

UNO-1372G

Embedded Automation

Computer with Intel® Atom
Quad-Core Processor, 3 x GbE,
2 x mPCIe, 1 mSATA, 2xCOM,
8xDIO, 3xUSB, HDMI/VGA

ADVANTECH

Enabling an Intelligent Planet

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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 when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

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 support.advantech.com/ 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 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.

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:
 15. The power cord or plug is damaged.
 16. Liquid has penetrated into the equipment.
 17. The equipment has been exposed to moisture.
 18. The equipment does not work well, or you cannot get it to work according to the user's manual.
 19. The equipment has been dropped and damaged.
 20. The equipment has obvious signs of breakage.
21. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -10°C (-14° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
22. **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.
ATTENTION: Danger d'explosion si la batterie est mal REMPLACÉ. REMPLACER UNIQUEMENT PAR LE MEME TYPE OU EQUIVALENT RECOMMANDÉ PAR LE FABRICANT, jeter les piles usagées SELON LES INSTRUCTIONS DU FABRICANT.
23. 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.

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Chapter 1

Overview

This chapter provides an overview of the products specifications.

Sections include:

- Introduction
- Safety precautions
- Accessories

1.1 Introduction

The UNO-1372G is an embedded Application Ready Platform (ARP) that can shorten development time and offers multiple networking interfaces to fulfill the extensive needs of different projects.

The UNO-1372G includes Intel's latest Intel Atom technology and provides multiple interfaces including up to two serial ports, three GbE LAN and three USB ports.

The UNO-1372G supports two display types, HDMI and VGA for various high resolution requirements.

The UNO-1372G can operate in wide temperatures (from -20 to 60°C).

The UNO-1372G even adopts Intel Atom CPU with Quad-Core computing power and up to 4GB DDR3 (supports a max of 8GB) built-in RAM for multi-tasking programs.

The UNO-1372G provides great expansion including two Mini PCIe and SIM card support. With these expansions and iDoor technology the UNO-1372G has great expandability from Wi-Fi, 3G, I/O expansion and fieldbus card with iDoor technology.

With a wide array of OS and driver support, such as Windows 7/8, WES7/WE8S, and embedded Linux, users can integrate applications easily in an application ready platform that can provide a versatile functions to fulfill diverse requirements.

1.2 Safety Precautions

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

Note! Safety Certification Temperature 50°C(122°F)



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.



Warning! Toujours débrancher le cordon d'alimentation de votre boîtier lorsque vous êtes travailler. Ne branchez pas lorsque l'appareil est allumé. Un afflux soudain de puissance peut endommager les composants électroniques sensibles. Seulement connu personnel de l'électronique devraient ouvrir le châssis.



Caution! Always ground yourself to remove any static electric charge before touching the product. 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.



Caution! Toujours à la terre pour éliminer toute charge d'électricité statique avant toucher UNO-1372G. Appareils électroniques modernes sont très sensibles à charges d'électricité statique. Utilisez un bracelet antistatique à tout moment. Placez tous composants électroniques sur une surface antistatique ou dans un statique-sac blindé.



1.3 Accessories

Please refer below for the accessory list:

- 4-pin connector for power wiring
- 10-pin connector for Digital I/O wiring
- Din-Rail Mounting Bracket
- Wallmount Mounting Bracket
- 4 PCS screws for HDD
- 6 PCS screws for mPCIe slot
- 4 PCS screws for wall mounting bracket
- 3 PCS screws for DIN-Rail Bracket
- Driver DVD
- Warranty card

If anything is missing or damaged, contact your distributor or sales representative immediately.

Chapter 2

Hardware Functionality

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

Sections include:

- Introduction
- Serial Interface
- LAN / Ethernet Connector
- Power Connector
- USB Connector
- Display Connector
- RTC Battery
- Power Button/Power Management
- Reset Button
- mPCIe Socket
- iDoor Expansion Slot
- PCIe Slot
- Antenna Mounting
- Dual Power Input and Remote Power Control
- Audio Jack
- LED Indicators

2.1 Introduction

The following figures show the connectors on the product. The following sections give you information about each peripheral.

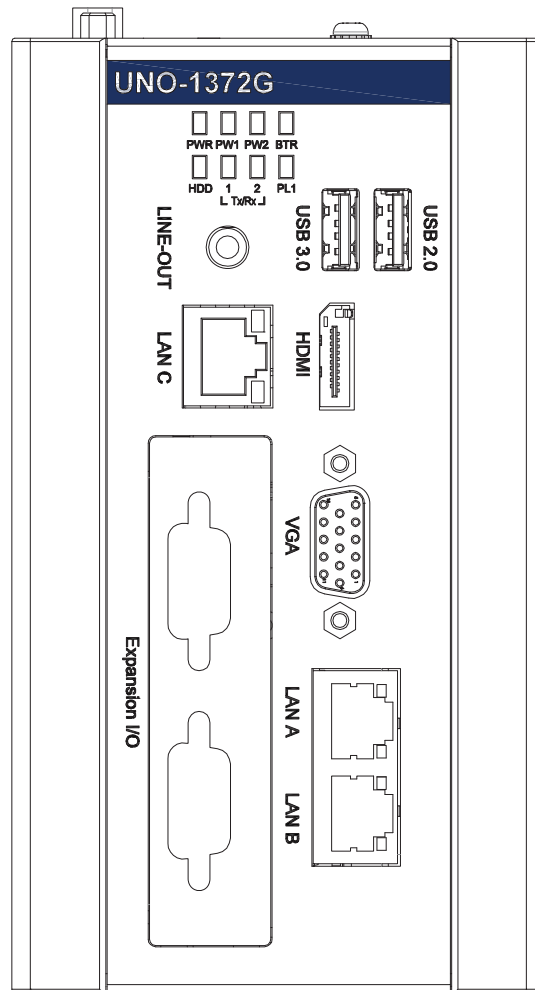


Figure 2.1 Front of UNO-1372G

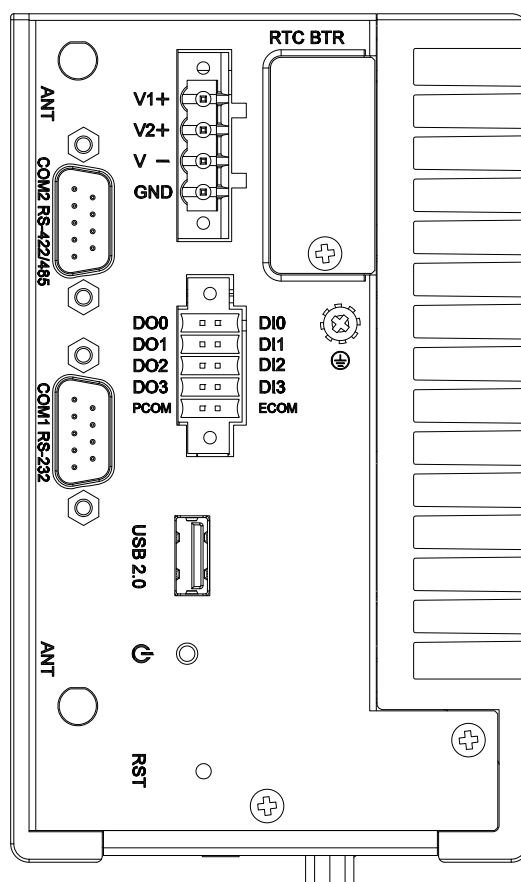


Figure 2.2 Top of UNO-1372G

2.1.1 System Hardware

- **CPU:** Intel Atom E3845 1.91GHz, 2MB L2 Cache
- **Memory:**
 - 4G DDR3L SDRAM burn-in,
 - Transcend/AQD-SD3L4GN16-SG 4GB
- **Storage:** One drive bay for SATA 2.5" HDD (Compatible with 9.5mm high HDDs)
- **Display:** 1 × VGA 1920*1200, 1 × HDMI 1920 x 1200, supports 2 independent displays
- **Expansion Slots:** 2 x Full-size mPCIe slot, 1x mSATA (Full-size)

2.2 Serial Interface (COM1~COM2)

The UNO-1372G offers one standard RS-232 and RS-422/485 (with cable) serial communication inter-face ports: COM1 ~ COM2.

The IRQ and I/O address range are listed below:

COM1: 3F8h, IRQ4

COM2: 2F8h, IRQ3

2.2.1 RS-232 Interface (COM 1)

The UNO-1372G offers one RS-232 serial communication interface ports: COM1. Please refer to Appendix A.3 for their pin assignments.

2.2.2 Automatic Data Flow Control Function for RS-485

In RS-485 mode, the UNO-1372G 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. More importantly, application software previously written for half duplex RS-232 environments can be maintained without modification.

2.3 LAN: Ethernet Connector

The UNO-1372G is equipped with three Gigabit LAN controller. The controller chip used is the Intel Ethernet controller with that is fully compliant with 802.1Qav, IEEE1588/802.1AS, 802.3az standards. The Ethernet port provides standard RJ-45 jacks on the front I/O and LED indicators in front of the connector to show its status of Link (100Mbps orange LED, 1000Mbps green LED) and Active (flashing green LED) status.

2.4 Power Connector

The UNO-1372G comes with a Phoenix connector that carries 9~36 V_{DC} external power input, and features reversed wiring protection. Therefore, it will not cause any damage to the system by reversed wiring of ground line and power line. Please refer to Appendix A

2.5 USB Connector

The USB interface supports Plug and Play, which enables you to connect or disconnect a device, without turning off the computer. This provides three USB connectors , which gives complete Plug & Play and hot swapping for up to 127 external devices. One of the three connectors are compatible with USB3.0 devices. The USB interface is USB EHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Appendix A for its pin assignment.

2.6 Display Connector

The UNO-1372G provides a HDMI and VGA controller for a high resolution interface. It supports up to full HD resolution for two independent display.

- 1 x VGA, supports 1920 x 1200 @ 60Hz 24bpp
- 1 x HDMI 1.4a, supports 1920 x 1200 @ 60Hz 24bpp

2.7 RTC Battery

The RTC Battery to ensures the setting in BIOS and system clock can be kept, even with power disconnected for a short time.

- **Type:** BR2032 (Using CR2032 is NOT recommended)
- **Output Voltage:** 3 V_{DC}
- **Location:** Top side removable cover named RTC BTR

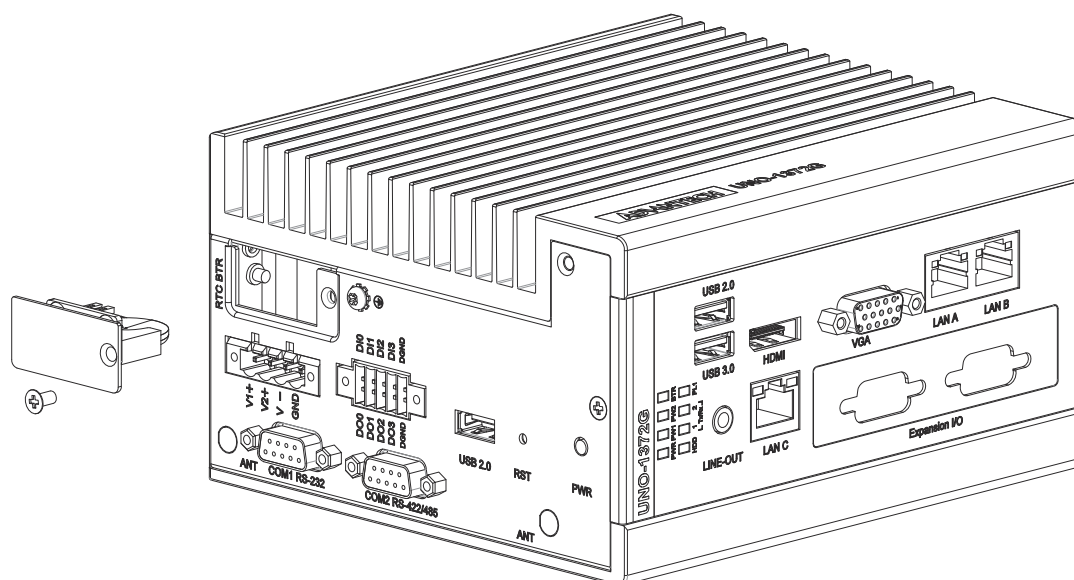


Figure 2.3 RTC Battery Location

2.8 Power Button/Power Management

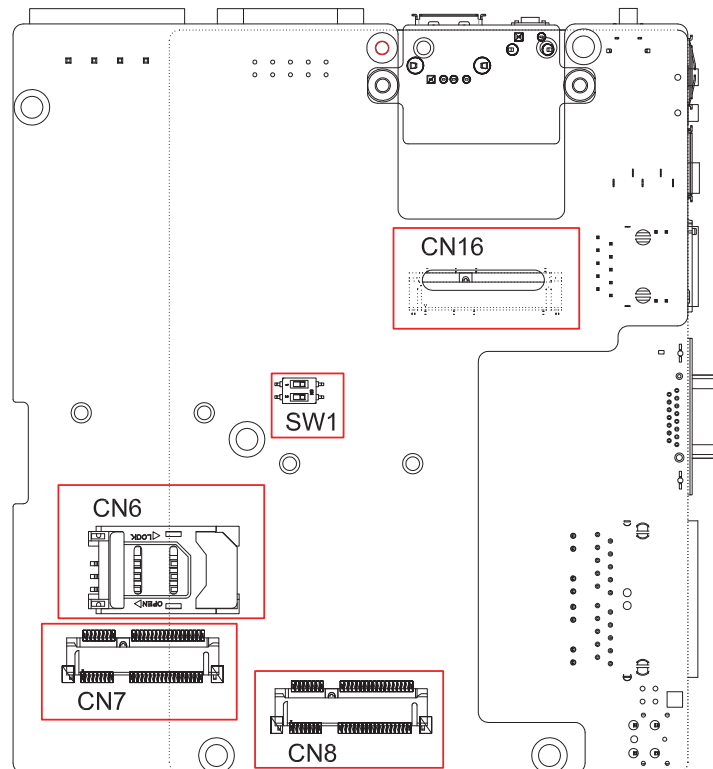
Press the "PWR" button to power on or power off (ATX type). This product supports the ACPI (Advanced Configuration and Power Interface). As well as power on/off, it supports multiple suspend modes, such as Power on Suspend (S1), Suspend to RAM (S3), Suspend to Disk (S4).

2.9 Reset Button

Press the "Reset" button to activate the hardware reset function.

2.10 PCI Express Mini Card Socket

There are three sockets for full size PCI Express mini cards. The first interface (CN16) on bottom board is for mSATA and the second (CN8) interface is mainly target to support iDoor technology/module for diversified application such as isolated COM port, Profibus, WLAN GPRS, 3G, MRAM and soon. Users can install the card easily by using the optional kit, please refer to Chapter 3 for details. An additional SIM card slot is used for 3G applications with CN7. Note, you still require a 3G Mini-PCIe module installed to be able to use 3G functions. The third one (CN7) is a full-size mini PCIe card which can be installed with Wi-Fi, Bluetooth, GPS modules for example.



2.11 iDoor Expansion Slot

At the front side, there's a iDoor Expansion slot that provide user to install mPCIe modules to extend extra I/O port for specific application, like Isolation COM, Digital I/O, CANOpen modules.

2.12 Antenna Mounting

This product offers two antenna mounting holes covered by pre-cut holes for users to install with antenna kit once users need 3G, WiFi or other wireless functions.

2.13 Dual Power Input

In the power connector, there is a secondary power input that helps users plug-in a second power source to prevent main power source failure.

2.14 Audio Jack

This product provides one Line-out port for local alarm functions.

2.15 LED Indicators

There are eight LEDs to indicate the status of the system power, power input 1, power input 2, RTC battery, storage read/write, COM1~2 transmit/receive.

2.16 Digital Input and Output

There are four digital inputs and four digital outputs configured from GPIO pins for most of on/off trigger and status reading.

Digital Input

- Input Channels 4
- Input Voltage (Wet Contact), Configure SW7 to 1,3
 - Logic 0: 0~3 V_{DC}
 - Logic 1: 10~30 V_{DC}
- Input Voltage (Dry Contact), Configure SW7 to 2,4
 - Logic 0: Open
 - Logic 1: Shorted to GND
- Input Current
 - 10 V_{DC} @ 2.67mA
 - 20 V_{DC} @ 5.64mA
 - 30 V_{DC} @ 8.91mA
- Isolation Protection 2,500 V_{DC}
- Overvoltage Protection 30 V_{DC}
- ESD Protection 4KV (Contact), 8KV (Air)
- Opto-Isolator Response 50 μs

Digital Output

- Channels 4
- Output Voltage: 5~30V_{DC}
- Output Capability Sink: 24 mA max./channel
- Opto-Isolator Response 50 μs

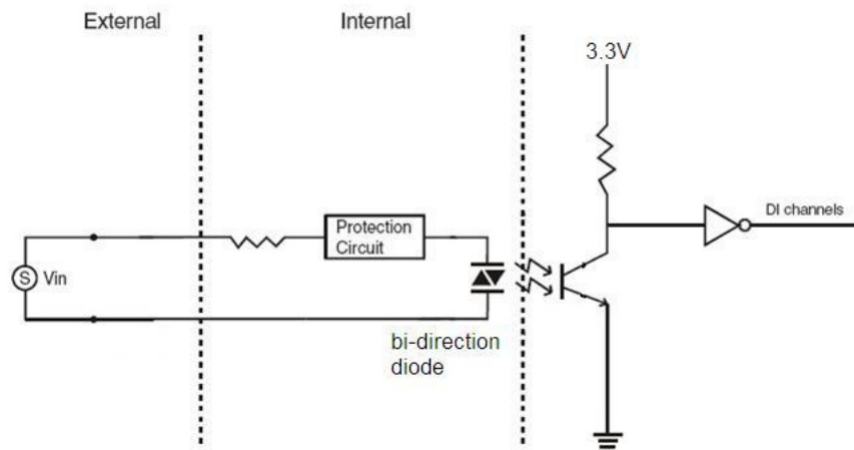


Figure 2.4 Wet Contact Wiring

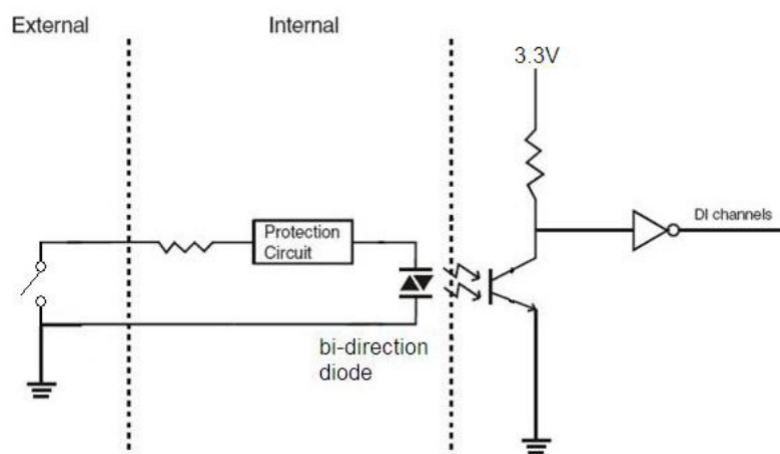


Figure 2.5 Dry Contact Wiring

Chapter 3

Initial Setup

This chapter introduces how to initialize the UNO-1372G.

Sections include:

- Chassis Grounding
- Inserting a mSATA
- Installing a wireless LAN card and Antenna
- Installing iDoor expansion kit
- Installing a Hard Disk
- Connecting Power
- BIOS Setup

3.1 Chassis Grounding

The UNO-1372G provides good EMI protection and a stable grounding base. There is an easy-to-connect chassis grounding point to use.

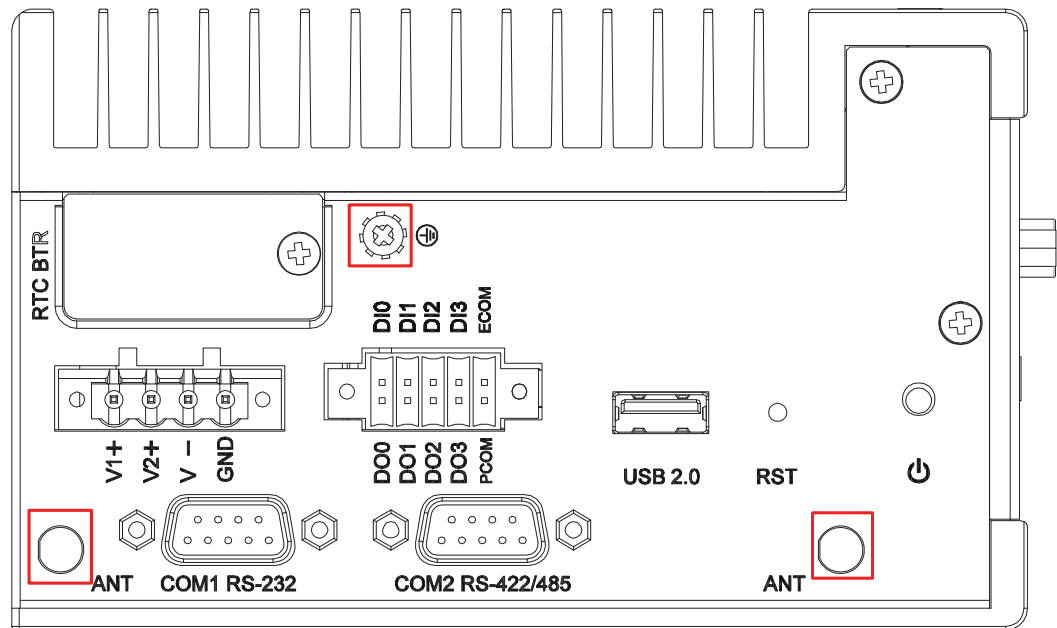


Figure 3.1 Chassis Grounding Connection

Please also note that system ground and chassis ground are separated.

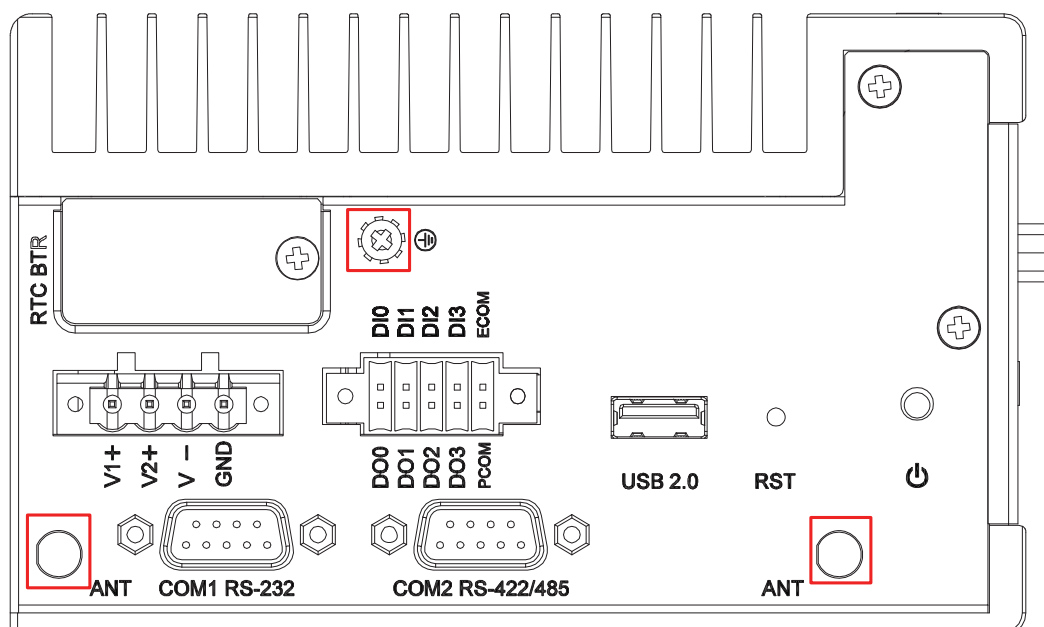
3.2 Inserting a mSATA

1. Remove the power cord.
2. Loosen the four screws in the left cover.
3. Disassemble the USB board with two screws
4. Plug a mSATA card with your OS and application program into the first mPCIe slot.
5. Screw the two screws on board to fix mSATA.
6. Secure the left cover.

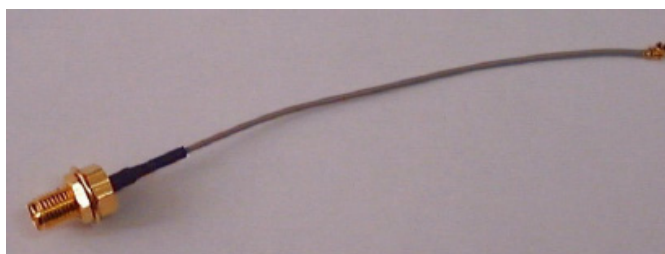
3.3 Installing a Wireless LAN Card and Antenna (optional)

Please contact Advantech to prepare the following optional kit:

Rear Panel for Antenna



- The internal cable: 1750006043 (15cm)



Wireless Module (PCI Express mini card)

- One of the suggested module is EWM-W151H01E which is a verified Wireless IEEE 802.11b/g/n module

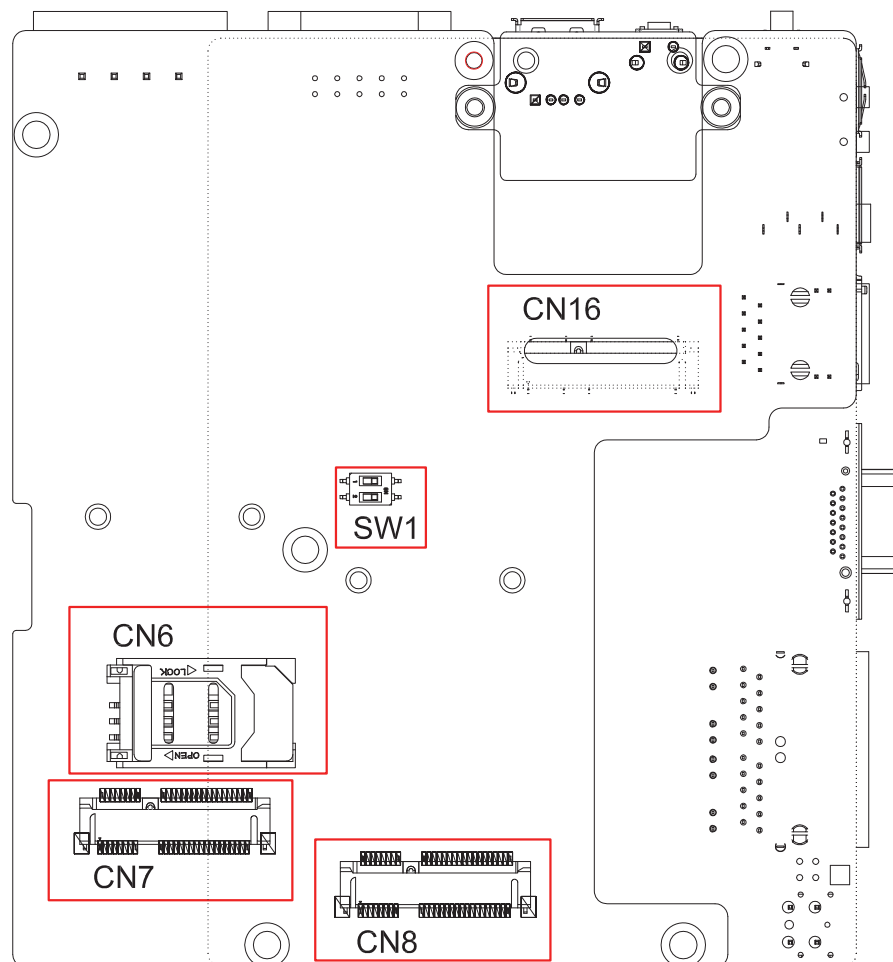
Antenna

- Please select the necessary specification according to your application.
- One of the suggested antenna is 1750002842.



Then follow the below steps for the installation:

1. Unscrew the left cover and open it.
2. Remove the hole(s) on the top panel for antenna installation.
3. Install the internal cable 1750006043 (15cm) on the top panel.
4. Plug the Wireless module onto the PCI Express mini card socket



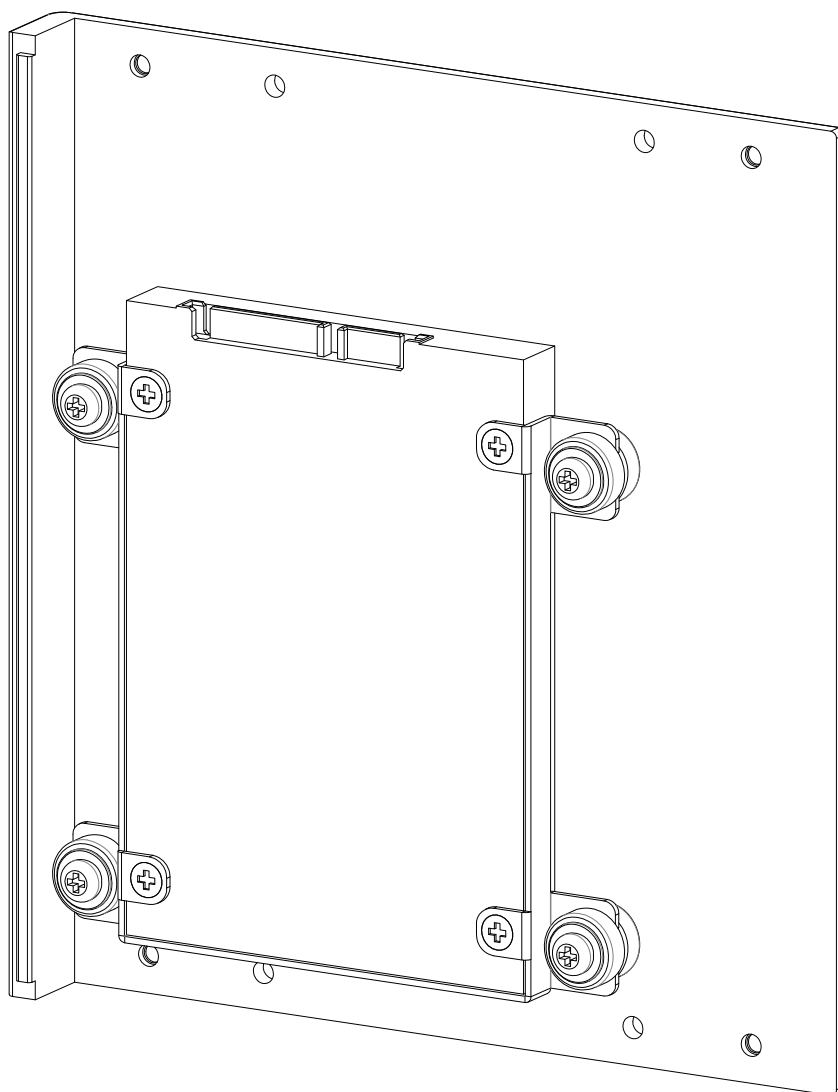
5. Connect the internal cable with the module.
6. Screw back the left cover.
7. Assemble the antenna on the SMA connector.

3.4 Installing a Hard Disk

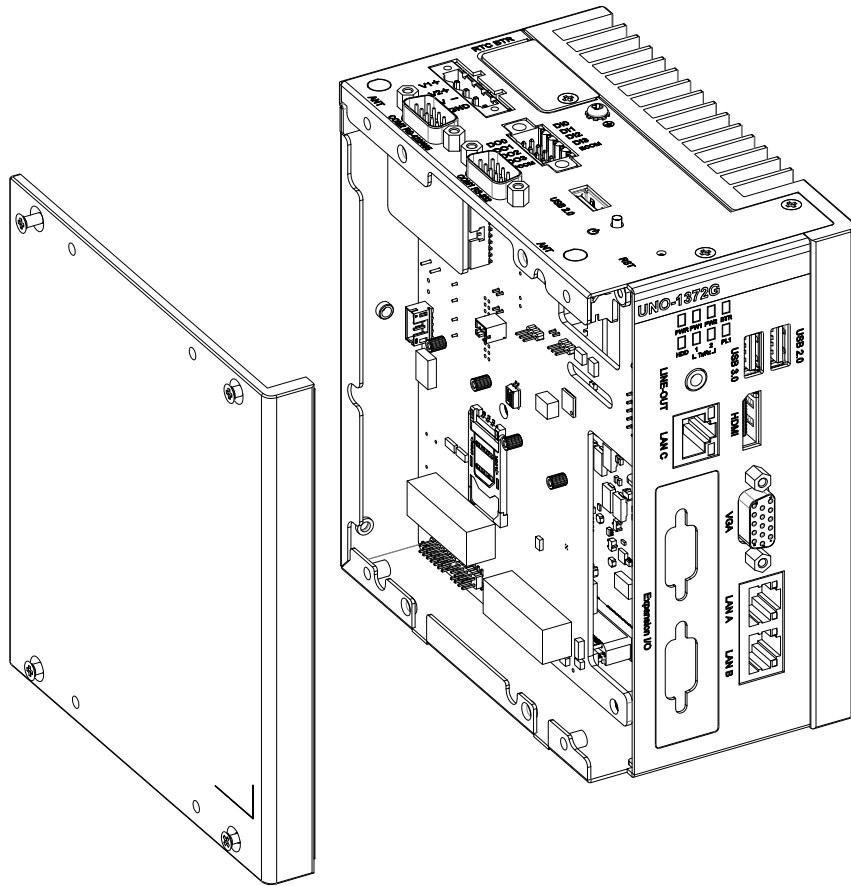
The procedure for installing a hard disk into the UNO-1372G is below. Please follow these steps carefully. Please note the system is not compatible with +12V HDD.

Please use an HDD with lower power input.

1. Remove the power cord.
2. Unscrew the four screws from the left cover.
3. Screw HDD to the left cover.



4. Screw back the left cover with four screws.



3.5 BIOS Setup

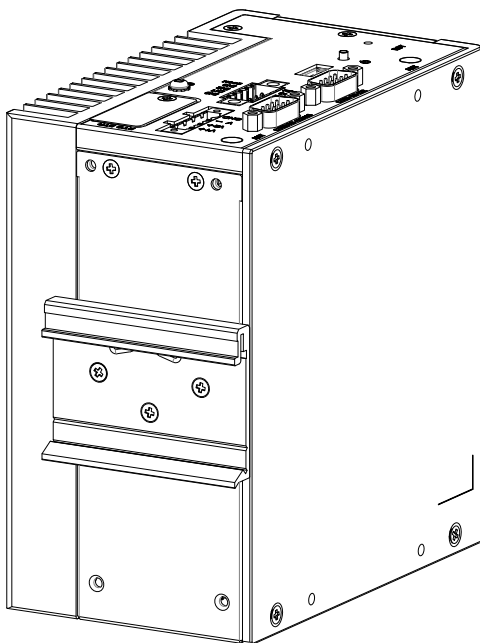
Press “F2” in the boot-up screen to enter the BIOS setup utility. Please follow the instruction on the screen to do the necessary settings.

Please note that you can try to “Restore Defaults” from the BIOS Setup manual if the UNO-1372G does not work properly.

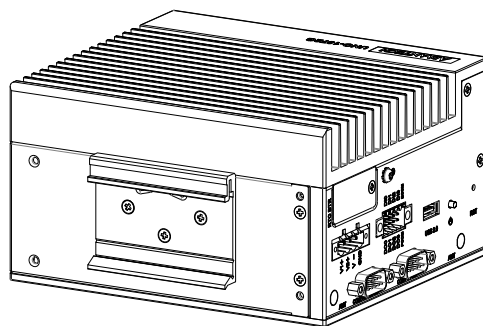
3.6 Din Rail Kit Assembly

The UNO-1372G supports Din-Rail and wall mounting. The assembly instructions are below.

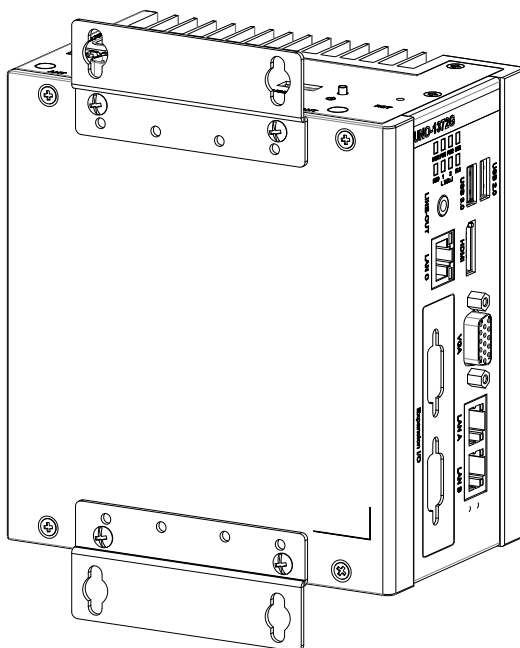
a. vertical Din-Rail



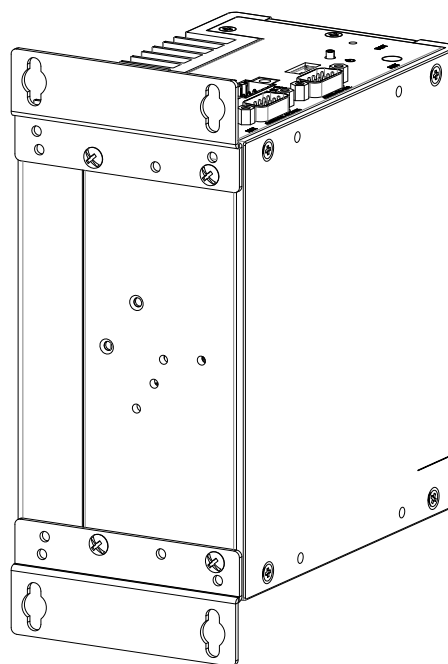
b. horizontal Din-Rail



c. wall mount (left side)



d. wall mount (back side)



3.7 Connecting Power

Connect the UNO-1372G to a 9~36 V_{DC} power source. The power source can either be from a power adapter or an in-house power source.

Appendix **A**

System Settings and Pin Assignments

A.1 System I/O Address and Interrupt Assignment

Table A.1: Interrupt Assignments

Interrupt No.	Interrupt Source
NMI	Parity Error Detected
IRQ 0	Interval timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 3	COM 2
IRQ 4	COM 1
IRQ 8	Real-time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 16	LAN
IRQ 17	USB
IRQ 18	USB and graphics
IRQ 19	HD audio and SATA
IRQ 7	Watchdog

A.2 Board Connectors and Jumpers

There are several connectors and jumpers on the inside board. The following sections tell you how to configure the hardware setting. Figure A.1 shows the locations the connectors and jumpers.

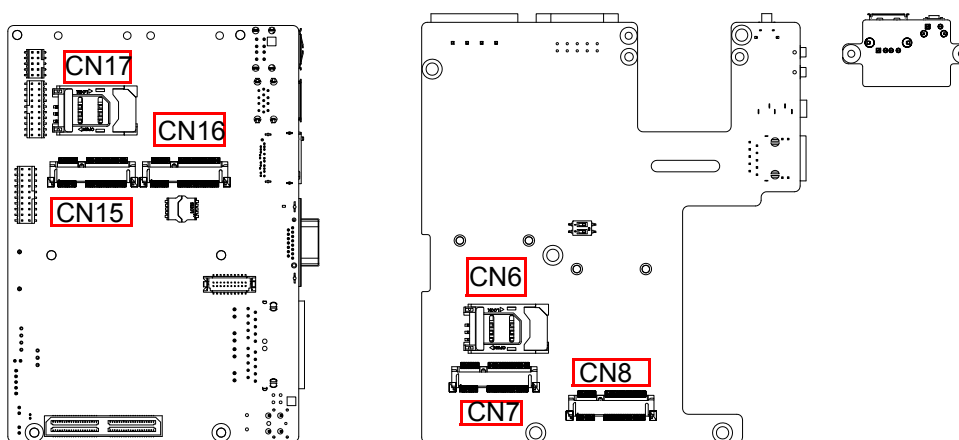


Figure A.1 Connector & Jumper Locations (front)

Table A.2: Connectors and Jumpers

Label	Function
CN16	mPCIe Slot for mSATA
CN7, CN8	mPCIe slot (support iDoor technology).
CN15	mPCIe with height limited
CN17	SIM card slot for CN15
CN6	SIM card slot for CN7

A.3 RS-232 Standard Serial Port (COM1)

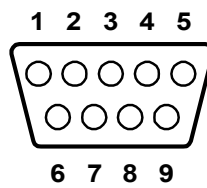


Table A.3: RS-232 Serial Port Pin Assignments

Pin	Pin Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

A.4 RS-422/485 Serial Port (COM2)

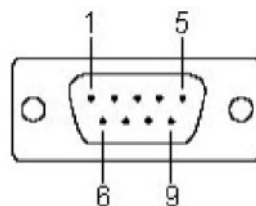


Table A.4: RS-422/485 Serial Port Pin Assignments

Pin	RS-422	RS-485
1	TX-	Data-
2	TX+	Data+
3	RX+	NC
4	RX-	NC
5	GND	GND
6	NC	NC
7	NC	NC
8	NC	NC
9	NC	NC

A.5 Power Connector (PWR)

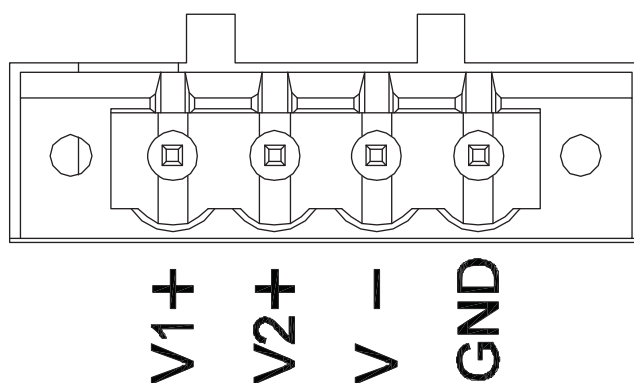


Table A.5: Power connector pin assignments

1 V1+	9~36 V _{DC} Input 1
2 V2+	9~36 V _{DC} Input 2
3 V-	Power Ground
4 GND	Chassis Ground
5 Remote	Power Button
6 Remote	System Reset
7 Remote	Remote Ground

A.6 USB Connector

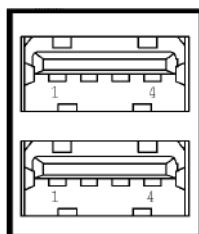


Table A.6: USB 2.0 Connector Pin Assignments

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

A.7 HDMI Display Connector

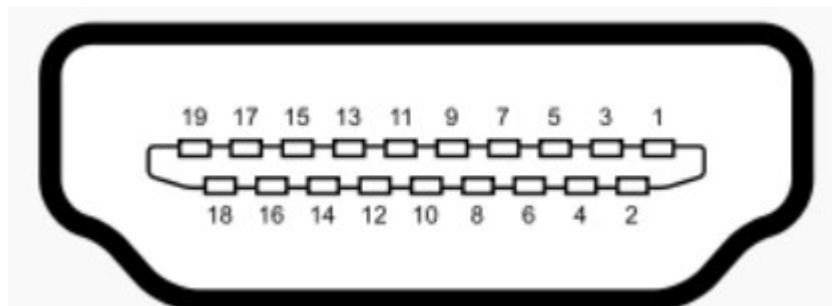


Table A.7: HDMI Adaptor Cable Pin Assignment

Pin	Signal Name
1	TMDS Data2+
2	TMDS Data2 Shield
3	TMDS Data2-
4	TMDS Data1+
5	TMDS Data1 Shield
6	TMDS Data1-
7	TMDS Data0+
8	TMDS Data0 Shield
9	TMDS Data0-
10	TMDS Clock+
11	TMDS Clock Shield
12	TMDS Clock-
13	CEC
14	Reserved
15	SCL
16	SDA
17	DDC/CEC/HEC Ground
18	+5 V Power (max 50 mA)
19	Hot Plug Detect

A.8 Clear CMOS (JP2)

This jumper of the board and is used to erase CMOS data and reset system BIOS information.

Follow the procedures below to clear the CMOS.

1. Turn off the system.
2. Move the jumper to PIN 2-3 to clear CMOS
3. Move the jumper back to PIN 1-2
4. Turn on the system. The CMOS is now cleared.
5. Turn on the system. The BIOS is reset to its default setting.

Note! *An alternative method of clearing the CMOS data is to remove the RTC battery.*



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