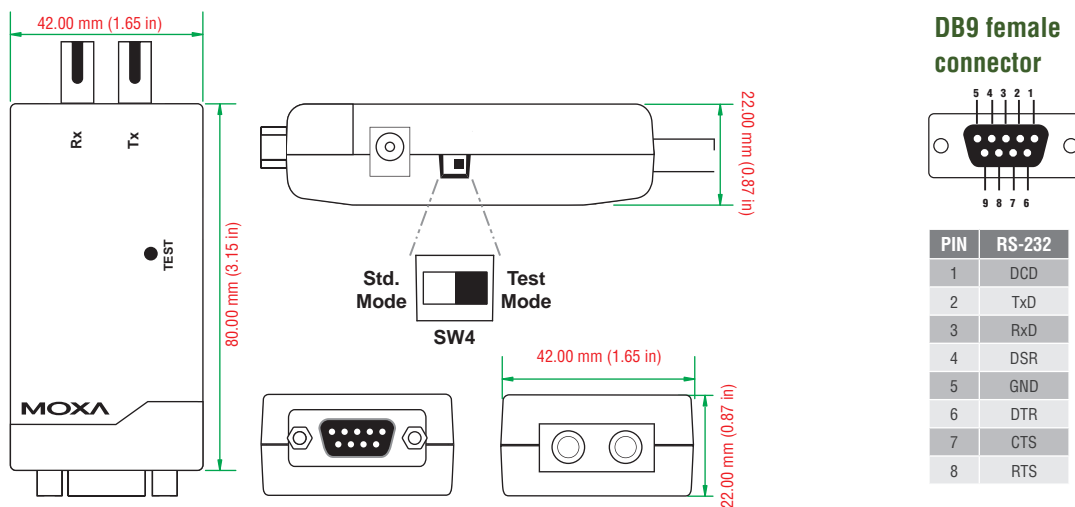
: Ordering Information

Available Models

TCF-90-M: Port-powered RS-232 to multi-mode optical fiber converter with ST connector for 5 km transmission
TCF-90-S: Port-powered RS-232 to single-mode optical fiber converter with ST connector for 40 km transmission
Note: Models with SC/FC connectors or a 60 km range are available by request.

Optional Accessories (can be purchased separately)

Power Adaptor: See Appendix A for details
CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist

- TCF-90 media converter
- USB power cord (50 cm)
- Quick Installation Guide
- Warranty Card

TCC-100/100I Series

Industrial RS-232 to RS-422/485 converters with optional 2 KV isolation

> RS-232 to RS-422 conversion with RTS/CTS support
> RS-232 to 2-wire or 4-wire RS-485 conversion
> 2 KV isolation protection (TCC-100I)
> Wall and DIN-rail mounting
> Plug-in terminal block for easy RS-422/485 wiring
> LED indicators for power, Tx, Rx
> Wide temperature model available (-40 to 85°C)

Introduction

The TCC-100/100I series RS-232 to RS-422/485 converters increase networking capability by extending the RS-232 transmission distance. Both converters have a superior industrial-grade design that includes DIN-rail mounting, terminal block wiring, external terminal block for power, and optical isolation (TCC-100I and TCC-100I-T only). The TCC-100/100I series converters are ideal solutions for converting RS-232 signals to RS-422/485 in critical industrial environments.

Specifications

RS-232 Side
Connector: DB9 female
Signals:
RS-232: TxD, RxD, RTS, CTS, GND

RS-422/485 Side
Connector: Terminal Block
Signals:
(interface selected by DIP switch)
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication
Baudrate: 50 bps to 921.6 Kbps
ESD Protection: 15 KV
Optical Isolation: 2 KV (TCC-100I/100I-T)

Physical Characteristics
Housing: Aluminum
Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)
Weight: 148 ± 5 g

Environmental Limits
Operating Temperature:
Standard Models: -20 to 60°C (-4 to 140°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
TCC-100/100-T: 300 mA @ 12 V
TCC-100I/100I-T: 400 mA @ 12 V
Voltage Reversal Protection: Protects against V+/V- reversal
Over Current Protection: Protects against two signals shorted together

Regulatory Approvals
CE: Class B
FCC: Class B

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

DB9 female connector

PIN	RS-232		PIN	RS-232
1	–		5	GND
2	TxD		6	–
3	RxD		7	CTS
4	–		8	RTS

Ordering Information

Available Models
TCC-100: RS-232 to RS-422/485 converter, -20 to 60°C operating temperature
TCC-100I: RS-232 to RS-422/485 converter with optical isolation, -20 to 60°C operating temperature
TCC-100-T: RS-232 to RS-422/485 converter, -40 to 85°C operating temperature
TCC-100I-T: RS-232 to RS-422/485 converter with optical isolation, -40 to 85°C operating temperature

Package Checklist
- TCC-100/100I series media converter
- DK-35A: DIN-rail mounting kit
- Power jack to 3-pin terminal block adaptor
- Quick Installation Guide (printed)
- Warranty Card

TCC-80/80I Series

Port-powered RS-232 to RS-422/485 converters with optional 2.5 KV isolation

TCC-80-DB9   TCC-80

TCC-80I-DB9   TCC-80I

> External power source supported but not required
> High-speed transmission up to 921.6 Kbps
> Compact size
> Converts RS-422, and both 2-wire and 4-wire RS-485
> RS-485 automatic data direction control
> Automatic baudrate detection
> 15 KV serial ESD protection
> Built-in 120-ohm termination resistors
> 2.5 KV isolation (for TCC-80I only)
> LED port power indicator
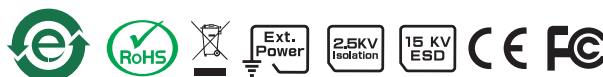
Introduction

The TCC-80/80I media converters provide complete signal conversion between RS-232 and RS-422/485, without requiring an external power source. The converters support both half duplex 2-wire RS-485 and full duplex 4-wire RS-422/485, either of which can be converted between RS-232's TxD and RxD lines. In addition,the TCC-80/80I's 15 KV ESD protection guards against damage from electrostatic discharge, and the TCC-80I is the world's first high-speed, port-powered converter with 2.5 KV isolation.

Automatic data direction control is provided for RS-485. In this case, the RS-485 driver is enabled automatically when the circuitry senses the TxD output from the RS-232 signal. This means that no programming effort is required to control the transmission direction of the RS-485 signal. Moreover, the TCC-80I's patented LED port power indicator lets you check whether or not the TCC-80I is receiving enough power.

Port Power over RS-232

The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD line. Regardless of whether the signal is high or low, the TCC-80/80I can obtain enough power from the data line. However, external power can be used if the handshake line is not available, if the serial cable is too long, or if the RS-232 device is a low power device. For external power, a 5 to 12 VDC power supply can be connected using an adaptor or a USB power cord.

Power over TXD
TxD

T+
T-
R+ / D+
R- / D-
GND

RS-422/485 Devices

External Power Adaptor

TxD

RTS

DTR

T+
T-
R+ / D+
R- / D-
GND

Long Range/ Terminated RS-422/485 Connection

Power Adaptor

USB Power

TxD

RTS

DTR

T+
T-
R+ / D+
R- / D-
GND

Long Range/ Terminated RS-422/485 Connection
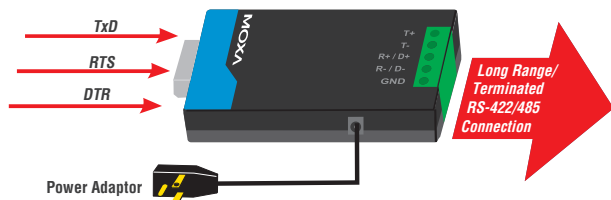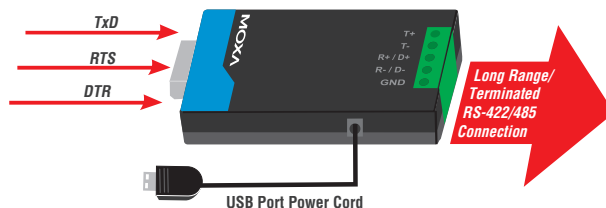
USB Port Power Cord

⋮ Port Power Dissipation

When installing a TCC-80 or TCC-80I converter, it is important to pay attention to power consumption, RS-232 cable length, and RS-422/485 transmission distance. In general, the TCC-80 and TCC-80I obtain 50 mW of power from the power source. Standard PC COM ports can provide 70 to 90 mW of power if the TxD, RTS, and DTR lines are connected. Moreover, the RS-232 cable should be shorter than 15 m (@ 9600 bps) to ensure that less power is lost from the host/device to the TCC-80. The remainder of the supplied power is used for transmitting the RS-422/485 signal.

⋮ Port Power and Optical Isolation

The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD line. Electrical 2.5 KV isolation for the TCC-80I is achieved with a photo coupler that transforms the electrical signal into light, and then re-transforms the light back into an electrical signal on the other side. In this way, the two electrical circuits are completely isolated from each other. This also protects the devices from ground loop currents, reduces damage caused by data loss, and prevents damage to the communication interfaces.
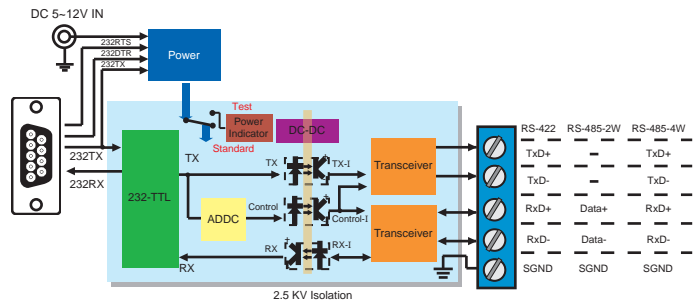
⋮ LED Port Power Indicator

It's easy enough to test the serial device with a multimeter to determine that the serial device will provide enough power to the media converter. However, it's even easier to let the TCC-80/80I test the device for you. Simply connect the TCC-80/80I to the device's RS-232 port and set the SW4 switch to Test mode. If the patented port power LED indicator lights up, the TCC-80/80I is receiving enough power. If the LED does not light up, you will need to attach an external power source to the TCC-80/80I.
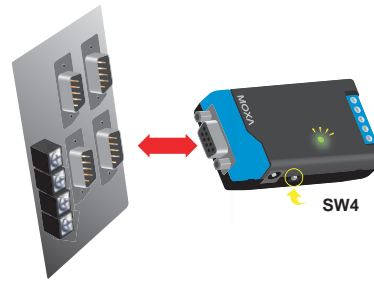
⋮ Specifications

RS-232 Side
Connector: DB9 female
Signals:
RS-232: TxD, RxD, GND
(Loop-back wiring: RTS to CTS, DTR to DSR and DCD)

RS-422/485 Side
Connector: Terminal Block or DB9 male
Signals:
(interface selected by DIP switch)
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w Signals: Data+, Data-, GND
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication
Baudrate: 50 bps to 921.6 Kbps
ESD Protection: 15 KV
Optical Isolation: 2.5 KV rms for 1 minute (TCC-80I only)

Physical Characteristics
Housing: ABS + PC
Dimensions: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)
Weight: 50 ± 5 g

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements
Source of Input Power: RS-232 port (TxD, RTS, DTR) or power input jack
Input Voltage: 5 to 12 VDC
Power Consumption:
TCC-80: 10 mA @ 5 V (with termination disabled)
TCC-80I: 20 mA @ 5 V (with termination disabled)

Regulatory Approvals
CE: Class B
FCC: Class B

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

TCC-80/80I

42.00 mm (1.65 in)

T+ T- R+ / D+ R- / D- GND

80.00 mm (3.15 in)

22.00 mm (0.87 in)

MOXA

Std. Mode   Test Mode

SW4

42.00 mm (1.65 in)

22.00 mm (0.87 in)

DB9 female connector

5 4 3 2 1

9 8 7 6
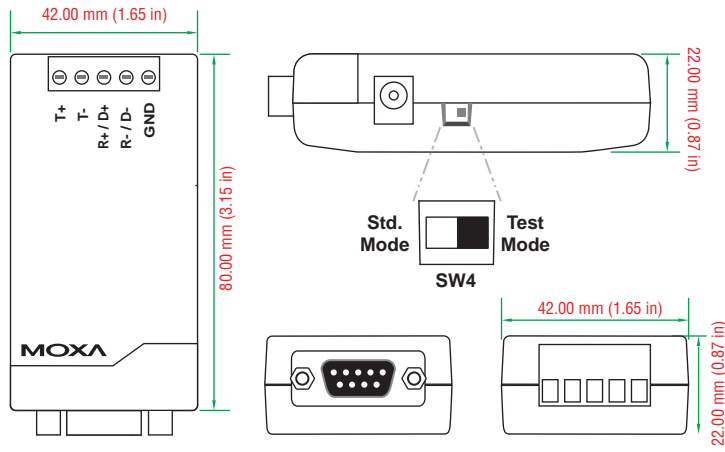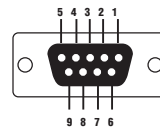
PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

DIP Switch Settings

ON
1 2 3

DIP Switch Settings			
RS-422 with Terminator	SW1	SW2	SW3
	OFF	OFF	ON
RS-422	SW1	SW2	SW3
	OFF	OFF	OFF
4-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	OFF	ON
4-wire RS-485	SW1	SW2	SW3
	ON	OFF	OFF
2-wire RS-485 with Terminator	SW1	SW2	SW3
	ON	ON	ON
2-wire RS-485	SW1	SW2	SW3
	ON	ON	OFF

TCC-80-DB9, TCC-80I-DB9

42.00mm [1.654 in]

80.0mm

23.60mm [0.929 in]

91.00mm [3.583 in]

MOXA
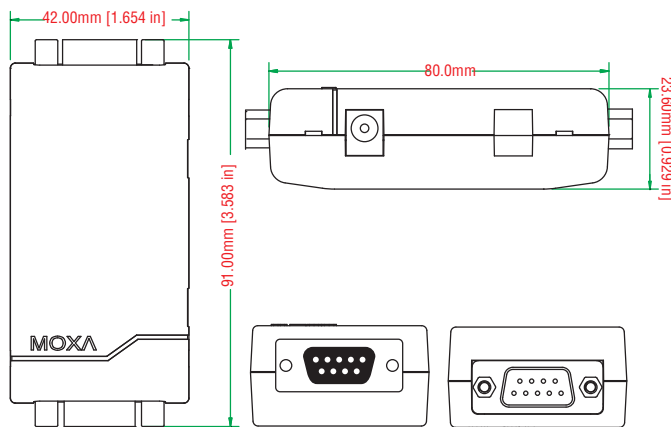
DB9 male RS-422/485 port

1 2 3 4 5

6 7 8 9
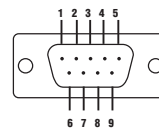
PIN	RS-422/RS-485-4w	RS-485-2w
1	TxD+(B)	–
2	TxD-(A)	–
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(B)
5	GND	GND
6	–	–
7	–	–
8	–	–

:: Ordering Information

Available Models

TCC-80: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and terminal block on the RS-422/485 side

TCC-80-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection and DB9 male connector on the RS-422/485 side

TCC-80I: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, terminal block on the RS-422/485 side, and 2.5 KV optical isolation

TCC-80I-DB9: Port-powered RS-232 to RS-422/485 converter with 15 KV serial ESD protection, DB9 male connector on the RS-422/485 side, and 2.5 KV optical isolation

Optional Accessories (can be purchased separately)

CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist

- TCC-80 or TCC-80I media converter
- USB power cord (50 cm)
- Quick Installation Guide (printed)
- Warranty Card

12

Serial Media Converters > TCC-80/80I Series

TCC-120/120I

Industrial RS-422/485 converters/repeaters with optional 2 KV isolation

> Boost serial signal to extend transmission distance
> Wall or DIN-rail mounting
> Terminal block for easy wiring
> Power input from terminal block
> DIP switch setting for built-in terminator (120 ohms)
> Boost RS-422 or RS-485 signal, or convert RS-422 to RS-485
> 2 KV isolation protection (TCC-120I)

: Introduction

The TCC-120 and TCC-120I are RS-422/485 converters/repeaters designed to extend RS-422/485 transmission distance. Both products have a superior industrial-grade design that includes DIN-rail mounting, terminal block wiring, and external terminal block for power. In addition, the TCC-120I supports optical isolation for system protection. The TCC-120 and TCC-120I are ideal RS-422/485 converters/repeaters for critical industrial environments.

: Specifications

Serial Communication
Connectors: Terminal Block on both ends
Baudrate: 50 bps to 921.6 Kbps
Signals:
RS-422/485-4w: TxD+, TxD-, RxD+, RxD-
RS-485-2w: Data+, Data-
RS-485 Data Direction Control: ADDC® (automatic data direction control)
ESD Protection: 15 KV for all signals
Optical Isolation: 2 KV for power and signal (TCC-120I only)

Physical Characteristics
Housing: Aluminum
Dimensions: 67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)
Weight: 148 ± 5 g

Environmental Limits
Operating Temperature: -20 to 60°C (-4 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 85°C (-14 to 176°F)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
TCC-120: 98 mA @ 12 V, 1.18 W
TCC-120I: 234 mA @ 12 V, 2.81 W
Voltage Reversal Protection: Protects against V+/V- reversal
Over Current Protection: Protects against two signals shorted together

Regulatory Approvals
CE: Class B
FCC: Class B

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Ordering Information

Available Models
TCC-120: RS-422/485 converter/repeater
TCC-120I: RS-422/485 converter/repeater with 2 KV optical isolation

Package Checklist
- TCC-120 or TCC-120I media converter
- DK-35A: DIN-rail mounting kit
- Quick Installation Guide (printed)
- Warranty Card

Dimensions
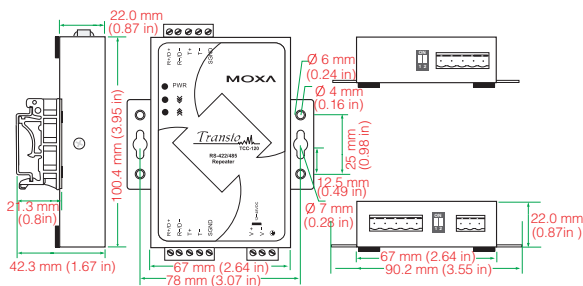
TCC-82

Port-powered RS-232 4-channel isolator

> 4 channels of 4 KV RMS isolation for 1 minute
> External power source supported but not required
> 15 KV serial ESD protection
> Automatic baudrate detection
> Compact size

RoHS | Port Power | USB Power | Ext. Power | 4 KV Isolation | 15 KV ESD | CE | FC

: Introduction

The TCC-82 provides full electrical isolation for bi-directional serial communication between two RS-232 devices in a compact, industrial-grade package. Both sides of an RS-232 connection are isolated optically to provide perfect protection against lightning surges, accidental high voltage shorts, and ground loops. The built-in, wide range isolators are tested to ensure that they can withstand more than 4 KV rms input to output for 1 minute. This means that the TCC-82 not only meets the requirements of general serial data communications, but also the high standards required by industrial automation and medical applications. The TCC-82 protects the TxD and RxD data lines, and also protects the RTS and CTS handshake lines for a total of 4 isolated channels to provide complete protection of your RS-232 applications.

+5 V | Isolated 5 V

Data Input → Optical Isolator → Data Output

+5V | Isolated 5 V
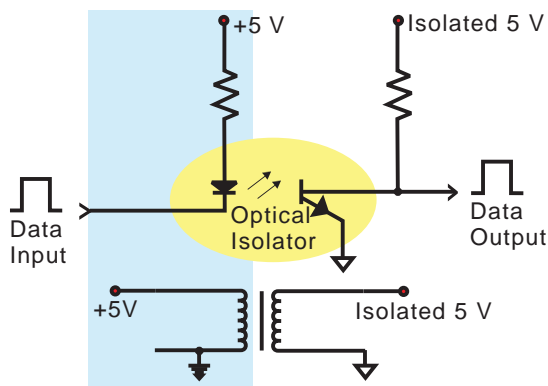
: External Power Source Not Required

The TCC-82 supports port-powered operation, which means that it can obtain power directly from the attached serial devices. Power is obtained from the RS-232 TxD, RTS, or DTR lines, regardless of whether the signal is high or low, eliminating the need for an external power supply. However, external power can be used if handshake lines are not available, if the serial cable is too long, or if the serial device is a low powered device. For external power, the TCC-82 can use a 5 to 12 VDC adaptor or a USB power cord. Note that both sides of the connection are powered independently, so if necessary, one side can rely on port power and the other on an external power source.
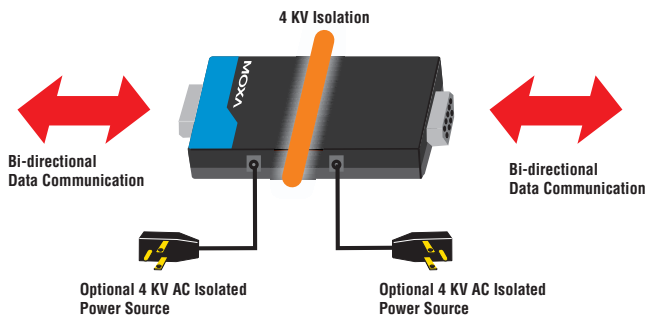
When installing the TCC-82, we recommend that you connect all output signals. The TCC-82 obtains power from these signals even if they are not used by your system. Care should be taken when choosing the external power supply if your application requires the full 4 KV of isolation. Most commercial power supplies provide only 1500 VAC isolation between the primary and secondary windings. If you are using external power for both sides of the TCC-82, make sure that separate power sources are used, each with sufficient isolation protection.

4 KV Isolation

Bi-directional Data Communication

Bi-directional Data Communication

Optional 4 KV AC Isolated Power Source

Optional 4 KV AC Isolated Power Source

: Specifications

Serial Communication
Connectors: DB9 male and DB9 female
Baudrate: 50 bps to 921.6 Kbps
Signals:
RS-232: TxD, RxD, RTS, CTS, GND
(Loop-back wiring: DTR to DSR and DCD)
ESD Protection: 15 KV for all signals
Optical Isolation: 4 KV for 1 minute

Physical Characteristics
Housing: ABS
Dimensions: 42 x 80 x 23.6 mm (1.65 x 3.15 x 0.93 in)
Weight: 60 ± 5 g

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 75°C (-14 to 167°F)

Power Requirements
Source of Input Power: RS-232 port (TxD signal) or power input jack
Input Voltage: 5 to 12 VDC
Power Consumption: 20 mA @ 5 V

Regulatory Approvals
CE: Class B
FCC: Class B

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

PIN	RS-232
1	DCD
2	TxD
3	RxD
4	DSR
5	GND
6	DTR
7	CTS
8	RTS

DB9 female connector

PIN	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

DB9 male connector
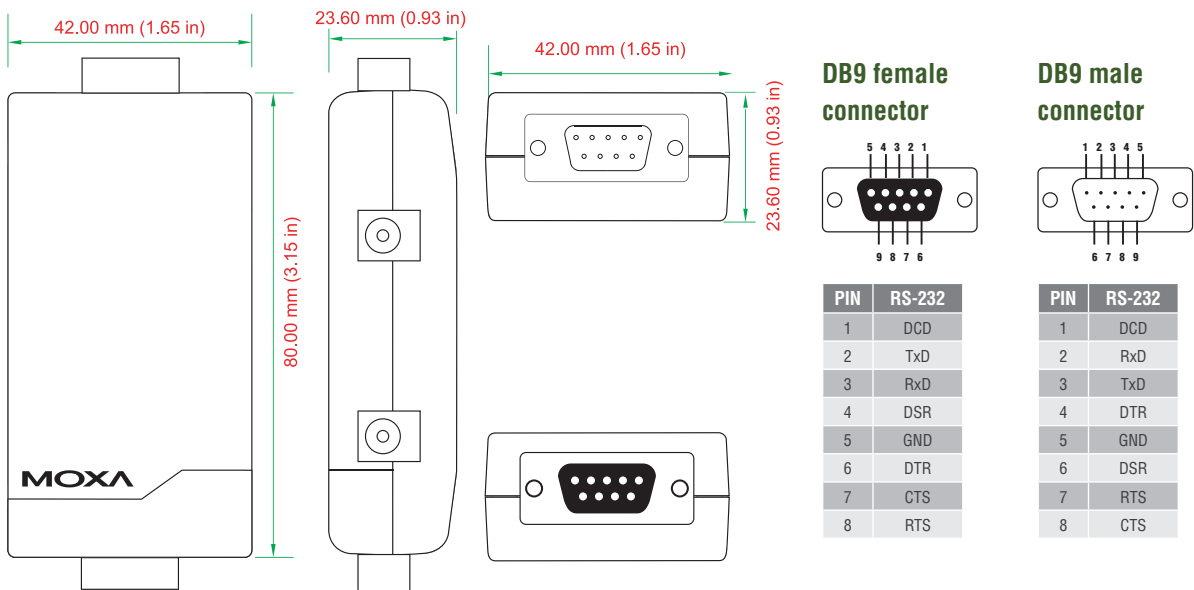
: Ordering Information

Available Models
TCC-82: Port-powered RS-232 isolator with 4 KV isolation and 15 KV serial ESD protection

Optional Accessories (can be purchased separately)
Power Adaptor
CBL-F9M9-20: DB9 male to DB9 female RS-232 cable (20 cm)

Package Checklist
- TCC-82 media converter
- USB power cord (50 cm) x 2
- Quick Installation Guide (printed)
- Warranty Card

Introduction to CAN-to-Fiber Media Converters

: Introduction to CAN

CAN is a serial communications bus defined by the International Standardization Organization (ISO). The CAN serial bus was introduced in 1986 as the "Automotive Serial Controller Area Network," a multimaster message broadcast system that specifies a maximum signaling rate of 1 Mbps. It was soon discovered that CANbus worked extremely well for many other applications, including weaving machines, elevator systems in large buildings, ships, trains, aircraft,

x-ray machines and other medical equipment, logging equipment, tractors and combines, coffee makers, and major appliances. CAN systems are extremely versatile. Technicians find it easy to repair or replace computer hardware in a CAN system without affecting the rest of the network in any way, and design engineers can easily modify existing CAN systems for other uses by adding or remove network nodes.

: Why CAN-to-Fiber Media Converters?

Many applications require connecting large numbers of CAN devices in a complex environment. However, since there is a limit to the driving capability of CANbus, users may not be able to set up as many CAN devices as they would like. In addition, variations in the allowed segment lengths, which result from the fact that different types of wire are used, poses additional limitations. Note that device numbers and segment lengths are dictated by the ISO 11898-2 standard.

CAN converters are used to get around the limitation on the number of CAN devices and the upper limit of segment lengths. Most installers use optical fiber to extend to longer transmission distances since the fiber will not corrupt the CANbus signal. CAN-to-fiber converters not only can solve the problem of extending transmission distance, but will also guarantee more secure data transmission and will not limit the number of CAN devices that can be used. The ICF-1170I is a CAN-to-fiber converter that secures data transmission by using fiber optic transmission to provide complete isolation and protection against EMI. The ICF-1170I series can separate and protect critical segments of the system from the rest of the CAN network and is protocol independent, allowing it to work with all of the different CAN protocols and frame lengths.

Typical Installation
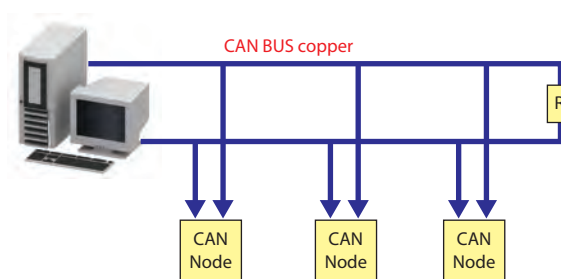
: Overview of the ICF-1170I CAN-to-Fiber Converter

The ICF-1170I series CAN-to-fiber converters provide secures data transmission by using fiber optic transmission to provide complete isolation and protection against EMI. The ICF-1170I series can

separate and protect critical segments of the system from the rest of the CAN network and is protocol independent, allowing it to work with all of the different CAN protocols and frame lengths.

Typical CAN application that uses a CAN-to-fiber converter

: Special Features

Fiber Test Mode

The ICF-1170I supports a special feature called Fiber Test Mode, which is easily activated with a DIP switch on the ICF-1170I's outer panel. Fiber Test Mode can be used to test the fiber cable between two ICF-1170I units, and provides a simple way to determine if the fiber cable is transmitting data correctly.

When in Fiber Test Mode, the fiber transceiver (TX) will continuously send out a data signal and the "Fiber TX" LED will light up. On the other side of the connection, when the ICF-1170I fiber transceiver (RX) receives the data signal from the TX side, the "Fiber RX" LED will light up.

If both the "Fiber TX" and "Fiber RX" LEDs light up at the same time, it means the fiber transmission between the two converters is okay, and the fiber cable is connected properly. If the test fails, you should check the fiber cable and fiber connectors to determine the cause of the transmission error.

Fiber optic communication is working properly when both the TX and RX LEDs will light up.

Fiber TX LED light on

Fiber test mode on

Fiber RX LED light on
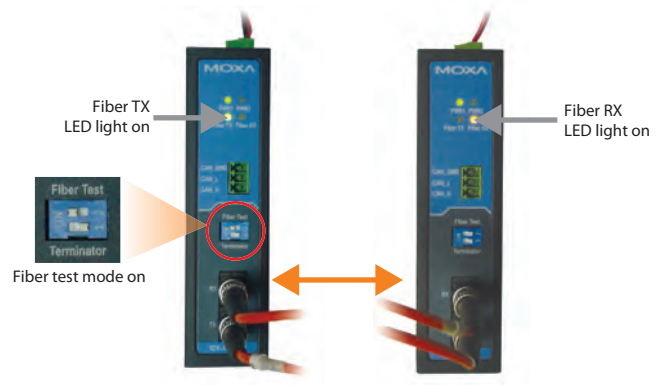
Redundant Power

To help ensure that your system works non-stop, the ICF-1170I CAN-to-fiber converter comes with a built-in redundant power input that is activated automatically when the primary power input fails. In addition, an alarm contact will be activated when the redundant power input is activated.

Isolation Protection

A special feature of the ICF-1170I CAN-to-fiber converter is its 2 KV isolation protection to protect the converter in environments with high electromagnet activity.

Long Transmission Distance

The ICF-1170I CAN-to-fiber converter supports a maximum transmission distance of about 2 km*, which makes it ideal for applications that require a longer transmission distance.

*Note: The maximum transmission distance of 2 km depends on the data rate and the protocol used, and is also limited by the signal rate, as indicated by the ISO 11898-2 standard.

ICF-1170I Series

Industrial CAN-to-fiber converters

> Transmits up to 2 km over optical fiber
> Converts CAN signals to fiber and fiber to CAN signals
> Baudrate up to 1 Mbps
> Dual power inputs for redundancy
> DIP switch for 120 Ω terminal resistance
> DIP switch for fiber test mode
> LEDs for Fiber TX, Fiber RX, Power 1, Power 2
> Wide temperature model available for -40 to 85°C environments
> Fully compatible with the ISO 11898 standard

: Introduction

The ICF-1170I series CAN-to-fiber converters are used to convert CAN signals from copper to optical fiber. The converters come with 2 KV optical isolation for the CANbus system and dual power inputs with alarm contact relay to ensure that your CANbus system will remain online.

: Fiber Test Mode

Fiber Test Mode can be used to test the fiber cable between two ICF-1170I units, and provides a simple way to determine if the fiber cable is transmitting data correctly. When in Fiber Test Mode, the fiber transceiver (TX) will continuously send out a data signal and the "Fiber TX" LED will light up. On the other side of the connection, when the ICF-1170I fiber transceiver (RX) receives the data signal form the TX side, the "Fiber RX" LED will light up.

: Specifications

CAN Communication
CANbus Interface: ISO 11898-2, Terminals (CAN_H, CAN_L,CAN_GND)
Protocols: CAN 2.0A and 2.0B (ISO 11898-2)
Connector Type: 3-pin removable screw terminal x1
Termination Resistor: Dip switch selector for 120 Ω terminal resistor
Buadrate: Up to 1 Mbps
System Delay: 150 ns
Isolation Protection: 2 KV
Transmission Distance: Max 2 km (depends on the data rate and the protocol used)
LED Indicators: PWR1, PWR2, Fiber TX, Fiber RX
Note: The transmission distance is limited by the signal rate, as mentioned in the ISO 11898-2 standard

Fiber Communication
Connector Type: ST (multi-mode) fiber ports x 2
Support Cable: 50/125, 62.5/125, or 100/140 μm (multi-mode)
Wavelength: 850 nm
TX Output: Multi-mode (> -5 dBm)
Rx Sensitivity: Multi-mode (-20 dBm)

Physical Characteristics
Housing: Aluminum (1 mm)
Dimensions: 30.3 x 70 x 115 mm (11.9x27.6x45.3 in)

Weight:
Product only: 175 g (0.39 lb)
Packaged: 320 g (0.71 lb)

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 12 to 48 VDC dual power inputs for redundant power
Power Consumption:
ICF-1170I: 221 mA @ 12 V
Alarm Contact: 1 relay output with current carrying of 1 A @ 24 VDC
Voltage Reversal Protection: Protects against V+/V- reversal
Over Current Protection: 1.1 A (protects against two signals shorted together)

Regulatory Approvals
CE: Class A
FCC: Part 15 sub Class A
UL: UL-508
TÜV: EN 60950-1
EMI: EN55022 1998, Class A

EMS:
EN61000-4-2 (ESD), Criteria B, Level 4
EN61000-4-3 (RS), Criteria A, Level 2
EN61000-4-4 (EFT), Criteria B, Level 4
EN61000-4-5 (Surge), Criteria B, Level 2
EN61000-4-6 (CS), Criteria B, Level 2
En61000-4-8 (PFMF), Criteria A, Level 3
Freefall: IEC 60068-2-32
MTBF: 792085 hrs

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions
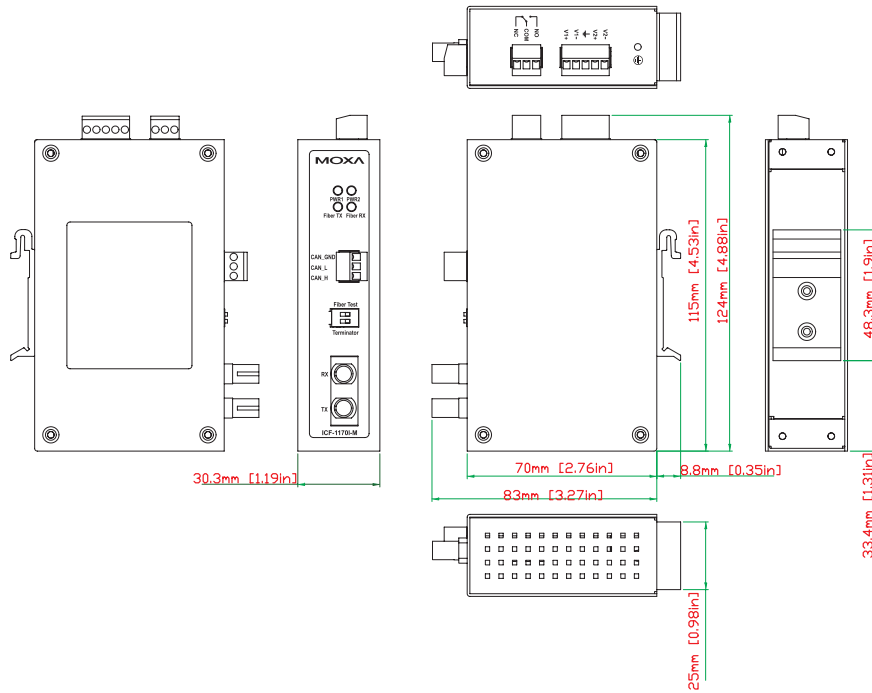
: Ordering Information

Available Models
ICF-1170I-M-ST: CAN-to-fiber converter, multi-mode, ST connector, 0 to 60°C
ICF-1170I-M-ST-T: CAN-to-fiber converter, multi-mode, ST connector, -40 to 85°C

Package Checklist
• ICF-1170I CANbus to Fiber Converter
• Quick Installation Guide (printed)
• Warranty Card

Embedded Computers

13

Embedded Computers

Wallmount Computers

	V2101-T-CE	V2101-T-XPE	V2101-T-LX	V2401-CE	V2401-XPE	V2401-LX	V2402-CE	V2402-XPE	V2402-LX
Computer									
CPU Speed	1.1 GHz	1.1 GHz	1.1 GHz	1.6 GHz	1.6 GHz	1.6 GHz	1.6 GHz	1.6 GHz	1.6 GHz
OS (pre-installed)	WinCE 6.0	Windows Embedded Standard 2009	Linux	WinCE 6.0	Window Embedded Standard 2009	Linux	WinCE 6.0	Windows Embedded Standard 2009	Linux
FSB	400 MHz	400 MHz	400 MHz	533 MHz	533 MHz	533 MHz	533 MHz	533 MHz	533 MHz
Flash	–	–	–	–	–	–	–	–	–
System Memory	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)	1 GB (2 GB max.)
USB Ports	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	6 (USB 2.0)	6 (USB 2.0)	6 (USB 2.0)	6 (USB 2.0)	6 (USB 2.0)	6 (USB 2.0)
Digital I/O	3 DIs, 3 DOs	3 DIs, 3 DOs	3 DIs, 3 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs
Storage									
Built-in	2 GB	2 GB	2 GB	2 GB (DOM)	2 GB (DOM)	2 GB (DOM)	2 GB (DOM)	2 GB (DOM)	2 GB (DOM)
CompactFlash Socket	✓ (for storing OS)	✓ (for storing OS)	✓ (for storing OS)	✓	✓	✓	✓	✓	✓
SD Slot	✓	✓	–	–	–	–	–	–	–
HDD Support	–	–	–	✓	✓	✓	✓	✓	✓
Other Peripherals									
KB/MS	–	–	–	1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable					
Audio	AC97 audio, with line-in/out interface			HD audio, with line-in/out interface					
Display									
Graphics Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓
VGA Output	✓	✓	✓	✓	✓	✓	✓	✓	✓
DVI Output	–	–	–	✓	✓	✓	✓	✓	✓
LVDS Output	✓	✓	✓	✓	✓	✓	–	–	–
LAN Interface									
10/100/1000 Mbps Ethernet Ports	2	2	2	2	2	2	2	2	2
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface									
RS-232 Ports	–	---	–	8 (68-pin VHDC)	8 (68-pin VHDC)	8 (68-pin VHDC)	–	–	–
RS-485	–	–	–	–	–	–	–	–	–
RS-232/422/485 Ports	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)
ESD Protection	2 KV	2 KV	2 KV	4 KV	4 KV	4 KV	4 KV	4 KV	4 KV
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	RTS/CTS, XON/XOFF			RTS/CTS, XON/XOFF, ADDC®					
Baudrate	50 bps to 115.2 Kbps			50 bps to 921.6 Kbps (non-standard baudrates supported)					
LEDs									
System	Power, Storage								
LAN	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M	100M, 1000M
Serial	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx	Tx, Rx
Physical Characteristics									
Housing	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Weight	940 g	940 g	940 g	2.1 kg	2.1 kg	2.1 kg	2 kg	2 kg	2 kg
Dimensions	150 x 49 x 125 mm			250 x 57 x 152 mm					
Mounting	DIN-Rail, wall, VESA								
Environmental Limits									
Operating Temperature	-40 to 85°C			-10 to 60°C					
Operating Humidity	5 to 95% RH								
Storage Temperature	-40 to 85°C								
Anti Vibration/Shock	2g/20g			5g/50g					
Regulatory Approvals									
EMC	CE (EN55022 Class A, EN61000-3-2 Class D, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)								
Safety	UL/cUL (UL508, UL609500-1, CSA C22.2 No. 60950-1-03), LVD, CCC (GB4943)								
Green Product	RoHS, cROHS, WEEE	RoHS, cROHS, WEEE							
Reliability									
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	3 years (see www.moxa.com/warranty)								

MOXA® www.moxa.com info@moxa.com

Wallmount Computers

	V462-CE	V462-XPE	V464-CE	V464-XPE	V466-CE	V466-XPE	V468-CE	V468-XPE	V481-CE V481-T-CE	V481-XPE V481-T-XPE
Computer										
CPU Speed	500 MHz	500 MHz	500 MHz	500 MHz	500 MHz	500 MHz	500 MHz	500 MHz	1 GHz	1 GHz
OS (pre-installed)	WinCE 6.0	WinXP Emb.	WinCE 6.0	WinXP Emb.	WinCE 6.0	WinXP Emb.	WinCE 6.0	WinXP Emb.	WinCE 5.0	WinXP Emb.
DRAM	–	–	–	–	–	–	–	–	–	–
SRAM	256 KB	256 KB	256 KB	256 KB	256 KB	256 KB	256 KB	256 KB	–	–
FSB	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz
Flash	–	–	–	–	–	–	–	–	–	–
System Memory	256 MB (1 GB max.)	512 MB (1 GB max.)	256 MB (1 GB max.)	512 MB (1 GB max.)	256 MB (1 GB max.)	512 MB (1 GB max.)	256 MB (1 GB max.)	512 MB (1 GB max.)	256 MB (1 GB max.)	512 MB (1 GB max.)
PCMCIA	✓	✓	–	–	–	–	–	–	–	–
Expansion Bus	PC/104-Plus onboard								PC/104 onboard	
USB Ports	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)
Digital I/O	–	–	–	–	–	–	8 DIs, 8 DOs	8 DIs, 8 DOs	–	–
Storage										
Built-in	256 MB	1 GB	256 MB	1 GB	256 MB	1 GB	256 MB	1 GB	256 MB	1 GB
CompactFlash Socket	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Peripherals										
KB/MS	1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable									
Audio	AC97 audio, with line-out interface								AC97 audio, with line-in/out interface	
Display										
Graphics Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mini Screen with Push Buttons	–	–	–	–	–	–	–	–	–	–
LAN Interface										
10/100 Mbps Ethernet Ports	2	2	4	4	4	4	4	4	1	1
10/100/1000 Mbps Ethernet Ports	–	–	–	–	–	–	–	–	1	1
Switch Ports	–	–	–	–	8	8	–	–	–	–
Controller	Realtek RTL8100CL								–	–
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface										
RS-232 Ports	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	–	–
RS-485	–	–	–	–	–	–	–	–	–	–
RS-232/422/485 Ports	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	8 (DB9-M)	8 (DB9-M)
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark									
Flow Control	RTS/CTS, XON/XOFF, ADDC®									
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)									
CANbus	–	–	–	–	–	–	–	–	–	–
LEDs										
System	Power, Battery, Storage								Power, Storage	
LAN	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M, Switch		10M, 100M	10M, 100M	10M, 100M, 1000M	
Physical Characteristics										
Housing	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Weight	1.32 kg	1.32 kg	1.32 kg	1.32 kg	1.32 kg	1.32 kg	1.32 kg	1.32 kg	2.2 kg	2.2 kg
Dimensions	223 x 121 x 57 mm								225 x 140 x 70 mm	
Mounting	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall
Environmental Limits										
Operating Temperature	-10 to 60°C								-10 to 60°C or -35 to 75°C	
Operating Humidity	5 to 95% RH									
Storage Temperature	-20 to 80°C or -40 to 85°C									
Anti Vibration / Shock	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g	5 g / 50 g
Regulatory Approvals										
EMC	CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)									
Safety	UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD, CCC (GB4943)								UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)	
Green Product	RoHS, CRoHS, WEEE									
Reliability										
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	3 years (see www.moxa.com/warranty)									

13

Embedded Computers > Product Selection Guides

Wallmount Computers

	UC-8410-LX UC-8410-T-LX	UC-8416-LX UC-8416-T-LX	UC-8418-LX UC-8418-T-LX	UC-7402-LX Plus	UC-7408-LX Plus UC-7408-T-LX Plus	UC-7408-CE UC-7408-T-CE	UC-7410-LX Plus
Computer							
CPU Speed	533 MHz	533 MHz	533 MHz	533 MHz	533 MHz	266 MHz	533 MHz
OS (pre-installed)	Linux			Embedded Linux		WinCE 5.0	Embedded Linux
DRAM	256 MB	256 MB	256 MB	128 MB	128 MB	128 MB	128 MB
SRAM	256 KB	256 KB	256 KB	–	–	–	–
FSB	–	–	–	–	–	–	–
Flash	16 MB (OS); 32 MB (data)	16 MB (OS); 32 MB (data)	16 MB (OS); 32 MB (data)	32 MB	32 MB	32 MB	32 MB
System Memory	–	–	–	–	–	–	–
PCMCIA	–	–	–	✓	✓	✓	✓
Expansion Bus	–	–	–	–	–	–	–
USB Ports	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	1 (USB 1.1)	1 (USB 1.1)	1 (USB 1.1)	1 (USB 1.1)
Digital I/O	4 DIs, 4 DOs	4 DIs, 4 DOs	12 DIs, 12 DOs	–	8 DIs, 8 DOs	8 DIs, 8 DOs	–
Storage							
Built-in	–	–	–	–	–	–	–
CompactFlash Socket	✓	✓	✓	✓	✓	✓	–
SD Slot	–	–	–	–	–	–	–
Display							
Mini Screen with Push Buttons	–	–	–	–	–	–	✓
LAN Interface							
10/100 Mbps Ethernet Ports	3	3	3	2	2	2	2
Switch Ports	–	8	–	–	–	–	–
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface							
RS-232/422/485 Ports	8 (RJ45)	8 (RJ45)	8 (RJ45)	–	8 (RJ45)	8 (RJ45)	8 (RJ45)
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Console Port	✓	✓	✓	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark			–	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark		
Flow Control	RTS/CTS, XON/XOFF, ADDC®			–	RTS/CTS, XON/XOFF, ADDC®		
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)			–	50 bps to 921.6 Kbps (non-standard baudrates supported)		
CANbus	–	–	2 (DB9-M)	–	–	–	–
LEDs							
System	Power, Ready, Storage, Battery						
LAN	10M, 100M						
Serial	TxD, RxD						
Physical Characteristics							
Housing	SECC sheet metal (1 mm)						
Weight	850 g	930 g	1 kg	830 g	870 g	870 g	810 g
Dimensions	200 x 37 x 120 mm	200 x 56 x 120 mm					
Mounting	DIN-Rail, wall						
Environmental Limits							
Operating Temperature	-10 to 60°C or -40 to 75°C				-10 to 60°C or -40 to 75°C		-10 to 60°C
Operating Humidity	5 to 95% RH				5 to 95% RH		5 to 95% RH
Storage Temperature	-20 to 80°C or -40 to 85°C				-20 to 80°C		-20 to 80°C
Anti Vibration/Shock	1g/5g	1g/5g	1g/5g	1g/5g	1g/5g	1g/5g	1g/5g
Regulatory Approvals							
EMC	CE (EN55022 Class B, EN55024-4-2, EN55024-4-3, EN55024-4-4), FCC (Part 15 Subpart B, Class B)			CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)			
Safety	UL/cUL (UL60950-1), CCC, LVD			UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)			
Green Product	RoHS, CRoHS, WEEE						
Reliability							
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)						

Wallmount Computers

	UC-7420-LX Plus	UC-7410-CE	UC-7420-CE	UC-7122-CE UC-7122-T-CE	UC-7124-CE UC-7124-T-CE	UC-7110-LX UC-7110-T-LX	UC-7112-LX	UC-7112-LX Plus	UC-7101-LX UC-7101-T-LX
Computer									
CPU Speed	533 MHz	266 MHz	266 MHz	200 MHz	200 MHz	192 MHz	192 MHz	192 MHz	192 MHz
OS (pre-installed)	Embedded Linux	WinCE 5.0				µClinux		Linux	µClinux
DRAM	128 MB	128 MB	128 MB	32 MB	32 MB	16 MB	16 MB	32 MB	16 MB
SRAM	–	–	–	–	–	–	–	–	–
FSB	–	–	–	–	–	–	–	–	–
Flash	32 MB	32 MB	32 MB	16 MB	16 MB	8 MB	8 MB	16 MB	8 MB
System Memory	–	–	–	–	–	–	–	–	–
PCMCIA	✓	–	✓	–	–	–	–	–	–
Expansion Bus	–	–	–	–	–	–	–	–	–
USB Ports	2 (USB 2.0), 1 (USB 1.1)	1 (USB 1.1)	2 (USB 2.0), 1 (USB 1.1)	–	–	–	–	–	–
Digital I/O	–	–	–	–	–	–	–	–	–
Storage									
Built-in	–	–	–	–	–	–	–	–	–
CompactFlash Socket	✓	–	✓	–	–	–	–	–	–
SD Slot	–	–	–	✓	✓	–	✓	✓	✓
Display									
Graphics Controller	–	–	–	–	–	–	–	–	–
Mini Screen with Push Buttons	✓	✓	✓	–	–	–	–	–	–
LAN Interface									
10/100 Mbps Ethernet Ports	2	2	2	2	2	2	2	2	1
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface									
RS-232/422/485 Ports	8 (RJ45)	8 (RJ45)	8 (RJ45)	2 (DB9-M)	4 (RJ45)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)	2 (DB9-M)
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Optical Isolation	–	–	–	–	–	–	–	–	–
Console Port	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark								
Flow Control	RTS/CTS, XON/XOFF, ADDC®								
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)								
CANbus	–	–	–	–	–	–	–	–	–
LEDs									
System	OS Ready			Ready, SD		Ready			Ready, SD
LAN	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M
Serial	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD
Physical Characteristics									
Housing	SECC sheet metal (1 mm)			Aluminum (1 mm)					
Weight	875 g	875 g	875 g	190 g	200 g	190 g	190 g	190 g	130 g
Dimensions	197 x 44 x 125 mm			77 x 111 x 26 mm					67 x 22 x 100.4 mm
Mounting	DIN-Rail, wall			DIN-Rail, wall					DIN-Rail, wall
Environmental Limits									
Operating Temperature	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C or -40 to 75°C					
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C		-20 to 80°C or -40 to 85°C			
Anti Vibration/Shock	1g/5g	1g/5g	1g/5g	–	–	–	–	–	–
Regulatory Approvals									
EMC	CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)								
Safety	UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)			LVD (EN60950-1), UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03)		UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)			LVD (EN60950-1), UL/cUL (UL60950, CAN/CSA-C22.2 No. 60950-00)
Green Product	RoHS, CRoHS, WEEE								
Reliability									
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)								

Rackmount Computers

	DA-660-8-LX	DA-660-8-CE	DA-660-16-LX	DA-660-16-CE	DA-661-16-LX	DA-661-16-CE	DA-662-16-LX	DA-662-16-CE	DA-662-I-16-LX	DA-662-I-16-CE
Computer										
CPU Speed	266 MHz	266 MHz	266 MHz	266 MHz	533 MHz	533 MHz	533 MHz	533 MHz	533 MHz	533 MHz
OS (pre-installed)	Emb. Linux	WinCE 5.0	Emb. Linux	WinCE 5.0	Emb. Linux	WinCE 5.0	Emb. Linux	WinCE 5.0	Emb. Linux	WinCE 5.0
DRAM	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB
FSB	–	–	–	–	–	–	–	–	–	–
Flash	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB
System Memory	–	–	–	–	–	–	–	–	–	–
PCMCIA	–	–	–	–	✓	✓	✓	✓	✓	✓
Expansion Bus	–	–	–	–	–	–	–	–	–	–
USB Ports	–	–	–	–	2	2	2	2	2	2
Storage										
Built-in	–	–	–	–	–	–	–	–	–	–
CompactFlash Socket	–	–	–	–	✓	✓	✓	✓	✓	√
HDD Support	–	–	–	–	–	–	–	–	–	–
Other Peripherals										
KB/MS	–	–	–	–	–	–	–	–	–	–
Display										
Graphics Controller	–	–	–	–	–	–	–	–	–	–
Mini Screen with Push Buttons	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LAN Interface										
10/100 Mbps Ethernet Ports	2	2	2	2	2	2	4	4	4	4
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Digital Isolation Protection	–	–	–	–	–	–	–	–	2 KV	2 KV
Serial Interface										
RS-232/422/485 Ports	8 (RJ45)	8 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)	16 (RJ45)
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Digital Isolation	–	–	–	–	–	–	–	–	2 KV	2 KV
Console Port	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark									
Flow Control	RTS/CTS, XON/XOFF, ADDC®									
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)									
LEDs										
System	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready	OS Ready
LAN	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M
Serial	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD
Physical Characteristics										
Housing	SECC sheet metal (1 mm)									
Weight	2.6 kg	2.6 kg	2.6 kg	2.6 kg	2.6 kg	2.6 kg	2.6 kg	2.6 kg	2.94 kg	2.94 kg
Dimensions	440 x 45 x 198 mm								440 x 45 x 228 mm	
Mounting	Standard 19-inch rackmount									
Environmental Limits										
Operating Temperature	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C	-20 to 80°C
Regulatory Approvals										
EMC	CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)									
Safety	UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)									
Green Product	RoHS, CRoHS, WEEE									
Reliability										
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)									

13

Embedded Computers ˅ Product Selection Guides

Rackmount Computers

	DA-710-XPE	DA-710-LX	DA-681-I-SP-CE	DA-681-I-SP-XPE	DA-681-I-SP-LX	DA-681-I-DP-CE	DA-681-I-DP-XPE	DA-681-I-DP-LX	DA-682-CE	DA-682-XPE	DA-682-LX
Computer											
CPU Speed	2 GHz	2 GHz	1 GHz	1 GHz	1 GHz	1 GHz	1 GHz	1 GHz	1 GHz	1 GHz	1 GHz
OS (pre-installed)	Win. Embedded Standard 2009	Linux	WinCE 6.0	WinXP Emb.	Linux	WinCE 6.0	WinXP Emb.	Linux	WinCE 6.0	WinXP Emb.	Linux
DRAM	–	–	–	–	–	–	–	–	–	–	–
FSB	533 MHz	533 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz	400 MHz
Flash	–	–	–	–	–	–	–	–	–	–	–
System Memory	1 GB (2 GB max.)	1 GB (2 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)	256 MB (1 GB max.)	512 MB (1 GB max.)	512 MB (1 GB max.)
PCMCIA	–	–	–	–	–	–	–	–	–	–	–
Expansion Bus	4 slots	4 slots	PC/104 onboard						2 slots	2 slots	2 slots
USB Ports	4 (USB 2.0)	4 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)	4 (USB 2.0)
Digital I/O	4 DIs, 4 DOs	4 DIs, 4 DOs	–	–	–	–	–	–	–	–	–
Storage											
Built-in	2 GB	1 GB	1 GB	2 GB	1 GB	1 GB	2 GB	1 GB	256 MB	1 GB	1 GB
CompactFlash Socket	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HDD Support	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Peripherals											
KB/MS	1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse via Y-type cable (Optional)										
Display											
Graphics Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mini Screen with Push Buttons	–	–	–	–	–	–	–	–	–	–	–
LAN Interface											
10/100 Mbps Ethernet Ports	–	–	6	6	6	6	6	6	–	–	–
10/100/1000 Mbps Ethernet Ports	4	4	–	–	–	–	–	–	4	4	4
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
100BaseFX Fiber Ports (multi-mode)	–	–	–	–	–	–	–	–	–	–	–
Serial Interface											
RS-232 Ports	2 (DB9-M)	2 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	–	–	–
RS-485	–	–	8 (TB)	8 (TB)	8 (TB)	8 (TB)	8 (TB)	8 (TB)	–	–	–
RS-232/422/485 Ports	–	–	–	–	–	–	–	–	–	–	–
ESD Protection	4 KV	4 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV	–	–	–
Digital Isolation	–	–	2 KV	2 KV	2 KV	2 KV	2 KV	2 KV	–	–	–
Console Port	–	–	–	–	–	–	–	–	–	–	–
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark		Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark						–	–	–
Flow Control	RTS/CTS, XON/XOFF		RTS/CTS, XON/XOFF, ADDC®						–	–	–
Baudrate	50 bps to 115.2 Kbps		50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)						–	–	–
LEDs											
System	Power, Storage, Power Failure		Ready, Storage, Power Failure (for dual power models only)						Ready, Power, Storage		
LAN	100M, 1000M		10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	100M, 1000M	100M, 1000M	100M, 1000M
Serial	TX, RX (for 4 modules), Programmable		TX, RX	TX, RX	TX, RX	TX, RX	TX, RX	TX, RX	TX, RX (for 2 modules)		
Physical Characteristics											
Housing	SECC sheet metal (1 mm)		SECC sheet metal (1 mm)								
Weight	14 kg		4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	4.5 kg	7 kg	7 kg	7 kg
Dimensions	400 x 480 x 180 mm		440 x 315 x 45 mm						440 x 315 x 90 mm		
Mounting	Standard 19-in rachmount		Standard 19-inch rackmount								
Environmental Limits											
Operating Temperature	-10 to 50°C		0 to 60°C	0 to 60°C	0 to 60°C	0 to 60°C	0 to 60°C	0 to 60°C	-10 to 60°C	-10 to 60°C	-10 to 60°C
Operating Humidity	5 to 95% RH		5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C		-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 75°C	-20 to 80°C	-20 to 80°C	-20 to 80°C
Regulatory Approvals											
EMC	CE, FCC (Part 15 Subpart B, CISPR 22 Class), CCC		CE (EN61000-3-2, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1) CE (EN55022); IEC 61850-3 for wide temp. models only						CE (EN61000-6-4)		
Safety	UL/cUL, LVD, CCC		UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)								
Green Product	RoHS, CRoHS, WEEE		RoHS, CRoHS, WEEE								
Reliability											
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	3 years (see www.moxa.com/warranty)										

13

Embedded Computers > Product Selection Guides

DIN-Rail Computers

	IA260-LX IA260-T-LX	IA260-CE IA260-T-CE	IA261-I-LX IA261-I-T-LX	IA261-I-CE IA261-I-T-CE	IA262-I-LX IA262-I-T-LX	IA262-I-CE IA262-I-T-CE	IA240-LX IA240-T-LX	IA241-LX IA241-T-LX
Computer								
CPU Speed	200 MHz	200 MHz	200 MHz	200 MHz	200 MHz	200 MHz	192 MHz	192 MHz
OS (pre-installed)	Linux	WinCE 6.0	Linux	WinCE 6.0	Linux	WinCE 6.0	Embedded Linux	
DRAM	128 MB (256 MB max.)						64 MB	64 MB
Flash	32 MB (64 MB max.)		32 MB	32 MB	32 MB	32 MB	32 MB	32 MB
PCMCIA	–	–	–	–	–	–	–	✓
USB Ports	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	2 (USB 2.0)	1 (USB 2.0)	1 (USB 2.0)
Digital I/O	8 DIs, 8 DOs	8 DIs, 8 DOs	8 DIs, 8 DOs	8 DIs, 8 DOs	8 DIs, 8 DOs	8 DIs, 8 DOs	4 DIs, 4 DOs	4 DIs, 4 DOs
Storage								
CompactFlash Socket	✓	✓	✓	✓	✓	✓	–	–
SD Slot	–	–	–	–	–	–	✓	✓
Display								
Graphics Controller	✓	✓	✓	✓	✓	✓	–	–
LAN Interface								
10/100 Mbps Ethernet Ports	2	2	2	2	2	2	2	2
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface								
RS-232/422/485 Ports	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	4 (DB9-M)	2 (DB9-M)	2 (DB9-M)	4 (RJ45)	4 (RJ45)
ESD Protection	4 KV	4 KV	15 KV	15 KV	15 KV	15 KV	15 KV	15 KV
Digital Isolation	–	–	2 KV	2 KV	2 KV	2 KV	–	–
Console Port	✓	✓	✓	✓	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark							
Flow Control	RTS/CTS, XON/XOFF, ADDC®							
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)							
CANbus	–	–	–	–	2 (DB9-M)	2 (DB9-M)	–	–
LEDs								
System	Power, Ready, Storage							
LAN	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M
Serial	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD	TxD, RxD
Physical Characteristics								
Housing	Aluminum, industrial vertical form factor						SECC sheet metal (1 mm)	
Weight	1 kg	1 kg	950 g	950 g	950 g	950 g	430 g	500 g
Dimensions	52 x 113 x 162 mm	52 x 113 x 162 mm	60 x 115 x 152 mm	60 x 115 x 152 mm	60 x 115 x 152 mm	60 x 115 x 152 mm	60 x 137 x 100 mm	60 x 137 x 100 mm
Mounting	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall
Environmental Limits								
Operating Temperature	-10 to 60°C or -40 to 75°C							
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C or -40 to 85°C							
Regulatory Approvals								
EMC	CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)						CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)	
Safety	UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)						UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)	
Green Product	RoHS, CRoHS, WEEE							
Reliability								
Buzzer, RTC, WDT	✓	✓	✓	✓	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)							

Modules and Boards

	EM-2260-CE	EM-2260-LX	EM-1240-LX EM-1240-T-LX	EM-1220-LX EM-1220-T-LX
Computer				
CPU Speed	200 MHz	200 MHz	192 MHz	192 MHz
OS (pre-installed)	WinCE 6.0	Linux	Embedded µClinux	
DRAM	128 MB	128 MB	16 MB	16 MB
Flash	32 MB	32 MB	8 MB	8 MB
Digital I/O	8 DIs, 8 DOs	8 DIs, 8 DOs	10 GPIOs	10 GPIOs
Storage				
SD Slot	–	–	✓	✓
EIDE Interface	✓	✓	–	–
Display				
Graphics Controller	✓	✓	–	–
LAN Interface				
10/100 Mbps Ethernet Ports	2	2	2	2
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Serial Interface				
RS-232/422/485 Ports	4	4	4	2
ESD Protection	15 KV	15 KV	15 KV	15 KV
Console Port	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark			
Flow Control	RTS/CTS, XON/XOFF, ADDC®			
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)			
Physical Characteristics				
Weight	70 g	70 g	50 g	40 g
Dimensions	106 x 87 mm	106 x 87 mm	90 x 80 mm	80 x 50 mm
Module Interface	–	–	Two 2 x 28 pin-headers (1.27 x 1.27 mm pitch)	
Environmental Limits				
Operating Temperature	-10 to 60°C	-10 to 60°C	-10 to 60°C or -40 to 75°C	
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C	-20 to 80°C	-20 to 80°C or -40 to 85°C	
Regulatory Approvals				
EMC	CE (Class A), FCC		CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)	
Green Product	RoHS, CRoHS, WEEE			
Reliability				
Buzzer, RTC, WDT	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)			

V2101 Series

x86 ready-to-run embedded computers with Intel Atom Z510PT, VGA, LVDS, audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD

-40°C 85°C

> Intel Atom Z510PT 1.1 GHz processor, 400 MHz FSB
> DDR2 SODIMM socket, supports DDR2 400 up to 2 GB
> Dual Independent Displays (VGA+ LVDS)
> 2 Gigabit Ethernet ports
> 4 USB 2.0 ports for high speed peripherals
> 3 DIs and 3 DOs
> 2 RS-232/422/485 ports
> Built-in CompactFlash for storing OS
> LED indicators for power, storage
> Ready-to-run Embedded Linux, WinCE 6.0, or Windows Embedded Standard 2009 platform
> -40 to 85°C wide operating temperature models available

Overview

The V2101 embedded computers are based on the Intel Atom Z510PT x86 processor, and feature 2 serial ports, dual Gigabit LAN ports, 4 USB 2.0 hosts, and SD socket. The V2100 Series offers both VGA and LVDS outputs, making it particularly well-suited for industrial applications, such as SCADA and factory automation.

The V2101 computers' 2 serial ports make them ideal for connecting a wide range of serial devices, and the dual 10/100/1000 Mbps Ethernet ports offer a reliable solution for network redundancy, promising continuous operation for data communication and management. As an added convenience, the V2101 computers have 3 DIs and 3 DOs for connecting digital input/output devices. In addition, the SD and

USB sockets provide the V2101 computers with the reliability needed for industrial applications that require data buffering and storage expansion.

Pre-installed with Linux, Windows CE 6.0, or Windows Embedded Standard 2009, the V2101 Series provides programmers with a friendly environment for developing sophisticated, bug-free application software at a lower cost.

All V2101 models support a wide operating temperature range of -40 to 85°C for harsh industrial environments.

Appearance

Front View
Reset Button, LED Indicators (Tx, Rx), SD Socket, USB 2.0 Host x 1, LED Indicators (Power/Storage)

Rear View
Audio Input, DI x 3/DO x 3 Channels, USB 2.0 Host x 3, 10/100/1000 Mbps Ethernet x 2, Audio Output, VGA Output, RS-232/422/485 Serial Port x 2

Side View
LVDS Output, Power Input, Power Button
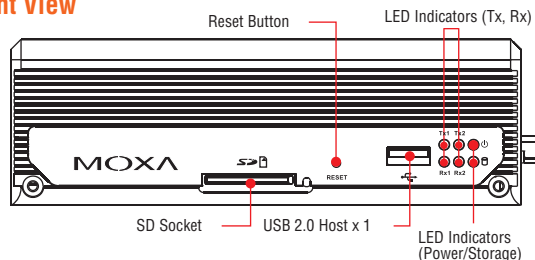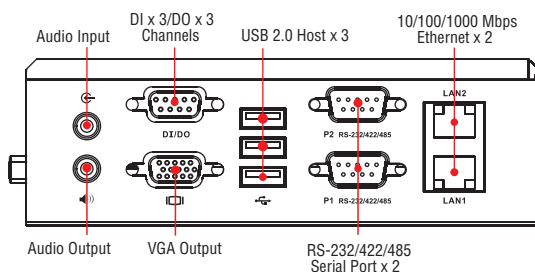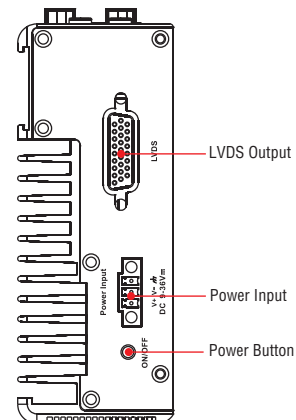
: Hardware Specifications

Computer
CPU: Intel Atom Z510PT 1.1 GHz processor
OS (pre-installed): Linux, Windows CE 6.0 or Windows Embedded Standard 2009
System Chipset: Intel® US15WPT
BIOS: 8 Mbit Flash BIOS, ACPI function supported (XPe model only)
FSB: 400 MHz
System Memory: 1 x 200-pin DDR2 SODIMM socket support DDR2 400 up to 2GB max, 1 GB built-in
USB: USB 2.0 compliant hosts x 4, type A connector, supports system boot up

Storage
Built-in: 2 GB CompactFlash to store OS
Storage Expansion: SD socket for storage expansion

Other Peripherals
Audio: AC97 audio, with line-in and line-out interface

Display
Graphics Controller: Intel® Graphics Media Accelerator, 500 Graphics, for 2D and 3D graphics
Video: The Poulsbo XL SCH supports full hardware acceleration of video decode standards such as H.264, MPEG2, MPEG4, and WMV9.
SDVO: Chrontel CH7317 for VGA output (1280 x 1024 @ 85 Hz)
VGA Interface: DB15 female connector
LVDS Interface: 18-bit or 24-bit single channel LVDS (1366 x 768 @ 85 Hz)

Ethernet Interface
LAN: 2 auto-sensing 10/100/1000 Mbps ports (RJ45)

Serial Interface
Serial Standards: 2 RS-232/422/485 ports, software selectable (DB9 male)
ESD Protection: 2 KV for all signals

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF
Baudrate: 50 bps to 115.2 Kbps

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 3, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: DB9 female

Digital Output
Output Channels: 3, sink type
Output Current: Max. 200 mA per channel
Output Voltage:
• Logic 0: 0-0.55 V
• Logic 1: 2.5-3.3 V
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: DB9 female

LEDs
System: Power, Storage
LAN: 100M/Link x 2, 1000M/Link x 2 (on connector)
Serial: Tx, Rx

Switches and Buttons
Power Switch: on/off (side)
Reset Button: For warm reboot (front side)

Physical Characteristics
Housing: Aluminum
Weight: 940 g
Dimensions:
Without ears: 150 x 49 x 125 mm (5.91 x 1.93 x 4.92 in)
With ears: 178 x 52 x 125 mm (7.01 x 2.05 x 4.92 in)
Mounting: DIN-Rail, wall, VESA

Environmental Limits
Operating Temperature: -40 to 85°C (-40 to 185°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)
Anti-vibration: 2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 9 to 36 VDC (3-pin terminal block for V+, V-, SG)
Power Consumption: (without LVDS output)
With no load on 4 USB ports:
• 1.88 A @ 9 VDC, 17 W
• 583 mA @ 24 VDC 14 W
• 422 mA @ 36 VDC 15 W
With full load on 4 USB ports:
• 3 A @ 9 VDC, 27 W
• 1 A @ 24 VDC, 24 W
• 700 mA @ 36 VDC, 25.2 W

Regulatory Approvals
EMC: CE (EN 55022 Class A, EN 61000-3-2 Class D, EN 61000-3-3, EN 55024), FCC (Part 15 Subpart B, CISPR 22 Class A, ANSI C63.4)
Safety: UL/cUL (UL508, UL60950-1, CSA C22.2 No. 60950-1-07), LVD (EN 60950-1), CCC
Green Product: RoHS, cRoHS, WEEE

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

13

Embedded Computers > V2101 Series

⁞ Software Specifications

Linux

Distribution: Debian Lenny 5.0
Kernel Version: 2.6.26
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE
File System: EXT2
System Utilities: bash, busybox, login, telnet, ftp, ssh, openbsd-inetd, apt, apt-utils, dpkg, grub, udev
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server
Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
iptables: Firewall service manager
NAT: Network Address Translation
pppd: dial in/out over serial port daemon & PPPoE
pppoe: PPP over ethernet
tftp/tftpd: Trivial file transfer protocol client/server
snmpd: snmpd agent daemon
usbmount: supports USB PnP
DHCP Client: dhcp3-client
cron: to manage regular background processing
grep: NU grep, egrep, and fgrep
minicom: friendly serial communication program
watchdog: software watchdog
inetd: TCP server manager program
Application Development Environment: GNU Make 3.8.1 (GNU make utility to maintain groups of programs)
Automatic Configuration Script Builder: autoconf 2.13
gcc: GNU C compiler
g++: GNU C++ compiler
libc6-dev: GNU C library (development libraries and headers)
Perl: Pratical Extraction and Report Language
Vim: Vi IMproved (enhanced vi editor)

Windows Embedded CE 6.0

Version: Windows Embedded CE 6.0 R2.
System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Enables clients to access files and other resources over the network (Microsoft® Wincows® CE).
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU Hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).

Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 3.5
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit Client
• Winsock 2.2

Windows XP Embedded

Version: Windows Embedded Standard 2009
System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, FTP, SMTP, PPPoE, PPTP, NetBIOS, remote Desktop Protocol 6.1
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Internet Explorer 7: The Internet Explorer Web browser that allows customers to connect to the Internet or to an intranet (see properties via inetcpl.cpl)
Windows Media Player 11: Playback functionality for digital media that includes videos, CDs, and DVDs for end users and developers.
Wi-Fi Protected Access 2: Enhances the Windows XP wireless client software with support for the new Wi-Fi Alliance certification for wireless security
Silverlight 1.1: A free runtime that powers rich application experiences and delivers high quality, interactive video across multiple platforms and browsers, using the .NET framework.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.
Watchdog: A hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).
Enhanced Write Filter: Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage

Application Development Software:
- Microsoft .Net Framework 3.5 (CLR and the .NET
  Framework class library)
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL),ASP.NET 2.0
- Certificate Request Client & Certificate
- Autoenrollment (CLR and the .NET Framework class library)
- COM APIs
- Common Control Libraries
- Common File Dialogs
- Direct3D, DirectPlay, DirectShow and Direct show filters
- Distributed Transaction Coordinator (MSDTC)
- Event Log, Internet Explorer
- Mapi32 Libraries
- Message Queuing (MSMQ) Core
- Microsoft Visual C++ Run Time Libraries
- Power Management dynamic-link library
- Registry Editor
- Registry Filter
- RPC
- Smart Card Cryptographic Service Providers
- USB 2.0 core drivers compliant with USB .95 or 1.0
- Windows API, Script Engines, and WMI
- XML paper specification

Dimensions (unit = mm)
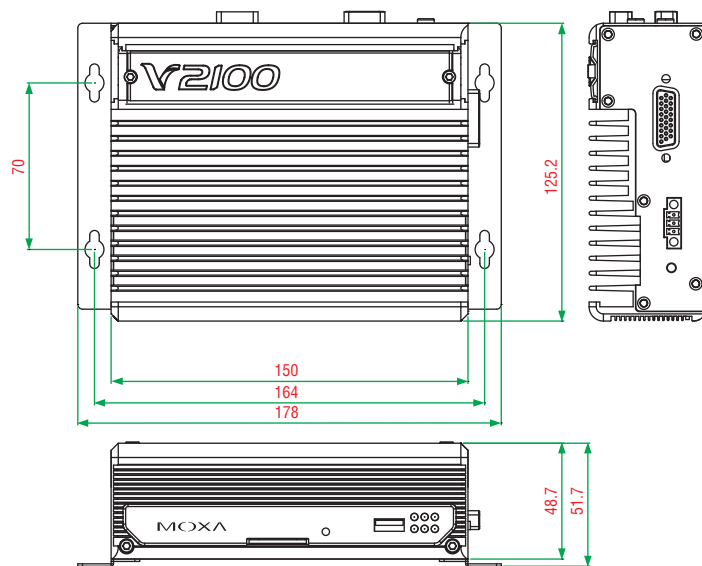
Ordering Information

Available Models

V2101-T-CE: x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, Audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, WinCE 6.0, -40 to 85°C operating temperature

V2101-T-XPE: x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, Audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, Windows Embedded Standard 2009, -40 to 85°C operating temperature

V2101-T-LX: x86 ready-to-run embedded computer with Intel Atom Z510PT, VGA, LVDS, Audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD, Linux 2.6, -40 to 85°C operating temperature

Optional Accessories (can be purchased separately)

PWR-24250-DT-S1: Power adaptor
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug

Package Checklist

- V2101 Embedded Computer
- Terminal Block to Power Jack Converter
- DIN-Rail Mounting Kit
- Wall Mounting Kit
- Quick Installation Guide (printed)
- Document & Software CD or DVD
- Product Warranty Statement (printed)

13

Embedded Computers > V2101 Series

V2401/2402 Series

x86 ready-to-run embedded computers with Intel Atom N270, VGA, DVI, LVDS, audio, 2 LANs, 12 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CompactFlash

> DDR2 SODIMM socket, supporting DDR2 533 up to 2 GB (max.)
> Dual independent displays (VGA, DVI, LVDS)
> 2 Gigabit Ethernet ports
> 4 RS-232/422/485 serial ports, supporting non-standard baudrates
> 8 RS-232 serial ports
> 6 USB 2.0 ports for high speed peripherals
> 4 DIs, 4 DOs
> CompactFlash socket for storage expansion
> Ready-to-run Embedded Linux, Windows CE 6.0, or Windows Embedded Standard 2009 platform

Overview

The V2401/2402 Series embedded computers are based on the Intel Atom N270 x86 processor, and feature 4 RS-232/422/485 serial ports, 8 RS-232 serial ports, dual Gigabit LAN ports, 6 USB 2.0 hosts, and a CompactFlash socket. The V2401 computer provides VGA, DVI, and LVDS outputs, and the V2402 computer provides both VGA and DVI outputs, making them particularly well-suited for industrial applications such as SCADA and factory automation.

The V2401 and V2402 come with 4 RS-232/422/485 serial ports, and the V2401 has an additional 8 RS-232 ports, making them ideal for connecting a wide range of serial devices, and the dual 10/100/1000 Mbps Ethernet ports offer a reliable solution for network redundancy,

promising continuous operation for data communication and management. As an added convenience, the V2401/2402 computers have 4 DIs, and 4 DOs for connecting digital input/output devices. In addition, the CompactFlash and USB sockets provide the V2400 computers with the reliability needed for industrial applications that require data buffering and storage expansion.

Pre-installed with Linux, Windows CE 6.0, or Windows Embedded Standard 2009, the V2401/2402 Series provides programmers with a friendly environment for developing sophisticated, bug-free application software at a low cost.

Appearance

Front View

Rear View

Power Input

Serial LEDs (Tx, Rx)

RS-232/422/485 Serial Port x 4 (DB9)

RS-232 Serial Port x 8 (68-pin VHDC connector, V2401)

DO x 4
DI x 4

USB 2.0 Host x 2

Reset Button

Dimensions (unit = mm)

274.5
262.5
150
86
151.6
250
56.75
62.75
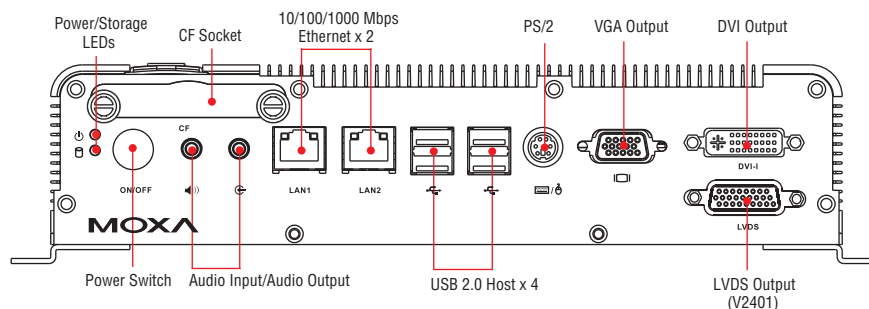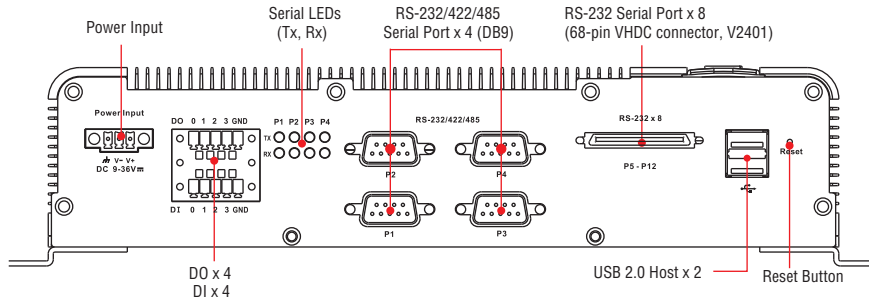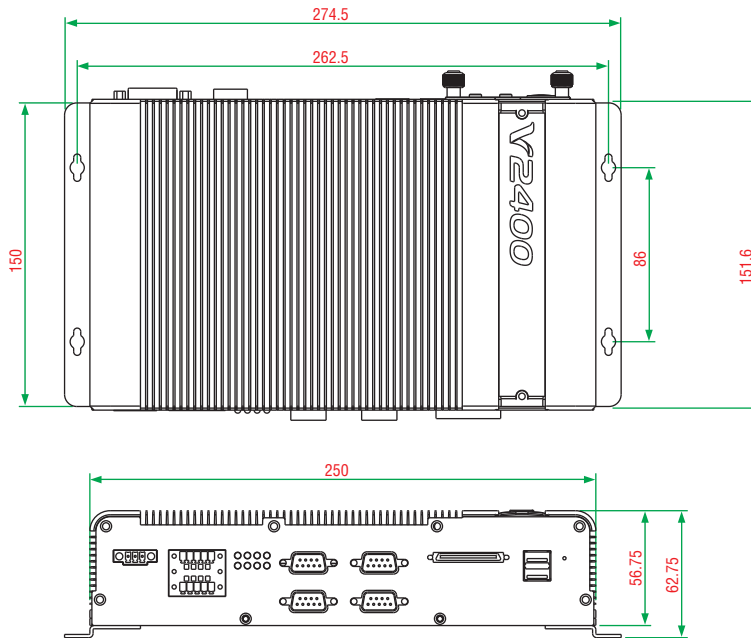
: Hardware Specifications

Computer

CPU: Intel Atom N270 1.6 GHz processor

OS (pre-installed): Linux, Windows CE 6.0 or Windows Embedded Standard 2009

System Chipset: Intel 945GSE + ICH7-M

BIOS: 8 Mbit Flash BIOS, SPI type, ACPI function supported

FSB: 400/533 MHz

System Memory: 1 x 200-pin DDR2 SODIMM socket support DDR2 533 up to 2 GB, built-in 1 GB

USB: USB 2.0 compliant hosts x 6, type A connector, supports system boot up

Storage

Built-in: 2 GB onboard industrial DOM to store OS

Storage Expansion: CompactFlash socket for CF card expansion, supporting CF Type-I/II socket with DMA mode

HDD Support: SATA-150 connector for HDD expansion

Other Peripherals

KB/MS: 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable

Audio: HD audio, with line-in and line-out interface

Display

Graphics Controller: Intel® Gen 2.5 Integrated Graphics Engine, 250 MHz core render clock and 200 MHz core display clock at 1.05-V core voltage

VGA Interface: DB15 female connector

LVDS Interface: Onboard HIROSE DF13-40DP-1.25 V connector (V2401 only)

DVI Interface: DVI-connector (chrontel CH7307 SDVO to DVI transmitter)

Ethernet Interface

LAN: 2 auto-sensing 10/100/1000 Mbps ports (RJ45)

Serial Interface

Serial Standards:

• 4 RS-232/422/485 ports*, software selectable (DB9 male)

• 8 RS-232 ports, (68-pin VHDC connector)

* COM1 pin 9 signal can be selected as ring (default), +5 V, or +12 V by jumper

ESD Protection: 4 KV for all signals

Serial Communication Parameters

Data Bits: 5, 6, 7, 8

Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark

13

Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 4, source type
Input Voltage: 0 to 5 VDC at 15 Hz
Digital Input Levels:
• Logic level 0: Close to GND
• Logic level 1: Open
Connector Type: Terminal Block

Digital Output
Output Channels: 4, source type, 0 to 5 VDC
Output Current: Max. 20 mA per channel
Output Voltage:
• Logic 0: 0-0.55 V
• Logic 1: 4.2-5.0 V
Connector Type: Terminal Block

LEDs
System: Power, Storage
LAN: 100M/Link x 2, 1000M/Link x 2 (on connector)

Switches and Buttons
Power Switch: on/off (front panel)
Reset Button: For warm reboot (rear panel)

Physical Characteristics
Housing: Aluminum
Weight:
• V2401: 2.1 kg
• V2402: 2 kg
Dimensions:
Without ears: 250 x 57 x 152 mm (9.84 x 2.24 x 5.98 in)
With ears: 275 x 63 x 152 mm (10.83 x 2.48 x 5.98 in)
Mounting: DIN-Rail, wall, VESA

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)
Anti-vibration: 5 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr/axis
Anti-shock: 50 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 9 to 36 VDC (3-pin terminal block for V+, V-, SG)
Power Consumption: 26 W (without LVDS output)
2.9 A @ 9 VDC
10.8 A @ 24 VDC
720 mA @ 36 VDC

Regulatory Approvals
EMC: CE, FCC, CCC
Safety: UL/cUL, LVD, CCC
Green Product: RoHS, CRoHS, WEEE

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

⁞ Software Specifications

Linux
Distribution: Debian Lenny 5.0
Kernel Version: 2.6.26
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE
File System: EXT2
System Utilities: bash, busybox, login, telnet, ftp, ssh, openbsd-inetd, apt, apt-utils, dpkg, grub, udev
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server
Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
iptables: Firewall service manager
NAT: Network Address Translation
pppd: dial in/out over serial port daemon & PPPoE
pppoe: PPP over ethernet
tftp/tftpd: Trivial file transfer protocol client/server
snmpd: snmpd agent daemon
usbmount: supports USB PnP
DHCP Client: dhcp3-client
cron: to manage regular background processing
grep: NU grep, egrep, and fgrep
minicom: friendly serial communication program
watchdog: software watchdog
inetd: TCP server manager program

Application Development Environment: GNU Make 3.8.1 (GNU make utility to maintain groups of programs)
Automatic Configuration Script Builder: autoconf 2.13
gcc: GNU C compiler
g++: GNU C++ compiler
libc6-dev: GNU C library (development libraries and headers)
Perl: Pratical Extraction and Report Language
Vim: Vi IMproved (enhanced vi editor)

Windows Embedded CE 6.0
Version: Windows Embedded CE 6.0 R3
System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Enables clients to access files and other resources over the network (Microsoft® Wincows® CE).
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU Hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).

Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 3.5
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit Client
• Winsock 2.2

Windows XP Embedded

Version: Windows Embedded Standard 2009
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, FTP, SMTP, PPPoE, PPTP, NetBIOS, remote Desktop Protocol 6.1
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Internet Explorer 7: The Internet Explorer Web browser that allows customers to connect to the Internet or to an intranet (see properties via inetcpl.cpl)
Windows Media Player 11: Playback functionality for digital media that includes videos, CDs, and DVDs for end users and developers.
Wi-Fi Protected Access 2: Enhances the Windows XP wireless client software with support for the new Wi-Fi Alliance certification for wireless security

Silverlight 1.1: A free runtime that powers rich application experiences and delivers high quality, interactive video across multiple platforms and browsers, using the .NET framework.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.
Watchdog: A hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).
Enhanced Write Filter: Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage
Application Development Software:
• Microsoft .Net Framework 3.5 (CLR and the .NET Framework class library)
• Active Directory Service Interface (ADSI) Core
• Active Template Library (ATL),ASP.NET 2.0
• Certificate Request Client & Certificate
• Autoenrollment (CLR and the .NET Framework class library)
• COM APIs
• Common Control Libraries
• Common File Dialogs
• Direct3D, DirectPlay, DirectShow and Direct show filters
• Distributed Transaction Coordinator (MSDTC)
• Event Log, Internet Explorer
• Mapi32 Libraries
• Message Queuing (MSMQ) Core
• Microsoft Visual C++ Run Time Libraries
• Power Management dynamic-link library
• Registry Editor
• Registry Filter
• RPC
• Smart Card Cryptographic Service Providers
• USB 2.0 core drivers compliant with USB .95 or 1.0
• Windows API, Script Engines, and WMI
• XML paper specification

Ordering Information

Available Models

V2401-CE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, LVDS, DVI, Audio, 2 LANs, 12 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, WinCE 6.0
V2401-XPE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, LVDS, DVI, Audio, 2 LANs, 12 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, Windows Embedded Standard 2009
V2401-LX: x86 ready-to-run embedded computer with Intel Atom N270, VGA, LVDS, DVI, Audio, 2 LANs, 12 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, Linux 2.6
V2402-CE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI, Audio, 2 LANs, 4 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, WinCE 6.0
V2402-XPE: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI, Audio, 2 LANs, 4 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, Windows Embedded Standard 2009
V2402-LX: x86 ready-to-run embedded computer with Intel Atom N270, VGA, DVI, Audio, 2 LANs, 4 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CF, Linux 2.6

Optional Accessories (can be purchased separately)

CBL-M68M9x8-100: 8-port RS-232 cable with VHDC connector
PWR-24250-DT-S1: Power adaptor
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug
FK-75125-01: Hard disk installation package
DK-DC50131-01: DIN-Rail mounting kit

Package Checklist

• 1 V2401 or V2402 computer
• Terminal block to power jack converter
• PS2 to KB/MS Y-type cable
• Wall mounting kit
• Document & Software CD or DVD
• Quick Installation Guide (printed)
• Product Warranty Statement (printed)

13

Embedded Computers > V2401/2402 Series

V460 Series

x86 computers with 4 serial ports, dual or quad LANs, VGA, 8 DIs, 8 DOs, CompactFlash, PCMCIA, 8 unmanaged switch ports, USB

> AMD Geode LX 800@0.9W CPU, 500 MHz
> Built-in 256 MB (CE) or 512 MB (XPe) DDR SDRAM
> Built-in 256 MB (CE) or 1 GB (XPe) industrial DOM to store the operating system
> 256 KB of SRAM with battery backup
> 2 RS-232 and 2 RS-232/422/485 serial ports, supporting non-standard baudrates
> Dual or quad 10/100 Mbps Ethernet ports for network redundancy
> PCMCIA socket for wireless network (V462 only)
> 8 10/100 Mbps unmanaged switch ports (V466 only)
> 8 DI and 8 DO channels (V468 only)
> CompactFlash socket for storage expansion
> 4 USB 2.0 hosts supporting system boot up
> Ready-to-run WinCE 6.0 or Windows XP Embedded platform

Overview

The V460 Series embedded computers are based on the AMD x86 processor, and feature 4 serial ports, dual or quad LAN ports, 4 USB 2.0 hosts, and CompactFlash and PCMCIA sockets. A VGA interface is also included, making the V460 computers particularly well-suited for industrial applications such as SCADA and factory automation.

The V460 computers' 4 serial ports can be used to connect a wide range of serial devices, and the dual 10/100 Mbps Ethernet ports offer a reliable solution for network redundancy, promising continuous operation for data communication and management. As an added convenience, the 8 built-in 10/100 Mbps unmanaged switch ports and the 8 DI and 8 DO channels can help connect network devices

and digital input/output devices easily. In addition, the CompactFlash, PCMCIA, and USB sockets provide the V462 computers with the reliability needed for industrial applications that require data buffering and storage expansion.

The V460 computers come with the WinCE 6.0 or WinXP Embedded operating system already installed. WinCE 6.0 and WinXP Embedded provide programmers with a friendly environment for developing sophisticated, bug-free application software at a lower cost.

Appearance

Front View

Storage LED
Power LED
10/100 Mbps Ethernet x 4
VGA Output
PCMCIA Socket (V462 only)
USB 2.0 Host x 4

SRAM Battery Status LED
Reset
10/100 Mbps Ethernet x 2 (V462 only)
CompactFlash Socket
PS/2
Audio Line Out

Rear View
V462/V464/V466

10/100 Mbps Ethernet Switch Ports x 8 (V466 only)

Power Switch

RS-232
Serial Ports x 2

RS-232/422/485
Serial Ports x 2

Power Input
9-36 VDC

V468

DI x 8   DO x 8   Power Switch

RS-232
Serial Ports x 2

RS-232/422/485
Serial Ports x 2

Power Input
9-36 VDC
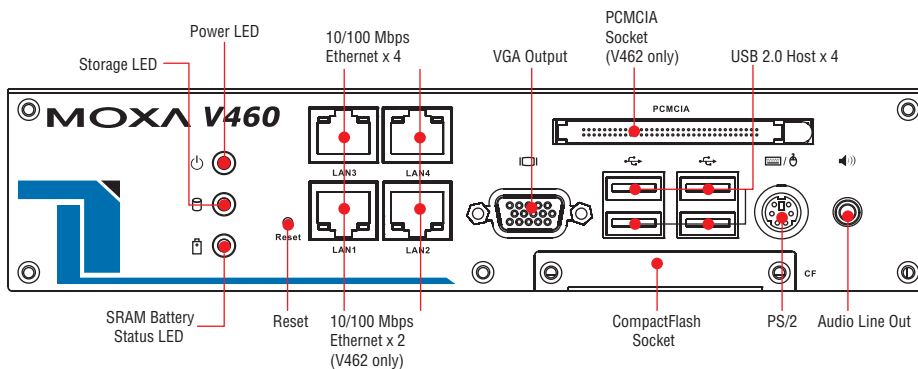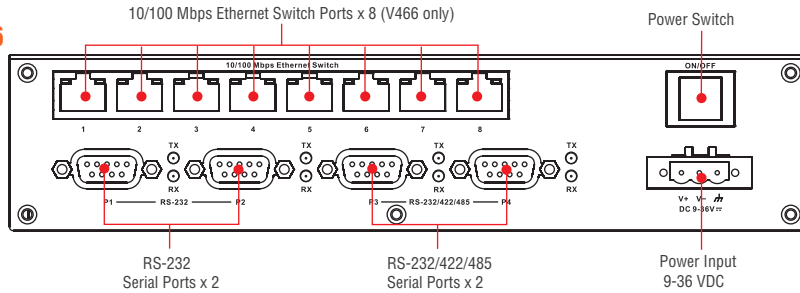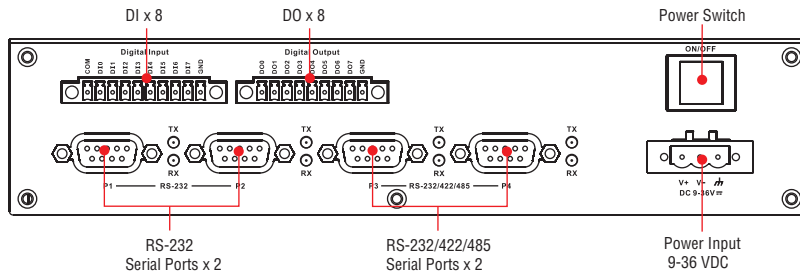
⋮ Hardware Specifications

Computer
CPU: AMD Geode LX 800@0.9W processor with 128K L2 Cache, 500 MHz
OS (pre-installed): Windows CE 6.0 or Windows XP Embedded
System Chipset: AMD CS5536
BIOS: 4 Mbit Flash BIOS, supporting Plug & Play, APM 1.2, ACPI 1.0
SRAM: 256 KB, battery backup
FSB: 400 MHz
System Memory: 200-pin SO-DIMM socket with built-in 256 MB (CE) or 512 MB (XPe) DDR, supporting DDR400 up to 1 GB
PCMCIA: Cardbus card and 16-bit PCMCIA 2.1/JEIDA 4.2 card (V462 only)
Expansion Bus: PC/104-Plus onboard
USB: USB 2.0 compliant hosts x 4, type A connector, supports system boot up

Storage
Built-in: 256 MB (CE) or 1 GB (XPe) industrial DOM for OS
Storage Expansion: CompactFlash socket

Other Peripherals
KB/MS: 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable
Audio: AC97 audio, with line-out interface

Display
Graphics Controller: CPU integrated 2D graphics
Display Interface: CRT interface for VGA output

Ethernet Interface
LAN: 10/100 Mbps, auto-sensing (RJ45)
• V462: 2 ports
• V464/466/468: 4 ports
Switch Ports: 8 unmanaged 10/100 Mbps built-in Ethernet switch ports (V462 only)
Controller: Realtek RTL8100CL
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards:
• 2 RS-232 ports (DB9 male)
• 2 RS-232/422/485 ports, software selectable (DB9 male)
ESD Protection: 15 KV for all signals

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input (V468 only)
Input Channels: 8, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: 10-pin screw terminal block (8 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output (V468 only)
Output Channels: 8, sink type
Output Current: Max. 200 mA per channel
Output Voltage:
• Logic 0: 0-0.55 V
• Logic 1: 2.5-3.3 V

On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 9-pin screw terminal block
Isolation: 3 KV optical isolation

LEDs
System: Power, Battery, Storage
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)

Switches and Buttons
Power Switch: on/off
Reset Button: For warm reboot

Physical Characteristics
Housing: Aluminum
Weight: 1.32 kg
Dimensions:
Without ears: 223 x 121 x 57 mm (8.78 x 4.76 x 2.24 in)
With ears: 248 x 140 x 70 mm (9.76 x 5.51 x 2.76 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-vibration: 5 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 50 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 9 to 36 VDC (3-pin terminal block for V+, V-, SG)
Power Consumption: 26 W
• 730 mA @ 36 VDC
• 1080 mA @ 24 VDC
• 2820 mA @ 9 VDC

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD, CCC (GB4943)
Green Product: RoHS, cRoHS, WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

: Software Specifications

Windows Embedded CE 6.0
System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Enables clients to access files and other resources over the network (Microsoft® Wincows® CE).
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU Hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit Client
• Winsock 2.2

Windows XP Embedded
System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, SNTP, FTP, SMTP, PPPoE, PPTP, NetBIOS
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.

Application Development Software:
- Microsoft .Net Framework 2.0 with service pack 2 (CLR and the .NET Framework class library)
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL),ASP.NET 2.0
- Certificate Request Client & Certificate Autoenrollment (CLR and the .NET Framework class library)
- COM APIs
- Common Control Libraries
- Common File Dialogs
- Direct3D, DirectPlay, DirectShow and Direct show filters
- Distributed Transaction Coordinator (MSDTC)
- Enhanced Write Filter (Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage)
- Event Log, Internet Explorer
- Mapi32 Libraries
- Message Queuing (MSMQ) Core
- Microsoft Visual C++ Run Time Libraries
- Power Management dynamic-link library
- Registry Editor
- RPC
- Smart Card Cryptographic Service Providers
- USB 2.0 core drivers compliant with The USB .95 or 1.0
- Windows API, Media Player 10, Script Engines, and WMI

Dimensions (unit = mm)

121 mm (4.76 in)

223 mm (8.78 in)

57 mm (2.24 in)

13

Embedded Computers > V460 Series
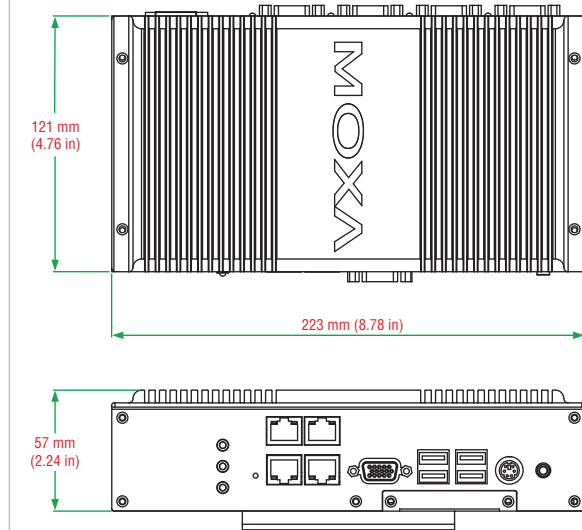
Model Name	Serial Ports		LAN Ports	Storage			PCMCIA	DI/DO	Switch	OS	
	RS-232	RS-232/422/485	10/100 Mbps	CF	USB	IDE				CE	XPE
V462	2	2	2	✓	4	–	✓	–	–	✓	✓
V464	2	2	4	✓	4	–	–	–	–	✓	✓
V466	2	2	4	✓	4	–	–	–	8	✓	✓
V468	2	2	4	✓	4	–	–	8/8	–	✓	✓

: Ordering Information

Available Models

V462-CE: x86 embedded computer with 4 serial ports, dual LANs, VGA, CompactFlash, PCMCIA, USB, and WinCE 6.0 OS
V462-XPE: x86 embedded computer with 4 serial ports, dual LANs, VGA, CompactFlash, PCMCIA, USB, and Windows XP Embedded OS
V464-CE: x86 embedded computer with 4 serial ports, quad LANs, VGA, CompactFlash, USB, and WinCE 6.0 OS
V464-XPE: x86 embedded computer with 4 serial ports, quad LANs, VGA, CompactFlash, USB, and Windows XP Embedded OS
V466-CE: x86 embedded computer with 4 serial ports, quad LANs, 8-port Ethernet switch, VGA, CompactFlash, USB, and WinCE 6.0 OS
V466-XPE: x86 embedded computer with 4 serial ports, quad LANs, 8-port Ethernet switch, VGA, CompactFlash, USB, and Windows XP Embedded OS
V468-CE: x86 embedded computer with 4 serial ports, quad LANs, VGA, 8 DI, 8 DO, CompactFlash, USB, and WinCE 6.0 OS
V468-XPE: x86 embedded computer with 4 serial ports, quad LANs, VGA, 8 DI, 8 DO, CompactFlash, USB, and Windows XP Embedded OS

Optional Accessories (can be purchased separately)

PWR-24250-DT-S1: Power adaptor
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug

Package Checklist
- V462 or V464 or V466 or V468 computer
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- DIN-rail Mounting Kit
- PS2 to KB/MS Y-type Cable
- Document and Software CD or DVD
- Quick Installation Guide (printed)
- Product Warranty Statement (printed)

V481 Series

x86 computers with 8 serial ports, dual LANs, VGA, CompactFlash, USB, audio

-35°C 75°C

> Intel Celeron M 1 GHz CPU, 400 MHz FSB
> 256 MB (CE) or 512 MB (XPe) DDR SDRAM, 256 MB (CE) or 1 GB (XPe) industrial CompactFlash built in
> 8 software-selectable RS-232/422/485 serial ports
> Serial port speed from 50 bps to 921.6 Kbps, supporting non-standard baudrates
> 10/100 Mbps and 10/100/1000 Mbps LANs for network redundancy
> Supports 2nd CompactFlash socket for storage expansion
> 2 USB 2.0 hosts that support system bootup
> LED indicators for system power and storage
> Designed to withstand 5g's of continuous vibration and 50g shocks
> Ready-to-run WinCE 5.0 or Windows XP Embedded platform
> DIN-rail or wall-mount installation
> Robust, fanless design
> Wide temperature model available

Microsoft® Windows® Embedded   CCC   e   RoHS   DNV   C E   FC   c(UL)us LISTED

⫶ Overview

The V481 ready-to-run embedded computers are based on the Intel x86 processor, and come with VGA interface, dual LANs, 8 serial ports, CompactFlash, USB, and audio. The VGA interface was included to make this computer particularly well-suited for industrial applications, such as SCADA and factory automation.

The V481 computers come with 8 software-selectable RS-232/422/485 serial ports built in, making them ideal for connecting a wide range of serial devices. The 10/100 Mbps and 10/100/1000 Mbps LAN ports offer a reliable solution for network redundancy, promising continuous operation for data communication and management. In addition, the second CompactFlash socket makes storage expansion easier, and the USB slots can be used to connect different types of devices, making

the V481 a reliable embedded computer for industrial applications that require VGA and HMI features.

The V481 comes with the Windows CE 5.0 or Windows XP Embedded operating system pre-installed, providing a friendly environment for programmers to develop sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and makes it possible to develop bug-free code quickly and at a lower cost. In addition, the wide operating temperature model, which works in temperatures ranging from -35 to 75°C, provides users with a great solution for any harsh environment.

⫶ Appearance

Front View

Audio Line-out
Audio Line-in
USB 2.0 Host x 2
Power LED
Storage LED
Reset
VGA
PS/2
10/100/1000 Mbps Gigabit Ethernet
10/100 Mbps Ethernet

Rear View

Power Switch

P5 P6 P7 P8

P1 P2 P3 P4

RS-232/422/485

ON / OFF

V+ V− ⏚
DC 9-36V ⎓

Serial Ports x 8
RS-232/422/485

Power Input
9-36 VDC
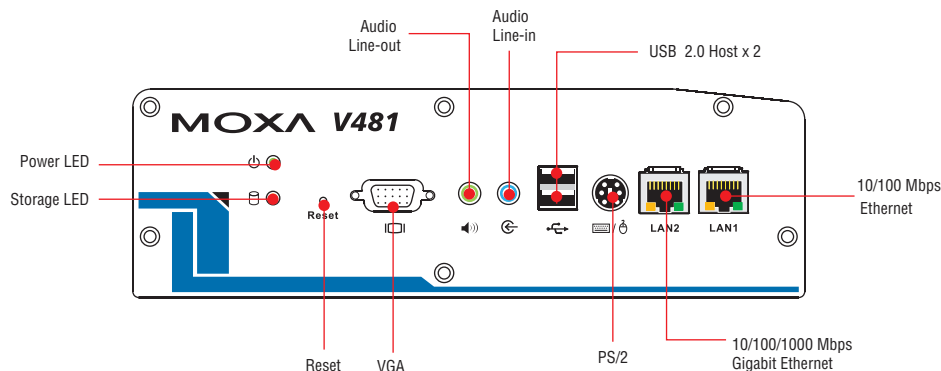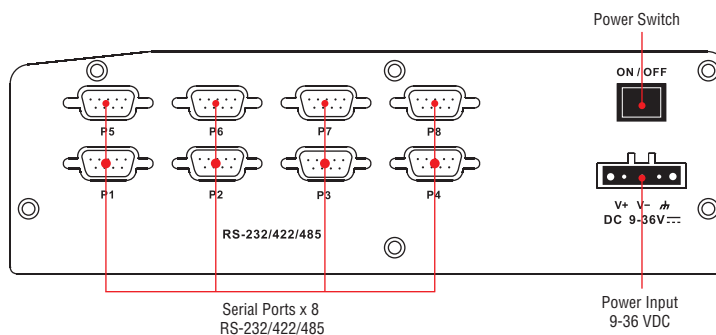
⦂ Hardware Specifications

Computer
CPU: Intel ULV Celeron M 1 GHz processor
OS (pre-installed): Windows CE 5.0 or Windows XP Embedded
System Chipset: Intel 852GM GMCH +ICH4
BIOS: 4 Mbit Flash BIOS, supporting Plug & Play
FSB: 400 MHz
System Memory: 200-pin SO-DIMM socket with built-in 256 MB (CE) or 512 MB (XPe) DDR, supporting DDR200/266 up to 1 GB
Expansion Bus: PC/104 onboard
USB: USB 2.0 compliant hosts x 2, type A connector, supports system boot up

Storage
Built-in: 256 MB (CE) or 1 GB (XPe) industrial CompactFlash card onboard to store OS
Storage Expansion: CompactFlash socket
HDD Support: IDE connector for hard disk expansion

Other Peripherals
KB/MS: 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable
Audio: AC97 audio, with line-in/out interface

Display
Graphics Controller: Integrated graphics with built-in Intel 852GM GMCH and Intel extreme Graphics 2 technology
Display Memory: Dynamic video memory for up to 32 MB of system memory
Display Interface: CRT

Ethernet Interface
LAN: 2 independent LAN ports (RJ45)
• LAN1: Auto-sensing 10/100 Mbps Ethernet, using integrated MAC and Intel 82562GZ transceiver
• LAN2: Auto-sensing 10/100/1000 Mbps Gigabit Ethernet, using Realtek RTL8110SC controller
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 8 RS-232/422/485 ports, software selectable (DB9 male)
ESD protection: 15 KV for all signals

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs
System: Power, Storage
LAN1: Act/Link and 10/100 Mbps mode (on connector)
LAN2: Act/Link and 10/100/1000 Mbps mode (on connector)

Switches and Buttons
Power Switch: on/off
Reset Button: For warm reboot

Physical Characteristics
Housing: Aluminum
Weight: 2.2 kg
Dimensions:
Without ears: 225 x 140 x 70 mm (8.86 x 5.51 x 2.76 in)
With ears: 248 X 140 X 70 mm (9.76 X 5.51 X 2.76 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -35 to 75°C (-31 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration:
• With CF card: 5 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
• With hard disk: 1 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1hr per axis
Anti-Shock:
• With CF card: 50 g @ IEC-68-2-27, half sine wave, 11 ms
• With hard disk: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 9 to 36 VDC
Power Consumption: 24 W
• 650 mA @ 36 VDC
• 1000 mA @ 24 VDC
• 2750 mA @ 9 VDC)

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)
Green Product: RoHS, CRoHS WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

Software Specifications

Windows Embedded CE 5.0
System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
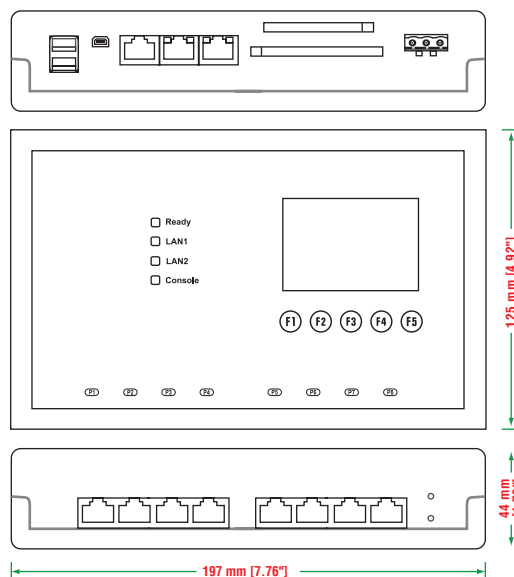**Web Server (httpd):** Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Application Development Software:
• Moxa WinCE 5.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit, Winsock 2.2, SQL Mobile

Windows XP Embedded
System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS,IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, SNTP, FTP, SMTP, PPPoE, PPTP, NetBIOS
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers, exposing file and print sharing services.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.
Application Development Software:
• Microsoft .Net Framework 2.0 with service pack 2 (CLR and the .NET Framework
  class library)
• Active Directory Service Interface (ADSI) Core
• Active Template Library (ATL),ASP.NET 2.0
• Certificate Request Client & Certificate Autoenrollment (CLR and the .NET Framework class library)
• COM APIs
• Common Control Libraries
• Common File Dialogs
• Direct3D, DirectPlay, DirectShow and Direct show filters
• Distributed Transaction Coordinator (MSDTC)
• Enhanced Write Filter (redirects disk write operations to volatile (RAM) or non-volatile (disk) storage)
• Event Log,Internet Explorer
• Mapi32 Libraries
• Message Queuing (MSMQ) Core
• Microsoft Visual C++ Run Time Libraries
• Power Management dynamic-link library
• Registry Editor
• RPC
• Smart Card Cryptographic Service Providers
• USB 2.0 core drivers compliant with USB .95 or 1.0
• Windows API, Media Player 10, Script Engines, and WMI

Dimensions (unit = mm)

140 mm (5.51 in)
86 mm (3.39 in)
236 mm (9.29 in)
78.40 mm (3.09 in)
69.80 mm (2.75 in)
225 mm (8.86 in)
248 mm (9.76 in)

Ordering Information

Available Models
V481-CE: x86 embedded computer with VGA, dual LANs, 8 serial ports, CompactFlash, USB, audio, WinCE 5.0, -10 to 60°C operating temperature
V481-XPE: x86 embedded computer with VGA, dual LANs, 8 serial ports, CompactFlash, USB, audio, Win XPE, -10 to 60°C operating temperature
V481-T-CE: x86 embedded computer with VGA, dual LANs, 8 serial ports, Compact Flash, USB, audio, WinCE 5.0, -35 to 75°C operating temperature
V481-T-XPE: x86 embedded computer with VGA, dual LANs, 8 serial ports, CompactFlash, USB, audio, Win XPE, -35 to 75°C operating temperature

Package Checklist
• V481 embedded computer
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• DIN-rail Mounting Kit
• PS2 to KB/MS Y-type Cable
• Document and Software CD or DVD
• Quick Installation Guide (printed)
• Warranty Card

UC-8400 Series

RISC ready-to-run industrial computers with 8 serial ports, 3 LANs, DIO, 8 Ethernet ports, 2 CAN ports, USB, CompactFlash

-40°C 75°C

> Intel XScale IXP435 533 MHz processor
> 256 MB DDR2 SDRAM and 16 MB Flash ROM onboard
> 32 MB NAND Flash for data storage
> 256 KB battery backup SRAM
> 8 RS-232/422/485 serial ports
> 8 10/100 Mbps unmanaged switch ports
> 2 CANbus ports
> 12 digital input and 12 digital output channels
> 3 10/100 Mbps Ethernet ports
> 2 USB 2.0 hosts for mass storage devices
> CompactFlash socket for storage expansion
> Ready-to-run Linux platform
> DIN-Rail or wall mounting installation
> Robust, fanless design
> -40 to 75°C wide temperature model available

Overview

The UC-8400 Series embedded computers come with 8 RS-232/422/485 serial ports, 3 Ethernet ports, 8 unmanaged switch ports, 2 CAN ports, 12 digital input channels, 12 digital output channels, a CompactFlash socket, and 2 USB 2.0 hosts.

The computers use the Intel XScale IXP435 533 MHz RISC CPU. This powerful computing engine supports several useful communication functions, but will not generate too much heat. The built-in 16 MB NOR Flash ROM and 256 MB SDRAM give you enough memory to run your application software directly on the UC-8400, and the 32 MB NAND Flash can be used to provide additional data storage. Moreover, the 256 KB SRAM offers a better data retention mechanism for avoiding data loss. The UC-8400 computers come with 8 RS-232/422/485 serial

ports, switch ports, digital I/O, and have 3 LAN ports and 2 CANbus ports, making it ideal as a communication platform for industrial applications that require network redundancy.

The UC-8400 Series comes with the Linux 2.6 platform pre-installed to provide an open software operating system for software program development. Software written for a desktop PC can be easily ported to the UC-8400 Series platform by using a common compiler, without needing to modify the code. This makes the UC-8400 an optimal solution for use with industrial applications, but with minimal cost and effort.

In addition to the standard model, the UC-8400 Series also comes in a -40 to 75°C wide temperature model for harsh industrial environments.

Appearance

Front View
UC-8410

Reset Button

RS-232/422/485

Reset

P1 P2 P3 P4 P5 P6 P7 P8

USB 2.0 Host x 2

Serial Port x 8, RJ45
(RS-232/422/485)

Embedded Computers > UC-8400 Series

UC-8416, UC-8418

Reset Button

CANbus Port x 2 DB9
(UC-8418)

Reset

USB 2.0 Host x 2

Serial Port x 8, RJ45
(RS-232/422/485)

Rear View
UC-8410

LED Indicators
(Power, SRAM Battery,
Ready, Storage)

DI Channel x 4

10/100 Mbps
Ethernet x 3

DO Channel x 4

Power Input
12 to 48 VDC

UC-8416

10/100 Mbps Ethernet Switch Port x 8

LED Indicators
(Power, SRAM Battery,
Ready, Storage)

10/100 Mbps
Ethernet x 3

DI Channel x 4

DO Channel x 4

Power Input
12 to 48 VDC

UC-8418

DI Channel x 8

DO Channels x 8

LED Indicators
(Power, SRAM Battery,
Ready, Storage)

10/100 Mbps
Ethernet x 3

DI Channel x 4

DO Channel x 4

Power Input
12 to 48 VDC

: Hardware Specifications

Computer
CPU: Intel XScale IXP435, 533 MHz
OS (pre-installed): Linux
DRAM: 256 MB DDR2 SDRAM onboard (512 MB max.)
SRAM: 256 KB, battery backup
Flash:
16 MB NOR Flash onboard to store OS (supports up to 32 MB)
32 MB NAND Flash onboard to store data
Expansion Bus: PCI/104 onboard
USB: USB 2.0 compliant hosts x 2, type A connector

Storage
Storage Expansion: CompactFlash socket

Ethernet Interface
LAN: 3 auto-sensing 10/100 Mbps ports (RJ45)
Switch Ports: 8 10/100 Mbps unmanaged ports (UC-8416 only)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 8 RS-232/422/485 ports, software-selectable (8-pin RJ45)
Console Port: RS-232 (TxD, RxD, GND), 4-pin header output (115200, n, 8, 1)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: source type
• UC-8410/8416: 4 channels
• UC-8418: 12 channels
Input Voltage: 0 to 30 VDC
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3V max.
• Logic level 1: +10V to +30V (COM to DI)
Connector Type: 10-pin screw terminal block (4 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output
Output Channels: sink type
• UC-8410/8416: 4 channels
• UC-8418: 12 channels
Output Current: Max. 200 mA per channel

On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 10-pin screw terminal block (4 points, GND)
Isolation: 3 KV optical isolation

CANbus Communication (UC-8418 only)
Interface: Dual optically isolated CAN2.0A/2.0B compliant ports
CAN Controller: Phillips SJA1000T
Signals: CAN-H, CAN-L
Isolation: 2 KV digital isolation
Speed: 10 Kbps to 1 Mbps
Connector Type: DB9 male

LEDs
System: Power, Ready, Storage, Battery for SRAM
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)
Serial: TxD x 8, RxD x 8
Reset Button: Supports "Reset to Factory Default"

Physical Characteristics
Housing: SECC sheet metal (1 mm)
Weight: 1 kg
Dimensions:
UC-8410: 200 x 37 x 120 mm (7.87 x 1.46 x 4.72 in)
UC-8416/8418: 200 x 57 x 120 mm (7.87 x 2.24 x 4.72 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 75°C (-4 to 167°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 12 to 48 VDC (3-pin terminal block)
Power Consumption: 15 W
• 310 mA @ 48 VDC
• 625 mA @ 24 VDC
• 1350 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class B, EN55024-4-2, EN55024-4-3, EN55024-4-4), FCC (Part 15 Subpart B, Class B)
Safety: UL/cUL (UL60950-1), CCC (GB9254, GB 17625.1), LVD (EN60950)

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

## : Software Specifications

Linux
Kernel Version: 2.6.23
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE, OpenVPN
File System: JFFS2, NFS, Ext2, Ext3
System Utilities: bash, busybox, tinylogin, telnet, ftp, ssh, scp
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server

Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
pppd: dial in/out over serial port daemon
snmpd: snmpd agent daemon
openssl: open SSL
Application Development Software: Moxa Linux API device control
Linux Tool Chain:
• GCC (V4.2.1): C/C++ PC Cross Compiler
• Glibc (V2.2.5): POSIX standard C Library
• GDB (V6.3): source level debug server
Software Encryption Lock:
BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

13

Embedded Computers > UC-8400 Series

Dimensions (unit = mm)
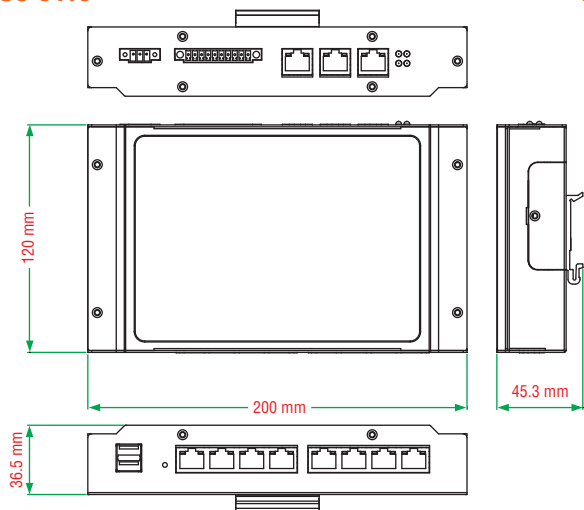
UC-8410

UC-8416/8418
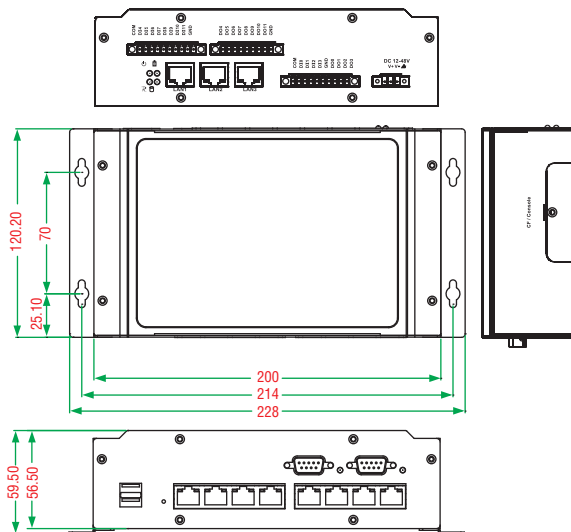
Model Name	Serial Ports	LAN Ports	CAN Ports		Storage		DI/DO	Switch	OS		Wide Temp.
	RS-232/422/485	10/100 Mbps		Optical Isolation	CF	USB			CE	Linux	
UC-8410	8	3	–	–	✓	2	4/4	–	–	✓	✓
UC-8416	8	3	–	–	✓	2	4/4	8	–	✓	✓
UC-8418	8	3	2	2 KV	✓	2	12/12	–	–	✓	✓

Ordering Information

Available Models

UC-8410-LX: RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
UC-8416-LX: RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
UC-8418-LX: RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
UC-8410-T-LX: RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature
UC-8416-T-LX: RISC-based industrial embedded computer with 8 serial ports, 4 DIs, 4 DOs, 3 LANs, 8 switch ports, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature
UC-8418-T-LX: RISC-based industrial embedded computer with 8 serial ports, 12 DIs, 12 DOs, 3 LANs, 2 CAN ports, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature

Package Checklist

• 1 UC-8410 or UC-8416 or UC-8418 computer
• Wall mounting kit
• DIN-Rail mounting kit
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
• Universal Power Adaptor (including power jack converter)
• Document and Software CD
• Quick Installation Guide (printed)
• Product Warranty Statement (printed)

UC-7400 Series

RISC ready-to-run computers with up to 8 serial ports, dual LANs, USB, PCMCIA, CompactFlash, 8 DI/DO channels, web server

> 128 MB RAM onboard, 32 MB flash
> Up to 8 RS-232/422/485 serial ports
> Up to 8 DI and 8 DO channels (TTL signal)
> Dual 10/100 Mbps LANs for network redundancy
> USB 2.0 host
> CompactFlash socket for storage expansion
> PCMCIA supporting WLAN, GPRS, UMTS, HSDPA
> LCM display and keypad for HMI
> Built-in firewall and VPN function
> Apache web server supporting PHP and XML
> Ready-to-run Linux or WinCE 5.0 platform
> DIN-rail or wallmount installation
> Robust, fanless design

Overview

The UC-7400 Series RISC-based ready-to-run Linux and WinCE computers are designed for embedded applications. The computers feature up to 8 RS-232/422/485 serial ports, a PCMCIA interface for wireless LAN communication, CompactFlash, digital input/output channels for some models, and USB ports for adding external memory. The built-in firewall, VPN, and web server make these computers ideal for applications that require a web server and front-end controller in the industrial embedded system.

The pre-installed open-standard Linux or WinCE OS operating system provide a convenient platform for software development. In fact, software written for a desktop PC can be ported as is to the UC-7400 platform using readily available development tools, and the code can be stored in the UC-7400's Flash memory. System integrators will find it easy to use the UC-7400 computers as part of distributed control systems based on embedded technology.

Appearance

Front View

8-ch Digital Output (UC-7408)

8-ch Digital Input (UC-7408)

Reset to Default

D/O 1 2 3 4 5 6 7 8

D/I 1 2 3 4 5 6 7 8

Reset to Default

Reset

RS-232/422/485 P1 P2 P3 P4   P5 P6 P7 P8

Serial Port x 8 RJ45
(RS-232/422/485)
(UC-7420/7410/7408)

Hardware Reset

Rear View

12-48 VDC
Power Input

PCMCIA x 1
(UC-7420/7408/7402)

USB 2.0 Host x 2,
A Type Connector
(UC-7420)

DC 12-48V PCMCIA LAN1 LAN2 Console USB

V+ V- CF

USB 1.1 Client x 1,
miniB Connector

CF x 1
(UC-7420/7408/7402)

10/100 Mbps
Ethernet x 2

RS-232
Console Port

Hardware Specifications

Computer
CPU:
UC-7402/7408/7410/7420: Intel XScale IXP422 266 MHz
UC-7402/7408/7410/7420 Plus: Intel XScale IXP425 533 MHz
OS (pre-installed): Embedded Linux or Windows CE 5.0
DRAM: 128 MB onboard
Flash: 32 MB onboard
PCMCIA: Cardbus card and 16-bit PCMCIA 2.1 ro JEIDA 4.2 card
(UC-7402/7408/7420 only)
USB:
• UC-7420, UC-7420 Plus: USB 2.0 compliant hosts x 2, A-type
connector
• UC-7402/7408/7410/7420, UC-7402/7408/7410/7420 Plus: USB
1.1 client x 1, mini B connector

Storage
Storage Expansion: CompactFlash socket (UC-7402/U7408/7420,
UC-7402/U7408/7420 Plus)

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: RS-232/422/485 software-selectable (8-pin RJ45)
UC-7402, UC-7402 Plus: 0 ports
UC-7408/7410/7420, UC-7408/7410/7420 Plus: 8 ports
ESD Protection: 15 KV for all signals
Console Port: RS-232 (all signals), RJ45 connector, supports PPP

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data
direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates;
see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input (UC-7408, UC-7408 Plus only)
Input Channels: 8
Input Voltage:
• Logic 0: 0-0.8 V
• Logic 1: 2.0-5.5 V
Over-current Limit: -24 mA

Digital Output (UC-7408, UC-7408 Plus only)
Output Channels: 8
Output Current: 24 mA
Output Voltage:
• Logic 0: 0-0.55 V
• Logic 1: 2.5-3.3 V

LEDs
System: OS Ready, Console (TxD/RxD)
LAN: 10M/100M x 2
Serial: TxD x 8, RxD x 8 (UC-7408/7410/7420, UC-7408/7410/7420
Plus only)

Physical Characteristics
Housing: SECC sheet metal (1 mm)
Weight:
UC-7402: 830 g
UC-7408: 870 g
UC-7410: 810 g
UC-7420: 875 g
Dimensions: 197 x 44 x 125 mm (7.76 x 1.73 x 4.92 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 1 g @ IEC-68-2-6, sine wave (resonance search),
5-500 Hz, 1 Oct/min, 1 cycle, 13 min 17 sec per axis (UC-
7408/7410/7420, UC-7408/7410/7420 Plus)
Anti-Shock: 5 g @ IEC-68-2-27, half sine wave, 30 ms (UC-
7410/7420, UC-7410/7420 Plus)

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption:
UC-7402: 4.3 W
• 180 mA @ 24 VDC
• 360 mA @ 12 VDC
UC-7408: 7.6 W
• 315 mA @ 24 VDC
• 628 mA @ 12 VDC
UC-7410: 10 W
• 415mA @ 24 VDC
• 830 mA @ 12 VDC
UC-7420: 11 W
• 450 mA @ 24 VDC
• 890 mA @ 12 VDC

Regulatory Approvals

EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

: Software Specifications

Linux

Kernel Version: 2.6.10
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Software:
• Moxa Linux API Library for device control
• Linux Tool Chain: Gcc, Glibc, GDB

Windows Embedded CE 5.0 (UC-7408/7410/7420 only)

System Utilities: Windows command shell, telnet, ftp, web-based administration manager

File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, IPv6 Tunneling, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
Web Server (httpd): WinCE IIS, including ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Application Development Software:
• Moxa WinCE 5.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft Foundation Classes (MFC)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX2
• SOAP Toolkit
• Winsock 2.2

Dimensions (unit = mm)

Embedded Computers > UC-7400 Series

13

| Model Name | Serial Ports | LAN Ports | PCMCIA | Storage | | DI/DO | OS | | Wide Temp. |
	RS-232/422/485	10/100 Mbps		CF	USB		CE	Linux	
UC-7402	–	2	✓	✓	–	–	–	✓	–
UC-7408	8	2	✓	✓	1.1: 1	8/8	✓	✓	✓
UC-7410	8	2	–	–	1.1: 1, 2.0: 2	–	✓	✓	–
UC-7420	8	2	✓	✓	1.1: 1, 2.0: 2	–	✓	✓	–

: Ordering Information

Available Models

UC-7402-LX Plus: RISC-based IXP425 embedded computer with dual LANs, PCMCIA, CompactFlash, Linux 2.6

UC-7408-LX Plus: RISC-based IXP425 embedded computer with 8 serial ports, 8 DI channels, 8 DO channels, dual LANs, PCMCIA, CompactFlash, USB, Linux 2.6, -10 to 60°C operating temperature

UC-7408-CE: RISC-based IXP422 embedded computer with 8 serial ports, 8 DI channels, 8 DO channels, dual LANs, PCMCIA, CompactFlash, WinCE 5.0, -10 to 60°C operating temperature

UC-7410-LX Plus: RISC-based IXP425 embedded computer with 8 serial ports, dual LANs, Linux 2.6

UC-7410-CE: RISC-based IXP422 embedded computer with 8 serial ports, dual LANs, WinCE 5.0

UC-7420-LX Plus: RISC-based IXP425 embedded computer with 8 serial ports, dual LANs, USB, PCMCIA, CompactFlash, Linux 2.6

UC-7420-CE: RISC-based IXP422 embedded computer with 8 serial ports, dual LANs, USB, PCMCIA, CompactFlash, WinCE 5.0

UC-7408-T-LX Plus: RISC-based IXP425 embedded computer with 8 serial ports, 8 DI channels, 8 DO channels, dual LANs, PCMCIA, CompactFlash, USB, Linux 2.6, -40 to 75°C operating temperature

UC-7408-T-CE: RISC-based IXP422 embedded computer with 8 serial ports, 8 DI channels, 8 DO channels, dual LANs, PCMCIA, CompactFlash, WinCE 5.0, -40 to 75°C operating temperature

Package Checklist

- 1 UC-7402 or UC-7408 or UC-7410, or UC-7420 computer
- Wall mounting kit
- DIN-Rail mounting kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-RJ45F9-150: 8-pin RJ45 to DB9 female console port cable, 150 cm
- CBL-RJ45M9-150: 8-pin RJ45 to DB9 male serial port cable, 150 cm
- Universal power adaptor
- Document and Software CD
- Quick Installation Guide (printed)
- Product Warranty Statement (printed)

UC-7101/7110/7112 Series

RISC ready-to-run embedded computers with 1 or 2 serial ports, dual LANs, SD

> MOXA ART ARM9 32-bit 192 MHz processor
> 16 or 32 MB RAM
> 8 or 16 MB Flash ROM
> Dual or single10/100 Mbps Ethernet for network redundancy
> 1 or 2 software-selectable RS-232/422/485 ports
> 50 bps to 921.6 Kbps baudrate (non-standard baudrates supported)
> SD socket for storage expansion
> Built-in real-time clock (RTC) and buzzer
> Pre-installed Linux Kernel 2.6 platform
> -40 to 75°C wide temperature models available

Overview

The UC-7101/UC-7110/UC-7112 mini RISC-based communication platforms are ideal for embedded applications. The computers come with 1 or 2 RS-232/422/485 serial ports and single or dual 10/100 Mbps Ethernet LAN ports to provide users with a versatile communication platform.

The UC-7101/UC-7110/UC-7112 use the ARM9 RISC CPU. Its design architecture and modern semiconductor technology provide the CPU with a powerful computing engine and communication functions, but without generating too much heat. The built-in 8 or 16 MB NOR Flash ROM and 16 or 32 MB SDRAM provide plenty of storage, and the SD socket (UC-7101 and UC-7112 only) provide users with flexible storage expansion to run applications that generate a lot of data. The dual or single LAN ports built into the ARM9 make the UC-

7101/7110/UC-7112 computers ideal communication platforms for data acquisition and protocol conversion applications, and the 1 or 2 RS-232/422/485 serial ports allow you to connect a variety of serial devices.

The pre-installed µClinux or Linux operating system provides an open platform for software development. This means that software written for desktop PCs can be easily ported to a UC-7101, UC-7110 or UC-7112 embedded computer with a GNU cross complier, eliminating the need to spend time modifying existing code. The operating system, device drivers, and your own software can all be stored in the UC-7101/UC-7110/UC-7112's flash memory.

Appearance

UC-7110/UC-7112
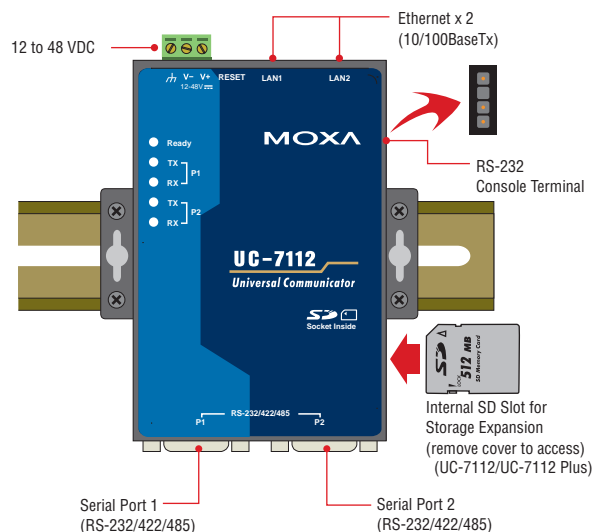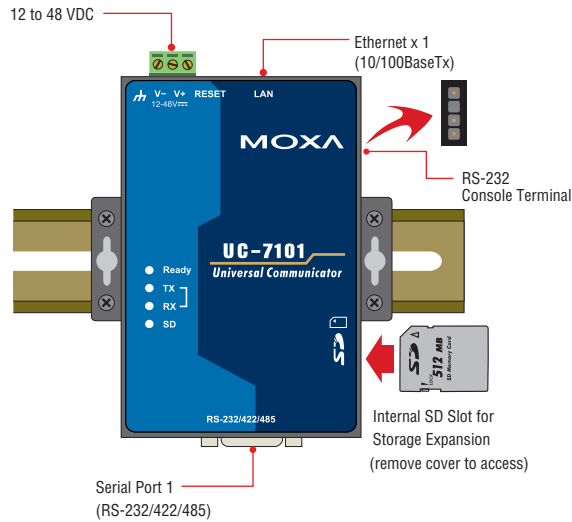
12 to 48 VDC

Ethernet x 2 (10/100BaseTx)

RS-232 Console Terminal

Internal SD Slot for Storage Expansion (remove cover to access) (UC-7112/UC-7112 Plus)

Serial Port 1 (RS-232/422/485)

Serial Port 2 (RS-232/422/485)

UC-7101

12 to 48 VDC

Ethernet x 1
(10/100BaseTx)

RS-232
Console Terminal

Internal SD Slot for
Storage Expansion
(remove cover to access)

Serial Port 1
(RS-232/422/485)

Hardware Specifications

Computer
CPU: MOXA ART ARM9 32-bit RISC CPU, 192 MHz
OS (pre-installed): µClinux or Linux
DRAM:
UC-7101/7110/7112: 16 MB
UC-7112 Plus: 32 MB onboard
Flash:
UC-7101/7110/7112: 8 MB onboard
UC-7112 Plus: 16 MB onboard

Storage
Storage Expansion: SD slot (UC-7101, UC-7112, and UC-7112 Plus only)

Ethernet Interface
LAN: Auto-sensing 10/100 Mbps (RJ45)
• UC-7101: 1 port
• UC-7110/7112/7112 Plus: 2 ports
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: RS-232/422/485 software-selectable (DB9 male)
• UC-7101: 1 port
• UC-7110/7112: 2 ports
ESD Protection: 15 KV ESD for all signals
Console Port: RS-232 (TxD, RxD, GND)
• UC-7101: 4-pin pin header output
• UC-7110/7112: 3-wire pin-header

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs
System: Ready
LAN: LED located on the RJ45 connector
• UC-7101: 10M/Link x 1, 100M/Link x 1
• UC-7110/7112: 10M/Link x 2, 100M/Link x 2
Serial:
• UC-7101: TxD x 1, RxD x 1
• UC-7110/7112: TxD x 2, RxD x 2

Physical Characteristics
Housing: Aluminum (1 mm)
Weight:
• UC-7101: 130 g
• UC-7110/7112: 190 g
Dimensions:
• UC-7101: 67 x 22 x 100.4 mm (2.64 x 0.87 x 3.95 in)
• UC-7110/7112: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-Vibration: 1 g @ IEC-68-2-6, sine wave (resonance search), 5-500 Hz, 1 Oct/min, 1 cycle, 13 min 17 sec per axis (UC-7101/7110 only)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption: 4.5 W
• 170 mA @ 24 VDC
• 340 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)
Safety:
• UC-7101: UL/cUL (UL60950, CAN/CSA-C22.2 No. 60950-00), LVD (EN60950-1)
• UC-7110/7112: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)
Green Product: RoHS, CRoHS, WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

⁞ Software Specifications

Linux (UC-7112-LX Plus only)

Kernel Version: 2.6.9
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Software:
• Moxa Linux API Library for device control
• Linux Tool Chain: Gcc, Glibc, GDB

µClinux

Kernel Version: 2.6.19
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: msh, busybox, tinylogin, telnet, ftp
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
telnetd: Telnet Server daemon
inetd: TCP server manager program
ftpd: FTP server daemon
boa: Web server daemon
Application Development Software:
• Moxa Linux API Library for device control
• Linux Tool Chain:
• Arm-elf-gcc: C/C++ PC Cross Compiler
• µClibc: POSIX Standard Library

Dimensions (unit = mm)

UC-7110/UC-7112
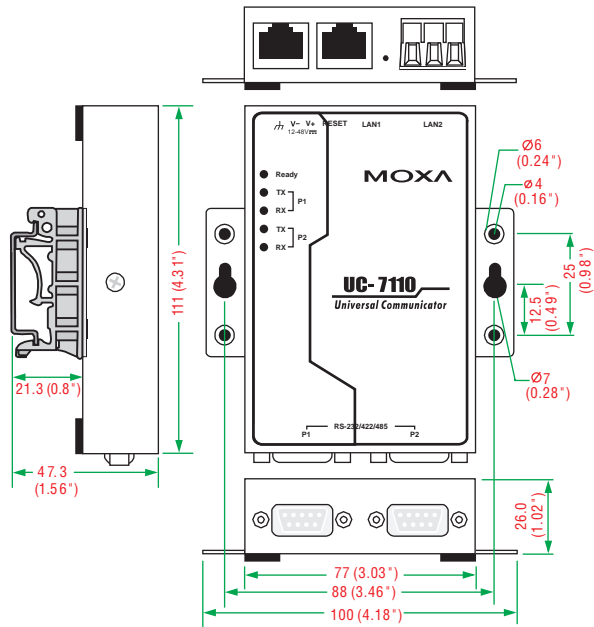
UC7101
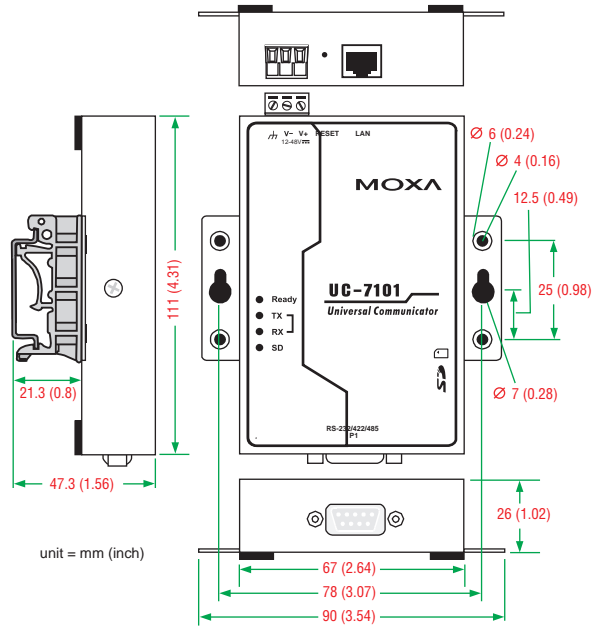
Model Name	Serial Ports	LAN Ports	Storage	OS		Wide Temp.
	RS-232/422/485	10/100 Mbps	SD	uCLinux	Linux	
UC-7101	1	1	✓	✓	–	✓
UC-7110	2	2	–	✓	–	✓
UC-7112	2	2	✓	✓	✓	–

: Ordering Information

Available Models

UC-7101-LX: Mini RISC-based embedded computer with 1 serial port, LAN, µClinux OS, -10 to 60°C operating temperature

UC-7110-LX: Mini RISC-based embedded computer with 2 serial ports, dual LANs, µClinux OS, -10 to 60°C operating temperature

UC-7112-LX: Mini RISC-based embedded computer with 2 serial ports, dual LANs, SD, µClinux 2.6 OS, -10 to 60°C operating temperature

UC-7112-LX Plus: Mini RISC-based embedded computer with 2 serial ports, dual LANs, SD, Linux 2.6 OS, -10 to 60°C operating temperature

UC-7101-T-LX: Mini RISC-based embedded computer with 1 serial port, LAN, µClinux OS, -40 to 75°C operating temperature

UC-7110-T-LX: Mini RISC-based embedded computer with 2 serial ports, dual LANs, µClinux OS, -40 to 75°C operating temperature

Package Checklist

- 1 UC-7101 or UC-7110 or UC-7112 computer
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adaptor (including terminal block to power jack converter)
- Document and Software CD
- Quick Installation Guide (printed)
- Product Warranty Statement (printed)

UC-7122/7124 Series

RISC ready-to-run embedded computers with dual LANs, 2 or 4 serial ports, SD, USB

-40°C 75°C

> Cirrus Logic EP9302 ARM9 32-bit 200 MHz processor
> On-board 32 MB RAM, 16 MB flash disk
> 2 or 4 software-selectable RS-232/422/485 serial ports
> 50 bps to 921.6 Kbps baudrate (non-standard baudrates supported)
> Dual 10/100 Mbps Ethernet for network redundancy
> SD socket for storage expansion supported
> Built-in real-time clock (RTC), buzzer, watchdog timer (WDT)
> Ready-to-run WinCE 5.0 platform
> -40 to 75°C wide temperature models available

Microsoft® Windows® Embedded   e   RoHS   CE   FC   c UL us LISTED

Overview

The UC-7122/7124 embedded computers come with 2 or 4 RS-232/422/485 serial ports and dual 10/100 Mbps Ethernet LAN ports to provide users with a versatile communication platform, making these RISC-based embedded computers ideal for your embedded applications.

The UC-7122/7124 embedded computers use the Cirrus Logic EP9302 ARM9 200 MHz RISC CPU. Unlike the x86 CPU, which uses a CISC design, the ARM9's RISC design architecture and modern semiconductor technology provide the UC-7122/7124 with a powerful computing engine and communication functions, but without generating too much heat. Moreover, the built-in 16 MB NOR Flash ROM and 16 MB SDRAM give you enough storage capacity to run applications on the UC-7122/7124 computers. The additional SD socket provides the flexibility of adding storage expansion disks, and the dual LAN ports built into the ARM9 make the UC-7122/7124 ideal communication platforms for simple data acquisition and protocol conversion applications. In addition, the RS-232/422/485 serial

ports allow you to connect a variety of serial devices. Taken together, these features ensure that the UC-7122/7124 embedded computers are convenient and powerful central control units for industrial applications, such as data acquisition, remote device control and monitoring, and protocol conversion.

The pre-installed WinCE 5.0 operating system provides a common Windows-based software operating system for software program development. This means that software written in Visual C/C++ for desktop PCs is easily ported to the UC-7122/7124 computers with a general programming tool such as Microsoft Embedded Visual C++ or Microsoft Visual Studio 2005. You will not need to spend time modifying existing software code, and the operating system, device drivers, and your own software can all be stored in the UC-7122/7124's flash memory.

Appearance

UC-7122

USB 2.0 Host x 1
12 to 48 VDC
Ethernet x 2 (10/100 Mbps)
RS-232 Console Terminal
Reset Button
Internal SD Slot for Storage Expansion (remove cover to access)
Serial Port 1 (RS-232/422/485, DB9 Male)
Serial Port 2 (RS-232/422/485, DB9 Male)

UC-7124

USB 2.0 Host x 1
12 to 48 VDC
Ethernet x 2 (10/100 Mbps)
RS-232 Console Terminal
Reset Button
Internal SD Slot for Storage Expansion (remove cover to access)
Serial Port 1 to 4 (RS-232/422/485, RJ45)
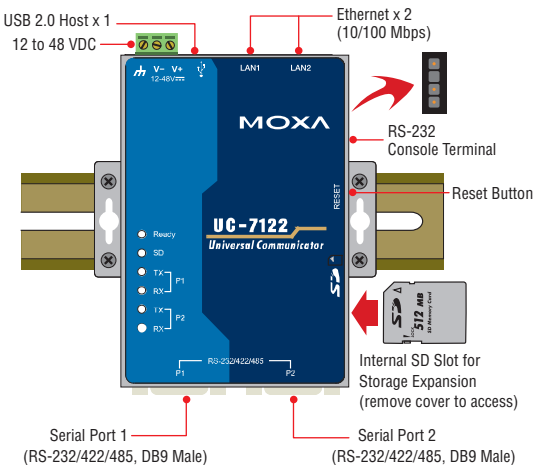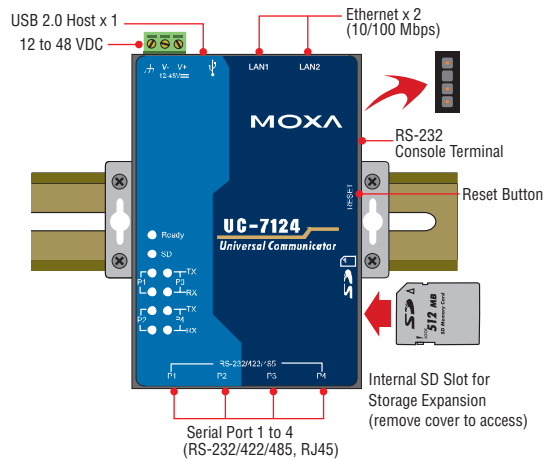
Hardware Specifications

Computer
CPU: Cirrus EP9302 ARM9 CPU, 200 MHz
OS (pre-installed): Windows CE 5.0
DRAM: 32 MB onboard
Flash: 16 MB onboard

Storage
Storage Expansion: SD slot

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards:
UC-7122: 2 RS-232/422/485 ports, software-selectable (DB9 male)
UC-7124: 4 RS-232/422/485 ports, software-selectable (RJ45)
ESD Protection: 15 KV for all signals
Console Port: RS-232 (TxD, RxD, GND), 4-pin pin header output

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs
System: Ready, SD
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)
Serial: TxD, RxD (2 or 4 of each)

Physical Characteristics
Housing: Aluminum (1 mm)
Weight:
UC-7122: 190 g
UC-7124: 200 g
Dimensions: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 1 g @ IEC-68-2-6, sine wave (resonance search), 5-500 Hz, 1 Oct/min, 1 cycle, 13 min 17 sec per axis
Anti-shock: 2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
UC-7122: 4.1 W   UC-7124: 4.3 W
• 170 mA @ 24 VDC   • 180 mA @ 24 VDC
• 340 mA @ 12 VDC   • 360 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)

Safety:
LVD: EN60950-1
UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03
Green Product: RoHS, CRoHS, WEEE

Reliability
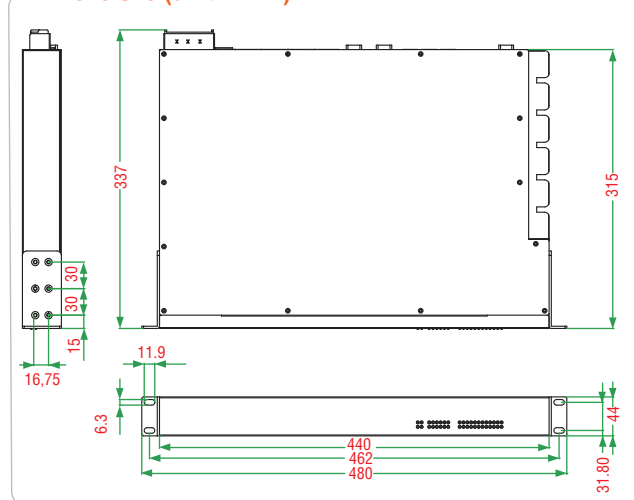**Alert Tools:** Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

Dimensions (unit = mm)

UC-7122
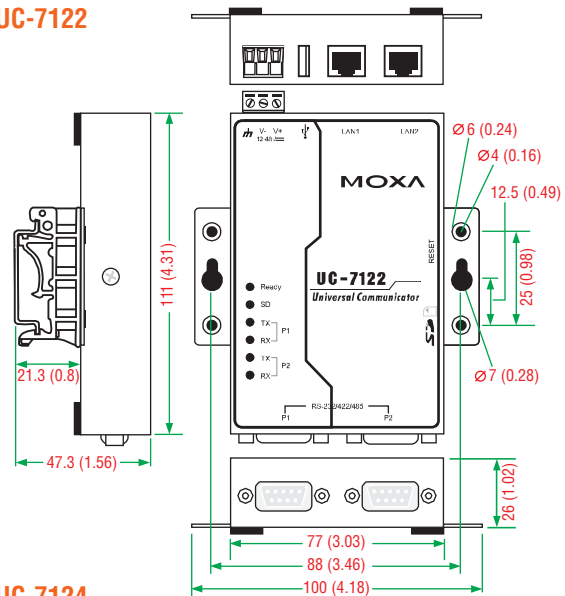
UC-7124
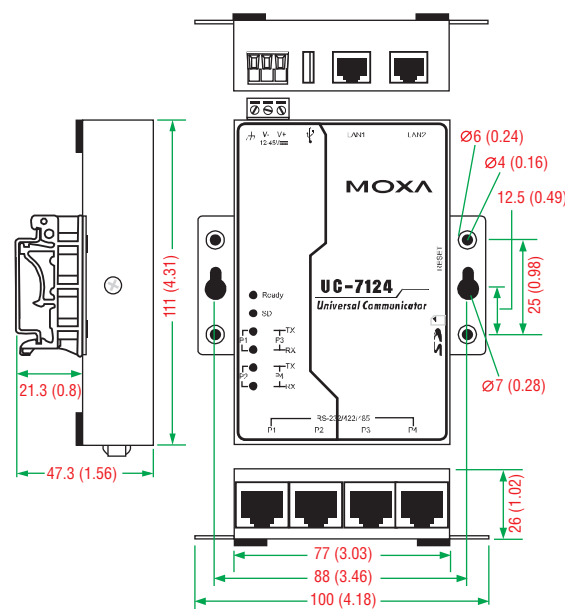
Pin Assignment

UC-7122 (DB9 male connector)
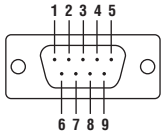
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

UC-7124 (8-pin RJ45 connector)
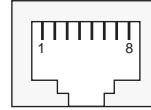
PIN	RS-232	RS-422/485-4w	RS-485
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TxD	TxD-	---
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

Software Specifications

Windows Embedded CE 5.0

System Utilities: Windows command shell, telnet, ftp, web-based administration manager

File System: FAT (on-board flash)

Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP

Telnet Server: Allows remote administration through a standard telnet client.

FTP Server: Used for transferring files to and from remote computer systems over a network.

Web Server (httpd): WinCE IIS, including ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.

Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.

Application Development Software:
• Moxa WinCE 5.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft Foundation Classes (MFC)
• Microsoft .NET Compact Framework 2.0 SP2
• Winsock 2.2

Ordering Information

Available Models

UC-7122-CE: Mini RISC-based embedded computer with 2 serial ports, dual LANs, SD, USB, WinCE 5.0, -10 to 60°C operating temperature

UC-7124-CE: Mini RISC-based embedded computer with 4 serial ports, dual LANs, SD, USB, WinCE 5.0, -10 to 60°C operating temperature

UC-7122-T-CE: Mini RISC-based embedded computer with 2 serial ports, dual LANs, SD, USB, WinCE 5.0, -40 to 75°C operating temperature

UC-7124-T-CE: Mini RISC-based embedded computer with 4 serial ports, dual LANs, SD, USB, WinCE 5.0, -40 to 75°C operating temperature

Accessories (can be purchased separately)

DK-35A: Mounting Kit for 35-mm DIN-Rail

Package Checklist

• UC-7122 or UC-7124 computer
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
• CBL-RJ45M9-150: 8 pin RJ45 to DB9 male serial port cable, 150 cm
• Universal power adaptor (including terminal block to power jack converter)
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

Model Name	Serial Ports	LAN Ports	Storage		OS		Wide Temp.
	RS-232/422/485	10/100 Mbps	SD	USB	CE 5.0	Linux	
UC-7122	2	2	✓	1	✓	–	✓
UC-7124	4	2	✓	1	✓	–	✓

DA-710 Series

x86 embedded computers with 2 serial ports, quad LANs, VGA, 4 DIs, 4 DOs, USB, and 4 peripheral expansion slots

> Intel Celeron M 2.0 GHz processor with 533 MHz FSB
> 1 X 200-pin DDR2 SODIMM socket, supporting DDR2 533 up to 2 GB
> 4 PCI slots for expansion modules
> Quad 10/100/1000 Mbps Ethernet for network redundancy
> 1 CompactFlash socket, 1 IDE, and 2 serial ATA-150 connectors for storage expansion
> 4 USB 2.0 ports for high speed peripherals
> 4 DIs and 4 DOs
> Ready-to-Run Linux or Windows Embedded Standard 2009 platform
> 19-inch rackmount model, 4U high
> Fanless Design
> Dual 100/240 VAC/VDC power input

:: Overview

The DA-710 computer is based on the Intel x86 processor, supports VGA, and comes with 4 Ethernet ports, 2 RS-232 serial ports, CompactFlash, and USB. The DA-710 comes in a standard 19-inch, 4U high form factor, making it an ideal platform for industrial applications.

The DA-710 comes with 4 PCI slots for inserting expansion modules. Moxa provides a variety of communication modules, including an 8-port RS-232/422/485 module, a 4-port 10/100 Mbps LAN module, an 8-port RS-422/485 module, an 8-port switch module, and a universal PCI expansion module. The friendly modular design gives

users the advantage of being able to swap out modules quickly and easily.

The DA-710 runs Linux, or Windows Embedded Standard 2009 (pre-installed), providing a friendly environment for developing sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and helps programmers develop bug-free code quickly and at a lower cost.

:: Appearance

Front View

Programmable LED x 4
Ethernet LED x 4
Power/Storage LED Indicators
Power 1/2 Fail LED Indicators
Module A LED x 16
Module B LED x 16
Module C LED x 16
Module D LED x 16
Rackmount Ear
Rackmount Ear

Rear View

Module Slot A   Module Slot B   Module Slot C   Module Slot D
VGA   PS/2   RS-232 Serial Port x 2   DI x 4 DO x 4   Reset Button   Power Input 2   Power Input 1
USB 2.0 Host x 4   10/100/1000 Ethernet Port x 4   Power Switch

Dimensions (unit = mm)

400 mm

420 mm

180 mm

480 mm

13
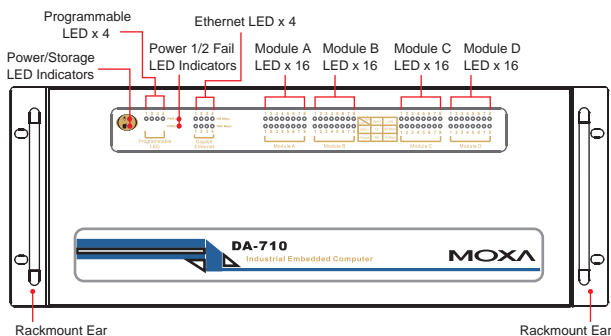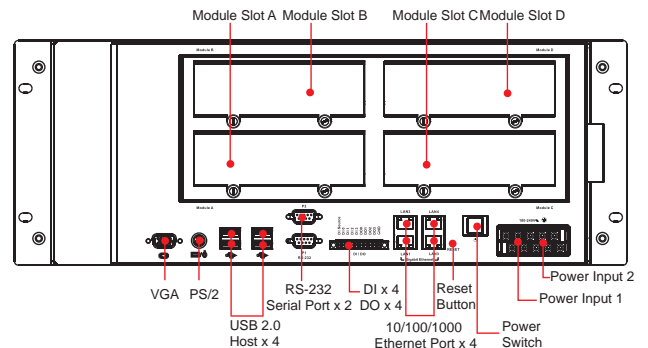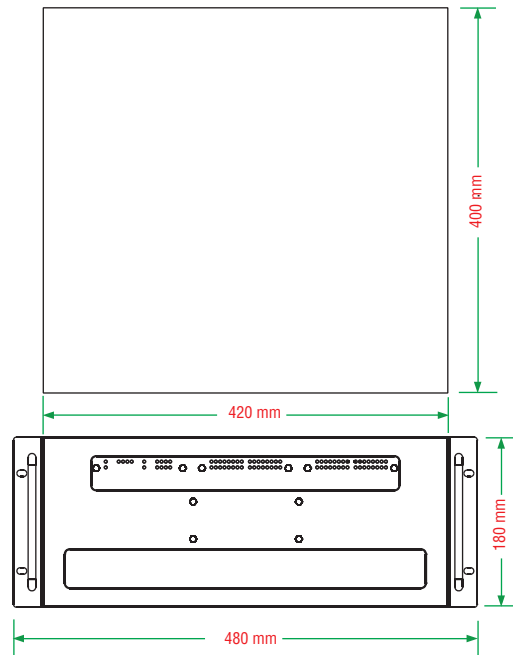
: Hardware Specifications

Computer

CPU: Intel Celeron M 2.0 GHz processor
OS (pre-installed): Windows Embedded Standard 2009, Linux 2.6
System Chipset: Intel GLE960 + ICH8M
BIOS: 8 Mbit SPI Serial Flash, PCI Plug & Play, ACPI function support
FSB: 533 MHz
System Memory: 1 x 200-pin DDR2 SODIMM socket supporting DDR2 533; up to 2 GB max. (1 GB built-in)
USB: USB 2.0 compliant hosts x 4, type A connector, supports system boot up

Storage

Built-in: Onboard industrial DOM to store OS; 1 GB for Linux, 2 GB for XPe
Storage Expansion: CompactFlash socket
HDD Support: 2 x SATA connector, 1 x IDE connector

Other Peripherals

KB/MS: 1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse

Display

Graphics Controller: Integrated Intel graphics media accelerator (GMA X3100)
Display Memory: Dynamic video memory technology
Intel Clear Video Technology: MPEG-2 hardware accelerator, Microsoft DirectX 9
Display Interface: CRT interface for VGA output (DB15 female connector)
Resolution: QXGA maximum with resolution up to 2048 x 1536 at 60 Hz

Ethernet Interface

LAN: 4 auto-sensing 10/100/1000 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface

Serial Standards: 2 RS-232 ports (DB9 male)
ESD Protection: 4 KV for all signals

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: XON/XOFF
Baudrate: 50 bps to 115.2 Kbps

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

Digital Input

Input Channels: 4, source type
Input Voltage: 0 to 30 VDC
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 to +30 V (DI Source to DI)
Connector Type: 6-pin screw terminal block (4 points, DI Source, GND)
Isolation: 4 KV optical isolation

Digital Output

Output Channels: 4, sink type
Output Current: Max. 200 mA per channel
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 5-pin screw terminal block (4 points, GND)
Isolation: 4 KV optical isolation

LEDs

System: Power x 1, Storage x 1
LAN: 100M x 4, 1000M x 4
Power Failure: LED x 2

Programmable: LED x 4
Module: Module A x 16, Module B x 16, Module C x 16, Module D x 16
Physical Characteristics
Housing: SECC sheet metal (1 mm)
Weight: 14 kg
Dimensions:
• Without ears: 400 x 420 x 180 mm (15.75 x 16.54 x 7.09 in)
• With ears: 400 x 480 x 180 mm (15.75 x 18.90 x 7.09 in)
Mounting: Standard 19-inch rackmount
Environmental Limits
Operating Temperature: -10 to 50°C (14 to 122°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (4 to 176°F)
Power Requirements
Input Voltage: Single or dual inputs, 100 to 240 VAC/VDC auto-ranging, 47 to 63 Hz, terminal block
Power Consumption: 60 W

Regulatory Approvals
EMC: CE (EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 55024), FCC (Part 15 Subpart B, CISPR 22 Class A, ANSI C63.4)
Safety: UL/cUL (UL 60950-1, CSA C22.2 No. 60950-1-07), CCC
Green Product: RoHS, CRoHS, WEEE
Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock) with backup lithium battery
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 time interval levels for system reset, software programmable
Warranty
Warranty Period: 3 years
Details: See www.moxa.com/warranty

: Software Specifications

Linux
Distribution: Debian Lenny 5.0
Kernel Version: 2.6.26
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE
File System: EXT2 (1G DOM)
System Utilities: bash, busybox, login, telnet, ftp, ssh, openbsd-inetd, apt, apt-utils, dpkg, grub, udev
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server
Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
iptables: Firewall service manager
NAT: Network Address Translation
pppd: dial in/out over serial port daemon & PPPoE
pppoe: PPP over ethernet
tftp/tftpd: Trivial file transfer protocol client/server
snmpd: snmpd agent daemon
usbmount: supports USB PnP
DHCP Client: dhcp3-client
cron: to manage regular background processing
grep: NU grep, egrep, and fgrep
minicom: friendly serial communication program
watchdog: software watchdog
inetd: TCP server manager program
Application Development Environment: GNU Make 3.8.1 (GNU make utility to maintain groups of programs)
Automatic Configuration Script Builder: autoconf 2.13
gcc: GNU C compiler
g++: GNU C++ compiler
libc6-dev: GNU C library (development libraries and headers)
Perl: Pratical Extraction and Report Language
Vim: Vi IMproved (enhanced vi editor)

Windows XP Embedded
Version: Windows Embedded Standard 2009
System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, FTP, SMTP, PPPoE, PPTP, NetBIOS
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.

Application Development Software:
- Microsoft .Net Framework 2.0 with service pack 2 (CLR and the .NET Framework class library)
- Active Directory Service Interface (ADSI) Core
- Active Template Library (ATL),ASP.NET 2.0
- Certificate Request Client & Certificate
- Autoenrollment (CLR and the .NET Framework class library)
- COM APIs
- Common Control Libraries
- Common File Dialogs
- Direct3D, DirectPlay, DirectShow and Direct show filters
- Distributed Transaction Coordinator (MSDTC)
- Enhanced Write Filter (Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage)
- Event Log, Internet Explorer
- Mapi32 Libraries
- Message Queuing (MSMQ) Core
- Microsoft Visual C++ Run Time Libraries
- Power Management dynamic-link library
- Registry Editor
- RPC
- Smart Card Cryptographic Service Providers
- USB 2.0 core drivers compliant with USB .95 or 1.0
- Windows API, Media Player 10, Script Engines, and WMI

⋮ Ordering Information

Available Models
DA-710-XPE: x86-based rackmount embedded computer with 2 RS-232 ports, 4 LANs, 4 peripheral expansion slots, 4 DIs, 4 DOs, VGA, CompactFlash, USB, Windows Embedded Standard 2009
DA-710-LX: x86-based rackmount embedded computer with 2 RS-232 ports, 4 LANs, 4 peripheral expansion slots, 4 DIs, 4 DOs, VGA, CompactFlash, USB, Linux 2.6

Expansion Modules (can be purchased separately)
DA-SP08-I-DB: 8-port RS-232/422/485 serial module with DB9 connector and digital isolation
DA-SP08-DB: 8-port RS-232/422/485 serial module with DB9 connector
DA-SP08-I-TB: 8-port RS-232/422/485 serial module with terminal block connector and digital isolation
DA-SP38-I-TB: 8-port RS-422/485 serial module with terminal block connector and digital isolation
DA-SW08-RJ: 8-port 10/100 Mbps unmanaged switch module
DA-LN04-RJ: 4-port 10/100 Mbps LAN module
DA-UPCI-DK: Universal PCI development kit

Package Checklist
- 1 DA-710 computer
- Ethernet Cable: RJ45 to RJ45 cross-over cable, 100 cm
- Quick Installation Guide (printed)
- Document and Software CD or DVD
- Product Warranty Statement (printed)

13

Embedded Computers ❯ DA-710 Series

DA-681 Series

x86 rackmount embedded computers with 4 isolated RS-232 and 8 isolated RS-485 ports, 6 LANs, VGA, CompactFlash, USB

> IEC 61850-3 certified for power substation automation systems (DPP-T models only)
> Intel Celeron M 1 GHz processor with 400 MHz FSB
> 1 x 200-pin DDR2 SODIMM socket, supporting DDR2 400 up to 1 GB (512 MB built-in)
> Six 10/100 Mbps Ethernet ports
> 1 CompactFlash socket, 1 IDE ATA-150 connector for storage expansion
> USB 2.0 ports for high speed peripherals
> 4 isolated RS-232 and 8 isolated RS-485 ports
> Serial port speed from 50 bps to 921.6 Kbps, supporting nonstandard baudrates
> Embedded Linux, WinCE 6.0, or WinXPe platform
> 19-inch rackmount model, 1U height
> Dual 100/240 VAC/VDC power input (single power and dual power models available)
> Fanless Design

⋮ Overview

The DA-681 computer is based on the Intel x86 processor and supports VGA, 6 Ethernet ports, 4 RS-232 and 8 RS-485 serial ports with optical isolation, CompactFlash, and USB. The DA-681 comes in a standard 19-inch, 1U high form factor, making it an ideal platform for industrial applications.

With its robust design, the DA-681 is suitable for industrial automation applications that require standard 19-inch rackmount solutions, such as power automation, transportation, and oil and gas. Another plus is that the serial ports come with 2 KV optical isolation protection to guarantee communication reliability in harsh industrial environments.

In addition, the DPP-T models have been certified to meet the IEC 61850-3 standard, making them ideal for power substation automation systems.

The DA-681 runs Linux, WinCE 6.0, or Windows XP Embedded (pre-installed), providing a friendly environment for developing sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and helps programmers develop bug-free code quickly and at a lower cost.

⋮ Appearance
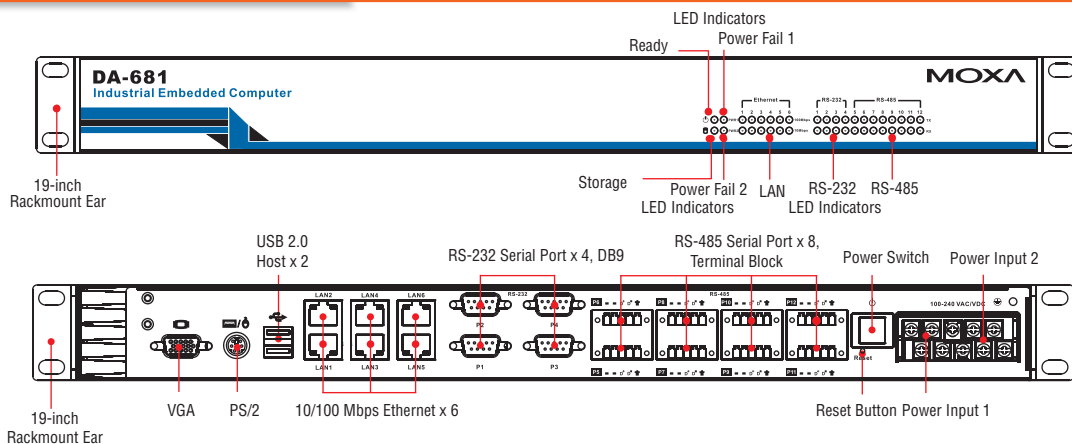
: Hardware Specifications

Computer

CPU: Intel Celeron M 1 GHz processor

OS (pre-installed): WinCE 6.0, Windows XP Embedded SP3, Linux 2.6

System Chipset: Intel 910GMLE + ICH6M chipset

BIOS: 4 mega-bit Flash BIOS, PCI Plug & Play, ACPI function support

FSB: 400 MHz

System Memory: 1 x 200-pin DDR2 SODIMM socket supporting DDR2 400; up to 1 GB max. (512 MB built-in)

Expansion Bus: PCI/104 onboard

USB: USB 2.0 compliant hosts x 2, Type A connector, supports system boot up

Storage

Built-in: 1 GB (2 GB for DA-681-XPE) industrial DOM onboard to store OS via IDE interface

Storage Expansion: CompactFlash socket

HDD Support: SATA connector for HDD expansion

Other Peripherals

KB/MS: 1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse

Display

Graphics Controller: Integrated graphics with built-in Intel 910GME, and built-in Intel extreme Graphics 2 technology

Display Memory: Dynamic video memory (shares up to 32 MB of system memory)

Display Interface: CRT Interface for VGA output (DB15 female connector)

Resolution: CRT display mode with pixel resolution up to 2048 x 1536 at 75 Hz

Ethernet Interface

LAN: 6 auto-sensing 10/100 Mbps ports (RJ45)

Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface

Serial Standards:
• 4 RS-232 ports (DB9 male)
• 8 RS-485 ports (terminal block)

ESD Protection: 15 KV for all signals

Isolation: 2 KV digital isolation

Serial Communication Parameters

Data Bits: 5, 6, 7, 8

Stop Bits: 1, 1.5, 2

Parity: None, Even, Odd, Space, Mark

Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

RS-485-2w: Data+, Data-, GND

LEDs

System: Power x 1, Storage x 1

LAN: 10M x 6, 100M x 6

Serial:
RS-232: 4 x Tx, 4 x Rx
RS-485: 8 x Tx, 8 x Rx

Power Failure: LED x 2 (dual power models)

Physical Characteristics

Housing: SECC sheet metal (1 mm)

Weight: 4.5 kg

Dimensions: 440 x 315 x 45 mm (17.32 x 12.40 x 1.77 in), 19 inch 1U height

Mounting: Standard 19-inch rackmount

Environmental Limits

Operating Temperature:
SP and DP models: -10 to 60°C (14 to 140°F)
DPP-T models: -40 to 75°C (-40 to 167°F)

Operating Humidity: 5 to 95% RH

Storage Temperature:
SP and DP models: -20 to 80°C (4 to 176°F)
DPP-T models: -40 to 85°C (-40 to 185°F)

Anti-vibration: 7 mm (2-9 Hz), 20 m/s/s (9-200 Hz), 15 m/s/s (200-500 Hz) @ IEC-61850-3, IEC 60870-2-2/Cm/(3M6)/(4M6), sine wave, 2-500 Hz, 1 Oct/min, 10 cycles, 2 hrs 40 mins per axis

Anti-shock: 300 m/s2 @ IEC-61850-3, IEC 60870-2-2/Cm/(3M6)/(4M6), half sine wave, 11 ms

Power Requirements

Input Voltage: Single or dual inputs, 100 to 240 VAC/VDC auto-ranging, 47 to 63 Hz, terminal block

Power Consumption: 26 W

Regulatory Approvals

EMC: CE (EN55022, EN61000-3-2, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class), CCC (GB9254, GB 17625.1), IEC 61850-3 (DPP-T models only)

Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)

Green Product: RoHS, CRoHS, WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock) with battery lithium backup

Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty

Warranty Period: 3 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)

13

: Software Specifications

Linux

Distribution: Debian Etch 4.0
Kernel Version: 2.6.18
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE
File System: EXT2 (1G DOM)
System Utilities: bash, busybox, login, telnet, ftp, ssh, openbsd-inetd, apt, apt-utils, dpkg, grub, udev
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server
Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
iptables: Firewall service manager
NAT: Network Address Translation
pppd: dial in/out over serial port daemon & PPPoE
pppoe: PPP over ethernet
tftp/tftpd: Trivial file transfer protocol client/server
snmpd: snmpd agent daemon
usbmount: supports USB PnP
DHCP Client: dhcp3-client
cron: to manage regular background processing
grep: NU grep, egrep, and fgrep
minicom: friendly serial communication program
watchdog: software watchdog
inetd: TCP server manager program
Application Development Environment: GNU Make 3.8.1 (GNU make utility to maintain groups of programs)
Automatic Configuration Script Builder: autoconf 2.13
gcc: GNU C compiler
g++: GNU C++ compiler
libc6-dev: GNU C library (development libraries and headers)
Perl: Pratical Extraction and Report Language
Vim: Vi IMproved (enhanced vi editor)

Windows Embedded CE 6.0

System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Enables clients to access files and other resources over the network (Microsoft® Wincows® CE).
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU Hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit Client
• Winsock 2.2

Windows XP Embedded

System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, FTP, SMTP, PPPoE, PPTP, NetBIOS
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.
Application Development Software:
• Microsoft .Net Framework 2.0 with service pack 2 (CLR and the .NET Framework class library)
• Active Directory Service Interface (ADSI) Core
• Active Template Library (ATL),ASP.NET 2.0
• Certificate Request Client & Certificate
• Autoenrollment (CLR and the .NET Framework class library)
• COM APIs
• Common Control Libraries
• Common File Dialogs
• Direct3D, DirectPlay, DirectShow and Direct show filters
• Distributed Transaction Coordinator (MSDTC)
• Enhanced Write Filter (Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage)
• Event Log, Internet Explorer
• Mapi32 Libraries
• Message Queuing (MSMQ) Core
• Microsoft Visual C++ Run Time Libraries
• Power Management dynamic-link library
• Registry Editor
• RPC
• Smart Card Cryptographic Service Providers
• USB 2.0 core drivers compliant with USB .95 or 1.0
• Windows API, Media Player 10, Script Engines, and WMI

MOXA® ❯ www.moxa.com ❯ info@moxa.com

: Ordering Information

Available Models

DA-681-I-SP-CE: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Single Power, WinCE 6.0, -10 to 60°C operating temperature
DA-681-I-SP-XPE: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Single Power, WinXPe SP3, -10 to 60°C operating temperature
DA-681-I-SP-LX: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Single Power, Linux 2.6, -10 to 60°C operating temperature
DA-681-I-DP-CE: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Dual Power, WinCE 6.0, -10 to 60°C operating temperature
DA-681-I-DP-XPE: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Dual Power, WinXPe SP3, -10 to 60°C operating temperature
DA-681-I-DP-LX: x86 rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, Dual Power, Linux 2.6, -10 to 60°C operating temperature
DA-681-I-DPP-T-CE: IEC 61850-3 x86 ready-to-run rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, dual power, WinCE 6.0, -40 to 75°C operating temperature
DA-681-I-DPP-T-XPE: IEC 61850-3 x86 ready-to-run rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, dual power, WinXPe SP3, -40 to 75°C operating temperature
DA-681-I-DPP-T-LX: IEC 61850-3 x86 ready-to-run rackmount computer with VGA, 6 Ethernet ports, 4 RS-232 ports, 8 RS-485 ports, CompactFlash, SATA, USB, dual power, Linux 2.6, -40 to 75°C operating temperature

Package Checklist

- DA-681 computer
- Rackmount Kit
- Ethernet Cable: RJ45 to RJ45 cross-over cable, 100 cm
- Quick Installation Guide (printed)
- Document and Software CD or DVD
- Product Warranty Statement (printed)

Model Name	Serial Ports		LAN Ports	Storage			OS	Power	IEC 61850-3 Certified
	RS-232	RS-485	10/100 Mbps	SATA	CF	USB			
DA-681-I-SP-CE	4	8	6	✓	✓	✓	CE 6.0	Single	–
DA-681-I-SP-XPE	4	8	6	✓	✓	✓	XPE	Single	–
DA-681-I-SP-LX	4	8	6	✓	✓	✓	Linux	Single	–
DA-681-I-DP-CE	4	8	6	✓	✓	✓	CE 6.0	Dual	–
DA-681-I-DP-XPE	4	8	6	✓	✓	✓	XPE	Dual	–
DA-681-I-DP-LX	4	8	6	✓	✓	✓	Linux	Dual	–
DA-681-I-DPP-T-CE	4	8	6	✓	✓	✓	CE 6.0	Dual	✓
DA-681-I-DPP-T_XPE	4	8	6	✓	✓	✓	XPE	Dual	✓
DA-681-I-DPP-T-LX	4	8	6	✓	✓	✓	Linux	Dual	✓

13

Embedded Computers ❯ DA-681 Series

DA-682 Series

x86 rackmount embedded computers with VGA, 4 Gigabit Ethernet ports, 2 peripheral expansion slots, CompactFlash, USB

TAIWAN EXCELLENCE 2009

> Intel Celeron M 1 GHz processor with 400 MHz FSB
> Built-in DDR2 SDRAM and industrial flash disk module
> Quad Gigabit Ethernet ports for network redundancy
> Software selectable RS-232/422/485 with 2 KV isolation protection
> 2 PCI expansion slots inserting expansion modules
> 1 CompactFlash socket for storage expansion
> USB 2.0 ports for high speed peripherals, supporting system bootup
> 19-inch rackmount, 2U high form factor
> 100/240 VAC/VDC power inputs
> Ready-to-Run Linux, WinCE 6.0, or Windows XP Embedded platform
> Fanless design

Microsoft® **Windows**™ Embedded   CCC   e   RoHS   CE   FC   c UL us LISTED

⋮ Overview

The DA-682 computers are based on the Intel x86 processor and support VGA, 4 Gigabit Ethernet ports, 8 RS-232/422/485 serial ports with optical isolation, CompactFlash, and USB. The DA-682 comes in a standard 19-inch, 2U high form factor.

With their robust design, the DA-682 computers are suitable for industrial automation applications that require standard 19-inch rackmount solutions, such as power automation, transportation, and oil and gas. Another plus is that the serial ports come with 2 KV optical isolation protection to guarantee communication reliability in harsh industrial environments.

The DA-682 computers run Linux, WinCE 6.0, or Windows XP

Embedded (pre-installed), providing a friendly environment for developing sophisticated application software. The great software support that Moxa provides makes the programmer's job easier, and helps programmers develop bug-free code quickly and at a lower cost.

The DA-682 comes with 2 PCI slots for inserting expansion modules. Moxa provides a variety of communication modules, including an 8-port RS-232/422/485 module, a 4-port 10/100 Mbps LAN module, and a universal PCI expansion module. The friendly design gives users the advantage of being able to swap out modules quickly and easily.

These features make the DA-682 an ideal solution for use with a wide array of industrial automation applications.

⋮ Appearance

Front View
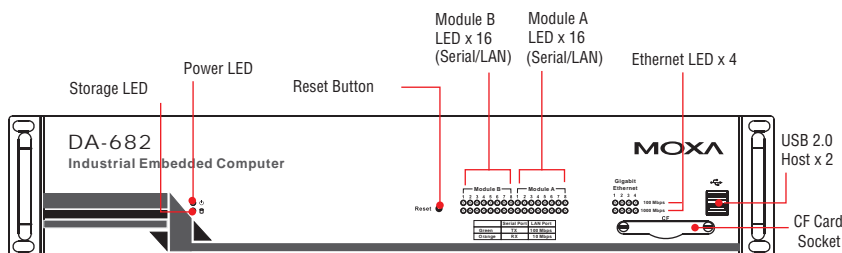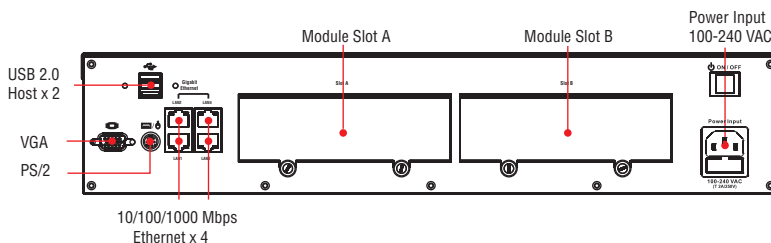
Storage LED
Power LED
Reset Button
Module B LED x 16 (Serial/LAN)
Module A LED x 16 (Serial/LAN)
Ethernet LED x 4
USB 2.0 Host x 2
CF Card Socket

Rear View

USB 2.0 Host x 2
VGA
PS/2
10/100/1000 Mbps Ethernet x 4
Module Slot A
Module Slot B
Power Input 100-240 VAC

: Hardware Specifications

Computer

CPU: Intel Celeron M 1 GHz processor
OS (pre-installed): Linux, WinCE 6.0, or Windows XP Embedded SP2
System Chipset: Intel 915GME + ICH6M chipset
BIOS: 4 mega-bit Flash BIOS, PCI Plug & Play, ACPI function support
FSB: 400/533 MHz
System Memory: 1 x 200-pin DDR2 SODIMM socket supporting DDR2 400/533; up to 1 GB max. (512 MB for WinXPe/Linux, 256 MB for WinCE 6.0)
USB: USB 2.0 compliant hosts x 4, Type A connector, supports system boot up

Storage

Built-in: 256 MB (CE) or 1 GB (WinXPe/Linux) industrial DOM for OS
Storage Expansion: CompactFlash socket

Other Peripherals

KB/MS: 1 PS/2 interface, supports standard PS/2 keyboard and PS/2 mouse

Display

Graphics Controller: Integrated graphics with built-in Intel 915GME, and built-in Intel extreme Graphics 2 technology
Display Memory: Dynamic video memory (shares up to 32 MB of system memory)
Display Interface: CRT Interface for VGA output (DB15 female connector)
Resolution: CRT display mode with pixel resolution up to 2548 x 1536 at 75 Hz

Ethernet Interface

LAN: 4 auto-sensing 10/100/1000 Mbps Gigabit ports (Realtek RTL8110SC controller)
Magnetic Isolation Protection: 1.5 KV built-in

LEDs

System: Power, Storage
Gigabit LAN: 100M x 4, 1000M x 4
LAN: 10/100M mode
Serial: TX/RX
Communication: Module A x 16, Module B x16

Switches and Buttons

Power Switch: on/off (on rear panel)
Reset Button: To reset system hardware (on front panel)

Physical Characteristics

Housing: SECC sheet metal (1 mm)
Weight: 7 kg
Dimensions: 440 x 315 x 90 mm (17.32 x 12.40 x 3.54 in) (without rackmount ears)
Mounting: Standard 19-inch rackmount

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-vibration: 2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements

Input Voltage: 100 to 240 VAC/VDC auto-ranging (47 to 63 Hz for AC input)
Power Consumption: 30 W (full loading)

Regulatory Approvals

EMC: CE (EN61000-6-4, EN61000-3-2, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)
Green Product: RoHS, CRoHS WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock) with battery lithium backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty

Warranty Period: 3 years
Details: See www.moxa.com/warranty

13

Embedded Computers › DA-682 Series

: Software Specifications

Linux

Distribution: Debian Etch 4.0
Kernel Version: 2.6.18
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, ARP, HTTP, CHAP, PAP, SSH 1.0/2.0, SSL, DHCP, NTP, NFS, Telnet, FTP, PPP, PPPoE
File System: EXT2, JFFS2 (1G DOM)
System Utilities: bash, busybox, login, telnet, ftp, ssh, openbsd-inetd, apt, apt-utils, dpkg, grub, udev
telnetd: telnet Server daemon
ftpd: FTP server daemon
sshd: secure shell server
Apache: web server daemon, supporting PHP and XML
openvpn: virtual private network service manager
iptables: Firewall service manager
NAT: Network Address Translation
pppd: dial in/out over serial port daemon & PPPoE
pppoe: PPP over ethernet
tftp/tftpd: Trivial file transfer protocol client/server
snmpd: snmpd agent daemon
usbmount: support USB PnP
DHCP Client: dhcp3-client
cron: management of regular background processing
grep: NU grep, egrep and fgrep
minicom: friendly serial communication program
watchdog: software watchdog
inetd: TCP server manager program
Application Development Environment: GNU Make 3.8.1 (GNU make utility to maintain groups of programs)
Automatic Configuration Script Builder: autoconf 2.13
gcc: GNU C compiler
g++: GNU C++ compiler
libc6-dev: GNU C Library (development libraries and headers)
Perl: Pratical Extraction and Report Language
Vim: Vi IMproved - enhanced vi editor

Windows Embedded CE 6.0

System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Enables clients to access files and other resources over the network (Microsoft® Wincows® CE).
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU Hardware function to reset CPU in a user specified time interval (triggered by calling a MOXA library function).
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX, SAX2
• SOAP Toolkit Client
• Winsock 2.2

Windows XP Embedded

System Utilities: Windows command shell, Telnet, ftp, Wireless Zero Configuration
File System: NTFS
Protocol Stack: DHCP, IPv4, DNS, IPsec, HTTP, TCP, UDP, ICMP, IGMP, ARP, TAPI, TSP, SNMP V2, NTP, ICS, PPP, CHAP, EAP, SNTP, Telnet, FTP, SMTP, PPPoE, PPTP, NetBIOS
Telnet Server: Allows users to connect to Telnet servers from remote computers.
IIS Web Server: Allows you to create and manage Web sites.
Terminal Server: Microsoft Terminal Server client application (mstsc.exe).
COM+ Services: The next evolution of Microsoft Component Object Model (COM) and Microsoft Transaction Server (MTS).
Computer Browser Service: Computer browsing functionality exposed by Windows through Microsoft Networking. Allows a client machine to browse its network neighborhood for available computers exposing file and print sharing services.
Disk Management Services: Support for disk and volume management operations. The component implements a Component Object Model (COM) interface that can be used to query and configure disks and volumes, both basic and dynamic. The component also monitors disk arrivals and removals and other changes in the storage subsystem.
Remote Registry Service: Enables remote users to modify registry settings on this computer.
Application Development Software:
• Microsoft .Net Framework 2.0 with service pack 2 (CLR and the .NET Framework class library)
• Active Directory Service Interface (ADSI) Core
• Active Template Library (ATL),ASP.NET 2.0
• Certificate Request Client & Certificate
• Autoenrollment (CLR and the .NET Framework class library)
• COM APIs
• Common Control Libraries
• Common File Dialogs
• Direct3D, DirectPlay, DirectShow and Direct show filters
• Distributed Transaction Coordinator (MSDTC)
• Enhanced Write Filter (Redirect disk write operations to volatile (RAM) or non-volatile (disk) storage)
• Event Log, Internet Explorer
• Mapi32 Libraries
• Message Queuing (MSMQ) Core
• Microsoft Visual C++ Run Time Libraries
• Power Management dynamic-link library
• Registry Editor
• RPC
• Smart Card Cryptographic Service Providers
• USB 2.0 core drivers compliant with USB .95 or 1.0
• Windows API, Media Player 10, Script Engines, and WMI

13

Embedded Computers ⌄ DA-682 Series

Dimensions (unit = mm)

315 mm
(12.40 in)

440 mm (17.32 in)

90 mm
(3.54 in)

13

⋮ Ordering Information

Available Models

DA-682-CE: x86 rackmount computer with VGA, 4 Gigabit Ethernet ports, 2 PCI slots, CompactFlash, USB, WinCE 6.0

DA-682-XPE: x86 rackmount computer with VGA, 4 Gigabit Ethernet ports, 2 PCI slots, CompactFlash, USB, WinXPe

DA-682-LX: x86 rackmount computer with VGA, 4 Gigabit Ethernet ports, 2 PCI slots, CompactFlash, USB, Linux

Expansion Modules (can be purchased separately)

DA-SP08-I-DB: 8-port RS-232/422/485 serial module with DB9 connector and digital isolation

DA-SP08-DB: 8-port RS-232/422/485 serial module with DB9 connector

DA-SP08-I-TB: 8-port RS-232/422/485 serial module with terminal block connector and digital isolation

DA-SP38-I-TB: 8-port RS-422/485 serial module with terminal block connector and digital isolation

DA-SW08-RJ: 8-port 10/100 Mbps unmanaged switch module

DA-LN04-RJ: 4-port 10/100 Mbps LAN module

DA-UPCI-DK: Universal PCI development kit

Package Checklist

- DA-682 embedded computer
- Rackmount Kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- AC power cable
- Document and Software CD or DVD
- Quick Installation Guide (printed)
- Warranty Card

DA-660/661/662/662-I

RISC 19-inch rackmount data acquisition computers with 8 or 16 serial ports, Ethernet/fiber LAN, PCMCIA, CompactFlash, USB

> Intel XScale IXP422/425 266/533 MHz processor
> 128 MB RAM onboard, 32 MB flash
> 8 or 16 software-selectable RS-232/422/485 serial ports
> 15 KV ESD protection for all serial signals
> Dual or quad 10/100 Mbps Ethernet ports
> PCMCIA CardBus for WLAN 802.11b/g wireless network supported
> CompactFlash and USB slots for storage expansion supported
> Standard 19-inch rackmount installation, 1U height
> Wide range of power input voltages from 100 to 240 V, both AC and DC
> LCM display and keypad for HMI
> Ready-to-Run Linux, Windows CE 5.0 OS platform
> Robust, fanless design

﹕ Overview

The DA-660/661/662/662-I embedded computers come with 8 or 16 software-selectable RS-232/422/485 serial ports, making them suitable for a variety of industrial applications. Models are available with either 2 or 4 10/100 Mbps Ethernet ports. Most models come with a PCMCIA socket to provide 802.11 b/g wireless LAN card expansion, and a CompactFlash socket and USB ports to make it easy to add additional

memory. The computers are designed with a standard 19-inch, rugged 1U rackmount case, and are embedded with a 100-240V AC/DC power input. This combination of features gives users a robust and reliable ready-to-run solution for applications such as data acquisition and power substations.

Model Name	RS-232/422/485 Serial Ports		Wired LAN		Wireless LAN	Memory Expansion	
	No. of Ports	Digital Isolation	10/100M	100BaseFX multi-mode	PCMCIA Socket	CompactFlash Socket	USB
DA-660	8 or 16	–	2 ports	–	–	–	–
DA-661	16	–	2 ports	–	✓	✓	2 ports
DA-662	16	–	4 ports	–	✓	✓	2 ports
DA-662-I	16	2 KV per port	4 ports	–	✓	✓	2 ports

﹕ Appearance

Front View (DA-660)

LCD Screen

LED Indicators (Ready, LAN, Tx, Rx)

19-inch Rackmount Ear

Reset ButtonPush Buttons
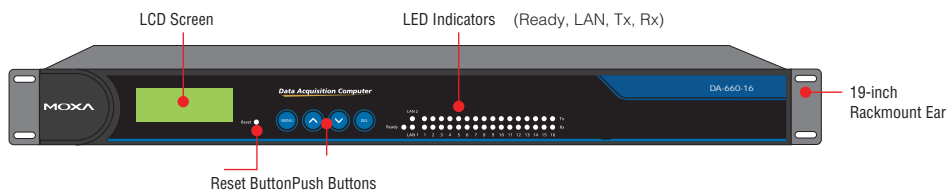
Front View (DA-661/662/662-I)

LCM Display Panel

LED Indicators
System Status, LAN, Serial Tx/Rx

19-inch
Rackmount Ear

PCMCIA
Socket

CF Socket

USB Host x 2

Reset Button

Push Buttons

Rear View (DA-660)

Power Input,
100 to 240 VAC/VDC

ON/OFF Switch

RS-232/422/485 Serial Ports x 8/16
RJ45, 50 bps to 921.6 Kbps

RS-232 Console Port

10/100 Mbps Ethernet, RJ45 x 2

Rear View (DA-661)

Power Input, 100 to
240 VAC/VDC

RS-232/422/485 Serial Ports x 8/16
RJ45, 50 bps to 921.6 Kbps

ON/OFF Switch

10/100 Mbps Ethernet, RJ45 x 2

RS-232 Console Port

Rear View (DA-662/662-I)

Power Input, 100 to
240 VAC/VDC

RS-232/422/485 Serial Ports x 8/16
RJ45, 50 bps to 921.6 Kbps

ON/OFF Switch

10/100 Mbps Ethernet, RJ45 x 4

RS-232 Console Port

: Hardware Specifications

Computer

CPU:
DA-660: Intel XScale IXP422 266 MHz
DA-661/662/662-I: IXP425 533 MHz
OS (pre-installed): Embedded Linux or Windows CE 5.0
DRAM: 128 MB onboard
Flash: 32 MB onboard
PCMCIA: Cardbus card and 16-bit PCMCIA 2.1 or JEIDA 4.2 card
(DA-661/662/662-I only)

Storage

Storage Expansion: CompactFlash Socket (DA-661/662/662-I only)

Ethernet Interface

LAN: 2 or 4 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface

Serial Standards: 8 or 16 RS-232/422/485 ports, software selectable
(8-pin RJ45)
ESD Protection: 15 KV for all signals
Isolation: 2 KV digital isolation (DA-662-I only)
Console Port: RS-232 (all signals), RJ45 connector, supports PPP

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark

Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data
direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates;
see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs

System: OS Ready
LAN:
DA-660/661: 10/100M x 2
DA-662/662-I: 10/100M x 4
Serial: TxD, RxD (8 or 16 of each)

Mini Screen with Push Buttons

LCD Panel: Liquid Crystal Display on the case, 2 x 16 text mode
Push Buttons: Four membrane buttons for convenient on-site
configuration

Physical Characteristics

Housing: SECC sheet metal (1 mm)
Weight:
DA-660/661/662: 2600 g
DA-662-I: 2940 g

Dimensions:
DA-660/661/662:
Without ears: 440 x 45 x 198 mm (17.32 x 1.77 x 7.80 in)
With ears: 480 x 45 x 198 mm (18.90 x 1.77 x 7.80 in)
DA-662-I:
Without ears: 440 x 45 x 228 mm (17.32 x 1.77 x 8.98 in)
With ears: 480 x 45 x 224 mm (18.90 x 1.77 x 8.82 in)
Mounting: Standard 19-inch rackkmount

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-vibration: 1 g @ IEC-68-2-6, sine wave (resonance search),
5-500 Hz, 1 Oct/min, 1 Cycle, 13 mins 17 sec per axis

Power Requirements
Input Voltage: 100 to 240 VAC/VDC auto ranging
(47 to 63 Hz for AC input)

Power Consumption:
DA-660: 12 W
DA-661/662/662-I: 20 W

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)
Green Product: RoHS, CRoHS WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions (unit = mm)

DA-660/661/662
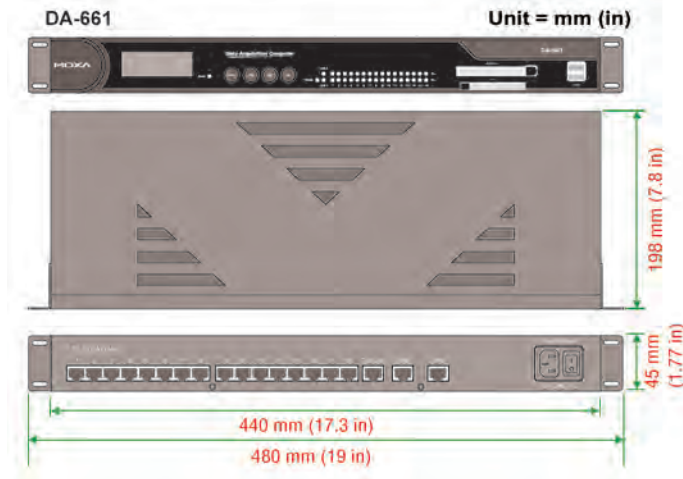
DA-662-I
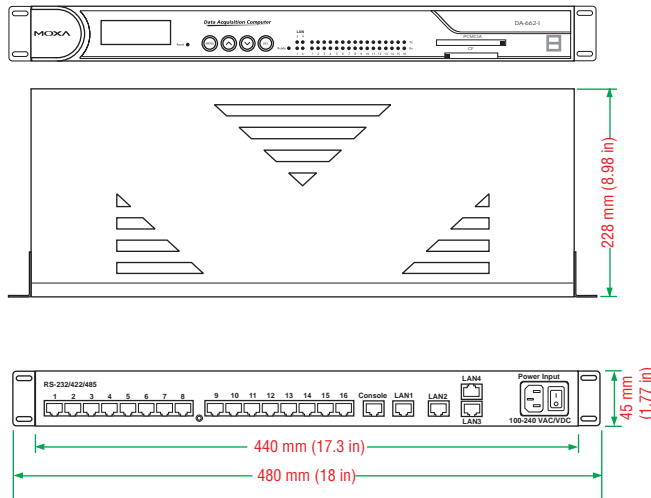
Software Specifications

Linux

Kernel Version:
DA-660: 2.4.18
DA-661/662/662-I: 2.6.10
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Software:
• Moxa Linux API Library for device control
• Linux Tool Chain: Gcc, Glibc, GDB

Windows Embedded CE 5.0

System Utilities: Windows command shell, telnet, ftp, web-based administration manager
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, SMTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client (DA-662-I only).
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Used to enable clients to access files and other resources over the network (DA-662-I only).
Web Server (httpd): WinCE IIS, including ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Application Development Software:
• Moxa WinCE 5.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft Foundation Classes (MFC)
• Microsoft® .NET Compact Framework 2.0 SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX2
• SOAP Toolkit
• Winsock 2.2

Ordering Information

Available Models

DA-660-8-LX: RISC-based 19-inch rackmount data acquisition computer with 8 serial ports, dual LANs, Linux OS
DA-660-8-CE: RISC-based 19-inch rackmount data acquisition computer with 8 serial ports, dual LANs, WinCE 5.0 OS
DA-660-16-LX: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, dual LANs, Linux OS
DA-660-16-CE: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, dual LANs, WinCE 5.0 OS
DA-661-16-LX: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, dual LANs, PCMCIA, CompactFlash, USB, Linux OS
DA-661-16-CE: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, dual LANs, PCMCIA, CompactFlash, USB, WinCE 5.0 OS
DA-662-16-LX: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, quad LANs, PCMCIA, CompactFlash, USB, Linux OS
DA-662-16-CE: RISC-based 19-inch rackmount data acquisition computer with 16 serial ports, quad LANs, PCMCIA, CompactFlash, USB, WinCE 5.0 OS
DA-662-I-16-LX: RISC-based 19-inch rackmount data acquisition computer with 16 digitally isolated serial ports, quad LANs, PCMCIA, CompactFlash, USB, Linux 2.6
DA-662-I-16-CE: RISC-based 19-inch rackmount data acquisition computer with 16 digitally isolated serial ports, quad LANs, PCMCIA, CompactFlash, USB, WinCE 5.0

Package Checklist

• DA-660 series computer
• 19-inch rackmount kit
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-RJ45F9-150: 8-pin RJ45 to DB9 female console port cable, 150 cm
• CBL-RJ45M9-150: 8-pin RJ45 to DB9 male serial port cable, 150 cm
• Power Cord
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

13

Embedded Computers > DA-660/661/662/662-I

DA Series Expansion Modules

Expansion modules with RS-232/422/485 and RS-232/485 serial ports, 10/100M LAN and unmanaged switch ports, and PCI development kit

> PCI slots for interface expansion
> 8 RS-232/422/485 software-selectable serial modules with isolation protection
> 4 10/100 Mbps LAN modules
> 8 10/100 Mbps unmanaged switch modules
> Universal PCI expansion module
> 8 RS-422/485 serial modules with terminal block connectors
> Fully compatible with Moxa's embedded computers that come with peripheral expansion slots

Overview

Moxa's peripheral expansion modules, which come with serial ports, LAN ports, switch ports, and PCI slots, give end-users the greatest flexibility for setting up industrial applications.

Different types of modules are available, including serial port modules, LAN port modules, switch port modules, and PCI modules, and all are fully compatible with Moxa's embedded computers that come with peripheral expansion slots.

The serial port modules include an 8-port RS-232/422/485 module with either DB9 or terminal block connectors, and an 8-port RS-422/485 module with terminal block connectors. Some modules are even designed with 2 KV digital isolation, making them fully suitable

for the great demands of industrial applications that use serial communication.

In addition, a 4-port LAN module and 8-port switch module are available for setting up industrial communication applications with Ethernet-based devices. A universal PCI development kit is also available for PCI-based devices for expanding industrial applications at a reasonable cost.

All modules are designed to offer the greatest flexibility for setting up applications and performing industrial tasks. In particular, users can swap out modules quickly and easily.

Appearance

DA-SP08-DB/DA-SP08-I-DB

RS-422/485 Serial Port x 8

DA-SP08-I-TB

RS-232/422/485
Serial Port x 8

DA-SP38-I-TB

RS-232/422/485
Serial Port x 8

DA-LN04-RJ

10/100 Mbps
Ethernet x 4

DA-SW08-RJ

10/100 Mbps Switch Port x 8

DA-UPCI-DK

Universal PCI Expansion Slot
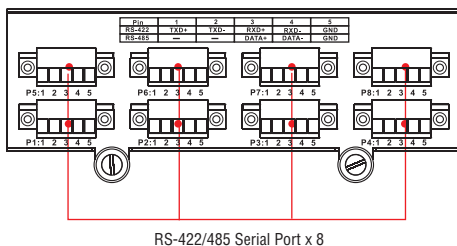
DA-SP08-DB, DA-SP08-I-DB, DA-SP08-I-TB Hardware Specifications

Serial Interface
Serial Standards: 8 RS-232/422/485 ports, software selectable (DB9 male or terminal block connector)
ESD Protection: 15 KV for all signals
Isolation: 2 KV digital isolation (DA-SP08-I-DB and DA-SP08-I-TB only)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Physical Characteristics
Weight: 290 g
Dimensions: 130 x 150 x 42 mm (5.12 x 5.91 x 1.65 in)

DA-SP38-I-TB Hardware Specifications

Serial Interface
Serial Standards: 8 RS-422/485 ports, software selectable (DB9 male or terminal block connector)
ESD Protection: 15 KV for all signals
Isolation: 2 KV digital isolation

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Physical Characteristics
Weight: 245 g
Dimensions: 130 x 150 x 42 mm (5.12 x 5.91 x 1.65 in)

DA-LN04-RJ Hardware Specifications

Ethernet Interface
LAN: 4 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Physical Characteristics
Weight: 198 g
Dimensions: 132 x 150 x 42 mm (5.20 x 5.91 x 1.65 in)

13

Embedded Computers > DA Series Expansion Modules

DA-SW08-RJ Hardware Specifications

Ethernet Interface
LAN: 8 auto-sensing 10/100 Mbps unmanaged Ethernet switch ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Physical Characteristics
Weight: 200 g
Dimensions: 132 x 150 x 42 mm (5.20 x 5.91 x 1.65 in)

DA-UPCI-DK Hardware Specifications

Universal PCI Expansion Adatpor
PCI Slots: 1
Interface Bus: 32-bit Universal PCI (3.3 V and 5 V)

Physical Characteristics
Weight: 195 g
Dimensions: 132 x 150 x 42 mm (5.20 x 5.91 x 1.65 in)

Compatibility Chart for Peripheral Expansion Modules and Embedded Computers

All expansion modules can be used on any of Moxa's embedded computers that come with the peripheral expansion slots, such as the DA-682 and DA-710.

Module Models	DA-682	DA-710
DA-SP08-DB 8-port Serial Module (RS-232/422/485)	✓	✓
DA-SP08-I-DB 8-port Serial Module (RS-232/422/485)	✓	✓
DA-SP08-I-TB 8-port Serial Module (RS-232/422/485)	✓	✓
DA-SP38-I-TB 8-port Serial Module (RS-422/485)	✓	✓
DA-LN04-RJ 4-port LAN Module (10/100 Mbps)	✓	✓
DA-SW08-RJ 8-port Switch Module (10/100 Mbps)	✓	✓
DA-UPCI-DK PCI Module	✓	✓

Ordering Information

Available Models
DA-SP08-I-DB: 8-port RS-232/422/485 serial module with DB9 connector and digital isolation
DA-SP08-DB: 8-port RS-232/422/485 serial module with DB9 connector
DA-SP08-I-TB: 8-port RS-232/422/485 serial module with terminal block connector and digital isolation
DA-SP38-I-TB: 8-port RS-422/485 serial module with terminal block connector and digital isolation
DA-SW08-RJ: 8-port 10/100 Mbps unmanaged switch module
DA-LN04-RJ: 4-port 10/100 Mbps LAN module
DA-UPCI-DK: Universal PCI development kit

Package Checklist
- 1 Expansion Module
- 8 Terminal Blocks (DA-SP08-I-TB, DA-SP38-I-TB)
- Product Notes (printed, DA-SP38-I-TB)

Model Name	Serial Ports		Isolation	Switch	LAN	Connector Type			PCI
	RS-232/422/485	RS-422/485	2 KV Digital	10/100 Mbps	10/100 Mbps	DB9	RJ45	Terminal Block	3.3/5 V
DA-SP08-I-DB	8	–	✓	–	–	✓	–	–	–
DA-SP08-DB	8	–	–	–	–	✓	–	–	–
DA-SP08-I-TB	8	–	✓	–	–	–	–	✓	–
DA-SP38-I-TB	–	8	✓	–	–	–	–	✓	–
DA-SW08-RJ	–	–	–	8	–	–	✓	–	–
DA-LN04-RJ	–	–	–	–	4	–	✓	–	–
DA-UPCI-DK	–	–	–	–	–	–	–	–	✓

13

Embedded Computers > DA Series Expansion Modules

IA261-I/262-I Series

RISC embedded computers with 2 or 4 digitally isolated serial ports, dual LANs, VGA, CAN, DIO, CompactFlash, USB

-40°C 75°C

> Cirrus Logic EP9315 ARM9 CPU, 200 MHz
> 128 MB RAM on-board, 32 MB flash disk
> VGA interface for field site monitoring
> 2 KV digitally isolated RS-232/422/485 serial ports
> Dual 10/100 Mbps Ethernet for network redundancy
> 8+8 DI/DO with 3 KV optical isolation protection
> 12 to 48 VDC redundant power input design
> Supports CompactFlash and USB 2.0 hosts
> Ready-to-run Linux or WinCE 6.0 platform
> -40 to 75°C wide temperature models available

Microsoft® Windows® Embedded   RoHS   CE   FC   c(UL)us LISTED

13

Embedded Computers ❯ IA261-I/262-I Series

Overview

The IA261-I/262-I embedded computers come with 2 (IA262-I) or 4 (IA261) RS-232/422/485 serial ports, dual CANbus ports (IA262-I only), dual Ethernet ports, 8 digital input channels, 8 digital output channels, VGA output, 2 USB hosts, and a CompactFlash socket. The computers are housed in a compact, IP40 protected, industrial-strength aluminum case.

The IA261-I/262-I computers use the Cirrus Logic EP9315 ARM9, 32-bit, 200 MHz RISC CPU. This powerful computing engine supports several useful communication functions, but will not generate too much heat. The built-in 32 MB NOR Flash ROM and 128 MB SDRAM provide enough memory to run your application software directly on the IA261-I/262-I.

With its built-in VGA output interface, the IA261-I/262-I are suitable for use with SCADA systems in industrial applications, such as manufacturing automation, production line process monitoring, and mining automation, that require VGA and HMI features.

The IA261-I/262-I computers support RS-232/422/485, CANbus, digital I/O, come with 2 KV isolation protection, and have dual LAN ports, making them ideal as communication platforms for industrial applications that require network redundancy. In addition to the standard models, wide temperature (-40 to 75°C) models are available for use in harsh industrial automation environments.

Appearance

Front View

LED Indicators
Power, Ready, Storage

LED Indicators
Serial, Tx/Rx

LED Indicators
Serial, Tx/Rx
CANBus, Tx/Rx
(IA262)

RS-232/422/485
Serial Port x 2

VGA Output

CompactFlash Socket

10/100 Mbps
Ethernet x 2

USB 2.0 Host x 2

RS-232/422/485
Serial Port x 2
CANBus Port x 2
(IA262)

Top View

Power Input 1

Power Input 2

Reset Button

DI x 8

DO x 8
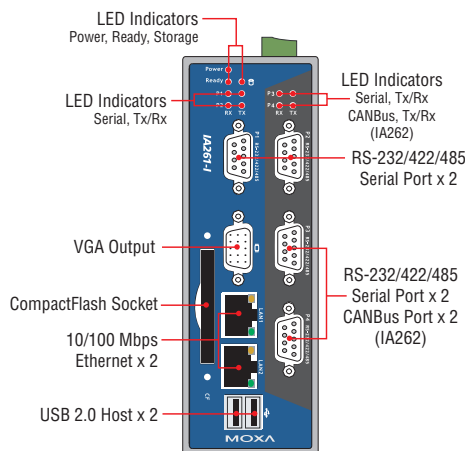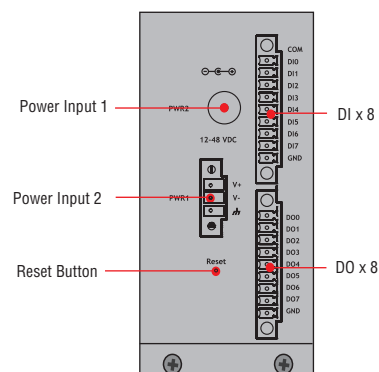
: Hardware Specifications

Computer
CPU: Cirrus EP9315 ARM9 CPU, 200 MHz
OS (pre-installed): Windows CE 6.0 or Linux
DRAM: 128 MB onboard
Flash: 32 MB onboard
USB: USB hosts x 2, compliant with USB 2.0 (OHCI) type A connectors

Storage
Storage Expansion: CompactFlash slot

Display
Graphics Controller: EP9315 internal graphics accelerator engine with TTL graphical signal support
Display Memory: Dynamic video memory (shares system memory)
Display Interface: CRT interface for VGA output, DB15 female connector
Resolution: 1024 x 768, 8 bits

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 2 or 4 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 15 KV for all signals
Isolation: 2 KV digital isolation
Console Port: RS-232 (TxD, RxD, GND), 4-pin header output (115200, n, 8, 1)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 8, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: 10-pin screw terminal block (8 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output
Output Channels: 8, sink type
Output Current: Max. 200 mA per channel
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 9-pin screw terminal block (8 points, GND)
Isolation: 3 KV optical isolation

CANbus Communication (IA262 CE models only)
Interface: Dual optically isolated CAN2.0A/2.0B compliant ports
CAN Controller: Phillips SJA1000T
Signals: CAN-H, CAN-L
Isolation: 2 KV digital isolation
Speed: 10 Kbps to 1 Mbps
Connector Type: DB9 male

LEDs
System: Power, Ready, Storage
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)
Serial: TxD x 4, RxD x 4
IA261-I: P1 to P4 for serial ports
IA262-I: P1 to P2 for serial ports, P3 to P4 for CAN ports

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"

Physical Characteristics
Housing: Aluminum, industrial vertical form factor
Weight: 950 g
Dimensions: 60 x 115 x 152 mm (2.36 x 4.53 x 5.98 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 5 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 50 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: Redundant power input design
PWR1: 12 to 48 VDC (3-pin terminal block)
PWR2: 12 to 48 VDC (power jack with thread)
Power Consumption:
With no load on USB ports: 5.8 W
• 240 mA @ 24 VDC
• 480 mA @ 12 VDC
With full load on USB ports: 11 W
• 450 mA @ 24 VDC
• 900 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN61000-6-4, EN61000-3-2 Class D, EN61000-3-3, EN61000-6-2), FCC (Part 15 Subpart B, CISPR 22 Class A, ANSI C63.4)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1)
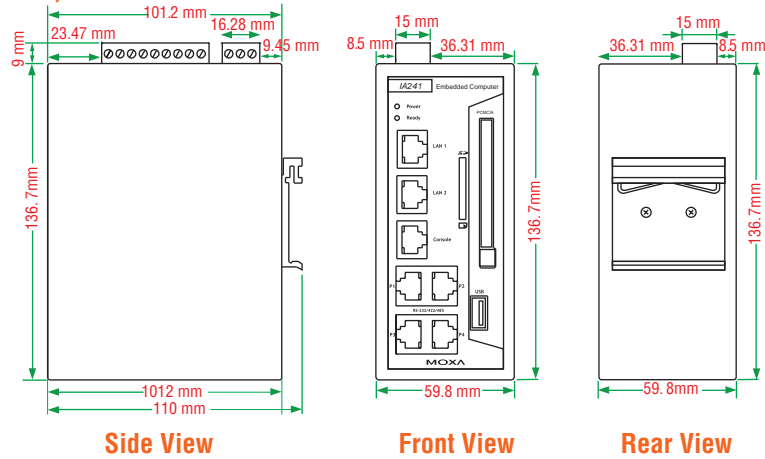**Green Product:** RoHS, CRoHS, WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

Software Specifications
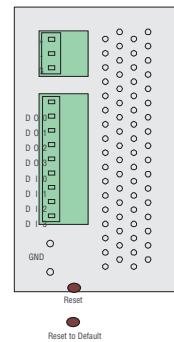
Linux

Kernel Version: 2.6.23
Protocol Stack: ARP, PPP, CHAP, PAP, IPv4, ICMP, TCP, UDP, DHCP, FTP, SNMP V1, HTTP, NTP, NFS, SMTP, SSH 1.0/2.0, SSL, Telnet, PPPoE, OpenVPN
File System: JFFS2, NFS, Ext2, Ext3
System Utilities: bash, tinylogin, telnet, ftp, smtpclient, scp
telnetd: telnet server daemon
sshd: secure shell server
Apache: web server daemon
openvpn: virtual private network
pppd: dial in/out over serial port daeon
snmpd: snmpd agent daeon
inetd: TCP server manager program
openssl: open SSL
Linux Tool Chain:
• GCC (V4.2.1): C/C++ PC Cross Compiler
• GDB (V5.3): Source level debug server
• Glibc (V2.2.5): POSIX standard C library

Windows Embedded CE 6.0

System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Server: CPU hardware function for resetting the CPU in a user-specified time interval; activated by a Moxa library function

Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 with SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX
• SOAP Toolkit
• Winsock 2.2
• CANopen library that conforms to DS301. V.4.02

Dimensions (unit = mm)
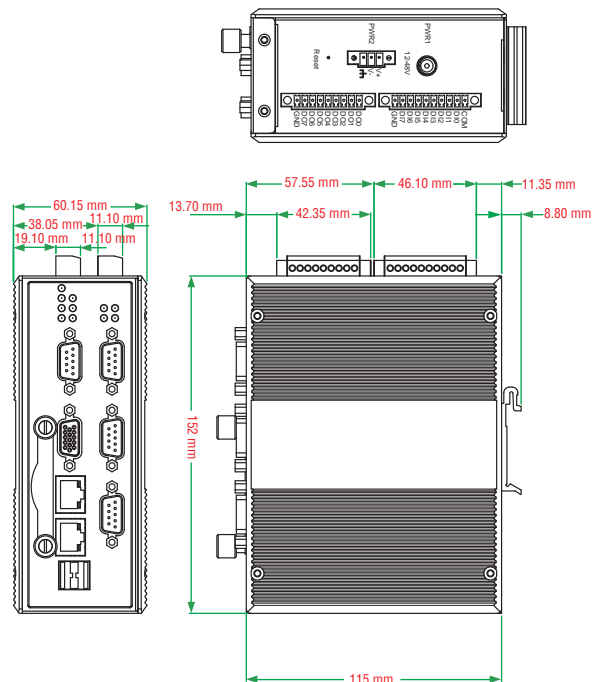
Ordering Information

Available Models

IA261-I-LX: RISC-based embedded computer with 4 serial ports, DIO, dual LANs, VGA, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
IA261-I-CE: RISC-based embedded computer with 4 serial ports, DIO, dual LANs, VGA, CompactFlash, USB, Win CE 6.0 OS, -10 to 60°C operating temperature
IA262-I-LX: RISC-based embedded computer with 2 serial ports, DIO, dual LANs, VGA, CANbus, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
IA262-I-CE: RISC-based embedded computer with 2 serial ports, DIO, dual LANs, VGA, CANbus, CompactFlash, USB, Win CE 6.0 OS, -10 to 60°C operating temperature
IA261-I-T-LX: RISC-based embedded computer with 4 serial ports, DIO, dual LANs, VGA, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature
IA261-I-T-CE: RISC-based embedded computer with 4 serial ports, DIO, dual LANs, VGA, CompactFlash, USB, Win CE 6.0 OS, -40 to 75°C operating temperature
IA262-I-T-LX: RISC-based embedded computer with 2 serial ports, DIO, dual LANs, VGA, CANbus, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature
IA262-I-T-CE: RISC-based embedded computer with 2 serial ports, DIO, dual LANs, VGA, CANbus, CompactFlash, USB, Win CE 6.0 OS, -40 to 75°C operating temperature

Package Checklist

• IA261-I or IA262-I computer
• Wall mounting kit
• DIN-Rail mounting kit
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-RJ45F9-150: 8-pin RJ45 to DB9 female console port cable, 150 cm
• CBL-RJ45M9-150: 8-pin RJ45 to DB9 male serial port cable, 150 cm
• Universal Power Adaptor
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

13

Embedded Computers > IA261-I/262-I Series

IA260 Series

RISC embedded computers with 4 serial ports, dual LANs, VGA, DIO, CompactFlash, USB

-40°C 75°C

TAIWAN EXCELLENCE 2009

> Cirrus Logic EP9315 ARM9 CPU, 200 MHz
> 128 MB RAM on-board, 32 MB flash disk
> 4 software-selectable RS-232/422/485 serial ports
> VGA interface for field site monitoring
> Dual 10/100 Mbps Ethernet for network redundancy
> 8+8 DI/DO channels, up to 30 VDC
> 12 to 48 VDC power input design
> Supports CompactFlash and USB 2.0 hosts
> Ready-to-run Linux/WinCE 6.0 platform
> H-type heat dissipation design for system reliability
> -40 to 75°C wide operating temperature model available

Microsoft® Windows® Embedded   CCC   e   RoHS   CE   FC   c UL us LISTED

Overview

The IA260 embedded computers come with 4 RS-232/422/485 serial ports, dual Ethernet ports, 8 digital input channels, 8 digital output channels, a VGA output, 2 USB hosts, and a CompactFlash socket. The computers are housed in a compact, IP40 protected, industrial-strength aluminum case.

The IA260 computers use the Cirrus Logic EP9315 ARM9, 32-bit, 200 MHz RISC CPU. This powerful computing engine supports several useful communication functions, but will not generate too much heat. The built-in 32 MB NOR Flash ROM and 128 MB SDRAM give you enough memory to run your application software directly on the IA260.

The patented "H-Type" heat dissipation design makes the IA260 an ideal computing unit for applications in extremely hot field sites, since it can directly transmit heat from inside the housing to the air. With its built-in VGA output interface, the IA260 computers are suitable for use with SCADA systems in industrial applications, such as factory automation, production line process monitoring, and mining automation, that require VGA and HMI features.

The IA260 computers support RS-232/422/485, digital I/O, and have dual LAN ports, making them ideal as communication platforms for industrial applications that require network redundancy. In addition to the standard model, a wide temperature (-40 to 75°C) model is available for use in harsh industrial automation environments.

Appearance

Front View

LED Indicators Power, Ready, Storage

LED Indicators Serial, Tx/Rx

LED Indicators Serial, Tx/Rx

10/100 Mbps Ethernet x 2

RS-232/422/485 Serial Port x 4

CompactFlash Socket

VGA Output

USB 2.0 Host x 2

Top View

Power Input

DI x 8

DO x 8

Reset

MOXA®   www.moxa.com   info@moxa.com

⋮ Hardware Specifications

Computer
CPU: Cirrus EP9315 ARM9 CPU, 200 MHz
OS (pre-installed): Windows CE 6.0 or Linux
DRAM: 128 MB onboard
Flash: 32 MB onboard
USB: USB 2.0 compliant hosts x 2, type A connector

Storage
Storage Expansion: CompactFlash slot

Display
Graphics Controller: EP9315 internal graphics accelerator engine with TTL graphical signal support
Display Memory: Dynamic video memory (shares system memory)
Display Interface: CRT interface for VGA output, DB15 female connector
Resolution: 1024 x 768, 8 bits

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 4 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 4 KV for all signals
Console Port: RS-232 (TxD, RxD, GND), 4-pin header output (115200, n, 8, 1)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 8, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: 10-pin screw terminal block (8 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output
Output Channels: 8, sink type
Output Current: Max. 200 mA per channel
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 9-pin screw terminal block
Isolation: 3 KV optical isolation

LEDs
System: Power, Ready, Storage
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)
Serial: TxD x 4, RxD x 4

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"

Physical Characteristics
Housing: Aluminum, industrial vertical form factor
Weight: 1 kg
Dimensions: 52 x 112.6 x 162 mm (2.05 x 4.43 x 6.38 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 2 g rms @ IEC-68-2-34, random wave, 5-500 Hz, 1 hr per axis
Anti-shock: 20 g @ IEC-68-2-27, half sine wave, 11 ms

Power Requirements
Input Voltage: 12 to 48 VDC (3-pin terminal block)
Power Consumption:
With no load on USB ports: 5.8 W
• 240 mA @ 24 VDC
• 480 mA @ 12 VDC
With full load on USB ports: 11 W
• 450 mA @ 24 VDC
• 900 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A), CCC (GB9254, GB 17625.1)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), LVD (EN60950-1), CCC (GB4943)
Green Product: RoHS, CRoHS, WEEE

Reliability
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

Software Specifications

Linux

Kernel Version: 2.6.23
Protocol Stack: ARP, PPP, CHAP, PAP, IPv4, ICMP, TCP, UDP, DHCP, FTP, SNMP V1, HTTP, NTP, NFS, SMTP, SSH 1.0/2.0, SSL, Telnet, PPPoE, OpenVPN
File System: JFFS2, NFS, Ext2, Ext3
System Utilities: bash, tinylogin, telnet, ftp, smtpclient, scp
telnetd: telnet server daemon
sshd: secure shell server
Apache: web server daemon
openvpn: virtual private network
pppd: dial in/out over serial port daeon
snmpd: snmpd agent daeon
inetd: TCP server manager program
openssl: open SSL
Linux Tool Chain:
• GCC (V4.2.1): C/C++ PC Cross Compiler
• GDB (V5.3): Source level debug server
• Glibc (V2.2.5): POSIX standard C library

Windows Embedded CE 6.0

System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Server: CPU hardware function for resetting the CPU in a user-specified time interval; activated by a Moxa library function
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 with SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX
• SOAP Toolkit
• Winsock 2.2

Dimensions (unit = mm)
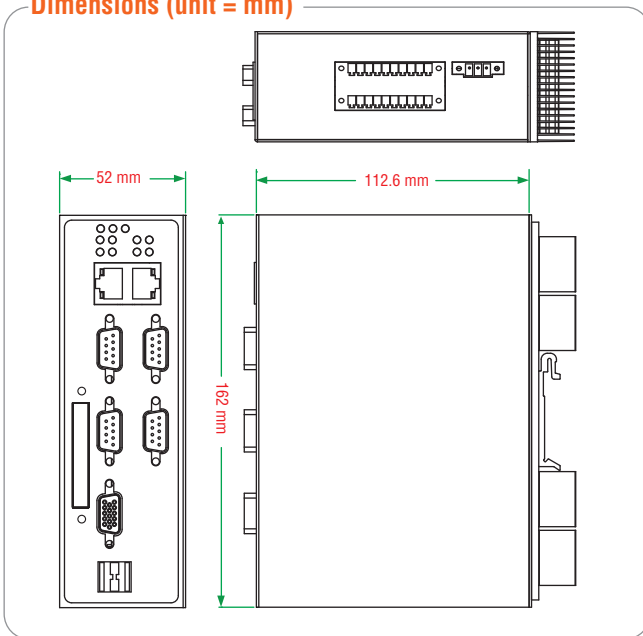
Ordering Information

Available Models

IA260-CE: RISC-based embedded computer with 4 serial ports, 8 DIs, 8 DOs, dual LANs, VGA, CompactFlash, USB, Win CE 6.0 OS, -10 to 60°C operating temperature
IA260-LX: RISC-based industrial embedded computer with 4 serial ports, 8 DIs, 8 DOs, dual LANs, VGA, CompactFlash, USB, Linux OS, -10 to 60°C operating temperature
IA260-T-CE: RISC-based embedded computer with 4 serial ports, 8 DIs, 8 DOs, dual LANs, VGA, CompactFlash, USB, Win CE 6.0 OS, -40 to 75°C operating temperature
IA260-T-LX: RISC-based industrial embedded computer with 4 serial ports, 8 DIs, 8 DOs, dual LANs, VGA, CompactFlash, USB, Linux OS, -40 to 75°C operating temperature

Package Checklist

• IA260 or IA260-T computer
• Wall mounting kit
• DIN-Rail mounting kit
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-RJ45F9-150: 8-pin RJ45 to DB9 female console port cable, 150 cm
• CBL-RJ45M9-150: 8-pin RJ45 to DB9 male serial port cable, 150 cm
• Universal Power Adaptor
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

IA240/241 Series

RISC embedded computers with 4 serial ports, 4 DI and 4 DO channels, dual LANs, PCMCIA, SD

-40°C / 75°C

TAIWAN EXCELLENCE 2006
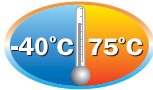
> MOXA ART 32-bit ARM9 industrial processor
> 64 MB RAM, 16 MB flash onboard
> 4 RS-232/422/485 serial ports
> 4 digital input and 4 digital output channels (TTL signal)
> Dual 10/100 Mbps Ethernet for network redundancy
> PCMCIA slot for wireless expansion (802.11b/g, GPRS/UMTS/HSDPA)
> SD socket for storage expansion
> Ready-to-run Linux Kernel 2.6 platform
> Unique patented Software Encryption Lock
> Installation options: DIN-rail, wallmount (with accessory)
> Robust, fanless design, IP30 protection mechanism
> -40 to 75°C wide temperature models available

Overview

The IA240/241 embedded computers are designed for industrial automation applications. The computers feature 4 RS-232/422/485 serial ports, dual LANs, 4 digital input channels, 4 digital output channels, and a PCMCIA cardbus and SD socket in a compact, IP30 protected, industrial-strength rugged housing.

The IA240/241's vertical DIN-rail form factor makes it easy to install the computers in a small cabinet. This space-saving solution also facilitates easy wiring, making the IA240/241 a great choice as front-end embedded controllers for industrial applications.

Wide temperature models of the IA240/241 are also available. The IA240-T and IA241-T can operate reliably in a temperature range from -40 to 75°C, making them appropriate for harsh industrial automation environments.

The industrial design of the IA240/IA241 provides a robust, reliable computing platform. Due to their RISC-based architecture, the IA240/IA241 computers will not generate a lot of heat, making them ideal for industrial automation environments.
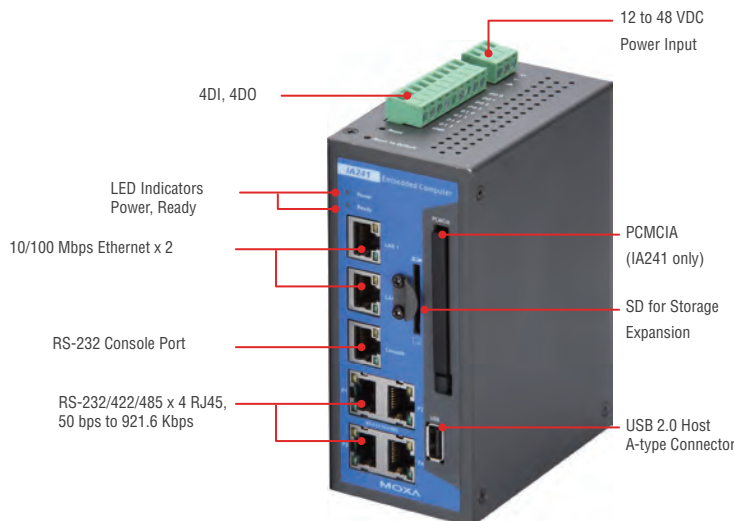
Appearance

12 to 48 VDC Power Input

4DI, 4DO

LED Indicators Power, Ready

10/100 Mbps Ethernet x 2

RS-232 Console Port

RS-232/422/485 x 4 RJ45, 50 bps to 921.6 Kbps

PCMCIA (IA241 only)

SD for Storage Expansion

USB 2.0 Host A-type Connector

Hardware Specifications

Computer
CPU: MOXA ART ARM9 32-bit RISC CPU, 192 MHz
OS (pre-installed): Embedded Linux
DRAM: 64 MB onboard
Flash: 16 MB onboard
PCMCIA: Cardbus card and 16-bit PCMCIA 2.1, JEIDA 4.2 card (IA241 only)
USB: USB 2.0 host

Storage
Storage Expansion: SD slot

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 4 RS-232/422/485 ports, software-selectable (8-pin RJ45)
ESD Protection: 15 KV for all signals
Console Port: RS-232, RJ45 connector, supports PPP

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 4
Input Voltage:
Logic 0: 0-0.8 V
Logic 1: 2.0-5.5 V
Over-current Limit: -24 mA

Digital Output
Output Channels: 4
Output Current: 24 mA
Output Voltage:
Logic 0: 0-0.55 V
Logic 1: 2.5-3.3 V

LEDs
System: Power, Ready, Storage
LAN: 10M/Link x 2, 100M/Link x 2 (on connector)
Serial: TxD x 4, RxD x 4 (on connector)

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"

Physical Characteristics
Housing: SECC sheet metal (1 mm)
Weight:
IA240: 430 g
IA241: 500 g
Dimensions: 60 x 137 x 100 mm (2.36 x 5.39 x 3.94 in)
Mounting: DIN-Rail, wall

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 1 g @ IEC-68-2-6, sine wave (resonance search), 5-500 Hz, 1 Oct/min, 1 cycle, 13 mins 17 sec per axis

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption: 7 W
• 300 mA @ 24 VDC
• 600 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)
Safety: UL/cUL (UL60950-1, CSA C22.2 No. 60950-1-03), TÜV (EN60950-1)
Green Product: RoHS, CRoHS WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

13

Dimensions (unit = mm)

Side View **Front View** **Rear View**

Pin Assignment

Serial Port, RJ45 Connector
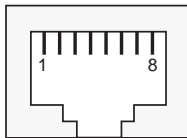
PIN	RS-232	RS-422	RS-485
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TxD	TxD-	–
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

Terminal Block on Top

Power Input

DI/DO

Software Specifications

Linux

Kernel Version: 2.6.9
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager

iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Software:
• Moxa Linux API Library for device control
• Linux Tool Chain: Gcc, Glibc, GDB
Software Encryption Lock:
BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

Ordering Information

Available Models

IA240-LX: RISC-based industrial computer with 4 serial ports, 4 DI and 4 DO channels, dual LANs, SD, Linux OS, -10 to 60°C operating temperature
IA241-LX: RISC-based industrial computer with 4 serial ports, 4 DI and 4 DO channels, dual LANs, PCMCIA, SD, Linux OS, -10 to 60°C operating temperature
IA240-T-LX: RISC-based industrial computer with 4 serial ports, 4 DI and 4 DO channels, dual LANs, SD, Linux OS, -40 to 75°C operating temperature
IA241-T-LX: RISC-based industrial computer with 4 serial ports, 4 DI and 4 DO channels, dual LANs, PCMCIA, SD, Linux OS, -40 to 75°C operating temperature

Package Checklist

• IA240 or IA241 computer
• Wall mounting kit
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• CBL-RJ45F9-150: 8-pin RJ45 to DB9 female console port cable, 150 cm
• CBL-RJ45M9-150: 8-pin RJ45 to DB9 male serial port cable, 150 cm
• Universal power adaptor (including terminal block to power jack converter) Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

EM-2260 Series

RISC embedded core modules with 4 serial ports, 8 DI/DO, dual LANs, VGA, CompactFlash, USB

> Cirrus Logic EP9315 ARM9 CPU, 200 MHz
> 128 MB RAM on-board, 32 MB flash disk
> Graphical interface for external VGA output connection
> 2 KV optically isolated RS-232/422/485 serial ports
> Dual 10/100 Mbps Ethernet for network redundancy
> 8 DI and 8 DO channels
> Supports CompactFlash and USB 2.0 hosts
> Ready-to-run WinCE 6.0 platform
> Full-function development kit for quick evaluation and application development

Overview

The EM-2260 embedded module features 4 RS-232/422/485 serial ports, dual Ethernet ports, an EIDE interface for designing an external storage connection, such as a CompactFlash socket and USB port signals. The module has a compact design that is easily integrated with a variety of industrial applications, including gas stations, vending machines, and ticketing machines, and offers a powerful serial communication capability for better system integration. Programmers will find the pre-installed, ready-to-run Windows CE 6.0 platform and full-function development kit a great benefit to developing software and building reliable communication bases for industrial automation applications.

The EM-2260 embedded module uses the Cirrus Logic EP9315 ARM9, 32-bit, 200 MHz RISC CPU. This powerful computing engine supports several useful communication functions, but will not generate a lot of heat. The built-in 32 MB NOR Flash ROM and 128 MB SDRAM

give you enough memory to run your application software directly on the EM-2260. With its built-in VGA output interface, the EM-2260 is suitable for use with SCADA systems in industrial applications, such as manufacturing automation, production line process monitoring, and mining automation, that require VGA and HMI features.

The EM-2260 Development Kit provides users with a handy tool for first time evaluation to test the functionality of the embedded core module. It has several peripherals built-in, including RS-232/422/485 ports and digital input and output, making it suitable for developing a variety of industrial applications.

Appearance

Cirrus Logic EP9315 ARM9 CPU · CN1 · CN2 · onboard 128 MB RAM · onboard 32 MB Flash
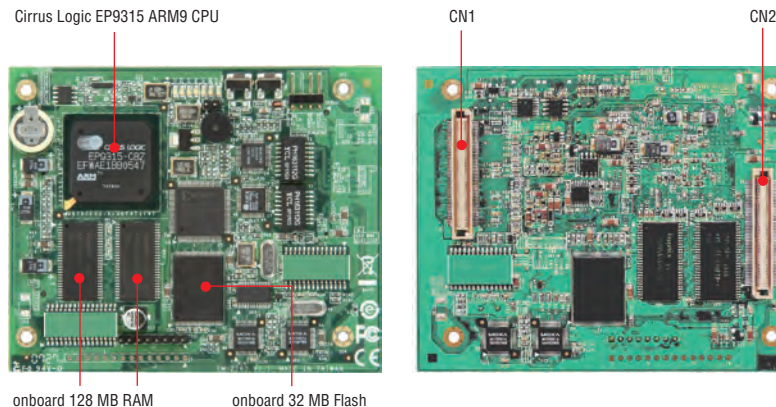
EM-2260 Embedded Module

Development Kit

Peripheral Extension Kit

EM-2260 Embedded Module

EM-2260-DK
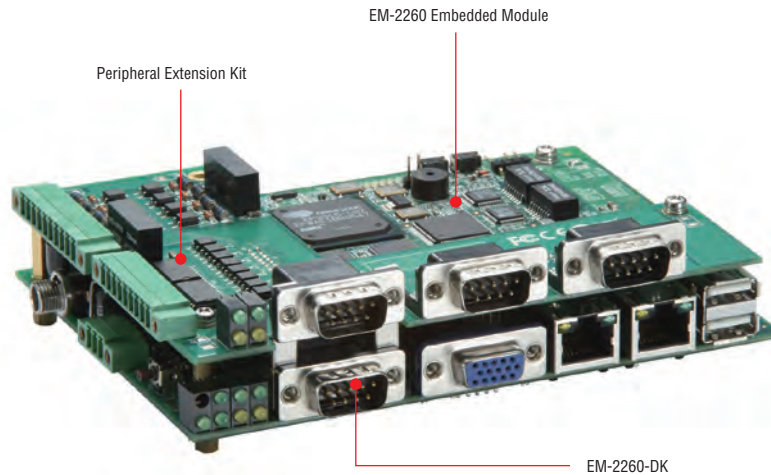
:: Hardware Specifications

Computer
CPU: Cirrus Logik EP9315 ARM9 CPU, 200 MHz
OS (pre-installed): Windows CE 6.0 or Linux
DRAM: 128 MB onboard
Flash: 32 MB

Storage
Storage Expansion: EIDE interface for connecting up to 2 external devices

Display
Graphics Controller: EP9315 internal graphics accelerator engine with TTL graphical signal support
Display Memory: Dynamic video memory (shares system memory)
Resolution: 1024 x 768, 8 bits

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: 4 RS-232/422/485 ports, software-selectable
Console Port: RS-232 (TxD, RxD, GND), 4-pin pin header output (115200, n, 8, 1)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
TTL: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 8
Input Voltage: 3.3 V, CMOS level

Digital Output
Output Channels: 8
Digital Output Levels: 3.3 V, CMOS level

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"

Physical Characteristics
Weight: 70 g
Dimensions: 106 x 87 mm (4.17 x 3.43 in)

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)

Power Requirements
Input Voltage: 12 VDC
Power Consumption: 5.8 W (480 mA @ 12 VDC)

Regulatory Approvals
EMC: CE (Class A), FCC
Green Product: RoHS, CRoHS, WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

13

Embedded Computers ❯ EM-2260 Series

Linux

Kernel Version: 2.6.23
Protocol Stack: ARP, PPP, CHAP, PAP, IPv4, ICMP, TCP, UDP, DHCP, FTP, SNMP V1, HTTP, NTP, NFS, SMTP, SSH 1.0/2.0, SSL, Telnet, PPPoE, OpenVPN
File System: JFFS2, NFS, Ext2, Ext3
System Utilities: bash, tinylogin, telnet, ftp, smtpclient, scp, busybox
telnetd: telnet server daemon
sshd: secure shell server
Apache: web server daemon
openvpn: virtual private network
pppd: dial in/out over serial port daemon
snmpd: snmpd agent daemon
inetd: TCP server manager program
openssl: open SSL
Linux Tool Chain:
• GCC (V3.3.2): C/C++ PC Cross Compiler
• GDB (V5.3): Source level debug server
• Blibc (V2.2.5): POSIX standard C library

Windows Embedded CE 6.0

System Utilities: Windows command shell, telnet, ftp
File System: FAT (on-board flash)

Protocol Stack: TCP, UDP, IPv4, SNMP V2, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard Telnet client
FTP Server: Used for transferring files to and from remote computer systems over a network.
File Server: Microsoft® Windows® CE functionality enables clients to access files and other resources over the network.
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI extensions.
Dial-up Networking Service: RAS client API and PPP, with support for Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Service: CPU hardware function for resetting CPU in a user specified time interval. Activated by Moxa library function.
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM and DCOM)
• Microsoft® .NET Compact Framework 2.0 with SP2
• XML, including DOM, XQL, XPATH, XSLT, SAX
• SOAP Toolkit
• Winsock 2.2

Dimensions
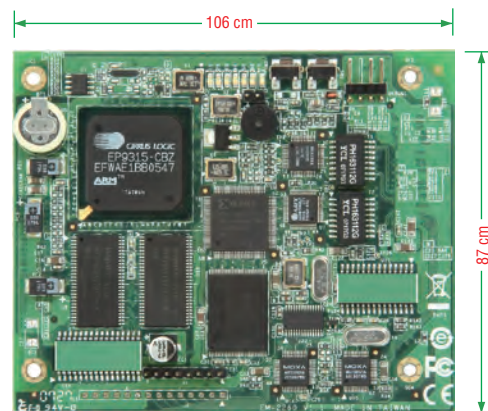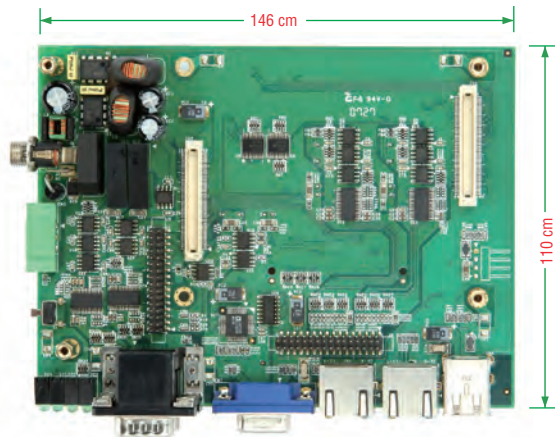
Ordering Information

Available Models

EM-2260-CE: RISC-based embedded core module with 4 serial ports, 8 DI and 8 DO channels, dual LANs, VGA, CompactFlash, USB, WinCE 6.0 OS
EM-2260-LX: RISC-based embedded core module with 4 serial ports, 8 DI and 8 DO channels, dual LANs, VGA, CompactFlash, USB, Linux OS

Development Kits (can be purchased separately)

EM-2260-CE Development Kit: Includes the EM-2260-CE module and EM-2260-DK carrier board for testing and application development
EM-2260-LX Development Kit: Includes the EM-2260-LX module and EM-2260-DK carrier board for testing and application development

Package Checklist (modules)

• EM-2260-CE or EM-2260-LX embedded module

Package Checklist (development kits)

• EM-2260 embedded module
• EM-2260-DK, the carrier board for the EM-2260 module
• Universal power adaptor set
• Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
• Document and Software CD
• Quick Installation Guide (printed)
• Warranty Card

EM-1200 Series

RISC ready-to-run embedded core modules with 2 or 4 serial ports, dual LANs, SD

> MOXA ART ARM9 32-bit 192 MHz processor
> 16 MB RAM, 8 MB flash disk on-board
> 2 or 4 software-selectable RS-232/422/485 serial ports
> Dual 10/100 Mbps Ethernet for network redundancy
> SD signals supported for external SD socket connection
> Built-in RTC, buzzer
> 10 GPIOs reserved for system integration
> Ready-to-run µClinux Kernel 2.6 platform
> Full-function development kit for quick evaluation and application development
> -40 to 75°C wide temperature models available

Overview

The EM-1220 and EM-1240 embedded modules feature 2 and 4 RS-232/422/485 serial ports, respectively, dual Ethernet ports, and an SD socket for external storage expansion. The modules have a compact design that can be easily integrated with industrial applications such as gas stations, vending machines, and ticketing machines, and offer a powerful serial communication capability for better system integration.

Programmers will find that the pre-installed, ready-to-run µClinux platform and the full-function development kit make it easy to develop software and build a reliable communication base for industrial automation applications. In addition, wide temperature models are also available to provide a reliable solution for any harsh environment.

Appearance

EM-1220

EM-1220 Embedded Module
Top View

MOXA ART ARM9 32-bit
Communication Processor

onboard 16 MB RAM

Bottom View

onboard Intel NOR
Flash 8 MB

Development Kit

LAN Port 2
LAN Port 1
Power Input
EM-1220
Embedded Module
Serial Port 2
Serial Port 1
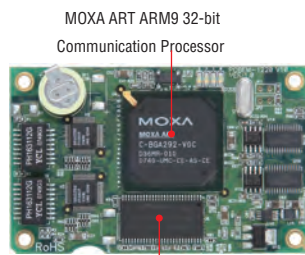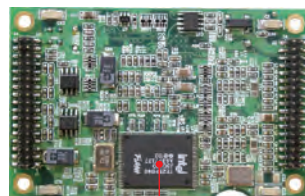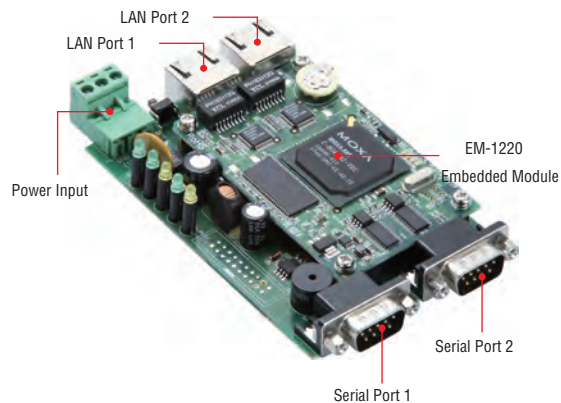
EM-1240

EM-1240 Embedded Module
Top View

MOXA ART ARM9 32-bit
Communication Processor

onboard Intel NOR Flash 8 MB

Bottom View
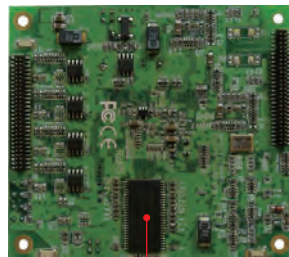
onboard Flash 16 MB

Development Kit

LAN Port 2
LAN Port 1
EM-1240
Embedded Module
Power Input
Console Port
Serial Port 4
Serial Port 3
Serial Port 2
Serial Port 1
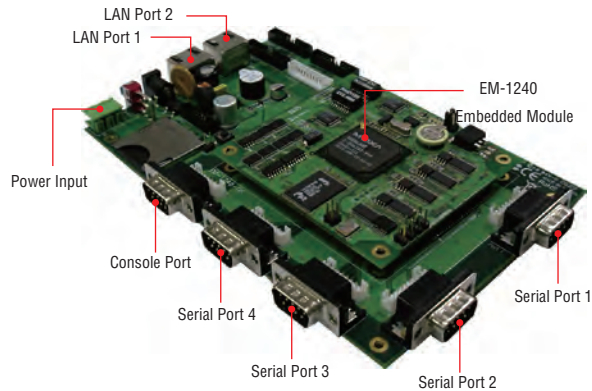
: Hardware Specifications

Computer
CPU: MOXA ART ARM9 32-bit 192 MHz processor
OS (pre-installed): Embedded µClinux (kernel 2.6.19)
DRAM: 16 MB onboard
Flash: 8 MB onboard

Storage
Storage Expansion: SD signals for external Secure Digital (SD) socket connection

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Serial Interface
Serial Standards: RS-232/422/485, software-selectable
• EM-1220: 2 ports
• EM-1240: 4 ports
ESD Protection: 15 KV for all signals
Console Port:
• EM-1220: RS-232 (TxD, RxD, GND), 4-pin pin header output
• EM-1240: RS-232 (all signals), RJ45 connector, supports PPP

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs
System: Ready
LAN: 10M/Link x 2, 100M/Link x 2
Serial: TxD x 2, RxD x 2

Physical Characteristics
Weight:
• EM-1220 Module: 40 g
• EM-1220 Development Kit: 120 g
• EM-1240 Module: 50 g
• EM-1240 Development Kit: 200 g
Dimensions:
• EM-1220 Module: 80 x 50 mm (3.15 x 1.97 in)
• EM-1220 Development Kit: 117 x 70 mm (4.61 x 2.76 in)
• EM-1240 Module: 90 x 80 mm (3.54 x 3.15 in)
• EM-1240 Development Kit: 177 x 115 mm (6.97 x 4.53 in)
Module Interface:
• EM-1220: Two 2 x 17 pin-headers (2.5 x 2.5 mm pitch)
• EM-1240: Two 2 x 28 pin-headers (1.27 x 1.27 mm pitch)

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)

Power Requirements
Input Voltage: 3.3 VDC

Power Consumption:
- EM-1220: 2.1 W (625 mA @ 3.3 VDC)
- EM-1240: 2.5 W (740 mA @ 3.3 VDC)

Regulatory Approvals

EMC: CE (EN55022 Class A, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A)

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

⋮ Software Specifications

μClinux

Kernel Version: 2.6.19

Protocol Stack: ARP, ICMP, IPV4, TCP, UDP, FTP, Telnet, SNMP V1, HTTP, CHAP, PAP, DHCP, NTP, NFS V2, SMTP, Telnet, PPP, PPPoE

File System: JFFS2, root file system (read only), and user directory (read/write)

System Utilities: msh, busybox, tinylogin, telnet, ftp

pppd: Dial in/out over serial port daemon, including PPPoE (Point-to-Point over Ethernet)

snmpd: SNMP V1 Agent daemon

telnetd: Telnet server daemon

inetd: TCP server manager program

ftpd: FTP server program

boa: Web server daemon

ntpdate: Network Time Protocol client utility

Tool Chain:
- Arm-elf-gcc: C/C++ PC Cross Compiler
- μClibc: POSIX standard C library

Dimensions

EM-1220
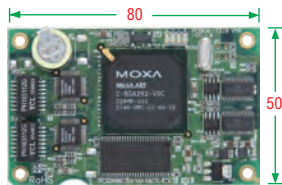
EM-1220-DK

EM-1240

EM-1240-DK

13

Embedded Computers > EM-1200 Series
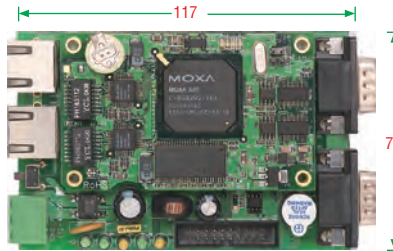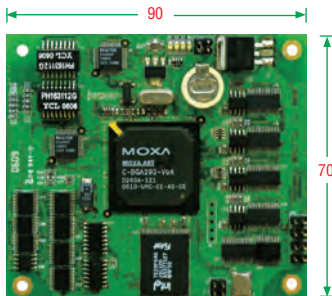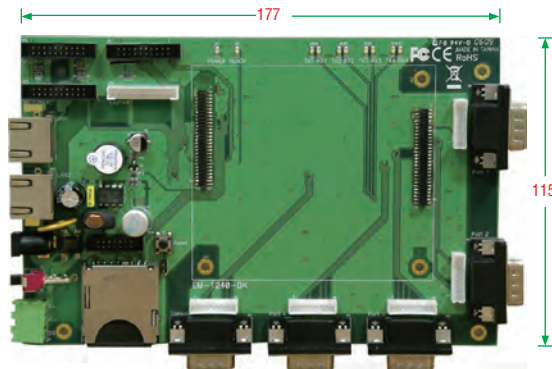
Model Name	Serial Ports	LAN Ports	Storage			VGA	GPIO	OS			Wide Temp.
	RS-232/422/485	10/100 Mbps	CF	SD	USB			CE	Linux	µClinux	
EM-1220	2	2	–	–	–	–	10	–	–	✓	✓
EM-1240	4	2	–	–	–	–	10	–	–	✓	✓

: Ordering Information

Available Modules

EM-1220-LX: RISC-based embedded core module with 2 serial ports, dual LANs, SD, µClinux, -10 to 60°C operating temperature

EM-1240-LX: RISC-based embedded core module with 4 serial ports, dual LANs, SD, µClinux OS, -10 to 60°C operating temperature

EM-1220-T-LX: RISC-based embedded core module with 2 serial ports, dual LANs, SD, µClinux, -40 to 75°C operating temperature

EM-1240-T-LX: RISC-based embedded core module with 4 serial ports, dual LANs, SD, µClinux, -40 to 75°C operating temperature

Development Kits (can be purchased separately)

EM-1220 Development Kit: Includes the EM-1220-DK snap-on testing board with built-in RJ45 LAN ports and DB9 male serial ports

EM-1240 Development Kit: Includes the EM-1240-DK snap-on testing board with built-in RJ45 LAN ports and DB9 male serial ports

Package Checklist (modules)

- 1 EM-1220 or EM-1240 module

Package Checklist (development kits)

- 1 EM-1220 or EM-1240 module
- EM-1220-DK or EM-1240-DK, the carrier board for the EM-1220 or EM-1240 module
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adaptor (including terminal block to power jack converter)
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- Document and Software CD
- Quick Installation Guide (printed)
- Product Warranty Statement (printed)

Wireless Embedded Computers

Cellular Embedded Computers

	W406-CE W406-T-CE	W406-LX W406-T-LX	W315-LX	W325-LX	W345-LX
Computer					
CPU Speed	200 MHz	200 MHz	192 MHz	192 MHz	192 MHz
OS (pre-installed)	WinCE 6.0	Embedded Linux	Embedded Linux		
DRAM	32 MB	32 MB	32 MB	32 MB	64 MB
Flash	16 MB	16 MB	16 MB	16 MB	16 MB
USB Ports	1 (USB 2.0)	1 (USB 2.0)	–	–	2 (USB 2.0)
Relay Outputs	4 DIs, 4 DOs	4 DIs, 4 DOs	–	–	1
Storage					
SD Slot	✓	✓	✓	✓	✓
LAN Interface					
10/100 Mbps Ethernet Ports	1	1	1	1	1
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV	1.5 KV	1.5 KV
Cellular Interface					
Cellular Modes	GSM/GPRS/EDGE		GSM, GPRS		
Radio Frequency Bands	850/900/1800/1900 MHz		850/900/1800/1900 MHz		
GPRS Class	12		10		
EDGE Class	12		–		
Coding Schemes	CS1 to CS4		CS1 to CS4		
Serial Interface					
RS-232/422/485 Ports	2 (DB9-M)	2 (DB9-M)	1 (DB9-M)	2 (DB9-M)	4 (DB9-M)
ESD Protection	15 KV	15 KV	15 KV	15 KV	15 KV
Console Port	✓	✓	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark				
Flow Control	RTS/CTS, XON/XOFF, ADDC™				
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)				
LEDs					
System	Ready, Storage	Ready, Storage	Ready, SD	Ready, SD	Ready, SD
LAN	10M, 100M	10M, 100M	10M, 100M	10M, 100M	10M, 100M
Cellular	Cellular Enabled, Signal Strength		GPRS Enabled, GSM Signal Strength		
Serial	TxD, RxD		TxD, RxD	TxD, RxD	TxD, RxD
Physical Characteristics					
Housing	Aluminum (1 mm)		Aluminum (1 mm)		
Weight	1 kg		195 g	195 g	400 g
Dimensions	44 x 119 x 40 mm		77 x 111 x 26 mm	77 x 111 x 26 mm	150 x 100 x 38 mm
Mounting	DIN-Rail, wall		DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall
Antenna Length	85 mm		110 mm	110 mm	110 mm
Environmental Limits					
Operating Temperature	-10 to 60°C or wide temperature (by request)		-10 to 60°C	-10 to 60°C	-10 to 60°C
Operating Humidity	5 to 95% RH		5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C or wide temperature (by request)		-20 to 80°C	-20 to 80°C	-20 to 80°C
Anti Vibration/Shock	2g/6g with DIN-rail/20g with wall mount		5g/50g	5g/50g	5g/50g
Regulatory Approvals					
EMC	FCC (Part 15 Subpart B, CISPR 22 Class B, ANSI C63.4)		FCC: Part 15, Part 24/24		
CE	EN55022 Class B, EN61000-3-2 Class A, EN61000-3-3, EN55024		EN55022, EN61000		
R&TTE	EN301 489-1, EN301 489-7, EN301 511		EN301 489-1, EN301 489-7, EN301 511		
Safety	LVD: EN60950-1 UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03		LVD: EN60950-1 UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03		
Green Product	RoHS, CRoHS, WEEE		GCF-CC, RoHS, CRoHS, WEEE		
Reliability					
Buzzer, RTC, WDT	✓	✓	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)		5 years (see www.moxa.com/warranty)		

WLAN Embedded Computers

	W311-LX	W321-LX	W341-LX
Computer			
CPU Speed	192 MHz	192 MHz	192 MHz
OS (pre-installed)	Embedded Linux with MMU support		
DRAM	32 MB	32 MB	64 MB
Flash	16 MB	16 MB	16 MB
USB Ports	–	–	2 (USB 2.0)
Relay Outputs	–	–	1
Storage			
SD Slot	✓	✓	✓
LAN Interface			
10/100 Mbps Ethernet Ports	1	1	1
Magnetic Isolation Protection	1.5 KV	1.5 KV	1.5 KV
WLAN Interface			
Standard Compliance	802.11a/b/g		
Radio Frequency Type	DSSS, CCK, OFDM		
Transmission Rate	54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps) • 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11b: 1, 2, 5.5, 11 Mbps		
Transmission Distance	Up to 100 meters (@ 11 Mbps in open areas)		
Wireless Security	WEP: 64-bit/128-bit, WPA, WPA2 data encryption		
WLAN Modes	Ad-hoc (802.11b/g), Infrastructure		
Serial Interface			
RS-232/422/485 Ports	1 (DB9-M)	2 (DB9-M)	4 (DB9-M)
ESD Protection	15 KV	15 KV	15 KV
Console Port	✓	✓	✓
Serial Communication Parameters	Data Bits: 5, 6, 7, 8; Stop Bits: 1, 1.5, 2; Parity: None, Even, Odd, Space, Mark		
Flow Control	RTS/CTS, XON/XOFF, ADDC™		
Baudrate	50 bps to 921.6 Kbps (non-standard baudrates supported)		
LEDs			
System	Ready, SD	Ready, SD	Ready, SD
LAN	10M, 100M	10M, 100M	10M, 100M
WLAN	Enable, Signal Strength		
Serial	TxD, RxD	TxD, RxD	TxD, RxD
Physical Characteristics			
Housing	Aluminum (1 mm)		
Weight	170 g	185 g	390 g
Dimensions	77 x 111 x 26 mm	77 x 111 x 26 mm	150 x 100 x 38 mm
Mounting	DIN-Rail, wall	DIN-Rail, wall	DIN-Rail, wall
Environmental Limits			
Operating Temperature	-10 to 60°C	-10 to 60°C	-10 to 60°C
Operating Humidity	5 to 95% RH	5 to 95% RH	5 to 95% RH
Storage Temperature	-20 to 80°C	-20 to 80°C	-20 to 80°C
Anti Vibration/Shock	5g/50g	5g/50g	5g/50g
Regulatory Approvals			
EMC	CE (ETSI EN 301 489-1/-17, ETSI EN 301 893, ETSI EN 300 328, EN50392), FCC Part 15C & Part 15E15E; e-Mark (e13) (W311/321 only)		
Safety	UL/cUL (UL60950-1), TÜV (EN60950-1)		
Green Product	RoHS, CRoHS, WEEE		
Reliability			
Buzzer, RTC, WDT	✓	✓	✓
Warranty	5 years (see www.moxa.com/warranty)		

W406

RISC-based wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DOs, 2 serial ports, Ethernet, SD

TAIWAN EXCELLENCE 2010

> Cirrus Logic EP9302 32-bit ARM9 processor
> On-board 32 MB RAM (maximum 64 MB)
> Built-in 16 MB Flash (maximum 32 MB)
> Built-in GSM/GPRS/EDGE cellular communication
> GSM 850/900/1800/1900 MHz supported
> GPRS/EDGE Class 12 supported
> SMS tunnel mode provided
> 4 DIs, 4 DOs
> Two software selectable RS-232/422/485 serial ports
> 50 bps to 921.6 Kbps, non-standard baudrates supported
> 10/100M Ethernet for network redundancy
> SD socket for storage expansion
> WinCE 6.0 or Linux 2.6 platform
> Din-Rail and Wall mount installation
> Robust, fanless design
> Wide temperature models available by request

Microsoft® Windows® Embedded

Overview

The W406 is an embedded Linux or WinCE computer that features 2 software selectable RS-232/422/485 ports, 1 Ethernet port, and quad-band GSM/GPRS/EDGE 900/1800/850/1900 MHz for cellular communication. It also comes with an SD socket, USB host, and 4 digital input and 4 digital output channels, making it the ideal computer for a variety of industrial applications such as data acquisition, data processing, protocol conversion, and remote device control and monitoring via wireless communication. The W406 comes pre-installed with either Linux or WinCE 6.0, and offers a reliable and powerful computing platform for industrial environments. Programmers will find that the W406 provides a convenient programming environment for producing bug-free industrial applications at a lower cost.

Appearance

W406 Front View
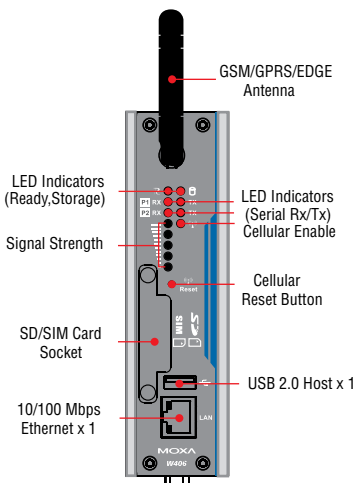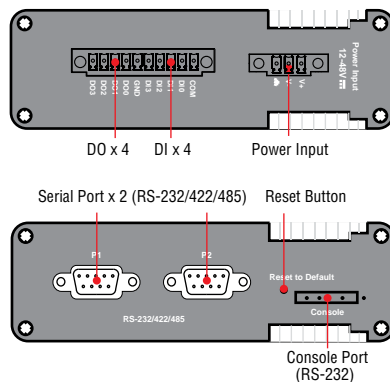
GSM/GPRS/EDGE Antenna

LED Indicators (Ready,Storage)

LED Indicators (Serial Rx/Tx) Cellular Enable

Signal Strength

Cellular Reset Button

SD/SIM Card Socket

USB 2.0 Host x 1

10/100 Mbps Ethernet x 1

W406 Top/Bottom View

DO x 4   DI x 4   Power Input

Serial Port x 2 (RS-232/422/485)   Reset Button

Console Port (RS-232)

W406 Rear View

DIN-rail Kit
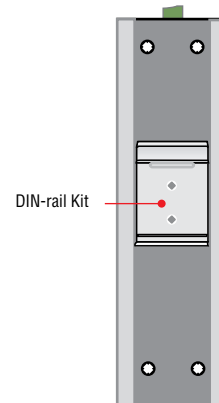
⋮ Hardware Specifications

Computer
CPU: Cirrus Logic EP9302 ARM9 32-bit RISC CPU, 200 MHz
OS (pre-installed): WinCE 6.0/Embedded Linux with MMU support
DRAM: 32 MB (64 MB max.)
Flash: 16 MB (16 MB max.)
USB: USB 2.0 compliant hosts x 1, type A connector

Storage
Storage Expansion: SD slot

Ethernet Interface
LAN: 1 auto-sensing 10/100 Mbps port (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Cellular Interface
Cellular Modes: GSM, GPRS, EDGE
Radio Frequency Bands: 850/900/1800/1900 MHz
GPRS Class: 12
EDGE Class: 12
Coding Schemes: CS1 to CS4

Serial Interface
Serial Standards: 2 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 15 KV ESD protection for all signals
Console Port: RS-232 interface (TxD, RxD, GND), with 4-pin pin header output

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Digital Input
Input Channels: 4, source type
Input Voltage: 0 to 30 VDC at 5 KHz
Digital Input Levels for Dry Contacts:
• Logic level 0: Close to GND
• Logic level 1: Open
Digital Input Levels for Wet Contacts:
• Logic level 0: +3 V max.
• Logic level 1: +10 V to +30 V (COM to DI)
Connector Type: 6-pin screw terminal block (4 points, COM, GND)
Isolation: 3 KV optical isolation

Digital Output
Output Channels: 4, sink type
Output Current: Max. 200 mA per channel
On-state Voltage: 24 VDC nominal, open collector to 30 V
Connector Type: 5-pin screw terminal block (4 points, GND)
Isolation: 3 KV optical isolation

LEDs
System: Ready, Storage
LAN: 10M/Link, 100M/Link (on connector)
Cellular: Cellular Enable, Signal Strength (5 LEDs)
Serial: TxD, RxD

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"
Cellular Reset Button: Supports cellular reset function

Physical Characteristics
Housing: Aluminum (1 mm)
Weight: 1 kg
Dimensions: (without ears or antenna)
144 x 119 x 40 mm (5.67 x 4.69 x 1.57 in)
Mounting: DIN-rail, wall (requires optional wall mount kit)
Antenna Length: 85 mm

Environmental Limits
Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: Available by request
Operating Humidity: 5 to 95% RH
Storage Temperature:
Standard Models: -20 to 80°C (-4 to 176°F)
Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Anti-vibration: 2 g @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis
Anti-shock:
• 6 g @ IEC-68-2-27, half sine wave, 11 ms (when attached to DIN-rail kit)
• 20 g @ IEC-68-2-27, half sine wave, 11 ms (when attached to optional wall mount kit)

Power Requirements
Input Voltage: 12 to 48 VDC
Power Consumption:
With no load on USB ports: 7.2 W
• 300 mA @ 24 VDC
• 600 mA @ 12 VDC
With full load on USB ports: 14.4 W
• 600 mA @ 24 VDC
• 1200 mA @ 12 VDC

Regulatory Approvals
EMC: CE (EN55022 Class B, EN61000-3-2 Class A, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class B, ANSI C63.4)
R&TTE: EN301 489-1, EN301 489-7, EN301 511
Safety: LVD: EN60950-1
UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03
Green Product: RoHS, CRoHS, WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty
Note: The Hardware Specifications apply to the embedded computer unit itself, but not to accessories. In particular, the wide temperature specification does not apply to accessories such as the power adaptor and cables.

14

Wireless Embedded Computers ➤ W406

: Software Specifications

Linux

Kernel Version: 2.6.23
Boot Loader: Redboot
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp, pppd, openvpn, iptables
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Software:
• MOXA Linux API Library
• Linux Tool Chain: Gcc, Glibc, GDB
Device Drivers:
 UART, RTC, Buzzer, SD Card, USB (supports USB flash disk), DI/DO
Software Encryption Lock:
BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

### Windows Embedded CE 6.0

Version: Windows Embedded CE 6.0 R2
System Utilities: Windows command shell, telnet, ftp, web-based administration manager
File System: FAT (on-board flash)
Protocol Stack: TCP, UDP, IPv4, SNMP, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSL, DHCP, SNTP, Telnet, FTP, PPP
Telnet Server: Allows remote administration through a standard telnet client.
FTP Server: Used for transferring files to and from remote computer systems over a network.
Web Server (httpd): Includes ASP, ISAPI Secure Socket Layer support, SSL 2, SSL 3, and Transport Layer Security (TLS/SSL 3.1) public key-based protocols, and Web Administration ISAPI Extensions.
Dial-up Networking Service: RAS client API and PPP, supporting Extensible Authentication Protocol (EAP) and RAS scripting.
Watchdog Server: CPU hardware function for resetting the CPU in a user-specified time interval; activated by a Moxa library function
Application Development Software:
• Moxa WinCE 6.0 SDK
• C Libraries and Run-times
• Component Services (COM)
• Microsoft® .NET Compact Framework 2.0 with SP2
• XML, including XQL
• Winsock 2.2

Dimensions (unit = mm)
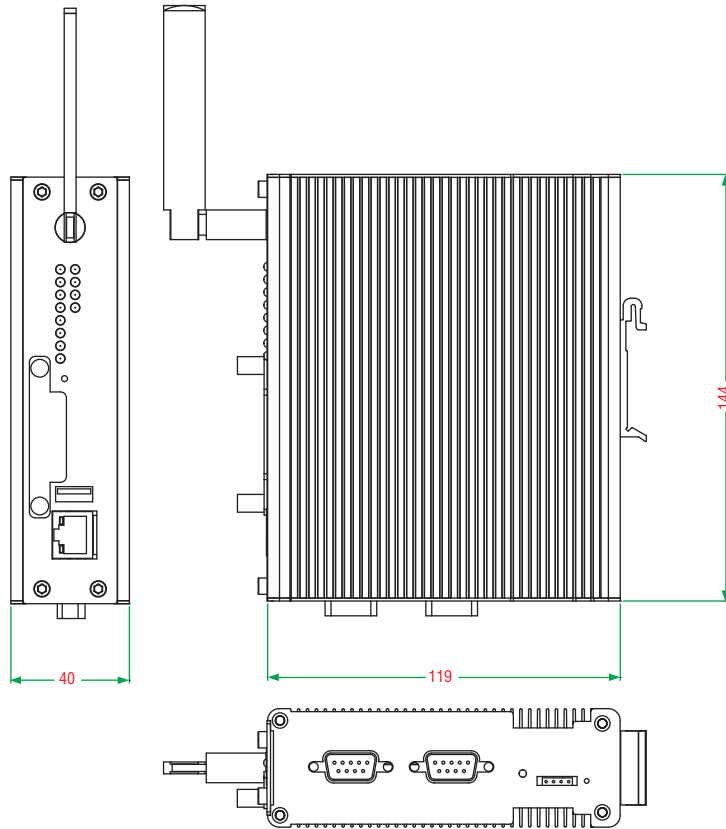
: Ordering Information

Available Models

W406-LX: RISC-based wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DO, 2 serial ports, Ethernet, SD, Linux 2.6 OS, -10 to 60°C operating temperature

W406-CE: RISC-based wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DO, 2 serial ports, Ethernet, SD, WinCE 6.0 OS, -10 to 60°C operating temperature

W406-T-LX: RISC-based wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DO, 2 serial ports, Ethernet, SD, Linux 2.6 OS (contact Moxa for details about this wide temp. computer)

W406-T-CE: RISC-based wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DO, 2 serial ports, Ethernet, SD, WinCE 6.0 OS (contact Moxa for details about this wide temp. computer)

Optional Accessories (can be purchased separately)

PPWR-24250-DT-ST: Power adaptor
PWC-C7US-2B-183: Power cord with 2-pin connector, USA plug
PWC-C7EU-2B-183: Power cord with 2-pin connector, Euro plug
PWC-C7UK-2B-183: Power cord with 2-pin connector, British plug
PWC-C7AU-2B-183: Power cord with 2-pin connector, Australia plug
PWC-C7CN-2B-183: Power cord with 2-pin connector, China plug

Package Checklist

- W406 computer
- Wall mounting kit (optional)
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- GSM/GPRS/EDGE Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

14

Wireless Embedded Computers ˃ W406

W315/325/345

RISC-based embedded computers with GSM/GPRS, LAN, and 1, 2, or 4 serial ports

W345

W325

W315

> MOXA ART ARM9 32-bit 192 MHz processor
> 32 or 64 MB RAM, and 16 MB flash disk onboard
> Built-in quad band GSM/GPRS 850/900/1800/1900 MHz
> GPRS Class 10, coding scheme from CS1 to CS4 supported
> 1, 2, or 4 software-selectable RS-232/422/485 serial ports
> 10/100 Mbps Ethernet for network redundancy
> Designed to withstand 5 g's of continuous vibration and 50-g shocks
> Relay Output for external alarm connection (W345 only)
> SD slot for storage expansion
> Ready-to-run Linux Kernel 2.6 platform
> DIN-rail or wall-mount installation
> Robust, fanless design

Overview

The W315/325/345 are embedded Linux computers that feature 1, 2, or 4 software selectable RS-232/422/485 ports, 1 Ethernet port, and quad-band GSM/GPRS 850/900/1800/1900 MHz for cellular communication. In addition, the W345 has 2 USB 2.0 hosts and 1 relay output, and the W325 and W345 come with an SD socket for external storage expansion. The W315/325/345 computers' Linux OS runs on

the MOXA ART 32-bit ARM9 processor, which provides a powerful and reliable platform for harsh, industrial environments. You will find these computers ideal for a variety of machine-to-machine applications, including data acquisition, protocol conversion, and remote device control and monitoring.

Appearance

W315

Ethernet (10/100BaseTx)

Wireless GSM/GPRS Antenna

12 to 48 VDC

Serial console port

1. Internal SD Slot for Storage Expansion
2. Internal SIM Card Slot (remove cover to access)

Serial Port 1 (RS-232/422/485)

W325

Ethernet (10/100BaseTx)

Wireless GSM/GPRS Antenna

12 to 48 VDC

Serial console port

1. Internal SD Slot for Storage Expansion
2. Internal SIM Card Slot (remove cover to access)

Serial Port 1 (RS-232/422/485)

Serial Port 2 (RS-232/422/485)

W345

USB 2.0 Host x 2

Wireless GSM/GPRS antenna

Ethernet (10/100BaseTx)

Relay Output

12 to 48 VDC

1. Internal SD Slot for Storage Expansion
2. Internal SIM Card Slot (remove cover to access)

Serial Console Port

Serial Port 1 to 4 (RS-232/422/485)

: Hardware Specifications

Computer

CPU: MOXA ART ARM9 32-bit RISC CPU, 192 MHz
OS (pre-installed): Embedded Linux with MMU support
DRAM:
W315/325: 32 MB
W345: 64 MB
Flash: 16 MB
USB: (W345 only) USB 2.0 compliant hosts x 2, type A connector
Relay Output: (W345 only)
• Form C, SPDT x 1
• Normal Switching Capacity: 2A @30 VDC
• Switching Power: 60 W max.
• Switching Voltage: 220 VDC max.
• Switching Current: 2 A max.
• Operating Time: 4 ms @ 20°C
• Initial Contact Resistance: 100 milli-ohm max.

Storage

Storage Expansion: SD slot

Ethernet Interface

LAN: 1 auto-sensing 10/100 Mbps port (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

Cellular Interface

Cellular Modes: GSM, GPRS
Radio Frequency Bands: 850/900/1800/1900 MHz
GPRS Class: 10
Coding Schemes: CS1 to CS4

Serial Interface

Serial Standards: 1, 2, or 4 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 15 KV ESD protection for all signals
Console Port: RS-232 interface (TxD, RxD, GND), with 4-pin pin header output

Serial Communication Parameters

Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals

RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs

System:
W315: Ready, SD
W325: Ready, SD
W345: Ready, SD
LAN: 10M/Link, 100M/Link (on connector)
Cellular: GPRS Enabled, GSM Signal Strength
Serial: TxD, RxD

Switches and Buttons

Reset Button: Supports "Reset to Factory Default"

Physical Characteristics

Housing: Aluminum (1 mm)
Weight:
W315/325: 195 g
W345: 400 g
Dimensions: (without ears or antenna)
W315: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
W325: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
W345: 150 x 100 x 38 mm (5.91 x 3.94 x 1.50 in)
Mounting: DIN-rail (requires optional DK-35A DIN-rail kit), wall
Antenna Length: 110 mm

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-vibration: 5 g @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis
Anti-shock: 50 g @ IEC-68-2-6, half-sine wave, 30 ms

Power Requirements

Input Voltage: 12 to 48 VDC
Power Consumption:
W315/325: 4.8 W
• 200 mA @ 24 VDC
• 400 mA @ 12 VDC
W345:
With no load on USB ports: 7.2 W
• 300 mA @ 24 VDC
• 600 mA @ 12 VDC
With full load on USB ports: 14.4 W
• 600 mA @ 24 VDC
• 1200 mA @ 12 VDC

Regulatory Approvals

EMC: CE (EN55022 Class A, EN61000-3-2, EN61000-3-3, EN55024), FCC (Part 15 Subpart B, CISPR 22 Class A, ANSI C63.4)
Safety: UL/cUL (UL60950-1), LVD (EN 60950-1)
R&TTE: EN301 489-1, EN301 489-7, EN301 511
Safety: LVD: EN60950-1
UL/cUL: UL60950-1, CSA C22.2 No. 60950-1-03
Green Product: RoHS, CRoHS, WEEE

Reliability

Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer)

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

⦂ Software Specifications

Linux

Kernel Version: 2.6.9
Boot Loader: Redboot
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE
snmpd: snmpd agent daemon
inetd: TCP server manager program

Application Development Environment:
• MOXA Linux API Library
• Linux Tool Chain: Gcc, Glibc, GDB
• BINEncryptor: Encryption tool for binary files, based on "Moxa Intellectual Protection Technology" (Patented)
Device Drivers:
W315/325: UART, RTC, Buzzer, SD Card
W345: UART, RTC, Buzzer, SD Card, USB (supports USB flash disk), DO
Software Encryption Lock:
BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

Model Name	Serial Ports	LAN Port	WLAN	Cellular	Relay Output	Storage		OS
	RS-232/422/485	10/100 Mbps	802.11a/b/g	GSM/GPRS Quad Band		SD	USB	
W315	1	1	–	✓	–	✓	–	Linux
W325	2	1	–	✓	–	✓	–	Linux
W345	4	1	–	✓	1	✓	2	Linux

Dimensions (unit = mm)

W315

W325

MOXA® www.moxa.com info@moxa.com

W345

138 mm (5.40 in)

100 mm (3.93 in)

25 mm (0.98 in)
35 mm (1.38 in)

38 mm (1.50 in)

40.5 mm (1.59 in)

150 mm (5.91 in)

161 mm (6.34 in)

173 mm (6.81 in)
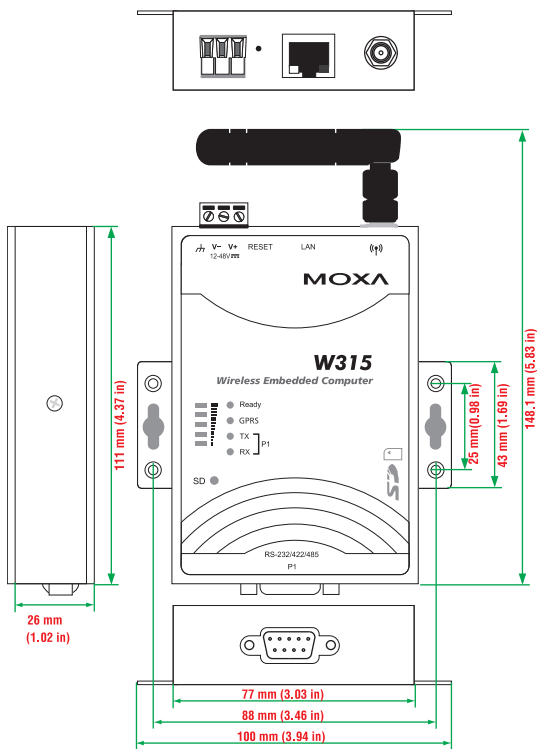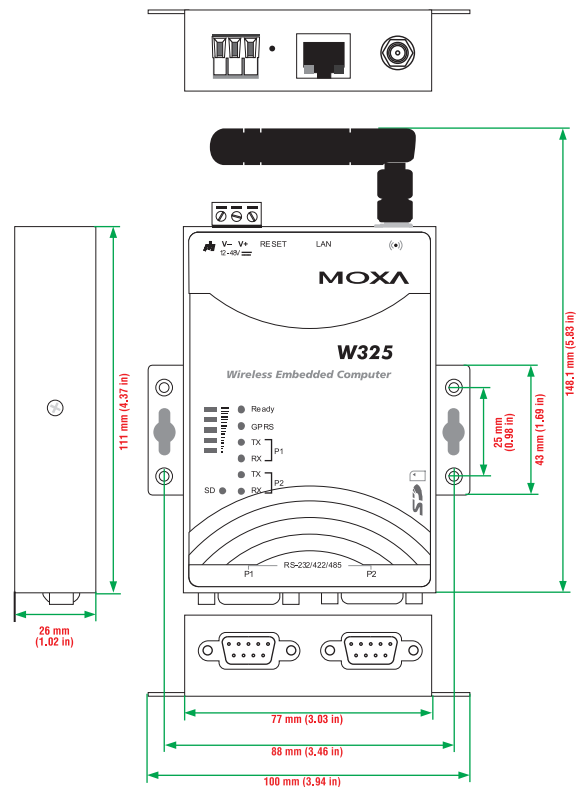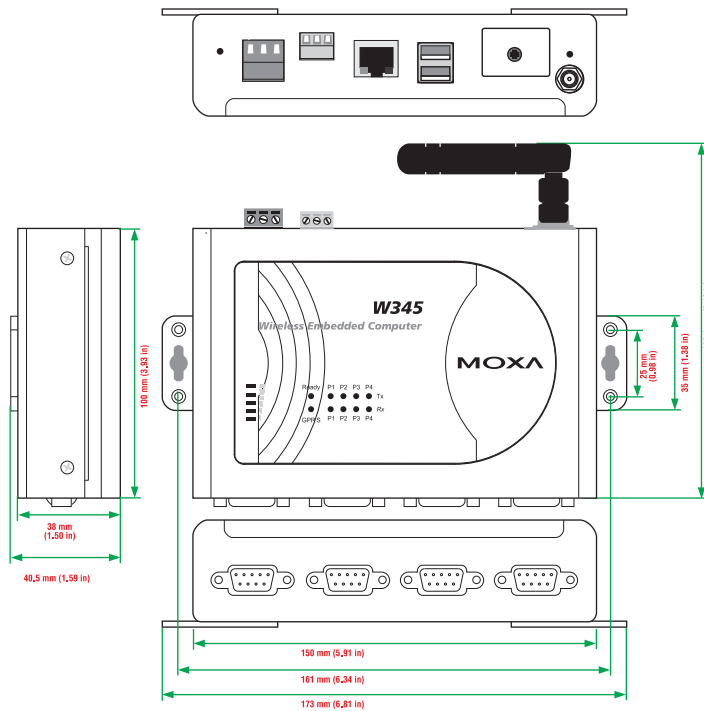
⦂ Ordering Information

Available Models

W315-LX: RISC-based wireless embedded computer with GSM/GPRS, 1 serial port, LAN, and SD
W325-LX: RISC-based wireless embedded computer with GSM/GPRS, 2 serial ports, LAN, and SD
W345-LX: RISC-based wireless embedded computer with GSM/GPRS, 4 serial ports, LAN, SD, USB, and relay output

Optional Accessories (can be purchased separately)

DK-35A: Mounting kit for 35-mm DIN-Rail

Package Checklist

- W315 or W325 or W345 computer
- Wall mounting kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adaptor (including terminal block to power jack converter)
- GSM/GPRS Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

W311/321/341

RISC-based embedded Linux computers with WLAN, LAN, and 1, 2, or 4 serial ports

> MOXA ART ARM9 32-bit 192 MHz processor running Linux 2.6
> 32 or 64 MB RAM, and 16 MB flash disk on board
> 802.11a/b/g WLAN with repeater function
> WEP, WPA, and WPA2 encryption
> 10/100 Mbps Ethernet for network redundancy
> Relay output for external alarm connection (W341 only)
> SD socket for storage expansion
> DIN-rail or wallmount installation
> Designed to withstand 5 g's of continuous vibration and 50-g shocks
> Robust, fan-less design

W341

W321

W311

Overview

The W311/321/341 embedded Linux computers feature 1, 2, or 4 software selectable RS-232/422/485 ports, and support the IEEE 802.1a/b/g standards for WLAN connections. In addition, the computers have 1 Ethernet port, and some models come with USB 2.0 hosts and an SD socket for storage expansion. The W311/321/341 computers' Linux OS runs on the MOXA ART 32-bit ARM9 processor that provides a powerful and reliable platform for harsh, industrial environments. You will find these computers ideal for a variety of machine-to-machine applications, including data acquisition, protocol conversion, and remote device control and monitoring.

Appearance

W311

Wireless LAN Antenna

Ethernet (10/100BaseTx)

12 to 48 VDC

Serial Console Port

Internal SD Slot for Storage Expansion (remove cover to access)

Serial Port (RS-232/422/485)

W321

Wireless LAN Antenna

Ethernet (10/100BaseTx)

12 to 48 VDC

Serial Console Port

Internal SD Slot for Storage Expansion (remove cover to access)

Serial Port 1 (RS-232/422/485)

Serial Port 2 (RS-232/422/485)

W341

USB 2.0 Host x 2

Ethernet (10/100BaseTx)

Relay Output

12 to 48 VDC

Wireless LAN Antenna

Internal SD Slot for Storage Expansion (remove cover to access)

Serial Console Port

Serial Port 1 to 4 (RS-232/422/485)

Hardware Specifications

Computer
CPU: MOXA ART ARM9 32-bit 192 MHz
OS (pre-installed): Embedded Linux with MMU support
DRAM:
W311/321: 32 MB
W341: 64 MB
Flash: 16 MB
USB: (W341 only) USB 2.0 compliant hosts x 2, type A connector
Relay Output: (W341 only)
• Form C, SPDT x 1
• Normal Switching Capacity: 2 A @ 30 VDC
• Switching Power: 60 W max.
• Switching Voltage: 220 VDC max.
• Switching Current: 2 A max.
• Operating Time: 4 ms @ 20°C
• Initial Contact Resistance: 100 milli-ohm max.

Storage
Storage Expansion: SD slot

Ethernet Interface
LAN: 1 auto-sensing 10/100 Mbps port (RJ45)
Magnetic Isolation Protection: 1.5 KV built-in

WLAN Interface
Standard Compliance: 802.11a/b/g
Radio Frequency Type: DSSS, CCK, OFDM
Media Access Protocol: CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
Tx Power (typical):
• 5.15-5.35 GHz: 14 dBm @ 6 Mbps, 14 dBm @ 54 Mbps
• 5.725-5.825 GHz: 14 dBm @ 6 Mbps, 13 dBm @ 54 Mbps
• 2.412-2.483 GHz (802.11g): 17 dBm @ 6 Mbps, 15 dBm @ 54 Mbps
• 2.412-2.472 GHz (802.11b): 18 dBm @ 1-11 Mbps
Rx Sensitivity (typical):
• 5.15-5.35 GHz: 6 Mbps @ -82 dBm, 54 Mbps @ -67 dBm
• 5.47-5.725 GHz: 6 Mbps @ -82 dBm, 54 Mbps @ -67 dBm
• 5.725-5.825 GHz: 6 Mbps @ -80 dBm, 54 Mbps @ -69 dBm
• 2.412-2.472 GHz (802.11g): 6 Mbps @ -84 dBm, 54 Mbps @ -69 dBm
• 2.412-2.472 GHz (802.11b): 11 Mbps @ -82 dBm, 1 Mbps @-90 dBm

Transmission Rate: 54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps)
• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
• 802.11b: 1, 2, 5.5, 11 Mbps
Transmission Distance: Up to 100 meters (@ 11 Mbps in open areas)
Antenna Connector: Reverse SMA
Antenna: External 2 dbi dipole antenna
Wireless Security: WEP: 64-bit/128-bit, WPA, WPA2 data encryption
WLAN Modes: Ad-hoc (802.11b/g), Infrastructure

Serial Interface
Serial Standards: 1, 2, or 4 RS-232/422/485 ports, software-selectable (DB9 male)
ESD Protection: 15 KV ESD protection for all signals
Console Port: RS-232 interface (TxD, RxD, GND), with 4-pin pin header output

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, XON/XOFF, ADDC™ (automatic data direction control) for RS-485
Baudrate: 50 bps to 921.6 Kbps (non-standard baudrates supported; see user's manual for details)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

LEDs
System: Ready, SD
LAN: 10M/Link, 100M/Link (on connector)
WLAN: Enable, Signal Strength
Serial: TxD, RxD

Switches and Buttons
Reset Button: Supports "Reset to Factory Default"

14

Wireless Embedded Computers ❯ W311/321/341

Physical Characteristics
Housing: Aluminum (1 mm)
Weight:
W311: 170 g
W321: 185 g
W341: 390 g
Dimensions: (without ears or antenna)
W311/W321: 77 x 111 x 26 mm (3.03 x 4.37 x 1.02 in)
W341: 150 x 100 x 38 mm (5.91 x 3.94 x 1.50 in)
Mounting: DIN-rail (requires optional DK-35A DIN-rail kit), wall

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -20 to 80°C (-4 to 176°F)
Anti-vibration: 5 g @ IEC-68-2-6, sine wave, 5-500 Hz, 1 Oct./min, 1 hr/axis
Anti-shock: 50 g @ IEC-68-2-6, half-sine wave, 30 ms

Power Requirements
Input Voltage:
W311 and W321: 12 to 24 VDC
W341: 12 to 48 VDC

Power Consumption:
W311/321: 4.8 W
• 200 mA @ 24 VDC
• 400 mA @ 12 VDC
W341:
With no load on USB ports: 7.2 W
• 300 mA @ 24 VDC
• 600 mA @ 12 VDC
With full load on USB ports: 14.4 W
• 600 mA @ 24 VDC
• 1200 mA @ 12 VDC

Regulatory Approvals
EMC: CE (ETSI EN 301 489-1/-17, ETSI EN 301 893, ETSI EN 300 328, EN50392), FCC Part 15C & Part 15E; e-Mark (e13) (W311/321 only)
Safety: UL/cUL (UL60950-1), TÜV (EN60950-1)
Green Product: RoHS, CRoHS, WEEE

Reliability
Alert Tools: Built-in buzzer and RTC (real-time clock) with battery backup
Automatic Reboot Trigger: Built-in WDT (watchdog timer) supporting 1-255 level time interval system reset, software programmable

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Specifications

Linux
Kernel Version: 2.6.9
Boot Loader: Redboot
Protocol Stack: TCP, UDP, IPv4, SNMP V1, ICMP, IGMP, ARP, HTTP, CHAP, PAP, SSH 1.0/ 2.0, SSL, DHCP, NTP, NFS, SMTP, Telnet, FTP, PPP, PPPoE
File System: JFFS2 (on-board flash)
System Utilities: bash, busybox, tinylogin, telnet, ftp, scp
telnetd: Telnet Server daemon
ftpd: FTP server daemon
sshd: Secure shell server
Apache: Web server daemon, supporting PHP and XML
openvpn: Virtual private network service manager
iptables: Firewall service manager
pppd: dial in/out over serial port daemon & PPPoE

snmpd: snmpd agent daemon
inetd: TCP server manager program
Application Development Environment:
• MOXA Linux API Library
• Linux Tool Chain: Gcc, Glibc, GDB
• BINEncryptor: Encryption tool for binary files, based on "Moxa Intellectual Protection Technology" (Patented)
Device Drivers:
• W311/W321: UART, RTC, Buzzer, SD Card
• W341: UART, RTC, Buzzer, SD Card, USB (supports USB flash disk), Watchdog Timer, DO
Software Encryption Lock:
BINEncryptor: Encryption tool for binary files (based on patented Moxa technology)

Model Name	Serial Ports	LAN Port	WLAN	Cellular	Relay Output	Storage		OS
	RS-232/422/485	10/100 Mbps	802.11a/b/g	GSM/GPRS Quad Band		SD	USB	
W311	1	1	✓	–	–	✓	–	Linux
W321	2	1	✓	–	–	✓	–	Linux
W341	4	1	✓	–	1	✓	2	Linux

Dimensions (unit = mm)

W311
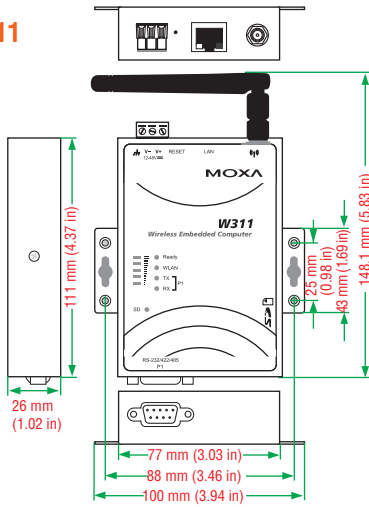
W321
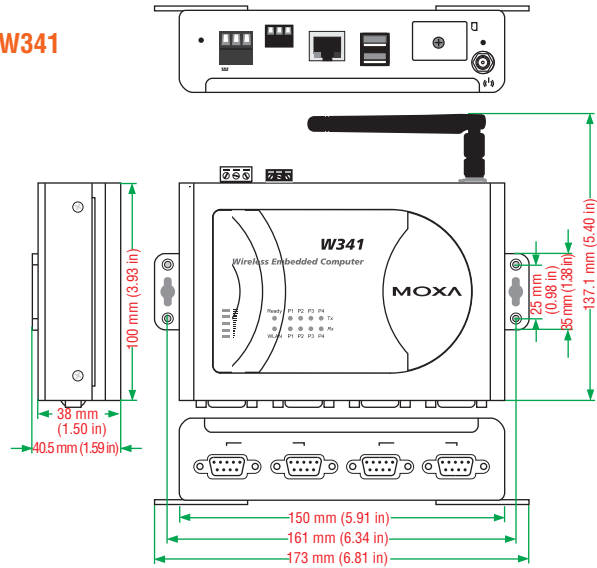
W341
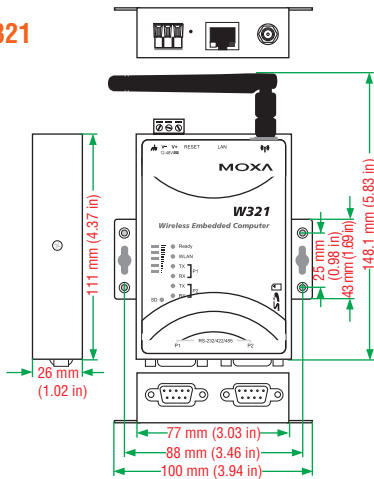
Pin Assignment Male DB9
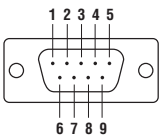
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DCD	TxD-(A)	–
2	RxD	TxD+(B)	–
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	–	–
7	RTS	–	–
8	CTS	–	–

Serial Console port
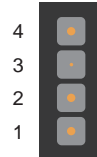
PIN	
1	TxD
2	RxD
3	NC
4	GND

Ordering Information

Available Models

W311-LX: RISC-based wireless embedded computer with WLAN, 1 serial port, LAN, and SD
W321-LX: RISC-based wireless embedded computer with WLAN, 2 serial ports, LAN, and SD
W341-LX: RISC-based wireless embedded computer with WLAN, 4 serial ports, LAN, SD, USB, and relay output

Optional Accessories (can be purchased separately)

DK-35A: Mounting kit for 35-mm DIN-Rail

Package Checklist

- W311 or W321 or W341 computer
- Wall mounting kit
- Ethernet cable: RJ45 to RJ45 cross-over cable, 100 cm
- CBL-4PINDB9F-100: 4-pin pin header to DB9 female console port cable, 100 cm
- Universal power adaptor (including terminal block to power jack converter)
- WLAN Antenna
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card

This page intentionally left blank.

Rcore Software

15

Rcore Software

Rcore—Embedded Software Platform

Take advantage of Moxa's Rcore platform to increase your competitiveness and ensure a faster time-to-market. The Rcore platform provides the following hard-to-beat benefits:

- Easy-to-use application libraries
- Proven and bug-free sample code
- Consulting-level advice for application development
- Fast concept validation and development cycle

Operating Systems

Moxa's x86 and RISC embedded computers offer a powerful computing environment and stable system for a variety of industrial applications. These computers use either a Linux or Windows (CE or XPe) embedded operating system to provide programmers around the world with a user-friendly environment for application development, and help reduce the effort required for system integration. Moxa continues to look for real-time operating systems that are suitable for mission critical applications.

Middleware

Moxa offers a variety of middleware to help you easily integrate these application modules into your system. This is essential for leveraging the profound features of these modules and reducing the effort required for application development. The VPN (OpenVPN, L2TP, and IPSec) middleware makes it easy for user applications to create secure tunnels between communication parties. The firewall (iptables) middleware protects enterprise information from un-friendly access. The database system (MySQL and MSSQL) middleware can be used to manage field-data acquisition, with web services (Web, PHP, ASP) included to give programmers an integration framework for building Internet accessible field applications, such as WebSCADA.

Sample Code

To lower customers' development cost, Moxa provides sample code for a wide range of embedded applications, such as serial-to-Ethernet (S2E), serial-to-serial (S2S), and Modbus TCP and RTU. This high-level sample code and application libraries hide the details of implementing complex data communication by presenting relatively simple function prototypes for user applications. In addition, low-level libraries that manage direct access to peripheral I/O devices, such as LCM, key pad, digital IO signals, and watchdog functions, are also included. With ready access to such a rich assortment of embedded applications, programmers obtain greater flexibility than would otherwise be possible. These libraries help programmers quickly grasp the full functionality of their applications, and in this way gain the confidence needed to complete their project, essentially speeding up product development and ensuring that code is efficient and bug-free.

Tools

Moxa provides a Windows PC-based tool (MDM) that auto-detects, configures, and manages Moxa's embedded computers over an Internet environment,. This tool provides features for setting IP addresses, managing files, monitoring memory usage of computers, and helping application developers deploy their programs en masse to an entire army of computers.

Moxa Device Manager

Unbounded management for Moxa embedded computers

Moxa Device Manager (MDM for short) is an easy-to-use remote management tool for managing Moxa's ready-to-run embedded computers on the Internet. Moxa's embedded computers make excellent front-end computers at remote sites for onsite data collection and industrial control applications. Simply put, MDM makes it easy for system administrators to manage remote computers.

⠿ Features

Remote Control Management
- Supports all of Moxa's embedded computers and all operating systems (Linux, CE, XPe)
- Control and monitor remote devices over the Internet
- Broadcast search for Moxa embedded computers on the same subnet
- Get instant device status
- Get device system information (IP, model name, product image, firmware version, OS, hostname, CPU type, memory information, and storage information) of all devices, all from the main page

Command-line Free Configuration and Maintenance
- Launch programs automatically at boot-up
- One-to-multiple file transfers including firmware upgrade (excluding EM-2260-CE, IA26X-CE, UC-712X-CE, DA-68X-LX, and XPe models) and file uploads
- Perform remote file system management
  - › Download/upload files
  - › Rename a file or directory
  - › Run/delete a file
  - › Create a directory
  - › Get the file list of a directory
  - › Change file mode (Linux only)
- Remote program monitoring and process control
- Remote system administration
  - › Network configuration settings
  - › Launch programs automatically at boot-up
  - › System time set up
  - › Reboot devices

User-friendly GUI
- Easy to use graphical user interface gives users "click and operate" management capability of remote devices
- Friendly window-based utilities make configuration easy

Easy Installation and Setup
- MDM Agent program running on an embedded computer can be started automatically at boot-up
- MDM Tool and Gateway can be installed on any PC running Windows XP

Mobile Configuration (for W406 Series)

- User friendly configuration for mobile setup, including GSM/GPRS/EDGE connection, and reconnection
- Interval setup, and reconnection enable/disable
- Security authentication enabler for PIN and PUK
- Disconnection diagnosis display
- Short Message Service (SMS) management, including Send & Receive SMS, SMS storage
- 10 sets of preinstalled phone books
- AT command console allows users to produce AT commands for operations such as dialing, hanging up, and changing the parameters of the connection
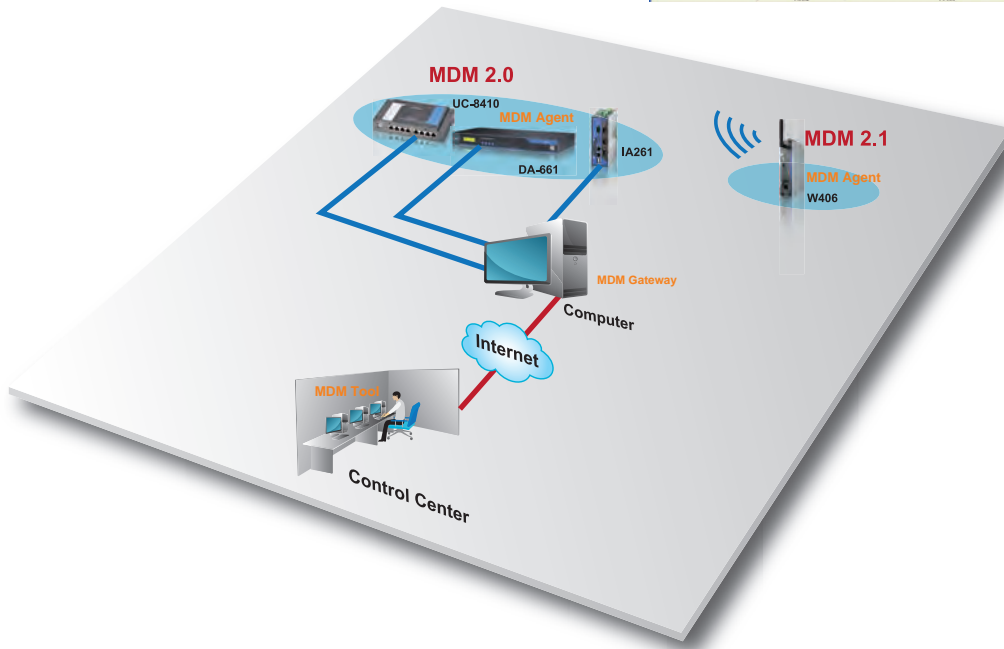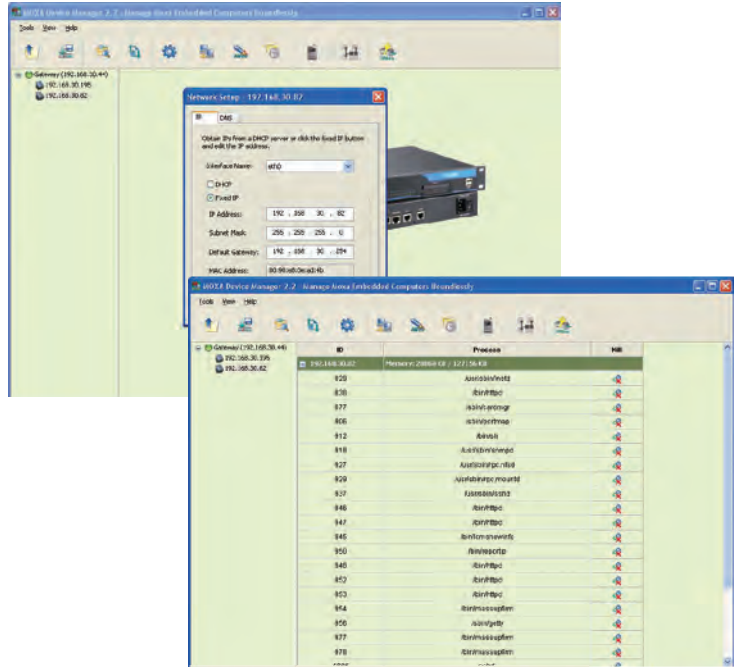
: System Requirements

- CPU: Intel Pentium 4 processor or higher
- RAM: 1 GB (Gateway, 512 MB)
- OS: Windows XP

: Free Download Information

Moxa device manager comes with MDM Agent, MDM Tool, and MDM Gateway (users can download the package from the Moxa website in the Support/Software section)

- MDM 2.0 Tool Software
- MDM 2.1 Tool Software (W406)
- MDM 2.0 Agent Software
- MDM 2.1 Agent Software (W406)
- MDM 2.0 Gateway Software

Automation Controllers

16

**Automation
Controllers**

Stand-alone Micro Controllers

Model	ioLogik W5312	ioLogik W5340	ioLogik E2210	ioLogik E2212	ioLogik E2214
Category	Cellular GPRS micro controller	Cellular GPRS micro controller	Active Ethernet micro controller	Active Ethernet micro controller	Active Ethernet micro controller
Comm. Interface	GPRS, 10/100M Ethernet	GPRS, 10/100M Ethernet	10/100M Ethernet	10/100M Ethernet	10/100M Ethernet
I/O Combination	8 DIs, 4 DIOs, 8 DOs	4 AIs, 8 DIOs, 2 Relays	12 DIs, 8 DOs	8 DIs, 8 DOs, 4 DIOs	6 DIs, 6 Relays
Control Protocol	Modbus/TCP, SNMP, OPC	Modbus/TCP, SNMP, OPC	Modbus/TCP, SNMP, OPC, Http-CGI	Modbus/TCP, SNMP, OPC, Http-CGI	Modbus/TCP, SNMP, OPC, Http-CGI
Local Intelligence	Click&Go	Click&Go	Click&Go	Click&Go	Click&Go
Alarm Function	SMS, E-mail, SNMP Traps, TCP/UDP Messaging	SMS, E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging

Model	ioLogik E2240	ioLogik E2242	ioLogik E2260	ioLogik E2262
Category	Active Ethernet micro controller	Active Ethernet micro controller	Active Ethernet micro controller	Active Ethernet micro controller
Comm. Interface	10/100M Ethernet	10/100M Ethernet	10/100M Ethernet	10/100M Ethernet
I/O Combination	8 AIs, 2 AOs	4 AIs, 12 DIOs	4 DOs, 6 RTDs	4 DOs, 8 TCs
Control. Protocol	Modbus/TCP, SNMP, OPC, Http-CGI	Modbus/TCP, SNMP, OPC, Http-CGI	Modbus/TCP, SNMP, OPC, Http-CGI	Modbus/TCP, SNMP, OPC, Http-CGI
Local Intelligence	Click&Go	Click&Go	Click&Go	Click&Go
Alarm Function	E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging	E-mail, SNMP Traps, TCP/UDP Messaging

Modular Micro Controllers

Model	ioLogik E4200
Category	Modular Active Ethernet micro controller
Comm. Interface	Dual 10/100M Ethernet
Max. Expansion Capacity	16 slices
Control Protocol	Modbus/TCP, SNMP, OPC
Local Intelligence	Click&Go
Alarm Function	SMS, E-mail, SNMP Traps, TCP/UDP Messaging
SMS/GPRS Connectivity	Yes, with an ext. modem

Introduction to Automation Controllers

: Make Your Remote Automation Applications Powerful and Easy

Remote automation is one of the most daunting challenges that SCADA engineers can face. The dizzying array of RTUs and PLCs available, coupled with multiple requirements such as low bandwidth consumption, data logging, ease of maintenance, extreme temperatures, local intelligence, and systems integration, can frustrate even experienced SCADA professionals. Moxa's remote automation solutions, which are packed with powerful cost and labor saving features, simplify the deployment and maintenance of your systems.

Remote Automation

Push Technology | Local Intelligence | Wide Temperature | Data Logging | Easy Integration | Easy Maintenance
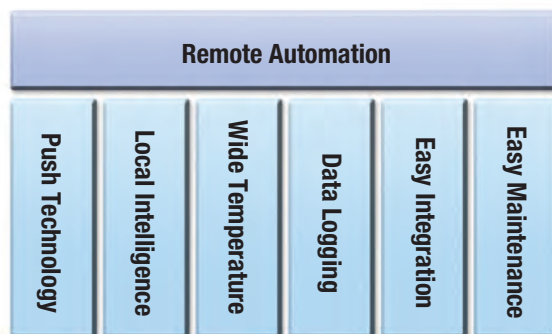
Key Factors in Remote Automation

: Conserve Bandwidth with Push Technology—A Byte Saved is a Penny Earned

Saving bandwidth saves money, which makes low bandwidth a key requirement for remote automation systems. Since GPRS carriers charge by how much traffic your system generates, the more data you send, the higher your bill will be. Reducing traffic between control and remote sites, but without affecting your system operations, is one way to achieve this.

Push technology, which can be configured to send the exact number of messages needed, and no more, is an excellent choice for remote automation users. In order to implement this technology, remote automation devices must be locally intelligent and be able to report by exception. With this combination of functions, your equipment will only send messages when there are status changes.

: Local Control—Bring Intelligence to Local Equipment

Wireless technology is the most popular solution for collecting data from remote sites. However, the reliability of wireless communication is a perennial issue. SCADA engineers can't always rely on central control to manage all remote sites. Remote equipment should be capable of local logic so they can maintain operations when communication with the central system is down.

Moxa's innovative Click&Go™ control logic offers simple yet powerful IF-THEN-ELSE control logic. With the menu-driven Click&Go™ system, users can reduce the learning curve and deploy simple control jobs in just few minutes. 80% of applications can be completed with just 24 ladder rules with Click&Go™.

⦂ Data Logging—Historical Data for Analysis

Preventative maintenance is important for remote automation which involves applications that are large in scale and widely distributed. Maintenance engineers may have to drive for up to three hours to reach one remote site, so it would be ideal to get the most out of every maintenance trip. Using historical data logs to analyze data and predict problems in advance would make system maintenance far more efficient. With preventative maintenance, engineers can replace problem

components before they fail to reduce downtime and provide non-stop service.

Precise time stamps are also important for data logging. It would be impossible to conduct an accurate analysis without reliable time data. SNTP (Simple Network Time Protocol) can synchronize network device clocks even across a large scale network.

⦂ Wired or Wireless Solutions—Unlock Every Option for Your Applications

SCADA engineers face many different challenges in their daily work, such as finding the best equipment for both short distance and long distance communications. Wired connections are certainly more reliable than wireless, but some obstacles can make wiring impossible. Actually

setting up a reliable wireless communications system is yet another challenge. Moxa provides Ethernet and GPRS network micro controllers, allowing users to choose the best solution for each application.

⦂ Wide Operating Temperature Range—From Frigid to Blistering

Outdoor equipment boxes are the most popular way to deploy remote devices, but exposure to the elements and the small contained space means the temperature could be much higher or lower than it is indoors. A wide operating temperature range is a critical design requirement for

remote automation. Most of Moxa's remote automation products can operate in a wide -40 to 75°C range, giving engineers the freedom to install Moxa's remote automation solution wherever it is needed.

⦂ Easy Maintenance—Save Labor Costs and Save Time

Performing maintenance at distant border sites is always a burden. Engineers might have to drive several hours just to fix simple issues. The more management tasks that can be performed remotely, the fewer demands there are on the maintenance staff.

Moxa designs many different solutions to make life easier for engineers. Modbus/TCP, Web consoles, HTTP command, SNMP protocol, remote configuration, firmware upgrade, and device reboots can all be performed remotely with Moxa's remote automation solutions. Unburden your SCADA engineers of these hassles and let them focus on other priorities.

⦂ Easy Integration—Flexible and Interoperable

Many remote sites still use legacy equipment, and any remote automation solution will need to connect these legacy I/O and serial devices with the control center.

Moxa offers micro controllers and programmable controllers for different scenarios. Micro controllers provide the easy-to-use control logic and

serial interface for meters. For larger scale scenarios, SCADA engineers can use programmable automation controllers to pre-process data and send information back to the control center.

To leverage existing SCADA software, Moxa also offers Active OPC Server to integrate Moxa solutions with existing SCADA systems.

SCADA Software	Custom Software	NMS (Network Management System)	CMS (Content Management System)
Moxa Active OPC Server	Modbus (TCP/RTU)	MXIO Library (VB, C, .Net)	SNMPv1/v2c/v3, SNMP Trap	Http Command or CGI Command

Moxa Controllers

Legacy Field Devices
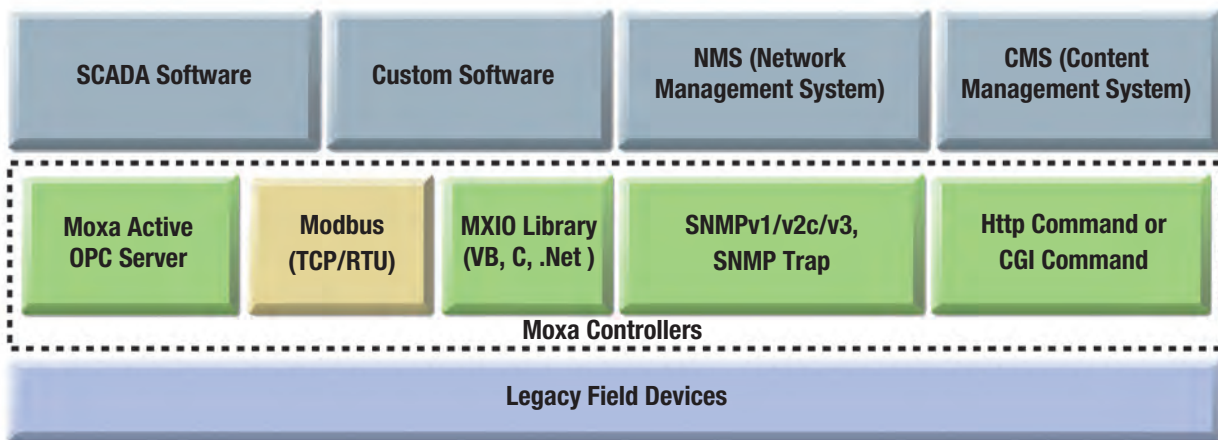
Moxa Solutions Simplify Integration

Note: Green boxes indicate Moxa-exclusive features

Introduction to PAC Solutions

⋮ Controllers that Combine Flexibility and Ruggedness for Mission-critical Systems

Programmable Automation Controllers (PACs) offer more features than traditional PLCs and are used for complex applications. The versatility that PACs provide unlocks more possibilities for industrial automation applications. Key features of PACs include an open platform, support for PC programming languages, VGA, large storage, powerful computing capability, protocol conversion, and a variety of communication interfaces.

Moxa's ioPAC is the first programmable automation controller designed for harsh environments. The ioPAC comes with a rugged metal chassis and can be used in wide temperature and high vibration environments.

⋮ The ioPAC is Ideal for Harsh Environments

The typical PAC is designed with a plastic chassis, only supports a 0 to 55°C operating temperature, and cannot be used in high-vibration environments. With these limitations, a typical PAC struggles to survive for any length of time at an unmanned site without the benefit of a heater

or air conditioner. Moxa offers industrial grade products that surpass requirements for a variety of harsh environments. Moxa's ioPAC supports a wide, -40 to 75°C operating temperature, and the aluminum chassis can resist UV rays to prevent wear and tear.

⋮ High Availability to Keep Services Up and Running

Moxa's ioPAC products are designed for high availability and low downtime to keep services up and running. In order to meet these requirements, ioPAC products are built with dual power inputs, dual LANs, and external SD storage support and hot-swappable I/O modules.

- Dual-power inputs and dual LANs ensure non-stop service during power failures and when the main network is down.

- An SD card is used for backups and data storage, and Moxa's ioPAC products allow users to keep all system data on an SD card. Replacing the CPU module or downloading a data log file can be done in a short amount of time to reduce downtime.

- Hot-swappable I/O modules allow you to replace I/O modules in a matter of minutes while services remain up and running.

- A metal chassis provides better protection than plastic, and also helps to reduce the effect of some kinds of electrical noise.

SD Card Slot

Dual LAN (M12 Connector)

Dual Power Inputs

Hot Swappable I/O Module

⠸ Remote Configuration and Maintenance

- **Remote Desktop Service**
  With this function, engineers can control the ioPAC from a remote location just as if they were sitting in front of it.

- **I/O Control Tool**
  Moxa provides I/O control tools to help customers configure, test, and monitor I/O status.

- **System Diagnostic Function Calls**
  The ioPAC library allows users to integrate diagnostic functions into their programs.

⠸ Anti-vibration Design

Moxa's ioPAC products are designed to operate in high vibration environments, such as on vehicles and railway systems, and LAN, serial, and I/O connections are similarly resilient. A spring-type terminal block with clamp is a robust design for I/O applications. In addition, the Ethernet port uses sturdy M12 connectors to operate in high-vibration environments.

Spring Type Terminal Block with Clamp

M12 Connector

Serial Interface

ioPAC 8020

Rugged programmable automation controller

> Hot-swappable I/O modules
> Two RS-232/422/485 serial ports
> Two LAN ports with M12 connectors
> Redundant dual VDC power input with extending power module
> Anti-vibration spring lock terminal block
> -40 to 75°C operating temperature range

CE FC

16

Automation Controllers > ioPAC 8020

: Introduction

The ioPAC 8020 is designed for front-end data acquisition and monitoring applications. With a powerful processor and a variety of interfaces, the 8020 can connect to devices such as PLCs, smart meters, controllers, and other serial devices. In addition to the serial interface, the 8020 also supports hot-swappable I/O slots for sensor signals, allowing you to choose from a variety of I/O modules for accessing sensor signals.

The ioPAC 8020 is a DIN-Rail, fanless, programmable automation controller. The housing design for this product is optimized for robustness and compactness, and the aluminum chassis provides better protection for rolling stock, wayside, roadside, environmental monitoring, wind turbine, and other outdoor applications. In addition, the ultra wide temperature design is suitable for both tropical and high altitude environments. With two M12 Ethernet connectors, two serial ports with DB9 connectors, and a spring lock terminal block for I/O signal interfaces, the ioPAC 8020 is tailor-made for high vibration applications.

: Hardware Specifications

Computer
CPU: ARM9 based CPU, 32-bit /192 Mhz
OS (pre-installed): eCOS
SDRAM: 8 MB
Flash: 4 MB

Ethernet Interface
LAN: 2 auto-sensing 10/100 Mbps ports (M12 connectors)

Serial Interface
Serial Standards: RS-232/422/485 ports (DB9 male)

Serial Signals
RS-232: TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND
RS-422: TxD+, TxD-, RxD+, RxD-, GND
RS-485-4w: TxD+, TxD-, RxD+, RxD-, GND
RS-485-2w: Data+, Data-, GND

Power Requirements
Input Voltage: 12 to 48 VDC

Mechanism
CPU Slots: 1
I/O Module Slots: 4 or 8 slots

Physical Characteristics
Housing: Aluminum
Mounting: DIN-Rail mounting

Environmental Limits
Operating Temperature: -40 to 75°C (-40 to 167°F)
Operating Humidity: 5 to 95% RH
Storage Temperature: -40 to 85°C (-40 to 185°F)

Regulatory Approvals
EMI: FCC part 15, CISPR (EN55022) Class A
EMS:
IEC 61000-4-2 (ESD), level 2/3
IEC 61000-4-3 (RS), level 2
IEC 61000-4-4 (EFT), level 2
IEC 61000-4-5 (Surge), level 3
IEC 61000-4-6 (CS), level 2
IEC 61000-4-8 (PM), level 1
IEC 61000-4-11 (DIP)
IEC 61000-6-2 (ESD), level 2/3
IEC 61000-6-4 (EFT), level 2
Safety: UL508 (Pending)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
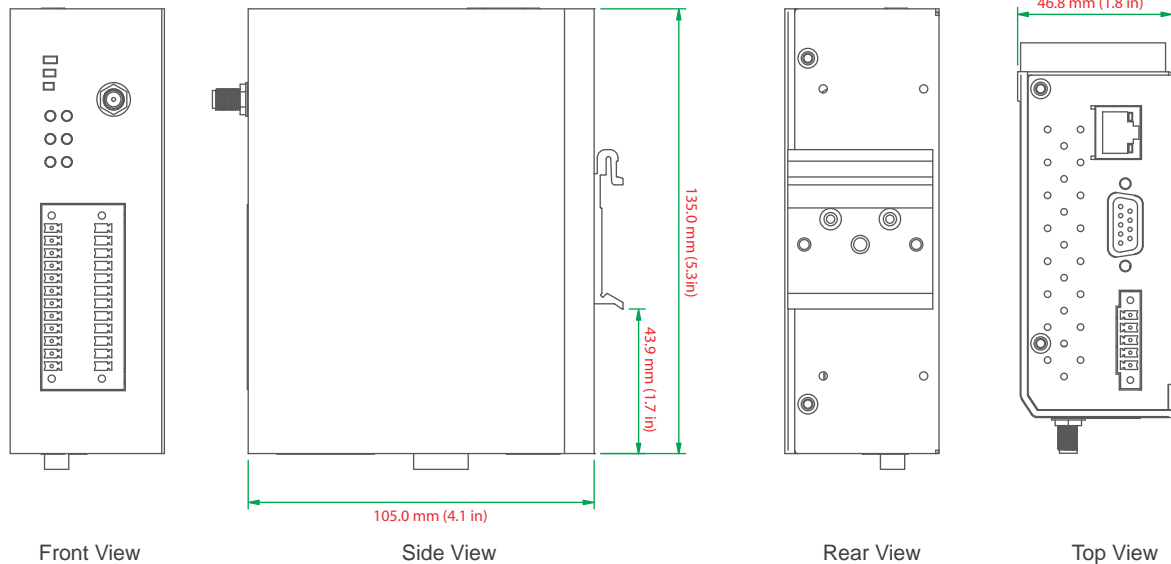**Rail Traffic:** EN50155 (Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 2 years
Details: See www.moxa.com/warranty

Introduction to Cellular Micro Controllers

⋮ Introduction

The ioLogik W5300 Active GPRS micro controller is a rugged, compact solution for remote monitoring and alarm systems. With the ioLogik W5300, you can define a GPRS connection strategy, including Always-On and Wake-On-Demand, to optimize data transfer rates for different applications. In addition, the operational cost of GPRS communication depends on the data transfer rate. With Moxa's active technology, you can expect to cut transmission costs in half and offer different GPRS

connection strategies to achieve better data transmission fees. This rugged, compact solution is suitable for the following applications.

• Water and wastewater industries
• Broadcast and telecom radio tower monitoring
• Infrastructure management
• Oil & gas, power, and transportation
• Lighting control monitoring

⋮ Integrated, Compact Solution

The ioLogik W5300 series Active GPRS micro controller products are 13 x 10 x 5 cm compact solutions that integrate a GPRS modem, PLC, and data logger in one rugged aluminum box that offers higher reliability and flexibility.

Unlike turnkey GPRS modem, PLC, and I/O module solutions, the Active GPRS micro controller integrates several knowledge domains in one simple box. Users do not need to waste time solving and debugging GPRS communication problems, reading and writing I/O data between the SCADA system and PLC, or dealing with the code for report by exception and data logging.

In addition, the integrated solution consumes less power and adds power saving features compared to the multiple devices of turnkey solutions, making it possible to build a system that uses a low power capacity solar power panel and battery. For example, the GPRS "Always On" mode only requires 4.2 W while "On Demand" mode only requires 2.8 W. The ioLogik W5300 series turns GPRS mode into GSM receiving mode and keeps the I/O data acquiring function working to extend I/O operation time. Note that while in "Wake on Demand" mode the system can still be woken by an event, a scheduler, or a caller ID.

Moxa's Active GPRS micro controller provides the following benefits:

• Smart and Active GPRS connections make it easy to connect
• Compact size ideal for installation in small spaces
• Intuitive menu-driven front-end intelligence allows you to configure your system quickly
• Less power consumption extends operation time and reduces maintenance workload

Cabinet

GPRS Modem
+
I/O Controller
+
Data Logger

ioLogik W5300 Series
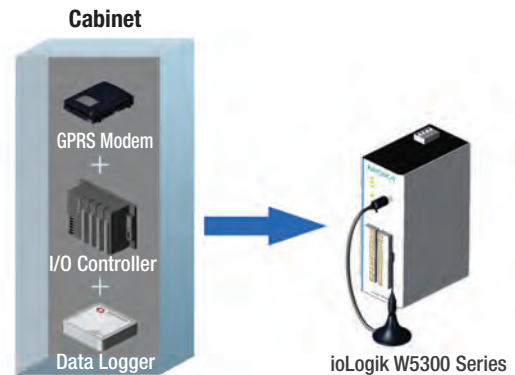
Traditional Solutions   **All-in-One, Compact Solutions**

⋮ Solves the Dynamic/Private IP Issue for GPRS Networks

GPRS devices are assigned private, dynamic IPs by GPRS service providers. These devices can access resources on the Internet, but cannot be managed or accessed directly from the Internet themselves since the private IP address is hidden. Moxa's Active GPRS connection technology includes push-based technology to overcome connectivity obstacles presented by private IPs. An ioLogik W5300 device can be easily deployed and managed, even in a dynamic IP environment.

② A connection is established

Internet

GPRS Device

GPRS Network

Active OPC Server with a Static IP

SCADA Host

① GPRS device registers itself on the Active OPC Server Activety
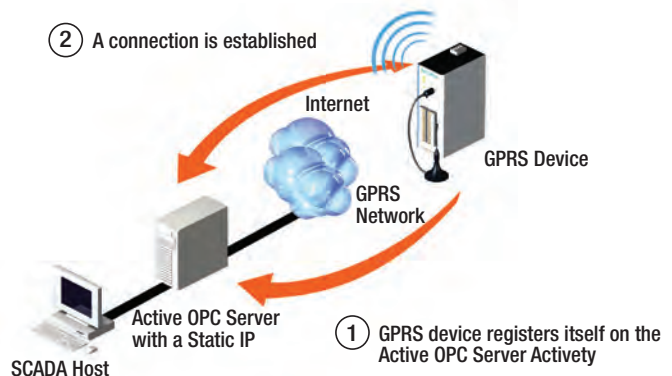
This is possible because of Moxa's innovative Active OPC Server, a central manager that is not only an OPC server connected with the SCADA system, but also a GPRS device gateway capable of managing the GPRS device's IP. The ioLogik W5300 can initiate communications with the Active OPC Server installed on the host with a static IP. By registering its own IP on the Active OPC server, the server can collect a table of all the remote GPRS devices and use this IP-MAC lookup table to locate and manage each remote W5300 controller. This creates a solid bi-directional connection with every private IP device. The Active OPC Server can also help the SCADA system create connections with GPRS devices by sharing its IP table. Because it uses the OPC Client/Server protocol, the Active OPC Server can make seamless connections with SCADA systems.
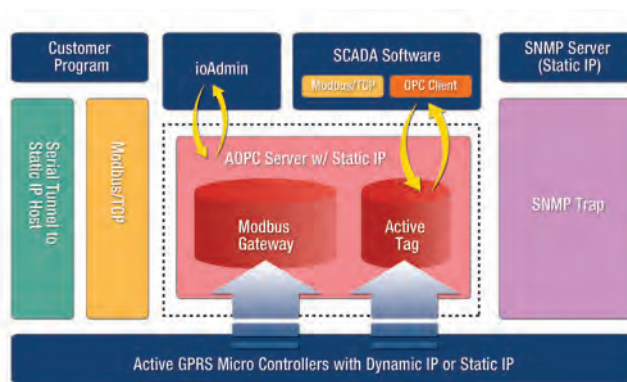
⋮ Optimizing Data Transmission

Operational expenses are a costly component of any GPRS telemetry solution. Because GPRS providers charge by packet size, a fine-tuned connectivity model is important in order to keep transmissions cost-effective yet highly efficient. GPRS transmissions should be optimized for a data plan, without wasting any bandwidth.

The Active GPRS micro controller offers two modes, Always On and Wake on Demand, which combine with the ioLogik W5300's integration function and Moxa's four different transmission strategies to optimize GPRS network use. Depending on the requirements of the specific application, one of the four transmission categories below can be used:

- Online real-time monitoring: Around 356 bytes of I/O data will be updated based on a user-defined interval or status trigger.
- Daily data updates: The data logger will record I/O data to a .CSV file in the SD card and update the central database daily. The file size, usually around 1 MB, will not exceed 13 MB. The data log can be further customized to a specific time period to reduce file size.

Strategy	Packet Size	Frequency
Online real-time monitoring	356 bytes	Once every 10 min
Data updated daily	1 MB (typical) 13 MB (max.)	Once a day
Report by exception	200 chars	Once a day
Notify by phone	160 chars	10 times a day

- Report by exception: The Active GPRS micro controller has menu-configured front-end intelligence. It is able to identify unusual events and actively send triggered exception messages of up to 200 characters to the central host.
- Notify by phone: The built-in SMS capability can send SMS messages of up to 160 characters to users. With this mode the Active GPRS micro controller will only use GSM functions and deactivate the GPRS functions in order to conserve power.

⋮ Intuitive Menu-driven Front-end Intelligence

Since IF-THEN-ELSE statements are a fundamental part of any programming language, even an untrained engineer will be able to use Click&Go's intuitive IF-THEN-ELSE configuration format to finish an I/O configuration in five minutes. Compared with the previous version of Click&Go, more functions are supported for each IF-THEN-ELSE description.

- **Report by Status Change**
  Send I/O status with TCP/UDP messages by configuring Click&Go rules:
  - Change of Status:
  - IF (DI-0 OFF to ON) and IF (DI-0 ON to OFF)
  - THEN (Send Active Message every 0 sec)

  Over Threshold:
  - IF (AI-0 >= 5V) THEN (Send Active Message every 0 sec)

16

Automation Controllers ⌄ Introduction to Cellular Micro Controllers

16
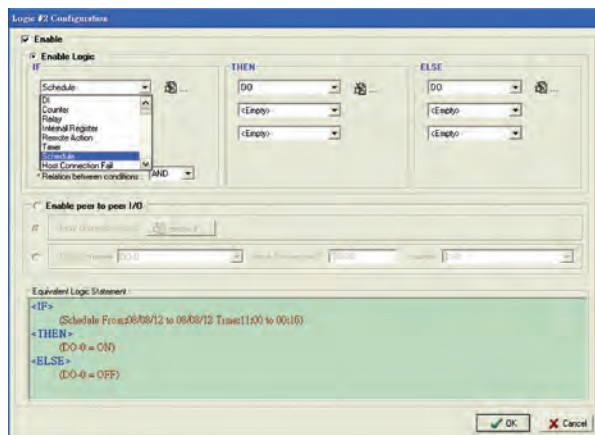
- **Periodically Report**

Click&Go supports 24 timers and schedulers in the control logic. Users can define these timers for different kinds of applications, such as periodically report each 10 minutes by timer counter or report once a day by scheduler.

    By Timer Clock:
- IF (Timer-0 TIMEOUT) THEN (Send Active Message every 0 sec.)

    By Scheduler:
- IF (Schedule From: 09/08/19 No limit Time:00:00:00 to 01:00:00 Recurrence)
- THEN (Send Active Message every 0 sec.)

Click&Go allows messages to be delivered by SMS, E-Mail, TCP/UDP, and SMNP Trap, and event response and real time stamps can also be attached. In addition, since Unicode is supported, you can create human-readable messages in your own language.

⠿ Compatible with Existing Systems

Moxa's Active GPRS micro controller solution can be used with existing systems. This includes Active I/O tags, Active message systems, and data logging. The ioLogik W5300 is compatible with the following systems:

- SCADA data acquisition system by OPC Client/Server protocol.
- SCADA data acquisition system by Modbus/TCP protocol.
- Historical analysis system by I/O data logging function.
- Read/write to a field serial device through a serial tunnel.

ioLogik W5300 products offer multiple potential avenues of communication with a SCADA system. To send active I/O tags, these controllers can communicate in the widely compatible OPC standard using the OPC Client/Server architecture. With Active OPC Server, you can quickly generate tags with one click and send them to the SCADA system.

Many SCADA systems include an operational data log for external historian software to access. Historian applications typically use SQL databases as their data solution, and ioLogik W5300 products can perform SQL updates with a .CSV logging file.

The ioLogik W5300 cellular micro controllers have additional TCP data communications features for yet another connectivity option with your HMI system. You can define a format compatible with your HMI database and transmit it using a TCP server.
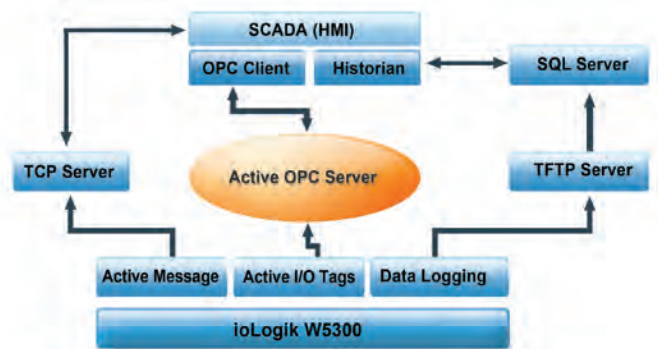
⠿ Attachable Serial Device Port

The ioLogik W5300 series features a 3-in-1 serial port that supports RS-232/422/485. In order to create convenient connections to serial devices in the field, the cellular controller has a built-in TCP client. With the TCP tunnel feature, you don't need to master TCP technology or the complex challenge of sending serial data over non-serial communications

networks. The completely "transparent tunnel mode" established between the host PC, the ioLogik remote controller, and the attached serial device allows you to control your devices as if they were directly connected. In some situations, you can use the "Modbus/RTU" operation mode to connect to Modbus field devices as well.

⠿ Sustainable Data Logging Function

Menu-driven local data logging configuration frees developers from frustrating programming requirements while granting them the peace of mind of knowing their data will be safely stored regardless of GPRS connection status.

The local data log records I/O data, not including an event and system log. This I/O data can be periodically saved to an SD card and stored in

a .CSV file daily. ioLogik W5300 devices include a built-in TFTP service response feature to deliver these files to the host PC on a predefined schedule. With up to 14 days of local data storage, the operational historian software can rely on the ioLogik W5300 to provide accurate, comprehensive historical data for analysis, even when the GPRS connection is unreliable.

Useful MXIO Library

The Active GPRS micro controller solution comes with a useful library suite that includes VB, VC, BCB, and .Net libraries. Software developers do not need to study the Modbus protocol to manage I/O monitoring and controlling functions, shortening development time and reducing costs.

Custom AP

VB, VC, BCB and .Net Libraries

Custom AP

Applications

An Active GPRS micro controller is a highly integrated solution that combines GPRS communications, front-end intelligence, and a front-end data logging function for information analysis and prediction.

Water Pipeline and Pumping Station Monitoring

Water pipeline and pumping systems are essential utilities that supply many important needs for everything from drinking water to cooling for industrial processes.

A water system includes the water resource, raw water mains, water treatment plants, pumping stations, and distribution transmission mains, and is required to deliver the water to the consumer.

Since this type of application is distributed over a wide geographical region, GPRS communications is the most ideal and cost-effective solution for systems monitoring. The ioLogik W5300 Active GPRS micro controllers are a perfect match for these industrial applications. For example, the ioLogik W5340 is equipped with 4 analog inputs, 8 digital inputs/outputs, and 2 relay outputs. It is suitable for pipeline monitoring and pumping station monitoring. Four analog inputs are available to connect with flow meters, pressure meters, temperature sensors, or PH meters. Relay outputs can open or close valves to control water flow. The ioLogik W5312 is equipped with 8 digital inputs, 8 digital outputs, and 4 digital inputs/outputs. It is suitable for water level monitoring on a water tank or storage reservoir. For some simple applications, the

ioLogik W5312's digital inputs can support counter mode to connect with a pulse flow meter.

On remote unmanned sites, the Active GPRS micro controller solution performs a local control and alarm role. For example, it monitors the water level. If it is over tank capacity, the ioLogik W5300 series can close a valve to stop the incoming water flow and send an SMS alert to maintenance staff. Another example is a pipeline pressure monitoring system. When the pressure is below a preset value, it can start the pump to inject more water and raise the water pressure.

Riverside Monitoring

River overflows and floods can cause disastrous consequences. For this reason, river water monitoring to control overflow and contain floods is very important. A sound water supply plan needs to take into consideration water flow and volume.

One of the most difficult parts of creating a river monitoring, prediction, and analysis system is laying the power and communication lines along the river, and ensuring that data transmission is not interrupted.

The ioLogik W5300 series collects meter readings from monitoring devices along the riverside. The data logging function of the units can store up to 14 days of I/O records, making it easy to import the records into a database for further prediction and analysis. When the readings of the monitoring devices reach a dangerous level, or when any pre-defined events are triggered, the ioLogik W5300 can actively send real-time alarm messages to the control room via SMS, SNMP Trap with I/O status, TCP, or email. Furthermore, to overcome power supply limitations in GPRS environments, the ioLogik W5300 series' power saving features make it possible to build a remote monitoring and alarm system that is powered by a smaller solar power panel, or consumes less battery power.

16

Automation Controllers › Introduction to Cellular Micro Controllers

ioLogik W5300 Series

Active GPRS micro controllers

> Integrated, compact box solution for GPRS telemetry applications
> Definable GPRS connection strategy to optimize data transmission
> Intuitive menu driven front-end intelligence
> Flexible, Unicode alarm system supporting SMS, email, SNMP Trap, TCP, UDP
> One RS-232/422/485 serial port built in to connect with field serial devices
> Backup and sustainable data logging function
> Seamless SCADA connectivity by Active OPC technology
> Configure, update firmware, and program over the air via ioAdmin
> Windows/WinCE VB/ VC.NET and Linux C APIs

: Introduction

The ioLogik W5300 series Active GPRS micro controllers are rugged, compact solutions for remote monitoring and alarm systems. With the ioLogik W5300 series, you can define a GPRS connection strategy, including Always-On and Wake-On-Demand, to optimize data transmission rates for different applications. In addition, the operational cost of GPRS communication depends on the data transmission rate. With Moxa's active technology, you can expect to cut transmission costs in half and offer different GPRS connection strategies to achieve better data transmission fees.

This rugged, compact solution is suitable for the following applications.

- Water and wastewater industries
- Broadcast and telecom radio tower monitoring
- Infrastructure management
- Oil & gas, power, and transportation
- Lighting control monitoring

ioLogik W5300 Series Selection Table

Models		I/O Combinations				
Standard Temperature (-10 to 55°C)	Wide Temperature (-40 to 70°C)	Digital Inputs	Digital Outputs	Analog Inputs	Relay Outputs	Configurable DIOs
ioLogik W5312	ioLogik W5312-T	8	8	–	–	4
ioLogik W5340	ioLogik W5340-T	–	–	4	2	8

⋮ ioLogik W5312 Specifications

DI/DO Configurable Channels
Channels: 4
I/O Mode:
• DI or Event Counter (up to 900 Hz)
• DO or Pulse Output (up to 100 Hz)

Digital Input
Channels: Up to 12, source/sink selectable
Sensor Type: NPN/PNP type
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:

Status \ DI Type	Source	Sink
ON	0 to 3 VDC	10 to 30 VDC
OFF	10 to 30 VDC	0 to 3 VDC

Common Type: 6 points per COM
Isolation: 3K VDC or 2K Vrms

Counter/Frequency: 900 Hz, power off storage
Digital Filtering Time Interval: Software selectable
Over-voltage Protection: 36 VDC
Poweroff Counter: Supports poweroff counter storage function

Digital Output
Channels: Up to 12, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 600 mA
Over-temperature Shutdown: 160°C
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

⋮ ioLogik W5340 Specifications

Analog Input
Channels: 4 analog inputs with differential input
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: 0 to 10 V, ±10 V, ±5 V, 0 to 20 mA, 4 to 20 mA
Accuracy:
• ±0.1% FSR @ 25°C
• ±0.3% FSR @ -10 and 55°C
Sampling Rate (all channels): 100 samples/sec
Input Impedance: 200K ohms (min.)
Built-in Resistor for Current Input: 102 ohms

DI/DO Configurable Channels
Channels: 8
I/O Mode:
• DI or Event Counter (up to 900 Hz)
• DO or Pulse Output (up to 100 Hz)

Digital Input
Channels: Up to 8, source/sink selectable
Sensor Type: NPN/PNP type
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:

Status \ DI Type	Source	Sink
ON	0 to 3 VDC	10 to 30 VDC
OFF	10 to 30 VDC	0 to 3 VDC

Common Type: 4 points per COM
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 900 Hz, power off storage
Digital Filtering Time Interval: Software selectable
Over-voltage Protection: 36 VDC
Poweroff Counter: Supports poweroff counter storage function

Digital Output
Channels: Up to 8, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 600 mA
Over-temperature Shutdown: 160°C
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

Relay Output
Channels: 2 Form A (Normal Open) relay outputs, 5 A
Contact Rating: 5 A @ 30 VDC, 5 A @ 240 VAC, 5 A @ 110 VAC
Inductance Load: 2 A
Resistance Load: 5 A
Breakdown Voltage: 500 VAC
Relay On/Off Time: 10 ms, 5 ms (max.)
Initial Insulation Resistance: 1G min. @ 500 VDC
Expected Life: 100,000 times (Typical)
Initial Contact Resistance: 30 milli-ohms (max.)
Pulse Output: 20 operation times per minutes at rated load
Isolation: 3K VDC or 2K Vrms

16

Automation Controllers › ioLogik W5300 Series

: Common Specifications

Cellular

Interface: GPRS
Band Options: Quad-band 850/900/1800/1900 MHz
GPRS Multi-Slot Class: Class 10
GPRS Terminal Device Class: Class B
SMS: Point-to-Point Text/PDU
SIM Control Voltage: 3 V

LAN

Ethernet: 1 x 10/100 Mbps, RJ45
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP, SNTP

Serial Communication

Interface: 1 x RS-232/422/485, software selectable
(9-pin D-Sub male, or 5-contact terminal block)
Baudrate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps

Power Requirements

Power Input: 24 VDC nominal, 12 to 36 VDC
Power Consumption:
• GPRS Always On (Communication): 4.2 W
• GPRS On Demand: 2.8 W

Physical Characteristics

Dimensions: 46.8 x 135 x 105 mm (1.84 x 5.31 x 4.13 in)
Weight: 495 g

Environmental Limits

Operating Temperature:
Standard Models: -10 to 55°C (14 to 131°F)
Wide Temp. Models: -40 to 70°C (-40 to 158°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

EMI: FCC part 15, CISPR (EN55022) Class A
EMS:
IEC 61000-4-2 (ESD), levels 2, 3
IEC 61000-4-3 (RS), level 2
IEC 61000-4-4 (EFT), level 2
IEC 61000-4-5 (Surge), level 3
IEC 61000-4-6 (CS), level 2
IEC 61000-4-8 (PM), level 1
IEC 61000-4-11 (DIP)
IEC 61000-6-2 (ESD), levels 2, 3
IEC 61000-6-4 (EFT), level 2
Safety: UL508 (Pending)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 2 years
Details: See www.moxa.com/warranty

Dimensions

Front View   Side View   Rear View   Top View

46.8 mm (1.8 in)
135.0 mm (5.3in)
43.9 mm (1.7 in)
105.0 mm (4.1 in)

: Ordering Information

Available Models

ioLogik W5312: Active GPRS micro controller with 8 DIs, 4 DIOs, and 8 DOs, -10 to 55°C operating temperature
ioLogik W5340: Active GPRS micro controller with 4 AIs, 8 DIOs, and 2 relay outputs, -10 to 55°C operating temperature
ioLogik W5312-T: Active GPRS micro controller with 8 DIs, 4 DIOs, and 8 DOs, -40 to 70°C operating temperature
ioLogik W5340-T: Active GPRS micro controller with 4 AIs, 8 DIOs, and 2 relay outputs, -40 to 70°C operating temperature

Introduction to Active Ethernet Micro Controllers

⁞ Active Ethernet Micro Controllers

The Most Intelligent Micro Controllers for Remote Monitoring and Alarm Applications

The ioLogik Active Ethernet micro controller is a new concept introduced by Moxa that offers proactive, event-based reporting and the control of I/O devices used for PC-based data acquisition and control. The I/O status of an Active Ethernet micro controller can be reported and controlled automatically on-site based on user specified conditions. This active reporting approach, which is new to PC-based monitoring, requires far less bandwidth than traditional polling methods. Users can obtain critical sensor data immediately instead of being confined by polling intervals. This makes network communication between a host computer and Active Ethernet micro controller concise and efficient, and makes data transmission 20 times faster compared with traditional SCADA systems (50 ms compared to 1 sec).

The intelligence of Active Ethernet micro controllers consists of two parts:

- The programming-free local control logic of Click&Go, and
- Remote monitoring and control

Click&Go provides a programming-free, easy-to-use IF-THEN-ELSE style of local I/O control that is capable of combining time-control and delivering TCP/UDP/SNMP Trap/e-mail/SMS messages with time stamp. In addition to Modbus/TCP, Active Ethernet I/O supports the familiar SNMP and CGI (Common Gateway Interface) protocols, giving IT engineers more options for obtaining remote I/O status and sending control commands. In addition, the Active OPC Server package makes it easy to link Active Ethernet micro controllers to SCADA systems.

Why Choose an Active Ethernet Micro Controller?

IA and IT-friendly Remote Mornitoring
- Moxa's Active OPC Server can connect an ioLogik to SCADA systems
- Open-standard Modbus/TCP
- SNMP for IT-based network management
- CGI commands for surveillance systems
- MXIO Library for WinCE/Linux, C++, VB/VC and .NET platforms

Intelligent Local I/O Control
- IF-THEN-ELSE style programming with no learning curve
- PLC-grade I/O control, timer, schedule, and register functions
- No need for third-party development tools, and no maintenance gaps
- Stand-alone operations require no host control
- Dramatic reduction in project implementation time

Push Technology for Events and Alarms
- Event-based TCP/UDP messages, SNMP traps, e-mail, SMS, and CGI command output
- Real-time events with time stamp
- Moxa's Active OPC Server package
- Saves bandwidth with no polling effort

Solution-oriented Design
Modular Type
- Easy-to-expand slice-type I/O modules
- Dual-LAN redundancy

Stand Alone Type
- Peer-to-peer function
- Optional LCM module
- Intuitive Windows utility

IA and IT-friendly Approaches to Remote I/O Control

In addition to Modbus/TCP, the I/O status of an Active Ethernet micro controller can be controlled in various ways. IT engineers can use SNMP and CGI, whereas IA engineers can use open-standard Active OPC Server. In addition, the MXIO library also offers programmers the benefit of fast implementation.

Push Technology for Events and Alarms

Active Messaging & Cooperation

DO-Stir Machine

RTD1   39°C
RTD2   42°C
RTD3   45°C

DO Heater

→ TCP/UDP Message + Time Stamp
→ SNMP Trap + Time Stamp
→ e-mail + Time Stamp
→ SMS (Short Message) + Time Stamp
→ CGI Command
→ Remote Action
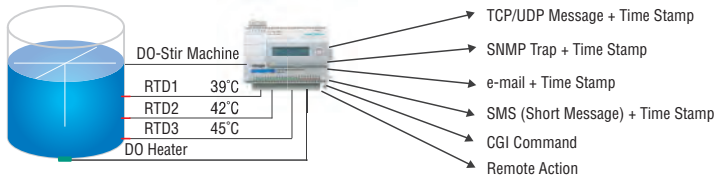
Active Ethernet micro controllers can be used to generate alarms when an event (user-defined by Click&Go) is triggered. Standard TCP or UDP packets can be sent to a central host, SNMP traps can be sent to IT monitoring systems, and e-mail/SMS messages can be sent to the site maintainer. The CGI commands and Remote Action functions allow the ioLogik E2200 to trigger a response from a camera or another E2200.

Active OPC Server Connection to SCADA

SCADA System

Moxa Active OPC Server
Traditional OPC Server

Push Architecture
Polling Architecture

Moxa Active Ethernet Micro Controllers
I/O Devices

Active OPC Server Lite is a free software package provided by Moxa that operates as an OPC driver for an HMI or SCADA system. Active OPC Server Lite offers seamless connection from Moxa's ioLogik series products to SCADA systems with 7 times the normal response, 50 times faster tag installation, and an 80% reduction of network bandwidth usage compared with other traditional OPC packages on the market.

Intelligent Local I/O Control

Local Alarm & I/O Control

If DI_0=On, Then DO_0=On

● Local intelligence
● No programming
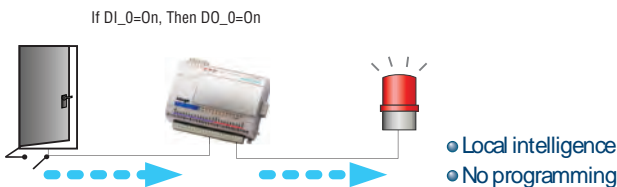
Active Ethernet micro controllers can be used for simple output control that is triggered by input status, without a PC controller. For example, a door sensor can be configured to trigger an alarm. Configuration is done through intuitive If/Then statements, with no programming required.

Instant Event Reporting by Input Status

Counter = 1

People Counter

● Improves data acquisition and control system efficiency
● Measurements are more accurate and timely to prevent data loss

Instead of relying on host computers that continually poll I/O devices for data, Active Ethernet micro controllers can proactively report sensor status using TCP or UDP messages. Proactive messaging allows much faster notification of I/O events and generates much lower network and CPU loads. Message content is fully customizable, and up to 10 simultaneous destinations are supported.

Solution-oriented Design

Dual-LAN Redundancy

LAN 1 — Primary Host

LAN 2 — Backup Host
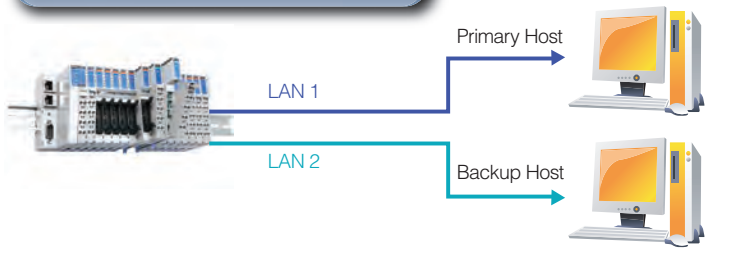
The ioLogik E4200 Modular Active Ethernet micro controllers come with dual network interfaces, which have separate MACs and IP addresses to connect to different network segments. Redundancy can be easily implemented to improve system reliability by allowing hosts located on different networks to control or monitor your system.

Peer-to-Peer Communication over Ethernet

Inputs — Ethernet — Outputs / Outputs
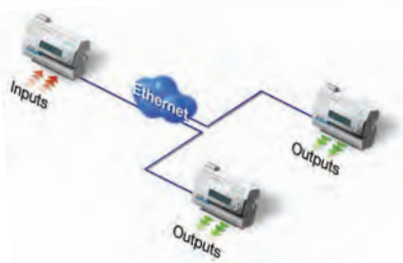
ioLogik E2200 Ethernet micro controllers are designed as cable replacement solutions that send input signals to remote outputs over an IP network. ioLogik products can be used to connect remote sensor signals to PLC controllers, DCS systems, or display devices over a network, without installing additional signal wires.

Intuitive Windows Utility

ioLogik micro controllers come with a very user-friendly Windows utility that includes remote configuration, firmware updates, and I/O testing and monitoring functions. These functions can save you many hours of installation and troubleshooting, and all settings can be saved to a file for future reference.

Optional LCD Module

The ioLogik E2200 stand-alone micro controllers provide an optional LCD module for on-site management and configuration. The unique display module can display network and I/O settings. You can change network settings to ensure the speed of installation and future maintenance.

16

Automation Controllers > Introduction to Active Ethernet Micro Controllers

ioLogik E4200

Modular Active Ethernet micro controller adaptor

> **Easy expansion; supports up to 16 I/O modules**
> **Dual Ethernet LANs and one RS-232 port**
> **Front-end intelligence that supports 80 Click&Go™ rules**
> **Unicode Active Messaging with real-time stamp, including SMS, SNMP Trap with I/O status, TCP, email**
> **Built-in web console**
> **PC utility: Auto detection of installed modules**
> **Windows/WinCE VB/VC.NET and Linux C APIs**

: Introduction

The ioLogik E4200 is suitable for remote monitoring and alarm systems, such as are used for water treatment systems, water supply systems, wastewater treatment systems, and power monitoring systems. These kinds of applications need more I/O points and a variety of I/O types, including temperature sensors, gas detectors, and water quality detectors, all of which can benefit from the versatile mixture of I/O features supported by the ioLogik E4200.

: Specifications

LAN
Ethernet: 2 x 10/100 Mbps (2 MACs, 2 IPs, RJ45 connectors)
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP, HTTP, SNTP

Serial Communication
Interface: 1 x RS-232 (9-pin D-Sub, male)
Parameters: N, 8, 1
Baudrate: 115,200 bps

Power Requirements
Power Input: 24 VDC nominal, 12 to 36 VDC
Power Consumption: 60 mA typical @ 24 VDC
Current for I/O Modules: Max. 1.5A @ 5 VDC

Field Power
Rated Voltage: 11 to 28.8 VDC, 24 VDC typical
Current in Field Power Contact: Max. 10 A

Isolation
System Power to I/O Driver: Optical isolation

Physical Characteristics
Dimensions: 45 x 99 x 70 mm (1.77 x 3.90 x 2.76 in)
Note: Please see page 17-15 for the dimensions diagram.
Weight: 180 g

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
EMI: FCC part 15, CISPR (EN55022) Class A
EMS:
IEC 61000-4-2 (ESD), level 2/3
IEC 61000-4-3 (RS), level 2
IEC 61000-4-4 (EFT), level 2
IEC 61000-4-5 (Surge), level 3
IEC 61000-4-6 (CS), level 2
IEC 61000-4-8 (PM), level 1
IEC 61000-4-11 (DIP)
IEC 61000-6-2 (ESD), level 2/3
IEC 61000-6-4 (EFT), level 2
Safety: UL508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 2 years
Details: See www.moxa.com/warranty

: Ordering Information

Step 1: Select a network adaptor module

ioLogik E4200

Step 2: Select I/O modules

M-1000/2000/3000/4000/6000 Series

Step 3: Select power modules

Power Modules M-7001/7002/7804/7805

Available Models
ioLogik E4200: Active Ethernet network adaptor
Note: The ioLogik E4200 Active Ethernet network adaptor can be expanded by adding up to 16 I/O modules. See pages 17-16 to 17-25 to select the M-series modules for your application.

ioLogik E2200 Series

Active Ethernet micro controllers

> Front-end intelligence that supports 24 Click&Go™ rules
> Active Messaging with real-time stamp, including SMS, SNMP Trap with I/O status, TCP, and email
> Supports SNMPv1/v2c/v3 protocol
> I/O peer-to-peer function
> Built-in web console
> PC utility: Auto detection of installed modules
> Windows/WinCE VB/VC.NET and Linux C APIs

16

Automation Controllers ＞ ioLogik E2200 Series

: Introduction

Moxa's ioLogik E2200 is a new type of active micro controller that can be used as an RTU (Remote Terminal Unit). Active Ethernet micro controllers are a kind of PC-based data acquisition and control device that use proactive, event-based reporting to control I/O devices. Unlike traditional RTUs, which are passive and must poll for data, Moxa's Active OPC Server makes seamless connection with SCADA systems

a reality. In addition, SNMP is used for communicating with an NMS (Network Management System) for IT field users. The I/O status of an Active Ethernet micro controller can be reported and controlled automatically on-site based on user specified conditions. This report-by-exception approach, which is new to PC-based monitoring, requires far less bandwidth than traditional polling methods.

ioLogik E2200 Series Selection Table

Models		I/O Combinations							
Standard Temperature (-10 to 55°C)	Wide Temperature (-40 to 75°C)	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	RTD Inputs	TC Inputs	Relay Outputs	Configurable DIOs
ioLogik E2210	ioLogik E2210-T	12	8	–	–	–	–	–	–
ioLogik E2212	ioLogik E2212-T	8	8	–	–	–	–	–	4
ioLogik E2214	ioLogik E2214-T	6	–	–	–	–	–	6	–
ioLogik E2240	ioLogik E2240-T	–	–	8	2	–	–	–	–
ioLogik E2242	ioLogik E2242-T	–	–	4	–	–	–	–	12
ioLogik E2260	ioLogik E2260-T	–	4	–	–	6	–	–	–
ioLogik E2262	ioLogik E2262-T	–	4	–	–	–	8	–	–

: ioLogik E2210 Specifications

Digital Input
Channels: 12, source type
Sensor Type: NPN, Dry contact
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact: (source type)
• Logic 0 (On): 0 to 3 VDC
• Logic 1 (Off): 10 to 30 VDC
Common Type: 12 points per COM
Isolation: 3K VDC or 2K Vrms

Counter/Frequency: 900 Hz
Digital Filtering Time Interval: Software selectable
Over-voltage Protection: 36 VDC
Digital Output
Channels: 8, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 400 mA (typical)
Over-temperature Shutdown: 175°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

⦂ ioLogik E2212 Specifications

Digital Input

Channels: 8, source/sink selectable
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:

DI Type Status	Source	Sink
ON	0 to 3 VDC	10 to 30 VDC
OFF	10 to 30 VDC	0 to 3 VDC

Common Type: 6 points per COM
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 900 Hz, power off storage
Digital Filtering Time Interval: Software selectable

Over-voltage Protection: 36 VDC
Poweroff Counter: Supports poweroff counter storage function

Digital Output

Channels: 8, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 400 mA (typical)
Over-temperature Shutdown: 175°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 2K Vrms or 3K VDC (Magnetic)

DI/DO Configurable Channels

Channels: 4
I/O Mode:
• DI or Event Counter (up to 900 Hz)
• DO or Pulse Output (up to 100 Hz)

⦂ ioLogik E2214 Specifications

Digital Input

Channels: 6, source/sink selectable
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:

DI Type Status	Source	Sink
ON	0 to 3 VDC	10 to 30 VDC
OFF	10 to 30 VDC	0 to 3 VDC

Common Type: 3 points per COM
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 900 Hz, power off storage

Digital Filtering Time Interval: Software selectable
Over-voltage Protection: 36 VDC
Poweroff Counter: Supports poweroff counter storage function
Relay Counter: Supports relay counter storage function

Relay Output

Channels: 6 Form A (N.O.) relay outputs, 5A
Contact Rating: 5 A @ 30 VDC, 5 A @ 250 VAC, 5 A @ 110 VAC
Inductance Load: 2 A
Resistance Load: 5 A
Breakdown Voltage: 500 VAC
Relay On/Off Time: 10 ms, 5 ms (Max.)
Initial Insulation Resistance: 1G min. @ 500 VDC
Expected Life: 100,000 times (Typical)
Initial Contact Resistance: 30 milli-ohms (Max.)
Pulse Output: 0.3 Hz at rated load

⦂ ioLogik E2240 Specifications

Analog Input

Channels: 8 analog inputs with differential input
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: ±150 mV, ±500 mV, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA
Data Format: 16-bit integer (2's complement)
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Sampling Rate (all channels):
• 10 samples/sec for voltage
• 6 samples/sec for current
Input Impedance: 900K ohms (min.)
Built-in Resistor for Current Input: 106 ohms
CMR @ 50/60 Hz: 95 dB min.
Zero Drift: ±9 μV/°C
Span Drift: ±25 ppm/°C
Isolation: 3K VDC or 2K Vrms

Analog Output

Channels: 2
Resolution: 12 bits
Output Range: 0 to 10 V, 4 to 20 mA
Drive Voltage: 15 VDC for current output
Accuracy:
±0.1% FSR @ 25°C,
±0.3% FSR @ -10 and 60°C
Zero Drift: ±9 μV/°C
Span Drift: ±25 ppm/°C
Load Resistor: Less than 250 ohms

⋮ ioLogik E2242 Specifications

Analog Input

Channels: 4 analog inputs with differential input
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: ±150 mV, 0 to 150 mV, ±500 V, 0 to 500 mV, ±5 V, 0 to 5 V, ±10 V, 0 to 10 V, 0 to 20 mA, 4 to 20 mA
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Sampling Rate (all channels): 100 samples/sec
Input Impedance: 200K ohms (min.)
Built-in Resistor for Current Input: 102 ohms

DI/DO Configurable Channels

Channels: 12
I/O Mode:
• DI or Event Counter (up to 900 Hz)
• DO or Pulse Output (up to 100 Hz)

Digital Input

Channels: Up to 12, source/sink selectable
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or event counter (up to 900 Hz)
Dry Contact:
• Logic 0: short to GND
• Logic 1: Open

Wet Contact:

DI Type Status	Source	Sink
ON	0 to 3 VDC	10 to 30 VDC
OFF	10 to 30 VDC	0 to 3 VDC

Common Type: 6 points per COM
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 900 Hz, power off storage
Digital Filtering Time Interval: Software selectable
Over-voltage Protection: 36 VDC
Poweroff Counter: Supports poweroff counter storage function

Digital Output

Channels: Up to 12, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 400 mA (typical)
Over-temperature Shutdown: 175°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 2K Vrms or 3K VDC (Magnetic)

⋮ ioLogik E2260 Specifications

RTD

Channels: 6
Input Type: Pt, JPt, Ni, RTD sensor, resistor
Sampling Rate: 12 samples/sec (all channels)
Resolution: 0.1°C or 0.1 ohm
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Input Impedance: 625K ohms (min.)

Digital Output

Channels: 4, sink, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 750 mA
Over-temperature Shutdown: 175°C
Isolation: 3K VDC or 2K Vrms

⋮ ioLogik E2262 Specifications

Thermocouple Input

Channels: 8
Sensor Type: J, K, T, E, R, S, B, N type TC and mV mode
Conversion Time: Less than 90 ms
Effective Resolution: 16 bits
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Input Impedance: 1 M ohm or better

Digital Output

Channels: 4, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 100 Hz)
Pulse Wave Width/Frequency: 10 ms/100 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 750 mA
Over-temperature Shutdown: 175°C
Isolation: 3K VDC or 2K Vrms

16

Automation Controllers > ioLogik E4200

: Common Specifications

LAN

Ethernet: 1 x 10/100 Mbps, RJ45
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, SNMP, HTTP, CGI, SNTP

Serial Communication

Interface: RS-485-2w: Data+, Data-, GND
Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters

Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: None
Baudrate: 1200 to 115200 bps
Protocol: Modbus/RTU

Power Requirements

Power Input: 24 VDC nominal, 12 to 36 VDC
Power Consumption: 282 mA typical @ 24 VDC

Physical Characteristics

Wiring: I/O cable max. 14 AWG
Dimensions: 115 x 79 x 45.6 mm (4.53 x 3.11 x 1.80 in)
Weight: under 250 g

Environmental Limits

Operating Temperature:
Standard Models: -10 to 60°C (14 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

EMI: FCC Part 15, CISPR (EN55022) class A
EMS: IEC 61000-4, IEC 61000-6
Safety: UL508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 2 years
Details: See www.moxa.com/warranty

Dimensions
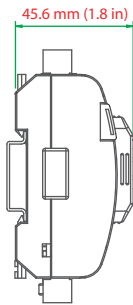
Side View   Front View   Rear View

: Ordering Information

Available Models

ioLogik E2210: Active Ethernet micro controller with 12 digital inputs and 8 digital outputs, -10 to 60°C operating temperature
ioLogik E2212: Active Ethernet micro controller with 8 digital inputs, 8 digital outputs, and 4 DIOs, -10 to 60°C operating temperature
ioLogik E2214: Active Ethernet micro controller with 6 digital inputs and 6 relay outputs, -10 to 60°C operating temperature
ioLogik E2240: Active Ethernet micro controller with 8 analog inputs and 2 analog outputs, -10 to 60°C operating temperature
ioLogik E2242: Active Ethernet micro controller with 4 analog inputs and 12 configurable DIOs, -10 to 60°C operating temperature
ioLogik E2260: Active Ethernet micro controller with 6 RTD inputs and 4 digital outputs, -10 to 60°C operating temperature
ioLogik E2262: Active Ethernet micro controller with 8 thermocouple inputs and 4 digital outputs, -10 to 60°C operating temperature
ioLogik E2210-T: Active Ethernet micro controller with 12 digital inputs and 8 digital outputs, -40 to 75°C operating temperature
ioLogik E2212-T: Active Ethernet micro controller with 8 digital inputs, 8 digital outputs, and 4 DIOs, -40 to 75°C operating temperature
ioLogik E2214-T: Active Ethernet micro controller with 6 digital inputs and 6 relay outputs, -40 to 75°C operating temperature
ioLogik E2240-T: Active Ethernet micro controller with 8 analog inputs and 2 analog outputs, -40 to 75°C operating temperature
ioLogik E2242-T: Active Ethernet micro controller with 4 analog inputs and 12 configurable DIOs, -40 to 75°C operating temperature
ioLogik E2260-T: Active Ethernet micro controller with 6 RTD inputs and 4 digital outputs, -40 to 75°C operating temperature
ioLogik E2262-T: Active Ethernet micro controller with 8 thermocouple inputs and 4 digital outputs, -40 to 75°C operating temperature

Accessories (can be purchased separately)

LDP1602: LCD module with 16 x 2 text and 5 buttons

LDP1602 LCD Module

Snap-on module for the ioLogik E2200/R2100 series

> Hot-pluggable display module for ioLogik Active Ethernet micro controllers
> Easy, portable configuration kit for IP display and configuration
> Direct display for analog value and digital input, counter status
> No battery required (powered through the I/O)

CE FC

16

Automation Controllers > LDP1602 LCD Module

∶ Installing the LCD Module

1. Remove the ioLogik's top cover.

2. Plug in the LCD module.

3. Check and configure the IP address.

4. Check IP and I/O status.

∶ Specifications

LCD Screen: 16 x 2 text display (in English)
Operating Temperature: 0 to 55°C (32 to 131°F)

Storage Temperature: -20 to 70°C (-4 to 158°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

∶ Ordering Information

LDP1602: LCD module with 16 x 2 text display and 5 buttons

Active OPC Server Lite

Seamlessly connect ioLogik to your SCADA system
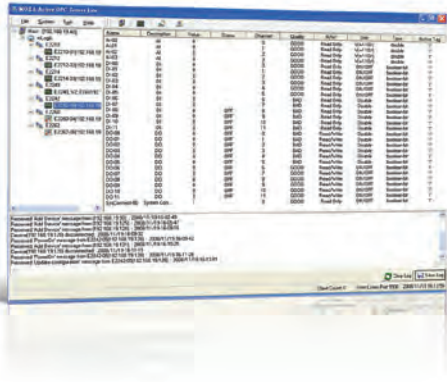
> OPC DA 3.0 supported

> Event-driven tag update
> • Save 80% on network bandwidth
> • I/O response that's 7 times faster

> Patented automatic tag generation

> Firewall-friendly connection from remote ioLogik devices
> • Allows remote I/O to use dynamic IP
> • Allows remote I/O to use private IP

> Download free from Moxa's website

: Introduction

Active OPC Server Lite is a software package provided by Moxa that operates as an OPC driver for an HMI or SCADA system. It offers seamless connection from Moxa's ioLogik series products to SCADA systems, including Wonderware, Citect, and iFix. Active OPC Server Lite meets the latest standard of OPC DA 3.0, which allows connections to various kinds of devices and host OPC machines.

Smart I/O Connection—Migrating from "Pull" to "Push"

General OPC servers typically use the "poll/response," or so-called "pull" architecture, to connect to Ethernet I/O devices, which involves an HMI/SCADA system continuously sending out commands to collect relevant data. Moxa's Active OPC Server, with its non-polling architecture, supports the standard OPC protocol, but also offers active (or "push") communication with Moxa's ioLogik series of Active Ethernet micro controllers to HMI/SCADA systems, providing instant I/O status reports.
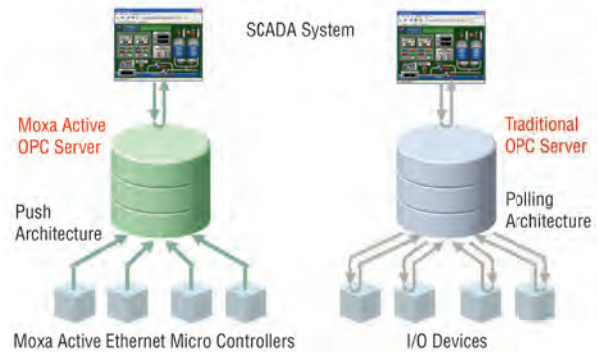
I/O Response that's 7 Times Faster and Provides 80% off Bandwidth Usage with Event-driven Tag Updates

Adding additional I/O channels will tend to bog down an HMI/SCADA system's operation, resulting in a longer response time and high network bandwidth occupation, all because of the traditional "pull" architecture. Active tags created by Active OPC Server Lite and ioLogik series products report the I/O status only when it changes. This type of event-driven tag status update results in an I/O response time that is 7 times faster than other OPC Server packages (using a testing environment with 2,560 I/O channels). In a different test of network bandwidth usage, Active OPC Server Lite and the ioLogik caused an apparent 80% reduction in network traffic. The end result is that I/O access is more precise, and the cost of communicating with remote I/O devices is substantially lower, especially when the remote site has limited bandwidth (e.g., satellite, microwave, and cellular communication). At the same time, the CPU usage of the SCADA/HMI system is also reduced by 35% with this innovative push-based architecture, so that less maintenance effort and lower level hardware devices can be implemented.

Critical Tests Say It Best

Test 1: Network Traffic Comparison
This test used 32 ioLogik E2210 units with 640 DI/O points. As shown in the figure, an Active Ethernet micro controller can save 80% on bandwidth consumption compared to passive Ethernet I/O.

Reduces Bandwidth Consumption by 80%
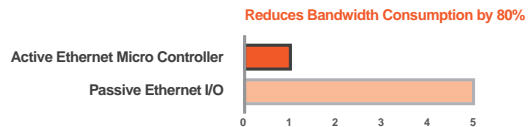
Test 2: I/O Status Response Time
This test used 128 ioLogik E2210 units with 2,560 I/O points. As shown in the figure, the active architecture is 7 times better than the passive architecture in response time when the I/O status changes.

7 Times Faster

Automation Controllers > Active OPC Server Lite

16

Dynamic IP/WAN Connection

Unlike the fixed IP requirements of Ethernet I/O with a traditional OPC server, Active OPC Server Lite and ioLogik products provide the flexibility of configuring the ioLogik to use dynamic IP addresses. The ioLogik connects directly to the Active OPC Server Lite instead of being polled, which makes dynamic IP addressing and WAN Access to the Ethernet I/O device possible, and adds even greater flexibility by allowing connections across firewalls. I/O devices for traditional data acquisition applications are not capable of using this approach.

OPC Server

General OPC Server
Polls continuously

Pull-based OPC Server

Local Network and Fixed IP Connection only

Remote I/O   Remote I/O   Remote I/O

MOXA OPC Server

Active OPC Server
No polling required

Router

Push-based Active OPC Server

Internet and Dynamic IP Connection

Router   ioLogik
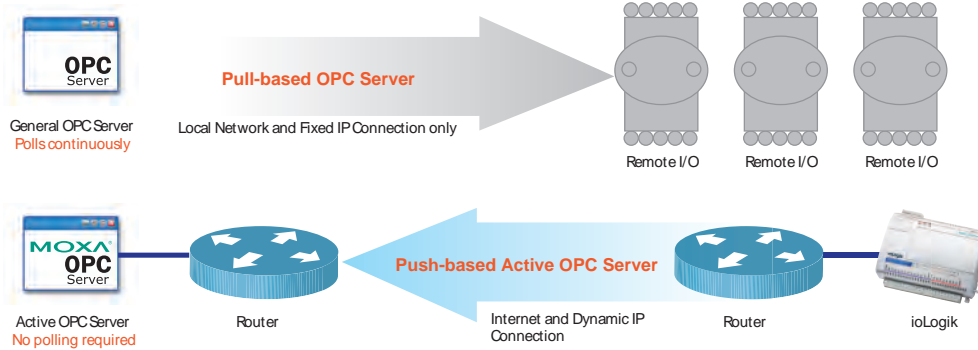
Automatic Tag Generation

Active OPC Server Lite and ioLogik series products support "Auto Tag Generation," which eliminates the headache of specifying target IP addresses, I/O channels, and data formats one by one, or editing and importing configuration text files, since Active OPC Server Lite creates the tags for the target ioLogik automatically. Simply select the channels that you need to update, and the tags are generated and configured automatically. Generally speaking, tag generation is 50 times faster with Active OPC Server Lite than with traditional OPC server packages. One of the biggest payoffs is that users will no longer need to be trained to install and configure your OPC.

OPC Server

General OPC Server

5 steps for channels, interfaces, and protocol definition: takes **20** seconds.

13 steps for device, IP address, and other communication parameters: takes **30** seconds.

1 step for checking the address table: takes **100** seconds.

It takes 2.5 min. to create only 1 tag

MOXA OPC Server

Active OPC Server

Select channels and press [Create Tags] button to update configuration: takes 5 seconds.

It takes 5 seconds to create 20 or more tags

ioLogik

Specifications

Hardware Requirements
CPU: Intel Pentium (Pentium 4 or above)
RAM: 512 MB (1024 MB recommended)
Network Interface: 10/100Mb Ethernet

Software Requirements
Operating System: Microsoft Windows 2000/XP/2003
Editor (optional): Microsoft Office 2003 (Access 2003) or above

OPC Server Specifications
OPC Data Access: 1.0a, 2.0, 2.05a, 3.0
Max. No. of Tags: 1,024 (V1.7 and above)

Ordering Information

Available Models
Active OPC Server Lite: Free software package for integrating with SCADA/HMI systems
Can be used with the following products
ioLogik E1200 Series: Remote Ethernet I/O
ioLogik E2200 Series: Active Ethernet micro controller
ioLogik E4200: Modular Active Ethernet micro controller
ioLogik W5300 Series: Active GPRS micro controller

16

Automation Controllers › Active OPC Server Lite

Click&Go™

Easy and intuitive I/O control configuration for the ioLogik Active Ethernet micro controllers
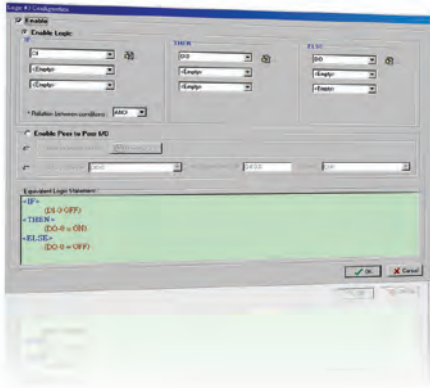
> PC-free solution with local intelligence
> Programming-free IF-THEN-ELSE logic reduces setup time
> Time-based scheduler and timer control
> Input-to-output control over IP with peer-to-peer and remote action

: Introduction

PC-free Alarm and Control Solution

Moxa's own Click&Go™ logic turns your ioLogik E2200 series, E4200, or W5300 series product into a compact and powerful RTU by allowing you to configure basic input to output controls, even if you have no programming knowledge. Click&Go™ is such a powerful software solution that when used with the ioLogik series products, Click&Go™ enables these remote I/O units with local control capability, without the need for a remote PC, or to keep operating when the remote PC or the network is down. Besides the basic local I/O control, alarm messages such as SNMP traps, TCP/UDP messages, e-mails and CGI commands can be triggered when there is an event.

Set Up Your System with Just a Few Clicks

Click&Go™ is a programming-free function set solution that displays the control options you need in an easy to access drop-down menu. This means that you are never more than a few mouse clicks away from getting your system set up and ready to go without a compiler or a debugger. Click&Go™'s intuitive IF-THEN-ELSE logic shortens the learning curve and deployment time.
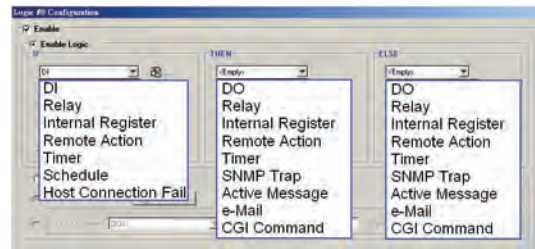
Active Reporting Makes Your Monitoring System Real-time

Click&Go™ is designed to provide a simple configuration platform and real-time monitoring capability. For any alarm system, fast response and real-time monitoring is very important. Click&Go™ supports various active communication methods, including TCP, UDP, SNMP Trap, email, and CGI commands, making it very easy to integrate Click&Go™ with any monitoring system. Click&Go™ also supports SNTP for time alignment, making sequential and historical alarm tracking possible. In addition, users can define the content of alarm messages themselves, making Click&Go™ a perfect solution for system users.
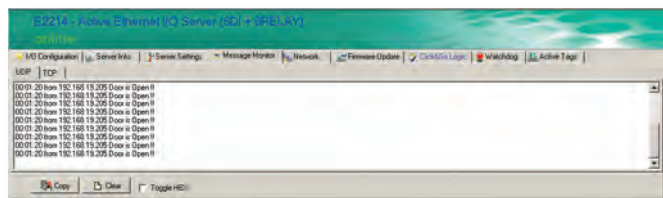
Click&Go™ Provides a Time-based Scheduler and Timer Control

Click&Go™ can be scheduled to perform user defined tasks such as output control, remote actions, and active messaging. This function is useful when applied to energy savings, lighting control, and water pumping systems. The timer function allows users to set a delay period for actions, which is particularly useful when used with alarm systems for which users need an authentication period to avoid false alarms.
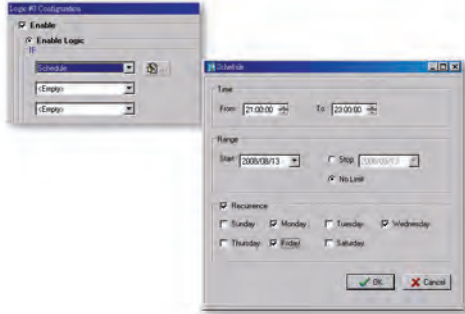
Click&Go™ Function Comparison

Click&Go™ now supports the ioLogik E2200, E4200, and W5300 series; a detailed function support comparison is shown in the table below.

Function Support Comparison			
	ioLogik E2200	ioLogik E4200	ioLogik W5300
No. of Rules	24	80	24
Input Monitor and Output Control	✓	✓	✓
Remote Action	✓	✓	–
CGI Commands	✓	–	–
Timer Trigger	✓	✓	✓
Schedule	✓	✓	✓
No. of Internal Registers	24	80	24
Timer	✓	✓	✓
Peer-to-Peer	✓	–	–
Active Reporting	✓	✓	✓
SMS Messages	–	✓ (GPRS modem required)	✓
Email	✓	✓	✓
SNMP Trap	✓	✓	✓
TCP/UDP Messages	✓	✓	✓

Input-to-Output Control over IP Networks (Remote Action)

Click&Go™ enables direct input-to-output control over IP networks, without the need for additional PCs. That is, when used in pairs, the ioLogik E2200 units can talk directly to each other, and digital inputs can be reproduced at a remote location over the network. Local analog inputs can also be referenced for remote digital outputs. A typical application can be found in water pumping systems where analog inputs that measure the water level are referenced to activate the pumps' On/Off control. By cross referencing the scheduler, less energy will be used to operate the water pumping system.

Energy Savings for Water Pumping Systems

Water Level Sensor

AI

ioLogik E2240
Ethernet

ioLogik E2210

DO

16

Automation Controllers > Click&Go™
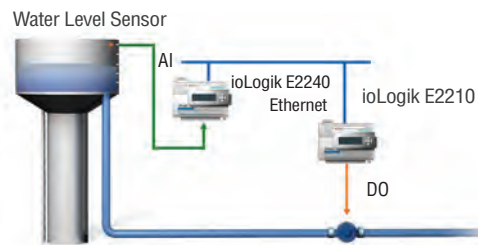
This page intentionally left blank.

Remote I/O

Stand-alone I/Os

Model	ioLogik E1210	ioLogik E1211	ioLogik E1212	ioLogik E1214	ioLogik E1240
Category	Remote Ethernet I/O	Remote Ethernet I/O	Remote Ethernet I/O	Remote Ethernet I/O	Remote Ethernet I/O
Comm. Interface	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports
I/O Combination	16 DIs	16 DOs	8 DIs, 8 DIOs	6 DIs, 6 Relays	8 AIs
Control Protocol	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server

Model	ioLogik E1241	ioLogik E1242	ioLogik E1260	ioLogik E1262
Category	Remote Ethernet I/O	Remote Ethernet I/O	Remote Ethernet I/O	Remote Ethernet I/O
Comm. Interface	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports	10/100 Ethernet, two switch ports
I/O Combination	4 AOs	4 AIs, 4 DIs, 4 DIOs	6 RTDs	8 TCs
Control Protocol	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server	Modbus/TCP, OPC Server

Model	ioLogik R2110	ioLogik R2140
Category	RS-485 I/O	RS-485 I/O
Comm. Interface	RS-485	RS-485
I/O Combination	12 DIs, 8 DOs	8 AIs, 2 AOs
Control Protocol	Modbus/RTU	Modbus/RTU

Modular I/Os

Model	NA-4010	NA-4020	NA-4021
Category	Modular Ethernet I/O	Modular Serial I/O	Modular Serial I/O
Comm. Interface	10/100 Ethernet	RS-485	RS-232
Max. Expansion Capacity	31 slices	31 slices	31 slices
Control Protocol	Modbus/TCP	Modbus/RTU	Modbus/RTU

Remote I/O > Product Selection Guides

17

Introduction to Remote I/O Solutions

Remote I/O modules are an important part of industrial automation networks, with modules available for transmitting both analog and digital signals. Remote I/O modules connect to a broad array of industrial sensors, alarms, and tools and are key mediators in process control. These versatile modules can process commands from remote controls while negotiating conversions between analog waveforms into digital values to perform important actions such as setting the voltage, triggering lights and alarms, adjusting a valve, or measuring the temperature. With their versatility, remote I/O devices can be used in a wide range of scenarios throughout the production line, plant floor, or even remote sites. Moxa offers three different remote I/O products: the ioLogik E1200 series of stand-alone remote Ethernet I/O products, the ioLogik R2100 series of stand-alone RS-485 I/O products, and the ioLogik 4000 series modules.

: Overview of Distributed Ethernet Data Acquisition Systems

Because of their versatility, Ethernet infrastructures are now widely used in industrial settings for automation, process control, and monitoring. An Ethernet infrastructure can support various communication protocols, allowing systems from different manufacturers to be connected. But industrial Ethernet provides more than just interoperability. It also enhances the overall performance of networks, allows for long-distance wiring, and increases bandwidth. Ethernet technology enables highly distributed systems, or even systems with remote monitoring. In addition, bandwidth can be increased since the performance is shared by several controllers, and there is greater flexibility since sensors do not need to be connected to a specific controller.

Web Server

Company Management

MTU

HMI

Leak/Pressure Detection System

Master Station
- MTU, PAC Controller
- HMI
- SCADA Software

Tank Farm

RTU

RTU

I/O

RTU

I/O

Communication Network
- Ethernet, TCP/IP
- Wireless, Cellular

Boost Station

Local Control
- RTU, PAC/Micro Controller
- Remote I/O
- Data Logger

Valve Station

Terminal Station
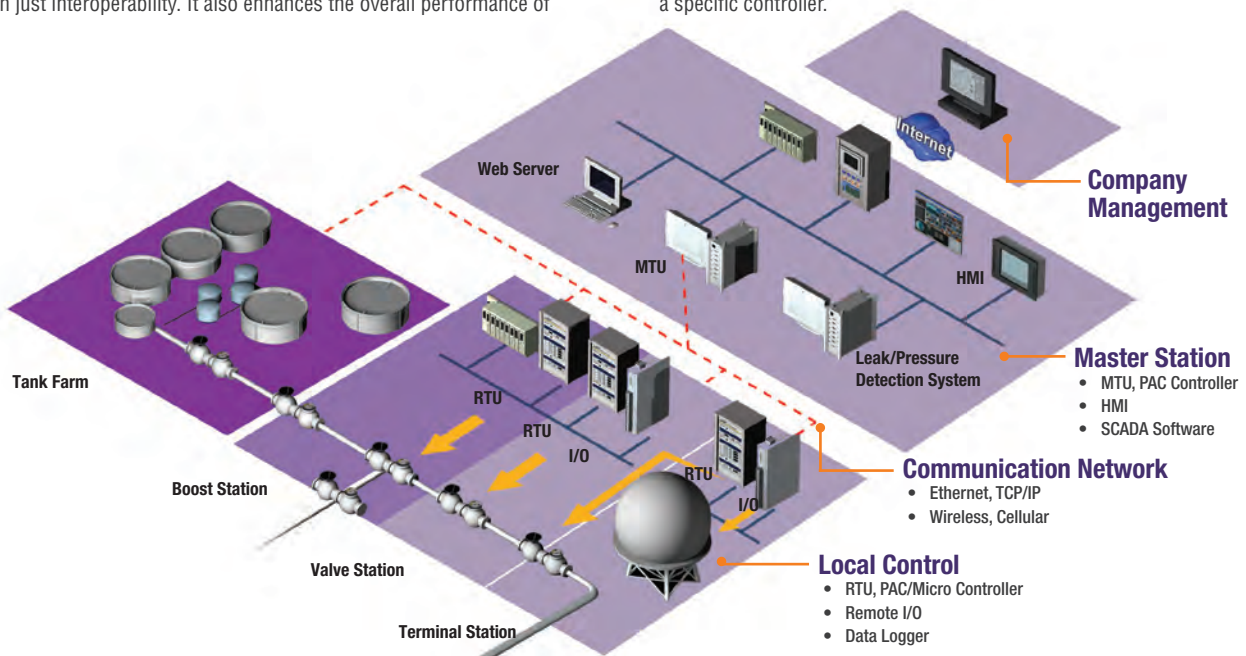
A distributed data acquisition system can be divided into three layers: the master station layer, the communication layer, and the local control layer. The master station offers visualized monitoring, logging, and trend analysis via a SCADA (supervisory control and data acquisition) system. The local control layer includes the field controllers, remote

I/O, switches, and sensors that perform real-time data collection and output control. The communication layer, including field buses, describes the hardware and software communication between the SCADA system and the remote I/O devices and sensors.
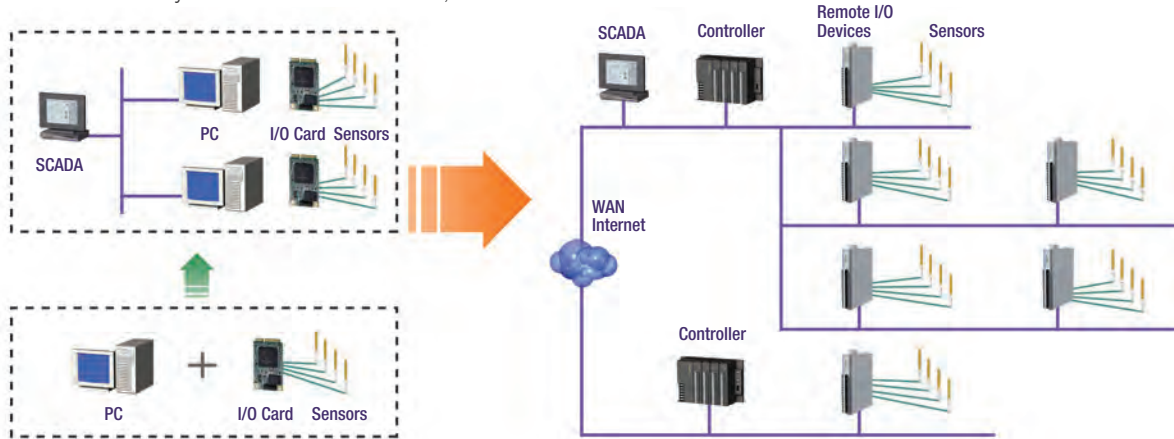
Changing a Data Acquisition System from Centralized to Distributed, and from Local to Remotely Monitored

Local Control Level Topology—Conserve Cables with Daisy-chain Ethernet

To maximize cabling efficiency, devices with built-in Ethernet switches can create daisy-chain topologies at the local control level. This reduces the length of cable required, and eliminates points of system failure by replacing external switches.

Studies have shown that on a $300,000 project, the total cost of ownership can be cut by up to 15% by daisy-chaining devices.
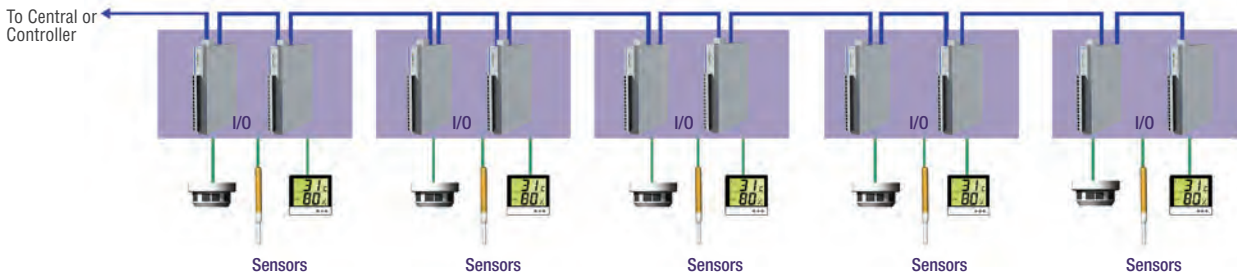
Daisy-chain Topology

Redundant Ring for the Master Station and Daisy-chain at the Local Control Layer

An optimal Ethernet data acquisition system will mix and match different network topologies for the perfect balance of features and costs at every level. Moxa's solution involves two components: a primary ring topology infrastructure using managed switches

designed for reliable redundant communications, which includes the SCADA PC and controllers, and field devices connected with a daisy-chain topology, which overcomes cabling problems and saves a significant amount on implementation costs.
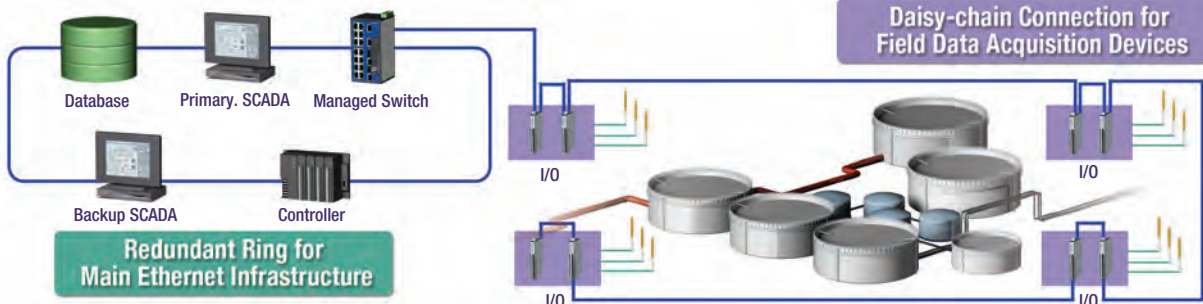
Best Wiring Approach: Redundant Ring for the Main Infrastructure and Daisy-chain at the Device Level

⦂ Modbus Control Protocol

Modbus is a communication protocol published by Modicon in 1979 for use with its PLC (programmable logic controller). It has become a defacto standard industrial communication protocol for many automation applications. This royalty-free, openly published protocol is now the most commonly used method for connecting industrial electronic devices. Modbus allows for communications between controllers and remote I/O modules that connect to both legacy RS-485 devices and the Ethernet network, and perform easy and fast deployment of data collection and remote output control.

⦂ Active OPC Server Lite

OPC is a series of standards developed by an industry task force including Microsoft and many international automation suppliers, such as Rockwell, Siemens AG, and Intellution. The core of OPC is Microsoft's OLE COM (component object model) and DCOM (distributed component object model) technologies, which provide a common method for data exchange between programs, or use a "Network Neighborhood" to browse a folder remotely on the network. The OPC Server package can be installed where the OPC Client is located, or anywhere on the local network. This COM/DCOM framework has defined a standard set of objects, interfaces, and methods to facilitate interoperability in process control and manufacturing automation. OPC compliant software (SCADA) and hardware (device package) allow industrial devices to seamlessly communicate with the central monitoring software. For SCADA/HMI developers, this means the OPC Client can now be built in as a standard driver to communicate with network devices, making it easier to support meters, process controllers, alarms, and I/O devices. For device manufacturers, providing an OPC Server solution along with their products allows for interoperability with SCADA, which account for over 80% of data acquisition applications.
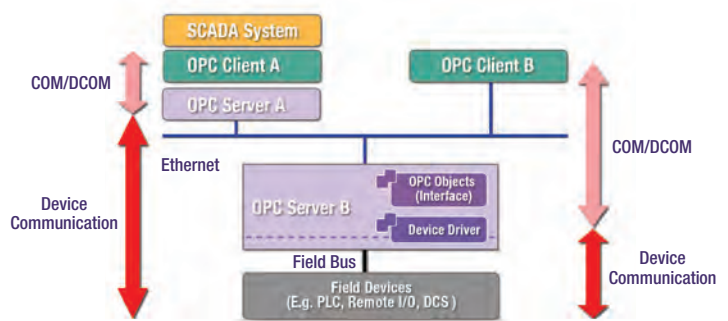
⦂ Push-based Active OPC Server

Moxa offers breakthrough push-based OPC Server technology that solves several common problems of traditional data acquisition. Active OPC Server Lite dramatically improves response time, bandwidth efficiency, IP flexibility, device connectivity, and deployment and training costs compared to conventional OPC solutions.

Push for Tag Installation

An Active OPC Server can generate tags and send necessary information to target devices automatically without requiring you to specify IP addresses, I/O channels, and data formats one by one, or edit and import configuration text files. In this push-based architecture, a single click "pushes" the installation profile from the device itself to the OPC Server so you do not need to search for devices on the network or pore over user's manuals to find detailed address definitions. It takes most users two to three minutes to create tags using a traditional OPC Server, and 60% of that time is wasted looking up details in user's manuals. By using Active OPC Server's push technology, you can generate all the tags you need in seconds—no questions asked.

17

Remote I/O > Introduction to Remote I/O Solutions
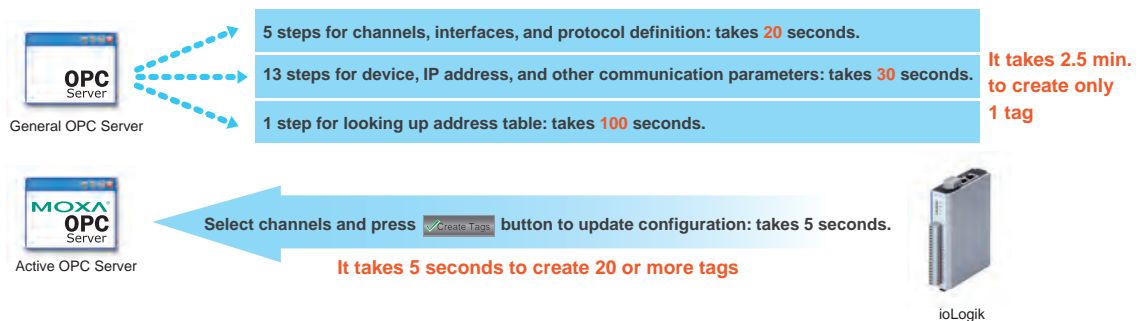
Push for Flexible Device Connectivity

A fixed IP address is an absolute requirement for remote field devices on conventional Ethernet and TCP/IP networks. This creates severe difficulties when deploying mobile devices that are usually assigned dynamic IP addresses because they are constantly moving, such as in hospital or factory floor applications. Obtaining fixed addresses for these devices would be cost-prohibitive.

An Active OPC Server bypasses this dilemma entirely. The Active OPC Server acts as a Web server to provide access to remote devices regardless of their IP addresses. This push-based algorithm allows the field devices to be anywhere on the network, even with a constantly changing IP address, making the OPC to field device connection Internet/WAN and firewall friendly. Traditional OPC Servers, especially those used for data acquisition applications, lack this capability.

OPC Server
General OPC Server
Polls continuously

Pull-based OPC Server
Local Network and Fixed IP Connection only

Remote I/O Remote I/O Remote I/O

MOXA OPC Server
Active OPC Server
No polling required

Router

Push-based Active OPC Server

Internet and Dynamic IP Connection

Router ioLogik
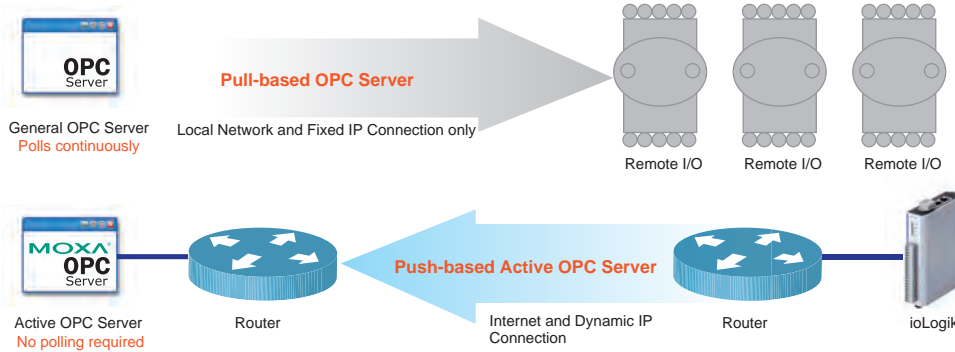
Push for Status Updates

Most Ethernet fieldbus protocols, such as Modbus/TCP, designate "master" and "slave" devices. Slave devices respond to queries, or "polls," from the master. As the number of the devices and channels increase, CPU load rises and more bandwidth is consumed, creating longer response times when conducting an entire polling cycle. Using push technology for tag status updates can go a long way in solving this problem. Instead of polling and waiting for a timeout or a response from a traditional OPC Server, an Active OPC Server simply waits for remote devices to send updates when an exception (such as change of status, or when a pre-defined threshold, limit, or schedule is reached) occurs. As a result, Active OPC Server reduces response time and CPU use through push-based, event-driven, and periodic data updates.

Performance tests have revealed that using Active OPC Server and this "Push" architecture result in an I/O response time that is 7 times faster than other OPC Server packages (using a testing environment with 2,560 I/O channels). In a different test of network bandwidth usage, combining Active OPC Server and the field device caused an apparent 80% reduction in network traffic. The end result is that I/O access is more precise, and the cost of communicating with remote I/O devices is substantially lower, especially when the remote site has limited bandwidth (e.g., satellite, microwave, and cellular communication). At the same

time, the CPU usage of the SCADA/HMI system is also reduced by 35% so that less maintenance effort and lower level hardware devices can be implemented.

Critical Tests Say It Best

Test 1: Network Traffic Comparison
This test used 40 ioLogik E1200 units with 640 DI/O points. As shown in the figure, ioLogik can save 80% on bandwidth consumption compared to passive Ethernet I/O.

Reduce Bandwidth Consumption by 80%

Moxa ioLogik Ethernet I/O
General Ethernet I/O

0 1 2 3 4 5
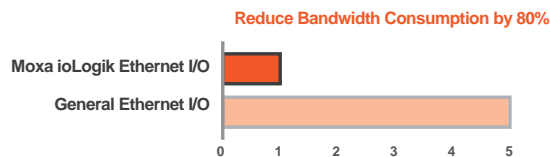
Test 2: I/O Status Response Time
This test used 160 ioLogik E1200 units with 2,560 I/O points. As shown in the figure, the active architecture is 7 times better than the passive architecture in response time when the I/O status changes.

7 Times Faster

Moxa ioLogik Ethernet I/O
General Ethernet I/O

0 1 2 3 4 5 6 7
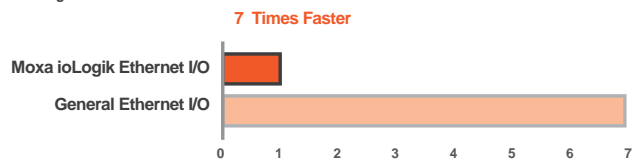
Smart I/O Connectivity

Several approaches are available for controlling the ioLogik E1200 over an Ethernet network. As a traditional I/O solution, the ioLogik E1200 allows a central SCADA system or field controller to poll the I/O channel status via the standard Modbus/TCP protocol. Aside from the default fixed Modbus/TCP address, the ioLogik E1200 allows you to define the address yourself for greater flexibility. In addition, the

MXIO (.NET) library makes it easy for programmers to deploy their own software on the ioLogik in the field. Moreover, the ioLogik E1200 can leverage the benefits of the active technology of the ioLogik E2000 series with the free Active OPC Server package to seamlessly connect to any Windows-based SCADA system.
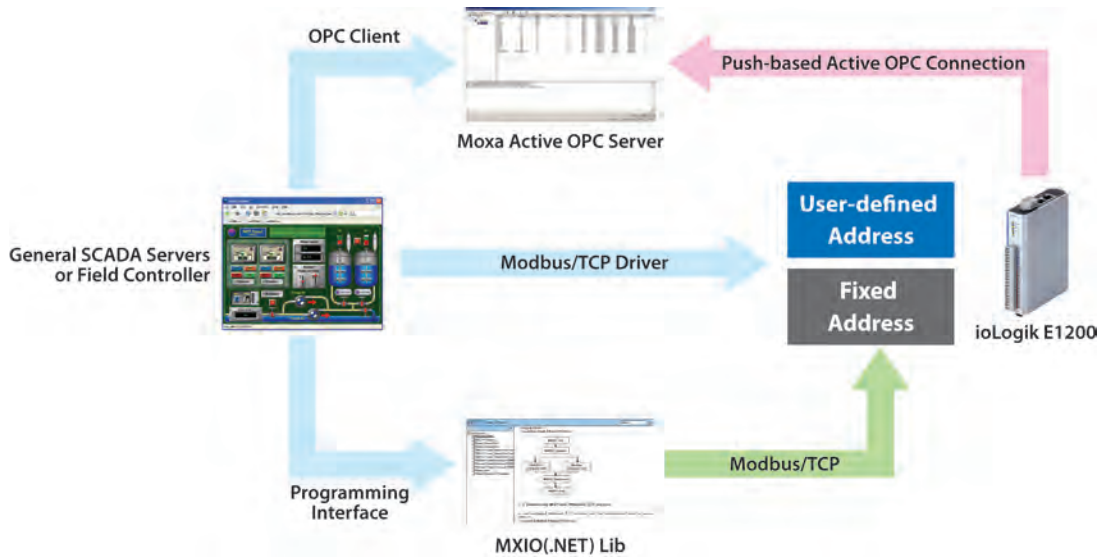
Easy Maintenance

ioLogik 4000 products provide spring type, removable terminal blocks (RTBs) that allow you to preserve field wiring before replacing an I/O

expansion module. Each I/O expansion module can be replaced quickly and easily.

Slice Type I/O Modules
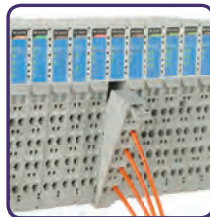
Removable Terminal Block

Spring Type Terminal Block

Module Coding Tag

The ioLogik E1200 is designed with a vertical form factor, and can be used with both DIN-Rail and wall mounting. A stress-relief connector

at the bottom of the ioLogik E1200 prevents the wiring from being inadvertently pulled out.

DIN-Rail Mounting

Wall Mounting

Stress-relief Connector

ioLogik E1200 Series

Remote Ethernet I/O with 2-port Ethernet switch

> Built-in 2-port Ethernet switch for daisy-chain topologies
> Free support of Moxa's push-based Active OPC Server Lite
> ▪ Seamlessly connect to any SCADA system
> ▪ Save 80% on network bandwidth
> ▪ I/O response that's seven times faster
> User-defined Modbus/TCP addressing
> MXIO programming library for Windows and WinCE VB/VC.NET and Linux C APIs
> Web configuration with Import/Export function

: Introduction

Daisy-chained Ethernet I/O Connection

A new daisy-chained Ethernet I/O concept is now available. The ioLogik E1200 industrial remote Ethernet I/O has two embedded Ethernet switch ports that allow information to flow to another local Ethernet device or connect to the next ioLogik in the daisy-chain. Applications such as factory automation, security and surveillance systems, and tunnel monitoring, can make use of daisy-chained Ethernet for building multi-drop I/O networks over standard Ethernet cables. Many industrial automation users are familiar with the multi-drop configuration

typically used in fieldbus applications. The daisy-chain function on the remote Ethernet I/O ioLogik E1200 not only increases the connection between machines and panels, but also lowers the cost of buying separate Ethernet switches, and at the same time reduces labor fees and cabling by a large percentage. For example, if a production facility contains 700 stations (20 points per station), the wiring cost reduction can reach 15% of the total implementation cost.
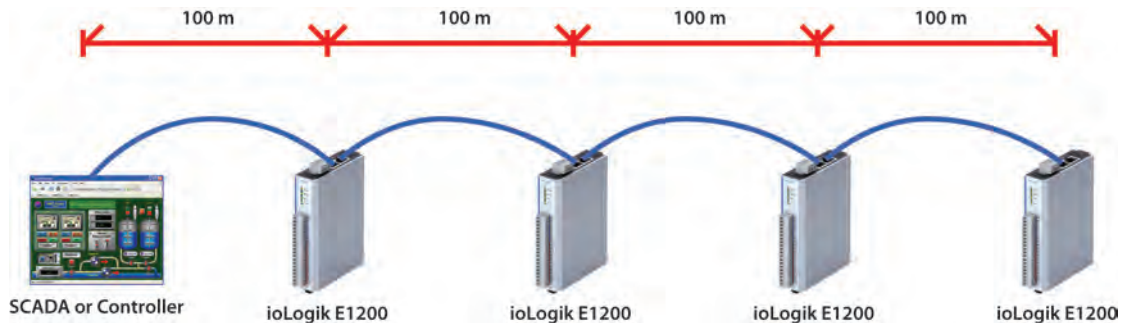
ioLogik E1200 Series Selection Table

Models	I/O Combinations							
	Digital Inputs	Digital Outputs	Analog Inputs	Analog Outputs	RTD Inputs	TC Inputs	Relay Outputs	Configurable DIOs
ioLogik E1210	16	–	–	–	–	–	–	–
ioLogik E1211	–	16	–	–	–	–	–	–
ioLogik E1212	8	–	–	–	–	–	–	8
ioLogik E1214	6	–	–	–	–	–	6	–
ioLogik E1240	–	–	8	–	–	–	–	–
ioLogik E1241	–	–	–	4	–	–	–	–
ioLogik E1242	4	–	4	–	–	–	–	4
ioLogik E1260	–	–	–	–	6	–	–	–
ioLogik E1262	–	–	–	–	–	8	–	–

⋮ ioLogik E1210 Specifications

Digital Input
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter
Dry Contact:
• Logic 0: short to GND
• Logic 1: open

Wet Contact:
• Logic 0: 0 to 3 VDC
• Logic 1: 10 to 30 VDC (DI COM to DI)
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 250 Hz, power off storage

⋮ ioLogik E1211 Specifications

Digital Output
I/O Mode: DO or Pulse Output
Pulse Wave Width/Frequency: 1 ms/500 Hz
Over-voltage Protection: 45 VDC

Over-current Limit: 600 mA per channel
Over-temperature Shutdown: 175°C (typical), 150°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

⋮ ioLogik E1212 Specifications

Digital Input
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:
• Logic 0: 0 to 3 VDC
• Logic 1: 10 to 30 VDC (DI COM to DI)
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 250 Hz, power off storage

Digital Output
I/O Mode: DO or Pulse Output
Pulse Wave Width/Frequency: 1 ms/500 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 600 mA per channel
Over-temperature Shutdown: 175°C (typical), 150°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

⋮ ioLogik E1214 Specifications

Digital Input
Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter
Dry Contact:
• Logic 0: short to GND
• Logic 1: open
Wet Contact:
• Logic 0: 0 to 3 VDC
• Logic 1: 10 to 30 VDC (DI COM to DI)
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 250 Hz, power off storage

Relay Output
Type: Form A (N.O.) relay outputs, 5A
Contact Rating: 5 A @ 30 VDC, 5 A @ 250 VAC, 5 A @ 110 VAC
Inductance Load: 2 A
Resistance Load: 5 A
Breakdown Voltage: 500 VAC
Relay On/Off Time: 1500 ms (Max.)
Initial Insulation Resistance: 1G min. @ 500 VDC
Expected Life: 100,000 times (Typical)
Initial Contact Resistance: 30 milli-ohms (Max.)
Pulse Output: 0.3 Hz at rated load

⋮ ioLogik E1240 Specifications

Analog Input
Type: Differential input
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: 0 to 10 VDC, 4 to 20 mA

Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Sampling Rate (all channels): 12 samples/sec
Input Impedance: 10M ohms (minimum)
Built-in Resistor for Current Input: 120 ohms

⋮ ioLogik E1241 Specifications

Analog Output
Resolution: 12 bits
Output Range: 0 to 10 VDC, 4 to 20 mA
Voltage Output: 10 mA (Max.)

Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Load Resistor:
• Internal power: 400 ohms
• External 24V power: 1000 ohms

17

Remote I/O > ioLogik E1200 Series

⠿ ioLogik E1242 Specifications

Analog Input

Type: Differential input
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: 0 to 10 VDC, 4 to 20 mA
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Sampling Rate (all channels): 12 samples/sec
Input Impedance: 10M ohms (minimum)
Built-in Resistor for Current Input: 120 ohms

Digital Input

Sensor Type: NPN, PNP, and Dry contact
I/O Mode: DI or Event Counter
Dry Contact:
• Logic 0: short to GND
• Logic 1: open

Wet Contact:
• Logic 0: 0 to 3 VDC
• Logic 1: 10 to 30 VDC (DI COM to DI)
Isolation: 3K VDC or 2K Vrms
Counter/Frequency: 250 Hz, power off storage

Digital Output

I/O Mode: DO or Pulse Output
Pulse Wave Width/Frequency: 1 ms/500 Hz
Over-voltage Protection: 45 VDC
Over-current Limit: 600 mA per channel
Over-temperature Shutdown: 175°C (typical), 150°C (min.)
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms

⠿ ioLogik E1260 Specifications

RTD

Input Type: PT50, PT100, PT200, PT500, PT1000;
Resistance of 10 ohms, 20 ohms, and 100 ohms
Sampling Rate: 12 samples/sec (all channels)
Resolution: 16 bits

Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Input Impedance: 625K ohms

⠿ ioLogik E1262 Specifications

Thermocouple Input

Sensor Type: J, K, T, E, R, S, B, N
Mili Volt Type: ±78.126 mV, ±39.062 mV, ±19.532 mV
Fault and Overvoltage protection: ±35 VDC (power off); +30 VDC, -25 VDC (power on)
Sampling Rate: 12 samples/sec (all channels)

Resolution: 16 bits
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Input Impedance: 10M ohms

⠿ Common Specifications

LAN

Ethernet: 2 x 10/100 Mbps switch ports, RJ45
Protection: 1.5 KV magnetic isolation
Protocols: Modbus/TCP, TCP/IP, UDP, DHCP, Bootp, HTTP

Power Requirements

Power Input: 24 VDC nominal, 12 to 36 VDC
Power Consumption: 130 mA typical @ 24 VDC

Physical Characteristics

Wiring: I/O cable max. 14 AWG
Dimensions: 27.8 x 124 x 84 mm (1.09 x 4.88 x 3.31 in)
Weight: under 200 g

Environmental Limits

Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

EMI: FCC Part 15, CISPR (EN55022) class A
EMS: IEC 61000-4, IEC 61000-6
Safety: UL508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 2 years
Details: See www.moxa.com/warranty

Dimensions

Front View   Side View   Rear View

Top View

Down View

124.0 mm (4.9 in)
132.0 mm (5.2 in)

84.0 mm (3.3 in)

27.0 mm (1.1 in)

27.8 mm (1.1 in)
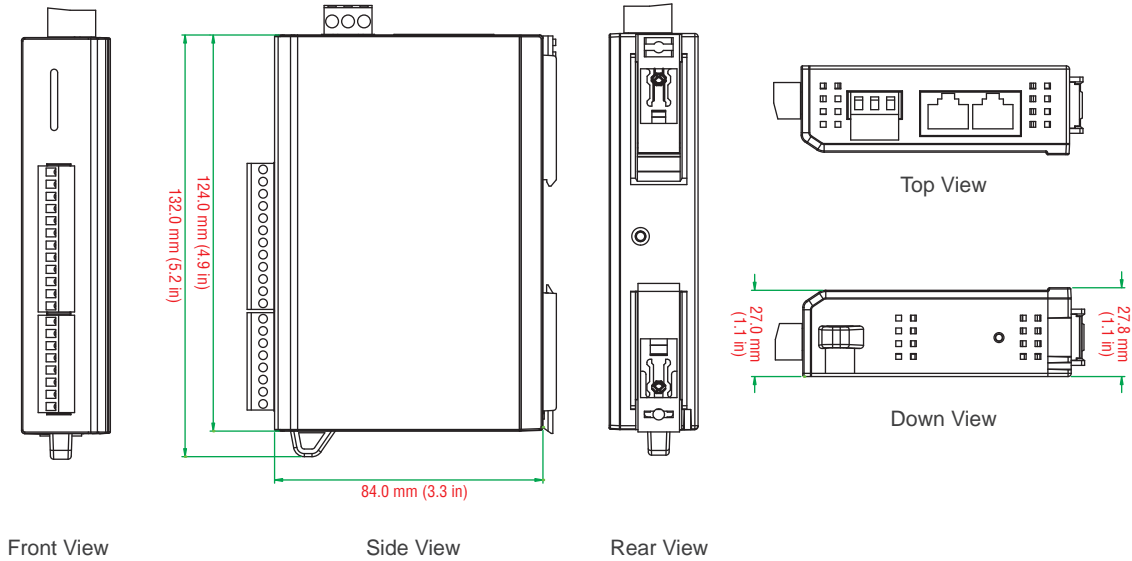
: Ordering Information

Available Models

ioLogik E1210: Remote Ethernet I/O with 2-port Ethernet switch and 16 DIs
ioLogik E1211: Remote Ethernet I/O with 2-port Ethernet switch and 16 DOs
ioLogik E1212: Remote Ethernet I/O with 2-port Ethernet switch, 8 DIs, and 8 DIOs
ioLogik E1214: Remote Ethernet I/O with 2-port Ethernet switch, 6 DIs, and 6 Relays
ioLogik E1240: Remote Ethernet I/O with 2-port Ethernet switch and 8 AIs
ioLogik E1241: Remote Ethernet I/O with 2-port Ethernet switch and 4 AOs
ioLogik E1242: Remote Ethernet I/O with 2-port Ethernet switch, 4 AIs, 4 DIs, and 4 DIOs
ioLogik E1260: Remote Ethernet I/O with 2-port Ethernet switch and 6 RTDs
ioLogik E1262: Remote Ethernet I/O with 2-port Ethernet switch and 8 TCs

17

Remote I/O > ioLogik E1200 Series

ioLogik R2110

RS-485 remote I/O with 12 digital inputs and 8 digital outputs

> 12-channel 24 VDC digital inputs with DI Event Counter mode, and software selectable filtering time
> 8-channel 24 VDC digital outputs with pulse output mode and software selectable pulse width
> LED indicators for all I/O channels
> Over-temperature protection (up to 175°C)
> Over-current protection (400-mA/channel)
> Easy-to-use, quick programming library for VB, VC++, BCB, .NET
> Firmware upgradable over RS-485

: Specifications

Serial Communication
Interface: RS-485-2w: Data+, Data-, GND
Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters
Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: None
Baudrate: 1200 to 115200 bps
Protocol: Modbus/RTU

Digital Input
Channels: 12, source type
I/O Mode: DI or Event Counter (up to 50 Hz)
Dry Contact:
Logic 0: short to GND
Logic 1: open
Wet Contact:
Logic 0: 0 to 3 VDC
Logic 1: 10 to 30 VDC
(DI COM to DI)
Common Type: 12 points per COM
Isolation: 3K VDC or 2K Vrms

Digital Output
Channels: 8, sink type, 36 VDC, 200 mA
I/O Mode: DO or Pulse Output (up to 50 Hz)
Output Current Rating: Max. 200 mA per channel
Isolation: 3K VDC or 2K Vrms
Output Frequency: 50 Hz

Power Requirements
Power Input: 24 VDC nominal, 12 to 48 VDC
Power Consumption: 282 mA typical @ 24 VDC

Physical Characteristics
Wiring: I/O cable max. 14 AWG
Dimensions: 115 x 79 x 45.6 mm (4.53 x 3.11 x 1.80 in)
Note: Please see page 16-22 for this product's dimensions diagram.
Weight: 200 g

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
EMI: FCC Part 15, CISPR (EN55022) class A
EMS: IEC 61000-4, IEC 61000-6
Safety: UL508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 2 years
Details: See www.moxa.com/warranty

: Ordering Information

ioLogik R2110: RS-485 remote I/O with 12 digital inputs and 8 digital outputs
LDP1602: LCD module with 16 x 2 text display and 5 buttons

ioLogik R2140

RS-485 remote I/O with 8 analog inputs and 2 analog outputs

> 8 analog input channels for millivolts (mV), voltage, and current signal with wire-off detection (at 4 to 20 mA)
> 2-channel analog outputs for voltage, current actuator control
> 16-bit resolution analog inputs, 12-bit resolution analog output
> Easy-to-use, quick programming library for VB, VC++, BCB, .NET
> NIST-Traceability calibration for analog I/O channels
> Firmware upgradable over RS-485

: Specifications

Serial Communication
Interface: RS-485-2w: Data+, Data-, GND
Serial Line Protection: 15 KV ESD for all signals

Serial Communication Parameters
Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: None
Baudrate: 1200 to 115200 bps
Protocol: Modbus/RTU

Analog Input
Channels: 8, sink type, 45 VDC, 200 mA
Resolution: 16 bits
I/O Mode: Voltage / Current
Input Range: ±150 mV, ±500 mV, ±5 V, ±10 V, 0 to 20 mA, 4 to 20 mA
Data Format: 16-bit integer
Accuracy:
±0.1% FSR @ 25°C
±0.3% FSR @ -10 and 60°C
Sampling Rate (all channels):
10 samples/sec (voltage)
6 samples/sec (current)
Built-in Resistor for Current Input: 106 ohms
CMR @ 50/60 Hz: 95 dB min.
Isolation: 3K VDC or 2K Vrms

Analog Output
Channels: 2
Resolution: 12 bits
Output Range: 0 to 10 V, 4 to 20 mA
Drive Voltage: 15 VDC for current output

Accuracy:
±0.1% FSR @ 25°C,
±0.3% FSR @ -10 and 60°C
Zero Drift: ±9 µV/°C
Span Drift: ±25 ppm/°C
Load Resistor: Less than 250 ohms

Power Requirements
Power Input: 24 VDC nominal, 12 to 48 VDC
Power Consumption: 282 mA typical @ 24 VDC

Physical Characteristics
Wiring: I/O cable max. 14 AWG
Dimensions: 115 x 79 x 45.6 mm (4.53 x 3.11 x 1.80 in)
Note: Please see page 16-22 for this product's dimensions diagram.
Weight: 200 g

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
EMI: FCC Part 15, CISPR (EN55022) class A
EMS: IEC 61000-4, IEC 61000-6
Safety: UL508
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 2 years
Details: See www.moxa.com/warranty

: Ordering Information

ioLogik R2140: RS-485 remote I/O with 8 analog inputs and 2 analog outputs
LDP1602: LCD module with 16 x 2 text display and 5 buttons

NA-4010 and NA-4020/4021 Series

Ethernet and RS-232/485 network adaptors

NA-4010
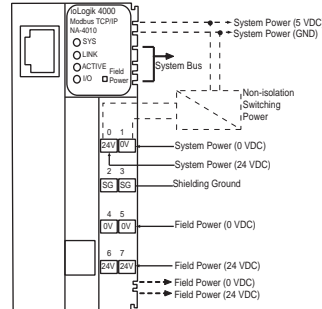
NA-4020/4021
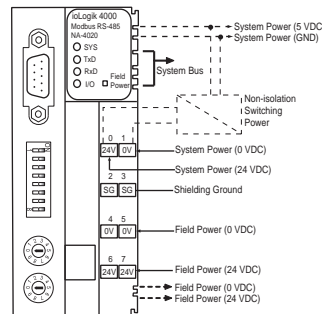
: NA-4010 Specifications

LAN
Ethernet: 1 x 10/100 Mbps, RJ45
Software Features
Protocols: Modbus/TCP, HTTP, Bootp
IP Settings: ARP, Bootp, static IP
Programming Library: MXIO DLL library for Windows supporting Visual Basic, Visual C++, Borland C++ Builder, .NET
Number of I/O Modules Supported: Max. of 32

Power Requirements
Power Input: 11 to 28.8 VDC, 24 VDC typical
Power Consumption: 60 mA typical @ 24 VDC
Current for I/O Modules: Max. 1.5 A @ 5 VDC

: NA-4020/4021 Specifications

Serial Communication Parameters
Parity: None, Even, Odd
Data Bits: 7, 8
Stop Bits: 1, 2
Baudrate: 1200 to 115200 bps
Signals:
• NA-4020: Data+, Data-, Gnd, DIR
• NA-4021: TxD, RxD, Gnd
Software Features
Protocols: Modbus/RTU, Modbus/ASCII
Modbus Address: 00 to 99 (set by rotary switches)

Programming Library: MXIO DLL library for Windows; Supports Visual Basic, Visual C++, Borland C++ Builder, .net, VB/VC.NET
Number of I/O Modules Supported: Max. of 32
Power Requirements
Power Input: 11 to 28.8 VDC, 24 VDC typical
Power Consumption: 60 mA typical @ 24 VDC
Current for I/O Modules: Max. 1.5 A @ 5 VDC

: NA-4010 and NA-4020/4021 Common Specifications

Field Power
Rated Voltage: 11 to 28.8 VDC, 24 VDC typical
Current in Field Power Contact: Max. 10 A

Isolation
System Power to I/O Driver: Optical isolation

Physical Characteristics
Dimensions: 45 x 99 x 70 mm (1.77 x 3.90 x 2.76 in)
Weight: 150 g

Environmental Limits
Operating Temperature: -10 to 60°C (14 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508
EMC: CE IEC 61000-6-2, IEC 61000-6-4
Vibration: IEC-68-2-6 (2 g's during operation)

Warranty
Warranty Period: 2 years
Details: See www.moxa.com/warranty

Dimensions

I/O Network Adaptor

70.0 mm (2.8 in)   45.0 mm (1.8 in)
99.0 mm (3.9 in)   99.0 mm (3.9 in)
60.0 mm (2.4 in)

Side View   Front View

I/O Module

70.0 mm (2.8 in)   15.0 mm (0.6 in)   30.0 mm (1.2 in)
                   12.0 mm (0.5 in)
99.0 mm (3.9 in)   99.0 mm (3.9 in)   70.0 mm (2.8 in)
60.0 mm (2.4 in)
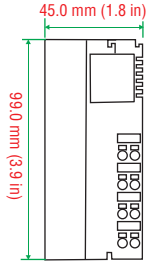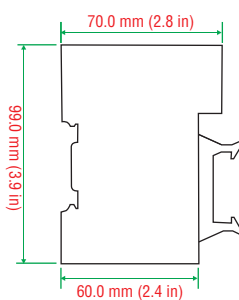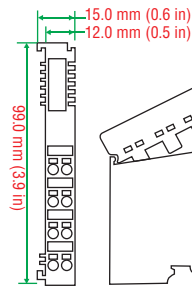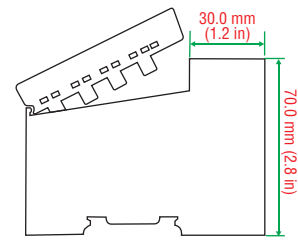
Side View   Front View   Removable View

: Ordering Information

Step 1: Select a network adaptor module

> NA-4000 series

Step 2: Select I/O modules

> M-1000/2000/3000/4000/6000 series

Step 3: Select power modules (optional)

> M-7000 series

Available Models
NA-4010: Ethernet network adaptor (Modbus/TCP)
NA-4020: RS-485 network adaptor (Modbus/RTU)
NA-4021: RS-232 network adaptor (Modbus/RTU)

Note: The NA-4010 NA-4020/4021 network adaptors can be expanded by adding up to 32 I/O modules. See pages 17-16 to 17-25 to select the M-series modules for your application.

I/O Module Selection Guide

I/O Modules

DC-Digital Inputs						AC-Digital Inputs	
Specs	Model	M-1800	M-1801	M-1600	M-1601	M-1450	M-1451
	Channels	8	8	16	16	4	4
	Sink/Source	Sink	Source	Sink	Source	–	–
	Connector	RTB	RTB	20-pin	20-pin	RTB	RTB
	Voltage	24 VDC	24 VDC	24 VDC	24 VDC	110 VAC	220 VAC
	Isolation	Optical isolation					

Digital Outputs					
Specs	Model	M-2800	M-2801	M-2600	M-2601	M-2450
	Channels	8	8	16	16	4
	Sink/Source	Sink	Source	Sink	Source	Relay
	Connector	RTB	RTB	20-pin	20-pin	RTB
	Voltage	24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
	Current	0.5 A	0.5 A	0.3 A	0.3 A	2.0 A
	Isolation	Optical isolation				

Analog Inputs				
Specs	Model	M-3802	M-3810	M-6200	M-6201
	Channels	8	8	2	2
	Current	4 to 20 mA	–	–	–
	Voltage	–	0 to 10 V	–	–
	Connector	RTB	RTB	RTB	RTB
	Resolution	12-bit	12-bit	–	–
	Isolation	Optical isolation			
	Sensor Input	–	–	RTD(ohm)	Thermo-couple (mV)

Analog Outputs		
Specs	Model	M-4402	M-4410
	Channels	4	4
	Current	4 to 20 mA	–
	Voltage	–	0 to 10 V
	Connector	RTB	RTB
	Resolution	12-bit	12-bit
	Isolation	Optical isolation	

Power Modules

Power Modules					
Specs	Model	M-7001	M-7002	M-7804	M-7805
	Channels	0	0	8	8
	Voltage	24 VDC	DC: 5, 24, 48 VDC AC: 110/220 VAC	0 VDC	24 VDC
	Purpose	System Power	Field Power	Field Power	Field Power

Digital Input Modules

8-channel 24 VDC digital input modules
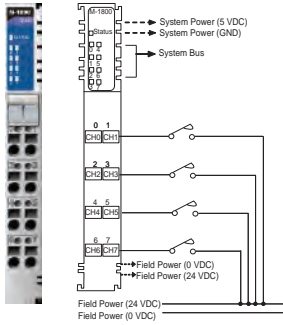
M-1800: 8 digital inputs, sink, 24 VDC

Inputs per Module: 8 channels, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA/point @ 28.8 VDC
Input Impedance: Typ. 5.1K ohms
Filtering Time: Typ. 1.5 ms
Common Type: External common (single common)
Power Consumption: Max. 35 mA @ 5 VDC
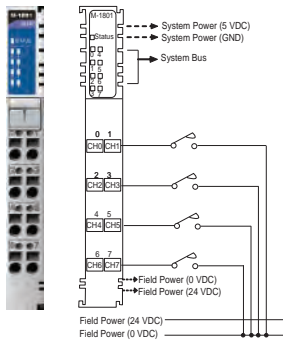
M-1801: 8 digital inputs, source, 24 VDC

Inputs per Module: 8 channels, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA/point @ 28.8 VDC
Input Impedance: Typ. 5.1K ohms
Filtering Time: Typ 1.5 ms
Common Type: External common (single common)
Power Consumption: Max. 35 mA @ 5 VDC

16-channel 24 VDC digital input modules
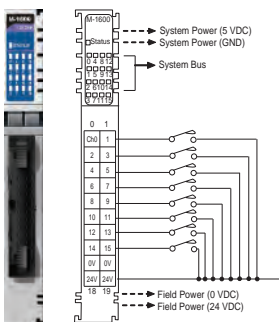
M-1600: 16 digital inputs, sink, 24 VDC

Inputs per Module: 16 channels, sink type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA/point @ 28.8 VDC
Input Impedance: Typ. 5.1K ohms
Filtering Time: Typ. 1.5 ms
Common Type: 16 channels for 2 COMs (single common)
Power Consumption: Max. 40 mA @ 5 VDC

17

Remote I/O > Digital Input Modules
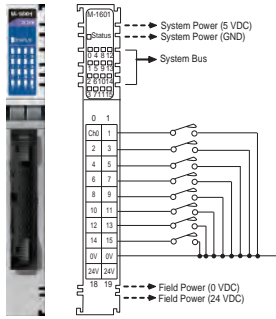
M-1601: 16 digital inputs, source, 24 VDC

Inputs per Module: 16 channels, source type
On-state Voltage: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
Min. Off-state Voltage: Max. 5 VDC
On-state Current: Max. 6 mA/point @ 28.8 VDC
Input Impedance: Typ. 5.1K ohms
Filtering Time: Typ. 1.5 ms
Common Type: 16 channels for 2 COMs (single common)
Power Consumption: Max. 40 mA @ 5 VDC

4-channel AC digital input modules
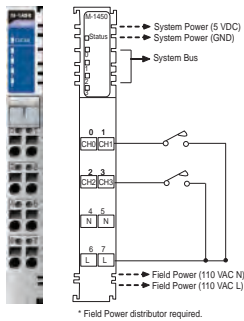
M-1450: 4 digital inputs, 110 VAC

Inputs per Module: 4 channels
On-state Voltage: 120 VAC nominal, min. 85 VAC to max. 132 VAC
Min. Off-state Voltage: Max. 45 VAC
On-state Current: Max. 8 mA/point @ 132 VAC
Input Impedance: Typ. 11K ohms
Common Type: 4 channels for 2 COMs (single common)
Power Consumption: Max. 35 mA @ 5 VDC

* Field Power distributor required.
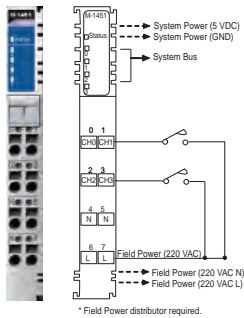
M-1451: 4 digital inputs, 220 VAC

Inputs per Module: 4 channels
On-state Voltage: 240 VAC nominal, min. 170 VAC to max. 264 VAC
Min. Off-state Voltage: Max. 45 VAC
On-state Current: Max. 12 mA/point @ 264 VAC
Input Impedance: Typ. 22K ohms
Common Type: 4 channels for 2 COMs (single common)
Power Consumption: Max. 35 mA @ 5 VDC

* Field Power distributor required.

: Ordering Information

Specs		DC-Digital Input Modules				AC-Digital Input Modules	
	Model	M-1800	M-1801	M-1600	M-1601	M-1450	M-1451
	Channels	8	8	16	16	4	4
	Sink/Source	Sink	Source	Sink	Source	–	–
	Connector	RTB	RTB	20-pin	20-pin	RTB	RTB
	Voltage	24 VDC	24 VDC	24 VDC	24 VDC	110 VAC	220 VAC
	Isolation	Optical Isolation					

Digital Output Modules

8-channel 24 VDC digital output modules
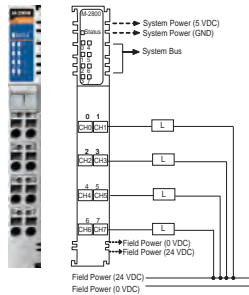
M-2800: 8 digital outputs, sink, 24 VDC, 0.5 A

Outputs per Module: 8 channels, sink type
Output Voltage Range: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 µA
Output Current Rating: Max. 0.5 A per channel
Common Type: 8 channels per external common (single common)
Power Consumption: Max. 60 mA @ 5 VDC
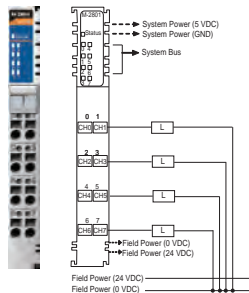
M-2801: 8 digital outputs, source, 24 VDC, 0.5 A

Outputs per Module: 8 channels, source type
Output Voltage Range: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 µA
Output Current Rating: Max. 0.5 A per channel
Common Type: 8 channels per external common (single common)
Power Consumption: Max. 60 mA @ 5 VDC

16-channel digital output modules
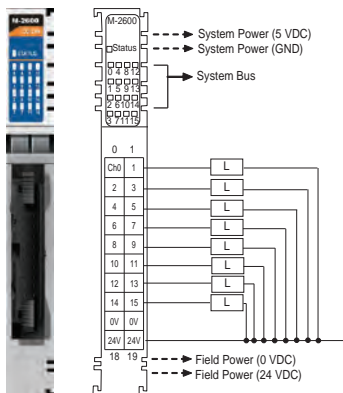
M-2600: 16 digital outputs, sink, 24 VDC, 0.3 A

Outputs per Module: 16 channels, sink type
Output Voltage Range: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 µA
Output Current Rating:
• Max. 0.3 A per channel
• Max. 4 A per common
Common Type: 16 channels for 2 COMs (single common)
Power Consumption: Max. 80 mA @ 5 VDC

17

Remote I/O > Digital Output Modules

17
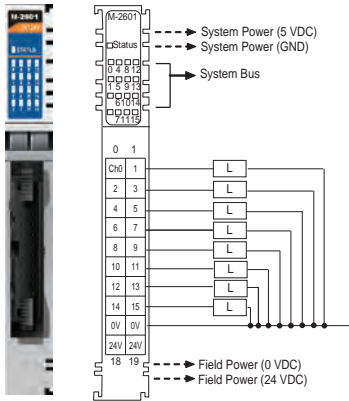
M-2601: 16 digital outputs, source, 24 VDC, 0.3 A

Outputs per Module: 16 channels, source type
Output Voltage Range: 24 VDC nominal, min. 11 VDC to max. 28.8 VDC
On-state Voltage Drop: Max. 0.3 VDC @ 25°C
On-state Current: Min. 1 mA per channel
Off Leakage Current: Max. 50 μA
Output Current Rating:
• Max. 0.3 A per channel
• Max. 4 A per common
Common Type: 16 channels for 2 COMs (single common)
Power Consumption: Max. 80 mA @ 5 VDC

4-channel relay output modules
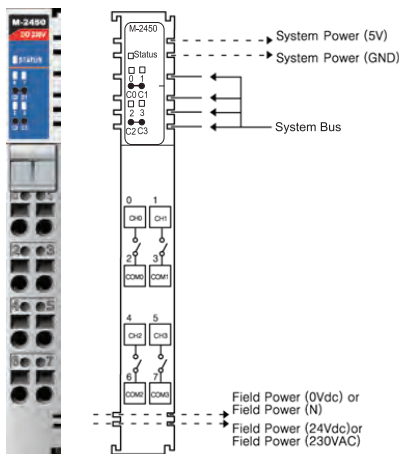
M-2450: 4 relay outputs, 24-VDC/230-VAC, 2 A

Outputs per Module: 4 channels, relay
Relay Type:
• Form A, Normally Open (N.O.)
• Single Pole, Single Throw (SPST)
Output Voltage Range: Load dependent
• 5 to 28.8 VDC @ 2 A resistive
• 48 VDC @ 0.8 A resistive
• 110 VDC @ 0.3 A resistive
• 250 VAC @ 2 A resistive
Output Current Rating: At rated power
• 2 A @ 5 to 28.8 VDC
• 0.8 A @ 48 VDC
• 0.5 A @ 110 VDC
• 2 A @ 250 VAC
Min. Load: 100 μA, 100 m VDC per point
Max. On-state Voltage Drop: 0.5 V @ 2 A, resistive load, 24 VDC
Off-state Leakage Current: Max. 1.5 mA
Common Type: 1 channel for 1 COM
Power Consumption: Max. 65 mA @ 5 VDC

: Ordering Information

	Digital Output Modules				
Specs	**Model**	M-2800	M-2801	M-2600	M-2601	M-2450
	Channels	8	8	16	16	4
	Sink/Source	Sink	Source	Sink	Source	Relay
	Connector	RTB	RTB	20-pin	20-pin	RTB
	Voltage	24 VDC	24 VDC	24 VDC	24 VDC	230 VAC/ 24 VDC
	Current	0.5 A	0.5 A	0.3 A	0.3 A	2.0 A
	Isolation	Optical isolation				
	Diagnostics	–	–	–	–	–

Analog Input Modules

8-channel analog input modules, 12-bit resolution
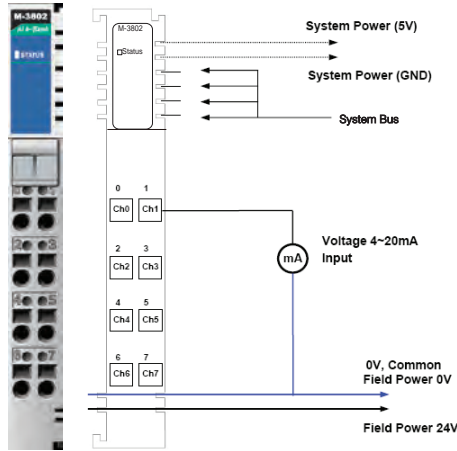
M-3802: 8 analog inputs, 4 to 20 mA, 12 bits

Resolution in Ranges: 12 bits, 3.91 μA/bit
Input Current Range: 4 to 20 mA (single-ended)
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Input Impedance: 120 ohms
Conversion Time: 4 ms for all channels
Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14
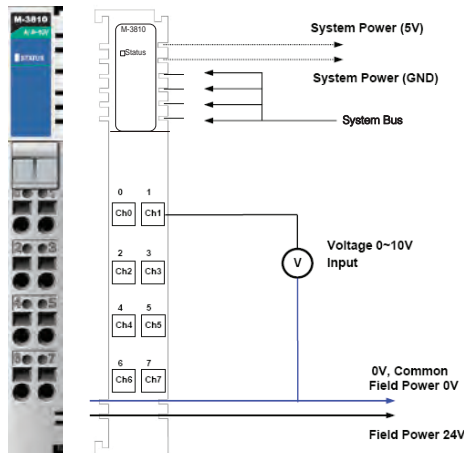
M-3810: 8 analog inputs, 0 to 10 V, 12 bits

Resolution in Ranges: 12 bits, 2.44 mV/bit
Input Current Range: 0 to 10 VDC (single-ended)
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Input Impedance: 500K ohms
Conversion Time: 4 ms for all channels
Power Consumption: Max. 150 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14

Temperature Input Modules

2-channel temperature input modules, RTD or thermocouple input
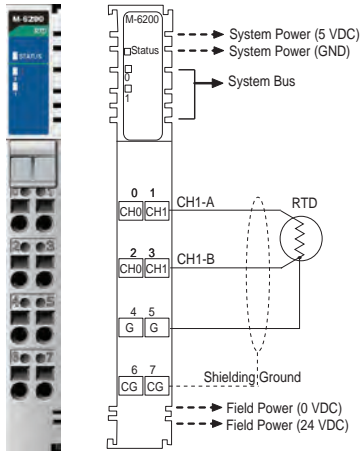
M-6200: 2 analog inputs, RTD: PT100, JPT100

Sensor Types:
• PT50, PT100, PT200, PT500, PT1000 (resistance 100 milli-ohms/bit)
• JPT100, JPT200, JPT500, JPT1000 (resistance 10 milli-ohms/bit)
• NI100, NI200, NI500, NI1000, NI120, CU10 (resistance 20 milli-ohms/bit)
Resolution: 0.1°C/10 milli-ohms
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Input Impedance: 500K ohms
Conversion Time: 200 ms for all channels
Diagnostics: Range over (if range over, data=Dx8000)
Power Consumption: Max. 80 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14
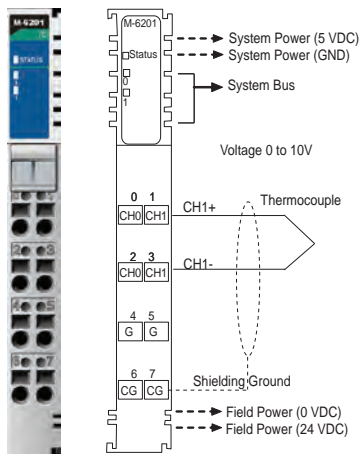
M-6201: 2 analog inputs, thermocouple

Sensor Types:
Type J/K/T/E/R/S/B/N/L/U/C/D
(mV input 10 µV/bit, 2 µV/bit)
Resolution: 0.1°C/10 µV
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Input Impedance: 500K ohms
Conversion Time: 200 ms for all channels
Diagnostics: Range over (if range over, data=Dx8000)
Power Consumption: Max. 80 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14

⋮ Ordering Information

		Analog Input Modules			
	Model	M-3802	M-3810	M-6200	M-6201
Specs	Channels	8	8	2	2
	Current	4 to 20 mA	–	–	–
	Voltage	–	0 to 10 V	–	–
	Connector	RTB	RTB	RTB	RTB
	Resolution	12-bit	12-bit	–	–
	Isolation	Optical isolation			
	Sensor Input	–	–	RTD (ohm)	Thermo-couple (mV)

Analog Output Modules

4-channel analog output modules, 12-bit resolution
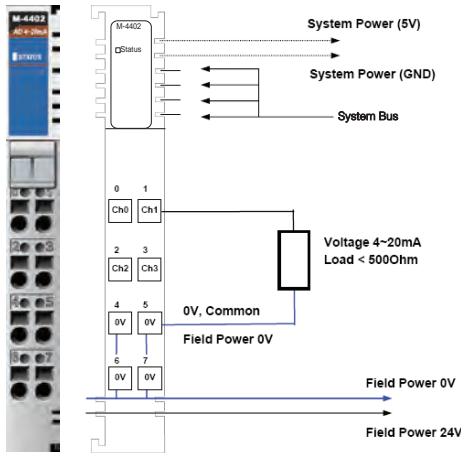
M-4402: 4 analog outputs, 4 to 20 mA, 12 bits

Resolution in Ranges: 12 bits, 3.91 µA/bit
Output Current Range: 4 to 20 mA
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Output Impedance: Max. 500 ohms
Conversion Time: 2 ms for all channels
Power Consumption: Max. 65 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14
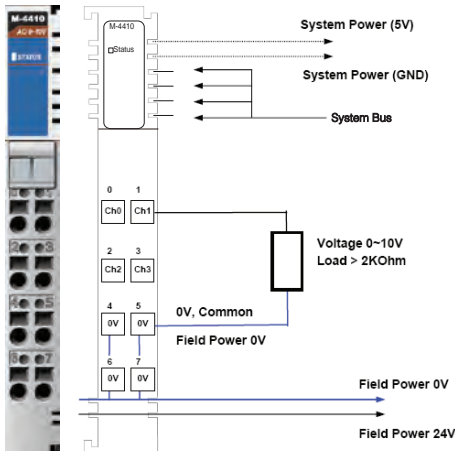
M-4410: 4 analog outputs, 0 to 10 V, 12 bits

Resolution in Ranges: 12 bits, 2.44 mV/bit
Output Current Range: 0 to 10 VDC
Data Format: 16-bit integer (2's complement)
Accuracy:
• ±0.1%, FSR @ 25°C
• ±0.3%, FSR @ 0°C, 60°C
Output Impedance: Max. 5K ohms
Conversion Time: 2 ms for all channels
Power Consumption: Max. 200 mA @ 5 VDC
Isolation: I/O to logic (photocoupler isolation)
Wiring: I/O cable max. AWG14

∶ Ordering Information

	Analog Output Modules		
	Model	M-4402	M-4410
	Channels	4	4
	Current	4 to 20 mA	–
Specs	Voltage	–	0 to 10 V
	Connector	RTB	RTB
	Resolution	12-bit	12-bit
	Isolation	Optical Isolation	

Power Modules

When to Use a Power Module

▌ System Power Distributor

The system power expansion module is designed to provide extra power for connected I/O expansion modules. Each NA-4000 series network adaptor can provide 1.5 A @ 5 VDC. If you need more power

for your installed I/O expansion modules, you will need to use an M-7001 module. However, note that the M-7001 can only provide 1 A @ 5 VDC.

M-7001

| 150 mA | 150 mA | 150 mA | 150 mA | 200 mA | **Supports 1000 mA** | 200 mA | 200 mA | 200 mA | **Supports 1000 mA** |
| 150 mA | 150 mA | 150 mA | 150 mA | | | 200 mA | 200 mA | 200 mA | **Supports 1000 mA** |

Total: 1400 mA   Total: 1000 mA
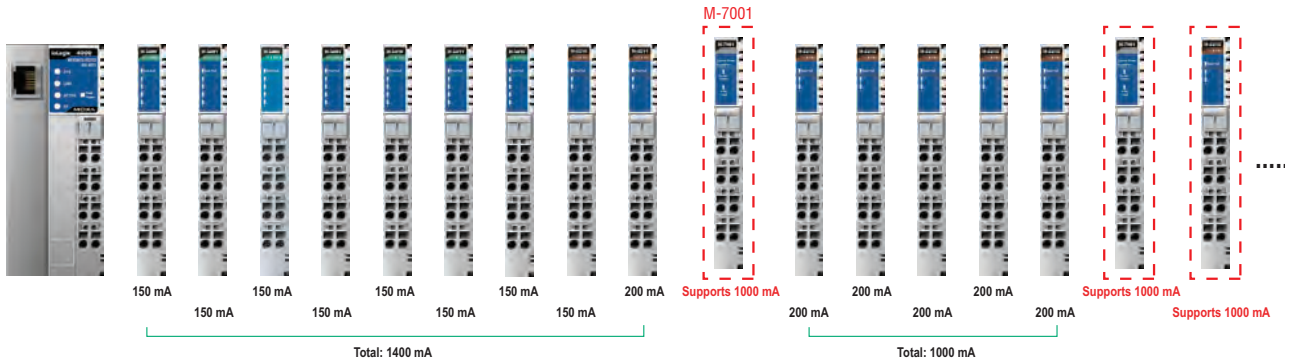
▌ Field Power Distributor

The field power distributor is designed to isolate different field voltages. For example, before you connect a 48 VDC or 110 VAC DI/O

module to a 24 VDC DI/O module, you will need an M-7002 field power distributor.

M-7002   M-7002

24 VDC   48 VDC   110 VAC

0V 24V   0V 48V   0V
110 VAC
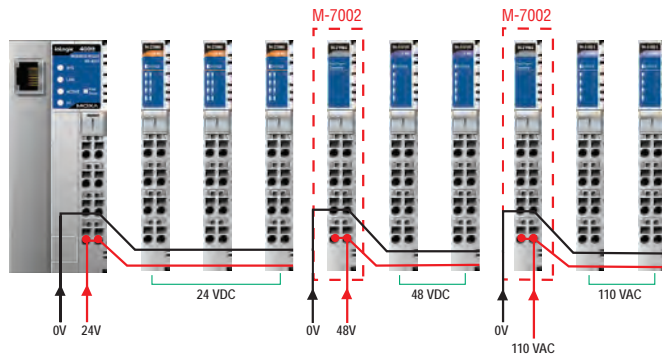
▌ Potential Power Distributor

There are three types of potential distributor modules that provide extra wiring points, such as shielding ground, 0 V field power, and 24 V field power. For example, the 8-channel digital input (sink type)

module by itself does not have a 24 V wiring point. In this case, you can add an M-7805 for easier wiring.

M-1801   M-7804   M-1800   M-7805
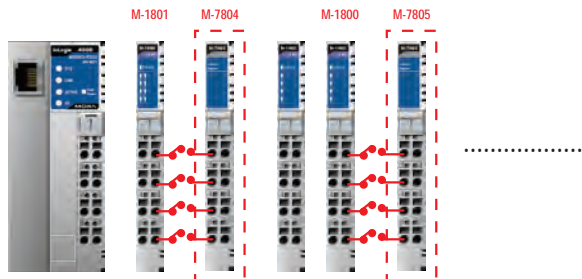
Power Modules

M-7001: System power module
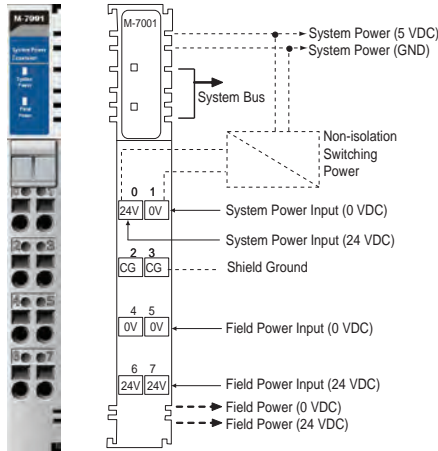
- **System Input Voltage:** 24 VDC, 11 to 28.8 VDC
- **Field Power Input Voltage:** 24 VDC (±20%)
- **Current for I/O Modules:** 1 A @ 5 VDC (Max.)
- **System Bus Output Voltage:** 5 VDC (Max.)
- **Field Power Contacts Current:** 10 A (Max.)

M-7002: Field power module
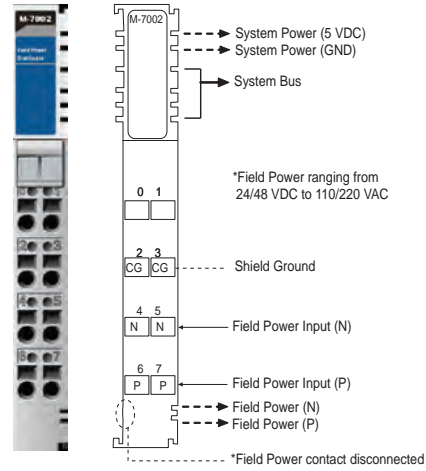
- **Field Power Input Voltage:**
  DC: 5 VDC, 24 VDC, 48 VDC
  AC: 110 VAC, 220 VAC
- **Current for Field Power Contacts:** 10 A (Max.)

M-7804: 0 VDC
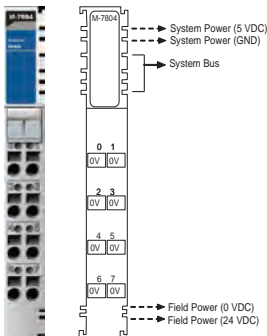
Channels: 8
Mode: 0 VDC

M-7805: 24 VDC
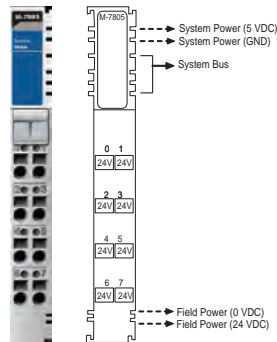
Channels: 8
Mode: 24 VDC

∷ Ordering Information

			Power Modules		
Specs	**Model**	M-7001	M-7002	M-7804	M-7805
	Channels	0	0	8	8
	Voltage	24 VDC	DC: 5, 24, 48 VDC AC: 110/220 VAC	0 VDC	24 VDC
	Purpose	System Power	Field Power	Field Power	Field Power

17

Remote I/O › Power Modules

Modular I/O Accessories

TB 1600 DIN-Rail mounting screw terminal module with 20-pin connector
- 20 pins, one-to-one assignment
- Connector pitch: 3.81 mm
- DIN-Rail mounting type
- Dimensions: 77.5 x 67.5 x 51 mm (3.05 x 2.66 x 2.01 in)
- RoHS compliant

20-to-20-pin flat cable
- Connects between the TB 1600 and ioLogik 4000 series
- Length: 500 mm
- Number of Pins: 20

M-8001-PK Removable terminal block
- Terminal block for the ioLogik 4000 series
- Packaging: 9 pcs in one box

M-8003-PK Marker with 0 to 9 numbering
M-8004-PK Blank marker
- Marker for the ioLogik 4000 series
- Packaging: 100 pcs in one box

: Ordering Information

- **TB 1600:** DIN-Rail mounting screw terminal module with 20-pin connector
- **20-to-20-pin flate cable:** 20-pin to 20-pin flat cable, 500 mm
- **M-8001-PK:** Removable terminal block, 9 pcs per pack
- **M-8003-PK:** Marker with 0 to 9 numbering, white color, 100 pcs
- **M-8004-PK:** Blank marker, 100 pcs

IP Surveillance

Video Networking Products

	VPort 461	VPort 354	VPort 254	VPort 351	VPort 251	VPort D351	VPort 15-M12	VPort 25
Type of Product	Encoder	Encoder	Encoder	Encoder	Encoder	Decoder	IP camera	IP camera
Form Factor								
Protection Rating	IP30	IP30	IP30	IP30	–	IP30	IP66	IP66
DIN-Rail Mounting	✓	✓	✓	✓	w/ optional kit	✓	–	–
Panel Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	✓	w/ optional kit	–	–
Surface/Ceiling Mounting	–	–	–	–	✓	–	✓	✓
Audio/Video Channels								
Video Inputs	1	4	4	1	1	0	0	0
Video Outputs	0	0	0	1	0	1	0	1
Audio Inputs	1	1	1	1	1	1	–	1
Audio Outputs	1	1	1	1	1	1	–	1
Compression Algorithm								
H.264	✓	–	–	–	–	–	–	–
MJPEG	✓	✓	✓	✓	✓	✓	✓	✓
MPEG4	–	✓	✓	✓	✓	✓	✓	✓
Video Performance								
QCIF (NTSC: 176 x 112)	30 FPS (max.)	30 FPS (max.)	–	–	–	–	30 FPS (max.)	–
QVGA (NTSC: 320 x 240)	–	–	30 FPS (max.)	30 FPS (max.)	30 FPS (max.)	–	30 FPS (max.)	30 FPS (max.)
CIF (NTSC: 352 x 240)	30 FPS (max.)	30 FPS (max.)	30 FPS (max.)	30 FPS (max.)	30 FPS (max.)	–	30 FPS (max.)	30 FPS (max.)
VGA (NTSC: 640 x 480)	30 FPS (max.)	–	7 FPS (max.)	30 FPS (max.)	30 FPS (max.)	–	30 FPS (max.)	30 FPS (max.)
2CIF (NTSC: 704 x 240)	–	30 FPS (max.)	–	–	–	–	–	–
4CIF (NTSC: 704 x 480)	30 FPS (max.)	30 FPS (max.)	7 FPS (max.)	30 FPS (max.)	30 FPS (max.)	–	–	30 FPS (max.)
Full D1 (NTSC: 720 x 480)	30 FPS (max.)	–	7 FPS (max.)	30 FPS (max.)	30 FPS (max.)	–	–	30 FPS (max.)
QCIF (PAL: 176 x 144)	25 FPS (max.)	25 FPS (max.)	–	–	–	–	25 FPS (max.)	–
QVGA (PAL: 320 x 288)	–	–	25 FPS (max.)	25 FPS (max.)	25 FPS (max.)	–	–	25 FPS (max.)
CIF (PAL: 352 x 288)	25 FPS (max.)	25 FPS (max.)	25 FPS (max.)	25 FPS (max.)	25 FPS (max.)	–	25 FPS (max.)	25 FPS (max.)
VGA (PAL: 640 x 576)	–	–	7 FPS (max.)	25 FPS (max.)	25 FPS (max.)	–	–	25 FPS (max.)
2CIF (PAL: 704 x 288)	–	25 FPS (max.)	–	–	–	–	–	–
4CIF (PAL: 704 x 576)	25 FPS (max.)	25 FPS (max.)	7 FPS (max.)	25 FPS (max.)	25 FPS (max.)	–	–	25 FPS (max.)
Full D1 (PAL: 720 x 576)	25 FPS (max.)	–	7 FPS (max.)	25 FPS (max.)	25 FPS (max.)	–	–	25 FPS (max.)
4VGA (1280x960)	–	–	–	–	–	–	15 FPS (MJPEG only, max.)	–
Quad View	–	30 FPS (max.)	30 FPS (max.)	–	–	–	–	–
Network Connections								
10/100BaseT(X) Ports	2	2	1	1	1	1	–	1
100BaseFX Ports	1	2	1	1	–	–	–	–
10/100Mbps, M12 Connector	–	–	–	–	–	–	1	–
Number of COM Ports								
PTZ Ports	1	1	1	1	1	1	–	–
COM Ports	1	1	1	–	–	–	–	–
RS-232 Console Ports	1	1	1	1	1	1	–	–
Network Management and Control								
Web Browser	✓	✓	✓	✓	✓	✓	✓	✓
SNMP Protocols	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3	v1/v2c/v3
RTSP (Real Time Streaming Protocol)	✓	✓	✓	✓	✓	–	✓	✓
Multicast (IGMP)	v3	v3	v3	v3	v3	–	v3	v3
QoS	✓	✓	✓	✓	✓	–	✓	✓
UPnP	✓	✓	✓	✓	✓	✓	✓	✓
DDNS	✓	✓	✓	✓	✓	✓	✓	✓
IP Filtering	✓	✓	✓	✓	✓	✓	✓	✓
Power Requirements								
Power Redundancy	✓	✓	✓	✓	–	✓	–	✓
Power Inputs	2	2	2	2	1	2	0	1
Power Outputs	0	0	0	0	1	0	0	0
Power-over-Ethernet (PoE)	–	–	–	–	–	–	✓	✓
Alarms								
VMD (Video Motion Detection)	Pending	Pending	–	✓	✓	–	✓	✓
Digital Inputs	2	4	4	2	1	2	0	1
Relay (Digital) Outputs	2	2	2	2	1	2	0	1
Alarm Video Recording	–	–	–	✓	–	–	–	–
Alarm Snapshot Image	✓	✓	✓	✓	✓	–	✓	✓
Supported Operating Temperature Ranges								
0 to 60°C	✓	✓	✓	✓	✓	✓	–	–
-25 to 55°C	–	–	–	–	–	–	✓	–
-40 to 50°C	–	–	–	–	–	–	–	–
-40 to 75°C	✓	✓	✓	✓	–	–	–	✓
Regulatory Approvals								
CE/FCC	✓	✓	✓	✓	✓	✓	✓	✓
UL508	Pending	Pending	✓	✓	–	✓	–	–
Class 1, Div 2; ATEX Class 1, Zone 2	Pending	–	–	UL/cUL Class I, Division 2, Groups A, B, C	–	–	–	–
DNV	Pending	–	–	✓	–	–	–	–
EN50155:2007	Pending	–	–	–	–	–	✓	–

Industrial Video Networking

Empower Your Video Network System with Industrial-grade Reliability

⋮ Leading the Industrial IP Video Revolution

Thanks to the ever-increasing popularity of IP networks, transmitting video, voice, and data simultaneously over Ethernet networks, and even over the Internet, is now standard at locations around the world. Because of this, CCTV surveillance systems are also becoming more commonplace. Versatile and advanced video digitization and compression technologies, such as MJPEG, MPEGx, and H.264, make it possible to migrate CCTV surveillance systems to IP-based platforms. This means that IP video solutions, which include IP cameras, video servers, and NVRs (Network Video Recorders), are used by some of the hottest products in the CCTV surveillance market. However, most IP video solutions on the market today are designed for general purpose applications, which means they are not suitable for unpredictable industrial environments. In fact, some seemingly commonplace applications, such as road traffic control and monitoring, oil and gas refineries and pipelines, and mining pits, should be classified as industrial-grade, and as such require using rugged, well-designed video-over-IP solutions to ensure that the video surveillance system works properly. To meet these stringent requirements, Moxa's industrial video networking solutions feature an industrial-grade rugged design and extra-high reliability.

⋮ Industrial-grade Rugged Design and Reliability

Products used in industrial environments must have a rugged design to provide better protection against adverse conditions. Moxa's VPort video servers and IP cameras are designed with rugged features for outdoor or harsh environments.

VPort Industrial Video Servers

- 12/24 VDC or 24 VAC redundant power inputs
- DIN-Rail mounting and panel mounting accessories available
- IP30 protected housing
- -40 to 75°C operating temperature range for T models
- Choose either RJ45 or fiber optic Ethernet ports
- MTBF of over 150,000 hours
- Industrial EMI/ESD protection and UL508, ATEX Class 1 Div. 2 and DNV certifications

Dual Power Inputs
SD Slot for Data Storage
Wall mount and Din-rail Mount
Dual LAN port for redundancy or cascade
IP30 Protection
RJ45 or Fiber Optical
RS-232/422/485 Serial port
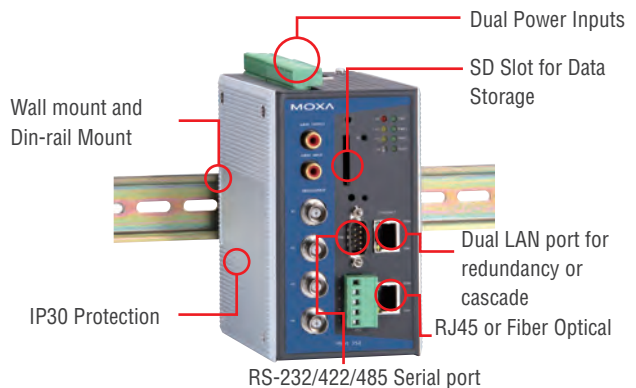
VPort IP Camera

- Wide operating temperature; heater and fan NOT required
- IP66-rated for protection from rain and dust
- PoE (Power-over-Ethernet) supported
- Vandal-proof form factor for preventing damage from unexpected external forces
- Versatile installation options for outdoor environments

PoE and direct-wired power supplies
IP66-rated protection
No heater, fanless design
Vandal-proof design
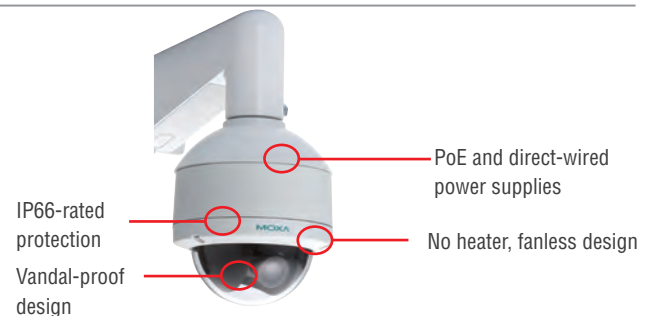
: Advanced and Efficient Networking Capability

Moxa's VPort series industrial video encoders allow users to deploy video surveillance network systems with versatile network connectivity for high-performance transmissions.

Advanced Network Protocols

- Modbus/TCP for easy communication with SCADA software
- Standard RTSP (real-time streaming protocol) video streaming for easy integration
- Multicast (IGMP) protocols for efficient network transmission
- SNMPv1/v2c/v3 MIB-II for easy network management
- QoS (ToS) for configuring the transmission priority of video streams
- UPnP, DDNS, and IP filtering supported

Two Ethernet Ports for Cascading and Port Redundancy

Some VPort products have two built-in 10/100 Mbps Ethernet ports for cascading multiple VPort units. With the cascade feature, you'll need fewer switch ports, and also reduce your cable layout effort. In addition, Ethernet port redundancy can be used to build a backup path for video transmission in case the primary path is broken.
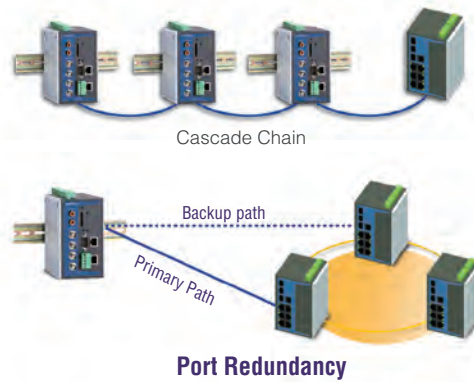
RS-232/422/485 COM Port for Serial-to-Ethernet Connectivity

A surveillance system not only includes video cameras but also other devices, and for the convenience of connecting these devices to an IP network, some VPort products support 1 RS-232/422/485 COM port that can transmit serial data via a TCP/IP network to remote sites. By using Moxa's own Real COM technology, serial data can be converted from the IP-packet format back to the original serial data format.
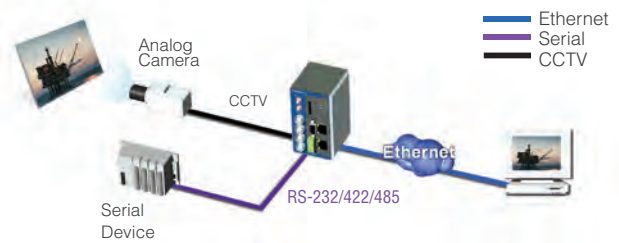
Transparent PTZ Control for Easy Control of PTZ Cameras

VPort products use Moxa's Real COM technology to implement transparent communication for RS-232/422/485 PTZ control. The benefit of the transparent PTZ control function is that it eliminates the need to build the PTZ control driver into the VPort product, allowing the use of a legacy PTZ control panel or keyboard to control a PTZ camera directly.
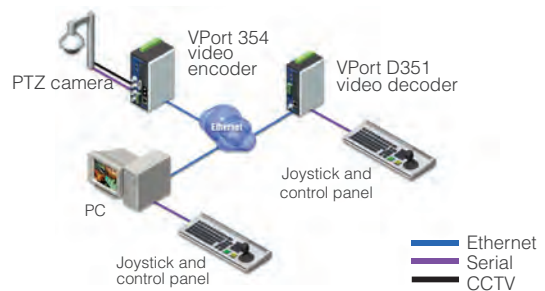
⁞ Visual Management in Automation Systems

Visualization using an IP surveillance system is an important and valuable tool for automation systems, which are often described as consisting of three separate layers: the information layer, the control layer, and the device layer. We have found that when integrating IP surveillance systems with automation systems, it is also useful to describe the surveillance system as consisting of three layers: the management layer, the operation layer, and the device layer. In what follows, we describe each of these layers in greater detail.
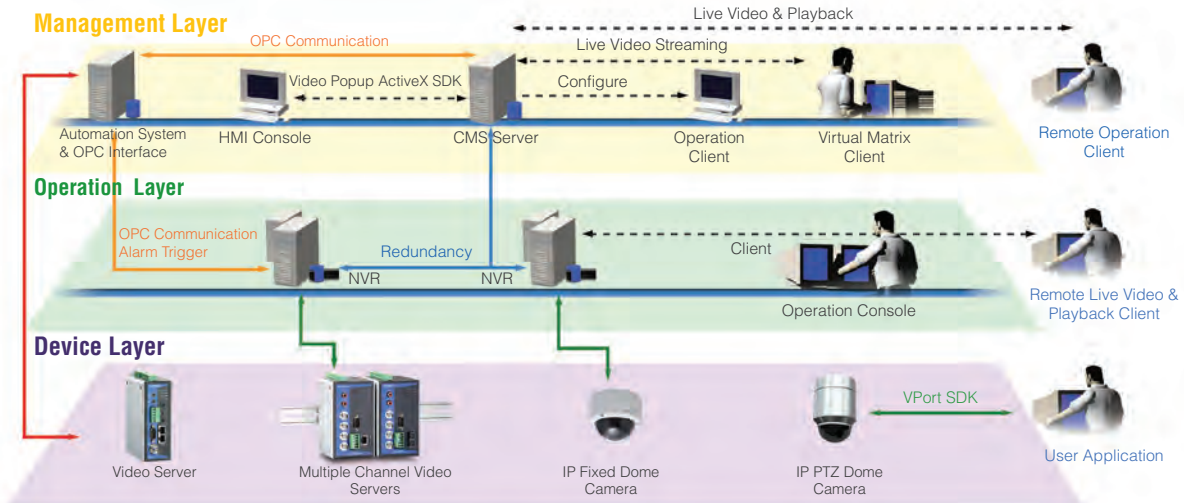
Management Layer

A video central management system, or video CMS for short, consists of a centralized network video recorder, an extreme space storage system (e.g., IP NAS), and a virtual matrix, all of which are part of the management layer. By design, the video CMS can communicate with the SCADA system to integrate event management. In addition, the video CMS can be used to collect information such as network traffic and performance reports, as well as network video recordings, from the network management system.

In some cases, the video CMS will also have access to remote video devices.

In order to streamline the process of integrating a video CMS with an automation system, Moxa provides a user-friendly software development kit, called VPort SDK PLUS, which is being used by third-part system integrators and software developers to develop special purpose video surveillance functions.

Free Software Development Kit—VPort SDK PLUS
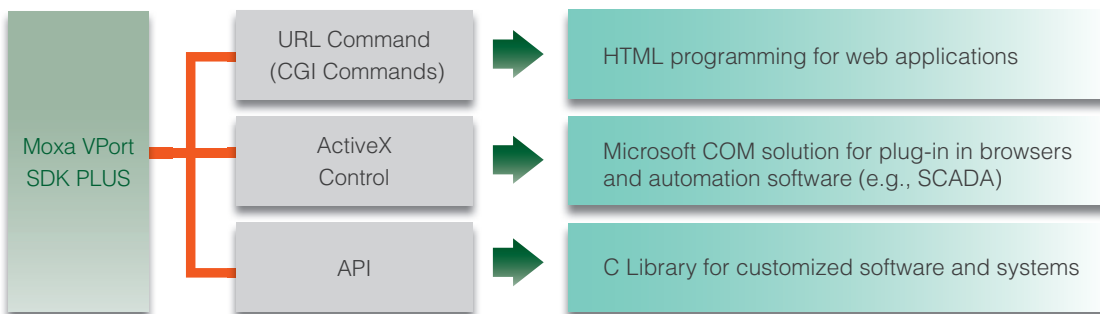
VPort Video Gadget Tools for Embedding Video into SCADA System

Moxa's VPort SDK PLUS includes the coding-free programming tool VPort Video Gadget, which is specially designed for automation systems. The main purpose of VPort Video Gadget is to eliminate the programming effort often required when integrating IP video with a SCADA system.

VPort Video Gadget

18

IP Surveillance ＞ Industrial Video Networking
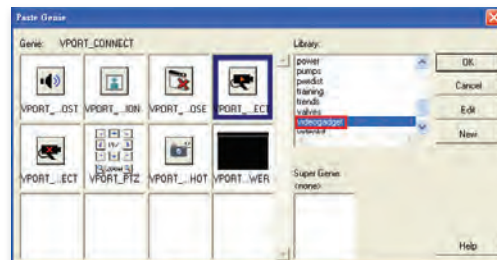
Operation Layer

Both the network video recorder and local operation console belong to the operation layer, which allows the SCADA system to communicate with the network video recorder to record events, analyze events, and perform other similar tasks. Since OPC (OLE for Process Control) is commonly used by automation systems to communicate with other systems, we can use OPC communication to bridge the video system with the automation system. One of the important applications of the OPC bridge is to conduct event-trigger video recording.

OPC interoperation between SCADA & NVR
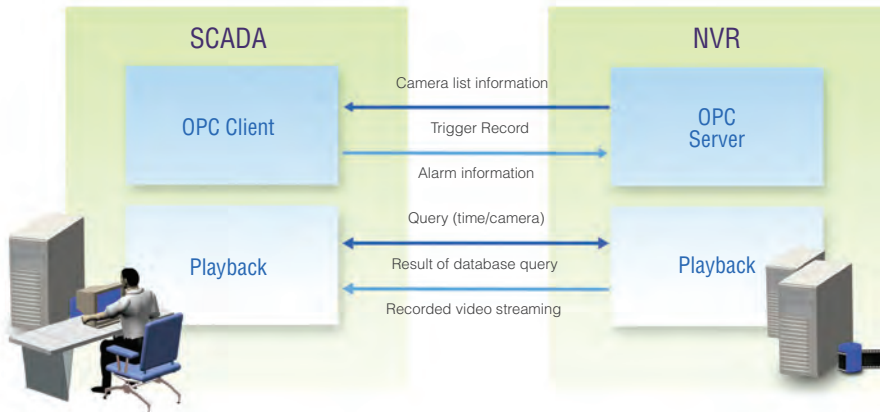
User-friendly IP Surveillance Software

SoftNVR-IA, Moxa's own 32-channel IP video surveillance software, is specially designed for industrial automation systems. The key feature of the software is a built-in OPC server, which simplifies communications with automation systems. In fact, both video recording and PTZ control can be triggered by the automation system in reaction to different types of events.

Device Layer

Many video devices, including IP cameras and analog cameras with video encoders, can be installed from the device layer. Currently, Moxa's IP video VPort series products support Modbus/TCP, which can transmit the Modbus protocol over a TCP/IP network. With Modbus/TCP support, SCADA systems and other automation management systems can include VPort products directly in their device monitoring system. Using the automation system to monitor a VPort's status makes the administrator's job that much easier.
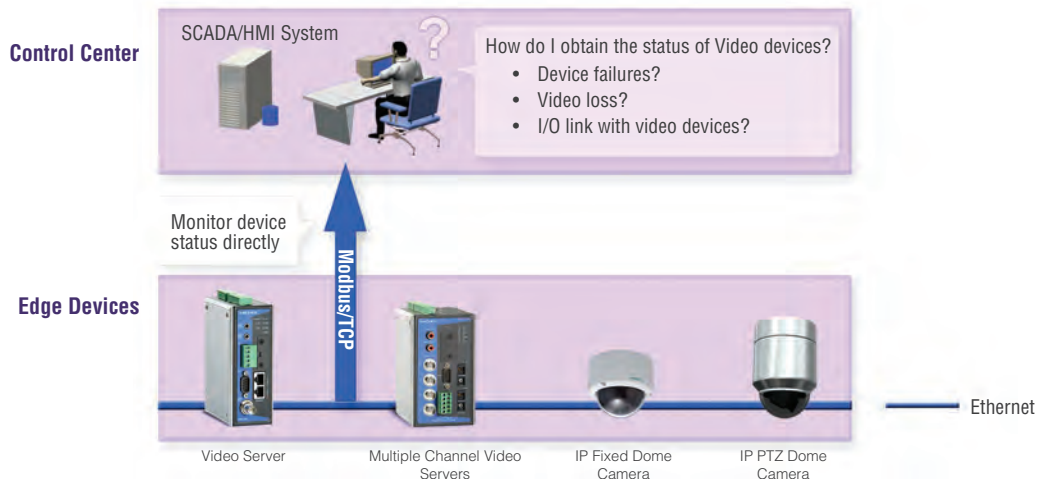
VPort 461 Series

Excellent video quality 1-channel H.264 industrial video encoder

> Three simultaneous video streams for H.264 and MJPEG
> Video stream up to 30/25 frames/sec at full D1 (NTSC:720 x 480; PAL:720x576) resolution
> Video latency under 200 ms
> 2 Ethernet ports for cascade and Ethernet port redundancy
> Local storage capability with SD card slot
> Industrial design with -40 to 75°C operating temperature
> Free VPort SDK PLUS supported

NEMA TS2 | CE | FC

Introduction

The VPort 461 1-channel industrial video encoder with H.264 video compression algorithm provides the best video quality on the market, but with a smaller bandwidth requirement than other video compression standards. In addition, to meet various video stream requirements, the VPort 461 can provide up to 3 video streams simultaneously with H.264 and MJPEG compression format. Video streams can be used for different purposes, such as viewing, recording, and analyzing, and the industrial rugged design, which includes a -40 to 75°C operating temperature, IP30 form factor protection, and industrial certifications, make the VPort 461 suitable for harsh environments.
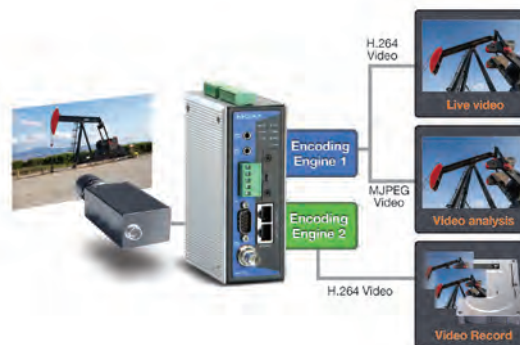
Specifications

Video
Video Compression: H.264 (MPEG4 part 10), MJPEG
Video Inputs: 1, BNC connector
Video Outputs: over Ethernet
Video Streams: Max. of 3 video streams (2 encoders: 1 for H.264, 1 for H.264 and MJPEG)
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QCIF	176 x 112	30	176 x 144	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	30	640 x 480	25
4CIF	704 x 480	30	704 x 576	25
Full D1	720 x 480	30	720 x 576	25

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay

Audio
Audio Inputs: 1 Line-in or MIC-in with 3.5 mm phone jack
Audio Outputs: 1 Line-out with 3.5 mm phone jack

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS, SNMPv1/v2c/v3, DDNS
Ethernet: 2 10/100BaseT(X) auto negotiating RJ45 ports

Serial Port
PTZ Ports: 1, RS-232/422/485 port (terminal block connector), max. speed of 115.2 Kbps, with 15 KV ESD protection
COM Ports: 1, RS-232/422/485 (DB9 female connector), max. speed of 115.2 Kbps, with 15 KV ESD protection
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 2, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 2, max. 24 VDC @ 1 A

LED Indicators
PWR1: Power 1
PWR2: Power 2
FAULT: Can be configured to correspond to system alarm, power failure, or disconnected network
VIDEO: Video input signal
PTZ: PTZ control signal
SD: SD card operation

Local Storage
SD Socket: Standard SD socket, V2.0 (SDHC)

Power Requirements
Input Voltage: 2 24 VDC/VAC power inputs for redundancy
Power Consumption: Approx. 5.5 W

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 52.98 x 135 x 105 mm (2.09 x 5.31 x 4.13 in)
Weight: 900 g

Installation: DIN-Rail mounting, wall mounting (with optional kit)

Alarms

Video Motion Detection: Includes sensitivity tuning (after V2.0)

Video Loss: Video loss alarm

Scheduling: Daily repeat timing schedule

Imaging: JPEG snapshots for pre/trigger/post alarm images

Email/FTP Messaging: Automatic transfer of stored images via email or FTP with event-triggered actions

Custom Alarms: HTTP event servers and CGI events for setting customized alarm actions

PAN/TILT/ZOOM

PTZ Camera Control: Via RS-232/422/485 PTZ port or COM port

PTZ Control Functions: PAN, TILT, ZOOM, FOCUS, moving speed, preset position (max. 25 positions), and 24 custom commands

PTZ Function Updates: Driver upload supported

Supported Device Protocols: Pelco D, Pelco P, Dynacolor DynaDome, Yokogawa (Fieldeye), Cohu, Custom Camera

Transparent PTZ Control: Control PTZ cameras with legacy PTZ control panel or keyboard connected to a PC or VPort decoder

Security

Password: User level password protection

Filtering: By IP address

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)

EMS:

EN61000-4-2 (ESD), level 2

EN61000-4-3 (RS), level 3

EN61000-4-4 (EFT), level 3

EN61000-4-5 (Surge), level 3

EN61000-4-6 (CS), level 3

EN61000-4-8

EN61000-4-11

EMI: FCC Part 15, CISPR (EN55022) class A

Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, D (Pending); ATEX Class I, Zone 2, Ex nC IIC (Pending)

Traffic Control: Complies with NEMA TS2-Section 2

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

System Requirements

CPU: Pentium 4, 2.4 GHz or above

Memory: 512 MB memory or above

OS: Windows XP/2000 with SP2 or above

Browser: Internet Explorer 6.x or above

Multimedia: DirectX 9.0c or above

Software Bundled Free

VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions (unit = mm)

Side View | Front View | Rear View | Top View
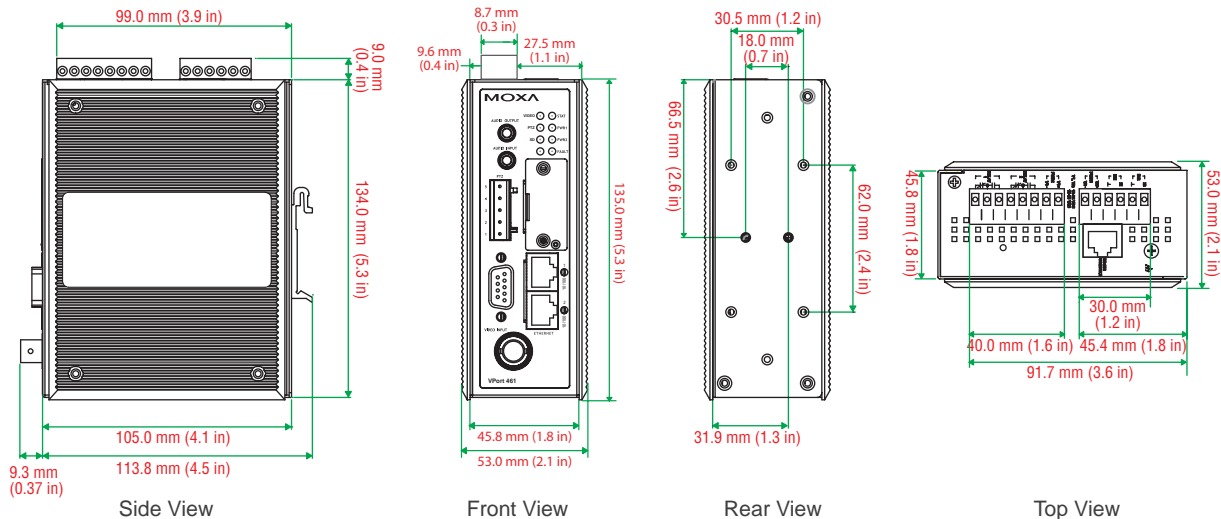
⦂ Ordering Information

Available Models

VPort 461: 1-channel H.264 industrial video encoder with 2 10/100BaseT(X) ports, 0 to 60°C operating temperature

VPort 461-T: 1-channel H.264 industrial video encoder with 2 10/100BaseT(X) ports, -40 to 75°C operating temperature

Optional Accessories (can be purchased separately)

SoftNVR-IA: 32-channel IP surveillance software for industrial automation applications

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies

MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature

WK-46: Wall mounting kit

RK-4U: 4U-high 19" rack mounting kit

VPort 351 Series

Full motion, 1-channel MJPEG/MPEG4 industrial video encoder

> Industrial design with -40 to 75°C operating temperature and fiber optic Ethernet port
> Video stream up to 30 frames/sec at full D1 (720 x 480) resolution
> Pre/post-alarm video recording function for advanced surveillance
> Transparent PTZ control for legacy PTZ control panels and keyboards
> 2-way (1 in, 1 out) audio supported
> Free VPort SDK PLUS and 4-channel video surveillance software

Introduction

The VPort 351 is a high performance, 1-channel industrial video encoder that provides up to full D1, full frame rate performance (NTSC: 720 x 480 @ 30 FPS; PAL: 720 x 576 @ 25 FPS) and supports a dual MJPEG/MPEG4 algorithm, making it especially well-suited for use with distributed surveillance systems in critical industrial applications. In addition, a continuous pre/post event trigger video record function can help system administrators determine why an alarm was triggered, and 2-way audio is provided for the convenience of real-time communication between system administrators located at the central site, and engineers in the field.

Specifications

Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Inputs: 1, BNC connector (1.0 Vpp, 75 ohms)
Video Outputs: 1, loop-through BNC connector
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QVGA	320 x 240	30	320 x 288	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	30	640 x 576	25
4CIF	704 x 480	30	704 x 576	25
Full D1	720 x 480	30	720 x 576	25

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay

Audio
Audio Inputs: 1 Line-in or MIC-in with 3.5 mm phone jack
Audio Outputs: 1 Line-out with 3.5 mm phone jack

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS, SNMPv1/v2c/v3, DDNS
Ethernet: 1 10/100BaseT(X) auto negotiating RJ45 port, or 1 100BaseFX fiber port (Single/multi mode, SC connector)

Serial Port
PTZ Ports: 1, RS-232/422/485 port (terminal block connector), max. speed of 115.2 Kbps
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 2, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 2, max. 24 VDC @ 1 A

LED Indicators
STAT: Indicates if the system booted properly or not
PWR1: Power 1
PWR2: Power 2
FAULT: Can be configured to correspond to system alarm, power failure, or disconnected network
VIDEO: Video input signal active
AUDIO TEST: Audio input signal in test mode
PTZ: PTZ control signal active

Power Requirements
Input Voltage: 2 12/24 VDC or 24 VAC inputs for redundancy
Power Consumption: Max. 8 W

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 52.98 x 135 x 105 mm (2.09 x 5.31 x 4.13 in)
Weight: 960 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Alarms
Pre/Post Alarm: 9 MB memory for video recordings
Video Motion Detection: Includes sensitivity tuning
Video Loss: Video loss alarm
Scheduling: Daily repeat timing schedule
Imaging: JPEG snapshots for pre/trigger/post alarm images
Email/FTP Messaging: Automatic transfer of stored images via email or FTP with event-triggered actions
Custom Alarms: HTTP event servers for setting customized alarm actions

PAN/TILT/ZOOM

PTZ Camera Control: Via RS-232/422/485 PTZ port
PTZ Control Functions: PAN, TILT, ZOOM, FOCUS, moving speed, preset position (max. 25 positions), and 10 custom commands
PTZ Function Updates: Driver upload supported
Supported Device Protocols: Pelco D, Pelco P, Dynacolor DynaDome, Custom Camera
Transparent PTZ Control: Control PTZ cameras with legacy PTZ control panel or keyboard connected to a PC or VPort decoder

Security

Password: User level password protection
Filtering: By IP address

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508
EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11

EMI: FCC Part 15, CISPR (EN55022) class A
Hazardous Location: UL/cUL Class I, Division 2, Groups A, B, C, D
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 272,608 hrs
Database: Telcordia (Bellcore), GB 25°C

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Bundled Free

SoftDVR™ Lite: 1 to 4-ch IP surveillance software for viewing and recording
VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View   Front View   Rear View   Top View

Ordering Information

Available Models		Port Interface		
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100BaseT(X)	Multi-mode, SC Connector	Single-mode, SC Connector
VPort 351	VPort 351-T	1	–	–
VPort 351-M-SC	VPort 351-M-SC-T	–	1	–
VPort 351-S-SC	VPort 351-S-SC-T	–	–	1

Optional Accessories (can be purchased separately)

SoftNVR-IA: 32-channel IP surveillance software for industrial automation applications
SoftNVR: Expandable IP surveillance software for managing up to 64 video channels
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

VPort 251

Full motion, 1-channel MJPEG/MPEG4 video encoder

> Compress analog video/audio signals into MJPEG/MPEG4 video streams
> Video stream up to 30 frames/sec at full D1 (720 x 480) resolution
> 2-way (1 in, 1 out) audio supported
> Transparent PTZ control for using legacy PTZ control panel or keyboard
> Loop-through power output for powering an analog camera
> Free VPort SDK PLUS and 4-channel video surveillance software

CE FC

18

IP Surveillance > VPort 251

: Introduction

The VPort 251 is a high performance, 1-channel video encoder with compact form factor that is suitable for installation in a variety of locations, including outdoor camera cabinets. To make installation easier, the VPort 251 supports both panel mounting and DIN-Rail mounting (with DK-35A accessory), and 1 loop-through power output for powering an analog camera. In addition, the VPort 251 provides up to full D1, full frame rate video performance (NTSC: 720 x 480 up to 30 FPS; PAL: 720 x 576 up to 25 FPS) and supports both MJPEG or MPEG4, making it especially well-suited for use with distributed video surveillance systems. A 2-way audio function is also provided for the convenience of real-time communication between system administrators located at the central site, and engineers in the field.

: Specifications

Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Inputs: 1, BNC connector (1.0 Vpp, 75 ohms)
Video Outputs: Via Ethernet port (1.0 Vpp, 75 ohms)
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QVGA	320 x 240	30	320 x 288	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	30	640 x 576	25
4CIF	704 x 480	30	704 x 576	25
Full D1	720 x 480	30	720 x 576	25

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay

Audio
Audio Inputs: 1 Line-in or MIC-in with 3.5 mm phone jack
Audio Outputs: 1 Line-out with 3.5 mm phone jack

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS, DDNS, SNMPv1/v2c/v3
Ethernet: 1 10/100BaseT(X) auto negotiating RJ45 port

Serial Port
PTZ Ports: 1, RS-232/422/485 (terminal block connector), max. 115.2 Kbps
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 1, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 1, max. 24 VDC @ 1 A

LED Indicators
STAT: Indicates if the system booted properly or not
VIDEO: Video input signal active
PTZ: PTZ control signal active

Power Requirements
Input Voltage: 12/24 VDC or 24 VAC input
Power Consumption: Approx. 6 W
Power Output: 2-pin terminal block connector for loop-through from power input

Physical Characteristics
Housing: Metal
Dimensions: 88.2 x 106 x 50 mm (3.47 x 4.17 x 1.97 in)
Weight: 850 g
Installation: DIN-Rail mounting (with optional kit), wall mounting

Alarms
Video Motion Detection: Includes sensitivity tuning
Video Loss: Video loss alarm
Scheduling: Daily repeat timing schedule
Imaging: JPEG snapshots for pre/trigger/post alarm images
Email/FTP Messaging: Automatic transfer of stored images via email or FTP with event-triggered actions

PAN/TILT/ZOOM
PTZ Camera Control: Via RS-232/422/485 PTZ port
PTZ Control Functions: PAN, TILT, ZOOM, FOCUS, moving speed, preset position (max. 25 positions), and 10 custom commands

PTZ Function Updates: Driver upload supported
Supported Device Protocols: Pelco D, Pelco P, Dynacolor DynaDome, Custom Camera
Transparent PTZ Control: Control PTZ cameras with legacy PTZ control panel or keyboard connected to a PC or VPort decoder

Security
Password: User level password protection
Filtering: By IP address

Environmental Limits
Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EMI: FCC Part 15, CISPR (EN55022) class A
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time: 281,496 hrs
Database: Telcordia (Bellcore), GB 25°C

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Bundled Free
SoftDVR™ Lite: 1 to 4-ch IP surveillance software for viewing and recording
VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View

Top View

Rear View

Front View
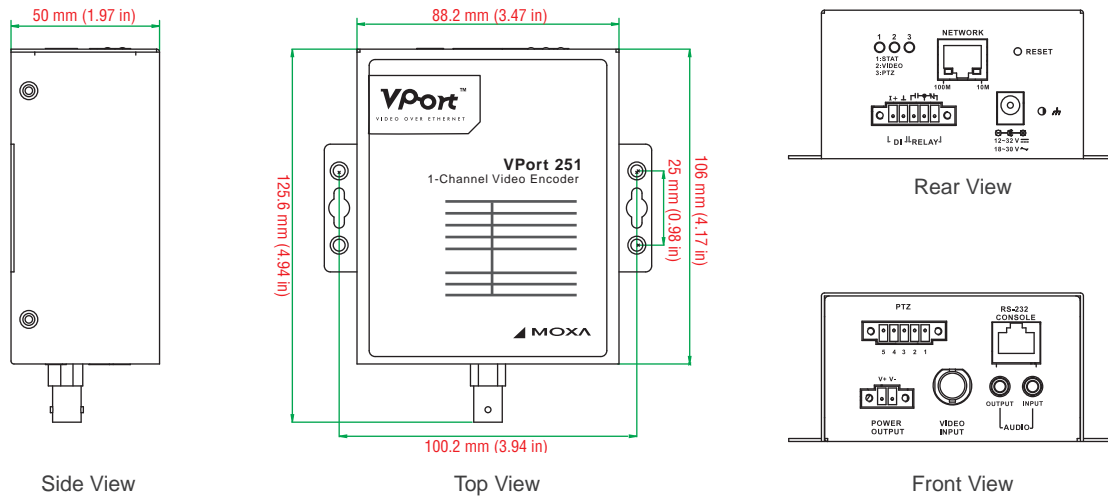
Ordering Information

Available Models
VPort 251: 1-channel MJPEG/MPEG4 video encoder, 0 to 60°C operating temperature

Optional Accessories (can be purchased separately)
SoftNVR-IA: 32-channel IP surveillance software for industrial automation applications
SoftNVR: Expandable IP surveillance software for managing up to 64 video channels
Power Adaptors (required for powering the VPort 251):
• PWR-12120-USJP-S2: L-type (5.5/2.1/9.5) power adaptor, 1.2 A @ 12 VDC output, US/JP plug
• PWR-12120-AU-S2: L-type (5.5/2.1/9.0) power adaptor, 1.2 A @ 12 VDC output, AU plug
• PWR-12150-EU-S2: L-type (5.5/2.1/9.0) power adaptor, 1.5 A @ 12 VDC output, Euro plug
• PWR-12150-UK-S2: L-type (5.5/2.1/9.0) power adaptor, 1.5 A @ 12 VDC output, UK plug
DK-35A: DIN-Rail mounting kit (35 mm)

18

IP Surveillance > VPort 251

VPort 354 Series

Full motion, 4-channel MJPEG/MPEG4 industrial video encoders

> Industrial design with -34 to 74°C operating temperature and fiber optic Ethernet port
> 2 Ethernet ports for cascade and port redundancy
> SD card slot for local storage capability
> Modbus/TCP supported for easy communication with SCADA software
> Video stream up to 120 frames/sec at 4CIF (704 x 480) resolution

NEMA TS2 CE FC

: Introduction

The VPort 354 is a high performance, 4-channel industrial video encoder that provides up to 4CIF full frame rate performance (NTSC: 704 x 480 @ 30 FPS; PAL: 704 x 576 @ 25 FPS) for each channel, and supports a dual MJPEG/MPEG4 algorithm, making it especially well-suited for use with distributed surveillance systems in critical industrial applications. In addition to the rugged-design features, the Modbus/

TCP and serial-to-Ethernet connectivity make the VPort 354 more suitable for industrial applications. The two built-in Ethernet ports can be cascaded as a daisy-chain or used for port redundancy, making network communication more safe and reliable. To prevent video loss when the network is down, the VPort 354 can automatically record video on an SD card, and once the network is back up, the recorded video can be downloaded via FTP access.

: Specifications

Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Inputs: 4, BNC connector (1.0 Vpp, 75 ohms)
Video Streams: Dual streams (one for MJPEG, the other for MPEG4) at the same video resolution (note that MJPEG only has one quality setting)
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QCIF	176 x 112	30	176 x 144	25
CIF	352 x 240	30	352 x 288	25
2CIF	704 x 240	30	704 x 288	25
4CIF	704 x 480	30	704 x 576	25

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay
Video Output: Via Ethernet port

Audio
Audio Inputs: 1 Line-in or MIC-in with RCA connector
Audio Outputs: 1 Line-out with RCA connector

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS, SNMPv1/v2c/v3, DDNS
Ethernet: 2 10/100BaseT(X) auto negotiating RJ45 ports, or 2 100BaseFX fiber ports (single/multi-mode, SC connector)

Serial Port
PTZ Ports: 1, RS-232/422/485 port (terminal block connector), max. speed of 115.2 Kbps, with 15 KV ESD protection

COM Ports: 1, RS-232/422/485 (DB9 female connector), max. speed of 115.2 Kbps, with 15 KV ESD protection
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 4, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 2, max. 24 VDC @ 1 A

LED Indicators
PWR1: Power 1
PWR2: Power 2
FAULT: Can be configured to correspond to system alarm, power failure, or disconnected network
V1, V2, V3, V4: Video input signal activity

Local Storage
SD Socket: Standard SD socket, SDHC, with SD LED indicator

Power Requirements
Input Voltage: 2 12/24 VDC or 24 VAC inputs for redundancy
Power Consumption: Approx. 12 W

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight: 1200 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Alarms
Video Motion Detection: Includes sensitivity tuning (Pending)
Video Loss: Video loss alarm
Scheduling: Daily repeat timing schedule
Imaging: JPEG snapshots for pre/trigger/post alarm images
Email/FTP Messaging: Automatic transfer of stored images via email or FTP with event-triggered actions

Custom Alarms: HTTP event servers and CGI events for setting customized alarm actions

PAN/TILT/ZOOM
PTZ Camera Control: Via RS-232/422/485 PTZ port or COM port
PTZ Control Functions: PAN, TILT, ZOOM, FOCUS, moving speed, preset position (max. 25 positions), and 10 custom commands
PTZ Function Updates: Driver upload supported
Supported Device Protocols: Pelco D, Pelco P, Dynacolor DynaDome, Yokogawa (Fieldeye series), Cohu Custom Camera
Transparent PTZ Control: Control PTZ cameras with legacy PTZ control panel or keyboard connected to a PC or VPort decoder

Security
Password: User level password protection
Filtering: By IP address

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -34 to 74°C (-29 to 165°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508 (Pending)

EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 2
EN61000-4-8
EN61000-4-11
EMI: FCC Part 15, CISPR (EN55022) class A
Traffic Control: Complies with NEMA TS2-Section 2
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Bundled Free
SoftDVR™ Lite: 1 to 4-ch IP surveillance software for viewing and recording
VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View   Front View   Rear View   Top View

⠿ Ordering Information

Available Models		Port Interface		
Standard Temperature (0 to 60°C)	Wide Temperature (-34 to 74°C)	10/100BaseT(X)	Multi-mode, SC Connector	Single-mode, SC Connector
VPort 354	VPort 354-T	2	–	–
VPort 354-MM-SC	-	–	2	–
VPort 354-SS-SC	-	–	–	2

Optional Accessories (can be purchased separately)
SoftNVR-IA: 32-channel IP surveillance software for industrial automation applications
SoftNVR: Expandable IP surveillance software for managing up to 64 video channels
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

VPort 254 Series

Rugged 4-channel MJPEG/MPEG4 industrial video encoders

> Industrial design with -40 to 75°C operating temperature and fiber optic Ethernet port
> Video stream up to 120 frames/sec at CIF (352 x 240) resolution
> Modbus/TCP supported for easy communication with SCADA software
> One RS-232/422/485 COM port for controlling external serial devices over Ethernet
> Free VPort SDK PLUS and 4-channel video surveillance software

Introduction

The rugged VPort 254 is a 4-channel industrial video encoder that provides up to 120 FPS at CIF resolution (NTSC: 352 x 240; PAL: 352 x 288), and supports an optional MJPEG/MPEG4 algorithm, making it especially well suited for use with distributed surveillance systems in critical industrial applications. In addition, the VPort 254 supports serial-to-Ethernet and Modbus/TCP communications for integrating automation systems, and 2-way audio is provided to allow real-time communication between system administrators located at a central site and engineers in the field.

Specifications

Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Inputs: 4, BNC connector (1.0 Vpp, 75 ohms)
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QVGA	320 x 240	30	320 x 288	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	7	640 x 576	7
4CIF	704 x 480	7	704 x 576	7
Full D1	720 x 480	7	720 x 576	7

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay

Audio
Audio Inputs: 1 Line-in or MIC-in with RCA connector
Audio Outputs: 1 Line-out with RCA connector

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS (ToS), SNMPv1/v2c/v3, DDNS, Modbus/TCP
Ethernet: 1 10/100BaseT(X) auto negotiating RJ45 port, or 1 100BaseFX fiber port (single/multi-mode, SC connector)

Serial Port
PTZ Ports: 1, RS-232/422/485 port (terminal block connector), max. speed of 115.2 Kbps, with 15 KV ESD protection
COM Ports: 1 RS-232/422/485 port (DB9 female connector), max. speed of 115.2 Kbps, with 15 KV ESD protection
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 4, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 2, max. 24 VDC @ 1 A

LED Indicators
STAT: Indicates if the system booted properly or not
PWR1: Power 1
PWR2: Power 2
FAULT: Can be configured to correspond to system alarm, power failure, or disconnected network
V1, V2, V3, V4: Video input signal activity

Power Requirements
Input Voltage: 2 12/24 VDC or 24 VAC inputs for redundancy
Power Consumption: Approx. 10 W

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 80.2 x 135 x 105 mm (3.16 x 5.31 x 4.13 in)
Weight: 1100 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

Alarms
Video Motion Detection: Includes sensitivity tuning
Video Loss: Video loss alarm
Scheduling: Daily repeat timing schedule
Imaging: JPEG snapshots for pre/trigger/post alarm images
Email/FTP Messaging: Automatic transfer of stored images via email or FTP with event-triggered actions
Custom Alarms: HTTP event servers for setting customized alarm actions

PAN/TILT/ZOOM
PTZ Camera Control: Via RS-232/422/485 PTZ port or COM port

PTZ Control Functions: PAN, TILT, ZOOM, FOCUS, moving speed, preset position (max. 25 positions), and 10 custom commands
PTZ Function Updates: Driver upload supported
Supported Device Protocols: Pelco D, Pelco P, Dynacolor DynaDome, Custom Camera
Transparent PTZ Control: Control PTZ cameras with legacy PTZ control panel or keyboard connected to a PC or VPort decoder

Security
Password: User level password protection
Filtering: By IP address

Environmental Limits
Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals
Safety: UL508
EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11

EMI: FCC Part 15, CISPR (EN55022) class A
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)
Time: 197,767 hrs
Database: Telcordia (Bellcore), GB 25°C

Warranty
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Software Bundled Free
SoftDVR™ Lite: 1 to 4-ch IP surveillance software for viewing and recording
VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View   Front View   Rear View   Top View

:: Ordering Information

Available Models		Port Interface		
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 75˚C)	10/100BaseT(X)	Multi-mode, SC Connector	Single-mode, SC Connector
VPort 254	VPort 254-T	1	–	–
VPort 254-M-SC	VPort 254-M-SC-T	–	1	–
VPort 254-S-SC	VPort 254-S-SC-T	–	–	1

Optional Accessories (can be purchased separately)
SoftNVR-IA: 32-channel IP surveillance software for industrial automation applications
SoftNVR: Expandable IP surveillance software for managing up to 64 video channels
DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

VPort D351

1-channel MJPEG/MPEG4 industrial video decoder

> Decode MJPEG and MPEG4 video streams to an analog video signal automatically
> Manual selection or automatic scan with maximum of 64 video sources
> 2-way (1 in, 1 out) audio supported
> Transparent PTZ control with legacy PTZ controller
> SNMP for network management

Introduction

The VPort D351 is a 1-channel video decoder for decoding MPEG4/MJPEG video streams from the the VPort 25 IP camera and VPort 251, VPort 254, VPort 351, and VPort 354 video encoders back to analog video signals. The analog video signal can be sent to legacy CCTV devices, such as monitors, multiplexers, and matrix switches, which can be used as originally intended as part of CCTV systems. In addition, bi-directional audio enables ready-to-use voice-over-IP

communication between the video encoder and decoder. Monitoring your cameras that are part of a large CCTV system is easy with the VPort D351, which can be set up to switch between different video sources either manually or automatically within a given time interval. Up to 64 video sources can be included in the list. In addition, the two DIs located on the top panel of the VPort D351 can be used to create two control buttons for up and down video source selection.

Specifications

Video
Video Decoding: MPEG4, MJPEG (auto-detecting)
Video Inputs: Accepts video streams from VPort series video encoders (VPort 251, VPort 254, VPort 351, VPort 354) and the VPort 25 IP camera over TCP/IP networks
Video Outputs: 1, BNC connector (1.0 Vpp, 75 ohms), NTSC or PAL
Video Resolution: Max. of 540 TVL lines
Video Sources: Up to 64, selected manually by web server or digital inputs, or selected automatically by scanning within a set time interval
Video Viewing:
• Max. 30/25 FPS (NTSC/PAL) can be decoded
• OSD (on-screen display) with video source, video source IP, date/time, and customized information

Audio
Audio Inputs: 1 Line-in or Mic-in with 3.5 mm phone jack
Audio Outputs: 1 Line-out with 3.5 mm phone jack

Network
Protocols: TCP, UDP, HTTP, SMTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, SNMPv1/v2c/v3
Ethernet: 1 10/100BaseT(X) auto negotiating RJ45 port

Serial Port
PTZ Ports: 1, RS-232/422/485 (terminal block connector), max. 115.2 Kbps
Console Port: 1 RS-232 RJ45 port

GPIO
Digital Inputs: 2, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 2, max. 24 VDC @ 1 A

LED Indicators
STAT: Indicates if the system booted properly or not
PWR1: Power 1
PWR2: Power 2
FAULT: Can be configured to correspond to system alarm, power failure, or disconnected network

Power Requirements
Input Voltage: 2 12/24 VDC or 24 VAC inputs for redundancy
Power Consumption: Max. 8 W

Physical Characteristics
Housing: Metal, IP30 protection
Dimensions: 52.98 x 135 x 105 mm (2.09 x 5.31 x 4.13 in)
Weight: 910 g
Installation: DIN-Rail mounting, wall mounting (with optional kit)

PAN/TILT/ZOOM
PTZ Camera Control: Transparent PTZ camera control with legacy PTZ controller through the RS-232/422/485 PTZ port

Security
Password: User level password protection
Filtering: By IP address

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508
EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 2
EN61000-4-8
EN61000-4-11

EMI: FCC Part 15, CISPR (EN55022) class A
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

## MTBF (meantime between failures)

Time: 275,819 hrs
Database: Telcordia (Bellcore), GB 25°C

Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Side View   Front View   Rear View   Top View
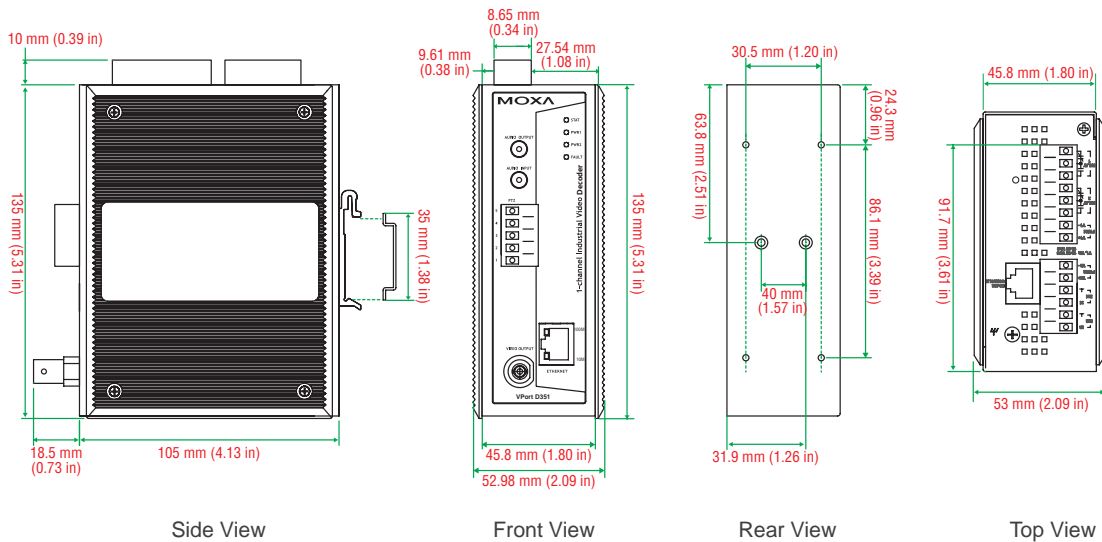
∷ Ordering Information

Available Models

VPort D351: 1-channel MJPEG/MPEG4 industrial video decoder, 0 to 60°C operating temperature

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

VPort 25 Series

IP66, day-and-night vandal-proof fixed dome IP camera for outdoors

> -40 to 50°C operating temperature; heater or fan not required
> IP66-rated for protection from rain and dust
> Direct-wired power input and PoE for power redundancy
> Up to 30 frames/sec at 720 x 480 resolution
> One camera lens for both day and night use

CE FC

18

IP Surveillance › VPort 25 Series

: Introduction

The VPort 25 is a vandal-proof, IP66-rated, fixed dome IP camera for use in harsh, outdoor environments. With a maximum resolution of 520 TVL and day-and-night CCD camera lens, the VPort 25 is especially well-suited for high performance video surveillance applications. The VPort 25's IP66-rating provides protection against dust and rain, and the vandal-proof form factor design prevents damage from unexpected external forces. In addition, the case-open sensor sends an alarm message when the VPort 25's outer case is opened.

Heater and Fan not Required; Supports Direct-wired Power Input and PoE for Power Redundancy

The VPort 25's no-heater/fan-less embedded system provides greater reliability for outdoor use. In addition, the camera comes with redundant power inputs: (1) direct power connection (12/24 VDC and 24 VAC), and (2) PoE (IEEE 802.3af) power input.

High Performance Video with Full Motion MJPEG/MPEG4 Video Stream

The VPort 25 uses the ASIC compression chip, which provides video performance up to full D1 (720 x 480) @ 30 FPS. To meet a wider range of customer requirements, the VPort 25 supports dual-codecs, including the MJPEG and MPEG4 algorithms.

: Specifications

Camera
Sensor: 1/3" Sony Super HAD or 1/3" Sony ExView
Lens:
Wide-end: F1.4, diagonal 115.4°, horizontal 90.3°
Tele-end: F2.4, diagonal 39.8°, horizontal 31.9°
Focal Length: F= 3.7-12 mm
Modulation: NTSC or PAL
Camera Angle: Pan: ±180°; tilt: ±85°, rotation: ±170° (camera angles controlled manually)
Illumination:
Color: 0.2 Lux at F1.2
Black and white: 0.03 Lux at F1.2
Synchronization: Internal
Gamma Correction: 0.45
White Balance: Auto tracking white balance
Electronic Shutter Speed: 1/60 (50) second to 1/100,000 second, automatic
S/N Ratio: More than 50 dB (AGC off)
AGC Control: On/Off
Flickerless Control: On/Off
Backlight Compensation: On/Off
Mirror: On/Off
Auto Exposure, Auto Iris:
On: Auto exposure
Off: Auto iris
Horizontal Resolution: 420/520 TVL

Effective Pixels:
NTSC: 510 x 492 (middle resolution), 768 x 494 (high resolution)
PAL: 500 x 582 (middle resolution), 752 x 582 (high resolution)
Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QVGA	320 x 240	30	320 x 288	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	30	640 x 576	25
4CIF	704 x 480	30	704 x 576	25
Full D1	720 x 480	30	720 x 576	25

Video Viewing:
• Adjustable image size and quality
• Timestamp and text overlay
Video Output: Via Ethernet port or BNC connector (1.0 Vpp, 75 ohms)
Audio
Audio Inputs: 1 Line-in or MIC-in with 2-pin terminal block connector
Audio Outputs: 1 Line-out with 2-pin terminal block connector
Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, QoS, SNMPv1/v2c/v3, DDNS

Ethernet: 1 10/100BaseT(X) auto negotiating RJ45 port

GPIO

Digital Inputs: 1, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 1, max. 24 VDC @ 1A

LED Indicators

STAT: Indicates if the system booted properly
Network: 1 LED for 10 Mbps, 1 LED for 100 Mbps
System: Power On/Off
DIP Switch: To turn the LED light On/Off

Power Requirements

Input Voltage: Redundant power inputs
• 12/24 VDC or 24 VAC with 2-pin terminal block connector
• Power-over-Ethernet (IEEE 802.3af)
Power Consumption: Max. 9.5 W

Physical Characteristics

Housing: IP66-rated for rain and dust protection, vandal-proof supports
Diameter: 142 mm (5.59 in)
Height: 118.9 mm (4.68 in)
Weight: 1700 g
Installation: Surface mounting, wall mounting

Alarms

Video Motion Detection: Includes sensitivity tuning
Video Loss: Video loss alarm
Case-open Sensor: Built in case-open sensor alarm
Scheduling: Daily repeat timing schedule
Imaging: JPEG snapshots for pre/trigger/post alarm images
Custom Alarms: HTTP event servers for setting customized alarm actions

Security

Password: User level password protection
Filtering: By IP address

Environmental Limits

Operating Temperature: -40 to 50°C (-40 to 122°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EMI: FCC Part 15, CISPR (EN55022) class A
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 74,155 hrs
Database: Telcordia (Bellcore), GB 25°C

Warranty

Warranty Period: 3 years
Details: See www.moxa.com/warranty

Software Bundled Free

SoftDVR™ Lite: 1 to 4-ch IP surveillance software for viewing and recording
VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View   Front View   Rear View
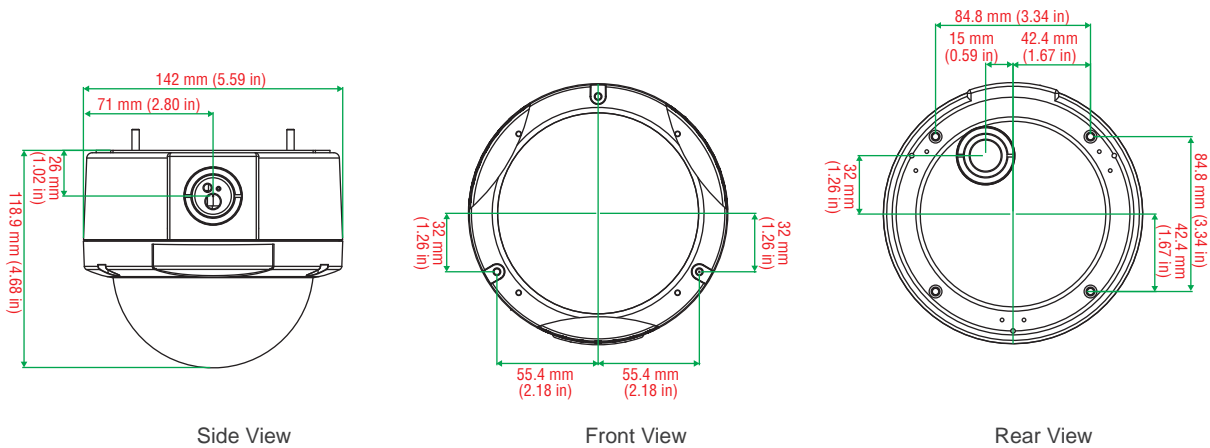
⁞ Ordering Information

Availabe Models	Camera Sensor		Modulation	
	SuperHAD	**Exview**	**NTSC**	**PAL**
VPort 25-CAM3S52N	✓	–	✓	–
VPort 25-CAM3S52P	✓	–	–	✓
VPort 25-CAM3E52N	–	✓	✓	–
VPort 25-CAM3E52P	–	✓	–	✓

: IP Camera Mounting Accessories

Mounting Kit

For mounting dome camera onto straight tube, gooseneck tube, or mini pendant

VP-MK
Height: 71 mm (2.8 in)
Diameter: 132.4 mm (5.21 in)
Weight: 300 g (0.7 lbs)
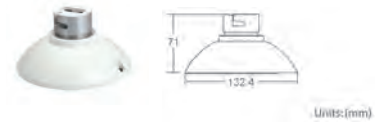
Straight Tube

VP-ST1 or VP-ST2
Height: 250 mm (9.84 in) or 500 mm (19.69 in)
Diameter: 50 mm (1.97 in)
Weight: 1000 g (2.2 lbs)/1800 g (4 lbs)
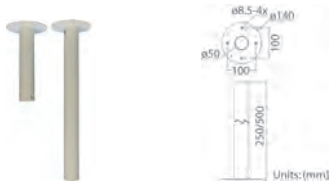
Gooseneck Tube

VP-GT
Dimensions: 323 x 385 mm (11.73 x 15.16 in)
Diameter: 92 x 42 mm (3.62 x 1.65 in)
Weight: 2100 g (4.6 lbs)
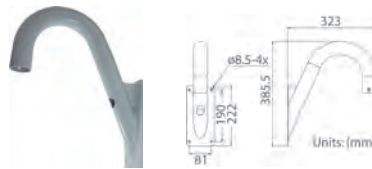
Mini Pendant

VP-MP
Dimensions:
184 x 104 x 115.2 mm (7.24 x 4.09 x 4.54 in)
Diameter: 44.5 mm (1.75 in)
Weight: 600 g (1.3 lbs)
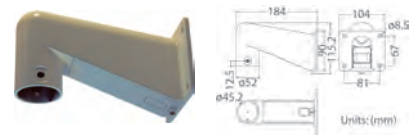
Wall Box Mounting

For mounting gooseneck and mini pendants on a wall

VP-WBM
Dimensions:
270 x 166 x 95 mm (10.63 x 6.54 x 3.74 in)
Weight: 2200 g (4.8 lbs)

Standard Corner Mounting Plate

For mounting gooseneck and mini pendants in a corner

VP-CST
Dimensions:
222 x 204 x 117 mm (8.74 x 8.03 x 4.61 in)
Weight: 2000 g (4.4 lbs)
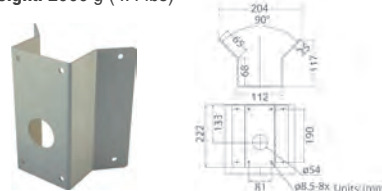
Mini Corner Plate

For mounting gooseneck and mini pendants in a corner

VP-CSTM
Dimensions:
270 x 166 x 95 mm (10.63 x 6.54 x 3.74 in)
Weight: 800 g (1.8 lbs)

Outdoor Thin Pole Direct Mounting

For mounting gooseneck and mini pendants on a pole

VP-PTD
Dimensions:
232 x 136 x 50 mm (9.13 x 5.35 x 1.97 in)
Recommended Pole Diameter:
112 to 140 mm (4.4 to 5.5 in)
Weight: 700 g (1.6 lbs)
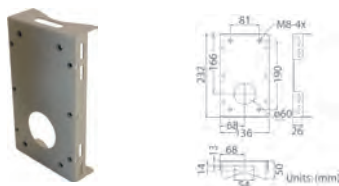
Outdoor Wide Pole Direct Mounting

For mounting gooseneck and mini pendants on a pole

VP-PWD
Dimensions:
270 x 170 x 60 mm (10.63 x 6.69 x 2.36 in)
Recommended Pole Diameter:
112 to 130 mm (4.4 to 5 in)
Weight: 1000 g (2.2 lbs)
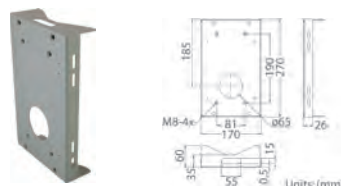
Stainless Steel Straps

For direct pole mounting or mounting a pole box on a pole

VP-SS1
Length: 700 mm (27.56 in)
Width: 16 mm (0.63 in)
Weight: 20 g (0.04 lbs)
Note: Four straps are shipped with each order

18

IP Surveillance › VPort 25 Series

VPort 15-M12 Series

EN50155-compliant, 1.3-megapixel, compact fixed dome IP cameras

> Meets EN50155:2007 criteria for rolling stock applications
> Provides MPEG4 and MJPEG dual video streams simultaneously
> Power-over-Ethernet (IEEE 802.3af) supported for less cabling and easy installation
> Hardened M12 Ethernet connectors for high vibration environments
> -25 to 55°C operating temperature
> VPort SDK PLUS provided free

EN50155 CE FC

: Introduction

The VPort 15-M12 is a 1.3 megapixel, compact, fixed-dome type IP camera that features a 1/3.8" Sony Progressive sensor for generating excellent image quality, even in low-light conditions. With an M12 connector and IP66 rain and dust protection, the VPort 15-M12 is well suited for high vibration and outdoor environments such as in trains and buses.

Meets EN50155's Criteria for Rolling Stock Applications

The EN50155 standard is the most basic and most important requirement for electronic devices and equipment used in railway carriages. The VPort 15-M12 meets the majority of the criteria stipulated by EN50155:2007, such as suitability for wide temperature and high vibration and shock environments, and is an optimal solution for railway carriages.

Rugged Design for Mission-critical Industrial Environments

- -25 to 55°C wide operating temperature
- M12 Ethernet connector for high vibration environments
- Power-over-Ethernet (IEEE 802.3af) supported for less cabling and easy installation
- IP66 protection for rain and dust
- Hardened surface installation

High Resolution and High Performance Video Streams

- 1/3.8", 1.3 megapixel progressive CMOS sensor
- Simultaneous MPEG4 and MJPEG video stream (dual streams)
- Supports 1280 x 960 (4VGA, MJPEG), VGA, QVGA, CIF, QCIF resolutions
- Max. frame rates:
  MPEG4: 30 FPS @ VGA, MJPEG: 15 FPS @ 1280 x 960

Auto-configuration Function for Mass Installation and Maintenance

The VPort 15-M12 series supports an auto-configuration function for mass installation and maintenance, which is particularly useful when your system includes large numbers of VPorts. With centralized backups of the configuration files of all VPorts in the system, as well as support for DHCP 66/67 and TFTP, the system integrator or administrator can save a lot of time and effort by installing new VPorts or recovering existing VPorts by downloading the configuration files automatically.

: Specifications

Camera
Sensor: 1/3.8" Sony Progessive CMOS
Picture Elements: 1280 (H) x 960 (V), 1.3 megapixels
Lens: F1.8, focal length = 4.3 mm
Angle of View: 83.1°
Camera Angle: 0-90° (Tilt and Pan)
Illumination: 0.1 Lux @ F1.8
Brightness: Manual control

Synchronization: Internal
Exposure: Auto and manual control modes
Sharpness: Manual control
Contrast: Manual control
White Balance: Auto, indoor, outdoor, manual control modes
Backlight Compensation: On/Off
Rotation: Flip, Mirror, and 180° Rotate
Horizontal Resolution: > 700TVL

Video

Video Compression: MJPEG and MPEG4 (ISO/IEC 14496-2)
Video Outputs: Via Ethernet
Video Streams: Maximum of 2 video streams (1 MPEG4 and 1 MJPEG)
Video Resolution:
• MPEG4: VGA, QVGA, CIF, QCIF
• MJPEG: 1280 x 960 (4VGA), VGA, CIF, QVGA, QCIF
FPS (Frames per second):
• MPEG4: 30 FPS @ VGA
• MJPEG: 15 FPS @ 1280 x 960

Network

Protocols: TCP, UDP, HTTP, Multicast, SMTP, FTP, Telnet, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, QoS, SNMPv1/v2c/v3, DDNS, TFTP, DHCP 66/67
Ethernet: 1 10/100BaseT(X) M12 D-code connector

Power Requirements

Input: Power-over-Ethernet (IEEE 802.3af)

Physical Characteristics

Housing: Plastic, IP66-rated for rain and dust protection
Dimensions: 110 x 47 mm (4.33 x 1.85 in)
Installation: Surface mounting

Security

Password: User level password protection
Filtering: By IP address

Environmental Limits

Operating Temperature: -25 to 55°C (-13 to 131°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EMI: FCC Part 15, CISPR (EN55022) class A
Rolling Stock: EN50155: 2007 compliance (shock, vibration, temperature, and EMC)
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 3 years
Details: See www.moxa.com/warranty

Software Bundled Free

VPort SDK PLUS: Includes CGI commands, ActiveX Control, and API library for customized applications or system integration for third-party developers (the latest version of SDK is vailable for download from Moxa's website).

Dimensions

Side View

Top View

47.66 mm (1.88 in)

110.21 mm (4.34 in)
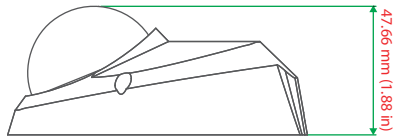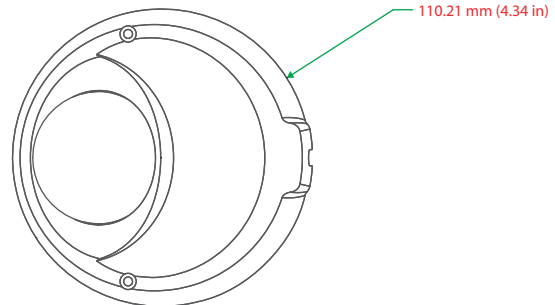
: Ordering Information

Available Models

VPort 15-M12-PAL: EN50155, 1.3 megapixel, compact fixed dome IP camera with M12 Ethernet connector, PAL modulation
VPort 15-M12-NTSC: EN50155, 1.3 megapixel, compact fixed dome IP camera with M12 Ethernet connector, NTSC modulation

VPort 704

4-slot modular industrial multi-service gateway

> Hot-swappable capability for versatile modules
> -40 to 75°C operating temperature
> High MTBF with passive backplane and fanless design
> Automatically detect and configure the module's IP address
> Moxa Turbo Ring supported (recovery time < 50 ms)

CE FC

⠿ Introduction

The VPort 704 series modular industrial multi-service gateways come with 3 built-in Gigabit ports, 3 10/100 Mbps fast Ethernet ports, and 4 slots for installing Ethernet, serial, or power interface modules. The 4 slots accept a versatile assortment of communications modules, including an IP video encoder (VPM-7304), serial-to-Ethernet module (VPM-7704), and other modules that adhere to the design rules for VPort 704 modules. The modular design turns the VPort 704 into an extremely versatile communications interface, and makes the VPort 704 particularly well suited for use at field sites.

The VPort 704's -40 to 75°C wide operating temperature, metal housing, passive backplane, and fanless design make it particularly well suited for harsh industrial environments and mission-critical applications, including oil and gas, trackside, and city traffic monitoring systems.

Modular, Integrated Solutions

The VPort 704 industrial multi-service gateway can be used with a variety of modules for field site device communication applications.

Gigabit
Ethernet

Turbo
Ring

Other Communication Modules

Device Server Module

Video Encoder Module

Rugged Design

- Passive backplane and fanless design for high MTBF
- Hot swappable for low MTBR
- -40 to 75°C wide operating temperature
- Rugged aluminum housing
- Redundant 24 VDC power inputs
- CE, FCC, UL508, NEMA TS2 compliance

Redundant 24VDC power inputs   Metal case

Wall mounting

Heat sink

4 slots

Easy to Use

- Visual GUI for system and connection status
- Easy IP configuration
- One web console for configuring all modules
- System diagnosis for easy maintenance

MOXA® ▶ www.moxa.com ▶ info@moxa.com

Dimensions

Side View   Front View   Top View

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX/EZX
IEEE 802.3x for Flow Control
IEEE 802.1D for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, Modbus/TCP, LLDP

MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9

Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: 3 10/100BaseT(X) RJ45 ports
Gigabit Ethernet: 3 10/100/1000BaseT(X) ports, auto negotiation speed, or 3 1000BaseSFP slots for fiber ports
Console Port: RS-232 (RJ45 connector)
Alarm Contact: 1 relay output with current carrying capacity of 1 A @ 24 VDC

Power Requirements

Input Voltage: Dual 24 VDC power inputs for reduncancy
Power Consumption: 14.5 watts (without modules)
Overload Current Protection: Present
Connection: 2 removable 3-pin terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal
Dimensions: 286.5 x 144 x 137 mm (11.26 x 5.67 x 5.39 in)
Weight: 2.79 kg (includes four slot covers)
Installation: Wall mounting

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)
EMS:
EN61000-4-2 (ESD), level 2
EN61000-4-3 (RS), level 3
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EMI: FCC Part 15, CISPR (EN55022) class A
Shock: IEC60068-2-27
Freefall: IEC60068-2-32
Vibration: IEC60068-2-6

: Ordering Information

Available Models

VPort 704: 4-slot industrial multi-service gateway, 3 combo Gigabit ports, 3 10/100baseT(x) ports, -40 to 75°C operating temperature

Communication Modules

VPM-7304: 4-channel MPEG4/MJPEG video encoder module
VPM-7704: 4-port RS-232/422/485 3-in-1 device server module

Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature

VPM-7304

4-port MPEG4/MJPEG video encoder module for the VPort 700 series

> 4-channel video input
> Video streams up to 120 frames/second at CIF resolution
> Dual codec with MJPEG and MPEG4
> 2-way (1 in, 1 out) audio supported
> 1 RS-232/422/485 PTZ port
> 4 digital inputs, 1 relay output

Note: The VPM-7304 module must be used with a VPort 700 series industrial multi-service gateway.

CE FC

⠿ Specifications

Video
Video Compression: MJPEG or MPEG4 (ISO/IEC 14496-2)
Video Inputs: 4, BNC connector (1.0 Vpp, 75 ohms)
NTSC/PAL: Auto-sensing or manual
Video Resolution and FPS (frames per second):

	NTSC		PAL	
	Size	Max. FPS	Size	Max. FPS
QVGA	320 x 240	30	320 x 288	25
CIF	352 x 240	30	352 x 288	25
VGA	640 x 480	7	640 x 576	7
4CIF	704 x 480	7	704 x 576	7
Full D1	720 x 480	7	720 x 576	7

Video Viewing: Adjustable image size and quality

Audio
Audio Inputs: 1 Line-in or MIC-in with 3.5 mm phone jack
Audio Outputs: 1 Line-out with 3.5 mm phone jack

Network
Protocols: TCP, UDP, HTTP, SMTP, FTP, NTP, DNS, DHCP, UPnP, RTP, RTSP, ICMP, IGMPv3, SNMPv1/v2c/v3, DDNS, Modbus/TCP

Serial Port
PTZ Ports: 1, RS-232/422/485 port (terminal block connector), max. speed of 115.2 Kbps, with 15 KV ESD protection

GPIO
Digital Inputs: 4, max. 8 mA
High: +13 to +30 V; Low: -30 to +3 V
Relay Outputs: 1, max. 24 VDC @ 1 A

LED Indicators
STAT: Indicates if the system boots properly or not
FAULT: Can be configured to correspond to system alarm, power failure, video loss, or disconnected network

Power Requirements
Power Consumption: 7.2 W

Physical Characteristics
Housing: Metal
Dimensions: 41 x 138 x 139 mm (1.61 x 5.43 x 5.47 in)
Weight: 560 g
Installation: Mounted in a VPort 700 series slot

Dimensions

124.9 mm (4.9 in)
116.3 mm (4.6 in)
14.4 mm (0.6 in)
41.2 mm (1.6 in)
137.6 mm (5.4 in)

Side View   Front View

Top & Bottom Views
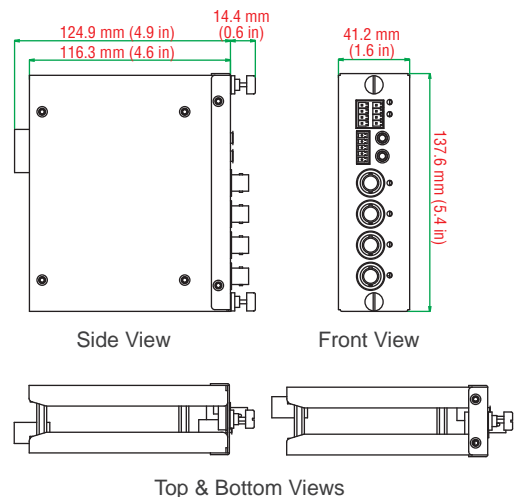
⠿ Ordering Information

Available Models
VPM-7304: 4-channel MPEG4/MJPEG video encoder module

VPM-7704

4-port RS-232/422/485 serial device server module for the VPort 700 series

> 4 serial ports supporting RS-232, RS-422, and RS-485
> Versatile socket operation modes, including TCP Server, TCP Client, and UDP
> SNMP MIB-II for network management
> Baudrates up to 921.6 Kbps (nonstandard baudrates supported)

Note: The VPM-7704 module must be used with a VPort 700 series industrial multi-service gateway.

CE FC

18

IP Surveillance > VPM-7704

: Specifications

Serial Interface
Serial Standards: RS-232/422/485
Number of Ports: 4 (RJ45 connectors)
Serial Line Protection: 15 KV ESD protection for all signals
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Serial Communication Parameters
Data Bits: 5, 6, 7, 8
Stop Bits: 1, 1.5, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: DSR/DTR and RTS/CTS (RS-232 only), XON/XOFF
Baudrate: 50 bps to 921.6 Kbps

Serial Signal
RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Power Requirements
Power Consumption: Approx. 5 W

Physical Characteristics
Housing: Metal
Dimensions: 41 x 138 x 139 mm (1.61 x 5.43 x 5.47 in)
Weight: 530 g
Installation: Mounted in a VPort 700 series slot
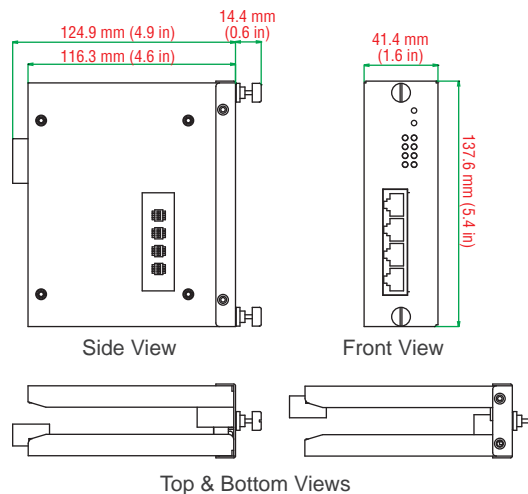
Dimensions

124.9 mm (4.9 in)
14.4 mm (0.6 in)
116.3 mm (4.6 in)
41.4 mm (1.6 in)
137.6 mm (5.4 in)

Side View

Front View

Top & Bottom Views

Pin Assignment

8-pin RJ45 connector
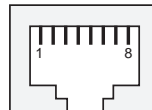
PIN	RS-232	RS-422/485-4w	RS-485-2w
1	DSR	–	–
2	RTS	TxD+	–
3	GND	GND	GND
4	TxD	TxD-	–
5	RxD	RxD+	Data+
6	DCD	RxD-	Data-
7	CTS	–	–
8	DTR	–	–

: Ordering Information

Available Models
VPM-7704: 4-port RS-232/422/485 device server module

SoftNVR-IA V1.0

32-channel IP video surveillance software designed for industrial automation systems

> Up to 32 channels in one system
> Create an OPC server for easy communication with automation systems
> Live view with H.264, MPEG4, and MJPEG, from VPort products
> Dual monitor display capability
> Video recording with manual control, event-trigger, and schedule setting
> Playback system with search by event and time
> Supports English, Traditional Chinese, and Simplified Chinese

⠿ Introduction

The SoftNVR-IA 32-channel IP surveillance software is designed for use with industrial applications. One of the key features of SoftNVR-IA is a built-in OPC server, which can communicate directly with industrial automation systems (SCADA, HMI, etc.). To enhance system intelligence, video recording and alarms can be triggered by events such as Digital Input and Video Loss that are supported by SoftNVR-IA, as well as events in automation systems. Most importantly, SoftNVR-IA gives industrial system integrators unlimited capability for integrating IP surveillance systems with automation systems.

OPC communication

- Can receive event tags sent from the automation system to trigger video recording and other actions
- Can send event tags to the automation system with system information and the status of each channel

Live View

- Supports 1, 4, 6, 9, 10, 13, 16, 25, 32 live display
- Supports MJPEG, MPEG4, and H.264 video streams (only supports VPort models, excluding the VPort 2000 series and VPort 3310)
- Supports up to 32 channels in the camera list
- Easy-to-use with drag and drop video display selection
- Can provide snapshot images in JPEG format
- Supports image tuning, including brightness, saturation, contrast, and hue
- Supports 2-way audio for voice communication between field sites and the control center
- Supports dual monitor and full screen display
- Supports display screen rotation
- Supports the PTZ control panel defined in VPort products

Dual monitor display

Video Record

- Video recording can be triggered manually or by event
- Video files are in AVI format, and can be played back on all popular media players (requires SoftNVR-IA codec)
- The storage hard disk can be selected from network hard drives
- Supports the FIFO recycle function for long time video recording
- Can configure the number of days recorded video files will be storedSupports pre-event video recording for up to 30 seconds

Playback & Search

- Can play back up to 4 recorded videos simultaneously
- Supports timeline selection when in video playback mode
- Supports stop, speed up, slow down, rewind frame-by-frame, and forward frame-by-frame
- Search video records by camera, time, or event
- Can take snapshot images when in video playback mode

Schedule

- Can set up a weekday schedule
- Schedule settings can be based on camera and event
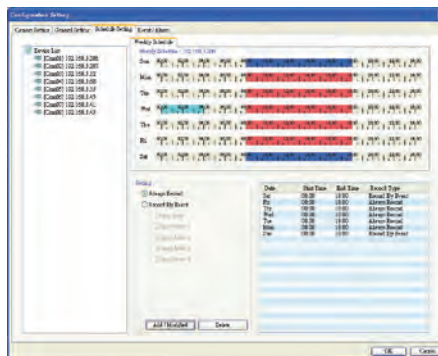
Alarm Events

- Alarm events: Digital input and Video Loss
- Can accept events from the automation system via OPC communication
- Alarm triggered actions: popup display, go preset, play sound, trigger DO (relay)

18

IP Surveillance > SoftNVR-IA V1.0
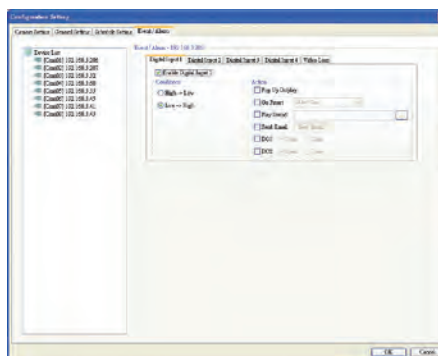
System

- Automatically search or manually detect the IP address of a video device on the LAN
- Can configure the server name

- Can configure multiple email addresses for receiving alarm messages
- Folder and file names of snapshot images can be customized
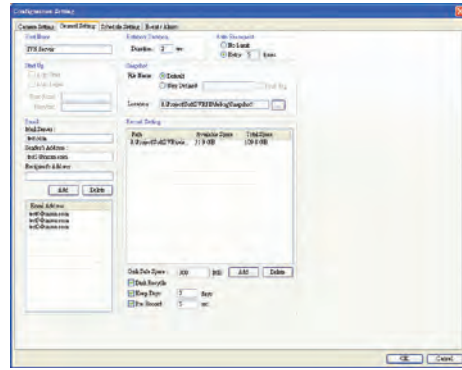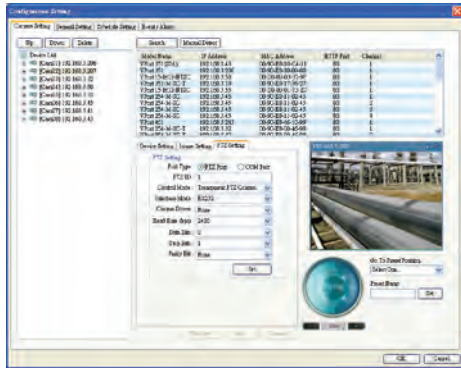
Recommended System Requirements

- Intel Core 2 Duo QX6700 or above
- 2 GB RAM or above
- Windows XP with SP3

- Motherboard: Intel chipset recommended
- Display card: ATI Radeon 9200, nVIDIA GeForce GT220, or above (dual monitors require 2 outputs); 1 GB DDR3 recommended

Ordering Information

Available Models
SoftNVR-IA V1.0: 32-channel IP video surveillance software for industrial automation systems

Package Checklist
SoftNVR-IA CD: Includes the SoftNVR software and related documents
Key Pro: Plugs into the USB port
Printed Manual: Moxa SoftNVR-IA Quick Installation Guide

SoftNVR

Expandable IP surveillance software for managing up to 64 video channels

Moxa's SoftNVR IP surveillance software can be used to record video over the network and manage up to 64 video stream channels generated by Moxa's video encoders (VPort 351, VPort 354, VPort 254, VPort 251) and IP cameras (VPort 25 series) simultaneously. Features include dual monitor display, video analysis, instant alarm, event recording, and video enhancement tools. SoftNVR gives users an advanced video management tool for medium to large video surveillance networking systems.

∶ Features

- Up to 64 channels in one system

- Dual monitor display capability for convenient viewing

- Video analysis with moving objects, and video loss detection

- Instant response for alarm notification

- Simple and user-friendly setup for recording schedules

- Multifunction playback system with intelligent search
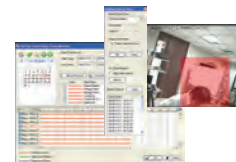
- Video enhancement tools for image quality tuning

- I/O device integration

- Live viewing from popular web browsers

∶ Introduction

Live Display

- Display a maximum of 64 channels, which can be configured for different modes, and in full screen.
- Dual monitor support:
  - Focus on important areas: Users can set one screen to monitor general cameras and the other to monitor important cameras.
  - Live view and playback at the same time: Users can set one screen to watch a live view, and use the other to play back images.

- A "Detected Event" for the spot monitor application can pop up in the secondary monitor while the primary one is viewing live video.

- Adjustable monitor windows: Supports 1, 4, 6, 9, 10, 13, 16, 25, 36, 49, or 64 divided windows in full screen and when using the "display in turns" function.
- Multiple views: Show images from one video source on multiple screens.

PTZ Control

- PTZ preset point: Save the definition of PTZ camera lens as a preset point and allow camera to move quickly to that location.
- Patrol: Allow camera to patrol an area based on a combined set of preset points.

- Digital PTZ:
  - Focus on any location you would like to highlight.
  - "Digital PTZ" and "Multiple Show" allow you to put the focus from single video resource anywhere you want.

Smart Detection

- Smart detection of 9 different events
  - General Motion
  - Object Disappears
  - Object Appears
  - Lost Focus
  - Camera Occlusion
  - Lost Signal
  - Signal Digital Input
  - System alarm when Disk Space Exhausted
  - System alarm when System Health Unusual
- Instant response for event alarms
  - On Screen Display
  - Play Sound
  - Send Email
  - PTZ Preset Go
  - Signal Digital Output

Recording and Schedule

- Video compression with MPEG4 and MJPEG.
- Record synchronized audio and video.
- Auto recycling when storage disk is full.
- Recording modes: Continuous record, record by event, record by digital input, record by motion, record by schedule, and manual recording.
- Recording schedule: Record daily, weekly, or by repeat schedule.
- Videos and images can be saved in outer storage devices such as DAS, NAS, or SAN without any limitations; useful if you need to increase your storage space in the future.

Remote Access

- Remote Live View by client program and web browser.
- Remote Playback by client program and web browser.
- Remote control PTZ camera.

Playback & Search

- Play back a maximum of 16 channels under different modes and in full screen.
- Intelligent search and smart search modes by event, area, camera, date, time, or log file.
- Administrator can configure the path to the recording database, without limitation. Unlimited support for additional storage devices.
- A search for a recorded video is based on the time period and event, which is the easiest and most efficient way to find the target recorded video.
- Complete playback control: Playback, reverse playback, fast forward.
- Digital zoom in to a specific area.
- Export video to AVI or ASF files.
- Export a single frame to a BMP or JPEG file and print it out.
- Back up the video by burning it to a disc and onto the hard disk.
- Video enhancement: Visibility, sharpness, brightness, contract, grayscale.

System

- User-friendly control interface; no complicated control window, making it easy for anyone with basic computer knowledge to use.
- Administrator can auto log in from a certain account, and enable, add, edit, and delete users without limitation. Configure access rights for users.
- Only the users in the administrator group can exit the Main Console.
- Can monitor connection conditions, such as Account, login time, flow rate, and IP address. Includes remote control information for analyzing data and sorting out responsibilities.
- Log data: Unusual event, system log, counting application can export to "xls" or "txt" file.
- Execute recording, smart guard, and other functions in the background after logging out of the system.
- Supports 22 languages: English, Tranditional Chinese, Simplified Chinese, Japanese, Franch, Spanish, German, Italian, Turkish, Danish, Hungarian, Greece, Finnish, Russian, Thai, Czech, Slovak, Korean, Portuguese, Portuguese (Brazil), Hebrew, Persian

⠸ System Requirements

Total FPS at CIF	600 or more	480 to 600	240 to 480	120 to 240	less than 120
CPU	Intel Core 2 Duo QX6700	Intel Core 2 Duo E6400	Intel Pentium D 930	Intel P4 2.8 GHz	Intel P4 2.4 GHz
RAM	2 GB	1 GB	1 GB	512 MB	512 MB
Motherboard	Intel 945 or 965 chip, Intel chipset recommended				
Display	ATI Radeon 9200, nVIDIA GeForce FX-5200, Intel 945 / 965, or above (ATI recommended)				
Ethernet	100BaseT(X) or above, Gigabit LAN recommended				
Hard Disk	80 GB or above				
OS	MS Windows 2000/XP Pro SP2/2003				

⠸ Ordering Information

Available Models
SoftNVR-4/8/16/25/32/64: SoftNVR with 4/8/16/25/32/64-channel license Key Pro

Package Checklist
SoftNVR CD: Includes the SoftNVR software and related documents
Key Pro: Plugs into the USB port
Printed Manual: Moxa SoftNVR Quick Installation Guide

VPort SDK PLUS

User-friendly software development kits for third-party developers to customize IP video management systems

: Introduction

Moxa IVN (Industrial Video Networking) solutions, which include VPort series IP video products and IP surveillance software solutions, are future-proof, ready-to-use IP video solutions for video surveillance applications. With the growing popularity of IP networks, more and more users need to integrate their video management system with other monitoring and control systems (e.g., SCADA or HMI) to get

the benefits of centralization and inter-operation. To assist third-party developers with this intergration,we are providing Moxa VPort SDK PLUS, which supports VPort series video server and IP cameras, for building customized video management systems and for integrating VPort series products into comprehensive monitoring and control systems.

URL Commands

URL commands are easy-to-use CGI commands used with HTML programming for web systems. Users can acquire video images and control VPort series products from their own customized web pages

by embedding these CGI commands into the HTML source code. All of the URL commands are listed in the VPort user's manual, or a CGI command manual.

ActiveX Control SDK PLUS

ActiveX Control is an OCX component that uses Microsoft COM (Component Object Model) technology to enable software components to communicate. ActiveX Control is used widely with platforms that support WIN32, IE Plug-in, and Visual Basic, and is also popular in automation system software, such as SCADA systems. Moxa ActiveX Control SDK PLUS is a user-friendly, customized tool for programmers that supports versatile parameters for customized viewing, recording, PTZ camera control, event triggering, and recorded video playback. Moxa ActiveX Control SDK PLUS is provided free of charge, and supports VB, VC, and C# developing environments, as well as plug-ins for web applications and automation tools (e.g., SCADA software). Third-party developers who want to use ActiveX SDK can download it from Moxa's website.

ActiveX Work Process
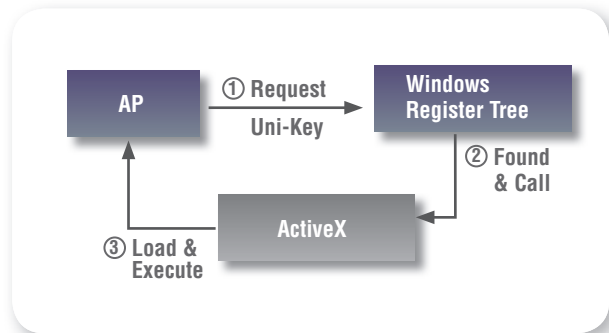
API SDK PLUS

For some video management applications, ActiveX Control SDK PLUS may not provide users with enough functionality. In this case, API SDK PLUS, which includes a detailed C library, can be used to program customized solutions in a Visual C++ or C# environment. API SDK PLUS includes a total of 4 DLL modules, and currently supports the WIN32, Linux, and WIN CE pocket 2003 platforms. API SDK PLUS

is provided free of charge. However, since API SDK PLUS uses proprietary technology and the programmer must be an experienced, professional C programmer, we are not releasing API SDK PLUS for general use. Third-party developers who would like to use API SDK PLUS should request support on Moxa's website to apply for a free copy. Some verification is required.

API Module Structure
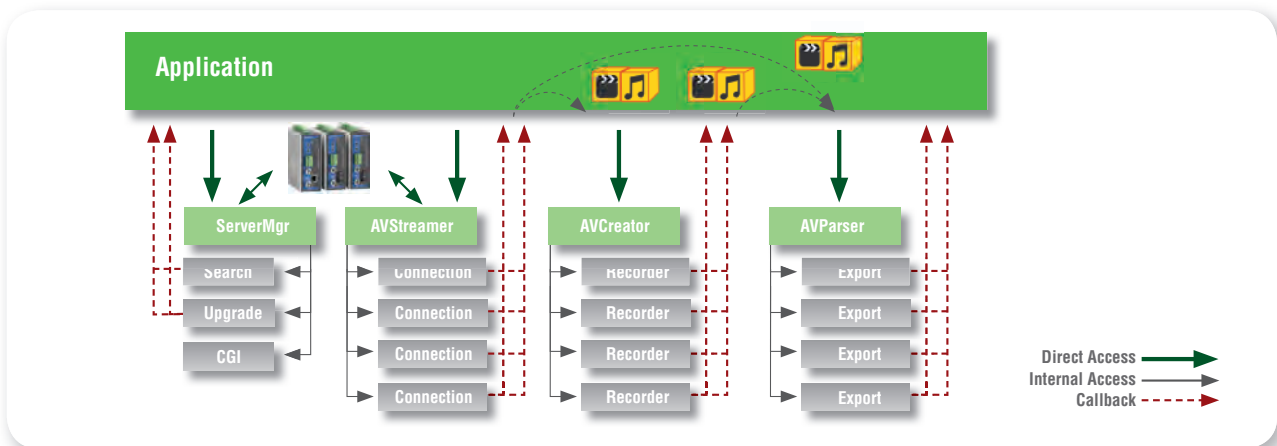
18 — IP Surveillance › VPort SDK PLUS

VPort Video Gadget

A coding-free programming method specially designed for SCADA systems

: Introduction

Embedding video into a SCADA system has always been a big hassle for system integrators, since they needed to invest the time and effort to study the IP video device's ActiveX SDK (software development kit), and then struggle to write bug-free code. In order to reduce the amount of programming effort required, Moxa has created a coding-free programming tool, called VPort Video Gadget, which is included with VPort ActiveX SDK PLUS. VPort Video Gadget has the potential to save system engineers an enormous amount of programming time and effort.

About VPort Video Gadget

VPort Video Gadget is basically a collection of pre-programmed function objects for embedding video into a SCADA system. Functions include connecting/disconnecting the VPort, displaying a video, closing a video, controlling PTZ, enabling/disabling audio, and taking snapshot images. There is no need for the system engineer to spend time writing the code, which is a huge benefit since it can save a lot of time and engineering resources.

Using VPort Video Gadget

Only and few steps are required to use VPort Video Gadget:

• Drag & drop the selected function object
• Input the required parameters into the appropriate columns
• Save, and the function programming task is done
• Supports Citect, InTouch, and Cimplicity third-party SCADA systems
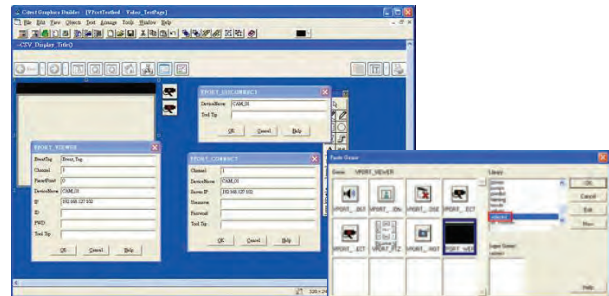
Note: The precise way to use VPort Video Gadget may be different for different SCADA systems. However, regardless of which SCADA system you use, VPort Video Gadget will be 100% coding-free.

A Great Tool for Automation Systems

Obviously, the key benefit provided by VPort Video Gadget is to greatly reduce the amount of programming effort required to integrate IP video into SCADA software. But more than that, with VPort Video Gadget your IP video system will no longer be separate from your automation system. Instead, it will just be one more element of the automation system, on the same par as I/O sensor alarms, motors, and other items.

To get VPort Video Gadget, download Moxa VPort ActiveX SDK PLUS from the download center on Moxa's website.

Accessories

A

Accessories

Serial Connection Options

Serial Board Connection Box/Cable Usage Chart

Serial Board Model Name	Connection Boxes 8-port								Connection Cables 8-port						4-port							2-port		
	OPT8-M9	OPT8-RJ45	OPT8A/B/S	OPT8F/K/Z	OPT8-M9+	OPT8A+/B+/S+	OPT8F+/K+/Z+	OPT8-RJ45+	CBL-M68M25x8-100 (OPT8C+)	CBL-M68M9x8-100 (OPT8D+)	CBL-M62M25x8-100 (OPT8C)	CBL-M62M9x8-100 (OPT8D)	CBL-M78M25x8-100	CBL-M78M9x8-100	CBL-M44M9x4-50	CBL-M44M9x4-50(POS)	CBL-M44M25x4-50	CBL-M37M9x4-30 (OPT4C)	CBL-M37M9x4-30 (OPT4D)	CBL-F40M9x4-50	CBL-F40M25x4-50	CBL-M25M9x2-50	CBL-F20M9x2-50	CBL-F20M25x2-50
C218Turbo Series	✓	✓	✓	✓	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–
C104H Series	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–
CP-114 Series	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–
CI-134 Series	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–
CP-118U	✓	✓	✓	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–
CP-138U	✓	✓	✓	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–
CP-168U	✓	✓	✓	✓	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–
C168H Series	✓	✓	✓	✓	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–
CP-104UL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-134U Series	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-114UL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-114UL-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-104EL-A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-114EL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-114EL-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	✓	–	–	–	–	–	–	–
CP-112UL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-112UL-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-132UL Series	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-102UL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-102EL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-132EL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-132EL-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–
CP-118EL-A	–	–	–	–	✓	✓	–	✓	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CP-168EL-A	–	–	–	–	✓	✓	✓	✓	✓	✓	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CP-118U-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–
CP-138U-I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–	–	–	–	–	–
POS-104UL	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	–	–	–	–	–	–	–
CA-108	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CB-108	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CA-114	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CB-114	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CA-134I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CB-134I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CA-104	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓	–	–	–
CA-132	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓
CA-132I	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	✓	✓

8-port RS-232 Connection Boxes

OPT8-M9
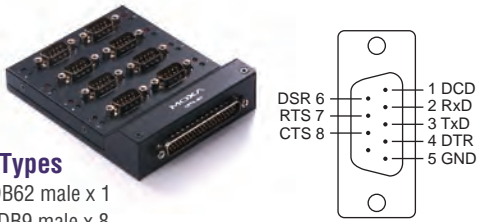
Connector Types
Board-side: DB62 male x 1
Device-side: DB9 male x 8

Specifications
LEDs: TxD, RxD indicators for each device-side port
Dimensions: 90 x 110 x 27 mm (3.5 x 4.3 x 1.1 in)

Included Accessories
Connection Cable: DB62 male to DB62 female 150 cm connection cable for connecting to the serial board

OPT8-RJ45

Connector Types
Board-side: DB62 male x 1
Device-side: 8-pin RJ45 x 8

Cable Length
30 cm

1 DSR
2 RTS
3 GND
4 TxD
5 RxD
6 DCD
7 CTS
8 DTR

OPT8A/S

Connector Types
Board-side: DB62 male x 1
Device-side: DB25 female x 8

Specifications
LEDs: TxD, RxD for each device-side port
Baudrate: 50 bps to 921.6 Kbps
Dimensions: 247 x 108 x 35 mm (9.7 x 4.3 x 1.4 in)
Protection: 25 KV ESD, 2 KV EFT surge protection (Opt8S only)

Included Accessories
Connection Cable: DB62 male to DB62 female 150 cm connection cable for connecting to the serial board

OPT8B
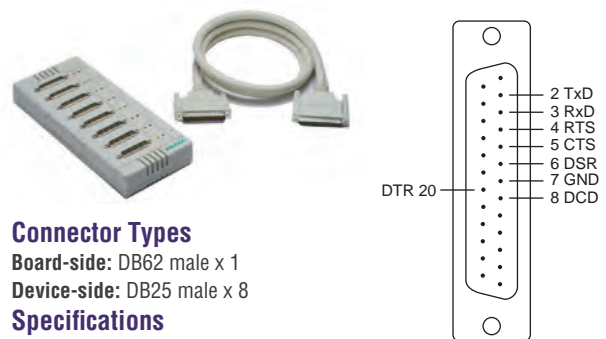
Connector Types
Board-side: DB62 male x 1
Device-side: DB25 male x 8

Specifications
LEDs: TxD, RxD indicators for each device-side port
Baudrate: 50 bps to 921.6 Kbps
Dimensions: 247 x 108 x 35 mm (9.7 x 4.3 x 1.4 in)

Included Accessories
Connection Cable: DB62 male to DB62 female 150 cm connection cable for connecting to the serial board

8-port RS-422 Connection Boxes

OPT8F/Z

Connector Types
Board-side: DB62 male x 1
Device-side: DB25 female x 8

Specifications
LEDs: TxD, RxD indicators for each device-side port
Baudrate: 50 bps to 115.2 Kbps
Dimensions: 247 x 108 x 35 mm (9.7 x 4.3 x 1.4 in)
Optical Isolation: 500 V (Opt8F only)
Power Consumption: 0.8 A max. @ 5 VDC

Included Accessories
Connection Cable: DB62 male to DB62 female 150 cm connection cable for connecting to the serial board
Power Adaptor: 100/110/220 VAC

7 GND
TxD+(A) 16
RxD-(A) 14
3 TxD+(B)
2 RxD+(B)

A

Accessories > Serial Connection Options

A
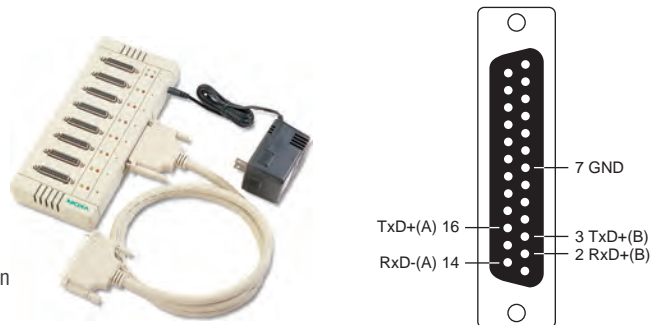
8-port RS-422/485 Connection Boxes

OPT8K
Connector Types
Board-side: DB62 male x 1
Device-side: DB25 female x 8
Specifications
LEDs: TxD, RxD indicators for each device-side port
Baudrate: 50 bps to 230.4 Kbps
Dimensions: 247 x 108 x 35 mm (9.7 x 4.3 x 1.4 in)
Protection: 16 KV ESD, 1 KV EFT surge protection
Power Consumption: 0.3 A max. @ 12 VDC
Included Accessories
Connection Cable: DB62 male to DB62 female 150 cm connection cable for connecting to the serial board
Power Adaptor: 110/230 VAC


```
                                                    7 GND
TxD+(A) 16
                                                    3 TxD+(B)
RxD-(A) 14
                                                    2 RxD+(B)
```
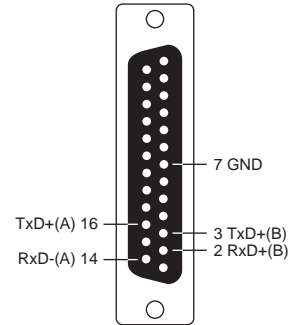
8-port RS-232 Connection Cables

CBL-M62M25x8-100 (OPT8C)
Connector Types
Board-side: DB62 male x 1
Device-side: DB25 male x 8
Cable Length
100 cm


```
                2 TxD
                3 RxD
                4 RTS
                5 CTS
                6 DSR
                7 GND
DTR 20          8 DCD
```

CBL-M62M9x8-100 (OPT8D)
Connector Types
Board-side: DB62 male x 1
Device-side: DB9 male x 8
Cable Length
100 cm


```
DSR 6           1 DCD
RTS 7           2 RxD
CTS 8           3 TxD
                4 DTR
                5 GND
```

CBL-M68M25x8-100 (OPT8C+)
Connector Types
Board-side: VHDCI 68 x 1
Device-side: DB25 male x 8
Cable Length
100 cm


```
                2 TxD
                3 RxD
                4 RTS
                5 CTS
                6 DSR
                7 GND
DTR 20          8 DCD
```

CBL-M68M9x8-100 (OPT8D+)
Connector Types
Board-side: VHDCI 68 x 1
Device-side: DB9 male x 8
Cable Length
100 cm


```
DSR 6           1 DCD
RTS 7           2 RxD
CTS 8           3 TxD
                4 DTR
                5 GND
```
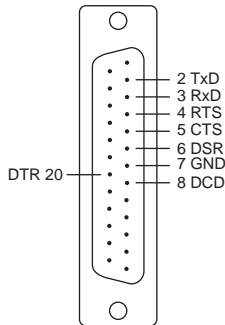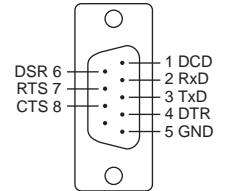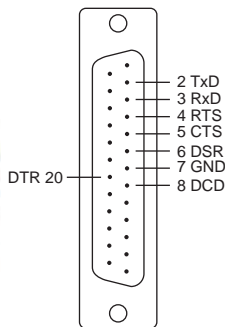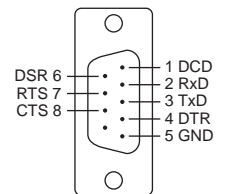
CBL-M78M25x8-100
Connector Types
Board-side: DB78 male x 1
Device-side: DB25 male x 8
Cable Length
100 cm


```
                2 TxD
                3 RxD
                4 RTS
                5 CTS
                6 DSR
                7 GND
DTR 20          8 DCD
```
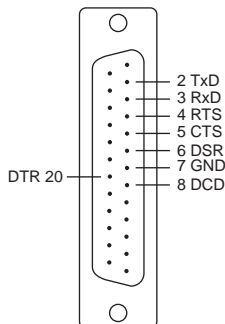
CBL-M78M9x8-100
Connector Types
Board-side: DB78 male x 1
Device-side: DB9 male x 8
Cable Length
100 cm


```
DSR 6           1 DCD
RTS 7           2 RxD
CTS 8           3 TxD
                4 DTR
                5 GND
```
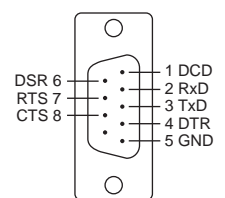
4-port Connection Cables

CBL-F40M9x4-50

40-pin box header to 4-port DB9 male cable

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
1	DCD	TxD-(A)	TxD-(A)	–
2	RxD	TxD+(B)	TxD+(B)	–
3	TxD	RxD+(B)	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–
9	–	–	–	–
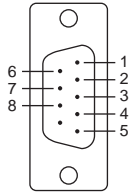
CBL-F40M25x4-50

40-pin box header to 4-port DB25 male cable

PIN	RS-232	RS-422	RS-485-4w	RS-485-2w
2	TxD	RxD+(B)	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	TxD+(B)	–
4	RTS	–	–	–
5	CTS	–	–	–
6	DSR	–	–	–
7	GND	GND	GND	GND
8	DCD	TxD-(A)	TxD-(A)	–
20	DTR	RxD-(A)	RxD-(A)	Data-(A)
22	–	–	–	–
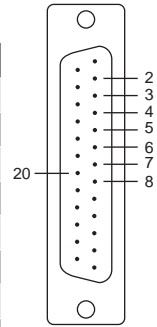
2-port Connection Cables

CBL-F20M9x2-50

20-pin box header to 2-port DB9 male cable

PIN	RS-422	RS-485-4w	RS-485-2w
2	RxD+(B)	RxD+(B)	Data+(B)
3	TxD+(B)	TxD+(B)	–
4	–	–	–
5	–	–	–
6	–	–	–
7	GND	GND	GND
8	TxD-(A)	TxD-(A)	–
20	RxD-(A)	RxD-(A)	Data-(A)
22	–	–	–
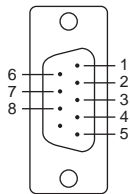
CBL-F20M25x2-50

20-pin box header to 2-port DB25 male cable

PIN	RS-422	RS-485-4w	RS-485-2w
1	TxD-(A)	TxD-(A)	–
2	TxD+(B)	TxD+(B)	–
3	RxD+(B)	RxD+(B)	Data+(B)
4	RxD-(A)	RxD-(A)	Data-(A)
5	GND	GND	GND
6	–	–	–
7	–	–	–
8	–	–	–
9	–	–	–
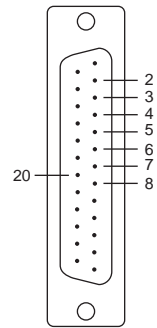
10-pin RJ45 to DB9/DB25 Connection Cables

These cables can be used with the following products: C320Turbo Series, CP-204J, CI-104J, A52, A53, A60

CN20030
Connector Types
Board-side: 10-pin RJ45 x 1
Device-side: DB25 female x 1
Cable Length
150 cm

DSR 20

8 DCD
7 GND
6 DTR
5 RTS
4 CTS
3 TxD
2 RxD
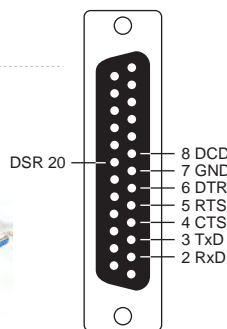
CN20060
Connector Types
Board-side: 10-pin RJ45 x 1
Device-side: DB9 male x 1
Cable Length
150 cm

DSR 6
RTS 7
CTS 8

1 DCD
2 RxD
3 TxD
4 DTR
5 GND
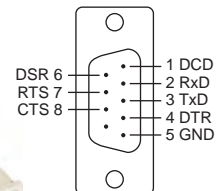
CN20040
Connector Types
Board-side: 10-pin RJ45 x 1
Device-side: DB25 male x 1
Cable Length
150 cm

DTR 20

2 TxD
3 RxD
4 RTS
5 CTS
6 DSR
7 GND
8 DCD
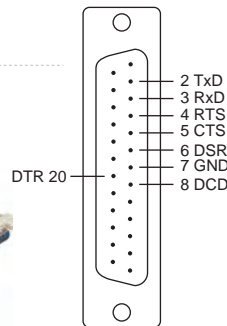
CN20070
Connector Types
Board-side: 10-pin RJ45 x 1
Device-side: DB9 female x 1
Cable Length
150 cm

RTS 8
CTS 7
DTR 6

5 GND
4 DSR
3 RxD
2 TxD
1 DCD

A

Accessories > Serial Connection Options
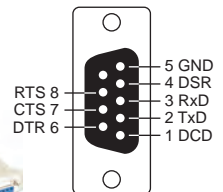
∶ 8-pin RJ45 to DB9/DB25 Connection Cables

These cables can be used with the following products: CP-104JU, OPT8-RJ45, NPort® 5210, NPort® 5600, NPort® 6600, CN2510/2600, NPort® W2004, UC-7410/7420

CBL-RJ45F25-150

Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB25 female x 1
Cable Length
150 cm

DSR 20

8 DCD
7 GND
6 DTR
5 RTS
4 CTS
3 TxD
2 RxD
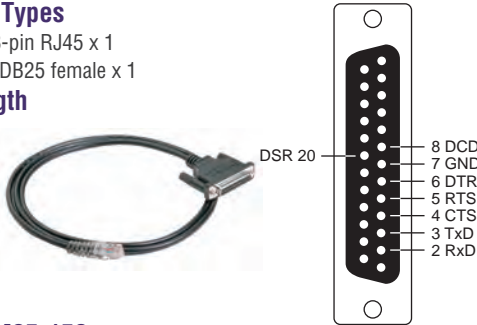
CBL-RJ45F9-150

Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB9 female x 1
Cable Length
150 cm

RTS 8
CTS 7
DTR 6

5 GND
4 DSR
3 RxD
2 TxD
1 DCD
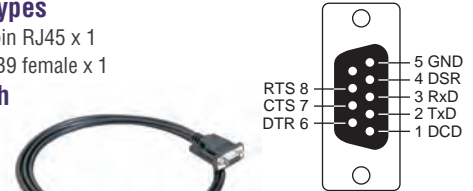
CBL-RJ45M25-150

Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB25 male x 1
Cable Length
150 cm

DTR 20

2 TxD
3 RxD
4 RTS
5 CTS
6 DSR
7 GND
8 DCD
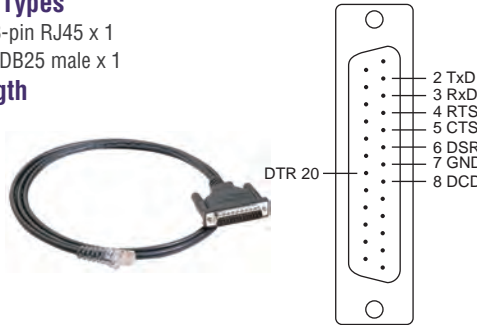
CBL-RJ45M9-150

Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB9 male x 1
Cable Length
150 cm

DSR 6
RTS 7
CTS 8

1 DCD
2 RxD
3 TxD
4 DTR
5 GND
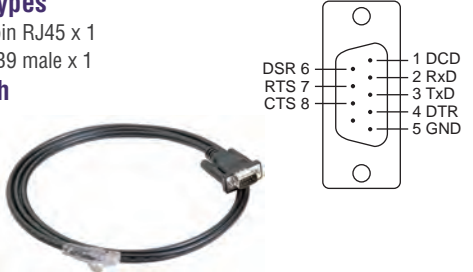
CBL-RJ45SF25-150

Cable Type: Shielded
Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB25 female x 1
Cable Length
150 cm

DSR 20

8 DCD
7 GND
6 DTR
5 RTS
4 CTS
3 TxD
2 RxD
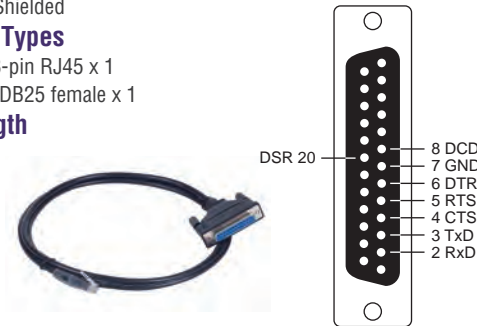
CBL-RJ45SF9-150

Cable Type: Shielded
Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB9 female x 1
Cable Length
150 cm

RTS 8
CTS 7
DTR 6

5 GND
4 DSR
3 RxD
2 TxD
1 DCD

CBL-RJ45SM25-150

Cable Type: Shielded
Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB25 male x 1
Cable Length
150 cm

DTR 20

2 TxD
3 RxD
4 RTS
5 CTS
6 DSR
7 GND
8 DCD
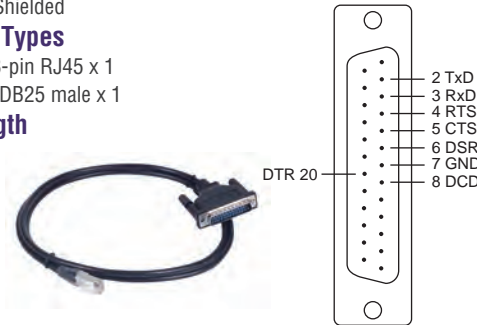
CBL-RJ45SM9-150

Cable Type: Shielded
Connector Types
Board-side: 8-pin RJ45 x 1
Device-side: DB9 male x 1
Cable Length
150 cm

DSR 6
RTS 7
CTS 8

1 DCD
2 RxD
3 TxD
4 DTR
5 GND

A

Accessories > Serial Connection Options
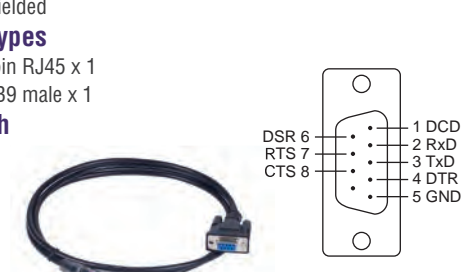
⁞ **Wiring Kits**

TB-M9

Type: DB9 male DIN-rail wiring terminal
Use with these products
Device Servers: NPort® DE-311/304/334
Specifications
Connector: DB9 male
Rating: 300 V, 20 A (IEC250V 10A)
Operating Temperature: -40 to 105°C (-40 to 221°F)
Suitable Wiring: 24-12 AWG (IEC 0.5-2.5 mm2)
Dimensions: 77.5 x 45 x 51 mm (3.05 x 1.77 x 2.01 in)

TB-M25

Type: DM25 male DIN-rail wiring terminal
Use with these products
Device Servers: NPort® DE-211
Serial Boards: CP-102UL, CP-132UL-I,
CP-102EL, CP-132EL-I, CP-132EL
Specifications
Connector: DB25 male
Rating: 300 V, 20 A (IEC250V 10A)
Operating Temperature: -40 to 105°C (-40 to 221°F)
Suitable Wiring: 24-12 AWG (IEC 0.5-2.5 mm2)
Dimensions: 77.5 x 90 x 51 mm (3.05 x 3.54 x 2.01 in)

TB-F9

Type: DB9 female DIN-rail wiring terminal
Use with these products
Device Servers: NPort® DE-311/304/334
Serial Boards: CI-132 Series,
CP-132 Series, CP-102U
Specifications
Connector: DB9 female
Rating: 300 V, 20 A (IEC250V 10A)
Operating Temperature: -40 to 105°C (-40 to 221°F)
Suitable Wiring: 24-12 AWG (IEC 0.5-2.5 mm2)
Dimensions: 77.5 x 45 x 51 mm (3.05 x 1.77 x 2.01 in)

TB-F25

Type: DB25 female DIN-rail wiring terminal
Use with these products
Device Servers: NPort® DE-211
Specifications
Connecctor: DB25 female
Rating: 300 V, 20 A (IEC250V 10A)
Operating Temperature: -40 to 105°C (-40 to 221°F)
Suitable Wiring: 24-12 AWG (IEC 0.5-2.5 mm2)
Dimensions: 77.5 x 90 x 51 mm (3.05 x 3.54 x 2.01 in)

3-pin Terminal Block

Model Name: TB-500F-103-5ESDV
Can be used with these products
Device Servers: NPort® 5200/5400
Usage
Power: For connecting to DC power source

7-pin Terminal Block

Model Name: TB-500F-107-5ESDV
Can be used with these products
Device Servers: NPort® 5230/5232
Usage
Data Transmission: For connecting to
serial devices

5-pin Terminal Block

Model Name: TB-500F-105-5ESDV
Can be used with these products
Device Servers: NPort® 5230/5232, NPort® 5430,
all NPort® IA models
Usage
Data Transmission: For connecting to serial
devices

10-pin Terminal Block

Model Name: TB-500F-110-5ESDV
Can be used with these products
Device Servers: All NPort® IA models
Usage
Power and Relay: For connecting to dual
DC power sources and relay output

Power Jack to Terminal Block Cable

Model Name: CBL-PJ21OW-10
Type: DB9 male DIN-rail wiring terminal
Specifications
Cable Length: 100±20 mm
Open Wire Length: 7.5±1 mm

RJ45 to DB9 Adaptor

Model Name: ADP-RJ458P-DB9M
Type: RJ45 to DB9 male

RJ45 to DB9 Adaptor

Model Name: ADP-RJ458P-DB9F
Type: RJ45 to DB9 female

A

Accessories ˅ Serial Connection Options

Power Supplies

24/48 VDC power supplies for installation on a DIN-Rail

	24 VDC DIN-Rail Power Supplies					48 VDC DIN-Rail Power Supplies	
	DR-4524	DR-75-24	DR-120-24	MDR-40-24	MDR-60-24	DR-75-48	DR-120-48
Dimensions (mm)	78 x 67 x 93	55.5 x 100 x 125.2	65.5 x 100 x 125.2	40 x 90 x 100	40 x 90 x 100	55.5 x 100 x 125.2	65.5 x 100 x 125.2
Power	45 W	75 W	120 W	40 W	60 W	75 W	120 W
Input	85-264 VAC (47-63 Hz)		88-132 VAC or 176-264 VAC (47-63 Hz) by switch	85-264 VAC (47-63 Hz)		85-264 VAC (27-63 Hz)	88-132 VAC or 176-264 VAC (47-63 Hz) by switch
Output	48 W, 24 VDC, 0-2 A	76.8 W, 24 VDC, 0-3.2 A	120 W, 24 VDC, 0-5 A	40 W, 24 VDC, 0-1.7 A	60 W, 24 VDC, 0-2.5 A	76.8 W, 48 VDC, 0-1.6 A	120 W, 48 VDC, 0-2.5 A
Over-voltage Protection	27.6-32.4 V	29-33 V		31.2-36 V		58-65 V	
Overload Protection	105-150%						
Type	Constant Current Limiting						
Reset	Auto Recovery						
Inrush Current	30 A and 115 V, or 60 A and 230 V						
Weight	400 g	550 g	650 g	260 g	280 g	550 g	650 g
Operating Temperature and Relative Humidity	-10 to 50°C (14 to 122°F) at 20 to 90% RH	-10 to 60°C (14 to 140°F) at 20 to 90% RH		-20 to 70°C (-4 to 158°F) at 20 to 90% RH		-10 to 60°C (14 to 140°F) at 20 to 90% RH	
Warranty	3 years						
Safety Standards	TÜV EN60950-1, UL508 Approved						
EMC Standards	CISPR22 (EN55022) Class B, EN61000-4-2/3/4/5/6/8/11, ENV50204, EN61000-3-2, EN50082-2						

⋮ Ordering Information

24 VDC DIN-Rail Power Supplies
DR-4524: 45W/2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input, -10 to 50°C operating temperature
DR-75-24: 75W/3.2A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input, -10 to 60°C operating temperature
DR-120-24: 120W/5A DIN-Rail 24 VDC power supply with universal 88 to 132 VAC or 176 to 264 VAC input by switch, -10 to 60°C operating temperature
MDR-40-24: 40W/1.7A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input, -20 to 70°C operating temperature
MDR-60-24: 60W/2.5A DIN-Rail 24 VDC power supply with universal 85 to 264 VAC input, -20 to 70°C operating temperature

48 VDC DIN-Rail Power Supplies
DR-75-48: 75W/1.6A DIN-Rail 48 VDC power supply with universal 85 to 264 VAC input, -10 to 60°C operating temperature
DR-120-48: 120W/2.5A DIN-Rail 48 VDC power supply with universal 88 to132 VAC or 176 to 264 VAC input by switch, -10 to 60°C operating temperature

Power Adaptors

The following power adaptors can be used with these products: NPort® DE-211/311, NPort® 5100/5200/5400/6150/6250/6450, NPort® W2004, NPort® 2150/2250 Plus, UC-7110/7410/7420, VPort 251

	PWR-12150-CN-S1	PWR-12120-USJP-S2	PWR-12120-DT-S2	PWR-12200-DT-S1	PWR-12042-US-S2	PWR-12042-EU-S1
Input Rating						
I/P	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz
Input Plug						
Plug Type	CN	US/JP	–	–	US	Euro
Output Rating						
O/P	1.5 A @ 12 VDC	1.2 A @ 12 VDC	1.2 A @ 12 VDC	2 A @ 12 VDC	420 mA @ 12 VDC	420 mA @ 12 VDC
Output Plug						
Connector Type	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.5	S-type 5.5/2.1/7.5	S-type 5.5/2.1/7.5	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.0
Outer Diameter	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm
Inner Diameter	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm
Physical Characteristics						
Dimensions	70 x 45 x 54 mm	75 x 34 x 72 mm	80 x 49.5 x 30 mm	110.8 x 51.8 x 32 mm	62 x 29 x 66 mm	62 x 29 x 78 mm
Weight	200 g	130 g	124.5 g	200 g	85 g	90 g
Cord Length	1800 ± 200 mm	1830 to 1950 mm	1830 mm (min.)	1800 ± 200 mm	1830 ± 150 mm	1830 ± 150 mm
Environmental Limits						
Operating Temperature	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)
Regulatory Approvals						
Safety	UL/PSE	UL/PSE	UL/CE/FCC/TÜV/PSE/SAA	UL/CE/FCC/GS/CCC	UL/FCC	CE/TÜV

	PWR-12042-UK-S1	PWR-12040-AU-S1	PWR-12120-AU-S2	PWR-12150-EU-S2	PWR-12150-UK-S2	PWR-12200-DT-S2
Input Rating						
I/P	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz	100-240 VAC, 50-60 Hz
Input Plug						
Plug Type	Euro	AU	AU	Euro	UK	–
Output Rating						
O/P	420 mA @ 12 VDC	400 mA @ 12 VDC	1.2 A @ 12 VDC	1.5 A @ 12 VDC	1.5 A @ 12 VDC	2 A @ 12 VDC
Output Plug						
Connector Type	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.0	L-type 5.5/2.1/9.0	L-type 5.5/2.1/7.5
Outer Diameter	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm	5.5 ± 0.1 mm
Inner Diameter	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm	2.1 ± 0.1 mm
Physical Characteristics						
Dimensions	65 x 48 x 72 mm	64.2 x 40.3 x 62.24 mm	75 x 41 x 64.94 mm	70 x 45 x 66.5 mm	70 x 45 x 60 mm	110 x 60 x 34 mm
Weight	105 g	93 g	150 g	200 g	200 g	200 g
Cord Length	1830 ± 150 mm	1500 ± 100 mm	1500 ± 100 mm	1800 ± 200 mm	1800 ± 200 mm	1800 ± 100 mm
Environmental Limits						
Operating Temperature	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)	0 to 40°C (32 to 104°F)
Regulatory Approvals						
Safety	CE	SAA	SAA/CE	FCC/ELT/PSE/CE	CE/GS/FCC/PSE/ETL	CE/GS/FCC/PSE/UL

Power Cords

The following power cords can be used with these products: CN2510, CN2600 Series, NPort® 5600 Series, NPort® 6600 Series

PWC-C13US-3B-183

US Plug (110 V)
Thickness: 6.8 mm
Max. Current: 10 A
Length: 1830 mm

PWC-C13EU-2B-183

Euro Plug (250 V)
Thickness: 6.8 mm
Max. Current: 10 A
Length: 1830 mm

PWC-C13UK-3B-183

UK Plug (250 V)
Thickness: 6.8 mm
Max. Current: 5 A
Length: 1830 mm

PWC-C13JP-3B-183

Japan Plug (125 V)
Thickness: 7.0 mm
Max. Current: 7 A
Length: 1830 mm

PWC-C13AU-3B-183

AU Plug (250 V)
Thickness: 6.0 mm
Max. Current: 10 A
Length: 1830 mm

PWC-C13CN-3B-183

CN Plug (250 V)
Thickness: 6.0 mm
Max. Current: 10 A
Length: 1830 mm

TK-485 Tuning Kit

Pull high/low resistance tuner with termination resistor

The TK-485, which has both a termination resistor and tuning resistor, is a great tool for engineers who build networks of daisy-chained 2-wire RS-485 devices. You no longer need to open up your RS-485 devices to add a termination resistor, and then add another resistor to tune the pull high/low resistance. Instead, simply connect the TK-485 to your RS-485 network, activate the termination resistor, and then tune the pull high/low resistor on the TK-485 until the RS-485 signal is transmitted intact.

: Specifications

Serial Protection
Isolation: 2 KV isolation protection
ESD Protection: ±4 KV protection from ESD due to contact discharge
Power Requirements
Power Input:
• 12 to 48 VDC input through power jack
• ±12 to ±48 VDC input through terminal block, with polarity protection
Resistance Options
Pull High: 600 Ω, 1 KΩ, 2 KΩ, 4.7 KΩ, 10 KΩ
Pull Low: 600 Ω, 1 KΩ, 2 KΩ, 4.7 KΩ, 10 KΩ
Terminator: 120 Ω

Connectors
Signal Inputs: D+, D-, GND
Signal Outputs: D+, D-, GND
Environmental Limits
Operating Temperature: 0 to 55°C
Operating Humidity: 95% RH max., non-condensing
Storage Temperature: -20 to 70°C

Fiber Optic Adaptors

SC male to ST female duplex adaptors

These SC male to ST female duplex adaptors are provided as an optional accessory to give users of Moxa industrial Ethernet switches more fiber optic connection options. Simply plug the adaptors directly into the SC connector of any Moxa industrial Ethernet switch to convert the original SC connector into an ST connector. This allows you to use an ST connector with any MOXA industrial Ethernet switch, but without the need for an extra patchcord.

ADP-SCm-STf-S
SC male to ST female duplex adaptor for single-mode fiber

Specifications
Single-mode: 9/125 µm
Ferrules and Sleeves: Zirconia Ceramic
Body Color: Blue
Insertion Loss: 0.5/1.1 (TYP/MAX)
SC-side Connector: SC male
ST-side Connector: ST female

ADP-SCm-STf-M
SC male to ST female duplex adaptor for multi-mode fiber

Specifications
Multi-mode: 62.5/125 µm
Ferrules and Sleeves: Zirconia Ceramic
Body Color: Gray
Insertion Loss: 0.1/0.3 (TYP/MAX)
SC-side Connector: SC male
ST-side Connector: ST female

Multimode Fiber Optic Patch Cords

These fiber optic patch cords can be used with the following products: TCF-90-M, TCF-142-M, TCF-142-M-T, all multi-mode models of EDS switches, IMC-101/101G Series, IMC-21

Features

- Standard multi-mode (graded index)
- Duplex for TX/RX, cable is joined together in lamp-cord fashion for easy separation when installing
- 62.5/125 micron core fiber
- Ceramic ferrules offer a typical insertion loss of ≤ 0.5 dB

- Operating temperature: -20 to 75°C (-4 to 167°F)
- Storage temperature: -40 to 85°C (-40 to 185°F)
- Standards: IEC607932-2
- Wavelength: 850/1300 nm

⋮ Ordering Information

SC to SC Connectors
Optical fiber patch cords, full duplex multi-mode, 62.5 microns

Model Name	Cable Length
PA-MM(62.5)-2ST2ST-1M	1 meter
PA-MM(62.5)-2ST2ST-3M	3 meters
PA-MM(62.5)-2ST2ST-5M	5 meters
PA-MM(62.5)-2ST2ST-10M	10 meters

ST to ST Connectors
Optical fiber patch cords, full duplex multi-mode, 62.5 microns

Model Name	Cable Length
PA-MM(62.5)-2ST2ST-1M	1 meter
PA-MM(62.5)-2ST2ST-3M	3 meters
PA-MM(62.5)-2ST2ST-5M	5 meters
PA-MM(62.5)-2ST2ST-10M	10 meters

SC to ST Connectors
Optical fiber patch cords, full duplex multi-mode, 62.5 microns

Model Name	Cable Length
PA-MM(62.5)-2ST2ST-1M	1 meter
PA-MM(62.5)-2ST2ST-3M	3 meters
PA-MM(62.5)-2ST2ST-5M	5 meters
PA-MM(62.5)-2ST2ST-10M	10 meters

Mounting Kits
Wall mounting, rack mounting, and DIN-Rail mounting kits

Wall Mounting Kits

WK-30
Dimensions: 40 x 30 x 1 mm
Use with these products
Unmanaged Ethernet Switches:
EDS-205A, EDS-G205

WK-32
Dimensions: 30.3 x 140 x 12.3 mm
Use with these products
Modular Ethernet Switches: EDS-828, EDS-728

WK-46
Dimensions: 51.6 x 66.8 x 1 mm
Use with these products
Managed Ethernet Switches: EDS-400A, EDS-500A, EDS-G509, EDS-P510
Unmanaged Ethernet Switches: EDS-200A series, EDS-300 series, EDS-G308, EDS-P308
Wireless AP/Bridge/AP Clients: AWK-1100, AWK-3121
Media Converter: IMC-101G/101 series
Video Servers: VPort 254, VPort 351, VPort 354, VPort 461, VPort 3310, VPort D351

WK-51
Dimensions: 50 x 67 x 1 mm
Use with these products
Media Converters: IMC-P101 series, PTC-101 series
Wireless AP/Bridge/Client: AWK-3121
Dual-RF Wireless AP/Bridge/Client: AWK-5222

WK-75
Dimensions: 75 x 90 x 2.5 mm
Use with these products
Modular Ethernet Switches: EDS-6000 series

Rack Mounting Kits

RK-4U (19")
Dimensions: 481 x 177.8 x 202.4 mm
Use with these products
Managed Ethernet Switches: EDS-400A, EDS-500A, EDS-728, EDS-828, EDS-G509, EDS-P510, ToughNet TN-5500 series
Unmanaged Ethernet Switches: EDS-200, EDS-200A, EDS-300 series, EDS-G205, EDS-G308, EDS-P308, ToughNet TN-5300 series
Wireless AP/Bridge/AP Clients: AWK-1100, AWK-3121
Media Converters: IMC-21, IMC-101, IMC-101G
Video Servers: VPort 254, VPort 351, VPort 354, VPort 461, VPort 3310, VPort D351

DIN-Rail Mounting Kits

DK-DC50131
Dimensions: 50 x 120 x 1 mm
Use with these products
Managed Ethernet Switches: TN-5500 series
Wireless AP/Bridge/AP Clients: AWK-4121, AWK-6222 series

DK-TN-5308
Dimensions: 66 x 174 x 12.8 mm
Use with these products
Unmanaged Ethernet Switches: TN-5308 series

DK-M12-305
Dimensions: 60 x 125 x 12.8 mm
Use with these products
Unmanaged Ethernet Switches: TN-5305 series

DK-35A
Dimensions: 42.5 x 10 x 19.34 mm
Use with these products
Video Server: VPort 251, VPort 2141

Ordering Information

Available Models
WK-30: Wall mounting kit for the EDS-205A/G205 series
WK-32: Wall mounting kit for the EDS-728/828 series
WK-46: Wall mounting kit
WK-51: Wall mounting kit for the IMC-P101 series, PTC-101 series, AWK-3121/5222 series
WK-51-01: Wall mounting kit for the ICF-1150/1170I series, AWK-3121/5222 series

WK-75: Wall mounting kit for the EDS-600 series
RK-4U: 4U-high 19" rack mounting kit
DK-DC50131: DIN-Rail mounting kit for the TN-5500 series, AWK-4121/6222 series
DK-TN-5308: DIN-Rail mounting kit for the TN-5308 series
DK-M12-305: DIN-Rail mounting kit for the TN-5305 series
DK-35A: DIN-Rail mounting kit for the VPort 251/2141 series

Product Index

B

Product Index

B

Product Index

B

V		
V2101 Series	x86 ready-to-run embedded computers with Intel Atom Z510PT, VGA, LVDS, audio, 2 LANs, 2 serial ports, 3 DIs, 3 DOs, 4 USB 2.0 ports, SD	Page 13-10
V2401/2402 Series	x86 ready-to-run embedded computers with Intel Atom N270, VGA, DVI, LVDS, audio, 2 LANs, 12 serial ports, 4 DIs, 4 DOs, 6 USB 2.0 ports, CompactFlash	Page 13-14
V460 Series	x86 computers with 4 serial ports, dual or quad LANs, VGA, 8 DIs, 8 DOs, CompactFlash, PCMCIA, 8 unmanaged switch ports, USB	Page 13-18
V481 Series	x86 computers with 8 serial ports, dual LANs, VGA, CompactFlash, USB, audio	Page 13-22
VPM-7304	4-port MPEG4/MJPEG video encoder module for the VPort 700 series	Page 18-26
VPM-7704	4-port RS-232/422/485 serial device server module for the VPort 700 series	Page 18-27
VPort 15-M12 Series	EN50155-compliant, 1.3-megapixel, compact fixed dome IP cameras	Page 18-22
VPort 25 Series	IP66, day-and-night vandal-proof fixed dome IP camera for outdoors	Page 18-19
VPort 251	Full motion, 1-channel MJPEG/MPEG4 video encoder	Page 18-11
VPort 254 Series	Rugged 4-channel MJPEG/MPEG4 industrial video encoders	Page 18-15
VPort 351 Series	Full motion, 1-channel MJPEG/MPEG4 industrial video encoders	Page 18-9
VPort 354 Series	Full motion, 4-channel MJPEG/MPEG4 industrial video encoders	Page 18-13
VPort 461 Series	Excellent video quality 1-channel H.264 industrial video encoders	Page 18-7
VPort 704	4-slot modular industrial multi-service gateway	Page 18-24
VPort D351	1-channel MJPEG/MPEG4 industrial video decoder	Page 18-17
VPort SDK PLUS	User-friendly software development kits for third-party developers to customize IP video management systems	Page 18-33
VPort Video Gadget	A coding-free programming method specially designed for SCADA systems	Page 18-34
W		
W311/321/341	RISC embedded Linux computers with WLAN, LAN, and 1, 2, or 4 serial ports	Page 14-12
W315/325/345	RISC embedded computers with GSM/GPRS, LAN, and 1, 2, or 4 serial ports	Page 14-8
W406	RISC wireless embedded computer with GSM/GPRS/EDGE, 4 DIs, 4 DOs, 2 serial ports, Ethernet, SD	Page 14-4
WE-2100T Series	Wireless LAN embedded serial device servers	Page 9-13
Wireless Accessories	Assorted cables, caps, connectos, mounting kits, termination resistors, power amplifiers, and arrestors for Moxa's AWK series products	Page 5-19
Wireless Antennas	IEEE 802.11b/g 2.4 GHz antennas, IEEE 802.11a/b/g 2.4/5 GHz dual-band antennas, IEEE 802.11a/b/g 2.4/5 GHz dual-band antennas, and IEEE 802.11a 5 GHz antennas	Page 5-19

This page intentionally left blank.

MOXA®

Moxa Headquarters
Fl.4, No.135, Lane 235
Pao-Chiao Rd., Shing-Tien City
Taiwan, R.O.C.
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231
www.moxa.com
info@moxa.com

Moxa Americas
Toll Free: 1-888-MOXA-USA
              (1-888-669-2872)
Tel: +1-714-528-6777
Fax: +1-714-528-6778
www.moxa.com
usa@moxa.com

Moxa Europe
Tel: +49-89-3 70 03 99-0
Fax: +49-89-3 70 03 99-99
www.moxa.com
de.moxa.com
europe@moxa.com

Moxa Asia-Pacific
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231
www.moxa.com
www.moxa.com.tw
japan.moxa.com
asia@moxa.com

Moxa China
www.moxa.com.cn
china@moxa.com

Shanghai Office
Tel: +86-21-5258-9955
Fax: +86-21-5258-5505

Beijing Office
Tel: +86-10-6872-3959/60/61
Fax: +86-10-6872-3958

Shenzhen Office
Tel: +86-755-8368-4084/94
Fax: +86-755-8368-4148