

SUPER[®]

SUPER P4DC6
SUPER P4DC6+
SUPER P4DC6+II
SUPER P4DCE
SUPER P4DCE+
SUPER P4DCE+II

USER'S MANUAL

Revision 1.2c

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Preface

About This Manual

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II mainboard. The SUPER P4DC6/P4DC6+/P4DCE/P4DCE+ supports both single and dual Intel® 603-pin Xeon™ 1.40 - 2.40 GHz processors at a front side bus speed of 400 MHz and data channel RAMBUS technology yielding a 3.2 GB data transfer bandwidth. The SUPER P4DC6+II/P4DCE+II supports single and dual Intel® 603-pin Xeon™ processors of up to 2.80 GHz at the same front side bus speed and memory size. Please refer to the motherboard specifications pages on our web site (http://www.supermicro.com/Product_page/product-m.htm) for updates on supported processors. This product is intended to be professionally installed.

Manual Organization

Chapter 1 includes a checklist of what should be included in your mainboard box, describes the features, specifications and performance of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II mainboard and provides information about the Intel 860 chipset.

Chapter 2 begins with instructions on handling static-sensitive devices. Read this chapter when you want to install the processors, the RDRAM memory modules into the RIMM slots and for mounting the mainboard in the chassis. Also refer to this chapter when you want to connect floppy/hard disk drives, the IDE or SCSI interfaces, the Adaptec SCSI RAID card, the parallel and serial ports and the twisted wires for the power supply, the reset button, the keylock/power LED and the keyboard.

If you encounter any problems see **Chapter 3**, which describes troubleshooting procedures for the video, the memory and the setup configuration stored in CMOS. For quick reference, a general FAQ (Frequently Asked Questions) section is provided.

Chapter 4 covers the AwardBIOS setup and options.

The **Appendices** list the BIOS POST messages, POST codes and beep codes.

Table of Contents

| | |
|---------------------------|-----|
| About This Manual | iii |
| Manual Organization | iii |

Chapter 1: Introduction

| | |
|---|------|
| 1-1 Overview | 1-1 |
| Checklist | 1-1 |
| Contacting Supermicro | 1-2 |
| SUPER P4DC6 Image | 1-4 |
| SUPER P4DC6+ Image | 1-5 |
| SUPER P4DC6/P4DCE Layout | 1-6 |
| SUPER P4DC6/P4DCE Quick Reference | 1-7 |
| SUPER P4DC6+/P4DCE+ Layout | 1-8 |
| SUPER P4DC6+/P4DCE+ Quick Reference | 1-9 |
| Motherboard Features | 1-10 |
| Intel 860 Chipset: System Block Diagram | 1-12 |
| 1-2 Chipset Overview | 1-13 |
| 1-3 Special Features | 1-14 |
| 1-4 PC Health Monitoring | 1-14 |
| 1-5 ACPI/PC 98 Features | 1-16 |
| 1-6 Power Supply | 1-18 |
| 1-7 Super I/O | 1-18 |

Chapter 2: Installation

| | |
|--|------|
| 2-1 Static-Sensitive Devices | 2-1 |
| 2-2 Processor and Heat Sink Installation | 2-2 |
| 2-3 Mounting the Motherboard in the Chassis | 2-4 |
| 2-4 Installing RIMMs | 2-5 |
| 2-5 Port/Front Control Panel Connector Locations | 2-6 |
| 2-6 Connecting Cables | 2-8 |
| PWR LED | 2-9 |
| IDE Hard Drive LED | 2-9 |
| PWR_ON | 2-9 |
| Reset | 2-9 |
| USB Keyboard | 2-10 |
| Alarm Reset | 2-10 |

| | |
|---|------|
| Fan Fail LED | 2-10 |
| Power Fail LED | 2-10 |
| NIC LED | 2-10 |
| PC | 2-11 |
| Chassis Intrusion | 2-11 |
| Keyboard Lock | 2-11 |
| Overheat | 2-11 |
| Speaker | 2-11 |
| ATX PS/2 Keyboard and Mouse Ports | 2-12 |
| Universal Serial Bus (USB) | 2-12 |
| Serial Ports | 2-12 |
| Wake-On-LAN | 2-12 |
| CD Headers | 2-13 |
| Fan Headers | 2-13 |
| Overheat LED | 2-13 |
| Infrared Connector | 2-13 |
| Wake-On-Ring | 2-14 |
| 2-7 Jumper Settings | 2-14 |
| Explanation of Jumpers | 2-14 |
| Rambus Speed | 2-15 |
| CMOS Clear | 2-15 |
| Keyboard Wake-Up | 2-16 |
| USB Wake-Up | 2-16 |
| SCSI Enable/Disable | 2-17 |
| SCSI Termination Enable/Disable | 2-17 |
| LAN Enable/Disable | 2-17 |
| Power Supply Alarm Enable/Disable | 2-18 |
| Onboard Audio Enable/Disable | 2-18 |
| 2-8 Parallel Port, AGP and Floppy/Hard Disk Drive Connections | 2-19 |
| Parallel Port Connector | 2-19 |
| Floppy Connector | 2-20 |
| IDE Connectors | 2-20 |
| AGP Slot | 2-21 |
| Legacy SCSI Connector | 2-21 |
| Ultra Wide SCSI Connector | 2-22 |
| 2-9 Installing Software Drivers | 2-23 |

Chapter 3: Troubleshooting

| | | |
|-----|---|-----|
| 3-1 | Troubleshooting Procedures | 3-1 |
| | Before Power On | 3-1 |
| | No Power | 3-1 |
| | No Video | 3-1 |
| | Memory Errors | 3-2 |
| 3-2 | Technical Support Procedures | 3-2 |
| 3-3 | Frequently Asked Questions | 3-3 |
| 3-4 | Returning Merchandise for Service | 3-6 |

Chapter 4: BIOS

| | | |
|-----|---------------------------|------|
| 4-1 | Introduction | 4-1 |
| 4-2 | Running Setup | 4-2 |
| 4-3 | Main BIOS Setup | 4-2 |
| 4-4 | Advanced BIOS Setup | 4-6 |
| 4-5 | PCI/PnPSetup | 4-16 |
| 4-6 | Power Management | 4-17 |
| 4-7 | Boot-up Devices | 4-21 |
| 4-8 | Security Setup | 4-22 |
| 4-9 | Exit Setup | 4-24 |

Appendices:

| | | |
|-------------|-------------------------------|-----|
| Appendix A: | AwardBIOS POST Messages | A-1 |
| Appendix B: | AwardBIOS POST Codes | B-1 |
| Appendix C: | AwardBIOS BeepCodes | C-1 |

Chapter 1

Introduction

1-1 Overview

Checklist

Congratulations on purchasing your computer mainboard from an acknowledged leader in the industry. Supermicro mainboards are designed with the utmost attention to detail to provide you with the highest standards in quality and performance.

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

One (1) Supermicro mainboard and User's Manual

One (1) ATA66/100 ribbon cable for IDE devices

One (1) floppy ribbon cable

One (1) Supermicro CD (or diskettes) containing drivers and utilities

One (1) Supermicro 50-pin SCSI cable (P4DC6/P4DC6+/P4DC6+II only)

One (1) SCSI Manual (P4DC6/P4DC6+/P4DC6+II only)

Two (2) Supermicro TMR-007 continuity RIMM modules

One (1) I/O shield plate

Two (2) pairs of CPU dual retention clips for heatsink fans

Optional Components

One (1) Supermicro 68-pin LVD Ultra160 SCSI cable (retail option only, P4DC6/P4DC6+/P4DC6+II only)

Two (2) CPU fans (retail option only)

One (1) Supermicro USB cable (retail option only)

Contacting Supermicro

Headquarters

Address: SuperMicro Computer, Inc.
980 Rock Ave.
San Jose, CA 95131 U.S.A.

Tel: +1 (408) 503-8000

Fax: +1 (408) 503-8008

Email: marketing@supermicro.com (General Information)
support@supermicro.com (Technical Support)

Web Site: www.supermicro.com

Europe

Address: SuperMicro Computer B.V.
Het Sterrenbeeld 28, 5215 ML
's-Hertogenbosch, The Netherlands

Tel: +31 (0) 73-6400390

Fax: +31 (0) 73-6416525

Email: sales@supermicro.nl (General Information)
support@supermicro.nl (Technical Support)
rma@supermicro.nl (Customer Support)

Asia-Pacific

Address: SuperMicro, Taiwan
D5, 4F, No. 16 Chien-Ba Road
Chung-Ho 235, Taipei Hsien, Taiwan, R.O.C.

Tel: +886-(2) 8226-3990

Fax: +886-(2) 8226-3991

Web Site: www.supermicro.com.tw

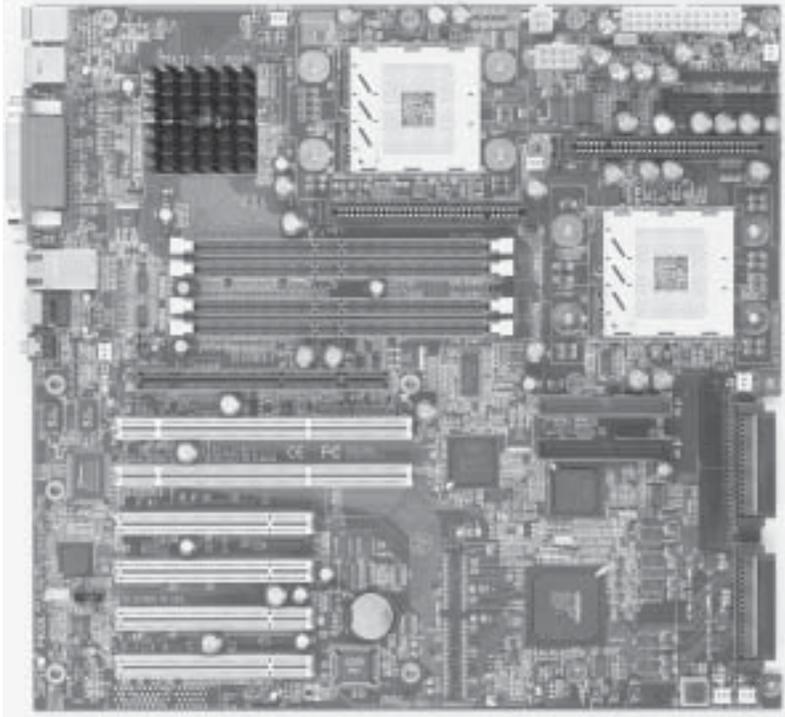
Technical Support:

Email: support@supermicro.com.tw

Tel: 886-2-8228-1366, ext.132 or 139

Notes

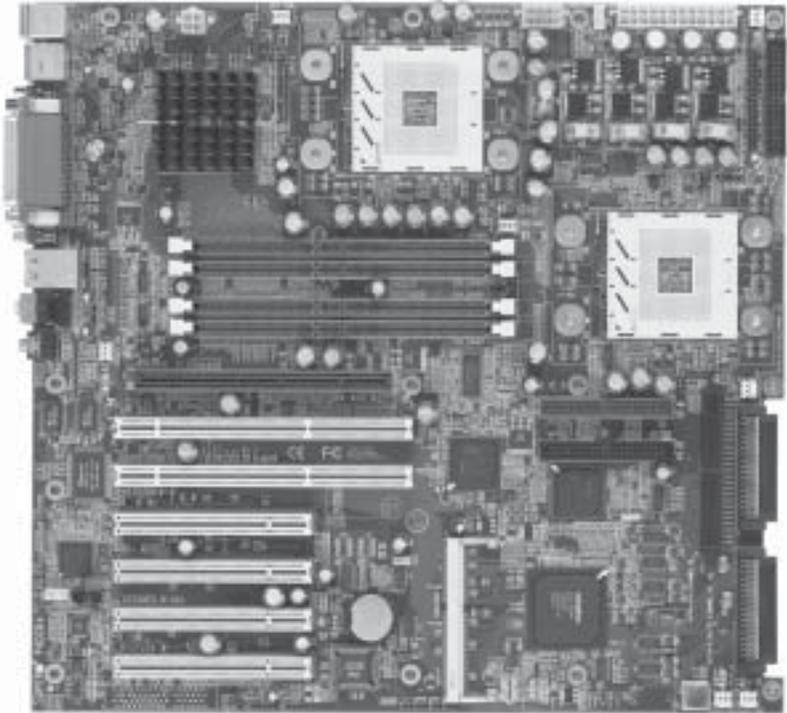
Figure 1-1. SUPER P4DC6 Image



Note:

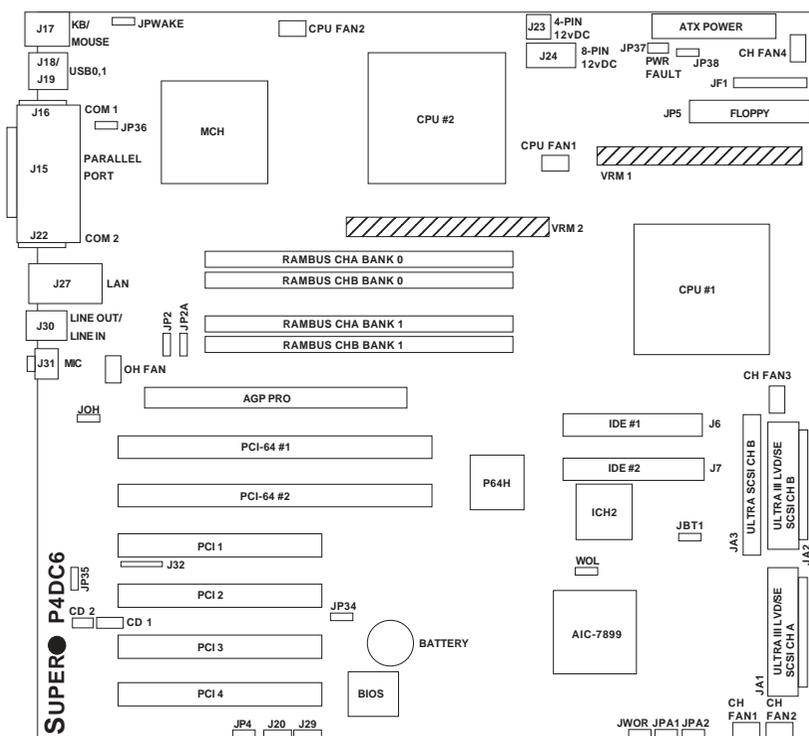
- The P4DCE shares the same layout as the P4DC6 but with no onboard SCSI.

Figure 1-2. SUPER P4DC6+ Image

**Notes:**

- The P4DCE+ shares the same layout as the P4DC6+ but with no onboard SCSI.
- The P4DC6+II shares the same layout as the P4DC6+ but includes a heatsink over the VRM modules.
- The P4DCE+II shares the same layout as the P4DCE+ but includes a heatsink over the VRM modules.

Figure 1-3. SUPER P4DC6/P4DCE Layout
(not drawn to scale)



Notes: See Chapter 2 for more information on jumper settings and pin definitions. On a 2-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either off or on one pin only.
The P4DCE shares the same layout as the P4DC6 but with no onboard SCSI.

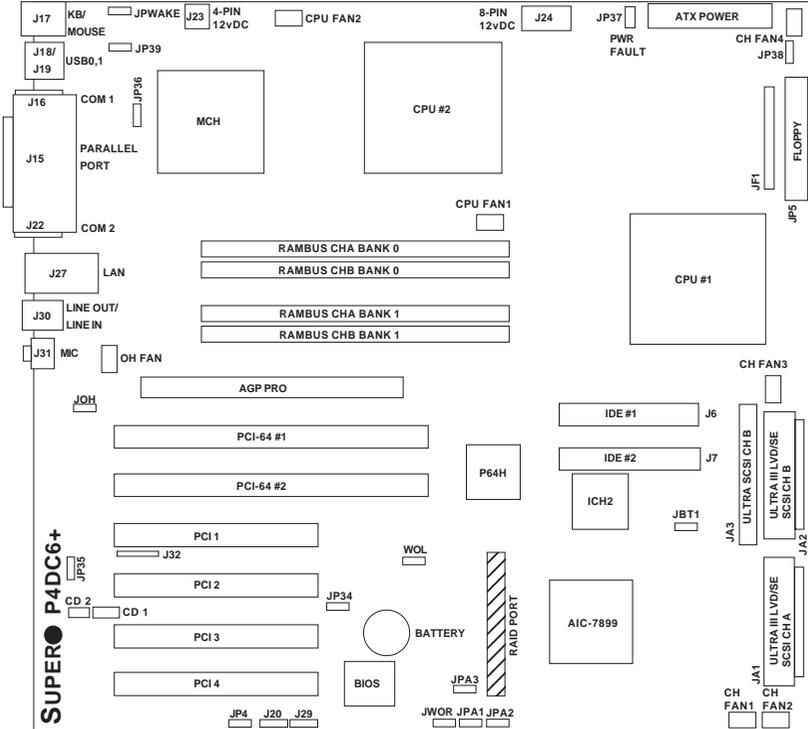
P4DC6/P4DCE Quick Reference

| <u>Jumpers</u> | <u>Description</u> | <u>Default Setting</u> |
|-----------------------|-------------------------------|-------------------------------|
| JBT1 | CMOS Clear | Pins 1-2 (Normal) |
| JP2, JP2A | Manufacturer Setting | Pins 1-2 (Auto) |
| JPA1, JPA2 | SCSI Termination | Open (Enabled) |
| JP4 | Onboard Audio | Pins 1-2 (Enabled) |
| JP34 | SCSI Enable/Disable | Pins 1-2 (Enabled) |
| JP35 | LAN Enable/Disable | Pins 1-2 (Enabled) |
| JP36 | Manufacturer Setting | Pins 1-2 (Enabled) |
| JP38* | Third Power Supply Fail Alarm | Open (Disabled) |
| JPWAKE | Keyboard Wake Up | Pins 1-2 (Disabled) |

| <u>Connectors</u> | <u>Description</u> |
|--------------------------|-------------------------------------|
| ATX POWER #1 | Primary ATX Power Connector |
| CD1, CD2 | Audio CD Inputs |
| COM1/COM2 | COM1/COM2 Serial Port Connector |
| CPU1/CPU2 | CPU #1 and CPU #2 Sockets |
| CPU/CH/OH FAN | CPU/Chassis/Overheat Fan Headers |
| J6, J7 | IDE #1, IDE #2 Connector |
| J15 | Parallel (Printer) Port |
| J16 | PS/2 Keyboard/Mouse Connector |
| J20, J29 | USB Headers 3 and 4 |
| J23 | 4-Pin 12vDC Power Connector |
| J24 | 8-Pin 12vDC Power Connector |
| J27 | LAN (Ethernet) Port |
| J30 | Line In/Line Out Jacks |
| J31 | Microphone Jack |
| J32 | Infrared Connector |
| JA1 | Ultra160 LVD SCSI CH A Connector |
| JA2 | Ultra160 LVD SCSI CH B Connector |
| JA3 | Ultra SCSI CH B Connector |
| JF1 | Front Control Panel |
| JOH | Overheat LED |
| JP5 | Floppy Disk Drive Connector |
| JP37* | Power Fail Connector |
| JWOR | Wake-on-Ring Header |
| LAN | Ethernet Port |
| USB0, USB1 | USB Ports 1 and 2 |
| VRM1/2 | Voltage Regulator Module Card Slots |

* For use with Supermicro chassis only.

Figure 1-4. SUPER P4DC6+/P4DCE+ Layout
(not drawn to scale)



Note: See Chapter 2 for more information on jumper settings and pin definitions. On a 2-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either off or on one pin only.

The P4DCE+ shares the same layout as the P4DC6+ but with no onboard SCSI and no RAID port.

The P4DC6+II shares the same layout as the P4DC6+ but includes a heatsink over the VRM modules.

The P4DCE+II shares the same layout as the P4DCE+ but includes a heatsink over the VRM modules. Both "II" models support processors of up to 2.80 GHz.

P4DC6+/P4DCE+ Quick Reference

| <u>Jumpers</u> | <u>Description</u> | <u>Default Setting</u> |
|-----------------------|-------------------------------|-------------------------------|
| JBT1 | CMOS Clear | Pins 1-2 (Normal) |
| JPA1, JPA2 | SCSI Termination | Open (Enabled) |
| JPA3 | PCI 64 Speed Select | Open (66 MHz) |
| JP4 | Onboard Audio | Pins 1-2 (Enabled) |
| JP34 | SCSI Enable/Disable | Pins 1-2 (Enabled) |
| JP35 | LAN Enable/Disable | Pins 1-2 (Enabled) |
| JP36 | Manufacturer Setting | Pins 1-2 (Enabled) |
| JP38* | Third Power Supply Fail Alarm | Open (Disabled) |
| JP39 | USB Wake Up | Pins 1-2 (Enabled) |
| JPWAKE | Keyboard Wake Up | Pins 1-2 (Disabled) |

| <u>Connectors</u> | <u>Description</u> |
|--------------------------|----------------------------------|
| ATX POWER #1 | Primary ATX Power Connector |
| CD1, CD2 | Audio CD Inputs |
| COM1/COM2 | COM1/COM2 Serial Port Connector |
| CPU1/CPU2 | CPU #1 and CPU #2 Sockets |
| CPU/CH/OH FAN | CPU/Chassis/Overheat Fan Headers |
| J6, J7 | IDE #1, IDE #2 Connector |
| J15 | Parallel (Printer) Port |
| J16 | PS/2 Keyboard/Mouse Connector |
| J20, J29 | USB Headers 3 and 4 |
| J23 | 4-Pin 12vDC Power Connector |
| J24 | 8-Pin 12vDC Power Connector |
| J27 | LAN (Ethernet) Port |
| J30 | Line In/Line Out Jacks |
| J31 | Microphone Jack |
| J32 | Infrared Connector |
| JA1 | Ultra160 LVD SCSI CH A Connector |
| JA2 | Ultra160 LVD SCSI CH B Connector |
| JA3 | Ultra SCSI CH B Connector |
| JF1 | Front Control Panel |
| JOH | Overheat LED |
| JP5 | Floppy Disk Drive Connector |
| JP37* | Power Fail Connector |
| JWOR | Wake-on-Ring Header |
| LAN | Ethernet Port |
| RAID Port | RAID Card Connector |
| USB0, USB1 | USB Ports 1 and 2 |

* For use with Supermicro chassis only.

Motherboard Features

CPU

- P4DC6/P4DC6+/P4DCE/P4DCE+: Single or dual Intel® Xeon™ 1.40 - 2.40 GHz 603-pin processors at a 400 MHz system bus speed
- P4DC6+II/P4DCE+II: Single or dual Intel® Xeon™ 1.40 - 2.80 GHz 603-pin processors at a 400 MHz system bus speed

Note: - refer to the motherboard specifications pages on our web site for updates on supported processors (http://www.supermicro.com/Product_page/product-m.htm).

Memory

- Four PC600/800 RDRAM RIMM sockets to support up to 2 GB RDRAM

Chipset

- Intel® 860 (82860NB)
- P64H (82806AA PCI-64 Hub)
- ICH2 (82801BA I/O CH, 82802AB Firmware Hub)

Expansion Slots

- One 4xAGP Pro (1.5v only)
- Two 64-bit PCI 66 MHz (3.3v)
- Four 32-bit PCI 33 MHz

BIOS

- 4 Mb Firmware Hub Award® Flash BIOS
- ACPI/APM Power Management
- PAC'99 color-coded I/O connectors
- Internal control of Power-On mode for recovery from AC power loss

PC Health Monitoring

- Nine onboard voltage monitors for two CPU core voltages, two CPU I/O voltages, +3.3v, $\pm 5v$, $\pm 12v$, 3v battery, and 5v system bus
- Three-fan status monitor with firmware/software on/off control
- Environmental temperature monitor and control
- CPU fan auto-off in sleep mode
- Three CPU/chassis temperature monitors
- System overheat LED and control
- System resource alert
- Chassis intrusion detection
- Auto-switching voltage regulator for the CPU core
- Slow blinking LED for suspend state indicator

- BIOS support for USB keyboard
- CPU slowdown at high temperature

ACPI/PC99 Features

- Microsoft® OnNow
- Real-time clock wake-up alarm
- Main switch override mechanism
- External modem ring-on

Onboard I/O

- AIC-7899 controller for dual channel Ultra160 SCSI (P4DC6, P4DC6+, P4DC6+II only)
- 2 IDE bus master interfaces support up to four UDMA/100 devices
- 1 floppy port interface (up to 2.88 MB)
- 2 Fast UART 16550A compatible serial ports
- 1 EPP/ECP (Enhanced Parallel Port/Extended Capabilities Port)
- PS/2 mouse and PS/2 keyboard ports (1 each)
- 1 Raptor RAID controller (P4DC6+ and P4DC6+II only)
- 1 LAN (Ethernet) port
- 1 infrared port
- 2 USB ports
- 2 USB headers
- 2 SCSI channels
- 1 audio line in
- 1 audio line out
- 1 audio mic in
- 1 CD audio (both types of standard headers provided)

Other

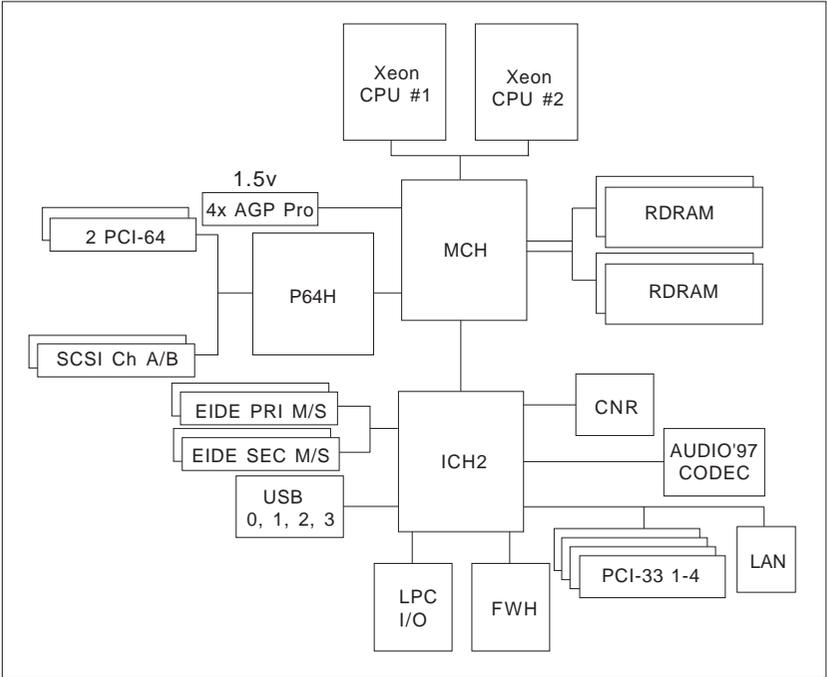
- Internal/external modem ring-on
- Control of recovery from AC power loss
- Wake-on-LAN (WOL)

CD Utilities

- BIOS flash upgrade utility (awdfash.exe)
- Drivers for the Intel® 860 chipset
- Intel® LDCM (retail only)

Dimensions

- Extended ATX: 12" x 13" (304.80 x 330.20 mm)



**Figure 1-5. Intel 860 Chipset:
System Block Diagram**

NOTE: This is a general block diagram and may not exactly represent all the features on your motherboard. See the previous section for the actual specifications of each motherboard.

1-2 Chipset Overview

The Intel® 860 chipset is a high performance, cost-effective and energy efficient chipset designed for AGP/PCI/LPC computer systems based on single or dual Intel® Xeon™ 603-pin processors at a 400 MHz Front Side (system) Bus speed.

Intel's 860 chipset consists of three major components: the Memory Controller Hub (MCH), the P64H and the I/O Controller Hub 2 (ICH2).

The MCH is optimized to provide superior performance between single or dual Xeon CPUs and the dual channel RAMBUS memory operating at up to 3.2 GB/s data bus bandwidth. The MCH also supports a 4x AGP Pro accelerated video slot.

The P64H provides support for two PCI-64 slots and two SCSI hard disk drive channels. It interfaces directly with the MCH.

The ICH2 is a highly integrated multifunctional I/O Controller Hub that provides the interface to the PCI Bus and integrates many of the functions needed in today's PC platforms.

Memory Support and AGP

The MCH supports up to 2 GB of RDRAM. The RAMBUS dual channel memory bus can support full duplex memory bandwidth transfers at up to 3.2 GB/s. Different memory module speeds (such as 600 MHz and 800 MHz) should not be mixed. Different RDRAM memory module sizes (such as 256 MB and 512 MB) may be used in Channel A and Channel B, but those within each channel (Bank0 and Bank1) must be the same. The MCH also provides full 4xAGP Pro capability for maximum bus utilization, including 2x and 4x mode transfer rates.

The ICH2 provides extensive I/O support functions and capabilities, which include Rev 2.2 compliant PCI with support for 33 MHz PCI operations, PCI-32 slots, ACPI Power Management Logic Support, an Enhanced DMA Controller, an Interrupt Controller and timer functions, an Integrated IDE controller supporting Ultra ATA100/66/33, a USB host interface with support for four USB ports, two host controllers, an Integrated LAN Controller, a System Management Bus (SMBus) with additional support for I²C devices, an AC97 2.1 Compliant Link for Audio and Telephony codecs, a Low Pin Count (LPC) interface, Firmware Hub (FWH) interface support and Alert On LAN (AOL).

Recovery from AC Power Loss

The BIOS provides a setting that allows you to determine how your system will respond when AC power is lost and then restored. You can choose for the system to remain powered off (in which case you must activate the power switch to turn it back on) or for it to return automatically to a power-on state. See the Power Lost Control setting in the BIOS chapter of this manual to change this setting. The default setting is "Always OFF."

1-3 Special Features

Adaptec Raptor RAID Controller (P4DC6+/P4DC6+II only)

The P4DC6+ and P4DC6+II include a Raptor RAID controller to offer the high degree of fault tolerance required by today's servers. A SO-DIMM socket is included on the motherboard to plug a Raptor adapter card (not included) into, which eliminates the need to use up a PCI slot to have RAID capability. The Raptor RAID controller and adaptor utilizes a 64-bit bus, provides 0, 1, 0/1, 5, and 0/5 RAID levels and supports S.M.A.R.T. and SES/SAF-TE.

1-4 PC Health Monitoring

This section describes the PC health monitoring features of the SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II motherboard.

Nine Onboard Voltage Monitors for the CPU Cores, CPU I/O, +3.3v, ±5v, ±12v, 3v Battery and 5v System Bus

The onboard voltage monitor will scan these nine voltages continuously. Once a voltage becomes unstable, it will give a warning or send an error message to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

Three-Fan Status Monitor with Firmware/Software On/Off Control

The PC health monitor can check the RPM status of the cooling fans. The onboard 3-pin CPU and chassis fans are controlled by the power management functions. The thermal fan is controlled by the overheat detection logic.

Environmental Temperature Control

The thermal control sensor monitors the CPU temperature in real time and will activate the thermal control fan whenever the CPU temperature exceeds a user-defined threshold. The overheat circuitry runs independently from the CPU. It can continue to monitor for overheat conditions even when the CPU is in sleep mode. Once it detects that the CPU temperature is too high, it will automatically turn the thermal control fan on to prevent any overheat damage to the CPU. The onboard chassis thermal circuitry can monitor the overall system temperature and alert users when the chassis temperature is too high.

CPU Fan Auto-Off in Sleep Mode

The CPU fan activates when the power is turned on. It can be turned off when the CPU is in sleep mode. When in sleep mode, the CPU will not run at full power, thereby generating less heat.

CPU Overheat LED and Control

This feature is available when the user enables the CPU overheat warning function in the BIOS. This allows the user to define an overheat temperature. When this temperature is exceeded, both the overheat fan and the warning LED are activated.

System Resource Alert

This feature is available when used with Intel's LANDesk Client Manager (optional). It is used to notify the user of certain system events. For example, if the system is running low on virtual memory and there is insufficient hard drive space for saving the data, you can be alerted of the potential problem.

Hardware BIOS Virus Protection

The system BIOS is protected by hardware so that no virus can infect the BIOS area. The user can only change the BIOS content through the flash utility provided by SUPERMICRO. This feature can prevent viruses from infecting the BIOS area and destroying valuable data.

Auto-Switching Voltage Regulator for the CPU Core

The auto-switching voltage regulator for the CPU core can support up to 20A of current and auto-sense voltage IDs ranging from 1.3v to 3.5v. This will allow the regulator to run cooler and thus make the system more stable.

1-5 ACPI/PC99 Features

ACPI is an acronym meaning "Advanced Configuration and Power Interface." The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a PC system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as CD-ROMs, network cards, hard disk drives and printers. This also includes consumer devices connected to the PC such as VCRs, TVs, telephones and stereos.

In addition to enabling operating system-directed power management, ACPI provides a generic system event mechanism for Plug and Play and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures while providing a processor architecture-independent implementation that is compatible with Windows 98, Windows NT and Windows 2000. You can check to see if ACPI has been properly installed by looking for it in the Device Manager, which is located in the "Control Panel" in Windows.

Microsoft OnNow

The OnNow design initiative is a comprehensive, system-wide approach to system and device power control. "OnNow" is a term for a PC that is always on but appears to be off and responds immediately to user or other requests.

Slow Blinking LED for Suspend-State Indicator

When the CPU goes into a suspend state, the chassis power LED will start blinking to indicate that the CPU is in suspend mode. The user can then press any key on the system's keyboard to awaken the CPU, at which time the LED will stop blinking and remain on.

USB Keyboard

If a USB keyboard is the only keyboard on the system, it can be enabled to function like a standard feature keyboard during system boot-up.

Real Time Clock Wake-Up Alarm

Although the PC may be perceived to be off when not in use, it is still capable of responding to preset wake-up events. In the BIOS, the user can set a timer to awaken the system at a predetermined time.

Main Switch Override Mechanism

When an ATX power supply is used, the power button can function as a system suspend button. With this feature enabled, the system will enter a SoftOff state when the user depresses the power button. The monitor will be suspended and the hard drive will spin down. Depressing the power button again will cause the whole system to awaken. During the SoftOff state, the ATX power supply provides power to keep the minimum required circuitry in the system alive. In case the system malfunctions and you want to turn off the power, just depress and hold the power button for four seconds. This will turn off the system completely with no main power provided to the motherboard.

External Modem Ring-On

Wake-up events can be triggered by a device such as the external modem ringing when the system is in the SoftOff state. "External Modem Ring-On" must be an included feature on the installed modem card when this feature is desired and the corresponding setting must be enabled in the BIOS. Note that external modem ring-on can only be used with an ATX 2.01 (or above) compliant power supply.

Wake-On-LAN

Wake-On-LAN (WOL) is defined as the ability of a remote management application to power up a computer that is powered off. Remote PC setup, updates and asset tracking can occur after hours and on weekends so that daily LAN maintenance traffic can be kept to a minimum and LAN-system users are not needlessly interrupted during normal work hours. The motherboards have a 3-pin WOL header to connect to the 3-pin header on a Network Interface Card (NIC) that has WOL capability. Wake-On-LAN must be enabled in the BIOS. Note that Wake-On-Lan can only be used with an ATX 2.01 (or above) compliant power supply.

1-6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is especially important for processors that have CPU clock rates of 1 GHz and above.

NOTE: Auxiliary 12v power (J23/24) is necessary to support Intel Xeon CPUs. Failure to provide such extra power will result in the CPUs becoming unstable after only a few minutes of operation. See Section 2-6 for details on connecting the power supply cables.

The SUPER P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II accommodates ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. You should use one that will supply at least 400W of power and includes the additional +12V, 8-pin and 4-pin power connectors - an even higher wattage power supply is recommended for high-load configurations. Your power supply must also supply 1.5A for the LAN port. It is strongly recommended that you use a high quality power supply that meets ATX power supply specification 2.02 or above. It must also be SSI compliant (info at <http://www.ssiforum.org/>). Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1-7 Super I/O

The functions of the disk drive adapter for the Super I/O chip include a floppy disk drive controller that is compatible with industry standard 82077/765, a data separator, write pre-compensation circuitry, decode logic, data rate selection, a clock generator, drive interface control logic and interrupt and DMA logic. The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives.

The functions of the disk drive adapter for the Super I/O chip include a floppy disk drive controller that is compatible with industry standard 82077/765, a data separator, write pre-compensation circuitry, decode logic, data rate selection, a clock generator, drive interface control logic and interrupt and DMA logic. The wide range of functions integrated onto the Super I/O greatly reduces the number of components required for interfacing with floppy disk drives. The Super I/O supports four 360K, 720K, 1.2M, or 1.44M disk drives and data transfer rates of 250 Kbps, 500 Kbps or 1 Mbps.

It also provides two high-speed, 16550 compatible serial communication ports (UARTs), one of which supports serial infrared communication. Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 Kbps, 500 Kbps or 1 Mbps to support higher speed modems.

The Super I/O supports one of the following: PC-compatible printer port (SPP), bi-directional printer port (BPP), Enhanced Parallel Port (EPP) or Extended Capabilities Port (ECP). The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through an SMI or SCI function pin. It also features auto power management to reduce power consumption.

The IRQs, DMAs and I/O space resources of the Super I/O can adjust flexibly to meet ISA PnP requirements, which support ACPI and Advanced Power Management (APM).

Notes

Chapter 2 Installation

2-1 Static-Sensitive Devices

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the anti-static bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

Unpacking

The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Installation Procedures

Follow the procedures as listed in the order below to install the motherboard into your system:

1. Install the processor and the heat sink.
2. Install the motherboard in the chassis.
3. Install the memory and add-on cards.
4. Finally, install the cables and drivers.

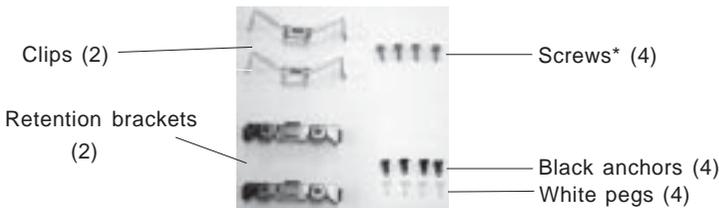
2-2 Processor and Heat Sink Installation



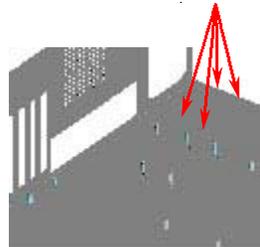
When handling the processor package, avoid placing direct pressure on the label area of the fan. Also, do not place the motherboard on a conductive surface, which can damage the BIOS battery and prevent the system from booting up.

IMPORTANT: Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heat sink.

1. Locate the following components, which are included in the shipping package. **Note:** VRM modules must also be installed (P4DC6 and P4DCE only) - they are not included with the motherboard.

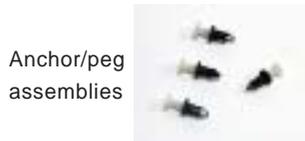


*These screws are to be used for mounting the motherboard to the back panel of a chassis that has four mounting holes (as shown on right).



For chassis that do not have four mounting holes, use the anchor/peg assemblies:

2. Insert the white pegs into the black anchors. Do not force the white pegs all the way in - about 1/3 of the white pegs should be inside the black anchors.



Anchor/peg assemblies

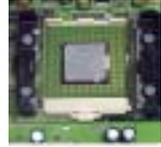
3. Place a retention bracket in the proper position and secure it by pressing two pegs into the retention holes until you hear a *click*. The clicking sound indicates that the peg is locked and secured.

Two pegs in position



One retention bracket in position

4. Secure the other retention bracket into position by repeating Step 3.



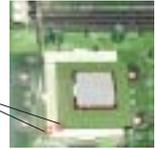
5. Lift the lever on the CPU socket: *make sure you lift the lever completely or you will damage the CPU socket when power is applied.*

Socket lever



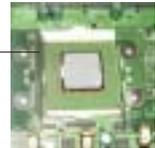
6. Install the CPU in the socket. Make sure that Pin 1 of the CPU is seated on Pin 1 of the socket (both corners are marked with a triangle). When using only one CPU, place it into CPU socket #1 (CPU socket #2 is automatically disabled if only one CPU is used).

Pin 1



7. Press the lever down until you hear it *click* into the locked position.

Socket lever in locked position



8. Apply the proper amount of thermal glue to the CPU die and place the heat sink on top of the CPU.

Heat sink

CPU



9. Secure the heat sink by locking the retention clips into their proper position.

Retention clip



10. Connect the three wires of the CPU fan to the CPU fan connector.

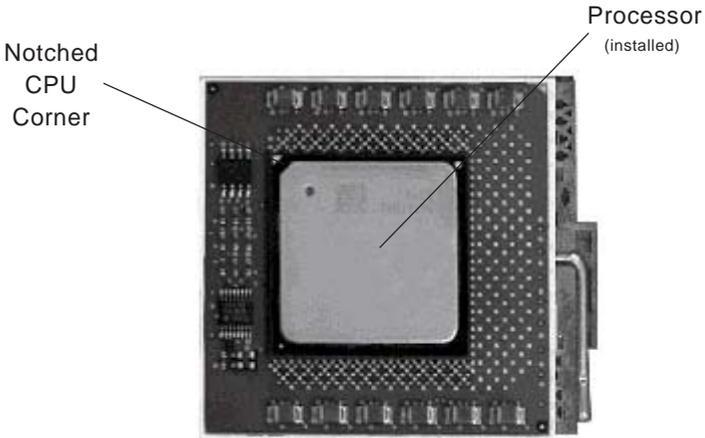
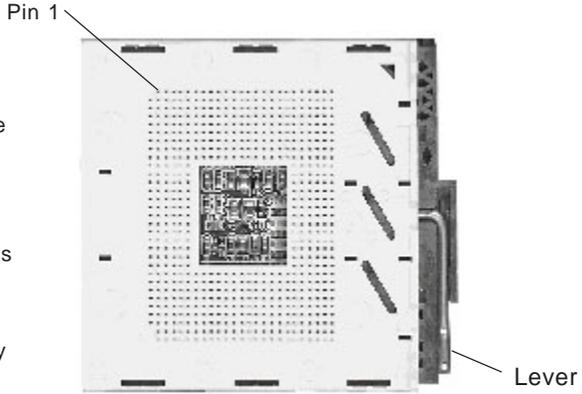
CPU fan wires

CPU fan connector





Warning! Make sure you lift the lever completely when installing the CPU. If the lever is only partly raised, damage to the socket or CPU may result.



**Figure 2-1. PGA 603-Pin Socket:
Empty and with Processor Installed**

2-3 Mounting the Motherboard in the Chassis

All motherboards have standard mounting holes to fit different types of chassis. Chassis may include a variety of mounting fasteners made of metal or plastic. Although a chassis may have both types, metal fasteners are the most highly recommended because they ground the motherboard to the chassis. For this reason, it is best to use as many metal fasteners as possible.

2-4 Installing RIMMs

CAUTION

Exercise extreme care when installing or removing RIMM modules to prevent any possible damage.

Note: Check the Supermicro web site for a list of recommended memory modules:

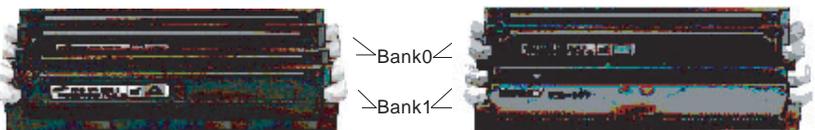
http://www.supermicro.com/TECHSUPPORT/FAQs/Memory_vendors.htm

RIMM Installation (See Figures 2-2 and 2-3)

1. Insert a pair of RDRAM modules (of the same type and size) into the two RIMM slots of Bank 0. If needed, insert another pair of RDRAMs (of the same type and size) into both slots of Bank1. If you populate only the two slots of Bank0, then you need to populate both slots of Bank1 with "Continuity Modules" to close the signal loop. See "RAMBUS Support" below for details on supported memory.
2. Insert each RDRAM module vertically into its slot. Pay attention to the two notches along the bottom of the module to prevent inserting the module incorrectly.
3. Gently press down on the RDRAM module until it snaps into place.
4. The P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II will support two (2) or four (4) 600 or 800 MHz 184-pin RDRAM modules for a total of up to 2 GB of system memory. Both ECC (Error Checking Correction) and Parity Checking are supported.

RAMBUS Support (Important!)

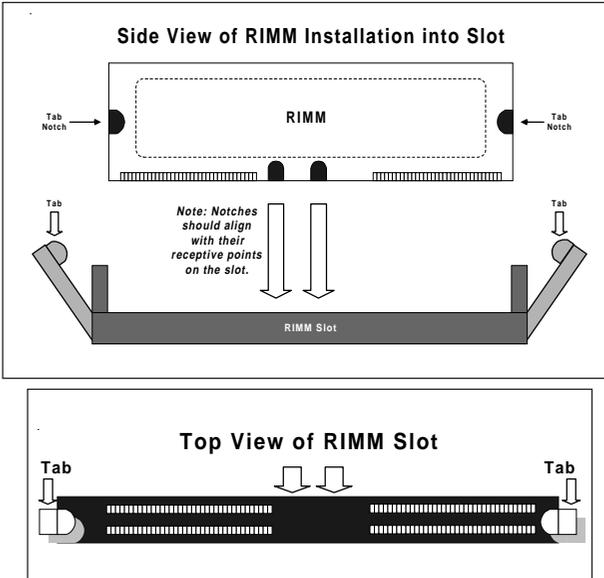
The Memory Controller Hub (MCH) enables the use of RAMBUS in the RIMM slots on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II. This hub supports both ECC and non-ECC type memory, but you cannot mix both types. (Check the Memory ECC Mode BIOS setting to enable the use of ECC. See Section 1-2 for more on the MCH.)



**Figure 2-2. Left: Four RIMMs in Banks 0 and 1
Right: Two RIMMs in Bank0 and Two Continuity Modules in Bank1**

Figure 2-3. RIMM Installation

To Install: With the tabs pulled outward, insert the RIMM module vertically and press straight down until it snaps into place. Pay attention to the alignment of the two notches.



To Remove: Use your thumbs to gently push out the tabs at both ends of the module. This should release it from the slot.

2-5 Port/Control Panel Connector Locations

The I/O ports are color coded in conformance with the PC99 specification to make setting up your system easier. See Figure 2-4 (below) for the colors and locations of the various I/O ports.

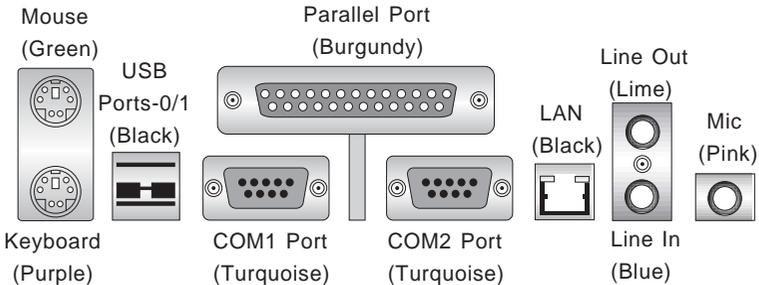


Figure 2-4. I/O Port Locations and Definitions

Front Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 2-5 for the pin locations of the Power LED, IDE LED, Power On, Reset, USB Keyboard, the 5v System Bus, Fan Failure LED, Power Failure LED, Network Interface Card LED, I2C LED, Chassis Intrusion, Keyboard Lock, Overheat and Speaker headers, which are all located on JF1. Refer to the following section for details.

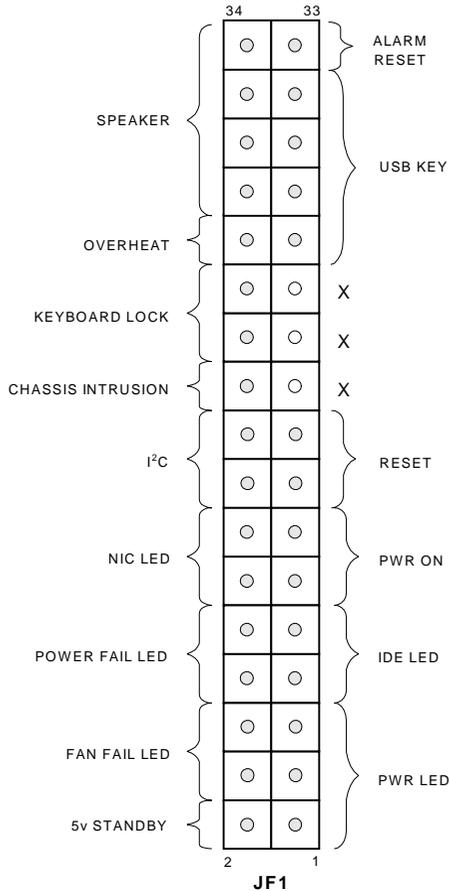
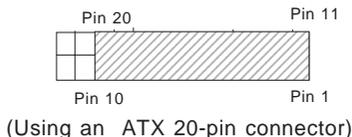
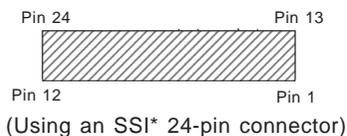


Figure 2-5. Front Control Panel Connectors

2-6 Connecting Cables (see previous page for locations)

Power Supply Connector

The primary power supply connector on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II meets the SSI (Superset ATX) 24-pin specification and also supports an ATX 20-pin connector.



Important !! The P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II must be connected to supplemental 12v power with the 4-pin J23 connector *and* the 8-pin J24 connector. Failure to use a power supply without such supplemental 12v power will result in CPU instability after only a few minutes of operation.

* SSI = Server System Infrastructure, a specification for chassis power supplies. Get more info at <http://www.ssiforum.org>

Table 2-1a
ATX Power Supply 24-pin Connector
Pin Definitions

| Pin Number | Definition | Pin Number | Definition |
|------------|------------|------------|------------|
| 13 | +3.3v | 1 | +3.3v |
| 14 | -12v | 2 | +3.3v |
| 15 | GND | 3 | GND |
| 16 | PS_ON# | 4 | +5v |
| 17 | GND | 5 | GND |
| 18 | GND | 6 | +5v |
| 19 | GND | 7 | GND |
| 20 | Res(NC) | 8 | PWR_OK |
| 21 | +5v | 9 | 5vSB |
| 22 | +5v | 10 | +12v |
| 23 | +5v | 11 | +12v |
| 24 | GND | 12 | +3.3v |

Table 2-1b
ATX Power Supply 20-pin Connector
Pin Definitions

| Pin Number | Definition | Pin Number | Definition |
|------------|------------|------------|------------|
| 11 | +3.3v | 1 | +3.3v |
| 12 | -12v | 2 | +3.3v |
| 13 | GND | 3 | GND |
| 14 | PS_ON | 4 | +5v |
| 15 | GND | 5 | GND |
| 16 | GND | 6 | +5v |
| 17 | GND | 7 | GND |
| 18 | -5v | 8 | PW-OK |
| 19 | +5v | 9 | 5vSB |
| 20 | +5v | 10 | +12v |

Table 2-1c
4-Pin +12v Power Supply
Connector (J23)

| Pins | Definition |
|-------|------------|
| 1 & 2 | Ground |
| 3 & 4 | +12v |

**Required
connection**

Table 2-1d
8-Pin +12v Power Supply
Connector (J24)

| Pins | Definition |
|----------|------------|
| 1 thru 4 | Ground |
| 5 thru 8 | +12v |

**Required
connection**

Table 2-1e
P/S Wire Definitions

| Color | Definition |
|--------|------------|
| Orange | +3.3v |
| Black | Ground |
| Red | 5v |
| White | Power OK |
| Yellow | +12v |
| Purple | 5v standby |
| Brown | -5v |

(For reference only)

PWR LED

The power LED connection is located on pins 1, 3 and 5 of JF1. This connector attaches to the LED on the chassis that indicates the computer is powered on. See Table 2-2 for pin definitions.

Table 2-2
Power LED Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 1 | +3.3v |
| 3 | NC |
| 5 | Signal |

IDE Hard Drive LED

The hard drive LED connection is located on pins 7 and 9 of JF1. Attach the IDE hard drive LED cable to these pins to display IDE hard drive activity. See Table 2-3 for pin definitions.

Table 2-3
IDE LED Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 7 | +5v |
| 9 | Signal |

PWR_ON

The PW_ON connection is located on pins 11 and 13 of JF1. Momentarily contacting both pins will power on/off the system. The user can also configure this button to function as a suspend button (see the "Power Button Mode" setting in BIOS). To turn the power off when set to suspend mode, hold down the power button for at least four seconds. See Table 2-4 for pin definitions.

Table 2-4
PW_ON Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 11 | PWR_ON |
| 13 | Ground |

Reset

The reset connection is located on pins 15 and 17 of JF1. This connector attaches to the hardware reset switch on the computer chassis. See Table 2-5 for pin definitions.

Table 2-5
Reset Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 15 | Reset |
| 17 | Ground |

USB Keyboard

If you are using a USB keyboard, connect it to pins 25, 27, 29, 31 and 33 of JF1. See Table 2-6 for pin definitions.

Table 2-6
USB Keyboard Pin Definitions
(JF1)

| Pin Number | Definition |
|------------|--------------|
| 25 | USB Power |
| 27 | USB Negative |
| 29 | USB Positive |
| 31 | Ground |

Alarm Reset

Pin 33 of JF1 can be used to attach an alarm reset switch to your chassis. See Table 2-7 for pin definition.

Table 2-7
Alarm Reset Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|--------------|
| 33 | Reset Signal |

Fan Fail LED

Connect the proper fan cable to pins 4 and 6 of JF1 for LED indication of a fan failure. You will need a fan fail cable (not included) to use this connection. See Table 2-8 for pin definitions.

Table 2-8
Fan Fail LED Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 4 | 5v |
| 6 | Signal |

Power Fail LED

Connect the proper cable to pins 8 and 10 of JF1 for LED indication of a power failure. You will need the proper power cable (not included) to use this connection. See Table 2-9 for pin definitions.

Table 2-9
Power Fail LED Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 8 | 5v |
| 10 | Signal |

NIC LED

The Network Interface Controller LED connection is located on pins 12 and 14 of JF1. Attach the NIC LED cable to these pins to display network activity. See Table 2-10 for pin definitions.

Table 2-10
Power Fail LED Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|------------|
| 12 | 3.3v Stby |
| 14 | Signal |

I²C

The I²C connection is located on pins 16 and 18 of JF1. See Table 2-11 for pin definitions.

Table 2-11
I²C Pin Definitions
(JF1)

| Pin Number | Definition |
|------------|------------|
| 16 | Bus Data |
| 18 | Bus Clock |

Chassis Intrusion

The chassis intrusion header is located on pin 20 of JF1. See the board layouts in Chapter 1 for its location. See Table 2-12 for pin definition.

Table 2-12
Chassis Intrusion Pin
Definitions (JF1)

| Pin Number | Definition |
|------------|-----------------|
| 20 | Intrusion Input |

Keyboard Lock

The keyboard lock connection is located on pins 22 and 24 of JF1. See Table 2-13 for pin definitions.

Table 2-13
Keyboard Lock Pin Definitions
(JF1)

| Pin Number | Function | Definition |
|------------|----------|----------------------|
| 22 | Keylock | Keyboard inhibit +5v |
| 24 | Ground | Black wire |

Overheat

A chassis overheat header is located on pin 26 of JF1. See Table 2-14 for pin definitions.

Table 2-14
Overheat Pin Definitions
(JF1)

| Pin Number | Definition |
|------------|----------------|
| 26 | Overheat Input |

Speaker

The speaker connector is located on pins 28, 30, 32 and 34 of JF1. See Table 2-15 for pin definitions.

Table 2-15
Speaker Pin Definitions
(JF1)

| Pin Number | Function | Definition |
|------------|----------|------------|
| 28 | Power | 3.3v |
| 30 | NC | NC |
| 32 | NC | NC |
| 34 | Spkr Out | Data |

(Note: NC indicates no-connection.)

ATX PS/2 Keyboard and PS/2 Mouse Ports

The ATX PS/2 keyboard and the PS/2 mouse are located at J17. See Table 2-16 for pin definitions. (The mouse port is above the keyboard port.) See Figure 2-4 for locations.)

Table 2-16
PS/2 Keyboard and Mouse Port Pin Definitions (J17)

| Pin Number | Definition |
|------------|------------|
| 1 | Data |
| 2 | NC |
| 3 | Ground |
| 4 | VCC |
| 5 | Clock |
| 6 | NC |

Universal Serial Bus (USB)

Two Universal Serial Bus connectors (USB0 and USB1) are located at J18 and J19. See Table 2-17 for pin definitions. Your motherboard also provides support for two additional USB ports: the USB2 (J20) and USB3 (J29) headers are located near the CNR slot.

Note: If you have the USB on JF1 connected you cannot use USB2.

Table 2-17
Universal Serial Bus Pin Definitions
J18 J19

| Pin# | Definition | Pin# | Definition |
|------|------------|------|------------|
| 1 | +5v | 1 | +5v |
| 2 | P0- | 2 | P0- |
| 3 | P0+ | 3 | P0+ |
| 4 | Ground | 4 | Ground |

(USB 2-J20 & USB3-J29)

| Pin Number | Definition |
|------------|------------|
| 1 | +5V |
| 2 | PO- |
| 3 | PO+ |
| 4 | Ground |
| 5 | Ground |

Serial Ports

Two serial connectors are provided on your board: COM1 (J16) and COM2 (J22). See Table 2-18 for pin definitions.

Table 2-18
Serial Port Pin Definitions COM1-J16 & COM2-J22

| Pin Number | Definition | Pin Number | Definition |
|------------|------------|------------|------------|
| 1 | CD | 6 | DSR |
| 2 | RD | 7 | RTS |
| 3 | TD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | 10 | NC |

Note: Pin 10 is included on the header but not on the port.

Wake-On-LAN

The Wake-On-LAN header is marked WOL. Refer to Table 2-19 for pin definitions. You must enable the LAN Wake-Up setting in BIOS to use this function. (You must also have a LAN card with a Wake-on-LAN connector and cable to use this feature.)

Table 2-19
Wake-On-LAN Pin Definitions (WOL)

| Pin Number | Definition |
|------------|-------------|
| 1 | +5v Standby |
| 2 | Ground |
| 3 | Wake-up |

CD Headers

There are two CD headers of different sizes on the motherboard for audio CD playback. You must connect an audio cable from your CD player to the header that fits your cable's connector. Refer to Table 2-20 for pin definitions.

Table 2-20a
Audio CD Header Pin Definitions
(CD1)

| Pin Number | Definition |
|------------|---------------------|
| 1 | Left Stereo Signal |
| 2 | Ground |
| 3 | Ground |
| 4 | Right Stereo Signal |

Table 2-20b
Audio CD Header Pin Definitions
(CD2)

| Pin Number | Definition |
|------------|---------------------|
| 1 | Right Stereo Signal |
| 2 | Ground |
| 3 | Ground |
| 4 | Left Stereo Signal |

Fan Headers*

The CPU fans, chassis fans and thermal control fan headers are designated CPU FAN #1/#2, Chassis Fan 1/2/3/4 and OH Fan respectively. Refer to Table 2-21 for pin definitions.

Table 2-21
Fan Header (CPU Fan 1-2,
Chassis Fan 1-4, OH Fan) Pin
Definitions

| Pin Number | Definition |
|------------|----------------|
| 1 | Ground (black) |
| 2 | +12V (red) |
| 3 | Tachometer |

*Caution: These fan headers are for DC power only.

Overheat LED (JOH)

The JOH header is used to connect an LED to provide warning of chassis overheating. It is located near the microphone connector. Refer to Table 2-22 for pin definitions.

Table 2-22
Overheat LED
Pin Definitions (JOH)

| Pin Number | Definition |
|------------|------------|
| 1 | 12vDC |
| 2 | OH Active |

Infrared Connector

The infrared connector is located at J32. See Table 2-23 for pin definitions. See the Technical Support section of our web site for information on the infrared devices you can connect to the system.

Table 2-23
Infrared Pin
Definitions (J32)

| Pin Number | Definition |
|------------|------------|
| 1 | +5v |
| 2 | Key |
| 3 | IRRX |
| 4 | Ground |
| 5 | IRTX |

Wake-On-Ring

The Wake-On-Ring header is designated as JWOR on the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II. This function allows your computer to receive and be "awakened" by an incoming call when in the suspend state. Refer to Table 2-24 for pin definitions. You must also have a WOR card and cable to use WOR.

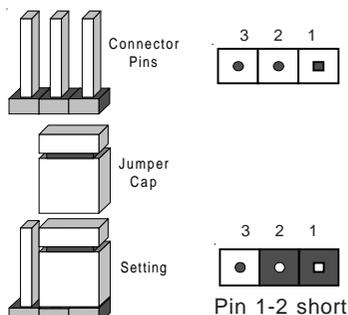
Table 2-24
Wake-On-Ring Pin
Definitions (JWOR)

| Pin Number | Definition |
|------------|------------|
| 1 | Ground |
| 2 | Wake-up |

2-7 Jumper Settings

Explanation of Jumpers

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector they are located on. **Pin 1 is always identified with a square solder pad on the printed circuit board.** See the motherboard layout pages for jumper locations.



CMOS Clear

Refer to Table 2-25 for instructions on how to clear CMOS. Always remove the AC power cord from the system before clearing CMOS.

Note: For an ATX power supply, you must completely shut down the system, remove the AC power cord, and then use JBT1 to clear CMOS. Replace JBT1 back to the pin 1-2 position before powering up the system again. **Do not** use the PW_ON connector to clear CMOS.

Table 2-25
CMOS Clear Jumper Settings (JBT1)

| Jumper Position | Definition |
|-----------------|------------|
| 1-2 | Normal |
| 2-3 | CMOS Clear |

The diagram shows two vertical jumper blocks. The first block, labeled 'Normal', has a small square jumper cap on the top two pins (1-2). The second block, labeled 'CMOS Clear', has a small square jumper cap on the bottom two pins (2-3).

PCI 64 Speed Select (P4DC6+/P4DCE+/P4DC6+II/ P4DCE+II only)

Jumper JPA3 allows you to change the speed of the 64-bit PCI slot. The default setting is 66 MHz. **Note:** If you have installed a RAID card into the RAID adapter port (P4DC6+/P4DC6+II only) and a PCI slot into the 64-bit 66 MHz PCI slot, you must set this jumper to 33 MHz. Refer to Table 2-26 for jumper settings.

Table 2-26
**64-bit PCI Speed Select
Jumper Settings (JPA3)**

| Jumper Position | Definition |
|-----------------|------------|
| Open | 66 MHz |
| Closed | 33 MHz |

Keyboard Wake-Up

The JPWAKE jumper is used together with the Keyboard Wake-Up function in BIOS. Enable both the jumper and the BIOS setting to allow the system to be woken up by depressing a key on the keyboard. See Table 2-27 for jumper settings. JPWAKE is located near the keyboard and mouse ports.

Note: Your power supply must meet ATX specification 2.01 or higher and supply 720mA of standby power to use this feature.

Table 2-27
Keyboard Wake-Up
Jumper Settings
(JPWAKE)

| Jumper Position | Definition |
|-----------------|------------|
| 1-2 | Disabled |
| 2-3 | Enabled |

USB Wake-Up

Jumper JP39 is used in conjunction with the Keyboard Wake-Up function in BIOS when you wish to wake the system up with a USB keyboard that has been connected to a USB port (not header). Set JP39 to pins 1-2 to support USB keyboard wake-up and resume from ACPI S1 mode and pins 2-3 pins to support USB keyboard wake-up and resume from ACPI S3 mode. See Table 2-28 for jumper settings.

Note: Your power supply must provide 5v of standby voltage with at least 1A to use this feature.

Table 2-28
USB Wake-Up
Jumper Settings (JP39)

| Jumper Position | Definition |
|-----------------|------------|
| 1-2 | 5v |
| 2-3 | 5v Standby |

SCSI Enable/Disable (P4DC6/P4DC6+/P4DC6+II only)

The SCSI Termination jumper at JP34 allows you to enable or disable the onboard SCSI controller. The normal (default) position is on pins 1-2 to enable SCSI termination. See Table 2-29 for jumper settings.

Table 2-29
SCSI Enable/Disable
Jumper Settings
(JP34)

| Jumper Position | Definition |
|-----------------|------------|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

SCSI Termination Enable/ Disable (P4DC6/P4DC6+/ P4DC6+II only)

Jumpers JPA1 and JPA2 allow you to enable or disable termination for the individual SCSI channels. Jumper JPA1 controls SCSI channel A and JPA2 controls SCSI channel B. The normal (default) setting is open to enable (terminate) both SCSI channels. If you wish to connect external SCSI devices, you should disable termination for the channel(s) you will be connecting them to. See Table 2-30 for jumper settings.

Table 2-30
**SCSI Termination Enable/
Disable Jumper Settings**
(JPA1, JPA2)

| Jumper Position | Definition |
|-----------------|------------|
| Open | Enabled |
| Closed | Disabled |

LAN Enable/Disable

Change the setting of jumper JP35 to enable or disable the onboard LAN or NIC (Network Interface Card) on the motherboard. See Table 2-31 for jumper settings. The default setting is enabled

Table 2-31
LAN (NIC)
Enable/Disable
Jumper Settings
(JP35)

| Jumper Position | Definition |
|-----------------|------------|
| Pins 1-2 | Enabled |
| Pins 2-3 | Disabled |

Power Supply Alarm Enable/Disable

The system can notify you in the event of a power supply failure. This feature assumes that three power supply units are installed in the chassis, with one acting as a backup. If you only have one or two power supply units installed, you should disable this (the default setting) with JP38 to prevent false alarms. See Table 2-32 for jumper settings.

Table 2-32
Power Supply Alarm Enable/Disable Jumper Settings (JP38)

| Jumper Position | Definition |
|-----------------|------------|
| Open | Disabled |
| Closed | Enabled |

Onboard Audio Enable/Disable

AC'97 brings high quality audio to PCs. When enabled with JP4, audio is processed onboard. The disabled setting should be selected when you wish to use an PCI add-on card for audio. See Table 2-33 for jumper settings.

Table 2-33
AC97 Enable/Disable Jumper Settings (JP4)

| Jumper Position | Definition |
|-----------------|------------|
| 1-2 | Enabled |
| 2-3 | Disabled |

2-8 Parallel Port, AGP, Floppy/Hard Disk and SCSI Connections

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A and the connector that does not have twisted wires always connects to drive B.
- The 80-wire ATA66/100 IDE hard disk drive cable that came with your system has two connectors to support two drives. This special cable should be used to take advantage of the speed this advanced technology offers. The blue connector connects to the onboard IDE connector interface and the other connector(s) to your hard drive(s). The middle connector is for the slave device and the remaining connector is for the master device. Consult the documentation that came with your disk drive for details on actual jumper locations and settings for the hard disk drive.

Table 2-34
Parallel (Printer) Port Pin Definitions (J15)

| Pin Number | Function | Pin Number | Function |
|------------|------------|------------|------------|
| 1 | Strobe- | 2 | Auto Feed- |
| 3 | Data Bit 0 | 4 | Error- |
| 5 | Data Bit 1 | 6 | Init- |
| 7 | Data Bit 2 | 8 | SLCT IN- |
| 9 | Data Bit 3 | 10 | GND |
| 11 | Data Bit 4 | 12 | GND |
| 13 | Data Bit 5 | 14 | GND |
| 15 | Data Bit 6 | 16 | GND |
| 17 | Data Bit 7 | 18 | GND |
| 19 | ACK | 20 | GND |
| 21 | BUSY | 22 | GND |
| 23 | PE | 24 | GND |
| 25 | SLCT | 26 | NC |

Parallel Port Connector

The parallel port is designated as J15. See Table 2-34 for pin definitions.

Floppy Connector

The floppy connector is designated as JP5. See Table 2-35 for pin definitions.

Table 2-35
Floppy Connector Pin Definitions (JP5)

| Pin Number | Function | Pin Number | Function |
|------------|----------|------------|-----------------|
| 1 | GND | 2 | FDHDIN |
| 3 | GND | 4 | Reserved |
| 5 | Key | 6 | FDEDIN |
| 7 | GND | 8 | Index- |
| 9 | GND | 10 | Motor Enable |
| 11 | GND | 12 | Drive Select B- |
| 13 | GND | 14 | Drive Select A- |
| 15 | GND | 16 | Motor Enable |
| 17 | GND | 18 | DIR- |
| 19 | GND | 20 | STEP- |
| 21 | GND | 22 | Write Data- |
| 23 | GND | 24 | Write Gate- |
| 25 | GND | 26 | Track 00- |
| 27 | GND | 28 | Write Protect- |
| 29 | GND | 30 | Read Data- |
| 31 | GND | 32 | Side 1 Select- |
| 33 | GND | 34 | Diskette |

Table 2-36
IDE Connector Pin Definitions (J6, J7)

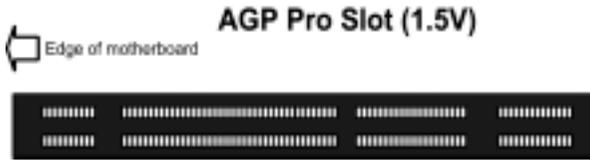
| Pin Number | Function | Pin Number | Function |
|------------|---------------|------------|----------------|
| 1 | Reset IDE | 2 | GND |
| 3 | Host Data 7 | 4 | Host Data 8 |
| 5 | Host Data 6 | 6 | Host Data 9 |
| 7 | Host Data 5 | 8 | Host Data 10 |
| 9 | Host Data 4 | 10 | Host Data 11 |
| 11 | Host Data 3 | 12 | Host Data 12 |
| 13 | Host Data 2 | 14 | Host Data 13 |
| 15 | Host Data 1 | 16 | Host Data 14 |
| 17 | Host Data 0 | 18 | Host Data 15 |
| 19 | GND | 20 | Key |
| 21 | DRQ3 | 22 | GND |
| 23 | I/O Write- | 24 | GND |
| 25 | I/O Read- | 26 | GND |
| 27 | IOCHRDY | 28 | BALE |
| 29 | DACK3- | 30 | GND |
| 31 | IRQ14 | 32 | IOCS16- |
| 33 | Addr 1 | 34 | GND |
| 35 | Addr 0 | 36 | Addr 2 |
| 37 | Chip Select 0 | 38 | Chip Select 1- |
| 39 | Activity | 40 | GND |

IDE Connectors

There are no jumpers to configure the onboard IDE interfaces J6 and J7. Refer to Table 2-36 for pin definitions. You must use the ATA100/66 cable included with your system to benefit from the ATA100/66 technology.

AGP Slot

The AGP Pro slot is backward compatible with AGP Pro and 4xAGP graphics cards, which have fewer pins than AGP Pro cards. Because of this, care must be taken when installing a graphics card into this slot, as doing so incorrectly can damage your motherboard. For AGP Pro cards, you should remove the orange sticker covering one end of the slot. For other cards, leave this sticker in place and make sure your card does not plug into the section it covers. A general rule of thumb is to make sure your card fills the section of pins nearer the center of the motherboard first, then the end toward the edge of the motherboard if there are more pins not seated. If the I/O shield of your card is flush with the edge of the motherboard, the card should be inserted correctly.



50-pin Legacy SCSI Connector Ultra Wide SCSI Connector (P4DC6/P4DC6+/P4DC6+II only)

Refer to Table 2-37 for pin definitions for the 50-pin Legacy SCSI connector located at JA3.

Table 2-37
50-pin Legacy SCSI Connector Pin Definitions (JA3)

| Pin Number | Function | Pin Number | Function |
|------------|----------|------------|----------|
| 1 | GND | 26 | -DB (0) |
| 2 | GND | 27 | -DB (1) |
| 3 | GND | 28 | -DB (2) |
| 4 | GND | 29 | -DB (3) |
| 5 | GND | 30 | -DB (4) |
| 6 | GND | 31 | -DB (5) |
| 7 | GND | 32 | -DB (6) |
| 8 | GND | 33 | -DB (7) |
| 9 | GND | 34 | -DB (P) |
| 10 | GND | 35 | GND |
| 11 | GND | 36 | GND |
| 12 | Reserved | 37 | Reserved |
| 13 | Open | 38 | Tempwr |
| 14 | Reserved | 39 | Reserved |
| 15 | GND | 40 | GND |
| 16 | GND | 41 | -ATN |
| 17 | GND | 42 | GND |
| 18 | GND | 43 | -BSY |
| 19 | GND | 44 | -ACK |
| 20 | GND | 45 | -RST |
| 21 | GND | 46 | -MSG |
| 22 | GND | 47 | -SEL |
| 23 | GND | 48 | -C/D |
| 24 | GND | 49 | -REQ |
| 25 | GND | 50 | -I/O |

Ultra Wide SCSI Connector (P4DC6/P4DC6+/P4DC6+II only)

Refer to Table 2-38 for the Ultra Wide SCSI pin definitions. The connectors are located at JA1 and JA2.

Table 2-38
Ultra Wide SCSI Connector (JA1, JA2)

| Pin Number | Function | Pin Number | Function |
|------------|----------|------------|----------|
| 1 | GND | 35 | -DB (12) |
| 2 | GND | 36 | -DB (13) |
| 3 | GND | 37 | -DB (14) |
| 4 | GND | 38 | -DB (15) |
| 5 | GND | 39 | Parity H |
| 6 | GND | 40 | -DB (0) |
| 7 | GND | 41 | -DB (1) |
| 8 | GND | 42 | -DB (2) |
| 9 | GND | 43 | -DB (3) |
| 10 | GND | 44 | -DB (4) |
| 11 | GND | 45 | -DB (5) |
| 12 | GND | 46 | -DB (6) |
| 13 | GND | 47 | -DB (7) |
| 14 | GND | 48 | Parity L |
| 15 | GND | 49 | GND |
| 16 | GND | 50 | Termpwrđ |
| 17 | Termpwrđ | 51 | Termpwrđ |
| 18 | Termpwrđ | 52 | Termpwrđ |
| 19 | GND | 53 | NC |
| 20 | GND | 54 | GND |
| 21 | GND | 55 | -ATTN |
| 22 | GND | 56 | GND |
| 23 | GND | 57 | -BSY |
| 24 | GND | 58 | -ACK |
| 25 | GND | 59 | -RST |
| 26 | GND | 60 | -MSG |
| 27 | GND | 61 | -SEL |
| 28 | GND | 62 | -CD |
| 29 | GND | 63 | -REQ |
| 30 | GND | 64 | -IO |
| 31 | GND | 65 | -DB (8) |
| 32 | GND | 66 | -DB (9) |
| 33 | GND | 67 | -DB (10) |
| 34 | GND | 68 | -DB (11) |

2-9 Installing Software Drivers

After all the hardware has been installed, you must first install the operating system and then the software drivers. The necessary drivers are all included on the Supermicro CD that came packaged with your motherboard. After inserting this CD into your CDROM drive, the display shown in Figure 2-6 should appear. (If this display does not appear, click on the My Computer icon and then on the icon representing your CDROM drive. Finally, double click on the S "Setup" icon.)

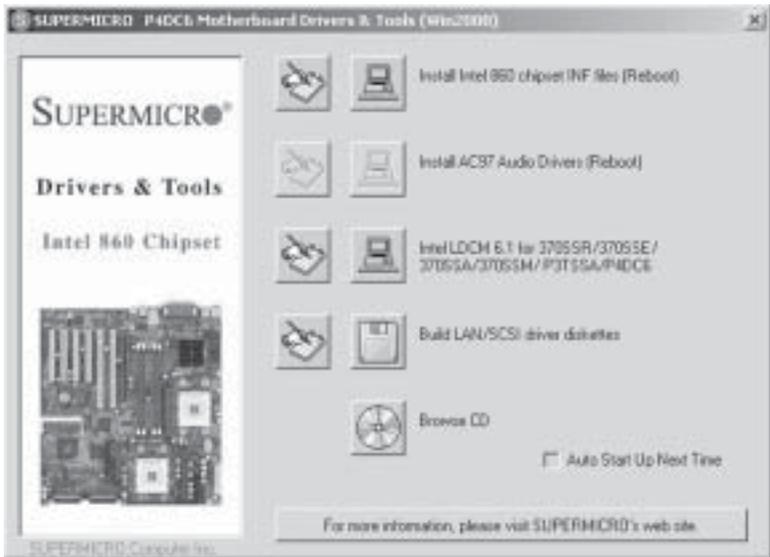


Figure 2-6. Driver/Tool Installation Display Screen

Click the icons showing a hand writing on paper to view the readme files for each item. Click the tabs to the right of these *in order from top to bottom* to install each item one at a time. **After installing each item, you must reboot the system before moving on to the next item on the list.** You should install everything here except for the SUPER Doctor utility, which is optional. The Security and Graphics Drivers support multiple languages. Click the arrows to pull down a menu of choices. The bottom icon with a CD on it allows you to view the entire contents of the CD.

Note: The memory size reported in the device manager may be less than expected because some is used by the onboard graphics. Higher screen resolutions will take up more of this memory.

Notes

Chapter 3

Troubleshooting

3-1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the "Technical Support Procedures" and/or "Returning Merchandise for Service" section(s) in this chapter. **Note: Always disconnect the power cord before adding, changing or installing any hardware components.**

Before Power On

1. Make sure no short circuits exist between the motherboard and the chassis.
2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.
3. Remove all add-on cards.
4. Install a CPU (making sure it is fully seated) and connect the chassis speaker and the power LED to the motherboard. (Check all jumper settings as well.)

No Power

1. Make sure no short circuits exist between the motherboard and the chassis.
2. Verify that all jumpers are set to their default positions.
3. Check that the 115v/230v switch on the power supply is properly set.
4. Turn the power switch on and off to test the system.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~3vDC. If it does not, replace it with a new one.

No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix C for details on beep codes.

NOTE:

If you are a system integrator, VAR or OEM, a POST diagnostics card is recommended. For I/O port 80h codes, refer to Appendix B.

Memory Errors

1. Make sure the RIMM modules are properly and fully installed for the amount of memory desired and RAMBUS terminators are installed in any unused channel.
2. Determine if different speeds of RIMMs have been installed and verify that the BIOS setup is configured for the fastest speed of memory used. It is recommended that all RIMMs in the system have the same speed.
3. Make sure you are using PC600 or PC800 compliant RDRAM.
4. Check for bad RIMM modules or slots by swapping modules among slots and noting the results.
5. Make sure all memory modules are fully seated in their slots.
6. All RDRAM must be of the same speed (e.g. PC600 or PC800). Additionally, the size of the memory bank sticks (e.g. 256 MB) must be the same in any given memory channel.

3-2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, note that as a mainboard manufacturer, Supermicro does not sell directly to end-users, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please go through the 'Troubleshooting Procedures' and 'Frequently Asked Question' (FAQ) sections in this chapter or see the FAQs on our web site (<http://www.supermicro.com/techsupport.htm>) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our web site at:
<http://www.supermicro.com/techsupport/download.htm>.

Note: Not all types and versions of BIOS can be flashed, depending on the modifications to the boot block code.

3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
 - Motherboard model and PCB revision number
 - BIOS release date/version (this can be seen on the initial display when your system first boots up)
 - System configurationA Technical Support form is provided on the Supermicro web site at: http://www.supermicro.com/techsupport/contact_support.htm.
4. Distributors: For immediate assistance, please have your account number ready when placing a call to our technical support department. We can be reached by e-mail at support@supermicro.com or by fax at (408) 503-8019.

3-3 Frequently Asked Questions

Question: What are the various types of memory that the P4DC6 motherboard can support?

Answer: The P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II has four 184-pin RIMM slots that support up to 2 GB of RDRAM. Please refer to Chapter 2 for additional information. Note: Check the Supermicro web site for recommended memory modules: http://www.supermicro.com/TECHSUPPORT/FAQs/Memory_vendors.htm

Question: How do I update my BIOS?

Answer: It is recommended that you **not** upgrade your BIOS if you are not experiencing problems with your system. Updated BIOS files are located on our web site at <http://www.supermicro.com>. Please check our BIOS warning message and the information on how to update your BIOS on our web site. Also, check the current BIOS revision and make sure it is newer than your current BIOS before downloading. Select your mainboard model and download the BIOS file to your computer. Unzip the BIOS update file and you will find the readme.txt (flash instructions), the awdf flash.exe (BIOS flash utility) and the BIOS image (xxxx.bin) files. Copy these files onto a bootable floppy and reboot your system. It is not necessary to set the BIOS boot block protection jumpers on the mainboard. At the DOS prompt upon rebooting, enter the command "awdf flash." Then type in the BIOS file that you want to update (xxxx.bin).

Question: After flashing the BIOS my system does not have video. How can I correct this?

Answer: If the system does not have video after flashing your new BIOS, it indicates that the flashing procedure failed. To remedy this, first clear CMOS per the instructions in this manual and retry the BIOS flashing procedure. If you still do not have video, please use the following **BIOS Recovery Procedure**. First, make sure the JPWAKE jumper is disabled. Then, turn your system off and place the floppy disk with the saved BIOS image file (see above FAQ) in drive A. Press and hold <Alt> and <F2> at the same time, then turn on the power keeping these keys pressed until your floppy drive starts reading. Your screen will remain blank until the BIOS program is done. If the system reboots correctly, then the recovery was successful. The BIOS Recovery Procedure will not update the boot block in your BIOS.

Question: What's in the CD that came with my mainboard?

Answer: The supplied compact disc has quite a few drivers and programs that will greatly enhance your system. We recommend that you review the CD and install the applications you need. Applications on the CD include Intel i860 chipset drivers for Windows plus security and audio drivers.

Question: Why can't I turn off the power using the momentary power on/off switch?

Answer: The instant power off function is controlled in BIOS by the "Power Button Mode" setting. When the "On/Off" feature is enabled, the mainboard will have instant off capabilities as long as the BIOS has control of the system. When either the "Standby" or the "Suspend" feature is enabled or when the BIOS is not in control such as during memory count (the first screen that appears when the system is turned on), the momentary On/Off switch must be held for more than four seconds to shut down the system. This feature is required to implement the ACPI features on the mainboard.

Question: I installed my microphone correctly but I can't record any sound. What should I do?

Answer: Go to <Start> <Programs> <Accessories> <Entertainment> and then <Volume Control>. Under the "Properties" tab, scroll down the list of devices in the menu and check the box beside "Microphone".

Question: How do I connect the ATA66/100 cable to my IDE device(s)?

Answer: The 80-wire/40-pin ATA66/100 IDE cable that came with your system has two connectors to support two drives. This special cable must be used to take advantage of the speed the ATA66/100 technology offers. Connect the blue connector to the onboard IDE header and the other connector(s) to your hard drive(s). Consult the documentation that came with your disk drive for details on actual jumper locations and settings.

Question: Why am I getting the message "Pre-Boot Agent Failed" on the top left of my screen during system boot-up?

Answer: This message will be displayed when the "Console Redirection" setting in BIOS is either 1) disabled or 2) enabled and there is no modem cable hooked up to the system. Note that this is not an error message, it is just to let users that use console redirection know if their connection is working. See the "Console Redirection" setting in the Advanced BIOS Settings section of BIOS for more information.

Table 3-1. Shared IRQs

P4DC6/P4DCE

| |
|--|
| PCI-32 #1 shares an IRQ with the onboard LAN and AGP |
| PCI-32 #2 shares an IRQ with AC97 and MC97 |
| PCI-32 #3 shares an IRQ with P64H and two PCI-64 slots |
| PCI-32 #4 shares an IRQ with USB |

P4DC6+/P4DCE+/P4DC6+II/P4DCE+II

| |
|--|
| PCI-32 #1 shares an IRQ with the onboard LAN |
| PCI-32 #2 shares an IRQ with AC97 and MC97 |
| PCI-32 #3 shares an IRQ with P64H and two PCI-64 slots |
| PCI-32 #4 shares an IRQ with USB |
| AGP has a dedicated IRQ |

3-4 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be shipped when service is complete.

The warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products. During the warranty period, contact your distributor first for any product problems.

Chapter 4

BIOS

4-1 Introduction

This chapter describes the AwardBIOS™ for the P4DC6/P4DC6+/P4DC6+II/P4DCE/P4DCE+/P4DCE+II. The Award ROM BIOS is stored in a Flash integrated circuit and can be easily upgraded using a floppy disk-based program.

Note: Due to periodic changes to the AwardBIOS™, some settings may have been added or deleted and might not yet be included in this manual. Please refer to the Support Manual Download area of the Supermicro web site <http://www.supermicro.com> for any changes to the BIOS that may not be reflected in this manual.

System BIOS

The BIOS is the "Basic Input Output System" used in all IBM® PC, XT™, AT®, and PS/2® compatible computers. The AwardBIOS™ Flash chip stores the system parameters, such type of disk drives, video displays, etc. in its CMOS memory (CMOS = Complementary Metal Oxide Semiconductor -- a battery-maintained RAM in the BIOS). The CMOS memory, usually referenced as just "CMOS", requires very little electrical power. When the computer is turned off, a back-up battery provides power to the BIOS Flash chip, enabling it to retain system parameters. Each time the computer is powered-on the computer is configured with the values stored in the BIOS RAM by the system BIOS, which gains control at boot-up.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing at the appropriate time during system boot (see below).

Starting the Setup Utility

Normally, the only visible POST (Power On Self Test) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Chipset and Power menus. Section 4-3 gives detailed descriptions of each parameter setting in the Setup utility.

4-2 Running Setup

**Optimal default settings are in bold text unless otherwise noted.*

The BIOS setup options described in this section are selected by choosing the appropriate text from the Main AwardBIOS™ Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options (see on next page).

When you first power on the computer, the AwardBIOS™ is immediately activated. While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing immediately after turning the system on, or
2. When the message shown below appears briefly at the bottom of the screen during the POST (Power On Self-Test), press the key to activate the Main Setup Menu:

Press to enter SETUP

4-3 Main BIOS Setup

All Main Setup options are described in this section. The Main BIOS Setup screen is displayed below.

Use the <Up/Down> arrow keys or the <Tab> key to move among the different settings in the above menu.

Press the <Esc> key to exit the CMOS Setup Menu and use the <Left> <Right> arrow keys to enter other categories of BIOS settings. The next section describes in detail how to navigate through the menus.

Main BIOS Setup Menu



Main Setup Features

Date/Time

Set the system date and time. Key in the correct information in the fields when the options of "mm:dd:yy" and "hh:mm:ss" appear in the screen. Press the <Enter> key to save the data.

Drive A/Drive B

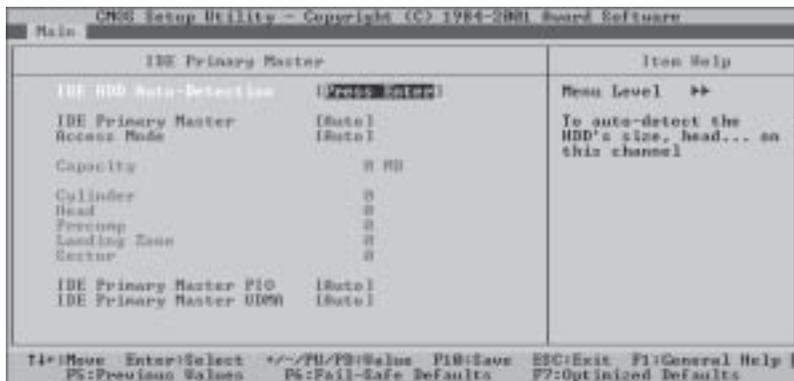
These options allow the user to set the type of floppy disk drive installed in the system. The settings are: "None", "360K, 5.25in", "1.2M, 5.25in", "720K, 3.5in", "1.44M, 3.5in" and "2.88M, 3.5in."

Swap Floppy Drive

These options allow the user to swap the names of floppy disk drives installed in the system, should there be two floppy disk drives installed on the main board. The settings are: "Disabled" and "Enabled." The default setting is "Disabled."

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

These options allow the user to set the parameters of the IDE Primary Master/Slave and IDE Secondary Master/Slave slots. Press the <Enter> key to activate the following sub-menu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the sub-menu are:



IDE HDD Auto-Detection

Press the <Enter> key to activate the "IDE HDD Auto-Detection" function to automatically detect the status of the IDE HDD installed in the system (such as the sizes of the hard drives).

IDE Primary Master

This option allows the user to determine the manner in which the AwardBIOS™ sets the settings for the IDE Primary Master Device. The settings are "None", "Auto" and "Manual."

Access Mode

This item determines the location through which the AwardBIOS™ access the IDE Primary Master Device. The settings are "CHS", "LBA", "Large" and "Auto".

IDE Primary Master PIO/IDE Primary Slave PIO/IDE Secondary Master PIO/IDE Secondary Slave PIO

This IDE PIO (Programmed Input/Output) field allows you to set a PIO mode (0-4) for the IDE Primary device: Mode 0 through Mode 4. Each increase in number indicates a corresponding increase in performance. The settings are "Mode 0", "Mode 1", "Mode 2", "Mode 3", "Mode 4" and "**Auto**."

IDE Primary Master UDMA/IDE Primary Slave UDMA IDE Secondary Master UDMA/IDE Secondary Slave UDMA

This option is available only when your IDE hard drive supports Ultra DMA/33 and the operating environment also includes a DMA drive (Windows 95 OSR2 or a third-party IDE bus master driver). If your IDE hard drive and your system software both support Ultra DMA/33, select "Auto" to enable BIOS support. The settings are "**Auto**" and "Disabled."

Video

This option allows the user to select the setting for the default video device. The settings are "**EGA/VGA**", "CGA 40", "CGA 80" and "MONO."

HaltOn

This option allows the user to select the situation in which you want the BIOS to stop the POST process and notify you about the status of the system. The settings are "All Errors", "No Errors", "**All but Keyboard**", "All but Diskette", and "All but Disk/Key."

Base Memory

This feature displays the amount of conventional memory detected during boot-up. The default setting for this option is "**640K**."

Extended Memory

This feature displays the amount of extended memory detected during boot-up. The default setting for this option is "**65535K**."

Total Memory

This feature displays the amount of total memory available in the system. The default setting for this option is "1024K."

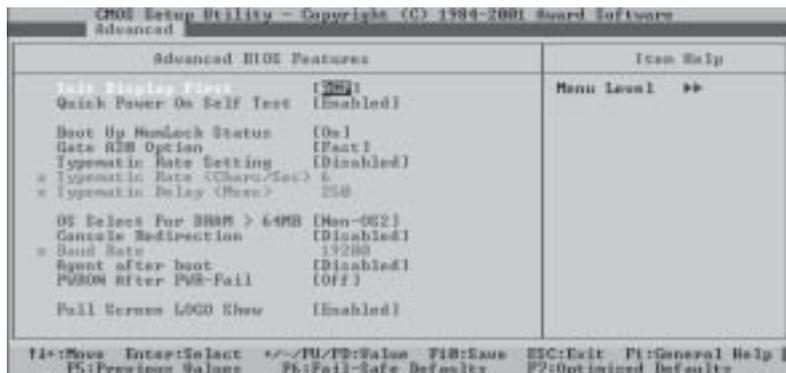
4-4 Advanced BIOS Setup

Choose "Advanced BIOS Setup" from the AwardBIOS™ Setup Utility main menu with the <Left> <Right> arrow keys. You should see the display below. Select one of the items in the left frame of the screen to go to the sub screen for that item. Advanced BIOS Setup options are displayed by highlighting the option using the arrow keys. All Advanced BIOS Setup options are described in this section.



4-4.1 Advanced BIOS Features

When the required item in the "Advanced BIOS Features" is highlighted, press the <Enter> key to activate the selection, as shown below:



Init Display First

This option allows the user to determine which device will be first displayed when the system boots up -- whether it is the device installed in the PCI slot or the device installed in the AGP slot. The settings are "PCI slot" and "**AGP.**"

Quick Power-On Self Test

If enabled, this feature will speed up the POST (Power On Self Test) after the computer is switched on. The settings are "Enabled" and "**Disabled.**" If "Disabled", the POST routine will remain in the normal speed.

Boot Up NumLock Status

If enabled, this feature sets the power on state for NumLock. The settings are "**On**" and "Off."

Gate A20 Option

This option allows the user to determine whether the chipset or the keyboard controller should have control over Gate A20. The settings are "Normal" or "**Fast.**" If set to "Normal", a pin in the keyboard controller controls Gate A20. If "**Fast**" is selected, the chipset will have control over Gate A20.

Typematic Rate Setting

Continual pressing of a key repeats that character onscreen at a rate predetermined by the keyboard controller. The key stroke repeating rate is called the "typematic rate." If "Enabled", this option allows the user to set the typematic rate of the system. If "**Disabled**", the user will not be allowed to set the typematic rate and "Typematic Rate" and "Typematic Delay" will not be displayed. The settings are "Enabled" and "**Disabled.**"

Typematic Rate (Chars/Sec)

If enabled, this option allows the user to set the number of times a key stroke repeats itself in a second when the key is held down. The settings are "**6**", "8", "10", "12", "15", "20", "24" and "30."

Typematic Delay

This option sets the delay time after a key is held down before it begins to repeat the keystroke. The settings are: "**250**", "500", "750" and "1000."

OS Select For DRAM > 64MB

This option allows the user to select the operating system that requires a DRAM memory greater than 64MB in order to function properly. The settings are "OS2" and "**Non OS2.**"

Console Redirection

This option allows the user to redirect the console (display) through the COM port when enabled. This is useful when two computers are hooked up to a single monitor. When enabled, the user can toggle the display from one system to the other using the <Tab> key. The function keys are disabled when the Console Redirection setting is enabled. The settings are "Enabled" and "**Disabled.**"

Agent After Boot

This option allows the user to keep the agent running after OS boot when Enabled. The settings are "Enabled" and "**Disabled.**"

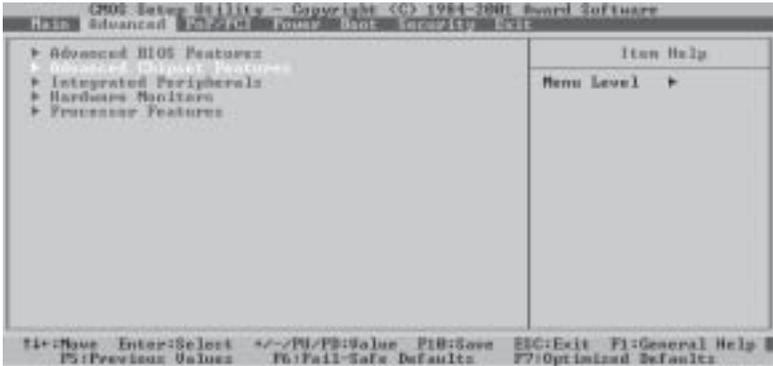
Power On after PWR Fail

This option allows the user to determine if the system's power will be automatically turned "on" or remains "off" after a power failure. The settings are "On", "**Off**" and "Former Status."

Full Screen Logo Show

This option controls whether the logo is displayed when booting up. The settings are "**Enabled**" and "Disabled."

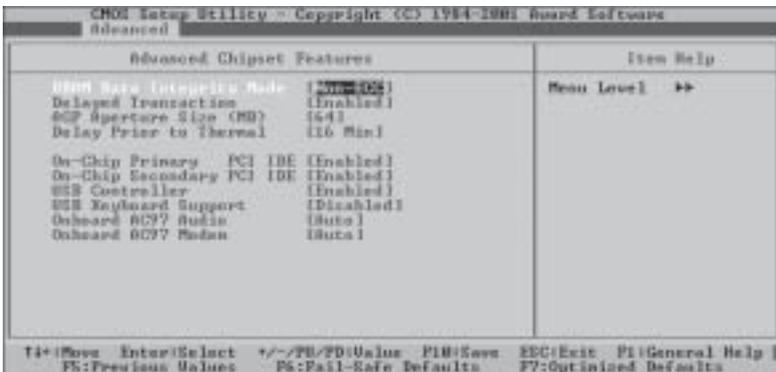
4-4.2 Advanced Chipset Features



This section documents the functions that the AwardBIOS provides the user with in configuring the system based upon the special features offered by the Intel 860 chipset. The Intel 860 chipset manages the operations of the major components of the board, such as the bus speed of the CPU, access to the memory and the communications between the PCI slots and the CPU. Normally, the default settings for the Advanced Chipset Features listed in this section are pre-configured by the manufacturer for optimal system performance. It is not recommended that the user alter the default settings.

This section is provided as an emergency measure for the user to restore the functions of the system when the critical data stored in the BIOS is lost.

When the item in "Advanced Chipset Features" is highlighted, press <Enter> to activate the screen below:



Note: "DRAM" refers to RAMBUS Dynamic RAM

DRAM Data Integrity Mode

This section documents the AwardBIOS management of the bus links between the host and bridge devices. The settings are "ECC" and "**Non-ECC.**"

Delayed Transaction

If "Enabled", this option allows the user to activate the BIOS support to allow the system to complete delayed transactions. The settings are "**Enabled**" or "Disabled."

AGP Aperture Size <MB>

This section determines the amount of RAM dedicated to AGP data. The settings are: "4", "8", "16", "32", "**64**", "128" and "256."

Delay Prior to Thermal

This setting determines the time in minutes between the thermal limit being exceeded and the system automatically shutting down. The settings are: "4 min", "8 min", "**16 min**", and "32 min."

On-Chip Primary PCI IDE

If "Enabled", this option allows the user to activate the BIOS to support the On-Chip Primary PCI IDE. The settings are "Disabled" and "**Enabled.**"

On-Chip Secondary PCI IDE

If "Enabled", this option allows the user to activate the to BIOS support the On-Chip Secondary PCI IDE. The settings are "Disabled" and "**Enabled.**"

USB Controller

If "Enabled", this option allows the user to activate the BIOS to support the USB Controller. The settings are "Disabled" and "**Enabled.**"

USB Keyboard Support

If "Enabled", this option allows the user to activate the BIOS to support a USB keyboard at boot-up. The settings are "**Disabled**" and "Enabled."

Onboard AC97 Audio

This option allows you to enable or disable the onboard AC97 audio. The settings are "Auto" and "Disabled".

Onboard AC97 Modem

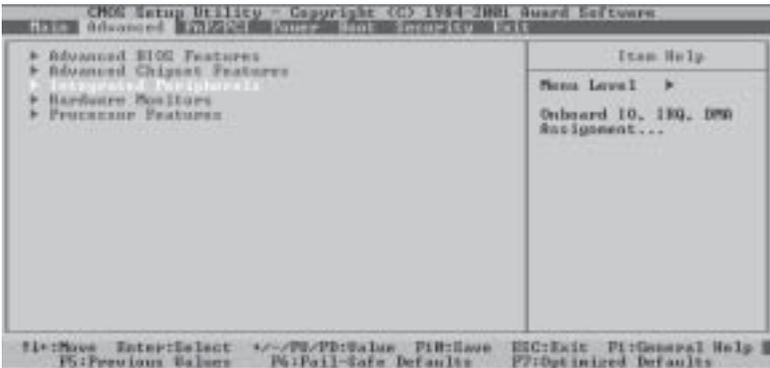
This option allows you to enable or disable the onboard AC97 modem. The settings are "Auto" and "Disabled".

Delay Prior to Thermal

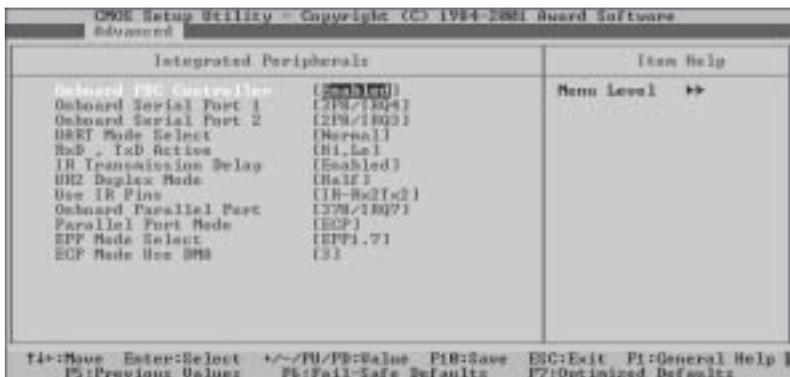
This section determines the time in minutes between the thermal limit being exceeded and the system automatically shutting down. The settings are: "4 min", "8 min", "16 min", and "32 min."

4-4.3 Integrated Peripherals

Under the "Advanced" section of the BIOS setup, select "Integrated Peripherals", as shown below.



With "Integrated Peripherals" is highlighted, press the <Enter> key to activate the selection, as shown below.



When the above menu appears, select the items using the <Up> <Down> arrow keys then press the <Enter> key to display the selected option.

Onboard FDC Controller

Select "Enabled" if your system has a floppy disk controller (FDC) installed on the mainboard and you wish to use it. The settings are "**Enabled**" and "Disabled."

Onboard Serial Port 1

This option allows the user to set the address and the corresponding IRQ for Serial Port 1. The settings are "Disabled", "**3F8/IRQ4**", "2F8/IRQ3", "3E8/IRQ4", "2E8/IRQ3" and "Auto."

Onboard Serial Port 2

This option allows the user to set the address and the corresponding IRQ for Serial Port 2. The settings are "Disabled", "3F8/IRQ4", "**2F8/IRQ3**", "3E8/IRQ4", "2E8/IRQ3" and "Auto."

UART Mode Select

This option allows the user to select the UART mode for the BIOS. The settings are "IrDA", "ASKIR" and "**Normal**."

RxD, TxD Active

This option allows the user to set the "RxD, TxD Active" functions. The settings are "Hi, Hi", "**Hi, Lo**", "Lo, Hi", and "Lo, Lo."

IR Transmission Delay

If "Enabled", the transmission of IR (Infrared) signals will be delayed. The settings are "**Enabled**" and "Disabled."

UR2 Duplex Mode

This allows you to set the mode for the UR2 Duplex Mode. The settings are "Full" and "**Half**."

Use IR Pins

This item sets the mode for Use IR Pins. The settings are "RxD2", "TxD2" and "**IR-Rx2Tx2**."

Onboard Parallel Port

This option allows the user to set the address and the corresponding IRQ for the onboard Parallel port. The settings are "Disabled", "**378/IRQ7**", "278/IRQ5" and "3BC/IRQ7."

Parallel Port Mode

This option set the mode for the onboard Parallel port. The settings are "**SPP**", "EPP", "ECP" and "ECP+EPP."

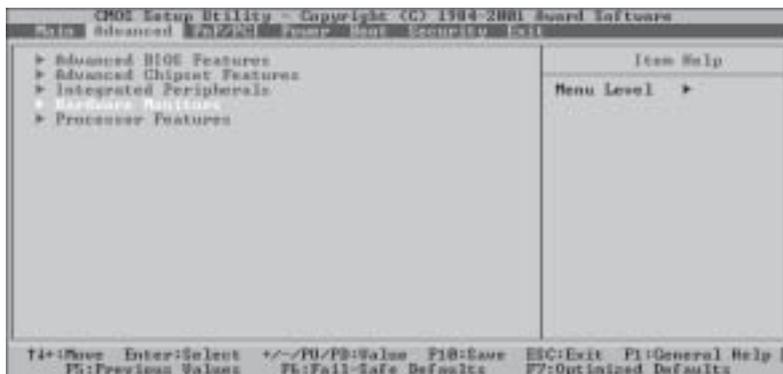
EPP Mode Select

This option allows the user to select the EPP mode. The settings are "EPP 1.9" and "**EPP 1.7**."

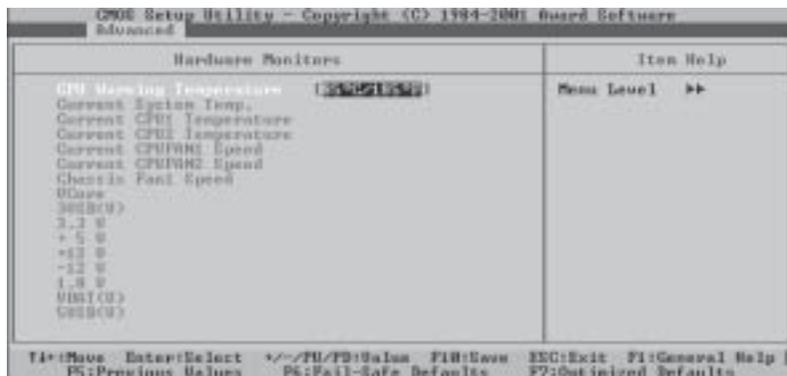
EPP Mode Use DMA

This option allows you to select which DMA is assigned to EPP. The settings are "1" and "**3**".

4-4.4 Hardware Monitors



When the item "Hardware Monitors" is highlighted, press the <Enter> key to activate the Hardware Monitors sub-menu" (shown below).



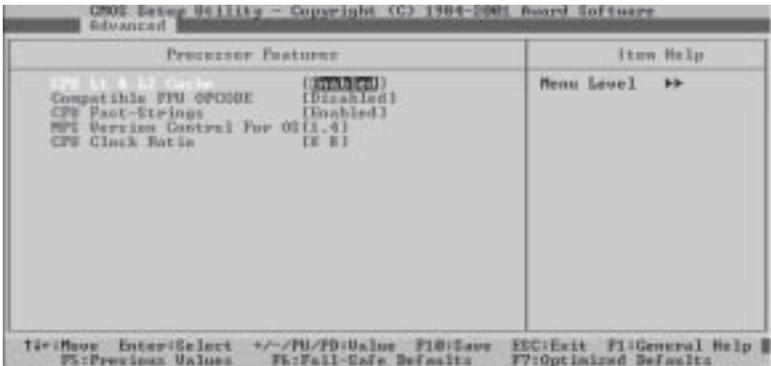
CPU Warning Temperatures

This item allows the user to set the CPU temperature threshold. When the CPU temperature reaches the threshold temperature set by the user, an alarm will be activated and a warning message will be displayed onscreen. The settings are "Disabled", "50°C/122°F", "53°C/127°F", "56°C/133°F", "60°C/140°F", "63°C/145°F", "66°C/151°F" and "70°C/158°F."

4-4.5 Processor Features



When the item "Processor Features" is highlighted, hit the <Enter> key to activate the sub-menu, which is shown below.



CPU L1 & L2 Cache

Set this option to "Enabled" to activate the function of the CPU L1 and L2 caches. The settings are "Disabled" and **Enabled**."

CPU L3 Cache

Set this option to "Enabled" to activate the function of the CPU L3 cache. The settings are "Disabled" and **Enabled**."

CPU Hyper-Threading

Set this option to "Enabled" to activate the hyper-threading function of the CPUs. Enabling the hyper-threading function makes each CPU appear as two to any programs that support it (you must have OS support also). The settings are "**Disabled**" and "Enabled."

MPS Version Control for OS

Set this option to "Enable" to activate the version of MPS control for the OS. The settings are "1.1" and "**1.4**".

CPU Clock Ratio

Use this option to set the clock ratio of the processor. The settings are "**x8**" "x9", "x10", "x11", "x12", "x13", "x14", "x15", "x16", "x17", "x18", "x19", "x20", "x21", "x22" and "x23".

4-5 PnP/PCI Configurations

When the Item "PnP/PCI" is highlighted on the main menu bar, press the <Enter> key to activate the following screen:



PCI Slot 1 IRQ Select

Use this setting to assign the IRQ# for PCI slot 1. The settings are "**Auto**", "3", "4", "5", "7", "9", "10" and "11."

PCI Slot 2 IRQ Select

Use this setting to assign the IRQ# for PCI slot 2. The settings are "**Auto**", "3", "4", "5", "7", "9", "10" and "11."

PCI Slot 3/PCI64 Slot 1, 2

Use this setting to assign the IRQ# for PCI slot 3 and the two 64-bit PCI slots. The settings are "**Auto**", "3", "4", "5", "7", "9", "10" and "11."

PCI Slot 4 IRQ Select

Use this setting to assign the IRQ# for PCI slot 4. The settings are "**Auto**", "3", "4", "5", "7", "9", "10". and "11."

Reset Configuration Data

If you have installed a new add-on device and this add-on device has caused conflicts in system configuration and has resulted in system boot-up failure, then, select "Enabled" to reset "Extended System Configuration Data" (ESCD) for the OS to reboot the system. The settings are "Enabled" and "**Disabled**."

Resources Controlled By

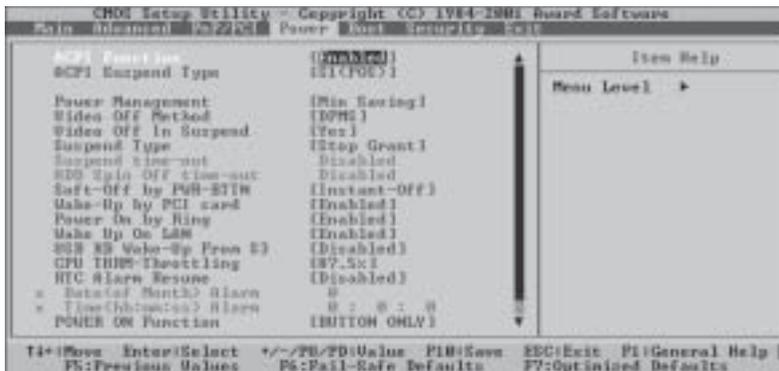
The Award BIOS can automatically configure all the boot devices and all Plug and Play compatible devices. However, if this item is set to "Auto (ESCD)", the user is not able to set the IRQ DMA and memory address, since the Award BIOS will automatically assign the values to these fields. The settings are "**AUTO (ESCD)**" and "Manual."

PCI/VGA Palette Snoop

To obtain optimum system performance, this item has been pre-set to "Disabled" by the manufacturer. The settings are "Enabled" and "**Disabled**."

4-6 Power Management

When the Item "Power" is highlighted on the main menu bar, press the <Enter> key to activate the following screen:



ACPI Function

This item allows you to enable and disable the Advanced Configuration and Power Management (ACPI). The settings are **"Enabled"** and **"Disabled"**.

ACPI Suspend Type

This item allows the user to determine the ACPI Suspend type. The settings are **"S1 <POS>"**, and **"S3 <STR>"**.

Power Management

This option sets the degree of power saving for the system, especially for HDD Power Down, Doze Mode and Suspend Mode. The settings are **"User Define"**, **"Min Saving"**, and **"Max. Saving"**.

Video Off Method

This item determines the manner in which the monitor is turned off. The settings are **"Blank Screen"**, **"V/H SYNC+Blank"** and **"DPMS"**. Select **"V/H SYNC+Blank"** to turn off the vertical and horizontal synchronization ports and the monitor. Select **"Blank Screen"** to turn off the video buffer and the monitor. Select **"DPMS"** to initiate display power management signals.

Video Off in Suspend

This item allows the AwardBIOS to turn off the video signal in suspend mode. The settings are: "No" and "**Yes.**"

Suspend Type

This item sets the system suspend type. The settings are "**Stop Grant**" and "PwrOn Suspend."

Soft-off by PWR-BTTN

This item determines the system's "Soft-off" mode when the user presses the power-button. The settings are "**Instant-off**" and "Delay 4 Sec."

Wake Up by PCI Card

This item allows the AwardBIOS to enable system wake up from a PCI card signal. The settings are "**Enabled**" and "Disabled."

Power On by Ring

This item allows the AwardBIOS to enable system wake up from a ring signal. The settings are "**Enabled**" and "Disabled."

Wake Up on LAN

This item allows the AwardBIOS to enable system wake up from a local area network (LAN) signal. The settings are: "**Enabled**" and "Disabled."

USB KB Wake Up from S3

This item allows the AwardBIOS to enable an USB keyboard wake up from a suspend to RAM (S3). The settings are: "Enabled" and "**Disabled.**"

CPU THRM Throttling

This item allows the AwardBIOS to enable system CPU percentage speed throttling upon reaching a user-defined temperature setting. The settings are: "**87.5%**", "62.5%", "50.0%", "37.5%", "25.0%", and "12.5%."

RTC Alarm Resume

This item allows the AwardBIOS to enable system wake up from an alarm signal based on the real-time clock. The settings are: "Enabled" and "**Disabled**."

Upon scrolling the window downward using the Down <Arrow>, the remaining power options become visible as shown below:



Power On Function

This option allows the user to determine the method by which the system activates the power on function. The settings are "Password", "Hot KEY", "Mouse Left", "Mouse Right", "Any Key", "**BUTTON ONLY**" and "Keyboard 98."

KB Power On Password

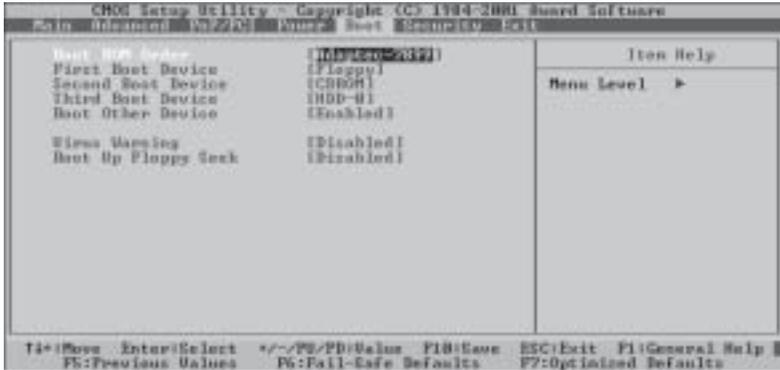
This item allows the user to set the password to activate the power on function through the keyboard. Press the <Enter> key to **enter the password**.

Hot Key Power On

This option allows the user to select the hot key to activate the power on function. The settings are "**Ctrl-F1**", "Ctrl-F2", "Ctrl-F3", "Ctrl-F4", "Ctrl-F5", "Ctrl-F6", "Ctrl-F7", and "Ctrl -8."

4-7 Boot-up Devices

When the Item "Boot" is highlighted on the main menu bar, press the <Enter> key to activate the following screen:



Award BIOS attempts to load the operating system from devices specified by the user in a user-specified sequence.

Boot ROM Order

This option determines the boot ROM order. The settings are "Adaptec-7899" and "Any PCI Slot".

First Boot Device

This item allows the user to select the device as the first boot-up device. The settings are "Floppy", "LS120", "HDD-0", "SCSI", "CDROM", "HDD-1", "HDD-2" and "HDD-3."

Second Boot Device

This item allows the user to select the device as the second boot-up device. The settings are The settings are "Floppy", "LS120", "HDD-0", "SCSI", "CDROM", "HDD-1", "HDD-2" and "HDD-3."

Third Boot Device

This item allows the user to set the device as the third boot-up device. The settings are The settings are "Floppy", "LS120", "**HDD-0**", "SCSI", "CDROM", "HDD-1", "HDD-2" and "HDD-3."

Boot Other Device

If "Enabled", this option enables the BIOS to load the OS from another device rather than the ones that have been specified as the first, second and third boot up devices. The settings are "**Enabled**" and "Disabled."

Virus Warning

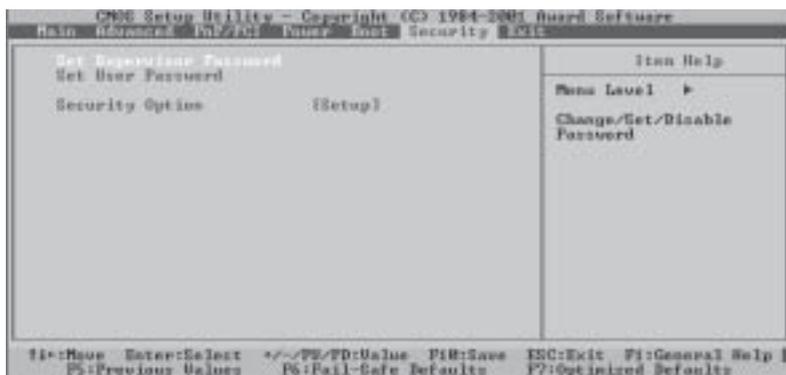
This item allows the user to choose the VIRUS Warning feature for the IDE Hard Drive Disk boot sector protection. If this function is enabled and if someone attempts to write data into this area, the BIOS will then display a warning message and an audible alarm will be activated. The settings are "Enabled" and "**Disabled**."

Boot Up Floppy Seek

Set this option to "Enabled" to allow the BIOS to test floppy drives to determine whether they have 40 or 80 tracks. The settings are "**Enabled**" or "Disabled."

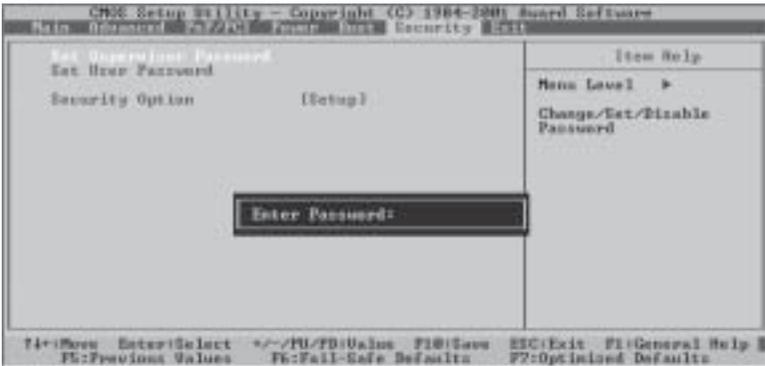
4-8 Security Setup

When the Item "Security" is highlighted on the main menu bar, press the <Enter> key to activate the following screen:



Set Supervisor's Password

When the item "Set Supervisor Password" is highlighted on the above screen, press the <Enter> key to activate the following screen. When prompted, type a password in the dialogue box to establish or to change the Supervisor's Password.



Set User's Password

When the item "Set User's Password" is highlighted on the Security Main Menu, press the <Enter> key to activate the password screen. When prompted, type a password in the dialogue box to establish or to change the User's Password.

Security Option

When the item "Security Option" is highlighted on the Security Main Menu, press the <Enter> key to activate the Security Option screen. This option allows the user to determine if the password is required every time the system boots up or only when you enter the CMOS setup. The settings are "System" and "Setup."

4-9 Exit Setup

Select "Exit" from the "Main Menu" bar and press the <Enter> key to activate the following screen:



Save & Exit Setup

If you highlight the letter "Y" and press <Enter> with the "Save & Exit Setup" field highlighted, you will save the changes you've made in the BIOS program (CMOS) and then exit setup. Your system should then continue with the boot-up procedure. The options are "Y", and "N."

Exit without Saving

If you highlight the letter "Y" and press <Enter> with the "Exit without Saving" field highlighted, any of the changes you've made in CMOS will not be saved when you exit the CMOS Setup. Your system should then continue with the boot-up procedure.

Load Fail-Safe Defaults

When the item "Load Fail Safe Defaults" is highlighted, press the <Enter> key to activate the dialogue box. Press the "Y" key to load the BIOS Fail-Safe default values for the most stable system operation. The settings are "Y" and "N."

Load Optimal Defaults

When the item "Load Optimal Defaults" is highlighted, press the <Enter> key to activate the dialogue box. Then press the "Y" key to load the default values that will provide the optimal system performance. The settings are "Yes" and "**No.**"

Notes

Appendix A

AwardBIOS POST Messages

During the Power-On Self-Test (POST), the BIOS will check for errors. If an error is found and a correction is needed, the BIOS will activate an alarm or display a message.

If a message is displayed, it will be accompanied by the following:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep Codes

Currently, there are two kinds of beep codes used in AwardBIOS. One code indicates that a video error has occurred and that the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that a Rambus error has occurred. This beep code consists of a single long beep that sounds repeatedly.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

CMOSBATTERYHASFAILED

The CMOS battery is no longer functional. It should be replaced.

CMOSCHECKSUMERROR

The CMOS checksum is incorrect. This can indicate that CMOS has been corrupted. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISKBOOTFAILURE,INSERTSYSTEMDISKANDPRESSEENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain the proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also make sure the disk has been formatted as a boot device. Then reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

The type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

The display switch on the motherboard can be set to either monochrome or color. This indicates that the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper or enter Setup and change the VIDEO selection.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

The hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize the controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during boot up.

If you are intentionally configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

OFFENDINGADDRESSNOTFOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDINGSEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

FLOPPY DISK(S) fail (80) → Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40) → Floppy Type mismatch.

Hard Disk(s) fail (80) → HDD reset failed

Hard Disk(s) fail (40) → HDD controller diagnostics failed.

Hard Disk(s) fail (20) → HDD initialization error.

Hard Disk(s) fail (10) → Unable to recalibrate fixed disk.

Hard Disk(s) fail (08) → Sector Verify failed.

Keyboard is locked out - Unlock the key.

BIOS detect the keyboard is locked. P17 of the keyboard controller is pulled low.

Keyboard error or no keyboard present.

Cannot initialize the keyboard. Make sure that the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop.

System will repeat POST procedure infinitely while the P15 of keyboard controller is pulled low. This is also used for M/B burn in testing.

BIOS ROM checksum error - System halted.

The checksum of ROM address F0000H-FFFFFFH is bad.

Memory test fail..

BIOS reports the a memory test fail if the onboard memory has an error.

Appendix B

AwardBIOS POST Codes

This section lists the POST (Power On Self Testing) Codes for the Award BIOS.

| POST (hex) | Description |
|------------|--|
| CFh | Test CMOS R/W functionality. |
| C0h | Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers |
| C1h | Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below) |
| C3h | Expand compressed BIOS code to DRAM |
| C5h | Call chipset hook to copy BIOS back to E000 & F000 shadow RAM. |
| 0h1 | Expand the Xgroup codes locating in physical address 1000:0 |
| 02h | Reserved |
| 03h | Initial Superio_Early_Init switch. |
| 04h | Reserved |
| 05h | 1. Blank out screen 2. Clear CMOS error flag |
| 06h | Reserved |
| 07h | 1. Clear 8042 interface 2. Initialize 8042 self-test |
| 08h | 1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface. |
| 09h | Reserved |
| 0Ah | <ul style="list-style-type: none"> ● Disable PS/2 mouse interface (optional). ● Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). ● Reset keyboard for Winbond 977 series Super I/O chips. |
| 0Bh | Reserved |
| 0Ch | Reserved |
| 0Dh | Reserved |
| 0Eh | Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker. |

Debuggig LED Encoding

| Post Code | Encoded LED | Task |
|-----------|-------------|----------------------------|
| C1h | 001b | Memory Detection |
| 05h | 010b | BIOS Shadowing |
| 07h | 011b | KBC Initialization |
| 0Eh | 100b | Shadow RAM test |
| 14h | 101b | Chipset defaults loaded |
| 26h | 110b | Clock generator configured |
| 2Bh | 111b | Video initialization |
| 52h | 000b | Just clear LEDs |

| POST (hex) | Description |
|------------|-------------|
|------------|-------------|

| | |
|-----|--|
| 0Fh | Reserved |
| 10h | Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support. |
| 11h | Reserved |
| 12h | Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override. |
| 13h | Reserved |
| 14h | Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers. |
| 15h | Reserved |
| 16h | Initial Early_Init_Onboard_Generator switch. |
| 17h | Reserved |
| 18h | Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686). |
| 19h | Reserved |
| 1Ah | Reserved |
| 1Bh | Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR. |
| 1Ch | Reserved |
| 1Dh | Initial EARLY_PM_INIT switch. |
| 1Eh | Reserved |
| 1Fh | Load keyboard matrix (notebook platform) |
| 20h | Reserved |
| 21h | HPM initialization (notebook platform) |
| 22h | Reserved |
| 23h | <ol style="list-style-type: none"> 1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: <ul style="list-style-type: none"> -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0. |
| 24h | Reserved |
| 25h | Reserved |
| 26h | Reserved |
| 27h | Initialize INT 09 buffer |
| 28h | Reserved |
| 29h | <ul style="list-style-type: none"> ● Program CPU internal MTRR (P6 & PII) for 0-640K memory address. ● Initialize the APIC for Pentium class CPU. ● Program early chipset according to CMOS setup. Example: onboard IDE controller. ● Measure CPU speed. ● Invoke video BIOS. |
| 2Ah | Reserved |
| 2Bh | Reserved |
| 2Ch | Reserved |

| POST (hex) | Description |
|------------|--|
| 2Dh | 1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed |
| 2Eh | Reserved |
| 2Fh | Reserved |
| 30h | Reserved |
| 31h | Reserved |
| 32h | Reserved |
| 33h | Reset keyboard except Winbond 977 series Super I/O chips. |
| 34h | Reserved |
| 35h | Reserved |
| 36h | Reserved |
| 37h | Reserved |
| 38h | Reserved |
| 39h | Reserved |
| 3Ah | Reserved |
| 3Bh | Reserved |
| 3Ch | Test 8254 |
| 3Dh | Reserved |
| 3Eh | Test 8259 interrupt mask bits for channel 1. |
| 3Fh | Reserved |
| 40h | Test 8259 interrupt mask bits for channel 2. |
| 41h | Reserved |
| 42h | Reserved |
| 43h | Test 8259 functionality. |
| 44h | Reserved |
| 45h | Reserved |
| 46h | Reserved |
| 47h | Initialize EISA slot |
| 48h | Reserved |
| 49h | 1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU. |
| 4Ah | Reserved |
| 4Bh | Reserved |
| 4Ch | Reserved |
| 4Dh | Reserved |
| 4Eh | 1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical. |
| 4Fh | Reserved |
| 50h | Initialize USB |
| 51h | Reserved |
| 52h | Test all memory (clear all extended memory to 0) |
| 53h | Reserved |
| 54h | Reserved |
| 55h | Display number of processors (multi-processor platform) |
| 56h | Reserved |
| 57h | 1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device. |

| POST (hex) | Description |
|------------|--|
| 58h | Reserved |
| 59h | Initialize the combined Trend Anti-Virus code. |
| 5Ah | Reserved |
| 5Bh | (Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional) |
| 5Ch | Reserved |
| 5Dh | 1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch. |
| 5Eh | Reserved |
| 5Fh | Reserved |
| 60h | Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility. |
| 61h | Reserved |
| 62h | Reserved |
| 63h | Reserved |
| 64h | Reserved |
| 65h | Initialize PS/2 Mouse |
| 66h | Reserved |
| 67h | Prepare memory size information for function call: INT 15h ax=E820h |
| 68h | Reserved |
| 69h | Turn on L2 cache |
| 6Ah | Reserved |
| 6Bh | Program chipset registers according to items described in Setup & Auto-configuration table. |
| 6Ch | Reserved |
| 6Dh | 1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO". |
| 6Eh | Reserved |
| 6Fh | 1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware. |
| 70h | Reserved |
| 71h | Reserved |
| 72h | Reserved |
| 73h | (Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed |
| 74h | Reserved |
| 75h | Detect & install all IDE devices: HDD, LS120, ZIP, CDROM..... |
| 76h | Reserved |
| 77h | Detect serial ports & parallel ports. |
| 78h | Reserved |
| 79h | Reserved |
| 7Ah | Detect & install co-processor |
| 7Bh | Reserved |
| 7Ch | Reserved |
| 7Dh | Reserved |
| 7Eh | Reserved |
| 7Fh | 1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: •Clear EPA or customization logo. |

| POST (hex) | Description |
|------------|--|
| 80h | Reserved |
| 81h | Reserved |
| 82h | <ol style="list-style-type: none"> 1. Call chipset power management hook. 2. Recover the text font used by EPA logo (not for full screen logo) 3. If password is set, ask for password. |
| 83h | Save all data in stack back to CMOS |
| 84h | Initialize ISA PnP boot devices |
| 85h | <ol style="list-style-type: none"> 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs. |
| 86h | Reserved |
| 87h | Reserved |
| 88h | Reserved |
| 89h | Reserved |
| 90h | Reserved |
| 91h | Reserved |
| 92h | Reserved |
| 93h | Read HDD boot sector information for Trend Anti-Virus code |
| 94h | <ol style="list-style-type: none"> 1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining |
| 95h | <ol style="list-style-type: none"> 1. Program daylight saving 2. Update keyboard LED & typematic rate |
| 96h | <ol style="list-style-type: none"> 1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table. |
| FFh | Boot attempt (INT 19h) |

Notes

Appendix C

AwardBIOS Error Beep Codes

This section lists the Award BIOS Error Beep Codes.

| Beep Code | Error Message Description |
|------------------|----------------------------------|
| 1 short beep | System boot. |
| 2 short beeps | Incorrect CMOS setting. |
| 1 long + 1 short | DRAM error. |
| 1 long + 2 short | VGA error. |
| 1 long + 3 short | Keyboard error. |
| 1 long + 9 short | ROM error. |
| Long beeps | Memory module error. |
| High beeps | Power error. |

Notes