

SM86360V4GA

(v1.x) Industrial Computer Board



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Trademarks

All trademarks are the properties of their respective owners.

Revision History

Revision	Date
V1.0	2014/07

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

Visit the website for technical guide, BIOS updates, driver updates and other information, or contact our technical staff via <http://www.grantech.com/support/>

Safety Instructions

- Always read the safety instructions carefully.
- Keep this User's Manual for future reference.
- Keep this equipment away from humidity.
- Lay this equipment on a reliable flat surface before setting it up.
- The openings on the enclosure are for air convection hence protects the equipment from overheating. **DO NOT COVER THE OPENINGS.**
- Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
- Always Unplug the Power Cord before inserting any add-on card or module.
- All cautions and warnings on the equipment should be noted.
- Never pour any liquid into the opening that could damage or cause electrical shock.
- If any 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 can not get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
- **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.**

警告使用者:

這是甲類資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Chemical Substances Information

In compliance with chemical substances regulations, such as the EU REACH Regulation (Regulation EC No. 1907/2006 of the European Parliament and the Council), GT provides the information of chemical substances in products at:

http://www.graintech.com/html/popup/csr/evmtprrt_pcm.html

Battery Information



European Union:

Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.



廢電池請回收

Taiwan:

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.



California, USA:

The button cell battery may contain perchlorate material and requires special handling when recycled or disposed of in California.

For further information please visit:

<http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

CE Conformity

Hereby, grantech International CO., LTD declares that this device is in compliance with the essential safety requirements and other relevant provisions set out in the European Directive.



FCC-A Radio Frequency Interference Statement



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.

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.

Notice 2

Shielded interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE Statement

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. GT will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.



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1 Overview



Thank you for choosing the 86360V4GA, an excellent industrial computer board.

Based on the innovative Intel® Q87 chipset for optimal system efficiency, the 86360 accommodates the Intel® Haswell processor and supports up to 4 DDR3/DDR3L 1333/1600 UDIMM slots to provide the maximum of 32GB memory capacity.

In the advanced-level and mid-range market segment, 86360V4GA provides a high-performance solution for today's front-end and general purpose workstation, as well as in the future.

Motherboard Specifications

Processor

- 4th generation Intel Core i3/ i5/ i7 processor (LGA1150)

Chipset

- Intel Q87 chipset

Memory

- 4 * DDR3/DDR3L 1333/1600 UDIMM slots
- Supports the maximum of 32GB
- Supports dual-channel mode

LAN

- Intel I217-LM Gigabit Fast Ethernet controller (LAN1)
- Intel I210-AT Gigabit Fast Ethernet controller (LAN2, LAN3, LAN4)

SATA

- 4 * SATA 6Gb/s ports

Audio

- Realtek ALC887 audio codec
- 1 * front audio header
- 1 * amplifier header

Graphics

- Graphics integrated in Intel processor

USB

- 2 * onboard USB 2.0 headers (4 ports)
- 4 * USB 2.0 ports on the rear panel
- 4 * USB 3.0 ports on the rear panel

Serial Port

- 4 * RS-232 serial port connectors (COM1, COM2, COM3, COM4)
- 2 * RS-232/422/485 serial port connectors (COM5, COM6)
- 1 * RS-232 serial port header providing 4 * RS-232 ports (COM7~COM10)

Rear Panel I/O

- 1 * PS/2 mouse/keyboard combo port
- 1 * VGA port
- 1 * DVI-D port
- 4 * Gigabit LAN jacks
- 4 * USB 2.0 ports
- 4 * USB 3.0 ports

Onboard Headers/ Connectors/ Jumpers

- 1 * 24-pin power connector
- 1 * 4-pin power connector
- 1 * CPU fan connector
- 2 * system fan connectors
- 4 * SATA 6Gb/s ports
- 2 * USB 2.0 headers (4 * ports)
- 4 * RS-232 serial port connectors
- 2 * RS-232/422/485 serial port connectors
- 1 * RS-232 serial port header (4 * ports)
- 1 * TPM header
- 1 * parallel port connector
- 1 * front panel header
- 1 * front audio header
- 1 * S/PDIF header
- 1 * amplifier header
- 1 * GPIO header
- 1 * chassis intrusion header
- 1 * clear CMOS jumper
- 2 * serial port pin 9 function select jumpers
- 4 * serial port power jumpers
- 1 * AMT jumper
- 1 * AT/ATX select jumper

Slot

- 1 * PCIe x16 slot
- 1 * PCIe x8 slot (x1 signal)
- 1 * Mini-PCIe slot (mSATA compatible)
- 2 * PCI slots

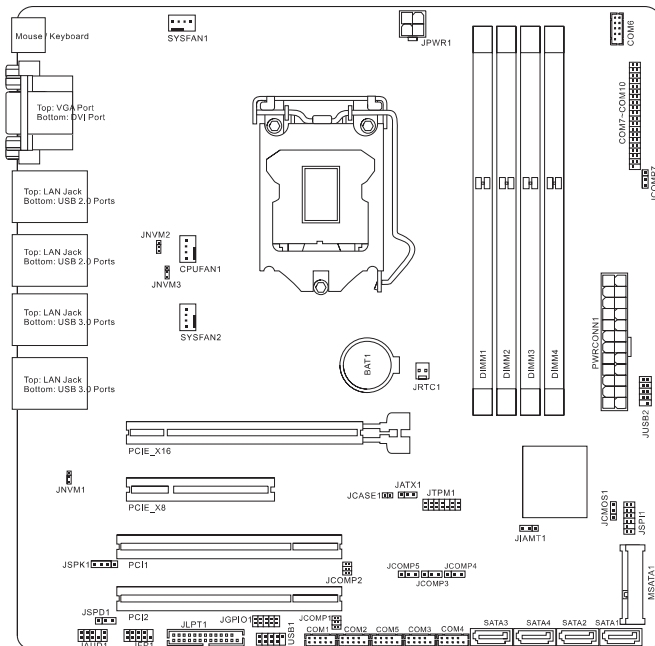
Form Factor

- uATX 244mm * 244mm

Environmental

- Operating Temperature: 0°C ~ 60°C
- Storage Temperature: -20°C ~ 80°C
- Humidity: 5% ~ 90% RH, Non-Condensing

Motherboard Layout



2 Hardware Setup



This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

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CPU (Central Processing Unit)

When installing the CPU, make sure that you install the cooler to prevent overheating. If you do not have the CPU cooler, consult your dealer before turning on the computer.

Important

Overheating

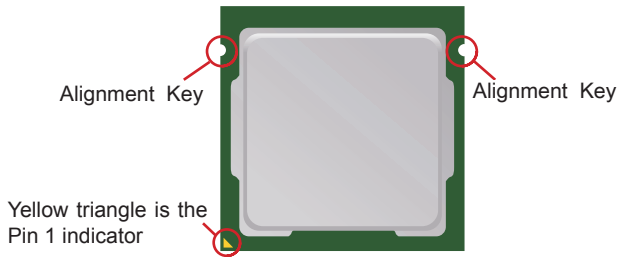
Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.

Replacing the CPU

While replacing the CPU, always turn off the power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.

Introduction to LGA 115x CPU

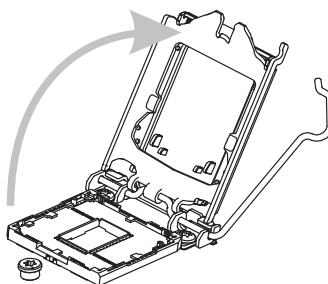
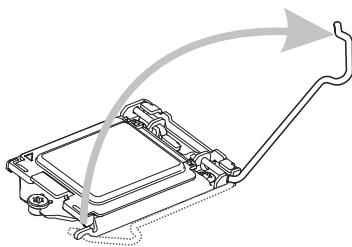
The surface of LGA 115x CPU. Remember to apply some thermal paste on it for better heat dispersion.



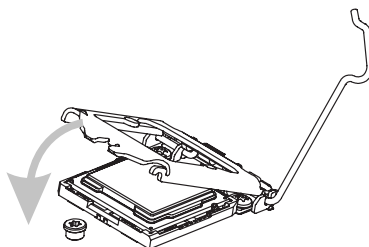
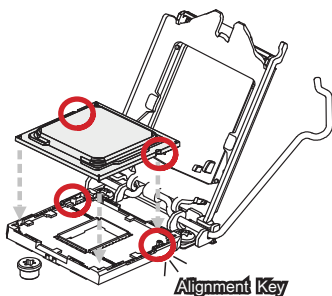
CPU Installation

When you are installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating**. Meanwhile, do not forget to apply some thermal paste on CPU before installing the heat sink/cooler fan for better heat dispersion.

1. Open the load lever and remove the plastic cap.
2. Lift the load lever up to fully open position.



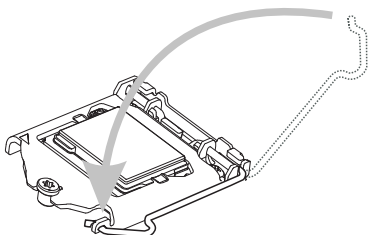
3. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.
4. Engage the load lever while pressing down lightly onto the load plate.



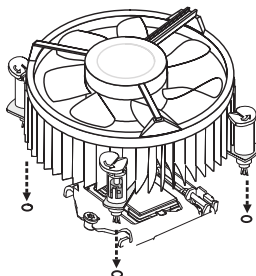
Important

Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.

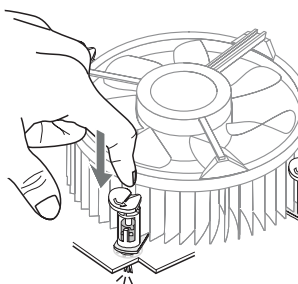
5. Secure the load lever with the hook under the retention tab.



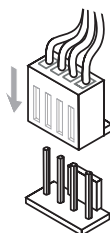
6. Make sure the four hooks are in proper position before you install the cooler. Align the holes on the motherboard with the cooler. Push down the cooler until its four clips get wedged into the holes of the motherboard.



7. Press the four hooks down to fasten the cooler. Turn over the motherboard to confirm that the clip-ends are correctly inserted.



8. Finally, attach the CPU Fan cable to the CPU fan connector on the motherboard.



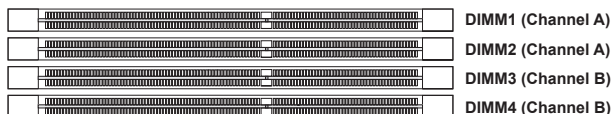
Important

- Confirm if your CPU cooler is firmly installed before turning on your system.
- Do not touch the CPU socket pins to avoid damage.
- Whenever CPU is not installed, always protect your CPU socket pins with the plastic cap covered.
- Please refer to the documentation in the CPU cooler package for more details about the CPU cooler installation.
- Read the CPU status in BIOS.

Memory

Dual-Channel Mode

In Dual-Channel mode, make sure that you install memory modules of the **same type and density** in different channel DIMM slots.



Recommended Memory Population

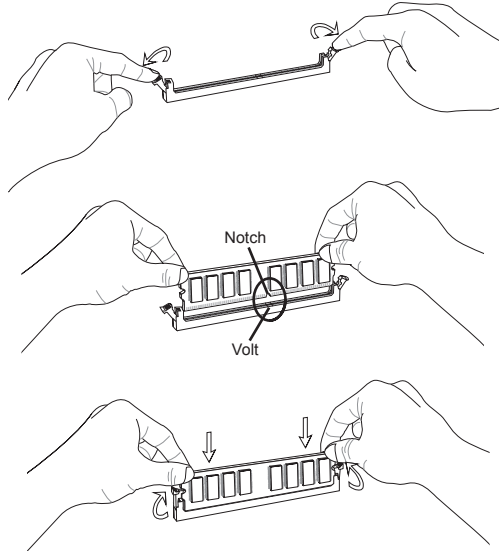
Number of DIMMs installed	1	2	3	4
DIMM1 (ch A)	V	V	V	V
DIMM2 (ch A)			V	V
DIMM3 (ch B)		V	V	V
DIMM4 (ch B)				V

Important

- "V" indicates a populated DIMM slot.
- Paired memory installation for Max performance.
- Populate the same DIMM type in each channel, specifically: 1. Use the same DIMM size; 2. Use the same number of ranks per DIMM.

Installing Memory Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the DIMM slot. The plastic clip at each side of the DIMM slot will automatically close when the memory module is properly seated.
3. Manually check if the memory module has been locked in place by the DIMM slot clips at the sides.



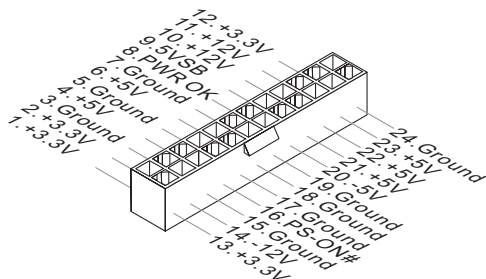
Important

- You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.
- To enable successful system bootup, always insert the memory module into the DIMM1 first.

Power Supply

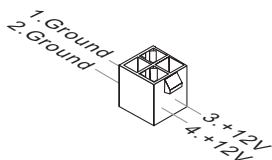
System Power Connector: PWRCONN1

This connector allows you to connect a power supply. To connect to the power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.



CPU Power Connector: JPWR1

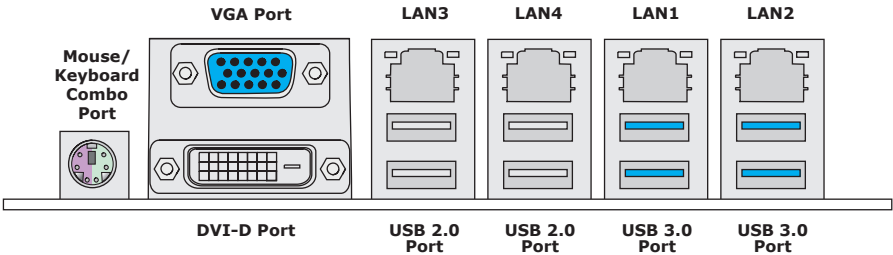
This connector is used to provide power to the CPU.



Important

Make sure that all power connectors are connected to the power supply to ensure stable operation of the motherboard.

Rear Panel I/O



➤ Keyboard / Mouse Combo Port

The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

➤ VGA Port

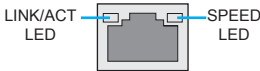
The DB15-pin female connector is provided for monitor.

➤ DVI-D Port

The DVI-D (Digital Visual Interface-Digital) connector allows you to connect an LCD monitor. It provides a high-speed digital interconnection between the computer and its display device. To connect an LCD monitor, simply plug your monitor cable into the DVI connector, and make sure that the other end of the cable is properly connected to your monitor (refer to your monitor manual for more information.)

➤ LAN Jack

The standard RJ45 LAN jack is provided for connection to the Local Area Network (LAN). You can connect a network cable to it.

	LED	LED Status	Description
	Link/ Activity LED	Off	No link
		Yellow	Linked
		Blinking	Data activity
	Speed LED	Off	10 Mbps connection
		Green	100 Mbps connection
		Orange	1 Gbps connection

➤ **USB 2.0 Port**

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

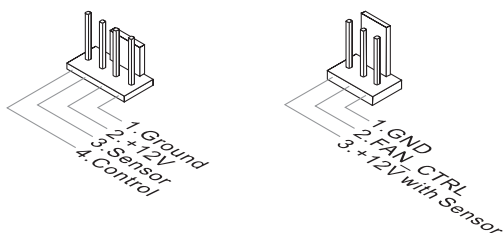
➤ **USB 3.0 Port**

The USB 3.0 port is backward-compatible with USB 2.0 devices and supports data transfer rate up to 5 Gbit/s (SuperSpeed).

Connector

Fan Power Connector: CPUFAN1, SYSFAN1, SYSFAN2

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND. If the motherboard has a System Hardware Monitor chipset onboard, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

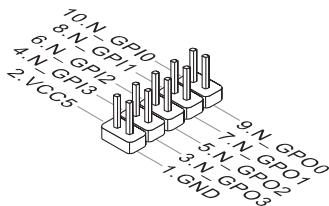


Important

- Please refer to the recommended CPU fans at processor's official website or consult the vendors for proper CPU cooling fan.
- Fan cooler sets with 3- or 4-pin power connector are both available. Users can select the fan type through BIOS.

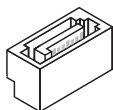
GPIO Header: JGPIO1

This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.



Serial ATA Connector: SATA1 ~ SATA4

This connector is a high-speed Serial ATA interface port. Each connector can connect to one Serial ATA device.



Important

Please do not fold the SATA cable into a 90-degree angle. Otherwise, data loss may occur during transmission.

RS-232 Serial Port Connector: COM1, COM2, COM3, COM4, COM7~COM10

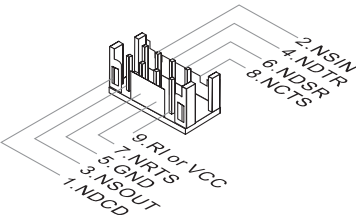
RS-232/422/485 Serial Port Connector: COM5, COM6

This connector is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial device to it through an optional serial port bracket.

Port	Description
COM1	RS-232; Pin 9 supports RI or power; Ring, 5V or 12V via JCOMP1
COM2	RS-232; Pin 9 supports RI or power; Ring, 5V or 12V via JCOMP2
COM3	RS-232; Pin 9 supports power; 5V or 12V via JCOMP3
COM4	RS-232; Pin 9 supports power; 5V or 12V via JCOMP4
COM5	RS-232/422/485; Pin 9 supports power; 5V or 12V via JCOMP5
COM6	RS-232/422/485
COM7~COM10	RS-232; 5V or 12V via JCOMP7

► COM1, COM2

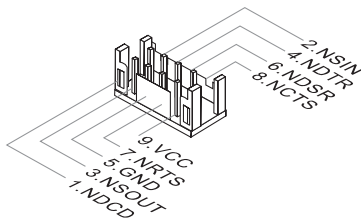
RS-232



PIN	SIGNAL	DESCRIPTION
1	NDCD	Data Carrier Detect
2	NSIN	Signal In
3	NSOUT	Signal Out
4	NDTR	Data Terminal Ready
5	GND	Signal Ground
6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	RI or VCC	Ring Indicate or 5V or 12V selected by jumper
10	NC	No Connection

► COM3, COM4

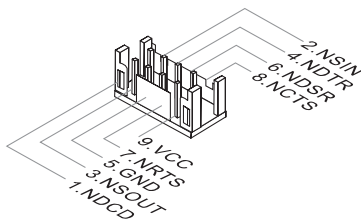
RS-232



PIN	SIGNAL	DESCRIPTION
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6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	VCC	5V or 12V selected by jumper
10	NC	No Connection

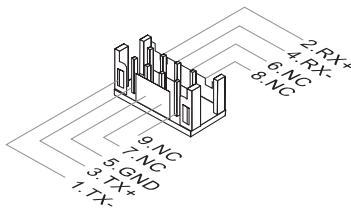
► COM5

RS-232



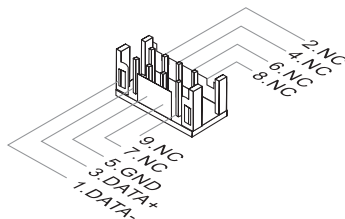
PIN	SIGNAL	DESCRIPTION
1	NDCD	Data Carrier Detect
2	NSIN	Signal In
3	NSOUT	Signal Out
4	NDTR	Data Terminal Ready
5	GND	Signal Ground
6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	VCC	5V or 12V selected by jumper
10	NC	No Connection

RS-422



PIN	SIGNAL	DESCRIPTION
1	422 TXD-	Transmit Data, Negative
2	422 RXD+	Receive Data, Positive
3	422 TXD+	Transmit Data, Positive
4	422 RXD-	Receive Data, Negative
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

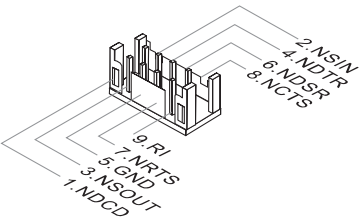
RS-485



PIN	SIGNAL	DESCRIPTION
1	485 TXD-	Transmit Data, Negative
2	NC	No Connection
3	485 TXD+	Transmit Data, Positive
4	NC	No Connection
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

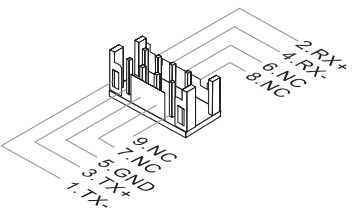
► COM6

RS-232



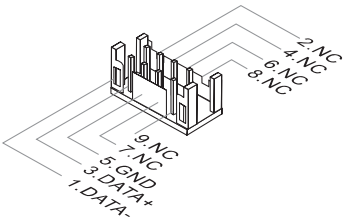
PIN	SIGNAL	DESCRIPTION
1	NDCD	Data Carrier Detect
2	NSIN	Signal In
3	NSOUT	Signal Out
4	NDTR	Data Terminal Ready
5	GND	Signal Ground
6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	RI	Ring Indicate
10	NC	No Connection

RS-422



PIN	SIGNAL	DESCRIPTION
1	422 TXD-	Transmit Data, Negative
2	422 RXD+	Receive Data, Positive
3	422 TXD+	Transmit Data, Positive
4	422 RXD-	Receive Data, Negative
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

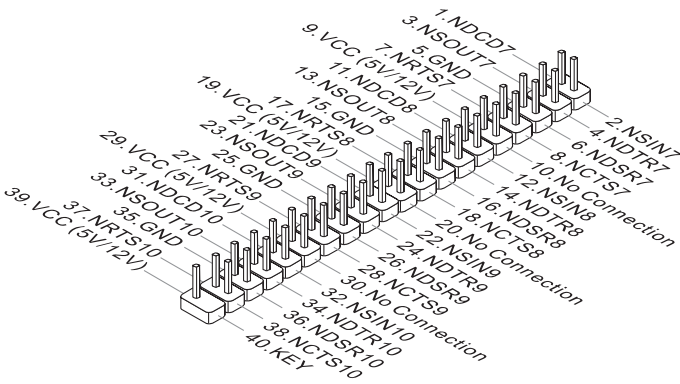
RS-485



PIN	SIGNAL	DESCRIPTION
1	485 TXD-	Transmit Data, Negative
2	NC	No Connection
3	485 TXD+	Transmit Data, Positive
4	NC	No Connection
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

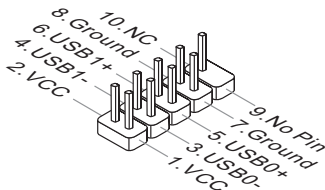
► COM7~COM10

RS-232



USB 2.0 Connector: JUSB1, JUSB2

This connector, compliant with Intel I/O Connectivity Design Guide, is ideal for connecting high-speed USB interface peripherals such as USB HDD, digital cameras, MP3 players, printers, modems and the like.

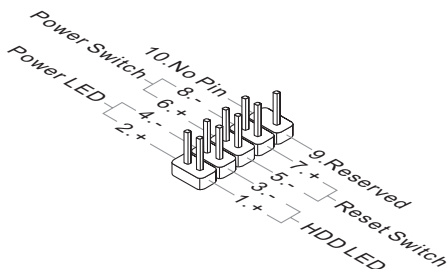


Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

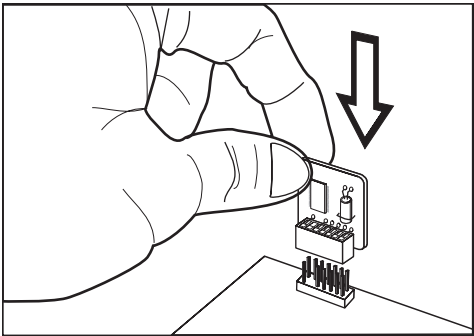
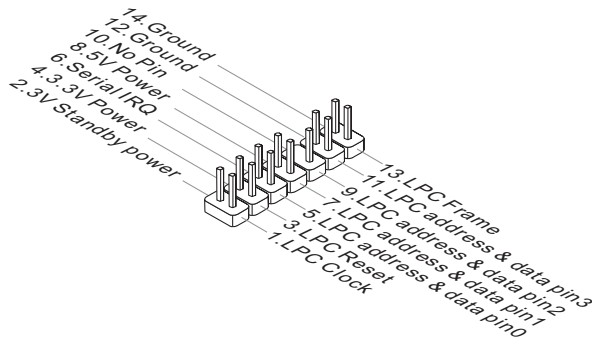
Front Panel Connector: JFP1

This front panel connector is provided for electrical connection to the front panel switches & LEDs and is compliant with Intel Front Panel I/O Connectivity Design Guide.



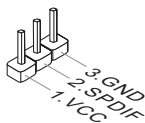
TPM Module Connector: JTPM1

This connector connects to a TPM (Trusted Platform Module) module (optional). Please refer to the TPM security platform manual for more details.



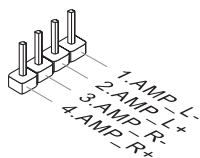
S/PDIF Header: JSPD1

This header is used to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.



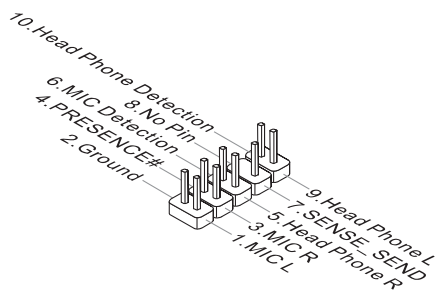
Audio Amplifier Header: JSPK1

The JAMP1 is used to connect audio amplifiers to enhance audio performance.



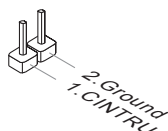
Front Audio Connector: JAUD1

This connector allows you to connect the front panel audio and is compliant with Intel Front Panel I/O Connectivity Design Guide.



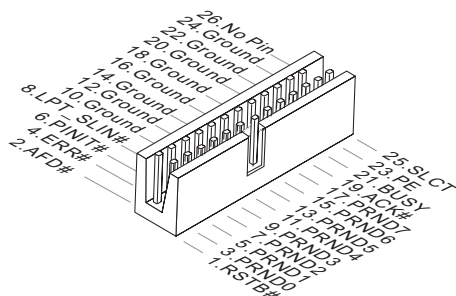
Chassis Intrusion Header: JCASE1

This connector connects to the chassis intrusion switch cable. If the computer case is opened, the chassis intrusion mechanism will be activated. The system will record this intrusion and a warning message will flash on screen. To clear the warning, you must enter the BIOS utility and clear the record.



Parallel Port Connector: JLPT1

The motherboard provides a 26-pin header for connection to an optional parallel port bracket. The parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.



Jumper

Important

Avoid adjusting jumpers when the system is on; it will damage the motherboard.

Clear CMOS Jumper: JCMOS1

There is a CMOS RAM onboard that has a power supply from an external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the jumper to clear data.



Normal



Clear CMOS

Important

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the motherboard.

AT/ATX Select Jumper: JATX1

This jumper allows users to select between AT and ATX power.



ATX



AT

AMT Jumper: JIAMT1

This jumper is used to enable/disable the Intel AMT ME technology.



Normal

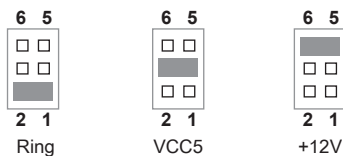


ME disable

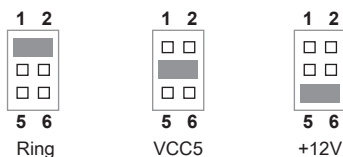
Serial Port Pin 9 Function Select Jumper: JCOMP1, JCOMP2

These jumpers specify the pin 9 function of the specified serial ports.

JCOMP1 (for COM1)

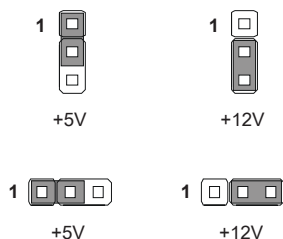


JCOMP2 (for COM2)



Serial Port Power Jumper: JCOMP3, JCOMP4, JCOMP5, JCOMP7

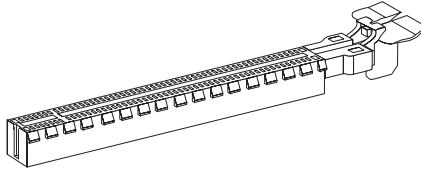
These jumpers specify the operation voltage of the onboard serial ports.



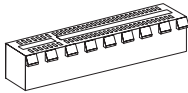
Slot

PCIe (Peripheral Component Interconnect Express) Slot

The PCI Express slot supports PCIe interface expansion cards.



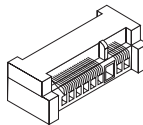
PCIe x16 slot



PCIe x8 slot
(x1 signal)

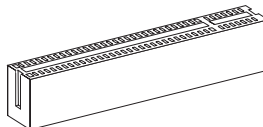
Mini-PCIe (Peripheral Component Interconnect Express) Slot

The Mini-PCIe slot is provided for wireless LAN cards, TV tuner cards, Robson NAND Flash cards and mSATA devices.



PCI (Peripheral Component Interconnect) Slot

The PCI slot supports PCI interface expansion cards.



Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Appendix

WDT & GPIO



This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

WDT Sample Code

```

SIO_INDEX_Port    equ 04Eh
SIO_DATA_Port     equ 04Fh
SIO_UnLock_Value  equ 087h
SIO_Lock_Value    equ 0AAh
WatchDog_LDN      equ 007h
WDT_UNIT          equ 60h    ;60h=second, 68h=minute, 40h=Disabled watchdog timer
WDT_Timer         equ 30     ;ex. 30 seconds

```

Sample code:

```

;Enable config mode
    mov     dx, SIO_INDEX_Port
    mov     al, SIO_UnLock_Value
    out     dx, al
    jmp     short $+2          ;Io_delay
    jmp     short $+2          ;Io_delay
    out     dx, al
;Change to WDT
    mov     dx, SIO_INDEX_Port
    mov     al, 07h
    out     dx, al
    mov     dx, SIO_DATA_Port
    mov     al, WatchDog_LDN
    out     dx, al
;Active WDT
    mov     dx, SIO_INDEX_Port
    mov     al, 30h
    out     dx, al
    mov     dx, SIO_DATA_Port
    in      al, dx
    or      al, 01h
    out     dx, al
;set timer
    mov     dx, SIO_INDEX_Port
    mov     al, 0F6h
    out     dx, al
    mov     dx, SIO_DATA_Port
    mov     al, WDT_Timer
    out     dx, al
;set UINT
    mov     dx, SIO_INDEX_Port
    mov     al, 0F5h
    out     dx, al
    mov     dx, SIO_DATA_Port
    mov     al, WDT_UNIT
    out     dx, al
;enable reset
    mov     dx, SIO_INDEX_Port
    mov     al, 0FAh
    out     dx, al
    mov     dx, SIO_DATA_Port
    in      al, dx
    or      al, 01h
    out     dx, al
;close config mode
    mov     dx, SIO_INDEX_Port
    mov     al, SIO_Lock_Value
    out     dx, al

```

GPIO Sample Code

● GPIO 0 ~ GPIO 3

	GPIO 0	GPIO 1	GPIO 2	GPIO 3				
IO Address	1C0Ch	1C0Ch	1C0Ch	1C0Ch				
SIO GPIO Register								
Bit	2	3	4	5				
Sample code	#1	#1	#1	#1				

● GPO 0 ~ GPO 3

	GPO 0	GPO 1	GPO 2	GPO 3				
IO Address	1C0Eh	1C0Eh	1C3Ah	1C3Ah				
SIO GPIO Register								
Bit	2	4	2	4				
Sample code	#2	#2	#2	#2				

```

GPIO_REG      equ    1C0Ch
GPO_REG       equ    1C0Eh
GPO_REG2      equ    1C3Ah
GPO_0         equ    00000100b
GPO_1         equ    00010000b
GPO_2         equ    00000100b
GPO_3         equ    00010000b

```

Sample Code:

#1 : Get GPI 0 status

```

mov    dx, GPI_REG
in     al, dx
;al bit2 = GPI 0 status
;al bit3 = GPI 1 status
;al bit4 = GPI 2 status
;al bit5 = GPI 3 status

```

#2 : Set GPO 0/1/2/3 status to high

```

mov    dx, GPO_REG
in     al, dx
and    Not (GPO_0+ GPO_1)    ;reset to 0
or     al, (GPO_0+ GPO_1)
out    dx, al
in     al, GPO_REG2
and    Not (GPO_2+ GPO_3)    ;reset to 0
or     al, (GPO_2+ GPO_3)
out    dx, al

```