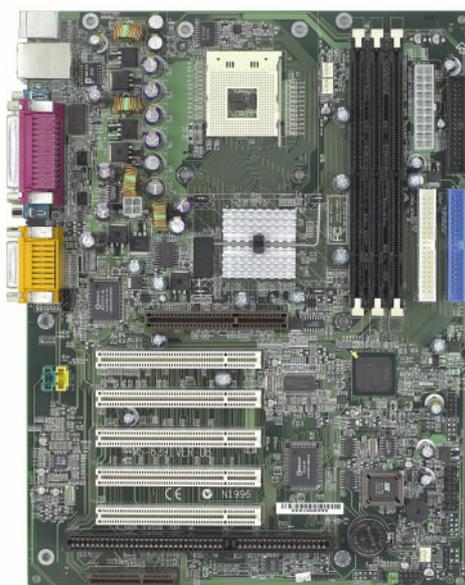


MSI 845 PRO4
MICRO-STAR INTERNATIONAL
MS-6391 ATX Mainboard



Version 1.0
G52-MA00362

Manual Rev : 1.0

Release Date : Jul. 2001



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.



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Revision History

Revision	Revision History	Date
V1.0	First Release	Jul. 2001

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
 - If the equipment has obvious sign of breakage
12. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), 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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Introduction

1

The 845 Pro4 (MS-6391) ATX mainboard is a high-performance computer mainboard based on **Intel® 82845 & 82801BA** chipsets. The 845 Pro4 is designed for Intel® Pentium® 4 processor in the 478 pin package that delivers a high performance and professional desktop platform solution.

The Intel® 82845 Memory Controller Hub (MCH) provides the processor interface, SDRAM interface, AGP interface and hub interface. It supports: a single processor with a data transfer rate of 400MHz, SDRAM at 133MHz operation (PC133), AGTL+ host bus with integrated termination supporting 32-bit host addressing, 1.5V AGP interface with 4x SBA/ data transfer and 2x/4x fast write capability, and 8-bit, 66MHz 4x hub interface to the Intel ICH2.

The 82801BA I/O Controller Hub 2 (ICH2) provides the I/O subsystem with access to the rest of the system and additionally integrates many I/O functions. It supports: upstream hub interface for access to the Intel MCH, 2-channel Ultra ATA/100 bus master IDE controller, USB controller 1.1 (expanded capabilities for 4 ports), I/O APIC, SMBus controller, FWH interface, LPC interface, AC'97 2.1 interface, PCI 2.2 interface, integrated system management controller, and integrated LAN controller.

This chapter includes the following topics:

Mainboard Specifications	1-2
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Quick Components Guide	1-5

Mainboard Specifications

CPU

- Support Intel® Pentium® 4 processor in FC-PGA2 package
- Support 1.3GHz, 1.4GHz and up to 2GHz

Chipset

- Intel® 845 chipset (593 FC-BGA)
 - Support 400MHz Intel NetBurst micro-architecture bus
 - Support SDRAM at 133MHz operation (PC133)
 - 100MHz FSB
 - AGP 2x/4x universal slot
- Intel® ICH2 chipset (360BGA)
 - Two full IDE channels, support up to ATA100
 - AC' 97 controller integrated
 - LPC interface for SIO
 - Integrated 10/100 Ethernet

Main Memory

- Three 168-pin SDRAM sockets
- Support a total of 3GB memory, using 16/64/128/256/512Mb technology

Slots

- One AGP 2x/4x slot
- Five PCI 2.2 32-bit Master PCI Bus slots (support 3.3v/5v PCI bus)
- One CNR (Communication Network Riser) slot
- One ISA (Industry Standard Architecture) slot (optional)

On-Board IDE

- An IDE controller on the ICH2 chipset provides IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA66/100 operation modes
- Can connect up to four IDE devices

On-Board Peripherals

- On-Board Peripherals include:
 - One floppy port supports two FDDs with 360KB, 720KB, 1.2MB, 1.44MB and 2.88MB.
 - Two serial ports (COM A + COM B)
 - One parallel port supports SPP/EPP/ECP mode
 - Four USB ports (Rear * 2/Front * 2)
 - One RJ-45 connector (optional)
 - One audio/game port

Audio

- ICH2 chipset integrated
- ADI 1885
 - AC' 97 compliant
 - Support two channel audio

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.

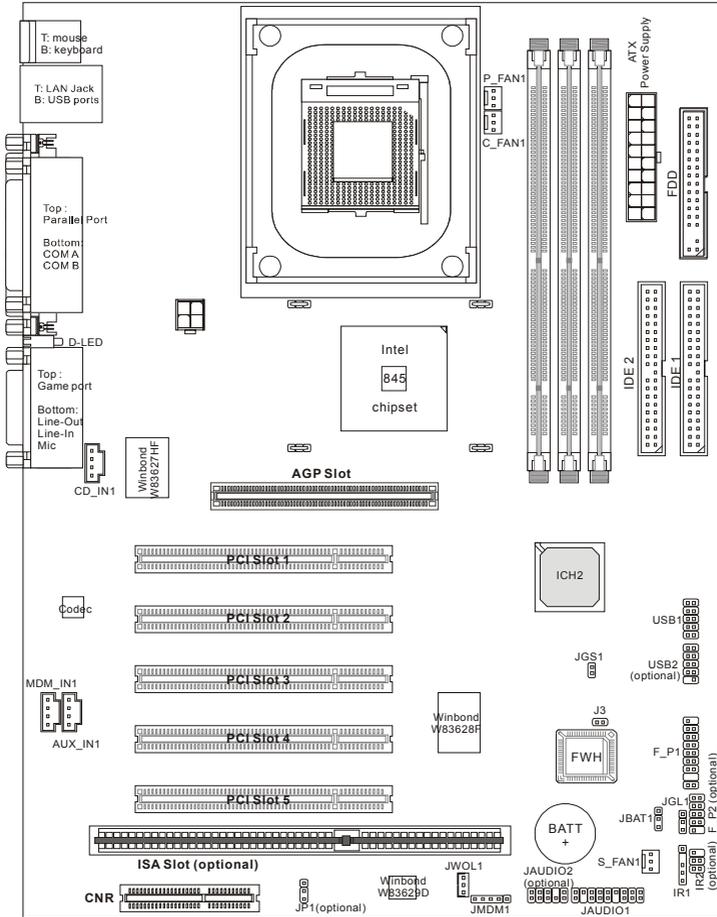
Dimension

- ATX Form Factor

Mounting

- 6 mounting holes

Mainboard Layout



MS-6391 ATX Mainboard

Quick Components Guide

Component	Function	Reference
Socket 478	Installing CPU	p. 2-2
DIMM 1~3	Installing DIMMs	p. 2-7
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PCI Slots	Installing expansion cards	p. 2-31
ISA Slots	Installing expansion cards	p. 2-31
CNR Slot	Installing CNR card	p. 2-31

Hardware Setup

2

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

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

This chapter contains the following topics:

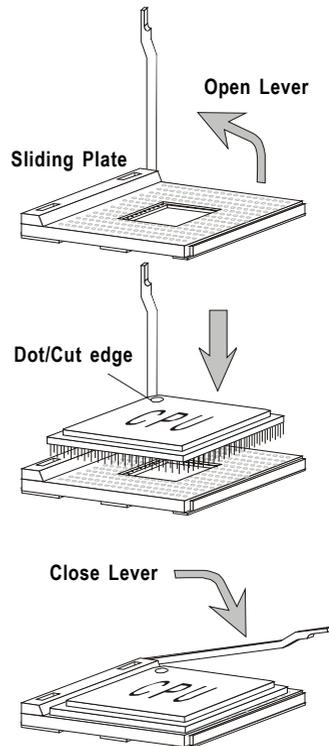
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Central Processing Unit: CPU

The mainboard supports Intel® Pentium® 4 processor in FC-PGA2 package. The mainboard uses a CPU socket called PGA478 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not find the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

CPU Installation Procedures

1. Pull the lever sideways away from the socket. Then, raise the lever up to a 90-degree angle.
2. Look for the dot/cut edge. The dot/cut edge should point towards the lever pivot. The CPU will only fit in the correct orientation.
3. Hold the CPU down firmly, and then close the lever to complete the installation.



CPU Core Speed Derivation Procedure

$$\begin{array}{lcl}
 \text{If} & \text{CPU Clock} & = 100\text{MHz} \\
 & \text{Core/Bus ratio} & = 14 \\
 \text{then} & \text{CPU core speed} & = \text{Host Clock} \times \text{Core/Bus ratio} \\
 & & = 100\text{MHz} \times 14 \\
 & & = 1.4\text{GHz}
 \end{array}$$

1. Overheating

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



WARNING!

2. 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.***

Installing the CPU Fan

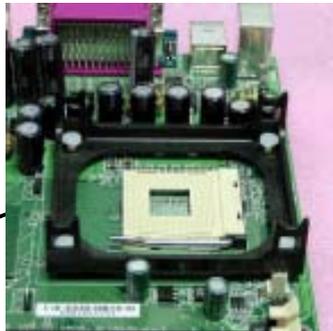
As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly important. To dissipate heat, you need to attach the CPU cooling fan and heatsink on top of the CPU. Follow the instructions below to install the heatsink/fan.



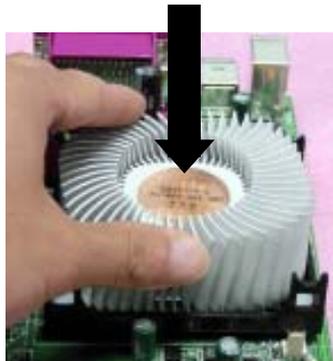
NOTE: The figures in this section are for reference only. Actual mainboard layout may be different from the one you purchased.

1. Locate the CPU and its retention mechanism on the mainboard.

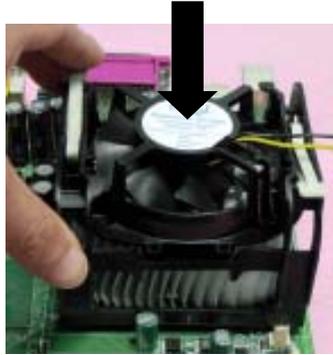
Retention Mechanism



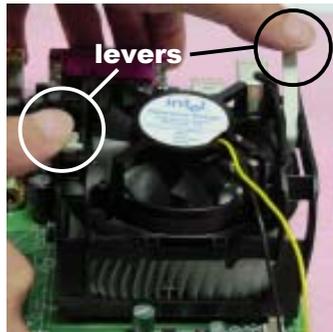
2. Position the heatsink onto the retention mechanism.



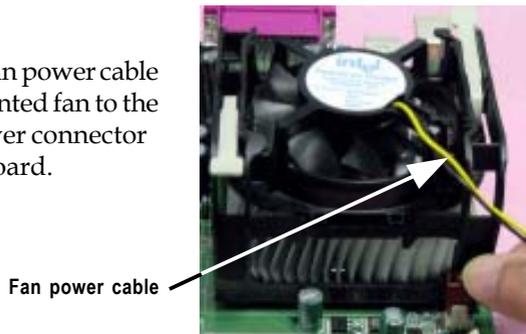
3. Mount the fan on top of the heatsink. Press down the fan until its four clips get wedged in the holes of the retention mechanism.



4. Press the two levers down to fasten the fan. Each lever can be pressed down in only **ONE** direction.



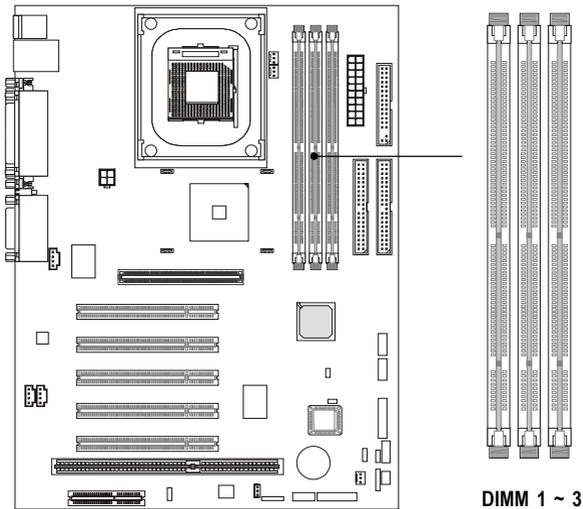
5. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the mainboard.



Memory Installation

Memory Bank Configuration

The mainboard supports a maximum memory size of 3GB. It provides three 168-pin **unbuffered** SDRAM DIMM (Double In-Line Memory Module) sockets and supports 64MB to 512MB technology.



Synchronous DRAM is a type of dynamic RAM memory chip that has been widely used starting in the latter part of the 1990s. SDRAMs are based on standard dynamic RAM chips, but have sophisticated features that make them considerably faster. First, SDRAM chips are fast enough to be synchronized with the CPU's clock, which eliminates wait states. Second, the SDRAM chip is divided into two cell blocks, and data is interleaved between the two so that while a bit in one block is being accessed, the bit in the other is being prepared for access. This allows SDRAM to burst the second and subsequent, contiguous characters at a rate of 10ns, compared to 60ns for the first character.

SDRAM provides 800 MBps or 1 GBps data transfer depending on whether the bus is 100MHz or 133MHz.

Memory Installation Procedures

You can install memory modules in any combination as follows:

Socket	Memory Module	Total Memory
Socket 1 (Bank0 & Bank1)	64MB, 128MB, 256MB, 512MB, 1GB	64MB ~ 1GB
Socket 2 (Bank2 & Bank3)	64MB, 128MB, 256MB, 512MB, 1GB	64MB ~ 1GB
Socket 3 (Bank4 & Bank5)	64MB, 128MB, 256MB, 512MB, 1GB	64MB ~ 1GB
Total System Memory		64MB ~ 3GB



Note: As 845 chipset does not properly support the PC100 memory, it is strongly recommended to **install PC133 DIMMs for the better system performance and stability**. We do not guarantee the system stability when installing PC100 DIMMs.

Installing DIMM Modules

1. The DIMM slot has 2 Notch Keys “VOLT and DRAM”, so the DIMM memory module can only fit in one direction.

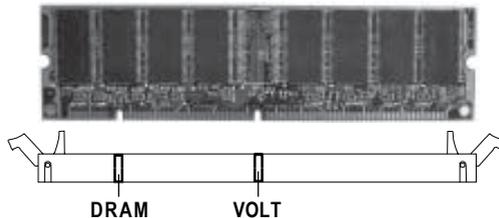


Front View



Rear View

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in.



3. The plastic clip at the side of the DIMM slot will automatically close.

Power Supply

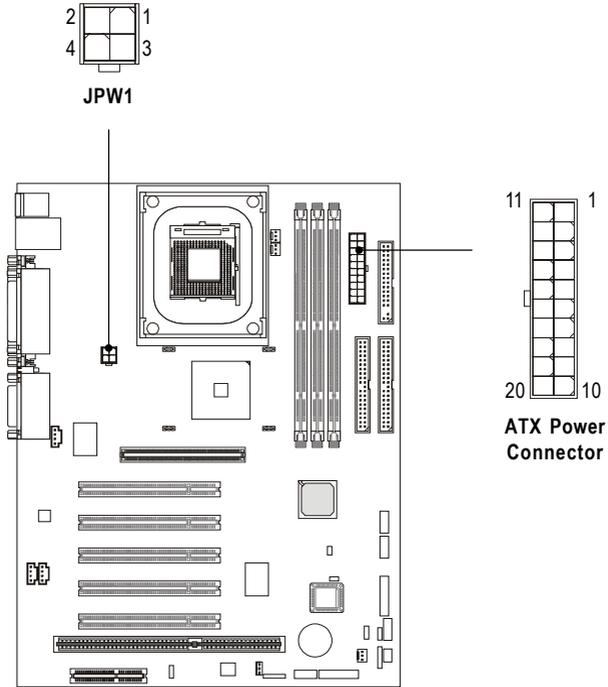
The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 20-Pin Power Connector

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plugs 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. The power connector supports **instant power on** function which means that system will boot up immediately when the power supply connector is inserted on the board.

ATX 12V Power Connector: JPW1

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



PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

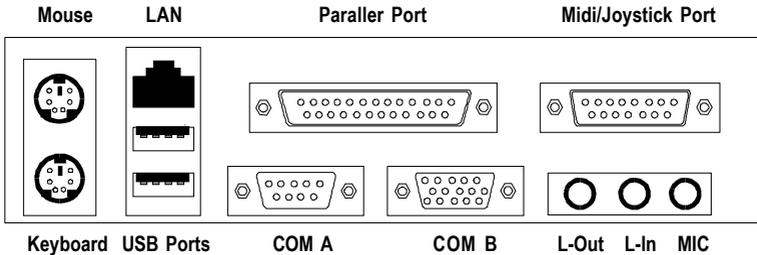
JPW1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

ATX Power Connector Pin Definition

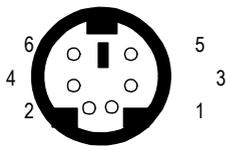
Back Panel

The Back Panel provides the following connectors:



Mouse Connector

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



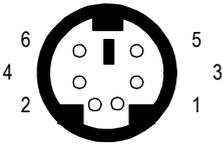
PS/2 Keyboard (6-pin Female)

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

Pin Definition

Keyboard Connector

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a PS/2® keyboard. You can plug a PS/2® keyboard directly into this connector.



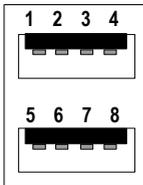
PS/2 Keyboard (6-pin Female)

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

Pin Definition

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 this connector.



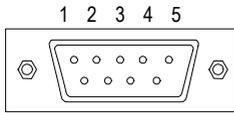
USB Ports

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

USB Port Description

Serial Port Connector: COM A & COM B

The mainboard offers two 9-pin male DIN connectors for serial port COM A and COM B. The ports are 16550A high speed communication ports that send/receive 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to them.



9-Pin Male DIN Connectors

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

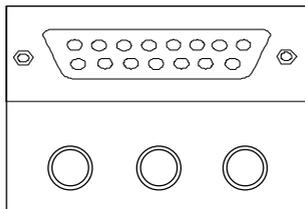
Pin Definition

Midi/Joystick/Audio Port Connector

The mainboard provides a 15-pin female connector for connecting a game joysticks/pads or MIDI devices.

The three ports at bottom provide the mainboard audio functions: **Line Out** is a connector for headphone or speakers. **Line In** is used for external CD player, tape players or other audio devices to be recorded by your computer or played through the Line Out. **Mic** is a connector for the microphone.

Midi / Joystick



L-out L-in MIC

LAN Jack (RJ-45) (optional)

The mainboard provides one standard RJ-45 jack for connection to Local Area Network (LAN). You can connect a network cable to the LAN jack.



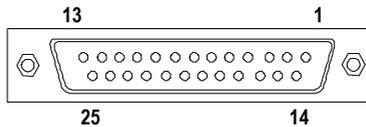
LAN RJ-45 Jack

PIN	SIGNAL	DESCRIPTION
1	RDN	Receive Differential Pair
2	RDP	Receive Differential Pair
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	GND	Ground
7	TDN	Transmit Differential Pair
8	TDP	Transmit Differential Pair

Pin Definition

Parallel Port Connector: LPT1

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



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	Paper End
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

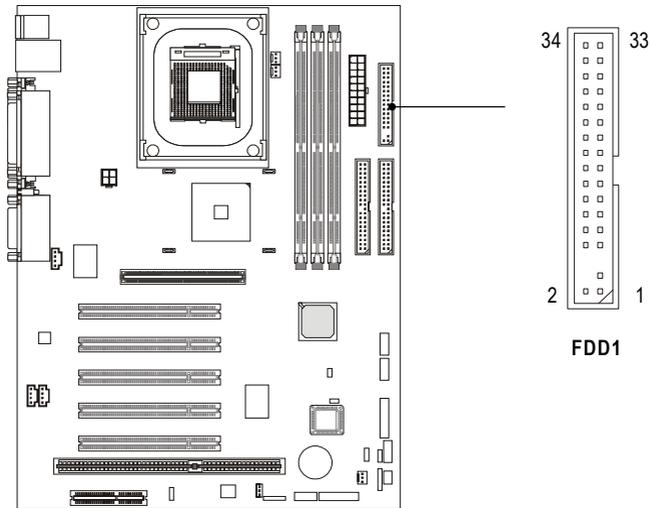
Pin Definition

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, modem, LAN, USB Ports, IR module and fans.

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.



Hard Disk Connectors: IDE1 & IDE2

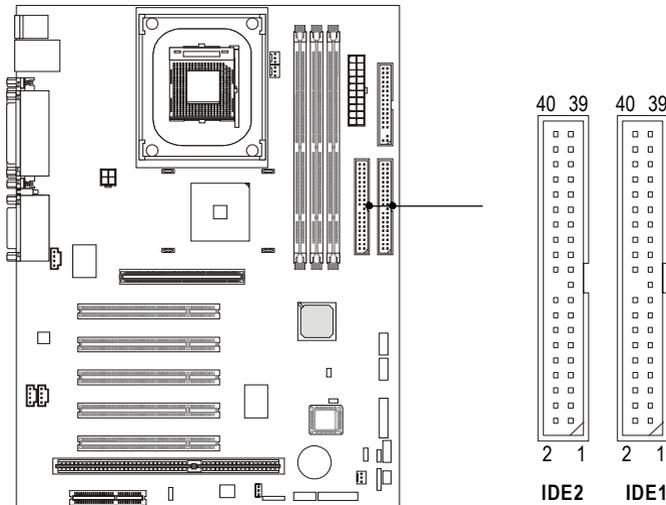
The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA/33/66/100 function. It has two HDD connectors: IDE1 (Primary) and IDE2 (Secondary). You can connect up to four hard disk drives, CD-ROM or 120MB Floppy to IDE1 and IDE2.

IDE1 (Primary IDE Connector)

- The first hard disk drive should always be connected to IDE1. You can connect a Master and a Slave drive to IDE1.

IDE2 (Secondary IDE Connector)

- You can connect a Master and a Slave drive to IDE2.

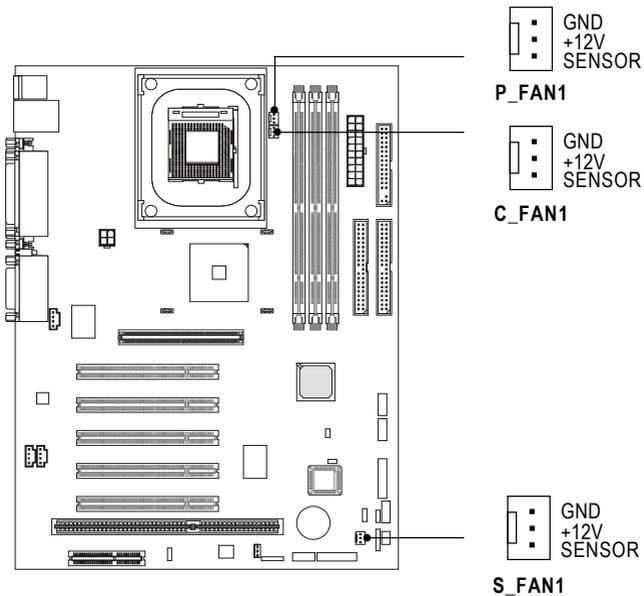


TIP:

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.

Fan Power Connectors: P_FAN1/C_FAN1/S_FAN1

The C_FAN1 (processor fan), S_FAN1 (system fan) and P_FAN1 (power supply fan) support system cooling fan with +12V. They support 3-pin head connector. When connecting the wire to the connector, 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. As 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.



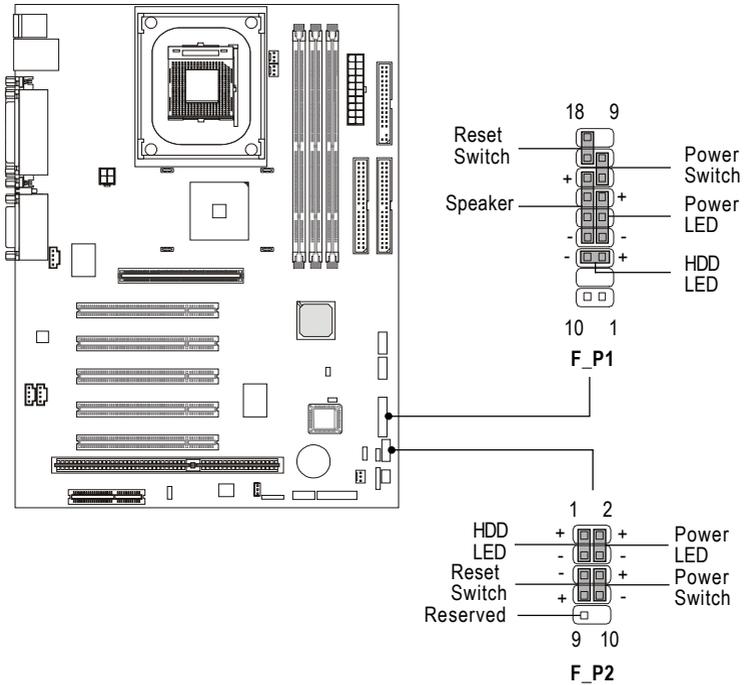
Note:

1. Always consult the vendor for proper CPU cooling fan.
2. CPUFAN supports the fan control function. You can install the PC Alert utility that will automatically control the CPU Fan speed according to the actual CPU temperature.

Case Connector: F_P1 & F_P2 (optional)

The case connector block F_P1 allows you to connect the Power Switch, Reset Switch, Power LED, Speaker, HDD LED.

The other case connector block F_P2 is compliant to Intel Front Panel I/O Connectivity Design Guide and can connect to the the Power Switch, Reset Switch, Power LED and HDD LED on the case.



Power Switch

Connect to a 2-pin push button switch.

Reset Switch

Reset switch is used to reboot the system rather than turning the power ON/OFF. Avoid rebooting while the HDD is working. You can connect the Reset switch from the system case to this pin.

Power LED (F_P1)

The Power LED is lit while the system power is on.

2-pin single color power LED: Connected to pin 5 & 6. The power LED is not able to change its color. You can only choose *Blinking* in the BIOS utility for the power LED to indicate the suspend/sleep mode.

LED Status	Description
Steady Green	The system is in the full-on mode.
Blinking	The system enters the suspend/sleep mode.

Speaker (F_P1 only)

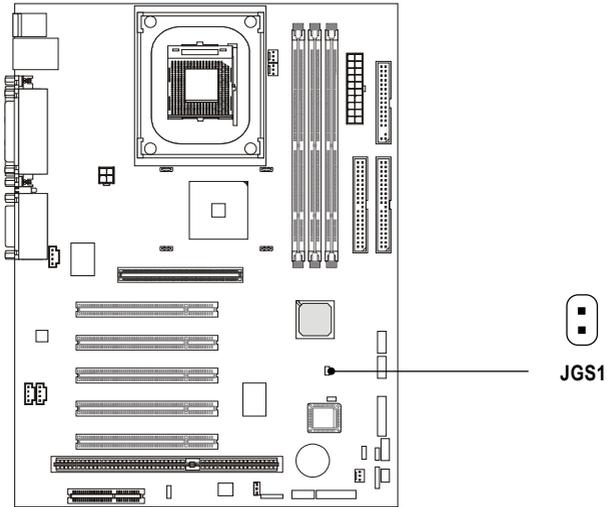
Speaker from the system case is connected to this pin.

HDD LED

HDD LED shows the activity of a hard disk drive connected to the IDE1 or IDE2 connector. Avoid turning the power off while the HDD is working. You can connect the HDD LED from the system case to this pin.

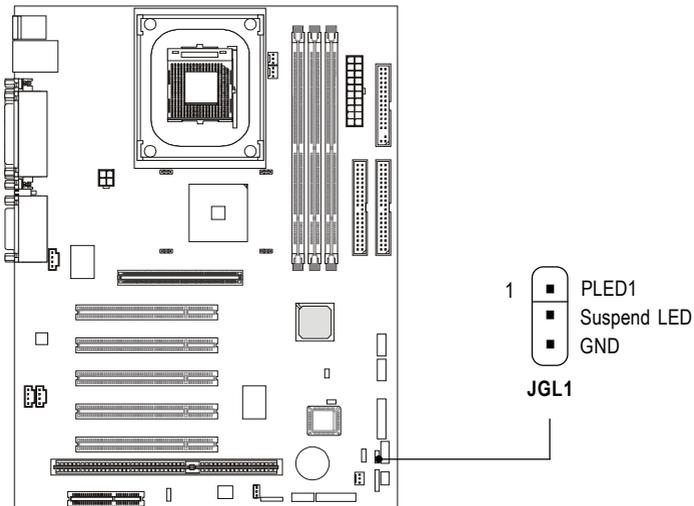
Power Saving Switch Connector: JGS1

Attach a power saving switch to this connector. Pressing the switch once will have the system enter the sleep/suspend state. Press any key to wake up the system.



Power Saving LED Connector: JGL1

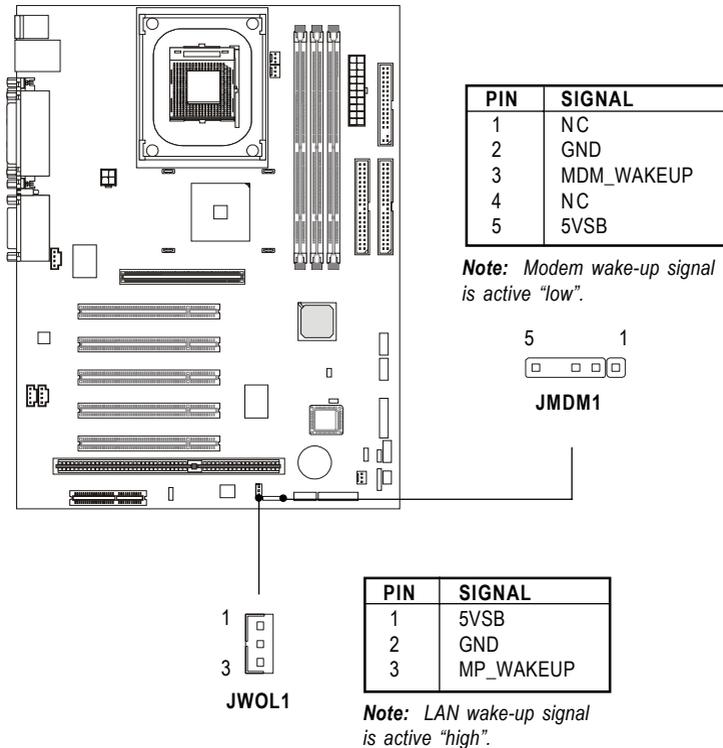
JGL1 is connected to a power saving LED. There are two types of LED that you can use: 3-pin or 2-pin (ACPI request) LED. If connected to a dual color LED, the LED light is green when system is turned on, and turns to orange color while entering the sleep state. For single color LED, the LED is lit when system is on, and blinks during the sleep state.



3-Pin LED	2-Pin LED
<p>Green Color</p> <p>Orange Color</p> <p>1 3</p>	<p>Green Color</p> <p>Orange Color</p> <p>1 3</p>
<p>Green: Full-On Mode</p> <p>Orange: Sleep Mode</p>	<p>Dual Color</p>

Wake On Ring/Wake On LAN Connectors: JMDM1/JWOL1

Wake On Ring (JMDM1) connector allows you to connect to a modem card with Wake On Ring function; Wake On LAN (JWOL1) connector allows you to connect to a LAN card with Wake On LAN function. The two connectors provide system the feature to boot up when a signal is received through the modem card/local area network.



 **Note:** To be able to use this function, you need a power supply that provide enough power for this feature. (Power supply with 750mA 5V Stand-by)

CD-In Connector

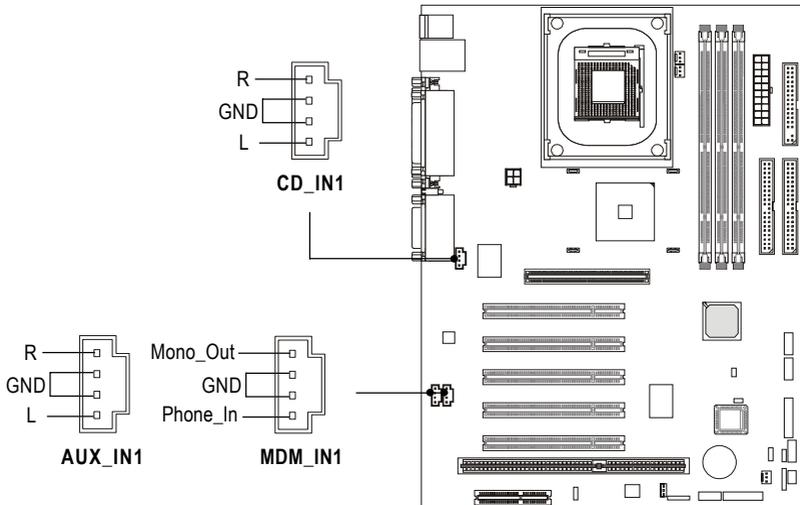
This connector allows you to connect to CD-ROM audio connector.

AUX Line-In Connector

This connector is used for a DVD add-on card with line-in connector.

Modem-In Connector

This connector is for Modem with internal voice connector. Mono_Out is connected to the Modem Speaker Out connector. Phone_In is connected to the Modem Microphone In connector.

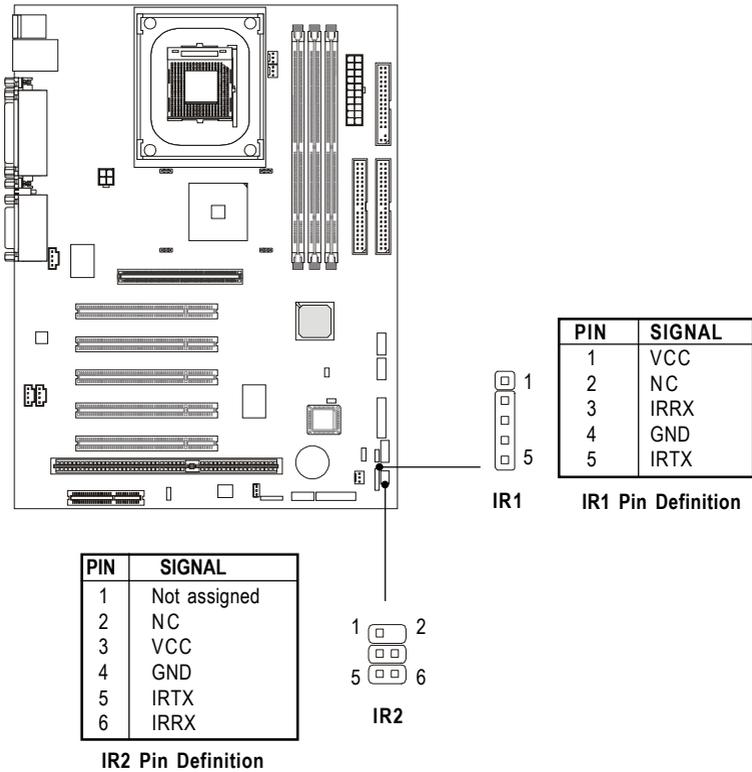


Note:

*Mono_Out is connected to the Modem speaker-out connector.
Phone_In is connected to the Modem microphone-in connector.*

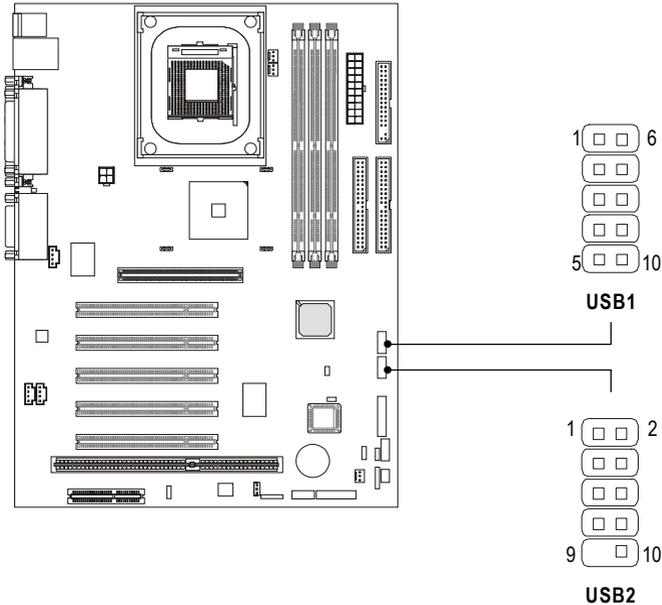
IrDA Infrared Module Connector: IR1 & IR2 (optional)

These connectors allow you to connect to IrDA Infrared modules. You must configure the setting through the BIOS setup to use the IR function. The difference between IR1 & IR2 is that **IR2 is compliant to Intel Front Panel I/O Connectivity Design Guide**.



USB PC To PC Connector: USB1 & USB2 (optional)

The mainboard provides two Front USB (Universal Serial Bus) pin headers that allow you to connect optional USB ports for front panel. Different from USB1, **USB2 is compliant to Intel Front Panel I/O Connectivity Design Guide.**



Pin	Description	Pin	Description
1	VCC	2	GND
3	USB2-	4	GND
5	USB2+	6	USB3+
7	GND	8	USB3-
9	GND	10	VCC

USB1 Pin Definition

Pin	Description	Pin	Description
1	VCC	2	VCC
3	USB3-	4	USB2-
5	USB3+	6	USB2+
7	GND	8	GND
9	NC	10	*USB_FP_OC0

USB2 Pin Definition

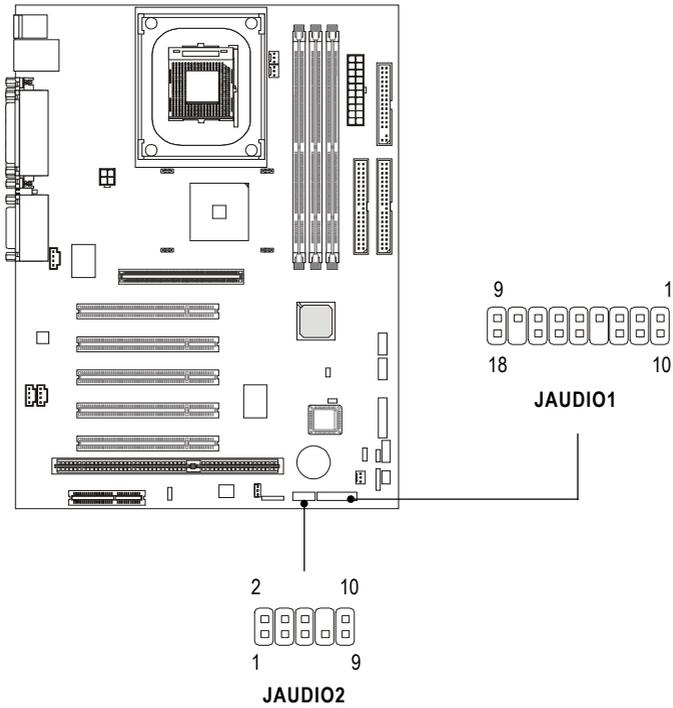
*USB_FP_OC0 is Front Panel USB Overcurrent signal (Ports 2 & 3)



Note: You can use only ONE USB header to connect USB ports. Make sure you choose the appropriate one for your USB ports.

Front Panel Audio Header: JAUDIO1 & JAUDIO2(optional)

You can connect an optional audio connector to the Front Panel Audio Header. **JAUDIO2 is compliant to Intel Front Panel I/O Connectivity Design Guide.**

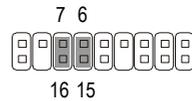


Pin	Description	Pin	Description
1	Active LINE Out(R)	10	Active LINE Out(L)
2	GND (aLO)	11	GND (aLO)
3	GND (+12)	12	GND (+12)
4	+12V (1A)	13	(Cut Away)
5	MIC	14	GND (MIC)
6	Front LINE Out(R)	15	LINE Next(R)
7	Front LINE Out(L)	16	LINE Next(L)
8	GND (fLO)	17	(Cut away)
9	Line In(R)	18	Line In(L)

JAUDIO1 Pin Definition

Caution!!!

If you don't want to connect to the optional front audio, pins 6 and 15, 7 and 16 have to be shorted by jumper caps in order to have signal output directed to the rear audio ports.



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	NC	No Connection
8	NC	No Connection
9	AUD_FPOUT_L	Left Channel Audio signal to Front Panel
10	AUD_RET_L	Left Channel Audio signal Return from Front Panel

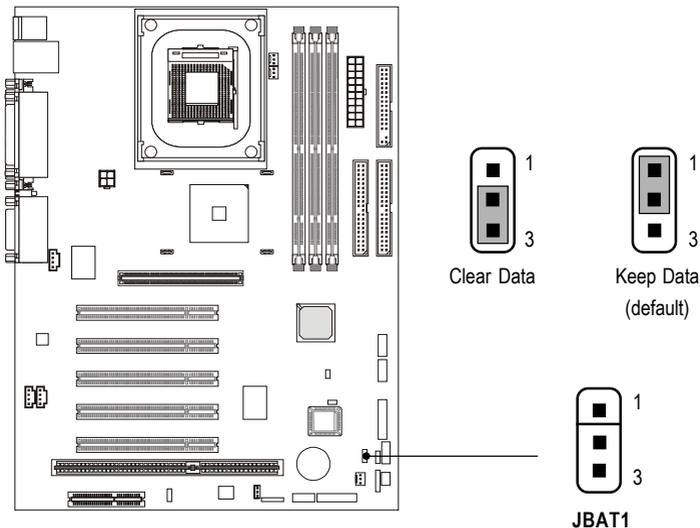
JAUDIO2 Pin Definition

Jumpers

The mainboard provides the following jumpers for you to set the computer's function. This section will mention how to change your mainboard'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 you turn on the computer. If you want to clear the system configuration, you can use the JBAT1 (Clear CMOS Jumper) to clear data. Follow the instructions below to operate:

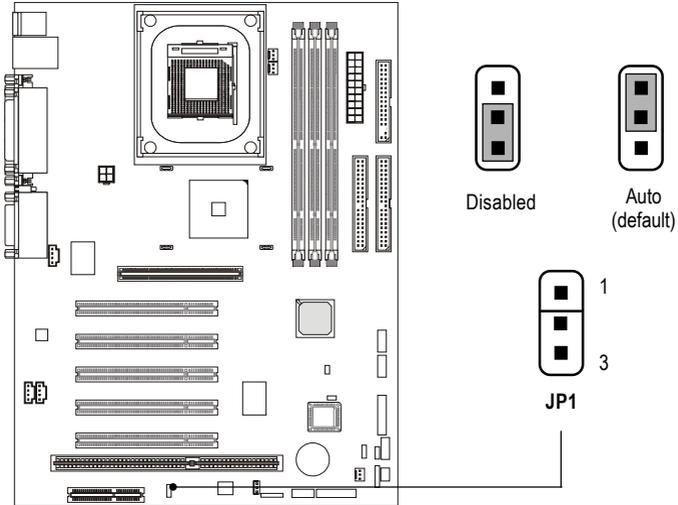


WARNING!

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.

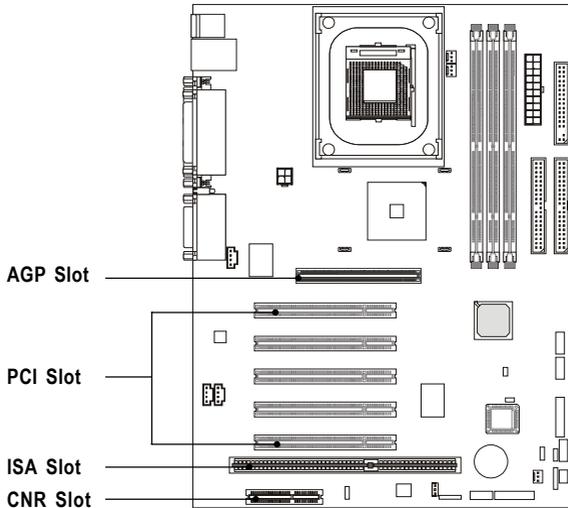
Onboard Audio Jumper: JP1 (optional)

This jumper is used to enable/disable the onboard soft audio codec.



Slots

The motherboard provides one AGP slot, five 32-bit Master PCI bus slots, one ISA slot and one CNR slot.



AGP (Accelerated Graphics Port) Slot

The AGP slot allows you to insert the AGP graphics card. AGP is an interface specification designed for the throughput demands of 3D graphics. It introduces a 66MHz, 32-bit channel for the graphics controller to directly access main memory and provides three levels of throughputs: 1x (266Mbps), 2x (533Mbps) and 4x (1.07Gbps).

PCI Slots

The five 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.

ISA (Industry Standard Architecture) Slot (optional)

The ISA slot provides one 16-bit interface that are used to add expansion card to the computer.

CNR (Communication & Networking Riser) Slot

The CNR slot allows you to insert the CNR expansion cards. CNR is a specially designed network, audio, or modem riser card for ATX family motherboards. Its main processing is done through software and controlled by the motherboard's chipset.

Award® BIOS Setup

3

This mainboard uses Award® BIOS ROM that has a built-in Setup program to allow users to modify the basic system configuration. The information is stored in battery-backed RAM (CMOS RAM) so that it retains the Setup information when the power is turned off.

This chapter provides you with the overview of the BIOS Setup program. It contains the following topics:

Entering Setup	3-2
Control Keys	3-2
Getting Help	3-3
Main Menu	3-4
Standard CMOS Features	3-6
Advanced BIOS Features	3-9
Advanced Chipset Features	3-14
Integrated Peripherals	3-17
Power Management Setup	3-22
PnP/PCI Configurations	3-27
PC Health Status	3-29
Frequency/Voltage Control	3-31
Load Fail-Safe/Optimized Defaults	3-33
Set Supervisor/User Password	3-34
Save & Exit Setup/Exit without Saving	3-36

Entering Setup

Power on the computer. When the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys to enter Setup.

TO ENTER SETUP BEFORE BOOT, PRESS <CTRL-ALT-ESC>
OR KEY

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

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 >	Jump to the Exit menu or return to the Main menu from a submenu
< +/PU >	Increase the numeric value or make changes
< -/PD >	Decrease the numeric value or make changes
< F1 >	General help, only for StatusPage Setup Menu and Option Page Setup Menu
< F5 >	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
< F6 >	Load the default CMOS value from the Fail-Safe default table, only for Option Page Setup Menu
< F7 >	Load Optimized defaults
< F10 >	Save all the CMOS changes and exit

Getting Help

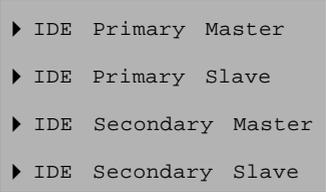
After entering the Setup program, the first screen you will see is the Main menu.

Main Menu

The Main menu lists the setup functions you can make changes to. You can use the control 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, which means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use control 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, press the <Esc>.



```

▶ IDE Primary Master
▶ IDE Primary Slave
▶ IDE Secondary Master
▶ IDE Secondary Slave

```

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.

Main Menu

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

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software

▶ 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
▶ PC Health Status	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.

Advanced BIOS Features

Use this menu to set 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 of integrated peripherals.

Power Management Setup

Use this menu to specify your settings of power management.

PnP/PCI Configurations

This entry appears if your system supports PnP/PCI.

PC Health Status

This entry shows your PC health status.

Frequency/Voltage Control

Use this menu to specify your settings of frequency/voltage control.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values of your system for the minimal/stable performance to operate.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal system performance operations.

Set Supervisor Password

Use this menu to set Supervisor Password.

Set User Password

Use this menu to set User Password.

Save & Exit Setup

Save CMOS value changes to CMOS and exit Setup program.

Exit Without Saving

Abandon all CMOS value changes and exit Setup program.

Standard CMOS Features

The items in Standard CMOS Features menu are divided into 13 categories. Each category includes none, one or more than one 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.

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
Standard CMOS Features

Date(mm:dd:yy):	Tue, Jul 3 2001	Item Help
Time(hh:mm:ss):	16: 15 : 29	
▶ IDE Primary Master		Menu Level ▶
▶ IDE Primary Slave		Change the day, month, year and century
▶ IDE Secondary Master		
▶ IDE Secondary Slave		
Drive A	[1.44M, 3.5 in.]	
Drive B	[None]	
Video	[EGA/VGA]	
Halt On	[All, But Keyboard]	
Base Memory	640K	
Extended Memory	65472K	
Total Memory	1024K	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

Date (mm:dd:yy)

This item allows you to set the system to the date that you specify (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, depends on the year of the BIOS.

Time (hh:mm:ss)

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

**IDE Primary Master/IDE Primary Slave/
IDE Secondary Master/IDE Secondary Slave**

Press PgUp/<+> or PgDn/<-> to select the hard disk drive category. The specification of hard disk drive will show on the right hand according to your selection. You can press <Enter> to enter the sub-menu. The sub-menu will appear as the following example:

CMOS Setup Utility - Copyright(C) 1984-2001 Award
Software

IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Primary Master	[Auto]	Menu Level ▶ ▶
Access Mode	[Auto]	To auto-detect the HDD's size, head...on this channel
Capacity	15365MB	
Cylinder	29770	
Head	16	
Precomp	65535	
Landing Zone	29769	
Sector	63	

Access Mode	The settings are CHS,LBA, Large, and 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/B

The two items allow you to set the type of floppy drivers installed. Available options are [None], [360K, 5.25 in], [1.2M, 5.25 in], [720k, 3.5 in], [1.44M, 3.5in], and [2.88M, 3.5in]. Default value for Drive A is [1.44M, 3.5in], and for Drive B is [None].

Video

This item allows you to set the type of video card. Available options are [EGA/VGA], [CGA40], [CGA80], and [MONO]. Default value is [EGA/VGA].

Halt on

This item allows you to set the type of errors that will cause system halt on. Available options are [All Errors], [No Errors], [All, But Keyboard], [All, But Diskette], and [All, But Disk/Key]. Default value is [All, But Keyboard].

<i>All Errors</i>	The system will halt on and display the error message if any error happens.
<i>No Errors</i>	The system will not halt on no matter any error happens.
<i>All, But Keyboard</i>	The system will halt on if any error happens. But the system will not halt on if the keyboard function is not normal.
<i>All, But Diskette</i>	The system will halt on if any error happens. But the system will not halt on if the disk drive function is not normal.
<i>All, But Disk/Key</i>	The system will halt on if any error happens. But the system will not halt on if the disk drive and keyboard function is not normal.

Base/Extended/Total Memory

The three items show the memory status of your system (read only).

Advanced BIOS Features

CMOS Setup Utility - Copyright(C) 1984-2001 Award Software
Advanced BIOS Features

Anti-Virus Protection	[Disabled]	Item Help
CPU L1 & L2 Cache	[Enabled]	
Quick Boot	[Disabled]	
1st Boot Device	[Floppy]	Menu Level ▶
2nd Boot Device	[HDD-0]	
3rd Boot Device	[CDROM]	
Boot Other Device	[Enabled]	Allows you to choose the
Swap Floppy	[Disabled]	VIRUS warning feature for
Seek Floppy	[Disabled]	IDE Hard Disk boot sector
Boot Up Num-Lock LED	[On]	protection. If this
Gate A20 Option	[Fast]	function is enabled and
Typematic Rate Setting	[Disabled]	someone attempt to write
x Typematic Rate (Chars/Sec)	6	data into this area, BIOS
x Typematic Delay (Msec)	250	will show a warning
Security Option	[Setup]	message on screen and
APIC Mode	[Enabled]	alarm beep
MPS Version Control For OS	[1.1]	
Boot OS/2 For DRAM > 64MB	[NO]	
Hard Disk S.M.A.R.T.	[Disabled]	
BIOS Flash Write Control	[Disabled]	
↑↓→←Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

Anti-Virus Protection

This item allows you to choose the virus-warning feature for IDE hard disk boot sector protection. If this function is enabled and someone attempts to write data into this area, BIOS will show a warning message on screen and alarm beeps. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

CPU L1 & L2 Cache

Cache memory is additional memory that is much faster than the system memory. When the CPU requests data, the system transfers the requested data from the main memory into cache memory, for even faster access by the CPU. Available options are:

<i>Enabled</i> (default)	Enable cache function
<i>Disabled</i>	Disable cache function



Note: The internal cache is built in the processor.

Quick Boot

This item allows you to speed up Power On Self Test (POST) after you power on the computer. If this is set to [Enabled], BIOS will shorten or skip some check items during POST. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

1st/2nd/3rd Boot Device

These three items allow you to set the sequence of boot device from that the BIOS attempts to load the operating system. Available options are [Floppy], [LS120], [HDD-0], [SCSI], [CDROM], [HDD-1], [HDD-2], [HDD-3], [ZIP100], [LAN], and [Disabled].

Boot Other Device

This item allows the system to try to boot from other device if the system fails to boot from the 1st/2nd/3rd boot device. Available options are [Disabled] and [Enabled]. Default value is [Enabled].

Swap Floppy

This item allows you to choose from the default of [Disabled] or choose [Enabled] to switch the floppy disk drives between being designated as A and B. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

Seek Floppy

This function allows the system to check if floppy installed or uninstalled when booting up the computer. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

Boot Up Num-Lock LED

This item allows you to set the NumLock status when you boot up your computer. When you choose from the default of [On], the keypad is numeric keys; when you choose [Off], the keypad is arrow keys. Available options are [On] and [Off]. Default value is [On].

Gate A20 Option

This allows you to set the Gate A20 status. When set to [Fast], Gate A20 is controlled by chipset. When set to [Normal], Gate A20 is controlled by a specific pin from the keyboard controller. Available options are [Fast] and [Normal]. Default value is [Fast].

Typematic Rate Setting

This item allows you to set the keystrokes repeat rate determined by keyboard controller. When set to [Enabled], the following two items **Typematic Rate** and **Typematic Delay** can be selected. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

Typematic Rate (Chars/Sec)

This item allows you to set the number of times a second to repeat a keystroke when you hold the key down. Available options are [6], [8], [10], [12], [15], [20], [24], and [30]. Default value is [6].

Typematic Delay (Msec)

This item allows you to set the delay time before the key begins to repeat the keystroke while holding down the key. Available options are [250], [500], [750], and [1000]. Default value is [250].

Security Option

This item allows you to limit access to the system and Setup program, or just to Setup program. When set to [Setup], the system will boot, but access to Setup program will be denied if the correct password is not entered at the prompt. When you choose [System], the system will not boot and access to Setup program will be denied if the correct password is not entered at the prompt. Available options are [Setup] and [System]. Default value is [Setup].

APIC Mode

This item is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance to PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQs resources for the system. Available options are [Enabled] and [Disabled].

MPS Version Control For OS

This item 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. Available options are [1.4] and [1.1]. Default value is [1.1].

Boot OS/2 For DRAM > 64MB

This item is set for the users running OS/2® operating system. When set to [No], you can not run the OS/2® operating system when DRAM installed is larger than 64 MB. When set to [Yes], it is possible. Available options are [No] and [Yes]. Default value is [No].

Hard Disk S.M.A.R.T

This item allows you to enable or disable the HDD S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) Capability. Default value is [Disabled].

BIOS Flash Write Control

The item is used to enable or disable the BIOS Flash Write Control for non-Award flash utility. Select [Enabled] when performing BIOS update with the non-Award flash utility. Ignore this option if you use the Award flash utility. Default value is [Disabled].

Advanced Chipset Features

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
Advanced Chipset Features

		Item Help
Configure DRAM Timing	[by SPD]	
CAS# Latency	[3]	
Prechare Delay	[7]	Menu Level ▶
RAS# to CAS# Delay	[3]	
RAS# Precharge	[3]	
DRAM Data Integrity Mode	[Non-ECC]	
DRAM Frequency	[Auto]	
Memory Hole At 15M-16M	[Disabled]	
Delayed Transaction	[Enabled]	
AGP Aperture Size (MB)	[64]	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		



Note: Change these settings only if you are familiar with the chipset

Configure DRAM Timing

This allows you to select whether DRAM timing is controlled by the SPD (Serial Presence Detect) EPROM on the DRAM module or by the user. When set to [by SPD] as default, the following four items are automatically determined by BIOS based on the configurations on the SPD. When set to [by User], you can configure these items manually. Available options are [by SPD] and [by User].

CAS# Latency

This item controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Available options are [2] and [3]; the value should be set depending on the SDRAM installed.

Precharge Delay

This item controls the number of clock cycles for DRAM to be allowed to precharge from the active state. Available options are [7], [6], and [5].

RAS# to CAS# Delay

This item allows you to insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. The setting [2] gives faster performance and [3] gives more stable performance. This item applies onl when synchronous DRAM is intalled in the system.

RAS# Precharge

If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may be fail to retain data. The setting [2] gives faster performance and [3] gives more stable performance. This item applies onl when synchronous DRAM is intalled in the system.

DRAM Data Integrity Mode

This item allows you to select the [Non-ECC] or [ECC] (Error-Checking and Correcting), according to the type of installed RDRAM.

DRAM Frequency

This item allows you to set the clock frequency of the DRAM installed. Available options are [PC100], [PC133] and [Auto]. Default value is [Auto].

Memory Hole at 15M-16M

This item allows you to reserve an address space for ISA expansion cards that require it. Available options are [Enabled] and [Disabled]. Default value is [Disabled].

Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select [Enabled] to support compliance with PCI specification version 2.1. Available options are [Enabled] and [Disabled].

AGP Aperture Size (MB)

This item allows you to select the size of the Accelerated Graphics Port (AGP) aperture. Aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. Available options are [4], [8], [16], [32], [64], [128], and [256]. Default value is [64].

Integrated Peripherals

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Integrated Peripherals

OnChip Primary PCI IDE	[Enabled]	Item Help
OnChip Secondary PCI IDE	[Enabled]	
IDE Primary Master PIO	[Auto]	Menu Level ▶
IDE Primary Slave PIO	[Auto]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Primary Master UDMA	[Auto]	
IDE Primary Slave UDMA	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
USB Controller	[Enabled]	
USB Keyboard Support	[Disabled]	
Init Display First	[AGP]	
AC'97 Audio	[Auto]	
AC'97 Modem	[Auto]	
Onboard/CNR LAN Selection	[Auto]	
IDE HDD Block Mode	[Enabled]	
Floppy Controller	[Enabled]	
Serial Port A	[3F8/IRQ4]	
Serial Port B	[2F8/IRQ3]	
Serial Port B Mode	[Normal]	
Rx/D, Tx/D Active	[Hi, Lo]	
IR Transmission Delay	[Enabled]	
IR Duplex Mode	[Half]	
IR Pin Select	[IR-Rx2Tx2]	
Parallel Port	[378/IRQ7]	
Parallel Port Mode	[ECP]	
EPP Version	[1.7]	
ECP Mode Use DMA	[3]	
Onboard Game Port	[201]	
Onboard Midi Port	[330]	
Midi IRQ Select	[10]	
↑↓→←Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

OnChip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately. Available options are [Enabled] and [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. Available options are [Auto], [Mode 0], [Mode 1], [Mode 2], [Mode 3], [Mode 4].

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA 33/66/100 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, 66 and 100, select Auto to enable BIOS support. Available options are [Auto] and [Disabled].

USB Controller

Select [Enabled] if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. Available options are [Enabled] and [Disabled].

USB Keyboard Support

Select [Enabled] if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard. Available options are [Enabled] and [Disabled].

Init Display First

Initialize the AGP video display before initializing any other display device on the system. Thus the AGP display becomes the primary display. Available options are [PCI slot] and [AGP].

AC'97 Audio

This item allows you to enable/disable the 845 chipset's feature to support AC97 Audio.

AC'97 Modem

This item allows you to enable/disable the onboard AC97 Modem function.

Onboard/CNR LAN Selection

This item allows you to select using the onboard LAN connector or CNR LAN function. Available options are [Auto] and [Ext. CNR]. Default value is [Auto].

IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support. Available options are [Enabled] and [Disabled].

Floppy Controller

Select Enabled if your system has a floppy disk controller (FDD) 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. Available options are [Enabled] and [Disabled].

Serial Port A/Serial Port B

Select an address and corresponding interrupt for the first and second serial ports. Available options are [3F8/IRQ4], [2E8/IRQ3], [3E8/IRQ4], [2F8/IRQ3], [Disabled], and [Auto].

Serial Port B Mode

The field allows you to specify the operation mode for serial port "COM B". Available settings are:

- Normal:* RS-232C Serial Port
- IrDA:* IrDA-compliant Serial Infrared Port
- ASKIR:* Amplitude Shift Keyed Infrared Port

RxD, TxD Active

This item allows you to determine the active of RxD, TxD. Available options are [Hi,Hi], [Lo,Lo], [Lo,Hi], and [Hi,Lo].

IR Transmission Delay

This item allows you to enable/disable the IR transmission delay. Available options are [Enabled] and [Disabled].

IR Duplex Mode

This item allows you to select the IR half.full duplex function. Available options are [Half] and [Full].

IR Pin Select

Consult your IR peripheral documentation to select the correct setting of the TxD and RxD signals.

Parallel Port

Select a logical LPT port address and corresponding interrupt for the physical parallel port.

Parallel Port Mode

The item allows you to select the operating mode for the parallel port. Available options are [SPP], [EPP], [ECP], and [ECP+EPP].

EPP Version

The item allows you to select the EPP version by the parallel port when the port is set to [EPP] or [ECP+EPP] mode. Available options are [1.7] and [1.9].

ECP Mode Use DMA

The item automatically specifies an DMA channel 1 or 3 for the parallel port when it is set to [EPP] or [ECP+EPP] mode.

Onboard Game Port

The items disable or assign the address of the Game port.

Onboard Midi Port

The items disable or assign the address of the Midi port.

Midi IRQ Select

The item specifies an IRQ for the Midi port.

Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy while operating in a manner consistent with your own style of computer use.

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Power Management Setup

IPCA Function	[Enabled]	Item Help
ACPI Standby State	[S1/POS]	
Power Management/APM	[User Define]	Menu Level ▶
Modem Use IRQ	[3]	
Suspend Time Out	[Disabled]	
Power Button Functoin	[Power Off]	
Wake Up On PME	[Disabled]	
Wake On On Ring	[Enabled]	
Wake Up On LAN	[Enabled]	
USB Wakep from S3	[Disabled]	
CPU THRM-Throttling	[50.0%]	
Resume By RTC Alarm	[Disabled]	
X Date(of Month) Alarm	0	
X Date(hh:mm:ss) Alarm	0 : 0 : 0	
POWER ON Function	[BUTTON ONLY]	
KB Power ON Password	[Enter]	
Hot Key Power ON	[Ctrl-F1]	
Power Again	[Power Off]	
Sleep State LED	[Single]	
Reload Global Timer Events		
Primary Master IDE	[Disabled]	
Primary Slave IDE	[Disabled]	
Secondary Master IDE	[Disabled]	
Secondary Slave IDE	[Disabled]	
FDC/LPT/COM Ports	[Disabled]	
↑↓→← Move Enter:Select +/-/PU/PD=Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

IPCA Function

This item allows you to set ACPI (Advanced Configuration and Power Management) function. Available options are [Enabled] and [Disabled]. Default value is [Enabled].

ACPI Standby State

This item allows you to set the ACPI standby state you will use. Available options are [S1/POS] and [S3/STR]. Default value is [S1/POS].

- | | |
|---------------|--|
| S1/POS | The S1 state is low power state. In this state, no system context (CPU or chipset) is lost and the hardware maintains all system context. |
| S3/STR | The S3 state 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 an “wake up” event occurs. |

Power Management/APM

This category allows you to select the type (or degree) of power saving and is directly related to the following item **Suspend Time Out**. There are three selections for Power Management:

- | | |
|-------------------------------|---|
| Min. Power Saving | Suspend Mode = 1 hr. |
| Max. Power Saving | Suspend Mode = 1 min. |
| User Defined (default) | This allows you to set the power saving mode manually. Available values are [Disabled], [1 Min], [2 Min], [4 Min], [8 Min], [12 Min], [20 Min], [30 Min], [40 Min], and [1 Hour]. |

MODEM Use IRQ

This determines the IRQ in which the MODEM can use. Available options are [3], [4], [5], [7], [9], [10], [11], and [NA].

Suspend Time Out

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off. Available options are [1 Min], [2 Min], [4 Min], [8 Min], [12 Min], [20 Min], [30 Min], [40 Min], [1 Hour], and [Disabled].

Power Button Function

This item allows you to set the function of pressing the power button. Available options are [Power Off] and [Suspend].

Wake Up On PME

This item allows you to enable the system to wake up when detecting the activities of the power management events. Available options are [Enabled] and [Disabled].

Wake Up On Ring

When set to [Disabled], the system will ignore any incoming call from the modem. When set to [Enabled], the system will boot up if there's an incoming call from the modem.

Wake Up On LAN

To use this function, you need a LAN add-on card which support power on functions. It should also support the wake-up on LAN jumper (JWOL1).

<i>Enabled</i>	Wake up on LAN supported.
<i>Disabled</i>	Wake up on LAN not supported.

USB Wakeup from S3

This item allows the USB devices to wake up the system from S3 sleep state. S3 is the STR (Suspend to RAM) mode for ACPI, which saves different amount of system power. Available options are [Enabled] and [Disabled].

CPU THRM-Throttling

This item allows you to select the CPU THRM-Throttling rate. Available options are [12.5%], [25.0%], [37.5%], [50.0%], [62.5%], [75.0%], and [87.5%].

Resume by RTC Alarm

This function is for setting date and time for your computer to boot up. During Disabled, you cannot use this function. During Enabled, choose the Date and Time Alarm:

Date(of month) Alarm You can choose which date the system will boot up. Set to 0, to boot every day.

Time(hh:mm:ss) Alarm You can choose what hour, minute and second the system will boot up.



Note: *If you have change the setting, you must let the system boot up until it goes to the operating system, before this function will work.*

POWER ON Function

This function allows you to select the item to power on the system. Available options are [BUTTON ONLY], [Keyboard 98], [Password], [Hot Key], [Mouse Left], and [Mouse Right].

KB Power ON Password

Normally, this item is unselectable. To enable this function, choose the [Password] setting in **POWER ON Function**. This will allow you to input the password for the KB power on function.

Hot Key Power ON

If **POWER ON Function** is set to [Hot Key], then you can assign a hot key combination in the field for the PS/2 keyboard to power on the system. Available options are [Ctrl-F1] through [Ctrl-F12].

Power Again

This item determines how the system will power on after a power failure.

- Power Off* Leaves the computer in the power off state
- Power On* Reboots the computer
- Last State* Restores the system to the state before power failure

Sleep State LED

This item determines which state the Power LED will use. The settings are [Single], [Dual] and [Blinking]. When set to [Blinking], the power LED will blink when the system enters the suspend mode. When set to [Dual], the power LED will change its color. Choose the [Single] and the power LED will always remain light up.

<Reload Global Timer Events>

Reload Global Timer events are I/O events whose occurrence can prevent the system from entering a power saving mode or can awaken the system from such a mode. In effect, the system remains alert for anything which occurs to a device which is configured as *Enabled*, even when the system is in a power down mode.

Primary Master IDE
Primary Slave IDE
Secondary Master IDE
Secondary Slave IDE
FDC/LPT/COM Ports

PnP/PCI Configurations

This section describes configuring the PCI bus system. PCI (Personal Computer Interconnect) is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own 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.

CMOS Setup Utility - Copyright(C) 1984-2001 Award Software
PnP/PCI Configuration

		Item Help
PNP OS Installed	[No]	
Clear ESCD	[Disabled]	Menu Level ▶
Resources Controlled By	[Auto (ESCD)]	Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices
X IRQ Resources	Press Enter	
X DMA Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
↑↓→←Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

PNP OS Installed

When set to [Yes], BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows 98. When set to [No], BIOS will initialize all the PnP cards. So, select [Yes] if your operating system is Plug & Play aware.

Clear ESCD

This item allows you to clear ESCD. Available options are [Disabled] and [Enabled]. Default value is [Disabled].

Resource Controlled By

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows 98. When set to [manual], you can choose specific resources by going into each of the sub menu that follows this field (a sub-menu is preceded by a “ ▶ ”). Available options are [Auto(ESCD)] and [Manual]. (If you choose *Auto*, the IRQ Resources and DMA Resources will not have function.)

DMA/IRQ Resources

This item is adjustable only when **Resources Controlled By** is set to *Manual*. Press [Enter] and you will enter the sub-menu of the items. This item lists IRQ 3/4/5/7/9/10/11/12/14/15 for users to set each IRQ a type depending on the type of device using the IRQ/DMA.

PCI/VGA Palette Snoop

When set to [Enabled], multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). Available options are [Enabled] and [Disabled]. Default value is [Disabled].

PC Health Status

This section helps you to get more information about your system including CPU temperature, FAN speed and voltages. It is recommended that you contact with your motherboard supplier to get proper value about your setting of the CPU temperature.

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
PC Health Status

<p>Current System Temp. Current CPU Temperature SYSTEM fan POWER fan CPU fan Vcore 3.3V + 5V +12V -12V - 5V VBAT(V) 5VSB(V) CPU Critical Temperature [Disabled]</p>	<p>Item Help</p> <hr/> <p>Menu Level ▶</p>
<p>↑↓→← Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe Defaults F7: Optimized Defaults</p>	

Current SystemTemp.

This item shows the current system temperature.

Current CPU Temperature

This item shows the current CPU temperature.

System Fan

This item shows the status of system's fan.

Power Fan

This item shows the status of power supply's fan.

CPU Fan

This item shows the status of CPU's fan.

Vcore

This item shows the current system voltage.

CPU Critical Temperature

This item allows you to set the shutdown temperature level for the processor. When the processor reach the temperature you set, this will shutdown the system. This function only works in ACPI-aware OS (such as Windows 98/ME/2000). Available options are [80°C/176°F], [85°C/185°F], [90°C/194°F], and [Disabled]. Default Value is [Disabled].

Frequency/Voltage Control

This section is for setting CPU Frequency/Voltage Control.

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Frequency/Voltage Control

CPU Ratio Selection	[x 8]	Item Help
Auto Detect PCI Clock	[Enabled]	
Spread Spectrum	[Enabled]	Menu Level ▶
CPU FSB Clock (Mhz)	[100]	
CPU Vcore Adjust	[1.75 V]	
DRAM Voltage Adjust	[3.3 V]	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Fail-safe Defaults F7:Optimized Defaults		

CPU Ratio Selection

The CPU Clock Ratio provides flexibility for overclockers from [x 8] to [x 24].



Note: Most of the Pentium® 4 processor doesn't support clock ratio adjustment. Please consult your reseller for further instructions.

Auto Detect PCI Clk

Use this item to enable or disable the feature of auto detecting the clock frequency of the installed PCI cards. Available options are [Enabled] and Disabled.

Spread Spectrum

This item is used to enable or disable the clock generator's Spread Spectrum feature. When overclocking the processor, always set it to [Disabled]. Available options are [Disabled] and [Enabled].

CPU FSB Clock (Mhz)

This item specifies the clock frequency of CPU host bus (FSB) and provides a method for end users to overclock the processor accordingly.

CPU Vcore Adjust

This item allows you to adjust CPU Vcore voltage. The adjustable value is up to 1.85 V.

DRAM Voltage Adjust

This item allows you to adjust DRAM voltage. Available options are [3.3V], [3.4V], [3.5V], and [3.6V].

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 the optimal performance of the mainboard. The Fail-Safe Defaults are the default values set by the BIOS vendor for the stable system performance.

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

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

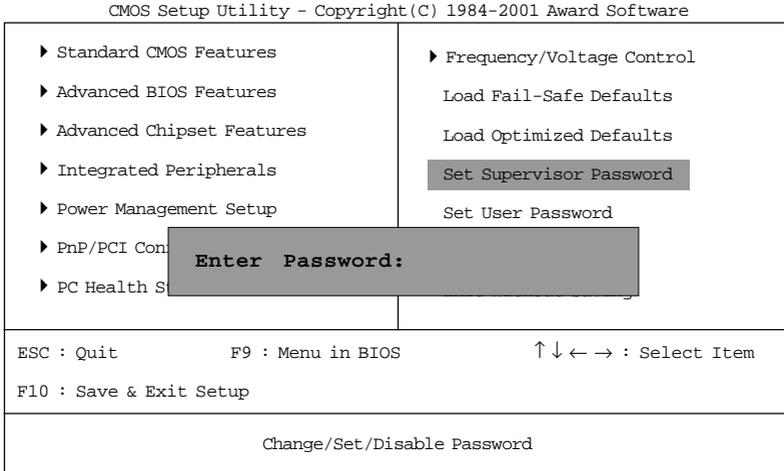
Type "Y" to load the BIOS default values for the minimal performance but most stable system operations.

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

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

Type "Y" to load the default factory settings for optimal system performance.

Set Supervisor/User Password



Type the password (up to eight characters in length) and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

When a password has been enabled, 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 require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

About Supervisor Password & User Password:

Supervisor Password: Can enter and change the options of the setup menus.

User Password: Can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

Save & Exit Setup/Exit without Saving

When you finish the changes and want to quit the Setup program, select **Save & Exit Setup**. A message as below will appear on the screen:

```
SAVE to CMOS and Exit(Y/N)? Y
```

Type "Y" to quit the Setup program and save the user setup value to RTC CMOS. Type "N" to return to Setup program.

When you want to quit the Setup program and leave the original settings, select **Exit without Saving**. A message as below will appear on the screen:

```
Quit Without Saving(Y/N)? Y
```

Type "Y" to quit the Setup Utility without saving data to RTC CMOS. Type "N" to return to the Setup program.

Glossary

A

ACPI (*Advanced Configuration & Power Interface*)

This power management specification enables the OS (operating system) to control the amount of power given to each device attached to the computer. Windows 98/98SE, Windows 2000 and Windows ME can fully support ACPI to allow users managing the system power flexibly.

AGP (*Accelerated Graphics Port*)

A new, high-speed graphics interface that based on PCI construction and designed especially for the throughput demands of 3-D graphics. AGP provides a direct channel (32-bit wide bus) between the display controller and main memory for high graphics quality and performance.

ATX

A modern shape and layout of mainboard that supersedes the widely-used Baby AT form factor. It improves many placement of components and makes a more efficient design.

BIOS (*basic input/output system*)

On PCs, an essential software that contains all the control code of input/output interface (such as keyboard, disk drives, etc.). It executes hardware test on booting the system, starts the OS, and provides an interface between the OS and the components. The BIOS is stored in a ROM chip.

Buffer

A region of memory reserved as a temporary storage area. In most cases, the OS or applications will create buffer areas to save the necessary data, and the applications can find the data in the areas first to increase the processing speed.

Bus

A set of hardware lines within the computer system, through which the data is transferred among different components. In a PC, the term *bus* usually refers to a local bus that connects the internal components to the CPU and main memory.

Cache

A special memory subsystem that is used to speed up the data traffer. It stores the contents of frequently accessed RAM locations and the addresses where these data items are stored.

Chipset

A collection of integrated chips designed to perform one or more related functions. For example, a modem chipset contains all the primary circuits for transmitting and receiving data; a PC chipset provides the electronic interfaces between all subsystems.

CMOS (*complementary metal-oxide semiconductor*)

CMOS is a widely used type of semiconductor, which features high speed and low power consumption. PCs usually contain a small amount of battery-powered CMOS memory to retain the date, time, and system setup parameters.

COM

In MS-DOS system, the name of a serial communications port. DOS supports four serial ports. For example, if a modem is connected to one serial port and a serial mouse to another, they are identified as COM1 and COM2.

DIMM (*dual in-line memory module*)

A small circuit board that holds memory chips. A *SIMM* (*single in-line memory module*) has a 32-bit path to the memory chips whereas a DIMM has 64-bit path.

DMA (*direct memory access*)

A transfer mode between the main memory and the peripheral devices that without passing through the CPU. Using the DMA controller, data is transferred much faster.

DRAM (*Dynamic RAM*)

A most common type of computer memory. It usually uses one transistor and a capacitor to represent a bit. As the development of technology, the memory type and specification used in computer becomes variety, such as SDRAM, DDR SDRAM, and RDRAM. For further instruction, please see the table below:

Dynamic RAM (DRAM) Memory Technologies					
Type	First Used	Clock Rate	Bus* Width	Peak Bandwidth	Volts
FPM (60,70ns)	1990	25MHz	64 bits	200 MBps	5v
EDO (50,60,70ns)	1994	40MHz	64 bits	320 MBps	5v
SDRAM (66MHz)	1996	66MHz	64 bits	528 MBps	3.3v
SDRAM (100MHz)	1998	100MHz	64 bits	800 MBps	3.3v
SDRAM (133MHz)	1999	133MHz	64 bits	1.1 GBps	3.3v
RDRAM (Direct Rambus)	1999	400MHz	16 bits	1.6 GBps	2.5v
DDR SDRAM (100MHz)	2000	100MHz	64 bits	1.6 GBps	3.3v
DDR SDRAM (133MHz)	2000	133MHz	64 bits	2.1 GBps	3.3v

* Memory channel width (64 bits started with 75MHz Pentium)

Source: *Computer Desktop Encyclopedia*

ECC Memory (*error correcting code memory*)

A type of memory that contains special circuitry for testing the accuracy of data and correcting the errors on the fly.

IDE (*Integrated Drive Electronics*)

A type of disk-drive interface widely used to connect hard disks, CD-ROMs and tape drives to a PC, in which the controller electronics is integrated into the drive itself, eliminating the need for a separate adapter card. The IDE interface is known as the ATA (AT Attachment) specification.

IEEE 1394

A new, high speed external bus standard, also known as *FireWire* or *iLink*, which supports data transfer rates of up to 400 Mbps for connecting up to 63 external devices.

IrDA (Infrared Data Association)

A group of device vendors, including computer, component and telecommunications, who have developed a standard for transmitting data via infrared light waves. This enables you to transfer data from one device to another without any cables.

LAN (local area network)

A computer network that covers a relatively smaller area, such as in a building or an enterprise. It is made up of servers, workstations, shared resources, a network operating system and a communications link. These individual PCs and devices on a LAN are known as “nodes”, and are connected by cables to access data and devices anywhere on the LAN, so that many users can share expensive devices and data.

LED (light emitting diode)

A semiconductor device that converts electrical energy into light. Since it lights up (usually red) when electricity is passed through it, it is usually used for the activity lights on computer's component, such as disk drivers.

LPT (line printer terminal)

Logical device name for a line printer; a name reserved by the MS-DOS for up to three parallel printer ports: LPT1, LPT2, and LPT3. It is frequently used by the OS to identify a printer.

PCI (Peripheral Component Interconnect)

A local bus standard developed by Intel and first appeared on PCs in late 1993. PCI provides “plug and play” capability and allows IRQs to be shared. The PCI controller can exchange data with the system's CPU either 32 bits or 64 bits at a time.

PnP (*Plug and Play*)

A set of specifications that allows a PC to configure itself automatically to work with peripherals. The user can "plug" in a peripheral device and "play" it without configuring the system manually. To implement this useful feature, both the BIOS that supports PnP and a PnP expansion card are required.

POST (*Power On Self Test*)

During booting up your system, the BIOS executes a series of diagnostic tests, include checking the RAM, the keyboard, the disk drives, etc., to see if they are properly connected and operating.

PS/2 Port

A type of port developed by IBM for connecting a mouse or keyboard to a PC. The PS/2 port supports a mini DIN plug containing just 6 pins. Most modern PCs equipped with PS/2 ports so that the special port can be used by another device, such as a modem.

USB (*universal serial bus*)

A hardware interface for low-speed peripherals such as the keyboard, mouse, joystick, etc. USB provides a maximum bandwidth of 12 Mbit/sec (Mbps) for connecting up to 127 peripheral devices to PC. USB features hot swap capability and multiple data streams, allows external devices to be plugged in and unplugged without turning the system off.

Virus

A program or a piece of code that infects computer files by inserting in those files copies of itself. The virus code is buried within an existing program, and is activated when that program is executed. All the viruses are man-made, and often have damaging side effects.