Thunder K8SRE /// S2891

Version 1.0

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Chapter 1: Introduction

1.1 - Congratulations

You have purchased one of the most powerful server solutions. The Thunder K8SRE (S2891) is a high-end server mainboard, based on Nvidia nForce™ Professional 2200 Media and Communications Processor (MCP) and AMD 8131 PCI-X HyperTransport™ Tunnel.

Designed to support up to two AMD Opteron™ (200 series) processors and 16GB of DDR400 memory, the S2891 is ideal for CPU, memory, and network intensive applications required in the HPC and clustering applications.

1.2 - Hardware Specifications

Processors
- Two uPGA 940-pin ZIF sockets
- Two onboard 4-phase VRM
- Supports one or two AMD Opteron™ processors
- Scalable 32bit and 64bit computing
- Integrated 144-bit DDR memory controller (128bit+16bit ECC)

Chipset
- Nvidia nForce Professional 2200 (CrushK8-04 Pro)
- AMD 8131™ PCI-X Tunnel
- Winbond W83627HF Super I/O
- Analog Devices ADT7463 Hardware Monitoring IC

Memory
- 128-bit dual channel memory bus
- Total Eight DDR DIMM sockets (Four per CPU)
- Supports up to 16GB Registered DDR
- Supports ECC and Chipkill
- Supports DDR400

Integrated Video Controller
- ATI® RAGE XL PCI VGA w/8MB onboard memory

Integrated LAN Controllers
- One Broadcom® BCM5704 Dual Port GbE

- Connected to PCI-X bus A (133MHz)
- Two RJ-45 LAN connectors with LEDs
- Two front panel LED headers

Integrated Enhanced IDE Controller
- Two IDE dual-drive ports for up to four EIDE devices
- Supports for ATA-133 IDE drives and ATAPI devices

System Management
- Total ten 3-pin fan headers with PWM support

- Seven fan headers with tachometer
- One 2-pin chassis intrusion hdr
- Temperature, voltage and fan monitoring
- Port 80h LED 7-segment display

Expansion Slots

- One PCI Express x16 slot with riser support for the following configuration
- One 16 slot
- Future multiple slot riser support in development (Check TYAN.COM for updates)
- One Tyan TARO™ SODIMM 100MHz (PCI-X B)
- One PCI-X 100MHz slot (PCI-X B)
- Total of three usable slots in pedestal chassis or two slots in 1U rackmount configuration

Integrated SATAII Controllers

- Two integrated dual port SATAII controllers
- Four SATA connectors support up to four drives
- Supports 3.0Gb/s per port
- NvRAID™ v2.0 support
- Supports RAID 0, 1, and 0+1

Integrated I/O

- One floppy connector supports up to two drives
- One parallel port header and two serial ports (one connector, one header)
- Six USB2.0 ports (two rear connectors & four front panel headers)
- One 15-pin VGA connector
- PS/2 mouse and keyboard connectors

Regulatory

- FCC Class B (DoC)
- European Community CE (DoC)

Intelligent Platform Management Interface Header

- Tyan Server Management Daughter card (optional) supports features listed below via SMDC header
- Baseboard Management Controller (BMC)
- Tailored for IPMI
- Supports KCS and BT styles
- Flexible Windows or Linux management solution
- Supports RMCP and SNMP protocols
- Supports ASF standard and EMP
- 1^2C serial multi-master controllers and UARTs
- Built-in IPMB connector
- Remote power on/off and reset support (IPMI-over-LAN)

BIOS

- Phoenix BIOS on 8Mbit LPC Flash ROM
- ACPI 2.0 and SRAT support
- PXE via Ethernet
- USB device boot
- SMBIOS 2.3.1, BBS 1.1 compliant
- 48-bit LBA support

Form Factor

- Extended ATX Footprint (12”x13”, 304.8x330.2mm)
- SSI 3.0/3.51 (24 + 8 pin) power connectors
- Serial (one) and VGA (one) connectors
- Stacked USB 2.0 (two) connectors
- Stacked PS/2 connectors
- Two RJ-45 LAN connectors with LEDs

1.3 - Software Specifications

OS (Operating System) Support
Microsoft Windows 2000
Microsoft Windows XP
Microsoft Windows Server 2003
SUSE Professional 9.x and SLES 9
RHEL3 Update 4
TYAN reserves the right to add support or discontinue support for any OS with or without notice.

Remember to visit TYAN's websit at http://www.tyan.com. There you can find information on all of TYAN's products with FAQs, manuals, and BIOS updates.

NOTES:

Chapter 2: Board Installation

Precautions: The Thunder K8SRE supports SSI, EPS12V type power supplies (24pin + 8pin) and will not operate with any other types. For proper power supply installation procedures see page 32.

DO NOT USE ATX 2.x or ATXGES power supplies as they will damage the board and void your warranty.

How to install our products right… the first time

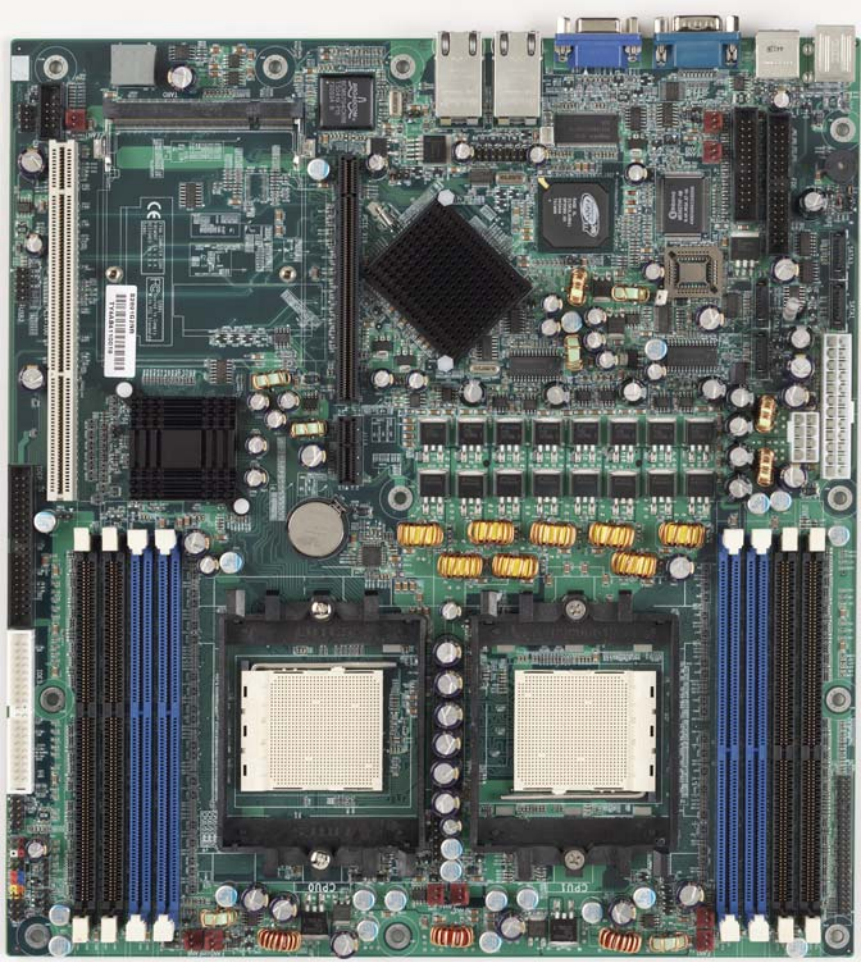
The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap.
(2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
(3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
(4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
(5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

NOTE	DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED

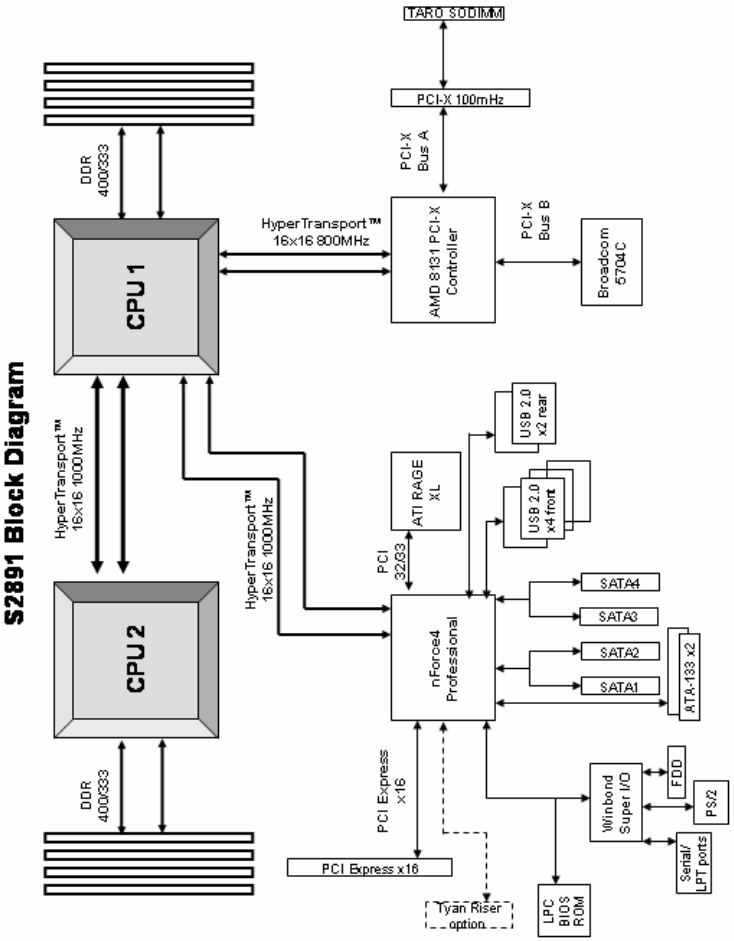
2.1- Board Image



This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

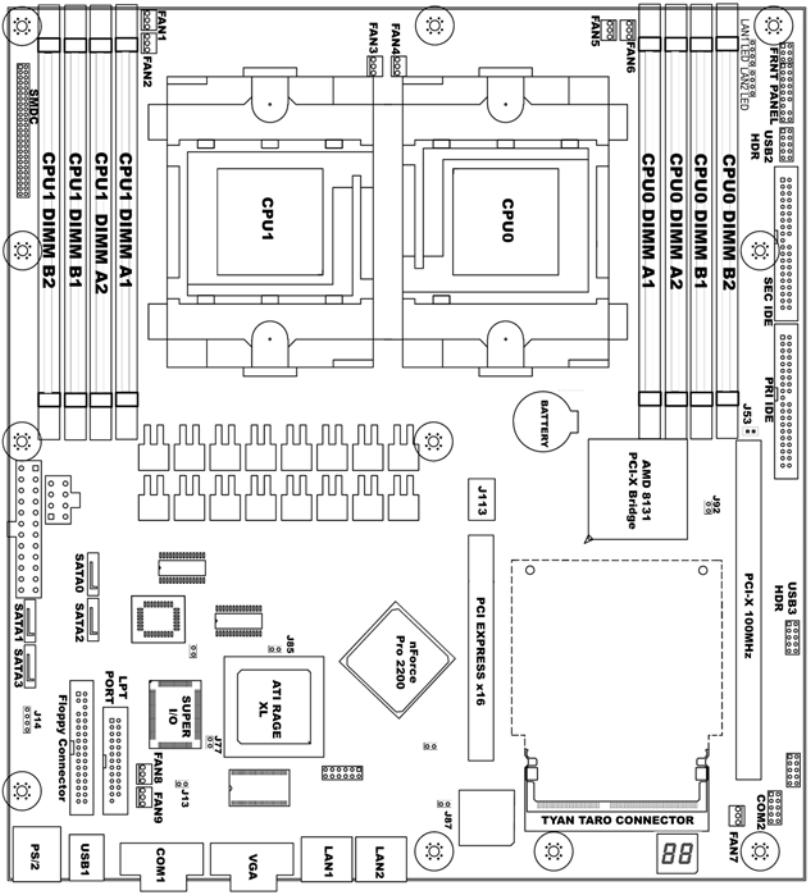
The following page includes details on the vital components of this motherboard.

2.2 - Block Diagram



Thunder K8SRE (S2891) Block Diagram

2.3 - Board Parts, Jumpers and Connectors

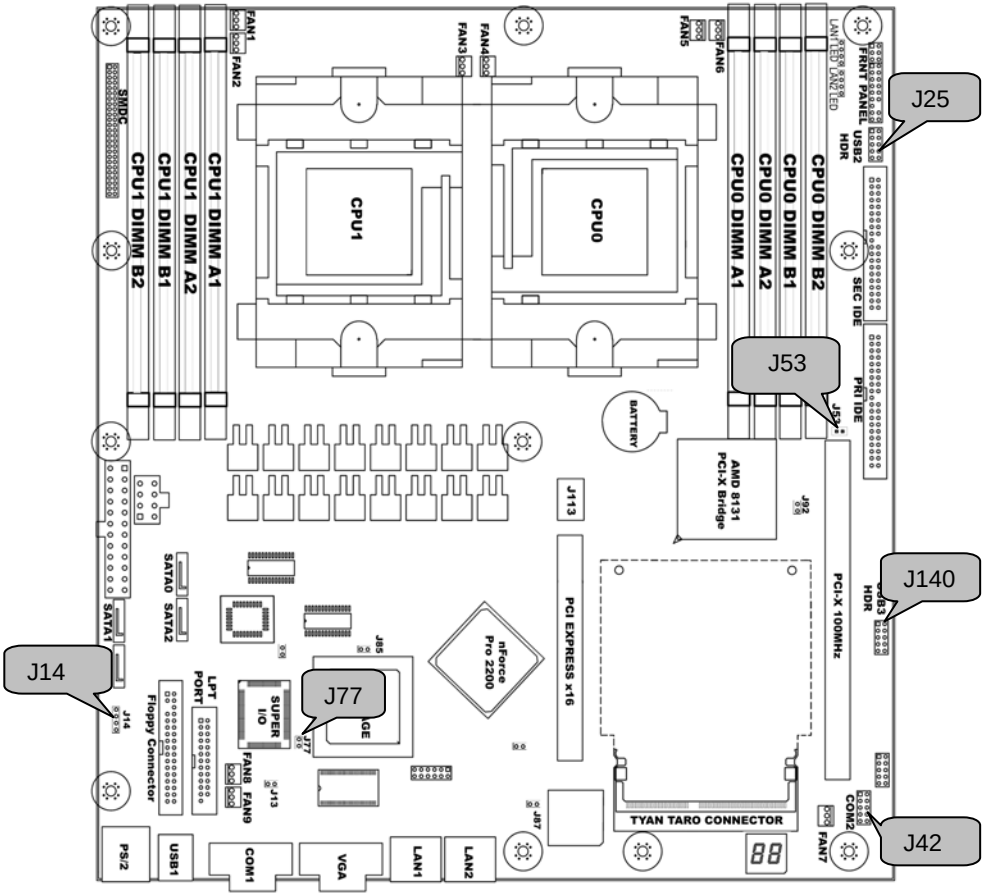


This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

Jumper Legend

▣▣	**OPEN** - Jumper OFF, without jumper cover
▣▣	**CLOSED** – Jumper ON, with jumper cover

Jumper/Connector	Function
J14	Onboard Buzzer/Speaker Header
J25/J140	USB Front Panel Header
J42	COM2 Header
J53	PCI-X Slot & TARO Connector Bus Speed Override
J73/J75	Front Panel LAN LED Headers
J77	INTR-Chassis Intrusion Header
J85	ATI Video Disable Jumper
J87	Gigabit Ethernet Disable Jumper
J112	Clear CMOS Jumper
J113	PCI Express x16 slot with riser card support
J139	Front Panel Header
TARO Connector	Connector for TYAN TARO™ SO-DIMM Controller Cards


J25
J53
J140
J14
J77
J42
CPU1 DIMM A1
CPU1 DIMM A2
CPU1 DIMM B1
CPU1 DIMM B2
CPU0 DIMM A1
CPU0 DIMM A2
CPU0 DIMM B1
CPU0 DIMM B2
CPU1
CPU0
FRNT PANEL
USB2
HDR
SEC IDE
PRI IDE
BATTERY
AMD 8131
PCI-X Bridge
PCI-X 100MHz
PCI EXPRESS x16
nForce
Pro 2200
SUPER
I/O
LPT
PORT
Floppy Connector
SATA0
SATA2
SATA1
TYAN TARO CONNECTOR
PS/2
USB1
COM1
VGA
LAN1
LAN2
COM2
FAN7

J14: Onboard Buzzer/Speaker Header

	**Closed Pin-3 and 4 (Default)** - Onboard Buzzer enabled
	**Open Pin-3 and 4** – Disable onboard buzzer or connect to chassis speaker.

J25 & J140: USB Front Panel Headers

	Use these headers to connect to chassis front panel USB connectors.

Signal	Pin	Pin	Signal
VCC	1	2	VCC
Data -	3	4	Data -
Data +	5	6	Data +
GND	7	8	GND
KEY	9	10	GND

J42: COM2 Header

	Use these pin definitions to connect a port to COM2.

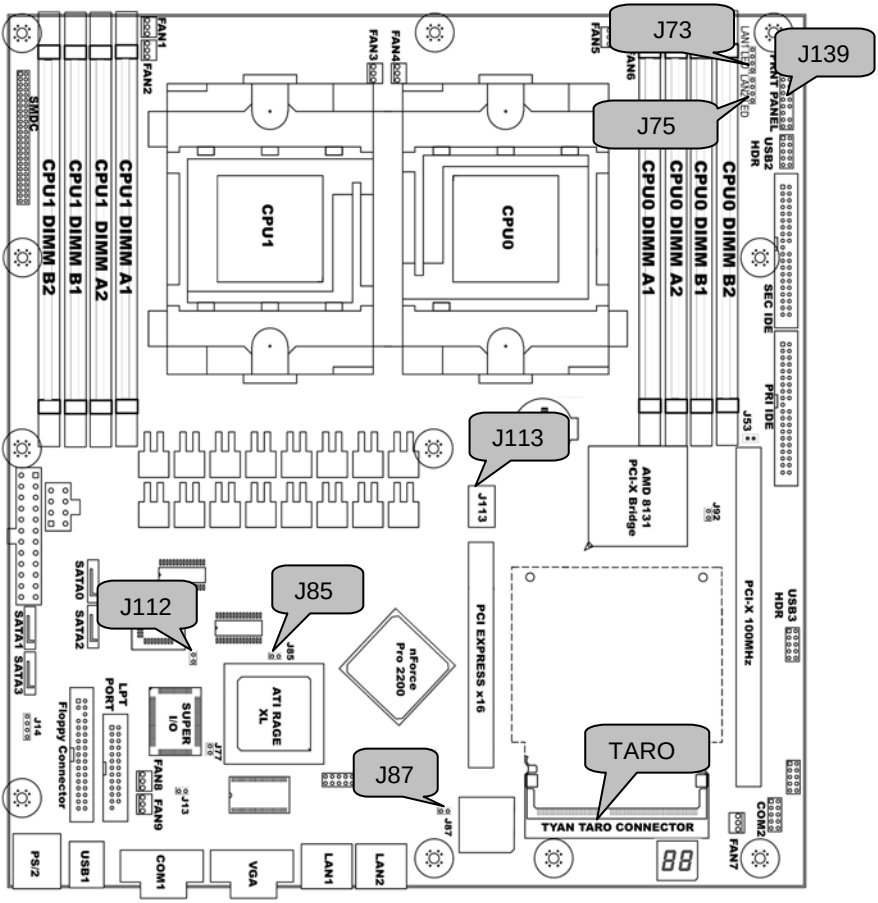
Signal	Pin	Pin	Signal
Data Carrier Detect	1	2	Data-Set-Ready
Receive-Data	3	4	Request-to-Send
Transfer-Data	5	6	Clear-to-Send
Data Terminal Ready	7	8	Ring-Indicator
Ground	9	10	NC/KEY

J77: INTR-Chassis Intrusion Header

	Pin1: Case Open Pin2: GND

J53: PCI-X Slot & TARO Connector Bus Speed Override

	Open-(Default) Allows PCI-X slot and the TARO slot to operate at up to 100MHz (Maximum one PCI-X 100 device)
	Closed-Forces PCI-X slot and the TARO slot to operate at a maximum bus speed of 66MHz.



J85: ATI Video Disable

■■	Open-(Default) Enable onboard video
■■	Closed-Disable onboard video

J113

The PCI Express x16 slot supports 1U or 2U riser cards. *See p. 4* for the detailed configuration.

J87: Gigabit Ethernet Disable

	Open-(Default) Enable onboard Gigabit Ethernet
	Closed-Disable onboard Gigabit Ethernet

J112: Reset CMOS Jumper

 (Clear)  (Default)	You can reset CMOS settings by using this jumper if you have lost your system/setup password or need to clear system BIOS setting. Power off system and **disconnect both power connectors from the motherboard.** Use jumper cap to close J112 for several seconds to Clear CMOS. Remove jumper cap (default setting). Reconnect power & power on system.

J139: Front Panel Header

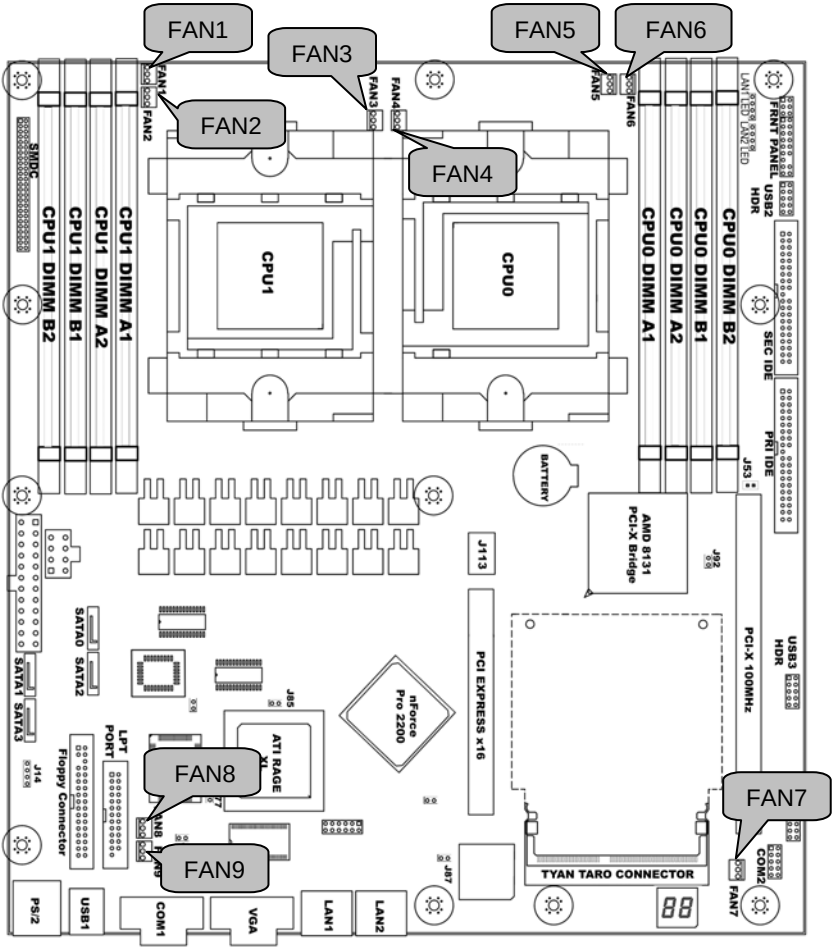
HDDLED+	1		2	PWR LED+
HDDLED-	3		4	PWR LED-
Reset SW	5		6	PWR SW
Reset SW	7		8	PWR SW
+5V	9		10	SLEEP SW
NC	11		12	SLEEP SW
+5V Standby	13		14	NC (KEY)
SMBUS DATA	15		16	GND
SMBUS CLOCK	17		18	Chassis Intr# (Active Low)

J73/J75: Front Panel LAN LED Headers

	Pin1	Yellow+	100Mb LNK/ACT	Gigabit LNK/ACT
	Pin2	Yellow-		
	Pin3	Green+	10Mb LNK/ACT	
	Pin4	Green-		

TARO SO-DIMM Connector

The TARO connector supports TYAN *M7901*, *M7902* and *M8110*.


FAN1
FAN3
FAN5
FAN6
FAN2
FAN4
FAN8
FAN7
FAN9
CPU1
CPU0
CPU1 DIMM A1
CPU1 DIMM A2
CPU1 DIMM B1
CPU1 DIMM B2
CPU0 DIMM A1
CPU0 DIMM A2
CPU0 DIMM B1
CPU0 DIMM B2
BATTERY
AMD 8131 PCI-X Bridge
PCI EXPRESS x16
nForce Pro 2200
ATI RAGE XL
TYAN TARO CONNECTOR
PCI-X 100MHz
SATA0
SATA2
SATA1
SATA3
LPT PORT
Floppy Connector
PS/2
USB1
COM1
VGA
LAN1
LAN2
COM2

Fan Connectors and Hardware Monitoring

1 2 3  **Pin1=Ground** **Pin2= +12v** **Pin3= Tachometer**	Use these headers to connect the processor or chassis cooling fan to your motherboard to keep the system stable and reliable.

FAN1	Direct +12V from power supply (No power control and tachometer monitor)
FAN2	Fan power control: ADT7463A pin10 Fan tachometer monitor: ADT7463A pin12
FAN3	Fan power control: W83627HF/AW pin116 Fan tachometer monitor: W83627HF/AW pin113
FAN4	Fan power control: W83627HF/AW pin115 Fan tachometer monitor: W83627HF/AW pin112
FAN5	Direct +12V from power supply (No power control and tachometer monitor)
FAN6	Fan power control: ADT7463A pin11 Fan tachometer monitor: ADT7463A pin24
FAN7	Direct +12V from power supply (No power control and tachometer monitor)
FAN8	Fan tachometer monitor: W83627HF/AW pin111
FAN9	Fan power control: ADT7463A pin13 Fan tachometer monitor: ADT7463A pin9

CPU Temperature Monitoring

CPU1: ADT7463A pin15 and 16 (with processor differential thermal output)
CPU2: ADT7463A pin17 and 18 (with processor differential thermal output)
CPU1 area: W83627HF/AW pin104 (with R1794 10K themistor)
CPU2 area: W83627HF/AW pin103 (with R1792 10K themistor)
CPU VRM area: W83627HF/AW pin102 (with R179310K themistor)

Voltage Monitoring

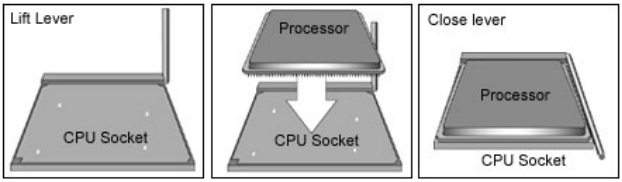
+12V	ADT7463A pin21
+5V	ADT7463A pin20
3.3V	W83627HF pin98
+3.3V standby	ADT7463A pin4
CPU1 Vcore 1.55 V	W83627HF pin100
CPU2 Vcore 1.55 V	W83627HF pin99
CPU1 DDR VTT 1.25V	W83627HF pin96
CPU2 DDR VTT 1.25V	ADT7463A pin23
CPU1 DDR 2.5V	W83627HF pin95
CPU2 DDR 2.5V	ADT7463A pin22

2.4 - Installing the Processor(s)

Your brand new Thunder K8SRE supports the latest 64-bit processor technology from AMD. Only AMD Opteron™ processor 200 series are certified and supported with this motherboard.
Check our website for latest processor support. **http://www.tyan.com**

NOTE If using a single processor, it MUST be installed in socket CPU0. When using a single processor only CPU0 memory banks are addressable.

TYAN is not liable for damage as a result of operating an unsupported configuration.



The diagram is provided as a visual guide to help you install socket processors and may not be an exact representation of the processors you have.

Step 1: Lift the lever on the socket until it is approximately 90° or as far back as possible to the socket.
Step 2: Align the processor with the socket. There are keyed pins underneath the processor to ensure that the processor's installed correctly.
Step 3: Seat the processor firmly into the socket by gently pressing down until the processor sits flush with the socket.
Step 4: Place the socket lever back down until it locks into place. The installation is finished.
Repeat these steps for the second processor if you are using two processors.

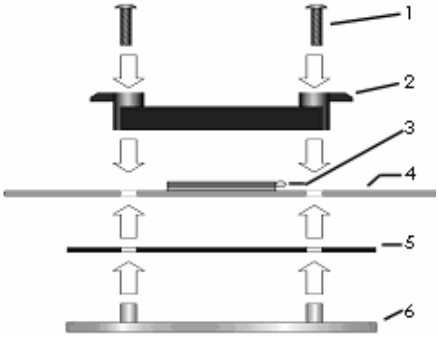
Take care when installing processors as they have very fragile connector pins below the processor and can bend and break if inserted improperly.

2.5 - Heatsink Retention Frame Installation

After you are done installing the processor(s), you should proceed to installing the retention frame and heatsink. The CPU heatsink will ensure that the processors do not overheat and continue to operate at maximum performance for as long as you own them. Overheated processors are also dangerous to the motherboard.

The backplate assembly prevents excessive motherboard flexing in the area near the processor and provides a base for the installation of the heatsink retention bracket and heatsink.

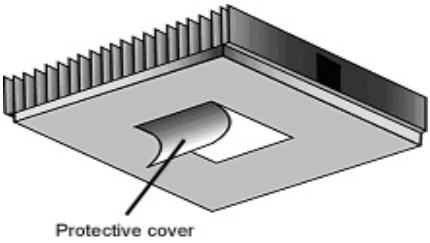
Because there are many different types of heatsinks available from many different manufacturers, a lot of them have their own method of installation. For the safest method of installation and information on choosing the appropriate heatsink, use heatsinks validated by AMD. Please refer to AMD's website at www.amd.com.
The following diagram will illustrate how to install the most common CPU back plates:



1. Mounting screws
2. Heatsink retention frame
3. CPU socket
4. Motherboard PCB
5. Adhesive insulator material
6. Backplate assembly

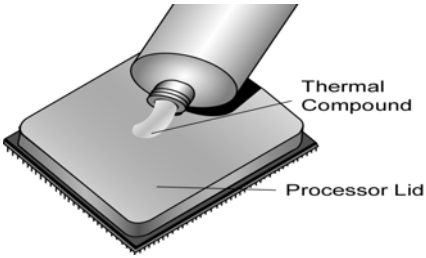
NOTE: Please see next section for specific instructions on how to install mounting bracket.

2.6 - Thermal Interface Material



There are two types of thermal interface materials designed for use with the AMD Opteron processor.

The most common material comes as a small pad attached to the heatsink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heatsink on the processor.



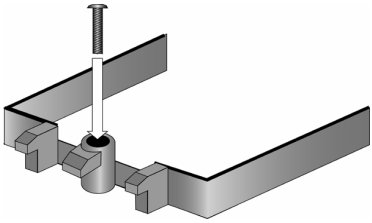
The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

NOTE

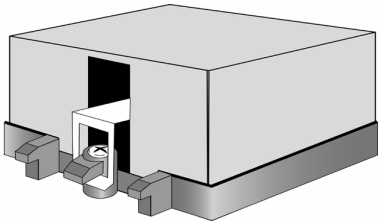
Always check with the manufacturer of the heatsink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements

2.7 - Heatsink Installation Procedures

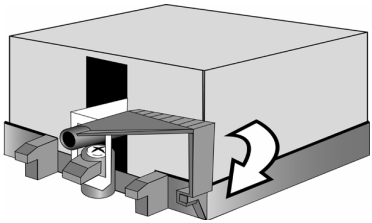
Type A: CAM LEVER (TYPE) INSTALLATION



1. After placing backplate and interface material under motherboard place heatsink retention frame on top of motherboard. Align plastic retention bracket screw holes with CPU back-plate standoffs.
Tighten screws to secure plastic retention bracket. Repeat for the other side. **DO NOT OVER TIGHTEN.**

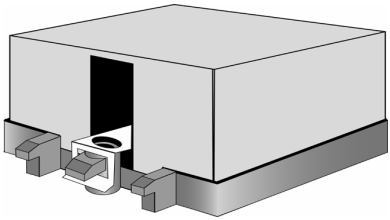


2. After tightening screws secure metal clip to plastic retention bracket center tab. Repeat for the other side of heatsink.

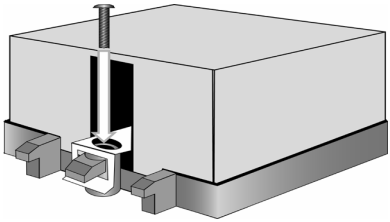


3. After securing metal clip to plastic retention bracket center tab, push down on plastic clip to lock plastic clip to side tab.

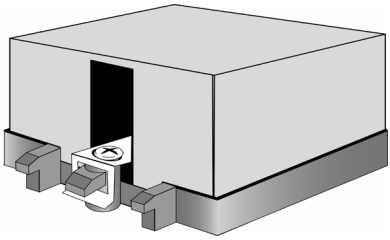
Type B: SCREW RETENTION TYPE HEATSINK



1. After placing CPU back-plate and adhesive interface material under motherboard, place heatsink retention frame on top of motherboard. Align heatsink retention frame screw hole with backplate assembly standoffs. Place heatsink inside plastic retention bracket. Place metal clip over retention frame tab. Repeat for other side.



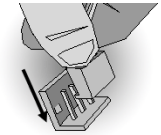
2. Insert screw through metal clip. **BE SURE METAL CLIP IS LOCKED ONTO RETENTION FRAME TAB.**



3. Tighten screw through metal clip. Repeat on the other side. **DO NOT OVER TIGHTEN.**

2.8 - Finishing Installing the Heatsink

After you have finished installing the heatsink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heatsink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.



Once you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

2.9 - Tips on Installing Motherboard in Chassis

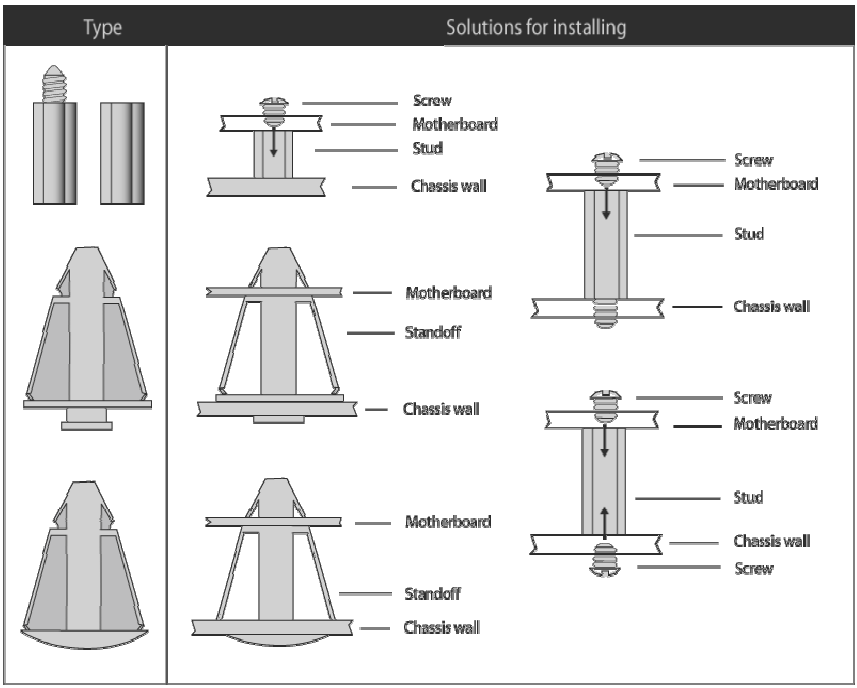
Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

Pay attention when installing board in chassis. Some components are near the mounting holes and can be damaged.

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.

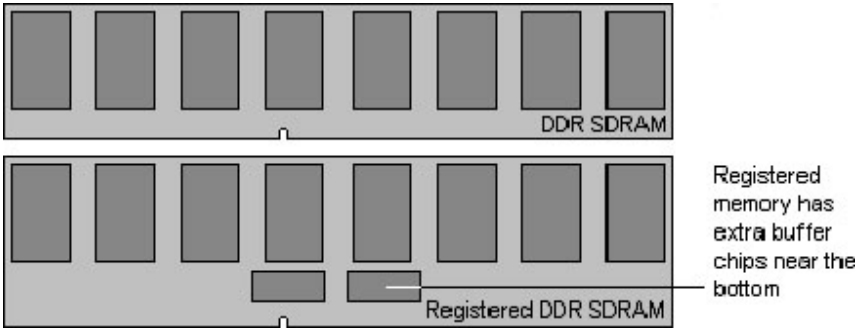
Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard



2.10 - Installing the Memory

Before attempting to install any memory, make sure that the memory you have is compatible with the motherboard as well as the processor.
The following diagram shows common types of DDR SDRAM modules:



Here are a few key points to note before installing memory into your Thunder K8SRE:

- **Always install memory beginning with CPU0 DIMMA1.**
- **In order to access memory on CPU1, both processors must be installed.**
- **Single, pairs, or four modules are supported on each CPU.**
- **Configure memory symmetrically on each CPU for best performance.**
- **AMD Opteron™ processors support 64bit (non-interleaved) or 128bit (interleaved) memory configurations**
- **At least ONE Registered DDR SDRAM module must be installed for the system to turn on and POST (power on self test)**
- 128MB, 256MB, 512MB, 1GB, and 2GB* Registered DDR400/333/266 DDR memory modules are supported
- All installed memory will be automatically detected
- The Thunder K8SRE supports up to 16GB* with two CPU's installed.

***** *Not validated at time of print*

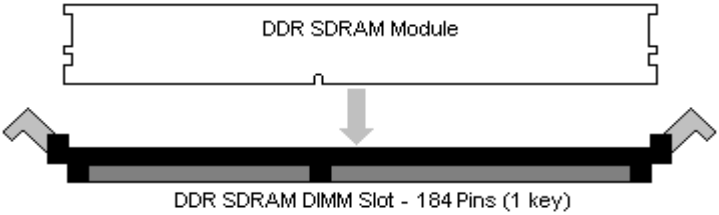
This following chart outlines the rules for populating memory

(Note: X indicates a populated DIMM Slot)

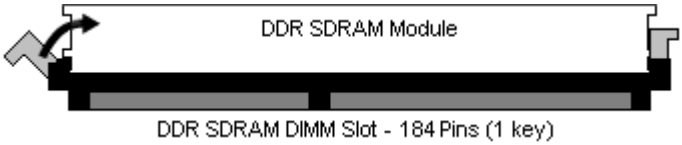
Memory Configuration Chart								
	CPU0 DIMM-A1	CPU0 DIMM-A2	CPU0 DIMM-B1	CPU0 DIMM-B2	CPU1 DIMM-A1	CPU1 DIMM-A2	CPU1 DIMM-B1	CPU1 DIMM-B2
128 bit memory support	X	X						
	X	X			X	X		
	X	X	X	X				
	X	X			X	X	X	X
	X	X	X	X	X	X	X	X
			X	X			X	X
					X	X		
					X	X	X	X
					X	X	X	X
					X	X	X	X
64 bit memory support	X							
	X		X					
	X				X			
	X						X	
			X		X			
			X				X	

Memory Installation Procedure

When you install the memory modules, make sure the module aligns properly with the memory slot. The modules are keyed to ensure that it is inserted only one way. The method of installing memory modules are detailed by the following diagrams.



Once the memory modules are firmly seated in the slot, two latches on either side will close and secure the module into the slot. Sometimes you may need to close the latches yourself.



To remove the memory module, simply push the latches outwards until the memory module pops up. Then remove the module.

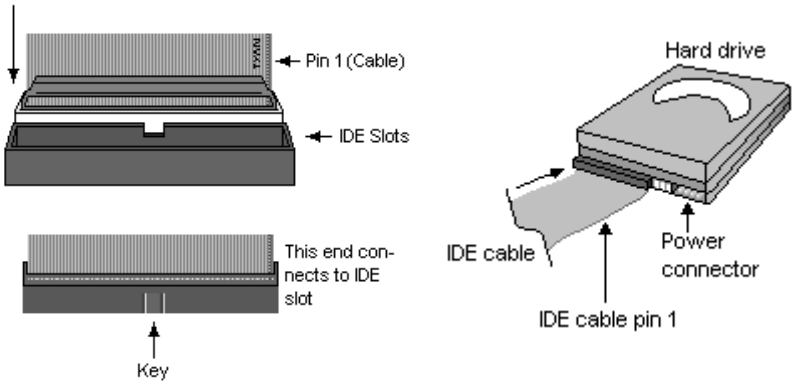
NOTE

YOU MUST ALWAYS unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

2.11 - Attaching Drive Cables

Attaching IDE Drive Cable
Attaching the IDE drive cable is simple. The cable is “keyed” to only allow it to be connected in the correct manner.

Attaching IDE cable to the IDE connector is illustrated below:



Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end into the drive. Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard. The other two connectors are used to connect to drives.

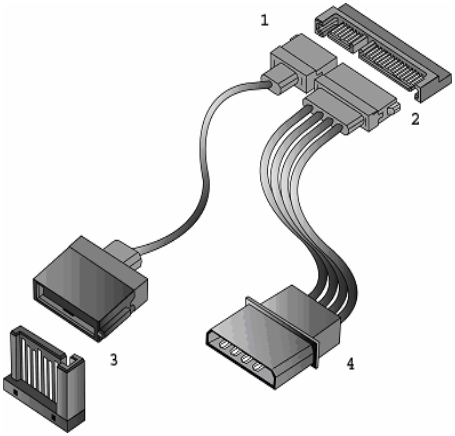
Note: Always remember to properly set the drive jumpers. If only using one device on a channel, it must be set as Master for the BIOS to detect it.

TIP: Pin 1 on the IDE cable (usually designated by a colored wire) faces the drive’s power connector.

Attaching Serial ATA Cables
The Thunder K8SRE is also equipped with 4 Serial ATA (SATA) channels. Connections for these drives are also very simple.

There is no need to set Master/Slave jumpers on SATA drives.

The following pictures illustrate how to connect an SATA drive



1.SATA drive cable connection

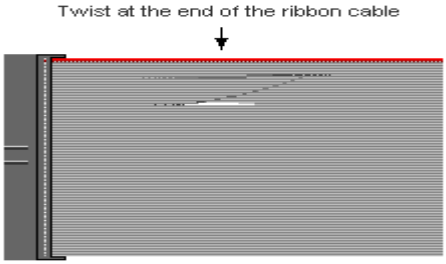
2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

Attaching Floppy Drive Cables

Attaching floppy diskette drives are done in a similar manner to hard drives. See the picture below for an example of a floppy cable. Most of the current floppy drives on the market require that the cable be installed with the colored stripe positioned next to the power connector. In most cases, there will be a key pin on the cable which will force a proper connection of the cable.

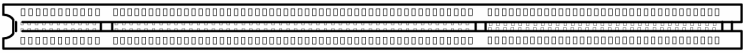


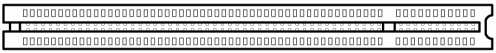
Attach first floppy drive (drive **A:**) to the end of the cable with the twist in it. Drive **B:** is usually connected to the next possible connector on the cable (the second or third connector after you install Drive **A:**).

2.12 - Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the most common slots that may appear on your motherboard. Not all of the slots shown will necessarily appear on your motherboard.

PCI-X 100 MHz Slot





PCI-Express x16 Slot

Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

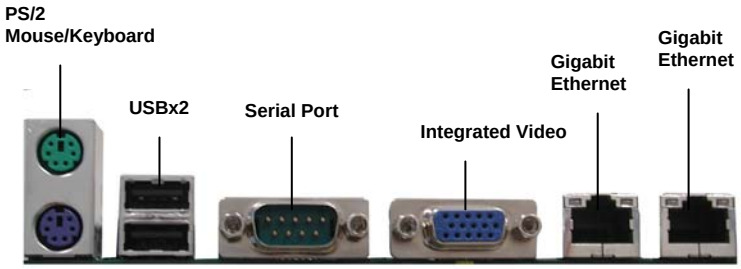
Slot or Device	IDSEL#	Bus#	INTA	INTB	INTC	INTD
PCI Express Slot #1	N/A	PCIX-Express	N/A	N/A	N/A	N/A
PCI-X Slot #2	AD24	PCIX-A	INTA	INTB	INTC	INTD
SODIMM TARO	AD26	PCIX-A	INTC	INTD	N/A	N/A
Onboard GB LAN	AD25	PCIX-B	INTA	INTB	N/A	N/A
Onboard ATI	AD23	PCIX Bus0	INTC		N/A	N/A

NOTE

YOU MUST ALWAYS unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

2.13 - Connecting External Devices

Your motherboard supports a number of different interfaces for connecting peripherals. Some I/O ports may not be available with the board due to the different configurations.



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

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.

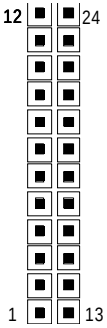
10/100/1000 Mbps LAN Link/Activity LED Scheme			
LEFT RIGHT		Left LED	Right LED
10 Mbps	Link	Green	Off
	Active	Blinking Green	Off
100 Mbps	Link	Green	Green
	Active	Blinking Green	Green
1000 Mbps	Link	Green	Orange
	Active	Blinking Green	Orange
No Link		Off	Off

2.14 - Installing the Power Supply

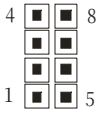
There are two power connectors on your Thunder K8SRE.
The Thunder K8SRE requires an EPS12V (24 pin + 8 pin) power supply to boot.

Please be aware that ATX 2.x and ATXGES power supplies are not compatible with the board and can damage the motherboard and/or CPU(s).

EPS12V Main Power 24-Pin
(Chipsets & Components)



12	+3.3V	24	GND
11	+12V2	23	+5V
10	+12V2	22	+5V
9	+5VSB	21	+5V
8	PWR OK	20	RESVD
7	GND	19	GND
6	+5V	18	GND
5	GND	17	GND
4	+5V	16	PSON#
3	GND	15	GND
2	+3.3V	14	-12V
1	+3.3V	13	+3.3V



EPS 12V 8-pin (CPU Power)

4	GND	8	+12V3
3	GND	7	+12V3
2	GND	6	+12V3
1	GND	5	+12V3

Applying power to the board

1. Connect the EPS 12V 8-pin power connector.
2. Connect the EPS 12V 24-pin power connector.
3. Connect power cable to power supply and power outlet

NOTE

YOU MUST unplug the power supply from the wall outlet before plugging the power cables to motherboard connectors.

2.15 – Finishing Up

Congratulations on making it this far! You're finished setting up the hardware aspect of your computer. 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.
In the rare circumstance that you have experienced 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 or by **calling your vendor's support line.**

Chapter 3: BIOS Setup

3.1 - BIOS Setup Utility

With the BIOS setup utility, you can modify BIOS settings and control the special features of your computer. The setup utility uses a number of menus for making changes and turning the special features on or off.

NOTE	All menus are based on a typical system. The actual menus displayed on your screen may be different and depend on the hardware and features installed in your computer.

To start the BIOS setup utility:

a. Turn on or reboot your system
b. Press <F2> during POST (F4 on remote console) to start BIOS setup utility

To select an item
Use the left/right (← →) arrow keys to make a selection

To display a sub-menu (A pointer " ▸ " marks all sub menus)
Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>.

3.2 - BIOS Menu Bar

The menu bar at the top of the windows lists these selections:

Main	To configure basic system setups
Advanced	To configure the advanced chipset features
Memory	To configure system memory features
Boot	To configure system boot order
Exit	To exit setup utility

NOTE Options written in **bold type** represent the BIOS setup default

3.3 - BIOS Legend Bar

The chart describes the legend keys and their alternates:

Key	Function
<F1> or <Alt-H>	General help window
<ESC>	Exit current menu
← → arrow keys	Select a different menu
↑ or ↓ arrow keys	Select different item
<+> or <->	Change values
<F9>	Load the Optimal default configuration values of the menu
<F10>	Select the previous value/setting of the field
<Enter>	Execute command or select submenu

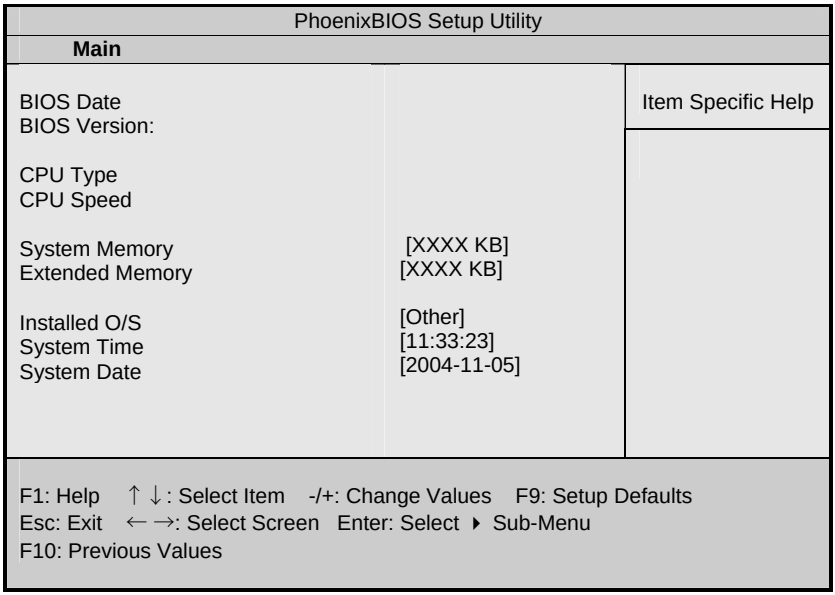
3.4 - Getting Help

Pressing [**F1**] will display 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 [**F1**] key again.

3.5 - BIOS Main Menu

The Main BIOS Menu is the first screen that you can navigate. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured, options in blue can be changed.

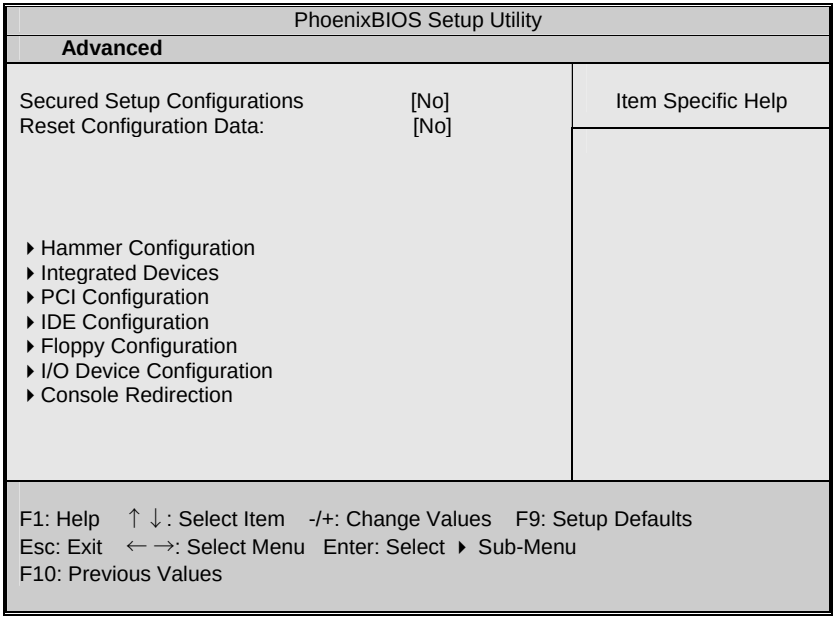
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany it.



Feature	Option	Description
System Time	**HH:MM:SS**	Set the system time
System Date	**MM:DD: YYYY**	Set the system date

3.6 - BIOS Advanced Menu

You can select any of the items in the left frame of the screen, such as Hammer Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

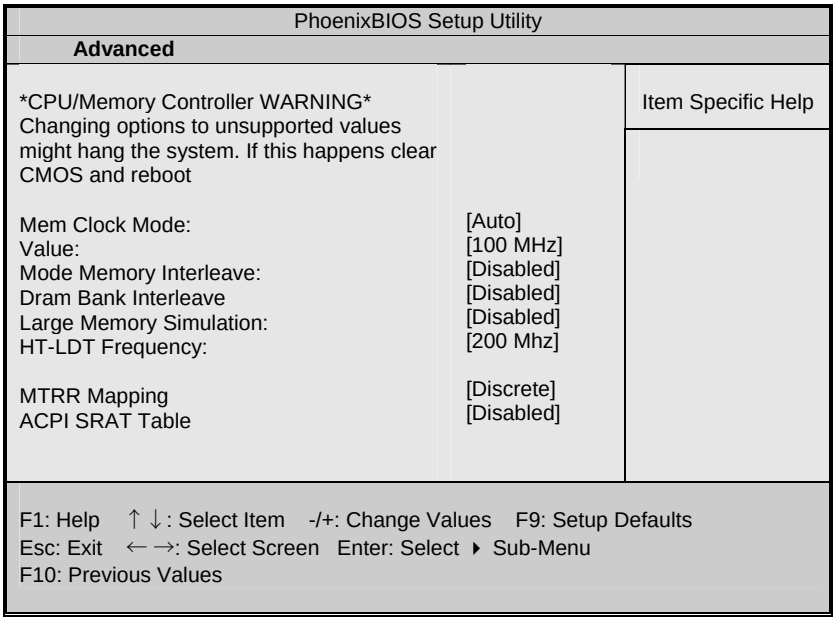


Feature	Option	Description
Secured Setup Configurations	**No**	Choosing "Yes" will prevents a Plug and Play Operation System from changing system settings.
	Yes	
Reset Configuration Data	**No**	Select "Yes" if you want to clear the Extended System Configuration Data (ESCD) area.
	Yes	
Hammer Configuration	**Menu Item**	Set Hammer Configuration.
Integrated Devices	**Menu Item**	Set integrated devices.

PCI Configuration	**Menu Item**	Configure PCI devices.
IDE Configuration	**Menu Item**	Configure IDE interface.
Floppy Configuration	**Menu Item**	Configure floppy interface.
I/O Device Configuration	**Menu Item**	Peripheral configuration
Console Redirection	**Menu Item**	Additional setup menus to configure console.

3.6.1 – Hammer Configuration Sub-Menu

You can use this screen to select options for the Hammer Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

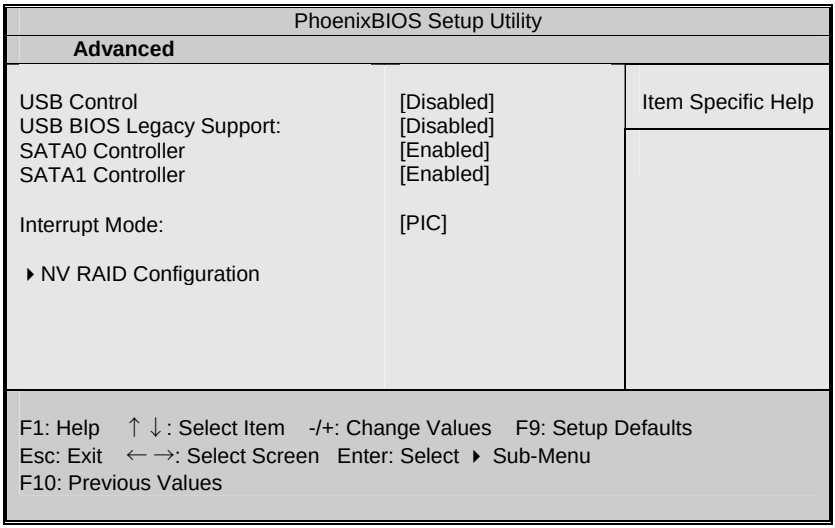


Feature	Option	Description
Mem Clock Mode	**Auto**	Select Memory Clock frequency.
	Limit	

Node Memory Interleave	**Disabled**	Interleave memory blocks across Processor Nodes. BIOS will auto detect capability of memory system.
	Enabled	
Dram Block Interleave	**Disabled**	Interleave memory blocks across dram chip selects. BIOS will auto detect capability on each node.
	Enabled	
Large Memory Simulation	**Disabled**	Enable LMS mode only when one CPU is installed with 64G or more memory.
	Enabled	
MTRR Mapping	**Discrete**	Configure MTRR mode.
	Continuous	
ACPI SRAT Table	**Disabled**	Enable ACPI2.0 static resources affinity table for ccNUMA systems.
	Enabled	

3.6.2 - Integrated Devices Sub-Menu

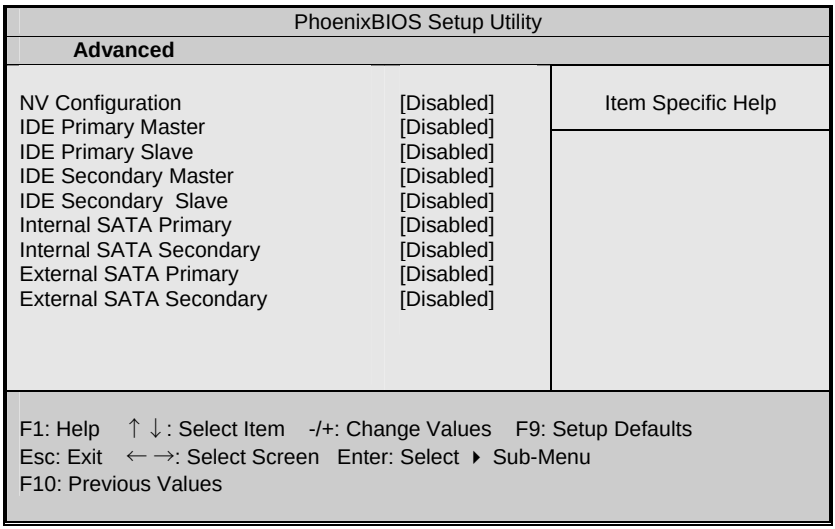
You can use this screen to select options for the Integrated Devices settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
USB Control	**Disabled**	Set USB controllers.
	USBA+USBB	
	USBA+ USBB+USB2	
USB BIOS Legacy Support	**Disabled**	Set support for USB Keyboard/Mouse.
	Enabled	
SATA0 Controller	**Enabled**	Set First Serial ATA device.
	Disabled	
SATA1 Controller	**Enabled**	Set Second Serial ATA device.
	Disabled	
Interrupt Mode	**PIC**	Select Interrupt Mode between 8259/PIC mode or APIC mode.
	8529/PIC	
NV RAID Configuration	**Menu Item**	Set Nvidia RAID control.

NV Configuration

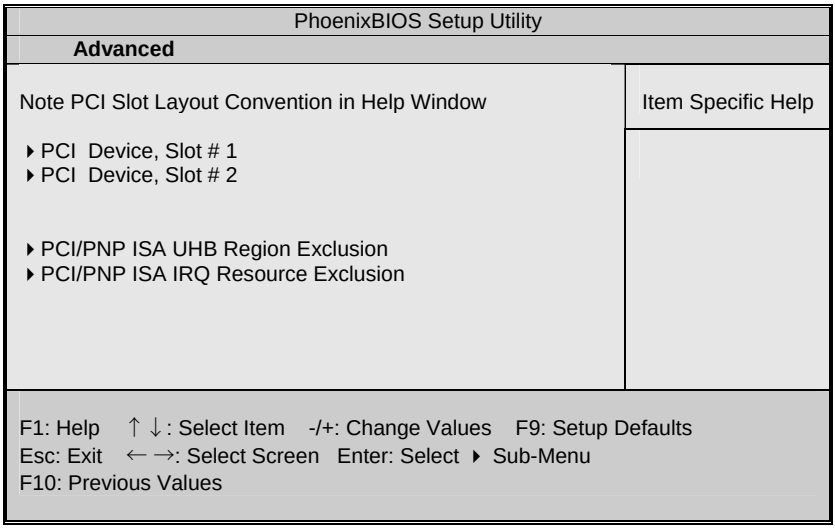
You can use this screen to select options for the NV Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
NV Configuration	**Enabled**	Set Nvidia RAID control.
	Disbled	
IDE Primary/Secondary Master/Slave	**Disabled**	Enable the drive as RAID.
	Enabled	
Internal SATA Primary/Secondary	**Disabled**	Enable the drive as RAID.
	Enabled	
External SATA Primary/Secondary	**Disabled**	Enable the drive as RAID.
	Enabled	

3.6.3 - PCI Configuration Sub-Menu

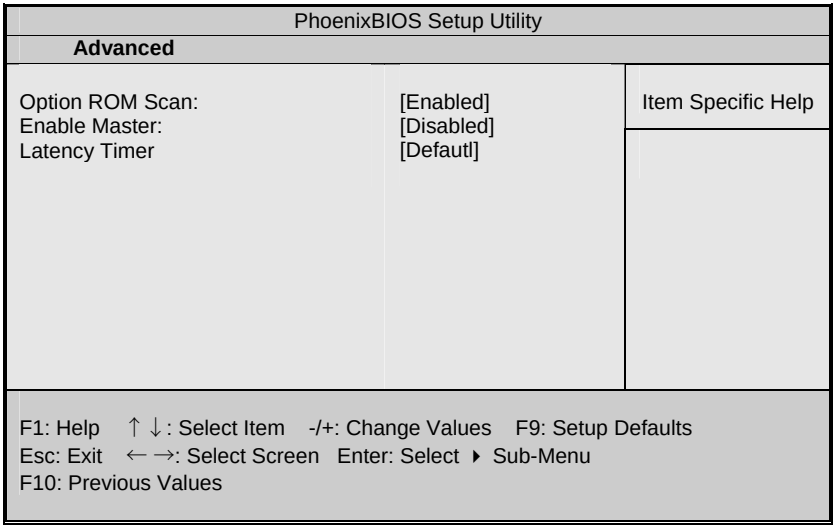
You can use this screen to select options for the PCI Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
PCI Device, Slot #1 & 2	**Menu Item**	Select PCI slot configuration.
PCI/PNP ISA UHB Region Exclusion	**Menu Item**	Reserve specific upper memory blocks for use by legacy ISA devices.
PCI/PNP ISA IRQ Resource Exclusion	**Menu Item**	Reserve the specific IRQs for use by legacy ISA devices.

PCI Device, Slot # 1 & 2

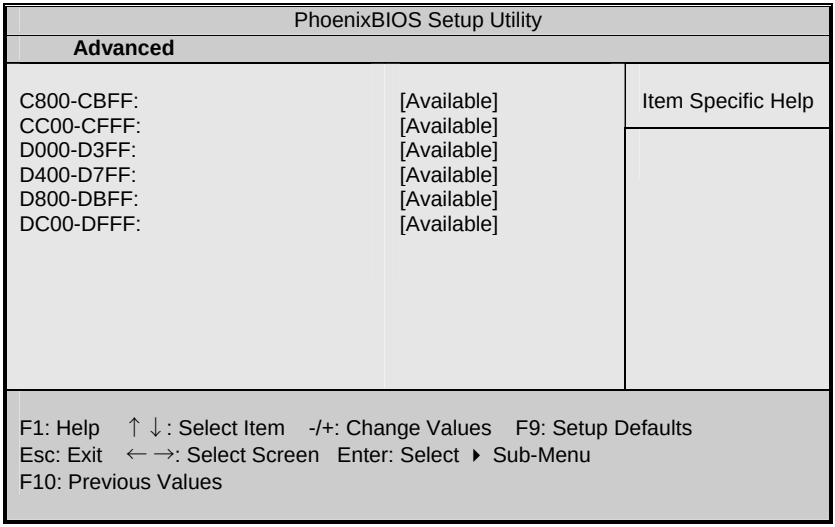
You can use this screen to select options for the PCI Device, Slot # 1 & 2 settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
Option ROM Scan	**Enabled**	Initialize device expansion ROM.
	Disabled	
Enable Master	**Disabled**	Enable selected device as a PCI bus master.
	Enabled	
Latency Timer	**Default**	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks.
	0020h	

PCI/PNP ISA UHB Region Exclusion

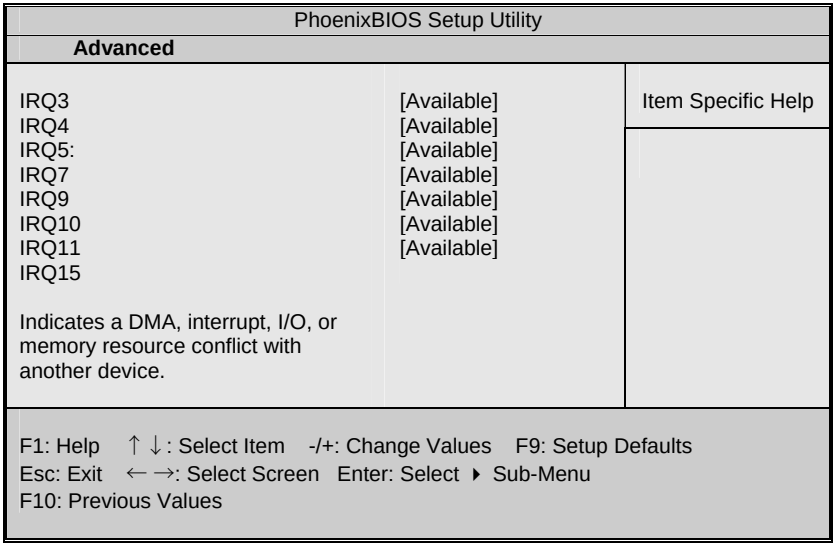
You can use this screen to select options for the PCI/PNP ISA UHB Region Exclusion settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
C800-CBFF, CC00-CFFF D000-D3FF, D400-D7FF D800-D8FF, DC00-DFFF	**Available**	Reserves the specified block of upper memory for use by legacy ISA devices.
	Reserved	

PCI/PNP ISA IRQ Resource Exclusion

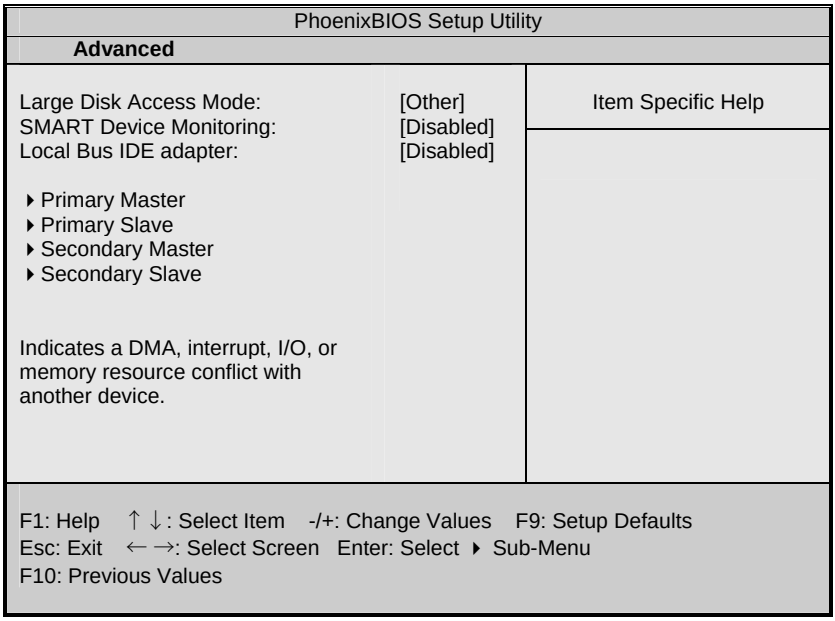
You can use this screen to select options for the PCI/PNP IRQ Resource Exclusion settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
IRQ3/4/5/7/9/10/11/15	**Available**	Reserves the specified IRQ for use by legacy ISA devices.
	Reserved	

3.6.4 - IDE Configuration Sub-Menu

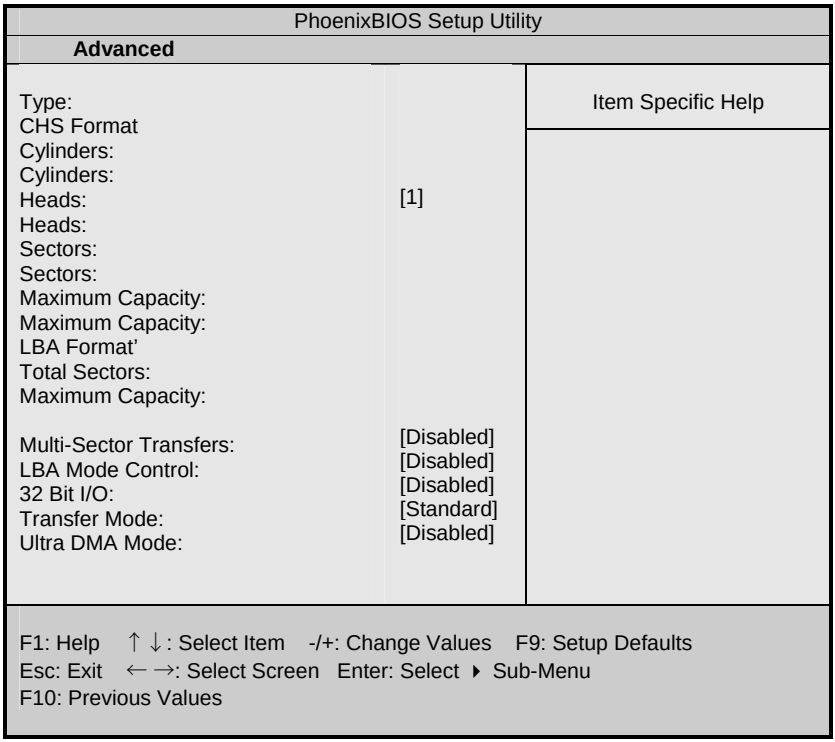
You can use this screen to select options for the IDE Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
Large Disk Access Mode	**Other**	Select the IDE access mode.
	DOS	
SMART Device Monitoring	**Disabled**	IDE failure prediction.
	Enabled	
Local Bus IDE adapter	**Both**	Enable the integrated local bus IDE adapter.
	Disabled	
	Primary	
	Secondary	
Primary Master/Slave	**Menu Item**	Configure the IDE channel.
Secondary Master/Slave	**Menu Item**	Configure the IDE channel.

Primary Master/Slave, Secondary Master/Slave

The following screen shows the information of IDE device.

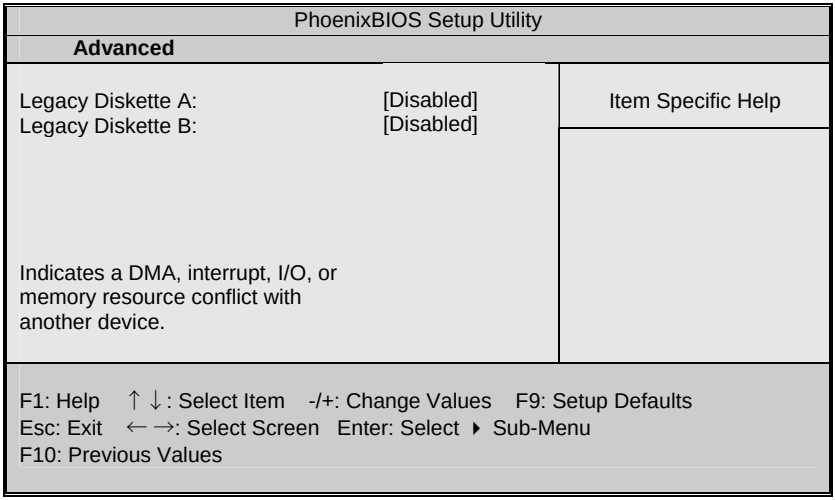


Feature	Option	Description
Multi-Sector Transfers	**Disabled**	Specify the number of sectors per block for multiple sector transfer.
	Enabled	
LBA Mode Control	**Disabled**	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads_Sectors.
	Enabled	
32 Bit I/O	**Disabled**	This setting enables or disables 32 bit IDE data transfers.
	Enabled	
Transfer Mode	**Standard**	Select the method for moving data to/from the drive.
	Fast PIO 1	

Ultra DMA Mode	**Disabled**	Select the Ultra DMA mode used for moving data to/from the drive.
	Enabled	

3.6.5 - Floppy Configuration Sub-Menu

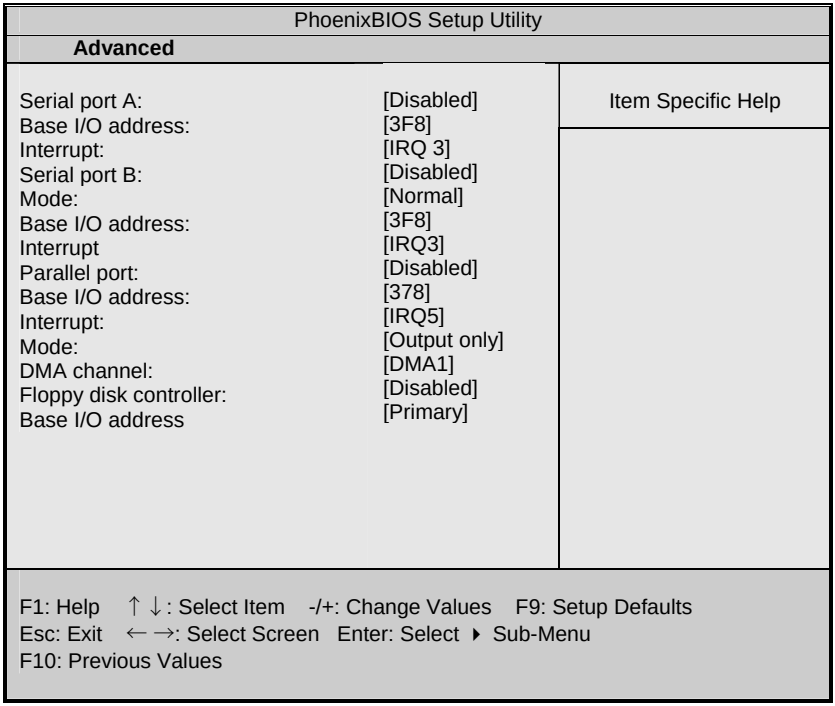
You can use this screen to select options for the Floppy Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
Legacy Diskette A/B	**Disabled**	Select floppy type
	Enabled	

3.6.6 - I/O Device Configuration Sub-Menu

You can use this screen to select options for the I/O Device Configuration settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

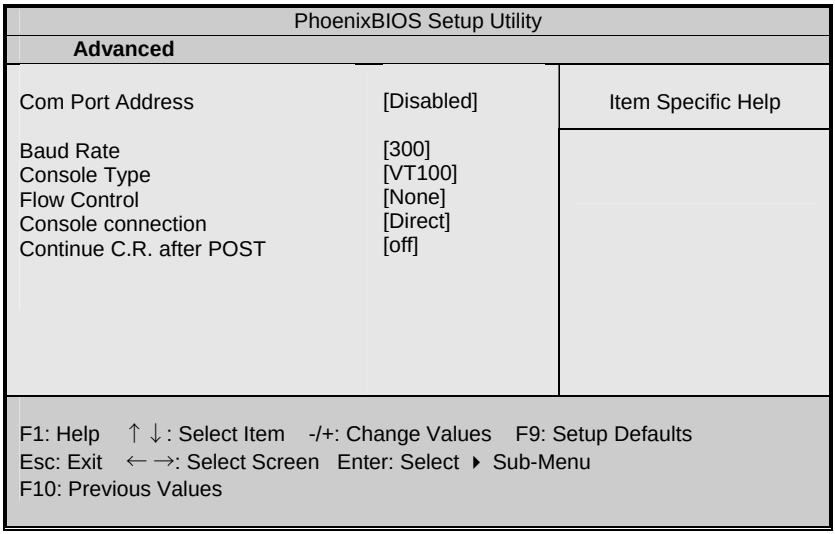


Feature	Option	Description
Serial port A	**Disabled**	Configure serial port A using options.
	Enabled	
Base I/O address	**3F8**	Set the base I/O address for serial port A.
	2F8	
Interrupt	**IRQ3**	Set the interrupt for serial port A.
	IRQ4	
Serial port B	**Disabled**	Configure serial port B using options.
	Enabled	
Mode	**Normal**	Set the mode for Serial port B using options.
	IR	
Base I/O address	**3F8**	Set the base I/O address for serial port B.
	2F8	

Interrupt	**IRQ3**	Set the interrupt for serial port B
	IRQ4	
Parallel port	**Disabled**	Configure parallel port using options.
	Enabled	
Base I/O Address	**378**	Set the base I/O address for parallel port.
	278	
Interrupt	**IRQ5**	Set the interrupt for parallel port.
	IRQ7	
Mode	**Output only**	Set the mode for parallel port using options.
	Bi-directional	
DMA channel	**DMA 1**	Set the DMA channel for parallel port.
	DMA 3	
Floppy disk controller	**Disabled**	Configure Floppy disk controller using options.
	Enabled	
Base I/O address	**Primary**	Set the base I/O address for parallel port.
	Secondary	

3.6.7 – Console Redirection Sub-Menu

You can use this screen to select options for the Console Redirection settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
Com Port Address	**Disabled**	Select the Com Port address.
	On-board COMA	
	On-board COMB	
Baud Rate	**300**	Enable the specified baud rate.
	1200	
Console Type	**VT100**	Enable the specified console type.
	VT100, 8bit	
Flow Control	**None**	Enable flow control.
	XON/XOFF	
Console connection	**Direct**	Indicate whether the console is connected directly to the system or a modem is used to connect.
	Via modem	
Continue C.R. after POST	**Off**	Enable Console Redirection after OS has loaded.
	On	

3.7 - BIOS Memory Menu

This menu has options for memory speed & latency. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

PhoenixBIOS Setup Utility		
Memory		
Cache Ram	[XXXX KB]	Item Specific Help
System Memory:	[XXXX KB]	
Extended Memory:		
	[Enabled]	
Memory Cache:	[uncached]	
Cache System BIOS area:	[uncached]	
Cache Video BIOS area:	[uncached]	
Cache Base 0-512k:	[uncached]	
Cache Base 512k-640k:	[uncached]	
Cache Extended Memory Area:	[uncached]	
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:	[Disabled]	
Cache E400 – E7FF:	[Disabled]	
Cache E800 – E8FF:	[Disabled]	
Cache EC00 – EFFF:	[Disabled]	
F1: Help ↑ ↓: Select Item -/+: Change Values F9: Setup Defaults Esc: Exit ← →: Select Screen Enter: Select ▸ Sub-Menu F10: Previous Values		

Feature	Option	Description
Memory Cache	**Disabled**	Set the state of memory cache.
	Enabled	
Cache A000-AFFF Cache B000-BFFF	**Disabled**	Control caching of the memory blocks.
	USHC	
	Write Through	
	Write Protect	
	Write Back	
Cache C800-CBFF ~ Cache EC00-EFFF	**Disabled**	Control caching of the memory blocks.
	Write Through	
	Write Protect	
	Write Back	

3.8 - Security Menu

This menu has options for the Security options. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

PhoenixBIOS Setup Utility

Boot

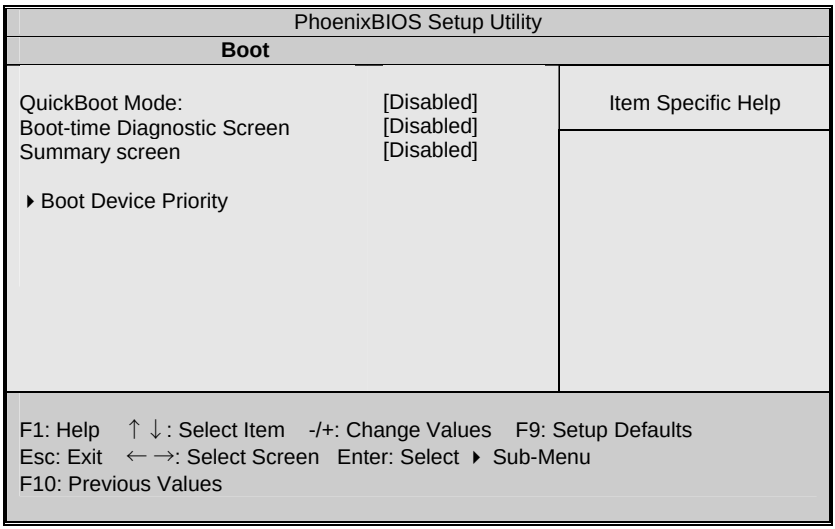
Supervisor Password Is: User Password Is:		Item Specific Help
Set Supervisor Password Set User Password		
Password on boot: Fixed disk boot sector: Diskette access:	[Disabled] [Normal] [User]	
Virus check reminder: System backup reminder:	[Disabled] [Disabled]	

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

Feature	Option	Description
Password on boot	**Disabled**	Enable password entry on boot.
	Enabled	
Fixed disk boot sector	**Normal**	Write protects boot sector on hard disk to protect against viruses.
	Write Protect	
Diskette access	**User**	Control access to diskette drives.
	Supervisor	
Virus check reminder	**Disabled**	Display reminder message at boot (daily, every Monday or 1st of every month).
	Daily	
System back reminder	**Disabled**	Display reminder message at boot (daily, every Monday or 1st of every month).
	Daily	

3.9 - BIOS Boot Menu

This menu has options for the Boot Device Priority. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
QuickBoot Mode	**Disabled**	Allow the system to skip certain tests while booting.
	Enabled	
Boot-time Diagnostic Screen	**Disabled**	Display the diagnostic screen during boot.
	Enabled	
Summary screen	**Disabled**	Display system configuration on boot.
	Enabled	
Boot Device Priority	**Menu Item**	Select the search order for the types of boot devices.

3.9.1 - Boot Device Priority

You can use this screen to select options for the Boot Device Priority settings. Follow the “Item Specific Help” on the right side to select, move or enable the item.

PhoenixBIOS Setup Utility

Boot

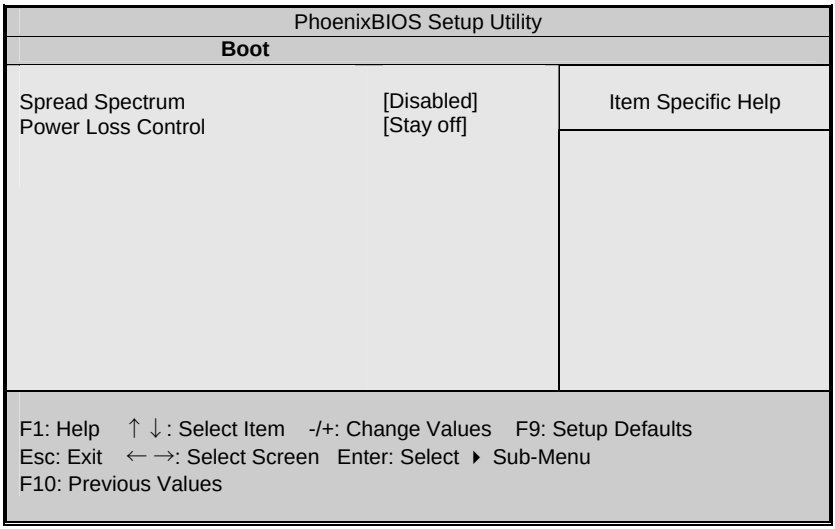
0: Legacy Floppy Drives 1: IDE0 2: IDE1 3: IDE2 4: IDE3 5: PCI BEV: MBA v7.6.6 Slot 0A48 6: 7: : USB FDC : USB HDD : ALL PCI SCSI : 1394 HDD : 1394 CD : Legacy Network Card	Item Specific Help Keys used to view or configure devices: Up and Down arrows Select a device <+> and <-> moves the device up and down. <f> and <r> moves the device fixed or removable. <x> exclude or include the device to boot. <shift+1> enables or disables a device <1-4> Loads default boot sequence.

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

The boot menu will list all bootable devices. Use <Enter> to expand or collapses devices with a ‘+’ or ‘-‘. Use <+> or <-> to arrange the priorities of all bootable devices.

3.10 - Power Menu

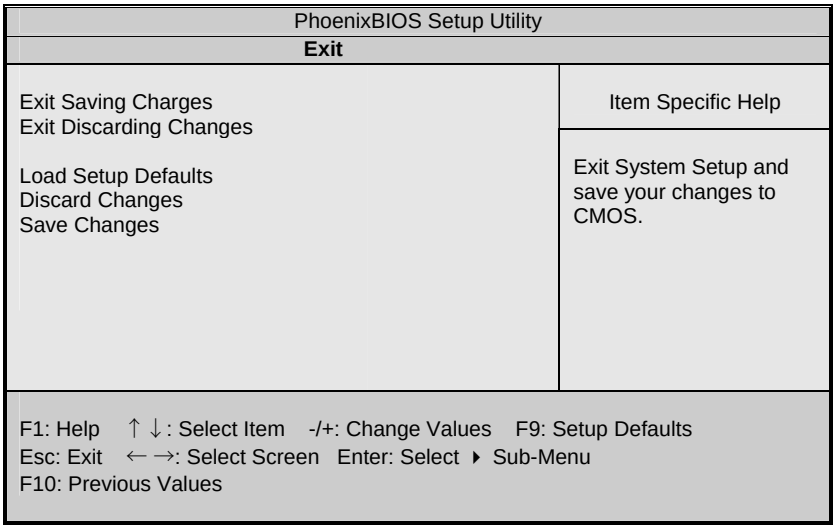
This menu has options for the Power management. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
Spread Spectrum	**Disabled**	Enable or disable Spread Spectrum.
	Enabled	
Power Loss Control	**Stay Off**	Control power loss.
	Power On	

3.11 - BIOS Exit Menu

This menu has options for the Exit Priority. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Exit Saving Changes
Use this option to exit setup utility and re-boot. All new selections you have made are stored into CMOS. System will use the new settings to boot up.

Exit Discarding Changes
Use this option to exit setup utility and re-boot. All new selections you have made are not stored into CMOS. System will use the old settings to boot up.

Load Setup Defaults
Use this option to load default setup values.

Discard Changes
Use this option to restore all new setup values that you have made but not saved in CMOS.

Save Changes
Use this option to restore all new setup values that you have made and saved in CMOS.

Chapter 4: 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.

4.1 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.

4.2 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.

4.3 BIOS Post Code

Code	Beeps / Description	Code	Beeps / Description
02h	Verify Real Mode	32h	Test CPU bus-clock frequency
03h	Disable Non-Maskable Interrupt (NMI)	33h	Initialize Phoenix Dispatch Manager
04h	Get CPU type	36h	Warm start shut down
06h	Initialize system hardware	38h	Shadow system BIOS ROM
08h	Initialize chipset with initial POST values	3Ah	Autosize cache
09h	Set IN POST flag	3Ch	Advanced configuration of chipset registers
0Ah	Initialize CPU registers	3Dh	Load alternate registers with CMOS values
0Bh	Enable CPU cache	42h	Initialize interrupt vectors
0Ch	Initialize caches to initial POST values	45h	POST device initialization
0Eh	Initialize I/O component	46h	2-1-2-3. Check ROM copyright notice
0Fh	Initialize the local bus IDE	48h	Check video configuration against CMOS
10h	Initialize Power Management	49h	Initialize PCI bus and devices
11h	Load alternate registers with initial POST values	4Ah	Initialize all video adapters in system
12h	Restore CPU control word during warm boot	4Bh	QuietBoot start (optional)
13h	Initialize PCI Bus Mastering devices	4Ch	Shadow video BIOS ROM
14h	Initialize keyboard controller	4Eh	Display BIOS copyright notice
16h	1-2-2-3. BIOS ROM checksum	50h	Display CPU type and speed
17h	Initialize cache before memory autosize	51h	Initialize EISA board
18h	8254 timer initialization	52h	Test keyboard
1Ah	8237 DMA controller initialization	54h	Set key click if enabled
1Ch	Reset Programmable Interrupt Controller	58h	2-2-3-1. Test for unexpected interrupts
20h	1-3-1-1. Test DRAM refresh	59h	Initialize POST display service
22h	1-3-1-3. Test 8742 KBD Controller	5Ah	Display prompt "Press F2 to enter SETUP"
24h	Set ES segment register to 4 GB	5Bh	Disable CPU cache
26h	Enable A20 line	5Ch	Test RAM between 512 and 640 KB
28h	Autosize DRAM	60h	Test extended memory
29h	Initialize POST Memory Manager	62h	Test extended memory address lines
2Ah	Clear 512 KB base RAM	64h	Jump to UserPatch1
2Ch	1-3-4-1. RAM failure on address	66h	Configure advanced cache registers

2Eh	1-3-4-3. RAM failure on data bits of low byte of memory bus	67h	Initialize Multi Processor APIC
2Fh	Enable cache before system BIOS shadow	68h	Enable external and CPU caches
30h	1-4-1-1. RAM failure on data bits of high byte of memory bus	69h	Setup System Management Mode (SMM) area
Code	**Beeps / Description**	**Code**	**Beeps / Description**
6Ah	Display external L2 cache size	A2h	Check key lock
6Bh	Load custom defaults (optional)	A4h	Initialize Typematic rate
6Ch	Display shadow-area message	A8h	Erase F2 prompt
6Eh	Display possible high address for UMB recovery	AAh	Scan for F2 key stroke
70h	Display error messages	ACh	Enter SETUP
72h	Check for configuration errors	AEh	Clear Boot flag
76h	Check for keyboard errors	B0h	Check for errors
7Ch	Set up hardware interrupt vectors	B2h	POST done - prepare to boot operating system
7Eh	Initialize coprocessor if present	B4h	One short beep before boot
80h	Disable onboard Super I/O ports and IRQs	B5h	Terminate QuietBoot (optional)
81h	Late POST device initialization	B6h	Check password (optional)
82h	Detect and install external RS232 ports	B9h	Prepare Boot
83h	Configure non-MCD IDE controllers	BAh	Initialize DMI parameters
84h	Detect and install external parallel ports	BBh	Initialize PnP Option ROMs
85h	Initialize PC-compatible PnP ISA devices	BCh	Clear parity checkers
86h.	Re-initialize onboard I/O ports.	BDh	Display MultiBoot menu
87h	Configure Motherboard Devices	BEh	Clear screen (optional)
88h	Initialize BIOS Data Area	BFh	Check virus and backup reminders
89h	Enable Non-Maskable Interrupts (NMIs)	C0h	Try to boot with INT 19
8Ah	Initialize Extended BIOS Data Area	C1h	Initialize POST Error Manager (PEM)
8Bh	Test and initialize PS/2 mouse	C2h	Initialize error logging
8Ch	Initialize floppy controller	C3h	Initialize error display function
8Fh	Determine number of ATA drives (optional)	C4h	Initialize system error handler
90h	Initialize hard-disk controllers	C5h	PnPnd dual CMOS (optional)
91h	Initialize local-bus hard-disk controllers	C6h	Initialize notebook docking (optional)

92h	Jump to UserPatch2	C7h	Initialize notebook docking late
93h	Build MPTABLE for multi-processor boards	C8h	Force check (optional)
95h	Install CD ROM for boot	C9h	Extended checksum (optional)
96h	Clear huge ES segment register	D2h	BIOS Boot Block
97h	Fixup Multi Processor table	E0h	BIOS Boot Block
98h	1-2. Search for option ROMs.	E1h	BIOS Boot Block
99h	Check for SMART Drive (optional)	E2h	Initialize the CPU
9Ah	Shadow option ROMs	E3h	Initialize system timer
9Ch	Set up Power Management	E4h	Initialize system I/O
9Dh	Initialize security engine (optional)	E5h	Check force recovery boot
9Eh	Enable hardware interrupts	E6h	Checksum BIOS ROM
9Fh	Determine number of ATA and SCSI drives	E7h	Go to BIOS
A0h	Set time of day	E8h	Set Huge Segment
Code	**Beeps / Description**	**Code**	**Beeps / Description**
E9h	Initialize Multi Processor	F1h	Initialize Run Time Clock
EAh	Initialize OEM special code	F2h	Initialize video
EBh	Initialize PIC and DMA	F3h	Initialize System Management Mode
ECh	Initialize Memory type	F4h	Output one beep before boot
EDh	Initialize Memory size	F5h	Boot to Mini DOS
EEh	Shadow Boot Block	F6h	Clear Huge Segment
EFh	System memory test	F7h	Boot to Full DOS
F0h	Initialize interrupt vectors		

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 only at 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 results in greater speed.

BBS (BIOS Boot Specification): 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. 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, which 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 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 the possibility of

losing your data should the system crash. Information 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 information is stored in SRAM instead of slower 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.

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): 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 socket 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.

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses 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, it 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

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.

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.

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

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

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

HyperTransport™: a high speed, low latency, scalable point-to-point link for interconnecting ICs on boards. It can be significantly faster than a PCI bus for an equivalent number of pins. It provides the bandwidth and flexibility critical for today's networking and computing platforms while retaining the fundamental programming model of PCI.

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.)

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.

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

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

Parallel port: transmits the bits of a byte on eight different wires 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 fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. 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 with 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 and 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: RAID I/O Steering (Intel)

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data and is often referred 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.

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)

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

SDRAM (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.

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

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a 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 shifts the processor over and down, guiding it 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. Furthermore, if you purchased your system from a dealer near you, you can 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:

This device may not cause harmful interference, and
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.