# GA - 686NX

# USER'S MANUAL

**Dual PENTIUM® PCI - ISA BUS MAINBOARD**

**REV. 1 Second Edition**

The author assumes no responsibility for any errors or omissions which may appear in this document nor does it make a commitment to update the information contained herein.



OCTOBER 01, 1996 Taipei, Taiwan

# TABLE OF CONTENTS

# 1. INTRODUCTION

## 1.1. PREFACE

Welcome to use the **GA - 686NX** motherboard. The motherboard is a PENTIUM® Pro 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

- Intel Pentium® Pro Processor based PC / AT compatible mainboard.
- Socket 8 on board supports Pentium® Pro processor & P6T running at 150-200 MHz.
- CPU L1 / L2 Write-Back cache operation.
- Supports 8 - 512 MB DRAM memory on board.
- 4 Master / Slave PCI Bus slots, 4 ISA Bus slots.
- 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.
- DALLAS 12887 like RTC on board.
- ATX form factor, 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® Pro processor 200 MHz
- DRAM — 32 MB EDO
- CACHE SIZE — 256KB/512 KB includeed in CPU
- DISPLAY — Matrox Millennium 2MB
- STORAGE — Onboard IDE port + Quantum FB 1280AT IDE Dirve
- O.S. — Windows95 with Display Driver at 1024 x 768 x 256 colors x 70Hz & BusMaster IDE Driver.

| Program | 512KB | 256KB |
|---|---|---|
| Winstone32 index | 143.3 | 140.5 |

| | | |
|---|---|---|
| Winstone96 index | 88.6 | 87.7 |
| WinBench96 | | |
| CPUmark32 | 612.0 | 588.0 |
| Disk WinMark96 | 1280.0 | 1280.0 |
| Graphics WinMark96 | 36.5 | 36.5 |

## 1.4. BLOCK DIAGRAM

µ §

## 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® Pro processor 150 - 200 MHz.
  - Pentium® Pro OverDrive® processor (P6T).
  - 387 pins (socket 8) ZIF socket on board.
- COPROCESSOR
  - Included in Pentium.
- SPEED
  - 60 / 66 MHz system speed.
  - 30 / 33 PCI-Bus speed.
  - 7.5 / 8 MHz AT bus speed.
- DRAM MEMORY
  - 2 banks 72 pins SIMM module socket on board.
  - Use 4 / 8 / 16 / 32 / 64 /128 MB 60~70 ns SIMM module DRAM.
  - 8 ~ 512 MB DRAM size.
  - Support Fast Page / EDO DRAM access mode.
- CACHE MEMORY
  - 16 KB cache memory included in CPU.
  - 256KB/512 KB 2nd cache in CPU.
  - Support Write Back cache mode for L1/L2 Cache.
- I/O BUS SLOTS
  - 4 Master / Slave PCI-BUS.
  - 4 16 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 1.44/2.88 MB Floppy port. (Using DMA2 & IRQ6) |
| | – Supports PS/2 Mouse. (Using IRQ12 ) |
| | – Supports PS/2 Keyboard. |
| • 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 | – ATX Form Factor, 4 layers PCB. |

## 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.
  – Max. 20A current at 5V.

# 3. HARDWARE INSTALLATION

## 3.1. UNPACKING

The mainboard package should contain the following:

- The **GA - 686NX** mainboard.
- USER'S MANUAL for mainboard & SCSI Driver Installation.
- Cable set for IDE & Floppy device.
- Diskette for BUS MASTE ATAPI device.

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

µ §≺Figure 3.1≻

## 3.3. QUICK REFERENCE FOR JUMPERS & CONNECTORS

| ♦ CN1-11 I/O Ports Connector | |
|---|---|
| CN1 | For Serial port2 (COM B). |
| CN2 | For LPT port. |
| CN3 | For Keyboard I/O port. |
| CN4 | For PS/2 Mouse port. |
| CN5 | For Serial port1(COM A). |
| CN6 | USB port (option). |
| CN7 | For Secondary IDE port. |
| CN8 | For Primary IDE port. |
| CN9 | For Floppy port |

| ♦ J1: CPU VRM Socket (Only for Ver.1X mainboard) |
|---|
| Install Pentium® Pro processor Voltage Regulator Power Module. |

♦ J2: SPEKER Connector

| Pin No. | Function |
|---|---|
| 1 | VCC |
| 2 | NC. |
| 3 | NC. |
| 4 | Output |

♦ J3: RESET Switch (RST)

| Pin No. | Function |
|---|---|
| 1 | RESET Input |
| 2 | GND |

♦ J4: POWER ON LED (PW-LED)

| Pin No. | Function |
|---|---|
| 1 | LED POWER (+) |

| | |
|---|---|
| 2 | NC |
| 3 | GND (-) |

♦ J5: Hard Disk active LED

| Pin No. | Function |
|---|---|
| 1 | LED POWER (+) |
| 2 | LED POWER (-) |
| 3 | LED POWER (-) |
| 4 | LED POWER (+) |

♦ J6: INFARED Connector (IR) -- Function Option

| Pin No. | Function |
|---|---|
| 1 | IR Data Output |
| 2 | GND |
| 3 | IR Data Input |
| 4 | NC |

| | |
|---|---|
| 5 | POWER (+) |

♦ J7: GN-SW

| Pin No. | Function |
|---|---|
| Close | Force system to enter Green Mode (Suspend mode). |
| Open | Normal Operation. |

♦ J8: ATX Power On/Off

| Pin No. | Function |
|---|---|
| Close & Open | This is the soft switch (Power On/Off) of ATX Power Supply, Close & Open one time to Power On & again to Power Off. |

♦ J9: GN-LED

| Pin No. | Function |
|---|---|
| 1 | LED anode (+). |
| 2 | LED cathode (-). |

♦ JP1: CPU cooling FAN Power Connector

| Pin No. | Function |
|---|---|

| | |
|---|---|
| 1 | +12V |
| 2 | GND |

♦ S1-1: System Speed Selection

| 1 | Function |
|---|---|
| ON | For 60 MHz system speed ( CPU 150, 180 MHz ). |
| OFF | For 66 MHz system speed ( CPU 166, 200 MHz ). |

♦ S1-2,3,4: CPU INT. / EXT. FREQ. RATIO

| 2 | 3 | 4 | Function |
|---|---|---|---|
| ON | OFF | OFF | x 2.5 |
| OFF | ON | OFF | x 3 |
| ON | ON | OFF | x 3.5 |
| OFF | OFF | ON | x 4 |

♦ Power1: PS/2 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 |

♦ Power2: ATX POWER connector

| Pin No. | Function |
|---|---|
| 3,5,7,13,15-17 | GND |
| 4,6,19,20 | VCC (+5V) |
| 10 | +12V |
| 12 | -12V |
| 18 | -5V |

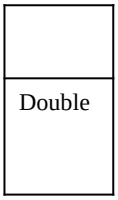
| | |
|---|---|
| 8 | Power Good |
| 9 | 5V SB (Stand by +5V) |
| 14 | PS-ON (Soft ON/OFF) |

## 3.4. DRAM INSTALLATION

The mainboard can be installed with 4 / 8 / 16 / 32 / 64 / 128 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 - 512 MB, and various configuration of DRAM types in the following TABLE are for reference:

| Bank0 | Bank1 | Single: | Single bank SIMM Module |
|---|---|---|---|
| Single | None | | Ex. 4MB, 16MB, 64MB |
| Single | Single | | |
| Single | Double | Double: | Double banks SIMM Module |
| Double | None | | Ex. 8MB, 32MB, 128MB |
| Double | Single | | |




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. CPU INSTALLATION AND JUMPERS SETUP

The system's speed depends on the frequency of CLOCK GENERATOR. The user can change the DIP SWITCH **(S1)** selection to set up the system speed to 60 MHz or 66 MHz for 150 - 200 MHz processor.

The mainboard can use Intel Pentium® Pro Processor or P6T (Pentium® OverDrive® Pro Processor).

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.

CPU Installation Table:

| DIP SWITCH (S1) | | | | FREQ. | EXT.CLK. | INT.CLK. | CPU Type |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | RATIO | MHz | MHz | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ON | ON | OFF | OFF | 2.5 | 60 | 150 | PENTIUM Pro 150 MHz |
| OFF | ON | OFF | OFF | 2.5 | 66 | 166 | PENTIUM Pro 166 MHz |
| ON | OFF | ON | OFF | 3 | 60 | 180 | PENTIUM Pro 180 MHz |
| OFF | OFF | ON | OFF | 3 | 66 | 200 | PENTIUM Pro 200 MHz |
| OFF | ON | ON | OFF | 3.5 | 66 | 233 | PENTIUM Pro 233 MHz |
| OFF | OFF | OFF | ON | 4 | 66 | 266 | PENTIUM Pro 266 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.**

## 3.6. 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.

## 3.7. SPEAKER CONNECTOR INSTALLATION

There is always a speaker in AT system for sound purpose. The 4 - Pins connector **J2** is used to connect speaker.

The speaker can work well in both direction of connector when it is installed to the connector **J2** on mainboard.

## 3.8. 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 **J3** on mainboard.

## 3.9. POWER LED & KEY LOCK CONNECTOR INSTALLATION

There are a system power LED lamp on the panel of case. The power LED will light on when system is powered-on, which is connected to a 3 PIN connector.

The connector should be connected to **J4** of mainboard in correct direction.

## 3.10. GREEN FUNCTION INSTALLATION

For the purpose of power saving, there are two jumpers, **J7** 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 **J7** is a switch to force the system get into green mode immediately.

## 3.11. ATAPI DEVICE INSTALLATION

There are two Enhance PCI IDE ports (**CN7,8**) on board, which following ATAPI standard SPEC. Any one IDE port can connecte to two ATAPI devices (IDE Hard Disk, CD-ROM & Tape Driver), so total four ATAPI devices can exist in a system.

The booting Hard Disk should be the Master device of 1st IDE channel.

The **J5** is the active LED port for ATAPI device.

## 3.12. PERIPHERAL DEVICE INSTALLATION

After the I/O 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.

If the PCI - Bus device is to be installed in the system, any one of four PCI - Bus slots can be used if Slave PCI - Bus device being installed; any one of four PCI-Bus slots can be used if Bus Master PCI-Bus device being installed.

## 3.13. KEYBOARD & PS/2 MOUSE INSTALLATION

The main board supports PS/2 connector type keyboard **(CN3)** & Mouse **(CN4)**.

The BIOS will auto detect wheather the PS/2 Mouse is installed or nor & assign IRQ12 for Mouse port if which was installed.

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

## 3.14. 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<br>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.

µ §

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.

  - PNP/PCI configuration

  This setup page includes all the configurations of PCI & PNP ISA resources.

- Integrated peripherals

This setup page includes all onboard peripherals.

- Load setup defaults

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

- User password

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.

µ §

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

µ §

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 |

- Typematic Rate Setting

  The default value is Disabled.

| | |
|---|---|
| Enabled | Enable Keyboard typematic rate setting. |
| Disabled | Disable Keyboard typematic rate setting. |

| |
|---|

- Typematic Rate (Chars/Sec)

  The default value is 6.

| | |
|---|---|
| 6-30 | Set the maximum typematic rate from 6 chars. per second to 30 chars. per second. |

- Typematic Delay (mSec)

  The default value is 250.

| | |
|---|---|
| 250-1000 | Set the time delay from first key to repeat the same key in to computer. |

- 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 |

- 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. |

- OS Select For DRAM>64MB

  The default value is Non-OS2.

| | |
|---|---|
| Non-OS2 | Using non-OS2 operating system. |
| OS2 | Using OS2 operating system and DRAM>64MB. |

| |
|---|
| |

- 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 |

## 4.7. CHIPSET FEATURES SETUP

µ §Figure 4.4: Chipset Features Setup

- Auto Configuration

  The default value is Enabled.

| | |
|---|---|
| Enable | For 60~70ns DRAM Timing. |
| Disable | For slow speed DRAM Timing. |

- DRAM Slow speed selection

  The default value is 60 ~ 70ns.

| | |
|---|---|
| 60 ~ 70ns | For 70ns DRAM. |
| 60ns | For 60ns DRAM (The best performance). |

- DRAM ECC/PARITY select

  The default value is Disabled.

| | |
|---|---|
| ECC | Enable ECC function when using 36 bit DRAM Module. |
| PARITY | Enable PARITY function when using 36 bit DRAM Module. |

| | |
|---|---|
| Disabled | Disable ECC & PARITY function. |

- PCI VGA Burst Write

The default value is Disabled.

| | |
|---|---|
| Disabled | Disable this function. |
| Enabled | Enable this function to better VGA performance;while some brands of VGA must be disabled this function (e.g.ET4000W32P). |

- Video RAM Cacheable

The default value is Disabled.

| | |
|---|---|
| Disabled | Disable this function. |
| Enabled | Enable this function to better VGA performance;while some brands of VGA must be disabled this function (e.g.ET4000W32P). |

- Memory Hole At 15M-16M

The default value is Disabled.

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

## 4.8. POWER MANAGEMENT SETUP

µ §

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 Yes.

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

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. PNP/PCI CONFIGURATION

µ §Figure 4.6: PCI Slot Configuration

- Resources Controlled by

  The default value is Manual.

| | |
|---|---|
| Manual | User can set the PnP resourse (I/O Address, IRQ & DMA channels) used by legacy ISA DEVICE. |
| Auto | BIOS automaticly use these PnP resoures. |

- IRQ (3,4,5,7,9,10,11,12,14,15),DMA(0,1,3,5,6,7) assigned to

  The default value is "Legacy ISA" or "PCI/ISA PnP".

| | |
|---|---|
| Legacy ISA | The resource is used by Legacy ISA device. |
| PCI/ISA PnP | The resource is used by PCI/ISA PnP device (PCI or ISA). |

## 4.10. INTEGRATED PERIPHERALS

µ §Figure 4.7: Load Setup Defaults

- 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 is0 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-Chip Primary IDE

  The default value is Enabled.

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

- On-Chip 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 |

- Onboard FDD Controller

  The default value is Enabled.

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

- Onboard Serial Port 1

  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 2

  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 SPP.

| | |
|---|---|
| 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. |

## 4.11. LOAD SETUP DEFAULTS

µ §

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.**

## 4.12. USER PASSWORD

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

µ §

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.

## 4.13. IDE HDD AUTO DETECTION

µ §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.

## 4.14. SAVE & EXIT SETUP

µ §

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.

## 4.15. EXIT WITHOUT SAVING

µ §

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*

µ §

### *5.1.2. PCI - BUS SLOT PIN OUT*

µ §

# 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.<br>Test the following processor status flags<br>carry, zero, sign, overflow,<br>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.<br>Disable video, parity checking, DMA.<br>Reset math coprocessor.<br>Clear all page registers, CMOS shutdown byte.<br>Initialize timer 0, 1, and 2, including set EISA timer to a known state.<br>Initialize DMA controllers 0 and 1.<br>Initialize interrupt controllers 0 and 1.<br>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.<br>Memory presence test.<br>OEM chip set routines.<br>Clear low 64 K of memory.<br>Test first 64 K memory. |
| 9 | Early Cache Initialization | Cyrix CPU initialization.<br>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).<br>Set NUM_LOCK status. |
| D | Initialize Video Interface | Detect CPU clock.<br>Read CMOS location 14h to find out type of video in use.<br>Detect and Initialize Video Adapter. |

| | | |
|---|---|---|
| E | Test Video Memory | Test video memory, write sign-on message to screen.<br>Setup shadow RAM - Enable shadow according to Setup. |
| F | Test DMA Controller 0 | BIOS checksum test.<br>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.<br>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.<br>☞ 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.<br>☞ 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.<br>Enable NMI, Enable cache before boot. |

| | | |
|---|---|---|
| 52 | Initialize Option ROMs | Initialize any option ROMs present from C8000h to EFFFFh.<br>☞ 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.<br>Boot via INT 19h. |
| B0 | Spurious | If interrupt occurs in protected mode. |
| B1 | Unclaimed NMI | If unmasked NMI occurs, display<br>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<br>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<br>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,<br>MMI M125 |
| 14 | 43 MB | 733 | 7 | 17 | 65535 | 733 | |
| 16 | 20 MB | 612 | 4 | 17 | 0 | 663 | Microscience HH725<br>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,<br>Priam S14 |
| 28 | 41 MB | 699 | 7 | 17 | 256 | 699 | Maxtor2190,<br>Priam S19 |
| 29 | 68 MB | 823 | 10 | 17 | 65535 | 823 | Maxtor1085<br>Micropolis1325 |
| 30 | 53 MB | 918 | 7 | 17 | 918 | 918 | Maxtor1105,<br>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<br>Miniscribe3053/<br>6053 |
| 42 | 41 MB | 981 | 5 | 17 | 981 | 981 | Miniscribe3053/<br>6053 RLL |
| 43 | 48 MB | 830 | 7 | 17 | 512 | 830 | Miniscribe 3650 |
| 44 | 69 MB | 830 | 10 | 17 | 65535 | 830 | Miniscribe 3650<br>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

Tel. No.

Address

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-01-02-061015