Thunder K8QS Pro /// S4882

Revision 1.00

All registered and unregistered trademarks and company names contained in this manual are property of their respective owners including, but not limited to the following.

TYAN, Thunder K8QS Pro are trademarks of TYAN Computer Corporation.
AMD, Opteron, and combinations thereof are trademarks of AMD Corporation.
Phoenix BIOS is a trademark of Phoenix Technologies.
Microsoft, Windows are trademarks of Microsoft Corporation.
SuSE,is a trademark of SuSE AG.
Linux is a trademark of Linus Torvalds
IBM, PC, AT, and PS/2 are trademarks of IBM Corporation.
Winbond is a trademark of Winbond Electronics Corporation.
Broadcom® is a trademark of Broadcom Corporation and/or its subsidiaries
ATI and Rage XL are trademarks of ATI Corporation
LSI Logic, Fusion MPT™, and LSI are trademarks of LSI Logic Corportation
Silicon Image is a trademark of Silicon Image, Inc.

Information contained in this document is furnished by TYAN Computer Corporation and has been reviewed for accuracy and reliability prior to printing. TYAN assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TYAN products including liability or warranties relating to fitness for a particular purpose or merchantability. TYAN retains the right to make changes to product descriptions and/or specifications at any time, without notice. In no event will TYAN be held liable for any direct or indirect, incidental or consequential damage, loss of use, loss of data or other malady resulting from errors or inaccuracies of information contained in this document.

Table of Contents

Before you begin…

Check the box contents!

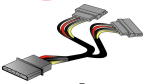
The retail motherboard package should contain the following:


1x Thunder K8QS Pro motherboard


1x 34-Pin floppy drive cable


1x LVD SCSI cable


4 x SATA cable


2x SATA Drive Power Adapter


1x Ultra-DMA-100/66 IDE cable


1x Cable set: 9-pin Serial and 25-pin Parallel


1x Thunder K8QS Pro user's manual


1x Thunder K8QS Pro Quick Reference guide


1x TYAN driver CD


1x LSI SCSI driver diskette


1x Silicon Image SiI3114 SATA RAID driver diskette


1x I/O shield with 2 LAN ports


4 x CPU Mounting Kit

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

Chapter 1: Introduction

Congratulations

You are now the owner of the ideal solution for rackmount servers, large computer clusters, or pedestal server needs. The Tyan Thunder K8QS Pro features support for Quad AMD Opteron processors, dual channel Gigabit Ethernet, Serial ATA (SATA), and dual channel U320 SCSI RAID.

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.

Hardware Specifications

Processor
Quad μPGA 940-pin ZIF sockets
Supports up to four AMD Opteron™ 800 series processors
Four onboard 3-phase VRMs
Integrated 128-bit DDR Memory Controller

Chipset
AMD-8131™ HyperTransport PCI-X Tunnel
AMD-8111™ HyperTransport I/O Hub
Winbond W83627HF Super I/O chip
Total five Hardware Monitoring IC:
One ADM1027 and four LM63

Memory
128-bit dual channel memory bus
Total sixteen 184-pin 2.5-Volt DDR DIMM sockets (4 on each CPU)
Supports up to 32 GB Registered DDR
Supports ECC and ECC with Chipkill type memory modules
Supports PC1600, PC2100, PC2700 & PC3200 DDR

Expansion Slots
Two independent PCI-X buses
Two 64-bit 66/33 MHz (3.3-Volt) PCI-X slots from PCI-X bridge A
Two 64-bit 133/100/66/33 MHz (3.3-Volt) PCI-X slots from PCI-X bridge B
One legacy 32-bit 33MHz (5-Volt) PCI slot
Total of five usable slots

Integrated Enhanced IDE Controller
Provides two IDE dual-drive ports for up to four EIDE devices
Supports for UDMA 33/66/100/133 IDE drives and ATAPI compliant devices

Integrated I/O
One floppy connector supports one device
Two 9-pin serial ports (one connector and one header) and One 25-pin parallel port pin-header
PS/2 mouse and keyboard connectors
Four USB v1.1 front panel headers
Two USB v2.0 connectors through VT6212

System Management
Total nine 3-pin fan headers with tachometer monitoring
Four fan headers with (PWM) speed control
One 2-pin Chassis Intrusion header
Temperature, voltage and fan monitoring

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

Integrated Dual Channel SCSI (Mfg. option)
LSI 53C1030 U320 SCSI controller
Dual-channel Ultra320 SCSI
Connects to PCI-X Bridge A
Supports LSI ZCR (Zero Channel RAID)

Integrated SATA Controller (Mfg. option)
One Silicon Image SI3114 controller
Four SATA 1.0 ports
Supports up to Four SATA drives
Supports RAID 0,1,0+1

Intelligent Platform Management Interface Header
Tyan Server Management Daughter cards (optional); supports features listed below via IPMI header
QLogic™ Zircon Baseboard Management Controller (BMC) based on powerful ARM7 technology
Tailored for IPMI highest 1.5 Spec.
Supports KCS and BT styles
Flexible Windows and Linux based Management Solution
Supports RMCP and SNMP protocols
Supports ASF standard and EMP
I^2C serial multi-master controllers and UARTs
Built-in IPMB connector
Remote power on/off and reset support (IPMI-over-LAN)

Integrated LAN Controllers
Broadcom® BCM5704C dual-channel Gigabit Ethernet controller
Two RJ-45 LAN connectors with LEDs
Connected to PCI-X Bridge A
Two Front Panel LED headers

BIOS
Phoenix BIOS
4Mbit LPC Flash ROM
Watchdog timer
USB boot support
48-bit LBA Support
Supports PXE via Ethernet
ACPI 2.0 & 1.0B support

Form Factor
SSI MEB footprint (13" x 16" / 330.2mm x 406.4mm)
EPS12V power connectors
One serial port and one VGA connector
Stacked USB 2.0 (two) connectors
Stacked PS/2 keyboard and mouse connectors
Two RJ-45 side-by-side LAN connectors with LEDs

Regulatory
FCC Class B (Declaration of Conformity)
European Community CE

Software Specifications

OS (Operating System) Support

Microsoft Windows 2000 Server	SuSE 8.2, 9.0
Microsoft Windows 2000 Advanced Server	Solaris 9.0
Microsoft Windows XP Professional	Turbo Linux 8.0
Microsoft Windows NT4.0 Server	Free BSD 5.1
Microsoft Windows 2003 Enterprise Server	United Linux 1.0
Microsoft Windows 2003 Standard Server	Red Hat Linux 7.3, 8.0, 9.0

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

Chapter 2: Board Installation

Precaution: The Thunder K8QS Pro supports EPS12V power supplies (24-pin/8-pin) and will not operate with any other types.

DO NOT USE ATX 2.x, ATX12V or ATXGES power supplies as they will damage the board and void your warranty.

How to install our products right… the first time

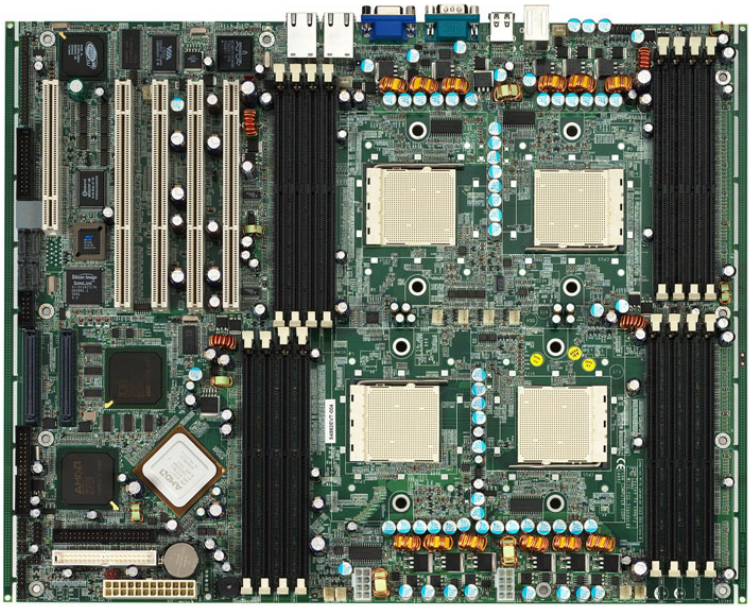
The first thing you should do is read this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

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

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

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

2.00 – Board Image

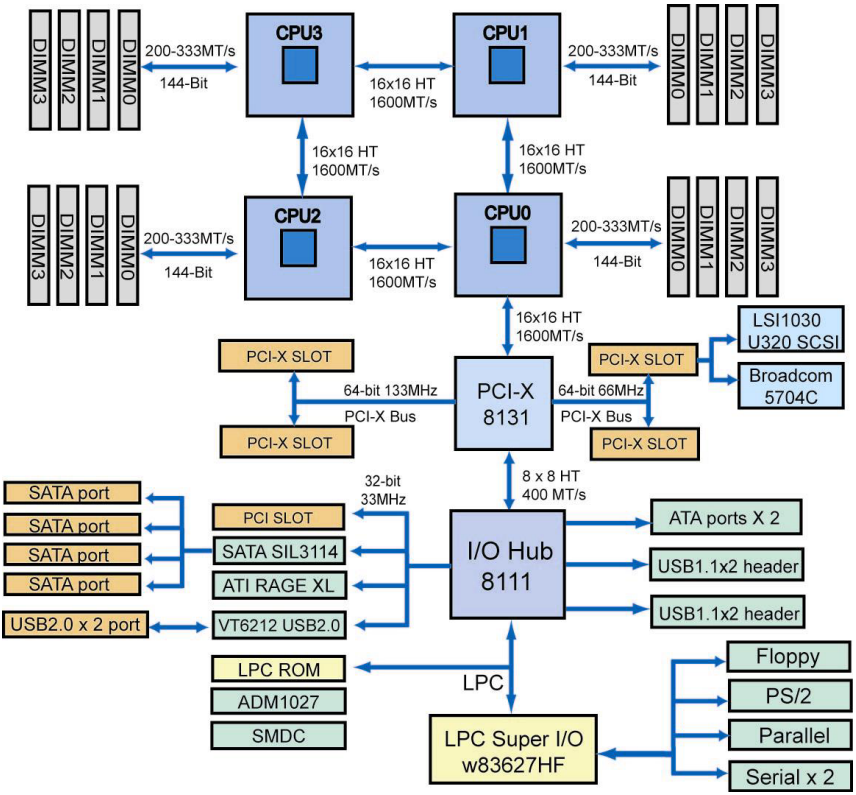


This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

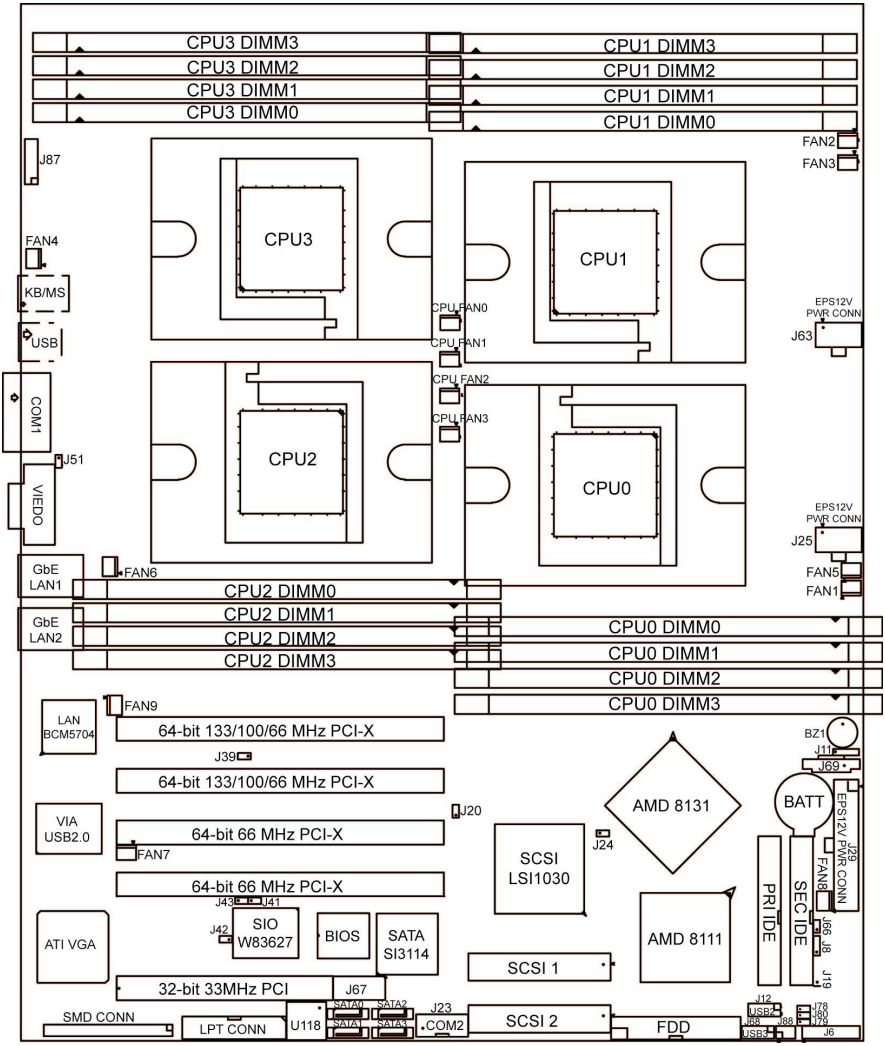
The following page includes details on the vital components of this motherboard.

2.01 – Block Diagram

S4882 Thunder K8QS Pro Block Diagram



2.02 – 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.

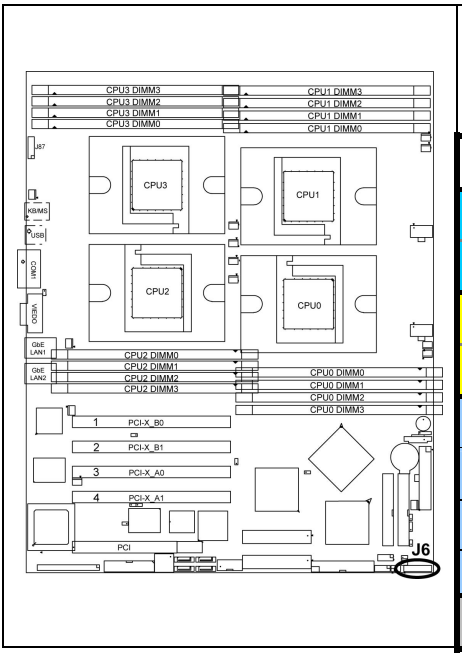
	Function	Settings
J6	Front Panel Connector	See Section 2.03 for pinout configuration
J8	Clear CMOS Jumper	**Close Pin-1 and Pin-2** (Default) Normal mode Close Pin-2 and Pin-3 Clear CMOS mode
J11	SMBus Connector	See Section 2.05 for pinout configuration
J12,J68	USB 1.1 Header	For front or rear chassis mount USB connectors
J19	Case Open Detect Connector	See Section 2.07 for pinout configuration
J23	Serial Port Internal Header	See Section 2.08 for pinout configuration
J24,J39	PCI-X channel B (PCI-X 1 and PCI-X 2) frequency configure	See Section 2.09 for adjusting speed
J42	Keyboard Lock Connector	**Open:** Enable PS/2 keyboard (Default) **Closed**: Disable PS/2 keyboard
J79	Gigabit LAN2 LED Header	See Section 2.11 for pinout
J80	Gigabit LAN1 LED Header	See Section 2.12 for pinout
	CPU Fan Connectors	See Section 2.13
	Chassis Fan Connectors	See Section 2.14
	SCSI Zero Channel RAID (ZCR) PCI Slot (PCI-X Slot4)	See Section 2.15
	Parallel Header(LPT CONN)	See Section 2.16

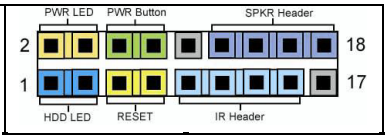
Jumper Legend

	**OPEN - Jumper OFF**	**Without jumper cover**
	**CLOSED - Jumper ON**	**With jumper cover**

	**To indicate the location of pin-1**
	**To indicate the location of pin-1**

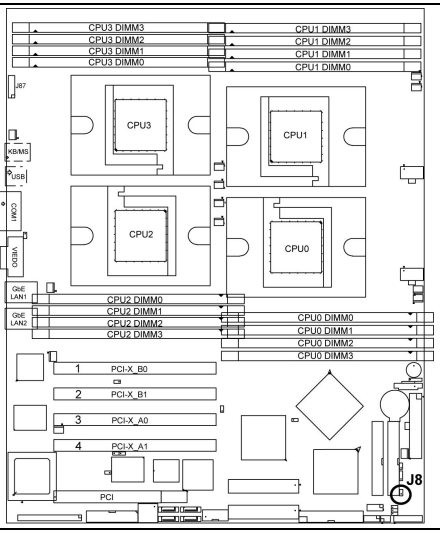
2.03 – Front Panel Connector (J6)

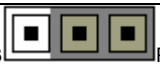
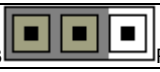




Function	PIN #	PIN #	Function
HDD LED+	1	2	PWR LED+
HDD LED-	3	4	PWR LED-
Reset Button -	5	6	PWR Button+
Reset Button +	7	8	PWR Button-
VDD_5_RUN	9	10	NC
IRRX	11	12	VDD_5_RUN
GND	13	14	NC
IRTX	15	16	BUZZER_SPKR
NC	17	18	SPKR

2.04 – Clear CMOS Jumper (J8)



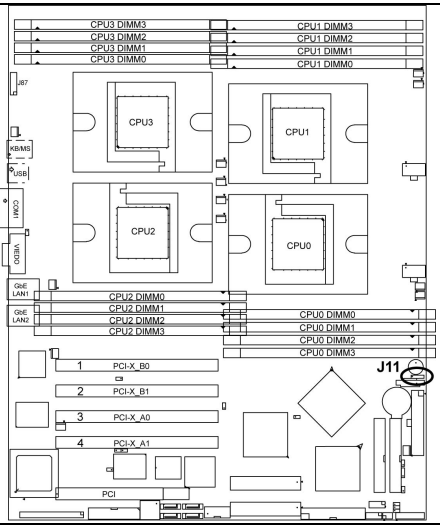
Pin_3  Pin_1	**Default**
Pin_3  Pin_1	Clear

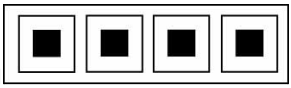
You can reset the CMOS settings by using this jumper if you have forgotten your system/setup password or need to clear system BIOS setting.

- Power off system and **disconnect both power connectors from the motherboard**
- Use jumper cap to close Pin_2 and Pin_3 for several seconds to Clear CMOS
- Put jumper cap back to Pin_1 and Pin_2 (default setting)

Reconnect power & power on system

2.05 – SMBus Connector (J11)

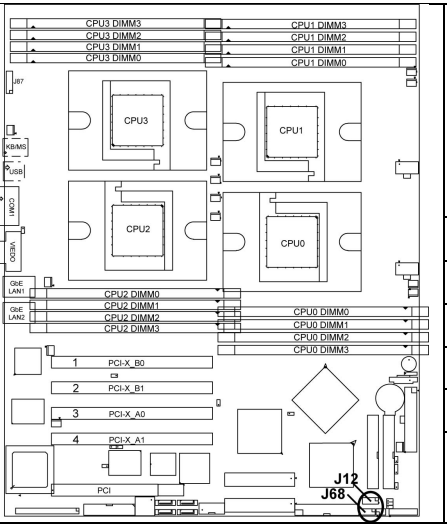


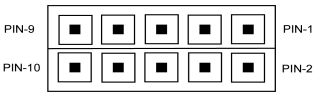
Pin_1 

Pin_1: SMBUSD_0	**Pin_2:** GND	**Pin_3:** SMBUSC_0	**Pin_4 :** NC

Use this connector to connect external SMBUS devices

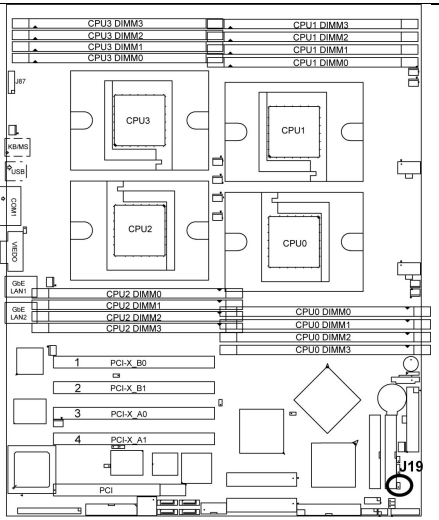
2.06 – USB 1.1 Header (J12,J68)

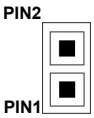




Signal Description	Pin #	Pin #	Signal Description
VCC	**1**	**2**	VCC
USB DATA-	**3**	**4**	USB DATA-
USB DATA+	**5**	**6**	USB DATA+
GND	**7**	**8**	GND
NC	**9**	**10**	GND

2.07 – Case Open Detect Connector (J19)



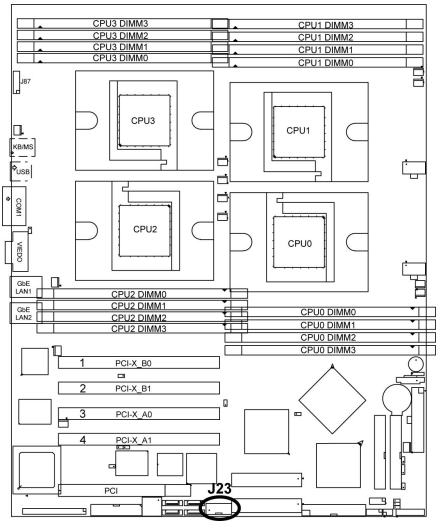


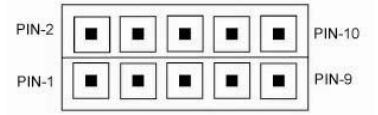
Pin-2
GND

Pin-1
INTRUDUER_L

For use with chassis that support this feature

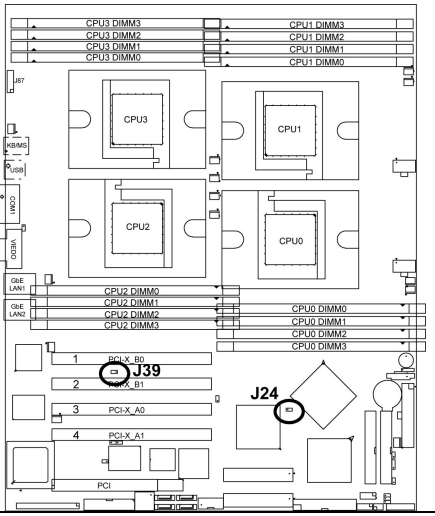
2.08 – Serial Port Internal Header (J23)

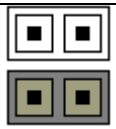




Signal Description	Pin #	Pin #	Signal Description
DCD2_L_SER (Data Carrier Detect)	**1**	**2**	DSR2_L_SER (Data-Set-Ready)
RXD2_SER(Receive-Data)	**3**	**4**	RTS2_L_SER(Request-to-Send)
TXD2_SER(Transfer-Data)	**5**	**6**	CTS2_L_SER(Clear-to-Send)
DTR2_L_SER(Data-Terminal-Ready)	**7**	**8**	RI2_L_SER(Ring-Indicator)
GND (Ground)	**9**	**10**	NC

2.09 – PCI-X channel B (PCI-X 1 and PCI-X 2) frequency configure (J24,J39)





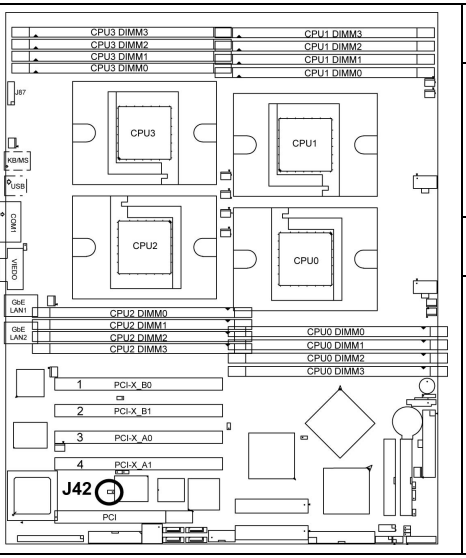
Open

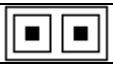
Closed

These two jumpers(J24&J39) are used to adjust PCI-X Bridge B PCI speed.

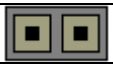
	J39	J24
133MHz	Open	Open
100MHz	Open	Closed
66MHz	Closed	Open

2.10 – Keyboard Lock Jumper (J42)



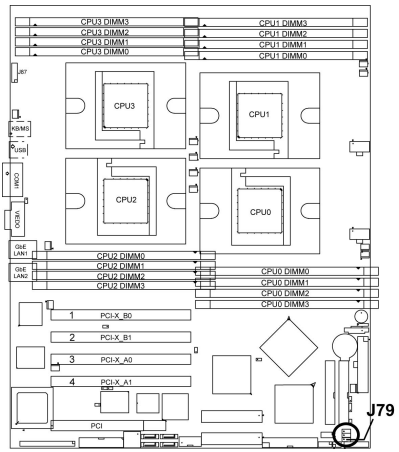


OPEN (Default)
To enable PS/2 keyboard



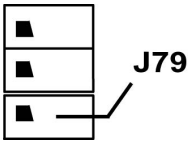
CLOSED
To disable PS/2 keyboard

2. 11– Gigabit LAN2 LED Header (J79)

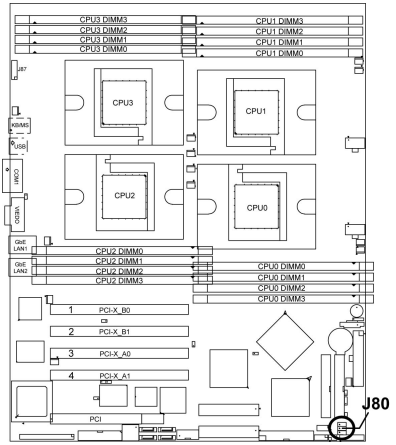


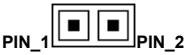
Pin_1:LAN LED+

Pin_2:LAN LED-



2. 12– Gigabit LAN1 LED Header (J80)

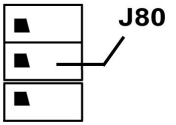




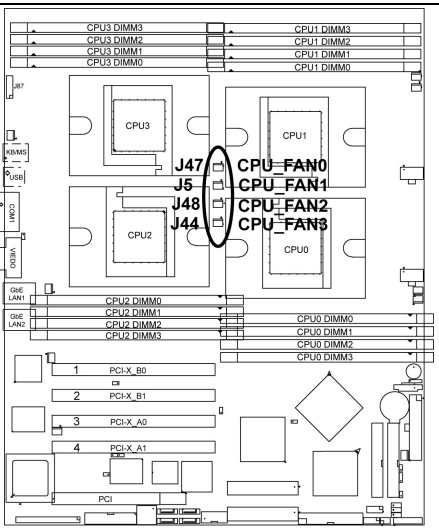
Pin_1:LAN LED+

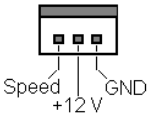
Pin_2:LAN LED-

Use this 2-pin header to connect external LAN LED.



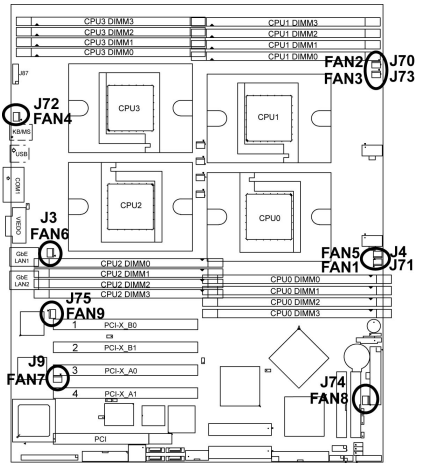
2.13– CPU FAN Connectors (J47, J5, J48, J44)

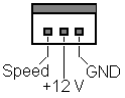




#	FAN Description	Function	Amp Rated (Maximum)
J47	CPU_FAN0	RPM Read	1.6 A
J5	CPU_FAN1	RPM Read	1.6 A
J48	CPU_FAN2	RPM Read	1.6 A
J44	CPU_FAN3	RPM Read	1.6 A

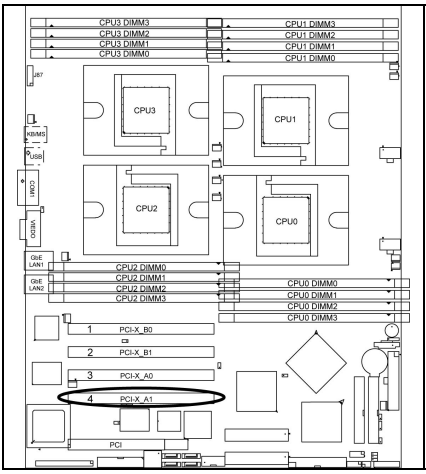
2.14– Chassis FAN Connectors (J71, J70, J73, J72, J4, J3, J9, J74, J75)





#	FAN Description	Function	Amp Rated (Maximum)
J71	FAN1	Read	2.0 A
J70	FAN2	Read	2.5 A
J73	FAN3	Read	2.5 A
J72	FAN4	Read	1.6 A
J4	FAN5	Read	2.5 A
J3	FAN6	Read	1.2 A
J9	FAN7	Read	1.6 A
J74	FAN8	NA	1.2 A
J75	FAN9	NA	1.2 A

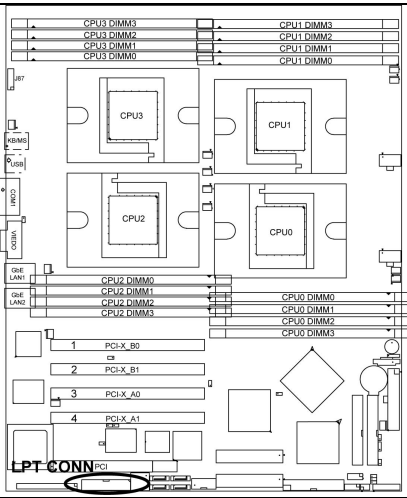
2.15 – SCSI Zero Channel RAID (ZCR) PCI Slot (PCI-X Slot4)



This slot is capable of accepting the LSI Zero Channel RAID card*

Note: It supports LSI 2032L Zero Channel RAID Card.

2.16– Parallel Header (LPT CONN)



Signal Configuration	PIN #	PIN #	Signal Configuration
STB	1	2	AUTFD
DATA0	3	4	ERROR
DATA1	5	6	INIT
DATA2	7	8	SLIN
DATA3	9	10	GND
DATA4	11	12	GND
DATA5	13	14	GND
DATA6	15	16	GND
DATA7	17	18	GND
ACK	19	20	GND
BUSY	21	22	GND
PE	23	24	GND
SLCT	25		

2.17 – OEM Reserved Connectors and Jumpers

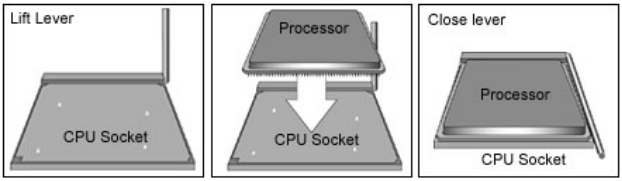
The connectors and jumpers, which are not listed, are reserved for OEM use only.

2.18– Installing the Processor(s)

Your brand new Thunder K8QS Pro supports the latest 64-bit processor technologies from AMD. Only AMD Opteron™ processor 800 series are certified and supported with this motherboard.
Check **our** website for latest processor support. **http://www.tyan.com**

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

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



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

Lift the lever on the socket until it is approximately 90° or as far back as possible to the socket.
Align the processor with the socket. There are keyed pins underneath the processor to ensure that the processor's installed correctly.
Seat the processor firmly into the socket by gently pressing down until the processor sits flush with the socket.
Place the socket lever back down until it locks into place.
Your processor is installed.
Repeat these steps for the second, third and fourth processor if you are using four processors.

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

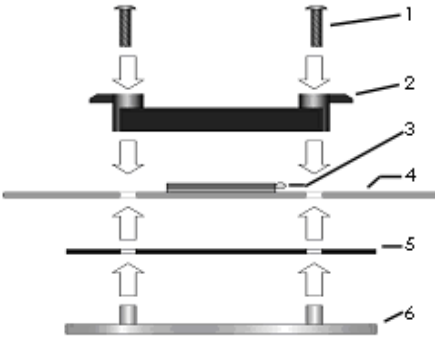
2.19 - Heatsink Retention Frame Installation

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

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

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

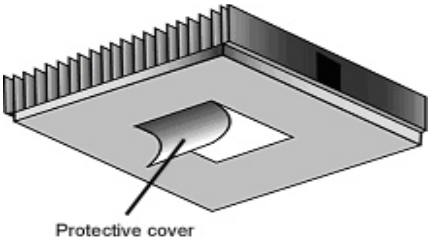
The following diagram will illustrate how to install the most common CPU back plates:



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

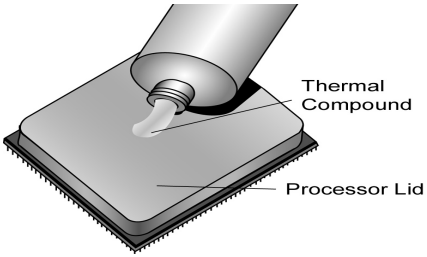
NOTE: Please see next section for specific instructions on how to install mounting bracket.

2.20 -- Thermal Interface Material



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

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

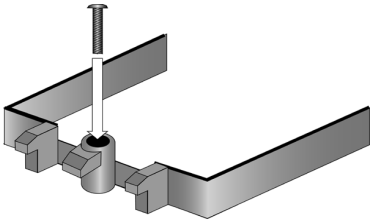


The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

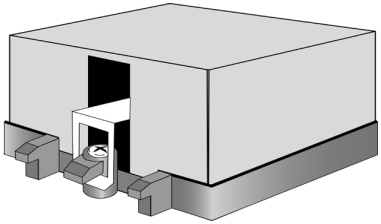
NOTE Always check with the manufacturer of the heatsink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements

2.21 Heatsink Installation Procedures

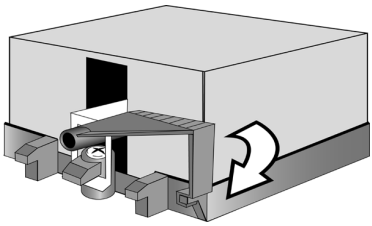
Type A: CAM LEVER (TYPE) INSTALLATION



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

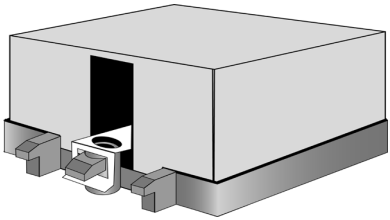


2. After tightening screws secure metal clip to plastic retention bracket center tab. Repeat for on other side of heatsink.

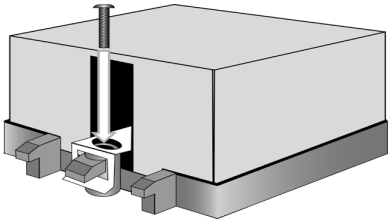


3. After securing metal clip to plastic retention bracket center tab, push down on plastic clip to lock plastic clip to side tab.

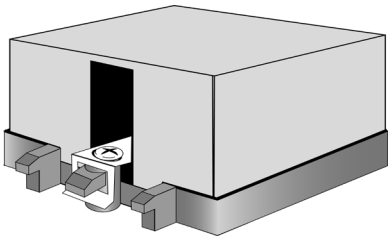
Type B: SCREW RETENTION TYPE HEATSINK



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.



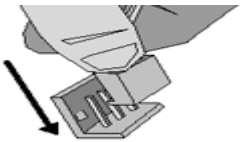
2. Insert screw through metal clip. **BE SURE METAL CLIP IS LOCKED ONTO RETENTION FRAME TAB.**



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

2.22 -- 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.

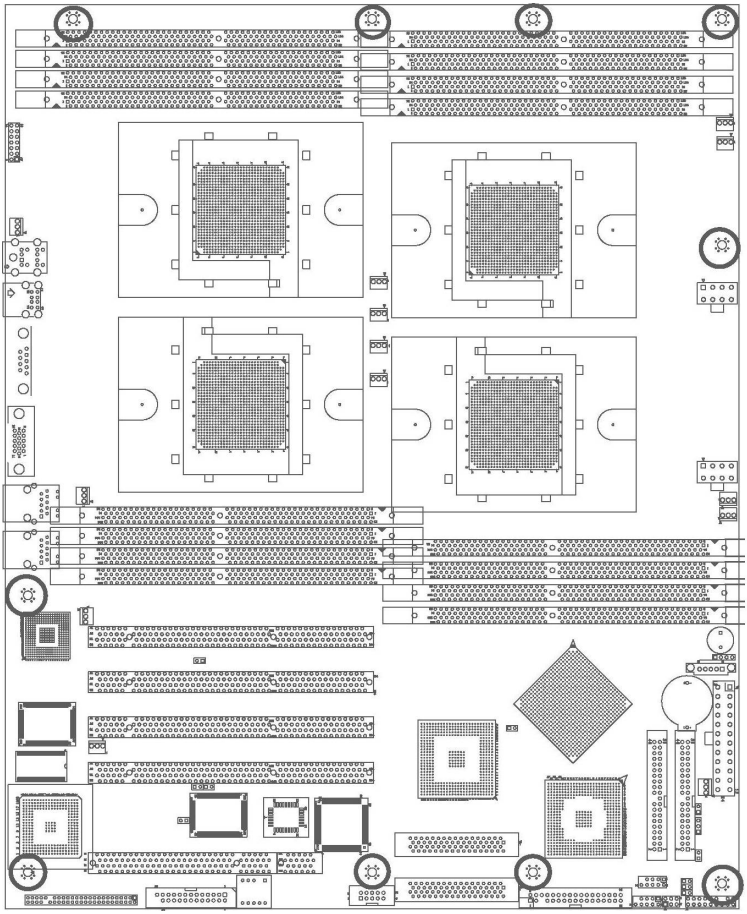


Once you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

2.23 –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.

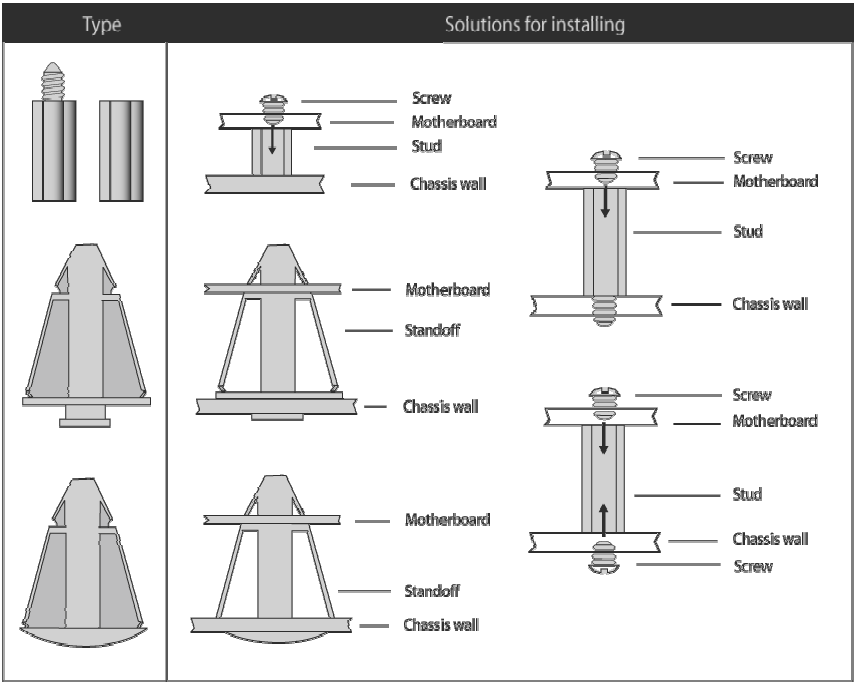
Thunder K8QS Pro S4882 Mounting Hole Placement



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



2.24 – Installing the Memory

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

Here are a few key points to note before installing memory into your Thunder K8QS Pro:

- **Always install memory beginning with CPU0_DIMM0 or CPU0_DIMM2**
- **In order to access memory that is associated with each CPU socket you must also have a CPU installed in that corresponding socket. Memory installed into dimm sockets that do not have a CPU installed with it will be non-functional.**
- **AMD Opteron™ processors support 64bit (non-interleaved) or 128bit (interleaved) memory configurations**
- **At least ONE Registered DDR SDRAM module must be installed for the system to turn on and POST (power on self test)**
- **128MB, 256MB, 512MB, 1GB and 2GB Registered PC3200 / PC2700 / PC2100 / PC1600 DDR SDRAM memory modules are supported**
- **All installed memory will be automatically detected**
- **The Thunder K8QS Pro supports up to 32GB.***

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

Modifying the memory configuration for a S4882 is fairly simple by following a few basic steps. The following terms are used in the memory modification description:

- **Bank** – One or more DIMM's logically arranged to form a given memory bus access width (64-bit or 128-bit).
- **Node** – A Single processor, its memory controller and all of its associated memory DIMM's and DIMM sockets. A node represents a given processor's memory array as viewed from the HyperTransport ™ link.
- **Bank Interleave** – This form of interleaving causes the memory controller to group two 128-bit DIMM banks into one large array. Every other 128-bit word is stored in a given DIMM bank. Even word addresses are stored in the bank composed of slots DIMM0 and DIMM1. Odd word addresses are stored in the bank composed of slots DIMM2 and DIMM3. If enabled in BIOS setup, each node with four identical DIMM's is setup to use bank interleave.

- **Node Interleave** – Node based interleaving causes the system to group even numbers of nodes into one large array. In the case of two-way node interleaving (2 processors present), every other 128-bit word is stored on a given node. Four-way node interleaving (four processors present) results in every 4th 128-bit word being stored on a given node. Node interleave is not compatible with Microsoft's SRAT table or Linux NUMA. If enabled in BIOS setup and if all loaded nodes have the same amount of memory.

Rules for populating memory :

64 bit support: Choose DIMM slots 0 or 2 by themselves or use 0 and 2 together for every CPU socket that corresponds to those DIMM slots.

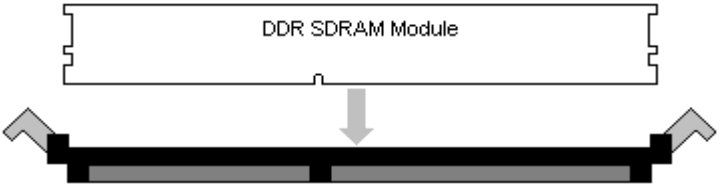
128-bit support: Choose DIMM slots 0 and 1 or 2 and 3 or all 4 together for every CPU socket that corresponds to those DIMM slots.

Refer to the diagram below if there are further questions on how to populate memory in 64-bit, 128-bit orientations or Bank Interleaving:

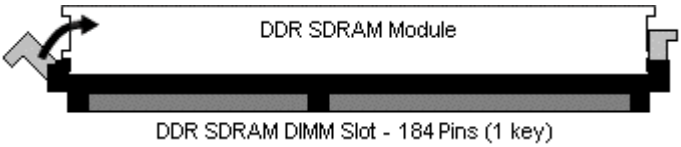
DIMM Number	64-Bit Width	128-Bit Width	Bank Interleave
DIMM0	Bank 0	Bank 0, low 64	Bank 0, low 64, even
DIMM1	Not Used	Bank 0, high 64	Bank 0, high 64, even
DIMM2	Bank 1	Bank 1, low 64	Bank 0, low 64, odd
DIMM3	Not Used	Bank 1, high 64	Bank 0, high 64, odd

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.

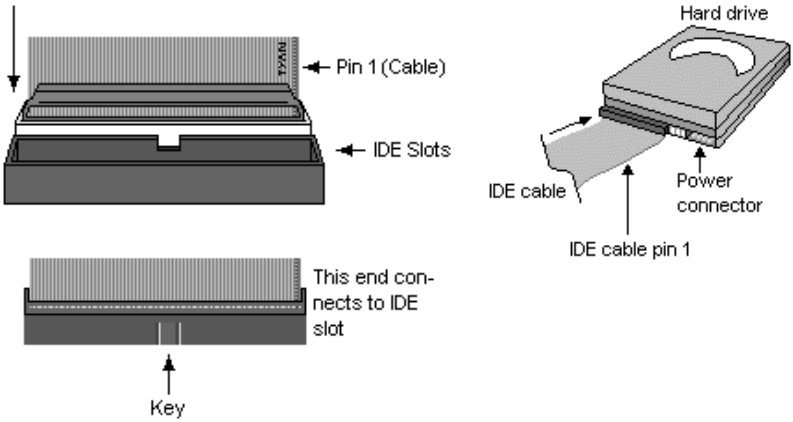
NOTE

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.

2.25 – Attaching Drive Cables

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.

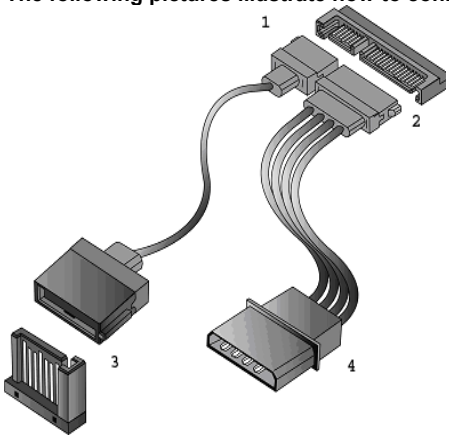
TIP: Pin 1 on the IDE cable (usually designated by a colored wire) faces the drive’s power connector.

The Thunder K8QS Pro 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 four SATA cables and two 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



1. SATA drive cable connection

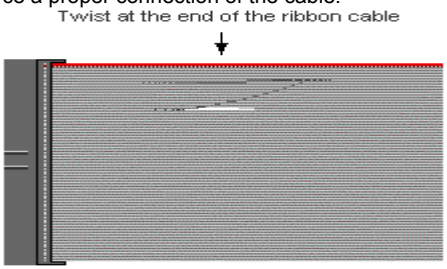
2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

Floppy Drives

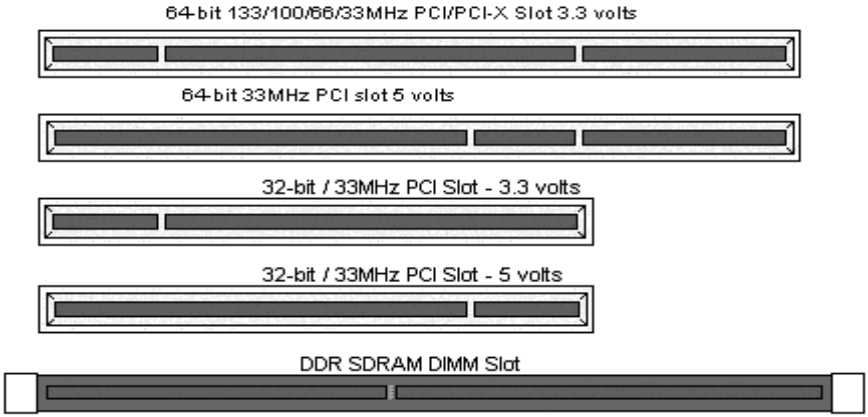
Attaching floppy diskette drives are done in a similar manner to hard drives. See the picture below for an example of a floppy cable. Most of the current floppy drives on the market require that the cable be installed with the colored stripe positioned next to the power connector. In most cases, there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



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

2.26 – 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.

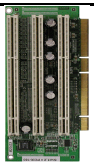
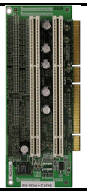


Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

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.

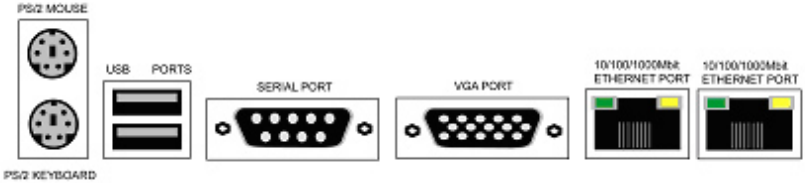
2.27 – PCI Riser Cards Supported on Thunder K8QS Pro S4882

TYAN				
Model Number	**M2037**	**M2043**	**M2043X**	**M2044**
What speeds can support	ALL SPEEDS	66MHz 33MHz	100MHz 66MHz 33MHz	100MHz 66MHz
Form Factor	1U	2U	2U	2U
What kind of Gold Finger	3.3V and 5V	3.3V and 5V	3.3V and 5V	3.3V and 5V
How many slots	1	3	2	3
What kinds of slots	5V	3.3V	3.3V	3.3V
UPC Code	635872-007255	635872-006906	635872-007095	635872-008368

You can use J24 & J39 to adjust the speed of PCI-X Channel B to fit different kinds of Riser Cards supported on Thunder K8QS Pro S4882. See section 2.09 for detail.

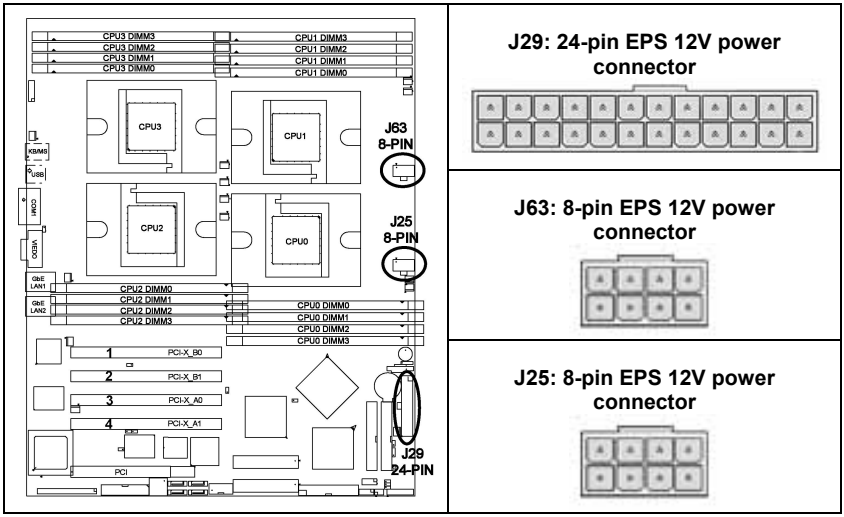
2.28 – Connecting External Devices

Connecting external devices to the motherboard is an easy task. The standard devices you should expect to plug into the motherboard are keyboards, mice, and printer cables. The following diagram will detail the ATX port stack for the following board:



2.29– Installing the Power Supply

There are three power connectors on your Thunder K8QS Pro. Tyan recommends that you have an EPS12V power supply that has one 24-pin and two 8-pin power connectors.



The Thunder K8QS Pro is standard EPS 12V compatible, please take following combination for reference. Please be aware that ATX 2.x, ATX12V and ATXGES power supplies are **not compatible** with the board and can damage the motherboard and/or CPU(s).

Power Supply Connection Matrix		
Model #	**Connector on EPS12V PWR Supply**	**MB Power Connector**
# 1	24-pin Connector	J29: 24-pin EPS 12V Connector
	8-pin Connector	J63: 8-pin EPS12V Connector
	8-pin Connector	J25: 8-pin EPS12V Connector
# 2	24-pin Connector	J29: 24-pin EPS 12V Connector
	8-pin Connector	J63: 8-pin EPS12V Connector
	4-pin Connector	J25: 8-pin EPS12V Connector
# 3*	24-pin Connector	J29: 24-pin EPS 12V Connector
	8-pin Connector	J63: 8-pin EPS12V Connector

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

Disconnect power supply from electrical outlet

a. Connect the EPS12V 8-pin power connector
b. Connect the EPS12V 24-pin power connector
c. Connect power cable to power supply to power outlet
   Make sure you have connected both connectors before attempting to apply power to the board.

NOTE: We suggest using a 650W or higher power supply; this is dependent on how many devices you have installed. However, 650W is sufficient for system without many devices (i.e. 4 x AMD Opteron 844 CPU, 16 x 1G DDR 333 Memory, 1 x HDD, 2 or 3 expansion cards).

2.30 – Finishing Up

Congratulations on making it this far! You're finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**

Chapter 3: BIOS

3.00 – BIOS Setup Utility

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

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

To start the BIOS setup utility:

a. Turn on or reboot your system
b. Press <F2> to start BIOS setup utility

BIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit

		Item Specific Help
System Time	[12:59:59]	
System Date	[11/01/2002]	<Tab>, <Shift-Tab>, or <Enter> selects field
Legacy Diskette A:	[1.44/1.25MB 3"]	
▸ Primary Master	[None]	
▸ Primary Slave	[None]	
▸ Secondary Master	[None]	
▸ Secondary Slave	[None]	
HDD Post Write Buffer:	[Enabled]	
Large Disk Access Mode:	[DOS]	
Extended Memory Testing	[Just zero it]	
Boot Summary Screen:	[Disabled]	
System Memory:	624 KB	
Extended Memory:	5024 MB	

F1 Help	↑/↓Select Item	-/+ Change Values		F9 Setup Defaults
ESC Exit	←Select Menu	Enter Select	▸ Sub-Menu	F10 Save and Exit

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

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

3.10 – BIOS Menu Bar

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

Main	To configure basic system setups
Advanced	To configure the chipset features
Security	To configure user and supervisor passwords
Power	To configure power management features
Boot	To configure system boot order
Exit	To exit setup utility

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

3.20 – BIOS Legend Bar

The chart describes the legend keys and their alternates:

Key	Function
<F1> or <Alt-H>	General help window
<ESC>	Exit current menu
← or →arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up/down
<Tab> or <Shift-Tab>	Cycle cursor up/down
<Home> or <End>	Move cursor to top/bottom of the window
<PgUp> or <PgDn>	Move cursor to next/previous page
<F5> or <->	Select the previous value/setting of the field
<F6> or <+> or <Space>	Select the next value/setting of the field
<F9>	Load the default configuration values of the menu
<F10>	Save and exit
<Enter>	Execute command or select submenu
<Alt-R>	Refresh screen

3.30 – BIOS Main Menu

BIOS Setup Utility

Main Advanced Security Power Boot Exit

		Item Specific Help
System Time	[12:59:59]	
System Date	[11/01/2002]	<Tab>, <Shift-Tab>, or <Enter> selects field
Legacy Diskette A:	[1.44/1.25MB 3"]	
▸ Primary Master	[None]	
▸ Primary Slave	[None]	
▸ Secondary Master	[None]	
▸ Secondary Slave	[None]	
HDD Post Write Buffer:	[Enabled]	
Large Disk Access Mode:	[DOS]	
Extended Memory Testing	[Just zero it]	
Boot Summary Screen:	[Disabled]	

System Memory:	624 KB	
Extended Memory:	5024 MB	
F1 Help ↑/↓ Select Item	-/+ Change Values	F9 Setup Defaults
ESC Exit ←Select Menu	Enter Select ▸ Sub-Menu	F10 Save and Exit

3.3.1 – System Time

Feature	Option	Description
HH : MM : SS	**---**	Set the system time

3.3.2 – System Date

Feature	Option	Description
MM : DD : YYYY	**---**	Set the system date

3.3.3 – Legacy Diskette

Feature	Option	Description
Legacy Diskette	360 KB 1.3 MB 720 KB **1.44/1.25 MB** 2.88 MB	This setting selects the type of the floppy disk drive installed in system.

3.3.4 –Primary/Secondary Master/Slave Sub-Menu

Feature	Option	Description
Type	**Auto**	Auto - To determine the IDE drive type by system BIOS
Multi-Sector Transfers	---	Display the This feature is determined by System BIOS
LBA Mode Control	---	This feature is determined by System BIOS
32 Bit I/O	Enabled **Disabled**	This setting enables or disables 32 bit IDE data transfers.
Transfer Mode:	**---**	Display the Transfer Mode of the plugged IDE device
Ultra DMA Mode	**---**	Display the Ultra DMA which the IDE device support

3.3.5 –Extended Memory Testing

Feature	Option	Description
Extended Memory Testing	Disable **Just zero it** Enable	Determines which type of tests will be performed on extended memory

3.3.6 – Boot Summary Screen

Feature	Option	Description
Boot Summary Screen	**Disable** Enable	Display system configuration on boot

3.3.7 – System Memory

Feature	Option	Description
System Memory	---	Display the size of system memory

3.3.8 – Extended Memory

Feature	Option	Description
Extended Memory	---	Display the size of extended memory

3.40 – BIOS Advanced Menu

BIOS Setup Utility

Main **Advanced** Security Power Boot Exit

Item Specific Help

▸ Hardware Monitor
▸ SMBIOS(DMI) Event Logging
▸ Console Redirection

<Tab>, <Shift-Tab>, or <Enter> selects field

Installed O/S: [Other]
Reset Configuration Data: [No]

Multiprocessor Specification: [1.4]
Use PCI Interrupt Entries in MP Table: [Yes]

(to be continued)

ACPI SRAT Table: [Enable]

RSDT FADT Revision:	[1]	
HPET Timer:	[Enable]	
Halt on Error:	[Yes]	
GART Error Reporting	[Disable]	
4GB Memory Hole Adjust	[Auto]	
4GB Memory Hole Size	[64MB]	
▸ Chipset Configuration		
▸ Keyboard Configuration		
▸ I/O Device Configuration		
▸ PCI Configuration		
▸ Watchdog Timer Option		
F1 Help ↑/↓Select Item -/+ Change Values F9 Setup Defaults		
ESC Exit ←Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit		

3.4.1 – Hardware Monitor Sub-Menu

Description
This screen contains info from motherboard hardware monitor sensors, such as temperature, fan speed and voltage.

3.4.2 –SMBIOS(DMI) Event Logging Sub-Menu

Feature	Option	Description
View DMI event log	---	View the contents of the DMI event log.
Clear all DMI event logs	**No** Yes	Setting this to 'Yes' will clear the DMI event log after rebooting
Event Logging	**Enable** Disable	Select 'Enable' to allow logging of DMI events.
ECC Event Logging	**Enable** Disable	Select 'Enable' to allow logging of ECC events.
Mark DMI events as read	**---**	Press Enter to mark all DMI events in the event log as read.

3.4.3 – Console Redirection Sub-Menu

Feature	Option	Description
Com Port Address	**Disabled** On-board COM A	If the console redirection function enabled, it will use COMA port on the motherboard.
Console connection	**Direct** Via modem	Indicate whether the console is connected directly to the system or a modem is used to connect.
Baud rate	300 /1200 /2400 /9600 /**19.2k** /38.4k /57.6k /115.2k	Select the baud rate of transfer
Flow Control	None XON/XOFF **CTS/RTS**	Select the Flow Control mode
Console Type	vt100 vt100 8bit ANSI 7bit **ANSI** Vt100 plus UTF8	Select the console type
Continue C.R. after POST	**Off** on	Enable Console Redirection after OS has loaded.
Installed O/S	**[other]** Win95 Win98 WinMe Win2000	Select the operating system installed on your system which you will use most commonly note. An incorrect setting can cause some operating systems to display unexpected behavior.

3.4.4 – Reset Configuration Data

Feature	Option	Description
Reset Configuration Data	**Yes** No	This setting erases all configuration data in a section of memory for ESCD (Extended System Configuration Data) which stores the configuration settings for non-PnP plug-in devices. Select Yes when required to restore the manufacturer's defaults

3.4.5 – Multiprocessor Specification

Feature	Option	Description
Multiprocessor Specification	**1.4** 1.1	Configures the MP Spec revision level. Some OS will require 1.1 for compatibility reasons

3.4.6 – Use PCI Interrupt Entries in MP Table

Feature	Option	Description
Use PCI Interrupt Entries in MP Table	**Yes** No	Configures the MP Table with PCI interrupt entries

3.4.7 – ACPI SRAT Table

Feature	Option	Description
ACPI SRAT Table	**Enable** Disable	Enable ACPI 2.0 static resources affinity table for ccNUMA systems.
RSDT FADT Revision	**1** 2	Configures the MP Table with PCI interrupt entries.

3.4.8 – HPET Timer

Feature	Option	Description
HPET Timer	**Enable** Disable	Enable HPET high precision event timer

3.4.9 – Halt on Error

Feature	Option	Description
Halt on Error	**Yes** No	BIOS will halt POST and wait for user input in case of POST errors.

3.4.10 – GART Error Reporting

Feature	Option	Description
GART Error Reporting	Enable **Disable**	This option should remain disabled for the normal operation. The driver developer may enable it for testing purpose

3.4.11 – 4GB Memory Hole Adjust

Feature	Option	Description
4GB Memory Hole Adjust	**Auto** Manual	Auto – Adjust the memory hole size automatically according to the memory space used by PCI devices Manual **–** Memory hole size is determined manually

3.4.12 – Chipset Configuration Sub-Menu

Feature	Option	Description
Dram Bank Interleave	**Auto** Disable	Interleave memory blocks across dram chip selects. BIOS will AUTO detect capability on each Node.
Node memory Interleave	**Disable** AUTO	Interleave memory blocks across processor nodes BIOS will AUTO detect capability of Memory System. Note: This cannot be enabled if ACPI SRAT table is also enabled. Changing one value will also toggle the other.
ECC	**Enable** Disable	ECC check/correct mode. This is a Global enable function for all blocks within CPU core and North Bridge
Dram ECC	**Enable** Disable	If all memory in the system supports ECC, enabling this will initial scrub dram and enable system requests to dram to be checked and/or corrected
ECC Scrub Redirection	**Enable** **Disable**	Enable ECC Scrubber to correct errors detected in Dram during normal CPU requests
4-bit ECC	**Enable** **Disable**	Enable 4-bit ECC mode on Nodes with ECC capable dims.
DCACHE ECC Scrub CTL	**Disable** 40ns/80ns/160ns/320ns/640ns/1.28us/2.56us	Set the rate of background scrubbing for DCACHE lines
L2 ECC Scrub CTL	**Disable** 40ns/80ns/160ns/320ns/640ns/1.28us/2.56us	Set the rate of background scrubbing for L2 cache lines
Dram ECC Scrub CTL	Disable **1.31ms** /2.62ms/5.24ms/10.49ms/20.97ms/42ms/84ms	Set the rate of BACKGROUND scrubbing for Dram.
Speculative TLB Reload	**Enable** Disable	Enable / Disable Speculative TLB Reload

3.4.13 – Keyboard Configuration Sub-Menu

Feature	Option	Description
NumLock	**Auto** On Off	Select Power-on state for NumLock
Keyboard auto-repeat rate	**30/sec** 26.7/sec ...	Select key repeat rate
Keyboard auto-repeat delay	1/4 sec **1/2 sec** 3/4 sec 1 sec	Select delay before key repeat

3.4.14 – I/O Device Configuration Sub-Menu

Feature	Option	Description
PS/2 Mouse	**Enable** Disable	Disable – prevent any installed PS/2 mouse from functioning, but frees up IRQ 12 Enable **–** force the PS/2 mouse port to be enabled regardless if a mouse is present
USB Host Controller	**Enable** Disable	Enable or disable the USB hardware
USB BIOS Legacy Support	**Disable** Enable	Enable or Disable support for USB Keyboards and Mice in with a non-USB aware OS such as DOS or UNIX
Onboard PCI IDE	Disable Primary Secondary **Both**	Enable the integrated local bus IDE adapter
Serial Port A	**Enable** Disable AUTO	Configure serial port
Serial Port A Base I/O Address	**3F8**/2F8/3E8/ 2E8	
Serial Port A Interrupt	**IRQ4 /** IRQ3	

Feature	Option	Description
Serial Port B	**Enable** Disable AUTO	Configure serial port
Serial Port B Base I/O Address	3F8/**2F8**/3E8/ 2E8	
Serial Port B Interrupt	IRQ4 **/ IRQ3**	
Parallel port	Disable **Enable** Auto	Configure Parallel port
Parallel Port Mode	**Output only** Bi-directional EPP ECP	
Parallel Port Base I/O Address	**378**/278/3BC	
Parallel Port Interrupt	IRQ5 **/ IRQ7**	

3.4.15 – PCI Configuration Sub-Menu

Feature	Option	Description
IOMMU Size	**Enable** Disable 32MB/64MB/128 MB/**256MB**/512 MB/1GB/2GB	Enable / Disable IOMMU and select the size of it.
Onboard SATA/LSI/BroadCom	**Enable** Disable	Enable or Disable the Onboard devices
Onboard USB 2.0	**Enable** Disable	Enable or Disable the Onboard devices
Onboard SATA/LSI/Broadcom Option Rom Scan	**Enable** Disable	Enable or Disable to initialize expansion ROM of Onboard devices
Broadcom LAN Port 2 PXE *	Enable **Disable**	Enable or Disable to support PXE
▸ PCI/PNP IRQ Exclusion ▸ PCI/PNP UMB Exclusions		Reserve specific IRQs for use by legacy ISA devices. Reserve specific upper memory blocks for use by legacy ISA devices.

***** Enable Broadcom LAN Port 2 PXE may lead to option ROM overflow.

3.4.16 – Watchdog Timer Option Sub-Menu

Feature	Option	Description
Watchdog Timer	**Disable** Enable	Enable/Disable Watchdog Timer
Time_Out Minutes	…	Watchdog Time_out configuration in minutes(1-255)

3.50 – BIOS Security Menu

BIOS Setup Utility

Main Advanced **Security** Power Boot Exit

Item Specific Help

Supervisor Password Is: XXXX
User Password Is: XXXX

Clear Supervisor Password [ENTER]
Set User Password

<Tab>, <Shift-Tab>, or <Enter> selects field

Password on boot: [Disabled]

Fixed disk boot sector [NORMAL]

F1 Help ↑/↓Select Item -/+ Change Values F9 Setup Defaults
ESC Exit ←Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

3.60 – BIOS Power Menu

BIOS Setup Utility

Main Advanced Security **Power** Boot Exit

Item Specific Help

ACPI Enabled [Yes]
Resume On Time: [Off]
Resume Time: [00:00:00]
Resume Date: [00/00/0000]

<Tab>, <Shift-Tab>, or <Enter> selects field

Intruder Support [Disabled]
After Power Failure: [Last State]

F1 Help ↑/↓Select Item -/+ Change Values F9 Setup Defaults
ESC Exit ←Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

3.6.1 –Resume On Time

Feature	Option	Description
Resume On Time	**Off** On	Enable wakes the system up at a specific time

3.6.2 –Resume On Time

Feature	Option	Description
Resume On Time	**Off** On	Enable wakes the system up at a specific time

3.6.3 –Intruder Support

Feature	Option	Description
Intruder Support	**Disabled** Enable	Enable/Disable Intruder Function

3.6.4 – After Power Failure

Feature	Option	Description
After Power Failure	Stay Off **Last State** Power On	This setting specifies whether your system will reboot after a power failure or interrupt occurs. Set to stay off to leave the computer in the power off state. Set to last state to restore the system to the previous status before power failure or interrupt occurred. Set to power on to leave the computer in the power on state.

3.70 – BIOS Boot Menu

BIOS Setup Utility

Main Advanced Security Power **Boot** Exit

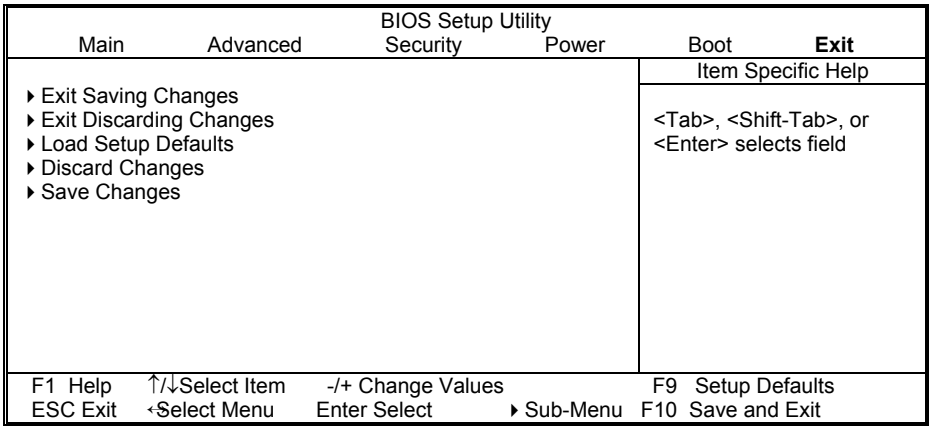
Item Specific Help

CD-ROM Drive
+Removable Devices
+Hard Drive
Network Boot
MBA V6.1.2 SLOT 0248
MBA V6.1.2 SLOT 0249

F1 Help ↑/↓Select Item -/+ Change Values F9 Setup Defaults
ESC Exit ←Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

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

3.80 – BIOS Exit Menu



3.8.1 – Exit Saving Changes

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

3.8.2 – Exit Discarding Changes

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

3.8.3 – Load Setup Defaults

Use this option to load all default setup values.
Use this option when system CMOS values have been corrupted or modified incorrectly.

3.8.4 – Discard Changes

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

3.8.5 – Save Changes

Use this option to store all new setup values into CMOS.

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

CPU, Memory, Video

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.

4.10 Beep Codes

Fatal errors which halt the boot process are communicated through a series of audible beeps.

(1) Memory module initialization failed
  (a) memory modules might not be plugged in correct configuration
  (b) wrong type of memory
  (c) bad memory modules
(2) Graphics initialization failed

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.

4.20 Flash Utility

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

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

Appendix I: Glossary

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

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs 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 HD's.

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

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

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

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

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

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

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

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead

of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

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

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

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

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

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

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

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

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

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

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

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

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

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX.

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

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

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

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

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

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

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

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

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

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

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

Parallel port: transmits the bits of a byte on eight different wires at the same time.

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

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM: a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

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

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

RAIDIOS: RAID I/O Steering (Intel)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix II: BIOS POST Code

Code	Beeps / Description	Code	Beeps / Description
02h	Verify Real Mode	3Ah	Autosize cache
03h	Disable Non-Maskable Interrupt (NMI)	3Ch	Advanced configuration of chipset registers
04h	Get CPU type	3Dh	Load alternate registers with CMOS values
06h	Initialize system hardware	42h	Initialize interrupt vectors
08h	Initialize chipset with initial POST values	45h	POST device initialization
09h	Set IN POST flag	46h	2-1-2-3. Check ROM copyright notice
0Ah	Initialize CPU registers	48h	Check video configuration against CMOS
0Bh	Enable CPU cache	49h	Initialize PCI bus and devices
0Ch	Initialize caches to initial POST values	4Ah	Initialize all video adapters in system
0Eh	Initialize I/O component	4Bh	QuietBoot start (optional)
0Fh	Initialize the local bus IDE	4Ch	Shadow video BIOS ROM
10h	Initialize Power Management	4Eh	Display BIOS copyright notice
11h	Load alternate registers with initial POST values	50h	Display CPU type and speed
12h	Restore CPU control word during warm boot	51h	Initialize EISA board
13h	Initialize PCI Bus Mastering devices	52h	Test keyboard
14h	Initialize keyboard controller	54h	Set key click if enabled
16h	1-2-2-3. BIOS ROM checksum	58h	2-2-3-1. Test for unexpected interrupts
17h	Initialize cache before memory autosize	59h	Initialize POST display service
18h	8254 timer initialization	5Ah	Display prompt "Press F2 to enter SETUP"
1Ah	8237 DMA controller initialization	5Bh	Disable CPU cache
1Ch	Reset Programmable Interrupt Controller	5Ch	Test RAM between 512 and 640 KB
20h	1-3-1-1. Test DRAM refresh	60h	Test extended memory
22h	1-3-1-3. Test 8742 KBD Controller	62h	Test extended memory address lines
24h	Set ES segment register to 4 GB	64h	Jump to UserPatch1
26h	Enable A20 line	66h	Configure advanced cache registers
28h	Autosize DRAM	67h	Initialize Multi Processor APIC
29h	Initialize POST Memory Manager	68h	Enable external and CPU caches
2Ah	Clear 512 KB base RAM	69h	Setup System Management Mode (SMM) area
2Ch	1-3-4-1. RAM failure on address	6Ah	Display external L2 cache size
2Eh	1-3-4-3. RAM failure on data bits of low byte of memory bus	6Bh	Load custom defaults (optional)
2Fh	Enable cache before system BIOS shadow	6Ch	Display shadow-area message
30h	1-4-1-1. RAM failure on data bits of high byte of memory bus	6Eh	Display possible high address for UMB recovery
32h	Test CPU bus-clock frequency	70h	Display error messages
33h	Initialize Phoenix Dispatch Manager	72h	Check for configuration errors
36h	Warm start shut down	76h	Check for keyboard errors
38h	Shadow system BIOS ROM	7Ch	Set up hardware interrupt vectors

Code	Beeps / Description	Code	Beeps / Description
7Eh	Initialize coprocessor if present	BAh	Initialize DMI parameters
80h	Disable onboard Super I/O ports and IRQs	BBh	Initialize PnP Option ROMs
81h	Late POST device initialization	BCh	Clear parity checkers
82h	Detect and install external RS232 ports	BDh	Display MultiBoot menu
83h	Configure non-MCD IDE controllers	BEh	Clear screen (optional)
84h	Detect and install external parallel ports	BFh	Check virus and backup reminders
85h	Initialize PC-compatible PnP ISA devices	C0h	Try to boot with INT 19
86h.	Re-initialize onboard I/O ports.	C1h	Initialize POST Error Manager (PEM)
87h	Configure Motherboard Devices	C2h	Initialize error logging
88h	Initialize BIOS Data Area	C3h	Initialize error display function
89h	Enable Non-Maskable Interrupts (NMIs)	C4h	Initialize system error handler
8Ah	Initialize Extended BIOS Data Area	C5h	PnPnd dual CMOS (optional)
8Bh	Test and initialize PS/2 mouse	C6h	Initialize notebook docking (optional)
8Ch	Initialize floppy controller	C7h	Initialize notebook docking late
8Fh	Determine number of ATA drives (optional)	C8h	Force check (optional)
90h	Initialize hard-disk controllers	C9h	Extended checksum (optional)
91h	Initialize local-bus hard-disk controllers	D2h	Unknown interrupt
92h	Jump to UserPatch2	E0h	Initialize the chipset
93h	Build MPTABLE for multi-processor boards	E1h	Initialize the bridge
95h	Install CD ROM for boot	E2h	Initialize the CPU
96h	Clear huge ES segment register	E3h	Initialize system timer
97h	Fixup Multi Processor table	E4h	Initialize system I/O
98h	1-2. Search for option ROMs.	E5h	Check force recovery boot
99h	Check for SMART Drive (optional)	E6h	Checksum BIOS ROM
9Ah	Shadow option ROMs	E7h	Go to BIOS
9Ch	Set up Power Management	E8h	Set Huge Segment
9Dh	Initialize security engine (optional)	E9h	Initialize Multi Processor
9Eh	Enable hardware interrupts	EAh	Initialize OEM special code
9Fh	Determine number of ATA and SCSI drives	EBh	Initialize PIC and DMA
A0h	Set time of day	ECh	Initialize Memory type
A2h	Check key lock	EDh	Initialize Memory size
A4h	Initialize Typematic rate	EEh	Shadow Boot Block
A8h	Erase F2 prompt	EFh	System memory test
AAh	Scan for F2 key stroke	F0h	Initialize interrupt vectors
ACh	Enter SETUP	F1h	Initialize Run Time Clock
AEh	Clear Boot flag	F2h	Initialize video
B0h	Check for errors	F3h	Initialize System Management Mode
B2h	POST done - prepare to boot operating system	F4h	Output one beep before boot

Code	Beeps / Description	Code	Beeps / Description
B4h	One short beep before boot	F5h	Boot to Mini DOS
B5h	Terminate QuietBoot (optional)	F6h	Clear Huge Segment
B6h	Check password (optional)	F7h	Boot to Full DOS
B9h	Prepare Boot		

Technical Support

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

Help Resources:

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

Returning Merchandise for Service

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

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

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

Operation is subject to the following conditions:

This device may not cause harmful interference, and
This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

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

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

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

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

Document #: D1607-100