

Tyan S1867
Thunder 2500
(Preliminary)
Motherboard User's Manual
Revision 1.00

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chapter 1

Introduction

Overview

The Thunder 2500 is a quality, high performance motherboard designed for Intel Pentium II and Pentium III microprocessors. This motherboard utilizes the ServerWorks ServerSet III HE and can support CPU speeds of 450MHz through 933MHz and host bus speeds of 100MHz to 133MHz (please see Tyan's website for up-to-date CPU support information).

The motherboard, with built-in AGP Pro slot, provides high performance capabilities that are ideal for a wide range of demanding applications such as CAD, CAM, CAE, desktop publishing, 3D animation, and video production.

This integrated high-performance system board is supported in an Extended ATX form factor. Some of the features included are onboard UltraDMA support, onboard dual channel Ultra2 SCSI (optional Ultra3 SCSI with LSI Symbios 53C1010 chip), onboard Creative ES1373 Audio, onboard Intel Ethernet 82559 and onboard high speed I/O,

With I/O and drive controller support built onboard, the one AGP Pro slot, six PCI and one ISA slots (one shared, seven usable) are free for numerous add-on expansion cards.

Remember to visit TYAN Computer's web site at <http://www.tyan.com>. There you can find information on all of TYAN's products along with FAQs, distributors list, drivers, and BIOS setting explanations.

Icons

In order to help you navigate this manual and set up your system, we have added several icons to our format.



This icon alerts you to particularly important details regarding the setup or maintenance of your system. This icon often appears next to information that may keep you from damaging your board or system. While we will often point out the most vital paragraphs in a chapter, you should always read every word in the text. Failing to do so can lead to exasperation and expense.



Wherever possible, we have included step-by-step instructions for setting up your system, which are indicated by this icon. However, it is in your best interest to read an entire section (and perhaps the entire manual) before you begin to fiddle with your motherboard.



While we have alerted you to potential dangers in several places in the manual with this icon, these warnings should not be regarded as the whole of your safety regimen. Never forget that computers are electrical devices, and are capable of delivering a shock. Prevent damage to yourself and to your board: always ensure that your system is turned off and unplugged whenever you are working with it, and that you are equipped with a static safety device.

Hardware Specifications/Features

Processor Information

- Dual Intel Slot 1
- Pentium III 450 - 933 MHz
- Two on-board VRMs (VRM 8.4 spec)
- Front Side Bus Support for 100 / 133 Mhz

Expansion Slots

- One 2x / Pro AGP slot
- Four 64-bit/33 MHz PCI slots (5 Volt Only)
- Two 64-bit/66 MHz PCI slots
- One 16-bit ISA slot (shared w/ one PCI)
- One shared, seven usable slots

Chipset Information

- ServerWorks ServerSet III HE 4-chip solution
- SMC 37B787 Super I/O chipset

System Management

(**not verified at time of print please see website for updates.)

- 2-pin Chassis Intrusion header
- Temperature and voltage monitoring
- 3-pin Wake on LAN header
- 3-pin Wake on Ring header

Main Memory

- Eight 168-pin Registered DIMM sockets
- Up to 8.0 GB PC100 / PC133 compliant Registered SDRAM
- Supports ECC (72bit) memory modules

Integrated Ultra2 or Ultra 160 SCSI (Optional)

- Dual Channel Ultra2 LVD SCSI Support
 - LSI Symbios SYM53C896 controller
 - 80MB/s transfer rate per channel
 - Allows up to 30 LVD SCSI devices
 - Channel A: One 68-pin connector
 - Channel B: One 68-pin connector
- Dual Channel Ultra3 LVD SCSI Support
 - LSI Symbios SYM53C1010 controller
 - 160MB/s transfer rate per channel
 - Allows up to 30 LVD SCSI devices
 - Channel A: One 68-pin connector
 - Channel B: One 68-pin connector
- A dedicated PCI slot available to support low-cost, intelligent RAID controller, RAID 0, 1 and 5 (SymBIOS 53C896 only)

Integrated LAN Controller (Optional)

- Intel 82559 LAN controller
- 3-pin Wake on LAN header**
- Optional Alert on LAN II support**

Intergated Audio (Optional)

- Creative Labs PCI ES1373 sound
- AC'97 CODEC
- Line-in, Line-out, Mic and Game/MIDI ports
- 4-pin CD-ROM audio header (ATAPI)
- 4-pin Video-IN header (ATAPI)
- 4-pin MPEG-IN header (ATAPI)

BIOS Information

- Pheonix BIOS on 2Mb Flash
- Auto configuration of IDE hard disk types
- Multiple boot options
- DMI 2.0 / PC99 compliant

Disk Drive & System I/O

- Two PCI bus mastering EIDE channels
- Supports EIDE CD-ROMs
- PIO Mode 3 & 4 (up to 16.6 MB/sec DTR)
- UltraDMA mastering mode support
- Support for one floppy drive (Mode 1.44MB supported)
- Two serial ports (16550 UARTs)
- One ECP/EPP parallel port
- Two USB rev 1.1 ports
- One PS/2 mouse port
- One PS/2 keyboard port

Physical Dimensions

- Extended ATX footprint (12" x 13")
- Eight layer board
- Two 20-pin ATX power connectors
- Stacked Mouse/Keyboard ports
- Stacked (2) USB/RJ-45 with LED ports
- Stacked Line-In/Line-Out/Mic-In/MIDI ports

Software Specifications

OS

- Operates with Windows 98/ SE, Windows NT 4.0, Windows 2000, Red Hat 6.0/6.1, Novell Netware, and SCO Unix.

* See TYAN website for CPU Compatibility List

**NOT verified at time of print, please see website for updates.

Technical Support

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

Help resources:

1. See FAQ and beep codes sections of this manual.
2. See Tyan web site for FAQ, bulletins, driver updates, etc.
<http://www.tyan.com>
3. Contact your dealer or distributor 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.

For Resellers Only:

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You can 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, or hand-carried to the manufacturer. TYAN will pay to have the board shipped back to you.

chapter 2

Board Installation

Unpacking

The retail motherboard package should contain the following:

- S1867 motherboard
- One IDE and floppy cable pack
- User's manual
- One 3-head Ultra2 SCSI cable w/ terminator (cables with 4 heads or longer must be ordered separately)
- One 3-head regular SCSI cable
- Two CPU retention modules
- One ATX I/O Shield
- One System Management & Driver CD; includes complete drivers for SCSI, LAN and audio controllers
- One Driver Diskette for LSI Symbios 53C896 or 53C1010
- One Slot 1 Terminator Card.

Installation

You are now ready to install your motherboard. The mounting hole pattern of the Thunder 2500 matches the Extended ATX system board specifications. Your chassis should be that of an Extended ATX motherboard form factor.

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

What's the first thing I should do?

The first thing you should do is read this user's manual. It contains important information which will make configuration and setup much easier.

Here are some precautions you should follow when installing your motherboard:



- (1) **Ground yourself properly before removing your motherboard from the antistatic bag.** Unplug the power from your computer and then touch any metal part on the computer case. (Or wear a grounded wrist strap.)
- (2) **Hold the motherboard by its edges and do not touch the bottom of the board.**
- (3) **Avoid touching motherboard components, IC chips, connectors, and leads.**
- (4) **Avoid touching pins of memory modules and chips.**
- (5) **Place motherboard on a grounded antistatic surface or on the antistatic bag.**

Having reviewed the precautions above, the next step is to take the motherboard out of the cardboard box and static bag, hold it by its edges, and place it on a grounded antistatic surface, component side up. Inspect the board for damage.



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

Press down on any of the socket ICs if it appears that they are not properly seated (the board should still be on an antistatic mat). Do not touch the bottom of the board. Remember, don't take any electronic device out of its protective bag until you are ready to actually install it into the computer case. If you do not ground yourself, you risk zapping the motherboard or adapter card. Subsequent problems may not arise immediately because electrostatic discharge damage, unlike physical damage, causes the device to fail over time.

***Power Supply Requirement: ATX Power Supply should be 2.01 compliant. Standby current must be 750mA or higher (SB5V = 0.75A)**

Installation Steps



1. Set Jumpers / Dip Switch
2. Mount Motherboard in Chassis
3. Install Memory
4. Install CPU & Cooling Fan
5. Connect IDE and Floppy Drives
6. Install Add-on Cards
7. Connect PS/2, USB, Serial and Parallel Devices
8. Connect Power Supply

Quick References for Jumpers

In this manual, the terms “closed” and “on” are used when referring to jumpers (or jumper pins) that are active; “open” and “off” are used when referring to jumpers (or jumper pins) that are inactive. See the **Figure 2-1** for examples of “on” and “off” pins and jumpers. The square pin in the diagram is Pin 1.

Jumpers and pins are connected by slipping the blue plastic jumper connector overtop of two adjacent jumper pins (indicated by **1-2** or **2-3**). The metal rod

inside the plastic shell bridges the gap between the two pins, completing the circuit. See **Figure 2-2** for more examples of pin connections.

The tables and maps on the following pages will help you set the jumpers for CPU speed, Infrared, and external connector pin assignments, among others. The miniature motherboard maps will help you locate the jumpers on your board. A full-page map of the motherboard can be found on the next two pages.

2 pin jumpers

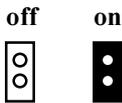


Figure 2-1

3 (or more) pin jumpers

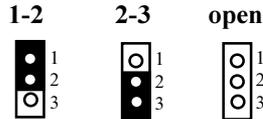
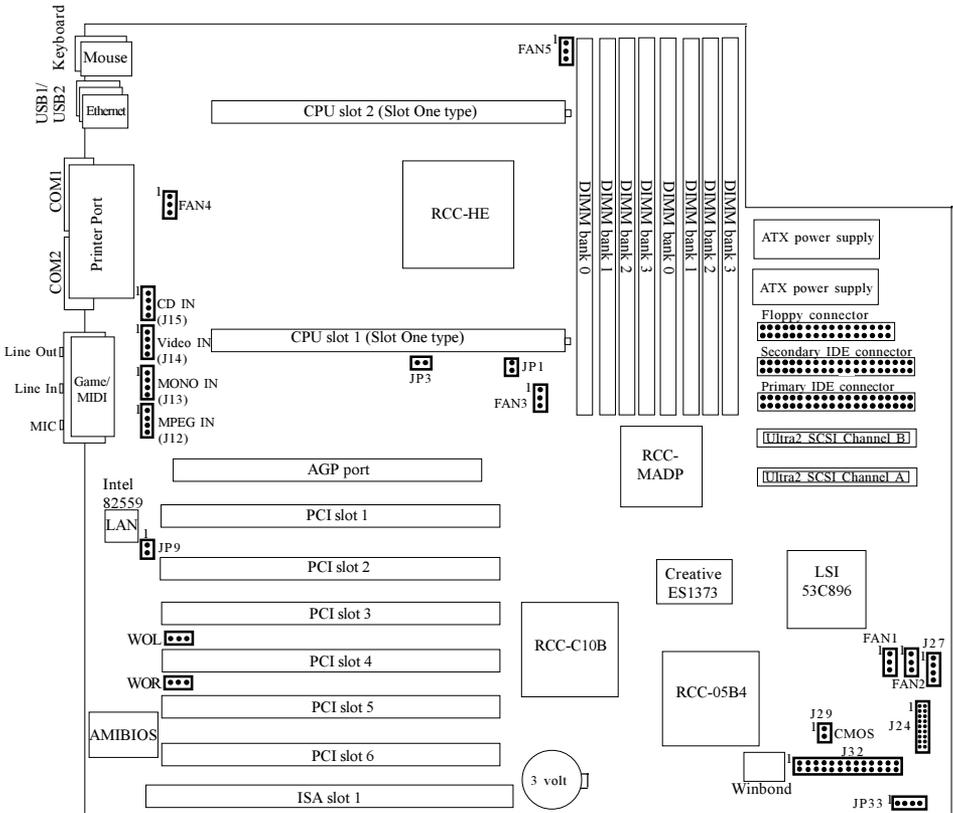


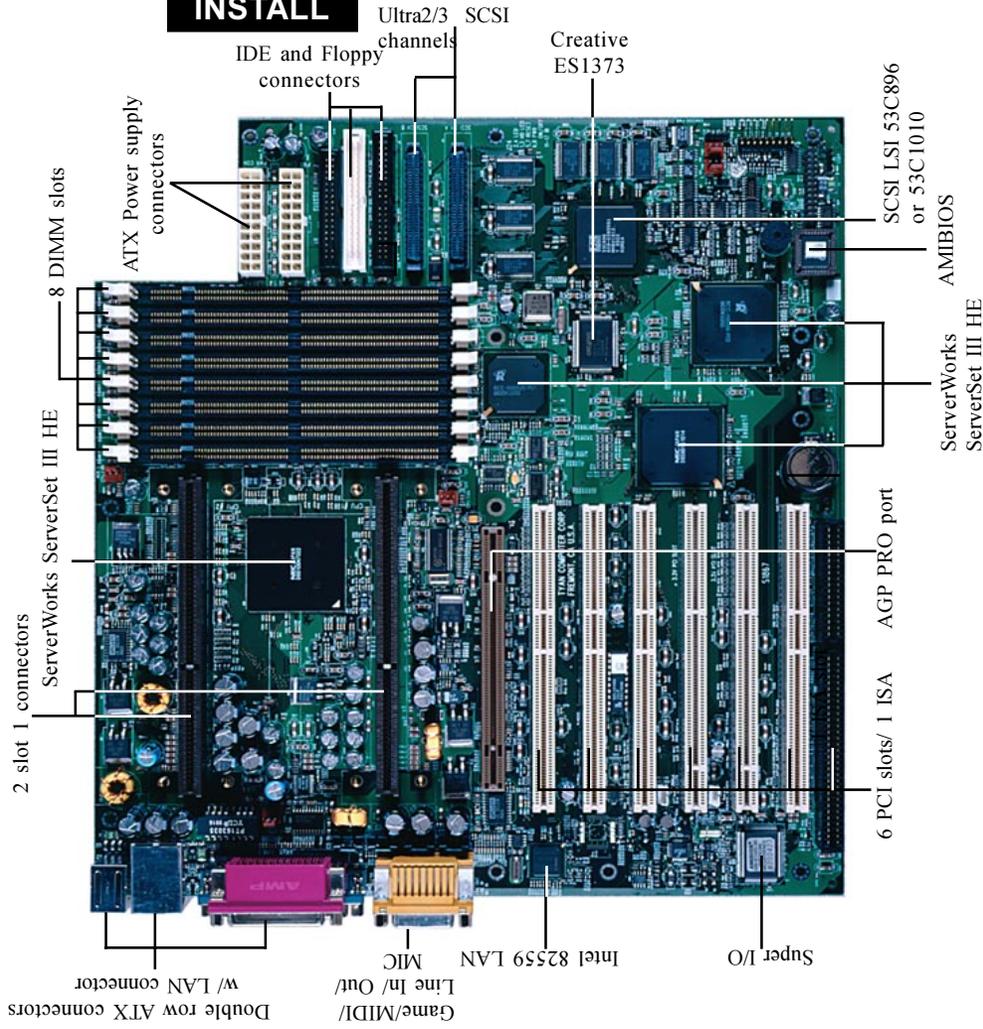
Figure 2-2

Map of Motherboard Jumpers



The tiny “1”s next to jumpers of 3 pins or more indicate the position of pin 1 for that jumper.

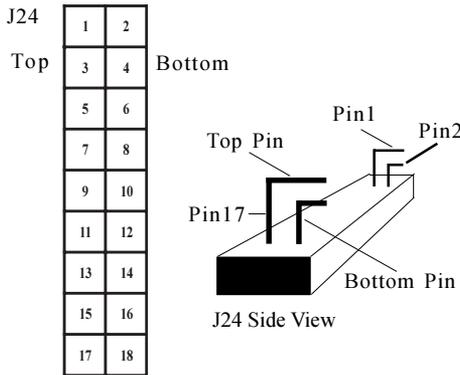
INSTALL



1. Setting Jumpers

1-A. Front Panel Assignment (Jumper J24)

VCC	1	2	Power LED
HDD LED	3	4	Sleep LED
Ground	5	6	Power On/Off
Reset	7	8	Ground
VCC	9	10	No Connect
IR Receive	11	12	VCC
Ground	13	14	No Connect
IR Transmit	15	16	VCC
No Connect	17	18	No Connect



*Power LED: For 2-pin: bicolor/single color LED - Use pins 2-4
For 3-pin: bicolor LED - Use Jumper J7

1-B. Front Side Bus Speed Select (Jumper JP1)

	100 MHz	100/133 MHz
JP1	Closed	Open

Jumper JP1 selects the Front Side Bus speed. When JP1 is closed, the FSB will run at 100 MHz only. Open jumper JP1 to allow both 133MHz and 100 MHz FSB support.

1-C. Spread Spectrum Enable/Disable (JP3)

	Enabled	Disabled
JP3	Closed	Open

This jumper Enables/Disables the Spread Spectrum setting. With this setting enabled, it reduces the amount of EMI emitted.

1-D. Reset CPU Speed and Safe Mode (Jumper J29)

	Default	Reset
J29	Open	Closed

If you have been locked out of your system because you forgot your password or set the CMOS incorrectly, follow the instructions below.

1. Power off the system
2. Close Jumper J29 (see page 12 for location of J29)
3. Power on the system, wait for at least 3 seconds, then power down
4. Open Jumper J29, then power on the system again.

By following this procedure, you will erase your password and reset CPU Speed.

1-E. Speaker Connector (Jumper J27)

The speaker should be connected to Jumper J27. As default, Jumper J27 closes pin 1 and 2 for use with the internal buzzer. Remove the jumper on pin 1 and 2 to connect an external buzzer. The external buzzer must be a 4-pin header connecting to J27 from pin1 through pin 4.

1-F. Wake-On Ring Connector (CON6)*

Pin	1	2	3
	+5 VSB	Ground	WOR

* WOR connector at the time of print has not been tested.

1-G. Wake-On LAN Connector (CON5)*

Pin	1	2	3
	5VSB	Ground	WOL

1-H. Server Management Connector (J32)*

The EXTSMI (External System Management Interface) connector, jumper J38, is used by some plug-in cards. Certain applications associated with these plug-in cards use the interface for hardware control and queries.

*NOT verified at time of print, please see website for updates.

1-J. Fan1, Fan2, Fan3, Fan4, Fan5 - Pinout

- Fan3 connector corresponds to CPU 1 slot.
- Fan4 connector corresponds to CPU 2 slot.
- Fan1 / Fan2 are Chassis Fans
- Fan5 is an Auxhiliary CPU fan header

Note: With Intel’s LANdesk system monitoring software, only **two** fans can be monitored at one time.

When using Intel’s LANdesk system management software, you may monitor the status of the CPU Fans by connecting them to the **Fan3** and/or **Fan4** connectors. You will NOT be able to monitor your CPU fan with the other Fan connectors.

1-L. Audio Connectors (J12, J13, J14, J15)

There are four black 4-pin connectors onboard which are used for various peripherals’ audio signals. The digital signal that comes in through these connectors is directed through the Ensoniq 1373 PCI sound Chip, and the digital signal is turned into an audio signal which goes out through the speaker. The MPEG connector (J12) is for DVD cards, the Mono connector (J13) is for Auxhiliary audio inputs; the Video connector (J14) is for TV cards and the CD-IN connector (J15) is for CD-ROMs.

1-M Enable/Disable LAN (JP9)

This jumper allows you to enable the onboard LAN function. Default is enabled (open).

	Enable	Disable
JP9	Open	Closed

1-N. Frontside USB Header (J33)*

Certain computer chassis allow for a front-end USB port connection. Therefore, this board provides a front side USB header should you decide to set up a USB connector at the front side of your computer.

Note: If you use J33, you will be unable to use the TOP USB port at the back of the motherboard. Both J33 and USB1 share the same channel.



important!

Hardware Reset Switch Connector Installation

The Reset switch on your case’s display panel provides you with the Hardware Reset function, which is the same as power on/off. The system will do a cold start after the Reset button is pushed.

CMOS RTC

The Real Time Clock (RTC) circuit, which provides the date and time for the system is integrated into the ServerWorks ServerSet III HE chipset. If the external battery for the RTC is low, you will most likely lose your BIOS settings. Normally the life span of an external battery is 2 years. If yours is running low, you will need to replace it with a new 3V lithium battery (CR2032).

***NOT verified at time of print, please see website for updates.**

Flash EEPROM

The Thunder 2500 uses flash memory to store BIOS firmware. It can be updated as new versions of the BIOS become available. You can upgrade your BIOS easily using the flash utility (see page 56).

2. Mounting the Motherboard in the Chassis

Follow the instructions provided by the case manufacturer for proper installation guidelines. TYAN recommends that you make use of all mounting holes to screw down the motherboard. The adapter cards and the screws holding them down will keep your board flat. The fastening screw should not short any of the traces on the motherboard. Make certain that you do not overtighten the screw, as it will damage the motherboard and possibly break internal traces in the surrounding area. The hole you should use is located at the top-center of the board where the adapter cards are fastened to the case.

3. Installing Memory

Since TYAN boards are manufactured with performance in mind, you should use add-in components that match. Some DIMM modules may seem to be high quality because of name or feel but that does not guarantee real-world usability. Some cheaper or OEM memory may have brand-name components, but they may contain inferior or substandard parts which do not meet the critical tolerances our products require. Because of this, your memory may not work correctly in a TYAN board though it may work well in a competitor's board. This is because many of our competitors do not adhere to the strict tolerances required for high performance. If you buy a TYAN board, you are getting the best system available. To make installation easy and trouble free, get high quality parts. For a list of recommended memory vendors, please visit Tyan's website at www.tyan.com - go to the "Memory Support" area in the Support Section. The website memory compatibility lists include DIMMs that have proven to be very stable on our boards and perform extremely well.

ATTENTION! ONLY REGISTERED DIMMs MAY BE USED ON THUNDER 2500

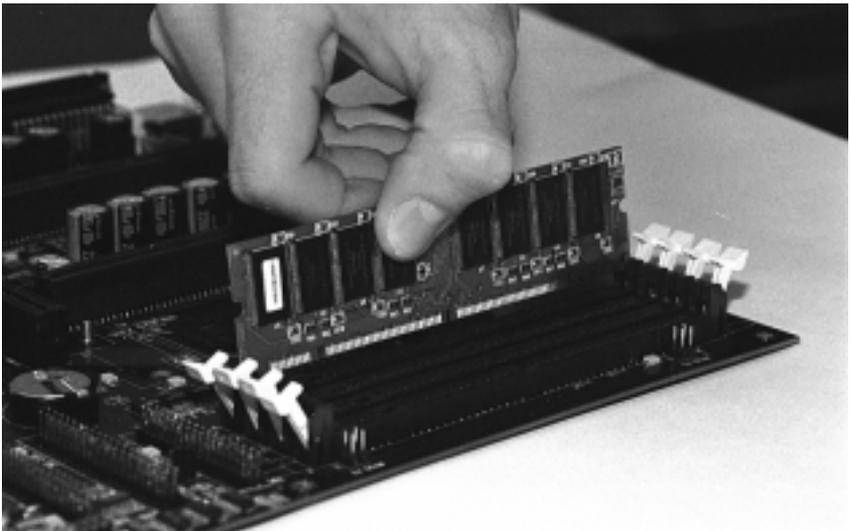


Figure 2-3

To install your DIMMs, line your module up so that the pins fit into the slot. There is only one way that your DIMM can fit properly. Make sure that the short row of pins is lined up with the short gap in the DIMM slot. Figure 2-3 to the previous page shows how to sit the DIMM into its slot. To insert the DIMM, push down vertically on the module with even force, as shown in the photo. Do not shove one end in first; doing so will bend the DIMM pins.

To lock the DIMM into place, push the plastic clips on either end of the slot onto the notches at the ends of the DIMM (see Figure 2-4 below). In some cases, pushing the memory module into the DIMM slot will move the plastic clips inward, automatically locking the module into place. To remove your DIMM, simply pull the clips back, and pull up on the module.

Place the DIMMs in an antistatic bag as soon as you remove them to avoid static damage.

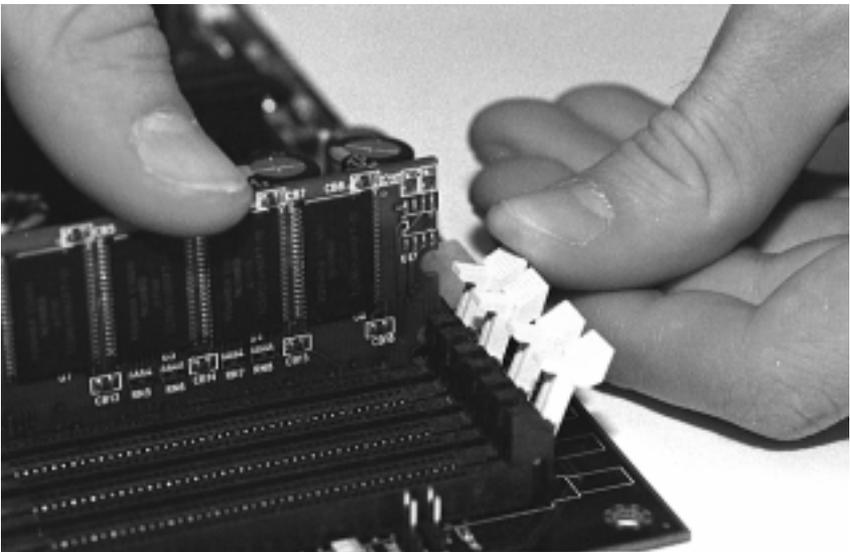


Figure 2-4

The Thunder 2500 uses a 64-bit data path from memory to CPU and can accommodate up to 8 GB of SDRAM. The 168-pin DIMMs (Dual In-line Memory Modules) must be of the 3.3V, **buffered** variety. The position of the notch in the SDRAM key position will tell you whether or not a DIMM is buffered (see the Figure 2-5 on the following page). All installed memory will be automatically detected, so there is no need to set any jumpers.

ATTENTION! ONLY REGISTERED DIMMs MAY BE USED ON THUNDER 2500



important!

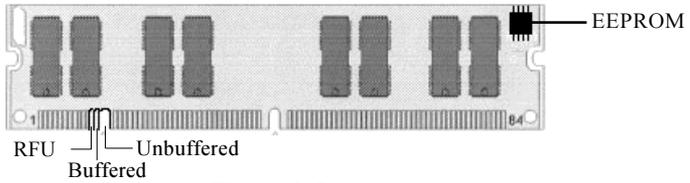


Figure 2-5a

Some details of memory installation:

- The mainboard supports registered 64MB, 128MB, 256MB, 512MB memory modules; and supports 1024MB **registered** SDRAM DIMM modules.
- PC100 / PC133 DIMMs may be used
- The board supports registered memory chips **ONLY**. DO NOT mix registered and non-registered memory chips on the motherboard. Memory modules must be of the same brand and variety. DO NOT use different memory modules at the same time.



Attention: Due to specific memory population, the DIMM modules must be inserted as pairs. In order for the board to Post please install the DIMMs in the combination shown below. All DIMM modules must be the same size and they must be Registered DIMMs. See table below and Figure 2-5b for details.

No. of DIMMS	DIMM BANK combination
2	0 and 0
4	0 and 0, 1 and 1
6	0 and 0, 1 and 1, 2 and 2
8	0 and 0, 1 and 1, 2 and 2, 3 and 3

See www.tyan.com for latest memory compatibility information.

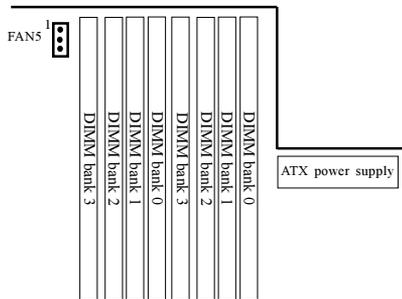


Figure 2-5b

4. Installing the CPU and Cooling Fan

Pentium II or Pentium III processors can be used on the Thunder 2500. Please refer to pages 14-17 for the correct CPU jumper settings for your board. Remember:

- The CPU is a sensitive electronic component and it can easily be damaged by static electricity. Do not touch the CPU pins with your fingers.
- Before the CPU is installed, the motherboard must be placed on a flat surface. You should be able to insert the CPU with minimal, but firm pressure. Do not press down hard on the CPU.

With CPUs reaching much higher clock frequencies, much more efficient cooling methods must be used to prevent the CPU from overheating. The cooling fan is an important component that is commonly neglected. Currently, one type of cooling mechanism is produced for Pentium II / III processors. The active cooler is equipped with a cooling fan and heatsink, allowing better air flow as well as heat dissipation for the CPU. (See Figure 2-6 below) The type of cooler used has no effect on performance, as long as the CPU fan is properly connected to the CPU fan header on the motherboard.



Figure 2-6

Figure 2-7 below shows an overhead view of the retention braces positioned at both ends of the CPU slot. Be sure to tighten the retention brace screws to secure them onto the motherboard. The terminator card must be inserted into the vacant slot if only one CPU is used.

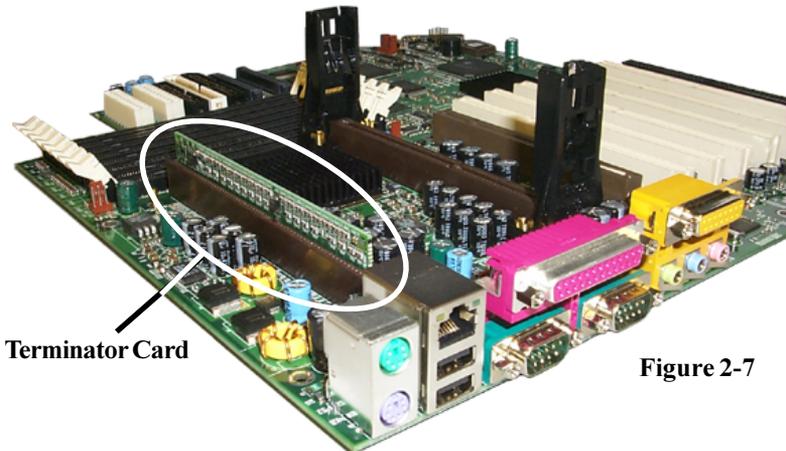


Figure 2-7



Figure 2-8

Carefully line up the pins of the CPU with the pins of the slot while placing the CPU between the two retention braces (the CPU cooling fan should face away from the PCI slots). Lower the CPU onto the motherboard (see Figure 2-8 above). Your CPU will be firmly secured onto the motherboard once the retention braces “snap” into the sides of the CPU. The installed CPU should look like Figure 2-9 below. Take the overhead clip (See Figure 2-10 on the right) and insert the ends of the clip over the top of the side braces. You will hear a ‘click’ when the overhead clip is fitted securely into the side braces. Finally, connect the CPU fan connector to the CPU fan header on the motherboard, please see page 16 for details regarding the appropriate header for the CPU fan.



Figure 2-9

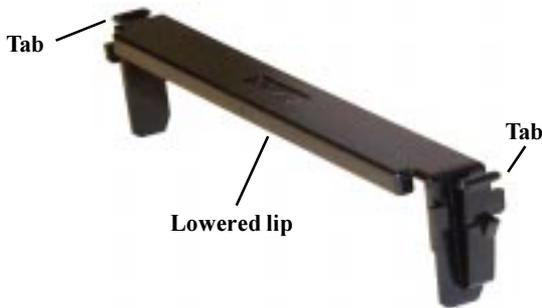


Figure 2-10

Make sure the lowered lip of the overhead clip is oriented away from the CPU fan (see Figure 2-11 below).



Figure 2-11

Removing CPU

Removal of the CPU is basically the reverse order of the installation steps. First remove the overhead clip. You need to push BOTH side tabs (see Figure 2-10 above) inwards in the order to unlock it from the side braces. After the overhead clip is removed, remove the CPU by gently bending the sides of the retention brace away from the CPU and slowly pulling the CPU upwards. This may require careful firm tugs to pull the CPU out of its slot.

5. Connecting IDE and Floppy Drives

The colored stripe on a ribbon cable should face toward the battery on the motherboard. In Figure 2-12 below, you can see how the IDE cables should look when they are connected to your hard drive. Notice how Pin 1 (denoted by a red stripe) is connected so that it is next to the power connector of the drive. The primary IDE connector is black; the secondary IDE connector is white. If you are using a UDMA/66 cable, the blue end must connect to the motherboard

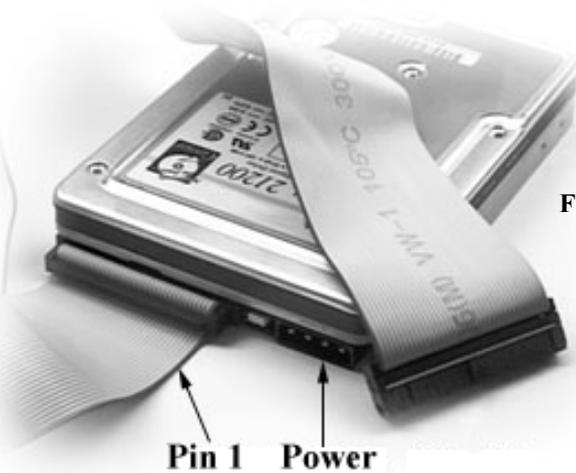


Figure 2-12

In most cases, this is the proper way of connecting your IDE cable to hard drive. Figure 2-13 on the following page shows the IDE cable properly connected to the motherboard. Contact your hard disk drive manufacturer or documentation for more information.

Some symptoms of incorrectly installed HDDs are:

- Hard disk drives are not auto-detected: may be a Master / Slave problem or a bad IDE cable. Contact your vendor.
- Hard Disk Drive Fail message at bootup: may be a bad cable or lack of power going to the drive.
- No video or beeps on bootup: usually means the cable is on backwards.
- Hard drive lights are constantly on: bad IDE cable or defective drives/mother board. Try another HDD.
- Hard drives do not power up: check power cables and cabling. May also be a bad power supply or IDE drive.

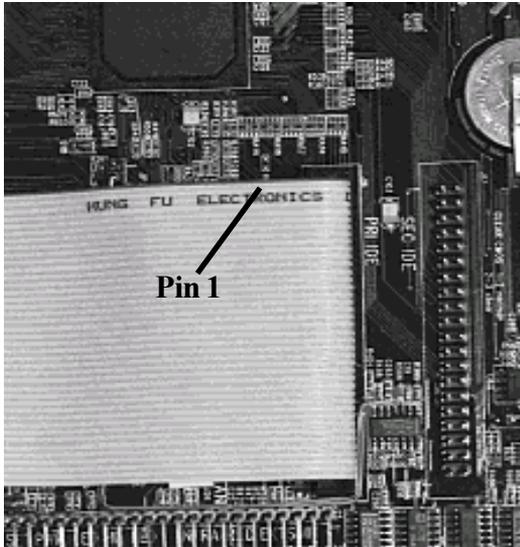


Figure 2-13

Connecting Floppy Drives

Pin 1 on the floppy cable is usually denoted by a red or colored stripe down one side of the cable (see Figure 2-14 below). Most of the current floppy drives on the market require that the colored stripe be positioned so that it is right next to the power connector. In most cases, there will be a key pin on the cable which will force you to connect the cable properly.

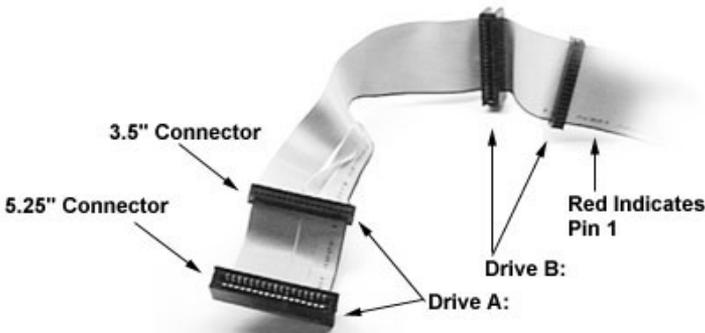


Figure 2-14

Drive A: is usually attached to the end of the cable with the twist in it. Drive B: is usually connected to the middle of the cable. Refer to your installation instructions or call your dealer if you are unsure about attaching floppy drives. Refer to Figure 2-14 for a detailed anatomy of the floppy cable. Remember, you can only have 2 floppy drives connected at any given time.

The color stripe on the cable should face toward the top of your chassis, or toward the big white B printed on the motherboard. Please refer to your documentation for proper installation.

Some symptoms of incorrectly installed floppies are:

- Floppy drives are not detected: usually caused by faulty cables, backward cables, or a bad floppy or motherboard. Try another single floppy drive to verify the problem or try another cable. Also, check to see if the onboard floppy is enabled in the BIOS.
- Floppy Drive Fail message at bootup: the cable, floppy, or motherboard may be faulty. Try another cable or floppy drive to verify.
- Light on the floppy is on constantly: a dead giveaway that the cable is on backwards. Reverse the cable at the motherboard end and try again.

6. Installing Add-on Cards

There are certain rules you need to follow when plugging in a card. In order to assure proper operation and a quick installation, adhere to these guidelines:

- If you are going to install a PCI-Bus interface card on your system, be aware that any one of the PCI slots can support a Master or Slave device.
- NEVER force a card into a slot. If it doesn't fit, look at the socket on the computer to make sure there are no wires or other obstructions to the slot.
- NEVER plug an ISA card into a PCI slot or a PCI card in an ISA slot. You will void your warranty and damage your system board if you do this.
- When plugging the card in, especially when installing long cards, try to push the entire card in at one time. Don't force one end of the card into the socket first and then the other. This will create a rocking motion between the card and the slot and it will damage the pins within the socket.
- Make sure that the cards are seated securely into the slots.
- Before turning on the system, make sure no cards are touching.

If you follow these basic guidelines, there shouldn't be any problems with installation. However, if you do encounter any problems, have a qualified professional install your cards for you or contact your card manufacturer.



important!



Remember, always read the manuals and installation notes that come with the adapter cards. They contain important information which will help you install the components right, the first time.

7. Connecting PS/2, USB, Serial & Parallel Devices

This board includes ports for USB, PS/2 mouse, and PS/2 keyboard devices. Note that, for this board, the PS/2 mouse port is the upper PS/2 port, and the PS/2 keyboard port is the lower PS/2 port.

The PS/2 connectors are probably quite familiar to you. The USB connectors, however, may be foreign. The USB (Universal Serial Bus) is 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.

Connecting Com and Printer Ports

Warning: When plugging in your keyboard and mouse, or when plugging anything into a serial or Com port, make sure that the power is off. Connecting these devices and ports while the power is on is called “hot plugging,” and may damage your system.

Figure 2-15 below shows the ATX double row connectors on this board. The Com and Printer ports, as well as the other ports, are labeled.

Note: Only TYAN cables will work on this motherboard. If you are using an existing case with old cables, your system will not function properly. Use only TYAN-approved cables.

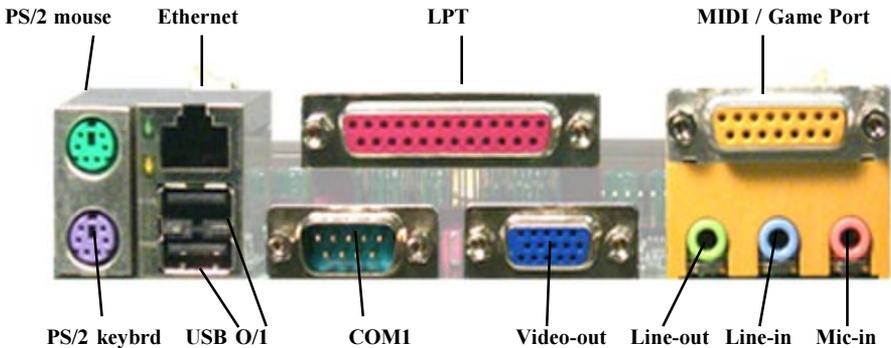


Figure 2-15

8. Connecting the Power Supply

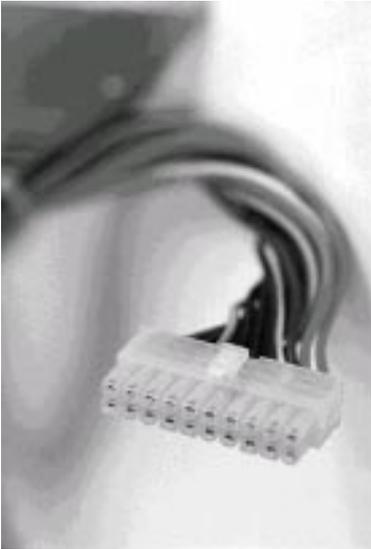


Figure 2-16

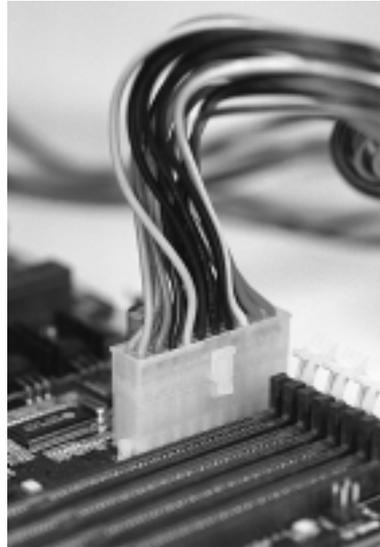


Figure 2-17

Tyan recommends using an ATX power supply that conforms to industry standard revision 2.01. The Thunder 2500 motherboard comes equipped with two onboard power connectors. Figure 2-16 above shows an ATX power connector. When plugging in the power connector, make sure that the plastic clip on the power connector is aligned with the plastic tab on the onboard connector (see Figure 2-17 above).

Make certain that you do not miss any pins because if you do, you will void your warranty and cause damage to yourself or your motherboard when you turn the system on. After connecting the power, make sure the connector is seated firmly into its socket so it will not become loose or fall off when the computer is jostled or moved. **NOTE: When installing your power supply, make sure the power supply switch is turned 'Off'. You may turn the switch back 'On' once you've finished building your system.**



You are done!

Other than checking the jumper settings and cable connections and putting the case back on, you are done. Installing a new motherboard may sound difficult, but by following these directions, you should have a fairly uneventful time installing our products. If you do encounter problems, your dealer will be able to help you, or you can consult one of our many technical support resources (see page 8).

*NOT verified at time of print, please see website for updates.

Intel Ethernet Setup and Use

The Thunder 2500 S1867 has the Intel 82559 10/100 Ethernet chip onboard, which makes setting up your Ethernet connection quite simple. The following installation and configuration instructions are courtesy of Intel, and the copyright on the information belongs to Intel Corporation. For more information, data sheets, white papers, or demos, visit their networking web site at <http://www.intel.com/network>.

You can use your modem or Internet connection to download drivers, troubleshooting tips, and more. When downloading new drivers, make sure the archive is for the PRO/100+ adapter (not PRO/100). This information can be found on Intel's website, as well as their FTP site and BBS service. You may find the driver in Tyan's CD.

Connect the Network Cable.

Connect a single network cable to the PRO/100+ adapter. The cable will only fit one way. For 100BASE-TX, your network cable must be category 5, twisted-pair wiring. If you plan on running the adapter at 100 Mbps, it must be connected to a 100BASE-TX hub (not a 100BASE-T4 hub). For 10BASE-T, use category 3, 4, or 5 twisted-pair wiring.

100BASE-T Wiring: Twisted Pair Ethernet (TPE). Use category 5 cable and RJ-45 connector for this adapter. Do not use category 3 wiring at 100 Mbps. At 100 Mbps, connect to a TX hub, not a T4 hub. Note: For more information on 100BASE-T wiring requirements and limitations, see "Fast Ethernet Wiring" in this guide and refer to the README files on the installation disk.

To configure the adapter, continue with the procedures specific to your operating system on the pages which follow.

Enable Wake-on LAN Power Jumper (JP34) - For Add-on Ethernet Cards only*

In order for the Wake On LAN (WOL) feature to work correctly, the adapter must be connected to a continuous power source. This allows the PRO/100+ adapter to "listen to" the network even when the computer is turned off. The WOL power connector (CON6) is enabled when the jumper is connected or closed (ON). **Warning: As always, turn off and unplug power to the computer before setting the WOL jumper.** The WOL connector on your motherboard is live when the computer is plugged in to a power outlet. Failure to do so could damage the adapter or computer. Also, be sure that your ATX power supply is 2.01 compliant or better. This level of quality is required because WOL requires 800 mAmps of 5V standby current. Due to power supply requirements, the ethernet add-on card must have the Intel 82559 Chip for wake-up.



Using Wake-on LAN*

In order to use the onboard LAN wake-up feature, you must enable the "LAN Wake-up for Onboard LAN" option in the Power Management Setup of the BIOS. The Wake-on LAN feature operates according to a published specification. In simple terms, the specification

allows designers to build network adapters that are capable of “listening to” network activity even when the computer is turned off. WOL adapters have a special low power standby mode that is active when the rest of the computer is without power. The adapter will respond to a special “wake-up” packet sent by another computer or network device. Typically this wake-up packet causes the adapter to signal the computer to power up and run a predefined program.

The wake up packet structure and behavior is defined in the WOL specification, available from the website at <http://www.us.pc.ibm.com/infobrf/iblan.html>. See the “Troubleshooting” section on page 38 for Wake-on LAN troubleshooting tips.

Configuration and Drivers

The Ethernet driver can not be installed directly from the Tyan Driver CD. Before installing the Intel 82559 Ethernet drivers, the complete LAN 82559 directory and all its contents must first be copied from the Tyan Driver CD onto your hard drive. The 82559 driver can then be installed from your hard drive. Make sure that you are following the proper instructions for your operating system (e.g. if you are using Windows 95 or 98, do not follow the Windows NT instructions).

DOS Setup for Novell NetWare Clients

Automatic configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The Intel 82559-based Integrated Fast Ethernet For WfM adapter IRQ level and I/O memory address are automatically set by the BIOS each time you start your computer.

Start your computer to automatically configure the adapter. Configuration is complete when the DOS prompt appears. You can now continue with the procedure below.

Run Setup to install network drivers

Setup can automatically install NetWare DOS ODI client drivers for you or display a README file with installation instructions for other NOS drivers.



1. If your computer already has network drivers installed, restart the computer without loading them. If the drivers are loaded from the AUTOEXEC.BAT or CONFIG.SYS file, type REM in front of each line that loads a network driver. Or, with DOS 6.x or later press 5 as DOS starts, to bypass the drivers.
2. Insert the Intel Configuration and Drivers floppy/CD in a drive, switch to the appropriate drive/directory, and at the DOS prompt, type SETUP.
3. If you have more than one Intel PRO series PCI adapter in your computer, an adapter selection menu appears on the screen. Select the adapter you want by noting the Ethernet address. See “Installing Multiple Adapters” for more information.
4. Select Automatic Setup from the Main menu. Then follow the instructions on the screen. (If you want to test the adapter with a responder on the network, see the next procedure.) Setup displays the adapter’s configuration, then runs a series of diagnostic tests that makes sure the adapter and network are functioning properly. If Setup finds a problem, it displays the results and some possible solutions.

5. When Setup finishes the tests, you'll see the Install Network Drivers screen.
6. Select the driver you want to install. Setup can install a NetWare client driver for you. If you're installing other drivers, Setup displays a README file with installation instructions. If you can't connect to a server, first try the suggestions here, then turn to the "Troubleshooting" section on page 36.
 - Make sure you're using the drivers for this adapter. The driver filename contains the letter B (for example, E100BODI.COM).
 - If you're replacing an existing adapter, make sure the LINK statement in your NET.CFG is correct for the new adapter. For example, the LINK statement for a NetWare client should be: LINK DRIVER E100BODI
 - Verify that the frame type in your NET.CFG file matches your network.
 - If setting up a server, check your LOAD and BIND statements.
 - Test the adapter by running diagnostics in Setup. Additional testing is available by using a responder (see next page).
 - Check the README files.

Responder testing on the network (optional)

Setup can test the adapter more thoroughly if you have a responder on the network while running the tests.

1. Go to a computer on the network with any EtherExpress adapter installed (except EtherExpress 32 or EtherExpress 16 MCA).
2. Run the appropriate configuration program for the installed adapter and set it up as a responder.
3. Return to the computer with the new adapter. Run Setup and make the new adapter a sender. Test the adapter.

Windows NT Server or Workstation

Automatic configuration

PCI computers automatically detect and configure PCI-compliant adapters while booting. The Intel 82559-based Integrated Fast Ethernet For WfM adapter IRQ level and I/O address are automatically set by the BIOS each time you start your computer. Start your computer to automatically configure the adapter. Configuration is complete when Windows NT starts or the DOS prompt appears.

Install network drivers - Windows NT Version 4.0 only

We recommend that you install the network drivers for the onboard Intel 82559 network adapter after NT has been installed. In other words, do not let NT auto-detect the onboard network card during the installation. The following steps will guide you through the installation procedure. You will need to have the Tyan driver CD and the NT 4.0 CD for this procedure.



1. Boot NT 4.0
2. Get the Tyan Driver CD and copy the Intel LAN drivers to a directory on your hard disk drive.
3. Double-click the Network icon in the Control Panel
4. Click the Adapters tab in the window that appears.
5. Click Add. A list of adapters appears.
6. Select the "Have Disk" icon and point it to the directory that you created on your hard drive in step 2.
7. You will see "Intel PRO PCI Adapter". Click OK.
8. Follow the NT prompts to complete the installation. (This will require the NT 4.0 CD)
9. Click OK in the main PROSet window to return to Windows NT.
10. Click close to finish.
11. Restart Windows NT when prompted.
12. To verify proper installation of the adapter, go to the Control Panel, double-click the Network icon, select the Adapters tab. You should see the name "Intel (R) PRO/100+ Management Adapter" in the network adapter window.

To install multiple adapters, repeat this procedure for each new adapter. See "Installing Multiple Adapters" for specific information. To run the PROSet software at any time, double-click the Intel PROSet icon in the Control Panel or click the Adapter Properties button.



Windows 98

Install Network Drivers from CD

1. After completion of Windows 98 installation, you will have to remove the "PCI Ethernet Controller" under the 'Device Manager' menu. (Go to Control Panel and then to Device Manager. Under the "Other Devices" section, choose "PCI Ethernet Controller" and click "Remove".)
 2. Reboot the system. An "Add New Hardware Wizard" dialog box should appear indicating that a "PCI Ethernet Controller" has been found.
 3. Click the "Next" button. Then select the "Search for the best driver for your device" option. (Make sure your Tyan Driver CD has been inserted)
 4. Select the "Specify a location" option. At the command prompt, type D:\LAN82559 (assuming D: is your CD-ROM drive)
 5. Click "Next". The "Intel (R) Pro/100+ Management Adapter" should appear. Click "Next" again.
 6. Continue installation process by following the Windows instructions.
 7. To check for proper installation, the "Intel Pro/100+ Management Adapter" should be found under "System Properties" in the Device Manager menu
- * In general, Windows 98 will automatically install the network drivers

NetWare Server, Client 32, UNIX, OS/2, Banyan, and Other Operating Systems

For these, refer to our online documents. On a DOS computer, view the appropriate README file for information on installing your network driver. To view the README

files, insert the Intel Configuration and Drivers disk into a drive, switch to that drive, and type: `SETUP /README`. Look through the selection called “Installing Intel PRO/100+ Management Adapter Drivers” for the operating system you need.

Installing Multiple Adapters

All users: The adapter’s 12-digit, hexadecimal Ethernet address is on a sticker on the motherboard near the LAN controller chip. The Ethernet address is sometimes called the node address or the MAC address. Note that the PCI slot number may not correspond with the physical connector in your computer.

NetWare users: The server drivers use the PCI slot number to identify each installed adapter. You can correlate the PCI slot number to the adapter by using the Ethernet address that is printed on a label on the adapter. Run Setup from the Intel disk to view the Ethernet address and slot number for each installed adapter. For more information, see the README files. NetWare 4.11 server installations use unique slot numbers that are assigned during sever setup.

Windows NT and Windows 95/98 users: Repeat the configuration procedure for each adapter you want to install (add only one adapter at a time). In Windows NT, be sure to click the Show all PRO Adapters box in the Configuration window. See the README file for more information.

Select Duplex Mode (optional)

Duplexing is a performance option that lets you choose how the adapter sends and receives data packets over the network. The PRO/100+ adapter can operate at full duplex only when connected to a full duplex 10BASE-T, 100BASE-TX switching hub, or another full duplex adapter. To summarize:

- Auto (requires a full duplex adapter or switching hub with auto-negotiation capability). The adapter negotiates with the hub to send and receive packets at the highest rate. This is the default setting. If the hub does not provide auto-negotiation, the adapter runs at half duplex.
- Full duplex (requires a full duplex switching hub or adapter). The adapter can send and receive packets at the same time. This mode can increase adapter performance capability. If the full duplex hub provides auto-negotiation, the adapter runs at full duplex. If the full duplex hub does not provide auto-negotiation, you need to set the adapter duplex mode manually. (see following paragraphs)
- Half duplex. The adapter performs one operation at a time; it either sends or receives.

Note: If your hub is running at 100 Mbps and half duplex, your potential bandwidth is higher than if you run at 10 Mbps and full duplex.

Troubleshooting

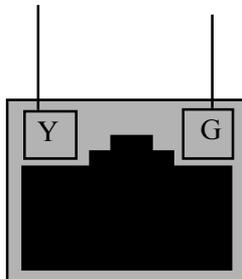
If the adapter can't connect to the network:

- Make sure the cable is installed properly. The network cable must be securely attached at both RJ-45 connections (adapter and hub). If the cable is attached but the problem persists, try a different cable. The maximum allowable distance from adapter to hub is 100 meters. If you're directly connecting two computers (no hub), use a crossover cable. Most hubs require a straight-through cable, while most switches require a crossover cable (see your hub or switch documentation to verify). See the Cabling Information README file for more information on crossover cables.
- Check the LED lights on the adapter. The onboard cable connector has two diagnostic LEDs. These lights help indicate if there's a problem with the connector, cable, or hub. The table below describes the LEDs, and the drawing on the next page shows their location.

LED	Indication	Meaning
LNK (green)	On	The adapter and hub have acknowledged a connection; the link between the hub and adapter is good.
	Off	The cable connection between the hub and adapter is faulty, or you have a driver configuration problem.
100 (yellow)	On	Network connection operating at 100Mbps.
	Off	Network connection operating at 10Mbps.

- Make sure you're using the correct drivers. Make sure you're using the drivers that come with this adapter. Drivers that support previous versions of the Intel PRO/100+ Management Adapter do not support this version of the adapter.

100 Mbps LED Link LED



- Make sure the hub port and the adapter have the same duplex setting. If you configured the adapter for full duplex, make sure the hub port is also configured for full duplex. Setting the wrong duplex mode can degrade performance, cause data loss, or result in lost connections.

Testing the adapter

Test the adapter by running Intel diagnostics. For DOS or Windows 3.1 computers, run Setup on the Intel Drivers and Configuration disk. For Windows NT and Windows 95 run Intel PROSet by double-clicking the Intel PROSet Icon in the Control Panel. Click Help from the main PROSet window to get complete diagnostics information and instructions.

Common problems and solutions

SETUP.EXE reports the adapter is "Not enabled by BIOS".

- The PCI BIOS isn't configuring the adapter correctly.

The computer hangs when the drivers are loaded.

- Change the PCI BIOS interrupt settings.
- If you are using EMM386, it must be version 4.49 or newer (this version ships with MS-DOS 6.22 or newer).

Diagnostics pass, but the connection fails or errors occur.

- At 100 Mbps use category 5 wiring and make sure the network cable is securely attached.
- For NetWare clients, make sure you specify the correct frame type in our NET.CFG file.
- Make sure the duplex mode setting on the adapter matches the setting on the hub.
- At 100 Mbps, connect to a 100BASE-TX hub only (not T4).

The LNK LED doesn't light.

- Make sure you've loaded the network drivers.
- Check all connections at the adapter and the hub.
- Try another port on the hub.
- Make sure the duplex mode setting on the adapter matches the setting on the hub.
- Make sure you have the correct type of cable between the adapter and the hub. 100 BASE-TX requires two pairs. Some hubs require a crossover cable while others require a straight-through cable. See the Cabling README file for more information on cabling.

The adapter stopped working when another adapter was added to the computer.

- Make sure the cable is connected to the EtherExpress PRO/100 TX PCI adapter.
- Make sure your PCI BIOS is current.
- Make sure the other adapter supports shared interrupts. Also, make sure your operating system supports shared interrupts — OS/2 doesn't.
- Try reseating the newest adapter.

The adapter stopped working without apparent cause.

- Try reseating the adapter first, then try a different slot if necessary.
- The network driver files may be corrupt or deleted. Delete and then reinstall the drivers.
- Try a different PRO/100 TX PCI adapter.
- Run the diagnostics.

The Wake-on LAN feature is not working.

- Make sure the WOL cable is attached and power is applied to the computer.
- Check the BIOS for its WOL setting. Some computers may need to be configured to WOL.
- Make sure the network cable is fully attached to the adapter.

Link LED does not light when power is connected.

- Make sure WOL cable is attached and power is applied to computer.
- Make sure network cable is attached at both ends.

Technical Information

Fast Ethernet Wiring

100BASE-TX Specification: The 100BASE-TX specification supports 100 Mbps transmission over two pairs of category 5 twisted-pair Ethernet (TPE) wiring. One pair is for transmit operations and the other for receive operations. Segment lengths are limited to 100 meters with 100BASE-TX for signal timing reasons. This complies with the EIA 568 wiring standard.

Fast Ethernet Hub and Switches

The two basic types of hubs are shared hubs and switching hubs. Intel PRO/100+ adapters can be used with either type of hub for 10 Mbps. At 100 Mbps, a TX hub or switch is required.

Shared hubs

In a shared network environment, computers are connected to hubs called repeaters. All ports of the repeater hub share a fixed amount of bandwidth, or data capacity. On a 100 Mbps shared hub, all nodes on the hub must share the 100 Mbps of bandwidth. As stations are added to the hub, the effective band-width available to any individual station gets smaller. Shared hubs do not support full duplex.

Think of a shared repeater hub as a single-lane highway that everyone shares. As the number of vehicles on the highway increases, the traffic becomes congested and transit time increases for individual cars.

On a shared hub all nodes must operate at the same speed, either 10 Mbps or 100 Mbps. Fast Ethernet repeaters provide 100 Mbps of available bandwidth, ten times more than what's available with a 10BASE-T repeater.

Repeaters use a well-established, uncomplicated design, making them highly cost effective for connecting PCs within a workgroup. These are the most common type of Ethernet hubs in the installed base.

Switching hubs

In a switched network environment, each port gets a fixed, dedicated amount of bandwidth. In the highway scenario, each car has its own lane on a multi-lane highway and there is no sharing.

In a switched environment, data is sent only to the port that leads to the proper destination station. Network bandwidth is not shared among all stations, and each new station added to the hub gets access to the full bandwidth of the network.

If a new user is added to a 100 Mbps switching hub, the new station receives its own dedicated 100 Mbps link and doesn't impact the 100 Mbps bandwidth of another station. Switching hubs can effectively increase the overall bandwidth available on the network, significantly improving performance. Switching hubs can also support full duplex. For more information on Fast Ethernet, visit the Network Products website (<http://www.intel.com/network>).

Creative Labs Sound Drivers Installation Note For S1867 Win NT 4.0 / Win98

Creative Labs ES1373 PCI Sound Setup



Note: This note assumes drive D: for your CDROM drive.

- 1) Go to the following directory path:
D:\Audio\S1867\drivers\setup\english
- 2) Select (double-click) sbsetup.exe - Setup window will appear with "Sound Blaster Setup Options". The two options are "Remove Only" and "Remove and Install Software". The default setting is "Remove and Install Software". Use the default setting and click "Next".
- 3) Click "Next" again. The installation will begin and autodetection of hardware and drivers will follow.
- 4) Click the "Finish" button and reboot the computer.

Frequently Asked Questions

Q: My system sometimes has no display. How should I check the system?

A: Check to see if the DIMM is REGISTERED. Also, the first thing to do is to check and see if you have any device conflict in I/O address, IRQ, or DMA. If you are using Windows 95/98, the Device Manager is a good place to start. Please consult your operating system manual for details. Second of all, slowing down the memory timing in the BIOS's chipset setup section will help the situation, as well. Many memory modules are not suitable for high performance systems and are probably the main source of your problem.



168-pin Registered DIMM

Q: Why don't I get a display after I put in my old DIMM module?

A: The SeverSet HE chipset requires the memory manufacturer to program an EEPROM chip with SPD (Serial Presence Detection) on the module in order for the BIOS to program the chipset's timing registers properly. Your DIMM may not have the EEPROM chip on the module, or the EEPROM may not contain the correct program. Make sure that the DIMM is Registered.

Q: Can I use EDO DIMMs on this motherboard?

A: No. The ServerWorks ServerSet does not support EDO memory.

Q: What is AGP?

A: AGP (Accelerated Graphics Port) is a new bus architecture for 3D graphics. The AGP slot eliminates the PCI bandwidth bottleneck by bypassing the PCI interface and accessing the system memory directly. Currently, the AGP supports 1X and 2X modes, which yield bandwidths of 266MB/s (at 33MHz bus speed) and 533MB/s (at 66MHz bus speed), respectively. Compare this with the mere 132MB/s (at 33MHz bus speed) that you get from the PCI bus.

Q: Does my operating system support AGP?

A: Currently, only Windows 98 and Windows 2000 will have built-in support for AGP. Some AGP cards require Windows 95 OSR2.1 or a special driver from Intel. Please check with your graphics vendor for more details.

Q: How do I install the onboard NIC drivers for WinNT 4.0?

A: The Ethernet driver can not be installed directly from the Tyran Driver CD. Before installing the Intel 82559 Ethernet drivers, the complete 82559 directory and ALL its components must first be copied from the Tyran CD onto your hard drive. The 82559 installation program can then be copied normally from your hard drive.

Q: How can I disable the keyboard detection in the BIOS?

A: You need to enable the Quick Boot option in CMOS - then the BIOS will not check for a keyboard.

Q: I cannot install Windows NT when I use an LS/120-type floppy disk drive. What should I do?

A: SYMPTOM - When you are trying to install Windows NT, you may experience any of the following symptoms:

1) When you boot from the installation disks, the following error message may be displayed when disk 2 is inserted:

```
Stop 0x0000007B Inaccessible Boot Device
(0xFF109C50, 0x00000000, 0x00000000, 0x00000000)
```

2) When you are attempting to create a set of installation disks using the WINNT /ox or WINNT32 /ox command, the following error message may be displayed:

```
This floppy disk is not formatted as high-density, not formatted
with a standard Windows NT or MS-DOS format, or is corrupted.
Setup is unable to use this disk.
```

CAUSE OF THE PROBLEM: You are using a LS/120-type floppy disk drive.

RESOLUTION - To work around this issue, install Windows NT Workstation with the /b switch. This causes Windows NT Workstation Setup to run without requiring the installation disks.

If you are using the S1867 or are installing with LSI Symbios 53C896 with 53C896 or 53C1010 chip then you must install NT 4.0 with a standard 1.44MB floppy disk.

Q: Where can I get Intel PRO/100+ Management Adapter drivers?

A: You will find the drivers located in the Tyan Drivers CD under the subdirectory 'LAN82559'. Please note: You must use the drivers provided in the Tyan CD only. These drivers have been tested and approved by Tyan engineering.

Q: Why does my Intel Ethernet work only intermittently?

A: The Inter Ethernet only operates under standby current; therefore, your power supply must be ATX 2.01 Compliant with a minimum SB5V current of 750mA.

Q: Why does my keyboard LED remain on after the system is turned off?

A: This situation is most likely caused by the enabling of Keyboard Wake-Up Function (under the Peripheral Setup) in the BIOS. When enabled, the motherboard would provide a standby voltage to the keyboard. This would subsequently cause the LED to remain on.

chapter 3

BIOS Configuration

Introduction to Setup

This manual describes the PhoenixBIOS Setup program. The Setup program lets you modify basic system 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.

The PhoenixBIOS in your computer is a customized version of an industry-standard BIOS for IBM PC AT-compatible personal computers. It supports Intel x86 and compatible processors. The BIOS provides critical low-level support for the system central processing, memory, and I/O subsystems.

The Phoenix BIOS has been customized by adding important, but non-standard features such as virus and password protection, power management, and detailed fine-tuning of the chipset controlling the system. The rest of this manual is intended to guide you through the process of configuring your system using Setup.



The BIOS section of the manual is subject to change without notice and is provided here for reference purposes only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

The PhoenixBIOS Setup screen is shown below.

PhoenixBIOS Setup Utility			
Main	Advanced	Security Misc. Boot Exit	
System Time:	[04:05:06]	Item Specific Help	
System Date:	[01/11/2000]		
Processor Speed	[800 Mhz]	<Tab>, <Shift-Tab>, or <Enter> selects field	
Front Side Bus:	[100 Mhz]		
Legacy Diskette A:	[1.44/1.25 MB 3½"]		
Legacy Diskette B:	[Disabled]		
▶ HDD Configuration			
▶ Keyboard Features			
PS/2 Mouse	[Auto Detect]		
System Memory	640KB		
Extended Memory	1024MB		
▶ Memory Cache			
F1 Help	↑↓ Select Item	+/- Change Values	F9 Setup Defaults
Esc Exit	← Select Menu	Enter Select ▶ Sub-Menu	F10 Save and Exit

BIOS

You can select a Setup option by using the following keyboard keys:

Key	Function
+/-	Change Values
Arrow keys	Changes selections within a box
Enter	Select Sub menu item
F1	Help
F9	Setup Defaults
F10	Save and Exit
Esc	Exit

The pages which follow contain explanations of the settings for the PhoenixBIOS Setup menus. Drawings have been included for ease of reference. Overall, the PhoenixBIOS Setup program is easy to use, and fairly intuitive. Note that the graphics in the manual are simpler than those that appear on your screen.

Main Setup

Select the PhoenixBIOS Setup options below by choosing Main Setup from the PhoenixBIOS main menu. The Standard Setup menu screen is shown below.

PhoenixBIOS Setup Utility		
Main	Advanced	Security Misc. Boot Exit
System Time:	[04:05:06]	Item Specific Help
System Date:	[01/11/2000]	
Processor Speed	[800 Mhz]	<Tab>, <Shift-Tab>, or <Enter> selects field
Front Side Bus:	[100 Mhz]	
Legacy Diskette A:	[1.44/1.25 MB 3½"]	
Legacy Diskette B:	[Disabled]	
▶ HDD Configuration		
▶ Keyboard Features		
PS/2 Mouse	[Auto Detect]	
System Memory	640KB	
Extended Memory	1024MB	
▶ Memory Cache		
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

System Date/Time

You can type the date and time in directly, or select the portion of the date or time that you want to modify and adjust it using the +/- keys. The clock runs on a 24-hour cycle (i.e. 1:00 PM is 13:00).

Processor Speed

Specifies the processor speed. Setting this value to a frequency higher than its rated value can damage the processor. Setting will return to Safe mode after BIOS is reset.

Legacy Diskette A: and B:

Move the cursor to these fields via the arrow keys and select the floppy type. The settings are 360KB 5¼ inch, 1.2 MB 5¼ inch, 720KB 3½ inch, 1.44MB 3½ inch, or 2.88MB 3½ inch. If you are not sure what type of floppy drive you have, consult the documentation that came with your drive.

HDD Configuration

Select this option to configure various drives including HDD and CDROMs, a picture of this setup screen is featured on the following page. Select the correct device you need to configure (eg. Primary Master or Secondary Slave) using the up and down arrow keys and push the <Enter> key to enter the device setup.

PhoenixBIOS Setup Utility		
Main		
HDD Configuration		Item Specific Help
▶ Primary Master	[<hard drive 1 name>]	
▶ Primary Slave	[<hard drive 2 name>]	
▶ Secondary Master	[<CDROM name>]	
▶ Secondary Slave	[none]	
IDE Bus Master DMA	[Enabled]	
Large Disk access mode:	[DOS]	
F1 Help	↑↓ Select Item	+/- Change Values
Esc Exit	← Select Menu	Enter Select ▶ Sub-Menu
		F9 Setup Defaults
		F10 Save and Exit

1- Primary / Secondary Master / Slave

Once the correct IDE device has been selected, a new menu will appear allowing the user to adjust different variables for this drive. By Default, the setting for all the devices is Auto. If the settings do not appear to be correct, or you would like to adjust the default settings, then the “Type” setting must be adjusted to [User], [CD-ROM], [IDE Removable] or [ATAPI Removable]. Below is a listing of the device parameters within this section. For User Configuration, both section a.) and b.) must be completed.

a.) User Configuration (Hard drive configuration):

Parameter	Description
Type	The number for a drive with certain identification parameters (see the next page for a table of drive types).
Cylinders	The number of cylinders in the disk drive.
Heads	The number of heads.
Sectors	The number of sectors per track. MFM drives have 17 sectors per track. RLL drives have 26 sectors per track. ESDI drives have 34 sectors per track. SCSI and IDE drives have even more sectors per track.
Size	The formatted capacity of the drive is the number of heads times the number of cylinders times the number of sectors per track times 512 (bytes per sector).

b.) CD-ROM, IDE and ATAPI Removable Configuration:

Parameter	Description
Multi-Sector Transfers	Specify the number of sectors per block for multiple sector transfers. "MAX" refers to the size of the disk returns when queried.
LBA Mode Control	Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads and Sectors.
32 Bit I/O	This setting Enables or Disables 32 bit IDE data transfers.
Transfer Mode	Select the method for moving data to/from the drive. Autotype the drive to select the optimum transfer mode.
Ultra DMA Mode	Selects the Ultra DMA mode used for moving data to/from the drive. Autotype the drive to select the optimum transfer mode.



2- IDE Bus Master DMA

Controls whether the BIOS programs the IDE controller for DMA Bus Mastering Operation. Default is Enabled.

3- Large Disk Access Mode

If the intended operating system for this product is DOS or a derivative of DOS such as Windows 9X or NT, then select the DOS option. If the intended operating system is something besides DOS such as Unix ,Novell or Linux, then select Other.

Keyboard Features

Parameter	Description
NumLock	Selects Power-on state for NumLock. Default is Auto.
Key Click	Enables Key click. Default is Disabled.
Keyboard auto-repeat rate	Selects key repeat rate. Default is 30/sec.
Keyboard auto-repeat delay	Selects delay before key repeat. Default is 1/2sec.

PS/2 Mouse

Disabled prevents any installed PS/2 mouse from functioning, but frees up IRQ 12. Enabled forces the PS/2 mouse port to be enabled regardless if a mouse is present. Auto-Detect will enable the PS/2 mouse only if present. Default is Auto-Detect.

Memory Cache

Parameter	Description
Memory Cache	Sets the states of the memory cache. Default is enabled.
Cache System BIOS area	Controls caching of system BIOS area. Default is Enabled.
Cache Video BIOS area	Controls caching of video BIOS area. Default is Wrie Protect.
Cache Base 0-512k	Controls caching of 512k base memory. Default is Write Back.
Cache Base 512k-640k	Controls Caching of 512k-640k. Default is Write Back.
Cache Extended Memory Area	Controls Caching of system memory above one MB. Default is Write Back.
Cache A0000-AFFFF through EC00-EFFF	Disabled- This block is not cached. USWC- Uncached Speculative Write Combined. Write through- Writes are cached and sent to main memory at once Write Protect- Writes are ignored. Write Back- Writes are cached but not sent to main memory until renecessary. Default is Disabled.



Advanced Setup

Setting items on this menu to incorrect values may cause your system to malfunction. It is suggested to use the Manufacturer's Defaults.

PhoenixBIOS Setup Utility	
Advanced	
	Item Specific Help
Installed O/S [Other] Reset Configuration Data [No] Extended Memory Test [Enabled] CPU-to-PCI Deferred Cycles [Enabled]	
▶ PCI Configuration	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Advanced Features Setup

Parameter	Description
Installed O/S	Select the operating system installed on your system which you will use most commonly. Note: An incorrect setting cause some operating systems to display unexpected behavior. Default is Other
Reset Configuration Data	Select 'Yes' if you want to clear Extended System Configuration Data. Default is No.
Extended Memory Test	If Enabled, a full memory test is performed on the extended memory during POST. Default is Enabled.
CPU-toPCI Deferred Cycles	If Enabled, the chipset will issue deferred cycles for CPU-to-PCI traffic. If Disabled, the chipset will use the retry mechanism. Default is Enabled.
PCI Configuration	Addition Menus to configure PCI devices. ((Continue to section below)

PCI Configuration

PhoenixBIOS Setup Utility	
Advanced	
PCI Configuration	Item Specific Help
<ul style="list-style-type: none"> ▶ Network ▶ SCSI ▶ Sound ▶ USB ▶ AGP Device ▶ PCI Slot 1 ▶ PCI Slot 2 ▶ PCI Slot 3 ▶ PCI Slot 4 ▶ PCI Slot 5 ▶ PCI Slot 6 <p>ISA Graphics device Installed: [NO]</p> <ul style="list-style-type: none"> ▶ PCI/PNP UMB IRQ Region Exclusion ▶ PCI/PNP ISA IRQ Resource Exclusion 	
<p>F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit</p>	

Network

Parameter	Description
Controller	Determines whether the PCI embedded controller is enabled or disabled by the BIOS. Default is Enabled.
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h.
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is Auto-Select.

SCSI

Parameter	Description
Controller	Determines whether the PCI embedded controller is enabled or disabled by the BIOS. Default is Enabled.
Option ROM Scan	Initialize device Expansion ROM. Default is Enabled.
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h.
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is Auto-Select.

Sound

Parameter	Description
Controller	Determines whether the PCI embedded controller is enabled or disabled by the BIOS. Default is Enabled.
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h.
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is 5.

USB

Parameter	Description
Controller	Determines whether the PCI embedded controller is enabled or disabled by the BIOS. Default is Enabled
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is Auto Select

AGP Device

Parameter	Description
Option ROM Scan	Initialize device expansion ROM. Default is Enabled.
Enable Master	Enable selected Device as a PCI Master. Default is Enabled.
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is Auto Select

PCI Slot 1 - PCI Slot 6

Parameter	Description
Option ROM Scan	Initialize device expansion ROM. Default is Enabled.
Enable Master	Enable selected Device as a PCI Master. Default is Enabled.
Latency Timer	Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Default is 0040h
PCI Interrupt Routing	PCI devices can use hardware interrupts called IRGs. A PCI device cannot use IRQs already in use by ISA or EISA devices. Use 'Auto' only if no ISA or EISA legacy cards are installed. Default is Auto Select.

ISA graphics device

Enable ISA (non-VGA) graphics device to access palette data in PCI VGA device.
Default is No.

PCI/PNP ISA UMB Region Exclusion

Parameter	Description
C800-CBFF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.
CC00-CFFF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.
D000-D3FF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.
D400-D7FF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.
D800-DBFF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.
DC00-DFFF	Reserves the specified block of upper memory for use by legacy ISA devices. Default is Available.

PCI/PNP ISA IRQ Resource Exclusion

Parameter	Description
IRQ 3	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.
IRQ 4	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.
IRQ 5	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.
IRQ 7	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.
IRQ 10	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.
IRQ 11	Reserves the specified IRQ for use by legacy ISA devices. Default is Available.

Security Setup

The PhoenixBIOS provides a Password Protection Utility to prevent unauthorized access to settings in the BIOS.

PhoenixBIOS Setup Utility		Item Specific Help
Security		
Supervisor Password Is:	Clear	
User Password:	Clear	
Set Supervisor Password	[Enter]	
Set User Password	[Enter]	
Password on boot:	[Disabled]	
Diskette Access:	[Supervisor]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit		

BIOS

1. Select Set Supervisor Password setting and press <Enter>. A menu will pop up allowing you to enter a new password.
2. Enter a new password and press <Enter>. Retype the password to confirm the new password and press <Enter>. The new Supervisor Password has been set.

PhoenixBIOS Setup Utility		Item Specific Help
Security		
Supervisor Password Is:	Clear	
User Password:	Clear	
Set Super		
Set User P		
Password		
Diskette		
F1 Help ↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit		

Set Supervisor Password

Enter New Password []

Confirm New Password []

3. Once the Supervisor Password has been set, the “Supervisor Password Is:” line will change to “set” confirming that a new password has been locked in.

PhoenixBIOS Setup Utility		
Security		
		Item Specific Help
Supervisor Password Is:	Set	
User Password:	Clear	
Set Supervisor Password	[Enter]	
Set User Password	[Enter]	
Password on boot:	[Disabled]	
Diskette Access:	[Supervisor]	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit		

4. Repeat Steps 1 and 2 for setting the User Password.

Details regarding Password Setup

Parameter	Description
Set Supervisor Password	Supervisor Password controls access to the setup utility.
Set User Password	User Password controls access to the system at boot.
Password on boot	Enables password entry on boot.
Diskette Access	Controls access to diskette drives.
Clearing Passwords	To erase all passwords, the CMOS must be reset. Please see installation section in chapter 1.

In either the Supervisor or User Security options, pressing <Enter> once when asked for a new password, and a second time when asked to confirm the new password, will uninstall the existing password. Note that uninstalling the Supervisor password uninstalls the User password as well.

Miscellaneous Setup

This section contain miscellaneous setup items including floppy check and wake-up functions

PhoenixBIOS Setup Utility	
Misc.	
	Item Specific Help
Floppy Check:	[Disabled]
Summary Screen:	[Disabled]
Boot-time Diagnostic Screen	[Enabled]
Wakeup on Keyboard	[Disabled]
Wakeup on LAN	[Disabled]
Wakeup on Modem Ring	[Disabled]

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

BIOS

Miscellaneous Settings

Parameter	Description
Floppy Check	If Enabled, this function verifies floppy type on boot; this disables speed boot. Default is Disabled.
Summary Screen	Display system configuration oin boot. Default is Disabled.
Boot time Diagnostic Screen	Display the diagnostic screen during boot. Default is Enabled.
Wakeup on Keyboard	If Enabled, the system can be awakened form a Soft-Off state by the keyboard. Default is Disabled.
Wakeup on LAN	If Enabled, the system can be awakened from a Soft-Off state by the LAN controller. Default is Disabled.
Wakeup on Modem Ring	If Enabled, the system can be awakened from a Soft-FF state by a modem's ring indicator signal.

Boot Setup

The boot setup allows the user to control which device is used to boot up the system. Use the keys provided in the table below to select which order in which the boot devices are initialized.

PhoenixBIOS Setup Utility	
Boot	
	Item Specific Help
Diskette Drive -Hard Drive <Hard Drive name and model> Bootable Add-in Cards Network Boot SYM53CXXX Boot Support +ATAPI CD-ROM Drive	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

Boot Setup Key commands

Key	Description
<Enter>	<Enter> is used to collapse or expand devices within a certain group. Expandable groups are shown with a "+" or "-" next to device type. For example, the Hard Drive section has a "-" next to it meaning that this section can and has already been expanded.
<Ctrl + Enter>	Expands ALL sections
<Shift + 1>	Enables or Disables a device. An exclamation mark will appear next to the disabled device.
<+> or <->	Moves the device up and down the list. The first boot device should be moved to the top of the list.
<n>	May move removable device between Hard Disk or Removable Disk
<d>	Remove a device that is not installed.

Exit Menu Settings

Once all the items within the BIOS have been configured, the user will need to save the configuration before exiting. If the wrong settings have been chosen, there is an option to “Load Setup Defaults” and return to the default settings provided by the manufacturer.

PhoenixBIOS Setup Utility	
Exit	
	Item Specific Help
Exit Saving Changes Exit Discarding Changes Load Setup Defaults Discard Changes Save Changes	
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults Esc Exit ← Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit	

BIOS

Exit Setup commands

Key	Description
Exit Saving Changes	Exit System Setup and save changes to CMOS.
Exit Discarding Changes	Exit utility without saving Setup data to CMOS.
Load Setup Defaults	Load Default Items for ALL setup items.
Discard Changes	Load previous values from CMOS for all setup items.
Save Changes	Save Setup Data to CMOS.

Congratulations! BIOS setup is now complete. You may now powerup the system.

Flash Writer Utility

The PhoenixBIOS Flash Writer Utility is now included in the PhoenixBIOS, and so it is simpler to upgrade the BIOS of your mainboard. The system BIOS is stored on a flash EEPROM ROM chip on the mainboard which can be erased and reprogrammed by following the directions on the following page.

1. From the DOS prompt, rename the BIOS file that you have downloaded to "Phoenixboot.rom" and copy it on to a floppy disk.
2. Insert the floppy disk with the BIOS upgrade into the A: drive.
3. Turn the power off.
4. Re-poweron the system and it will begin to read from the A: drive, and write the BIOS information contained on the floppy disk in that drive to the EEPROM ROM chip. When the BIOS has been totally reprogrammed, the system will reboot with the new BIOS in operation.
5. If the system does not reboot in three minutes, power down the system wait a few seconds, and then turn the power back on again. You will be prompted to press <F2> to run Setup. You may check your settings at this time, or simply save and exit the program.

System Resources

Beep Codes

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. There are only two beep codes that are associated with the Thunder 2500. Please refer to the chart below.

Beep Code	Description
1-2	No video, the motherboard does not detect a video card. Reinsert video card or replace video card with a different PCI or AGP video card.
1-3-3-1	No memory. Memory is installed incorrectly or is incompatible with the systemboard. Refer to memory installation section for detailed information.

Appendix 1

LSI Symbios Ultra2/3 LVD SCSI

1. INTRODUCTION

With the dual channel onboard Ultra2/3 SCSI connectors, you can connect up to 30 SCSI peripherals, such as hard disk drives, scanners, CD-ROM drives, and tape drives. This guide provides instructions for

- Connecting SCSI peripherals
- Installing the Symbios 53C896 or 53C1010 software

The motherboard has two independent Ultra2/3 LVD SCSI channels and each has a maximum throughput of 80MB/sec or 160MB/sec respectively..

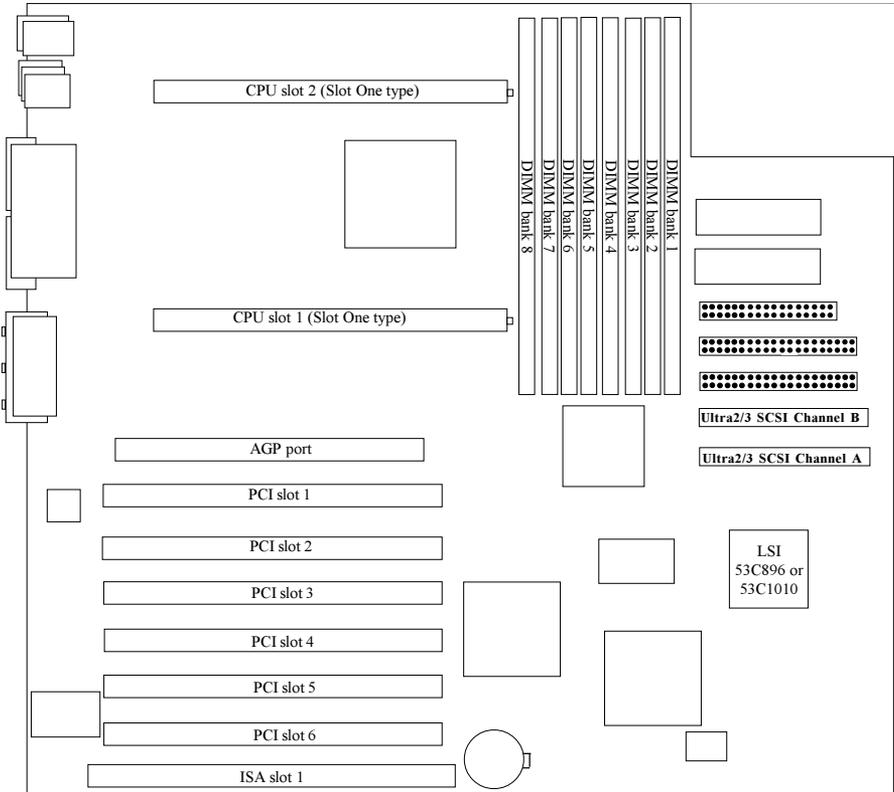
Support for Non-Ultra2/3 SCSI Devices

The LVD signaling used for Ultra2/3 devices operates differently than single-ended signaling used on Ultra, Fast, and Fast Wide SCSI devices. Ultra2/3 SCSI devices are designed with multimode capability so that if a single-ended device is connected to the LVD Ultra2 SCSI bus, the Ultra2/3 devices automatically switch to single-ended mode. When an Ultra2/3 SCSI device operates in single-ended mode it is subject to the cable distance limitations and signal noise problems of that interface.

LSI recommends that single-ended Ultra and earlier devices be kept on a separate channel than the LVD Ultra2 devices. This will permit the Ultra2/3 devices to operate at full speed and cable distances.

Board Layout

The following diagram shows the major SCSI connectors for the motherboard.



2. Setting Up SCSI Peripherals

Setting up SCSI peripherals before attaching them to the SCSI connectors typically involves setting SCSI IDs and termination, mounting internal peripherals inside your computer, and connecting power cables to each peripheral. Since setup can vary from peripheral to peripheral, always refer to the peripheral's documentation for specific instructions. Below are some guidelines for setting SCSI IDs and termination on your peripherals.



important!

NOTE: If you refer to the peripheral's documentation for installation instructions, be sure to return to this document to continue with installation of the software included in the package.

Check the SCSI IDs

The motherboard SCSI connectors and each peripheral you connect to it requires a unique SCSI ID number ranging from 0 to 15 on each channel. ID numbers don't have to be sequential, as long as the connector and each peripheral has a different number for each channel.

Each SCSI channel on the motherboard is preset to ID 7 and should not be changed. If you will be booting from a SCSI hard disk, it's best to set the disk's ID at 0 or 1. Most SCSI hard disks come from the factory preset to ID 0. The IDs for internal peripherals are usually set with jumpers; external peripherals are usually set with a switch on the back of the peripheral.

Terminate the Ends

To ensure reliable communication on the SCSI bus, the peripheral at the end of each cable, or the end of the cable itself, must have a terminator installed (or enabled). The peripherals between the ends of each cable must have the terminator removed (or disabled).



important!

NOTE: When connecting Ultra2/3 SCSI peripherals, it is important to note that the necessary termination of the SCSI bus is done either on the end of the cable (with a permanent terminator) or a separate terminating connector. Ultra SCSI and earlier single-ended devices had the ability to terminate the bus directly from the device. Using an Ultra SCSI terminator on an LVD Ultra2/3 SCSI bus will force the bus to single-ended mode, limiting the speed and cable distance. For this reason be sure that you have the necessary Ultra2/3 cable or terminator before installing the Ultra2/3 SCSI devices.

3. Connecting SCSI Peripherals

A total of 30 SCSI peripherals can be connected to the onboard SCSI connector, with 15 on each channel. Before connecting peripherals to the connectors, be sure to also review “Setting Up SCSI Peripherals” on the previous page.

Connecting Internal Cables for Ultra2 SCSI Devices

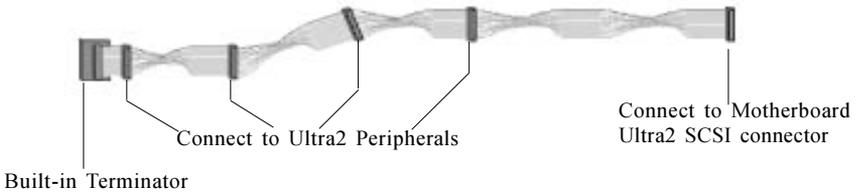
When connecting internal Ultra2/3 SCSI peripherals there are special SCSI cables necessary to sustain the higher speeds of LVD signaling. If your cables are not marked, you can identify most Ultra2/3 SCSI cables as having twisted pairs of the flat ribbon cable in between the device connectors. These cables will usually have a terminator built into the end of the cable.

The motherboard has two separate Ultra2/3 SCSI channels. Each channel will connect to a separate cable. Follow these steps to connect your internal peripherals:



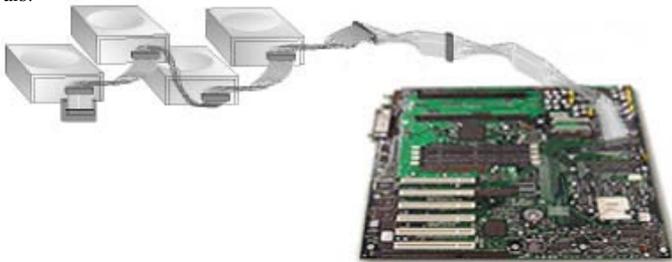
NOTE: We recommend keeping your Ultra2/3 peripherals separate from your non-Ultra2/3 peripherals. Connecting a non-Ultra2 peripheral to an Ultra2/3 SCSI bus forces the Ultra2/3 SCSI channel and any attached peripherals to drop down to Ultra SCSI performance levels (40MBytes/sec).

STEP 1: Locate a 68-pin internal Ultra2/3 SCSI cable. (It should look similar to



STEP 2: Plug the long end of the cable(s) to the Ultra2/3 connector(s) on the motherboard - Channel A or B. (refer to the board layout for connector location).

STEP 3: Plug the remaining connectors to your internal Ultra2/3 SCSI peripherals.





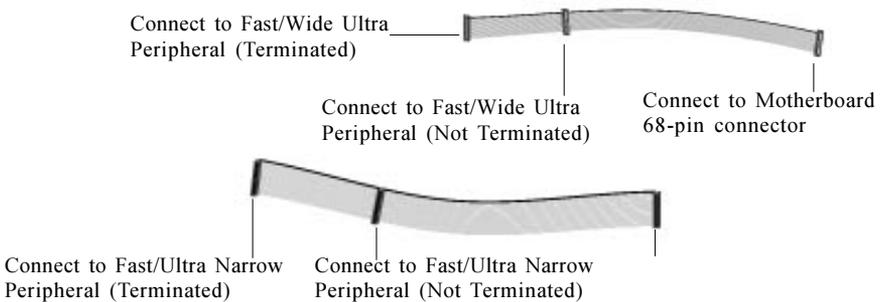
NOTE: Internal Ultra2/3 SCSI peripherals come from the factory without termination. Proper termination is provided by the built-in terminator at the end of the Ultra2/3 internal SCSI cable.

Connecting Internal Cables for Non-Ultra2 SCSI Devices

Internal cables for single-ended SCSI devices do not have special twists or terminators built into the cable ends. If you are connecting non-Ultra2/3 SCSI devices, use a channel separate from the Ultra2/3 SCSI devices you just connected. The motherboard has a special 50-pin narrow connector to more easily support narrow Ultra and earlier devices if you so choose.

If you are connecting Wide SCSI peripherals you will need a 68-pin cable. If you are connecting narrow SCSI peripherals you will need a 50-pin cable. When connecting the 50-pin cable to peripherals ensure that the colored edge of the cable connects to pin 1 of both the device and the motherboard SCSI connector.

STEP 1: Locate a 68-pin or 50-pin internal Ultra SCSI cable.



SCSI

STEP 2: Plug the long end of the cable to the 68-pin motherboard connector if the cable is 68-pin or plug the long end of the cable to the 50-pin motherboard connector if the cable is 50-pin.

STEP 3: Plug the other end of the cable to a terminated Fast/Wide Ultra SCSI peripheral (if 68-pin) or a terminated Fast/Ultra Narrow SCSI peripheral (if 50-pin).

STEP 4: To connect a second peripheral, plug the middle connector of the cable to the peripheral. The peripheral must not be terminated.

Connecting the External Cable for SCSI Devices

Use a 68-pin external Ultra2/3 SCSI connector to connect your external Ultra2/3 peripherals. Each Ultra2/3 SCSI peripheral connects to the next in a daisy chain. Therefore each external peripheral will require an external cable.

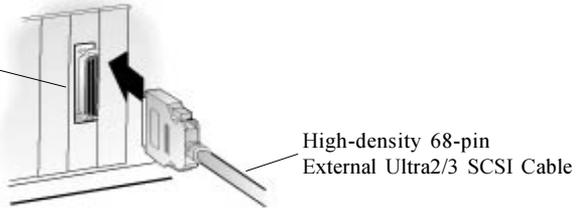
As an option, Tyan provides an external Ultra2/3 SCSI connector that can be inserted in an expansion slot. The cable end of the external SCSI connector can either be plugged into the Ultra2/3 SCSI motherboard connector, or it can be connected to the end of a 68-pin Ultra SCSI cable (be sure to take off the cable terminator first).



NOTE: You have the option to connect either Ultra2/3 SCSI or Ultra SCSI (and earlier) devices externally. However, mixing both Ultra2/3 SCSI and non-Ultra2/3 SCSI on the same channel will cause all devices on that channel to operate in Ultra SCSI (single-ended) mode with the limits of the cable and speeds of that interface.

STEP 1: Connect one end of an external SCSI cable to the external Ultra2/3 connector at the back of the computer.

68-pin External Ultra2/3 SCSI Connector

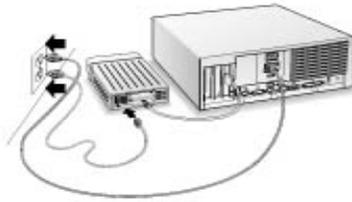


STEP 2: Connect the other end of the cable to a SCSI connector on the back of an external peripheral. If you are installing only one external peripheral, terminate the peripheral and skip to Step 4.

STEP 3: Connect other external peripherals by connecting each peripheral to the previous one until all peripherals are connected. The peripheral at the end of the chain must be the only external peripheral terminated.



STEP 4: Connect all power cables to the external peripherals.



4. Additional Termination Information

The last physical device on the end of each SCSI bus cable must be terminated. Termination must be disabled for all other devices in the middle of the cables. Ultra2/3 SCSI peripherals *do not* have built-in termination, but Ultra and Fast/Wide devices do have termination that must be checked. For more information refer to the owners manuals for each SCSI device.

The host adapter will automatically enable or disable termination as necessary.

When installed in multiple computer configurations, i.e. clusters, you can force the motherboard to enable termination even when power to the computer is OFF. This would enable the other computers in the cluster to continue to operate the shared SCSI devices even when the computer

supplying termination at the other end of the bus is shut down. By default, the motherboard is built with the onboard termination Enabled.

5. Installing Symbios 53C896 or 53C1010 SCSI Software

To install the 53C896 or 53C1010 SCSI software (drivers), go to the section below for the operating system installed on your computer (for example, Computers with Windows 95/98). If the operating system is not yet installed, install it now. Refer to your operating system documentation for instructions.



important!

NOTE: If you have installed a new SCSI hard drive in a computer running Windows or DOS, you must partition and format the drive with the DOS FDISK and FORMAT commands before it can be used. Refer to your Windows and DOS documentation for instructions.

Computers with Windows 98/95 Installed

1. Click on the Start Button on the Task bar and Select Settings, Control Panel. Under the Control Panel, select System, Device Manager, Other Devices.
2. Double click the "PCI SCSI bus controller"
3. Click on "Driver" and then "Update Driver" buttons.

4. Click "Next"
5. Select "Search for a better driver than the one your device is using now"
6. Click "Next" and select "Specify a location"
7. At the command prompt, type A:\ and click "Next". Where A: is the Symbios 53C896 or 53C1010 driver disk provided by Tyan.
8. Windows will copy driver from the floppy disk.
9. Repeat the steps above for the secondary SCSI channel.
10. Reboot the system when prompted.
11. Repeat the steps above for secondary SCSI channel.
12. Reboot the system when prompted.

Computers with Windows 2000 / NT 4.0 53C896 Installed

Windows 2000

1. SCSI drivers does not need to be installed, Windows 2000 will find it.
2. Make sure mem is in right slots(0-0, 1-1, 2-2, 3-3) Look at board for correct sequence.
3. Check JP1 jumper on means 100Mhz, off = cpu default(100 or 133)
4. Use approved memory
5. Make sure memory is same speed as FSB on CPU
6. Enable DMA in BIOS for IDE devices

NT4.0

1. Hit F6 as soon as NT starts, load supplied SCSI driver. If NT installation is from a floppy disk, go directly to step 2.
2. When it asks for a mass storage device press "S" to install the floppy disk..
2. Follow onscreen instructions.
2. Make sure memory is in the right slots(0-0, 1-1, 2-2, 3-3)
3. Check JP1 jumper on means 100Mhz off = cpu default
4. Use approved memory
5. Make sure mem is same speed as FSB on CPU
6. Enable DMA in BIOS for IDE devices
7. 1 CPU means you must have a terminator

Computers with Windows 2000 / NT 4.0 53C1010 Installed

1. Hit F6 as soon as 2000 / NT starts to load hit until allows you to install 1010 SCSI driver.
2. Choose option for loading SCSI manufacturer's drivers by pressing "S"
3. Follow on screen instructions to install drivers. (If using Windows 2000, the drivers must first be unzipped to a separate floppydisk before installation.)
4. Follow onscreen instructions.
2. Make sure mem is in right slots(0-0, 1-1, 2-2, 3-3) Look at board layout on page 12 for the correct sequence.
3. JP1 jumper on means 100Mhz, off = CPU default(100 or 133).
4. Use approved memory

5. Make sure memory is same speed as FSB on CPU
6. Enable DMA in BIOS for IDE devices

Computers with NetWare, OS/2, SCO UNIX, and UnixWare

The 7800 Family Manager Set included in the package allows you to install drivers for NetWare, OS/2, SCO UNIX, and UnixWare. Refer to the 7800 Family Manager Set User's Guide for installation instructions.

5. Troubleshooting

If you have any problems during the installations, check the following items first:

- Are all SCSI devices powered on?
- Are all SCSI cables and power cables properly connected?
- Does each device on the SCSI bus have a unique SCSI ID?
- Does the total SCSI cable length exceed the maximum allowable length?
- Is the SCSI chain properly terminated?

Appendix 2

Glossary

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

AGP (Accelerated Graphics Port) is a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66MHz, 2X supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133MHz.

The **AT** was the original form factor of IBM's PC.

ATAPI (AT Attachment Packet Interface), also known as IDE or ATA, is 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 hard drives.

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

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

A **BBS** (Bulletin Board System) is a computer system with a number of modems hooked

up to it which acts as a center for users to post messages and access information.

The **BIOS (Basic Input/Output System)** program 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.

A **buffer** is 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 the possibility of losing your data should the system crash. Information stored in a buffer is temporarily stored, not permanently saved.

A **bus** is 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).

A **cache** is 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 slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 1GB 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 512MB 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 are chips that hold the basic start-up information for the BIOS.

The **COM port** is another name for the serial port, which is so-called 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).

DIMM Dual In-line Memory Modules are a faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank DIMM banks are 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 are similar to IRQs. DMA channels allow hardware devices (like sound cards 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 and Play devices will take care of this for you.

In **Doze mode**, only the CPU's speed is slowed.

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

EDO RAM (Extended Data-Out RAM) speeds access to memory locations by assuming that memory addresses are static: the next time it looks for a bit of data, it will be at the same spot, or one nearby.

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/html/drivers.html>

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

Firmware is low level software that controls the system hardware.

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

A **Global timer** is an onboard hardware timer, such as the Real Time Clock.

Handshaking is a form of encryption. One system, typically the server, sends an encryption scheme to another agent, typically a client. Thus, the client's data is protected during transmittal to the server.

HDD stands for **Hard Disk Drive**.

H-SYNC controls the horizontal properties of the monitor.

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

IDE Integrated Device (or Drive) Electronics is a simple, self-contained hard drive interface. It can handle drives up to 8.4GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs).

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

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

IRQ An Interrupt Request is 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. Happily, Plug and Play operating systems take care of these details for you.

ISA stands for Industry Standard Architecture. ISA is a slower 8- or 16-bit BUS (data pathway).

Latency is 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 is waiting for the peripheral to send some data back (peripherals tend to be slower than on-board system components).

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

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

The **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 stands for Peripheral Component Interconnect. PCI is a 32-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).

The **PCI PIO (PCI Programmable Input/Output)** modes are the data transfer modes used by IDE drives. These modes use the CPU for data transfer (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 is a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

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

PnP is an acronym for Plug and Play, a design standard that has become ascendant in the industry. Plug and Play devices require little set-up to use. Novice end users can simply plug them into a computer that is running on a Plug and Play-aware operating system (such as Windows 95), and go to work. Devices and operating systems that are not Plug and Play require you to reconfigure your system each time you add or change any part of your hardware.

The term **RAM (Random Access Memory)**, while technically referring 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) is a storage chip which contains the BIOS (Basic Input/Output System), the basic instructions required to boot the computer and start up the operating system.

SDRAM (Synchronous Dynamic RAM) is so-called 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.

The **serial port** is so called 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).

SIMM Single In-line Memory Modules are the most common form of RAM. They must be installed in pairs, and do not have the carrying capacity or the speed of DIMMs.

SIMM bank/socket SIMM sockets are the physical slots into which you stick SIMM modules. A pair of SIMM sockets form a SIMM bank, and act as a unit. If only one socket is filled, the bank will not operate.

In **Sleep/Suspend mode**, all devices except the CPU shut down.

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

In **Standby mode**, the video and fixed disk drive shut down; all other devices operate normally.

UltraDMA 33/66 is a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without UltraDMA your system cannot take advantage of the higher data transmission rates of the new UltraATA hard drives.

Universal Serial Bus or USB, is 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) is the PC video display standard.

V-SYNC controls the vertical properties of the monitor.

WOL (Wake-on LAN) is a feature which allows remote power up through a LAN connection when used in conjunction with a WOL compliant network adapter and appropriate software. The system “listens” to network activity even when the computer is off. Special “wake-up” packets sent by another computer causes the adapter to signal the computer to power up and run a predefined program.

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



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 receiver.
- Plug the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer or 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 normes de Classe B d'interférence radio tel que spécifié par le Ministère Canadien des Communications dans les règlements d'interférence radio.

Notice for Europe (CE Mark)

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

CAUTION: Lithium Batteries included with this board. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to manufacturer instructions.