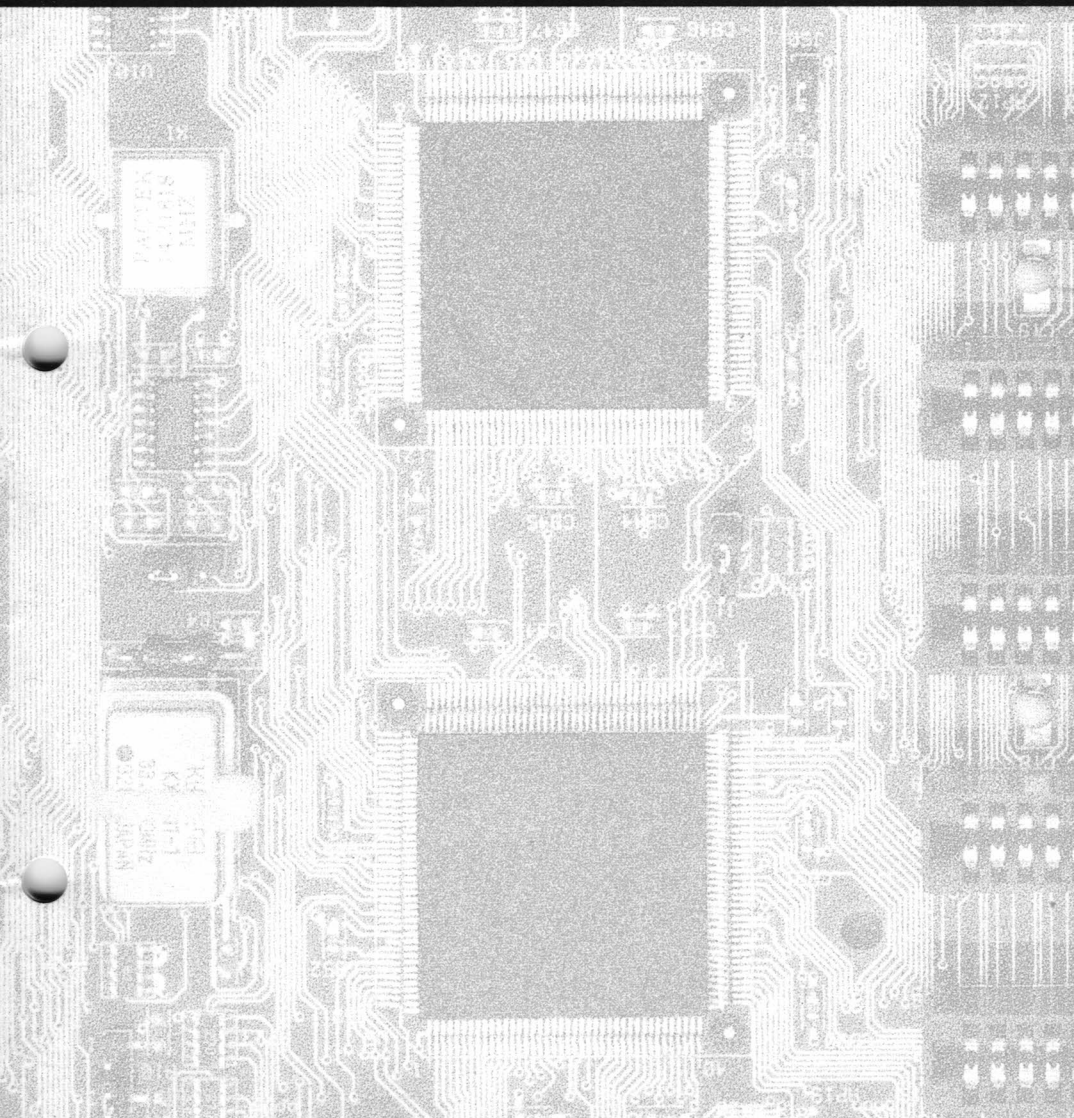
386-GT
MAIN BOARD MANUAL



386-GT

MAIN BOARD
User's Guide

DOC No. : 13049
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Date : February 1994

HANDLING PRECAUTIONS

→ **Static electricity may cause damage to the integrated circuits on the mainboard. Before handling any mainboard outside of its protective packaging, ensure that there is no static electric charge in your body.**

Observe any or all of these basic precautions when handling the mainboard or other computer components:

- Wear a static wrist strap which fits around your wrist and is connected to a natural earth ground.
- Touch a grounded or anti-static surface or a metal fixture such as a water pipe.
- Avoid contact with the components on add-on cards, boards and modules and with the "golden finger" connectors plugged into the expansion slot. It is best to handle system components by their mounting bracket.

Above methods either prevent static build-up or cause it to be discharged properly.

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ABOUT THIS MANUAL

This manual is designed to guide you and facilitate your use of the 386-GT mainboard. It is divided into chapters and appendices. The chapters contain the main body of information normally referred to by users. The appendices provide more detailed technical information for reference.

Chapter 1	introduces the basic parts and features of the mainboard.
Chapter 2	gives information on the jumper and connector settings on the mainboard.
Chapter 3	provides information on the mainboard's memory subsystem consisting of SIMMs and Cache memory and describes how you can upgrade memory.
Chapter 4	briefly explains the mainboard's Award BIOS* system Setup and tells you how to change the Setup settings.
Chapter 5	briefly explains the mainboard's AMI BIOS* system Setup and tells you how to change the Setup settings.
Appendix A	provides relevant technical information.

* Your mainboard only comes with one BIOS chip — either Award or AMI BIOS. Refer only to the chapter that applies to the Setup BIOS of your mainboard.

NOTE : The material in this manual is for information only and is subject to change without notice. We reserve the right to make changes in the product design without reservation and without notification to its users. We shall not be liable for technical or editorial omissions made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

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Chapter 1

Overview

Based on an ISA-bus architecture, the 386-GT mainboard empowers any high-end system to exploit a wide-range of hardware and software capabilities and applications. The board's special feature is the VIA GMC chipset, a highly integrated single chipset.

This chapter gives you a brief overview of this mainboard, providing basic information on its major parts and components.

Specifications

The 386-GT mainboard comes with the following features:

- 80386 single CPU microprocessor in a PQFP package.
- VIA GMC VT82C486 PC/AT chipset includes built-in 8042 keyboard controller.
- Award or AMI BIOS.
- Supports 0/32/128KB direct-mapped write-back/write-through cache memory.
- 30-pin SIMM sockets supports 1 up to 64MB DRAM for 386 system, provides page mode DRAM operation.
- Supports system and video BIOS cacheable and shadow.
- Supports decoupled DRAM refresh.
- One 8-bit and five 16-bit ISA expansion slots.
- Dallas DS1287/DS12885Q real time clock/calendar.
- Optional Intel 80387 or Cyrix 87DLC coprocessor.

Mainboard Layout

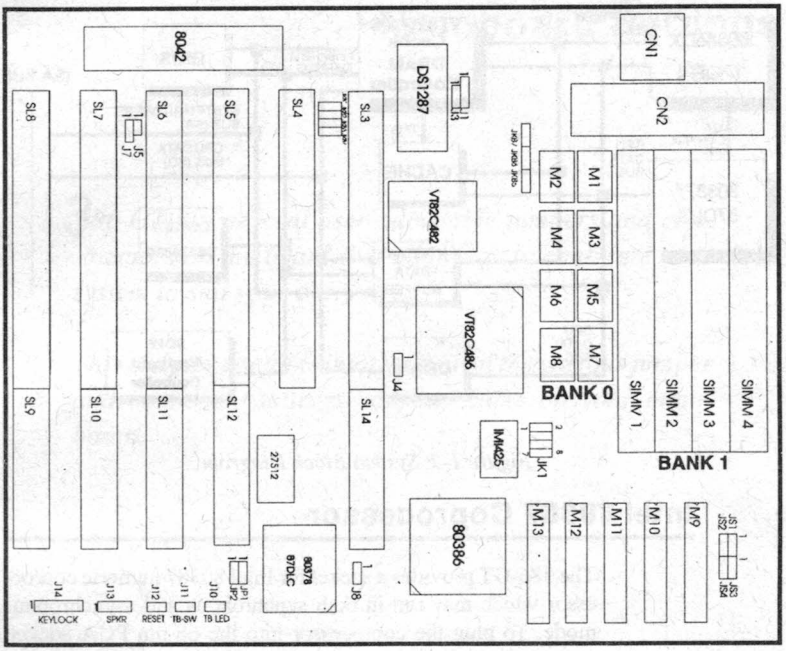


Figure 1-1. Mainboard Layout

System Block Diagram

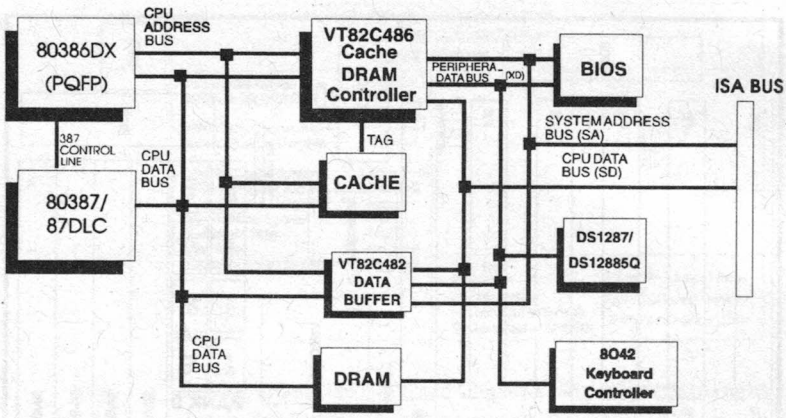
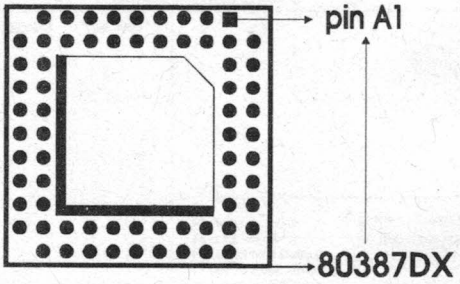


Figure 1-2. System Block Diagram

Intel 80387 Coprocessor

The 386-GT provides a socket for Intel 80387 numeric coprocessor which may run in both synchronous and asynchronous mode. To plug the coprocessor into the 68-pin PGA socket, please note that the alignment and position is as follows:



Chapter 2

Mainboard Settings

386-GT has several user-adjustable jumpers and connectors on the board that allow you to configure your system to suit your every need.

This chapter contains information on the various jumper and connector settings you can make on your mainboard.

Jumper and Connector Locations

Figure II-1 below shows the jumper and connector locations on the mainboard.

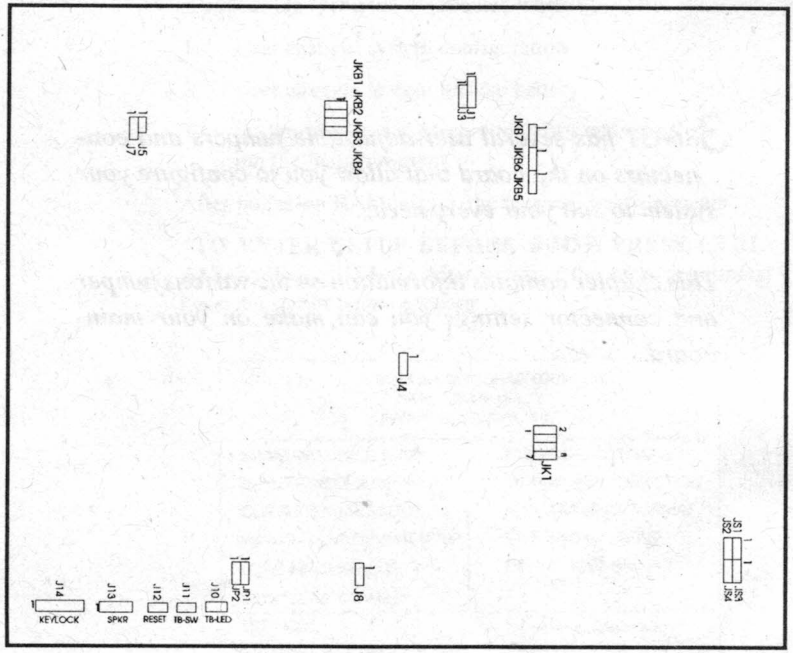


Figure 2-1. Jumper and Connector Positions

Jumpers

Jumpers are used to select the operation modes for your system. Each jumper on the board has three metal pins with each pin representing a different function. To "set" a jumper, a black cap containing metal contacts is placed over the jumper pin/s according to the required configuration. A jumper is said to be "shorted" when the black cap has been placed on one or two of its pins, as shown in the figure below:

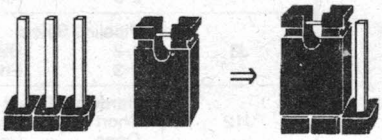


Figure 2-2. Jumper with Pins Shorted

→ **NOTE : Users are not encouraged to change the settings of jumpers not listed in this manual as they may be considered factory defaults which may adversely affect the performance of the mainboard.**

→ **NOTE : JKB5, JKB6, JKB7 are for Internal Keyboard Controller feature use only. Users are not encouraged to change their factory default settings except when using the Internal Keyboard Controller feature.**
Likewise, J5 and J7 are for External Keyboard Controller feature use only. Users are not encouraged to change their factory default settings except when using the External Keyboard Controller feature.

Setting the Jumpers

JUMPER	PIN DEFINITION
J3	External, Internal Battery Select 1-2 External battery 2-3 Internal battery (default)
J5	Display Type Select Open Mono/EGA/VGA (default) Close Color
J7	Password Clear (Award/AMI BIOS Select) 1-2 Award BIOS 2-3 AMI BIOS
J8	Pipeline Select 1-2 Disable (default) 2-3 Enable
J12	Hardware Reset Short Reset Open Normal
JP1	Cyrix 87DLC Select 1-2 Enable 2-3 Disable (default)
JP2	80387 Operation Mode Select 1-2 Sync. mode (default) 2-3 Async. mode
JKB1, JKB2, JKB3, JKB4, J4	External/Internal Keyboard Select 1-2 External keyboard 2-3 Internal keyboard
JKB5	Award BIOS Clear 1-2 Default 2-3 Award BIOS clear
JKB6	AMI BIOS Clear 1-2 Default 2-3 AMI BIOS clear
JKB7	Mono/VGA/CGA Select 1-2 Mono/VGA (default) 2-3 CGA

Table 2-1. Jumper Definitions

CPU Clock (JK1)

CPU TYPE	CLK 2	1-2	3-4	5-6	7-8
80386DX-33MHz	66.6 MHz	Open	Short	Open	Short
	66.6 MHz	Short	Open	Open	Short
80386DX-40MHz	80 MHz	Short	Short	Open	Short

Table 2-2. CPU Clock Jumper Selection (JK1)

Connectors

The connectors allow the mainboard to connect electronically with other parts of the system. Some connectors have two pins, others have four or five pins.

Some malfunction problems encountered with your system may be caused by loose or improper connection. Ensure that all connections are in place and firmly attached.

CONNECTOR	PIN OUTS	SIGNAL NAME
CN1 Keyboard Connector	1 2 3 4 5	Keyboard clock Keyboard data No connection Ground +5V
CN2 Power Connector	1 2, 10, 11, 12 3 4 5, 6, 7, 8 9	Power good +5V +12V –12V Ground –5V
J10 Turbo LED	1 2	VCC Turbo signal
J11 Turbo Switch	1 2	Ground Turbo switch signal
J12 Reset Switch	1 2	Power good Ground
J13 Speaker Connector	1 2 3 4	Speaker signal NC Ground +5V
J14 Keylock and Power LED Connector	1 2 3, 5 4	Power signal Spare Ground Keylock

Table 2-3. Connector Pin Definitions

Memory Subsystem

386-GT is equipped with the memory necessary for running all your applications. Memory comes in the form of DRAM (SIMMs) and cache SRAM.

This chapter describes these two kinds of memory and gives instructions on how to install each kind on the mainboard.

Memory Locations

The board layout below shows the locations of the DRAM memory banks and the cache SRAM:

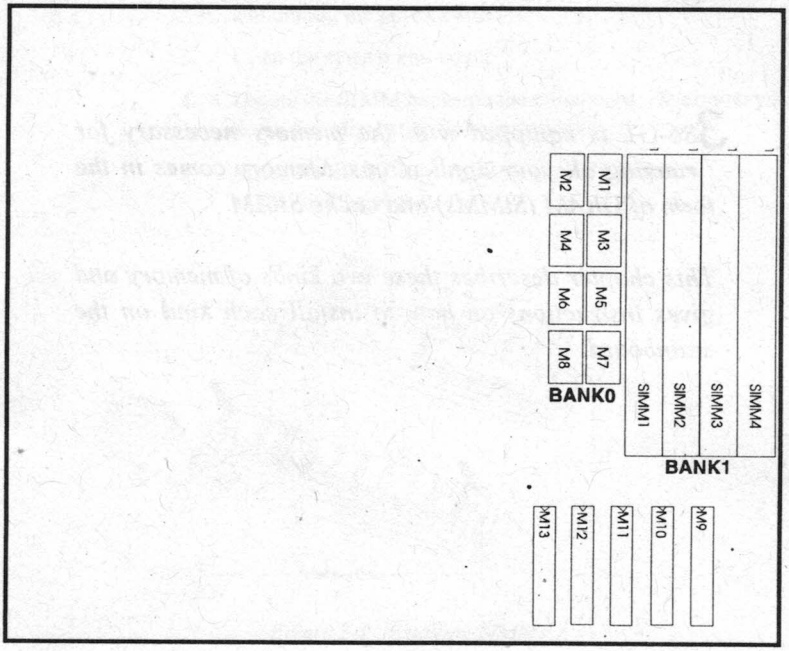


Figure 3-1 Memory Locations

Installing DRAM

SIMM Banks

386-GT can accommodate on-board memory from 1 to 64MB using SIMMs (Single-In-Line Memory Modules). The main-board has two memory banks — Bank 0, 1. Bank 0, which may be factory-installed, use the SOJ-type 4MB (1MB x 4 x 8pcs) RAM package. Bank 1 can accept either a 256KB, lMB, 4MB, or 16MB SIMM in each socket.

DRAM Configuration

Memory can be installed in a variety of configurations, as shown in the next table:

TOTAL MEMORY	BANK 0 (SOJ-TYPE)	BANK 1 (30-PIN)
1MB	None	256K x 4
4MB	None	1M x 4
	4MB	None
5MB	4MB	256K x 4
8MB	4MB	1M x 4
16MB	None	4M x 4
20MB	4MB	4M x 4
64MB	None	16M x 4

Table 3 - 1 DRAM Configurations

Installation Instructions

→ **NOTE : Always observe static electricity precautions. See "Handling Precautions" at the start of this manual.**

Assuming the 386-GT has been mounted on your computer system unit, follow the instructions below:

1. Turn off the computer.
2. Disconnect all connections to the system unit and unplug the power cord.
3. Open the system unit cover.
4. Locate the SIMM banks on the mainboard. Determine your desired configuration to be installed.
5. Insert the SIMM edge connector at a 75-degree angle onto the socket.

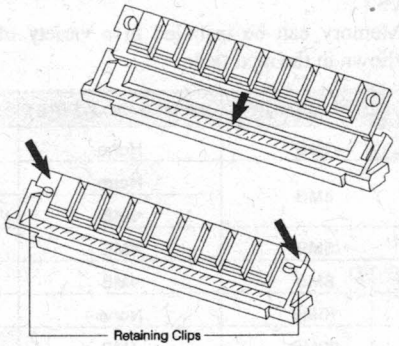


Figure 3-2. Installing SIMMs

6. Carefully push the SIMM down and back into the socket until the retaining clips of the socket snap, holding the SIMM in place. The holes in the SIMM should match the pins on the socket's retaining clips.

To remove the SIMM/s, pull the retaining latch on both ends of the socket and reverse the procedure above.

Cache Memory

The 386-GT can accept cache memory of 32 or 128KB.

→ **NOTE : Be sure to use the correct chips for the amount of cache memory you want to add. You must install both the correct Cache and Tag SRAM.**
Alter RAM type is always the same as Tag RAM.
Always observe static electricity precautions. See "Handling Precautions" at the beginning of this manual.

To install cache memory, it may be necessary to remove the board from the system, depending on your case design and arrangement of internal components. Read your computer's manual for instructions on how to remove the mainboard from the case. If you do not have the confidence to make the installation, better consult a service technician for assistance.

1. Turn off the computer.
2. Disconnect all connections to the system unit and unplug the power cord.
3. Open the system unit cover.
4. Following the instructions on your computer manual, remove the mainboard from the system unit (if necessary).
5. Locate the cache memory on the mainboard.
   See Figure 3-1 again.
6. Be guided by the Cache SRAM settings depending on your desired SRAM configuration:

Correct orientation of the chips is necessary for the cache to operate properly. Normally, the chips have either a curved notch or a dot. This marker on the chip must be matched to the marker on the socket for correct alignment.

Install the chips individually as follows:

7. Align the chip with the marker on the socket. Press the chip onto the socket, ensuring that the pins on the chip are aligned with the corresponding connections on the socket.

8. Carefully apply enough pressure to partially seat the chip into the socket.

Ensure that all pins are properly aligned with the connectors and that there are no bent pins. If there are any bent pins, remove the chip, straighten the pin and repeat the process.

9. Press the chip completely into the socket so that the pins are properly seated.

Cache SRAM Specifications and Settings

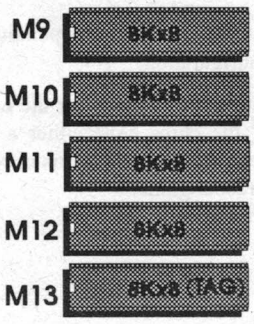
32K Cache SRAM

32Kbytes Direct Mapped Cache option is achieved by installing four 8K x 8 SRAM (Data RAM) at M9, M10, M11, M12. Install one 8K x 8 SRAM (Tag RAM 28-pin) at M13.

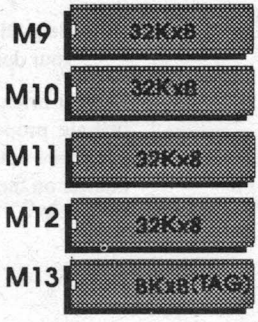
128K Cache SRAM

128Kbytes Direct Mapped Cache option is achieved by installing four 32K x 8 SRAM (Data RAM) at M9, M10, M11, M12. Install one 8K x 8 SRAM (Tag RAM 28-pin) at M13.

32K Cache SRAM



128K Cache SRAM



The cache size is jumper selectable. M9 - M13 are assigned as Bank 0.

	32K	128K
Bank 0	8K x 8	32K x 8
Data RAM	8K x 8	32K x 8
Tag (Alt) RAM (M13)	8K x 8	8K x 8
JS1 (Jumper)	1-2	2-3
JS2 (Jumper)	1-2	2-3
JS3 (Jumper)	2-3	1-2
JS4 (Jumper)	2-3	1-2

Table 3-2. Cache Configuration Size

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Award BIOS Setup

386-GT comes with the Award BIOS chip that contains the ROM Setup information of your system. This chip serves as an interface between the CPU and the rest of the mainboard's components.*

This chapter explains the information contained in the Setup program and tells you how to modify the settings according to your system configuration.

* If your mainboard uses the AMI BIOS chip, disregard this chapter. Refer to Chapter 5 instead.

System Setup

A Setup program, built into the system BIOS, is stored in the CMOS RAM that allows the configuration settings to be changed. This program is executed when:

1. User changes system configuration.
2. User changes system backup battery.
3. System detects a configuration error and asks the user to run the Setup program.

After power-on RAM testing, the message below appears:

"**TO ENTER SETUP BEFORE BOOT, PRESS CTRL-ALT-ESC** or **<DEL>**". After pressing the afore mentioned keys, the screen below appears:

ROM ISA BIOS (VIA00000) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	HDD LOW LEVEL FORMAT
POWER MANAGEMENT SETUP	SAVE AND EXIT SETUP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
LOAD SETUP DEFAULTS	
ESC : Quit	↑ ↓--> <-- : Select Item
F10 : Save and Exit	(Shift) F2 : Color
Time, Date, Hard Disk Type	

Use the arrow keys to select and press **<Enter>** to run the selected program.

Standard CMOS Setup

The Standard CMOS Setup has ten items for setting. Each item may have one or more option settings. Use the arrow keys to highlight the item and then use the **<PgUp>**, or **<PgDn>** keys to select the value you want in each item.

ROM ISA BIOS (VIA00000)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm: dd: yy)	: Tues., August 31 1993					
Time (hh: mm: ss)	: 12 : 37 : 05					
DAYLIGHT SAVING	: Disabled					
		CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS
Drive C: User (81MB)	:	611	16	0	0	17
Drive D: None (0MB)	:	0	0	0	0	0
Drive A	: 1.2MB, 5.25 in.					
Drive B	: 1.44MB, 3.5 in.					
Video	: EGA/VGA					
Halt on	: All Errors					

Base Memory	: 640K
Extended Memory	: 7168K
Expanded Memory	: 0K
Other Memory	: 384K
Total Memory	: 8192K

Esc : Quit	↑↓--> <--: Select Item	PgUp/PgDn/+/- : Modify
F1 : Help	(Shift) F2 : Change Color	F3 : Toggle Calendar

The Standard CMOS Setup screen is displayed above. System BIOS automatically detects memory size, thus no changes are necessary. Press "**F3**" function key to show the calendar.

BIOS Features Setup

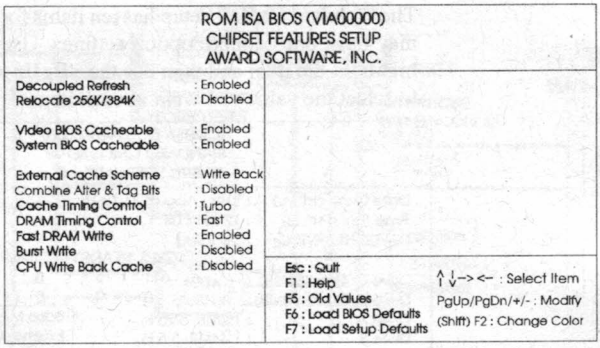
ROM ISA BIOS (VIA00000)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Enabled
External Cache	: Enabled
Quick Power-On Self-Test	: Disabled
Boot Sequence	: A:, C:
Boot Up Floppy Seek	: Enabled
Boot Up Numlock Status	: On
Boot Up System Speed	: High
IDE HDD Block Mode	: Disabled
Gate A20 Option	: Fast
Memory Parity Check	: Enabled
Typematic Rate Setting	: Disabled
Typematic Rate (Chars/Sec)	: 6
Typematic Delay (Msec)	: 250
Security Option	: Setup

System BIOS Shadow	: Enabled
Video BIOS Shadow	: Enabled
C8000-CBFFF Shadow	: Disabled
CC000-CFFFF Shadow	: Disabled
D000-D3FFF Shadow	: Disabled
D4000-D7FFF Shadow	: Disabled
D8000-DBFFF Shadow	: Disabled
DC000-DFFFF Shadow	: Disabled
E0000-E3FFF Shadow	: Disabled
E4000-E7FFF Shadow	: Disabled
E8000-EBFFF Shadow	: Disabled
EC000-EFFFF Shadow	: Disabled

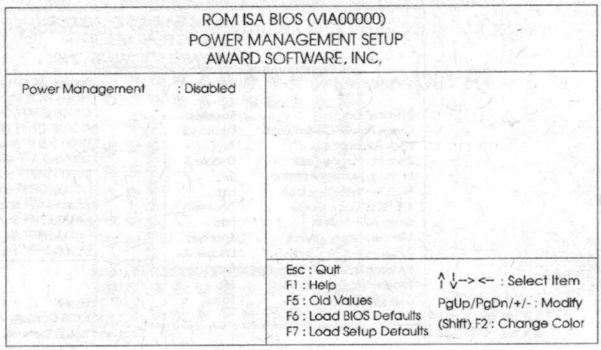
Esc : Quit	↑↓--> <--: Select Item
F1 : Help	PgUp/PgDn/+/- : Modify
F5 : Old Values	(Shift) F2 : Change Color
F6 : Load BIOS Defaults	
F7 : Load Setup Defaults	

Chipset Features Setup



Moving around the BIOS and Chipset Features Setup programs shown above works the same way as moving around the Standard CMOS Setup program. Users are not encouraged to run the BIOS and Chipset Features Setup programs. Your system should have been fine-tuned before shipping. Improper Setup may cause the system to fail, consult your dealer before making any changes.

Power Management Setup



→ **NOTE : Pressing "Ctrl+Alt+8" will invoke the Power Management Feature when "Enabled" while pressing "Ctrl+Alt+Backspace" will restore the system with normal display.**

Load BIOS Default

BIOS defaults contain the most appropriate values of the system parameters that allow minimum system performance. The OEM manufacturer may change the defaults through MODBIN before the binary image burns into the ROM.

Load Setup Default

Selecting this field loads the factory defaults for BIOS and Chipset Features which the system automatically detects.

Password Setting

When you select this function, you can create a password. Type your password up to eight characters and press **<Enter>**. You will be asked to confirm the password. Type the password again and press **<Enter>**. You may also press **<Esc>** to abort the selection and not enter a password. To disable password, press **<Enter>** when you are prompted to enter password. A message appears, confirming the password is disabled. When the password is disabled, the system boot and you can enter Setup freely.

Security Option

If you select **System** under this field, you will be prompted for the password every time system is rebooted or any time you try to enter Setup. If you select **Setup**, you will be prompted only when you try to enter Setup.

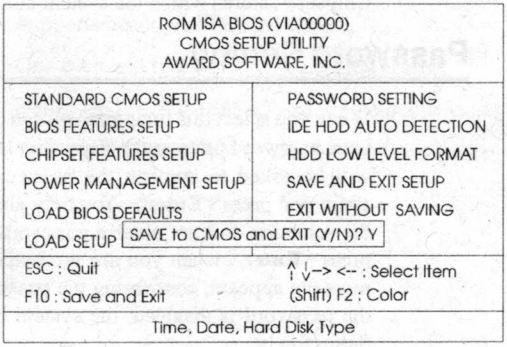
Clear Password

If you forget your password, turn off the system power first and remove the system unit cover. Locate Jumper J7 and cap it. Turn the system power back on and screen will display the message below:

PASSWORD IS SET DISABLED
PLEASE REMOVE JUMPER (J7) BEFORE SETTING UP NEW PASSWORD

This message indicates that the password is disabled. Remove Jumper J7 and enter CMOS Setup to set new password.

Exiting Setup



After you have made changes under Setup, press **<Esc>** to return to the main menu. Move cursor to "**Save and Exit Setup**" or press "**F10**" and then press "**Y**" to change the CMOS Setup. If you did not change anything, press **<Esc>** again or move cursor to "**Exit Without Saving**" and press "**Y**" to retain the Setup settings.

→ **NOTE : Default values of the various Setup items on this chapter may not necessarily be the same ones shown on your screen.**

Chapter 5

AMI BIOS Setup

386-GT comes with the AMI BIOS chip that contains the ROM Setup information of your system. This chip serves as an interface between the CPU and the rest of the mainboard's components.*

This chapter explains the information contained in the Setup program and tells you how to modify the settings according to your system configuration.

* If your mainboard uses the Award BIOS chip, disregard this chapter. Refer to Chapter 4 instead.

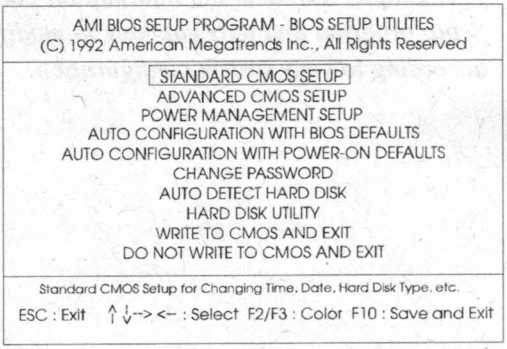
System Setup

A Setup program has been built into the system BIOS so that configurations stored in the CMOS RAM can be changed. This program is executed when:

1. User changes system configuration.
2. User changes system backup battery.
3. System detects a configuration error and asks the user to run the Setup program.

After power-on RAM testing, the message below appears:

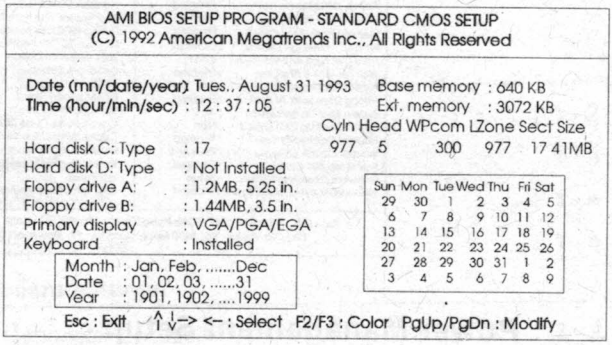
"Press <DEL> if you want to run Setup." Press **<Del>** to run Setup or do nothing to bypass. If the **<Del>** key is pressed, the following screen is displayed:



Use the arrow keys to select and press **<Enter>** to run the selected program.

→ **NOTE : Default values of the various Setup items on this chapter may not necessarily be the same ones shown on your screen.**

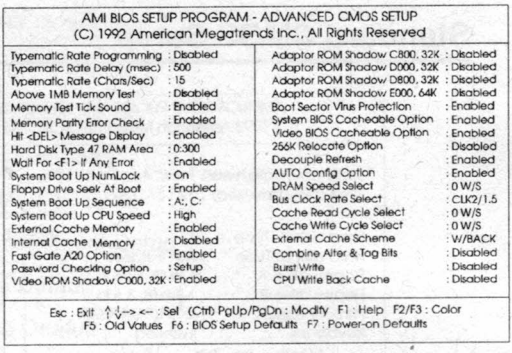
Standard CMOS Setup



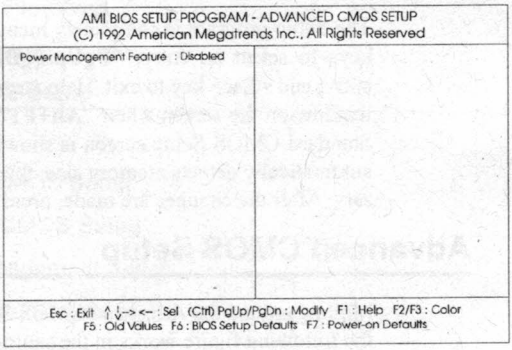
The Setup program is completely menu driven. Use the arrow keys to select an entry; "**PgUp/PgDn**" keys to change an entry; and **<Esc>** key to exit. Help messages are displayed in a window on the screen when "**Alt+F1**" keys are pressed. The Standard CMOS Setup screen is shown above. System BIOS automatically detects memory size, thus no changes are necessary. After the changes are made, press **<Esc>** to exit.

Advanced CMOS Setup

Moving around the Advanced CMOS Setup program shown in the following figure works in the same way as moving around the Standard CMOS Setup. Users are not encouraged to run the Advanced CMOS Setup program. Your system should have been fine-tuned before shipping. Improper Setup may cause the system to fail. Consult your dealer before making any changes.

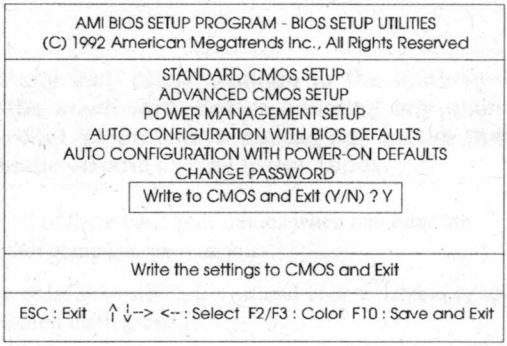


Power Management Setup



→ **NOTE : Pressing "Ctrl+Alt+8" will invoke the Power Management Feature when "Enabled" while pressing "Ctrl+Alt+Backspace" will restore the system with normal display.**

Write to CMOS and Exit



After making the necessary changes under Setup, press **<Esc>** to return to the main menu. Move cursor to "**Write to CMOS and Exit**", and press "**Y**" to change the CMOS Setup. If no changes are made, press **<Esc>** again and press "**Y**" to retain the CMOS settings.

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Hard Disk Specifications

This appendix contains some technical information about the different IDE hard disk drives which can be installed with your 386-GT mainboard.

CONNER

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
CP-30104	120MB	726	8	39
CP-30174	170MB	903	8	46
CP-30204	203MB	684	16	38
CP-30254	251MB	895	10	55
CP-30344	343MB	904	16	46
CP-30364	360MB	702	16	63
CP-30544	544MB	1024	16	63

MAXTOR

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
7120A	120MB	1023	14	17
2190	152MB	1024	15	17
7170A	170MB	984	10	34
7213A	213MB	683	16	38
7245A	245MB	967	16	31
7345A	345MB	790	15	57

QUANTUM

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
LPS120AT	120MB	901	5	53
LPS240AT	240MB	723	13	51
ELS127AT	127MB	919	16	17
ELS170AT	170MB	1011	15	22

SEAGATE

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
ST3144A	125MB	1001	15	17
ST3283A	245MB	978	14	35

WESTERN DIGITAL

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
AC2120	125MB	872	8	35
AC2200	200MB	989	12	35
AC2250	255MB	1010	9	55
AC2340	341MB	1010	12	55

PRIAM

MODEL	CAPACITY	CYLINDER	HEAD	SECTOR
S19	152MB	1024	15	17