



PRL-DL

User Guide

Motherboard

E1172

First Edition

January 2003

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FCC/CDC statements

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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



The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the product and adding devices on it, carefully read all the documentation that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

About this guide

This user guide contains the information you need when installing this ASUS motherboard.

How this guide is organized

This manual contains the following parts:

- **Chapter 1: Product introduction**
This chapter describes the features of this motherboard. It includes brief descriptions of the special attributes of the motherboard and the new technology it supports.
- **Chapter 2: Hardware information**
This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.
- **Chapter 3: Powering up**
This chapter describes the power up sequence and gives information on the BIOS beep codes.
- **Chapter 4: BIOS setup**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 5: OS Installation**
This chapter tells how to install SCSI, LAN, and VGA drivers for various operating systems.

Conventions used in this guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



WARNING: Information to prevent injury to yourself when trying to complete a task.



CAUTION: Information to prevent damage to the components when trying to complete a task.



IMPORTANT: Information that you **MUST** follow to complete a task.



NOTE: Tips and additional information to aid in completing a task.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. ASUS Websites

The ASUS websites worldwide provide updated information on ASUS hardware and software products. The ASUS websites are listed in the ASUS Contact Information on page x.

2. Optional Documentation

Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

PRL-DL specifications summary

CPU	Supports Intel® Xeon™ processors On-die 512KB L2 cache
Chipsets	RCC Grand Champion Super Lite North Bridge (GCSL) RCC Champion South Bridge 6.0 (CSB6)
Front Side Bus (FSB)	400 MHz / 533 MHz
Memory	4 x 184-pin DDR DIMM sockets Supports PC2100/PC1600 registered ECC DDR DIMMs Supports 64MB to 4GB system memory
Onboard LAN	Intel® 82540 Gigabit Ethernet controller
Onboard VGA	ATI® RAGE-XL PCI-based VGA controller
Expansion slots	4 x 64-bit/33MHz PCI slot 2 x 32-bit/33MHz PCI slot
Rear panel I/O	1 x Parallel port 1 x Serial port 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port 4 x USB 1.1 ports 1 x RJ-45 ports (with LED)
Internal connectors	2 x ATA/100 IDE connectors 1 x PIO mode 4 IDE connector 1 x Floppy disk connector 1 x Serial Port 2 (COM2) connector 1 x Serial Port header CPU/Power/Chassis fan connectors 12V 8-pin Power connector IDE LED/Power LED connectors 20-pin Front panel connector
BIOS	4Mbit Flash memory Award BIOS with Enhanced Server, ACPI, DMI, Green, PnP Features Plus, VGA & SCSI BIOS
Special Features	3 x FAN sensor and control Voltage sensor: VCORE +2.5V, +3V, +5V, +12V, +3VSB, VBAT 3 x Thermal sensors: 1 x Environment, 2 x CPU (internal thermal diode)

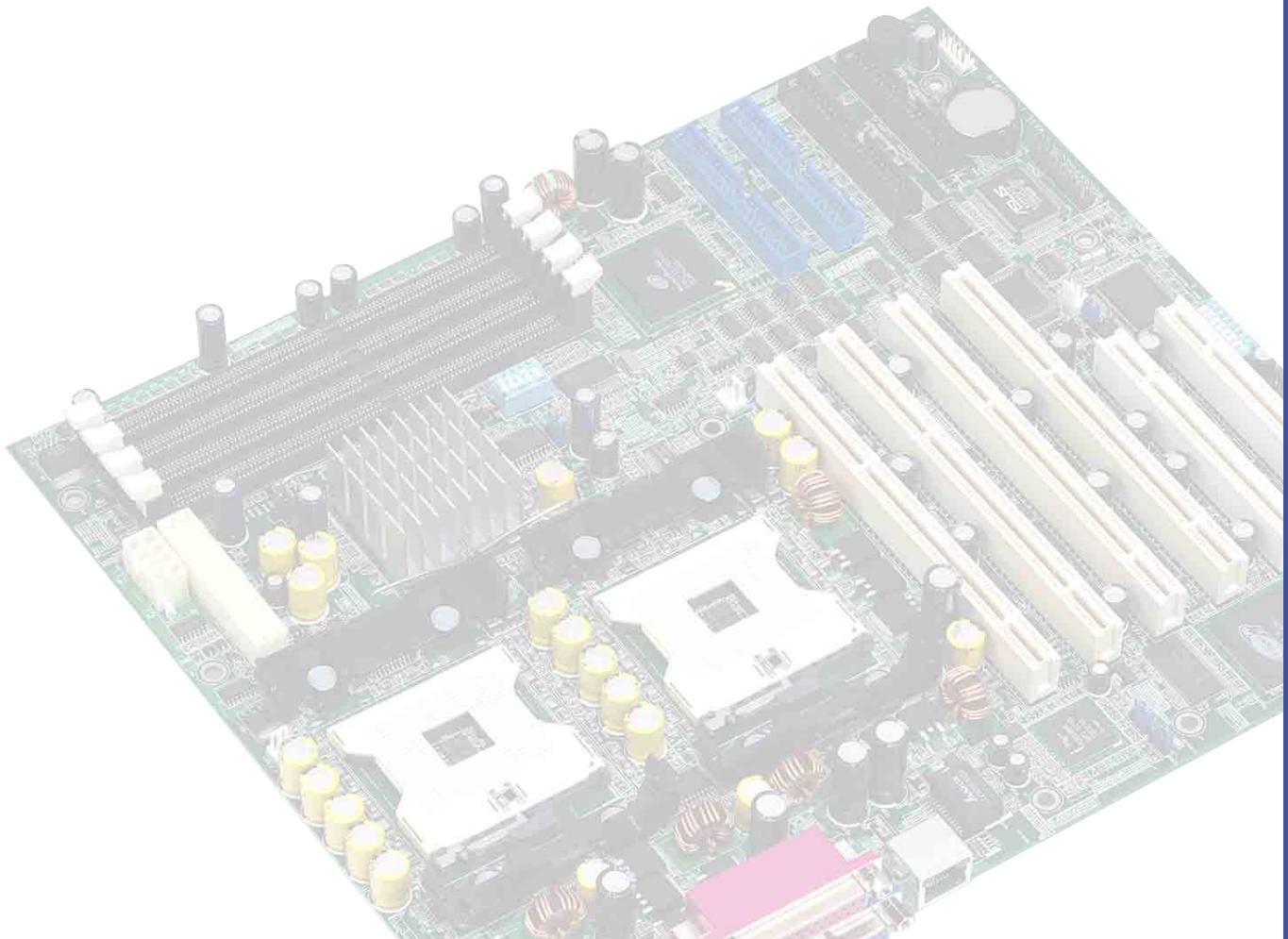
(Continued on the next page)

PRL-DL specifications summary

Form Factor	Extended ATX form factor: 12 in x 10.5 in (30.48 cm x 26.67 cm)
Support CD contents	Device drivers Management software Utilities Contact information

* Specifications are subject to change without notice.

Chapter 1



This chapter describes the features of the PRL-DL motherboard. It includes brief explanations of the special attributes of the motherboard and the new technology it supports.

Product introduction

Chapter summary

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1.1 Welcome!

Thank you for buying the ASUS® PRL-DL motherboard!

The ASUS PRL-DL motherboard delivers a host of new features and latest technologies making it another standout in the long line of ASUS quality server motherboards!

The PRL-DL incorporates dual Intel® Xeon™ processor in a 603/604-pin package coupled with the ServerWorks® Grand Champion Super-Lite (GCSL) System Set to deliver a reliable and high performance dual-processor server platform.

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

1.2 Package contents

Check your PRL-DL package for the following items.

- ✓ ASUS PRL-DL motherboard
Extended ATX form factor: 12 in x 10.5 in (30.48 cm x 26.67 cm)
- ✓ ASUS PRL-DL support CD
- ✓ I/O shield
- ✓ 80-conductor ribbon cable for UltraDMA100/66//33 IDE drives
- ✓ Ribbon cable for a 3.5-inch floppy drive
- ✓ Bag of extra jumper caps
- ✓ PRL-DL User Guide
- ✓ 2 x Intel Box CPU mounting plates



If any of the above items is damaged or missing, contact your retailer.

1.3 Special features

1.3.1 Product highlights

Latest processor technology

The PRL-DL motherboard supports both Intel® Xeon™ processors via dual 604-pin surface mount ZIF sockets. The processor features the Intel® NetBurst™ micro-architecture that includes hyper-pipelined technology, a rapid execution engine, a 533MHz or a 400MHz system bus, and an execution trace cache to offer a significant increase in performance. See page 2-4 for more information.

DDR memory support

Employing the Double Data Rate (DDR) memory technology, the PRL-DL motherboard supports up to 4GB of system memory using PC2100/1600 registered ECC DDR DIMMs. The ultra-fast 266MHz memory bus doubles the speed of the PC100 SDRAM to deliver the required bandwidth for the latest 3D graphics, multimedia, and Internet applications. See page 2-10.

Advanced 64-bit PCI slots

The 64-bit/33MHz PCI slots maximize I/O bandwidth for current 64-bit PCI cards that support 33MHz bus.

ATA/100 IDE support

The dual-channel bus master IDE connectors comply with the ATA/100 protocol and supports ATA/100, Multi-Word DMA Mode2, PIO modes 3 & 4 IDE devices such as ATAPI IDE CD-ROM, CD-R/RW, ZIP, and LS-120 drives.

Third IDE Channel support

The CSB6 South Bridge chip provides a third IDE with PIO mode 3/4 support which provides more device connectivity in this server system.

Onboard LAN

The motherboard comes with the Intel® 82540 Gigabit Ethernet controller to support the latest LAN technologies.

Onboard VGA

The ATI Rage-XL PCI-based VGA controller integrates an 8MB display SDRAM to provide onboard video solution.

1.3.2 Value-added solutions

Temperature, fan, and voltage monitoring

The CPU temperature is monitored by the ASUS ASIC to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The system voltage levels are monitored to ensure stable supply of current for critical components.

Dual function power switch

While the system is ON, pressing the power switch for less than 4 seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than 4 seconds lets the system enter the soft-off mode regardless of the BIOS setting.

Remote Ring In

This feature allows the system to wake up remotely through an internal or external modem, if present.

Wake-Up support

The motherboard includes Wake-On-LAN, Wake-On-Ring, and BIOS Wake-Up features.

Server management

The motherboard comes with an ASMC connector that supports the optional ASMC-HE/ME/LE card to comply with server reliability, availability, and serviceability requirements. Remote management response via remote diagnostics and troubleshooting still works even when the operating system has stopped functioning.

ACPI ready

The Advanced Configuration power Interface (ACPI) provides more energy saving features for operating systems that support OS Direct Power Management (OSPM).

Concurrent PCI

This feature allows multiple PCI transfers from PCI master buses to the memory and processor.

Chassis intrusion detection

The motherboard supports chassis intrusion monitoring through the ASUS ASIC. A chassis intrusion event is retained in the system memory for more protection.

Smart BIOS

The 4Mbit firmware gives an easy-to-use interface that provides more control and protection to the motherboard. The BIOS has a boot block write protection and HD/SCSI/MO/ZIP/CD/Floppy boot selection, and is Year 2000 certified.

Compliance

Both the BIOS and the hardware levels of the motherboard meet the stringent requirements for SDG 2.0 certification. The new SDG 2.0 requirements for systems and components are based on the following high-level goals: support for Plug-and-Play compatibility and power management for configuring and managing all system components, 32-bit device drivers, and installation procedures for Windows NT/2000/XP. Color-coded connectors and descriptive icons make identification easy as required by the PC '99 specification.

1.4 Motherboard overview

Before you install the PRL-DL motherboard, familiarize yourself with its physical configuration and available features to facilitate the motherboard installation and future upgrades. A sufficient knowledge of the motherboard specifications will also help you avoid mistakes that may damage the board and its components.

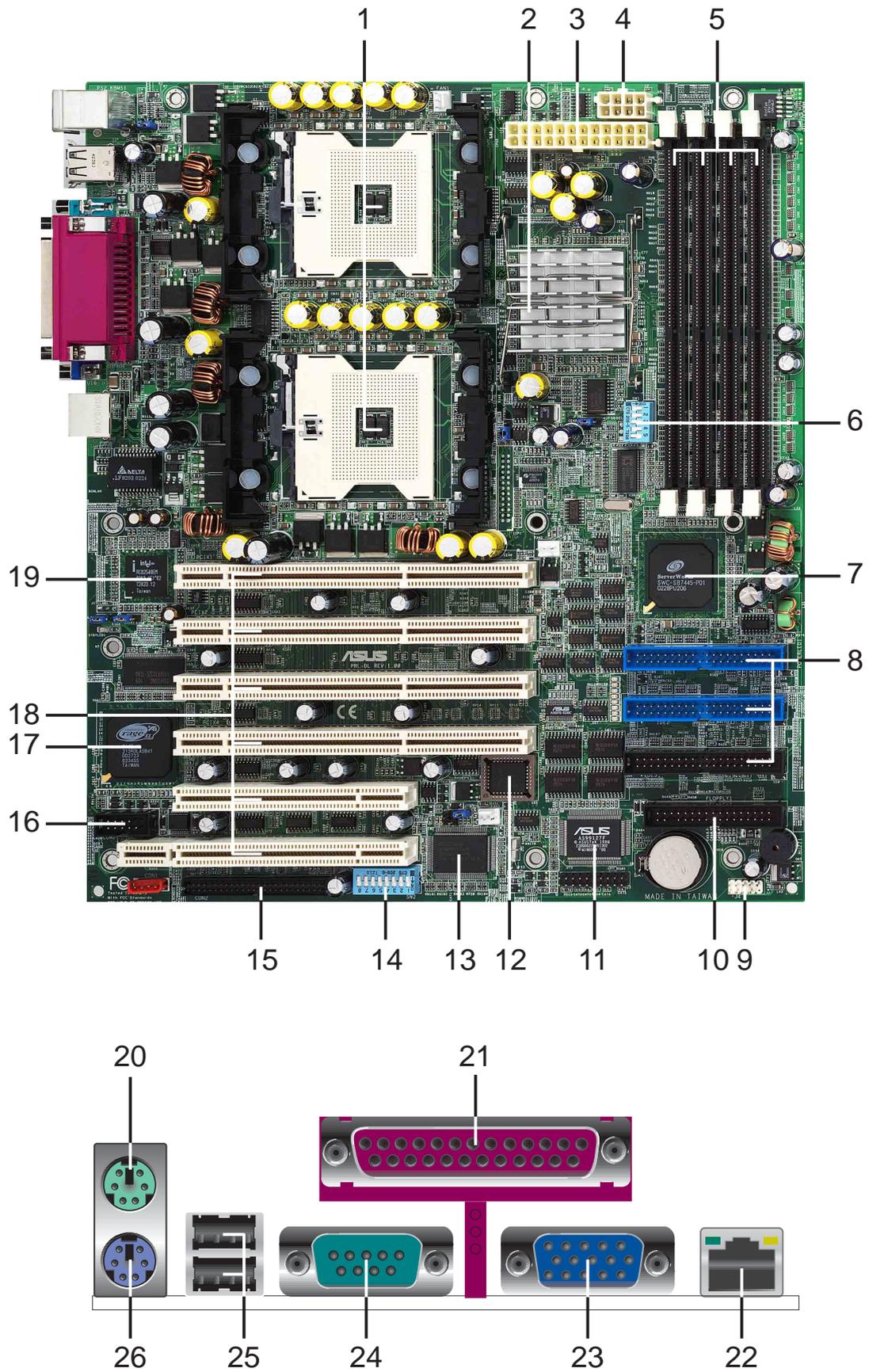
1.4.1 Major components

The following are the major components of the PRL-DL motherboard as pointed out in the picture on page 1-7.

1. 604-pin CPU sockets
2. ServerWorks® Grand Champion SuperLite (GCSL) North Bridge
3. 24/20-pin ATX power connector
4. 8-pin 12V SSI power connector
5. DDR DIMM sockets
6. DIP switches
7. Serverworks CSB6 South Bridge
8. IDE connectors
9. USB header
10. Floppy connector
11. ASUS ASIC
12. Flash ROM
13. LPC Super-I/O controller
14. DIP switches
15. 80-pin ASMB daughterboard connector
16. Serial port 2
17. ATI Rage-XL VGA controller
18. 64-bit PCI slots (PCI64-1 to PCI64-4), 32-bit PCI slots (PCI-1 & PCI-2)
19. Intel® 82540 Gigabit Ethernet controller
20. PS/2 mouse port
21. Parallel port
22. RJ-45 ports
23. VGA port
24. Serial port 1
25. USB ports 1 and 2
26. Keyboard port



See page 1-8 for the specifications of each component. Refer to Chapter 2 for detailed information on the components.



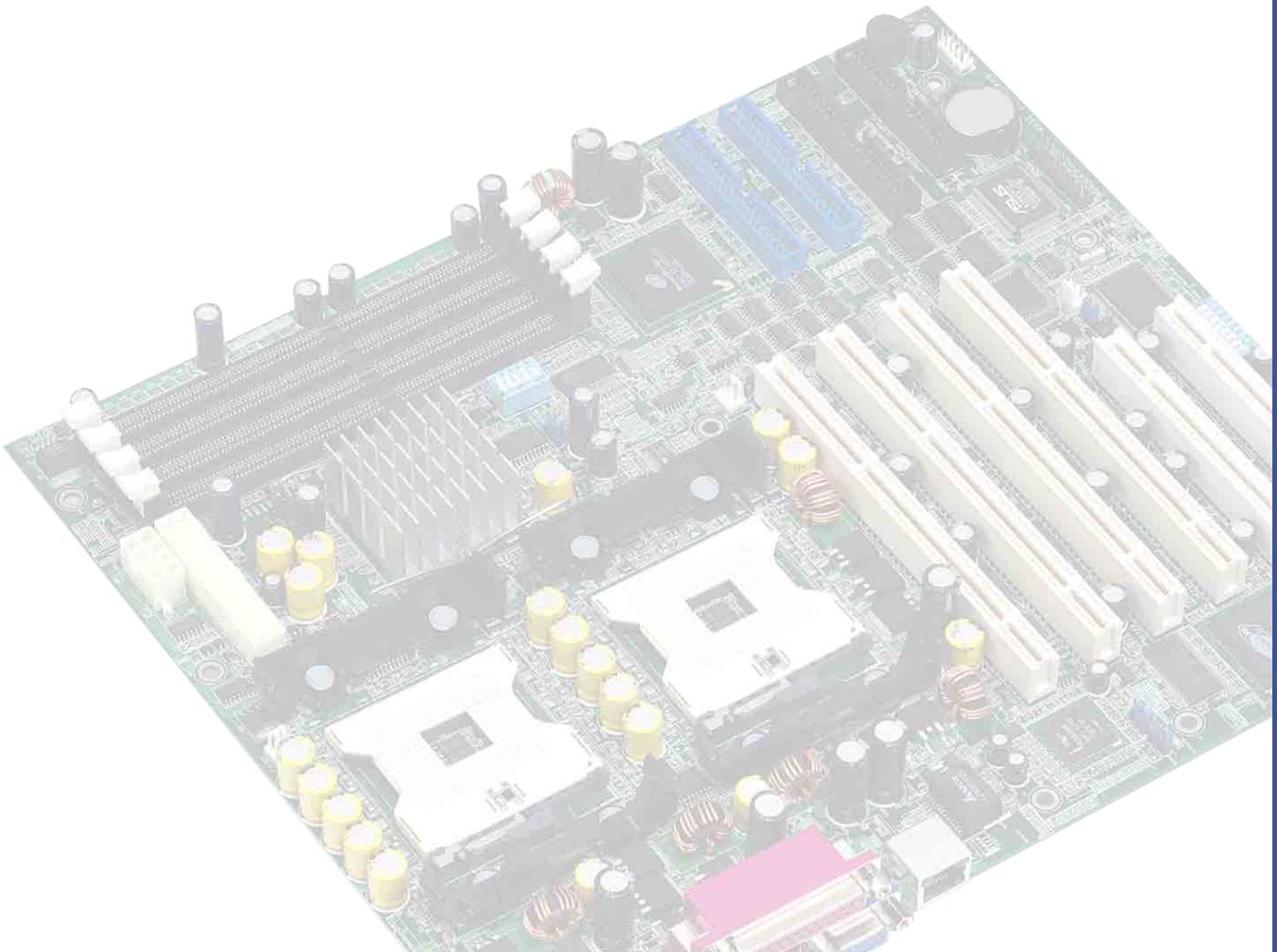
1.4.2 Core specifications

- 1 604-pin CPU sockets.** A 604-pin surface mount, Zero Insertion Force (ZIF) socket for the Intel® Xeon™ processor with 512KB L2 cache and a 533MHz or a 400MHz system bus that allows up to 4.26GB/s or 3.2GB/s data transfer rate.
- 2 ServerWorks® Grand Champion SuperLite north bridge . CMIC-SL.** The Champion Memory and I/O Controller SuperLite (CMIC-SL) acts as the host bridge of the Grand Champion SuperLite (GCSL) SystemSet. The GCSL device interfaces directly to the processor bus, and integrates the functions of the main memory controller and the Inter Module Bus (IMB) interface unit. The processor interface supports a 400/533 MHz Front Side Bus (FSB) providing a 3.2GB/s or 4.26GB/s bandwidth, memory bandwidth with up to 4GB registered ECC PC1600/2100 DDR DIMMs, and two high speed IMBs plus one thin IMB to connect to the south bridge CSB6.
- 3 24/20-pin ATX power connector.** This power connector is for an ATX power supply.
- 4 8-pin 12V SSI power connector.** This power connector is for an ATX power supply.
- 5 DDR DIMM sockets.** These four 184-pin DIMM sockets support up to 4GB system memory using registered ECC PC1600/2100 DDR DIMMs.
- 6 DIP switches.** This 5-switch Dual Inline Package (DIP) allows you to set the CPU external frequency.
- 7 ServerWorks® South Bridge, CSB6** performs as a PCI to LPC (Low Pin Count) Bridge and integrates PCI master/slave functions, DMA controller, ATA100 IDE interface, USB controller, SMBus host, ACPI and other integral functions.
- 8 IDE connectors.** These dual-channel bus master IDE connectors support up to four Ultra DMA/100/66, PIO Modes 3 & 4 IDE devices. Both the primary (blue) and secondary (blue) connectors are slotted to prevent incorrect insertion of the IDE ribbon cable.
- 9 Front USB header.** A Front USB header is available for additional USB port connectors.

- 10 Floppy disk connector.** This connector accommodates the provided ribbon cable for the floppy disk drive. One side of the connector is slotted to prevent incorrect insertion of the floppy disk cable.
- 11 ASUS ASIC.** This chip performs multiple system functions that include hardware and system voltage monitoring, IRQ routing, among others.
- 12 Flash ROM.** This 4Mb firmware contains the programmable BIOS program.
- 13 LPC super I/O controller.** This Low Pin Count (LPC) interface provides the commonly used Super I/O functionality. The chipset supports UART compatible serial ports, one parallel port with EPP and ECP capabilities, a floppy drive, and PS/2 keyboard and mouse.
- 14 DIP switches.** This Dual Inline Package (DIP) switch allows you to set the frequencies.
- 15 50-pin ASMB Connector.** This connector supports the ASMB proprietary Server Management daughter card.
- 16 Serial port 2.** This 9-pin COM2 port is for pointing devices or other serial devices.
- 17 ATI Rage-XL VGA controller.** This PCI-based VGA controller supports up to 8MB display SDRAM for 1280x1024 and true color resolutions.
- 18 64-bit PCI/32-bit PCI slots.** Four 64-bit/33MHz PCI slots and two 32-bit/33MHz PCI expansion slots support bus master PCI cards.
- 19 Intel® 82540 32bit PCI Gigabit Ethernet Controller.** This LAN controller fully supports 10BASE-T/100BASE-TX/1000BASE-T networking protocols and data rates up to 1000Mbps, 100Mbps, and 10Mbps.
- 20 PS/2 mouse port.** This green 6-pin connector is for a PS/2 mouse.
- 21 Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.
- 22 RJ-45 ports.** These ports allows connection to a Local Area Network (LAN) through a network hub.

- 23** **VGA port.** This port is for a VGA-monitor or other VGA-compatible devices.
- 24** **Serial port 1.** This 9-pin COM1 port is for pointing devices or other serial devices.
- 25** **USB 1.1 ports.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB devices.
- 26** **PS/2 keyboard port.** This purple 6-pin connector is for a PS/2 keyboard.

Chapter 2



This chapter describes the hardware setup procedures that you have to perform when installing system components. It includes details on the switches, jumpers, and connectors on the motherboard.

Hardware information

Chapter summary

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2.1 Motherboard installation

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it. The PRL-DL uses the extended ATX form factor that measures 12 inches x 10.5 inches (30.5 x 26.67 cm).



Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause you physical injury and damage motherboard components.

2.1.1 Placement direction

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

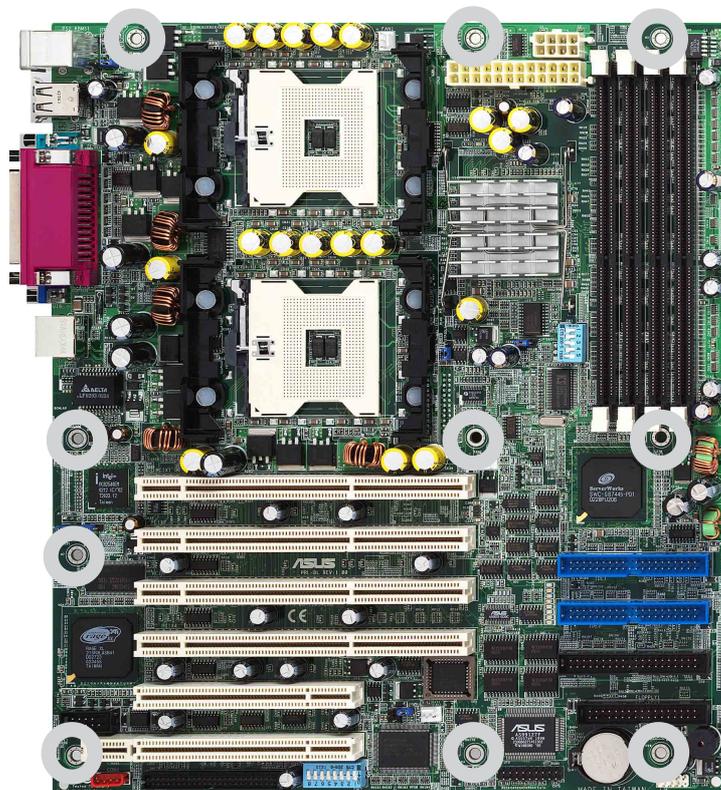
2.1.2 Screw holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.

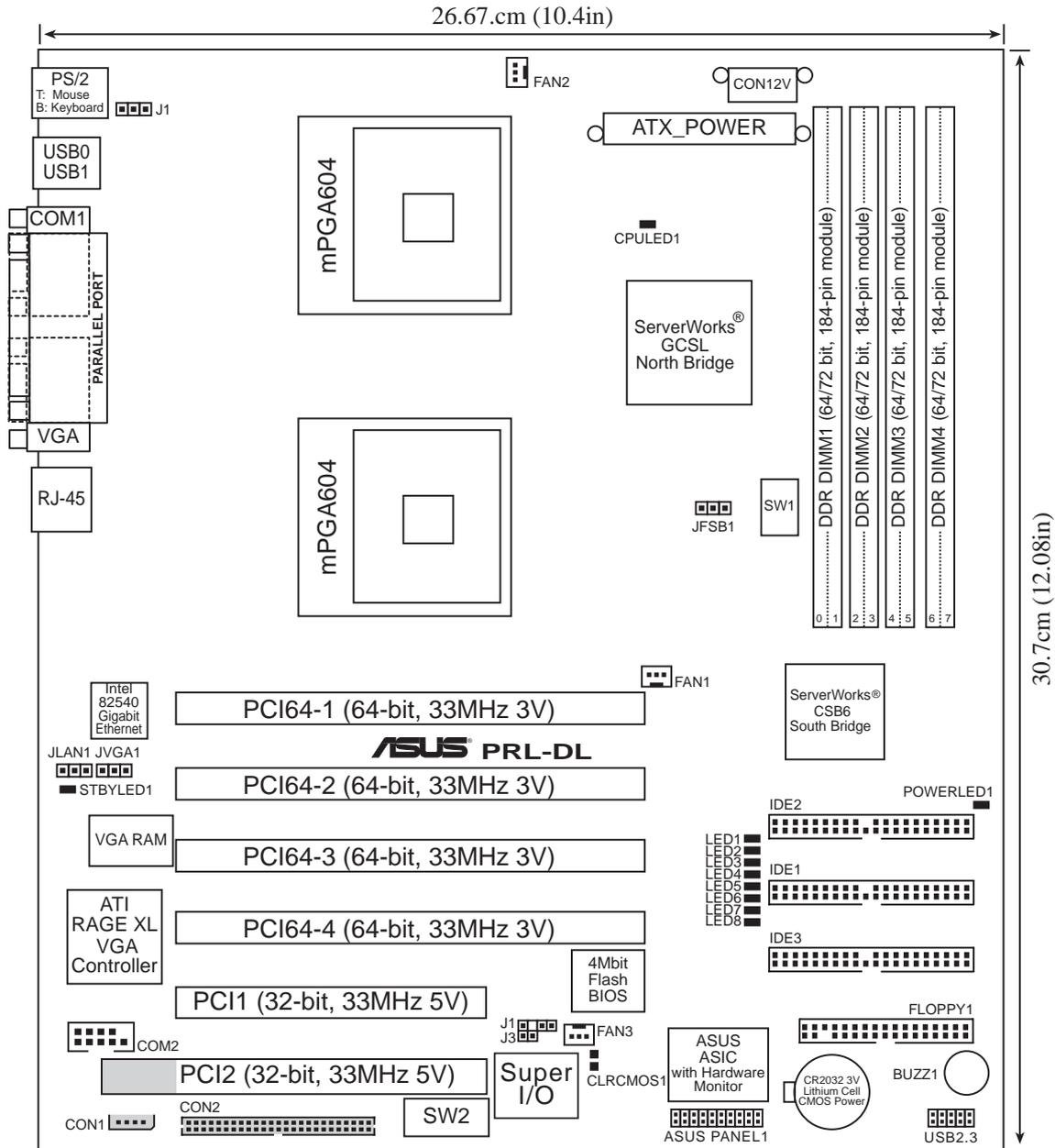


Do not overtighten the screws! Doing so may damage the motherboard.

Place this side towards the rear of the chassis



2.2 Motherboard layout



The PCI2 32-bit, 4-pin CON1 and 80-pin ASMB connector features are optional. These components are grayed out in the above motherboard layout.

2.3 Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

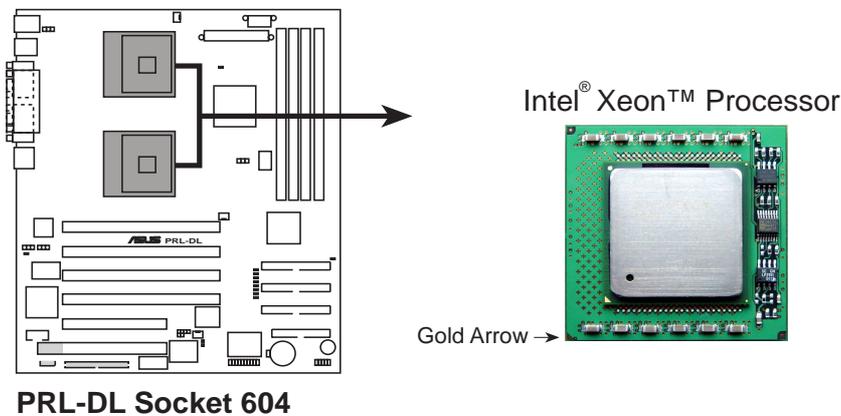


-
1. Unplug the power cord from the wall socket before touching any component.
 2. Use a grounded wrist strap or touch a safely grounded object or to a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
 3. Hold components by the edges to avoid touching the ICs on them.
 4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
 5. **Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply.** Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.
-

2.4 Central Processing Unit (CPU)

2.4.1 Overview

The motherboard comes with dual surface mount 604-pin Zero Insertion Force (ZIF) sockets. The sockets are designed for the Intel Processor in the 603/604-pin package with 512KB L2 cache. The processor includes the Intel® NetBurst™ micro-architecture that features the hyper-pipelined technology, rapid execution engine, 400/533 MHz system bus, and execution trace cache. Together, these attributes improve system performance by allowing higher core frequencies, faster execution of integer instructions, and data transfer rates of up to 4.26GB/s or 3.2GB/s.



Note in the illustration that the CPU has a gold triangular mark on one corner. This mark indicates the processor Pin 1 that should match a specific corner of the CPU socket.



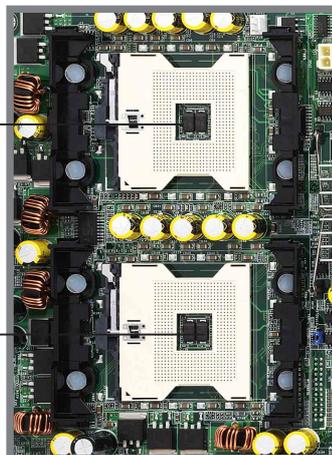
Incorrect installation of the CPU into the socket may bend the pins and severely damage the CPU!



The motherboard supports either one or two CPUs. If you are installing only one CPU, you **MUST** install it in CPU socket 1.

CPU Socket 2
(outer socket)

CPU Socket 1
(inner socket)



2.4.2 Installing the CPU



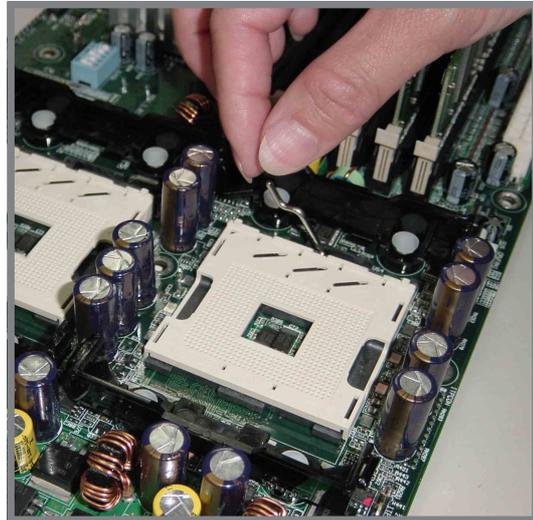
If you are installing two CPUs, install in the CPU socket 2 first.

Follow these steps to install a CPU.

1. Locate the 604-pin ZIF sockets on the motherboard. Unlock the socket by pressing the lever sideways, then lift it up to at least 115° angle.



Make sure that the socket lever is lifted up to at least 115° angle, otherwise the CPU does not fit in completely.

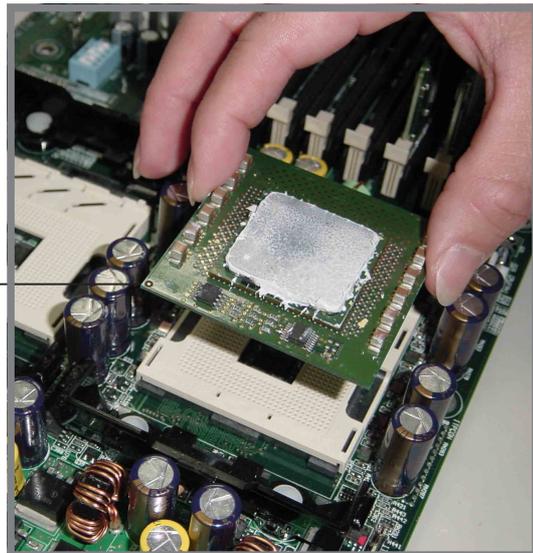


2. Position the CPU above the socket as shown.
3. Carefully insert the CPU into the socket until it fits in place.

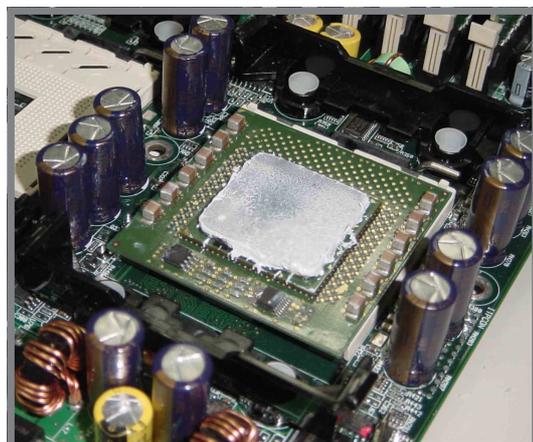
Marked Corner —



The CPU fits only in one correct orientation. **DO NOT** force the CPU into the socket to prevent bending the pins and damaging the CPU!



4. When the CPU is in place, press it firmly on the socket while you push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.

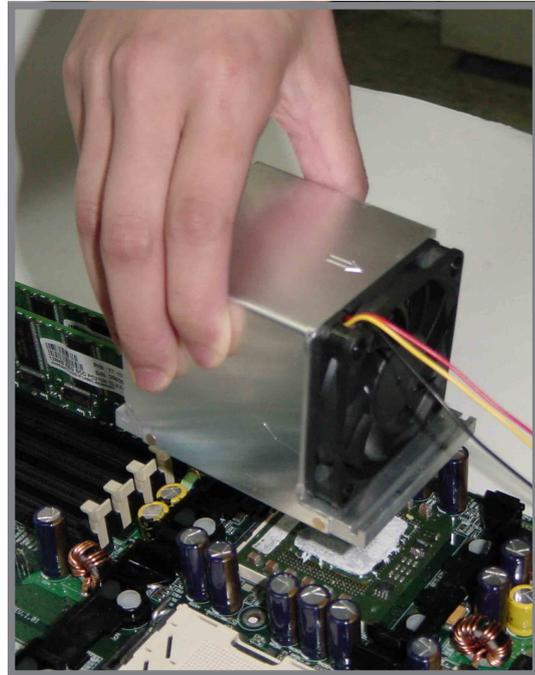


2.4.3 Installing the CPU heatsink and fan

The Intel® Xeon™ processors require a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

Follow these steps to install the CPU heatsink and fan.

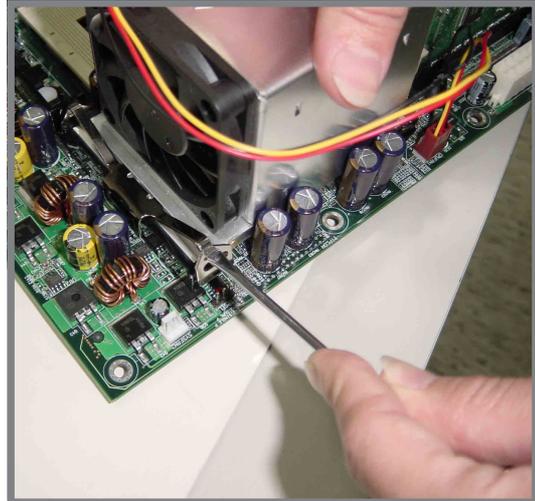
1. Place the heatsink and fan assembly on top of the installed CPU, making sure that it fits in place.



2. Hook one end of the retention bracket into the protruding tab on the corner of the plastic retention base. (The retention base comes installed with the motherboard.)



3. Use a small flat screw driver to attach the other end of the bracket, while firmly holding down the heatsink and fan assembly. The middle hook of the bracket snaps in place if you properly attached the two ends.



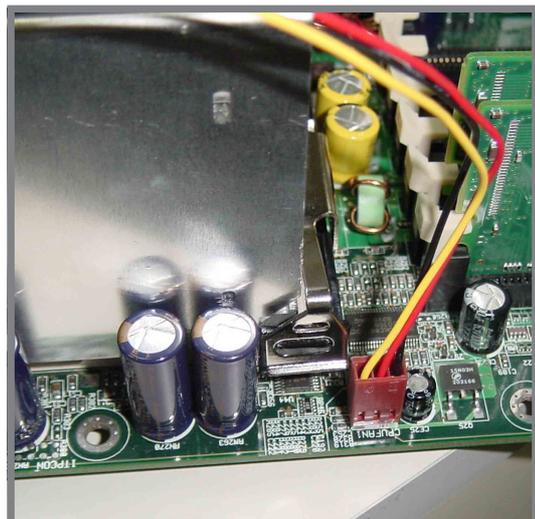
4. As shown, the middle hook of the bracket snaps in place if you properly attached the two ends.
5. Do steps 2 to 4 to install the other bracket.



6. When the heatsink and fan assembly is in place, connect the fan cable to the fan connector on the motherboard labeled FAN1 (for the CPU on socket 1) and FAN2 (for the CPU on socket 2).



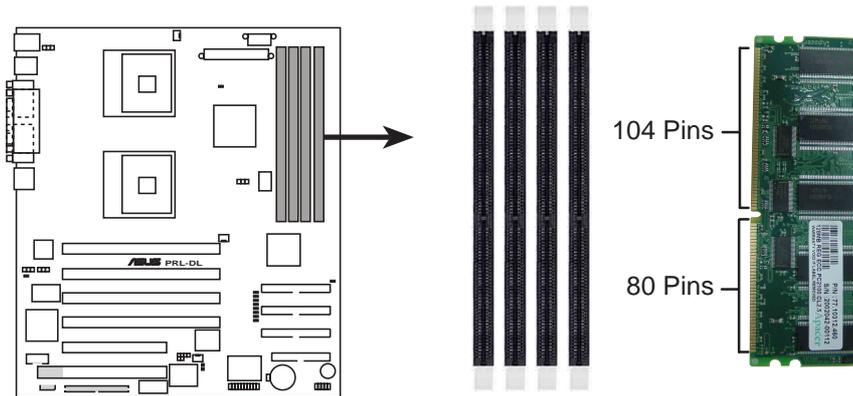
Don't forget to connect the CPU fan cable. Hardware monitoring problems may occur if you fail to plug the cable.



2.5 System memory

2.5.1 Overview

The motherboard comes with six Double Data Rate (DDR) Dual Inline Memory Module (DIMM) sockets. These sockets support up to 4GB system memory using 184-pin registered PC2100/1600 DIMMs with Serial Presence Detect (SPD) and Error Check and Correction (ECC).



PRL-DL 184-Pin DDR DIMM Sockets



A DDR DIMM is keyed with a notch so that it fits in only one direction. **DO NOT** force a DIMM into a socket to avoid damaging the DIMM.

The DDR SDRAM technology evolved from the mainstream PC66, PC100, PC133 memory known as Single Data Rate (SDR) SDRAM. DDR memory however, has the ability to perform two data operations in one clock cycle, thus providing twice the throughput of SDR memory. For example, a 200MHz DDR DIMM will support a 100MHz memory bus, and a 266MHz DDR DIMM will support a 133MHz memory bus.

DDR Data Transfer Rate		DDR Base Frequency
266MHz	➔	133MHz
200MHz	➔	100MHz

A DDR DIMM has the same physical dimensions as an SDR DIMM, but it has a 184-pin footprint compared to the 168-pin of the SDR DIMM. Also, a DDR DIMM is single notched while an SDR DIMM is double notched. Therefore, a DDR DIMM is not backward compatible with SDR, and should be installed only in a socket specially designed for DDR DIMMs.

2.5.2 Memory Configurations

The motherboard supports system memory of up to 4GB in a one-way non-interleaved configuration.

Memory configuration table

DIMM Socket	184-pin ECC DDR DIMM	Total Memory
DDRA1	SDRAM 128MB, 256MB, 512MB, 1GB, 2GB	(x1) =
DDRA2	SDRAM 128MB, 256MB, 512MB, 1GB, 2GB	(x1) =
DDRB1	SDRAM 128MB, 256MB, 512MB, 1GB, 2GB	(x1) =
DDRB2	SDRAM 128MB, 256MB, 512MB, 1GB, 2GB	(x1) =
Total System Memory		(Max. 4GB) =



The system chipset only supports PC1600/2100 registered ECC DIMMs. Make sure to use only the specified DIMM types for stable system operation.

2.5.3 Installing a DIMM

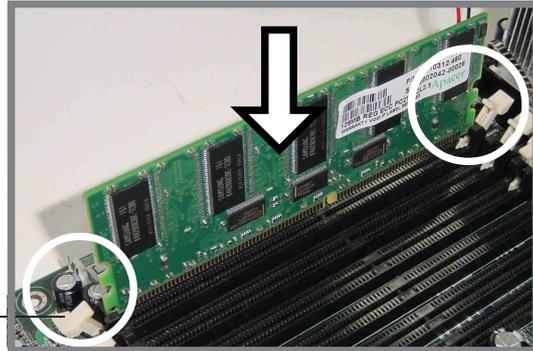


Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

Follow these steps to install a DIMM.

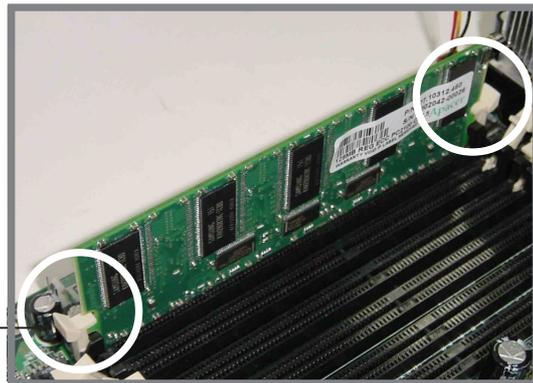
1. Unlock a DIMM socket by pressing the retaining clips outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.

Unlocked Retaining Clip



3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.

Locked Retaining Clip



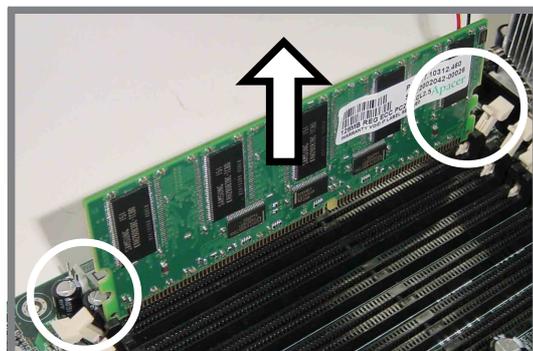
2.5.4 Removing a DIMM

Follow these steps to remove a DIMM.

1. Simultaneously press the retaining clips outward to unlock the DIMM.
2. Remove the DIMM from the socket.



Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.



2.6 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.



Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.6.1 Installing an expansion card

Follow these steps to install an expansion card.

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.6.2 Configuring an expansion card

After installing the expansion card, configure the it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

Standard Interrupt Assignments

IRQ	Priority	Standard Function
0	1	System Timer
1	2	Keyboard Controller
2	N/A	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	Sound Card (sometimes LPT2)
6	14	Floppy Disk Controller
7*	15	Printer Port (LPT1)
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.

IRQ assignments for this motherboard

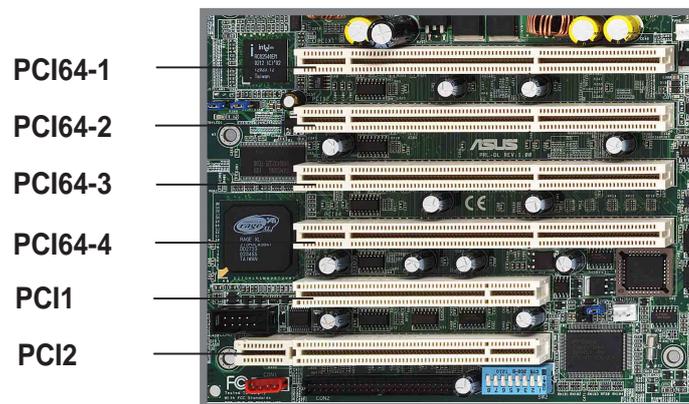
	PCI INTA	PCI INTB	PCI INTC	PCI INTD
PCI slot 1	8	9	10	11
PCI slot 2	12	13	14	15
PCI slot 3	17	18	19	20
PCI slot 4	19	20	21	22
PCI32 slot 5	23	24	25	26
PCI32 slot 6	27	28	29	30
Onboard 82540 controller	2	—	—	—
Onboard VGA controller	1	—	—	—



When using PCI cards on shared slots, ensure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

2.6.3 PCI slots

This motherboard implements the PCI (Peripheral Component Interconnect) bus technology to support up to 66MHz data transfers, or about 533MB/s. This bus technology is primarily designed for servers to increase the performance of high bandwidth devices such as Gigabit Ethernet cards and Ultra320 SCSI or RAID cards. The following figure shows the four 64-bit PCI slots and two 32-bit PCI slots on the motherboard.



PCI slot (PCI-1 & PCI-2)

PCI-1 & PCI-2 are 32-bit/33MHz 5V PCI slots with a Low Pin Count (LPC) signal connector to accommodate the ASUS Server Management Card.

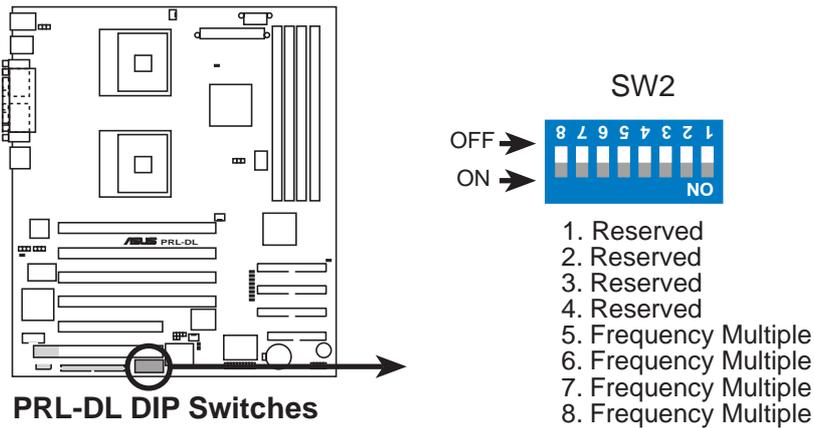
2.7 Switches and jumpers

2.7.1 Switches

The following figure shows the location and default settings of the DIP switches on the motherboard.

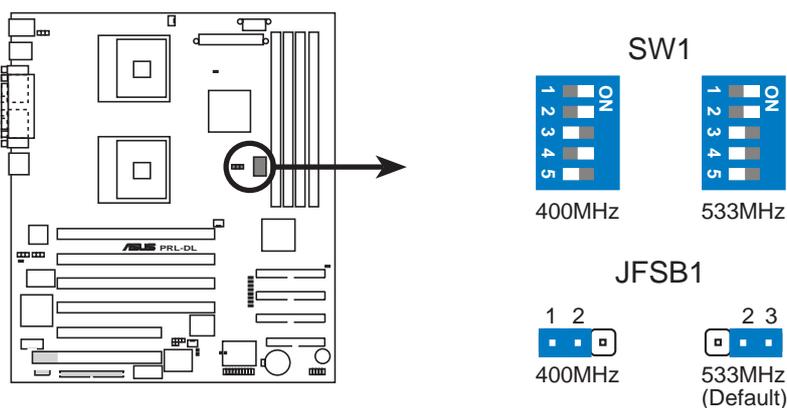


Keep the default settings for stable system operation.



1. CPU External Frequency Selection (SW1 & JFSB1)

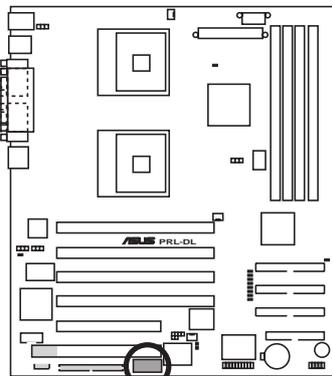
This option tells the clock generator which frequency to send to the CPU and SDRAM; and sets the CPU's *External* frequency. (The BUS Clock multiplied by the Frequency Multiple equals the CPU's *Internal* frequency or the advertised CPU speed.)



Both the dip switch and jumper must be set together.

2. CPU Frequency Multiple Setting (SW2 Switches 5-8)

Set DSW switches (1-4) to use the clock multiplier to coordinate the ratio of bus speeds with CPU settings. Set the DSW switches according to the internal speed of your processor and the bus frequency (133/100MHz).



**PRL-DL CPU
Frequency Multiple Selection**



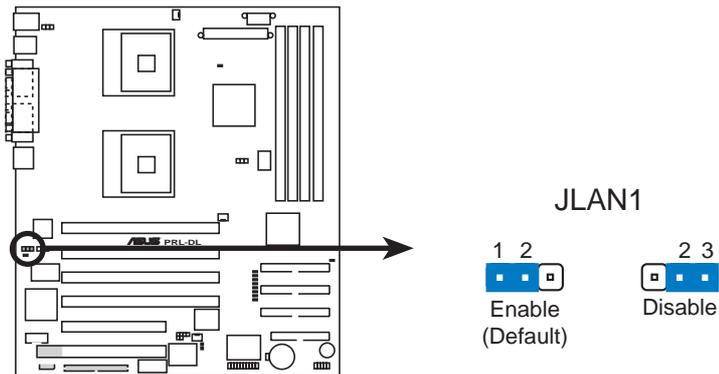
MultiplierTable

Multiplier	DSW			
	5	6	7	8
8.0x	[OFF]	[OFF]	[OFF]	[OFF]
10.0x	[OFF]	[ON]	[OFF]	[OFF]
11.0x	[ON]	[ON]	[OFF]	[OFF]
12.0x	[OFF]	[OFF]	[ON]	[OFF]
13.0x	[ON]	[OFF]	[ON]	[OFF]
14.0x	[OFF]	[ON]	[ON]	[OFF]
15.0x	[ON]	[ON]	[ON]	[OFF]
16.0x	[OFF]	[OFF]	[OFF]	[ON]
17.0x	[ON]	[OFF]	[OFF]	[ON]
18.0x	[OFF]	[ON]	[OFF]	[ON]
19.0x	[ON]	[ON]	[OFF]	[ON]
20.0x	[OFF]	[OFF]	[ON]	[ON]
21.0x	[ON]	[OFF]	[ON]	[ON]
22.0x	[OFF]	[ON]	[ON]	[ON]
23.0x	[ON]	[OFF]	[OFF]	[OFF]
24.0x	[ON]	[ON]	[ON]	[ON]

2.7.2 Jumpers

1. 32bit PCI Gigabit Ethernet setting (3-pin JLAN1)

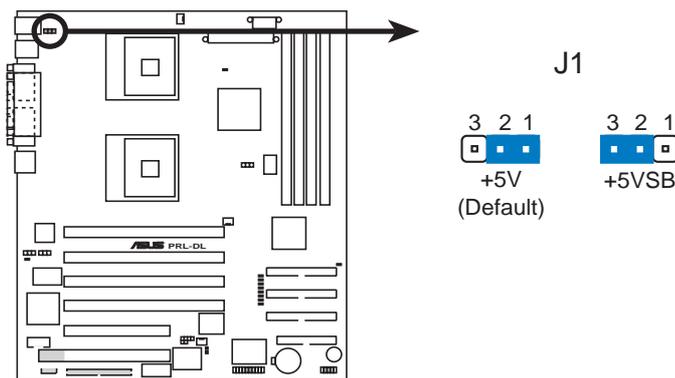
These jumpers are set by default, pins [1-2], to enable the onboard INTEL 82540 32bit PCI Gigabit Ethernet controller to support 10/100/1000BASE-TX networking. Reset to pins 2-3 to disable the controller.



PRL-DL Intel 82540 LAN Chip Setting

2. Keyboard Power Setting (3-pin J1)

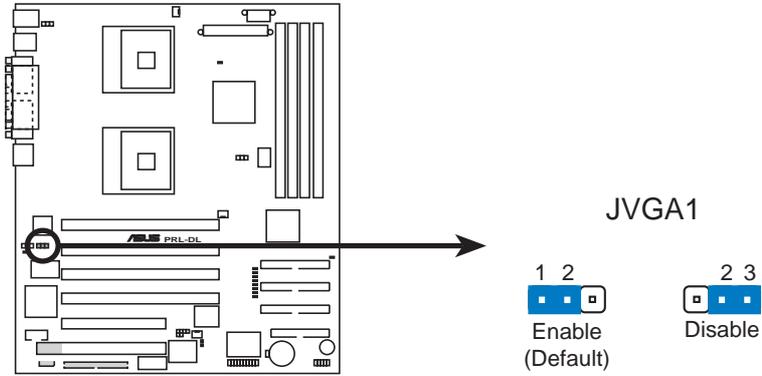
These jumpers are set by default, pins [2-3], to enable keyboard power up. Reset to pins [1-2] to disable keyboard power up.



PRL-DL Keyboard Power Setting

3. VGA setting (3-pin JVGA1)

This jumper is set by default, pins [1-2], to enable the onboard the onboard ATI Rage XL VGA controller. Reset to pins 2-3 to disable the VGA controller.



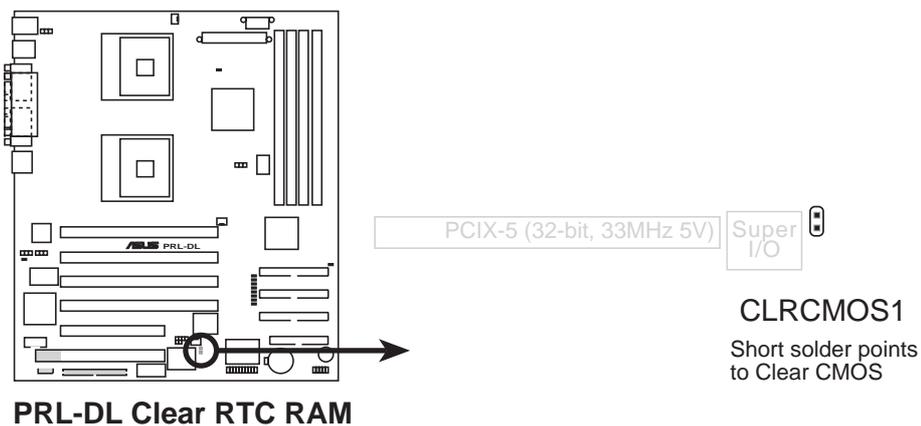
PRL-DL ATI RageXL VGA Setting

4. Clear RTC RAM (CLRCMOS1)

These solder pads allow you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The RAM data in CMOS, that include system setup information such as system passwords, is powered by the onboard button cell battery.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the battery.
3. Short the solder pads for about 5 seconds.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the key during the boot process and enter BIOS setup to re-enter data.



2.8 Connectors

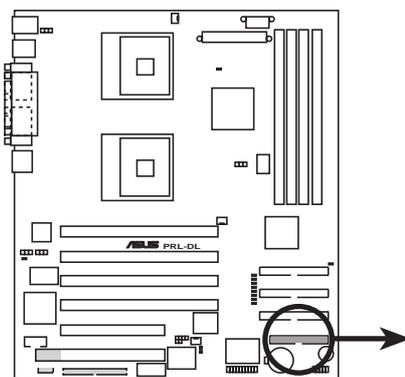
This section describes and illustrates the internal connectors on the motherboard.



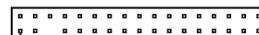
Always connect ribbon cables with the red stripe to Pin 1 on the connectors. Pin 1 is usually on the side closest to the power connector on hard drives and CD-ROM drives, but may be on the opposite side on floppy disk drives.

1. Floppy disk drive connector (34-1 pin FLOPPY1)

This connector supports the provided floppy drive ribbon cable. After connecting one end to the motherboard, connect the other end to the floppy drive. (Pin 5 is removed to prevent incorrect insertion when using ribbon cables with pin 5 plug).



FLOPPY1



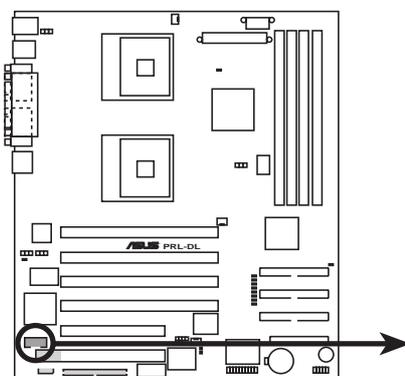
PIN 1

NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

PRL-DL Floppy Disk Drive Connector

2. Serial port 2 connector (10-1 pin COM2)

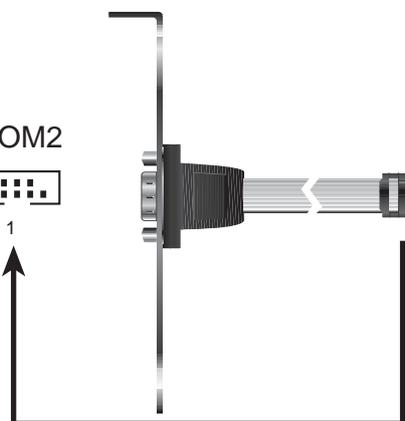
This connector accommodates a second serial port using an optional serial port bracket. Connect the bracket cable to this connector then install the bracket into a slot opening at the back of the system chassis.



COM2



PIN 1



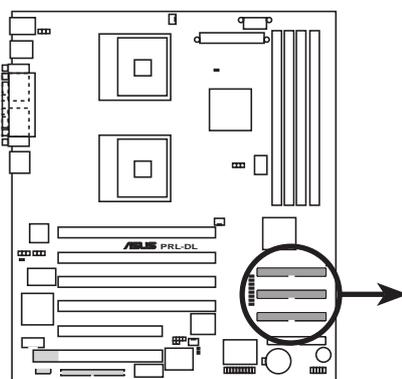
PRL-DL Serial COM2 Connector

3. IDE connectors (two 40-1 pin IDE1, IDE2, IDE3)

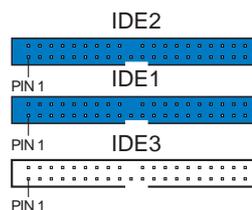
This connector supports the provided UltraDMA/100/66 IDE hard disk ribbon cable. Connect the cable's blue connector to the primary (recommended) or secondary IDE connector, then connect the gray connector to the UltraDMA/100/66 slave device (hard disk drive) and the black connector to the UltraDMA/100/66 master device. It is recommended that you connect non-UltraDMA/100/66 devices to the secondary IDE connector. If you install two hard disks, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings. BIOS supports specific device bootup. If you have more than two UltraDMA/100/66 devices, purchase another UltraDMA/100/66 cable. You may configure two hard disks to be both master devices with two ribbon cables – one for the primary IDE connector and another for the secondary IDE connector.



1. Pin 20 on each IDE connector is removed to match the covered hole on the UltraDMA cable connector. This prevents incorrect orientation when you connect the cables.
2. The hole near the blue connector on the UltraDMA/100/66 cable is intentional.



PRL-DL IDE Connectors



NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

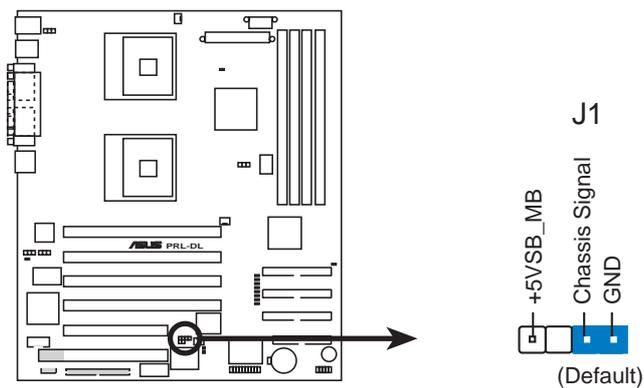


For UltraDMA/100/66 IDE devices, use an 80-conductor IDE cable. The UltraDMA/66 cable included in the motherboard package also supports UltraDMA/100.

4. Chassis alarm lead (4-1 pin J1)

This lead is for a chassis designed with intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.

By default, the pins labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. If you wish to use the chassis intrusion detection feature, remove the jumper cap from the pins.



PRL-DL Chassis Open Alarm Lead

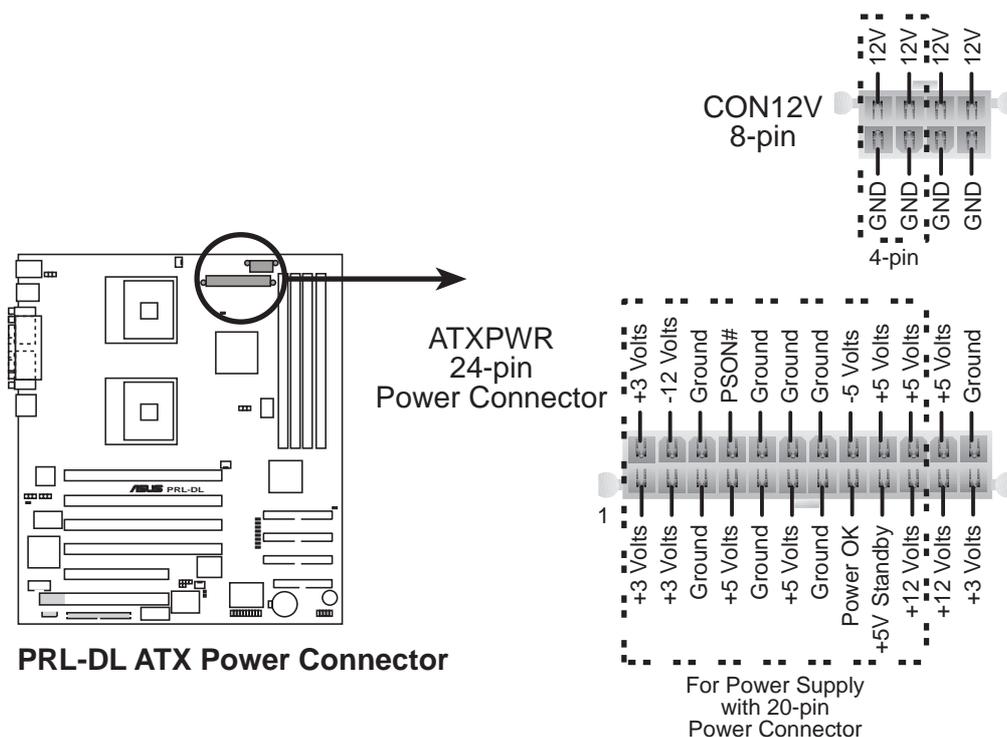
5. ATX power connectors (24/20-pin ATXPWR, 8-pin CON12V)

These connectors connect to an ATX 12V power supply. The plugs from the power supply are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

In addition to the 24/20-pin ATXPWR connector, this motherboard requires that you connect the 8-pin ATX +12V power plug to provide sufficient power to the CPU.



Make sure that your ATX 12V power supply can provide 8A on the +12V lead and at least 1A on the +5-volt standby lead (+5VSB). The minimum recommended wattage is 230W, or 300W for a fully configured system. The system may become unstable and may experience difficulty powering up if the power supply is inadequate.

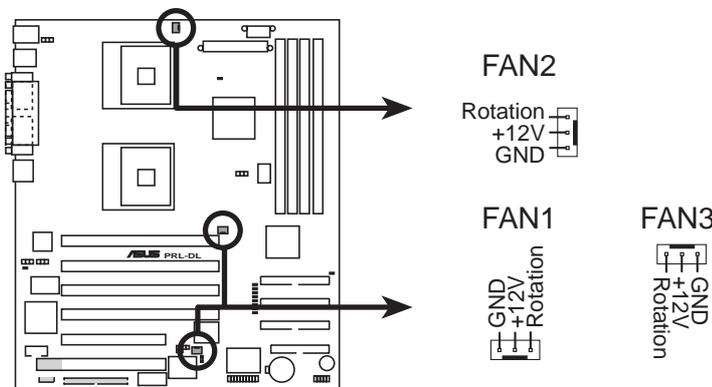


6. CPU, Chassis, and Power Fan Connectors (3-pin FAN1, FAN2, FAN3, FAN4)

The fan connectors support cooling fans of 350mA~740mA (8.88W max.) or a total of 1A~2.22A (26.64W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



Do not forget to connect the fan cables to the fan connectors. Lack of sufficient air flow within the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors!



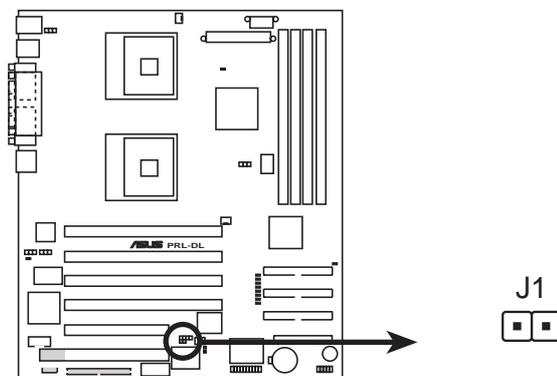
PRL-DL 12-Volt Cooling Fan Power

7. Wake-On-Ring Connector (2-pin J1)

This connector connects to internal modem cards with a Wake-On-Ring output. The connector powers up the system when a ringup packet or signal is received through the internal modem card.



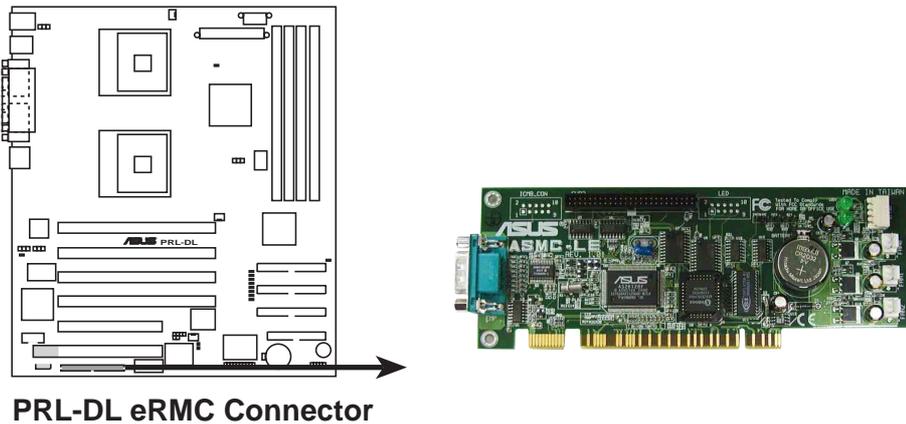
For external modems, Wake-On-Ring is detected through the COM port.



PRL-DL Wake on Ring Header

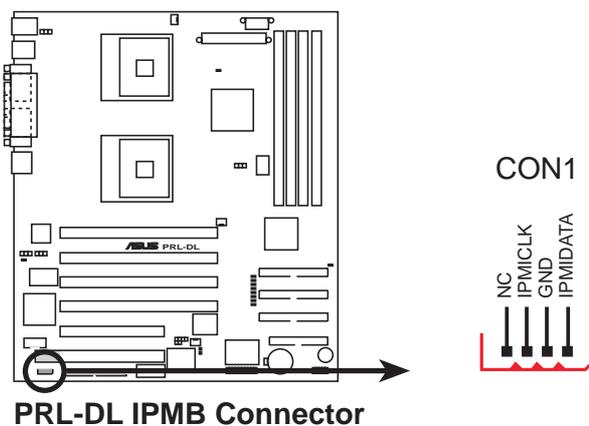
8. Server management card connector (50-pin CON2)

This connector allows you to connect the optional ASMC-LE, ASMC-ME, or ASMC-HE card using an ASMC interface cable. Install the ASMC card into the PCI6 slot and connect the cable from the card to this connector. The PCI6 slot on the motherboard has a Low Pin Count (LPC) signal connector to accommodate the ASMC card.



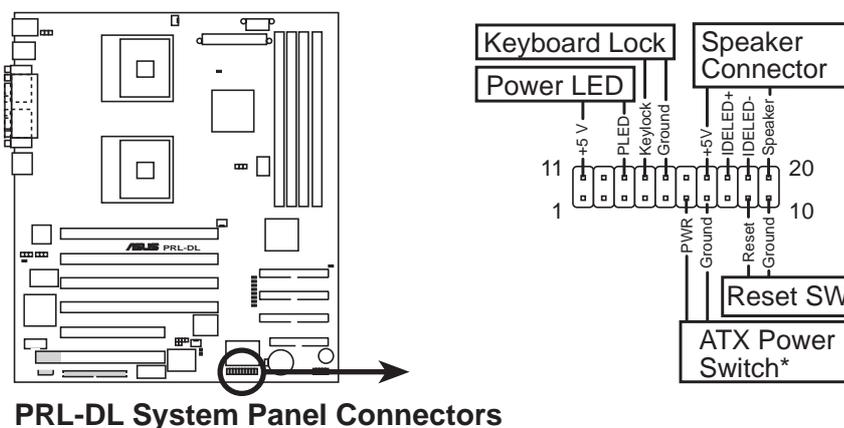
9. IPMI connector (4-pin CON1)

The Intelligent Platform Management Interface (IPMI) connector is for the ASMC card. Connect the 4-pin ASMC interface cable to this connector.



11. System panel connector (20-pin PANEL)

This connector accommodates several system front panel functions.



- **System Power LED Lead (3-1 pin PLED)**

This 3-1 pin connector connects to the system power LED. The LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Keyboard Lock Switch Lead (2-pin KEYLOCK)**

This 2-pin connector supplies the case-mounted key switch for keyboard locking.

- **System Warning Speaker Lead (4-pin SPEAKER)**

This 4-pin connector is for a chassis-mounted speaker.

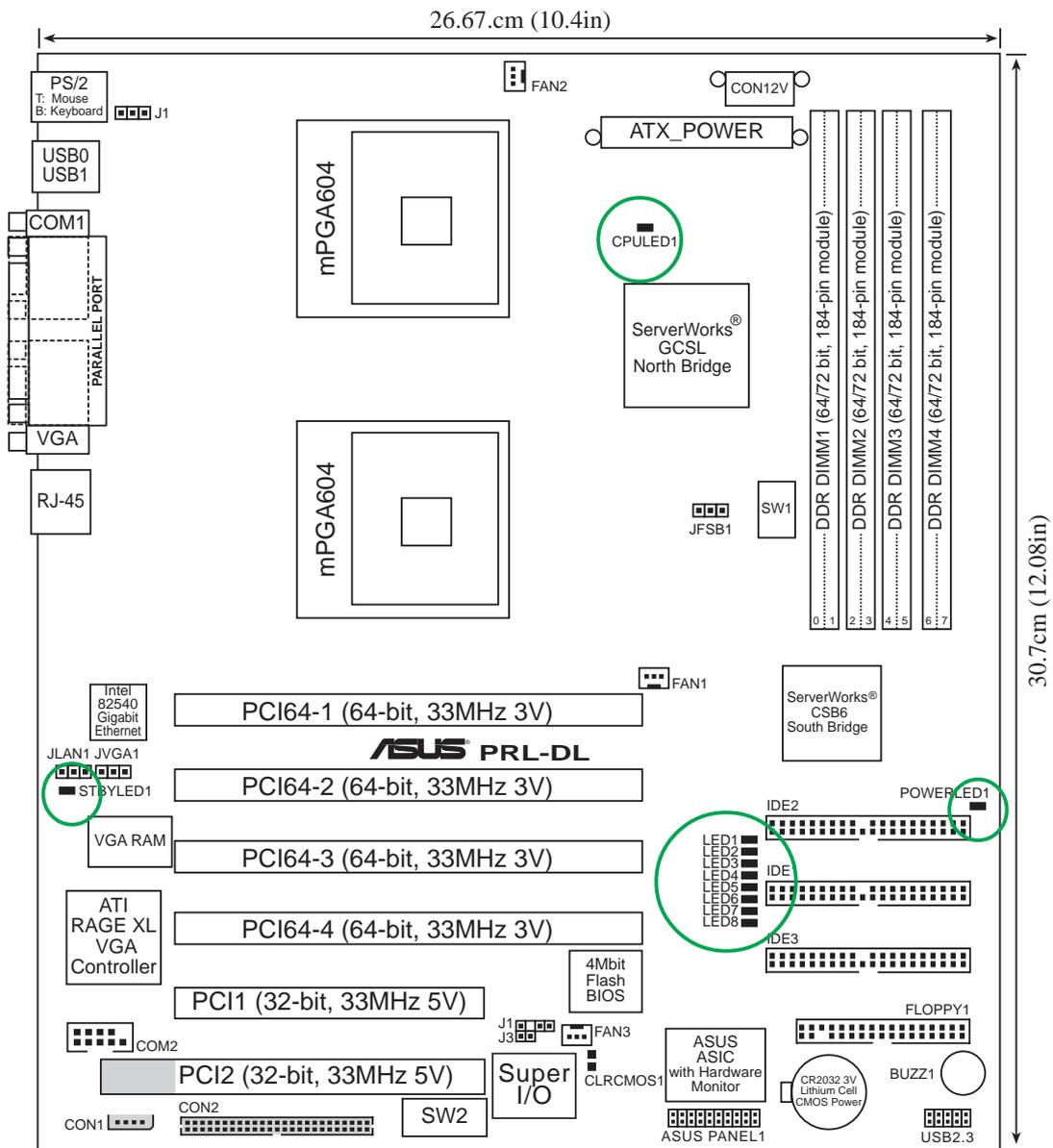
- **ATX Power Switch / Soft-Off Switch Lead (2-pin PWR)**

This connector connects a switch that controls the system power. Pressing the power switch turns the system between ON and SLEEP, or ON and SOFT OFF, depending on the BIOS or OS settings. Pressing the power switch while in the ON mode for more than 4 seconds turns the system OFF.

- **Reset Switch Lead (2-pin RESET)**

This 2-pin connector connects to the case-mounted reset switch for rebooting the system without turning off the system power.

2.9 Onboard LEDs



Onboard LEDs

- CPULED1** Lights if one or two CPU overheats or if CPU 1 is not inserted.
- STBYLED1** Lights when the motherboard receives standby power.
- POWERLED1** Lights when the motherboard is turned ON.
- LED1-LED8** Port 80h post code LEDs (see next page)

2.9.1 Port 80h post code LEDs

LED	8	7	6	5	4	3	2	1	
	■	■	■	■	■	■	■	■	FFh
	■	■	■	■	■	■	■	■	C0h
	■	■	■	■	■	■	■	■	0Dh
	■	■	■	■	■	■	■	■	00h

POST Code < C0h >

1. Chipset very early initialization.
2. Programed chipset registers before memory detection.

POST Code < C1h >

1. Power on check.
2. Memory detection and initialization.

POST Code < 80h > : Get memory type from SPD.

If BIOS can't get SPD = Error Code < D0h >

If memory type is not DDR-SDRAM = Error Code < D8h >

POST Code < 81h > : Get size and timing information from SPD.

POST Code < 82h > : Set memory size according to each memory module.

POST Code < 83h > : Set memory timing.

POST Code < 84h > : Initialize memory module.

POST Code < 85h > : Do DQS for memory module.

POST Code < 86h > : Finish memory detection and initialization

3. Test first 256 MB memory.

POST Code < 0Ch >

1. BIOS checksum verify.

POST Code < C3h >

1. Decompressed BIOS codes into memory.

POST Code < C5h >

1. Shadow system BIOS.

2. Disabled CPU cache.
3. Check if go to BOOTBLOCK POST.

POST Code < 05h >

1. Blank out the video screen.
2. Initialized the keyboard.

POST Code < 07h >

1. Used walking 1's algorithm to check out interface to CMOS circuitry.
2. Also set real-time clock power status. Then check for override.

POST Code < 09h >

1. Programed chipset register to default value according to ROMTABLE.
2. early initialize CPU.
3. Initialized APIC.
4. Set A20 off.

POST Code < 0Ah >

1. Initialized int. vectors (0-77h) to the spurious interrupt handler. Then initialize 00h-1fh to their proper places.

POST Code < 0Bh >

1. Checked normal ISA CMOS checksum and battery. If it fails, we load the manufacturing defaults.
2. Chipset very early PM initialization, change SMBASE for CPU and move SMM code.
3. PMM initialization.
4. Disable all memory caching then enable E800 and F000 segment caching.
5. PnP early initialization.
6. BBS initialization.

POST Code < 0Ch >

1. Initialize the keyboard controller and set up all of the 40: area data.
2. Load CPU micro-code update if BIOS updated option is enable.

POST Code < 0Dh >

1. Programed CPU MTRR. Measure CPU speed and save CPU speed.
2. Initialized the video, whether it is mono, color or EGA/VGA. After initialize, shrink the VGA BIOS.
3. If no video found in this stage, beep a warning sound.

POST Code < 0Eh >

1. Set A20 on.
2. Showed HP Logo or Award Logo
3. Showed CPU type on screen.

POST Code < 14h >

1. Test 8254 Channel 2.

POST Code < 18h >

1. Test 8259 functionality.

POST Code < 30h >

1. Disabled D0/D1 command to KBC, wait for command accepted.
2. Special KBC Initialization (set KBC to PS2 mode).
3. Sizing base memory (0-640K) and extended memory starting at just over the 1M boundary.

Will continue until fail to read what was written or come to the 3GB boundary.

POST Code < 31h >

1. Set CPU MTRR for address above 1MB.
2. Cleared base memory.
3. Build UMB structure.
4. Initialized USB.
5. Erased all of memory above 1MB if QUICK_POST is disabled.

POST Code < 32h >

1. Displayed AWARD PnP message. (Award_PnP_Msg)
2. Initialized onboard SuperIO.
 - a. Early IDE chip initialize.
 - b. Programed SuperIO chip.

POST Code < 3Dh >

1. Initialize and install mouse and 40: area stuff...
2. Set extended memory size.
3. Save EXT_MEM_Size_MB in G_RAM.
4. Expanded ACPI table into memory.
5. Setup ACPITable and ACPINVS Size.
6. According to length of ACPI table to decrease Ext_MEM_FOUND, EXT_MEMORY.
7. After extended memory test, copy all ACPI tables to ACPI reclaim area (just below top of extended memory, see ATBASE INT15 function 0e820h). Then fill in physical address and checksum for all ACPI tables.
8. Get extended memory size and set size for E801h.
9. Check USB Legacy Mode.
10. Installed Mouse.

POST Code < 3Eh >

1. Do external cache sizing if it cannot be detected correctly after onboard memory configuration (just return).

POST Code < 41h >

1. Programed chipset registers accroding to menuitem setting.
2. Installed floppy devices.

POST Code < 42h >

1. Installed hard disks.

POST Code < 45h >

1. Initialized and installed co-processor.

POST Code < 4Eh >

1. Checked whether the keyboard is locked or not.
2. Report USB Keyboard.
3. Translate HaltOn_Item value to tell whether individual catagory error should be reported or not.

POST Code < 4Fh >

1. Power management initialization.
2. Verify password.

POST Code < 50h >

1. Write all of CMOS back to RAM.

POST Code < 52h >

1. Do whatever needs to do before PCI ROM initialization.
2. Shadow adaptor card's ROM.
3. Do whatever need to do after PCI ROM initialization.
4. Build BBS Table.
5. Set segment f000 to shadow write.
6. Save SCSI card information.
7. Set segment f000 to shadow read.
8. Enable parity and NMI.
9. Enable IRQ 12 if PS2 mouse hot plug.
10. Enable BIOS Setup.

POST Code < 60h >

1. Set up PS2.

POST Code < 61h >

1. Enable L1/L2 cache according to BIOS setup option.
2. Chipset final initialization.
3. Chipset power management final initialization.
4. Show system configuration.

POST Code < 62h >

1. Force NUM-LOCK on 101-key keyboard.
2. Clear LED first.
3. Set NumLock status according BIOS setup.
4. Set Typematic rate according BIOS setup.

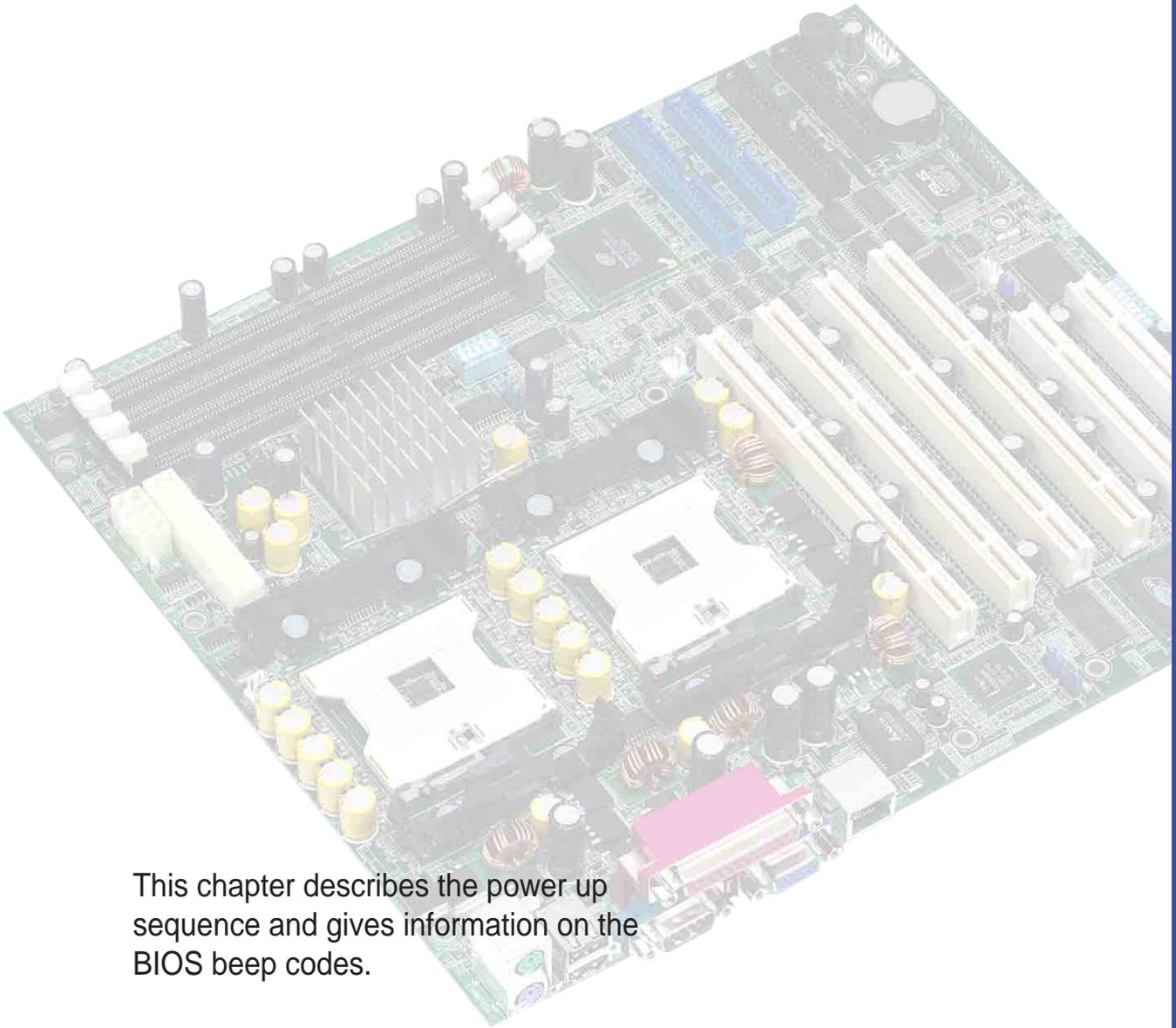
POST Code < 63h >

1. Send D2 command following with dummy code 80h for PM to check power down.
2. PNP final initialization.
3. Enable Boot Menu.
4. Check RTC clock data (hour, minute and second), if error set register A to default value.
5. Set up low stack.
6. Clear any pending keystroke and KB queue buffer.
7. Clear garbage in base memory except BIOS data.
8. Set segment EC00 to EFFF shadow read/write.
9. Set segment EC00 to EFFF shadow read/write.
10. Set A20 off.

POST Code < ffh >

1. INT 19h (system boot).

Chapter 3



This chapter describes the power up sequence and gives information on the BIOS beep codes.

Powering up

Chapter summary

- 3.1 Starting up for the first time 3-1**
- 3.2 Powering off the computer 3-2**

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
 - a. Monitor
 - b. External SCSI devices (starting with the last device on the chain)
 - c. System power (if you are using an ATX power supply, you need to switch on the power supply as well as press the ATX power switch on the front of the chassis).
6. After applying power, the power LED on the system front panel case lights up. For ATX power supplies, the system LED lights up when you press the ATX power switch. If your monitor complies with “green” standards or if it has a “power standby” feature, the monitor LED may light up or switch between orange and green after the system LED turns on. The system then runs the power-on tests. While the tests are running, the BIOS beeps or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

Award BIOS Beep Codes

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM installed or detected
One long beep followed by three short beeps	Video card not found or video card memory bad
High frequency beeps when system is working	CPU overheated; System running at a lower frequency

7. At power on, hold down <Delete> to enter BIOS Setup. Follow the instructions in Chapter 4.

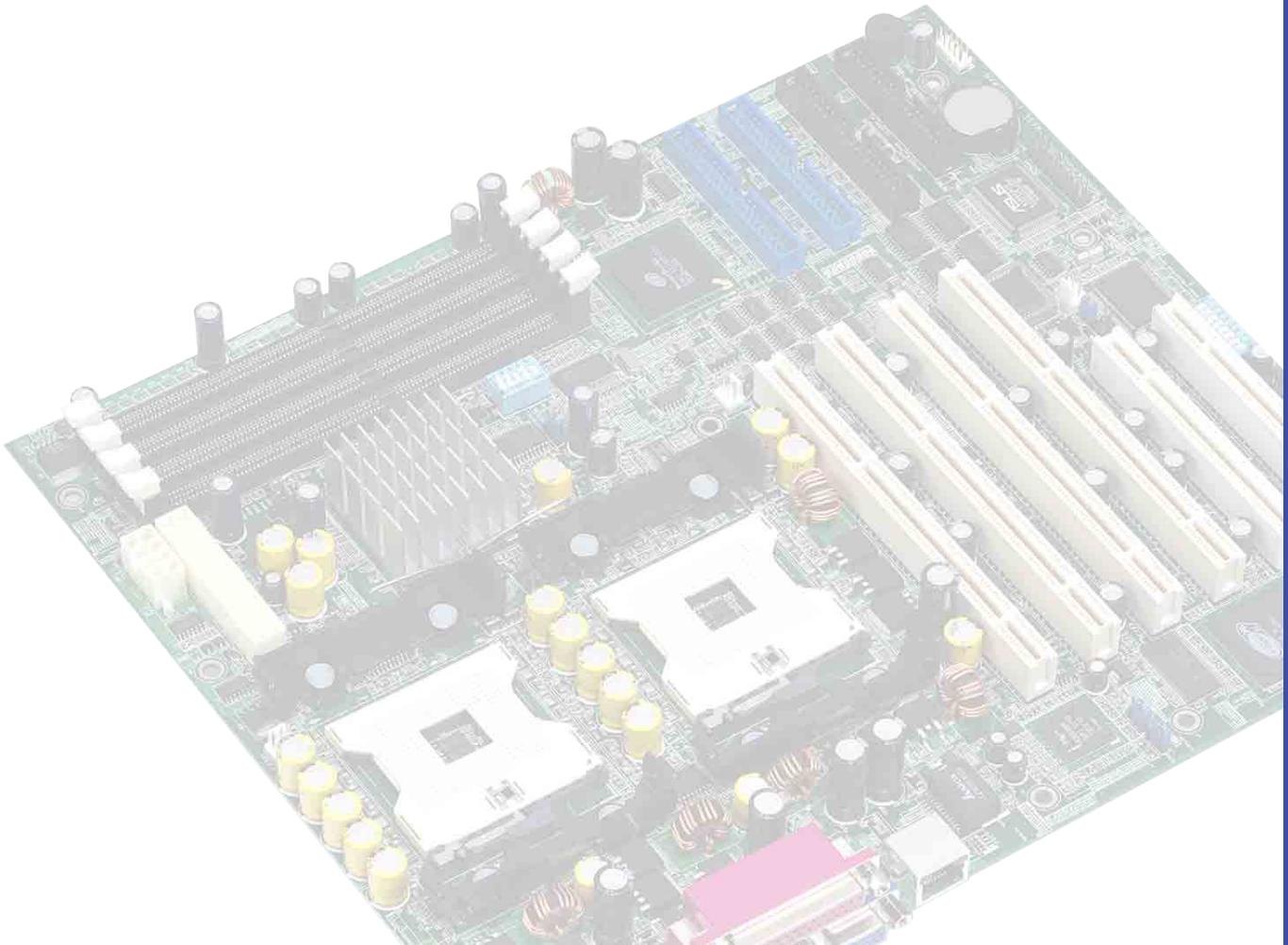
3.2 Powering off the computer

You must first exit the operating system and shut down the system before switching off the power. For ATX power supplies, you can press the ATX power switch after exiting or shutting down the operating system. If you use Windows 98SE/2000/XP, click the Start button, click Shut Down, then click the OK button to shut down the computer. The power supply should turn off after Windows shuts down.



The message “You can now safely turn off your computer” does not appear when shutting down with ATX power supplies.

Chapter 4



This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

BIOS setup

Chapter summary

4.1	Managing and updating your BIOS	4-1
4.2	BIOS Setup program	4-5
4.3	Main Menu	4-8
4.4	Advanced Menu	4-15
4.5	Power Menu	4-22
4.6	Boot Menu	4-27
4.7	Server Menu	4-29
4.8	Exit Menu	4-30

4.1 Managing and updating your BIOS

4.1.1 Creating a bootable disk

AFLASH.EXE is a Flash Memory Writer utility that updates the BIOS by uploading a new BIOS file to the programmable flash ROM on the motherboard. This file works only in DOS mode. To determine the BIOS version of your motherboard, check the last four numbers of the code displayed on the upper left-hand corner of your screen during bootup. Larger numbers represent a newer BIOS file.

1. Type `FORMAT A:/S` at the DOS prompt to create a bootable system disk. DO NOT copy `AUTOEXEC.BAT` and `CONFIG.SYS` to the disk.
2. Type `COPY D:\AFLASH\AFLASH.EXE A:\` (assuming D is your CD-ROM drive) to copy `AFLASH.EXE` to the boot disk you created.



AFLASH works only in DOS mode. It does not work in the DOS prompt within Windows, and does not work with certain memory drivers that may be loaded when you boot from the hard drive. It is recommended that you reboot using a floppy disk.

3. Reboot the computer from the floppy disk.



BIOS setup must specify “Floppy” as the first item in the boot sequence.

4. In DOS mode, type `A:\AFLASH <Enter>` to run `AFLASH`.

```
ASUS ACPI BIOS
FLASH MEMORY WRITER V2.0
Copyright (C) 1994-2001 ASUSTeK COMPUTER INC.

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB
Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model          : XXX-XX
BIOS Built Date     : 12/25/01

Choose one of the followings:
1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD

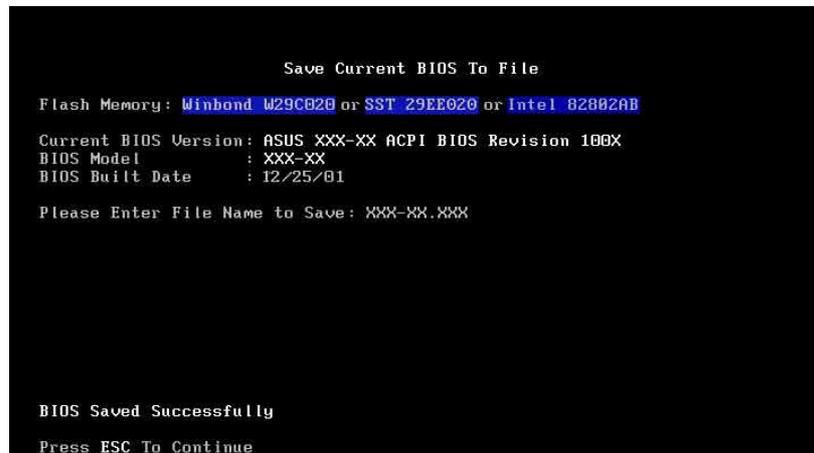
Enter choice: [1]

Press ESC To Exit
```



If the word “unknown” appears after Flash Memory:, the memory chip is either not programmable or is not supported by the ACPI BIOS and therefore, cannot be programmed by the Flash Memory Writer utility.

5. Select 1. Save Current BIOS to File from the Main menu and press <Enter>. The Save Current BIOS To File screen appears.



6. Type a filename and the path, for example, A:\XXX-XX.XXX, then press <Enter>.

4.1.2 Updating the BIOS



Update the BIOS only if you have problems with the motherboard and you are sure that the new BIOS revision will solve your problems. Careless updating may result to more problems with the motherboard!

1. Download an updated ASUS BIOS file from the Internet (WWW or FTP) (see ASUS CONTACT INFORMATION on page x for details) and save to the boot floppy disk you created earlier.
2. Boot from the floppy disk.
3. At the "A:\>" prompt, type AFLASH and then press <Enter>.
4. At the Main Menu, type 2 then press <Enter>. The Update BIOS Including Boot Block and ESCD screen appears.
5. Type the filename of your new BIOS and the path, for example, A:\XXX-XX.XXX, then press <Enter>.

To cancel this operation, press <Enter>.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W29CB20 or SST 29EE020 or Intel 82802AB
Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model      : XXX-XX
BIOS Built Date   : 12/25/01
Please Enter File Name for NEW BIOS: A:\XXX-XX.XXX
```

6. When prompted to confirm the BIOS update, press Y to start the update.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W29CB20 or SST 29EE020 or Intel 82802AB
BIOS Version
[CURRENT] ASUS XXX-XX ACPI BIOS Revision 100X
[test.awd] ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model
[CURRENT] XXX-XX
[test.awd] XXX-XX
Date of BIOS Built
[CURRENT] 09/25/99
[XXXX.XXX] 05/29/00
Check sum of 1001.010 is F266.
Are you sure (Y/N) ? [Y]
Press ESC To Return to Main Menu
```

7. The utility starts to program the new BIOS information into the Flash ROM. The boot block is updated automatically only when necessary. This minimizes the possibility of boot problems in case of update failures. When the programming is done, the message “*Flashed Successfully*” appears.

```
Update BIOS Including Boot Block and ESCD

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB

BIOS Version
[CURRENT] ASUS XXX-XX ACPI BIOS Revision 100X
[test.awd] ASUS XXX-XX ACPI BIOS Revision 100X

BIOS Model
[CURRENT] XXX-XX
[test.awd] XXX-XX

Date of BIOS Built
[CURRENT] 12/25/01
[XXXX.XXX] 05/29/00

Check sum of 1001.010 is F266.

Are you sure (Y/N) ? [Y]
Block Erasing -- Done
Programming -- 3FFFF
Flashed Successfully

Press ESC To Continue
```

8. Follow the onscreen instructions to continue.

```
ASUS ACPI BIOS
FLASH MEMORY WRITER V2.0
Copyright (C) 1994-2001 ASUSTeK COMPUTER INC.

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB

Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model : XXX-XX
BIOS Built Date : 12/25/01

Choose one of the followings:

1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD

Enter choice: [1]

You have flashed the EPROM:It is recommended that you turn off
the power, enter SETUP and LOAD Setup Defaults to have CMOS
updated with new BIOS when exits.

Press ESC To Exit
```



If you encounter problems while updating the new BIOS, DO NOT turn off the system because this may cause boot problems. Just repeat the process, and if the problem persists, load the original BIOS file you saved to the boot disk. If the Flash Memory Writer utility is not able to successfully update a complete BIOS file, the system may not boot. If this happens, call the ASUS service center for support.

4.2 BIOS Setup program

This motherboard supports a programmable Flash ROM that you can update using the provided utility described in section “4.1 Managing and updating your BIOS.”

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to “Run Setup”. This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you may want to change the configuration of your computer in the future. For example, you may want to enable the security password feature or make changes to the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the Flash ROM.

The Flash ROM on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Delete> during the Power-On Self Test (POST) to enter the Setup utility, otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. It is a menu-driven program, which means you can scroll through the various sub-menus and make your selections among the predetermined choices.



Because the BIOS software is constantly being updated, the following BIOS setup screens and descriptions are for reference purposes only, and may not exactly match what you see on your screen.

4.2.1 BIOS menu bar

The top of the screen has a menu bar with the following selections:

- MAIN** Use this menu to make changes to the basic system configuration.
- ADVANCED** Use this menu to enable and make changes to the advanced features.
- POWER** Use this menu to configure power management features.
- BOOT** Use this menu to configure the default system device used to locate and load the Operating System.
- SERVER** Use this menu to set server-related items
- EXIT** Use this menu to exit the current menu or to exit the Setup program.

To access the menu bar items, press the right or left arrow key on the keyboard until the desired item is highlighted.

4.2.2 Legend bar

At the bottom of the Setup screen is a legend bar. The keys in the legend bar allow you to navigate through the various setup menus. The following table lists the keys found in the legend bar with their corresponding functions.

Navigation Key(s)	Function Description
<F1> or <Alt + H>	Displays the General Help screen from anywhere in the BIOS Setup
<Esc>	Jumps to the Exit menu or returns to the main menu from a sub-menu
Left or Right arrow	Selects the menu item to the left or right
Up or Down arrow	Moves the highlight up or down between fields
- (minus key)	Scrolls backward through the values for the highlighted field
+ (plus key) or spacebar	Scrolls forward through the values for the highlighted field
<Enter>	Brings up a selection menu for the highlighted field
<Home> or <PgUp>	Moves the cursor to the first field
<End> or <PgDn>	Moves the cursor to the last field
<F5>	Resets the current screen to its Setup Defaults
<F10>	Saves changes and exits Setup

General help

In addition to the Item Specific Help window, the BIOS setup program also provides a General Help screen. You may launch this screen from any menu by simply pressing <F1> or the <Alt> + <H> combination. The General Help screen lists the legend keys and their corresponding functions.

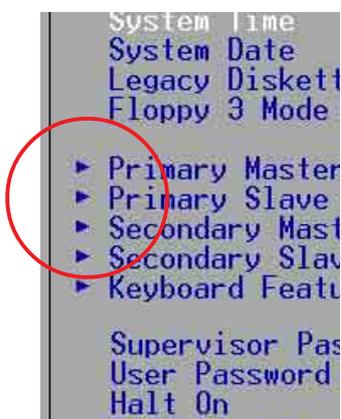
Saving changes and exiting the Setup program

See “4.8 Exit Menu” for detailed information on saving changes and exiting the setup program.

Scroll bar

When a scroll bar appears to the right of a help window, it indicates that there is more information to be displayed that will not fit in the window. Use <PgUp> and <PgDn> or the up and down arrow keys to scroll through the entire help document. Press <Home> to display the first page, press <End> to go to the last page. To exit the help window, press <Enter> or <Esc>.

Sub-menu

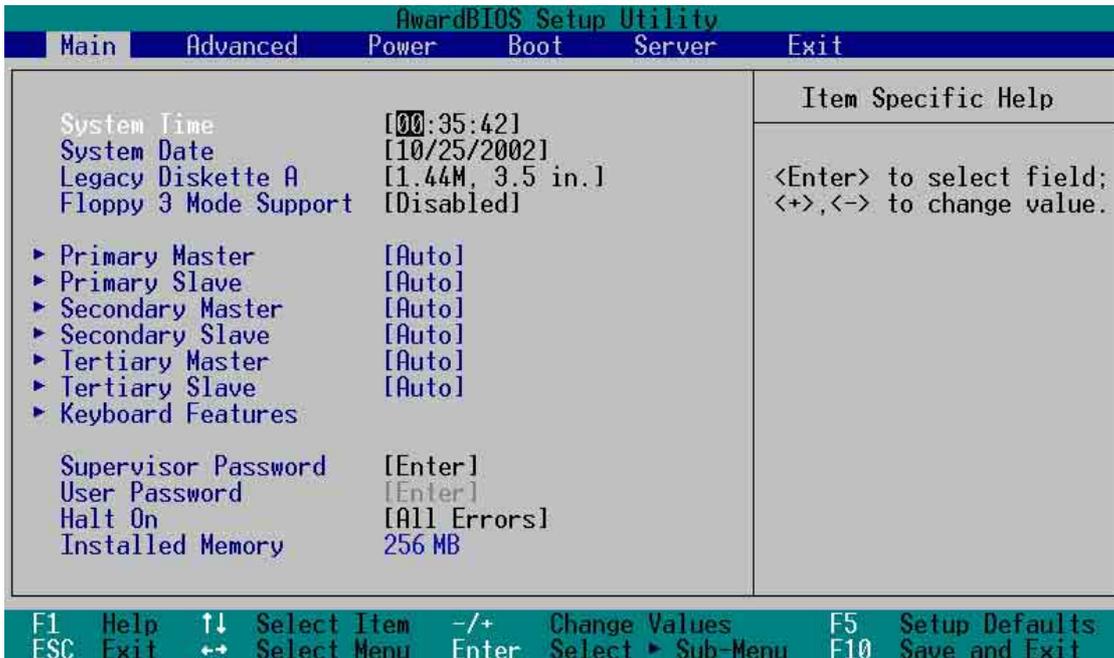


Note that a right pointer symbol (as shown on the left) appears to the left of certain fields. This pointer indicates that you can display a sub-menu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub-menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

Take some time to familiarize yourself with the legend keys and their corresponding functions. Practice navigating through the various menus and sub-menus. If you accidentally make unwanted changes to any of the fields, use the set default hot key <F5> to load the Setup default values. While moving around through the Setup program, note that explanations appear in the Item Specific Help window located to the right of each menu. This window displays the help text for the currently highlighted field.

4.3 Main Menu

When you enter the Setup program, the following screen appears.



System Time [XX:XX:XX]

Sets the system to the time that you specify (usually the current time). The format is hour, minute, second. Valid values for hour, minute and second are Hour: (00 to 23), Minute: (00 to 59), Second: (00 to 59). Use the <Tab> or <Shift> + <Tab> keys to move between the hour, minute, and second fields.

System Date [XX/XX/XXXX]

Sets the system to the date that you specify (usually the current date). The format is month, day, year. Valid values for month, day, and year are Month: (1 to 12), Day: (1 to 31), Year: (up to 2099). Use the <Tab> or <Shift> + <Tab> keys to move between the month, day, and year fields.

Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration 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.]

Floppy 3 Mode Support [Disabled]

This is required to support older Japanese floppy drives. The Floppy 3 Mode feature allows reading and writing of 1.2MB (as opposed to 1.44MB) on a 3.5-inch diskette. Configuration options: [Disabled] [Enabled]

Supervisor Password [Disabled] / User Password [Disabled]

These fields allow you to set passwords. To set a password, highlight the appropriate field and press <Enter>. Type in a password then press <Enter>. You can type up to eight alphanumeric characters. Symbols and other characters are ignored. To confirm the password, type the password again and press <Enter>. The password is now set to [Enabled]. This password allows full access to the BIOS Setup menus. To clear the password, highlight this field and press <Enter>. The same dialog box as above appears. Press <Enter>. The password is set to [Disabled].

A note about passwords

The BIOS Setup program allows you to specify passwords in the Main menu. The passwords control access to the BIOS during system startup. Passwords are not case sensitive, meaning, passwords typed in either uppercase or lowercase letters are accepted. The BIOS Setup program allows you to specify two different passwords: a Supervisor password and a User password. If you did not set a Supervisor password, anyone can access the BIOS Setup program. If you did, the Supervisor password is required to enter the BIOS Setup program and to gain full access to the configuration fields.

Forgot the password?

If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. See section “2.7 Switches and jumpers” for information on how to erase the R TC RAM.

Halt On [All Errors]

This field specifies the types of errors that will cause the system to halt. Configuration options: [All Errors] [No Error] [All but Keyboard] [All but Disk] [All but Disk/Keyboard]

Installed Memory [XXX MB]

This field automatically displays the amount of conventional memory detected by the system during the boot process.

4.3.1 Primary/Secondary/Tertiary Master/Slave

AwardBIOS Setup Utility			
Main		Item Specific Help	
Primary Master [Auto]			
Type	[Auto]	<Enter> to select the type of the IDE drive. [User Type HDD] allows you to set each entry on your own. WARNING: Ultra DMA mode 3/4/5 can be enabled only when BIOS detects shielded 80-pin cable.	
Cylinders	[1024]		
Head	[255]		
Sector	[63]		
CHS Capacity	8422MB		
Maximum LBA Capacity	25590MB		
Multi-Sector Transfers	[Maximum]		
SMART Monitoring	[Disabled]		
PIO Mode	[4]		
ULTRA DMA Mode	[Disabled]		
F1 Help	↑↓ Select Item	-/+ Change Values	F5 Setup Defaults
ESC Exit	↔ Select Menu	Enter Select ► Sub-Menu	F10 Save and Exit

Type [Auto]

Select [Auto] to automatically detect an IDE hard disk drive. If automatic detection is successful, Setup automatically fills in the correct values for the remaining fields on this sub-menu. If automatic detection fails, this may be because the hard disk drive is too old or too new. If the hard disk was already formatted on an older system, Setup may detect incorrect parameters. In these cases, select [User Type HDD] to manually enter the IDE hard disk drive parameters. Refer to the next section for details.



Before attempting to configure a hard disk drive, make sure you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed hard disk.

[User Type HDD]

AwardBIOS Setup Utility			
Main			
Primary Master	[User Type HDD]	Item Specific Help	
Type	[User Type HDD]	<Enter> to select the type of the IDE drive. [User Type HDD] allows you to set each entry on your own. WARNING: Ultra DMA mode 3/4/5 can be enabled only when BIOS detects shielded 80-pin cable.	
Translation Method	[LBA]		
Cylinders	[1024]		
Head	[255]		
Sector	[63]		
CHS Capacity	8422MB		
Maximum LBA Capacity	25590MB		
Multi-Sector Transfers	[Maximum]		
SMART Monitoring	[Disabled]		
PIO Mode	[4]		
ULTRA DMA Mode	[Disabled]		
F1 Help	↑↓ Select Item	-/+ Change Values	F5 Setup Defaults
ESC Exit	↔ Select Menu	Enter Select	▶ Sub-Menu F10 Save and Exit

Manually enter the number of cylinders, heads and sectors per track for the drive. Refer to the drive documentation or on the drive label for this information.



After entering the IDE hard disk drive information into BIOS, use a disk utility, such as FDISK, to partition and format new IDE hard disk drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drives to active.

If no drive is installed or if you are removing a drive and not replacing it, select [None].

Other options for the Type field are:

[CD-ROM] - for IDE CD-ROM drives

[LS-120] - for LS-120 compatible floppy disk drives

[ZIP] - for ZIP-compatible disk drives

[MO] - for IDE magneto optical disk drives

[Other ATAPI Device] - for IDE devices not listed here

After making your selections on this sub-menu, press the <Esc> key to return to the Main menu. When the Main menu appears, the hard disk drive field displays the size for the hard disk drive that you configured.

Translation Method [LBA]

Select the hard disk drive type in this field. When Logical Block Addressing (LBA) is enabled, the 28-bit addressing of the hard drive is used without regard for cylinders, heads, or sectors. Note that LBA Mode is necessary for drives with more than 504MB storage capacity. Configuration options: [LBA] [LARGE] [Normal] [Match Partition Table] [Manual]

Cylinders

This field configures the number of cylinders. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

Head

This field configures the number of read/write heads. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

Sector

This field configures the number of sectors per track. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

CHS Capacity

This field shows the drive's maximum CHS capacity as calculated by the BIOS based on the drive information you entered.

Maximum LBA Capacity

This field shows the drive's maximum LBA capacity as calculated by the BIOS based on the drive information you entered.

Multi-Sector Transfers [Maximum]

This option automatically sets the number of sectors per block to the highest number that the drive supports. Note that when this field is automatically configured, the set value may not always be the fastest value for the drive. You may also manually configure this field. Refer to the documentation that came with the hard drive to determine the optimum value and set it manually. To make changes to this field, set the Type field to [User Type HDD]. Configuration options: [Disabled] [2 Sectors] [4 Sectors] [8 Sectors] [16 Sectors] [32 Sectors] [Maximum]

SMART Monitoring [Disabled]

This field allows you to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) system that utilizes internal hard disk drive monitoring technology. This parameter is normally disabled because the resources used in the SMART monitoring feature may decrease system performance. Configuration options: [Disabled] [Enabled]

PIO Mode [4]

This option lets you set a PIO (Programmed Input/Output) mode for the IDE device. Modes 0 through 4 provide successive increase in performance. Configuration options: [0] [1] [2] [3] [4]

Ultra DMA Mode [Disabled]

Ultra DMA capability allows improved transfer speeds and data integrity for compatible IDE devices. Set to [Disabled] to suppress Ultra DMA capability. To make changes to this field, set the Type field to [User Type HDD]. Configuration options: [0] [1] [2] [3] [4] [5] [Disabled]

4.3.2 Keyboard Features

AwardBIOS Setup Utility	
Main	
Keyboard Features	Item Specific Help
Boot Up NumLock Status [On] Keyboard Auto-Repeat Rate [12/Sec] Keyboard Auto-Repeat Delay [1/4 Sec]	Select Power-on state for Numlock

F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ←→ Select Menu Enter Select ► Sub-Menu F10 Save and Exit

Boot Up NumLock Status [On]

This field enables users to activate the Number Lock function upon system boot. Configuration options: [Off] [On]

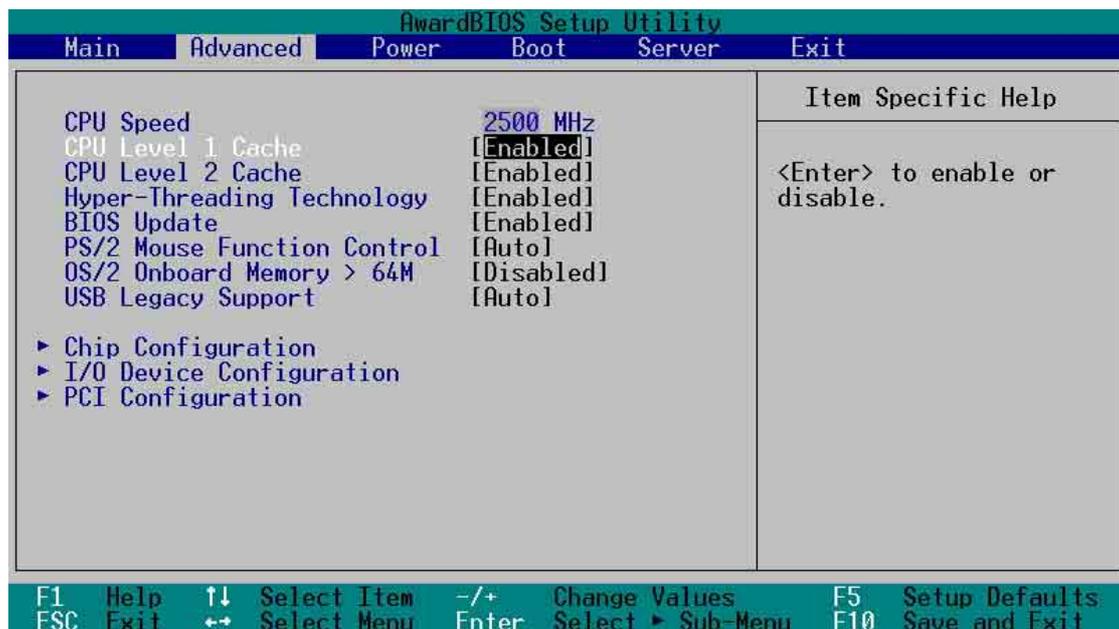
Keyboard Auto-Repeat Rate [6/Sec]

This controls the speed at which the system registers repeated keystrokes. Options range from 6 to 30 characters per second. Configuration options: [6/Sec] [8/Sec] [10/Sec] [12/Sec] [15/Sec] [20/Sec] [24/Sec] [30/Sec]

Keyboard Auto-Repeat Delay [1/4 Sec]

This field sets the time interval for displaying the first and second characters. Configuration options: [1/4 Sec] [1/2 Sec] [3/4 Sec] [1 Sec]

4.4 Advanced Menu



CPU Speed [Manual]

This field displays the auto-detected CPU speed.

CPU Level 1 Cache, CPU Level 2 Cache [Enabled]

These fields allow you to choose from the default [Enabled] or choose [Disabled] to turn on or off the CPU Level 1 and Level 2 built-in cache. Configuration options: [Disabled] [Enabled]

Hyper-Threading Technology [Enabled]

This item allows you to enable or disable support for Hyper-Threading Technology enabled processors which contain multiple logical processors per physical processor package. Configuration options: [Disabled] [Enabled]

BIOS Update [Enabled]

This field functions as an update loader integrated into the BIOS to supply the processor with the required data. When set to [Enabled], the BIOS loads the update on all processors during system bootup. Configuration options: [Disabled] [Enabled]

PS/2 Mouse Function Control [Auto]

The default setting [Auto] allows the system to detect a PS/2 mouse at startup. If a mouse is detected, the BIOS assigns IRQ12 to the PS/2 mouse. Otherwise, IRQ12 can be used for expansion cards. When you set this field to [Enabled], BIOS reserves IRQ12, whether or not a PS/2 mouse is detected at startup. Configuration options: [Enabled] [Auto]

OS/2 Onboard Memory > 64M [Disabled]

When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to set this option to [Enabled]. Otherwise, leave to the default setting [Disabled]. Configuration options: [Disabled] [Enabled]

USB Legacy Support [Auto]

This motherboard supports Universal Serial Bus (USB) devices. The default of [Auto] allows the system to detect a USB device at startup. If detected, the USB controller legacy mode is enabled. If not detected, the USB controller legacy mode is disabled.

When you set this field to [Disabled], the USB controller legacy mode is disabled whether or not you are using a USB device. Configuration options: [Disabled] [Enabled] [Auto]

4.4.1 Chip Configuration

AwardBIOS Setup Utility	
Advanced	
Chip Configuration	Item Specific Help
Enhanced Mapping Mode Unknown Video Memory Cache Mode [UC] Onboard PCI IDE [All] DDR DQS DELAY TAP in DEC [5]	Select [USWC] only when your display card supports this feature.
F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Video Memory Cache Mode [UC]

USWC (uncacheable, speculative write combining) is a new cache technology for the video memory of the processor. It can greatly improve the display speed by caching the display data. You must set this to UC (uncacheable) if your display card cannot support this feature; otherwise your system may not boot. Configuration options: [UC] [USWC]

Onboard PCI IDE [All]

You can select to enable the primary, secondary, tertiary IDE channel, all channels, or disable all channels. Configuration options: [All] [Primary\Secondary] [Primary\Tertiary] [Primary] [Secondary\Tertiary] [Secondary] [Tertiary] [Disabled]

DDR DQS Delay TAP in DEC [5]

Default setting is 5. User settings are from 0 to 96. The last setting, 96, is for auto selection. Configuration options: [0...96]

4.4.2 I/O Device Configuration

AwardBIOS Setup Utility	
Advanced	
I/O Device Configuration	Item Specific Help
Floppy Disk Access Control [R/W] Onboard Serial Port 1 [3F8H/IRQ4] Onboard Serial Port 2 [2F8H/IRQ3] Onboard Parallel Port [378H/IRQ7] Parallel Port Mode [ECP+EPP] ECP DMA Select [3]	<Enter> to select.
F1 Help ↑↓ Select Item -/+ Change Values ESC Exit ↔ Select Menu Enter Select ► Sub-Menu	F5 Setup Defaults F10 Save and Exit

Floppy Disk Access Control [R/W]

When set to [Read Only], this parameter protects files from being copied to floppy disks by allowing reads from, but not writes to, the floppy disk drive. The default setting [R/W] allows both reads and writes. Configuration options: [R/W] [Read Only]

Onboard Serial Port 1 [3F8H/IRQ4]

Onboard Serial Port 2 [2F8H/IRQ3]

These fields allow you to set the addresses for the onboard serial connectors. Serial Port 1 and Serial Port 2 must have different addresses. Configuration options: [3F8H/IRQ4] [2F8H/IRQ3] [3E8H/IRQ4] [2E8H/IRQ10] [Disabled]

Onboard Parallel Port [378H/IRQ7]

This field allows you to set the address of the onboard parallel port connector. If you disable this field, the Parallel Port Mode and ECP DMA Select configurations are not available. Configuration options: [Disabled] [378H/IRQ7] [278H/IRQ5]

Parallel Port Mode [ECP+EPP]

This field allows you to set the operation mode of the parallel port. [Normal] allows normal-speed operation but in one direction only; [EPP] allows bidirectional parallel port operation; [ECP] allows the parallel port to operate in bidirectional DMA mode; [ECP+EPP] allows normal speed operation in a two-way mode. Configuration options: [Normal] [EPP] [ECP] [ECP+EPP]

ECP DMA Select [3]

This field allows you to configure the parallel port DMA channel for the selected ECP mode. This selection is available only if you select [ECP] or [ECP+EPP] in Parallel Port Mode above. Configuration options: [1] [3]

4.4.3 PCI Configuration

AwardBIOS Setup Utility	
Advanced	
PCI Configuration	Item Specific Help
Slot 1 IRQ [Auto]	<Enter> to select an IRQ.
Slot 2 IRQ [Auto]	
Slot 3 IRQ [Auto]	
Slot 4 IRQ [Auto]	
Slot 5 IRQ [Auto]	
Slot 6 IRQ [Auto]	
PCI/VGA Palette Snoop [Disabled]	
PCI Latency Timer [32]	
Sparse PCI Host Bus [3BUS]	
Primary VGA BIOS [PCI VGA Card]	
USB Function [Enabled]	
Onboard LAN Boot ROM [Disabled]	
F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults	
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

Slot 1, Slot 2, Slot 3, Slot 4, Slot 5, Slot 6 IRQ [Auto]

These fields set how IRQ use is determined for each PCI slot. The default setting for each field is [Auto], which utilizes auto-routing to determine IRQ use. Configuration options: [Auto] [NA] [3] [4] [5] [7] [9] [10] [11] [12] [14] [15]

PCI/VGA Palette Snoop [Disabled]

Some non-standard VGA cards, like graphics accelerators or MPEG video cards, may not show colors properly. Setting this field to [Enabled] corrects this problem. If you are using standard VGA cards, leave this field to the default setting [Disabled]. Configuration options: [Disabled] [Enabled]

PCI Latency Timer [32]

Leave on default setting for best performance vs. stability.

Sparse PCI Host Bus

This field allows you to reserve the bus number for the PCI slots. Configuration options: [Disabled] [2 BUS] [3 BUS] [4 BUS]

Primary VGA BIOS First [PCI VGA Card]

This field allows you to select the primary graphics card. Configuration options: [PCI VGA Card] [Onboard VGA]

USB Function [Enabled]

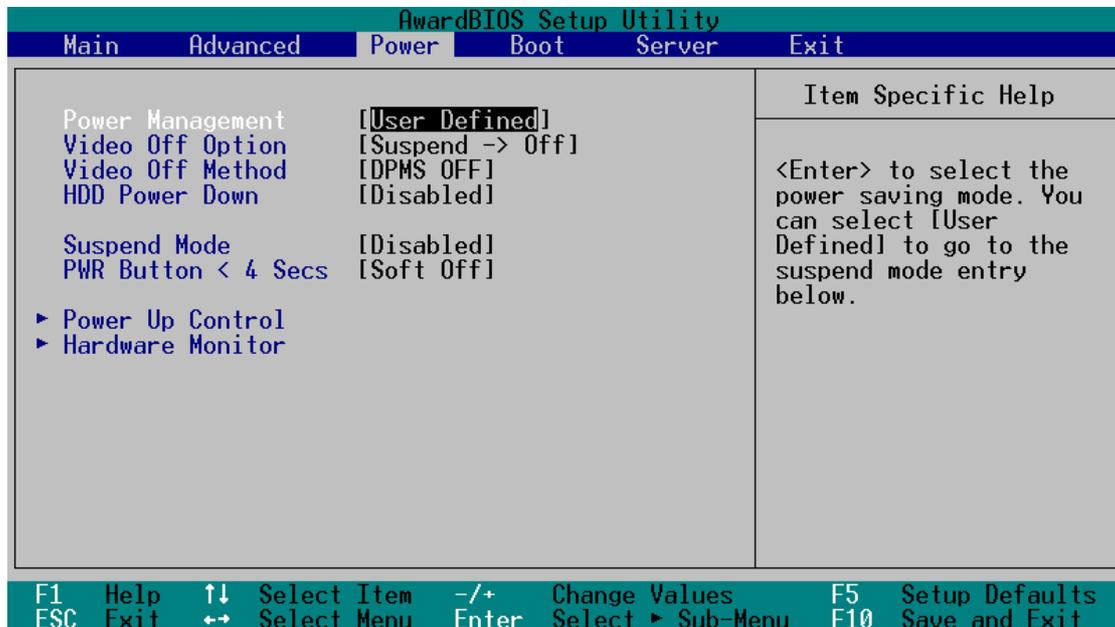
Set this field to [Enabled] if you want to use Universal Serial Bus devices. Configuration options: [Disabled] [Enabled]

Onboard LAN Boot ROM [Disabled]

When set to [Enabled], these fields allow the system to boot from the network using the onboard LAN controller boot ROM. Configuration options: [Disabled] [Enabled]

4.5 Power Menu

The Power menu allows you to reduce power consumption. This feature turns off the video display and shuts down the hard disk after a period of inactivity.



Power Management [User Defined]

This field allows you to activate or deactivate the automatic power saving features. When set to [Disabled], the power management features do not function regardless of the other settings on this menu. The [User Defined] option allows you to set the period of inactivity before the system enters suspend mode. Refer to “Suspend Mode” item.

When set to [Max Saving], system power is conserved to its greatest amount. This setting automatically puts the system into suspend mode after a brief period of system inactivity. [Min Saving] allows the least power saving as the system enters suspend mode only after a long period of inactivity. Configuration options: [User Defined] [Disabled] [Min Saving] [Max Saving]



You should install the Advanced Power Management (APM) utility to keep the system time updated even when the computer enters suspend mode. In Windows 3.x and Windows 95, you need to install Windows with the APM feature. In Windows 98 or later, APM is automatically installed as indicated by a battery and power cord icon labeled “Power Management” in the Control Panel. Select the item “Advanced” in the Power Management Properties dialog box.

Video Off Option [Suspend -> Off]

This field determines when to activate the video off feature for monitor power management. Configuration options: [Always On] [Suspend -> Off]

Video Off Method [DPMS OFF]

This field defines the video off features. The Display Power Management System (DPMS) feature allows the BIOS to control the video display card if it supports the DPMS feature. [Blank Screen] only blanks the screen. Use this for monitors without power management or “green” features.



Even if installed, your screen saver does not display when you select [Blank Screen] for the above field.

[V/H SYNC+Blank] blanks the screen and turns off vertical and horizontal scanning. Configuration options: [Blank Screen] [V/H SYNC+Blank] [DPMS Standby] [DPMS Suspend] [DPMS OFF] [DPMS Reduce ON]

HDD Power Down [Disabled]

Shuts down any IDE hard disk drives in the system after a period of inactivity as set in this user-configurable field. This feature does not affect SCSI hard drives. Configuration options: [Disabled] [1 Min] [2 Min] [3 Min]...[15 Min]

Suspend Mode [Disabled]

Sets the time period before the system goes into suspend mode. Configuration options: [Disabled] [1~2 Min] [2~3 Min] [4~5 min] [8~9 Min] [20 Min] [30 Min] [40 Min] [1 Hour]

PWR Button < 4 Secs [Soft Off]

When set to [Soft off], the ATX switch can be used as a normal system power-off button when pressed for less than 4 seconds. [Suspend] allows the button to have a dual function where pressing less than 4 seconds puts the system in sleep mode. Regardless of the setting, holding the ATX switch for more than 4 seconds powers off the system. Configuration options: [Soft off] [Suspend]

4.5.1 Power Up Control

AwardBIOS Setup Utility	
Power	
Power Up Control	Item Specific Help
AC Power Loss Restart [Disabled]	<Enter> to select whether or not to restart the system after AC power loss.
Wake/Power Up On Ext. Modem [Disabled]	
Onboard LAN Power Up [Disabled]	
Power Up On PCI Card [Disabled]	
Power On By PS/2 Keyboard [Disabled]	
Automatic Power Up [Disabled]	
F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults	
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit	

AC PWR Loss Restart [Disabled]

This allows you to set whether or not to reboot the system after power interruptions. [Disabled] leaves your system off while [Enabled] reboots the system. [Previous State] sets the system back to the state it was before the power interruption. Configuration options: [Disabled] [Enabled] [Previous State]

Wake/Power Up On Ext. Modem [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode. Configuration options: [Disabled] [Enabled]



The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Onboard LAN Power Up [Disabled]

Power Up on PCI Card [Disabled]

These fields allow you to boot your computer from another computer by sending a wake-up frame or signal to the LAN device, or the PCI modem card if present. Configuration options: [Disabled] [Enabled]

Power On By PS/2 Keyboard [Disabled]

This parameter allows you to use specific keys on the keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Space Bar] [Ctrl-Esc] [Power Key]

Automatic Power Up [Disabled]

This allows an unattended or automatic system power up. You may configure your system to power up at a certain time of the day by selecting [Everyday] or at a certain time and day by selecting [By Date]. Configuration options: [Disabled] [Everyday] [By Date]

4.5.2 Hardware Monitor

AwardBIOS Setup Utility			
Power			
Hardware Monitor		Item Specific Help	
MB Temperature	30°C/86°F	<Enter> to switch between monitoring or ignoring.	
CPU1 Temperature	41°C/105.5°F		
CPU2 Temperature	50°C/122.0°F		
CPU1 Fan Speed	7500RPM		
CPU2 Fan Speed	5273RPM		
System Fan Speed	5073RPM		
VCORE Voltage	1.50V		
3.3V Voltage	3.45V		
5V Voltage	4.91V		
12V Voltage	12.09V		
3VSB Voltage	3.45V		
F1 Help	↑↓ Select Item		-/+ Change Values
ESC Exit	←→ Select Menu		Enter Select ► Sub-Menu
		F5 Setup Defaults	
		F10 Save and Exit	

MB Temperature [xxx°C/xxx°F], CPU1 Temperature [xxx°C/xxx°F], CPU2 Temperature [xxx°C/xxx°F]

The onboard hardware monitor is able to detect the MB (motherboard) and CPU temperatures. Set to [Ignore] only if necessary.

CPU1 Fan Speed [xxxxRPM], CPU2 Fan Speed [xxxxRPM], System Fan Speed [xxxxRPM]

The onboard hardware monitor is able to detect the CPU fan speeds in rotations per minute (RPM). The presence of the fans is automatically detected.

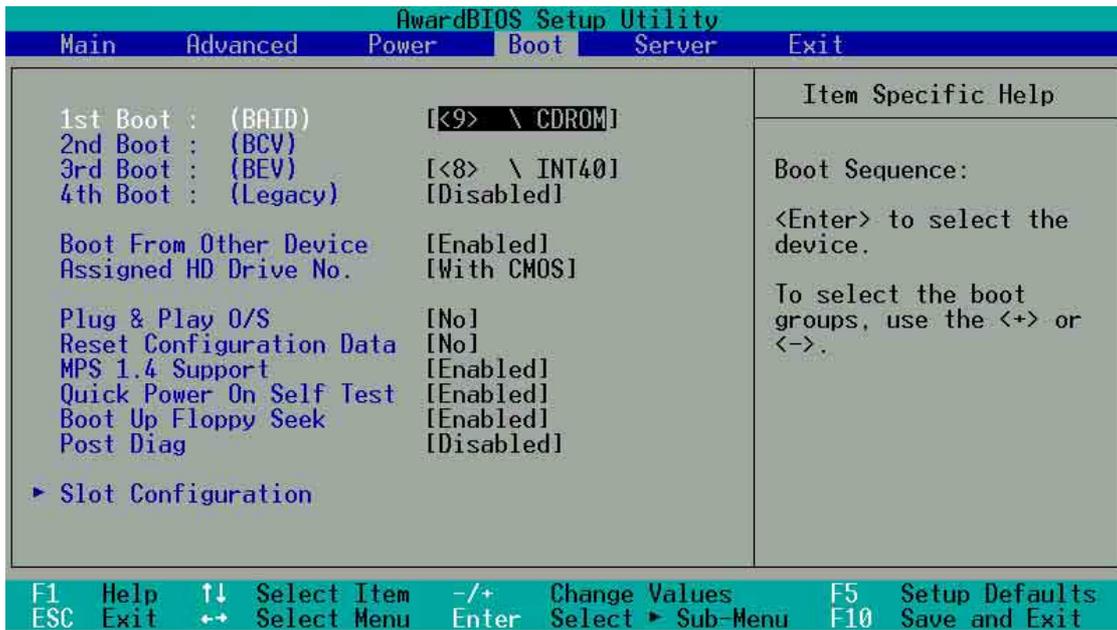
VCORE Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage, 3VSB Voltage

The onboard hardware monitor is able to detect the voltage output by the onboard voltage regulators.



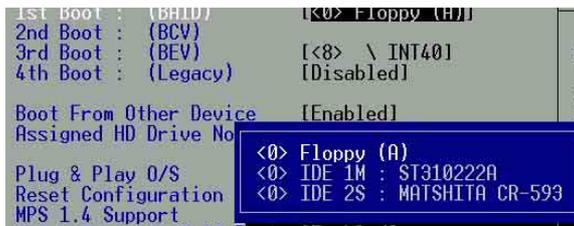
If any of the monitored items is out of range, the following error message appears: “Hardware Monitor found an error. Enter Power setup menu for details”. You will then be prompted to “Press F1 to continue or DEL to enter SETUP”.

4.6 Boot Menu

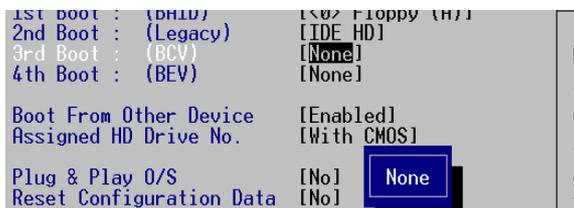


The motherboard BIOS supports the BIOS Boot Specification (BBS) version 1.01. BBS is an intelligent mechanism that provides flexible ways to set boot sequence for Initial Program Load (IPL) devices such as CD-ROMs and network remote boot ROMs.

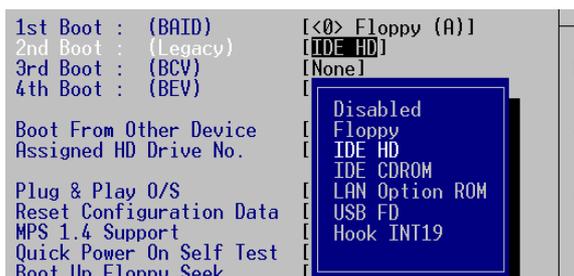
The IPL devices are classified into three categories:



BIOS Aware IPL Devices (BAID)



PnP devices, includes Boot Connection Vector (BCV) and Bootstrap Entry Vector (BEV) devices



Legacy devices

1st Boot : (BAID) [None]

This field allows you to select a BIOS Aware IPL Devices (BAID) to boot from. A BAID is any device that can boot on an operating system but requires a specific BIOS code for support. Bootable FDDs, ATA HDD, ATAPI CD-ROM, ATA ZIP, and ATA MO drives are classified as BAID. The drives present in the system will appear as options for this field.

2rd Boot : (BCV) [None]

This field allows you to select a Boot Connection Vector (BCV) device to boot from. BCV devices include SCSI controllers or SCSI cards, RAID cards, and other devices on add-on cards with option ROM that hooks INT 13 to BIOS. The BCV devices present in the system will appear as options for this field. The field shows [None] if no BCV device is installed.

3rd Boot : (BEV) [<0> Intel Corporation]

This field allows you to select a Bootstrap Entry Vector (BEV) device to boot from. BEV devices include network controllers or cards. The BEV devices present in the system will appear as options for this field. For this motherboard, the following options are present onboard: [None]

4th Boot : (Legacy) [Disabled]

This field reserves the boot sequence selection only to legacy devices including FDD, HDD, CD-ROM, and LAN. This mode does not allow booting from a boot device on an add-on card or controller. If you wish to assign a device as a 1st Boot device for a specific application, you must set that legacy device at the 1st Boot sequence.

For this motherboard, the following options are present onboard:
[Disabled] [Floppy] [HDD] [CD-ROM] [LAN Option ROM]

Plug & Play O/S [No]

This field allows you to use a Plug-and-Play (PnP) operating system to configure the PCI bus slots instead of using the BIOS. When [Yes] is selected, interrupts may be reassigned by the OS. If you installed a non-PnP OS or if you want to prevent reassigning of interrupt settings, keep the default setting [No]. Configuration options: [No] [Yes]

Reset Configuration Data [No]

The Extended System Configuration Data (ESCD) contain information about non-PnP devices. It also holds the complete record of how the system was configured the last time it was booted. Select [Yes] if you want to clear these data during the Power-On-Self-Test (POST). Configuration options: [No] [Yes]

MPS 1.4 Support [Enabled]

This field allows you to enable or disable the MultiProcessor Specification 1.4 support. Configuration options: [Disabled] [Enabled]

Quick Power On Self Test [Enabled]

This field speeds up the Power-On-Self Test (POST) routine by skipping retesting a second, third, and fourth time. Configuration options: [Disabled] [Enabled]

Boot Up Floppy Seek [Enabled]

When enabled, the BIOS will seek the floppy disk drive to determine whether the drive has 40 or 80 tracks. Configuration options: [Disabled] [Enabled]

Post Diag [Disabled]

Configuration options: [Disabled] [Enabled]

4.6.1 Slot Configuration

AwardBIOS Setup Utility	
Boot	
Slot Configuration	Item Specific Help
Init Slot1 [Normal] Init Slot2 [Normal] Init Slot3 [Normal] Init Slot4 [Normal] Init Slot5 [Normal] Init Slot6 [Normal]	<Enter> to set priority for Add-on card initialization.
F1 Help ↑↓ Select Item -/+ Change Values ESC Exit ↔ Select Menu Enter Select ► Sub-Menu	F5 Setup Defaults F10 Save and Exit

Init Slot 1, 2, 3, 4, 5, 6 IRQ [Normal]

This field allows you to set the priority level for each expansion slot in order to determine expansion card initialization order. Configuration options: [High] [Normal] [Low] [Skip]

Remote Console [Disabled]

This field allows the text mode VGA display to be sent out to VT100 terminal through COM1. This function is effective at BIOS POST and DOS environment. Configuration options: [Disabled] [Enabled] [POST Only]

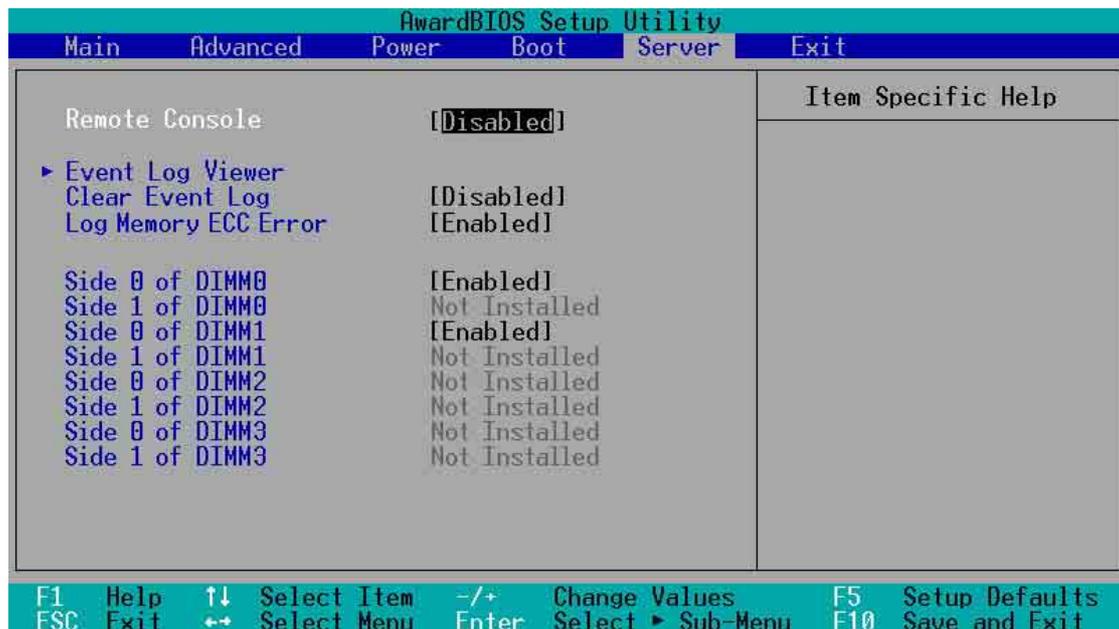
Log Memory ECC Error [Enabled]

This field allows you to set whether “Error Checking and Correcting” memory errors are logged. Configuration options: [Disabled] [Enabled]

Side 0 of DIMM0 -- Side 1 of DIMM3 [Enabled]

This field displays the presence of ECC DIMMS in the slots. Installed DIMMs automatically display [Enabled]. If the DIMM slot is empty, the gray “Not Installed” message is displayed. Configuration options: [Enabled] Not Installed.

4.7 Server Menu



Remote Console [Disabled]

This field allows the text mode VGA display to be sent out to VT100 terminal through COM1. This function is effective at BIOS POST and DOS environment. Configuration options: [Disabled] [Enabled] [POST Only]

Event Log Viewer

Pressing <Enter> on this item gives you a sub-menu. You will be shown all events such as “no bootable media” or “fan speed out of range”.

Clear Event Log [Disabled]

This field clears the event log recorded on the sub-menu. Select [Enabled] to automatically clear the event log. Reset to [Disabled] to store up event log data. An IPMI device must be connected to the server for this field to function. Configuration options: [Disabled] [Enabled]

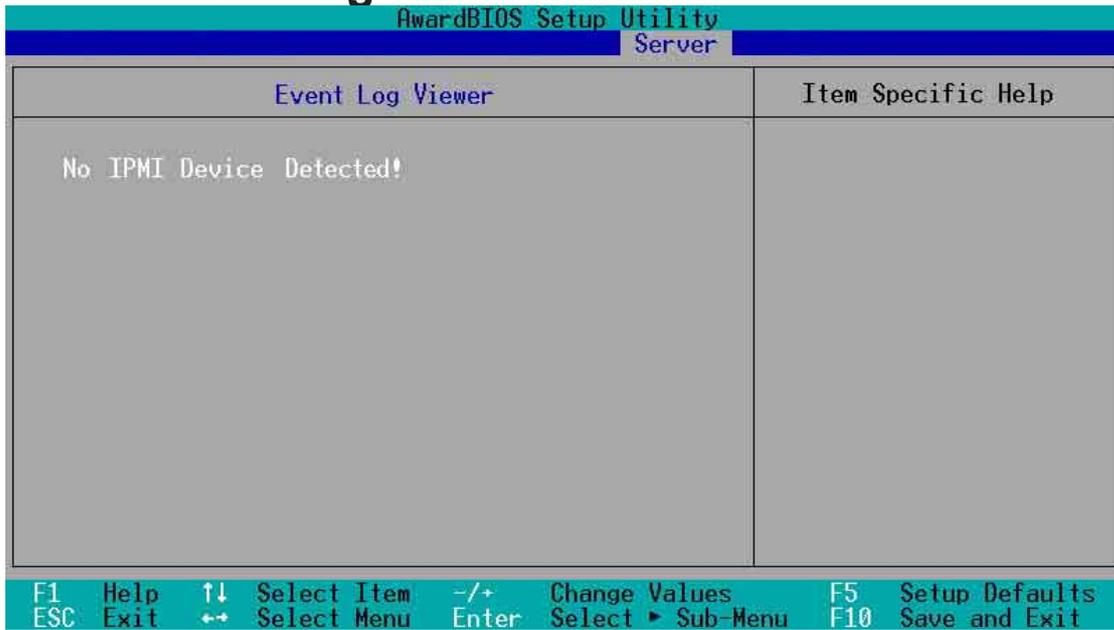
Log Memory ECC Error [Enabled]

This field allows you to set whether “Error Checking and Correcting” memory errors are logged. Configuration options: [Disabled] [Enabled]

Side 0 of DIMM0 -- Side 1 of DIMM3 [Enabled]

This field displays the presence of ECC DIMMS in the slots. Installed DIMMs automatically display [Enabled]. If the DIMM slot is empty, the gray “Not Installed” message is displayed. Configuration options: [Enabled] Not Installed.

4.7.1 Event Log Viewer

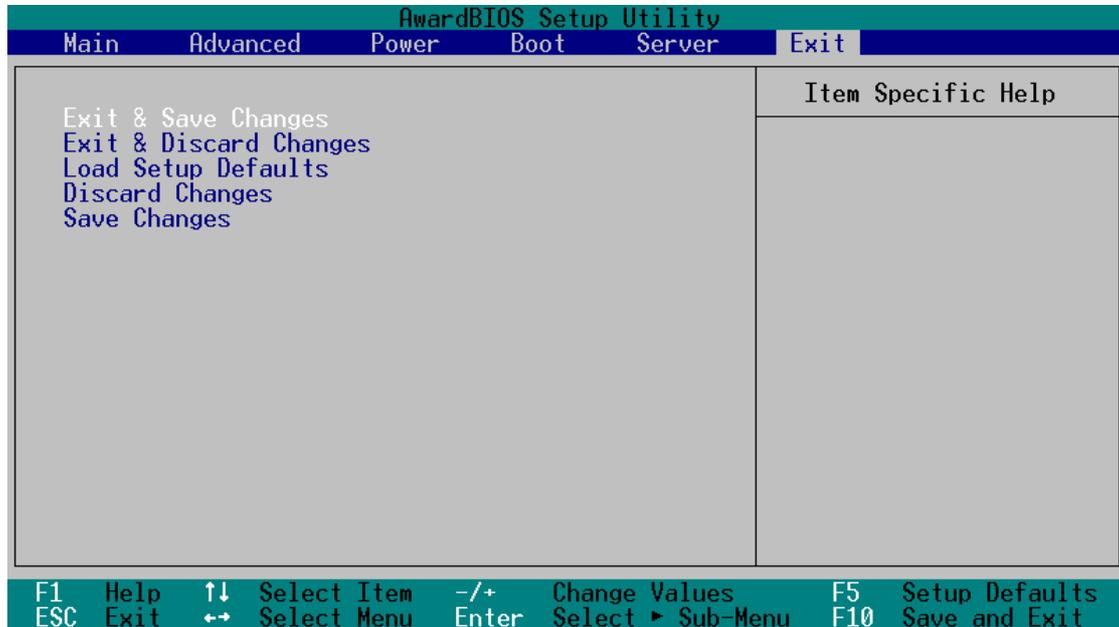


No IPMI Device Detected

Unless an IPMI device, like the ASMC-LE/HE server management card is installed, the Event Log Viewer will not display any data. If installed, a detailed range of server data is displayed.

4.8 Exit Menu

When you have made all of your selections from the various menus in the Setup program, save your changes and exit Setup. Select Exit from the menu bar to display the following menu.



Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Exit Saving Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select [Yes] to save changes and exit.



If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Pressing <Enter> saves the changes while exiting.

Exit Discarding Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select [Yes] to load default values. Select Exit Saving Changes or make other changes before saving the values to the non-volatile RAM.

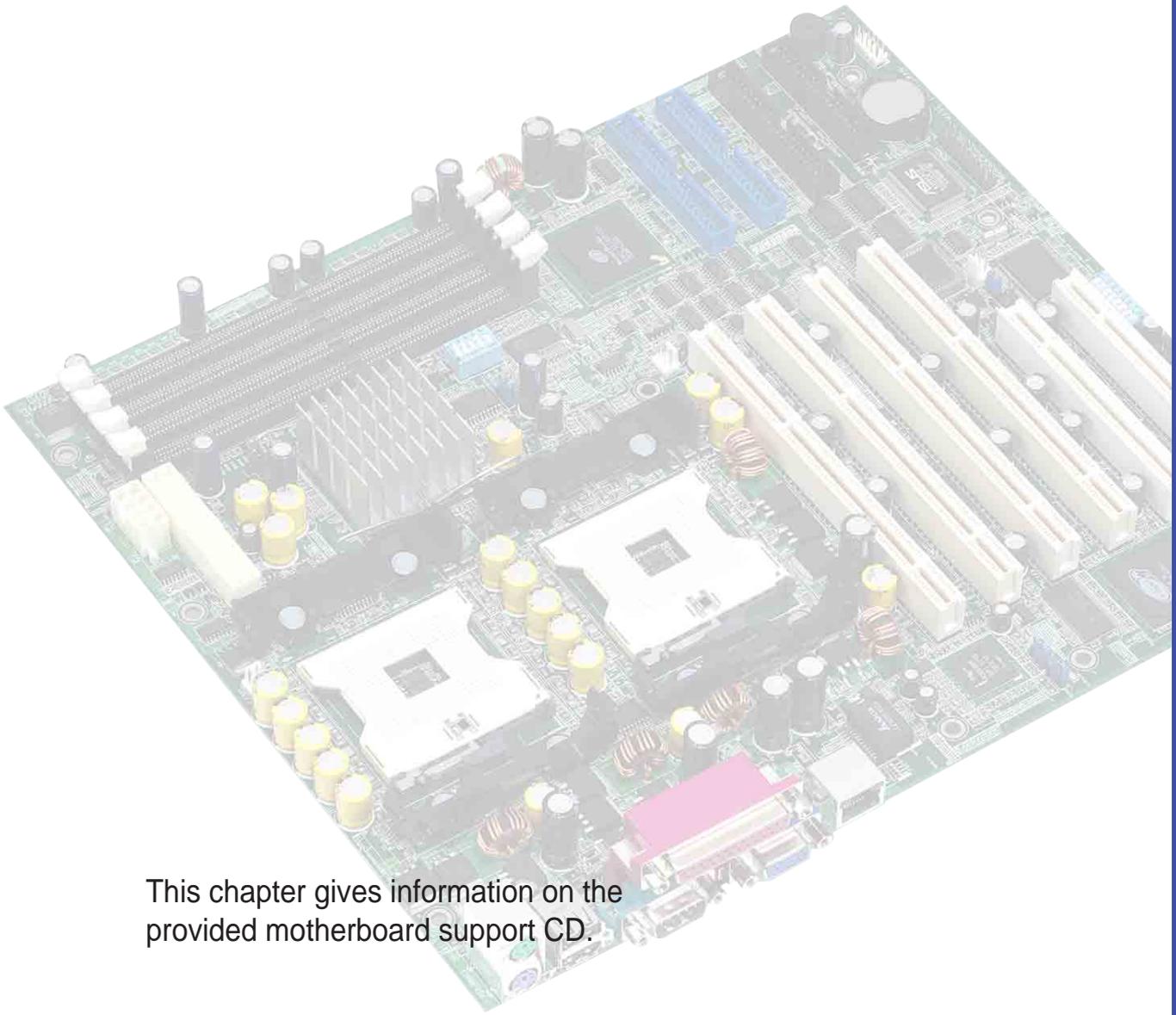
Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select [Yes] to discard any changes and load the previously saved values.

Save Changes

This option saves your selections without exiting the Setup program. You can then return to other menus and make further changes. After you select this option, a confirmation window appears. Select [Yes] to save any changes to the non-volatile RAM.

Chapter 5



This chapter gives information on the provided motherboard support CD.

Support CD

Chapter summary

- 5.1 Microsoft Windows NT Server**
- 5.2 Microsoft Windows 2000 Server**
- 5.3 Microsoft Windows XP Professional**
- 5.4 Novell NetWare Server**
- 5.5 SCO Open Server 5.0.x**
- 5.6 Linux RedHat 7.x**

Support CD Contents

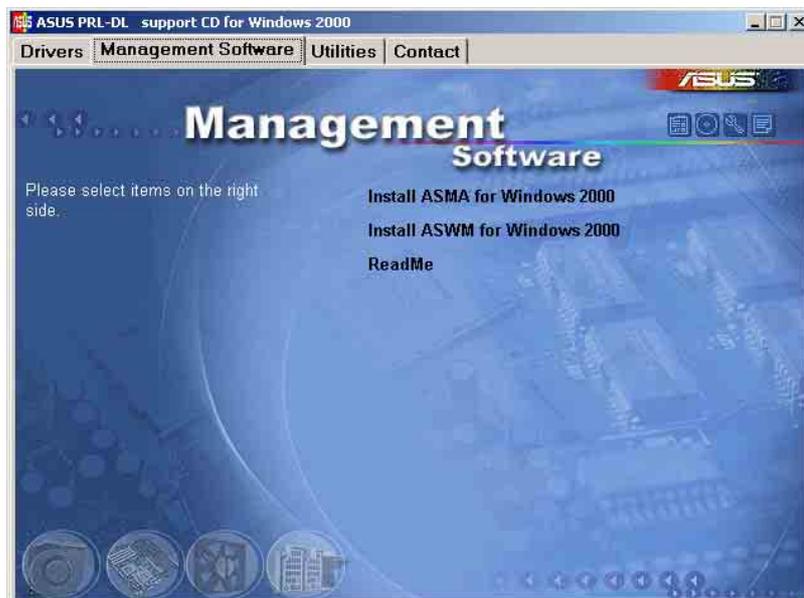
Drivers

The support CD will detect your operating system and display relevant drivers for you to install. This is where you can find drivers for the onboard devices. Follow the installation wizards or find additional instructions as text files in each of the drivers' folders.



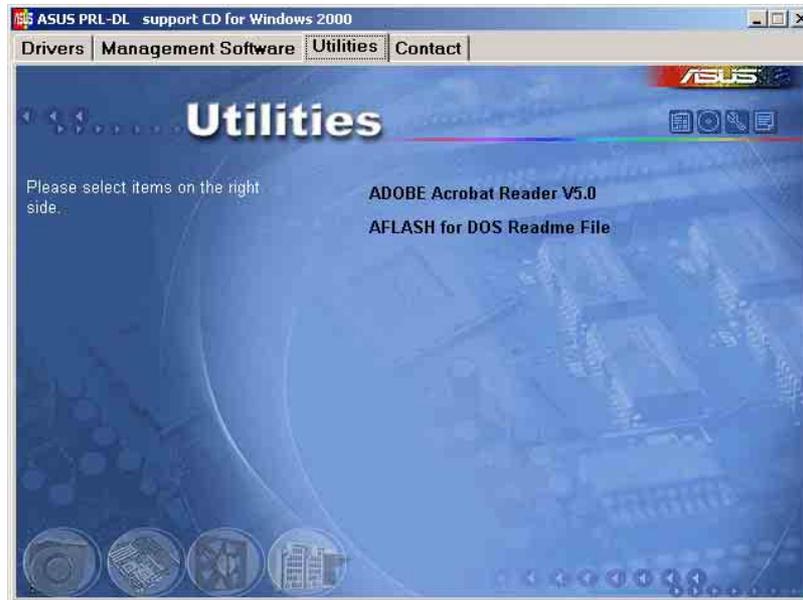
Management Software

This is where you will find ASUS' specially designed server management software.



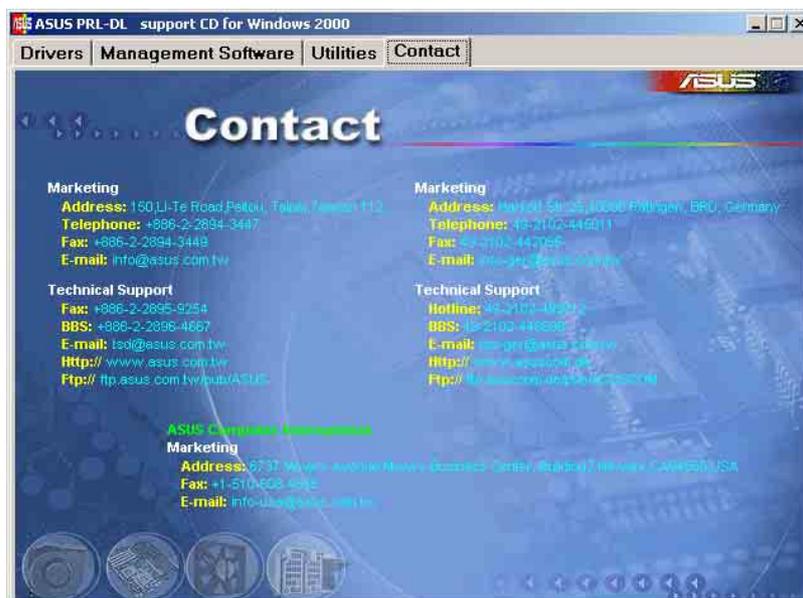
Utilities

This is where you can install Adobe Acrobat Reader for viewing User's Manuals contained in this support CD or from ASUS' Web Site.



Contact

This is where you can find contact information for ASUS technical support.



The following pages will give information on certain drivers for server systems using different operating systems.

5.1 Microsoft® Windows® NT Server 4.0

5.1.1 Intel® 82540EM LAN Driver Installation

A. Preparing the Intel 82540EM LAN Driver Disk

If you need to use a floppy disk to install the on-board Intel 82550 network adapter drivers, use the **dcreat.exe** utility located in the **\Drivers\LAN\MAKEDISK** directory on ASUS Driver Support CD.

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

Choose check bottom of Windows NT4.0 to create Windows NT diskette (two diskette) when appeared create window disk screen.



To enable the Intel 82540EM LAN under Windows NT4, you need to upgrade to Windows NT **Service Pack 5 or later**.

B. New System Installation

1. Press **Next** when **Installing Windows NT Networking** screen appears.
2. Select **Wired to the Network**: Press **Next**. You can select install IIS or not.
3. Press **Select from list.....** Insert the **Intel(R) PRO LAN Adapter diskette** and click **Have Disk**.



Don't let the Windows NT system to detect the on-board network device. The bundled driver cannot support Intel 82550 network controller and will cause the system installation failure.

4. Type **A:** (for floppy) in the dialog box and click **OK**. Then follow the prompts to complete installation. When the adapter is added you'll see a new adapter "**Intel(R) PRO/1000 Family Adapter**," listed in the Network adapters list.



5. Click **Next** to finish and configure any protocols as prompted.

C. Existing System Installation

1. Double-click the **Network** icon in the **Control Panel**.
2. Select the **Adapter** tab.
3. Click **Add**. You'll see a list of adapters.
4. Don't select an adapter from this list. Instead, insert the **Intel(R) PRO LAN Adapter diskette** and click **Have Disk**.
5. Type **A:** (for floppy) in the dialog box and click **OK**. Then follow the prompts to complete installation. When the adapter is added you'll see a new adapter listed in the Network adapters list.
6. Click **OK** to finish and configure any protocols as prompted
7. Restart Windows NT when prompted.

5.1.2 ATI® Rage XL Display Driver Installation

1. Start up Windows NT in VGA mode.
2. Run the Windows NT Display program located in the Control Panel, under **Settings** in the Start menu or right click the mouse button on the desktop and select **Properties** from the popup menu.
3. Select the **Settings** tab.
4. Select **Display Type....**
5. Select **Change...** from the display options.
6. Select **Have Disk...**
7. Windows NT system will prompt you for the correct path, enter the path of the driver, such as **D:\ Drivers\ATI\nt40\ATIDrive** (assuming your CD-ROM drive is letter D)
8. A list of video adapters will be displayed. Select the “**XPERT 98 PCI**”, then click on **OK** button.
9. Windows NT will once again prompt for confirmation. All appropriate files are then copied to the hard disk. Select **Apply** in Control Panel.
10. The installed driver will become active once you restart Windows NT.



5.2 Microsoft® Windows® 2000 Server

5.2.1 Intel® 82540EM LAN Driver Installation

You may install the Intel LAN drivers directly from the support CD. Proceed to the section “*B. Update LAN Driver on an Existing System Installation.*”

If you wish to create a LAN driver disk, proceed to the section “*A. Preparing the Intel LAN Driver Disk.*”

A. Preparing the Intel 82540EM LAN Driver Disk



Prepare one blank formatted high density floppy disk before proceeding.

If you need to use a floppy disk to install the on-board Intel 82540EM network adapter drivers, use the ***dcreat.exe*** utility located in the **Drivers\LAN\MAKEDISK** directory on ASUS Driver Support CD.

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

Choose check bottom of Windows 2000 to create Windows 2000 diskette (one diskette) when appeared create window disk screen.

B. Update Driver on an Existing System Installation

1. Boot Windows 2000 system and log on as Administrator.
2. Click on the **Start** button. Select **Settings—>Control Panel**.
3. Double-click the **System** icon in the **Control Panel**. Select the **Hardware** tab. Click on **Device Manager....** Button.
4. Click the **Other Devices**. And highlight “**Ethernet Controller**”. Click right-button on the mouse. Select **Properties**.
5. Select the **Driver** tab. Click on **Update Drivers..** Button.
6. Click **Next**. Select the “**Display a list of the known drivers for this device**”.
7. Select “**Network adapters**” in Hardware Type and Click **Next**.

8. Click **Have Disk...** Select **A:** floppy diskette for the network driver and click **OK**.
9. Select “**Intel® PRO/1000MT Network Connection**” from the listed Network Adapters. Click **Next**. System would prompt you an Update Driver Warning message. Click **Yes** to continue installing driver.
10. Click **Finish**. Windows 2000 system will prompt if you want to restart the system now. After system been restarted, the new driver will be loaded into the system.

5.2.2 ATI® Rage XL Display Driver Installation

Windows 2000 system can correctly recognize ATI RAGE XL PCI driver during system installation. User needs not to load any driver for supporting the on-board ATI RAGE XL graphics chip.



5.2.3 Enabling ATA100 Feature in Windows® 2000

To enable the ATA100 feature under Windows 2000, you need to upgrade to Windows 2000 **Service Pack 2 or later**.

5.3 Microsoft® Windows® XP Professional

5.3.1 Intel® 82540EM LAN Driver Installation

A. Preparing Intel 82540EM LAN Driver Disk

If you need to use a floppy disk to install the on-board Intel 82540EM network adapter drivers, use the **dcreat.exe** utility located in the `\Drivers\LANMAKEDISK` directory on ASUS Driver Support CD. Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

Choose check bottom of Windows XP to create Windows XP diskette (one diskette) when appeared create window disk screen.

B. Update Driver on an Existing System Installation

1. Boot Windows XP system and log on as Administrator.
2. Click on the **Start** button. Select **Settings—>Control Panel**.
3. Double-click the **System** icon in the **Control Panel**. Select the **Hardware** tab. Click on **Device Manager....** Button.
4. Click the **Other Devices**. And highlight “**Ethernet Controller**”. Click right-button on the mouse. Select **Properties**.
5. Select the **Driver** tab. Click on **Update Drivers..** Button.
6. Click **Next**. Select the “**Install from a list or specific location[Advanced]**”.
7. Click **Next**. Select **A:** floppy diskette for the network driver.

8. Select “**Intel® PRO/1000MT Network Connection**” from the listed Network Adapters. Click **Next**. System would prompt you an Update Driver Warning message. Click **Yes** to continue installing driver.
9. Click **Finish**. Windows XP system will prompt if you want to restart the system now. After system been restarted, the new driver will be loaded into the system.

5.3.2 Enabling ATA100 Feature in Windows® XP Professional

Windows XP system can correctly recognize ATI RAGE XL PCI driver during system installation. User needs not to load any driver for supporting the on-board ATI RAGE XL graphics chip.

5.4 Novell® NetWare® Server

5.4.1 Intel® 82540EM LAN Driver Installation

A. Preparing Intel 82540EM LAN Driver Disk

1. Use the self-extracting image files:

For the Intel(R) PRO/1000 Server Adapter driver, the executable file is located here:

`\Drivers\Lan\makedisk\makenw.bat`

2. Use the manual to create driver diskette:

If you need to use a floppy disk to install the on-board Intel 82550 network adapter drivers, use the **MAKEDISK.BAT** utility located in the `\Drivers\LAN\MAKEDISK` directory on ASUS Driver Support CD.

MAKEDISK [operating system] [destination]

where **[operating system]** is the OS for which you are creating the diskette, and **[destination]** is the drive letter and path (such as A:). If no destination is specified, the A: drive will be used. The possible **[operating system]** options are:

NT = Microsoft Windows NT

W2K = Microsoft Windows 2000*

NW = Novell NetWare servers and clients

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using *this utility*.

B. NetWare 4.XX, 5.X, and 6.X Installations

1. Prepare the *Intel(R) PRO LAN Adapter diskette* from previous section.
2. Install NetWare 4.xx or 5.x according to the NetWare instructions.

3. When the NetWare installation procedure prompts you for a Network Driver, insert the Intel PRO/1000 driver diskette into drive **A:** Then use the **INS** key to select an unlisted driver. A dialog box appears. The “**CE1000.LAN — Intel 8254X Based Network Connection**” driver appear as a selection.



If the “Loader could not find public symbol: <symbol name>” error message prompted when system is loading Intel PRO LAN adapter driver, it is because the related network driver modules are too old. Download the latest Netware Support Pack from Novell web site at: <http://support.novell.com/products/nw411/patches.htm>

4. Installation of the Intel 82540EM Network Adapter for NetWare 5.x or 4.xx is complete.

Add or check the load and bind statements you need to the server’s AUTOEXEC.NCF file so the

Intel(R) PRO LAN Adapter driver loads automatically load and bind the server driver as follows:

```
LOAD CE1000 LAN SLOT=10004 FRAME=ETHERNET_II  
NAME=CE1000_1_EII
```

```
BIND IP CE1000_1_EII addr=xxx.xxx.xxx.xxx  
mask=xxx.xxx.xxx.xxx gate=xxx.xxx.xxx.xxx
```

5.4.2 ATI® Rage XL Display Driver Installation

You can select the “Super VGA” for the X Server on NetWare 5.x server system. The other NetWare system didn’t support X Server and you didn’t need the VGA driver support.

5.5 SCO Open Server 5.0.x

5.5.1 Intel® 82540EM LAN Driver Installation

SCO OpenServer 5.0.6 system can correctly recognize Intel network controller during installation. User doesn't need to load or modify the network driver for the onboard LAN device.

You can find the Intel 82540 Network driver from support CD at:

```
\Drivers\Lan\UNIX\SCO5
```

Instructions for Installing the eeE Driver for SCO OpenServer

1. Copy the `eee.vol` file to any directory, say `/tmp`, on the SCO system, renaming the file as **VOL.000.000**. Also, make the file read-only by using '`chmod`'.

For example,

```
# cp eee.vol /tmp/VOL.000.000
# chmod 444 /tmp/VOL.000.000
```

2. If there is an older version of the eeE driver on the system, you must first remove it. To do this, run '`netconfig`'. Remove all instances of the "Intel ..." adapters. Exit `netconfig` without opting to relink the kernel.
3. Install the new driver using '`custom`'. When asked for the installation media, choose '`media images`', and type the directory path to the `VOL.000.000` file. (In step 1, if you copied it to `/tmp`, type '`/tmp`'). After the installation of the driver is complete, exit '`custom`'.
4. Run '`netconfig`' and add the adapters. For each adapter that is present in the system, enter the appropriate TCP/IP parameters. By default, the driver automatically detects the line speed and duplex mode. If you want to force any of these settings, choose 'Advanced Options' and set the speed and duplex modes. Exit '`netconfig`' and choose to relink the kernel.
5. Reboot the system. At the command prompt, type:

```
# reboot (or init 6)
```

5.5.2 ATI® Rage XL Display Driver Installation

SCO OpenServer 5.0.6 system can correctly recognize ATI Rage XL graphic controller (ATI MACH64) during installation. User doesn't need to load or modify the video driver for the onboard VGA device.

5.6 Linux RedHat 7.x

5.6.1 Intel 82540EM LAN Driver Installation

This file describes the Linux* Base Driver for the Intel® PRO/1000 Family of Adapters, version 4.1.x. This driver is intended for 2.2.x and 2.4.x kernels; it is known to build properly on 2.2.x kernels through 2.2.20 and on 2.4.x kernels through 2.4.17. Intel focused testing on Intel processor-based systems running kernels 2.4.7 and 2.2.16. This driver includes support for Itanium™-based systems.

The Intel PRO/1000 driver is only supported as a loadable module at this time. Intel is not supplying patches against the kernel source to allow for static linking of the driver. For questions related to hardware requirements, refer to the documentation supplied with your Intel PRO/1000 adapter. All hardware requirements listed apply to use with Linux.

New features include support for the Intel® PRO/1000 MT Desktop Adapter.

Update Driver on an Existing System Installation

To build a binary RPM* package of this driver, run 'rpm -tb <filename.tar.gz>'. Replace <filename.tar.gz> with the specific file name of the driver.



For the build to work properly, the currently running kernel MUST match the version and configuration of the installed kernel sources. If you have just recompiled the kernel reboot the system now.

1. Move the base driver tar file to the directory of your choice. For example, use '/home/username/e1000' or '/usr/local/src/e1000'.
2. Untar/unzip the archive, where x.x.x is the version number for the driver tar:

```
tar xzf e1000-x.x.x.tar.gz
```

3. Change to the driver src directory, where x.x.x is the version number for the driver tar:

```
cd e1000-x.x.x/src/
```

4. Compile the driver module:

```
make install
```

The binary will be installed as:

For Linux 2.2.x systems:

```
/lib/modules/[KERNEL_VERSION]/net/e1000.o
```

For Linux 2.4.x systems:

```
/lib/modules [KERNEL_VERSION]/kernel/  
drivers/net e1000.o
```



The install locations listed above are the default locations. They may not be correct for certain Linux distributions. For more information, go to [ldistrib.htm](#).

5. Install the module:

```
insmod e1000 <parameter>=<value>
```

6. Assign an IP address to the interface by entering the following, where x is the interface number:

```
ifconfig ethx <IP_address>
```

7. Verify that the interface works. Enter the following, where <IP_address> is the IP address for another machine on the same subnet as the interface that is being tested:

```
ping <IP_address>
```

5.6.2 ATI Rage XL Display Driver Installation

The RedHat 7.x system can automatically recognize ATI Rage XL graphic controller (ATI MACH64) during installation. You don't need to load or modify the video driver for the onboard VGA device.