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Programmable Automation Controllers

To view all of Advantech's Programmable Automation Controllers & I/O Modules, please visit www.advantech.com/products.

PAC Overview

Introduction

Advantech offers PAC solutions designed for industrial automation applications which combine the openness and flexibility of PCs with the reliability of traditional automation controllers, such as PLCs. Advantech's offerings include the APAX series, ADAM-5000 series, and Embedded Automation Computers, utilizing sophisticated thermal designs to ensure the system stability. APAX controllers support Windows CE, Windows XP Embedded and Windows 7 operating systems. Advantech's PACs are ideal platforms to implement in diverse applications, such as power/energy, transportation, machine automation, factory automation, building automation, facility management system, environment monitoring, and more.

Real-time PACs: APAX Series

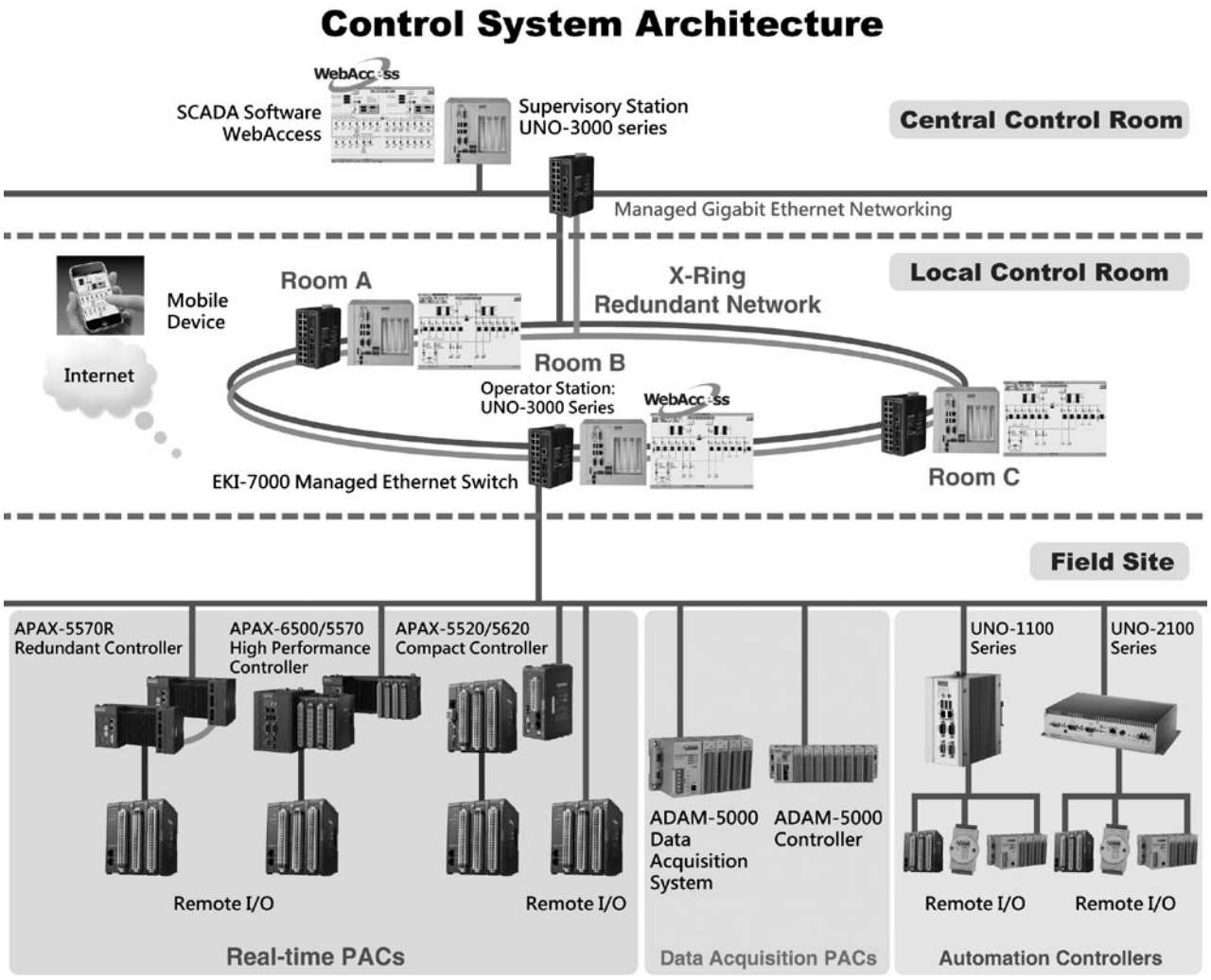
APAX series are Ethernet-enabled controllers allowing users to deploy I/O modules in flexible expansion combinations, like direct stack or daisy-chain. The control performance and functionality are not only better than PLCs, but also better than most PC-based controllers. Features including versatile CPU modules, I/O modules designed as reliable as PLC I/Os, high density I/Os with LEDs, hot swap and stackable functionality are delivered. Both C/C++ and .NET library, and IEC 61131-3 languages are provided as programming tools.

Data Acquisition PACs: ADAM-5000 Series

ADAM-5000 series are modularized I/Os to be inserted on backplanes with fixed slot numbers. Leveraging Advantech's rich experience in industrial data acquisition applications, ADAM-5000 offers a compact control system. Inheriting the reliability and robustness of a PLC system, ADAM-5000 offers the openness and flexibility of a PC, including computing power, networking and storage capability. Both C/C++ and .NET libraries and IEC 61131-3 languages are provided as programming tools.

Automation Controllers

Advantech's Embedded Automation Computers are designed to fulfill the needs of mission critical automation applications. Their embedded design, industrial automation features and advanced computer technology deliver robustness, reliability and flexibility to satisfy customers who are looking for a rugged and compact computing platform. They support various interfaces to integrate with other devices, such as Ethernet, RS-232/422/485, onboard I/O, extension PC card slots, CAN-bus and more. Through standard Ethernet networking, these computers can link to Advantech remote I/O solutions, such as APAX-5000 high density I/O (through APAX-5070 Modbus/TCP coupler module) or ADAM-6000 series compact modules, to get data and perform control tasks.



Real-time I/O Control Suitable for Multiple Domain Applications

Currently most PC-based controllers face one major challenge, especially DIN-rail PAC systems, which is real-time I/O control. Performance is severely hampered when I/O points increase because the access time also increases, which impacts control precision as well.

Food and beverage companies face shorter production runs on a wide range of products for different vendors, while automotive companies are dealing with changes in customer preference, aggressive competition and rising fuel costs. These industries require a mix of discrete, batch, process and motion control solution. In the past, these applications had forced engineers to use multiple controllers: a PLC for discrete control, a motion controller for multi-axis control, and a distributed control system or loop controller for process applications, which has proven time consuming and costly. Advantech PACs feature the ability to handle all these tasks with a single control system.

The result is shortened development time through reusable programming tools, lower maintenance costs through reduced parts, better information sharing among applications, and fewer personnel support throughout the plant.

Information Processing and Networking Capabilities

Advantech PACs not only provide excellent real-time I/O control, but also another key benefit for automation applications, information processing. With the ability to perform field operations, data exchanges and valuable information collection, this series is able to execute efficient decision-making. Information processing includes data logging and analysis with storage devices like SD or CF cards, recipe management for batch control, and database exchanges through SQL and OPC. Furthermore, implementing HMI software enables local operation.

This improves control system networking tremendously, allowing the network to share a common protocol at the device level, control level, and information level. It provides the ability to move information from the device level to executives at the enterprise resource planning (ERP) level without new protocols or drivers.

Advantech PACs feature a PC-based architecture, delivering significant networking benefits for manufacturers by USB, RS-232, RS-422/485 and Ethernet interfaces. Users can connect to field devices through serial or USB interface to satisfy any kind of application. The Ethernet interface allows users to effectively manage I/O control and information flow throughout the manufacturing and IT enterprise. Leveraging the high computing power of Advantech PACs also allows networks to communicate seamlessly on the factory floor with other common sets of IT capabilities like video, data and telephones. Easy access to such information is critical to making decisions about the capacity of an enterprise.

Scalability

In the past, many PLCs required users to learn different programming software and specify networks depending on the size and complexity of the application. Advantech PACs allow users to more closely match the controller to application needs without compromising functionality or learning a new control system. Such scalability reduces the headaches and high cost associated with system redesign, lack of program re-use, and re-training.

Software

Advantech PACs support software to satisfy both PC-based and PLC-based programmers. Leveraging IEC 61131-3 SoftLogic programming environment, PLC programmers can take PLC operations to the next level in many areas, such as communication, information processing, enterprise level database integration, and user interface development.

For PC-based programmers, Advantech offers an open platform solution, with C/C++ and .NET libraries for I/O control and communication functionality. They can satisfy programmers familiar with high level programming languages like Microsoft Visual Studio .NET. In addition, several convenient utilities are offered to save development time.

SoftLogic Control Software

SoftLogic Software

For tradition PLC platforms, the development environment will vary by PLC supplier and they cannot be compatible with each other. PAC platforms has a trend to adapt the International standard IEC 61131-3, established to standardize the multiple languages, sets of instructions and different concepts existing in the field of automation systems. Therefore, these programming languages which compliance with the IEC 61131-3 standard, usually named as SoftLogic software, make users able to leverage PLC-world typical programming interface. But they also can benefit from a portability of all platforms, reducing learning costs for building automation systems.

Advantech SoftLogic Software: KW MultiProg and ProConOS

Advantech delivers KW-Software's MultiProg development environment and ProConOS runtime kernel for various control platforms, including ADAM-5510 series, ADAM-5550 series and APAX series controllers. KW MultiProg supports all IEC-61131-3 programming language as following:

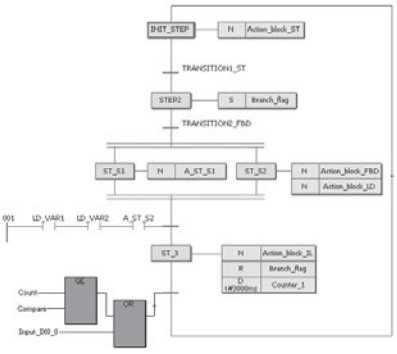
- Instruction List (IL)

```
1   LD    %IX0.2
2   AND   %IX0.3
3   OR    Action_INIT
4   ST    IL_VAR
5
6   LD    Input_IX0_0
7   JMPC  MANUAL
8
9   (*Timer FB TON*)
10  LD    Timer_start
11  ST    TON_IL.IN
12  LD    PT_TON_IL
13  ST    TON_IL.PT
14  CAL   TON_IL
15  LD    TON_IL.Q
16  ST    Action_INIT
17  STN   Timer_start
18  LD    TON_IL.ET
19  ST    Timer_value
20
```

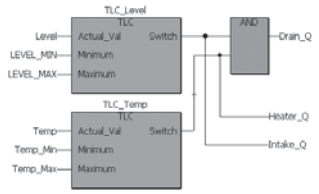
- Structured Text (ST)

```
1   CASE MODUS OF
2   1: ROBOT_X:= ROBOT_X + 200;
3      ROBOT_Z := ROBOT_Z + ADD_ARM ;
4      MODUS:=1;
5      IF ROBOT_X >= RANGE_POS_1 THEN
6         MODUS:=2;
7      END_IF;
8   2: ROBOT_X:= ROBOT_X - 200;
9      ROBOT_Z := ROBOT_Z - ADD_ARM ;
10     MODUS:=2;
11     IF ROBOT_X <= RANGE_NEG_1 THEN
12        MODUS:=1;
13     END_IF;
14  END_CASE;
15  ROBOT_Y:= ROBOT_X;
16  COUNTER_1 := COUNTER_1+1;
17  IF COUNTER_1 >1000 THEN
18     COUNTER_1 :=0;
19  END_IF;
20
```

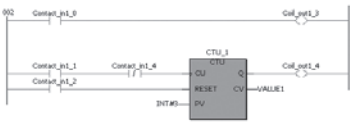
- Sequential Function Chart (SFC)



- Function Block Diagram (FBD)



- Ladder Diagram (LD)



- **Graphic Editor**

Programmers can work with SFC, FBD, and LD programming languages. The editor supports mixing of SFC, FBD, and LD in a single worksheet. The fully graphical editor allows completely free placements of objects. The Edit Wizard helps you when inserting and replacing code elements in worksheets. You can insert keywords and statements, operators, functions and function blocks with the help of the Edit Wizard. In addition, the Wizard simplifies the declaration of own data types.

- **Text Editor**

With the text editor, you edit and debug the code in IL and ST programming and define user-defined data types. IntelliSense function automatically completes your variable names, structure elements and function block parameters.

- **Variable Grid Editor**

In the variables grid, each line represents the declaration of a variable or FB instance. For an optimal overview, variables can be divided into different groups. The attributes of each variable/instance are defined in the respective table columns either by entering or selecting a combo box entry. The variables editor prevents a number of syntactical declaration errors and makes declaration easy and clear.

KW MultiProg has several features which can save your development time and well manage your complicated project:

- **Project Template**

A new project can not only be created with the Project Wizard in MultiProg, but also based on a project template. Owing to the practice-orientated template management, you can not only access supplied default templates, but save each own project as template.

- **Cross-Compiling**

The basic languages of the IEC 61131-3 standard, i.e. FBD, LD and IL, can be cross-compiled to each other including their comments. Program code which has been written in ST can be compiled to any of the three basic languages.

- **Password Protection**

You can protect complete subtrees or individual project nodes in the project tree with a password. Access rights can be restricted for editing the project structure, opening and writing worksheets, downloading to individual configurations or resources and debugging. Each user has to log in using the valid password in order to get full access to a protected project.

- **Multi-User Feature**

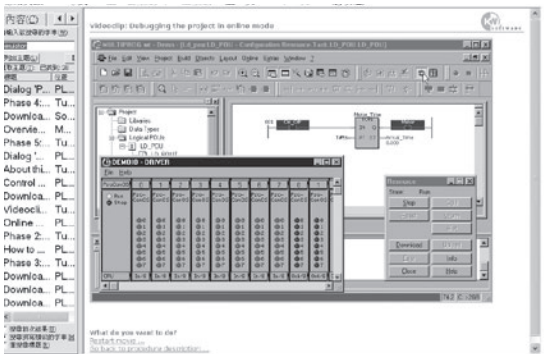
The Multi-User feature provides safe access to project source files while several users are working on the same project at the same time. In order to provide a safe and fast development environment for multiple users, the project is saved as server project on a server PC in the network. Each user can create a client project on his local PC for editing. The respective nodes in the project tree of the client project must be checked out, which means that no other user has write access for these data any longer.

- **Online Assistance in Multiple Languages**

The software includes online help systems and documentation, available in English, German, French, Spanish, Japanese and Chinese.

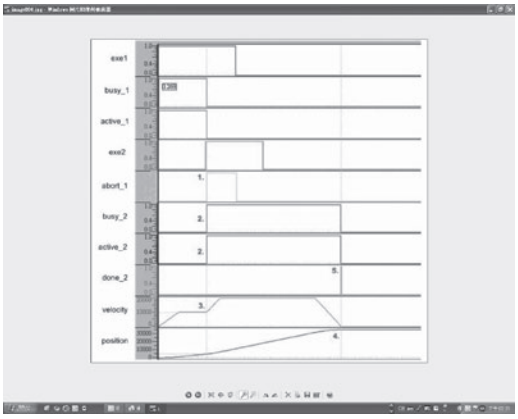
▪ Offline Simulation Tools

Program simulation is the best debug function for software developer. Before the program is downloaded into the controller, programmers can use this function to simulate programs. The easy-to-use 32 bit simulation offers fast and real-time multitasking test environment. The picture below is the simulation tool function and program with I/O status monitoring. Programmers can set the simulation value to AI or DI channels for checking the program before downloading. By simply clicking on a green input point (LED) you activate a simulator input. The output LEDs represent the actuated signal outputs in the same way.



▪ Logic Analyzer

The Logic Analyzer is a powerful tool for recording variable values in online mode and representing them in a graph. Using the results delivered by the analyzer, you can evaluate if the program runs as expected.



▪ Online Change

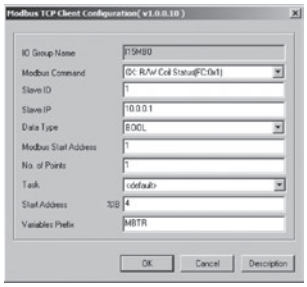
It is not acceptable to stop a machine and shut down processes in order to carry out maintenance work. Not to mention the difficulties that occurs during the debug phase, when constant switching between development and online mode is necessary. Changes of current program can be downloaded to the targeted Advantech PAC controller after compilation and commissioned without having to stop the controller and program execution. This feature enables controller to switch between two process cycles from the "old" to the "new" code after downloading the modified program.

▪ Advantech Advanced Function Blocks

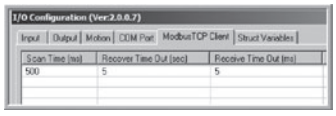
To satisfy automation applications, Advantech also add some add-on features for various dedicated control and automation applications:

- I/O Function Blocks: Used to control I/O with Advantech PAC controller. Including AI/O read FB, AI/O write FB, DI/O read FB, DI/O write FB, I/O error FB.
- SQL Database Function Blocks: Used for data log and analysis.
- Scheduling Function Blocks: Used for time scheduling control in building automation and devices schedule control applications.
- Email Function Blocks: Used for event notification and remote service applications.
- Modbus Communication Driver:

Advantech has provided an interface to monitor and control tags. This interface is accessible via Modbus/TCP as well as Modbus/RTU .The APAX controller can be treated as a Modbus Slave. The APAX Controller reserves approximately 128K Bytes memory space for Modbus use. This shared memory block can store user's data and exchange the data through Modbus/TCP and Modbus/RTU protocol with a HMI/SCADA software.



Modbus TCP Input

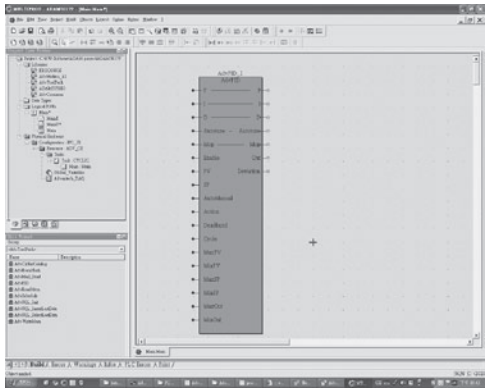


Modbus/TCP Client General Settings

▪ Auto-Tuning PID Function Blocks

The PID function blocks provide auto-tuning functionality. This function block makes use of Proportion, Integral, and Derivative calculations to provide a control cycle function to implement modulation control, and automatically find the optimized P, I, and D parameters.

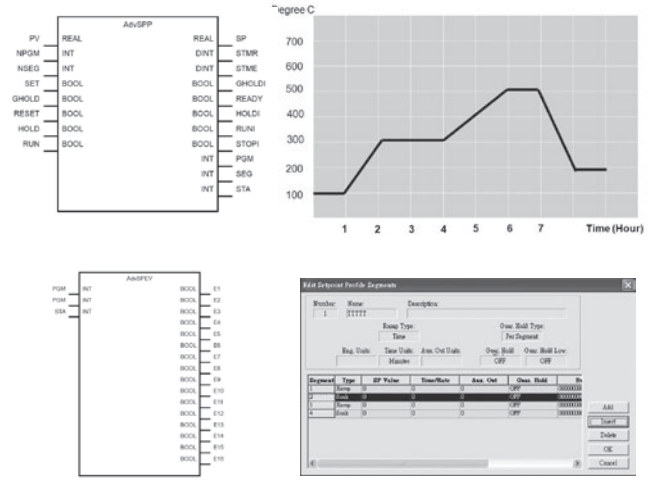
Using this control function, user can save more time on process control commissioning duty. The totally recommended PID are 32 loops, depending on customer's process application. For the flow and pressure control applications, we recommended up to 16 PID loops.



SoftLogic Control Software

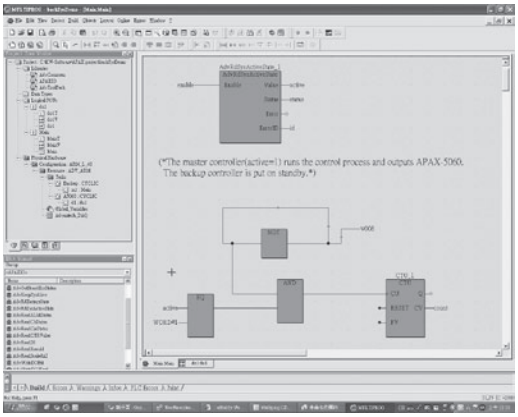
▪ Batch Control Function Blocks

The typical batch control application markets include food & beverage, furnace, bio-chemical, pharmaceutical, etc. The major control functions of batch applications are ramp/soak, recipes, PID auto-tuning and batch reports. The AdvSPP function block is used for Setpoint programmers (SPP). This function performs ramp/soak curve generation. The AdvSPEV function block can trigger batch control event, by directing the output status to digital output channels or part of control logic. This function block supports 16 events per segment basis



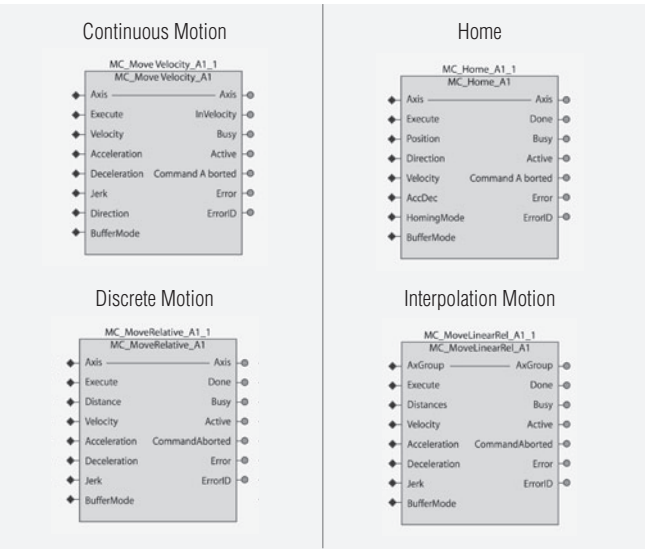
▪ Backup Function Blocks

APAX-5000 series delivers system backup functionality. To leverage this functionality, two controllers with the same control program, are installed in one system. After both controllers' backup function is enabled, the APAX-5000 system will automatically delegate one of the two controllers as the master controller. The control program should use the function block "AdvRdSysActiveState" to know if its controller is the master controller currently, by the parameter Value. If the Value responses "True", it means the controller is master controller, then the program should execute the control algorithm. If the Value responses "False", it means the controller is backup controller, then its program should do nothing, and simply checking if the master controller is still alive periodically. When it detect the master controller lost, it should executing the control algorithm, making it become the master controller.



▪ PLCopen Motion Control

Advantech offers motion function blocks which follow PLCopen standards. They can help system integrators to easily perform point-to-point moves, continuous moves, linear and circular interpolation and homing functionality. With the PLCopen-compliance FB, system integrators can benefits from reduced hardware cost and fully utilizing PC's high computing ability. The programmed application can be migrated to different hardware platforms in another machine development cycle.



Ordering Information

- **MPROG-ADV46E** KW Multiprog Advanced v4.6 (64 kbyte I/O)*
- **MPROG-BAS46E** KW Multiprog Basic v4.6 (128 bytes I/O)*
- **MPROG-ADV46UE** Upgrade of KW Multiprog Advanced v4.6 (64 kbyte I/O)
- **MPROG-BAS46UE** Upgrade of KW Multiprog Basic v4.6 (128 bytes I/O)

Notes:

*Using MPROG-BAS46E Basic (128 Bytes I/O), programmer can leverage 1024 points DI/O (128 Bytes*8), or 32 (APAX and ADAM-5550KW series)/64 (ADAM-5510KW series) points AI/O, or mix of DI/O and AI/O

PC-based Programming Software

PC-based Programming Software

Advantech PAC offers the seamless software integration for automation application. Regarded as SoftPLC, Advantech PACs not only leverage KW-Software including LD/FBD/IL/ST and SFC, but also empower many application-oriented & practice-oriented function blocks to different domain fields, such as batch control for food/beverage, auto-tuning PID for temperature control in EFMS, PLCOpen-compliant motion control blocks for a variety of trajectory control and positioning purposes in machine automation. Multi-tasking, runtime error reports and operating mode chances are also possible for PAC applications.

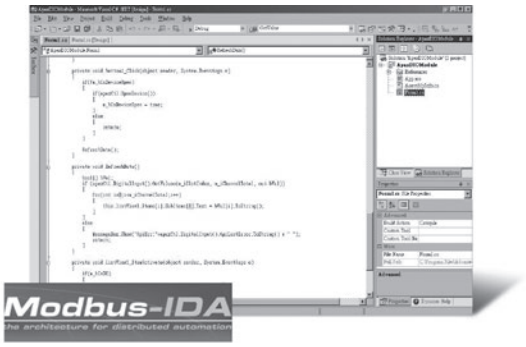
For PC-based users, Advantech also offers the .NET function library. System integrators can benefit from flexibility to integrate I/O control, motion control, industrial communication protocols and data process/exchange, database access, HMI interface and SCADA. Plenty of C/C++ and .NET examples save programmer learning time, helping save programmers' development effort and shortening time to market.

.NET and C/C++ Library

Advantech's PAC series solution offers a complete PC-based platform with Application Programming Interface (API). With C/C++ libraries and .NET class libraries provided by Advantech, PC-based programmers can develop their own programs for industrial control and automation tasks, involving I/O control, system backup function, communication, SQL and scheduling, even integrated with HMI/SCADA interface.

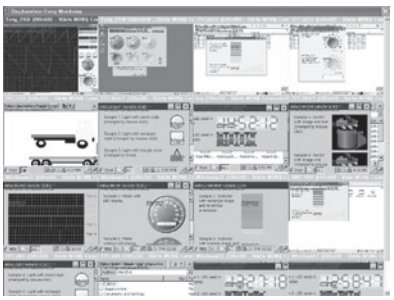
Modbus Server

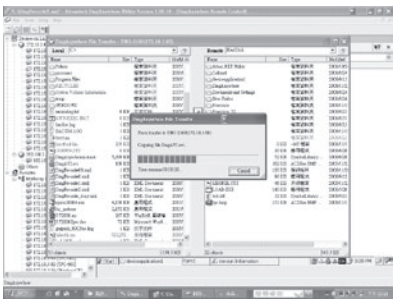
Advantech's PAC series offers Modbus/RTU and Modbus/TCP for data exchange purposes. Advantech offers a series of API, including Modbus server/client configuration, easy data access function and callback function for multithread event handling. Plenty of samples programs can help you to easily set up the Modbus communication. Besides, APAX-5570 series and APAX-5520 controller has built-in Modbus server, so any Modbus client (such as HMI) can access to APAX I/O without writing programming.

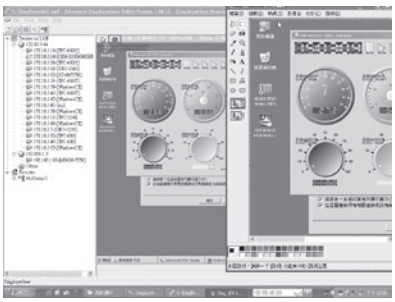


DiagAnywhere – Remote Maintenance Software

DiagAnywhere, an abbreviation of "Diagnostic Anywhere", is a networking solution for remotely monitoring and controlling APAX controllers through Windows-based operating systems. It includes the utility on the client side and the server on APAX controllers. Any computer installed with the utility can connect to APAX controllers, seeing what's happens on the controller and performing remote control. It is very convenient that the engineer doesn't need use a screen to operate the controller in the field, and allows them to maintain the system on the remote site. One DiagAnywhere client can monitor and control up to 16 target controllers simultaneously. This useful software tool also supports remote screen snapshots, remote screen recording, file upload and download between utility (on the client computer) and server (APAX controller), favorite devices grouping to manage system more easily, and authentication functionality. All these features help users save maintenance cost and effort.





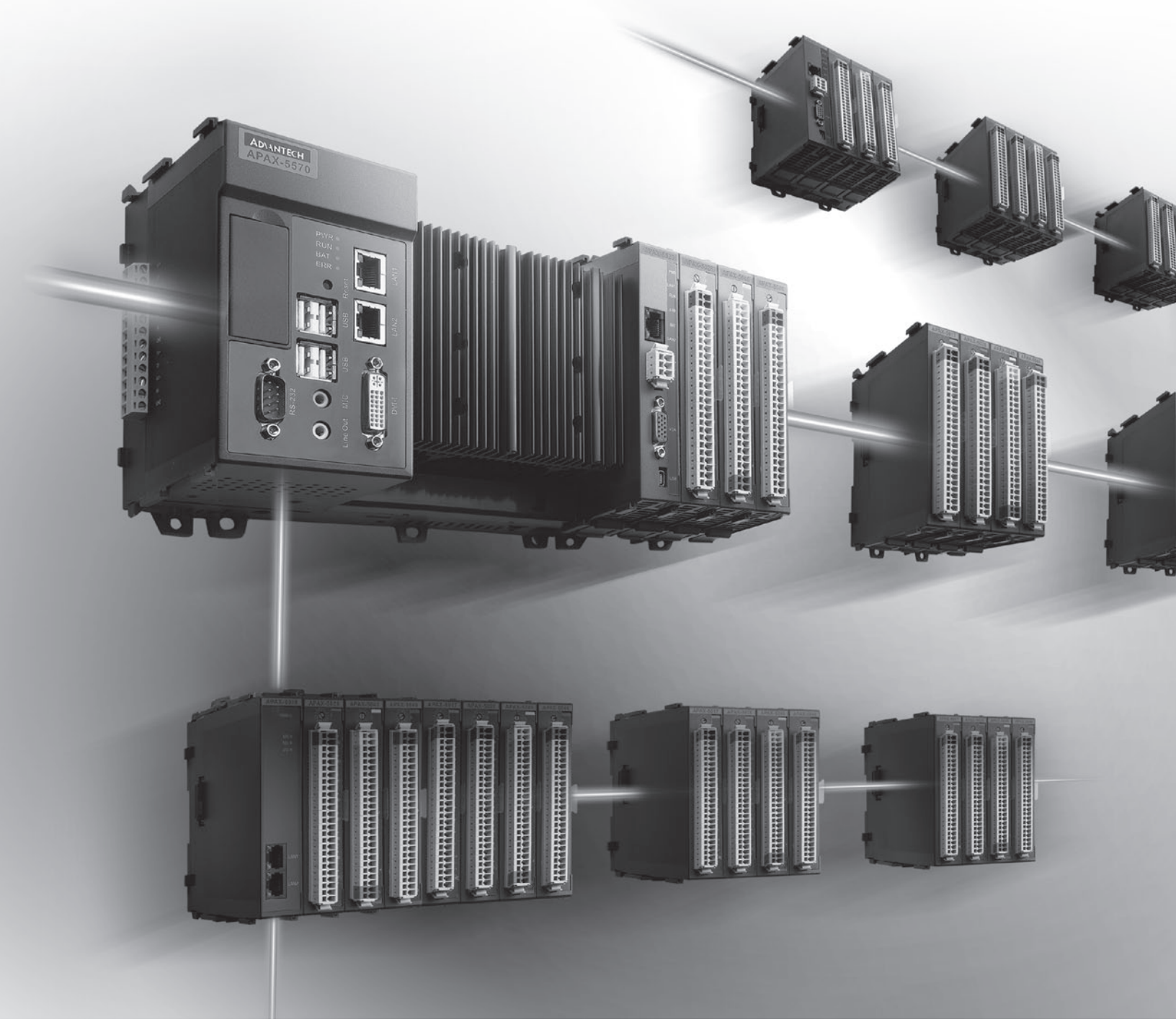


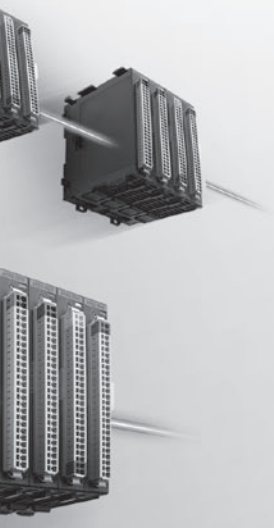
APAX Series Overview

Introduction

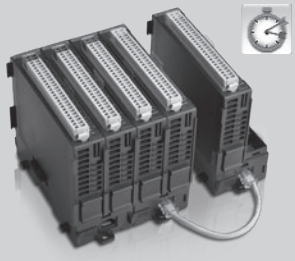
The APAX-6000 and APAX-5000 series, are designed for industrial automation application and combine the openness and flexibility of PCs with the reliability of PLCs. APAX controllers utilize a sophisticated thermal design to ensure the system stability and the system can work under high computing by integrating multiple tasks in one platform. APAX controllers offer various storage medium and communication interfaces for data logging and networking. High performance controllers deliver custom expansion slots with PCI bus signals reserved for the integration of 3rd-party products.

The APAX series is fully Ethernet-enabled which allows users to deploy the I/O modules in many expansion combinations, like direct stack or remote expansion. It supports both DIN-rail and wall mounting which makes the installation very flexible. Furthermore, all APAX I/O modules comply with high noise immunity and excellent reliability, just like a standard PLC. The user-friendly design of this series also includes slice I/O, high density I/O with LEDs, hot swap and flexible expansion functionality.



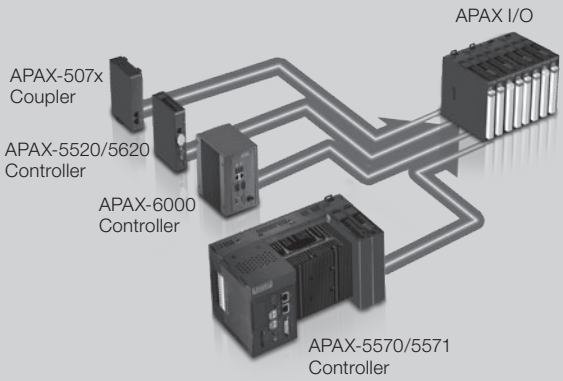


Guaranteed Real-time Performance



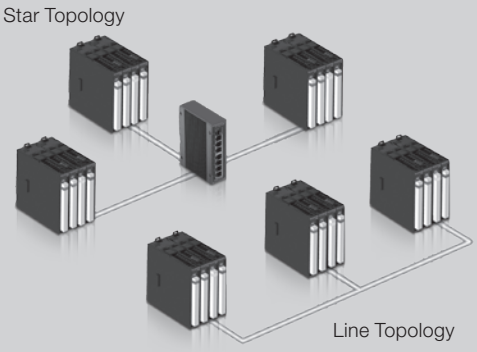
APAX I/O local bus adopts real-time I/O access methodology to ensure deterministic control with real-time performance. Contributed by the dedicated Digital Signal Processor (DSP) which handles I/O data process without controller's CPU resource, the I/O scan rate can be maintained within 1 ms, offering time deterministic I/O. The I/O processing is running on the back-end, and controller's CPU and DSP can share data through built-in dual port RAM. All these deliver real-time performance regardless of the number of I/O points. Programmers can concentrate on their application program development, and APAX system can perform real-time I/O access automatically.

Changeable Controllers and Couplers



APAX I/O modules can be accessed by different controllers or couplers to satisfy different applications. No matter what kind of CPU or couplers are used, the APAX I/O modules are the same. Using different couplers, I/O modules can link to various real-time Ethernet and fieldbus systems. It greatly saves I/O investment and offers scalability for future needs.

Flexible Expansion Topology



All APAX I/O modules are inserted on backplane modules. Through expansion port on backplanes and standard Ethernet cable, a remote expansion with local-bus speed between backplanes is built, and the distance can be up to 100 m. Standard Ethernet switch can be used between two backplanes. So line, tree or star topology can be built for I/O expansion - all with fast local-bus speed. The implementation of Ethernet switches not only enhances the flexibility of I/O expansion, it also increases the expansion distance. When fiber optic ports are available on the Ethernet switch, the distance can be much longer.

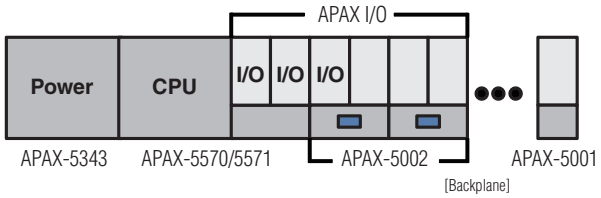
APAX System Architecture

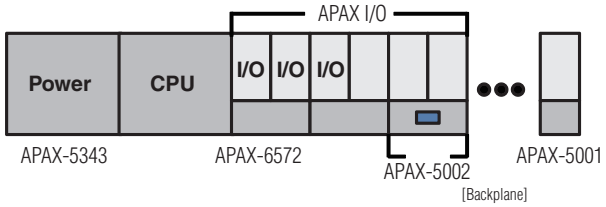
Introduction

To simplify the system configuration, Advantech's new APAX-6000 and APAX-5000 series provide easy and flexible way to setup different functions and configurations. There are multiple APAX series system combinations that can be selected to develop reliable control systems as detailed below.

Application Ready High Performance PACs

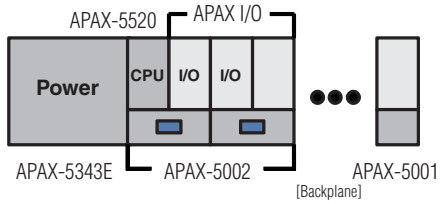
Advantech's APAX-5570 and 6570 series offers several high performance controllers with Atom and Celeron M grade CPUs. These controllers benefit from the high throughput, openness, flexibility and connectivity brought by PC-based architectures. Contributed by excellent heat dissipation technology with no hard disks, they deliver great system reliability. Various peripheral interfaces such as LAN, USB, DVI, audio, RS-232, RS-422/485, etc, are provided. These high performance PAC controllers are suitable for many complex control applications. Besides, its powerful integration ability makes it an ideal platform to integrate video, audio, HMI/SCADA software, database, data processing into one single solution.

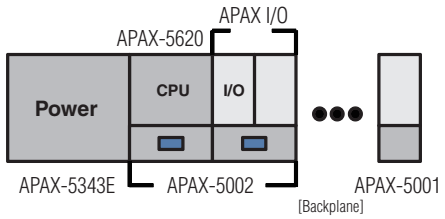




Robust, Compact PACs

APAX-5520/5620 series controllers offer a compact size without fans. These controllers have no rotating parts, helping further increase system reliability. APAX-5520/5620 features a VGA interface, enabling local displays, and its RS-485 and LAN ports offer communication ability with Modbus protocol. CF slot and battery backup RAM can be used for data storage. These features make APAX-5520/5620 as compact and robust as a PLC, but with enhanced displays, connectivity, and storage.



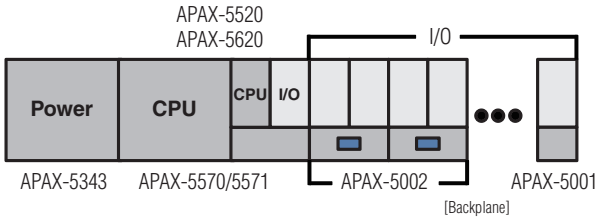


Dedicated System with Dual Controllers

APAX-6000 and APAX-5000 feature unique system architectures with two individual controllers executing different tasks, integrated into one platform. One controller focuses on I/O control processing while the other controller possesses high computing performance to be responsible for tasks like database, HMI/SCADA software, recipes, communication, storage, vision processing, and more.

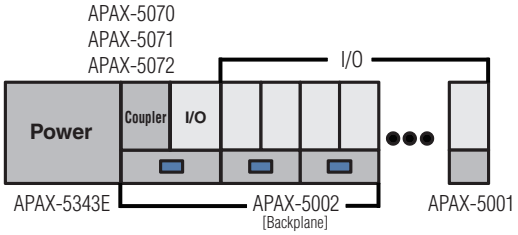
For example, APAX-5570 can be one controller delivering powerful computing ability and sufficient resources to execute all other tasks except I/O processing. Another controller could be APAX-5520, concentrating on I/O control. For many control applications, I/O control is critical, and this dual controller architecture offers excellent reliability and efficiency. Regardless of what happens on the APAX-5570 (even if the operating system crashes), I/O control process is still secure.

Any application running on APAX-5570, such as HMI/SCADA software, can access data from APAX-5520 through Modbus protocol. HMI/SCADA software that supports Modbus clients can link to Modbus servers on APAX-5520 to get data. Advantech offers related libraries for programmers. This can significantly save a lot of development time for communication.



Scalable Systems with Remote I/O

For different fieldbus or real-time Ethernet networks, such as Modbus/TCP, Ethernet/IP, PROFINET, etc, APAX series offers different kinds of couplers for communication. Controllers, HMI, and computers in the same network can access APAX I/O modules through the coupler. Not having to change I/O modules for different fieldbus or real-time Ethernet networks helps ensuring current I/O modules' investment for future demands. These couplers feature daisy-chain design, making installation easier.

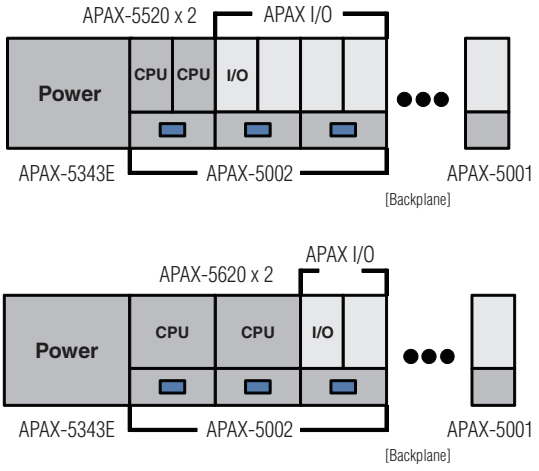


Reliable Backup System

APAX-5000 series delivers system backup functionality to significantly decrease the risk that the system will fail when the controller crashes. To leverage this, two controllers with the same control program are installed in one system. After both controllers' backup functions are enabled, APAX-5000 will automatically delegate one controller as the master controller.

The master controller will run the control program to execute the control process, while another controller (the backup controller) is put on standby. The master controller periodically sends live messages to the backup controller. If the backup controller does not receive a message from the master controller, it will automatically become the master controller and restart the control process.

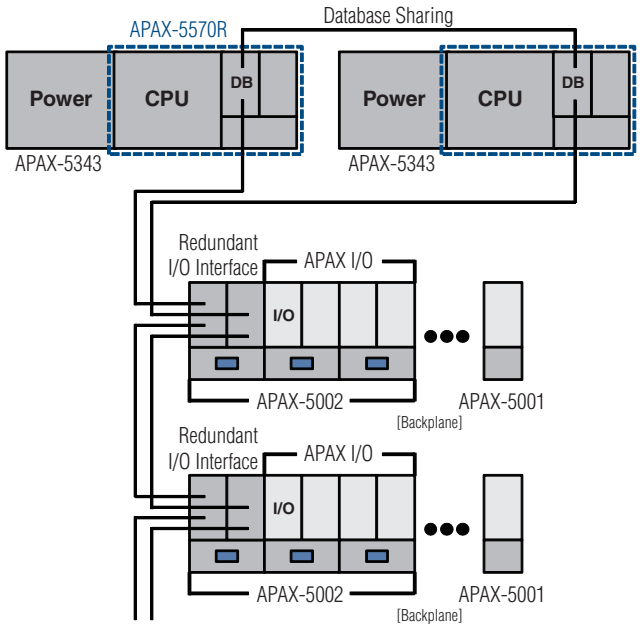
If the master controller is switched, it means there was an error happening on the previous master controller. Therefore, engineers can repair or change the previous master controller and re-enable it as the backup controller. Then if the new master controller fails, the new backup controller will automatically take over the control once again. This mechanism ensures the control system will continuously run the control process.



Highly Reliable Redundancy System

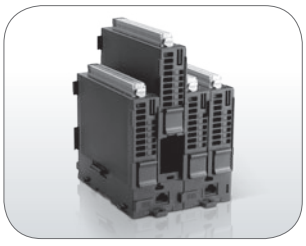
Similar to the backup system, Advantech's redundancy solution has two controllers with a slave controller to take over the control responsibility when master controller fails or crashes. The difference lies in the database sharing between master and slave controller.

For redundancy system, master and slave will continuously synchronize database between the two controllers. It means when master controller fails or crashes, the slave controller has already kept necessary variables' message within database. This feature is significant for critical control applications, offering the best reliability to system. Except for data sharing, the overswitch time from master to slave is much faster for redundancy system, comparing to backup system.



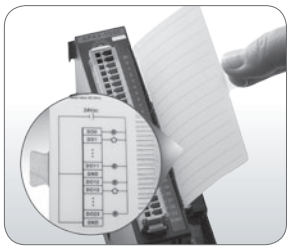
APAX I/O Modules:

APAX I/O modules feature high density I/O with up to 24 digital channels or 12 analog channels on a single module, saving system installation space. For analog modules, each channel can be configured with different type and range. It means users don't need to purchase different modules for different signals. Every I/O module is equipped with a processor, making it able to execute on-module data processing and calculation and perform self troubleshooting. This can help improve system performance.



Hot Swap I/O

Clamp Type Terminal Blocks



Writable Labels with Wiring Information

APAX Controller Selection Guide





System		APAX-5520	APAX-5620	APAX-5570/5571	APAX-6550	APAX-6572
CPU		XScale PXA270 520 MHz		APAX-5570: Celeron M 1 GHz APAX-5571: Celeron M 1.5 GHz	Geode LX 800 500MHz	Atom D510 1.6 GHz
Memory		Flash 32 MB, SDRAM 64MB		512 MB DDR2 DRAM	256 MB DDR SDRAM	2 GB DDR2 DRAM
Storage		1 x CF slot		1 x SD card slot	1 x CF slot (internal)	1 x CF slot (internal)
Local Display		VGA		DVI-I	VGA	VGA
USB Ports		1 x USB 1.1		4 x USB 2.0	2 x USB 1.1	4 x USB 2.0
Audio		-		Mic in, Line out	Line in, Line out	Mic in, Line in, Line out
Cooling System		Fanless		APAX-5570: Fanless APAX-5571: With Fan	Fanless	Fanless
Power Input		18 ~ 30 V_{DC}		18 ~ 30 V_{DC}	9 ~ 36 V_{DC}	9 ~ 36 V_{DC}
Diagnostics LED		Power, Battery, Run, Error			Power, IDE, LAN, Serial	Power, IDE, LAN, Serial
Real-time Clock		Yes				
Watchdog Timer		Yes				
Control Software		C/C++ library and .NET class library for C and .NET programming environment KW IEC 61131-3 SoftLogic programming tool				
Local Real-time I/O Modules		32 (max.)*				
Digital I/O Points		2048 (max.)				
Analog I/O points		512 (max.)				
Communication (Ethernet)	LAN Ports	1	2	2		3
	Speed	10/100 Mbps		10/100/1000 Mbps	10/100 Mbps	10/100/1000 Mbps
	Protocol	Modbus/TCP				
Communication (Serial)	COM 1	RS-485	RS-485	RS-232		RS-232/422/485
	COM 2	-	RS-485	RS-422/485	RS-232/422/485	RS-232/422/485
	COM 3	-	-	-	RS-232/422/485	-
	CAN Bus	-	2	-		-
	Protocol	Modbus/RTU, CANopen (APAX-5620 only)				
Isolation	Communication	2500 V_{DC} (RS-485)	2500 V_{DC} (CAN & RS-485)	2500 V_{DC} (RS-422/485 only)	-	-
Environment	Operating Temperature (when mounted vertically)	-10 ~ 55° C			-10 ~ 50° C	-10 ~ 50° C
	Storage Temperature	-40 ~ 70° C				
	Relative Humidity	0 ~ 95 % (non-condensing)				
	Vibration Protection	IEC 60068-2-64/60068-2-6: 1 Grms @ 5 ~ 500 Hz (Random, operating) 2 G @ 5 ~ 500 Hz (Sine, non-operating)		IEC 60068-2-64/2-6: 2 Grms @ 5 ~ 500 Hz (Random, operating) 2 G @ 5 ~ 500 Hz (Sine, non-operating)	IEC 60068-2-64: 2 Grms @ 5 ~ 500 Hz (Random, operating)	IEC 60068-2-64: 2 Grms @ 5 ~ 500 Hz (Random, operating)
	Shock Protection	IEC 60068-2-27: 20 G @ wall mount		IEC 60068-2-27: 30 G @ wall mount	IEC 60068-2-27: 50 G @ wall mount	IEC 60068-2-27: 50 G @ wall mount
Power Supply Module (Optional)		APAX-5343E		APAX-5343	PWR-243	
Page		18-21	18-21	18-18	18-17	18-16

*APAX DI/O modules can use ID numbers 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX Communication and Motion Module Selection Guide

Coupler Modules

NEW

Module Name		APAX-5070	APAX-5071	APAX-5072
Description		Modbus/TCP Communication Coupler	PROFINET Communication Coupler	EtherNet/IP Communication Coupler
Communication	Protocol	Modbus/TCP	PROFINET RT, DCP, DHCP, TCP/UDP, DNS, SNTP, ICMP	EtherNet/IP
	Data Transfer Rates	10/100 Mbps	100 Mbps	10/100 Mbps
	Connected I/O Modules	32 (max.)*		
	Digital Signals	2048 (max.)		
	Analog Signals	512 (max.)		
General	Connector	2 x RJ-45 (2-channel switch, share same IP address)		
	Topology	Line or star wiring		
	Operating Temperature	-10 ~ 60° C (when mounted vertically)		
	Storage Temperature	-40 ~ 85° C		
	Relative Humidity	5 ~ 95% (non-condensing)		
Page		18-36	18-36	18-36

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

Communication and Motion Modules

NEW

NEW

NEW

Module Name		APAX-5090P	APAX-5095P	APAX-5202P
Description		4-port RS-232/422/485 Communication Module	2-port CANopen Master Module	2-port AMONet Master Module
Serial Communication	Baud Rate	50 bps ~ 230.4 kbps	-	-
	Data Bits	5, 6, 7, 8	-	-
	Stop Bits	1, 1.5, 2	-	-
	Parity	None, even, odd	-	-
CANopen Communication	Data Transfer Rates	-	Max. 1 Mbits/s	-
Motion	Transmission Speed	-	-	2.5, 5, 10 or 20 Mbps
	Slaves Number	-	-	1 Ring: 64 (max.) 2 Rings: 128 (max.)
General	Interface	2 x RS-422/485 2 x RS-232/422/485	2 x CAN Bus	2 x AMONet
	Connector	26-pin clamp-type terminal	DB9	RJ-45
	Operating Temperature	0 ~ 60° C (when mounted vertically)		
	Storage Temperature	-40 ~ 70° C		
	Relative Humidity	5 ~ 95% (non-condensing)		
Page		18-22	18-22	18-23

Note: APAX-5090P, APAX-5095P and APAX-5202P can only be used by controller with a PCI interface

APAX I/O Module Selection Guide

Module Name		APAX-5013	APAX-5017	APAX-5017H	APAX-5018	APAX-5028
Description		8-ch RTD Module	12-ch AI Module	12-ch High Speed AI Module	12-ch Thermocouple Module	8-ch AO Module
Analog Input	AI Channels	8	12	12	12	-
	Input Type*	RTD (2-wire or 3-wire)	V, mV, mA	V, mV, mA	V, mV, mA, Thermocouple	-
	Sampling Rate (Samples/second)	50 Hz filter: 8 (Total**) 60 Hz filter: 10 (Total**)	12 (Total**)	1000 (per channel)	12 (Total**)	-
	Input Resolution	16-bit	16-bit (voltage) 14 ~ 15-bit (current)	12-bit	16-bit (voltage) 14 ~ 15-bit (current, thermocouple)	-
	Input Accuracy	±0.1 % of FSR	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	±0.1 % of FSR (Voltage) ±0.2 % of FSR (Current)	-
	Voltage Input	-	±150 mV, ±500 mV, ±1 V, ±5 V, ±10 V	0 ~ 500 mV, ±10 V, 0 ~ 10 V	±50 mV, ±100 mV, ±500 mV, ±1 V, ±2.5 V	-
	Current Input	-	±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 20 mA, 4 ~ 20 mA	±20 mA, 0 ~ 20 mA, 4 ~ 20 mA	-
	Direct Sensor Input	RTD (Pt-100, Pt-200, Pt-500, Pt-1000, Balco, Ni 518)	-	-	Thermocouple (Type J, K, T, E, R, S, B)	-
	Wire Burnout Detection	All RTD range	4 ~ 20 mA	4 ~ 20 mA	4 ~ 20 mA and all Thermocouple range	-
Analog Output	AO Channels	-	-	-	-	8
	Output Type*	-	-	-	-	V, mA
	Output Resolution	-	-	-	-	14-bit
	Output Accuracy	-	-	-	-	±0.1 % of FSR
	Output Slew Rate	-	-	-	-	0.7 VDC/µs (per channel)
	Voltage Output	-	-	-	-	±2.5 V, ±5 V, ±10 V, 0 ~ 2.5 V, 0 ~ 5 V, 0 ~ 10 V
	Current Output	-	-	-	-	0 ~ 20 mA, 4 ~ 20 mA
	Short Circuit Protection	-	-	-	-	Yes
	Fail Safe Value	-	-	-	-	Yes
General	Weight	170 g	170 g	175 g	170 g	175 g
	Operating Temperatrure	-10 ~ 60° C (when mounted vertically)				
	Storage Temperature	-40 ~ 85° C				
	Relative Humidity (non-condensing)	5 ~ 95%				
	Power Consumption (typical)	2.5 W @ 24 V_{DC}	4 W @ 24 V_{DC}	3.5 W @ 24 V_{DC}	3.5 W @ 24 V_{DC}	3.5 W @ 24 V_{DC}
	Isolation between channels and backplane	2500 V_{DC}				
	Power Supply Module (optional)	APAX-5343E				
Page		online	online	online	online	online

*Each cahnnel can be configured with different type and range

**Sampling rate value depends on used channel number.

Example: Using 6 channels on APAX-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.





Module Name		APAX-5040	APAX-5045	APAX-5046	APAX-5060	APAX-5080
Description		24-ch DI Module	24-ch DI/O Module	24-ch DO Module	12-ch Relay Module	4/8-ch Counter Module
Digital Input	DI Channels	24	12	-	-	4
	Input Type	Sink or Source Load	Sink or Source Load	-	-	Source Load
	Rated Input Voltage	24 V_{DC}	24 V_{DC}	-	-	24 V_{DC}
	Input Voltage Range (signal "0")	-5 ~ 5 V_{DC}	-5 ~ 5 V_{DC}	-	-	0 ~ 3 V_{DC}
	Input Voltage Range (signal "1")	15 ~ 30 V_{DC} -15 ~ -30 V_{DC}	15 ~ 30 V_{DC} -15 ~ -30 V_{DC}	-	-	10 ~ 30 V_{DC}
	Rated Input Current	4.4 mA (typical)	4.4 mA (typical)	-	-	10 mA (typical)
	Input Filter	3 ms	3 ms	-	-	3 ms
	Over Voltage Protection	Yes	Yes	-	-	Yes
Counter Input	Counter Channels	-	-	-	-	4 or 8 (depends on mode)
	Rated Input Voltage	-	-	-	-	24 V_{DC}
	Input Voltage Range (signal "0")	-	-	-	-	0 ~ 3 V_{DC}
	Input Voltage Range (signal "1")	-	-	-	-	10 ~ 30 V_{DC}
	Rated Input Current (signal "1")	-	-	-	-	5 ~ 15 mA (typical)
	Counting Range	-	-	-	-	32-bit + 1-bit overflow/underflow
	Counter Frequency	-	-	-	-	1 MHz (max.)
	Counter Gate and Alarm Function	-	-	-	-	Yes
	Over Voltage Protection	-	-	-	-	Yes
Digital Output	DO Channels	-	12	24	12	4
	Output Type	-	Sink	Sink	Relay (Form A, SPST)	Sink
	Rated Output Voltage	-	24 V_{DC}	24 V_{DC}	250 V_{AC}, 30 V_{DC}	24 V_{DC}
	Rated Output Current (signal "1")	-	0.5 A	0.5 A	5 A	0.5 A
	Short Circuit Protection	-	Yes	Yes	-	Yes
	Thermal Shutdown Protection	-	Yes	Yes	-	Yes
General	Weight	160 g	165 g	165 g	195 g	170 g
	Operating Temperatrure	-10 ~ 60° C (when mounted vertically)				
	Storage Temperature	-40 ~ 85° C				
	Relative Humidity (non-condensing)	5 ~ 95%				
	Power Consumption (typical)	2 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}	2 W @ 24 V_{DC}	2.5 W @ 24 V_{DC}
	Isolation between channels and backplane	2500 V_{DC}				
	Channel Status LED	Yes (per channel)				
	Fail Safe Value	-	Yes (DO channel)	Yes	Yes	Yes (DO channel)
	Power Supply Module (optional)	APAX-5343E				
Page		online	online	online	online	online

APAX-6572

PAC with Intel® Atom™ D510 CPU

NEW

RoHS COMPLIANT 2002/95/EC CE FCC

Features

- Intel® Atom™ D510 1.6 GHz CPU
- Onboard 2 GB DDR2 DRAM
- Expands I/O by connecting with APAX-5000 I/O modules
- Supports Windows WES7, WES2009 and Windows CE
- Provides C/C++ and .NET library for I/O control and communication
- Supports real-time control tasks under Windows CE through ProConOS
- 2 x RS-232/422/485 (automatic flow control)
- 3 x 10/100/1000 Mbps LAN, 4 x USB 2.0

Introduction

APAX-6572 is a high performance controller with an Intel Atom D510 CPU. By installing Windows WES7, WES2009 or Windows CE operating system, it becomes an application-ready platform. It is an ideal open control platform which can be combined with APAX I/O modules, and features flexible I/O expansion, real-time I/O control, and powerful computing and networking capability through various interfaces.

Specifications

General

- **Certification** CE, FCC Class A
- **Cooling System** Fanless
- **Mounting** DIN-rail, Wall mount (panel mount)
- **Dimensions (W x H x D)** 222 x 155 x 140 mm
- **Enclosure** Aluminum + SECC, ABS + PC (I/O)
- **Weight** 2.6 kg
- **Power Consumption** 35 W @ 24 V_{DC} (Typical, Without I/O modules)
- **Power Requirement** 9 ~ 36 V_{DC} (e.g +24 V @ 1 A) (Min. 24 W), AT
- **Watchdog Timer** Programmable 7-tier event handler, from 1 ~ 255 seconds for each tier

System Hardware

- **CPU** Intel Atom D510 (1.6 GHz)
- **Memory** 2 GB DDR2 DRAM (onboard)
- **LED Indicators** Power, IDE, LAN (Active, Status), Serial (Tx, Rx)
- **Display** VGA (DB15 connector), up to 1024 x 768 @ 60 Hz
- **Audio** Line in, Line out, Mic in
- **Storage** 1 x internal Type I/II CompactFlash card slot
- **Mini-PCIe** 1 x PCI express mini card slot for expansion

Software

- **Operating System** Windows WES7, WES2009, Windows CE
- **Control Software** C/C++ and .NET library with utility
  KW MultiProg (development), ProConOS (kernel)
- **Remote Management** Built-in Advantech DiagAnywhere agent
  Modbus/ASCII master/slave mode

I/O Expansion

- **Built-in I/O Module Slots** 4
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication

- **Serial Ports** RS-232/422/485 x 2 (supports automatic RS-485 data flow control)
- **Serial Baud Rate** 50 ~ 115.2 kbps
- **LAN Ports** 3 x RJ-45 Ports, 10/100/1000 Mbps
- **USB Ports** 4 x USB 2.0

Environment

- **Operating Temperature** -10 ~ 55 ° C (when mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Operating Humidity** 20 ~ 95% (non-condensing)
- **Storage Humidity** 0 ~ 95% (non-condensing)
- **Shock Protection** 50 G @ wall mount, half sine, 11 ms
  (Conforms to IEC 60068-2-27)
- **Vibration Protection** 2 Grms @ 5 ~ 500 Hz
  (Random, operating, 1hr/axis)
  (Conforms to IEC 60068-2-64)

Ordering Information

- **APAX-6572** PAC with Intel Atom D510 CPU

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-6550

PAC with AMD Geode LX CPU

NEW

Features

- AMD Geode LX 800 500MHz CPU
- Onboard 256 MB DDR SDRAM
- Expands I/O by connecting with APAX-5000 I/O modules
- Supports Windows WES2009 and Windows CE
- Provides C/C++ and .NET library for I/O control and communication
- Supports real-time control tasks under Windows CE .NET through ProConOS
- 1 x RS-232 and 2 x RS-232/422/485 (automatic flow control)
- 2 x 10/100 Mbps LAN, 2 x USB 2.0

Introduction

APAX-6550 is a compact controller with Geode LX800 CPU. By installing a Windows WES2009 or Windows CE operating system, it becomes an application-ready platform which can be combined with APAX I/O modules. APAX-6550 features flexible I/O expansion, real-time I/O control performance, powerful computing and networking capabilities. APAX-6550 can help users build an integrated automation solution in a short time, and offering excellent reliability.

Specifications

General

- **Certification** CE, FCC Class A
- **Cooling System** Fanless
- **Mounting** DIN-rail, Wall mount (panel mount)
- **Dimensions (W x H x D)** 168 x 155 x 140 mm
- **Enclosure** Aluminum + SECC, ABS + PC (I/O)
- **Weight** 2.2 kg
- **Power Consumption** 20 W @ 24 V_{DC} (Typical, Without I/O modules)
- **Power Requirement** 9 ~ 36 V_{DC} (e.g +24 V @ 1 A) (Min. 24 W), AT
- **Watchdog Timer** Yes

System Hardware

- **CPU** AMD Geode LX 800 (500MHz)
- **Memory** 256 MB DDR SDRAM (onboard)
- **LED Indicators** Power, IDE, LAN (Active, Status), Serial (Tx, Rx)
- **Display** VGA (DB15 connector), up to 1024 x 768 @ 60 Hz
- **Audio** Line in, Line out
- **Storage** 1 x internal Type I/II CompactFlash card slot

Software

- **Operating System** Windows WES2009, Windows CE
- **Control Software** C/C++ and .NET library with utility
  KW MultiProg (development), ProConOS (kernel)
- **Remote Management** Built-in Advantech DiagAnywhere agent
  Modbus/ASCII master/slave mode

I/O Expansion

- **Built-in I/O Module Slots** 2
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication

- **Serial Ports** COM1: RS-232
  COM2 & COM3: RS-232/422/485 (supports automatic RS-485 data flow control)
- **Serial Baud Rate** COM1: 50 ~ 115.2 kbps
  COM2 & COM3: 300 ~ 115.2 kbps (RS-232), 300 ~ 921.6 kbps (RS-422/485)
- **LAN Ports** 2 x RJ-45 Ports, 10/100 Mbps
- **USB Ports** 2 x USB 2.0

Environment

- **Operating Temperature** -10 ~ 55 ° C (when mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Operating Humidity** 20 ~ 95% (non-condensing)
- **Storage Humidity** 0 ~ 95% (non-condensing)
- **Shock Protection** 50 G @ wall mount, half sine, 11 ms
  (Conforms to IEC 60068-2-27)
- **Vibration Protection** 2 Grms @ 5 ~ 500 Hz
  (Random, operating, 1hr/axis)
  (Conforms to IEC 60068-2-64)

Ordering Information

- **APAX-6550** PAC with AMD Geode LX CPU

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-5570/5571

PACs with Intel® Celeron® M CPU

Features

- Intel® Celeron® M 1 GHz or 1.5 GHz CPU processor
- Expands I/O by connecting with APAX-5000 I/O modules
- Provides complete C/C++ and .NET libraries for I/O control and communication
- Supports real-time control by KW IEC 61131-3 SoftLogic programming
- DVI-I supports dual display
- Dual power input for redundancy with power-fail relay
- 1 x RS-232 and 1 x isolated RS-422/485 ports
- Supports Windows WES2009 and Windows CE .NET
- Combine with compact controller (for example, APAX-5520KW) to deliver dual CPU architecture
- SD card slot for data logging

Introduction

APAX-5570/5571 is a controller with high performance Intel Celeron M grade CPU. By installing Windows WES2009 or Windows CE operating system makes APAX-5570/5571 a ready application platform to shorten development time. Connecting with other APAX-5000 I/O modules, APAX-5570/5571 can become a complete control system. Through C/C++ and .NET class libraries or KW SoftLogic programming tool for the I/O modules, developers can build applications in a short amount of time.

Specifications

General

Certifications	CE, FCC class A
Cooling System	APAX-5570: Fanless, heatsink only APAX-5571: Heatsink with fan
Mounting	DIN-rail, wall mount (panel mount)
Dimensions (W x H x D)	270 x 142 x 126 mm
Enclosure	ABS+PC
Weight	APAX-5570: 2.42 kg APAX-5571: 2.46 kg
Power Consumption (Typical, without inserted module)	APAX-5570: 30 W @ 24 V_{DC} APAX-5571: 45 W @ 24 V_{DC}
Power Input	18 ~ 30 V_{DC} (Dual Power Input)
Power Reversal	Yes
Real-time Clock	Yes
Watchdog Timer	Yes

System Hardware

CPU	APAX-5570: Intel Celeron M 1 GHz (non-cache) APAX-5571: Intel Celeron M 1.5 GHz (1 MB L2 cache)
System Chipset	Intel 915 GME
Memory	512 MB DDR2 DRAM on board (Dual channel mode)
LED Indicators	Power, Run, Error, Battery
Display	DVI-I supports DVI and VGA for dual display
Audio	Mic-in, Line-out
Storage	1 x SD card slot (SD card size: up to 16 GB)
Reset Button	Yes

Software

OS Support	Windows WES2009, Windows CE
Control Software	C/C++ and .NET library KW Multiprog (development tool) KW ProConOS (runtime kernel)

I/O Expansion

Connected I/O Modules	32 (max.)*
Digital Signals	2048 (max.)
Analog Signals	512 (max.)

Communication

Serial Ports	1 x RS-232, 1 x Isolated RS-422/485
Serial Port Isolation	2500 V_{DC} (RS-422/485 only)
Serial Baud Rate	RS-232: 50 bps ~ 115.2 kbps RS-422/485: 50 ~ 230400 bps
LAN Ports	2 x RJ-45 Ports, 10/100/1000 Mbps (Intel 82574L) (supports teaming function)
USB Ports	4 x USB 2.0

Environment

Operating Temperature	-10 ~ 55° C (when mounted vertically)
Storage Temperature	-40 ~ 70° C
Relative Humidity	5 ~ 95% (non-condensing)
Shock Protection	30 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
Vibration Protection	2 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis) 2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis) (Confirms to IEC 60068-2-64 and IEC 60068-2-6)

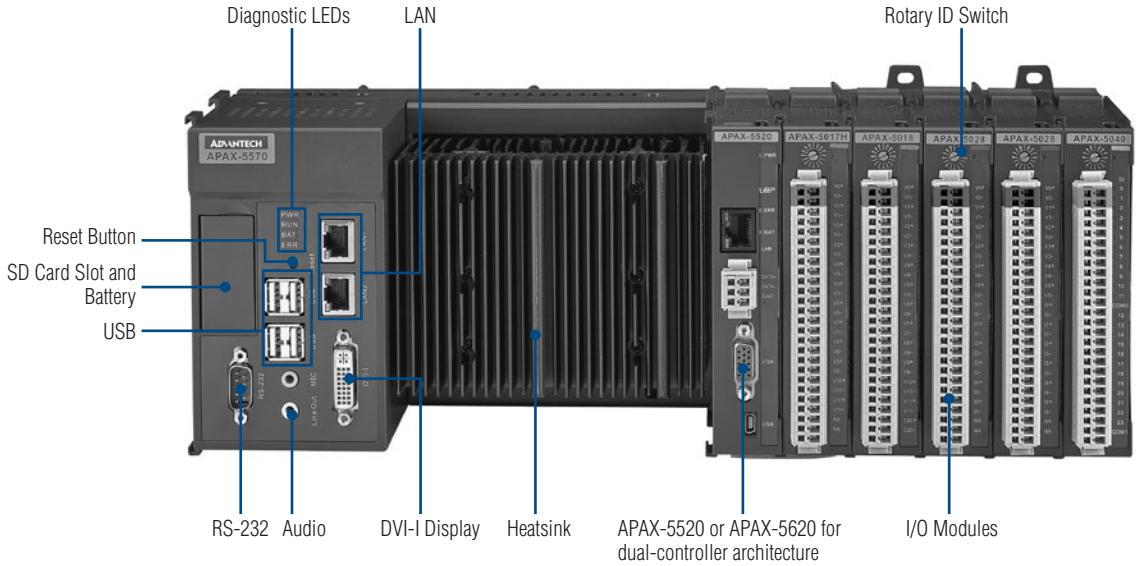
Ordering Information

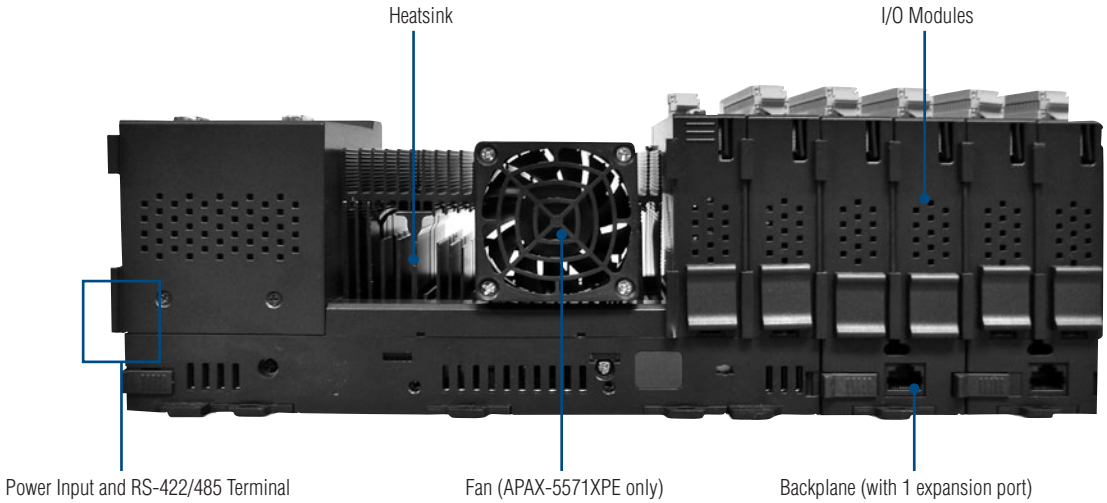
APAX-5570	PAC with Intel Celeron M 1 GHz
APAX-5571	PAC with Intel Celeron M 1.5 GHz

Accessories

APAX-5343	Power Supply for APAX-5570 Series

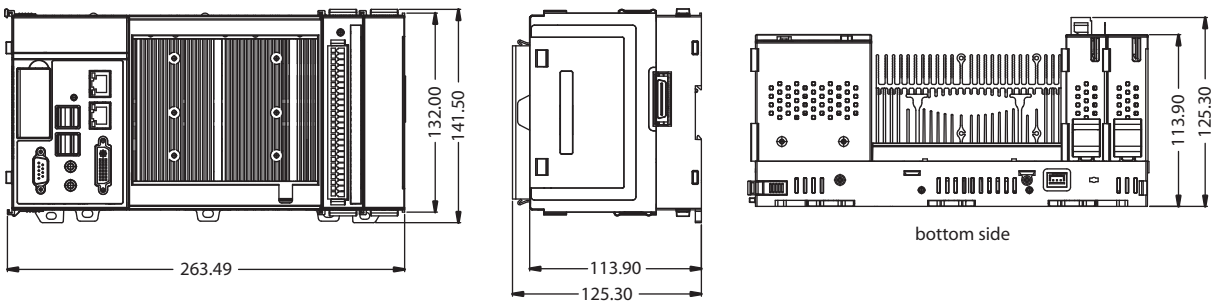
*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15





Dimensions

Unit: mm



APAX-5570R

Redundant Controller System

Features

- Redundant system with two controllers (master and slave) to ensure continuous I/O control
- Develop programs with IEC 61131-3 SoftLogic software to ensure time deteministic performance
- Supports Ethernet programming, monitoring and online editing
- Up to 32 connected I/O modules
- Supports dual power supply for both controllers

Introduction

APAX-5570R is a redundant system with two controllers, both equipped with high performance Celeron M grade CPUs to backup and monitor each other, offering excellent reliability for I/O control. Master controller performs I/O processing, while the slave controller is automatically synchronizing with master controller to update the latest database information. When the master controller fails, the slave controller will automatically take over the control responsibility in a short time.

Specifications

General

- **Certification** CE, FCC Class A
- **Cooling System** Fanless
- **Mounting** DIN-rail, Wall mount (panel mount)
- **Dimensions (WxHxD)** 270 x 142 x 126 mm (for one controller)
- **Enclosure** ABS + PC
- **Weight** 5 KG
- **Power Consumption** 65 W @ 24 V_{DC} (Typical)
- **Power Requirement** 9 ~ 36 V_{DC} (e.g +24 V @ 1 A) (Min. 24 W), AT
- **Watchdog Timer** Yes
- **Switchover Time** ≦ 50 ms

System Hardware (For one controller)

- **CPU** Intel Celeron M 1 GHz (non-cache)
- **Memory** 512 MB DDR2 DRAM (onboard, dual channel mode)
- **LED Indicators** Power, IDE, LAN (Active, Status), Serial (Tx, Rx)
- **Display** DVI-I supports DVI and VGA for dual display
- **Audio** Mic-in, Line-out
- **Storage** 1 x SD card slot (SD card size: up to 16 GB)

Software

- **Control Software** KW MultiProg (development), ProConOS (kernel)

I/O Expansion

- **Distance between I/O Station & Controllers** 100 m
- **Distance between I/O Stations** 100 m
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication

- **Serial Ports** COM1: RS-232
COM2: RS-422/485 (isolated)
- **Serial Baud Rate** COM1: 50 ~ 115.2 kbps
COM2: 50 ~ 203.4 kbps
- **LAN Ports** 2 x RJ-45 Ports, 10/100/1000 Mbps
- **USB Ports** 4 x USB 2.0

Environment

- **Operating Temperature** -10 ~ 55° C (when mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 30 G @ wall mount, half sine, 11 ms
(Conforms to IEC 60068-2-27)
- **Vibration Protection** 2 Grms @ 5 ~ 500 Hz (Random, operating, 1hr/axis),
2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis)
(Conforms to IEC 60068-2-64 and 60068-2-6)

Ordering Information

- **APAX-5570R** Redundant Controller System

Accessories

- **APAX-5343** Power Supply for APAX-5570 Series

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-5520CE/KW
APAX-5620CE/KW

PAC with Marvel XScale® CPU

PAC with Marvel XScale® CPU and CAN

APAX-5520CE/KW

RoHS COMPLIANT 2002/95/EC CE FCC

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 210 g
- **Power Consumption** 4.5 W @ 24 V_{DC} (typical)

System Hardware

- **CPU** Intel XScale PXA270 520 MHz
- **Memory Flash** 32M bytes, SDRAM 64M bytes
- **Battery Backup Memory** 256 KB file system, 256 KB direct access
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **VGA** DB15 connector
- **SB Ports** 1 x USB 1.1
- **Storage** 1 x Type II CompactFlash card slot

Software

- **OS Support** Windows CE
- **Control Software** C/C++ and .NET library
  KW Multiprog (development tool)
  KW ProConOS (runtime kernel)

I/O Expansion

- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication (Ethernet)

- **LAN Ports** 1 x RJ-45 Port, 10/100 Mbps
- **Offers Modbus/TCP Server and Client APIs**

Communication (Serial)

- **Medium** 1 x Isolated RS-485 (2-wire, isolated)
- **Offers Modbus/RTU Master and Slave APIs**

Environment

- **Operating Temperature** -10 ~ 55 ° C (when mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5520CE** PAC with Marvel XScale CPU, WinCE
- **APAX-5520KW** PAC with Marvel XScale CPU, KW

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

APAX-5620CE/KW

RoHS COMPLIANT 2002/95/EC CE FCC

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 60 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 310 g
- **Power Consumption** 11 W @ 24 V_{DC} (typical)

System Hardware

- **CPU** Intel XScale PXA270 520 MHz
- **Memory Flash** 32M bytes, SDRAM 64M bytes
- **Battery Backup Memory** 256 KB file system, 256 KB direct access
- **Real-time Clock** Yes
- **Watchdog Timer** Yes
- **VGA** DB15 connector
- **USB Ports** 1 x USB 1.1
- **Storage** 1 x Type II CompactFlash card slot

Software

- **OS Support** Windows CE
- **Control Software** C/C++ and .NET library
  KW Multiprog (development tool), KW ProConOS (runtime kernel)

I/O Expansion

- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)

Communication (Ethernet)

- **LAN** 2 x RJ-45 Port, 10/100 Mbps
- **Offers Modbus/TCP Server and Client APIs**

Communication (Serial)

- **Medium** 2 x Isolated RS-485 (2-wire, isolated)
- **Offers Modbus/RTU Master and Slave APIs**

Communication (CAN)

- **Medium** Isolated CAN x 2
- **Protocol** CANopen
- **Speed** maximum 1 Mbit/s

Environment

- **Operating Temperature** -10 ~ 55 ° C (when mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5620CE** PAC with Marvel XScale CPU, CAN, WinCE
- **APAX-5620KW** PAC with Marvel XScale CPU, CAN, KW

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15

APAX-5090P
APAX-5095P

4-port RS-232/422/485 Communication Module

2-port CANopen Communication Module

APAX-5090P

CE FCC RoHS

APAX-5095P

CANopen CE FCC RoHS

Specifications

General

- **Certifications** CE, FCC class A
- **Interface** COM 1, COM 2: RS-422/485
  COM 3, COM 4: RS-232/422/485
- **Connectors** 1 x 26-pin clamp-type terminal
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Data Bits** 5, 6, 7, 8
- **Stop Bits** 1, 1.5, 2
- **Parity** None, even, odd
- **Baud Rate** 50 bps ~ 230.4 kbps
- **Data Signals** RS-232: TxD, RxD, RTS, CTS, GND
  RS-422: Tx+, Tx-, Rx+, RX-
  RS-485: Data+, Data-
- **FIFO** 128 bytes
- **Flow Control** RTS/CTS, Xon/Xoff

Protection

- **ESD Protection** 15 kV
- **EFT Protection** 2,500 V_{DC}
- **Isolation Protection** 2,500 V_{DC} (between COM port and backplane)

Environment

- **Operating Temperature** 0 ~ 60° C (mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5090P** 4-port RS-232/422/485 Comm. Module

Note: APAX-5090P can only be used by controllers with a PCI interface

Specifications

General

- **Certifications** CE, FCC class A
- **Interface** 2 x CAN Bus
- **Connectors** DB9
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Protocol** CANopen
- **Speed** Max. 1 Mbits/s
- **Supports PDO transmission mode**
- **Supports NMT and SDO communication object**
- **Supports Heartbeat producer and consumer**
- **Supports Emergency objects**

Protection

- **Isolation Protection** 2,500 V_{DC}

Environment

- **Operating Temperature** 0 ~ 60° C (mounted vertically)
- **Storage Temperature** -40 ~ 70° C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5095P** 2-port CANopen Module

Note: APAX-5095P can only be used by controllers with a PCI interface

APAX-5202P

2-port AMONet Master Module

NEW

Features

- Max. 20 Mbps transfer rate
- 2 x independent AMONet RS-485 master rings
- Max. 128 AMONet RS-485 slave modules supported
- Easy installation with RJ45 phone jack and LED diagnostic
- KW Multiprog software programming support

CE FCC RoHS

Introduction

APAX-5202P is a PCI interface card which supports two AMONet RS-485 master rings, and transfers data between host and slaves directly without any operations in between. Each ring can control up to 2,048 I/O points, 256 axes, or a combination of I/O points and axes for motion control. The ring can support up to 20 Mbps transfer rate and a maximum communication distance of up to 100 meters. The communication between master and slave is based on a customized RS-485 solution that saves wires, covers a long distance, supports high-speed communication and has time-deterministic features. The communication interface between master and PAC is accomplished by memory mapping. Various functions can be chosen on the slave modules, and standard industrial DIN-rail mounting design makes it easy to distribute them in the field. The master collects information from slave modules and publishes the information to its PAC controller.

Specifications

AMONet RS-485 Motion Control

- **Connectors** RJ-45
- **LED Indictors** Active, Error (Each Port)
- **Number of Rings** 2
- **Transmission Speed** 2.5, 5, 10 or 20 Mbps with automatic data flow control
- **Serial Interface** Half duplex RS-485 with transformer isolation
- **Cable Type** CAT5 UTP/ STP Ethernet cable
- **Surge Protection** 10 kV
- **Communication Distance (Max.)** 100 m @ 20 Mbps w/32 slave modules
100 m @ 10 Mbps w/64 slave modules
- **Slave Module Support** Digital I/O, Motion Control

General

- **Certifications** CE, FCC Class A
- **Connectors** 2 x RJ45
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Power Consumption** 2.5 W @ 5 V_{DC} (typical)
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Operating Temperature** 0 ~ 60° C (mounted vertically)

Ordering Information

- **APAX-5202P** 2-port AMONet Master Module

Note: APAX-5202P can only be used by controllers with a PCI interface

Accessories

- **AMAX-2241/PMA** 4-axis AMONet Motion Module for Panasonic Minas A
- **AMAX-2242/J2S** 4-axis AMONet Motion Module for Mitsubishi MR-J2S
- **AMAX-2243/YS2** 4-axis AMONet Motion Module for Yaskawa Sigma-II
- **AMAX-2752SY** 32-ch Isolated Digital Input AMONet Module
- **AMAX-2754SY** 32-ch Isolated Digital Output AMONet Module
- **AMAX-2756SY** 16/16-ch Isolated Digital I/O AMONet Module
- **PCL-10220M-2** 20-pin SCSI Cable, 2 m
- **PCL-10150M-2** 50-pin SCSI Cable, 2 m

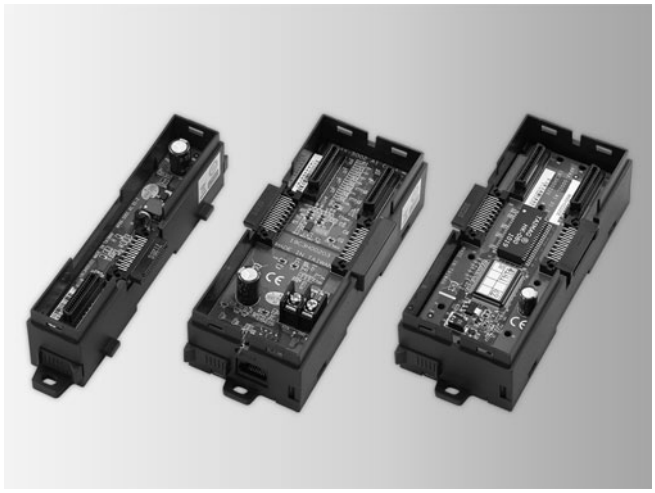
APAX-5343
APAX-5343E
APAX-5001/5002

Power Supply for APAX-5570 Series
Power Supply for APAX Expansion Modules

1-slot/2-slot Backplane Module

NEW

APAX-5343 APAX-5343E



APAX-5001 APAX-5002 APAX-5002L

Specifications

Input

- **Rated Voltage** 115/230 V_{AC}
- **Voltage Range** 90 ~ 264 V_{AC}
- **Rated Input Current** 1.5 A (at rated load)
- **Rated Input Frequency** 50/60 Hz
- **Input Frequency Range** 47 ~ 63 Hz
- **Inrush Current Limit** < 50 A

Output

- **Output Power** 72 W
- **Power Loss** about 8~9 W (at rated load)
- **Efficiency** > 88% (at rated load)
- **Rated Voltage** 24 V_{DC}
- **Rated Output Current** 3 A
- **Output Current Limit** 3.5 ~ 4.3 A
- **Residual Ripple** < 240 mVpp
- **Startup Delay** < 3 second
- **Voltage Rise** 60 ms (typical)

Protection

- **Isolation Protection (In/Out)** 4242 V_{DC}
- **Output Over Voltage Protection** shutdown as approximate 25 ~ 27 V_{DC}, latch off mode
- **Over Load Protection** auto-recovery mode
- **Short Circuit Protection** auto-recovery mode

General

- **Certifications** CE, FCC class A, UL 508, Energy Star
- **Dimensions (W x H x D)** 75 x 151 x 115 mm
- **Enclosure** PC
- **Operating Temperature** 0 ~ 50° C (mounted vertically)
- **Storage Temperature** -20 ~ 75° C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Mounting** DIN-rail, wall mount (panel mount)

Ordering Information

- **APAX-5343** Power Supply for APAX-5570 Series
- **APAX-5343E** Power Supply for APAX Expansion Module

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 28 x 151 x 38 mm (APAX-5001)
  54 x 151 x 38 mm (APAX-5002, APAX-5002L)
- **Enclosure** ABS+PC
- **Weight** 70 g (APAX-5001)
  120 g (APAX-5002, APAX-5002L)
- **Mounting** DIN-rail, wall mount (panel mount)
- **Power Consumption** 0.3 W @ 24 V_{DC} (APAX-5001)
  1.3 W @ 24 V_{DC} (APAX-5002, APAX-5002L)
- **Power Input** 18 ~ 30 V_{DC}
- **Slot Number** 1 (APAX-5001)
  2 (APAX-5002, APAX-5002L)

Environment

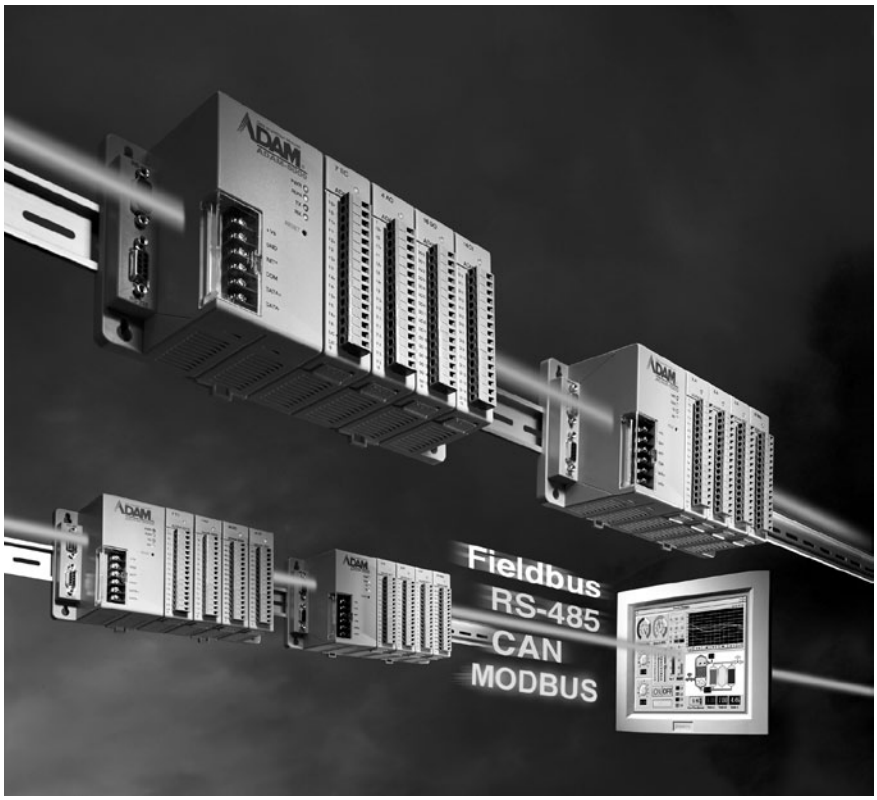
- **Operating Temperature** 0 ~ 60° C (when mounted vertically)
- **Storage Temperature** -25 ~ 75° C
- **Relative Humidity** 5 ~ 95% (non-condensing)

Ordering Information

- **APAX-5001** 1-slot Backplane Module
- **APAX-5002L** 2-slot Backplane Module
- **APAX-5002** 2-slot Backplane Module with RJ-45 Port

	Slot Number	Expansion Port (RJ-45)	Power Input Terminal
APAX-5001	1	N/A	N/A
APAX-5002L	2	N/A	N/A
APAX-5002	2	Yes	Yes

ADAM-5000 Series



Distributed I/O Systems

Ethernet-based Data Acquisition and Control System

With the ADAM-5000/TCP as your Ethernet I/O data processing center, you can monitor and control field signals at a speed of 10/100 Mbps. The best field-proven communication performance that can be reached in industrial network environments. Additionally, the popular Modbus/TCP protocol is supported as well.

RS-485 based Data Acquisition and Control System

The ADAM-5000/485 system is a data acquisition and control system that can acquire, monitor and control data through multi-channel I/O modules. It communicates with a network master over a twisted-pair, multi-drop RS-485 network. Both ADAM ASCII and Modbus/RTU protocols are supported.

PC-based Controllers

Ethernet-enabled PC-based Controllers

The ADAM-5510 series of PC-based programmable controllers includes ADAM-5510M, ADAM-5510E, ADAM-5510/TCP and ADAM-5510E/TCP. They feature Intel x86-based CPUs running Datalight ROM-DOS.

Users can use Borland C 3.0 to develop the application program and then download it by Windows-based ADAM-5510 series utility. The Ethernet-enabled feature of ADAM-5510/TCP and ADAM-5510E/TCP enables features like:FTP server, web server, TCP/UDP connections and email alarm. The ADAM-5510 controllers also have high expansion capability by supporting Modbus/RTU master/slave and Modbus/TCP client/server functions.

ADAM-5550CE features AMD GX2 CPU running Windows CE operating system. Users can use Microsoft Visual Studio .NET to develop the application program.

ADAM-5550KW and ADAM-5510KW series allow users leverage IEC 61131-3 SoftLogic programming environment to complete their automation task.

Open Network and Fieldbus Solutions for Device Networking

Introduction

The Fieldbus concept will change the control environment and device characteristics of future control systems in both processing and manufacturing. Compared with traditional systems, the Fieldbus system reduces cost of cabling, commissioning, and installation. In addition, the Fieldbus system has greater reliability.

The ADAM-5000 series, a compact distributed data acquisition and control system, supports the shift toward Fieldbus-based systems. Based on popular Fieldbus data communication structures such as RS-485 and Modbus, the ADAM-5000 series now offers two different DA&C systems that allow field I/O devices to easily connect to PC network applications: the ADAM-5000 DA&C systems and the ADAM-5510 series of PC-based controllers.

Maximum System Design Flexibility

The ADAM-5000's modular design allows users to tailor solutions based on their own requirements. Built-in programmable I/O ranges and alarm outputs enhance flexibility in system design. A variety of communication media such as twisted-pair wiring, radio modems and fiber optics are supported.

System Maintenance and Troubleshooting

The ADAM-5000 series uses hardware self-test and software diagnosis to monitor system problems. Also included is a watchdog timer that monitors the microprocessor. If the system crashes, the watchdog automatically resets the system. Node ID setting is easily accomplished by setting a DIP switch on the front of the system.

Easy Installation and Networking

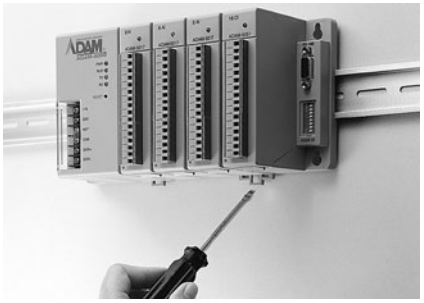
The ADAM-5000 series can be easily mounted on a DIN-rail or on a panel. Signal connections, network modifications and maintenance are simple and quick. Building a multi-drop network only requires a single twisted pair of wires.

Proven for Industrial Environments

The ADAM-5000 series can operate in industrial environments at temperatures between -10 and 70° C, and can use unregulated power sources between 10 and 30 V_{DC}. These units are protected against accidental power supply reversals. A 3-way isolation design (I/O, power & communication) prevents ground loops and reduces the effect of electrical noise in the system.

Extensive Software Support

The ADAM-5000 series is supported by most standard process controls and HMI software. .NET Class LIB is provided for use with Windows applications. OPC drivers provide links to a wide range of HMI/SCADA software packages such as InTouch, FIX and ICONICS. Advantech data acquisition software and Advantech Studio SCADA/HMI software are both tightly integrated with the ADAM-5000 systems.



DIN-rail Mounting

Installed with industrial standard DIN-rails

Panel/Wall Mounting

Flat surface system mounting

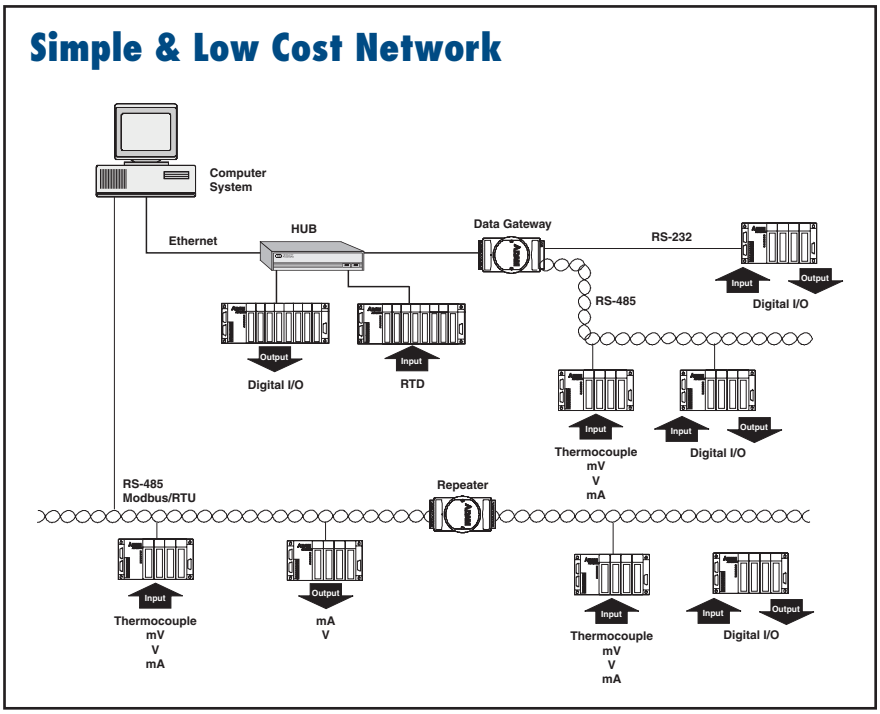
Node ID Setting

8-pin dip switch configuration

Connection

Pre-wired plug-in terminals with I/O modules

Simple & Low Cost Network



ADAM-5000 Controller Selection Guide

System		ADAM-5510M ADAM-5510KW	ADAM-5510E	ADAM-5510/TCP ADAM-5510KW/TCP	ADAM-5510E/TCP ADAM-5510EKW/TP	ADAM-5550
CPU		80188				AMD Geode GX533 (GX2)
RAM		640 KB				128 MB DDR SDRAM
Flash ROM		256 KB				-
Flash Memory		256 KB				-
Flash Disk		1 MB				-
OS		ROM-DOS				WinCE
Control Software		ADAM-5510M: Borland C ADAM-5510KW: KW SoftLogic	Borland C	ADAM-5510/TCP: Borland C ADAM-5510KW/TCP: KW SoftLogic	ADAM-5510E/TCP: Borland C ADAM-5510EKW/TP: KW SoftLogic	ADAM-5550CE: C/C++ and .NET ADAM-5550KW: KW SoftLogic
Real-time Clock		Yes				
Watchdog Timer		Yes				
COM1		RS-232	RS-232/485	RS-232	RS-232/RS-485	RS-232/485
COM2		RS-485				
COM3 (Programming)		RS-232 (TX, RX, GND)				RS-232
COM4		RS-232/485				
I/O Slots		4	8	4	8	8
Power Consumption		4 W				12 W
Isolation	Communication	2,500 V_{DC} (COM2 RS-485)				2,500 V_{DC} (COM2 RS-485) 1,000 V_{DC} (COM4 RS-485)
	Communication Power	3,000 V_{DC}				
	I/O Module	3,000 V_{DC}				
Diagnosis	Status Display	Power, CPU, Communication, Battery				Power, User Define
	Self Test	Yes, while ON				
	Software Diagnosis	Yes				
Communication	Network	RS-232/485		Ethernet (RJ-45)		Ethernet (2 x RJ-45)
	Speeds	1,200 bps ~ 115.2 kbps		10/100 Mbps		10/100 Mbps
	Max. Distance	4,000 feet (1.2 km)		150 m		150 m
	Data Format	N, 8, 1, 1		-	-	-
	Max. Nodes	32	32	256 for Ethernet, 32 for RS-485	256 for Ethernet, 32 for RS-485	-
	Protocol	User Defined, Modbus/RTU	User Defined, Modbus/RTU	User Defined, Modbus/RTU, Modbus/TCP	User Defined, Modbus/RTU, Modbus/TCP	Modbus/RTU, Modbus/TCP
	Remote I/O	Modbus Device				
	Power Requirements	10 ~ +30 V_{DC}				
Environment	Operating Temperature	-10 ~ 70° C (14 ~ 158° F)				0 ~ 55° C (32 ~ 131° F)
	Storage Temperature	-25 ~ 85° C (-13 ~ 185° F)				
	Humidity	5 ~ 95%				
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System		ADAM-5000/485	ADAM-5000E	ADAM-5000L/TCP	ADAM-5000/TCP
CPU		80188	80188	RISC CPU	
RAM		-	-	4 MB	
Flash ROM (User AP)		-	-	512 KB	
Flash Memory (Data Storage)		-	-	-	
Flash Disk		-	-	-	
OS		-	-	real-time OS	
Timer BIOS		-	-	-	
Real-time Clock		-	-	-	
Watchdog Timer		Yes			
I/O Slots		4	8	4	8
Power Consumption		3 W		4.0 W	5.0 W
Isolation	Communication	2,500 V_{DC}	3,000 V_{DC}	RS-485: 1,500 V_{DC}	
	Communication Power	3,000 V_{DC}			
	I/O Module	3,000 V_{DC}			
Diagnosis	Status Display	Power, CPU, Communication		Power, CPU, Error Diagnostic, Communication	
	Self Test	Yes, while ON			
	Software Diagnosis	Yes			
Communication	Interface	RS-232/485 (2-wire)	RS-232/485 (2-wire)	Ethernet	
	Speeds (bps)	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	1,200, 2,400, 4,800, 9,600, 19.2 K, 38.4 K, 57.6 K, 115.2 K	10 M, 100 M	
	Max. Distance	4,000 feet (1.2 km)	4,000 feet (1.2 km)	100 m without repeater	
	Data Format	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1 O, 8, 1	Advantech protocol: N, 8, 1 Modbus protocol: N, 8, 1 N, 8, 2 E, 8, 1	TCP/IP	
	Max. Nodes	128	128	Depend on IP address	
	Protocols	ADAM ASCII/Modbus Protocol	ADAM ASCII/Modbus Protocol	Modbus/TCP	
	Remote I/O	-	-	20 nodes Modbus devices	
	Power Requirements	+10 ~ +30 V_{DC}			
Environment	Operating Temperature	-10 ~ 70° C (14 ~ 158° F)			
	Storage Temperature	-25 ~ 85° C (-13 ~ 185° F)			
	Humidity	5 ~ 95%			
Page		online	online	online	online

ADAM-5000 I/O Module Selection Guide

Analog Input/Output Modules





Module		ADAM-5013	ADAM-5017	ADAM-5017P	ADAM-5017UH	ADAM-5018
Analog Input	Resolution	16 bit	16 bit	16 bit	12 bit	16 bit
	Input Channel	3	8	8	8	7
	Sampling Rate	10 (total*)	10 (total*)	10 (total*)	200K**	10 (total*)
	Voltage Input	-	±150 mV, ±500 mV ±1 V, ±5 V, ±10 V	±150 mV, ±500 mV ±15V, ±10V, ±5 V, ±1 V 0 ~ 150mV, 0 ~ 500mV 0 ~ 1V, 0 ~ 5V, 0 ~ 10V 0 ~ 15V	±10 V, 0 ~ 10 V	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V
	Current Input	-	±20 mA	±20 mA, 4 ~ 20mA	0 ~ 20 mA, 4 ~ 20 mA	±20 mA
	Direct Sensor Input	Pt or Ni RTD	-	-	-	J, K, T, E, R, S, B
Isolation		3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}	3,000 V_{DC}
Page		online	online	online	online	online

*Sampling rate value depends on used channel number.
Example: Using 5 channels on ADAM-5017, sampling rate for each used channel will be 10/5 = 2 samples/second.
**The sampling rate vary with the controller.






Module		ADAM-5018P	ADAM-5024	ADAM-5050	ADAM-5051/ ADAM-5051D/ ADAM-5051S	ADAM-5052	ADAM-5053S
Analog Input	Resolution	16 bit	-	-	-	-	-
	Input Channel	7	-	-	-	-	-
	Sampling Rate	10 (total*)	-	-	-	-	-
	Voltage Input	±15 mV, ±50 mV ±100 mV, ±500 mV ±1 V, ±2.5 V	-	-	-	-	-
	Current Input	4 ~ 20 mA	-	-	-	-	-
	Direct Sensor Input	J, K, T, E, R, S, B	-	-	-	-	-
Analog Output	Output Channels	-	4	-	-	-	-
	Resolution	-	12 bit	-	-	-	-
	Voltage Output	-	0 ~ 10 V	-	-	-	-
	Current Output	-	0 ~ 20 mA 4 ~ 20 mA	-	-	-	-
Digital Input and Digital Output	Digital Input Channels	-	-	16 DIO (bit-wise selectable)	16 (ADAM-5051) 16w/LED (5051D/5051S)	8 w/LED	32
	Digital Output Channels	-	-		-	-	-
Isolation		3,000 V_{DC}	3,000 V_{DC}	-	2,500 V_{DC} (5051S)	5,000 V_{RMS}	2,500 V_{DC}
Page		online	online	online	online	online	online

*Sampling rate value depends on used channel number.
Example: Using 6 channels on ADAM-5017, sampling rate for each used channel will be 12/6 = 2 samples/second.

ADAM-5000 I/O Module Selection Guide

Digital Input/Output Modules





Module		ADAM-5055S	ADAM-5056/ ADAM-5056D	ADAM-5056S/ ADAM-5056SO	ADAM-5057S	ADAM-5060
Digital Input and Digital Output	Digital Input Channels	8 w/LED	-	-	-	-
	Digital Output Channels	8 w/LED	16 (ADAM-5056) 16 w/LED (ADAM-5056D)	16 w/LED	32	6 relay (2 form A/4 form C)
Isolation		2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	-
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Module		ADAM-5069	ADAM-5080	ADAM-5081	ADAM-5090/ ADAM-5091	ADAM-5095
Digital Input and Digital Output	Digital Input Channels	-	-	-	-	-
	Digital Output Channels	8 power relay (form A)	-	-	-	-
Counter (32-bit)	Channels	-	4	4/8	-	-
	Input Frequency	-	0.3 ~ 1000 Hz max. (frequency mode) 5000 Hz max. (counter mode)	5 Hz ~ 1 MHz max. (frequency mode) 1 MHz max. (counter mode)	-	-
	Mode	-	Frequency, Up/Down Counter, Bi-direction Counter	Frequency, Counter (Up/Down, Bi-direction, Up, A/B Phase)	-	-
Communication	Channels	-	-	-	4	2
	Type	-	-	-	RS-232	CAN
Isolation		-	1,000 V_{RMS}	2,500 V_{DC}	-	1,000 V_{DC}
Page		online	online	online	online	online

Motion and Storage Modules

Model		ADAM-5202	ADAM-5240	ADAM-5030
Axes	Number of Axes	-	4	-
	Linear Interpolation	-	v	-
	2-Axis Circle Interpolation	-	v	-
Advanced Functions	Encoder Channels	-	4	-
	Limit switch Input Channel	-	8	-
	Home Input Channel	-	4	-
	Emergency stop Input Channel	-	1	-
	Slow Down Limit Switch	-	8	-
	Servo On Output Channel	-	4	-
	General Purpose DO Channel	-	4	-
	Position Compare Event	-	V	-
	Remote Motion	V	-	-
	Remote I/O	V	-	-
	Board ID	-	-	-
Connectors		4 x RJ-45	100-PinSCSI-II	-
Wiring Board		-	ADAM-3952	-
Remote Slave Module		AMAX-2752SY/2754SY/2756SY AMAX-2241/2242/2243	-	-
Storage	Type	-	-	SD (Secure Digital Card)
	Channel	-	-	2
	Size	-	-	2 GB (Max)
USB	Type	-	-	V2.0 (compliant)
	Channel	-	-	2
Supported Controller		ADAM-5550KW		
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ADAM-5000 Controller Support Table

Type		PAC			PC-based Controller		
System		ADAM-5550KW	ADAM-5510KW ADAM-5510EKW	ADAM-5510KW/TCP ADAM-5510EKW/TP	ADAM-5550CE	ADAM-5510/TCP ADAM-5510E/TCP	ADAM-5510M ADAM-5510E
Function	I/O Module	8-slot Micro PAC with GX2 CPU	4/8-slot Softlogic Controller w/ RS-485	4/8-slot Softlogic Controller w/ Ethernet	8-slot PC-based Controller with GX2 CPU	4/8-slot PC-based Controller with Ethernet	4/8-slot PC-based Controller with RS-485
Analog Input (AI)	ADAM-5013	•	•	•	•	•	•
	ADAM-5017P	•	-	-	•	•	•
	ADAM-5017UH	•	-	-	•	•	•
	ADAM-5018P	•	-	-	•	•	•
Analog Output (AO)	ADAM-5024	•	•	•	•	•	•
Digital Input (DI)	ADAM-5051S	•	•	•	•	•	•
	ADAM-5053S	•	-	-	•	-	-
Digital Output (DO)	ADAM-5056S	•	•	•	•	•	•
	ADAM-5056SO	•	•	•	•	•	•
	ADAM-5057S	•	-	-	•	-	-
Digital I/O	ADAM-5055S	•	•	•	•	•	•
Relay Output	ADAM-5069	•	•	•	•	•	•
Counter/ Frequency	ADAM-5080	-	•	•	-	•	•
	ADAM-5081	•	-	-	•	•	•
Comm.	ADAM-5090	-	•	•	-	•	•
	ADAM-5091	•	-	-	•	-	-
	ADAM-5095	•	-	-	•	-	-
Motion	ADAM-5202	•	-	-	•	-	-
	ADAM-5240	•	-	-	•	-	-
SD	ADAM-5030	•	-	-	•	-	-

ADAM-5000 Remote I/O System Support Table

Remote I/O System			ADAM-5000/485	ADAM-5000E	ADAM-5000L/TCP	ADAM-5000/TCP
Function	I/O Module	Description	4-slot Distributed DA&C for RS-485	8-slot Distributed DA&C for RS-485	4-slot Distributed DA&C for Ethernet	8-slot Distributed DA&C for Ethernet
Analog Input (AI)	ADAM-5013	3-ch RTD Input	•	•	•	•
	ADAM-5017	8-ch AI	•	•	•	•
	ADAM-5017P	8-ch AI w/ Independent Input Range	•	•	•	•
	ADAM-5017H	8-ch high Speed (1K) AI	•	•	•	•
	ADAM-5017UH	8-ch Ultra high Speed (200K) AI	•	•	•	•
	ADAM-5018	7-ch Thermocouple Input	•	•	•	•
	ADAM-5018P	7-ch Thermocouple Input w/ Independent Input Range	•	•	•	•
Analog Output (AO)	ADAM-5024	4-ch AO	•	•	•	•
Digital Input (DI)	ADAM-5051	16-ch DI	•	•	•	•
	ADAM-5051D	16-ch DI w/ LED	•	•	•	•
	ADAM-5051S	16-ch Isolated DI w/ LED	•	•	•	•
	ADAM-5052	8-ch Isolated DI w/ LED	•	•	•	•
Digital Output (DO)	ADAM-5056	16-ch DO	•	•	•	•
	ADAM-5056D	16-ch DO w/ LED	•	•	•	•
	ADAM-5056S	16-ch Isolated DO w/ LED	•	•	•	•
	ADAM-5056SO	16-ch Source Type Isolated DO w/ LED	•	•	•	•
Digital I/O	ADAM-5050	16-ch Universal Digital I/O	•	•	•	•
	ADAM-5055S	16-ch Isolated Digital I/O w/ LED	•	•	•	•
Relay Output	ADAM-5060	6-ch Relay Output	•	•	•	•
	ADAM-5069	8-ch Power Relay Output w/ LED	•	•	•	•
Counter/ Frequency	ADAM-5080	4-ch Counter/Frequency	•	•	•	•
	ADAM-5081	4-ch High Speed Counter/Frequency	•	•	•	•

ADAM-5550CE/KW

PAC with AMD Geode GX CPU

Features

- SoftLogic support in Win CE
- Can be operated with or without display/keyboard/mouse
- Remote monitoring through Web Server and Email Alarm
- Remote maintenance via FTP Server
- Supports Modbus/RTU Master and Modbus/TCP (Server/Client) Protocol
- Supports SQL database
- Supports SD Storage Module
- Supports Motion Control Module
- Deterministic I/O at 1 ms
- Remote I/O expansibility
- Rich support to ADAM-5000 I/O Modules

Introduction

ADAM-5550 is a Programmable Automation Controller designed for control tasks which require Industrial PC computing performance with the PLC's robustness. ADAM-5550 offers an AMD Geode GX533 CPU along with control specific features such as watchdog timer, battery backup RAM and deterministic I/O. ADAM-5550KW features 5 standard IEC 61131-3 programming languages in Windows CE, so PLC users can develop control strategies with their own familiar programming languages. The powerful Multiprog KW Software and stable ProConOS have allowed ADAM-5550KW to become the best choice for a Programmable Automation Controller on the market today. Besides, ADAM-5550CE offer a open platform that user can develop their program using the common eVC and .NET programming environment to build compact and reliable control solution. With the optional HMI Software and built-in VGA port, no longer will users be required to build up additional SCADA PC's in their applications. This compact and powerful PAC is ideal for a variety of applications ranging from machine automation to SCADA applications.

Specifications

Control System

- **CPU** AMD Geode GX533 (GX2) 330 MHz
- **I/O Capacity** 8 slots
- **LED Indicators** Power, User define
- **Memory** 128 MB DDR SDRAM with 1 MB Battery Backup
  1 x CompactFlash® Card (Internal)
- **Operating System** Windows CE
- **Real-time Clock** Yes
- **Watchdog Timer** Yes

Communications

- **Comm. Protocol** Modbus/RTU and Modbus/TCP
- **Medium** 2 x 10/100 Base-T Ethernet Interface with RJ-45 connectors

Protection

- **Communication** 2,500 V_{DC} (COM2 RS-485)/1,000 V_{DC} (COM4 RS-485)
- **Power Reversal Protection** Yes

Power

- **Power Consumption** 12 W @ 24 Vdc (not including I/O modules)
- **Power Input** Unregulated 10 ~ 30 V_{DC}

Software

- **Operating System** Windows CE .NET
- **Control Software** ADAM-5550CE: eVC and .NET library
  ADAM-5550KW: KW Multiprog (development tool)
  ProConOS (runtime kernel)

General

- **Certifications** CE, FCC Class A
- **Connectors** 1 x RS-232/485 (COM1)
  1 x RS-485 (COM2)
  1 x RS-232 (COM3)
  1 x RS-232/485 (COM4)
  2 x USB 1.1 ports (KB/Mouse via USB Ports)
  1 x VGA (1024 X 768 Resolution)
- **Dimensions** 355 x 110 x 75 mm
- **Enclosure** ABS + PC
- **Plug-in Screw Terminal** Accepts 0.5 mm^2 to 2.5 mm^2, 1 - #12 or 2 - #14 to #22 AWG
- **Mounting** DIN-rail, stack, wall

Environment

- **Humidity** 5% to 95%, non-condensing
- **Operating Temperature** 0 ~ 55° C when mounting vertically
- **Storage Temperature** - 25 ~ 85° C

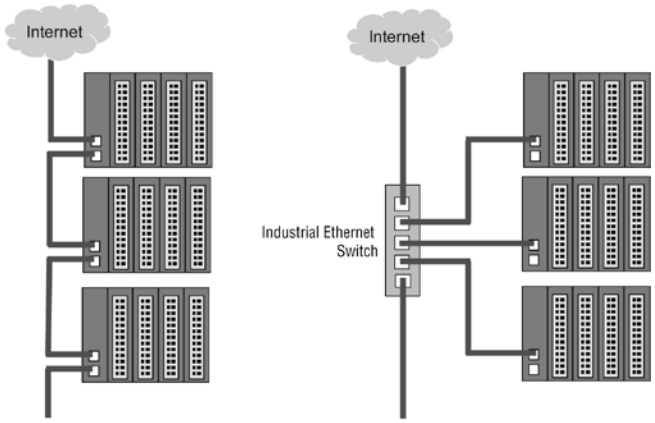
Ordering Information

- **ADAM-5550KW** PAC with AMD Geode GX CPU, KW
- **ADAM-5550CE** PAC with AMD Geode GX CPU, WinCE

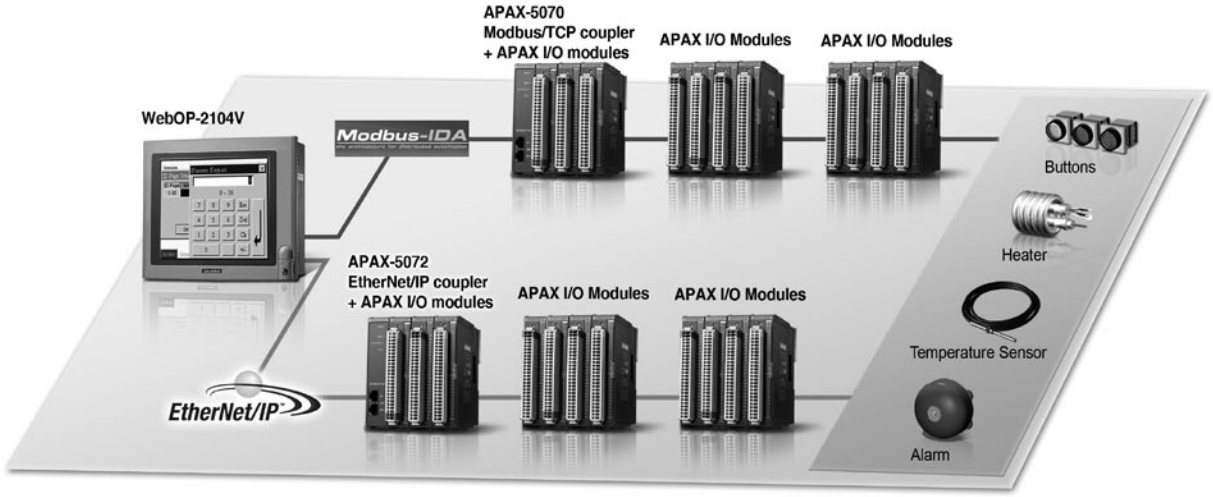
Remote I/O Solution Introduction

APAX and ADAM-5000 series I/O modules can be stacked with APAX and ADAM controllers to deliver excellent real-time control performance, allowing users to form centralized control systems. However, many applications require multiple I/O stations with a certain amount of I/O points, and these stations can be located in different places to build distributed systems. A lot of industrial fieldbus and real-time Ethernet products and communication protocols have been developed to satisfy these demands. APAX I/O modules can link to different networking types through specific APAX coupler modules to leverage these commonly used industrial networking protocols. For example, using the APAX-5070 Modbus/TCP coupler, APAX I/O modules can link to Modbus/TCP networks. With a coupler attached, APAX I/O modules can also function as remote I/O stations, which can be distributed in different locations for data acquisition and control tasks. All APAX couplers support both daisy-chain and star topologies as well.

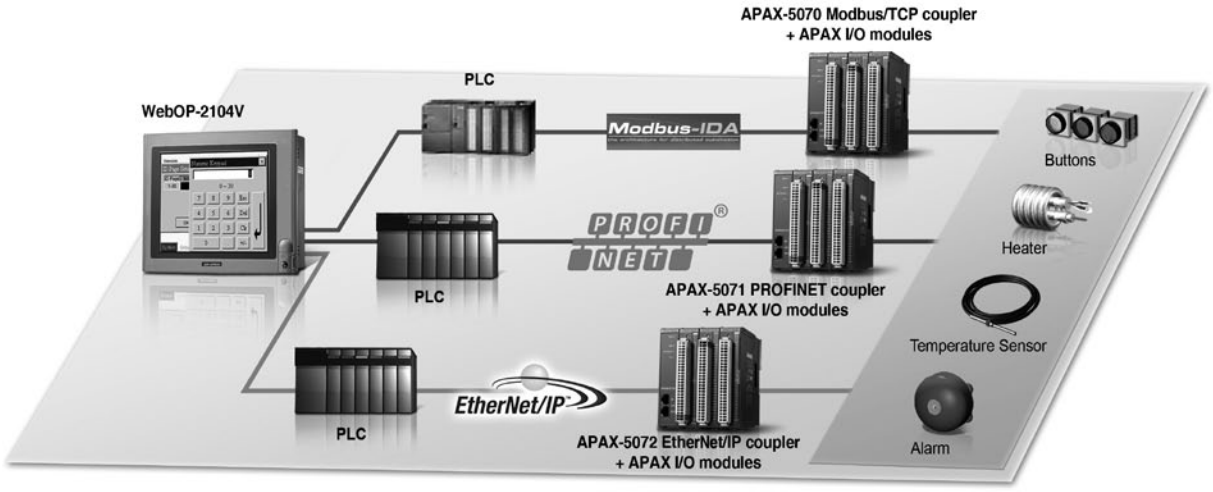
HMIs, embedded automation computers, or PLCs that support the same protocol as the coupler can control remote APAX I/O modules. By changing coupler module, APAX I/O modules can link to different fieldbus and real-time Ethernet networks.



Remote Data Acquisition System with HMI



Control System with HMI



APAX-5070
APAX-5071
APAX-5072

Modbus/TCP Communication Coupler

PROFINET Communication Coupler

EtherNet/IP Communication Coupler

APAX-5070

APAX-5071

APAX-5072

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 190 g
- **Connector** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communication

- **Protocol** Modbus/TCP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)
- **Data Transfer Rates** 10/100 Mbps
- **Topology** Line or star
- **Isolation Protection** 1,500 V_{AC}

Environment

- **Operating Temperature** -10 ~ 55° C (mounted vertically)
- **Storage Temperature** -40 ~ 85° C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis) 2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis) (Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5070** Modbus/TCP Communication Coupler

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connectors** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Protocol** PROFINET RT, DCP, DHCP, TCP/UDP DNS, SNTP, ICMP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)
- **Data Transfer Rates** 100 Mbps
- **Topology** Line or star

Environment

- **Operating Temperature** -10 ~ 55° C (mounted vertically)
- **Storage Temperature** -40 ~ 85° C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis) 2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis) (Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5071** PROFINET Communication Coupler

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

Specifications

General

- **Certifications** CE, FCC class A
- **Dimensions (W x H x D)** 30 x 139 x 100 mm
- **Enclosure** ABS+PC
- **Weight** 180 g
- **Connectors** 2 x RJ-45 (2-channel switch, share same IP address)
- **Power Consumption** 2 W @ 5 V_{DC} (typical)

Communications

- **Protocol** EtherNet/IP
- **Connected I/O Modules** 32 (max.)*
- **Digital Signals** 2048 (max.)
- **Analog Signals** 512 (max.)
- **Data Transfer Rates** 10/100 Mbps
- **Topology** line or star
- **Isolation Protection** 1,500 V_{AC}

Environment

- **Operating Temperature** -10 ~ 55° C (mounted vertically)
- **Storage Temperature** -40 ~ 85° C
- **Relative Humidity** 5 ~ 95% (non-condensing)
- **Shock Protection** 10 G @ wall mount, half sine, 11 ms (Confirms to IEC 60068-2-27)
- **Vibration Protection** 1 Grms @ 5 ~ 500 Hz (Random, operating, 1 hr/axis) 2 G @ 5 ~ 500 Hz (Sine, non-operating, 1 hr/axis) (Confirms to IEC 60068-2-64 and IEC 60068-2-6)

Ordering Information

- **APAX-5072** EtherNet/IP Communication Coupler

Accessories

- **APAX-5002** 2-slot Backplane Module
- **APAX-5343E** Power Supply for APAX Expansion Module

*APAX DI/O modules can use ID number 0 ~ 31, while AI/O modules and counter modules can only use ID numbers 0 ~ 15