80486VESA Motherboard

User's Manual

Part No. 03-0023X-00

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1 Introduction

What is VESA VL-Bus?

The VESA VL-Bus is a proposal from the Video Electronics Standard Association committee. The architecture of the VL-Bus generally follows the 486 CPU local bus. Additional hardware functions are added to accommodate VL-Bus master devices and intrractinn with the system I/O bus. The VL-bus extends the capabilities of the 16-bit ISA bus to 32-bus architecture and up to 100Mb/sec (at 50 MHz data transfer rate, while maintaining compatibility with ISA add-on boards.

The VL-Bus slot uses a Micro Channel connector inline with a ISA bus connector.

Advantage of VESA VL-Bus

The VL-Bus allows VL-Bus devices to operate at full CPU bandwidth, this can dramatically increase the speed of I/O-bound peripherals such as SCSI control card and Video Graphic adapter with a very minimum increase in cost. For example, a peripheral device on the ISA bus will take a minimum of 500 nanosecond to complete a data transfer while a peripheral on the VL-Bus will take only 40 nanosecond (at 50MHz) to complete a data transfer. In addition to that, VL-Bus is a 32-bit bus compared to ISA's 8/16-bit bus.

80486VESA Motherboard Overview

The 80486VESA system board is a high performance, function enchanced computer system board that combines the power of Intel's new 80486 CPU and the VESA VL-bus. The board design includes a variety of high-powered features. Its high performance capability can provide an ideal system board solution for a wide range of demanding applications like CAD/CAM/CAE, database management, image processing, artificial intelligence, desktop publishing, and the environments of network and multiuser systems. The 80486VESA system board fully utilizes the 32-bit CPU power.

The 80486VESA system board also incorporates an Intel 80486 microprocessor which has an 8 KByte static RAM cache. Included is a four-way set associative cache controller implemented on the 80486 chip and an internal enhanced numeric coprocessor unit. The system also has an option to accommodate 64KB, 128KB, and 256KB of external cache.

Because of its unique memory subsystem design, the 80486VESA allows for 1 Megabyte to 32 Megabytes of 32-bit high speed memory by using 256KB, 1MB, and/or 4MB SIMM modules.

80486VESA Features

- Intel 80486 microprocessor
  - 8 KBytes static RAM with four-way set associative internal cache
  - Internal enhanced numeric coprocessor unit (486DX, 486DX2, 487SX, 486SX2)
- Optional 64/128/256KBytes external cache
- SIMM module memory on system board expandable from 1 Megabyte to 32 Megabytes
- Dual system speed via hardware or software selection
- System and video BIOS relocateable to RAM area for enhanced performance
- Two 32-bit VL-Bus, two 8-bit ISA bus and four 16-bit ISA bus slots
- Fast A20 implementation to speed-up multitasking operating system
- Hidden DRAM refresh to boost system performance
- SiS-460 Single Chip

Performance Report

80486VESA-20 MHz:
- Landmark Speed Rating : 91.2 MHz (Ver. 1.14)
- Power Meter MIPS : 8.898 MIPS (Ver. 1.3)

80486VESA-25 MHz:
- Landmark Speed Rating : 114.1 MHz (Ver. 1.14)
- Power Meter MIPS : 11.136 MIPS (Ver. 1.3)

80486VESA-33 MI-Iz:
- Landmark Speed Rating : 151.9 MHz (Ver. 1.14)
- Power Meter MIPS : 14.819 MIPS (Ver. 1.3)

80486VESA-50 MHz:
- Landmark Speed Rating : 200 + MHz (Ver. 1.14)
- Power Meter MIPS : 22.271 MIPS (Ver. 1.3)

2 Configuration and layout

Connector and Jumper Settings

Before installing the 80486VESA system board, make sure the connectors and jumper settings are set for your configuration.

The 80486VESA system board has two jumpers (JP9, JP1O) for the CPU Type selection, and two jumpers (JP12, JP13) for the Cache Size selection. Connectors are also provided for the front panel interface between the system board and the computer chassis. The functions and settings of each connector and jumper setting are explained as follows (see Figure 1, page 11 for locations).

Front Panel Reset Connector (JP14)

The reset button connector is a 2-pin single in-line BERG strip. It is used to reboot the system and will allow safe re-initialization of the system at any time. The connector should always be set in the OFF position, otherwise the system will continually reset itself. The pin assignments are:

JP14 Pin#	Assignment
1	Ground
2	Reset Strobe

Front Panel Turbo Connector (JP15)

Connector JP15 is a 2-pin single in-line BERG strip. It is the connector for the "Turbo" processor speed which can allow you to switch between system speeds. (Please refer to Chapter 3 "Installation & Operation" for a detailed description on speed switching procedures). The pin assignments are:

JP15 Pin#	Assignment
1	Ground
2	Turbo Control

Front Panel Turbo LED Connector (JP16)

Connector JP16 is a 2-pin single in-line BERG strip. It can be connected to an LED display indicating the CPU speed. The display lights up when the CPU is running at full speed (Please refer to Chapter 3 "Installation & Operation" for more information about speed change). The pin assignments arc:

JP16 Pin#	Assignment
1	Anode
2	Cathode

Front Panel Keylock and Power LED Connector (JP18)

Connector JP18 is a 5-pin single in-line BERG strip which provides for the front panel keylock and power LED connection When it is connected to a lock on your system case you can enable or disable the keyboard by switching the key. The pin assignments are:

P18 Pin#	Assignment
1	LED power
2	N. C.
3	ground
4	keyboard inhibit
5	ground

Front Panel Speaker Connector (JP17)

Connector JP17 is a 4-pin single in-line BERG strip which provides for the front panel speaker connection. The pin assignments are:

JP17 Pin#	Assignment
1	speaker data
2	N. C.
3	ground
4	+5 v

Power Supply Connector (PW1)

There is a power supply connectors on-board. The pin assignments are:

PWl Pin#	Assienment
1	power good
2	+5 VDC
3	+12 VDC
4	-12 VDC
5	ground
6	ground
7	ground
8	ground
9	-5VDC
10	+5VDC
11	+5VDC
12	+5VDC

External Battery (JPl)

The 80486VESA motherboard provides one external battery supply connector. The pin assignments are:

JP1 Pin#	Assignment
1	Battery Positive
2	No Connection
3	Ground
4	Ground

Monitor Type (JP2)

Jumper JP2 is used to set the display type. The motherboard is designed to work with both monochrome and color display monitors. The pin assignments are:

JP2 Pin#	Function
1&2 (Closed)	Monochrome Monitor
l&2 (Open)	Color Monitor

Keyboard Connector (KBl)

The keyboard connector is a 5-pin DIN connector. This connector consist of a 90-degree printed circuit board PCB mounting. The pin assignments are:

KBl Pin#	Assignment
1	keyboard clock
2	keyboard data
3	spare
4	ground
5	+5 v

CPU Type Selection

The 80486VESA motherboard can accomodate either the Intel 486DX, 486DX2,486SX, 487SX, 486 Over Drive, 486SX/DX PQFP or P24T. There are two jumpers to be set for the microprocessor Selection. Configuration of the correct CPU setting will allow compatibility with various low end and high end applications. The jumper settings are:

U46	U48	JP9	JP10	JP22	JP23
—	486SX/DX-PQFP	1-2, 3-4	1-2	Close	Open
486SX	—	2-3	Open	Open	Close
486DX/486DX2 486 Over Drive 168-pin	—	1-2,3-4	1-2	Open	Close
487SX/487SX2 486 Over Drive 169-pin P24T	—	1-2,3-4	2-3	Open	Close
486DX/486DX2 486 Over Drive 168-pin	486SX/DX-PQFP	1-2,3-4	1-2	Open	Close
487SX/487SX2 486 Over Drive 169-pin P24T	486SX/DX-PQFP	1-2,3-4	2-3	Open	Close

CPU Clock Selection

The 80486 VESA motherboard uses a CPU frequency generator to generate the clock instead of oscillator. There are three jumpers to be set for the CPU clock selection. The jumper settings are:

CPU Clock			
50 MHz	Open	Close	2-3
40 MHz	Close	Close	2-3
33 MHz	Close	Open	1-2
25 MHz	Open	Close	1-2
20 MI	Close	Close	1-2

Cache Memory Configuration

There are two jumpers to be set for the cache memory selection The jumper selections are as follows:

Selection	JP13	JP12
64K	Open	Open
128K	1-2	Close
256K	2-3	Close

Table 3: Cache Memory Configurations

Note: For 64K cadre, *install 8Kx8 SRAM in locations 1143, U34, 1135, U36, U37, U39, U40, U41, and U42.*

For 128K cache, install 8Kx8 SRAM in locations 1143, and 32Kx8 SRAM in locations U34, U35, U36, and U37.

For 256K cache install 32Kx8 SRAM in locations U43, U34, U35, U36, U37, U39, U40, U41, and U42.

VESA VL-Bus Identifier Jumpers (JP19, JP20)

The identifier jumpers (JP19, JP20) allow VL-Bus slave to identify the speed of the host CPU.

High Speed Write	JP19
0 wait write min.	Open
1 wait write min.	Close

CPU Speed	JP20
<=33MHz	Open
> 33MHz	Close

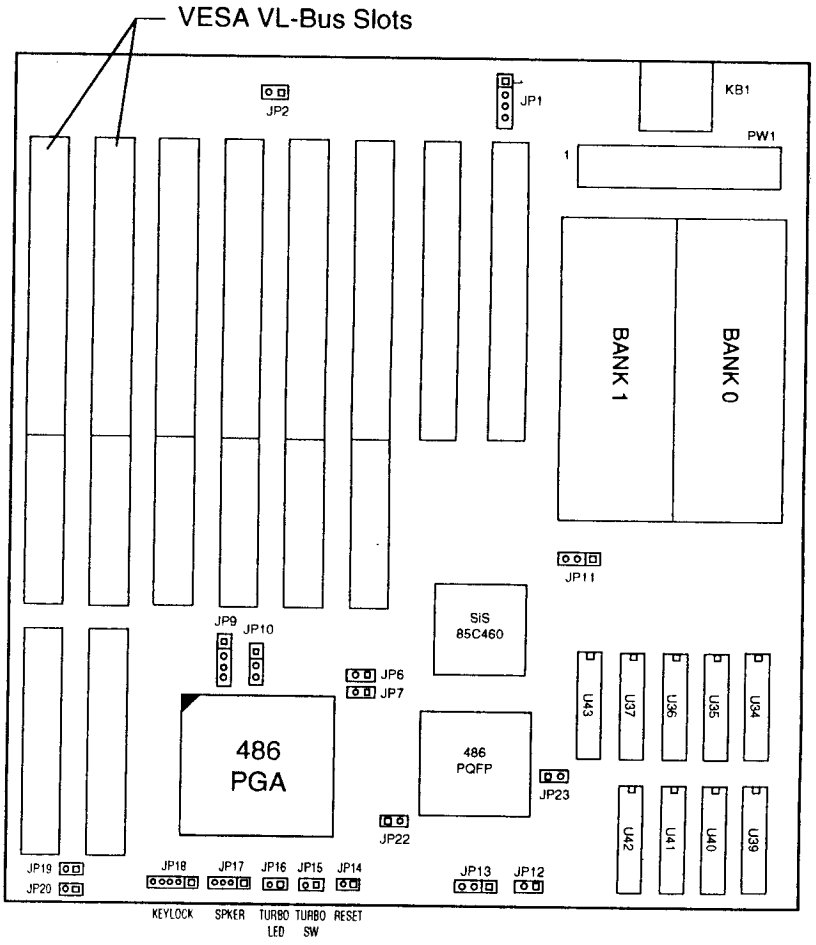

Figure 1: 80486VESA Motherboard

3 Installation and Operation

Before You Begin

Before removing the motherboard from its anti-static bag, you need to eliminate any static electricity that may be accumulated on your body. The charge that can build up in your body may be more than enough to damage integrated circuits on the system board. Therefore, it is important to observe basic precautions whenever you will handle or use computer components. Although areas with humid climate are much less prone to static build-up, it is best to always safeguard against accidental damage that may lead to costly repairs. The following measures should be sufficient to protect your equipment from static discharge:

- After removing the system cover, discharge any static electricity that might have accumulated in your body by touching a grounded or anti-static surface (e.g. anti-static pads). If nothing is available, touch the power supply housing. This assumes the system unit is plugged in and grounding the case. De certain to do this before removing components from their anti-static coverings

*When handling separate cards, boards or modules, be cautious to avoid contacting with the components on them, and also with the "gold edge" connectors that plug into the expansion bus. It is best to handle them either by their edges or by mounting brackets that attach to the slot opening in the system cases. I Iowever, the above recommendations arc just intended to advise reasonable care to avoid the static discharge problems.

- Make certain that everything that connects to the system case, including the power supply, is unplugged before doing the installation work.

Installing The SIMM Modules

The 80486VESA system board can accommodate up to a maximum of 32 megabytes of memory on board using 8 sockets for the standard 30-pin SIMM memory modules. Two banks of SIMM modules are available for use with 256KB x 9, lMB x 9 or 4MB x 9 - 80 nanosecond, fast page mode SIMM memory modules. Each bank contains four SIMM memory sockets. When installing or removing the SIMM memory modules, extreme care must be taken to avoid damage to the SIMM sockets. The 80486VESA system board can be configured for various memory configurations from 1MB to 32MB. (Refer to Table 4, page 13, for the memory configurations available).

To install a SIMM memory module, carefully follow the steps below:

Step 1 Insert the SIMM module's "gold edge" connectors into the socket at a 70-degree angle and guide the component side of the SIMM module to face the edge of the board. The module can only fit into the socket one way.

Step 2 Gently press the SIMM module toward the edge of the board until it snaps into the socket in a vertical position. The module should clip into the locking tabs at each end of the socket. If the pegs do not fit into the holes, the SIMM is probably not inserted fully into the socket.

To remove a SIMM memory module, carefully follow the steps below:

Step 1 Gently push the edge of the sockets to release the module. Remove one side of the SIMM module first then the other side, to prevent from breaking the socket. The module should fall back at an angle; then it can be removed from the socket.

Memory Configuration

Memory can be installed using 256KB, 1MB or 4MB SIMM modules. The following are all the available memory configurations:

Total Memory	Memory Installation Bank 0	Bank 1
1MB	256Kx9	----
2MB	256Kx9	256Kx9
4MB	lMBx9	----
8MB	lMBx9	lMBx9
16MB	4MBx9	----
20MB	lMBx9	4MBx9
32MB	4MBx9	4MBx9

Table 4: Memory Configurations

System Speed Change

The 80486VESA system board can be configured for full or low speeds to accomodate most DOS applications. On power up, the system will be operating in full speed (factory setting).

You can switch between full and low speeds by toggling the turbo switch or pressing the keyboard keys.

- Toggling the Turbo Switch

1) Set the turbo switch to the on position to slow down the system speed

2) Set the turbo switch to the off position to speed up the system speed.

- Pressing the Keyboard Keys

Note: Before using the keyboard keys to control the system speed, the turbo switch has to be set to the off position.

1) Press the < CTRL > < ALT > keys while simultaneously pressing the < - > key to slow down the system speed.

2) Press the < CTRL > < ALT > keys while simultaneously pressing the < + > key to speed up the system speed.

Memory Caching

The 80486VESA system board provides an optional 64/128/256KB external cache memory. The internal and external cache enable/disable selections in the BIOS Advanced CMOS Setup program, will turn ON or OFF, either the 80486VESA's 8K internal cache or external memory cache.

4 BIOS Setup and Diagnostics

Software Setup

After hardware configuration of the 80486VESA system board is completed, and system hardware has been assembled, the completed system may be powered-up. At this point, software setup should be run to ensure that the system information is correct.

The System Setup is sometimes called CMOS Setup or Standard Setup. Normally, system setup is needed when the system hardware is not identical with the information contained in the CMOS RAM, or whenever the CMOS RAM has lost power.

Running AM1 BIOS

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines are divided into two phases:

- System Test and Initialization (test and initialize system boards for normal operations)
- System Configuration Verification (compare defined configuration with hardware actually installed)

The AMI BIOS performs the various diagnostic checks at the time the system is powered up; if an error is encountered, the error will be reported in one of two different ways. If the error occurs before the display device is initialized, a series of beeps will be transmitted (See Appendix C).

If the error occurs after the display device is initialized, the screen will display the error message. In the case of a non-fatal error, a prompt to press the <F1> key may also appear on the screen.

Normally, the only routine visible on the screen will be the memory test. Figure 2 displays the screen which appears when the system is powered on.

```
ROM BIOS (c) 1990 American Megatrends, Inc.
xxxx KB OK
Hit <DEL> if you want to run SETUP


(c) American Megatrends, Inc.
xx-xxxx-xxxxxx-xxxxxxxx-xxxxxx-xxxx
```

Figure 2: Initial Power-On Screen

At the left bottom corner of the screen, below the copyright message, a one (1) line reference string appears. This screen is used to determine the options installed in the AMI BIOS. If a problem occurs with the system, copy the reference number down before consulting your system manufacturer.

To "freeze" the screen, power on the system and hold a key down on the keyboard. This will cause a "Keyboard Error" message to appear on the screen and the system will wait for the <F1> key to be pressed. At this point, you may copy the line down and then press <F1> to continue the boot procedure. After the POST routines are completed, the following message appears:

" Hit <DEL> if you want to run SETUP "

To access the AMI BIOS SETUP program, press the <DEL> key. The screen in Figure 3 will be displayed at this time.

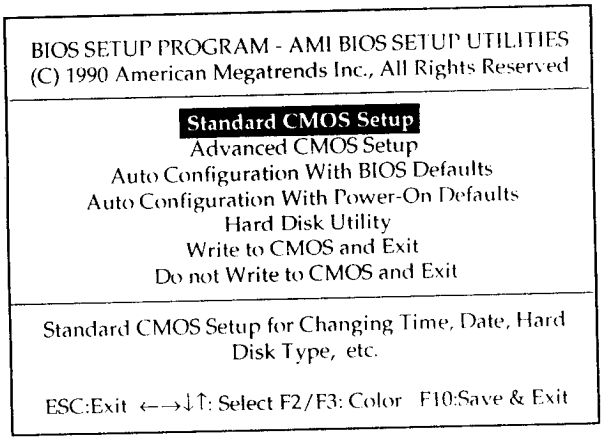

Figure 3: Standard CMOS Setup Menu

Listed below are explanations of the keys displayed at the bottom of the screens accessed through the BIOS SETUP program:

ESC: Exit to previous screen.

ARROW KEYS: Use arrow keys to move cursor to desired selection.

PAGEUP/PAGEDOWN/CTRL-PAGEUP/CTRL-PAGEDOWN: modify the default value of the options for the highlighted feature If there are less than ten (10) available options, the Ctrl-PageUp and Ctrl-PageDown keys function the same as the PageUp and PageDown keys.

F1: Displays help screen for selected feature.

F2/F3: Changes background and foreground colors.

F5: Retrieves the values which were resident when current setup session was started. These values will be CMOS values if the CMOS was uncorrupted at the start of the session, or they will be the BIOS Setup default values.

F6: Loads all features in the Advanced CMOS Setup with the BIOS Setup defaults.

F7: Loads all features in the Advanced CMOS Setup with the Power-On defaults.

F10: Saves all changes made to Setup and exits program

Standard CMOS Setup

Standard CMOS Setup is the first option on the main setup menu Press <ENTER> at the highlighted selection to access this option. The screen in Figure 4 will appear.

BIOS Setup Program -Standard CMOS SET UP
(C) 1991 American Megatrends Inc., All Rights Reserved

Date (mm/date/year): Tue Jan 01 1991
Time (hour/min/sec): 09:39:06
Daylight Saving: Disabled

Base memory: 640KB
Ext. memory: OKB

Hard disk C:type:47 = USER TYPE

Cyln	Head	WPCom	LZone	Sect	Size
642	8	0	0	17	43MB

Hard disk D:type :Not Installed
Floppy drive A: :1.2MB,5.1/4"
Floppy drive B: :Not Installed
Primary display :Monochrome
Keyboard :Installed

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Month: Jan,Feb ,..... Dec
Date: 01,02,03 . . 31
Year : 1901,1902.....2099

Esc = Exit, ←→↓↑ = Select, F2/F3: Color, PgUp/PgDn = Modify

Figure 4: The Standard CMOS Setup Screen

The standard CMOS Setup utility is used to configure the following features:

- **Set Date: Month, Date, Year.** Ranges for each value are listed below in prompt box in the lower left corner of the CMOS Setup Screen.

- **Set Time: Hour, Minute, and Second.** Uses **24 hour clock** format (for PM numbers add 12 to the hour; you would enter 4:30 p.m as 16:30:00).

- **Daylight Savings:** Disabled or Enabled.

- Hard Disk C: **and Hard Disk D:** Hard disk types from 1 to 46 are standard ones; type 47 is user definable. You must enter the hard disk parameters for each drive.

- Floppy **Drive A and Floppy Drive B:** The options are 360KB 5 1/4", 1.2MB 5 1/4", 720KB 3 1/2", 1.44MB 3 1/2", and Not Installed. Not Installed could be used as an option for diskless workstations.

- Primary Display: Options are Monochrome, Color 40x25, VGA/PGA/EGA. Color 80x25, and Not Installed. The Not Installed option could be used for network file servers.

- Keyboard: Options are Installed or Not Installed.

"Not Installed" is available for use as an option. This option could be used for diskless workstations and SCSI hard disks. Type 47 may be used for both disks C: and D:. The parameters for type 47 under Hard Disk C: and Hard Disk D: may be different, which effectively allows 2 different user definable hard disk types.

Note: The USER definition entry allows you to perform a test on a disk drive not defined in ROM. The USER definition entry is valid only during the period that the test is performed.

- **Type:** This is the number designation for a drive with certain identification parameters.
- **Cyl:** This is number of cylinders found in the specified drive type
- **Heads:** This is the number of heads found in the specified drive type.
- **WPcom:** WPcom is the read delay circuitry which takes into account the timing differences between the inner and outer edges of the surface of the disk platter. The number designates the starting cylinder of the signal.
- **L-Zone:** LZone is the landing zones of the heads. This number determines the cylinder location where the heads will normally park when the system is shut down.
- **Capacity:** This is the formatted capacity of the drive based on the following formula:

  (# of heads) x (# of cylinders) x (# of sectors) x (512 bytes / sec)

The following warning message, shown in Figure 5, is displayed each time when either the Standard CMOS Setup or Advanced CMOS Setup is selected, before any changes are allowed to any of the setup parameters.

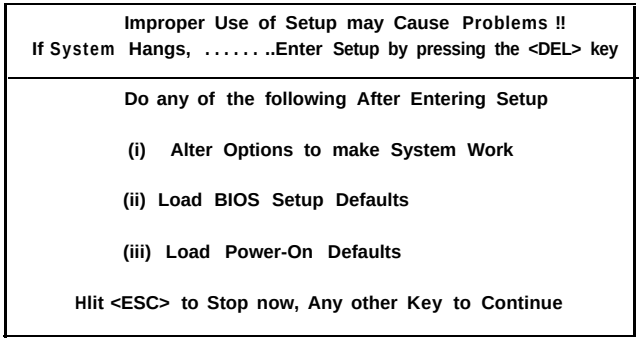

Figure 5: BIOS Setup Warning message

Advanced CMOS Setup

The Advanced CMOS Setup contains the setup of the system features and the SiS-460 chipset's configuration registers, to help you achieve an optimum operational environment.

From the following menu, highlight the Advanced CMOS Setup option and press <ENTER>:

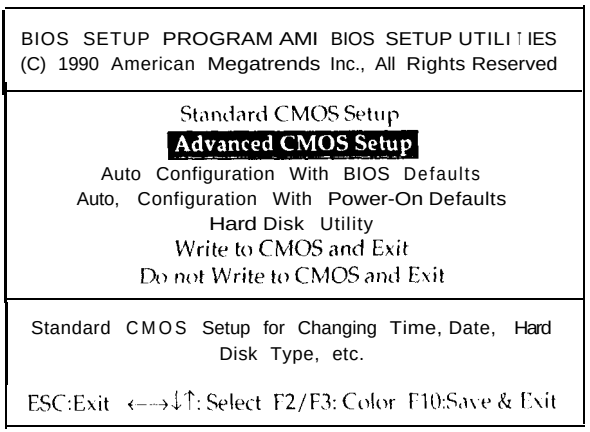

Figure 6: BIOS Setup Menu

Advanced CMOS Features

The Advanced CMOS Setup program has several help screens, accessed by the <Fl> key, which will display the options available for a particular feature and special help for some of the options. The following table lists the features and toptions available for each.

Feature	Available Options
Above 1MB Memory Test	Disabled (default) Enabled
Hard Disk Type 47 RAM Area	0300 (default) DOS 1 KB
External Cache Memory	Enabled (default) Disabled
Internal Cache Memory	Enabled (default) Disabled
Video ROM Shadow C000, 32K	Enabled (default) Disabled
Adapter ROM Shadow C800, 32K	Disabled (default) Enabled
Adapter ROM Shadow D000, 32K	Disabled (default) Enabled
Adapter ROM Shadow D800, 32K	Disabled (default) Enabled
Adapter ROM Shadow E000, 32K	Disabled (default) Enabled
Adapter ROM Shadow E800, 32K	Disabled (default) Enabled
Auto Config Function	Enabled (default) Disabled
*DRAM Speed Option	Slowest (50 MHz Slower (40 M Hz Faster (33 MHz Fastest (25/2O MHz
*DRAM Write CAS Pulse	IT(25/20 MHz) 2T (50/40/33 MHz
*DRAM Write Cycle	0 w/s (25/20 MI z 1 W/S (50/40/33 MHz

'Cache Write Cycle Option	2T(25/20 MHz) 3T(50/10/33 MHz
'Cache Read Cycle Option	1T(25/20 MHz, 33 MHz w/64KB or 256KB Cache) 2T(50/40 MHZ, 33 MHz w/128KB Cache)
'Bus Clock Frequency, Select	7.15 MHz 1/4 CLK (33 MHz 1/5 CLK (20/40 MHz 1/6 CLK (25/50 MHz)
Video Cacheable Option:	Enabled (default) Disabled
Bios Cacheable Option	Enabled (default) Disabled
Slow CPU Below [25MHz]	Disabled (25/33/40/50 MHz) Enabled (20 MHz)

Note:
Features marked with * are set by BIOS automatically if "Auto Config Function" is enabled.

When Auto Config Function is enabled, the BIOS will automatically detect CPU type, CPU frequency and number of cache banks to set up the optimal parameters to help your system achieve an optimum and reliable operation environment. To set the parameter you want to meet your requirement, the Auto Config Function has to be disabled.

"Hard Disk Type 47 RAM Area" - If the BIOS Shadow RAM is disabled, the Hard Disk Type 47 parameter table will use regular RAM. There are two options, 0:300 (lower system RAM) and DOS 1KB (the top 1KB of the 640K base memory).

"Adapter ROM Shadow" - is for shadowing other adapter ROMs. If you have expansion cards with ROMs on them, you will need to know the ROM addresses.

After you have made your selection within the advanced CMOS Setup. press <ESC> to return to the main menu.

Auto Configuration with BIOS Defaults

The "Auto Configuration with BIOS Defaults" loads the default system values directly from ROM.

From the following menu highlight the feature from the main menu and press <ENTER>

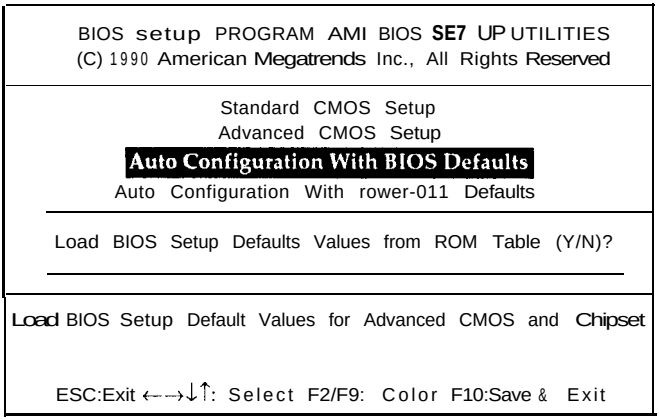

Figure 8: Auto Configuration w/ BIOS Defaults Menu

Auto Configuration with Power-On Defaults

The "Auto Configuration with Power-On Defaults" loads the settings detected when you turn on the computer. If your svstem behaves erractically, you can use this feature to check for incorrect settings.

From the following menu, highlight the feature from the main menu and press <ENTER>.

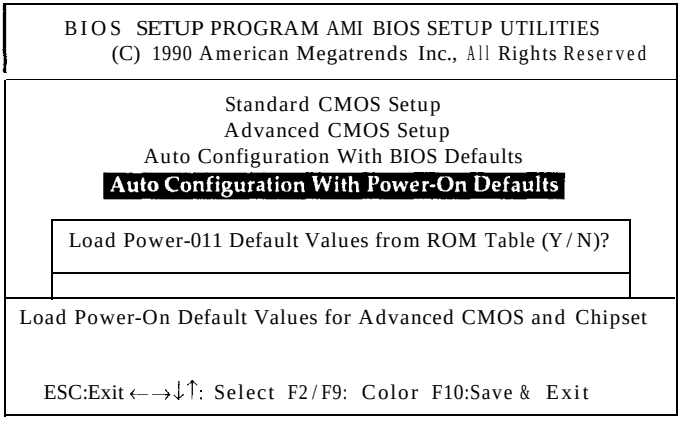

Figure 9: Auto Configuration w/ Power-On Defaults

Hard Disk Utility

The "Hard Disk Utility" is basic drive setup software. All of the options are destructive to data existing on a disk drive. The options are used for low-level formatting before using the DOS "FDISK" and "FORMAT", or similiar utilities.

Write to CMOS and Exit/Do not Exit

After completion of all selections, move the cursor down to either "Write to CMOS and Exit" or "Do not Write to CMOS and Exit" to save the data/values changed, or to abandon all the changes and continue with the booting process.

From the following menu, highlight the option and press <ENTER>.

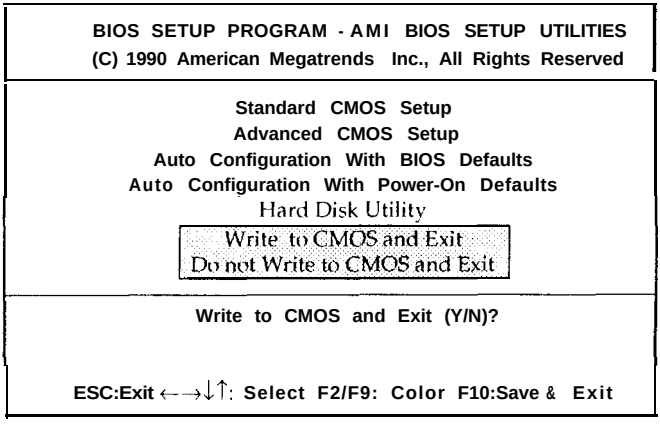

Figure 10: Write to CMOS/Do not Write to CMOS Menu

Appendix A

Disk Drive Types

Type	Cyln	Head	WPcom	LZone	Sector	Size
1	306	4	125	305	17	10MB
2	615	4	300	615	17	20MB
3	615	6	300	615	17	30MB
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	981	17	112MB
10	820	3	65535	828	17	20MB
11	855	5	65535	855	17	35MB
12	855	7	65535	855	17	50MB
13	306	8	128	319	17	28 MB
14	733	7	65535	733	17	43MB
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	1024	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	65535	925	17	69MB
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

Disk Drive Types (Cont.)

Type	Cyln	Head	WPcom	LZone	Sectors	
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	68MR
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	48M II
44	830	IO	65535	830	17	69MB
45	9 I 7	15	65535	918	17	114MB
46	1224	15	65535	1223	17	152MB

Appendix B

Specifications

Memory:
Up to 32MB of 32 bit RAM

Expansion Slots:
Two 32-bit VL-Bus, two S-bit ISA bus and four 16-bit ISA bus slots.

Keyboard Support:
Enhanced AT keyboard

Size:
8.6 inches by 10 inches

Processor:
Intel 80486DX 33/50 MHz / Intel 80486DX2 50/66 MHz
Intel 80486SX 20/25 MHz / Intel 80487SX 20/25 MHz
Intel 80486 Over Drive / P24T / 486SX-PQFP / 486DX-PQFP

Co-Processor:
Internal enhanced numeric coprocessor (486DX, 486DX2,487SX, 486 Over Drive, P24T)

Cache Controller:
Internal 8K byte of cache memory (Four-way set associative)
Support for 64/128/256Kbyte external cache memory (Direct mapped, Write-back)

BIOS:
AMI (American Megatrends, Inc.)

Environment:
Operating Temperature: 10 degrees C to 40 degrees C.
Required Airflow: 50 linear feet per min. across 80486
Humidity: 0 to 90% noncondensing
Altitude: 0 to 10,000 feet above sea level

System Requirements

Power Supplies for 486 Computers

A clean steady power source is necessary to get reliable performance from the system. With the high clock speeds of the CPU (running at 20MHz or above) the quality of the power supply becomes even more important. Most power supplies on the market meet the standards required by the CPU, however some have been found to be out of specification. To be certain of the highest performance by your system, be sure your power supply provicies a voltage range of 5.25 volts maximum to 4.95 volts minimum.

In areas with noisy power transmission, we suggest the use of a line noise filter between the power and the computer.

Appendix C

Troubleshooting

The POST (power-on self test) performs various diagnostic tests at the time the system is powered ON. Whenever an error is encountered during these tests, either you hear a few short beeps or see an error displayed on the screen.

Non-fatal errors are those which, in most cases, allow the system to continue the boot up process. The error messages normallv appear on the screen.

Fatal errors are those which will not allow the svstcm to continue the boot up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list below correspond to the number of beeps for the corresponding error. The following error messages are conveyed through a number of short beeps; you can always identify the error by counting the number of short beeps.

# OF BEEPS	MEANING OF ERROR
1	Refresh Failure - The memory refresh circuitry of the motherboard is faulty.
2	Parity Error - A parity error was detected in the base mrmnry (the first block of 64 KB) of the system.

3 Base 64KB Memory Failure - A memory failure occurred within the first 64 KB of memory.

4 Timer Not Operational - Timer #l on the motherboard has failed to function properly.

5 Processor Error - The CPU on the motherboard has generated an error.

6 8042-Gate A20 Failure - The keyboard controller (8042) contains the Gate A20 switch which allows the CPU to operate in virtual mode. This error message means that the BIOS is not ahle to switch the CPU into protected mode.

7 **Processor Exception Interrupt Error -** The CPU on the motherboard has generated an exception interrupt.

8 **Display Memory Read/Write Error -** The system video adapter is either missing or its memory is faulty. Note: This is not a fatal error.

9 **ROM Checksum Error - The ROM** checksum value does not match the value encoded in the BIOS.

10 CMOS Shutdown Register Read/Write Error - The shutdown register for the CMOS memory has failed.

Non-Fatal BIOS Error Messages

If a non-fatal error occurs during the POST routines performed each time the system is powered on, the error message will appear on the screen in the following format:

ERROR Message Line 1
ERROR Message Line 2
press <Fl> to RESUME

Write down the error message and press the <Fl> key to continue with the boot-up procedure.

For most of the error messages, you will not see an "ERROR Message Line 2." Generally, for those messages containing an "ERROR Message Line 2", the message will be "RUN SETUP UTILITY". Pressing the <Fl> key will invoke the BIOS Setup Program. The following are descriptions of the error messages.

- 8042 Gate A20 Error - The gate-A20 portion of the keyboard controller (8042) has failed to operate correctly. The 8042 chip should be replaced.
- **Address Line Short - An error** has occurred in the address decoding circuitry of the motherboard
- **Cache Memory Bad, Do Not Enable Cache** ! - The BIOS has found the cache memory of the motherboard to be defective. Consult your system manufacturer to repair the problem.
- **CH-2 Timer Error** - Most AT standard motherboards include two timers. An error with tinier #1 is a fatal error, explained on page 34. If an error occurs with tinier #2, this error message appears.

- **C: Drive Error -** The BIOS is not receiving any response from hard disk C:. It may be necessary to run the Hard Disk Utility to correct this problem. Also, check the type of hard disk selected in the Standard CMOS Setup of the BIOS Setup Program to see if the correct hard disk drive has been selected.

- **C: Drive Failure -** The BIOS can not get any response from the hard disk drive C:. It may be necessary to replace the hard disk.

- **CMOS Battery State Low -** There is a battery in your system which is used for storing the CMOS values. This battery appears to be low in power and needs to be replaced.

- **CMOS Checksum Failure -** After the CMOS values are saved, a checksum value is generated to provide for error checking. If the previous value is different from the value currently read, this error message appears. To correct this error, you should run BIOS Setup Program.

- **CMOS Display Type Mismatch** - The type of video stored in CMOS does not match the type detected by the BIOS. Run the BIOS Setup Program to correct this error.

- **CMOS Memory Size Mismatch -** If the BIOS finds the amount of memory on your motherboard to be different from the amount stored in CMOS, this error message is generated. Run the BIOS Setup Program to correct this error.

. **CMOS System Options Not Set** - The values stored in the CMOS arc either corrupt or nonexistent. Run the BIOS Setup Program to correct this error.

- CMOS Time & Date Not Set - Run the Standard CMOS Setup of the BIOS SETUP Program to set the date and time of the CMOS

- **D: Drive Error** - The BIOS is not receiving any response from hard disk D:. It may be necessary to run the I Hard Disk Utility to correct this problem. Also, check the type of hard disk selected in the Standard CMOS Setup of the BIOS Setup Program to see if the correct hard disk drive has been selected.

- **D: Drive Failure** - The BIOS can not get any response from the hard disk drive D:. It may be necessary to replace the hard disk.

- Diskette Boot Failure - The diskette used to boot-up in floppy drive A: is corrupt, which means you can not use it to boot-up the system. Use another boot diskette and follow the instructions on the screen.

- Display Switch Not Proper - Some systems require that a video switch on the motherboard be set to either color or monochrome, depending upon the type of video you are using. To correct this situation, set the switch properly. (Remember to shut down the system first).

- DMA #1 Error - An error has occurred with the first DMA channel on the motherboard.

- DMA #2 Error - An error has occurred with the second DMA channel on the motherboard.

- DMA Error - An error has occurred with the DMA controller on the motherboard.

- FDD Controller Failure - The BIOS is not able to comnunicate with the floppy disk drive controller. Check all appropriate connections after the system is powered off.

- HDD Controller Failure - The BIOS is not able to communicate with the hard disk drive controller. Check all appropriate connections after the system is powered off.

- **C: Drive Failure -** The BIOS can not get any response from the hard disk drive C:. It may be necessary to replace the hard disk.

- **D: Drive Failure -** The BIOS can not get any response from the hard disk drive D:. It may be necessary to replace the hard disk.

- **CMOS Time & Date Not Set -** Run the Standard CMOS Setup of the BIOS SETUP Program to set the date and time of the CMOS.

- **Cache Memory Bad, Do Not Enable Cache** ! - The BIOS has found the cache memory of the motherboard to be defective. Consult your system manufacturer to repair the problem.

- **INTR #l Error -** The interrupt channel #l has failed the POST routine.

- **INTR #2 Error -** The interrupt channel #2 has failed the POST routine.

- **Invalid Boot Diskette -** The BIOS can read the diskette in floppy drive A:, but it can not boot-up the system with it. Use another boot diskette and follow the instructions on the screen.

- **KB/Interface Error -** The BIOS has found an error with the keyboard connector on the motherboard.

- **Keyboard Error -** The BIOS has encountered a timing problem with the keyboard. Make sure you have an AMI Keyboard BIOS installed in your system. You may also set the "Keyboard" option in the Standard CMOS Setup to "Not Installed", which will cause the BIOS to skip the keyboard POST routines.

- **Keyboard is Locked...Unlock It** - The keyboard lock on the system is engaged. The system must be unlocked to continue the boot up procedure.

- **No ROM BASIC** - This error occurs when a proper bootable sector cannot be found on either the floppy diskette drive A: or the hard disk drive C:. The BIOS will trv at this point to run ROM Basic, and the error message will be generated when the BIOS does not find it.

- **Off Board Parity Error** - The BIOS has encountered a parity error with some memory installed in an I/O bus expansion slot. The message will appear as follows:

  OFF BOARD PARITY ERROR
  ADDR (HEX) = (XXXX)

  where XXXX is the address (in hexadecimal) at which the error has occurred. "Off Board" means that it is part of the memory installed on an expansion card in an I/O bus expansion slot, as opposed to memory attached directly to the motherboard.

- **On Board Parity Error** -The BIOS has encountered a parity error with some memory installed on the motherboard. The message will appear as follows:

  ON BOARD PARITY ERROR
  ADDR (I E X = (XXXX)

  where XXXX is the address (in hexadecimal) at which the error has occurred. "On Board" means that it is part of the memory attached directly to the motherboard, as opposed to memory installed on an expansion card in an I/O bus expansion slot.

- **Parity Error ????** - The BIOS has encountered a paritv error with some memory in the system, but it is not able to determine the address of the error.

Appendix D

Warranty Information

Your 80486VESA system board comes with a limited one-year warranty. The manufacturer warrants this product against defects in material and workmanship for one (1) year from date of purchase. Defective parts will be exchanged or repaired at the manufacturer's option, for one (1) year after date of original purchase.

Service can be obtained by calling the manufacturer for a Return Merchandise Authorization (RMA) number. A receipt or copy of invoice with date of purchase is also required before any warranty service will be rendered. Write the RMA number legibly on the outside of the shipping carton and mail prepaid or hand carry to the manufacturer. Shipping and handling charges will be applied for all orders that have to be mailed when service is complete.

This warranty covers normal consumer use and does not cover damages incurred in shipping or failure due to abuse, misuse, or misapplication, nor as a result of service or modification other than by the manufacturer.