

User Manual

ECU-1251 Series

ADVANTECH

Enabling an Intelligent Planet

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Support

For more information on this and other Advantech products, please visit our websites at: <http://www.advantech.com>

For technical support and service, please visit our support website at: <http://www.advantech.com/support/>

This manual is for ECU-1251 Series.

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -25° C (-13° F) OR ABOVE 70° C (158° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**

16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. Due to the sensitive nature of the equipment it must be stored in a restricted access location, only accessible by qualified engineers.
18. When installing this equipment, ensure that the Earth cable is securely attached using a 3.5mm screw.
19. The equipment does not include a power cord and plug.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

Overview

1.1 Introduction

For solar power, electricity and factory related applications which require a total wireless and Ethernet communication solutions, Advantech has released the ECU-1251 RISC-based industrial communication gateway. ECU-1251 has an open platform design with Cortex A8 processor, up to four RS-232/485 isolated serial ports, two 10/100 Ethernet ports and operating temperature range of -40~70°C. With Linux operating system and open TagLink SDK, which enable to system integrators to develop applications which precisely fit their need.



1.2 Specifications:

1.2.1 General

- **Certification:** CE, FCC
- **Mounting:** Wall-Mount/ DIN-Rail
- **Power Consumption:** 2.4W @ 24V_{DC}
- **Power Requirements:** 10 ~ 30 V_{DC}

1.2.2 System

- **CPU:** TI Cortex A8, 800MHz
- **Memory:** DDR3L 256MB
- **Indicators:** LEDs for Power, LAN (LINK, ACT), Serial (Tx, Rx), Programmable
- **Storage:** 1GB Micro-SD card for system storage
- **SD Slot:** 1 x Micro-SD slot
- **Watchdog:** Yes
- **Node ID:** 8-bit
- **Real-time clock:** Yes

1.2.3 Communication

- **Serial Port:** 4 x RS-232/485 ECU-1251
- **Isolation:** 3000 VDC
- **Serial Port Speed:** RS-232/RS-485: 50 ~ 115.2 kbps
- **Ethernet Port:** 2 x 10/100 Base-T RJ-45 ports ECU-1251
- **USB Port:** 1 x USB2.0
- **Wireless (Optional):** Interface: 1x Mini-PCIe (Full-size)
- **Type:** WIFI/3G/GPRS/4G
- **Signal:** USB

1.2.4 Software

- **OS Support:** RT-Linux 3.12
- **Programming:** Linux C

1.2.5 Environment

- **Humidity:** 5~95% (non-condensing)
- **Operating Temperature:** -40 ~ 70°C
- **Storage Temperature:** -40~85°C

1.3 Safety Precautions

The following messages inform how to make each connection. In most cases, you will simply need to connect a standard cable

Warning! *Always disconnect the power cord from your chassis whenever you are working on it. Do not connect while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.*



Caution! *Always ground yourself to remove any static electric charge before touching ECU-1251 Series. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.*



Note! *If DC voltage is supplied by an external circuit, please put a protection device in the power supply input port.*



1.4 Chassis Dimensions:

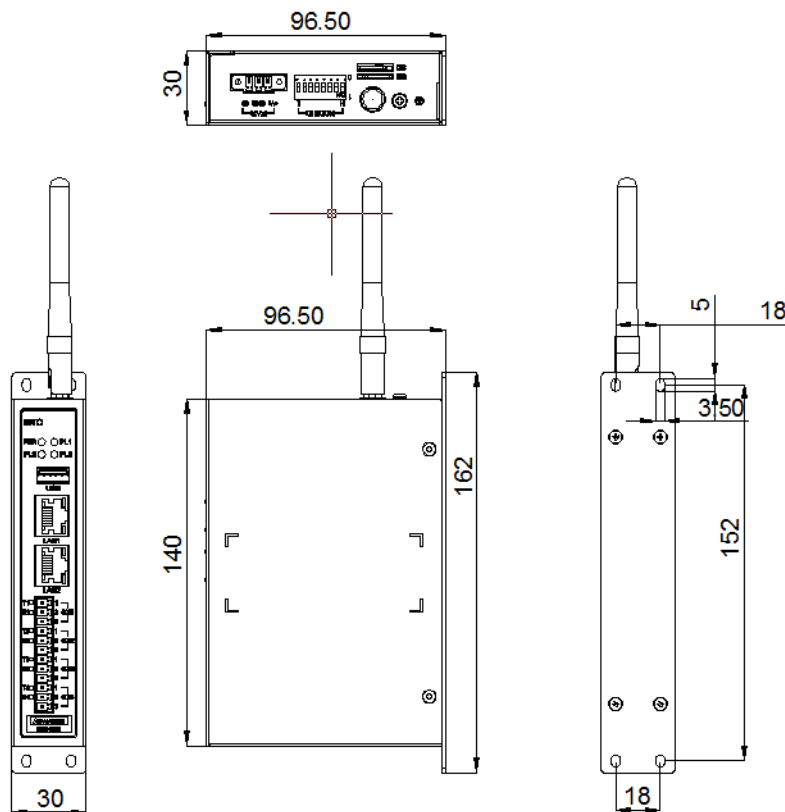


Figure 1.1 ECU-1251 Chassis Dimensions

1.5 Packing List

The accessory package of ECU-1251 contains the following items:

- (A) ECU-1251
- (B) 1 x warranty card
- (C) Connector

Chapter 2

Hardware
Functionality

2.1 Overview

The following figures show the panel configuration on ECU-1251. More information of each peripheral is included in the following sections.

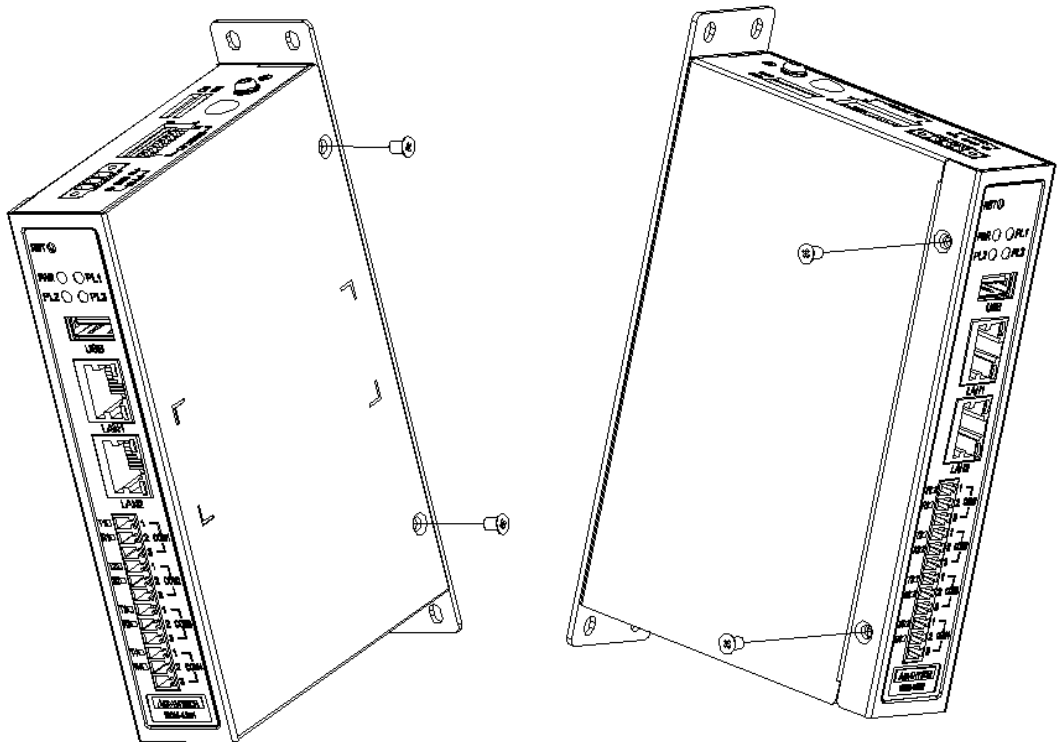


Figure 2.1 ECU-1251 overview

2.2 LED Status Indicators

The LEDs in the front panel can be divided into 4 groups:

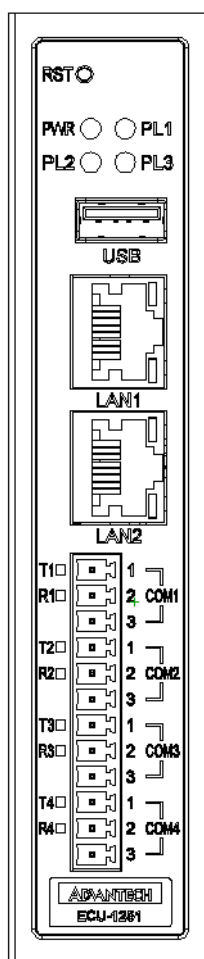


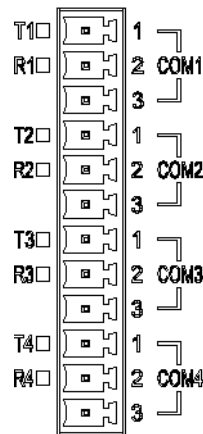
Figure 2.2 ECU-1251 LED status indicator

2.2.1 System Status Indicators:

PWR ○ ○ PL1
PL2 ○ ○ PL3

LED	Status	Description
PWR	Green	Power is on
	Off	Power is off
IRIG	Green	Customers can define the Programmable LED state according to the actual need.
	Off	

2.2.2 Serial Communication Status Indicator



LED	Color	Description
TX1	Orange	Blinking, Serial port 1 data being transmitted
RX1	Green	Blinking, Serial port 1 data being received
TX2	Orange	Blinking, Serial port 2 data being transmitted
RX2	Green	Blinking, Serial port 2 data being received
TX3	Orange	Blinking, Serial port 3 data being transmitted
RX3	Green	Blinking, Serial port 3 data being received
TX4	Orange	Blinking, Serial port 4 data being transmitted
RX4	Green	Blinking, Serial port 4 data being received

2.2.3 Ethernet Status Indicator



LED	Color	Description
Link1	Yellow	Lighting, Ethernet not connected
Act1	Green	Blinking, Ethernet data being transmitted
Link2	Yellow	Lighting, Ethernet not connected
Act2	Green	Blinking, Ethernet data being transmitted

Chapter 3

Wiring and Installation

3.1 Wiring

3.1.1 Power Supply Wiring

ECU-1251 supports power input ranging from and 10VDC to 30V_{DC}.

1. Remove all power and signal connections.
2. Place the unit heat-sink side down.
3. Remove the screws shown below.

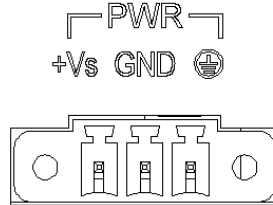


Figure 3.1 Power Supply Wiring

Table 3.1: AC/DC Power Input Connector Pin Definition

Function	Pin	Screen Printing	Function Description
Power Input	1	+Vs	PWR V+ DC power input PIN
	2	GND	PWR V- DC power input PIN
	3	⊕	GND

3.1.2 Communication Ports

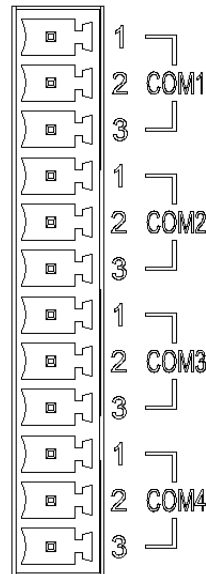


Figure 3.2 RS-232/485 Serial Ports (COM1~ COM4)

Table 3.2: RS-232/485 Serial Ports (Pin Assignments)

Pins	1	2	3
RS-232	Rx	Tx	GND
RS-485	Data+	Data-	GND

3.1.3 Wireless Card Installation

ECU-1251 is equipped with a Mini-PCIe interface on the front of motherboard, which supports one full-size wireless network card. If users also need SIM card, slot on the front of motherboard can be used. The installation is shown as below.



Figure 3.3 USB Connector

Table 3.3: USB Connector Pin Assignment

Pin	Signal
1	VCC
2	DATA-
3	DATA+
4	GND



Figure 3.4 LAN Connectors (LAN1~LAN4)

Table 3.4: LAN Connector Pin Assignments

Pin	Assignment	Description
1	TD+	Transmit+
2	TD-	Transmit-
3	RD+	Receive+
4	N/C	Not used
5	N/C	N/C
6	RD-	Receive-
7	N/C	N/C
8	N/C	N/C

ECU-1251 has an 8-bit node ID. The detailed definition is as follows:

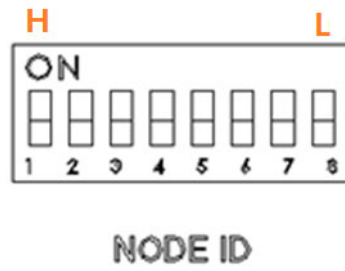


Figure 3.5 Dial Switch Setting

Table 3.5: ECU-1251 Node ID Setting

Node ID	8-bit, support 0~255 devices. In peer to peer application, the Node ID should be 1~255.
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3.2 Jumper Setting

3.2.1 Jumper Setting

The motherboard of ECU-1251 has two types of jumper for user operation, as the below shown.

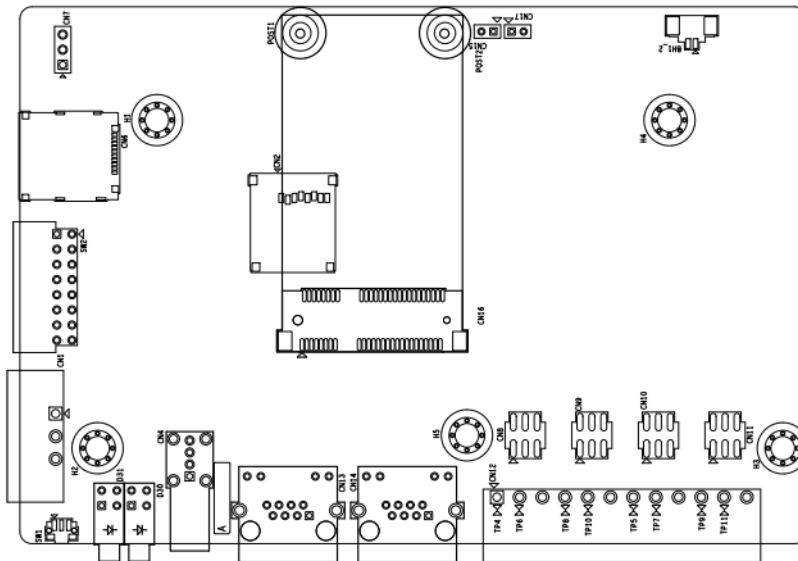
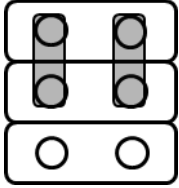
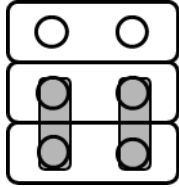


Figure 3.6 Jumper on the back motherboard

Table 3.6: Jumper Setting of Terminal Resistor For COM(1?4)

Location	Description
----------	-------------

Table 3.6: Jumper Setting of Terminal Resistor For COM(1?4)

CN8 CN9 CN10 CN11		Data+/Data- of RS-485
		RX/TX of RS-232

3.3 Installation

3.3.1 Wall-mounted and DIN-Rail Installation

ECU-1251 supports two types of installation: Wall-mounted and DIN-Rail Installation. For wall-mounted installation, users can fix the device on the wall with 4 screws as shown below.

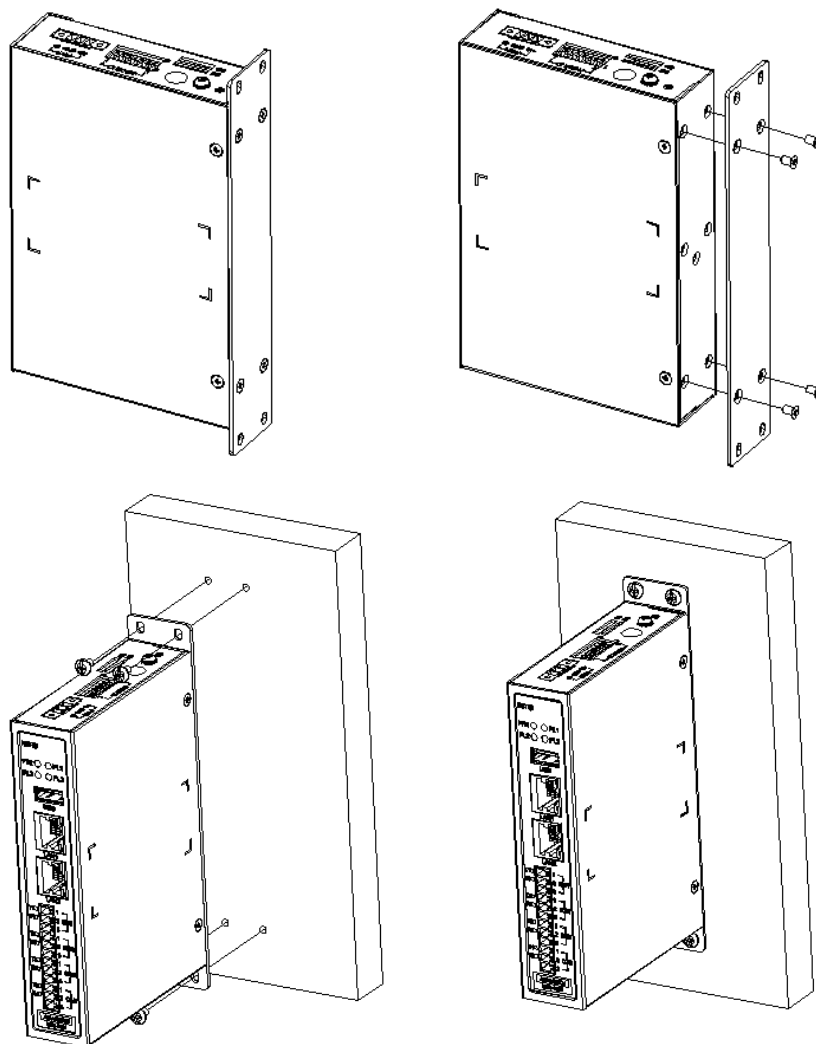


Figure 3.7 Wall-mounted installation

ECU-1251 supports DIN-Rail installation. Firstly, users can install a sliver DIN-Rail buckle with screws on the back of ECU-1251. And then fix ECU-1251 on the DIN-Rail. The detailed steps are shown as below:

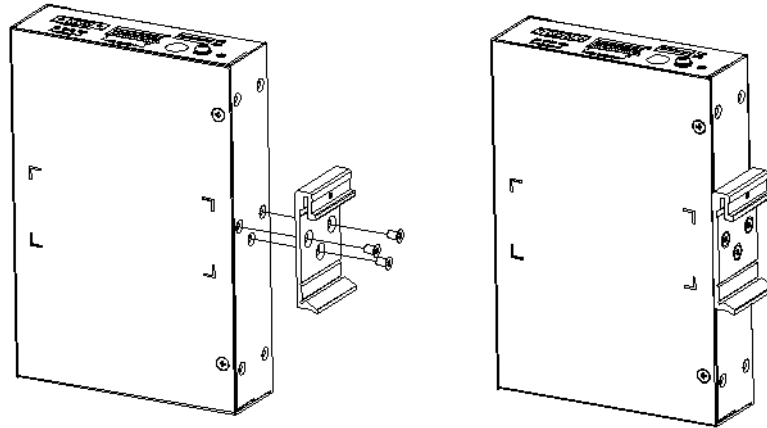


Figure 3.8 Vertical DIN-Rail buckle Installation

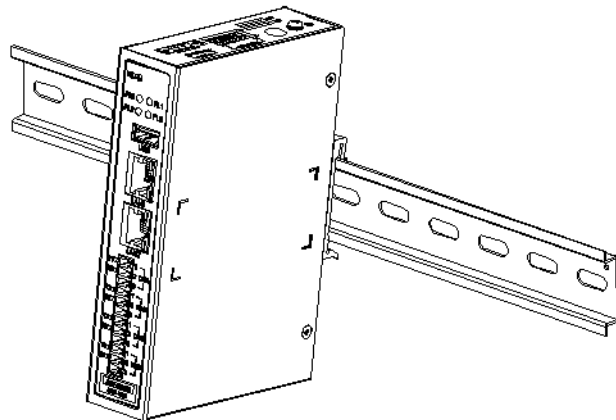


Figure 3.9 Vertical DIN-Rail Installation

3.3.2 SD&SIM Card Installation

ECU-1251 is equipped with a Micro SD slot and a SIM slot.

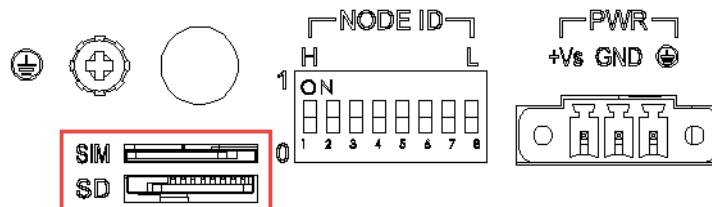
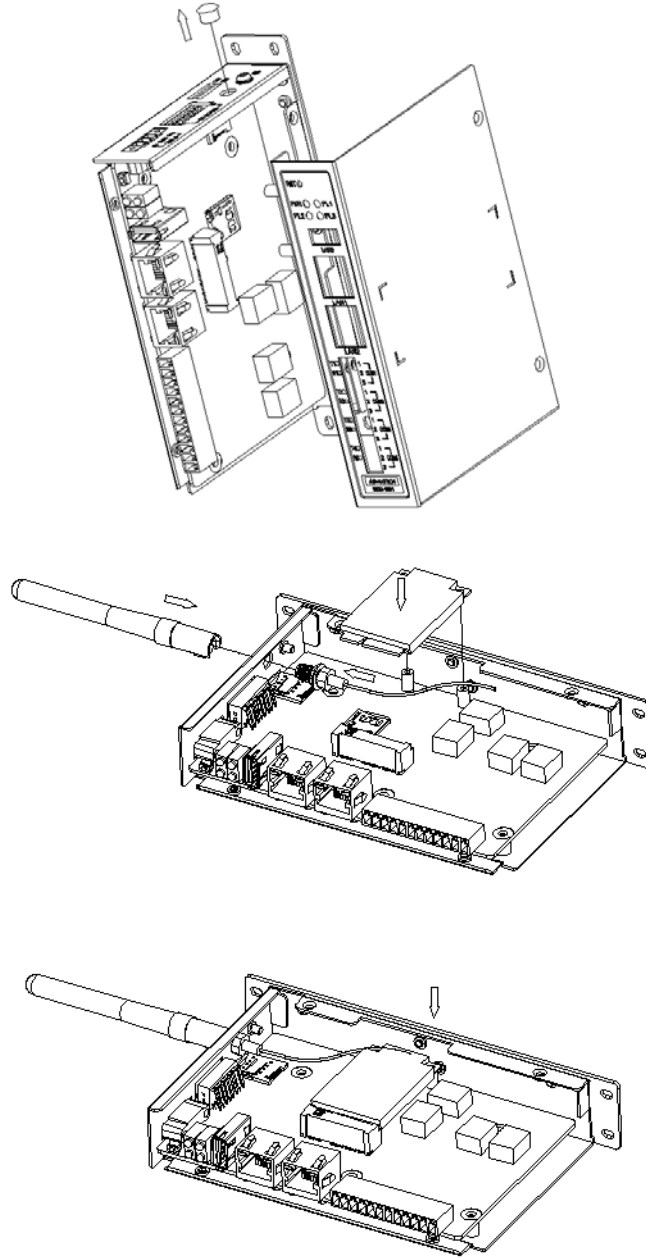


Figure 3.10 SD&SIM Card Installation

3.3.3 Installing a Wireless module Card and Antenna (Optional)

For optional wireless module card and antenna, please contact Advantech for the following wireless solution kit.

- Top panel with pre-cut antenna holes



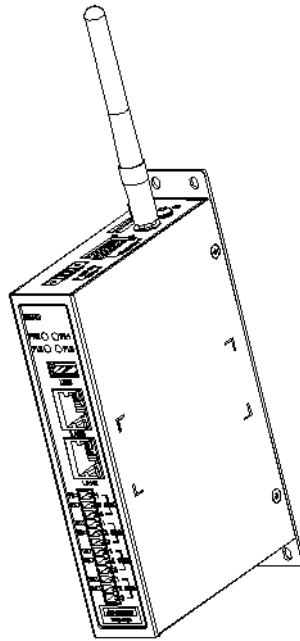


Figure 3.11 Installing a Wireless module Card and Antenna

- The internal coaxial cable with standard SMA connector
For more information about internal coaxial cable, please contact with Advantech.



- Wireless module card (PCI Express Mini card)
The ECU-1251 supports one full-size Mini PCIe slot (only USB signal) for wireless module card installation. For more information about wireless module cards, refer to the datasheet or contact Advantech.
- Antenna
Select the necessary specification according to your application. For more information about antenna, please contact with Advantech.

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

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