

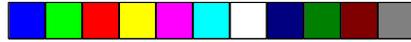
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chapter 1

Introduction

Overview

The S1576S is a quality, high performance mainboard designed for Intel Pentium microprocessors. This mainboard utilizes the Intel 430TX chipset and can support CPU speeds of 75MHz through 233MHz. The S1576S will also support the Cyrix M1 (6x86) and M2 (6x86MX) CPU's, the AMD K5 and K6 CPU's, and the Intel multimedia Pentium P55C and P54CTB (MMX Overdrive) CPU's.

The S1576S's PCI Local Bus provides high performance capabilities that are ideal for a wide range of demanding applications such as CAD, CAM, CAE, networking, multi-user environments, database management, desktop publishing, image processing and 3D animation.

This integrated system board achieves high reliability with numerous features and yet is small enough to be supported in an ATX form-factor. Some of the features included are onboard dual channel PCI PIO, BUS Master IDE and UltraDMA/33, onboard floppy controller, onboard high speed I/O, and support for pipeline-burst SRAM.



Flexibility and expandability have been designed into the S1576S. With I/O and drive controller support built onboard, the five PCI and three ISA slots (one ISA and one PCI as a shared slot) are free for numerous add-on expansion cards.

Remember to take a look at TYAN Computer's web site located at <http://www.tyan.com>. There you can find information on all of TYAN's products along with FAQs, distributors list, drivers and CMOS setting explanations. If you have a tech support question please contact us at www.tyan.com.

Icons

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



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

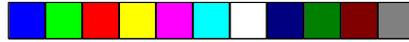


Wherever possible, we have included step-by-step instructions for setting up your system, which are indicated by this icon. However, it is in your best interest to read an entire section (and perhaps the entire manual) before you begin to fiddle with your motherboard.



While we have alerted you to potential dangers in several places in this 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 burn or 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

- ♦ ZIF Socket #7.
- ♦ 50-83MHz BUS support (see disclaimer on page 18).
- ♦ Pentium/Pentium MMX 75-233MHz.
- ♦ AMD K5/K6 75MHz-233MHz.
- ♦ Cyrix M1 6x86 P120+ to P200+ (see disclaimer on page 18).
- ♦ Cyrix M2 6x86MX support built-in (see disclaimer on page 18).

Chipset Information

- ♦ Intel 430TX PCIset.
- ♦ Fifth generation Pentium chipset.

Voltage and Power Information

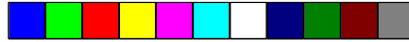
- ♦ Design incorporates ATX power supply connector.
- ♦ 12 V power source for DC fan onboard.
- ♦ 3.3V or 5.0V DRAM support.
- ♦ Switching Power Supply onboard.

Main Memory

- ♦ Up to 256MB on board.
- ♦ Three 168-pin DIMM sockets.
- ♦ EDO or FPM SIMM support.
- ♦ EDO DIMM and SDRAM support.

System Management

- ♦ Wake-on LAN connector.
- ♦ Optional LM75 CPU temperature-sensing chip.
- ♦ Optional National LM78 thermal, fan and heat monitoring chip.
- ♦ Optional Intel LANDesk Client manager software, and/or Intel LANDesk Server manager software (with LM78 installed).



INTRO

Expansion Slots

- ♦Five 32-bit PCI Bus Master slots.
- ♦Three 16-bit ISA slots.
- ♦One shared, seven usable.

Physical Dimensions

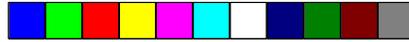
- ♦ATX design.
- ♦8.3 x 12 inches.

BIOS Information

- ♦Award Plug and Play flash BIOS.
- ♦Deep Green and Energy Star compliant.
- ♦ACPI, Year 2000, and PC97/98 compliant.
- ♦Soft power-down, multiple boot options.
- ♦Win98 Ready, DMI 2.0 compliant.
- ♦Support for easy BIOS upgrades with flash EEPROM chip.

Disk Drive & System I/O

- ♦Two PCI Bus Mastering EIDE channels.
- ♦Supports EIDE CD-ROMs.
- ♦PIO Mode 3 & 4 (up to 17MB/sec DTR).
- ♦UltraDMA33 Bus Mastering Mode (up to 33MB/sec DTR).
- ♦Two floppy drives (up to 2.88MB).
- ♦Two ATX serial ports (16550 UARTs).
- ♦One ATX ECP/EPP parallel port.
- ♦One IR (InfraRed) I/O interface port.
- ♦Two USB rev 1.2 (universal serial BUS) ports.
- ♦One ATX PS/2 mouse port connector.
- ♦One ATX PS/2 keyboard connector.



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**Ensoniq Audio PCI
(optional)**

♦32-bit sound with built-in wavetable synthesis.

Software Specifications

OS

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

Information presented in this publication has been carefully checked for reliability. However, no responsibility is assumed for inaccuracies. The information contained in this document is subject to change without notice.

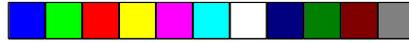
Technical Support

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

Try our web page – [http:// www.tyan.com](http://www.tyan.com),
or user newsgroup – 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.



INTRO

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. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

Trademarks

Award BIOS/Flash are trademarks of Award Software International, Inc.

Windows is a trademark of Microsoft Corporation.

IBM, PC, AT, PS/2 are trademarks of IBM Corporation.

INTEL, Pentium are trademarks of Intel Corporation.

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chapter 2

Board Installation

Unpacking

The mainboard package should contain the following:

- S1576S Mainboard
- One IDE 40 pin cable
- One 34 pin floppy cable
- User's Manual

The mainboard contains sensitive electric components which can be easily damaged by static electricity, so the mainboard should be left in its original packaging until it is ready to be installed.



With the power supply plugged in and turned off, touch an unpainted area of the system chassis immediately before handling the mainboard or any component. Doing so discharges any static charge your body may have acquired.

After opening the mainboard carton, extract the system board-holding it by its edges-and place it on a grounded anti-static surface, component side up. Inspect the board for damage. Press down on any of the



socket ICs if it appears that they are not properly seated (the board should still be on an anti-static mat). Do not touch the bottom of the board.



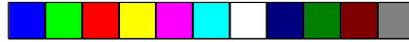
DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED!

Installation

You are now ready to install your mainboard. The mounting hole pattern of the S1576S matches the ATX system board specifications. Your chassis should be that of a standard ATX mainboard form factor.

INSTALL



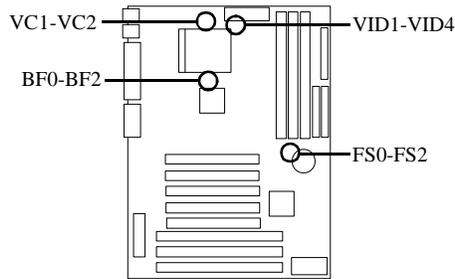


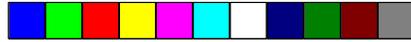
chapter 3

Onboard Resource Settings

Quick References for Jumpers

The following tables will help you set the jumpers for CPU speed, BUS frequency, and memory voltage, among others. For CPU settings, you may want to refer first to the more comprehensive chart on page 13. The miniature motherboard maps will help you locate the jumpers on your board. A full-page map of the motherboard can be found on page 14.





Jumper Settings by CPU Type

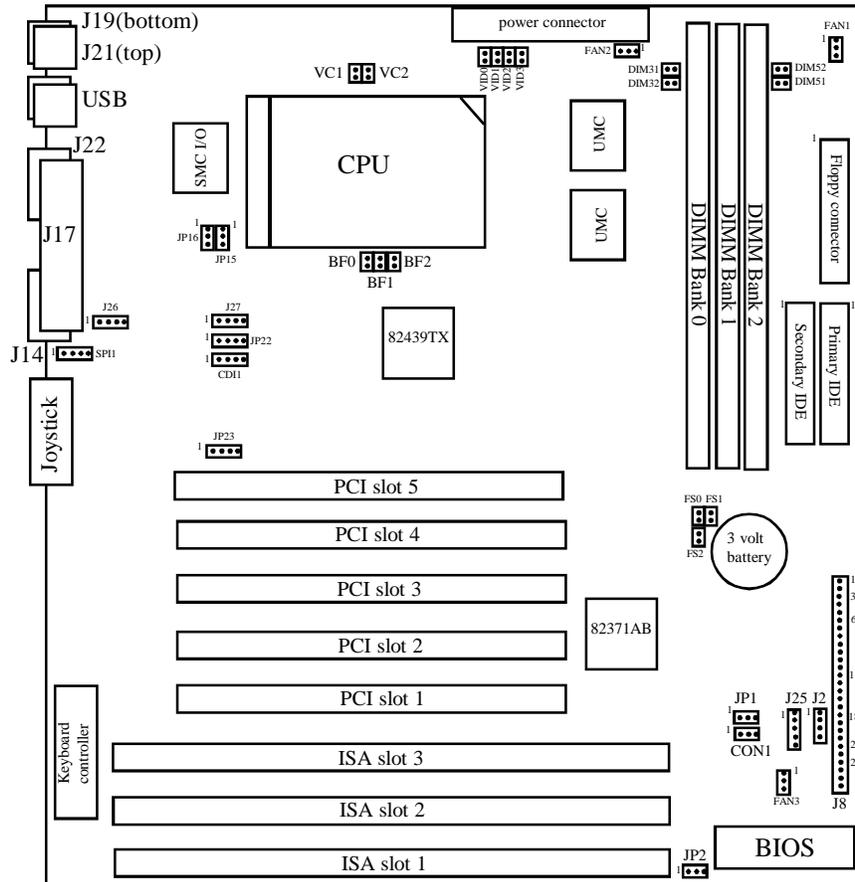
CPU	BUS speed & multiplier	BF0	BF1	BF2	VID0	VID1	VID2	VID3	FS0	FS1	FS2	VC1	VC2
Intel P54C 75	50MHz x 1.5	OFF	OFF	OFF	^	^	^	^	ON	ON	ON	OFF	OFF
Intel P54C 90	60MHz x 1.5	OFF	OFF	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
Intel P54C 100	66MHz x 1.5	OFF	OFF	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
Intel P54C 120	60MHz x 2	ON	OFF	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
Intel P54C 133	66MHz x 2	ON	OFF	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
Intel P54C 150	60MHz x 2.5	ON	ON	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
Intel P54C 166	66MHz x 2.5	ON	ON	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
Intel P54C 200	66MHz x 3	OFF	ON	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
Intel P55C 166	66MHz x 2.5	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
Intel P55C 200	66MHz x 3	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
Intel P55C 233	66MHz x 3.5	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
AMD K5 90	60MHz x 1.5	OFF	OFF	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
AMD K5 100	66MHz x 1.5	OFF	OFF	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
AMD K5 120	60MHz x 2	ON	OFF	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
AMD K5 133	66MHz x 2	ON	OFF	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
AMD K5 166	66MHz x 2.5	ON	ON	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
AMD K6 166	66MHz x 2.5	ON	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
AMD K6 200	66MHz x 3	OFF	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
AMD K6 233	66MHz x 3.5	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	ON	ON
Cyrix PR120+ 6x86	50MHz x 2	ON	OFF	OFF	^	^	^	^	ON	ON	ON	OFF	OFF
Cyrix PR150+ 6x86	60MHz x 2	ON	OFF	OFF	^	^	^	^	ON	OFF	OFF	OFF	OFF
Cyrix PR166+ 6x86	66MHz x 2	ON	OFF	OFF	^	^	^	^	OFF	OFF	OFF	OFF	OFF
*Cyrix PR200+ 6x86	75MHz x 2	ON	OFF	OFF	^	^	^	^	OFF	ON	OFF	OFF	OFF
Cyrix PR150+ 6x86L	60MHz x 2	ON	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Cyrix PR166+ 6x86L	66MHz x 2	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
*Cyrix PR200+ 6x86L	75MHz x 2	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	ON	ON
Cyrix PR166+ 6x86MX	60MHz x 2.5	ON	ON	OFF	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
Cyrix PR166+ 6x86MX	66MHz x 2	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
Cyrix PR200+ 6x86MX	66MHz x 2.5	ON	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
Cyrix PR200+ 6x86MX	75MHz x 2	ON	OFF	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON	ON
*Cyrix PR233+ 6x86MX	66MHz x 3	OFF	ON	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
*Cyrix PR233+ 6x86MX	75MHz x 2.5	ON	ON	OFF	ON	OFF	OFF	ON	OFF	ON	OFF	ON	ON

ONBOARD

*See disclaimer on page 18.

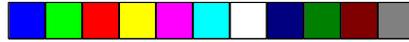
^It does not matter how these jumpers are set. For P54C, AMD K5, and Cyrix 6x86 CPUs, VC1 and VC2 are set to OFF, making the VID0-VID3 settings, which are only active if VC1 and VC2 are ON, irrelevant. The VID0-VID3 settings for the Cyrix 6x86L series will vary. Some of the CPUs in this series are 2.8V, and others are 3.3V. Check the face of the CPU and the CPU Voltage Settings table for the proper settings for these jumpers.

Map of Jumpers on Motherboard

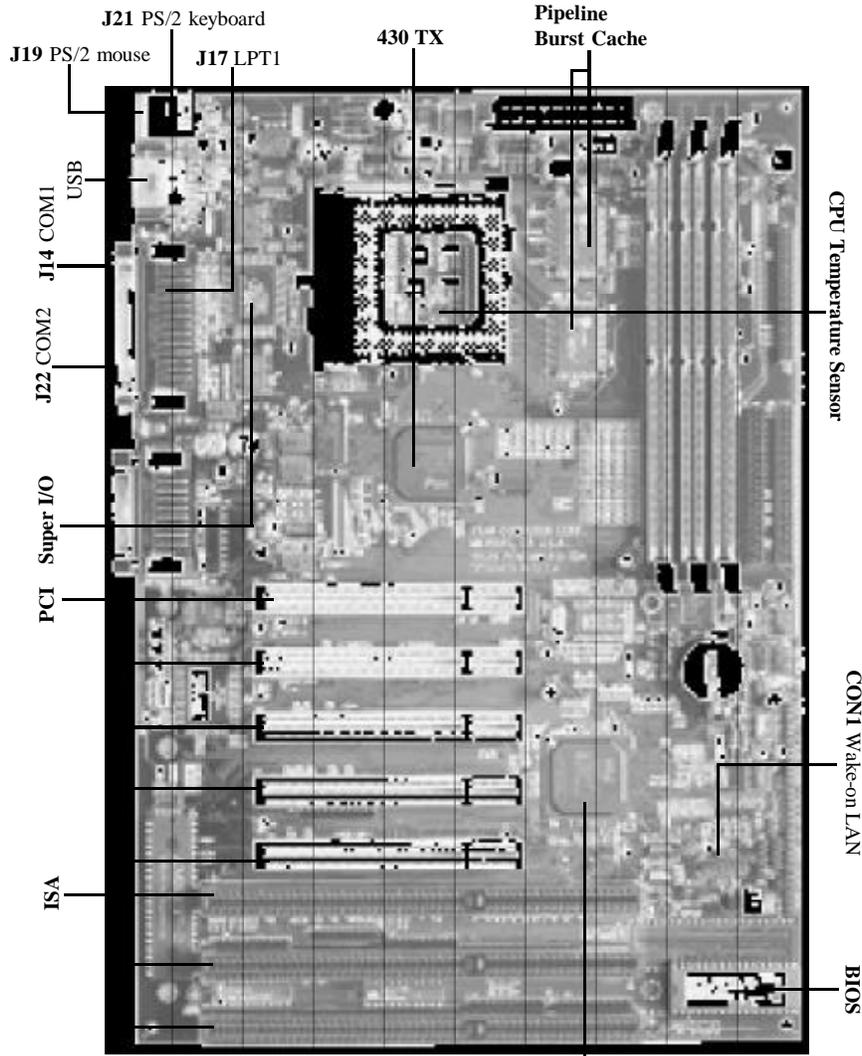


The following jumpers and connectors are optional, and will only be present if your board has the Ensoniq sound chip installed: J26, J27, JP22, JP23, CDI1, and Joystick.

The tiny "1" next to jumpers of 3 pins or more indicate the position of pin 1 for that jumper. Refer to pages 15-17 for the jumper and pin assignments.



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ONBOARD

82371AB (PIIX 4)

Pin Assignments

	1	2	3	4	5
J2 (IR)	RX	GND	TX	VCC	--
CON1 (Wake-on LAN)	VCC	GND	Wake	--	--
FAN	GND	VCC	Fan Monitor	--	--

(-- indicates pin is absent)

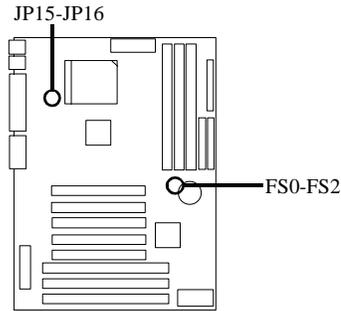
BUS Settings

BUS Frequency	FS0	FS1	FS2
50MHz	ON	ON	ON
60MHz	ON	OFF	OFF
66MHz	OFF	OFF	OFF
75MHz	OFF	ON	OFF
83MHz	ON	OFF	ON

*Notes: Please ignore the BUS speed settings printed on the motherboard. Please see the warning regarding 75MHz and 83MHz speeds on page 18.

JP15 and JP16 Settings

	1-2	2-3
JP15	COM PORT	IR
JP16	COM PORT	IR

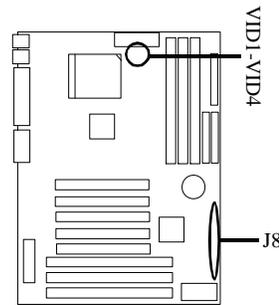


J8 Settings

Pins	1-2	3-4	6-11	13-14	15-16	18-20	22-23	24-27
Function	PWR ON/OFF	EXTSM1 (sleep)	IR	Primary IDE	Secondary IDE	PWR LED	RST SW	SPK
Assignment	1=VCC 2=GND	3=GND 4=sleep	6=VCC 8=IR RX 9=GND 10=IR TX 11=VCC	13=- 14=+	15=- 16=+	18=LED+ 20=GND	22=GND 23=reset	24=VCC 25=GND 27=Speaker

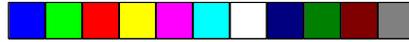
CPU Model Settings

CPU	VID0	VID1	VID2	VID3	VC1	VC2
P54C	^	^	^	^	OFF	OFF
P55C	OFF	OFF	OFF	ON	ON	ON
K5	^	^	^	^	OFF	OFF
K6-166	ON	OFF	OFF	ON	ON	ON
K6-200	ON	OFF	OFF	ON	ON	ON
K6-233	OFF	OFF	ON	ON	ON	ON
Cyrix 6x86	^	^	^	^	OFF	OFF
Cyrix 6x86L	*	*	*	*	ON	ON
Cyrix 6x86MX	*	*	*	*	ON	ON



*For Cyrix settings, please refer to the CPU Voltage table. For all CPUs, please refer to the BUS Settings and CPU Speed Settings tables. VC1 and VC2 should be set to OFF for Pentium non-MMX CPUs, and ON for all other CPUs.

^It does not matter how these jumpers are set (see note on page 13).

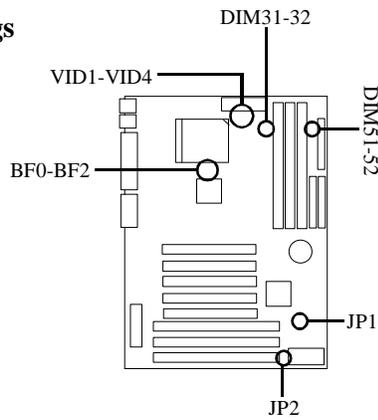


DIMM Memory Voltage Settings

DIMM VCC	DIMM31 DIMM32	DIMM51 DIMM52
3.3V	ON	OFF
5V	OFF	ON

BIOS Memory Voltage Settings

BIOS VCC	JP2
5V	1-2
12V	2-3



ONBOARD

CPU Multipliers

CPU Mult.	x1.5	x2	x2.5	x3
BF0	OFF	ON	ON	OFF
BF1	OFF	OFF	ON	ON
BF2	OFF	OFF	OFF	OFF

CPU Voltage Settings

CPUVCC	20V	21V	22V	23V	24V	25V	26V	27V	28V	29V	30V	31V	32V	33V	34V	35V
VD0	OFF	ON														
VD1	OFF	OFF	ON	ON												
VD2	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
VD3	OFF	ON														

JP1 Settings

	JP1
BATTERY ON	1-2
RESET CMOS	2-3



Disclaimer:

This motherboard incorporates support for 75MHz and 83MHz BUS speeds. However, these speeds will push PCI bandwidth beyond the Intel-recommended specification for PCI 2.1 compliance. Therefore, TYAN Computer Corporation takes no responsibility for any problems, be they hardware or software, related to the use of BUS speeds beyond 66MHz. We also cannot guarantee any PCI cards' compatibility beyond the specified speed of 33MHz. Technical support and RMA/Warranty claims relating to the use of BUS speeds beyond the 66MHz/33MHz limit recommended by Intel will not be honored by TYAN. **Use at your own risk.**

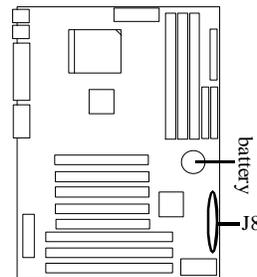
Windows 95 Users:

You may encounter problems with some of the devices in the Intel 82371AB chip. Neither the PCI Bridge nor the PCI Universal Serial BUS device IDs for this chip (also called PIIX4) are recognized by Windows 95. This is a software problem, not a hardware problem, and can be easily remedied by either upgrading to Windows 98 or downloading the 82371AB patch found at <http://www.tyan.com> or at <ftp://download.intel.com/design/pcisets/busmastr/setupex.exe>. (Note: USB requires Windows 95 OSR 2.1 or above; please contact Microsoft for USB update.)

CMOS RTC

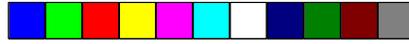
The 430TX chipset includes an internal battery and Real Time Clock circuit. The RTC provides the date and time for the system. If the battery is low, it will prevent your system from POSTing, and you will not get a display.

Normally the life span of an RTC internal battery is 10 years, but if yours is running low, you will need to replace it with a new 3V lithium battery (Duracell DL2032).



Soft Power Connector

The Soft Power Connector is located on pins 1 and 2 of jumper block



J8. Pressing the Soft Power Button will turn the system on (and off).

Speaker Connector Installation

S1576S provides a 4-pin header to connect the speaker. The speaker is connected to pins 24-27 of jumper block J8.

Hardware Reset Switch Connector Installation

The Reset switch on your case's display panel provides you with the Hardware Reset function, which is the same as power on/off. The system will do a cold start after the Reset button is pushed. The Reset switch is a 2-pin connector and should be installed on pins 22 and 23 on jumper block J8.

ONBOARD

Flash EEPROM

The S1576S uses flash memory to store BIOS programs. It can be updated as new versions of the BIOS become available. The flash utility will guide you through the update process step by step (see Chapter 5).

JP2 determines which type of EPROM is used. This jumper has been set to match the onboard BIOS chip. The factory default for the S1573S is on pins 1-2. Depending on the type of EPROM used, some boards will have JP2 on pins 2-3.

Hardware CMOS & Password Reset



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

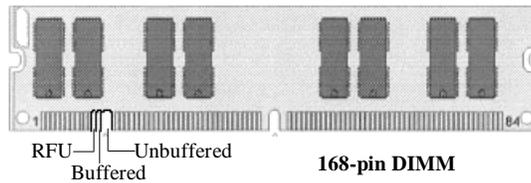
1. Power off the system
2. Set jumper JP1 to pins 2 and 3 (see previous page for location of JP1).

3. Wait for 2 seconds, then return JP1 to pins 1 and 2.
4. Power on the system again.

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

DRAM Installation

The S1576S uses a 64-bit data path from memory to CPU and can accommodate up to 256MB of RAM. SDRAMs (Synchronous DRAMs) are also supported in the DIMM slots. DIMMs must be of the **unbuffered** variety. The position of the notch in the DRAM Key Position will tell you whether or not a DIMM is unbuffered (see figure on page 20). All installed memory will be automatically detected, so there is no need to set jumpers. The TX chipset can cache up to 64MB of RAM.

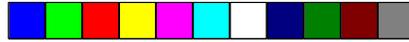


Some details of memory installation:

- ♦ One unbuffered DIMM must be installed for the system to POST.
- ♦ The mainboard supports 1, 2, and 4MBx64 DIMM modules.

The table below shows some of the possible memory configurations.

DIMM Bank0	8MBx1	8MBx1	16MBx1	8MBx1	8MBx1	8MBx1	16MBx1	32MBx1	64MBx1	64MBx1	64MBx1	64MBx1	128MBx1
DIMM Bank1	0	0	0	8MBx1	8MBx1	16MBx1	16MBx1	32MBx1	0	32MBx1	64MBx1	64MBx1	128MBx1
DIMM Bank2	0	0	0	0	8MBx1	8MBx1	0	0	0	0	0	64MBx1	0
Total	8MB	8MB	16MB	16MB	24MB	32MB	32MB	64MB	64MB	96MB	128MB	192MB	256MB



CPU Installation

Several types of CPUs (75 through 233MHz) can be used on the S1576S. Please refer to page 13 for the correct CPU jumper settings for your particular CPU.

Remember:



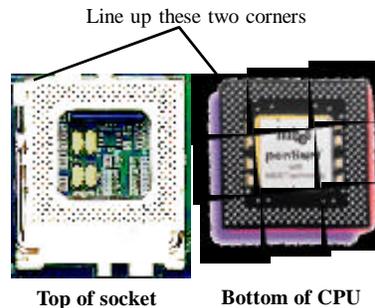
- ♦ The CPU is a sensitive electronic component and it can easily be damaged by static electricity. Do not touch the CPU pins with your fingers.
- ♦ When installing the CPU into the socket, match the CPU pins to the socket pins. Note that one corner of the socket's top is different from the other three corners. Likewise, one corner of the CPU's bottom is different from the other three corners. Line the unique socket corner up with the unique CPU corner.
- ♦ Before the CPU is installed, the mainboard must be placed on a flat surface. You should be able to insert the CPU with minimal, but firm, pressure. Do not press down hard on the CPU.
- ♦ An assembly composed of both a cooling fan and a heat sink is required to protect the CPU from being damaged.

ONBOARD



CPU Installation Procedure:

1. Make sure the ZIF socket lever is up. To raise the lever, pull it a bit horizontally, and then as far as it will go vertically. The top plate will slide back to open up the socket.
2. Align the CPU and socket pin 1 corners. The pins on the bottom of the CPU should align with the holes in the socket.
3. Insert the CPU into the socket. It should slip in easily. If it does not, adjust the position of the lever a little.



4. Press the lever down. The top plate will slide forward into its original position. You will feel some resistance as the CPU is secured in the socket. This is normal and will not damage the CPU. The lever should snap into place at the side of the socket.

Cache Memory

The S1576S has 512KB of onboard pipeline-burst SRAM; this SRAM cannot be upgraded. The TX chipset can cache a maximum of 64MB of RAM.

Peripheral Device Installation

After all the jumpers on the mainboard have been set, the mainboard can be mounted into the case. You may then install the display card and any other peripheral devices that you may have.

If a PCI-BUS interface card is to be installed in the system, any one of the five PCI-BUS slots can support either a Master or a Slave device. Note that PCI slot 1 and slot 5 share the same BUS master resource, and so you cannot use a BUS master on slot 1 and slot 5 at the same time.

After installing the peripheral controllers, you should check the CPU and all your devices again before preparing to power on the system.

Connecting the Power Supply



The female power connector on the mainboard fits with the male power connector from your power supply. Beware: incorrect installation of the power supply can result in serious damage to the system board and connected peripherals. Before connecting the leads from the power supply, you should first make sure that the power supply is unplugged.





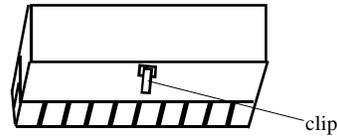
Most male power supply connectors will have twenty wires, seven of which are black. The black wires will be in the middle of the connector. The easiest way to orient the connectors properly is to line up the plastic clip on the male connector with the tab on the female connector. The plastic clip should be facing the middle of the motherboard.

 Align the plastic guide pins on the male connector with their receptacles on the mainboard. You may need to hold the lead at an angle in order to properly line it up with the onboard connector. Once you have the guide pins aligned, press the lead into the connector so that the plastic clip on the lead snaps into place and secures the lead to the connector. Please see the figure below.

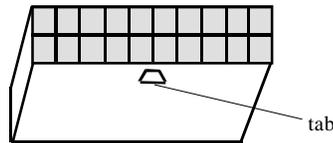
ONBOARD



Power supply connector



Onboard connector



chapter 4

BIOS Configuration



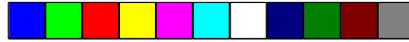
Award's BIOS has a built-in setup program that allows you to modify the basic system configuration. This type of information is stored in the battery-backed CMOS NVRAM. **Entering incorrect information or forgetting your password can lock you out of your system. Refer to "Hardware CMOS & Password Reset" (page 19) in Chapter 3 for information on resetting the CMOS NVRAM.**

Entering Setup

You can enter Setup by powering on the computer and watching for the below message during the POST (Power On Self Test).

Press DEL to enter Setup

When this message appears at the bottom of the screen, press the key. This must be done quickly, as the message is only displayed for a brief time. If you do not press the key in time (or at all), the system will boot normally. If you choose to enter Setup the Main Menu will appear on the screen.



Control Keys

Below is a chart of the control keys available in Setup.

PgUp	Increases the numeric value of a field, or changes current setting.
PgDn	Decreases the numeric value of a field, or changes current setting.
F1	General help.
F2	Changes color; choose from a total of 16 colors.
F5	Restores the previous CMOS value.
F6	Loads BIOS defaults.
F7	Loads Setup Defaults.
F10	Saves all CMOS changes (only in Main Menu).
Esc	Quit, or exit current menu.

Getting Help

In the Main Menu, a description of the highlighted setup function is displayed at the bottom of the screen. If you need help in the Standard CMOS Setup, BIOS Features Setup, Chipset Features Setup, Power Management Setup, PnP/PCI Configuration, or Integrated Peripherals Menus, press F1 to bring up a small Help window that describes the appropriate keys to use and the possible actions for the highlighted item. To exit the Help window, press <Esc>.

The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use the arrow keys to select from amongst the items and press <Enter> to view a selected sub-menu.

ROM PCI/ISA BIOS (2A59IT5A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT	IDE HDD AUTO DETECT
PNP/PCI CONFIGURATION	SAVE & EXIT SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
ESC : Quit : Select Item	
F10 : Save & Exit Setup (Shift)F2 : Change Color	
Time, Date, Hard Disk Type...	

Below is a list of the sub-menus and commands, and a description of their functions. Note that while the menu options appear in all capital letters on screen, we have adapted a more conventional capitalization scheme for this manual.

Standard CMOS Setup

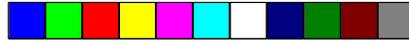
This setup menu allows you to change basic parameters such as the day, time, and drive types.

BIOS Features Setup

This setup menu allows you to alter a variety of enhanced parameters such as BIOS Shadowing, Boot Up System Speed, and CPU Internal Cache.

Chipset Features Setup

This setup page includes all the features of the 430TX chipset, including the DRAM Refresh Rate and I/O Recovery Time.



Power Management Setup

From within this menu, you can set or disable system power management options.

PnP/PCI Configuration

Enter this sub-menu to modify the configuration of Plug and Play standard and PCI BUS parameters.

Load BIOS Defaults

This item will load the BIOS defaults, which are the most stable settings for each system parameter.

Load Setup Defaults

This item will load the Setup defaults, which are the optimal values for the system parameters.

Integrated Peripherals

This option lets you enable or disable onboard devices. You can also configure the I/O and IRQ settings of the onboard serial and parallel ports.

Supervisor Password and User Password

Change, set, or disable a password with this function. It allows you to limit access to the system and/or to Setup.

IDE HDD Auto Detection

The IDE HDD Auto Detection menu automatically configures your hard disk parameters.

Save & Exit Setup

Saves changes to CMOS and exits setup.

Exit Without Saving

Abandons all CMOS changes and exits setup.



Standard CMOS Setup Menu

In this menu drawing and all those that follow, the values shown are the default values, unless otherwise noted.

ROM PCI/ISA BIOS (2A59IT5A)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm:dd:yy) : Wed, Aug 6 1997								
Time (hh:mm:ss) : 18 : 01 : 38								
	Type	Size	CYLS	HEADS	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	: Auto	0	0	0	0	0	0	AUTO
Primary Slave	: Auto	0	0	0	0	0	0	AUTO
Secondary Master	: Auto	0	0	0	0	0	0	AUTO
Secondary Slave	: Auto	0	0	0	0	0	0	AUTO
Drive A	: 1.44 M, 3.5 in.							
Drive B	: 1.2 M, 5.25 in.							
Floppy 3 Mode Support	: Disabled							
Video	: EGA/VGA							
Halt On	: All Errors							
		Base Memory:		640 K				
		Extended Memory:		7168 K				
		Other Memory:		384 K				
		Total Memory:		8192 K				
ESC : Quit			: Select Item			PU/PD/+/- : Modify		
F1 : Help			(Shift)F2 : Change Color					

Date

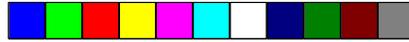
The date format is <month>, <day>, <year>. Press <F3> to show the calendar.

Time

The time format is <hours>, <minutes>, <seconds>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

Primary/Secondary Drive Type

This category identifies the types of hard disk drives that have been installed in the computer. There are 45 already-defined types and one which you can customize. Select auto if the drive type is unknown.



Press PgUp or PgDn to select a numbered hard disk type or type a number and press <Enter>. Note that the specifications of your drive must match the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk type is not listed, you can select User to define your own drive manually.

If you select the User type, you will be asked to fill in the categories shown in the chart below. Type in the parameters and press <Enter>. Your hard disk information should be provided in the documentation from the hard disk vendor or the system manufacturer.

CYLS	number of cylinders
HEADS	number of heads
PRECOMP	write precomp cyl
LANDZ	landing zone
SECTOR	number of sectors
MODE	auto, normal, large, or LBA

If a hard disk has not been installed or you have a CD-ROM or tape drive connected to an IDE channel, select None and press <Enter>.

Drive A type/Drive B type

This category identifies the types of floppy disk drives that have been installed in your computer as the A and/or B drives. The possible floppy drive types are as follows:

None	No floppy drive installed.
360KB, 5.25 in.	5.25 inch PC-type standard drive; 360KB capacity.
1.2MB, 5.25 in.	5.25 inch AT-type high-density drive; 1.2MB capacity.
720KB, 3.5 in.	3.5 inch double-sided drive; 720KB capacity.
1.44MB, 3.5 in.	3.5 inch double-sided drive; 1.44MB capacity.
2.88MB, 3.5 in.	3.5 inch double-sided drive; 2.88MB capacity.

Floppy 3 Mode Support

Provides support for Floppy 3, a 1.25MB floppy type used mostly in Japan.





TYAN Chapter 4
COMPUTER

Video

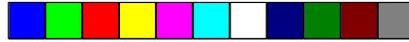
This category detects the type of graphics adapter used for the primary display system. The value entered in this field must match your video display card and monitor. You may not need to alter the default value, as BIOS usually detects the correct video type automatically.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, SVGA, or PGA monitor adapters.
CGA 40	Color Graphics Adapter, power up in 40 column mode.
CGA 80	Color Graphics Adapter, power up in 80 column mode.
Mono	Monochrome adapter, including hi-res monochrome.

Halt On

The category determines whether the computer will stop if an error is detected during power up.

No errors	The system boot will not be stopped for any errors that are detected.
All errors	If the BIOS has detected a non-fatal error, the system will be stopped and you will be prompted.
All, but Keyboard	The system boot will not stop for a keyboard error, but will stop for all other errors.
All, but Diskette	The system boot will not stop for disk errors, but will stop for all other errors.
All, but Disk/Key	The system boot will not stop for a keyboard or disk error, but will stop for all other errors.



Memory

You cannot alter this category from within Setup: it is for display only and is determined by the BIOS POST (Power On Self Test). The three categories are as follows:

Base Memory

The BIOS POST will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 640KB.

Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

Other Memory

This refers to memory located in the 640KB to 1024KB address space. This memory can be used for a number of different applications. DOS uses this area to load device drivers in order to keep as much conventional memory free for application programs as possible. Often called "high memory."

BIOS

BIOS Features Setup

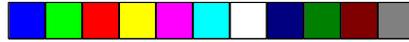
ROM PCI/ISA BIOS (2A59IT5A)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
External Cache	: Disabled	CC000-CFFFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D0000-D3FFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	D4000-D7FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D8000-DBFFF Shadow	: Disabled
Boot Up Floppy Seek	: Enabled	DC000-DFFFF Shadow	: Disabled
Boot Up NumLock Status	: On		
Boot Up System Speed	: High		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/sec)	: 6		
Typematic Delay (Msec)	: 250	ESC : Quit	: Select Item
Security Option	: Setup	F1 : Help	PU/PD/+/- : Modify
PS/2 mouse function control	: Enabled	F5 : Old Values (Shift)	F2 : Color
PCI/VGA Palette Snoop	: Disabled	F6 : Load BIOS Defaults	
Assign IRQ for VGA	: Disabled	F7 : Load Setup Defaults	
OS select for DRAM > 64 MB	: Non-OS/2		

Virus warning

When enabled, this function flashes on-screen messages. During and after the system boot up, any attempt to write to the boot sector or the partition table of the hard disk drive will halt the system and produce an error message. If a warning appears, you should run an anti-virus program to locate the problem. This feature protects only the boot sector, not the entire drive. Note that some disk diagnostic programs will trigger a virus warning message.

Enabled	Activates automatically when the system boots up, causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
Disabled	No warning message will appear when anything attempts to access the boot sector or hard disk partition table.



CPU Internal Cache and External Cache

These two fields-when enabled-result in faster memory access.

Quick Power On Self Test

Select Enabled to reduce the amount of time required to run the Power On Self Test (POST). It should be noted that the quick test skips certain steps that are covered in the normal POST.

Boot Sequence

This category determines which drive the computer searches first for the disk operating system (DOS).

A, C	System will first search for floppy disk drive, then hard disk drive
C, A	System will first search for hard disk drive, then floppy disk drive

Swap Floppy Drive

If you have two floppy drives, you can choose to designate the physical A drive as the logical B drive, and vice-versa. If this function is Enabled, the two will be swapped. If Disabled, the two will be defined normally (i.e. physical and logical designation will be the same).

Boot Up Floppy Seek

During POST, the BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. The 360KB type is 40 tracks while the 720KB, 1.2MB, and 1.44MB are all 80 tracks.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that the BIOS cannot distinguish between 720KB, 1.2MB, and 1.44MB drive types, as they are all 80 tracks.
Disabled	BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning messages if the drive installed is 360KB.

Boot Up NumLock Status

Determines whether or not NumLock is active when the system boots. If On, the number keys are active on the keypad; if Off, the arrow keys are active.



Boot Up System Speed

Select High to boot at the default CPU speed; select Low to boot at the speed of the ATX BUS. If you are using old software or certain add-in peripherals you may need to use the Low system speed.

Typematic Rate Setting, Typematic Rate (Chars/sec), and Typematic Delay (Msec)

The Typematic Rate Setting enables or disables the Typematic Rate and Typematic Rate Delay functions. The Typematic Rate (6, 8, 10, 12, 15, 20, 24, or 30 characters per second) and Typematic Rate Delay (250, 500, 750, or 1000 milliseconds) control the speed at which a keystroke is repeated. The delay between when a key on the keyboard is pressed and when the character begins to appear repeatedly on screen is controlled by the Typematic Rate Delay. Once it has begun to repeat, the character appears at the speed set by the Typematic Rate.

Security Option

Allows you to select whether a password (if you have one) is required each time the system boots or only when you enter Setup.

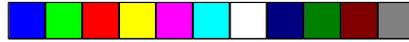
System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

PS/2 mouse function control

Enables or Disables the PS/2 mouse.

PCI/VGA Palette Snoop

Leave this field at Disabled unless you have one video card running on a PCI BUS, and another running on an ISA BUS. Enabling it will allow both cards to be refreshed. Most systems will only have one video card, and that located on a PCI BUS.



Assign IRQ for VGA

For most PCI cards, you do not want your system to assign an IRQ to the VGA. However, for some older PCI cards, you do. Enabling this function allows the system to assign an IRQ.

OS select for DRAM > 64 MB

If you are using IBM OS/2, and more than 64MB of memory, you must Enable this field.

Video BIOS Shadow

This function allows BIOS to “shadow” firmware-to copy it from ROM into the system RAM. Once there, the CPU can read the firmware through the 16-bit or 32-bit DRAM BUS. Firmware that is not shadowed is read through the 8-bit X BUS. Shadowing improves the performance of the system BIOS and ROM firmware for expansion peripherals, but reduces the amount of high memory available for loading device drivers. Rather than shadowing all the available memory sections at once, you should Enable shadowing of each memory section independently, to see how it affects performance.

BIOS

Chipset Features Setup

ROM PCI/ISA BIOS (2A59IT5A)
CHIPSET SETUP UTILITY
AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	Pipeline Cache Timing	: Faster
DRAM Timing	: 70ns	Chipset NA# Asserted	: Enabled
DRAM Leadoff Timing	: 10/6/4	Mem. Drive Str. (MA/RAS)	: Auto
DRAM Read Burst (EDO/FP)	: x333/x444	DRAM Refresh Rate	: 15.6 us
DRAM Write Burst Timing	: x333	CPU Warning Temperature	: Disabled
Fast EDO Lead Off	: Disabled	Current CPU Temperature	: 35 C/ 95°F
Refresh RAS# Assertion	: 5 Clks		
Fast RAS To CAS delay	: 3		
DRAM Page Idle Timer	: 2 Clks		
DRAM Enhanced Paging	: Enabled		
Fast MA to RAS# delay	: 2 Clks		
SDRAM(CAS Lat/RAS-to-CAS)	: 3/3	ESC : Quit	: Select Item
SDRAM Speculative Read	: Disabled	F1 : Help	PU/PD/+/- : Modify
System BIOS Cacheable	: Disabled	F5 : Old Values	(Shift)F2 : Color
Video BIOS Cacheable	: Disabled	F6 : Load BIOS Defaults	
8 Bit I/O Recovery Time	: NA	F7 : Load Setup Defaults	
16 Bit I/O Recover Time	: NA		
Memory Hole at 15M-16M	: Disabled		
PCI 2.1 Compliance	: Disabled		

Auto Configuration

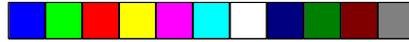
This function selects the optimal values for your chipset parameters. If Disabled, the chipset parameters will revert to setup information stored in CMOS. When Auto Configuration is Enabled, many of the options below will not be available.

DRAM Timing

The value in this field is determined by the performance parameters of the installed DRAM chips. Unless you install new memory that has a different performance rating than the factory DRAMs, you should not alter this field.

DRAM Leadoff Timing

Selects the combination of CPU clocks the DRAM on your board requires before each read from or write to the memory. Beware: changing the value from the setting determined by the board designer for the installed DRAM may cause memory errors.



DRAM Read Burst (EDO/FP)

Sets the timing for reads from EDO (Extended Data Output) or FP[M] (Fast Page Mode) memory. The lower you set the timing numbers, the faster the system will address the memory. Selecting timing numbers lower than the installed DRAM is able to support can result in memory errors.

DRAM Write Burst Timing

Sets the timing for writes to memory. As above, the lower the timing values, the faster the system will address the memory. Note that selecting timing numbers lower than the installed DRAM is able to support can result in memory errors.

Fast EDO Leadoff

Unless you have EDO DRAMS in a synchronous cache or cacheless system, select Disabled. Enabling will cause a 1-HCLK pull-in for all read leadoff latencies for EDO DRAMs (i.e., page hits, page misses, and row misses). You should also select Disabled if any of the DRAM rows contains FPM DRAMs.

Refresh RAS# Assertion

Selects the number of clock cycles in which RAS# is asserted for refresh cycles.

Fast RAS To CAS delay

Inserts a timing delay between the CAS and RAS strobe signals when DRAM is refreshed, read from, or written to.

DRAM Page Idle Timer

Selects the time in HCLKs that the DRAM controller waits to close a DRAM page after the CPU becomes idle.

DRAM Enhanced Paging

When Enabled, the chipset keeps the page open until a page/row miss. When Disabled, the chipset uses additional data to keep the DRAM page open when the host may be only temporarily absent.

Fast MA to RAS# delay

Do not change these values unless you change the specifications of the installed DRAM or the installed CPU.

SDRAM(CAS Lat/RAS-to-CAS)

You can select a combination of CAS latency and RAS-to-CAS delay in HCLKs of 2/2 or 3/3. The board designer should have set these values based on the installed DRAM. As above, do not change the values in this field unless you change the specifications of the installed DRAM or the installed CPU.

SDRAM Speculative Read

The chipset can guess at a DRAM read address in order to reduce read latencies. A read request containing the data memory address is issued by the CPU, and received by the DRAM controller. If this function is Enabled, the controller issues the read command just before it has finished decoding the data address.

System BIOS Cacheable

If Enabled, results in better system performance by permitting caching of the system BIOS ROM at F0000h-FFFFFh. Any program which tries to write to this memory area may cause a system error.

Video BIOS Cacheable

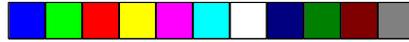
If Enabled, this function results in better video performance by permitting caching of the video BIOS ROM at C0000h to C7FFFh. Note that any program which tries to write to this area may cause a system error.

8- and 16-Bit I/O Recovery Time

Because the PCI BUS is so much faster than the ISA BUS, the I/O recovery mechanism adds BUS clock cycles to the ISA BUS between PCI-originated I/O cycles. These two fields let you add recovery time (in BUS clock cycles) for both 8-bit and 16-bit I/O.

Memory Hole at 15M-16M

You can reserve this area of the system memory for ISA adapter ROM. As long as it is reserved, however, it cannot be cached. Any peripher-



als that require this area of system memory should have a note in their user information to that effect.

PCI 2.1 Compliance

Select Enabled to support compliance with PCI specification version 2.1.

Pipeline Cache Timing

If your system contains a single bank of pipelined burst SRAM, select Faster. If your system contains two banks of pipelined burst SRAM, select Fastest.

Chipset NA# Asserted

If Disabled, NA# assertion depends upon cache size and type. If Enabled, the NA# pin is never asserted. Instead, in a process called “pipelining,” the chipset will signal the CPU for a new memory address before all the data transfers for the current cycle are complete.

Mem. Drive Str. (MA/RAS)

Stands for Memory Address Drive Strength. Controls the strength of the output buffers driving the MA and BA1 pins (first value) and SCASx#, CKEx, MWEx#, and SRASx# pins (second value).

DRAM Refresh Rate

Designates the period required to refresh the DRAMs. Be sure the value entered is in accordance with your DRAM specifications.

CPU Warning Temperature

LM75 monitors the CPU’s temperature. If the CPU temperature exceeds the value in this field, a warning beep will sound. Enabled warning temperature choices are 60, 65, 70, 75, 80, 85, or 90 degrees Celsius. If Disabled, no beep will sound.

Current CPU Temperature

This display-only field shows the current CPU temperature as detected by LM75.



Power Management Setup

ROM PCI/ISA BIOS (2A59IT5A)
POWER MANGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Disabled	**Reload Global Timer Events**	
PM Control By APM	: No	IRQ [3-7, 9-15],NMI	: Disabled
Video Off Method	: V/H SYNC+Blank	Primary IDE 0	: Disabled
Video Off After	: Standby	Primary IDE 1	: Disabled
MODEM Use IRQ	: 3	Secondary IDE 0	: Disabled
Doze Mode	: Disabled	Secondary IDE 1	: Disabled
Standby Mode	: Disabled	Floppy Disk	: Disabled
Suspend Mode	: Disabled	Serial Port	: Enabled
HDD Power Down	: Disabled	Parallel Port	: Disabled
Throttle Duty Cycle	: 62.5%	Power Interruption	: Disabled
ZZ Active in Suspend	: Disabled	ESC	: Quit
VGA Active Monitor	: Enabled	F1	: Help
Soft-Off by PWR-BTTN	: Delay 4 sec.	PU/PD/+/-	: Modify
CPUFAN Off In Suspend	: Enabled	F5	: Old Values (Shift)
Resume by Ring	: Disabled	F2	: Color
IRQ 8 Break Suspend	: Disabled	F6	: Load BIOS Defaults
		F7	: Load Setup Defaults

Power Management

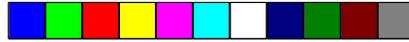
This option allows you to select the level of power saving for the Doze, Standby, and Suspend modes. Max Saving provides the most power saved; Min Saving the least. User Define allows you to set each of the modes individually.

PM Control by APM

If APM is installed on your system, selecting Yes gives better power savings.

Video Off Method

The Blank Screen option will let the system BIOS blank the screen when disabling video. V/H SYNC+Blank will let the BIOS turn off the V-SYNC and H-SYNC signals running from the VGA card to the monitor.



Video Off After

Selects the mode in which you want the monitor to blank.

MODEM Use IRQ

If Resume by Ring is Enabled, it is possible to wake the system by dialing in. This field determines which IRQ will be monitored for the incoming call.

Doze Mode

Defines the continuous idle time before the system enters Doze mode. Only the CPU's speed is slowed.

Standby Mode

Defines the continuous idle time before the system enters Standby mode. Video and fixed disk drive shut down; all other devices operate normally.

Suspend Mode

Defines the continuous idle time before the system enters Suspend mode. All devices except the CPU shut down.

HDD Power Down

The hard disk drive powers down after the chosen period of drive inactivity, while all other devices remain active.

Throttle Duty Cycle

While the system is in Doze mode, the CPU clock runs only part of the time. This function allows you to select the percentage of time that the clock will run.

ZZ Active in Suspend

When Enabled, the ZZ signal is active during Suspend mode.

VGA Active Monitor

When Enabled, any video activity restarts the global timer for Standby.





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Soft-Off by PWR-BTTN

Determines the amount of time between when you press the power button to power off your computer and when the system actually turns off.

CPUFAN Off In Suspend

You may choose whether or not the CPU fan will remain on when the system is in Suspend mode. Enabling this function turns the CPU fan off.

Resume by Ring

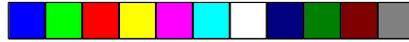
Makes it possible for the system to be awakened by remote. You might Enable this function to make remote servicing possible or to get access to your system while you are on a business trip.

IRQ 8 Break Suspend

If this field is Disabled, IRQ8 will not be monitored, and it will not awaken the system from Suspend mode. If this field is Enabled, IRQ8 will be monitored, and will be able to awaken the system from Suspend mode.

Reload Global Timer Events

Defines the activities that can cause the PM timers to reload (e.g. when your system is awakened by remote via a modem).



PnP/PCI Configuration

ROM PCI/ISA BIOS (2A59IT5A)
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

PNP OS Installed	: Yes	PCI IDE IRQ Map To	: PCI-AUTO
Resource Controlled by	: Manual	Primary IDE INT#	: A
Reset Configuration Data	: Disabled	Secondary IDE INT#	: B
IRQ-3 assigned to	: Legacy ISA	Used MEM base addr	: DC00
IRQ-4 assigned to	: Legacy ISA	Used MEM Length	: 8K
IRQ-5 assigned to	: PCI/ISA PnP		
IRQ-7 assigned to	: Legacy ISA		
IRQ-9 assigned to	: PCI/ISA PnP		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: PCI/ISA PnP	ESC : Quit	: Select Item
IRQ-14 assigned to	: Legacy ISA	F1 : Help	PU/PD/+/- : Modify
IRQ-15 assigned to	: Legacy ISA	F5 : Old Values (Shift)	F2 : Color
DMA-0 assigned to	: PCI/ISA PnP	F6 : Load BIOS Defaults	
DMA-1 assigned to	: PCI/ISA PnP	F7 : Load Setup Defaults	
DMA-3 assigned to	: PCI/ISA PnP		
DMA-5 assigned to	: PCI/ISA PnP		
DMA-6 assigned to	: PCI/ISA PnP		
DMA-7 assigned to	: PCI/ISA PnP		

(non-default settings)

PnP OS Installed

Select Yes if the system operating environment is Plug and Play aware (e.g. Windows 95 is).

Resources Controlled by

The BIOS can automatically configure all the boot- and Plug and Play-compatible devices. If you select Auto, all the interrupt request and DMA assignment fields disappear, since the BIOS automatically assigns values to them.

BIOS

Reset Configuration Data

You should leave this field Disabled unless you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot. If this occurs, select Enabled to reset the Extended System Configuration Data when you exit Setup.

IRQ-n assigned to

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt.

Legacy ISA

Choose this type for devices compliant with the original PC AT BUS specification.

PCI/ISA PnP

Choose this type for devices compliant with the Plug and Play standard, whether designed for the PCI or ISA BUS architecture.

DMA-n assigned to

Legacy ISA

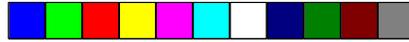
Choose this type for devices compliant with the original PC AT BUS specification.

PCI/ISA PnP

Choose this type for devices compliant with the Plug and Play standard, whether designed for the PCI or ISA BUS architecture.

PCI IDE IRQ Map To:

This field lets you select PCI IDE IRQ mapping or PC AT (ISA) interrupts. If your system does not have one or two PCI IDE connectors on the system board, select values according to the type of IDE interfaces installed in your system (choose the ISA value if you have ISA interfaces; choose PCI-AUTO if you have PCI interfaces). Standard ISA interrupts for IDE channels are IRQ-14 for primary channels and IRQ-15 for secondary channels. If you select ISA for this field, the Primary and Secondary IDE INT# fields will not be visible.



Primary IDE INT# and Secondary IDE INT#

Up to four interrupts (INT# A, INT# B, INT# C, and INT# D) can be activated by each PCI peripheral connection. A PCI connection is assigned INT# A by default. Unless the peripheral device requires two interrupt services, assigning INT# B will have no effect. Note that the PCI IDE interface in the chipset has two channels, and therefore requires two interrupt services. The default values for the Primary and Secondary IDE INT# fields are appropriate for two PCI IDE channels. The Secondary channel has a higher interrupt than the Primary.

Used Mem base addr

This function designates a base address for the memory area used by peripheral devices that require high memory.

Used Mem Length

Selects a length for the high memory area specified in the previous field. If no base address is specified, this field will not appear.



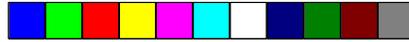
Load BIOS Defaults

ROM PCI/ISA BIOS (2A59IT5A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	LOAD SETUP DEFAULTS
PNP/PCI CONFIGURATION	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Save & Exit Setup F10 : Quit	
: Select Item (Shift)F2 : Change Color	
Load BIOS Defaults except standard CMOS SETUP	

Load BIOS Defaults

To load BIOS default values to CMOS NVRAM, enter Y. If you do not wish to load the Setup defaults, enter N. If any problem has occurred with your system's configuration, loading the BIOS defaults is recommended.



Load Setup Defaults

ROM PCI/ISA BIOS (2A59IT5A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET I/O	DRD
PNP/PCI C	O DETECT
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Save & Exit Setup	
F10 : Quit	
: Select Item	
(Shift)F2 : Change Color	
Load SETUP Defaults except standard CMOS SETUP	

Load Setup Defaults

To load Setup default values to CMOS NVRAM, enter Y. If you do not wish to load the Setup defaults, enter N. If any problem has occurred with your system's configuration, loading the Setup defaults is recommended.

BIOS

Integrated Peripherals

ROM PCI/ISA BIOS (2A59IT5A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Disabled	Parallel Port Mode	: ECP+EPP
IDE Primary Master PIO	: Auto	ECP Mode Use DMA	: 3
IDE Primary Slave PIO	: Auto	Parallel Port EPP Type	: EPP1.7
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave PIO	: Auto		
IDE Primary Master UDMA	: Disabled		
IDE Primary Slave UDMA	: Disabled		
IDE Secondary Master UDMA	: Disabled		
IDE Secondary Slave UDMA	: Disabled		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
USB Keyboard Support	: Disabled		
On-board FDC Controller	: Enabled	ESC : Quit	: Select Item
On-board UART 1	: Com1/3F8	F1 : Help	PU/PD/+/- : Modify
On-board UART 2	: Com2/2F8	F5 : Old Values (Shift)	F2 : Color
On-board UART 2 Mode	: Standard	F6 : Load BIOS Defaults	
On-board Parallel Port	: 378/IRQ7	F7 : Load Setup Defaults	

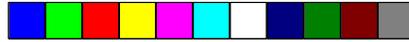
(non-default settings)

IDE HDD Block Mode

The terms “multiple commands,” “multiple sector read/write,” and “block transfer” are all alternate names for block mode. Unless your IDE hard drive is old, it should support Block Mode. If Enabled, Block Mode yields automatic detection of the optimal number of block read/writes per sector that the drive can support.

IDE Primary Master PIO, IDE Primary Slave PIO, IDE Secondary Master PIO, and IDE Secondary Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (from 0 to 4) for each of the four IDE devices supported by the onboard IDE interface. Modes 0 through 4 provide successively increasing performance. In Auto mode, the system automatically determines the best mode for each device.



IDE Primary Master UDMA, IDE Primary Slave UDMA, Secondary Master UDMA, and IDE Secondary Slave UDMA

Ultra DMA/33 can only be implemented if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

On-Chip Primary PCI IDE and On-Chip Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

USB Keyboard Support

Select Enabled if your system contains a Universal Serial BUS (USB) controller and you have a USB keyboard.

Onboard FDC Controller

If your system has a floppy disk controller (FDC) installed on the system board and you wish to use it, select Enabled. If you install an add-in FDC or the system has no floppy drive, select Disabled.

Onboard UART 1 and Onboard UART 2

Select an address and corresponding interrupt for the first and second serial ports.

Onboard UART 2 Mode

The second serial port offers these InfraRed interface modes:

- HPSIR IrDA-compliant serial infrared port
- ASKIR Amplitude shift keyed infrared port

Onboard Parallel Port

Select an LPT port name and matching address for the physical parallel (printer) port.

BIOS



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Parallel Port Mode

Select an operating mode for the onboard parallel (printer) port. Select Normal unless your hardware and software require one of the other possible modes. If you select Normal for this field, the next two fields will not be visible.

ECP Mode Use DMA

Select a DMA channel for the port.

Parallel Port EPP Type

Select EPP port type 1.7 or 1.9. Your device's user information should tell you which port type is required. 1.9 is common in newer devices.



IDE HDD Auto Detection

ROM PCI/ISA BIOS (2A59IT5A)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master								

Select Primary Master Option (N=Skip) : N								
OPTIONS	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE	
2(Y)	1090	528	64	0	2111	63	LBA	

[Esc: Skip]

Note: Some OSes (like SCO-UNIX) must use "NORMAL" for installation

Type Y to accept the HDD parameter reported by BIOS. Type N to keep the old HDD parameter information.

Notes on IDE HDD Auto Detection:

- ◆ If the hard disk is smaller than 540MB, select the NORMAL parameters.
- ◆ If the hard disk is larger than 540MB, select LBA parameters.
- ◆ Always select NORMAL parameters for SCO-UNIX.



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chapter 5

Flash Writer Utility

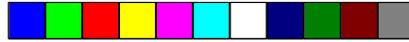
Flash Memory Writer

You can upgrade the BIOS of your mainboard by using a Flash Memory Writer (FMW) utility. This utility can be downloaded from TYAN's BBS and from the TYAN website. The system BIOS is stored on a flash EPROM ROM chip on the mainboard which can be erased and reprogrammed by the FMW.

The following three files make up the FMW:

- | | |
|--------------|--|
| AWDFLASH.EXE | -The Flash Memory Writer utility for Award to Award upgrade. |
| README | -A text file of instructions. |
| TXAWDXXX.BIN | -This file contains the new BIOS information. XXX is our stand-in for the BIOS version number. |

The Flash memory writer records (or "programs") a new BIOS onto the flash memory chip. You cannot upgrade an Award BIOS to an AMI BIOS or an AMI BIOS to an Award BIOS.



Note:

You should ALWAYS clear your CMOS after flashing a BIOS. This will clear out any stray settings from your old BIOS which may have been carried over from the flashing process. Most problems encountered after flashing a BIOS will be solved by this simple procedure.



To reprogram the System BIOS, you must first do the following:

1. Check jumper JP2 (default pins 1-2). The S1576S uses a 5V flash EPROM, so jumper JP2 should be left in the default position on pins 1 and 2. This jumper should never be moved, and has been hardwired on some boards.
2. Make sure the CPU is running in “real mode.” FMW will not run if the CPU is operating in a protected or “virtual mode.” This means that you can not run it with Windows running or with any memory manager software. You must disable any memory manager before you can run FMW. The easiest way to do this is as follows:
 - A. Boot your system from a bootable floppy disk with no CONFIG.SYS or AUTOEXEC.BAT files, and then run Flash Memory Writer from a backup copy of your support disk. You can make your backup floppy bootable when you format it, and use one disk for both purposes.
 - B. If you are using MS-DOS 6.x, you can use the feature that allows you to bypass the CONFIG.SYS and AUTOEXEC.BAT file. You can access this feature by pressing <F5> while the “Starting MS DOS...” line is on the screen.

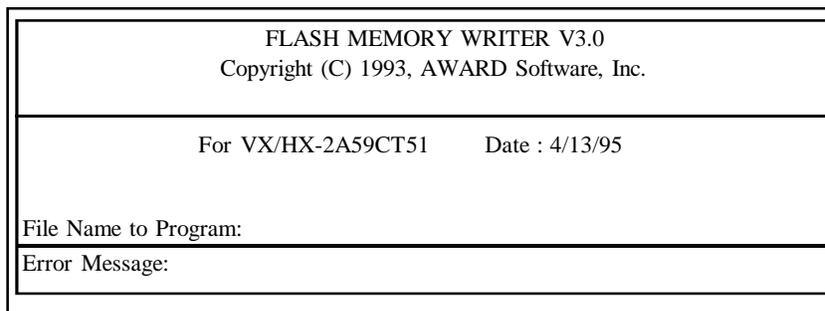
It is important that you make sure that there are no memory managers running. If you are uncertain whether or not there is a memory manager running on your system, try running FMW. If it works, there is no active memory manager. If you see a warning message about the CPU mode, check to see that you have followed the preceding directions properly, and try again.

FLASH

Once you have satisfied the two requirements mentioned above (1 and 2), you can run FMW. You may copy the contents of the “Flash” directory to your hard drive, or you may run the utility from a backup of the support floppy disk. Either way, make sure the new BIOS file is in the same directory as the FMW utility.

To start FMW, change to the “Flash” directory (if you are not already in it). Type “Awdflash” at the DOS command line and press the <Enter> key. The following screen will appear:

The Flash Memory Writer Utility Screen



FLASH MEMORY WRITER V3.0
Copyright (C) 1993, AWARD Software, Inc.

For VX/HX-2A59CT51 Date : 4/13/95

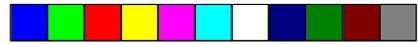
File Name to Program:

Error Message:

Type in the whole file name, e.g. A61AW10.BIN, and confirm that you want to program the BIOS. The utility will Blank, Erase, and then Program the flash memory on the mainboard with the new BIOS file. You should choose Yes to save the original system BIOS to a floppy diskette **before** you program the new BIOS. This leaves you with a backup of your original BIOS in case you need to reinstall it. This is highly recommended. If you cannot successfully program the BIOS file for some reason, reinstall you original BIOS from the backup file. Always reset the CMOS with jumper JP1 after flashing to a new BIOS.



Warning: If you do not successfully install a complete BIOS file in the flash memory on the Mainboard, your system may not be able to boot. If this happens, it will require service by your system vendor. To avoid such an inconvenience, follow the requirements and instructions in this section precisely.



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FLASH

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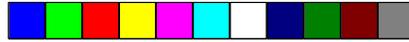
chapter 6

System Resources

Timer and DMA Channel Maps

TIMER MAP: TIMER Channel-0 system timer interrupt
 TIMER Channel-1 DRAM REFRESH request
 TIMER Channel-2 SPEAKER tone generator

DMA CHANNELS: DMA Channel-0 Available
 DMA Channel-1 Available
 DMA Channel-2 FLOPPY DISK adapter
 DMA Channel-3 Available
 DMA Channel-4 Cascade for DMA
 controller 1
 DMA Channel-5 Available
 DMA Channel-6 Available
 DMA Channel-7 Available



Interrupt Map

- NMI: Parity check error
- IRQ (H/W):
- 0 System TIMER interrupt from TIMER-0
 - 1 KEYBOARD output buffer full
 - 2 Cascade for IRQ 9-15
 - 3 SERIAL port 2
 - 4 SERIAL port 1
 - 5 PARALLEL port 2 (available if not used)
 - 6 FLOPPY DISK adapter
 - 7 PARALLEL port 1
 - 8 RTC clock
 - 9 Available
 - 10 Available
 - 11 Available
 - 12 PS/2 mouse (available if not used)
 - 13 MATH co-processor
 - 14 Primary IDE
 - 15 Secondary IDE

POST Messages

When the BIOS detects a correctable error during POST, a beep code sounds or an error message appears. What follows is an explanation of these messages and the measures you can take to solve the problem they indicate. Also included in this list are some status messages which do not necessarily indicate an error (e.g. "CPU at *nmmn*," which merely indicates the CPU speed).

Beep Codes

Only one beep code is active now, and it sounds when a video error has occurred and the BIOS cannot initialize the video screen, and so cannot display any information. The beep code is one long beep followed by two short ones.

SYSTEM

BIOS ROM checksum error-System halted

The checksum of the BIOS code in the BIOS chip is incorrect, indicating the BIOS code may have become corrupt. Contact your system dealer to replace the BIOS.

CMOS battery failed

CMOS battery is no longer functional. Contact your system dealer for a replacement battery.

CMOS checksum error-Defaults loaded

Checksum of CMOS is incorrect, so the system loads the default equipment configuration. A checksum error may indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

CPU at *nnnn*

Displays the running speed of the CPU.

Display switch is set incorrectly.

The display switch on the motherboard can be set to either monochrome or color. This message indicates that the switch is set to a setting different from the one indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the Video selection.

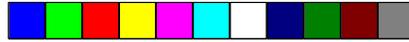
Floppy disk(s) fail

Cannot find or initialize the floppy drive controller or the drive. Make sure the controller is installed correctly. If no floppy drives are installed, be sure the Diskette Drive selection in Setup is set to None or Auto.

HARD DISK initializing

Please wait a moment...

Some hard drives require extra time to initialize.



HARD DISK INSTALL FAILURE

Cannot find or initialize the hard drive controller or the drive. Make sure the controller is installed correctly. If no hard drives are installed, be sure the Hard Drive selection in Setup is set to None.

Hard disk(s) diagnosis fail

The system may run specific disk diagnostic routines. This message appears if one or more hard disks return an error when the diagnostics run.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are pressed during POST. To purposely configure the system without a keyboard, set the error halt condition in Setup to Halt On All, But Keyboard. The BIOS then ignores the missing keyboard during POST.

Keyboard is locked out - Unlock the key

This message usually indicates that one or more keys have been pressed during the keyboard tests. Be sure nothing (including your hand) is resting on the keyboard.

Memory Test :

This message appears during a full memory test, and counts down the memory areas to be tested.

Memory test fail

If POST detects an error during memory testing, additional information appears, giving details about the type and location of the memory error.

Override enabled - Defaults loaded

If the system cannot boot using the current CMOS configuration, the BIOS can override the current configuration with a set of BIOS defaults designed for the most stable, minimal-performance system operations.

SYSTEM

Press ESC to skip memory test

You may press <Esc> to skip the full memory test.

Press TAB to show POST screen

System OEMs may replace the Award BIOS POST display with their own proprietary display. Including this message in the OEM display permits the operator to switch between the OEM display and the default POST display.

Primary master hard disk fail

POST has detected an error in the primary master IDE hard drive.

Primary slave hard disk fail

POST has detected an error in the primary slave IDE hard drive.

Resuming from disk, Press TAB to show POST screen

The BIOS offers a save-to-disk feature for laptops. This message may appear when the operator restarts the system after a save-to-disk shutdown. See the “Press TAB to show POST screen” explanation above for a description of this feature.

Secondary master hard disk fail

POST has detected an error in the secondary master IDE hard drive.

Secondary slave hard disk fail

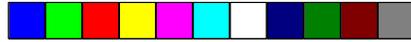
POST has detected an error in the secondary slave IDE hard drive.

POST Codes

Code	Name	Description
C0	Turn Off Chipset Cache	OEM Specific: Controls cache.
1	Processor Test 1	Processor Status (IFLAGS) Verification. Tests the following processor status flags: carry, zero, sign, overflow. The BIOS sets each flag, verifies that it is set, then turns each flag off and verifies that it is off.
2	Processor Test 2	Reads/Writes/Verifies all CPU registers except SS, SP, and BP with data pattern FF and 00.
3	Initialize Chips	Disables NMI, PIE, AIE, UEI, and SQWV, video, parity checking, and DMA. Resets math co-processor. Clears all page registers and CMOS shutdown byte. Initializes timer 0, 1, and 2, and sets EISA timer to a known state. Initializes DMA controllers 0 and 1. Initializes interrupt controllers 0 and 1. Initializes EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed to keep the memory from decaying. This function assures that the memory refresh function is working properly. Initializes keyboard controller.
5	Blank Video, Initialize Keyboard	
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies that CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power-on BIOS defaults.
C1	Memory Presence Test	OEM Specific: Tests to size onboard memory.
C5	Early Shadow	OEM Specific: Early Shadow enabled for fast boot.
C6	Cache Presence Test	Detects external cache size.
8	Setup Low Memory	Initializes chipset early. Tests for presence of memory. Runs OEM chipset routines. Clears low 64KB of memory. Tests first 64KB of memory.

SYSTEM

Code	Name	Description
9	Early Cache Initialization	Initializes Cyrix CPU, and cache.
A	Setup Interrupt Vector Table	Initializes first 120 interrupt vectors with SPURIOUS_INT_HDLR and initializes INT 00h-1Fh according to INT_TBL.
B	Test CMOS RAM Checksum	Tests CMOS RAM Checksum. If it is bad, or the <Insert> key is pressed, loads defaults.
C	Initialize Keyboard	Detects the type of keyboard controller (optional). Sets NUM_LOCK status.
D	Initialize Video Interface	Detects CPU clock. Reads CMOS location 14h to find out what type of video is in use. Detects and initializes video adapter.
E	Test Video Memory	Tests video memory. Writes sign-on message to screen. Enables shadow according to Setup.
F	Test DMA Controller 0	Tests BIOS checksum. Detects and initializes keyboard.
10	Test DMA Controller 1	Tests DMA Controller 1.
11	Test DMA Page Registers	Tests DMA Page Registers.
12-13	Reserved	-
14	Test Timer Counter 2	Tests 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verifies 8259 Channel 1 masked interrupts by alternately turning off and on interrupt lines.
16	Test 8259-2 Mask Bits	Verifies 8259 Channel 2 masked interrupts by alternately turning off and on interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turns off interrupts to verify that no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Forces an interrupt and verifies that the interrupt occurred.
19	Test Stuck NMI Bits (Parity, I/O Check)	Verifies that NMI can be cleared.
1A	-	Displays the CPU clock.
1B-1E	Reserved	-



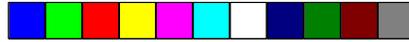
Code	Name	Description
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, executes EISA initialization. If not, executes ISA tests and clears EISA mode flag. Tests EISA Configuration Memory Integrity (checksum and communication interface). Initializes slot 0 (system board). Initialize slots 1 through 15. Sizes base memory from 256KB to 640KB and extended memory above 1MB.
20	Enable Slot 0	
21-2F	Enable Slots 1-15	
30	Size Base and Extended Memory	
31	Test Base and Extended Memory	Tests base memory from 256KB to 640KB and extended memory above 1MB using various patterns. Note: This test is skipped in EISA mode and can be skipped in ISA mode by pressing the <Esc> key. If EISA mode flag is set, then tests the EISA memory found in initialized slots. Note: This test is skipped in ISA mode and can be skipped in EISA mode by pressing the <Esc> key.
32	Test EISA Extended Memory	
33-3B	Reserved	
3C	-	Enables Setup.
3D	Initialize and Install Mouse	Detects whether or not mouse is present. If it is, initializes mouse and installs interrupt vectors.
3E	Setup Cache Controller	Initializes the cache controller.
3F	Reserved	
BF	Chipset Initialization	Programs chipset registers with Setup values.
40	-	Displays whether or not virus protection is enabled or disabled.
41	Initialize Floppy Drive and Controller	Initializes floppy disk drive controller and any drives.
42	Initialize Hard Drive and Controller	Initializes hard drive controller and any drives.
43	Detect and Initialize Serial/Parallel Ports	Initializes any serial and parallel ports, and also the game port.



SYSTEM



Code	Name	Description
44	Reserved	
45	Detect and Initialize Math Co-processor	Detects and initializes the math co-processor.
46-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboots if Manufacturing POST Loop pin is set. Otherwise, displays any messages (i.e., any non-fatal errors that were detected during POST) and enters Setup.
4F	Security Check	Asks for security password (optional).
50	Write CMOS	Writes all CMOS values back to RAM and clears the screen.
51	Pre-boot Enable	Enables the parity checker and NMI. Enables cache before boot.
52	Initialize Option ROMs	Initializes any option ROMs present from C8000h to EFFFh. Note: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Sets up virus protection according to Setup.
61	Set Boot Speed	Sets system speed for boot.
62	Setup NumLock	Sets up NumLock status according to Setup.
63	Boot Attempt	Sets low stack. Boots via INT 19h.
B0	Spurious	Appears if interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, press F1 to disable NMI, and F2 to reboot.
E1-EF	Setup Pages	E1-Page 1, E2-Page 2, etc.
FF	Boot	Boots system.



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).

SYSTEM

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