

**GMB-786UN**

**486/386 Mainboard**

*User's Guide*

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**User's Guide**

Version 1.00

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## ABOUT THIS GUIDE

This guide contains instructions for configuring and installing the GMB-786UN mainboard.

- Chapter 1, **Introduction**, acquaints user with the special features of the GMB-786UN mainboard.
- Chapter 2, **Hardware Configuration**, gives information on configuring memory and setting the mainboard's jumpers. Brief sections on installing memory and a math coprocessor are also included.
- Chapter 3, **Mainboard Installation**, is an overview of how to install the mainboard in a system.
- Chapter 4, **BIOS Setup**, provides the BIOS information for system configuration.
- Chapter 5, **Hard Disk Types**, provides a Default fixed Disk table.
- Chapter 6, **Error Codes**, provides references for all POST communicate errors.
- Chapter 7, **Connector Pin Assignment**, provides the OPTi Local Bus/AT Bus Pin Assignment on EISA Connectors.

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## UNPACKING THE MAINBOARD

The GMB-786UN Mainboard comes packed in a sturdy cardboard shipping carton. The carton contains:

- The GMB-786UN Mainboard
- This User's Guide

*Note: Do not remove the mainboard from its original packing until ready to install.*

The GMB-786UN mainboard is easily damaged by static electricity. Observe the following precautions while unpacking and installing the mainboard.

1. Touch an unpainted area of the system chassis before handling the mainboard or any component. Doing so, discharges the static charge the user's body may have built.
2. Remove the mainboard from its anti-static wrapping and place it on a grounded surface, component side up.
3. Inspect the mainboard for damage. Shipping may have loosened integrated circuits from their sockets. If any integrated circuit appears loose, press carefully to seat it firmly in this socket.

Do not apply power if the mainboard appears damaged. If there is damage to the board, or items are missing, contact dealer immediately.

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## CHAPTER 1 INTRODUCTION

The GMB-786UN mainboard is a 2/3 body AT size high-performance mainboard that provides with basic elements on which to build an advanced computer. The GMB-786UN mainboard is configured with one of the following microprocessors:

- 80486SX-25, 80487SX-25, 80486DX2-50 CPU running at 25MHz.
- 80486DX-33, 80486DX2-66 CPU running at 33MHz.
- 80386DX-40 CPU running at 40MHz.
- 80486DX-50 CPU running at 50MHz.

### 1.1 KEY FEATURES

The advanced features of the GMB-786UN mainboard include:

- 100% IBM PC-AT compatible, single chip 486/386 solution, easy to update from 386 to 486 system.
- Provide three board configuration:-
  - Universal motherboard without CPU
  - 80386DX standard motherboard (80486 system upgradable)
  - 80486SX standard motherboard (80486DX system upgradable)
- Support CPU type: 80386DX-40 (PQFP), 80486SX-25 (PQFP, PGA), 80487SX-25 (PGA), 80486DX-33,50 (PGA), 80486DX2-50,66 (PGA).
- Support 80387DX (PGA) Numeric Co-processor.
- High performance single chip core logic with Internal Cache Controller.
- Built-in direct mapped secondary cache controller with option write-back or write-through operation and 0 wait state for cache hit.
- Optional cache memory size of 64/128/256KB in either one or two banks of SRAM.
- Two non-cacheable blocks ranging from 128K to 1MB.
- System & video Bios Shadow, optional caching of shadowed video BIOS.
- Memory size from 1MB to 32MB, possible using combinations of 256Kx9, 1Mx9 and 4Mx9 SIMM modules in two memory bank.
- Hidden DRAM refresh support.
- Support KB control Turbo/DeTurbo mode select.
- Support 7 Direct Memory Access channels.
- Support 16 Interrupt levels.
- Five 16-bit I/O slots, two 8-bit I/O slots, one OPTI Standard Local Bus slot

- Battery backup for CMOS configuration and real time clock/calender.
- Hardware and Software turbo clock switching.
- 8MHz AT Bus clock & speed changeable by software, CPU clock available by oscillator.
- User Defined Password to inhibit illegal access.
- 2/3 Baby AT board size = 220mm(W) X 240mm(L).

## 1.2 MAINBOARD COMPONENTS

This section gives a brief description of key components on the mainboard. Refer to Fig 1 for component locations.

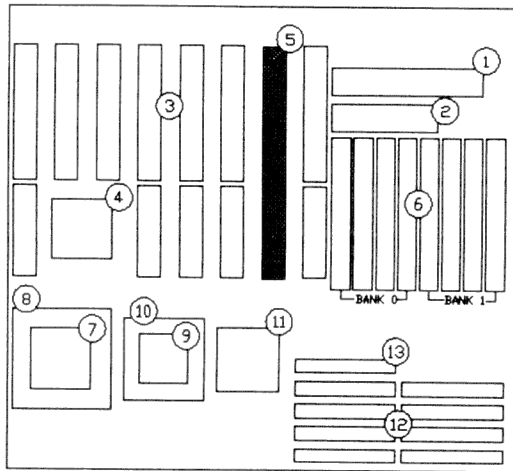


Fig 1 Key Components of the GMB-786UN Mainboard

- |  |   |
|--|---|
| (1). Keyboard Controller                           | (8). 486SX/486DX/487SX<br>Microprocessor Socket |
| (2). System BIOS                                   | (9). PQFP 386DX Microprocessor                  |
| (3). Expansion Slots                               | (10). PQFP 486SX Microprocessor                 |
| (4). UM82C206 Integrated<br>Peripherals Controller | (11). Single Chip Toshiba 4800                  |
| (5). Local Bus Slot                                | (12). Cache Memory                              |
| (6). Main Memory                                   | (13). Tag Cache                                 |
| (7). 387 Coprocessor Socket                        |   |

# CHAPTER 2 HARDWARE CONFIGURATION

This chapter describes how to set the mainboard jumpers for cache memory and display type, and how to install memory modules.

Before beginning the configuration, user should take the following precautions:

- Turn off the power supply, and unplug the power cord before begin.
- Unplug all cables that connect the mainboard to any external devices.

## 2.1 JUMPER AND MEMORY BANK LOCATIONS

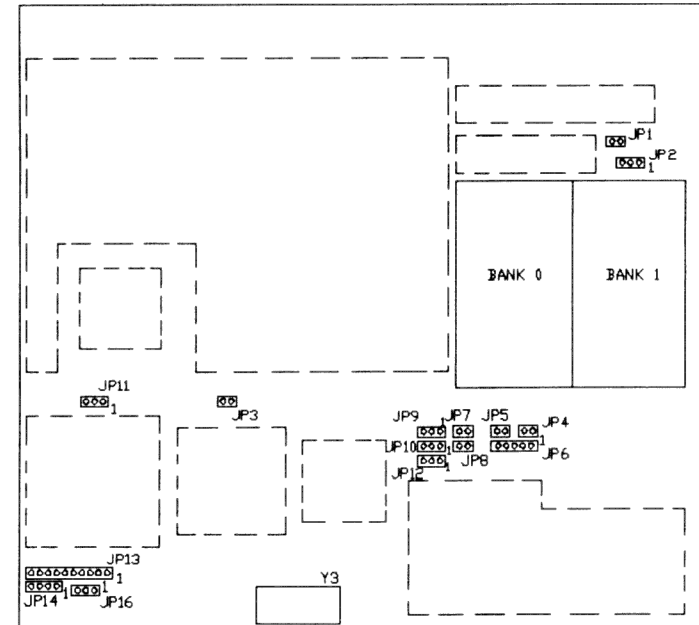






















Fig 2 Jumper and Memory Bank Locations

## 2.2 JP3, JP4, JP9, JP10, JP12, JP13, JP16 - CPU JUMPER SETTING

The GMB-786UN mainboard can support processor at different speed. Jumpers JP3, JP4, JP9, JP10, JP12, JP13 and JP16 are required to setup for installing various CPU. Refer to Fig 2 for the jumpers location, and set the jumpers according to the following table:

CPU TYPE	JP3	JP4	JP9	JP10
386DX-40 PQFP	 OPEN	 OPEN	 3 2 1	 3 2 1
486SX-25 PQFP	 CLOSE	 CLOSE	 3 2 1	 3 2 1
486SX-25 PGA	 CLOSE	 CLOSE	 3 2 1	 3 2 1
486DX/DX2 PGA	 CLOSE	 CLOSE	 3 2 1	 3 2 1
487SX-25 PGA	 CLOSE	 CLOSE	 3 2 1	 3 2 1














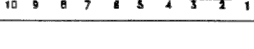

CPU TYPE	JP12	JP13	JP16
386DX-40 PQFP	 3 2 1	 OPEN	 3 2 1
486SX-25 PQFP	 3 2 1	 OPEN	 3 2 1
486SX-25 PGA	 3 2 1	 10 9 8 7 6 5 4 3 2 1	 3 2 1
486DX/DX2 PGA	 3 2 1	 10 9 8 7 6 5 4 3 2 1	 3 2 1
487SX-25 PGA	 3 2 1	 10 9 8 7 6 5 4 3 2 1	 3 2 1

Table 1: CPU Jumper Setting

## 2.3 MATH COPROCESSOR INSTALLATION

The GMB-786UN mainboard has a socket that supports a 68 pin PGA 80387DX Math Coprocessor. See Fig 1 in Chapter 1 for the socket's location.

### 2.3.1 INSTALLING AN 80387DX MATH COPROCESSOR

Install an 80387DX math coprocessor as follows:

*Caution:* Static electricity can damage a math coprocessor.

1. Make sure that power to the mainboard is off and review the section on static electricity precautions at the beginning of this manual.
2. Align the coprocessor so that the notched corner of the chip matches the notched corner of the socket. The notched corner of the chip is marked by a round dot.
3. Align the pins with the second inner row of socket holes. The 80387 coprocessor is correctly aligned if an empty row of socket holes appears around the chip.

- Carefully press the chip into the socket.

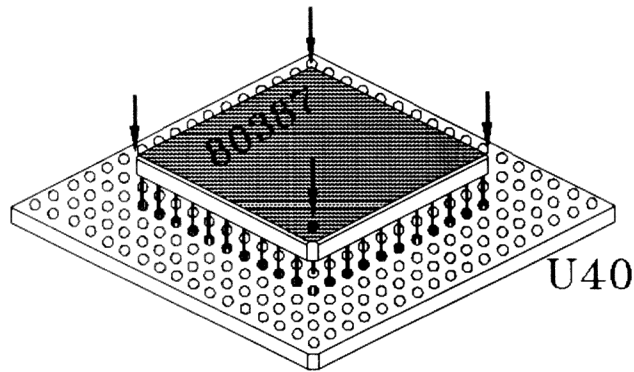


Fig 3 Installing an 80387DX Math Coprocessor on universal/80386 standard motherboard

### 2.3.2 UPGRADING CPU SPEED

The following steps are for the upgrading from 386DX-40 (PQFP) or 486SX-25 (PQFP) to 486DX/DX2 (PGA) / 486SX (PGA) / 487SX (PGA):

- Pug the PGA CPU into the socket.

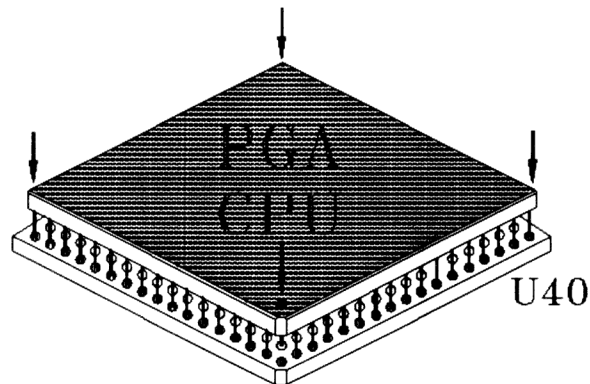


Fig 4 Installing a PGA CPU

- Change the CPU type jumper setting according to the CPU Type Jumper Setting table on pg4.
- Change the OSC (Y3) with speed relevant to the CPU speed.

OSC SPEED	CPU SPEED
25MHz	486SX-25 PGA / 486DX2-50 PGA
33MHz	486DX-33 PGA / 486DX2-66 PGA
50MHz	486DX-50 PGA

Table 2

### 2.3.3 OPTI STANDARD LOCAL BUS SUPPORT

The GMB-786UN motherboard also support the standard OPTI Local Bus slot. Thus, user can insert the OPTI-Standard Local VGA Add-On card to increase the performance, which is proportional to the CPU for its advantage.

### 2.4 CACHE CONFIGURATION

The special feature of the GMB-786UN mainboard is a built-in direct-mapped cache controller with optional write-back or write-through operation which supports 64KB, 128KB, or 256KB cache memory.

The GMB-786UN mainboard has a built-in cache controller. It requires external SRAM as tag and cache memory. The caching Scheme is direct mapping with selectable write-back or write-through operation. The mainboard allows 64KB, 128KB, and 256KB cache configurations. Memory size is selected by the hardware jumpers and the BIOS setup program.



### 2.4.1 UPGRADING CACHE

The GMB-786UN mainboard is available with an optional 64KB, 128KB, or 256KB cache memory on-board. User can upgrade cache memory by installing additional SRAM (Static Random Access Memory) chips in sockets U35, U36, U39, U42; and U33, U34, U38, U41; and U29.

The speed of the SRAM chips needed depends on the clock speed of the microprocessor:

**50MHz, 40MHz CPU requires 20ns (tag) and 20ns (data) SRAM chips.**

**33MHz, 25MHz CPU requires 25ns (tag) and 25ns (data) SRAM chips.**

### 2.4.2 CACHE SIZE AND MEMORY LOCATIONS

The table below describes the chip capacity and socket location required for each cache size configuration. User can use 8K x 8-bit or 32K x 8-bit SRAM chips in banks 0 and 1, and in the Tag RAM sockets. Please note that, do not combine different chip capacities in banks 0 and 1.

Cache Size	BANK 0				BANK 1				TAG RAM
	U35	U36	U39	U42	U33	U34	U38	U41	U29
64K	8Kx8	8Kx8	8Kx8	8Kx8	8Kx8	8Kx8	8Kx8	8Kx8	8Kx8
128K	32Kx8	32Kx8	32Kx8	32Kx8	NONE	NONE	NONE	NONE	8Kx8
256K	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8	32Kx8

Table 3: Cache Size Configuration

### 2.4.3 CACHE CHIP SOCKETS AND JUMPER LOCATIONS

The diagram below describes the location of the cache chip sockets and cache jumpers.

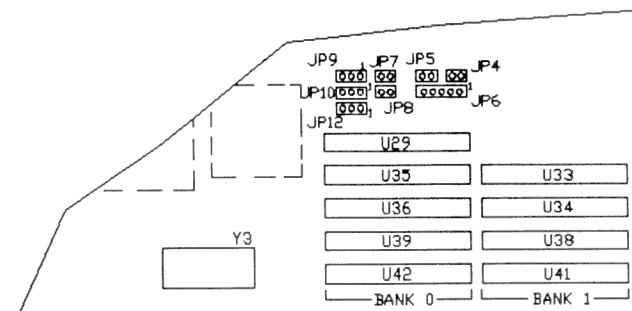


Fig 5 Cache Jumper and Socket Locations

### 2.4.4 JP5-8 - CACHE JUMPER SETTING

Cache memory is configured using jumpers, JP5 - JP8. The following table summarize the possible configuration.

Jumper	Cache Size		
	64K	128K	256K
JP5			
JP6			
JP7			
JP8			

Table 4: Cache Jumper Setting

### 2.4.5 INSTALLING CACHE CHIPS

Install cache chips on the mainboard as follows:

**Caution:** *Static electricity can damage a cache chip.*

1. Review the section on static electricity precautions at the beginning of this manual, and make sure that power to the mainboard is off.
2. Align the chip so that the notched corner of the chip matches the notched corner of the socket.
3. Align the pins with the socket holes.
4. Carefully press the chip into the socket.

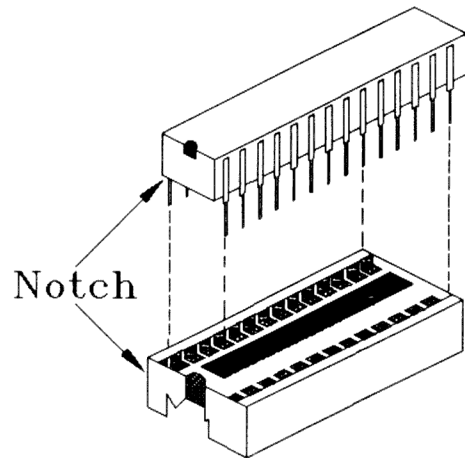


Fig 6 Installing a Cache Chip

### 2.5 JP1-DISPLAY ADAPTER SETUP

Set the jumper, JP1, to configure the mainboard for either a color display card or a monochrome display card. Short the jumper for a color display adapter. Open the jumper for a monochrome display adapter. Refer to Fig 2 for the location of JP1. Set the jumper as below.

JP1 -- Display Adapter Type

Display Adapter	JP1
Color Display (Default)	
Mono Display	

Table 5

### 2.6 JP14-SOURCE OF GA20

The source of GA20 can be selected by JP14, when emulation fast gate A20 is selected, the system performance may optimize under Multi-user operation system. Refer to Fig 2 for location of JP14. Set jumper as below.

JP14 -- Select Source of GA20

Source of GA20	JP14
386 KBGA20	
386 EMULATE KBGA20	
486 EMULATE KBGA20	
486 KBGA20	

Table 6

## 2.7 JP2-DISCHARGE CMOS SETUP

The CMOS Setup can be erased by shorting the jumper JP2 as below. Refer to Fig 2 for the location of JP2.

**JP2 -- Discharge CMOS Setup**

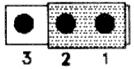
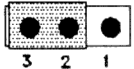
Setting	JP2
Normal Operation (Default)	
Discharge CMOS	

Table 7

## 2.8 JP11-386 CPU SPEED SELECTION

The jumper JP11 is for the selection of 386 CPU speed. Refer to Fig 2 for the location of JP11. Set the jumper as below.

**JP11 -- 386 CPU SPEED SELECTION**

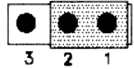
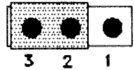
386 CPU SPEED SELECTION	JP11
386 CPU 33/40MHz	
386 CPU 25MHz	

Table 8

## 2.9 MEMORY INSTALLATION

The GMB-786UN lets user add system memory via SIMM sockets on the mainboard. On-board memory is located in two banks: Bank 0 and Bank 1. See Fig 2.

Four SIMM sockets are provided in each bank. User can install either a 256K, 1M, or 4M SIMM in each socket. Note that all SIMM modules in a bank must be the same capacity.

SIMM speed required for best performance depends on the CPU speed, which requires 70ns SIMM.

The mainboard supports the following configurations:

Bank 0	Bank 1	Memory Size
256K	NONE	1MB
256K	256K	2MB
1M	NONE	4MB
256K	1M	5MB
1M	1M	8MB
4M	NONE	16MB
1M	4M	20MB
4M	1M	20MB
4M	4M	32MB

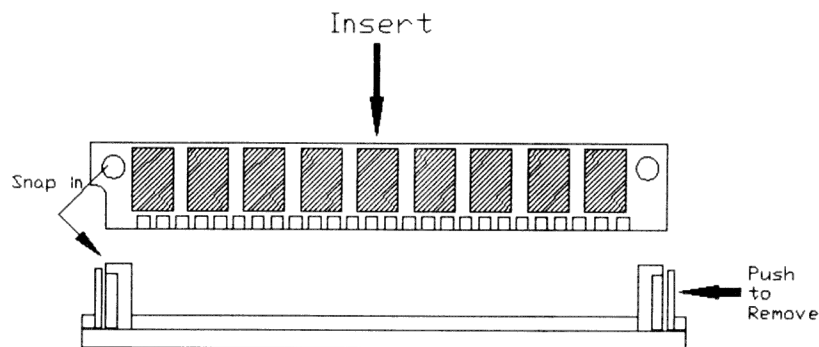
Table 9: On-board Memory Configuration

### 2.9.1 INSTALLING SIMM

Install a SIMM in a memory socket as follows:

*Caution: Static electricity can seriously damage SIMM modules.*

1. Review the section on static electricity precautions at the beginning of this manual.
2. Align the SIMM module so that the pin-1 marking on the module corresponds to the socket pin-1 marking.
3. Hold the module at a 70-degree angle to the socket, and insert the module's connectors into the socket.
4. Snap the module to a vertical position in the socket. The module is fully inserted when retaining pegs snap into holes at each end of the module.



**Fig 7 Installing a SIMM**

5. To fill a bank, repeat steps 1 through 4 until the sockets in each bank contain SIMMs.
6. After installing memory, run BIOS Setup to indicate to the system for how much memory the user has installed.

## CHAPTER 3 MAINBOARD INSTALLATION

Once the GMB-786UN mainboard's hardware has been configured, the user is now ready to install the mainboard into the system chassis. This chapter describes what are needed to assemble an advanced computer system based on the GMB-786UN mainboard.

### 3.1 COMPONENTS

The following components are recommended:

- Case with standard chassis and hardware. The GMB-786UN fits most AT compatible cases.
- Standard AT power supply.
- 8 ohm speaker.
- Floppy disk drive(s) (360KB, 1.2MB, or 1.44MB).
- Hard disk drive (optional).
- Hard disk and floppy disk drive controller card.
- Flat ribbon cables to connect the disk drive controller and the disk drive(s).
- Serial/parallel interface card.
- AT-compatible keyboard.
- Video card and Display (monochrome, CGA, EGA, or VGA).

## 3.2 INSTALLING THE MAINBOARD

Before starting, check the location of the mounting holes in the case and on the mainboard.

*Caution:* Static electricity can damage the mainboard.

Install the GMB-786UN mainboard as follows:

1. Review the section on static electricity precautions at the beginning of this manual.
2. Place the case on an anti-static mat and remove the cover. Remove the nylon stand-offs and screws for mounting the mainboard.
3. Put the front of the case to the right and the rear to the left. The mainboard occupies the section of the case nearest the user; the power supply goes on the far side.
4. Align the mounting holes on the case to the mounting holes on the mainboard. Make sure to access the keyboard connector (J1) once the board is installed.
5. From the bottom of the mainboard, insert stand-offs into the proper holes on the board, and attach the mounting screws to the bottom of the case.

*Note:* Some cases do not use stand-offs and mounting screws; in this case user can fasten the mainboard into the case with regular screws.

6. Place the mainboard into the case and fasten the board securely with regular screws.

## 3.3 CONNECTION THE MAINBOARD

Once the mainboard has been fastened into the system case, the next step is to connect the internal cables. The internal cables are wire leads with plastic female connectors that attach to the connectors. The mainboard connectors have varying numbers of pins and are the points of contact between the mainboard and other parts of the computer.

A description of each connector and its connector pins follows. See Fig 8 for the location of the connectors on the mainboard.

*Note:* Before making connectors on the board, make sure that power to the system is turned off.

### 3.3.1 CONNECTION LOCATIONS

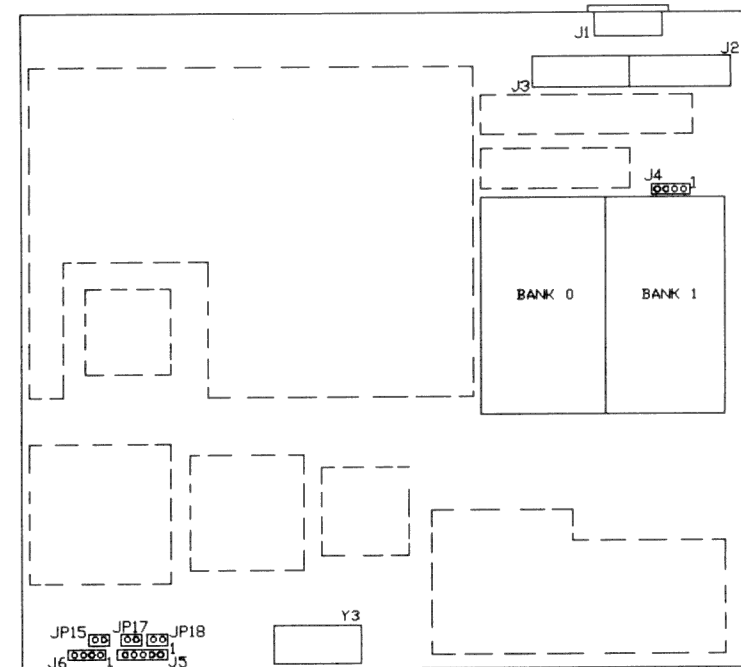


Fig 8 Connector Locations

## 3.4 CONNECTORS

### 3.4.1 J2/J3-POWER SUPPLY CONNECTOR

The power supply connector has two six-pin male header connectors. Plug the dual connectors from the power directly onto the board connector.

J3		J2	
Pin	Description	Pin	Description
1	Power Good	1	Ground
2	+5V DC	2	Ground
3	+12V DC	3	-5V DC
4	-12V DC	4	+5V DC
5	Ground	5	+5V DC
6	Ground	6	+5V DC

Table 10

### 3.4.2 J5-KEYLOCK & POWER LED CONNECTOR

J5 is a keylock connector that enables and disables the keyboard and the Power-LED on the case.

Pin	Description
1	LED power
2	Not Used
3	Ground
4	Keyboard Inhibiter
5	Ground

Table 11

### 3.4.3 JP17-TURBO SWITCH CONNECTOR

JP17 connects to the Turbo switch, which is used to select the mainboard's clock speed.

Setting	Description
Open	Normal Mode
Short (default)	Turbo Mode

Table 12

### 3.4.4 JP15-TURBO LED CONNECTOR

JP15 is usually connected to a Turbo LED on front of the system case. If the system board select is in Turbo mode, the indicator will light during high-speed operation.

Pin	Description
1	+ Anode
2	-Cathode

Table 13

### 3.4.5 J6-SPEAKER CONNECTOR

Attach the system speaker to connector J6.

Pin	Description
1	Data Out
2	Not Used
3	Ground
4	+5V

Table 14

### 3.4.6 JP18-RESET SWITCH CONNECTOR

Attach the Reset switch cable to this connector. The Reset switch restarts the system.

Setting	Description
Short	Reset
Open	Not Reset

Table 15

### 3.4.7 J4-EXTERNAL BATTERY

The GMB-786UN mainboard has a battery on-board; however, user can also attach an external battery to connector J4. Using an external battery helps to conserve the on-board battery.

Pin	Description
1	VDD (6V)
2	Not Used
3	Ground
4	Ground

Table 16

### 3.4.8 J1-KEYBOARD CONNECTOR

A standard five-pin female DIM keyboard connector is located at the rear of the keyboard. Plug the jack on the keyboard cable into this connector.

Pin	Description
1	Keyboard Clock
2	Keyboard Data
3	Spare
4	Ground
5	+5V DC

Table 17

## 3.5 SYSTEM ASSEMBLY OVERVIEW

After installing and connecting the mainboard, assemble components in the following order:

1. **Power Supply:** Place the power supply so that it fits the raised tongues on the chassis floor. Insert and fasten the two screws on the back panel of the chassis. Connect the power supply to the power supply connector, J2/J3.
2. **Disk Drives:** Slide disk drives into the chassis. Connect a wide 34-wire ribbon cable to each disk drive; this cable will attach to an adapter card. The power supply has four cables, each with four wires. Connect these cables to the disk drives.
3. **Adapter Cards:** Insert each adapter card -- Disk Controller cards, Video card, Serial/Parallel Interface card, etc. -- into an expansion slot. Refer to the installation and configuration instructions that comes with the card. Connect the disk drives to the Floppy Disk and Hard Disk Controller cards.
4. **Keyboard:** Connect the keyboard to its connector, J1.
5. **Display:** Connect the display cable to the Video Card, and the display's power cord into a power outlet.
6. **Case:** Slide on the case cover and fasten its screws.

Connect the power cord to the power supply and plug it into a wall outlet. Put the boot disk into drive A: and turn on the power. User will then need to run the BIOS setup program.

## CHAPTER 4 AMI BIOS SETUP

The setup program provided with the mainboard is the AMI BIOS from American Megatrends Inc. Enter the AMI Setup program's Main Menu as follows:

1. Turn on or reboot the system. After a series of diagnostic checks, the following message appears:  
"Hit <DEL> if you want to run SETUP"
2. Press the <DEL> key to enter the AMI BIOS setup program and the following screen appears:  
STANDARD CMOS SETUP  
ADVANCED CMOS SETUP  
ADVANCED CHIPSET SETUP  
AUTO CONFIGURATION WITH BIOS DEFAULTS  
AUTO CONFIGURATION WITH POWER-ON DEFAULTS  
CHANGE PASSWORD  
HARD DISK UTILITY  
WRITE TO CMOS AND EXIT  
DO NOT WRITE TO CMOS AND EXIT
3. Choose an option and press <Enter>. Modify the system parameters to reflect the options installed in the system. (See the following sections for more information).
4. Press <ESC> at anytime to return to the Main Menu.
5. In the Main Menu, choose "WRITE TO CMOS AND EXIT" to save changes and reboot the system. Choosing "DO NOT WRITE TO CMOS AND EXIT" ignores all changes and exists the program.

### 4.1 STANDARD CMOS SETUP

Run the Standard CMOS Setup as follows.

1. Choose "STANDARD CMOS SETUP" from the Main Menu and a screen with a list of items appears.



BIOS SETUP PROGRAM - STANDARD CMOS SETUP																																																							
(C)1990 American Megatrends Inc., All Rights Reserved																																																							
Date (mn/date/year): Thu, Jan 31 1991	Base memory : 640 KB																																																						
Time (hour/min/sec): 15 : 23 : 15	Ext. memory : 3072 KB																																																						
Daylight saving : Disabled	Cyln Head Wpcom LZone Sect Size																																																						
Hard disk C: type : Not Installed																																																							
Hard disk D: type : Not Installed																																																							
Floppy drive A : Not Installed																																																							
Floppy drive B : Not Installed																																																							
Primary display : Not Installed																																																							
Keyboard : Not Installed																																																							
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Year : 1981, 1982, ..., 2099																																																							
ESC:Exit ←→↑↓:Select F2/F3:Color PU/PD:Modify																																																							

Fig 9 Standard CMOS Setup Screen

- Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn keys. Some fields let user enter numeric values directly.
- After user finished with the Standard CMOS Setup program, press the <ESC> key. The following appears:  
"Write to CMOS and Exit (Y/N)?"
- Typing "N" and <Enter> returns user to the Main Menu. Typing "Y" and <Enter> saves the system parameters and the system reboots.

## 4.2 ADVANCED CMOS SETUP

Run the Advanced CMOS Setup as follows.

- Choose "ADVANCED CMOS SETUP" from the Main Menu and a screen with a list of items appears.

BIOS SETUP PROGRAM - ADVANCED CMOS SETUP	
(C)1990 American Megatrends Inc., All Rights Reserved	
Typematic Rate Programming : Enabled	Turbo Switch Function : Enabled
Typematic Rate Delay (msec) : 500	Password Checking Option : Setup
Typematic Rate (Chars/Sec) : 15	Video ROM Shadow C000, 16K : Enabled
Mouse Support Option : Enabled	Video ROM Shadow C400, 16K : Enabled
Above 1 MB Memory Test : Disabled	Adaptor ROM Shadow C800, 16K : Enabled
Memory Test Tick Sound : Enabled	Adaptor ROM Shadow CC00, 16K : Enabled
Memory Parity Error Check : Enabled	Adaptor ROM Shadow D000, 16K : Disabled
Hit <DEL> Message Display : Enabled	Adaptor ROM Shadow D400, 16K : Disabled
Hard Disk Type 47 RAM Area : 0:300	Adaptor ROM Shadow D800, 16K : Disabled
Wait For <F1> If Any Error : Enabled	Adaptor ROM Shadow DC00, 16K : Disabled
System Boot Up Num Lock : On	Adaptor ROM Shadow E000, 16K : Disabled
Numeric Processor Test : Enabled	Adaptor ROM Shadow E000, 64K : Disabled
Weitek Processor : Disabled	System ROM Shadow F000, 64K : Enabled
Floppy Drive Seek At Boot : Enabled	C000 Write Protect, 64K : Enabled
System Boot Up Sequence : A:, C:	D000 Write Protect, 64K : Disabled
System Boot Up CPU Speed : High	E000 Write Protect, 64K : Disabled
Cache Memory Select : Both	BootSector Virus Protection : Disabled
Fast A20 and fast reset : Enabled	
Fast KB Reset DELAY 2 $\mu$ s : Enabled	
Fast KB Reset Requires HALT : Disabled	
ESC:Exit ←→↑↓:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 10A BIOS Setup Defaults  
(80486DX, 80486SX, 80486DX2, 80487SX and 486DLC CPU)

BIOS SETUP PROGRAM - ADVANCED CMOS SETUP	
(C)1990 American Megatrends Inc., All Rights Reserved	
Typematic Rate Programming : <b>Enabled</b>	Turbo Switch Function : <b>Enabled</b>
Typematic Rate Delay (msec) : <b>500</b>	Password Checking Option : <b>Setup</b>
Typematic Rate (Chars/Sec) : <b>15</b>	Video ROM Shadow C000, 16K : <b>Enabled</b>
Mouse Support Option : <b>Enabled</b>	Video ROM Shadow C400, 16K : <b>Enabled</b>
Above 1 MB Memory Test : <b>Disabled</b>	Adaptor ROM Shadow C800, 16K : <b>Enabled</b>
Memory Test Tick Sound : <b>Enabled</b>	Adaptor ROM Shadow CC00, 16K : <b>Enabled</b>
Memory Parity Error Check : <b>Enabled</b>	Adaptor ROM Shadow D000, 16K : <b>Disabled</b>
Hit <DEL> Message Display : <b>Enabled</b>	Adaptor ROM Shadow D400, 16K : <b>Disabled</b>
Hard Disk Type 47 RAM Area : <b>0:300</b>	Adaptor ROM Shadow D800, 16K : <b>Disabled</b>
Wait For <F1> If Any Error : <b>Enabled</b>	Adaptor ROM Shadow DC00, 16K : <b>Disabled</b>
System Boot Up Num Lock : <b>On</b>	Adaptor ROM Shadow E000, 16K : <b>Disabled</b>
Numeric Processor Test : <b>Enabled</b>	Adaptor ROM Shadow E000, 64K : <b>Disabled</b>
Weitek Processor : <b>Absent</b>	System ROM Shadow F000, 64K : <b>Enabled</b>
Floppy Drive Seek At Boot : <b>Enabled</b>	C000 Write Protect, 64K : <b>Enabled</b>
System Boot Up Sequence : <b>A:, C:</b>	D000 Write Protect, 64K : <b>Disabled</b>
System Boot Up CPU Speed : <b>High</b>	E000 Write Protect, 64K : <b>Disabled</b>
Cache Memory Select : <b>Enabled</b>	BootSector Virus Protection : <b>Disabled</b>
Fast A20 and fast reset : <b>Enabled</b>	
Fast KB Reset DELAY 2μs : <b>Enabled</b>	
Fast KB Reset Requires HALT : <b>Disabled</b>	
ESC:Exit ↓↑←→:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 10B BIOS Setup Defaults (80386DX CPU)

- Use the arrow keys to move between items and to select values. Modify the selected fields by using the PgUp/PgDn keys. An explanation of the <F> keys follows:
  - <F1>: "Help" gives options available for each item.
  - <F2/F3>: Change color.
  - <F5>: Get the old values. These values are the values with which the user started the current session. If the CMOS was good, then the old values are either the CMOS values or the BIOS Setup default values.
  - <F6>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the BIOS Setup default values.
  - <F7>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the Power-On default values.
- After user has finished with the Advanced CMOS Setup program, press the <ESC> key. the following appears:
 

"Write to CMOS and Exit (Y/N)?"
- Typing "N" and <Enter> returns user to the Main Menu. typing "Y" and <Enter> saves the system parameters and the system reboots.

### 4.3 ADVANCED CHIPSET SETUP

The Advanced Chipset Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.

*Note:* Change these settings only if user is familiar with the Chipset.

Run the Advanced Chipset Setup as follows:

1. Choose "ADVANCED CHIPSET SETUP" from the Main Menu and a screen with a list of items appears.

BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP (C)1990 American Megatrends Inc., All Rights Reserved	
Hidden Refresh	: Enabled
Cache Scheme	: W-Back
Video BIOS Cache	: Enabled
DRAM Read/Write	: 1 WS
RAS Precharge	: 2ScLk
SRAM Read	: 0 WS
SRAM Burst	: Enabled
SRAM Write	: 1 WS
Master Cycle Swap	: Disabled
IO Recovery Time	: 1ATCLK
AT Wait State	: 0 WS
AT BUS CLK	: CLK2/10
Non-Cacheable Block-0 Size	: 0 KB
Non-Cacheable Block-0 Base	: 0000000H
Non-Cacheable Block-1 Size	: 0 KB
Non-Cacheable Block-1 Base	: 0000000H
Cyrix A20M Pin	: Disabled
Cyrix Pin Enabled	: Barb
Gate A20 Path	: Normal
ESC:Exit ↓→↑←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 11A Default Advanced Chipset Setup Screen for 386DX-40

BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP (C)1990 American Megatrends Inc., All Rights Reserved	
Hidden Refresh	: Enabled
Cache Scheme	: W-Back
Video BIOS Cache	: Enabled
DRAM Read/Write	: 0 WS
RAS Precharge	: 2ScLk
SRAM Read	: 0 WS
SRAM Burst	: Enabled
SRAM Write	: 0 WS
Master Cycle Swap	: Disabled
IO Recovery Time	: 1ATCLK
AT Wait State	: 0 WS
AT BUS CLK	: SCLK/3
Non-Cacheable Block-0 Size	: 0 KB
Non-Cacheable Block-0 Base	: 0000000H
Non-Cacheable Block-1 Size	: 0 KB
Non-Cacheable Block-1 Base	: 0000000H
Cyrix A20M Pin	: Disabled
Cyrix Pin Enabled	: Barb
Gate A20 Path	: Normal
ESC:Exit ↓→↑←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 11B Default Advanced Chipset Setup Screen for 486SX-25/486DX2-50

BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP	
(C)1990 American Megatrends Inc., All Rights Reserved	
Hidden Refresh	: Enabled
Cache Scheme	: W-Back
Video BIOS Cache	: Enabled
DRAM Read/Write	: 1 WS
RAS Precharge	: 2Sclk
SRAM Read	: 0 WS
SRAM Burst	: Enabled
SRAM Write	: 0 WS
Master Cycle Swap	: Disabled
IO Recovery Time	: 1ATCLK
AT Wait State	: 0 WS
AT BUS CLK	: SCLK/4
Non-Cacheable Block-0 Size	: 0 KB
Non-Cacheable Block-0 Base	: 0000000H
Non-Cacheable Block-1 Size	: 0 KB
Non-Cacheable Block-1 Base	: 0000000H
Cyrix A20M Pin	: Disabled
Cyrix Pin Enabled	: Barb
Gate A20 Path	: Normal
ESC:Exit ↓→↑←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 11C Default Advanced Chipset Setup Screen for 486DX-33/486DX2-66

BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP	
(C)1990 American Megatrends Inc., All Rights Reserved	
Hidden Refresh	: Enabled
Cache Scheme	: W-Back
Video BIOS Cache	: Enabled
DRAM Read/Write	: 2 WS
RAS Precharge	: 4Sclk
SRAM Read	: 1 WS
SRAM Burst	: Enabled
SRAM Write	: 2 WS
Master Cycle Swap	: Disabled
IO Recovery Time	: 1ATCLK
AT Wait State	: 0 WS
AT BUS CLK	: SCLK/6
Non-Cacheable Block-0 Size	: 0 KB
Non-Cacheable Block-0 Base	: 0000000H
Non-Cacheable Block-1 Size	: 0 KB
Non-Cacheable Block-1 Base	: 0000000H
Cyrix A20M Pin	: Disabled
Cyrix Pin Enabled	: Barb
Gate A20 Path	: Normal
ESC:Exit ↓→↑←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color	
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults	

Fig 11D Default Advanced Chipset Setup Screen for 486DX-50

- Use the arrow keys to move between items select values. Modify selected fields using the PgUp/PgDn keys. An explanation of the <F> keys are shown on pg27 of this manual.
- After finishing with the Advance Chipset Setup, press the <ESC> key. The following appears:  
"Write to CMOS and Exit (Y/N)?"
- Typing "N" and <Enter> returns user to the Main Menu. Typing "Y" and <Enter> saves the system parameters and the system reboots.

## 4.4 AUTO CONFIGURATION WITH BIOS DEFAULTS

This Main Menu item loads the default system values. If the CMOS is corrupted the defaults will load automatically. Choose this item and the following message appears:

"Load BIOS Setup Default Values from ROM Table (Y/N)? N"

To use the BIOS defaults, change the prompt to "Y" and press <Enter>.

The following message appears:

"Default values loaded. Press any key to continue."

## 4.5 AUTO CONFIGURATION WITH POWER-ON DEFAULTS

This Main Menu item uses the default Power-On values. Use this option as a diagnostic aid if the system behaves erratically. Choose this item and the following message appears:

"Load Power-On Default Values (Y/N)? N"

To use the Power-On defaults, change the prompt to "Y" and press <Enter>. The following message appears:

"Default values loaded. Press any key to continue."

## 4.6 CHANGE PASSWORD

The Main Menu item lets user to configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program.

The password cannot be longer than 6 ASCII characters. A default password is stored in the ROM in case the CMOS is corrupted. The default password is <AMI>. To change the password choose "Change Password" in the Main Menu and press <Enter>.

When user next boot the system, after saving changed value to CMOS, user will be prompted for the password.

If user is not prompted for the password, check that the "Password Checking Option" in the Advanced CMOS Setup is configured for "Always" or "Setup". See the section above on "Advanced CMOS Setup."

When the password prompt appears, key in the new password and press <Enter>. If loose or disconnected batteries corrupt the CMOS, use the default password, <AMI> instead.

**Important:** Keep a safe record of the new password. If forget or lose the password, the only way to access the system is to disconnect the CMOS batteries and then re-use the default password <AMI>.

## 4.7 HARD DISK UTILITY

This Main Menu item gives user three options for analyzing and formatting a hard disk. The three options are:

- **Hard Disk Format** - performs a "low level" format of the hard disk. Check with the hard drive manufacturer to see if this option is required.
- **Auto Interleave** - determines optimum interleave factor before formatting the hard disk.
- **Media Analysis** - analyzes each track of the hard drive. Marks unusable tracks as "bad" to prevent future data storage on those tracks.

Error messages specific to the Hard Disk Utility options may appear during initialization or operation. Refer to Chapter 6 for a list of these messages.

**Warning:** *Performing any one of these options destroys all data on the hard disk. User must back-up the hard disk before performing any of these tests.*

- Notes:**
1. *System documentation of brand new hard disk usually provides a list of "bad tracks" as well as the optimum interleave factor.*
  2. *These options are not valid for a SCSI Disk Drive.*

## CHAPTER 5 HARD DISK TYPES

The AMI BIOS supports the following hard disk types.

Type	Cyln	Head	WPrec	LZone	Sect	Cap (MB)
1	306	4	128	305	17	10MB
2	615	4	300	615	17	20MB
3	615	6	300	615	17	31MB
4	940	8	512	940	17	62MB
5	940	6	512	940	17	47MB
6	615	4	65535	615	17	20MB
7	462	8	256	511	17	31MB
8	733	5	65535	733	17	30MB
9	900	15	65535	901	17	112MB
10	820	3	65535	820	17	20MB
11	855	5	65535	855	17	35MB
12	855	7	65535	855	17	50MB
13	306	8	128	319	17	20MB
14	733	7	65535	733	17	43MB
15	0	0	0	0	0	0MB
16	612	4	0	663	17	20MB
17	977	5	300	977	17	41MB
18	977	7	65535	977	17	57MB
19	1024	7	512	1023	17	60MB
20	733	5	300	732	17	30MB
21	733	7	300	732	17	43MB
22	733	5	300	733	17	30MB
23	306	4	0	336	17	10MB
24	925	7	0	925	17	54MB
25	925	9	65335	925	17	69MB

(TO BE CONTINUED)

Type	Cyln	Head	WPrec	LZone	Sect	Cap (MB)
26	754	7	754	754	17	44MB
27	754	11	65535	754	17	69MB
28	699	7	256	699	17	41MB
29	823	10	65535	823	17	68MB
30	918	7	918	918	17	53MB
31	1024	11	65535	1024	17	94MB
32	1024	15	65535	1024	17	128MB
33	1024	5	1024	1024	17	43MB
34	612	2	128	612	17	10MB
35	1024	9	65535	1024	17	77MB
36	1024	8	512	1024	17	68MB
37	615	8	128	615	17	41MB
38	987	3	987	987	17	25MB
39	987	7	987	987	17	57MB
40	820	6	820	820	17	41MB
41	977	5	977	977	17	41MB
42	981	5	981	981	17	41MB
43	830	7	512	830	17	48MB
44	830	10	65535	830	17	69MB
45	917	15	65535	918	17	114MB
46	1224	15	65535	1223	17	152MB
47	USER DEFINE TYPE					

**Table 18: Default Fixed Disk Table**

## CHAPTER 6 ERROR CODES

Every time when power on the system, the POST (Power On Self Test) diagnostic routines will check to make sure the system is running properly. During boot-up, the POST communicate errors to the user as either a series of beeps, or as messages on the display screen. Fatal errors do not let the system complete boot-up, and are usually signalled as a series of beeps, since the display may not come on. Non-fatal errors allow boot-up to continue, and error messages appear on the screen.

### 6.1 BEEP ERROR CODES

These codes are emitted as a series of audible beeps. All Beep Error Codes, except for number 8, are fatal errors. If the system does not boot-up and starts beeping, write down the number of beeps that had heard and consult an authorized repair person.

Beep Error Codes and their meanings follow:

Number of Beeps	Error Message
1	Refresh Failure
2	Parity Error
3	Base 64 KB Memory Failure
4	Timer Not Operational
5	Processor Error
6	8042 - Gate A20 Failure
7	Processor Exception Interrupt Error
8	Display Memory Read/Write Error
9	ROM Checksum Error
10	CMOS Shutdown Register Read/Write Error

**Table 19**

## 6.2 ERROR MESSAGES

Non-fatal Error Messages usually appear on the screen as follows:

ERROR Message Line 1

ERROR Message Line 2

Press <F1> to RESUME

After user note the Error Message, then press the <F1> key to allow the system to proceed with boot-up. A list of Error Messages follows:

Message	Action
CMOS Battery State Low	Replace the battery.
CMOS Checksum Failure	Run the BIOS SETUP program.
CMOS System Options Not Set	Run the BIOS SETUP program.
CMOS Display Type Mismatch	Run the BIOS SETUP program.
Display Switch Not Proper	Properly set the video switch on the mainboard to monochrome or color.
Keyboard Is Locked...Unlock It	Unlock the keyboard lock to continue boot-up.
Keyboard Error	Make sure to have the AMI keyboard BIOS installed, or set the Standard CMOS Setup's "Keyboard" option to "Not Installed".
CMOS Memory Size Mismatch	Run the BIOS SETUP program.
FDD Controller Failure	Check all connections after the system is powered off.
HDD Controller Failure	Check all connections after the system is powered off.

Message	Action
C: Drive Error	Check Standard CMOS Setup to see if correct hard disk is selected.
D: Drive Error	Check Standard CMOS Setup to see if correct hard disk is selected.
CMOS Time & Date Not Set	Check Standard CMOS Setup to see if correct date and time are selected.
Diskette Boot Failure	Use another boot disk.
Invalid Boot Diskette	Use another boot disk.
On Board Parity Error	Use memory diagnostic software, such as AMIDIAG, to find and correct memory problems.
Off Board Parity Error	Use memory diagnostic software, such as AMIDIAG, to find and correct memory problems.
Parity Error ????	Use memory diagnostic software, such as AMIDIAG, to find and correct memory problems.

Table 20

Note: For any other error messages please consult an authorised repair person.



### 6.3 HARD DISK UTILITY ERROR MESSAGES

The following error messages may appear during the Hard Disk Utility routines of the BIOS Setup program. The first four messages may appear during initialization; the rest may appear during operations.

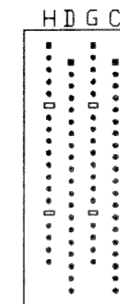
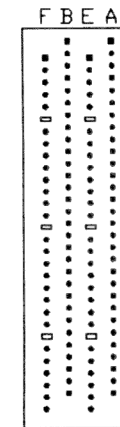
Message	Action
<b>No Hard Disk Installed</b>	Check if hard disk is on the system.
<b>Fatal Error Bad Hard Disk</b>	Check all cables and power connections.
<b>Hard Disk Controller Failure</b>	Check that the controller is properly inserted in the BUS slot.
<b>C: (D:) Hard Disk Failure</b>	Check all cables and power connections.
<b>Drive Parameter Activity Failed</b>	Check to see if the proper drive type is selected in the Standard CMOS Setup.

Table 21

Note: For any other error messages please consult an authorised repair person.

## CHAPTER 7 CONNECTOR PIN ASSIGNMENT

This chapter provides the pin assignment of the OPTi Local Bus/AT Bus on EISA connector.



AT BUS: A,B,C,D  
LOCAL: E,F,G,H

Fig 12 EISA Connector

<u>ROW F</u>	<u>ROW B</u>	<u>ROW E</u>	<u>ROW A</u>
1 CA(2)	1 GROUND	1 GROUND	1 IOCHCK#
2 CA(4)	2 RESDRV	2 CA(3)	2 D(7)
3 CA(6)	3 +5V	3 CA(5)	3 D(6)
4 CA(8)	4 IRQ(9)	4 CA(7)	4 D(5)
5 +5V	5 -5V	5 CA(9)	5 D(4)
ACCESS KEY	6 DRQ(2)	ACCESS KEY	6 D(3)
7 CA(10)	7 -12V	7 GROUND	7 D(2)
8 CA(12)	8 N0WS#	8 CA(11)	8 D(1)
9 CA(14)	9 +12V	9 CA(13)	9 D(0)
10 CA(16)	10 GROUND	10 CA(15)	10 CHRDY
11 +5V	11 SMWTC#	11 CA(17)	11 AEN#
12 CA(18)	12 SMRDC#	12 GROUND	12 SA(19)
13 CA(20)	13 IOWC#	13 CA(19)	13 SA(18)
14 CA(22)	14 IORC#	14 CA(21)	14 SA(17)
15 CA(24)	15 DACK#(3)	15 CA(23)	15 SA(16)
ACCESS KEY	16 DRQ(3)	ACCESS KEY	16 SA(15)
17 +5V	17 DACK#(1)	17 CA(25)	17 SA(14)
18 DRAMS#	18 DRQ(1)	18 GROUND	18 SA(13)
19 RST4#	19 REFRESH#	19 GROUND	19 SA(12)
20 +5V	20 BCLK	20 READY#	20 SA(11)
21 BE#(2)	21 IRQ(7)	21 BE#(3)	21 SA(10)
22 BE#(0)	22 IRQ(6)	22 BE#(1)	22 SA(9)
23 HRQ0	23 IRQ(5)	23 GROUND	23 SA(8)
24 M/IO#	24 IRQ(4)	24 HLDA1	24 SA(7)
ACCESS KEY	25 IRQ(3)	ACCESS KEY	25 SA(6)
26 W/R#	26 DACK#(2)	26 ADS#	26 SA(5)
27 +5V	27 T/C	27 D/C#	27 SA(4)
28 SCLK	28 BALE	28 RDYO#	28 SA(3)
29 LDEV#	29 +5V	29 GROUND	29 SA(2)
30 CD(31)	30 OSC	30 CD(30)	30 SA(1)
31 CD(29)	31 GROUND	31 CD (28)	31 SA(0)

Table 22A: EISA Connector Row F,B,E,A

<u>ROW H</u>	<u>ROW D</u>	<u>ROW G</u>	<u>ROW C</u>
1 CD(27)	1 W16#	1 GROUND	1 SBHE#
2 +5V	2 IOCS#	2 CD(26)	2 LA(23)
3 CD(25)	3 IRQ(10)	3 CD(24)	3 LA(22)
4 CD(23)	4 IRQ(11)	4 CD(22)	4 LA(21)
5 CD(21)	5 IRQ(12)	5 CD(20)	5 LA(20)
ACCESS KEY	6 IRQ(15)	ACCESS KEY	6 LA(19)
7 CD(19)	7 IRQ(14)	7 CD(18)	7 LA(18)
8 CD(17)	8 DACK#(0)	8 CD(16)	8 LA(17)
8 CD(15)	9 DRQ(0)	9 GROUND	9 MRDC#
10 +5V	10 DACK#(5)	10 CD(14)	10 MWTC#
11 CD(13)	11 DRQ(5)	11 CD(12)	11 D(8)
12 CD(11)	12 DACK#(6)	12 CD(10)	12 D(9)
13 CD(9)	13 DRQ(6)	13 CD (8)	13 D(10)
14 CD(7)	14 DACK#(7)	14 GROUND	14 D(11)
ACCESS KEY	15 DRQ(7)	ACCESS KEY	15 D(12)
16 +5V	16 +5V	16 CD(6)	16 D(13)
17 CD(5)	17 MASTER#	17 CD(4)	17 D(14)
18 CD(3)	18 GROUND	18 CD(2)	18 D(15)
19 CD(1)		19 CD(0)	

Table 22B: EISA Connector Row H,D,G,C