Tyan S2420

Tomcat i810ef

Motherboard User's Manual
Revision 1.20

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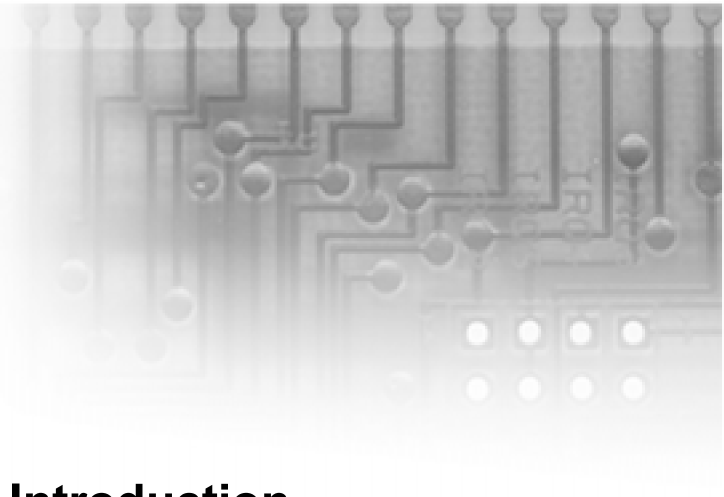
chapter 1



Introduction

Overview

The Tomcat i810ef is a quality, high performance motherboard designed for Socket 370 Intel Celeron / Pentium III microprocessors. The Tomcat i810ef utilizes the Intel i810ef Chipset with AMI BIOS and can support Celeron / Pentium III CPU speeds of 300MHz through 800+ MHz, and host bus speeds of 66MHz to 133MHz. For CPU speed support, please refer to the CPU Compatibility Chart on Tyan's website:

http://www.tyan.com/support/html/pentiumii_iii_ppga.html

The Tomcat i810ef motherboard provides high performance capabilities that are ideal for a wide range of demanding applications such as CAD, CAM, CAE, desktop publishing, 3D animation, and video production.

This integrated high-performance system board in a Flex-ATX form factor offers more features and expandability than other Flex-ATX boards in its class. Some of the features included are onboard UltraDMA / 66, 133 MHz Front Side BUS Speed, onboard digital link sound with AC'97 Codec, onboard VGA port, built-in Intel 3D Graphics accelerator and onboard 4MB 133 MHz display cache for enhanced graphics performance.

Flexibility and high-integration have been designed into the Tomcat i810ef. With I/O and drive controller support built onboard (along with the many onboard features previously mentioned), the two PCI slots are free for more add-on expansion cards. Remember to visit Tyan's Website at **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.

important!

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.

procedure

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.

warning

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	•Socket 370 Type CPU** •66/100/133MHz bus support** •Celeron/III processor up to 800+ MHz** •Integrated VRM 8.4
Chipset Information	•Intel 810e AGPset •GMCH (82810e), ICH (82801AA), 4Mb FWH •ITE 8712F (or 8702F) LPC Super I/O Chipset
BIOS Information	•AMI Plug and Play flash BIOS •ACPI & APM/ Year 2K •Bicolor LED for PC99 compliance •Soft power-down •Win98 Ready / DMI 2.0 compliant
Main Memory	•Max. 512MB support •Two 3.3V 168-pin DIMM sockets •PC100 SDRAM support only
Expansion Slots	•Two 32-bit PCI 2.2 Bus Master slots •EXTSMI Server Management Connector
Disk Drive & System I/O	•UltraDMA/66 support (up to 4 drives) •Two 40-pin EIDE connectors (Primary/ Secondary) •Two floppy drives (up to 1.44MB / Mode 3) •Two 9-pin 16550 UART Serial ports •One 25-pin ECP/EPP Parallel port •Two USB rev 1.2 ports •PS/2 Mouse & Keyboard ports •Chassis Intrusion Alarm Header •One 20-pin Server Management Connector
3D Graphics Accelerator	•Intel graphics engine integrated in chipset •Standard 15-pin Analog VGA port •Digital video-out 20-pin header for LCD monitor (optional) •4MB 133 MHz display cache onboard for enhanced graphics performance

AC97 Sound	•Digital link sound with AC'97 Codec onboard •One Game port •Audio line-in, microphone, and speaker ports
Network Feature	•Intel 82559 10/100 Ethernet onboard •3-pin Wake on LAN Header •3-pin Wake on Ring Header (*requires ATX 2.01 power supply)*
Voltage and Power Information	•ATX power supply connector •+12V power source for DC fan onboard •3.3V unbuffered PC100 SDRAM •Power recovery after interrupt feature •Utilizes GTL+ bus to reduce power consumption and EMI
Physical Dimensions	•Flex-ATX design •9.0" x 7.5"

** See Tyan website at **www.tyan.com** for CPU Compatibility List.

Software Specifications

OS	•Operates with Windows 98, Windows 2000, Windows NT 4.0, 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 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).

Help resources:
1. See FAQ and beep codes sections of this manual.
2. See Tyan web site for FAQ, bulletins, driver updates, etc.
   http://www.tyan.com
3. Contact your dealer or distributor for help BEFORE calling Tyan.
4. Check the Tyan user group: **alt.comp.periphs.mainboard.tyan**

Returning Merchandise for Service

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

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

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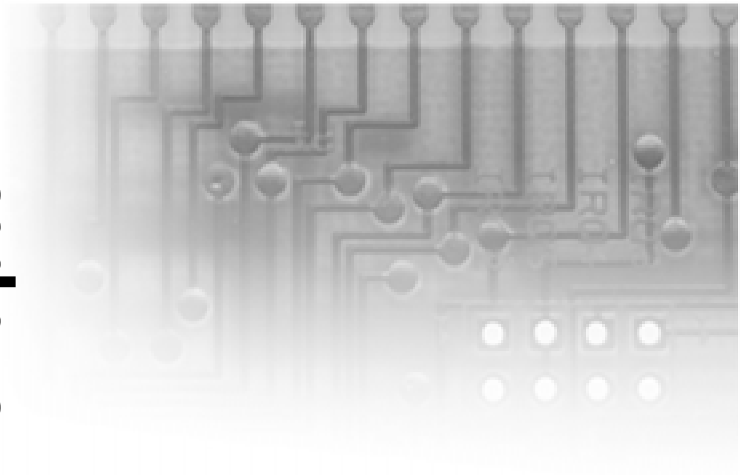
chapter 2



Board Installation

Unpacking

The motherboard package should contain the following:

(1) Tomcat i810ef S2420 mainboard
(1) 40-pin IDE and 34-pin floppy cable pack
(1) 80-pin ATA-66 IDE cable included
(1) Tomcat i810ef S2420 User's Manual
(1) Driver CD
(1) I/O shield (optional) included if purchasing Tomcat i810ef S2420 with LAN option

Installation

You are now ready to install your motherboard. The mounting hole pattern of the Tomcat i810ef S2420 matches the Flex-ATX system board specifications. Your chassis should support a Flex-ATX mainboard form factor.

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

What's the first thing I should do?

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

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

(1) **Ground yourself properly before removing your motherboard from the antistatic bag.** Unplug the power from your computer and then touch any metal part on the computer case. (Or wear a grounded wrist strap.)

(2) **Hold the motherboard by its edges and do not touch the bottom of the board.**

(3) **Avoid touching motherboard components, IC chips, connectors, and leads.**

(4) **Avoid touching pins of memory modules and chips.**

(5) **Place motherboard on a grounded antistatic surface or on the antistatic bag.**

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

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.

procedure

Installation Steps

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

Quick References for Jumpers

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

Jumpers and pins are connected by slipping the blue plastic jumper connector overtop of two adjacent jumper pins (indicated by **1-2** or **2-3**). The metal rod inside the plastic shell bridges the gap between the two pins, completing the circuit. See **Figure 2-2** for more example of pin connections.

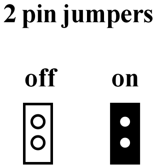


Figure 2-1

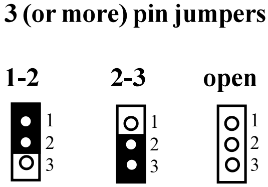
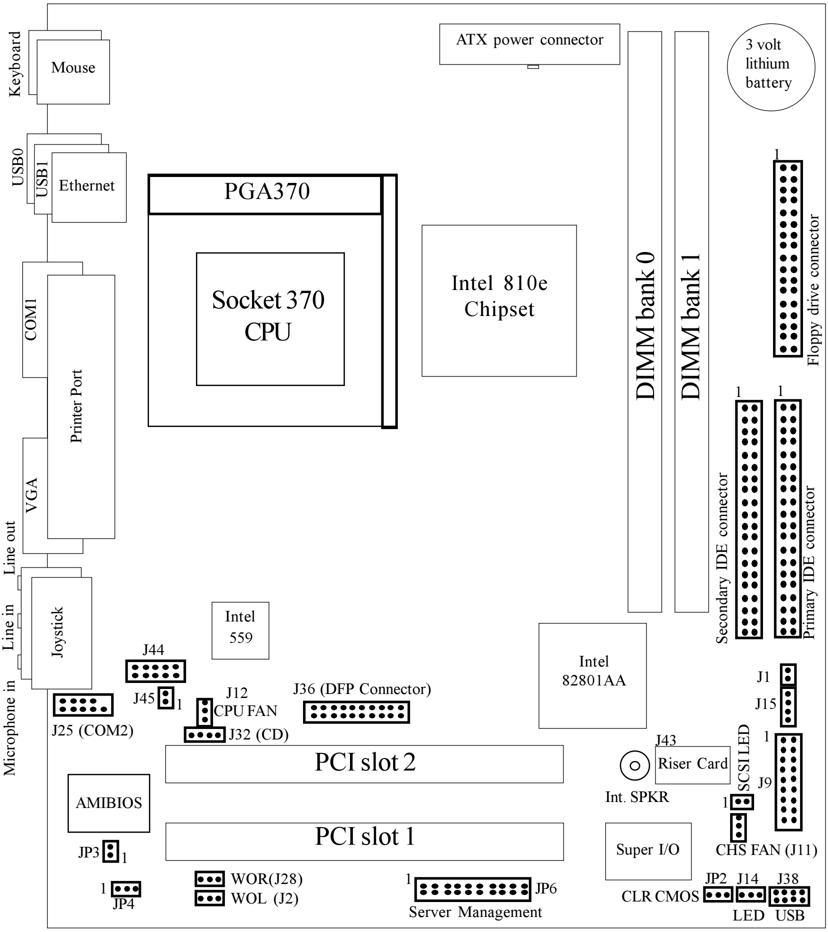


Figure 2-2

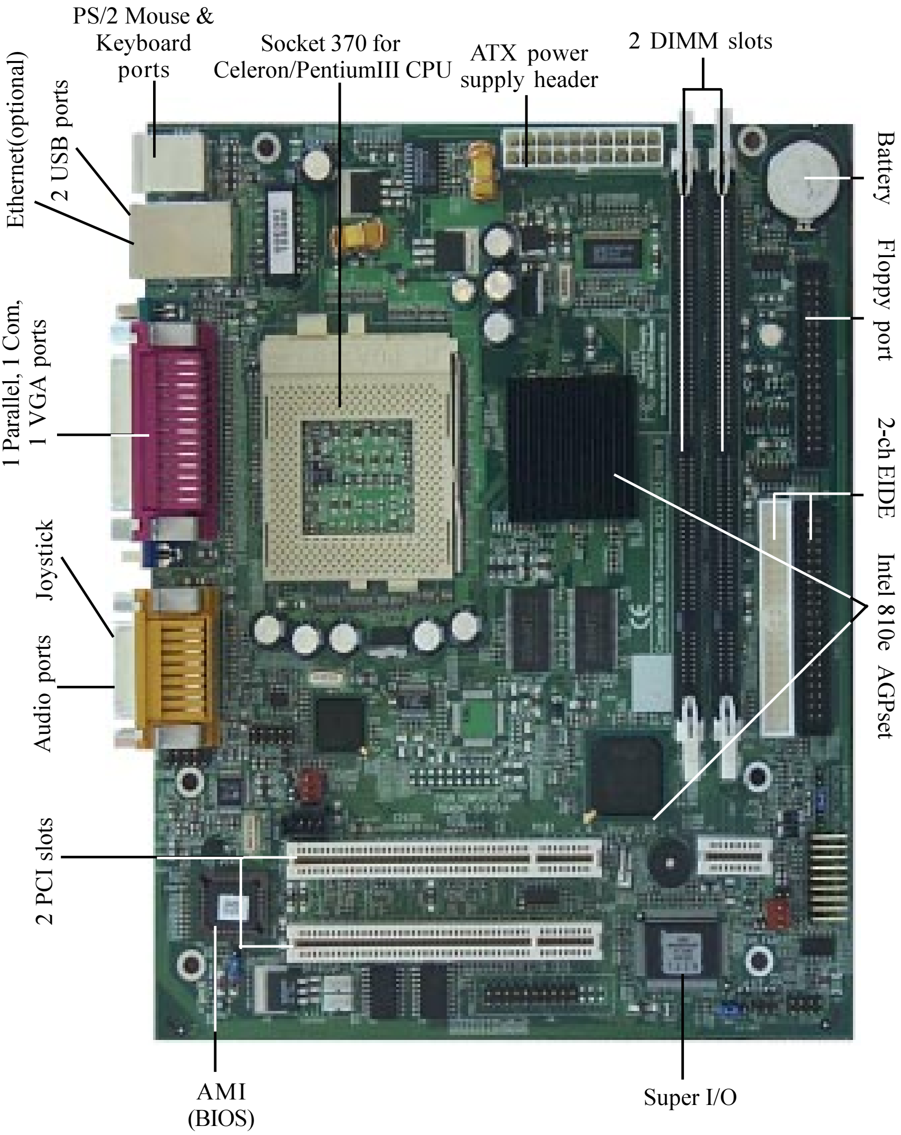
The tables and maps on the following pages will help you set the jumpers for CPU speed, Infrared, and external connector pin assignments, among others. The miniature motherboard maps will help you locate the jumpers on your board. A full-page map of the motherboard can be found on the next two pages.

Map of Motherboard Jumpers


Keyboard
Mouse
USB0
USB1
Ethernet
COM1
Printer Port
VGA
Line out
Line in
Joystick
Microphone in
ATX power connector
3 volt lithium battery
PGA370
Socket 370 CPU
Intel 810e Chipset
DIMM bank 0
DIMM bank 1
Floppy drive connector
Secondary IDE connector
Primary IDE connector
Intel 559
J44
J45
J12
CPU FAN
J36 (DFP Connector)
J32 (CD)
J25 (COM2)
Intel 82801AA
J1
J15
J9
J43
Riser Card
SCSI LED
Int. SPKR
PCI slot 2
PCI slot 1
AMIBIOS
JP3
JP4
WOR(J28)
WOL (J2)
JP6
Server Management
Super I/O
CHS FAN (J11)
CLR CMOS
JP2
J14
J38
LED
USB
1

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

Map of S2420 Features

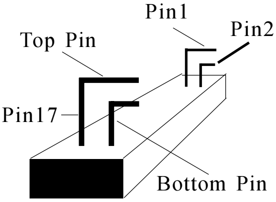

PS/2 Mouse & Keyboard ports
Socket 370 for Celeron/PentiumIII CPU
ATX power supply header
2 DIMM slots
Ethernet(optional)
2 USB ports
1 Parallel, 1 Com, 1 VGA ports
Joystick
Audio ports
2 PCI slots
Battery
Floppy port
2-ch EIDE
Intel 810e AGPset
AMI (BIOS)
Super I/O

1. Setting Jumpers

Note: There are no Jumper settings for CPU bus speed or clock multiplier on the S2420 board. The Tomcat i810ef is designed to automatically detect the socketed CPU and its proper speed settings.

1-A. J9 External Pin Assignments

HDD LED	VCC	1	2	LED Green	Pwr/Slp LEDs
	LED	3	4	LED Yellow	
Reset Switch	Ground	5	6	Power On/Off	Power (Sleep) Switch
	Switch	7	8	Ground	
Infrared	VCC	9	10	NC.	
	IRRX	11	12	Ground	
	Ground	13	14	KEY	
	IRTX	15	16	IR PWR	
	RESV	17	18	RESV	

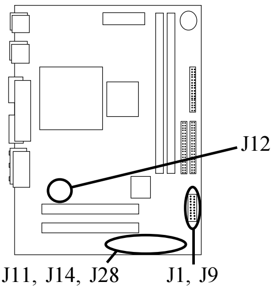


J9 Side View

1-B. Power LED (J14)

Pin	1	2	3
	+5 VSB LED YEL	Ground	VCC LED GRN

Jumper J14 is a 3-pin ACPI LED header. If you need a 2-pin Power LED header, use jumper J9 above.



1-C. Wake-On Ring Connector -optional (J28)

Pin	1	2	3
	+5 VSB	Ground	WOR

1-D. Wake-On LAN Connector -optional (J2)

Pin	1	2	3
	+5 VSB	Ground	WOL

1-E. Chassis Intrusion Alarm Connector (J1)

The J1 connector is an intrusion alarm, that can be connected to the system chassis. When active (J1 is connected to the chassis), this alarm will alert the system administrator anytime someone opens the system's case.

1-F. CPU Fan (J12) / Chassis Fan Connector (J11)

Pin	1	2	3
	Ground	+12V	Speed

CPU Fan connector is for the CPU fan. **CHS Fan1**connector is for the Chassis Fan. You may monitor the status of these Fans when using Intel's LANDesk system management software.

Flash EEPROM

The Tomcat i810ef uses flash memory to store BIOS firmware. It can be updated as new versions of the BIOS become available. You can upgrade your BIOS easily using the flash utility. In order to flash the BIOS, do the following:

i. Shutdown the system, and close jumper JP3 to disable the boot block protection (see Boot Block section below). Then boot system to DOS.
ii. Type "flash4mb" followed by <ENTER> key.
iii. Choose whether to save or not save the old BIOS.
iv. Type in the BIOS filename, like "BIOSFILE.ROM".
v. Flash utility will auto-complete the flash, including updating the boot block at this point.
vi. Shutdown the system, and open jumper JP3 again. Remember to clear the CMOS (see CMOS section below) before turning your system back on.

See page 60 for more details about the Flash Writer Utility.

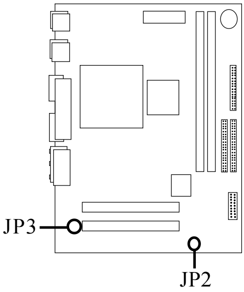
1-G. Boot Block Jumper (JP3)

	Locked	Unlocked
JP3	OFF	ON

By default, this jumper is set to the **OFF** (locked) position. Having the Boot Block protection "locked" will allow system-bootup even if the BIOS bootup fails. In other words, the boot block acts as a backup in case your BIOS fails to boot the system. If the jumper is set to the **ON** position, this would allow the Boot Block to refresh its BIOS code at the same time you flash a new BIOS.

important!

Note: If the Boot Block is 'unlocked' (jumper ON) and if failure occurs during a new BIOS Flash, you run the risk of rendering your entire system un-bootable. The "backup" protection of the Boot Block will be lost.



1-H. Clear CMOS and Reset Password (JP2)

	Default	Reset
JP2	1-2	2-3

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

1. Power off the system
2. Set jumper JP2 to pins 2 and 3
3. Wait for 10 seconds, then return jumper JP2 to pins 1 and 2.
4. Power on the system again.

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

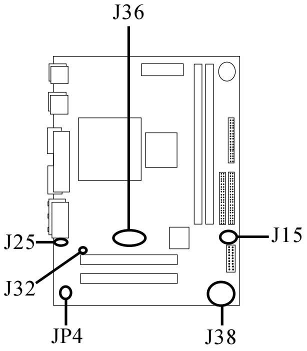
1-I. External Speaker Connector (J15)

The speaker should be connected to pins 1-4 of jumper J15.

Pin	1	2	3	4
	VCC	~	Buzzer	SpkDrv

1-J. CD Audio Connector (J32)

Pin	1	2	3	4
	CD-L	Ground	Ground	CD-R



1-K. LCD Monitor Header (optional) (J36)

This is a 20-pin Silicon Image SII154 Digital video-out header for LCD Monitors.

1-L. COM2 port header (J25)

This is a connector header for the COM2 Port (see map for detailed location)

1-M. On Board Sound Enable/Disable (JP4)

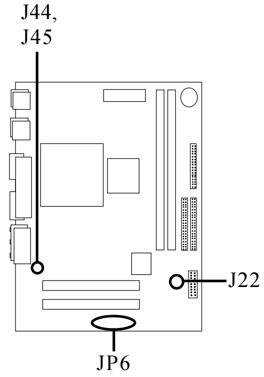
This jumper setting is Enabled by default

	Enable	Disable
JP4	1-2	2-3

1-N. Frontside USB Header (J38)

Certain computer chassis allow for a front-end USB port connection. Therefore, this board provides a front side USB header should you decide to set up a USB connector at the front side of your computer. **Note: If you use J38, you will be unable to use the TOP USB port at the back of the motherboard. Both J38 and USB1 share the same channel.**

important!



1-O. SCSI LED (J22)

This is the SCSI LED connector.

1-P. LAN LED (J45)

This is the LAN LED connector

1-Q. AUX Audio Connector (J44)

This connector is for plugging external audio devices such as add on cards and other output devices.

1-R. Server Management Connector (JP6)

The EXTSMI (External System Management Interface), connector JP6, is used by some plug-in cards. Certain applications associated with these plug-in cards use the interface for hardware control and queries.

Soft Power Connector

The Soft Power Connector is part of jumper block J9 (pins 6-8). The Tomcat i810ef uses the chipset 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.

Hardware Reset Switch Connector Installation

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

CMOS RTC

The Real Time Clock (RTC) circuit, which provides the date and time for the system is integrated into the 810e chipset. 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).

2. Mounting the Motherboard in the Chassis

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

3. Installing Memory

Since Tyan boards are manufactured with performance in mind, you should use add-in components that match. Some DIMM modules may seem to be high quality because of name or feel but that does not guarantee real-world usability. Some cheaper or OEM memory may have brand-name components, but they may contain inferior or substandard parts which do not meet the critical tolerances our products require. Because of this, your memory may not work correctly in a Tyan board though it may work well in a competitor's board.

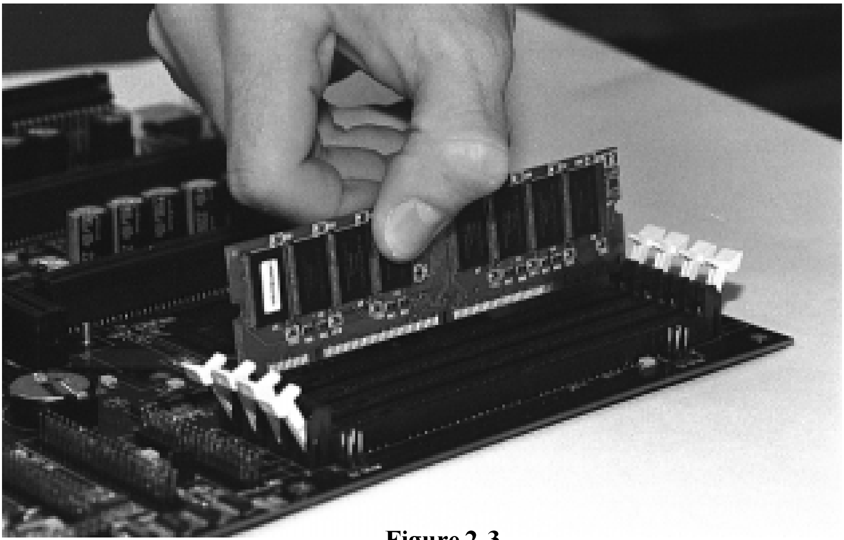


Figure 2-3

***Note:** The image above is used to illustrate a concept and may not represent the actual image of your motherboard.

This is because many of our competitors do not adhere to the strict tolerances required for high performance. If you buy a Tyan board, you are getting the best system available. To make installation easy and trouble free, get high quality parts. For a list of recommended memory vendors, please visit Tyan's website at **www.tyan.com -** go to the "Memory Support" area in the Support Section. The website memory compatibility lists include DIMMs that have proven to be very stable on our boards and perform extremely well.

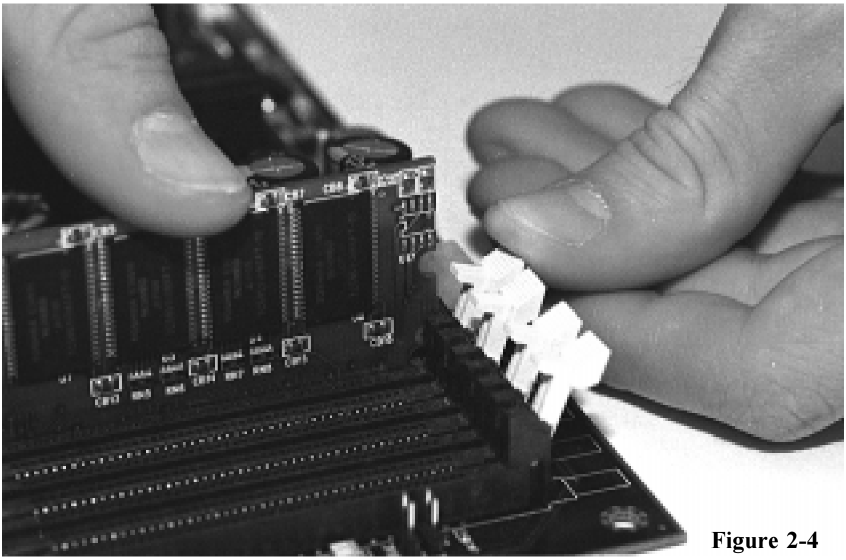


Figure 2-4

Note: The image above is used to illustrate a concept and may not represent the actual image of your motherboard.

To install your DIMMs, line your module up so that the pins fit into the slot.

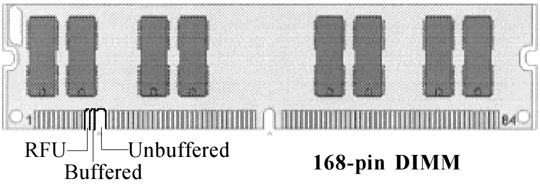


Figure 2-5

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** (see previous page) shows how to sit the DIMM into its slot. To insert the DIMM, push down vertically on the module with even force, as shown in the photo. **Do not shove one end in first; doing so will bend the DIMM pins.**

important!

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** on previous page). In some cases, pushing the memory module into the DIMM slot will move the plastic clips inward, automatically locking the module into place. To remove your DIMM, simply pull the clips back, and pull up on the module. Place the DIMMs in an anti-static bag as soon as you remove them to avoid static damage.

The Tomcat i810ef uses a 64-bit data path from memory to CPU and can accommodate up to 512MB of SDRAM. The 168-pin DIMMs (Dual In-line Memory Modules) must be of the 3.3V, PC-100, **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 previous page). All installed memory will be automatically detected, so there is no need to set any jumpers. Some details of memory installation:

- The mainboard supports 32MB, 64MB, 128MB SDRAM; and supports 256MB unregistered SDRAM DIMM modules.
- PC-100 DIMM is required.

The table below shows some of the possible memory configurations. Not all possible configurations are listed.

DIMM Bank 1	DIMM Bank 2	Total
32MBx1	32MBx1	64MB
64MBx1	32MBx1	96MB
64MBx1	64MBx1	128MB
128MBx1	64MBx1	192MB
128MBx1	128MBx1	256MB
128MBx1	256MBx1	384MB
256MBx1	256MBx1	512MB

Warning! DO NOT use registered DIMMs. (Check with your memory dealer for more information). See www.tyan.com for the latest memory compatibility information.

4. Installing the CPU and Cooling Fan

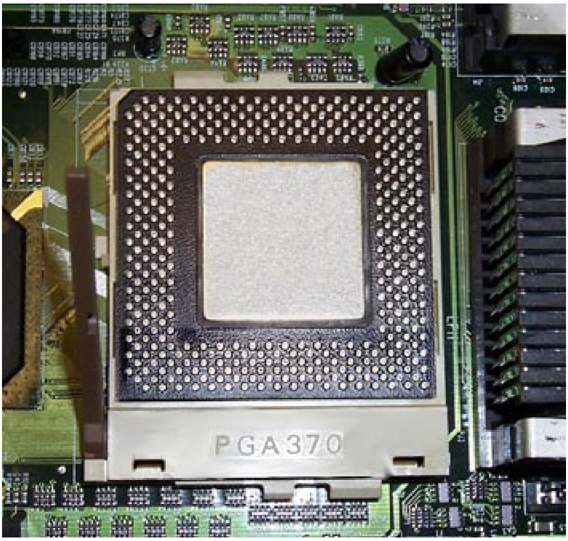


Figure 2-6

Socket 370 Type processors can be used on the Tomcat i810ef. 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 mainboard must be placed on a flat surface. You should be able to insert the CPU into the slot with minimal, but firm pressure. Do not press down hard on the CPU.

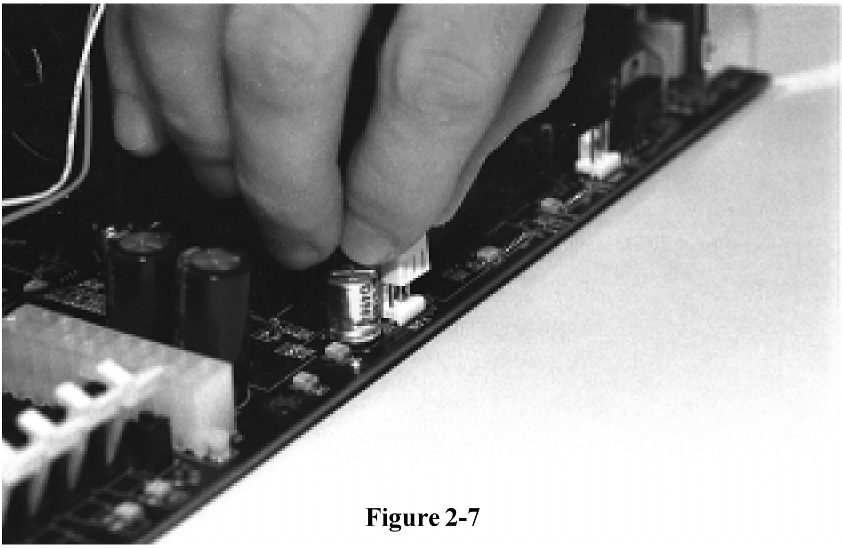


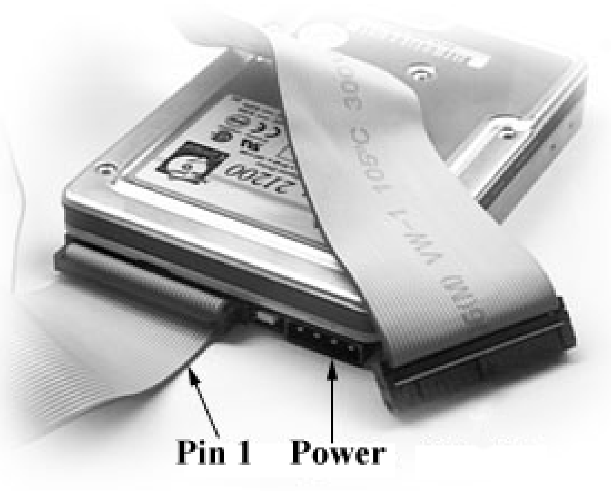
Figure 2-7

Pin 1 on the CPU is denoted by a small dot on one of the corners and Pin 1 on the ZIF socket is denoted by an angled corner (see **Figure 2-6** on previous page). Never force a CPU into a socket. Forcing a CPU to seat will bend the pins on the CPU and possibly damage the motherboard. Push down lightly on the CPU, and lower the arm on the ZIF socket to secure the CPU. A squeaking noise is normal as the arm lowers. After the CPU is securely seated, install the appropriate cooling device. Tyan strongly recommends a heatsink/fan combination. Consult with your case manufacturer for other cooling options. Locate the cooling fan connector (e.g. CPU Fan) on the motherboard. Plug the CPU's cooling fan cable into the cooling fan connector on the board. 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 2-7** on the previous page).

Connecting IDE and Floppy Drives

The colored stripe on a ribbon cable should face toward the ATX Power Connector on the motherboard. In **Figure 2-8** below, you can see how the IDE cables should look when they are connected to your hard drive. Notice how Pin 1 (denoted by a red stripe) is connected so that it is next to the power connector of the drive. The primary IDE connector is black; the secondary IDE connector is white. In most cases, this is the proper way of connecting your IDE cable to the hard drive. **Figure 2-9** on the next page shows the IDE cable properly connected to the motherboard. Contact your hard disk drive manufacturer or documentation for more information.

Figure 2-8



ATA-66 IDE hard drives require a special 80 pin IDE cable which has additional grounding wires. The cable is included in the motherboard package, and is required when using ATA-66 drives. This cable will also support all legacy IDE drives. Note: The blue end of the ATA/66 cable must connect to the motherboard. 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: usually means 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.

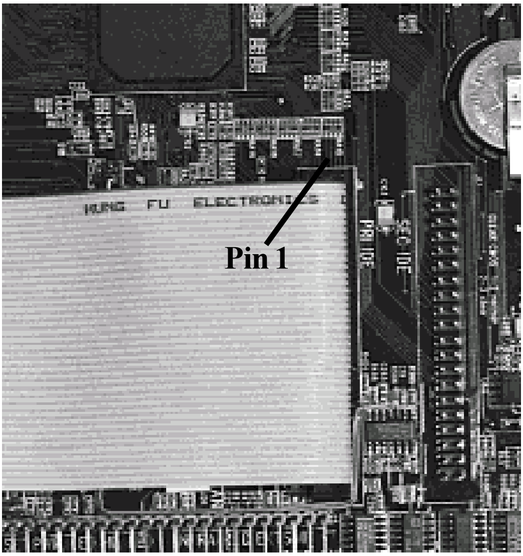


Figure 2-9

***Note:** The image above is used to illustrate a concept and may not represent the actual image of the motherboard.

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 2-10** on the following page). 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.

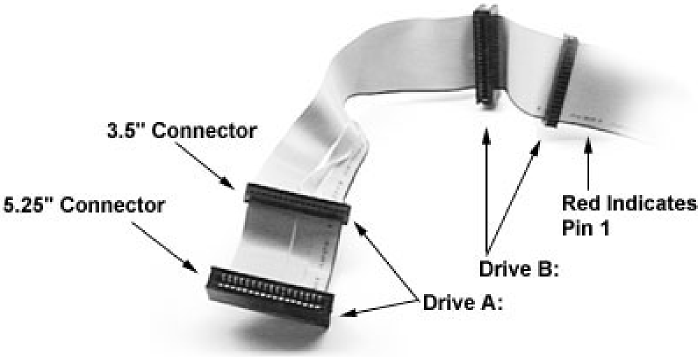


Figure 2-10

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 2-10** for a detailed anatomy of the floppy cable. Remember, you can only have 2 floppy drives connected at any given time. 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: normally signifies that the cable is on backwards. Reverse the cable at the motherboard end and try again.

6. Installing Add-on Cards

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:

important!

- If you are going to install a PCI-Bus interface card on your system, be aware that any one of the 4 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.

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

This board includes ports for USB, Ethernet, PS/2 mouse, and PS/2 keyboard devices. Note that, for this board, the mouse port is the upper PS/2 port, and the 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 2-11 below shows the ATX double row connectors on this board. The Ethernet, Com and Printer ports, as well as the other ports, are labeled.

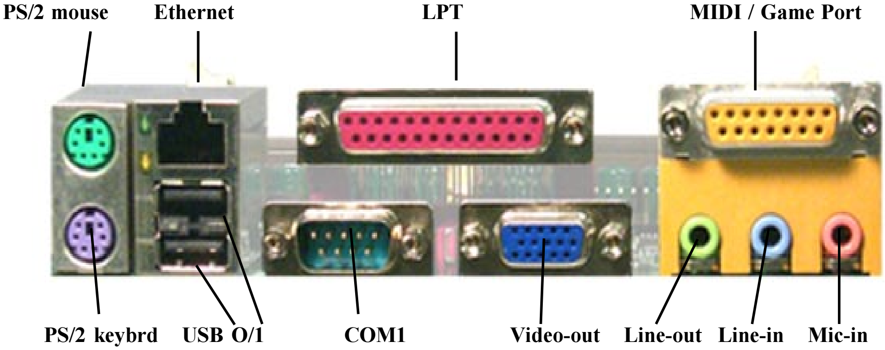


Figure 2-11

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

8. Connecting the Power Supply

The Tomcat i810ef requires an ATX power supply. Tyan recommends using one that conforms to industry standard revision 2.01. The photos below show the ATX power connector before (**Figure 2-12**) and after (**Figure 2-13**) it has been plugged in. The plastic clip on the power connector should lock over the plastic tab on the onboard connector. You shouldn't be able to plug the power connector in any other way but just to be safe, make sure it looks like **Figure 2-13**.

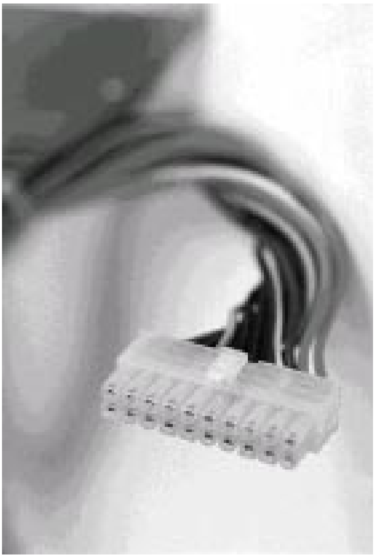


Figure 2-12

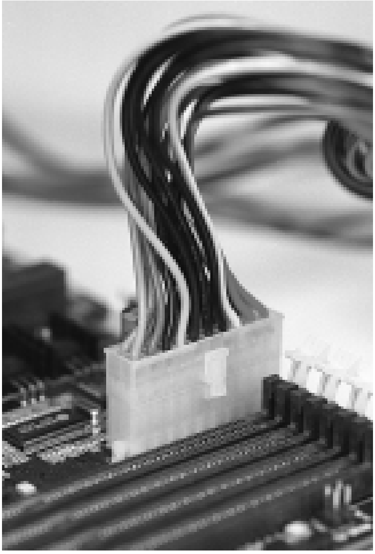


Figure 2-13*

***Note:** The images above is used to illustrate a concept and may not represent the actual image of your motherboard.

important!

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.

You are done!

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

Frequently Asked Questions

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 ess, IRQ, or DMA. If you are using Windows 98/2000, 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: Where can I get USB cables for my motherboard?
A: You can get USB cables from **www.etyan.com** or **www.wiretekusa.com**
Tyan USB Cable Part # : S1606-001-01

Q: What is the USB pin out information for Tyan motherboards?
A: Please refer to URL link here: **http://www.tyan.com/techref/html/io_usb.html**

Q: My motherboard is dead, how do I return it?
A: Contact the place of purchase or your distributor for assistance to return the motherboard for service. RMA issues will not be handled via email by Tyan Tech Support. Please refer to URL link here for more details:
http://www.tyan.com/support/html/rma_faq.html

Q: Is my motherboard Y2K compliant?
A: Please refer to URL link here:
http://www.tyan.com/support/html/year2000.html

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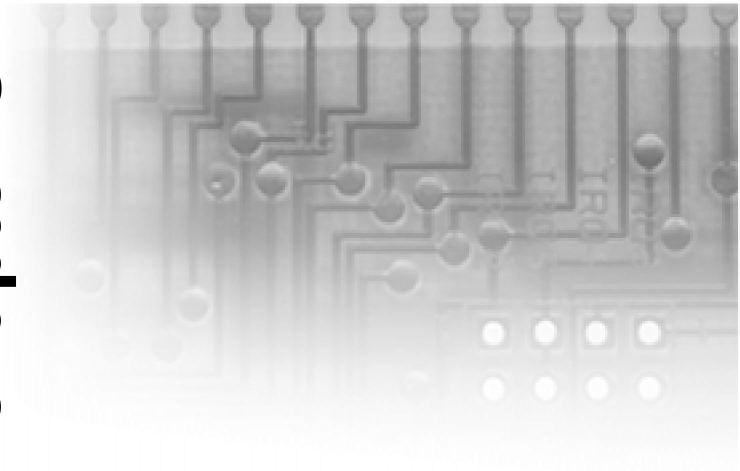
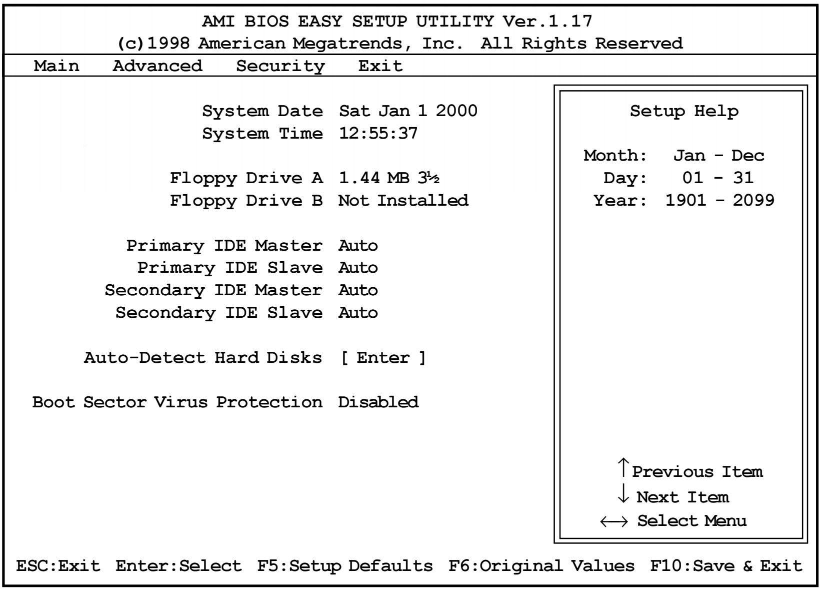
chapter 3



BIOS Configuration

The AMIBIOS Setup screen is shown below.



```
                AMI BIOS EASY SETUP UTILITY Ver.1.17
       (c)1998 American Megatrends, Inc.  All Rights Reserved
  Main    Advanced    Security    Exit

                System Date  Sat Jan 1 2000         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
```

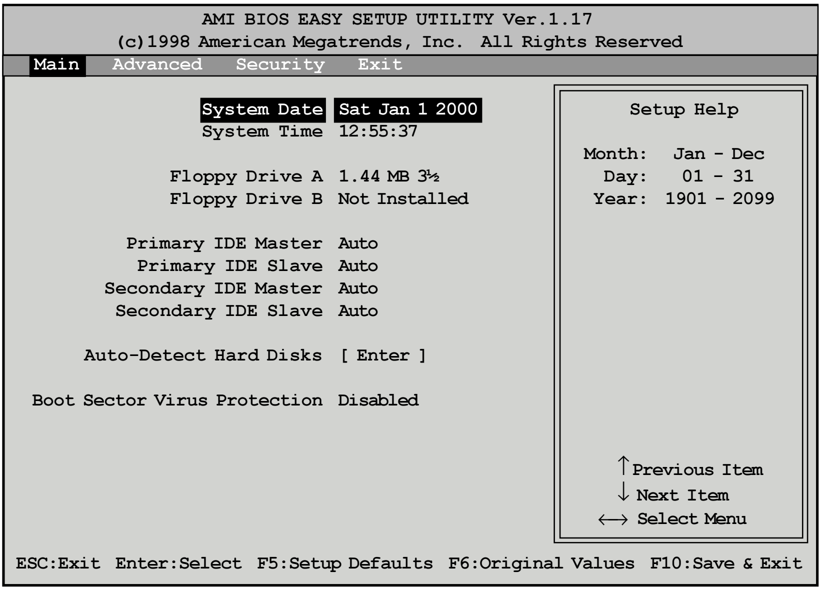
You can select a Setup option by using the following keyboard keys:

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.

Main Setup

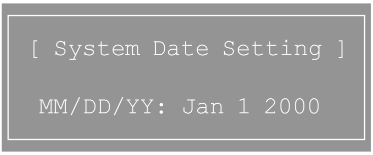
Select the AMIBIOS Setup options below by choosing Main Setup from the AMIBIOS Setup main menu. The Standard Setup menu screen is shown below.



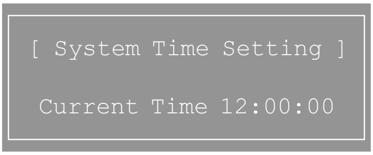
```
                AMI BIOS EASY SETUP UTILITY Ver.1.17
        (c)1998 American Megatrends, Inc.  All Rights Reserved
  Main   Advanced   Security   Exit

                System Date  Sat Jan 1 2000          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
```

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).



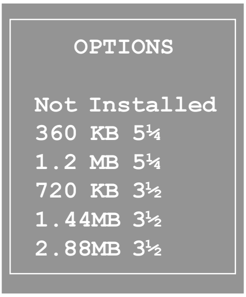
```
[ System Date Setting ]

MM/DD/YY: Jan 1 2000
```



```
[ System Time Setting ]

Current Time 12:00:00
```

Floppy Drive A: and B:

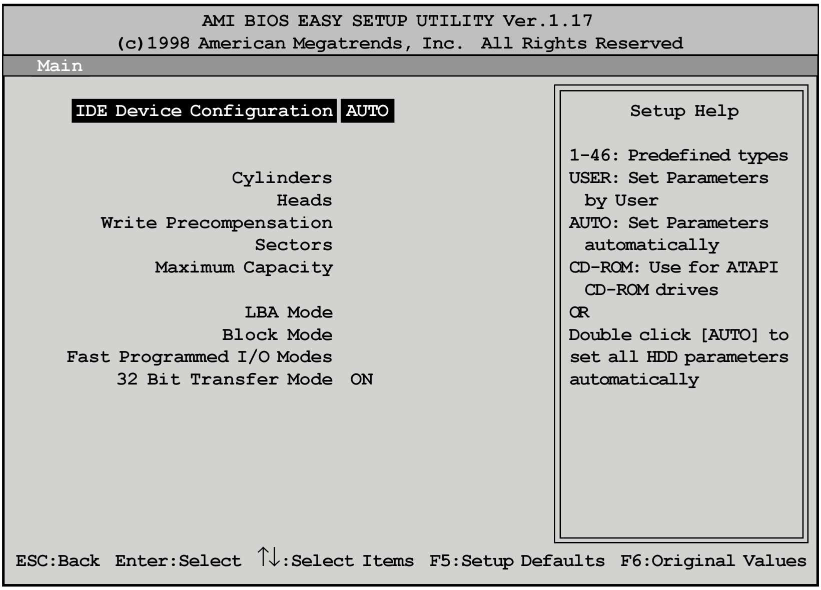
Move the cursor to these fields via the arrow keys and select the floppy type. The settings are 360KB 5¼ inch, 1.2 MB 5¼ inch, 720KB 3½ inch, 1.44MB 3½ inch, or 2.88MB 3½ inch. If you are not sure what type of floppy drive you have, consult the documentation that came with your drive.



```
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.1.17
      (c)1998 American Megatrends, Inc.  All Rights Reserved
  Main

      IDE Device Configuration AUTO                Setup Help

                                              1-46: Predefined types
                     Cylinders                USER: Set Parameters
                         Heads                  by User
        Write Precompensation                 AUTO: Set Parameters
                       Sectors                  automatically
              Maximum Capacity                CD-ROM: Use for ATAPI
                                                CD-ROM drives
                      LBA Mode                OR
                    Block Mode                Double click [AUTO] to
     Fast Programmed I/O Modes                set all HDD parameters
          32 Bit Transfer Mode  ON            automatically

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

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 the next page). 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 drivers 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.

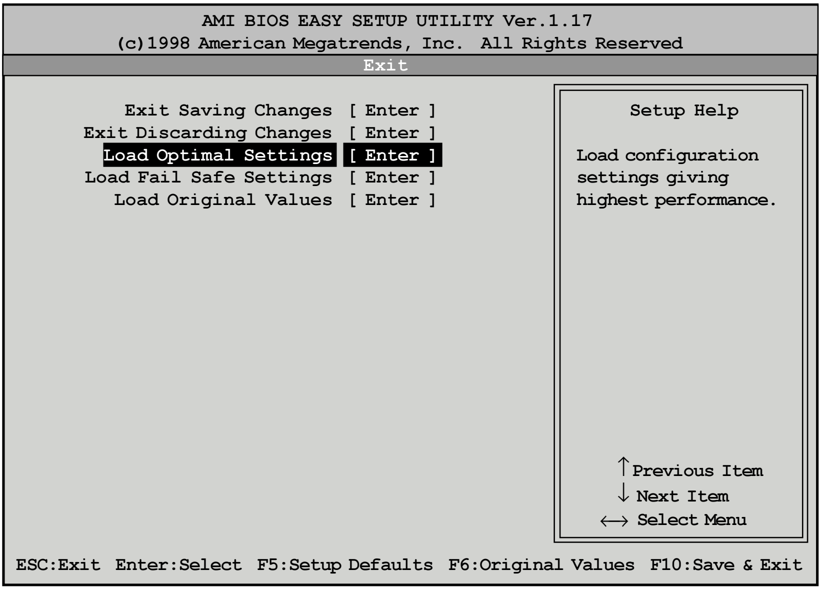
Boot Sector Virus Protection
The available settings for this option are ‘Enable’ and ‘Disable’.

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.

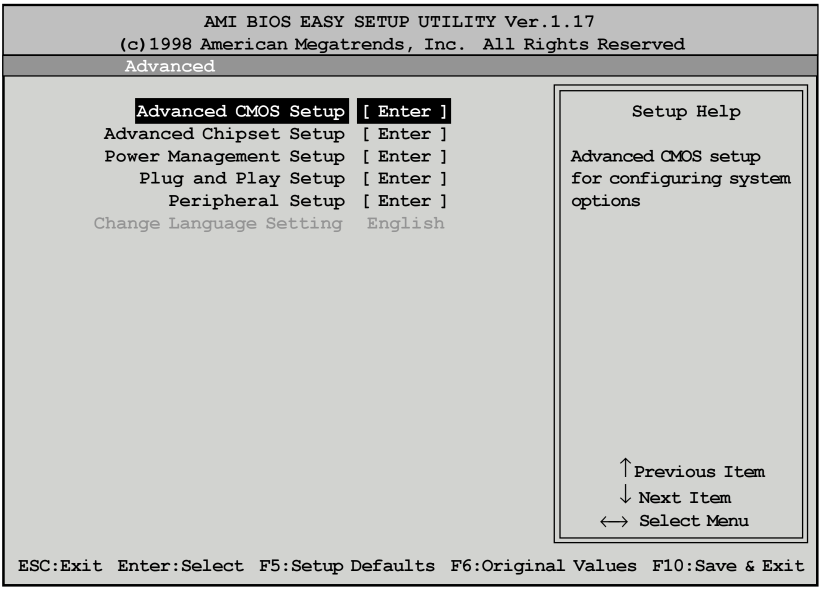
Fail-Safe Defaults
The Fail-Safe default settings consist of the safest set of parameters. Use them if the system is behaving erratically. They should always work but do not provide optimal system performance characteristics.



```
                AMI BIOS EASY SETUP UTILITY Ver.1.17
       (c)1998 American Megatrends, Inc.  All Rights Reserved
                                 Exit

        Exit Saving Changes  [ Enter ]              Setup Help
     Exit Discarding Changes  [ Enter ]
      Load Optimal Settings  [ Enter ]         Load configuration
    Load Fail Safe Settings  [ Enter ]         settings giving
       Load Original Values  [ Enter ]         highest performance.

                                                  ↑ Previous Item
                                                  ↓ Next Item
                                                 ←→ Select Menu

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

Advanced CMOS Setup

The Advanced Setup options included in the AMIBIOS Setup for the Tomcat i810ef are described in this chapter. Select Advanced Setup from the AMIBIOS Setup main menu to display the Advanced Setup options.



```
                AMI BIOS EASY SETUP UTILITY Ver.1.17
      (c)1998 American Megatrends, Inc.  All Rights Reserved
           Advanced

            Advanced CMOS Setup  [ Enter ]        Setup Help
         Advanced Chipset Setup  [ Enter ]
         Power Management Setup  [ Enter ]    Advanced CMOS setup
             Plug and Play Setup [ Enter ]    for configuring system
               Peripheral Setup  [ Enter ]    options
        Change Language Setting   English

                                                ↑Previous Item
                                                ↓ Next Item
                                              ←→ Select Menu

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

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
Initial Display Mode	BIOS	BIOS
Display Mode at Add-On ROM Init	Force BIOS	Force BIOS

Settings Chart (Continued)

Setting Option	Optimal Default	Fail-Safe Default
Floppy Access Control	Read-Write	Read-Write
Hard Disk Access Control	Read-Write	Read-Write
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
System BIOS Cacheable	Enabled	Disabled
Processor Serial Number	N/A	N/A
C000 Shadow (64K)	Cached	Cached
D000 Shadow (64K)	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

This option specifies the type of emulation used for a non-disk device attached as the primary master IDE device. The settings are Auto (AMIBIOS automatically determines the proper emulation), Floppy, or 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, Network, Floptical, SCSI, CDROM, IDE-0, IDE-1, IDE-2, or IDE-3.

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, Floppy, Floptical, CDROM, or IDE-0

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, Floppy, Floptical, CDROM, or IDE-0

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.

Initial Display Mode

This option specifies the initial display mode when the system boots. The settings are:

Setting	Description
BIOS	The messages that AMI BIOS displays before booting the system will appear on the system monitor
Silent	The messages that AMI BIOS displays will not appear on the system monitor

Display Mode at Add-On ROM Init

This option specifies the system display mode that is set at the time that AMIBIOS POST initializes an optional option ROM. The settings are:

Setting	Description
Force BIOS	The display mode currently being used by AMIBIOS is used.
Keep Current	The current display mode is used.

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.

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.

Processor Serial Number

This function activates the Processor Serial Number. It can either be Enabled or Disabled. Default setting is Disabled.

C000 Shadow 64K

These options specify how the 64 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.

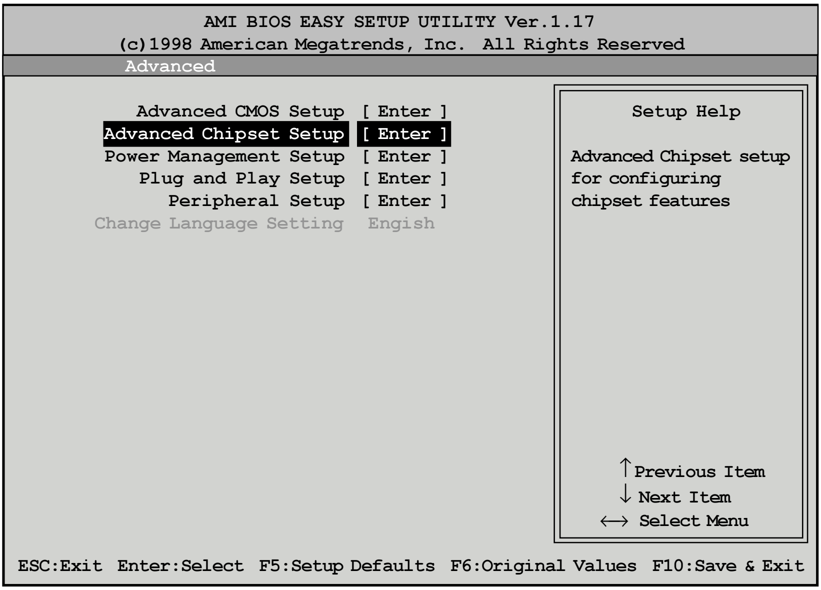
D000 Shadow 64K

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.

Advanced 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.



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                AMI BIOS EASY SETUP UTILITY Ver.1.17
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       Advanced

      Advanced CMOS Setup  [ Enter ]          Setup Help
   Advanced Chipset Setup  [ Enter ]
   Power Management Setup  [ Enter ]     Advanced Chipset setup
     Plug and Play Setup  [ Enter ]     for configuring
        Peripheral Setup  [ Enter ]     chipset features
 Change Language Setting   Engish

                                             ↑ Previous Item
                                             ↓ Next Item
                                            ←→ Select Menu

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

Advanced Chipset Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
USB Function	Enabled	Enabled
USB KB / Mouse Legacy Support	Disabled	Disabled
CPU Latency Timer	Disabled	Disabled
DRAM Page Closing Policy	Closed	Closed
CD Hole	Disabled	Disabled
Memory Hole	Disabled	Disabled
DRAM Refresh Rate	15.6 us	15.6 us
DRAM Cycle Time	1	1
Addr Setup Time	1	1
CAS# Latency	Auto	Auto
RAS to CAS Delay	Auto	Auto
SDRAM RAS# Precharge	Auto	Auto

Settings Chart (continued)

Setting Option	Optimal Default	Fail-Safe Default
Display Cache Window Size	64MB	64MB
CPU Freq Select	Software	Software
CPU Freq Ratio	x4	x4
Initialize Display Cache Memory	Enabled	Enabled
Paging Mode Control	Open	Open
RAS to CAS	Default	Default
CAS Latency	Fast	Slow
RAS Timing	Fast	Slow
RAS Precharge Timing	Fast	Slow
ICH Decode Select	Subtractive	Subtractive
Game Port A	Enabled	Enabled
CPU BIST Enable	Disabled	Disabled
DMA-0 Type	LPC DMA	LPC DMA
DMA-1 Type	LPC DMA	LPC DMA
DMA-2 Type	LPC DMA	LPC DMA
DMA-3 Type	LPC DMA	LPC DMA
DMA-5 Type	LPC DMA	LPC DMA
DMA-6 Type	LPC DMA	LPC DMA
DMA-7 Type	LPC DMA	LPC DMA
ICH Delayed Transaction	Disabled	Disabled
ICH DCB Enable	Disabled	Disabled
Memory Detection Mode	Auto Only	Auto Only
CPU Clock Frequency	Auto	Auto
Local Memory Frequency Select	100MHz	100 MHz

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.

CPU Latency Timer

This option only appears if the USB Function option is set to Enable. The settings are as follows:

Setting	Description
Enabled	The CPU cycle is only deferred after being held in Snoop Stall for 31 clocks and after another ADS# signal has arrived.
Disabled	The CPU cycle is deferred immediately after receiving another ADS# signal.

DRAM Page Closing Policy
The settings are Closed or Open. If set to Closed, DRAM pages tend to be closed after use. If set to Open, DRAM pages tend to be left open.

CD Hole
If set to Enabled, access to the address range 000DC000h - 000DFFFFh is controlled by bits 3-2 of the PAM register. If set to Disabled, all request for access to this address range are forwarded to the hub link.

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.

DRAM Refresh Rate
This option specifies the interval between refresh signals to DRAM system memory. The settings are 15.6 us (microseconds), 7.9 us, or FR 128 CLKs.

DRAM Cycle Time
This optional specifies the length of the DRAM cycle time in SCLKs. The settings are 7 SCLKs or 8 SCLKs.

Addr Setup Time
This option specifies the address set up time in SCLKs. If set to Enabled, a new address is set up in the same clock cycle that asserts CS#. If set to Disabled, CS# is asserted in the clock cycle after the address was issued.

CAS# Latency
This option specifies the number of SCLKs between the time when the Read command is sampled by DRAM and the Whitney Sample reads data from SDRAM. The settings are 3(SCLKs) or 2.

RAS# to CAS# Delay
This option specifies the length of the delay 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.

SDRAM RAS# Precharge
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 (AMIBIOS automatically determines the optimal delay), 2 SCLKs, or 3 SCLKs.

Display Cache Window Size
This option specifies the amount of cache available for the graphics local memory window. The settings are 32MB or 64MB.

CPU Freq Select
This option selects the method used to set the CPU frequency. The settings are Hardware or Software.

CPU Freq Ratio
This option sets the CPU frequency ratio. The settings are between x2 and x8 of the CPU BUS Speed. The ratio increases with 0.5 step.

Initialize Display Cache Memory
The settings are Enabled or Disabled. Set this option to Enabled to display cache memory at system boot. Set this option to Disabled to bypass the display cache initialization procedure.

Paging Mode Control
This option is only available if the Initialze Display Cache Memory option is set to Enabled. The settings are Close or Open. Set this option to Open to open paging mode.

RAS to CAS
This option is only available if the Initialize Display Cache Memory option is set to Enabled. The settings are Override or Default. If set to Override, the RAS to CAS delay override is fixed at 2 clocks. If set to Default, the delay is determined by the CL bit.

CAS Latency
This option is only available if the Initialize Display Cache Memory option is set to Enabled. The settings are Slow or Fast.

RAS Timing
This option is only available if the Initialize Display Cache Memory option is set to Enabled. The settings are Slow or Fast. If set to Fast, tRAS is set to 5 clocks and tRC is to 8 clocks. If set to Slow, tRAS is set to 7 clocks and tRC is set to 10 clocks.

RAS Precharge Timing
This option is only available if the Initialize Display Cache Memory option is set to Enabled. The settings are Slow or Fast. If set to Fast tRP is set to 3 clocks. If set to Slow, tRP is set to 2 clocks.

ICH Decode Select
This option sets the type of ICH decode used. The settings are Subtractive or Positive.

Game Port A
Set this option to Enabled to enable game port A. The settings are Enabled or Disabled.

CPU BIST Enable
Set this option to Enabled to enable CPU BIST. The settings are Enabled or Disabled.

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

ICH Delayed Transaction
Set this option to Enabled to enable delayed ICU transactions. The settings are Enabled or Disabled.

ICH DCB Enable
Set this option to Enabled to enable ICU DCB. The settings are Enabled or Disabled.

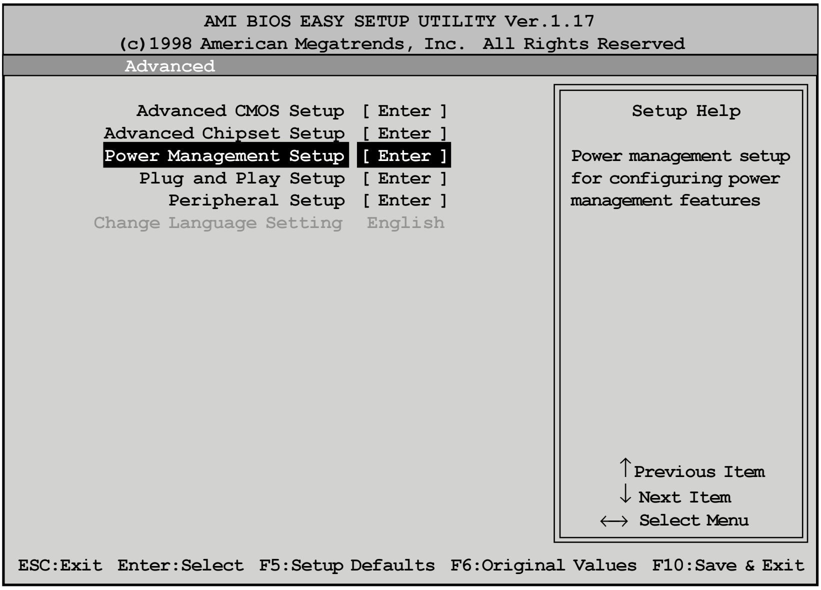
Memory Detection Mode
Some memory chips have incorrect SPD information. We provide an option which bypasses the SPD and uses the BIOS to auto size and program the memory controller.

CPU Clock Frequency
This feature allows the user to adjust the CPU frequency, the settings are between 66Mhz and 133Mhz.

Local Memory Frequency Select
This feature allows you to set the frequency of the 4MB display memory modules on the motherboard. The frequency can be set at 100Mhz or 133Mhz depending on which board you have purchased.

Power Management Setup

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



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                 AMI BIOS EASY SETUP UTILITY Ver.1.17
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          Advanced

          Advanced CMOS Setup  [ Enter ]              Setup Help
        Advanced Chipset Setup  [ Enter ]
        Power Management Setup  [ Enter ]      Power management setup
           Plug and Play Setup  [ Enter ]      for configuring power
              Peripheral Setup  [ Enter ]      management features
       Change Language Setting   English

                                                    ↑ Previous Item
                                                    ↓ Next Item
                                                   ←→ Select Menu

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

Power Management Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Power Management Mode	APM	APM
Suspend Time Out (Minute)	Disabled	Disabled
Power Button Mode	On / Off	On / Off
CPU Sleep Pin Enable	Enabled	Enabled
After G3 Enable	Enabled	Enabled
Green PC Monitor Power State	Standy By	Stand By
Video Power Down Mode	Suspend	Suspend
Hard Disk Power Down Mode	Suspend	Suspend
Hard Disk Time Out (Minute)	Disabled	Disabled
Display Activity	Ignore	Ignore
Manual Throttle Ratio	50 %	50 %

Settings Chart (continued)

Setting Option	Optimal Default	Fail-Safe Default
ADVANCED SMI ENABLE CONTROLS		
Timer Overflow Enable	Disabled	Disabled
Thermal SMI Enable	Disabled	Disabled
PMI SMI Enable	Disabled	Disabled
SW SMI Timer Enable	Disabled	Disabled
TCO Logic SMI Enable	Enabled	Enabled
ADVANCED RESOURCE EVENT CONTROLS		
RTC Resume	Disabled	Disabled
RTC Alarm Date	15	15
RTC Alarm Hour	12	12
RTC Alarm Minute	30	30
RTC Alarm Second	30	30
USB Controller Resume	Disabled	Disabled
PME Resume	Disabled	Disabled
RI Resume	Disabled	Disabled
LAN Wake-UP	Disabled	Disabled
Suspend to RAM Support	Enabled	Enabled
Reset IDE on S3 Resume	N/A	N/A

Power Management Mode

This option specifies the power management mode. The settings are APM, ACPI, or Disabled. Select APM (Advanced Power Management) to enable the chipset power management. Select ACPI (Intel Advanced Configuration and Power Interface) to enable ACPI power managment.

Suspend Time Out (Minute)

This option defines the length of a period of system inactivity while in Standby mode. When this length of time expires, the computer enters Suspend power state. The settings are Disabled, 1min, 5min, or 10min.

Power Button Mode

This option specifies how the power button mounted externally on the computer chassis is used. 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.

CPU Sleep Pin Enable
Set this option to Enabled to enable the Sleep pin on the CPU. The settings are Enabled or Disabled.

After G3 Enable
Set this option to Enabled to enabled the After G3 function. The settings are Enabled or Disabled.

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.

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, AMIBIOS watches for display activity. The computer enters the Full On state if any activity occurs. AMIBIOS reloads the Standby and Suspend time-out timers if display activity occurs. The settings are Monitor or Ignore.

Manual Throttle 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 between the normal CPU clock speed and the CPU clock speed when the

computer is in the power-conserving state. The settings are 12.5%, 25%, 37.5%, 50%, 62.5%, 75%, or 87.5%.

Time Overflow Enable
Set this option to Enabled to enable the SMI timer overflow. The settings are Enabled or Disabled.

Thermal SMI Enable
Set this option to Enabled to enable the thermal SMI. The settings are Enabled or Disabled.

PMI SMI Enable
Set this option to Enabled to enable the PME SMI. The settings are Enabled or Disabled.

SW SMI Timer Enable
Set this option to Enabled to enable the software SMI timer. The settings are Enabled or Disabled.

TCO Logic SMI Enable
Set this option to Enabled to enable the TCO logic SMI. The settings are Enabled or Disabled.

RTC Resume
If Enabled, this option allows you to set an hour and minute for the system to resume (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.

USB Controller Resume
Set this option to Enabled to enable USB controller (Universal Serial Bus) resume. The settings are Enabled or Disabled.

PME Resume
Set this option to Enabled tp enable PME resume. The settings are Enabled or Disabled

RI Resume
Set this option to Enabled to enable RI resume. The settings are Enabled or Disabled.

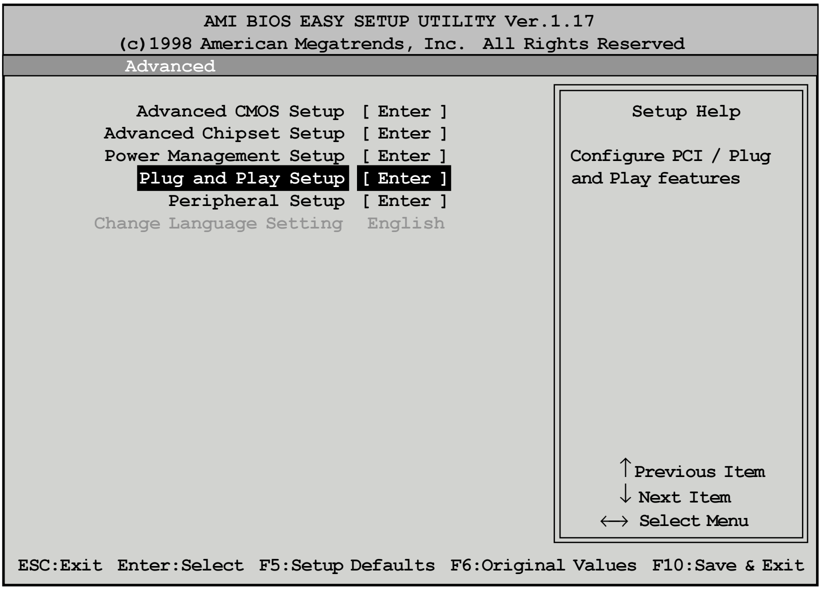
LAN Wake-up
When this option is Enabled, the system will wake up when a signal is received on the Wake-on LAN header. In order for this wake up function to work, the system must have been brought up at least past the POST before it was last shut down (i.e. if you turn the system off before the POST, 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.

Suspend to RAM Support
Under the Windows 98 and Window 2000 ACPI mode default, when a system goes into "Standby", it becomes suspend to RAM also known as a S3 State. This option allows Windows to go to S1 state instead of S3 for standby. In the BIOS default setting S3 "Standby" is enabled. Currently some cards cannot support suspend to RAM, in other words they are not S3 ready.

Reset IDE on S3 Resume
Currently some ATA66 IDE drives will fail to recover from the S3 standby state in Win98 and Win 2000. This option will allow these drives to recover from S3. In the BIOS default setting, the reset IDE on S3 Resume function is enabled.

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.



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                    AMI BIOS EASY SETUP UTILITY Ver.1.17
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      Advanced

         Advanced CMOS Setup  [ Enter ]              Setup Help
      Advanced Chipset Setup  [ Enter ]
      Power Management Setup  [ Enter ]         Configure PCI / Plug
         Plug and Play Setup  [ Enter ]         and Play features
            Peripheral Setup  [ Enter ]
    Change Language Setting    English

                                                   ↑ Previous Item
                                                   ↓ Next Item
                                                  ←→ Select Menu

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

Plug and Play Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Plug and Play Aware O/S	Yes	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
OffBoard PCI IDE Card	Auto	Auto
*OffBoard PCI IDE Primary IRQ	Disabled	Disabled
*OffBoard 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

Setup Chart (continued)

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
IRQ3	PCI/PnP	PCI/PnP
IRQ4	PCI/PnP	PCI/PnP
IRQ5	PCI/PnP	PCI/PnP
IRQ7	PCI/PnP	PCI/PnP
IRQ9	PCI/PnP	PCI/PnP
IRQ10	PCI/PnP	PCI/PnP
IRQ11	PCI/PnP	PCI/PnP
IRQ14	PCI/PnP	PCI/PnP
IRQ15	PCI/PnP	PCI/PnP
Reserved Memory Size	Disabled	Disabled
*Reserved Memory Address	C8000	C8000

* 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

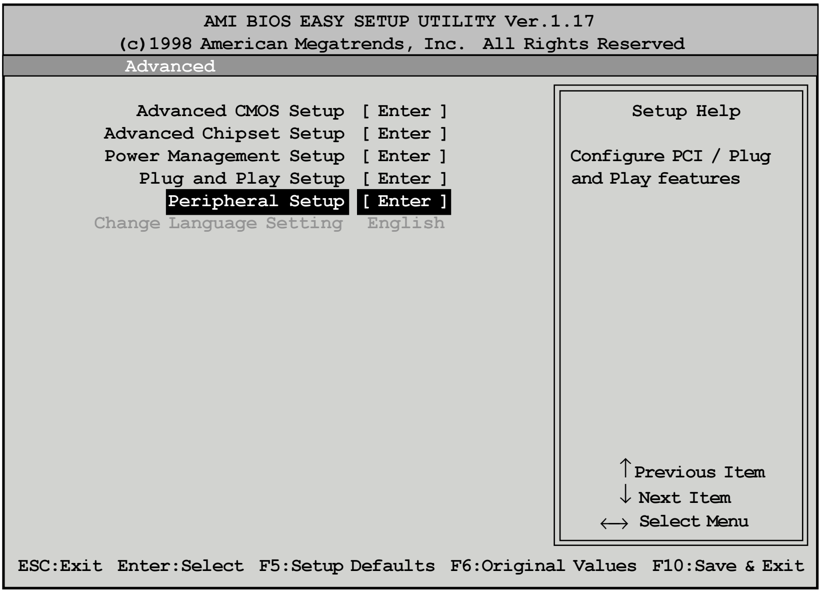
This option specifies the size of the memory area reserved for legacy ISA adapter cards. The settings are Disabled, 16K, 32K, or 64K.

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.

Peripheral Setup

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



```
                      AMI BIOS EASY SETUP UTILITY Ver.1.17
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        Advanced

           Advanced CMOS Setup  [ Enter ]            Setup Help
         Advanced Chipset Setup  [ Enter ]
         Power Management Setup  [ Enter ]        Configure PCI / Plug
            Plug and Play Setup  [ Enter ]        and Play features
               Peripheral Setup  [ Enter ]
       Change Language Setting    English




                                                  ↑Previous Item
                                                  ↓ Next Item
                                                 ←→ Select Menu
ESC:Exit  Enter:Select  F5:Setup Defaults  F6:Original Values  F10:Save & Exit
```

Peripheral Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
KBC Clock Rate	Disabled	Disabled
Keyboard Wake-up Function	Enabled	Enabled
Mouse Wake-up Function	Enabled	Enabled
Super I/O Game Port	201h	201h
*CPU Current Temperature	~	~
*Vcore - CPU	~	~
*Vcc +3.3V	~	~
*Vcc +5V	~	~
*Vcc +12V	~	~
*Vcc -12V	~	~
*Vcc -5V	~	~
*CPU Fan Speed	N/A	N/A
*Chassis Fan Speed	N/A	N/A
OnBoard FDC	Enabled	Enabled

Settings Chart (continued)

Setting Option	Optimal Default	Fail-Safe Default
OnBoard Serial Port1	3F8h	3F8h
OnBoard Serial Port2	Disabled	Disabled
Serial Port2 Mode	N/A	N/A
* Duplex Mode	N/A	N/A
OnBoard Parallel Port	378	378
Parallel Port Mode	ECP	ECP
Parallel Port IRQ	7	7
Parallel Port DMA Channel	3	3
OnBoard IDE	Both	Both

* Setting Option not selectable

KBC Clock Rate

This function allows controls the speed of the keyboard clock. The default setting is 12MHz. The settings are 8MHz or 12MHz

Keyboard Wake-up Function

This option allows for system power-on via the keyboard. The settings are Enabled or Disabled.

Mouse Wake-up Function

This option allows for system power-on via the mouse. The settings are Enabled or Disabled.

Super I/O Game Port

This option specifies the base I/O port address of the Game Port. The settings are Disabled, 201h and 209h. Default is 201h

CPU Current Temperature, Vcore-CPU, Vcc +3.3V, Vcc +5V, Vcc+12V, Vcc -12V, Vcc -5V, CPU Fan Speed, Chassis Fan Speed - These settings display the current state of the above. Settings are not selectable.

Onboard FDC

Set this option to Enabled to enable the floppy drive controller on the motherboard. 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.

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.

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

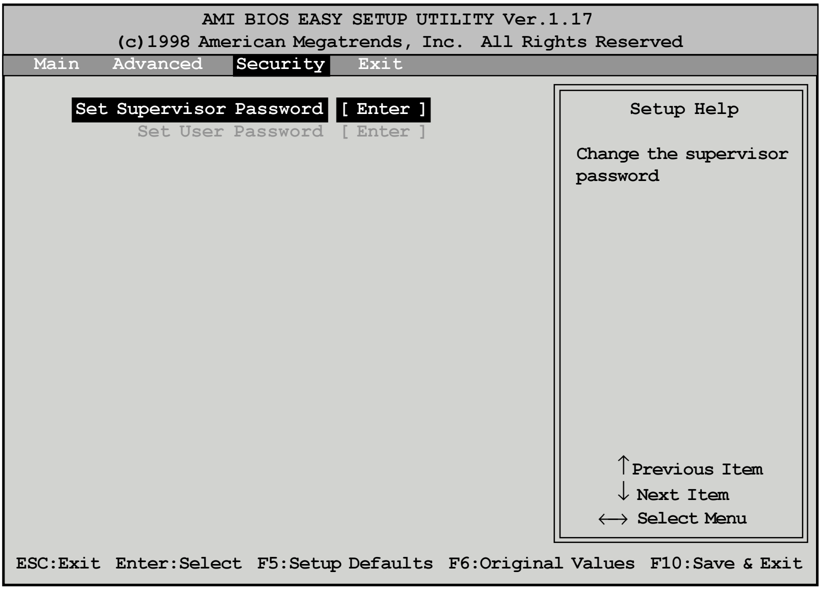
This option specifies the IDE channel used by the onboard IDE controller. The settings are Disabled, Primary, Secondary, or Both.

CPU Current Temperature, VIN (0-6), CPU Fan, Chassis Fan (Optional)

The status of these settings are detected automatically via the chipset and are displayed on the screen. These settings are available on some versions of the motherboard.

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.



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                  AMI BIOS EASY SETUP UTILITY Ver.1.17
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   Main    Advanced    Security    Exit

      Set Supervisor Password  [ Enter ]            Setup Help
             Set User Password  [ Enter ]
                                                 Change the supervisor
                                                 password




                                                     ↑Previous Item
                                                     ↓ Next Item
                                                   ←→ Select Menu
 ESC:Exit  Enter:Select  F5:Setup Defaults  F6:Original Values  F10:Save & Exit
```

When you select the Supervisor Security option, a dialog box 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.

Language Utility

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

Flash Writer Utility

1. If you want to flash BIOS without updating the boot block, do this:

   Type “flash4mb” followed by the BIOS file name
   Example: FLASH4MB BIOSFILE.ROM

2. If you want to flash BIOS with boot block update, do this:

   - i. Shutdown system, close JP3 to disable the boot block protection. Then boot system to DOS.
   - ii. Type "flash4mb" followed by <ENTER> key.
   - iii. To save or not save the old BIOS by you choice.
   - iv. Type in the BIOS file name, like "BIOSFILE.ROM”.
   - v. Flash utility will auto-complete the flash, include boot block at this point.
   - vi. Shutdown the system, open jumper JP3 again. Then restart the system.

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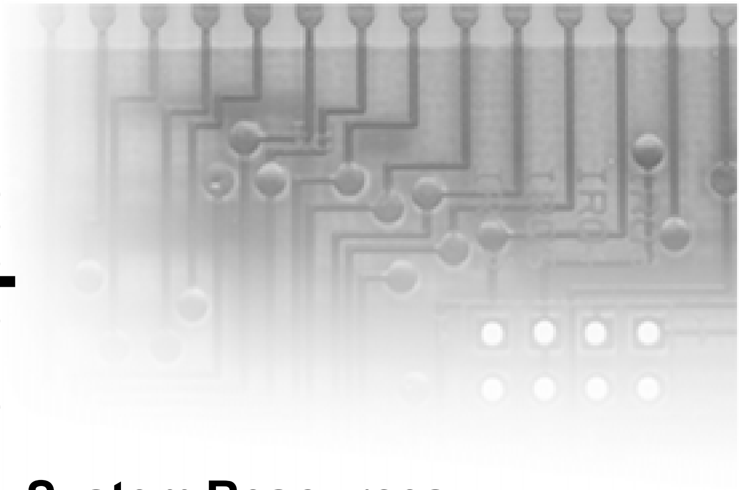
chapter 4



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 64-65. 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...	for 5 or 7 beeps, first test with a new CPU - if that does not solve the problem, then 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
```

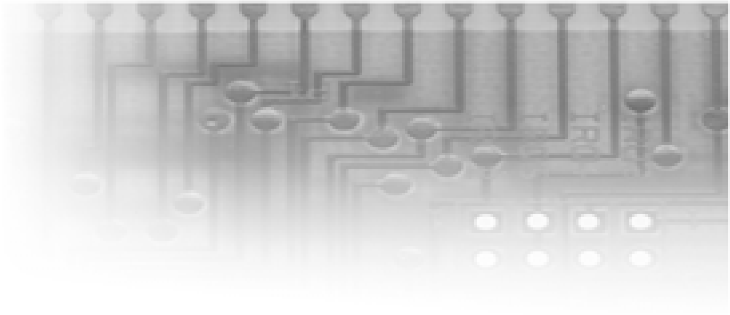
and the system will halt. The system will not halt if the Wait for <F1> If Any Error option in Advanced Setup is Disabled.

```
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

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.

AMR (**A**udio **M**odem **R**iser) is a modem that can be used on Intel Reference Motherboard platforms using Intel's core logic chipsets supporting AC-Link 2.1 It supports fax and all data feeback modes. It provides high speed communicstions between your perosn al computer and a remote location, such as an Internet Service Provider (ISP)

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.

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.

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 Jumpers and jumper pins are active when they are On or Closed, and inactive when they are Off or Open.

CMOS Complementary **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 Dual **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 Direct **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 Dynamic **RAM** is a widely available, very affordable form of RAM which has the unfortunate tendency to lose data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM 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.

FlipChip is a surface mount chip technology where the chip (CPU) is packaged in place on the board and then underfilled with an epoxy. A common technique for attachment is to place solder balls on the chip, "flip" the chip over onto the board and melt the solder.

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 Integrated **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 Input/**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 set-up to use. Novice end users can simply plug them into a computer that is running on a Plug and Play-aware operating system (such as Windows 95), and go to work. Devices and operating systems that are not Plug and Play require you to reconfigure your system each time you add or change any part of your hardware.

The term **RAM** (**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 Static **RAM**, unlike DRAM, does not need to be refreshed in order to prevent data loss. Thus, it is faster, and more expensive.
In **Standby mode**, the video and fixed disk drive shut down; all other devices operate normally.

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

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

VGA (**V**ideo **G**raphics **A**rray) is the PC video display standard.

V-SYNC controls the vertical properties of the monitor.

ZIF socket Zero **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' interférence 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 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 # D1393-120