TYAN

Thunder i7520/S5360
Thunder i7520R/S5360-1U

Revision 1.01

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Table of Contents

Before you begin…

Check the box contents!
The retail motherboard package should contain the following:

1x Thunder i7520 S5360 or Thunder i7520R S5360-1U motherboard

1x 80-pin Ultra-DMA-133/100/66/33 IDE cable

1x Thunder i7520 S5360 / Thunder i7520R S5360-1U User's Manual

1x Thunder i7520 S5360 / Thunder i7520R S5360-1U Quick Reference

1x TYAN Driver CD

1x I/O shield

1 x Serial ATA driver diskette

1 x Serial ATA power cable

2 x Serial ATA cables

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

Chapter 1: Introduction

1.1 – Congratulations!

You have purchased one of the most powerful Intel Xeon®-based server solutions in an Extended ATX form factor.

Based on the same printed circuit board design, Tyan provides two models with different manufacturer's options. This user's manual covers both models.

Thunder i7520 S5360 is ideal for a pedestal or tower enterprise server systems featuring some state-of-the-art technologies such as dual/single 800 MHz FSB Xeon® processor support with EM64T 64-bit technology, multiple PCI-X buses, PCI-Express bus, dual channel DDR Registered ECC memory design, onboard dual 64-bit PCI-X Gigabit Ethernet ports, Serial-ATA IDE ports, and multiple USB2.0 (Universal Serial Bus) ports.

Thunder i7520R S5360-1U takes Thunder i7520 S5360 similar design and well suited for high-density rackmount configurations.

Visit Tyan's website at http://www.tyan.com. There, you can find information on all of Tyan's product FAQ's, lists of worldwide distributors, Tyan Software utilities, the latest Windows and Linux based drivers, memory compatibility listings and much more.

1.2 – i7520 S5360 Hardware Specifications

Processors

- Dual Intel® Xeon "Nocona" processors
- Two ZIF mPGA604 sockets
- Onboard EVRD 10.1
- 800 MHz FSB support
- Supports Intel Extended Memory 64 Technology (EM64T)

Expansion Slots

- Three PCI-X 133/100/66 MHz slots*
- One PCI-X 100/66 MHz slot
- One PCI-X 66 MHz slot
- One (x 8) PCI-Express slot
- One 32-bit/33 MHz PCI 2.2 slot
- Four PCI-X, one PCI-Express (x 8), and one PCI independent buses
- Total seven usable slots

Chipset

- Intel Lindenhurst E7520 chipset
- MCH North Bridge and ICH5R South Bridge chips
- Two PXH I/O Bridge chips
- Winbond W83627HF Super I/O chip

Memory

- Eight DDR-333/266 DIMM sockets
- Up to 32/16 GB of Registered DDR266/333
- Supports ECC type memory modules

Integrated IDE (Parallel ATA)

- Provides two PCI bus master channels for up to four UDMA IDE devices
- Support for UDMA 33/66/100 IDE and ATAPI devices

Integrated Serial ATA (SATA) Host Controllers

- Provides independent DMA operation on 2 ports
- Data transfer rates up to 1.5GB/s
- Supports RAID 0 or 1 (with 82801ER/ICH5R chip)
- Adaptec's driver and option ROM

Optional SCSI module (Tyan M7902)

- Adaptec AIC7902 dual-channel Ultra320 SCSI controller
- Operating at 64-bit PCI-X bus
- Supports Intel 's RAIDIOS™ and Adaptec's Zero-Channel RAID logics
- Supports Adaptec's HostRAID™
- Two 68-pin SCSI connectors

Integrated I/O

- One floppy connector for up to two drives
- Two 9-pin UART serial support (1 port via cable---optional)
- One 25-pin ECP/EPP parallel header
- PS/2 mouse & keyboard stacked connectors
- Six USB 2.0 ports (2 rear USB connectors, four front USB ports via optional cables)

BIOS

- Phoenix BIOS 8 Mb flash ROM
- Supports ACPI Power Management: S1, S4 and S5 modes
- Auto detection of memory size
- Auto configuration of IDE hard disk types
- User settings of hardware monitoring
- Multiple boot options including PXE
- Supports Console Redirect

Form Factor

- Extended ATX (12" x 13")
- One EPS ATX/12V 24-pin system power connector
- One SSI EEB v3.51 complaint 8-pin split CPU power connector
- Stacked PS/2 mouse/keyboard ports
- Stacked two USB ports
- One serial, one parallel and one VGA ports
- Two RJ45 connectors (Depends on

Integrated PCI Graphics
- ATI Rage XL PCI controller
- 8 MB Frame Buffer

Integrated Dual GbE LAN Controllers
- Dual 10/100/1000 GbE LANs
- Intel 82546GB controller
- Supports ASF1.0 or IPMI1.5
- Two RJ45 connectors with LED's

Optional SATA RAID module (Tyan M8110/M8120)
- Adaptec/Marvell 64-bit PCI-X SATA-I controller
- Eight or four 1.5 GB/s SATA ports
- High-performance command queuing with EDMA support
- Supports SATA RAID 0, 1, 10
- Adaptec ZCR support

the onboard LAN option)

System Management
- ADI ADT7463 H/W Monitor IC
- Three 4-pin (3-pin compatible) fan connectors
- Six 3-pin system fan headers
- Tachometer monitoring and PWM control for certain fans
- One 2-pin chassis intrusion header
- SMBus connectors
- Temperature and voltage monitoring
- Watchdog timers
- Optional Tyan's M3291 SMDC (Server management Daughter Card) IPMI 2.0 via a 2x25 header

Regulation
- FCC Class B (Declaration of Conformity)
- European Community CE (Declaration of Conformity)

* **Refer to Section IV for greater PCI bus routing clarification**

Software Specifications

OS (Operating System) Support
Microsoft Windows XP
Microsoft Windows 2000 advanced Server
Microsoft Windows Server 2003
Microsoft Windows NT4.0
Red Hat 8.0, 9.0
SuSE Server 8.0
Other distributions of Linux pending validation

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

1.3 – i7520 S5360 Board Image
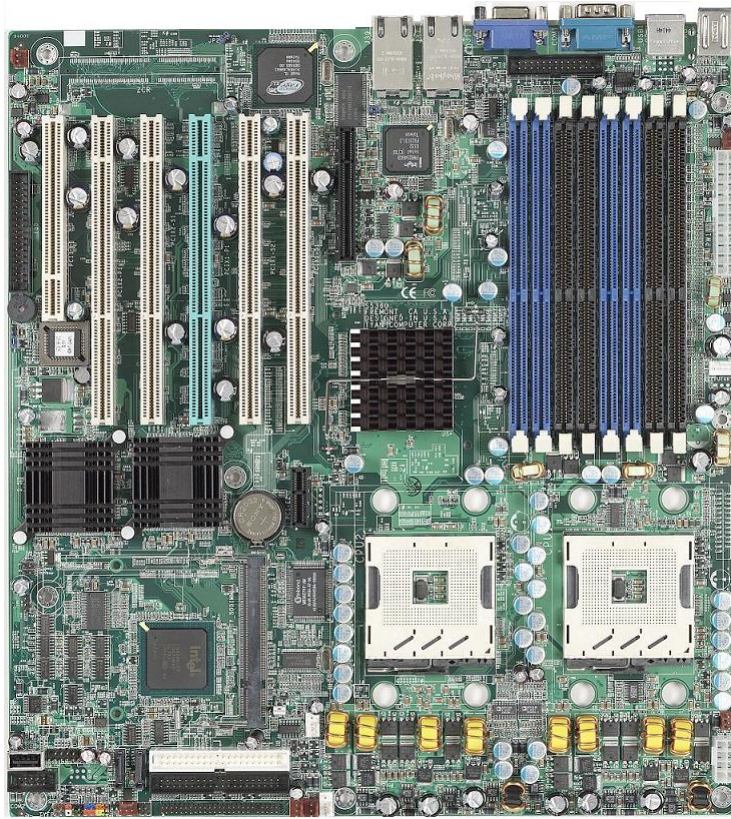
1.4 – i7520 S5360 Block Diagram
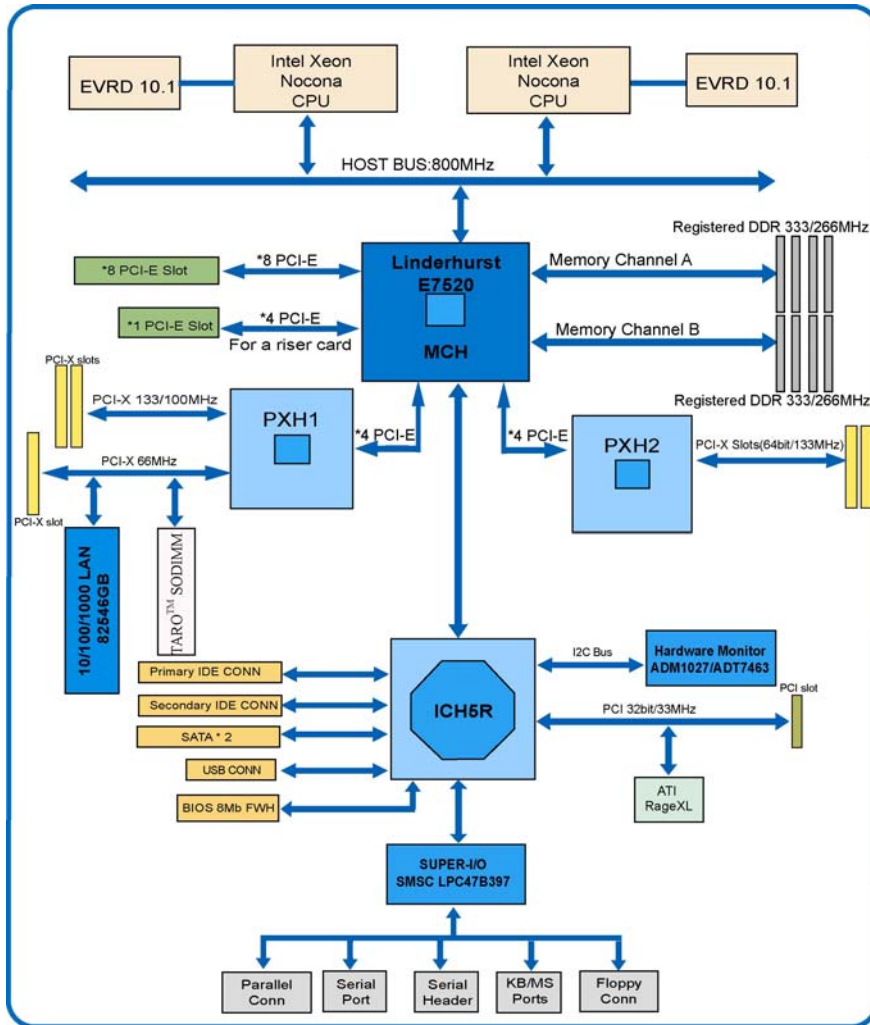
The above picture is purely representative. Due to engineering updates and new board revisions, certain components may change and or be repositioned. The picture above may or may not look exactly like the board you received.

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

1.5 – i7520 S5360 Components View

Fig. 3-1 Thunder i7520 S5360 Key Component View

This jumper diagram 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 diagram. The board parts are not to scale.

1.6 – i7520 S5360 Jumper Settings Quick Reference

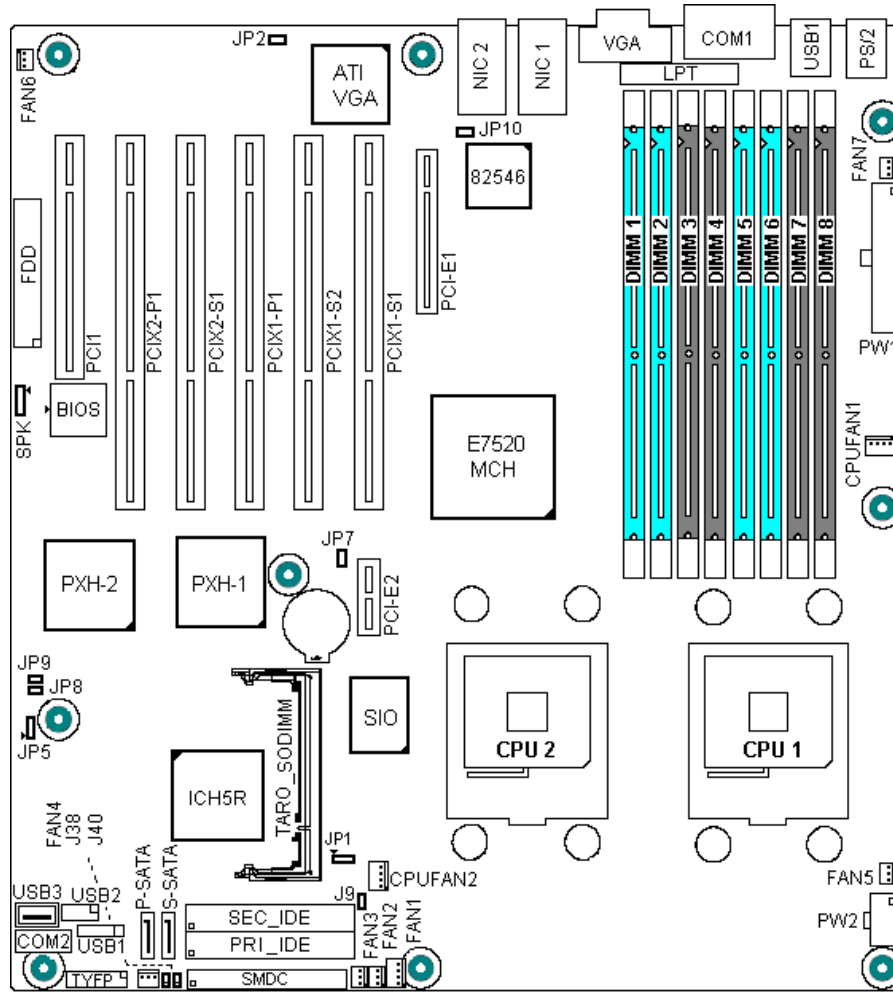| Jumper	Function	Settings
JP1	CMOS Clear (Refer to **Section 3.1.2**)	1-2: Clear CMOS **2-3: Normal**
JP2	Onboard VGA (Refer to **Section 3.1.3**)	**Open: Enable ATI VGA** Close: Disable ATI VGA
JP5	Watch-Dog Timer (Refer to **Section 3.1.4**)	**1-2: WDT resets system** 2-3: WDT generates NMI
JP7	PCIX1 Channel B (for PCIX1-S1 and PCIX1-S2 slots)	**Open: Enable 133 MHz maximum frequency** Close: Disable 133 MHz and up to 100/66 MHz Refer to **Section 3.1.5**
JP8	PCIX2 Channel A (for PCIX2-P1 slot)	**Open: Enable 133 MHz maximum frequency** Close: Disable 133 MHz and up to 100/66 MHz Refer to **Section 3.1.7**
JP9	PCIX2 Channel B (for PCIX2-S1 slot)	**Open: Enable 133 MHz maximum frequency** Close: Disable 133 MHz and up to 100/66 MHz Refer to **Section 3.1.8**
JP10	Onboard Intel 82546GB NIC	**Open: Enable dual GbE ports** Close: Disable dual GbE ports Refer to **Section 3.1.9**
SPK	Buzzer/External Speaker	1-4: For external speaker connector **3-4: Enable onboard buzzer** Refer to **Section 3.1.10**
CPU FAN1	CPU1 Fan Connector	**Refer to Section 3.1.15**
CPU FAN2	CPU2 Fan Connector	**Refer to Section 3.1.15**
FAN1	4-pin System Fan Connector	**Refer to Section 3.1.15**
FAN2 ~ FAN7	3-pin System Fan Connectors	**Refer to Section 3.1.15**
J9	External LED Input Header	**Refer to Section 3.1.11**
J34	SMDC Connector	**Refer to Section 3.1.12**
J38	LAN1 LED Header	**Refer to Section 3.1.14**
J40	LAN2 LED Header	**Refer to Section 3.1.14**
USB2	USB Header	**Refer to Section 3.1.13**
P-SATA/ S-SATA	SATA Connectors	**Refer to Section 3.1.16**

JFP (Front Panel Connector)			
Signal	**Pin**	**Pin**	**Signal**
HD LED +	**1**	**2**	PWR LED +
HD LED -	**3**	**4**	GND
GND	**5**	**6**	PWR_ON-
Reset Button -	**7**	**8**	GND
+5V	**9**	**10**	Warning LED+
NC	**11**	**12**	GND
3Vsb	**13**	14	KEY
SMB DATA	**15**	**16**	GND
SMB CLK	**17**	**18**	Chassis Intrusion-

1.7 – i7520R S5360-1U Hardware Specifications

Processors

- Dual Intel® Xeon "Nocona" processors
- Two ZIF mPGA604 sockets
- Onboard EVRD 10.1
- 800 MHz FSB support
- Supports Intel Extended Memory 64 Technology (EM64T)

Expansion Slots

- One PCI-X 133/100/66 MHz slot*
- One PCI-X 100/66 MHz slot

Chipset

- Intel Lindenhurst-VS E7320 chipset
- MCH North Bridge and ICH5R South Bridge chips
- One PXH I/O Bridge chip
- Winbond W83627HF Super I/O chip

Memory

- Eight DDR-333/266 DIMM sockets
- Up to 32/16 GB of Registered DDR266/333
- Supports ECC type memory modules

Integrated IDE (Parallel ATA)

- Provides two PCI bus master channels for up to four UDMA IDE devices
- Support for UDMA 33/66/100 IDE and ATAPI devices

Integrated Serial ATA (SATA) Host Controllers

- Provides independent DMA operation on 2 ports
- Data transfer rates up to 1.5GB/s
- Supports RAID 0 or 1 (with 82801ER/ICH5R chip)
- Adaptec's driver and option ROM

Integrated PCI Graphics

- ATI Rage XL PCI controller
- 8 MB Frame Buffer

Optional SCSI module (Tyan M7902)

- Adaptec AIC7902 dual-channel Ultra320 SCSI controller
- Operating at 64-bit PCI-X bus
- Supports Intel 's RAIDIOS™ and Adaptec's Zero-Channel RAID logics
- Supports Adaptec's HostRAID™
- Two 68-pin SCSI connectors

Integrated I/O

- One floppy connector for up to two drives
- Two 9-pin UART serial support (1 port via cable---optional)
- One 25-pin ECP/EPP parallel header
- PS/2 mouse & keyboard stacked connectors
- Six USB 2.0 ports (2 rear USB connectors, four front USB ports via optional cables)

BIOS

- Phoenix BIOS 8 Mb flash ROM
- Supports ACPI Power Management: S1, S4 and S5 modes
- Auto detection of memory size
- Auto configuration of IDE hard disk types
- User settings of hardware monitoring
- Multiple boot options including PXE
- Supports console re-direction

Form Factor

- Extended ATX (12" x 13")
- One EPS ATX/12V 24-pin system power connector
- One SSI EEB v3.51 complaint 8-pin split CPU power connector
- Stacked PS/2 mouse/keyboard ports
- Stacked two USB ports
- One serial, one parallel and one VGA ports
- Two RJ45 connectors (Depends on the onboard LAN option)

Integrated Dual Gigabit Ethernet LAN Controllers

- Dual 10/100/1000 Gigabit Ethernet LANs
- Intel 82546GB controller
- Supports ASF1.0 or IPMI1.5
- Two RJ45 connectors with LEDs

Optional SATA RAID module (Tyan M8110/M8120)

- Adaptec/Marvell 64-bit PCI-X SATA-I controller
- Eight or four 1.5 GB/s SATA ports
- High-performance command queuing with EDMA support
- Supports SATA RAID 0, 1, 10
- Adaptec ZCR support

Riser Card Support

- 2U-riser cards
  - o M2360 (Supports up to three 64-bit PCI-X slots on 3 independent PCI-X buses)
  - o M2364 (Supports up to two 64-bit PCI-X slots and one PCI-Express x4 slot)
  - o M2044
- 1U-riser cards
  - o M2033
  - o M2037

❖ Refer to Appendix IV for PCI-X/PCI bus arrangement
❖ TYAN reserves the right to add support or discontinue support for any OS with or without notice.

System Management

- ADI ADT7463 H/W Monitor IC
- Three 4-pin (3-pin compatible) fan connectors
- Six 3-pin system fan headers
- Tachometer monitoring and PWM control for certain fans
- One 2-pin chassis intrusion header
- SMBus connectors
- Temperature and voltage monitoring
- Watchdog timers
- Optional Tyan's M3291 SMDC (Server management Daughter Card) IPMI 2.0 via a 2x25 header

Regulation

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

Software Specifications

OS (Operating System) Support
Microsoft Windows XP
Microsoft Windows 2000 advanced Server
Microsoft Windows Server 2003
Microsoft Windows NT4.0
Red Hat 8.0, 9.0
SuSE Server 8.0
Other distributions of Linux pending validation

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1.8 – i7520R S5360-1U Board Image
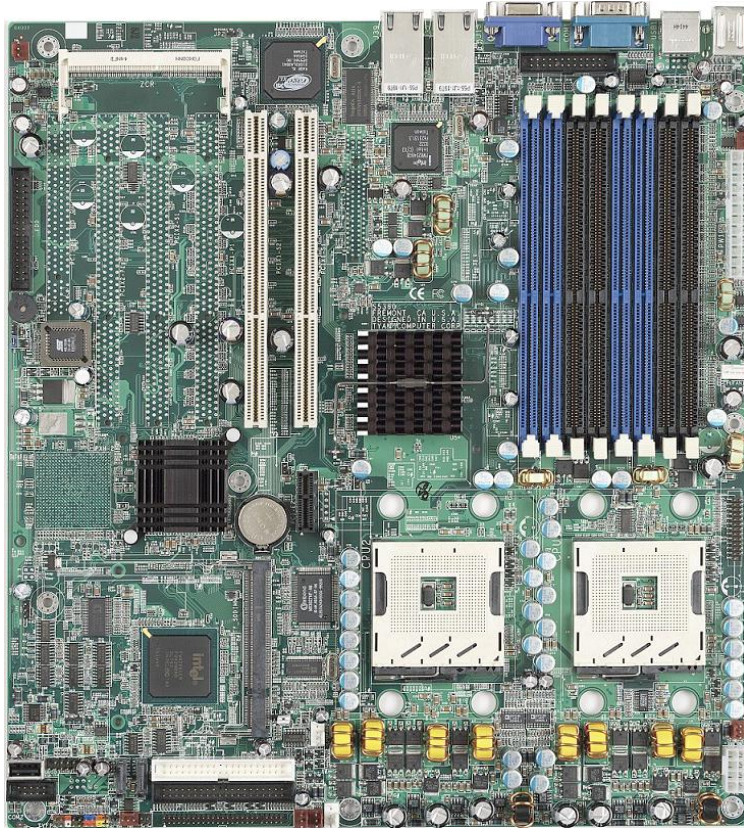
1.9 – i7520R S5360-1U Board Diagram
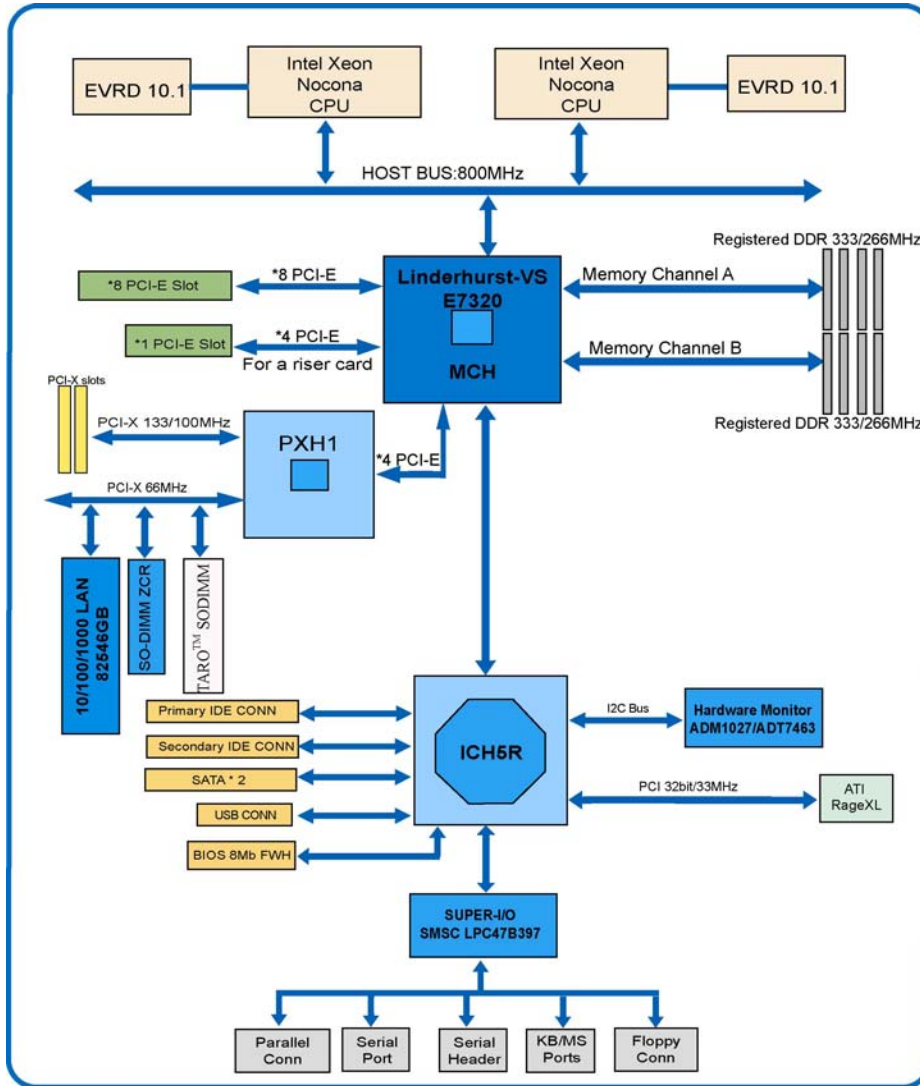
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The following page includes details on the vital components of this motherboard.

1.10 – i7520R S5360-1U Key Components View

Fig. 3-1 Thunder i7520 S5360 Key Component View

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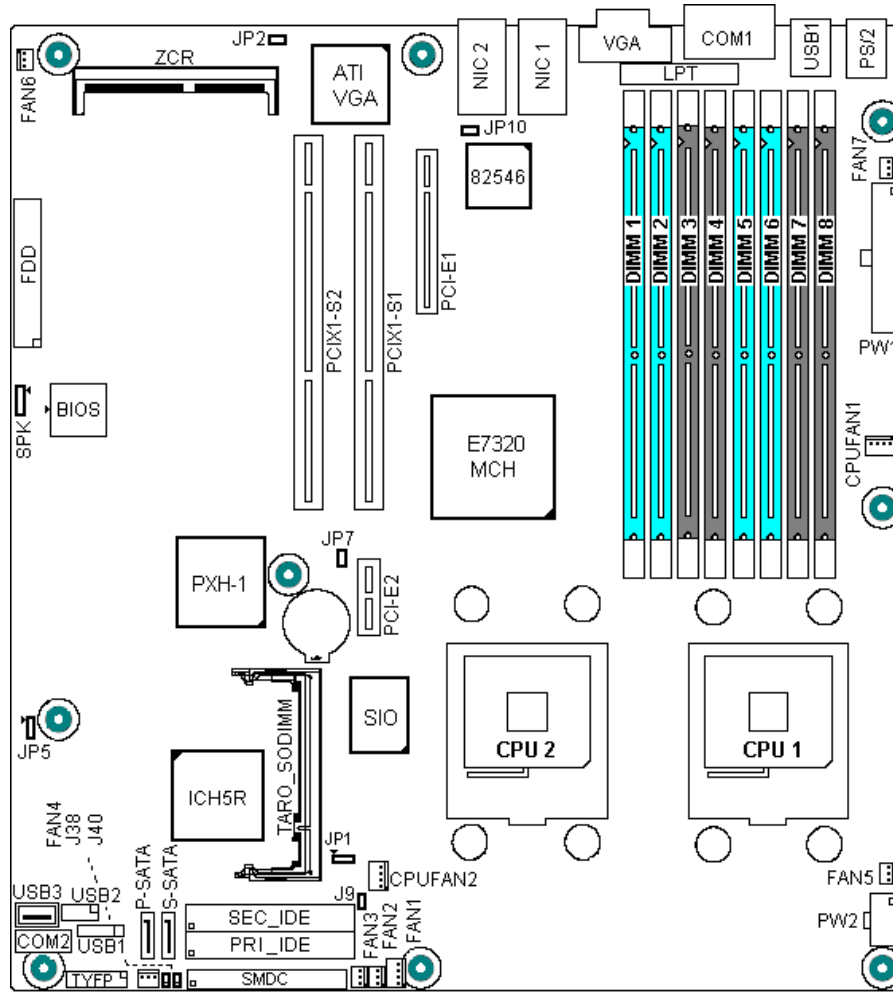
1.11 – i7520R S5360-1U Jumper Settings Quick Reference

Jumper	Function	Settings
JP1	CMOS Clear	1-2: Clear CMOS **2-3: Normal** **(Refer to** Section 3.1.2**)**
JP2	Onboard VGA	**Open: Enable ATI VGA** Close: Disable ATI VGA (Refer to **Section 3.1.3**)
JP5	Watch-Dog Timer	**1-2: WDT resets system** 2-3: WDT generates NMI (Refer to **Section 3.1.4**)
JP7	PCIX1 Channel B (for PCIX1-S1 and PCIX1-S2 slots)	**Open: Enable 133 MHz maximum frequency** Close: Disable 133 MHz and up to 100/66 MHz Refer to **Section 3.1.5**
JP10	Onboard Intel 82546GB NIC	**Open: Enable dual GbE ports** Close: Disable dual GbE ports Refer to **Section 3.1.9**
SPK	Buzzer/External Speaker	1-4: For external speaker connector **3-4: Enable onboard buzzer** Refer to **Section 3.1.10**
CPU FAN1	CPU1 Fan Connector	**Refer to Section 3.1.15**
CPU FAN2	CPU2 Fan Connector	**Refer to Section 3.1.15**
FAN1	4-pin System Fan Connector	**Refer to Section 3.1.15**
FAN2 ~ FAN7	3-pin System Fan Connectors	**Refer to Section 3.1.15**
J9	External LED Input Header	**Refer to Section 3.1.11**
J34	SMDC Connector	**Refer to Section 3.1.12**
J38	LAN1 LED Header	**Refer to Section 3.1.14**
J40	LAN2 LED Header	**Refer to Section 3.1.14**
USB2	USB Header	**Refer to Section 3.1.13**
P-SATA/ S-SATA	SATA Connectors	**Refer to Section 3.1.16**

JFP (Front Panel Connector)			
Signal	**Pin**	**Pin**	**Signal**
HD LED +	1	2	PWR LED +
HD LED -	3	4	GND
GND	5	6	PWR_ON-
Reset Button -	7	8	GND
+5V	9	10	Warning LED+
NC	11	12	GND
3Vsb	13	14	KEY
SMB DATA	15	16	GND
SMB CLK	17	18	Chassis Intrusion-

Chapter 2: Choose Proper Parts For Your System

Before you installing a system with this motherboard, make sure your major system parts meet the following basic guidelines and requirements:

2.1 – Central Processor Unit (CPU) Considerations

- **Process Type and Package**

  Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support Intel Xeon® 800 MHz front side bus (FSB) processors in 604-pin Pin Grid Array package.

- **Front Side Bus (FSB)**

  The processor host bus, or called Front Side Bus (FSB), always operates at 800 MHz. Choose Intel Xeon® 800 MHz FSB processors for Thunder i7520 S5360 board.

  The system will not be operational with installing Intel Xeon® 533 or 400 MHz FSB processors.

- **Single/Dual Processor System**

  Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support single or dual Intel Xeon® processors.

  Single Processor System:

  The processor must be installed on the CPU1 ZIF (Zero-Insertion-Force) socket, if only one processor is present.

  Dual Processor System:

  For dual processor configurations, both processors must operate with the same FSB frequency, core frequency, and have the same internal cache sizes. Mixing processors operating at different FSB frequency, core frequency, or cache sizes may cause system non-operation or damages on processors and/or the motherboard.

2.2 – Memory Considerations

- **Memory Type**

  Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support up to eight 184-pin *DDR333/266 Registered ECC* DIMM modules. The DDR memory modules can be using 256Mb, 512Mb and 1Mb memory chips.

  Visit Tyan's web site for the memory recommendation list.

- **Memory Installation**

  Thunder i7520 S5360 and Thunder i7520R S5360-1U are based on Intel's E7520 Linderhurst chipset and Intel's E7520R Linderhurst-VS chipset, respectively. Both models support 144-bit wide dual memory channels in interleaved memory scheme. With the exception of Configuration 1 in the memory configuration table below**,** memory modules are installed in pairs, starting from DIMM8 towards DIMM1.

  Each pair of memory modules must be in the same capacity, density, speed, and configuration.

  Visit Tyan's web site for the memory recommendation list at: **www.tyan.com**

	DIMM 8 Ch. B	DIMM 7 Ch. A	DIMM 6 Ch. B	DIMM 5 Ch. A	DIMM 4 Ch. B	DIMM 3 Ch. A	DIMM 2 Ch. B	DIMM 1 Ch. A
	(Black)		(Blue)		(Black)		(Blue)	
Conf. 1	X							
Conf. 2	X	X						
Conf. 3	X	X	X	X				
Conf. 4	X	X	X	X	X	X		
Conf. 5	X	X	X	X	X	X	X	X

2.3 – Chassis/Enclosure Considerations

- **Motherboard size**
  The printed circuit board size is 13" (W) x12" (L).
- **Motherboard and CPU Heat-sink Mounting Holes**
  There are nine motherboard-mounting holes and eight CPU heat-sink mounting holes on the board design. The motherboard and CPU mounting hole pattern follows SSI EEB v3.51 (A Server System Infrastructure specification for Entry Pedestal Servers and Workstations) specifications. Ensure that your chassis supports those 9 motherboard-mounting holes to secure the motherboard. S5360/S5360-1U supports Intel's CEK (*Common Enabling Kit*) for securing Intel's Xeon® 800 MHz FSB processors and processor cooling heat-sinks in the chassis. Two CEK springs for the dual processors are pre-assembled with the motherboard or enclosed in the motherboard accessory package. The CPU heat-sinks must be mounted down to the chassis base pan with stand-offs. Any additional chassis standoffs, besides the 9 motherboard-mounting holes and 8 CPU heat-sink mounting holes, should be removed to preventing from short-circuit or motherboard damage.
- **Others**
  As a system integrator, the air-flow/thermal, EMI/EMC, shock/vibration, and system packing should be also considered for choosing a proper enclosure.
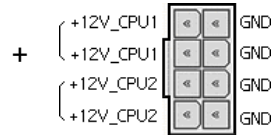
2.4 – Power Supply Considerations
- **Power connectors**
  Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support EPS/12V power supply unit (PSU) with two power connectors listed below.

EPS/12V Power Connectors

24-pin system power connector **(PW1)**

8-pin CPU power connector (PW2)

- **Split processor power planes**
  Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support dual Intel's 800 MHz FSB Xeon® processors, which could reach up to 140 Watts per processor. (Check Intel's web for your processor specifications.) By following SSI EEB v3.51 specifications, S5360/S5360-1U is designed with two separate voltage regulator circuits to provide the power for both onboard processors in separate power rail. Using a power supply with a combined CPU power plane from the CPU power connector, is not allowed and may cause system failed to power up or a damage to power supply.

▪ **Power requirements**
Check your power supply specifications to ensure sufficient power currents for each power rail based on your system configuration.
The major system components/parts power sources are listed below as reference:

Components/Parts	Main Power Source	Power Connectors
CPU1	+12V_CPU1	8-pin CPU power connector
CPU2	+12V_CPU2	8-pin CPU power connector
Memory (Normal)	+12V	24-pin power connector
Memory (Suspend to RAM)	+5Vstandby	24-pin power connector
System logic	+3.3V	24-pin power connector
X8 PCI-Express	+12V and +3.3V	24-pin power connector
X1 PCI-Express	+12V and +3.3V	24-pin power connector
64-bit PCI-X	+12V, +5V, +3.3V and 3.3Vstandby	24-pin power connector
32-bit PCI	+12V, +5V and +3.3V	24-pin power connector
Cooling fans	+12V	24-pin power connector
IDE/SATA hard drives	+12V and +5V	From PSU
CDROM/DVD drives	+12V and +5V	From PSU

Visit Tyan's web site for the power supply recommendation list at: **www.tyan.com**

Chapter 3: Board Installation

How to install our products right…. the first time!

The first thing you should do 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:
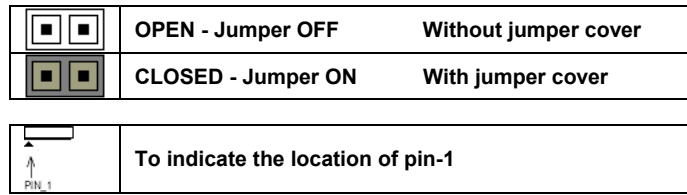
(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap.

(2) Inspect the mounting holes pattern of the Thunder i7520 S5360 to match your chassis standoff locations and remove the additional standoffs.

(3) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.

(4) Avoid touching the motherboard components, IC chips, connectors, memory modules and leads.

(5) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.

(6) Inspect the board for damage.

(7) Check the jumper settings and connector locations as described in next sections.

In last sections of this chapter, we will cover the 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

3.1 – Jumpers

Jumper Example:

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

PIN_1	To indicate the location of pin-1

3.1.1 - Front Panel Header (TYFP)

Normally, a chassis has some control or signal wires can be connected onto a motherboard
for hard drive LED, power LED, power button, and reset button,
The front panel header (marked as "TYFP") has been implemented on Thunder i7520 S5360
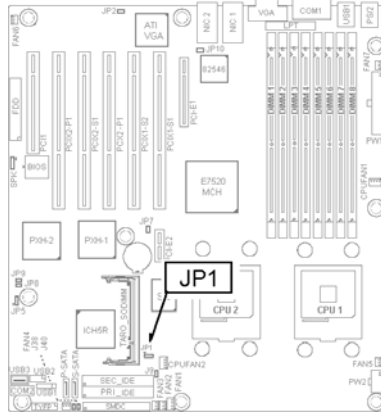or Thunder i7520R S5360-1U board for such purposes.
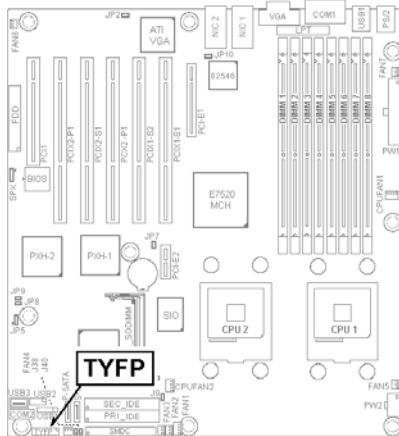
Front Panel Header (TYFP)

JFP (Front Panel Conne tor)			
Signal	**Pin**	**Pin**	**Signal**
HD LED +	1	2	PWR LED +
HD LED -	3	4	GND
GND	5	6	PWR_ON-
Reset Button -	7	8	GND
+5V	9	10	Warning LED+
NC	11	12	GND
3Vsb	13	14	KEY
SMB DATA	15	16	GND
SMB CLK	17	18	Chassis Intrusion-

3.1.2 - Clear CMOS (JP1)

JP1

Pin 1-2: Clear CMOS

Pin 2-3: Normal (Default)

You can reset the CMOS settings by pressing this button, if you have forgotten your system/setup password or need to clear system BIOS settings.

- Power off system and **disconnect both power connectors from the motherboard**
- Place the jumper shunt to close JP1 Pin 1 and Pin 2 for several seconds to Clear CMOS
- Move the jumper shunt back to JP1 Pin 2 and Pin 3 position

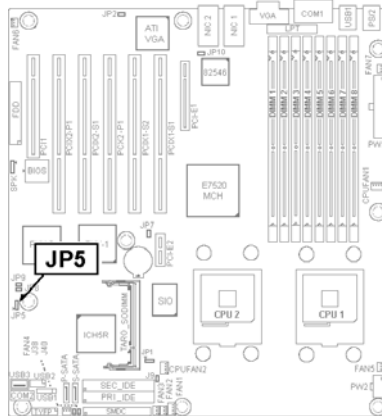### 3.1.3 - Enable/Disable onboard ATI Rage XL graphics (JP2)
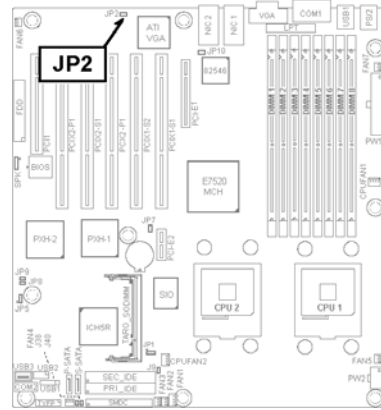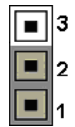
JP2

OPEN: Enable Onboard VGA (Default)

CLOSED: Disable Onboard VGA

The onboard ATI Rage XL graphics controller is placed on 32-bit 33 MHz PCI bus with 8 MB video frame buffer.
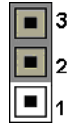
3.1.4 – Watchdog Timer (JP5)

JP5

Pin 1-2: Watchdog resets system (Default)

Pin 2-3: Watchdog generates NMI

Once the watchdog function is enabled in BIOS setup, system needs an application or utility to clear the watchdog timer periodically before the timer expiration. If the application or utility fails to clear the watchdog timer, the system will be reset or entered a NMI service routine, depending on the JP5 setting.

It is an OEM option of generating NMI service routing for watchdog function.

3.1.5 – PCIX-1 Channel B (for PCIX1-S1 and PCIX1-S2 slots) Maximum Frequency (JP7)
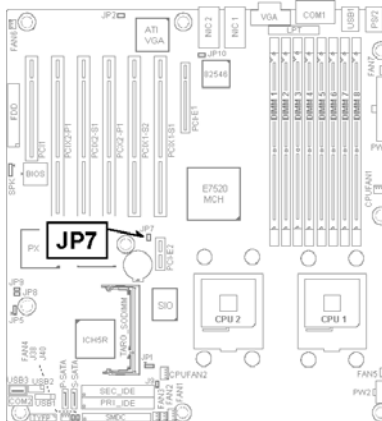
JP7

OPEN: 133/100/66 MHz (Default)

CLOSE: 100/66 MHz

JP7 is for onboard PXH-1 Channel B PCI-X bus frequency setting.

The PCIX1-S1 and PCIX1-S2 slots are the only devices on this PCI-X bus.

Only one device/add-in card on PCIX1-S1 slot is allowed to run this bus to run PCI-X frequency up to 133 MHz. Placing two or more devices on PCIX1-S1 through a riser card or installing one device on PCIX1-S2 slot can only support up to PCI-X 100 MHz.

3.1.6 – PCIX-1 Channel A Maximum Frequency

The following devices are connected to PCIX-1 Channel A PCI-X bus:
- TARO Socket (Tyan's 200-pin SODIMM proprietary socket)
- Onboard Intel 82546GB dual channel gigabit Ethernet controller
- PCIX1-P1 64-bit PCI-X slot (available on Thunder i7520 S5360 only)
- ZCR socket (available on Thunder i7520R S5360R only)

The maximum PCI-X bus frequency on this bus (PCIX-1 Channel A) is set to 66 MHz.

3.1.7 – PCIX-2 Channel A Maximum Frequency (For Thunder i7520 S5360 only)
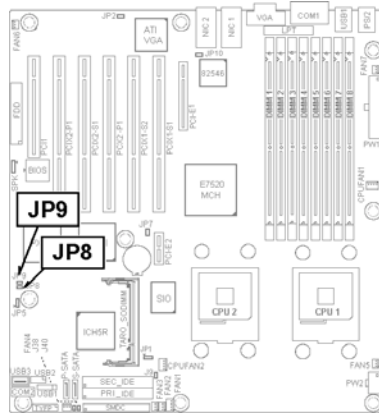
JP8　　(For PCIX2-P1 PCI-X slot)

OPEN: 133/100/66 MHz (Default)

CLOSE: 100/66 MHz

JP8 is for the onboard secondary PXH I/O Bridge chip (PXH-2) Channel A PCI-X bus frequency setting.
The PCIX2-P1 slot is the only device on this PCI-X bus.

3.1.8 – PCIX-2 Channel B Maximum Frequency (For Thunder i7520 S5360 only)

JP9   (For PCIX2-S1 PCI-X slot)

OPEN: 133/100/66 MHz
(Default)

CLOSE: 100/66 MHz

JP9 is for the onboard secondary PXH I/O Bridge chip (PXH-2) Channel B PCI-X bus frequency setting.
The PCIX2-S1 slot is the only device on this PCI-X bus.
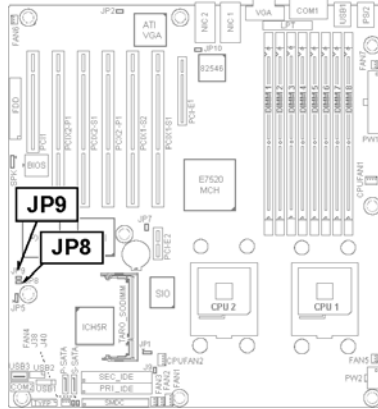
3.1.9 - Enable/Disable onboard 82546 NIC (JP10)
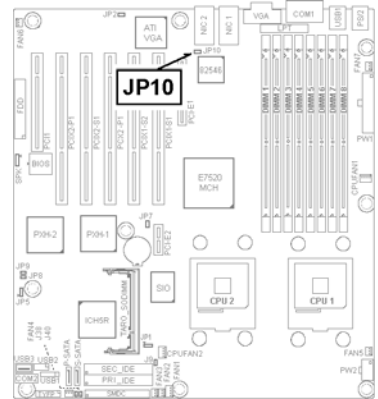
JP10

OPEN: Enable Onboard 82546 NIC
(Default)

CLOSED: Disable Onboard 82546
NIC

3.1.10 – External Speaker Header (SPK)

Pin 2 –3: Enable onboard buzzer
(Default)

Pin 1 and Pin 4: For connecting
an external chassis speaker
(with disabling onboard buzzer)
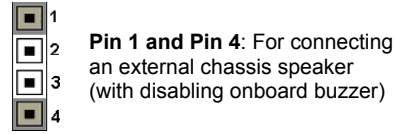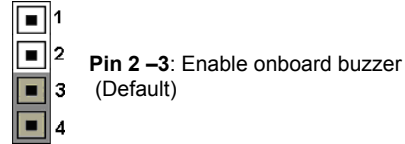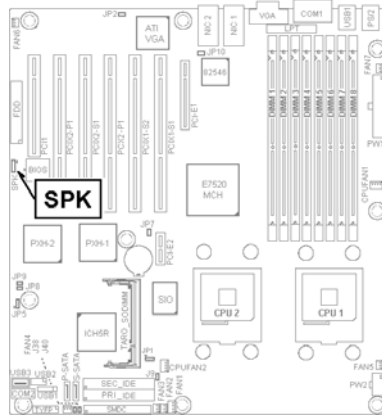
3.1.11 – External LED Input Connector (J9)

J9   **External LED Input Connector**

Pin 1: External LED ACTIVE signal
input (active at Logic High)

Pin 2: GND
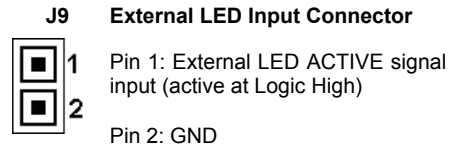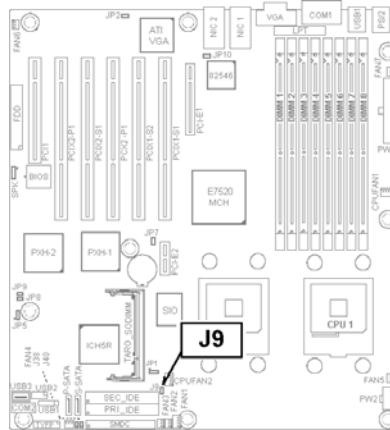
J9 is for an external LED input connector.
It can be connected with an internal device
LED indication, such as hard disk drive LED.

This signal is combined or shared with
onboard primary IDE LED, secondary IDE
LED and SATA LED.

With M7902 SCSI module on TARO
SODIMM socket, the M7902 SCSI drive LED
is also combined with above LED signals and
to be connected to the front panel header
HDD LED pins (TYFP Pin 1 and Pin 3).

3.1.12 - SMDC Connector (J34)
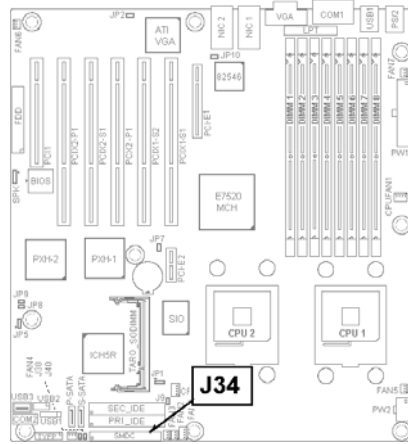
J34   SMDC Connector

J34 is a 25 x 2 position connector, which is for connecting an optional Tyan Server Management Daughter Card (SMDC).
Both Thunder i7520 S5360 and Thunder i7520R S5360-1U boards support
Tyan M3291 (SMDC)
See Appendix III for details about the Tyan SMDC

3.1.13 - Front USB Connector (USB2)
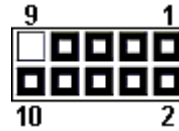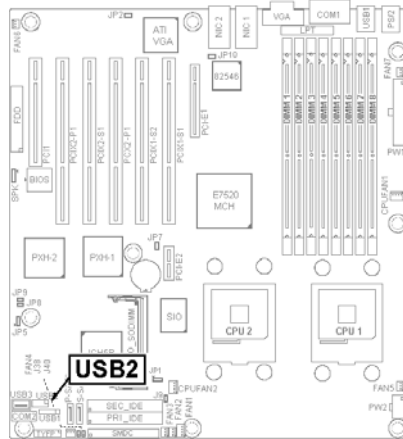
Front USB Header (USB2)

Function	Pin#	Pin#	Function
Power	1	2	Power
USB2-	3	4	USB3-
USB2+	5	6	USB3+
GND	7	8	GND
Key	9	10	Reserved

3.1.14 – Gigabit LAN1 LED Header (J38) & LAN2 LED Header (J40)

Pin_1: LINK- /ACT-

Pin_2: Power
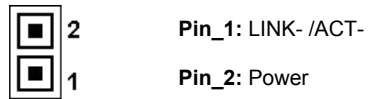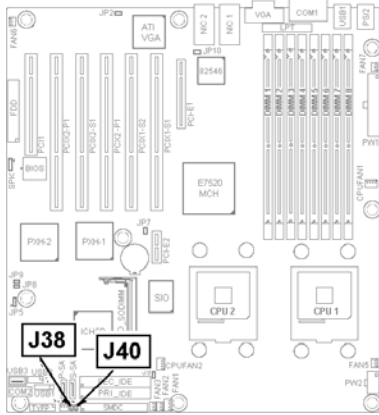
J38: NIC1 external LINK/ACTIVITY LED Header

J40: NIC2 external LINK/ACTIVITY LED Header

NIC1 and NIC2 RJ45 LED Scheme
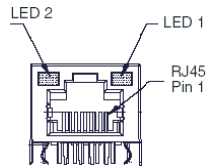
Description	**Left LED (ACTIVITY)**	**Right LED (SPEED)**
No Link	OFF	OFF
Linked at 10 Mbps	Green	OFF
Linked at 100 Mbps	Green	**Green**
Linked at 1000 Mbps	Green	Yellow
Activity at any speed	Blink Green	

3.1.15 - Fan Connector

Pin1: GND
Pin2: +12V
Pin3: Tachometer
Pin4: Fan PWM (Speed) Control

* PWM stands for Pulse Width Modulation

This 4-pin fan connector supports a new standard of fan connector for better fan life.
It has an integrated fan speed control on the fan itself. The first 3 pins of this 4-pin fan
connector are backward compatible with a traditional 3-pin fan connector without PWM fan
speed control. (Pin4 will be unconnected for connecting a 3-pin fan).

There are three 4-pin fan connectors (CPU FAN1, CPUFAN2 and FAN1) and six 3-pin fan
connectors (FAN2, FAN3, FAN4, FAN5, FAN6 and FAN7) on the Thunder i7520
S5360/Thunder i7520R S5360-1U board. Use these connectors to connect chassis and
processor cooling fans to your motherboard. Cooling fans can keep the system stable and
reliable for its product life.
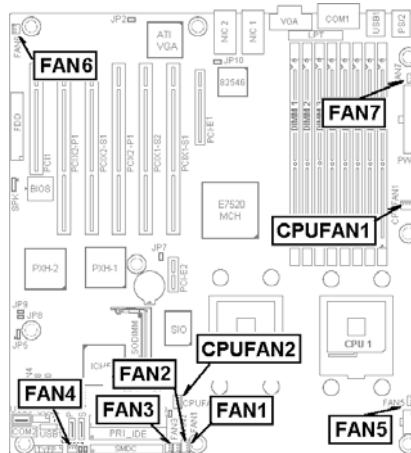
FAN	PWM Control	Tachometer Reading
CPUFAN1	**Yes** (ADT7463 Pin24/PWM1)	**Yes** (ADT7463 Pin11/TACH1)
CPUFAN2	**Yes** (ADT7463 Pin10/PWM2)	**Yes** (ADT7463 Pin12/TACH2)
FAN1	**Yes** (ADT7463 Pin13/PWM3)	**Yes** (ADT7463 Pin9/TACH3)
FAN2	**No**	**No**
FAN3	**Yes** (SIO Pin116/FANPWM1)*	**Yes** (SIO Pin111/FANIO3)
FAN4	**Yes** (SIO Pin116/FANPWM1)*	**Yes** (SIO Pin113/FANIO1)
FAN5	**No**	**No**
FAN6	**No**	**No**
FAN7	**Yes** (SIO Pin115/FANPWM2)	**Yes** (SIO Pin112/FANIO2)

* FAN3 and FAN4 are shared the same PWM control.

3.1.16 - Serial ATA Connectors (P-SATA & S-SATA)
The Primary SATA (SATA0) and the secondary SATA (SATA1) ports are integrated into Intel's
ICH5R South Bridge chip:
Users can connect up to two serial-ATA hard disks onto these two connectors to run IDE
mode or configure both drives as a RAID (RAID level 0 or 1) under Microsoft's Windows XP
and Windows 2000 operating systems.
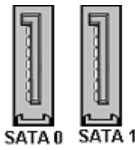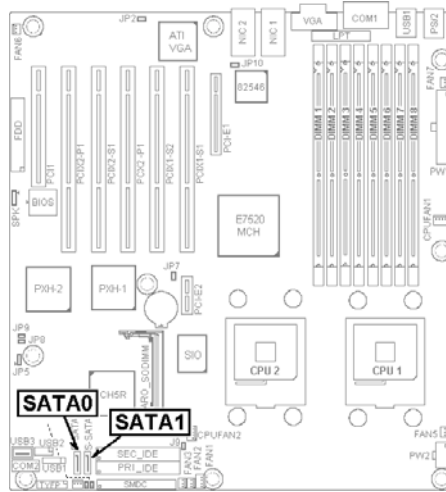
ICH5R Integrated Serial-ATA Connectors

**Regarding to SATA RAID setup information, you may search the contents of the driver
CD that shipped with your motherboard or visit our website at:** www.tyan.com

3.2 – Installing the Processor and Heatsink

DCA (Direct Chassis Attach) is required to install the Intel Xeon®processors on Thunder i7520 S5360/Thunder i7520R/S5360-1U. The processor heat-sinks need to be Intel's CEK (Common Enabling Kit) compliant. Each processor heat-sink needs to be mounted to chassis with which are 8 processor heat-sink mounting holes (4 holes for each processor)
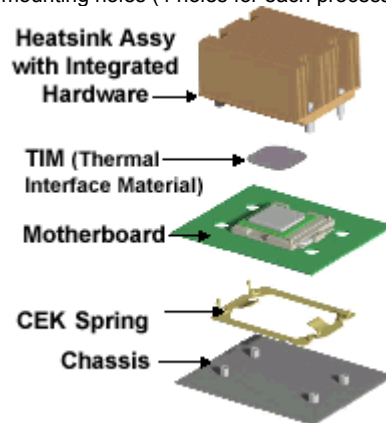
After you finish installing the heatsink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heatsink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.
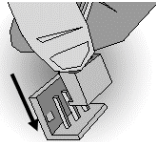
After you're finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

3.3 – Mounting the Motherboard

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are in gold or silver color. Usually, the chassis manufacturer will pre-install the support studs. Remove the unused or additional studs, which may scratch the motherboard or cause short-circuit with the components on the bottom side. If you're 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.

Mounting the Motherboard
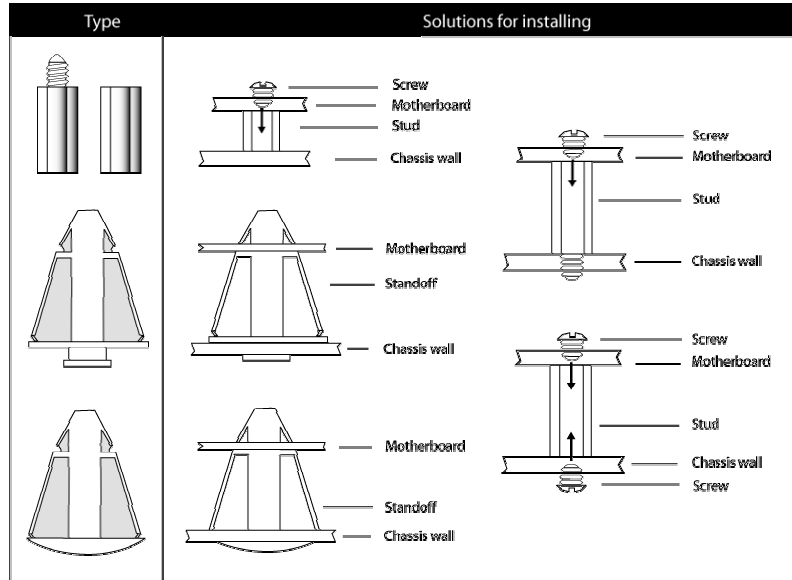
TIP: Use metal studs if possible, as they hold the motherboard into place more securely than plastic standoffs.

3.4 – 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. Check Section 2.2 "Memory Consideration" for your memory module selection. For this information, please check TYAN's web site at: **www.tyan.com**

When installing memory modules, make sure the modules align properly with the memory socket. There should be keys (small indents) on your memory modules that fit according to the keys in the memory socket. DDR modules and sockets have only one key, which is slightly near the center of the module/socket. The method of installing memory modules is detailed in the following diagrams.
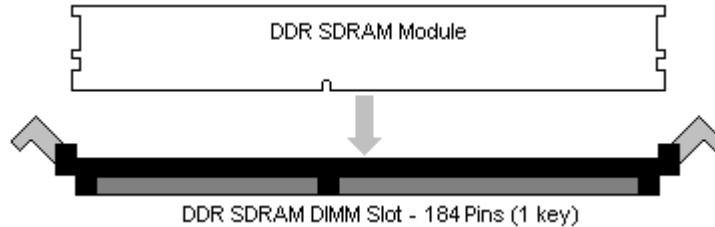
Once the memory modules are firmly seated in the socket, two clamps on either side will close and secure the module into the socket. Sometimes you may need to close the clamps manually.
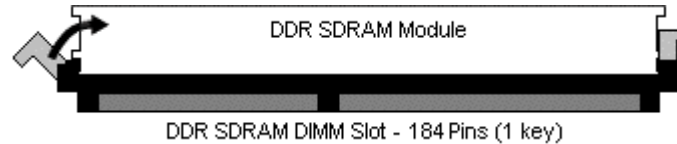
To remove the memory module, simply push the clamps outwards until the memory module pops up. Then simply remove the module.

TIP: When installing memory, a module may require a considerable amount of force to seat properly, although this is very rare. To avoid bending and damaging your motherboard, place it on its anti-static bag and onto a flat surface, and then proceed with memory installation.

Note: You **MUST** unplug the power connector to the motherboard before performing system hardware changes, to avoid damaging the board or expansion device

3.5 – Attaching Drive Cables

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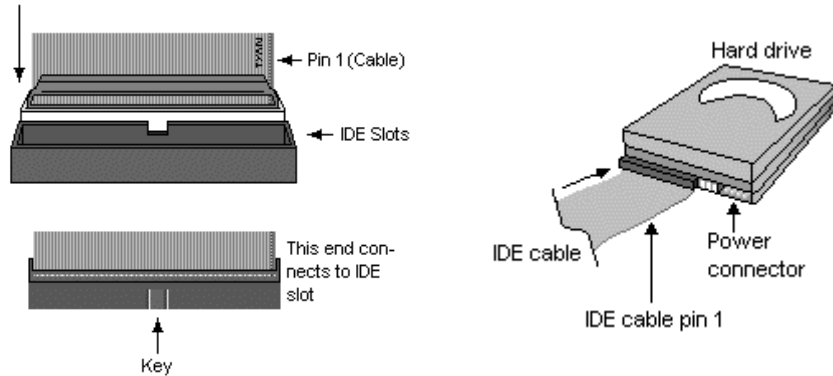
Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end(s) into the drive(s). Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard.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

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

Serial ATA

Attaching Serial ATA cables to the Serial ATA connectors is illustrated below:
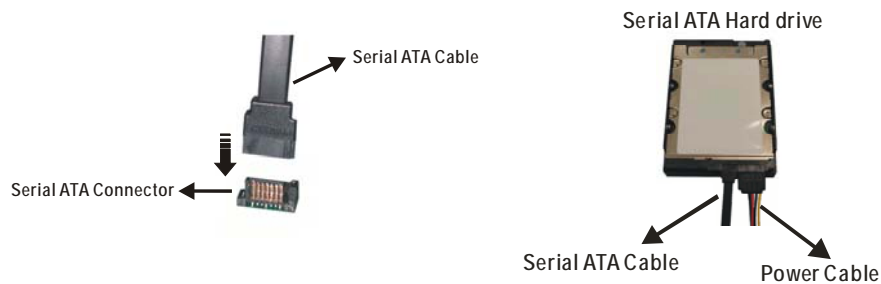
Simply plug in the BLACK END of the Serial ATA cable into the motherboard Serial ATA connector, and the other end(s) into the drive(s). Each standard Serial ATA cable has two connectors. Both BLACK ENDS of the Serial ATA cable are the same that are used to connect to drives or motherboard.

Floppy Drives

Attaching a floppy drive can be done in a similar manner to an IDE drive. See the diagram 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 proper connection of the cable.

Twist at the end of the ribbon cable
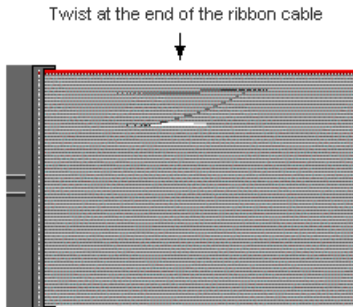
The first floppy drive (commonly denoted as **A:**) is usually attached to the end of the cable with the twist in it. Drive B: is usually connected to the second or third connector in the cable (the second or third connector after you install Drive **A:**).

Refer to your floppy drive's installation instructions (if available), or contact your dealer if you are unsure about how to attach the floppy drive(s). Remember, you can only have 2 floppy drives connected at any given time.

Below are some symptoms of incorrectly installed floppy drives. While they are minor and installing them incorrectly doesn't cause severe problems, it may cause your system to freeze or crash when trying to read and/or write to diskettes.

Symptoms of incorrectly installed floppy drives	
Drive is not automatically detected	Usually caused by faulty cables, cables put in backwards or a bad floppy drive or motherboard. Try another floppy drive to verify the problem if the cable is properly installed or try replacing the actual cable. Also check to see if the onboard floppy controller is enabled in the BIOS setup.
Drive Fail message at bootup	The cable, floppy drive or motherboard may be faulty. Try another drive or cable to verify.
Drive does not power on	Check power cable and cabling. Maybe a bad power supply or drive cable problem.
Drive activity light is constantly on	Usually signifies that the cable on the drive is on backwards, which is a common issue. Reverse the cable at the floppy drive end and try again.

3.6 – 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, however, there will be combinations of what you see here.

64-bit / 66MHz PCI Slot - 3.3V

32-bit / 33MHz PCI Slot - 3.3V

DDR SDRAM DIMM Slot

PCI-Express x 8 slot
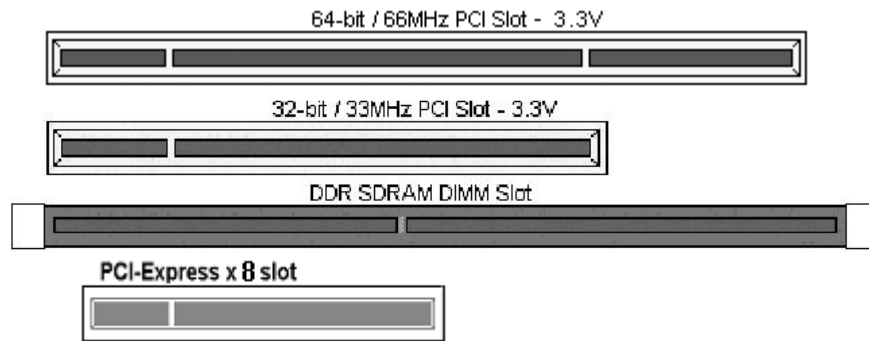
Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards (or anything else) into any slots if they won't seat in place. It's better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

TIP: It's a good practice to install add-in cards in a staggered manner, rather than directly adjacent to each other. This allows air to more easily circulate within the chassis, providing improved cooling for all installed devices.

Note: YOU MUST unplug the power connector to the motherboard before performing system hardware changes, to avoid damaging the board or expansion device.

3.7 – 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, mouse, and printer cables. The following diagram will detail the ATX port stack for the following board:

Thunder i7520 S5360
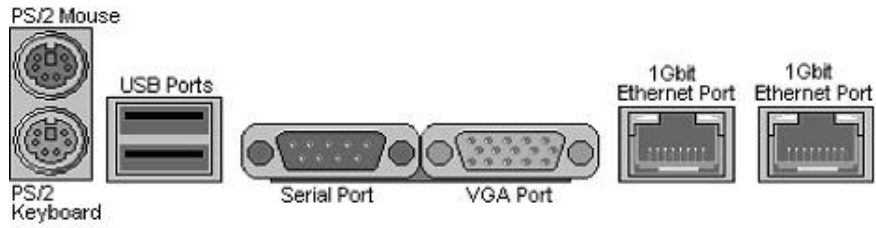
Besides being used primarily to connect printers, the Printer Port is also used for devices such as Zip drive, some external CD-RW drives and or other external devices. More on the uncommon side these days are the Serial Ports. They were primarily used to connect external modems, but most modems today are using USB or are installed internally.

TIP: While the ports have been created to accept connectors in only one direction, make sure to be careful when inserting connectors. At times, attaching connectors in the incorrect orientation can damage, bend and or break the pins.

3.8 – Installing the Power Supply

There are two power connectors on this motherboard. By default, this motherboard requires that you have an EPS ATX12V power supply that has the standard ATX-style 24-pin connector, as well as an additional 8-pin square connector. The CPU power is provided by the onboard switching voltage regulator, which is sourced by +12V power. This +12V CPU power source is from the onboard 8-pin split power planes. The +12V power on the 24-pin ATX power connector is for system board and separated from CPU +12V regulator power source. Therefore, the CPU will not be powered if you do not connect the 8-pin CPU power connector.
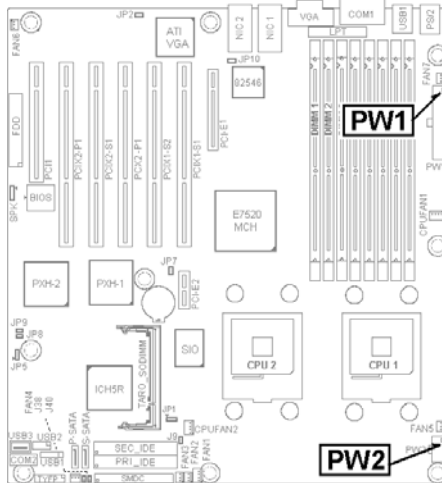
PW1: 24-pin main power connector

PW2: 8pin +12V power connector

+12V_CPU1	GND
+12V_CPU1	GND
+12V_CPU2	GND
+12V_CPU2	GND
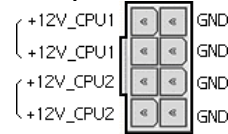
NOTE	**YOU MUST** unplug the power supply before plugging in the 24-pin and 8-pin power cables to motherboard connectors.

3.9 – 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 4: BIOS Setup

Installation

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

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

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

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

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

Starting Setup

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

When these preliminary tests are complete, the BIOS searches for an operating system on one of the system's data storage devices (hard drive, CD-ROM, etc). If one is found, the BIOS will launch that operating system and hand control over to it. You can enter the BIOS setup by pressing the [**F2**] key when the machine boots up and begins to show the memory count.

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	Change from one menu to the next
Up/Down Arrow Keys	More between selections
Enter	Opens highlighted section
+/- Keys	Change settings.

Getting Help

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

In Case of Problems

If you discover that you have trouble booting the computer after making and saving the changes with the BIOS setup program, 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 the outcome. The chipset defaults are carefully chosen by TYAN or your system manufacturer for the best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

Setup Variations

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

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

4.1 – Main BIOS Setup

When you enter Phoenix BIOS Setup Utility, the following screen will appear as below:

Phoenix cME FirstBIOS Pro Setup Utility

Main	Advanced	Security	Power	Boot	Exit

```
   System Time:              [ 10 : 15: 18]              Item Specific Help
   System Date:              [02/15/2004]          _____

   Legacy Diskette A:        [1.44/1.25 MB 31/2"]   <Tab>, <Shift-Tab>, or
                                                    <Enter> selects field.
 ►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]

 ►Memory Cache
 ►Boot Features


 ►System Information


```

F1: Help	↑↓ Select Item	+/- Change Value	F9: Setup Defaults
Esc: Exit	←→ Select Menu	Enter: Select ► Sub-Menu	F10: Save and Exit

Main
Use this menu for basic system configuration and system date and time settings.

Advanced
Use this menu to set the Advanced Features available on your system.
- o **Advanced Chipset Control**
  Use this menu to change the values in the chipset registers and optimize your system's performance.
- o **Advanced Processor Options**
  Use this menu to specify your processor settings.
- o **I/O Device Configuration**
  Use this menu to specify your basic I/O peripherals such as floppy, serial and parallel ports.
- o **Console Redirection**
  Use this menu to assign one of serial ports to perform the console redirection function.
- o **Hardware Monitor**
  Use this menu to setup BIOS event logging. The information of system voltages, temperatures and fan tachometers is also display in this sub-menu.

Security
Use this menu to setup passwords and storage media protection.

Power
Configure the power button behavior and the settings for system power resume from an AC power loss.

Boot
Configure the system boot up sequence for multiple bootable devices.

Exit
Use this menu to save or ignore the changes of CMOS settings. The default BIOS settings can also be retrieved, in case of improper custom CMOS settings.

4.2 – Main 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. User can Use the arrow or <Enter> keys to highlight the item and then use the <+ > or < - > keys to select the value you want in each item.

Main	Advanced	Security	Power	Boot	Exit

System Time: [10 : 15: 18] System Date: [02/15/2004]	Item Specific Help _____
Legacy Diskette A: [1.44/1.25 MB 31/2"]	<Tab>, <Shift-Tab>, or <Enter> selects field.
►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]	
►Memory Cache ►Boot Features	
►System Information	

F1: Help	↑↓ Select Item	**+/-** Change Value	**F9**: Setup Defaults
Esc: Exit	←→ Select Menu	**Enter**: Select ► Sub-Menu	**F10**: Save and Exit

System Time / Date Setup:

System Time: Adjusts the system clock.
> **[HH: MM: SS]**
> HH   Hours (24hr. format)
> MM   Minutes
> SS   Seconds

System Date: Adjusts the system date.
> **[MM/DD/YYYY]**
> MM   Months
> DD   Days
> YYYY   Years

Legacy Diskette A:
Defines the floppy drive type.

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

IDE and Integrated SATA Master / Slave Setup:
Computer detects IDE drive types.

> None / Auto / Manual

Memory Cache:
To select the memory cache types for memory segments within 640KB base address and extended memory.

Feature	Option	Description
Cache System BIOS Area:	**Uncached** **Write Protect**	Control Caching of System BIOS Area.
Cache Video BIOS Area	**Uncached** **Write Protect**	Control Caching of Video BIOS Area
Cache Base 0-512k	Uncached Write Through Write Protect **Write Back**	Control caching of 512k Base Memory
Cache Base 512k-640k	**Uncached** Write Through Write Protect Write Back	Control caching of 512k-640k Base Memory
Cache Extended Memory Area	**Uncached** Write Through Write Protect Write Back	Control Caching of System Memory above One Megabyte
Cache A000-AFFF/B000-BFFF	**Disabled** USWC Caching Write Through Write Protect Write Back	Control Caching of This Block
Cache C800-CBFF/CCC0-CFFF…DC00-DFFF	**Disabled** Write Through Write Protect Write Back	Control Caching of This Block
Cache E000-E3FF/E400-E7FF…EC00-EFFF	**Disabled** Write Through **Write Protect** Write Back	Control Caching of This Block

Boot Features:

Summary Screen:

Enable or disable the system configuration information on display during system boot up stage.

Enabled / Disabled

Quiet Boot:

Enable or disable the display of OEM logo screen during POST (Power On Self Test).

Enabled / Disabled

QuickBoot Mode:

Enable or disable the system to skip certain tests during POST. Enabling this item will reduce the system boot time

Enabled / Disabled

F12 Boot Menu:

Enable or disable the display of Multiboot menu. When this item is enabled, users can choice a different boot device from BIOS settings by pressing <F12> hotkey during system boot up stage.

Enabled / Disabled

Halt on POST Errors:

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

Enabled / Disabled

System Information:

Display system board model, BIOS version and BIOS build date.

4.3 – Advanced BIOS Features

In Advanced BIOS features, you will be able to adjust many of the feature that effect system speed and boot-up options.

Phoenix cME FirstBIOS Pro Advanced CMOS Setup Menu

Main	Advanced	Security	Power	Boot	Exit

Installed O/S	[**Win2000**]	Item Specific Help
Reset Configuration Data	[No]	_____
Large Disk Access Mode	[DOS]	
		Select the operating system
Parallel ATA	[Both]	installed on your system, which
Serial ATA	[Enabled]	you will use most commonly.
Native Mode Operation	[Auto]	
SATA RAID Enable	[Disabled]	Note: An incorrect setting can
		cause some operating systems
► Advanced Chipset Control		to display unexpected behavior.
► Advanced Processor Options		
► I/O Device Configuration		
► Console Redirection		
Legacy USB Support	[Enabled]	
► Hardware Monitor		

F1: Help	↑↓ Select Item	**+/-** Change Value	**F9**: Setup Defaults
Esc: Exit	←→ Select Menu	**Enter**: Select ► Sub-Menu	**F10**: Save and Exit

Installed O/S:
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.
        Win95 / Win98 / WinMe / Win2000 / Other

Reset Configuration Data:
If you select "Yes" on this item, the Extended System Configuration Data (ESCD) area will be cleared.
        No / Yes

Large Disk Access Mode:
Different operating systems may require different representations of hard disk geometries. For UNIX, Novell Netware, or certain operating systems, this item needs to set as "Other". For Microsoft Windows or DOS operating systems, choice "DOS".
        Other / DOS

Parallel ATA:
This option allows users to enable or disable the integrated primary and/or secondary parallel ATA channels.
        Disabled / Channel 0 / Channel 1 / Both

Serial ATA:
This option allows users to enable or disable the integrated ICH5R serial ATA ports.
Enabled / Disabled

Native Mode Operation:
This option for ATA hard drives. Certain operating systems cannot support Native Mode Operation. Setting "Auto" for this item is recommended.
Auto / Parallel ATA / Serial ATA / Both

SATA RAID Enable:
Select the ICH5R integrated SATA ports to be IDE mode or RAID mode. If select to "RAID" mode for attached SATA drives, there is an option ROM banner display to allow users to enter the RAID configuration menu during the system boot up.
The ICH5R integrated SATA ports support RAID level 0 or RAID level 1 under Windows.
Enabled / Disabled

Advanced Chipset Control:
Integrated USB
Integrated USB 1.1
Enabled / Disabled
Integrated USB 2.0
Enabled / Disabled
Integrated Gbit LAN
Integrated Gbit LAN
Enabled / Disabled

Onboard LAN1 Boot Strap
Enabled / Disabled

Onboard LAN2 Boot Strap
Enabled / Disabled

Advanced Processor Options:
Users can enable or disable Intel's Hyper Threading Technology to enable or disable a logical processor for each processor under Microsoft Windows XP or Windows 2003.

Hyper Threading Technology
Enabled / Disabled

Other options in this sub-menu are for debug purpose.

I/O Device Configuration:

Floppy disk controller**:** Enabled / Disabled

Serial port A: Disabled / Enabled / Auto
           Base I/O Address: 3F8 / 2F8 /3E8/2E8
           Interrupt: IRQ3 / IRQ4

Serial port B: Disabled / Enabled / Auto
           Base I/O Address: 3F8 / 2F8 / 3E8/2E8
           Interrupt: IRQ3 / IRQ4

Parallel port: Disabled / Enabled / Auto
           Mode: Output Only / Bi-directional / EPP / ECP
           Base I/O Address: 3F8 / 278 / 3BC
           Interrupt: IRQ5 / IRQ7
           DMA: DMA1 / DMA3

Console Redirection:

COM Port Address: Disabled / Onboard COM A / Onboard COM B
           Select onboard serial port or serial port on BMC IPMI card for console
           redirection.

Baud Rate: 300 /1200 /2400 /9600 / 19.2K /38.4K /57.6K /115.2K

Console Type: VT100 / VT100 8bit / PC-ANSI, 7bit / PC ANSI / VT100+ / VT-UTF8

Flow Control: None / XON/XOFF / CTS/RTS

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

Continue C.R. after POST
           ON / OFF
           Enable Console Redirection after OS has loaded.

Legacy USB Support
           Enable support for legacy Universal Serial Bus.
                      Enabled / Disabled

Hardware Monitor
           BIOS Event Logging
                      BIOS Event Logging: Enabled / Disabled
                      View BIOS Event Log: [Enter]   Press < Enter > key to view the event log
                      Clear all BIOS Event Logs: Enabled /Disabled

           Real-time Sensors
                      Auto display CPU/system temperatures, fan speeds and voltages.

4.4 – Security

In Security BIOS features, you will be able to setup passwords and floppy write-protect.

Phoenix cME FirstBIOS Pro Advanced CMOS Setup Menu

Main	Advanced	Security	Power	Boot	Exit

Supervisor Password Is	Clear / Set	Item Specific Help
User Password Is	Clear / Set	_____
Set Supervisor Password	[Enter]	Supervisor Password controls
Set User Password	[Enter]	access to the setup utility.
Diskette Access	[Supervisor]	
Fixed Disk Boot Sector	[Normal]	
Virus Check Reminder	[Disabled]	
System Backup Reminder	[Disabled]	
Password on Boot	[Disabled]	
Start From Floppy	[Enabled]	
Start From IDE CD-ROM	[Enabled]	
Floppy Write Protect	[Disabled]	

F1: Help	↑↓ Select Item	**+/-** Change Value	**F9**: Setup Defaults
Esc: Exit	←→ Select Menu	**Enter**: Select ► Sub-Menu	**F10**: Save and Exit

Please refer to the "Item Specific Help" fields for the descriptions of each settings.

4.5 – Power

Power Button Behavior:
Select the desired system power state after press power button.
          [On/Off] / [Wake/Sleep]

After Power Failure:
With this setting, users can specify the choice for the AC power resume…
          [Stay Off]: Set to stay off to leave the computer in the power off state, after power resume from an AC power loss.
          [Last State]: Set to last state to restore the system to the previous status before power failure or interrupt occurred.
          [Power On]: Set to power on to leave the computer in the power on state..
          [Last State] / [Stay Off] / [Power On]

4.6 – Boot

Main	Advanced	Security	Power	Boot	Exit

+ Removable Devices
+ Hard Drive
  CD-ROM Device
  Network Boot

Item Specific Help
_____

F1: Help	↑↓ Select Item	**+/-** Change Value	**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

4.7 – Exit

Main	Advanced	Security	Power	Boot	Exit

Exit Saving Changes   Item Specific Help
Exit Discarding Changes   _____
Load Setup Defaults
Discard Changes
Save Changes

F1: Help	↑↓ Select Item	**+/-** Change Value	**F9**: Setup Defaults
Esc: Exit	←→ Select Menu	**Enter**: Select ► Sub-Menu	**F10**: Save and Exit

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

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

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

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

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

.

Chapter 5: Diagnostics

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

Memory, Video, CPU

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

5.1 Beep Codes

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

The most common type of error is a memory error.

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

5.2 Flash Utility

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

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

Appendix I: Glossary

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

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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Handshaking: a process where two devices initiate communications. One device, typically the server, sends a message to another device, typically a client, in order to request establishment

of a communications channel. The two devices will then exchange messages back and forth in order to settle on a communications protocol.

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

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

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

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

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

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

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

IPL: see Initial Program Load.

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

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

Mirroring: see RAID.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SATA (Serial ATA): is an evolutionary replacement for the Parallel ATA physical storage interface. Serial ATA is a drop-in solution in that it is compatible with today's software and

operating systems. It will provide for systems, which are easier to design, with cables that are simpler to route and install, smaller cable connectors, and lower voltage requirements.

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

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

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

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

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

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

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

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

Striping: see RAID

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

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

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

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

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

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

Appendix II: Post Error Code for BIOS

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
7Eh	Initialize coprocessor if present	BAh	Initialize DMI parameters
80h	Disable onboard Super I/O ports and IRQs	BBh	Initialize PnP Option ROMs

Code	Beeps / Description	Code	Beeps / Description
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
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		

Appendix III: SMDC Information

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 absence 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 powered by an intelligent controller known as Baseboard Management Control (BMC). BMC is a standalone mini-CPU and runs on its own Real Time Operating System (RTOS) to complete all different kinds of tasks. Backed by Renesas' H8 technology, IT manager can rest assure his server machines are always taken care.

Tyan SMDC is not a peripheral card. Unlike an AGP card, Network card or SCSI card, the SMDC does not require any hardware specific driver. As long as a standby power comes into the system, the SMDC will be active on the system.

Tyan SMDC is compatible with all IPMI-compliance software as well as Tyan System Operator^{TM} (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 Specifications.

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

The SMDC M3291 is equipped with the following features:

- Hardware Monitoring
- Protocol and Standard
- Auxiliary Communication Interface
- Auxiliary SMBus / I^{2}C buses
- Teamed with other IPMB Devices (PMCs and EMCs)
- Remote Monitor, Control and Diagnostics
- Remote Console Redirect over LAN
- Sensor Data Record
- System Event Log
- Field Replaceable Unit Information Storage
- Real Time Clock
- Upgrade BMC firmware
- "Always Ready"
- TYAN System Operator ™ (TSO)
- OEM Drivers
- Front Panel LED and Buzzer (Optional)

Appendix IV: PCI-X/PCI Bus

Thunder i7520 S5360
S5360 board has two onboard Intel 6700PXH 64-bit PCI Hubs. Each of Intel 6700PXH chip supports two independent 133 MHz PCI-X channels. Those two Intel 6700PXH chips are marked as "PXH-1" and "PXH-2" on Fig. AP4-1.

<u>Intel 6700PXH chip (PXH-1):</u>
- PCI-X Channel A Bus: Connected to TARO^{TM} SO-DIMM, PCIX1-P1 expansion slot and Intel 82546GB dual channel GbE controller.
- PCI-X Channel B Bus: Connected to PCIX1-S1 and PCIX1-S2 expansion slots

<u>Secondary Intel 6700PXH chip (PXH-2):</u>
- PCI-X Channel A Bus: Connected to PCIX2-P1 expansion slot
- PCI-X Channel B Bus: Connected to PCIX2-S1 expansion slot

<u>Expansion Slot Frequency:</u>
- PCI-E1: PCI-Express x8
- PCIX1-S1: PCI-X up to 133/100/66 MHz (Up to 100/66 MHz with a PCI-X card on PCIX1-S2 slot)
- PCIX1-S2: PCI-X up to 100/66 MHz
- PCIX1-P1: PCI-X up to 66 MHz
- PCIX2-S1: PCI-X up to 133/100/66 MHz
- PCIX2-P1: PCI-X up to 133/100/66 MHz
- PCI1: 32-bit PCI at 33 MHz
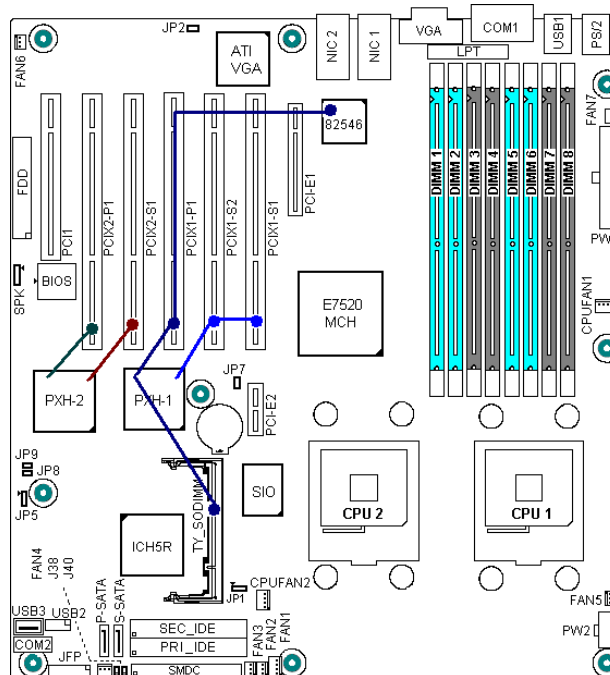
Fig. AP4-1: Thunder i7520 S5360 PCI-X/PCI Buses

Thunder i7520R S5360-1U
This board has one onboard Intel 6700PXH 64-bit PCI Hub, which supports two independent 133 MHz PCI-X channels. The Intel 6700PXH chip is marked as "PXH-1" on Fig. AP4-2.

Primary Intel 6700PXH chip (PXH-1):
- PCI-X Channel A Bus: Connected to TARO^{TM} SO-DIMM, ZCR and Intel 82546GB dual channel GbE controller.
- PCI-X Channel B Bus: Connected to PCIX1-S1 and PCIX1-S2 expansion slot expansion slots

Expansion Slot Frequency:
- PCIX1-S1: PCI-X up to 133/100/66 MHz (Up to 100/66 MHz with a PCI-X card on PCIX1-S2 slot)
- PCIX1-S2: PCI-X up to 100/66 MHz
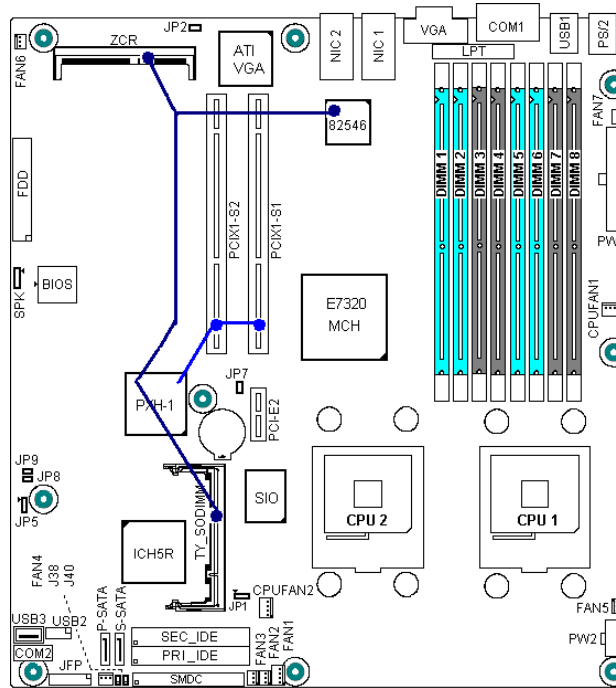
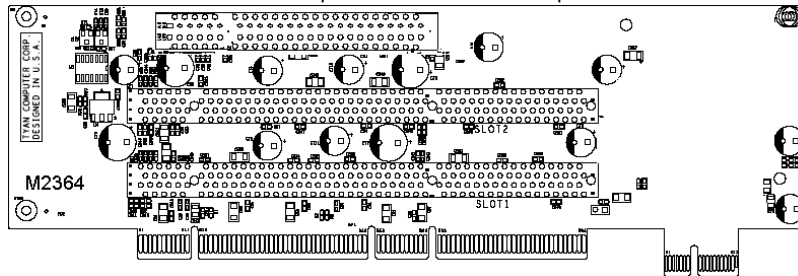Fig. AP4-2: Thunder i7520R S5360-1U PCI-X/PCI Buses

Appendix V: Riser Card Support
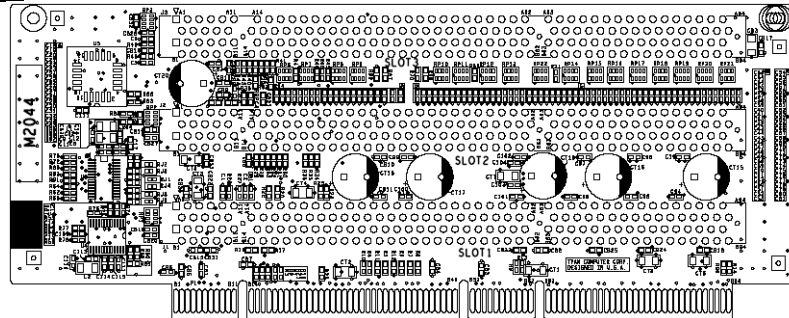
2U Riser Cards

M2360 ❑   Provides *three* PCI-X 133/100/66 MHz slots on independent PCI-X buses
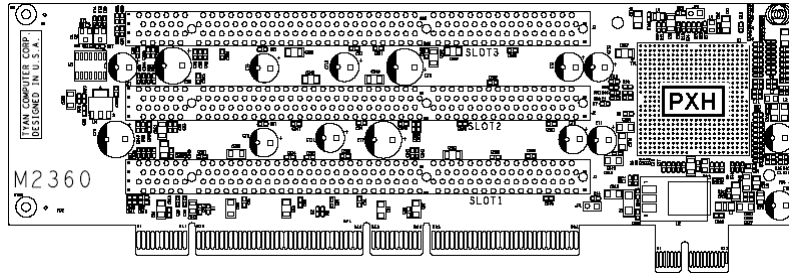
M2364 ❑   Provides *two* PCI-X 100/66 MHz slots on a PCI-X bus
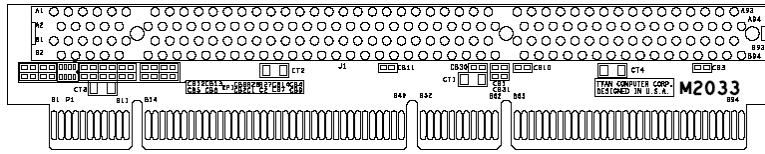   ❑   Provides *one* PCI-Express x8 slot with PCI-Express x4 lanes

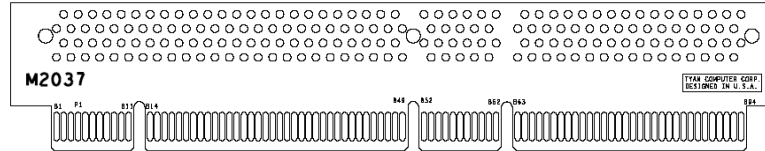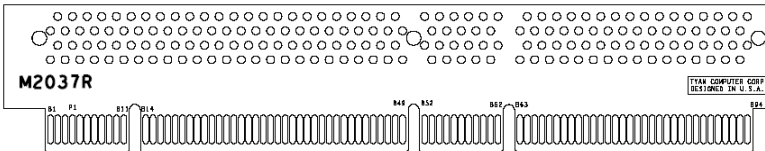**M2044** ❑   Provides *three* PCI-X slots on a PCI-X bus

1U Riser Cards

M2033   ❑   Universal card edge with one PCI-X/PCI slot (with 3.3 V key)

M2037   ❑   Universal card edge with one 64-bit PCI slot (with 5 V key)

M2037R   ❑   Universal card edge with one right-side 64-bit PCI slot (with 5 V key)

Technical Support

If a problem arises with your system, you should first turn to your dealer for direct support. Your system has most likely been configured or designed by them and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assitance for you. Furthermore, if you purchased your system from a dealer near you, take the system to them directly 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**) 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 softare 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**

Help Resources:

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

Returning Merchandise for Service

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

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

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

Operation is subject to the following conditions:

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

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

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

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

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

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