MS-7046 (v1.X) M-ATX Mainboard

G52-M7046X1

Manual Rev: 1.0
Release Date: August 2004

CE   **N1996**

FCC-B Radio Frequency Interference Statement

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 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 A.C. 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.

FCC	**Micro-Star International** **MS-7046**
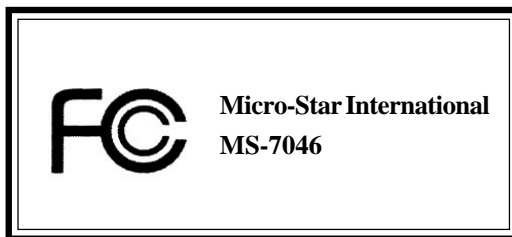
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation

Revision History

Revision	Revision History	Date
V1.0	First release of PCB 1.0 Intel 915P & Intel ICH6	August 2004

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 MSI homepage & FAQ site for technical guide, BIOS updates, driver

updates, and other information: **http://www.msi.com.tw** & **http://www.msi. com.tw/program/service/faq/faq/esc_faq_list.php**

➤ Contact our technical staff at: **support@msi.com.tw**

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. **Do not cover the openings.**
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
    ➤ The power cord or plug is damaged.
    ➤ Liquid has penetrated into the equipment.
    ➤ The equipment has been exposed to moisture.
    ➤ The equipment has 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.
12. **Do not leave this equipment in an environment unconditioned, storage temperature above 60^0 C (140^0F), it may damage the equipment.**

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

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CONTENTS

Getting Started

Thank you for choosing the MS-7046 v1.X Micro ATX mainboard. The MS-7046 v1.X mainboard is based on **Intel® 915P** and **Intel® ICH6** chipset for optimal system efficiency. Designed to fit the advanced **Intel® Pentium Prescott LGA775** processor, the MS-7046 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® ICH6 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.

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 ICH6.
  - Supports PIO, Bus Master operation modes.
  - Can connect up to Two Ultra ATA drives.
➤ Serial ATA 150 controller integrated in ICH6.
  - 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 (4/6 Pins)
  - 1 Coaxial SPDIF-Out / SPDIF-In
  - 1 MIC-In
  - 4 Line-Out

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® ICH6 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
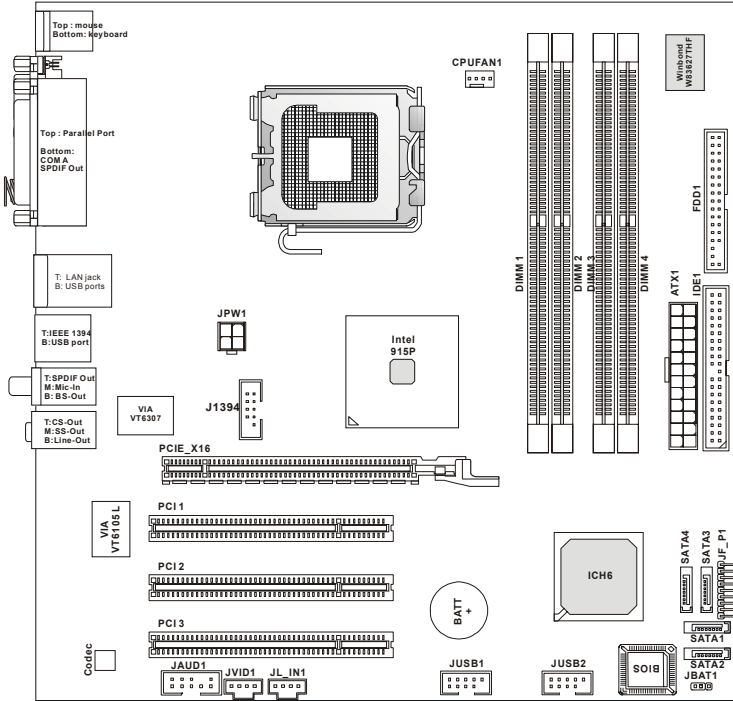
MS-7046 v1.X M-ATX Mainboard

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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.

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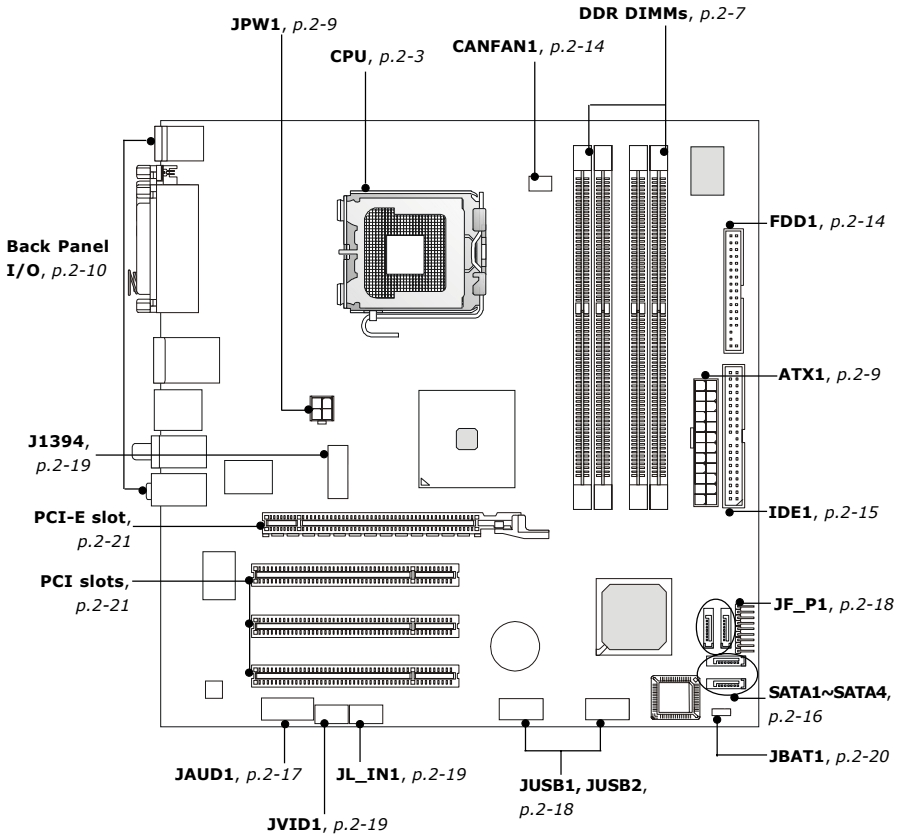
Central Processing Unit: CPU

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 speci-fications 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.
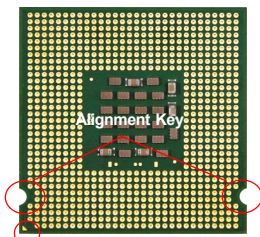
The surface of LGA 775 CPU. Remember to apply some sili-cone heat transfer compound on it for better heat dispersion.

Alignment Key

Alignment Key

Yellow triangle is the Pin 1 indicator
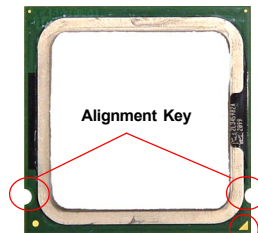
Yellow triangle is the Pin 1 indicator

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).
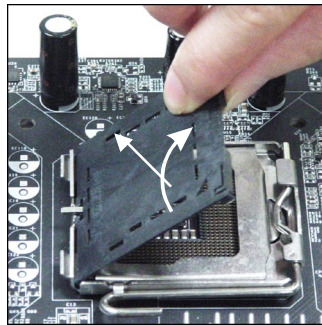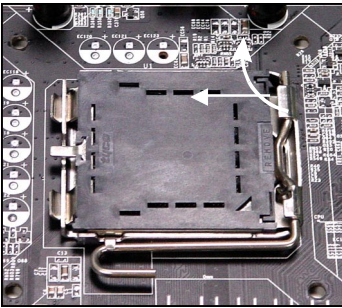
3. The pins of socket reveal.

4. Open the load lever.
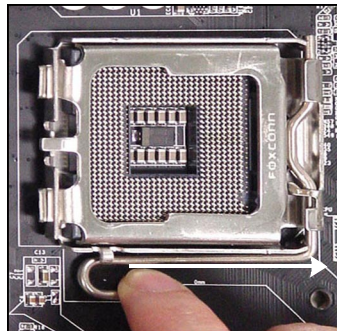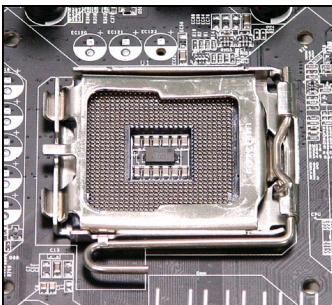
5. Lift the load lever up and open the load plate.
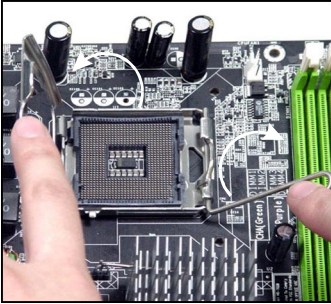
6. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.
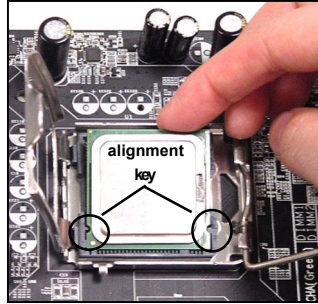
7. Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.
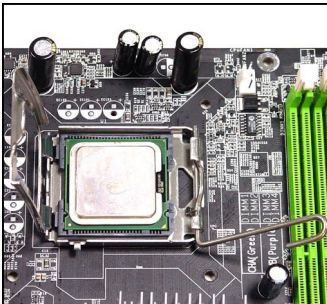
8. Cover the load plate onto the package.
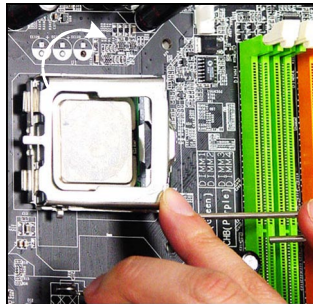
9. Press down the load lever lightly onto the load plate, and then secure the lever with the hook under retention tab.
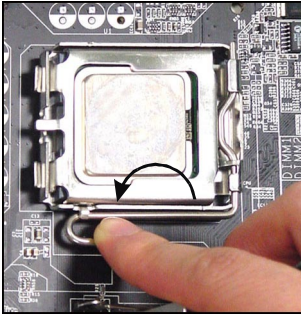
10. Align the holes on the mainboard with the heatsink. Push down the cooler until its four clips get wedged into the holes of the mainboard.
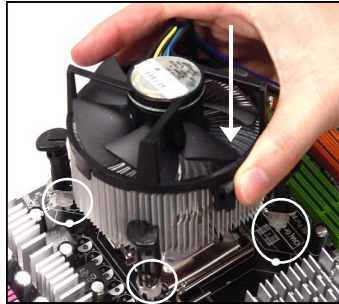
11. Press the four hooks down to fasten the cooler. Then rotate the locking switch (refer to the correct direction marked on it) to lock the hooks.
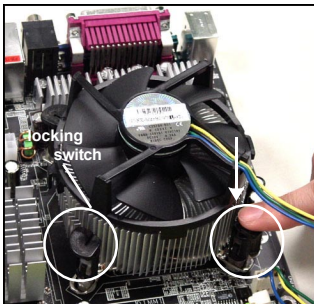
12. Turn over the mainboard to confirm that the clip-ends are correctly inserted.
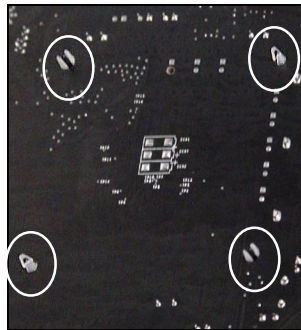
MSI Reminds You...
1. Confirm if your CPU cooler is firmly installed before turning on your system.
2. Check the information in *H/W Monitor* in BIOS (refer to p.3-20 for details) for the CPU temperature.
3. Do not touch the CPU socket pins to avoid damaging.
4. Whenever CPU is not installed, always protect your CPU socket pin with the plastic cap covered (shown in Figure 1) to avoid damaging.
5. 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).
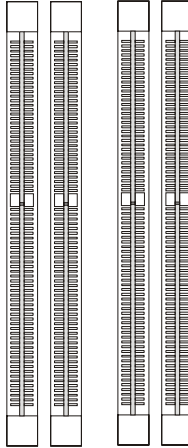
DDR DIMM Slots (DIMM 1~4)

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.

Volt   Notch
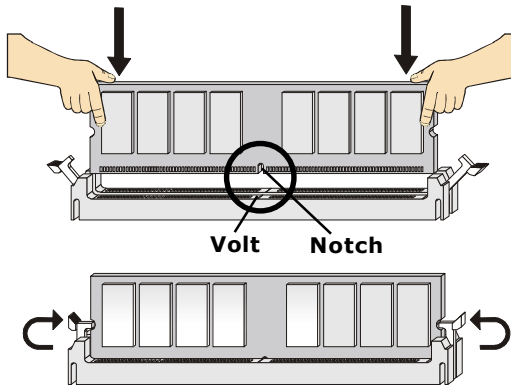
MSI Reminds You...
You can barely see the golden finger if the module is properly inserted in the socket.

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

PIN	SIGNAL	PIN	SIGNAL
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
12	NC	24	GND

ATX 12V Power Connector: JPW1

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

JPW1 Pin Definition

PIN	SIGNAL
1	GND
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:
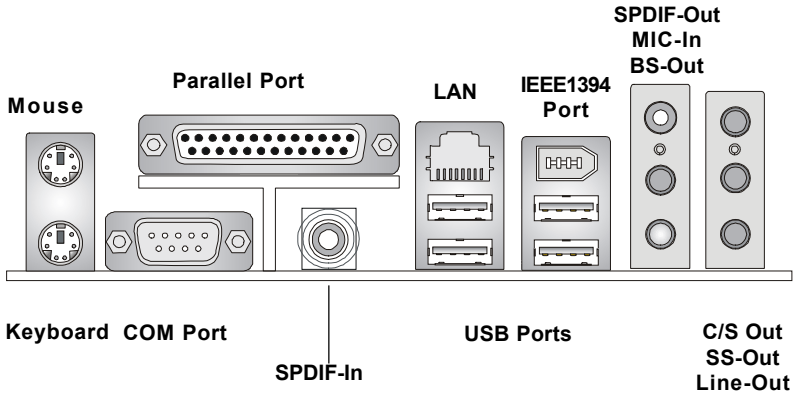
Mouse/Keyboard Connector

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

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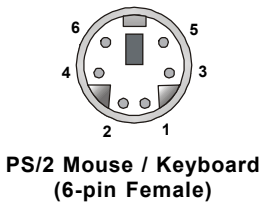
PIN	SIGNAL	DESCRIPTION
1	Mouse/Keyboard Data	Mouse/Keyboard data
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse/Keyboard Clock	Mouse/Keyboard clock
6	NC	No connection

RJ-45 LAN Jack

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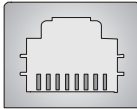
LAN Jack

(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.
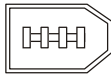
**IEEE1394
Port
(Standard)**

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.

1 2 3 4 5

6 7 8 9
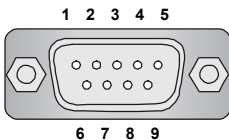
9-Pin Male DIN Connector

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.
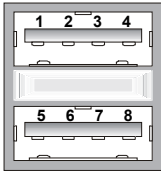
USB Port Description

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

1 2 3 4

5 6 7 8

USB Ports

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 privided on the back pannel also can be used to connect your digital audio equipment.

SPDIF-In

SPDIF-Out

Center/ Subwoofer Out

MIC

Side Surrond Out

Back Surround Out

Line-Out
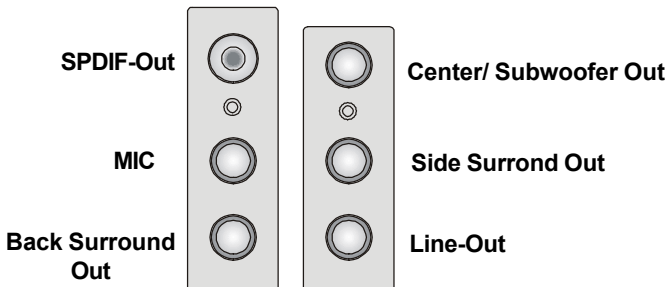
Parallel Port Connector: LPT1

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.
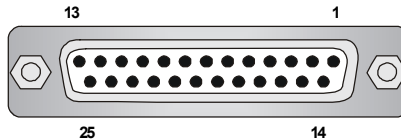
Pin Definition

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.

FDD1
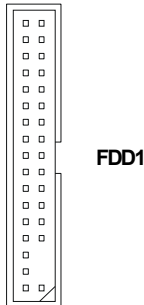
Fan Power Connectors: CPUFAN1

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.

GND SENSOR

CPUFAN1

+12V control
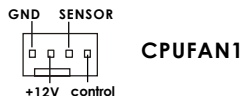
MSI Reminds You...
1. *Always consult the vendors for proper CPU cooling fan.*
2. *CPUFAN1 supports the fan control. Fan/heatsink with 3 or 4 fins are both available.*
3. *Be sure to configure the **CPU FAN control mode** in BIOS for the CPU Fan you are using first. Please refer P.3-20 for details.*
4. *Please refer to the recommended CPU fans at Intel® official website.*

Hard Disk Connector: IDE1

The mainboard has a 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.
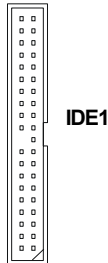
IDE1

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.

SATA4 SATA3

1

7

1   7

SATA1

SATA2
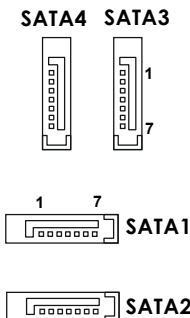
SATA1~ SATA4 Pin Definition

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

Connect to serial ATA ports

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.

Front Panel Audio Connector: JAUD1

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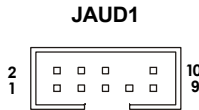
JAUD1

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	AUD_RET_R	Right channel audio signal return from front panel
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	AUD_RET_L	Left channel audio signal return from front panel

MSI

MSI Reminds You...

If you don't want to connect to the front audio header, pins 1 & 2, 3 & 4 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.
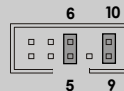
Front Panel Connector: JF_P1

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

```
1 ┌─┐
  │ │── PS-ON
  │ │── PWR_LED
  │ │── HDD_LED
  │ │── Reset
8 └─┘
```

JF_P1
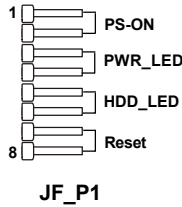
Front USB Connectors: JUSB1 / JUSB2

The mainboard provides two 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, JUSB2
(USB 2.0)

JUSB1/2 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

IEEE 1394 Connectors: J1394

The mainboard provides one IEEE1394 pin header that allows you to connect IEEE 1394 port via front panel.
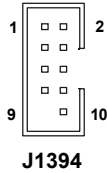
Pin Definition

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

J1394

Video-In Connector: JVID1

The connector is for TV-Turner card audio connector.

JVID1

L GND R
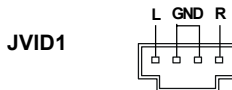
Front Audio Line-In Connector: JL_IN1

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

JL_IN1

L GND R
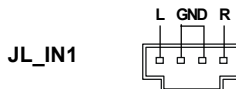
Jumpers

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:

JBAT1

3   1

Keep Data

3   1

Clear Data

3   1

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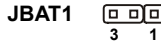
MSI Reminds You...
You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

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.
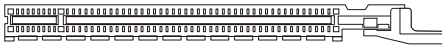
PCI Express x16 slot

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.***
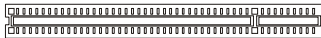
PCI Slots

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 B#	INT C#	INT D#	INT A#
PCI Slot 2	INT C#	INT D#	INT A#	INT B#
PCI Slot 3	INT D#	INT A#	INT B#	INT C#

3

BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.
You may need to run the Setup program when:

◈ An error message appears on the screen during system boot up, and requests you to run SETUP.

◈ You want to change the default settings for customized features.

MSI Reminds You...

1. The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

2. While booting up, the BIOS version is shown in the 1st line appearing after the memory count. It is usually in the format: example: W7046IMS V1.3 080104

where:

1st digit refers to BIOS maker as A=AMI(R); W=AWARD(R)
2nd - 5th digit refers to the model number.
6th digit refers to the chipset vendor.
7th - 8th digit refers to the customer, MS=all standard customers.
V1.3 refers to the BIOS version.
080104 refers to the date this BIOS is released.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <DEL> key to enter Setup.

```
Press DEL to enter SETUP
```

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Selecting the First Boot Device

You are allowed to select the 1st boot device without entering the BIOS setup utility by pressing <F11>. When the same message as listed above appears on the screen, press <F11> to trigger the boot menu.
The POST messages might pass by too quickly for you to respond in time. If so, restart the system and press <F11> after around 2 or 3 seconds to activate the boot menu similar to the following.

Select First Boot Device		
Floppy	: 1st Floppy	
IDE-0	: IBM-DTLA-307038	
CDROM	: ATAPI CD-ROM DRIVE 40X M	
[Up/Dn] Select	[RETURN] Boot	[ESC] cancel

The boot menu will list all the bootable devices. Select the one you want to boot from by using arrow keys, then press <Enter>. The system will boot from the selected device. The selection will not make changes to the settings in the BIOS setup utility, so next time when you power on the system, it will still use the original first boot device to boot up.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Fail-Safe Defaults
<F7>	Load Optimized Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields, that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (-->) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Main Menu

Once you enter Phoenix-Award® BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from the eleven setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```
                  Phoenix - AwardBIOS CMOS Setup Utility

    ▶ Standard CMOS Features          ▶ Frequency/Voltage Control

    ▶ Advanced BIOS Features            Load Fail-Safe Defaults

    ▶ Advanced Chipset Features         Load Optimized Defaults

    ▶ Integrated Peripherals            Set Supervisor Password

    ▶ Power Management Setup            Set User Password

    ▶ PnP/PCI Configurations           Save & Exit Setup

    ▶ H/W Monitor                      Exit Without Saving

    Esc : Quit       F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
    F10 : Save & Exit Setup

                     Time, Date, Hard Disk Type...
```

Standard CMOS Features
Use this menu for basic system configurations, such as time, date etc.

Advanced BIOS Features
Use this menu to setup the items of AWARD® special enhanced features.

Advanced Chipset Features
Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

Power Management Setup
Use this menu to specify your settings for power management.

PNP/PCI Configurations
This entry appears if your system supports PnP/PCI.

H/W Monitor
This entry shows the status of your CPU, fan, warning for overall system status.

Frequency/Voltage Control
Use this menu to specify your settings for CPU / DRAM / PCI / PCI Express frequency/ voltage control and overclocking.

Load Fail-Safe Defaults
Use this menu to load factory default settings into the BIOS for stable system performance operations.

Load Optimized Defaults
Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

Set Supervisor Password
Use this menu to set Supervisor Password.

Set User Password
Use this menu to set User Password.

Save & Exit Setup
Save changes to CMOS and exit setup.

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items in Standard CMOS Features Menu includes some basic setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.
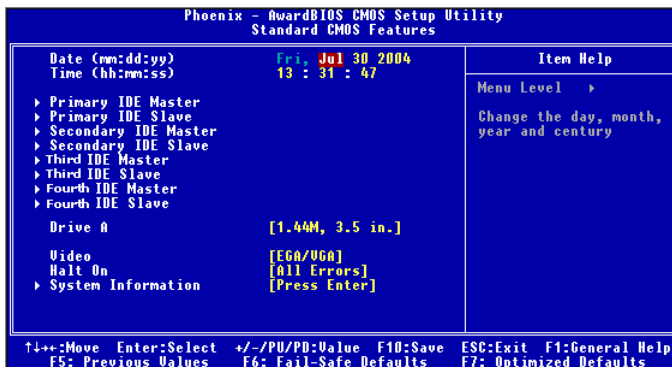
Date
This allows you to set the system to the date that you want (usually the current date). The format is <day><month> <date> <year>.

day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
month	The month from Jan. through Dec.
date	The date from 1 to 31 can be keyed by numeric function keys.
year	The year can be adjusted by users.

Time
This allows you to set the system time that you want (usually the current time). The time format is <hour> <minute> <second>.

Primary/Secondary/Third/Fourth IDE Master/Slave
Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

Access Mode	The settings are CHS, LBA, Large, Auto.
Capacity	The formatted size of the storage device.
Cylinder	Number of cylinders.
Head	Number of heads.
Precomp	Write precompensation.
Landing Zone	Cylinder location of the landing zone.
Sector	Number of sectors.

Drive A
This item allows you to set the type of floppy drive installed. Available options: [None], [360K, 5.25 in.], [1.2M, 5.25 in.], [720K, 3.5 in.], [1.44M, 3.5 in.], [2.88M, 3.5 in.].

Video
The setting controls the type of video adapter used for the primary monitor of the system. Available options are [EGA/VGA], [CGA 40], [CGA 80] and [Mono].

Halt On
The setting determines whether the system will stop if an error is detected at boot. Available options are:

[All Errors]	The system stops when any error is detected.
[No Errors]	The system doesn't stop for any detected error.
[All, But Keyboard]	The system doesn't stop for a keyboard error.
[All, But Diskette]	The system doesn't stop for a disk error.
[All, But Disk/Key]	The system doesn't stop for either a disk or a keyboard error.

System Information
Press <Enter> to enter the sub-menu and the following screen appears:

```
              Phoenix - AwardBIOS CMOS Setup Utility
                       System Information
 ┌──────────────────────────────────────┬──────────────────────┐
 │ Total Memory            1024K         │       Item Help      │
 │ BIOS version                          ├──────────────────────┤
 │ CPU Type                              │ Menu Level    ▶▶     │
 │ CPU ID/uCodeID                        │                      │
 │ CPU Frequency                         │                      │
 └──────────────────────────────────────┴──────────────────────┘
```
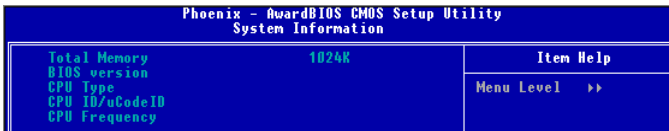
Total Memory / BIOS Version / CPU Type / CPU ID/uCode ID / CPU Frequency
The items show the CPU type, BIOS version and memory status of your system (read only).

Advanced BIOS Features

```
            Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced BIOS Features

   Hyper-Threading Function    [Enabled]         ┌──── Item Help ────┐
   USB Flash Disk Type         [Auto]            │
   Quick Boot                  [Enabled]         │ Menu Level    ▶
   MPS Table Version           [1.4]             │
   Boot to OS/2                [No]              │
 ▶ Boot Sequence               [Press Enter]     │




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```
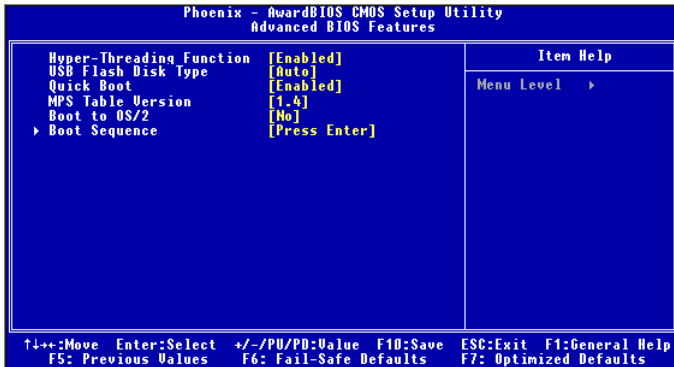
Hyper-Threading Technology
The processor uses Hyper-Threading technology to increase transaction rates and reduces end-user response times. The technology treats the two cores inside the processor as two logical processors that can execute instructions simultaneously. In this way, the system performance is highly improved. If you disable the function, the processor will use only one core to execute the instructions. Settings: [Enabled], [Disabled].

MSI

MSI Reminds You...
Enabling the functionality of Hyper-Threading Technology for your computer system requires ALL of the following platform Components:
- ***CPU:*** *An Intel® Pentium® 4 Processor with HT Technology;*
- ***Chipset:*** *An Intel® Chipset that supports HT Technology;*
- ***BIOS:*** *A BIOS that supports HT Technology and has it enabled;*
- ***OS:*** *An operating system that supports HT Technology.*

For more information on Hyper-threading Technology, go to:
www.intel.com/info/hyperthreading

Quick Boot
Setting the item to [Enabled] allows the system to boot within 5 seconds since it will skip some check items. Setting options: [Enabled], [Disabled].

USB Flash Disk Type
This field allows you to specify the mode of the connected USB flash disk.
[Auto]	By USB device.
[Floppy]	Emulation to Floppy Mode.
[HDD]	Emulation to HDD mode.

MPS Table Version
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system. Setting options: [1.4], [1.1].

Boot to OS/2
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose [No], you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose [Yes]. Setting options: [Yes], [No].

Boot Sequence
Press <Enter> to enter the sub-menu and the following screen appears:

```
           Phoenix - AwardBIOS CMOS Setup Utility
                        Boot Secquence
 ┌──────────────────────────────────────┬──────────────────────────┐
 │ ▶ Hard Disk Boot Priority   [Press Enter]│        Item Help         │
 │   1st Boot Device           [Floppy]   ├──────────────────────────┤
 │   2st Boot Device           [Hard Disk]│ Menu Level    ▶▶         │
 │   3rd Boot Device           [CDROM]    │                          │
 │   Boot From Other Device    [Enabled]  │ Select Hard Disk Boot    │
 │                                        │ Device Priority          │
 └──────────────────────────────────────┴──────────────────────────┘
```
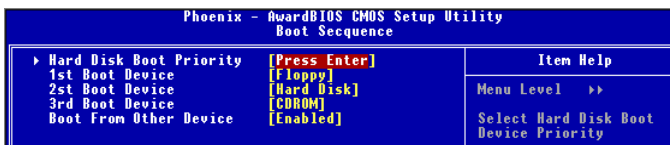
1st/2nd/3rd Boot Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

> **MSI** **MSI Reminds You...**
> *Available settings for "1st/2nd/3rd Boot Device" vary depending on the bootable devices you have installed. For example, if you did not install a floppy drive, the setting "Floppy" will not show up.*

Boot from Other Device
Setting the option to [Enabled] allows the system to try to boot from other device if the system fails to boot from the 1st/2nd/3rd boot device.

Advanced Chipset Features

```
            Phoenix - AwardBIOS CMOS Setup Utility
                   Advanced Chipset Features

   DRAM Timing Selectable      [By SPD]              Item Help
   CAS Latency Time            [2.5]
   DRAM RAS# to CAS# Delay     [3]              Menu Level   ▶
   DRAM RAS# Precharge         [3]
   Precharge dealy (tRAS)      [8]
   System Memory Frequency     [400MHz]
   Video  BIOS Cacheable       [Disabled]
   Memory Hole                 [Disabled]
 ▶ PCI Express Root Port Func[Press Enter]




 ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

DRAM Timing Selectable
Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to [By SPD] enables DRAM timings and the following related items (*CAS Latency Time, DRAM RAS# to CAS# Delay, DRAM RAS# Precharge, Precharge Delay (tRAS), System Frequency*) to be determined by BIOS based on the configurations on the SPD. Selecting [Manual] lets users configure the DRAM timings and the following related items manually. Setting options: [Manual], [By SPD].

CAS Latency Time
This controls the CAS latency, which determines the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Settings: [Auto], [2], [2.5], [3]. [2] increases the system performance the most while [3] provides the most stable performance.

DRAM RAS# to CAS# Delay
When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance. Setting options: [Auto], [2], [3], [4], [5].

DRAM RAS# Precharge
This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Setting options: [Auto], [2], [3], [4], [5].

Precharge delay (tRAS)
This setting determines the precharge delay, which determines the timing delay for DRAM precharge. Setting options: [Auto], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15].

System Memory Frequency
User can place an artificial memory clock limit on the system. Please note that memory is prevented from running faster than this frequency. Setting options: [Auto], [333MHz], [400MHz].

Memory Hole
In order to improve performance, certain space in memory can be reserved for ISA peripherals. This memory must be mapped into the memory space below 16MB. When this area is reserved, it cannot be cached. Settings: [Disabled], [Enabled].

PCI Express Root Port Function
Press <Enter> to enter the sub-menu and the following screen appears:

```
            Phoenix - AwardBIOS CMOS Setup Utility
                   PCI Express Root Port Func

    PCI Express Port        [Auto]              Item Help
    PCI-E Compliancy Mode   [v1.0a]
                                          Menu Level   ▶▶
```
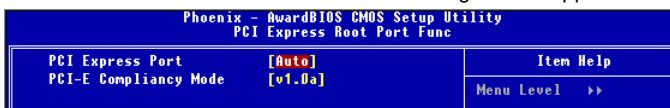
PCI Express Port
These items allow you to enable or disable the controllers of each PCI Express port. Setting options: [Enabled], [Disabled], [Auto].

PCI-E Compliancy Mode
This item allows you to select the supported spec of PCI Express x1 slot. Setting options: [v1.0], [v1.0a].

Integrated Peripherals

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    Integrated Peripherals

   USB Controller              [Enabled]              Item Help
   USB 2.0 Controller          [Enabled]
   USB Keyboard Support        [Enabled]         Menu Level  ▶
   USB Mouse Support           [Enabled]
   Azalia/AC97 Selection       [Auto]
   Onboard VIA 1394            [Enabled]
   Onboard LAN                 [Enabled]
   Onboard Lan Boot ROM        [Disabled]
 ▶ IO Devices Configuration    [Press Enter]
 ▶ IDE Devices Configuration   [Press Enter]
 ▶ SATA Devices Configuration  [Press Enter]




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

USB Controller
Select [Enabled] if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. Setting options: [Enabled], [Disabled].

USB 2.0 Controller
Select [Enabled] if your system contains the USB 2.0 controller. Setting options: [Enabled], [Disabled].

USB Keyboard Support
Select [Enabled] if you need to use a USB-interfaced keyboard or storage device in the operating system. Setting options: [Enabled], [Disabled].

USB Mouse Support
Select [Enabled] if you need to use a USB-interfaced mouse in the operating system. The settings are: [Enabled], [Disabled].

Azalia / AC97 Selection
Selecting [Auto] allows the mainboard to detect whether an audio device is used. If an audio device is detected, the onboard audio (Azalia or AC97) controller will be enabled; if not, it is disabled. Disable the controller if you want to use other controller cards to connect an audio device. Setting optoins: [Auto], [Disabled].

Onboard VIA 1394
This setting controls the onboard VIA 1394 device. Setting options: [Enabled], [Disabled].

Onboard LAN Control
This setting controls the onboard LAN controller. Setting options: [Enabled], [Disabled].

Onboard Lan Boot ROM
This item is used to decide whether to invoke the Boot ROM of the Onboard LAN Chip. Settings: [Enabled], [Disabled].

IO Devices Configuration

Press <Enter> to enter the sub-menu and the following screen appears:

```
             Phoenix - AwardBIOS CMOS Setup Utility
                    IO Devices Configuration
  ┌──────────────────────────────────────────┬──────────────────┐
  │ Onboard FDC Controller    [Enabled]       │     Item Help     │
  │ Onboard Serial Port 1     [3F8/IRQ4]      │                   │
  │ Onboard Parallel Port     [378/IRQ7]      │  Menu Level   ▶▶  │
  │ Parallel Port Mode        [ECP+EPP]       │                   │
  │ EPP Mode Select           [EPP1.9]        │                   │
  │ ECP Mode Use DMA          [3]             │                   │
  │ PWRON After PWR-Fail      [Off]           │                   │
  └──────────────────────────────────────────┴──────────────────┘
```
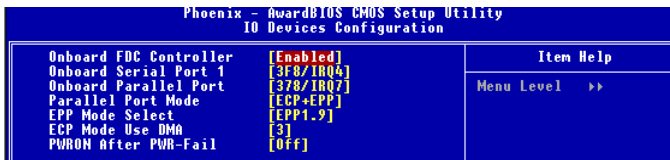
Onboard FDC Controller

Select [Enabled] if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install add-on FDC or the system has no floppy drive, select [Disabled] in this field. Setting options: [Enabled], [Disabled].

Onboard Serial Port 1

Select an address and corresponding interrupt for the first serial port. Setting options: [3F8/IRQ4], [2E8/IRQ3], [3E8/IRQ4], [2F8/IRQ3], [Disabled], [Auto].

Onboard Parallel Port

There is a built-in parallel port on the on-board Super I/O chipset that provides Standard, ECP, and EPP features. It has the following options:

       [Disabled]
       [3BC/IRQ7]   Line Printer port 0
       [278/IRQ5]   Line Printer port 2
       [378/IRQ7]   Line Printer port 1

Parallel Port Mode

SPP : Standard Parallel Port
EPP : Enhanced Parallel Port
ECP : Extended Capability Port
ECP + EPP: Extended Capability Port + Enhanced Parallel Port
Normal

SPP/EPP/ECP/ECP+EPP

To operate the onboard parallel port as Standard Parallel Port only, choose [SPP]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously. Choose [Normal] to use Standard Parallel Port + Bi-Directional Mode simultaneously.

EPP Mode Select

The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: "EPP Mode Select." At this time either [EPP 1.7] spec or [EPP 1.9] spec can be chosen.

ECP Mode Use DMA

The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA." At this time, the user can choose between DMA channel [3] or [1].

PWRON After PWR-fail

This item specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Off]	Leaves the computer in the power off state.
[On]	Leaves the computer in the power on state.
[Former-sts]	Restores the system to the status before power failure or interrupt occurred.

IDE Function Setup

Press <Enter> to enter the sub-menu and the following screen appears:
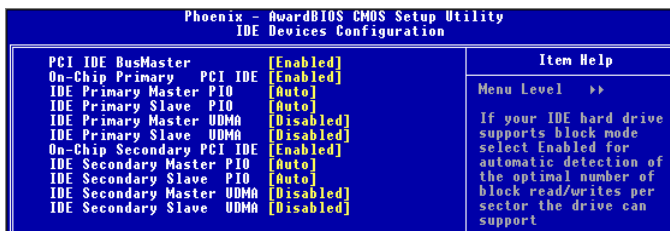
PCI IDE BusMaster

Set this option to [Enabled] to specify that the IDE controller on the PCI local bus has bus mastering capability. Settings options: [Disabled], [Enabled].

On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Choose [Enabled] to activate each channel separately. Settings: [Enabled], [Disabled].

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In [Auto] mode, the system automatically determines the best mode for each device. The settings are: [Auto], [Mode 0], [Mode 1], [Mode 2], [Mode 3], [Mode 4].

IDE Primary/Secondary Master/Slave DMA

Ultra DMA 33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows ME, XP or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66, Ultra DMA/100 and Ultra DMA/133, select Auto to enable BIOS support. Settings: [Auto], [Disabled].

SATA Devices Configuration
Press <Enter> to enter the sub-menu and the following screen appears:

```
                   Phoenix - AwardBIOS CMOS Setup Utility
                       SATA Devices Configuration
 ┌──────────────────────────────────────────────┬──────────────────────┐
 │ *** On-Chip Serial ATA Setting ***            │      Item Help       │
 │ On-Chip Serial ATA        [Enhanced Mode]     ├──────────────────────┤
 │ PATA IDE Mode             [Primary]           │ Menu Level    ▶▶     │
 │ SATA Port                 SATA2 is Secondary  ├──────────────────────┤
 │                                               │ [Disabled]: Disabled │
 └──────────────────────────────────────────────┴──────────────────────┘
```

On-Chip Serial ATA
This setting is used to specify the SATA controller. The settings are:

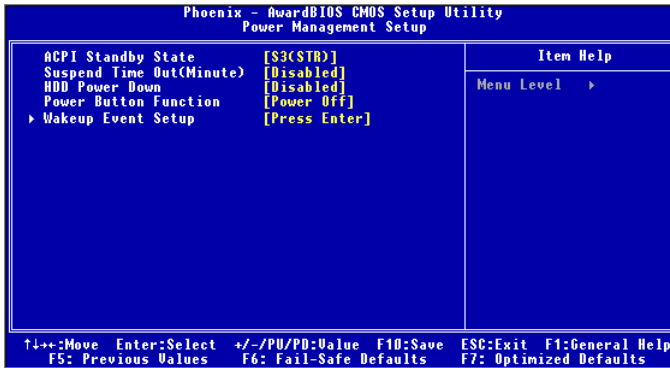|	
[Disabled]	Disable the SATA controller.
[Auto]	PATA and SATA will be arranged by BIOS, and you will be able to see the IDE Device status listed in **Standard COMS Features**.
[Combined]	PATA and SATA will be combined. Max. of 2 IDE drives in each channel are available.
[Enhanced]	PATA and SATA will both be enabled. Max. of 6 IDE drives are supported.
[SATA only]	Only SATA is operating in legacy mode.

PATA IDE Mode
This item is available for you to select the parallel ATA channel. Setting options: [Primary], [Secondary].

SATA Port
This allows you to set the boot sequence of serial ATA port.

Power Management Setup

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Power Management Setup

   ACPI Standby State         [S3(STR)]              Item Help
   Suspend Time Out(Minute)   [Disabled]
   HDD Power Down             [Disabled]          Menu Level    ▶
   Power Button Function      [Power Off]
 ▶ Wakeup Event Setup         [Press Enter]




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

> **MSI Reminds You...**
> *S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.*

ACPI Standby State

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME, Windows 2000 and Windows XP, you can choose to enter the Standby mode in S1(POS) or S3(STR) fashion through the setting of this field. Setting options are:

[S1 (POS)]   The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3 (STR)]   The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

Suspend Time Out (Minute)

If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off. Settings: [Disabled], [1 Min], [2 Min], [4 Min], [8 Min], [12 Min], [20 Min], [30 Min], [40 Min], [1 Hour].

HDD Power Down

If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active. Settings are [Disabled] and [1] through [15] Min.

Power Button Function
This feature sets the function of the power button. Settings are:

[Power Off]   The power button functions as normal power off button.
[Suspend]   When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

Wakeup Event Setup
Press <Enter> and the following sub-menu appears.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                      Wakeup Event Setup

  Resume by PCI Device(PME#)[Enabled]         │      Item Help
  Resume From S3 by USB     [Enabled]         │
  PS/2 KB Wake Up From S3   [Enabled]         │  Menu Level   ▸▸
  PS/2 MS Wake Up From S3   [Enabled]         │
  PS/2 KB Power On          [Disabled]        │
  Resume by RTC Alarm       [Disabled]        │
x Date(of Month) Alarm          0             │
x Time(hh:mm:ss) Alarm          0 :  0 :  0   │
```

Resume by PCI Device (PME#)
When set to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event). Setting options: [Enabled], [Disabled].

Resume From S3 by USB
The item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) sleep state. Setting options: [Disabled], [Enabled].

PS/2 KB/MS Wake Up From S3
The items allow the activity of the PS2 keyboard/mouse to wake up the system from S3 (Suspend to RAM) sleep state. Setting options: [Disabled], [Enabled].

PS/2 KB Power On
The items allow the activity of the PS2 keyboard to power on the system. Setting options: [Disabled], [Enabled].

Resume by RTC Alarm
This is used to enable or disable the feature of booting up the system on a scheduled time/date from the S3, S4, and S5 power off state. Setting options: [Disabled], [Enabled].
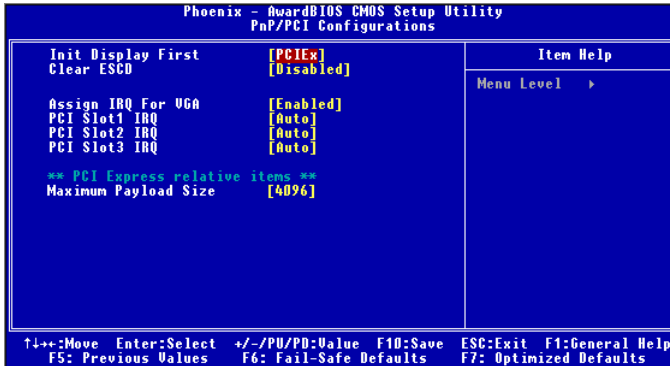
Day (of Month) Alarm
The field specifies the date for *Resume by RTC Alarm*. Settings: [0]~[31].

Time (hh:mm:ss) Alarm
The field specifies the time for *Resume by RTC Alarm*. Format is <hour><minute> <second>.

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                           PnP/PCI Configurations

    Init Display First        [PCIEx]                    Item Help
    Clear ESCD                [Disabled]
                                                    Menu Level  ▶
    Assign IRQ For VGA        [Enabled]
    PCI Slot1 IRQ             [Auto]
    PCI Slot2 IRQ             [Auto]
    PCI Slot3 IRQ             [Auto]

    ** PCI Express relative items **
    Maximum Payload Size      [4096]




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Init Display First
This setting specifies which VGA card is your primary graphics adapter. Setting options are:

[PCI Ex]   The system initializes the PCI Express graphic first. If a PCI Express graphic card is not available, it will initialize the PCI graphic card.

[PCI Slot]   The system initializes the PCI Graphic card first. If a PCI Graphic card is not available, it will initialize the PCI Express graphic.

Clear ESCD
The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to [Enabled], the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to [Disabled] automatically. Setting options: [Enabled], [Disabled].

Assign IRQ For VGA
Set to [Enabled] allows BIOS to assign an IRQ to VGA card. Choose [Disabled] if you want to release the IRQ. Setting options: [Enabled], [Disabled].

PCI Slot1 IRQ, PCI Slot2 IRQ, PCI Slot3 IRQ
These items specify the IRQ line for each PCI slot. Setting options: [3], [4], [5], [7], [9], [10], [11], [12], [14], [15], [Auto]. Selecting [Auto] allows BIOS to automatically determine the IRQ line for each PCI slot.

MSI Reminds You...

IRQ (Interrupt Request) lines are system resources allocated to I/O devices. When an I/O device needs to gain the attention of the operating system, it signals this by causing an IRQ to occur. After receiving the signal, when the operating system is ready, the system will interrupt itself and perform the service required by the I/O device.

PCI Express relative items
Maximum Payload Size
This item allows you to set the maximum TLP (transaction layer packet) payload size for the PCI Express devices. Setting options: [128], [256], [512], [1024], [2048], [4096].

H/W Monitor

This section shows the status of your CPU, fan, overall system status, etc. Monitor function is available only if there is hardware monitoring mechanism onboard.
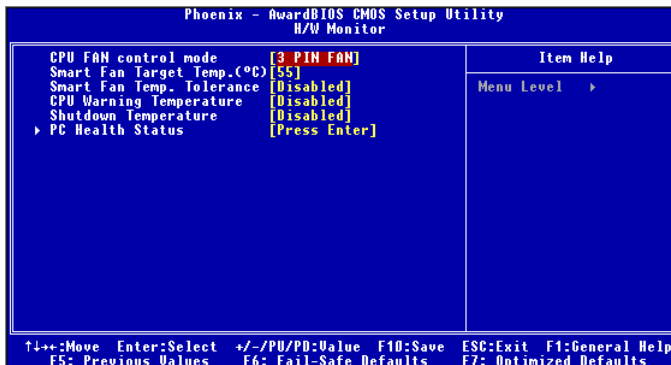
CPU FAN Control mode
If you enable the *CPU Smart Fan Target Temp Select*, this item is available for you to choose the CPU fan pin number of your system. Be sure to select the correct pin number identical to the pin of the CPU fan you purchase. Setting options: [3 PINS], [4 PINS].

Smart Fan Target Temp. (^{o}C)
When the current temperature of the CPU fan reaches the value you specify here, the CPU fan will speed up for cooling down to avoid the CPU damage; on the contrary, if the CPU fan current temperature is lower than the specified value, the CPU fan will slow down its speed to keep the temperature stable.

Smart Fan Temp. Tolerance
You can select a fan tolerance value here for the specific range for the *Smart Fan Target Temp.* item. If the current temperature of the CPU fan reaches the maximum threshold (the temperature set in the *Smart Fan Target Temp.* plus the tolerance value you set here), the fan will speed up for cooling down. On the contrary if the current temperature reaches the minimum threshold (the set temperatures minus the tolerance value), the fan will slow down to keep the temperatures stable.
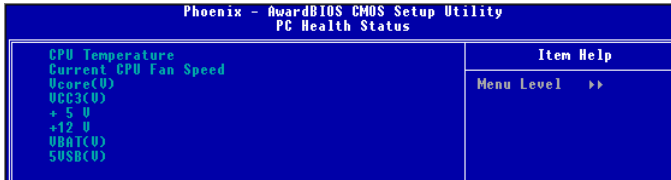
CPU Warning Temperature
This item is used to specify a thermal limit for CPU. If CPU temperature reaches the specified limit, the system will issue a warning and allows you to prevent the CPU overheating problem.

Shutdown Temperature
If the CPU temperature reaches the upper limit preset in this setting, the system will be shut down automatically. This helps you to prevent the CPU overheating problem. This item is available only when your OS supports this function, such as Windows ME/XP.

PC Health Status
Press <Enter> and the following sub-menu appears.
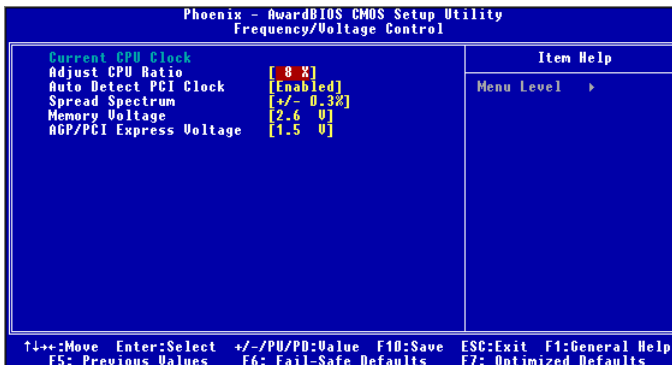

CPU Temperature, Current CPU Fan Speed, Vcore(V), VCC3(V), +5 V, +12 V, VBAT(V) +5VSB(V)
These items display the current status of all of the monitored hardware devices/ components such as CPU voltage, temperatures and all fans' speeds.

Frequency/Voltage Control

The items in Frequency/Voltage Menu includes some important settings of CPU, PCI Express, PCI Slots, DRAM and overclocking functions.

```
                 Phoenix - AwardBIOS CMOS Setup Utility
                       Frequency/Voltage Control
   Current CPU Clock                               ┌─────────────────┐
   Adjust CPU Ratio              [ 8 X]            │    Item Help    │
   Auto Detect PCI Clock         [Enabled]         │                 │
   Spread Spectrum               [+/- 0.3%]        │ Menu Level    ▶ │
   Memory Voltage                [2.6  V]          │                 │
   AGP/PCI Express Voltage       [1.5  V]          │                 │

   ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
        F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

MSI **MSI Reminds You...**
Change these settings only if you are familiar with the chipset.

Current CPU Clock
These two items show the current clocks of CPU. Read-only.

Adjust CPU Ratio
This item allows you to adjust the CPU ratio. The setting range depends on the CPU you installed.

Auto Detect PCI Clk
This item is used to auto detect the PCI slots. When set to [Enabled], the system will remove (turn off) clocks from empty PCI slots to minimize the electromagnetic interference (EMI). Settings: [Enabled], [Disabled].

Spread Spectrum
When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses creates EMI (Electromagnetic Interference). The *Spread Spectrum* function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves. If you do not have any EMI problem, leave the setting at [Disabled] for optimal system stability and performance. But if you are plagued by EMI, select the desired range for EMI reduction. Remember to disable *Spread Spectrum* function if you are overclocking, because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up.

Memory Voltage
Adjusting the DDR voltage can increase the DDR speed. Any changes made to this setting may cause a stability issue, so ***changing the DDR voltage for long-term purpose is NOT recommended***.

AGP/PCI Express Voltage
AGP voltage and PCI Express voltage are both adjustable in their individual fields, allowing you to increase the performance of your AGP display card/PCI Express card when overclocking, but the stability may be affected.

MSI

MSI Reminds You...
*The settings shown in different color in **Memory Voltage** and **AGP/ PCI Express Voltage** help to verify if your setting is proper for your system.*
Gray: Default setting.
Yellow: High performance setting.
**Red: Not recommended setting and the system may be
          unstable.**
*Changing **Memory Voltage** and **AGP/PCI Express Voltage** may result in the instability of the system; therefore, it is **NOT** recommended to change the default setting for long-term usage.*

Load Fail-Safe/Optimized Defaults

The two options on the main menu allow users to restore all of the BIOS settings to the default Fail-Safe or Optimized values. The Optimized Defaults are the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard. The Fail-Safe Defaults are the default values set by the BIOS vendor for stable system performance.

When you select Load Fail-Safe Defaults, a message as below appears:

```
Load Fail-Safe Defaults (Y/N)? N
```

Pressing *Y* loads the BIOS default values for the most stable, minimal system performance.

When you select Load Optimized Defaults, a message as below appears:

```
Load Optimized Defaults (Y/N)? N
```

Pressing *Y* loads the default factory settings for optimal system performance.

Set Supervisor/User Password

When you select this function, a message as below will appear on the screen:

Enter Password:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To clear a set password, just press <Enter> when you are prompted to enter the password. A message will show up confirming the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup without entering any password.

When a password has been set, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also have BIOS to request a password each time the system is booted. This would prevent unauthorized use of your computer. The setting to determine when the password prompt is required is the *Security Option* of the *Advanced BIOS Feature* menu. If the *Security Option* is set to [System], the password is required both at boot and at entry to Setup. If set to [Setup], password prompt only occurs when you try to enter Setup.

MSI

MSI Reminds You...
About Supervisor Password & User Password:
Supervisor password: Can enter and change the settings of the setup menu.
User password: Can only enter but do not have the right to change the settings of the setup menu.