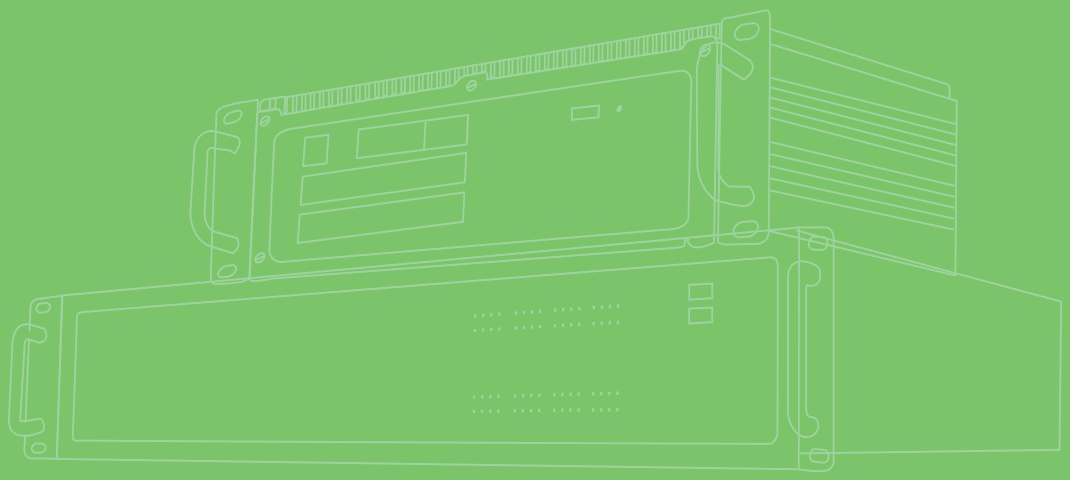

User Manual

ECU-1871

Intel® Atom™ D510 1.66GHz Automation Computer with 2 x LAN, 3 x COM, 1 x IRIG-B and 1 x PCI-104 Extend

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgements

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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-1871.

Part No. xxxxxxxxxxxxx Edition 1

Printed in China May 2013

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 merchandize 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 -20° C (-4° 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.

Contents

Chapter 1

Overview

This chapter provides an overview of ECU-1871's specifications.

Sections include:

- Introduction
- Hardware Specifications
- Safety Precautions
- Chassis Dimensions
- Packing List

1.1 Introduction

ECU-1871 is an embedded Application Ready Platform (ARP) that can shorten development time and offers rich networking interfaces to fulfill extensive needs. ECU-1871 is designed to be a total solution for network enabled Application Ready Platforms.

Leveraging field-approved and worldwide approved real-time OS technology, Advantech ECU-1871 provides WES 2009, WES 7,Windows CE 6.0 and Linux ready solution, and supports several standard networking interfaces, such as Ethernet, RS-232/485, IRIG-B system-time-synchronization etc.Because of its openness, great expansion capability and reliable design (fanless and diskless), the ECU-1871 is ideal embedded platform for implementing customer's software for diverse applications.

Target on Data Server and Communication Gateway in Substations

Advantech ECU-1871 has been defined and designed to be compliant with IEC-61850-3, which has been defined as an international hardware standard of communication network and system in power substations. In modern power substation, this standard facilitates the management to large number of devices and enables the various devices to communicate with one another. ECU-1871 is a ready and certified platform to serve these requirements.

Open Architecture Designed for Automation

For applications demanding customized control, ECU-1871 that uses more flexible, off-the-shelf technology is a better option. ECU-1871 uses off-the-shelf components such as an x86 processor, an Ethernet chip set, Compact Flash., and SATA HDD. At the same time, the ECU-1871 unit can broadcast the process data through the Ethernet and share the data with operators and managers. By using off-the-shelf components, machine builders can customize the control scheme they use for other machines that require multiple inputs, optimized control, or Ethernet communication. So, ECU-1871 offers the I/O connectivity of PCs with options like: 2 x Ethernet (2 x 10/100/1000 Base-T), 3 x Serial ports (1 x RS-232 (with isolation), 2 x RS-485 (with isolation, including 1 road RS-485 (COM3) through internal jumpers changed to IRIG-B port), 1 x IRIG-B Fiber ports (Can add 1 RS-485 (COM3) IRIG-B green terminal port), 4 x USB ports (1 x Front, 2 x Rear, 1 x Internal), 1 x CompactFlash , 1 x SATA and VGA interface for display panels.

Robust IO Isolate System from Electrical Noise

ECU-1871 is designed for the applications in substation where is supposed to have certain electric interference. Equipping with isolated power, isolated communication ports, ECU-1871 has high resistance toward electrical noise. It has been proved not only can work well in substation but also suitable for any harsh applications.

An Industry-Proven Design

Industrial applications require controllers with high-vibration specifications and a wide temperature range. Controllers in industrial environments require flexible and stable mounting, and many machine builders underestimate the need for rugged controllers because their applications are mounted in an industrial enclosure. ECU-1871 has a special design without the weaknesses of a standard PC. No fan, and no HDD prevent dust and vibration problems. With a smart mechanical design, ECU-1871

can meet 10 G shock (with CompactFlash), 2 G vibration (with CompactFlash), up to 70° C operating temperature (tested under 100% CPU loading) and almost anything an industrial environments demand.

Designed to Fit Comfortably Into Racks or Wall

In completely new packaging, ECU-1871 has standard 2U half cabinet rack size as 220 x 150 x 89 mm (8.7"x 5.9"x 3.5")(W x H x D) could fit your half cabinet rack. The rear IO connection and indicator LEDs on the front panel for all ports and modes highly simplify monitoring for operation and maintenance in the rack. You could easily mount ECU-1871 on rack, manage all UNOs in one rack and easily develop your application on rack.

At the same time, in order to adapt to different application environment, ECU-1871 is also equipped with Wall-mount of parts, in order to meet customer requirements of reality scene is not convenient cabinet installation.

Flexible Networking Options

The Advantech ECU-1871 offers two ways to connect to a network: Ethernet and Modem. The two built-in Ethernet ports provide high-speed networking capability up to 1 Gbps. And through ECU-1871's isolated serial COM ports, you could link industrial modems to offer the most popular and easiest networking method by PSTN. The ECU-1871 provides one channel with 9-pins of the standard RS-232 isolated serial COM ports and 2 channels isolated serial COM ports with RS-485 selectable. These ports all equip with surge and isolation protection up to 2,000 V_{DC}, protecting your system from abrupt high voltage attack and accident or damage in harsh environments.

Precision IRIG-B system-time-synchronization

In order to ensure customer consistent system time applications, ECU-1871 provides 1 fiber IRIG-B port for system-time-synchronization(at the same time the system can also add another 1 RS-485(COM3) through jumper setting), the function in the maximum range can ensure that the computer system and equipment time synchronization and accuracy, which can guarantee the system work efficiently.

Popular Operating Systems and Rapid Application Development

The Advantech ECU-1871 supports the popular off-the-shelf Microsoft Windows NT/XP operating systems and the Linux operating system. ECU-1871 also features prebuilt Microsoft WES 2009, WES 7,Windows CE 6.0 and Linux solutions offering a pre-configured image with optimized onboard device drivers. Microsoft Windows CE and XP Embedded are compact, highly efficient, and real-time operating systems that are designed for embedded systems without a HDD. There is no need to waste time and energy on developing onboard device drivers or using the Platform Builder to build a custom Windows CE image, they have all been done for the Advantech ECU-1871 series. Through the built-in runtime library and Software Development Kit (SDK), the ECU-1871 series leverages your existing Windows-based programming skills to rapidly develop applications.

1.2 Hardware Specifications:

1.2.1 General

- **Certification:** CE, FCC class A, CCC, Electricity IV level for China (Compatible IEC 61850-3, IEEE 1613)
- **Dimensions (W x D x H):** 2U 220 x 150 x 89 mm (8.7"x 5.9"x 3.5")
- **Enclosure:** Aluminum +SECC
- **Mounting:** 2U Half Rack-mount & Wall-mount
- **Power Consumption:** 24 W (Typical)
- **Power Requirements:** 18 ~ 30 V_{DC} (e.g 24 V @ 2 A) (Min. 48 W), AT
- **Weight:** 2.4 kg (Typical)
- **System Design:** Fanless with no internal cabling
- **OS Support:** WES 2009, Windows XP, WES 7,Windows CE 6.0 and Linux
- **Remote Management:** Built-in Advantech DiagAnywhere agent on Windows CE/XPe

1.2.2 System Hardware

- **CPU:** Intel Atom D510 1.66 GHz/ 512 KB L2 Cache
- **Memory:** 2G DDRII 667 MHz
- **Indicators:** LEDs for Power, HDD,IRIG,COM(Tx Rx) and LAN (Active Statue)
- **Storage:** SSD: 1 x type I/II CompactFlash® slot
- **HDD:** 1 x integrated 2.5" SATA HDD bracket
- **Display:** DB15 VGA connector, 1600 x 1200 @ 85 Hz
- **WatchDog Timer:** Programmable 256 levels time interval, from 1 to 255 seconds for each tier
- **PCI-104 Slot:** 1 x PCI-104 supports +3.3 V & +5 V power
- **Reset Button:** Yes

1.2.3 Communication Interface

- **Serial Ports:**
  RS-232 DB9 connector
  1 Port
  RS-485 Screw Plug-in Terminal block
  2 Ports
  2000 V_{DC} Isolation
- **Serial Ports Speed:**
  RS-232 50 ~ 115.2 kbps
  RS-485 50 ~921.6 kbps
- **LAN:** 2 x 10/100/1000Base-T RJ-45 ports
- **USB Ports:** 4 x USB, UHCI, Rev. 2.0 compliant 1 x Front, 2 x Rear and 1 x Internal ports

1.2.4 Time Synchronization Interface

- **Type:** IRIG-B (fiber interface) (optional COM3 (RS-485) IRIG-B input)
- **Channel:** 1
- **Support Format:** IRIG-B00X according to IRIG STANDARD 04, 200-98
- **Input Signal:** ST Multi-mode, 1 Isolation RS-485 (Optional)
- **Message Syntax:** QQQHHMMSS(year, day, hour, minute & second)
- **Resolution of Time:** 1s

1.2.5 Environment

- **Humidity:** 95% @ 40°C (non-condensing)
- **Operating Temperature:** IEC 60068-2-2 with 100% CPU loading, 48 hrs -20 ~ 70°C (-4 ~ 158°F)
- **Operating Humidity:** 20 ~ 95% (non-condensing)

1.3 Safety Precautions

The following messages informs 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-1871. 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:

1.4.1 Chassis Rack-mount mounting size

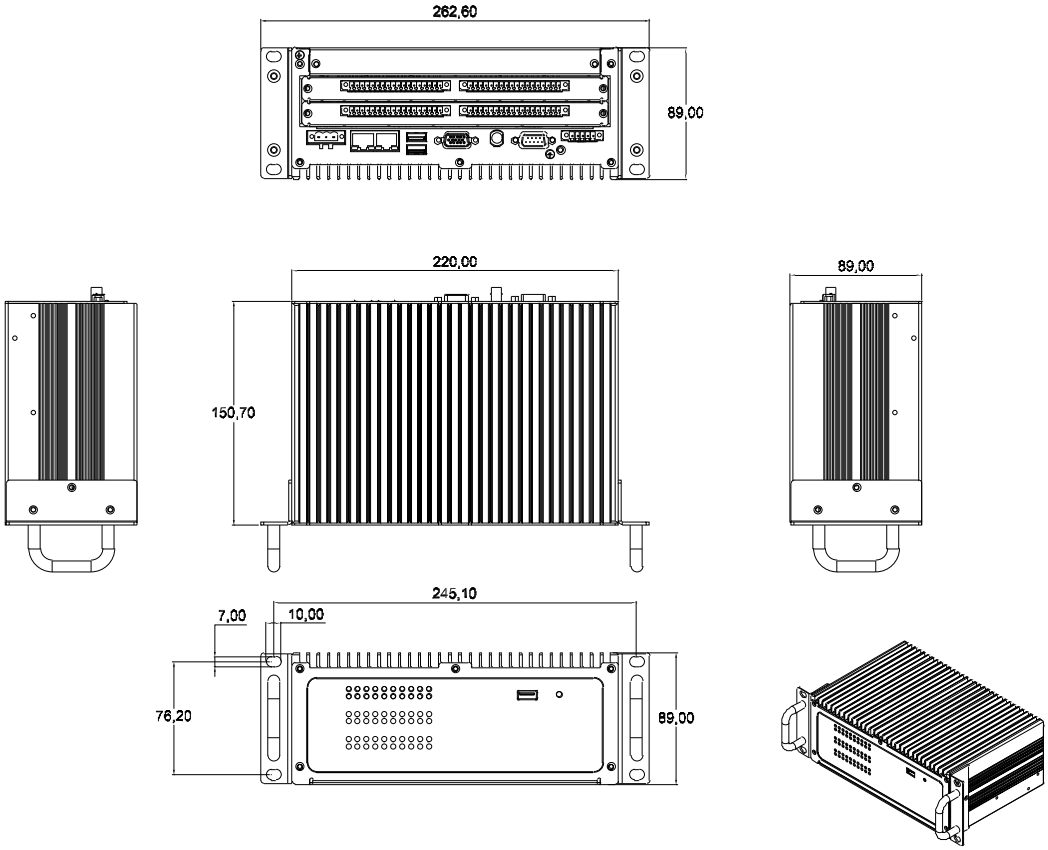


Figure 1.1 ECU-1871 Chassis Rack-mount mounting size

1.4.2 Chassis Wall-mount mounting size

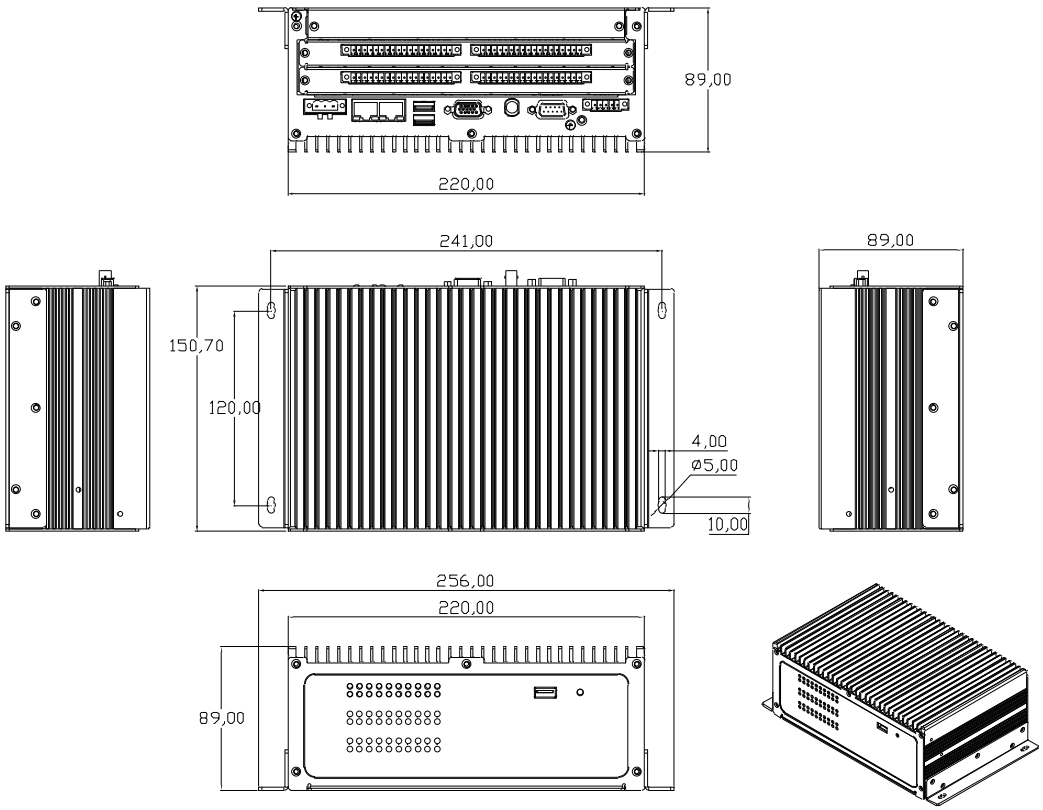


Figure 1.2 ECU-1871 Chassis Wall-mount mounting size

1.5 Packing List

The accessory package of ECU-1871 contains the following items:

(A) ECU-1871

(B) 2 x rack mounting kit

(C) 2 x Wall mounting kit

(D) 2 x front handles

(E) H=1.1 + M3*6L ST BLK 10 pcs screw Ear or L Wall-mount mounting kit (P/N: 1930000071)

(F) H=1 + M3*5L ST Ni 6 pcs screws for SATA HDD installation (P/N: 1930030500)

(G) M4x8 4PCS round-head screw for Wall-mount (P/N: 1935040820)

(H) M4x8 4PCS flat-head screw for handle (P/N: 1930040800)

(I) 1 x clamp for USB dongle

(J) 2 x screws for USB clamp

(K) 1 x 5-pins green screw terminals

(L) 1 x 3-pins green screw terminal

(M) 1 x SATA signal cable

(N) 1 x SATA power cable

(O) 2 pcs jumper shorter

(P) 1 x S-CH manual

(Q) 1 x ROHS LIST

(R) energy solution series Driver and Utility DISC

(S) 1 x warranty card

Chapter 2

Hardware Functionality

This chapter shows how to setup the ECU-1871's hardware functions, including connecting peripherals, setting switches and indicators.

Sections include:

- Overview
- LED Indicators
- Power Input
- IRIG-B
- RS-232/485 Interface
- LAN / Ethernet Connector
- USB Ports
- VGA Display
- Advanced Watchdog Timer
- PCI-104

2.1 Overview

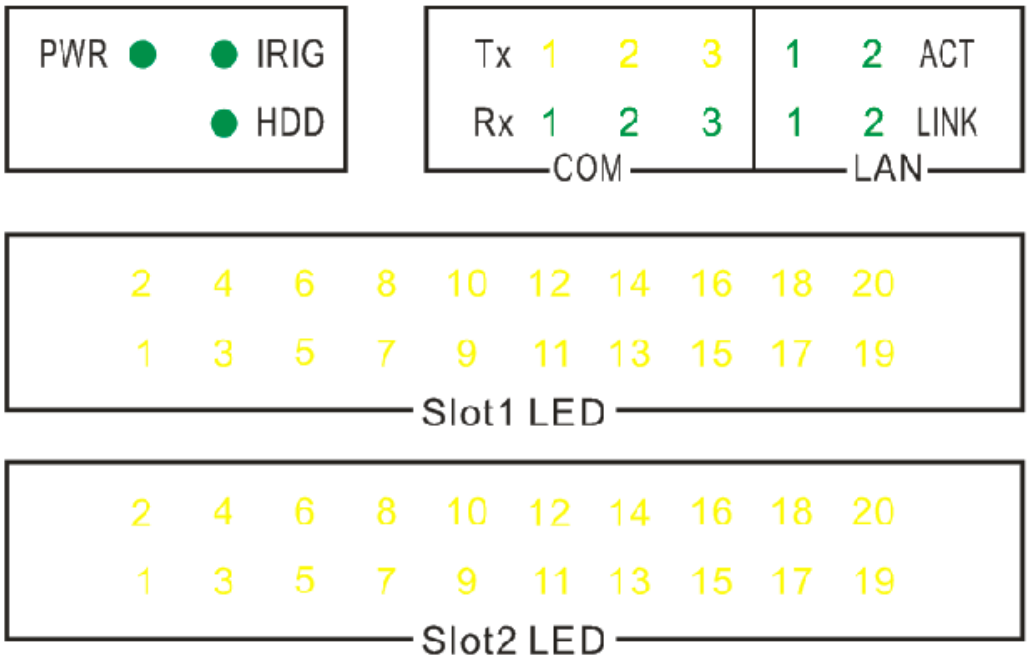
The following two figures show the indicators and connectors on ECU-1871. The following sections give you detailed information about function of each peripheral.

Figure 2.1 ECU-1871 Front Panel

Figure 2.2 ECU-1871 Rear Panel

2.2 LED Indicators

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



2.2.1 System Status Indicators:

Table 2.1: Definition of System Status Indicators

Item	LED	Status	Description
1	PWR	Green	System power is on
		Off	System power is off
2	IRIG	Green	IRIG-B signal being received
		Off	No IRIG-B signal being received
3	HDD	Green	Data being received/ transmitted between storage devices
		Off	No Data being received/ transmitted between storage devices

2.2.2 LAN Status Indicators

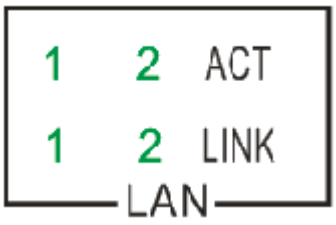


Table 2.2: Definition of LAN Status Indicators

Item	LED	Status	Description
1	LAN/ LINK (Port 1~2)	Green	1Gbps network link
		Orange	100Mbps network link
		Off	10Mbps network link or invalid network link
2	LAN/ ACT (Port 1~2)	Green	Ethernet date being received/ transmitted
		Off	No Ethernet data being received/ transmitted

2.2.3 Serial Communication Status Indicators

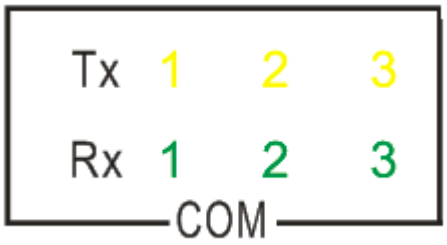


Table 2.3: Definition of Serial COM Status Indicators

Item	LED	Status	Description
1	COM/Rx (Port 1 ~ 3)	Green	Serial port data being received
		Off	No data being received
2	COM/Tx (Port 1 ~ 3)	Orange	Serial port data being transmitted
		Off	No data being transmitted

COM3 through the CN26 jumper is set to 1 IRIG-B ports, but also through the CN16 COM2, COM3 terminal resistance, specified as follows:

Jumper Setting :

CN26 IRIG Choose

CN16 COM Terminal Register

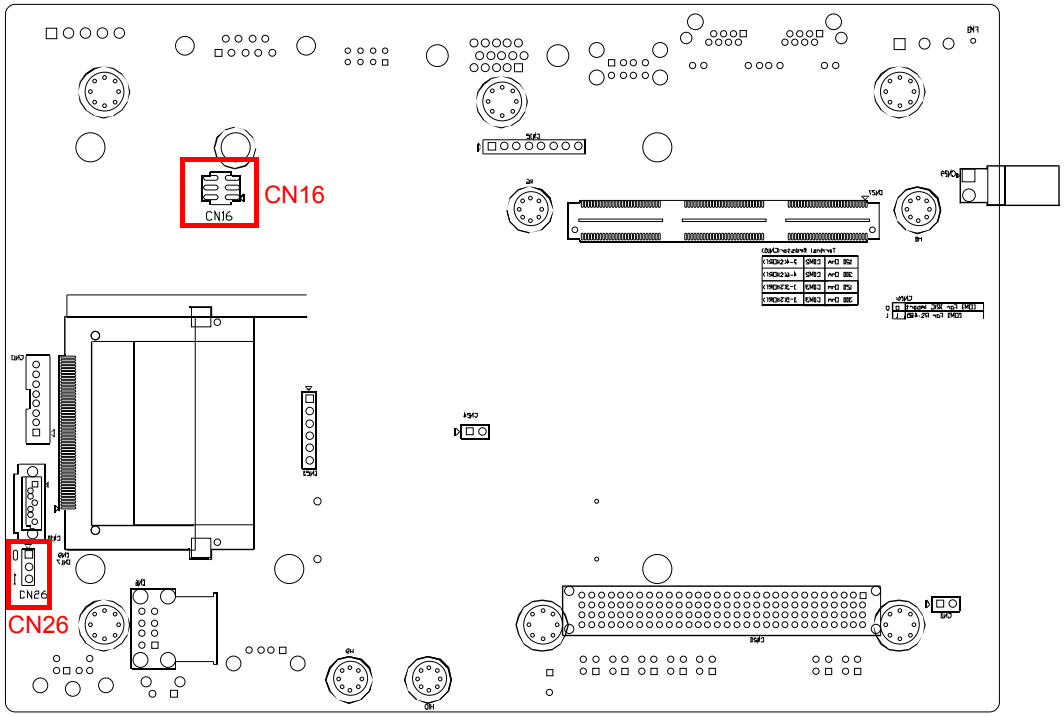


Figure 2.3 CN16 CN26 position diagram

CN26 IRIG Choose

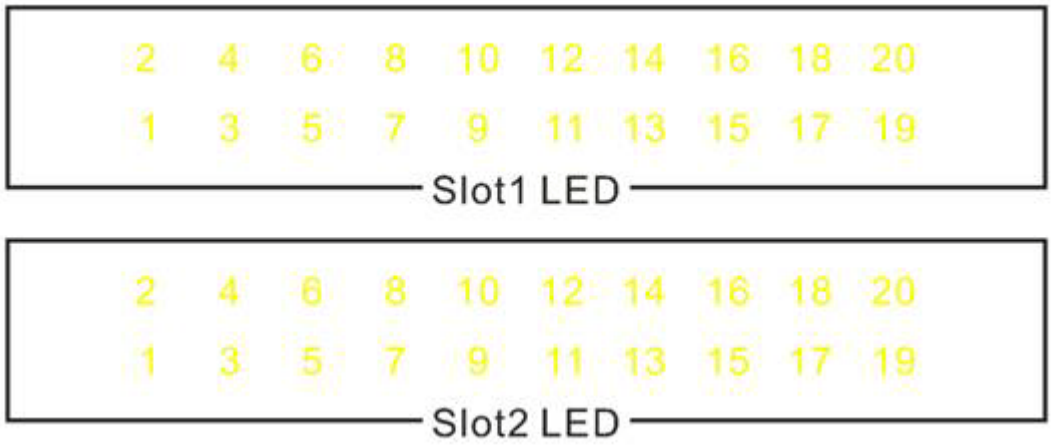
Description	Can choose COM3 function IRIG or RS-485	
Setting	**Function**	**Description**
1-2	IRIG	COM3 for IRIG
2-3	COM	COM3 for RS-485
The default setting COM3 for RS-485		

CN16 Terminal Register

Description	Can choose COM2-COM3 Terminal Register	
Setting	**Function**	**Description**
2-4	COM2	Terminal Register 120 Ohm
4-6	COM2	Terminal Register 300 Ohm
1-3	COM3	Terminal Register 120 Ohm
3-5	COM3	Terminal Register 300 Ohm

2.2.4 Reserve expansion LED

ECU-1871 in order to better meet the actual needs of customers, the product has set aside 1 PCI-104 expansion port, used to extend more cards, the following LED for subsequent expansion card reservation state display LED.



2.3 Power Input

The ECU-1871 comes with a Phoenix connector(CN21) that carries 18~30 V_{DC} external power input, can adapt to 24 V_{DC} or 48 V_{DC} power supply. Another optional AC adapter, in order to comply with the 110V_{AC} to 240 V_{AC} power input. Power supply by a terminal row access, terminal pins are defined below and shown in the table below.

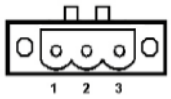


Table 2.4: Power connector pin assignments

Pin	Description
1	V+(18~30V_{DC})
2	V-
3	GND

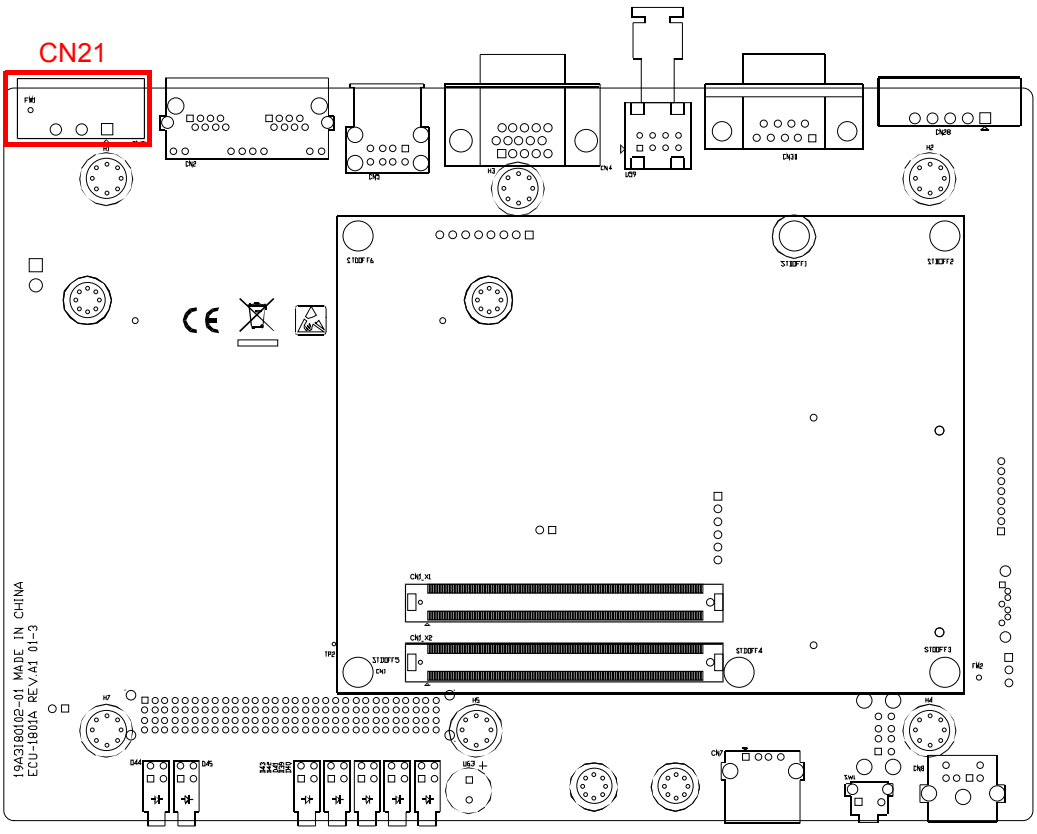


Figure 2.4 Power input location(CN21)

2.4 IRIG-B

ECU-1871 provides 1 fiber IRIG-B port(U59)(It can be changed from COM3 to 1 IRIG by jumper (CN26), please refer to chapter 2.2.3 for system-time-synchronization, the function provides more accurate time recording information, to facilitate data analysis.

Please refer to the PCIIRIG_User_Interface.chm in "PCIIRIG driver" folder on the CD, which provides detailed description of the specific application of the IRIG configuration.

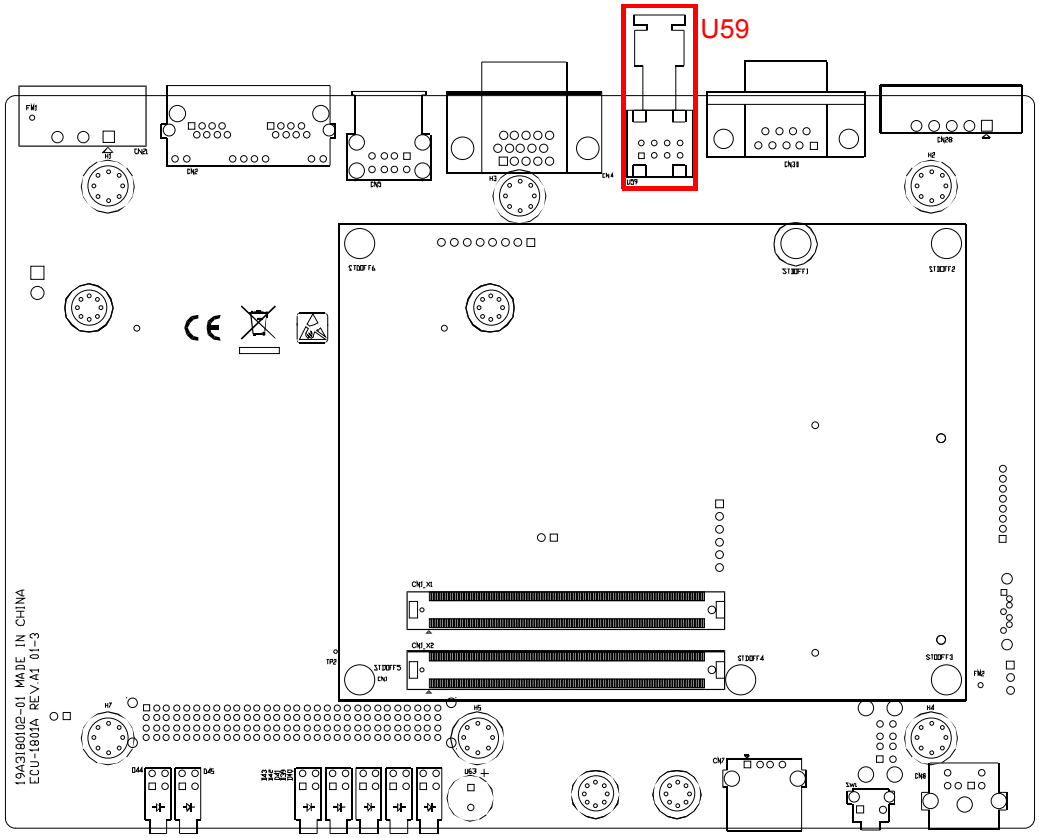


Figure 2.5 1 fiber IRIG-B location(U59)

2.5 RS-232/485 Interface (COM1~COM3)

The ECU-1871 offers one standard RS-232 and two RS-485 serial communication interface ports: COM1. Please refer to Appendix A.1 for pin assignments. COM1 is one standard RS-232. COM2 to COM3. Refer to Appendix A.2 for their pin assignments. The default setting of COM2 to COM3 are RS-485.

2.5.1 OXuPCI954 UARTs with 128 bytes FIFO

Advantech ECU-1871 comes with Oxford OXuPCI954 UARTs containing 128 bytes FIFO.

2.5.2 RS-485 Detection

In RS-485 mode, ECU-1871 automatically detects signals to match RS-485 networks. (No jumper change required)

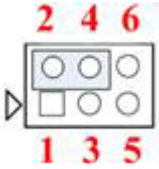
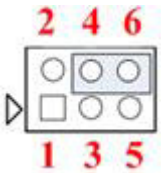
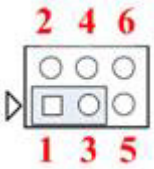
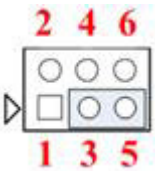
2.5.3 Automatic Data Flow Control Function for RS-485

In RS-485 mode, ECU-1871 automatically detects the direction of incoming data and switches its transmission direction accordingly. So no handshaking signal (e.g. RTS signal) is necessary. This lets you conveniently build an RS-485 network with just two wires.

2.5.4 Terminal Resistor

The onboard termination resistor (120 ohm/300 ohm) for COM2~COM3 can be used for long distance transmission or device matching. (Default Open.) Please also refer to Table 2.7.

Table 2.5: Jumper setting of terminal resistor

Function	Setting	Description
COM2		Add 120 ohm termial resistor on COM2 Data+/ Data- of RS-485
		Add 300 ohm termial resistor on COM2 Data+/ Data- of RS-485
COM3		Add 120 ohm termial resistor on COM3 Data+/ Data- of RS-485
		Add 300 ohm termial resistor on COM3 Data+/ Data- of RS-485

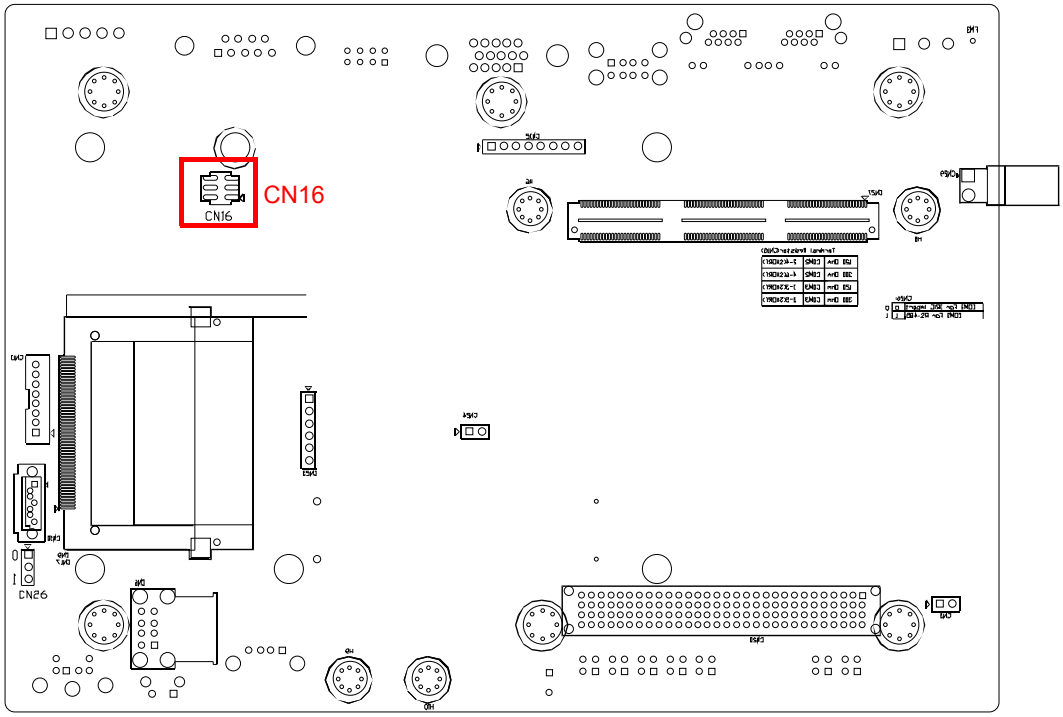


Figure 2.6 COM2~3 Port Related Jumper Locations

2.5.5 COM3 function setting

ECU-1871 can choose COM3 function IRIG or RS-485 by using CN26 Jumper. Refer to chapter 2.2.3.

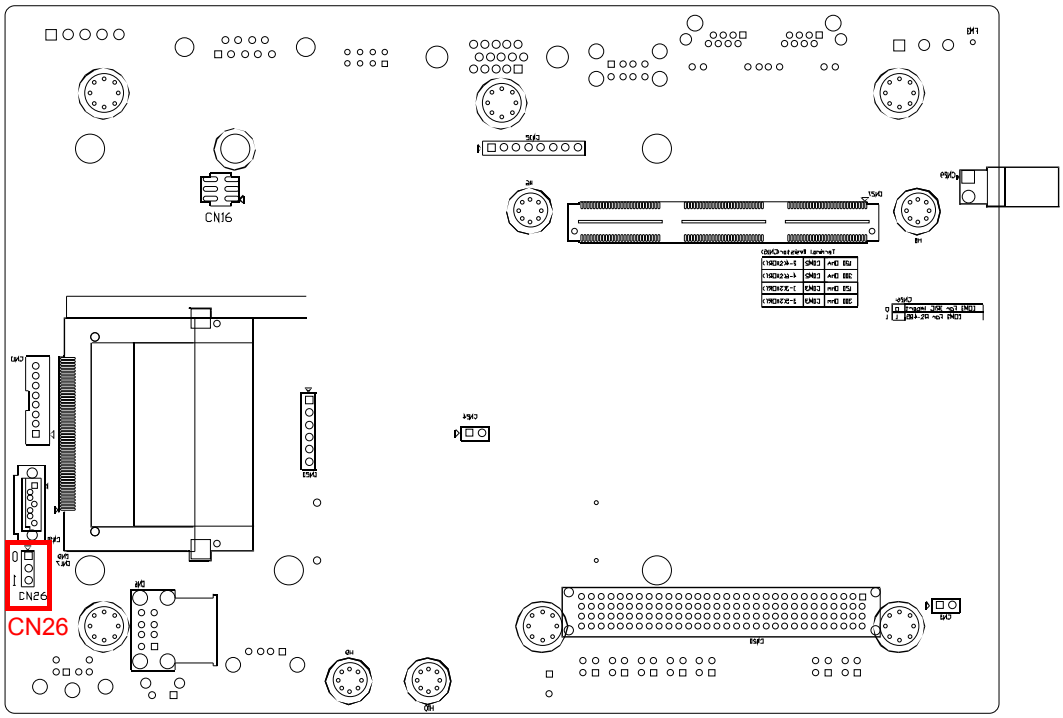


Figure 2.7 COM3 setting IRIG-B jumper location(CN26)

2.6 LAN: Ethernet Connector

The ECU-1871 is equipped with 2 Intel 82574L Gigabit Ethernet Controller which are compliant with IEEE802.3 1000Base-T, 100Base-T and 10Base-T (802.3, 802.3u and 802.3ab).

The Ethernet port provides a standard RJ-45 jack on board, and LED indicators on the front side to show its Link and Active status.

Note these LAN controllers all use PCI resource, the bandwidth or throughput may be restricted by the PCI bandwidth.

2.7 USB Ports

The ECU-1871 provides four USB interface connectors, which provide complete Plug & Play and hot swapping for up to 127 external devices.

The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. ECU-1871 provides 1 USB port on the front panel, and 2 USB port on the rear panel. It also provides 1 USB port inside the chassis for USB dongle key.

2.8 VGA Display

The ECU-1871 with Intel ICH8-M, integrates the graphic controller GMA-3150 and provides a resolution of 1600 x 1200 @ 85 Hz for VGA output

2.9 Advanced Watchdog Timer

The ECU-1871 provides one hardware Watchdog Timer for users to have a chance to escalate system status before the forced system reset. Users can operate system I/O port 4E and 4F to set different time. You can see Interface technique of Micro-computer or example by Advantech (Appendix B).

2.10 PCI-104:

ECU-1871 supports standard PCI-104 version 1.2 expansion, which supports up to 2 PCI device. You also could install the expansion of other functions of the PCI-104 interface to meet customer's demand. The power supply is 3.3V default.

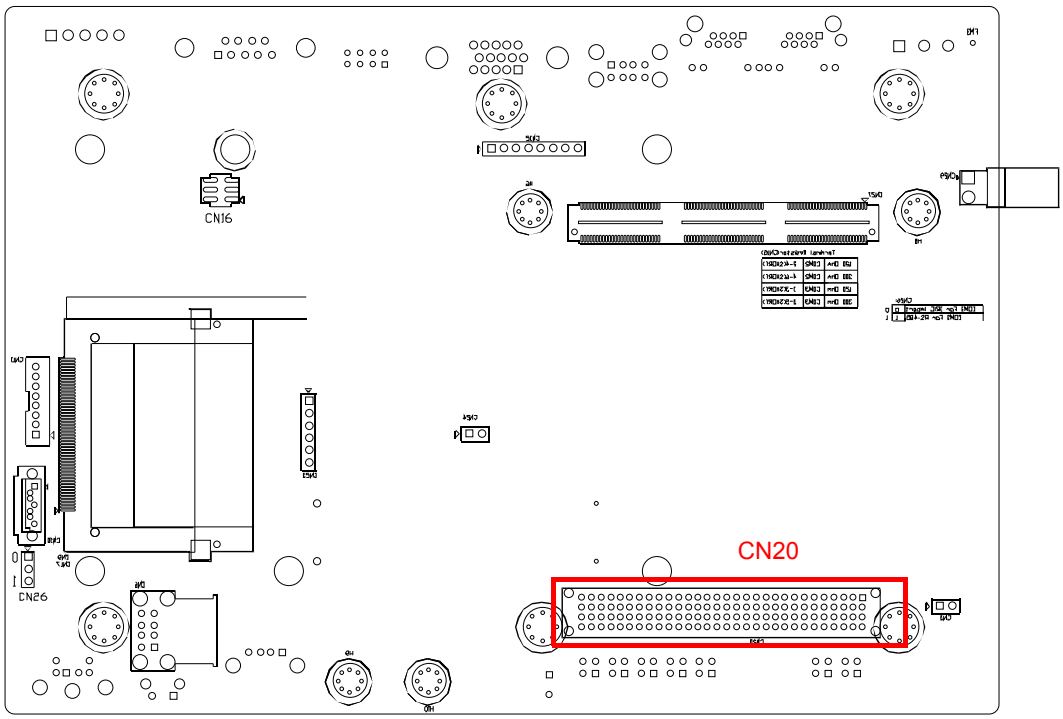


Figure 2.8 PCI-104(CN20) Location

Chapter 3

Initial Setup

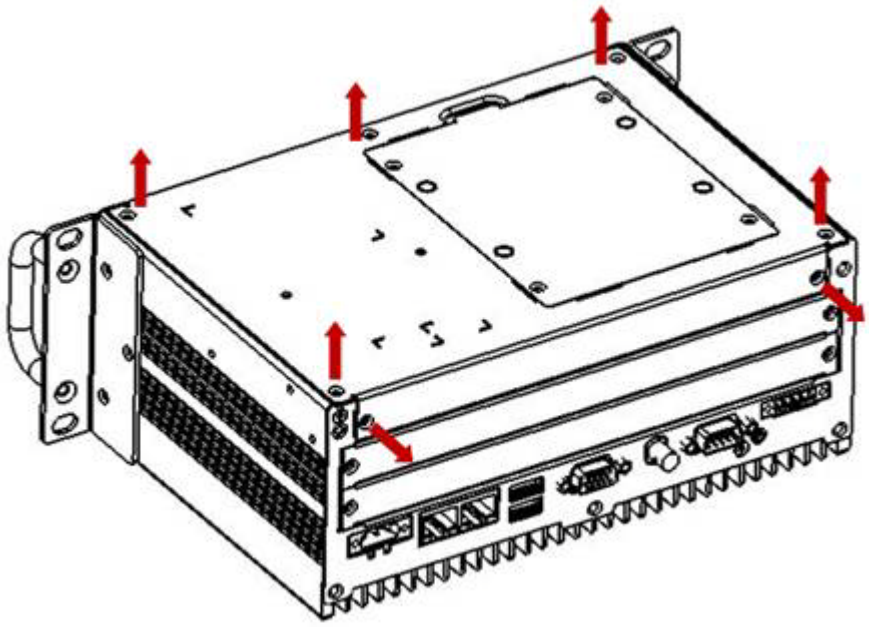
Sections include:

- Configuration
- Install a CompactFlash Card
- Installing a USB Dongle
- Installing a Hard Disk
- Installation on Rack & Wall
- BIOS Setup and System Assignments

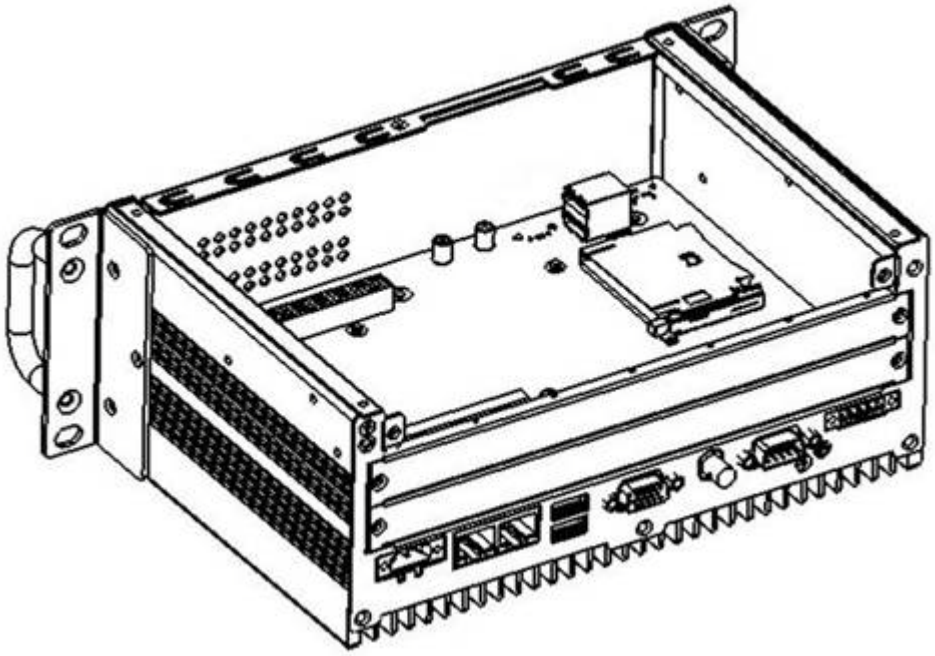
3.1 Configuration

To open the chassis, follow the steps below:

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



4. Remove the L-shaped cover (with HDD BRK)

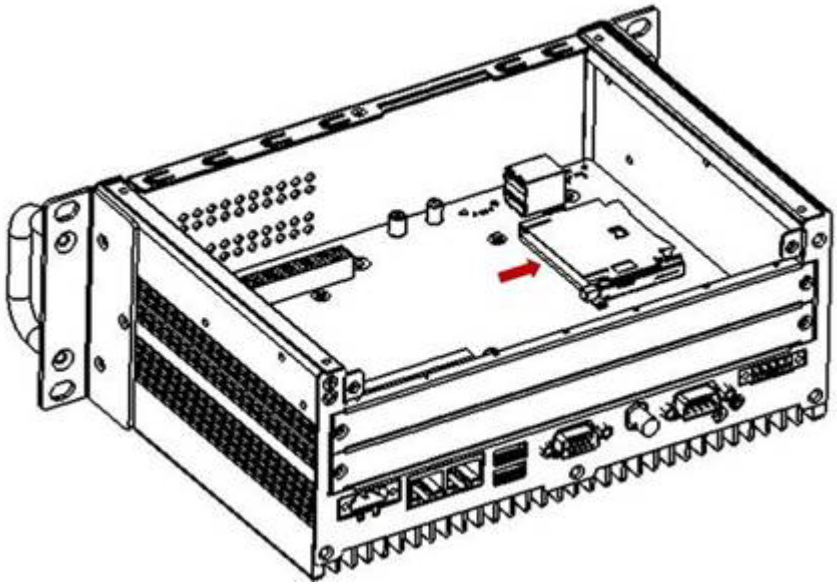


Note! *If an HDD is installed, please remove any HDD related connections before opening the chassis.*

3.2 Install a CompactFlash Card

ECU-1871 provides 1 CompactFlash Card slots, to install the cards:

1. Follow section 3.1 to open the chassis.
2. Insert the card at the location (CN9) shown below.



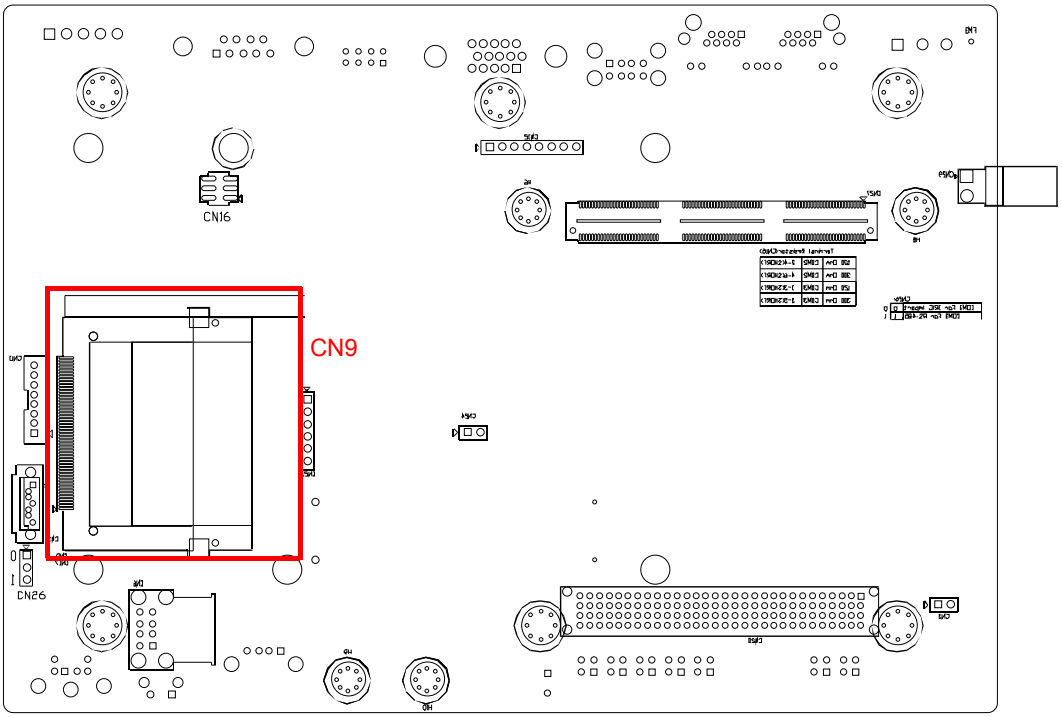
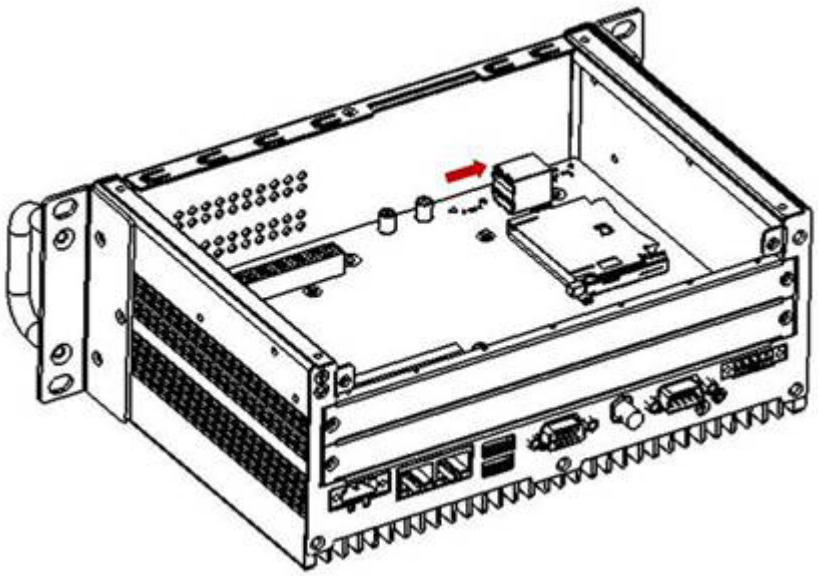


Figure 3.1 CompactFlash Card Slot Location(CN9)

3.3 Installing a USB Dongle

ECU-1871 provides a clamp to four the USB dongle which can be installed inside the chassis. Please follow the steps to install the USB dongle and clamp:

1. Follow section 3.1 to open the chassis.
2. Plug the USB Dongle in the upside port of CN6, please note the downside port is a dummy port.



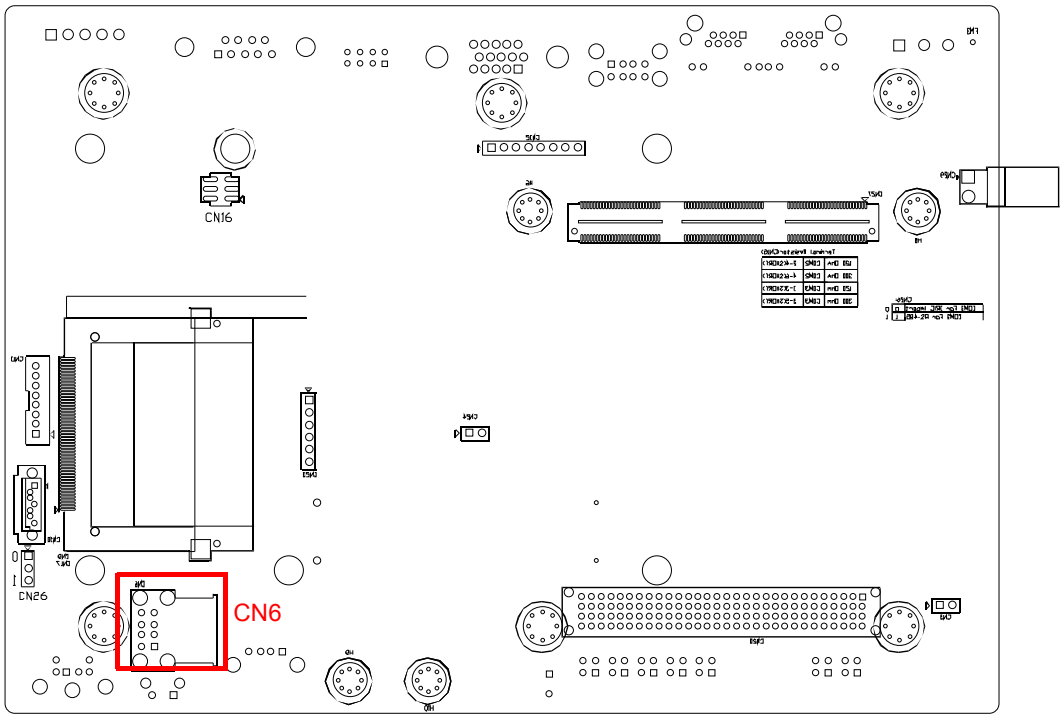
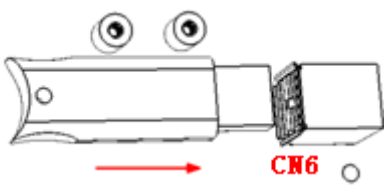
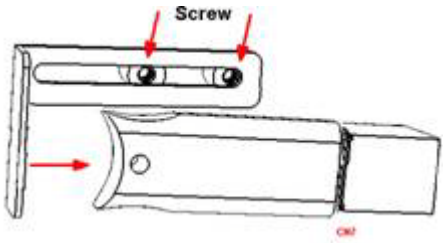


Figure 3.2 CN6 Location of Internal USB Port(CN6)



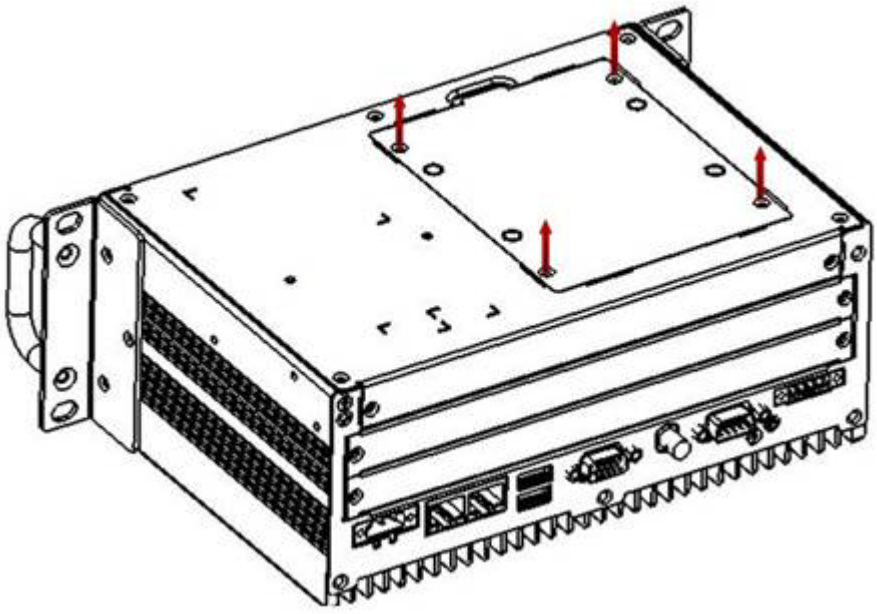
3. Adjust the position of the kit to fasten the USB dongle, and then screw to fix the kit.

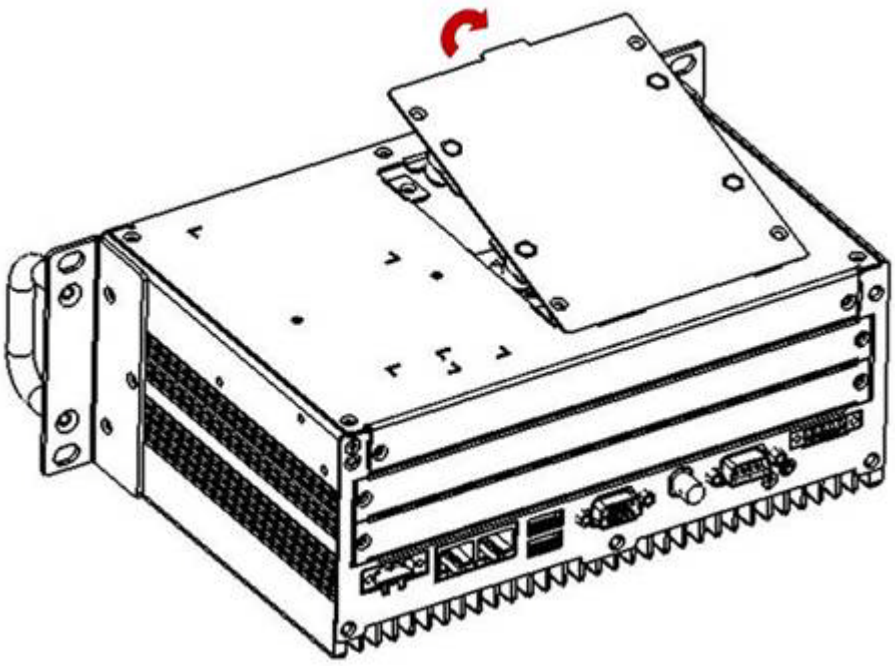


3.4 Installing a Hard Disk

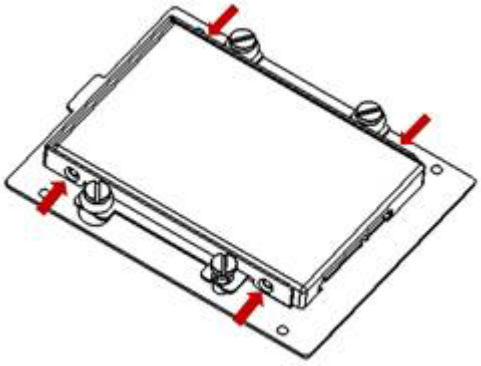
Please follow the steps below to install an HDD:

1. Turn the unit heat-sink side down.
2. Unscrew the 4 screws and remove the HDD bay.





3. Insert the HDD into the HDD bay and screw it.



4. Connect the SATA cable between HDD and connector then assemble the HDD back to the chassis. The locations of the connectors are shown below, SATA signal connector locates on CN10 and SATA power connector locates on CN11.

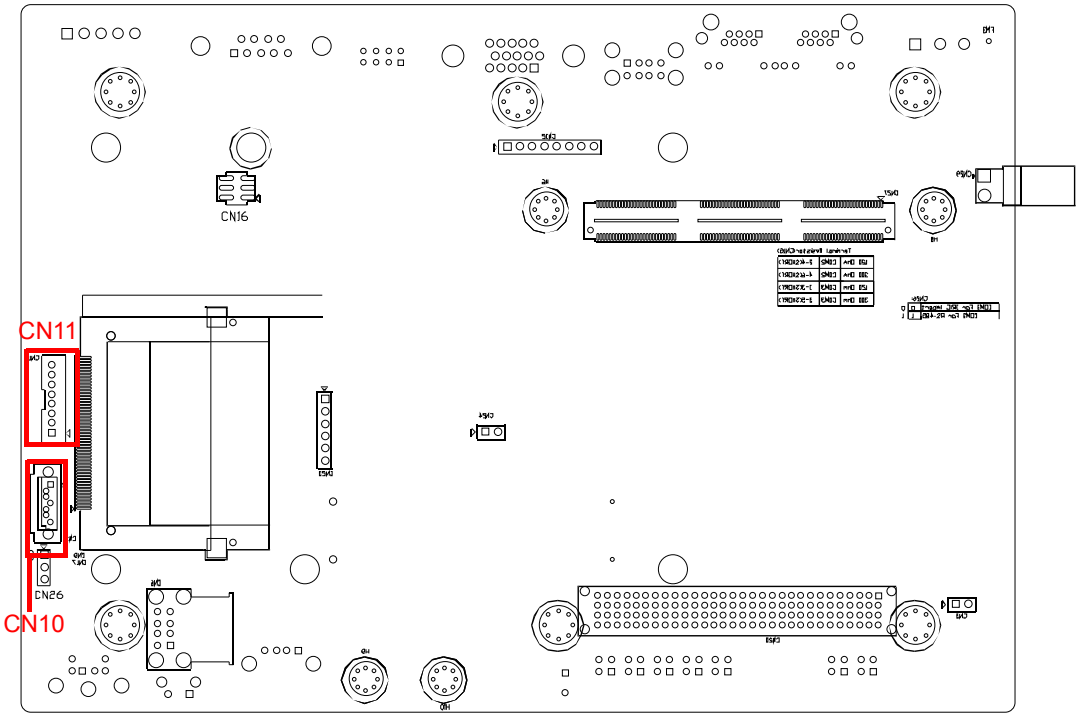
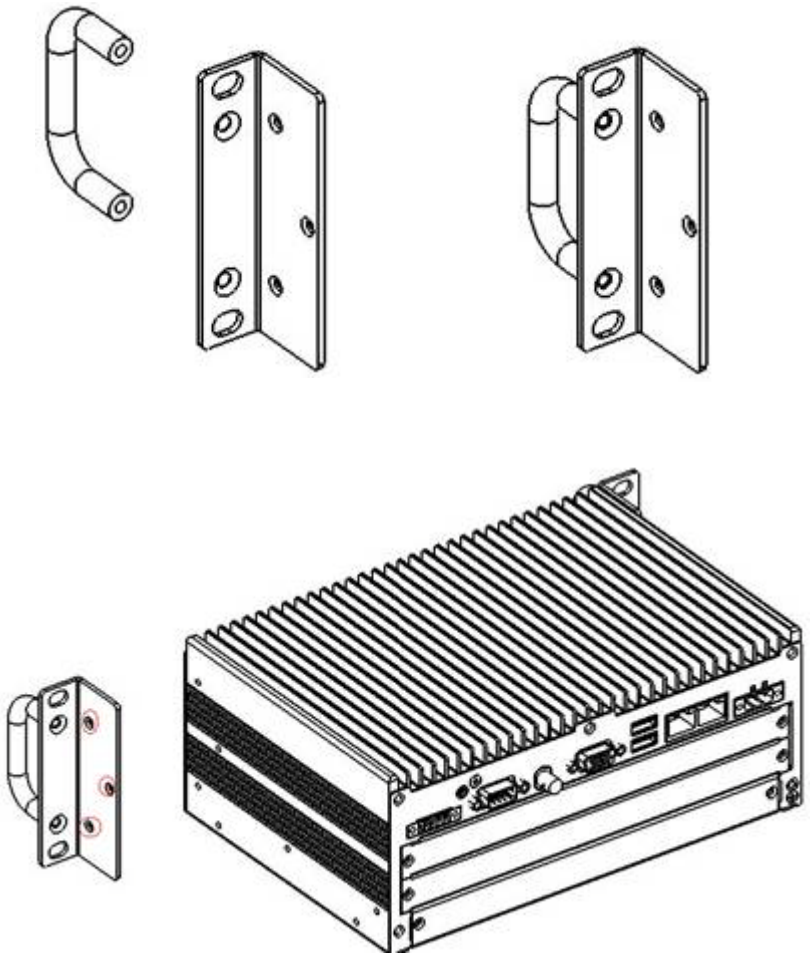


Figure 3.3 SATA Signal and Power Connector Location(CN10 CN11)

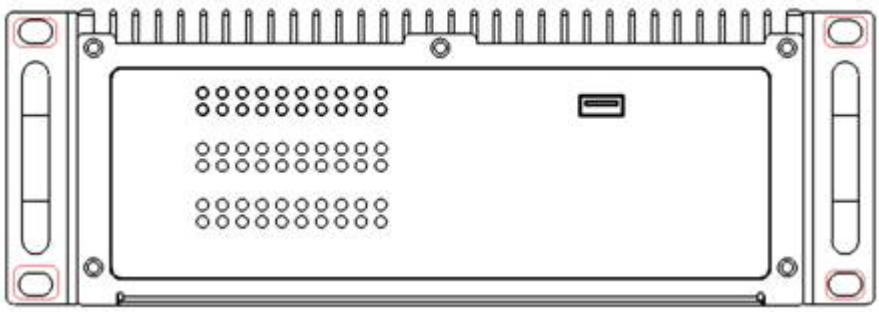
3.5 Installation on Rack & Wall

3.5.1 ECU-1871 provides the kits for Wall-mount in the accessory box

1. Screw the ears and handles at the position indicated below.The same on the other side.



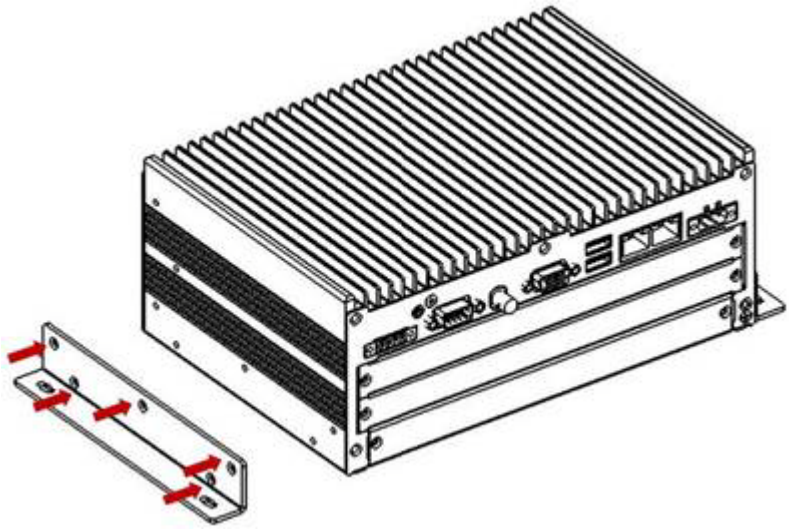
2. Use the 4 screw holes to mount the ECU-1871 on the rack.



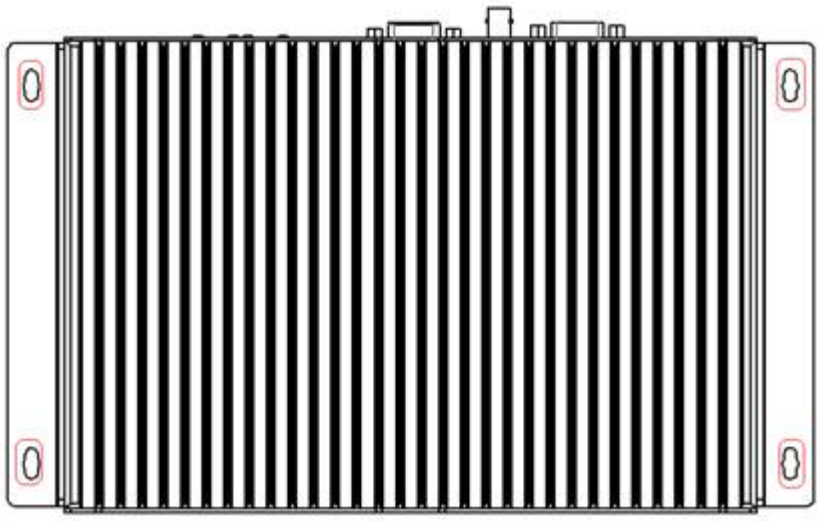
3. ECU-1871 equips the Aluminum Fins on the top of the unit as heat-sink. It can generate nature convection for better heat transmission.To have optimal thermal performance, please leave 2U (440 mm) space height on the top of the unit

3.5.2 ECU-1871 provides the kits for Wall-mount in the accessory box

1. Screw the wall mounting bracket at the position indicated below.The same on the other side.



2. Use the 4 screw holes to mount the ECU-1871 on the wall.



3.6 BIOS Setup and System Assignments

ECU-1871 adopts Advantech's SOM-6763 CPU module.Further information about the SOM module, can be found in SOM'suser's manual. You can find this manual on the ECU-1871's companion DISC.

Please note that you can try to "LOAD BIOS DEFAULTS" from the BIOS Setup manual if the ECU-1871 does not work properly.

Note! *ECU-1871 does not support S3(Suspend to RAM) mode.*

Appendix A

System Settings & Pin Assignments

Sections include:

- RS-232 Serial Ports (COM1)
- RS-485 Serial Ports (COM2~COM3)
- USB Connectors (USB1~USB4)
- VGA Display Connector

A.1 RS-232 Serial Ports (COM1)

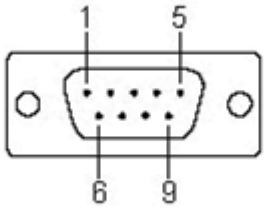


Table A.1: COM1~2 Port Pin Definitions

PIN	RS-232
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

A.2 RS-485 Serial Ports (COM2~COM3)

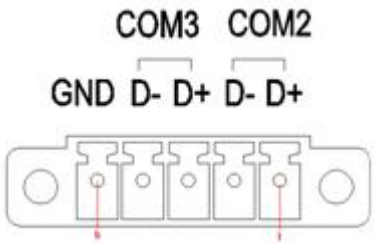


Table A.2: RS-485 Serial Ports (COM2~3)

Pins	RS-485
1	Data+
2	Data-
3	Data+
4	Data-
5	GND

A.3 USB Connectors (USB1~USB4)

Table A.3: USB Connector Pin Assignments

Pin	Signal	Cable Color
1	VCC	Red
2	DATA-	White
3	DATA+	Green
4	GND	Black

A.4 VGA Display Connector

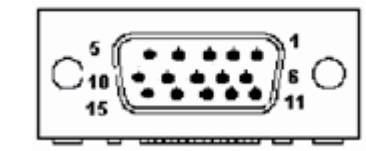


Table A.4: VGA Adaptor Cable Pin Assignments

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	VCC
10	GND
11	N/C
12	VGA_SDA
13	HSYNC
14	VSYNC
15	VGA_SCL

Appendix B

Watchdog Timer Programming

```
---------------------------------------------------------------------------
Enter the extended function mode, interruptible double-write
---------------------------------------------------------------------------
MOV DX,4EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
---------------------------------------------------------------------------
Configured logical device 8, configuration register CRF6
---------------------------------------------------------------------------
MOV DX,4EH
MOV AL,2BH
OUT DX,AL
MOV DX,4FH
IN AL,DX
AND AL.OEFH;Setbit 4=0 Pin 89=WDTO
OUT DX,AL
MOV DX,4EH
MOV AL,07H; point to Logical Device Number Reg.
OUT DX,AL
MOV DX,4FH
MOV AL,08H; select logical device 8
OUT DX,AL;
MOV DX,4EH
MOV AL,30H;Set watch dog activate or inactivate
OUT DX,AL
MOV DX,4FH
MOV AL,01H; 01:activate 00:inactivate
OUT DX,AL;
MOV DX,4EH
MOV AL,F5H; Setting counter unit is second
OUT DX,AL
MOV DX,4FH
MOV AL,00H
OUT DX,AL;
MOV DX,4EH
MOV AL,F6H
OUT DX,AL
MOV DX,4FH
MOV AL,05H; Set 5 seconds
OUT DX,AL
;----------------------------------------
; Exit extended function mode
;----------------------------------------
MOV DX,4EH
MOV AL,AAH
OUT DX,AL
```

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