American Megatrends, Inc.

Series 16

Enterprise-II

80486 EISA Motherboard

User's Guide

MAN-616
10/21/92

Limited Warranty

Limitations of Liability

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Revision History

March 3, 1992   Added documentation for Rev G features.

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Preface

To the OEM

Thank you for purchasing the high performance Enterprise-II 80486 EISA motherboard. This product is a state of the art 80486-based motherboard that includes the famous AMIBIOS. It is assumed that you have also licensed the rights to use the American Megatrends documentation for the Enterprise-II.

This manual was written for the OEM to assist in the proper installation, and operation of the Enterprise-II motherboard and AMIBIOS. This manual is not meant to be read by the computer owner who purchases a computer with the Enterprise-II motherboard. It is assumed that you, the computer manufacturer, will use this manual as a sourcebook of information, and that parts of this manual will be included in the computer owner's manual.

Technical Support

If an Enterprise-II motherboard fails to operate as described or you are in doubt about a configuration option, please call technical support at 404-246-8600.

Acknowledgments

This manual was written by Robert Cheng and Paul Narushoff. The writers gratefully acknowledge the assistance of Rex Wade and Sukha Ghosh.

New in Series 16 Revision G

New Jumpers

There are several additional jumpers: J35, J36, and J37. These jumpers select the processor type and speed.

Support for Additional Processors

Rev G of the Enterprise-II now support the Intel 80486SX, 80487SX, P23T, P24, and the 80486DX.

Support for Additional Processor Speeds

Rev G of the Enterprise-II will now support the following processor speeds:

80486DX   25, 33, and 50 MHz
80486SX 25 MHz
80487SX 25 MHz

New in Series 16 Revision G, Continued

Selecting the Processor Speed

A table on page 14 documents the jumper settings for selecting the processor speed.

Selecting the Processor Type

A table on page 14 describes how to set jumpers to select the processor speed.

J22 Name Change

The name of J22 has been changed to Interrupt Latch Disable. This jumper is always shorted.

American Megatrends BBS

The American Megatrends BBS permits OEMs, VARs, and system integrators to access technical information about motherboard and BIOS products. Product Engineering Change Notices, Tech Tips, Technical Notes, and technical manuals are available on the BBS.

Data Transmission Rates

The BBS automatically handles modems with data transmission rates from 1,200 to 14,400 bps. If using an HST modem, call 404-246-8780. If using a non-HST modem, call 404-246-8782.

BBS Phone Numbers

The following table lists the characteristics of the BBS phone numbers. The BBS requires no parity, 8 data bits, and 1 stop bit.

Phone Number	Characteristics
404-246-8780	Supports HST and v.42.
404-246-8781	Supports HST and v.42.
404-246-8782	Dual standard. Can handle 2400 or 9600 bps. Supports v.32 and v.42. Can handle up to 14,400 baud.
404-246-8783	Supports v.32 and v.42.

Chapter 1

System Overview

The American Megatrends Series 16 Enterprise-II is an EISA (Extended Industry Standard Architecture) motherboard. It is approximately 13.8 inches wide by 12 inches long (identical in size to a standard IBM AT motherboard with similar mounting hole locations). The following graphic illustrates the dimensions of the Enterprise-II motherboard and identifies the height restrictions.
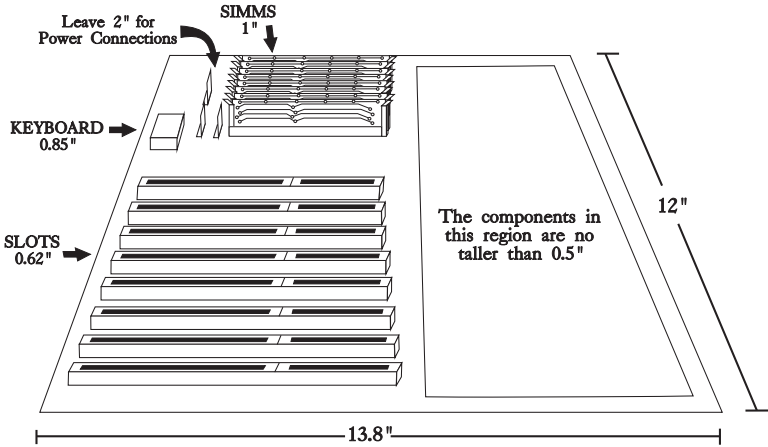
American Megatrends Series 16 Enterprise II EISA Motherboard

Description

Processor Type and Speed

The Enterprise-II EISA motherboard comes with either an 80486DX operating at 25, 33, or 50 MHz or an 80486SX operating at 25 MHz. The Enterprise-II also supports future Intel processors and upgradable processors. 80486SX-equipped Enterprise-II motherboards support an 80487SX operating at 25 MHz.

Heat Sink for 50 MHz CPUs

All Enterprise-II EISA motherboards with 50 MHz 80486DX CPUs are also equipped with a heat sink to help dissipate the additional heat.

Processor Speed

All Enterprise-II motherboards have two clock speeds: high or low. The high clock speed is factory-set to 25, 33, or 50 MHz.

The low clock speed is achieved by adding the appropriate number of software delays, depending on the speed of the processor used on the motherboard, and emulates an IBM AT running at 8 MHz.

Speed selection is through the turbo switch or the keyboard (<Ctrl> <Alt> <+> or <Ctrl> <Alt> <->).

Cache Memory

The Enterprise-II supports 128 KB of direct mapped, write-through external cache memory. The Intel 80486 processors have 8 KB of internal cache.

All system memory can be cached. The cache read has 0 wait states. Burst mode is supported. Cache memory is enabled and disabled through the keyboard: <Ctrl> <Alt> <Shift> <+> enables cache and <Ctrl> <Alt> <Shift> <-> disables it.

Main Memory

The Enterprise-II motherboard supports up to 32 MB of onboard memory. It also supports up to 64 MB of additional offboard system memory on the 32-bit memory expansion slot.

The Enterprise-II supports up to 96 MB of system RAM. Up to 4 gigabytes of memory are supported on the EISA bus.

SIMMs

The Enterprise-II supports 1 MB x 9 or 4 MB x 9 fast page mode SIMMs operating at 70 ns (RAS access time), fast page mode at 25, 33, and 50 MHz.

Shadow RAM

The Enterprise-II system BIOS is always shadowed. The video BIOS is shadowed through AMIBIOS Setup. Adaptor ROM BIOS is also shadowed via AMIBIOS Setup.

Description, Continued

BIOS

The Enterprise-II has a 128 KB EISA AMIBIOS located at E000–FFFFh with built-in Setup, hard disk drive diagnostics, and user-definable hard disk drive types. The EISA AMIBIOS allows you to bypass error messages for missing video, keyboard, or floppy drives to facilitate the building of file server systems

CMOS RAM

The Enterprise-II has 8 KB of nonvolatile SRAM with built-in battery backup for EISA configuration. The battery is on the CMOS RAM/RTC chip itself.

Real Time Clock

The Enterprise-II has a real time clock and CMOS RAM with built-in battery backup for ISA BIOS Setup. The battery is on the CMOS/RTC chip.

Math Coprocessor

The Enterprise-II has a socket for an optional Weitek® 4167 numeric coprocessor.

EISA Integrated Peripheral Controller

The Enterprise-II has an Intel 82357 EISA Integrated System Peripheral Controller.

Seven DMA Channels

The Enterprise-II has seven DMA channels. In accordance with the EISA specifications, any DMA channel may be programmed for 8, 16, or 32-bit DMA device size and ISA compatible, type A, type B, or burst type C modes.

Fifteen Interrupt Levels

The Enterprise-II has 15 hardware interrupt levels. Of course, NMIs take precedence over the following hardware interrupts.

Priority	Label	Typical Interrupt Source
1	IRQ 0	Interval Timer 1, Counter 0 OUT
2	IRQ 1	Keyboard
3-10	IRQ 2	Used internally for IRQ 8 through IRQ 15
3	IRQ 8	Real-TIme-Clock
4	IRQ 9	EISA bus
5	IRQ 10	EISA bus
6	IRQ 11	EISA bus
7	IRQ 12	Mouse on EISA bus
8	IRQ 13	Coprocessor Error
9	IRQ 14	EISA bus (Hard disk drive controller)
10	IRQ 15	EISA bus
11	IRQ 3	EISA bus (Serial Port 2)
12	IRQ 4	EISA bus (Serial Port 1)
13	IRQ 5	EISA bus (Parallel Port 2)
14	IRQ 6	EISA bus and floppy disk controller
15	IRQ 7	EISA bus (Parallel Port 1)

Timer Features

The Enterprise-II has five programmable 16-bit counter/timers.

System Arbiter

The Enterprise-II has standard EISA arbitration features.

Refresh Generation

The Enterprise-II has a refresh generation feature.

I/O Capability

The Enterprise-II accesses 32-, 16-, 8-bit memory devices and 32-, 16-, 8-bit I/O devices on the EISA bus.

EISA Bus

The EISA Bus in the Enterprise-II has a system clock that is generated by the EISA bus clock (BCLK) and operates at 8.33 MHz.

I/O Slots

The Enterprise-II has one 32-bit proprietary memory card slot and seven 32-bit EISA bus slots (fully compatible with ISA adapter cards). It also has one 8-bit XT-compatible slot. If the memory slot is used, the 8-bit slot cannot be used.

Description, Continued

I/O Address Space

The Enterprise-II uses I/O addresses x100h through x3FFh for ISA compatible I/O (x = a "don't care" character which does not affect mapping location. For example, I/O port addresses 0100h, 1100h, 2100h, and 3100h map to the same location).

The Enterprise-II also uses the following EISA I/O port addresses:

- s000h through s0FFh for EISA expansion slot
- s400h through s4FFh for EISA expansion slot
- s800h through s8FFh for EISA expansion slot
- sC00h through sCFFh for EISA expansion slot

(s = EISA bus slot number,
s = 0 for motherboard)

Addresses

The Enterprise-II uses 32-bit memory addresses to access 4 gigabytes of memory address space on the EISA expansion slots.

I/O Channel Check

The Enterprise-II supports the use of the I/O channel check to generate NMIs.

Description, Continued

I/O Wait State Generation

The Enterprise-II has an open bus structure (allowing multiple microprocessors to share the system resources, including memory). The Enterprise-II supports refresh of system memory from channel microprocessors.

Keyboard

The Enterprise-II uses a 5-pin IBM AT-compatible DIN connector and has a keyboard lock to prevent unauthorized access.

Mouse

The Enterprise-II has a 6-pin IBM PS/2®-compatible mini-DIN connector.

Speaker

The Enterprise-II has a standard speaker attachment.

Chapter 2

Installation

Unpacking the Motherboard

Step	Action
1	Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 404-236-8600.
	Leave the Enterprise-II motherboard in its original packing.
2	Perform all unpacking and installation procedures on a ground connected anti-static mat. The operator should wear an anti-static wristband, grounded at the same point as the anti-static mat. Or use a sheet of conductive aluminum foil grounded through a 1 megohm resistor instead of the anti-static mat. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 megohm resistor serves the same purpose as the wristband.
3	Inside the carton, the Enterprise-II motherboard is packed in an anti-static bag, and sandwiched between sheets of sponge. Remove the sponge and remove the anti-static bag. Place the Enterprise-II motherboard on a grounded anti-static surface component side up. Save the original packing material in case of reshipment.
4	Inspect the motherboard for damage. Press down on all ICs mounted in sockets to verify proper seating. Do not apply power to the motherboard if it has been damaged.
5	If the motherboard is undamaged, it is ready to be installed.

J13 SPEAKER
J14 KB LOCK
J17 RESET
J18 TURBO SWITCH
J19 TURBO LED
J22 DIAG LED

128K
CACHE
MEMORY

WEITEK
WTL4167
FPU

intel
80486

MEMORY CARD

J37

J35

J21

J36

AMI
MODULE

J5

J9

1 - DIAG
2 - COLOR/MONO

BANK 1: SIMM

BANK 2: SIMM

J8 FLOPPY

PS1   PS2

PS3

J12 DISK TYPE

SW1

J6

J7

MOUSE

KEYBOARD

SLOT 1   J10/J11
SLOT 2   J15/J16
SLOT 3   J20
BIOS
SLOT 4   J23/J24
SLOT 5   J25/J26
SLOT 6   J28/J29
SLOT 7   J30/J31
(NON-MASTER) SLOT 8   J33/J34

MOUNTING HOLE FOR SCREWS

MOUNTING HOLE FOR PLASTIC TAB

Installation Steps

The steps for assembling a system that uses the 80486 Enterprise-II motherboard and CPU card are shown in the following table. Each step is discussed in detail in the following pages.

Step	Action	Turn to
1	Set switch and jumper options	Page 12
2	Install memory	Page 15
3	Install coprocessors	Page 19
4	Install motherboard	Page 20
5	Connect the power supply	Page 21
6	Connect the keyboard	Page 25
7	Connect the mouse	Page 25
8	Connect cables	Page 26
9	Install adapter cards	Page 30
10	Test and configure	Page 36

Warning
The Enterprise-II motherboard contains sensitive electronic components which can be easily damaged by static electricity. Follow the instructions carefully to ensure correct installation and to avoid static damage.

Step 1 Set Switch and Jumper Options

Set all user-configurable jumpers and switches and install coprocessors before installing the motherboard in the chassis. There are two user-configurable switches and five jumpers.

SW

SW is a dual 2-bit DIP switch. SW-1 is used for manufacturing diagnostics. The motherboard is shipped with this switch Off. The switch should remain Off.

The COL/MONO (SW-2) switch sets the type of video display adapter card in the system. This switch is factory-set to Off, for a monochrome display adapter (MDA™). Set On for a color graphics adapter (CGA). This switch has no effect on EGA and VGA adapters.

J12 Floppy Disk Type

J12 is a 3 pin single-inline berg. This jumper selects the floppy disk drive type when using the onboard floppy controller. Some 3½" drives (PS/2 compatible) have inverted DENSEL (density select) signals.

Short Pins 1-2 for normal XT and AT style drives (default). Short Pins 2-3 for PS/2 compatible drives (inverted DENSEL). When using PS/2-compatible drives, resistor network RN13 must be changed from 150Ω to 10KΩ.

Step 1 Set Switch and Jumper Options,

J27 EBC 25/33 MHz Select

J27 is a three-pin berg. Short pins 1-2 to select 25 or 50 MHz operation. Leave J27 open to select 33 MHz operation.

J35 CLKEBC Select

J35 is a three-pin berg that selects normal or /2 operation. Short pins 2-3 if the system has a 25 or 33 MHz 80486DX/SX. Short pins 1-2 only if the system has a 50 MHz processor.

J36 NMI Pin Select

J36 is a four-pin berg that selects processor type. Short pins 2-3 if the system has an 80486SX. Short pins 1-2 and 3-4 if the system has an 80487SX, P24, P23T, or 80486DX.

J22 Interrupt Latch Disable

This jumper is always shorted.

J37 FERR# Pin Select

This jumper selects processor type. Short pins 2-3 if an 80487SX is used. Leave J37 open if an 80486SX is used. Short pins 1-2 if an 80486DX or P24 is used.

Selecting the Processor Speed

Processor	Speed	J2 *	J27 EBC 25/33 MHz Select	J35 CLKEBC Select Normal or /2
80486DX	25 MHz	Short pins 1-2	Short pins 1-2	Short pins 2-3
	33 MHz	Short pins 1-2	Open	Short pins 2-3
	50 MHz	Short pins 1-2	Short pins 1-2	Short pins 1-2
80486SX	25 MHz	Short pins 1-2	Short pins 1-2	Short pins 2-3
80487SX	25 MHz	Short pins 1-2	Short pins 1-2	Short pins 2-3

*   Leave J2 open if the processor is a B6 or earlier version of an i486.

Selecting the Processor Type

Processor Type	J36 NMI Pin Select	J37 FERR# Pin Select
80486SX	Short pins 2-3	Open
80487SX	Short pins 1-2 and Pins 3-4	Short pins 2-3
80486DX, P24	Short pins 1-2 and Pins 3-4	Short pins 1-2

Step 2 Install Memory

The main memory subsystem on the Enterprise-II motherboard consists of two 32-bit memory banks of 4 SIMM sockets each. Both banks house SIMMs (Single In-line Memory Module) DRAM packages. You can use 1 MB or 4 MB x 9 bit SIMMs.

Motherboard Memory Configurations

The 80486 Enterprise-II supports 4 MB, 8 MB, 16 MB, and 32 MB memory configurations on the motherboard.

Selecting SIMMs

The table on the following page has SIMM part numbers. If using SIMMs other than these, be sure they meet the following specifications:

Parameter	Specification
Page Mode	FAST
Refresh	CAS before RAS
t_{CAC}	$\leq$ 20 ns
t_{RAC}	$\leq$ 80 ns
t_{AA}	$\leq$ 45 ns
t_{RP}	70 ns
t_{CPA}	$\leq$ 45 ns

SIMM Part Numbers

The following table lists suggested manufacturers and
part numbers.

Memory Type	Manufacturer	Part Number
1 MB x 9	Fujitsu®	MB85235-70
	Toshiba®	THM91000AS-70
	NEC®	MC-42100A9-70
	Siemens®	HYM910005-70
4 MB x 9	OKI®	MSC2340-70459
	Toshiba	THM94000S-80
	NEC	MC-85235-80

Installing SIMMs

Both Bank 0 and Bank 1 have four SIMM sockets. These
sockets can be filled with either 1 MB x 9 or 4 MB x 9
SIMMs. Use only one type of module to fill each bank.

Place the 80486 Enterprise-II motherboard on an anti-
static mat. With the component side of the SIMM facing
you, firmly push the card into the socket at a 45 degree
angle, then push it up to a vertical position. When
properly inserted, the SIMM clicks into place as the
latching pins engage. See the following figure.

SIMM Installation

The following graphic demonstrates how to install SIMMs.
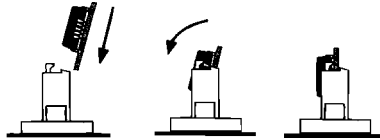
SIMM Types

The graphic below shows the two types of SIMMs.
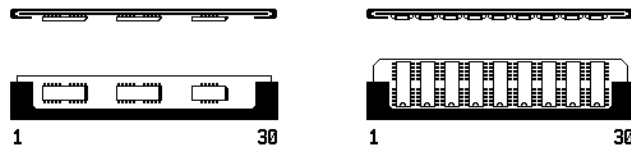
Memory Configuration

The 80486 Enterprise-II motherboard checks the memory banks and automatically configures the amount of memory installed in the SIMM sockets. There are no user definable jumper or switch settings for configuring memory.

The following table shows the total system memory on the motherboard for each of the memory configurations:

Bank 0	Bank 1	Total Memory
1 MB x 9	None	3712K
1 MB x 9	1 MB x 9	7808K
4 MB x 9	None	16000K
4 MB x 9	4 MB x 9	32384K

Step 3 Install Coprocessor

The 80486 Enterprise-II motherboard supports the Weitek WTL4167 coprocessor. The coprocessor must operate at the same frequency as the microprocessor.

Board Frequency	Part Number
25 MHz	WTL4167-025
33 MHz	WTL4167-033
50 MHz	N/A

Installing the Weitek

U89 is the empty 144-pin PGA socket below the memory slot (J21) and to the left of the 80486. "WEITEK" is etched on the motherboard next to the socket. Pin 1 of the socket has a white diagonal line across one corner of the square etched on the motherboard. This corner corresponds to pin 1 of the coprocessor — also identified by a diagonally cut corner.

Check for bent pins on the coprocessor. Gently straighten any bent pins with pliers. Install the component in the socket. Align the pins and press the coprocessor firmly into the socket, making sure that pin 1 of the coprocessor is aligned with pin 1 of socket U89.

Test for Math Coprocessor

The BIOS System Configuration screen appears at the end of POST. If *Installed* is not displayed in the Math Coprocessor field, reinstall the coprocessor. Turn power off, check the coprocessor orientation, press the chip firmly in place and turn the power on. If still not properly installed, call Technical Support.

Step 4 Install the Motherboard

The mounting hole pattern on the Enterprise-II is the same as the mounting hole pattern on the AT motherboard. Standoffs and mounting screws are not supplied with the Enterprise-II motherboard. The following table describes the installation.

Step	Action
1	Place the chassis for the motherboard on an anti-static mat. Connect the chassis to ground to avoid static damage during installation. Connect an alligator clip with a wire lead to any unpainted part of the chassis. Ground the other end of the lead at the same point as the mat and the wristband.
2	Rotate the chassis so that the front is to the right, and the rear is to the left. The side facing you is where the motherboard is mounted. The power supply is mounted at the far end of the chassis.
3	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place. Find the slots provided for the standoffs on the chassis. Hold the motherboard, component-side up, with the edge with the standoffs toward you and the edge with the power supply connector away from you. The edge connectors for the adapter cards should be to the left.
4	Carefully slide the motherboard into the chassis. Make certain that the standoffs fit the slots provided for them. If the standoffs are properly locked, the motherboard should not slide. It should also rest level with the chassis. The far edge should fit the slots in the plastic clips.
5	Place the two mounting screws in the holes provided for them and tighten them. If necessary, shift the motherboard slightly to align the mounting holes on the motherboard with the holes on the chassis. Refer to the graphic on page 10.

Step 5 Connect the Power Supply

The power supply should match the physical configuration of the chassis. Make sure that the power switch is Off before assembly.

Before attaching all components, make sure that the proper voltage has been selected. Power supplies often can run on a wide range of voltages, but must be set (usually with a switch) to the proper range. Use at least a 200 watt (or larger) power supply, which should have built-in filters to suppress radiated emissions. The filters help the OEM pass the appropriate FCC certification testing.

If all EISA expansion slots are filled, a standard 200-250 watt power supply is not sufficient. A 300-450 watt power supply is needed if all slots are used.

Connect to PS1 and PS2

The power supply is connected to PS1 and PS2 on the motherboard. A third connector (PS3) is supplied for some 400 watt power supplies which have three power plugs.

Power Supply Connectors are Keyed

The connectors should be keyed to prevent connecting the plugs to the wrong connectors.

The keys on the connector must be cut to fit on some power supplies. The following figure illustrates the keys that must be cut.

Remove
Key 6

Remove
Key 3

PS2

PS1

Remove
Key 5

PS3

See the following figure for the location of connectors PS1, PS2, and PS3.

AT-compatible power supplies have two 6-pin connectors that are inserted in PS1 and PS2. The 6-pin connector with 3 red wires and 2 black wires is connected to PS2 and the remaining 6-pin connector is connected to PS1.

PS3 can be connected to an additional power source.
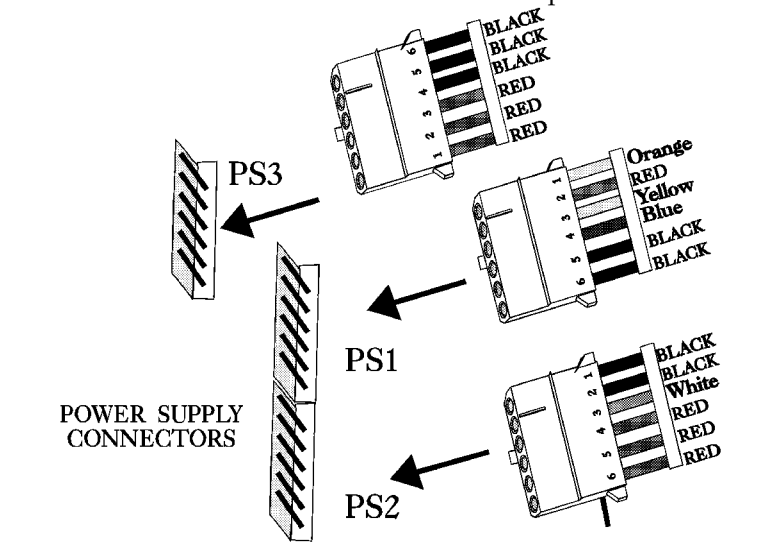
Step 5 Connect the Power Supply, Continued

PS1 Pinout

Pin	Description
1	Power Good (Orange wire)
2	VCC (Red wire)
3	+12 Volts (Yellow wire)
4	-12 Volts (Blue wire)
5	Ground (Black wire)
6	Ground (Black wire)

PS2 Pinout

Pin	Description
1	Ground (Black wire)
2	Ground (Black wire)
3	-5 Volts (White wire)
4	VCC (Red wire)
5	VCC (Red wire)
6	VCC (Red wire)

PS3 Pinout

Pin	Description
1	VCC (Red wire)
2	VCC (Red wire)
3	VCC (Red wire)
4	Ground (Black wire)
5	Ground (Black wire)
6	Ground (Black wire)

Step 6 Connect the Keyboard Cable

The keyboard connector on the Enterprise-II is a 5-pin DIN socket and is labeled KEYBRD and J7 on the motherboard. It works with a standard AT-compatible keyboard.

A 5-pin DIN to 6-pin mini DIN converter is needed to connect a PS/2-type keyboard.

Pin	Assignments
1	Keyboard clock
2	Keyboard data
3	Not used
4	Ground
5	VCC

Step 7 Connect the Mouse

This optional step connect a PS/2-type mouse. The mouse connector 6-pin mini DIN socket labeled J6. An IBM PS/2 compatible mouse can be connected to this socket. The pinout:

Pin	Description
1	Mouse clock
2	Mouse data
3	NC
4	GND
5	VCC

Step 8 Connect Cables

When connecting chassis connectors to the motherboard, make sure to connect the correct connector end.

Most connector wires are color-coded. Match the color of the wires leaving the switch or LED to the same pin on the connector end. There may be more than one connector with the same color-coded wires. If so, follow the wire to the switch or LED.

Pin 1 of all connectors is labeled on the Enterprise-II motherboard to identify the pin orientation when plugging in cables. See the following graphic.
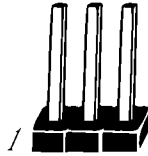
The following cables should be connected to the motherboard:

- Reset Switch cable to J17
- Speaker cable to J13.
- Keyboard Lock cable to J14.
- Turbo Switch cable to J18
- Turbo LED cable to J19

J17 Reset Button Connector

J17 is a 2-pin single-inline berg. When this button is pressed, the system performs a hard reset. Pin 1 is ground and Pin 2 is Hard Reset.

J13 Speaker Cable

J13 is a 4 pin single-in-line berg. AMIBIOS signals hardware problems through the speaker. Pin 1 on the motherboard is labeled by a plus (+).

Pin	Description
1	Data Out
2	Key
3	Ground
4	VCC

J14 Keyboard Lock Connector

J14 is a 5-pin single-inline berg. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use. This connector is keyed with a blank hole. Pin 1 on the motherboard is labeled with a plus (+) sign.

Pin	Description
1	LED power
2	Key
3	Ground
4	Keyboard lock
5	Ground

J18 Turbo Switch Connector

J18 is a 2-pin single-inline berg. The turbo switch allows the user to switch the motherboard clock speed between high and low speeds.

J19 Turbo LED

J19 is a 2-pin berg. The LED lights when the board is running at high speed. Connect the Turbo LED to J19.

Floppy Drive Controller

J8 is a 34-pin dual-inline berg connector for floppy drives. Using the graphic on page 10, identify J8 on the motherboard. Pin one of each of the bergs are marked with a 1. Pin one of the cable is usually denoted by a colored stripe on the cable. See the following graphic. The BIOS POST routine checks the adapter slots for a floppy disk controller. If a disk controller is found, the onboard floppy controller is automatically disabled.
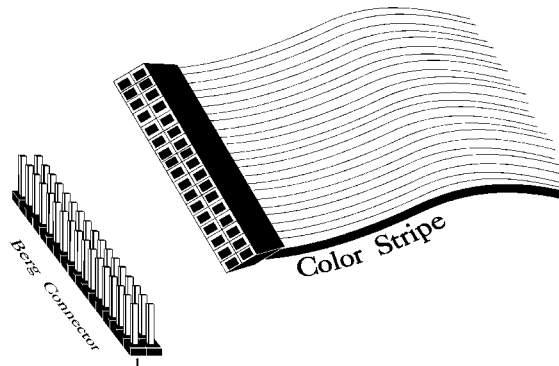
The Enterprise-II supports up to two 3½" or 5¼" floppy disk drives. The connecting cable is a 34-pin ribbon cable with two 34-pin edge connectors. There should be a twist in the cable between the floppy connectors, and the last (end) connector should be connected to drive A:.

Step 8 Connect Cables, Continued

Floppy Pinout

Pin	Use	Pin	Use
1	GND	2	RPM/LC
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	-INDEX
9	GND	10	-MOTOR0
11	GND	12	-FDSEL1
13	GND	14	-FDSEL0
15	GND	16	-MOTOR1
17	GND	18	DIR
19	GND	20	-STEP
21	GND	22	-WDATA
23	GND	24	-WGATE
25	GND	26	-TRK0
27	GND	28	-WRPROT
29	GND	30	-RDATA
31	GND	32	HDSEL
33	GND	34	DSKCHNG

Twist in Floppy Cable

Floppy B to Floppy A	Floppy B to Floppy A	Floppy B to Floppy A	Floppy B to Floppy A
10 to 16	12 to 14	14 to 12	16 to 10
11 to 15	13 to 13	15 to 11	

Step 9 Install Adapter Cards

The 80486 Enterprise-II EISA motherboard provides full
compatibility with all IBM XT- or AT-compatible adapter
cards. It has eight EISA slots. The slots are numbered on
the motherboard from SLOT1 through SLOT8. The EISA
slots can accept 8- or 16-bit ISA (XT- or AT-compatible) or
16- or 32-bit EISA adapter cards. The slots are described
below:

Slot	Description
1 - 6	EISA bus master slot. These slots accept any EISA/ISA adapter card.
7 – 8	EISA non-bus master slot. These expansion slots accept only ISA or EISA adapter cards that do not have EISA bus mastering capability.

EISA adapter cards have longer and denser fingers on the edge connecters than ISA adapter cards. The EISA slots on the motherboard have two rows of contacts, one below the other.

The ISA slot can be inserted into the EISA connector only far enough to make contact with the upper row of contacts. EISA adapters have longer fingers to allow contact with the second row of contacts. See the following graphic.

ISA Adapter Card
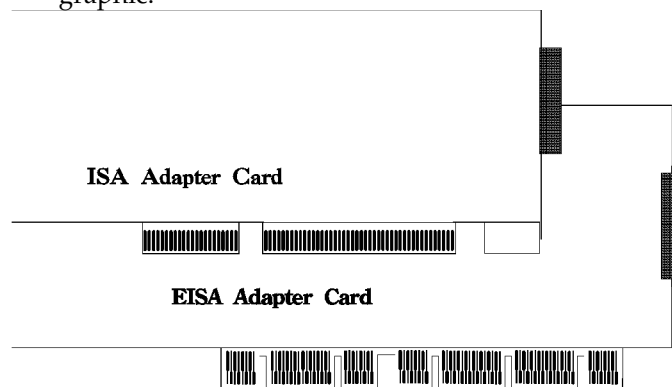
EISA Adapter Card

When installing EISA adapter cards, make sure that they snap in twice and are fully seated into the EISA slot. If the card makes contact only with the upper row of contacts, it does not function properly.

Step 9 Install Adapter Cards, Continued

8-Bit ISA Slot Pinout

Pin	Use	Pin	Use
A1	IOCHCK-	B1	GND
A2	SD07	B2	RSTDRV
A3	SD06	B3	+5
A4	SD05	B4	IRQ9
A5	SD04	B5	-5
A6	SD03	B6	DREQ2
A7	SD02	B7	-12
A8	SD01	B8	OWS-
A9	SD00	B9	+12
A10	IOCHRDY	B10	GND
A11	AEN	B11	SMEMW-
A12	SA19	B12	SMEMR-
A13	SA18	B13	IOW-
A14	SA17	B14	IOR-
A15	SA16	B15	DACK3-
A16	SA15	B16	DREQ3
A17	SA14	B17	DACK1-
A18	SA13	B18	DREQ1
A19	SA12	B19	REF-
A20	SA11	B20	SYSCLK
A21	SA10	B21	IRQ7
A22	SA09	B22	IRQ6
A23	SA08	B23	IRQ5
A24	SA07	B24	IRQ4
A25	SA06	B25	IRQ3
A26	SA05	B26	DACK2-
A27	SA04	B27	T/C
A28	SA03	B28	BALE
A29	SA02	B29	+5
A30	SA01	B30	OSC
A31	SA00	B31	GND

16-Bit ISA Extension Pinout

The following 16-bit pins are an extension of the 8-bit board layout and are used in conjunction with the 8-bit board standard pins.

Pin	Use	Pin	Use
C1	SBHE-	D1	MEMCS16-
C2	LA23	D2	IOCS16-
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ13
C7	LA18	D7	IRQ14
C8	LA17	D8	DACK0-
C9	MEMR-	D9	DREQ0
C10	MEMW-	D10	DACK5-
C11	SD08	D11	DREQ5
C12	SD09	D12	DACK6-
C13	SD10	D13	DREQ6
C14	SD11	D14	DACK7-
C15	SD12	D15	DREQ7
C16	SD13	D16	+5
C17	SD14	D17	MASTER-
C18	SD15	D18	GND

32-bit EISA Slot Pinout

The following table identifies the pin values for the pins on each of the eight rows of pins on an EISA adapter card. 8- and 16-bit ISA signals are shown. Pins labeled *xxxxxx* are generally used to isolate signals on the bus from adjacent power pins. Rows A, B, C, and D are upper (ISA) contacts. Rows E, F, G, and H are lower (EISA) contacts. The following table lists the pinouts for Rows F, B, E, and A.

Step 9 Install Adapter Cards, Continued

32-bit EISA Slot Pinout, cont'd

Row F	Row B	Row E	Row A
1 GND	1 GND	1 CMD#	1 IOCHK#
2 + 5 volts	2 RESDRV	2 START#	2 D7
3 + 5 volts	3 + 5 volts	3 EXRDY	3 D6
4 *xxxxxx*	4 IRQ 9	4 EX32#	4 D5
5 *xxxxxx*	5 - 5 volts	5 GND	5 D4
6 Access Key	6 DRQ 2	6 Access Key	6 D3
7 *xxxxxx*	7 - 12 volts	7 EX16#	7 D2
8 *xxxxxx*	8 NOWS#	8 SLBURST#	8 D1
9 + 12 volts	9 + 12 volts	9 MSBURST#	9 D0
10 M-IO	10 GND	10 W-R	10 CHRDY
11 LOCK#	11 SMWTC#	11 GND	11 AEN
12 Reserved	12 SMRDC#	12 Reserved	12 SA19
13 GND	13 IOWC#	13 Reserved	13 SA18
14 Reserved	14 IORC#	14 Reserved	14 SA17
15 BE# 3	15 DAK# 3	15 GND	15 SA16
16 Access Key	16 DRQ3	16 Access Key	16 SA15
17 BE# 2	17 DAK# 1	17 BE# 1	17 SA14
18 BE# 0	18 DRQ1	18 LA# 31	18 SA13
19 GND	19 REFRESH#	19 GND	19 SA12
20 + 5 volts	20 BCLK	20 LA# 30	20 SA11
21 LA# 29	21 IRQ 7	21 LA# 28	21 SA10
22 GND	22 IRQ 6	22 LA# 27	22 SA9
23 LA# 26	23 IRQ 5	23 LA# 25	23 SA8
24 LA# 24	24 IRQ 4	24 GND	24 SA7
25 Access Key	25 IRQ 3	25 Access Key	25 SA6
26 LA16	26 DAK# 2	26 LA15	26 SA5
27 LA14	27 T-C	27 LA13	27 SA4
28 + 5 volts	28 BALE	28 LA12	28 SA3
29 + 5 volts	29 + 5 volts	29 LA11	29 SA2
30 GND	30 OSC	30 GND	30 SA1
31 LA10	31 GND	31 LA9	31 SA0

32-bit EISA Slot Pinout, cont'd

The following table lists the pinouts for Rows H, D, G, and C.

Row H	Row D	Row G	Row C
1 LA8	1 M16#	1 LA7	1 SBHE#
2 LA6	2 IO16#	2 GND	2 LA23
3 LA5	3 IRQ 10	3 LA4	3 LA22
4 + 5 volts	4 IRQ 11	4 LA3	4 LA21
5 LA2	5 IRQ 12	5 GND	5 LA20
6 Access Key	6 IRQ 15	6 Access Key	6 LA19
7 D16	7 IRQ 14	7 D17	7 LA18
8 D18	8 DAK# 0	8 D19	8 LA17
9 GND	9 DRQ 0	9 D20	9 MRDC#
10 D21	10 DAK# 5	10 D22	10 MWTC#
11 D23	11 DRQ 5	11 GND	11 D8
12 D24	12 DAK# 6	12 D25	12 D9
13 GND	13 DRQ# 6	13 D26	13 D10
14 D27	14 DAK# 7	14 D28	14 D11
15 Access Key	15 DRQ# 7	15 Access Key	15 D12
16 D29	16 + 5 volts	16 GND	16 D13
17 + 5 volts	17 MASTER16#	17 D30	17 D14
18 + 5 volts	18 GND	18 D31	18 D15
19 MAXx#		19 MREQx#	

Step 10 Test and Configure

Review the following points before powering up:

✓ make sure that all adapter cards are seated properly,
✓ make sure all connectors are properly installed,
✓ if the math coprocessor is used, make sure it is seated properly,
✓ make sure there are no screws or other foreign material on the motherboard,
✓ plug the system into a surge-protected power strip, and
✓ make sure blank back panels are installed on the back of the chassis to minimize RF emissions.

Start the Test

Plug everything in and turn on the switch. If there are any signs of a problem, turn off the unit immediately. Reinstall the connectors. Call Technical Support if there are problems.

BIOS Errors

If the system operates normally, a display should appear on the monitor. The BIOS Power On Self Test (POST) should execute.

If POST does not run successfully, it will beep or display error messages. Beeps indicate a serious problem with the system configuration or hardware. The Beep Code (see page 40) indicates the problem. Make sure the affected part is properly seated and connected. An error message is displayed if the error is less serious. Recheck the system configuration or the connections.

Configure the System

Run the AMIBIOS Setup utility. You must enter the requested information and save the configuration data in CMOS RAM. The system will then reset, run POST, and boot the operating system. See the documentation on configuring the system through STANDARD CMOS SETUP which begins on page 51.

Run the ECU

The Series 16 Enterprise-II is an EISA motherboard. You must run an EISA Configuration Utility (ECU) to properly configure the system. The American Megatrends ECU and the appropriate motherboard CFG files are shipped on a floppy disk with Enterprise-II motherboard.

Chapter 3

BIOS Power-On Self Test

AMIBIOS provides all IBM-standard POST routines as well as enhanced AMIBIOS POST routines and CPU internal diagnostics. AMIBIOS POST codes can be accessed via the Manufacturing Test Port (I/O Port 80h).

POST Phases

When the system is powered on, the AMIBIOS executes POST, which has two phases:

- *System Test and Initialization* (test and initialize motherboards for normal operations), and

- *System Configuration Verification* (compare defined configuration with there hardware actually installed).

BIOS Error Reporting

AMIBIOS performs diagnostic when the system is powered up. Errors are reported in one of two different ways:

If...	Then...
the error occurs before the display device is initialized,	a series of beeps sound. Beep codes indicate that a fatal error has occurred. AMIBIOS Beep Codes are described on the next page.
the error occurs after the display device is initialized,	the error message is displayed. Displayed error messages are explained below. A prompt to press <F1> can also appear.

Beep Codes

Errors may occur during POST (Power On Self Test), which is performed every time the system is powered on. Fatal errors (listed below) are usually communicated through a series of audible beeps. All errors except Beep Code 8 are fatal. Fatal errors do not allow the system to continue.

If POST initializes the system video monitor, errors can be displayed on the screen. These errors usually allow the system to continue. They are listed on Page 41.

AMIBIOS Beep Codes

Beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	A parity error was detected in the base memory (the first 64 KB block) of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	A memory failure occurred within the first 64 KB of memory, or Timer #1 on the motherboard is not functioning.
5	Processor error	The CPU (Central Processing Unit) on the motherboard has generated an error.
6	8042 - Gate A20 Failure	Gate A20 on the keyboard controller (8042) contains the allows the CPU to operate in protected mode. The BIOS is not able 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. This may not be 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 CMOS RAM has failed.

AMIBIOS Displayed Error Messages

Error message are displayed as follows:

```
ERROR Message Line 1
ERROR Message Line 2
Press <F1> to RESUME
```

The system does not halt if *Wait for <F1> If Any Error* in ADVANCED CMOS SETUP is *Disabled.* If a second message appears, it is usually:

```
RUN SETUP UTILITY.
```

Press <F1> to run AMIBIOS Setup.

Error Message	Explanation
8042 Gate-A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
C: Drive Error	No response from drive C:. Run the Hard Disk Utility. Check the C: hard disk type in STANDARD CMOS SETUP.
C: Drive Failure	No response from drive C:. It may be necessary to replace the hard disk.
Cache Memory Bad, Do Not Enable Cache!	Cache memory on the motherboard is defective. Consult the cache memory manufacturer.
CH-2 Timer Error	Most AT motherboards include two timers. An error occurred in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	A checksum value is generated for error checking. This message appears if the previous value is different from the current value. Run AMIBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run AMIBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run AMIBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run AMIBIOS Setup.
CMOS Time & Date Not Set	Run STANDARD CMOS SETUP to set the date and time in CMOS RAM.
D: Drive Error	No response from drive D:. Run the Hard Disk Utility. Check the D: hard disk type in STANDARD CMOS SETUP.
D: drive failure	No response from hard disk drive D:. It may be necessary to replace the hard disk.
Diskette Boot Failure	The boot diskette in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot diskette and follow the screen instructions.

Error Message	Explanation
Display Switch Not Proper	Some systems require a video switch on the motherboard be set to either color or monochrome. Turn the system off, set the switch properly, then power on.
DMA Error	Error in the DMA controller on the motherboard.
DMA #1 Error	Error in the first DMA channel on the motherboard.
DMA #2 Error	Error in the second DMA channel on the motherboard.
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the diskette in drive A: but it cannot boot the system with it. Use another boot diskette and follow the screen instructions.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue the boot process.
Keyboard Error	Timing problem with the keyboard. Make sure a keyboard controller AMIBIOS is installed. Set the *Keyboard* option in STANDARD CMOS SETUP to *Not Installed* to skip the keyboard POST routines.
KB/Interface Error	Error in the keyboard connector on the motherboard.
No ROM BASIC	Cannot find a proper bootable sector on either diskette drive A: or hard disk drive C:. Use a bootable disk.
Off Board Parity Error	Parity error in offboard memory. The format is: `OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)` *XXXX* is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Onboard Parity Error	Parity error in motherboard memory. The format is: `Onboard PARITY ERROR ADDR (HEX) = (XXXX)` *XXXX* is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag to find and correct memory problems.

EISA Error Messages

Error Message	Explanation
EISA CMOS Checksum Failure	The Checksum for EISA CMOS is bad or has never been written. The battery for EISA CMOS RAM may be bad. Run the ECU.
EISA CMOS inoperational	Read/Write error in extended CMOS RAM. The battery may be bad.
Expansion board not ready at Slot *X, Y, Z*	The BIOS cannot find the adapter card in Slot *X, Y*, or *Z*. Make sure the adapter card is in the correct slot and is correctly seated.
Fail-Safe Timer NMI Inoperational	Devices that depend on the fail-safe NMI timer cannot operate correctly.
ID information mismatch for Slot *X, Y, Z.*	The ID of the EISA Adapter Card in Slot *X, Y*, or *Z* does not match the ID in EISA CMOS RAM.
Invalid Configuration Information for Slot X, Y, Z.	The configuration information for EISA Adapter Cards *X, Y*, or *Z* is not correct. The card cannot be configured. Run the ECU.
Software Port NMI Inoperational	The software port NMI is not working.

ISA BIOS NMI Messages

ISA NMI Message	Explanation
Memory Parity Error at *xxxxx*	Memory failed. The memory location is *xxxxx*. If not determined, the message is *Memory Parity Error ????*.
I/O Card Parity Error at *xxxxx*	An adapter card failed. If the address is known, it is *xxxxx*. If not, the message is *I/O Card Parity Error ????*.
DMA Bus Time-out	A device other than the CPU has driven the bus signal for more than 7.8 microseconds.

EISA BIOS NMI Error Messages

EISA NMI Message	Explanation
BUS Timeout NMI at Slot *n*	There was a Bus Timeout NMI at Slot *n*.
(E)nable (D)isable Expansion board?	Type E to enable the adapter card that had an NMI or D to disable it.
Expansion board Disabled at Slot *n*	The adapter card in Slot *n* has been disabled.
Expansion board NMI at Slot *n*	An adapter card NMI was generated from Slot *n*.
Fail-Safe Timer NMI	A fail-safe timer NMI has been generated.
Software Port NMI	A software port NMI has been generated.

BIOS Configuration Summary Screen

```
System Configuration (C) Copyright 1985-1991 American Megatrends Inc.

Main Processor         : 80486      Base Memory Size     : 640 KB
Numeric Coprocessor    : Present    Ext. Memory Size     : 7808 KB
Floppy Drive A:        : 1.2 MB ½   Hard Disk C: Type    : 44
Floppy Drive B:        : 1.44 MB ¼  Hard Disk D: Type    : None
Display Type:          :VGA or EGA  Serial Port(s)       : 3F8
ROM-BIOS Date:         : 05/01/91   Parallel Port(s)     : 378

Weitek                 : Absent     Mouse                : Absent
On Board Floppy        : Enabled    External Cache       : 128 KB
Video Bios Shadow      : Enabled    C800 Bios Shadow     : Disabled

MEMORY     TYPE     USED AS          MEMORY     TYPE      USED AS

BANK1    1 M X 9   1 M x 9           BANK4     Absent    Absent
BANK2    1 M X 9   1 M x 9           BANK5     Absent    Absent
BANK3    Absent    Absent            BANK6     Absent    Absent
```

POST Memory Test

Normally, the only visible POST routine is the memory test, shown below.

```
ROM BIOS (C) 1991 American Megatrends Inc.
xxxxx KB OK
Press <DEL> if you want to run SETUP




(C) American Megatrends
XX-XXXX-XXXXXX-XXXXXXXX-XXXXXX-XXXX-X
```

A BIOS Identification string appears in the left bottom corner of the screen. Press **<Ins>** during system boot to display two additional BIOS Identification strings. The BIOS Identification String are described in the *ISA and EISA AMIBIOS Technical Reference*. When a problem occurs, freeze the screen by powering on the system and holding a key down, which causes a *Keyboard Error* message. Copy the BIOS Identification Strings and report this information to American Megatrends Technical Support. Press **<F1>** to continue. Enable the *Wait for <F1> If any Error* option in ADVANCED CMOS SETUP before using this method to freeze the screen.

Chapter 4

AMIBIOS Setup

AMIBIOS Features

AMIBIOS has several features that can be accessed at any time.

Keyboard Speed Switching

The end use can increase processor speeds at any time by pressing <Ctrl><Alt><+>. Processor speed can be decreased by pressing <Ctrl><Alt><->. Of course, the OEM can modify these keystroke combinations via AMIBCP. The above values are merely the default settings.

Enable Cache Memory

External cache memory can be enabled by pressing <Ctrl><Alt><Shift><+> or disabled by pressing <Ctrl><Alt><Shift><->. The OEM can modify these keystroke combinations via AMIBCP. The above values are merely the default settings.

AMIBIOS Setup

AMIBIOS Setup has two parts:

- STANDARD CMOS SETUP, and
- ADVANCED CMOS SETUP.

STANDARD CMOS SETUP

STANDARD CMOS SETUP permits the end user to configure and set system components such as floppy drives, hard disk drives, time and date, monitor type, and keyboard.

ADVANCED CMOS SETUP

ADVANCED CMOS SETUP allows the end user to configure more advanced parts of memory configuration, peripheral support, and password support. ADVANCED CMOS SETUP is discussed in Section 4.

Section 1

Running AMIBIOS Setup

A record of the computer's system parameters (such as amount of memory, disk drives, video displays, and numeric coprocessors) is stored in CMOS (Complementary Metal Oxide Semiconductor) RAM.

When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains the system parameters.

Each time the system is powered-on, it is configured with these values, unless CMOS RAM has been corrupted. AMIBIOS Setup resides in the ROM BIOS (Read Only Memory Basic Input/Output System) and is available each time the computer is turned on.

If, for some reason, CMOS RAM becomes corrupted, the system is configured with the default values stored in this ROM file. There are two sets of BIOS values stored in the ROM file: the BIOS Setup default values and the Power-On default values.

Starting Setup

When POST has completed, the following message appears:

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

Press <Del> to run AMIBIOS Setup.

AMIBIOS Setup Key Use

Keystroke	Action
<Esc>	Returns to previous screen.
→,←, ↑, ↓	Move the cursor from one option to the next.
<PgUp> and <PgDn>; <Ctrl><PgUp> and <Ctrl><PgDn>	Modify the default value of the options for the highlighted parameter. If there are fewer than 10 options, <Ctrl> <PgUp> and <Ctrl> <PgDn> operate like <PgUp> and <PgDn>.
<F1>	Displays Help.
<F2>	Change background colors.
<F3>	Change foreground colors.
<F5>	Restores the values resident when the current Setup session began. These values are taken from CMOS RAM if CMOS RAM was uncorrupted at the start of the session. Otherwise, the values are 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 returns to DOS.

Note: The default value for **<F5>**, **<F6>**, and **<F7>** is always N. To execute these options, change the N to Y and press **<Enter>**.

AMIBIOS Setup Main Menu

The AMIBIOS Setup Main Menu options are shown below.

```
            AMIBIOS SETUP PROGRAM - BIOS SETUP UTILITIES
    (C) Copyright 1992 American Megatrends, Inc. All Rights Reserved

                        STANDARD CMOS SETUP
                        ADVANCED CMOS SETUP
                       ADVANCED CHIP SET SETUP
                    POWER MANAGEMENT BIOS SETUP
                          PERIPHERAL SETUP
                AUTO CONFIGURATION WITH BIOS DEFAULTS
              AUTO CONFIGURATION WITH POWER-ON DEFAULTS
                         CHANGE PASSWORD
                       AUTO DETECT HARD DISK
                        HARD DISK UTILITY
                      WRITE TO CMOS AND EXIT
                    DO NOT WRITE TO CMOS AND EXIT


    Standard CMOS Setup for changing Time, Date, Hard Disk Type, etc.
```

Each option is explained in detail in this section.

Warning Message

A warning is displayed every time you choose STANDARD CMOS SETUP or ADVANCED CMOS SETUP. Press any key to continue.

Auto Configuration With BIOS Defaults

Auto Configuration With BIOS Defaults uses the default system values. The BIOS default value are best-case values that should optimize system performance. If CMOS RAM is corrupted, the BIOS defaults is automatically loaded. To use the BIOS defaults, type Y and press <Enter>. The following message appears:

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

Auto Configuration With Power-On Defaults

This option configures the default Power-On values. Power-On default values are worst-case values for system performance, but are the most stable values that can be chosen. Use this option as a diagnostic aid if the system is behaving erratically. Type *Y* and press <Enter> to use the Power-On defaults. The following message appears:

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

Write to CMOS and Exit

The features selected and configured in the STANDARD CMOS SETUP, ADVANCED CMOS SETUP, and the new Password Setup are stored in CMOS RAM when this option is selected. A CMOS RAM checksum is calculated and written to CMOS RAM. Control is then passed to the ROM BIOS.

```
Write to CMOS and Exit (Y/N)?
```

Type *N* and press <Enter> to return to the Main Menu. Type *Y* and press <Enter> to save the system parameters and continue the boot process.

Do Not Write to CMOS RAM and Exit

This option passes control to the ROM BIOS without writing any changes to CMOS RAM. Type *N* and press <Enter> to return to the Main Menu. Type *Y* and press <Enter> to continue the boot process without saving any system parameters.

Section 2

STANDARD CMOS SETUP

STANDARD CMOS SETUP is the first option on the Main Menu. Press <Enter> at the highlighted selection to display this option. The following screen appears.

```
                    AMIBIOS SETUP PROGRAM — CMOS SETUP PROGRAM
                    (C)1992 American Megatrends Inc., All Rights Reserved

Date (mn/date/year): Fri, Aug 07 1992           Base memory : 640 KB
Time (hour/min/sec): 09 : 38 : 09               Ext. memory : 2816 KB
                                    Cyln  Head  WPcom LZone Sect  Size
Hard disk C: type  : 40             820    6    820   820   17    41 MB
Hard disk D: type  : Not Installed
Floppy drive A:    : 1.2  MB, 5¼
Floppy drive B:    : 1.44 MB, 3½        Sun Mon Tue Wed Thu Fri Sat
Primary Display    : VGA/PGA/EGA
Keyboard           : Installed          30  31   1   2   3   4   5

                                         6   7   8   9  10  11  12

                                        13  14  15  16  17  18  19
   Month : Jan, Feb,.....Dec
   Date  : 01, 02, 03,...31             20  21  22  23  24  25  26
   Year  : 1901, 1902,...2099
                                        27  28  29  30  31   1   2

                                         3   4   5   6   7   8   9

  ESC:Exit  ↑→↓←:Select  F2:Color  PU/PD:Modify
```

TANDARD CMOS SETUP Options

Date And Day Configuration

Ranges for each value are shown in the lower left corner of the Screen. Move the cursor to the Date field via ↑ or ↓ and set the Date and Day by pressing <PgUp> and <PgDn> to change the values.

Time Configuration

This option uses a 24 hour clock format. For PM numbers, add 12 to the hour. Enter 4:30 P.M. as 16:30:00. Move the cursor to the Time field via ↑ or ↓ and set the time by pressing <PgUp> and <PgDn>.

Hard Disk Drive C:
Hard Disk Drive D:

Move the cursor to these fields via ↑ or ↓ and select a hard drive type by pressing <PgUp> and <PgDn>. The hard drive types are listed on page 53. Match the hard disk drive parameters provided by the hard disk manufacturer to a hard disk drive type in this table. If the parameters for the hard disk drive being configured do not match type 1 – 46, select Type 47 and enter the hard drive parameters.

If configuring an IDE drive, you must select Type 47. If configuring an ESDI drive, you must select Type 1. If configuring a SCSI drive, you must select *Not Installed. Not Installed* is used to configure diskless workstations.

Type 47 can be used for both hard disks C: and D:. The parameters for type 47 under Hard Disk C: and Hard Disk D: can be different, which effectively allows two different user-definable hard disk types. The hard disk drive parameters are:

Parameter	Description
Type	The number designation for a drive with certain identification parameters.
Cylinders	The number of cylinders in the disk drive.
Heads	The number of heads.
Write Precompensation	The size of a sector gets progressively smaller as the track diameter diminishes. Yet each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number where write precompensation begins.
Landing Zone	This number is the cylinder location where the heads will normally park when the system is shut down.
Sectors	The number of sectors per track. Hard drives that use MFM have 17 sectors per track. RLL drives have 26 sectors per track. ARLL and ESDI drives have 34 sectors per track. SCSI and IDE drive may have even more sectors per track.
Capacity	The formatted capacity of the drive is : Number of heads X (Number of cylinders) X (Number of sectors per track) X (512 bytes per sector).

STANDARD CMOS SETUP Options

Hard Disk Drive Types

Type	Cylinders	Heads	Write Precompensation	Landing Zone	Sectors	Size
1	306	4	128	305	17	10 MB
2	615	4	300	615	17	20 MB
3	615	6	300	615	17	31 MB
4	940	8	512	940	17	62 MB
5	940	6	512	940	17	47 MB
6	615	4	65535	615	17	20 MB
7	462	8	256	511	17	31 MB
8	733	5	65535	733	17	30 MB
9	900	15	65535	901	17	112 MB
10	820	3	65535	820	17	20 MB
11	855	5	65535	855	17	35 MB
12	855	7	65535	855	17	50 MB
13	306	8	128	319	17	20 MB
14	733	7	65535	733	17	43 MB
16	612	4	0	663	17	20 MB
17	977	5	300	977	17	41 MB
18	977	7	65535	977	17	57 MB
19	1024	7	512	1023	17	60 MB
20	733	5	300	732	17	30 MB
21	733	7	300	732	17	43 MB
22	733	5	300	733	17	30 MB
23	306	4	0	336	17	10 MB
24	925	7	0	925	17	54 MB
25	925	9	65535	925	17	69 MB
26	754	7	754	754	17	44 MB
27	754	11	65535	754	17	69 MB
28	699	7	256	699	17	41 MB
29	823	10	65535	823	17	68 MB
30	918	7	918	918	17	53 MB
31	1024	11	65535	1024	17	94 MB
32	1024	15	65535	1024	17	128 MB
33	1024	5	1024	1024	17	43 MB
34	612	2	128	612	17	10 MB
35	1024	9	65535	1024	17	77 MB
36	1024	8	512	1024	17	68 MB
37	615	8	128	615	17	41 MB
38	987	3	987	987	17	25 MB
39	987	7	987	987	17	57 MB
40	820	6	820	820	17	41 MB
41	977	5	977	977	17	41 MB
42	981	5	981	981	17	41 MB
43	830	7	512	830	17	48 MB
44	830	10	65535	830	17	69 MB
45	917	15	65535	918	17	114 MB
46	1224	15	65535	1223	17	152 MB
47			Enter disk drive parameters supplied by hard drive manufacturer.			

Floppy Drive A:
Floppy Drive B:

Move the cursor to these fields via ↑ or ↓ and select a drive type by pressing <PgUp> and <PgDn>. The settings are *360 KB 5¼ inch*, *1.2 MB 5¼ inch*, *720 KB 3½ inch*, *1.44 MB 3½ inch, 2.88 MB 3½ inch,* or *Not Installed*. *Not Installed* can be used to configure diskless workstations.

Monitor

Move the cursor to this field via ↑ or ↓ and select a monitor type by pressing <PgUp> and <PgDn>. The settings are *Monochrome*, *Color 40x25*, *VGA/PGA/EGA*, *Color 80x25*, or *Not Installed*. *Not Installed* is used for network file servers and other systems that do not have monitors.

Keyboard

Move the cursor to this field via ↑ or ↓ and select a setting by pressing <PgUp> and <PgDn>. The settings are *Installed* or *Not Installed*. *Not Installed* could be used for network file servers, since it prevents the display of error messages about missing keyboards.

Section 3

ADVANCED CMOS SETUP

The following options are displayed on the ADVANCED CMOS SETUP screen.

- Typematic Rate Programming,
- Typematic Rate Delay (msec),
- Typematic Rate (Chars/Sec),
- Extended Memory Test,
- Memory Test Tick Sound,
- Memory Parity Error Check,
- Hit <ESC> Message Display,
- Hard Disk Type 47 RAM Area,
- Wait For <F1> If Any Error,
- System Boot Up Num Lock,
- Numeric Processor,
- Floppy Drive Seek at Boot,
- System Boot Up Sequence,
- Fast Gate A20 Option,
- Password Checking Option,
- Video ROM Shadow C000, 32K
- Adaptor ROM Shadow C800, 32K

Help Screens

All AMIBIOS Setup options have help screens accessed by pressing <F1> when the option is highlighted.

Warning Message

A warning message is displayed when ADVANCED CMOS SETUP is selected. Press any key to continue.

ADVANCED CMOS SETUP Screen

ADVANCED CMOS SETUP is shown below. Use ↑ or ↓ to scroll through the options.

```
╔═══════════════════════════════════════════════════════════════════════╗
            AMIBIOS SETUP UTILITY – ADVANCED CMOS SETUP
           (C) 1992 AMERICAN MEGATRENDS INC. ALL RIGHTS RESERVED.
╠═══════════════════════════════════════════════════════════════════════╣
 Typematic Rate Programming : Disabled │
 Typematic Rate Delay (msec): 250      │
 Typematic Rate (Chars/Sec) : 30.0     │
 Extended Memory Test       : Disabled │
 Memory Test Tick Sound     : Disabled │
 Memory Parity Error Check  : Disabled │
 Hit <DEL> Message Display  : Disabled │
 Hard Disk Type 47 RAM Area : 0:300    │
 Wait For <F1> If Any Error : Disabled │
 System Boot Up Num Lock    : Off      │
 Numeric Processor          : Absent   │
 Floppy Drive Seek at Boot  : Disabled │
 System Boot Up Sequence    : C:, A;   │
 Fast Gate A20 Option       : Enabled  │
 Password Checking Option   : Enabled  │
 Video ROM Shadow C000, 32K : Enabled  │
Adaptor ROM Shadow C800, 32K: Enabled  │
╠═════════╦═════════════════════════════════════════════════════╦═══════╣
══════════║ESC:Exit  ↑→↓←:Sel  (Ctrl)Pu/Pd:Modify   F1:Help  F2:Color ║═══════
══════════║F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults║═══════
╚═══════════════════════════════════════════════════════════════════════╝
```

ADVANCED CMOS SETUP Options

Typematic Rate Programming, Rate, and Delay

Typematic Rate Programming enables or disables the following two options. Typematic Rate Delay (250, 500, 750, or 1,000 milliseconds) and Typematic Rate (6, 8, 10, 12, 14, 15, 20, 24, or 30 characters per second) control the speed at which a keystroke is repeated.

When a key is pressed and held down, the associated character is displayed. After a delay specified by the Typematic Rate Delay, the character repeats at the Typematic Rate. When two or more keys are pressed and held down simultaneously, only the last key is repeated.

Repeating stops when the last key pressed is released, even if other keys are pressed.

ADVANCED CMOS SETUP Options, Continued

Extended Memory Test

This feature, when enabled, executes POST memory routines on the RAM above 1 MB (if present on the system). If disabled, the BIOS only checks the first 1 MB of RAM.

Memory Test Tick Sound

This option enables (turns on) or disables (turns off) the ticking sound during the memory test.

Memory Parity Error Check

This option can be Enabled or Disabled. If enabled, the parity is tested on all memory above 1 MB. If disabled, only the first 1 MB of memory is tested.

Hit <DEL> Message Display

Disabling this option prevents

```
        Hit <DEL> if you want to run Setup
```

from appearing when the system boots.

Hard Disk Type 47 RAM Area

You can specify a user-definable hard disk type for drive
C: and drive D:. The type 47 drive parameters must be
entered in STANDARD CMOS SETUP (see page 53). This
option specifies the type 47 data storage area – 0:300h in
lower system RAM or in the top 1 KB of applications
memory, starting at address 639K or 511K (depending on
how much base memory the system has). Type 47 data is
stored in shadow RAM if shadowing is enabled. The
following graphic illustrates type 47 data storage.

Hard Disk Type 47 Data Storage

```
      ╱╲
     ╱  ╲
    ╱Shadowing╲  YES    Store in
    ╲  on?   ╱ ──────  Shadow RAM
     ╲    ╱
      ╲╱
       │ NO
      ╱╲
     ╱  ╲
    ╱PS/2 Mouse╲  YES   Store in
    ╲Supported?╱ ─────  Top 1 K of
     ╲      ╱           Application RAM
      ╲  ╱
       ╲╱
       │ NO
```
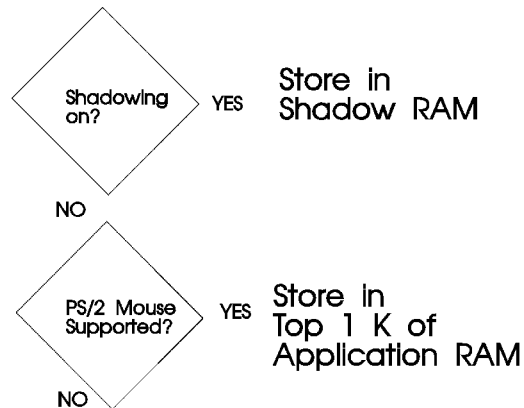
Store at 0:300h or
Top 1 K of
Application RAM
as selected in
Advanced CMOS Setup

Wait for <F1> If Any Error

If enabled, the BIOS waits until the end user presses <F1>
before continuing after an error message. If disabled, the
BIOS continues after the error message.

System Boot Up Num Lock

Turns off *Num Lock* when the system is powered on so
you can use the arrow keys on both the numeric keypad
and the keyboard.

Numeric Processor

Specifies that a math coprocessor is configured in the
system. The settings are *Present* or *Absent.*

Floppy Drive Seek At Boot

The default for this option is *Disabled* to allow a fast boot
and to decrease the possibility of damage to the heads.

System Boot Up Sequence

This option sets the boot sequence for disk drives. The
default is A:,C:. The settings are *C:,A:* or *A:,C:.*

Fast Gate A20 Option

Gate A20 controls the ability to access memory addresses
above 1 MB by enabling or disabling access to the
processor address line A20. To remain XT-compatible and
be able to access conventional memory (from 0 - 1024K),
address line A20 must always be low, so Gate A20 must
be disabled. However, some software programs both
enter protected mode and use the CMOS RAM Shutdown
byte to return to real mode via the BIOS. For this
software, Gate A20 must be constantly enabled and
disabled via the keyboard controller, which is slow. Fast
Gate A20 is an alternate method of enabling Gate A20
that permits faster switching between addresses modes.

ADVANCED CMOS SETUP Options, Continued

Password Checking Option

This option enables the password check option every time the system boots or the end user runs Setup. If *Always* is chosen, a user password prompt appears every time the system is turned on. If *Setup* is chosen, the password prompt appears if Setup is run. See Section 6 (Page 61) for instructions on changing a password.

Video or Adaptor ROM Shadow

ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM.

The video ROM segment at C000–C7FFh can be Enabled or Disabled.

Shadowing for the adapter ROM at C800h–CFFFh can also be Enabled or Disabled.

Section 4

AMIBIOS Password Support

AMIBIOS Setup has an optional password feature. The system can be configured so the end user must enter a password every time the system boots or when Setup is run.

Changing a Password

The password check option is enabled or in ADVANCED CMOS SETUP (Page 60).

The password (1-6 characters) is stored in CMOS RAM. To change a password, select the Change Password option from the main Setup screen and press <Enter>. The following prompt appears.

```
Enter CURRENT Password:
```

The first time this option is selected, the end user must enter a password and press <Enter>. The screen does not display the characters entered. After the current password has been correctly entered, the end user is asked to retype the new password and press <Enter>.

If the password confirmation is incorrect, an error message appears. If the new password is entered without error, the end user can press <Esc> to return to the Main Setup menu.

Password Storage

The password is stored in CMOS RAM after Setup completes. The next time the system boots, the end user is prompted for the password if the password function is present and has been enabled.

Using a Password

The end user must enter the new password when the password prompt appears and then press <Enter>. The end user should use the default password if CMOS RAM is corrupted.

The end user should keep a record of the new password when the password is changed. If he forgets the password and password protection is enabled he must return the system to the manufacturer for repair.

Section 5

Hard Disk Utility

AMIBIOS includes three hard disk utilities:

Utility	Purpose	Turn to
Hard Disk Format	Performs a low level format of the hard drive(s). Read the system or hard disk drive documentation to find out if the hard disk has been preformatted.	Page 65
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page 67
Media Analysis	Analyzes each hard disk drive track to determine whether it is usable. The track is labeled bad if unusable.	Page 55

The hard disk utility error messages are described on page 69.

These routines work on drives that use the MFM, RLL, ARLL, or ESDI data recording techniques. *They do not work on IDE or SCSI Disk Drives.*

Warning
AMIBIOS Hard Disk Utilities destroy all hard disk data. Back up the data on the hard disk before running this utility.

When to Use AMIBIOS Hard Disk Utilities

When	Conditions	Run...
Installing a new hard disk.	The hard disk drive manufacturer provided a list of bad tracks, the system documentation includes the optimum interleave factor, and the drive is preformatted .	None
Installing a new hard disk.	You do not have a list of bad tracks.	Media Analysis
Installing a new hard disk.	You do not know the optimum interleave factor.	Auto Interleave
Installing a new hard disk.	The drive is not formatted.	Hard Disk Format
Installing a used hard disk drive.	N/A	All Hard Disk Utilities

When Hard Disk Diagnostics is selected, the following screen appears.

```
             AMIBIOS SETUP PROGRAM - HARD DISK DIAGNOSTICS
          (C) 1992 American Megatrends, Inc. All rights reserved.

                              Cyln  Head  WPcom LZone Sect  Size(in MB)
  Hard Disk C: Type : 40      820   6     820   820   17    41
  Hard Disk D: Type : Not Installed

  Hard Disk Type can be changed from the STANDARD SETUP option in Main Menu




                      Hard Disk Format
                      Auto Interleave
                      Media Analysis




                 ESC:Exit    ↑→↓←:Sel    F2:Color
```

Select an option and press <Enter>.

Hard Disk Format Utility

> **Warning**
>
> *The Hard Disk Format utility destroys all hard disk data. Back up the data on the hard disk before running this utility.*

This routine does not work on IDE or SCSI drives. Use Hard Disk Format to integrate a new hard disk to the system, or to reformat a used hard disk which has developed bad tracks as a result of aging or poor handling. Select Media Analysis to find bad tracks. The following screen appears when Hard Disk Format is selected.

```
            AMIBIOS SETUP PROGRAM - HARD DISK DIAGNOSTICS
          (C) 1992 American Megatrends, Inc. All rights reserved.

                                  Cyln  Head  WPcom LZone Sect  Size(in MB)
Hard Disk C: Type : 40            820   6     820   820   17    41
Hard Disk D: Type : Not Installed


    ┌─────────────────────────────────┐
    │      Hard Disk Format           │
    │                                 │
    │ Disk Drive (C/D)      ? C       │
    │ Disk Drive Type       ? 40      │
    │ Interleave (1-16)     ? 3       │
    │ Mark Bad Tracks (Y/N) ? N       │
    │ Proceed (Y/N)         ? N       │
    └─────────────────────────────────┘




                   ═══ESC:Exit    ↑→↓←:Sel═══
```

Hard Disk Format Screen

Answer the questions on the screen. The first two questions are already completed if only one hard disk drive was selected in Standard CMOS Setup and the cursor is on *Interleave*. The Disk Drive Type is read from CMOS RAM. The interleave factor can be selected manually or determined by the Auto Interleave routine.

The hard disk drive manufacturer usually provides a list of bad tracks. Enter these tracks. They are then labeled as bad to prevent data from being stored on them. The following screen is displayed after entering *Y* in Mark Bad Tracks, pressing **<Enter>**, and selecting add, delete, revise, or clear from the Bad Track Edit Menu.

```
            AMIBIOS SETUP PROGRAM - HARD DISK DIAGNOSTICS
            (C) 1992 American Megatrends, Inc. All rights reserved.

                              Cyln  Head  WPcom LZone Sect  Size(in MB)
    Hard Disk C: Type : 40     820   6     820   820   17    41
    Hard Disk D: Type : Not Installed

    ┌──────────────────────┐ ┌──────────────────┐ ┌──────────────────┐
    │   Hard Disk Format   │ │Bad Track Edit Menu│ │  Bad Track # 0   │
    │                      │ │                  │ │                  │
    │ Disk Drive (C/D)   ? C│ │ Add an Entry     │ │ No.   Cyln.  Head│
    │ Disk Drive Type    ? 40│ │ Revise an Entry  │ │                  │
    │ Interleave (1-16)  ? 3 │ │ Delete an Entry  │ │                  │
    │ Mark Bad Tracks (Y/N) ? Y│ │ Clear Bad Trk List│ │                  │
    │ Proceed (Y/N)      ?  │ │                  │ │                  │
    └──────────────────────┘ └──────────────────┘ │                  │
                       ┌──────────────────────┐   │                  │
                       │ Enter Cylinder # : 0  │   │                  │
                       │    Enter Head # :     │   │                  │
                       │                      │   │                  │
                       └──────────────────────┘   └──────────────────┘

    ═════════════════════| ESC:Exit   ↑→↓←:Sel |═════════════════════
```

Type *Y* and press **<Enter>**. A warning screen appears. Press any key to continue.

Warning
Data on the hard drive will be irrevocably lost.

Auto Interleave Utility

> ***Warning***
> *The Auto Interleave utility destroys hard disk data. Back up the data on the hard disk before running this utility.*

The Auto Interleave utility calculates the optimum interleave factor through trial and error by measuring the transfer rate for four different interleave values. To determine the best interleave factor, the system formats a portion of the hard disk for each transfer rate calculated. The cylinders, heads and sectors formatted for each value is displayed in the activity box. It does not work on IDE or SCSI drives.

Select Auto Interleave on the main Hard Disk Utility Screen and press <Enter>. The following appears.

```
              AMIBIOS SETUP PROGRAM - HARD DISK DIAGNOSTICS
              (C) 1992 American Megatrends, Inc. All rights reserved.

                                Cyln  Head  WPcom LZone Sect   Size(in MB)
 Hard Disk C: Type : 40          820   6     820   820   17     41
 Hard Disk D: Type : Not Installed

 ┌──────────────────────┐ ┌──────────────────────┐ ┌──────────────────────┐
 │    Auto Interleave   │ │Bad Track Edit Menu   │ │    Bad Track # 0     │
 │                      │ │                      │ │                      │
 │ Disk Drive (C/D)    ? C │ Add an Entry        │ │ No.    Cyln.   Head  │
 │ Disk Drive Type     ? 40│ Revise an Entry     │ │                      │
 │ Mark Bad Tracks (Y/N) ? Y│ Delete an Entry     │ │                      │
 │ Proceed (Y/N)       ?   │ Clear Bad Trk List  │ │                      │
 └──────────────────────┘ └──────────────────────┘ │                      │
                                                    │                      │
              ┌──────────────────────────┐          │                      │
              │  Enter Cylinder # : 0     │          │                      │
              │     Enter Head # :        │          │                      │
              │                           │          │                      │
              └──────────────────────────┘          └──────────────────────┘

 ══════════════════════════╡ESC:Exit   ↑→↓←:Sel╞════════════════════════════
```

The cursor is on *Mark Bad Tracks.* The default is *N*. To mark additional bad tracks, type *Y* and press <Enter>. After selecting options from the Bad Tracks Edit Menu, press <Esc>. Type *Y* and press <Enter> to proceed with the Auto Interleave process. A warning screen appears. Press <Enter> to return to the main Hard Disk Utility screen. To proceed, type *Y* and press <Enter>.

Media Analysis Utility

The Media Analysis utility performs a series of tests to locate bad or damaged tracks on the hard disk as a result of aging or poor handling. This utility locates all bad tracks and lists them in the Bad Track List Box. Since this test writes to all cylinders and heads on the hard disk to verify any bad tracks, the test requires several minutes to complete. For best results, run this test in its entirety. Media Analysis does not work on IDE or SCSI drives.

Select *Media Analysis* from the main Hard Disk Utility Menu and press <Enter>. The following screen appears.

```
          AMIBIOS SETUP PROGRAM - HARD DISK DIAGNOSTICS
          (C) 1992 American Megatrends, Inc. All rights reserved.

                                    Cyln  Head  WPcom LZone Sect  Size(in MB)
   Hard Disk C: Type : 40           820   6     820   820   17    41
   Hard Disk D: Type : Not Installed

      ┌─────────────────────────────┐
      │      Media Analysis         │
      │                             │
      │ Disk Drive (C/D)     ? C    │
      │ Disk Drive Type      ? 40   │
      │ Interleave (1-16)    ? 3    │
      │ Proceed (Y/N)        ? N    │
      └─────────────────────────────┘




                      ═══┤ESC:Exit    ↑→↓←:Sel├═══
```
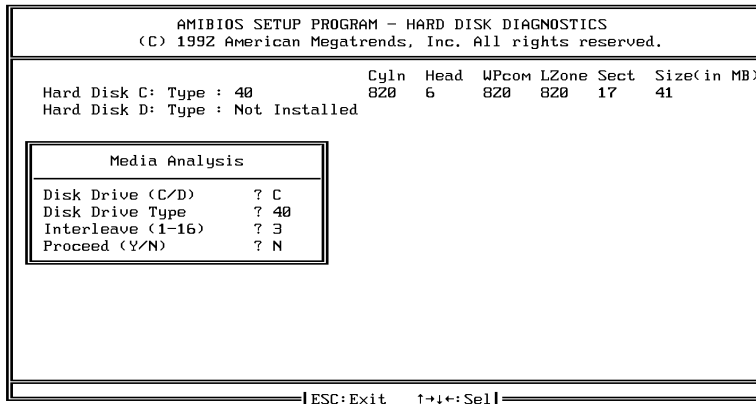
Media Analysis Screen

The cursor is on *Proceed.* The warning screen appears. Press <Enter> to stop. The main Hard Disk Utility screen appears. Type Y and press <Enter> to perform the hard disk drive analysis.

Hard Disk Utility Error Messages

Initialization Errors

Message	Explanation
No Hard Disk Installed	There is no hard disk drive in the system but Hard Disk Utility was selected.
FATAL ERROR Bad Hard Disk	No response from the hard disk, or the hard disk is not repairable. Check all cable and power connections to the hard disk.
Hard Disk Controller Failure	Error response from the reset command sent to the hard disk controller. The controller may not be seated properly in the BUS slot.
C: (D:) Hard Disk Failure	The hard disk drive (C: or D:) is not responding to commands. Check power and cable connections to the hard disk.

Hard Disk Utility Error Messages, Continued

Operation Errors

Message	Explanation
Address Mark Not Found	The address mark (initial address) on the hard disk could not be found.
Attachment Failed to Respond	No response has been received from the hard disk drive.
Bad ECC on Disk Read	When the hard disk drive utility writes to the disk, it also calculates an ECC (Error Correction Code) value for the data being written. This ECC value is written to the drive and then read back. The value read back is different from the one calculated.
Bad Sector Flag Detected	An operation was performed on a sector that has been flagged as bad.
Controller Has Failed	A diagnostic command was issued to the controller failed.
Drive Not Ready	An operation on the hard disk drive has timed out. The hard disk drive utility has waited beyond a preset specified time limit.
Drive Parameter Activity Failed	A reset command was sent to the controller followed by drive parameters. Using these parameters, the controller did not get a response from the hard disk. Make sure the drive type is correct.
ECC Corrected Data Error	The ECC value (explained above) read from the disk is not the same value which was written to the disk. The data is not correct. An attempt was made to correct the data, but the ECC value is not corrected.
Requested Sector Not Found	The requested sector could not be found.
Reset Failed	The reset command did not properly reset the hard disk.
Seek Operation Failed	A seek command failed. A seek operation is the act of finding a particular sector on the hard disk.
Undefined Error - Command Aborted	An unidentifiable error condition occurred.
Write Fault on Selected Drive	A write fault occurred during the write operation on the hard disk drive.

Appendix A

32-Bit Enterprise-II Memory Card

The 80486 Enterprise-II motherboard supports up to 32 MB of SIMMs on the motherboard. You can install the Series 19 32-bit Memory Card to increase 32-bit memory. All SIMM banks on the motherboard must be filled before installing a 32-bit Memory Card.

Unpacking the Memory Card

Follow the same procedures outlined on page 9 when unpacking the Series 19 Memory Card.

Memory Card Features

The 32-bit Memory Card plugs into the 32-bit slot on the motherboard labeled J20 and J21. The Memory Card has a capacity of 64 MB and uses 1 MB or 4 MB x 9 SIMMs. It has four 32-bit memory banks with four sockets each. Use as many banks as you wish. All banks must use the same SIMM type. When upgrading memory on the Memory Card, you must fill an entire bank. The new SIMMs must be the same type as the previously installed SIMMs. For example, if Bank3 is populated with four 1 MB x 9 SIMMs, each of the remaining banks must be upgraded with four 1 MB x 9 SIMMs.

The SIMM banks on the 80486 Enterprise-II motherboard are marked BNK1 and BNK2. The SIMM banks on the 32-bit Memory Card are marked BANK3, BANK4, BANK5, and BANK6. The DIP switch (SW) on the memory board has no effect.

Installing the 32-bit Memory Card

Step	Action
1	The memory card has two edge connectors: The 64-pin connector plugs into J20 and the 132-pin connector into J21 on the motherboard.
2	The card has a guide on one end. Hold the board firmly and gently press down until the card is in the slot. Install a screw in the card guide.
3	Turn the power on.
4	Make sure the total amount of memory on the configuration screen is correct. See the table below. If incorrect, make sure the SIMMs are seated properly.

Memory Configurations

This table shows the total memory for all memory combinations. BANK 1 and 2 are on the motherboard. BANK3, 4, 5, and 6 on the memory card.

Bank1	Bank2	Bank3	Bank4	Bank5	Bank6	Total RAM
1 MB	1 MB	1 MB	--	--	--	12 MB
1 MB	1 MB	1 MB	1 MB	--	--	16 MB
1 MB	1 MB	1 MB	1 MB	1 MB	--	20 MB
1 MB	1 MB	1 MB	1 MB	1 MB	1 MB	24 MB
1 MB	1 MB	4 MB	--	--	--	24 MB
1 MB	1 MB	4 MB	4 MB	--	--	40 MB
1 MB	1 MB	4 MB	4 MB	4 MB	--	56 MB
1 MB	1 MB	4 MB	4 MB	4 MB	4 MB	72 MB
4 MB	4 MB	1 MB	--	--	--	36 MB
4 MB	4 MB	1 MB	1 MB	--	--	40 MB
4 MB	4 MB	1 MB	1 MB	1 MB	--	44 MB
4 MB	4 MB	1 MB	1 MB	1 MB	1 MB	48 MB
4 MB	4 MB	4 MB	--	--	--	48 MB
4 MB	4 MB	4 MB	4 MB	--	--	64 MB
4 MB	4 MB	4 MB	4 MB	4 MB	--	80 MB
4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	96 MB

Appendix B

EISA Configuration Worksheets

This appendix consists of a two-page worksheet for up to eight EISA adapter cards. Complete a worksheet for each EISA adapter card in the system to simplify the EISA configuration process. These worksheets are helpful used in conjunction with the American Megatrends EISA Configuration Utility (ECU) when configuring an EISA system with many EISA adapter cards.

Motherboard Configuration

Serial Number _____

Revision Number _____

ECN Number _____

Memory Type for Bank1 and Bank2: (check the type used)	___ 1 MB x 9 SIMM ___ 4 MB x 9 SIMM
Memory Type for Bank3, Bank4, Bank5, and Bank6:	___ 1 MB x 9 SIMM ___ 4 MB x 9 SIMM
Memory Installed: (check the banks installed)	___ Bank1 ___ Bank2 ___ Bank3 ___ Bank4 ___ Bank5 ___ Bank6
Total Amount of Memory:	_____ MB
Other Options: (check the options installed)	___ Weitek

EISA Slot 1

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
              ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
              ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                      ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A   ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 1, cont'd

Interrupt Description

Edge-Triggered Interrupts:

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                                         ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                                         ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 2

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                           ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                           ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex): _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex): _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                               ___ 5   ___ 6   ___ 7

Data size ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                           ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 2, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                     ___ IRQ5   ___ IRQ6
                     ___ IRQ7   ___ IRQ9
                     ___ IRQ10   ___ IRQ11
                     ___ IRQ12   ___ IRQ14
                     ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                     ___ IRQ5   ___ IRQ6
                     ___ IRQ7   ___ IRQ9
                     ___ IRQ10   ___ IRQ11
                     ___ IRQ12   ___ IRQ14
                     ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 3

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                            ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                            ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex): _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex): _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                              ___ 5   ___ 6   ___ 7

Data size ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                    ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 3, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                     ___ IRQ5   ___ IRQ6
                     ___ IRQ7   ___ IRQ9
                     ___ IRQ10   ___ IRQ11
                     ___ IRQ12   ___ IRQ14
                     ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                     ___ IRQ5   ___ IRQ6
                     ___ IRQ7   ___ IRQ9
                     ___ IRQ10   ___ IRQ11
                     ___ IRQ12   ___ IRQ14
                     ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 4

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                       ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                       ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                              ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                      ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 4, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used:　___ IRQ3　　　___ IRQ4
　　　　　　　　　　　___ IRQ5　　　___ IRQ6
　　　　　　　　　　　___ IRQ7　　　___ IRQ9
　　　　　　　　　　　___ IRQ10　　___ IRQ11
　　　　　　　　　　　___ IRQ12　　___ IRQ14
　　　　　　　　　　　___ IRQ15

Share:　　　　　　　___ Yes　　　___ No

Level-Triggered Interrupts

Interrupt line used:　___ IRQ3　　　___ IRQ4
　　　　　　　　　　　___ IRQ5　　　___ IRQ6
　　　　　　　　　　　___ IRQ7　　　___ IRQ9
　　　　　　　　　　　___ IRQ10　　___ IRQ11
　　　　　　　　　　　___ IRQ12　　___ IRQ14
　　　　　　　　　　　___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 5

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                      ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                      ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                              ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                     ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 5, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used:	___ IRQ3	___ IRQ4
	___ IRQ5	___ IRQ6
	___ IRQ7	___ IRQ9
	___ IRQ10	___ IRQ11
	___ IRQ12	___ IRQ14
	___ IRQ15	

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used:	___ IRQ3	___ IRQ4
	___ IRQ5	___ IRQ6
	___ IRQ7	___ IRQ9
	___ IRQ10	___ IRQ11
	___ IRQ12	___ IRQ14
	___ IRQ15	

Switch and Jumper Settings

_____

_____

_____

EISA Slot 6

Card Description: _____

Manufacturer:
_____

EISA Master: ___ Yes   ___ No
                        ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                        ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                        ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                        ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 6, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                                  ___ IRQ5   ___ IRQ6
                                  ___ IRQ7   ___ IRQ9
                                  ___ IRQ10   ___ IRQ11
                                  ___ IRQ12   ___ IRQ14
                                  ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                                  ___ IRQ5   ___ IRQ6
                                  ___ IRQ7   ___ IRQ9
                                  ___ IRQ10   ___ IRQ11
                                  ___ IRQ12   ___ IRQ14
                                  ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 7

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                        ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                       ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                            ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                            ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 7, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                       ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                       ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

EISA Slot 8

Card Description: _____

Manufacturer: _____

EISA Master: ___ Yes   ___ No
                ___ 16-bit   ___ 32-bit

ISA Master: ___ Yes   ___ No
                ___ 8-bit   ___ 16-bit

Memory Description

Space is provided below for configuration information for two memory banks. Some EISA adapter cards have up to eight memory banks. Duplicate this sheet if there are more than two memory banks.

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

Amount of Memory: _____

Starting Address (hex):   _____

Cacheable: ___ Yes   ___ No

Type: ___ RAM   ___ ROM

Use: ___ System   ___ Expanded   ___ Virtual   ___ Other

DMA Channel Description

DMA channels used: ___ 0   ___ 1   ___ 2   ___ 3
                        ___ 5   ___ 6   ___ 7

Data size   ___ 8-bit   ___ 16-bit   ___ 32-bit

Timing: ___ Compatible   ___ Type A
                        ___ Type B   ___ Type C

Share: ___ Yes   ___ No

EISA Slot 8, cont'd

Interrupt Description

Edge-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                       ___ IRQ15

Share: ___ Yes   ___ No

Level-Triggered Interrupts

Interrupt line used: ___ IRQ3   ___ IRQ4
                       ___ IRQ5   ___ IRQ6
                       ___ IRQ7   ___ IRQ9
                       ___ IRQ10   ___ IRQ11
                       ___ IRQ12   ___ IRQ14
                       ___ IRQ15

Switch and Jumper Settings

_____

_____

_____

Appendix C

Heat Dissipation

The 50 MHz 80486DX and 66 MHz 80486DX2 are very high performance CPUs that can rival the performance of any currently available CPU, including RISC processors. However, there is an undesirable side effect to the high performance — the heat generated by high power consumption.

These CPUs can dissipate up to 5 watts of power. Since this power is concentrated in a small area, it is necessary to remove the heat generated by this power consumption. For this reason we have supplied a heat sink with all American Megatrends motherboards and CPU Cards that have a 50 MHz 80486DX or 66 MHz 80486DX2 CPU.

Since American Megatrends manufactures only the motherboard and CPU Card system components, it has no control over operating factors such as air flow and ambient temperature inside the computer case. The system integrator must make sure that the 50 MHz 80486DX or 66 MHz 80486DX2 CPU always operates within a safe operating temperature range.

**Test Procedure to Assure Proper Operating
Temperatures:**

1.   Install the American Megatrends motherboard or
        CPU card in a fully loaded system.
2.   Install a temperature sensor (such as a
        thermocouple) so that the surface of the heat sink
        can be measured without opening the case.
3.   Turn on the system and run a diagnostics utility
        program such as AMIDiag for at least one hour.

Expected Results

If the temperature on the surface of the heat sink is 75
degrees centigrade or below, there will be no problem
with the operation of the computer.

Identifying a Problem

If the temperature exceeds 75 degrees centigrade, the
system integrator must take the necessary measures to
ensure that the CPU does not overheat.

Potential Solutions

●   Install a fan to increase the air flow over the CPU.
        Some power supplies may have larger or more
        powerful fans.

●   Install a different heat sink with a greater surface
        area.

●   Different case styles may have better ventilation
        allowing for more air-flow over the CPU.

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