

**SYM86601VGGA-H310**  
**ATX Industrial Motherboard**  
**User's Manual**

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## Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

## FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B 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 residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

### Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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## Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

## Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



### **Important:**

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

## Safety Measures

To avoid damage to the system:

- Use the correct AC input voltage range.

To reduce the risk of electric shock:

- Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

## About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- One SYM86601VGGA-H310 motherboard
- One COM port cable (with Bracket, Length: 300mm, 2 x COM ports)
- One Serial ATA data cable (Length: 500mm)
- One I/O shield

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

## Optional Items

- USB 2.0 port cable (Length: 350mm)
- USB 3.1 Gen1 port cable (Length: 320mm)
- USB 3.1 Gen2 port cable (Length: TBD)
- D-SUB cable (with Bracket, Length: 300mm, 2 x COM ports)
- Serial ATA data cable (with Lock, Length: 500mm)
- Thermal solution (For 35W, Height: 37.3mm)
- Thermal solution (For 65W, Height: 72.8mm)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

## Before Using the System Board

Before using the system board, prepare basic system components.

If you are installing the system board in a new system, you will need at least the following internal components.

- A CPU
- Memory module
- Storage devices such as hard disk drive, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

# Chapter 1 - Introduction

## Specifications

<b>SYSTEM</b>	Processor	8th Generation Intel® Core™/Pentium®/Celeron® LGA 1151 Socket Processors with TDP up to 95W
	Chipset	SYM86601VGGA- H310: Intel H310 Chipset
	Memory	SYM86601VGGA-H310: Two 288-pin DIMM up to 32GB, Dual Channel DDR4 2400/2666MHz
	BIOS	AMI SPI 128Mbit
<b>GRAPHICS</b>	Controller	Intel® HD Gen 9 Graphics
	Feature	OpenGL 5.0, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9
	Display	1 x VGA 1 x DVI-I (DVI-D signal) 1 x DP++ VGA: resolution up to 1920x1200 @ 60Hz DVI-D: resolution up to 1920x1200 @ 60Hz DP++: resolution up to 4096x2160 @ 60Hz
	Triple Displays	VGA + DVI-I (DVI-D signal) + DP++
<b>EXPANSION</b>	Interface	CS630-H310: 1 x PCIe x16 (Gen 3) 1 x PCIe x4 (Gen 2) 5 x PCI CS630-Q370: 1 x PCIe x16 (Gen 3) 1 x PCIe x4 (Gen 3) 5 x PCI 1 x mPCIe (supports mSATA) 1 x M.2 2260/2280 M key (PCIe Gen3 x 4 NVMe)
<b>AUDIO</b>	Audio Codec	Realtek ALC888
<b>ETHERNET</b>	Controller	CS630-H310: 1 x Intel® I211AT PCIe (10/100/1000Mbps) 1 x Intel® I219V LAN Phy (10/100/1000Mbps) CS630-Q370: 1 x Intel® I211AT PCIe (10/100/1000Mbps) 1 x Intel® I219LM LAN Phy with iAMT12.0 (10/100/1000Mbps) (only Core i7/i5 supports iAMT)
<b>REAR I/O</b>	Ethernet	2 x GbE (RJ-45)
	USB	4 x USB 3.1 Gen1 2 x USB 2.0
	Serial	1 x RS-232/422/485 (RS-232 with power) (DB-9)
	PS/2	1 x PS/2 (mini-DIN-6)

<b>REAR I/O</b>	Display	1 x VGA 1 x DVI-I (DVI-D signal) 1 x DP++
	Audio	1 x Line-out 1 x Mic-in 1 x Line-in (opt., MOQ required)
<b>INTERNAL I/O</b>	Serial	1 x RS-232/422/485 (RS-232 with power) (2.54mm pitch) 4 x RS-232 (2.54mm pitch)
	USB	CS630-H310: 4 x USB 2.0 (2.54mm pitch) or 2 x USB 2.0 (2.54mm pitch) + 1 x Vertical USB 2.0 (type A) (opt.) CS630-Q370: 2 x USB 3.1 Gen 2 (2.00mm pitch) 4 x USB 2.0 (2.54mm pitch) or 2 x USB 2.0 (2.54mm pitch) + 1 x Vertical USB 2.0 (type A) (opt.)
	Audio	1 x S/PDIF 1 x Front Audio Header
	SATA	CS630-H310: 4 x SATA 3.0 (up to 6Gb/s) CS630-Q370: 5 x SATA 3.0 (up to 6Gb/s) RAID 0/1/5/10
	DIO	1 x 8-bit DIO
	LPC	1 x LPC
	SMBus	1 x SMBus
<b>WATCHDOG TIMER</b>	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
<b>SECURITY</b>	TPM	Infineon TPM2.0/1.2 (opt., MOQ required)
<b>POWER</b>	Type	ATX
	Connector	8-pin ATX 12V power 24-pin ATX power
	RTC Battery	CR2032 Coin Cell
<b>OS SUPPORT</b>		Windows 10 IoT Enterprise 64-bit Linux: Ubuntu 18.04
<b>ENVIRONMENT</b>	Temperature	Operating: -10 to 60°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
<b>MECHANICAL</b>	Dimensions	ATX Form Factor 305mm (12") x 244mm (9.6")

## Features

### ● Watchdog Timer

The Watchdog Timer function allows your application to regularly “clear” the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

### ● DDR4

DDR4 delivers increased system bandwidth and improves performance. The advantages of DDR4 provide an extended battery life and improve the performance at a lower power than DDR3/DDR2.

### ● Graphics

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 1 x VGA, 1 x DVI-I (DVI-D signal) and 1 x DP++ interfaces for display outputs.

### ● PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The PCI Express architecture also supports high performance graphics infrastructure by enhancing the capability of a PCIe x16 Gen 3 at 16GB/s bandwidth.

### ● Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

### ● Gigabit LAN

Intel® I211AT PCIe and Intel® I219V LAN Phy controllers support up to 1Gbps data transmission for SYM86601VGGA-H310. Intel® I211AT PCIe and Intel® I219LM controllers support up to 1Gbps data transmission for SMY86601VGGA-Q370.

### ● Audio

The Realtek ALC888S-VD2-GR audio codec provides 5.1-channel High Definition audio output.

### ● Wake-On-PS/2

This function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system.

**Important:**

The 5V\_standby power source of your power supply must support  $\geq 720\text{mA}$ .

### ● Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

**Important:**

The 5V\_standby power source of your power supply must support  $\geq 720\text{mA}$ .

### ● Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

**Important:**

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the 5V\_standby power source of your power supply must support  $\geq 1.5\text{A}$ . For 3 or more USB ports, the 5V\_standby power source of your power supply must support  $\geq 2\text{A}$ .

### ● RTC Timer

The RTC installed on the system board allows your system to automatically power-on on the set date and time.

### ● ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting “Standby” when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating session will resume exactly where you left off the next time you power-on the system.

**Important:**

The 5V\_standby power source of your power supply must support  $\geq 720\text{mA}$ .

- **Power Failure Recovery**

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

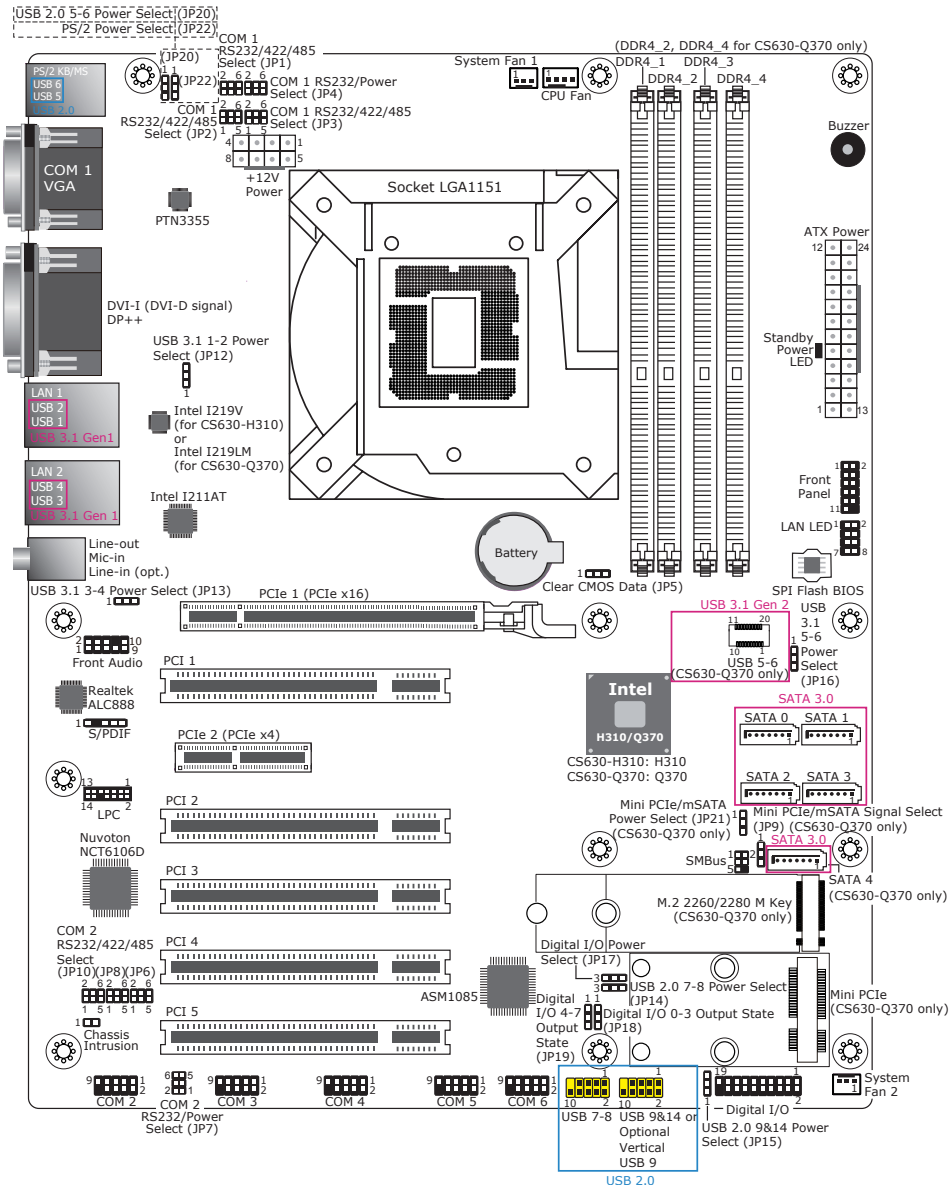
- **USB**

The system board supports the new USB 3.1 Gen 2. It is capable of running at a maximum transmission speed of up to 10 Gbit/s (1.2 GB/s) and is faster than USB 3.1 Gen 1 (5 Gbit/s, or 625 MB/s), USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.1 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.



# Chapter 2 - Hardware Installation

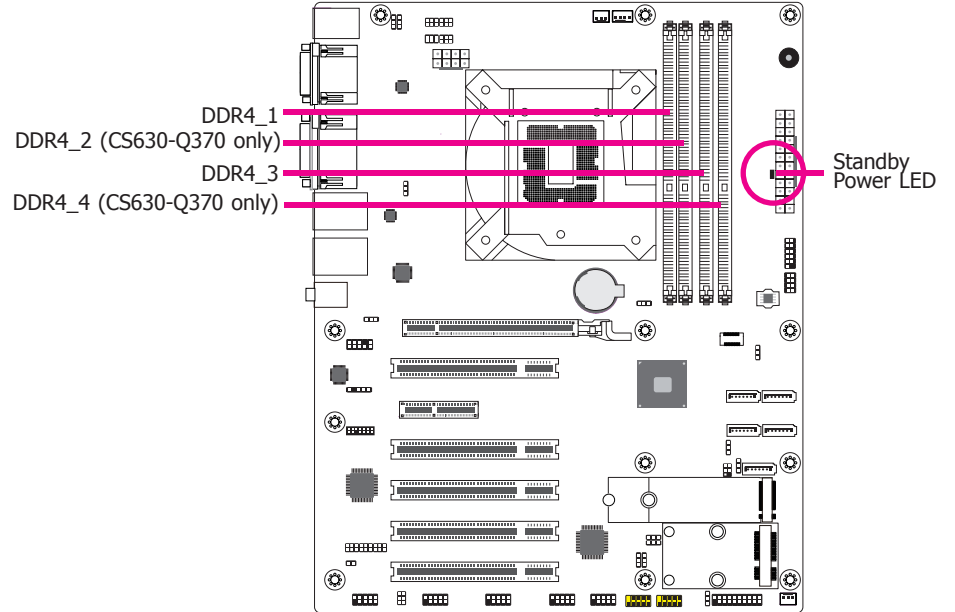
## Board Layout



**Important:** Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

## System Memory

**Important:** When the Standby Power LED lit red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.



## Features

- Two 288-pin DIMM up to 32GB (CS630-H310)  
Four 288-pin DIMM up to 64GB (CS630-Q370)
- Dual Channel DDR4 2400/2666 Mhz

The system board supports the following memory interface.

### Single Channel (SC)

Data will be accessed in chunks of 64 bits (8B) from the memory channels.

### Dual Channel (DC)

Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

<b>Single Channel</b>	DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.
<b>Dual Channel</b>	DIMMs of the same memory configuration are on different channels.

## Installing the DIMM Module



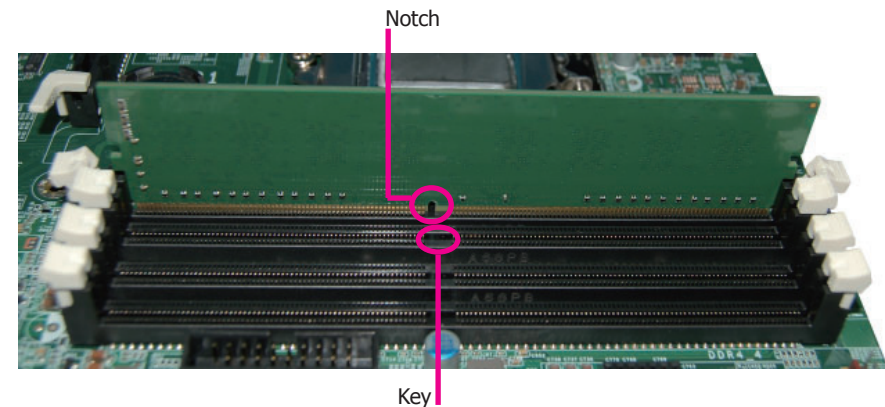
### Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the DIMM socket on the system board.
4. Push the "ejector tabs" at the ends of the socket to the side.



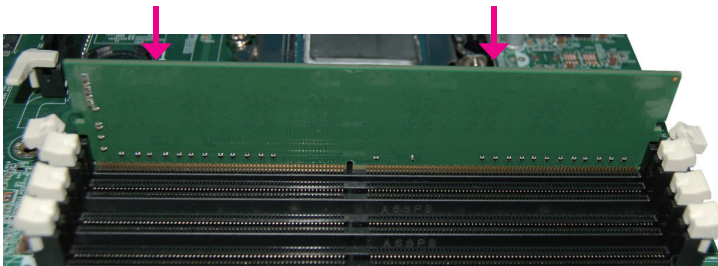
5. Note how the module is keyed to the socket.



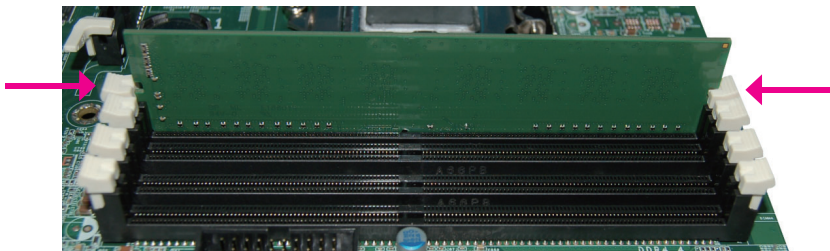
6. Grasping the module by its edges, position the module above the socket with the “notch” in the module aligned with the “key” on the socket. The keying mechanism ensures the module can be plugged into the socket in only one way.



7. Seat the module vertically, pressing it down firmly until it is completely seated in the socket.



8. The ejector tabs at the ends of the socket will automatically snap into the locked position to hold the module in place.



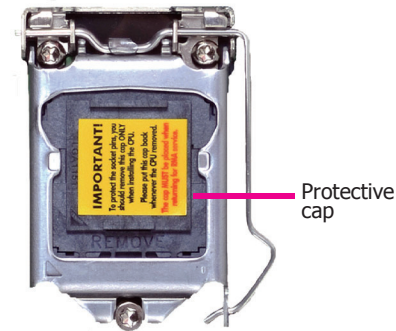
## CPU

The system board is equipped with a surface mount LGA 1151 socket. This socket is exclusively designed for installing a LGA 1151 packaged Intel CPU.



### Important:

1. Before you proceed, make sure (1) the LGA 1151 socket comes with a protective cap, (2) the cap is not damaged and (3) the socket's contact pins are not bent. If the cap is missing or the cap and/or contact pins are damaged, contact your dealer immediately.
2. Make sure to keep the protective cap. RMA requests will be accepted and processed only if the LGA 1151 socket comes with the protective cap.

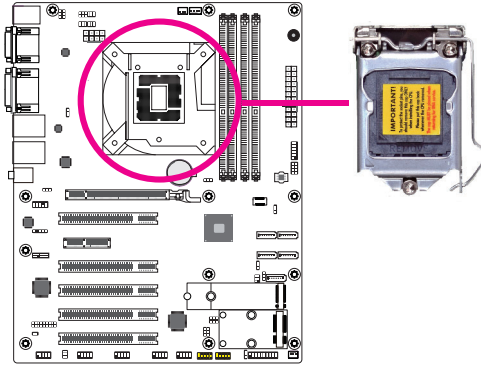


### Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

## Installing the CPU

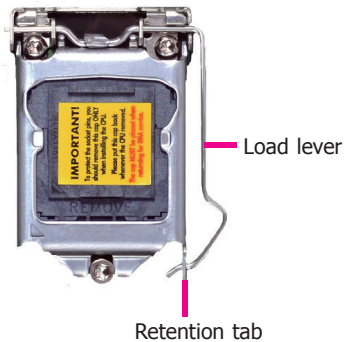
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the LGA 1151 CPU socket on the system board.



### Important:

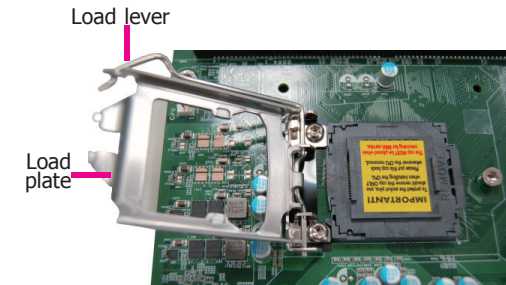
The CPU socket must not come in contact with anything other than the CPU. Avoid unnecessary exposure. Remove the protective cap only when you are about to install the CPU.

4. Unlock the socket by pushing the load lever down, moving it sideways until it is released from the retention tab; then lift the load lever up.

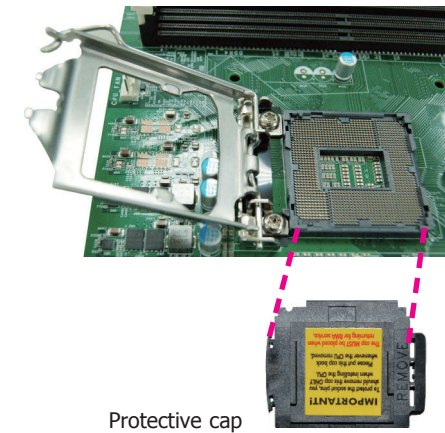


5. Lift the load lever to lift the load plate.

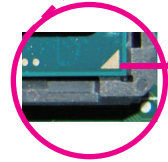
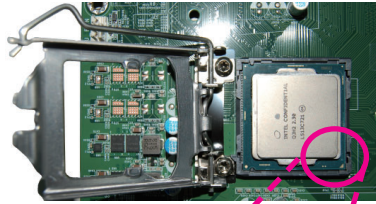
Lift the load lever up to the angle shown on the photo.



6. Remove the protective cap from the CPU socket. The cap is used to protect the CPU socket against dust and harmful particles. Remove the protective cap only when you are about to install the CPU.

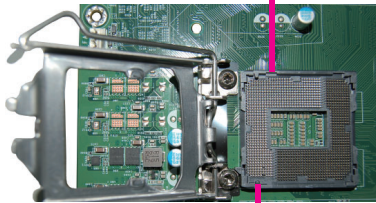


7. Insert the CPU into the socket. The gold triangular mark on the CPU must align with the corner of the CPU socket shown on the photo.



Gold triangular mark

The CPU's notch will properly fit into the socket's alignment key.



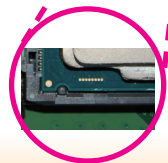
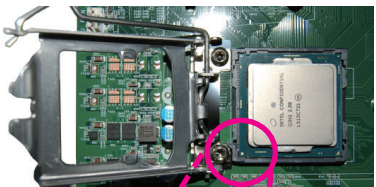
Alignment key

Alignment key



**Important:**

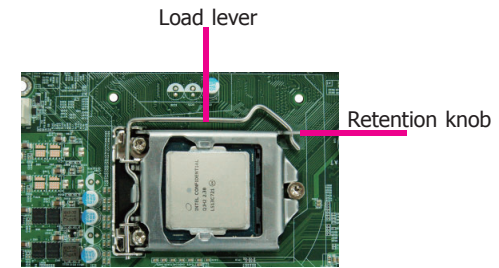
The CPU will fit in only one orientation and can easily be inserted without exerting any force.



8. Close the load plate then push the load lever down.

While closing the load plate, make sure the front edge of the load plate slides under the retention knob.

9. Hook the load lever under the retention tab.



## Installing the Fan and Heat Sink

The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.



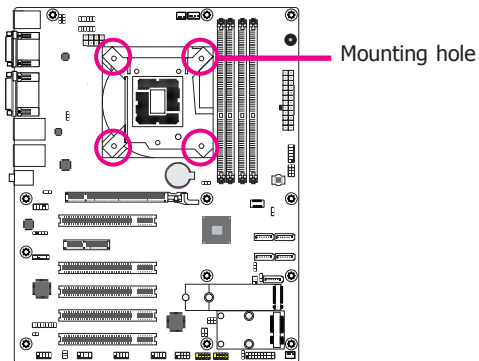
### Note:

A boxed Intel® processor already includes the CPU fan and heat sink assembly. If your CPU was purchased separately, make sure to only use Intel®-certified fan and heat sink.

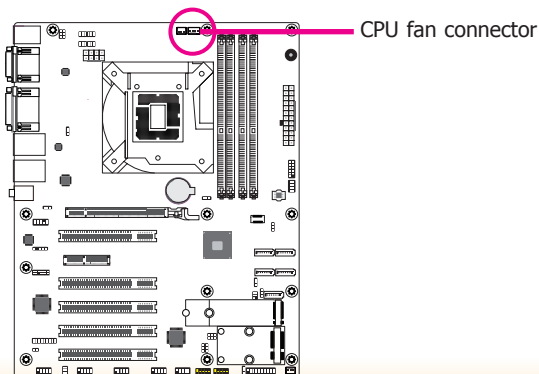
1. Before you install the fan / heat sink, you must apply a thermal paste onto the top of the CPU. The thermal paste is usually supplied when you purchase the fan / heat sink assembly. Do not spread the paste all over the surface. When you later place the heat sink on top of the CPU, the compound will disperse evenly.

Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan / heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the fan / heat sink on top of the CPU.

2. Place the heat sink on top of the CPU. The 4 push-pins around the heat sink, which are used to secure the heat sink onto the system board, must match the 4 mounting holes around the socket.

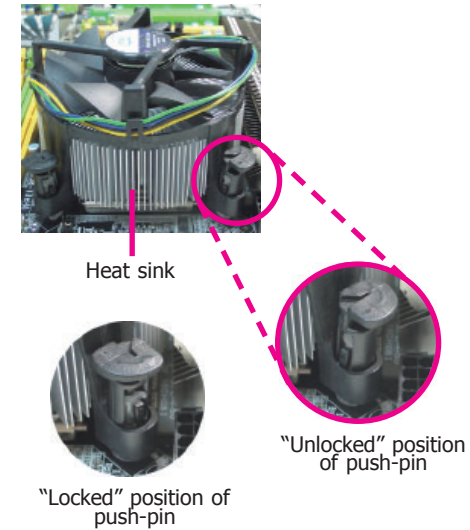


3. Orient the heat sink such that the CPU fan's cable is nearest the CPU fan connector.

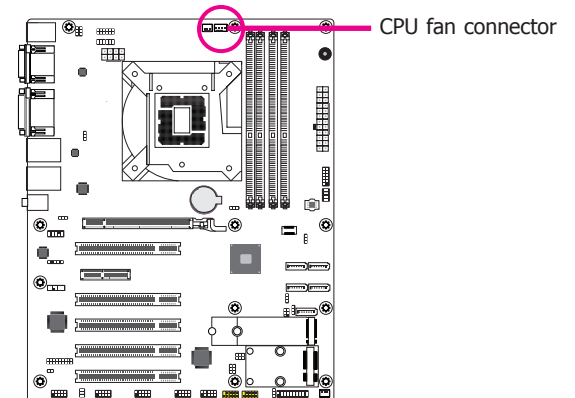


4. Rotate each push-pin according to the direction of the arrow shown on top of the pin.

Push down two pushpins that are diagonally across the heat sink. Perform the same procedure for the other two push-pins.

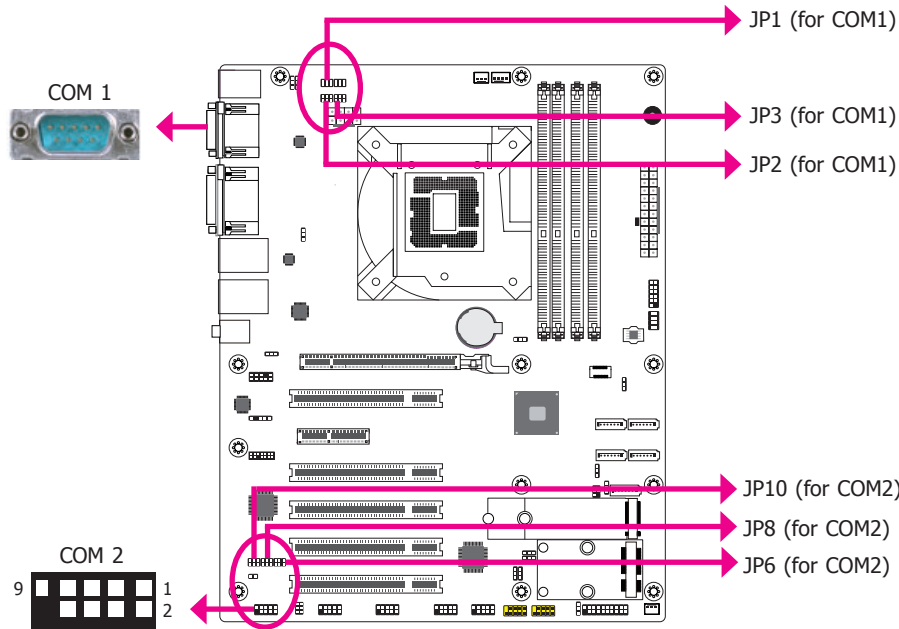


5. Connect the CPU fan's cable to the CPU fan connector on the system board.

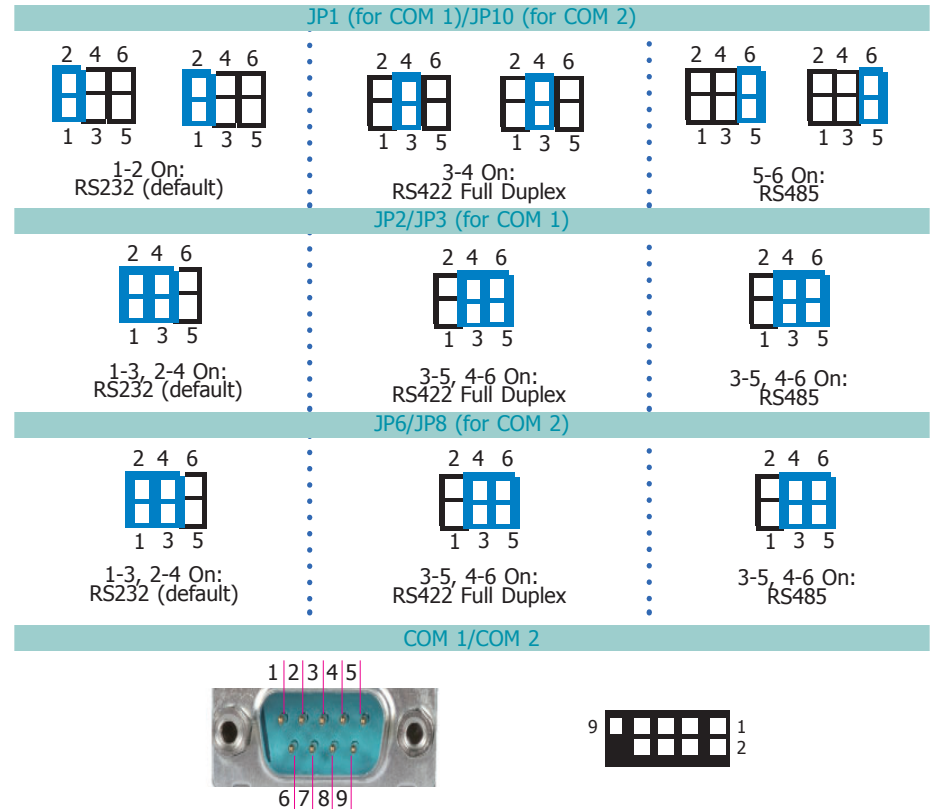


### Jumper Settings

#### COM1/COM2 RS232/422/485 Select

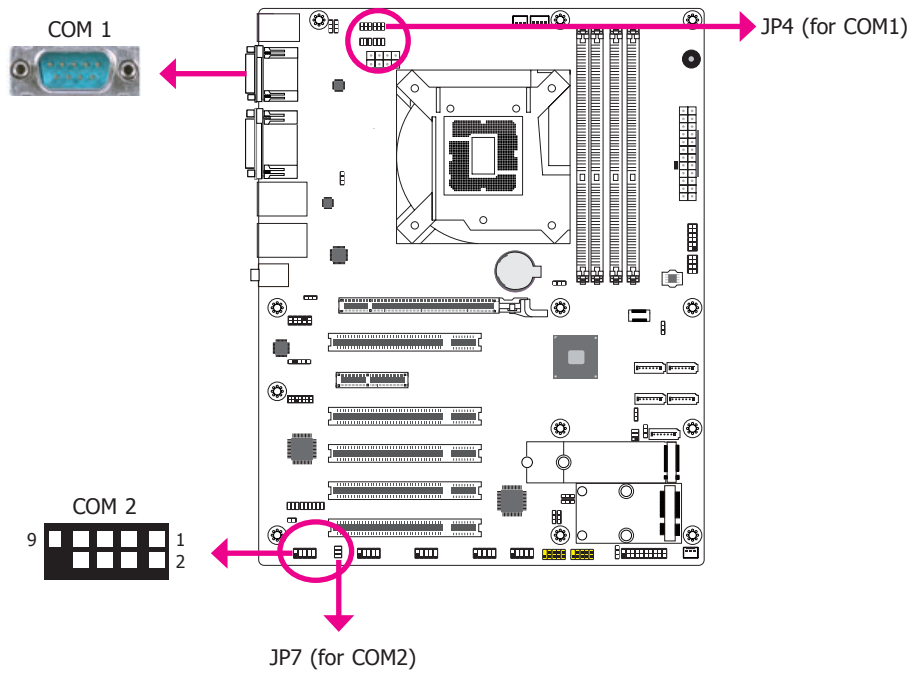


JP1/JP2/JP3 (for COM1) and JP6/JP8/JP10 (for COM2) are used to configure the COM ports to RS232, RS422 (Full Duplex) or RS485. When COM 1 RS232/422/485 is selected, JP2 and JP3 must be set in accordance to JP1. When COM 2 RS232/422/485 is selected, JP6 and JP8 must be set in accordance to JP10. The pin functions of the COM ports will vary according to the jumpers' setting.

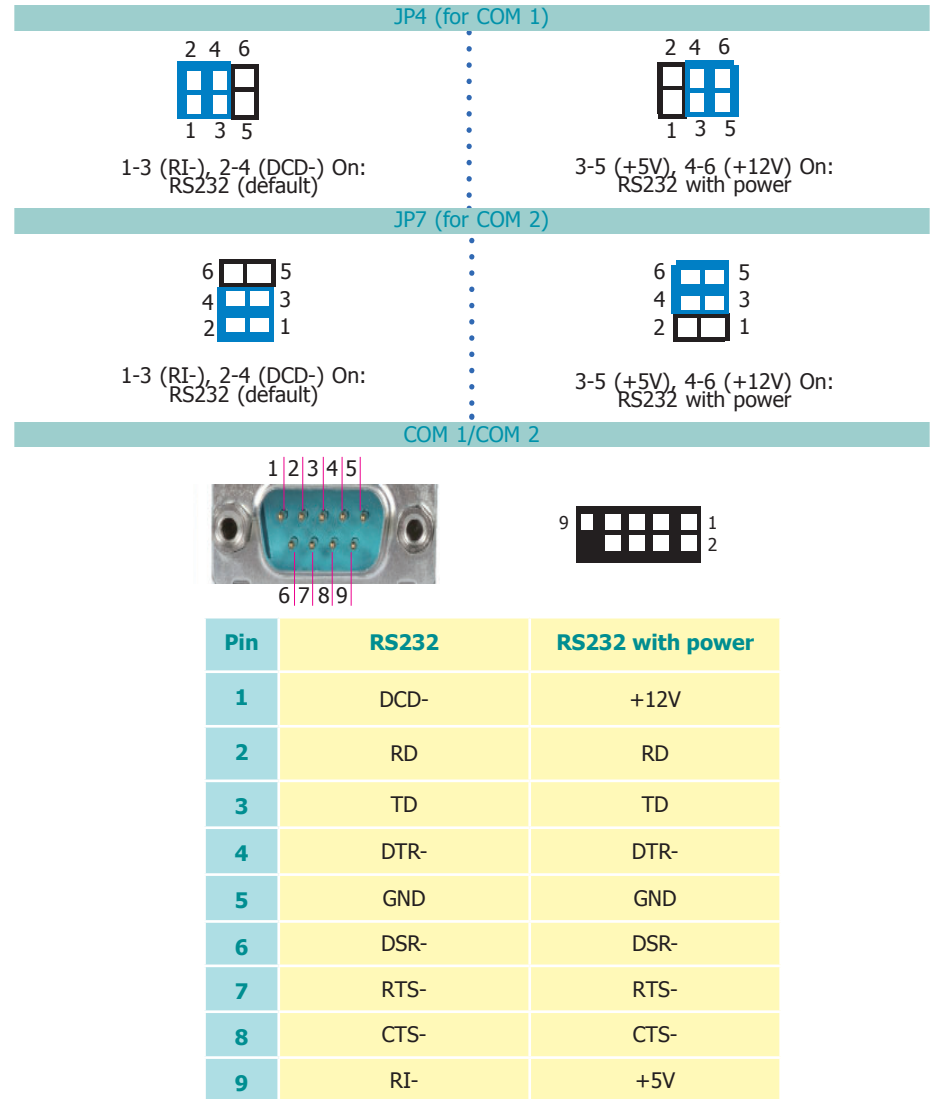


Pin	RS232	RS422 Full Duplex	RS485
1	DCD-	RXD+	DATA+
2	RD	RXD-	DATA-
3	TD	TXD+	N.C.
4	DTR-	TXD-	N.C.
5	GND	GND	GND
6	DSR-	N.C.	N.C.
7	RTS-	N.C.	N.C.
8	CTS-	N.C.	N.C.
9	RI-	N.C.	N.C.

## COM1/COM2 RS232/Power Select

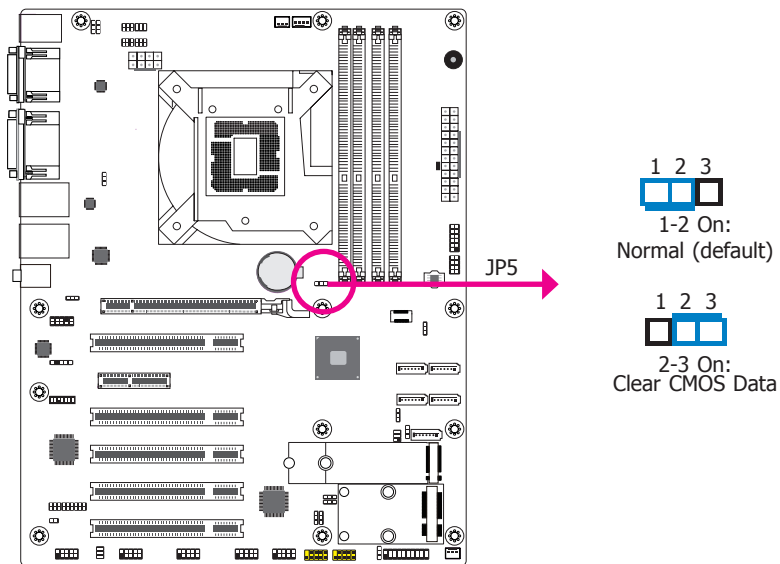


JP4 (for COM 1) and JP7 (for COM 2) are used to configure Serial COM ports to pure RS232 or RS232 with power. The pin functions of COM 1 and COM 2 will vary according to JP4's and JP7's settings respectively.





### Clear CMOS Data



If you encounter the followings,

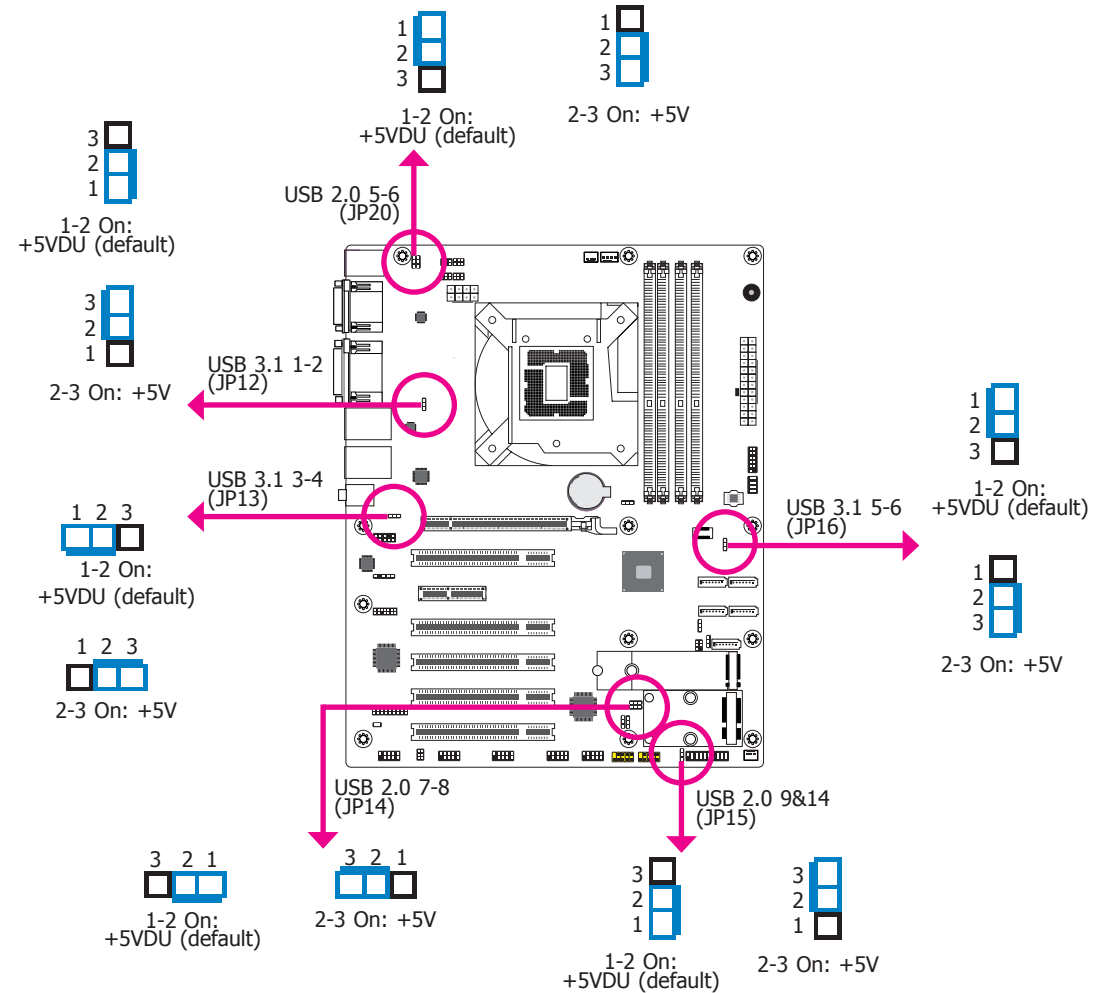
- a) CMOS data becomes corrupted.
- b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.
2. Set JP5 pins 2 and 3 to On. Wait for a few seconds and set JP5 back to its default setting, pins 1 and 2 On.
3. Now plug the power cord and power-on the system.

### USB Power Select



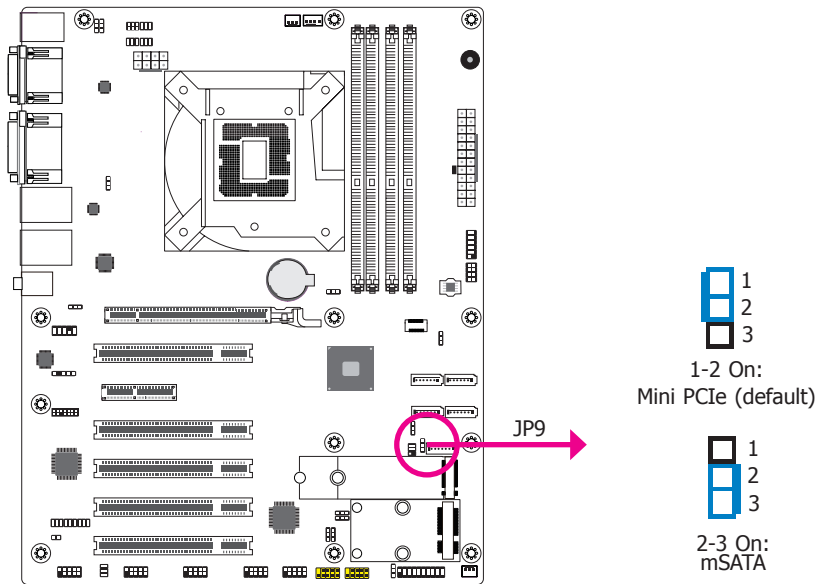
JP12, JP13, JP14, JP15, JP16 and JP20 are used to select the power of the USB ports. Selecting +5VSDU will allow you to use a USB device to wake up the system.



**Important:**

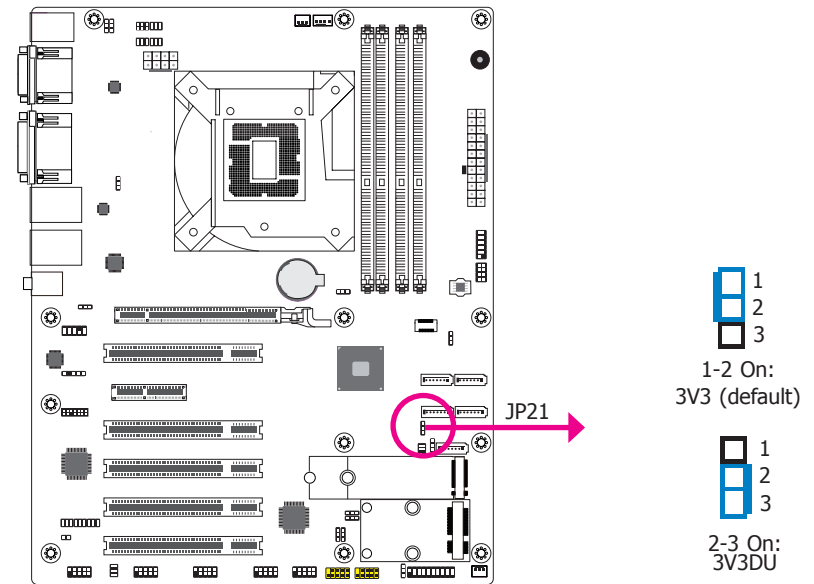
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V\_standby power source of your power supply must support  $\geq 1.5A$ . For 3 or more USB ports, the +5V\_standby power source of your power supply must support  $\geq 2A$ .

## Mini PCIe/mSATA Signal Select (for CS630-Q370 only)



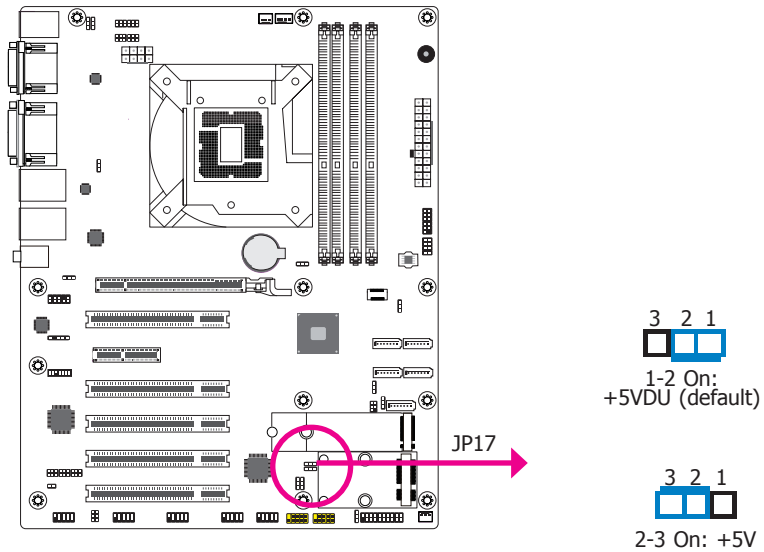
JP9 is designed to select the Mini PCIe signal: mSATA or Mini PCIe (default).

## Mini PCIe/mSATA Power Select (for CS630-Q370 only)



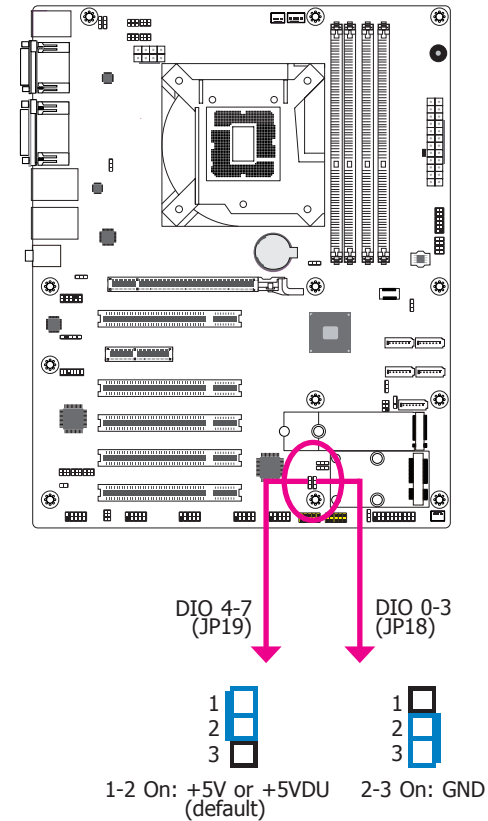
JP21 is designed to select the Mini PCIe/mSATA power: 3V3 (default) or 3V3DU.

## Digital I/O Power Select



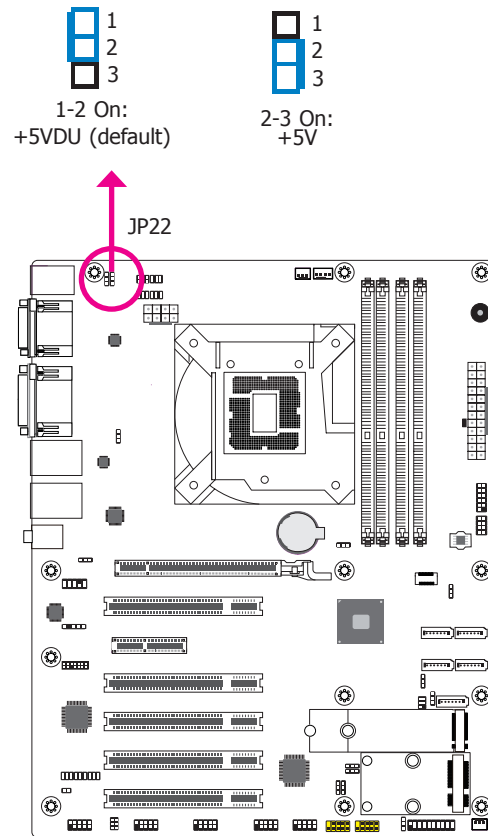
JP17 is used to select the power of DIO (Digital I/O) signal: +5VDU (default) or +5V.

## Digital I/O Output State



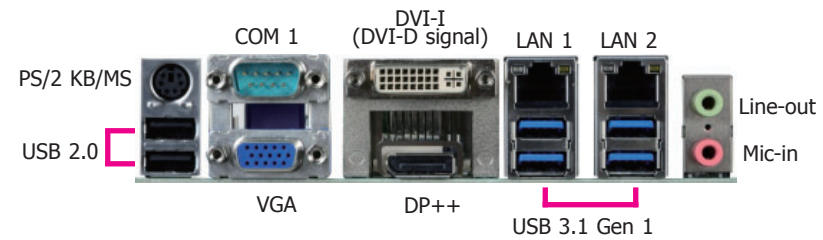
Based on the power level of DIO (Digital I/O) selected on JP17, JP18 (DIO pin 0-3) and JP19 (DIO pin 4-7) are used to select the output state of Digital I/O: pull high or pull low. When selecting pull high, the power selection will be the same as the JP17's setting.

### PS/2 Power Select



JP22 is designed to select the PS/2 power: +5VDU (default) or +5V.

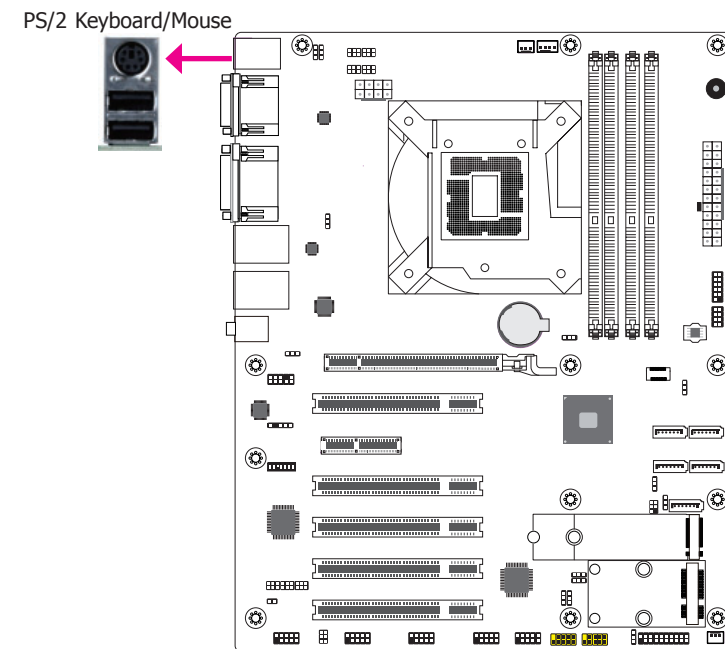
## Rear Panel I/O Ports



The rear panel I/O ports consist of the following:

- 1 PS/2 Keyboard/Mouse port
- 2 USB 2.0 ports
- 1 Serial COM port
- 1 VGA port
- 1 DVI-I (DVI-D signal) port
- 1 DP++ port
- 2 RJ45 LAN ports
- 4 USB 3.1 Gen 1 ports
- 1 Line-in jack (optional)
- 1 Line-out jack
- 1 Mic-in jack

## PS/2 Keyboard/Mouse Port



This rear I/O port is used to connect a PS/2 keyboard/mouse. The PS/2 mouse port uses IRQ12.

### Wake-On-PS/2 Keyboard/Mouse

The Wake-On-PS/2 Keyboard/Mouse function allows you to use the PS/2 keyboard or PS/2 mouse to power-on the system. To use this function:

#### • BIOS Setting

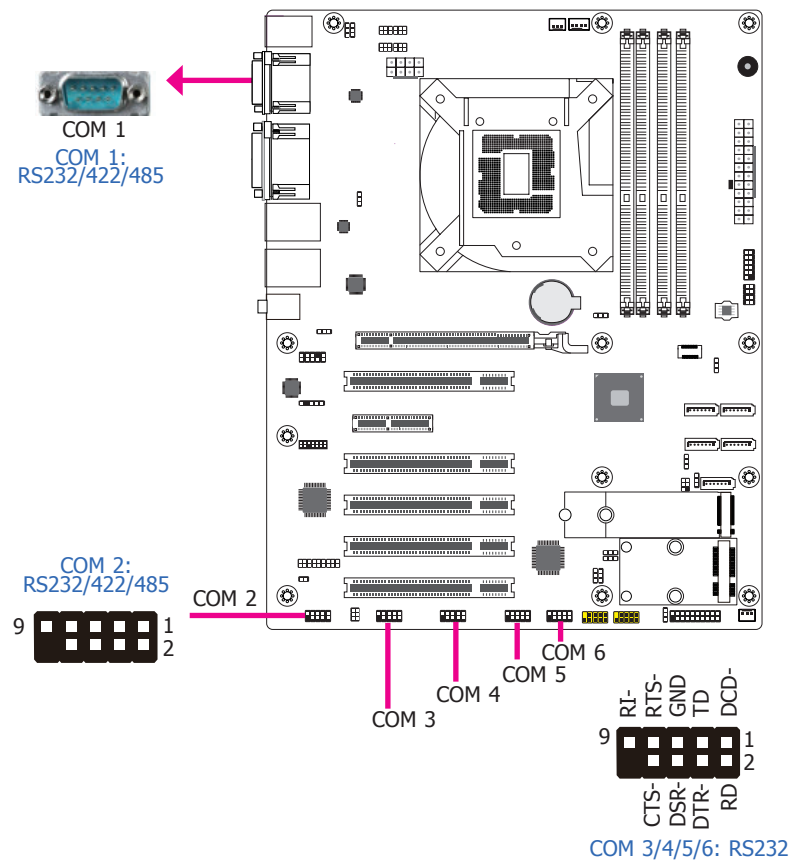
Configure the wake-up function of PS/2 keyboard/mouse in the Advanced menu ("ACPI Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.



#### **Important:**

The +5V\_standby power source of your power supply must support  $\geq 720\text{mA}$ .

## COM (Serial) Ports



The pin functions of COM 1 port will vary according to setting of JP1, JP2, JP3 and JP4. Refer to "COM1/COM2 RS232/422/485 Select" and "COM1/COM2 RS232/Power Select" in this chapter for more information.

The pin functions of COM 2 port will vary according to setting of JP6, JP7, JP8 and JP10. Refer to "COM1/COM2 RS232/422/485 Select" and "COM1/COM2 RS232/Power Select" in this chapter for more information.

COM 3 to COM 6 are fixed at RS232.

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

## Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

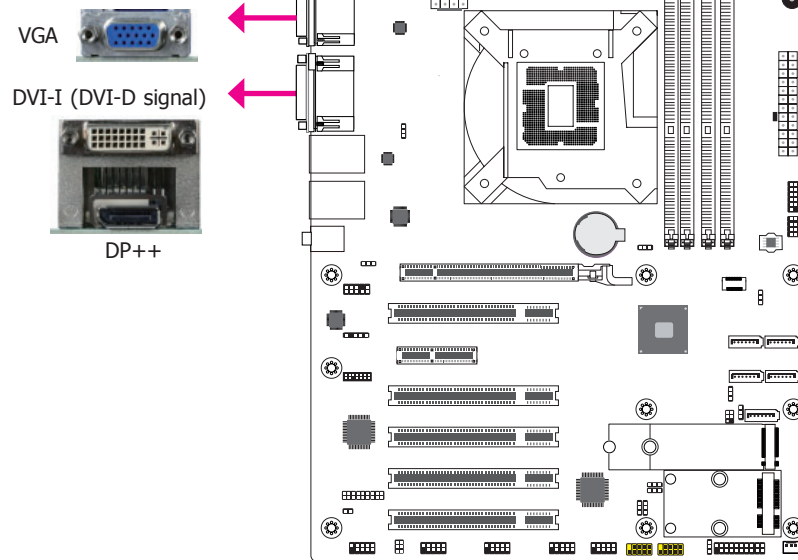
## BIOS Setting

Configure the serial COM ports in the Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

## Graphics Interfaces

The display ports consist of the following:

- 1 VGA port
- 1 DVI-I (DVI-D signal) port
- 1 DP++ port



### VGA Port

The VGA port is used for connecting a VGA monitor. Connect the monitor's 15-pin D-shell cable connector to the VGA port. After you plug the monitor's cable connector into the VGA port, gently tighten the cable screws to hold the connector in place.

### DVI-I (DVI-D Signal) Port

The DVI-I port is used to connect a LCD monitor. This port supports DVI-D signal only. Connect the display device's cable connector to the DVI-I port. After plugging the cable connector into the port, gently tighten the cable screws to hold the connector in place.

### DP++ Port

The DP++ port which carries both digital audio and video signals is used to connect a LCD monitor or a digital TV that has the DP++ port.

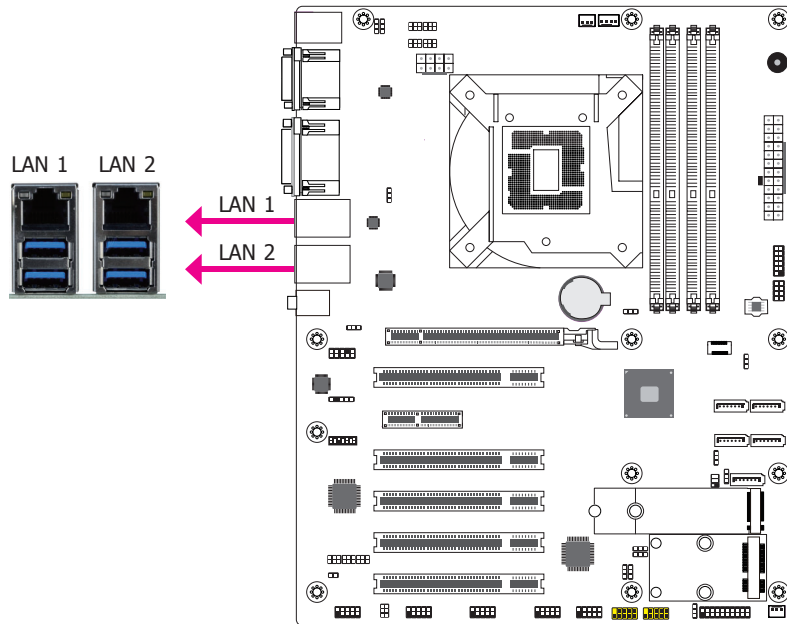
### BIOS Setting

Configure the display devices in the advanced menu ("Video Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

## Driver Installation

Install the graphics driver. Refer to the chapter 4 for more information.

### RJ45 LAN Ports



### Features

- 1 Intel® I211AT PCIe
- 1 Intel® I219V LAN Phy (CS630-H310)
- 1 Intel® I219LM LAN Phy with iAMT12.0 (CS630-Q370)

The LAN port allows the system board to connect to a local area network by means of a network hub.

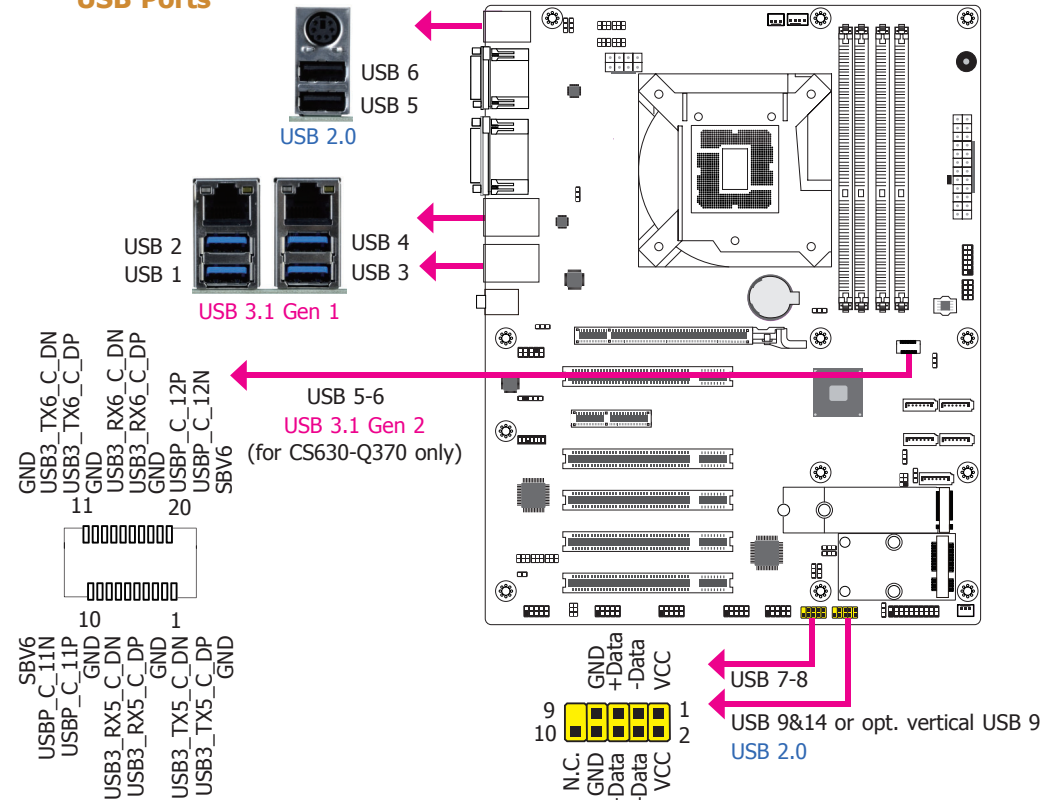
### BIOS Setting

Configure the onboard LAN ports in the Advanced menu ("ACPI Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

### Driver Installation

Install the LAN drivers. Refer to the chapter 4 for more information.

### USB Ports



The USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with 2 onboard USB 2.0 ports (USB 5-6) and 4 onboard USB 3.1 Gen 1 ports (USB 1-2/3-4). The 10-pin connectors allow you to connect 2 additional USB 2.0 ports (USB 7-8/9&14). The 20-pin connector allows you to connect 2 additional USB 3.1 Gen 2 ports (USB 5-6) for CS630-Q370. The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

### BIOS Setting

Configure these onboard USB devices in the Advanced menu ("USB Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

### Driver Installation

You may need to install the proper drivers in your system operation to use the USB device. Refer to your operating system's manual or documentation for more information.



### Wake-On-USB Keyboard/Mouse

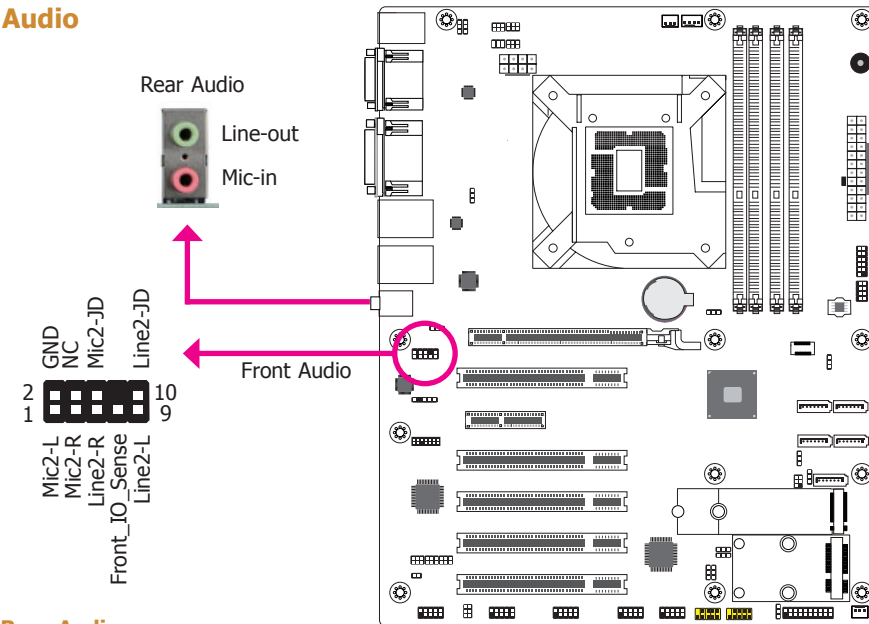
The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.



#### Important:

If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the +5V\_standby power source of your power supply must support  $\geq 1.5A$ . For 3 or more USB ports, the +5V\_standby power source of your power supply must support  $\geq 2A$ .

### Audio



#### Rear Audio

The system board is equipped with 2 audio jacks (Line-out and Mic-in). Line-in jack is available upon request. A jack is a one-hole connecting interface for inserting a plug.

- Line-in Jack (Light Blue) (optional)  
This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.
- Line-out Jack (Lime)  
This jack is used to connect a headphone or external speakers.
- Mic-in Jack (Pink)  
This jack is used to connect an external microphone.

#### Front Audio

The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

#### BIOS Setting

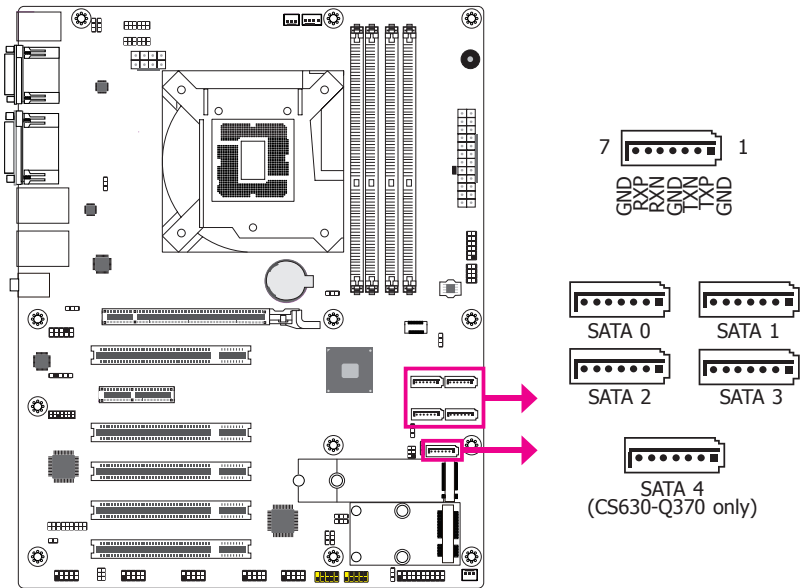
Configure these Audio devices in the Advanced menu ("Audio Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

#### Driver Installation

Install the audio driver. Refer to the chapter 4 for more information.

## I/O Connectors

### SATA (Serial ATA) Connectors



#### Features

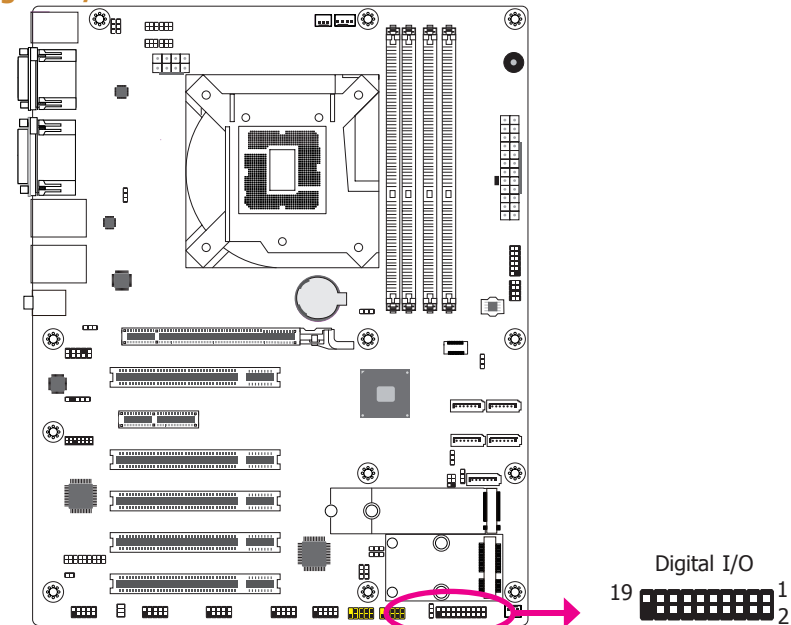
- Serial ATA 3.0 ports with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller
- Supports Intel® Smart Response Technology
- Supports RAID 0, RAID 1, RAID 5, RAID 10 (CS630-Q370 only)

The Serial ATA connectors are used to connect Serial ATA devices. Connect one end of the Serial ATA data cable to a SATA connector and the other end to your Serial ATA device.

#### BIOS Setting

Configure the Serial ATA drives in the Advanced menu ("SATA Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

### Digital I/O Connector

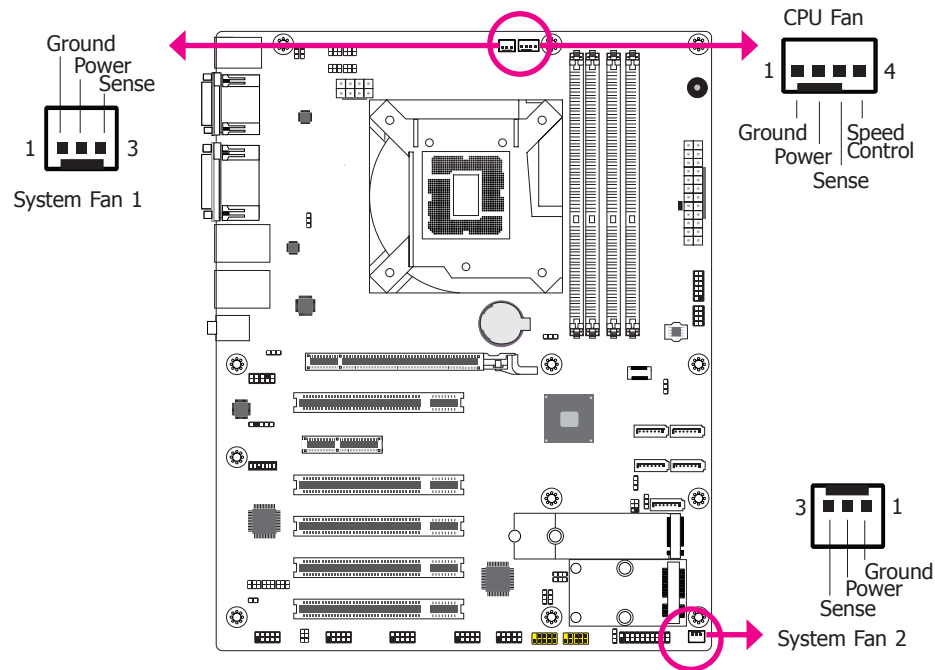


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to these connectors.

#### Digital I/O Connector

Pin	Pin Assignment	Pin	Pin Assignment
1	GND	2	+12V
3	DIO7	4	+12V
5	DIO6	6	GND
7	DIO5	8	+5V
9	DIO4	10	+5V
11	DIO3	12	GND
13	DIO2	14	+5V <sub>DU</sub>
15	DIO1	16	+5V <sub>DU</sub>
17	DIO0	18	GND
19	GND		

## Cooling Fan Connectors

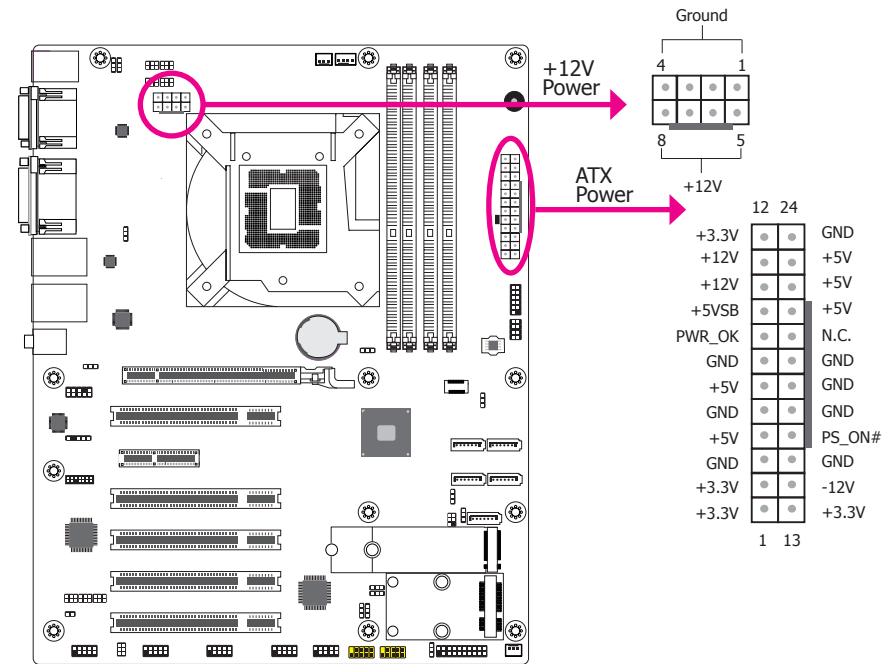


These fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

### BIOS Setting

The Advanced menu ("SIO NUVOTON6106D" submenu) of the BIOS will display the current speed of the cooling fans. Refer to chapter 3 for more information.

## Power Connectors



Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 8-pin +12V power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 8-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

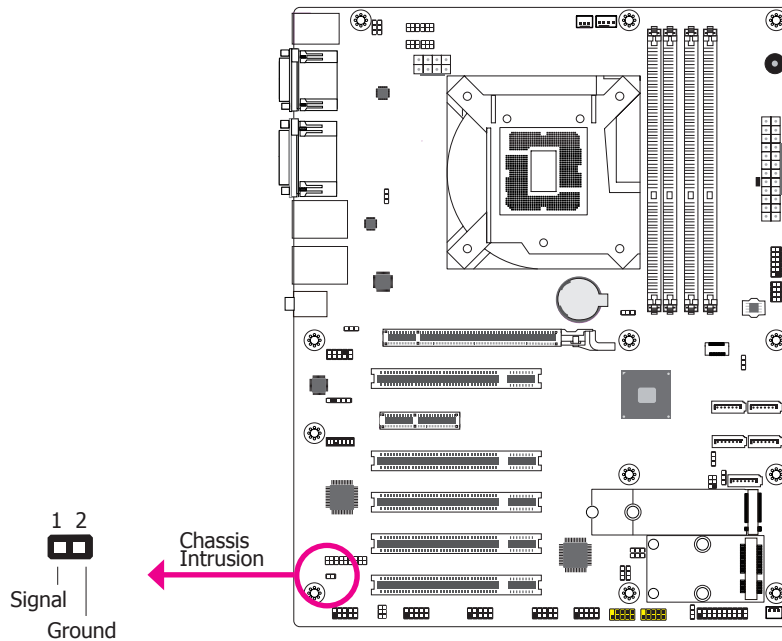
The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that you use a minimum of 400 Watt (or greater) power supply.



### Important:

Insufficient power supplied to the system may result in instability or the add-in boards and peripherals not functioning properly. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

### Chassis Intrusion Connector

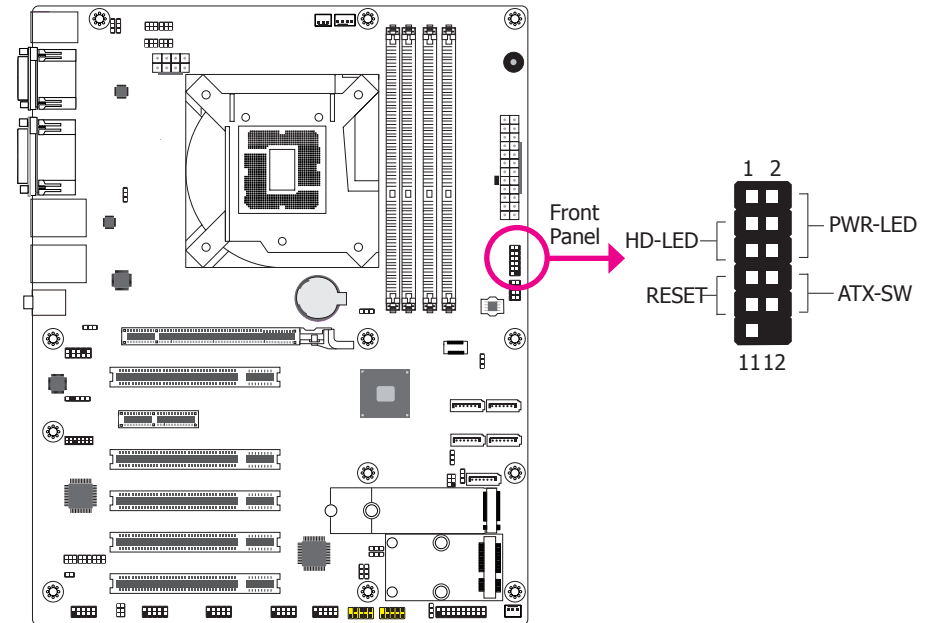


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

#### BIOS Setting

Configure the chassis intrusion detection function in the Advanced menu ("SIO NUVO-TON6106D" submenu) of the BIOS. Refer to the chapter 3 for more information.

### Front Panel Connector



#### HD-LED - Hard Drive LED

This LED will light when the hard drive is being accessed.

#### RESET - Reset Switch

This switch allows you to reboot without having to power off the system.

#### PWR-LED - Power/Standby LED

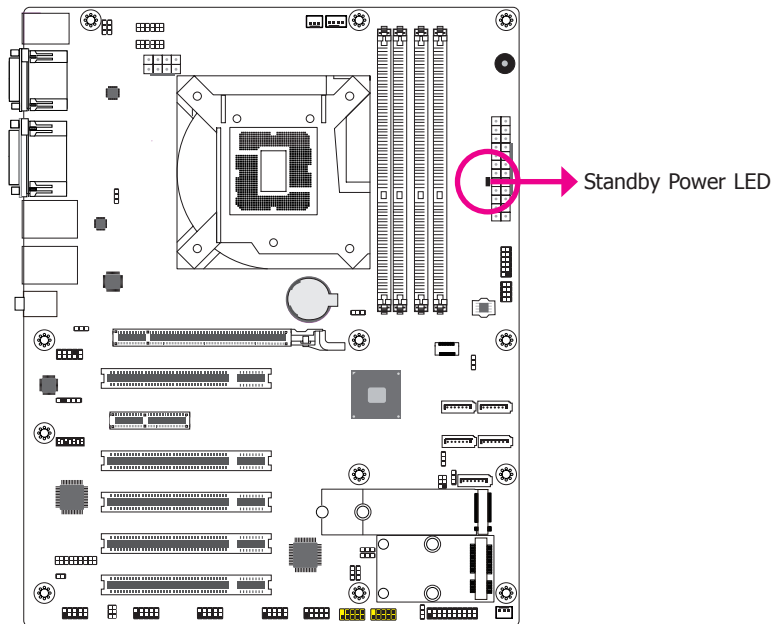
When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

#### ATX-SW - ATX Power Switch

This switch is used to power on or off the system.

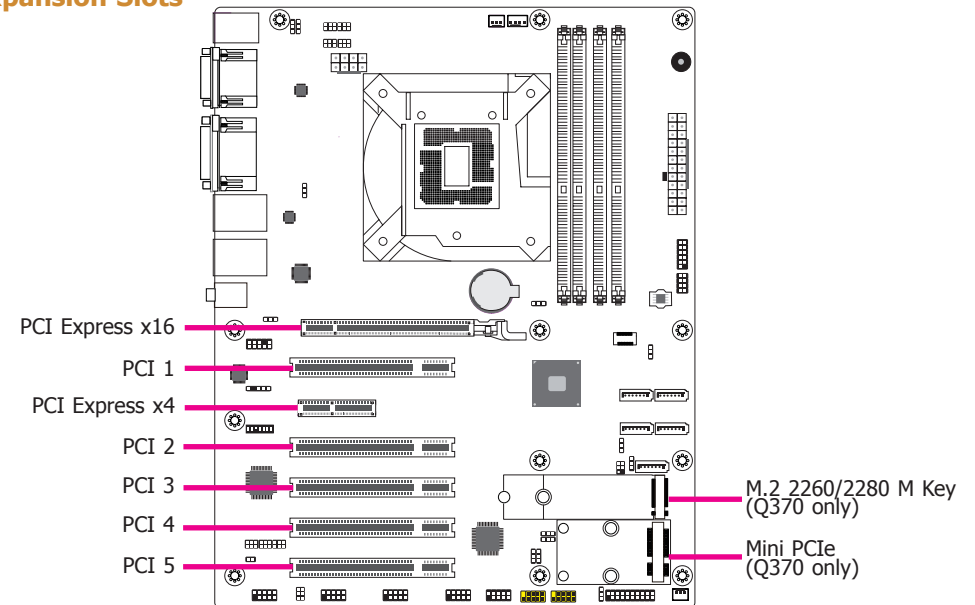
	Pin	Pin Assignment		Pin	Pin Assignment
HD-LED	3	HDD Power	PWR-LED	2	LED Power
	5	Signal		4	LED Power
RESET	7	Ground	ATX-SW	6	Signal
	9	RST Signal		8	Ground
	11	N.C.		10	Signal

## Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

## Expansion Slots



### PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

### PCI Slot

The PCI slot supports expansion cards that comply with PCI specifications. You can install a PCI expansion card or a customized riser card designed for only 2 PCI slots expansion (for low profile PCI card only) into the PCI slot.

### PCI Express x4 Slot

Install PCI Express cards such as network cards or other cards that comply to the PCI Express specifications into the PCI Express x4 slot.

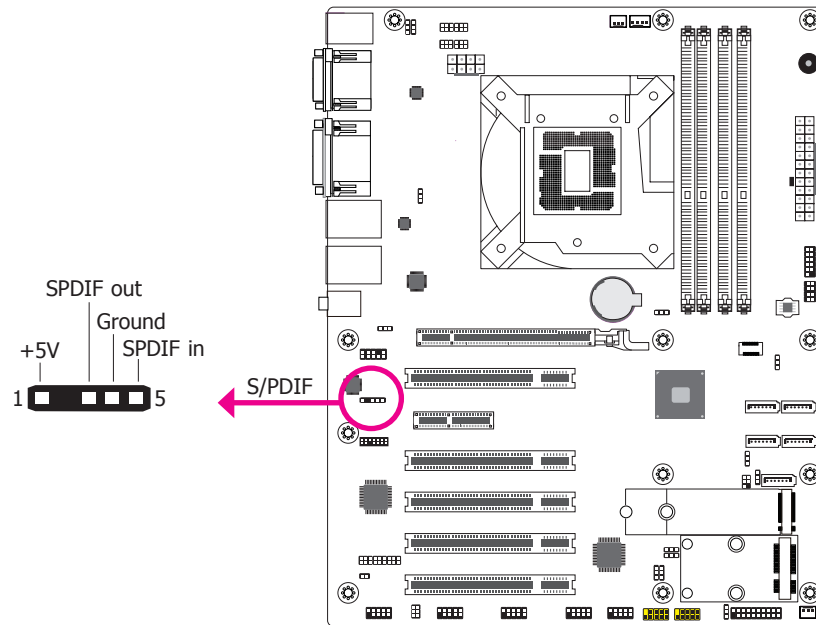
### M.2 M Key Socket (for Q370 only)

The M.2 socket is the Next Generation Form Factor (NGFF) which is designed to support multiple modules and make the M.2 more suitable in application for solid-state storage.

### Mini PCIe Socket (for Q370 only)

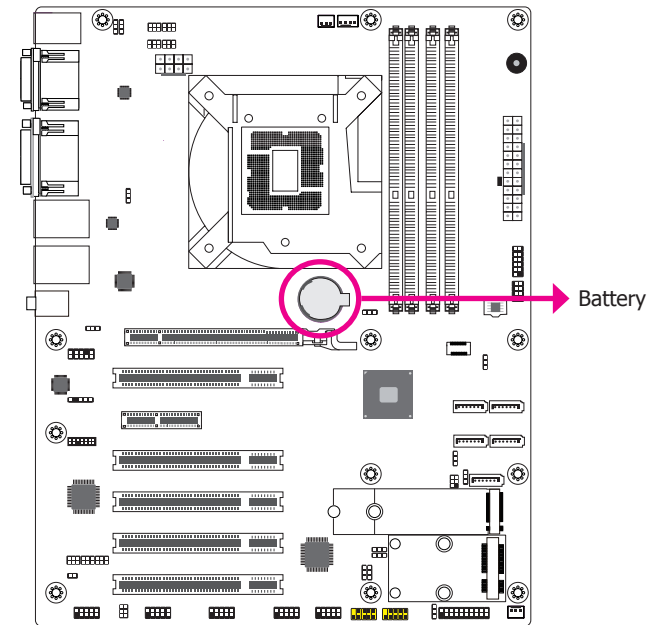
The full-size Mini PCIe socket supports USB/Mini PCIe/mSATA signals and is used to install a Mini PCIe card. Mini PCIe and mSATA signals can be switched with a jumper.

## S/PDIF Connector



The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

## Battery

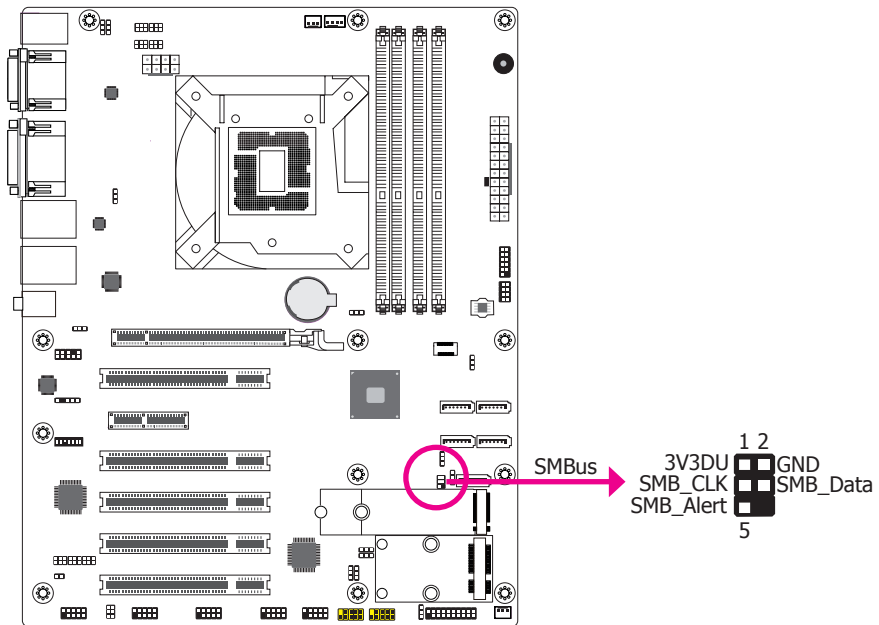


The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

### Safety Measures

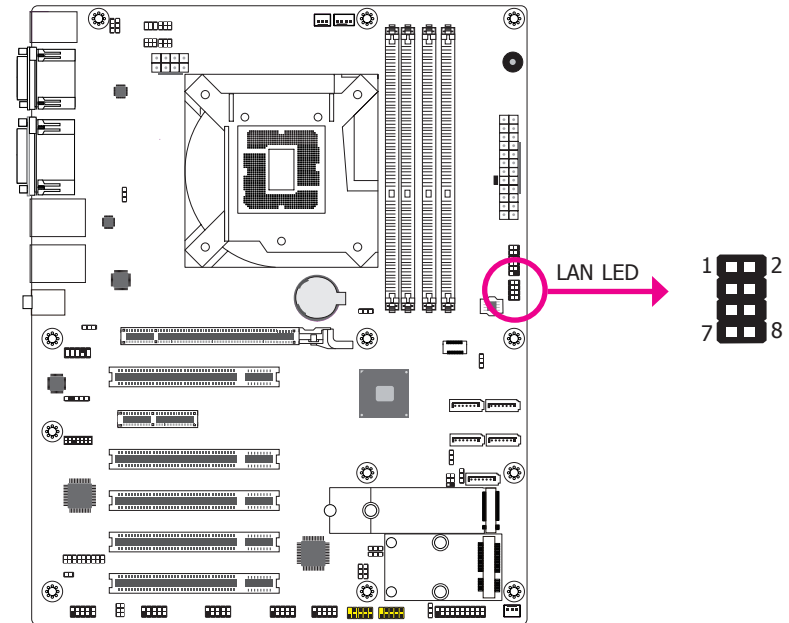
- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to local ordinance.

## SMBus Connector



The SMBus (System Management Bus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

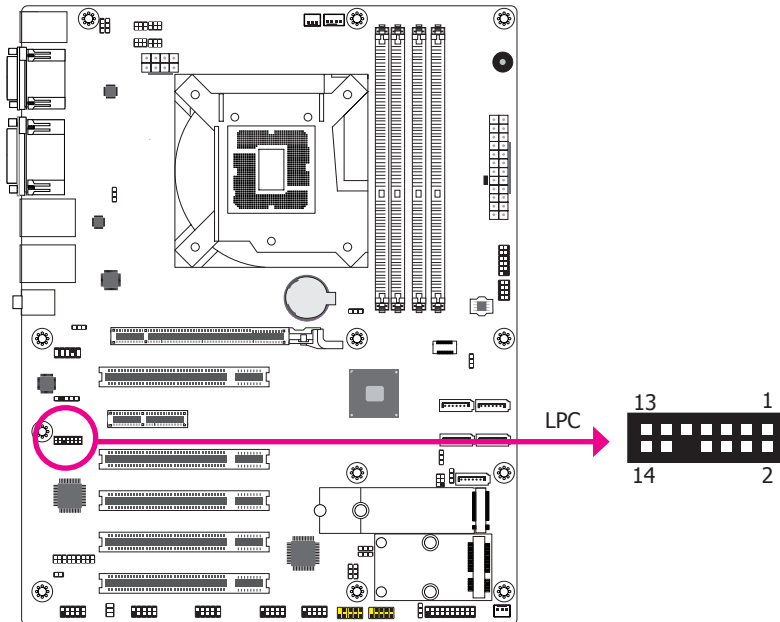
## LAN LED Connector



The LAN LED connector is used to detect the connection state of RJ45 LAN ports when the connection is made to an active network via a cable. The pin functions of the LAN LED connector are listed below.

Pin	Pin Assignment	Pin	Pin Assignment
1	GBE_LED_1000-	2	GBE_LED_100-
3	GBE_LED_LINK_ACT-	4	3V3DU
5	LINK_1000_4	6	LINK_100_4
7	LINK_ACTIVITY_4	8	3V3DU

## LPC Connector



The Low Pin Count Interface was defined by Intel® Corporation to facilitate the industry's transition towards legacy free systems. It allows the integration of low-bandwidth legacy I/O components within the system, which are typically provided by a Super I/O controller. Furthermore, it can be used to interface firmware hubs, Trusted Platform Module (TPM) devices and embedded controller solutions. Data transfer on the LPC bus is implemented over a 4 bit serialized data interface, which uses a 33MHz LPC bus clock. For more information about LPC bus refer to the Intel® Low Pin Count Interface Specification Revision 1.1'. The table below indicates the pin functions of the LPC connector.

Pin	Pin Assignment	Pin	Pin Assignment
1	L_CLK	2	L_AD1
3	L_RST#	4	L_AD0
5	L_FRAME#	6	3V3
7	L_AD3	8	GND
9	L_AD2	10	---
11	INT_SERIRQ	12	GND
13	5VSB	14	5V