



Getting Started

Thank you for choosing the MS-7091 v1.X Micro ATX mainboard. The MS-7091 v1.X mainboard is based on **Intel® 915P** and **Intel® ICH6R** chipset for optimal system efficiency. Designed to fit the advanced **Intel® Pentium Prescott LGA775** processor, the MS-7091 v1.X mainboard delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU

- Supports Intel® Pentium 4 Prescott LGA775 processors in LGA775 package.
- Supports up to Pentium 4 3XX, 5XX sequence processor or higher speed.
- Supports Intel Hyper-Threading Technology.

Chipset

- Intel® 915P chipset
 - Supports FSB 533/800MHz.
 - Supports DDR 400/333 memory interface.
- Intel® ICH6R chipset
 - Hi-Speed USB (USB2.0) controller, 480Mb/sec, up to 8 ports.
 - 4 Serial ATA ports with transfer rate up to 150 Mbytes/sec.
 - 1 channel Ultra ATA 100 bus Master IDE controller.
 - PCI Master v2.3, I/O APIC.
 - ACPI 2.0 Compliant.
 - Serial ATA 150 RAID 0, RAID 1 and Matrix RAID.
 - Integrated AHCI controller.

Main Memory

- Supports four DDR1 SDRAM memory modules.
- Supports up to 4GB memory size.
- Supports Dual channel DDR1.

Slots

- One PCI Express x16 slot (supports PCI Express Bus specification v1.0a compliant).
- Three 32-bit v2.3 Master PCI bus slots (support 3.3v/5v PCI bus interface).
 - The second PCI slot (PCI2, in blue color) supports 2 master devices.

On-Board IDE

- One Ultra DMA 66/100 IDE controllers integrated in ICH6R.
 - Supports PIO, Bus Master operation modes.
 - Can connect up to Two Ultra ATA drives.
- Serial ATA 150 controller integrated in ICH6R.
 - Up to 150MB/sec transfer speed.
 - Can connect up to four Serial ATA devices.

On-Board Peripherals

- On-Board Peripherals include:
 - 1 floppy port supports 1 FDD with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
 - 1 serial port
 - 1 parallel port supports SPP/EPP/ECP mode
 - 8 USB 2.0 / 1.1 ports (Rear*4 / Front*4)
 - 1 RJ45 connector
 - 1 Rear 1394 port (6 Pins) / 1 Front 1394 port

- 1 Coaxial SPDIF-Out / SPDIF-In, 1 Optical SPDIF-Out / SPDIF-In
- 1 MIC-In
- 4 Line-Out
- 1 Line-In

LAN

- VIA® VT6105L LAN Controller
 - 10/100 IEEE 802.3/802.3u 10Base-T & 100Base-T compliant.

IEEE 1394

- VIA® VT6307 PCI 1394a Integrated Host Controller

Audio

- Azalia link controller integrated in Intel® ICH6R chipset.
- 8-channel audio codec CMedia CMI9880L.

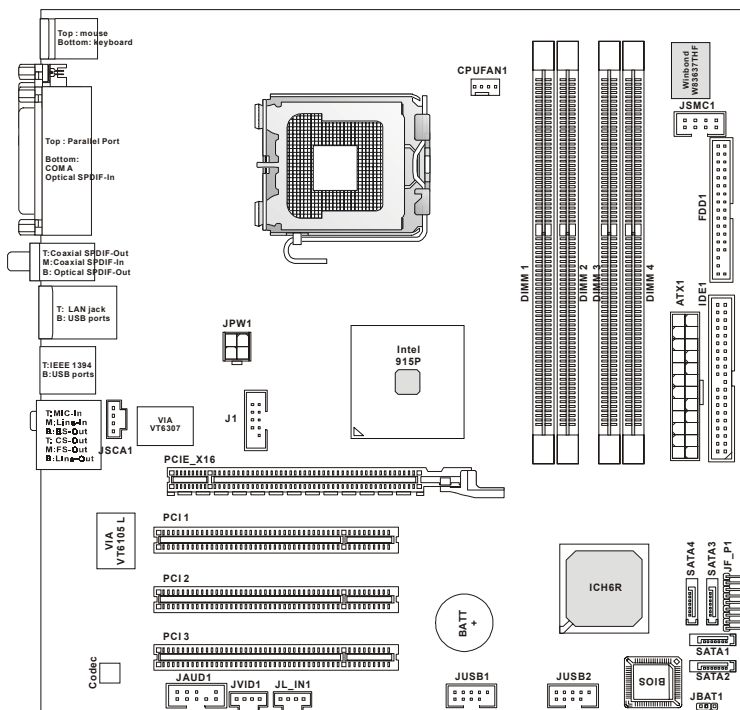
BIOS

- The mainboard BIOS provides “Plug & Play” BIOS which detects the peripheral devices and expansion cards of the board automatically.
- The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications.

Mounting and Dimension

- M-ATX Form Factor: 24.38 cm (L) x 24.38 cm (W)
- 6 mounting holes

Mainboard Layout



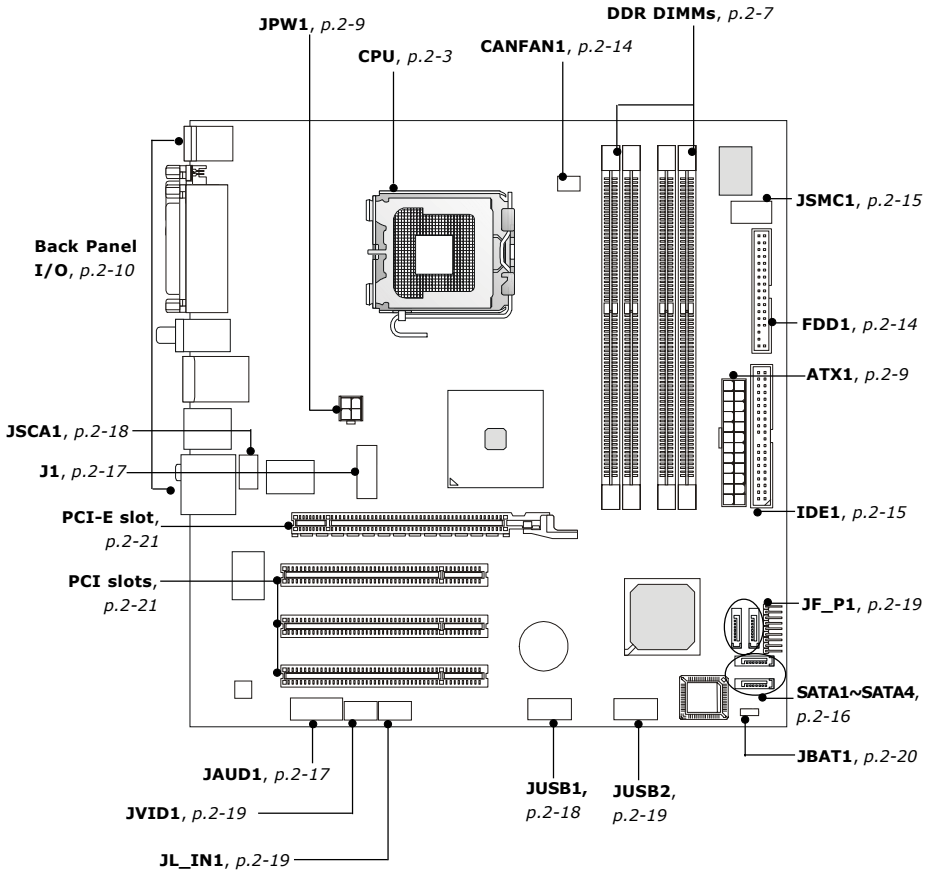
MS-7091 v1.X M-ATX Mainboard

2

Hardware Setup

This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. Also, it provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc. While doing the installation, be careful in holding the components and follow the installation procedures.

Quick Components Guide



Central Processing Unit: CPU

The mainboard supports Intel® Pentium 4 Prescott processor. The mainboard uses a CPU socket called LGA775. When you are installing the CPU, **make sure to install the cooler to prevent overheating**. If you do not have the CPU cooler, contact your dealer to purchase and install them before turning on the computer.

For the latest information about CPU, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php.



MSI Reminds You...

Overheating

Overheating will seriously damage the CPU and system, always make sure the cooling fan can work properly to protect the CPU from overheating.

Replacing the CPU

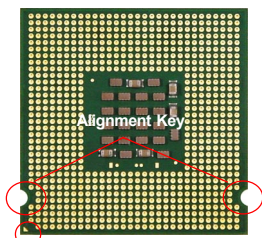
While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from grounded outlet first to ensure the safety of CPU.

Overclocking

*This motherboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while doing overclocking. Any attempt to operate beyond product specifications is not recommended. **We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.***

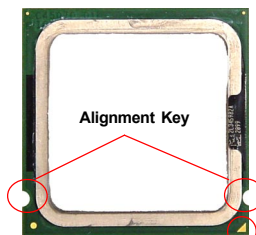
Introduction to LGA 775 CPU

The pin-pad side of LGA 775 CPU.



Yellow triangle is the Pin 1 indicator

The surface of LGA 775 CPU. Remember to apply some silicone heat transfer compound on it for better heat dispersion.



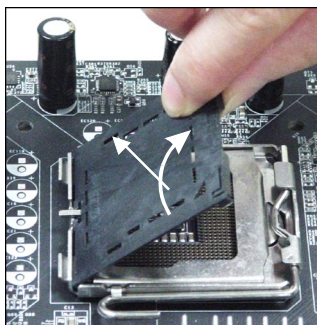
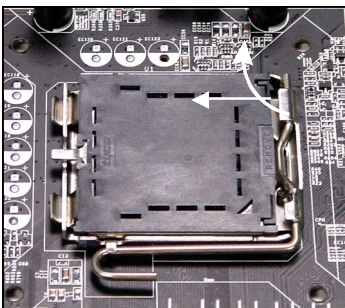
Yellow triangle is the Pin 1 indicator

CPU & Cooler Installation

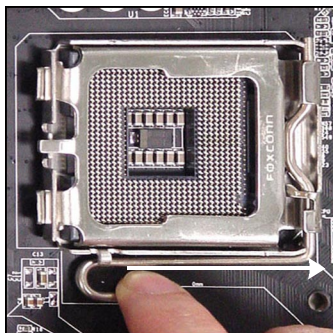
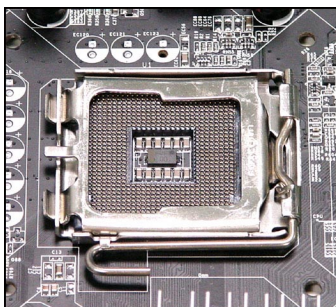
When you are installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating.** If you do not have the cooler, contact your dealer to purchase and install them before turning on the computer. Meanwhile, do not forget to apply some silicon heat transfer compound on CPU before installing the heat sink/cooler fan for better heat dispersion.

Follow the steps below to install the CPU & cooler correctly. Wrong installation will cause the damage of your CPU & mainboard.

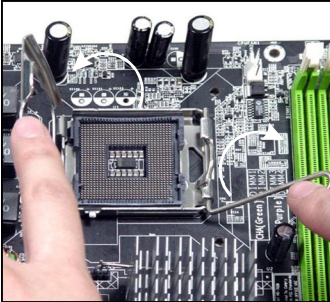
1. The CPU has a plastic cap on it to protect the contact from damage. Before you install the CPU, always cover it to protect the socket pin.
2. Remove the cap from lever hinge side (as the arrow shows).



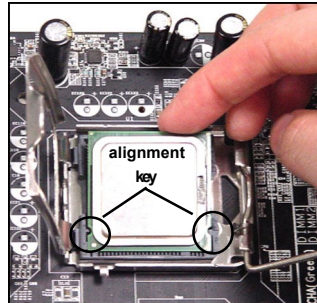
3. The pins of socket reveal.
4. Open the load lever.



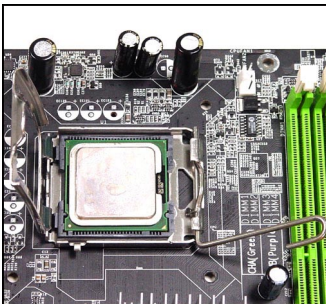
5. Lift the load lever up and open the load plate.



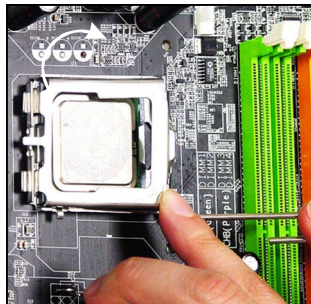
6. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.



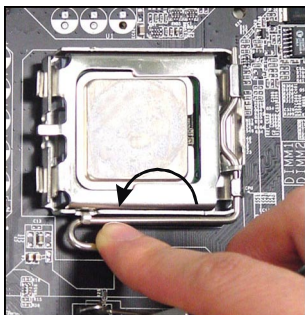
7. Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.



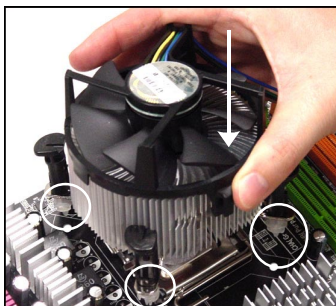
8. Cover the load plate onto the package.



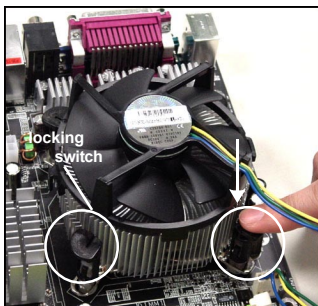
9. Press down the load lever lightly onto the load plate, and then secure the lever with the hook under retention tab.



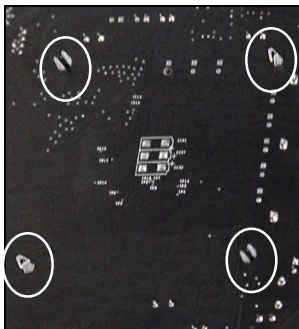
10. Align the holes on the mainboard with the heatsink. Push down the cooler until its four clips get wedged into the holes of the mainboard.



11. Press the four hooks down to fasten the cooler. Then rotate the locking switch (refer to the correct direction marked on it) to lock the hooks.



12. Turn over the mainboard to confirm that the clip-ends are correctly inserted.

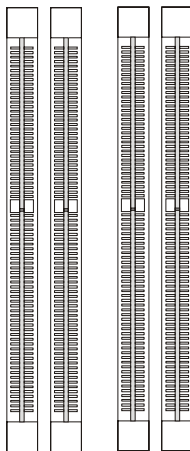


MSI Reminds You...

1. Confirm if your CPU cooler is firmly installed before turning on your system.
2. Do not touch the CPU socket pins to avoid damaging.
3. Whenever CPU is not installed, always protect your CPU socket pin with the plastic cap covered (shown in Figure 1) to avoid damaging.
4. Please note that the mating/unmating durability of the CPU is 20 cycles. Therefore we suggest you do not plug/unplug the CPU too often.

Memory

The mainboard provides 4 slots for 184-pin DDR SDRAM DIMM (Double In-Line Memory Module) modules and supports the memory size up to 4GB. You can install DDR400/DDR333 modules on the DDR DIMM slots (DIMM 1~4).



DDR DIMM Slots
(DIMM 1~4)

Introduction to DDR SDRAM

DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM. Please note that the DDR SDRAM does not support ECC (error correcting code) and registered DIMM.

DDR Population Rules

Install at least one DIMM module on the slots. Each DIMM slot supports up to a maximum size of 1GB. Users can install either single- or double-sided modules to meet their own needs. Please note that **each DIMM can work respectively for single-channel DDR, but there are some rules while using dual-channel DDR** (Please refer to the suggested DDR population table on p.2-8). Users may install memory modules of different type and density on different-channel DDR DIMMs.

However, the **same type and density memory modules** are necessary while using dual-channel DDR, or instability may happen.

Please refer to the following table for detailed dual-channel DDR. Other combination not listed below will function as single-channel DDR.

DIMM1 (Ch A)	DIMM2 (Ch A)	DIMM3 (Ch B)	DIMM4 (Ch B)	System Density
128MB~1GB		128MB~1GB		256MB~2GB
	128MB~1GB		128MB~1GB	256MB~2GB
128MB~1GB	128MB~1GB	128MB~1GB	128MB~1GB	512MB~4GB

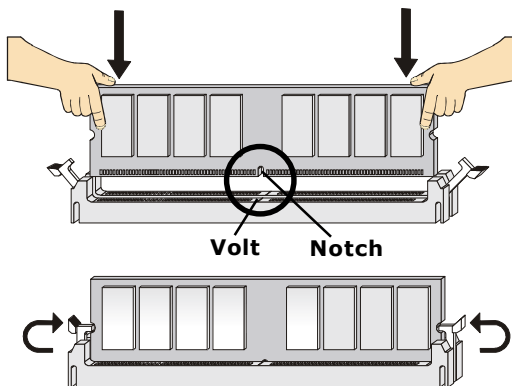


MSI Reminds You...

*Dual-channel DDR works **ONLY** in the 3 combinations listed in the table above.*

Installing DDR Modules

1. The DDR DIMM has only one notch on the center of module. The module will only fit in the right orientation.
2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.
3. The plastic clip at each side of the DIMM slot will automatically close.



MSI Reminds You...

You can barely see the golden finger if the module is properly inserted in the socket.

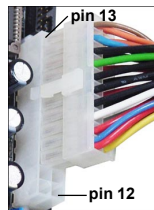
Power Supply

The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 24-Pin Power Connector: ATX1

This connector allows you to connect an ATX 24-pin power supply. To connect the ATX 24-pin 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.

You may use the 20-pin ATX power supply as you like. If you'd like to use the 20-pin ATX power supply, please plug your power supply along with pin 1 & pin 13 (refer to the image at the right hand). There is also a foolproof design on pin 11, 12, 23 & 24 to avoid wrong installation.



Pin Definition

ATX1		Pin Definition			
		PIN	SIGNAL	PIN	SIGNAL
	13	1	+3.3V	13	+3.3V
		2	+3.3V	14	-12V
		3	GND	15	GND
		4	+5V	16	PS-ON#
		5	GND	17	GND
		6	+5V	18	GND
		7	GND	19	GND
		8	PWR OK	20	Res
		9	5VSB	21	+5V
		10	+12V	22	+5V
		11	+12V	23	+5V
	24	12	NC	24	GND

ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.

JPW1 Pin Definition

JPW1		JPW1 Pin Definition	
		PIN	SIGNAL
	2	1	GND
	4	2	GND
		3	12V
		4	12V

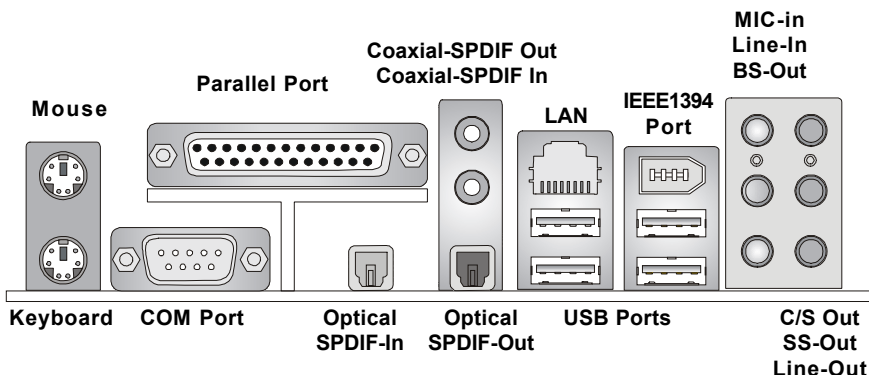


MSI Reminds You...

1. These two connectors connect to the ATX power supply and have to work together to ensure stable operation of the mainboard.
2. Power supply of 350 watts (and above) is highly recommended for system stability.
3. ATX 12V power connection should be greater than 18A.

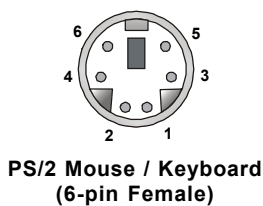
Back Panel

The back panel provides the following connectors:



Mouse/Keyboard Connector

The mainboard provides a standard PS/2® mouse/keyboard mini DIN connector for attaching a PS/2® mouse/keyboard. You can plug a PS/2® mouse/keyboard directly into this connector. The connector location and pin assignments are as follows:

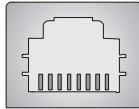


Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Mouse/Keyboard Data	Mouse/Keyboard data
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse/Keyboard Clock	Mouse/Keyboard clock
6	NC	No connection

RJ-45 LAN Jack

The mainboard provides a RJ-45 connector that allows your computer to be connected to a network environment.



LAN Jack
(RJ-45)

Pin	Signal	Description
1	TDP	Transmit differential pair
2	TDN	Transmit differential pair
3	RDP	Receive differential pair
4	NC	Not used
5	NC	Not used
6	RDN	Receive differential pair
7	NC	Not used
8	NC	Not used

IEEE1394 Port

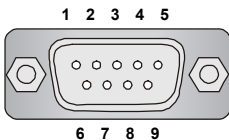
The mainboard provides a rear IEEE 1394 port. The standard IEEE1394 port connects to IEEE1394 devices without external power. The IEEE1394 high-speed serial bus complements USB by providing enhanced PC connectivity for a wide range of devices, including consumer electronics audio/video (A/V) appliances, storage peripherals, other PCs, and portable devices.



**IEEE1394
Port
(Standard)**

Serial Port Connector: COM Port

The mainboard offers one 9-pin male DIN connectors as serial port COM port. This port is a 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to this connector.



9-Pin Male DIN Connector

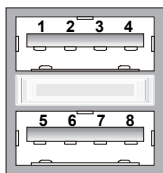
Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

USB Connectors

The mainboard provides a UHCI (Universal Host Controller Interface) Universal Serial Bus root for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.

USB Port Description

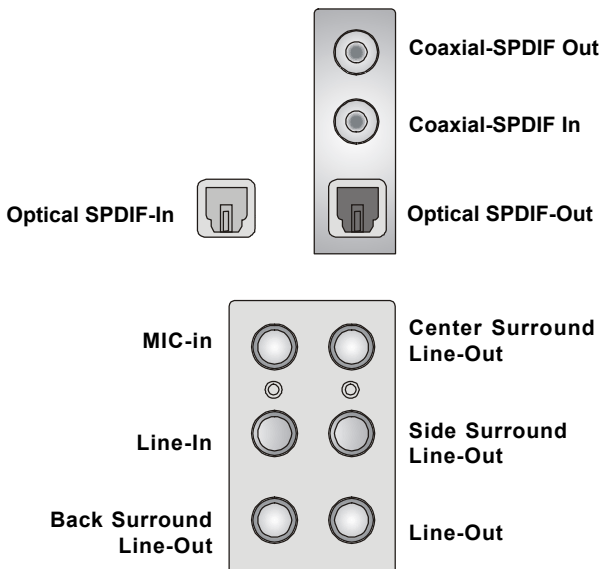


USB Ports

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

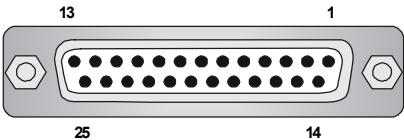
Audio Port Connectors

This mainboard supports 6-channel audio operation. To have correct audio operation, please connect the speakers to the proper connectors as illustrated below. The SPDIF connectors provided on the back panel also can be used to connect your digital audio equipment.



Parallel Port Connector: LPT1

The mainboard provides a 25-pin female centronic connector as LPT. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.



Pin Definition

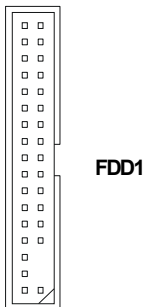
PIN	SIGNAL	DESCRIPTION
1	STROBE	Strobe
2	DATA0	Data0
3	DATA1	Data1
4	DATA2	Data2
5	DATA3	Data3
6	DATA4	Data4
7	DATA5	Data5
8	DATA6	Data6
9	DATA7	Data7
10	ACK#	Acknowledge
11	BUSY	Busy
12	PE	PaperEnd
13	SELECT	Select
14	AUTO FEED#	Automatic Feed
15	ERR#	Error
16	INIT#	Initialize Printer
17	SLIN#	Select In
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, LAN, USB Ports, IR module and CPU/System/Power Supply FAN.

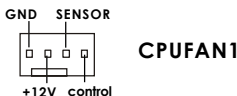
Floppy Disk Drive Connector: FDD1

The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.



Fan Power Connectors: CPUFAN1

The CPUFAN1 (processor fan) supports system cooling fan with +12V. It supports four-pin/three-pin head connector. When connecting the wire to the connectors, always take 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 mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

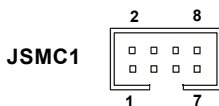


MSI Reminds You...

1. Always consult the vendors for proper CPU cooling fan.
2. CPUFAN1 supports the fan control. Fan/heatsink with 3 or 4 pins are both available.
3. Please refer to the recommended CPU fans at Intel® official website.

Smart Card Reader Connector: JSMC1

The mainboard provides one smart card reader header for users to connect to smart card interface.

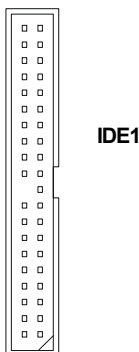


Pin Definition

Pin	Signal	Pin	Signal
1	VCC5	2	SCRST#
3	SCPWR#	4	SCPSNT
5	GND	6	SCIO
7	SCLED	8	SCCLK

Hard Disk Connector: IDE1

The mainboard has one 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA33/66/100 function. You can connect up to 2 hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices. The connector supports the provided IDE hard disk cable.



IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.



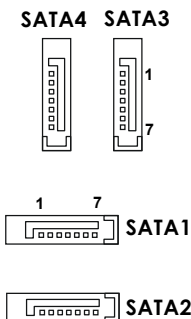
MSI Reminds You...

If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA Connectors controlled by Intel ICH6: SATA1~SATA4

The SouthBridge of this mainboard is Intel ICH6 which supports four serial ATA connectors SATA1~SATA4.

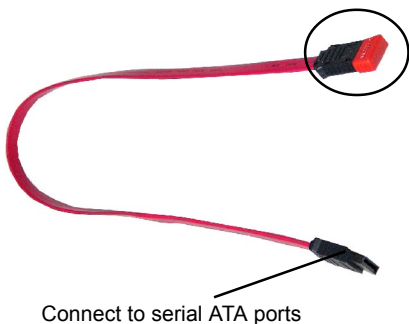
SATA1~SATA4 are dual high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150 MB/s. Both connectors are fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device. Please note that the hard disk with your operating system installed should be always connected to SATA1 or SATA2.



SATA1~ SATA4 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		

Serial ATA cable



Take out the dust cover and connect to the hard disk devices

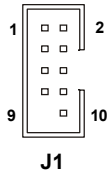


MSI Reminds You...

Please do not fold the serial ATA cable in a 90-degree angle, since this might cause the loss of data during the transmission.

IEEE 1394 Connectors: J1

The mainboard provides one IEEE 1 pin header that allows you to connect IEEE 1394 port via front panel.

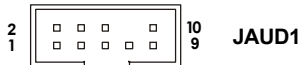


Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	TPA+	2	TPA-
3	Ground	4	Ground
5	TPB+	6	TPB-
7	Cable power	8	Cable power
9	Key (no pin)	10	Ground

Front Panel Audio Connector: JAUD1

The JAUD1 front panel audio connector allows you to connect front panel audio devices if available.

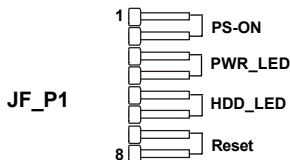


JAUD1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	AUD_MIC	Front panel microphone input signal
2	AUD_GND	Ground used by analog audio circuits
3	AUD_MIC_BIAS	Microphone power
4	AUD_VCC	Filtered +5V used by analog audio circuits
5	AUD_FPOUT_R	Right channel audio signal to front panel
6	NC	NC
7	HP_ON	Reserved for future use to control headphone amplifier
8	KEY	No pin
9	AUD_FPOUT_L	Left channel audio signal to front panel
10	NC	NC

Front Panel Connector: JF_P1

The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs.



Front USB Connector: JUSB1

The mainboard provides one USB 2.0 pin header JUSB1 that is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems** and **the like**.



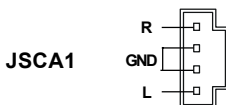
JUSB1
(USB 2.0)

JUSB1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	USBOC

SCART Output Connector: JSCA1

The JSCA1 connector allows you to connect the output device with SCART spec. SCART is the established European standard for connecting home video equipment like TVs, VCRs, DVD player, etc.



USB Wireless LAN Connector: JUSB2

This connector is specially designed to connect to the USB wireless device.



JUSB2

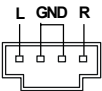
JUSB2 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	+5V Dual	2	+5V Dual
3	GND	4	USB1-
5	GND	6	USB1+
7	GND	8	GND
9	+3.3V Dual	10	+3.3V Dual

Video-In Connector: JVID1

The connector is for TV-Turner card audio connector.

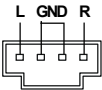
JVID1



Front Audio Line-In Connector: JL_IN1

The JL_IN1 Front Audio Line-In connector allows you to connect front panel audio devices if available.

JL_IN1

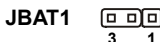


Jumpers

The motherboard provides the following jumpers for you to set the computer's function. This section will explain how to change your motherboard's function through the use of jumpers.

Clear CMOS Jumper: JBAT1

There is a CMOS RAM on board that has a power supply from 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. That battery has long life time for at least 5 years. If you want to clear the system configuration, use the JBAT1 (Clear CMOS Jumper) to clear data. Follow the instructions below to clear the data:



Keep Data



Clear Data



MSI Reminds You...

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 mainboard.

Slots

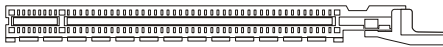
The motherboard provides one PCI Express x16 slot and three 32-bit PCI bus slots.

PCI Express Slots

The PCI Express slot, as a high-bandwidth, low pin count, serial, interconnect technology, support Intel highest performance desktop platforms utilizing the Intel Pentium 4 processor with HT Technology.

PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a PCI Express x1 lane for Gigabit Ethernet, TV Tuners, 1394 controllers, and general purpose I/O. Also, desktop platforms with PCI Express Architecture will be designed to deliver highest performance in video, graphics, multimedia and other sophisticated applications. Moreover, PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP8x designs with transfer rates of 4.0 GB/s over a PCI Express x16 lane for graphics controllers.

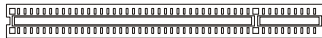
You can insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first.



PCI Express x16 slot

PCI (Peripheral Component Interconnect) Slots

The PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration. ***The second PCI slot (in BLUE color) supports 2 master devices.***



PCI Slots

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus INT A# ~ INT D# pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#
PCI Slot 3	INT C#	INT D#	INT A#	INT B#