

# **ASUS<sup>®</sup> AP140R-E1**

**Intel<sup>®</sup> Pentium<sup>®</sup> 4 1U Rackmount Server**  
800/533MHz Front Side Bus

User Guide



**E2179**

**V2.0**

**JULY 2005**

**Copyright © 2005 ASUSTeK COMPUTER INC. All Rights Reserved.**

No part of this manual, including the products and software described in it, may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form or by any means, except documentation kept by the purchaser for backup purposes, without the express written permission of ASUSTeK COMPUTER INC. ("ASUS").

ASUS provides this manual "as is" without warranty of any kind, either express or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose. In no event shall ASUS, its directors, officers, employees, or agents be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of use or data, interruption of business and the like), even if ASUS has been advised of the possibility of such damages arising from any defect or error in this manual or product.

Specifications and information contained in this manual are furnished for informational use only, and are subject to change at any time without notice, and should not be construed as a commitment by ASUS. ASUS assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual, including the products and software described in it.

Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification or alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

# Contents

Notices .....	vi
Safety information .....	vii
About this guide .....	viii
<b>Chapter 1: Product introduction .....</b>	<b>1-1</b>
1.1 System package contents .....	1-2
1.2 System specifications .....	1-3
1.3 Front panel features .....	1-4
1.4 Rear panel features .....	1-4
1.5 Internal features .....	1-5
1.6 LED information .....	1-6
<b>Chapter 2: Hardware setup .....</b>	<b>2-1</b>
2.1 Chassis cover .....	2-2
2.1.1 Removing the cover .....	2-2
2.1.2 Installing the cover .....	2-3
2.2 Central Processing Unit (CPU) .....	2-4
2.2.1 Removing the CPU heatsink .....	2-4
2.2.2 Installing a CPU .....	2-4
2.2.3 Installing the CPU heatsink .....	2-6
2.3 System memory .....	2-7
2.3.1 Memory configurations .....	2-7
2.3.2 Installing a DIMM .....	2-9
2.3.3 Removing a DIMM .....	2-9
2.4 Hard disk drives .....	2-10
2.4.1 Installing an IDE hard disk drive .....	2-10
2.4.2 Installing a Serial ATA hard disk drive .....	2-12
2.4.3 Installing a Hot-Swap SATA HDD(AA2 model) ....	2-13
2.5 Expansion cards .....	2-15
2.5.1 Installing a PCI card .....	2-15
2.5.2 Configuring an expansion card .....	2-17
2.6 Cable connections .....	2-18
2.7 Removable components .....	2-19
2.7.1 System fans .....	2-19
2.7.2 Device fan .....	2-19
2.7.3 Rear fan .....	2-19

# Contents

2.7.4	Power supply module .....	2-20
2.7.5	Optical drive .....	2-21
2.7.6	Motherboard .....	2-23
<b>Chapter 3: Installation options .....</b>		<b>3-1</b>
3.1	Rackmount rail kit items .....	3-2
3.2	Rack rails assembly .....	3-2
3.3	Attaching the rails to the rack .....	3-3
3.4	Rackmounting the server .....	3-4
<b>Chapter 4: Motherboard information .....</b>		<b>4-1</b>
4.1	Motherboard layout .....	4-2
4.2	Jumpers .....	4-4
4.3	Connectors .....	4-8
<b>Chapter 5: BIOS Setup .....</b>		<b>5-1</b>
5.1	Managing and updating your BIOS .....	5-2
5.1.1	Creating a bootable floppy disk .....	5-2
5.1.2	Updating the BIOS .....	5-3
5.2	BIOS Setup program .....	5-4
5.2.1	BIOS menu screen .....	5-5
5.2.2	Menu bar .....	5-5
5.2.3	Navigation keys .....	5-6
5.2.4	General help .....	5-6
5.2.5	Sub-menu .....	5-6
5.2.6	Scroll bar .....	5-6
5.2.7	Pop-up window .....	5-6
5.3	Main menu .....	5-7
5.3.1	Primary IDE Master .....	5-8
5.3.2	Primary IDE Slave .....	5-11
5.3.3	Secondary IDE Master .....	5-11
5.3.4	Secondary IDE Slave .....	5-11
5.4	Advanced menu .....	5-12
5.4.1	Advanced BIOS Features .....	5-12
5.4.2	CPU Configuration .....	5-13
5.4.3	Memory Configuration .....	5-14
5.4.4	Chipset .....	5-16

5.4.5	Onboard Device .....	5-18
5.4.6	PCIPnP .....	5-22
5.4.7	USB Configuration .....	5-24
5.5	Power menu .....	5-25
5.5.1	APM Configuration .....	5-26
5.5.2	Hardware Monitor .....	5-29
5.6	Boot menu .....	5-30
5.6.1	Boot Device Priority .....	5-30
5.6.2	Hard Disk Boot Priority .....	5-31
5.6.3	Removable Device Priority .....	5-31
5.6.4	Boot Settings Configuration .....	5-32
5.6.5	Security .....	5-33
5.7	Exit menu .....	5-35

## **Chapter 6: Driver installation ..... 6-1**

6.1	RAID .....	6-2
6.1.1	RAID configurations .....	6-2
6.1.2	Installing hard disk drives .....	6-2
6.1.3	Setting the RAID item in BIOS .....	6-3
6.1.4	RAID configuration utility .....	6-3
6.1.5	Creating a RAID driver disk .....	6-21
6.1.6	Installing the Intel® 6300ESB RAID controller driver .....	6-22
6.2	LAN .....	6-29
6.2.1	Windows® 2000 Server .....	6-29
6.2.2	Windows® 2003 Server .....	6-31
6.2.3	Red Hat® Linux 9.0 .....	6-33
6.3	VGA Driver Installation .....	6-34
6.3.1	Windows® 2000/2003 Server .....	6-34
6.3.2	Red Hat® Linux 9.0 .....	6-34

## **Appendix: References ..... A-1**

A.1	Power supply .....	A-2
A.1.1	General description .....	A-2
A.1.2	Specifications .....	A-3
A.2	Qualified Vendors List (QVL) .....	A-4
A.3	Troubleshooting .....	A-5

# 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.



---

**WARNING!** 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

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional 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.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

## Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.



---

This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

---

### Lithium-Ion Battery Warning

**CAUTION!** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

### CD-ROM Drive Safety Warning

**CLASS 1 LASER PRODUCT**

# About this guide

## Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

## Contents

This guide contains the following parts:

### 1. Chapter 1: Product Introduction

This chapter describes the general features of the barebone server. It includes sections on front panel and rear panel specifications.

### 2. Chapter 2: Hardware setup

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

### 3. Chapter 3: Configuration options

This chapter describes the optional installation procedures for the barebone server.

### 4. Chapter 4: Motherboard information

This chapter includes the motherboard layout, and brief descriptions of the jumpers and internal connectors.

### 5. Chapter 5: BIOS setup

This chapter tells how to change the system settings through the BIOS Setup menus.

### 6. Chapter 6: Driver Installation

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

### 7. Appendix: References

This appendix includes additional information that you may refer to when configuring your barebone server.

## Conventions

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



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



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



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



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

# Chapter 1

This chapter describes the general features of the barebone server. It includes sections on front panel and rear panel specifications.



ASUS AP140R-E1 1U barebone server

# Product introduction

# 1.1 System package contents

Check your ASUS AP140R-E1 package for the following items.



Contact your dealer immediately if any of the items is damaged or missing.

Package items	Model	
	AA2 (2 Hot-Swap SATA)	AI2 (2 internal SATA/IDE)
1. ASUS AR13 1U rackmount chassis with: <ul style="list-style-type: none"><li>ASUS PSCH-LR motherboard</li><li>300W power supply</li><li>SATA backplane</li><li>52X Optical drive</li><li>Chassis fan</li><li>HDD fan</li><li>Hot-swap SATA HDD bays ( x 2 )</li><li>IDE cables, power cables</li><li>SATA cables ( x 2 )</li></ul>	✓	✓
2. CPU heatsink	✓	✓
3. Front Input/Output panel	✓	✓
4. SMBUs Cable	✓	✓
5. ASUS AR-13 rackmount rail kit	✓	✓
6. AC power cable	✓	✓
7. SATA Power cable		✓
8. System screws and cables	✓	✓
9. Bundled CDs <ul style="list-style-type: none"><li>AP140R-E1 drivers and utilities CD (Include ASUS ASWM CD)</li><li>TrendMicro® ServerProtect® CD</li></ul>	✓	✓
10. Documentation <ul style="list-style-type: none"><li>ASUS AP140R-E1 user guide</li></ul>	✓	✓

## 1.2 System specifications

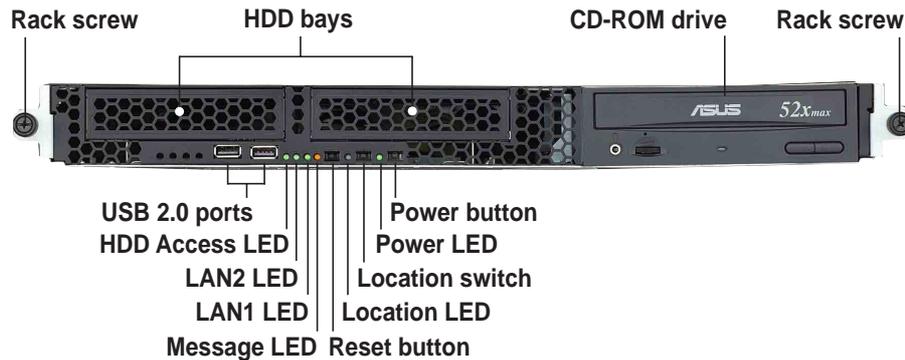
The ASUS AP140R-E1 is a 1U barebone server system featuring the ASUS PSCH-LR motherboard. The server supports the Intel® Pentium® 4 Processor, and includes the latest technologies through the chipsets embedded on the motherboard.

<b>Chassis</b>	Rackmount 1U (AR13)
<b>Motherboard</b>	ASUS PSCH-LR
<b>Chipset</b>	Intel® E7210 Memory Controller Hub (MCH) Intel® 6300ESB I/O Controller Hub (ICH)
<b>Processor</b>	Supports Intel® Pentium® 4 with Hyper-Threading Technology, 512K L2 cache, 1MB L3 cache, and 800MHz FSB
<b>Memory</b>	4 x 184-pin DDR sockets for up to 4GB system memory Supports PC3200/PC2700/PC2100 unbuffered ECC or non-ECC DDR DIMMs
<b>LAN</b>	Intel® 82547GI Gigabit LAN controller (CSA I/F) for LAN2 port Intel® 82541GI Gigabit LAN controller (32-bit) for LAN1 port
<b>VGA</b>	ATI RAGE-XL PCI-based VGA controller
<b>Expansion slots</b>	2 x 64-bit/66MHz 3V PCI-X slots
<b>Drive bays</b>	1 x 5.25-inch bay (with installed ASUS 52X CD-ROM) 2 x 3.5-inch internal HDD bays
<b>Front I/O</b>	2 x USB 2.0 ports Power switch Reset switch Location switch Power LED HDD Access LED Location LED Message LED 2 x LAN LEDs
<b>Rear panel I/O</b>	1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x Serial port 1 x VGA port 2 x Gigabit LAN ports (RJ-45) 2 x USB 2.0 ports Location switch Location LED
<b>Management</b>	ASUS Server Web-based Management (ASWM)
<b>Hardware monitors</b>	Voltage, temperature, and fan speed monitoring Automatic System Restart (ASR) feature
<b>Power supply</b>	300W power supply, 115V/230V, 50Hz/60Hz
<b>Dimensions</b>	620mm (l) x 490mm (w) x 43.6 mm (h))

## 1.3 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, location switch, optical drive, and two USB ports are located on the front panel.

### AI2 model



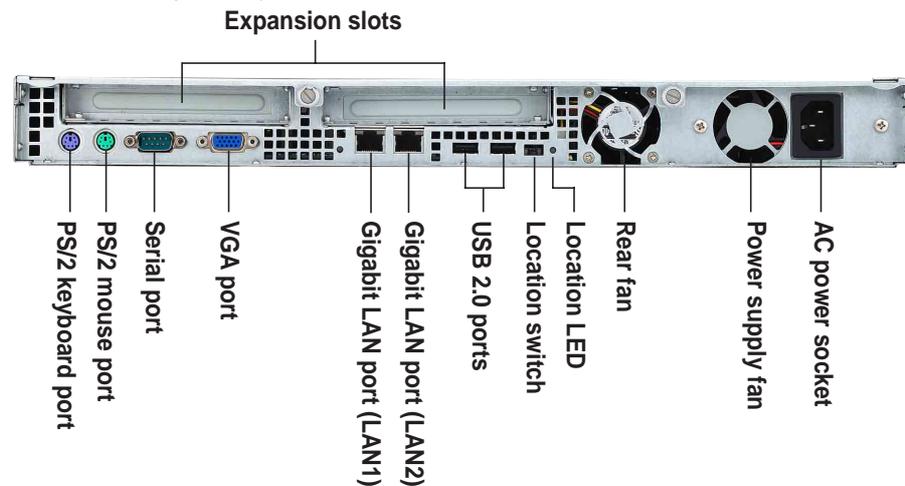
### AA2 model



Refer to section “1.6.1 Front panel LEDs” for the LED descriptions.

## 1.4 Rear panel features

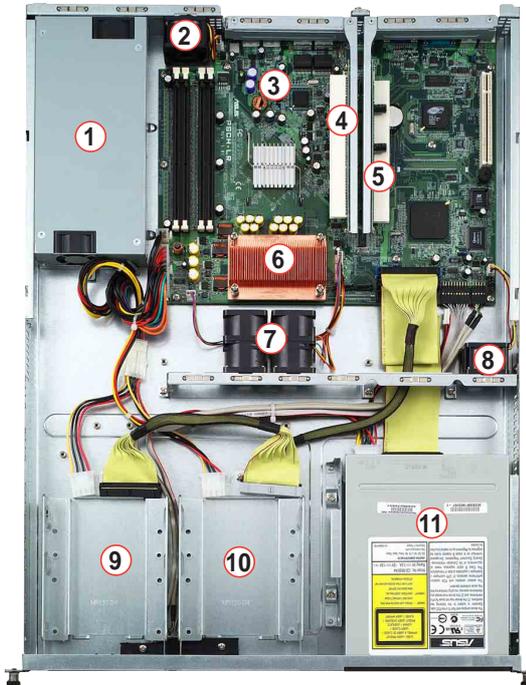
The rear panel includes the expansion slots, LAN, VGA, and I/O ports, fans, and the system power socket.



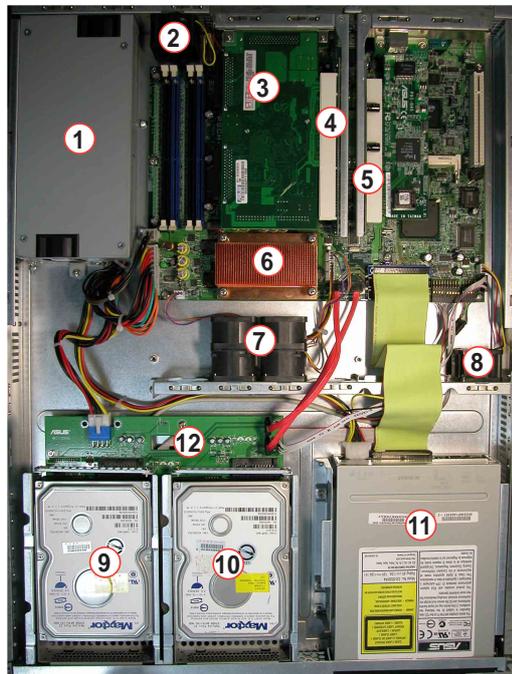
Refer to section “1.6.2 Rear panel LEDs” for the LED descriptions.

## 1.5 Internal features

The barebone system includes the basic components as shown.



1. Power supply
2. Rear fan
3. PSCH-LR motherboard
4. PCI-X riser card (PCIX2)
5. PCI-X riser card (PCIX1)
6. CPU heatsink
7. System fans
8. Device fan
9. HDD bay 1
10. HDD bay 2
11. Optical drive



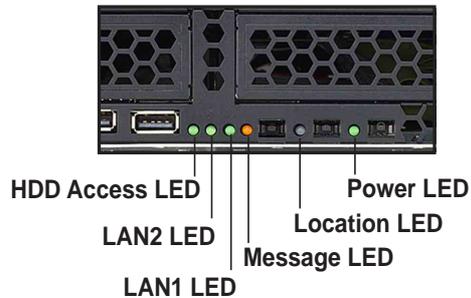
1. Power supply
2. Rear fan
3. PSCH-LR motherboard
4. PCI-X riser card (PCIX2)  
(Not include PCI-X card)
5. PCI-X riser card (PCIX1)  
(Not include PCI-X card)
6. CPU heatsink
7. System fans
8. Device fan
9. Hot-swap HDD bay 1  
(Not include HDD)
10. Hot-swap HDD bay 2  
(Not include HDD)
11. 52X Optical drive
12. SATA HDD backplane



The 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.

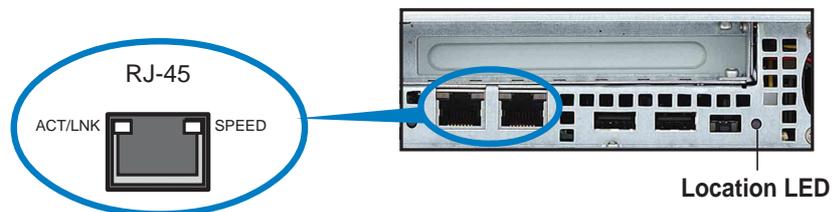
## 1.6 LED information

### 1.6.1 Front panel LEDs



LED	Icon	Display status	Description
Power LED		ON	System power ON
HDD Access LED		OFF Blinking	No activity Read/write data into the HDD
Message LED		OFF Blinking	System is normal; no incoming event ASWM indicates a HW monitor event
Location LED		OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LED		OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

### 1.6.2 Rear panel LEDs



ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
Green	Linked	Orange	100Mbps connection
Blinking	Linking	Green	1000Mbps connection

## Chapter 2

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.



ASUS AP140R-E1 1U barebone server

# Hardware setup

## 2.1 Chassis cover

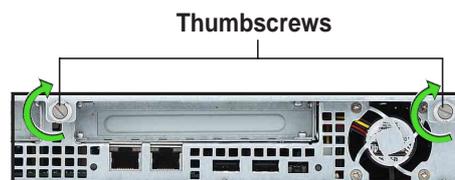
Remove the chassis cover to access the internal components or if you wish to install system devices.

### 2.1.1 Removing the cover

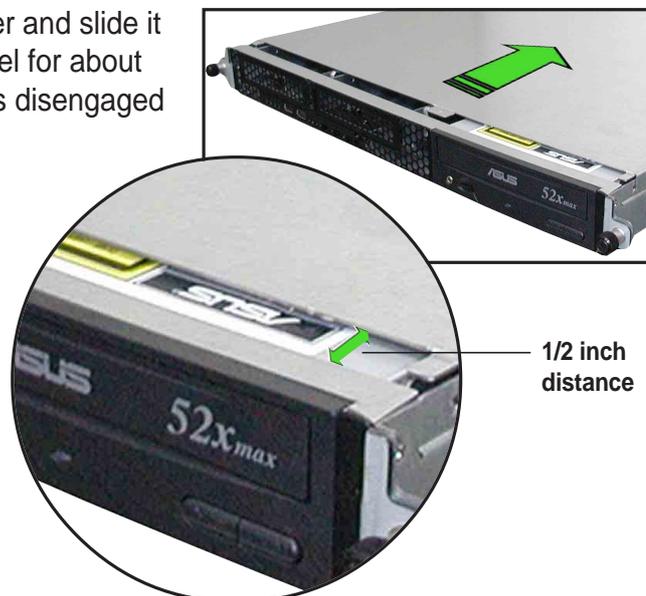
1. Use a Phillips screwdriver to remove the screw on each front end of the top cover.



2. Loosen the two thumbscrews on the rear panel to release the top cover from the chassis.



2. Firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.



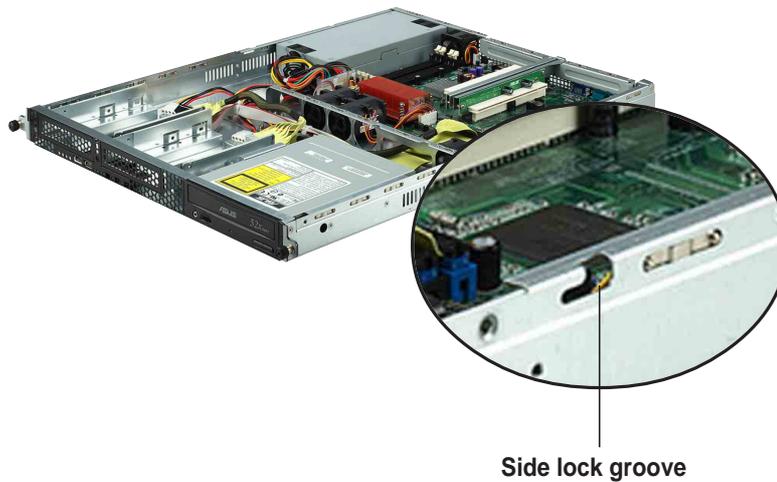
3. Lift the cover from the chassis.

## 2.1.2 Installing the cover

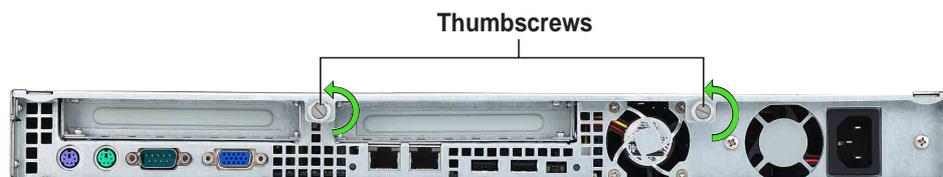
1. Position the cover on top of the chassis with the thumbscrews on the rear, and leaving a gap of about half an inch from the front panel.



2. Make sure that the side markings on the cover (two on each side) are aligned to the grooves on the chassis.



3. Slide the cover toward the front until it snaps in place.
4. Tighten the thumbscrews on the rear to secure the cover.



## 2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount 478-pin Zero Insertion Force (ZIF) socket and designed for the Intel® Pentium® 4 processor.



---

If your barebone system comes with the CPU heatsink installed, remove the pre-installed CPU heatsink before installing a CPU as described in section “2.2.1 Removing the CPU heatsink.”

---

### 2.2.1 Removing the CPU heatsink

To remove the CPU heatsink:

1. Use a Phillips (cross) screwdriver to loosen the four screws that secure the heatsink until it is released.
2. Carefully lift the heatsink from the motherboard.



---

You don't need to detach the screws from the heatsink.

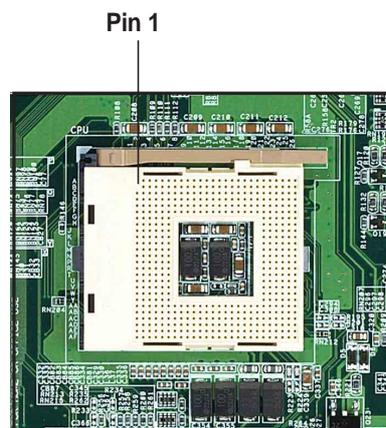
---



### 2.2.2 Installing a CPU

To install a CPU:

1. Locate the CPU socket on the motherboard and take note of the Pin 1 on the socket.

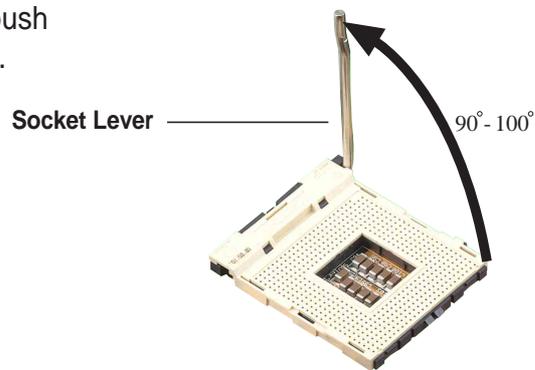


---

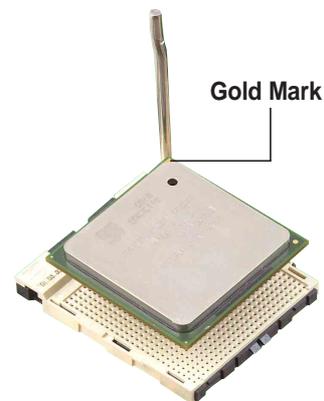
Make sure that the socket lever is pushed back all the way, otherwise the CPU does not fit in completely.

---

2. Flip up the socket lever and push it all the way to the other side.



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



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!

5. Carefully push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.
6. Apply the thermal interface material (thermal grease) to the top of the CPU. This thermal grease should come with the CPU package.



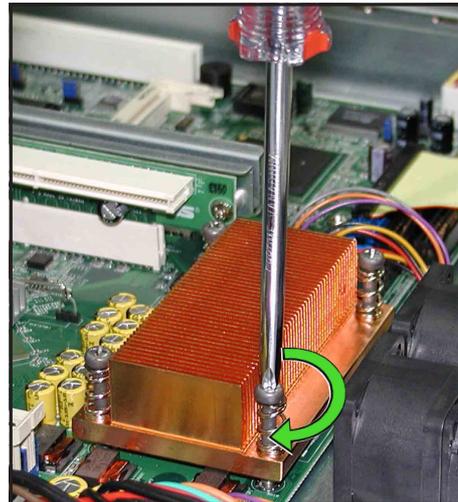
## 2.2.3 Installing the CPU heatsink

To install the CPU heatsink:

1. Carefully place the heatsink on top of the installed CPU.



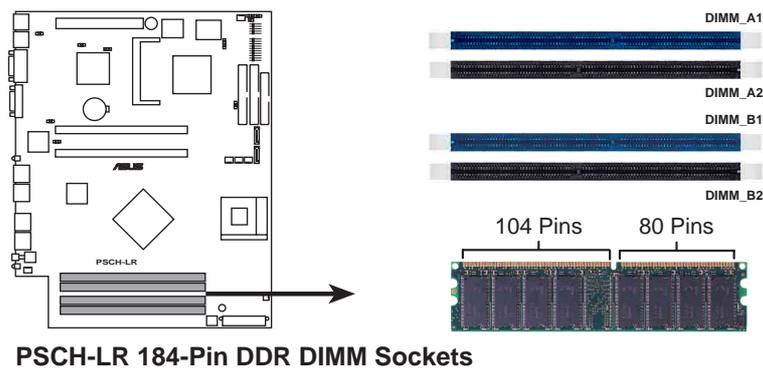
2. Hold down the heatsink lightly and twist each of the four screws with a Philips (cross) screwdriver just enough to attach the heatsink to the motherboard.
3. When the four screws are attached, tighten them one by one to completely secure the heatsink.



## 2.3 System memory

The motherboard comes with four Double Data Rate (DDR) Dual Inline Memory Module (DIMM) sockets. These sockets support up to 4GB system memory using 184-pin unbuffered ECC or non-ECC PC3200/PC2700/PC2100 DDR DIMMs.

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



### 2.3.1 Memory configurations



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 1GB DIMMs (total 4GB), the system may detect only about 3.6GB (less than 4GB) due to ICH resource allocation.

**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/PC2700/PC2100	400/333/266 MHz
533 MHz	PC2700/PC2100	333/266 MHz
400 MHz	PC2100	266 MHz

## 2.3.2 Installing a DIMM



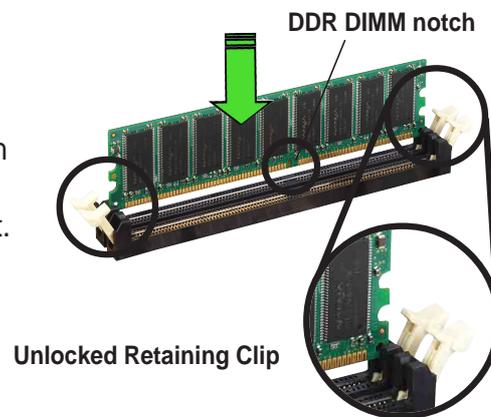
Make sure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause damage to both the motherboard and the components!

Follow these steps to install a DIMM.

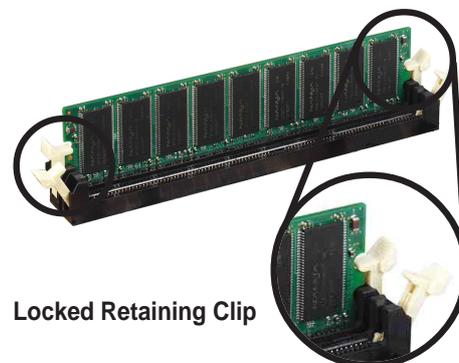


To access the DIMM sockets, remove the upper HDD fan cage. Refer to section “2.10 Removable components” for instructions.

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.



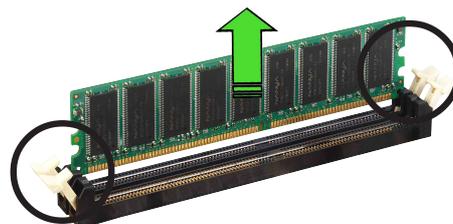
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



## 2.3.3 Removing a DIMM

Follow these steps to remove a DIMM.

1. While supporting the DIMM with your fingers, press the retaining clips outward simultaneously to release the DIMM from the socket.
2. Remove the DIMM from the socket.



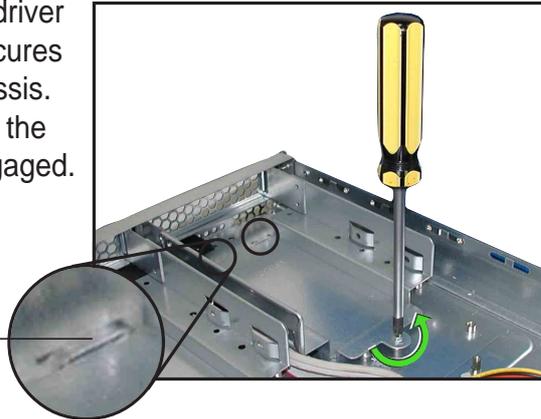
## 2.4 Hard disk drives

### 2.4.1 Installing an IDE hard disk drive

To install an IDE HDD:

1. Use a Phillips (cross) screwdriver to remove the screw that secures the hard disk tray to the chassis. Slide the tray backward until the two tray lock tabs are disengaged. Lift the tray from the bay.

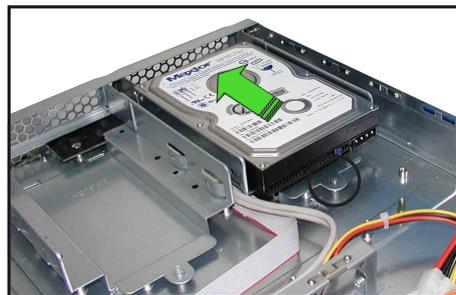
Lock tab



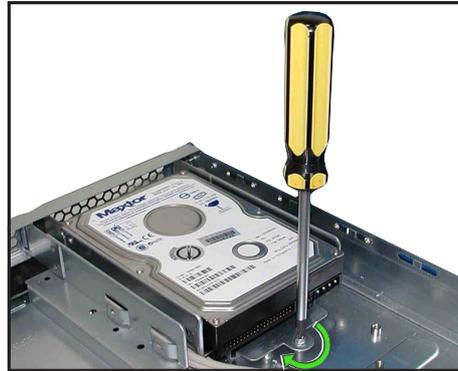
2. Place a hard disk drive into the drive tray, and secure it with four screws.



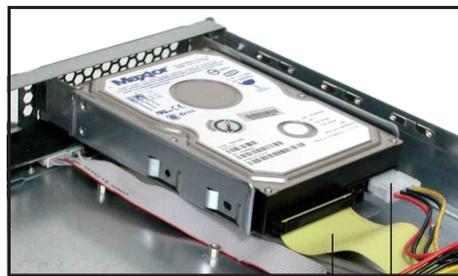
3. Carefully place the tray with installed hard disk drive into the drive bay. Slide it forward until the front end aligns with the front panel, and the screw hole matches the standoff.



- Secure the tray with a screw.



- Connect the 40-pin IDE cable and a 4-pin power plug to their respective connectors on the back of the drive.



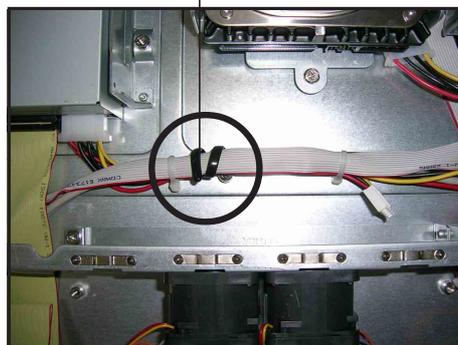
40-pin IDE cable  
4-pin power plug



The other end of the IDE cable is pre-connected to the primary IDE connector on the motherboard.

- Repeat steps 1 to 5 to install a second IDE drive.
- When finished installing devices, join the power and signal cables together with the cable clamp to prevent interference to the rotating fan blades.

Cable clamp

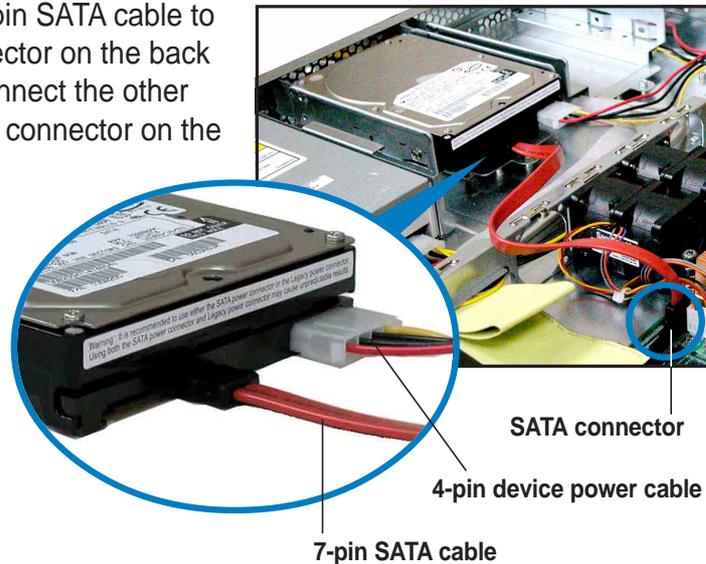


Ensure that all cables are held together with the cable clamp, specially those near the system fans. Loose cables may get caught with the fan blades causing fan failure!

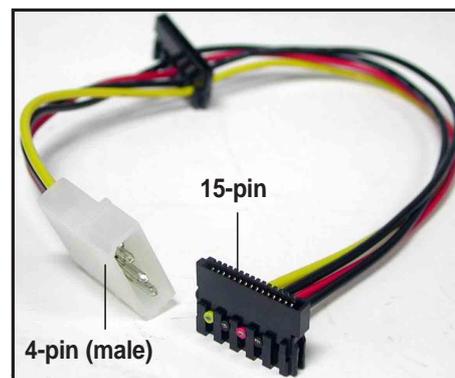
## 2.4.2 Installing a Serial ATA hard disk drive

To install an SATA HDD:

1. Follow steps 1 to 4 in section “2.4.1 Installing an IDE hard disk drive.”
2. Connect the 7-pin SATA cable to the SATA connector on the back of the drive. Connect the other end to an SATA connector on the motherboard.



3. Connect the HDD power cable.
  - For Serial ATA HDDs *with a 4-pin power connector*, connect a 4-pin (female) device plug from the power supply to the 4-pin (male) power connector on the back of the drive as shown above.
  - For Serial ATA HDDs *without a 4-pin power connector*, use an SATA power cable with a 4-pin/15-pin plugs. Connect a 4-pin (female) device plug from the power supply to the 4-pin (male) plug of the SATA power cable. Connect the 15-pin SATA power plug to the power connector on the back of the drive.



SATA power cable

4. Repeat steps 1 to 3 to install a second SATA drive.



Ensure that all cables are held together with the cable clamp, specially those near the system fans. Loose cables may get caught with the fan blades causing fan failure! See step 7 of section “2.4.1 Installing an IDE hard disk drive.”

## 2.4.3 Installing a hot-swap SATA HDD (AA2 model)

To install a hot-swap SATA HDD:

1. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



2. Firmly hold the tray lever and pull the drive tray out of the bay.



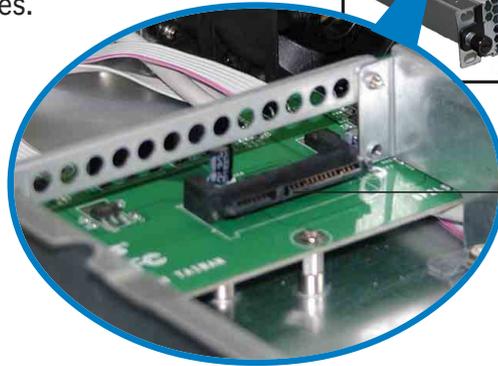
3. Take note of the drive tray holes. Each side has three holes to fit different types of hard disk drives. Use two screws on each side to secure the hard disk drive.



4. Place a SATA hard disk drive on the tray, then secure it with four screws.



5. Carefully insert the drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



SATA interface on the backplane



---

When installed, the SATA connector on the drive connects to the SATA interface on the backplane.

---

6. Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.
7. Repeat steps 1 to 6 if you wish to install a second SATA drive.



8. Connect the bundled SATA cables to the connectors on the SATA backplane. Refer to section “2.7 SATA backplane cabling” for information on the SATA backplane cable connections.

## 2.5 Expansion cards

The system comes with two PCI-X riser card brackets that you may remove separately if you wish to install PCI cards.

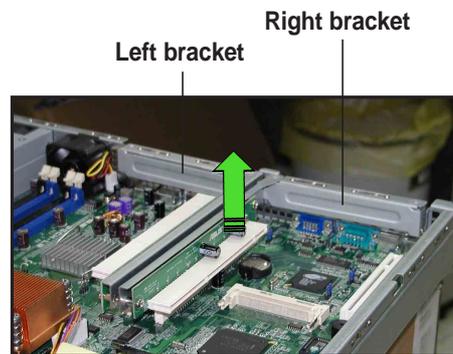


- The riser card brackets have different orientation. For illustration purposes, the riser card brackets will be referred to as **right bracket** and **left bracket**.
- The PCI-X slots on the riser cards support 3V universal-type 32-bit/64-bit PCI cards.

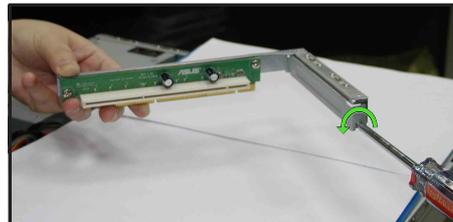
### 2.5.1 Installing a PCI card

To install a PCI card:

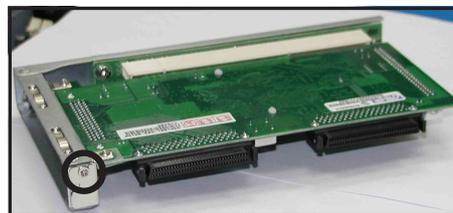
1. Firmly hold a riser card bracket, then pull it up to detach it from the PCI-X slot on the motherboard.



2. Use a Phillips (cross) screwdriver to remove the screw that secures the slot metal cover.



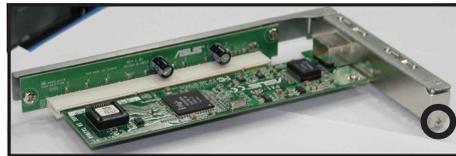
3. Install a PCI card to the **left bracket** as shown, then secure the card with a screw.



4. Install the left bracket with the card into the PCI-X slot on the motherboard. Make sure that the golden connectors completely fit the slot and the bracket aligns with the rear panel.



5. If you wish to install a second PCI card, repeat steps 1 and 2 then install the card to the **right bracket** as shown. Secure the card with a screw.



6. Install the right bracket with the card into the PCI-X slot on the motherboard. Make sure that the golden connectors completely fit the slot and the bracket aligns with the rear panel.



When properly installed, the riser card brackets with PCI cards appear as shown.



7. Connect the cable(s) to the cards, if applicable.

## 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 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
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	PIRQB#	—	—	—
PCI slot 2	PIRQA#	—	—	—
Onboard LAN controller	PXIRQ0#	PXIRQ1#	PXIRQ2#	PXIRQ3#
Onboard VGA controller	PXIRQ1#	PXIRQ2#	PXIRQ3#	PXIRQ0#



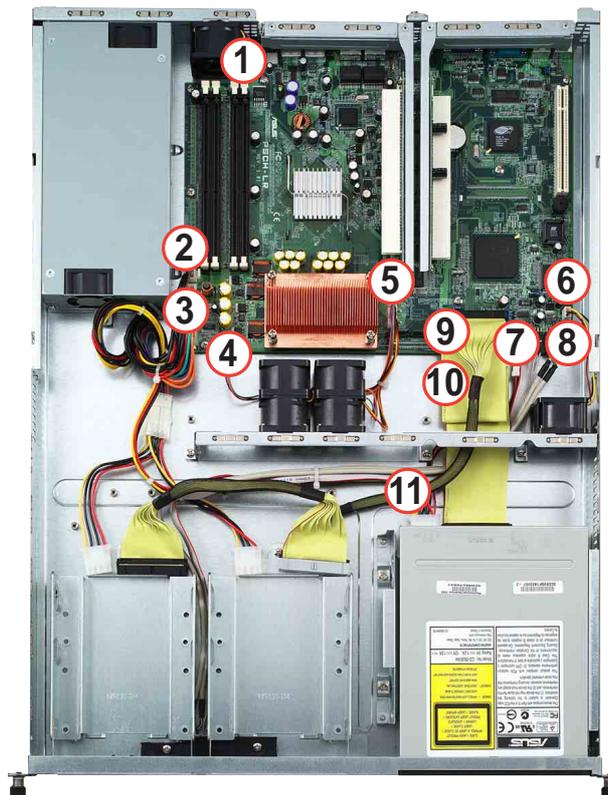
When using PCI cards on shared slots, ensure that the drivers support “Share IRQ” or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

## 2.6 Cable connections



The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.

Refer to this section when reconnecting cables to ensure correct cable connections.



### Pre-connected system cables

1. Rear fan connector (FAN5)
2. 4-pin 12V power connector (from power supply to motherboard)
3. 20-pin ATX power connector (from power supply to motherboard)
4. System fan connector (FAN6)
5. System fan connectors (FAN2, FAN3, FAN4)
6. Device fan connector (FAN1)
7. Panel connector for front panel LEDs
8. Front panel USB 2.0 (2 ports)
9. Primary IDE (from motherboard to HDDs)
10. Secondary IDE (from motherboard to optical drive)
11. 4-pin power connector (from power supply to optical drive)

## 2.7 Removable components

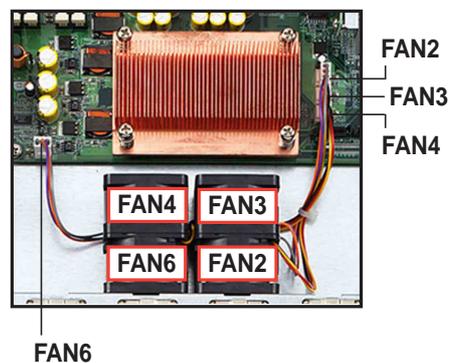
You may need to remove previously installed system components when installing or removing system devices, or when you need to replace defective components. This section tells how to remove the following components:

1. System fans
2. Device fan
3. Rear fan
4. Power supply module
5. Optical drive
6. Motherboard

### 2.7.1 System fans

To uninstall the system fans:

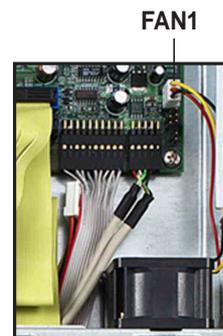
1. Disconnect the system fan cables from the connectors labeled FAN2, FAN3, FAN4, and FAN6 on the motherboard.
2. Remove the four screws that secure a 40mm x 56mm system fan.
3. Repeat step 2 to uninstall the other 40mm x 56mm system fan.



### 2.7.2 Device fan

To uninstall the device fan:

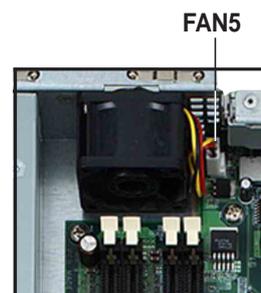
1. Disconnect the system fan cable from the connector labeled FAN1 on the motherboard.
2. Remove the four screws that secure the 40mm x 28mm device fan.



### 2.7.3 Rear fan

To uninstall the rear fan:

1. Disconnect the system fan cable from the connector labeled FAN5 on the motherboard.
2. From the rear panel, remove the four screws that secure the 40mm x 28mm rear fan.



## 2.7.4 Power supply module

To uninstall the power supply module:

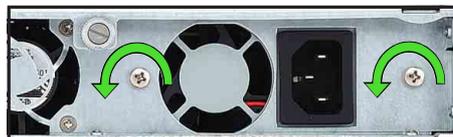
1. Disconnect all the power cables connected to the motherboard and system devices.



2. Use a Phillips (cross) screwdriver to remove the screw that secures the front end of the power supply.



3. From the rear panel, remove the two screws that secure the rear end of the power supply.



4. Slide the power supply forward for about half an inch, then carefully lift it out from the chassis.

## 2.7.5 Optical drive

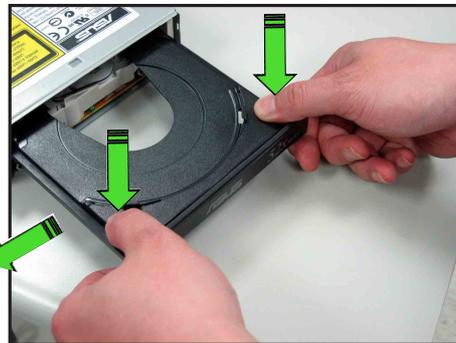
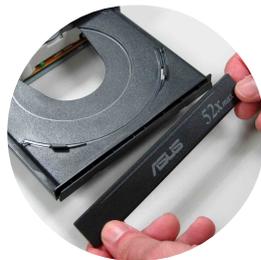
To uninstall the optical drive:

1. Please use a pin-ejector (paper clipper may be used) for tray-out.. (or you can open the tray by pushing the “open button”)



When changing ODD, the black ODD front plastic housing is already removed. User can uninstall/install ODD after remove the tray bezel.

2. Then remove the tray bezel demonstrated in the photo.



3. Disconnect the power and signal cables connected to the rear of the ODD.

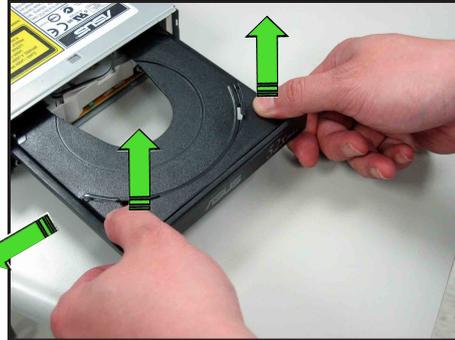


4. Use a Philips (cross) screwdriver to remove the two screws that secure the metal bracket on the side of the ODD.
5. Remove the bracket to release the drive.



To install an optical drive:

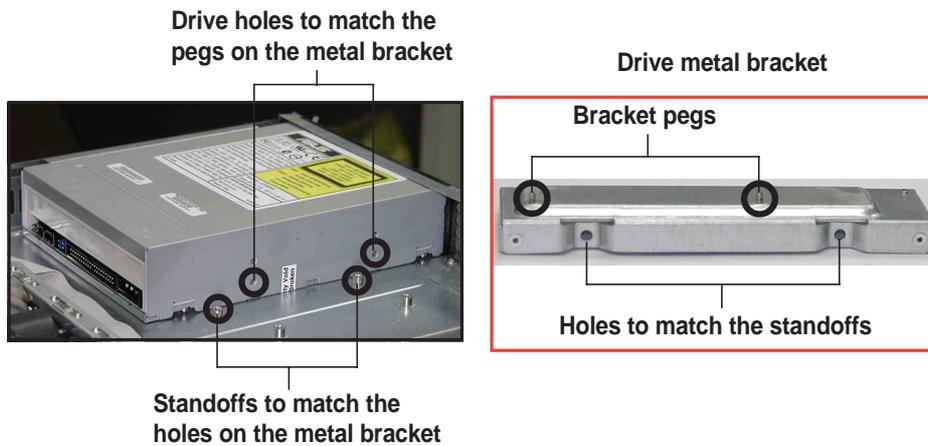
1. Please follow previous Step 1 instructions to tray-out and to remove the ODD bezel.



2. Then put the ODD inside the server and insert ODD into the ODD bay.



The purpose of the metal bracket is to secure the ODD us securely in place.



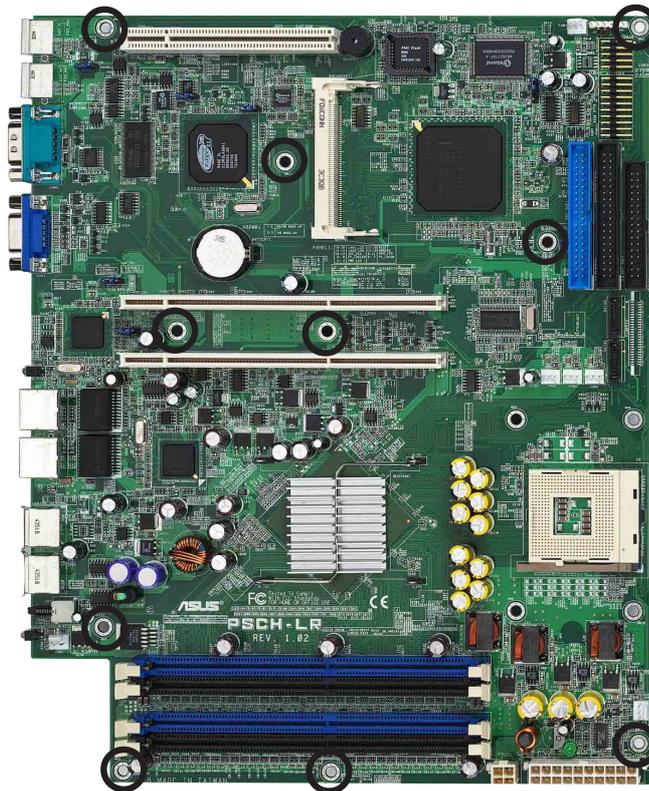
3. Secure the bracket with two screws and re-connect the power and signal cables in place. Put back the tray bezel to finish ODD installation.



## 2.7.6 Motherboard

To uninstall the motherboard:

1. Disconnect all the power and signal cables connected to the motherboard. Refer to section “2.6 Cable connections” for the location of the cables.
2. Uninstall all the devices from the motherboard including the CPU and heatsink, riser card brackets, and DDR DIMMs. Refer to the corresponding sections for instructions on removing these components.
3. Use a Phillips (cross) screwdriver to remove the ten (10) screws that secure the motherboard to the base of the chassis. The locations of the screw holes are indicated in the following figure.



4. Carefully lift the motherboard out of the chassis.



To install a motherboard, position the I/O connectors toward the rear panel then carefully fit the motherboard to the base of the chassis. Secure the motherboard with ten screws on the holes indicated in the above figure.



## Chapter 3

This chapter describes the optional installation procedures for the barebone server.

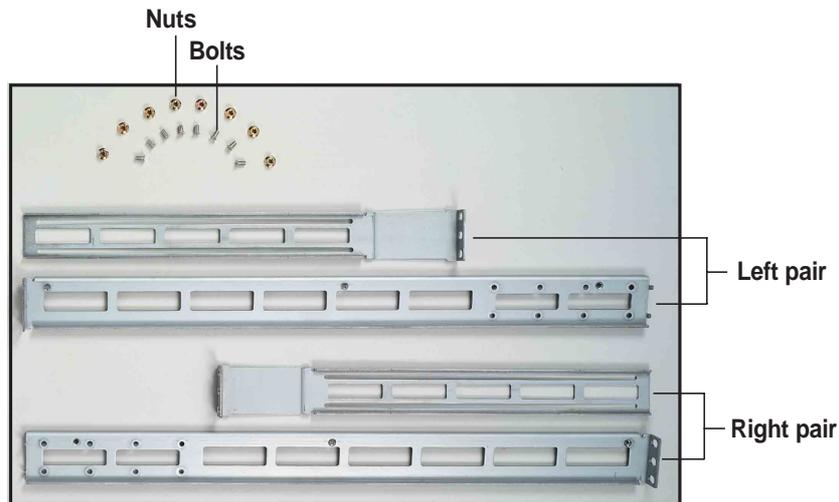


ASUS AP140R-E1 1U barebone server

# Installation options

## 3.1 Rackmount rail kit items

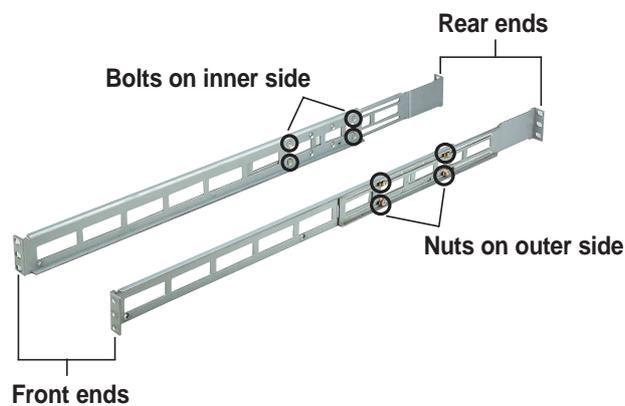
Your rackmount rail kit package contains two pairs of rails (one pair for each side of the barebone system), and eight (8) pairs of nut-and-bolt type screws.



## 3.2 Rack rails assembly

To assemble the rack rails:

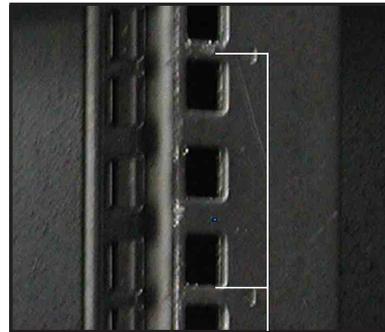
1. Determine the depth of the rack where you wish to install the system.
2. Match one long and one short rail to your desired length, and fix them together using four (4) pairs of nuts and bolts.
3. Repeat step 2 to assemble the other rail pair.



## 3.3 Attaching the rails to the rack

To attach the rails to the rack:

1. Select one unit of space (1U) on the rack where you wish to install the barebone server.
2. Remove the screws from the 1U space on the rack front.



1U space

3. Align the front end holes of a rack rail pair to the 1U space.
4. Drive in two screws on the outer holes to secure the front end.



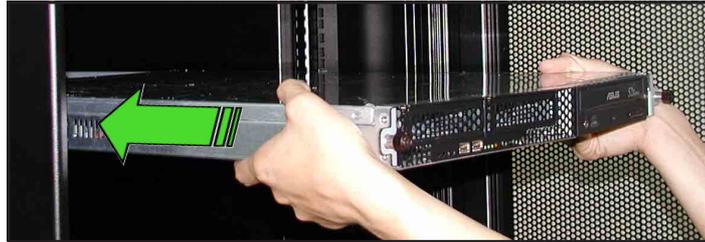
5. Find the **rear 1U space** that corresponds to the **front 1U space** where you attached the rail.
6. Remove the screws from the rear 1U space, and align the rear end holes.
7. Drive in two screws on the outer holes to secure the rear end.
8. From the rack front, find the corresponding 1U space for the second rail pair.
9. Repeat steps 2 to 7 to attach the second rail pair. When properly installed, the rack rails appear as shown.



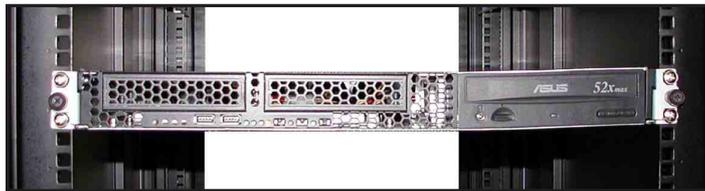
## 3.4 Rackmounting the server

To mount the server to the rack:

1. Firmly hold the server on both sides and insert the rear panel side to the front end of the rack rail.



2. Carefully push the server all the way to the back until the front panel fits the front end of the rack, and the rack screws on the server match the middle hole on the rack.



3. Tighten the two rack screws to secure the server to the rack.



Rack screw

# Chapter 4

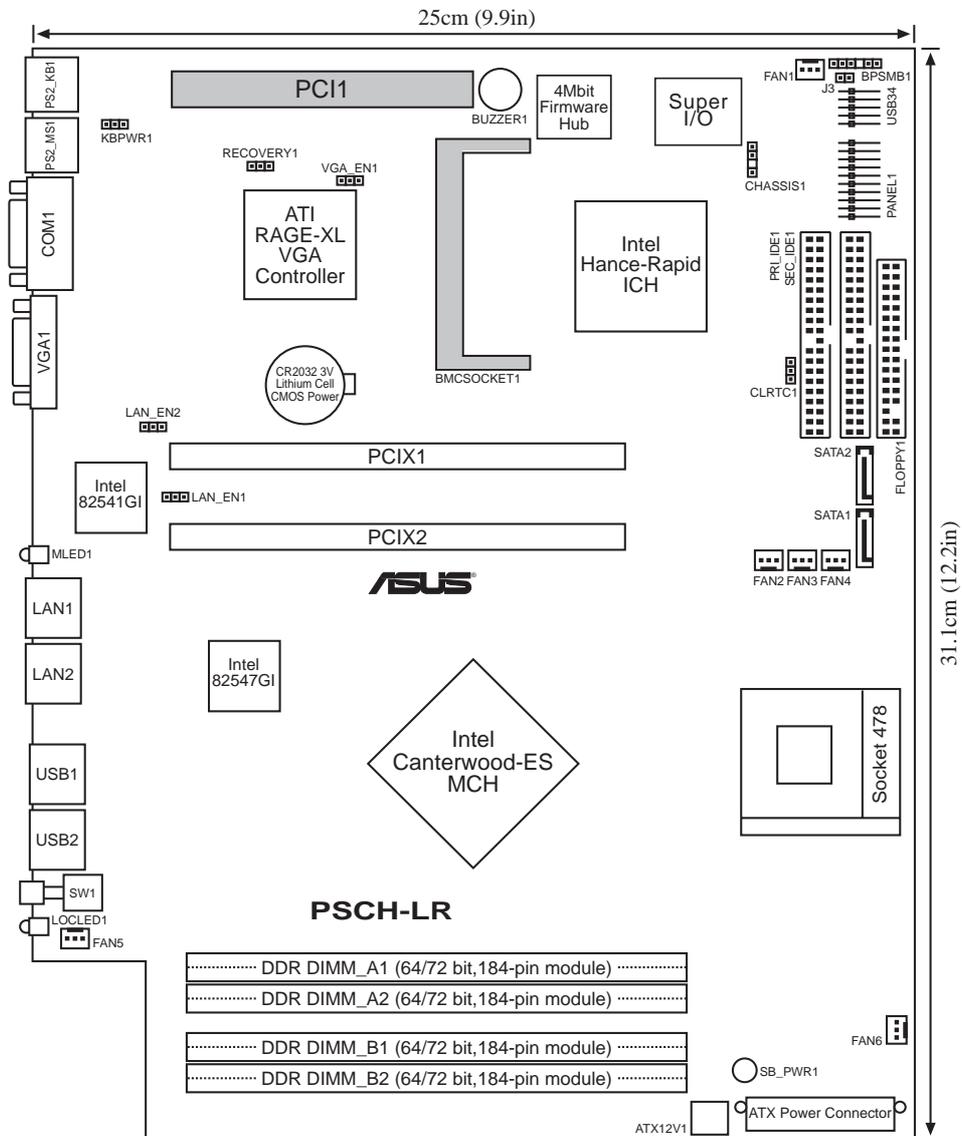
This chapter includes the motherboard layout, and brief descriptions of the jumpers and internal connectors.



ASUS AP140R-E1 1U barebone server

# Motherboard info

## 4.1 Motherboard layout



- The PCI1 slot is used for debugging card only.
- The BMC SOCKET1 slot is reserved for a server management card.

## Layout contents

<b>Jumpers</b>	
1. Keyboard power (3-pin KBPWR1)	4-4
2. Gigabit LAN1 controller setting (3-pin LAN_EN1)	4-4
3. Gigabit LAN2 controller setting (3-pin LAN_EN2)	4-5
4. Onboard VGA setting (3-pin VGA_EN1)	4-5
5. Recovery setting (3-pin RECOVERY1)	4-6
6. Clear RTC RAM (3-pin CLRTC1)	4-7

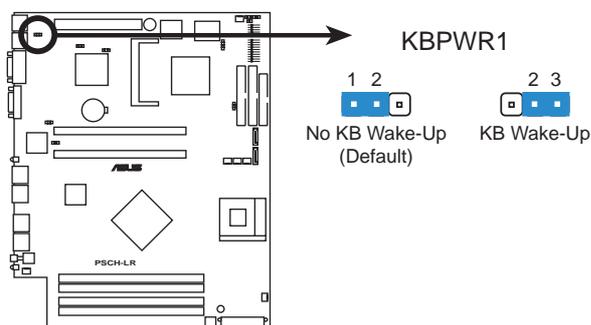
  

<b>Internal connectors</b>	
1. Floppy disk drive connector (34-1 pin FLOPPY1)	4-8
2. SMBus connector (6-1 pin BPSMB1)	4-8
3. IDE connectors (40-1 pin PRI_IDE [blue], SEC_IDE [black])	4-9
4. Serial ATA connectors (7-pin SATA1, SATA2)	4-10
5. ATX power connectors (20-pin, 4-pin)	4-11
6. LED connector (2-pin J3)	4-11
7. Fan connectors (3-pin FAN1/2/3/4/5/6)	4-12
8. Chassis intrusion connector (4-1 pin CHASSIS1)	4-12
9. USB header (10-1 pin USB34)	4-13
10. System panel connector (20-1 pin PANEL1)	4-13
- LAN connection indicators (2-pin LAN1_LED, LAN2_LED)	4-14
- Hard disk activity LED (2-pin IDE_LED)	4-14
- Front panel location LED (2-pin FP_LOCLEd)	4-14
- System power LED (2-pin PWR_LED)	4-14
- Reset switch (2-pin RESET)	4-14
- ATX power button/ Soft-off switch (2-pin PWRBTN)	4-14
- Message LED (2-pin MSG_LED)	4-14
- Front panel location switch (2-pin FP_LOCSW)	4-14

## 4.2 Jumpers

### 1. Keyboard power (3-pin KBPWR1)

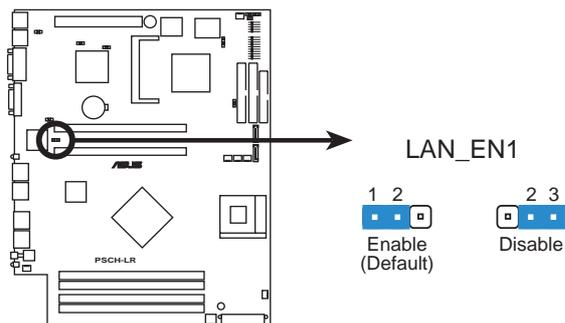
This jumper allows you to enable or disable the keyboard wake-up feature. Set this jumper to pins 2-3 (+5VSB) if you wish to wake up the computer when you press a key on the keyboard (the default is the Space Bar). This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting in the BIOS (see section 4.5.1 Power Up Control).



PSCH-LR Keyboard Power Setting

### 2. Gigabit LAN1 controller setting (3-pin LAN\_EN1)

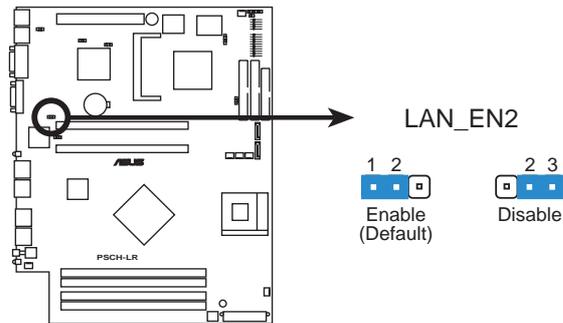
This jumper allows you to enable or disable the Intel® 82541GI Gigabit LAN controller. Setting this jumper to pins 2-3 disables the Gigabit LAN port (RJ-45) on the rear panel that corresponds to this controller.



PSCH-LR LAN\_EN1 Setting

### 3. Gigabit LAN2 controller setting (3-pin LAN\_EN2)

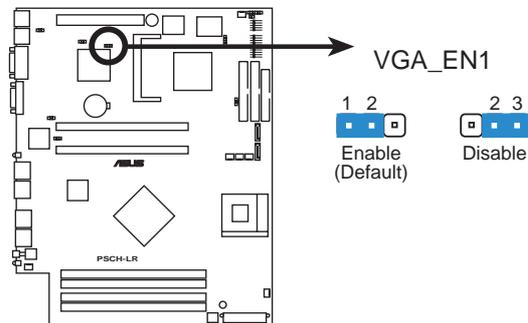
This jumper allows you to enable or disable the Intel® 82547GI Gigabit LAN controller. Setting this jumper to pins 2-3 disables the Gigabit LAN port (RJ-45) on the rear panel that corresponds to this controller.



PSCH-LR LAN\_EN2 Setting

### 4. Onboard VGA setting (3-pin VGA\_EN1)

This jumper allows you to enable or disable the onboard VGA. Set this jumper to disabled (pins 2-3) if you wish to install a VGA card.



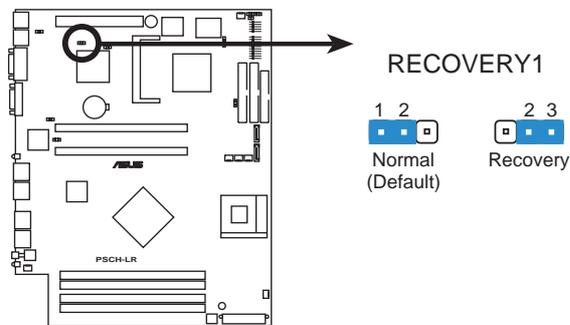
PSCH-LR VGA Jumper Setting

## 5. Recovery setting (3-pin RECOVERY1)

This jumper allows you to update/recover the BIOS quickly.

To update the BIOS:

1. Prepare a floppy disk that contains the latest BIOS for the motherboard (xxxx-xxx.BIN) and the AWDFLASH.EXE utility.
2. Set the jumper to pins 2-3.
3. Insert the floppy disk then turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1-2.
6. Turn on the system.



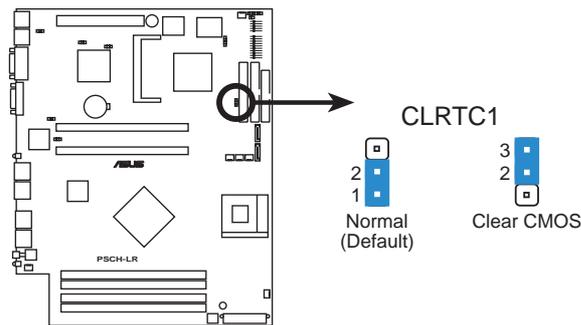
**PSCH-LR RECOVERY Setting**

## 6. Clear RTC RAM (3-pin CLRTC1)

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

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the 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 onboard 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.



**PSCH-LR 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!

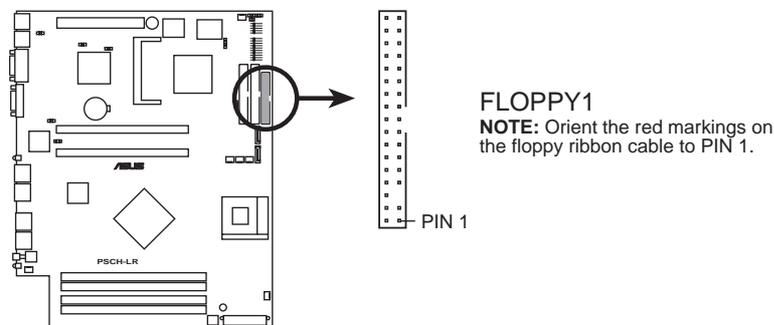
## 4.3 Connectors



This section describes the internal connectors on the motherboard. Refer to section “1.4 Rear panel features” for information on the external (rear panel) connectors.

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

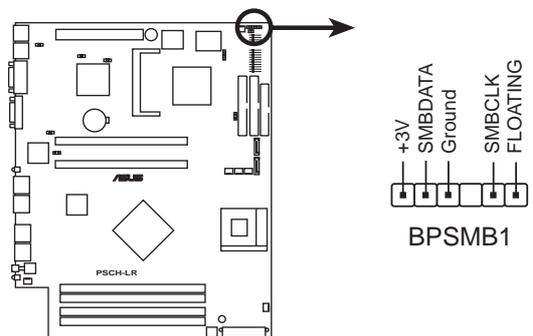
This connector supports the provided floppy drive ribbon cable. After connecting one end to the motherboard, connect the other end to the floppy drive. (Pin 5 is removed to prevent incorrect insertion when using ribbon cables with pin 5 plug).



PSCH-LR Floppy Disk Drive Connector

### 2. 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.



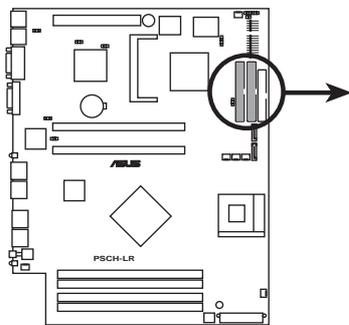
PSCH-LR SMB Connector

### 3. IDE connectors (40-1 pin PRI\_IDE [blue], SEC\_IDE [black])

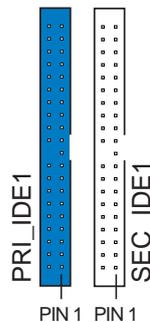
This connector supports the provided UltraDMA/100/66 IDE hard disk ribbon cable. Connect the cable's blue connector to the primary (recommended) or secondary IDE connector, then connect the gray connector to the UltraDMA/100/66 slave device (hard disk drive) and the black connector to the UltraDMA/100/66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



1. Pin 20 on each IDE connector is removed to match the covered hole on the UltraDMA cable connector. This prevents incorrect orientation when you connect the cables.
2. The hole near the blue connector on the UltraDMA/100/66 cable is intentional.
3. For UltraDMA/100/66 IDE devices, use the 80-conductor IDE cable.



PSCH-LR IDE Connectors

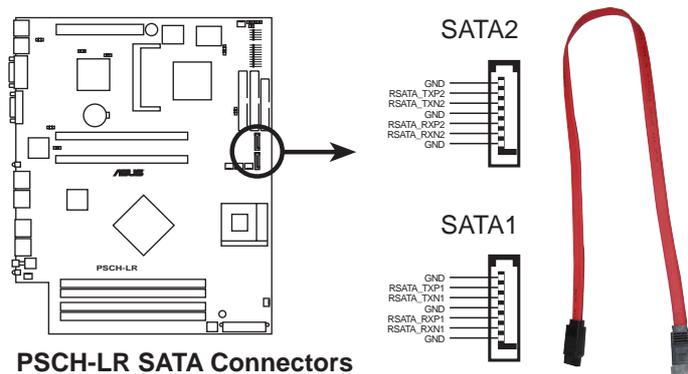


**NOTE:** Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

#### 4. 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.



#### Important notes on Serial ATA and RAID feature

1. You must enable the RAID function on the BIOS if you wish to create a RAID disk. Refer to "Chapter 5 BIOS Setup" for information.
2. Create a RAID driver disk from the **Drivers** folder in the support CD. Select the specific driver folder for your operating system.

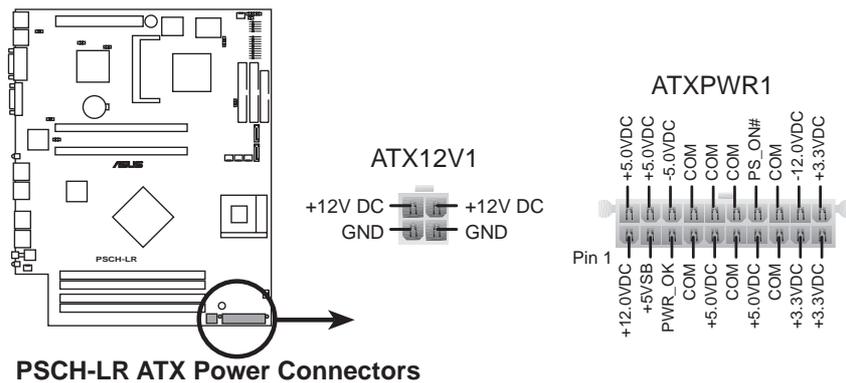
## 5. ATX power connectors (20-pin, 4-pin ATXPWR1)

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

In addition to the 20-pin power connector, this motherboard requires that you connect the 4-pin ATX +12V power plug to provide sufficient power to the CPU.

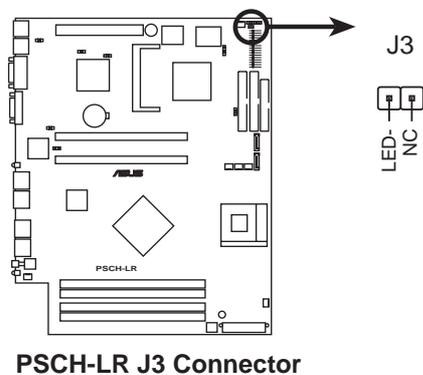


1. Do not forget to connect the 4-pin ATX +12V power plug. Otherwise, the system does not boot up.
2. Make sure that your ATX 12V power supply can provide 8A on the +12V lead and at least 1A on the +5-volt standby lead (+5VSB). The minimum recommended wattage is 300W. The system may become unstable or may not boot up if the power is inadequate.



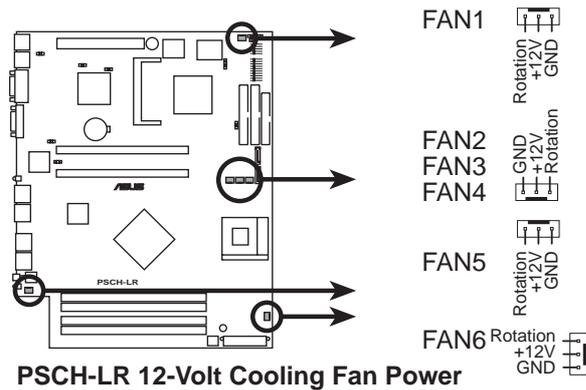
## 6. LED connector (2-pin J3)

For some storage cards, such as SCSI cards, with access signals for external LEDs, this connector allows the access signals to go through the front panel IDE\_LED lead.



## 7. Fan connectors (3-pin FAN1/2/3/4/5/6)

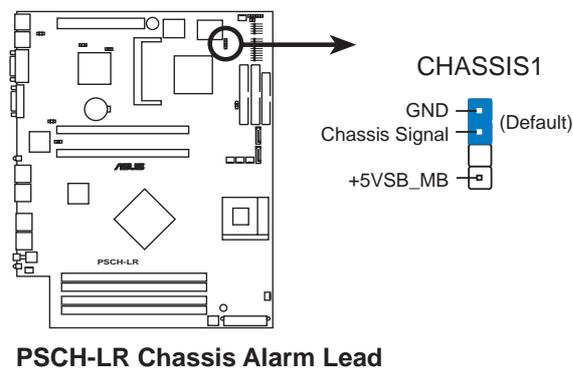
The fan connectors support cooling fans of 550mA~1100mA (13.2W max.) or a total of 3.3A (39.6W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.



## 8. Chassis intrusion connector (4-1 pin CHASSIS1)

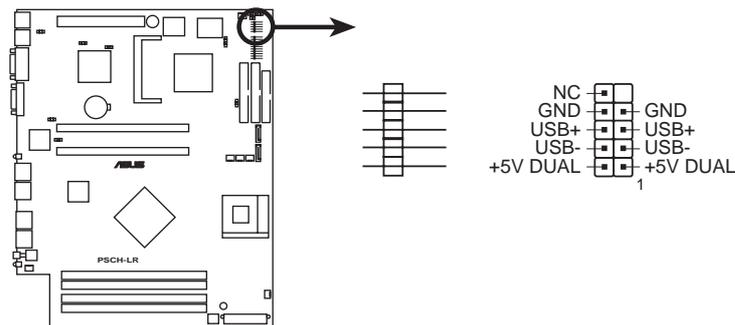
This lead is for a chassis designed with intrusion detection feature. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high-level signal to this lead to record a chassis intrusion event.

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.



## 9. USB header (10-1 pin USB34)

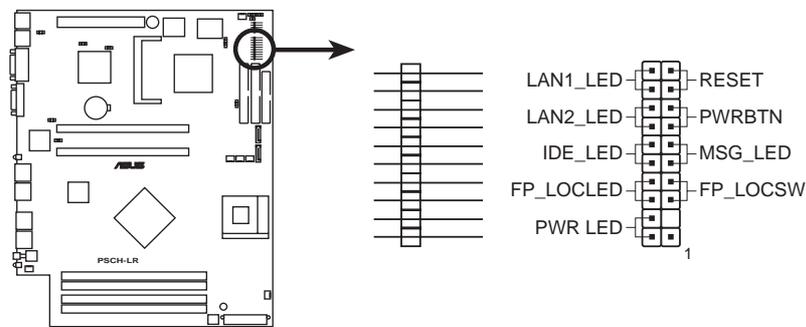
This USB header is connects to the two USB ports on the front panel. The header complies with USB 2.0 specification that supports up to 480 Mbps connection speed. This speed advantage over the conventional 12 Mbps on USB 1.1 allows faster Internet connection, interactive gaming, and simultaneous running of high-speed peripherals.



**PSCH-LR USB Connector**

## 10. System panel connector (20-1 pin PANEL1)

This connector accommodates several system front panel functions.



**PSCH-LR PANEL Connector**

- **LAN connection indicators (2-pin LAN1\_LED, LAN2\_LED)**  
These leads connect to the LAN LEDs on the front panel to indicate if the LAN connection is active.
- **Hard disk activity LED (2-pin IDE\_LED)**  
These leads connect the HDD LED on the front panel using a cable. The read or write activities of the device connected to the any of IDE connectors cause the IDE LED to light up.
- **Front panel location LED (2-pin FP\_LOCLEDD)**  
These leads connect to the front panel location LED.
- **System power LED (2-pin PWR\_LED)**  
These leads connect to the system power LED on the front panel using a cable. The LED lights up when you turn on the system power.
- **Reset switch (2-pin RESET)**  
These leads connect to the reset switch on the front panel using a cable for rebooting the system without turning off the system power.
- **ATX power button/ Soft-off switch (2-pin PWRBTN)**  
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.
- **Message LED (2-pin MSG\_LED)**  
These lead connect to the message LED on the front panel. The LED indicates receipt of messages from a fax/modem. The normal status of this LED is OFF when there is no incoming data signal. The LED blinks when data is received. The system message LED feature requires an ACPI operating system and driver.
- **Front panel location switch (2-pin FP\_LOCSW)**  
These leads connect to the front panel location switch.

# Chapter 5

This chapter tells how to change the system settings through the BIOS Setup menus.



ASUS AP140R-E1 1U barebone server

# BIOS setup

## 5.1 Managing and updating your BIOS



- 
- The **original BIOS file** for this motherboard is in the support CD.
  - Copy the original BIOS to a **bootable floppy disk** in case you need to restore the BIOS in the future.
- 

### 5.1.1 Creating a bootable floppy disk



---

The 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**

Insert a 1.44 MB floppy disk into the drive. At the DOS prompt, type:

**format a: /s**, then press the <Enter> key

#### **Windows® XP environment**

- a. Insert a new 1.44 MB floppy disk in the floppy disk drive.
  - b. From the Windows desktop, click **Start > My Computer**.
  - c. In the **My Computer** window, click the **3 1/2 Floppy** icon.
  - d. From the Menu bar, click **File > Format**.
  - e. Select “**Create an MS-DOS Startup Disk**” in the **Format Options** field, then click **Start**.
2. Copy the original (or the latest) motherboard BIOS to the bootable floppy disk.

## 5.1.2 Updating the BIOS

The Basic Input/Output System (BIOS) can be updated using the AwardBIOS Flash Utility (AWDFLASH.EXE). Follow these instructions to update the BIOS using this utility.

1. Download the latest BIOS file from the ASUS web site. Rename the file to **\*.BIN** and save it to a floppy disk.
2. Insert the disk that contains the new BIOS file into the floppy drive.



---

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

---

3. Reboot the computer.
4. Press <Alt> + <F2> during POST to display the following screen.

```
AwardBIOS Flash Utility V8.24B
(C)Phoenix Technologies Ltd. All Rights Reserved

For KM400-8235-6A6LYA0AC-00   DATE: 05/19/2003
Flash Type - SST-39SF020 /5V

File Name to Program : 1001-015.BIN

Message: Please Wait!
```

5. AWDFLASH checks the new BIOS file from the floppy disk.
6. After verification, AWDFLASH flashes the new BIOS file. Do not shut down the computer during the flash process.

```
AwardBIOS Flash Utility V8.24B
(C)Phoenix Technologies Ltd. All Rights Reserved

For KM400-8235-6A6LYA0AC-00   DATE: 05/19/2003
Flash Type - SST-39SF020 /5V

File Name to Program : 1001-015.BIN

Program Flashing Memory

█ Write OK  █ No Update  █ Write Fail

Warning: Don't Turn Off Power Or Reset System!
```

7. After the new BIOS file is copied, the computer returns to POST.

## 5.2 BIOS Setup program

This motherboard includes a Flash ROM that you can update using the provided utility described in section 5.1 Managing and updating your BIOS.”

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

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

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

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

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

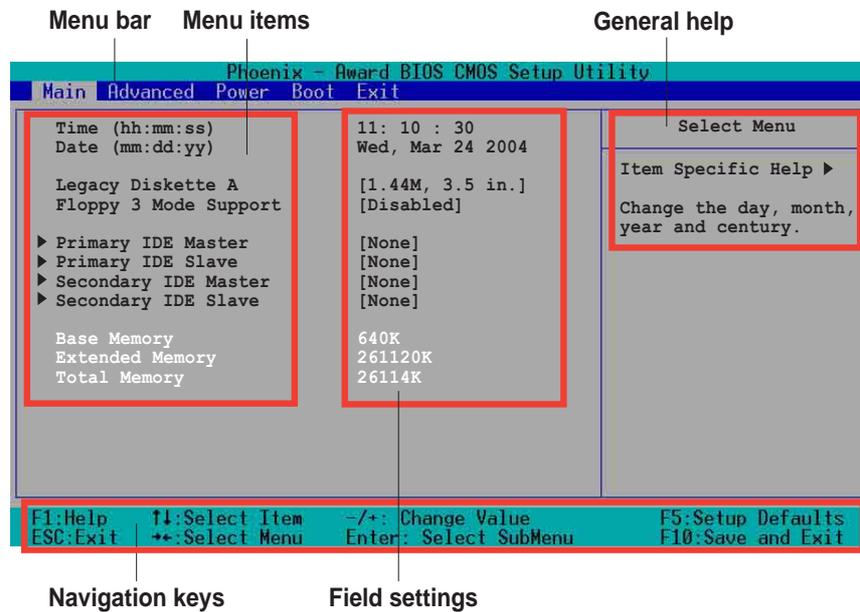


---

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

---

## 5.2.1 BIOS menu screen



## 5.2.2 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.

### 5.2.3 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.

---

### 5.2.4 General help

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

### 5.2.5 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.

### 5.2.6 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.

### 5.2.7 Pop-up window

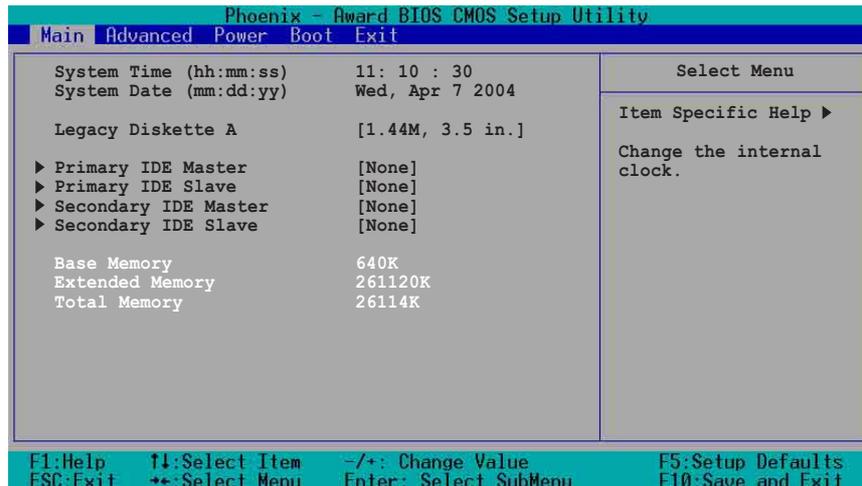
Select an item in the menu, then press Enter to display a pop-up window with the configuration options for that item.

## 5.3 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 “5.2.1 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.

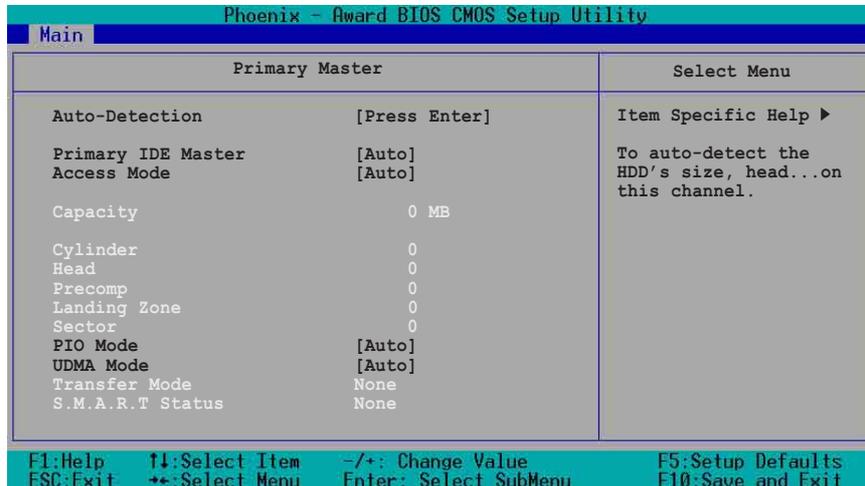
### Legacy Diskette A [1.44M, 3.5 in.]

Sets the type of floppy drive installed. Configuration options: [None] [360K, 5.25 in.] [1.2M, 5.25 in.] [720K, 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

### Base/Extended/Total Memory [xxxK]

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

## 5.3.1 Primary IDE Master



### Auto-Detection [Press Enter]

Press Enter to automatically detect an IDE drive, if the drive is not yet detected. Upon pressing Enter, the message "Detecting Hard Drive..." appears as the BIOS attempts to detect the presence of a IDE drive.

### 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]**

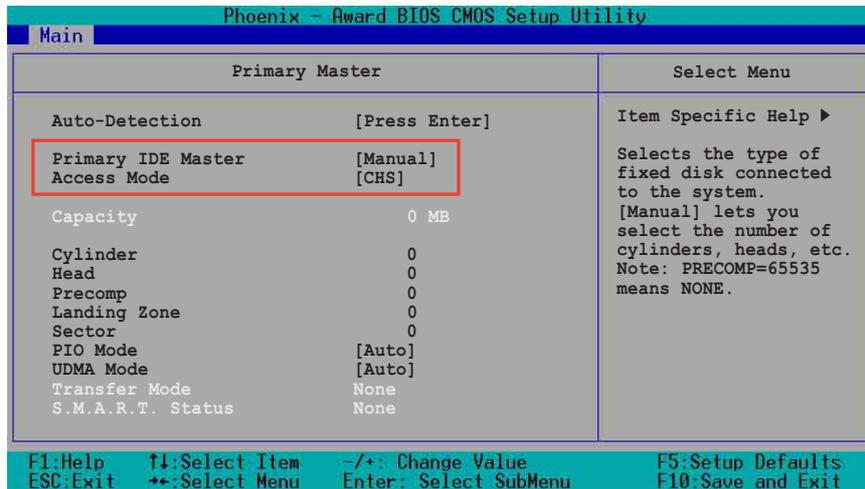
Sets the PIO mode for the IDE drive. The settings Mode 0 to 4 allow successive increase in performance. Configuration options: [Auto] [Mode 0] [Mode 1] [Mode 2] [Mode 3] [Mode 4]

**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."

---

## **5.3.2 Primary IDE Slave**

When configuring a drive as Primary IDE Slave, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

## **5.3.3 Secondary IDE Master**

When configuring a drive as Secondary IDE Master, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

## **5.3.4 Secondary IDE Slave**

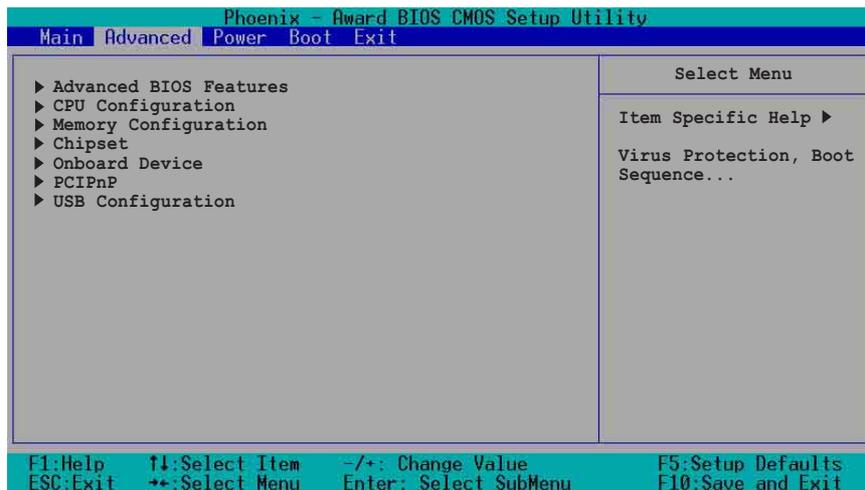
When configuring a drive as Secondary IDE Slave, refer to section "5.3.1 Primary IDE Master" for the menu item descriptions.

## 5.4 Advanced menu

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

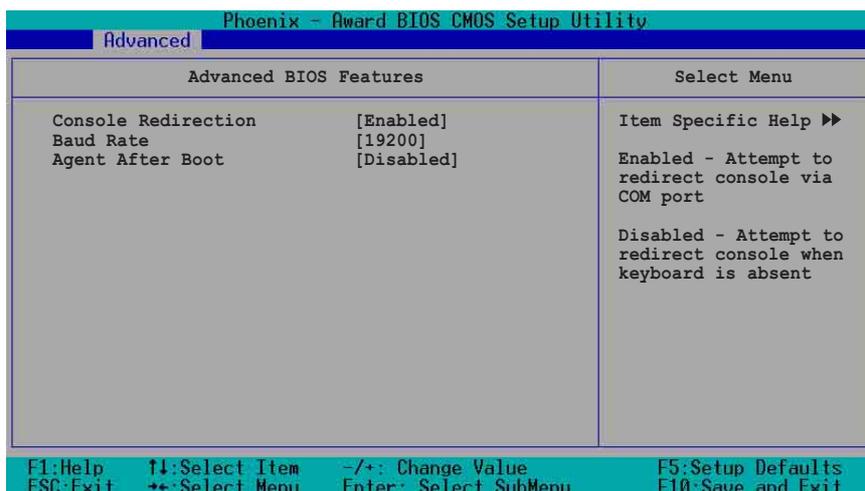


Take caution when changing the settings of the Advanced menu items. Incorrect field values may cause the system to malfunction!



### 5.4.1 Advanced BIOS Features

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



### Console Redirection [Enabled]

When set Enabled, BIOS attempts to redirect the console via the COM port. When set to Disabled, BIOS attempts to redirect the console when a keyboard is not present. Configuration options: [Disabled] [Enabled]

### Baud Rate [19200]

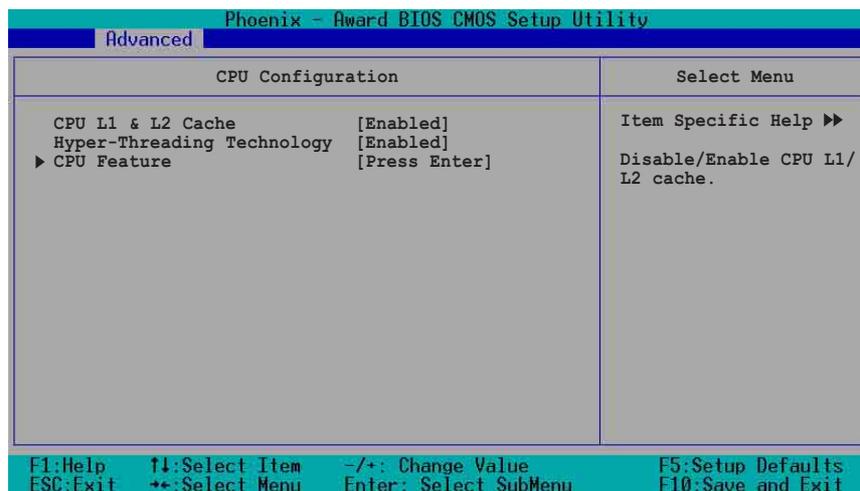
Allows you to specify the baud rate for console redirection. Configuration options: [9600] [19200] [38400] [57600] [115200]

### Agent After Boot [Disabled]

When set to enable, the server management agent running after a system boot. Configuration options: [Disabled] [Enabled]

## 5.4.2 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]

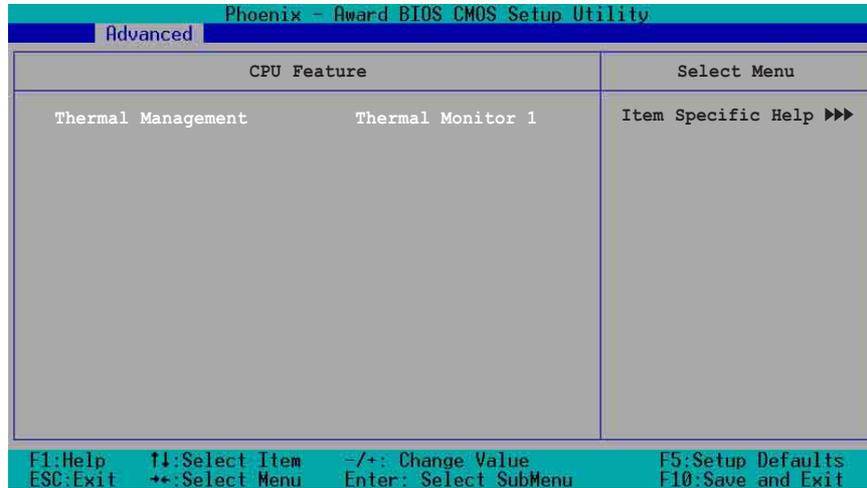
### Hyper-Threading Function [Disabled]

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



The item **Hyper-Threading Technology** appears only if you installed an Intel Pentium 4 CPU that supports this feature.

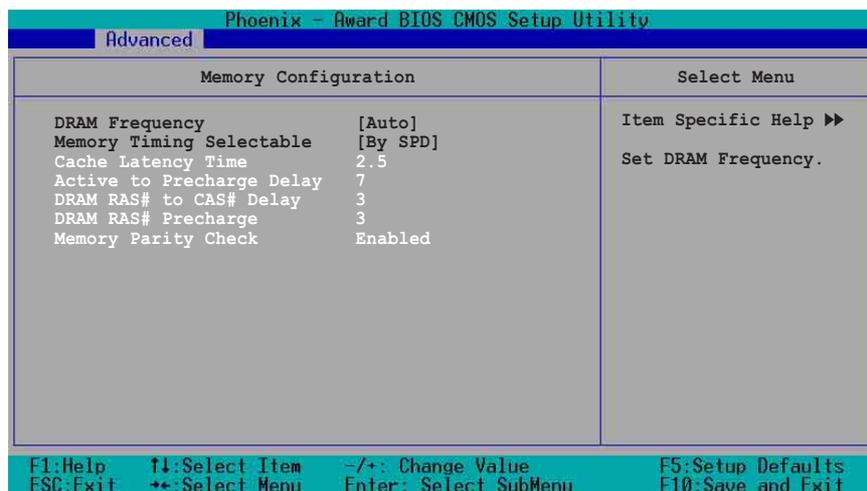
## CPU Feature



The Thermal Management item is not user-configurable.

## 5.4.3 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]**

Allows you to select the DRAM operating frequency.

Configuration options *(for CPUs with 533MHz FSB)*:  
[DDR266] [DDR333] [Auto]

Configuration options *(for CPUs with 800MHz FSB)*:  
[DDR266] [DDR333] [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]**

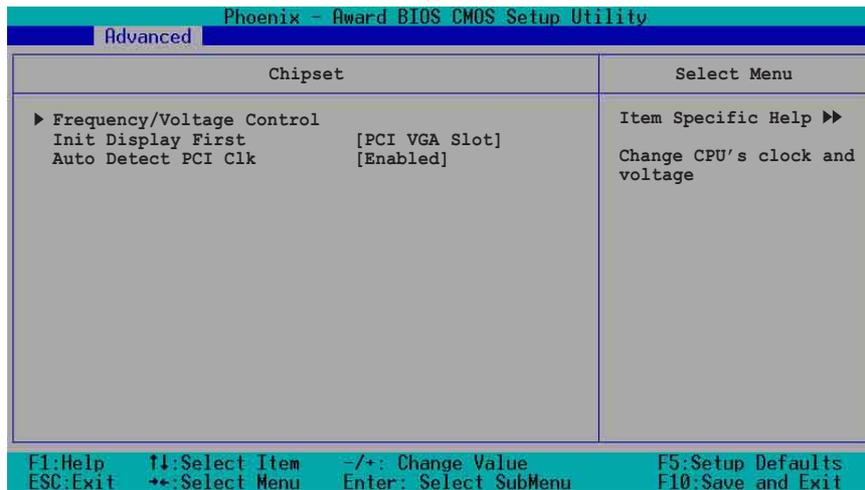
This item controls the idle clocks after issuing a precharge command to the DDR SDRAM. Configuration options: [4] [3] [2]

## **Memory Parity Check [Enabled]**

Allows memory parity checking option. This item shows Enabled if you installed ECC DDR DIMMs, and shows Disabled if you installed non-ECC DDR DIMMs.

## 5.4.4 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.



The item **Frequency/Voltage Control** does not appear if you installed a CPU with a fixed clock ratio.

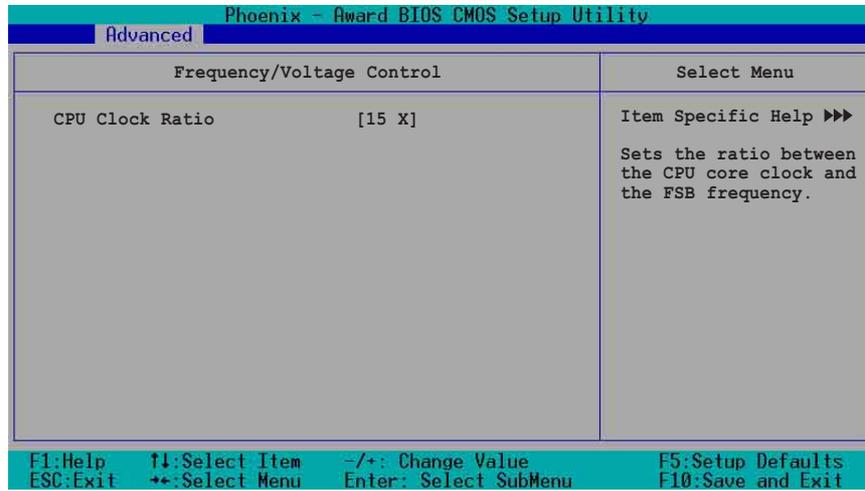
### Init Display First [PCI VGA Card]

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

### Auto Detect PCI Clk [Enabled]

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

## Frequency /Voltage Control

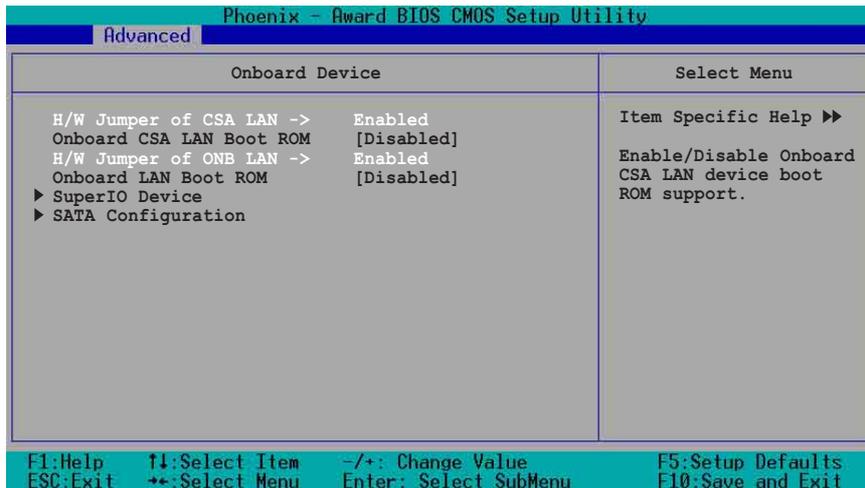


### CPU Clock Ratio [15 X]

Allows you to set the ratio between the CPU core clock and the FSB frequency. Configuration options: [15 X]

## 5.4.5 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.



### H/W Jumper of CSA LAN [Enabled]

This item shows Enabled when the jumper LAN\_EN2 is set to pins 1-2, and shows Disabled when the jumper is set to pins 2-3. Refer to section "4.2 Jumpers" for the jumper location.

### Onboard CSA LAN Boot ROM [Disabled]

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



The item **Onboard CSA LAN Boot ROM** appears only when the jumper LAN\_EN2 is set to pins 1-2.

### H/W Jumper of ONB LAN [Enabled]

This item shows Enabled when the jumper LAN\_EN1 is set to pins 1-2, and shows Disabled when the jumper is set to pins 2-3. Refer to section "4.2 Jumpers" for the jumper location.

### Onboard LAN Boot ROM [Disabled]

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



The item **Onboard LAN Boot ROM** appears only when the jumper LAN\_EN1 is set to pins 1-2.

## SuperIO Device

Phoenix - Award BIOS CMOS Setup Utility	
Advanced	
SuperIO Device	Select Menu
Serial Port1 Address [3F8/IRQ4]	Item Specific Help ►►► Set Base I/O address for serial port 1.
F1:Help    ↑↓:Select Item    -/+ : Change Value    F5:Setup Defaults	ESC:Exit    ←:Select Menu    Enter: Select SubMenu    F10:Save and Exit

### Serial Port 1 [3F8/IRQ4]

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

## SATA Configuration

Phoenix - Award BIOS CMOS Setup Utility	
Advanced	
SATA Configuration	Select Menu
*** On-Chip Serial ATA Setting *** On-Chip Serial ATA [Disabled] SATA Mode IDE Serial ATA Port0 Mode Primary Master Serial ATA Port1 Mode Primary Slave	Item Specific Help ►►► [Disabled]: Disable SATA Controller. [Auto]: Auto-arrange the BIOS. [Combined Mode]: PATA and SATA are combined. Max. of 2 IDE drives on each channel. [Enhanced Mode]: Enable both SATA and PATA. Max. of 6 IDE drives are supported. [SATA Only]: SATA is operating in legacy mode.
F1:Help    ↑↓:Select Item    -/+ : Change Value    F5:Setup Defaults	ESC:Exit    ←:Select Menu    Enter: Select SubMenu    F10:Save and Exit



The items **SATA Mode**, **Serial ATA Port0 Mode**, and **Serial ATA Port1 Mode** are configurable only when the On-Chip Serial ATA item is set to either Combined Mode, Enhanced Mode, or SATA Only.

## **\*\*On-Chip Serial ATA Setting**

### **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 PATA devices on any of the parallel ATA channels**, and **one SATA device on each serial ATA channel** for a maximum of **four** IDE devices.
- 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.
- d. Setting to [**SATA Only**] allows you to install SATA devices on the Serial ATA channels only.
- e. Setting to [**Disabled**] disables the onboard SATA controller. The RAID feature is also disabled.



---

For more information, refer to the “Parallel and Serial ATA hard disk configurations” on the next page.

---

### **SATA Mode [IDE]**

When set to [RAID], this item allows configuration of the installed SATA devices into a disk array. See Chapter 5 for information on RAID configuration. Configuration options: [IDE] [RAID]

### **Serial ATA Port0 Mode [Primary Master]**

### **Serial ATA Port1 Mode [Primary Slave]**

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]



---

The configuration options for the items **Serial ATA Port0 Mode** and **Serial ATA Port1 Mode** vary depending on the On-chip Serial ATA and SATA Mode settings.

---

## ***Parallel and Serial ATA hard disk configurations***

### **On Primary IDE connector**

A: Hard disk 1

B: Hard disk 2

### **On Secondary IDE connector**

C: Hard disk 3

D: Hard disk 4

### **On SATA connectors**

E: SATA hard disk 1

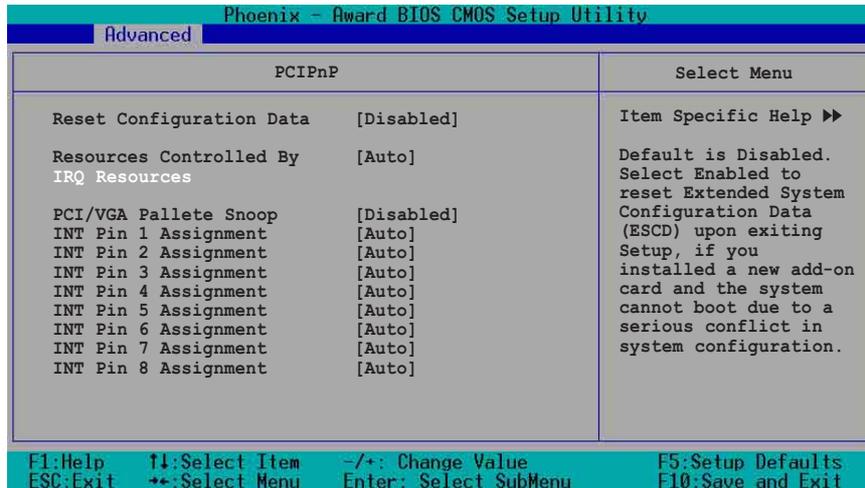
F: SATA hard disk 2

Setting	A	B	C	D	E	F
<b>Auto or Enhanced Mode</b>	✓	✓	✓	✓	✓	✓
<b>Combined Mode</b> Serial ATA Port0 Mode [Primary Master] Serial ATA Port1 Mode [Primary Slave]	x	x	✓	✓	✓	✓
<b>Combined Mode</b> Serial ATA Port0 Mode [Secondary Master] Serial ATA Port1 Mode [Secondary Slave]	✓	✓	x	x	✓	✓
<b>SATA Only</b>	x	x	x	x	✓	✓

✓ Supported  
x Disabled

## 5.4.6 PCIPnP

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



### Reset Configuration Data [Disabled]

Allows you to enable or disabled resetting of the Extended System Configuration Data (ESCD) when you exit the Setup. The ESCD includes information on non-PnP devices. Set this item to [Enabled] if you installed an expansion card that conflicts with other devices and cause system boot failure. Configuration options: [Disabled] [Enabled]

### Resources Controlled By [Auto]

When set to [Auto], 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 how to enable 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]

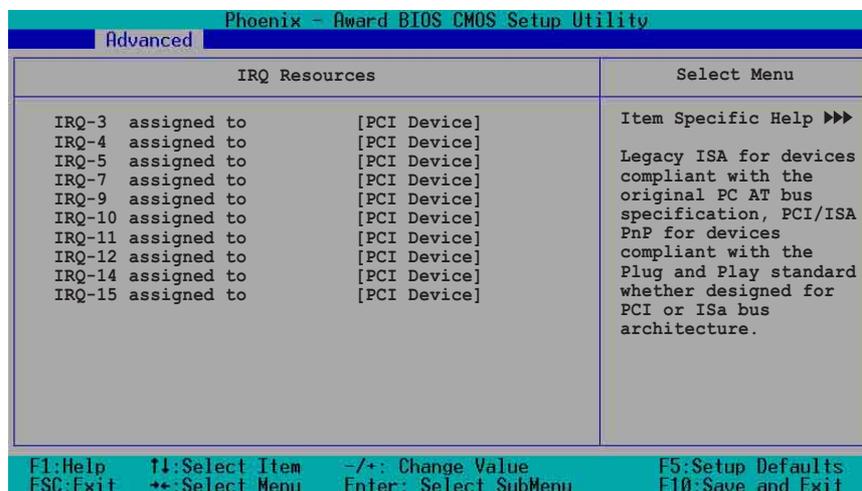
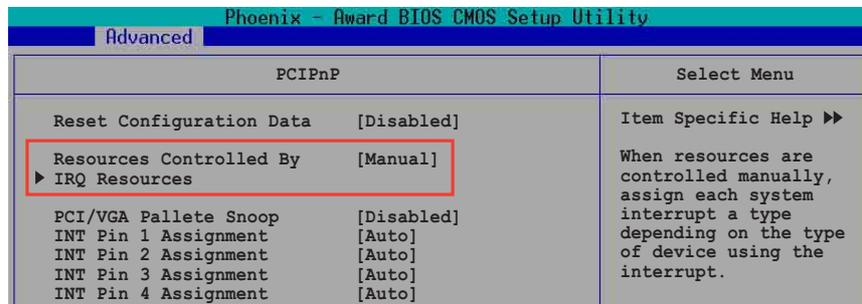
## INT Pin 1~8 Assignment [Auto]

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 devices.

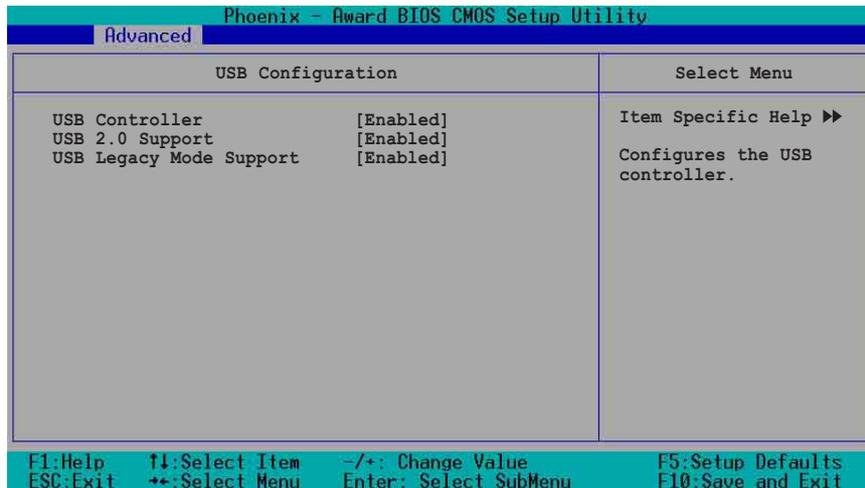


## IRQ-xx assigned to [PCI device]

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]

## 5.4.7 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: [Disabled] [Enabled]

### USB 2.0 Support [Enabled]

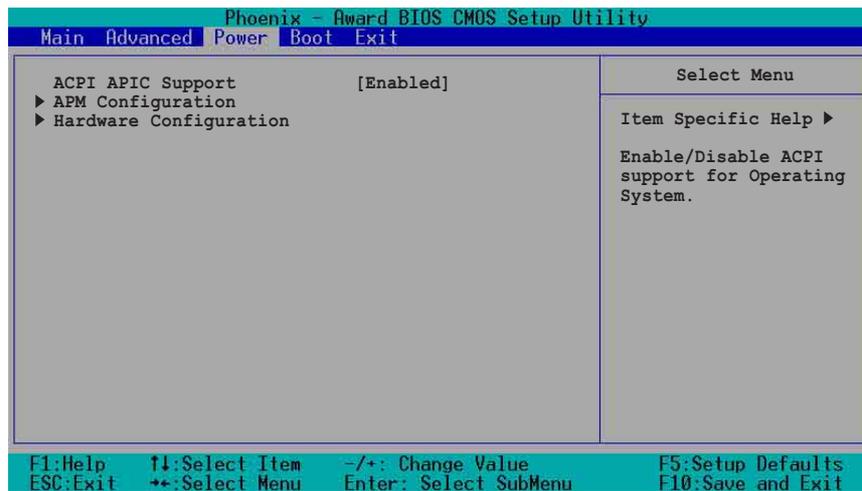
Allows you to enable or disable the EHCI controller. Setting this item to [Enabled] allows the built-in high speed USB support in the BIOS to turn on automatically when you install high speed USB devices. Configuration options: [Disabled] [Enabled]

### USB Legacy Mode Support [Enabled]

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

## 5.5 Power menu

The Power menu items allow you to change the power management settings. Select an item then press Enter to display the configuration options.

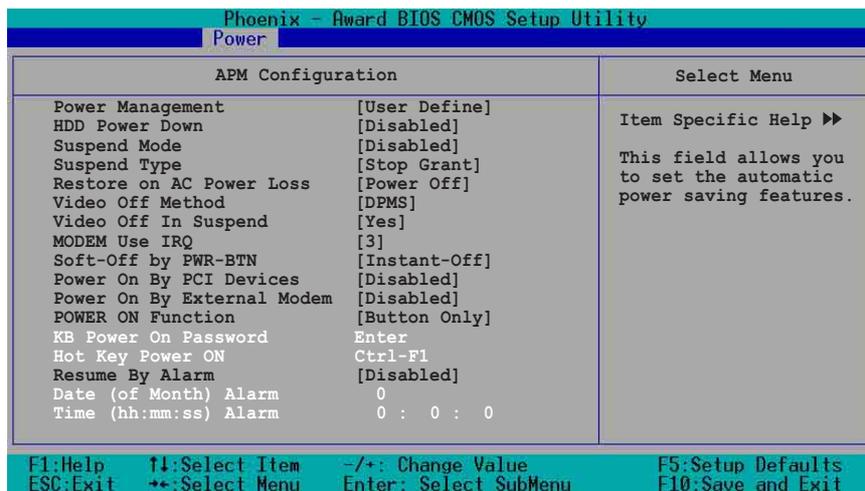


### ACPI APIC Support [Enabled]

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

## 5.5.1 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: [Yes] [No]

### **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-BTTN [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.]

### **Power On By PCI Devices [Disabled]**

Allows you to enable or disable the PCI devices or cards 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 [BUTTON ONLY]**

Allows you to select a device to turn the system power on. Configuration options: [Password] [Hot Key] [Any KEY] [BUTTON ONLY] [PS/2 Mouse]

### **KB Power On Password [Enter]**

Allows you to set a password to turn the system power on. Highlight this item then press enter to set a password.



---

To configure this item, you should set the **Power On Function** item to [Password].

---

### **Hot Key Power On [Ctrl-F1]**

Allows you to set a hot key combination to turn the system power on. Configuration options: [Ctrl-F1] ... [Ctrl-F12]



---

To configure this item, you should set the **Power On Function** item to [Hot Key].

---

### **Resume by Alarm [Disabled]**

Allows you to enable or disable RTC to generate a wake event. When this item is enabled, you can 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]

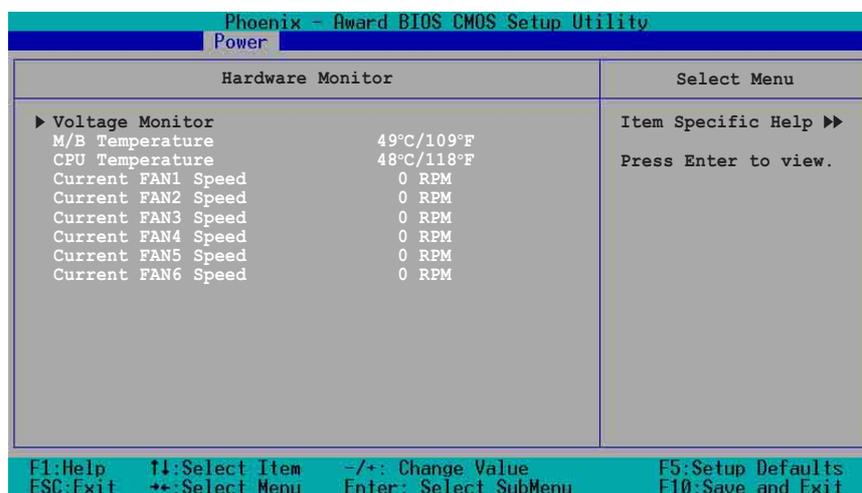
#### **Time (hh:mm:ss) Alarm [0 : 0 : 0]**

To set the time of alarm:

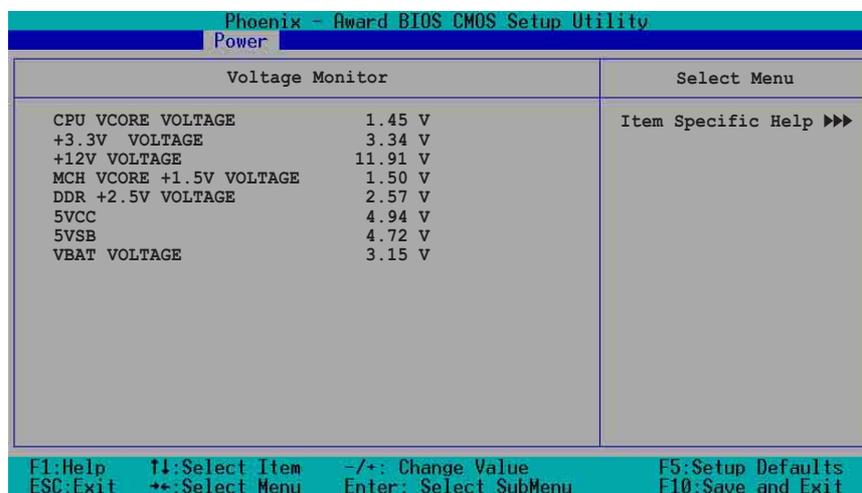
1. Highlight this item and press Enter to display a pop-up menu for the hour field.
2. Key-in a value (Min=0, Max=23), then press Enter.
3. Press tab to move to the minutes field, then press Enter.
4. Key-in a minute value (Min=0, Max=59), then press Enter.
5. Press tab to move to the seconds field,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

## 5.5.2 Hardware Monitor

This menu shows the hardware monitoring status. Select an item then press Enter to display a pop-up menu with the configuration options.



### Voltage Monitor

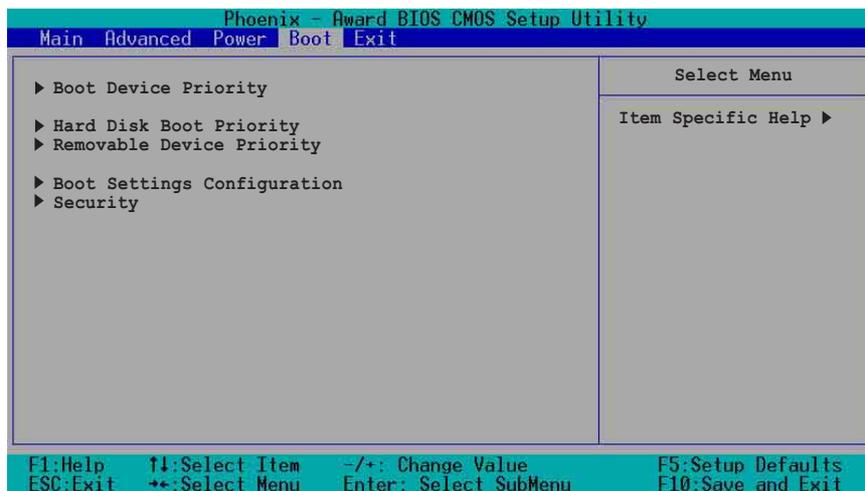


**CPU VCORE Voltage, +3.3V Voltage, +12V Voltage, MCH VCORE +1.5V Voltage, DDR +2.5V Voltage, 5VCC Voltage, +5VSB Voltage, VBAT Voltage**

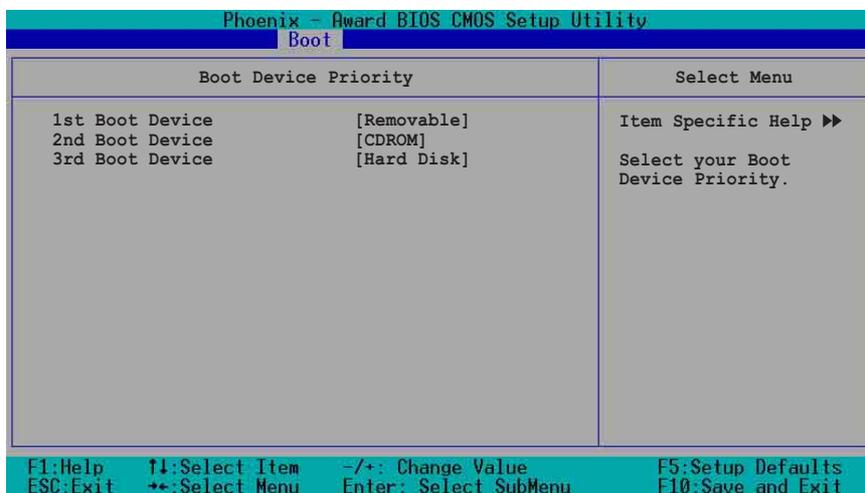
Auto-detected voltages through the onboard voltage regulators.

## 5.6 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.



### 5.6.1 Boot Device Priority



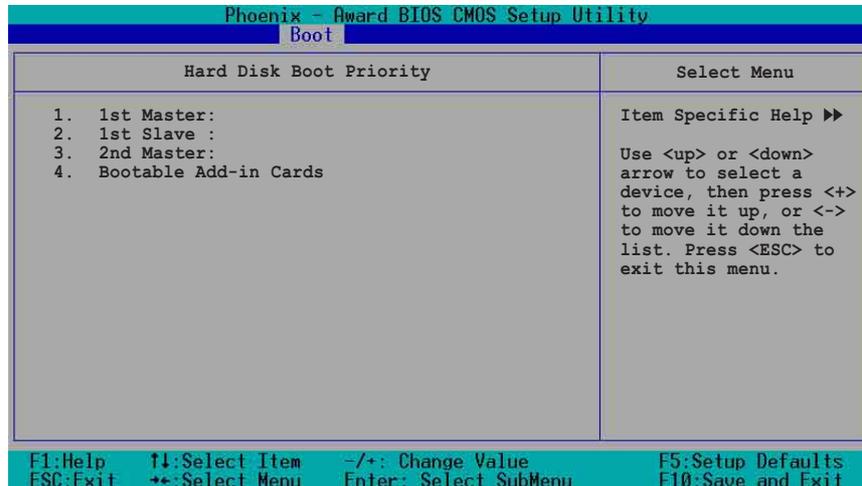
**1st Boot Device [Removable]**

**2nd Boot Device [CDROM]**

**3rd Boot Device [Hard Disk]**

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

## 5.6.2 Hard Disk Boot Priority



**1st Master**

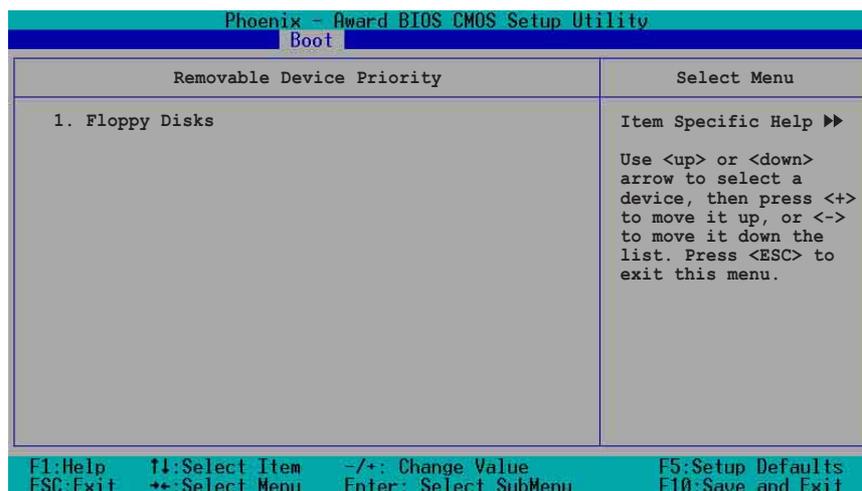
**1st Slave**

**2nd Master**

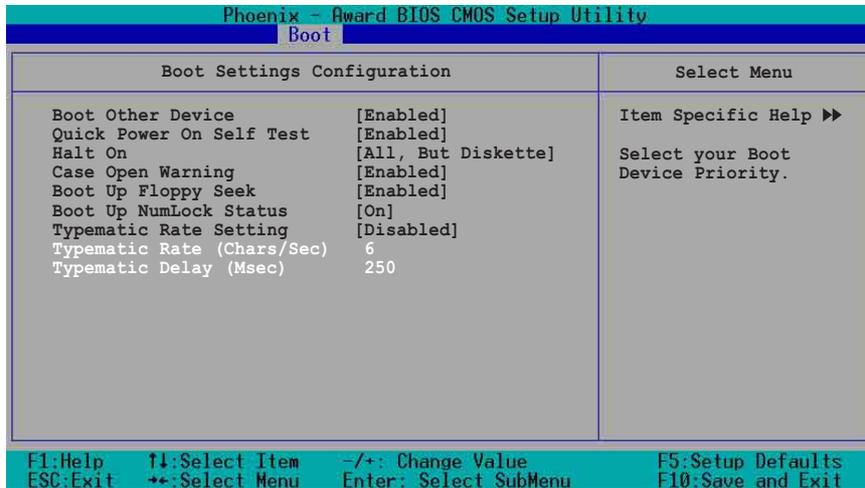
**Bootable Add-in Cards**

These items allow you to set the priority of hard disk drives (if you installed more than one) from which you wish to boot.

## 5.6.3 Removable Device Priority



## 5.6.4 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, But diskette]

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 [Disabled]

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: [On] [Off]

### 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.

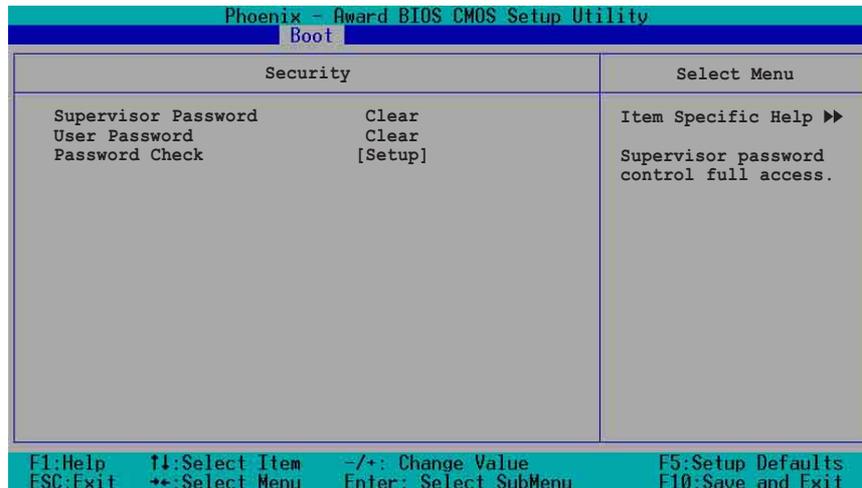
### Typematic Rate (Chars/Sec) [6]

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]

## 5.6.5 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 up to 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?**

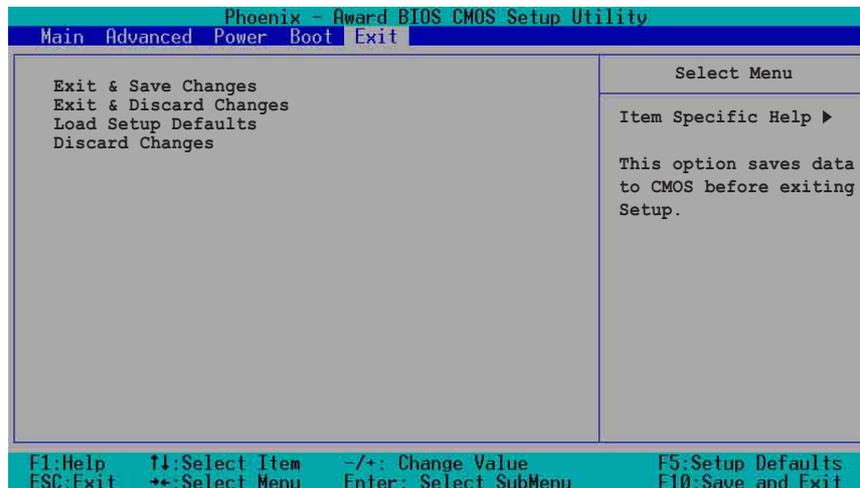
If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery. If you need to erase the CMOS RAM, refer to section “4.2 Jumpers” for instructions.

## **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]

## 5.7 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 (with a blinking [Y]):

- press <Enter> to save and exit
- type [N], then press <Enter>, or simply press <Esc>, to cancel the command and return to the Exit 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 (with a blinking [Y]):

- press <Enter> to discard your changes and exit
- type [N], then press <Enter>, or simply press <Esc>, to cancel the command and return to the Exit 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 (with a blinking [Y]):

- press <Enter> to load the default values
- type [N], then press <Enter>, or simply press <Esc>, to cancel the command and return to the Exit menu

### **Discard Changes**

Select this option to discard the changes that you made, and restore the previously saved values.

When a confirmation window appears (with a blinking [Y]):

- press <Enter> to discard any changes, and load the previously saved values
- type [N], then press <Enter>, or simply press <Esc>, to cancel the command and return to the Exit menu

# Chapter 6

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



ASUS AP1600R-E2 (AA2/AI2)

# Driver installation

## 6.1 RAID

The server system/motherboard comes with the **Adaptec® HostRAID™** technology embedded in the Intel® 6300ESB Southbridge to support up to two SATA hard disk drives and RAID 0, 1, and JBOD configurations.

Refer to the RAID definitions below.

### 6.1.1 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.

---

### 6.1.2 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.

### 6.1.3 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.

---

### 6.1.4 RAID configuration utility

You can create a RAID set using the utility embedded in the RAID controller. For example, you can use 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 and RAID 1 set 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.

```
Adaptec Embedded SATA HostRAID BIOS V2.2-1 1237
(c) 1998-2004 Adaptec, Inc. All Rights Reserved.

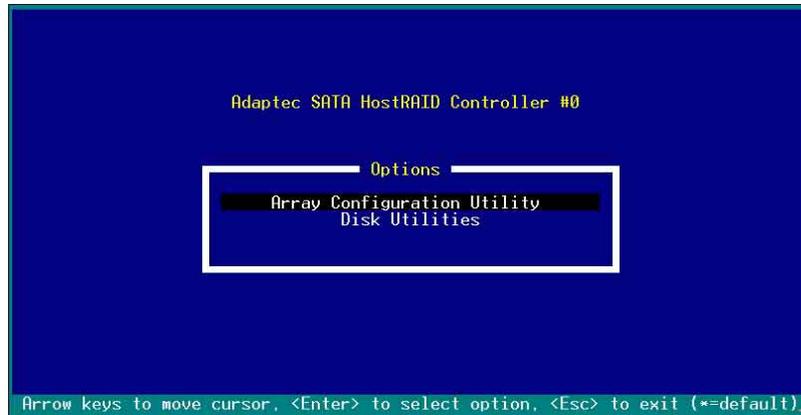
*** Press <Ctrl><A> for Adaptec RAID Configuration Utility! ***

Controller #00: HostRAID-ICH9 at PCI Bus:00, Dev:1F, Func:02
Loading Configuration...Done.
Port#00 ST380023AS      3.01      74.53 GB Healthy
Port#01 ST380023AS      3.01      74.53 GB Healthy

SATA JBOD- PORT-0 ST380023AS      74.53 GB
SATA JBOD- PORT-1 ST380023AS      74.53 GB

2 JBOD Device(s) Found.
```

3. Use the arrow keys to highlight an option.



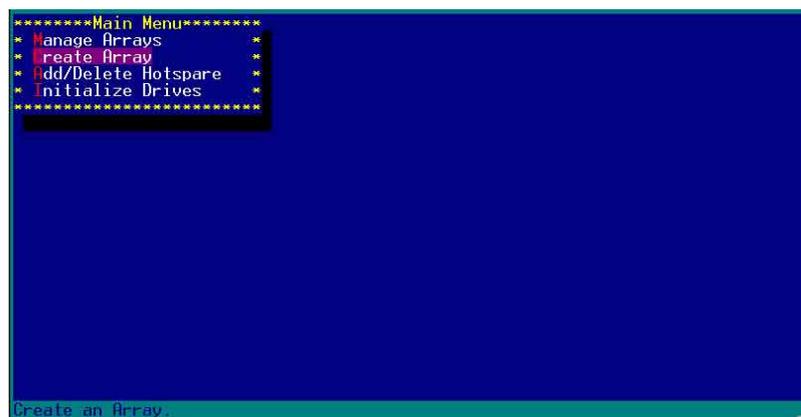
The **Array Configuration Utility** menu lets you create and manage RAID sets. The **Disk Utilities** allows you to check and verify SATA hard disk drives.

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.

#### 6.1.4.1 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.

```
****Select drives for initialization**** *****Selected Drives*****
* 00 ST380023AS 74.5GB * 00 ST380023AS 74.5GB *
* 01 ST380023AS 74.5GB * * *
*****
* *
* *
* *
* *
* *
*****
<INS> Select Drive, <DEL> Deselect Drive, <*> Moves Cursor
<Enter> Complete Selection, <Esc> Cancel Selection
```



---

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>.

```
****Select drives to create Array**** *****Selected Drives*****
* 00 ST380023AS 74.5GB * 00 ST380023AS 74.5GB *
* 01 ST380023AS 74.5GB * 01 ST380023AS 74.5GB *
*****
* *
* *
* *
* *
* *
*****
<INS> Select Drive, <DEL> Deselect Drive, <*> Moves Cursor
<Enter> Complete Selection, <Esc> Cancel Selection
```

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.

```
*****Array Properties*****
*
* Array Type       : RAID 0(Stripe)
* Array Label     : 6300ESB
* Array Size      : 149.031 GB
* Stripe Size     : 64KB
* Create RAID via :
*                 [Done]
*****

<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box, <F1> Help
```

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

```
*****Array Properties*****
*
* Array Type       : RAID 0(Stripe)
* Array Label     : 6300ESB
* Array Size      : 149.031 GB
* Stripe Size     : *****
*                 * 16KB *
*                 * 32KB *
*                 * 64KB *
* Create RAID via : *****
*                 [Done]
*****

<***> Moves Cursor, <Esc> Cancel Selection, <Enter> Accept Selection, <F1> Help
```



---

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.

```
*****Array Properties*****
* Array Type      : RAID 0(Stripe)
* Array Label    : 6300ESB
* Array Size     : 149.031 GB
* Stripe Size    : 64KB
* Create RAID via : * No Init
                  * Migrate
                  [D]
*****
< ** > Moves Cursor, < Esc > Cancel Selection, < Enter > Accept Selection, < F1 > Help
```

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

```
*****Array Properties*****
* Array Type      : RAID 0(Stripe)
* Array Label    : 6300ESB
* Array Size     : 149.031 GB
* Stripe Size    : 64KB
* Create RAID via : No Init
*
*               [Done]
*****
< Tab > Next Field, < Shift+Tab > Previous Field
< Enter > Accept Value, < Esc > Cancel Dialog Box, < F1 > Help
```



### 6.1.4.2 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>.

```
*****Array Properties*****
*                               *
* Array Type      : * RAID 0(Stripe)*
*                 * RAID 1(Mirror)*
* Array Label    : *****
* Array Size     : 149.031 GB
* Stripe Size    : 64KB
* Create RAID via :
*                 [Done]
*                               *
*****

<*> Moves Cursor, <Esc> Cancel Selection, <Enter> Accept Selection, <F1> Help
```

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

```
*****Array Properties*****
*                               *
* Array Type      : RAID 1(Mirror)
* Array Label    : 6300ESB
* Array Size     : 74.500 GB
* Stripe Size    : N/A
* Create RAID via :
*                 [Done]
*                               *
*****

<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box, <F1> Help
```

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.



- 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.

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          * 00 6300ESB RAID 1 74.5GB *
* Add/Delete Hotspare  *
* Initialize Drives    *
*****

Symbol (*) indicates this array is bootable, <Del> Delete Array
<Enter> Display Array properties and members, <Ctrl+S> Verify Array
<Ctrl+R> Rebuild Array, <Ctrl+B> Mark/Unmark Bootable Array <*> Moves Cursor

```

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

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          * 00 6300ESB RAID 1 74.5GB *
* Add/Delete Hotspare  *
* Initialize Drives    *
*****

*****Array Properties*****
* Array #00           : 6300ESB          Type      : RAID 1 *
* Array Size          : 74.5GB
* Array Status        : OPTIMAL
*
* *****Array Members*****
* 00 ST380023AS       74.5GB
* 01 ST380023AS       74.5GB
*
*****

<Esc> Previous Menu

```

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

```

*** Exit Utility? ***
* Yes
* No
*****

Arrow keys to move cursor, <Enter> to select option, <Esc> to exit (*=default)

```

### 6.1.4.3 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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
** 00 6300ESB RAID 0 149GB **
*****

Symbol (*) indicates this array is bootable. <Del> Delete Array
<Enter> Display Array properties and members. <Ctrl+S> Verify Array
<Ctrl+R> Rebuild Array. <Ctrl+B> Mark/Unmark Bootable Array <*> Moves Cursor
```

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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
** 00 6300ESB RAID 0 149GB **
*****

*****
* This will make all other existing bootable array Non-bootable. *
* Do you want to make this array bootable? (Yes/No): *
*****

Y - Yes, N - No.
```

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

```

*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
* * 00 6300ESB RAID 0 149GB *
*****

Symbol (*) indicates this array is bootable, <Del> Delete Array
<Enter> Display Array properties and members, <Ctrl+S> Verify Array
<Ctrl+R> Rebuild Array, <Ctrl+B> Mark/Unmark Bootable Array <*> Moves Cursor

```

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.

```

* Main Processor(s): Genuine Intel(R) CPU 3.20GHz *
*****
* Math Processor : Built-In Base Memory Size : 640KB *
* Floppy Drive A: : 1.44 MB 3*"" Extd Memory Size : 1023MB *
* Floppy Drive B: : None Serial Port(s) : 3F8,2F8 *
* Display Type : VGA/EGA Parallel Port(s) : 378 *
* BIOS Build Date : 05/12/04 PS/2 Mouse : Present *
* ACPI 1.0 Support : Enabled *
*****
* ATA(PI) Device(s) Type Size LBA Block SMART 32Bit DMA PIO *
* Mode Mode Info Mode Mode Mode *
* Secondary Master : ATAPI CDROM UDMA2 4 *
*****
* PCI Devices: *
* PCI Onboard PCI Bridge PCI Onboard PCI Bridge *
* PCI Onboard USB Controller,IRQ11 PCI Onboard System Device *
* PCI Onboard System Device PCI Onboard USB Controller,IRQ10 *
* PCI Onboard USB Controller,IRQ9 PCI Onboard PCI Bridge *
* PCI Onboard SerialBus Cntrl,IRQ9 PCI Onboard RAID,IRQ5 *
* PCI Onboard IDE PCI Bridge Ethernet,IRQ5 *
* PCI Bridge RAID,IRQ9 PCI Bridge VGA *
*****
Press <ESC> to boot...2

```

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.

```

*****
Please select boot device:
*****
1st FLOPPY DRIVE
SM-ASUS DVD-ROM E616
HostRAID#0-#0 6300ESB
*****
* and * to move selection
* ENTER to select boot device
* ESC to boot using defaults
*****

```

#### 6.1.4.4 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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
* * 00 6300ESB RAID 0 149GB *
*****

Symbol (*) indicates this array is bootable, <Del> Delete Array
<Enter> Display Array properties and members, <Ctrl+S> Verify Array
<Ctrl-R> Rebuild Array, <Ctrl-B> Mark/Unmark Bootable Array <*> Moves Cursor
```

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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
* * 00 6300ESB RAID 0 149GB *
*****

*****Array Properties*****
* Array #00 : 6300ESB Type : RAID 0 *
* Array Size : 149GB Stripe Size: 64KB *
* * * * *
* [Delete] [Cancel] *
* * * * *

<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box
```

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

```
*****Main Menu*****
* Manage Arrays          *****List of Arrays*****
* Create Array          * * 00 6300ESB          RAID 0          149GB *
* Add/Delete Hotspare  *
* Initialize Drives    *
*****

*****
* WARNING: Deleting the array will result in data loss! *
* Do you want to delete the Array?(Yes/No):             *
*****

Y - Yes, N - No.
```

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.

```
*****Main Menu*****
* Manage Arrays          *
* Create Array          *
* Add/Delete Hotspare  *
* Initialize Drives    *
*****

*****
* No Arrays present. *
*****

Press any key to continue...
```

### 6.1.4.5 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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
** 00 RAID 1 RAID 1 74.5GB **
*****

Symbol (*) indicates this array is bootable. <Del> Delete Array
<Enter> Display Array properties and members. <Ctrl+S> Verify Array
<Ctrl+R> Rebuild Array. <Ctrl+B> Mark/Unmark Bootable Array <*> Moves Cursor
```

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.

```
*****Main Menu*****
* Manage Arrays
* Create Array
* Add/Delete Hotspare
* Initialize Drives
*****

*****List of Arrays*****
** 00 RAID 1 RAID 1 74.5GB **
*****

*****Array Properties*****
* Array #00 : RAID 1 Type : RAID 1 *
* Array Size : 74.5GB *
* [Delete] [Cancel] *
*****

<Tab> Next Field. <Shift+Tab> Previous Field
<Enter> Accept Value. <Esc> Cancel Dialog Box
```

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

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          ** 00 RAID 1          RAID 1  74.5GB **
* Add/Delete Hotspare  *****
* Initialize Drives    *****
*****

*****
* WARNING: Deleting the array will render array unusable. *
* Do you want to delete the Array? (Yes/No):              *
*****

Y - Yes, N - No.

```

- 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.

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          ** 00 RAID 1          RAID 1  74.5GB **
* Add/Delete Hotspare  *****
* Initialize Drives    *****
*****

*****Deleting Information*****
* Member#0: port#00      Member#1: port#01      *
* To delete the partition table, choose which member: *
* [None] [Member#0] [Member#1] [Both] *
*****

<Tab> Next Field, <Shift+Tab> Previous Field
<Enter> Accept Value, <Esc> Cancel Dialog Box

```

- 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.

```

*****Main Menu*****
* Manage Arrays *****
* Create Array          *****
* Add/Delete Hotspare  *****
* Initialize Drives    *****
*****

*****
* No Arrays present. *
*****

Press any key to continue...

```

### 6.1.4.6 Rebuilding a RAID set

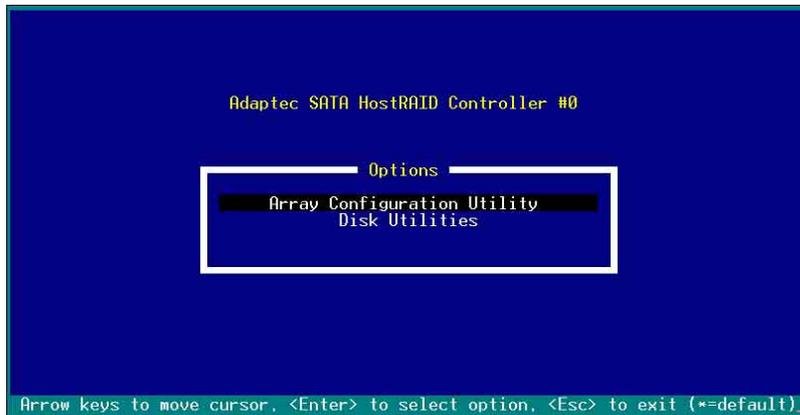
The utility displays the condition of the RAID set during the POST. When a RAID set is degraded, you can use the utility to rebuild it.



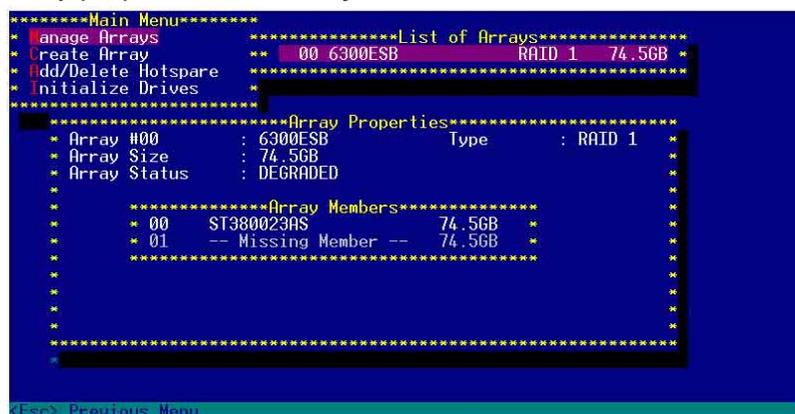
Check the physical connections of the SATA hard disk drives before you rebuild a degraded RAID set. Check the system and motherboard user guide for additional information.

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.

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          ** * 00 6300ESB      RAID 1   74.5GB *
* Add/Delete Hotspare  *****
* Initialize Drives    *
*****
*****Array Properties*****
* Array #00           : 6300ESB          Type      : RAID 1 *
* Array Size         : 74.5GB
* Array Status       : BUILDING          2% Block #: 3328000
*
* *****Array Members*****
* 00 ST380023AS      74.5GB
* 01 ST380023AS      74.5GB
*
*****
<Esc> Previous Menu

```

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.

```

*****Main Menu*****
* Manage Arrays *****List of Arrays*****
* Create Array          ** * 00 6300ESB      RAID 1   74.5GB *
* Add/Delete Hotspare  *****
* Initialize Drives    *
*****
*****Array Properties*****
* Array #00           : 6300ESB          Type      : RAID 1 *
*
* Arr*****Initiated process in progress. Exiting now will not complete
* * the initiated process unless RAID management application is
* * installed under Operating System.
* * Do you want to stop array building process ? (Yes/No)
*
*****
Y - Yes, N - No

```

## 6.1.5 Creating a 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.

---

### 6.1.5.1 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 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.

### 6.1.5.2 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.

## 6.1.6 Installing the Intel® 6300ESB RAID controller driver

### 6.1.6.1 Windows® 2000/2003 Server OS

#### *During Windows® 2000/2003 Server OS installation*

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

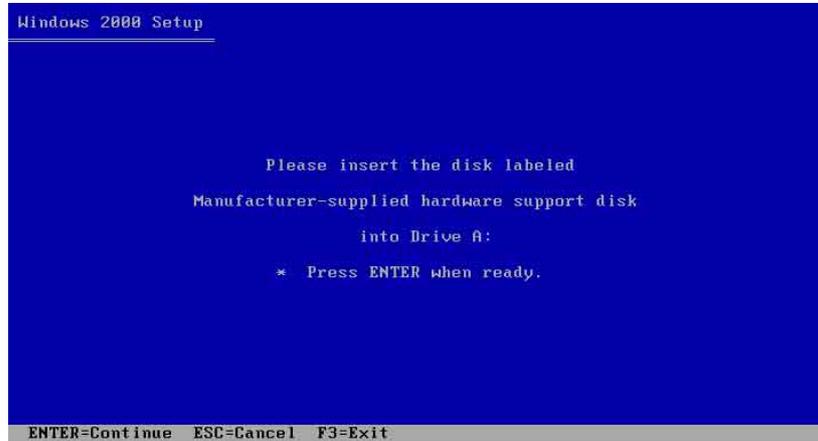
1. Boot the computer using the Windows® 2000/2003 Server installation CD. The **Windows® 2000/2003 Setup** starts.



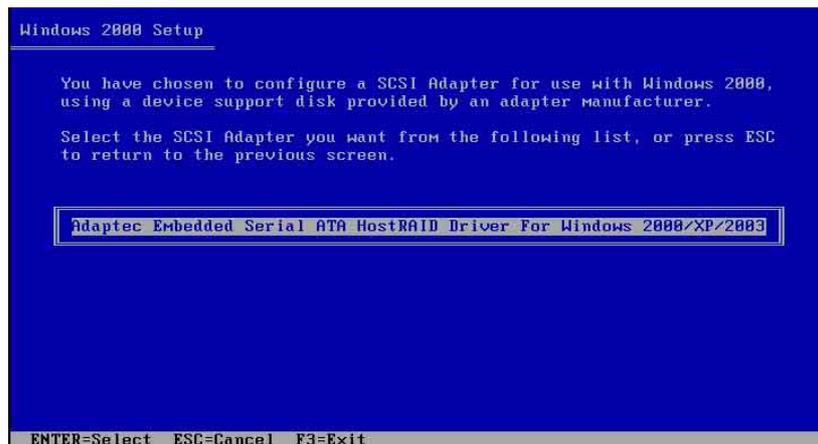
2. Press <F6> when the message “**Press F6 if you need to install a third party SCSI or RAID driver...**” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



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.

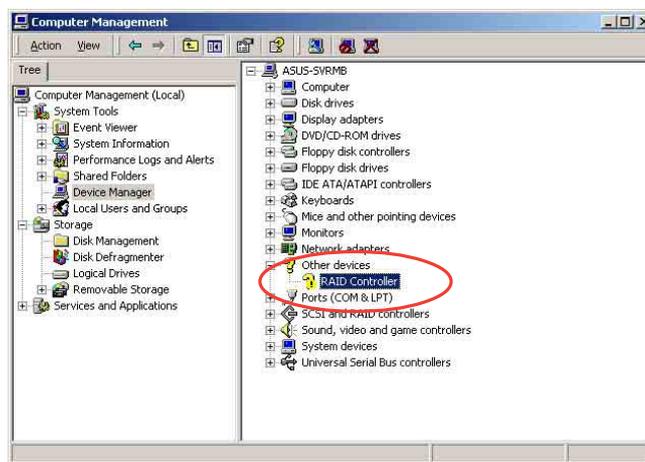


6. The Windows® 2000/2003 Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

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.

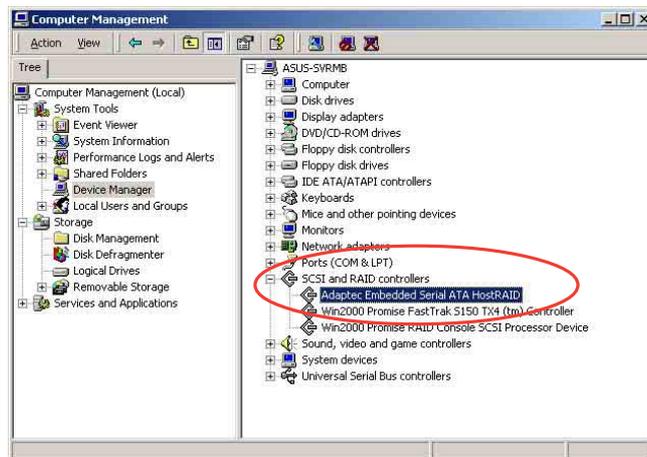


11. Click **Finish** after the driver installation is done.



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.



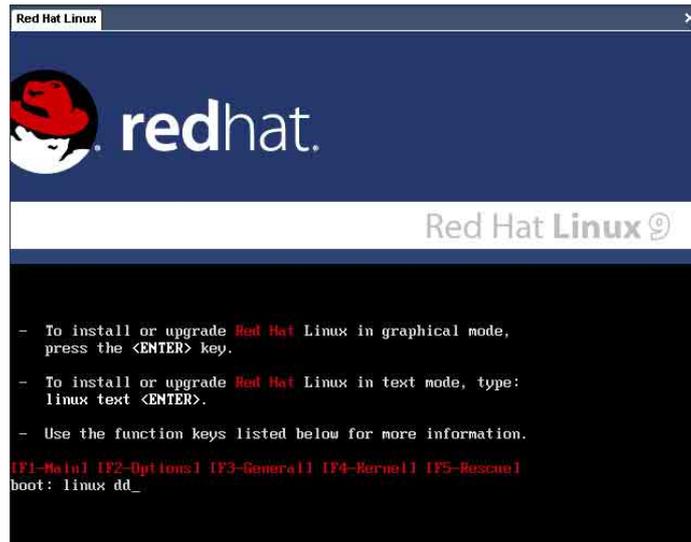
4. Right-click the **Adaptec Embedded Serial ATA HostRAID** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.



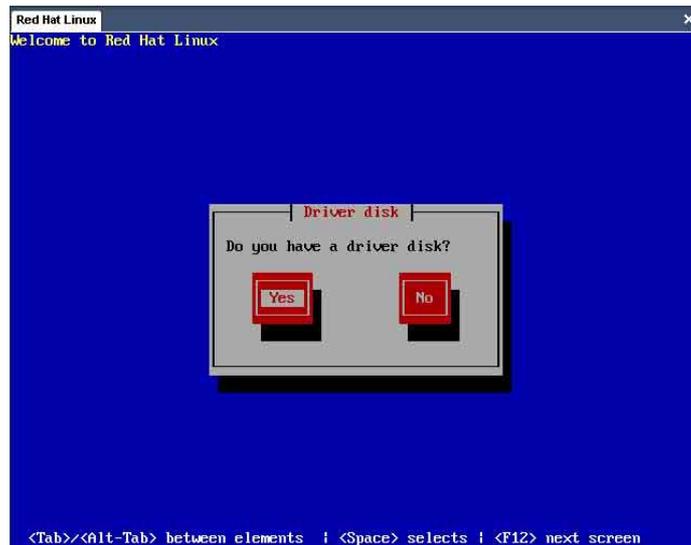
### 6.1.6.2 Red Hat® Linux 9.0

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

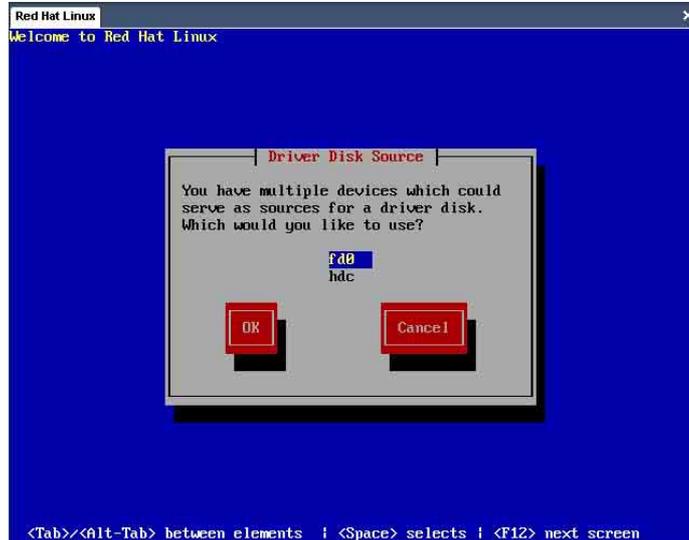
1. Boot the system from the Red Hat® Installation CD.
2. At the `boot:`, type `linux dd`, then press <Enter>.



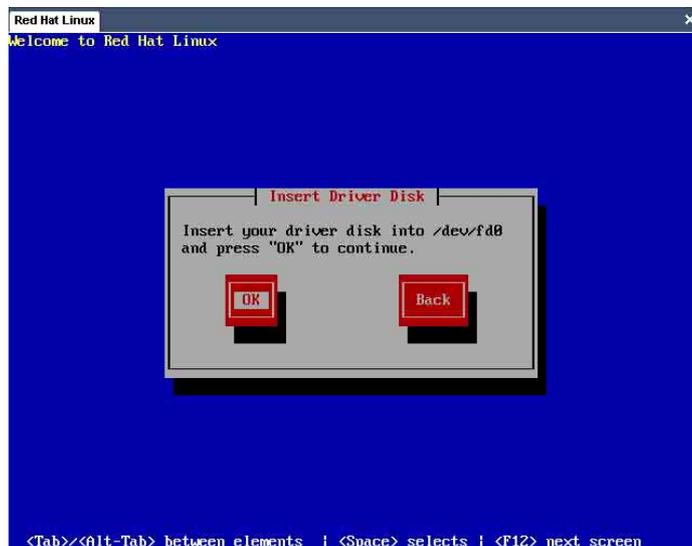
3. Select **Yes** using the <Tab> key when asked if you have the driver disk. Press <Enter>



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>.

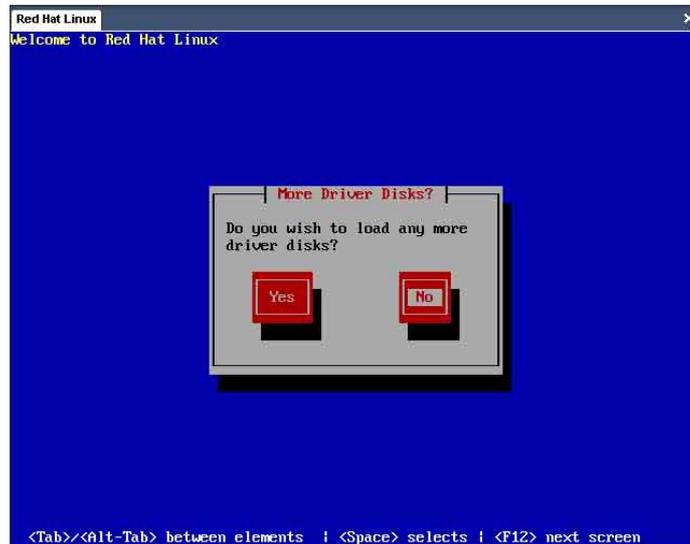


5. When prompted, insert the Intel® 6300ESB Red Hat® Linux 9.0 driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

- 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.



- Follow screen instructions to continue the OS installation.

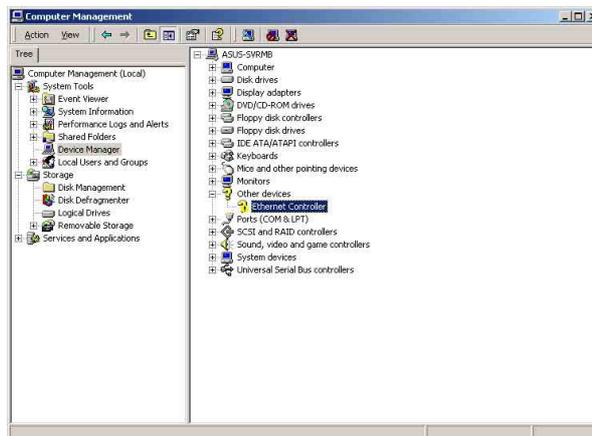
## 6.2 LAN

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

### 6.2.1 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.

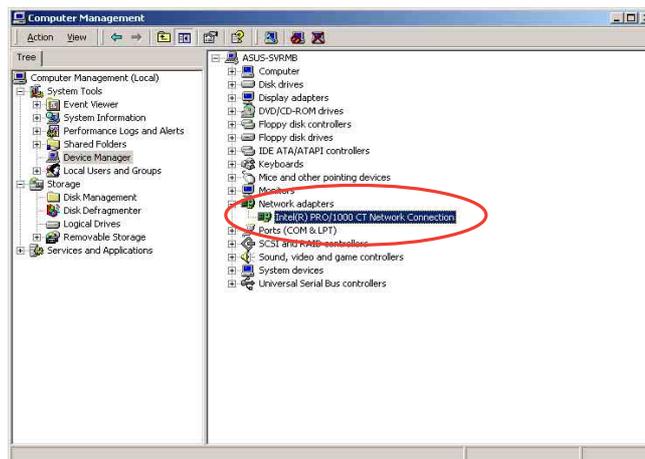
The LAN controller drivers are automatically installed in the system.



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.



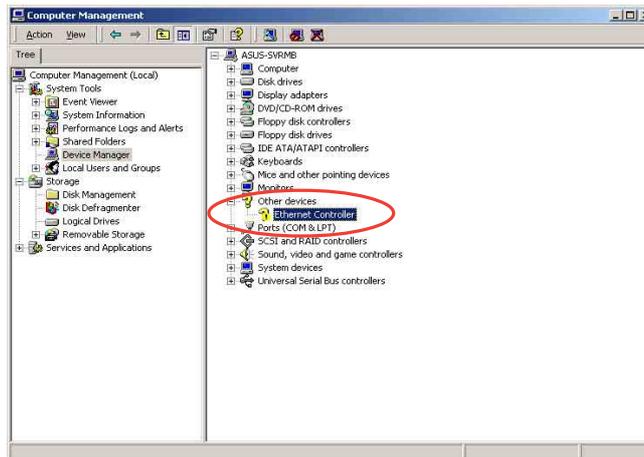
4. Right-click the **Intel(R) PRO/1000 CT Network Connection** item, then select **Properties** from the menu.
5. Click the **Driver** tab, then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.



## 6.2.2 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.

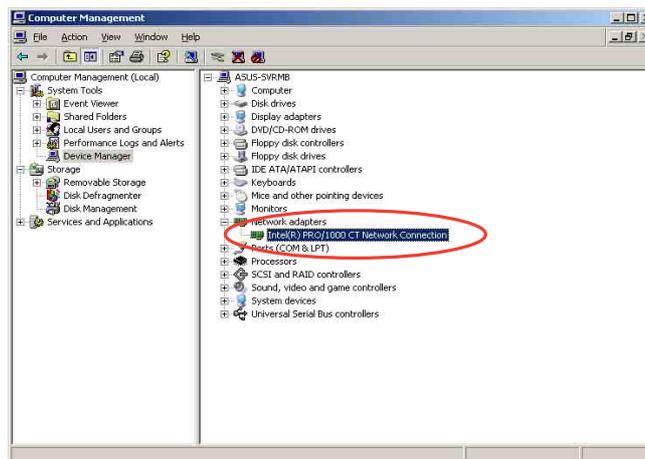


The LAN controller drivers are automatically installed in the system.

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.



## 6.2.3 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.  
`makeinstall`

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.

## 6.3 VGA driver installation

This section provides instructions on how to install the ATI® RAGE XL Video Graphics (VGA) drivers.

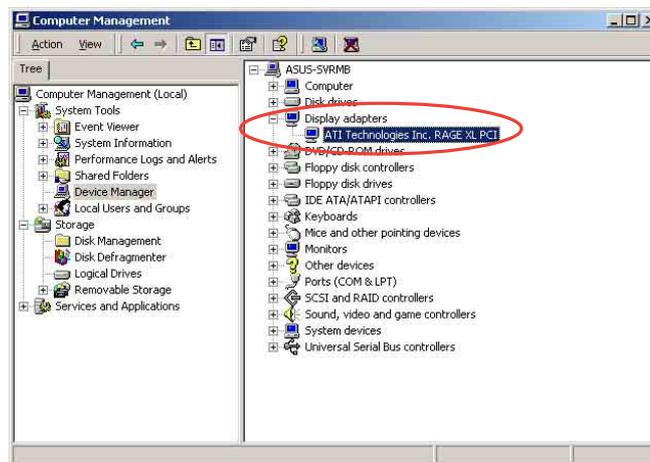
### 6.3.1 Windows® 2000/2003 Server

The Windows® 2000/2003 Server operating system automatically recognizes the ATI® RAGE XL VGA drivers during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

Follow these instructions to make sure that the ATI® RAGE XL VGA drivers are properly installed.

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 **ATI Technologies Inc. RAGE XL PCI** item should appear.



4. Right-click the **ATI Technologies Inc. RAGE XL PCI** item , then select **Properties** from the menu.
5. Click the **Driver** tab , then click the **Device Details** button to display the VGA drivers .
6. Click **OK** when finished.

### 6.3.2 Red Hat Linux® 9.0

The Red Hat Linux 9.0 ( 2.4.x kernels ) operating system automatically recognizes the ATI RAGE XL VGA drivers during system installation. There is no need to install an additional driver(s) to support the onboard VGA.

# Appendix

This appendix includes additional information that you may refer to when configuring your barebone server.



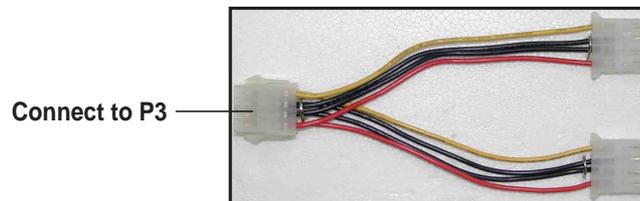
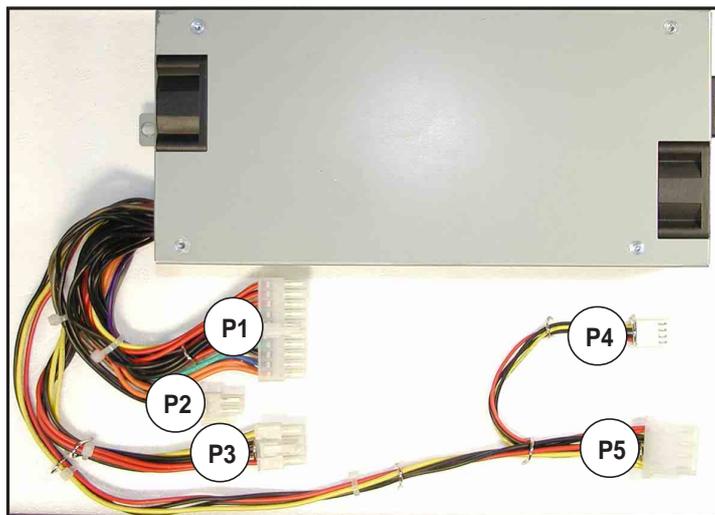
ASUS AP140R-E1 1U barebone server

# References

## A.1 Power supply

### A.1.1 General description

The server comes with an SSI-type 300W 115V/230V power supply with universal AC input that includes PFC and ATX-compliant output cables and connectors. Take note of the devices to which you should connect the plugs.



- P1 Motherboard 20-pin ATX power connector
- P2 Motherboard 4-pin +12V AUX power connector
- P3 8-pin connector for 2 additional device connectors
- P4 4-pin floppy disk drive connector
- P5 4-pin device connector

## A.1.2 Specifications

### Output voltage regulation

Output Voltage	Min (V)	Nom (V)	Max (V)	Ripple/Noise
+3.3V	3.14	3.30	3.46	50mV <sub>p-p</sub>
+5V	4.75	5.00	5.25	50mV <sub>p-p</sub>
+12V	11.40	12.00	12.60	120mV <sub>p-p</sub>
-12V	-10.80	-12.20	-13.20	120mV <sub>p-p</sub>
+5VSB	4.75	5.00	5.25	50mV <sub>p-p</sub>

### Output current capacity

Output Voltage	Min (A)	Max (A)	Peak (A)
+3.3V	0.3	20.0	
+5V	0.8	28.0	
+12V	0.3	18.0	25.0
-12V	0.0	0.8	
+5VSB	0.0	2.0	3.0

### Over-voltage protection

Voltage	Min (V)	Max (V)
+3.3V	3.9	4.5
+5V	5.7	6.5
+12V	13.3	15.0
+12V	-13.3	-15.0
+5VSB	5.7	6.5

## A.2 Qualified Vendors List (QVL)

CPU					
Vendor	Model	L2 cache	L3 cache	Clock	Bus speed
Intel	Pentium4 2.8GHz	512KB	-	21	533
Intel	Pentium4 3.0GHz	512KB	-	15	800
Intel	Pentium4 3.2GHz	512KB	-	16	800
Intel	Pentium4 3.4GHz	512KB	-	17	800

Memory					
Type	Size	Vendor	Module	Chip vendor	Component
184-pin Non-ECC (DDR266)	256MB	Transcend	-	WINBOND	W942508BH-75
	512MB	Transcend	TS64MLD64V6F5	0402PR	V58C2256804SAT6
184-pin Non-ECC (DDR333)	256MB	Kingston	KVR333X64C25	NANYA	NT5DS32M8BT-6K
	512MB	Kingston	KVR333X64C25	HYNIX	HY5DU56822BT-J
184-pin (non-ECC) (DDR400)	256MB	Apacer	77.10636.11G	Infineon	HYB25D256800BT-5
	512MB	Apacer	77.10736.11G	Infineon	HYB25D256800BT-5

IDE HDD					
Vendor	Model	Interface	Speed	Capacity	FW Rev.
Seagate	ST3160021A	IDE	7200rpm	160GB	3.06
Maxtor	6Y160L0	IDE	7200RPM	160GB	YAR41BW0

SATA HDD					
Vendor	Model	Interface	Speed	Capacity	FW Rev.
Seagate	ST3160023AS	SATA	7200rpm	160GB	3.05
Seagate	ST3160026AS	SATA	7200rpm	120GB	3.05
Maxtor	6Y160L0	SATA	7200RPM	80GB	YAR51EW0

Optical drives					
Vendor	Model	Interface	Speed	Capacity	FW Rev.
ASUS	CD-S520/A4	IDE	52X	-	-
ASUS	E616PI	IDE	16X	-	-

## A.3 Troubleshooting



Some problems that you may encounter are not due to defects on the system or the components. These problems only requires simple troubleshooting actions that you can perform by yourself.

Problem	Action
<b>The power LED on the server or on the monitor do not light up</b>	<ol style="list-style-type: none"><li>1. Check if the power cable is properly connected to the power connector in the system rear panel.</li><li>2. Make sure that the power cables are connected to a grounded power outlet.</li><li>3. Press the power button to make sure that the system is turned on.</li></ol>
<b>The keyboard does not work</b>	Check if the keyboard cable is properly connected to the PS/2 keyboard port.
<b>The mouse does not work</b>	Check if the mouse cable is properly connected to the mouse port.
<b>The system does not perform power-on self tests (POST) after it was turned on</b>	<ol style="list-style-type: none"><li>1. Check the memory modules and make sure you installed the DIMMs the system supports.</li><li>2. Make sure that the DIMMs are properly installed on the sockets.</li></ol>

Problem	Action
<p><b>The system continuously beeps after it was turned on</b></p>	<ol style="list-style-type: none"> <li>1. Check the memory modules and make sure you installed supported DIMMs.</li> <li>2. Make sure that the DIMMs are properly installed on the sockets.</li> </ol>
<p><b>The message “Non-system disk or disk error” appears</b></p>	<ol style="list-style-type: none"> <li>1. Check if a bootable HDD is active.</li> <li>2. Check if the HDDs are properly installed.</li> </ol>
<p><b>Network connection not available</b></p>	<ol style="list-style-type: none"> <li>1. Make sure that the network cable is connected to the LAN port on the rear panel.</li> <li>2. Make sure that you have installed the LAN drivers from the support CD.</li> </ol>