NCCH-DLE

Motherboard

E1975

First Edition V1
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Notices

Federal Communications Commission Statement

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

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

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

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

Canadian Department of Communications Statement

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

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

Safety information

Electrical safety

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

Operation safety

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

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This manual contains the following parts:

- **Chapter 1: Product introduction**

  This chapter describes the features of the motherboard and the new technologies it supports.

- **Chapter 2: Hardware information**

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

- **Chapter 3: Powering up**

  This chapter describes the power up sequence and ways of shutting down the system.

- **Chapter 4: BIOS setup**

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

- **Chapter 5: Driver installation**

  This chapter provides instructions for creating and configuring RAID, and installing the necessary drivers for different system components.

- **Appendix: Reference information**

  This appendix includes additional information that you may refer to when configuring the motherboard.

Where to find more information

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

1. **ASUS websites**

   The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

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

Conventions used in this guide

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

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

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

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1+Key2+Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl+Alt+D>
Command	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: **`format A:/S`**

NCCH-DLE specifications summary

CPU	Support for dual Intel® Xeon™ Processors up to 3.6 GHz with Hyper-Threading Technology 1 MB or 2 MB L2 cache (for 800 MHz) 512 KB L2 chache (for 533 MHz)
Chipset	Northbridge: Intel® E82875P Memory Controller Hub (MCH) Southbridge: Intel® 6300ESB I/O Controller Hub (ICH)
Front Side Bus	800/533 MHz
Memory	Dual-channel memory architecture 4 x 184-pin DDR DIMM sockets for up to 4GB memory Supports PC3200/PC2700/PC2100 unbuffered ECC or non-ECC DDR DIMMs
Expansion slots	1 x AGP Pro 8X/4X 2 x 3.3V/64-bit/66MHz PCI-X 2 x 5V/32-bit/33MHz PCI
Storage	Supported by Southbridge (6300ESB ICH) - 2 x Ultra DMA/100 connectors - 2 x Serial ATA connectors - RAID 0, RAID 1, or JBOD configurations Supported by Promise® PDC20319 controller - 4 x Serial ATA connectors - RAID0, RAID1, or RAID0+1 configurations
Graphics	ATI® RAGE-XL PCI-based VGA controller
LAN	Intel® 82547GI Gigabit LAN controller (CSA)
USB	Intel® 6300ESB SouthBridge supports: - 4 USB 2.0/1.1 ports VIA VT6212L USB controller supports: - 4 USB 2.0/1.1 ports
IEEE 1394	TI TSB43AB22A IEEE 1394 controller
Special features	ASUS POST Reporter ASUS Q-Fan technology ASUS CrashFree BIOS ASUS EZ Flash BIOS ASUS MyLogo2
BIOS features	8Mb Flash ROM, Phoenix-Award BIOS, PnP, DMI2.0, WfM2.0, SM BIOS2.3

(continued on the next page)

NCCH-DLE specifications summary

Rear panel	1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x Parallel port 2 x Serial ports 4 x USB 2.0 ports 1 x 1394 port 1 x LAN port (RJ-45) Line In/Line Out/Microphone ports
Internal connectors	Floppy disk drive connector Serial ATA connectors IDE connectors GAME/MIDI connector USB 2.0 connectors IEEE 1394 connector Chassis intrusion connector Serial ATA RAID connectors Backplane SMBus connector Power connectors Hard disk activity LED connector Front panel audio connector Internal audio connectors CPU and system fan connectors System panel connector
Power Requirement	SSI power supply (with 24-pin and 8-pin 12V plugs) ATX 12V 2.0 compliant
Form Factor	ATX form factor: 12 in x 10.5 in (30.5 cm x 26.7 cm)
Support CD contents	Device drivers ASUS Live Update Utility Anti-virus software

**Specifications are subject to change without notice.*

This chapter describes the motherboard features and the new technologies it supports.

1 Product introduction

Chapter summary

1

1.1 Welcome!

Thank you for buying the ASUS® NCCH-DLE motherboard!

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

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

1.2 Package contents

Check your NCCH-DLE package for the following items.

Motherboard	ASUS NCCH-DLE motherboard
I/O modules	USB 2.0 + GAME port module S/PDIF Out module with cable 1-port 1394 module
Cables	3-in-1 floppy/Ultra ATA cable 6 x SATA cables 3 x SATA power cables
Accessories	I/O shield CPU heatsink support kit
Application CDs	ASUS motherboard support CD
Documentation	User guide

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

1.3 Special features

1.3.1 Product highlights

Latest processor technology

The motherboard supports dual Intel® Xeon™ Processors via 604-pin surface mount ZIF sockets. The processor has 1 MB or 2 MB L2 cache, includes an 800/533 MHz system bus, and features the Intel Hyper-Threading Technology that allows up to 3.6 GHz core frequencies.

Dual-channel DDR400 memory support

Employing the dual-channel DDR memory architecture, the motherboard provides a solution that doubles the system memory bandwidth to boost system performance. The motherboard supports up to 4 GB of system memory using PC3200/PC2700/PC2100 ECC or non-ECC DDR DIMMs to deliver up to 6.4 GB/s data transfer rate for the latest 3D graphics, multimedia, and Internet applications.

Serial ATA technology

The motherboard supports the new Serial ATA technology through the SATA interfaces and the Intel® 6300ESB ICH and Promise® PDC20319 controllers onboard. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 150MB/s data transfer rate.

Multi-RAID solution

The motherboard has the Promise® PDC20319 controller to support multi-RAID solution using Serial ATA/150 hard disks. The RAID0 (striping), RAID1 (mirroring), and RAID 0+1 provide a cost-effective high-performance solution for added system performance and reliability.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification, dramatically increasing the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1.

Gigabit LAN solution

The Intel® 82547GI Gigabit Ethernet controller allows full-duplex Gigabit performance on LAN on Motherboard (LOM) applications through the Communication Streaming Architecture (CSA). Instead of connecting to the PCI bus, the controller connects to the dedicated CSA bus on the Memory Controller Hub (MCH) thus reducing the PCI bottlenecks by freeing the PCI bus for other I/O operations.

AGP 8X support

The motherboard supports the latest graphic architecture, the AGP Pro/8X interface (a.k.a. AGP 3.0), offering 2.1GB/s bandwidth which is twice that of its predecessor AGP 4X.

IEEE 1394 support

The IEEE 1394 interfaces and the TI TSB43AB22A controller onboard provide high-speed and flexible PC connectivity to a wide range of peripherals and devices compliant to IEEE 1394a standards. The IEEE 1394 allows up to 400Mbps transfer rates through simple, low-cost, high-bandwidth asynchronous (real-time) data interfacing between computers, peripherals, and consumer electronic devices such as camcorders, VCRs, printers,TVs, and digital cameras.

6-channel audio feature

The SoundMAX-class ADI AD1980 AC '97 audio CODEC supports 6-channel 5.1 surround sound output, stereo microphone input, variable Sample Rate Conversion (SRC), professional quality 103-dB out put with 94-dB Signal Noise Ratio (SNR), and analog enumeration capability. The SoundMAX 4 XL software features the AudioESP™ (Audio Enumeration and Sensing Process) that allows intelligent detection of the peripherals plugged into the audio ports and identifies the incompatible devices, if any.

ASUS POST Reporter™

The motherboard offers a new exciting feature called the ASUS POST Reporter™ to provide friendly voice messages and alerts during the Power-On Self-Tests (POST) informing you of the system boot status and causes of boot errors, if any. The bundled Winbond Voice Editor software lets you customize the voice messages in the supported languages.

ASUS Q-Fan technology

The ASUS Q-Fan technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation.

ASUS EZ Flash BIOS

With the ASUS EZ Flash, you can easily update the system BIOS even before loading the operating system. No need to use a DOS-based utility or boot from a floppy disk.

ASUS MyLogo2™

This new feature present in the motherboard allows you to personalize and add style to your system with customizable boot logos. The ASUS MyLogo2 is automatically installed when you install ASUS Update from the support CD.

1.3.2 Value-added solutions

Temperature, fan, and voltage monitoring

The CPU temperature is monitored by the Hardware monitor (Winbond H/W monitoring IC W83792D) to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The system voltage levels are monitored to ensure stable supply of current for critical components.

ACPI ready

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

Chassis intrusion detection

The motherboard supports chassis intrusion monitoring through the Winbond ASIC.

ASUS Update

This utility allows you to update the motherboard BIOS through a user-friendly interface. Connect to the Internet then to the ASUS FTP site nearest you to obtain the latest BIOS version for your motherboard.

This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the jumpers and connectors on the motherboard.

2 Hardware information

Chapter summary

2

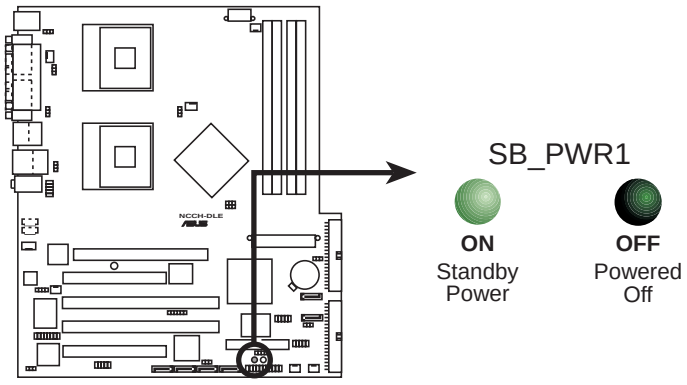
2.1 Before you proceed

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

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

Standby power LED

The motherboard comes with a standby power LED. This green LED (SB_PWR1) lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component.



NCCH-DLE Standby power LED

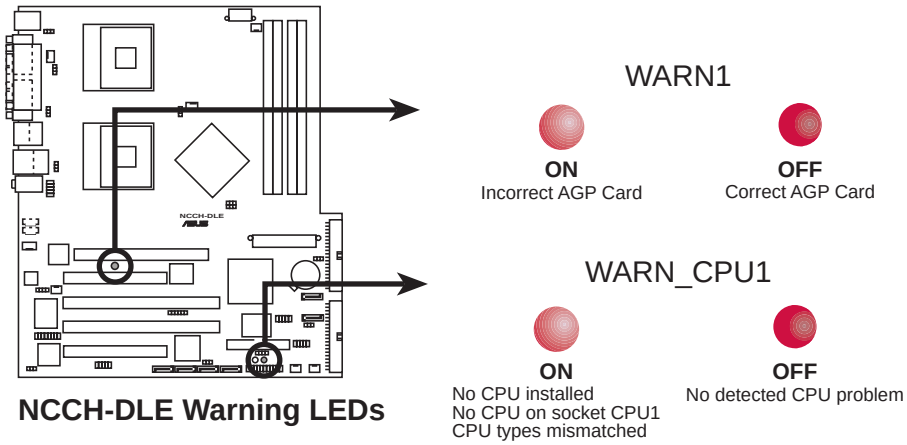
AGP warning LED

This LED (WARN1) is a smart protection from motherboard burn out caused by an incorrect AGP card. If you plug in any 3.3V AGP card into the 1.5V AGP slot, this LED lights up thus preventing the system to power up. This LED remains off if you plug in a 1.5V AGP card.

CPU warning LED

This red LED (WARN_CPU1) lights up if:

- there is no installed CPU on either one of the sockets
- you installed a CPU on socket CPU2, but not on socket CPU1 ***(if installing only one CPU, you must install on socket CPU1)***
- you installed CPUs of different types, e.g. an Intel® Xeon™ processor with 800 MHz FSB and an Intel® Xeon™ processor with 533 MHz FSB ***(install identical CPUs, either two Intel® Xeon™ processors with 800 MHz FSB, or two Intel® Xeon™ processors with 533 MHz FSB)***



NCCH-DLE Warning LEDs

2.2 Motherboard installation

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

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

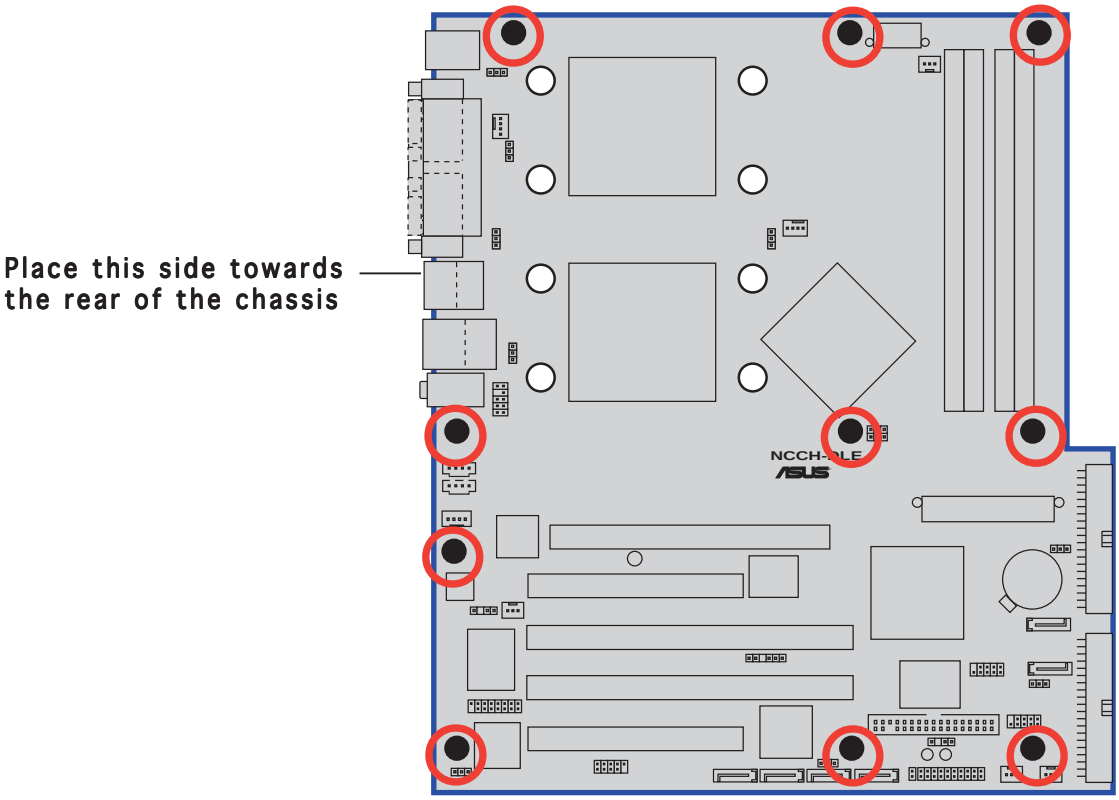
2.2.1 Placement direction

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

2.2.2 Screw holes

Place ten (10) screws into the holes indicated by solid black circles to secure the motherboard to the chassis.

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



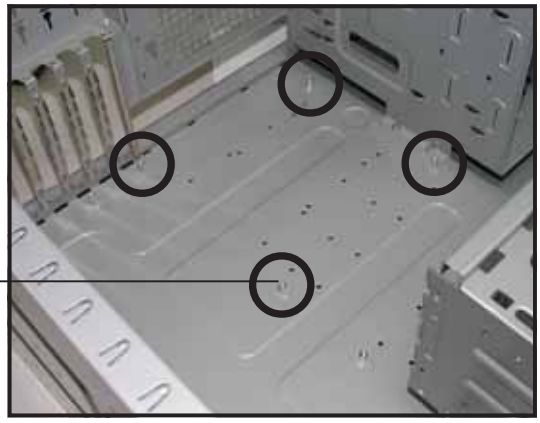
2.2.3 Support plates for motherboard

For additional protection from motherboard breakage due to the weight of the CPU heatsinks, your motherboard package comes with a CPU heatsink support kit that consists of:

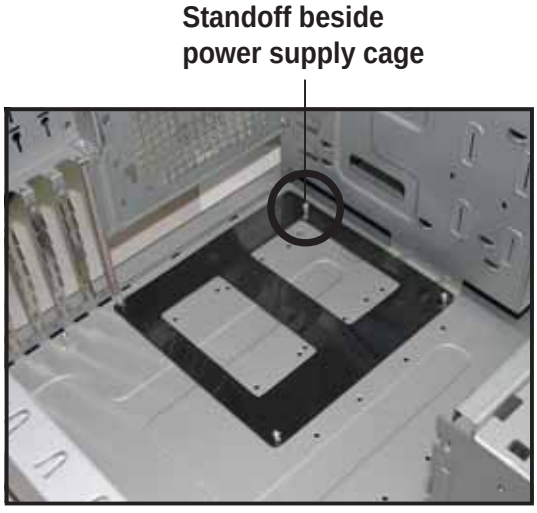
- 2 x metal support plates
- 1 x contour sheet
- 3 different sets of metal nuts and rubber pads for varied chassis standoffs (each set contains 8 metal nuts and 2 rubber pads)

To install the support plates:

1. Open and lay your system chassis flat on a stable surface, then place the motherboard standoffs on the holes as shown.



2. Align the holes of the contour sheet with the standoffs on the base of the chassis. Press the sheet flat making sure that it is completely affixed to the chassis.



The contour sheet fits in only one orientation. Make sure that the hole located about 1 cm from the corner matches the standoff beside the power supply cage.

3. Determine the height of the standoffs on your chassis, and select the appropriate set of metal nuts and rubber pads from your package.

Use a nut size that is slightly lower than the standoffs on your chassis.

4. Use a plier to attach four nuts to the bolts on the metal support plate.

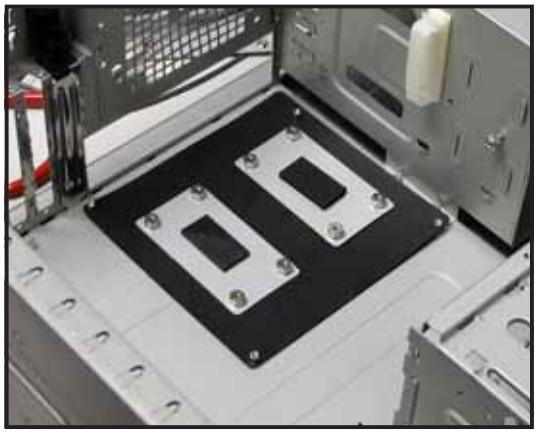
5. Align a rubber pad to the rectagular mark on the center of the plate, then press to attach.

6. Remove the adhesive label underneath a plate.

7. Carefully align and place the plate on a rectangular cut on the contour sheet.

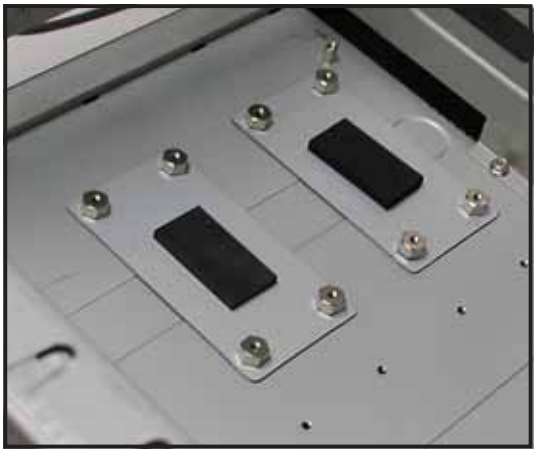
Make sure that the metal support plates fit perfectly to the rectangular cuts on the contour sheet; otherwise, the CPU heatsink screws would not align to the metal nuts.

8. Repeat steps 4 and 7 to prepare and install the second plate.



9. Remove the contour sheet from the chassis.

The support plates appear as shown when installed.

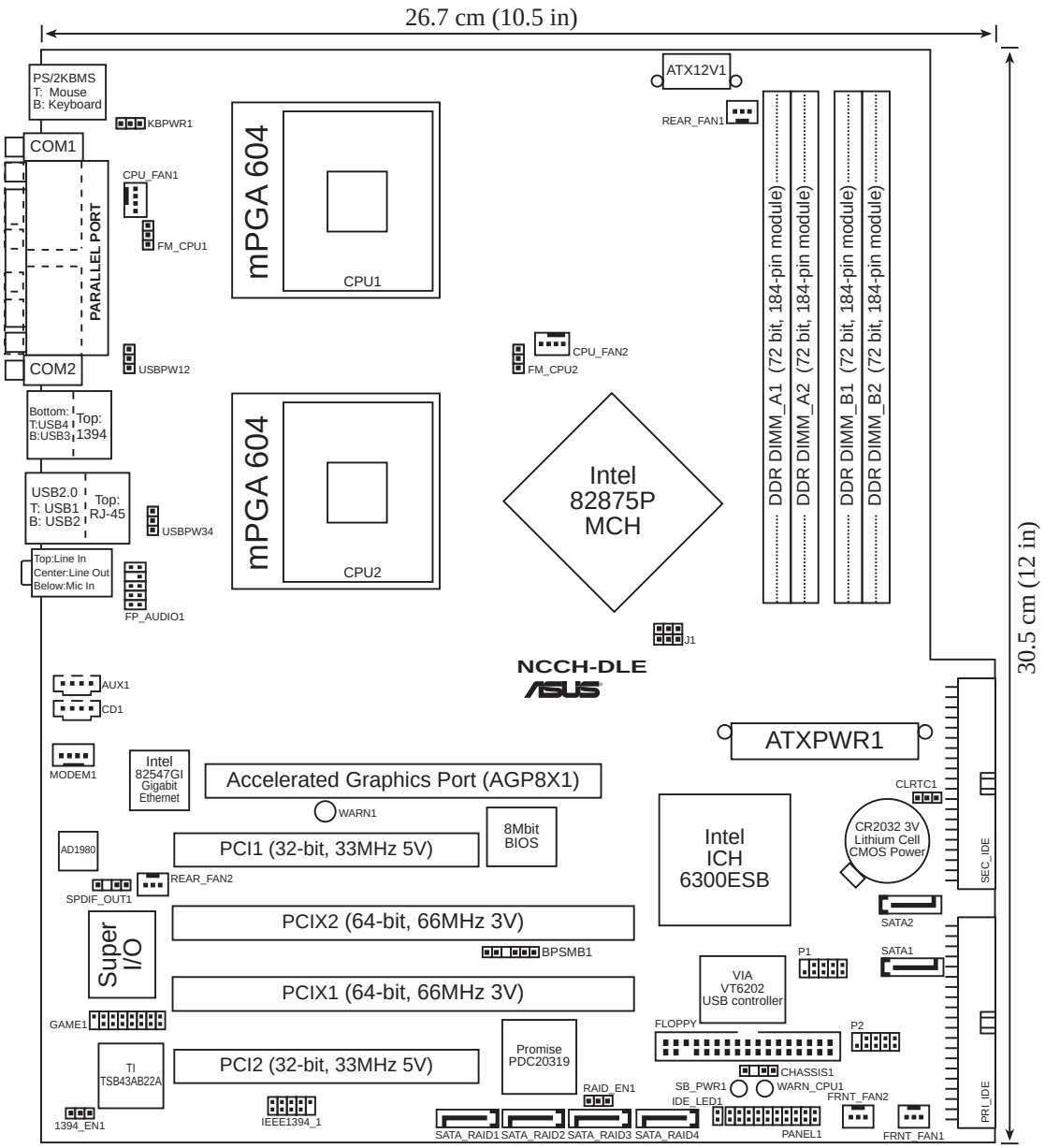


10. Install the motherboard with the external I/O ports toward the chassis rear panel. The CPU sockets should be right on top of the support plates.

Make sure that the CPU heatsink holes on the motherboard perfectly match the metal nuts on the support plates; otherwise, you can not install the CPU heatsinks properly.

11. Secure the motherboard with 10 screws. Refer to section “2.2.2 Screw holes” for illustration.

2.2.4 Motherboard layout



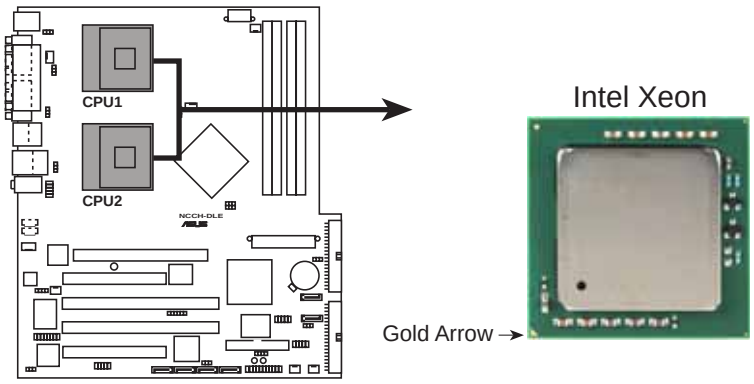
2.2.5 Layout contents

Internal connectors *(continued)*

2.3 Central Processing Unit (CPU)

2.3.1 Overview

The motherboard comes with dual surface mount 604-pin Zero Insertion Force (ZIF) sockets. The sockets are designed for the Intel® Xeon™ Processor in the 604-pin package.

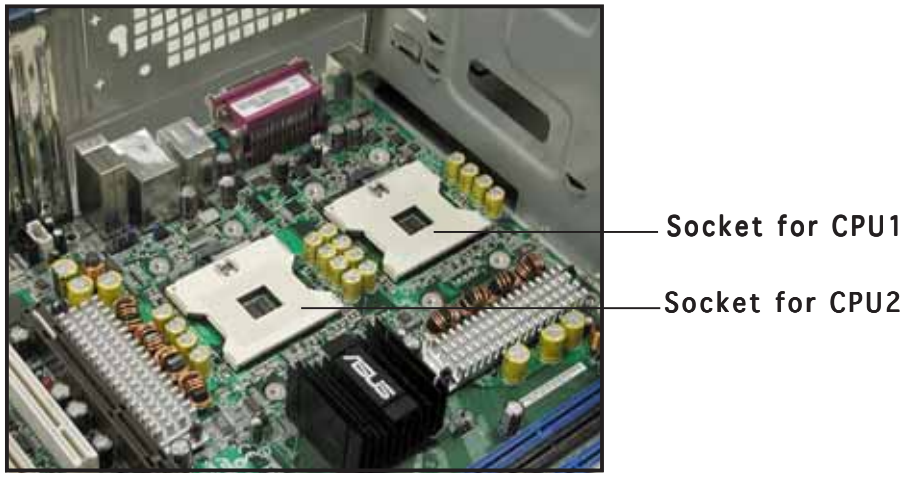


NCCH-DLE CPU Socket 604

2.3.2 Installing the CPU

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

If installing only one CPU, use the socket CPU1.



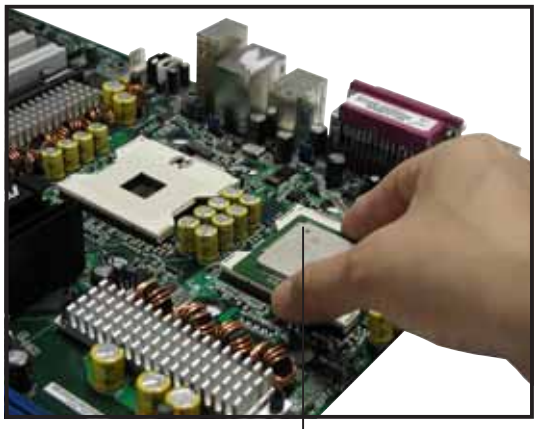
Incorrect installation of the CPU into the socket may bend the pins and severely damage the CPU!

Follow these steps to install a CPU.

1. Locate the 604-pin ZIF sockets on the motherboard. Flip up the socket lever and push it all the way to the other side.

Make sure that the socket lever is pushed back all the way, otherwise the CPU does not fit in completely.

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



Marked corner (gold arrow)

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

4. Carefully push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.
5. Apply the thermal grease to the top of the CPU. This thermal grease should come with the CPU package.
6. Repeat steps 1 to 5 if you wish to install a second CPU.

2.3.3 Installing the CPU heatsink and fan

The Intel® Xeon™ processors require an Intel certified heatsink and fan assembly to ensure optimum thermal condition and performance.

When you buy a boxed Intel CPU, the package includes the heatsink, fan, retention brackets, screws, thermal grease, installation manual, and other items that are necessary for CPU installation.

1. Make sure that you have applied the thermal grease to the top of the CPU before installing the heatsink and fan.
2. Refer to the installation manual that came with the CPU package for details on heatsink/fan assembly and installation.

CPU heatsink (top view)

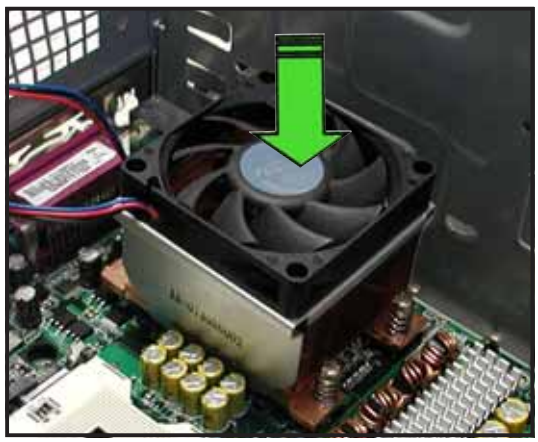
CPU heatsink (bottom view)

Heatsink screw

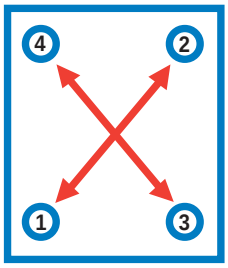
Before installing the CPU heatsinks, ensure that the jumpers FM_CPU1 and FM_CPU2 are set correctly depending on the pin definition of your CPU fan cables. Refer to page 2-24 for information on these jumpers.

To install the CPU heatsink and fan:

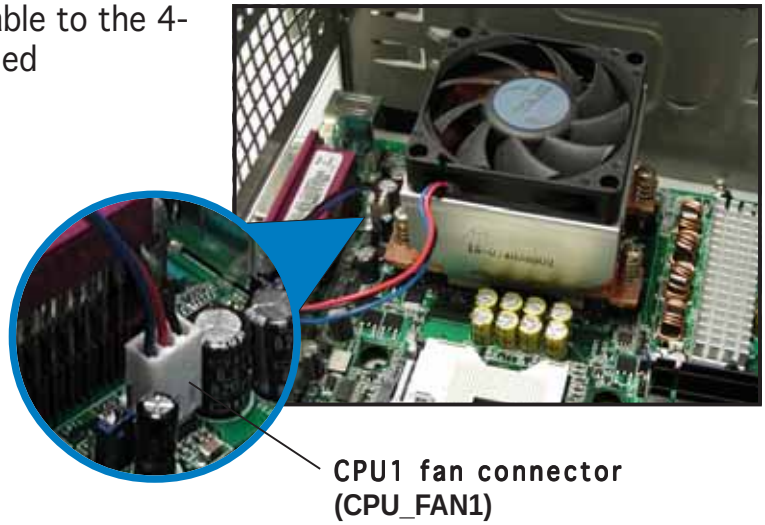
1. Place the heatsink on top of the installed CPU, making sure that the four screws on the heatsink align with the nuts on the support plate.



2. Use a Phillips screwdriver to tighten the four heatsink screws in a diagonal sequence.



3. Connect the fan cable to the 4-pin connector labeled CPU_FAN1.



CPU1 fan connector (CPU_FAN1)

4. Repeat steps 1 to 3 to install the other heatsink if you have installed a second CPU, then connect the fan cable to the 4-pin connector labeled CPU_FAN2.

   The heatsinks appear as shown when installed.

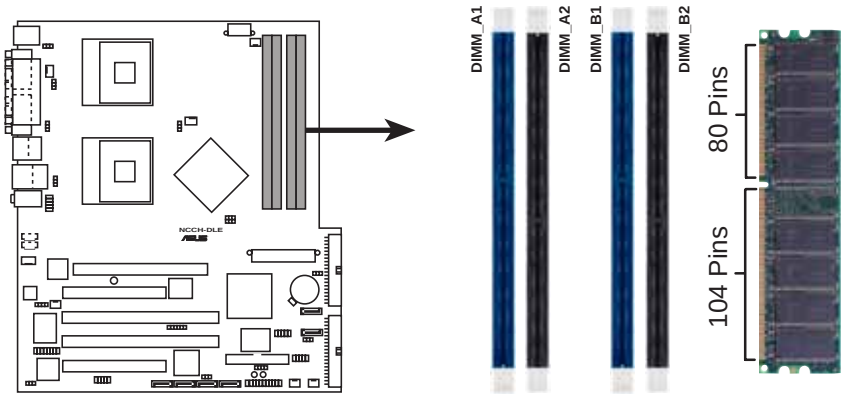
CPU2 fan connector (CPU_FAN2)

2.4 System memory

2.4.1 Overview

The motherboard comes with four Double Data Rate (DDR) Dual Inline Memory Module (DIMM) sockets.

The following figure illustrates the location of the DDR DIMM sockets.



NCCH-DLE 184-pin DDR DIMM sockets

2.4.2 Memory configurations

You may install unbuffered ECC or non-ECC 64MB, 128MB, 256MB, 512MB, and 1GB DDR DIMMs into the DIMM sockets using the recommended memory configurations.

Important notes

1. Installing DDR DIMMs other than the recommended configurations may cause memory sizing error or system boot failure. Use any of the recommended configurations in Table 1.
2. In dual-channel configurations, install only **identical** (the same type and size) DDR DIMM pairs for each channel.
3. Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
4. Make sure that the memory frequency matches the CPU FSB (Front Side Bus). Refer to Table 2.
5. DIMMs installed into **any three** sockets will function in single-channel mode.
6. When all four sockets are populated with 1 GB DIMMs (total 4GB), the system may detect only about 3.6+ GB (less than 4 GB) due to chipset limitation.

Table 1 Recommended memory configurations

Mode		Sockets DIMM_A1 (blue)	DIMM_A2 (black)	DIMM_B1 (blue)	DIMM_B2 (black)
Single-channel	(1)	Populated	—	—	—
	(2)	—	Populated	—	—
	(3)	—	—	Populated	—
	(4)	—	—	—	Populated
Dual-channel	(1)	Populated	—	Populated	—
	(2)	—	Populated	—	Populated
	(3)*	Populated	Populated	Populated	Populated

* *For dual-channel configuration (3), you may:*

- install identical DIMMs in all four sockets

  or

- install identical DIMM pair in DIMM_A1 and DIMM_B1 (blue sockets) and identical DIMM pair in DIMM_A2 and DIMM_B2 (black sockets)

Table 2 Memory frequency/CPU FSB synchronization

CPU FSB	DDR DIMM Type	Memory Frequency
800 MHz	PC3200	400 MHz
533 MHz	PC2700	333 MHz
400 MHz	PC2100	266 MHz

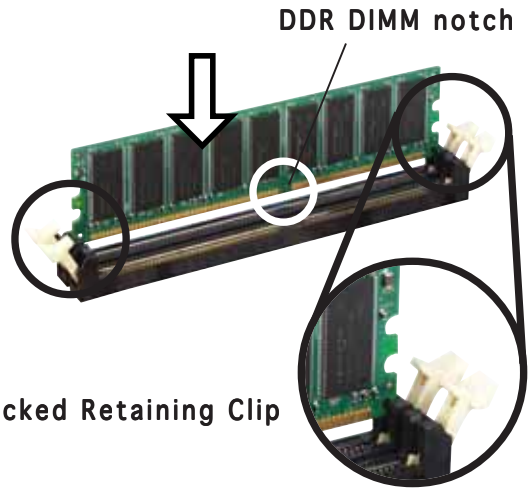
Obtain DDR DIMMs only from ASUS qualified vendors for better system performance. Visit the ASUS website (www.asus.com) for the latest QVL.

2.4.3 Installing a DIMM

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

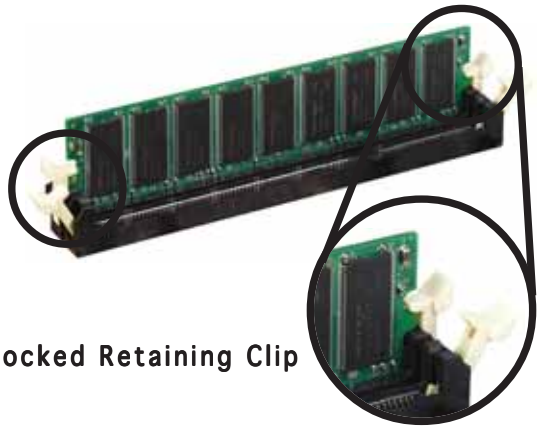
Follow these steps to install a DIMM.

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



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

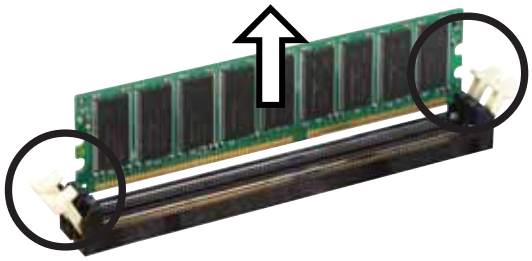
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



2.4.4 Removing a DIMM

Follow these steps to remove a DIMM.

1. Simultaneously press the retaining clips outward to unlock the DIMM.



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

2. Remove the DIMM from the socket.

2.5 Expansion slots

In the future, you may need to install expansion cards. The motherboard has two 64-bit PCI-X slots, two 32-bit PCI slots, and an AGP slot. The following sub-sections describe the slots and the expansion cards that they support.

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

2.5.1 Installing an expansion card

Follow these steps to install an expansion card.

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

2.5.2 Configuring an expansion card

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

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

Standard interrupt assignments

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

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

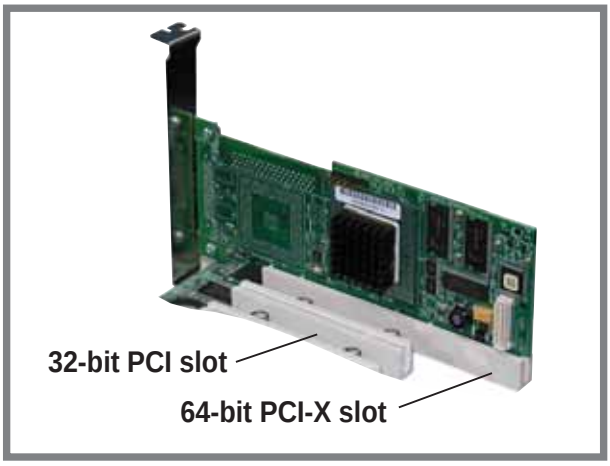
IRQ assignments for this motherboard

	INTA#	INTB#	INTC#	INTD#
PCI slot 1	IRQF#	IRQG#	IRQH#	IRQE#
PCI slot 2	IRQG#	IRQH#	IRQE#	IRQF#
PCI-X slot 1	P1_IRQ0#	P1_IRQ1#	P1_IRQ2#	P1_IRQ3#
PCI-X slot 2	P1_IRQ1#	P1_IRQ2#	P1_IRQ3#	P1_IRQ0#
AGP Pro/8x slot	INTA#	INTB#	—	—
Onbd. USB controller #1	IRQ_A#	—	—	—
Onbd. USB controller #2	IRQ_D#	—	—	—
Onbd. USB 2.0 controller	IRQ_H#	—	—	—
Onbd. LAN controller (Intel 82547GI)	IRQ_F#	—	—	—
Onbd. RAID controller (Promise PDC20319)	IRQ_H#	—	—	—
Onbd. IDE controller	IRQ_C#	—	—	—
Onbd. SATA controller (6300ESB ICH)	IRQ_C#	—	—	—
Onbd. USB 2.0 controller #3 (VT6202)	IRQ_E#	IRQ_F#	IRQ_G#	—
Onbd. 1394 controller (TSB43AB22A)	IRQ_E#	—	—	—
Onbd. audio controller (AD1980)	IRQ_B#	—	—	—

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

2.5.3 PCI/PCI-X slots

The PCI and PCI-X slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI/PCI-X specifications.

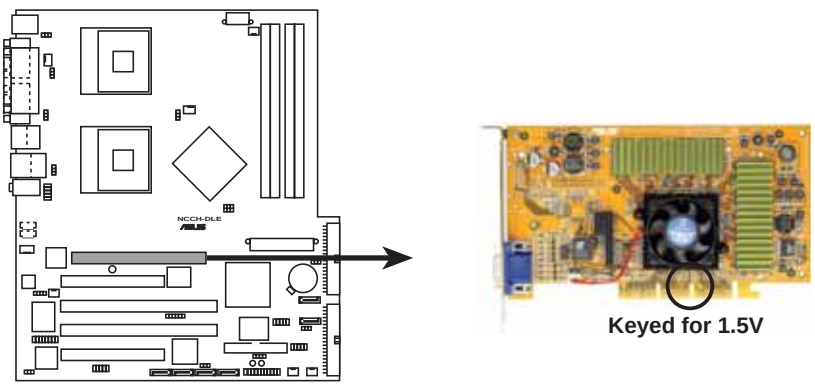


When installing long PCI cards, it is recommended that you install them in PCI_X slot 1 or PCI-X slot 2. Long PCI cards installed in PCI slots 1 and 2 may interfere with the SATA connectors.

2.5.4 AGP Pro slot

This motherboard has an Accelerated Graphics Port (AGP) Pro slot that supports AGP 8X (+0.8V) cards and AGP 4X (+1.5V) cards. When you buy an AGP card, make sure that you ask for one with +0.8V or +1.5V specification. Note the notches on the card golden fingers to ensure that they fit the AGP slot on your motherboard.

Install only +0.8V or +1.5V AGP cards. This motherboard does not support 3.3V AGP cards. The WARN1 LED lights up if you installed an incorrect AGP card. Refer to page 2-2 for the LED location.

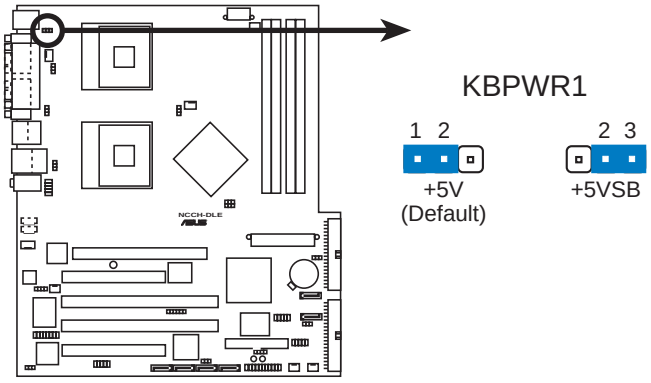


NCCH-DLE Accelerated Graphics Port (AGP)

2.6 Jumpers

1. Keyboard power (3-pin KBPWR1)

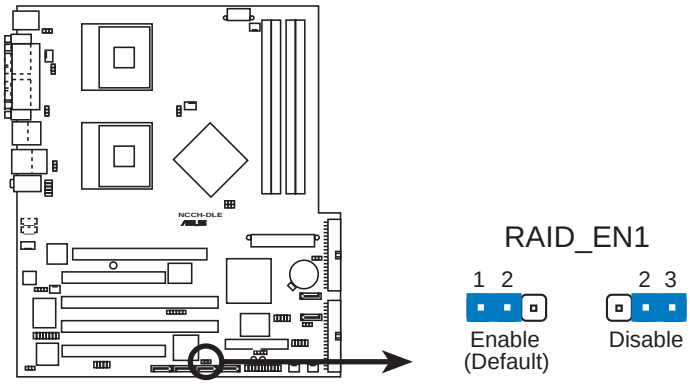
This jumper allows you to enable (pins 2-3) or disable (pins 1-2) the keyboard wake-up feature. Set this jumper to pins 2-3 (+5VSB) if you wish to wake up the computer when you press a key on the keyboard. This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting in the BIOS. Refer to Chapter 4 for information.



NCCH-DLE Keyboard power setting

2. RAID controller setting (3-pin RAID_EN1)

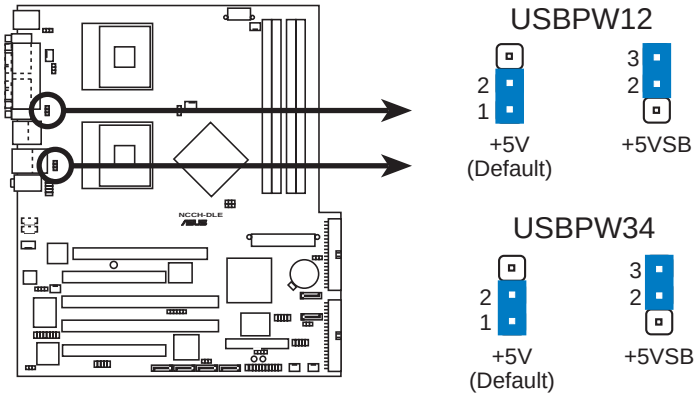
This jumper allows you enable or disable the Promise® PDC20319 RAID controller.



NCCH-DLE RAID controller setting

3. USB device wake-up (3-pin USBPW12, USBPW34)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).



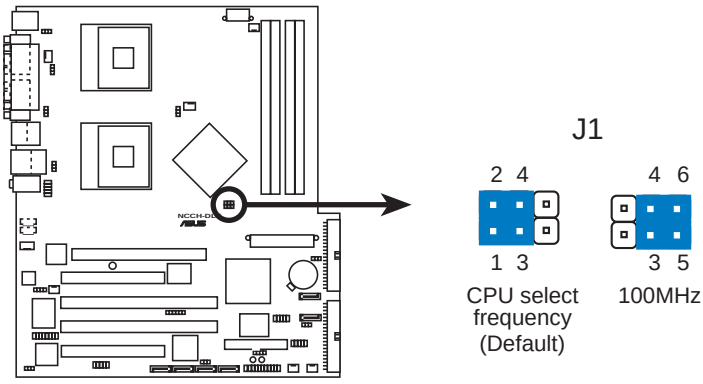
NCCH-DLE USB device wake up

1. The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port. Otherwise, the system would not power up.
2. The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

4. CPU external frequency selection (6-pin J1)

This jumper allows you to select the CPU external frequency (or bus clock).

To ensure system stability, it is recommened that you keep the default setting.



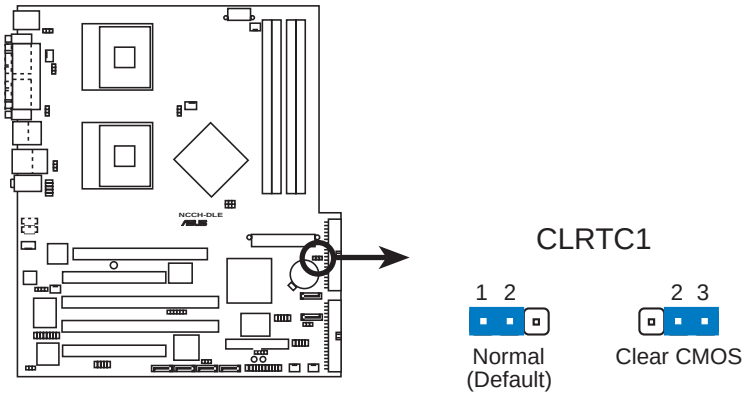
NCCH-DLE CPU external frequency setting

5. Clear RTC RAM (3-pin CLRTC1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. The RAM data in CMOS, that include system setup information such as system date, time, and system setup parameters, and passwords, is powered by the onboard button cell battery.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

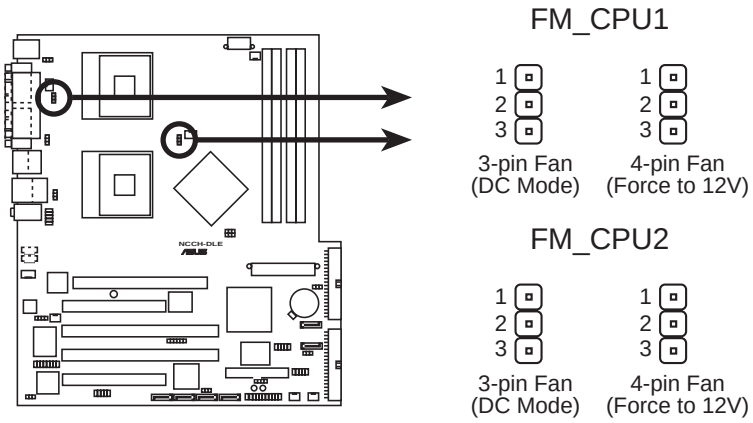


NCCH-DLE Clear RTC RAM

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

6. CPU fan pin selection (3-pin FM_CPU1, FM_CPU2)

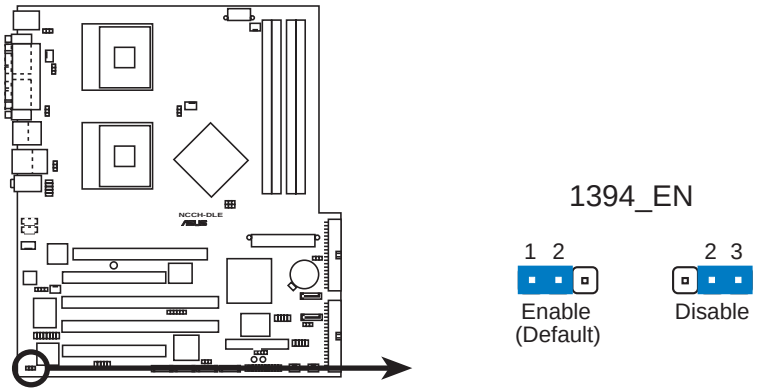
These jumpers allow you to connect either a 3-pin or a 4-pin fan cable plug to the CPU fan connectors (CPU_FAN1, CPU_FAN2). Set these jumpers to pins 1-2 if you are using a 3-pin fan cable plug, or to pins 2-3 if you are using a 4-pin plug.



NCCH-DLE USB CPU fan pin setting

7. IEEE 1394 setting (3-pin 1394_EN)

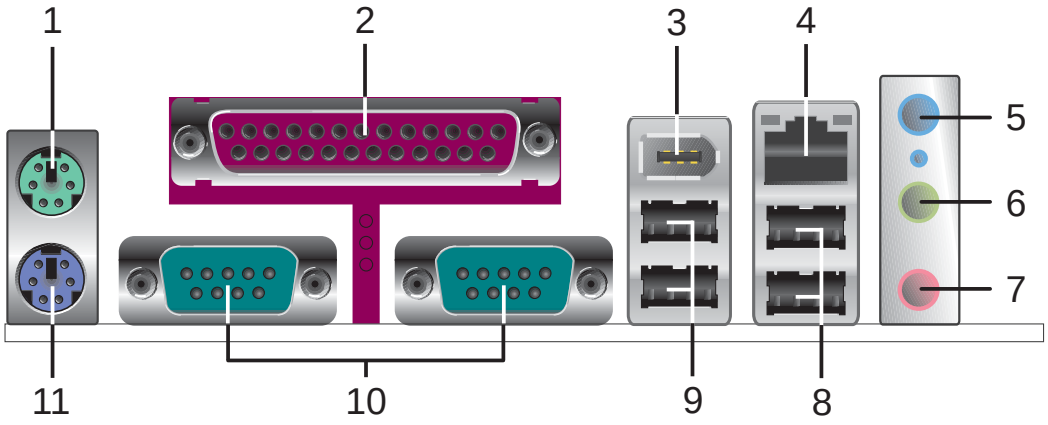
These jumpers allow you to enable or disable the onboard IEEE 1394 controller. Set to pins 1-2 to activate the 1394 feature.



NCCH-DLE 1394 Function setting

2.7 Connectors

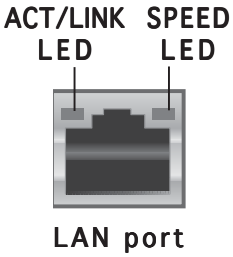
2.7.1 Rear panel connectors



1. **PS/2 mouse port.** This green 6-pin connector is for a PS/2 mouse.
2. **Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.
3. **IEEE 1394 port.** This port connects IEEE 1394-compliant devices like camcorders, VCRs, printers, or digital cameras.
4. **LAN port (RJ-45).** This Gigabit LAN port (controlled by Intel 82547GI) allows connection to a Local Area Network (LAN) via a network hub.

LAN port LED indications

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



5. **Line In port.** This Line In (light blue) port connects a tape player or other audio sources. In 6-channel mode, the function of this port becomes Rear Speaker Out.
6. **Line Out port.** This Line Out (lime) port connects a headphone or a speaker. In 6-channel mode, the function of this port becomes Front Speaker Out.
7. **Microphone port.** This Mic (pink) port connects a microphone. In 6-channel mode, the function of this port becomes Bass/Center.

The functions of the Line Out, Line In, and Microphone ports change when you select the 4/6-channel configuration. Refer to the table on the next page for audio ports function variation.

Audio ports function variation

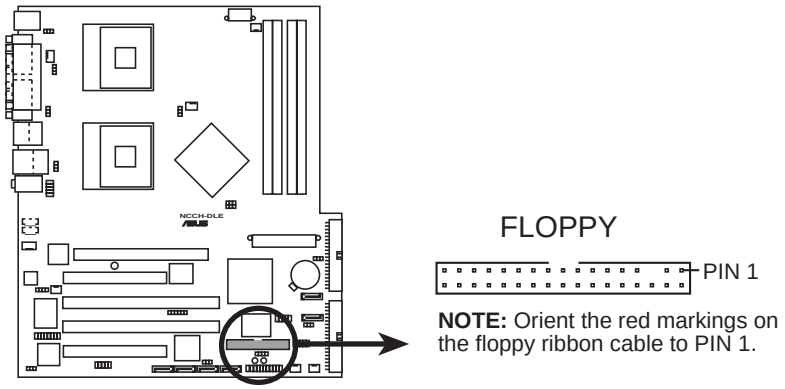
Port	Headphone/2-Channel	4-Channel	6-Channel
Light Blue	Line In	Rear Speaker Out	Rear Speaker Out
Lime	Line Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Bass/Center

8. **USB 2.0 ports 3 and 4.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
9. **USB 2.0 ports 1 and 2.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
10. **Serial ports.** These 9-pin communication ports (COM1/COM2) are for pointing devices or other serial devices.
11. **PS/2 keyboard port.** This purple connector is for a PS/2 keyboard.

2.7.2 Internal connectors

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

This connector supports the provided floppy drive ribbon cable. After connecting one end to the motherboard, connect the other end to the floppy drive.

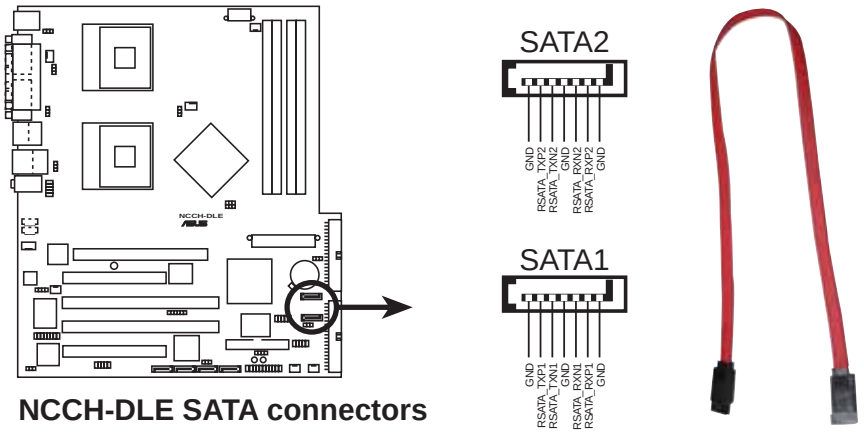


NCCH-DLE Floppy disk drive connector

2. Serial ATA connectors (7-pin SATA1, SATA2)

These next generation connectors support the thin Serial ATA cables for Serial ATA hard disks. The current Serial ATA interface allows up to 150 MB/s data transfer rate, faster than the standard parallel ATA with 133 MB/s (Ultra ATA/133).

If you installed Serial ATA hard disks, you may create a RAID 0/RAID 1 configuration using the RAID feature of the Intel® 6300ESB ICH. Refer to page 4-19 for the SATA configuration.

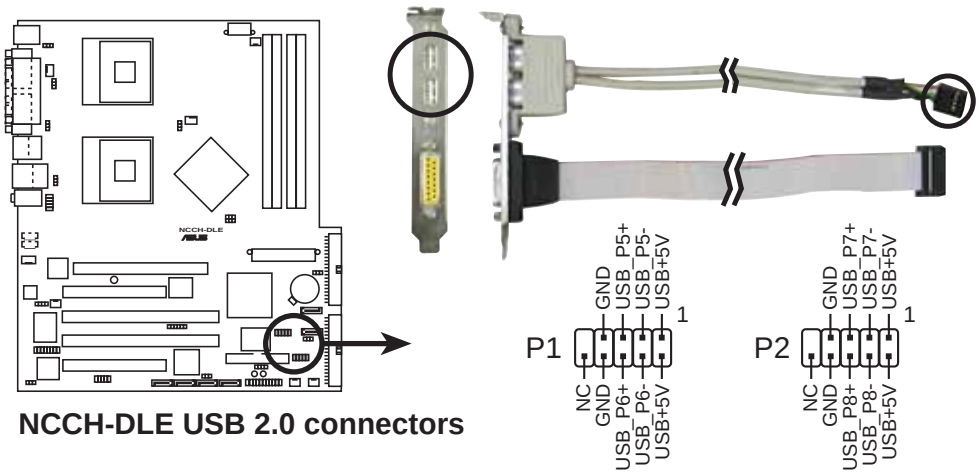


NCCH-DLE SATA connectors

3. USB connector (10-1 pin P1, P2)

These connectors are for USB 2.0 ports. Connect the 4-port USB module cables to these connectors, then install the module to the opening at the front of the system chassis. The USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

The connector P1 is for front USB ports 5 and 6; P2 is for front USB ports 7 and 8.

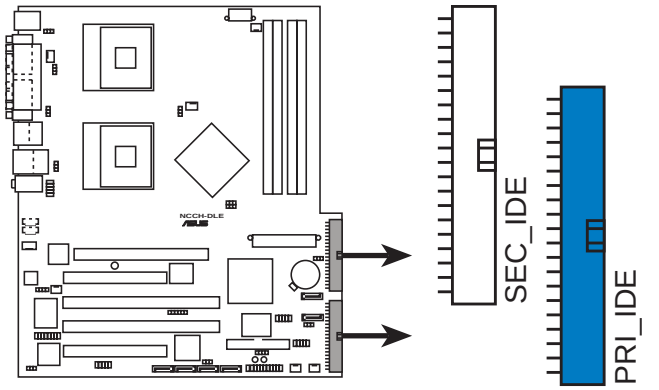


NCCH-DLE USB 2.0 connectors

4. IDE connectors (40-1 pin PRI_IDE[blue], SEC_IDE [white)

This connector supports the provided UltraDMA/100/66 IDE hard disk ribbon cable. Connect the cable's blue connector to the primary (recommended) or secondary IDE connector, then connect the gray connector to the UltraDMA/100/66 slave device (hard disk drive) and the black connector to the UltraDMA/100/66 master device.

- Refer to the hard disk drive label or documentation when setting the device as master or slave.
- Pin 20 on each IDE connector is removed to match the covered hole on the UltraDMA cable connector. This prevents incorrect orientation when you connect the cables.

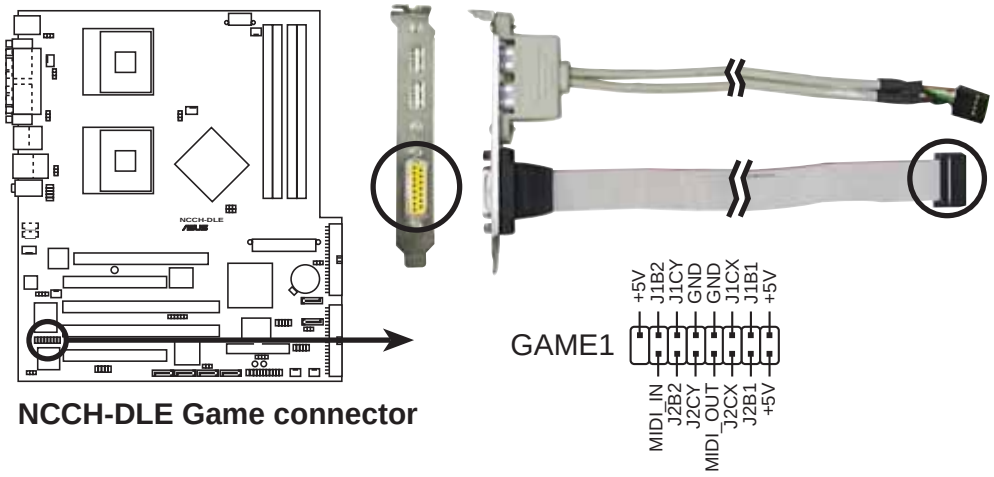


NCCH-DLE IDE connectors

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

5. GAME/MIDI connector (16-1 pin GAME1)

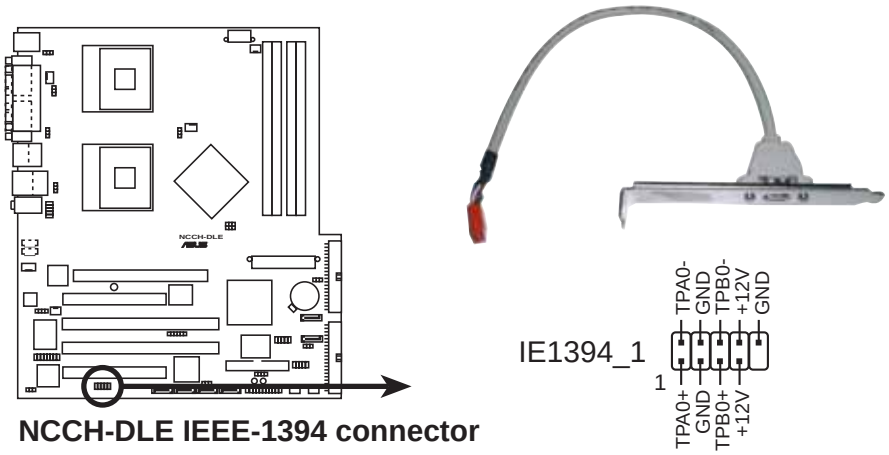
This connector supports a GAME/MIDI module. Connect the GAME/MIDI cable to this connector. The GAME/MIDI port on the module connects a joystick or a game pad for playing games, and MIDI devices for playing or editing audio files.



NCCH-DLE Game connector

6. IEEE 1394 connector (10-1 pin IE1394_1)

This connector is for a 1394 module. Attach the 10-1 pin 1394 cable plug from the module to this connector. You may also connect a 1394-compliant internal hard disk to this connector.

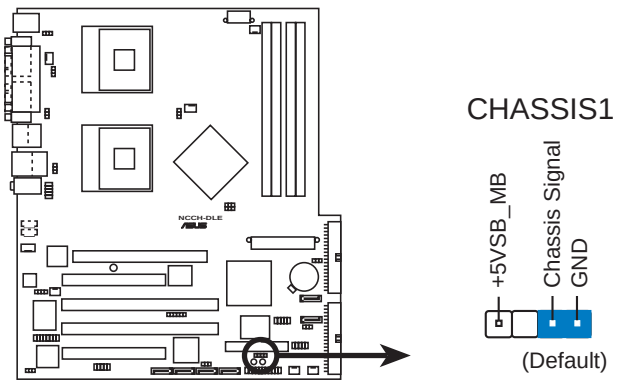


NCCH-DLE IEEE-1394 connector

7. Chassis intrusion connector (4-1 pin CHASSIS1)

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

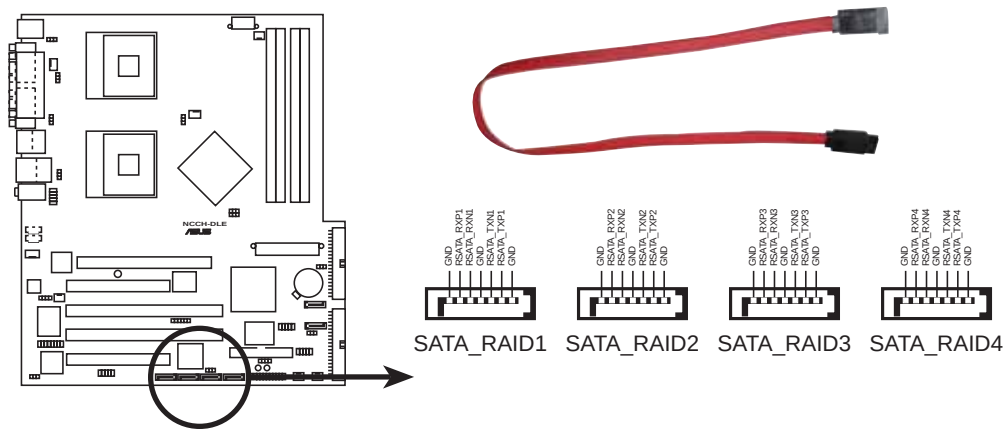
By default, the pins labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. If you wish to use the chassis intrusion detection feature, remove the jumper cap from the pins.



NCCH-DLE Chassis intrusion connector

8. Serial ATA RAID connectors (7-pin SATA_RAID1, SATA_RAID2)

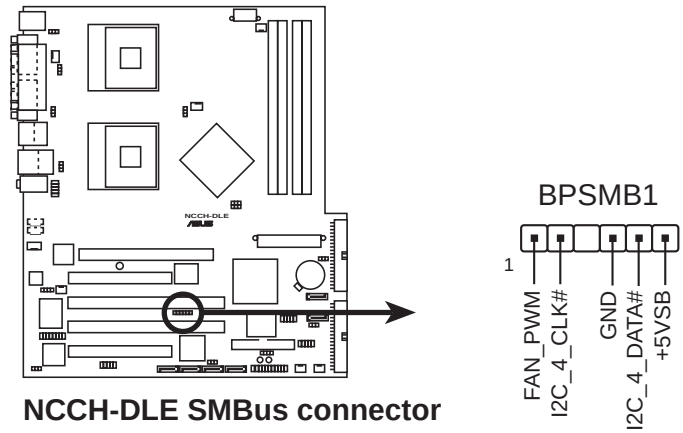
These Serial ATA connectors support SATA hard disks that you may configure as a RAID set. Through the onboard Promise® PDC20319 RAID controller, you may create a RAID 0, RAID 1, or RAID 0+1 configuration. Configure the onboard device and SATA items in BIOS to use the RAID feature. Refer to page 4-30 for information.



NCCH-DLE SATA RAID connectors

9. Backplane SMBus connector (6-1 pin BPSMB1)

This connector allows you to connect SMBus (System Management Bus) devices. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.

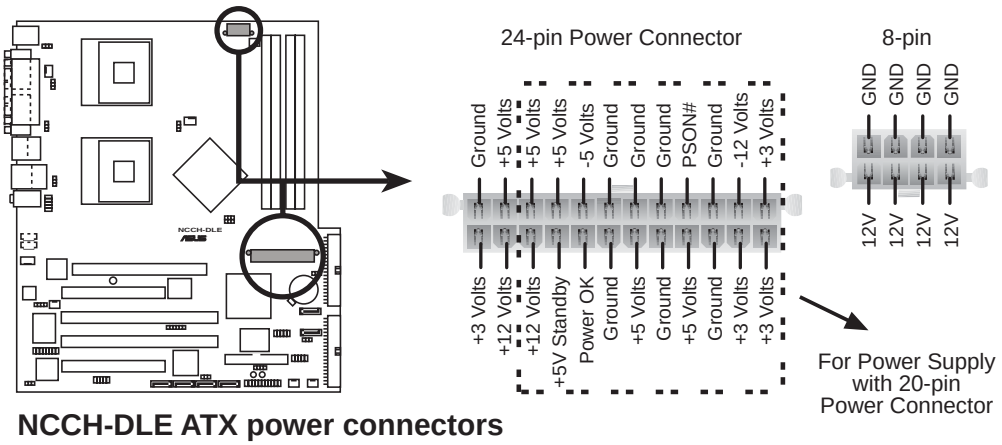


NCCH-DLE SMBus connector

10. Power connectors (24-pin ATXPWR1, 8-pin ATX12V1)

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

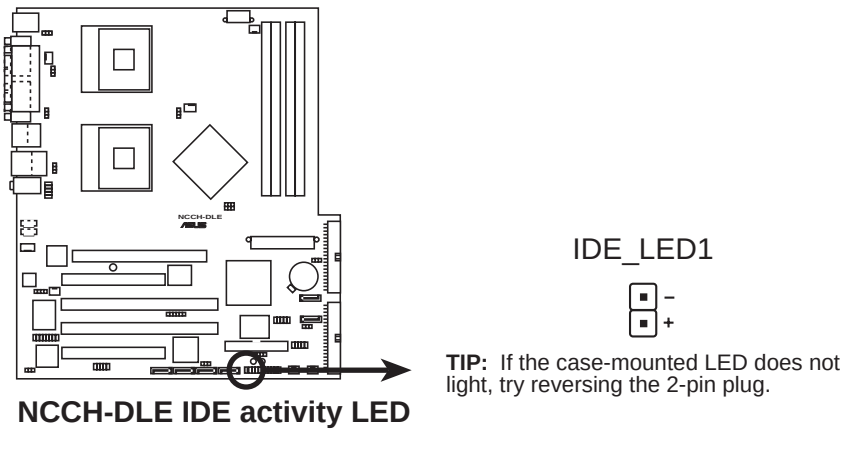
1. Do not forget to connect the 8-pin +12V power plug. Otherwise, the system does not boot up.
2. When using Intel® Xeon™ 800 MHz processor, make sure that your power supply can provide a total of 27A, minimum of three +12V output leads and at least 1A on the +5V standby lead (+5VSB).
3. The minimum recommended wattage is 600W. The system may become unstable or may not boot up if the power is inadequate.



NCCH-DLE ATX power connectors

11. Hard disk activity LED connector (2-pin IDELED1)

This connector supplies power to the hard disk activity LED. The read or write activities of any device connected to the primary or secondary IDE connector cause this LED to light up.



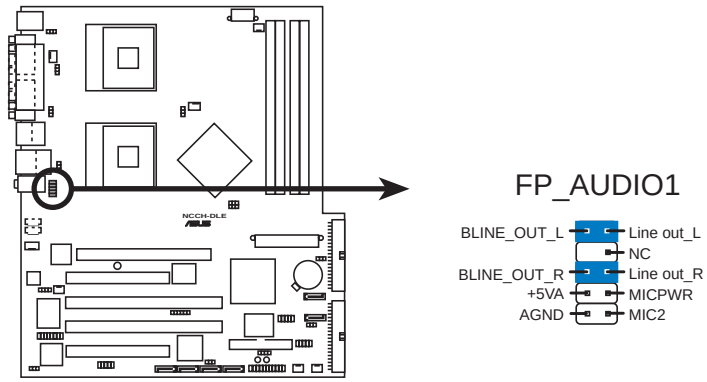
TIP: If the case-mounted LED does not light, try reversing the 2-pin plug.

NCCH-DLE IDE activity LED

12. Front panel audio connector (10-1 pin FP_AUDIO1)

This is an interface for the Intel front panel audio cable that allow convenient connection and control of audio devices.

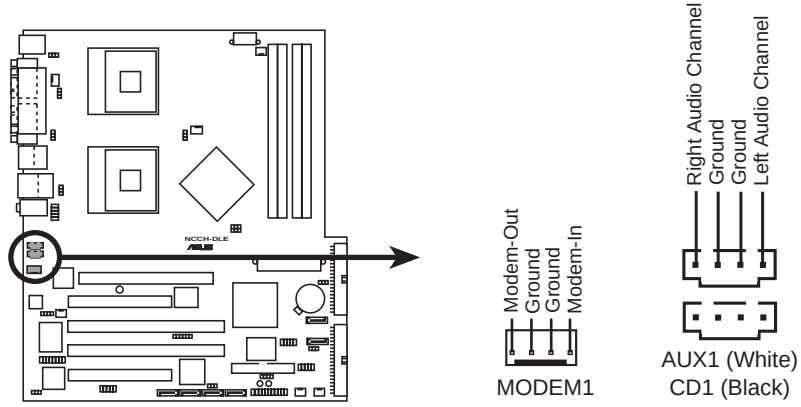
By default, the pins labeled LINE OUT_R/BLINE_OUT_R and the pins LINE OUT_L/BLINE_OUT_L are shorted with jumper caps. Remove the caps only when you are connecting the front panel audio cable.



NCCH-DLE Front panel audio connector

13. Internal audio connectors (4-pin CD1, AUX1, MODEM1)

These connectors allow you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card. The MODEM connector allows the onboard audio to interface with a voice modem card with a similar connector. It also allows the sharing of mono_in (such as a phone) and a mono_out (such as a speaker) between the audio and a voice modem card.

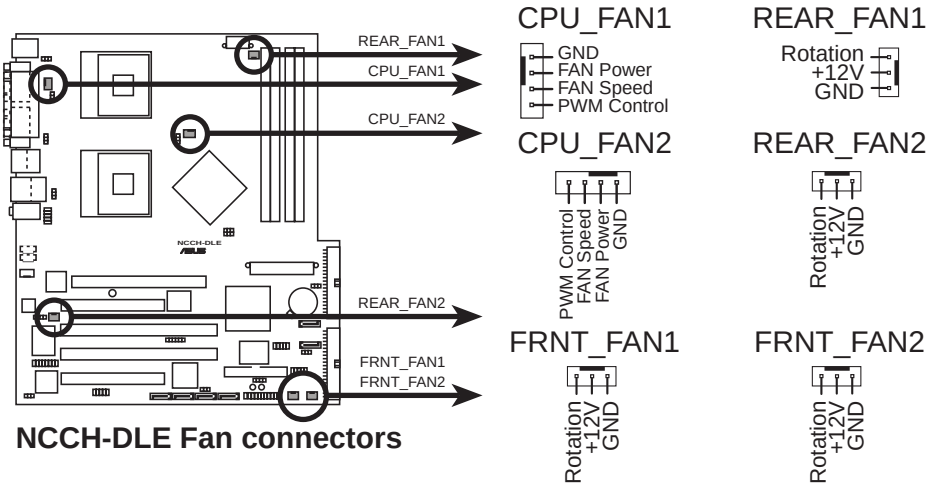


NCCH-DLE Internal audio connectors

14. CPU and system fan connectors (4-pin CPU_FAN1/2, 3-pin REAR_FAN1/2, 3-pin FRNT_FAN1/2)

The fan connectors support cooling fans of 350mA~740mA (8.88W max.) or a total of 2.1A~4.44A (53.28W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

The CPU fan connectors support either a 3-pin or a 4-pin fan cable plug. Both connectors are slotted to ensure connection in correct orientation.

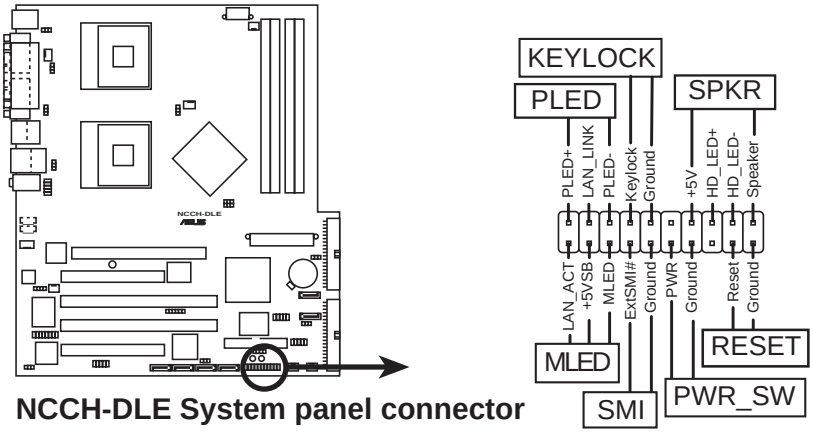


NCCH-DLE Fan connectors

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

15. System panel connector (20-pin PANEL1)

This connector accommodates several system front panel functions.



NCCH-DLE System panel connector

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

  This lead connects to the system power LED. The LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Message LED (2-pin MLED)**

  This lead connects to the message LED cable on the front panel and indicates the booting status. The LED blinks when the system is in the boot process until the operating system is loaded.

- **System warning speaker (4-pin SPEAKER)**

  This lead connects to the case-mounted speaker and allows you to hear system beeps and warnings.

- **Hard disk activity (2-pin HD_LED)**

  This lead connects the HDD LED cable. The read or write activities of the device connected to the any of IDE connectors cause the IDE LED to light up.

- **Power switch / Soft-off switch (2-pin PWR_SW)**

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

- **Reset switch (2-pin RESET)**

  This lead connects to the chassis-mounted reset switch for rebooting the system without turning off the system power.

- **System Management Interrupt (2-pin SMI)**

  This lead connects to the chassis-mounted suspend switch. This feature allows you to manually put the system into suspend mode, or “green” mode, where system activity is instantly decreased to save power and to expand the life of certain system components.

This chapter describes the power up sequence, BIOS beep codes, and ways of shutting down the system.

3 Powering up

Chapter summary

3

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off.
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:

a. Monitor

b. External SCSI devices (starting with the last device on the chain)

c. System power

6. After applying power, the power LED on the system front panel case lights up. For SSI-type power supplies, the system LED lights up when you press the power switch. If your monitor complies with "green" standards or if it has a "power standby" feature, the monitor LED may light up or switch between orange and green after the system LED turns on. The system then runs the power-on tests. While the tests are running, the BIOS beeps (see BIOS beep codes table below) or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

Phoenix-Award BIOS beep codes

No. of Beeps	Description
2	Parity error
3	Main memory read/write test error
4	Motherboard timer not operational
6	Keyboard controller BAT test error
7	General exception error
8	Display memory error
10	CMOS shutdown register read/write error

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

3.2 Vocal POST Messages

This motherboard includes the Winbond speech controller to support a special feature called the ASUS POST Reporter™. This feature gives you vocal POST messages and alerts to inform you of system events and boot status. In case of a boot failure, you will hear the specific cause of the problem.

These POST messages are customizable using the Winbond Voice Editor software that came with your package. You can record your own messages to replace the default messages.

Following is a list of the default POST messages and their corresponding actions, if any.

POST message	Action
No CPU installed	• Install an Intel® Xeon™ Processor into the CPU socket.
System failed CPU test	• Check the CPU if properly installed. • Call ASUS technical support for assistance. See the "ASUS contact information."
System failed memory test	• Install 184-pin unbuffered ECC or non-ECC PC3200/2700/2100 DIMMs into the DIMM sockets. • Check if the DIMMs on the sockets are properly installed. • Make sure that the DIMMs are not defective. • Refer to section "2.4 System memory" for instruction on installing a DIMM.
System failed VGA test	• Install a PCI VGA card into one of the PCI slots, or a +0.8V/1.5V AGP card into the AGP slot. • Make sure that your VGA/AGP card is not defective.
System failed due to CPU	• Check your CPU settings in BIOS over-clocking and make sure you only set to the recommended settings.

POST message	Action
No keyboard detected	• Check your keyboard if properly connected to the purple PS/2 connector on the rear panel. • See section “2.7.1 Rear panel connectors” for the location of the connector.
No floppy disk detected	• Make sure you have connected a floppy disk to the floppy disk connector on the motherboard. • See section “2.7 Connectors.”
No IDE hard disk detected	• Make sure you have connected an IDE hard disk drive to the one of the IDE connectors on the motherboard. • See section “2.7 Connectors.”
CPU temperature too high	• Check CPU fan if working properly.
CPU fan failed	• Check the CPU fan and make sure it turns on after you applied power to the system. • Make sure that your CPU fan supports the fan speed detection function.
CPU voltage out of range	• Check your power supply and make sure it is not defective. • Call ASUS technical support for assistance. See the “ASUS contact information.”
System completed Power-On Self Test	• No action required Computer now booting to operating • No action required system

3.3 Powering off the computer

3.3.1 Using the OS shut down function

If you are using Windows® 2000 Professional or Windows® 2000 Server:

1. Click the **Start** button then click **Shut Down...**
2. Make sure that the **Shut down** option button is selected, then click the **OK** button to shut down the computer.
3. The power supply should turn off after Windows® shuts down.

If you are using Windows® XP or Windows® Server 2003:

1. Click the **Start** button then select **Turn Off Computer.**
2. Click the **Turn Off** button to shut down the computer.
3. The power supply should turn off after Windows® shuts down.

3.3.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than 4 seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than 4 seconds lets the system enter the soft-off mode regardless of the BIOS setting. See section "4.5 Power Menu" in Chapter 4.

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

4 BIOS setup

Chapter summary

4.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup.

1. **Award BIOS** Flash Utility (Updates the BIOS in DOS mode using a floppy disk.)
2. **ASUS CrashFree BIOS 2** (Updates the BIOS using a bootable floppy disk or the motherboard support CD when the BIOS file fails or gets corrupted.)
3. **ASUS EZ Flash** (Updates the BIOS in DOS mode using a floppy disk or the motherboard support CD.)
4. **ASUS Update** (Updates the BIOS in Windows® environment.)

Refer to the corresponding sections for details on these utilities.

Save a copy of the original motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update or Award BIOS Flash utilities.

4.1.1 Creating a bootable floppy disk

This barebone system does not include a floppy disk drive. Connect an external floppy disk drive (USB interface) to any of the USB 2.0 ports on the front or rear panel if you need to use a floppy disk.

1. Do either one of the following to create a bootable floppy disk.

   DOS environment

   a. Insert a 1.44MB floppy disk into the drive.
   b. At the DOS prompt, type **`format A:/S`** then press <Enter>.

   Windows® XP environment

   a. Insert a 1.44 MB floppy disk to the floppy disk drive.
   b. Click **Start** from the Windows® desktop, then select **My Computer**.
   c. Select the 3 1/2 Floppy Drive icon.
   d. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.
   e. **Windows® XP users:** Select **Create an MS-DOS startup disk** from the format options field, then click **Start**.

Windows® 2000 environment

To create a set of boot disks for Windows® 2000:

a. Insert a formatted, high density 1.44 MB floppy disk into the drive.
b. Insert the Windows® 2000 CD to the optical drive.
c. Click **Start**, then select **Run**.
d. In the **Open** field, type **`D:\bootdisk\makeboot a:`**
   assuming that D is your optical drive letter.
e. Press <Enter>, then follow screen instructions to continue.

2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

4.1.2 AwardBIOS Flash Utility

The Basic Input/Output System (BIOS) can be updated using the AwardBIOS Flash Utility. The following sections tell you how to update the BIOS or how to save the current BIOS file.

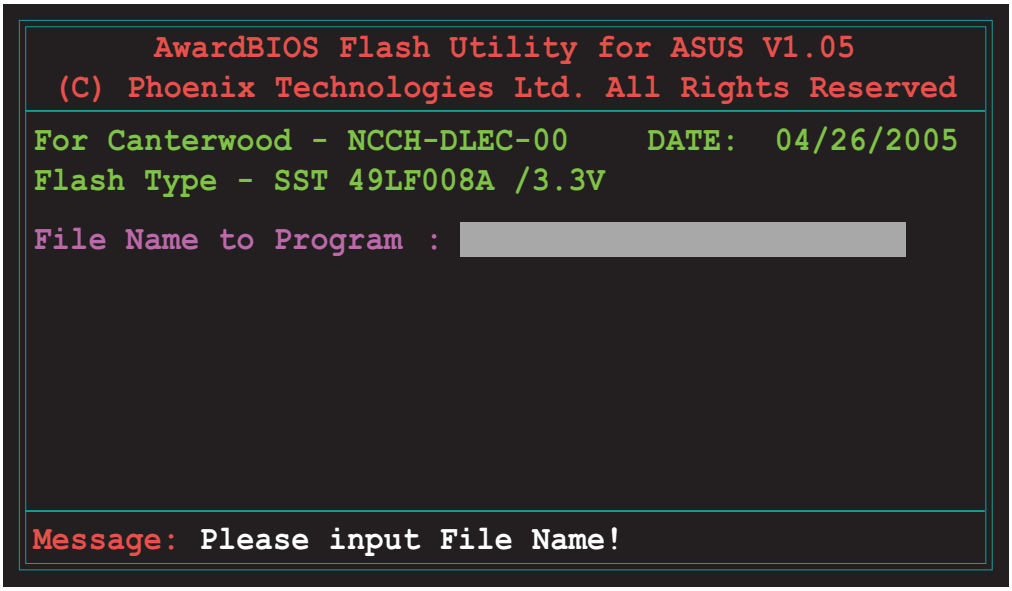
Updating the current BIOS file

To update the current BIOS file:

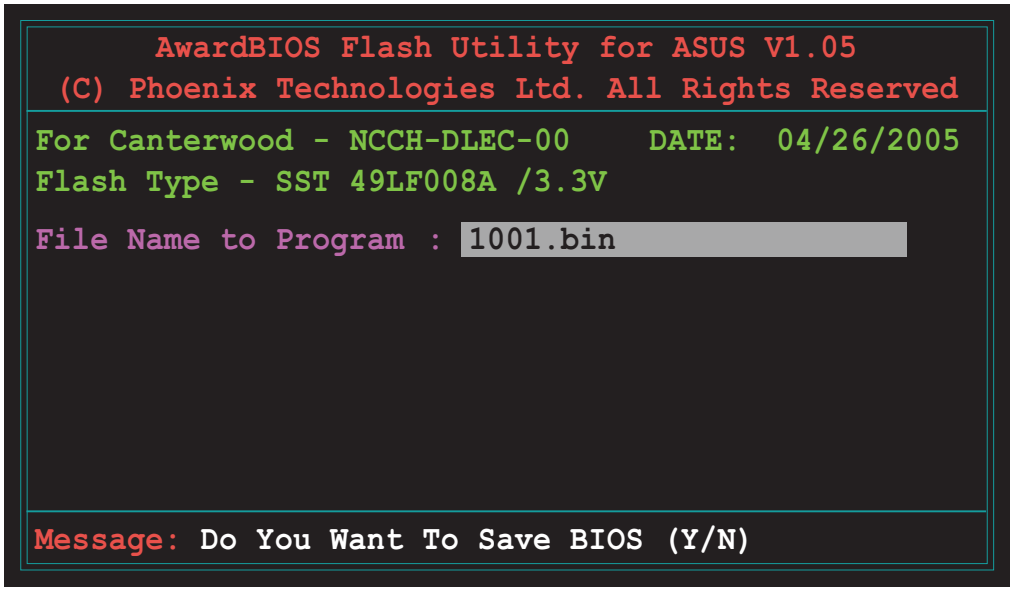
1. Download the latest BIOS file from the ASUS web site. Extract the zipped file, then save it to a floppy disk as ***.BIN**.

Save only the updated BIOS file in the floppy disk to avoid loading the wrong BIOS file.

2. Copy the AwardBIOS Flash Utility (awdflash.exe) from the Software folder of the support CD to the floppy disk with the latest BIOS file.
3. Boot the system in DOS mode using the bootable floppy disk you created earlier.
4. When the A:> appears, replace the bootable floppy disk with the floppy disk containing the new BIOS file and the Award BIOS Flash Utility.
5. At the prompt, type awdflash then press <Enter>. The Award BIOS Flash Utility screen appears.



6. Type the BIOS file name in the File Name to Program field, then press <Enter>.

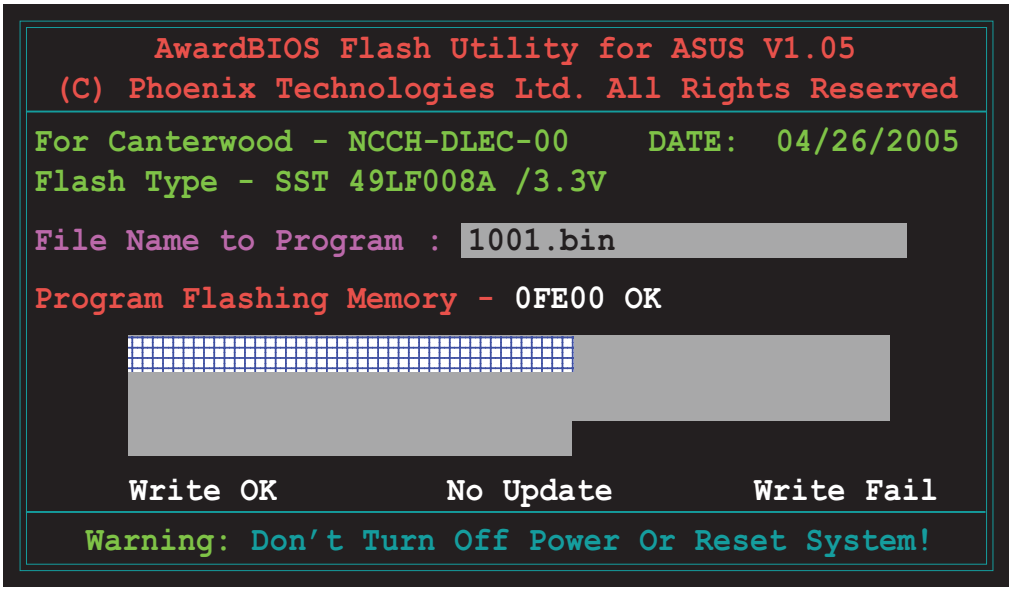


7. The utility prompts you to save the current BIOS file. Press <Y> to save the current BIOS file to the floppy disk, or <N> to continue.

If you intend to save the current BIOS file, make sure that the floppy disk has enough disk space to save the file. See the next section for details on saving the current BIOS file.

8. The utility verifies the BIOS file in the floppy disk and starts flashing the BIOS file.

Do not turn off or reset the system during the flashing process!



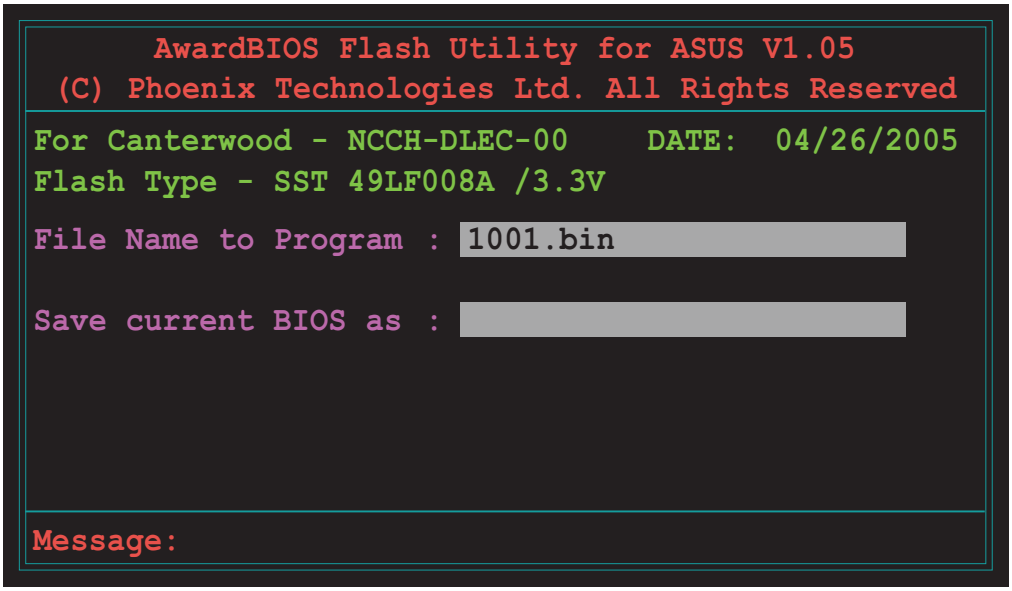
9. After the flashing process is completed, press <F1> to restart your computer.

Copying the current BIOS file

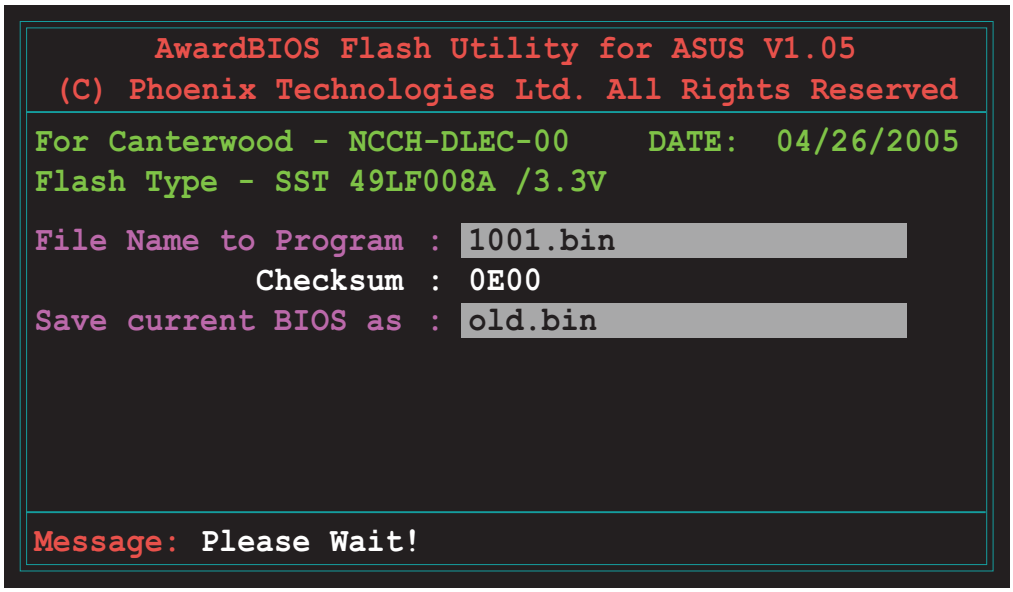
You can use the AwardBIOS Flash Utility to save the current BIOS file. You can load the current BIOS file when the BIOS file gets corrupted during the flashing process.

To save the current BIOS file using the AwardBIOS Flash Utility:

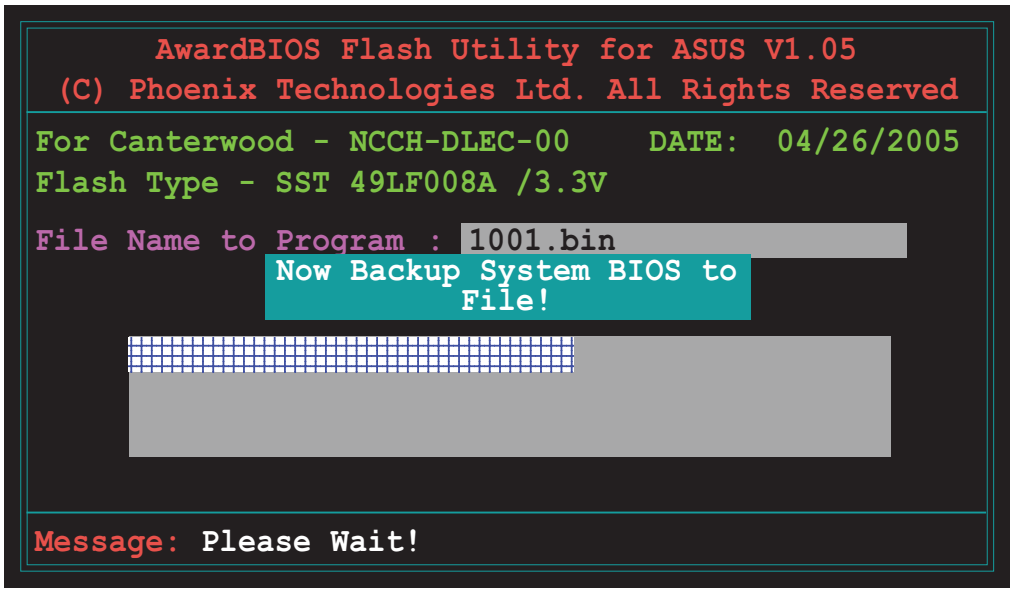
1. Follow steps 1 to 6 of the previous section.
2. Press <Y> when the utility prompts you to save the current BIOS file. The following screen appears.



3. Type a filename for the current BIOS file in the Save current BIOS as field, then press <Enter>.



4. The utility saves the current BIOS file to the floppy disk, then returns to the BIOS flashing process.



4.1.3 ASUS CrashFree BIOS 2 utility

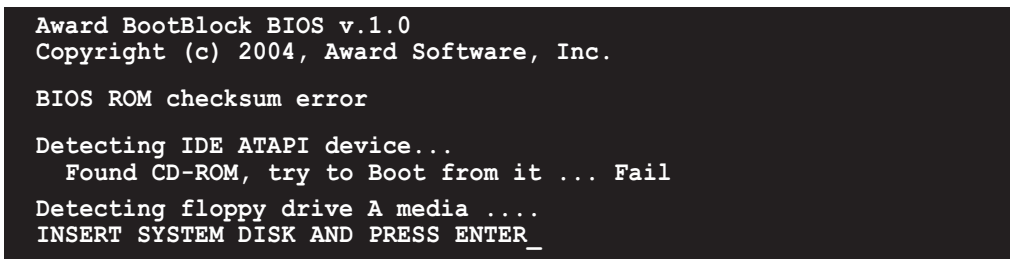
The ASUS CrashFree BIOS 2 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using the floppy disk that contains the updated BIOS file and the AwardBIOS Flash Utility or the motherboard support CD.

Prepare the floppy disk containing the updated motherboard BIOS and the AwardBIOS Flash Utility or the motherboard support CD before using this utility.

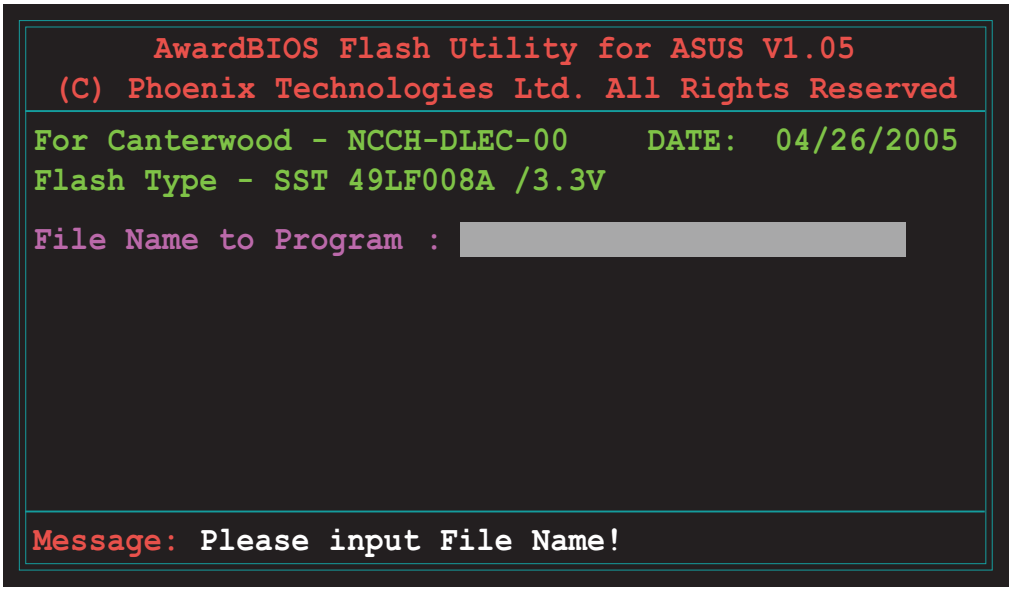
Recovering the BIOS from a floppy disk

To recover the BIOS from a floppy disk:

1. Turn on the system, then insert the bootable floppy disk to the floppy disk drive. The following screen appears when the BIOS file is corrupted.



2. Press <Enter>. When the A:> appears, replace the bootable floppy disk with the floppy disk containing the new BIOS file and the Award BIOS Flash Utility.
3. At the prompt, type awdflash then press <Enter>. The Award BIOS Flash Utility screen appears.



4. Update the BIOS file following the instructions on the section "AwardBIOS Flash Utility".

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

Recovering the BIOS from the support CD

To recover the BIOS from the support CD:

1. Place the motherboard support CD to the optical drive, remove any floppy disk from the floppy disk drive, then restart the system. The following screen appears when the BIOS file is corrupted.

```
Award BootBlock BIOS v.1.0
Copyright (c) 2004, Award Software, Inc.

BIOS ROM checksum error

Detecting IDE ATAPI device...
  Found CD-ROM, try to Boot from it ... Pass
  1. FD 1.44MB  System Type-(00)
Loading FreeDOS  FAT KERNEL GO!
Press any key to boot from CDROM...
```

2. When prompted, press any key to boot from the CD. The CD loads the boot files to the system, then prompts you to recover the BIOS file.

```
The BIOS was corrupted! Do you want to recover (y/n)?
```

3. Press <Y>. The following screen appears.

```
Would you like to FLASH bios now? (y/n)
Yes or No _
```

4. Press <Y>. The AwardBIOS Flash Utility appears.

```
      AwardBIOS Flash Utility for ASUS V1.05
 (C) Phoenix Technologies Ltd. All Rights Reserved

For Canterwood - NCCH-DLEC-00     DATE:  04/26/2005
Flash Type - SST 49LF008A /3.3V

File Name to Program :

Message: Please input File Name!
```

The AwardBIOS Flash Utility searches the support CD for the updated BIOS file. When found, the utility automatically updates the BIOS, then restarts the system.

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

4.1.4 ASUS EZ Flash utility

The ASUS EZ Flash feature allows you to update the BIOS without having to go through the long process of booting from a floppy disk and using a DOS-based utility. The EZ Flash utility is built-in the BIOS chip so it is accessible by pressing <Alt> + <F2> during the Power-On Self Tests (POST).

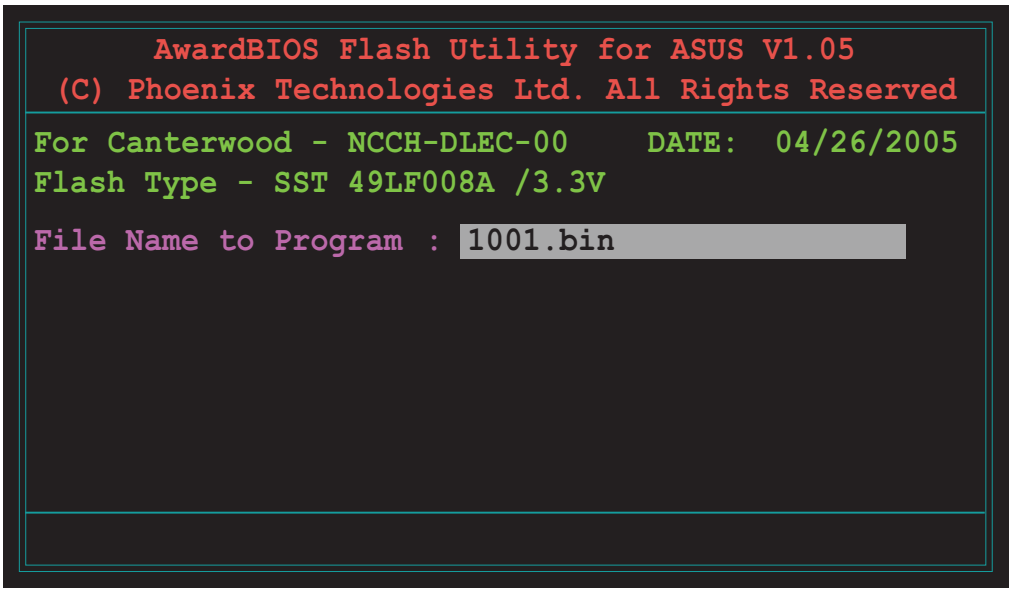
To update the BIOS using EZ Flash:

1. Visit the ASUS website (www.asus.com) to download the latest BIOS file for the motherboard.
2. Save the BIOS file to a floppy disk, then restart the system.
3. Press <Alt> + <F2> during POST to display the following.

```
Insert Disk press Enter or Esc to continue POST
```

4. Insert the floppy disk that contains the BIOS file to the floppy disk drive, then press <Enter>. When the correct BIOS file is found, EZ Flash opens the AwardBIOS Flash Utility.

   The AwardBIOS Flash Utility searches the floppy disk for the updated BIOS file. When found, the utility automatically updates the BIOS, then restarts the system.



- Do not shutdown or reset the system while updating the BIOS to prevent system boot failure!
- A “Source File Not Found!” error message appears if the correct BIOS file is not found in the floppy disk.

4.1.5 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment. The ASUS Update utility allows you to:

- Save the current BIOS file
- Download the latest BIOS file from the Internet
- Update the BIOS from an updated BIOS file
- Update the BIOS directly from the Internet, and
- View the BIOS version information.

This utility is available in the support CD that comes with the motherboard package.

ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).

Installing ASUS Update

To install ASUS Update:

1. Place the support CD in the optical drive. The **Drivers** menu appears.
2. Click the **Utilities** tab, then click **Install ASUS Update VX.XX.XX**.
3. The ASUS Update utility is copied to your system.

Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS through the Internet

To update the BIOS through the Internet:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start** > **Programs** > **ASUS** > **ASUSUpdate** > **ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from the Internet** option from the drop-down menu, then click **Next**.

3. Select the ASUS FTP site nearest you to avoid network traffic, or click **Auto Select**. Click **Next**.

4. From the FTP site, select the BIOS version that you wish to download. Click Next.
5. Follow the screen instructions to complete the update process.

The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

Updating the BIOS through a BIOS file

To update the BIOS through a BIOS file:

1. Launch the ASUS Update utility from the Windows® desktop by clicking **Start** > **Programs** > **ASUS** > **ASUSUpdate** > **ASUSUpdate**. The ASUS Update main window appears.
2. Select **Update BIOS from a file** option from the drop-down menu, then click **Next**.

3. Locate the BIOS file from the **Open** window, then click **Save**.
4. Follow the screen instructions to complete the update process.

4.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section "4.1 Managing and updating your BIOS."

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

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

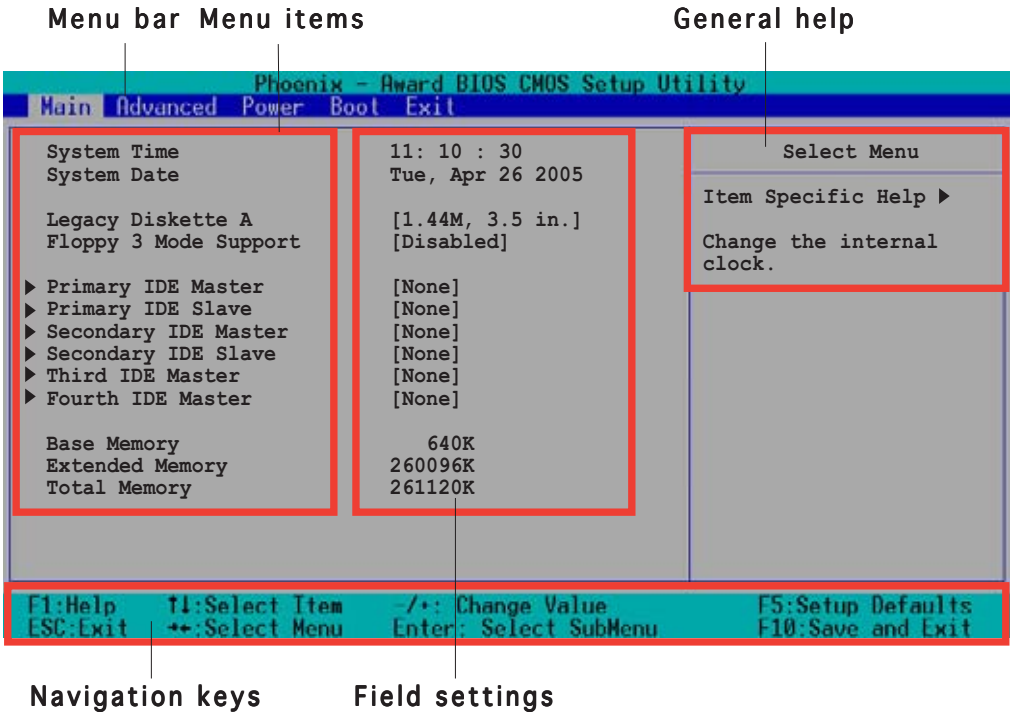
The firmware hub on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

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

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section "4.7 Exit Menu."
- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

4.2.1 BIOS menu screen



4.2.2 Menu bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration settings
Advanced	For changing the advanced system settings
Power	For changing the power configuration settings
Boot	For changing the system boot configuration settings
Exit	For selecting the exit options and loading default settings

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

4.2.3 Navigation keys

At the **bottom** of a menu screen are the navigation keys for that particular menu. Use the navigation keys to select items in the menu and change the settings.

The navigation keys differ from one screen to another.

4.2.4 General help

On the right side of the menu screen is a brief description of the selected item.

4.2.5 Sub-menu

An item with a sub-menu on any menu screen is distinguished by a solid triangle before the item. To display the sub-menu, select the item and press <Enter>.

4.2.6 Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press **Up/Down arrow keys** or **PageUp/PageDown keys** to display the other items on the screen.

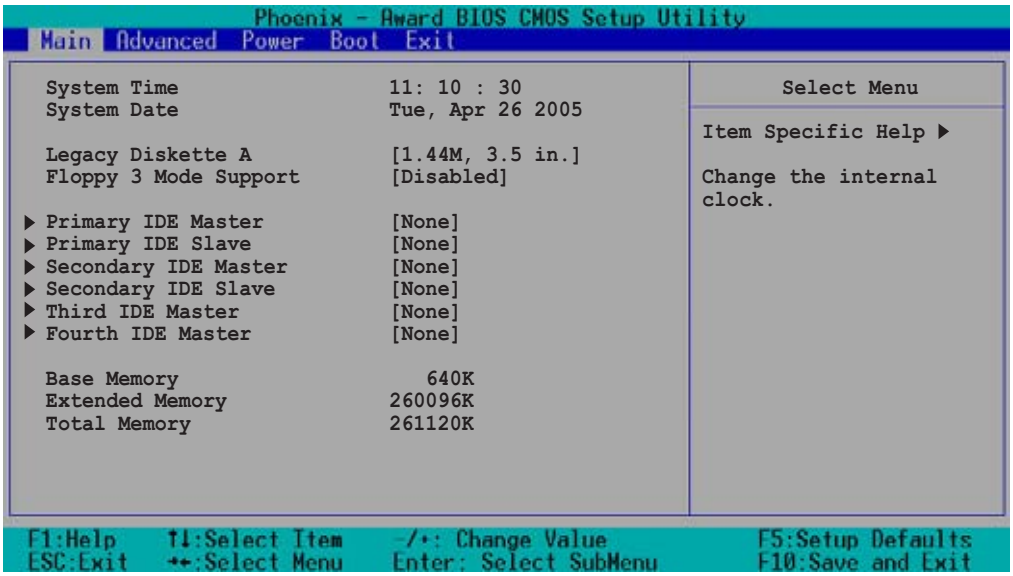
4.2.7 Pop-up window

Select an item in the menu, then press <Enter> to display a pop-up window with the configuration options for that item.

4.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears giving you an overview of the basic system information.

Refer to section "4.2.1 BIOS menu screen" for information on the menu screen items and how to navigate through them.



System Time (hh:mm:ss)

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

System Date (mm:dd:yy)

Sets the system to the date that you specify (usually the current date). The format is month:day:year. Valid values for month, day, and year are Month: (1 to 12), Day: (1 to 31), Year: (1999 to 2099). Use the <Tab> key to move between the month, day, and year fields.

Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration options: [Disabled] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

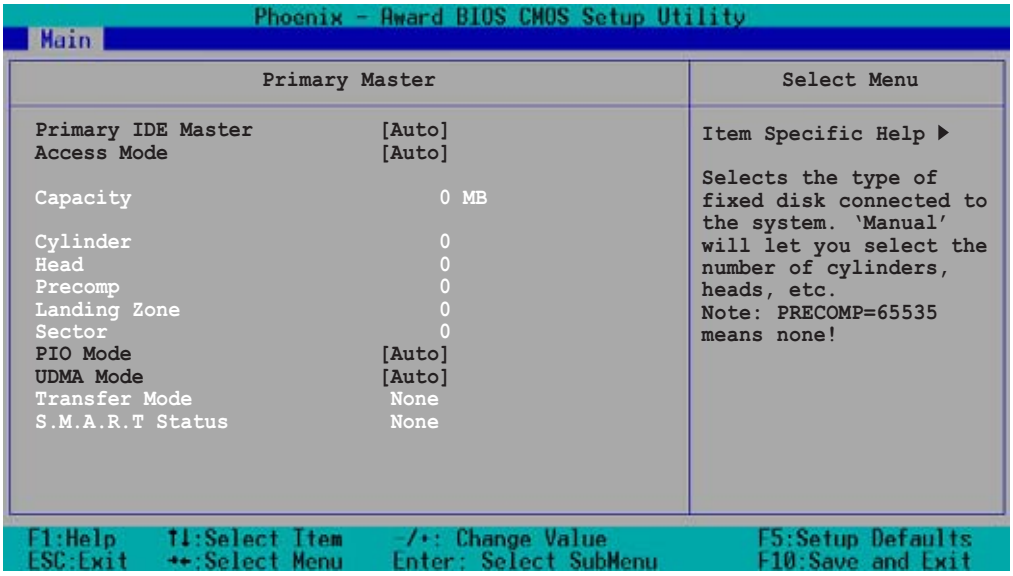
Floppy 3 Mode Support [Disabled]

Enables support for older Japanese floppy drives. The Floppy 3 Mode feature allows reading and writing of 1.28 MB (as opposed to 1.44 MB) on a 3.5-inch floppy disk. Configuration options: [Disabled] [Drive A]

Base/Extended/Total Memory [xxxK]

The base memory, extended memory, and total memory values are auto-detected. These fields are not user-configurable.

4.3.1 Primary IDE Master



Primary IDE Master [Auto]

Select [Auto] to automatically detect an IDE drive. If automatic detection is successful, the setup BIOS automatically fills in the correct values for the remaining fields on this sub-menu.

If automatic detection fails, this may be because the IDE drive is too old or too new. If the drive was already formatted on a previous system, the BIOS may detect incorrect parameters. In these cases, select [Manual] to manually enter the IDE drive parameters. Refer to the section "Manually detecting an IDE drive."

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

The IDE drive information items are grayed out when this item is set to [Auto].

Access Mode [Auto]

Allows selection of the sector addressing mode. The default [Auto] allows automatic detection of an IDE drive. Set this item to [CHS] if the **Primary IDE Master** item is set to [Manual] so you can manually enter the drive values. Configuration options: [CHS] [LBA] [Large] [Auto]

PIO Mode [Auto]

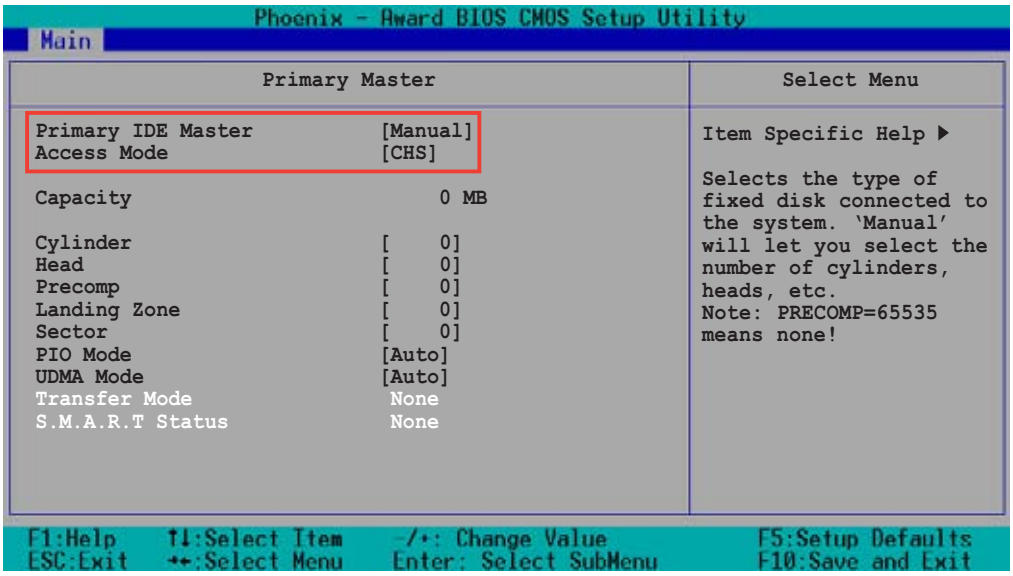
Sets the PIO mode for the IDE drive. The settings Mode 0 to 4 allow successive increase in performance. Configuration options: [Auto] [Mode 0] [Mode 1] [Mode 2] [Mode 3] [Mode 4]

UDMA Mode [Auto]

When this item is set to [Auto], the UDMA capability allows improved transfer speeds and data integrity for supported IDE drives. Configuration options: [Disabled] [Auto]

Manually detecting an IDE drive

If you wish to manually enter the drive information, set the Primary IDE Master item to [Manual], and the Access Mode item to [CHS].



Before attempting to manually configure an IDE drive, make sure that you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed IDE drive!

To manually enter the number of cylinder, head, precomp, landing zone, and sector per track for the drive, highlight an item, key-in the value that you obtained from the drive documentation, then press <Enter>. Refer to the drive documentation or the drive label for this information.

To enter a value, you may also highlight the item, then press <Enter> to display a pop-up menu. Type in the value from the drive documentation, then press <Enter>.

Capacity [xxxxx MB]

Displays the auto-detected hard disk capacity. The value is not user-configurable.

Cylinder

Shows the number of the hard disk cylinders.

Head

Shows the number of the hard disk read/write heads.

Precomp

Displays the precompressed volumes on the hard disk, if any, on the motherboard.

Landing Zone

Displays the drive's maximum usable capacity as calculated by the BIOS based on the drive information you entered.

Sector

Shows the number of sectors per track.

Transfer Mode

Shows the data transfer mode if the IDE hard disk drive supports the feature. Otherwise, this item is grayed out and shows the value [None].

S.M.A.R.T. Status

Shows the Smart Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) status if the IDE hard disk drive supports the feature. Otherwise, this item is grayed out and shows the value [None].

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

4.3.2 Primary IDE Slave

When configuring a drive as Primary IDE Slave, refer to section "4.3.1 Primary IDE Master" for the menu item descriptions.

4.3.3 Secondary IDE Master

When configuring a drive as Secondary IDE Master, refer to section "4.3.1 Primary IDE Master" for the menu item descriptions.

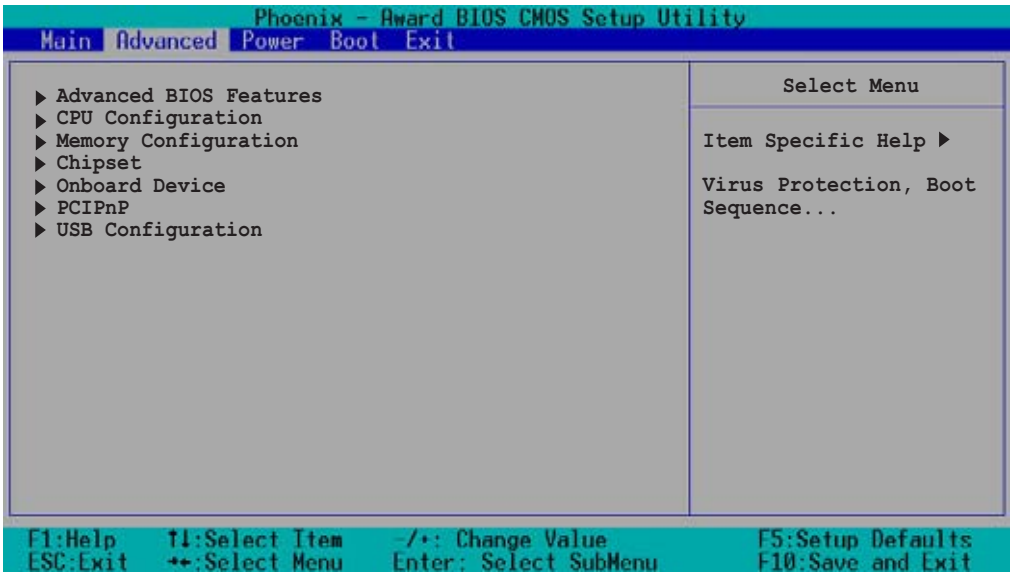
4.3.4 Secondary IDE Slave

When configuring a drive as Secondary IDE Slave, refer to section "4.3.1 Primary IDE Master" for the menu item descriptions.

4.4 Advanced menu

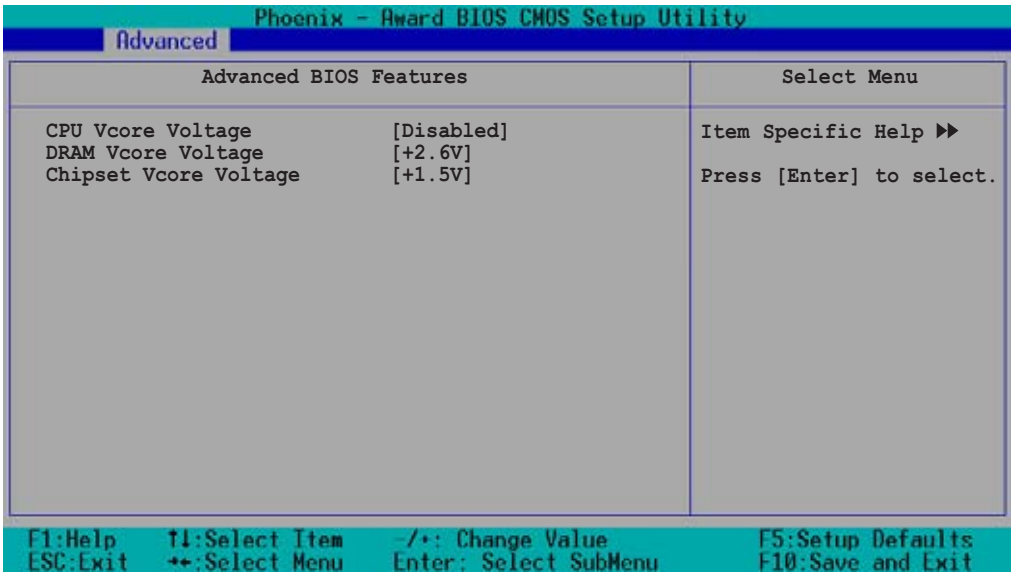
The Advanced menu items allow you to change the settings for the CPU, memory, chipset, and other system devices.

Take caution when changing the settings of the Advanced menu items. Incorrect field values may cause the system to malfunction!



4.4.1 Advanced BIOS Features

This menu shows the console redirection and agent information. Select an item then press <Enter> to display a pop-up menu with the configuration options.



CPU Vcore Voltage [Disabled]

Allows you to select the CPU Vcore voltage.
Configuration options: [Disabled] [+100 mV] [+200 mV] [+300 mV]

DRAM Vcore Voltage [+2.6V]

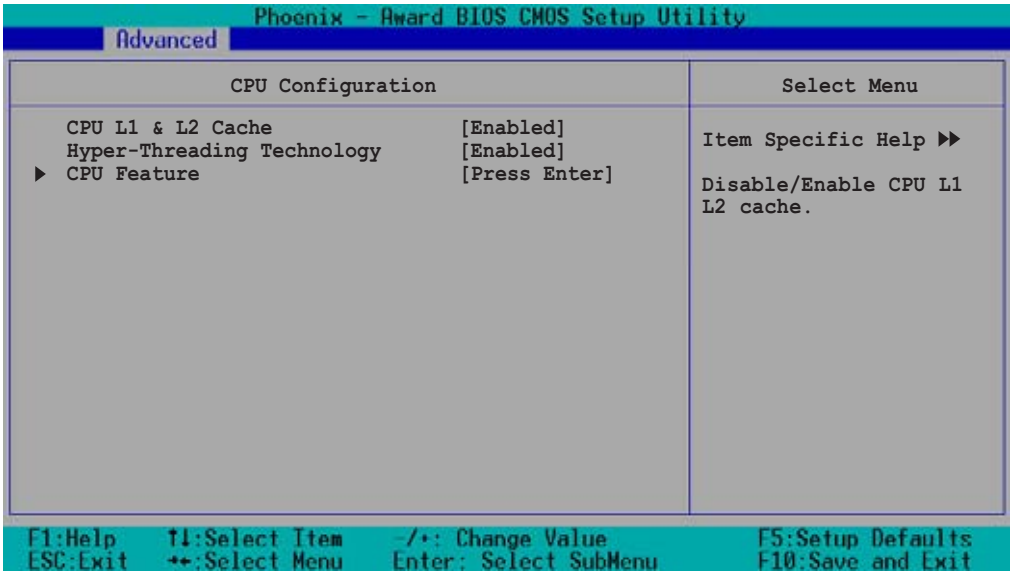
Allows you to select the DRAM Vcore voltage.
Configuration options: [+2.5V] [+2.6V] [+2.7V] [+2.8V] [+2.9V] [+3.0V] [+3.1V] [+3.2V]

Chipset Vcore Voltage [+1.5V]

Allows you to select the chipset Vcore voltage.
Configuration options: [+1.8V] [+1.7V] [+1.6V] [+1.5V]

4.4.2 CPU Configuration

This menu shows the CPU configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.



CPU L1 & L2 Cache [Enabled]

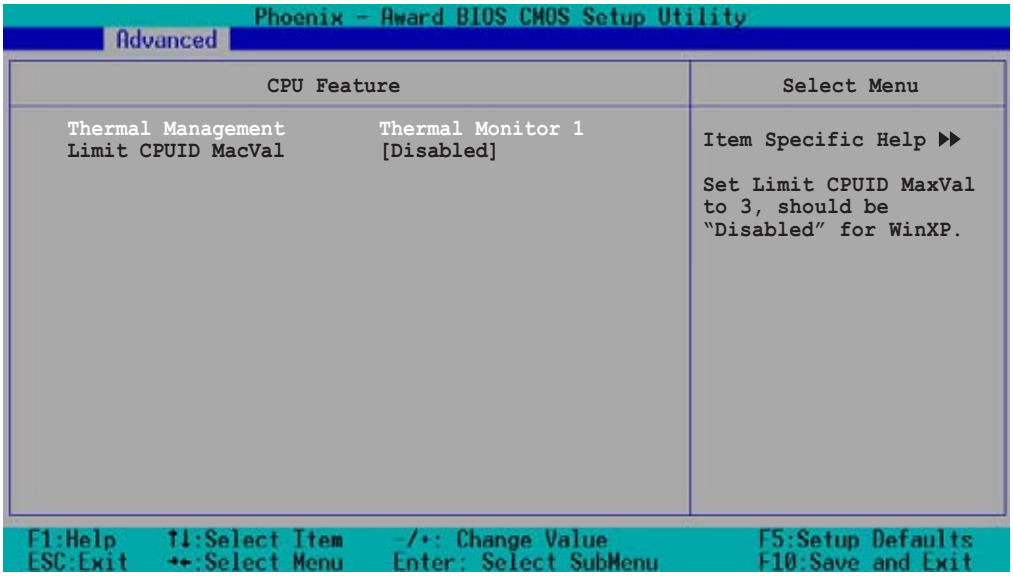
Allows you to enable or disable the CPU L1 and L2 cache.
Configuration options: [Disabled] [Enabled]

Hyper-Threading Technology [Enabled]

Allows you to enable or disable the processor Hyper-Threading Technology.
Configuration options: [Disabled] [Enabled]

CPU Feature [Press Enter]

Allows you to enable or disable the Hyper-Threading Technology.
Configuration options: [Disabled] [Enabled]



Thermal Management [Thermal Monitor 1]

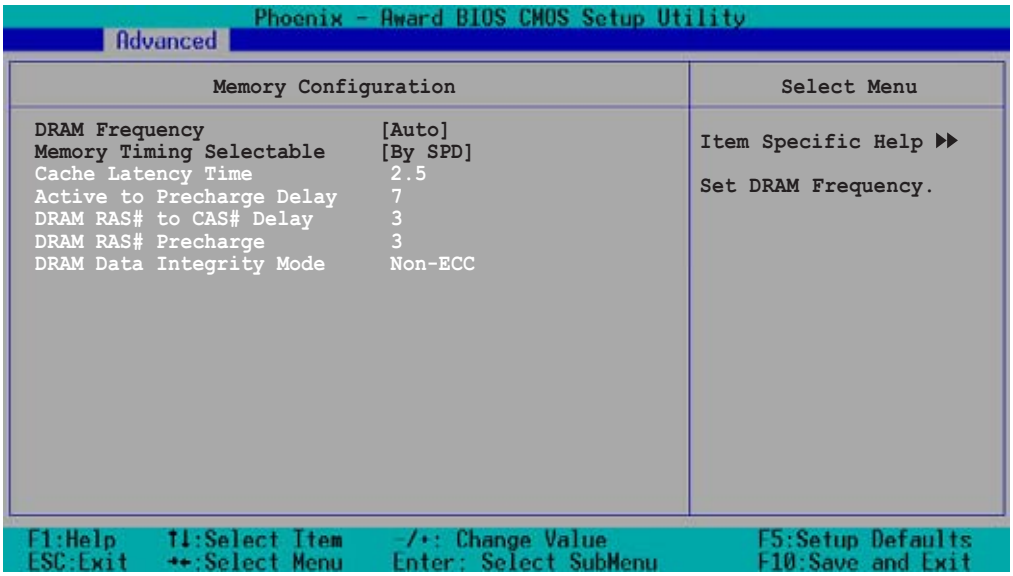
This item is not user-configurable.

Limit CPUID MaxVal [Disabled]

Sets the CPUID maximum value to 3. Set this item to [Disabled] in Windows XP operating system. Configuration options: [Disabled] [Enabled]

4.4.3 Memory Configuration

This menu shows the memory configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.



DRAM Frequency [Auto]

This item sets the DRAM operating frequency.
Configuration options: [DDR266] [DDR320] [DDR400] [Auto]

Memory Timing Selectable [By SPD]

The DRAM clock are set according to the DRAM SPD (Serial Presence Detect). Select [By SPD] for automatic DRAM clock detection. Select [Manual] to allow setting the succeeding memory items to optimal timings.
Configuration options: [Manual] [By SPD]

The items CAS Latency Time, Active to Precharge Delay, DRAM RAS# to CAS# Delay, and DRAM RAS# Precharge are configurable only when the Memory Timing Selectable item is set to [Manual].

CAS Latency Time [2.5]

This item sets the latency (in clocks) between the DRAM read command and the time the data actually becomes available.
Configuration options: [2] [2.5] [3]

Active to Precharge Delay [7]

This item controls the number of DRAM clocks used for DRAM parameters.
Configuration options: [8] [7] [6] [5]

DRAM RAS# to CAS# Delay [3]

Controls the latency between the DRAM active command and the read/ write command. Configuration options: [4] [3] [2]

DRAM RAS# Precharge [3]

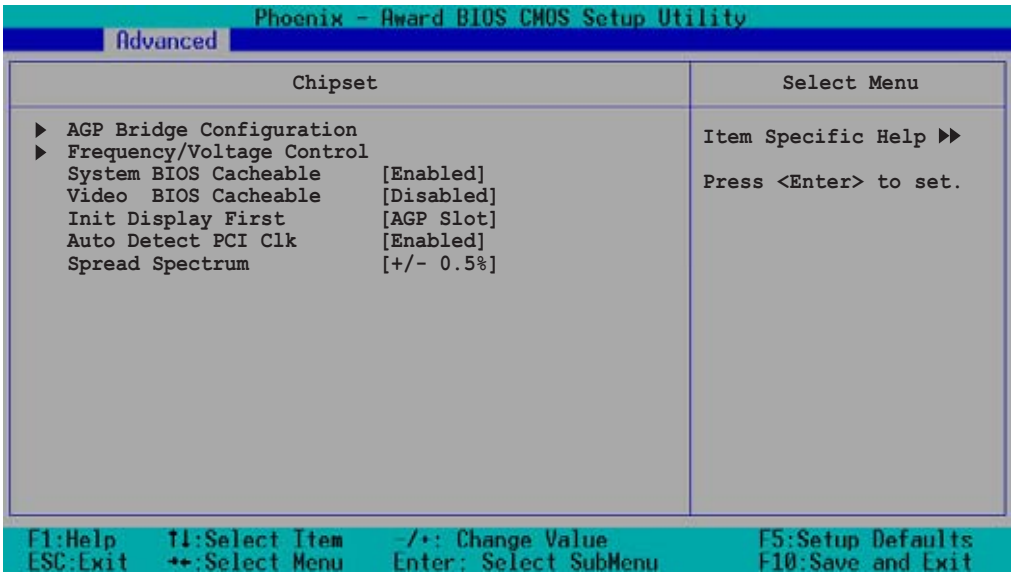
This item controls the idle clocks after issuing a precharge command to the DDR SDRAM. Configuration options: [4] [3] [2]

DRAM Data Integrity Mode [Non-ECC]

This item is not user-configurable and set to [Non-ECC] by default.

4.4.4 Chipset

This menu shows the chipset configuration settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.



System BIOS Cacheable [Enabled]

Allows you to enable or disable the cache function of the system BIOS. Configuration options: [Disabled] [Enabled]

Video BIOS Cacheable [Disabled]

Allows you to enable or disable the cache function of the video BIOS. Setting to [Enabled] improves the display speed by caching the display data. Configuration options: [Disabled] [Enabled]

Init Display First [AGP Slot]

Allows you to select the graphics controller to use as primary boot device.
Configuration options: [PCI VGA Card] [AGP Slot]

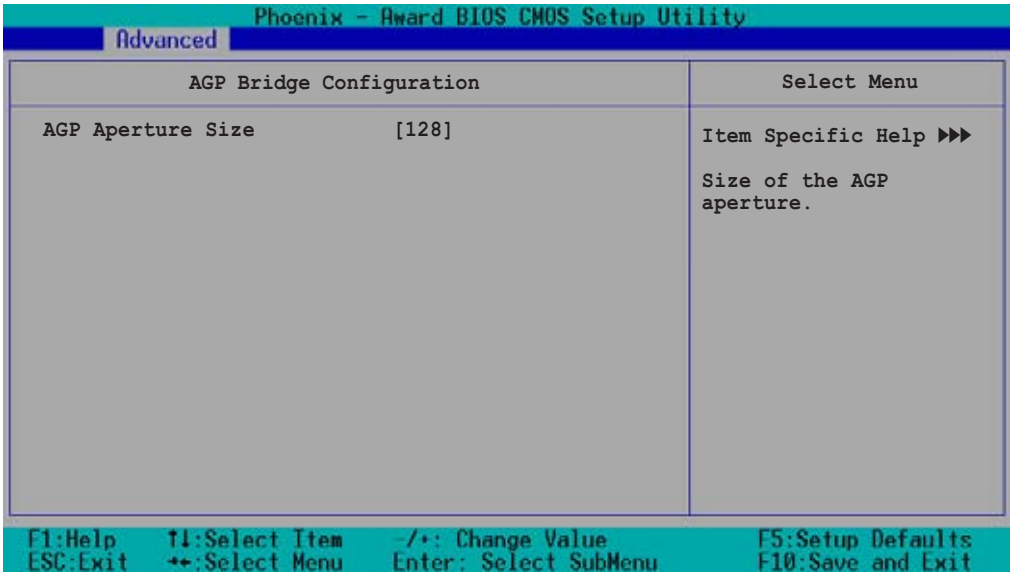
Auto Detect PCI Clk [Enabled]

Allows you to select the maximum PCI bus speed to be programmed.
Configuration options: [Enabled] [Disabled]

Spread Spectrum [+/- 0.5%]

Allows you to select the clock generator spread spectrum.
Configuration options: [Disabled] [+/- 0.1%] [+/- 0.2%] [+/- 0.3%] [+/- 0.4%] [+/- 0.5%] [+/- 0.6%] [+/- 0.7%] [+/- 0.8%] [+/- 0.9%] [+/- 1.0%]

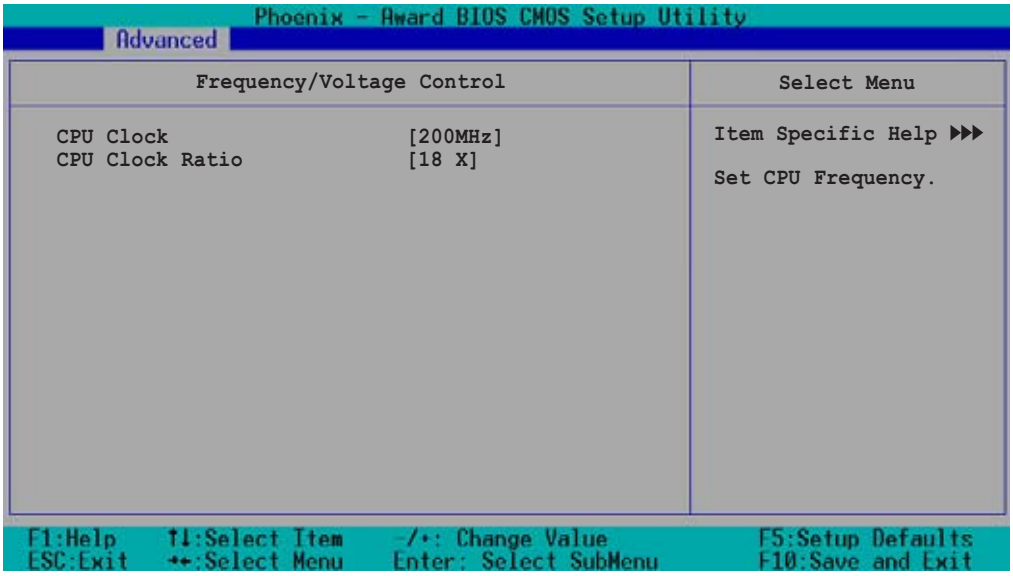
AGP Bridge Configuration



AGP Aperture Size [128]

Allows you to select the size of the AGP aperture.
Configuration options: [4] [8] [16] [32] [64] [128] [256]

Frequency/Voltage Control



CPU Clock [200MHz]

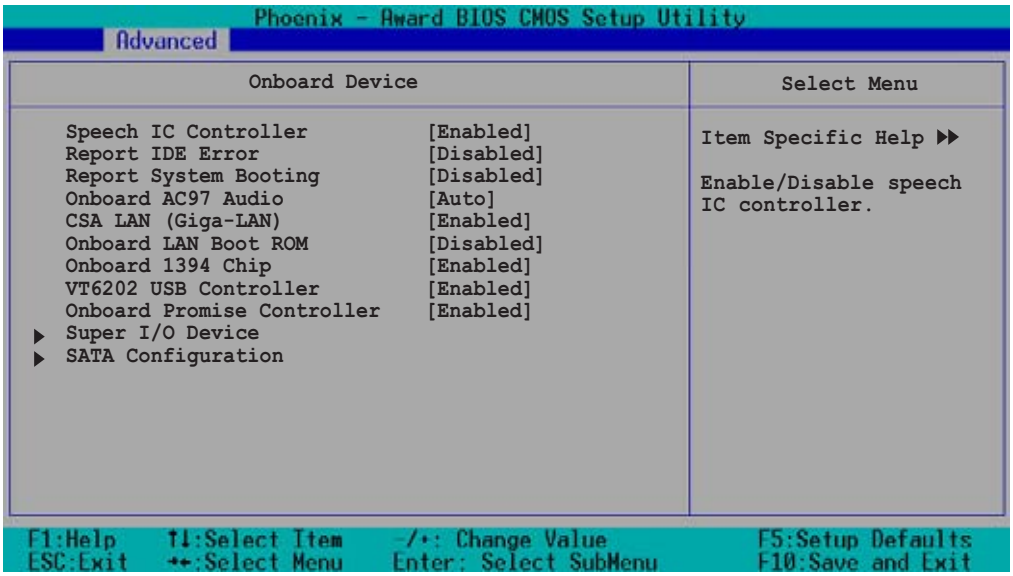
Allows you to set the CPU clock frequency. Highlight this item then press <Enter> to display a pop-up menu. Type in the value then press <Enter>. Configuration options: [Min = 200; Max = 250]

CPU Clock Ratio [18 X]

This option allows you to set the ratio between the CPU core clock and the front side bus frequency. Highlight this item then press <Enter> to display a pop-up menu. Type in the value then press <Enter>.
Configuration options: [Min = 14; Max = 18]

4.4.5 Onboard Device

This menu shows the onboard device configuration settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.



Speech IC Reporter [Enabled]

Enables or disables the speech IC controller. Configuration options: [Disabled] [Enabled]

Report IDE Error [Disabled]

Enables or disables the speech IC IDE error report. Configuration options: [Disabled] [Enabled]

Report System Booting [Disabled]

Enables or disables the speech IC system error report. Configuration options: [Disabled] [Enabled]

Onboard AC97 Audio [Enabled]

Enables or disables the onboard AC97 audio controller. Configuration options: [Disabled] [Enabled]

CSA LAN (Giga-LAN) [Enabled]

Allows you to enable or disable the onboard CSA LAN. Configuration options: [Disabled] [Enabled]

Onboard LAN Boot ROM [Disabled]

Allows you to enable or disable the onboard LAN boot ROM. Configuration options: [Disabled] [Enabled]

Onboard 1394 Chip [Enabled]

Allows you to enable or disable the onboard 1394 controller.
Configuration options: [Disabled] [Enabled]

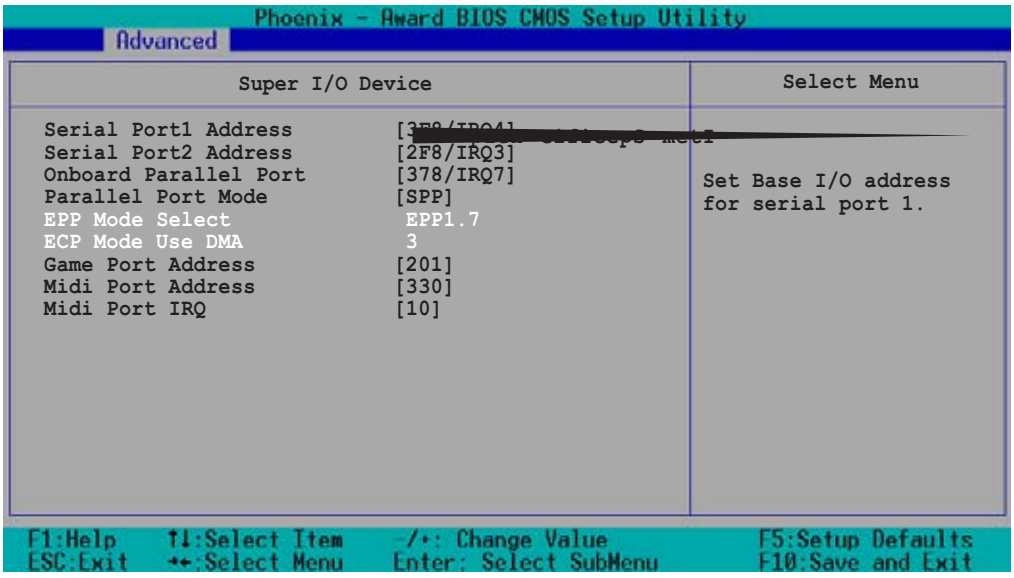
VT6202 USB Controller [Enabled]

Allows you to enable or disable the onboard USB controller.
Configuration options: [Disabled] [Enabled]

Onboard Promise Controller [Enabled]

Allows you to enable or disable the onboard Promise® 20319 RAID controller. Configuration options: [Disabled] [Enabled]

Super I/O Device



Serial Port 1 [3F8/IRQ4]
Serial Port 2 [2F8/IRQ3]

Allow you to select the serial port base addresses.
Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3] [Auto]

Onboard Parallel Port [378/IRQ7]

Allows you to select the parellel port base address.
Configuration options: [Disabled] [378/IRQ7] [278/IRQ5] [3BC/IRQ7]

Parallel Port Mode [SPP]

Allows you to select the parallel port mode.
Configuration options: [SPP] [EPP] [ECP] [ECP+EPP] [Normal]

EPP Mode Select [EPP1.7]

Allows you to select the EPP mode. This item becomes configurable only if the **Parallel Port Mode** is set to [EPP] or [ECP+EPP].l
Configuration options: [EPP 1.9] [EPP 1.7]

ECP Mode Use DMA [3]

Allows you to select the ECP mode. This item becomes configurable only if the **Parallel Port Mode** is set to [ECP] or [ECP+EPP].
Configuration options: [1] [3]

Game Port Address [201]

Allows you to select the game port address.
Configuration options: [Disabled] [201] [209]

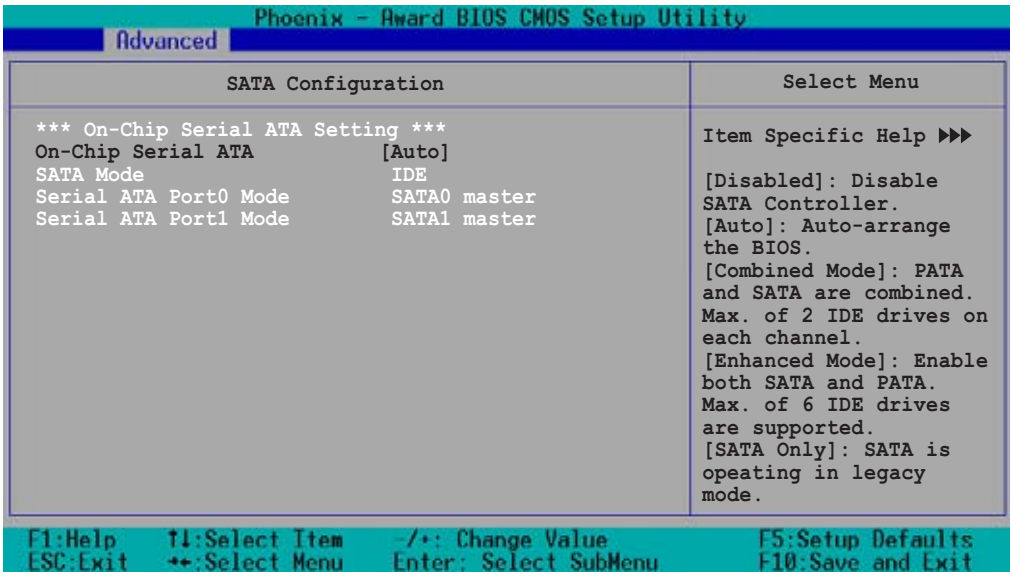
Midi Port Address [330]

Allows you to select the MIDI port address.
Configuration options: [Disabled] [330] [300] [290]

Midi Port IRQ [10]

Allows you to select the MIDI port IRQ. Configuration options: [5] [10]

SATA Configuration



On-Chip Serial ATA Setting

The SATA Mode and Serial ATA Port0 Mode items are configurable only when the On-Chip Serial ATA item is set to [Combined Mode] [Enhanced Mode] or [SATA Only].

On-chip Serial ATA [Auto]

This item allows you to configure your serial ATA devices, if present. Configuration options: [Disabled] [Auto] [Combined Mode] [Enhanced Mode] [SATA Only]

a. Setting to [**Auto**] allows BIOS to automatically configure the SATA devices.

b. Setting to [**Combined Mode**] allows you to install parallel ATA and serial ATA devices at the same time. You may install **two IDE devices on any of the parallel ATA channels**, and **one IDE device on each serial ATA channel** for a maximum of **four** devices. Use ths option when you installed a legacy operating system like MS-DOS, Windows ME/98/NT4.0.

c. Setting to [**Enhanced Mode**] allows you to install parallel ATA and serial ATA devices at the same time, with a maximum of **six** IDE devices on each channel. Use this option when you installed a native operating system like Windows 2000/XP.

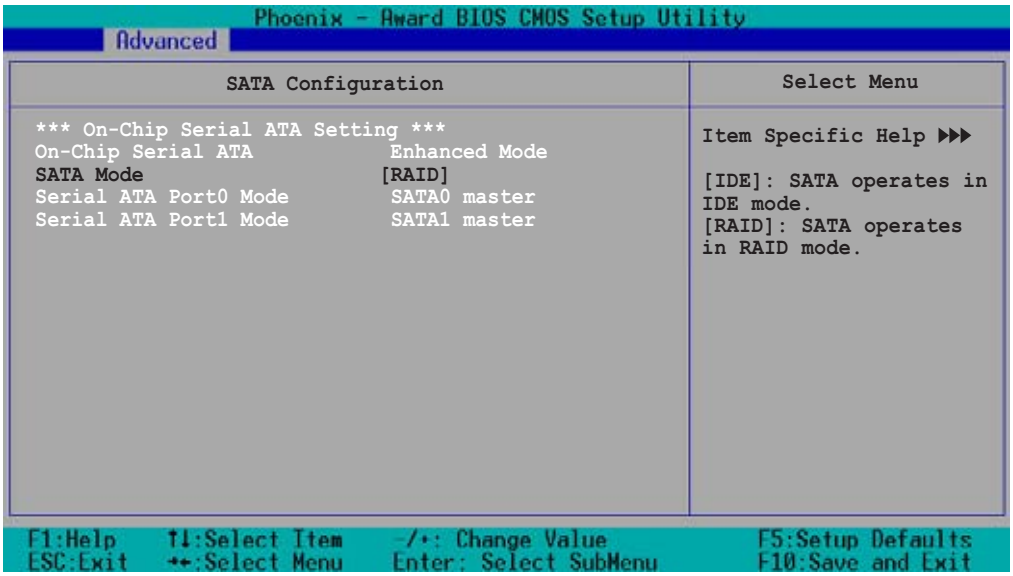
d. Setting to [**SATA Only**] allows you to install IDE devices on the Serial ATA channels only.

e. Setting to [**Disabled**] disables the onboard SATA controller. The RAID feature is also disabled.

SATA Mode [RAID]

When set to [RAID], this item allows configuration of the installed SATA devices into a disk array. When set to [IDE], the devices operate in normal IDE mode. Configuration options: [IDE] [RAID]

- The item **SATA Mode** becomes configurable only when the item **On-Chip Serial ATA** is set to either [Combined Mode] or [Enhanced Mode].
- The On-Chip Serial ATA becomes fixed to [Enhanced Mode] when you set the SATA Mode item to [RAID].

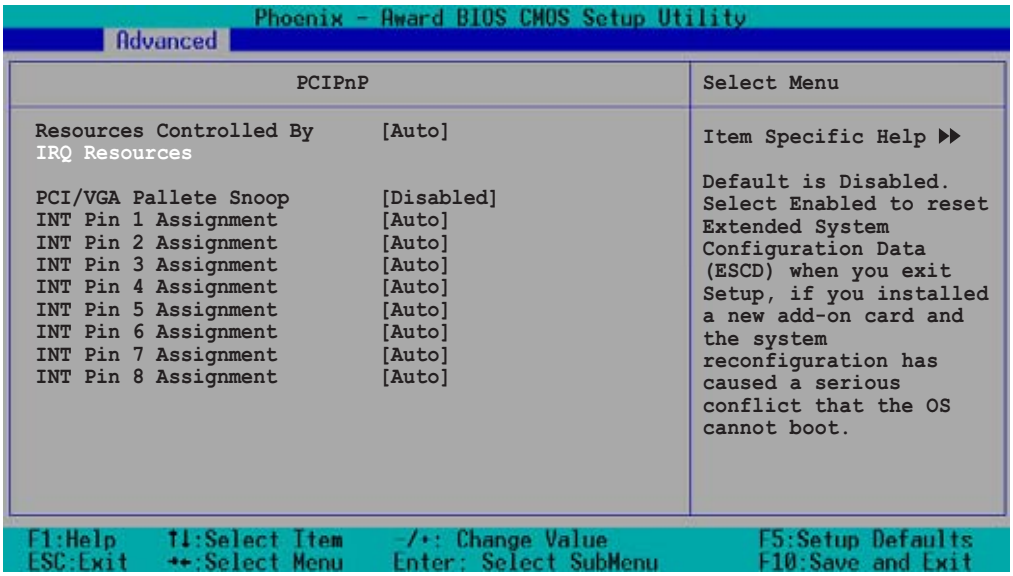


Serial ATA Port0 Mode [SATA0 master]
Serial ATA Port1 Mode [SATA1 master]

Allow you to set the SATA Port0 and Serial ATA Port1 modes. The options for these items vary depending on the setting of the **On-Chip Serial ATA** item. Configuration options: [Primary Master] [Primary Slave] [Secondary Master] [Secondary Slave] [SATA0 master] SATA1 master]

4.4.6 PCIPnP

This menu shows the PCIPnP configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.



Resources Controlled By [Auto]

When set to [Auto(ESCD)], allows BIOS to automatically configure of all boot and Plug and Play devices. When set to [Manual], you can assign the available IRQ Resources to the PCI devices.
Configuration options: [Auto] [Manual]

When the item **Resources Controlled By** is set to [Auto], the item IRQ Resources is grayed out and not user-configurable. Refer to the section "IRQ Resources" for information on this item.

PCI/VGA Pallete Snoop [Disabled]

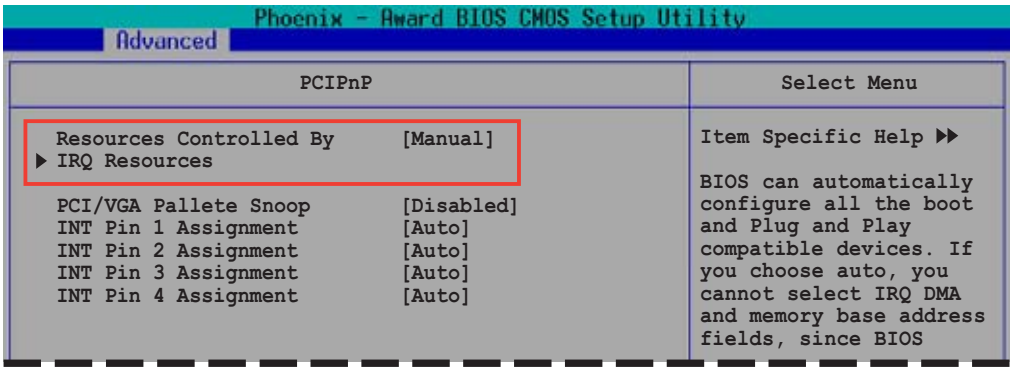
Some non-standard VGA cards, like graphics accelerators or MPEG video cards, may not show colors properly. Setting this field to [Enabled] corrects this problem. If you are using a standard VGA card, leave this field to the default setting [Disabled]. Configuration options: [Disabled] [Enabled]

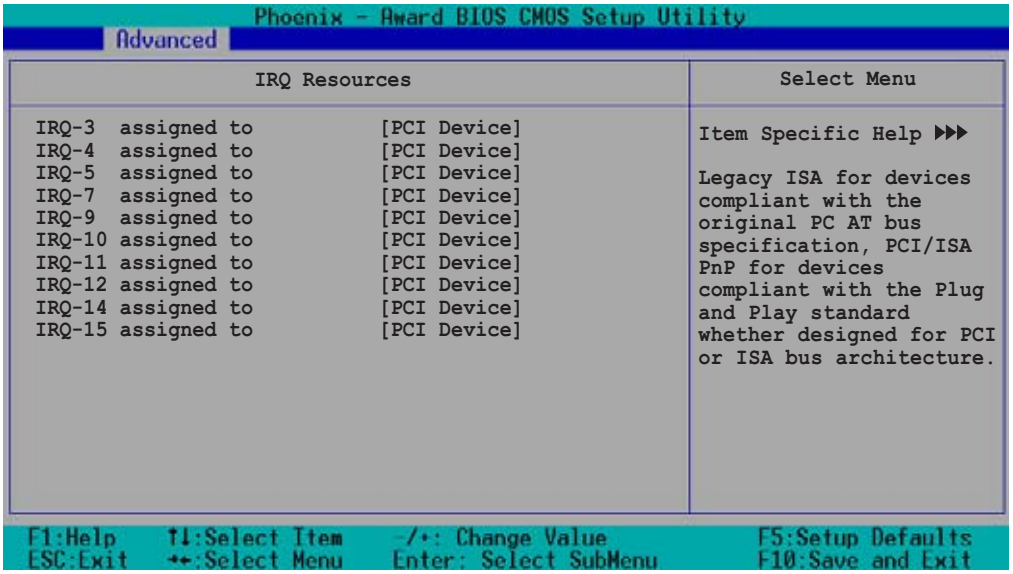
INT Pin 1~8 Assignment [Auto]

Allows you to select the appropriate interrupt to the specific devices to avoid conflict. Configuration options: [Auto] [3] [4] [5] [7] [9] [10] [11] [12] [14] [15]

IRQ Resources

Set the item **Resources Controlled By** to [Manual] to enable the item **IRQ Resources**, and assign the interrupts depending on the type of installed PCI device.



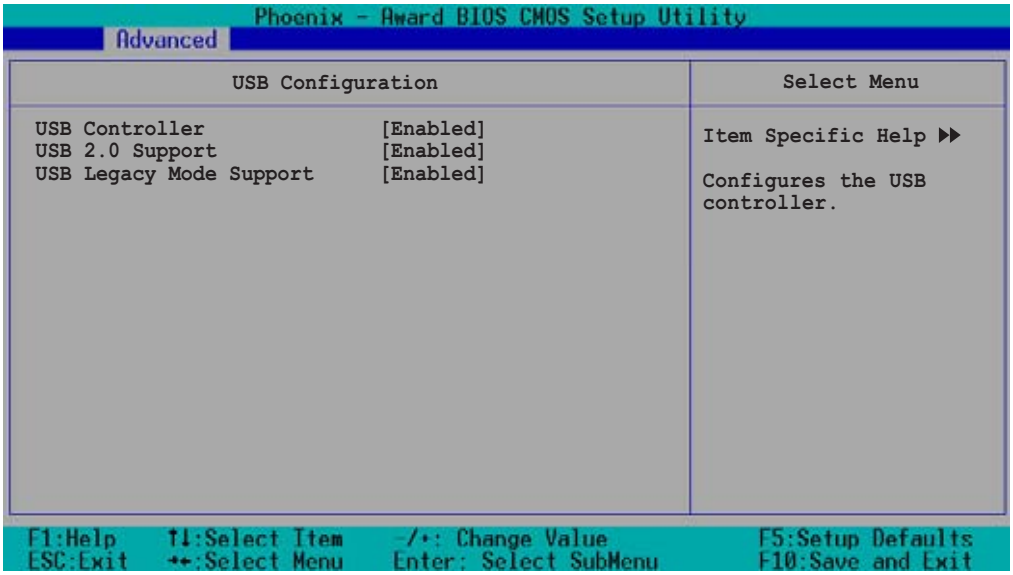


IRQ-xx assigned to [PCI device]

The IRQ Resources sub-menu is activated when the Resources Controlled by parameter is set to [Manual]. Select [PCI Device] to assign an IRQ address to a Plug and Play device. Setting to [Reserved] reserves the IRQ address. Configuration options: [PCI Device] [Reserved]

4.4.7 USB Configuration

This menu shows the USB configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.



USB Controller [Enabled]

Allows you enable or disable the USB controller.
Configuration options: [Enabled] [Disabled]

USB 2.0 Support [Enabled]

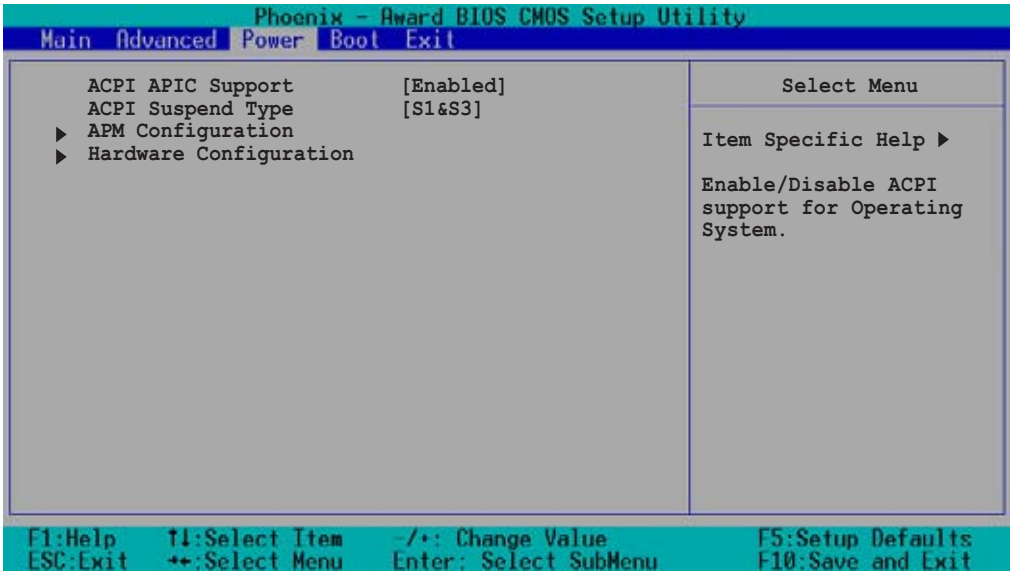
Allows you to enable or disable the EHCI controller. Setting this item to [Enabled] allows the built-in high speed USB support in the BIOS to turn on automatically when you install high speed USB devices.
Configuration options: [Enabled] [Disabled]

USB Legacy Mode Support [Enabled]

Allows you enable or disable support for the legacy USB devices.
Configuration options: [Disabled] [Enabled]

4.5 Power menu

The Power menu items allow you to change the settings for the Advanced Power Management (APM). Select an item then press <Enter> to display the configuration options.



ACPI APIC Support [Enabled]

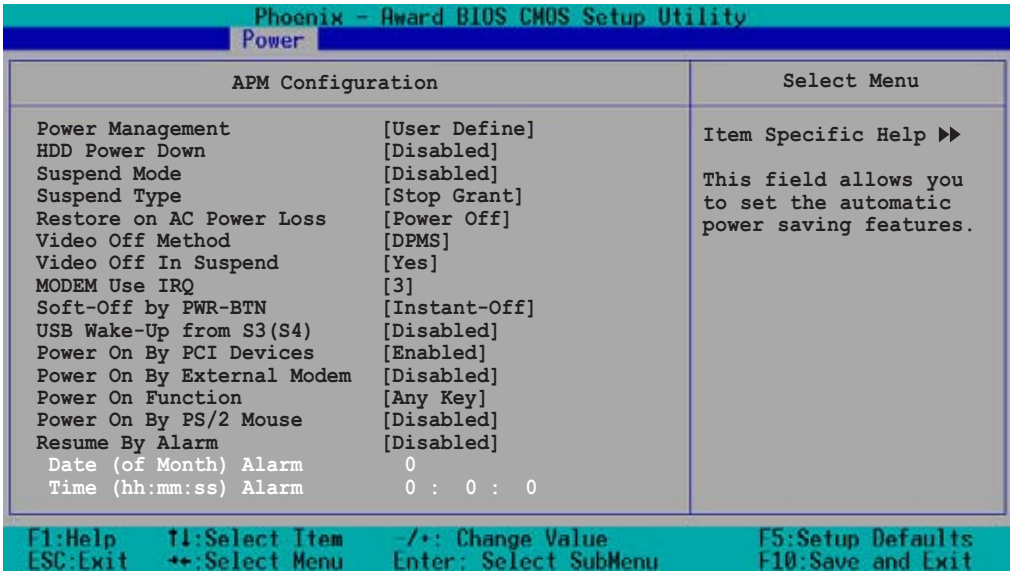
Allows you to enable or disable the ACPI feature on the operating system.
Configuration options: [Disabled] [Enabled]

ACPI Suspend Type [S1&S3]

Allows you to select the ACPI stat for system suspend.
Configuration options: [S1(POS)] [S3 (STR)] [S1&S3]

4.5.1 APM Configuration

This menu shows the Advanced Power Management (APM) configuration settings. Select an item then press <Enter> to display a pop-up menu with the configuration options.



Power Management [User Define]

Allows you to set the automatic power saving features.
Configuration options: [User Define] [Min. Saving] [Max. Saving]

HDD Power Down [Disabled]

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

Suspend Mode [Disabled]

Sets the time period before the system goes into suspend mode.
Configuration options: [Disabled] [1 Min] [2 Min] [4 Min] [8 Min] [12 Min] [20 Min] [30 Min] [40 Min] [1 Hr]

Suspend Type [Stop Grant]

Allows you to select the suspend type.
Configuration options: [Stop Grant] [PwrOn Suspend]

Restore on AC Power Loss [Power Off]

When set to [Power Off], the system goes into “off state” after an AC power interruption. When set to [Power On], the system turns on automatically after an power interruption. When set to [Last State], the system goes into whatever was the system state (on or off) before the power interruption. Configuration options: [Power Off] [Power On] [Last State]

Video Off Method [DPMS]

This item determines the video off features. The Display Power Management System (DPMS) feature allows the BIOS to control the video display card if it supports the DPMS feature. [Blank Screen] only blanks the screen. Use this for monitors without power management or "green" features. Configuration options: [Blank Screen] [V/H SYNC+Blank] [DPMS]

Video Off In Suspend [Yes]

This item determines when to activate the video off feature for monitor power management. Configuration options: [No] [Yes]

MODEM Use IRQ [3]

Allows you to select the IRQ assignment for the modem.
Configuration options: [NA] [3] [4] [5] [7] [9] [10] [11]

Soft-Off by PWR-BTN [Instant-Off]

When set to [Instant-Off], the system goes to soft off when you press the power button for **less** than 4 seconds. When set to [Delay 4 Sec], press the power button for **more** than 4 seconds to power off the system.
Configuration options: [Instant-Off] [Delay 4 Sec.]

USB Wake-Up From S3(S4) [Disabled]

Allows you to enable or disable USB KB/Mouse wake-up from S3 (S4).
Configuration options: [Disabled] [Enabled]

Power On By PCI Devices [Enabled]

Allows you to enable or disable the PME to generate a wake-up event.
Configuration options: [Disabled] [Enabled]

Power On By External Modem [Disabled]

Allows you to enable or disable system power up when the external modem receives a call while in soft-off mode.
Configuration options: [Disabled] [Enabled]

Power On Function [Any Key]

Allows you to select a device to turn the system power on.
Configuration options: [Disabled] Ctrl+ESC] [Space Bar] [Power Key] [Any Key]

Resume by Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake event. Enabling this item lets you set the date and time of alarm using the two following items.
Configuration options: [Disabled] [Enabled]

Date (of Month) Alarm [0]

To set the date of alarm, highlight this item and press <Enter> to display a pop-up menu. Key-in a value within the specified range then press <Enter>.
Configuration options: [Min=0] [Max=31]

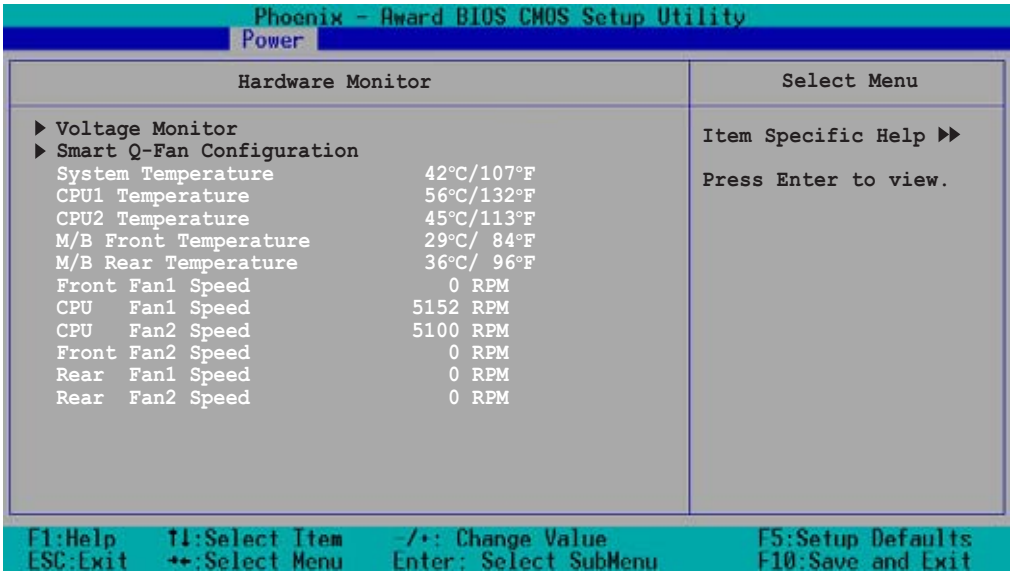
Time (hh:mm:ss) Alarm [0 : 0 : 0]

To set the time of alarm:

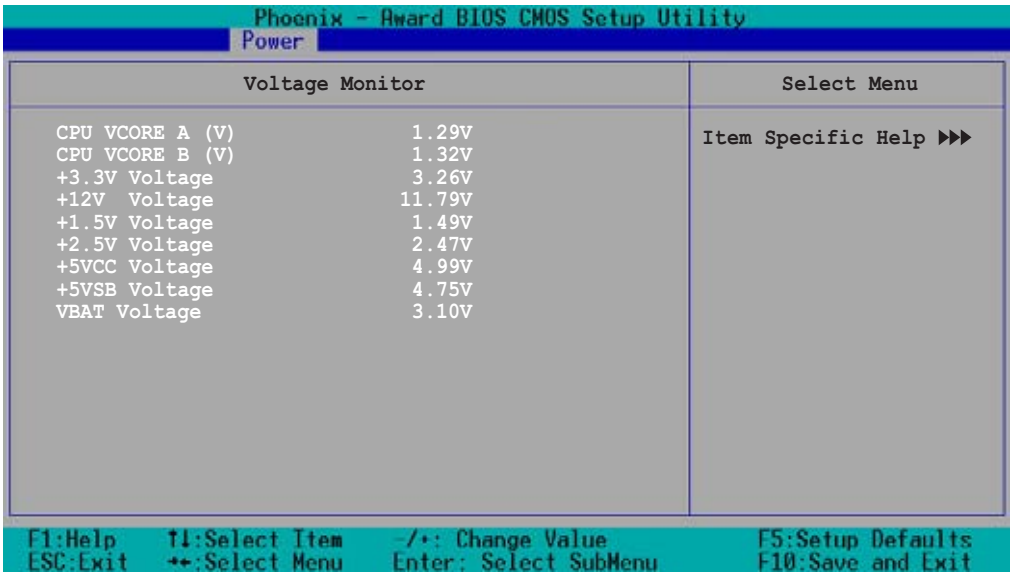
1. Highlight this item and press <Enter> to display a pop-up menu for the hour field.
2. Key-in a value (Min=0, Max=23), then press <Enter>.
3. Press tab to move to the minutes field, then press <Enter>.
4. Key-in a minute value (Min=0, Max=59), then press <Enter>.
5. Press tab to move to the seconds field, then press <Enter>.
6. Key-in a value (Min=0, Max=59), then press <Enter>.

4.5.2 Hardware Monitor

This menu shows the hardware monitoring status. Select a sub-menu then press <Enter> to display the configuration options.



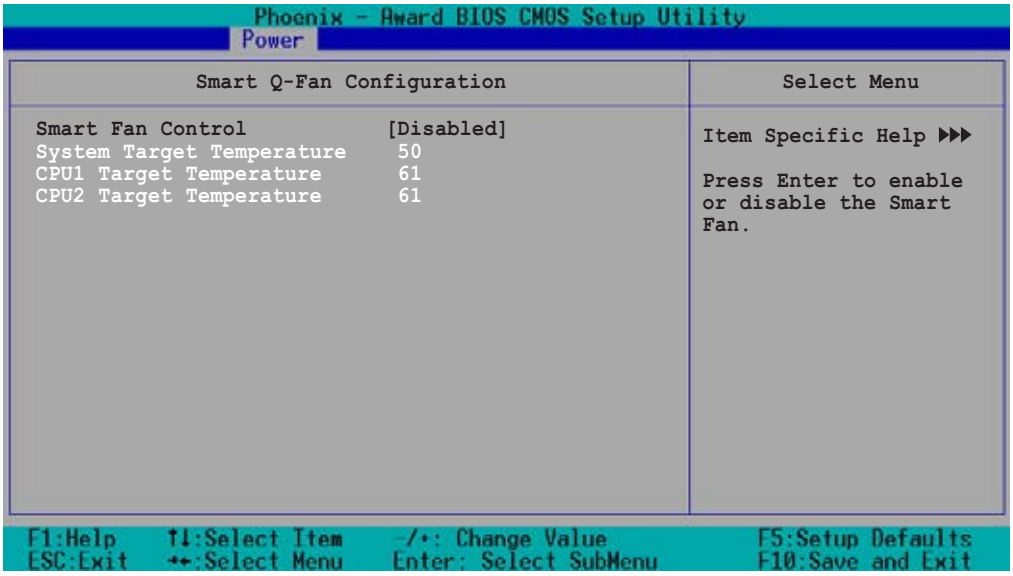
Voltage Monitor



CPU VCORE A, +3.3V Voltage, +12V Voltage, +1.5V Voltage, +2.5V Voltage, +5VCC Voltage, +5VSB Voltage,VBAT Voltage,

These fields show the auto-detected voltages through the onboard voltage regulators.

Smart Q-Fan Configuration



Smart Fan Control [Disabled]

Allows you to enable or disable the Smart Fan feature. This feature smartly adjusts the CPU/system fan rotations based on the user-assigned threshold temperature. Configuration options: [Disabled] [Enabled]

System Target Temperature [50]

Allows you to select the system target temperature for automatic CPU fan speed adjustment according to the actual system temperature. Configuration options: [Min = 30, Max = 60]

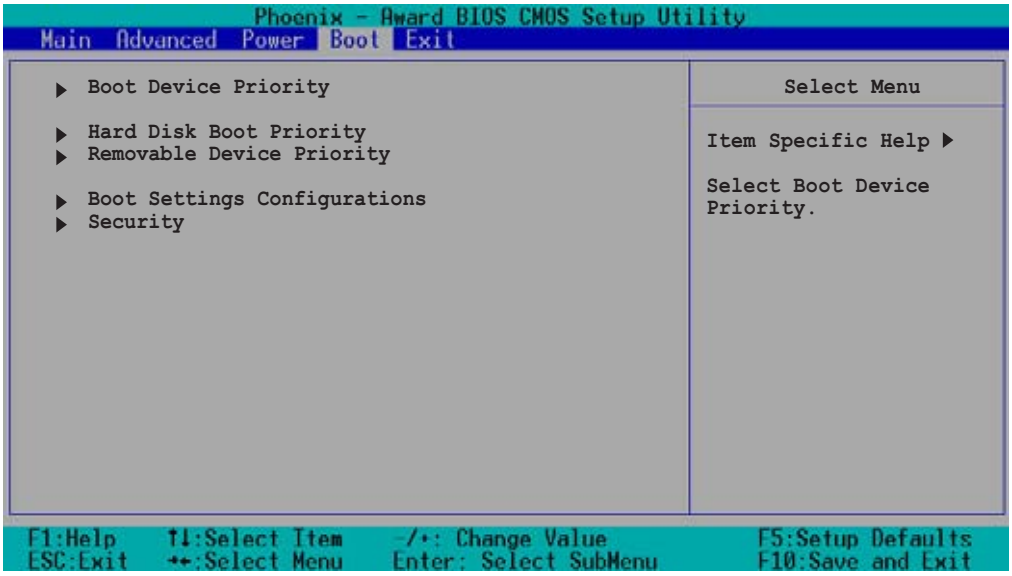
CPU1 Target Temperature [61]
CPU2 Target Temperature [61]

Allows you to select the CPU1/CPU2 target temperature for automatic CPU fan speed adjustment according to the actual CPU1/CPU2 temperature. Configuration options: [Min = 31, Max = 61]

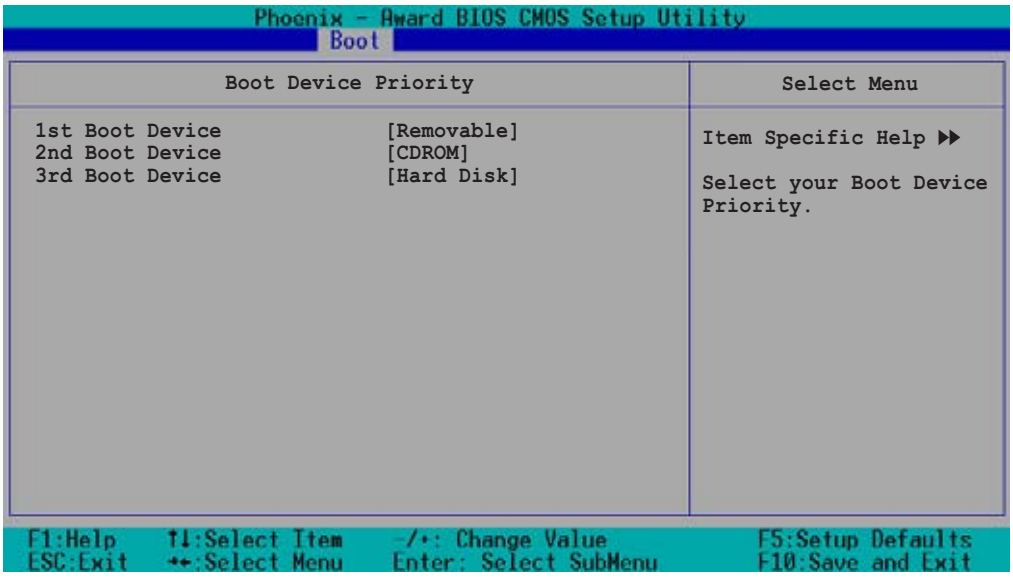
Use the ASUS Server Web-based Management (ASWM) to obtain the actual fan RPM (rotations per minute).

4.6 Boot menu

The Boot menu items allow you to change the system boot settings. Select an item then press <Enter> to display a sub-menu with additional items, or show a pop-up menu with the configuration options.



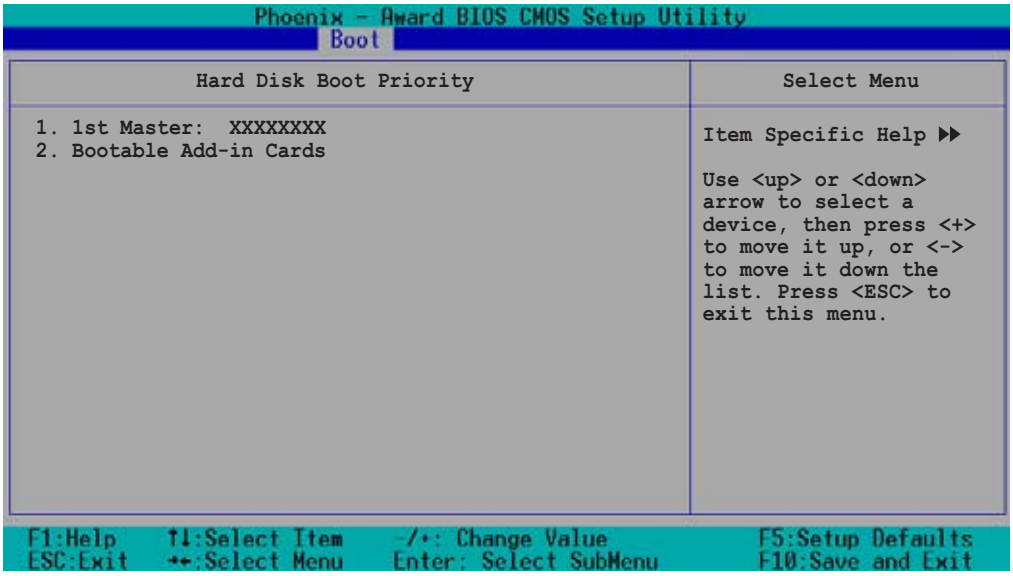
4.6.1 Boot Device Priority



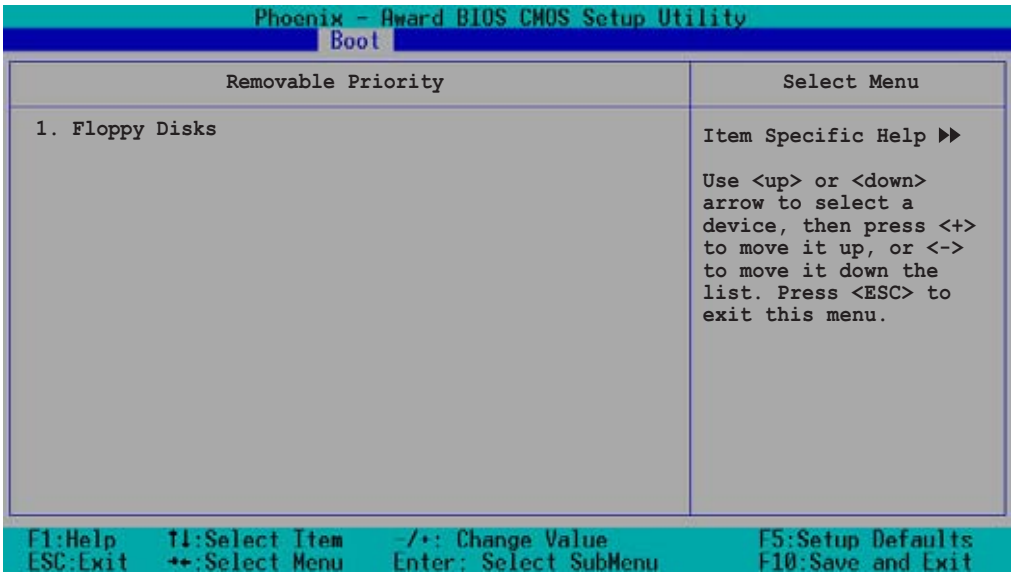
1st Boot Device [Removable]
2nd Boot Device [CDROM]
3rd Boot Device [Hard Disk]

Allows you to select your boot device priority.
Configuration options: [Removable] [Hard Disk] [CDROM] [Legacy LAN] [Disabled]

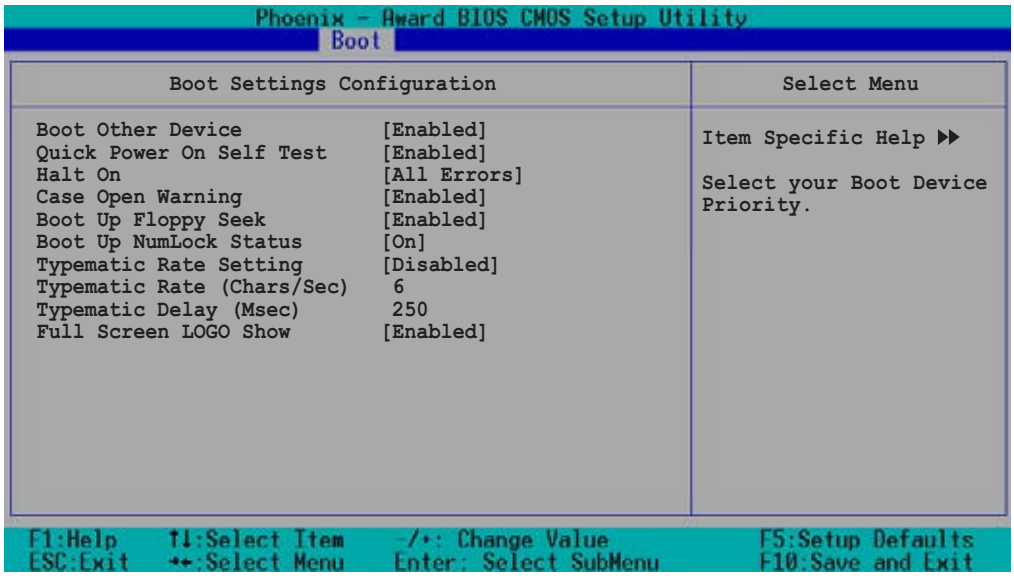
4.6.2 Hard Disk Boot Priority



4.6.3 Removable Device Priority



4.6.4 Boot Settings Configuration



Boot Other Device [Enabled]

Allows you to enable or disable selection of other boot device. Configuration options: [Disabled] [Enabled]

Quick Power On Self Test [Enabled]

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

Halt On [All Errors]

Sets the system to halt on errors according to the system functions specified in each option. Configuration options: [All Errors] [No Errors] [All, But Keyboard] [All , But Diskette] [All, But Disk/Key]

Case Open Warning [Enabled]

Allows you to enable or disable the case open status feature. Setting to [Enabled] clear the case open status. Configuration options: [Disabled] [Enabled]

Boot Up Floppy Seek [Enabled]

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

Boot Up NumLock Status [On]

Allows you to select the power-on state for the NumLock. Configuration options: [Off] [On]

Typematic Rate Setting [Disabled]

Allows you to enable or disable the keyboard typematic rate setting. Set to [Enabled] to configure the Type Rate and Type Delay items. Configuration options: [Disabled] [Enabled]

The items **Typematic Rate (Chars/Sec)** and **Typematic Delay** become configurable only when the item Typematic Setting is enabled.

Typematic Rate (Chars/Sec) [6]

Allows you to select the rate at which character repeats when you hold a key. Configuration options: [6] [8] [10] [12] [15] [20] [24] [30]

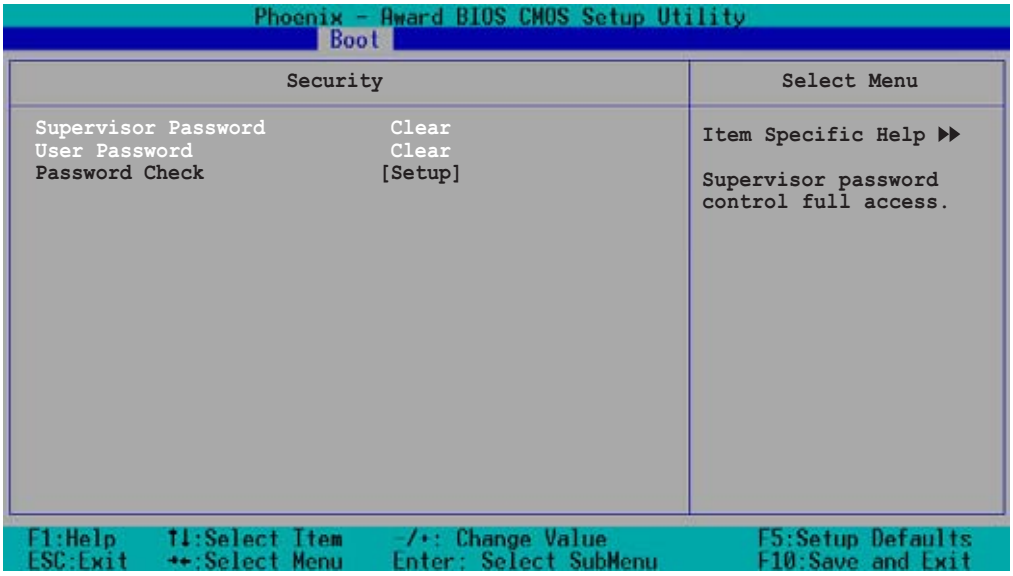
Typematic Delay (Msec) [250]

Allows you to set the delay before key strokes begin to repeat. Configuration options: [250] [500] [750] [1000]

Full Screen LOGO Show [Enabled]

Setting to [Enabled] displays the logo instead of the POST messages. Setting to [Disabled] displays the normal POST messages. Configuration options: [Disabled] [Enabled]

4.6.5 Security



Supervisor Password [Clear]
User Password [Clear]

These fields allow you to set passwords.

To set a password:

1. Highlight an item then press <Enter>.
2. Type in a password using eight (8) alphanumeric characters, then press <Enter>.
3. When prompted, confirm the password by typing the exact characters again, then press <Enter>. The password field setting is changed to [Set].

To clear the password:

1. Highlight the password field, and press <Enter> twice. The following message appears:

   "PASSWORD DISABLED!!! Press any key to continue..."
2. Press any key to return to the menu.

A note about passwords

The Supervisor password is required to enter the BIOS Setup program preventing unauthorized access. The User password is required to boot the system preventing unauthorized use.

Forgot the password?

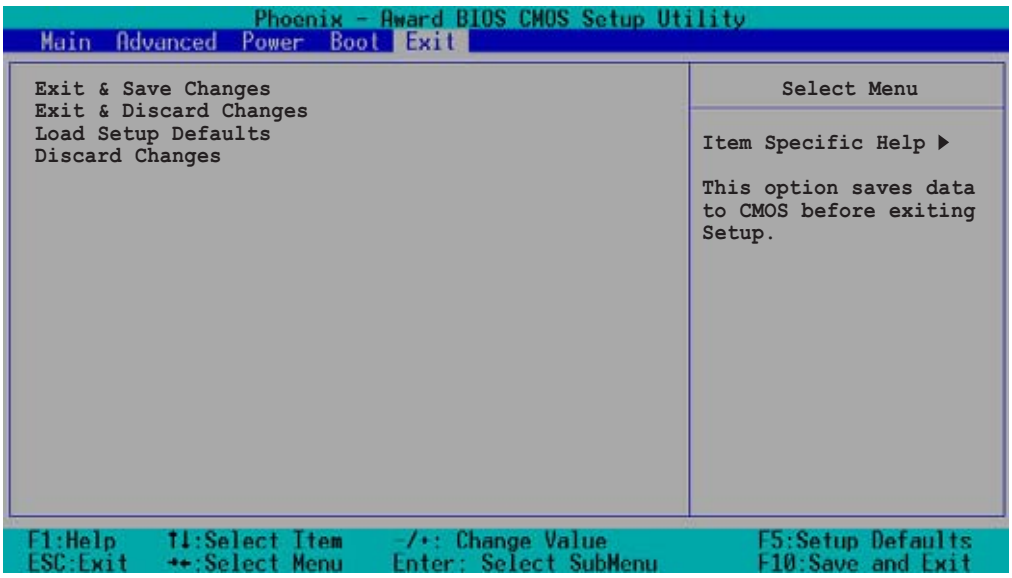
If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. If you need to erase the CMOS RAM, refer to section "2.6 Jumpers" for instructions.

Password Check [Setup]

This field requires you to enter the password before entering the BIOS setup or the system. Select [Setup] to require the password before entering the BIOS Setup. Select [System] to require the password before entering the system. Configuration options: [Setup] [System]

4.7 Exit menu

The Exit menu items allow you to load the BIOS setup default settings, save or discard any changes you made, or exit the Setup utility.



Exit & Save Changes

Select this option then press Enter, or simply press <F10>, to save your changes to CMOS before exiting the Setup utility. When a confirmation window appears, type [Y] to save and exit, or [N] to cancel and return to the menu.

Exit & Discard Changes

Select this option then press Enter if you wish to exit the Setup utility without saving your changes. When a confirmation window appears, type [Y] to exit and discard your changes, or [N] to cancel and return to the menu.

Load Setup Defaults

Select this option then press Enter, or simply press <F5>, to load the optimized values for each of the Setup menu items. When a confirmation window appears, type [Y] to load the default values, or [N] to cancel and return to the menu.

Discard Changes

Select this option to discard the changes that you made, and restore the previously saved values. When a confirmation appears, type [Y] to discard any changes and load the previously saved values, or [N] to cancel and return to the menu.

This chapter provides instructions for creating and configuring RAID, and installing the necessary drivers for different system components.

5 Driver installation

Chapter summary

5

5.1 RAID

This motherboard comes with the following RAID solutions:

- **Adaptec® HostRAID™** technology embedded in the Intel® 6300ESB Southbridge supports up to two SATA hard disk drives and RAID 0, 1, and JBOD configurations.
- **Promise® PDC20319 SATA RAID** controller supports up to four SATA hard disk drives and RAID 0, 1, and 0+1 configurations.

Refer to the RAID definitions below.

5.1.1 RAID configurations

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

JBOD *(Spanning)* stands for **Just a Bunch of Disks** and refers to hard disk drives that are not yet configured as a RAID set. This configuration stores the same data redundantly on multiple disks that appear as a single disk on the operating system. Spanning does not deliver any advantage over using separate disks independently and does not provide fault tolerance or other RAID performance benefits.

If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support CD to a floppy disk before you install an operating system to the selected hard disk drive. Refer to section “2. RAID driver installation” for details.

5.1.2 Installing hard disk drives

The motherboard supports Serial ATA hard disk drives for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

5.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set(s). To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced Menu**, select **Onboard device**, then press <Enter>.
3. Select the item **SATA Configuration**, then press <Enter> to display the configuration options.
4. Select **RAID** from the **SATA Mode** options, then press <Enter>.
5. Save your changes, then exit the BIOS Setup.

Refer to the BIOS setup for details on configuring the BIOS.

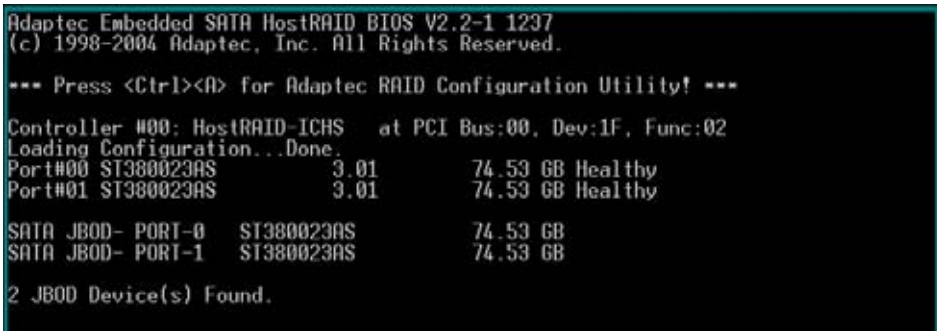
5.1.4 Adaptec® RAID configuration utility

You can create a RAID set using the **Adaptec RAID Configuration Utility**, if you installed SATA hard disk drives on the SATA connectors supported by the Intel® 6300ESB Southbridge.

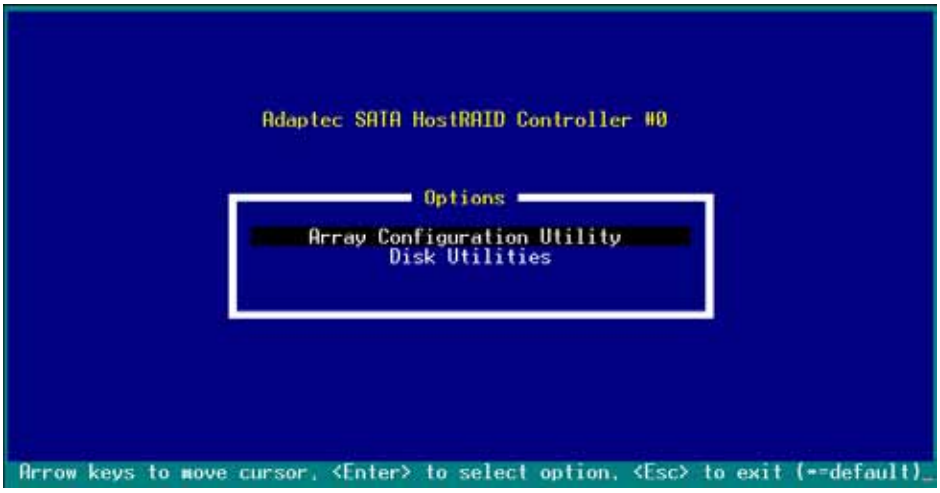
The Adaptec RAID Configuration Utility allows you to create RAID 0, RAID 1, and JBOD configurations using the SATA hard disk drives connected to the SATA connectors supported by the motherboard Southbridge chip.

To enter the Adaptec RAID Configuration Utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. During POST, the Adaptec HostRAID™ technology automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> <A> to enter the utility.



3. Use the arrow keys to highlight an option.



The **Array Configuration Utility** menu lets you create and manage RAID sets. The **Disk Utilities** allows you to check and verify SATA hard disk drives.

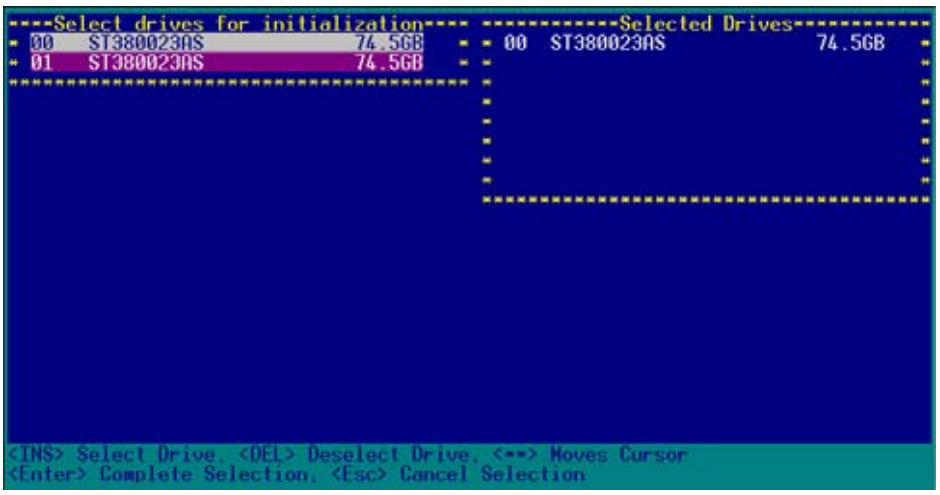
At the bottom of the screen is the legend box. The keys on the legend box allow you to navigate through the setup menu options or execute commands. The keys on the legend box vary according to the menu level.

5.1.4.1 Creating a RAID 0 set (Striped)

To create a RAID 0 set:

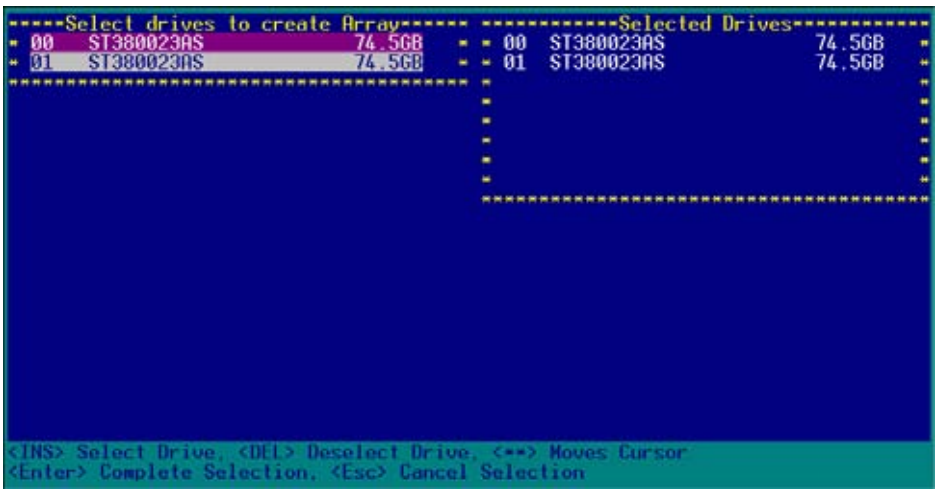
1. From the Adaptec RAID Configuration Utility initial menu, highlight **Array Configuration Utility**, then press <Enter>.
2. From the Main Menu, select **Create Array**, then press <Enter>.

3. Select the first drive you want to add to the array, then press <Insert>. The selected drive appears in the **Selected Drives** section.

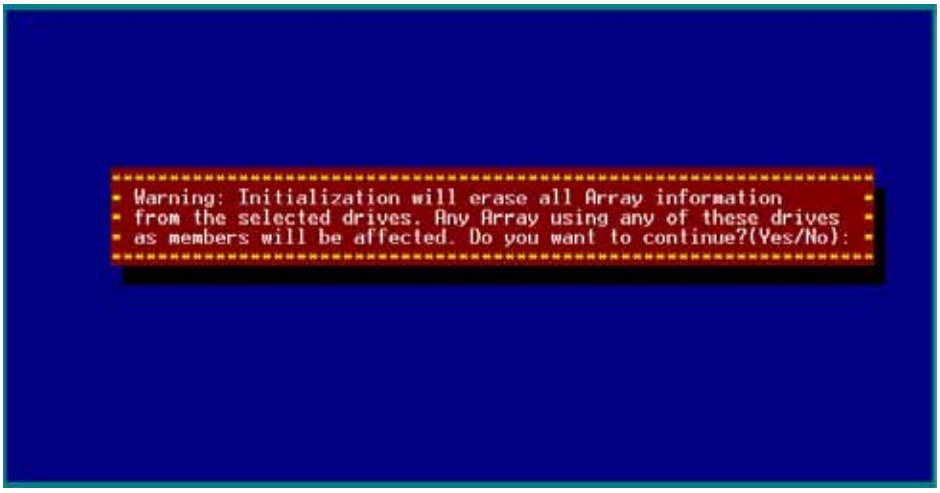


A RAID 0 set requires two identical hard disk drives.

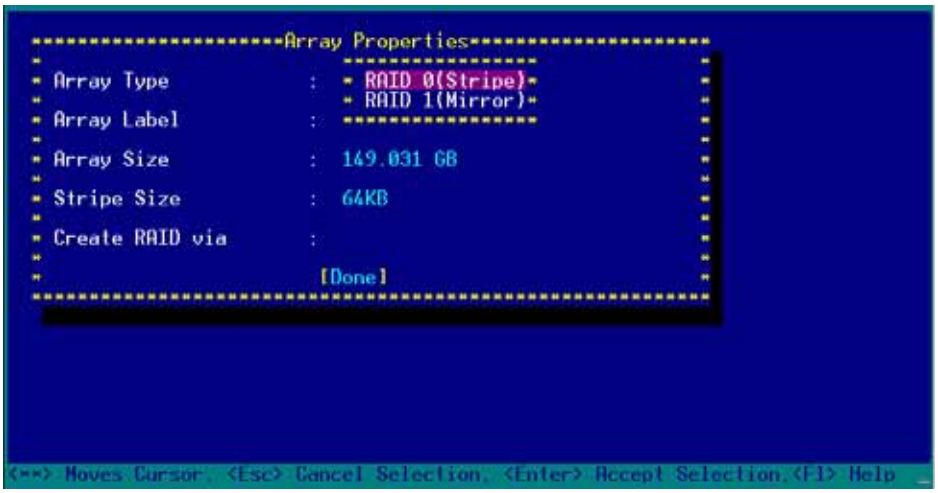
4. When all the drives required for a RAID 0 set appear in the **Selected Drives** field, press <Enter>.



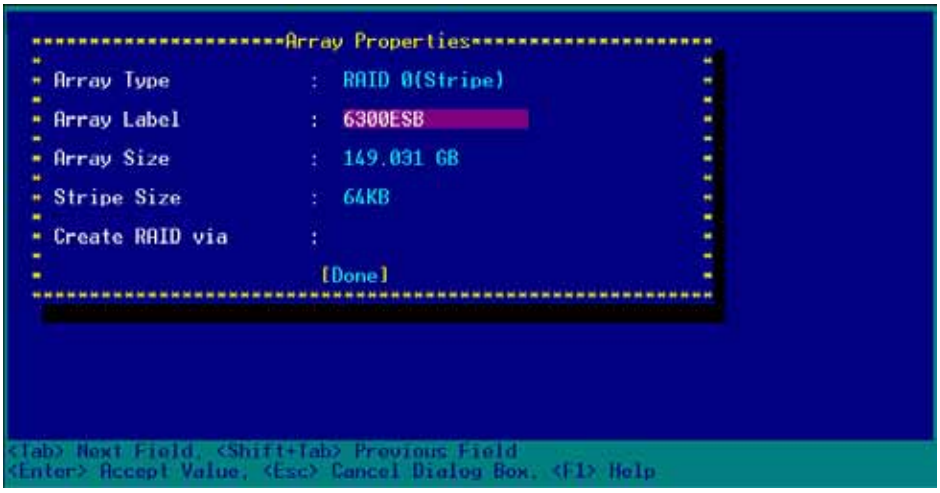
5. A message appears on screen, warning users that initialization will erase all array information on the drives. Press <Y> to proceed or press <N> to abort creating the RAID 0 set.



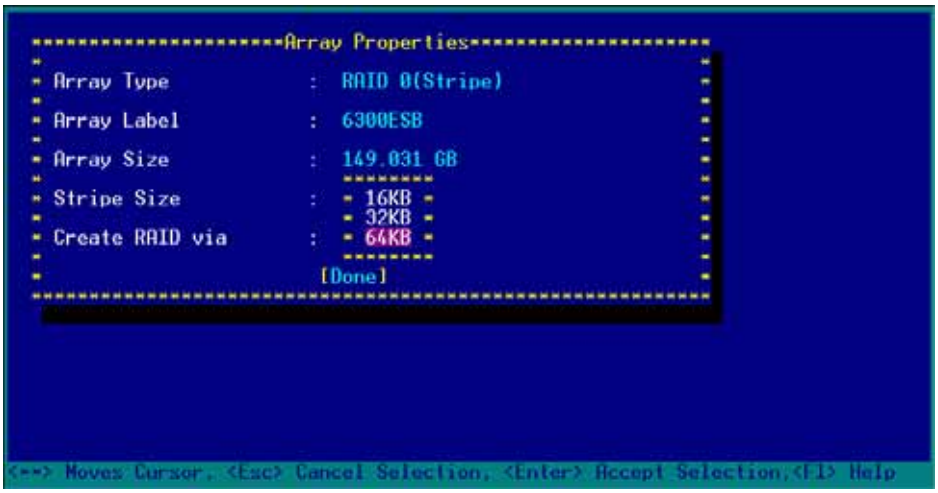
6. After disk initialization, the utility displays the **Array Properties** menu. Select **Array Type** > **RAID 0 (Stripe)**, then press <Enter>.



7. Move the cursor to the **Array Label** option, then type a name for the RAID 0 set. Press <Enter> when done.

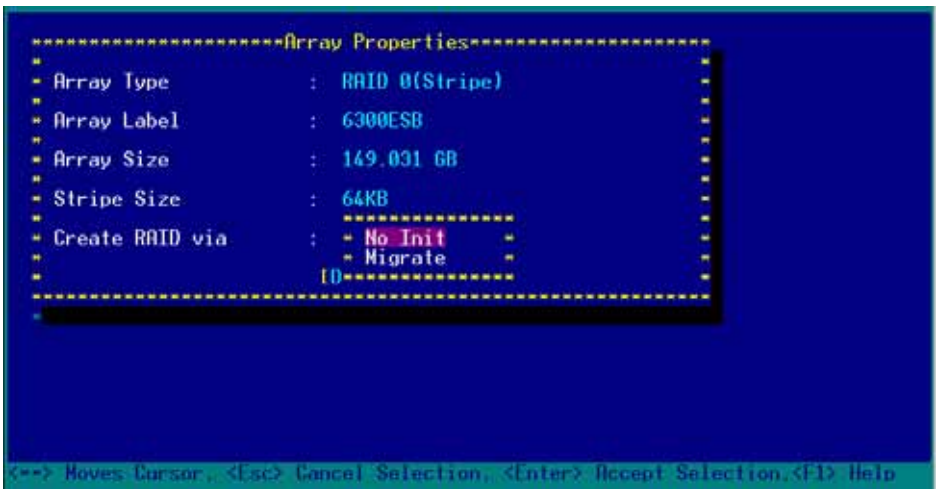


8. Move the cursor to the **Stripe Size** option, select **64KB** from the menu, then press <Enter> to select.

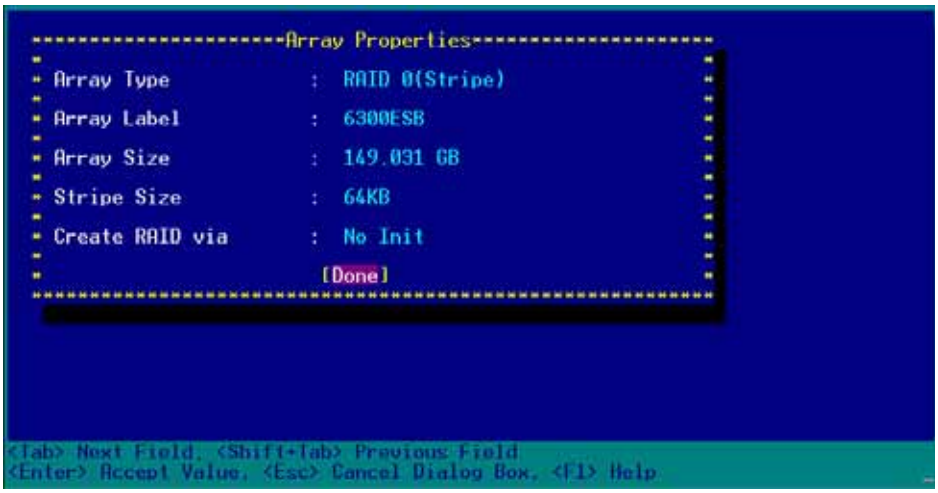


For server systems, we recommend that you use a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

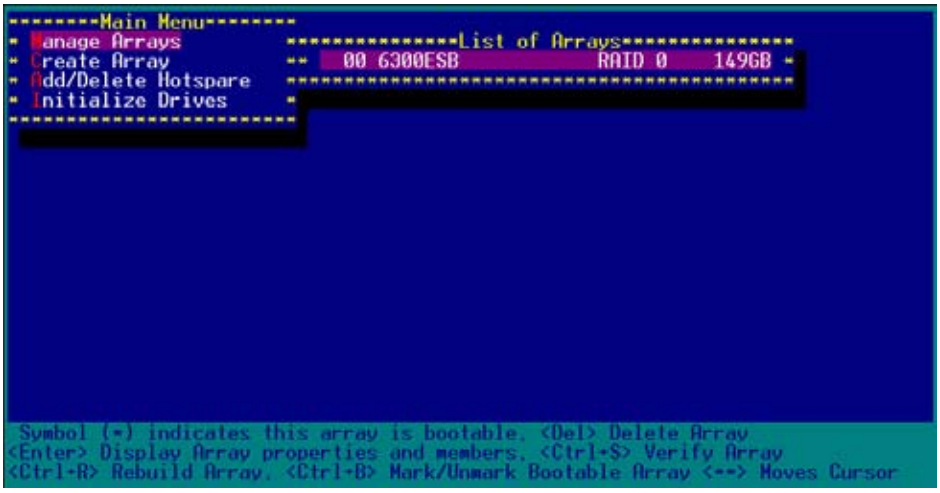
9. Move the cursor to the **Create RAID via** option, select **No Init** from the menu, then press <Enter> to select.



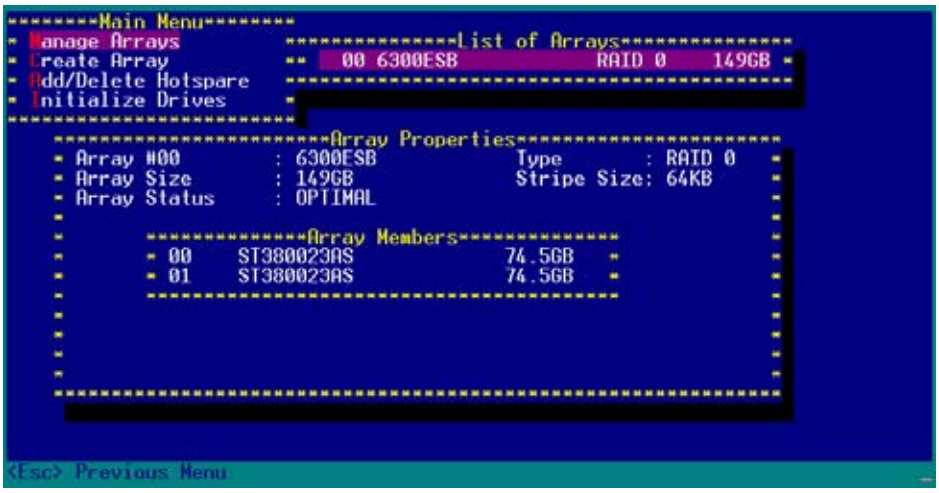
10. When you have finished setting the array properties, move the cursor to **Done**, then press <Enter> to create the RAID 0 set.



11. After you have created the RAID 0 set, the utility main menu appears. Select **Manage Arrays** to display the array, then press <Enter> to view the array properties.



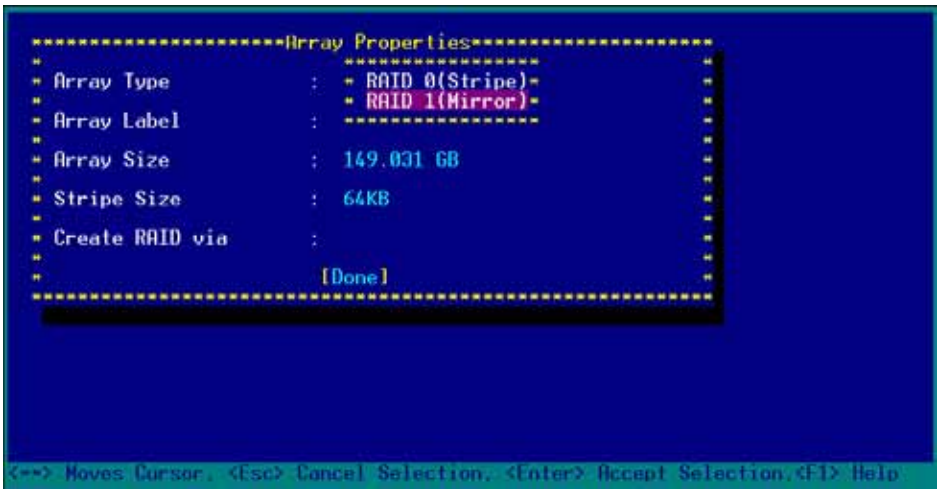
12. The screen displays the array properties. Press <Esc> to return to the previous menu.



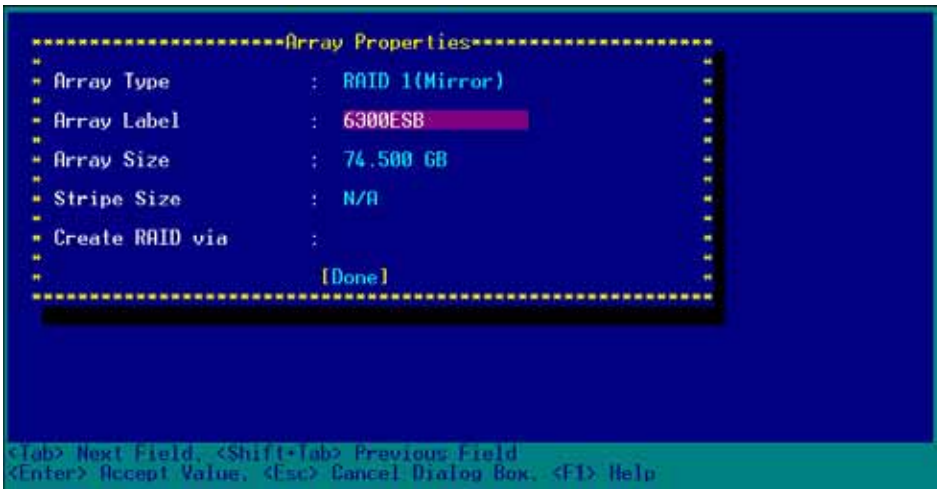
5.1.4.2 Creating a RAID 1 set (Mirrored)

To create a RAID 1 set:

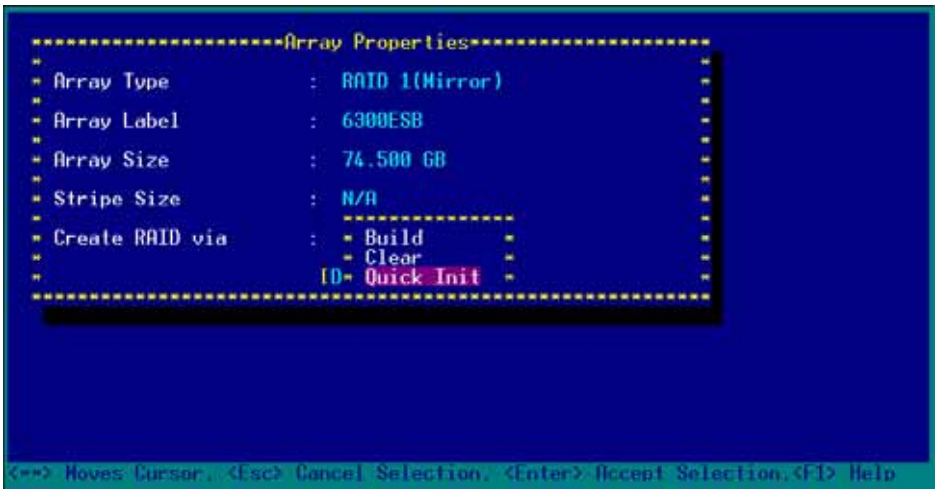
1. Follow instructions 1 to 5 of the section “Creating a RAID 0 set (Stripe).”
2. From the **Array Properties** menu, select **Array Type** > **RAID 1 (Mirror)**, then press <Enter>.



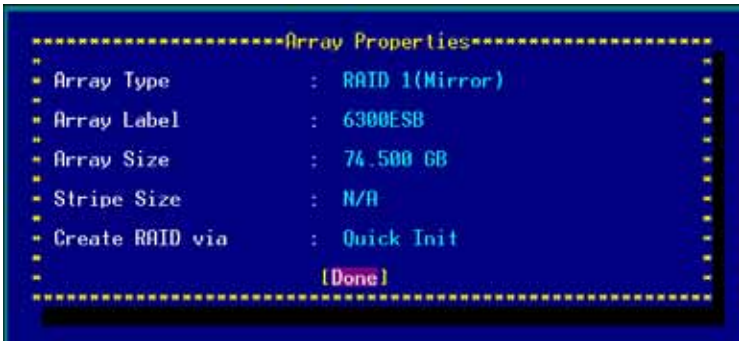
3. Move the cursor to the **Array Label** option, then type a name for the RAID 1 set. Press <Enter> when finished.



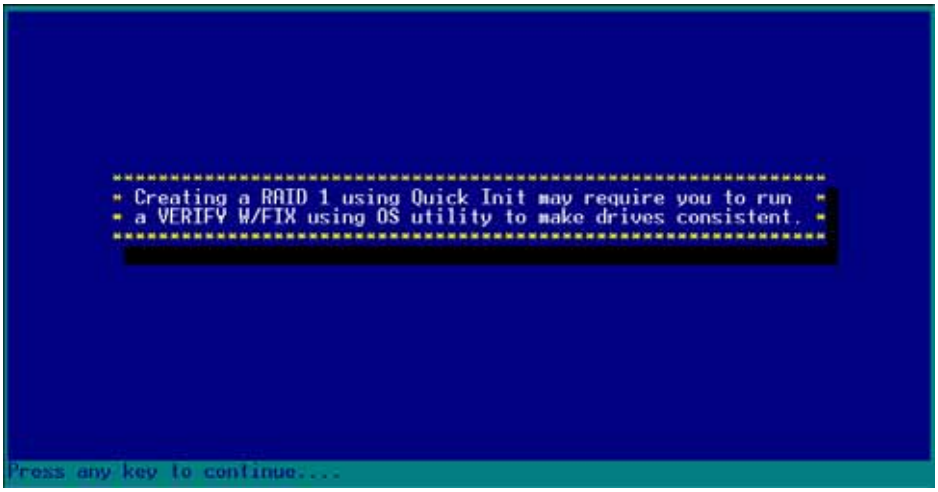
4. Move the cursor to the **Create RAID via** option, select **Quick Init** from the menu, then press <Enter> to select.



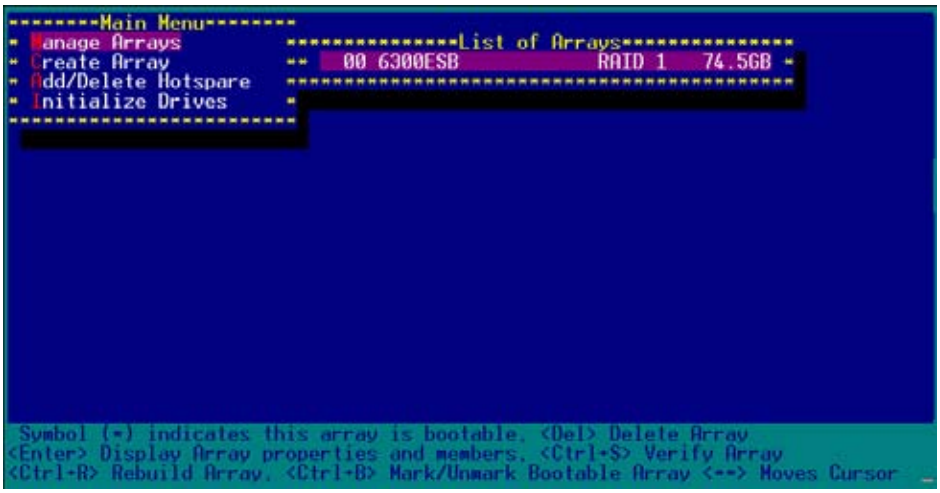
5. When you have finished setting the array properties, move the cursor to **Done**, then press <Enter> to create the RAID 1 set.



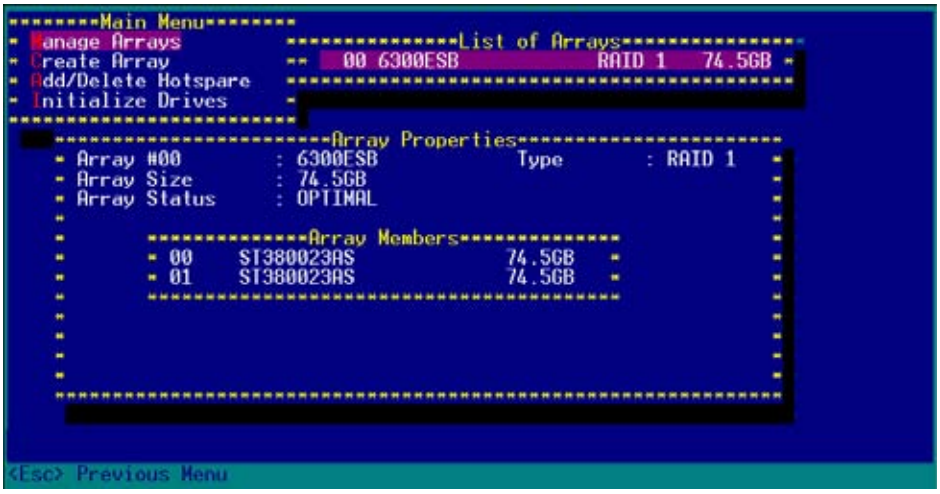
6. A message appears on screen informing you that a RAID 1 array created with Quick Init requires you to run a Verify W/FIX on the drives for consistency. Press any key to continue.



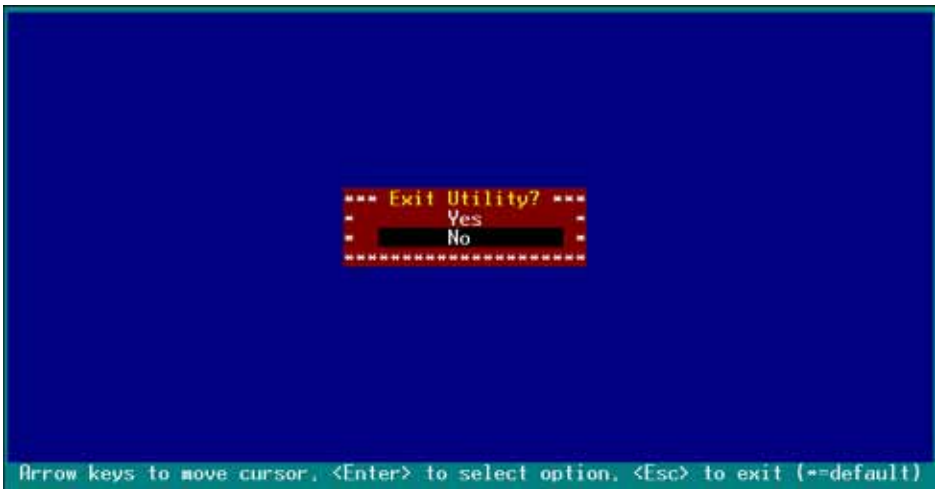
7. After you have created the RAID 1 set, the utility main menu appears. Select **Manage Array** to display the created set. Press <Enter> to view the array properties.



8. The screen displays the array properties. Press <Esc> to return to the previous menu.



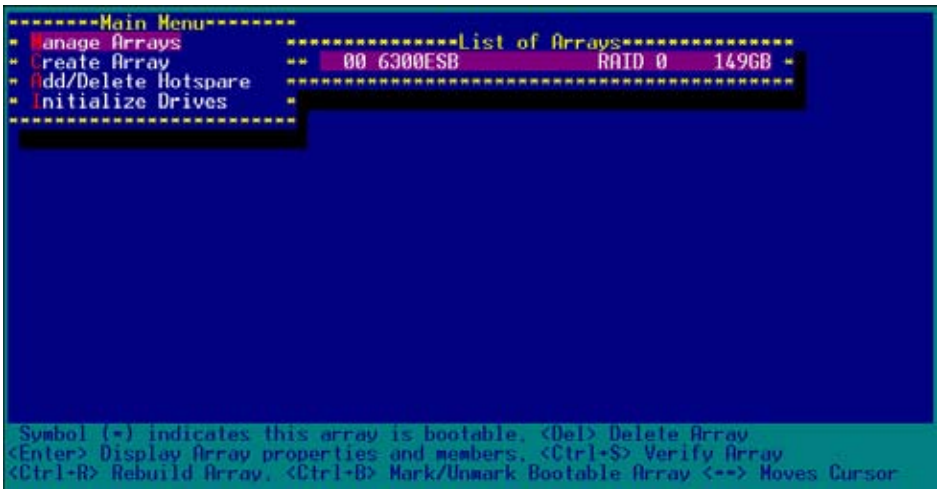
9. To exit the utility, press <Esc>, highlight **Yes**, then press <Enter>.



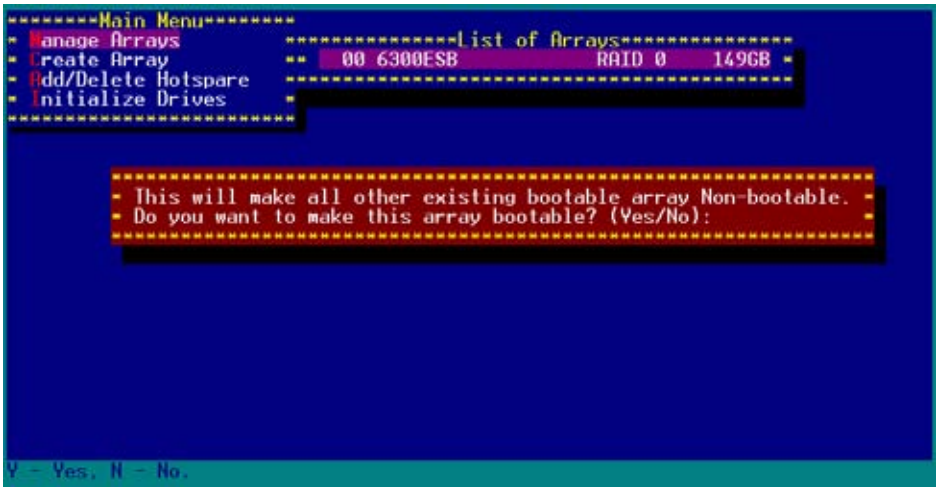
5.1.4.3 Creating a bootable RAID set

To create a bootable RAID set:

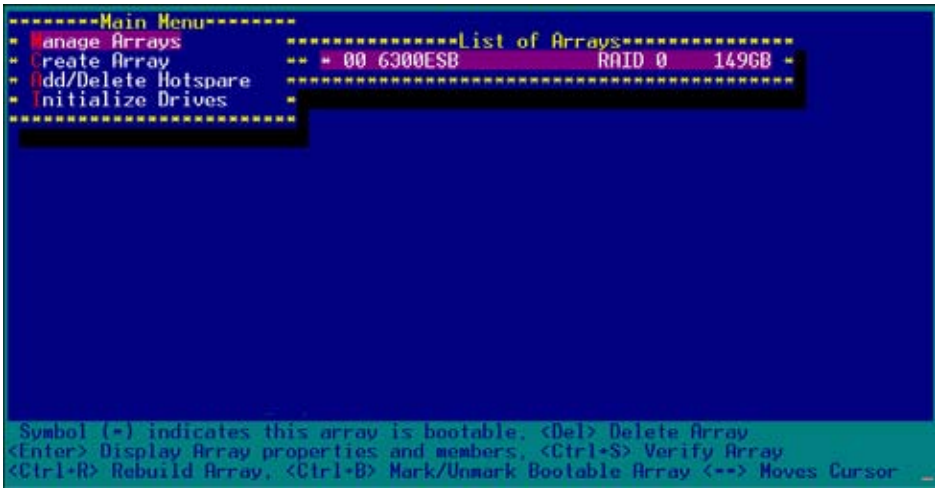
1. From the main menu, select **Manage Arrays**, then select the RAID set you want to make as bootable.



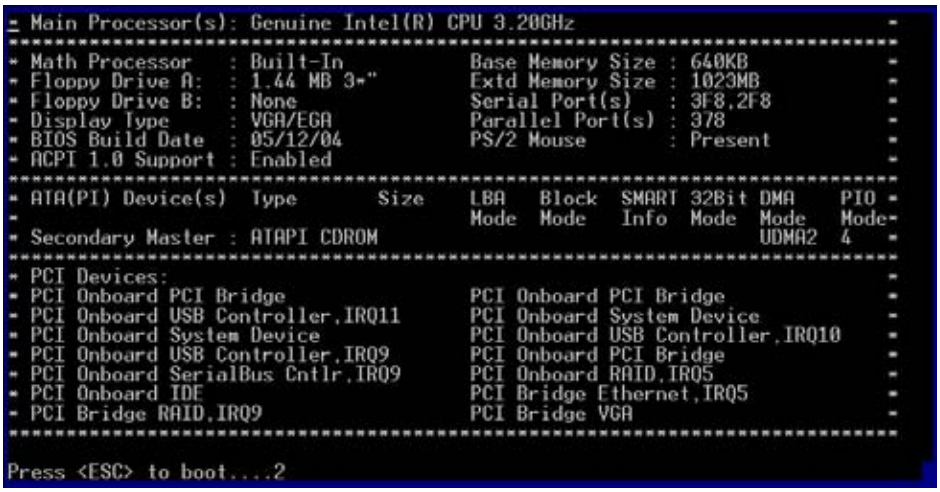
2. Press <Ctrl> + <B>. A message appears on screen informing you that all other arrays (if available) will become non-bootable. Press <Y> to continue.



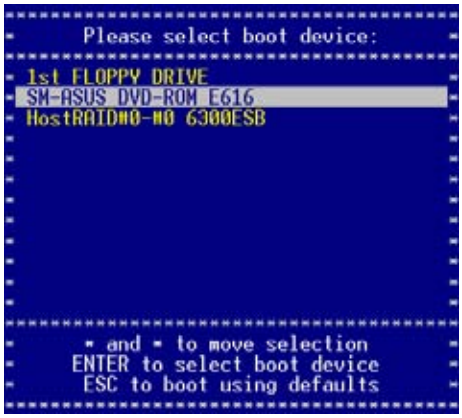
The RAID 0 array becomes bootable. An asterisk precedes a bootable array for easy identification.



3. Press <Esc> to return to the previous menu.
4. Exit the utility, then reboot the system.
5. During POST, press <Esc> to select the boot device.



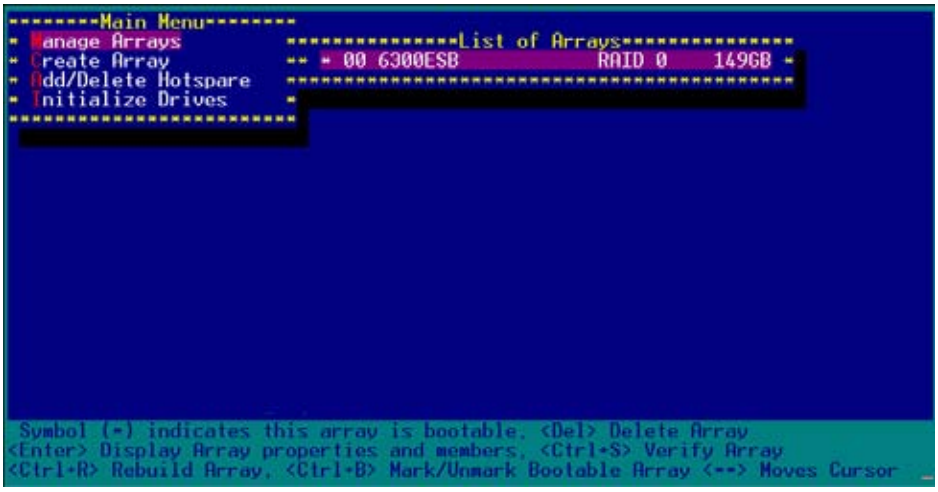
6. Use the up or down arrow to highlight the bootable RAID set (HostRAID#0-#0 6300ESB), then press <Enter> to select. The system boots from the RAID set.



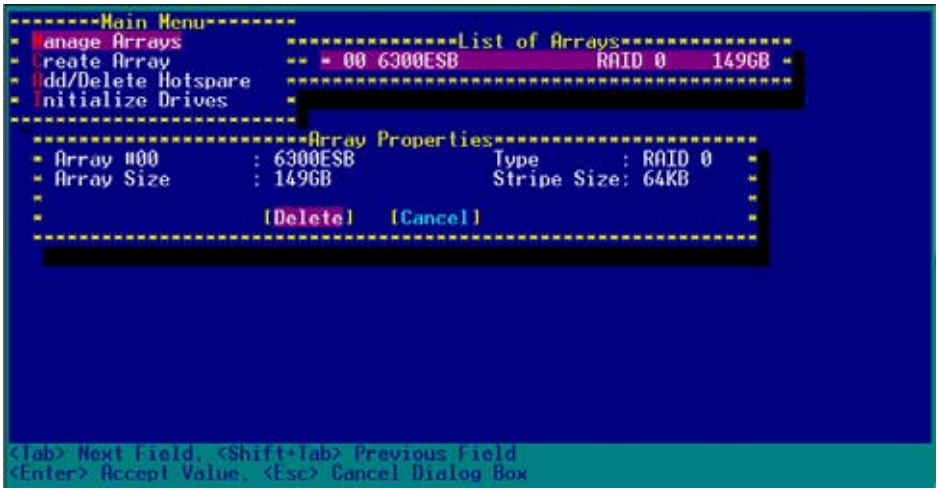
5.1.4.4 Deleting a RAID 0 set

To delete a RAID 0 set:

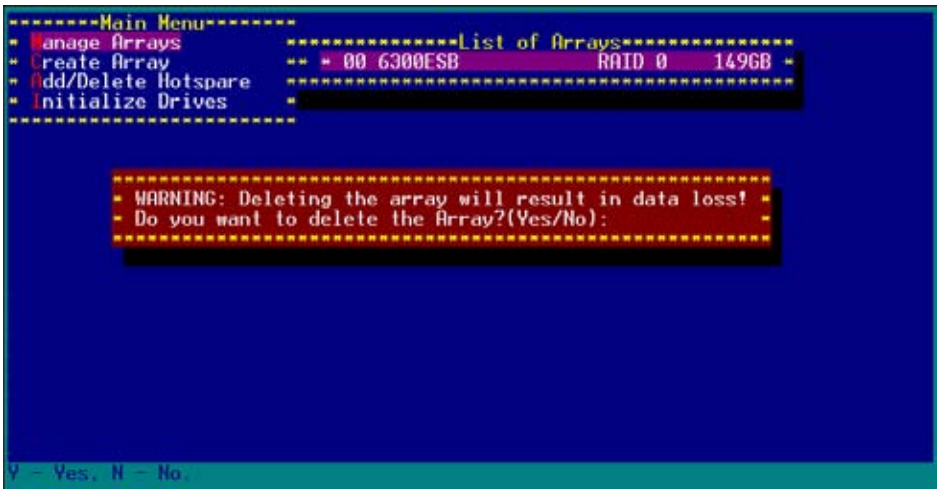
1. From the array list, select the RAID set you want to delete, then press <Del>. The Array Properties dialog box appears.



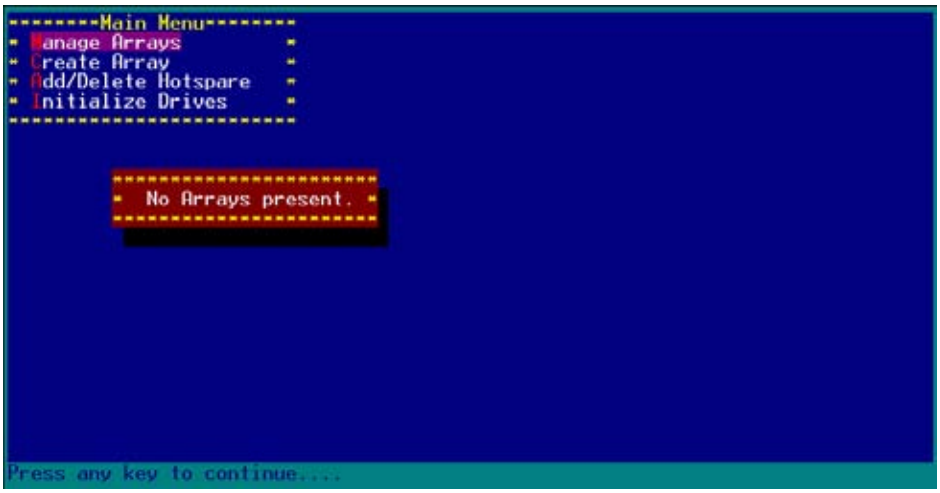
2. Move the cursor to **Delete**, then press <Enter> to delete the selected RAID set; otherwise, move the cursor to **Cancel** to close the dialog box.



3. When prompted, press <Y> to delete the RAID set or press <N> to abort the operation.



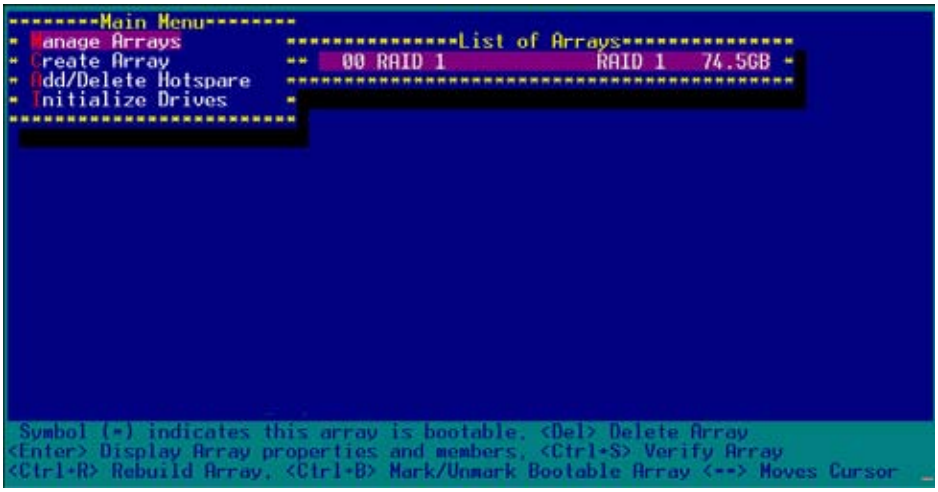
4. To verify if the array was deleted, select **Manage Arrays** from the main menu. A **No Arrays Present** message pops up on the screen if no array is detected.



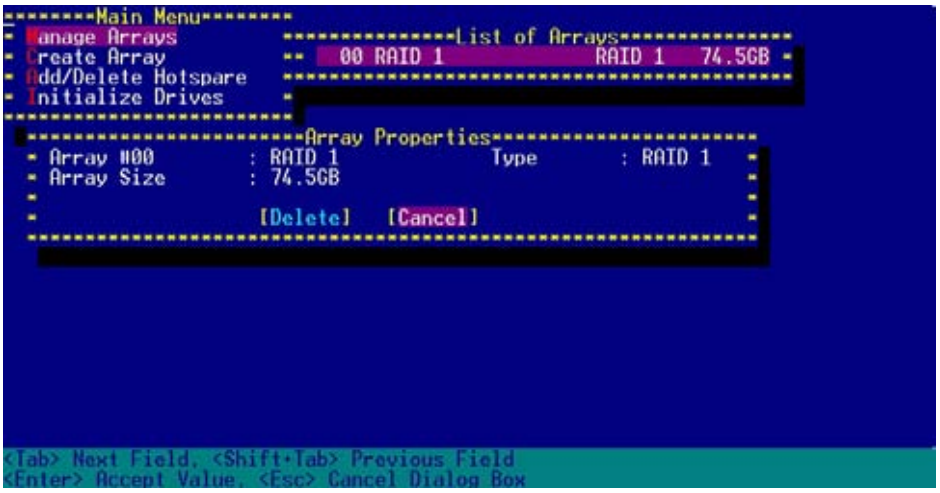
5.1.4.5 Deleting a RAID 1 set

To delete a RAID 1 set:

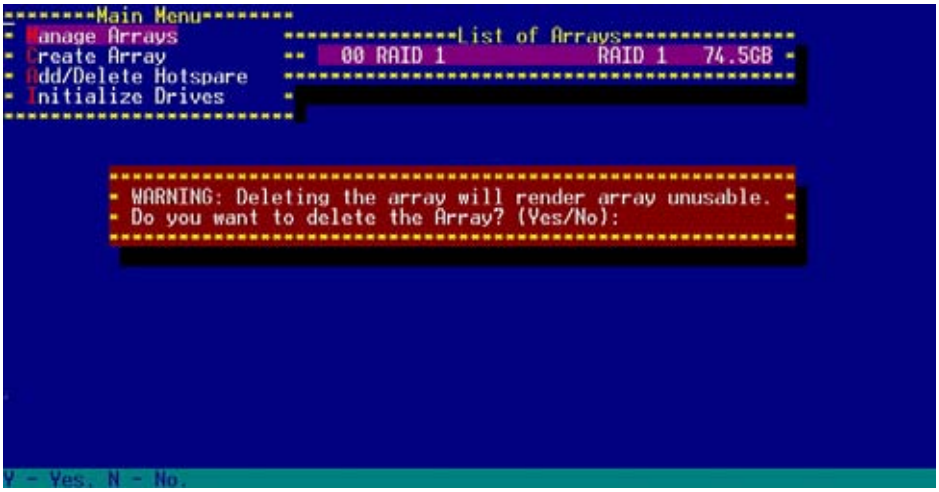
1. From the array list, select the RAID set you want to delete, then press <Del>. The Array Properties dialog box appears.



2. Move the cursor to **Delete**, then press <Enter> to delete the selected RAID set; otherwise, move the cursor to **Cancel** to close the dialog box.

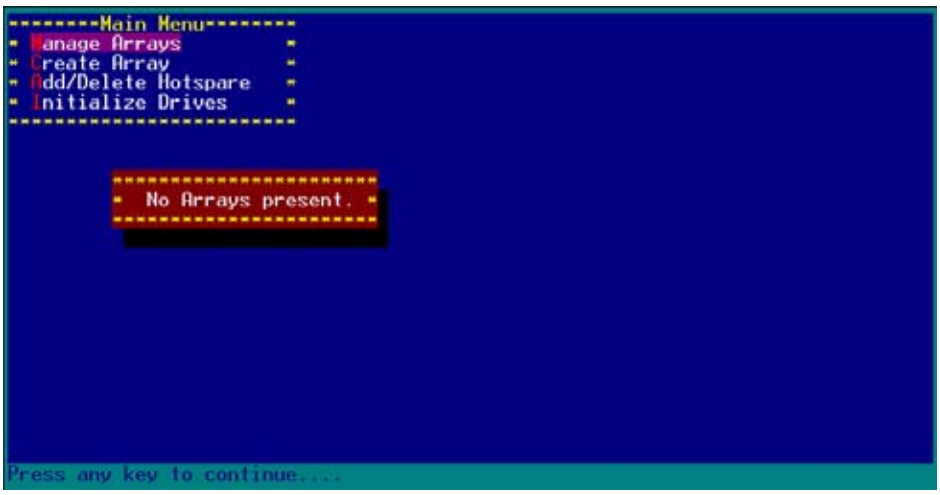


3. When prompted, press <Y> to delete the RAID set or press <N> to abort the operation.



4. When prompted, use the arrow keys to select either **Member#0** or **Member#1** to delete a RAID 1 set member. Select **[None]** or **[Both]** if you want to delete the entire array.

5. To verify if the array was deleted, select **Manage Arrays** from the main menu. A **No Arrays Present** message pops up on the screen if no array is detected.



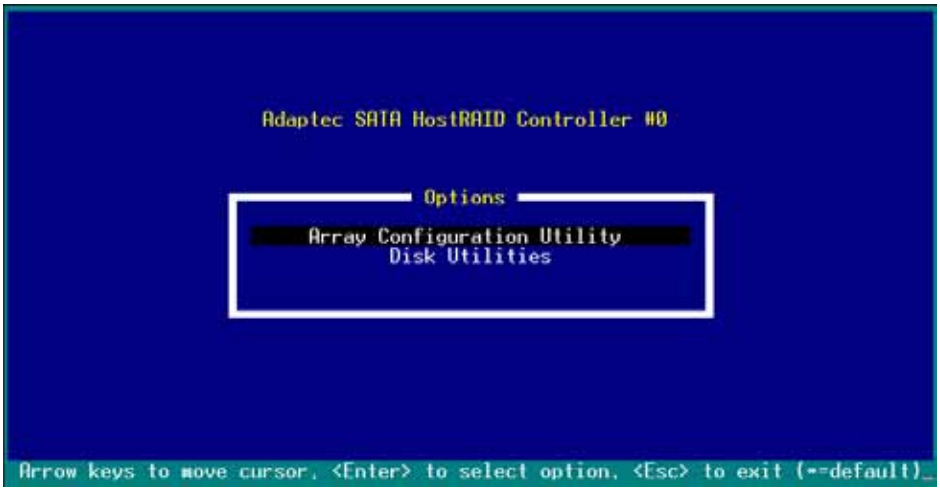
5.1.4.6 Rebuilding a RAID set

The utility displays the condition of the RAID set during the POST. When a RAID set is degraded, you can use the utility to rebuild it.

Check the physical connections of the SATA hard disk drives before you rebuild a degraded RAID set. Check the system and motherboard user guide for additional information.

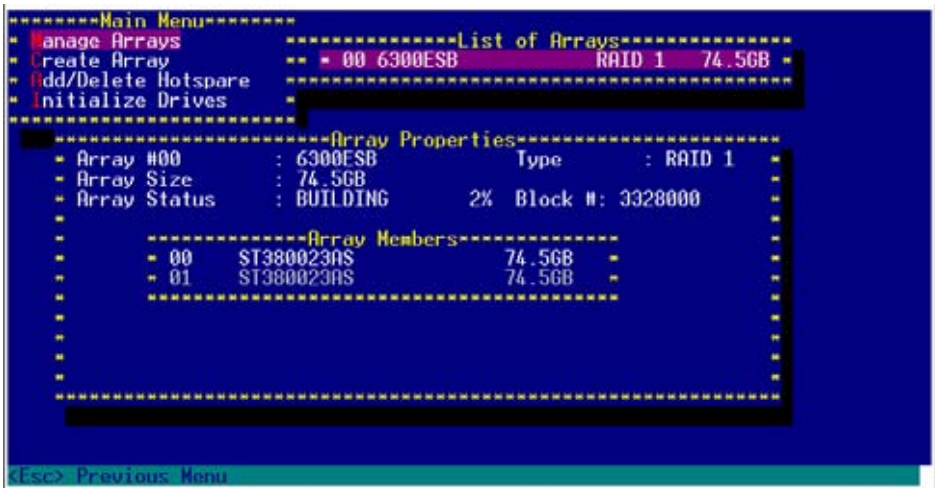
To rebuild a RAID array:

1. Enter the Adaptec RAID Configuration Utility following the instructions in the section “Creating a RAID 0 (Stripe).”
2. Select **Array Configuration Utility** from the initial menu, then press <Enter>.

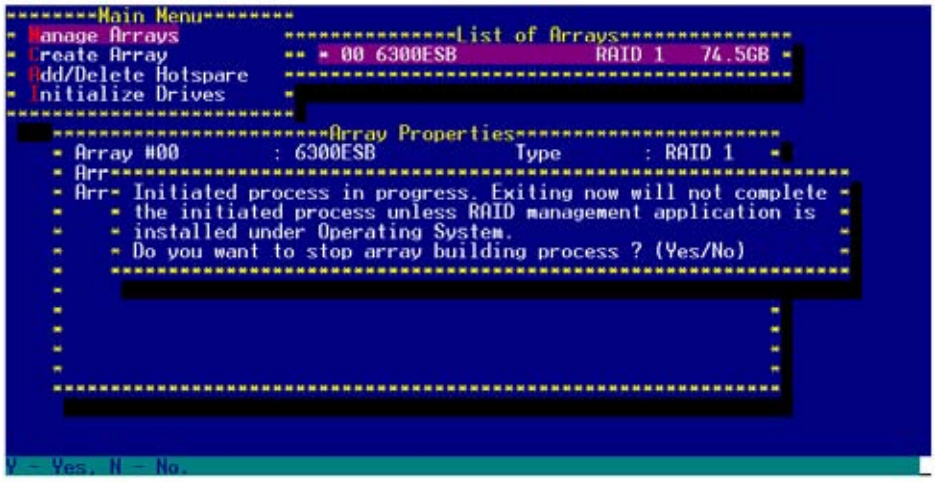


3. From the main menu, highlight Manage Arrays, then press <Enter> to display the installed RAID sets.
4. Highlight the degraded RAID set, then press <Enter> to display the array properties. The **Array Status** shows DEGRADED.

5. Press <Ctrl> + <R> to rebuild the RAID set. The **Array Status** shows the rebuilding progress.



To rebuild the RAID set using the RAID management application in the operating system, press <Esc> while the RAID set is being rebuilt to exit the application. A message pops up for confirmation. Press <Y> to exit.



5.1.5 Creating an Intel® 6300ESB RAID driver disk

You may have to use another system to create the RAID driver disk from the system/motherboard support CD or from the Internet.

5.1.5.1 Windows® 2000/2003 Server

A floppy disk with the RAID driver is required when installing Windows® 2000/2003 Server operating system on a hard disk drive that is assigned to an array.

To create a RAID driver disk from Windows® environment:

1. Place the system or motherboard support CD in the optical drive.
2. When the **Drivers** menu appears, select the RAID driver disk that you want to create.

   OR

   Browse the contents of the support CD to locate the driver disk utility. The **Intel® 6300ESB** RAID Driver Disk is located in:

   \Drivers\6300ESB\Windows

3. Insert a formatted high-density floppy disk to the floppy disk drive.
4. Follow screen instructions to complete the process.
5. After creating a RAID driver disk, eject the floppy disk, then write-protect it to prevent computer virus infection.

5.1.5.2 Red Hat® Linux 9.0

To create an **Intel® 6300ESB** Red Hat® Linux 9.0 driver disk:

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Decompress the file **RH9.0+release+build+16.gz** into the floppy disk from the following path in the support CD:

   \Drivers\6300ESB\Linux

3. Eject the floppy disk.

5.1.6 Installing the Intel® 6300ESB RAID controller driver

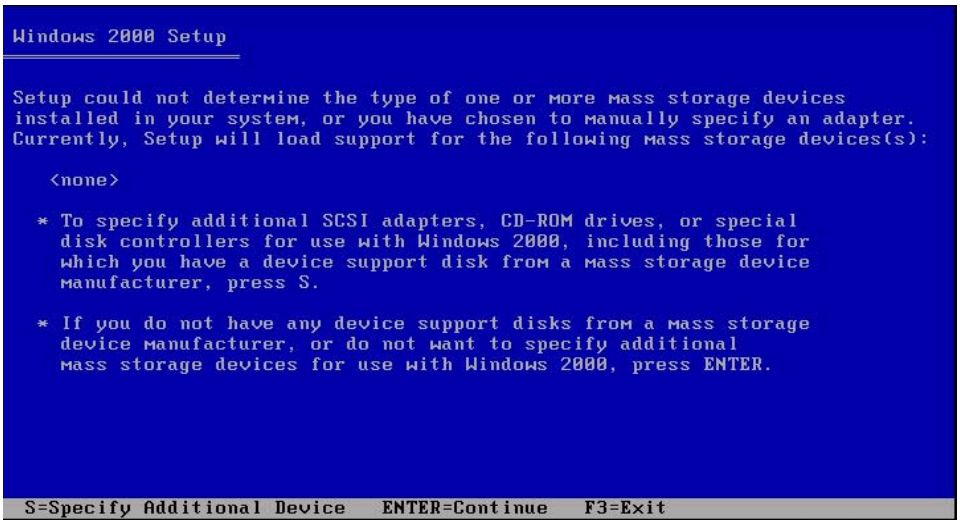
5.1.6.1 Windows® 2000/2003 Server

During Windows® 2000/2003 Server OS installation

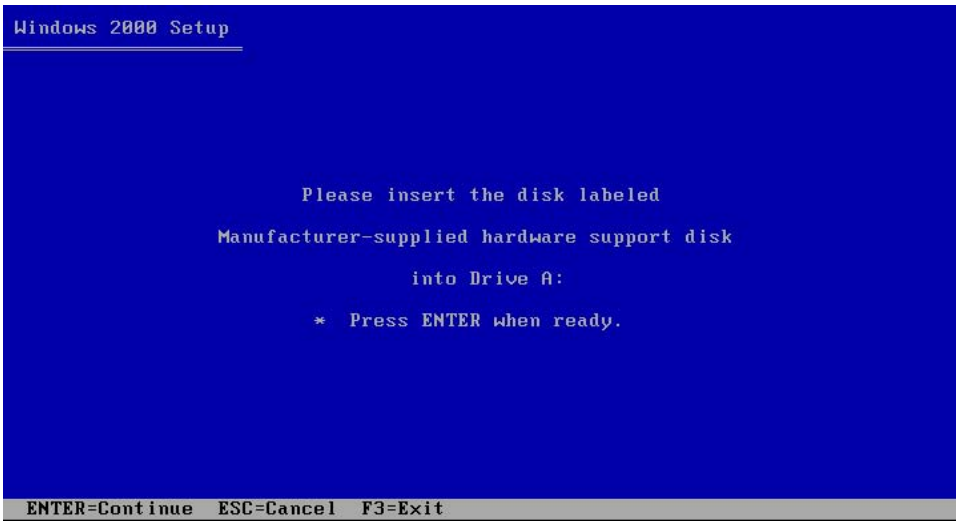
To install the Intel® 6300ESB RAID controller driver under Windows® 2000/2003 Server OS:

1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.

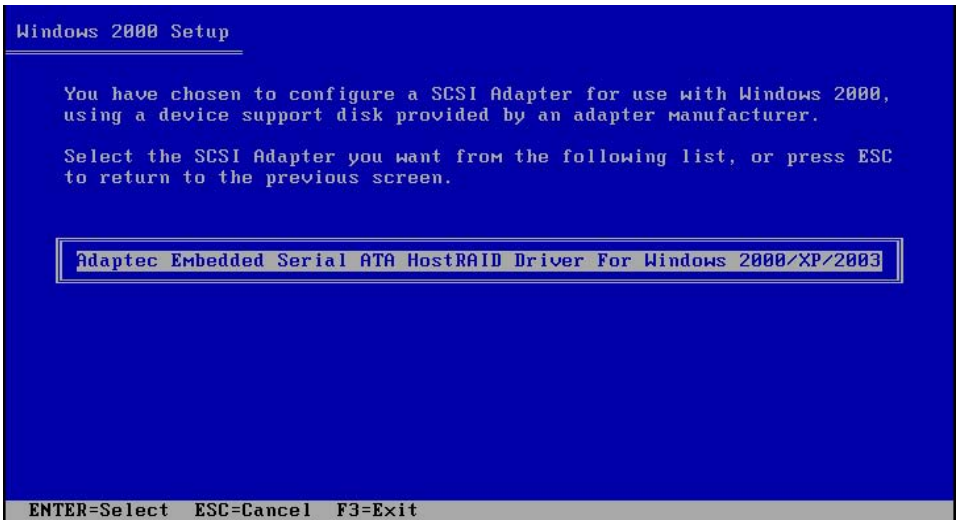
2. Press <F6> when the message "**Press F6 if you need to install a third party SCSI or RAID driver...**" appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the Intel® 6300ESB RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Select the **Adaptec Embedded Serial ATA HostRAID Driver for Windows 2000/XP/2003**, then press <Enter> to select.

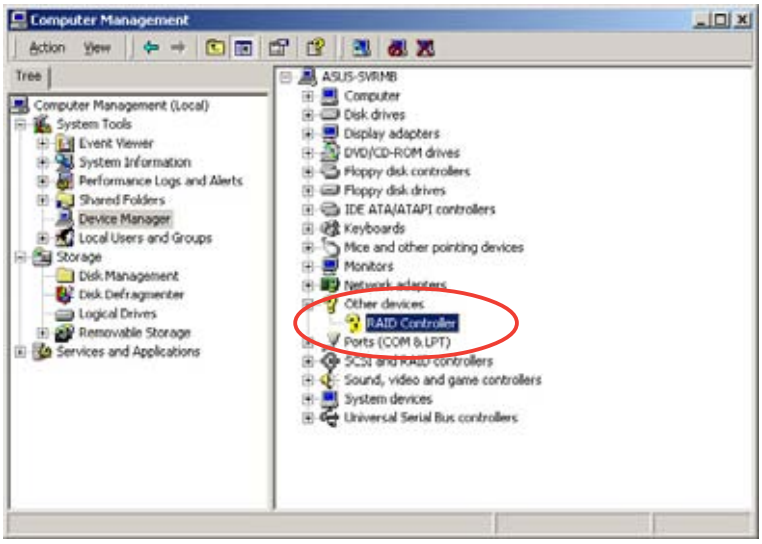


6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® 2000/2003 Server OS

To install the Intel® 6300ESB RAID controller driver on an existing Windows® 2000/2003 Server OS:

1. Restart the computer, then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
4. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.

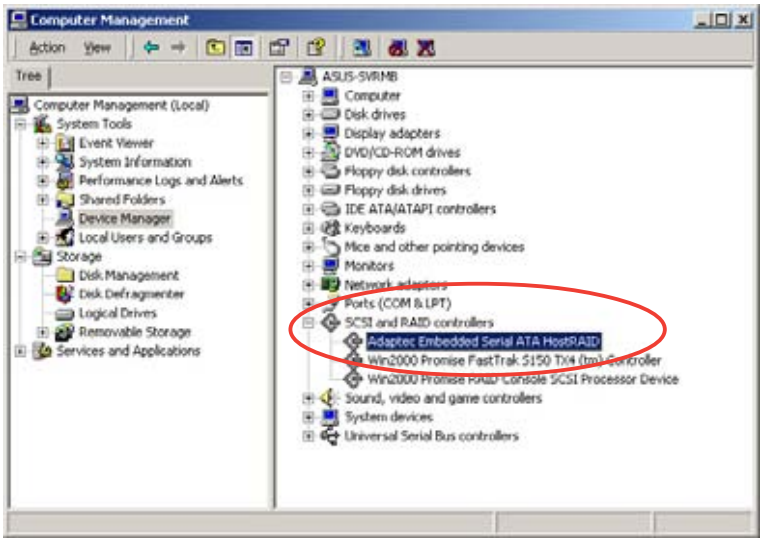


5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option "**Search for a suitable driver for my device (recommended)**, then click **Next**.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.

11. Click **Finish** after the driver installation is done.

To verify the Intel® 6300ESB RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SCSI and RAID controllers**.
   The **Adaptec Embedded Serial ATA HostRAID** item should appear.

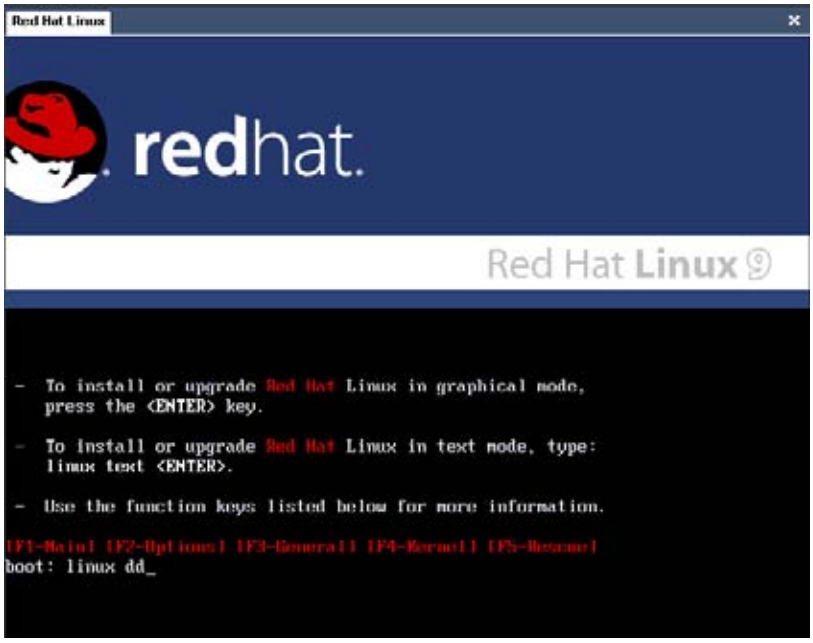


4. Right-click the **Adaptec Embedded Serial ATA HostRAID** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

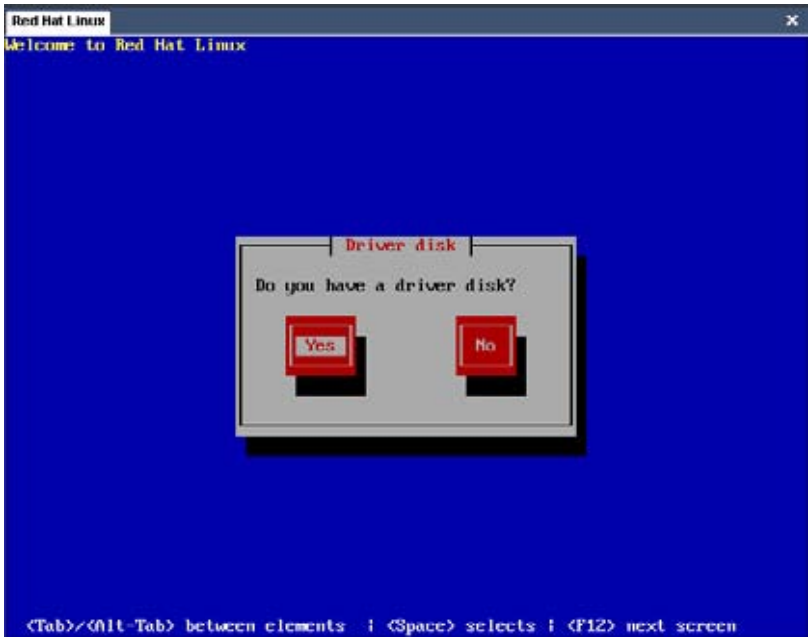
5.1.6.2 Red Hat® Linux 9.0

To install the Intel® 6300ESB RAID controller driver under Red Hat® Linux 9.0 OS:

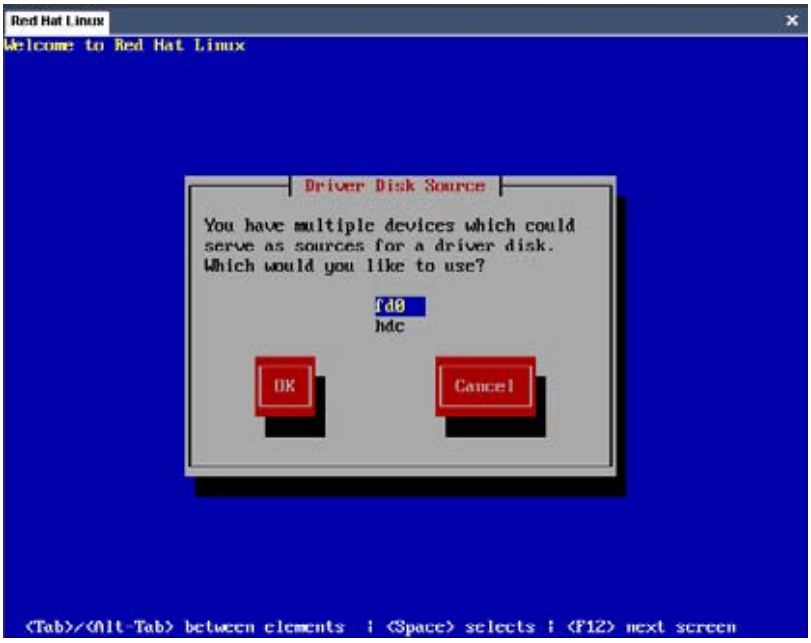
1. Boot the system from the Red Hat® Installation CD.
2. At the **boot:**, type **linux dd** , then press <Enter>.



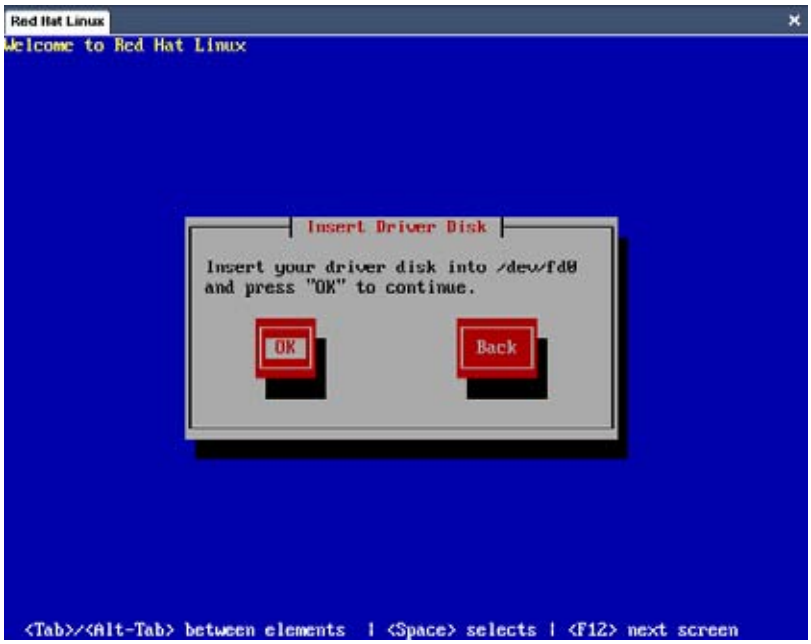
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



4. Select **fd0** using the <Tab> key when asked to select the driver disk source. Press <Tab> to move the cursor to **OK**, then press <Enter>.

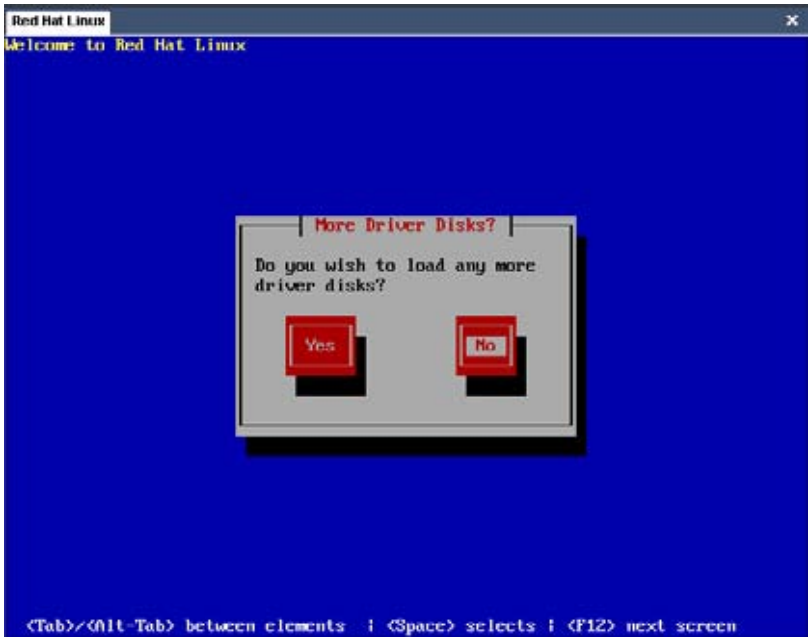


5. When prompted, insert the Intel® 6300ESB Red Hat® Linux 9.0 driver disk to the floppy disk drive, select **OK**, then press <Enter>.



The drivers for the Intel® 6300ESB RAID controller are installed to the system.

6. When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>; otherwise, select **Yes** if you need to install additional RAID controller drivers.



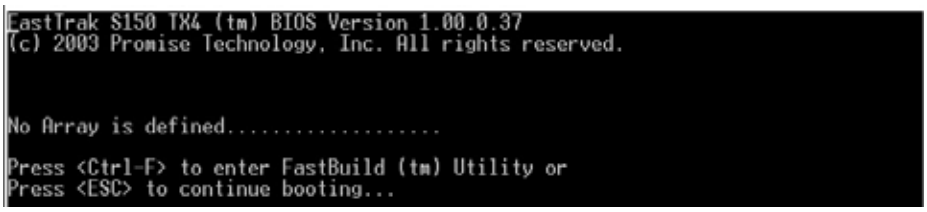
7. Follow screen instructions to continue the OS installation.

5.1.7 FastBuild™ Utility

The FastBuild™ Utility allows you to create RAID 0, 1, and 0+1 set(s) from SATA hard disk drives connected to the SATA connectors supported by the Promise® PDC20319 RAID controller.

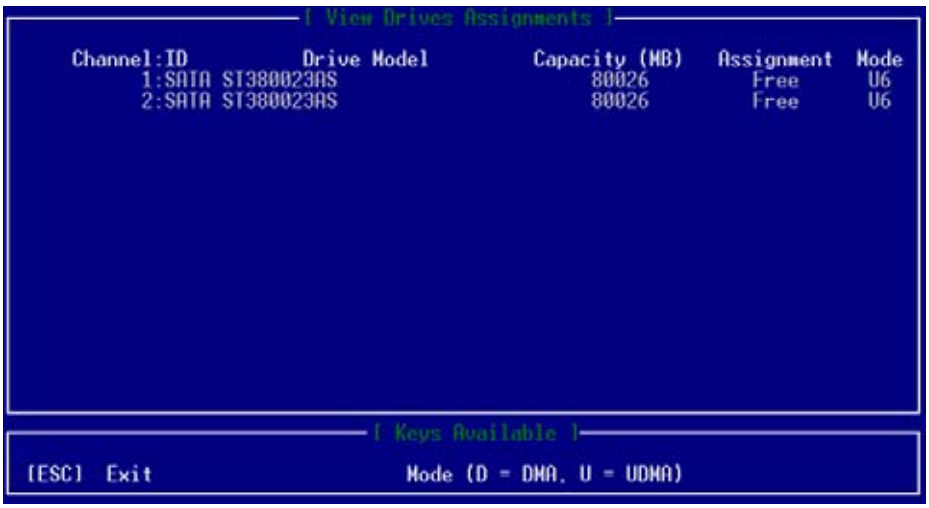
To enter the FastBuild™ Utility:

1. Turn on the system after installing all the SATA hard disk drives.
2. If this is the first time you restart the system with the new hard disk drives installed and connected to the SATA connectors, the FastTrak S150 TX4™ BIOS displays the following:



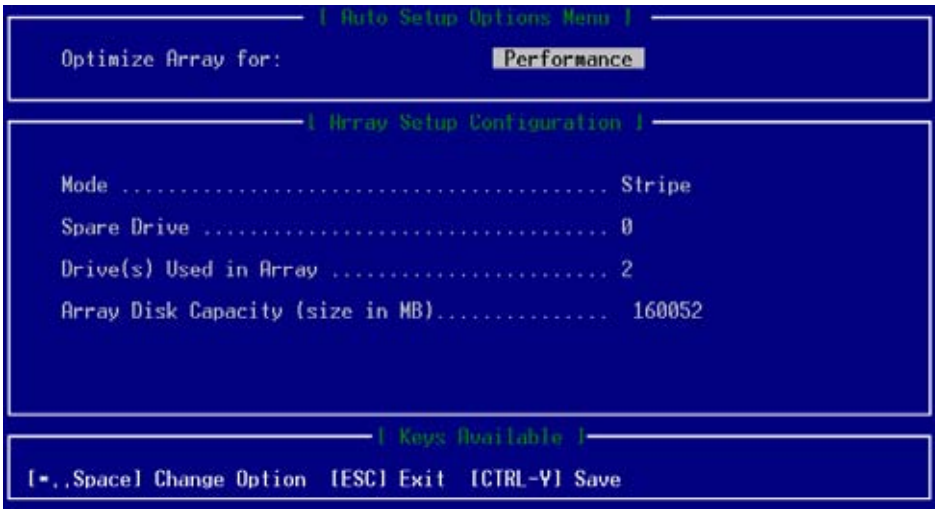
3. Press <Ctrl+F> to display the FastBuild™ Utility main menu.

4. To make sure that the SATA hard disk drives are properly installed, press <2> to view the drive assignments. When finished, press <Esc> to return to the main menu.

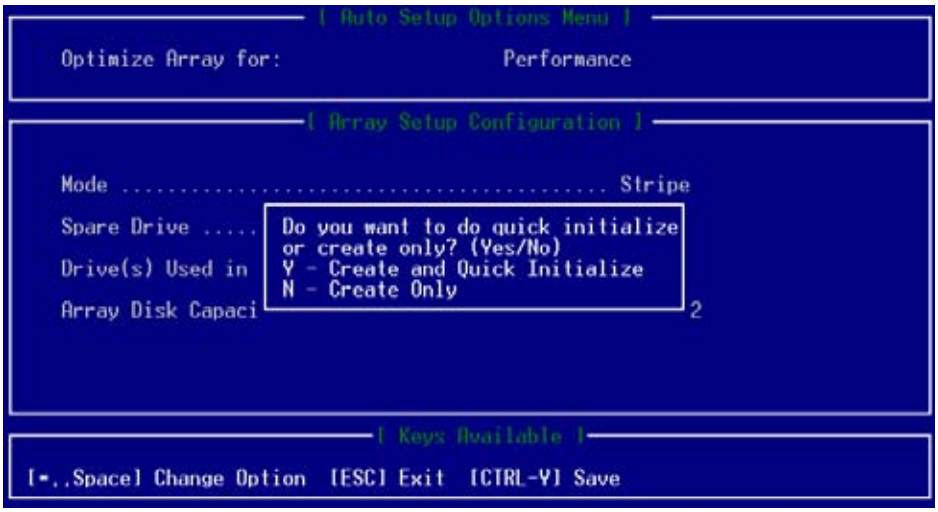


5.1.7.1 Creating a RAID 0 set (Performance)

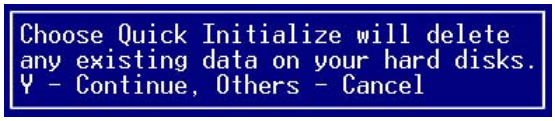
1. In the FastBuild™ Utility main menu, press <1> to display the **Auto Setup Options Menu**.



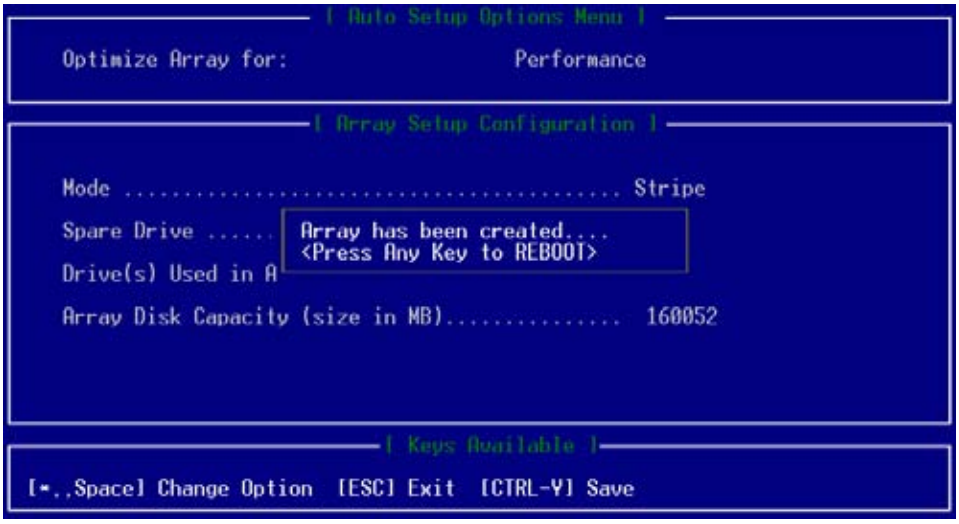
2. Use the arrow keys to go to the **Optimize Array for** field, then select **Performance** using the space bar. The **Mode** field displays **Stripe**.
3. After making a selection, press <Ctrl+Y> to save and create a RAID 0 array.
4. A pop-up window appears. Press <Y> (Create and Quick Initialize).



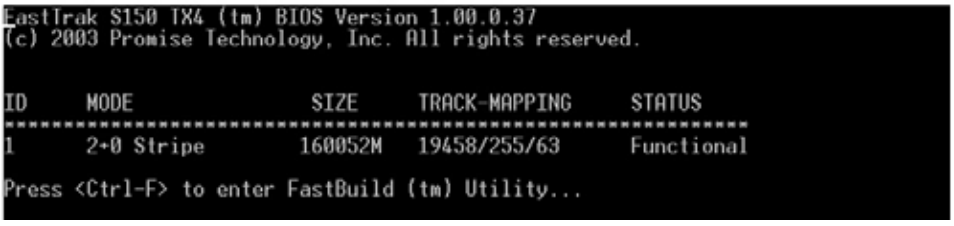
5. A pop-up message appears, warning you that all existing data on the hard disk drives will be deleted. Press <Y> to continue.



6. After you have created the RAID 0 set, press any key to reboot the system.



During POST, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.



7. Once the array is created, use the FDISK utility to format the array as a single hard drive.
8. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID 0 array as a single drive unit.

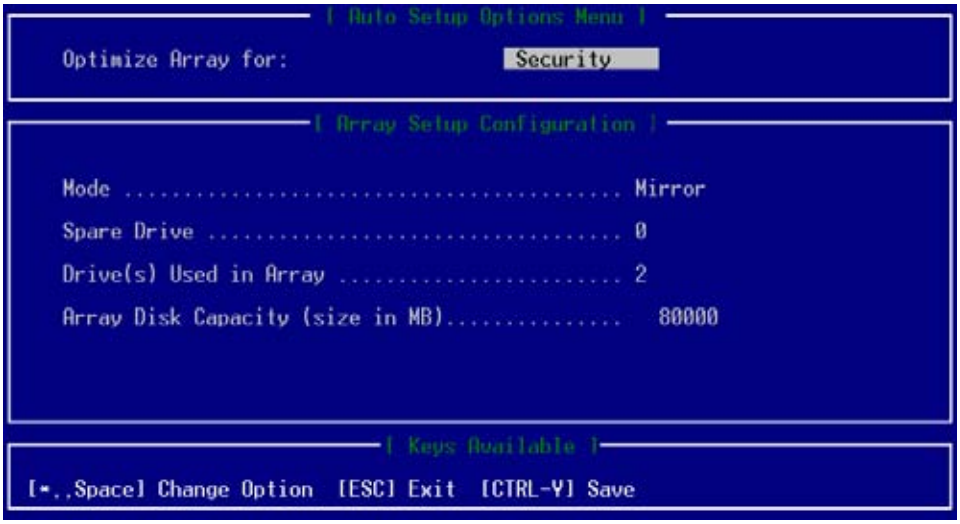
During the OS installation, the system prompts you to install third-party SCSI or RAID driver. Refer to section “2. RAID driver installation” for details.

5.1.7.2 Creating a RAID 1 set (Security)

Using two new SATA hard disk drives

Refer to these instructions when creating a RAID 1 set using two new SATA hard disk drives.

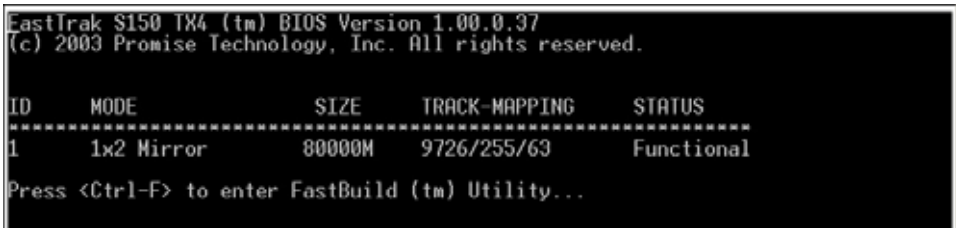
1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <1> to display the **Auto Setup Options Menu**.



3. Use the arrow keys to go to the **Optimize Array for** field, then select **Security** using the space bar. The **Mode** field displays **Mirror**.
4. After making a selection, press <Ctrl+Y>.
5. A pop-up window appears. Press <N> (Create only) to create the RAID 1 set.

6. After you have created the RAID 1 set, press any key to reboot the system.

   During POST, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.



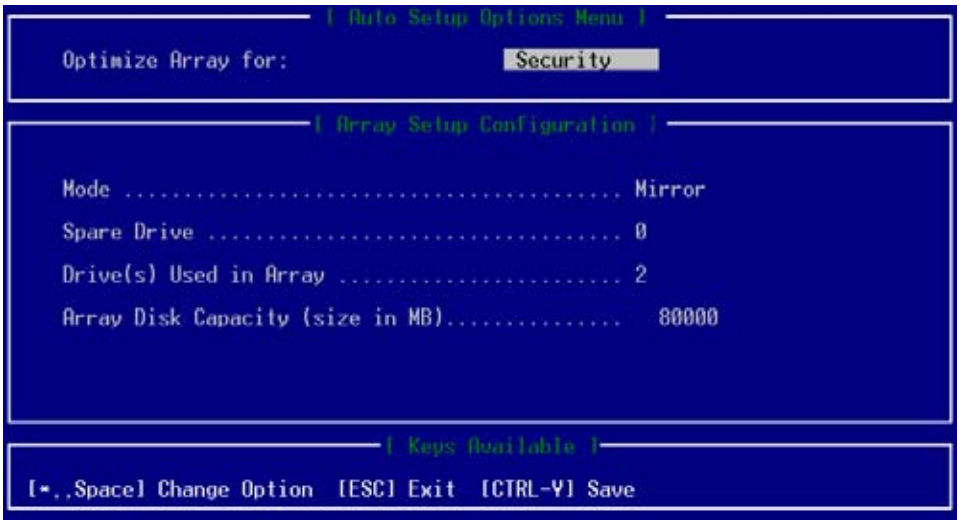
7. Use the FDISK utility to format the array as a single hard drive.
8. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID 0 array as a single drive unit.

During the OS installation, the system prompts you to install third-party SCSI or RAID driver. Refer to section “2. RAID driver installation” for details.

Using an existing boot/data hard disk drive and a new drive

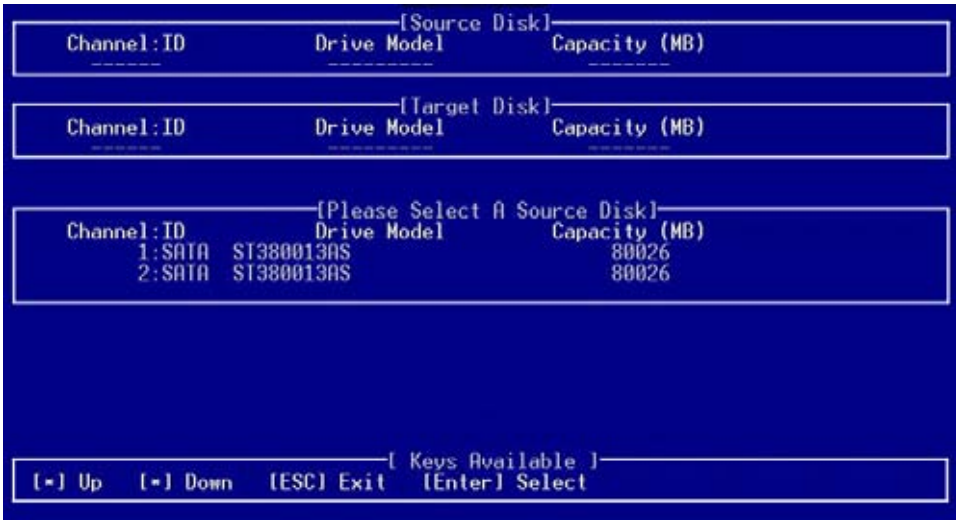
Refer to these instructions when creating a RAID 1 set using an existing bootable or data hard disk drive and a new drive of the same or larger storage capacity.

1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <1> to display the **Auto Setup Options Menu**.

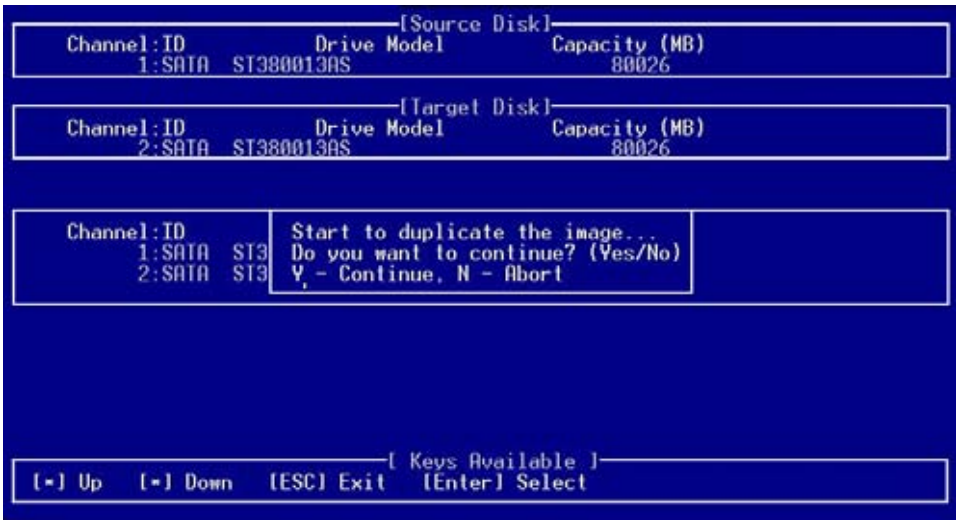


3. Use the arrow keys to go to the **Optimize Array for** field, then select **Security** using the space bar. The **Mode** field displays **Mirror**.
4. After making a selection, press <Ctrl+Y>.
5. A pop-up window appears. Press <Y> (Create and duplicate) to copy the existing data from the source (existing) drive to the target (new) drive.

6. When prompted, use the arrow keys to select the source disk, then press <Enter>.

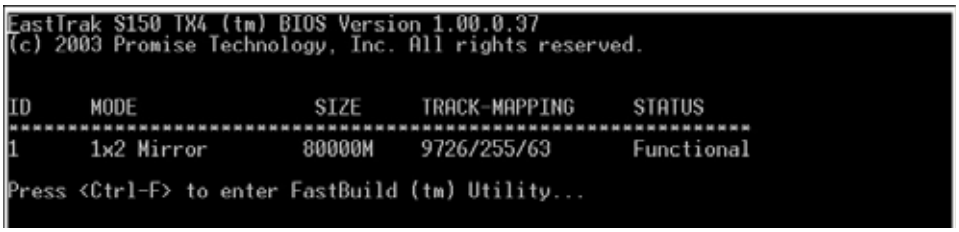


7. When prompted to start the duplication process, press <Y> to continue; otherwise, press <N> to abort the operation.



8. After you have created the RAID 1 set, press any key to reboot the system.

   During POST, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.



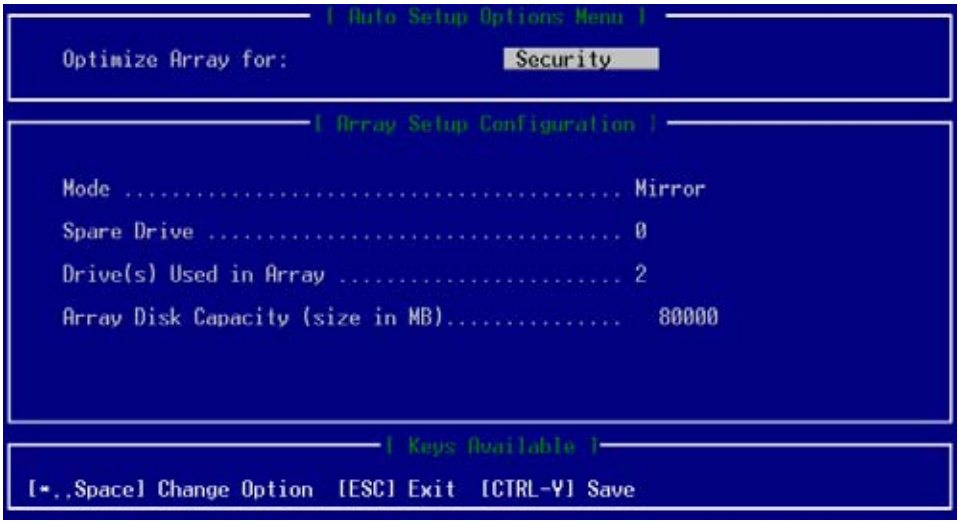
9. Use the FDISK utility to format the array as a single hard drive.
10. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID 1 array as a single drive unit.

Using quick initialization

Refer to these instructions when creating a RAID 1 set using one or two existing hard disk drives containing data that you **do not want to keep**.

Using quick initialization erases all data from the existing hard disk drive(s). Make sure to backup all important data before using this RAID 1 configuration mode.

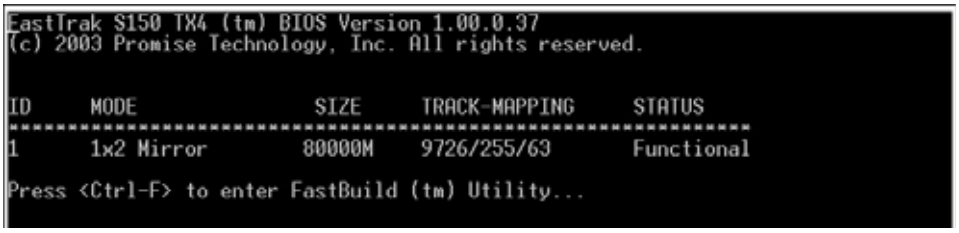
1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <1> to display the **Auto Setup Options Menu**.



3. Use the arrow keys to go to the **Optimize Array for** field, then select **Security** using the space bar. The **Mode** field displays **Mirror**.
4. After making a selection, press <Ctrl+Y>.
5. A pop-up window appears. Press <I> (Create and Quick Initialize).

6. After you have created the RAID 1 set, press any key to reboot the system.

   During POST, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.

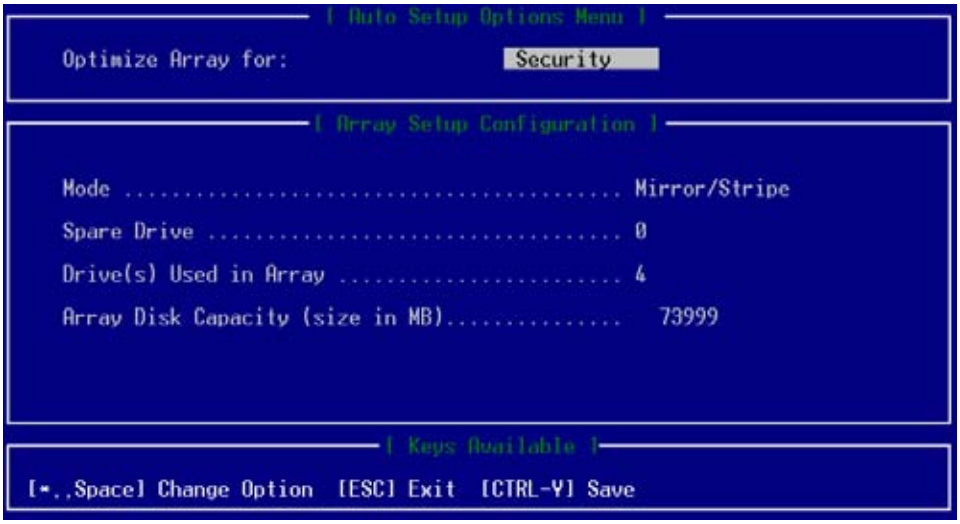


7. Use the FDISK utility to format the array as a single hard drive.
8. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID 1 set as a single drive unit.

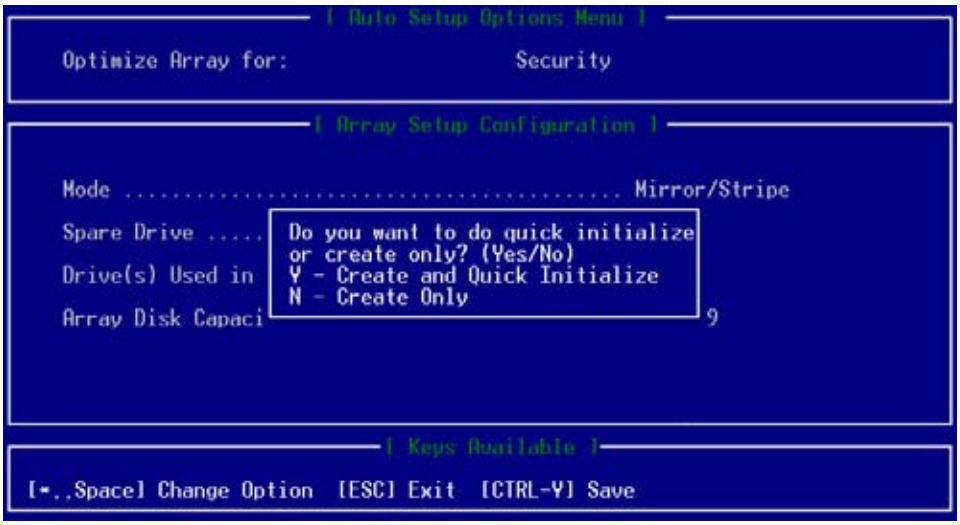
5.1.7.3 Creating a RAID 0+1 set (Security and Performance)

You must install four SATA hard disk drives to create a RAID 0+1 set.

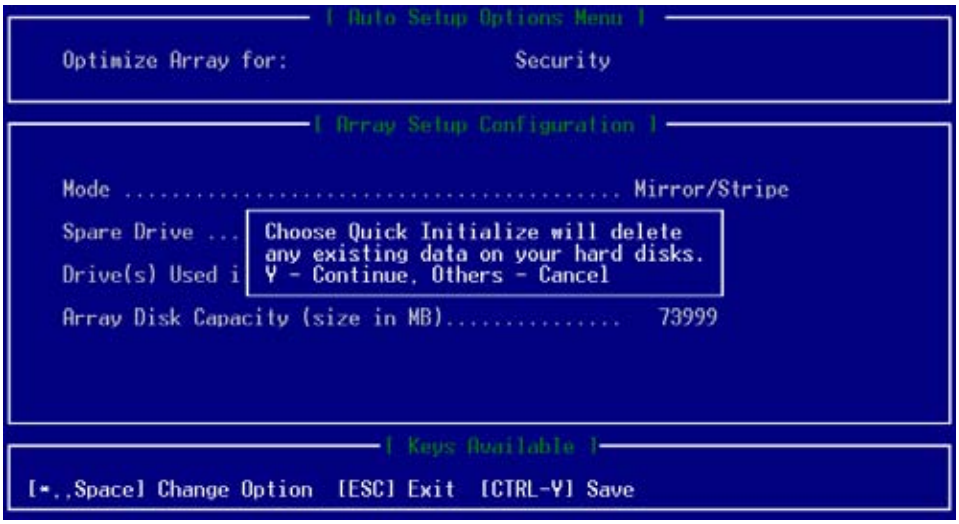
1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <1> to select **Auto Setup**. The following screen appears.



3. Use the arrow keys to go to the **Optimize Array for** field, then select **Security** using the space bar. The **Mode** field displays **Mirror/Stripe**.
4. After making a selection, press <Ctrl+Y>.
5. A pop-up window appears. Press <Y> (Create and Quick Initialize) to create the RAID 0+1 set.

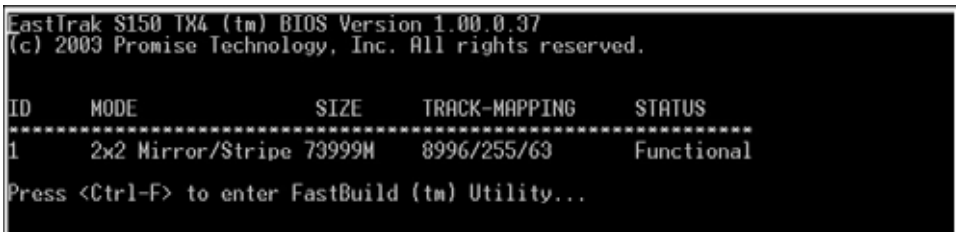


6. A pop-up message appears, warning you that all existing data on the hard disk drives will be deleted. Press <Y>.



7. After you have created the RAID 0+1 set, press any key to reboot the system.

   During POST, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.

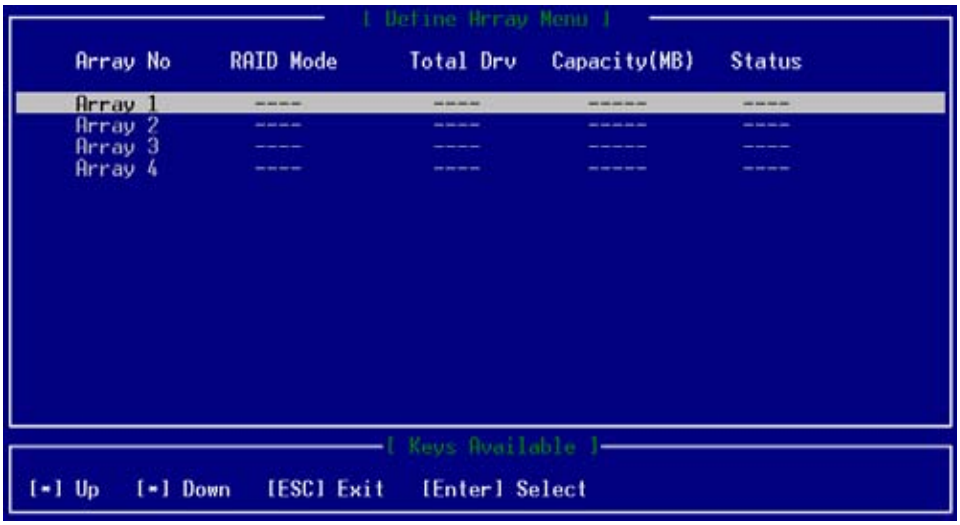


8. Use the FDISK utility to format the array as a single hard drive.
9. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID 0+1 set as a single drive unit.

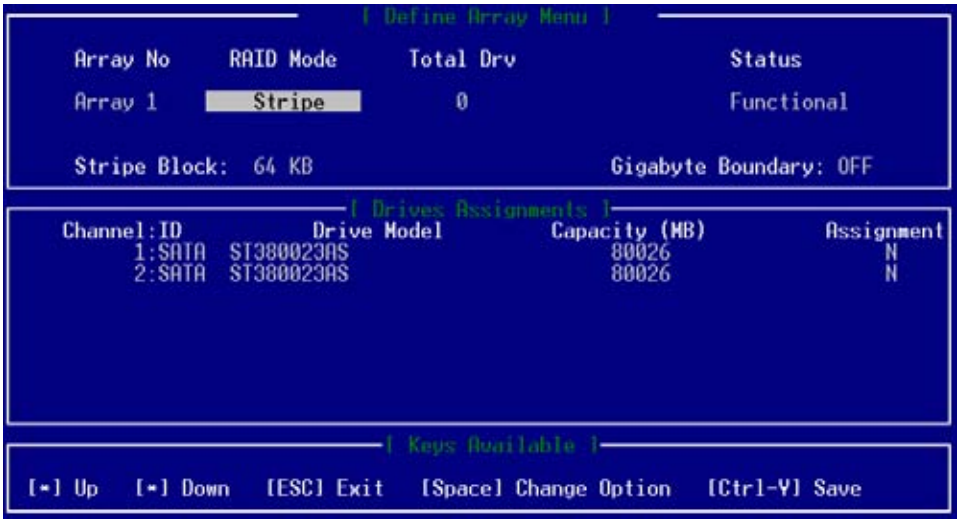
5.1.7.4 Manually creating a RAID set

We strongly recommend that you use the **Auto Setup** option to create a RAID set.

1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <2> to display the **Define Array Menu**.



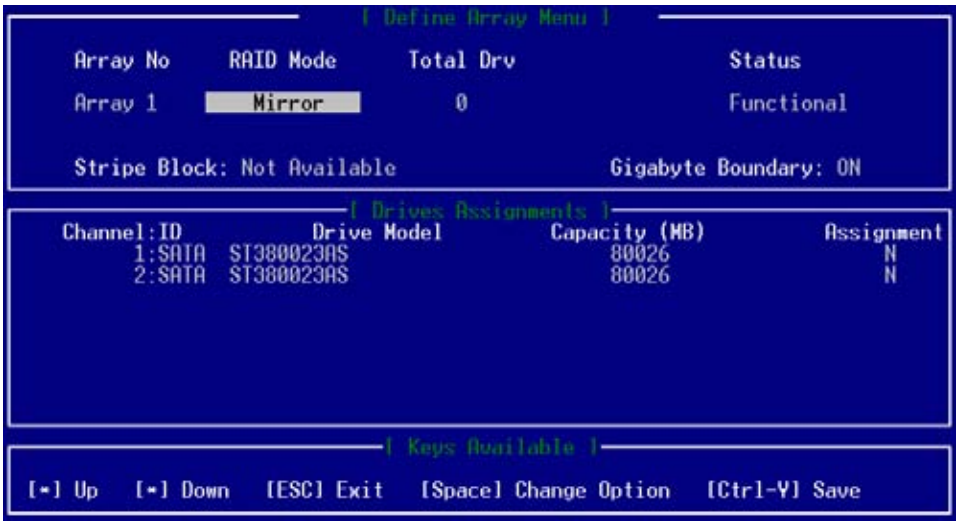
3. Press the up or down arrow keys to highlight the array number you want to define, then press <Enter>. The **Define Array Menu** appears.



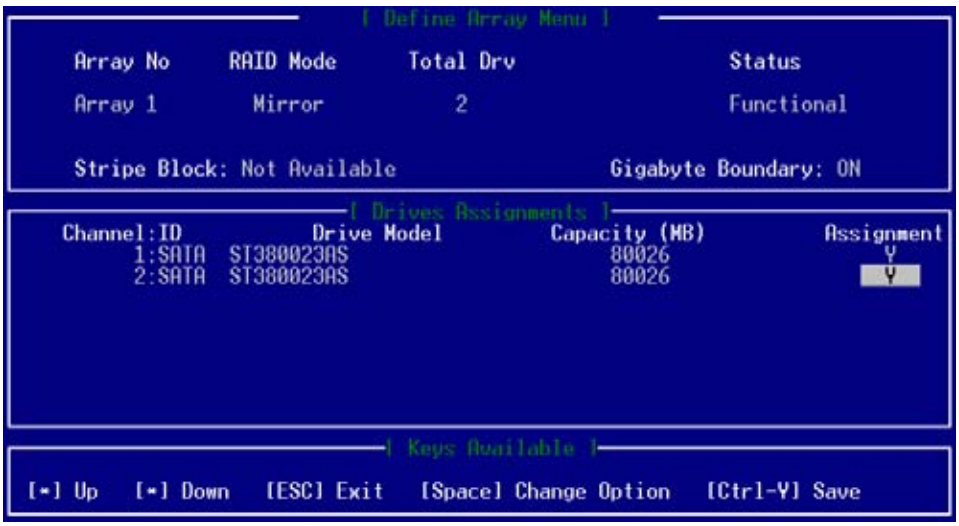
4. Press the <Spacebar> to select the array type for the selected array number. You can select Performance (RAID 0 Striping) or Security (RAID 1 Mirroring) if you installed two SATA hard disk drives. You can select a RAID 0+1 (Striping/Mirroring) if you have installed four SATA hard disk drives.

5. Press the down arrow key to highlight the **Stripe Block** option. Press the <Spacebar> to manually assign the stripe block size to 16, 32, 64, or 128 KB.

- You can manually assign the stripe block size only if you are creating a RAID 0 (Striping) or RAID 0+1(Striping/Mirroring) set.
- For server systems, we recommend that you use a lower array block size. For multimedia computer systems used mainly for audio and video editing, we recommend a higher array block size for optimum performance.

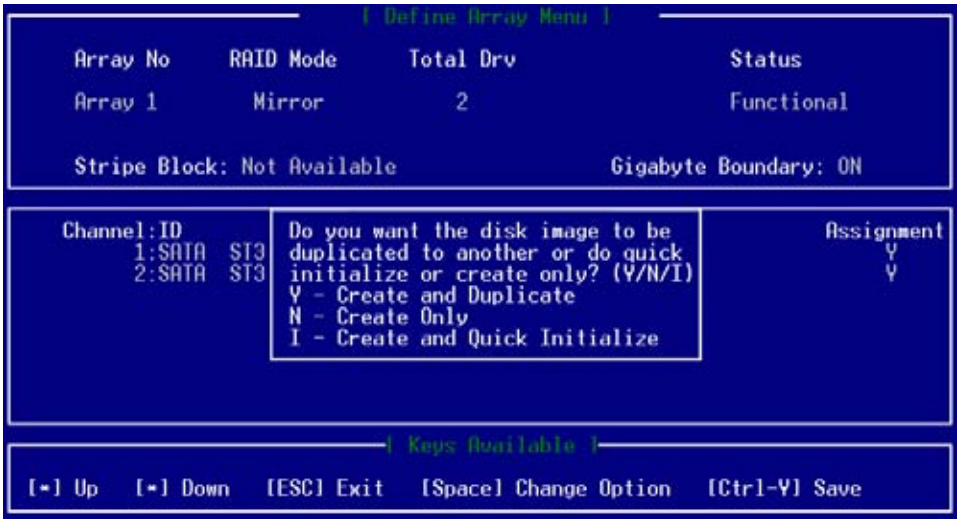


6. Press the down arroy key to move to the **Drives Assignments** section.
7. Highlight the hard disk drives that you want to assign to the array, then press <Spacebar>. The **Assignment** column of the assigned drives show **Y**.

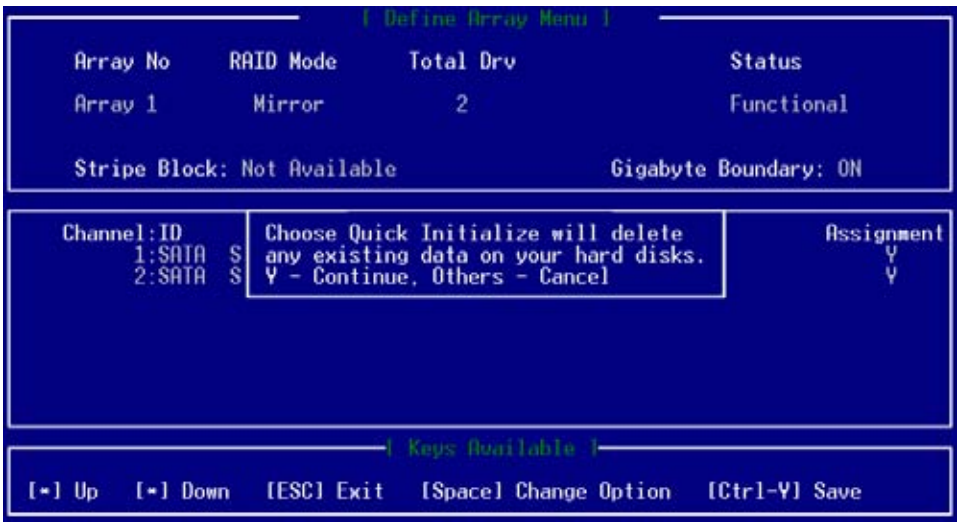


5. Press <Ctrl> + <Y>.
6. When a dialog box appears, press <I> to create and quick initialize the RAID set.

Using quick initialization erases all data from the existing hard disk drives. Make sure to backup all important data before using this RAID configuration mode.



7. When prompted, press <Y> to continue.



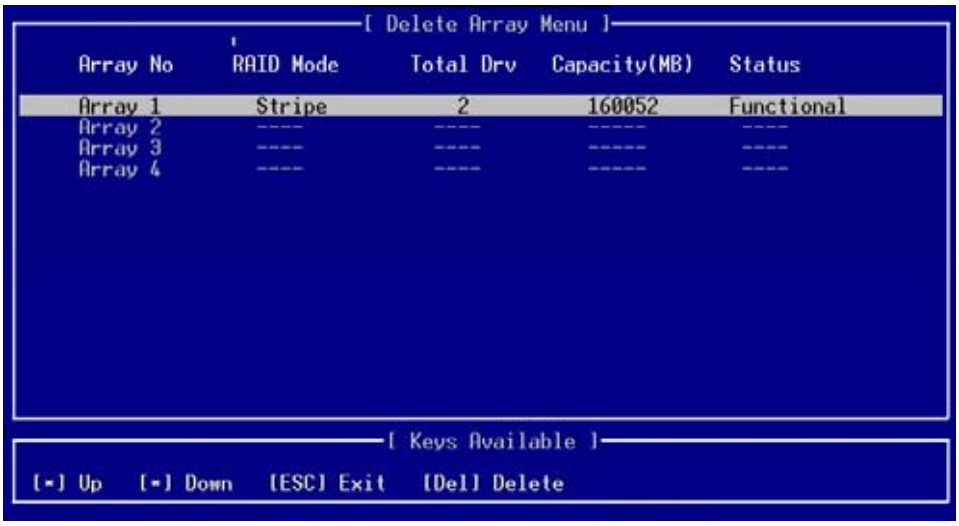
8. After you have created the RAID set, press any key to reboot the system.
   During the boot process, the FastTrak S150 TX4™ BIOS checks and displays the disk array information.
9. Use the FDISK utility to format the array as a single hard drive.
10. After you have formatted the arrayed drives, install an operating system (OS). The OS will treat the RAID set as a single drive unit.

5.1.7.5 Deleting a RAID set

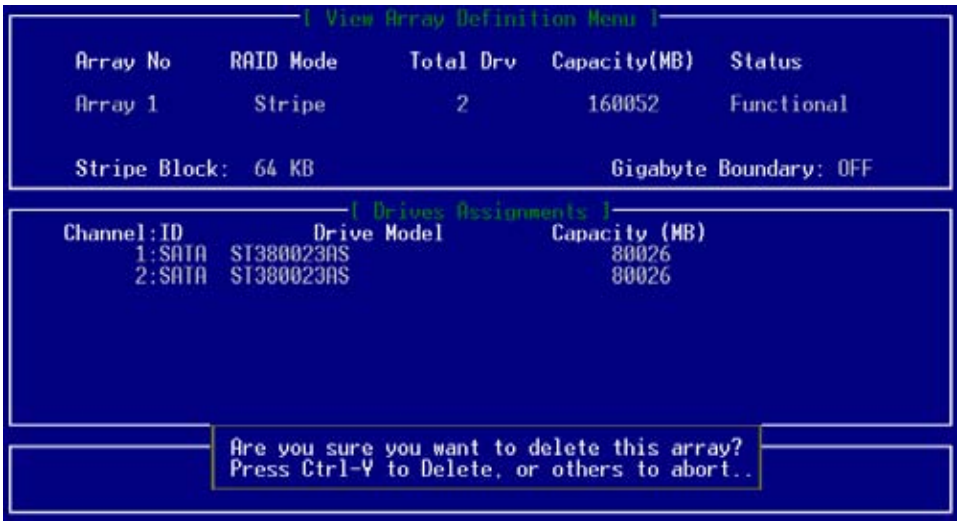
The **Delete Array** menu deletes the disk array assignments and not the data on the hard disk drives. You can recover a deleted array by immediately defining a new one.

To delete an array:

1. Restart the system, then enter the FastBuild™ Utility.
2. In the FastBuild™ Utility main menu, press <4> to display the **Delete Array Menu**.

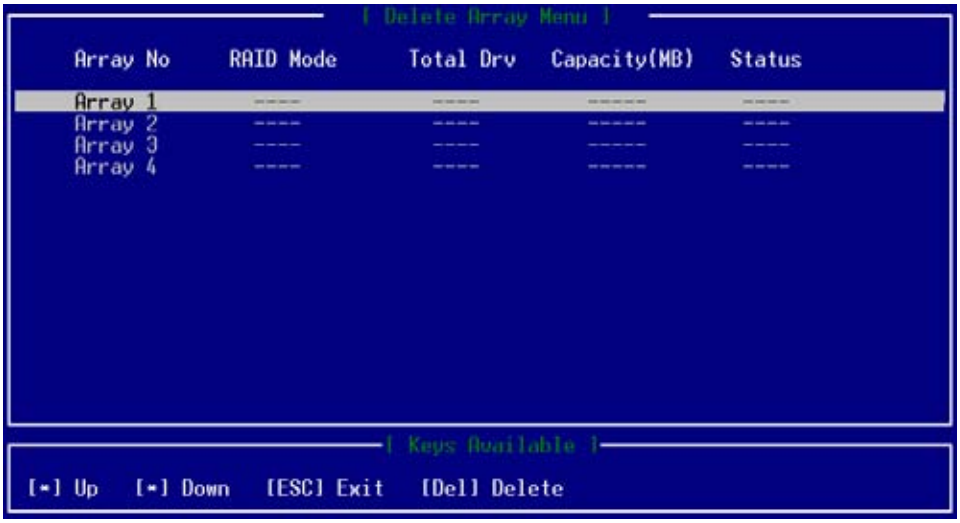


3. Press the up or down arrow keys to highlight the array number you want to delete, then press <Del>. The **View Array Definition Menu** appears displaying the hard disk drives assigned to the selected array.



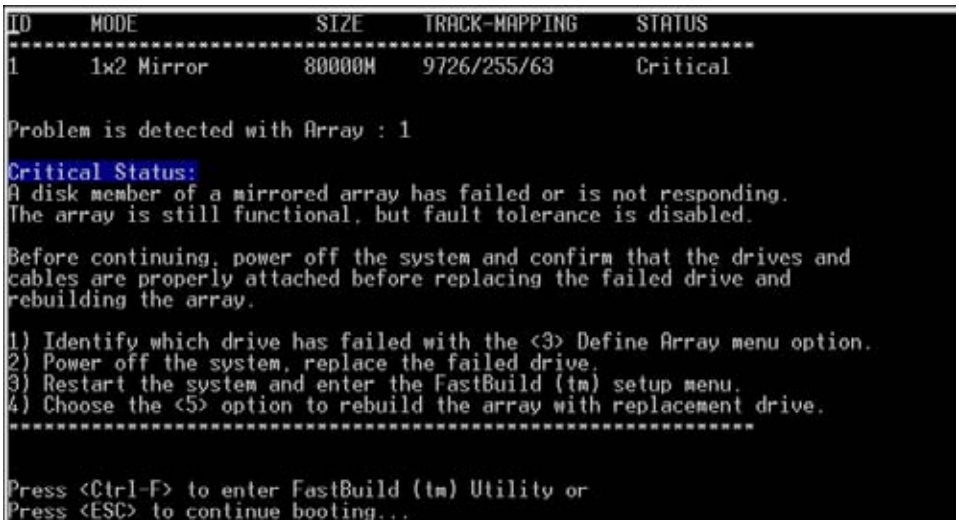
4. When prompted, press <Ctrl> + <Y> to delete the array.

5. The **Delete Array Menu** appears, showing that the array is successfully deleted. Press <Esc> to exit.



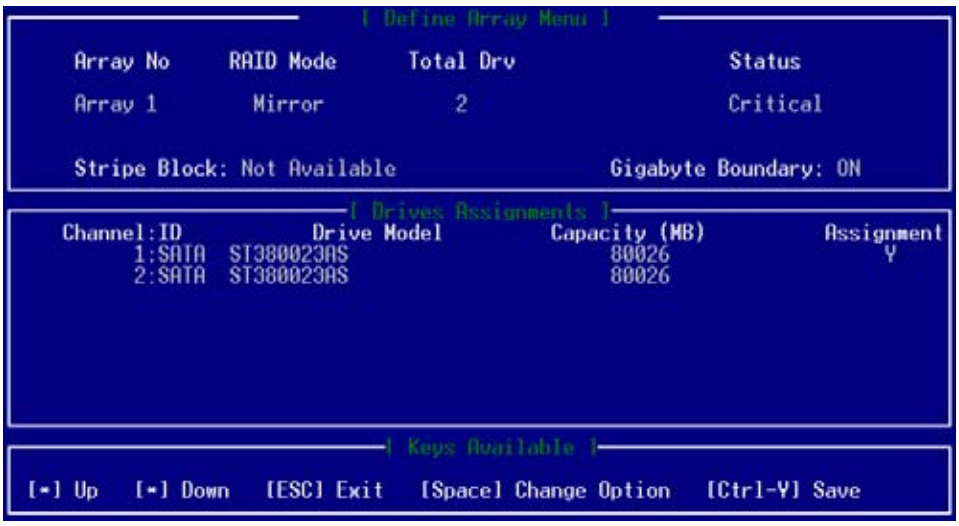
5.1.7.6 Rebuilding a RAID 1 set

The **Rebuild Array Menu** allows you to rebuild a RAID 1 set and recover the array from errors. During POST, the FastTrak S150 TX4™ BIOS checks and displays the RAID 1 condition. The screen displays the following information if the BIOS detected an error on the array.



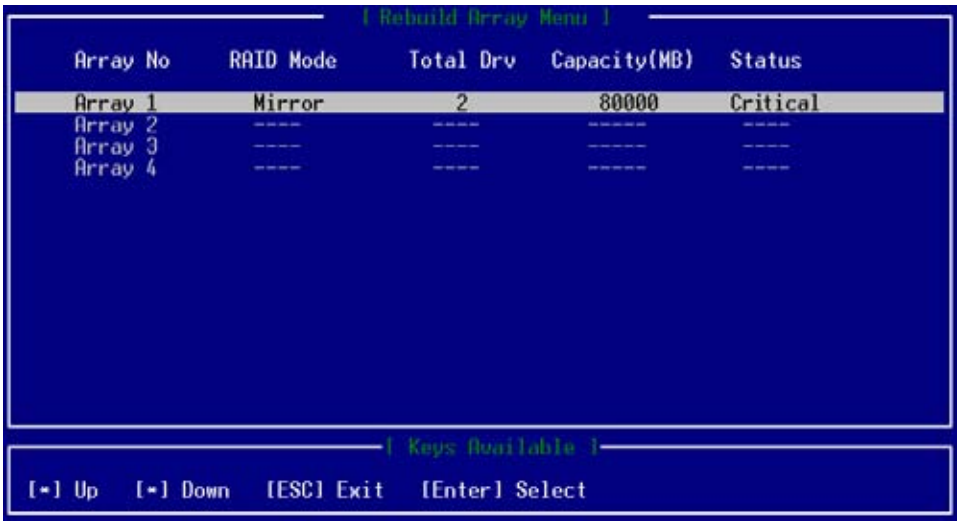
To rebuild the array:

1. Press <Ctrl> + <F> to enter the FastBuild™ Utility.
2. From the FastBuild™ Utility main menu, press <3> to display the **Define Array Menu**.



3. Select the failed array, then identify the failed drive channel and ID.
4. Exit the utility, then turn off the system.
5. Replace the failed drive with an identical (same storage capacity) drive.

6. Restart the system, then press <Ctrl> + <F> to enter the FastBuild™ Utility.
7. From the FastBuild™ Utility main menu, press <5> to display the **Rebuild Array Menu**.



8. Use the arrow keys to select the array with a **Critical** status, then press <Enter>.
9. From the **Select Drive to Rebuild** section, use the arrow keys to highlight the replacement drive, then press <Enter>.

   All data on the replacement drive will be overwritten with mirrored information from the existing array drive. A progress bar indicates the duplicating process.
10. When finished, exit the utility, then restart the system.

5.1.8 Installing the Promise® PDC20319 RAID controller driver

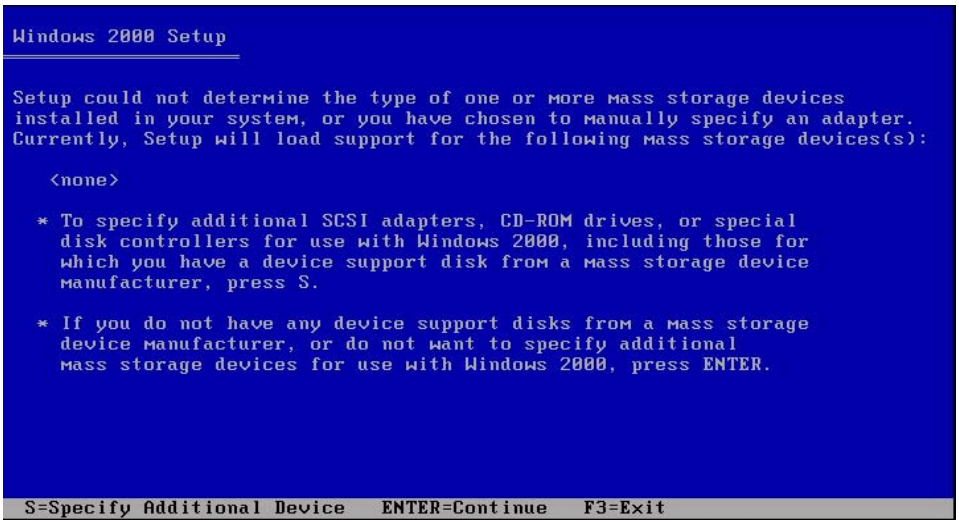
5.1.8.1 Windows® 2000 Server

During Windows® operating system installation

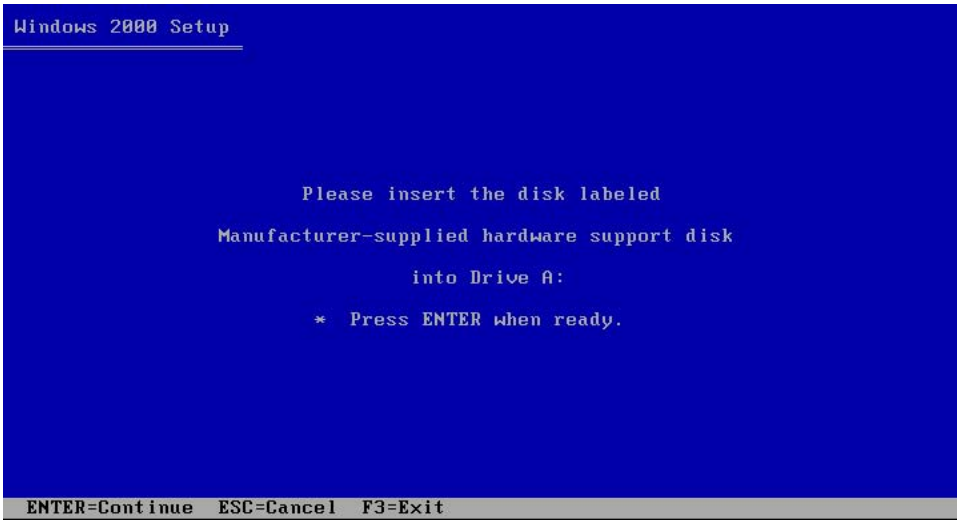
To install the Promise® PDC20319 RAID controller driver during Windows® 2000 Server OS installation:

1. Boot the computer using the Windows® 2000 Server installation CD. The **Windows® 2000 Setup** starts.

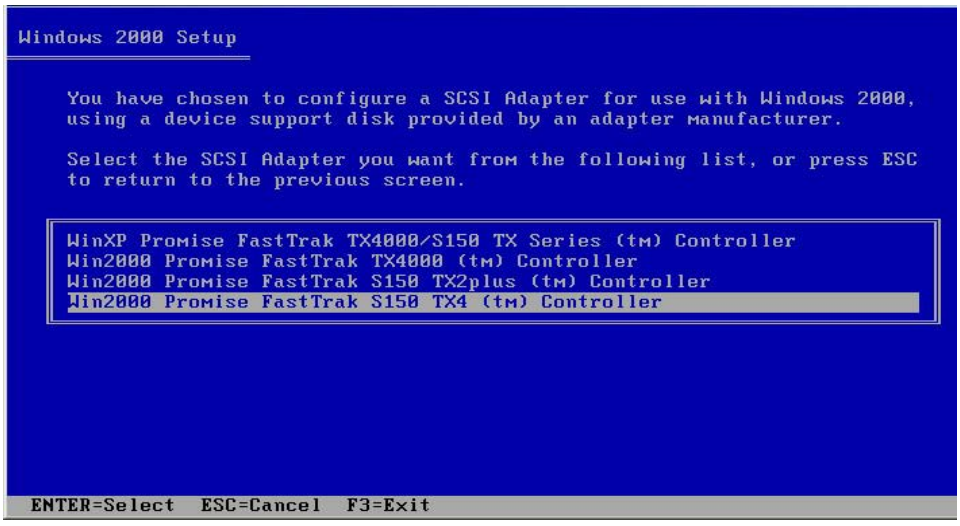
2. Press <F6> when the message "**Press F6 if you need to install a third party SCSI or RAID driver...**" appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the Promise® PDC20319 RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Use the arrow keys to select the **Win2000 Promise FasTrak S150 TX4 (tm) Controller** item from the list, then press <Enter> to select.



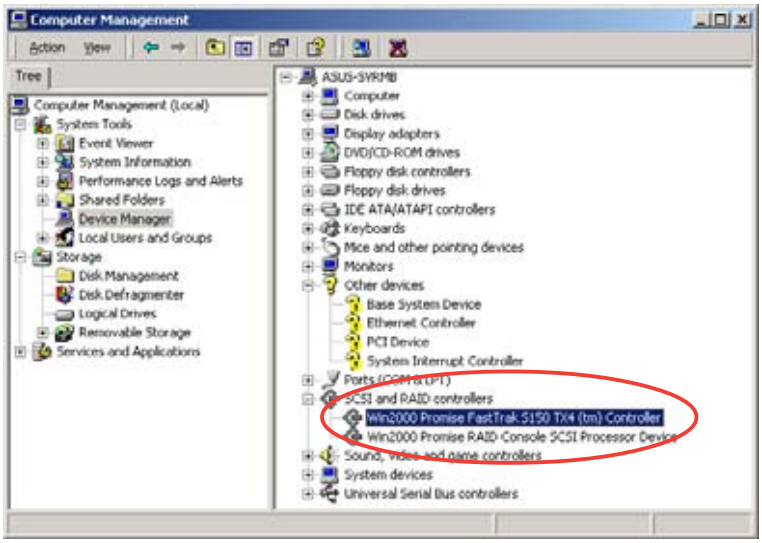
6. The Windows® 2000 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® operating system

Follow the same instructions in the section **"Installing the Intel® 6300ESB RAID controller driver: To an existing Windows® 2000/2003 Server OS"** to install the Promise® PDC20319 RAID controller driver on an existing Windows® 2000 Server OS.

To verify the Promise® PDC20319 RAID controller driver installation:

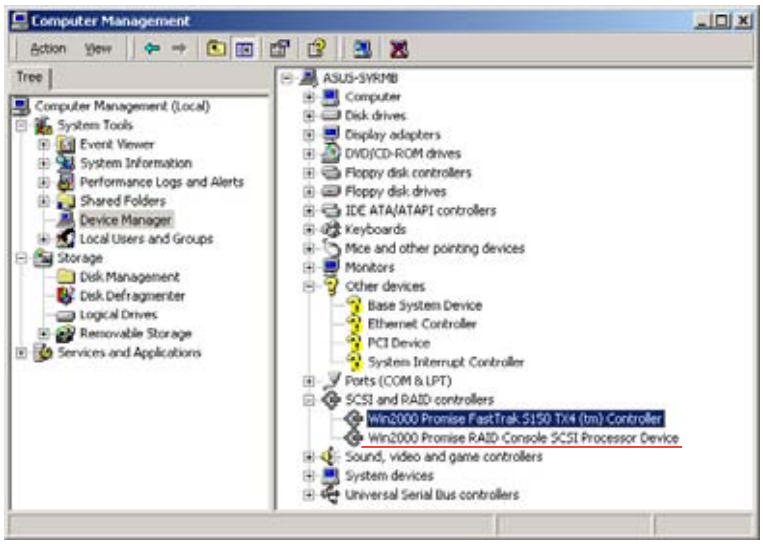
1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SCSI and RAID controllers**.
   The **Win2000 Promise Fastrak S150 TX4 (tm) Controller** item should appear.



4. Right-click the **Win2000 Promise Fastrak S150 TX4 (tm) Controller** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

After installing the RAID controller driver, you must remove the Windows®-assigned SCSI controller driver. To do this:

1. From the **Computer Management** window, click the "+" sign before the item **SCSI and RAID controllers**.
2. Right-click the **Win2000 Promise RAID Console SCSI Processor Device** item, then select **Properties** from the menu.



3. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller properties.
4. Click the **Uninstall** button, then click **OK**.
5. Follow screen instructions to uninstall the driver.

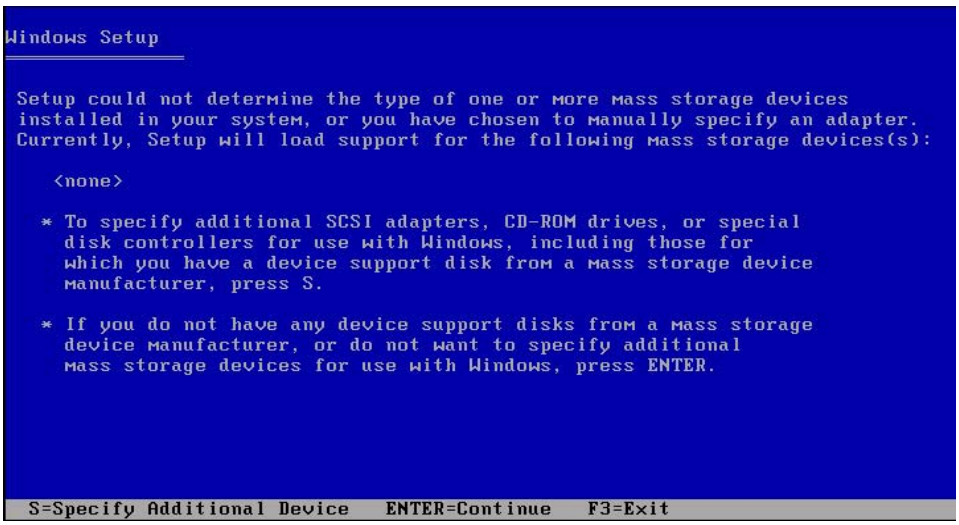
5.1.8.2 Windows® 2003 Server

During Windows® operating system installation

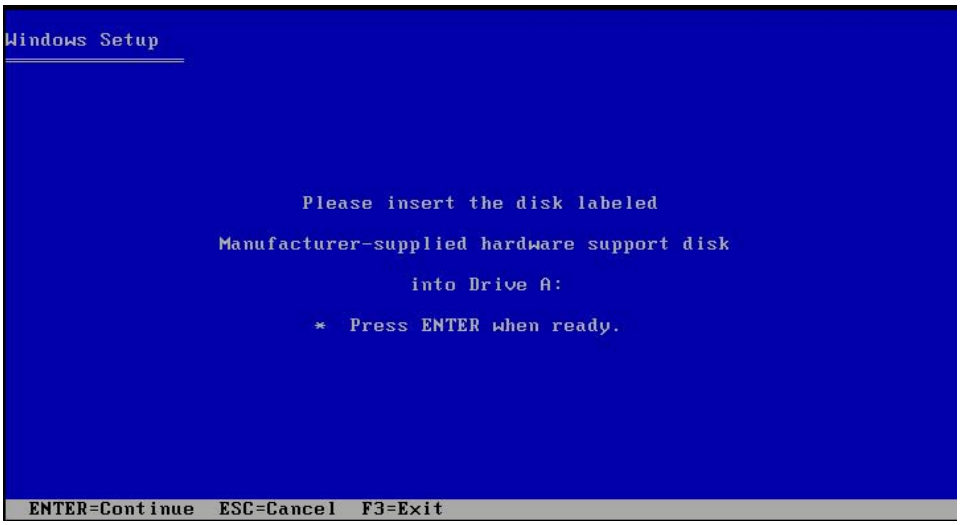
To install the Promise® PDC20319 RAID controller driver during Windows® 2003 Server OS installation:

1. Boot the computer using the Windows® 2003 Server installation CD. The **Windows® Setup** starts.

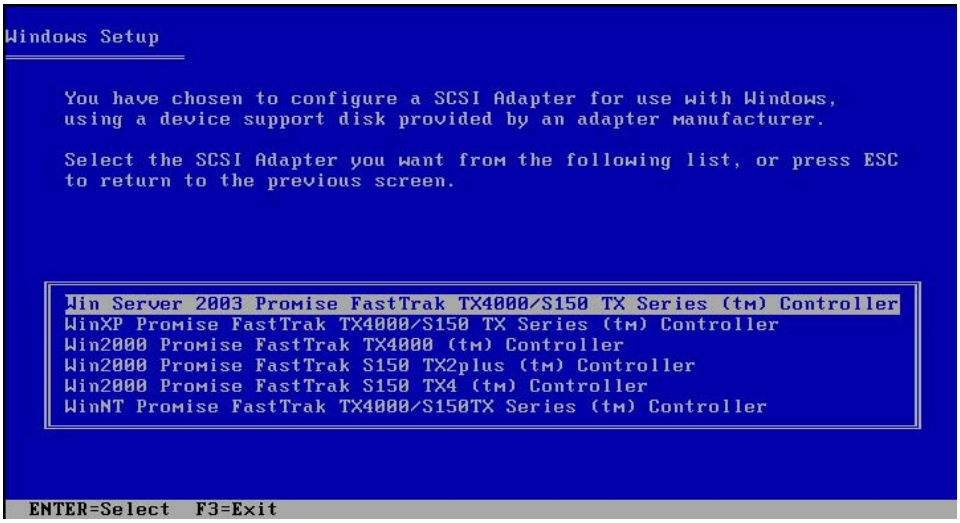
2. Press <F6> when the message "**Press F6 if you need to install a third party SCSI or RAID driver...**" appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the Promise® PDC20319 RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Use the arrow keys to select the **Win Server 2003 Promise FasTrak TX4000/S150 TX Series (tm) Controller** item from the list, then press <Enter> to select.

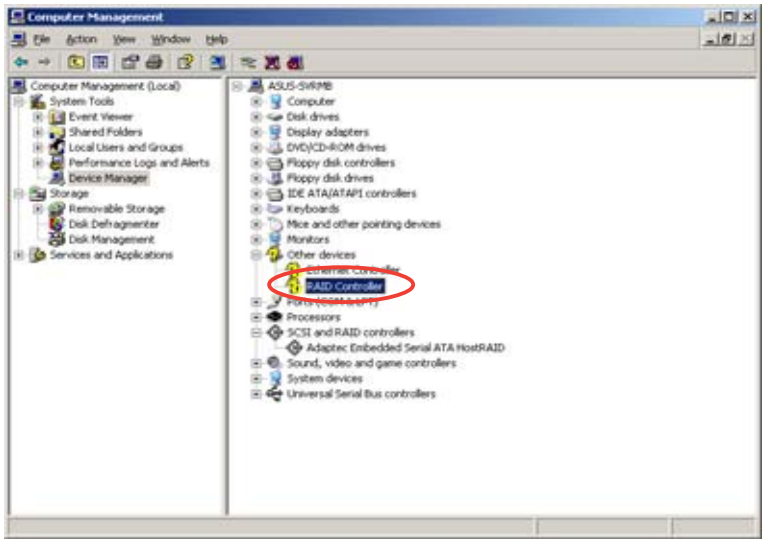


6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

To an existing Windows® operating system

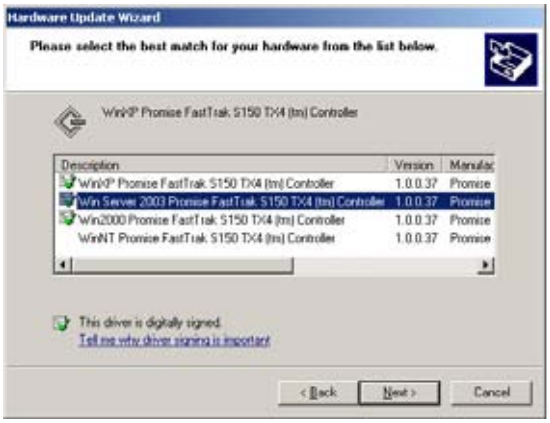
To install the Promise® PDC20319 RAID controller driver on an existing Windows® 2003 Server OS.

1. Restart the computer, then log in with **Administrator** privileges.
2. Insert the RAID driver disk you created earlier to the floppy disk drive.
3. Windows®s automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
4. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
5. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.



6. Right-click the **RAID controller** item, then select **Properties**.
7. Click the **Driver** tab, then click the **Update Driver** button.
8. The **Hardware Update Device Driver Wizard** window appears. Select the option "**Install the software automatically (Recommended)**, then click **Next**.

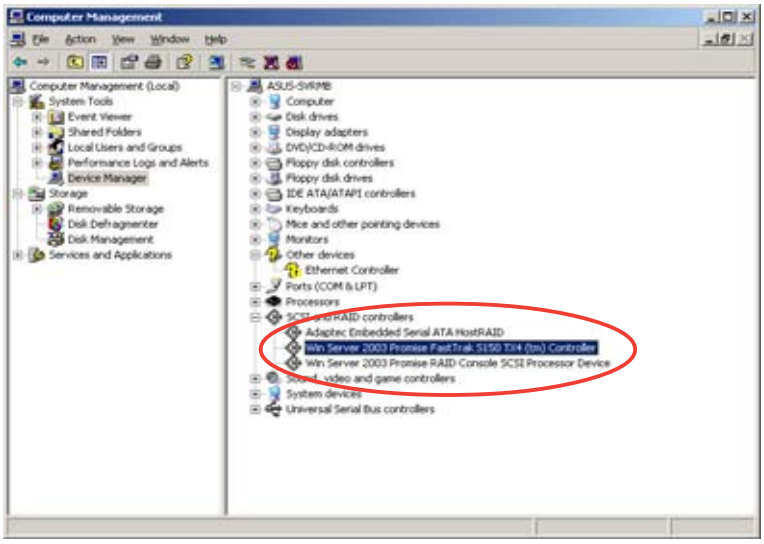
9. The wizard searches for the RAID controller drivers, then displays a list of detected drivers. Select **Win Server 2003 Promise FastTrak S150 TX4 (tm) Controller**, then click **Next**.



10. Click **Finish** after the driver installation is done.

To verify the Promise® PDC20319 RAID controller driver installation:

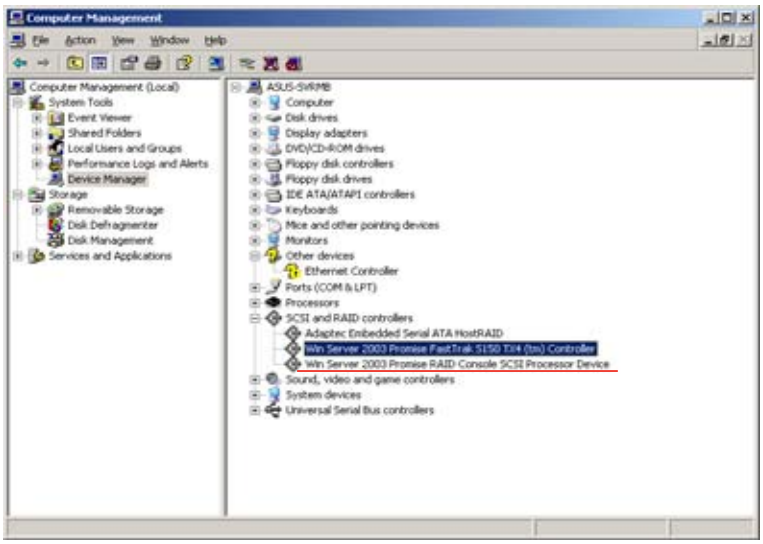
1. Right-click the **My Co**before**mputer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **SCSI and RAID controllers**.
   The **Win Server 2003 Promise Fastrak S150 TX4 (tm) Controller** item should appear.



4. Right-click the **Win Server 2003 Promise Fastrak S150 TX4 (tm) Controller** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

After installing the RAID controller driver, you must remove the Windows®-assigned SCSI controller driver. To do this:

1. From the **Computer Management** window, click the "+" sign before the item **SCSI and RAID controllers**.
2. Right-click the **Win Server 2003 Promise RAID Console SCSI Processor Device** item, then select **Properties** from the menu.

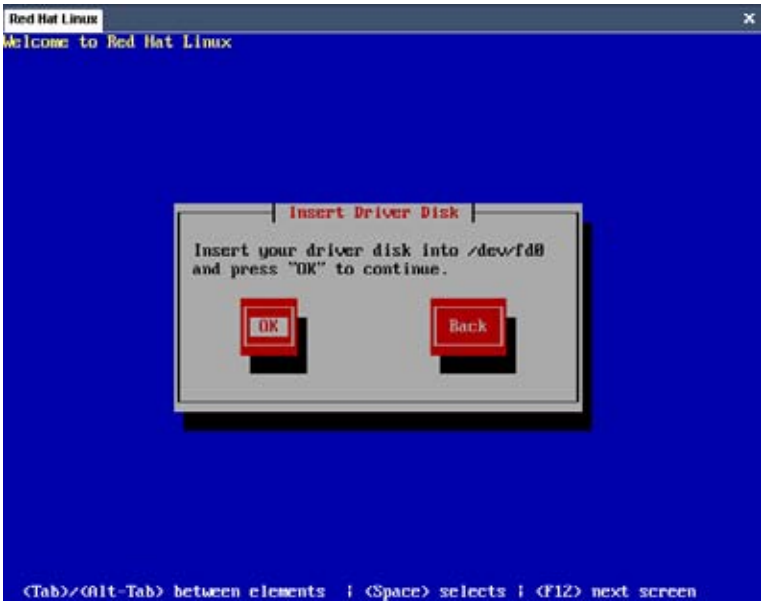


3. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller properties.
4. Click the **Uninstall** button, then click **OK**.
5. Follow screen instructions to uninstall the driver.

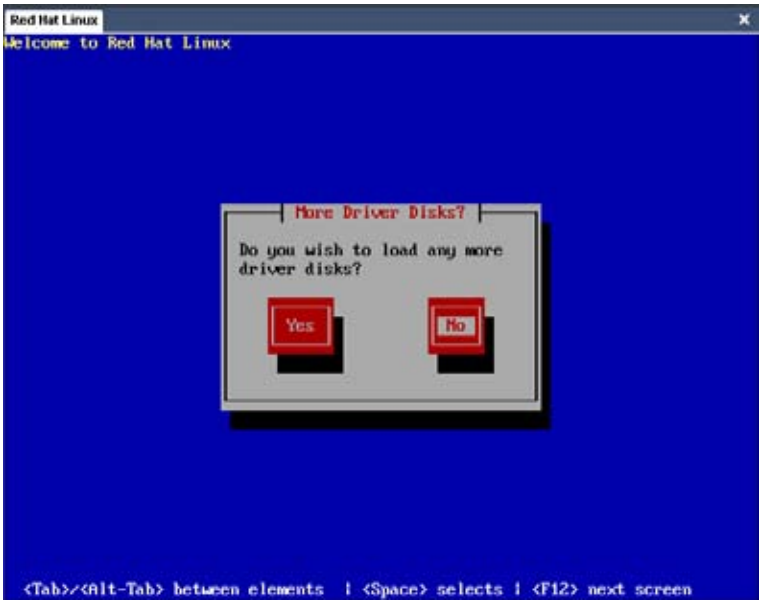
5.1.8.3 Red Hat® Linux 9.0

To install the Promise® PDC20319 RAID controller driver during Red Hat® Linux 9.0 OS installation:

1. Follow steps 1 to 4 of section "2.3.2 Installing the Intel® 6300ESB RAID controller driver > Red Hat® Linux 9.0" on page 47 to 49.
2. When prompted, insert the Promise® PDC20319 driver disk to the floppy disk drive, select **OK,** then press <Enter>.



3. The drivers for the Promise® PDC20319 RAID controller are installed to the system.
4. When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>; otherwise, select **Yes** if you need to install additional RAID controller drivers.



5. Follow screen instructions to continue the OS installation.

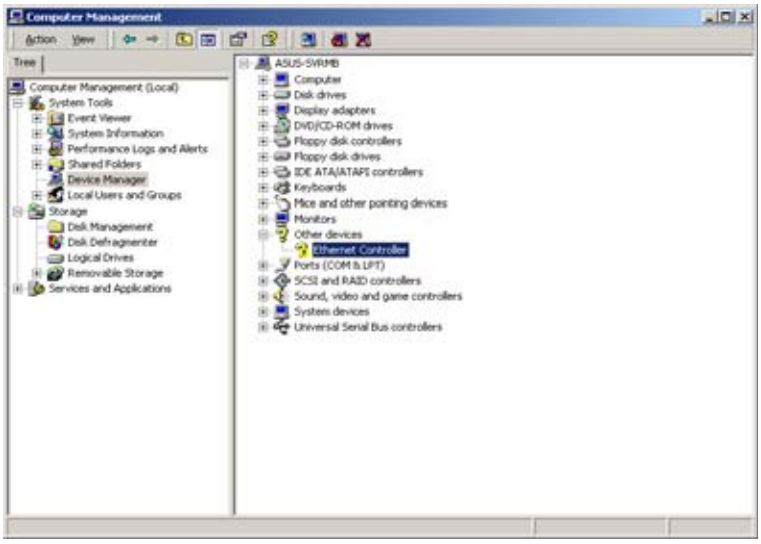
5.2 LAN

This section provides instructions on how to install the Intel® 82547GI LAN controller drivers.

5.2.1 Windows® 2000 Server

To install the Intel® 82547GI LAN controller driver on a Windows® 2000 Server OS:

1. Restart the computer, then log in with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive, or the LAN controller driver disk to the floppy disk drive.
3. Windows® automatically detects the LAN controller and displays a **New Hardware Found** window. Click **Cancel**.
4. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
5. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.



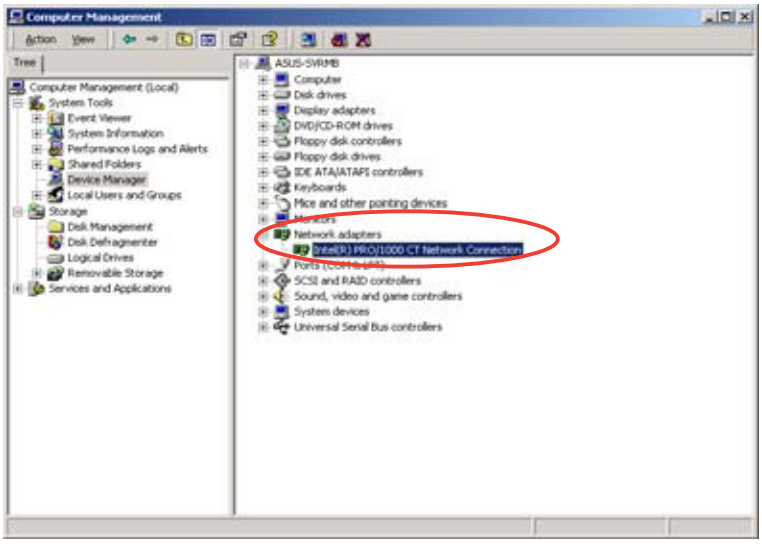
6. Right-click the **LAN Controller** item, then select **Properties**.
7. Click the **Driver** tab, then click the **Update Driver** button.
8. The **Intel® PRO Network Connections** window appears. Click the **Install Base Drivers** button.

   The LAN controller drivers are automatically installed in the system.

To verify the Intel® 82547GI LAN controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **Network adapters**.

   The **Intel(R) PRO/1000 CT Network Connection** item should appear.

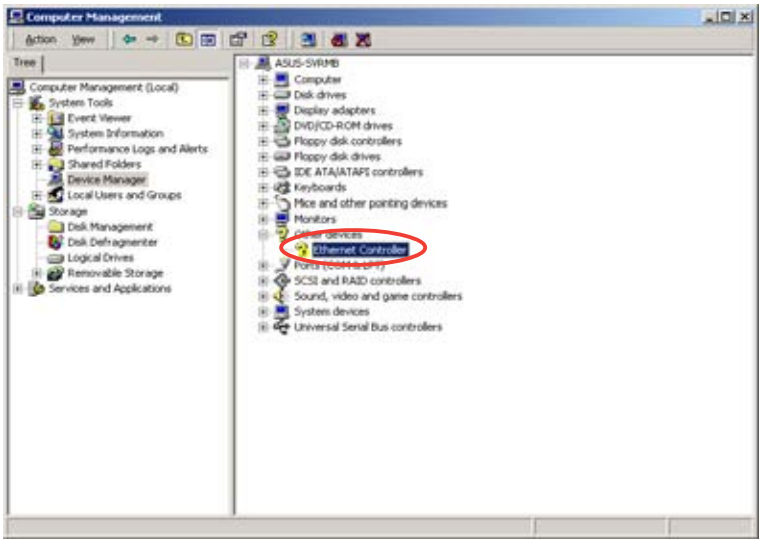


4. Right-click the **Intel(R) PRO/1000 CT Network Connection** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

5.2.2 Windows® 2003 Server

To install the Intel® 82547GI LAN controller driver on a Windows® 2003 Server OS:

1. Restart the computer, then log in with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive, or the LAN controller driver disk to the floppy disk drive.
3. Windows® automatically detects the LAN controller and displays a **New Hardware Found** window. Click **Cancel**.
4. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
5. Click the **Hardware** tab, then click the **Device Manager** button to display the list of devices installed in the system.



6. Right-click the **LAN Controller** item, then select **Properties**.
7. Click the **Driver** tab, then click the **Update Driver** button.
8. The **Hardware Update Device Driver Wizard** window appears. Select the option "**Install the software automatically (Recommended)**, then click **Next**.

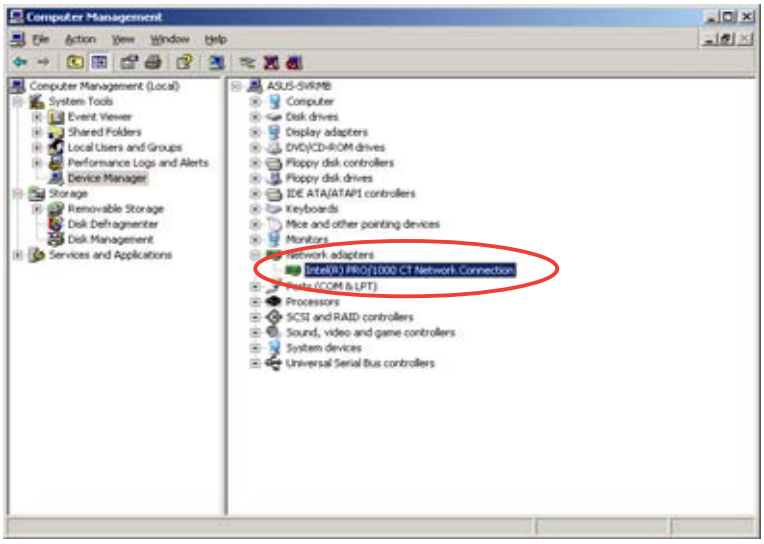
9. The **Intel® PRO Network Connections** window appears. Click the **Install Base Drivers** button.

The LAN controller drivers are automatically installed in the system.

To verify the Intel® 82547GI LAN controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop , then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **Network adapters**.

   The **Intel(R) PRO/1000 CT Network Connection** item should appear.



4. Right-click the **Intel(R) PRO/1000 CT Network Connection** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

5.2.3 Red Hat® Linux 9.0

Follow these instructions when installing the Intel® 82547GI LAN controller base driver for the in Red Hat® Linux version 5.2.x operating system. The following procedures were tested for 2.4.x kernels through 2.4.20.

Building and installing the drivers

To build a binary RPM package of this driver, run

rpmbuild -tb <filename.tar.gz>

Replace <filename.tar.gz> with the specific filename of the driver.

The currently running kernel must match the version and configuration of the installed kernel sources for the build to work properly, Reboot the system now if you have just recompiled the kernel. The RPM functionality has only been tested in Red Hat® distributions.

1. Move the base driver tar file to the directory of your choice. For example,
   use /home/username/e1000 or /usr/local/src/e1000.
2. Untar or unzip the archive.
   tar zxf e1000-x.x.x.tar.gz
3. Change to the driver src directory.
   cd e1000-x.x.x/src/
4. Compile the driver module.
   makenstall

   The binary is installed as:

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

   The locations listed above are default install locations and might not be correct for some Linux distributions. For more information, see the ldistrib.txt file included in the driver tar.
5. Install the module.
   insmod e1000 <parameter>=<value>
6. Assign an IP address to the interface by entering the following:
   ifconfig ethx <IP_address>

   where x is the interface number.
7. To verify if the interface works, enter the following:
   ping <IP_address>

   where <IP_address> is the IP address of another system on the same subnet as the system being tested.

5.3 VGA

This section provides instructions on how to install the Intel® E7221 Super Video Graphics Adapter (SVGA) driver.

5.3.1 Windows® 2000 Server

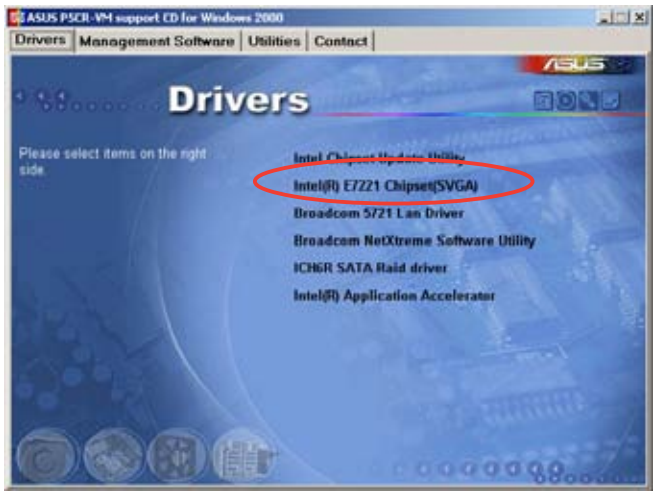
You need to manually install the Intel® E7221 SVGA driver on a Windows® 2000 Server operating system.

To install the Intel® E7221 SVGA driver:

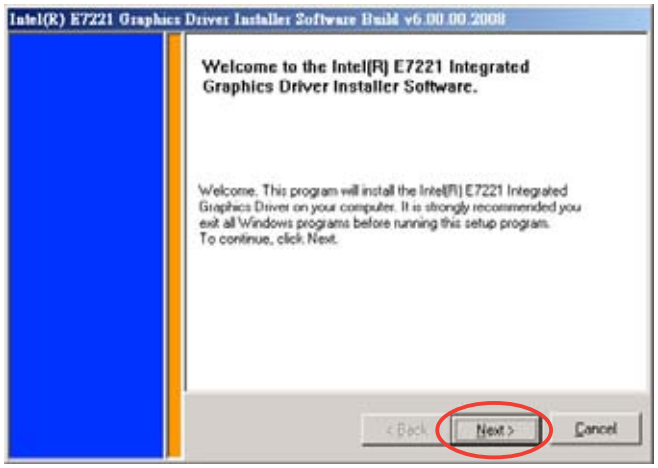
1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support CD to the optical drive. The support CD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

Windows® automatically detects the VGA controller and displays a **New Hardware Found** window. Click **Cancel** to close this window.

3. Click the item **Intel(R) E7221 Chipset (SVGA)** item from the **Drivers** menu.



4. The **Intel(R) E7221 Graphics Driver Installer Software** window appears. Click **Next**. Follow screen instructions to complete installation.



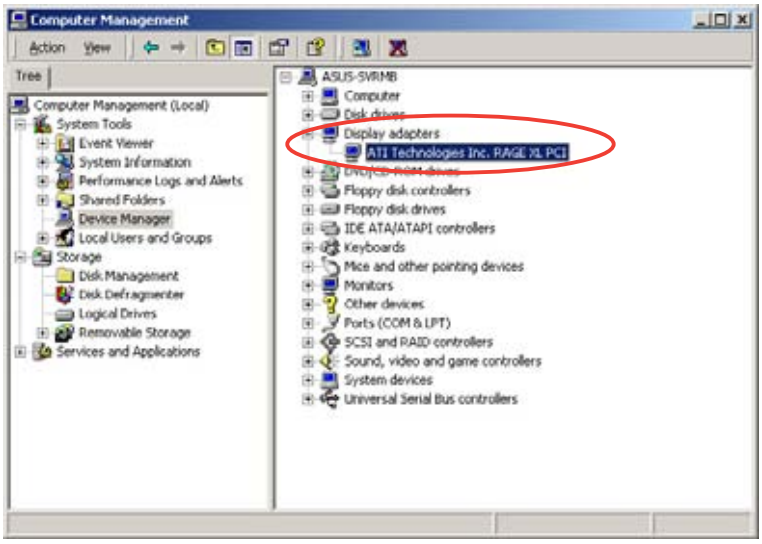
5.3.2 Windows® 2003 Server

The Windows® 2003 Server operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

Verifying the VGA driver installation

To verify if the Intel® E7221 SVGA driver is properly installed in a Windows® 2000/2003 Server operating system:

1. Right-click the **My Computer** icon on the Windows® desktop, then select **Properties** from the menu.
2. Click the **Hardware** tab, then click the **Device Manager** button.
3. Click the "+" sign before the item **Display adapters**.
   The **Intel® E7221 SVGA XXXXXXX** item should appear.



4. Right-click the **Intel® E7221 SVGA XXXXXXX** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the VGA drivers.
6. Click **OK** when finished.

5.3.3 Red Hat® Linux 9.0

The Red Hat® Linux 9.0 (2.4.x kernels) operating system automatically recognizes the Intel® E7221 SVGA driver during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

This appendix includes additional information that you may refer to when configuring the motherboard.

4 Reference information

Appendix summary

A.1 NCCH-DLE block diagram