GA - 586ATS

USER'S MANUAL

PCI - ISA SOLUTION

PENTIUM™ PCI - ISA BUS MAINBOARD

REV. 2 Second Edition

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FEBRUARY 01, 1996 Taipei, Taiwan

TABLE OF CONTENTS

1. INTRODUCTION 1-1
1.1. PREFACE 1-1
1.2. KEY FEATURES 1-1
1.3. PERFORMANCE LIST 1-2
1.4. BLOCK DIAGRAM 1-3
1.5. INTRODUCE THE PCI - BUS 1-4
1.6. FEATURES 1-4
2. SPECIFICATION 2-1
2.1. HARDWARE 2-1
2.2. SOFTWARE 2-2
2.3. ENVIRONMENT 2-2
3. HARDWARE INSTALLATION 3-1
3.1. UNPACKING 3-1
3.2. MAINBOARD LAYOUT 3-2
3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS 3-2
3.4. DRAM INSTALLATION 3-4
3.5. SRAM INSTALLATION AND JUMPERS SETUP 3-5
3.5.1 Async. SRAM 3-5
3.5.2 Sync. SRAM 3-5
3.6. CPU INSTALLATION AND JUMPERS SETUP 3-6
3.7. CMOS RTC & ISA CFG CMOS SRAM 3-6
3.8. SPEAKER CONNECTOR INSTALLATION 3-7
3.9. POWER LED & KEY LOCK CONNECTOR INSTALLATION 3-7
3.10. TURBO SWITCH CONNECTOR INSTALLATION 3-7
3.11. TURBO LED CONNECTOR INSTALLATION 3-7
3.12. HARDWARE RESET SWITCH CONNECTOR INSTALLATION 3-7
3.13. GREEN FUNCTION INSTALLATION 3-7
3.14. PERIPHERAL DEVICE INSTALLATION 3-8
3.15. KEYBOARD SETTING FUNCTION 3-8
4. BIOS CONFIGURATION 4-1
4.1. ENTERING SETUP 4-1
4.2. CONTROL KEYS 4-2
4.3. GETTING HELP 4-2
4.3.1. Main Menu 4-2
4.3.2. Status Page Setup Menu / Option Page Setup Menu 4-2
4.4. THE MAIN MENU 4-2
4.5. STANDARD CMOS SETUP MENU 4-4
4.6. BIOS FEATURES SETUP 4-8
4.7. CHIPSET FEATURES SETUP 4-11
4.8. POWER MANAGEMENT SETUP 4-15
4.9. PCI SLOT CONFIGURATION 4-17
4.10. LOAD SETUP DEFAULTS 4-18
4.11. PASSWORD SETTING 4-19
4.12. IDE HDD AUTO DETECTION 4-20
4.13. SAVE & EXIT SETUP 4-21
4.14. EXIT WITHOUT SAVING 4-22
5. AT TECHNICAL INFORMATION 5-1
5.1. I/O BUS CONNECTOR PIN OUT 5-1
5.1.1. ISA SLOT PIN OUT 5-1

5.1.2. PCI - BUS SLOT PIN OUT 5-2
5.2. I/O & MEMORY MAP 5-3
5.3. TIMER & DMA CHANNELS MAP 5-3
5.4. INTERRUPT MAP 5-4
5.5. RTC & CMOS RAM MAP 5-5
APPENDIX A: POST MESSAGE A-1
APPENDIX B: POST CODES B-1
APPENDIX C: BIOS DEFAULT DRIVE TABLE C-1
APPENDIX D: PROBLEM SHEET D-1

1. INTRODUCTION

1.1. PREFACE

Welcome to use the **GA - 586ATS** motherboard. The motherboard is a 256 KB / 512 KB CACHE PENTIUM™ Processor based PC / AT compatible system with ISA bus and PCI Local Bus, and has been designed to be the fastest PC / AT system. There are some new features allow you to operate the system with just the performance you want.

This manual also explains how to install the motherboard for operation, and how to set up your CMOS CONFIGURATION with BIOS SETUP program.

1.2. KEY FEATURES

- Pentium® based PC / AT compatible mainboard with PCI - ISA Bus.
- 4 Master / Slave PCI Bus slots, 4 ISA Bus slots.
- Supports Pentium processor / P54CT running at 75-200 MHz.
- Supports true 64 bits CACHE and DRAM access mode.
- Supports 321 Pins (Socket 7) ZIF white socket on board.
- Supports 256 KB / 512 KB Async. 2nd cache memory or 256 KB / 512 KB Pipeline Burst Sync. 2nd Cache Module (or on board for REV. 2X.).
- CPU L1 / L2 Write-Back cache operation.
- Supports 8 - 128 MB DRAM memory on board.
- Supports 2 channels Enhance PCI IDE ports for 4 IDE Device.
- Supports 2xCOM (16550), 1xLPT (EPP / ECP), 1x1.44MB Floppy port.
- Supports Green function, Plug & Play function.
- Licensed AWARD BIOS, FLASH EEPROM for BIOS update.
- BENCHMARQ3287 / DALLAS 12887 / ODIN 12C887 RTC on board.
- 3/4 BABY AT size, 4 layers PCB.

1.3. PERFORMANCE LIST

The following performance data list is the testing results of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users. (The different Hardware & Software configuration will result in different benchmark testing results.)

- CPU Pentium™ processor 133/166 MHz
- DRAM 16 MB EDO
- CACHE SIZE 256 KB Pipeline Burst SRAM
- DISPLAY S3968 VGA
- STORAGE Onboard IDE port + Quantum Fireball 540AT
- O.S. MS DOS V6.22

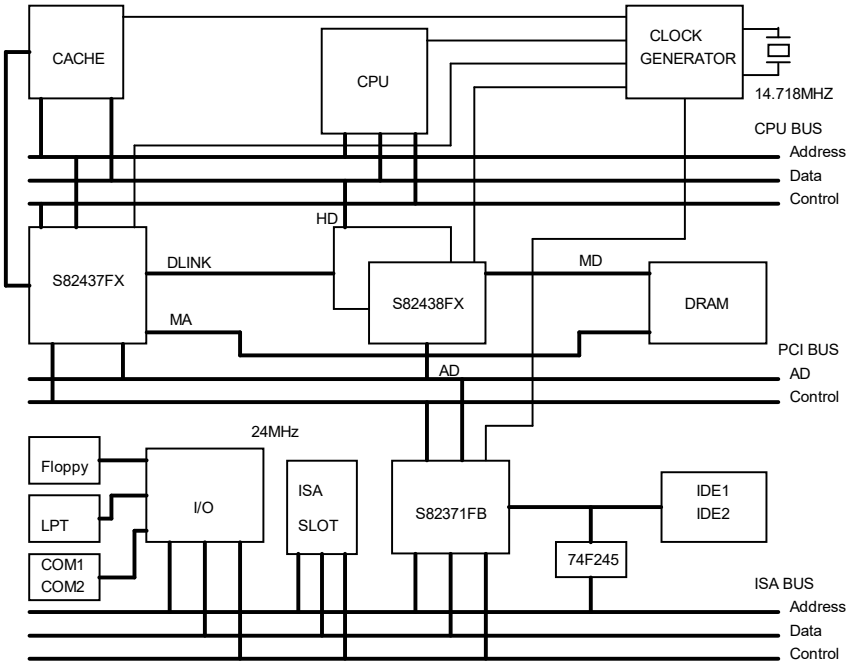
≺DOS≻

Program	Item	Unit	Pentium 133/66	Pentium 166/60
LandMark Speed	CPU	MHz	765.62	956.98
	FPU	MHz	2220.33	2775.26
V2.0	VIDEO	chr/ms	20480.00	20480
	MIPS	Mips	66.1	81.3
Power Meter	Dhrystone	K-Dstone/s	116.2	142.8
	Whetstone	K-Wstone/s	25623.4	32235.9
V1.81	Data Transfer Rate	KB/S	14275.0	14275.0
	Mean Seek	ms	10.2	9.5
	Track-Track Seek	ms	2.6	2.4
Norton System Info.	CPU	Index	420.3	525.4
V8.0	Disk	Index	24.0	24.0
Core Test	DATA Transfer Rate	KB/S	14928	14960
	Sequential Read	ms	6240	6240
V.3.02	Random Read	ms	2288	2288
	Performance Index	Index	94.64	94.83
PC BenchMark	DOS Mark	Index	1000.83	1085.13
	CPU Mark16	Index	285.57	342.69
V9.0	Video Score	Index	5353.74	5359.79
	Disk Score	Index	516.31	543.11

≺ WINDOWS≻– with Display Driver at 800 x 600 x 256 colors x 72Hz

Program	Item	Unit	Pentium 133/66	Pentium 120/60
Winbench 95	Disk Winmark95	KB/s	23.1	26.2
	Graphics Winmark95	Mpixels/S	1010	1010
Winstone 95	Winstone95	Index	207.2	222.8

1.4. BLOCK DIAGRAM



1.5. INTRODUCE THE PCI - BUS

Connecting devices to a CPU local bus can dramatically increase the speed of I/O-bound peripherals with only a slight increase in cost over traditional systems. This price / performance point has created a vast market potential for local bus products. The main barrier to this market has been the lack of an accepted standard for local bus peripherals. Many mainboard and chipset manufactures developed their own local bus implementations, but they are incompatible with each other. The VL (Video Electronics Standards Association) local bus and PCI (Peripheral Component Interconnect) bus specification was created to end this confusion.

The PCI - bus standard, under development since Jun. 1992, which is designed to bring workstation-level performance to standard PC platform. The PCI - bus removes many of the bottlenecks that have hampered PC for several years. On the PCI - bus, peripherals operate at the native speed of the computer system, thus enabling data transfer between peripherals and the system at maximum speed. This performance is critical for bandwidth-constrained devices such as video, multimedia, mass storage, and networking adapters.

PCI - bus standard provides end-users with a low-cost, extendible and portable local bus design, which will allow system and peripherals from different manufactures to work together.

1.6. FEATURES

- 32 bits bus transfer mode.
- Bus Master or Slave access.
- Memory burst transfer to 132 MB/sec.
- 33 MHz operation speed.
- 10 device loading ability.
- CPU independent.

2. SPECIFICATION

2.1. HARDWARE

- CPU
  - Pentium® Processor 75 - 200 MHz, P55C, Pentium® OverDrive® Processor (P54CT, P54CTB), AMD5K86, Cyrix6X86.
  - 321 pins (socket 7) ZIF white socket on board.
  - 3.3V / 2.8V Dual Power Ready.
- COPROCESSOR
  - Included in Pentium.
- SPEED
  - 50 / 60 / 66 MHz system and 25 / 30 / 33 PCI-Bus speed.
  - 7.5 / 8 MHz AT bus speed.
  - Hardware speed switchable function.
- DRAM MEMORY
  - 2 banks 72 pins SIMM module socket on board.
  - Use 4 / 8 / 16 / 32 MB 60~70 ns SIMM module DRAM.
  - 8 ~ 128 MB DRAM size.
  - Support Fast Page / EDO DRAM access mode.
- CACHE MEMORY
  - 16 KB cache memory included in Pentium.
  - 256 KB / 512 KB Async. or Pipeline Burst Sync. 2nd cache.
  - Support Write Back cache function for both CPU & on board cache.
- SHADOW RAM
  - Main BIOS shadow function.
  - Video BIOS shadow function programmable.
  - Shadow RAM cacheable function.
- I/O BUS SLOTS
  - 4 Master / Slave PCI-BUS.
  - 3 16 bits ISA BUS, 1 8 bits ISA BUS..
- IDE PORTS
  - 2 Enhanced IDE channels on board. (Using IRQ14, 15)
  - Support Mode 3,4 IDE & ATAPI CD - ROM.
- I/O PORTS
  - Supports 2 16550 COM ports. (Using IRQ4, 3)
  - Supports 1 EPP/ECP LPT port. (Using IRQ7 or 5 and DMA3 or 1)
  - Supports 1 1.44MB Floppy port. (Using DMA2 & IRQ6)
  - Supports PS/2 Mouse. (Using IRQ12)
  - Option Function.

- GREEN FUNCTION
  - Standby & Suspend mode support.
  - Green switch & LED support.
  - IDE & Display power down support.
  - Monitor all IRQ / DMA / Display / I/O events.
- BIOS
  - 128KB FLASH EEPROM.
  - Supports Plug & Play Function.
- DIMENSION
  - 3/4Baby AT size / 4 layers.

2.2. SOFTWARE

- BIOS
  - Licensed AWARD BIOS.
  - AT CMOS Setup, BIOS / Chipset Setup, Green Setup, Hard Disk Utility included.
- O.S.
  - Operation with MS-DOS, Windows/95, WINDOWS NT, OS/2, NOVELL and SCO UNIX.

2.3. ENVIRONMENT

- Ambient Temp. – 0°C to +50°C (Operating).
- Relative Hum. – 0 to +85% (Operating).
- Altitude – 0 to 10,000 feet (Operating).
- Vibration – 0 to 1,000 Hz.
- Electricity
  - 4.9 V to 5.2 V.
  - 5 A to 7 A current.

3. HARDWARE INSTALLATION

3.1. UNPACKING

The mainboard package should contain the following:

- The **GA - 586ATS** mainboard.
- USER'S MANUAL.
- Cable set for I/O Device.
- Diskette for BUS MASTE IDE Driver.

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

Unpacking and installation should be done on a grounded anti-static mat. The operator should be wearing an anti static wristband, grounded at the same point as the anti-static mat.

Inspect the mainboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damages on the board before proceeding.

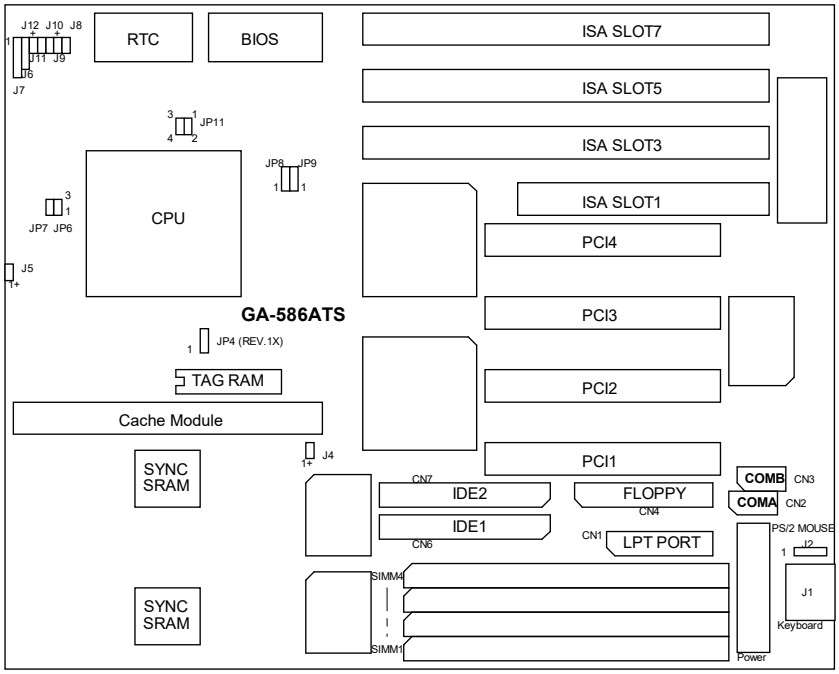
After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface component side up. Again inspect the board for damage. Press down on all of the socket IC's to make sure that they are properly seated. Do this only on with the board placed on a firm flat surface.

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

You are now ready to install your mainboard. The mounting hole pattern on the mainboard matches the IBM-AT system board. It is assumed that the chassis is designed for a standard IBM XT/AT mainboard mounting.

Place the chassis on the anti-static mat and remove the cover. Take the plastic clips, Nylon stand-off and screws for mounting the system board, and keep them separate.

3.2. MAINBOARD LAYOUT



≺Figure 3.1≻

3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

♦ JP6,7: CPU Power Select Jumper	
Pin No.	Function
Close Pin 1-2	For single 3.3V processor.
Close Pin 2-3	For single 2.8V / 3.3V processor (Ex. P55C).

♦ Power Connector	
Pin No.	Function
1	Power Good signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V

♦ J1: Keyboard Connector	
Pin No.	Function
1	Key Clock.
2	Key Data.
3	NC.
4	VCC (+5V).
5	GND.

♦ J4: IDE Hard Disk Active LED	
Pin No.	Function
1	LED anode (+).
2	LED cathode (-).

♦ J5: CPU Cooling Fan Power Connector	
Pin No.	Function
1	+12V
2	GND

♦ J6: Speaker Connector	
Pin No.	Function
1	VCC.
2	NC.
3	NC.
4	Data.

♦ J7: Power LED and Key-Lock Connector	
Pin No.	Function
1	LED anode (+).
2	NC.
3	LED cathode (-).
4	Key lock.
5	GND.

♦ J8: Green Function Switch	
Pin No.	Function
Close	For system entering Green mode (Suspend mode).
Open	Normal operation.

♦ J9: Green Function LED	
Pin No.	Function
1	LED anode (+).
2	LED cathode (-).

♦ J10: Reset Switch	
Open	For normal operation.
Close	For hardware reset system.

♦ J11: Turbo Switch	
Pin No.	Function
Close	For low speed (Non-cache).
Open	For high speed.

♦ J12: Turbo LED Connector	
Pin No.	Function
1	LED anode (+).
2	LED cathode (-).

♦ JP4: CACHE Size Selection (for REV.1X mainboard)	
Pin No.	Function
1-2	256KB CACHE SIZE.
2-3	512KB CACHE SIZE.

♦ JP8,9: System Speed Selection		
JP8	JP9	Function
1-2	1-2	For 50 MHz system speed (CPU 75, 100(x2) MHz).
1-2	2-3	For 60 MHz system speed (CPU 90, 120, 150, 180 MHz).
2-3	1-2	For 66 MHz system speed (CPU 100, 133, 166, 200 MHz).

♦ JP11: CPU INT. / EXT. FREQ. RATIO		
1,2	3,4	
Open	Open	x 1.5
Close	Open	x 2
Close	Close	x 2.5
Open	Close	x 3

♦ CN1-4,6,7 I/O Ports Connector	
CN2	For COM A (Serial port1)
CN3	For COM B (Serial port2)
CN4	For Floppy port
CN1	For LPT port
CN6	For Primary IDE port
CN7	For Secondary IDE port

3.4. DRAM INSTALLATION

The mainboard can be installed with 4 / 8 / 16 / 32 MB 72 pins SIMM module DRAM, and the DRAM speed must be 60 or 70 ns. The DRAM memory system on mainboard consists of bank 0 & bank 1. Each bank consist of 2 PCs 72 pins SIMM module DRAM. Because the 72 pins SIMM module is 32 bits width, using 2 PCs which can match a 64 bits system. The total memory size is 8 - 128 MB, and various configuration of DRAM types in the following TABLE are for reference:

Bank0	Bank1
Single	None
Single	Single
Single	Double
Double	None
Double	Single
Double	Double

Single: Single bank SIMM Module
Ex. 4MB, 16MB

Double: Double banks SIMM Module
Ex. 8MB, 32MB

The DRAM installation position refer to Figure 3.1, and notice the Pin 1 of SIMM module must match with the Pin 1 of SIMM socket when the DRAM SIMM module is installed.

Insert the DRAM SIMM module into the SIMM socket at 45 degree angle. If there is a wrong direction of Pin 1, the DRAM SIMM module couldn't be inserted into socket completely. After completely insert SIMM module into socket, then press the SIMM module in vertical direction until the left and right metal holders can keep the SIMM module standing up con-firmly.

3.5. SRAM INSTALLATION AND JUMPERS SETUP

3.5.1 Async. SRAM (REV.1X)

The cache memory system consists of Data SRAM & TAG SRAM (U16), the Data SRAM type is Mixed mode 32Kx8-15 ns or 64Kx8-15 ns.

The mainboard can be installed with 256 KB or 512 KB cache memory when using 32Kx8 or 64Kx8 DATA SRAM separately. Please refer to the following table to install cache memory system :

SIZE	Data SRAM	J4	TAG SRAM (U16)
256 KB	32 KB x 8	1-2	8 KB x 8 - 32 K x 8
512 KB	64 KB x 8	2-3	16 KB x 8,32 K x 8

3.5.2 Sync. SRAM (Pipe Line Burst SRAM) (REV.2X)

If Sync SRAM Module are installed, they consists of Pipeline Burst 2 PCs 32 K x 32-7 for 256KB or 4 PCs 32Kx16-7 (May be 2 PCs 64Kx32-8) for 512KB Sync. SRAM. The TAG SRAM (U16) is needed and Data SRAM (U1,2,4,5,8,10,11,12) must be keep empty. (For REV.1X mainboard the cache size Jumper (JP4) setting must match the cache size of cache module.)

3.6. CPU INSTALLATION AND JUMPERS SETUP

The system's speed depends on the frequency of CLOCK GENERATOR. The user can change the JUMPER **(JP8, JP9 & JP11)** selection to set up the system speed to 50 MHz, 60 MHz or 66 MHz for 75 - 200 MHz 3.3 / 2.8 V Pentium® Processor.

The mainboard can use Pentium® Processor, P54CT, P55C, P54CTB CPU, and the CPU speed must match with the frequency of CLOCK GEN. It will cause system hanging up if the CLOCK GEN.'S frequency is higher than CPU's.

JP8	JP9	JP11		FREQ.	CPU SPEED
		1-2	3-4	RATIO	
1-2	1-2	OFF	OFF	1.5	PENTIUM 75 MHz, AMD5K86-P75
1-2	2-3	OFF	OFF	1.5	PENTIUM 90 MHz, AMD5K86-P90/P120
2-3	1-2	OFF	OFF	1.5	PENTIUM 100 MHz, AMD5K86-P100/P133
1-2	1-2	ON	OFF	2	Cyrix 6X86-P120
1-2	2-3	ON	OFF	2	PENTIUM 120 MHz, AMD5K86-P150, Cyrix 6X86-P150
2-3	1-2	ON	OFF	2	PENTIUM 133 MHz, AMD5K86-P166, Cyrix 6X86-P166
1-2	2-3	ON	ON	2.5	PENTIUM 150 MHz
2-3	1-2	ON	ON	2.5	PENTIUM 166 MHz
1-2	2-3	OFF	ON	3	PENTIUM 180 MHz
2-3	1-2	OFF	ON	3	PENTIUM 200 MHz

The CPU is a sensitive electric component and it can be easily damaged by static electricity, so users must keep it away from metal surface when the CPU is installed onto mainboard.

When the user installs the CPU on socket, please notice the PIN 1 of CPU is in the same corner as the PIN 1 of socket!

Before the CPU is installed, the mainboard must be placed on a flat plane in order to avoid being broken by the pressure of CPU installation.

3.7. CMOS RTC & ISA CFG CMOS SRAM

There're RTC & CMOS SRAM on board, they have a power supply from internal battery to keep the DATA inviolate & effective. The RTC is a REAL-TIME CLOCK device which provides the DATE & TIME to system. The CMOS SRAM is used for keeping the information of ISA device system configuration, so the system can automatically boot OS. every time.

Due to the life-time of RTC internal battery is 5 years, the user can change a new RTC to replace old one after it can not work. The new one's brand and type must be same with old one.

3.8. SPEAKER CONNECTOR INSTALLATION

There is always a speaker in AT system for sound purpose. The 4 - Pins connector **J6** is used to connect speaker. The speaker can work well in both direction of connector when it is installed to the connector **J6** on mainboard.

3.9. POWER LED & KEY LOCK CONNECTOR INSTALLATION

There are a system power LED lamp and a key on the panel of case. The power LED will light on when system is powered-on, and the key can lock the keyboard input or unlock it, both of them are connected to a 5 PIN connector. The connector should be installed to **J7** of mainboard in correct direction.

3.10. TURBO SWITCH CONNECTOR INSTALLATION

The TURBO switch on the panel is used for controlling the system speed. Some program developed on XT should be executed with a low speed system, so a high speed system needs the speed switching function to change its running speed.

The mainboard uses 40 MHz speed method to implement TURBO switching function. The **J11** on mainboard should be connected to the TURBO switch on panel, and user can push in or pop out the TURBO switch to enable or disable the turbo function of system.

Please don't use switch ON/OFF when power is ON.

3.11. TURBO LED CONNECTOR INSTALLATION

The TURBO LED on panel can indicate the current speed status of system. The TURBO LED connector should be installed to **J12** in correct direction.

3.12. HARDWARE RESET SWITCH CONNECTOR INSTALLATION

The RESET switch on panel provides users with HARDWARE RESET function which is almost the same as power-on/off. The system will do a cold start after the RESET switch is pushed and released by user. The RESET switch is a 2 PIN connector and should be installed to **J10** on mainboard.

3.13. GREEN FUNCTION INSTALLATION

For the purpose of power saving, there are two jumpers, **J8** and **J9**, to make sure the power saving function doing well. The **J9** is a indicator (green LED) for green function. If the green LED is ON, the system is operating in green mode. The **J8** is a switch to force the system get into green mode immediately.

3.14. PERIPHERAL DEVICE INSTALLATION

After the device installation and jumpers setup, the mainboard can be mounted into the case and fixed by screw. To complete the mainboard installation, the peripheral device could be installed now. The basic system needs a display interface card and a disk device.

If the PCI - Bus device is to be installed in the system, any one of four PCI - Bus slots can be used no matter Slave or Master PCI - Bus device being installed.

After installing the peripheral device, the user should check everything again, and prepare to power-on the system.

3.15. KEYBOARD SETTING FUNCTION

After booting the O.S., there are some special functions used by keyboard as follows:

"CTRL_ALT_DEL"	– Pressing these keys simultaneously will cause system to Warm Start (Software Reset).

4. BIOS CONFIGURATION

Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS SRAM so that it retains the Setup information when the power is turned off.

4.1. ENTERING SETUP

Power ON the computer and press <Del> immediately will allow you to enter Setup. The other way to enter Setup is to power on the computer, when the below message appears briefly at the bottom of the screen during the POST (Power On Self Test), press <Del> key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

• TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" bottom on the system case. You may also restart by simultaneously press <Ctrl>,<Alt>, and <Del> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to,

• PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

4.2. CONTROL KEYS

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu - Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - Exit current page and return to Main Menu
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Change color from total 16 colors
F3 key	Calendar, only for Status Page Setup Menu
F4 key	Reserved
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the default
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

4.3. GETTING HELP

4.3.1. Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

4.3.2. Status Page Setup Menu / Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc>.

4.4. THE MAIN MENU

Once you enter Award BIOS CMOS Setup Utility, the Main Menu (Figure 4.1) will appear on the screen. The Main Menu allows you to select from seven setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

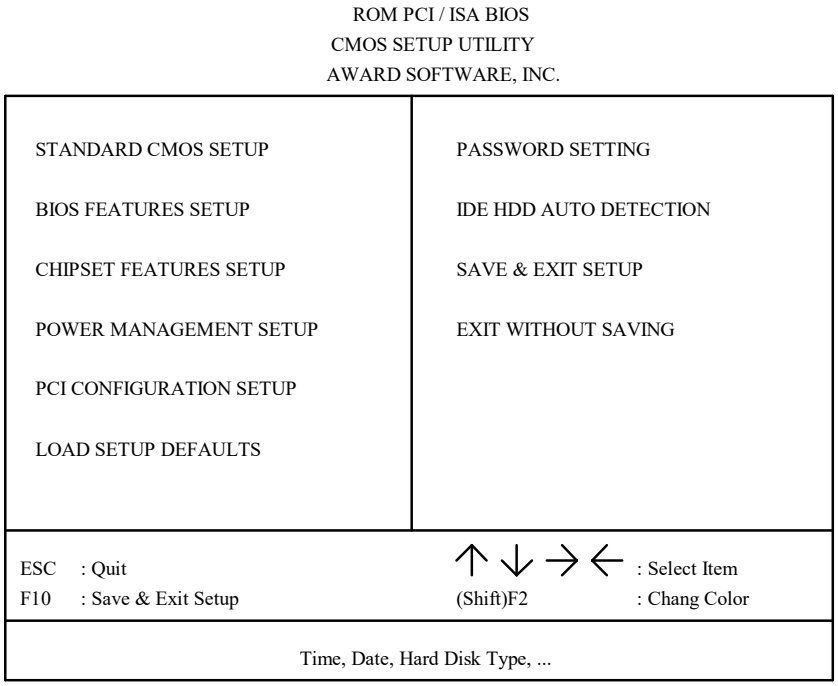


Figure 4.1: Main Menu

- Standard CMOS setup

  This setup page includes all the items in a standard compatible BIOS.

- BIOS features setup

  This setup page includes all the items of Award special enhanced features.

- Chipset features setup

  This setup page includes all the items of chipset special features.

- Power management setup

  This setup page includes all the items of Green function features.

- PCI configuration setup

  This setup page includes all the configurations of PCI slots parameters.

- Load setup defaults

  BIOS defaults indicates the most appropriate value of the system parameter which the system would be in safe configuration.

- Password setting

  Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

- IDE HDD auto detection

  Automatically configure hard disk parameter.

- Save & exit setup

  Save CMOS value changes to CMOS and exit setup.

- Exit without save

  Abandon all CMOS value changes and exit setup.

4.5. STANDARD CMOS SETUP MENU

The items in Standard CMOS Setup Menu (Figure 4.2) are divided into 9 categories. Each category includes no, one or more than one setup items. Use the arrows to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

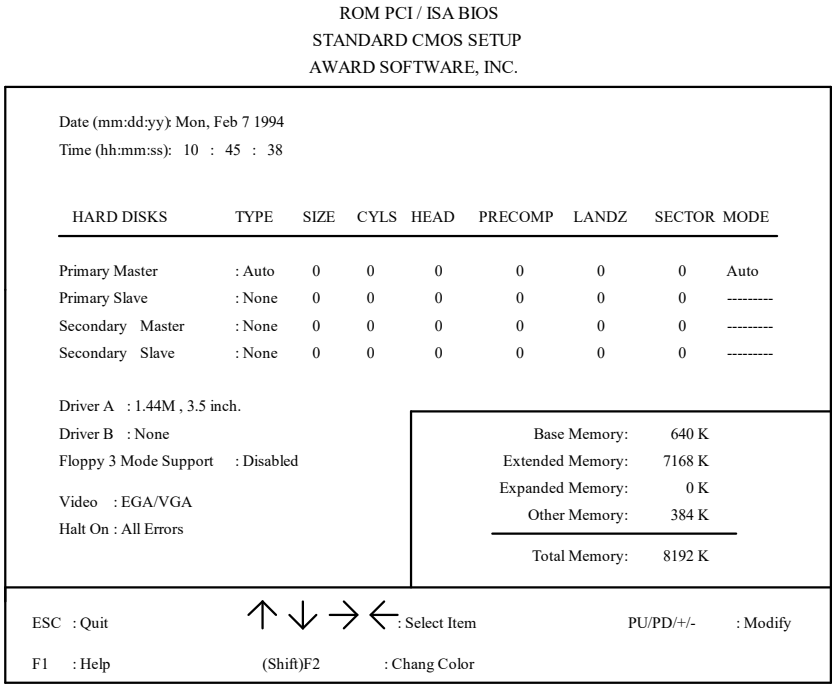


Figure 4.2: Standard CMOS Setup Menu

- Date

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

day	The day, from Sun to Sat, determined by the BIOS and is display-only
date	The date, from 1 to 31 (or the maximum allowed in the month)
month	The month, Jan. through Dec.
year	The year, from 1900 through 2099

- Time

  The time format in <hour> <minute> <second>. The time is calculated base on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

- Primary HDDs / Secondary HDDs

  The category identify the types of hard disk drive C drive F 4 devices that has been installed in the computer. There are 45 pre-defined types and a user definable type. Type 1 to Type 45 are pre-defined. Type User is user-definable and type Auto will automatically detect HDD's type..

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

  If you select Type User, related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>. Those information should be provided in the documentation form your hard disk vendor or the system manufacturer.

CYLS.	number of cylinders
HEADS	number of heads
PRECOMP	write precomp
LANDZONE	landing zone
SECTORS	number of sectors

  If a hard disk has not been installed select NONE and press <Enter>.

- Drive A type / Drive B type

  The category identify the types of floppy disk drive A or drive B that has been installed in the computer.

None	No floppy drive installed
360K, 5.25 in.	5-1/4 inch PC-type standard drive; 360 kilobyte capacity.
1.2M, 5.25 in.	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity (3-1/2 inch when 3 Mode is Enabled).
720K, 3.5 in.	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in.	3-1/2 inch double-sided drive; 1.44 megabyte capacity.

- Floppy 3 Mode Support (for Janpan Area)

Disable	Normal Floppy Drive.
Drive A	Drive A is 3 mode Floppy Drive.
Drive B	Drive B is 3 mode Floppy Drive.
Both	Drive A & B are 3 mode Floppy Drive.

- Video

  The category detects the type of adapter used for the primary system monitor that must matches your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in setup.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, 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, includes high resolution monochrome adapters

- 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 error that may be detected
All errors	Whenever the BIOS detects 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; it will stop for all other errors
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors

- Memory

  The category is display-only which is determined by POST (Power On Self Test) of the BIOS.

  Base Memory

  The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.

  Extended Memory

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

  Expanded Memory

Expanded Memory in memory defined by the Lotus/Intel/Microsoft (LIM) standard as EMS. Many standard DOS applications can not utilize memory above 640 K, the Expanded Memory Specification (EMS) swaps memory which not utilized by DOS with a section, or frame, so these applications can access all of the system memory. Memory can be swapped by EMS is usually 64 K within 1 MB or memory above 1 MB, depends on the chipset design.

Expanded memory device driver is required to use memory as Expanded Memory.

Other Memory

This refers to the memory located in the 640 K to 1024 K address space. This is memory that can be used for different applications. DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

4.6. BIOS FEATURES SETUP

ROM PCI / ISA BIOS
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000 - CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000 - CFFFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D0000 - D3FFF Shadow	: Disabled
Boot Sequence	: A, C	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		
Security Option	: Setup		
PCI/VGA Palette Snoop	: Disabled		

ESC	: Quit	↑ ↓ → ←	: Select Item
F1	: Help	PU/PD/+/-	: Modify
F5	: Old Values	(Shift)F2	: Color
F6	: Load BIOS Defaults		
F7	: Load Setup Defaults		

Figure 4.3: BIOS Features Setup

- Virus Warning

This category flashes on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will appear, in the mean time, you can run anti-virus program to locate the problem. Default value is Disabled.

Enabled	Activate 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 to appear when anything attempts to access the boot sector or hard disk partition table

- CPU Internal Cache / External Cache

  These two categories speed up memory access. However, it depends on CPU / chipset design. The default value is Enabled.

Enabled	Enable cache
Disabled	Disable cache

- Quick Power On Self Test

  This category speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST. The default value is Enabled.

Enabled	Enable quick POST
Disabled	Normal POST

- Boot Sequence

  This category determines which drive computer searches first for the disk operating system (i.e., DOS). Default value is A,C.

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

  The default value is Disabled.

Enabled	Floppy A & B will be swapped under DOS
Disabled	Floppy A & B will be normal definition

- Boot Up Floppy Seek

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

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks, Note that BIOS can not tell from 720 K, 1.2 M or 1.44 M drive type 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 message if the drive installed is 360 K

- Boot Up NumLock Status

  The default value is On

On	Keypad is number keys
Off	Keypad is arrow keys

- Security Option

  This category allows you to limit access to the system and Setup, or just to Setup. The default value is 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

To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

- Video BIOS Shadow

  It determines whether video BIOS will copied to RAM, however, it is optional from chipset design. Video Shadow will increase the video speed. The default value is Enable.

Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

- C8000 - CFFFF Shadow / D0000 - DFFFF Shadow

  These categories determine whether optional ROM will be copied to RAM by 16 K byte. The default value are Disabled.

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

- PCI/VGA Palette Snoop

  The default value are Disabled.

Enabled	For having Video Card on ISA BUS and VGA Card on PCI BUS.
Disabled	For VGA Card only.

4.7. CHIPSET FEATURES SETUP

ROM PCI / ISA BIOS
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

DRAM Precharge Wait State	: 1	PCI Bursting	: Enabled
DRAM Wait State	: 1	Onboard FDC Controller	: Enabled
DRAM Read Burst Timing	: x3333	Onboard Serial Port A	: COM1/3F8
DRAM Write Burst Timing	: x3333	Onboard Serial Port B	: COM2/2F8
Memory Hole At 15M-16M	: Disabled	Onboard Parallel Port	: 378H/IRQ7
IDE HDD Block Mode	: Enabled	Onboard Parallel Mode	: SPP
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave PIO	: Auto		
On-Board Primary PCI IDE	: Enabled		
On-Board Secondar PCI IDE	: Enabled	ESC : Quit ↑↓→← : Select Item	
PCI Slot IDE 2nd Channel	: Enabled	F1 : Help PU/PD/+/- : Modify	
		F5 : Old Values (Shift)F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Figure 4.4: Chipset Features Setup

- DRAM Precharge Wait State

  The default value is 1.

0	0 Wait State, for 60~70ns DRAM.
1	1 Wait State, for 70ns DRAM.

- DRAM Wait State

  The default value is 1.

0	0 Wait State, for 60~70ns DRAM.
1	1 Wait State, for 70ns DRAM.

- DRAM Read Burst Timing

  The default value is X3333.

X2222	2 Burst Wait State, for 60~70ns DRAM.
X3333	3 Burst Wait State, for 70ns DRAM.

- DRAM Write Burst Timing

The default value is X3333.

X2222	2 Burst Wait State, for 60~70ns DRAM.
X3333	3 Burst Wait State, for 70ns DRAM.

- Memory Hole At 15M-16M

  The default value is Disabled.

Disabled	Normal Setting.
Enabled	Set Address=15~16MB remap to ISA BUS.

- IDE HDD Block Mode

  The default value is Enabled.

Enabled	Enable IDE HDD Block Mode
Disabled	Disable IDE HDD Block Mode

- IDE Primary Master PIO (for onboard IDE 1st channel).

  The default value is Auto.

Auto	BIOS will automatically defect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Primary Slave PIO (for onboard IDE 1st channel).

  The default value is Auto.

Auto	BIOS will automatically defect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Secondary Master PIO (for onboard IDE 2nd channel).

  The default value is Auto.

Auto	BIOS will automatically defect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- IDE Secondary Slave PIO (for onboard IDE 2nd channel).

  The default value is Auto.

Auto	BIOS will automatically defect the IDE HDD Accessing mode.
Mode0~4	Manually set the IDE Accessing mode.

- On-Board Primary IDE

  The default value is Enabled.

Enabled	Enable onboard 1st channel IDE port.
Disabled	Disable onboard 1st channel IDE port.

- On-Board Secondary IDE

  The default value is Enabled.

Enabled	Enable onboard 2nd channel IDE port.
Disabled	Disable onboard 2nd channel IDE port.

- PCI Slot IDE 2nd Channel

  The default value is Enabled.

Enabled	Enable PCI BUS DEVICE's 2nd IDE Channel
Disabled	Disable PCI BUS DEVICE's 2nd IDE Channel

- PCI Bursting

  The default value is Enabled.

Enabled	Enable PCI BUS Bursting Access.
Disabled	Disable PCI BUS Bursting Access.

- Onboard FDC Controller

  The default value is Enabled.

Enabled	Enable onboard FDD port.
Disabled	Disable onboard FDD port.

- Onboard Serial Port A

  The default value is COM1/3F8.

COM1/3F8	Enable onboard Serial port A and address is 3F8H.
COM2/2F8	Enable onboard Serial port A and address is 2F8H.
COM3/3E8	Enable onboard Serial port A and address is 3E8H.
COM4/2E8	Enable onboard Serial port A and address is 2E8H.
Disabled	Disable onboard Serial port A.

- Onboard Serial Port B

  The default value is COM2/2F8.

COM1/3F8	Enable onboard Serial port B and address is 3F8H.
COM2/2F8	Enable onboard Serial port B and address is 2F8H.
COM3/3E8	Enable onboard Serial port B and address is 3E8H.
COM4/2E8	Enable onboard Serial port B and address is 2E8H.
Disabled	Disable onboard Serial port B.

- Onboard Parallel port

  The default value is 378H/IRQ7.

378H	Enable onboard LPT port and address is 378H/IRQ7.
278H	Enable onboard LPT port and address is 278H/IRQ5.
Disabled	Disable onboard LPT port.
3BCH	Enable onboard LPT port and address is 3BCH/IRQ7.

- Onboard Parallel Mode

  The default value is Normal.

SPP	Using Parallel port as Normal Printer Port.
EPP	Using Parallel port as Enhanced Parallel Port.
ECP	Using Parallel port as Extended Capabilities Port.
ECP+EPP	Using Parallel port as ECP & EPP mode.

4.8. POWER MANAGEMENT SETUP

ROM PCI / ISA BIOS
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Enabled	Power Down Activities	
PM Control by APM	: No	IRQ3 (COM 2)	: ON
Video Off Method	: DPMS	IRQ4 (COM 1)	: ON
		IRQ5 (LPT 2)	: OFF
Standby Mode	: Disabled	IRQ6 (Floppy Disk)	: ON
Suspend Mode	: Disabled	IRQ7 (LPT 1)	: OFF
HDD Power Down	: Disabled	IRQ8 (RTC Alarm)	: OFF
		IRQ9 (IRQ2 Redir)	: OFF
		IRQ10 (Reserved)	: OFF
		IRQ11 (Reserved)	: OFF
		IRQ12 (PS/2 Mouse)	: ON
		IRQ14 (Hard Disk)	: ON
		IRQ15 (Reserved)	: OFF
		ESC : Quit ↑↓→← : Select Item	
		F1 : Help PU/PD/+/- : Modify	
		F5 : Old Values (Shift)F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Figure 4.5: Power Management Setup

- Power Management

  The default value is Enabled.

Enabled	Enable Green function.
Disabled	Disable Green function.

  Please disable Green Function for Non-S CPU in OS/2, Unix, Window NT & Novell system.

- PM Control by APM

  The default value is No.

Yes	Enable software APM function.
No	Disable software APM function.

- Video off Method

  The default value is DPMS Support.

V/H SYNC + Blank	BIOS will turn off V/H-SYNC when gets into Green mode for Green monitor power saving.
Blank Screen	BIOS will only black monitor when gets into Green mode.
DPMS Support	BIOS will use DPMS Standard to control VGA card. (The Green type VGA card will turn of V/H-SYNC automatically.)

- Standby Mode (for Network Card using)

  The default value is Disable.

Disable	Disable Standby Mode.
1 min - 1 Hour	Setup the timer to enter Standby Mode.

- Suspend mode (for CPU stop clock Mode)

  The default value is Disable.

Disable	Disable Suspend Mode.
1 min - 1 Hour	Setup the timer to enter Suspend Mode.

- HDD Power Down

  The default value is Disable.

Disable	Disable HDD Power Down mode function.
1-15 mins	Enable HDD enter Power Down mode between 1 to 15 mins.

- IRQX (3,4,5,6,7,8,9,10,11,12,14,15)

  The default value is On.

On	The system will return to normal mode from Green Mode when the IRQX is active.
Off	The system will not return to normal mode from Green Mode when the IRQX is active.

4.9. PCI SLOT CONFIGURATION

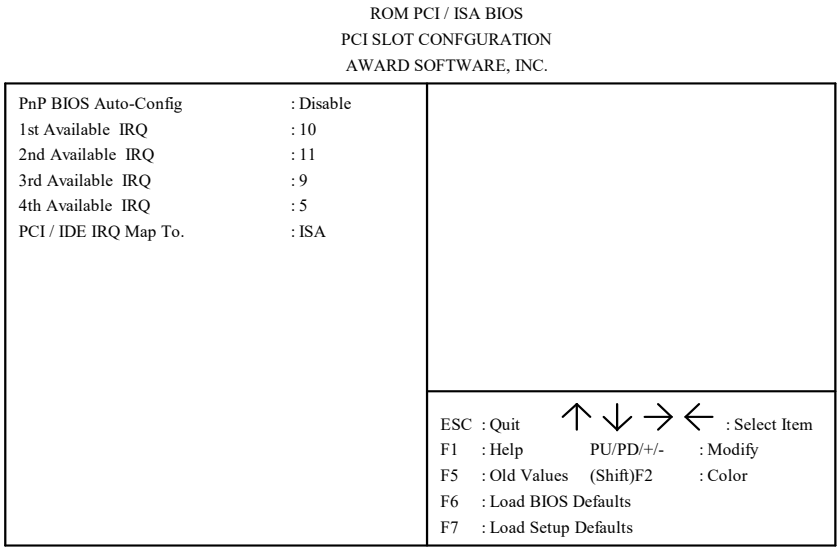


Figure 4.6: PCI Slot Configuration

- PnP BIOS Auto-Config

  The default value is Disabled.

Disabled	BIOS only set up the IRQ for PnP device Automatically, not including PCI device.
Enabled	BIOS will set up the IRQ for PnP device and PCI device Automatically.

WARNING: When this item is Enabled, the PnP function will fully function. If system has non-PnP ISA device, the user must use ICU to define the IRQ that any ISA device should have, otherwise the BIOS may set a IRQ for PnP/PCI device which would conflict with ISA device.

- Available IRQ

  The default value is shown on the above table. These available IRQs are Mapped to be PCI INT# A~D by BIOS for PCI device automatically. If some one IRQ is used by ISA device then the user must keep the IRQ

out of the available table. These items are available only when PnP BIOS Auto-Config is disabled

- PCI IDE IRQ Map To: ISA

ISA	For PCI IDE card using paddle card to connect ISA IRQ or using onboard IDE controller.

4.10. LOAD SETUP DEFAULTS

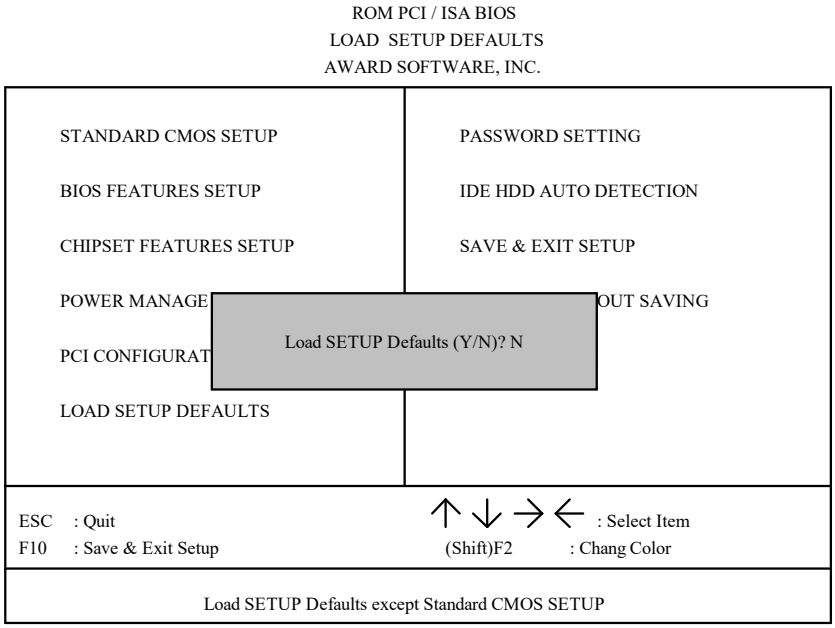


Figure 4.7: Load Setup Defaults

- Load SETUP Defaults

  To load SETUP defaults value to CMOS SRAM, enter "Y". If not, enter "N".

If there is any problem occurred, loading SETUP DEFAULTS step is recommended.

4.11. PASSWORD SETTING

When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD

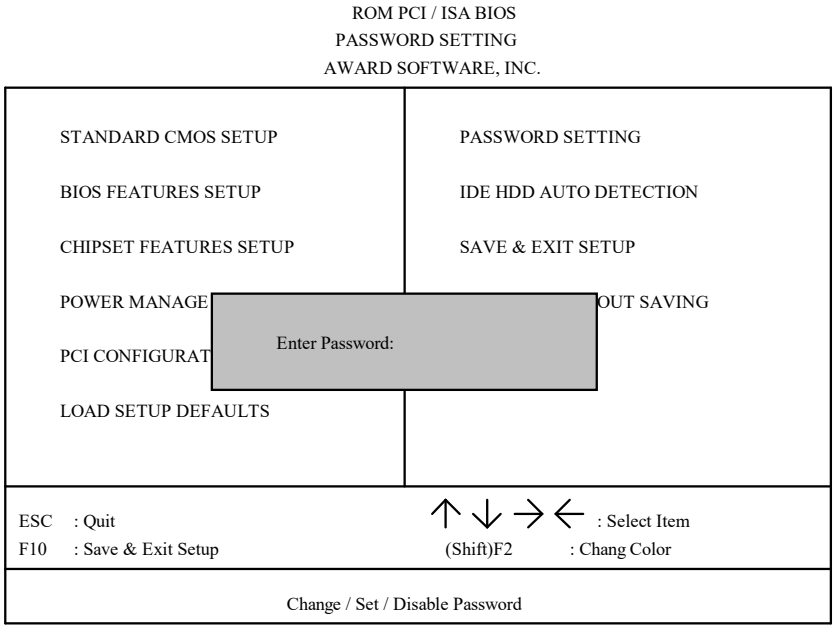


Figure 4.8: Password Setting

Type the password, up to eight characters, and press <Enter>. The password typed now will clear and previously entered password from CMOS memory. 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, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

If you select System at Security Option of BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter Setup. If you select Setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.

4.12. IDE HDD AUTO DETECTION

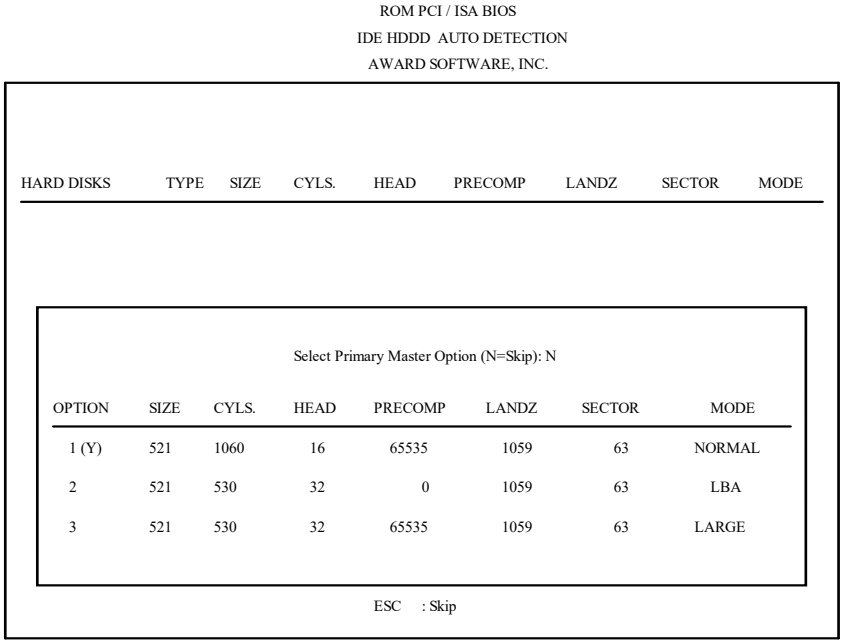


Figure 4.9: IDE HDD Auto Detection

Type "Y" will accept the H.D.D. parameter reported by BIOS.

Type "N" will keep the old H.D.D. parameter setup. If the hard disk cylinder NO. is over 1024, then the user can select LBA mode or LARGER mode for DOS partition LARGE than 528 MB.

4.13. SAVE & EXIT SETUP

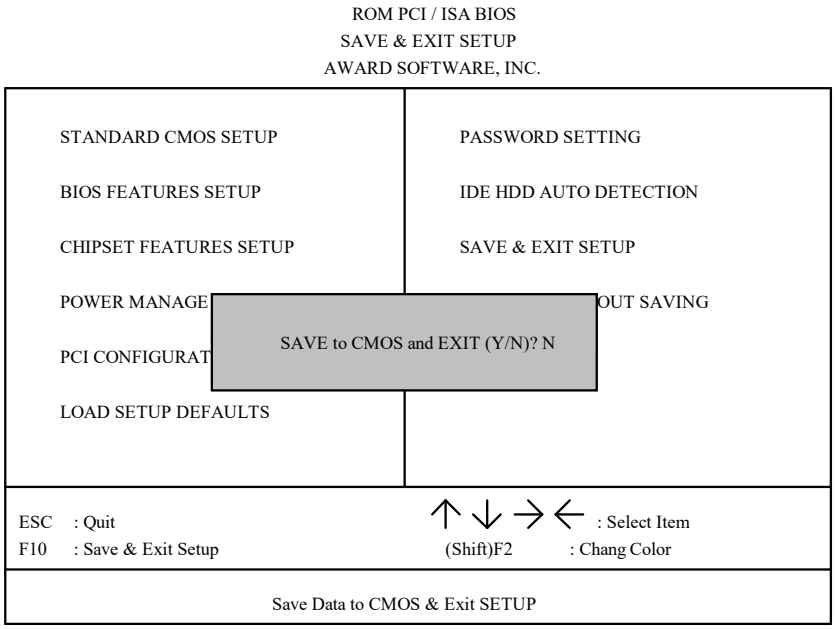


Figure 4.10: Save & Exit Setup

Type "Y" will quit the Setup Utility and save the user setup value to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

4.14. EXIT WITHOUT SAVING

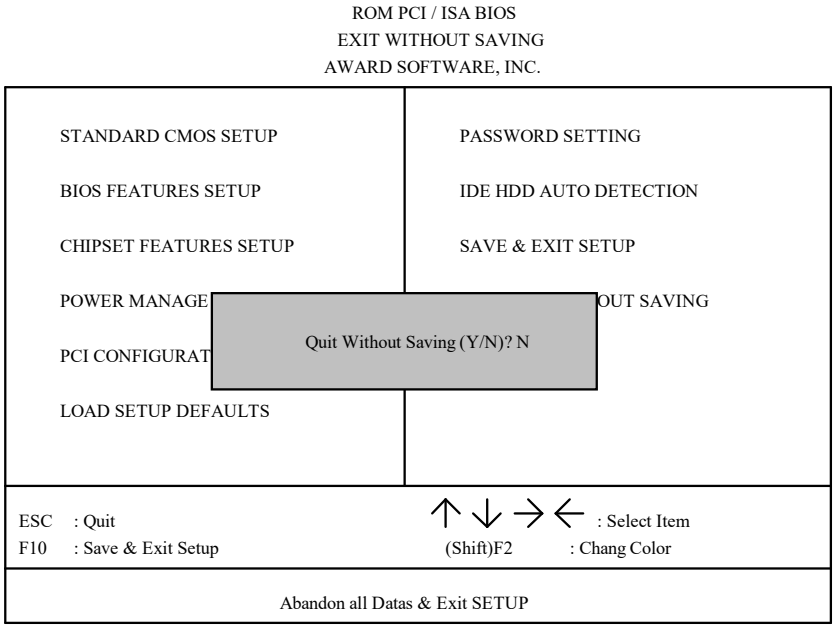


Figure 4.11: Exit Without Saving

Type "Y" will quit the Setup Utility without saving to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

5. AT TECHNICAL INFORMATION

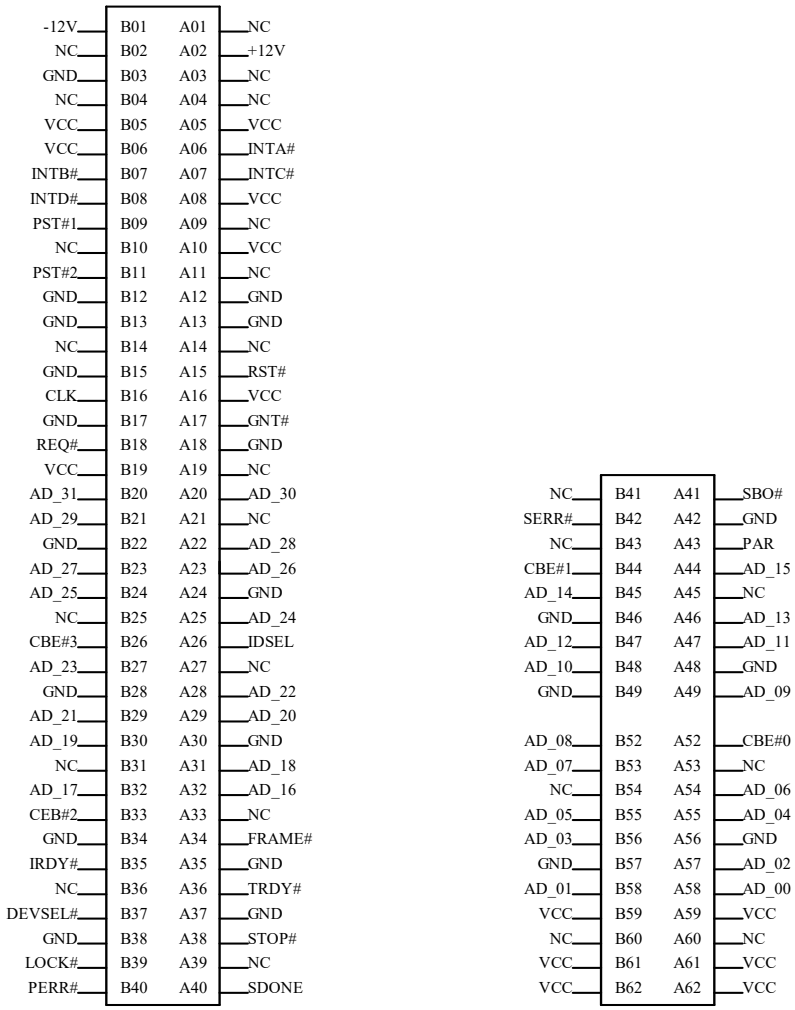
5.1. I/O BUS CONNECTOR PIN OUT

5.1.1. ISA SLOT PIN OUT

GND	B01	A01	-I/O CH CHK
RESET	B02	A02	SD07
+5V	B03	A03	SD06
IRQ9	B04	A04	SD05
-5V	B05	A05	SD04
DRQ2	B06	A06	SD03
-12V	B07	A07	SD02
0WS	B08	A08	SD01
+12V	B09	A09	SD00
GND	B10	A10	-I/O CH RDY
-SMEMW	B11	A11	AEN
-SMEMR	B12	A12	SA19
-IOW	B13	A13	SA18
-IOR	B14	A14	SA17
-DACK3	B15	A15	SA16
-DRQ3	B16	A16	SA15
-DACK1	B17	A17	SA14
-DRQ1	B18	A18	SA13
-REFRESH	B19	A19	SA12
BCLK	B20	A20	SA11
IRQ7	B21	A21	SA10
IRQ6	B22	A22	SA09
IRQ5	B23	A23	SA08
IRQ4	B24	A24	SA07
IRQ3	B25	A25	SA06
-DACK2	B26	A26	SA05
T/C	B27	A27	SA04
BALE	B28	A28	SA03
+5V	B29	A29	SA02
OSC	B30	A30	SA01
GND	B31	A31	SA00

-MEMCS16	D01	C01	SBHE
-I/OCS16	D02	C02	LA23
IRQ10	D03	C03	LA22
IRQ11	D04	C04	LA21
IRQ12	D05	C05	LA20
IRQ15	D06	C06	LA19
IRQ14	D07	C07	LA18
-DACK0	D08	C08	LA17
DRQ0	D09	C09	-MEMR
-DACK5	D10	C10	-MEMW
DRQ5	D11	C11	SD08
-DACK6	D12	C12	SD09
DRQ6	D13	C13	SD10
-DACK7	D14	C14	SD11
DRQ7	D15	C15	SD12
+5V	D16	C16	SD13
-MASTER	D17	C17	SD14
GND	D18	C18	SD15

5.1.2. PCI - BUS SLOT PIN OUT



-12V	B01	A01	NC
NC	B02	A02	+12V
GND	B03	A03	NC
NC	B04	A04	NC
VCC	B05	A05	VCC
VCC	B06	A06	INTA#
INTB#	B07	A07	INTC#
INTD#	B08	A08	VCC
PST#1	B09	A09	NC
NC	B10	A10	VCC
PST#2	B11	A11	NC
GND	B12	A12	GND
GND	B13	A13	GND
NC	B14	A14	NC
GND	B15	A15	RST#
CLK	B16	A16	VCC
GND	B17	A17	GNT#
REQ#	B18	A18	GND
VCC	B19	A19	NC
AD_31	B20	A20	AD_30
AD_29	B21	A21	NC
GND	B22	A22	AD_28
AD_27	B23	A23	AD_26
AD_25	B24	A24	GND
NC	B25	A25	AD_24
CBE#3	B26	A26	IDSEL
AD_23	B27	A27	NC
GND	B28	A28	AD_22
AD_21	B29	A29	AD_20
AD_19	B30	A30	GND
NC	B31	A31	AD_18
AD_17	B32	A32	AD_16
CEB#2	B33	A33	NC
GND	B34	A34	FRAME#
IRDY#	B35	A35	GND
NC	B36	A36	TRDY#
DEVSEL#	B37	A37	GND
GND	B38	A38	STOP#
LOCK#	B39	A39	NC
PERR#	B40	A40	SDONE

NC	B41	A41	SBO#
SERR#	B42	A42	GND
NC	B43	A43	PAR
CBE#1	B44	A44	AD_15
AD_14	B45	A45	NC
GND	B46	A46	AD_13
AD_12	B47	A47	AD_11
AD_10	B48	A48	GND
GND	B49	A49	AD_09
AD_08	B52	A52	CBE#0
AD_07	B53	A53	NC
NC	B54	A54	AD_06
AD_05	B55	A55	AD_04
AD_03	B56	A56	GND
GND	B57	A57	AD_02
AD_01	B58	A58	AD_00
VCC	B59	A59	VCC
NC	B60	A60	NC
VCC	B61	A61	VCC
VCC	B62	A62	VCC

5.2. I/O & MEMORY MAP

MEMORY MAP:	[0000000-009FFFF]	System memory used by DOS and application program.
	[00A0000-00BFFFF]	Display buffer memory for VGA/ EGA/CGA/MONOCHROME adapter.
	[00C0000-00DFFFF]	Reserved for I/O device BIOS ROM or RAM buffer.
	[00E0000-00EFFFF]	Reserved for PCI device ROM.
	[00F0000-00FFFFF]	System BIOS ROM.
	[0100000-BFFFFFF]	System extension memory.
I/O MAP:	[000-01F]	DMA controller.(Master)
	[020-021]	INTERRUPT controller.(Master)
	[022-023]	CHIPSET control registers I/O ports.
	[040-05F]	TIMER control registers.
	[060-06F]	KEYBOARD interface controller.(8042)
	[070-07F]	RTC ports & CMOS I/O ports.
	[080-09F]	DMA register.
	[0A0-0BF]	INTERRUPT controller.(Slave)
	[0C0-0DF]	DMA controller.(Slave)
	[0F0-0FF]	MATH COPROCESSOR
	[1F0-1F8]	HARD DISK controller.
	[278-27F]	PARALLEL port-2.
	[2B0-2DF]	GRAPHICS adapter controller.
	[2F8-2FF]	SERIAL port-2.
	[360-36F]	NETWORK ports.
	[378-37F]	PARALLEL port-1
	[3B0-3BF]	MONOCHROME & PRINTER adapter.
	[3C0-3CF]	EGA adapter.
	[3D0-3DF]	CGA adapter.
	[3F0-3F7]	FLOPPY DISK controller.
	[3F8-3FF]	SERIAL port-1.

5.3. TIMER & DMA CHANNELS MAP

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 IBM SDLC
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

5.4. 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 8-15
3 SERIAL port 2
4 SERIAL port 1
5 PARALLEL port 2
6 FLOPPY DISK adapter
7 PARALLEL port 1
8 RTC clock
9 Available
10 Available
11 Available
12 Available
13 MATH coprocessor
14 HARD DISK adapter
15 Available

5.5. RTC & CMOS RAM MAP

RTC & CMOS:	00	Seconds
	01	Second alarm
	02	Minutes
	03	Minutes alarm
	04	Hours
	05	Hours alarm
	06	Day of week
	07	Day of month
	08	Month
	09	Year
	0A	Status register A
	0B	Status register B
	0C	Status register C
	0D	Status register D
	0E	Diagnostic status byte
	0F	Shutdown byte
	10	FLOPPY DISK drive type byte
	11	Reserve
	12	HARD DISK type byte
	13	Reserve
	14	Equipment byte
	15	Base memory low byte
	16	Base memory high byte
	17	Extension memory low byte
	18	Extension memory high byte
	19-2d	
	2E-2F	
	30	Reserved for extension memory low byte
	31	Reserved for extension memory high byte
	32	DATE CENTURY byte
	33	INFORMATION FLAG
	34-3F	Reserve
	40-7f	Reserved for CHIPSET SETTING DATA

APPENDIX A: POST MESSAGE

When the BIOS encounters an error that requires the user to correct something, either a beep code will sound or a message will be displayed in a box in the middle of the screen and the message PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP will be shown in the information box at the bottom.

- POST BEEP

  Currently there is only one beep code in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

- ERROR MESSAGE

  Once or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes message for both the ISA and the EISA BIOS.

⌦ CMOS BATTERY HAS FAILED

CMOS battery is no longer functional. It should be replaced.

⌦ CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

⌦ DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

⌦ DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to re-configure the drive type correctly.

⌦ DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than 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.

⌦ DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

⌦ EISA Configuration Checksum Error

PLEASE RUN EISA CONFIGURATION UTILITY

The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has configured incorrectly. Also be sure the card is installed firmly in the slot.

⌦ EISA Configuration Is Not Complete

PLEASE RUN EISA CONFIGURATION UTILITY

The slot configuration information stored in the EISA non-volatile memory is incomplete.

☞ When either of these errors appear, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⌦ ERROR ENCOUNTERED INITIALIZING HARD DRIVE

Hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

⌦ ERROR INITIALIZING HARD DISK CONTROLLER

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly in the hard drive.

⌧ FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

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

⌧ Invalid EISA Configuration

PLEASE RUN EISA CONFIGURATION UTILITY

The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⌧ KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

⌧ Memory Address Error at ...

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

⌧ Memory parity Error at ...

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

⌧ MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to re-configure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

⌦ Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

⌦ OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

⌦ OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

⌦ PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

⌦ PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system will the NMI enabled.

⌦ RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

⌦ Should Be Empty But EISA Board Found

PLEASE RUN EISA CONFIGURATION UTILITY

A valid board ID was found in a slot that was configured as having no board ID.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⌦ Should Have EISA Board But Not Found

PLEASE RUN EISA CONFIGURATION UTILITY

The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⌦ Slot Not Empty

Indicates that a slot designated as empty by the EISA Configuration Utility actually contains a board.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

⌦ SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

⌦ Wrong Board In Slot

PLEASE RUN EISA CONFIGURATION UTILITY

The board ID does not match the ID stored in the EISA non-volatile memory.

☞ When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

APPENDIX B: POST CODES

☞ EISA POST codes are typically output to port address 300h. ISA POST codes are typically output to port address 80h.

POST	Name	Description
C0	Turn Off Chipset Cache	OEM Specific-Cache control.
1	Processor Test 1	Processor Status (1 FLAGS) Verification. Test the following processor status flags carry, zero, sign, overflow, The BIOS will set each of these flags, verify they are set, then turn each flag off and verify it is off.
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV. Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2, including set EISA timer to a known state. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies 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-Test to size on-board memory.
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection.
8	Setup low memory	Early chip set initialization. Memory presence test. OEM chip set routines. Clear low 64 K of memory. Test first 64 K memory.

9	Early Cache Initialization	Cyrix CPU initialization. Cache initialization.
A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT-HDLR and initialize INT 00h-1Fh according to INT_TBL.
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
C	Initialize keyboard	Detect type of keyboard controller (optional). Set NUM_LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization.
10	Test DMA Controller 1	
11	Test DMA Page registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.
19	Test Stuck NMI Bits (Parity/IO Check)	Verify NMI can be cleared.
1A		Display CPU clock.
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag. Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots 1-15	Initialize slot 1 through 15.

30	Size Base and Extended Memory	Size base memory from 256 K to 640 K extended memory above 1 MB.
31	Test Base and Extended Memory	Test base memory from 256 K to 640 K and extended memory above 1 MB using various patterns. ☞ This will be skipped in EISA mode and can be "skipped" with ESC key in ISA mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA memory found in slots initialization. ☞ This will be skipped in ISA mode and can be "skipped" with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values.
40		Display virus protest disable or enable.
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
42	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
46	Reserved	
47	Reserved	
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. ☞ When FSCAN option is enabled, will initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.

60	Setup Virus Protect	Setup virus protect according to Setup
61	Set Boot Speed	Set system speed for boot
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack. Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
E1-EF	Setup Pages	E1 - Page 1, E2 - Page 2, etc.
FF	Boot	

APPENDIX C: BIOS DEFAULT DRIVE TABLE

Type	Size (MB)	Cylinders	Heads	Sectors	Write / Precomp	Land Zone	Example Model
1	10 MB	306	4	17	128	305	TEAC SD510 MMI 112, 5412
2	20 MB	615	4	17	300	615	Seagate ST225, ST4026
3	31 MB	615	6	17	300	615	
4	62 MB	940	8	17	512	940	
5	47 MB	940	6	17	512	940	
6	20 MB	615	4	17	65535	615	Seagate ST125 Tandon TM262
7	31 MB	462	8	17	256	511	
8	30 MB	733	5	17	65535	733	Tandon TM703
9	112 MB	900	15	17	65535	901	
10	20 MB	820	3	17	65535	820	
11	35 MB	855	5	17	65535	855	
12	50 MB	855	7	17	65535	855	
13	20 MB	306	8	17	128	319	Disctron526, MMI M125
14	43 MB	733	7	17	65535	733	
16	20 MB	612	4	17	0	663	Microscience HH725 Syquest3250, 3425
17	41 MB	977	5	17	300	977	
18	57 MB	977	7	17	65535	977	
19	60 MB	1024	7	17	512	1023	
20	30 MB	733	5	17	300	732	
21	43 MB	733	7	17	300	732	
22	30 MB	733	5	17	300	733	Seagate ST4038
23	10 MB	306	4	17	0	336	
24	54 MB	925	7	17	0	925	Seagate ST4051
25	69 MB	925	9	17	65535	925	Seagate ST4096
26	44 MB	754	7	17	754	754	Maxtor2085
27	69 MB	754	11	17	65535	754	Maxtor2140, Priam S14
28	41 MB	699	7	17	256	699	Maxtor2190, Priam S19
29	68 MB	823	10	17	65535	823	Maxtor1085 Micropolis1325
30	53 MB	918	7	17	918	918	Maxtor1105, 1120, 4780
31	94 MB	1024	11	17	65535	1024	Maxtor1170
32	128 MB	1024	15	17	65535	1024	CDC9415
33	43 MB	1024	5	17	1024	1024	
34	10 MB	612	2	17	128	612	
35	77 MB	1024	9	17	65535	1024	
36	68 MB	1024	8	17	512	1024	
37	41 MB	615	8	17	128	615	

38	25 MB	987	3	17	987	987	
39	57 MB	987	7	17	987	987	Maxtor1140, 4380
40	41 MB	820	6	17	820	820	Seagate ST251
41	41 MB	977	5	17	977	977	Seagate ST4053 Miniscribe3053/ 6053
42	41 MB	981	5	17	981	981	Miniscribe3053/ 6053 RLL
43	48 MB	830	7	17	512	830	Miniscribe 3650
44	69 MB	830	10	17	65535	830	Miniscribe 3650 RLL
45	114 MB	917	15	17	65535	918	Conner CP3104
46	152 MB	1224	15	17	65535	1223	Conner CP3204
User							

APPENDIX D: PROBLEM SHEET

1. Customer Data

Name
Address
Tel. No.
Fax. No.
Purchase Date

2. Mainboard Date

Model NO. GA-
Rev. No.
Serial No.

3. System Configuration

CPU Type:
CPU Brand:
CPU Speed:
DRAM Type: ❑ 1 ❑ 2 ❑ 4 ❑ 8 ❑ 16 ❑ 32 MB
DRAM Speed: ❑ 80 ❑ 70 ❑ 60 ns
DRAM Total Size: MB
DRAM Brand:
SRAM Size: ❑ 64KB ❑ 128 KB ❑ 256 KB ❑ 512 KB
SRAM Part No. TAG: DATA:
Video Card:
Video Chip or Brand:
Floppy Drive A Capacity & Brand:
Floppy Drive B Capacity & Brand:
Storage Controller Type ❑ MFM ❑ RLL ❑ IDE ❑ EDSI ❑ SCSI
Hard Drive C Brand & Type:
Hard Drive D Brand & Type:
LAN Controller Type:
LAN Card Brand & Model:
Serial / Parallel Chip Brand & Model:
Mouse Brand & Model:
O.S. ❑ DOS ❑ OS/2 ❑ NETWARE ❑ UNIX / XENIX Ver.:

4. AUTOEXEC.BAT & CONFIG.SYS File:

5. Problem Description:

R-02-02-060701