Tyan S1952DLU
Thunder X

Motherboard User's Manual
Revision 1.0

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TYAN COMPUTER

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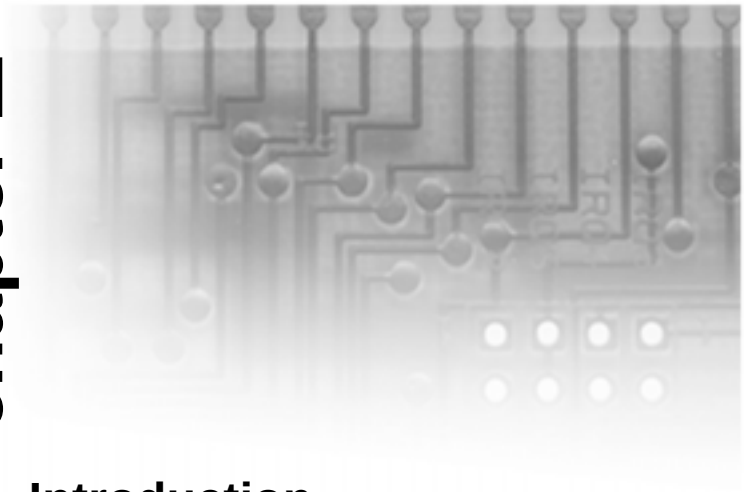
chapter 1



Introduction

Overview

The S1952DLU Thunder X is a quality, high performance motherboard designed for dual Intel Pentium II Xeon microprocessors. This motherboard utilizes the Intel 440GX AGPset and can support CPU speeds of 400MHz through 500MHz, and host bus speeds of up to 100MHz.

The S1952DLU motherboard, with built-in AGP slot, provides high performance capabilities that are ideal for a server environment and ideal for a wide range of demanding applications such as CAD, CAM, CAE, desktop publishing, 3D animation, and video production.

This integrated system board achieves high reliability with numerous features and yet is small enough to be supported in an extended ATX form factor. Some of the features included are onboard dual channel PCI PIO, Bus Master IDE and UltraDMA/33, onboard floppy controller, onboard 32-bit PCI Ultra2 dual channel SCSI, and onboard high speed I/O.

Flexibility and expendability have been designed into the Thunder X. With I/O and drive controller support built onboard, the one AGP slot, six PCI and one ISA slot (one shared, seven usable slots) are free for numerous add-on expansion cards.

Remember to take a look at TYAN Computer's web site located 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	•Two Slot 2 connectors •Supports 100MHz Bus (BIOS selectable) •Pentium II Xeon 400 - 500MHz. CPU •3 onboard VRM components (2 for CPUs / 1 for L2 cache)
Chipset Information	•Intel 440GX AGPset •Latest generation Slot 2 chipset •NS351 Super I/O chipset
Voltage and Power Information	•ATX power supply connector •+12V power source for DC fan onboard •3.3V DRAM support •Utilizes GTL+ bus to reduce power consumption and EMI
Main Memory	•Up to 2 GB memory support •Four 168-pin DIMM sockets. •Supports SDRAM w/SPD, SDRAM+ECC •100MHz SDRAM support
System Management	•ADM9240 sensor chip with onboard alarm for heat, fan, and voltage •Intel LANDesk Client Manager software included •Chassis intrusion detection capable. •Power recovery after interrupt
Expansion Slots	•One 32-bit AGP slot. •Six 32-bit PCI Bus Master slots. •One 16-bit ISA slots. •One shared PCI-ISA / seven usable slots.

.

Ultra2 LVD SCSI On-board	•Adaptec 7896 controller •32-bit Dual channel PCI Ultra2 LVD SCSI •Two 68-pin high density Ultra2 SCSI ports •One 50-pin single-ended SCSI-2 port
Chassis	•Intel Marlinspike MS440GX compatible Slot 2 chassis required.
Physical Dimensions	•Extended ATX design. •13.0 inches x 12.0 inches. •Requires Intel Venus compatible I/O shield.
BIOS Information	•AMI Plug and Play flash BIOS. •Deep Green, Energy Star, ACPI, Year 2000, and PC98 compliant. •Soft power-down, multiple boot options. •Win98/NT5 ready, DMI 2.0 compliant. •PCI 2.1, APM 1.1 compliant.
Disk Drive & System I/O	•Two PCI bus mastering EIDE channels. •Supports EIDE CD-ROMs. •PIO Mode 3 & 4 (up to 17MB/sec DTR). •Support for two floppy drives (up to 2.88MB). •Two ATX serial ports (16550 UARTs). •One ATX ECP/EPP parallel port. •One IR (InfraRed) I/O interface port. •Two ATX USB rev 1.2 (universal serial bus) ports. •One ATX PS/2 mouse connector. •One ATX PS/2 keyboard connector.

Software Specifications

OS

- Operates with MS-DOS, Windows 3.x, Windows for WorkGroup 3.x, Windows 95, Windows 98, Windows NT, OS/2, Novell Netware, and SCO Unix.

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 to you, you can actually bring your system in to them to have it serviced, instead of attempting to do so yourself (which can have expensive consequences). Please keep in mind that due to the volumes of emails and technical support calls we receive, our response time may not necessarily be immediate.

If your dealer is unable to assist you:

1) try our web page:	**http://www.tyan.com**
2) user newsgroup:	**alt.comp.periphs.mainboard.tyan**
3) technical support phone line:	**(510) 440-8808**
4) or e-mail address:	**techsupport@tyan.com**

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.

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chapter 2

Board Installation

2.1 Unpacking

The motherboard package should contain the following:

(1) S1952DLU motherboard
(1) 40-pin IDE and 34-pin floppy cable pack
(1) One Ultra 2 LVD 68-pin SCSI cable
(1) One 50-pin SCSI cable
(1) S1952 User's Manual
(1) One CPU retention module set.
(1) System Management & Driver CD (Intel LANDesk)

2.2 Installation

You are now ready to install your motherboard. The mounting hole pattern of the S1952DLU matches the ATX system board specifications. Your chassis should be that of an extended ATX mainboard form factor.

procedure

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.

important!

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.

2.3 Setting 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.

2 Pin Jumpers

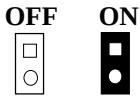


Figure 2-1

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 example of pin connections.

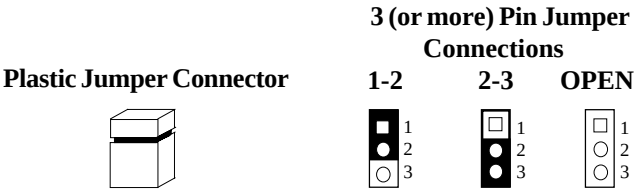


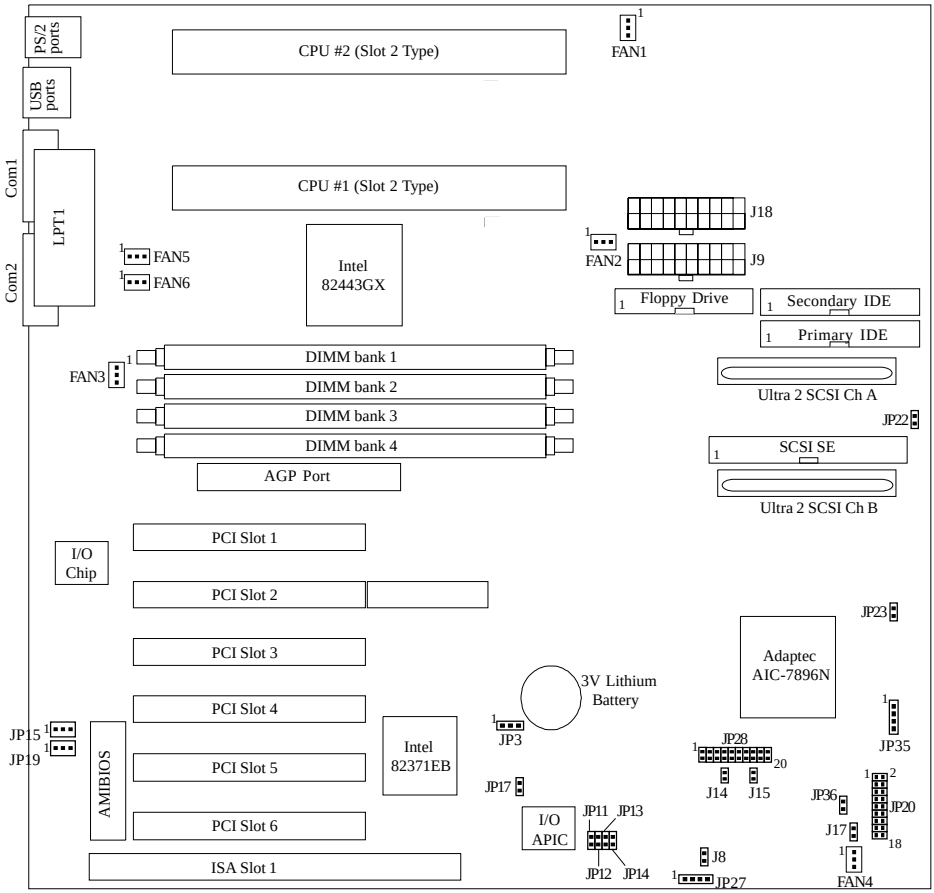
Figure 2-2

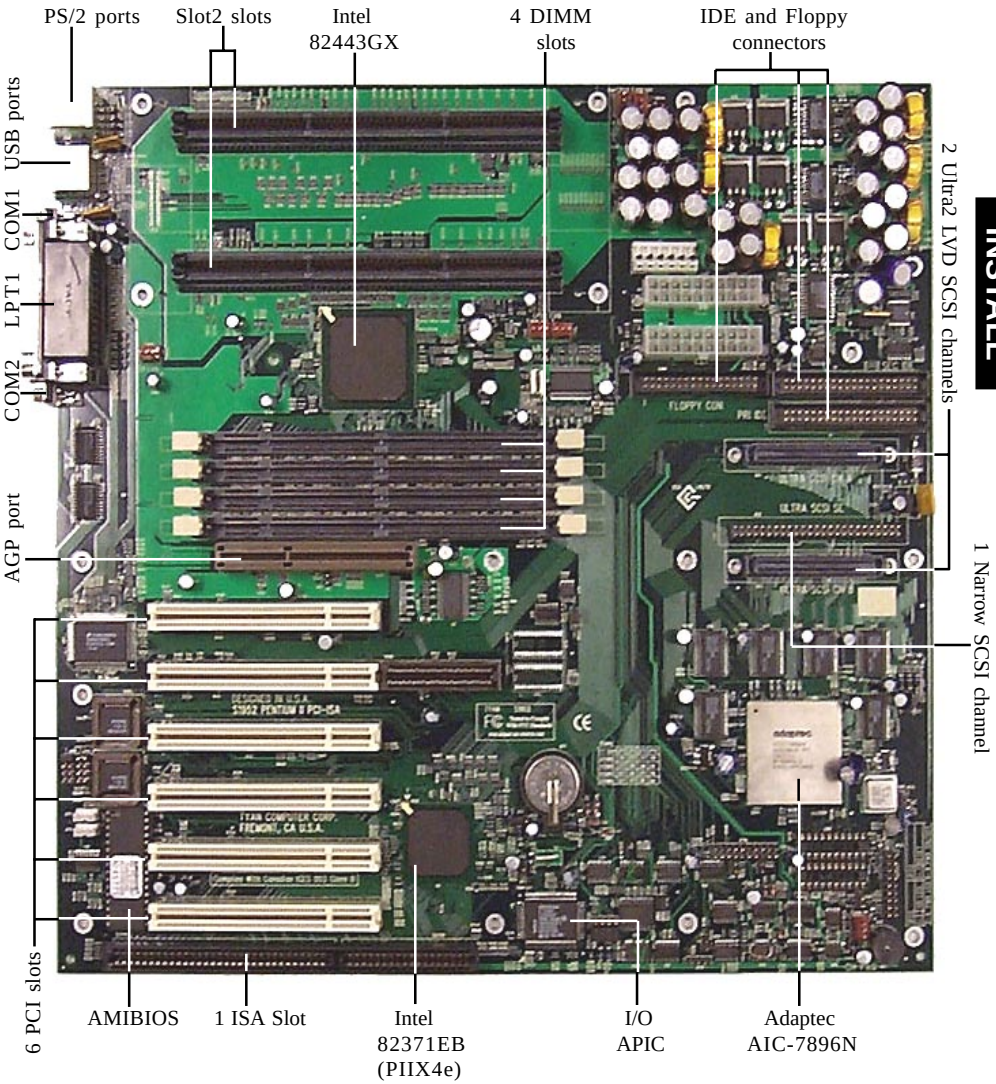
** In the figures, the darkened areas indicate the location of the plastic jumper connector*.

Quick References for Jumpers

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.

Map of Motherboard Jumpers




PS/2 ports
Slot2 slots
Intel 82443GX
4 DIMM slots
IDE and Floppy connectors
USB ports
COM1
LPT1
COM2
AGP port
2 Ultra2 LVD SCSI channels
1 Narrow SCSI channel
6 PCI slots
AMIBIOS
1 ISA Slot
Intel 82371EB (PIIX4e)
I/O APIC
Adaptec AIC-7896N

1 - CPU Speed Settings (Jumpers JP11, JP12, JP13, JP14)

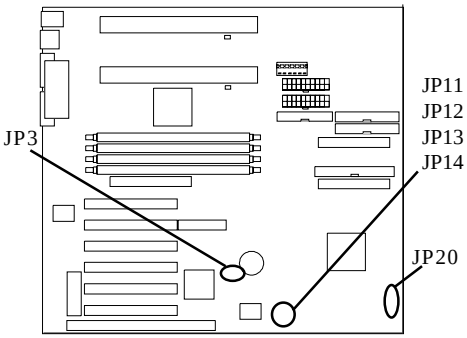
In order to adjust the speed of the CPU, change the jumper settings according to the chart below. The clock speed settings control the clock multiplier (CPU Core / Bus Ratio). Tyan does not recommend operating CPUs, memory, or PCI Bus at higher than rated speed. Tyan takes no responsibility for any problems related to overclocking any bus or component on the system board. See the motherboard diagram below for jumper locations

CPU Settings for 100MHz Bus

Clock Speed	Multiplier	JP11	JP12	JP13	JP14
350MHz	x 3.5	ON	OFF	OFF	ON
400MHz	x 4.0	OFF	ON	ON	ON
450MHz	x 4.5	OFF	ON	OFF	ON
500MHz	x 5.0	OFF	OFF	ON	ON

2 - CMOS Clear (Jumper JP3)

	Default	CMOS Clear
JP3	1-2	2-3



Hardware CMOS & Password Reset

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 and unplug your power supply.
2. Set jumper JP3 to pins 2 and 3 (see next page for location of JP3).
3. Wait for 2 seconds, then return jumper JP3 to pins 1 and 2.
4. Power on the system again (plug-in your power supply first).

By following this procedure, you will erase your password and reset the SCSI IRQ Settings CMOS to the BIOS defaults.

3 - Panel Connector Settings (Jumper JP20)

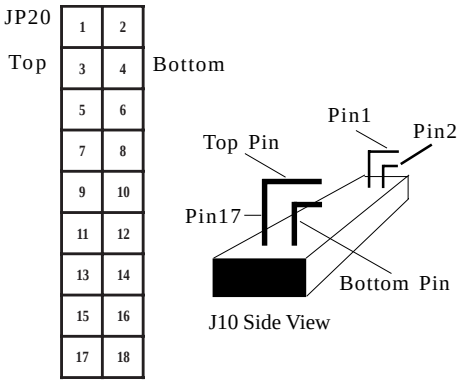
Pins	1-3	2-4	5-7 or 7-8	6-8 or 5-6	9-15
Functions	HD LED *	Power LED	Reset Switch	Power On/Off	Infra Red
Assignment	1=LED+ 3=LED-	**	5=GND 7=Reset 8=GND	5=GND 6=Power 8=GND	9=VCC 11=IR RX 13=GND 15=IR TX

* HD LED: Onboard SCSI LED can be enabled in the BIOS CMOS Setup. If SCSI LED is disabled, only the IDE HD LED will function.

** Power LED: For 2-pin: bicolor/single color - Use pins 2-4
For 3-pin: bicolor - Use pins 2-4 and GND pin 13

JP20 Pinout (2x9 External Connector)

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



4 - Speaker Connector (Jumper JP35)

	External Spkr	Internal Buzzer (Default)
JP35	1-4	3-4

5 - Internal SCSI LED Pinout (Jumper JP27)

1	VCC
2	LED
3	LED
4	VCC

Jumper settings at 1-2 or 3-4.

6 - Enable On-board SCSI (Jumper JP36)

	Enable SCSI	Disable SCSI
JP36	OFF	ON

7 - Proprietary Server Mgmt Connector Pinout (Jumper JP28)

NMSMBCLK	2	1	SERVERSMI#
GND	4	3	GND
MNSMBDATA	6	5	ON/OFFin
KEYUNLK	8	7	LPOK
NMSB3V	10	9	NMIOUT
GND	12	11	FP_RSET#
No Connect	14	13	GND
GND	16	15	SECURE
No Connect	18	17	CHISINT
GND	20	19	No Connect

8 - Wake-On LAN (Jumper JP15)

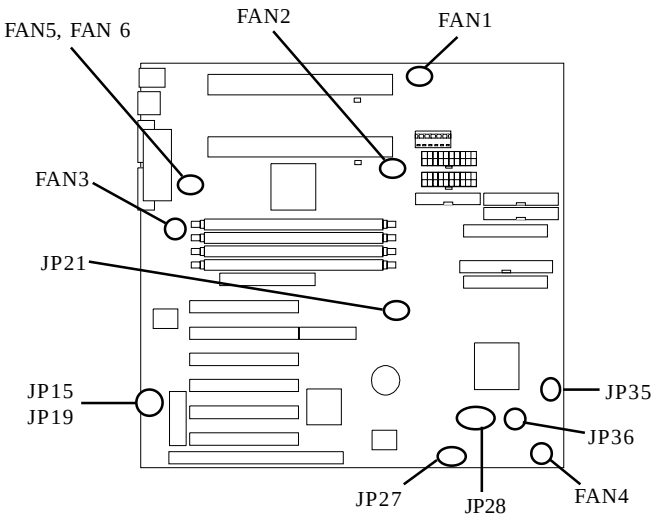
9 - Wake-On Ring (Jumper JP19)

10 - Other Pin Assignments

	1	2	3
JP15 (Wake-on LAN)	Stanby 5V	GND	Wake (Pwr ON, Active High)
FAN 1-6	GND	VCC	Fan Monitor

11 - Fan Speed Detect

	Speed Detect
Fan1 (CPU2)	Detect #0
Fan2 (CPU1)	Detect #1
Fan3 (Chassis)	No Speed Detect
Fan4 (Chassis)	No Speed Detect
Fan5 (CPU2)	No Speed Detect
Fan6(CPU1)	No Speed Detect



12 - Reserved Jumpers

The following jumpers are preset for optimum performance. Their settings are NOT to be changed. Tyan is not responsible for any motherboard malfunctions due to the tampering of these jumper settings. Location of these jumpers can be found on page 2-4.

JP2 / J14 / J15 / JP21 / JP22 / JP23 - RESERVED!

Soft Power Connector

The Soft Power Connector is located on pins 5 & 6 or pins 6 & 8 of jumper block JP20. The Thunder X uses the PIIX4e chip for power management, including turning on and off the system. If the Power Button Function option in the BIOS Power Management Menu is set to On/Off (which is the default), pressing the power button once after the BIOS has booted up will turn the system on and off. If the Power Button Function option is set to Suspend, pressing the power button once will wake the system or send it to Suspend mode. In this case, you cannot turn the system off unless you shut down through the Windows operating system or you hold the power button down for four seconds.

Speaker Connector Installation

The Thunder X provides a 4-pin header to connect the external speaker. The speaker should be connected to pins 1-4 of jumper JP35. As default, pins 3-4 of jumper JP35 are connected to the internal buzzer.

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. The Reset switch is a 2-pin connector and should be installed on pins 5 & 7 OR pins 7 & 8 of jumper JP20.

External SMI

The EXTSMI (External System Management Interface) connector, jumper JP17, is used by some plug-in cards. Certain applications associated with these plug-in cards use the interface for hardware control and queries.

Chassis Intrusion Alarm Connector

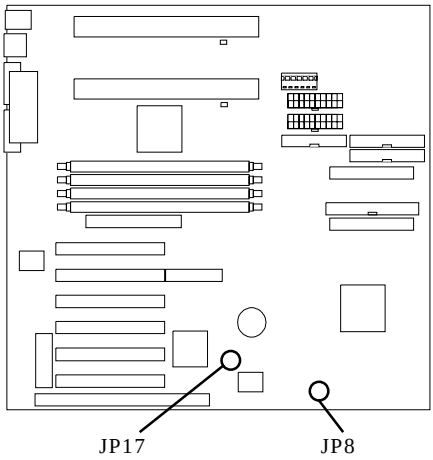
The J8 connector is an intrusion alarm, that can be connected to the system chassis. When active (J8 is connected to the chassis), this alarm will alert the system administrator anytime someone opens the system's case.

CMOS RTC

The 440GX AGPsets include a Real Time Clock (RTC) circuit, which provides the date and time for the system. If the external battery for the RTC is low, it will prevent your system from POSTing, and you will not get a display. 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 (Sony CR2032).

Flash EEPROM

The Thunder 100 uses flash memory to store BIOS programs. It can be updated as new versions of the BIOS become available. You can upgrade your BIOS easily using the flash utility (see page 3-31).



2.4 Memory Installation

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 use 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.

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. Some brands we recommend are Advantage Memory, Corsair Microsystems, Millennium, Kingston Memory, QesTec Incorporated, Unigen, Micron Technology, and Crucial Technology. These DIMMs have proven to be very stable on our boards and perform extremely well.

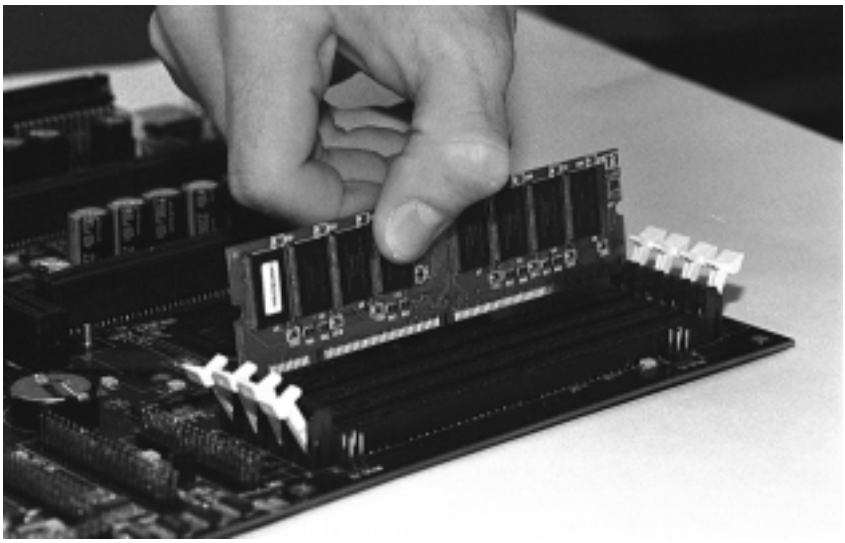
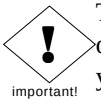


Figure 2-3

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 above shows how to set 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 in the ends of the DIMM (see Figure 2-4 below). To remove your DIMM, simply pull the clips back, and pull up on the module.

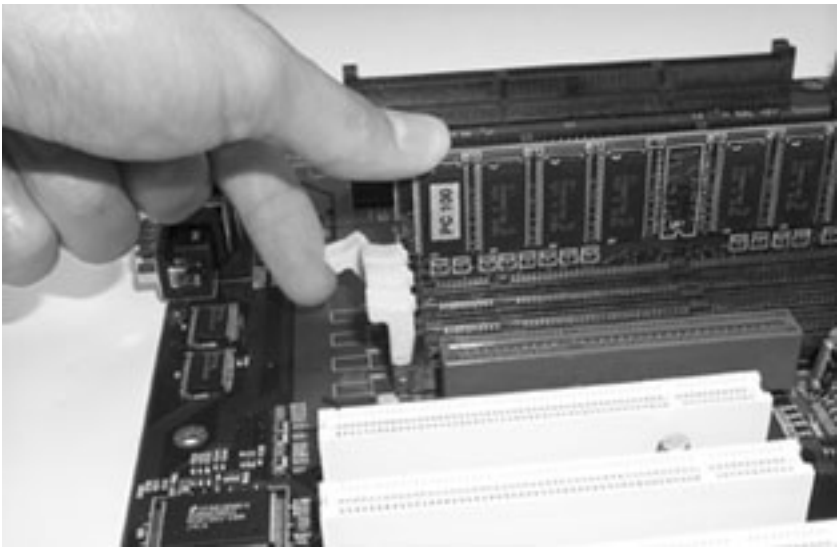


Figure 2-4

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

The Thunder X uses a 64-bit data path from memory to CPU and can accommodate up to 1024MB of SDRAM (2GB of SDRAM has not been validated). The 168-pin DIMMs (Dual In-line Memory Modules) must be of the 3.3V, **unbuffered** variety. The position of the notch in the SDRAM key position will tell you whether or not a DIMM is unbuffered (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.

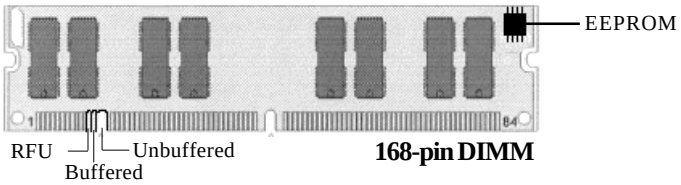


Figure 2-5

Some details of memory installation:

- One unbuffered DIMM must be installed for the system to POST.
- The mainboard supports 8MB, 16MB, 32MB, 64MB, 128MB SDRAM; and 256MB registered SDRAM DIMM modules.
- PC-100 DIMM is required if CPU bus speed is at 100MHz

The table below shows some of the possible memory configurations.

DIMM 1	DIMM 2	DIMM 3	DIMM 4	Total Memory
8MBx1	0	0	0	8MB
8MBx1	8MBx1	0	0	16MB
8MBx1	8MBx1	8MBx1	0	24MB
16MBx1	8MBx1	8MBx1	0	32MB
16MBx1	16MBx1	8MBx1	8MBx1	48MB
16MBx1	16MBx1	16MBx1	0	48MB
32MBx1	16MBx1	16MBx1	0	64MB
32MBx1	32MBx1	16MBx1	16MBx1	96MB
32MBx1	32MBx1	32MBx1	32MBx1	128MB
64MBx1	32MBx1	32MBx1	0	128MB
64MBx1	64MBx1	32MBx1	0	160MB
64MBx1	64MBx1	64MBx1	0	192MB
128MBx1	64MBx1	64MBx1	0	256MB
128MBx1	128MBx1	64MBx1	0	320MB
128MBx1	128MBx1	128MBx1	0	384MB
256MBx1	128MBx1	128MBx1	0	512MB
256MBx1	256MBx1	128MBx1	0	640MB
256MBx1	256MBx1	256MBx1	0	768MB
256MBx1	256MBx1	256MBx1	256MBx1	1024MB
512MBx1	512MBx1	512MBx1	512MBx1	2048MB

Cache Memory

Pentium II Xeon processors have the L2 (Level 2) cache built into their architecture, so there is no need for an L2 cache on the motherboard. The Pentium II Xeon processor has a physical L2 cache size of 2MB and a cacheable memory area of 2MB.

2.5 CPU Installation

Pentium II Xeon processors (400 through 500MHz) can be used on the Thunder X. Please refer to page 2-4 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.

Currently, Intel produces two types of Pentium II processors: the active (or boxed) cooling processor and the passive cooling processor (see Figure 2-6 below). These two types of processors are essentially the same in design; the only difference lies in their cooling methods. The active cooling processor is equipped with a cooling fan and heat sink, while the passive cooling processor is equipped with a heat sink alone. Both types of CPUs provide the user with the same performance, and both types can be installed in the Pentium II slot on the Thunder X.

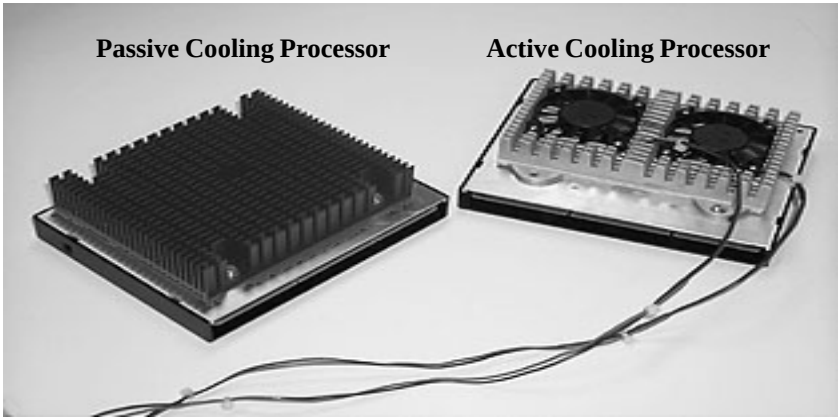


Figure 2-6

First Install the motherboard into your case.
Make sure that your case/chassis is compatible with Intel's MarlinSpike MS440GX Slot 2 chassis! Four bolts on the chassis should fit through the motherboard holes located near the CPU slots (see Figure 2-7 below). Follow the instructions provided by the case manufacturer for proper installation guidelines. TYAN recommends that you use only one screw to hold down the motherboard. The rest of the mounting holes should be used for the plastic standoffs. If your case does not have a hole for a standoff, simply cut off the bottom of the plastic standoff so that the flat portion rests on the metal. 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.

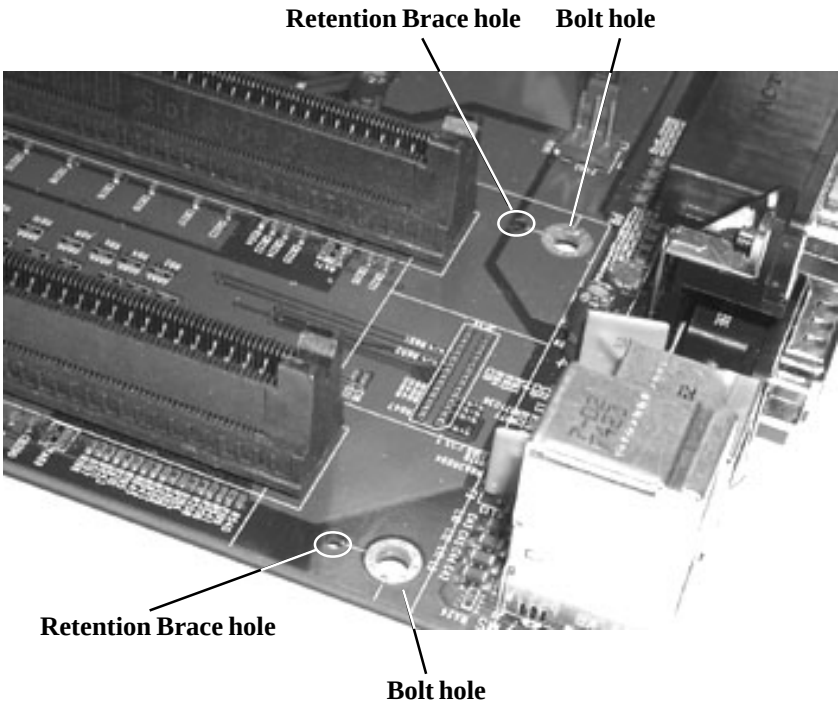


Figure 2-7

Installing CPU Retention Brace

Installation of a Pentium II Xeon processor requires a pair of CPU retention braces (see Figure 2-8), which is first secured onto the motherboard.

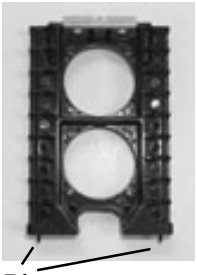


Figure 2-8

To attach the retention braces, locate the small retention brace hole and the bolt hole near the CPU slots on the board (see Figure 2-7 on previous page). Carefully line up the pins on the bottom of the brace with the retention brace holes. At the same time, make sure the chassis bolts are in line with the bolt holes on the retention brace. There is only one correct orientation for the modules to be set properly.

warning

Set the braces in place and fasten them to the bolt using a nut. Tighten the nut in a clockwise manner to secure the brace to the board. **Warning:** Do NOT overtighten as you may damage the retention brace and/or the motherboard. Your fastened retention braces should look like Figure 2-9 below..

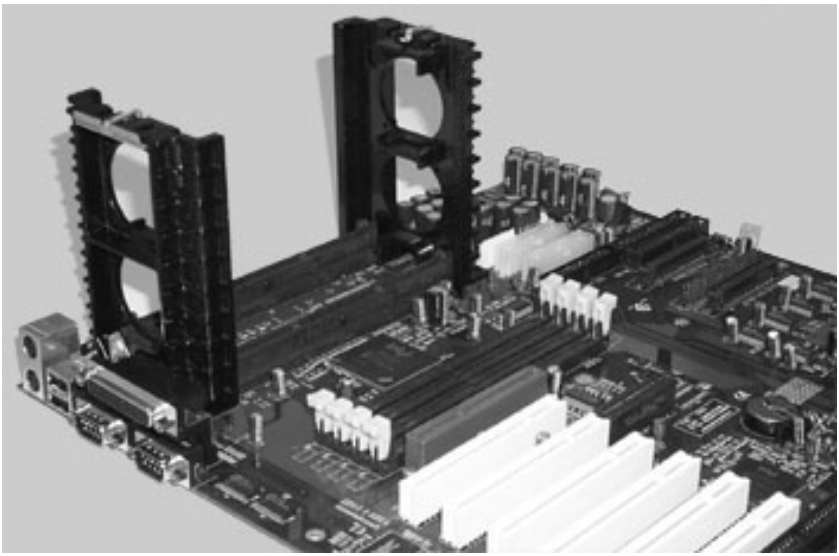


Figure 2-9

Installing the Processor

Before the CPUs can be plugged into the slots, you must attach a handle to each CPU (See Figure 2-10). The handles secure the alignment of the CPUs with each slot and fasten on top of the retention brace to lock the CPUs in place.

Figure 2-10

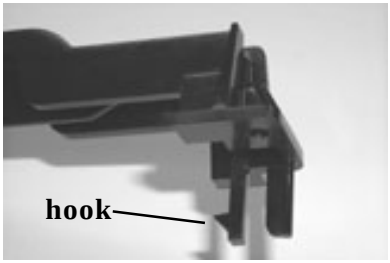


Figure 2-11

On each side of the handle is a small hook that fits nicely into the notches on the sides of the CPU (See Figure 2-11). In order to attach the handle, slide the handle over the top side of the CPU until the handle snaps into place (See Figure 2-12)

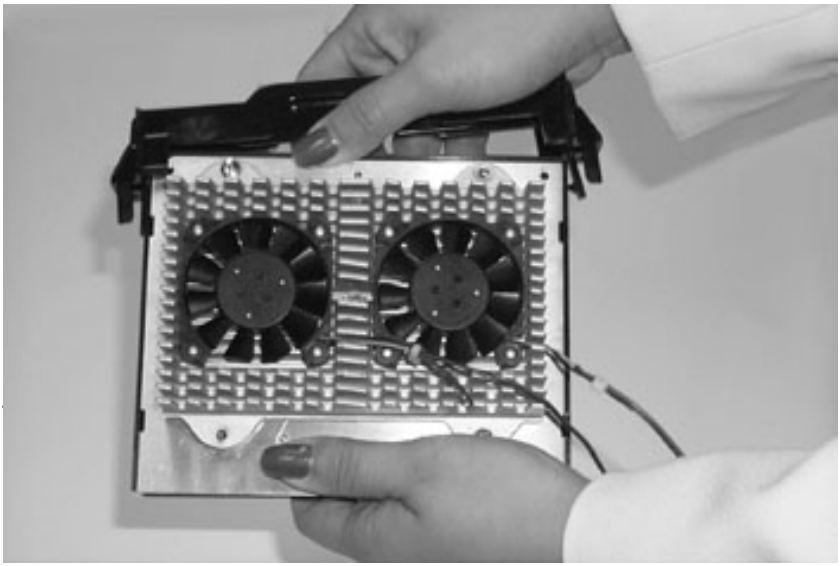


Figure 2-12

important!

NOTE: The orientation of the handle to the CPU depends on which slot the CPU will be inserted to. (See page 2-4 for location of the slots.)

Installing CPU 1

First attach the handle to the top of CPU1. Align the handle so that the screw holes of the handle are on the **OPPOSITE** side of the cooling fan or heat sink. See Figure 2-13.

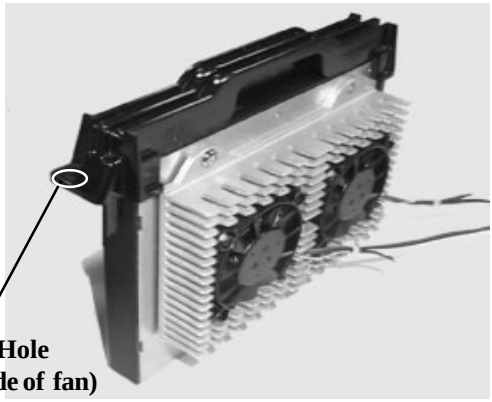


Figure 2-13

When the handle is securely installed, you are ready to plug in the CPU. Slide the CPU between the two retention braces and onto CPU1 slot. Make sure that the fan or heat sink is facing away from the edge of the motherboard. Press down firmly on the handle until the CPU is securely in the slot (see Figure 2-14 below). Be sure to screw the handles onto the retention braces after CPU is inserted.

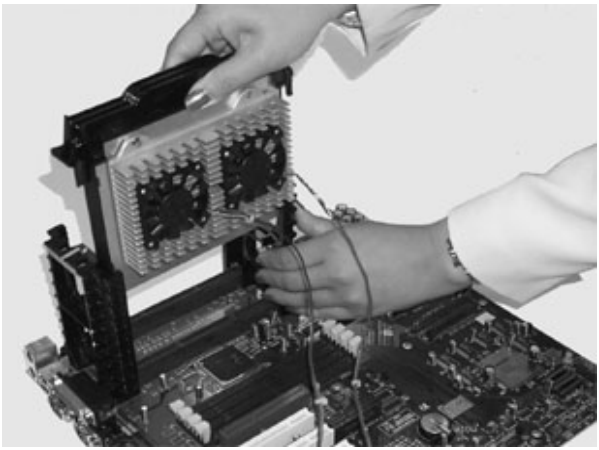


Figure 2-14

Installing CPU 2

Attach the handle to the top of CPU 2. Align the handle so that the screw holes of the handle are on the **SAME** side of the cooling fan or heat sink. See Figure 2-15 below.

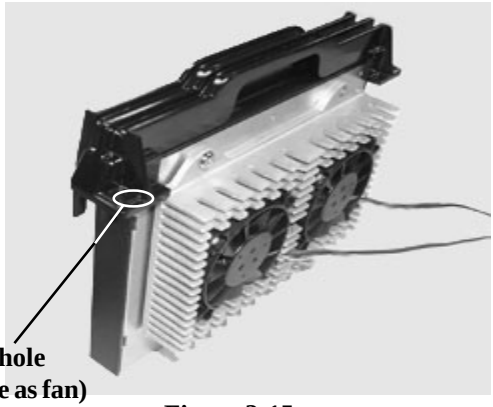


Figure 2-15

Install CPU2 into the CPU2 slot the same way you installed CPU 1. Again, make sure that the fan or heat sink is facing away from the edge of the motherboard (see Figure 2-14 on previous page).

If you have an active cooling processor, you will need to connect the CPU's fan cable to the fan power connector on the board. Locate the fan connector (e.g. FAN1) on the motherboard. Plug the CPU's fan cable into the fan connector. There will be a plastic clip assembly similar to that of the ATX power connector that will force you to connect the fan cable correctly (see Figure 2-16 below).

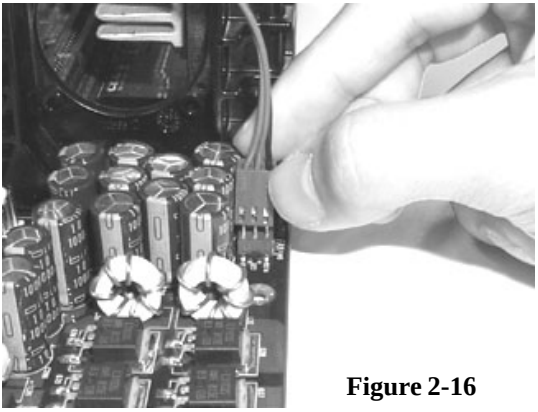


Figure 2-16

Removing the CPU.
To remove the CPU, unscrew the screws on the handle and gently pull the handle up until the CPU is released from its slot. Be careful not to bend the motherboard.

NOTE ON USING A SINGLE CPU:
If you are using a single CPU, Tyan recommends that the CPU be installed in the **CPU2 slot.** The default slot on the Thunder X is the CPU2 slot. If you choose to install your CPU in the CPU1 slot, you will not be able to monitor your CPU with your system management software.

2.6 Add-on Card Installation

There are a few 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 two 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.

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.

2.7 Power Supply Installation

Connecting the Power Supply
Tyan recommends using an ATX power supply that conforms to industry standard revision 2.01. The Thunder X motherboard comes equipped with two onboard power connectors. This allows the option of using two power supplies in order to distribute the load created by any number of devices that you may have in your system.

Figure 2-17 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 2-18 below).

Figure 2-17

warning

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.

Figure 2-18

2.8 Connecting IDE / SCSI Cables and Devices

The colored stripe on a ribbon cable should face toward the top of your chassis, or towards the big white B printed on the motherboard.
In Figure 2-19 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.

Figure 2-19

In most cases, this is the proper way of connecting your IDE cable to the hard drive. Figure 2-20 shows the IDE cable properly connected to the motherboard.

The Thunder X motherboard is equipped with three onboard SCSI connectors - two Ultra 2 SCSI channels and one Single-Ended SCSI channel. Connection of SCSI cables to SCSI devices is similar to an IDE connection.

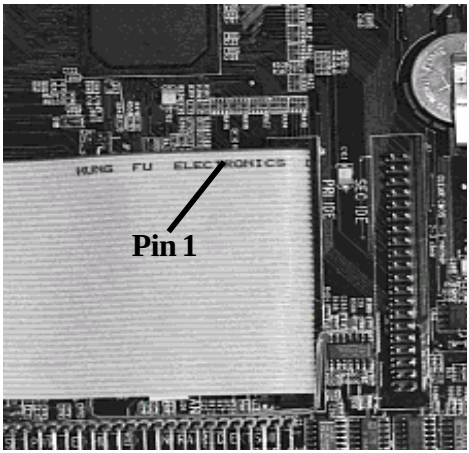


Figure 2-20

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/motherboard. Try another HDD.
- Hard drives do not power up: check power cables and cabling. May also be a bad power supply or IDE drive.

2.9 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 2-21 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.

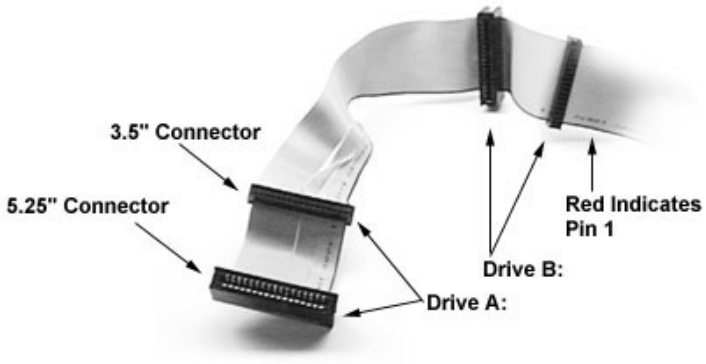


Figure 2-21

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 2-20 on the previous page 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, or see Figure 2-20 on page 2-18.

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.

2.10 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 2-22 at the top of the next page 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.

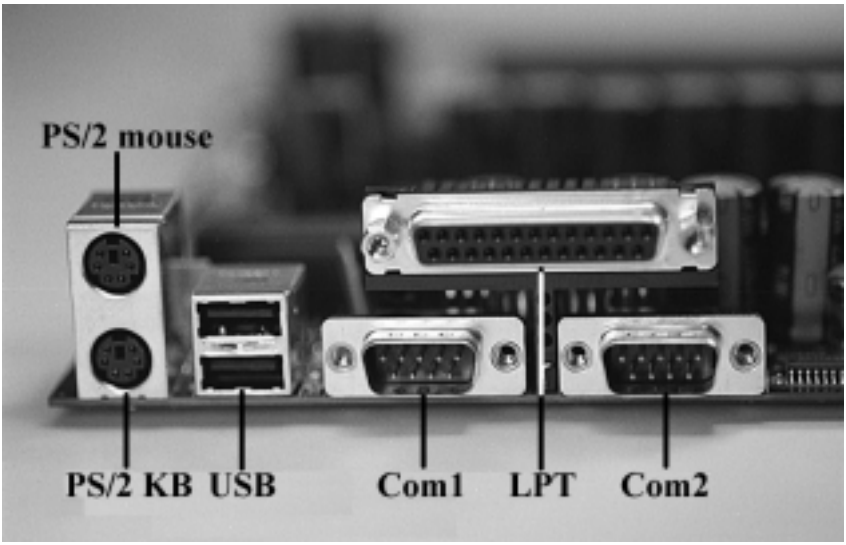


Figure 2-22

2.11 Connecting USB and PS/2 ports

This board includes ports for USB, PS/2 mouse, and PS/2 keyboard devices. The location of these ports is shown in Figure 6 above. 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. Figure 2-23 on the next pate shows the PS/2 ports on the left and USB ports on the right.

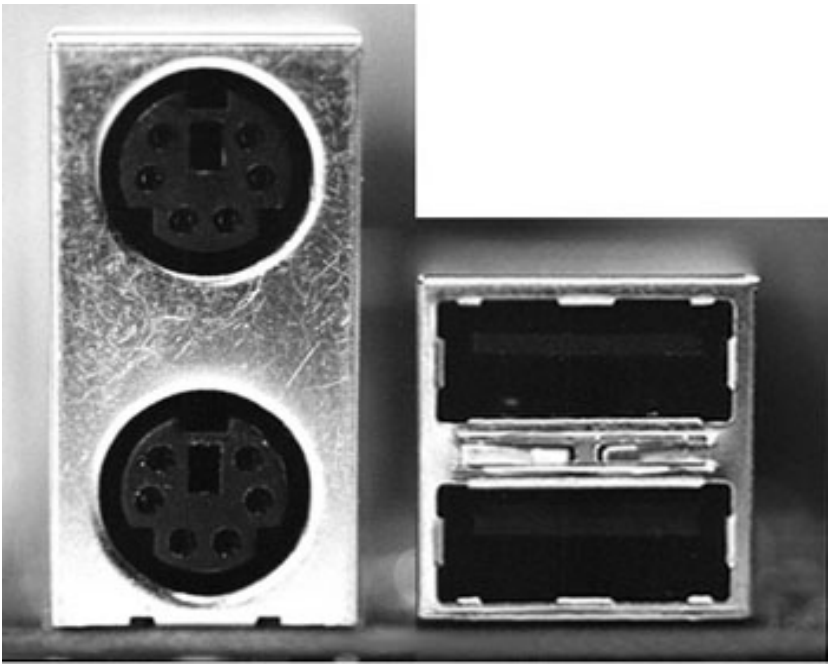


Figure 2-23

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 1-8).

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chapter 3

BIOS Configuration

The AMIBIOS Setup screen is shown below.

```
              AMI BIOS EASY SETUP UTILITY Ver.1.16
          (c)1998 American Megatrends, Inc.  All Rights Reserved
  Main    Advanced    Security    Exit

                  System Date  Thu Oct 15 1998          Setup Help
                  System Time  12:55:37
                                                      Month:  Jan - Dec
               Floppy Drive A  1.44 MB 3½               Day:   01 - 31
               Floppy Drive B  Not Installed           Year:  1901 - 2099

            Primary IDE Master  Auto
              Primary IDE Slave  Auto
          Secondary IDE Master  Auto
            Secondary IDE Slave  Auto

        Auto-Detect Hard Disks  [ Enter ]

  Boot Sector Virus Protection  Disabled

                                                        ↑ Previous Item
                                                        ↓ Next Item
                                                        ↔ Select Menu

ESC:Exit  Enter:Select  F5:Setup Defaults  F6:Original Values  F10:Save & Exit
```

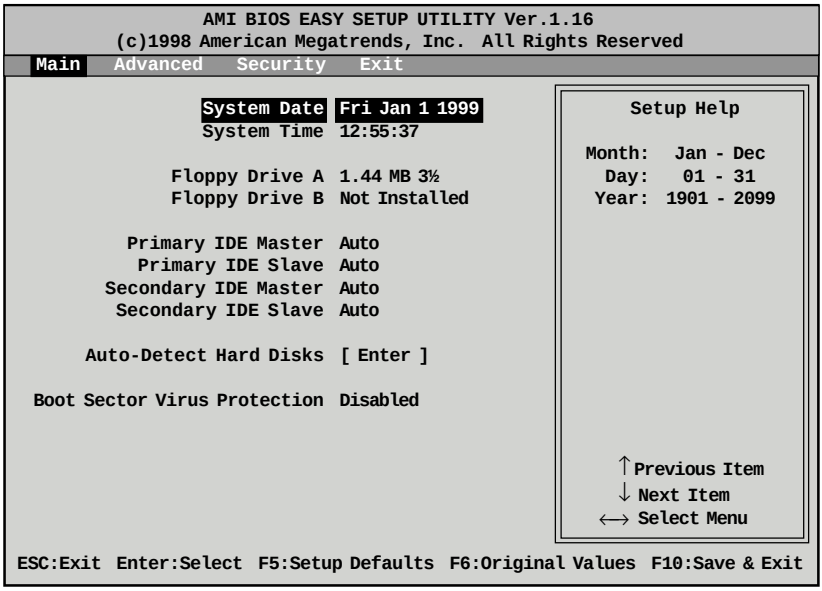
You can select a Setup option by using the following keyboard keys:

Key	Function
Tab	Moves from one box to the next
Arrow keys	Changes selections within a box
Enter	Opens highlighted selection

The pages which follow contain explanations of the settings for the AMIBIOS Setup menus. Drawings have been included for ease of reference. Overall, the AMIBIOS 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.

3.1 Main Setup

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



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 ↑ ↓ cursor keys. The clock runs on a 24-hour cycle (i.e. 1:00 PM is 13:00).

```
[ System Date Setting ]

MM/DD/YY: Jan 1 1998
```

```
[ System Time Setting ]

Current Time 12:00:00
```

Floppy Drive 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.

```
OPTIONS

Not Installed
360 KB 5¼
1.2 MB 5¼
720 KB 3½
1.44MB 3½
2.88MB 3½
```

Primary Master, Primary Slave, Secondary Master, Secondary Slave

Select these options to configure the various drives. A screen with a list of drive parameters appears.

```
AMI BIOS EASY SETUP UTILITY Ver.1.16
(c)1998 American Megatrends, Inc.  All Rights Reserved
Main

IDE Device Configuration  AUTO

                Cylinders
                    Heads
  Write Precompensation
                Sectors
        Maximum Capacity

                LBA Mode
               Block Mode
Fast Programmed I/O Modes
    32 Bit Transfer Mode  ON

Setup Help

1-46: Predefined types
USER: Set Parameters
  by User
AUTO: Set Parameters
  automatically
CD-ROM: Use for ATAPI
  CD-ROM drives
OR
Double click [AUTO] to
set all HDD parameters
automatically

ESC:Back  Enter:Select  ↑↓:Select Items  F5:Setup Defaults  F6:Original Values
```

BIOS

IDE Device Configuration: To have the BIOS autodetect the IDE drive, select Auto. Otherwise, you may choose one of the 46 drive types offered, or enter the parameters yourself (see Entering Drive Parameters on page 3-5). Consult the table below to see how to configure various drive types yourself.

Type	How to Configure
SCSI	Select *Type*. Select *Not Installed* on the drive parameter screen. The SCSI drivers provided by the SCSI manufacturer should allow you to configure the SCSI drive.
IDE	Select *Type*. Select *Auto* to let AMIBIOS determine the parameters. Click on *OK* when AMIBIOS displays the drive parameters. Select *LBA Mode*. Select *On* if the drive has a capacity greater than 540MB. Select *Block Mode*. Select *On* to allow block mode data transfers. Select *32-Bit Mode*. Select *On* to allow 32-bit data transfers. Select the *PIO Mode*. It is best to select *Auto* to allow AMIBIOS to determine the PIO mode. If you select a PIO mode that is not supported by the IDE drive, the drive will not work properly. If you are absolutely certain that you know the drive's PIO mode, select PIO mode 0-4, as appropriate.
CD-ROM	Select *Type*. Select *CDROM*. Click on *OK* when AMIBIOS displays the drive parameters.
Standard MFM	(MFM drives are older IDEs which use an encoding scheme that produces slower data access and less storage room.) Select *Type*. You must know the drive parameters. Select the drive type that exactly matches your drive's parameters.
Non-Standard MFM	Select *Type*. If the drive parameters do not match the drive parameters listed for drive types 1-46, select *User* and enter the correct hard disk drive parameters.

LBA/Large Mode: These modes make it possible for the BIOS to take advantage of the additional space on drives which are larger than 504MB. This can be autodetected (when you select Auto for Type), or you can turn the modes On or Off yourself.

Block Mode: If On, Block Mode automatically detects the optimal number of block read/writes per sector that the drive can support.

Fast Programmed I/O Modes: Programmed Input/Output is a method of transmitting data between devices that uses the system's CPU as part of the data path. There are 6 modes - 5 with their own transmission speed and 1 auto mode. To use modes 3 and 4, you must be using an Enhanced IDE drive.

PIO Mode	Data Transfer Rate (MBps)
Auto	
0	3.3
1	5.2
2	8.3
3	11.1
4	16.6

32bit Transfer Mode: If On, allows for the transmission of 32 bits in parallel (i.e. at the same time). If Off, only 16 bits will be transmitted in parallel.

Entering Drive Parameters

If you select User for the drive Type, you can enter the hard disk drive parameters yourself. The drive parameters are as follows:

Parameter	Description
Type	The number for a drive with certain identification parameters (see the next page for a table of drive types).
Cylinders (Cyl)	The number of cylinders in the disk drive.
Heads (Hd)	The number of heads.
Write Precompensation (WP)	The actual physical size of a sector gets progressively smaller as the track diameter diminishes. Yet, each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number on the disk surface where write precompensation begins.
Sectors (Sec)	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).

Auto-Detect Hard Disks
This option lets the system detect your hard disk(s) automatically for your convenience.

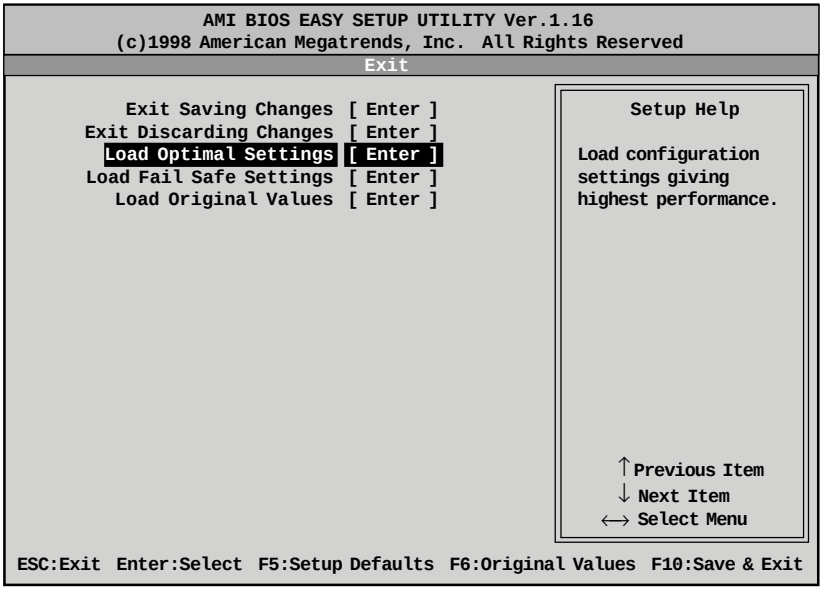
Boot Sector Virus Protection
The available settings for this option are 'Enable' and 'Disable'.

Default Settings

Every option in AMIBIOS Setup contains two default values: a Fail-Safe default and the Optimal default value. You can also choose to restore the original BIOS settings (i.e. those that your board came with) at any time. These options can be found in the 'Exit' menu.

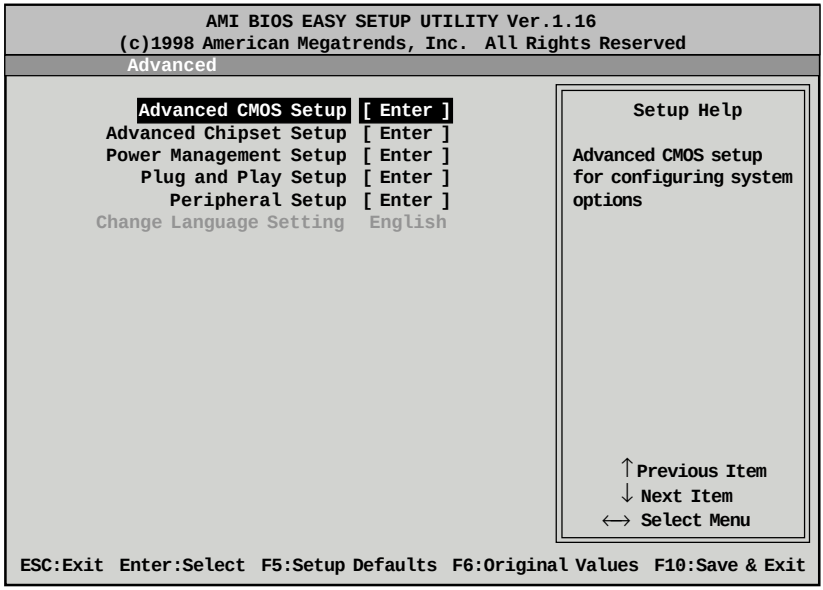
Optimal Defaults
The Optimal default values provide optimum performance settings for all devices and system features.

Fail-Safe Defaults
The Fail-Safe default settings consist of the safest set of parameters. Use them if the system is behaving erratically. They should always work but do not provide optimal system performance characteristics.



3.2 Advanced CMOS Setup

The Advanced Setup options included in the AMIBIOS Setup for the Thunder X are described in this chapter. Select Advanced Setup from the AMIBIOS Setup main menu to display the Advanced Setup options.



Advanced CMOS Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Quick Boot	Enabled	Enabled
Primary Master ARMD Emulated as	Auto	Auto
Primary Slave ARMD Emulated as	Auto	Auto
Secondary Master ARMD Emulated as	Auto	Auto
Secondary Slave ARMD Emulated as	Auto	Auto
1st Boot Device	Floppy	Floppy
2nd Boot Device	1st IDE-HDD	1st IDE-HDD
3rd Boot Device	ATAPI CDROM	ATAPI CDROM
Try Other Boot Devices	Yes	Yes
Floppy Access Control	Read-Write	Read-Write
Hard Disk Access Control	Read-Write	Read-Write

Settings Chart (Continued)

Setting Option	Optimal Default	Fail-Safe Default
S.M.A.R.T. for Hard Disks	Disabled	Disabled
Boot Up Num-Lock	On	On
PS/2 Mouse Support	Enabled	Enabled
Primary Display	VGA/EGA	VGA/EGA
Password Check	Setup	Setup
Boot To OS/2	No	No
Internal Cache	WriteBack	WriteBack
System BIOS Cacheable	Enabled	Disabled
Cache Bus ECC	Enabled	Enabled
Default Primary Video	AGP	AGP
MPS Revision	1.1	1.1
C000,16K Shadow	Cached	Cached
C400,16K Shadow	Cached	Cached
C800,16K Shadow	Disabled	Disabled
CC00,16K Shadow	Disabled	Disabled
D000,16K Shadow	Disabled	Disabled
D400,16K Shadow	Disabled	Disabled
D800,16K Shadow	Disabled	Disabled
DC00,16K Shadow	Disabled	Disabled

Advanced Setup

Quick Boot

Set this option to Enabled to instruct AMIBIOS to boot quickly when the computer is powered on. This option replaces the old Above 1 MB Memory Test Advanced Setup option. The settings are:

Setting	Description
Disabled	AMIBIOS tests all system memory. AMIBIOS waits up to 40 seconds for a READY signal from the IDE hard disk drive. AMIBIOS waits for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. AMIBIOS checks for a <Del> key press and runs AMIBIOS Setup if the key has been pressed.
Enabled	AMIBIOS does not test system memory above 1MB. AMIBIOS does not wait up to 40 seconds for a READY signal from the IDE hard disk drive. If a READY signal is not received immediately from the IDE drive, AMIBIOS does not configure that drive. AMIBIOS does not wait for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. You cannot run AMIBIOS Setup at system boot, because there is no delay for the *Hit <Del> to run Setup* message.

Pri/Sec Master/Slave ARMD Emulated as
ATAPI Removable Media Disks (e.g. ZIP drives) are hybrid drives. They are removable, and can be used as floppy drives, but also have great capacity and so are sometimes used as hard drives. These four options ensure that, if you have an ARMD attached as a master or slave device, it can be properly detected by the system. The settings are Auto, Floppy, and Hard Disk.

1st Boot Device
This option sets the type of device for the first boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM, SCSI, NETWORK, and I_2O.

2nd Boot Device
This option sets the type of device for the second boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM, and SCSI.

3rd Boot Device
This option sets the type of device for the third boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM.

Try Other Boot Devices
Set this option to Yes to instruct AMIBIOS to attempt to boot from any other drive in the system if it cannot find a boot drive among the drives specified in the 1st Boot Device, 2nd Boot Device, and 3rd Boot Device options. The settings are Yes or No.

Floppy Access Control
This option specifies the read-write access that is set when booting from a floppy drive. The settings are Read-Write or Read-Only.

Hard Disk Access Control
This option specifies the read-write access that is set when booting from a hard disk drive. The settings are Read-Write or Read-Only.

S.M.A.R.T. for Hard Disks
Set this option to Enabled to permit AMIBIOS to use the SMART (System

Management and Reporting Technologies) protocol for reporting server system information over a network. Enabling this feature allows you to back up your data when your hard disk is about to fail. The settings are Enabled or Disabled.

Boot Up Num-Lock
Set this option to Off to turn the Num Lock key off when the computer is booted so you can use the arrow keys on both the numeric keypad and the keyboard. The settings are On or Off.

PS/2 Mouse Support
Set this option to Enabled to enable AMIBIOS support for a PS/2-type mouse. The BIOS will allocate IRQ12 for the PS/2 mouse. The settings are Enabled or Disabled.

Primary Display
This option configures the type of monitor attached to the computer. The settings are Absent, VGA/EGA, CGA40x25, CGA80x25, or Mono.

Password Check
This option enables password checking every time the system boots or when you run AMIBIOS Setup. If Always is chosen, a user password prompt appears every time the computer is turned on. If Setup is chosen, the password prompt appears if AMIBIOS is executed.

Boot To OS/2
Set this option to Yes if you are running an OS/2 operating system and using more than 64 MB of system memory on the motherboard. The settings are Yes or No.

Internal Cache
This option sets the type of caching algorithm used by the L1 internal cache memory on the CPU. The settings are Disabled, WriteThru, or WriteBack.

System BIOS Cacheable
When set to Enabled, the contents of the F0000h system memory segment can be read from or written to cache memory. The contents of this memory segment are copied from the BIOS ROM to system RAM for faster execution. The settings are Enabled or Disabled. The Optimal default setting is Enabled.

Cache Bus ECC
When Enabled, this option permits ECC error checking on the L2 cache bus. This ensures that cached data is not improperly altered. The settings are Enabled or Disabled.

Default Primary Video
This option sets the primary video card as either AGP (Accelerated Graphics Port) card or a regular PCI video card. The settings are AGP or PCI.

MPS Revision
This option sets the Multi-Processor Symmetry. Then settings are 1.1 or 1.4.

C000,16K Shadow and C400,16K Shadow
These options specify how the 32 KB of video ROM at C0000h is treated. The settings are:

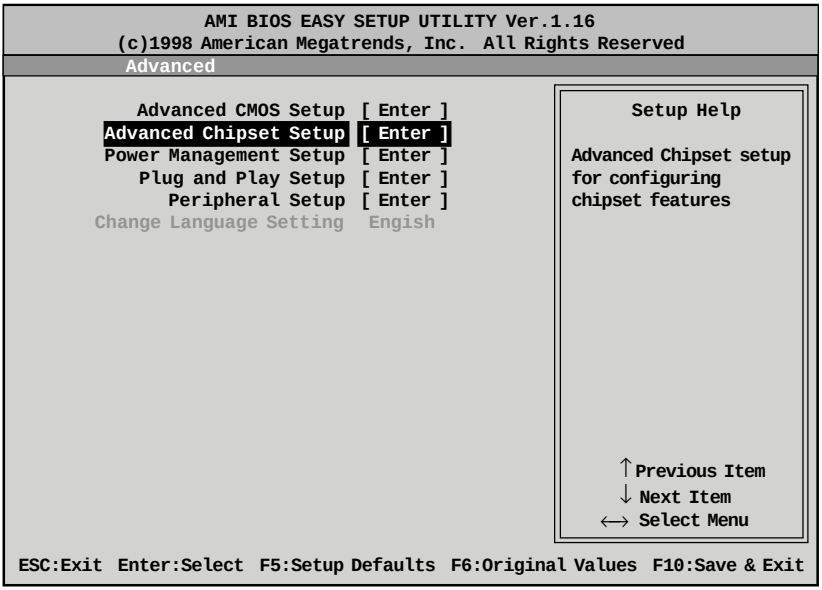
Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Enabled	The contents of the video ROM area from C000h-C7FFFh are copied (shadowed) from ROM to RAM for faster execution.
Cached	The contents of the video ROM area from C000h-C7FFFh are copied from ROM to RAM and can be written to or read from cache memory.

C800,16K Shadow; CC00,16K Shadow; D000,16K Shadow; D400,16K Shadow; D800, 16K Shadow; and DC00,16K Shadow
These options enable shadowing of the contents of the ROM area named in the option. The ROM area not used by ISA adapter cards is allocated to PCI adapter cards. The settings are:

Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Enabled	The contents of the designated ROM area are copied (shadowed) from ROM to RAM for faster execution.
Cached	The contents of the designated ROM area are copied from ROM to RAM and can be written to or read from cache memory.

3.3 Chipset Setup

Choose Chipset Setup on the AMIBIOS Setup main menu. All Chipset Setup options are then displayed. AMIBIOS Setup can be customized. AMIBIOS Setup can be customized via AMIBCP. See the AMIBIOS Utilities Guide for additional information.



Advanced Chipset Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
USB Function	Disabled	Disabled
*USB KB/Mouse Legacy Support	Disabled	Disabled
*Port 64/60 Emulation	Disabled	Disabled
SERR#	Disabled	Disabled
PERR#	Disabled	Disabled
WSC# Handshake	Enabled	Enabled
USWC Write Post	Enabled	Enabled
Master Latency Timer (Clks)	64	64
Multi-Trans Timer (Clks)	32	32
PCI1to PCI0 Access	Disabled	Disabled
Method of Memory Detection	Auto & SPD	Auto & SPD
DRAM Integrity Mode	Auto	Auto

Settings Chart (continued)

Setting Option	Optimal Default	Fail-Safe Default
DRAM Refresh Rate	15.6 us	15.6 us
Memory Hole	Disabled	Disabled
SDRAM RAS# to CAS# Delay	3SCLKs	3SCLKs
SDRAM RAS# Precharge	3SCLKs	3SCLKs
Power Down SDRAM	Disabled	Disabled
ACPI Control Register	Disabled	Disabled
Gated Clock	Disabled	Disabled
Graphics Aperture Size	64 MB	64 MB
Search for MDA Resources	Yes	Yes
AGP Multi-Trans Timer (AGP Clks)	32	Disabled
AGP Low-Priority Timer (Clks)	16	Disabled
AGP SERR	Disabled	Disabled
AGP Parity Error Response	Disabled	Disabled
8bit I/O Recovery Time	Disabled	Disabled
16bit I/O Recovery Time	Disabled	Disabled
PIIX4 SERR#	Disabled	Disabled
USB Passive Release	Enabled	Enabled
PIIX4 Passive Release	Enabled	Enabled
PIIX4 Delayed Transaction	Disabled	Disabled
Type FDMA Buffer Control1	Disabled	Disabled
Type FDMA Buffer Control2	Disabled	Disabled
DMA-0 Type	Normal ISA	Normal ISA
DMA-1Type	Normal ISA	Normal ISA
DMA-2 Type	Normal ISA	Normal ISA
DMA-3 Type	Normal ISA	Normal ISA
DMA-4 Type	Normal ISA	Normal ISA
DMA-5 Type	Normal ISA	Normal ISA
DMA-6 Type	Normal ISA	Normal ISA
DMA-7 Type	Normal ISA	Normal ISA
CPU Bus Frequency	Auto	Auto

***** Setting option not selectable.

USB Function

Set this option to Enabled to enable USB (Universal Serial Bus) support. The settings are Enabled or Disabled.

USB KB/Mouse Legacy Support
Set this option to Enabled to enable support for older keyboards and mouse devices if the USB Function option is set to Enabled. The settings are Enabled or Disabled.

Port 64/60 Emulation
Setting this option to Enabled allows a USB keyboard to act like a legacy keyboard. If this option is not Enabled, USB keyboard lights will not work under Windows NT. With other operating systems, a USB keyboard will work normally with this option Disabled. The settings are Enabled or Disabled.

SERR#
Set this option to Enabled to enable the SERR# signal on the bus. The settings are Enabled or Disabled.

PERR#
Set this option to Enabled to enable the PERR# signal on the bus. The settings are Enabled or Disabled. The Optimal and Fail-safe default settings are Disabled.

WSC# Handshake
Set this option to Enabled to enable handshaking for the WSC# signal. Handshaking is a form of encryption; see the Glossary for more information. The settings are Enabled or Disabled.

USWC Write Post
This option sets the status of USWC posted writes to I/O. USWC is a type of memory that is used by VGA devices. The settings are:

Setting	Description
Enabled	USWC posted writes to I/O are enabled.
Disabled	USWC posted writes to I/O are disabled.

BX Master Latency Timer (Clks)
This option specifies the master latency timer (in PCI clocks) for devices in the computer. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

Multi-Trans Timer (Clks)
This option specifies the multi-trans latency timings (in PCI clocks) for devices in the computer. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

PCI1 to PCI0 Access
Set this option to Enabled to enable access between two different PCI buses (PCI1 and PCI0). The settings are Enabled or Disabled.

Method of Memory Detection
This option determines how your system will detect the type of system memory you have installed. Options are Auto+SPD or Auto only.

DRAM Integrity Mode
This option sets the type of system memory checking. The settings are:

Setting	Description
Non ECC	No error checking or error reporting is done.
EC	Errors are detected, but no corrections will be made.
ECC Hardware	Errors are detected, and single bit errors are corrected.

DRAM Refresh Rate
This option specifies the interval between refresh signals to DRAM system memory. The settings are 15.6 us (microseconds), 31.2 us, 62.4 us, 124.8 us, or 249.6 us.

Memory Hole
This option specifies the location of an area of memory that cannot be addressed on the ISA bus. The settings are Disabled, 512KB-640KB, or 15MB-16MB.

SDRAM RAS# to CAS# Delay
This option specifies the length of the a inserted between the RAS and CAS signals of the DRAM system memory access cycle if SDRAM is installed. The settings are Auto, 2 SCLKs or 3 SCLKs. The Optimal default setting is Auto.

SDRAM RAS# Precharge
(CHANGE) This option specifies the length of the RAS precharge part of the DRAM system memory access cycle when SDRAM system memory is installed in this computer. The settings are Auto, 2 SCLKs, or 3 SCLKs.

Power Down SDRAM
If this option is set to Enabled, the SDRAM Power Down feature is enabled. The settings are Enabled or Disabled.

ACPI Control Register
Set this option to Enabled to enable the ACPI (Advanced Configuration and Power Interface) control register. The settings are Enabled or Disabled. The Optimal and Fail-safe default settings are Enabled.

Gated Clock
Set this option to Enabled to enable the gated clock. The settings are Enabled or Disabled.

Graphics Aperture Size
This option specifies the amount of system memory that can be used by the Accelerated Graphics Port (AGP). The settings are 4 MB, 8 MB, 16 MB, 32 MB, 64 MB, 128 MB, or 256 MB.

Search for MDA Resources
Set this option to Yes to let AMIBIOS search for MDA resources. The settings are Yes or No.

AGP Multi-Trans Timer (AGP Clks)
This option sets the AGP multi-trans timer. The settings are in units of AGP Clocks. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

AGP Low-Priority Timer (Clks)
This option sets the AGP low priority timer. The settings are in units of AGP Clocks. The settings are Disabled, 16, 32, 48, 64, 80, 96, 112, 128, 144, 176, 192, 208, 224, or 240.

AGP SERR
Set this option to Enabled to enable the AGP SERR signal. The settings are Enabled or Disabled.

AGP Parity Error Response
Set this option to Enabled to enable AGP parity error response. The settings are Enabled or Disabled.

8bit I/O Recovery Time
This option specifies the length of a delay inserted between consecutive 8-bit I/O operations. The settings are Disabled and from 1 to 8 Sysclk (system clocks) in increments of one.

16bit I/O Recovery Time
This option specifies the length of a delay inserted between consecutive 16-bit I/O operations. The settings are Disabled and from 1 to 4 Sysclk (system clocks) in increments of one.

PIIX4 SERR#
Set this option to Enabled to enable the SERR# signal for the Intel PIIX4 chip. The settings are Enabled or Disabled.

USB Passive Release
Set this option to Enabled to enable passive release for USB. The settings are Enabled or Disabled.

PIIX4 Passive Release
Set this option to Enabled to enable passive release for the Intel PIIX4e chip. This option must be Enabled to provide PCI 2.1 compliance. The settings are Enabled or Disabled.

PIIX4 DELAYED TRANSACTION
Set this option to Enabled to enable delayed transactions for the Intel PIIX4 chip. This option must be Enabled to provide PCI 2.1 compliance. The settings are Enabled or Disabled.

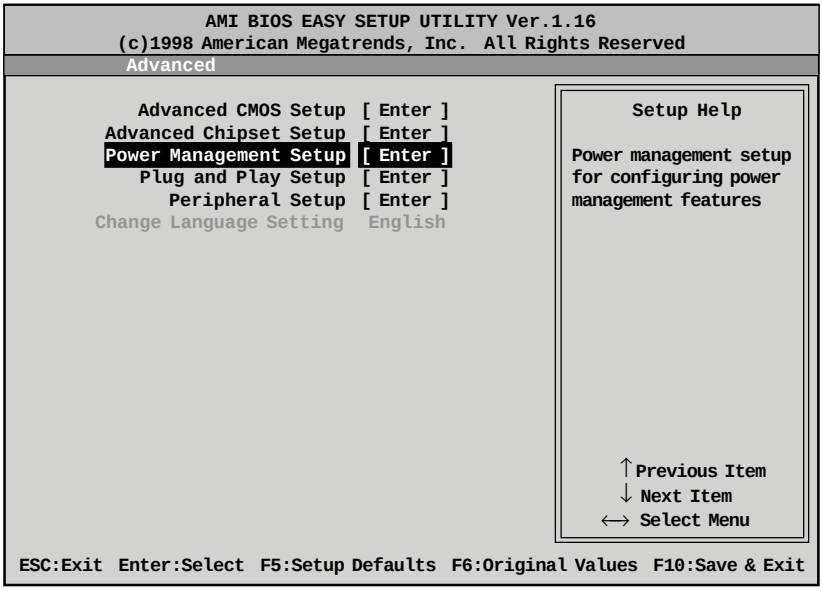
TypeF DMA Buffer Control1 and **2**
These options specify the DMA channel where TypeF buffer control is implemented. The settings are Disabled, Channel-0, Channel-1, Channel-2, Channel-3, Channel-5, Channel-6, or Channel-7.

DMA-*n* Type
These options specify the bus that the specified DMA channel can be used on. The settings are Normal ISA, PC/PCI, or Distributed.

CPU Bus Frequency
This option provides selective CPU Bus Frequency; however, it is strongly recommended that the default setting (Auto) be selected. Unpredictable situations may arise if the Intel default CPU bus speed is not used. The settings are Auto, 66.8MHz, 68.5MHz, 75MHz, 83.3MHz, 100MHz, 103MHz, or 112MHz.

3.4 Power Management Setup

The AMIBIOS Setup options described in this section are selected by choosing Power Management Setup from the AMIBIOS Setup main menu.



Power Management Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
ACPI Aware O/S	No	No
Power Management / APM	Enabled	Enabled
Power Button Function	On/Off	On/Off
Green PC Monitor Power State	Suspend	Stand By
Video Power Down Mode	Suspend	Disabled
Hard Disk Power Down Mode	Suspend	Disabled
Hard Disk Time Out (Minute)	Disabled	Disabled
Power Saving Type	Sleep	Sleep
Standby / Suspend Timer Unit	4 min	4 min
Standby Time Out	Disabled	Disabled
Suspend Time Out	Disabled	Disabled
Slow Clock Ratio	50% - 62.5%	50% - 62.5%
Display Activity	Ignore	Ignore

Setting Option	Optimal Default	Fail-Safe Default
Device 6 (Serial port 1)	Monitor	Monitor
Device 7 (Serial port 2)	Monitor	Monitor
Device 8 (Parallel port)	Monitor	Monitor
Device 5 (Floppy disk)	Monitor	Monitor
Device 0 (Primary master IDE)	Monitor	Monitor
Device 1(Primary slave IDE)	Monitor	Monitor
Device 2 (Secondary master IDE)	Monitor	Monitor
Device 3 (Secondary slave IDE)	Monitor	Monitor
LAN Wake-up	Disabled	Disabled
PC 98 Power LED	Disabled	Disabled
Fan OFF at Suspend	Enabled	Enabled
RTC Wake-up	Disabled	Disabled
*Hour	N/A	N/A
*Minute	N/A	N/A

* Setting option not selectable.

ACPI Aware O/S
Set this option to Yes to enable Advanced Configuration and Power Interface (ACPI) BIOS for an ACPI-aware operating system.

Power Management/APM
Set this option to Enabled to enable the chipset power management and APM (Advanced Power Management) features. The settings are Enabled or Disabled.

Power Button Function
This option specifies how the power button mounted externally on the computer chassis is used. See Soft Power Connector on page 31 for more information. The settings are shown in the table below.

Setting	Description
On/Off	Pushing the power button turns the computer on or off.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

Green PC Monitor Power State
This option specifies the power state that the green PC-compliant video monitor enters when AMIBIOS places it in a power saving state after the

specified period of display inactivity has expired. The settings are Off, Stand By, or Suspend.

Video Power Down Mode
This option specifies the power state that the video subsystem enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are Stand By, Suspend, or Disabled.

Hard Disk Power Down Mode
This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The settings are Disabled, Stand By, or Suspend.

Hard Disk Time Out (Minute)
This option specifies the length of a period of hard disk drive inactivity. When this length of time expires, the computer enters power-conserving state specified in the Hard Disk Power Down Mode option (see the previous page). The settings are Disabled, and from 1 to 15 minutes, in one minute intervals.

Power Saving Type
There are several types of sleeping states within the general sleep state. This option allows you to choose how “asleep” you want your system to be. In deeper sleep modes, more energy is saved. However, upon waking up, the system must “reorient” itself, and reestablish control over the system’s sleeping components. The settings are POS, Sleep, Stop Clock, and Deep Sleep. POS is the lightest sleep mode; Deep Sleep is the heaviest.

Standby/Suspend Timer Unit
This option specifies the unit of time used for the Standby and Suspend time out periods. The settings are 4 msec, 4 sec, 32 sec, or 4 min.

Standby Time Out
This option defines the length of time that the system, while in Full On state, must be inactive before it enters Standby mode. The settings are Disabled and from 4 minutes to 508 minutes, in increments of 4 minutes.

Suspend Time Out
This option defines the length of time that the system, while in Standby mode, must be inactive before it enters Suspend mode. The settings are Disabled and from 4 minutes to 508 minutes, in increments of 4 minutes.

Slow Clock Ratio
This option specifies the speed at which the system clock runs in the Standby Mode power saving state. The settings are expressed as a percentage of the normal CPU clock speed. The settings are 0-12.5%, 12.5%-25%, 25%-37.5%, 37.5%-50%, 50%-62.5%, 62.5%-75%, or 75-87.5%.

Display Activity
When set to Monitor, this option enables event monitoring on the video display. If set to Monitor and the computer is in a power saving state, display activity will cause the system to enter the Full On state. AMIBIOS reloads the Standby and Suspend time-out timers if display activity occurs. The settings are Monitor or Ignore.

Device *n* (*Device identity*)
When set to Monitor, these options enable event monitoring on the specified hardware interrupt request line. If set to Monitor and the computer is in a power saving state, any activity on the IRQ line will cause the system to enter the Full On state. AMIBIOS reloads the Standby and Suspend time-out timers if activity occurs on the specified IRQ line. The settings for each of these options are Monitor or Ignore.

LAN Wake-up
When this option is Enabled, the system will wake up when a signal is received on the Wake-on LAN header. In order for this wake up function to work, the system must have been brought up at least past the POST before it was last shut down (i.e. if you turn the system off before the POST, the registry will not be set, and the system will not be able to wake up using this function). This function requires an ATX 2.01 compliant power supply with 5V standby (STB5V) current of at least 800mA. The settings are Enabled or Disabled.

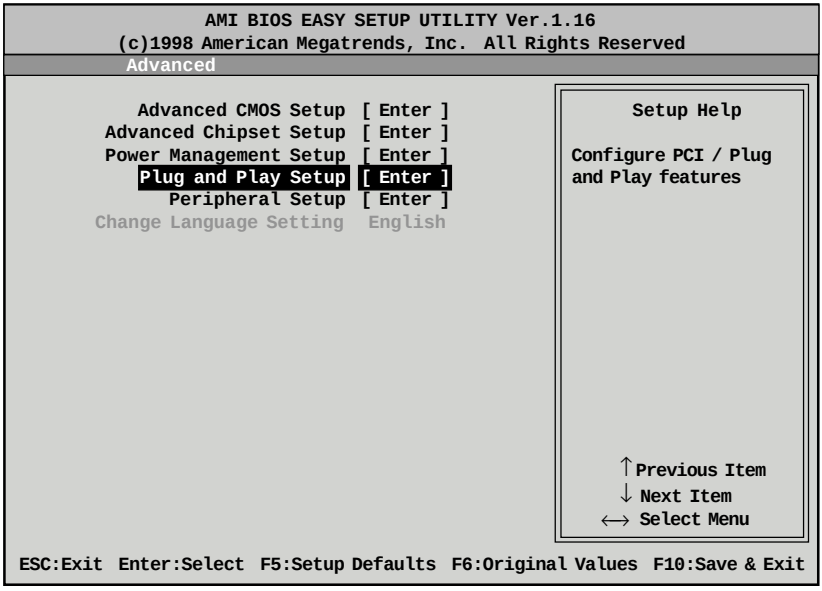
PC98 Power LED
When this option is Enabled, your power LED will turn to yellow when your system is in Suspend mode. Note that if you do not have a two-color LED, your LED will turn off when the system is in Suspend mode if this option is set to Enabled. The settings are Enabled or Disabled.

FAN OFF at Suspend
If this option is Enabled, the CPU fan will turn off when the system is in Suspend mode. If Disabled, the CPU fan will remain on while the system is in Suspend mode. The settings are Enabled or Disabled.

RTC Wake-up
If Enabled, this option allows you to set an hour and minute for the system to wake up. The next two fields allow you to choose the wake up time. Note that the time fields will not be available if this option is set to Disabled. In order for this wake up function to work, the system must have been brought up at least past the POST before it was last shut down (i.e. if you turn the system off before the POST, the registry will not be set, and the system will not be able to wake up using this function). The settings are Enabled or Disabled.

3.5 Plug and Play Setup

Choose PCI/Plug and Play Setup from the AMIBIOS Setup screen to display the PCI and Plug and Play Setup options, described below.



Plug and Play Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Plug and Play Aware O/S	No	No
PCI Latency Timer (PCI Clocks)	64	64
PCI VGA Palette Snoop	Disabled	Disabled
Allocate IRQ to PCI VGA	Yes	Yes
PCI IDE BusMaster	Disabled	Disabled
Off Board PCI IDE Card	Auto	Auto
*Off Board PCI IDE Primary IRQ	Disabled	Disabled
*Off Board PCI IDE Secondary IRQ	Disabled	Disabled
PCI Slot1 IRQ Priority	Auto	Auto
PCI Slot2 IRQ Priority	Auto	Auto
PCI Slot3 IRQ Priority	Auto	Auto
PCI Slot4 IRQ Priority	Auto	Auto
DMA Channel 0	PnP	PnP
DMA Channel 1	PnP	PnP
DMA Channel 3	PnP	PnP
DMA Channel 5	PnP	PnP
DMA Channel 6	PnP	PnP
DMA Channel 7	PnP	PnP
IRQ 3	PCI/PnP	PCI/PnP
IRQ 4	PCI/PnP	PCI/PnP
IRQ 5	PCI/PnP	PCI/PnP
IRQ 7	PCI/PnP	PCI/PnP
IRQ 9	PCI/PnP	PCI/PnP
IRQ 10	PCI/PnP	PCI/PnP
IRQ 11	PCI/PnP	PCI/PnP
IRQ 12	PCI/PnP	PCI/PnP
IRQ 14	PCI/PnP	PCI/PnP
IRQ 15	PCI/PnP	PCI/PnP
Reserved Memory Size	Disabled	Disabled
*Reserved Memory Address	C8000	C8000
PCI Device Search Order	First-Last	First-Last
BIOS Devnode for Shadow RAM	Disabled	Disabled

* Setting option is not selectable

Plug and Play Aware O/S
Set this option to Yes to inform AMIBIOS that the operating system can handle plug and Play (PnP) devices. The settings are No or Yes.

PCI Latency Timer (PCI Clocks)
This option specifies the latency timings (in PCI clocks) for PCI devices installed in the PCI expansion slots. The settings are 32, 64, 96, 128, 160, 192, 224, or 248.

PCI VGA Palette Snoop
When this option is set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA) and this field is set for:

Setting	Description
Disabled	Data read and written by the CPU is only directed to the PCI VGA device's palette registers.
Enabled	Data read and written by the CPU is directed to the both the PCI VGA device's palette registers and the ISA VGA device palette registers, permitting the palette registers of both devices to be identical.

This option must be set to Enabled if any ISA adapter card installed in the system requires VGA palette snooping.

Allocate IRQ to PCI VGA
Set this option to Yes to allocate an IRQ to the VGA device on the PCI bus. The settings are Yes or No.

PCI IDE BusMaster
Set this option to Enabled to specify that the IDE controller on the PCI bus has bus mastering capability. The settings are Disabled or Enabled.

OffBoard PCI IDE Card
This option specifies whether or not an offboard PCI IDE controller adapter card is used in the computer, and where it is installed. If an offboard PCI IDE controller is used, the motherboard onboard IDE controller is automatically disabled. The settings are Auto and Slot1 through Slot6. If Auto is selected, AMIBIOS automatically determines the correct setting (including using the onboard controller if no offboard controller card is detected). This option forces IRQ 14 and 15 to a PCI slot on the PCI local bus. This is necessary to

support non-compliant PCI IDE adapter cards.

OffBoard PCI IDE Primary IRQ
This option specifies the PCI interrupt used by the primary IDE channel on the offboard PCI IDE controller. The settings are Disabled, Hardwired, INTA, INTB, INTC, or INTD.

Offboard PCI IDE Secondary IRQ
This option specifies the PCI interrupt used by the secondary IDE channel on the offboard PCI IDE controller. The settings are Disabled, Hardwired, INTA, INTB, INTC, or INTD.

PCI Slot *n* IRQ Priority
These options specify the IRQ priority for PCI devices installed in the PCI devices installed in the PCI expansion slots. The settings are Auto, IRQ 3, 4, 5, 7, 9, 10, and 11, in priority order.

DMA Channel *n*
These options allow you to specify the bus type used by each DMA channel. The settings are PnP or ISA/EISA .

IRQ*n*
These options specify the bus that the specified IRQ line is used on. These options allow you to reserve IRQs for legacy ISA adapter cards. These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, you can use these options to reserve the IRQ by assigning an ISA/EISA setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as PCI/PnP. IRQ12 only appears if the Mouse Support option in Advanced Setup is set to Disabled. IRQ14 and 15 will not be available if the onboard PCI IDE is enabled. If all IRQs are set to ISA/EISA and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ9 will still be available for PCI and PnP devices, because at least one IRQ must be available for PCI and PnP devices. The settings are ISA/EISA or PCI/PnP.

Reserved Memory Size
This option specifies the size of the memory area reserved for legacy ISA adapter cards. The settings are Disabled, 16K, 32K, or 64K.

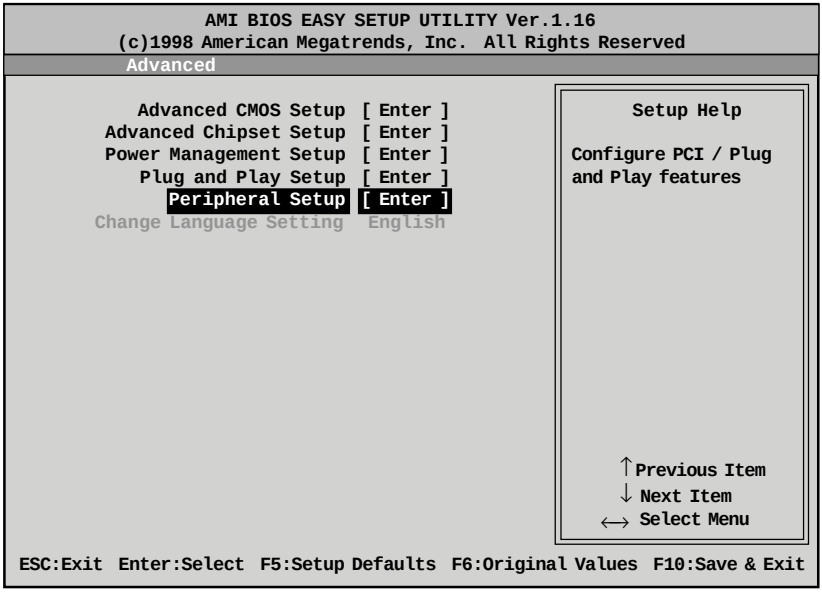
Reserved Memory Address
This option specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards. This option does not appear if the Reserved Memory Size option is set to Disabled. The settings are C0000, C4000, C8000, CC000, D0000, D4000, D8000, or DC000.

PCI Device Search Order
This option changes the BIOS scan order of the PCI slot - from first to last or last to first. The settings are First-Last or Last-First.

BIOS Devnode for Shadow RAM
This option is used for some add-on card ROMs which do not claim the correct memory range that they occupy. The settings are Disabled or Enabled.

3.6 Peripheral Setup

Peripheral Setup options are displayed by choosing Peripheral Setup from the AMIBIOS Setup main menu. All Peripheral Setup options are described here.



Peripheral Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
OnBoard SCSI	Enabled	Enabled
External OnBoard SCSI LED	Enabled	Enabled
Power Interruption	Disabled	Disabled
Onboard FDC	Auto	Auto
Onboard Serial Port 1	3F8h	3F8h
Onboard Serial Port 2	2F8h	2F8h
Serial Port 2 Mode	Normal	Normal
*IR Duplex Mode	N/A	N/A
*IR Receiver Pin	IRRX1	IRRX1
Onboard Parallel Port	378	378
Parallel Port Mode	Normal	Normal
*EPP Version	N/A	N/A
Parallel Port IRQ	7	7
*Parallel Port DMA Channel	N/A	N/A
Onboard IDE	Both	Both

Onboard SCSI
Select 'Enabled' to use onboard SCSI. The settings are Enabled or Disabled.

External Onboard SCSI LED
Set this option to Enabled to direct the SCSI (onboard or add-on card) LED to the front panel.

Power Interruption
The settings are Enabled or Disabled.

Onboard FDC
Set this option to Enabled to enable the floppy drive controller on the mother-board. The settings are Auto, Enabled, or Disabled.

Onboard Serial Port1
This option specifies the base I/O port address of serial port 1. The settings are Auto, Disabled, 3F8h, 2F8h, 3E8h, or 2E8h.

Onboard Serial Port2
This option specifies the base I/O port address of serial port 2. The settings are Auto, Disabled, 3F8h, 2F8h, 3E8h, or 2E8h.

Serial Port2 Mode
This option specifies the operating mode for serial port 2. This option will not appear if the Onboard Serial Port2 option is set to Disabled, or is set to Auto and your system does not have an onboard serial port 2. The settings are Normal, Sharp-IR, IrDA, and Consumer.

IR Transmission Mode
This option specifies the infrared transmission method. This option will not appear if the Serial Port2 Mode option is set to Normal. The settings are Full or Half.

Mode	Description
Full Duplex	Data is transmitted in two directions at once. Any data you send will not appear on your screen until it has been received by the other device and sent back to you. Full duplex is the faster of the two modes.
Half Duplex	Data is transmitted in only one direction at a time. Any data you send will be instantly displayed on your screen. Half duplex mode is easier for the devices to execute. Not all IR-capable devices can handle full duplex mode.

IR Receiver Pin
This option specifies which pin will act as the receiver for IR data transmission. This option will not appear if the Serial Port2 Mode option is set to Normal. The only setting is IRRX1.

OnBoard Parallel Port
This option specifies the base I/O port address of the parallel port on the motherboard. The settings are Auto, Disabled, 378, or 278.

Parallel Port Mode
This option specifies the parallel port mode. The settings are:

Setting	Description
Normal	The normal parallel port mode is used.
Bi-Dir	Use this setting to support bidirectional transfers on the parallel port.
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specifications. EPP uses the existing parallel port signals to provide asymmetric bidirectional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specifications. ECP uses the DMA protocol to achieve data transfer rates of up to 2.5 Megabits per second. ECP provides symmetric bidirectional communication.

EPP Version
This option specifies the Enhanced Parallel Port specification version number that is used in the system. This option only appears if the Parallel Port Mode option is set to EPP. The settings are 1.7 or 1.9. Version 1.9 is common on newer devices; consult your device's user information for the appropriate port type. There are no default settings.

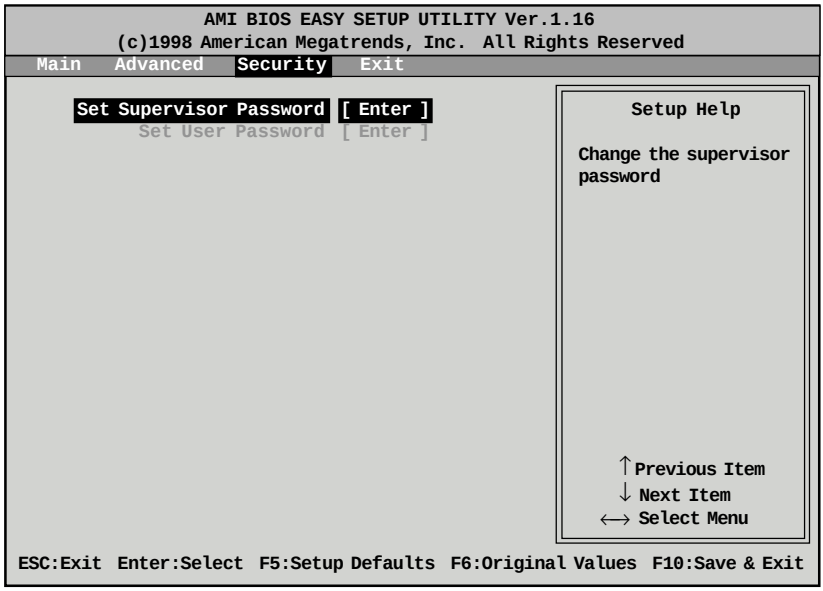
Parallel Port IRQ
This option specifies the IRQ used by the parallel port, and only appears if OnBoard Parallel Port is set to 278 or 378. The settings are 5 or 7.

Parallel Port DMA Channel
This option is only available if the setting for the Parallel Port Mode option is set to ECP and the OnBoard Parallel Port option is set to 378, 278, or 3BC. This option sets the DMA channel used by the parallel port. The settings are 0 through 7 in increments of one.

Onboard IDE
This option specifies the IDE channel used by the onboard IDE controller. The settings are Disabled, Primary, Secondary, or Both.

3.7 Supervisor and User Security

You can limit access to the Setup Program or to the system using the Supervisor and User password options (the Supervisor password gives you access to the Setup Program and the system; the User password, only to the system). Note that you must create a supervisor password before you create a user password.



When you select the Supervisor Security option, a dialog box (shown below) will appear, allowing you to enter a password. You may either type the password in, or click on the onscreen buttons. Your password must be between one and six characters long.

Once you have entered your new password, you will be asked to confirm it. If the two passwords do not match, you will be prompted to enter a new password, and then to confirm it. This will continue until you enter the same series of characters both times. Once this is accomplished, a dialog box will appear and notify you that the Supervisor Password has been installed. You may then select the User Security option and enter a password for the user.
You can enter a new User password at any time simply by selecting the User Security option, and typing in a new password. To enter a new Supervisor password, select the Supervisor Security option. You will be asked to enter the current password. After you do so, you will be prompted to enter the new password.

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.

3.8 Language Utility

Currently, the BIOS Setup program is available only in English.

3.9 Flash Writer Utility

The AMI Flash Writer Utility is now included in the AMIBIOS, 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 “amiboot.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. While holding the <Ctrl> and <Home> keys, turn the power on. The system 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 <F1> to run Setup. You may check your settings at this time, or simply save and exit the program.

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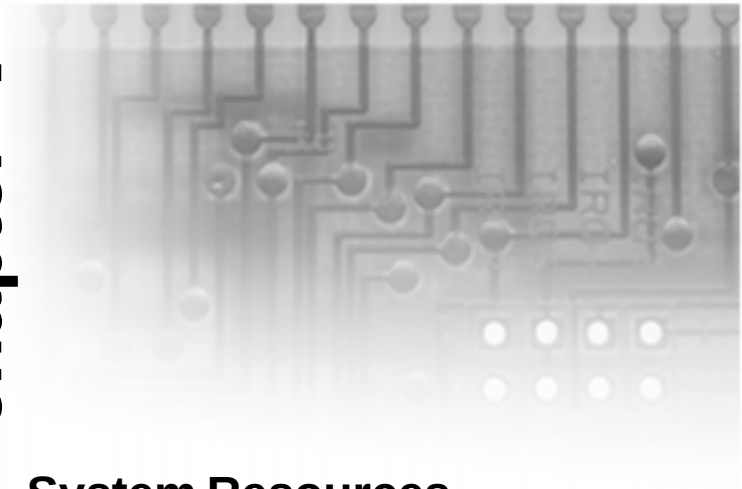
chapter 4



System Resources

Beep Codes

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. If AMIBIOS POST can initialize the system video display, it displays the error message. Displayed error messages, in most cases, allow the system to continue to boot. Displayed error messages are described on pages 74-75. See the top of the next page for the beep code chart.

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry is faulty.
2	Parity Error	Parity error in the base memory (the first 64 KB block) of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	A memory failure in the first 64 KB of memory, or Timer 1 is not functioning.
5	Processor Error	The CPU generated an error.
6	8042 - Gate A20 Failure	Cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU on the CPU Card generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in AMIBIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM has failed.
11	Cache Memory Bad — Do Not Enable Cache	The cache memory test failed. Cache memory is disabled. Do not press <Ctrl> <Alt> <Shift> <+> to enable cache memory.

Troubleshooting System Problems

If the computer beeps...	**then...**
1, 2, or 3 times...	reseat the memory SIMMs or DIPs. If the system still beeps, replace the memory.
6 times...	reseat the keyboard controller chip. If it still beeps, replace the keyboard controller. If it still beeps, try a different keyboard, or replace the keyboard fuse, if there is one.
8 times...	there is a memory error on the video adapter. Replace the video adapter, or the RAM on the video adapter.
9 times...	the BIOS ROM chip is bad. The system probably needs a new BIOS ROM chip.
11 times...	reseat the cache memory on the motherboard. If it still beeps, replace the cache memory.
4, 5, 7, or 10 times...	the motherboard must be replaced.

Displayed Error Messages

If an error occurs after the system display has been initialized, the error message will be displayed as follows:

```
ERROR Message Line 1
ERROR Message Line 2
Press <F1> to continue
```

and the system will halt. The system will not halt if the Wait for <F1> If Any Error option in Advanced Setup is Disabled.

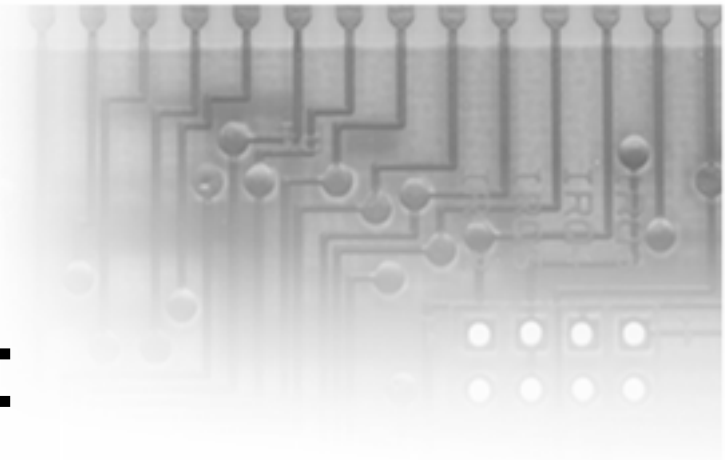
```
RUN SETUP UTILITY
```

may also appear. Press <F1> to run WINBIOS Setup if this message appears.

Error Message	Explanation
8042 Gate-A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry.
C: Drive Error	No response from drive C:. Run the AMIDiag Hard Disk Utility. Check the C: hard disk type in Standard Setup.
C: Drive Failure	No response from hard disk drive C:. Replace the drive.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective. Run AMIDiag.
CH-2 Timer Error	An AT system has two timers. There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	CMOS RAM checksum is different than the previous value. Run WINBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM have been destroyed. Run WINBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected. Run WINBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory found by AMIBIOS is different than the amount in CMOS RAM. Run WINBIOS Setup.
CMOS Time and Date Not Set	Run Standard Setup to set the date and time.
D: Drive Error	No response from drive D:. Run the AMIDiag Hard Disk Utility. Check the hard disk type in Standard Setup.

Error Message	Explanation
D: drive failure	No response from hard disk drive D:. Replace the drive.
Diskette Boot Failure	The boot diskette in drive A: cannot be used to boot the system. Use another boot diskette and follow the screen instructions.
Display Switch Not Proper	Some systems require a video switch be set to either color or monochrome. Turn the system off, set the switch properly, then power on.
DMA Error	Error in the DMA controller.
DMA 1 Error	Error in the first DMA channel.
DMA 2 Error	Error in the second DMA channel.
FDD Controller Failure	AMIBIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	AMIBIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR1 Error	Interrupt channel 1 failed POST.
INTR2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	AMIBIOS can read the diskette in floppy drive A:, but it cannot boot the system with it. Use another boot diskette and follow the screen instructions.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue to boot.
Keyboard Error	The keyboard has a timing problem. Make sure a Keyboard Controller AMIBIOS is installed. Set Keyboard in Advanced Setup to Not Installed to skip the keyboard POST routines.
KB/Interface Error	There is an error in the keyboard connector.
No ROM BASIC	Cannot find a proper bootable sector on either drive A: or C:. AMIBIOS cannot find ROM Basic.
Off Board Parity Error	Parity error in memory installed on an adapter card in an expansion slot. The format is: OFF BOARD PARITY ERROR ADDR = (XXXX) XXXX is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
On Board Parity Error	Parity error in motherboard memory. The format is: ON BOARD PARITY ERROR ADDR = (XXXX) XXXX is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag to find and correct memory problems.

appendix A



Frequently Asked Questions

Portions of this appendix can be found in more detail at Tyan's website **(www.tyan.com)** under the FAQ section.

To help alleviate any common problems associated with the installation of new hardware or software, we are providing useful suggestions which should help you get your system running in no time. This FAQ is divided into major categories from common issues faced by most people.

1 - Boot Issues

Q: Why doesn't my computer boot up?

A: One of the most common problems with a new system is that when you unpack it and try to turn it on, the system won't boot. There are a few reasons for this but the most common ones are the easiest to fix. Follow these guidelines.

1. Make sure the power is firmly connected to the power supply on the back of the computer.
2. Make sure the voltage selection on the back of the power supply matches the power coming out of your wall (US is 110V).....more importantly, is it really plugged in?

3. Is your monitor turned on? Is the brightness turned up?
4. Did you turn on the power?
5. Make sure your IDE/SCSI hard drive cables are correctly connected to your IDE/SCSI drive. Verify that Pin-1 on the cable corresponds to Pin-1 on the drive. See Chapter 2 on Connecting IDE/SCSI Cables and Devices.

Q: My hard drive light stays on, but there is no video. Why?

A: There aren't many things that can cause this symptom but there are a few things you can try.

First, disconnect all nonessential cables from the motherboard. These include cables going to the case for the power LED, reset, and other display indicators. Second, remove all IDE / SCSI sound and floppy cables from the motherboard. In addition, disconnect the power cable from the back of the power supply. Once all these cables are cleared, reconnect the power cord and turn the system on.

Q: Why do I hear a buzzing noise from the power supply?

A: If you hear a buzzing noise, turn off your system immediately.

This is generally caused by a power connector that's plugged in backwards or a short somewhere on the motherboard. The first thing to check is your cables. Disconnect all cables from the motherboard and turn the system on. If the system beeps, all is fine. Reconnect the cables one at a time to isolate the bad or improperly installed cable. The cable which is most often responsible for this sort of behavior is the IDE or SCSI cable. If the cable is reversed on the motherboard or drive end, it will produce a short and not allow the system to boot. Make certain that pin-1 on the cable lines up with pin-1 on the motherboard and hard drive.

If this still does not solve the problem, remove the system board from the case and run it on top of the box it came packed in. If the buzzing stops and the system beeps, the problem is with a short between the case and the motherboard. In this case, try using plastic standoffs or nylon washers between the screws holding it down to the case.

Q: All I get are beep codes. What do they mean?

A: Fatal errors, which halt the boot process, are communicated through a series of audible beeps. If AMIBIOS POST can initialize the system video display, it displays the error message. Displayed error messages, in most

cases, allow the system to continue to boot. See Chapter 4 - System Resources for more information on beep codes.

2 - Video Issues

Q: The computer beeps but I don't see anything. Why?

A: If your system worked before and you just recently moved your system to a new location, odds are, something fell off your motherboard or an adapter card has been worked loose. If this is the case, follow these steps to correct the problem.

1. Turn off your computer.
2. Open up the case and remove each adapter card one at a time. Re-seat the card to make sure it makes good contact with the mother-board.
3. Check to see if the CPU is firmly seated in the CPU socket. It may have inched out of its socket during the move.
4. Plug the power back in and turn on. If it works - great! If not, read on.
5. Remove the motherboard from the case and run it on the box the system board was shipped in or a phone book if you don't have the box.
6. If the system boots, the mover probably shorted the board to the case or the board was knocked loose from the standoffs. Carefully remount the board into the case and reinstall the controller cards.

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 264MB/s (at 33MHz bus speed) and 528MB/s (at 66MHz bus speed), respectively. Compare this with the mere 132MB/s (at 33MHz bus speed) that you get with the PCI bus.

Q: Does my operating system support AGP?

A: Currently, only Windows 98 and Windows NT 5.0 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: My PCI video card works on the motherboard, but my AGP video card does not. Why?

A: AGP video cards are much pickier about how they are seated in their respective slots compared to VLB or ISA and even PCI. The major difference between PCI and AGP is that the AGP cards have very fine contacts which are sensitive to position with the connector. The contact layout is very similar to that of EISA systems.

If you have an AGP motherboard, it's not uncommon for the AGP card to creep its way over time or pop out during moves or from a light tap on the case. If you are working on a system and suddenly, you get no video, try re-seating the card as it may have popped out of its socket or creeped out over time.

3 - CPU Issues

Q: What CPUs can I run in dual CPU mode?

A: Only Intel CPUs can be run in dual mode at this time. AMD, Cyrix, IBM and IDT CPUs are not supported in dual mode.

Q: Can I overclock my CPU?

A: Overclocking your CPU is not recommended by TYAN. Because TYAN does not recommend this, we are not able to provide technical support to those who are overclocking their CPUs. Overclocking your CPU may cause damage to your system board and/or shorten the life expectancy of your CPU. **If you would like a faster CPU, please purchase a faster one.**

Q: Do dual CPUs really increase the performance of my system?

A: Yes, but only in certain environments. There are 3 requirements for dual processing to actually be beneficial. These requirements are:

1. A motherboard capable of CPU operation.
2. An operating system capable of utilizing dual CPUs.
3. An application capable of utilizing dual CPUs.

Some operating systems which use dual CPUs are Microsoft Windows NT Server or Workstation and various flavors of UNIX. Windows 95 will not take advantage of dual CPUs and neither will Windows 98. Using dual CPUs with Windows 95/98 and DOS will work, but the O/S will NOT take advantage of the second CPU.

In addition to a dual CPU aware O/S, you will also need an application that utilizes dual CPUs. These programs usually fit into the CAD, Animation, or Graphic Design categories and include such programs as Kinetix 3D Studio MAX, Microsoft's Soft Image, Adobe Photoshop, and Alias/Wavefront's Maya. If you have any questions as to whether or not your application supports dual CPUs, please contact the software publisher or your reseller.

Q: When I turn the computer on, the system displays strange CPU speeds.

A: The solution to this is to first check that you have the correct CPU jumper settings. CPU speed jumpers can be found in the Chapter 2. Next, verify that your CPU is indeed what you ordered. If you order a 450MHz CPU, make sure it's not a 400MHz CPU. Overclocking may also play a role in strange CPU speed behavior. NEVER overclock a CPU. Overclocking may damage your CPU, system, or both and will void your warranty. If you have an older sound card, try moving the sound card to the ISA slot at the edge of the board. This will resolve most problems, but if this fails, it's possible that there may be a problem with the motherboard's clock generator. Return the motherboard to the dealer for repair or replacement.

4 - Memory Issues

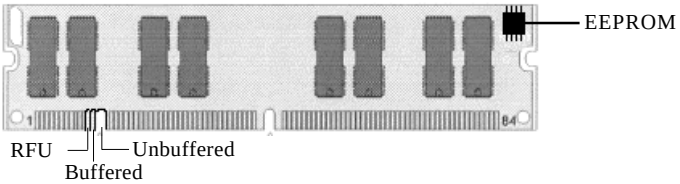
Q: Can I mix brands, types, and speeds of RAM?

A: It isn't a good idea to mix brands, types, and speeds of RAM because all Tyan motherboards are produced with performance in mind. When we talk about performance, it goes hand in hand with tolerances which must be met in order to reach the performance levels expected of high quality peripherals. When you mix memory types, brands, or speeds on any high performance board, these timing issues may play a significant role in the stability, reliability and performance of the entire system. This is why we recommend using a single type of DIMM brand, speed, and type (particularly unbuffered). Adding different banks of DIMMS of different sizes is fine.

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

A: The 440GX 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 440GX's timing registers properly. Your DIMM may not have the EEPROM chip on the module, or the EEPROM may not contain the correct program. Check with your memory vendor for details.

The figure below shows a DIMM module with an EEPROM chip.



168-pin DIMM

Q: My system sometimes becomes unstable. How should I check the system?
A: The first thing to do is to check and see if you have any device conflict in address, IRQ, or DMA. If you are using Windows 95, 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.

Q: Can I use EDO DIMMs on this motherboard?
A: No. The Intel 440GX AGPset does not support EDO memory. The 440GX AGPset supports bus speeds of 100MHz, and EDO memory does not. You must use SDRAM (which does support 100MHz bus speeds) on this board.

5 - Hard Drive / Floppy Drive Issues

Q: My floppy drive light stays on. Why?
A: The number 1 cause for the floppy light staying lit continuously is a reversed cable at either the motherboard or drive end. NEVER stick a floppy disk into a drive if the floppy light is continuously lit because it will render the floppy unreadable.

To correct the problem, make certain that the red stripe on the floppy cable is correctly aligned with pin 1 on the motherboard. In addition, 90% of the floppy drives on the market today require the red stripe on the cable to face the power connector on the drive. If you are unsure of proper cable orientation on the motherboard end, please refer to Chapter 2 - Map of Motherboard Jumpers on page 2-4.

Q: I can't partition my hard drive larger than 2GB. Why?

A: The FAT file system (most commonly used by DOS) has a partition limit of 2GB. There is no way to increase the partition size unless you either use NTFS provided by Windows NT or the 32bit file system provided by Windows 95. Other operating systems may offer this feature, but check with your O/S developer for more information about 2GB limits.

6 - BIOS Issues

Q: How do I bypass keyboard detection on system with no keyboard installed.

A: On boards equipped with AMI BIOS, enable the "Quick Boot" option in the Advanced Setup menu. This will bypass the keyboard check and allow you to boot up without error.

Q: Why is the video screen scrambled after entering the BIOS setup?

A: Some video cards (Diamond FireGL AGP, Viper 330 AGP, or 3D Labs chip AGP cards) BIOS are not compatible with AMI WinBIOS. You can use text mode BIOS to fix the video problem. This text mode BIOS is available from our BIOS download site.

Q: When I clear the BIOS with the jumper, it does not clear. Why?

A: In most cases, BIOS can be cleared by inserting jumper JP3 to the 2-3 position. In some cases, certain brands' power supply need to be unplugged from a power source in order to clear the BIOS using jumper JP3.

Q: How do I determine my BIOS version?

A: BIOS versions may be difficult to distinguish on some motherboards. All Tyan motherboards use either AMI or Award BIOS. The BIOS version can be found at bootup just below the left hand corner logo. Ignore all version numbers that do not start with "TYN". Tyan BIOS versions begin at startup with the following line:

TYN [motherboard model] Vx.xx MM/DD/YY

x.xx is the BIOS version number,
motherboard model reflects the motherboard you have, and MM/DD/YY is the release date of the BIOS.

7- Driver Issues

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

A: When trying to install Windows NT 4.0 from the bootable CD-ROM you will encounter a blue screen with the message "Inaccessable_boot_device".

Root Cause: The Tyan S1952DLU uses the Adaptec AIC-7896 SCSI chip. Windows NT 4.0 was created before the Adaptec AIC-7896 chip was available, thus it doesn't natively support the chip. The installation failed because the NT installation process detects the AIC-7896 chip as an older version of the Adaptec controller. This incorrect hardware detection will lead NT into installing an older driver, which is not compatible with the AIC-7896 thus causing the blue screen error. Even if you manually tell NT to use the driver on the floppy disk provided by Tyan, NT will still use the older driver from the CD-ROM. At this time there is no solution which can correct the CD-ROM boot install of NT 4.0. But there is another solution....

Work Around: You must use the three floppies that come with NT 4.0 in order to install NT correctly with the AIC-7896. Once the second floppy disk has finished loading, NT will ask if you want it to scan for a mass storage device. At this point, you can have NT install the Adaptec driver from the disk provided by Tyan. This method will force NT to use the correct driver for the AIC-7896 and will allow you to complete the installation from the CD-ROM.

8 - Miscellaneous Issues

Q: My system will not turn off . Why?

A: The power button is designed to turn off the system ONLY when you press or hold down the power button for more than 5 seconds. New BIOS versions will provide an option for instant power-off.

Q: I can't get my com ports to work.

A: To ensure that the motherboard is recognizing and initializing the com ports, boot up the system and review the POST screen (Power-On Self-Test). There you will find a section for I/O ports and if it is working properly, you should see the interrupts the com ports are using (i.e.. 2F8, 3F8, etc.). If the motherboard shows these as active, it's probably not a bad motherboard, but rather a bad or incompatible cable, or you have an IRQ conflict with another communications device such as an internal modem.

Q: What are some basic troubleshooting guidelines?

A: In order to verify that you have a marginal motherboard, follow this procedure.

1. Minimize your system to a "bare-bones" configuration.

Remove all cards except for the video card (and SCSI if you are not using IDE) and boot up normally. If you still get error messages in your current O/S, try booting to "safe" mode or to a standard configuration using generic drivers. Another option to try is to reset the CMOS to factory defaults.

2. The basics of troubleshooting is simple. Divide and conquer.

Take one piece of the equation out at a time until the system stops doing what you don't want it to do. This is the EASIEST way to troubleshoot a problem. In most cases, problems are not caused by the motherboard, but rather by shared IRQs, improper installation, or user error.

3. If you have replaced the motherboard and the problem still persists, it's probably not the motherboard at fault.

There is a very, very slim chance that two consecutive boards will be bad....however, if it's exhibiting the same symptoms, check with your peripheral vendors for possible conflicts and compatibility issues.

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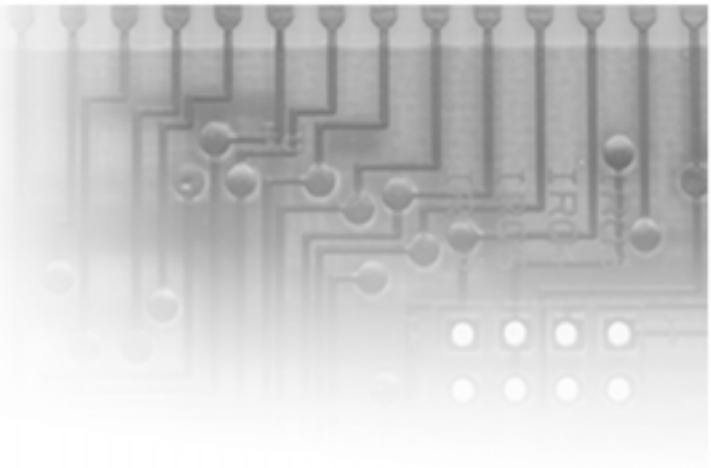
appendix B



Adaptec Ultra2 LVD SCSI

1. INTRODUCTION

With the dual onboard Ultra2 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 AIC7986 software

The motherboard has two independent Ultra2 LVD SCSI channels and each has a maximum throughput of 80MBytes/sec.

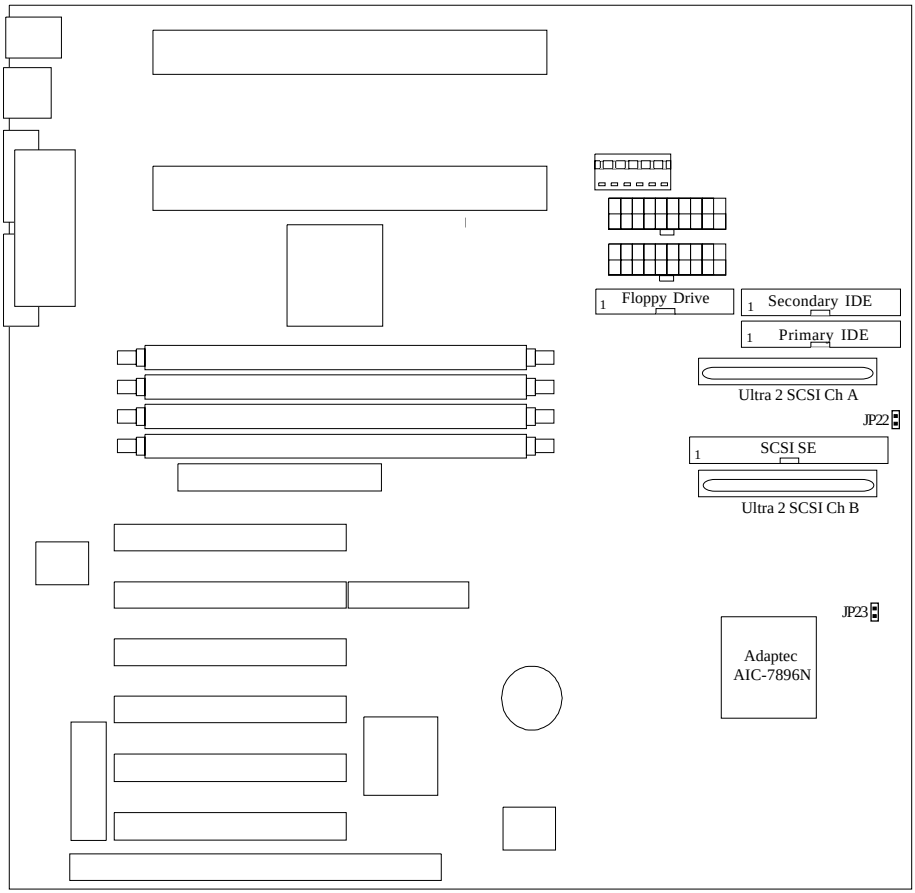
Support for Non-Ultra2 SCSI Devices

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

Adaptec recommends that single-ended Ultra and earlier devices be kept on a separate channel than the LVD Ultra2 devices. This will permit the Ultra2 devices to operate at full speed and cable distances. The motherboard has a standard narrow SCSI (50-pin) connector to simplify connecting single-ended devices.

Board Layout

The following diagram shows the major SCSI connectors and jumpers 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.

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).

NOTE: When connecting Ultra2 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 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 cable or terminator before installing the Ultra2 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.

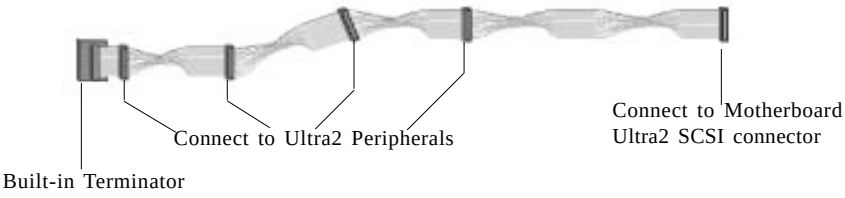
Connecting Internal Cables for Ultra2 SCSI Devices

When connecting internal Ultra2 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 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 SCSI channels. Each channel will connect to a separate cable. Follow these steps to connect your internal peripherals:

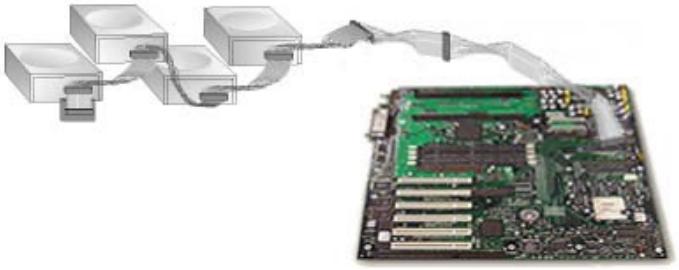
NOTE: We recommend keeping your Ultra2 peripherals separate from your non-Ultra2 peripherals. Connecting a non-Ultra2 peripheral to an Ultra2 SCSI bus forces the Ultra2 SCSI channel and any attached peripherals to drop down to Ultra SCSI performance levels (40 MBytes/sec).

STEP 1: Locate a 68-pin internal Ultra2 SCSI cable. (It should look similar to the cable below.)



STEP 2: Plug the long end of the cable(s) to the Ultra2 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 SCSI peripherals.



important!

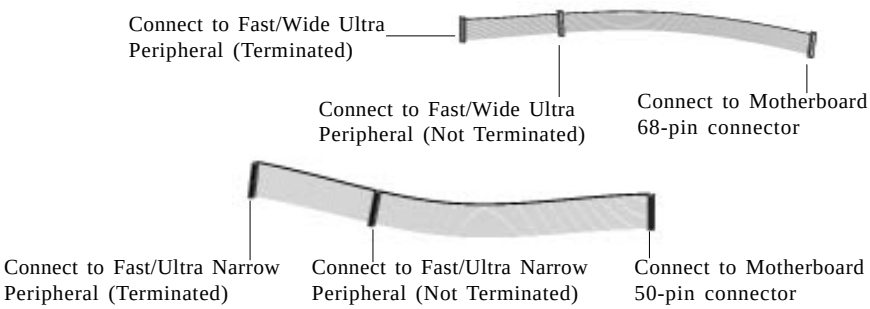
NOTE: Internal Ultra2 SCSI peripherals come from the factory without termination. Proper termination is provided by the built-in terminator at the end of the Ultra2 internal SCSI cable.

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 SCSI devices, use a channel separate from the Ultra2 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.



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.

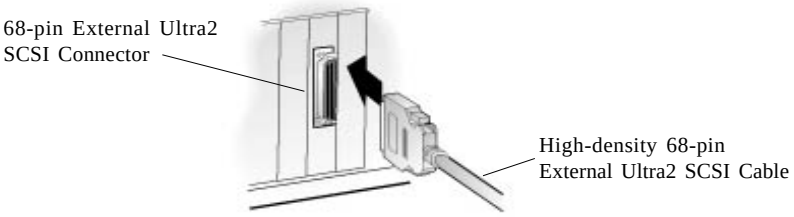
Connecting the External Cable for SCSI Devices

Use a 68-pin external Ultra2 SCSI connector to connect your external Ultra2 peripherals. Each Ultra2 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 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 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 SCSI or Ultra SCSI (and earlier) devices externally. However, mixing both Ultra2 SCSI and non-Ultra2 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.

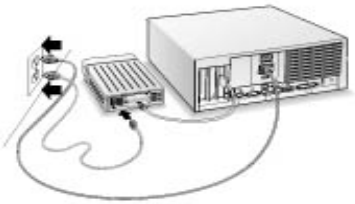
STEP 1: Connect one end of an external SCSI cable to the external Ultra2 connector at the back of the computer.



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 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. To enable onboard termination on Channel A, set jumper JP22 to the ON position. To enable onboard termination on Channel B, set jumper JP23 to the ON position. The default setting for both jumpers is the OFF position. The OFF position allows for the hardware to set the termination automatically. The ON position forces devices to be terminated ALWAYS.

5. Installing AIC7896 SCSI Software

To install the AIC7896 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.

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 95 / 98 Installed

STEP 1: Turn on all external peripherals and then the computer. Windows 95 /98 will ask you to select which driver you want to install.

STEP 2: Select "**Driver from disk provided by hardware manufacturer**," then click **OK**.

STEP 3: Insert the 7800 Family Manager Set setup diskette in your floppy disk drive, then click **OK**.

STEP 4: Follow the instructions that appear onscreen.

Computers with Windows NT Installed

STEP 1: Turn on all external peripherals and then the computer.

STEP 2: Start Windows NT on your computer.

STEP 3: Insert the 7800 Family Manager Set setup diskette in your floppy disk drive.

STEP 4: Click the **Start** button, then click **Run**.

STEP 5: When the Run dialog box appears, type **a:\setup** if you are using the A drive, or **b:\setup** if you are using the B drive. Then click **OK**.

STEP 6: Follow the instructions that appear onscreen.

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?

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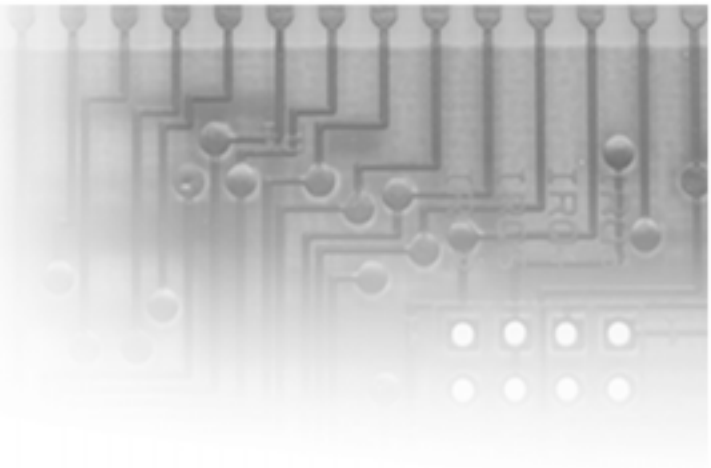
appendix C



Glossary

ACPI (**A**dvanced **C**onfiguration and **P**ower **I**nterface) 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 (**A**ccelerated **G**raphics **P**ort) 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, it 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 A**ttachment **P**acket **I**nterface), 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** (**B**ulletin **B**oard **S**ystem) 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** (**B**asic **I**nput/**O**utput **S**ystem) 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 and jumper pins are active when they are On or Closed, and inactive when they are Off or Open.

CMOS **C**omplementary **M**etal-**O**xide **S**emiconductors 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 **D**ual **I**n-line **M**emory **M**odules 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 **D**irect **M**emory **A**ccess 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 **D**ynamic **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 (**E**xtended **D**ata-**O**ut **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 (**E**xtended **S**ystem **C**onfiguration **D**ata) 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 **H**ard **D**isk **D**rive.

H-SYNC controls the horizontal properties of the monitor.

IC (**I**ntegrated **C**ircuit) is the formal name for the computer chip.

IDE **I**ntegrated **D**evice (or Drive) **E**lectronics 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 Int**errupt) is a hardware interrupt signal that goes to the IDE.

I/O **I**nput/**O**utput 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 **I**ndustry **S**tandard **A**rchitecture. 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 onboard system components).

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

OEMs (**O**riginal **E**quipment **M**anufacturers) 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 **P**eripheral **C**omponent **I**nterconnect. 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 P**rogrammable **I**nput/**O**utput) 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 (**P**ower **M**anagement **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 setup 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** (**R**andom **A**ccess **M**emory), 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 (**R**ead-**O**nly **M**emory) 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 (**S**ynchronous **D**ynamic **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 **S**ingle **I**n-line **M**emory **M**odules 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 **S**tatic **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 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 (**V**ideo **G**raphics **A**rray) 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 **Z**ero **I**nsertion **F**orce 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' interference radio tel que spécifié par le Ministére Canadien des Communications dans les réglements 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 PC 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.

Note: The joystick port maximum output rating is 9 amperes at 5 volts.

Document # D1329-100