



# Tomcat i815T S2080

## User's Manual Revision 1.00

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## Before you begin...

### Check the box contents!

The retail motherboard package should contain the following:



Tomcat i815T motherboard



34-pin floppy cable



UltraDMA-100/66/33 IDE cable



I/O shield\* (optional on S2080GN models)



Tomcat i815T user's manual



Tyan driver CD

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

\* If you require a different I/O shield solution, please contact your chassis vendor

# Chapter 1: Introduction

## 1.1 Congratulations!

Thank you for purchasing the Tyan Tomcat i815T!

The Tyan Tomcat i815T is a high performance desktop platform designed for desktop applications that require the power of an Intel® Pentium III™ processor. This platform utilizes the Intel 815e chipset and can support CPU speeds through 1.13+GHz and front side bus speeds of 100 MHz or 133 MHz. Please see Tyan's website for updates and information concerning CPU information and support:

**<http://www.tyan.com>**

This integrated performance board is supported in an ATX form factor. Some of the features included are onboard UltraDMA-100/66/33, optional onboard D.V.M. video, and optional dual 10/100 LAN capability.

With both I/O and drive controller support onboard, the one 2x/4x mode AGP slot and six 32-bit 33MHz PCI slots are free for numerous types of add-on expansion cards. The three 168-pin DIMM sockets can support up to 512MB of PC100/133 non-registered, unbuffered SDRAM.

Remember to visit Tyan's website at **<http://www.tyan.com>**. There you can find information on all of Tyan's products with FAQs, distributors list, and BIOS settings explanations.

## 1.2 Hardware Specifications

<b>Processor Information**</b>	Single PGA370 ZIF socket Supports Intel Pentium III FC-PGA) 500MHz-1.13+GHz Supports Intel Celeron (FC-PGA) 800MHz Onboard VRM 8.5 spec 100MHz and 133MHz front-side bus support
<b>Expansion Slots</b>	One AGP slot supports 2x/4x modes Six 32-bit 33MHz 5V PCI slots Total of seven usable slots
<b>Chipset Information</b>	Intel 815e chipset MCH+ICH2+FWH (4Mb) National PC87366 LPC Super I/O chipset
<b>Hardware Monitoring** (manufacturing option)</b>	National PC87366 hardware monitoring ASIC 3-pin fan monitoring headers 2-pin chassis intrusion header
<b>Memory*</b>	Three 3.3V 168-pin SDRAM sockets Supports up to 512MB* PC100/133 non-registered, unbuffered SDRAM
<b>Integrated I/O</b>	One floppy connector supports up to two drives Two 9-pin 16550-based serial ports (one via optional cable)*** One 25-pin SPP/ECP/EPP parallel port Four USB ports (two via optional cable) PS/2 keyboard and mouse ports
<b>Integrated PCI IDE</b>	Dual-channel master mode Up to four Enhanced IDE devices Support for UltraDMA-100/66/33 IDE and ATAPI com- pliant devices
<b>Integrated LAN (manufacturing option)</b>	Two LAN controllers - One Intel 82559 LAN controller - One ICH2 LAN controller 10/100 Mbps data transfer rate per controller
<b>Integrated 2D/3D graphics (manufacturing option)</b>	Intel 815e D.V.M. technology graphics core System-utilized memory frame buffer Standard 15-pin analog VGA port

\* Please check Tyan website for memory compatibility information: <http://www.tyan.com>

\*\* Not validated at time of print, please check Tyan website for compatibility information:  
<http://www.tyan.com>

\*\*\* Second serial port is an optional feature available on some Tomcat i815T models

**BIOS**

AMI BIOS 4 Mb Flash  
Supports APM 1.2 & ACPI 1.0  
Auto-configuration of IDE hard disk types  
Multiple boot options  
DMI 2.0 compliant

**Form Factor**

ATX 2.03 12" x 8.0" (304.80mm x 203.20mm)  
One 20-pin power connector  
Stacked mouse & keyboard ports  
Stacked two USB ports  
Stacked one parallel, one serial, and  
one (optional) VGA port  
Two (optional) RJ-45 LAN ports with LEDs

**Regulatory**

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

## 1.3 Software Specifications

**OS**

Windows 98/ME, NT/2000

# Chapter 2: Board Installation

## 2.1 Installation

Once you've checked that everything is inside the box (see p. 4 for details), you will then be ready to install your motherboard. The mounting hole pattern of the motherboard matches the ATX board specifications, so your chassis must be capable of supporting an Extended ATX board (check the motherboard dimensions provided on p. 7).

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

### Question: what's the first thing I should do?

The first thing you should do is read the **user's manual**. It contains important information which will make configuration and setup much easier, as well as provide information on device installation and component setup. By reading through the manual completely before installing your motherboard, you will have a complete overview on the installation.

## 2.3 Here are some safety tips:

- (1) **Ground yourself properly before removing your motherboard from the antistatic bag.** Unplug the power from your computer power supply and touch any metal part on the computer case. (You might also want to 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 (such as the bag it came in), component side up. Then, inspect the board for damage.

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

Press down on any of the socketed ICs if it appears that they are not properly seated (the board should still be on an antistatic mat or on top of the bag it came in). 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 start installing it into the computer case (e.g. setting jumpers, etc.) If you do not ground yourself, you risk zapping the motherboard or adapter card. Subsequent problems may not arise immediately because electrostatic discharge, unlike physical damage, causes the device to fail over time.

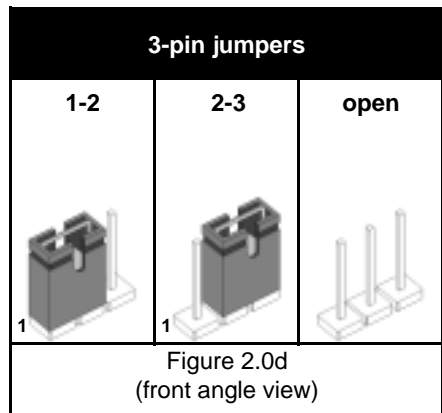
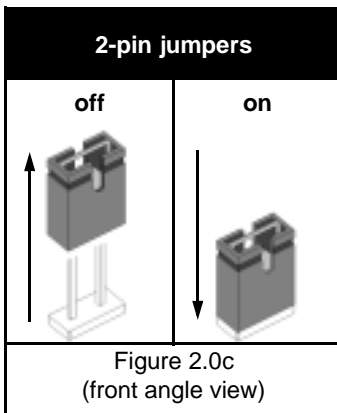
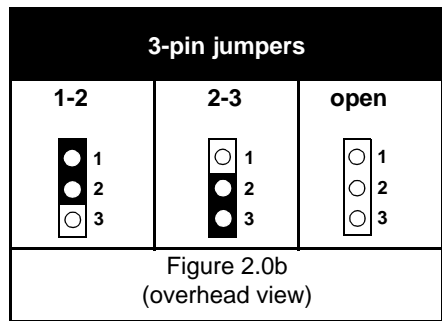
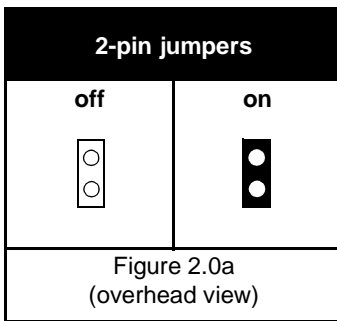


## 2.4 Quick References for Jumpers

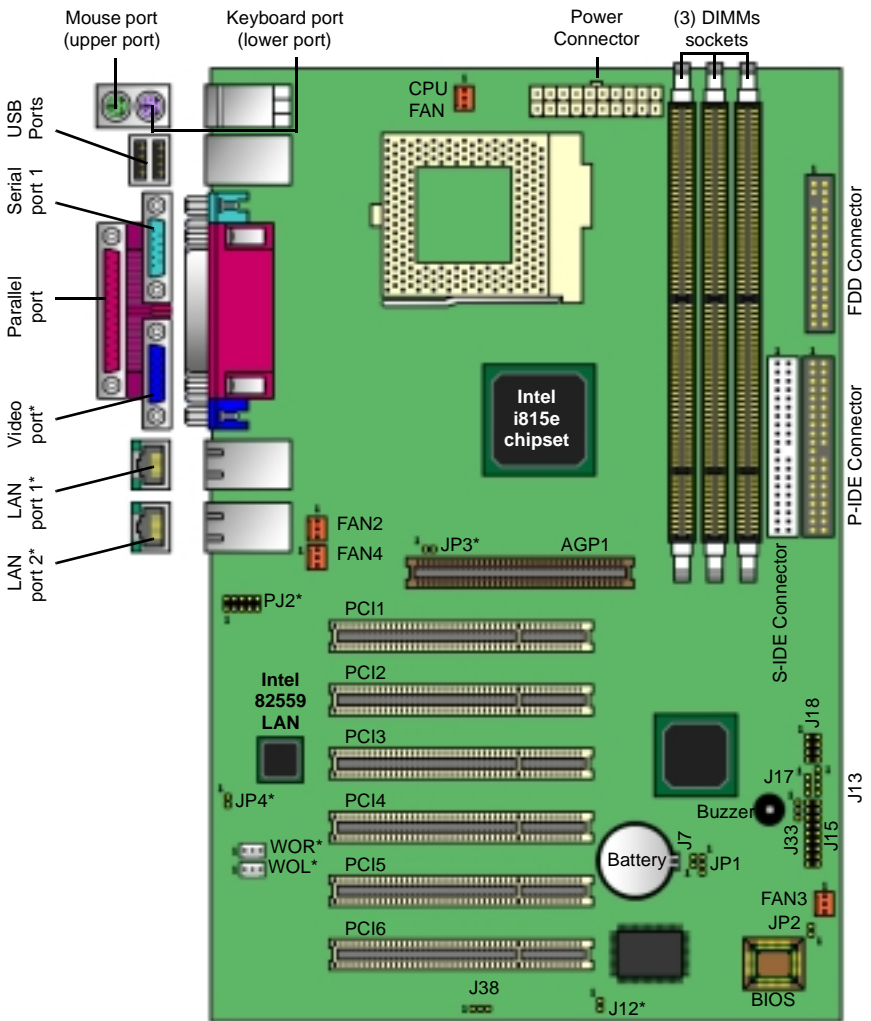
In this manual, the term “closed” and “on” are used when referring to jumpers (or jumper pins) that are active; “open” and “off” are used when referring to jumpers (or jumper pins) that are inactive. See **Figure 2.0a** and **Figure 2.0c** for examples of “on” and “off” pins and jumpers.

Jumpers and pins are connected by slipping the plastic jumper connector over the top 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 2.0b** and **Figure 2.0d** for more examples of 3-pin jumper connections. NOTE: The small number “1” indicates pin 1.

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. Full page maps of the motherboard can be found on the next two pages.



## 2.5 Map of Motherboard Jumpers

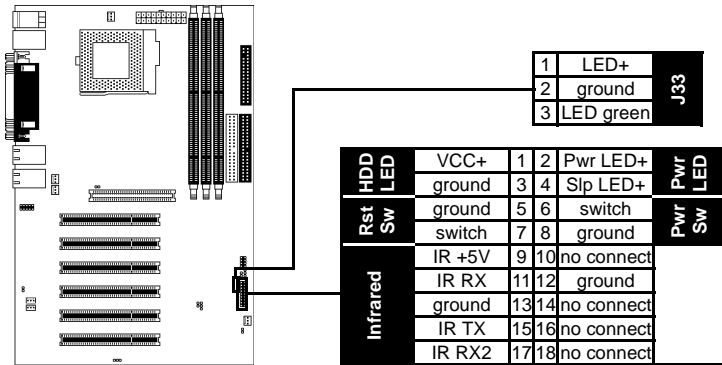


\* Indicates an optional feature available on some Tomcat i815T models

## 2.6 Setting up Jumpers and Onboard Connectors

Pinouts for certain connectors are available on the Tyan website: <http://www.tyan.com>

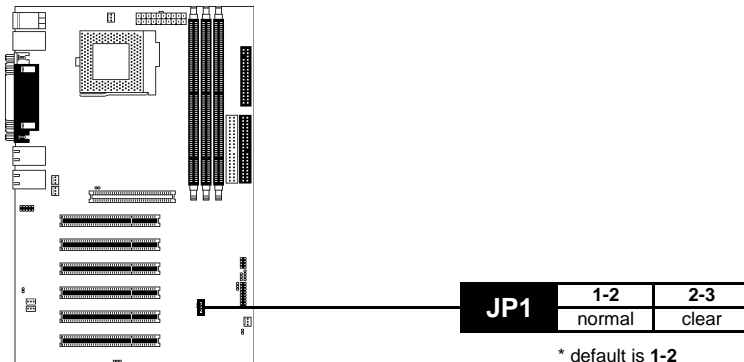
### 2.6-A. Front Panel Connector (J15)



Your chassis will usually come with connectors to install onto the motherboard, such as HDD and Power LEDs. The Front Panel Connector has been implemented for such purposes. If you need a 3-pin Power LED, use J33 (pinout shown **above**).

Abbreviations		
Rst	→	Reset
Pwr	→	Power
Slp	→	Sleep

### 2.6-B. CMOS Reset (JP1)



\* default is 1-2

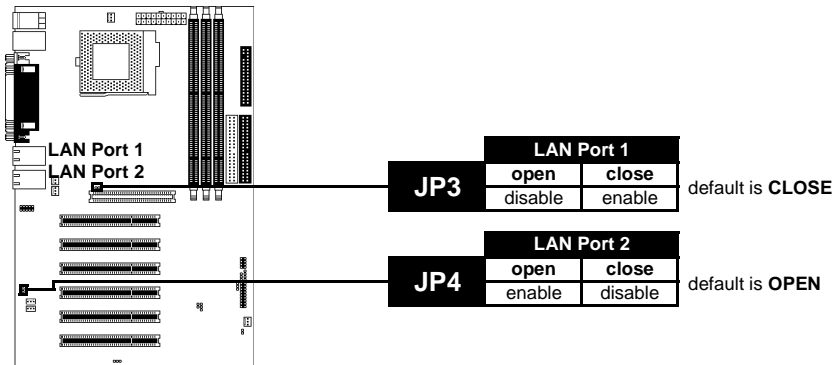
If you have been locked out of your system because you forgot your password or set the CMOS incorrectly, or have just finished flashing your BIOS follow the instructions below.

1. Power off the system
2. Close pins 2-3 on JP1
3. Wait about three seconds
4. Close pins 1-2 on JP1, then power on the system again

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

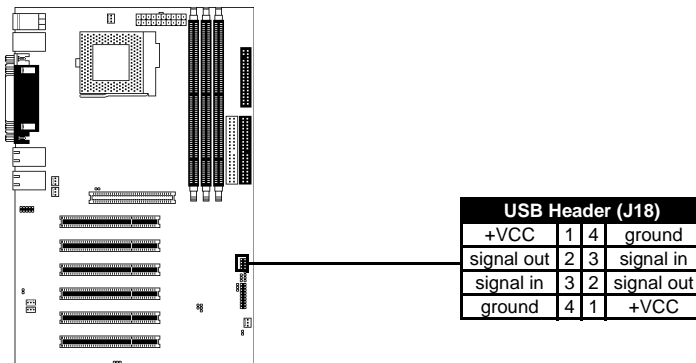
### 2.6-C. LAN Enable/Disable (JP3, JP4) (optional)

You can disable the LAN ports separately through the use of the jumpers shown **below**.



### 2.6-D. USB (J18)

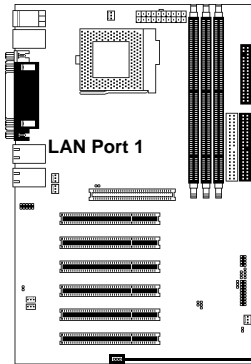
This is a header for additional (optional via cable) USB\* ports. Please note the opposite but parallel configuration of the USB pinout for J18.



\* Only certain chassis allow for frontside USB connection. Please check with your chassis vendor for details on frontside USB connections.

### 2.6-E. LAN1 Double EEPROM (J38) (optional)

If your board configuration contains this **optional** double EEPROM feature, this jumper can be used to enable and disable the writing capability of the LAN1 double EEPROM.



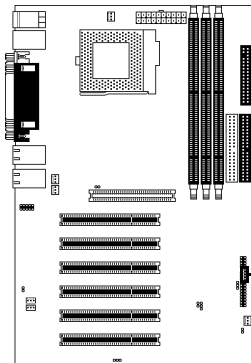
\* default is 2-3

<b>J38</b>	1-2	2-3
	(see below)	normal

Closing pins 1-2 will allow write enable capability. **NOTE: Do not tamper** with this feature if you do not need it. Tyan will not be held liable from damage related to the incorrect setting of this jumper.

### 2.6-F. Speaker Connector (J13)

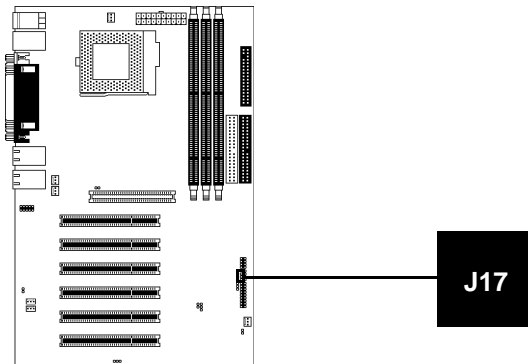
This is the 4-pin connector for a speaker.



<b>J13</b>	1	2	3	4
	power in	no connect	no connect	speaker

## 2.6-G. SMBus Connector (J17)

This is a **debug** feature. Tampering with this jumper will cause serious damage to your board.

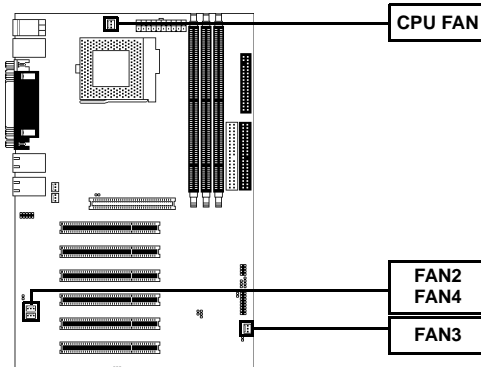


### NOTE:

Tyan takes no responsibility and will not be held liable for damage related to the tampering of J17. Please do not connect this jumper, attempt to alter it, or otherwise tamper with it. Irreparable damage will occur to the board.

## 2.6-H. FAN Connectors (CPU FAN, FAN)

These are the 3-pin connectors for both CPU and chassis fans.



FAN	1	2	3
	ground	+12V	speed

Specifications	
Voltage	12V
Amperage	1.2A

### NOTE:

**NOTE:** The FAN connectors are **12V at 1.2A**. Tyan takes no responsibility and will not be held liable for damage related to the misuse of these fan headers.

### 2.6-I. HDD/SCSI/External LED connector (J12)

This is a 2-pin connector for connecting external LED devices such as SCSI or HDD devices that have connectors for LED output.



### 2.6-J. Soft Power Connector

The soft power connector is part of jumper block **J15** (pins 6 and 8). This board 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 is set to Suspend, pressing the power button once will wake up 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 (BIOS-dependent feature).

### 2.6-K. Hardware Reset Switch Connector Installation

The reset switch on your chassis case provides you with the Hardware Reset function, which is the same as power on/off, except that the system will immediately execute a cold start after the reset button is pushed. The reset switch needs to be connected to jumper block **J15** (pins 5 and 7).

### 2.6-L. Flash Utility

You can upgrade the BIOS of this motherboard by using the Flash Utility (see **p.47**). Check the Tyan website for more details: <http://www.tyan.com>


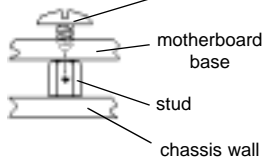

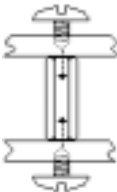

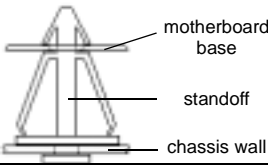

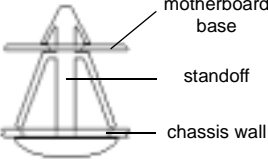
## 2.7 Mounting the Motherboard into the Chassis

Your chassis may include mounting hardware. If mounting hardware was included, you can use the following examples to help you in installing your motherboard into the chassis.

The chassis may have come with the studs integrated into the chassis wall, so in those cases you would only need to use screws (possibly included with your chassis) to install the motherboard. See the examples (**Figure 2.0**, shown below) for more details.

If the chassis includes mounting hardware without the studs pre-installed, then you will need to install the motherboard using the mounting hardware as shown in the examples **below**. Remember not to over-tighten any of the screws, or you might risk breaking internal traces in the surrounding area, or damage the motherboard in some other way.

Other examples of how to install your motherboard using other hardware (that may or may not have been included with your chassis) are shown below.

Type of hardware	One solution for installing motherboard	Another solution	Another solution
	 <p>screw</p> <p>motherboard base</p> <p>stud</p> <p>chassis wall</p>		
	 <p>motherboard base</p> <p>standoff</p> <p>chassis wall</p>		
	 <p>motherboard base</p> <p>standoff</p> <p>chassis wall</p>		

**Figure 2.0**

**NOTE:**





The diagrams above are only representative of a few solutions for installing a motherboard into the chassis. The installation procedure for installing your motherboard into the chassis may differ.



## 2.8 Installing Memory

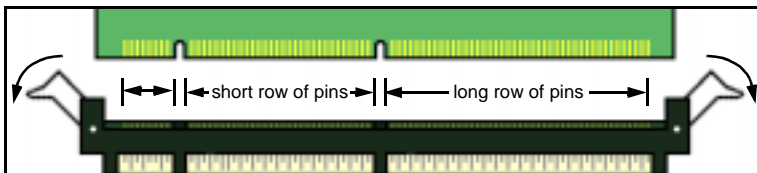
Please keep in mind that although some memory modules may appear to be high-quality, they may contain inferior or substandard parts. The type of memory you choose to install should be checked against the memory compatibility list, which is available from Tyan's website at <http://www.tyan.com>

Here are some details of memory installation for this board:

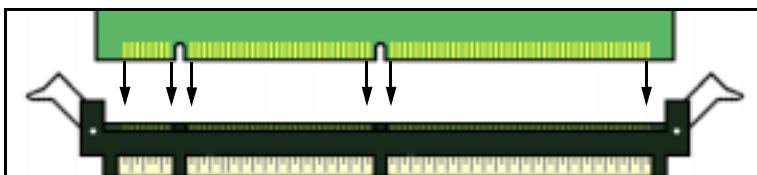
-  At least one non-registered, unbuffered DIMM must be installed in order to POST.
-  Supports 128MB, 256MB, 512MB\* non-registered, unbuffered DIMMs ONLY.
-  PC100 supported in a three DIMM setup. **PC133 only supported in a two DIMM setup.**
-  The motherboard supports up to 512MB\* of PC100/133 SDRAM.

### Memory Installation Procedure

- Step 1** Line your module up so that the pins fit into the socket. There is only one way your DIMM can fit properly. Make sure that the short row of pins is lined up with the short gap in the DIMM socket, just as the long row of pins should line up with the long gap in the DIMM socket.

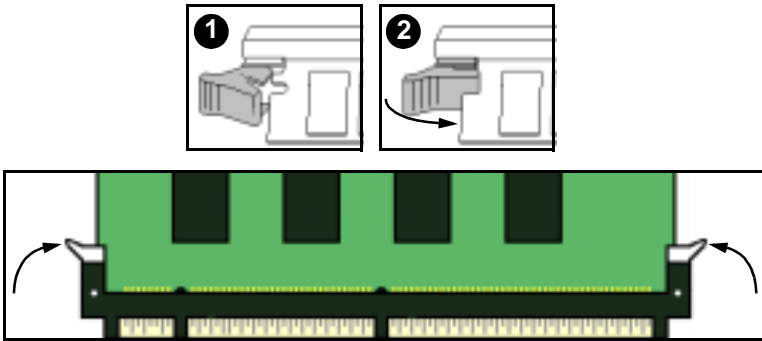


- Step 2** Insert the DIMM by pushing the module into the socket **with even force**. Do not insert one end and then the other: install the whole module at once or you might bend the DIMM pins. Make sure the DIMM is securely seated.



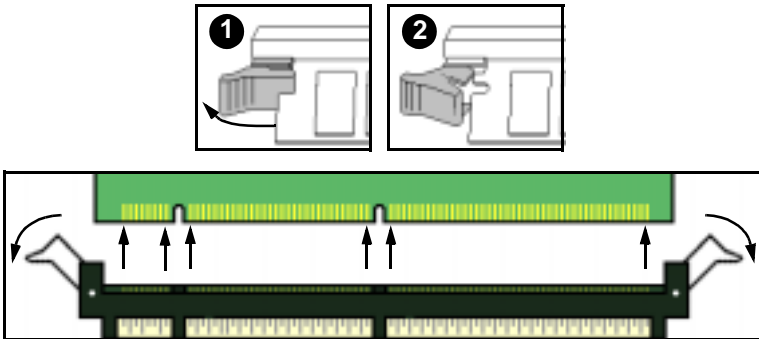
\* Please check Tyan website for memory compatibility information: <http://www.tyan.com>

**Step 3** Lock the DIMM into place by pushing the clips back on either end of the socket onto the notches in the ends of the DIMM (see pictures below for details).



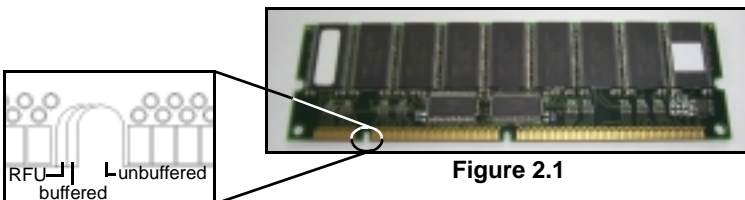
### Removing a DIMM

Removing a DIMM is just the reverse: pull back the clips from the DIMM (see pictures below), and carefully pull the module straight out. Place the DIMMs in an anti-static bag as soon as you remove them to avoid static damage.



### Unbuffered and Non-Registered vs. Registered Memory

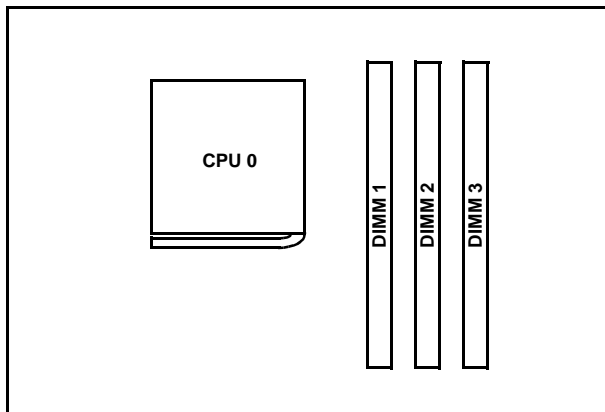
The 168-pin DIMMs (Dual In-line Memory Modules) must be of the 3.3V PC100/PC133 unbuffered variety. The notch position in the SDRAM key position will tell you whether or not a DIMM is unbuffered (see **Figure 2.1 below**). All installed memory will be auto-detected, so there is no need to set any jumpers.



**Figure 2.1**

### Suggested Memory Configurations

The table below shows some of the possible memory configurations. **Not all possible configurations are listed.** Your memory configuration may differ from one or more of the combinations shown below. **Please make sure that you using unbuffered, non-ECC, unregistered DIMMs!**



Up to 512MB* unbuffered, non-ECC, unregistered SDRAM possible								
DIMM 1	64MBx1	64MBx1	128MBx1	128MBx1	0	256MBx1	256MBx1	512MBx1
DIMM 2	0	64MBx1	0	128MBx1	256MBx1	128MBx1	0	0
DIMM 3	0	0	64MBx1	0	0	0	256MBx1	0
TOTAL	<b>64MB</b>	<b>128MB</b>	<b>192MB</b>	<b>256MB</b>	<b>256MB</b>	<b>384MB</b>	<b>512MB</b>	<b>512MB</b>

**NOTE:**

PC100 is supported in a three DIMM configuration.






PC133 is supported **ONLY** in a two DIMM configuration.

\* Please check Tyan website for memory compatibility information: <http://www.tyan.com>

## 2.9 Installing the CPU and Cooling Fan

Intel Pentium II processors up to 1.13+GHz and Intel Celerons up to 800MHz can be used on this board. For more information on CPU compatibility, check Tyan's website at: <http://www.tyan.com>.

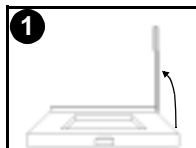
When installing your CPU, remember the following:

-  The CPU is a sensitive electronic component and can easily be damaged by static electricity
-  Do not touch the CPU pins with your fingers
-  You should be able to insert the CPU into the socket with virtually no force
-  Do not press down hard on the CPU as you might bend or break pins, or otherwise damage the CPU
-  The CPU voltage will automatically be detected by the motherboard, so there is no need to set any jumpers or BIOS setting.

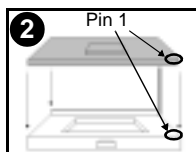
### Installing the CPU

Before installing the CPU, check it for any visible damage. Make sure none of the pins are bent or missing. Be sure where Pin 1 is on both the CPU and the socket. The following steps each have a corresponding picture next to it to help guide you through the installation.

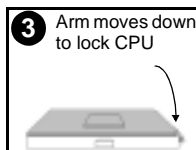
**Step 1** Carefully lift the arm of the ZIF socket until it is at a 90 degree angle pointing away from the motherboard. Be very careful not to damage any components that might be next to the socket.



**Step 2** There are two beveled corners on the CPU, which will match the two angled corners on the socket. Carefully install the CPU by lining both Pin 1 on the CPU and Pin 1 on the socket, making sure the pins actually fit into the socket. **Do not** force the CPU into the socket: check the pin alignment of CPU pins to socket holes.



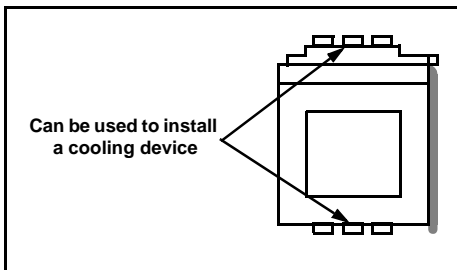
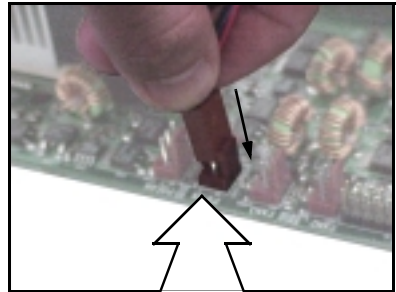
**Step 3** Push down lightly on the CPU while lowering the arm on the socket to secure the CPU (see right). A squeaking noise may be heard while lowering the arm, or the socket may make a 'click' noise when the arm is locked into position: these noises are normal.



## Installing the Cooling Fan(s)

After a CPU has been installed, you will need to **install the proper cooling device** for the CPU. This device, a heatsink/fan combination, can be purchased at many computer retail stores. Installation of the cooling device may vary depending on the fan manufacturer's design. You should also take space into consideration when install a cooling device: make sure the cooling device is not too big, or else you may end up damaging components around the CPU socket.

Tyan **highly recommends** that you use some type of thermal compound (available from many computer retail stores), between the CPU and heat sink, to maximize distribution of heat away from the CPU. Please use extra caution when installing any type of clamp-style fan, or else damage may occur to the CPU socket, and/or the CPU itself. See **the picture to the right** for an example of how to connect the cooling fan's power supply. Another diagram has also been provided below, to aid in CPU fan installation onto the socket. Check with your cooling device vendor for more details about installation.



Can be used to install a cooling device

Mounting points on the CPU socket

Close-up of fan connector

FAN		
1	2	3
ground	+12V	speed

Specifications	
Voltage	12V
Amperage	1.2A

### NOTE:

The FAN connector has a **12V, 1.2A limitation**. Tyan takes no responsibility and will not be held liable for damage related to the misuse of any FAN jumper.

## Installing Chassis Fans

Alternatively, if you wish to also install chassis fans for increased cooling, headers are provided to power those fans as well (see p. 14, section 2.6-H). Chassis fan installation will vary depending on your chassis manufacturer's design. Please check with your chassis manufacturer for details on proper chassis fan installation.

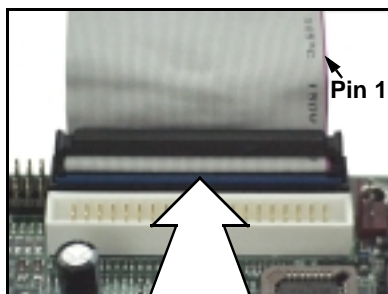
## 2.10 Connecting IDE and Floppy Drives

A variety of IDE and ATAPI-compliant devices can be installed on this motherboard, such as hard disk drives (HDDs) and CD-ROMs.

Please keep in mind that on this motherboard, the primary IDE connector is **BLACK**, and the secondary IDE connector is **WHITE**. See the picture to the right for an example of the IDE cable properly connected to the motherboard, with the **BLUE** end of the IDE cable installed on the motherboard.

Pin 1 on the IDE cable is usually denoted by a red or colored stripe down one side of the cable. That side of the cable must match Pin 1 on the motherboard's IDE connector. There will also be a key pin on the cable that matches with a notch in the IDE connector, to ensure proper installation. Consult the documentation that came with your IDE/ATAPI device, or contact the device's manufacturer for more details on installation.

Please note that UltraDMA-100/66 IDE HDDs require a special 80-wire cable which has additional grounding wires. This cable has been included with this motherboard for your convenience. The UltraDMA-100/66 cable is backwards compatible with UltraDMA-33 and legacy IDE HDDs.



**BLUE end goes to IDE connector**

### NOTE:

Only Tyan-approved cables are recommended for this motherboard. If you are using an existing configuration with older cables, your system might not function properly. Use only Tyan-approved cables (i.e. the ones included with your motherboard).

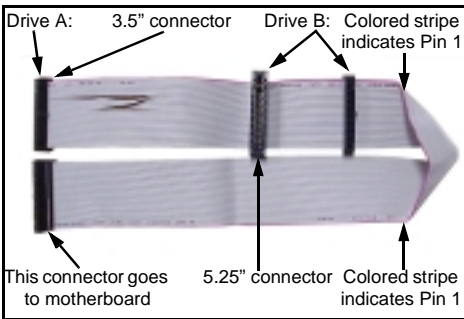
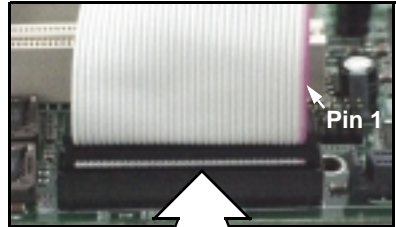
### Some symptoms of incorrectly installed HDDs are...

<b>HDDs are not auto-detected</b>	May be a Master/Slave configuration problem, bad IDE cable, or BIOS mis-configuration. Consult the HDD documentation or contact your HDD vendor.
<b>Hard Disk Drive Fail message at bootup</b>	May be a bad cable or lack of power going to the drive. Check the cables for damage and bad connections.
<b>No video or beeps during bootup</b>	Usually means the cable was installed backwards.
<b>HDD lights are constantly on</b>	Bad IDE cable or defective drives. Try another HDD, or contact your HDD vendor.
<b>HDD does not power on</b>	Check power cables and cabling. May be a bad power supply or IDE drive problem.

### Connecting Floppy Drives

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

The first floppy drive (sometimes denoted as A:) is usually attached to the end of the cable with the twist in it. Drive B: is usually connected to the second or third connector in the cable (the second or third connector after you install Drive A:). Refer to your floppy drive's installation instructions (if available), or contact your dealer if you are unsure about how to attach the floppy drive(s). Remember, you can only have 2 floppy drives connected at any given time.



**Floppy cable\***



**Match striped side with Pin 1**

#### Some symptoms of incorrectly installed FDDs are...

<p><b>FDDs are not auto-detected</b></p>	<p>Usually caused by faulty cables, cables put in backwards, or a bad floppy or motherboard. Try another floppy drive to verify the problem or try another cable. Also check to see if the onboard floppy is enabled in the BIOS.</p>
<p><b>Floppy Drive Fail message at bootup</b></p>	<p>The cable or floppy drive may be faulty. Try another cable or floppy drive to verify.</p>
<p><b>FDD does not power on</b></p>	<p>Check power cables and cabling. May be a bad power supply or IDE drive problem.</p>
<p><b>FDD light is constantly on</b></p>	<p>Usually signifies that the cable is on backwards. Reverse the cable at the floppy drive end and try again.</p>

\* Cable may vary. Diagram provided for reference only.

## 2.11 Installing Add-on Cards

There are a few rules you need to follow when installing add-on cards. In order to assure proper operation and a quick installation, adhere to the following guidelines:

- ➡ If you are going to install a PCI-bus interface card in your system, be aware that any one of the five 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 motherboard to make sure there are no wires or other obstructions to the slot.
- ➡ NEVER plug an ISA card into a PCI 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, or a rocking motion between the card and the slot might occur, and could damage the pins within the socket.
- ➡ Make sure the cards are seated securely into their slots.
- ➡ Before turning on the system, make sure no cards are touching.
- ➡ Check the PCI device specifications with the PCI slot specifications (p.6) BEFORE installing!

When installing the add-on cards, make sure the cards are installed with **even** force; do not insert one end and then the other. See the before (Figure 2.2a) and after (Figure 2.2b) example installation images

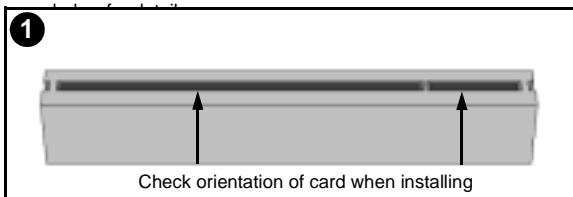


Figure 2.2a\*

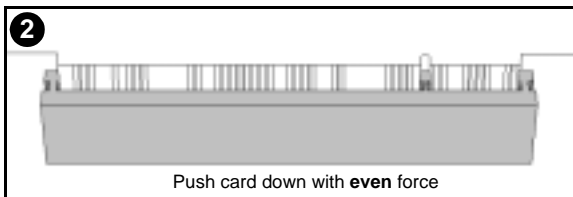


Figure 2.2b\*

\* The diagrams are provided as examples for installation, and may not represent the actual slots



## 2.12 Connecting PS/2, USB, and Serial Devices

This motherboard includes ports for PS/2 mouse and keyboard, Universal Serial Bus (USB) devices, and serial and parallel devices. Please note that the upper PS/2 port is the mouse port, and the lower PS/2 port is for the keyboard (see **Figure 2.3** below).

Installation of peripheral/external devices may vary. For details on installation of devices into the various ports shown below, please consult your device's documentation, device manufacturer, or your dealer for details.

### Connecting Serial and Parallel Ports

The serial and parallel ports can be used to connect various devices such as a mouse or printer. The connectors can only be connected one way: be sure and check the orientation of the connector before installing it into the port.

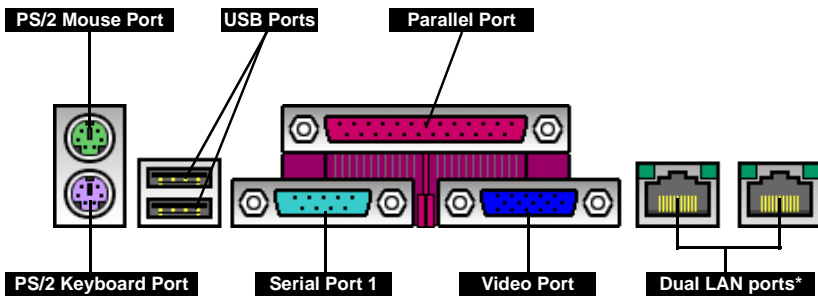


Figure 2.3

**NOTE:**

When plugging in your keyboard and mouse, or when plugging in anything into a serial or parallel 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 and/or external devices that you are trying to install.

\* Indicates an optional feature available on some Tomcat i815T models

## 2.13 Connecting the power supply

This motherboard requires an **ATX power supply**, one that conforms to **ATX standard 2.01 or better**.

The clip on the power connector should lock over the 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 2.4b**. Make certain that you do not miss connecting any of the pins because if you do, you will void your warranty and possibly cause damage to yourself and/or your motherboard when the power is turned 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.

### Step 1

Shown on the **right**, in **Figure 2.4a**, is the 20-pin connector of the ATX power supply.

Note the clip in the image: it will help you install the plug correctly.



Figure 2.4a

### Step 2

Shown on the **right**, in **Figure 2.4b**, is the 20-pin connector plugged into the board\*.

The clip is over the **TAB** of the onboard connector.

When you connect the cable into the motherboard's 20-pin onboard connector, it will make a **CLICK** noise. **This is normal.**

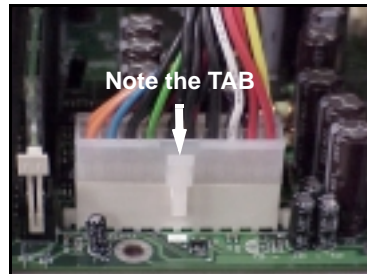


Figure 2.4b

\* The images are provided as examples for installation, and may not represent the actual board

## 2.14 You are done!

Other than checking the jumper settings and cable connections, and putting the case back together, you are done.

Installing a new motherboard may seem difficult, but by following these directions, you should have a fairly uneventful time installing our products. If you do encounter problems, your vendor/dealer will be able to help you, or you can consult one of our many technical support resources (see **p. 55**).

## 2.15 Frequently Asked Questions (FAQ)

**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 conflicts related to the IRQ, or DMA. If you are using Microsoft Windows, the Control Panel is a good place to start investigating the conflict. Please consult your operating system documentation for details. Secondly, slowing down the memory timing in the BIOS' chipset setup section might help the situation as well. Many memory modules are not suitable for high performance systems and might be the main source of your problem. Also check to make sure you are using a power supply that that confirms to **ATX 2.01 or better**. Lastly, make sure the motherboard is receiving adequate cooling.

**Q: I have a question about memory compatibility; what memory will work on my motherboard?**

A: Memory compatibility information can be found on Tyan's website at: <http://www.tyan.com>

**Q: Where can I get additional accessories for my Tyan motherboard?\***

A: You can purchase additional accessories such as USB cables\*, as well as other Tyan-approved accessories at the Tyan Computer Online Store: <http://www.etyan.com>

**Q: Where do I get pinout information for my motherboard?**

A: Pinouts of certain headers are available on the Tyan website: <http://www.tyan.com>

**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 e-mail by Tyan Tech Support. Please refer to the URL link here for more details: [http://www.tyan.com/support/html/rma\\_faq.html](http://www.tyan.com/support/html/rma_faq.html)

**Q: How do I upgrade my BIOS?**

A: Check the section about the Flash Utility (see **p. 47**) for information on upgrading your BIOS. BIOS update files, flash utilities, and instructions on how to install them are also available from the Tyan website at: <http://www.tyan.com>

**Q: Why do I get a "CMOS checksum invalid" error message during POST?**

A: If you get the above error message or "Invalid configuration, run Setup" message, it is an indication that the CMOS battery needs to be changed. Contact your dealer for assistance. Once you've replaced your battery or flashed your BIOS, don't forget to check the Clear CMOS section (see **p.11**) so that you can reset your CMOS.

\* If your chassis supports frontside USB connectors, it will usually come with the necessary cables. Check that your chassis is frontside USB capable. Please check with your chassis vendor for details.

# Chapter 3: BIOS Setup

## Introduction to the BIOS setup

The BIOS is the basic input/output system, required by the computer to perform functions such as CPU and hard drive support. This chapter describes different settings for the BIOS that can be used to configure your system.

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

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

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

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

## Starting Setup

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

When these preliminaries are finished, the BIOS seeks an operating system on one of the data storage devices (HDD, floppy drive, etc.) If one is found, the BIOS will launch that operating system and hand control of system operations to it. You can start the setup program by pressing the **[DEL]** key while the system is booting up.

## Setup Keys

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
Tab	Moves from one selection to the next
Left/Right Arrow Keys	Change from one menu to the next
Up/Down Arrow Keys	Move between selections
Enter	Opens highlighted section
PgUp/PgDn Keys	Change setting

## Getting Help

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

## In Case of Problems

If you discover that you have trouble booting the computer after making and saving changes with the BIOS setup program, you can restart the computer by:



Holding the power button down until the computer shuts off

The best advice is to alter only settings that you thoroughly understand. In particular, do not change settings in the Chipset screen unless you are absolutely sure that you need to. The Chipset defaults were carefully chosen by Tyan or your system manufacturer for the best performance and reliability. Even a seemingly small change to the Chipset setup may cause the system to become unstable.

## Setup Variations

Not all systems have the same setup program. While the basic look and function of the setup program remains more or less the same for all systems, the appearance of your Setup screen may differ from the screens shown here. Each system design and chipset combination require custom configurations. In addition, the final appearance of the setup program depends on your system designer. Your system designer can decide that certain items should not be available for user configuration, and remove them from the BIOS setup program.

### 3.1 Main Setup

In this screen, you can alter general features such as the date and time, as well as access the IDE configuration screens. Note that the options listed below are for options that can directly be changed within the **Main Setup** screen.

<b>System Time</b>	<b>FORMAT:</b>	<i>hh:mm:ss</i>
	<b>OPTIONS:</b>	hh = hours mm = minutes ss = seconds
	<b>NOTES:</b>	System time works on 24-hour format
<b>System Date</b>	<b>FORMAT:</b>	<i>mm/dd/yyyy</i>
	<b>OPTIONS:</b>	mm = month dd = day yyyy = year
	<b>NOTES:</b>	
<b>System / Extended Memory</b>	<b>FORMAT:</b>	<i>[size in KB]</i>
	<b>OPTIONS:</b>	N/A
	<b>NOTES:</b>	Cannot be altered. Provided for your information only.

### 3.2. Advanced Setup

Options such as I/O device interfaces can be altered through this screen.

#### 3.2-A. Configure Nat366 Serial Port(s) and Parallel Port (Super I/O)

In this screen you can configure the different hardware ports available, change the status of the floppy controller, and more.

<b>Onboard Floppy Controller</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Disabled Enabled
	<b>NOTES:</b>	Enables or disables the onboard floppy controller.

<b>Serial Port Address</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Disabled #### (address)
	<b>NOTES:</b>	You can enable the serial port through this option, and also by setting the address.

<b>Serial Port 2 Mode</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	IR Normal IR = Infrared Selects the mode to use.
	<b>NOTES:</b>	This option is only for Serial Port 2.

<b>Parallel Port Address</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Disabled ### (address)
	<b>NOTES:</b>	You can enable the parallel port through this option, and also by setting the address.

<b>Parallel Port IRQ</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	IRQ5 IRQ7 These options appear when the parallel port is enabled.
	<b>NOTES:</b>	

<b>Mode</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Normal	Standard one-way protocol for parallel devices.
		Bi-directional	Two-way protocol for parallel devices.
		EPP	Enhanced Parallel Port interface may provide higher bandwidth, if an EPP device is used.
		ECP	Enhanced Capability Port interface may provide higher bandwidth, if an ECP device is used.
<b>NOTES:</b>			



### 3.2-B. IDE Configuration

On bootup, the BIOS will attempt to detect all compatible devices on the IDE channel. If compatible devices are detected, options to control them will be displayed in the associated IDE configuration screens.

<b>Onboard PCI IDE Controller</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Both 'Both' enables both IDE ports.
		Disabled Disables the ports.
		Primary Enables the primary port only.
		Secondary Enables the secondary port only.

<b>Hard Disk Protect</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Disabled
		Enabled
<b>NOTES:</b>	Enables or disables the BIOS' ability to write to the IDE device.	

<b>ATA(P) Detect Time Out</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	# Sets the time that the BIOS will wait during IDE device detection, before determining that there are no devices available.

<b>ATA(P) 80Pin Cable Detection</b>	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Host, Device
		Host & Device Disabled
<b>NOTES:</b>	Selects the process that the BIOS will use to detect the 80Pin ATA(P) cable(s).	

Type	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	None Auto-typing is not able to supply the drive type, or the user has selected <i>None</i> to disable any drives that might be installed.
		1 to 39 Pre-configured drive parameters. This option is dependent on your drive.
		User The user must define the different parameters of the drive.
		Auto Auto-detect the drive parameters.
		IDE Removeable Removeable read-and-write media (e.g. Zip drive).
		CD-ROM Readable CD-ROM drive.
	ATAPI Removeable Removeable ATAPI media (e.g. USB Zip drive).	
	<b>NOTES:</b>	All options are dependent on the drive.
LBA Mode Control	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Disabled / Enabled Enabling LBA causes logical block addressing to be used in place of Cylinders, Heads, and Sectors.
	<b>NOTES:</b>	All options are dependent on the drive.
Block (Multi-Sector Transfer)	<b>FORMAT:</b>	[#]
	<b>OPTIONS:</b>	#, Auto Number of sections transferred per block.
	<b>NOTES:</b>	All options are dependent on the drive.
PIO Mode	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	Standard Selects the method for transferring data between the HDD and system memory. Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4
	<b>NOTES:</b>	Options are dependent on your drive. Please consult with your drive vendor for more info.
DMA Mode	<b>FORMAT:</b>	[option]
	<b>OPTIONS:</b>	[mode], Auto Determines DMA mode for the IDE device. When set to Auto, the BIOS will determine the mode.
	<b>NOTES:</b>	All options are dependent on the drive.

SMART Monitoring	FORMAT:	[option]
	OPTIONS:	Disabled / Enabled Self-Monitoring Analysis-Reporting Technology, which monitors condition of the HDD and reports when a catastrophic IDE failure is about to happen.

32-bit Data Transfer	FORMAT:	[option]
	OPTIONS:	Disabled / Enabled Enables 32-bit communication between CPU and IDE card. Requires PCI or local bus.
NOTES:	All options are dependent on the drive.	

ARMD Emulation Type	FORMAT:	[option]
	OPTIONS:	Disabled, [option], Auto Specifies type of emulation for non-disk device on the primary IDE channel.
NOTES:	All options are dependent on the drive.	

### 3.2-C. Floppy Configuration

In this screen, you can change options related to the Floppy Controller.

Floppy A (..B)	FORMAT:	[size in MB] [media dimensions]
	OPTIONS:	360KB, 5 1/4" 1.2MB, 5 1/4" 720KB, 3 1/2" 1.44/1.25MB, 3 1/2" 2.88MB, 3 1/2" Not Installed Disabled
NOTES:	This option is provided for your floppy device needs. It is also linked to the <b>Boot Sequence</b> in the <b>Boot Menu</b> .	

Diskette Write Protect	FORMAT:	[option]
	OPTIONS:	Disabled Enabled
NOTES:	Enables or disables the BIOS' ability to write to the floppy device.	

Floppy Drive Seek	FORMAT:	[option]
	OPTIONS:	Enabled Onboard floppy controller is enabled.
		Disabled Onboard floppy controller is disabled.
Auto BIOS will detect the presence of a floppy controller.		

### 3.2-D. Boot Settings Configuration

In this screen, you can change options related to the BIOS bootup.

<b>Quick Boot</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	If Enabled, the BIOS will bypass some settings in order to boot up quicker.
<b>Quiet Boot</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	When Disabled, normal POST messages will not appear at bootup time.
<b>AddOnROM Display Mode</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Force BIOS Keep Current	Specifies the system display mode at time of booting an optional ROM.
<b>Bootup Num-Lock</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	When Disabled, Num-Lock will not be activated at bootup.
<b>Bootup CPU Speed</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	High Low	Sets speed of CPU at bootup time.
<b>PS/2 Mouse</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	AutoDetect	BIOS will auto-detect the presence of a PS/2 mouse.
		Disabled	Disable any installed PS/2 mouse device.
<b>OPTIONS:</b>	Enabled	Enable any installed PS/2 mouse device.	
<b>Typematic Rate</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	# Fast	Sets speed that the system will accept keyboard input.
<b>System Keyboard</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	Sets whether the system should detect if a keyboard is present.
<b>Primary Display</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	VGA/EGA CGA40, CGA80 MONO	Sets video display mode at bootup time.

(Boot Settings configuration, continued)

<b>Parity Check</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Sets whether the memory will be checked at bootup for errors.
<b>Boot to OS/2</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Yes No	Sets whether the system is booting to OS/2 or not.
<b>Wait for F1 if error</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Sets whether the system should wait for user input if an error occurs.
<b>Hit DEL Message Display</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Sets whether the system will show the BIOS entry key at bootup.
<b>Internal Cache</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Write-Back Disabled	Sets the type of caching algorithm to use for the L1 cache.
<b>External Cache</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Write-Back Disabled	Sets the type of caching algorithm to use for the L2 cache.

### 3.2-E. Event Log Configuration

In this screen, you can change options related to the logging of ECC events.

<b>Event Logging</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	Sets whether events should be logged into memory or not
<b>ECC Event Logging</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled Enabled	On the Tomcat i815T, ECC events are not logged.
<b>Clear All Event Logs</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Yes No	Setting this to Yes will cause all events to be cleared from memory.
<b>View Event Log</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Shows you the event log.

(Event Log configuration, continued)

<b>Mark All Events As Read</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	By using this option, the events in the Event Log can be organized.

### 3.3. Chipset Configuration screen

Options related to the chipset can be altered through this screen.

<b>Processor Serial Number</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[varies]	Identifies the CPU (not user configurable)

<b>CPU and DRAM Frequency*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets ratios for the CPU and DRAM frequencies.

<b>CPU Latency Timer</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[option] Disabled	Reserved for debugging purposes.

<b>C000 - C400, 16k Shadow</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Cached/WP [other]	Specifies how the 16k of Video ROM is treated at the listed address.

<b>C800 - DC00, 16k Shadow</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Cached/WP [other]	Specifies how the 16k of Video ROM is treated at the listed address.

#### 3.3-A. GMCH Configuration screen

Options related to the graphics in the chipset can be altered through this screen.

<b>Primary Video Device</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets the primary device for video output.

<b>Internal Graphics Mode Select</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled, 1MB [other]	Enables or disables the internal video device.

<b>Display Cache Window Size</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	###MB	Sets amount of cache available for the graphics local memory window.

\* Not validated at time of print, please check the Tyan website for updates: <http://www.tyan.com>

**NOTE: Tyan will not be held liable for any damage incurred from ANY alteration of this setting from its default value.**

(GMCH configuration, continued)

Display VBIOS Message	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or disables the video BIOS message.
Internal Graphics Scaling	FORMAT:	[option]	
	OPTIONS:	Auto [other]	Sets the scaling process for the internal video device.
Internal Graphics TV Format	FORMAT:	[option]	
	OPTIONS:	NTSC PAL [other]	Sets the type of video standard for your country.
Output Device Sync / Non-sync	FORMAT:	[option]	
	OPTIONS:	Synchronous Non-Synchronous	Set this according to your video monitor type.
Digital Device Priority	FORMAT:	[option]	
	OPTIONS:	[other, dependent]	Sets order of priority for video output devices.
AGP Graphics Aperture Size	FORMAT:	[option]	
	OPTIONS:	##MB [other]	Sets maximum memory aperture size for onboard AGP port.
Init Display Cache Memory	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	If Enabled, display cache will be initialized at time of system boot.
Paging Mode Control	FORMAT:	[option]	
	OPTIONS:	Open Close	Enable or Disable the paging mode.
RAS-to-CAS Override	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled [other]	Enables or Disables the delay override.
CAS Latency	FORMAT:	[option]	
	OPTIONS:	Slow [other]	Sets number of SCLKs between Read by DRAM and Read by Whitney.
RAS Timing	FORMAT:	[option]	
	OPTIONS:	Slow [other]	Sets clock frequency for RAS and RC.

(GMCH configuration, continued)

<b>System Memory Frequency</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets frequency of onboard DIMM memory.
<b>SDRAM Refresh</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets interval between refresh signals to the SDRAM.
<b>DRAM Cycle Time (SCLKs)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets length of DRAM cycle time in SCLKs.
<b>RAS# to CAS# Delay (SCLKs)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets delay time between RAS and CAS signals of the DRAM access cycle.
<b>RAS Pre-charge</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Slow [other]	Sets clock frequency for RAS and RP.
<b>RAS# Precharge (SCLKs)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Sets length of time for RAS precharging during memory access cycle.
<b>DRAM Page Closing Policy</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Open [other]	Sets whether DRAM pages should be closed after use.
<b>Memory Hole</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	If Enabled, a certain memory portion is made off-limits to ISA bus.

### 3.3-B. ICH Configuration screen

Options related to the interface chipset can be altered through this screen.

<b>ICH Positive Decode*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled [other]	Sets type of ICH decode used.

\* Optional feature, may not be supported on all Tomcat i815T models



(ICH configuration, continued)

<b>CPU BIST Enable*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables CPU BIST function.
<b>ICH DCB*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables DCB function.
<b>ICH Dev31 Func(3,5,6) Enable*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables ICH device listed.
<b>LPC 4Eh-4Fh Decode*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	If Enabled, a certain memory portion is made off-limits to ISA bus.
<b>DMA-(0,1,2,3,5,6,7) Type*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	LPC DMA [varies]	Specifies the bus that the specified DMA channel can be used on.

### 3.4. PCI / PnP Configuration screen

Options related to the PCI Plug-n-Play interface can be altered through this screen.

<b>Plug &amp; Play O/S</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Yes No	Indicates whether a PnP OS is being used or not.
<b>Reset Configuration Data</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Yes	Erases all configuration data in a section of memory for ESCD (Extended System Configuration Data) which stores the configuration settings for non-PnP plug-in devices.
		No	Does not erase ESCD.
	<b>NOTES:</b>	Select Yes when required to restore the manufacturer's defaults.	
<b>PCI Latency Time</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	##	Specifies latency timing for PCI devices.

\* Optional feature, may not be supported on all Tomcat i815T models

(PCI / PnP configuration, continued)

<b>Allocate IRQ to PCI VGA*</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Yes [other]	Sets whether PCI devices recognize another type of VGA adapter.
<b>Palette Snooping</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	If Enabled, multiple VGA devices on different buses will function correctly.
<b>PCI IDE Bus Master</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Specifies whether PCI IDE device has bus mastering capability.
<b>Offboard PCI/ISA IDE Card</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Specifies if an offboard PCI IDE controller card is installed.
<b>USB Function</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables USB functionality.
<b>Legacy USB Support</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Auto [other]	Enables legacy USB support.
<b>IRQ (3,4,5,7,9,10,11,14,15)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Available [other]	Specifies if the listed IRQ is usable by PCI / PnP devices.
<b>DMA Channel (0,1,3,5,7)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Available [other]	Specifies if the listed DMA channel is usable by PCI / PnP devices.
<b>Reserved Memory Size</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Disabled [other]	Specifies size of memory area reserved for legacy ISA devices.

\* Optional feature, may not be supported on all Tomcat i815T models

### 3.5 Power Configuration screen

Power management options can be altered through this screen.

ACPI Aware O/S	FORMAT:	[option]	
	OPTIONS:	No Yes	Indicates if the O/S can manage power functions or not.
Repost Video on S3 Resume	FORMAT:	[option]	
	OPTIONS:	No Yes	Sets whether or not to repost the video on S3 power state (hibernation).
Power Management / APM	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enable or Disable power management functions.
Standby Timeout	FORMAT:	[option]	
	OPTIONS:	Disabled [other]	Set time that system will wait for inactivity before going to Standby mode.
Suspend Power Saving Type	FORMAT:	[option]	
	OPTIONS:	S1 [other]	Set type of power saving mode for Suspend mode.
Suspend Time Out	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Set time that system will wait for inactivity before going to Suspend mode.
Power Button Mode	FORMAT:	[option]	
	OPTIONS:	On/Off Suspend	Set function for external power button.
After G3 Enable	FORMAT:	[option]	
	OPTIONS:	Disabled Enabled	Enable or Disable After G3 function.
Green PC Monitor Power State	FORMAT:	[option]	
	OPTIONS:	Suspend [other]	Sets power state for the green PC-compliant monitor (if present).
Video Power Down Mode	FORMAT:	[option]	
	OPTIONS:	Suspend [other]	Set power state for video subsystem after period of inactivity ends.
Hard Disk Power Down Mode	FORMAT:	[option]	
	OPTIONS:	Suspend [other]	Set power state for hard disk drive after period of inactivity ends.

(Power configuration, continued)

Hard Disk Time Out (minute)	FORMAT:	[option]	
	OPTIONS:	Disabled [other]	Sets time that the system will wait before hard disk enters power save state.
Display Activity	FORMAT:	[option]	
	OPTIONS:	Ignore [other]	Sets event monitoring on video display.
Manual Throttle Ratio	FORMAT:	[option]	
	OPTIONS:	50% [other]	Sets speed at which system clock runs in Standby mode.
THRM Throttle Ratio	FORMAT:	[option]	
	OPTIONS:	50% [other]	Adjusts THRM throttle ratio.
Intruder Sel*	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Sets Intruder Sel function onboard.
Thermal SMI Enable	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables Thermal SMI functionality.
PME SMI Enable	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables PME SMI functionality.
SW SMI Timer Enable	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables SW SMI functionality.
TCO Logic SMI Enable	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables TCO Logic SMI functionality.
SLP SMI Enable	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables SLP SMI functionality.
RTC Resume	FORMAT:	[option]	
	OPTIONS:	Enabled Disabled	Enables or Disables RTC's ability to trigger system resume.

(Power configuration, continued)

<b>AC97 Logic Resume</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables AC'97 Logic's ability to trigger system resume.
<b>USB Controller Resume</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables USB's ability to trigger system resume.
<b>PME Resume</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables PME's ability to trigger system resume.
<b>RI Resume</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables RI's ability to trigger system resume.
<b>SMBus Resume</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables SMBus' ability to trigger system resume.

### 3.6 Boot Configuration screen

Boot options can be altered through this screen.

<b>(menu dependent on devices detected)</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	(dependent on devices detected)	Hard disk drives, Removeable drives, and ATAPI CD-ROM drives can be re-ordered in boot priority through this menu.  The first item listed a (or moved to) the top will take precedence over the devices listed after the first item.

### 3.7 Security Configuration screen

Security options can be altered through this screen.

<b>Change Supervisor Password</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Changes the password for the Supervisor (6 letter and/or number limit).
<b>Change User Password</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Changes the password for the User (6 letter and/or number limit).

(Security configuration, continued)

<b>Clear User Password</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Clears the password for the User.
<b>Boot Sector Virus Protection</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	Enabled Disabled	Enables or Disables protection against boot sector viruses.

### 3.8 Exit screen

Exit and BIOS-related loading options are available through this screen.

<b>Exit Saving Changes</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Save changes and exit the BIOS setup.
<b>Exit Discarding Changes</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Exit BIOS setup without saving any changes.
<b>Load Optimal Defaults</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Loads default settings for BIOS Optimal system setup.
<b>Load Failsafe Defaults</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Loads default settings for BIOS Failsafe system setup.
<b>Discard Changes</b>	<b>FORMAT:</b>	[option]	
	<b>OPTIONS:</b>	[ENTER]	Disregard all changes made; reset all settings back to stored values.

## Chapter 4: System Resources

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

### MEMORY, VIDEO, CPU

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

#### 4.1 Beep Codes

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

If you hear one long beep followed by two short beeps, then a video problem has probably occurred and the BIOS is having difficulty initializing the video display. Any other beep sequences that may or may not occur are probably due to memory problems.

#### 4.2 Flash Utility

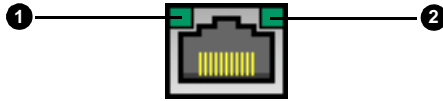
Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, you must check the Tyan website: <http://www.tyan.com>

#### NOTE:

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

# Appendix I: LAN Information\* (optional feature)

Your motherboard may have (2) onboard LAN controllers. LAN capabilities include 10/100 MBits/s transfer speed. For more information regarding the **optional** onboard LAN controllers, check the Intel website: <http://www.intel.com>



Below are some explanations of what the LEDs mean, and how they display the LAN's status.\*

LAN Status	LED (1) - Green/Orange Light	LED (2) - Yellow Light
Good connection @ 10 Mbps	LED (1) is GREEN	OFF
Good connection @ 100 Mbps	LED (1) is ORANGE	OFF
No connection	OFF	OFF
Data being transferred	Green (10Mbps) or Orange (100Mbps)	LED is blinking

\* Please check Tyan website for updates: <http://www.tyan.com>



## Appendix II: Glossary

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

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

**ATAPI** (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Doze mode:** in this mode, only the CPU's speed is slowed.

**DRAM** (Dynamic RAM): 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**IPL:** see **Initial Program Load**.

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

**ISA** (Industry Standard Architecture): a slower 8- or 16-bit bus (data pathway).

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

**Mirroring:** see **RAID**.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Standby mode:** in this mode, the video and fixed disk drive (usually the HDD) shuts down; all other devices continue to operate normally.

**Striping:** see RAID.

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

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

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

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

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

## 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. Furthermore, if you purchased your system from a dealer near you, you can actually bring your system to them to have it serviced, instead of attempting to do so yourself (which can have expensive consequences).

### Help Resources:

1. See the FAQ and beep codes section of this manual.
2. See the Tyan website for FAQ, bulletins, driver updates, and other information: <http://www.tyan.com>
3. Contact your dealer for help **BEFORE** calling Tyan.
4. Check the Tyan user group: [alt.comp.periphs.mainboard.tyan](mailto:alt.comp.periphs.mainboard.tyan)

## Returning Merchandise for Service

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

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

**Notice for the USA**

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

Operation is subject to the following conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:
  - Reorient or relocate the receiving antenna.
  - Increase the separation between the equipment and receiver.
  - Plug the equipment into an outlet on a circuit different from that of the receiver.
  - Consult the dealer or an experienced radio/television technician for help.

**Notice for Canada**

This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux normes de Classe B d'interférence radio tel que spécifié par le Ministère Canadien des Communications dans les règlements d'interférence radio.)

**Notice for Europe (CE Mark)**

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

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