TYAN

Tiger i7320 / i7320R /// S5350 / S5350-1U

Revision 1.01

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Before you begin…

Check the package contents before you proceed.
The retail motherboard package should contain the following:

1 x motherboard

1 x 34-Pin floppy drive cable

2 x Ultra-DMA-133/100/66/33 IDE cable

1 x User's Manual

1 x Quick Reference Guide

1 x TYAN driver CD

1 x SATA RAID Driver Diskette

1 x I/O shield

1 x Cable set (9 pin serial and 24 pin parallel)

2 x CEK Spring

1 x Serial ATA power cable

2 x Serial ATA cable

1 x USB2.0 cable

If any of these items are missing, please contact your vendor or dealer for replacement before continuing with the installation process.

Chapter 1: Introduction

1.1 Congratulations!

Congratulations on your purchase of the powerful Dual Intel Xeon processor solution, the Tiger i7320 S5350 / Tiger i7320R S5350-1U. Based on Intel E7320 chipset, the S5350 offers exceptional performance. Compatible with EPS12V power supplies, the CEB form factor S5350 features an onboard ATi 8MB PCI RageXL VGA, two Gigabit Ethernet ports, serial ATA, RAID, which provides an advances and versatile solution for your server needs.

For more information about this and other TYAN products, visit the TYAN Web site at http://www.tyan.com. Product FAQs, distributors list and advanced BIOS information are also available on the Web site.

1.2 Hardware Specifications

Processors

- Two mPGA604 sockets
- Intel® Xeon "Nocona" processor with EM64T support
- 800 MHz FSB support

Expansion Slots

- Tiger i7320 (S5350)
    - Two PCI-X 64/66 slots
    - Three 32/33 PCI 2.3 slots
- Tiger i7320R (S5350-1U)
    - One PCI-X 64/66 slot
    - One propriety TARO® SO-DIMM connector

Chipset

- Intel E7320 ("Lindenhurst-VS") MCH
- Intel 6300ESB ("Hance Rapids") South Bridge
- SMSC DME1737 LPC I/O chip

System Management

- SMSC DME1737 and EMC6D102 (or ADM1027) w/ hardware monitoring
- Nine 3-pin Fan headers (seven w/ tachometer input and temperature-sensing auto fan control)
- Temperature and voltage monitoring
- Watchdog timer

Integrated LAN Controllers

- Two GbE LAN controllers
- — Two Broadcom BCM5721 PCI-Express GbE Lan controller
- — WoL and Teaming supported

Integrated 2D/3D PCI Graphics

- ATI® Rage™ XL PCI graphics controller
- 8MB frame buffer of video memory

Optional Modules

- M3289, IPMI SMDC card
- — QLogic Zircon BMC
- — Tailored for IPMI highest 1.5 spec.
- — Built-in IPMB connector
- — Supports remote power on/off and reset
- M7901/M7902, SO-DIMM Ultra 320 SCSI card
- — Adaptec AIC-7901/7902 single/dual-channel Ultra 320 SCSI controller
- — Adaptec HostRAID support w/ RAID 0, 1, 10 supported
- M8110 SO-DIMM SATA card
- — Adaptec AIC-8110 SATA I controller
- — Supports up to 4 SATA ports running at 1.5Gb/s
- — Adaptec Host RAID support with RAID 0, 1 & 10 supported

Memory

- Dual memory channels, 8 x DIMM sockets
- Supports up to eight DDR-266/333 DIMM
- Registered ECC memory supported

Integrated PCI IDE

- Dual channel master mode support four IDE devices
- Supports for ATA-100/66/33 IDE drives and ATAPI compliant devices

Integrated Serial ATA

- Two serial ATA host controllers embedded
- Supports two serial ports running at 1.5Gb/s
- RAID 0 or 1 supported

Back Panel I/O Ports

- Stacked PS/2 mouse & keyboard ports
- Stacked two USB2.0 ports
- One 15-pin VGA port
- One 9-pin COM port
- Two RJ45 10/100/1000 Base-T port w/ activity LED

Integrated I/O Interfaces

- One floppy connector
- Two USB 2.0 ports (via cable)
- One COM port (via cable)
- One LPT port (via cable)
- Power/IDE/SATA LED connectors
- Two 4-pin headers for front panel LAN LED
- 2 x 25 connector for optional IPMI SMDC card

BIOS

- Phoenix BIOS 8Mbit Flash
- Supports APM 1.2 & ACPI 1.0
- PnP, DMI2.0, WfM2.0 power Management

Form Factor

- CEB footprint
- 10.2" x 12.0" (259.1mm x 304.8mm)

Power

- On board dual 4-phase VRM
- EPS 12V (24-pin + 8-pin) power connectors

Regulatory

- FCC Class B (Declaration of Conformity)
- CE (Declaration of Conformity)
- BSMI

	Note
	TYAN reserves the right to add support or discontinue support for any OS with or without notice.

Chapter 2: Board Installation

2.1 Installing the Motherboard

The Tiger i7320 S5350 / Tiger i7320R S5350-1U motherboard conforms fully to the CEB specification. Before continuing with the installation, confirm that your chassis supports a standard CEB motherboard. If you are unsure, contact your dealer for more information.

2.1.1 Installation Notes

This user manual contains important information and you should read it thoroughly before attempting the installation procedure.
Precautions:

- Static electricity can damage components on your motherboard. Before touching the product, discharge any static build up in yourself by touching a well grounded object such as a metal water pipe or a grounded electrical appliance. TYAN recommends putting on a good quality grounded wrist strap before removing your motherboard from the antistatic bag.
- Disconnect your computer from the power supply before any disassembly procedure is attempted.
- Touch the motherboard as little as possible and do not touch the bottom of the board at all. Bending or flexing the motherboard may break delicate components or copper tracks on the board.
- Avoid touching any of the motherboard components.
- Place the motherboard on a grounded antistatic surface or on the antistatic bag in which the board was shipped.
- Inspect the board for damage.

Read the following sections for detailed instructions on how to install your motherboard in a chassis and add a processor, memory, disk drives, and an optional module.

⚠	**Warning**
	Do not apply power to the board if it appears damaged.

2.2 Board Image

The following is an image of the Tiger i7320 S5350 motherboard.
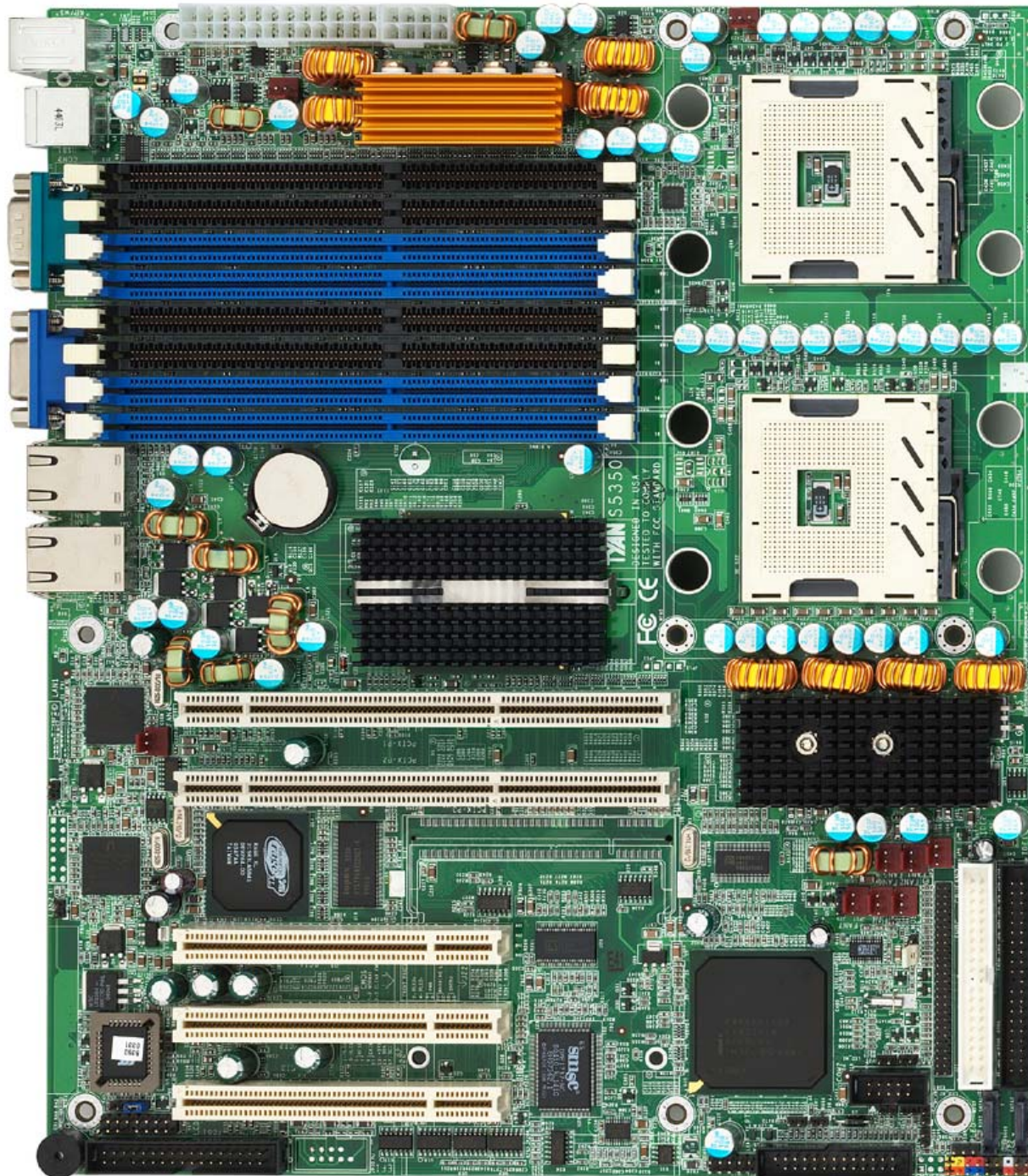
The above photograph is purely representative. Due to engineering updates and new board revisions, certain components may change and or be repositioned. The picture above may or may not look exactly like the board you received.

The following is an image of the Tiger i7320R S5350-1U motherboard.
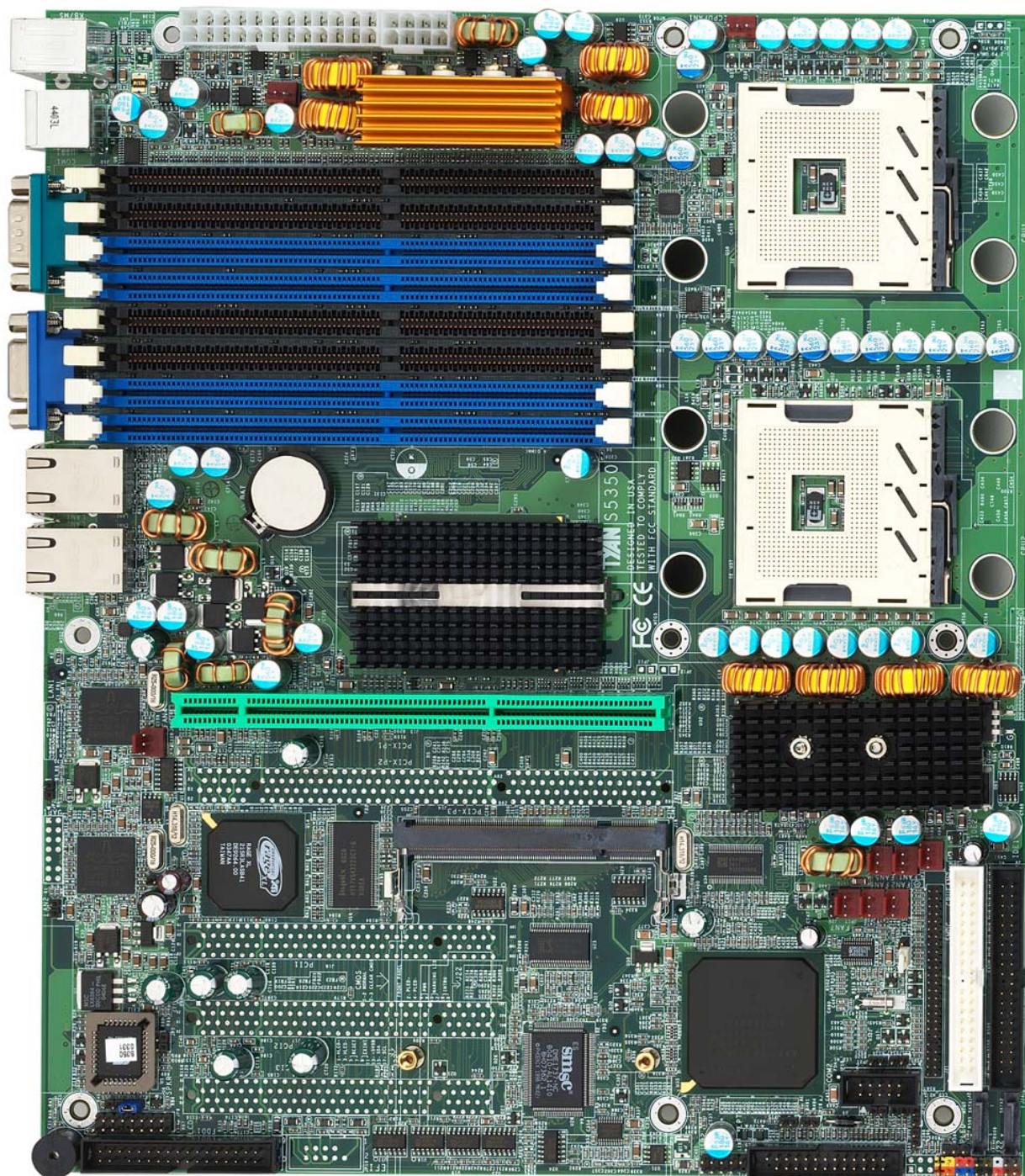
The above photograph is purely representative. Due to engineering updates and new board revisions, certain components may change and or be repositioned. The picture above may or may not look exactly like the board you received.

2.3 Block Diagram

The following is a block diagram of the Tiger i7320 S5350 / Tiger i7320R S5350-1U.
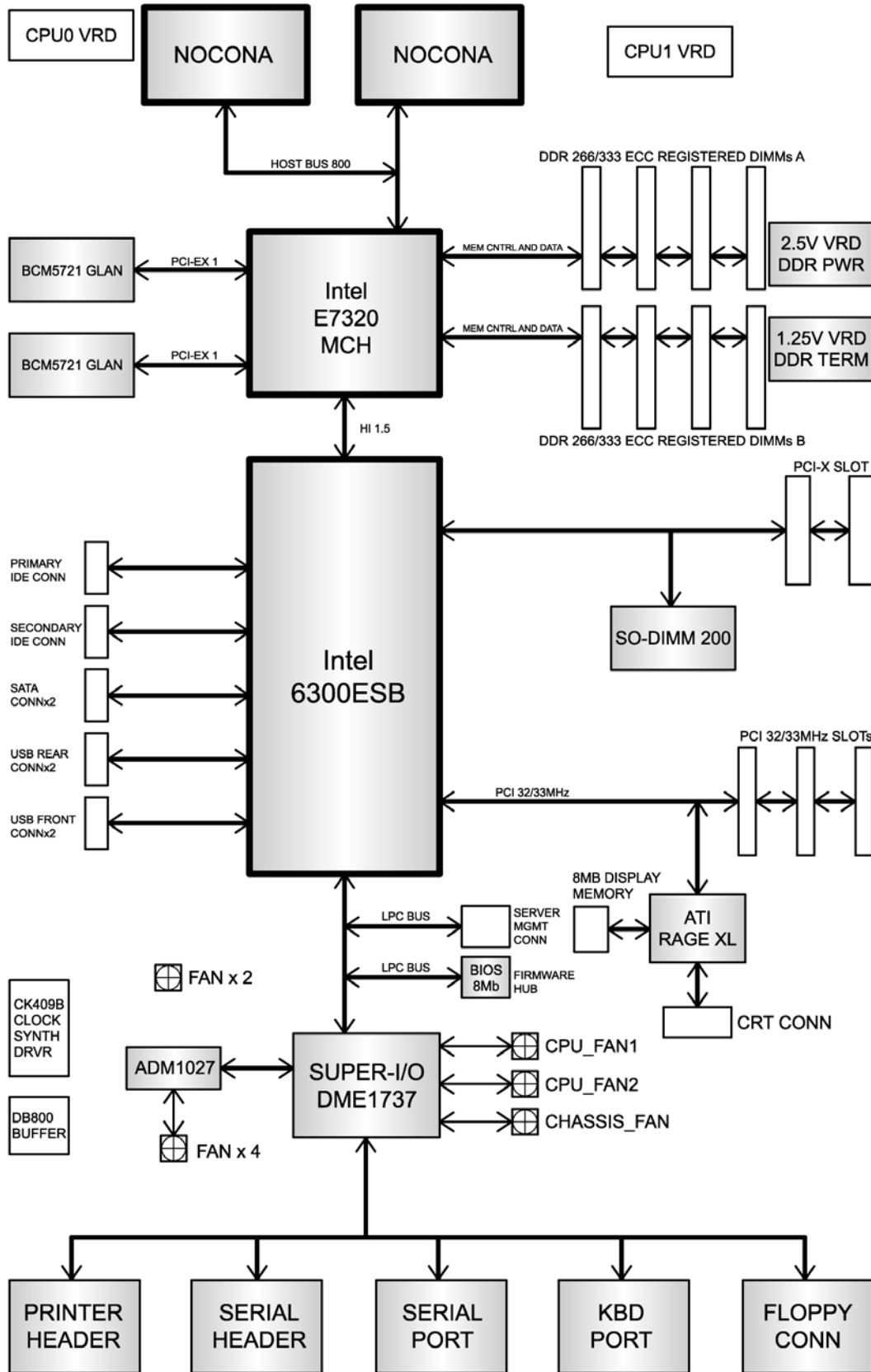
2.4 Motherboard Components

The diagram below shows the main motherboard components.
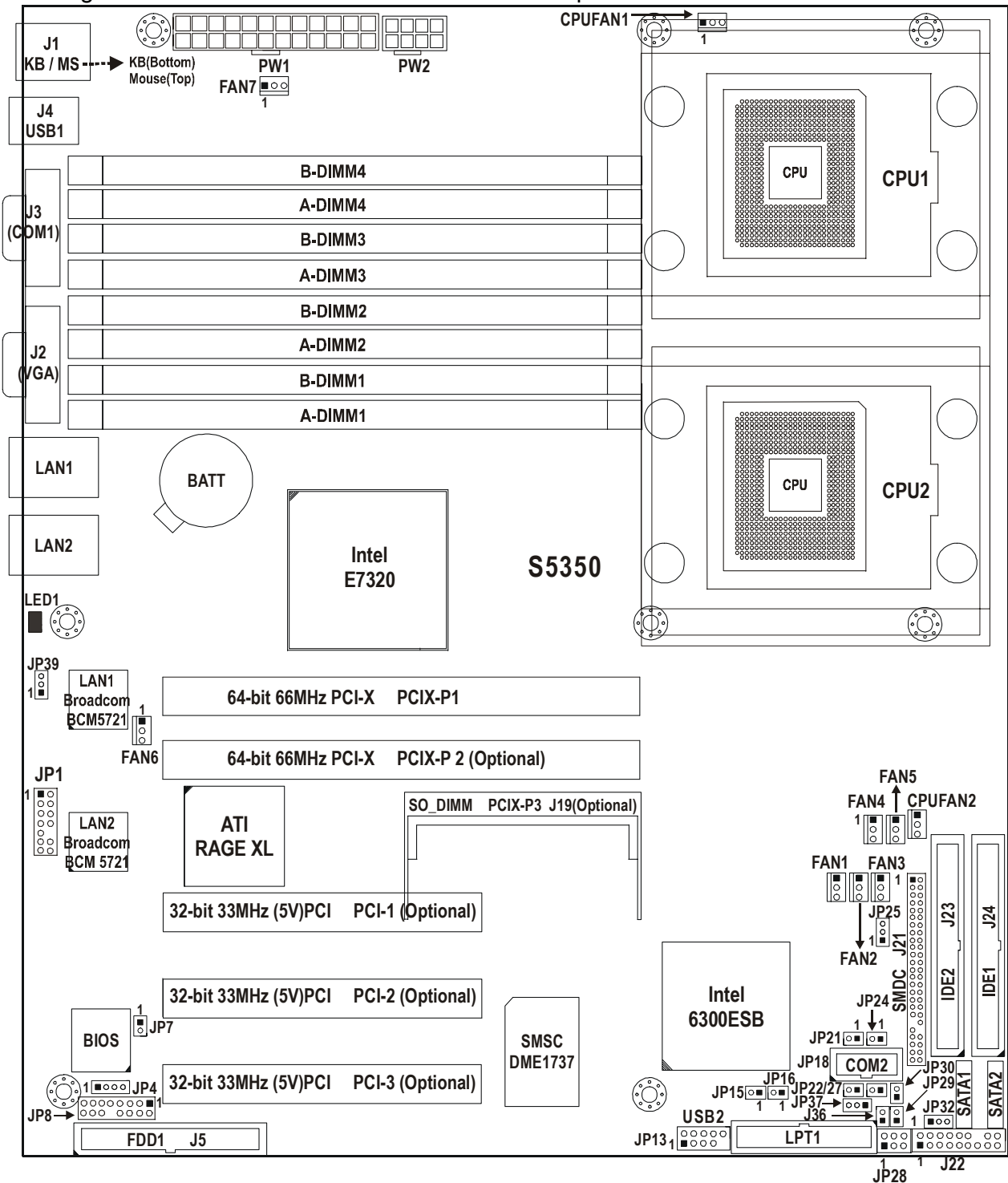
Note

1. This diagram represents the latest version of the motherboard available at the time of publishing. The board you receive may not look exactly like the above diagram. Parts are not drawn to scale

2. PCI-1, PCI-2, PCI-3 and PCIX-P2 slots for Tiger i7320 S5350 only.

3. PCIX-P3 (SO_DIMM) socket for Tiger i7320R S5350-1U only.

2.5 Jumpers and Connectors

The following section gives details of the motherboard pin headers and jumpers and their functions. Pin headers are on-board connectors that can be used to connect the motherboard to peripherals. Jumpers are used to configure the motherboard.

Jumper	Function	Settings
J19*	SO-DIMM Socket	
J21*	SMDC (System Management Daughter Card) Connector	
J22	Front Panel Connector	
J36**	Reserved	
JP4	External Speaker Header	Pin 3-4 close: Buzzer (Default)
JP1**	Reserved	
JP7**	Reserved	
JP8**	Reserved	
FAN1/2/3/4/5	Chassis Fan Connectors with tachometer monitoring and fan speed control	
JP13	Front Panel USB Header	
CPUFAN1/2	CPU Fan Connectors with tachometer monitoring and fan speed control	
JP15**	Reserved	
JP16	SATA activity LED Header	
FAN6/7	Chassis FAN Connectors	
JP18	COM2 Connector	
JP21/JP30	LAN1/LAN2 activity LED Headers	
JP22**	Reserved	
JP24/JP29	LAN1/LAN2 speed LED Headers	
JP25	Clear CMOS Jumper	Pin 1-2: Normal (Default) Pin 2-3: Clear CMOS
JP27**	Reserved	
JP28**	Reserved	
JP29	LAN2 speed LED header	
JP32	3-pin Power LED Connector	
JP37**	Reserved	
JP39**	Reserved	

* Some jumpers and headers are optional and not available with the board due to the different configurations.
** J36, JP1, JP7, JP8, JP15, JP22, JP27, JP28, JP37, JP39 and Jumpers not listed are reserved for OEM use or testing purpose only.

2.5.1 Jumper Legend

■ ■	**Jumper OFF – open (without jumper cap)**
■ ■	**Jumper ON – closed (with jumper cap)**
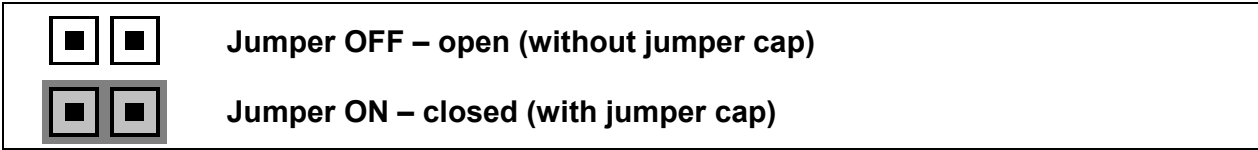
2.5.2 SO-DIMM Socket: J19 (for Tiger i7320R S5350-1U only))
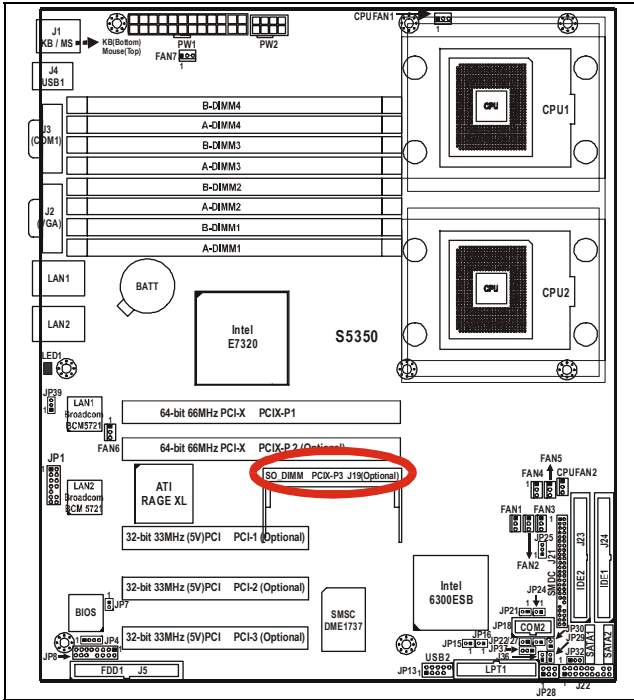
This socket provides the connection to SCSI/SATA Daughter Card (compatible with Tyan M7901/M7902/M8110)

2.5.3 SMDC Connector: J21 (Optional)
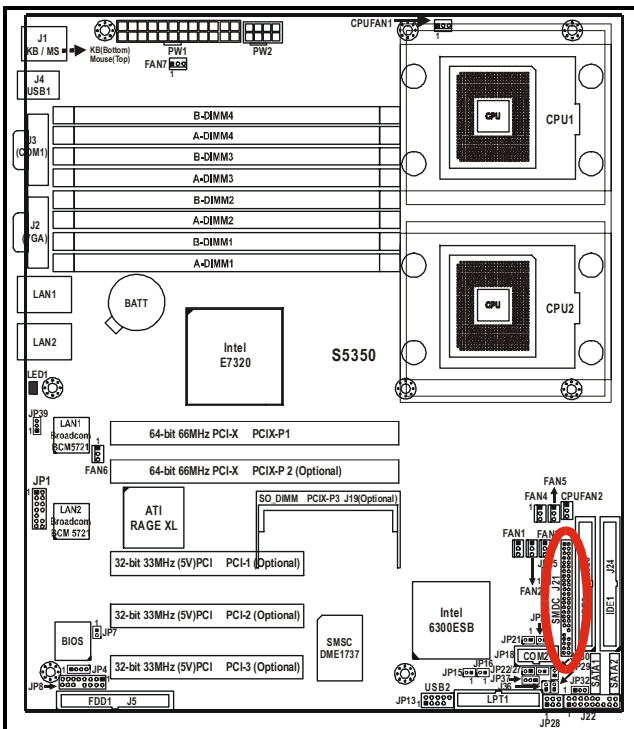
For connection with Tyan Server Management Daughter Card (SMDC)

More information on Tyan SMDC card please visit our website at http://www.tyan.com

2.5.4 Front Panel Connector: J22

Pin	2	4	6	8	10	12	14	16	18
Signal	PWR_LED+	PWR_LED-	POWER BUTTON	GND	LED+ (reserved)	LED- (reserved)	NC	GND	INTRU#

Pin	1	3	5	7	9	11	13	15	17
Signal	HD_LED+	HD_LED-	GND	RESET+	+5V	EXT	+5VSB	SMBUS DATA	SMBUS CLOCK

Use this header to connect various front panel indicators and buttons.

2.5.5 External speaker Header: JP4

1	2	3	4
+5V	NC	NC	SPKR-

Use this pin header to connect external speakers.

Pin3-4 Closed: Buzzer (Default)

2.5.6 Chassis Fan Connectors with Fan Control: FAN 1/2/3/4/5

GND
+12V
Tachometer

Use these headers to connect the chassis cooling fans to your motherboard to keep the system stable and reliable.

These connectors support the tachometer monitoring and auto fan speed control.

2.5.7 Front Panel USB 2.0 Connector: JP13 (USB2)

+5V	Data 2-	Data 2+	GND	GND
2	**4**	**6**	**8**	**10**
1	**3**	**5**	**7**	**9**
+5V	Data 1-	Data 1+	GND	NC/Key

Use these headers to connect to the USB devices via the enclosed USB cable.

2.5.8 CPU FAN1/FAN2 Connectors
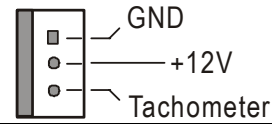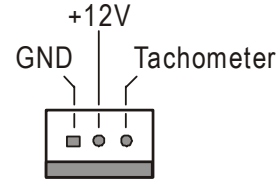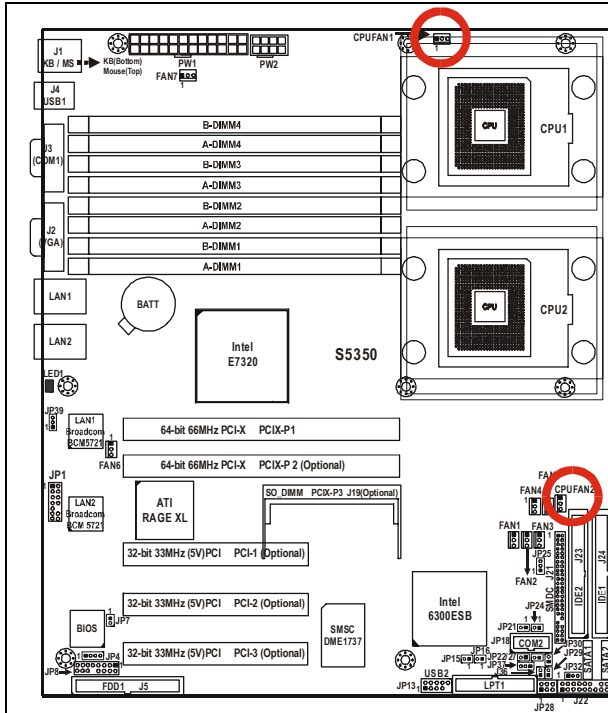
Use these headers to connect the CPU cooling fans to your motherboard to keep the system stable and reliable.

These connectors support the tachometer monitoring and auto fan speed control.

2.5.9 SATA activity LED Header: JP16
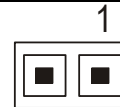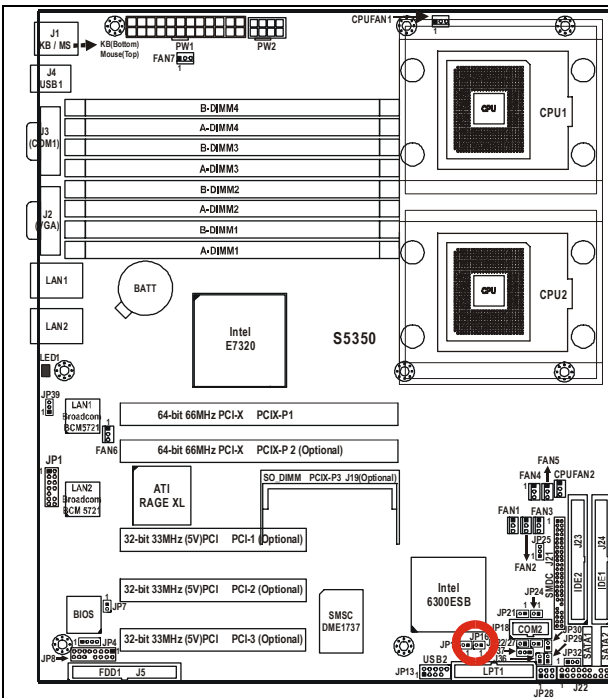
2	1
LED-	LED+

Use this header to connect an activity indicator LED for an external SATA device.

2.5.10 Chassis Fan Connectors: FAN6, FAN7

GND

+12V

NC
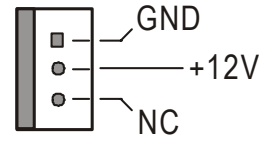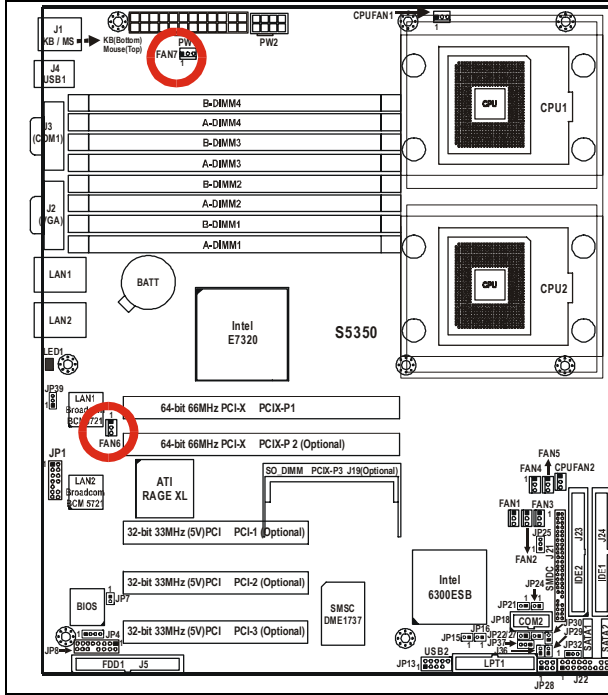
Use this header to connect the chassis cooling fans to your motherboard to keep the system stable and reliable.

2.5.11 COM2 connector: JP18
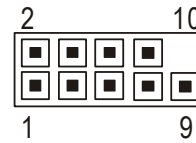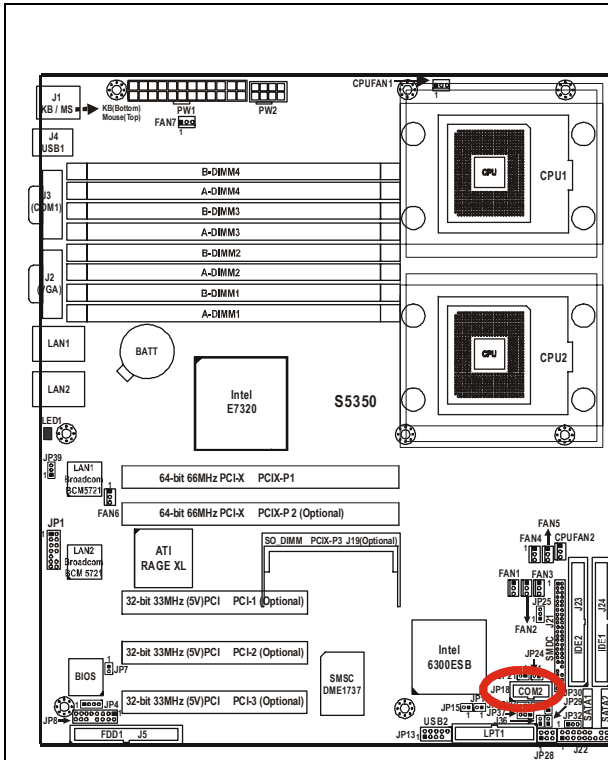
DSR	RTS	CTS	RI	NC/Key
2	**4**	**6**	**8**	**10**
1	**3**	**5**	**7**	**9**
DCD	RXD	TXD	DTR	GND

Use this connector to connect the UART device via the enclosed COM2 cable

2.5.12 LAN1/LAN2 activity LED Headers: JP21, JP30

JP21

1

Pin 1: LED+
Pin 2: LED-

Use these headers to connect with the front panel activity LEDs for LAN1/LAN2.

JP30

1

2.5.13 LAN1/LAN2 speed LED Headers: JP24, JP29

JP24

1

JP29

1

Pin 1: Orange+
Pin 2: Green+

Use these headers to connect with the front panel dual color LEDs to indicate the speed of LAN1 and LAN2.
Off=10
Green=100
Orange=Gigabit

Reference Section 2.10.1 for the correct LAN LED Color scheme

JP24 is for LAN1, JP29 is for LAN2.

2.5.14 Clear CMOS Jumper: JP25
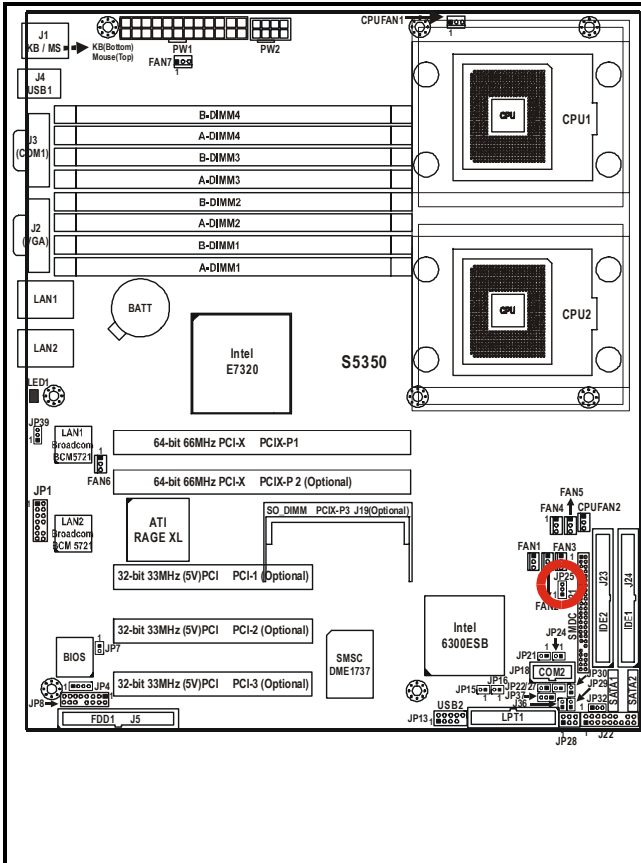
3 ■ ■ 1 ■	**Pin 1-2:** **Normal (Default)**
3 ■ ■ 1 ■	Pin 2-3: Clear BIOS

Use this jumper when you forgot your system/setup password or need to clear system BIOS setting.

How to clear the CMOS data
- Power off system and **disconnect power supply from AC source**
- Use jumper cap to close Pin_2 and 3 for several seconds to Clear CMOS
- Replace jumper cap to close Pin_1 and 2 (default setting)
- Reconnect power supply to AC source

Power on system

2.5.15 3-pin Power LED Connector: JP32
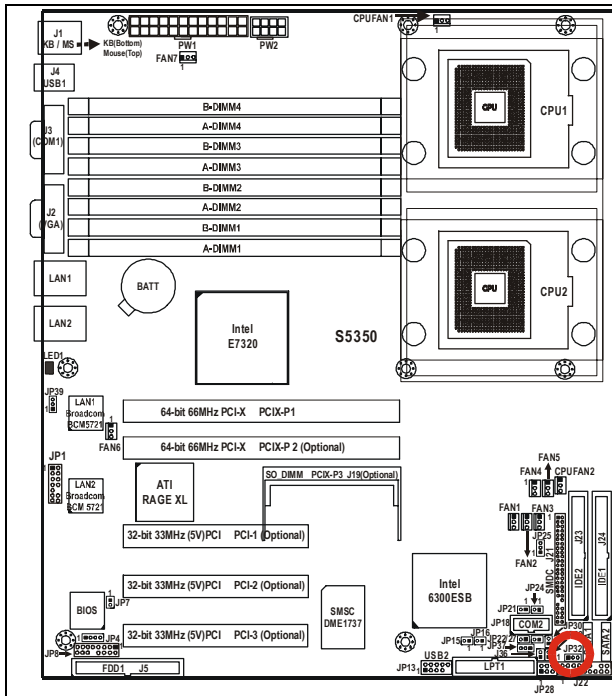
1		3
■	■	■

1	**2**	**3**
LED+	NC	LED-

Use this header to connect the 3-pin power LED cable

2.6 Mounting the Motherboard

Before installing your motherboard, ensure that your chassis is fully compatible. The Tiger i7320 S5350 / Tiger i7320R S5350-1U motherboard conforms fully to the CEB specification. Your chassis should include preinstalled mounting posts that match exactly with the mounting holes in the motherboard. Lay the motherboard on top of the mounting holes to ensure that all the necessary mounting posts exist in your chassis and that they match the mounting holes on the motherboard.

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN recommends using metal studs with screws that will fasten the motherboard more securely in place.

The diagram below is an example of typical motherboard fixing studs.

Mounting the Motherboard
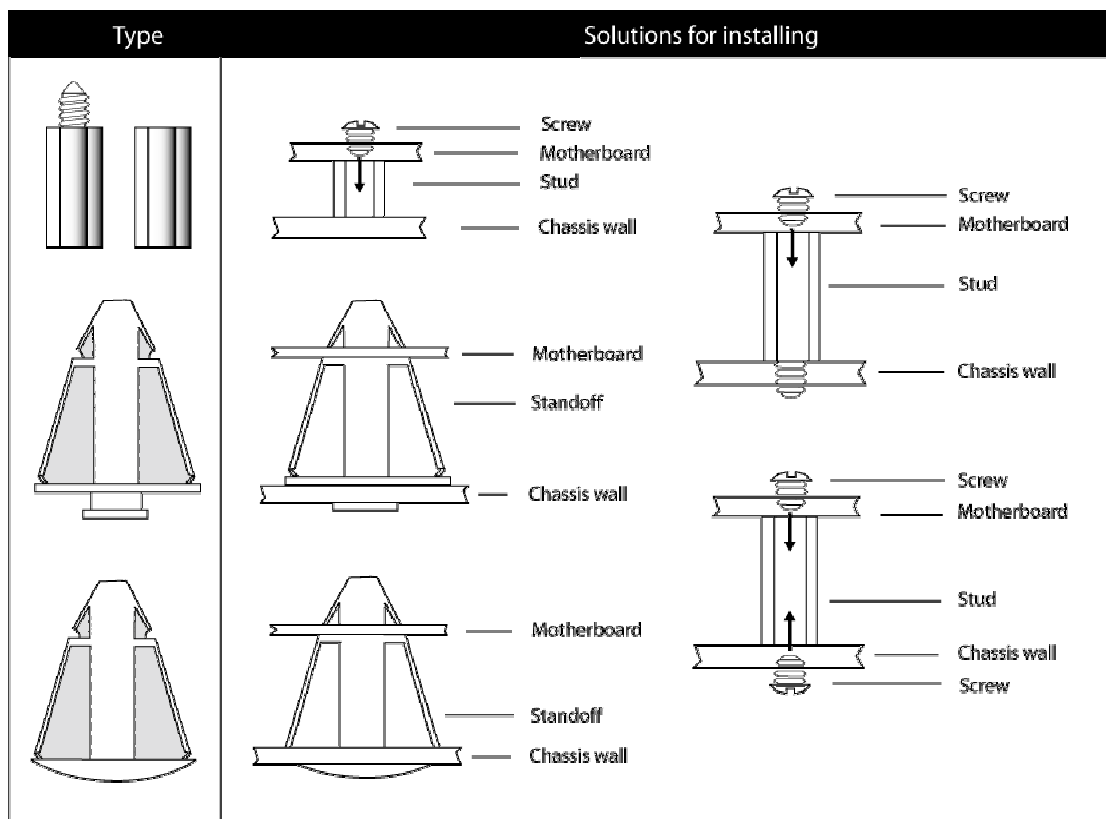
Note

Use metal studs if possible, as they hold the motherboard in place more securely than plastic standoffs.

2.6.1 Installing Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. DDR 266/333 modules are required. Check the TYAN Web site at: **www.tyan.com** for details of the type of memory recommended for your motherboard.

The following diagram shows common types of memory modules.

Key points to note before installing memory into Tiger i7320 / i7320R:

- **Always install memory beginning with DIMM4**
- 128MB, 256MB, 512MB, 1GB, 2GB and 4GB* Registered ECC PC2700/PC2100 DDR SDRAM memory modules are supported
- All installed memory will be automatically detected.
- The Tiger i7320 S5350 / Tiger i7320R S5350-1U supports up to 32GB* of memory.
- **Registered ECC Memory is supported.**
- Either single or dual-rank modules are supported.
- Memory modules of the same type and density are required for dual-channel DDR operation. Mismatched memory may cause system instability.

    * Not validated at the time of print; subject to change.

Refer to the following table for supported DDR-333/266 populations
(Note: S indicates a single rank DIMM, D indicates a dual rank DIMM)

DIMM Slot	Population													
B-DIMM4	S	D	S	S	D	S	S	S	D	S	S	S	S	D
A-DIMM4	S	D	S	S	D	S	S	S	D	S	S	S	S	D
B-DIMM3			S	D	D	S	S	D	D	S	S	S	D	D
A-DIMM3			S	D	D	S	S	D	D	S	S	S	D	D
B-DIMM2						S	D	D	D	S	S	D	D	D
A-DIMM2						S	D	D	D	S	S	D	D	D
B-DIMM1										S	D	D	D	D
A-DIMM1										S	D	D	D	D

Note

Intel E7320 chipset specification lists a limitation of 8 banks of DDR333 memory. However, by design the Tiger i7320/i7320R supports up to 16 banks of DDR333 memory. Please note that this a feature of Tyan's breakthrough engineering design, and similar memory support may not be present on competitor products that use the Intel E7320 chipset

2.6.2 Memory Installation Procedure

Follow these instructions to install memory modules into the Tiger i7320 / i7320R.
1.   Press the locking levers in the direction shown in the following illustration.
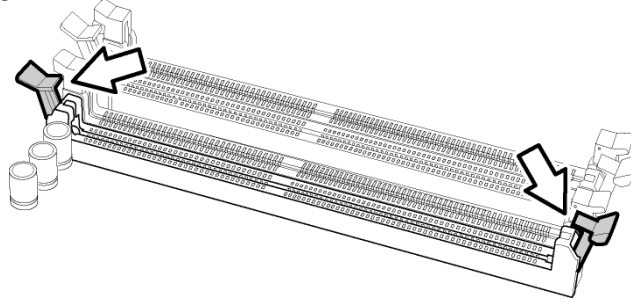
2.   Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.

Key slot
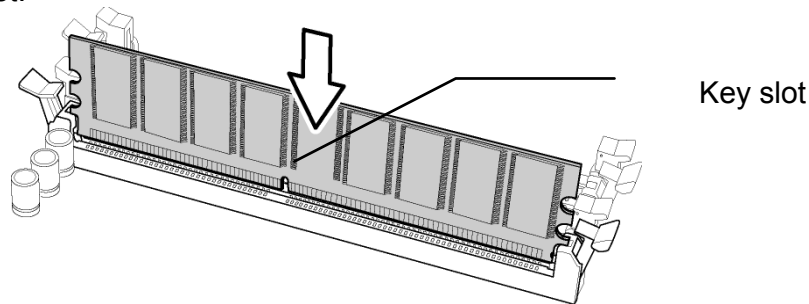
3.   Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.
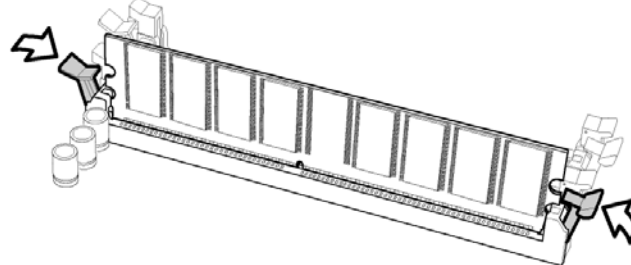
2.6.3 Installing the Processor and Cooling Fan

Your Tiger i7320 S5350 / Tiger i7320R S5350-1U supports the latest processor technologies from Intel. Check the TYAN website for latest processor support:

http://www.tyan.com

Processor Installation

The processor should be installed carefully. Make sure you are wearing an antistatic strap and handle the processor as little as possible.
Follow these instructions to install your processor and heat sink.

1.   Locate the processor sockets on the motherboard and lift the locking lever as shown.
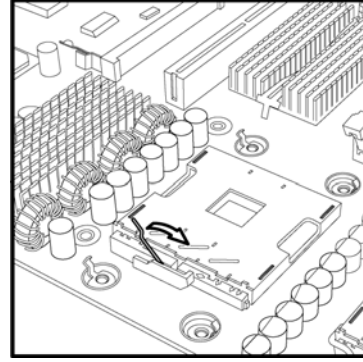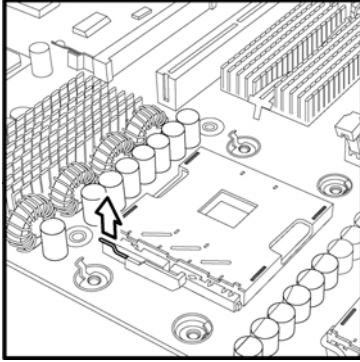
2.   Insert the processor into the socket making sure that pin 1 is correctly located.
3.   Return the locking lever to its locked position.
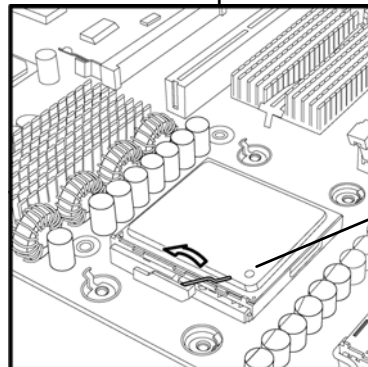
Pin 1

4.   Repeat this procedure for the second processor socket.
5.   Turn the board upside down and insert the heat sink spring mechanism as shown.
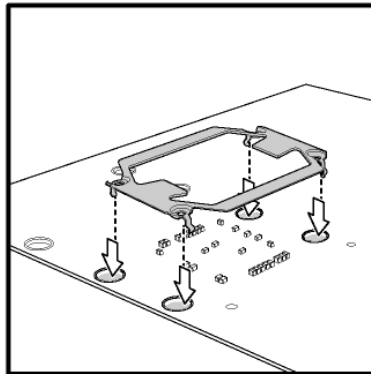
6.   Turn the board the right way up again and screw the heat sink into place.
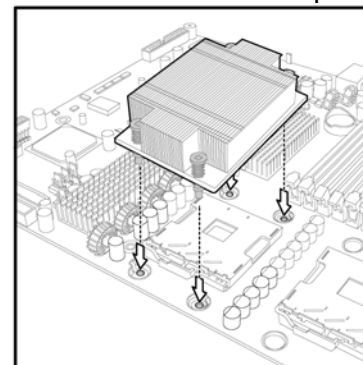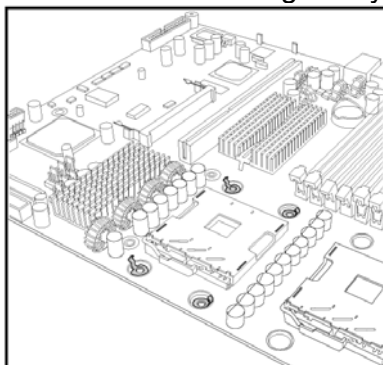
7.   Repeat this procedure for the second processor.

Cooling Fan Installation

Some thought should be given to fan installation. There are pin headers on the board for CPU fans and chassis fans. You may find that just chassis fans or just CPU fans are sufficient to cool your system. If you are in any doubt about what you need, consult your dealer.

2.7 Installing Drive Cables

IDE and FDD connectors are "keyed" to only allow insertion only one way. TYAN motherboards have two on-board IDE channels, each supporting two drives. **The black connector is a standard IDE channel. Only the blue connector supports RAID.**
Insert the IDE cable as shown in the diagram.
TIP: When connecting to an IDE cable to a drive, Pin 1 on the IDE cable (usually designated by a colored wire) should be closest to the drive power connector.
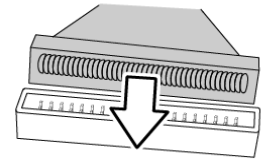
Serial ATA
Attaching Serial ATA cables to the Serial ATA connectors is illustrated below:
Plug in one end of the Serial ATA cable into the motherboard Serial ATA connector, and the other end into the drive. Each standard Serial ATA cable has two connectors, one at each end. Connectors are the same on both ends.
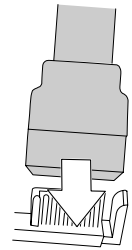
Floppy Drives
Floppy disk drive (FDD) cables can be installed in the same way as IDE cables. Usually connectors are keyed to prevent insertion the wrong way. In most cases the cable should be inserted into the drive with pin 1 closest to the power input. FDD cables usually have a single red wire that marks pin 1. See the diagram below.

Colored cable denotes pin 1
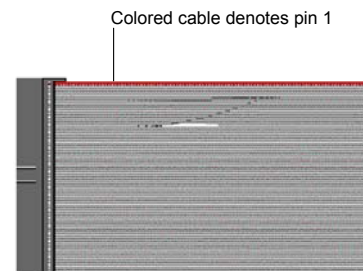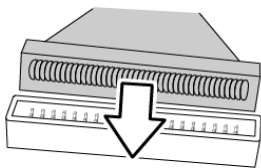
Troubleshooting Floppy Drives

See the chart below for troubleshooting floppy disk drive installations.

Symptoms of incorrectly installed floppy drives	
Drive is not automatically detected	Usually caused by faulty cables, cables put in backwards or a faulty floppy drive. Try another floppy drive or try replacing the cable. Check to see if the onboard floppy controller is enabled in the BIOS setup.
Drive Fail message at boot up	The cable, floppy drive or motherboard may be faulty. Try another drive or cable.
Drive does not power on	Check power cable and cabling. A faulty power supply or drive cable could be the problem.
Drive activity light is constantly on	Usually signifies that the cable on the drive is inserted backwards. Reverse the cable at the floppy drive end and try again.

2.8 Installing Expansion Cards

Before installing add-in cards, you should ensure that they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the expansion slots that appear on your motherboard.

64-bit 133/100/66/33MHz PCI/PCI-X Slot 3.3 volts

64-bit 33MHz PCI slot 5 volts

32-bit / 33MHz PCI Slot - 3.3 volts

32-bit / 33MHz PCI Slot - 5 volts
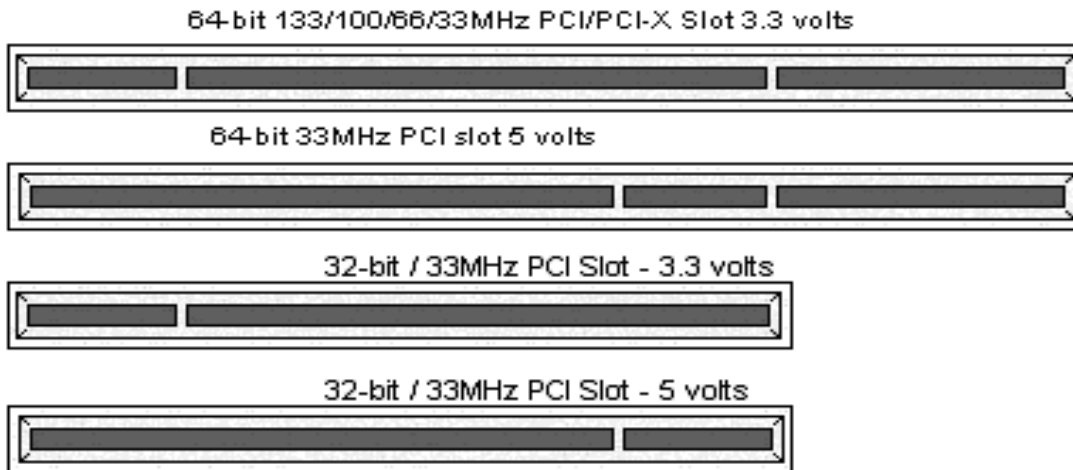
Expansion cards should be pushed firmly into the appropriate slot. Excessive force can damage both the card and the motherboard and care should be taken.

Notes

Unplug the power connector to the motherboard before performing system hardware changes, to avoid damaging the board or expansion cards

2.9 Installing Optional SO-DIMM modules (for S5350-1U only)

Your Tiger i7320R S5350-1U motherboard is equipped with an optional proprietary SO-DIMM connector. The SO-DIMM connector can be used for expansion cards to provide such features as, additional SATA or SCSI support. For details of available expansions cards, visit the TYAN website at http://www.tyan.com. To install a SO-DIMM expansion card:

   1.   Open the spring levers as shown.
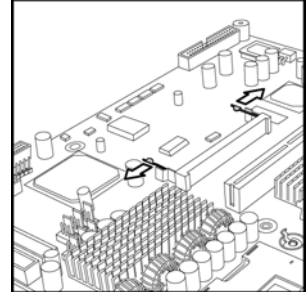
   2.   Insert the SO-DIMM card as shown, making sure that the card is the right way up. The card will fit in only one way and the screw holes in the card should line up exactly with the mounting posts on the motherboard.
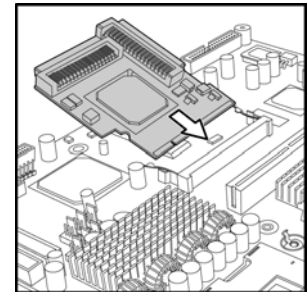
   3.   Push the SO-DIMM card down into place and make sure the spring levers click into place as shown.
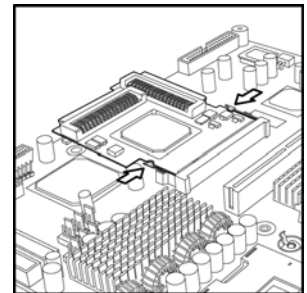
   4.   Screw the board into place using one or two screws as required.

Removal of a SO-DIMM card is a reversal of the installation procedure. Push out the spring levers as shown and pull the card out of the socket.
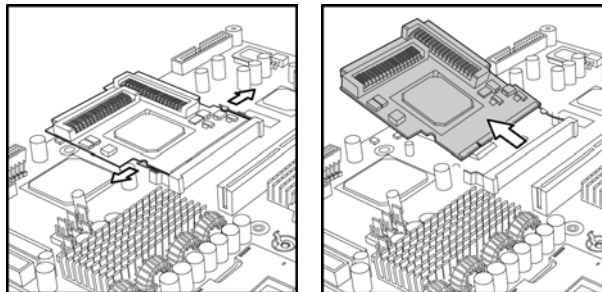
The SO-DIMM expansion cards will fit in the slot only one way. Make sure that you align the slot in the card with the key in the card slot.

Key slot
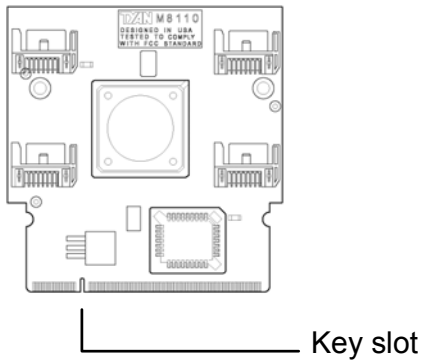
2.10   Connecting External Devices

Your new motherboard supports a number of different interfaces for connecting peripherals. See the diagram below.
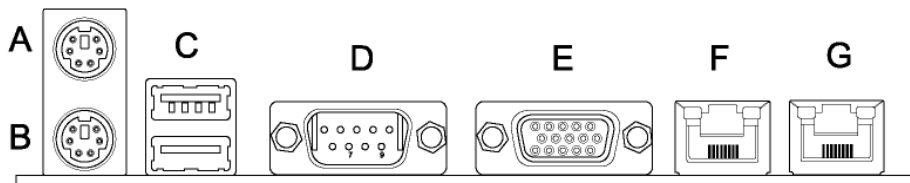
Port definitions:

A	PS2 mouse port (green)
B	PS2 keyboard port (purple)
C	USB 2.0 ports
D	Serial port (green)
E	VGA port (blue)
F	LAN1 Gigabit Ethernet port
G	LAN2 Gigabit Ethernet port

Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

2.10.1 Onboard LAN LED Color Definition

The two onboard Ethernet ports have green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

10/100/1000 Mbps LAN Link/Activity LED Scheme			
LEFT RIGHT		**Left LED**	**Right LED**
10 Mbps	**Link**	**Green**	**Off**
	Active	**Blinking Green**	**Off**
100 Mbps	**Link**	**Green**	**Green**
	Active	**Blinking Green**	**Green**
1000 Mbps	**Link**	**Green**	**Orange**
	Active	**Blinking Green**	**Orange**
No Link		**Off**	**Off**

2.11   Installing the Power Supply

There are two power connectors on your Tiger i7320 S5350 / Tiger i7320R S5350-1U. The Tiger i7320 S5350 / Tiger i7320R S5350-1U requires that you have an EPS12V power supply that has a 24-pin and an 8-pin power connector. **Please be aware that using of the incompatible power supplies with the board can damage the motherboard and/or CPU(s).**

EPS12V

EPS12V (24-pin) Power Connector   1   +   EPS12V (8-pin) Power Connector
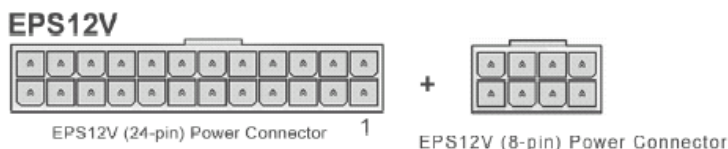
Disconnect power supply from electrical outlet
1.   Connect the EP12V 8-pin power connector
2.   Connect the EP12V 24-pin power connector
3.   Connect power cable to power supply to power outlet

Make sure you have connected both connectors before attempting to apply power to the board.

	Note
	Unplug the power supply before plugging in the 24-pin and 8-pin power cables to motherboard.

2.12   Finishing Up

Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

If you experience difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website (**www.tyan.com**) or by calling your vendor's support line.

Chapter 3: BIOS Setup

3.1 About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. This chapter describes different settings for the BIOS that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information when the power is turned off.

This motherboard's BIOS is a customized version of the industry-standard BIOS for IBM PC AT-compatible personal computers. The BIOS provides critical, low-level support for the system's central processing unit (CPU), memory, and I/O subsystems.

This BIOS has been customized by adding important features such as virus and password protection, power management, and chipset "tuning" features that control the system. This section will guide you through the process of configuring the BIOS for your system setup.

Starting Setup

The BIOS is immediately activated when you turn on the computer. The BIOS reads system configuration in CMOS RAM and begins the process of checking out the system and configuring it through the Power-On-Self-Test (POST).

When these preliminary tests are complete, the BIOS searches for an operating system on one of the system's data storage devices (hard drive, CD-ROM, etc). If one is found, the BIOS will launch that operating system and hand control over to it. You can enter the BIOS setup by pressing the [**Delete**] key when the machine boots up and begins to show the memory count.

Setup Basics
The table below shows how to use the setup program with the keyboard.

Key	Function
Tab	Moves from one selection to the next
Left/Right Arrow Keys	Changes from one menu to the next
Up/Down Arrow Keys	Moves between selections
Enter	Opens highlighted section
PgUp/PgDn Keys	Changes settings.

Getting Help

Pressing [**F1**] displays a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**] or the [**F1**] key again.

In Case of Problems

If you discover that you have trouble booting the computer after making and saving the changes with the BIOS setup program, restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.

The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are sure of the outcome. TYAN or your

system manufacturer has carefully chosen the chipset defaults for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

Setup Variations

Not all systems have the same BIOS setup layout or options. While the basic look and function of the BIOS setup remains more or less the same for most systems, the appearance of your Setup screen may differ from the charts shown in this section. Each system design and chipset combination requires a custom configuration. In addition, the final appearance of the Setup program depends on the system designer. Your system designer may decide that certain items should not be available for user configuration, and remove them from the BIOS setup program.

> **Note**
>
> On the following pages, options written in bold type represent the BIOS Setup default.

3.2 Main BIOS Setup

When you enter Phoenix - AwardBIOS CMOS Setup Utility, the following screen will appear as below:

```
          PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main    Advanced   Security   Power   Boot   Exit

                                                        Item Specific Help
     System Time:              [14:28:15]
     System Date:              [2004-07-06]
                                                    <Tab>, <Shift-Tab>,
     Legacy Diskette A:        [1.44/1.25 MB  3     or
                                                    <Enter> selects
   ▸ IDE Channel 0 Master                           field.
   ▸ IDE Channel 0 Slave
   ▸ IDE Channel 1 Master
   ▸ IDE Channel 1 Slave
   ▸ IDE Channel 2 Master
   ▸ IDE Channel 3 Master

   ▸ Memory Cache
   ▸ Boot Features

     System Memory:            [XXXX KB]
     Extended Memory:          [XXXX KB]




   F1  Help   ↑↓ Select Item   -/+   Change Values    F9  Setup Defaults
   Esc Exit   ↔  Select Menu  Enter Select ▸ Sub-Menu F10 Previous Values
```

The main menu contains the following menu items:

Main
Use this menu for basic system configuration.

Advanced
Use this menu to set the Advanced Features available on your system.

Security
Use this menu to configure security settings for your system.

Power
Use this menu to specify your settings for power management.

Boot
Use this menu to configure boot options for your system.

Exit
This contains the various BIOS exit options.

3.3 Main

In this section, you can alter general features such as the date and time, as well as access to the IDE configuration options. Note that the options listed below are for options that can directly be changed within the Main Setup screen. Users use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
       PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main   Advanced   Security   Power   Boot   Exit

                                                       Item Specific Help
       System Time:             [14:28:15]
       System Date:             [2004-07-06]
                                                    <Tab>, <Shift-Tab>,
       Legacy Diskette A:       [1.44/1.25 MB  3    or
                                                    <Enter> selects
   ▸ IDE Channel 0 Master                           field.
   ▸ IDE Channel 0 Slave
   ▸ IDE Channel 1 Master
   ▸ IDE Channel 1 Slave
   ▸ IDE Channel 2 Master
   ▸ IDE Channel 3 Master

   ▸ Memory Cache
   ▸ Boot Features

       System Memory:           [XXXX KB]
       Extended Memory:         [XXXX KB]




   F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
   Esc Exit  ↔  Select Menu  Enter Select ▸ Sub-Menu F10 Previous Values
```

System Time / Date setup
System Time: Adjusts the system clock.

HH	Hours (24hr. format)
MM	Minutes
SS	Seconds

System Date: Adjusts the system date.

MM	Months
DD	Days
YYYY	Years

Legacy Diskette A
Defines the floppy drive type

NONE / 360K, 5.25 in / 1.2 M, 5.25 in / 720 K, 3.5 in / **1.44 M, 3.5 in /** 2.88 M, 3.5 in

System Memory
This displays/allows you to change the amount of system memory present on the system.

Extended Memory
This displays/allows you to change the amount of extended memory present on the system.

3.3.1 IDE Master / Slave Setup

Computer detects IDE drive type from drive C to drive F.
Press **Enter** on any of the Master/Slave options to view advanced details of the corresponding drive.

```
        PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
       Main

                                                           Item Specific Help
         Type:
         CHS Format
         Cylinders:                                   User = you enter
         Cylinders:                                   parameters of
         Heads:                       [  1]           hard-disk
         Heads:                                       drive installed at
                                                      this
         Sectors:                                     connection.
         Sectors:                                     Auto = autotypes
         Maximum Capacity:                            hard-disk drive
         Maximum Capacity:                            installed here.
         LBA Format                                   1-39 = you select
         Total Sectors:                               pre-determined  type
         Maximum Capacity:                            of
                                                      hard-disk drive
         Multi-Sector Transfers:   [Disabled]         installed here.
         LBA Mode Control:         [Disabled]         CD-ROM = a CD-ROM
         32 Bit I/O:               [Disabled]         drive
         Transfer Mode:            [Standard]         is installed here.
         Ultra DMA Mode:           [Disabled]         ATAPI Removable =
                                                      removable disk drive
                                                      is
                                                      installed here.



        F1 Help   ↑↓ Select Item  -/+  Change Values   F9  Setup Defaults
        Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

The system displays advanced details like the number of heads/cylinders/sectors on the detected disk and the maximum storage capacity of the disk.
This option lets you set the following hard disk parameters:

Multi-Sector Transfers
This option allows you to specify the number of sectors per block for multiple sector transfers.
Disabled / 2 Sectors / 4 Sectors / 8 Sectors / **16 Sectors**

LBA Mode Control
Enables or disables LBA Mode.
In LBA Mode, instead of referring to a cylinder, head and sector number, each sector is instead assigned a unique "sector number". In essence, the sectors are numbered 0, 1, 2, etc. up to (N-1), where N is the number of sectors on the disk.
In order for LBA to work, it must be supported by the BIOS and operating system, but since it is also a new way of talking to the hard disk, the disk must support it as well. All newer hard disks do in fact support LBA, and when auto detected by a BIOS supporting LBA, will be set up to use that mode.
When LBA is turned on, the BIOS will enable geometry translation. This translation may be done in the same way that it is done in Extended CHS or large mode, or it may be done using a different algorithm called LBA-assist translation. The translated geometry is still what is presented to the operating system for use in Int 13h calls. The difference between LBA and ECHS is that when using ECHS the BIOS translates the parameters used by these calls from the translated geometry to the drive's logical geometry. With LBA, it translates from the translated geometry directly into a logical block (sector) number.
LBA has in recent years become the dominant form of hard disk addressing. Since the 8.4 GB limit of the Int13h interface was reached, it became impossible to express the geometry of large hard disks using cylinder, head and sector numbers, translated or not, while remaining below the Int13h limits of 1,024 cylinders, 256 heads and 63 sectors. Therefore, modern

drives are no longer specified in terms of classical geometry, but rather in terms of their total number of user data sectors and addressed using LBA.

Disabled / Enabled

32 Bit I/O

Enables or disables 32 bit data transfer mode.

Enabling this option causes the PCI hard disk interface controller to bundle together two 16-bit chunks of data from the drive into a 32-bit group, which is then transmitted to the processor or memory. This results in a small performance increase.

Enabled / **Disabled**

Transfer Mode

These modes determine the speed at which data is transferred to and from the drive. The Auto option automatically determines the correct transfer rates.

Auto / **Standard** / Fast PIO 1 / Fast PIO 2 / Fast PIO 3 / Fast PIO 4 / FPIO 3 / DMA 1 / FPIO 4 / DMA 2

Ultra DMA Mode

Enables or disables Ultra DMA Mode.

Ultra DMA (UDMA, or, more accurately, Ultra DMA/33) is a protocol for transferring data between a hard disk drive through the computer's data paths (or bus) to the computer's random access memory (RAM). The Ultra DMA/33 protocol transfers data in burst mode at a rate of 33.3 MBps (megabytes per second), twice as fast as the previous Direct Memory Access (DMA) interface.

Ultra DMA support in your computer means that it will boot (start) and open new applications more quickly. It will also help users of graphics-intensive and other applications that require large amounts of access to data on the hard drive. Ultra DMA uses Cyclical Redundancy Checking (CRC), offering a new level of data protection.

Because the Ultra DMA protocol is designed to work with legacy application PIO and DMA protocols, it can be added to many existing computers by installing an Ultra DMA/33 Peripheral Component Interconnect adapter card. Ultra DMA uses the same 40-pin Integrated Drive Electronics interface cable as PIO and DMA.

Disabled / Mode 0 / Mode 1 / Mode 2

3.3.2 Memory Cache

This setting allows you to tweak the various cache settings for optimal performance of your system.
Press Enter to display the various cache settings.

```
 PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
 Main

                                                        Item Specific Help
     Cache System BIOS area:     [Write Protect]
     Cache Video BIOS area       [Write Protect]        Controls caching of
     Cache Base 0-512k:          [Write Back]           system BIOS area.
     Cache Base 512k-640k:       [Write Back]
     Cache Extended Memory Area: [Write Back]
     Cache A000 - AFFF:          [Disabled]
     Cache B000 - BFFF:          [Disabled]
     Cache C800 - CBFF:          [Disabled]
     Cache CC00 - CFFF:          [Disabled]
     Cache D000 - D3FF:          [Disabled]
     Cache D400 - D7FF:          [Disabled]
     Cache D800 - DBFF:          [Disabled]
     Cache DC00 - DFFF:          [Disabled]
     Cache E000 - E3FF:          [Write Protect]
     Cache E400 - E7FF:          [Write Protect]
     Cache E800 - EBFF:          [Write Protect]
     Cache EC00 - EFFF:          [Write Protect]




 F1  Help  ↑↓ Select Item  -/+  Change Values     F9  Setup Defaults
 Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-MenuF10 Previous Values
```

Cache System BIOS Area
This feature is only available when the system BIOS is shadowed. It enables or disables the caching of the system BIOS ROM at F0000h-FFFFFh via the L2 cache. This greatly speeds up accesses to the system BIOS. However, this does not necessarily make the system perform better because the OS does not need to access the system BIOS often.
As such, it would be a waste of L2 cache bandwidth to cache the system BIOS instead of data that are more critical to the system's performance. In addition, if any program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.
    NULL / **Write Protect**

Cache Video BIOS Area
This feature is only valid when the video BIOS is shadowed. It enables or disables the caching of the video BIOS ROM at C0000h-C7FFFh via the L2 cache. This greatly speeds up accesses to the video BIOS. However, this does not necessarily make the system perform better because the OS bypasses the BIOS and uses the graphics driver to access the video card's hardware directly.
As such, it would be a waste of L2 cache bandwidth to cache the video BIOS instead of data that are more critical to the system's performance. In addition, if any program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.
    NULL / **Write Protect**

3.3.3 Boot Features

This option allows setting boot parameters. Press Enter to view the Boot Features screen.

```
        PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main

                                                      Item Specific Help
      Floppy check:              [Disabled]
      Keyboard Error Report      [Enabled]        Enabled verifies
      Summary screen:            [Enabled]        floppy type on boot;
      Quiet Boot                 [Disabled]       disabled speeds boot.
      QuickBoot Mode:            [Enabled]

      Extended Memory Testing    [Just zero it]












   F1  Help   ↑↓ Select Item   -/+   Change Values     F9  Setup Defaults
   Esc Exit   ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

Summary Screen
Enables or disables the display of the summary screen during boot up.
When Summary Screen is Enabled (the default), a Phoenix BIOS Setup Utility summary screen appears during system boot after the power-on self-test (POST). The summary screen lists many of the system setup settings. When this option is set to Disabled, the summary screen does not appear.
        Enabled / Disabled

Quiet Boot
Enables or disables the OEM logo screen during boot up.
        Enabled / **Disabled**

Quick Boot Mode
This BIOS feature allows you to decrease the time it takes to boot up the computer by shortening or skipping certain standard booting procedures.
If enabled, the BIOS will shorten the booting process by skipping some tests and shortening others. In addition, it will also perform the following to further speed up the booting process:

- Spin up the hard disks as soon as power is supplied (or as soon as possible)
- Initialize only critical parts of the chipset
- Read memory size from the SPD (Serial Presence Detect) chip on the memory modules
- Eliminate logo delays

If disabled, the BIOS will run the whole gamut of boot-up tests.
It is recommended that you disable this feature when you boot up a new computer for the first time or whenever you install a new piece of hardware. This allows the BIOS to run full diagnostic tests to detect any problems that may slip past Quick Boot's abbreviated testing scheme.
After a few error-free test runs, you should enable this feature for much faster booting.
        Enabled / Disabled

Extended Memory Testing
Determines the tests that will be run on extended memory (memory above 1MB) during boot up.

　　　　Normal / **Just zero it** / None

3.4 Advanced

This section facilitates configuring advanced BIOS options for your system.

```
        PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main   Advanced   Security   Power   Boot   Exit

                                                      Item Specific Help
   ▶ Hardware Monitor
     Installed O/S:            [Win2000]
     Reset Configuration Data: [No]             Show hardware monitor
     Large Disk Access Mode:   [DOS]            Current state.

     Parallel ATA:            [Both]
     Serial ATA:              [Enabled]
     Native Mode Operation:   [Auto]
     SATA RAID Enable         [Disabled]

   ▶ Advanced Chipset Control
   ▶ Advanced Processor Options
   ▶ I/O Device Configuration
   ▶ DMI Event Logging

     Legacy USB Support:      [Disabled]
   ▶ Console Redirection
   ▶ ASF Configuration




   F1  Help   ↑↓ Select Item   -/+   Change Values   F9  Setup Defaults
   Esc Exit   ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

Installed OS
Select the operating system installed on the PC.
Note: An incorrect setting can cause the operating system to behave unpredictably.

　　　　Other / Win95 / Win98 / WinMe / **Win2000**

Reset Configuration Data
If you install a new piece of hardware or modify your computer's hardware configuration, the BIOS will automatically detect the changes and reconfigure the ESCD (Extended System Configuration Data). Therefore, there is usually no need to manually force the BIOS to reconfigure the ESCD.
However, sometimes, the BIOS may not be able to detect the hardware changes. A serious resource conflict may occur and the operating system may not even boot as a result. This is where the Reset Configuration Data BIOS feature comes in.
This BIOS feature allows you to manually force the BIOS to clear the previously saved ESCD data and reconfigure the settings. All you need to do is enable this BIOS feature and then reboot your computer. The new ESCD should resolve the conflict and allow the operating system to load normally.
Please note that the BIOS will automatically reset it to the default setting of No after reconfiguring the new ESCD. So, there is no need for you to manually disable this feature after rebooting.

　　　　Yes / **No**

Large Disk Access Mode
This option determines whether a hard drive with more than 1024 cylinders, more than 16 heads and or more than 64 tracks per sector is present on the system. Set this option to **DOS** if such a hard drive is present. Else, set this option to **Other**.
Virtually, all modern hard disks have these characters so leave this option at **DOS**, unless you know otherwise.
> **DOS** / Other

Parallel ATA
This option determines the controller to be used for parallel ATA devices.
> Primary / Secondary / **Both**

Serial ATA
This enables or disables booting from a serial ATA device.
> **Enabled** / Disabled

Native Mode Operation
This determines whether SATA devices should work in Native Mode or in Emulated Mode. In Native Mode, the SATA devices are treated as regular SATA devices, while in Emulated Mode, they are treated as though they were IDE devices.
If you are installing Windows 98, ensure that this option is set to Emulated, else the installation will hang.
> **Auto /** Parallel ATA / Serial ATA / Both

SATA RAID Enable
When this option is enabled, the Silicon Image RAID BIOS is loaded on system start up, allowing for configuration of hardware RAID arrays. With the SATA RAID ROM option disabled, the drives attached to the controller can only act independently of one another.
> Enabled / **Disabled**

Legacy USB Support
When enabled, the BIOS takes control of the USB ports. Enable this only if you run an OS that does not support USB (e.g. DOS) or when you have USB hardware like USB mice that you want to use even before the operating system loads.
> **Disabled** / Enabled

3.4.1 Hardware Monitor

This displays critical system parameters like CPU speed, fan speeds, voltage levels and CPU temperature.

```
         PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
              Advanced

                                                    Item Specific Help
      V+12 =
      VBAT =
      V+5 =
      Vccp =
      VCC =
      VTR =
      V1.5=
      VTT  =
      5VTR =
      VCC =

      CPU1
      CPU2
      Fan1
      Fan2
      Fan3
      Fan4
      Fan5

      CPU1 Temp. =
      CPU2 Temp. =
      Ambient Temp1 =
      Ambient Temp2 =

  F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
  Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-MenuF10 Previous Values
```
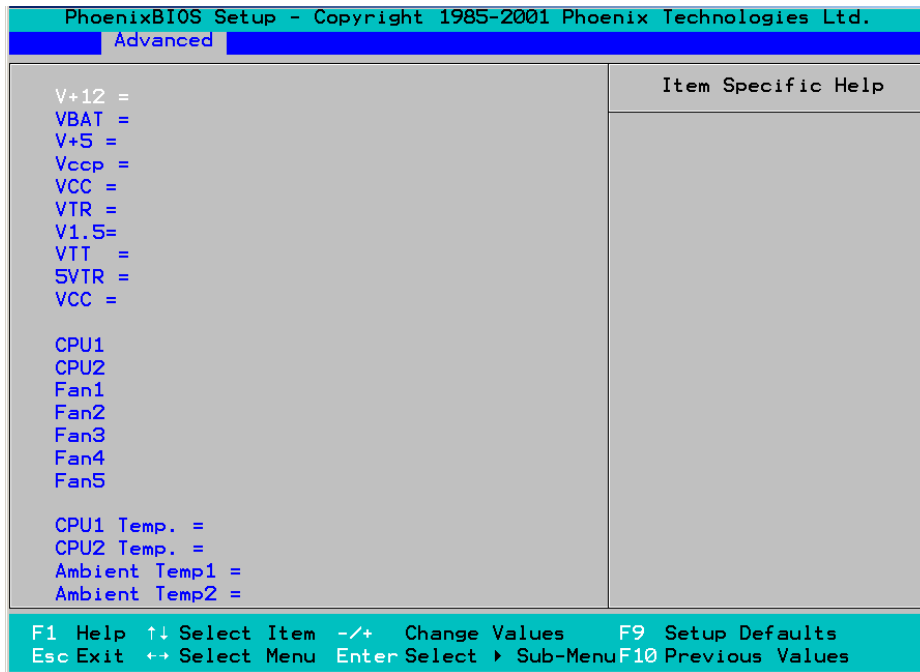
3.4.2 Advanced Chipset Control

This section allows you to fine tune the chipset configuration.

```
         PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
              Advanced

                                                    Item Specific Help
   ▶ Integrated Device Control Sub-Menu
   ▶ Integrated LAN 1 (BCM5721)
   ▶ Integrated LAN 2 (BCM5721)                   These items determine
     Spectrum Spread          [Disabled]          whether the
                                                  integrated
                                                  PCI Devices will be
     Force Compliance Mode    [Disabled]          Enabled in PCI Config
     Entry:                                       Space.

     DRAM Data Integrity Mode [Auto]
     DRAM Data Integrity Mode [Auto]
     ECC Error Type           [SMI]
     SERR signal condition    [Single bit]
     Memory Remap Function    [Enabled]


  F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
  Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-MenuF10 Previous Values
```

Spectrum Spread
When enabled, this option modulates the frequency of the CPU clock rate (and hence all clock driven mainboard components), so that any EMI interference generated is not always at the same constant frequency, but instead is spread over a small band of frequencies, therefore reducing problems with equipment that may be particularly sensitive to certain fixed frequencies.
        Enabled / **Disabled**

Force Compliance Mode Entry:
Enable or Disable PCI-E Compliance mode by setting item to the desired value.
> Enabled / **Disabled**

DRAM Data Integrity Mode
If you have ECC memory modules installed, select the correct ECC mode with this setting.
> Disabled / 72-bit ECC / 144-bit ECC / **Auto**

ECC Error Type
When an ECC error occurs, it generates an interrupt. Select the type of interrupt to report: NMI (Non-Maskable); SMI (System Management); SCI (System Control).
> None / NMI / **SMI** / SCI

SERR signal condition
Select ECC error conditions that SERR# be asserted.
> None / **Single bit** / Multiple bit/ Both

Memory Remap Function
Remaps the memory used by the BIOS (A0000 to FFFF - 384 k) above the 1 Mb limit. If enabled, you cannot shadow Video and System BIOS.
> **Enabled** / Disabled

3.4.2.1 Integrated Device Control Sub-Menu

```
       PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
           Advanced

                                                        Item Specific Help
       USB Device 29, Function 1:[Enabled]
       USB Device 29, Function 0 & 1:  [Enabled]
       USB Device 29, Function 7:[Enabled]         Enable or Disable
                                                    this
                                                    USB Device by setting
                                                    item to the desired
                                                    value.














       F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
       Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
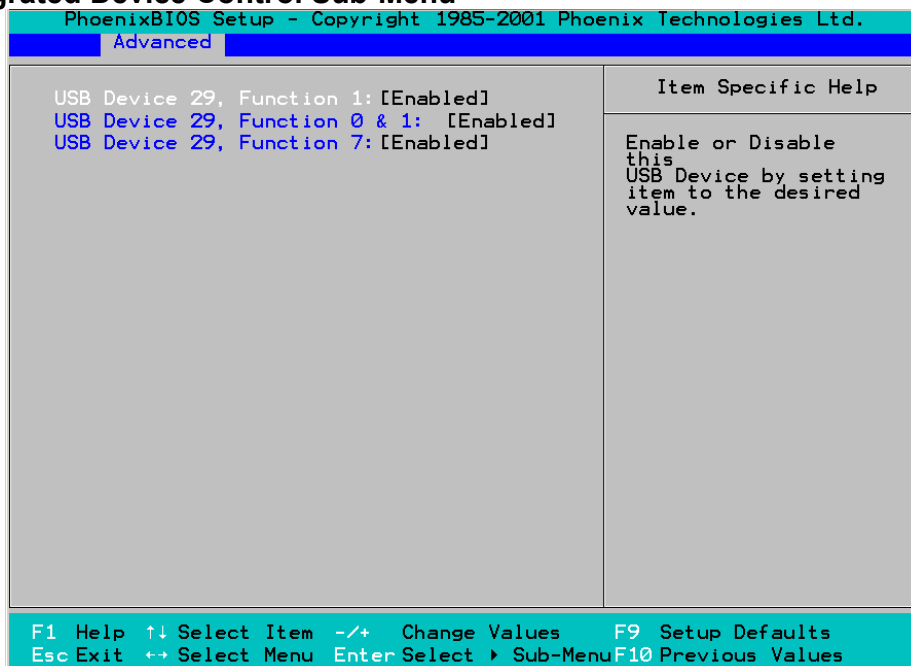
USB Device 29, Function 1:
Enable or Disable this USB Device by setting item to the desired value.
> **Enabled** / Disabled

USB Device 29, Function 0 & 1:
Enable or Disable these 2 USB Functions by setting item to the desired value.
> **Enabled** / Disabled

USB Device 29, Function 7:
Control USB 2.0 functionality through this Setup Item.
> **Enabled** / Disabled

3.4.2.2 Integrated LAN 1

```
         PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
              Advanced

                                                        Item Specific Help
       PCI-E port A Device 2 :    [Auto]
       Option ROM Scan:          [Disabled]
                                                      Force PCI Express
                                                      v1.0
                                                      Compatibility Mode
                                                      this PCI-E Port A
                                                      by setting item to
                                                      the desired value.

      F1  Help  ↑↓ Select Item  -/+  Change Values    F9  Setup Defaults
      Esc Exit  ↔ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
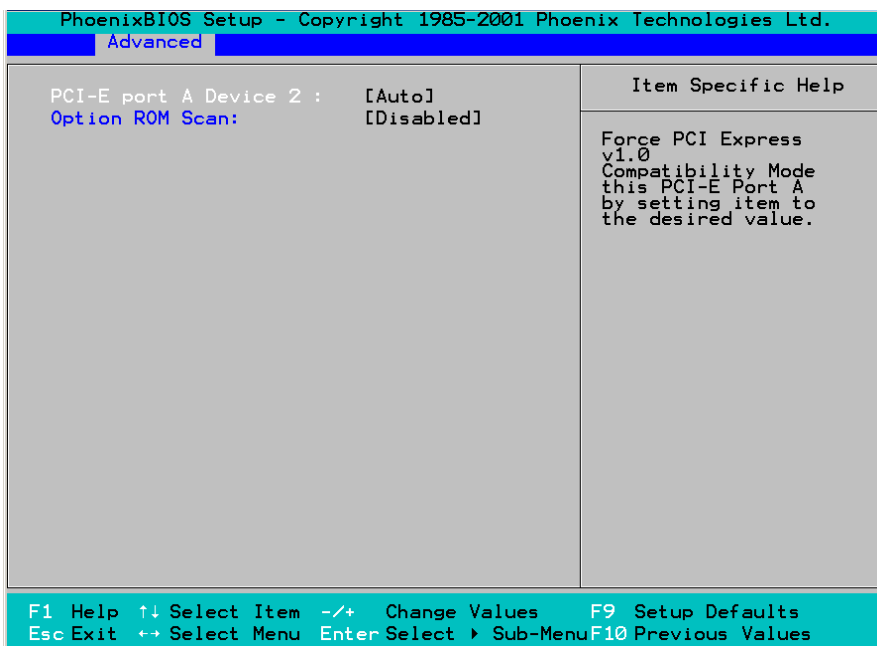
PCI-E port A Device 2:
Force PCI Express v1.0 Compatibility Mode this PCI-E Port A by setting item to the desired value.

  Auto / Disabled / Enabled / Force PCI Express v1.0 Compatibility Mode

Option ROM Scan
Initialize device expansion ROM

  Enabled / **Disabled**

3.4.2.3 Integrated LAN 2

```
         PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
              Advanced

                                                        Item Specific Help
       PCI-E port A1 Device 3 :   [Auto]
       Option ROM Scan:          [Disabled]
                                                      Force PCI Express
                                                      v1.0
                                                      Compatibility Mode
                                                      this PCI-E Port A1
                                                      by setting item to
                                                      the desired value.

      F1  Help  ↑↓ Select Item  -/+  Change Values    F9  Setup Defaults
      Esc Exit  ↔ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
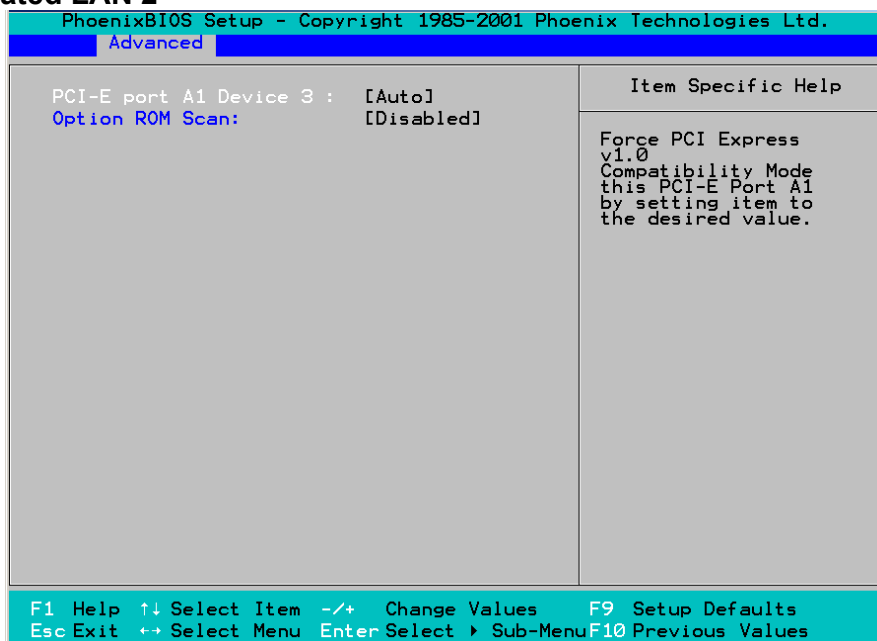
PCI-E port A Device 3:
Force PCI Express v1.0 Compatibility Mode this PCI-E Port A by setting item to the desired value.

  Auto / Disabled / Enabled / Force PCI Express v1.0 Compatibility Mode

Option ROM Scan
Initialize device expansion ROM
> Enabled / **Disabled**

3.4.3 Advanced Processor Options

This section allows you to fine-tune the processor options.

```
PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
     Advanced

                                              Item Specific Help
 Hyper Threading Technology[Enabled]

 Intel Enhanced Debug         [Enabled]       Enables 2nd Logical
 Machine Checking             [Disabled]      Processor.

                                              This is applicable
 Fast String operations       [Enabled]       only
 Compatible FPU Code          [Disabled]      for Win XP
 Split Lock operations        [Enabled]
 Thermal Management 2         [Disabled]
 Adjacent Cache Line Prefetch[Enabled]
 Set Max Ext CPUID = 3        [Disabled]
 Echo TPR                     [Enabled]




 F1  Help   ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
 Esc Exit   ←→ Select Menu  Enter Select ▸ Sub-MenuF10 Previous Values
```

Hyper Threading Technology
Enable this only if you have an Intel Hyper Threading processor.
Hyper-Threading Technology enables multi-threaded software applications to execute threads in parallel. Hyper-Threading Technology provides thread-level-parallelism (TLP) on each processor resulting in increased utilization of processor execution resources. As a result, resource utilization yields higher processing throughput. Hyper-Threading Technology is a form of simultaneous multi-threading technology (SMT) where multiple threads of software applications can be run simultaneously on one processor. This is achieved by duplicating the architectural state on each processor, while sharing one set of processor execution resources. Hyper-Threading Technology also delivers faster response times for multi-tasking workload environments. By allowing the processor to use on-die resources that would otherwise have been idle, Hyper-Threading Technology provides a performance boost on multi-threading and multi-tasking operations for the Intel NetBurst® microarchitecture.
> **Enabled** / Disabled

Thermal Management 2
Thermal Management throttles the processor back as it reaches its maximum operating temperature. Throttling reduces the number of processing cycles, thereby diminishing the heat dissipation of the CPU. This cools the unit. Once the CPU has reached a safe operating temperature, thermal throttling is automatically disabled, and normal full speed processing begins again.
The BIOS supports two types of thermal management.
- **Thermal Monitor 1:** Thermal Monitor 1 uses a highly accurate on-die temperature sensing circuit in the CPU that has the ability to act quickly upon any thermal issues (~50ns). This circuitry keeps an eye on the most taxed areas of the CPU-die at all times and will quickly act upon temperatures going over the safety limits. The

thermal monitor's control circuit, when active, lowers the CPU temperature by throttling the internal CPU clock speed. This is done with a 50% duty-cycle, which means that a 2GHz CPU will then effectively run at a 1GHz clock speed. Due to the fast response time of the thermal monitor circuit (~50ns) the CPU will only be 'throttled' for a very brief period. Once the CPU-die temperature is within safe operating limits again it'll set back to the 2GHz clock speed it originally operated at.

- **Thermal Monitor 2:** Thermal Monitor 2 decreases or increases the CPU clock and core voltage according to the CPU load. This information is read from the five VID pins of the CPU. Accordingly, the CPU temperature is also automatically decreased, when the core voltage is decreased. This improves the CPU lifespan. The states switch is so fast that the performance decrease is insignificant.
  Enabled / Disabled

Set Max Ext CPUID=3
Sets Max CPUID extended function value to 3.
        Disabled / Enabled

3.4.4 I/O Device Configuration

This setting allows you to configure I/O devices.

```
 PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
       Advanced

                                                  Item Specific Help
   Serial port A:            [Enabled]
   Base I/O address:         [3F8]
   Interrupt:                [IRQ 4]           Configure serial port
                                               A
                                               using options:
   Serial port B:            [Enabled]
   Base I/O address:         [2F8]             [Disabled]
   Interrupt:                [IRQ 3]            No configuration
   Mode:                     [Normal]
                                               [Enabled]
   Parallel port:            [Enabled]          User configuration
   Mode:                     [Bi-directional]
   Base I/O address:         [378]
   Interrupt:                [IRQ 7]
   DMA channel:              [DMA 1]

   Floppy disk controller:   [Enabled]




 F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
 Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

Serial Port A:
This defines how the first serial port is detected and configured.
        Disabled / **Enabled**

Base I/O Address:
Set the base I/O address for serial port A.
        3F8 / 2F8 / 3E8 / 2E8

Interrupt:
Set the interrupt for serial port A.
        IRQ3 / **IRQ4**

Serial Port B:
This defines how the second serial port is detected and configured.
        Disabled / **Enabled**

Base I/O Address:
Set the base I/O address for serial port A.
        3F8 **/ 2F8** / 3E8 / 2E8

Interrupt:
Set the interrupt for serial port A.
        IRQ3 / IRQ4

Mode
Set the mode for serial port B.
        Normal / IrDA / ASK-IR

Parallel Port
This defines how the parallel port is detected and configured.
        Disabled / **Enabled**

Mode
This field allows the user to select the parallel port mode. The default value is Standard that automatically selects the correct mode to use. The other modes are explained as follows:
SPP works with all parallel port devices. However, it is the slowest transfer mode and should only be used when faster transfer modes cannot be used.
There are two faster bidirectional modes available - the ECP (Extended Capabilities Port) and EPP (Enhanced Parallel Port) modes.
ECP uses the DMA protocol to achieve data transfer rates of up to 2.5 Mb/s and provides symmetric bidirectional communication. On the other hand, EPP uses existing parallel port signals to provide asymmetric bidirectional communication.
Generally, because of its FIFOs and the DMA channel it uses, ECP is good for large data transfers (useful for scanners and printers). On the other hand, EPP is better with links that switch directions frequently (like parallel port drives).
There are two versions of the EPP transfer protocol - EPP1.7 and EPP1.9. Generally, EPP1.9 is the preferred setting because it supports the newer EPP1.9 devices and most EPP1.7 devices and offers advantages like support for longer cables. However, because certain EPP1.7 devices cannot work properly with an EPP1.9 port, this BIOS feature was implemented to allow you to set the EPP mode to EPP1.7 when such an issue occurs.
Therefore, it is recommended that you set this BIOS feature to EPP1.9. But if you have trouble connecting to your parallel port device, switch to EPP1.7.
However, the manufacturer of your parallel port peripheral may have designated a preferred parallel port mode for the device in question. In that case, it's best to follow their recommendation.
For those who don't know what mode to select but at least know that their parallel port device supports bidirectional transfers, the BIOS offers the ECP+EPP mode. If you select this mode, then the parallel port device will be able to use either one of those modes. However, this should be considered as a last resort as you may be needlessly tying up an IRQ if your device does not use ECP at all. Or the BIOS may not select the best parallel port mode for the device. If possible, set the parallel port to the transfer mode that best suits your parallel port device.
However, the manufacturer of your parallel port peripheral may have designated a preferred parallel port mode for the device in question. In that case, it's best to follow their recommendation.
        SPP / EPP / ECP

Base I/O Address / Interrupt:
This determines the base address and interrupt of the parallel port.
Disabled / **378/IRQ7 /** 278/IRQ5 / 3BC/IRQ7

DMA Channel
This BIOS feature determines which DMA channel the parallel port should use when it is in ECP mode.
The ECP mode uses the DMA protocol to achieve data transfer rates of up to 2.5 Mbits/s and provides symmetric bidirectional communications. For all this, it requires the use of a DMA channel.
By default, the parallel port uses DMA Channel 3 when it is in ECP mode. This works fine in most situations.
This feature is provided just in case one of your add-on cards requires the use of DMA Channel 3. In such a case, you can use this BIOS feature to force the parallel port to use the alternate DMA Channel 1.
Please note that there is no performance advantage in choosing DMA Channel 3 over DMA Channel 1 or vice versa. As long as either Channel 3 or Channel 1 is available for your parallel port to use, the parallel port will be able to function properly in ECP mode.
DMA 1 / DMA 3

Floppy Disk Controller
This defines how the floppy disk controller is detected and configured.

- Disabled
- **Enabled**

3.4.5 DMA Event Logging

```
     PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
          Advanced

                                             Item Specific Help

    Event log validity
    Event log capacity               Report the validity
                                     of
    View DMI event log               the DMI event log

    Event Logging            [Enabled]
    ECC Event Logging        [Enabled]

    Mark DMI events as read
    Clear all DMI event logs  [No]

 F1  Help   ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
 Esc Exit   ←→ Select Menu  Enter Select  ▶ Sub-Menu F10 Previous Values
```

Event Logging
Select Enabled to allow logging of DMI events
　　　　Disabled / **Enabled**

ECC Event Logging
Select Enabled to allow logging of ECC events
　　　　Disabled / **Enabled**

Clear all DMI event logs
Setting this to 'Yes' will clear the DMI event log after rebooting.
　　　　No / Yes

3.4.6 Console Redirection

```
     PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
         Advanced

     Com Port Address          [Disabled]              Item Specific Help

     Baud Rate                 [19.2K]            If enabled, it will
     Console Type              [PC ANSI]          use a port on the
     Flow Control              [CTS/RTS]          motherboard.
     Console connection:       [Direct]
     Continue C.R. after POST: [Off]

     F1  Help   ↑↓ Select Item  -/+   Change Values      F9  Setup Defaults
     Esc Exit   ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

Com Port Address
If enabled it will use a port on the motherboard.
　　　　Disabled / On-board COM A / On-board COM B / NULL

Baud Rate
Enables the specified baud rate.
　　　　300 / 1200 / 2400 / 9600 / **19.2K /** 38.4K / 57.6K / 115.2K

Console Type
Enables the specified console type.
　　　　VT100 / VT100,8bit / PC-ANSI, 7bit / **PC ANSI** / VT100+ / VT-UTF8 / NULL

Flow Control
Enables Flow Control
　　　　NULL / XON/XOFF / **CTS/RTS**

Console connection
Indicate whether the console is connected directly to the system or a modem is used to connect.
　　　　Direct / Via modem

Continue C.R. after POST
Enables Console Redirection after OS has loaded.
　　　　Off / On

3.4.7 ASF Configuration

```
 PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
     Advanced

                                            Item Specific Help

  Minimum WatchDog Timeout
  BIOS Boot Timeout                        Time for BIOS to
  OS Boot Timeout                          stop the WatchDog
  Power-on wait time                       timer after a
                                           reset has occurred




 F1  Help  ↑↓ Select Item  -/+  Change Values    F9  Setup Defaults
 Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
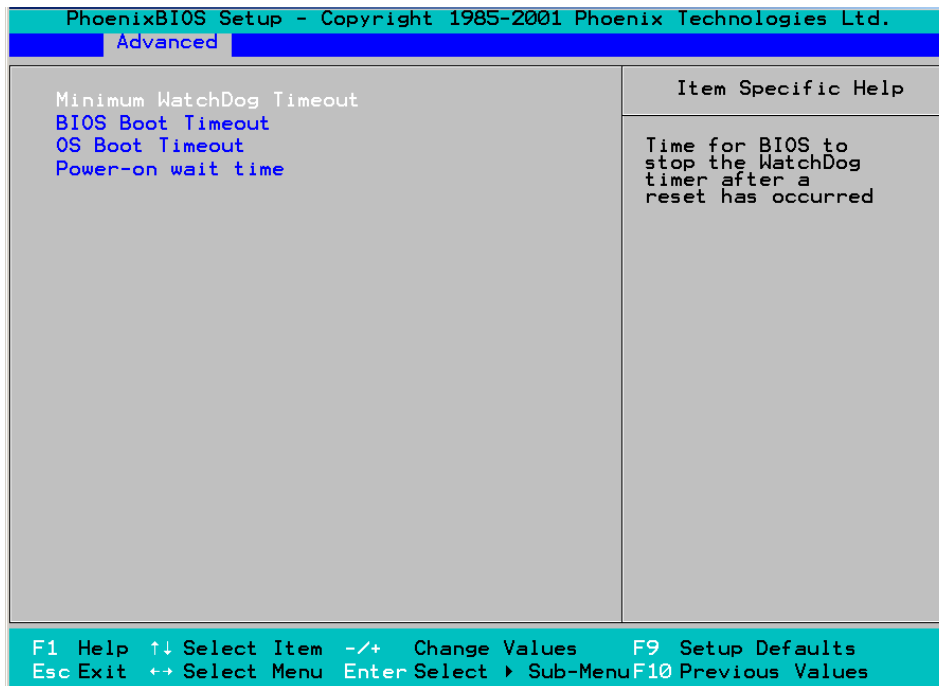
Minimum WatchDog Timeout
Time for BIOS to stop the WatchDog timer after a reset has occurred.

BIOS Boot Timeout
Time for BIOS to boot before the system is reset.

OS Boot Timeout
Time for OS to boot before the system is reset.

Power-on wait time
Maximum amount of time for Alert Sending Device (ASD) to establish connection with its transport media.

3.5 Security

These settings allow you to configure the security options for your system.

```
PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
 Main   Advanced   Security   Power   Boot   Exit

                                              Item Specific Help
    Supervisor Password Is:
    User Password Is:

    Set Supervisor Password
    Set User Password

    Password on boot:          [Disabled]












 F1  Help  ↑↓ Select Item   -/+   Change Values    F9  Setup Defaults
 Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
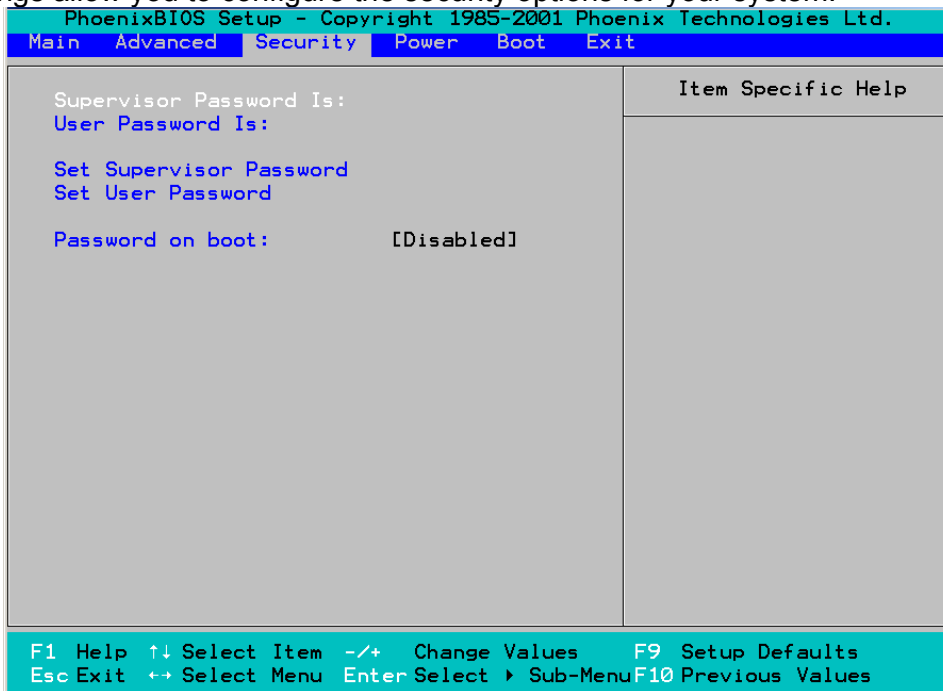
The system displays the current supervisor and user passwords.

Set Supervisor Password
This option allows the supervisor to set the supervisor password to restrict access to the BIOS settings.

Set User Password
This option allows the user to set the user password.

Password on boot
When enabled, the system will ask for a password at every boot. The system will continue booting only if the correct password is entered. If the wrong password is entered three times, the system will automatically shut down.
            Disabled / Enabled

3.6 Power

These settings allow you to configure the power options for your system.

```
     PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
      Main   Advanced   Security   Power   Boot   Exit

                                                    Item Specific Help

        Resume On Time:          [Off]
        Resume Time:


        Power Button Behavior    [On/Off]
        After Power Failure:     [Last State]
        Chassis Intrusion Detect: [No]
        Power On By PCI/PCI-X     [Disabled]













      F1  Help  ↑↓ Select Item  -/+  Change Values    F9  Setup Defaults
      Esc Exit  ↔  Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```
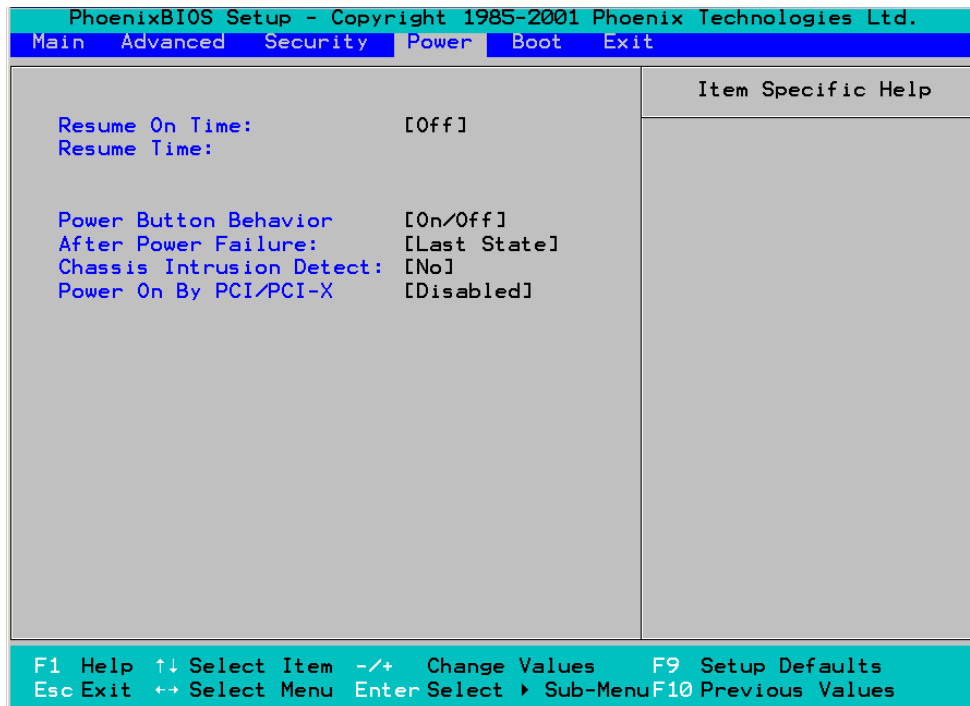
Resume On Time
When enabled, this allows the system to be woken up at a specified time. This time is specified by the **Resume Time** parameter.
            Off / On

Power Button Behavior
This specifies the behavior of the system after the power button is pressed.
- **On/Off** - This powers on / powers off the system after the power button is pressed.
- Wake/Sleep - This wakes the system from/puts the system to sleep.

After Power Failure
Specifies the mode of operation after the system recovers from a power loss.
- **Enabled:** This restores the system to the last state it was in before the power loss occurred.
- Disabled: This keeps the power switched off till the power button is pressed.

Chassis Intrusion Detect
Enable/Disable: when chassis open event is detected, BIOS will record the event.
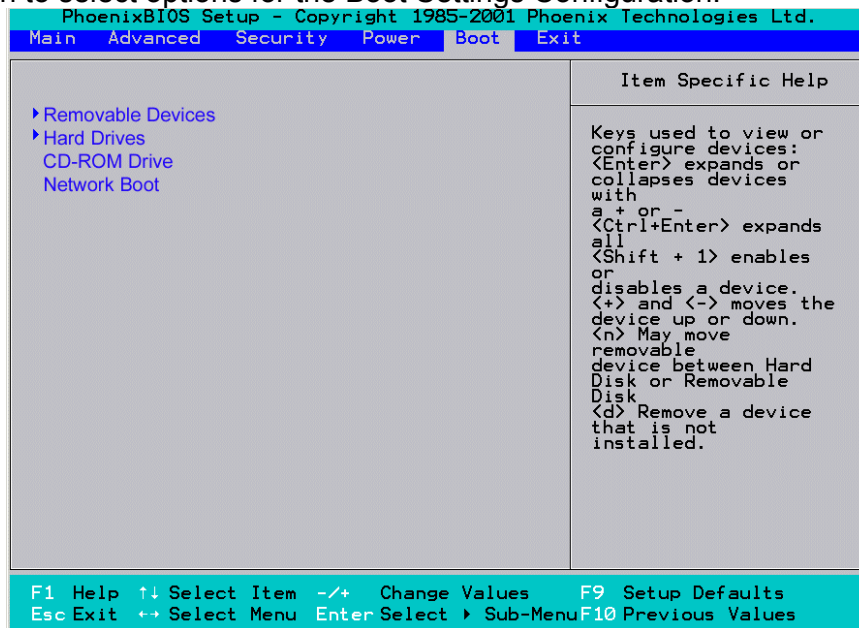   Enabled / **Disabled**

Power On by PCI/PCI-X card
An input signal from PME on the PCI card awakens the system from a soft off state.
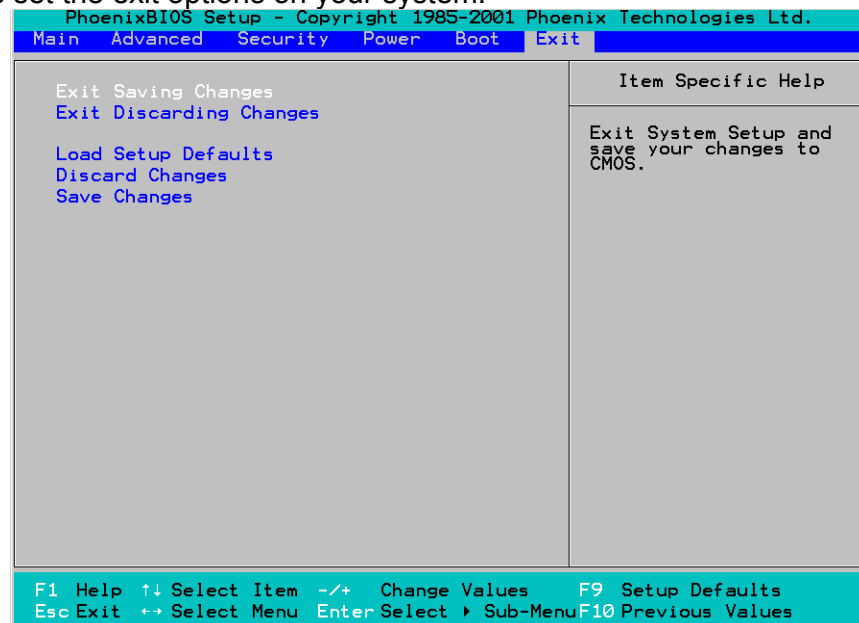   Enabled / **Disabled**

3.7 Boot

Use this screen to select options for the Boot Settings Configuration.

```
     PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main   Advanced   Security   Power   Boot   Exit

                                              Item Specific Help

    ▶Removable Devices                    Keys used to view or
    ▶Hard Drives                          configure devices:
     CD-ROM Drive                         <Enter> expands or
     Network Boot                         collapses devices
                                          with
                                          a + or -
                                          <Ctrl+Enter> expands
                                          all
                                          <Shift + 1> enables
                                          or
                                          disables a device.
                                          <+> and <-> moves the
                                          device up or down.
                                          <n> May move
                                          removable
                                          device between Hard
                                          Disk or Removable
                                          Disk
                                          <d> Remove a device
                                          that is not
                                          installed.



   F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
   Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

3.8 Exit

These settings set the exit options on your system.

```
     PhoenixBIOS Setup - Copyright 1985-2001 Phoenix Technologies Ltd.
   Main   Advanced   Security   Power   Boot   Exit

                                              Item Specific Help

     Exit Saving Changes
     Exit Discarding Changes               Exit System Setup and
                                           save your changes to
     Load Setup Defaults                   CMOS.
     Discard Changes
     Save Changes












   F1  Help  ↑↓ Select Item  -/+   Change Values    F9  Setup Defaults
   Esc Exit  ←→ Select Menu  Enter Select ▶ Sub-Menu F10 Previous Values
```

Exit Saving Changes
This exits BIOS setup after saving the changes made.

Exit Discarding Changes
This exits BIOS setup after discarding the changes made.

Load Setup Defaults
Loads the factory default values.

Discard Changes
Discards all changes made without exiting BIOS setup.

Save Changes
Saves all changes made without exiting BIOS setup.

Chapter 4: SATA/RAID Setup (for SATA RAID model)

The motherboard supports RAID 0 or 1 for Serial ATA drives through the Intel® 6300ESB chipset. The Serial ATA as RAID option must be enabled in the BIOS before the system can load the Adaptec® RAID option ROM code for Intel® RAID. The Adaptec® RAID option ROM is a standard PnP (Plug and Play) option ROM that provides a pre-operating system user interface for the Intel® RAID implementation. It also allows the boot order to be selected from within the BIOS setup utility.

For this information, please check Tyan's web site at: **www.tyan.com**

⚠	**Warning**
	Before installing the driver into an existing system, backup any important or useful data. Failure to follow this accepted PC practice could result in data loss.
	The Intel RAID feature is available in Win2000 and WinXP.

4.1 BIOS Configuration
• Enter the BIOS setup program by pressing the <F2> key after the Power-On Self Test (POST) memory test begins.
• Select the **Advanced** menu.
• Switch the **SATA RAID Enabled** option from **Disabled** to **Enabled**
• Press <F10> to save the BIOS setting and exit the BIOS setup program.

4.2 Installing Serial ATA (SATA) hard disks

Installing Serial ATA (SATA) hard disks requires the use of a new SATA data cable (4-conductor) which supports the Serial ATA protocol and a SATA power cable. Either end of the SATA data cable can be connected to the SATA hard disk or the SATA connector on the motherboard.

📝	**Note**
	• Both the data and power SATA cables are new cables. You cannot use older 40-pin 80-conductor IDE or regular IDE power cables with SATA hard drives.
	• Carefully follow any technical instructions that come from the hard disk manufacturer.

Follow the given steps for correct cable installation:
1. Attach either cable end to the SATA connector on the motherboard.
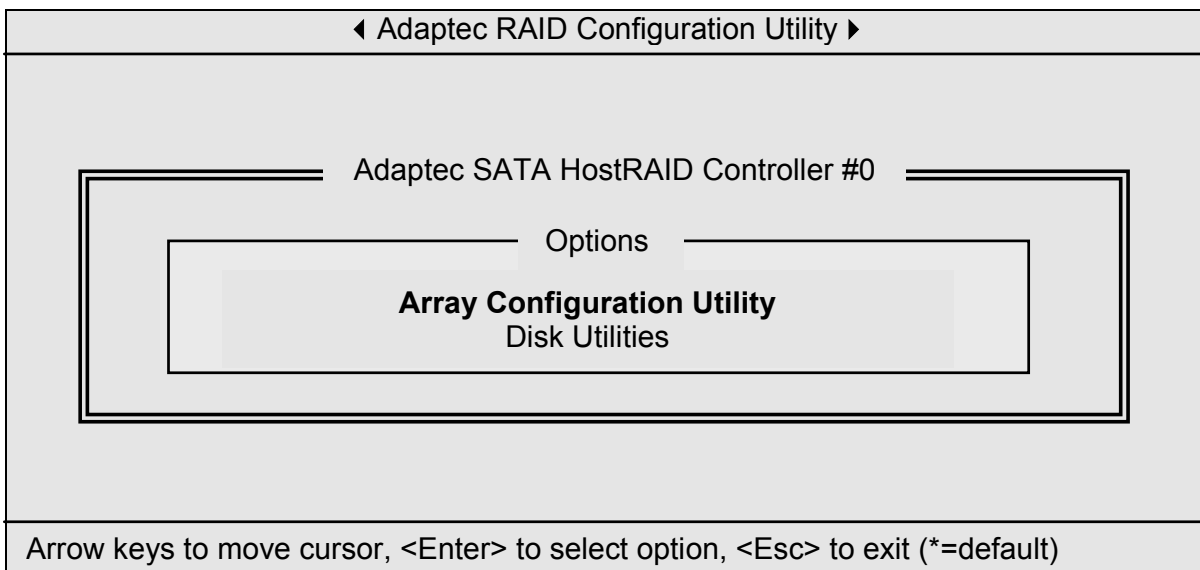2. Attach the other cable end to the SATA hard disk.

4.3 Adaptec RAID Configuration Utility

The Serial ATA RAID sets must be configured in the RAID Configuration utility for two HDD. This configuration can be done by the Adaptec® RAID Option ROM. During the Power-On Self Test (POST), the following message will appear for a few seconds: Press **<Ctrl-A>** to enter RAID Configuration Utility. After this message appears, press the **<Ctrl>** and **<A>** keys simultaneously, the following screen menu appears.
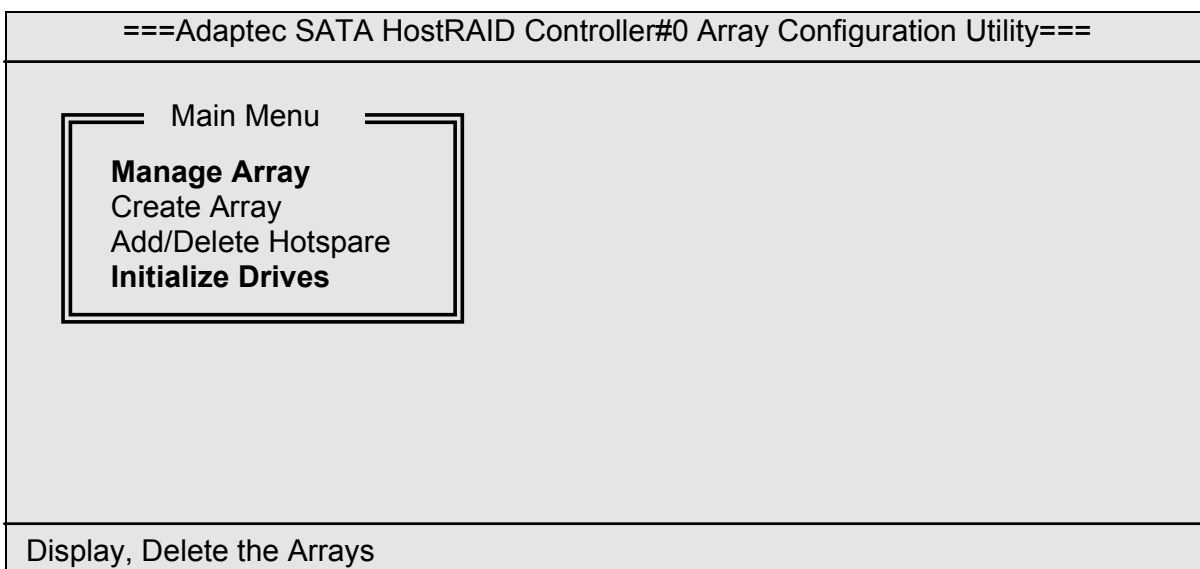
Note

The 'Drive Model', 'Serial #', and 'Size' listed in your system can differ from the following example.

```
◀ Adaptec RAID Configuration Utility ▶


              ═══ Adaptec SATA HostRAID Controller #0 ═══

                       ─── Options ───
                   Array Configuration Utility
                        Disk Utilities



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

4.4 Manage Array

Use the Manage Arrays option to view array properties and members, and delete arrays. The following sections describe these operations in greater detail.

```
===Adaptec SATA HostRAID Controller#0 Array Configuration Utility===

        ═══ Main Menu ═══
       Manage Array
       Create Array
       Add/Delete Hotspare
       Initialize Drives




Display, Delete the Arrays
```

Display array properties and members
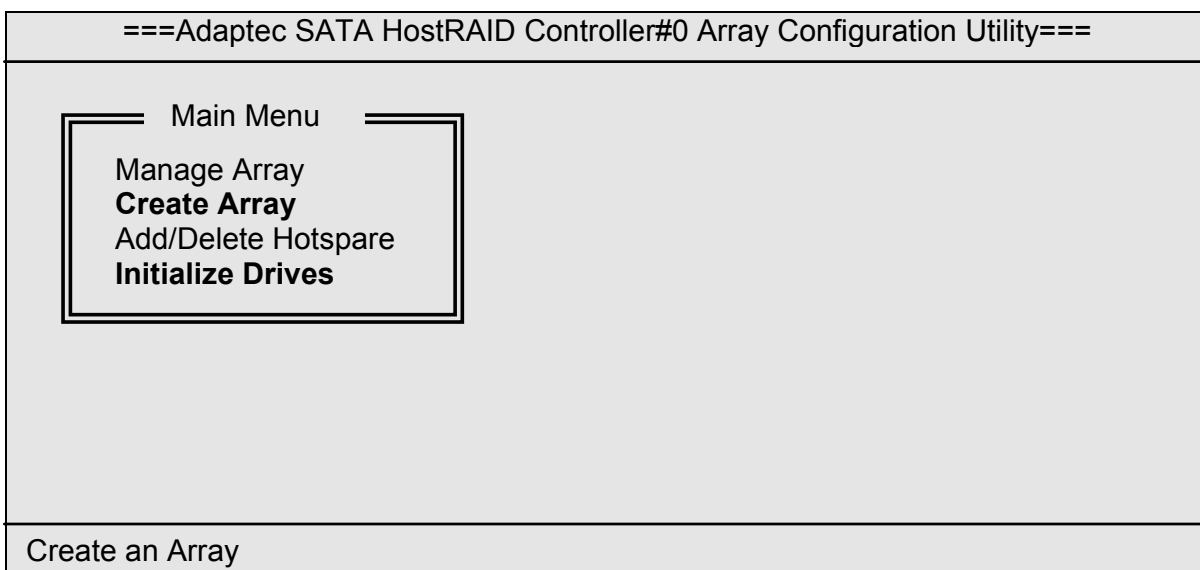
1. From the **Adaptec SATA HostRAID Controller#0 Array Configuration Utility** menu, select **Manage Array.**
2. From the **List of Arrays** dialog box, select the array you want to view and press **Enter**.
   The **Array Properties** dialog box appears, showing detailed information on the array. The physical disks associated with the array are displayed here.
3. Press **Esc** to return to the previous menu.

Deleting Arrays

<table>
<tr><td rowspan="2">⚠️</td><td>**Warning**</td></tr>
<tr><td>Take caution in using this option; All data on the RAID drives will be lost! Deleted arrays cannot be restored.</td></tr>
</table>

1. From the **Adaptec SATA HostRAID Controller#0 Array Configuration Utility** menu, select **Manage Array.**
2. Select the array you wish to delete and press **Delete**.
3. In the **Array Properties** dialog box, select Delete and press **Enter**. The following prompt is displayed:

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

4. Press **Yes** to delete the array or **No** to return to the previous menu.
5. Press **Esc** to return to the previous menu.

4.5 Create Array
Before creating arrays, make sure the disks for the array are connected and installed in your system. Note that disks with no usable space, or disks that are uninitialized are shown in gray and cannot be used.

```
===Adaptec SATA HostRAID Controller#0 Array Configuration Utility===

   ╔═══ Main Menu ═══╗
   ║  Manage Array    ║
   ║  Create Array    ║
   ║  Add/Delete Hotspare ║
   ║  Initialize Drives ║
   ╚══════════════════╝




 Create an Array
```

Follow the given steps to create a RAID 0 or RAID 1 Volume

1. From the **Adaptec SATA HostRAID Controller#0 Array Configuration Utility** menu, select option **Create Array** and press the <Enter> key.

2. Select the disks for the new array and press <Ins> key. To deselect any disk, highlight the disk and press **Delete**.

3. Press Enter when both disks for the new array are selected. The **Array Properties** menu displays.

To assign properties to the new array:

1. In the Array Properties menu, select an array type and press Enter. Note that only the available array types, RAID 0 and RAID 1, are displayed. Each of these types requires two drives.

2. Type in an optional label for the array and press Enter.

3. For RAID 0, select the desired stripe size. Available stripe sizes are 16KB, 32KB and 64KB (default)

4. Create RAID via allows you to select between the different creation methods for RAID 0 and RAID 1. The following table gives examples of when each is appropriate.

RAID level	Create RAID via	When appropriate
RAID 0	No Init	Creating a RAID 0 on new drives.
RAID 0	Migrate*	Creating a RAID 0 from one new drive and one drive with data you wish to preserve.
RAID 1	Build*	Any time you wish to create a RAID 1, but especially if you have data on one drive that you wish to preserve.
RAID 1	Clear	Creating a RAID 1 on new drives, or when you want to ensure that the array contains no data after creation.
RAID 1	Quick Init	Fastest way to create a RAID 1. Appropriate when using new drives.
* If you select Migrate for RAID 0, or Build for RAID 1, you will be asked to select the source drive. The contents of the source drive will be preserved. However, the data on the new drive will be lost.		

Note

Before adding a new drive to an array, back up any data contained on the new drive. Otherwise, all data will be lost.
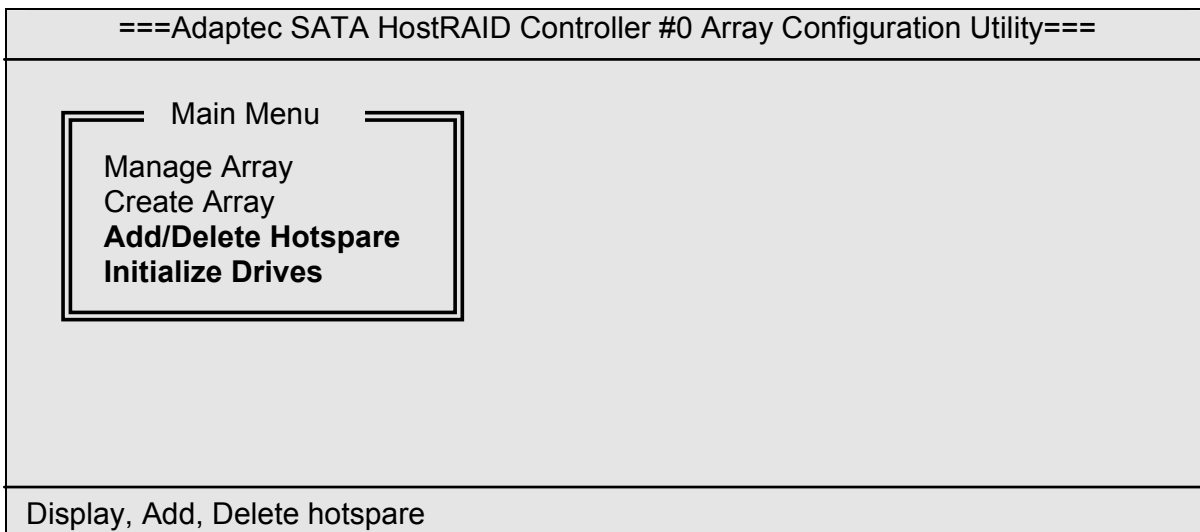
A RAID 1 created using the Quick Init option may return some data miscompares if you later run a consistency check. This is normal and is not a cause for concern.

The Adaptec RAID Configuration Utility allows you to use drives of different sizes in a RAID 1. If you choose the smaller drive as the second drive, you will be warned about the risk of data loss.

Warning

Do not interrupt the creation of a RAID 0 using the Migrate option. If you do, there is no way to restart and no way to recover the data that was on the source drive.

When you are finished, press **Done**.

4.6 Add/Delete Hotspare

===Adaptec SATA HostRAID Controller #0 Array Configuration Utility===

```
┌─══ Main Menu ══┐
│                          │
│  Manage Array            │
│  Create Array            │
│  Add/Delete Hotspare     │
│  Initialize Drives       │
│                          │
└──────────────────────────┘
```

Display, Add, Delete hotspare

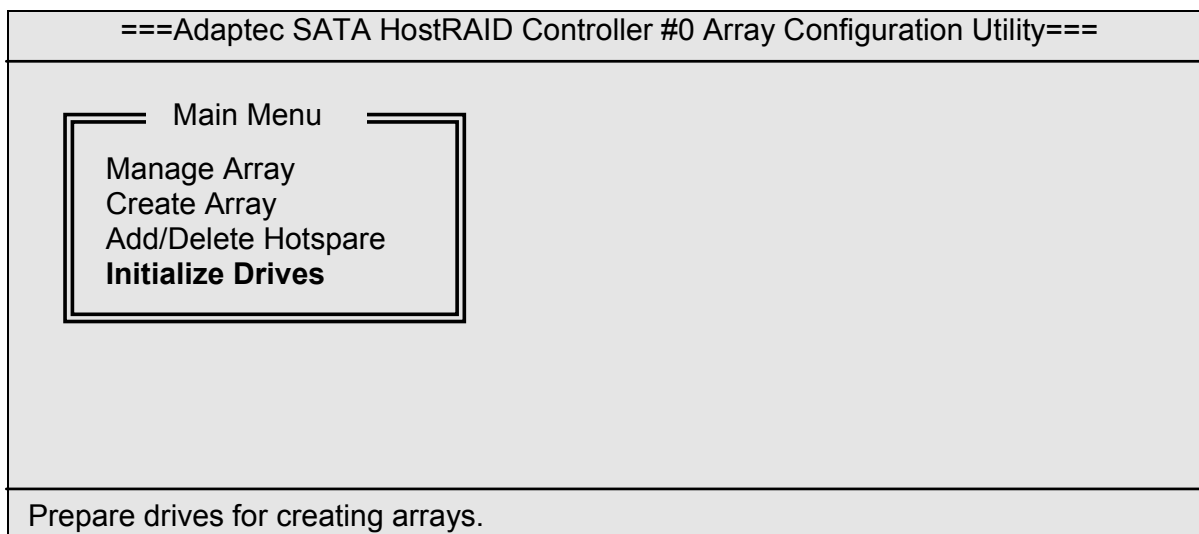**Create a drive spare:**
1.   Select option Add / Delete Hotspare and press the <Enter> key to create the drive spare. The following prompt is displayed:
     Do you want to create a spare? (Yes/No):
2.   Press **Y** to create the drive spare.
3.   Press **Esc** to return to the previous menu.

Delete a drive spare:
1.   Select option Add / Delete Hotspare and press the <Enter> key to delete the drive spare. The following prompt is displayed:
     Do you want to delete the spare? (Yes/No):
2.   Press **Y** to delete the drive spare.
3.   Press **Esc** to return to the previous menu.

4.7 Initialize Drives

If an installed disk does not appear in the disk selection list for creating a new array or if it appears grayed out, you may have to initialize it before you can use it as part of an array. Drives attached to the controller must be initialized before they can be used in an array.
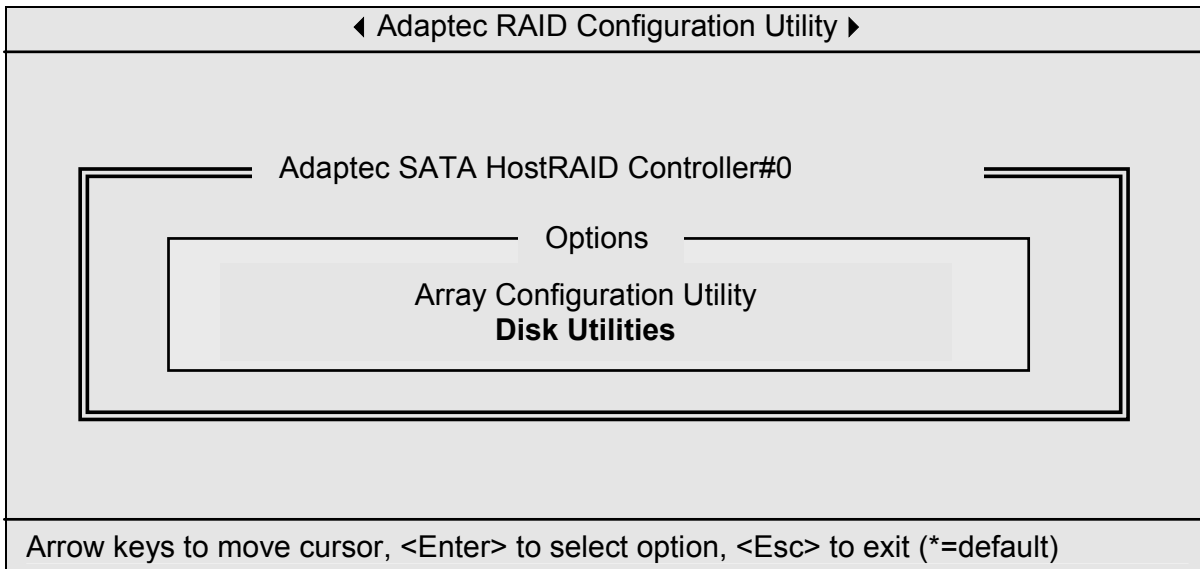
```
===Adaptec SATA HostRAID Controller #0 Array Configuration Utility===

    ┌═══ Main Menu ═══┐
    │ Manage Array      │
    │ Create Array      │
    │ Add/Delete Hotspare│
    │ Initialize Drives  │
    └───────────────────┘




  Prepare drives for creating arrays.
```

Warning

Take caution in using this option; Initialization will erase all Array information from the selected drives. Any away using any of these drives as members will be affected.

1.   Select **Initialize Drives**.
2.   Use the <↑> and <↓> keys to highlight the disk you wish to Initialize and press **Insert**.
3.   Repeat step 2 so that both drives to be initialized are selected.
4.   Press <Enter>
5.   Read the warning message and ensure that you have selected the correct disk drives to initialize. Type **Y** to continue.
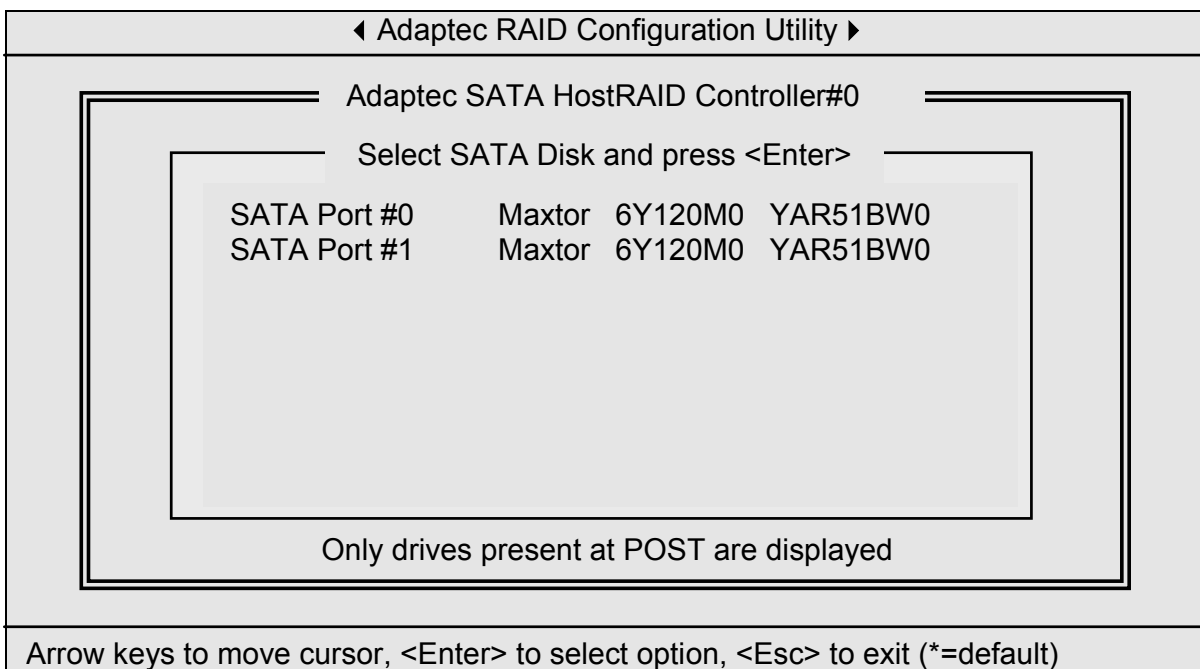
4.8 Disk Utilities

The Disk Utilities enable you to low-level format or verify the media of your Serial ATA hard disks.

From the **Adaptec RAID Configuration Utility** menu, select **Disk Utilities**.

```
◀ Adaptec RAID Configuration Utility ▶


              Adaptec SATA HostRAID Controller#0

                      ───── Options ─────
                    Array Configuration Utility
                         Disk Utilities




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

1.   Press the <Enter> key to select SATA Disk.

```
◀ Adaptec RAID Configuration Utility ▶

        ═══ Adaptec SATA HostRAID Controller#0 ═══

           ─── Select SATA Disk and press <Enter> ───

        SATA Port #0       Maxtor   6Y120M0   YAR51BW0
        SATA Port #1       Maxtor   6Y120M0   YAR51BW0






               Only drives present at POST are displayed


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

Warning

⚠ Take caution in using this option;

Format Disk-This drive is about to be formatted. All data on the disk will be erased.

Verify Disk Media- This drive will be scanned for media defects. All recoverable defects will be remapped.
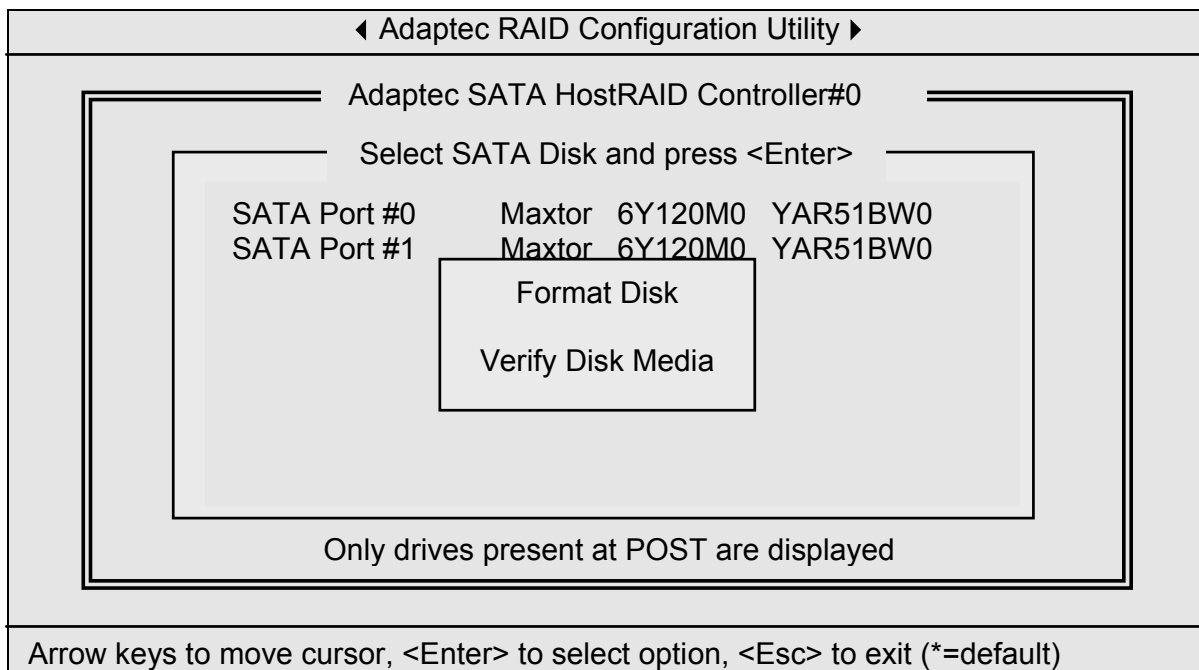
2.   Select options **Format Disk** or **Verify Disk Media** and press the <Enter> key.

You are offered the following options:

Format Disk— Simulates a format of the hard drive by writing zeros to the entire disk.

Verify Disk Media— Scans the media of a disk drive for defects. Any errors found are corrected.

3.   Press **Esc** to return to the previous menu.

```
◄ Adaptec RAID Configuration Utility ►

═══════ Adaptec SATA HostRAID Controller#0 ═══════

──────── Select SATA Disk and press <Enter> ────────

   SATA Port #0       Maxtor   6Y120M0   YAR51BW0
   SATA Port #1       Maxtor   6Y120M0   YAR51BW0
                    ┌──────────────────────┐
                    │    Format Disk       │
                    │                      │
                    │   Verify Disk Media  │
                    └──────────────────────┘



          Only drives present at POST are displayed

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

Chapter 5: Diagnostics

Note: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN website at: http://www.tyan.com.

5.1 Beep Codes

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. For example, if the BIOS POST can initialize the video but an error occurs, an error message will be displayed. If it cannot display the message, it will report the error as a series of beeps.

The most common type of error is a memory error.

Before contacting your vendor or TYAN Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

5.2 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN web site: http://www.tyan.com/

Note

Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

Appendix I: Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path, can carry. Greater bandwidth, then, also results in greater speed.

BBS (BIOS Boot Specification): is a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails for some reason. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, and provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data, usually from an application, though it is also used when printing, and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it, all at once, to a disk drive. While this improves system performance --- reading to or writing from a disk drive a single time is much faster than doing so repeatedly --- there is also the possibility of losing your data should the system crash. Information stored in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times, since the needed information is stored in the SRAM instead of in the slow DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Cache size: refers to the physical size of the cache onboard. This should not be confused with the cacheable area, which is the total amount of memory which can be scanned by the system in search of data to put into the cache. A typical setup would be a cache size of 512KB, and a cacheable area of 512MB. In this case, up to 512KB of the main memory onboard is capable of being cached. However, only 512KB of this memory will be in the cache at any given moment. Any main memory above 512MB could never be cached.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): is a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM sockets, because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

Doze mode: in this mode, only the CPU's speed is slowed.
DRAM (Dynamic RAM): widely available, very affordable form of RAM which has the unfortunate tendency to lose data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN's BIOS updates can be found at http://www.tyan.com

EMRL: Embedded RAID Logic. An Adaptec specific RAID technology.

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Fault-tolerance: a term describing a system where one component can quickly be replaced without causing a loss of service, such as in a RAID system.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX, although TYAN also makes some Baby-AT and ATX Footprint boards.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

Handshaking: a process where two devices initiate communications. One device, typically the server, sends a message to another device, typically a client, in order to request establishment of a communications channel. The two devices will then exchange messages back and forth in order to settle on a communications protocol.

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

IDE INT (IDE Interrupt): a hardware interrupt signal that goes to the IDE.

I/O (Input/Output): the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

Initial Program Load (IPL): a feature built into BBS-compliant devices, describing those devices as capable of loading and executing an OS, as well as being able to provide control back to the BIOS if the loading attempt fails.

IPL: see Initial Program Load.

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

ISA (Industry Standard Architecture): a slower 8- or 16-bit bus (data pathway).

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This is most common when the system sends data out to a peripheral device, and it waiting for the peripheral to send some data back (peripherals tend to be slower than onboard system components).

Mirroring: see RAID.

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

OEMs (Original Equipment Manufacturers): Compaq or IBM package other companies' motherboards and hardware inside their case and sell them.

Parallel port: transmits the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.
PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM: a type of RAM that can maintain it's data as long as power is provided to the memory chips. In this configuration, SRAM requests are pipelined, which means that larger packets of data are sent to the memory at one time, and acted upon quickly. This type of SRAM operates at bus speeds higher than 66MHz.

 Pipelining: improves system performance by allowing the CPU to begin executing a second instruction before the first is completed. A pipeline can be likened to an assembly line, with a given part of the pipeline repeatedly executing a set part of an operation on a series of instructions.

PM timers (Power Management timers): software timers that count down the number of seconds or minutes until the system times out and enters sleep, suspend, or doze mode.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Novice end users can simply plug them into a computer that is running on a Plug-n-Play aware operating system (such as Windows 98), and go to work. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

PXE (Preboot Execution Environment): one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was designed to define a standard set of preboot protocol services within a client, towards the goal of allowing networked-based booting to boot using industry standard protocols.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly, also the multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: stands for RAID I/O Steering, a type of RAID technology from Intel. RAIDIOS is a specification used to enable an embedded I/O controller, embedded on the motherboard, to be used as just an I/O controller or to be the I/O component of a hardware RAID subsystem. The RAIDIOS circuit allows an I/O Processor (either embedded on the motherboard or on an add-in card) to configure the I/O controller and service the I/O controller's interrupts. The I/O controller and the I/O Processor together are two of the primary components of a hardware RAID subsystem.

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data, is often used to refer to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SATA (Serial ATA): is an evolutionary replacement for the Parallel ATA physical storage interface. Serial ATA is a drop-in solution in that it is compatible with today's software and operating systems. It will provide for systems which are easier to design, with cables that are simpler to route and install, smaller cable connectors, and lower voltage requirements.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SCSI Interrupt Steering Logic (SISL): Architecture that allows a RAID controller, such as AcceleRAID 150, 200 or 250, to implement RAID on a system board-embedded SCSI bus or a set of SCSI busses. SISL: SCSI Interrupt Steering Logic (LSI) (only on LSI SCSI boards)

SIMM (Single In-line Memory Module): formally the most common form of RAM for motherboards. They must be installed in pairs, and do not have the carrying capacity or the speed of DIMM modules.

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SSI (Server System Infrastructure): an industry initiative intended to provide ready-to-use design specifications for common server hardware elements (chassis, power supplies, and racks) to promote and support server industry growth.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

Striping: see RAID

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

ZCR: Zero Channel RAID. PCI card that allows a RAID card to use the onboard SCSI chip, thus lowering cost of RAID solution

ZIF Socket (Zero Insertion Force socket): these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shift the processor over and down, guiding into the board and locking it into place.

Technical Support

If a problem arises with your system, you should turn to your dealer for help first. Your system has most likely been configured by them, and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assistance. Furthermore, if you purchased your system from a dealer near you, you can actually bring your system to them to have it serviced, instead of attempting to do so yourself (which can have expensive consequences).

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN website for FAQ's, bulletins, driver updates, and other information: http://www.tyan.com
3. Contact your dealer for help BEFORE calling TYAN.
4. Check the TYAN user group: alt.comp.periphs.mainboard.TYAN

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

Note

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN will pay to have the board shipped back to you.

Notice for the USA
Compliance Information Statement (Declaration of Conformity Procedure) DoC
FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

1) This device may not cause harmful interference, and
2) This device must accept any interference received including interference that may cause undesired operation. 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 one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Plug the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer on an experienced radio/television technician for help.

Notice for Canada
This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux norms de Classe B d'interference radio tel que specifie par le Ministere Canadien des Communications dans les reglements d'ineteference radio.)

Notice for Europe (CE Mark)
This product is in conformity with the Council Directive 89/336/EEC, 92/31/EEC (EMC).

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

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