



**Tomcat K8E**



**S2865**

Version 1.1

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**Appendix**

**Glossary**

**Technical Support**

## Check the box contents!

The retail motherboard package should contain the following:

	1x Tomcat K8E motherboard
	1x 34-Pin floppy drive cable
	4 x SATA cable
	2 x SATA Drive Power Adapter
	2 x Ultra-DMA-100/66 IDE cable
	1 x IEEE1394a Cable
	1 x USB2.0 cable
	1 x Tomcat K8E user's manual
	1 x Tomcat K8E Quick Reference guide
	1 x TYAN driver CD
	1 x I/O shield
	1 x NV RAID driver diskette (Depending on CD version)

**NOTE:** If CD version is M2.2, the box contents include CD and diskette. If CD version is M2.3, you will find CD only. Please copy the NV RAID file from CD to a blank disk **if your CD is M2.3**. Then use the disk to install NV RAID. \*\*Refer to p.71 for information on NV RAID installation.

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

# Chapter 1: Introduction

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## 1.1 - Congratulations

You have purchased one of the most powerful server solutions. The Tomcat K8E (S2865) is a flexible AMD64 platform for multiple applications, based on nVIDIA nForce4 Ultra and SMSC DME1737 chipsets.

Designed to support AMD® Athlon 64™ / Athlon 64 FX™ / Athlon 64 X2 Dual Core™ Opteron™ 100 series 939-pin processors and 4GB DDR 400/333 memory, the S2865 with integrated Dual Gigabit Ethernet LAN, built-in 8MB ATI® RAGE XL™ video and four serial ATA ports, is ideal for CPU, memory, and video intensive applications such as CAD, Graphics Design, and High Bandwidth Video Editing, etc.

Remember to visit TYAN's Website at <http://www.TYAN.com>. There you can find information on all of TYAN's products with FAQs, online manuals and BIOS upgrades.

## 1.2 - Hardware Specifications

### Processor

- uPGA 939-pin socket
- Supports 1 AMD Athlon 64, Athlon 64 FX, Athlon 64 X2 Dual Core and Opteron 100 series 939 pin CPU
- Up to 1000 MHz Hyper-Transport link support

### Expansion Slots

- One x16 PCI Express connector for graphics
- Four 32-bit, 33Mhz PCI v2.3 slots
- Two x1 PCI Express interface
- Total seven usable expansion slots

### Chipset

- nVIDIA nForce4 Ultra
- SMSC DME1737

### Integrated 2D/3D PCI Graphics

- ATI® Rage™XL PCI graphics controller
- 8MB Frame Buffer of video memory

### Integrated LAN Controllers

- One Broadcom BCM5721 GbE controller
  - Operating at x1 PCI-E interface
  - ASF 2.0 support
  - Pin headers for front panel LAN LED
- One nForce4 integrated MAC with Marvell 88E1111-CAA Gigabit Ethernet PHY
  - 32bit PCI v2.3 interface
  - IEEE802.3 compliant, WOL/PXE support
  - Pin headers for front panel LAN LED

### **System Management**

- SMSC DME1737 w/ hardware monitoring
- One 4-pin CPU fan, four 4-pin system fans, and one 3-pin headers (4/w tachometer input and 5/w auto fan control)
- Temperature and voltage monitoring
- Watchdog timer

### **Memory**

- Dual memory channels
- Supports up to four DDR-400/333 DIMMs
- Up to 4GB of unbuffered, ECC/non-ECC memory

### **Integrated PCI IDE**

- Dual channel master mode support up to four IDE devices
- Support for ATA-133/100/66/33 IDE drives and ATAPI compliant devices

### **Integrated Serial ATA II**

- Serial ATA II Host controllers embedded
- Supports four Serial ports running at 3.0Gb/s
- NVRAID 0, 1, 0+1 and JBOD support
- SATA activity LED connector

### **Back Panel I/O Ports**

- Stacked PS/2 mouse & keyboard ports
- COM1 connector
- One 15-pin VGA port
- Three audio jacks
- Stacked two USB2.0 ports and one RJ45 (Marvell 88E1111-CAA PHY + nVIDIA MAC) 10/100/1000 Base-T port with link/activity LED

### **Integrated Audio**

- Realtek ALC655 5.1 channel audio CODEC
- AC'97 Rev.2.2 supported
- 2 x 5 pin header for front panel audio connector
- CD-in connector

### **Integrated PCI 1394**

- VIA VT6307 PCI FireWire (1394) controller
- Two 1394 ports (via cable)

### **BIOS**

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

### **Power**

- ATX 12V support, on board 4-phase VRM
- Universal 24-pin + 8-pin power connectors
- 4-pin auxiliary power connector

### **Form Factor**

- ATX footprint, 9.6" x 12.0" (244mm x 305mm)

### **Regulatory**

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

### **Integrated I/O Interfaces**

- One Floppy connector
- Four USB2.0 ports (via cable)
- One COM port (via cable)
- Tyan 2x9 front-panel pin header
- 2x25 pin TYAN SMDC pin header
- One Parallel pin header

- Stacked two USB2.0 ports and one RJ45 (BCM5721) 10/100/1000 Base-T port with link/activity LED

## **1.3 - Software Specifications**

### **OS (Operating System) Support**

Microsoft Windows 2000

Microsoft Windows XP (32-bit)

Microsoft Windows XP (64-bit)

Microsoft Windows Server 2003 (32-bit)

Microsoft Windows Server 2003 (64-bit)

SuSE Professional 9.x

SuSE Enterprise Server 9.0

RHEL3.0 Update 4

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

**NOTE:**

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## Chapter 2: Board Installation

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You are now ready to install your motherboard. The mounting hole pattern of the Tomcat K8E matches the ATX specification. Before continuing with installation, confirm that your chassis supports an ATX motherboard.

### How to install our products right... the first time

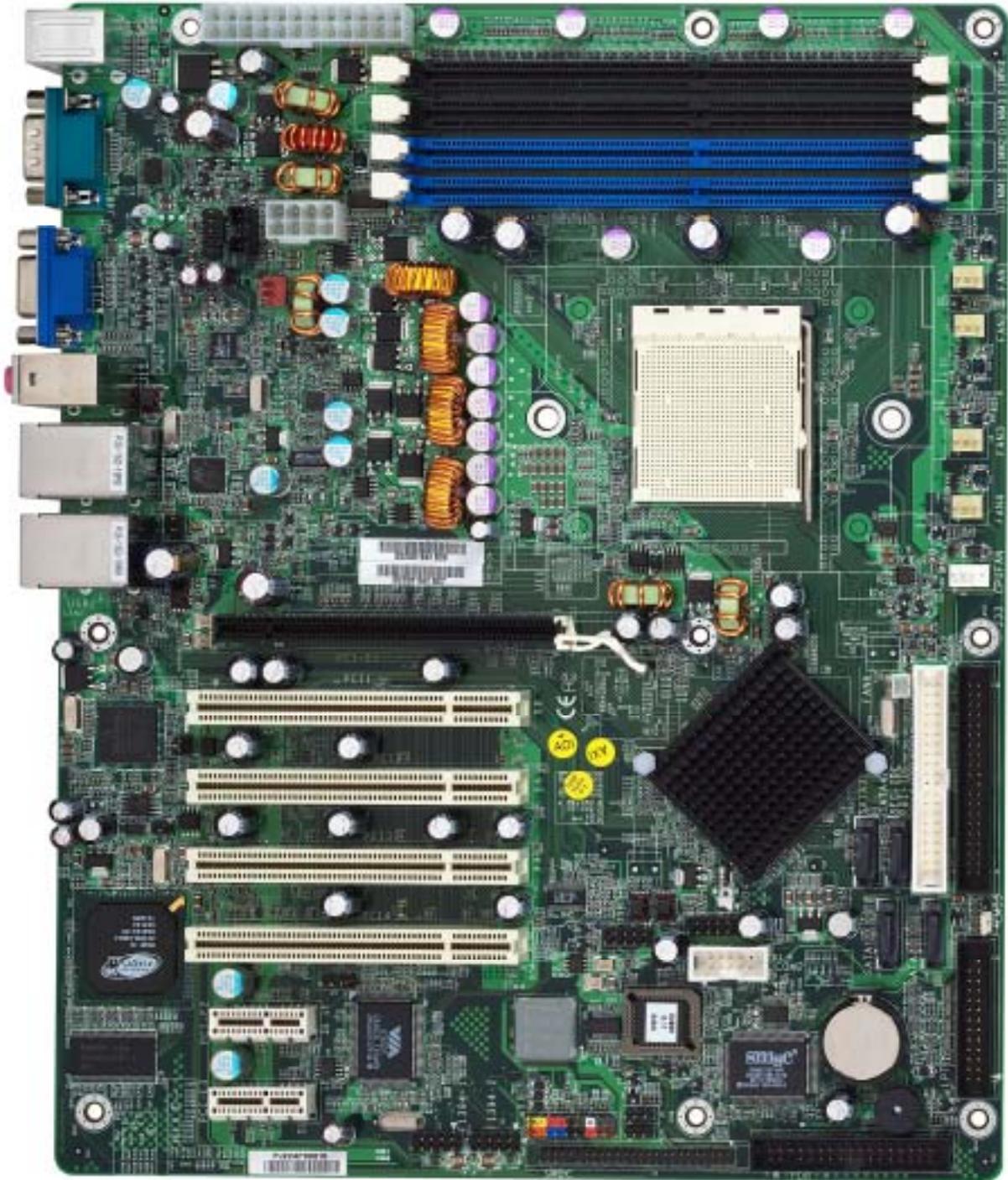
The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

- (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.

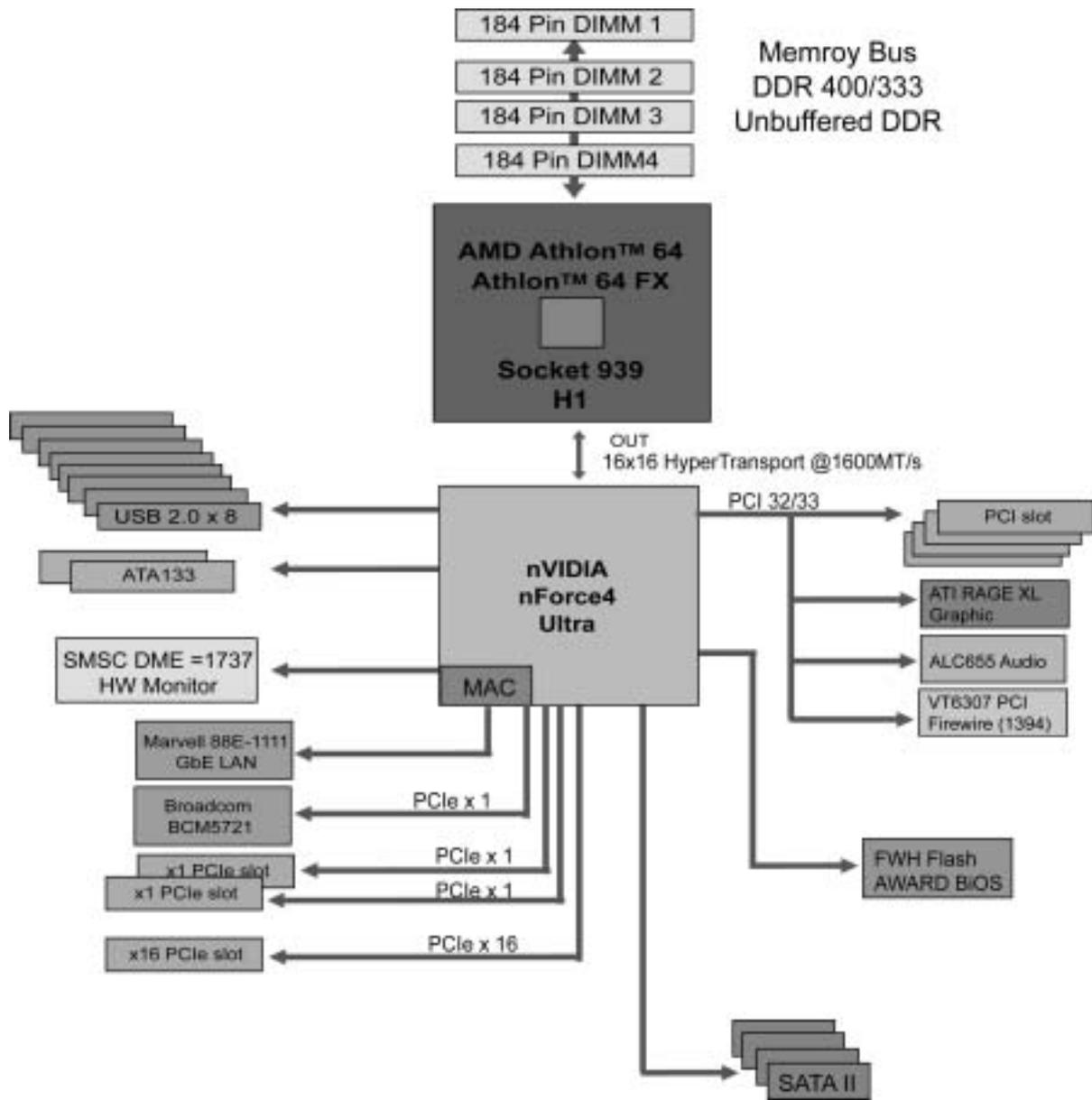
<b>NOTE</b>	<b>DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED</b>
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## 2.1- Board Image



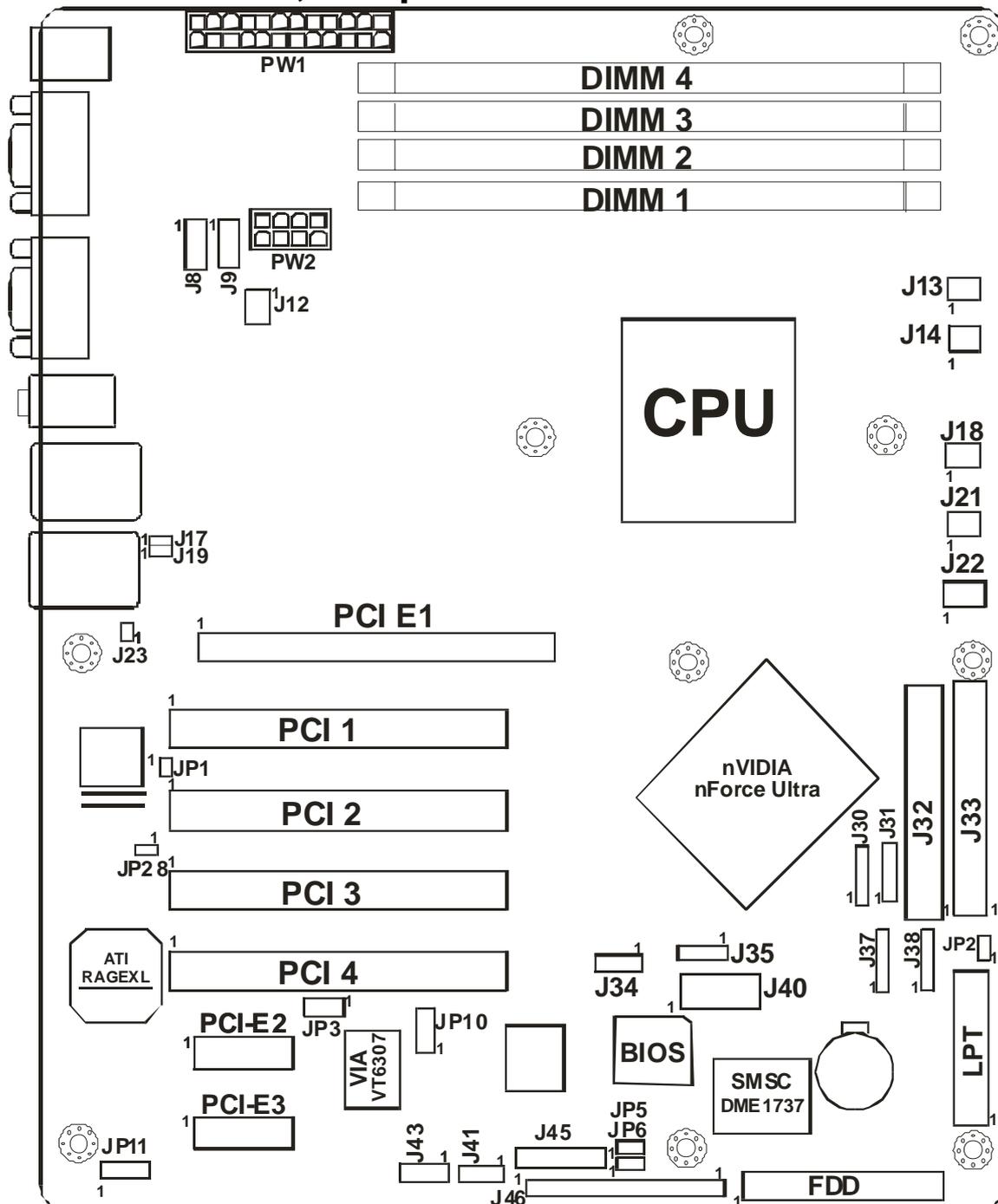
This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

## 2.2 - Block Diagram



Tomcat K8E (S2865) Block Diagram

## 2.3 - Board Parts, Jumpers and Connectors



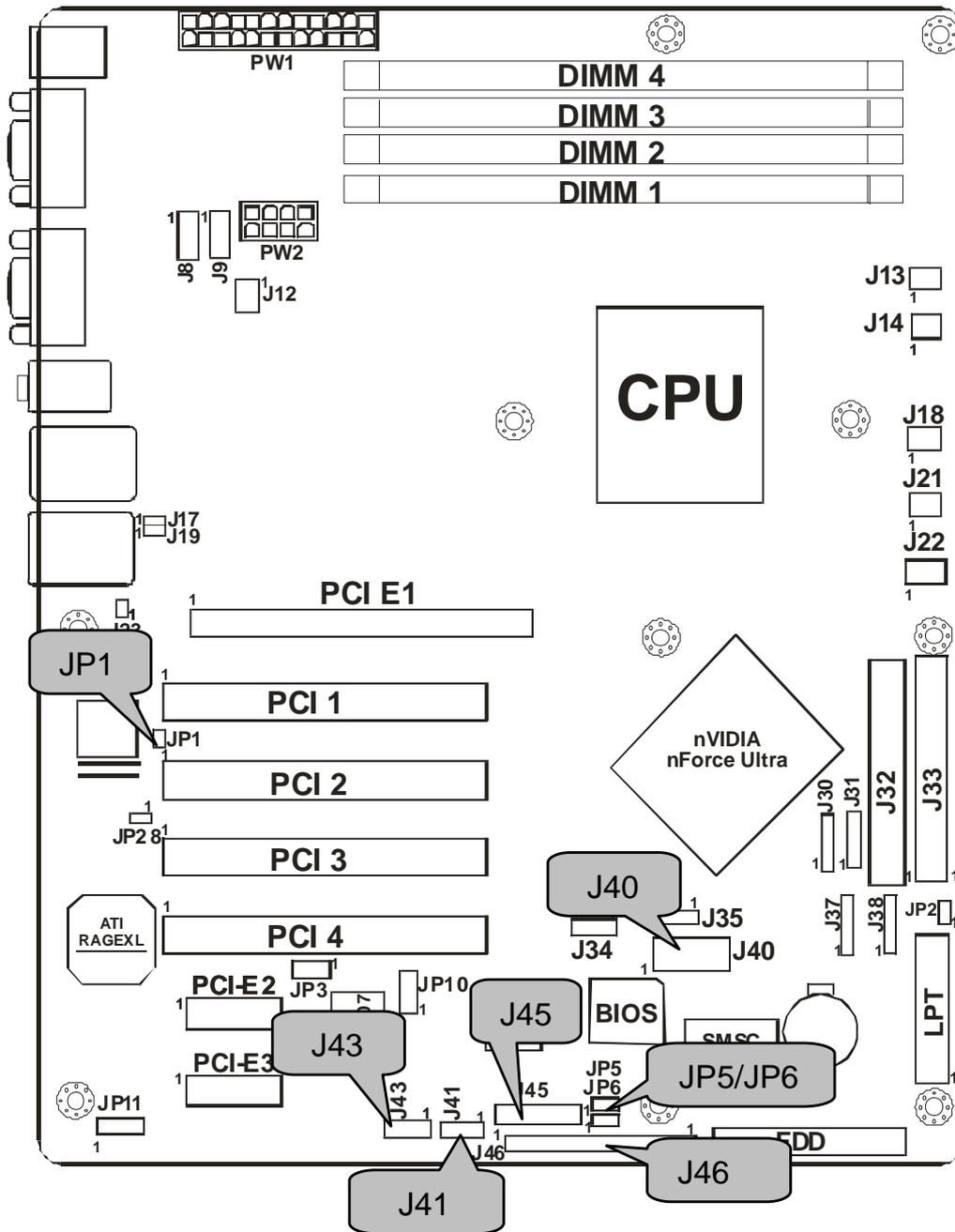
This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

### Jumper Legend

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

## Jumpers & Connectors

<b>Jumper/Connector</b>	<b>Function</b>
J45	Front Panel Header
J46	SMDC Connector
J41/J43	IEEE1394a Connectors
J40	COM2 Header
JP1	LAN2 Enable/Disable Jumper
J8	Front Audio Header
J34/J35	Front Panel USB2.0 Connectors
J19/J23	Front Panel LAN1/LAN2 Speed LED Pin Headers
J17/J28	Front Panel LAN1/LAN2 Link and Active LED Connectors
JP2	Clear CMOS Jumper
J13/J14/J18/J21	Front Fan Connectors (Fan1/Fan2/Fan3/Fan4)
J12	Chassis Fan Connector (Fan5)
J22	CPU_Fan Connector
J30/J37/J31/J38	Serial ATA RAID Connectors
JP3	PCI Slot Volt Select Header
J9	CD_in Connector
J32/J33	IDE Connectors
JP5/JP6	SMDC/ASF2.0 Select Header
PCI-E1	PCI Express x16 Slot
PCI 1/2/3/4	PCI Slots
PCI-E2/E3	PCI Express x1 Slot



**JP5/JP6: SMDC/ASF2.0 Select Header**

	Support ASF2.0, for LAN2 only (Default)
	Support SMDC card, for LAN2 only **Refer to p. 81 Appendix for information on SMDC.

### J41/J43: IEEE1394a Connectors

	Signal	Pin	Pin	Signal
	XTPA+	1	2	XTPA-
	GND	3	4	GND
	XTPB+	5	6	XTPB-
	NC	7	8	VCC
	NC	9	10	GND

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

### J40: COM2 Header

	Signal	Pin	Pin	Signal
	DCD	1	2	DSR
	RXD	3	4	RTS
	TXD	5	6	CTS
	DTR	7	8	RI
	GND	9	10	NC/Key

Use these pin definitions to connect a port to COM2.  
**\*TYAN does not provide cable for this header. It is designed for OEM use only.**

### JP1: LAN2 Enable/Disable Jumper

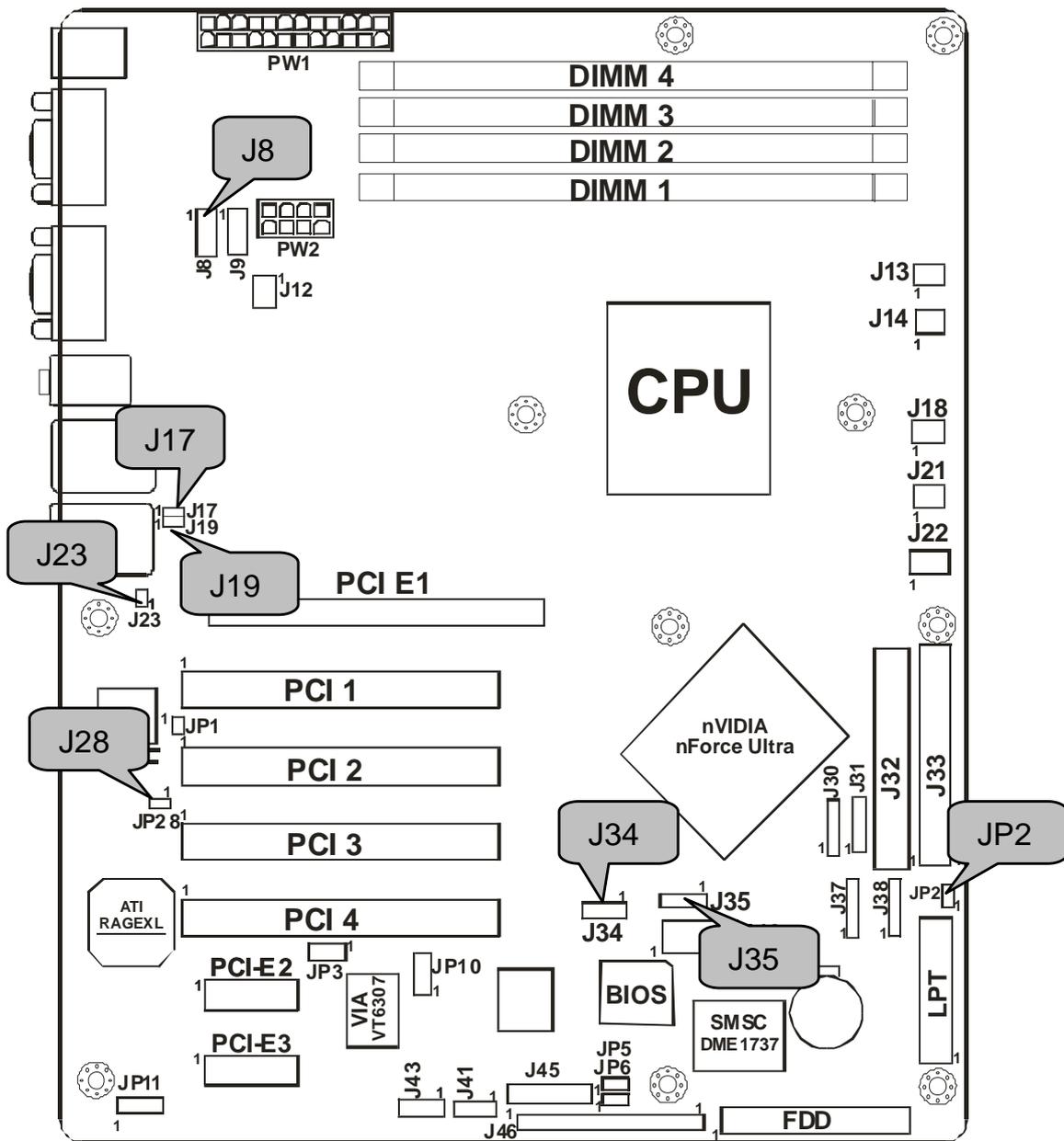
	<b>Open</b> -Disables onboard LAN2 function.
	<b>Closed</b> -(Default) Enables onboard LAN2 function.

### J46: SMDC Connector

For connection with Tyan Server Management Daughter Card (SMDC).  
 The SMDC connector supports

### J45: 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
EXINT	9	10	NC
EXINT	11	12	NC
+5VSB	13	14	x
SDA	15	16	Chassis Intr# (Active Low)
SCL	17	18	Chassis Intr# (Active Low)



**J17/J28: Front Panel LAN1/LAN2 Link and Active LED Connectors**

 1	<p>J17 for LAN1, J28 for LAN2          Pin 1: LED+, Pin 2: LED-          Use these headers to connect with the front panel link/activity LEDs for LAN1 and LAN2.</p>
--	--

### J8: Front Audio Header

	Signal	Pin	Pin	Signal
	Front-MCI	1	2	GND
	VCC	3	4	VCC
	Front-Speaker-Out-L	5	6	Speaker-Out-L
	JD0	7	8	NC
	Front-Speaker-Out-R	9	10	Speaker-Out-R

Use this header to connect with the front panel audio outputs.

### J34/J35: Front Panel USB2.0 Connectors

	Signal	Pin	Pin	Signal
	USB PWR	1	2	USB PWR
	USB2-	3	4	USB3-
	USB2+	5	6	USB3+
	GND	7	8	GND
	NC	9	10	Key

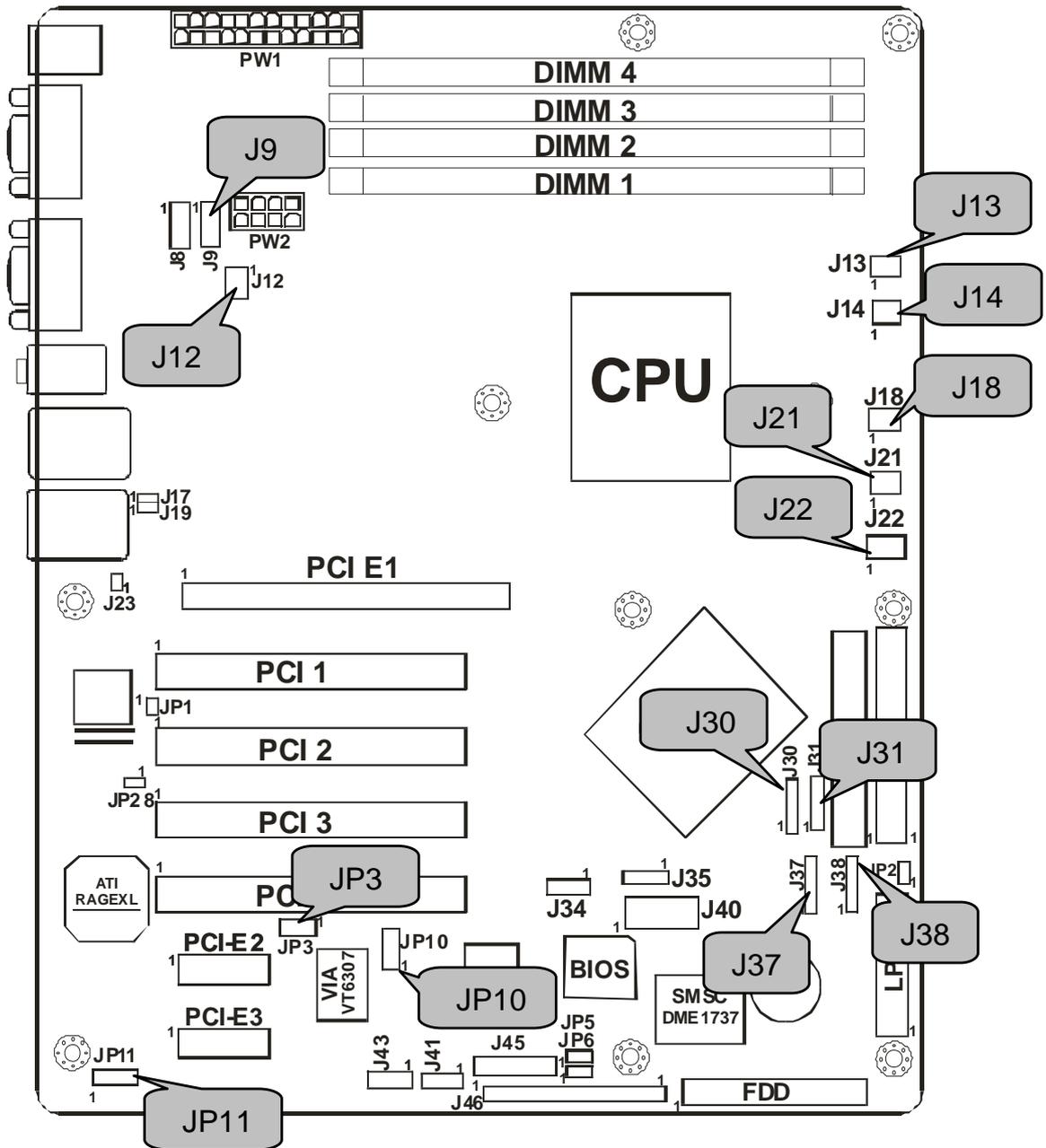
Use these headers to connect to the USB devices via the enclosed USB cable.

### J19/J23: Front Panel LAN1/LAN2 Speed LED Pin Headers

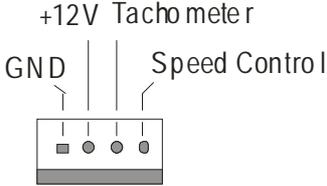
	<p>J19 for LAN1, J23 for LAN2          Pin 1: Green+, Pin 2: Orange+</p> <p>Use these headers to connect with the front panel dual color LEDs to indicate the speed of LAN1 and LAN2.  <b>**Refer to p. 33 for correct LAN LED color definition.</b></p>
--	--

### JP2: Clear CMOS Jumper

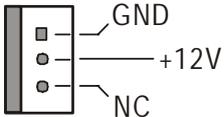
<p><b>Normal (Default)</b></p>	<p>Use this jumper when you forgot your system/setup password or need to clear system BIOS setting.</p> <p>How to clear the CMOS data</p> <ul style="list-style-type: none"> <li>- Power off system and <b>disconnect power supply from AC source</b></li> <li>- Use jumper cap to close Pin_2 and 3 for several seconds to Clear CMOS</li> <li>- Replace jumper cap to close Pin_1 and 2</li> </ul> <p>Reconnect power supply to AC source          Power on system</p>
<p><b>Clear</b></p>	



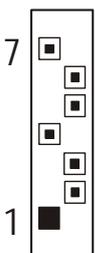
### J13, J14, J18, J21, J22: Fan Connectors

	<p>Use these headers to connect the chassis/CPU cooling fans to your motherboard to keep the system stable and reliable.</p> <p>Front fans--J13: Fan1, J14: Fan2, J18: Fan3, J21:Fan4 CPU fan--J22</p> <p>These connectors support the tachometer monitoring and auto fan speed control.</p>
---	--

### J12 (Fan5): Chassis Fan Connector

	<p>Use this header to connect the chassis cooling fan to your motherboard to keep the system at optimum performance levels.</p>
---	---

### J30, J37, J31, J38: Serial ATA RAID Connectors

	<table border="1"> <tr><td>7</td><td>GND</td></tr> <tr><td>6</td><td>RXP</td></tr> <tr><td>5</td><td>RXN</td></tr> <tr><td>4</td><td>GND</td></tr> <tr><td>3</td><td>TXN</td></tr> <tr><td>2</td><td>TXP</td></tr> <tr><td>1</td><td>GND</td></tr> </table>	7	GND	6	RXP	5	RXN	4	GND	3	TXN	2	TXP	1	GND	<p>Connects to the Serial ATA ready drives via the Serial ATA cable</p> <p><b>You may use any two of the four Serial ATA ports to have the support of RAID 0 and 1 through the on board nVIDIA chip.</b></p>
7	GND															
6	RXP															
5	RXN															
4	GND															
3	TXN															
2	TXP															
1	GND															

### JP3: PCI Slot Volt Select Header

	<p>Select 3.3 volt for PCI slot</p>
	<p>Select 5 volt for PCI slot (Default)</p>

### J9: CD\_in Connector

	<p>Connect CD-ROM (DVD) audio out.</p> <p>Pin 1: CD_in Left      Pin 2: Ground Pin 3: Ground      Pin 4: CD_in Right</p>
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### JP10: 1394 Enable/Disable Jumper

	Disable on-board 1394
	Enable on-board 1394 (Default)

### JP11: VGA Enable/Disable Jumper

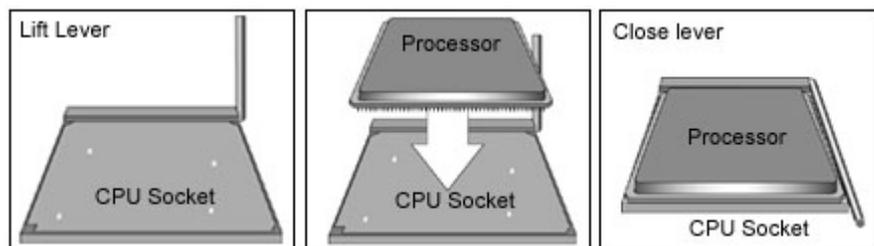
	Enable on-board VGA (Default) <b>NOTE:</b> If there is any VGA card in the PCI-E slot, the system will auto-detect PCI-E slot.
	Disable on-board VGA

## 2.4 - Installing the Processor

Your brand new Tomcat K8E supports the latest 64-bit processor technology from AMD®. Only AMD® Athlon 64™ / Athlon 64 FX™ / Athlon 64 X2 Dual Core™ Opteron™ 100 series 939-pin series CPU's are certified and supported with this motherboard.

Check our website for latest processor support. <http://www.tyan.com>

**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 the socket processor and may not be an exact representation of the processor 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.

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

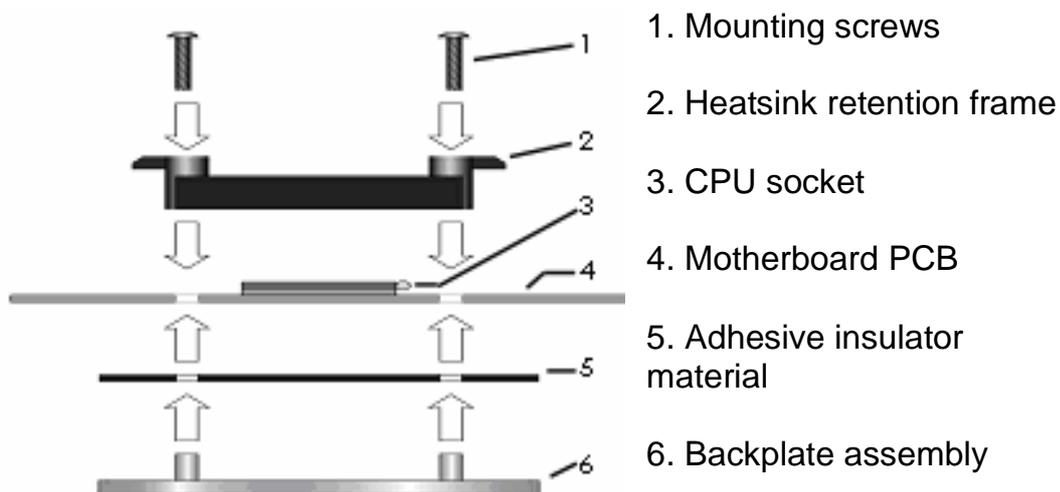
## 2.5 - Heatsink Retention Frame Installation

After you are done installing the processor, you should proceed to install the retention frame and heatsink. The CPU heatsink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is 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.

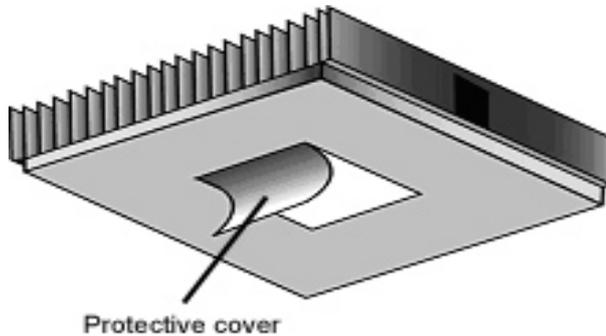
Because there are many different types of heatsinks available from many different manufacturers, a lot of them have their own methods of installation. For the safest method of installation and information on choosing the appropriate heatsink, use heatsinks validated by AMD. Please refer to AMD's website at [www.amd.com](http://www.amd.com).

The following diagram will illustrate how to install the most common CPU back plates:



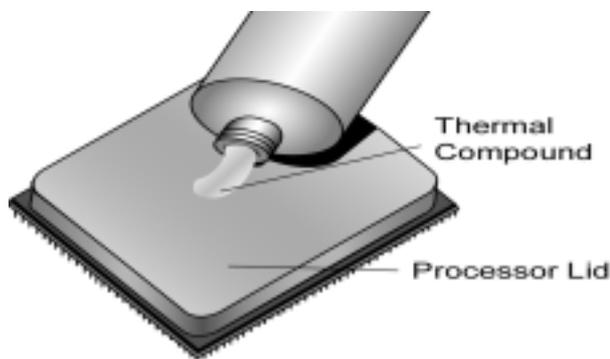
**NOTE:** Please see next section for specific instructions on how to install mounting bracket.

## 2.6 - Thermal Interface Material



There are two types of thermal interface materials designed for use with the AMD® Athlon64™ / Opteron™ 1xx 939-pin series processors.

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.



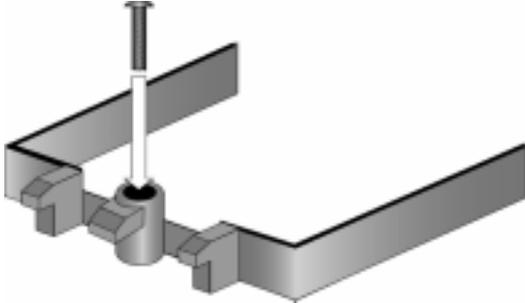
The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

### NOTE

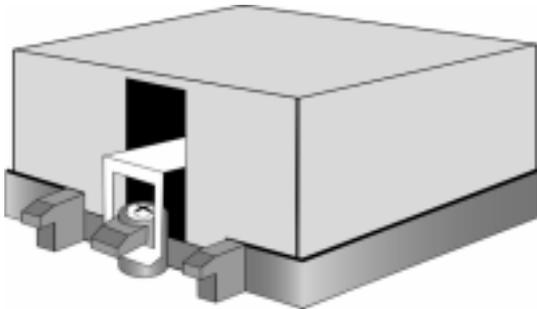
Always check with the manufacturer of the heatsink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements

## 2.7 - Heatsink Installation Procedures

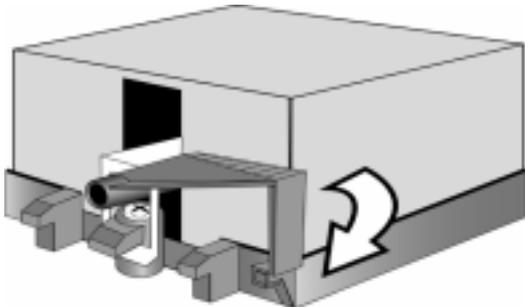
### Type A: CAM LEVER (TYPE) INSTALLATION



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 backplate standoffs. Tighten screws to secure plastic retention bracket. Repeat for the other side. **DO NOT OVER TIGHTEN.**

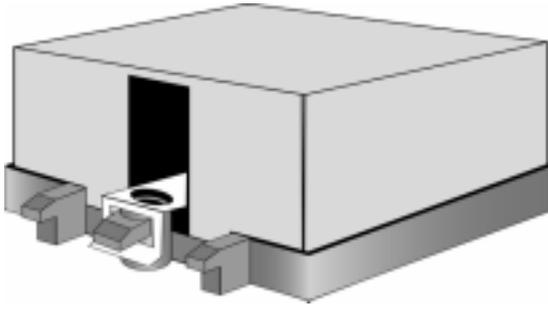


2. After tightening screws secure metal clip to plastic retention bracket center tab. Repeat for the other side of heatsink.

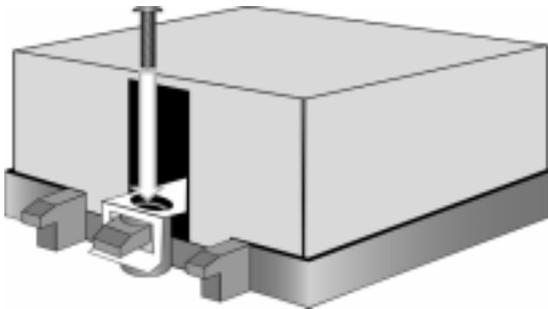


3. After securing metal clip to plastic retention bracket center tab, push down on plastic clip to lock plastic clip to side tab.

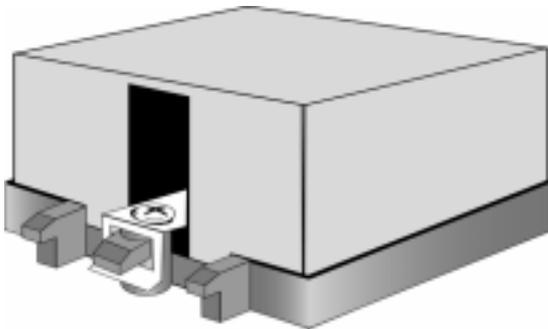
## Type B: SCREW RETENTION TYPE HEATSINK



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.

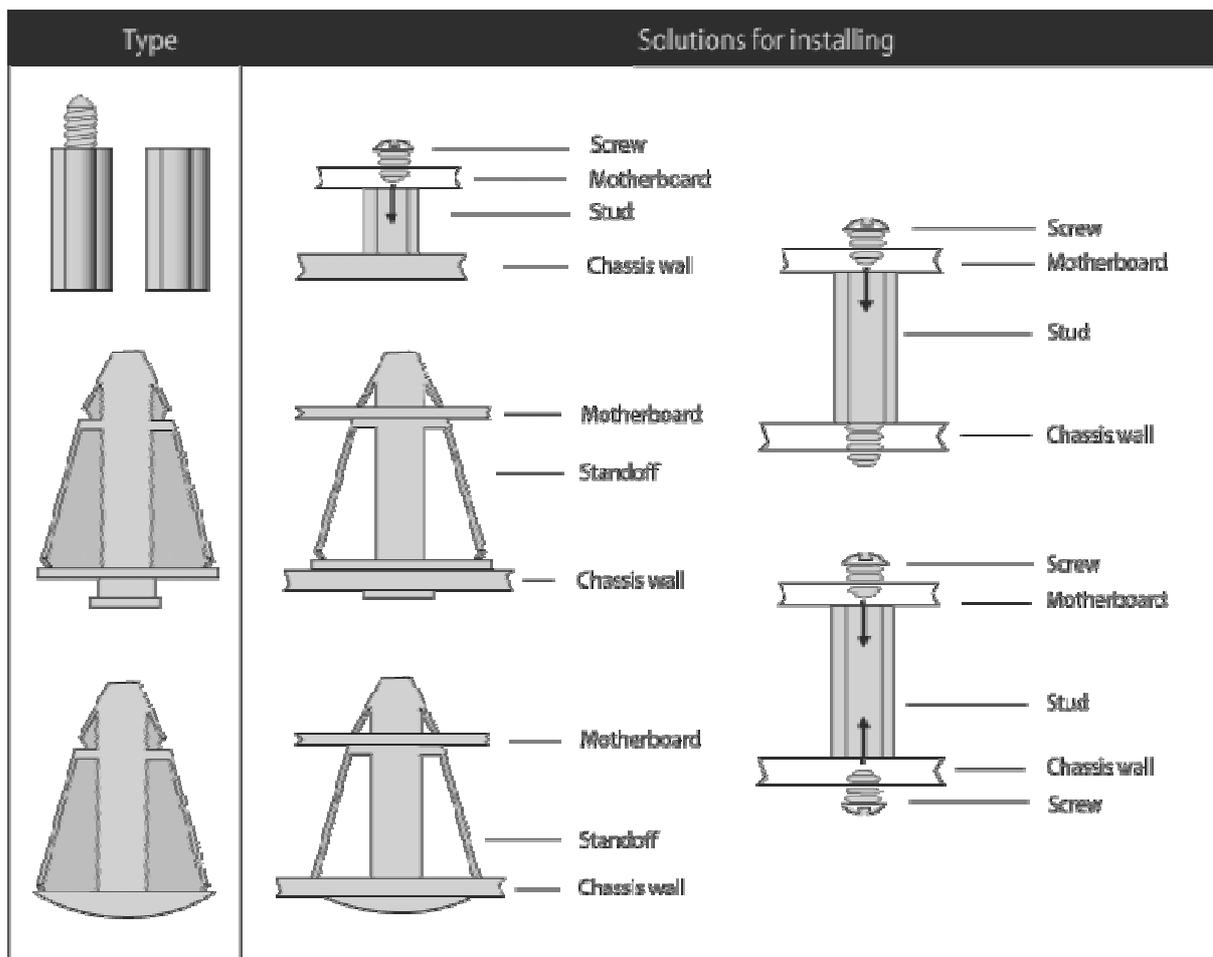
## 2.9 - Tips on Installing Motherboard in Chassis

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.

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.

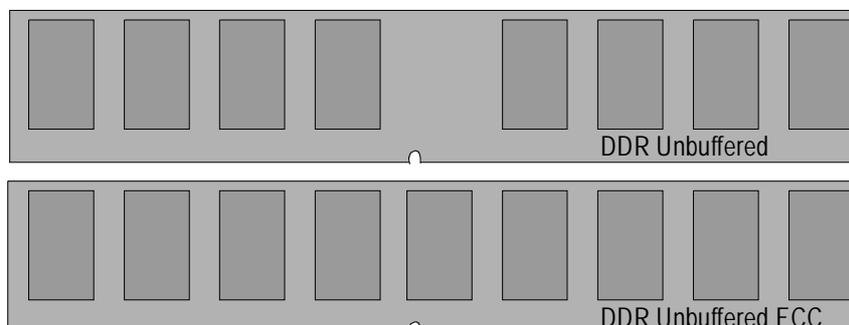
Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

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:



- **Always install memory beginning with DIMM1**
- 128MB, 256MB, 512MB, 1GB, and 2GB\* Non-Reg/ECC or Non-Reg/Non-ECC PC3200/PC2700/PC2100 DDR SDRAM memory modules are supported.
- All installed memory will be automatically detected and no jumpers or settings need to be set.
- The Tomcat K8E supports up to 4GB of memory.
- Registered Memory is not supported.

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

Memory Population Rule  
(Note: X indicates a populated DIMM Slot)

DIMM Slot	DIMM1	DIMM2	DIMM3	DIMM4
64 bits support	X			
			X	
	X		X	
128 bits support	X	X		
			X	X
	X	X	X	X

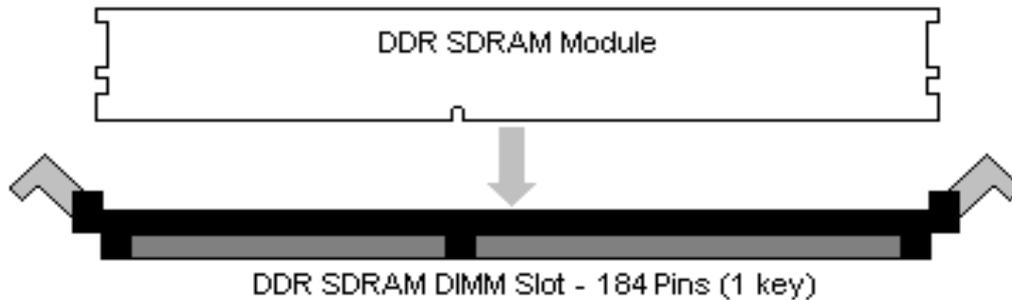
### NOTE:

Symmetrical DIMMS must be identical

- Same DRAM technology, eg 128-bit, 256-bit, etc
- Same DRAM bus width, eg x8 or x16
- Matched Sided DIMMs (single-sided or double-sided)

## 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

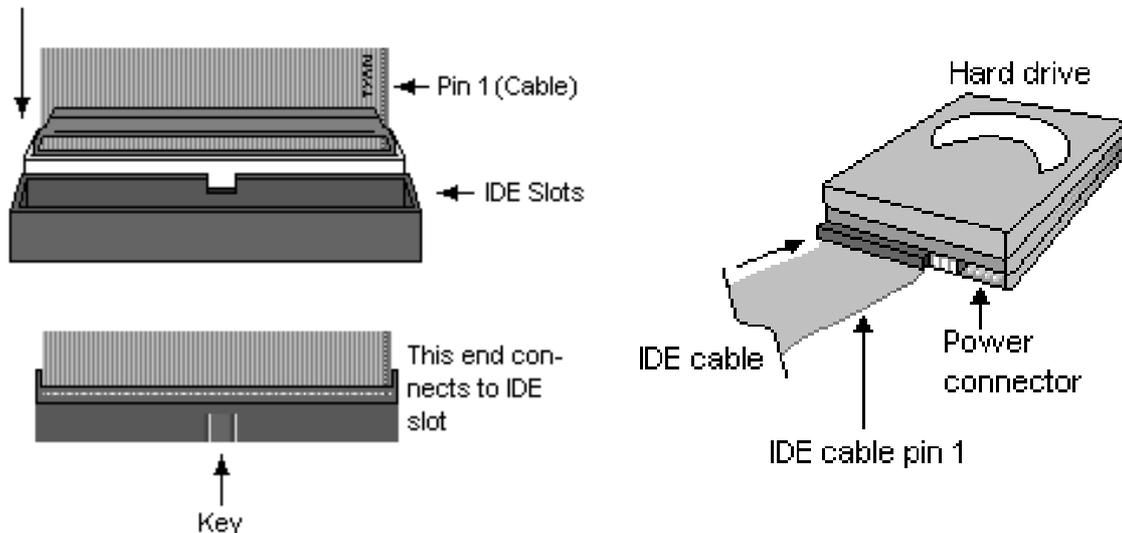
**YOU MUST ALWAYS** unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

## 2.11 - Attaching Drive Cables

### Attaching IDE Drive Cable

Attaching the IDE drive cable is simple. These cables are “keyed” to only allow them to be connected in the correct manner. TYAN motherboards have two on-board IDE channels, each supporting two drives. **The black connector designates the Primary channel, while the white connector designates the Secondary channel.**

Attaching IDE cables to the IDE connectors is illustrated below:



Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end(s) into the drive(s). 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.**

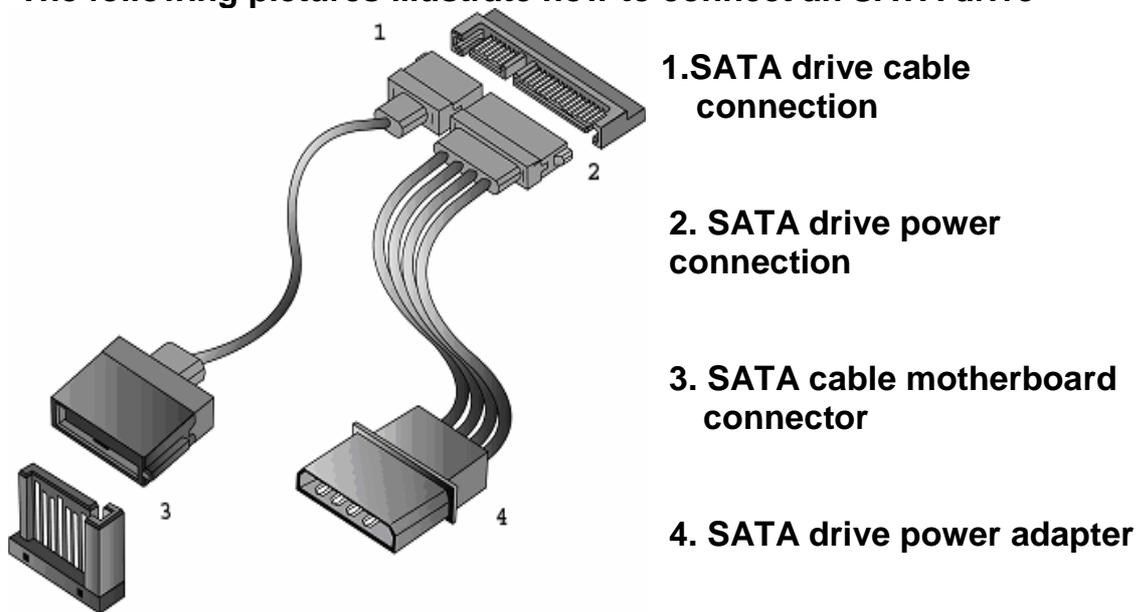
### Attaching Serial ATA Cables

The Tomcat K8E 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.

Tyan has supplied two SATA cables and one SATA power adapter. If you are in need of other cables or power adapters please contact your place of purchase.

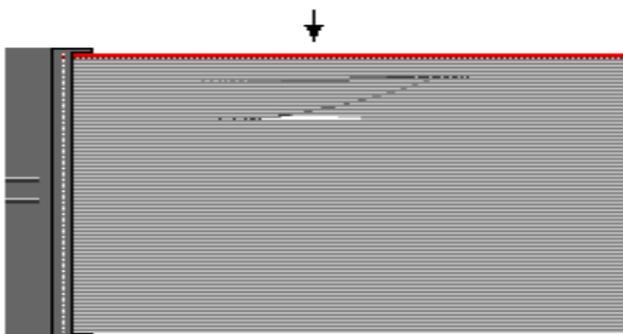
The following pictures illustrate how to connect an SATA drive



### 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.

Twist at the end of the ribbon cable

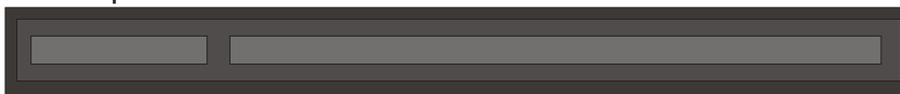


Attach first floppy drive (drive **A:**) to the end of the cable with the twist in it. Drive **B:** is usually connected to the next possible connector on the cable (the second or third connector after you install Drive **A:**).

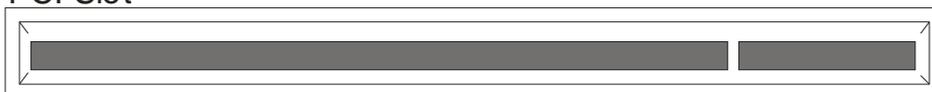
## 2.12 - Installing Add-in Cards

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 Express x16 Slot



PCI Slot



PCI Express x1 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.

### PCI IDESELs and IRQ Assignments

Slot or Device	IDSEL#	Bus#	PIRQ	PIRQ	PIRQ	PIRQ
PCI Slot #1 (32bit)	PCIXB AD23	PCIX- B	G0_B_ INTB_A	G0_B_ INTC_B	G0_B_ INTD_C	G0_A_ INTA_D
PCI Slot #2 (32bit)	PCIXA AD24	PCIX- A	G0_A_ INTC_D	G0_A_ INTD_A	G0_A_ INTA_B	G0_A_ INTB_C
PCI Slot #3 (32bit)	PCI AD25	PCI Bus	T0_PC_ INTA_C	T0_PC_ INTB_D	T0_PCI_ INTB_A	T0_PCI_ INTB_B
PCI Slot #4 (32bit)	PCIXB AD26	PCIX- B	G0_B_ INTC_B	G0_B_ INTD_C	G0_B_ INTD_D	G0_B_ INTD_A
Onboard IEEE1394	PCI AD22	PCI Bus	T0_PC_ INTD_C			

#### 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.

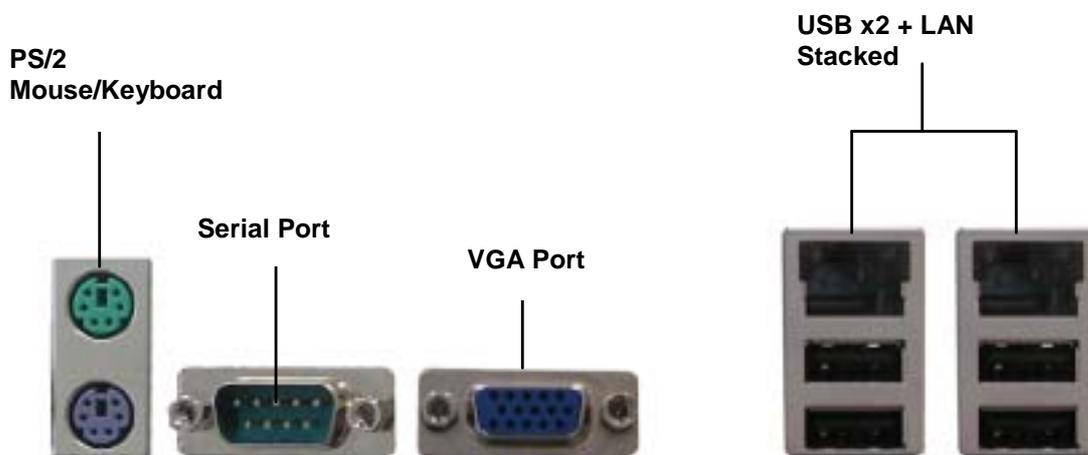
## 2.13 - Connecting External Devices

Your motherboard supports a number of different interfaces through connecting peripherals. The I/O ports of S2865ANRF, S2865AGNRF and S2865G2NR for connecting peripherals are different due to the different configurations. See the following diagrams for the details.

### S2865ANRF

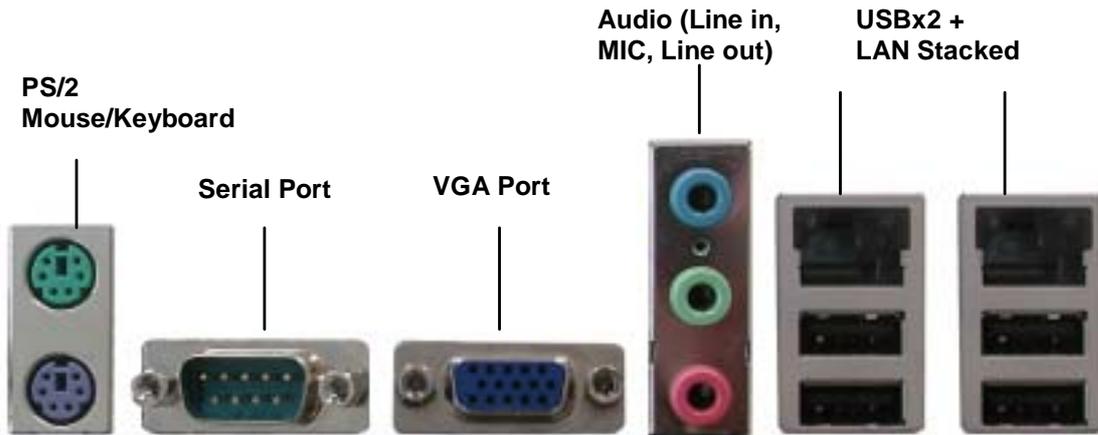


### S2865G2NR



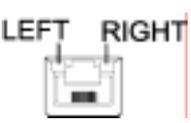
**NOTE:** Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

## S2865AGNRF



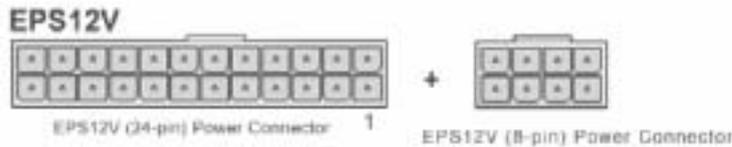
### Onboard LAN LED Color Definition

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 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	Yellow
	Active	Blinking Green	Yellow
No Link		Off	Off

## 2.14 - Installing the Power Supply

There are two power connectors on your Tomcat K8E S2865. The Tomcat K8E S2865 requires that you have an EPS12V power supply that has a 24-pin and an 8-pin power connector. The Tomcat K8E also supports ATX 2.x and ATX12V power supplies (20-pin + 4-pin). Please be aware that the 1<sup>st</sup> pin of 20-pin power connector should be align with the 1<sup>st</sup> pin of 24-pin power connector on the motherboard.



### 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 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.**

# NOTE

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# Chapter 3: BIOS Setup

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## 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. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings 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 are subject to change, 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 even when the power is turned off.

To start the BIOS setup utility:

1. Turn on or reboot your system.
2. Press <Del> during POST ([Tab] on remote console) to start the BIOS setup utility.

## 3.2 Setup Basics

The table below shows how to navigate in the setup program using 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

### 3.3 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 the [F1] key again.

### 3.4 In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can 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 absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by TYAN or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

### 3.5 BIOS Main Menu

Phoenix-AwardBIOS CMOS Setup Utility	
▶ Standard CMOS Features	▶ Frequency/Voltage Control
▶ Advanced BIOS Features	Load Fail-Safe Defaults
▶ Advanced Chipset Features	Load Optimized Defaults
▶ Integrated Peripherals	Set Supervisor Password
▶ Power Management Setup	Set User Password
▶ PnP/PCI Configurations	Save & Exit Setup
▶ PC Health Status	Exit without Saving
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults	

**Standard CMOS Features**

Use this menu for basic system configuration.

**Advanced BIOS Features**

Use this menu to set the advanced features available on your system.

**Advanced Chipset Features**

Use this menu to change the values in the chipset registers and optimize your system's performance.

**Integrated Peripherals**

Use this menu to specify your settings for integrated peripherals.

**Power Management Setup**

Use this menu to specify your settings for power management.

**PnP / PCI Configurations**

Use this menu to view and set PCI and PnP options.

**PC Health Status**

Use this menu to show your system temperature, speed and voltage status.

**Frequency/Voltage Control**

Use this menu to specify your settings for frequency/voltage control.

**Load Fail-Safe Defaults**

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

**Load Optimized Defaults**

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

**Supervisor / User Password**

Use this menu to set User and Supervisor Passwords.

**Save & Exit Setup**

Save CMOS value changes to CMOS and exit setup.

**Exit Without Saving**

Abandon all CMOS value changes and exit setup.

## 3.6 Standard CMOS Features

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.

Phoenix-AwardBIOS CMOS Setup Utility Standard CMOS Features		
		Item Specific Help
Date (mm:dd;yy) Time (hh:mm:ss)		
▶ IDE Channel 0 Master	[None]	
▶ IDE Channel 0 Slave	[None]	
▶ IDE Channel 1 Master	[None]	
▶ IDE Channel 1 Slave	[None]	
▶ IDE Channel 2 Master	[None]	
▶ IDE Channel 3 Master	[None]	
▶ IDE Channel 4 Master	[None]	
▶ IDE Channel 5 Master	[None]	
Drive A		
Drive B	[1.44M, 3.5 in]	
Halt on	[None]	
	[All, But Keyboard]	
Base Memory		
Extended Memory		
Total Memory		
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### Date / Time Setup

System Date: Adjusts the system date.

mmMonths

ddDays

yyYears

System Time: Adjusts the system clock.

hhHours (24hr. format)

mmMinutes

SSSeconds

### 3.6.1 IDE Channel 0/1/2/3/4/5 Master/Slave Setup

Computer detects IDE drive type from drive C to drive F.

Phoenix-AwardBIOS CMOS Setup Utility IDE Channel 0 Master		
IDE HDD Auto-Detection	[Press Enter]	Item Specific Help
IDE Channel 0 Master Access Mode	[Auto] [Auto]	
Capacity		
Cylinder		
Head		
Precomp		
Landing Zone		
Sector		
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

#### Drive A/B

Defines the floppy drive type.

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

#### Halt On

Determines if the computer should stop when an error is detected during power up.

No Errors / All Errors / **All, But Keyboard** / All, But Diskette / All, But Disk/Key

### 3.7 Advanced BIOS

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.

Phoenix-AwardBIOS CMOS Setup Utility Advanced BIOS Features		
<ul style="list-style-type: none"> <li>▶ Removable Device Priority</li> <li>▶ Hard Disk Boot Priority</li> <li>▶ CD-ROM Boot Priority</li> <li>Virus Warning</li> <li>CPU Internal Cache</li> <li>External Cache</li> <li>Quick Power On Self Test</li> <li>First Boot Device</li> <li>Second Boot Device</li> <li>Third Boot Device</li> <li>Boot Other Device</li> <li>Swap Floppy Drive</li> <li>Boot Up Floppy Seek</li> <li>Boot Up NumLock Status</li> <li>Gate A20 Option</li> <li>Typematic Rate Setting</li> <li>x Typematic Rate (Chars/Sec)</li> <li>x Typematic Delay (Msec)</li> <li>Security Option</li> <li>APIC Mode</li> <li>MPS Version Control For OS</li> <li>Install O/S</li> <li>OS Select For DRAM &gt; 64MB</li> <li>▶ Console Redirection</li> <li>Small Logo (EPA) Show</li> </ul>	<ul style="list-style-type: none"> <li>[Press Enter]</li> <li>[Press Enter]</li> <li>[Press Enter]</li> <li>[Disabled]</li> <li>[Enabled]</li> <li>[Enabled]</li> <li>[Enabled]</li> <li>[Removable]</li> <li>[CDROM]</li> <li>[Hard Disk]</li> <li>[Enabled]</li> <li>[Disabled]</li> <li>[Disabled]</li> <li>[On]</li> <li>[Fast]</li> <li>[Disabled]</li> <li>6</li> <li>250</li> <li>[Setup]</li> <li>[Enabled]</li> <li>[1.4]</li> <li>[Others]</li> <li>[Non-OS2]</li> <li>[Press Enter]</li> <li>[Disabled]</li> </ul>	<p>Item Specific Help</p>
<p>: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit            F1: General Help F5: Previous Values F6: Fail-Safe Defaults            F7: Optimized defaults</p>		

### 3.7.1 Removable Device Priority

This item allows you to select removable boot device priority.

Phoenix-AwardBIOS CMOS Setup Utility Removable Device Prioiry		
1. Floppy		Item Specific Help

### 3.7.2 Hard Disk Boot Priority

This item allows you to select the hard disk boot priority.

Phoenix-AwardBIOS CMOS Setup Utility Hard Disk Boot Prioiry		
1. Bootable Add-in Cards		Item Specific Help

### 3.7.3 CD-ROM Boot Priority (Option)

This item allows you to select the CD-ROM boot priority. It is available only when the CD-ROM drive is connected.

Phoenix-AwardBIOS CMOS Setup Utility CD-ROM Boot Prioiry		
1. Ch1 M.	DVD-ROM DDV1621	Item Specific Help

**Virus Warning**

This item allows you to use the function of virus warning.

Enabled / **Disabled**

**CPU Internal / External Cache**

This option toggles the use of CPU L1 or L2 cache. The L1 cache is also called the primary cache or internal cache. The L2 cache also called as the external cache is placed between the CPU and the DRAM (dynamic RAM).

**Enabled** / Disabled

**Quick Power On Self Test**

This option allows you to use the function of quick power on test.

**Enabled** / Disabled

**First, Second, and Third Boot Devices**

These indicate the boot priority. For example if the First Boot Device is set as Removable, the Second Boot Device as CDROM, and the Third Boot Device as Hard Disk, then the system will try to boot from a removable drive. If it fails, the system will try to boot from a CDROM. If this also fails, it will try to boot from the Hard Disk.

**Boot Other Device**

This option allows the system to boot from any other bootable device.

**Enabled** / Disabled

**Swap Floppy Drive**

This feature allows the system to swap floppy drive.

Enabled / **Disabled**

**Boot Up Floppy Seek**

During Power-On Self-Test (POST), BIOS will determine if the floppy disk drive installed is 40 or 80 tracks.

Enabled / **Disabled**

**Boot Up NumLock Status**

This option, when enabled, automatically turns on your NumLock key when the system is booted. This is a matter of personal taste.

**On** /Off

**Gate A20 Option**

This feature determines how Gate A20 is used to address memory above 1MB. When set to Fast, the motherboard chipset controls the operation of Gate A20. But when set to Normal, a pin in the keyboard controller controls Gate A20.

**Fast** / Normal

### **Typematic Rate Setting**

This feature enables you to control the keystroke repeat rate when you depress a key continuously. When enabled, you can manually adjust the settings using the two typematic controls (Typematic Rate and Typematic Delay). If disabled, the BIOS will use the default setting.

**Enabled / Disabled**

### **Typematic Rate (Chars/Sec)**

Defines how many characters are repeated per second when holding down a key on the keyboard:

**6 / 8 / 10 / 12 / 15 / 20 / 24 / 30**

### **Typematic Delay (Msec)**

Defines the delay (in milli-seconds) that occurs at keystroke before that key will start to repeat.

**250 / 500 / 750 / 1000**

### **Security Option**

Setting this option to System will set the BIOS to ask for the password each time the system boots up. If you choose Setup, then the password is only required for access into the BIOS setup menus.

**Setup / System**

### **APIC Mode**

This option allows you to enable or disable Advanced Programmable Interrupt Controller (APIC) Mode.

**Enabled / Disabled**

### **MPS Version Control For OS**

This feature is only applicable to multiprocessor motherboards as it specifies the version of the Multi-Processor Specification (MPS) that the motherboard will use. The MPS is a specification by which PC manufacturers design and build Intel architecture systems with two or more processors.

**1.1 / 1.4**

### **OS Select For DRAM > 64MB**

This BIOS feature determines how systems with more than 64MB of memory are managed. A wrong setting can cause problems like erroneous memory detection.

**Non-OS2 / OS2**

### **Installed O/S**

This feature is used to select Linux if your are running Linux operation systems.

**Others / Linux**

### 3.7.4 Console Redirection

Phoenix-AwardBIOS CMOS Setup Utility Console Redirection		
Console Redirection	[SMDC]	Item Specific Help
x Baud Rate	19200	
Agent Address	[3F8h]	
Agent after boot	[Disabled]	

#### **Console Redirection**

This option will redirect the BIOS and POST screens to the serial port to allow remote management using a terminal server.

**SMDC** / Enabled / Disabled

#### **Baud Rate**

This feature allows you to select the baud rate of transfer.

#### **Agent Address**

Address connection

**3F8h**/2F8h/3E8h/2E8h

#### **Agent after boot**

Keep Agent running after OS boot.

Enabled / **Disabled**

#### **Small Logo (EPA) Show**

This option toggles the display of the EPA Energy Star logo at POST.

Enabled / **Disabled**

## 3.8 Advanced Chipset

In Advanced Chipset Features, you will be able to adjust many of the chipset special features.

Phoenix-AwardBIOS CMOS Setup Utility Advanced Chipset Features		
CPU Frequency	[200.0]	Item Specific Help
HT Frequency	[Auto]	
HT Width	[ 16 16 ]	
▶ DRAM Configuration	[Press Enter]	
CPU Spread Spectrum	[Disabled]	
SATA Spread Spectrum	[Disabled]	
PCIE Spread Spectrum	[Disabled]	
SSE/SSE2 Instructions	[Enabled]	
System BIOS Cacheable	[Disabled]	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### CPU Frequency

This feature is used to set the CPU frequency.

**200.0** / 201.0 / 201.5 / 202.0 / 202.5 / 203.0 / 203.5 / 204.0 ..... / 250.0

### HT Frequency

This feature is used to set the Hyper Transport frequency.

1x / 2x / 3x / 4x / 5x / **Auto**

### HT Width

This feature is used to set the Hyper Transport width.

8 8 / 16 8 / 8 16 / **16 16**

### 3.8.1 DRAM Configuration

Phoenix-AwardBIOS CMOS Setup Utility DRAM Configuration		
Timing Mode	[Auto]	Item Specific Help
Memclock index value (Mhz)	200Mhz	
x CAS# latency (TCL)	2.5	
x Min RAS# active time (Tras)	8T	
x RAS# to CAS# delay (Trcd)	4T	
x Row precharge Time (Trp)	2T	
1T/2T Memory Timing	2T	
S/W memory hole Romapping	[Disabled]	
H/W memory hole Remapping	[Enabled]	
MTRR mapping mode	[Continuous]	
DRAM ECC feature control	[Enabled]	
ECC memory Interlock	[At Least One]	
ECC MCE enable	[Enabled]	
Chip-Kill mode enable	[Disabled]	
ECC Redirection	[Enabled]	
DRAM background scrubber	[Disabled]	
DCache background scrubber	[Disabled]	
L2 cache background scrubb	[Disabled]	

#### Timing Mode

This option permits you to either manually select memory timings, or allow the SPD (Serial Presence Detect) to determine the said timings automatically.

**Auto** / Manual

#### Memclock index value (Mhz)

This feature is used to set the Memclock index value.

100Mhz / 133Mhz / 166Mhz / **200Mhz**

#### CAS# latency (TCL)

This setting controls the time delay (in clock cycles - CLKs) that passes before the DRAM starts to carry out a read command after receiving it. This also determines the number of CLKs for the completion of the first part of a burst transfer. In other words, the lower the latency, the faster the transaction.

2 / **2.5** / 3

**Min RAS# active time (Tras)**

This feature is used to set Min RAS# active time.

Auto / 5T / 6T / 7T / **8T** / 9T / 10T / 11T / 12T / 13T / 14T / 15T

**RAS# to CAS# delay (Trcd)**

This field lets you to insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed.

**4T** / 3T / 2T / 5T / 6T / 7T / Auto

**Row precharge Time (Trp)**

This feature is used to set Row precharge time.

Auto / **2T** / 3T / 4T / 5T / 6T / 7T

**1T/2T Memory Timing**

This feature is used to set the memory timing.

1T / **2T**

**S/W memory hole remapping**

This feature is used to configure the function of S/W memory hole remapping.

Enabled / **Disabled**

**H/W memory hole remapping**

This feature is used to configure the function of S/W memory hole remapping.

**Enabled** / Disabled

**MTRR mapping mode**

This feature is used to set MTRR mapping mode.

**Continuous** / Discrete

**DRAM ECC feature control**

This feature allows the user to configure ECC setup for DRAM.

**Enabled** / Disabled

**ECC memory Interlock**

This feature is used to set ECC memory interlock.

**At least one** / All are

**ECC MCE enable**

This option is used to enable the MCE (memory check exception) function for ECC.

Disabled / **Enabled**

**Chip-Kill mode enable**

This option is used to enable the function of Chip-Kill mode.

**Disabled** / Enabled

### **ECC Redirection**

This feature is used to enable ECC scrubber to correct errors detected in DRAM during normal CPU requests.

Disabled / **Enabled**

### **DRAM background scrubber**

DRAM scrubbing corrects and rewrites memory errors so that later reads are correct. Doing this while memory is not being used improves performance.

**Disabled** / 40.0ns / 80.0ns / 160ns / 320ns / 640ns / 1.28u / 2.56u / 5.12u / 105.12u

### **L2 cache background scrubber**

This feature allows the L2 Data Cache RAM to be corrected while idle.

**Disabled** / 40.0ns / 80.0ns / 160ns / 320ns / 640ns / 1.28u / 2.56u / 5.12u / 105.12u

### **DCache background scrubber**

This feature allows the L1 Data Cache RAM to be corrected while idle.

**Disabled** / 40.0ns / 80.0ns / 160ns / 320ns / 640ns / 1.28u / 2.56u / 5.12u / 105.12u

### **CPU Spread Spectrum**

This feature is used to configure CPU spread spectrum.

**Disabled** / Center+Spread

### **SATA Spread Spectrum**

This feature is used to configure SATA spread spectrum.

**Disabled** / Down Spread

### **PCIe Spread Spectrum**

This feature is used to configure PCIe spread spectrum.

**Disabled** / Down Spread

### **SSE/SSE2 Instruction**

This feature is used to enable the function of SSE/SSE2 instruction.

Disabled / **Enabled**

### **System BIOS Cacheable**

Enabling this option will cause the BIOS code from ROM to be copied on to the much faster RAM at location F000h-FFFFh, thus increasing system performance. However, if any program writes to this memory area, a system error may result.

**Disabled** / Enabled

### 3.9 Integrated Peripherals

Options related to onboard peripheral features can be altered through the following:

Phoenix-AwardBIOS CMOS Setup Utility Integrated Peripherals		
▶ IDE Function Setup	[Press Enter]	Item Specific Help
▶ RAID Config	[Press Enter]	
OnChip USB	[V1, 1+V2.0]	
USB Keyboard Support	[Disabled]	
USB Mouse Support	[Disabled]	
AC97 Audio	[Auto]	
MAC Lan	[Auto]	
MAC Media Interface	[Pin Strap]	
IDE HDD Block Mode	[Enabled]	
BCM5721 Lan Boot ROM	[Disabled]	
Onboard FDC Controller	[Enabled]	
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[Standard]	
x ECP Mode Use DMA	3	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### 3.9.1 IDE Function Setup

Phoenix-AwardBIOS CMOS Setup Utility DRAM Configuration		
OnChip IDE Channel 0	[Enabled]	Item Specific Help
Primary Master PIO	[Auto]	
Primary Slave PIO	[Auto]	
Primary Master UDMA	[Auto]	
Primary Slave UDMA	[Auto]	
OnChip IDE Channel 1	[Enabled]	
Secondary Master PIO	[Auto]	
Secondary Slave PIO	[Auto]	
Secondary Master UDMA	[Auto]	
Secondary Slave UDMA	[Auto]	
IDE DMA transfer access	[Enabled]	
Serial-ATA 1	[Enabled]	
Serial-ATA 2	[Enabled]	
IDE Prefetch Mode	[Enabled]	

#### OnChip IDE Channel 0/1

This chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary and/or secondary onboard IDE interface. Select Disabled to deactivate this interface, if you install a primary and/or secondary add-in IDE interface.

Disabled / **Enabled**

#### Primary / Secondary Master / Slave PIO

The four IDE PIO (Programmed Input / Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

**Auto** / Mode 0 ~ Mode 4

#### Primary / Secondary Master / Slave UDMA

This option allows you to select the mode of operation for the Ultra DMA/33 implementation. This is possible only if your IDE hard drive supports UDMA and the operating environment includes a DMA driver (Windows 95 OSR2 or a third party IDE bus master driver).

**Auto** / Disabled

#### IDE DMA transfer access

This feature is used to enable the function of IDE DMA transfer access.

Disabled / **Enabled**

### Serial-ATA 1/2

This option allows you to enable the function of Serial ATA 1/2.

**Enabled** / Disabled

### IDE Prefetch Mode

This option is used to enable the IDE Prefetch Mode.

Disabled / **Enabled**

## 3.9.2 RAID Config

Phoenix-AwardBIOS CMOS Setup Utility RAID Config		
RAID Enable	[Disabled]	Item Specific Help
x IDE Primary Master RAID	[Disabled]	
x IDE Primary Slave RAID	[Disabled]	
x IDE Secondary Master RAID	[Disabled]	
x IDE Secondary Slave RAID	[Disabled]	
x SATA 1 Primary RAID	[Disabled]	
x SATA 1 Secondary RAID	[Disabled]	
x SATA 2 Primary RAID	[Disabled]	
x SATA 2 Secondary RAID	[Disabled]	

### RAID Enable

This item allows you to Enable or Disable the onboard RAID function.

Enabled / **Disabled**

### IDE Primary / Secondary Master / Slave RAID

This feature allows you to enable the function of IDE Primary/Secondary Master/Slave RAID.

Enabled / **Disabled**

### SATA 1/2 Primary/Secondary RAID

This feature allows you to enable the function of SATA 1/2 Primary/Secondary RAID.

Enabled / **Disabled**

**NOTE:** Please refer to p. xx for information on how to make a NV RAID driver diskette from TYAN CD.

### OhChip USB

This setting is used to configure the version of OnChip USB.

Disabled / **V1.1+V2.0** / V1.1

### **USB Keyboard Support**

This option allows you to enable the support for USB keyboard.

Enabled / **Disabled**

### **USB Mouse Support**

This option allows you to enable the support for USB mouse.

Enabled / **Disabled**

### **AC97 Audio**

This option allows the auto selection of AC97 audio codec processing.

**Auto** / Disabled

### **MAC Lan**

This option allows the auto selection of MAC Lan (nVidia) support.

**Auto** / Disabled

### **MAC Media Interface**

This option allows you to set the MAC media interface.

**Pin Strap** / MII / RGMII

### **IDE HDD Block Mode**

The IDE HDD Block Mode feature speeds up hard disk access by transferring data from multiple sectors at once instead of using the old single sector transfer mode.

**Enabled** / Disabled

### **BCM5721 Lan Boot ROM**

This controls if the onboard LAN will be run on bootup. LAN Boot ROMs are used to download operating system code from a network server. Options are:

Enabled / **Disabled**

### **Onboard FDC Controller**

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select "Disabled" in the field.

**Enabled** / Disabled

### **Onboard Serial Port 1**

Select an address and corresponding interrupt for the first serial port.

**3F8/IRQ4** / 2F8/IRQ3 / 3E8/IRQ4 / 2E8/IRQ3 / Auto

### **Onboard Serial Port 2**

Select an address and corresponding interrupt for the second serial port.

3F8/IRQ4 / **2F8/IRQ3** / 3E8/IRQ4 / 2E8/IRQ3 / Auto

### Onboard Parallel Port

To use the parallel port on the system, select an address and corresponding interrupt for the parallel port.

**378/IRQ7 / 278/IRQ5 / 3BC/IRQ7 / Disabled**

### Parallel Port 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.

**Standard / SPP / EPP1.7 / EPP 1.9 / ECP / ECP+EPP**

### ECP Mode Use DMA

This BIOS feature determines which DMA channel the parallel port should use when it is in ECP mode.

**3 / 1**

## 3.10 Power Management Setup

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.

Phoenix-AwardBIOS CMOS Setup Utility Power Management Setup		
ACPI function	[Enabled]	Item Specific Help
ACPI Suspend Type	[S1&S3]	
Power Management	[User Define ]	
Video Off Method	[DPMS Support]	
HDD Power Down	[Disabled]	
HDD Down in Suspend	[Disabled]	
Soft-Off by PBTN	[instant-off]	
Intruder# Detection	[Disabled]	
PowerOn After Pwr-Fail	[Off]	
WOL (PME#) From Soft-Off	[Disabled]	
WOR (RI#) From Soft-Off	[Disabled]	
Power-On by Alarm	[Disabled]	
x Day of Month Alarm	0	
x Time (hh:mm:ss) Alarm	0 : 0 : 0	
AMD Cool'n'Quiet/Power Now	[Disabled]	
POWER ON Function	[BUTTON ONLY]	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### ACPI Function

This feature allows you to Enable or Disable the ACPI (Advanced Configuration and Power Interface) function. ACPI establishes industry-standard interfaces for OS-directed configuration and power management on laptops, desktops, and servers.

**Enabled** / Disabled

### ACPI Suspend Type

This option specifies the method to be used hibernate.

S1 (POS) (Power on Suspend) / S3 (STR) (Suspend to RAM) / **S1 & S3**

### Power Management

This function allows you to set the default parameters of power-saving modes. Set this to User Define to choose your own parameters. The following table shows the parameters for Maximum Saving and Minimum Saving options for the various modes:

Mode	Doze	Standby	Suspend	HDD Power Down
Min Saving	1 hour	1 hour	1 hour	15 min
Max Saving	1 min	1 min	1 min	1 min

### Video Off Method

This option defines the method used to power off video.

Blank Screen / V/H SYNC+Blank / **DPMS Support**

### HDD Power Down

This setting defines the delay before the hard drive is powered down.

**Disabled** / 1 min ~ 15 min

### HDD Down in Suspend

This setting defines the delay before the hard drive is powered down in suspend mode,

**Disabled** / Enabled

### Soft-Off by PBTN

This determines how long the power button needs to be pressed to switch off the PC. Options are:

**Instant-Off** / Delay 4 Sec.

### Intruder Detection

This feature is used to enable the function of intruder detection.

Enabled / **Disabled**

### PowerOn After Pwr-Fail

This option defines the state of the system when power fails and returns again. If On is selected, the system automatically switches on when power is resumed.

If Former-Sts is selected, the system automatically switches on and restores itself to the state it was last in when power failed.

Former-Sts / On / **Off**

#### **WOL(PME#) From Soft-Off**

This feature is used to enable the function of wake on LAN from soft-off status.

**Disabled** / Enabled

#### **WOR (RI#) From Soft-Off**

This feature is used to enable the function of wake on Ring from soft-off status.

**Disabled** / Enabled

#### **Power-On by Alarm**

This option allows your system to turn on at a pre-selected time.

Enabled / **Disabled**

#### **Day of Month Alarm**

This option allows you to set the date on which the system will turn on every month. Enter 0 to disable this function.

#### **Time (hh:mm:ss) Alarm**

This option allows you to set the time on which the system will turn on.

#### **AMD Cool 'n' Quiet/Power Now**

This option allows you to set the function of AMD Cool'n Quiet or Power Now technology which controls your system's level of processor performance, dynamically adjusting the operating frequency and voltage.

Auto / **Disabled**

#### **Power on Function**

This option defines how the system can be waked up from the sleep mode.

**Button only** / keyboard+BTN / KB+Mouse+BTN / Mouse+BTN

## 3.11 PnP/PCI Configuration

Phoenix-AwardBIOS CMOS Setup Utility PnP/PCI Configuration		
Init Display First	[PCI-Ex]	Item Specific Help
Reset Configuration Data	[Disabled]	
Resource Controlled By x IRQ Resources	[Auto(ESCD)] Press Enter	
PCI/VGA Palette Snoop xx PCI Express relatives items xx Maximum Payload Size	[Disabled] [4096]	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### Init Display First

This BIOS feature allows you to select whether to boot the system using the PCI Express graphics card or the PCI graphics card. This is particularly important if you have PCI Express and PCI graphics cards but only one monitor.  
PCI Slot / **PCI Ex**

### Reset Configuration Data

This feature allows you to manually force the BIOS to clear the previously saved ESCD (Extended System Configuration Data) data and reconfigure the settings. Use this feature when the BIOS can not automatically detect the hardware change and reconfigure the ESCD.

Enabled/**Disabled**

### Resources Controlled By

When this option is set to AUTO, the BIOS by using ESCD, controls the IRQ and DMA assignments of all of the boot and PNP devices in the system. If you set this option to Manual, you will be able to manually assign all IRQ and DMA information.

**Auto (ESCD)** / Manual

### IRQ Resources

This option is used to manually assign IRQ resources.

### PCI/VGA Palette Snoop

This option is only useful if you use an MPEG card or an add-on card that makes use of the graphics card's Feature Connector.

**Disabled** / Enabled

### Maximum Payload Size

This setting defines the maximum payload size. This controls the maximum amount of data that can be transferred in a packet. Larger payload sizes increase data throughput, but increase the time that an application must wait for data to begin being transferred.

128 / 256 / 512 / 1024 / 2048 / **4096**

## 3.12 PC Health Status

This section monitors critical parameters of your PC and can automatically shutdown the PC if the temperature of the processor exceeds the specified threshold value. This is only available if there is a Hardware Monitor onboard.

Phoenix-AwardBIOS CMOS Setup Utility			
PC Health Status			
Shutdown Temperature	[Disabled]	Item Specific Help	
Auto Fan Power Control	[Disabled]		
Min PWM Temperature	[55 ]		
Min PWM Duty Cycle Set	[50%]		
CPU Temperature			
Current System Temp			
VDIMM			
VCCP			
5V			
12V			
3.3VSB			
VBat			
Vcc33			
CPU Fan Speed			
Fan3 Speed			
Fan2 Speed			
Fan1 Speed			
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit			
F1: General Help F5: Previous Values F6: Fail-Safe Defaults			
F7: Optimized defaults			

## Shutdown Temperature

This option allows a user to define the system shutdown temperature. If the CPU temperature exceeds the predefined shutdown threshold, the BIOS forces a system shutdown.

### NOTE

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The onboard SMSC<sup>®</sup> DEM1737 hardware monitoring ASIC automatically detects the system, motherboard and CPU temperature. It detects the CPU and chassis fan speeds in RPM. The hardware monitor ASIC also detects the voltage output through the voltage regulators.

---

## Auto FAN Power Control

Leave this feature as default.

**Disabled** / Enabled

## Min PWM Temperature

This item lets CPU fan work at minimum PWM duty cycle once the CPU temperature is below the set option.

45 / 50 / **55** / 60

## Min PWM Duty Cycle Set

This item allows you to set minimum PWM Duty Cycle.

0% / 30% / 40% / **50%**

## 3.13 Frequency/Voltage Control

This section facilitates controlling the CPU clock and frequency ratio.

Phoenix-AwardBIOS CMOS Setup Utility Frequency/Voltage Control		
CPU Voltage Regulator	[Default]	Item Specific Help
CHIPSET Voltage Regulator	[Default]	
DRAM Voltage Regulator	[Default]	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

### CPU Voltage Regulator

This option controls how much voltage is supplied to your processor with a maximum allowable voltage of 1.55V. Select Default if you are not sure.

**Default** / -0.025v / -0.050v / -0.075v / -0.100v / +0.025v / +0.050v / +0.075v / +0.100v / +0.125v.....

#### **WARNING!**

We suggest you to set the CPU voltage by the default value. Overvoltage may cause serious damage to system which is not guaranteed.

### Chipset Voltage Regulator

This option controls how much voltage is supplied to your chipset. Select Default if you are not sure.

**Default** / +0.02V / +0.04V / +0.06V

### DRAM Voltage Regulator

This option controls how much voltage is supplied to your DRAM. Select Default if you are not sure.

**Default** / +0.01V / +0.02V / +0.03V

## 3.14 Load Fail-Safe/Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

**Load Fail-Safe Defaults (Y/N)? N**

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operations.

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

**Load Optimized Defaults (Y/N)? N**

Pressing 'Y' loads the default values that are factory settings for optimal system performance operations.

## 3.15 Supervisor/User Password Setting

You can set either a supervisor or a user password, or both of them. The differences are:

**Set Supervisor Password:** can enter and change the options of the setup menus.

**Set User Password:** Can enter but does not have permission to change any options.

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

### Enter Password

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

## 3.16 Save & Exit Setup / Exit without Saving

### Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

**Save to CMOS and EXIT (Y/N)?** **Y**

Pressing “Y” stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

### Exit without Saving

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

**NOTE:**

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# Chapter 4: Diagnostics

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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 two kinds of audible beeps.

- A single long beep followed by two short beeps: It indicates that a video error has occurred.
- A single long beep repeatedly: It indicates that a DRAM error has occurred.

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

POST (hex)	Description
<b>CFh:</b>	Test CMOS R/W functionality.
<b>C0h</b>	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
<b>C1h:</b>	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
<b>C3h:</b>	Expand compressed BIOS code to DRAM
<b>C5h:</b>	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
<b>01h:</b>	Expand the Xgroup codes locating in physical address 1000:0
<b>03h:</b>	Initial Superio_Early_Init switch
<b>05h:</b>	1.Blank out screen 2.Clear CMOS error flag
<b>07h:</b>	1. Clear 8042 interface 2. Initialize 8042 self-test
<b>08h:</b>	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
<b>0Ah:</b>	1. Disable PS/2 mouse interface (optional). 2. Autodetect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
<b>0Eh:</b>	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
<b>10h:</b>	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
<b>12h:</b>	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
<b>14h:</b>	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
<b>16h:</b>	Initial onboard clock generator if Early_Init_Onboard_Generator is defined. See also POST 26h.
<b>18h:</b>	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).

<b>POST (hex)</b>	<b>Description</b>
<b>1Bh:</b>	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
<b>1Dh</b>	Initial EARLY_PM_INIT switch.
<b>1Fh:</b>	Load keyboard matrix (notebook platform)
<b>21h:</b>	HPM initialization (notebook platform)
<b>23h:</b>	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.
<b>24h:</b>	Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.
<b>25h:</b>	Early PCI Initialization: -Enumerate PCI bus number. -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0
<b>26h:</b>	1. If Early_Init_Onboard_Generator is not defined Onboard clock generator initialization. Disable respective clock resource to empty PCI& DIMM slots. 2. Init onboard PWM 3. Init onboard H/W monitor devices
<b>27h:</b>	Initialize INT 09 buffer
<b>29h:</b>	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed.
<b>2Bh:</b>	Invoke Video BIOS
<b>2Dh:</b>	1. Initialize double-byte language font (Optional) 2. Put information on screen display, including Award title, CPU type, CPU speed, full screen logo.
<b>33h:</b>	Reset keyboard if Early_Reset_KB is defined e.g. Winbond 977 series Super I/O chips. See also POST 63h.
<b>35h:</b>	Test DMA Channel 0.
<b>37h:</b>	Test DMA Channel 1.
<b>39h:</b>	Test DMA page registers.
<b>3Ch:</b>	Test 8254
<b>3Eh:</b>	Test 8259 interrupt mask bits for channel 1.
<b>40h:</b>	Test 8259 interrupt mask bits for channel 2.
<b>43h:</b>	Test 8259 functionality.

<b>POST (hex)</b>	<b>Description</b>
<b>47h:</b>	Initialize EISA slot
<b>49h</b>	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
<b>4Eh:</b>	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
<b>50h:</b>	Initialize USB Keyboard & Mouse.
<b>52h:</b>	Test all memory (clear all extended memory to 0)
<b>53h:</b>	Clear password according to H/W jumper (Optional).
<b>55h:</b>	Display number of processors (multi-processor platform)
<b>57h:</b>	1. Display PnP logo 2. Early ISA PnP initialization - Assign CSN to every ISA PnP device.
<b>59h:</b>	Initialize the combined Trend Anti-Virus code.
<b>5Bh:</b>	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD
<b>5Dh:</b>	1. Initialize Init_Onboard_Super_IO 2. Initialize Init_Onboard_AUDIO.
<b>60h:</b>	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
<b>63h:</b>	Reset keyboard if Early_Reset_KB is not defined.
<b>65h:</b>	Initialize PS/2 Mouse
<b>67h:</b>	Prepare memory size information for function call: INT 15h ax=E820h
<b>69h:</b>	Turn on L2 cache
<b>6Bh:</b>	Program chipset registers according to items described in Setup & Auto-configuration table.
<b>6Dh:</b>	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO"
<b>6Fh:</b>	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
<b>75h:</b>	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.....

<b>POST (hex)</b>	<b>Description</b>
<b>77h:</b>	Detect serial ports & parallel ports.
<b>7Ah</b>	Detect & install co-processor
<b>7Ch:</b>	Init HDD write protect.
<b>7Fh:</b>	Switch back to text mode if full screen logo is supported -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue ◆Clear EPA or customization logo.
<b>82h:</b>	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
<b>83h:</b>	Save all data in stack back to CMOS
<b>84h:</b>	Initialize ISA PnP boot devices
<b>85h:</b>	1. USB final Initialization 2. Switch screen back to text mode
<b>87h:</b>	NET PC: Build SYSID Structure.
<b>89h:</b>	1. Assign IRQs to PCI devices 2. Set up ACPI table at top of the memory.
<b>8Bh:</b>	1. Invoke all ISA adapter ROMs 2. Invoke all PCI ROMs (except VGA)
<b>8Dh:</b>	1. Enable/Disable Parity Check according to CMOS setup 2. APM Initialization
<b>8Fh:</b>	Clear noise of IRQs
<b>93h:</b>	Read HDD boot sector information for Trend Anti-Virus code
<b>94h:</b>	1. Enable L2 cache 2. Program Daylight Saving 3. Program boot up speed 4. Chipset final initialization. 5. Power management final initialization 6. Clear screen & display summary table 7. Program K6 write allocation 8. Program P6 class write combining
<b>95h:</b>	Update keyboard LED & typematic rate
<b>96h:</b>	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table
<b>FFh:</b>	Boot attempt (INT 19h)

**NOTE:**

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# Chapter 5: Setting up RAID Configuration

The Tomcat K8E S2865 provides support for NVIDIA RAID 0, 1, and 0+1. The RAID (Redundant Array of Independent Disks) technology uses multiple drives to either increase total disk space or to offer data protection.

The RAID techniques were first published in 1988 by a multivendor consortium – the RAID Advisory Board. RAID techniques were divided into different categories or levels. Originally, RAID levels focused on improving resiliency or data availability. As additional RAID levels were defined, one was introduced for improving performance. For all levels, RAID techniques optimize storage solutions by using multiple disks grouped together and treated them as a single storage resource.

This chapter describes the basic steps for configuring NVIDIA RAID.

## 5.1 Setting up the BIOS

1. Start your computer, then press Delete to enter the BIOS setup. The BIOS CMOS Setup Utility screen appears.

Phoenix-AwardBIOS CMOS Setup Utility	
▶ Standard CMOS Features	▶ Frequency/Voltage Control
▶ Advanced BIOS Features	Load Fail-Safe Defaults
▶ Advanced Chipset Features	Load Optimized Defaults
▶ Integrated Peripherals	Set Supervisor Password
▶ Power Management Setup	Set User Password
▶ PnP/PCI Configurations	Save & Exit Setup
▶ PCI Health Status	Exit without Saving

: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit  
F1: General Help F5: Previous Values F6: Fail-Safe Defaults  
F7: Optimized defaults

- Use the arrow keys to select **Integrated Peripherals**, then press Enter. The Integrated Peripherals screen appears.

Phoenix-AwardBIOS CMOS Setup Utility Integrated Peripherals		
▶ IDE Function Setup	[Press Enter]	Item Specific Help
▶ RAID Config	[Press Enter]	
OnChip USB	[V1, 1+V2.0]	
USB Memory Type	[SHADOW]	
USB Keyboard Support	[Disabled]	
USB Mouse Support	[Disabled]	
AC97 Audio	[Auto]	
MAC Lan	[Auto]	
MAC Media Interface	[Pin Strap]	
IDE HDD Block Mode	[Enabled]	
Onboard Lan Boot ROM	[Enabled]	
Onboard FDC Controller	[Enabled]	
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[Standard]	
x ECP Mode Use DMA	3	
: Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized defaults		

- Use the arrow keys to select the RAID Config.

4. Press Enter. The RAID Config screen appears.

Phoenix-AwardBIOS CMOS Setup Utility RAID Config		
RAID Enable	[Disabled]	Item Specific Help
x SATA 1 Primary RAID	[Disabled]	
x SATA 1 Secondary RAID	[Disabled]	
x SATA 2 Primary RAID	[Disabled]	
x SATA 2 Secondary RAID	[Disabled]	

5. From the RAID Config screen, enable RAID, then enable any of the disks that you want to use as RAID disks. In the figure above, the master and slave drives on the secondary IDE port are enabled as RAID disks. Make sure to enable the SATA drives also if you are setting up a RAID 0+1 array.
6. Press **F10** to save the configuration and exit. The PC reboots.
7. Enter the RAID BIOS setup by pressing **F10** when prompted, and proceed to set up NVIDIA RAID BIOS as described in the next section.

## 5.2 Configuring the NVIDIA RAID BIOS

The NVIDIA RAID BIOS set up lets you choose the RAID type and which hard drives you want to make part of the array.

### Entering the RAID BIOS Setup

1. Wait until you see the RAID software prompting you to press **F10**. The RAID prompt appears as part of the system POST and boot process prior to loading the OS. You have a few seconds to press **F10** before the screen disappears.
2. Press **F10**. The NVIDIA RAID utility – Define a New Array screen appears.

NVIDIA RAID Utility - Define a New Array -					
RAID Mode: <b>Mirroring</b>			Striping Block: <b>Optional</b>		
Free Disks			Array Disks		
<u>Loc</u>	<u>Disk Model Name</u>		<u>Loc</u>	<u>Disk Model Name</u>	
1.0M	ST380023AS				
1.1M	ST380023AS	[ ] Add			
		[ ] Del			
[F6] Back [F7] Finish [TAB] Navigate [ ] Select [Enter] Popup					

By default, RAID Mode is set to Mirroring and Striping Block is set to Optimal.

### Using the Define a New Array Screen

If necessary, press the tab key to move from field to field until the appropriate field is highlighted.

- **Selecting the RAID Mode**

By default, this is set to Mirroring. To change to a different RAID mode, press the down arrow key until the mode that you want appears in the RAID Mode box—either Mirroring, Striping, Spanning, or Stripe Mirroring.

- **Selecting the Striping Block Size**

Striping block size is given in kilobytes, and affects how data is arranged on the disk. It is recommended to leave this value at the default Optimal, which is 64KB, but the values can be between 4 KB and 128 KB (4, 8, 16, 32, 64, and 128 KB)

## Assigning the Disks

The disks that you enabled from the RAID Config BIOS setup page appear in the Free Disks block. These are the drives that are available for use as RAID array disks.

To designate a free disk to be used as a RAID array disk,

1. Tab to the Free Disks section. The first disk in the list is selected.
2. Move it from the Free Disks block to the Array Disks block by pressing the rightarrow key ( `>` ). The first disk in the list is moved, and the next disk in the list is selected and ready to be moved.
3. Continue pressing the right-arrow key ( `>` ) until all the disks that you want to use as RAID array disks appear in the Array Disks block.

The figure below illustrates the Define a New Array screen after two disks have been assigned as RAID1 array disks.

NVIDIA RAID Utility - Define a New Array -			
RAID Mode: <b>Mirroring</b>		Stripping Block: <b>Optional</b>	
Free Disks		Array Disks	
<u>Loc</u>	<u>Disk Model Name</u>	<u>Loc</u>	<u>Disk Model Name</u>
		1.0M	ST380023AS
		1.1M	ST380023AS
	[ ] Add		
	[ ] Del		
[F6] Back [F7] Finish [TAB] Navigate [ ] Select [Enter] Popup			

## Completing the RAID BIOS Setup

1. After assigning your RAID array disks, press **F7**. The Clear disk array prompt appears.

NVIDIA RAID Utility - Define a New Array -			
RAID Mode: <b>Mirroring</b>		Stripping Block: <b>Optional</b>	
Free Disks		Array Disks	
<u>Loc</u>	<u>Disk Model Name</u>		<u>Model Name</u>
		Clear disk data?	ST380023AS
		[Y] YES [N] NO	ST380023AS
		[ ] Del	
[F6] Back [F7] Finish [TAB] Navigate [ ] Select [Enter] Popup			

2. Press **Y** to clear the disk data. The **Array List** screen appears, where you can review the RAID arrays that you have set up.

NVIDIA RAID Utility - Array List -					
<u>Boot</u>	<u>Id</u>	<u>Status</u>	<u>Vendor</u>	<u>Array Model Name</u>	
Yes	2	Healthy	NVIDIA	MIRROR	74.53G
[Ctrl-X] Exit [ ] Select [B] Set Boot [N]New Array [ENTER] Detail					

3. Use the arrow keys to select the array that you want to set up, then press **B** to specify the array as bootable.
4. Press **Enter** to view and verify details.  
The **Array Detail** screen appears.

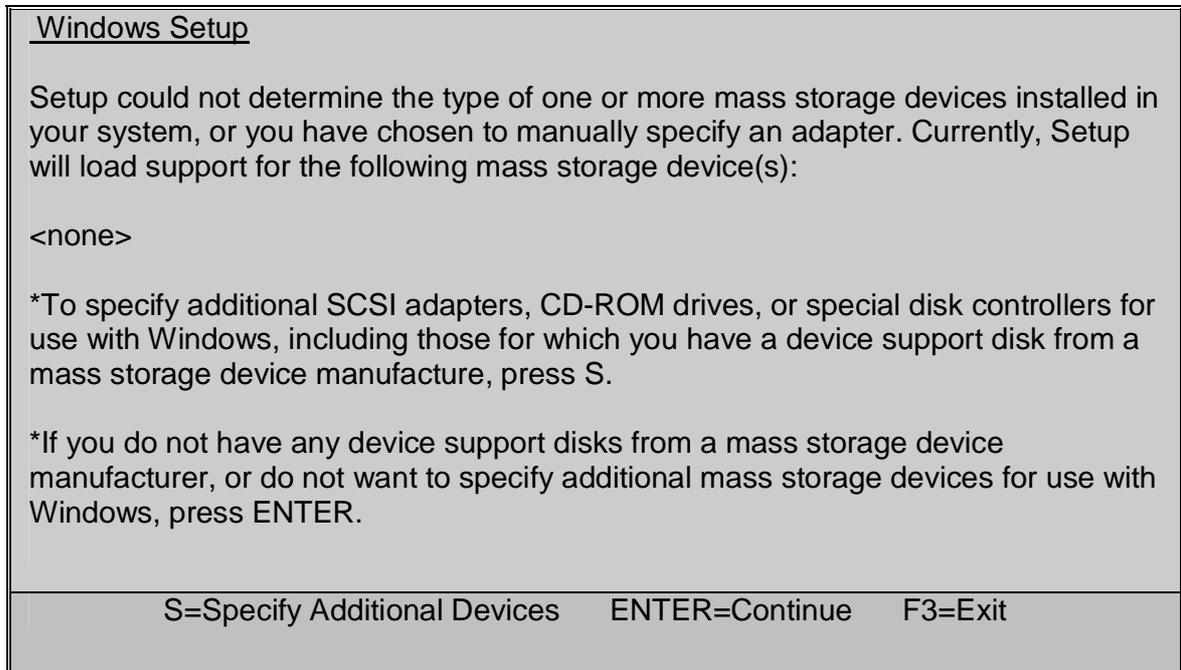
Array 2: NVIDIA MIRROR 75.56G - Array Detail -					
RAID Mode: Mirroring			Striping Block 32k		
Striping Width: 1					
<u>Adapt</u>	<u>Channel</u>	<u>M/S</u>	<u>Index</u>	<u>Disk Model Name</u>	<u>Capacity</u>
1	0	Master	0	ST380023AS	74.56GB
1	1	Master	1	ST380023AS	74.56GB
[R] Rebuild [D] Delete [C] Clear Diskt [Enter] Return					

The Array Detail screen shows various information about the array that you selected, such as Striping Block used, RAID Mode, Striping Width, Disk Model Name, and disk capacity.

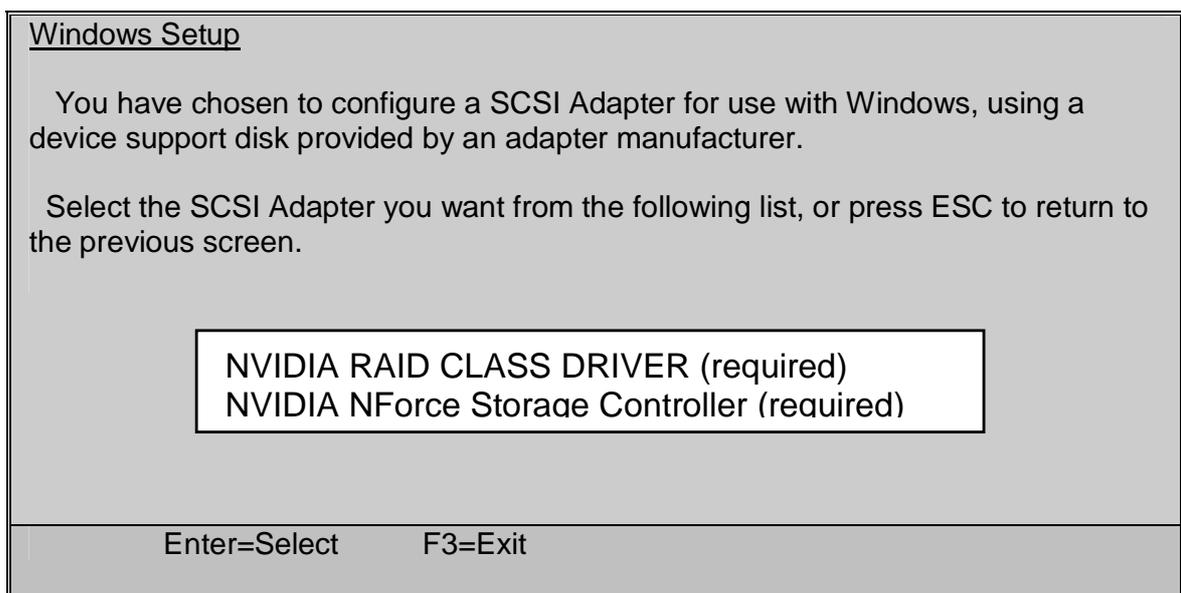
5. If you want to mark this disk as empty and wipe out all its contents, press **C**.
6. At the prompt, press **Y** to wipe out all the data, otherwise press **N**.
7. Press **Enter** again to go back to the previous screen and then press **F10** to exit the RAID setup.

## Installing the RAID Drivers

1. After you complete the RAID BIOS setup, boot from the Windows CD. The Windows Setup program starts.
2. Press F6 and wait a few moments for the Windows Setup screen to appear.

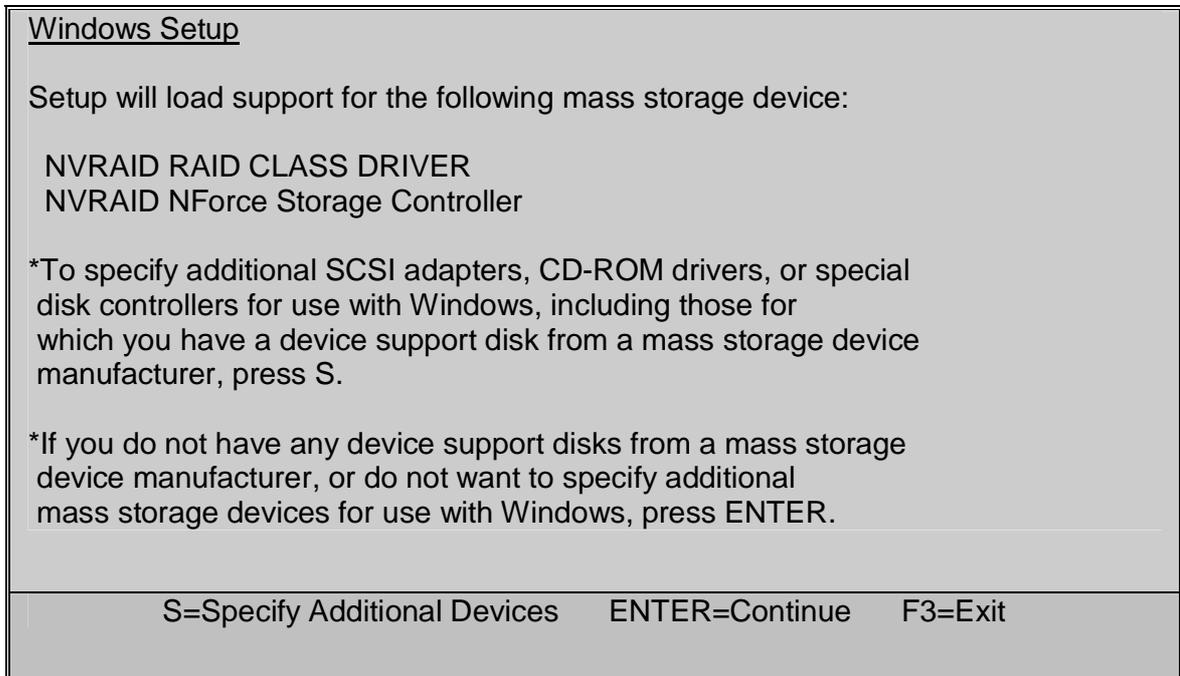


3. Specify the NVIDIA drivers.
  - a. Insert the floppy that has the RAID driver, press S, then press **Enter**. The following Windows Setup screen appears:



- b. Select "NVIDIA RAID CLASS DRIVER (required)" and then press **Enter**.
- c. Press **S** again at the Specify Devices screen.
- d. Select "NVIDIA NForce Storage Controller (required)" and then press **Enter**.

The following Windows Setup screen appears listing both drivers:



4. Press **Enter** to continue with Windows XP Installation.  
Be sure to leave the floppy disk inserted in the floppy drive until the blue screen portion of Windows XP installation is completed, then take out the floppy.
5. Follow the instructions on how to install Windows XP.  
After Windows XP is completed installed, it is recommended that you install the ForceWare software in order to access NVRAIDMAN-the RAID management tool.

**NOTE:** Each time you add a new hard drive to a RAID array, the RAID driver will have to be installed under Windows once for that hard drive. After that, the driver will not have to be installed.

## 5.3 Making a Driver Disk from TYAN CD

Follow the steps below to make a NV RAID driver diskette from the TYAN CD provided.

1. Start the system and insert the TYAN CD into the CD-ROM drive to boot from CD. You will see the following menu. Then press 1 and Enter to boot the system to Tyan diskette maker. (If you would like to boot from hard disk, press 0 and Enter or just wait for 10 seconds to boot automatically from hard disk.).

```
Boot from CD:

ISOLINUX 2.00 2002-10-25 Copyright (C) 1994-2002 H. Peter Anvin
0) Boot from first hard drive
1) Boot to TYAN diskette maker
boot: 1_
```

2. Choose the chipset vendor "nVIDIA" from the main menu.

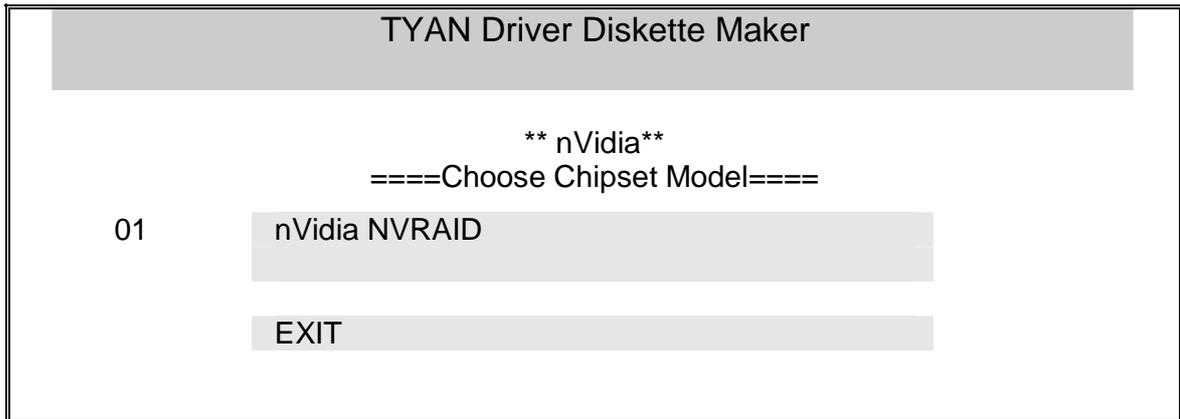
```
TYAN Driver Diskette Maker V1.0

** Main Menu**
====Choose Chipset Vendor====

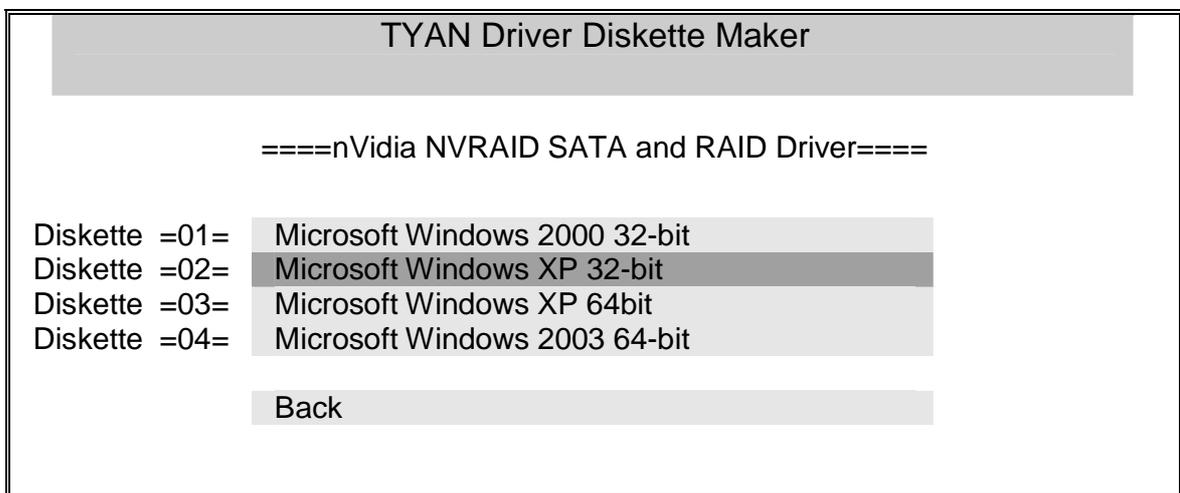
01  Adaptec
02  Intel
03  LSI
04  nVidia
05  Promise
06  Silicon Image
07  VIA

EXIT
```

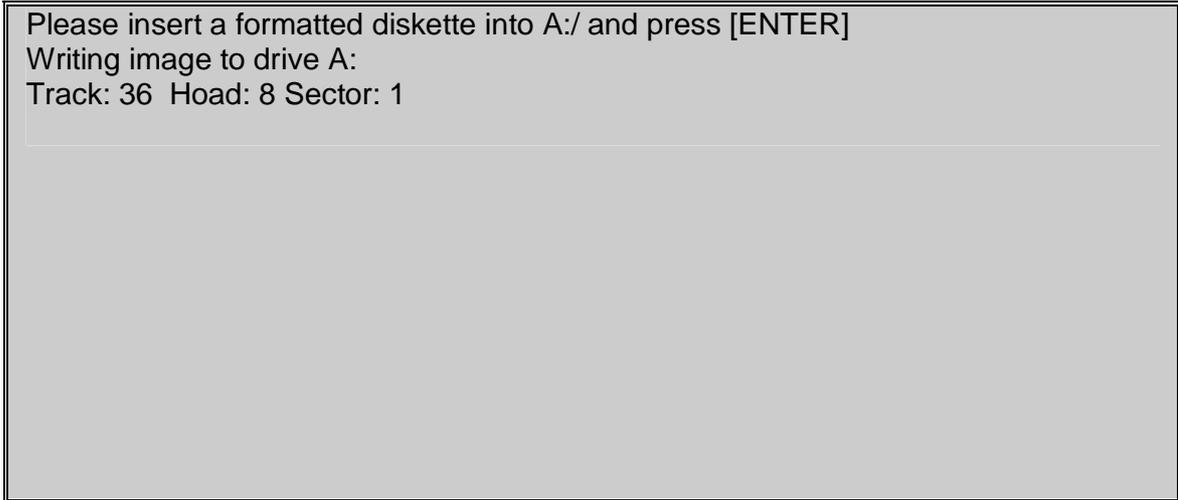
3. The following picture pops up after selecting nVidia.



4. After selecting nVidia, selecting the OS to start the diskette making.



5. Follow the instruction on menu to insert a diskette and press [ENTER].



6. Using "ESC" key to quit the Tyan diskette maker. The system will automatically restart.

## Appendix: SMDC Information

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### Overview

Tyan Server Management Daughter Card (SMDC) is a powerful yet cost-efficient solution for high-end server management hardware packages. Tyan's goal is to provide remote system monitoring and control even when the operating system is absent or simply fails. This empowers Tyan's server board with advanced industrial-standard features.

Tyan SMDC is a snap-in card that provides essential server management solution. It enables any IT Manager by providing multi-interfaces to access the hardware remotely and perform **monitor**, **control** and **diagnose** activities effectively.

Tyan SMDC is not a peripheral card. Unlike regular peripheral card such as AGP card, Network card or SCSI card, SMDC does not require any hardware specific driver. As long as a standby power comes into the system, SMDC will begin looking after the system.

Tyan SMDC provides diversified methods to communicate with the hardware. IT manager can use *Keyboard Controller Style* (KCS) and standard IPMI-Over-LAN communication as defined in latest IPMI 1.5 specification.

Tyan SMDC is compatible with all IPMI-compliance software as well as Tyan System Operator™ (TSO) software package.

By adding SMDC, Tyan's server board becomes a highly manageable and IPMI compatible system with all the advanced features suggesting in IPMI Spec.

More detailed information on Tyan's SMDC card can be found on our website: <http://www.tyan.com>

## Features of Tyan Server Management



Monitor various system components remotely  
-such as fans, processor temperature, and more



Remote power on and power off



Console redirect  
-the ability to view system remotely



Alert and error actions  
-such as audible beep, e-mail, power down and reboot



SMDC runs on stand-by power  
-the SMDC will continue to function, even if the system is not powered on

## How SMDC and TSO Work

The brief descriptions below will help explain how these items function.

	<p>Agent – a system with SMDC installed The SMDC is installed in the Agent system that uses a compatible/supported Tyan motherboard.</p>
	<p>Manager – manages the Agent The Manger is set up to manage the Agent that has the SMDC. The Manager and Agent should be located in the same place.</p>
	<p>Console – communicates with Manager The Console is used to monitor and control the Agent through the Manager.</p>

# Glossary

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**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 loses 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

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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).

If these options are not available for you then Tyan Computer Corporation can help. Besides designing innovative and quality products for over a decade, Tyan has continuously offered customers service beyond their expectations. Tyan's website ([www.tyan.com](http://www.tyan.com)) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest software and operating system components to keep their systems running as powerful and productive as possible. Tyan also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, Tyan serves multiple market segments with the industry's most competitive services to support them.

**"Tyan's tech support is some of the most impressive we've seen, with great response time and exceptional organization in general" - Anandtech.com**

Please feel free to contact us directly for this service at [techsupport@tyan.com](mailto:techsupport@tyan.com)

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](mailto: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'interference 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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