American Megatrends, Inc.

Series 87 Enterprise-IV

80486 EISA VLB

Motherboard

User's Guide

Limited Warranty

Buyer agrees if this product proves to be defective, that American Megatrends, Inc. is only obligated to replace or refund the purchase price of this product at American Megatrend's discretion according to the terms and conditions of the warranty card accompanying the Enterprise-IV motherboard. American Megatrends shall not be liable in tort or contract for any loss or damage, direct, incidental or consequential. Please see the Warranty Registration Card shipped with this product for full warranty details.

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Revision History

6/8/93	Initial release.
10/6/93	Add new AMIBIOS Setup options.
9/8/94	Added information from errata sheets.

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Preface

Preface

To the OEM, VAR, or System Integrator

Thank you for purchasing the high performance Series 87 Enterprise-IV EISA VL-Bus™ motherboard from American Megatrends. It is assumed that you have also licensed the rights to use the technical documentation for the Enterprise-IV. This manual was written for American Megatrends customers who are system integrators, VARs, or OEMs to assist in the proper installation and operation of the Enterprise-IV motherboard. This manual is not meant to be read by the computer owner who purchases a computer with the Enterprise-IV 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-IV 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 Vivek Saxena, Paul Narushoff, and Robert Cheng.

American Megatrends BBS

The American Megatrends BBS permits OEMs, VARs, and system integrators to access technical information about American Megatrends motherboard, peripheral card, and BIOS products. Product Engineering Change Notices, Tech Tips, Technical Notes, and complete 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.42bis.
404-246-8781	Supports HST and v.42bis.
404-246-8782	Dual standard. Can handle 2400 or 9600 bps. Supports v.32bis and v.42bis. Can handle up to 14,400 baud.
404-246-8783	Supports v.32bis and v.42bis.

Packing Slip

You should have received:

• an Enterprise-IV EISA VLB motherboard,
• the *Enterprise-IV Motherboard User's Guide,*
• a diskette containing the American Megatrends ECU and EISA configuration files, and
• the *American Megatrends ECU User's Guide.*

Chapter 1

Introduction to VL-Bus

The Series 87 Enterprise-IV EISA Local Bus Motherboard conforms to the VESA® (Video Electronics Standards Association) VL-Bus® specifications as well as the EISA (Extended Industry Standard Architecture) specification.

The VL-Bus

The VL-Bus is designed to standardize the hardware interface of peripherals connected to a microprocessor-level local bus. The VL-Bus Specification is a standard set of interface, architecture, timings, electrical, and physical specifications that permits all VL-Bus products to be totally interchangeable.

VL-Bus is Based on 80486 Local Bus Design

The general architecture of the VL-Bus is designed to Intel® 80486 CPU local bus standards with additional hardware functions that accommodate VL-Bus master devices and facilitate the system I/O bus interface. The timing specifications allow VL-Bus devices to operate at the full 32-bit 80486 CPU bandwidth. *Both VL-Bus slots on the Enterprise-IV motherboard have bus mastering capability.* Six of the seven EISA expansion slots are EISA (NOT Vl-Bus) bus mastering slots.

EISA and Local Bus Expansion

The American Megatrends Enterprise-IV EISA Local Bus motherboard has seven expansion slots. Six of these slots are EISA bus mastering slots. One is an EISA non-bus master slot. Two slots are VL-Bus bus mastering slots. The VL-Bus slots consist of a standard EISA 32-bit slot connector and an inline VL-Bus connector.

Introduction to VL-Bus, Continued

The following graphic shows the EISA and VL-Bus expansion slots. You can install 16-bit ISA or 32-bit EISA adapter cards in any expansion slot, including the VL-Bus slots. The VL-Bus expansion slots include one EISA slot that has both EISA and VL-Bus bus mastering (SLOT 6) slot and one VL-Bus master slot (SLOT 7) that is an EISA non-bus mastering slot.

EISA or ISA adapter cards have no VL-Bus functionality when installed in a VL-Bus expansion slot.
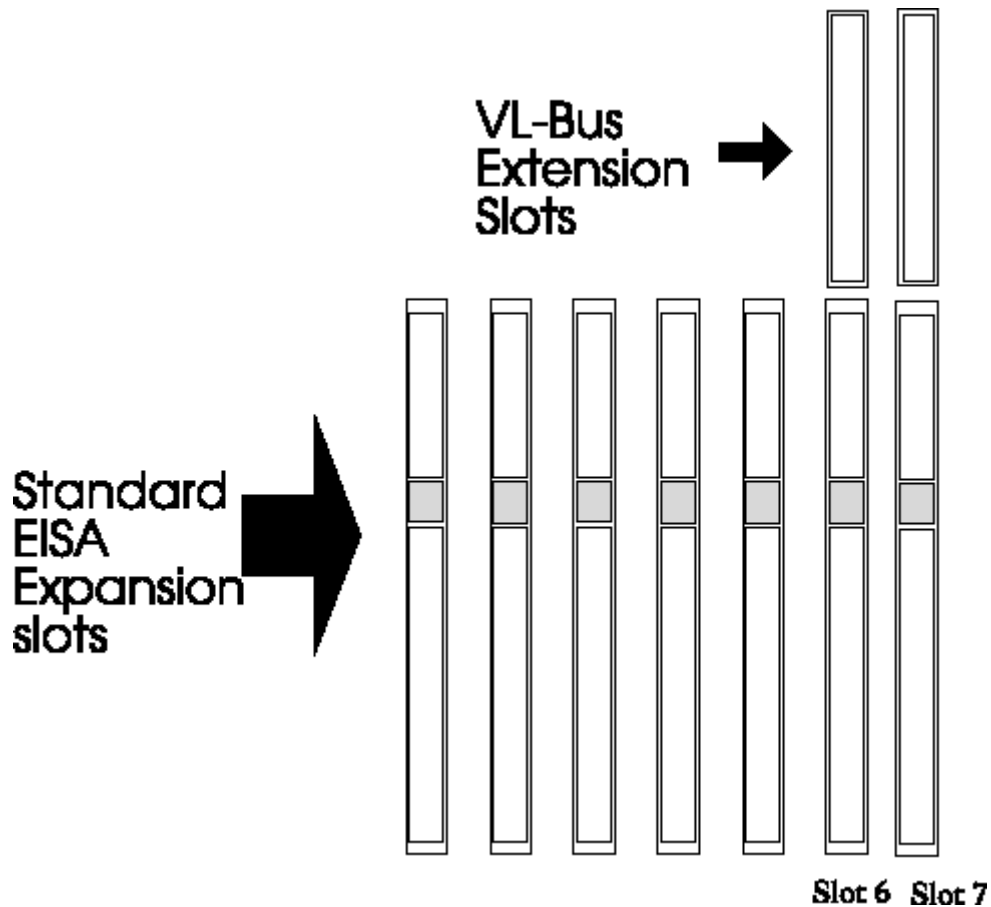
The current VL-Bus expansion socket specification includes a 16-bit MCA® (Micro Channel Architecture) expansion socket inline with a standard 32-bit EISA expansion socket connector.

A future VL-bus specification will use a 32-bit MCA connector (a total of 64 bits). The VL-Bus specification supports 32-bit EISA adapter cards.

The VL-Bus Adapter Cards have a different set of connectors on the bottom of the card and will only fit in the VL-Bus expansion slots.

Chapter 2

Enterprise-IV Description

Dimensions

The American Megatrends 80486 Enterprise-IV EISA Local Bus motherboard is approximately 8½" by 13", similar in size to a standard Baby AT® motherboard. The mounting hole locations permit the motherboard to be used with any Baby AT chassis. The height of the components is no more than 1½ inches, but allow 2 inches of clearance for the power supply connectors, as shown below.
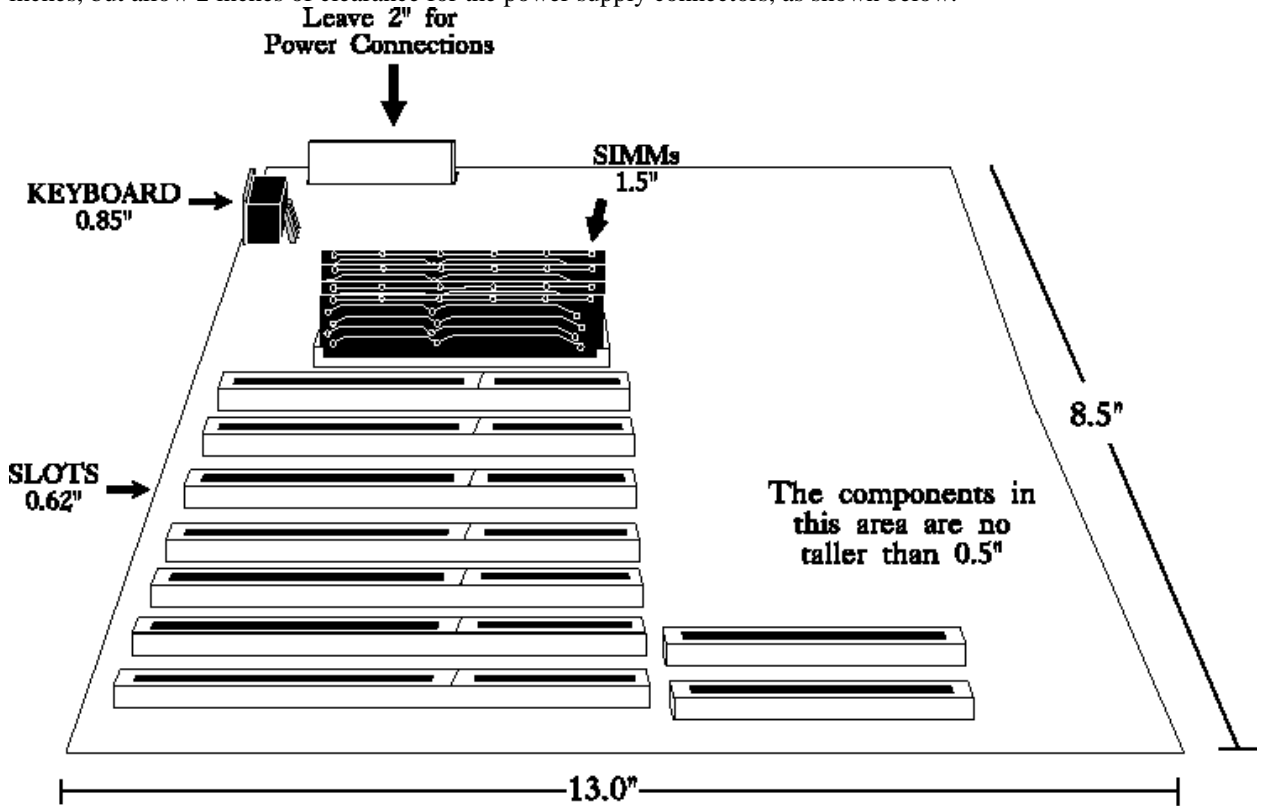
Series 87 Enterprise IV EISA VLB

Specifications

Processor Type and Speed

Microprocessors can be installed in two sockets: the CPU socket and the Upgrade Socket. The motherboard supports the following processors:

Processor in ZIF Socket (Upgrade Socket)	PQFP Processor	Frequency
Empty	486SX	20, 25, or 33 MHz
Empty	486DX	20, 25, or 33 MHz
486DX	empty	25, 33, or 50 MHz
486DX2	empty	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)
486SX	486SX	20 or 25 MHz
P24	empty	25 MHz or 33 MHz
P24T	empty	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)
487SX	486SX (or none)	20, 25, or 33 MHz
Intel Overdrive® (P23T)	empty	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)

CPU Sockets

The Enterprise-IV may come with a factory-mounted 486DX or 486SX. It also has a 240-pin PGA ZIF upgrade processor socket for an Intel 80486DX, 80486SX, 80486DX2, or upgrade processor CPU.

If both the PQFP and ZIF sockets contain CPUs, the CPU in the ZIF socket will be the active CPU.

The Enterprise-IV motherboard also will support future Intel processors.

Specifications, Continued

Programmable Crystal Oscillator

The Enterprise-IV motherboard has a programmable crystal oscillator that supports all possible motherboard frequencies.

Heat Sink for 50 and 66 MHz CPUs

The Enterprise-IV EISA Local Bus motherboard has a heat sink for all motherboards equipped with a 50 MHz 80486DX or 25 MHz (operates at 50 MHz internally) or 33 MHz (operates at 66 MHz internally) 80486DX2 to help dissipate heat. See page 91 for additional information about heat dissipation.

Processor Speeds

The Enterprise-IV operates at either of two speeds: high or low. High speed is set at time of manufacture to the processor speed (25, 33, 50, or 66 MHz). A low speed that is approximately the same speed as an original IBM® AT is simulated by adding extra cycles. The clock speeds can be changed via the <Ctrl> <Alt> <+> and <Ctrl> <Alt> <-> keychords. These keychords can be changed by the OEM via AMIBCP.

System Memory

The Enterprise-IV EISA VLB motherboard supports up to 256 MB of onboard memory via four banks of 256 KB x 36, 1 MB x 36, 4 MB x 36, or 16 MB x 36 SIMMs. Each SIMM bank consists of four SIMM slots, a total of 16 SIMM sockets. The 70 ns SIMMs must support fast page mode.

Cache Memory

The 256 KB secondary (external) cache memory uses a write-through or write-back caching algorithm. Up to 64 MB of system memory is cached. There are zero wait states for cache memory read and write for motherboards operating at speeds up to 33 MHz. Burst mode is supported. In addition, 80486 processors have an 8 KB internal cache memory. All of system memory is cached in the 80486 internal cache memory.

Both internal and external cache memory is enabled by pressing <Ctrl> <Alt> <Shift> <+> and disabled by pressing <Ctrl> <Alt> <Shift> <->

SRAM Type

The Enterprise-IV EISA VLB motherboard uses 15 ns 32 KB x 8 SRAM DIPs for cache memory.

ROM

The Enterprise-IV EISA VLB motherboard has 128 KB of Read Only Memory in an EPROM used for the system BIOS at E0000h - FFFFFh.

Shadow RAM

AMIBIOS Setup allows you to selectively shadow the 128 KB system BIOS, video BIOS (in 32 KB increments), or Adaptor ROM BIOS (in 32 KB increments) in ADVANCED CMOS SETUP in AMIBIOS Setup.

EISA Configuration Utility

The American Megatrends EISA Configuration Utility is provided with the Enterprise-IV EISA VLB motherboard. A diskette containing two EISA Configuration files (!AMI87A1.CFG and AMI87A1.OVL) is also supplied.

Chapter 2 Description

System BIOS

The Enterprise-IV EISA VLB motherboard uses a customized AMIBIOS system BIOS with a built-in Setup configuration utility and hard disk drive utilities. Via AMIBIOS Setup, you can configure up to two user-definable hard disk drive types. You can easily configure systems with no video monitor, keyboard, or floppy disk drives in STANDARD CMOS SETUP.

CMOS RAM

The Enterprise-IV has 50 bytes of standard ISA CMOS RAM to store system configuration data. ISA CMOS RAM, the real time clock, and the battery are on the Dallas DS1387 CMOS RAM/RTC chip. The Enterprise-IV EISA VLB motherboard also includes an additional 4 KB of EISA Extended CMOS RAM.

Built-in Battery

The Enterprise-IV EISA VLB motherboard uses a Dallas DS1387 CMOS RAM chip with a built-in battery.

Math Coprocessor

Enterprise-IV motherboards equipped with an 80486SX support an optional Intel 80487SX math coprocessor.

Expansion Slots

The Enterprise-IV has seven 32-bit EISA expansion slots. Six of these expansion slots are EISA bus mastering slots. The other two slots are VL-Bus bus mastering slots. The VL-Bus and EISA slots also can be used for 16-bit ISA adapter cards.

Specifications, Continued

Seven DMA Channels

The Enterprise-IV 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-IV 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	PS/2 Mouse
8	IRQ 13	Coprocessor Error
9	IRQ 14	EISA bus (Hard disk drive controller)
10	IRQ 15	EISA bus
11	IRQ 3	Onboard serial port or EISA bus
12	IRQ 4	Onboard serial port or EISA bus
13	IRQ 5	Onboard parallel port or EISA bus
14	IRQ 6	Onboard floppy controller or EISA bus
15	IRQ 7	Onboard parallel port or EISA bus

Onboard I/O

The Enterprise-IV has an onboard IDE controller, floppy controller, two serial ports with National Semiconductor 16450 UARTs, and a parallel port.

Specifications, Continued

Timer Features

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

System Arbiter

The Enterprise-IV has standard EISA arbitration features.

Refresh Generation

The Enterprise-IV has a refresh generation feature.

I/O Capability

The Enterprise-IV accesses 32-, 16-, or 8-bit memory devices and 32-, 16-, or 8-bit I/O devices on both the VL-Bus and the EISA bus.

I/O Address Space

The Enterprise-IV 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-IV 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, the motherboard is always 0)

Memory Range

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

I/O Channel Check

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

I/O Wait State Generation

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

Keyboard and Keyboard Lock

The Enterprise-IV has a five-pin IBM AT-compatible DIN connector and has a keyboard lock to prevent unauthorized access.

PS/2 Mouse

A PS/2 mouse can be used via a cable attached to a 10-pin berg mouse connector mounted next to the keyboard connector.

Speaker

The Enterprise-IV has a standard speaker attachment.

Real Time Clock

The Enterprise-IV has a standard crystal-controlled AT-type real time clock. The real time clock is included with ISA CMOS RAM on the Dallas DS1387 chip.

Chapter 3

Installation

Step	Action	Turn to
1	Unpack the motherboard	Page 20
2	Set switch and jumper options.	Page 22
3	Install memory.	Page 25
4	Install upgradable processor or math coprocessor.	Page **Error! Bookmark not defined.**
5	Install motherboard.	Page 30
6	Connect the power supply.	Page 32
7	Connect the keyboard.	Page 35
8	Connect the mouse.	Page 35
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11	Perform initial test and configuration.	Page 47

Step 1 Unpack the Motherboard

Step	Action
1	If the box is damaged, call Technical Support at 404-246-8600.
2	Perform all unpacking and installation procedures on a grounded anti-static mat. 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.
3	The motherboard is packed in an anti-static bag, and sandwiched between sheets of sponge. Remove the sponge and the anti-static bag. Save the original packing material.
4	Place the motherboard on a grounded anti-static surface component-side up.
5	Inspect the motherboard for damage. Do not apply power if damaged.
6	Press down on all socketed ICs to verify proper seating.
7	If the motherboard is undamaged, it is ready to be installed.

J11 MOUSE

J17
Diag LED

PS/2 Mouse

P1

P3 P2

EISA NON-MASTER SLOT 7

EISA MASTER SLOT 6

EISA MASTER SLOT 5

EISA MASTER SLOT 4

EISA MASTER SLOT 3

EISA MASTER SLOT 1

SW1

J21

J22

J23

(C) 1993 AMERICAN MEGATRENDS
SERIES 87 REV-A

J2
SER1

J3
SER2

J4 PARALLEL

BANK0

J31

J6 FLOPPY

J9 IDE

J12
J13
J14

J5 HLED

VESA MASTER SLOT 2

VESA MASTER SLOT 1

CACHE RAM

J38

J15
J16

J10

1

Intel "SX"

AMIBIOS

DALLAS
DS1287
REAL TIME CLOCK

J43

J39

J42 TURBO LED
J41 RESET
J40 SPKR
J34 KEYLCK

A square Pad □ and the Numeral 1 denote Pin 1
in Jumpers and Connectors.

Enterprise-IV EISA VLB Mot

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Step 2 Set Switch and Jumper Options

CPU and Upgrade Socket

Intel 80486SX, 80486DX, or 8048DX2 CPUs can be inserted in the CPU socket. An Intel 80487SX math coprocessor or an Upgrade Processor (P23T or P24T) can be inserted in the Upgrade Socket.

SW1

SW1 has two switches. See the graphic on the previous page for the SW1 location. Set SW1 before installation.

Switch	Description
DIAG	Turns on manufacturing diagnostics. This switch is factory-set to OFF and should remain OFF.
COL/MONO	Sets the video type. It has no effect if an EGA or VGA adapter is used. It is factory-set to OFF (for a monochrome display adapter). Set ON to use a CGA video adapter card.

J15, J16, J43 CPU Select

J15 (a four-pin berg), J16 (a three-pin berg), and J43 (a two-pin berg) together select the CPU type.

CPU in ZIF Socket	PQFP CPU	J43	J15	J16
None	486DX/SX	OPEN	N/A	N/A
P23T, 487SX, or P24T	486DX/SX	SHORT	Short 1-2 Short 3-4	Short 2-3
P23T, 487SX, or P24T		N/A	Short 1-2 Short 3-4	Short 2-3
486DX or 486DX2		N/A	Short 1-2 Short 3-4	Short 1-2
486DX or 486DX2	486DX/SX	SHORT	Short 1-2 Short 3-4	Short 1-2
486SX		N/A	Short 2-3	N/A
486SX	486DX/SX	SHORT	Short 2-3	N/A
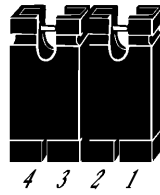
J15 Select CPU Type

Select 486DX
Short pins 1-2 & 3-4
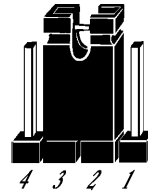
Select 486SX
Short pins 2-3

J16 Select CPU Type
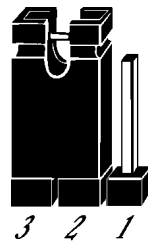
Celect 487SX, P23T,
Or P24T
Pins 2-3 Shorted
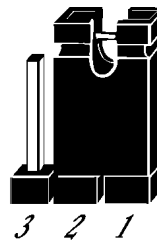
Select 486DX2, P24,
486SX, Or 486DX
Pins 1-2 Shorted

J43 Select CPU Type

Pins 1-2 OPEN
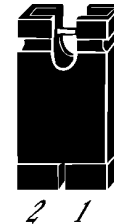
Pins 1-2 Shorted

J38 Local Bus ID

J38 is a three-pin single-inline berg. In normal operation, pins 1-2 are shorted when running Local Bus Adapter Cards at 33 MHz or less (the default setting). Short pins 2-3 if running Local Bus Adapter Cards at speeds higher than 33 MHz. J38 is shown below. Set J38 before installing the motherboard. See the graphic on the next page for the location of J38.
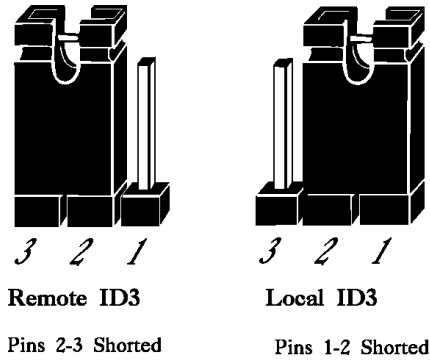
J31 CPU Priority

J31 is a three-pin header that selects the CPU priority. Short pins 1-2 to set Low priority (the default setting). Short pins 2-3 to set High priority.

Chapter 3 Installation
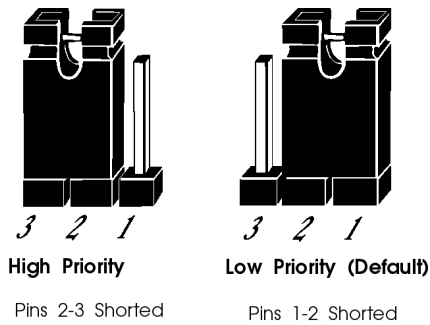
Step 3 Install Memory

The main memory on the Enterprise-IV EISA VLB motherboard consists of four 32-bit memory banks of one SIMM socket each. The SIMM sockets accept 256 KB x 36, 1 MB x 36, 4 MB x 36, or 16 MB x 36 SIMMs in the combinations shown below.

If used, SIMM banks must be completely filled, no matter which type of SIMMs are used. All SIMMs in a bank must be the same type.

For system memory, fast page mode access and hidden refresh is supported. Burst support is provided.

Possible Memory Configurations

Bank0	Bank1	Bank2	Bank3	Total RAM
256 KB x 36	None	None	None	1 MB
256 KB x 36	256 KB x 36	None	None	2 MB
1 MB x 36	None	None	None	4 MB
256 KB x 36	256 KB x 36	1 MB x 36	None	6 MB
1 MB x 36	1 MB x 36	None	None	8 MB
256 KB x 36	256 KB x 36	1 MB x 36	1 MB x 36	10 MB
1 MB x 36	1 MB x 36	1 MB x 36	None	12 MB
1 MB x 36	1 MB x 36	1 MB x 36	1 MB x 36	16 MB
4 MB x 36	None	None	None	16 MB
256 KB x 36	256 KB x 36	4 MB x 36	None	18 MB
1 MB x 36	4 MB x 36	None	None	20 MB
1 MB x 36	1 MB x 36	4 MB x 36	None	24 MB
4 MB x 36	4 MB x 36	None	None	32 MB
1 MB x 36	4 MB x 36	4 MB x 36	None	36 MB
1 MB x 36	1 MB x 36	4 MB x 36	4 MB x 36	40 MB
4 MB x 36	4 MB x 36	4 MB x 36	None	48 MB
4 MB x 36	4 MB x 36	4 MB x 36	4 MB x 36	64 MB
16 MB x 36	None	None	None	64 MB
16 MB x 36	16 MB x 36	None	None	128 MB
16 MB x 36	16 MB x 36	16 MB x 36	None	192 MB
16 MB x 36	16 MB x 36	16 MB x 36	16 MB x 36	256 MB

SIMM Part Numbers

Memory Type	Manufacturer	Part Number
1 MB x 36	Micron	MT12D136M-7
	Mitsubishi	MH1M36ADJ-7
	PNY	P361000-70
	Motorola	MCM36100AS-70
	Oki	MSC2355-70YS12
	Samsung	KMM5361000AV-7
4 MB x 36	Micron	MT12D436M-7
	Mitsubishi	MH4M36SAJ-7
	Motorola	MCM36400S-70
	PNY	P364000-70
	Samsung	KMM5364100-7
16 MB x 36	Mitsubishi	MH16M09J-7
	Mitsubishi	MH16M09TJ-7
	Samsung	KMM5916000-7

Installing SIMMs

The system memory banks consist of four SIMM sockets. The sockets take 256 KB x 36, 1 MB x 36, 4 MB x 36, or 16 MB x 36 SIMMs. Use only one SIMM type to fill each bank.

Place the motherboard on an anti-static mat. With the component side of the SIMM facing you, firmly push the SIMM into the socket. When properly inserted, the SIMM clicks in place as the latching pins engage, as shown below.

Chapter 3 Installation
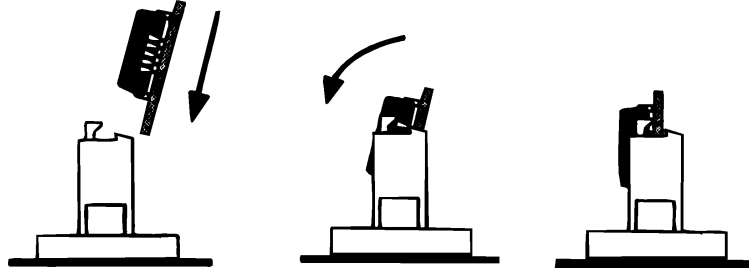
Selecting SIMMs

The SIMMs must meet the following specifications:

Parameter	Specification
Page Mode	Fast
Refresh	CAS before RAS
t_{CAC}	≤ 20 ns
t_{RAC}	≤ 70 ns
t_{AA}	≤ 45 ns
t_{RP}	70 ns
t_{CPA}	≤ 45 ns

Step 4 Install Upgrade Processor

Follow the procedures described in this step to install an upgrade processor in the empty ZIF socket near the CPU.

> *Warning*
> Improper Upgrade Processor installation can damage the Upgrade Processor and/or the motherboard. You must follow the procedures in this section exactly as documented.

Processor Type and Speed

The Upgrade Processor socket is a 240-pin socket near one edge of the board. The Enterprise-IV VLB EISA motherboard supports the following CPUs and Upgrade Processors:
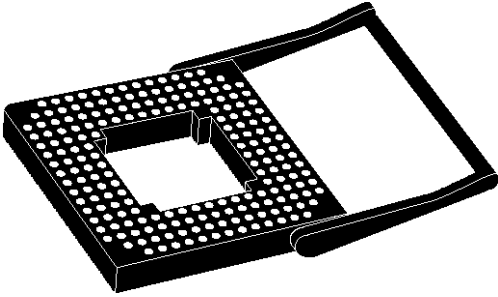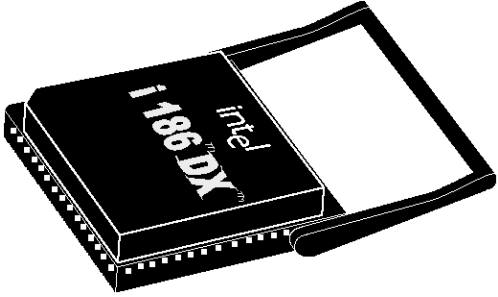
Upgrade Processor in ZIF Socket	PQFP CPU
None	486DX
P23T, 487SX, or P24T	486DX
P23T, 487SX, or P24T	
486DX or 486DX2	
486DX or 486DX2	486DX
486SX	
486SX	486DX

The Enterprise-IV VLB EISA motherboard also supports future Intel processors and upgradeable processors.

Installing an Upgrade Processor

The following discussion applies only to 169-pin processors, such as the 486DX, 486DX2, 486DX3, 486SX, 80487SX, P23T, or P24. Upgrade Processor installation is easy because a ZIF (zero insertion force) socket is used.

Step	Action
1	Lift the lever on the ZIF socket. The empty Upgrade Processor socket looks like this.
2	Pin 1 of the socket has a white diagonal line across one corner on the motherboard, which corresponds to pin 1 of the Upgrade Processor. Check for bent pins on the Upgrade Processor chip. Gently straighten any bent pins with pliers. Place the Upgrade Processor squarely in the middle of the socket, *making sure that one row of socket pins shows on all four sides.* Make sure that pin 1 of the Upgrade Processor is aligned with pin 1 of the socket.
3	The Upgrade Processor socket is a 240-pin socket. But the 486DX, 486DX2, 486DX3, 486SX, 80487SX, P24, and P23T come in 169-pin packages. *When these processors are installed, an extra row of socket pins should show on all four sides of the socket,* as shown below.
4	Complete installation by lifting the ZIF lever to the other side of the socket, as shown below.

Step	Action

Installing a P24T

The P24T Upgrade Processor is a 240-pin package that uses all socket pins. Use the same procedure describe above to install the P24T. However, when a P24T Upgrade Processor is properly installed, it uses all 240 pins, so no extra socket pins can be seen.

Step 5 Install the Motherboard

The mounting holes on the motherboard are the same as an AT motherboard. Standoffs and mounting screws should be supplied with the chassis. *Be sure to use plastic standoffs.*

Step	Action
1	Wear an antistatic wristband. Place the chassis for the motherboard on an anti-static mat.
2	Connect the chassis to ground to avoid static damage. Connect an alligator clip with a wire lead to any unpainted part of the chassis. Ground the other end of the lead to the same point as the mat and wristband.
3	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 near the back end of the chassis.
4	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place.
5	Find the slots provided for the standoffs on the chassis. Hold the motherboard, component-side up, with the edge with three standoffs toward you and the edge with the power supply connector away from you. The edge connectors for the adapter cards should be on the left.
6	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.
7	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.

The motherboard mounting hole locations are shown below.

Legend: ☐ screw hole ○ Mounting hole
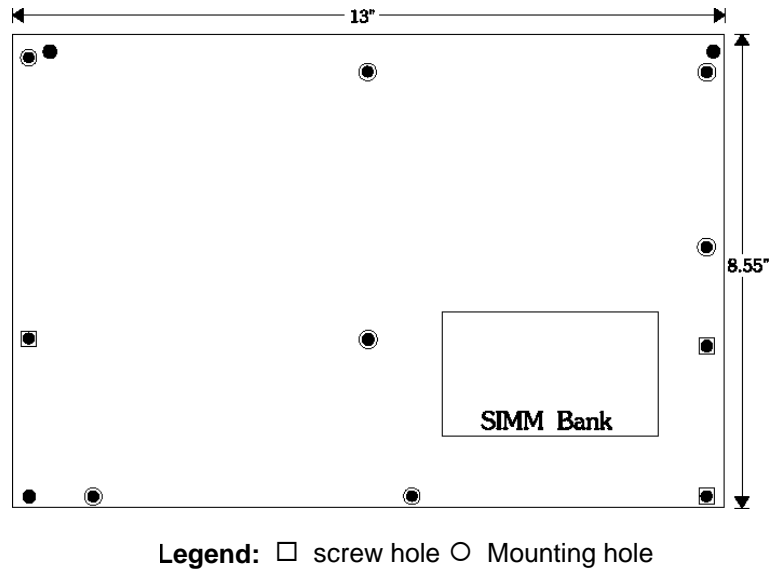
Step 6 Connect the Power Supply

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

Before attaching the power cables, make sure that the proper voltage is 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 230 watt power supply that has built-in filters to suppress radiated emissions. 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. The location of the power supply connectors (P1, P2, and P3) is shown in the following graphic.

Connect to P1 and P2

The connector with three red wires and two black wires is attached to P2. The connector with the Orange line 1 is attached to P1. P3 is provided for high capacity power supplies that have an extra cable. The following graphic shows the wire colors for all power connectors.

Power Supply
Connectors
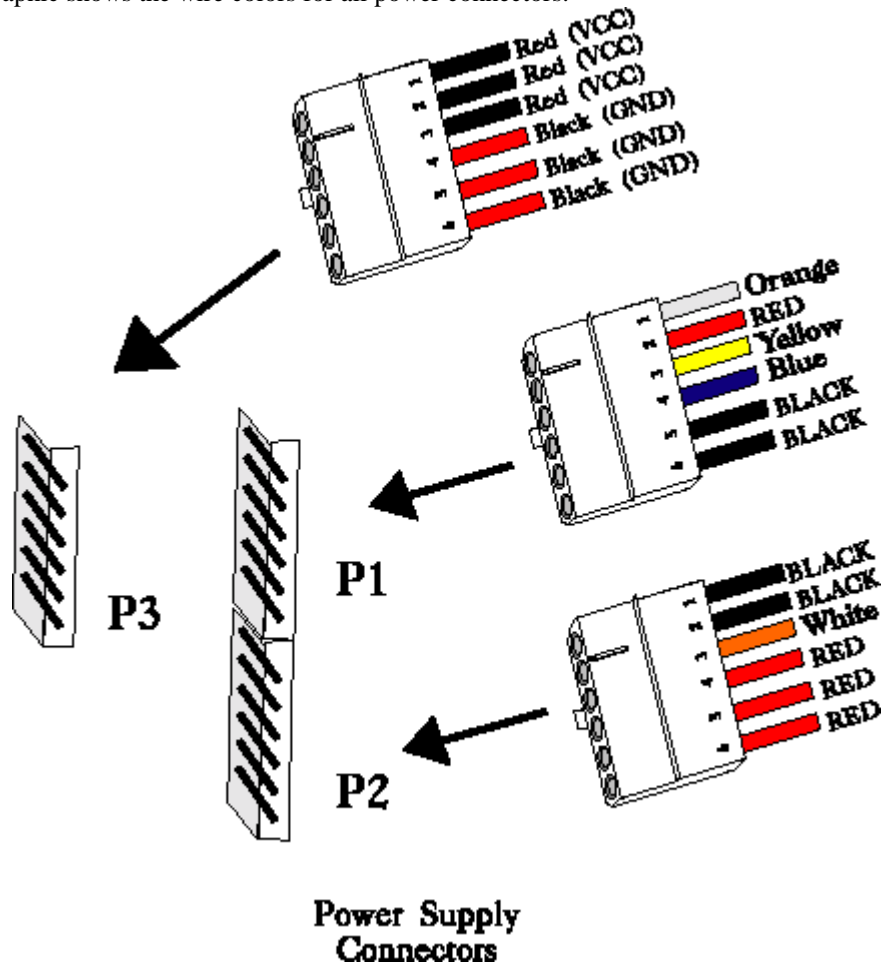
Step 6 Connect the Power Supply, Continued

Power Supply Connectors are Keyed

Power supply connectors are keyed to make sure you attach them correctly. The keys must be cut to fit on some power supplies, as shown below.

Remove
Key 5

P3

Remove
Key 6

Remove
Key 3

P2

P1
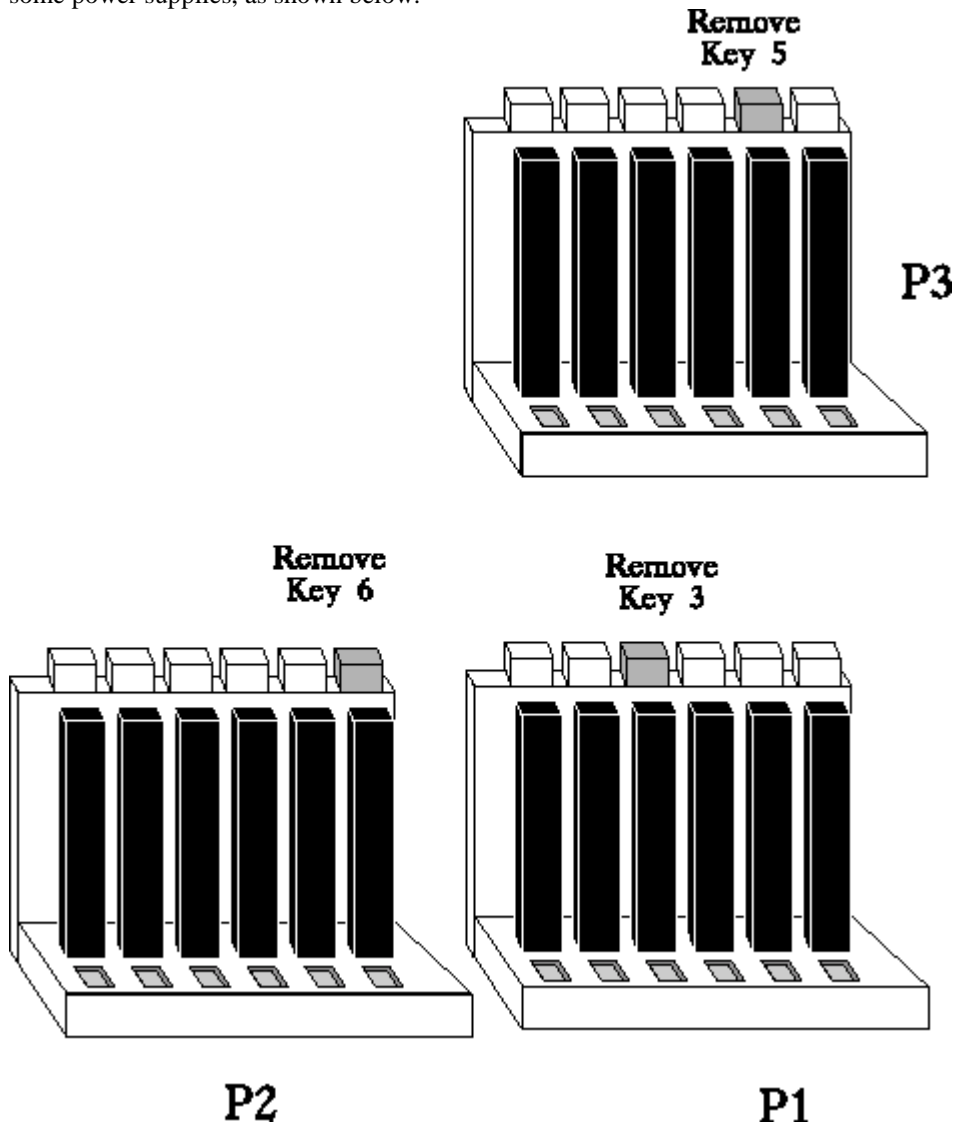
Step 6 Connect the Power Supply, Continued

P1 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)

P2 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)

P3 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 7 Connect the Keyboard

The keyboard connector is a five-pin DIN socket (see below) labeled KEYBRD and J8 on the motherboard. It accepts a standard ISA keyboard.
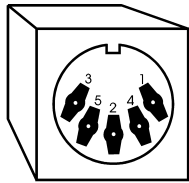
5-Pin Keyboard Connector

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

Step 8 Connect the Mouse

The American Megatrends Enterprise-IV EISA VLB motherboard mouse connector is a 10-pin berg connector.

J11 is a 10-pin berg connector that attaches to a PS/2-compatible mouse via a standard serial cable. The mouse connector is next to the keyboard connector. The connector position is shown above. The J11 pinout and J11 are shown below.

Pin	Assignment	Pin	Assignment
1	Clock	2	N/C
3	N/C	4	N/C
5	N/C	6	FVCC
7	N/C	8	Data
9	GND	N/A	Key Pin

Step 9 Connect Cables

When attaching connectors to the motherboard, make sure you attach the correct end. Most connector wires are color-coded. Match the color of the wires leaving pin 1 on the switch or LED to pin 1 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 motherboard. Sometimes the label is obscured by a part. You can always identify Pin 1 by looking at the other side of the motherboard. All Pin 1 locations are always identified by a square pad.

Summary of Connectors

- Reset Switch cable to J41,
- Speaker cable to J40,
- Keyboard Lock cable to J34,
- Turbo LED cable to J42,
- Turbo switch cable to J39, and
- J5 IDE Hard Disk Drive LED.

The DIAG Led is mounted n the motherboard.

J41 Reset Switch Connector

J41 is a two-pin single-inline berg. A hard reset is performed by the system when the Reset switch is pressed. Pin 1 is ground and Pin 2 is Hard Reset. The graphic above shows the location of J41. The following is an illustration of J41.
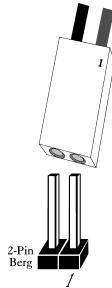
J40 Speaker Connector

J40 is a four-pin single-inline berg. See the graphic at the top of the page for the J40 location. J40 is shown below.
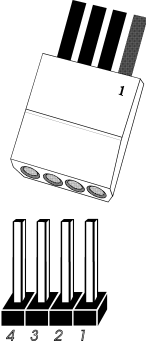
Pin	Description
1	Data Out
2	Key
3	Ground
4	VCC

J34 Keyboard Lock Connector

J34 is a five-pin single-inline berg that connects via a cable to the keyboard lock. The keyboard lock allows you to lock the keyboard, protecting the system from unauthorized use. Pin 1 of J34 on the motherboard is labeled. The connector and the J34 pinout is shown below. See the graphic at the top of the previous page for the J34 location.
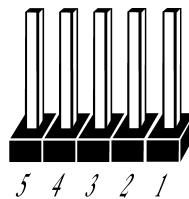
Pin	Description
1	LED power
2	Key
3	Ground
4	Keyboard Lock
5	Ground

J42 Turbo LED Connector

J42 is a two-pin berg that connects to the Turbo LED via a cable. The LED lights when the board runs at high speed. Connect the Turbo LED to J42. J42 is shown below. See the graphic at the top of page 36 for the J42 location.
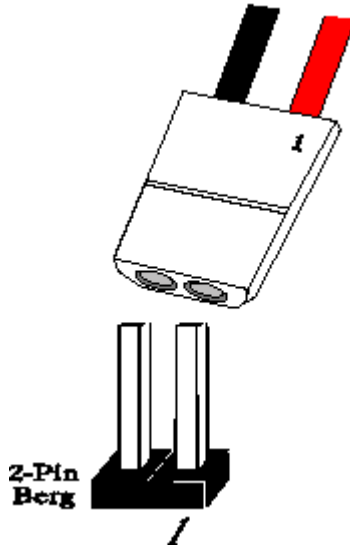
J39 Turbo Switch Connector

J39 is a two-pin berg that connects to the turbo switch mounted on the chassis via a cable, as shown below. The turbo LED switch is bipolar. You can select Low or High speed by pressing the turbo switch, attached to J39 via a connector cable. J39 is shown below. See the graphic at the top of page 36 for the J39 location.

Chapter 3 Installation
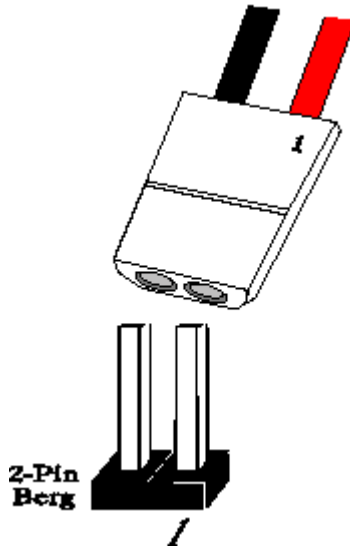
Step 10 Install Adapter Cards

The Enterprise – IV EISA VLB motherboard has seven expansion slots numbered SLOT – SLOT7.
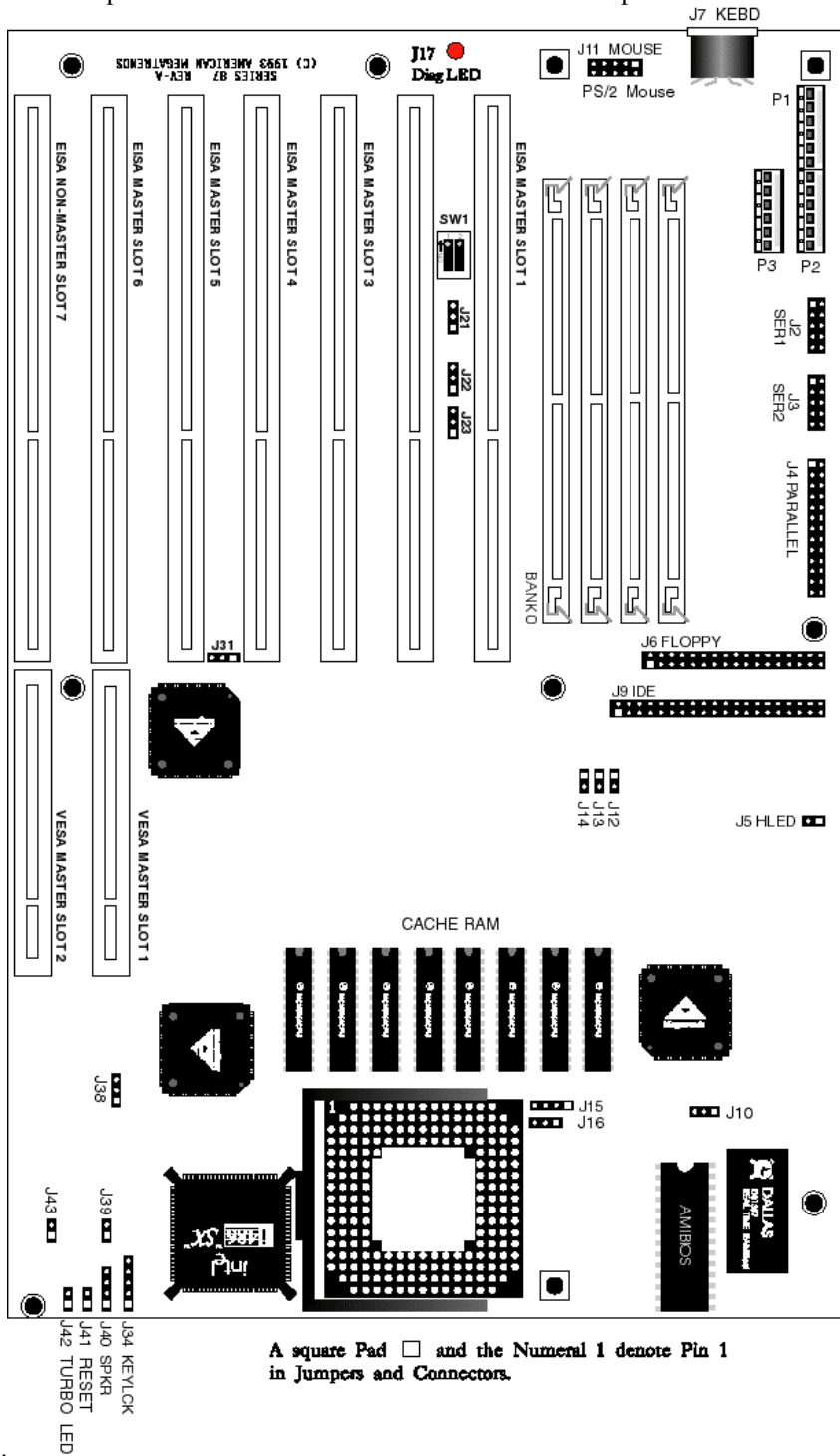
Step 10 Install Adapter Cards

Type of Adapter Card	Slots
VL-Bus *Bus Mastering* 32-bit Local Bus Adapter Cards	Slots 6 and 7
EISA 32-bit *Bus Mastering* Cards	Slots 1 - 6
EISA 32-bit Non-Bus Mastering Cards	Slot 7
Standard 8-bit XT- and 16-bit AT-compatible Cards	Slots 1 - 7

EISA Adapter Cards

EISA adapter cards have different fingers on the edge connecters than ISA adapter cards. The EISA expansion slots have two rows of contacts, one below the other. AN ISA (AT-compatible) Adapter Card can be inserted into the EISA connector only far enough to make contact with the upper row of contacts. The longer fingers on EISA adapter cards allow contact with the second row of contacts. See the following graphic.
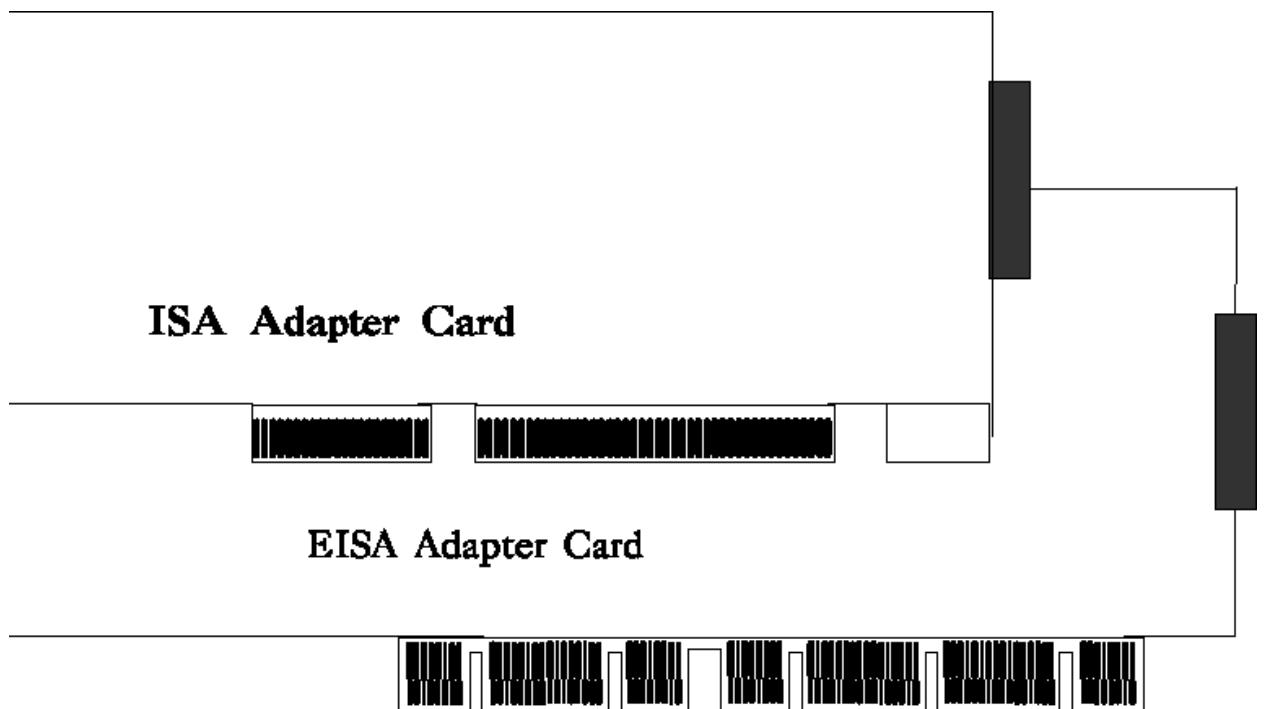
When installing EISA adapter cards, make sure that they snap in twice and are fully seated in the EISA expansion slot. If the card makes contact only with the upper row of contacts, it cannot function properly.

Step 10 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	D5	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.

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 D5
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

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32-bit EISA Slot Pinout, cont'd

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 D50	9 MRDC#
10 D51	10 DAK# 5	10 D52	10 MWTC#
11 D53	11 DRQ 5	11 GND	11 D8
12 D54	12 DAK# 6	12 D55	12 D9
13 GND	13 DRQ# 6	13 D56	13 D10
14 D57	14 DAK# 7	14 D58	14 D11
15 Access Key	15 DRQ# 7	15 Access Key	15 D12
16 D59	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#	

VL-Bus Cards

VL-Bus cards use the standard ISA/EISA connectors, but they also have an additional 112-pin MCA connector inline with the EISA expansion card sockets, as shown below.
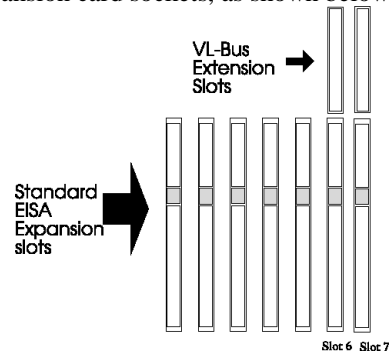
Step 10 Install Adapter Cards, Continued

VL-Bus

The two longest expansion slots on the Enterprise-IV EISA VLB motherboard are for VL-Bus adapter cards. These VL-Bus *bus mastering* slots are labeled *VESA MASTER SLOT-1)* and *VESA MASTER SLOT-2).* These slots use the standard EISA/ISA sockets and an inline 112-pin extension connector to accommodate VL-Bus-compatible adapter cards. The pinout for the VL-Bus connector follows:

Pin	Use	Pin	Use
A1	DAT01	B1	DAT00
A2	DAT03	B2	DAT02
A3	GND	B3	DAT04
A4	DAT05	B4	DAT06
A5	DAT07	B5	DAT08
A6	DAT09	B6	GND
A7	DAT11	B7	DAT10
A8	DAT13	B8	DAT12
A9	DAT15	B9	VCC
A10	GND	B10	DAT14
A11	DAT17	B11	DAT16
A12	VCC	B12	DAT18
A13	DAT19	B13	DAT20
A14	DAT21	B14	GND
A15	DAT23	B15	DAT22
A16	DAT25	B16	DAT24
A17	GND	B17	DAT26
A18	DAT27	B18	DAT28
A19	DAT29	B19	DAT30
A20	DAT31	B20	VCC
A21	ADR30	B21	ADR31
A22	ADR28	B22	GND
A23	ADR26	B23	ADR29
A24	GND	B24	ADR27
A25	ADR24	B25	ADR25

Chapter 3 Installation

Step 10 Install Adapter Cards, Continued

VL-Bus, cont'd

Pin	Use	Pin	Use
A26	ADR22	B26	ADR23
A27	VCC	B27	ADR21
A28	ADR20	B28	ADR19
A29	ADR18	B29	GND
A30	ADR16	B30	ADR17
A31	SA00	B31	GND
A32	ADR12	B32	VCC
A33	ADR10	B33	ADR13
A34	ADR08	B34	ADR11
A35	GND	B35	ADR09
A36	ADR06	B36	ADR07
A37	ADR04	B37	ADR05
A38	WBACK#	B38	GND
A39	BE0#	B39	ADR03
A40	VCC	B40	ADR02
A41	BE1#	B41	N/C
A42	BE2#	B42	RESET#
A43	GND	B43	D/C#
A44	BE3#	B44	M/IO#
A45-47	A05#	B45-47	W/R#
A48	LRDY#	B48	RDYRTN#
A49	LDEV<>#	B49	GND
A50	LREQ<>#	B50	IRQ9
A51	GND	B51	BRDY#
A52	LGNT<>#	B52	BLAST#
A53	VCC	B53	ID0
A54	ID5	B54	ID1
A55	ID3	B55	GND
A56	ID4	B56	LCLK
A57	LKEN#	B57	VCC
A58	LEADS#	B58	LBS16#

Step 11 Perform Initial Test and Configuration

Before powering up the system, make sure that:

_ all adapter cards are seated properly,
_ all connectors are properly seated,
_ the math coprocessor or Upgradable Processor is seated properly,
_ there are no screws or other foreign material on the motherboard,
_ the system is plugged into a surge-protected power strip, and
_ blank back panels are installed on the back of the chassis to minimize RF emissions.

Step 11 Perform Initial Test and Configuration, Continued

Start the Test

Plug everything in and turn on the switch. If there are any problems, turn off the unit immediately. Reinstall the connectors and call Technical Support at 404-246-8600.

Configure the System

Run AMIBIOS Setup to save configuration data in CMOS RAM. The system then resets, runs POST, and boots the operating system. See page 63 for a description of STANDARD CMOS SETUP configuration options. If the system operates normally, a memory display should appear on the monitor. The BIOS Power On Self Test (POST) should run. POST beeps or displays error messages is unsuccessful. There is a serious problem if the system beeps. The beeps are part of a Beep Code (see page 50) that indicates a bad component. Make sure the affected part is properly seated and connected. If the BIOS is able to initialize the system video monitor, messages (described on page 51) are displayed on the screen.

Run the ECU

Run the American Megatrends EISA Configuration Utility (ECU) to properly configure the system. Use the files on the diskette supplied with the Enterprise-IV EISA VLB motherboard (!AMI87A1.CFG and AMI87A1.OVL). The *American Megatrends EISA Configuration Utility User's Guide* provides complete details about running the ECU.

Chapter 3 Installation

Chapter 4

AMIBIOS Power-On Self Test

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

POST Phases

When the system is powered on, AMIBIOS executes POST routines. The POST phases are:

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

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

BIOS Error Reporting

If...	then...
the error occurs before the display device is initialized,	a series of beeps sound. Beep codes indicate that a fatal error occurred. The Beep Codes are described on the next page.
the error occurs after the display device is initialized,	the error message is displayed. Displayed BIOS error messages are explained on page 51. A prompt to press <F1> can also appear with displayed error messages.

Beep Codes

Fatal errors, listed below, are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal. Fatal errors halt the boot process.

In most cases, displayed errors allow the system to continue. AMIBIOS displayed errors are described on page 51.

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 generated an error.
6	8042 - Gate A20 Failure	Gate A20 on the keyboard controller (8042) allows the CPU to operate in protected mode. The BIOS is not able to switch the CPU to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.
11	Cache memory bad — do not enable cache	The cache memory test failed. Cache memory is disabled.

Troubleshooting System Problems

What to Do If the Computer Beeps

Here is what you need to do if your computer has an AMIBIOS and it starts beeping:

If the system beeps...	then...
1, 2, or 3 times...	reseat the memory SIMMs or DIPs. If the system still beeps, replace the memory.
6 times...	reseat the keyboard controller chip. If it still beeps, replace the keyboard controller. If it still beeps, try a different keyboard, or replace the keyboard fuse, if the keyboard has one.
8 times...	there is a memory error on the video adapter. Replace the video adapter, or the RAM on the video adapter.
9 times...	the BIOS chip is bad. The system probably needs a new BIOS ROM chip.
11 times...	reseat the cache memory on the motherboard. If it still beeps, replace the cache memory.
4, 5, 7, or 10 times...	the motherboard must be replaced.

AMIBIOS Displayed Error Messages

Error message are displayed as follows:

```
ERROR Message Line 1
ERROR Message Line 2
Press the <F1> key to continue
```

After the message, the system halts. The system does not halt if *Wait for <F1> If Any Error* in ADVANCED CMOS SETUP is set to *Disabled.*

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	Drive C: may be missing. Run the BIOS Hard Disk Utility. Check the C: hard disk type in STANDARD CMOS SETUP.
C: Drive Failure	No response from hard disk drive C:. Replace drive C:.
Cache Memory Bad, Do Not Enable Cache!	Cache memory on the motherboard is defective. Test cache memory with AMIDiag.
CH-2 Timer Error	Error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.

Error Message	Explanation
CMOS Checksum Failure	After CMOS RAM settings are saved, a checksum is generated. This message appears if the previous checksum differs from the current checksum. 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 hard disk drive D:. Drive D: may be missing. Run the AMIBIOS Hard Disk Utility. Check the D: hard disk type in STANDARD CMOS SETUP.
D: drive failure	No response from hard disk drive D:. Replace drive D:.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
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 controller. Check all connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk controller. Check all connectors 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 floppy 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. Set *Keyboard* 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 drive A: or hard disk drive C:. ROM Basic (INT 18h) does not run. The BIOS cannot find ROM Basic.
Off Board Parity Error	Parity error in adapter card memory. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) *XXXX* is the hex address where the error occurred. Run AMIDiag to find memory errors.
On Board Parity Error	Parity error in motherboard memory. The format is: ON BOARD PARITY ERROR ADDR (HEX) = (XXXX) *XXXX* is the hex address where the error occurred. Run

Chapter 4 AMIBIOS POST

Error Message	Explanation
	AMIDiag to find memory errors.
Parity Error ????	Parity error in system memory but the address cannot be determined. Run AMIDiag to fin memory errors.

EISA AMIBIOS Error Messages

Error Message	Explanation
EISA CMOS Checksum Failure	The Checksum for EISA CMOS is incorrect. Replace the EISA Extended CMOS RAM battery.
EISA CMOS inoperational	Read/Write error in extended CMOS RAM. The battery may need to be replaced.
Expansion Board not ready at Slot *X, Y, Z*	Cannot find the adapter card in Slot *X, Y*, or *Z*. Make sure the adapter card is in the correct slot and is seated correctly.
Fail-Safe Timer NMI Inoperational	Devices that depend on the fail-safe NMI timer will not 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 adapter card in this slot cannot be configured. Run the ECU.
Software Port NMI Inoperational	The software port NMI is not working.

NMI Messages

EISA NMI Messages

EISA NMI Message	Explanation
BUS Timeout NMI at Slot *n*	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* is disabled.
Expansion Board NMI at Slot *n*	An expansion board NMI occurred in Slot *n*.
Fail-Safe Timer NMI	Fail-safe timer NMI generated.
Software Port NMI	Software port NMI generated.

ISA NMI Messages

NMI Message	Explanation
Memory Parity Error at *xxxxx*	Memory failed. If the memory location is known, it is displayed as *xxxxx*. If not, the message is *Memory Parity Error ????*.
I/O Card Parity Error at *xxxxx*	An adapter card failed. If the address is known, it is displayed as *xxxxx*. If not, the message is *I/O Card Parity Error ????*.
DMA Bus Time-out	A device drove the bus signal for more than 7.8 µseconds.

BIOS Configuration Summary Screen

```
AMIBIOS System Configuration (C) 1985-1993 American Megatrends Inc.

Main Processor      : 486DX2       Base Memory Size    : 640 KB
Numeric Processor   : Present      Ext. Memory Size    : 15360 KB
Floppy Drive A:     : 1.2 MB 5½    Hard Disk C: Type   : 44
Floppy Drive B:     : 1.44 MB 5¼   Hard Disk D: Type   : None
Display Type:       : VGA/PGA/EGA  Serial Port(s)      : 3F8
AMIBIOS Date:       : 11/11/92     Parallel Port(s)    : 378
```

```
80486DX2 - 50MHz CPU
256 KB CACHE MEMORY
```

AMIBIOS Identification Strings

The AMIBIOS Identification String is displayed at the bottom of the screen during the memory test. You will need this string when reporting AMIBIOS problems.

```
AMIBIOS (C) 1993 American Megatrends Inc.,
BIOS Release xxxxxxxx


xxxxx KB OK


Press <DEL> if you want to run SETUP






(C) American Megatrends Inc.,
41-0000-004687-00111111-111192-AMIS87-H
```

Enable the *Wait for <F1> If any Error* option in ADVANCED CMOS SETUP, then press <Ins> to display two additional AMIBIOS Identification Strings.

Step	Action
1	When a problem occurs, freeze the screen by powering on the system and holding a key down on the keyboard.
2	Copy the BIOS ID Strings on a sheet of paper before calling American Megatrends technical support at 404-246-8600.
3	Press <F1> to continue the boot process.
4	Hit <DEL> if you want to run SETUP is displayed. You can press <Del> to access AMIBIOS Setup.

Chapter 5

AMIBIOS Setup

Keyboard Speed Switching

You 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 through AMIBCP. The above settings are the default settings.

Cache Memory Enable

You can enable both internal and external cache memory by pressing <Ctrl> <Alt> <Shift> <+>. You can disable cache memory by pressing <Ctrl> <Alt> <Shift> <->.

Of course, the OEM can modify these keystroke combinations through AMIBCP. The above settings are the default settings.

AMIBIOS Setup Parts

AMIBIOS Setup is divided into three parts:

•   STANDARD CMOS SETUP,
•   ADVANCED CMOS SETUP, and
•   ADVANCED CHIPSET SETUP.

STANDARD CMOS SETUP

AMIBIOS STANDARD CMOS SETUP, discussed in Section 2 beginning on page 63, configures system components such as floppy drives, hard disk drives, monitor type, and the keyboard.

ADVANCED CMOS SETUP

ADVANCED CMOS SETUP, discussed in Section 3 beginning on page 67, configures the system password, keyboard typematic rate, boot sequence and speed, and enables system performance features, such as Fast Gate A20 support.

ADVANCED CHIPSET SETUP

ADVANCED CHIPSET SETUP configures chipset-specific options. It is discussed in Section 4, beginning on page 77.

Section 1

Running AMIBIOS Setup

AMIBIOS Setup resides in ROM and is available when the computer is turned on. AMIBIOS Setup permits the end user to configure these system parameters (type of disk drives and monitor, day, date, and time, and so on). The parameters are stored in CMOS RAM. When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains these parameters. The system is configured with these values when powered on.

Default Values

If the configuration values in CMOS RAM become corrupted, the system is configured with the default settings stored in this ROM file. There are two sets of BIOS settings stored in the ROM file: the BIOS Setup defaults and the Power-On defaults. See page 61 for more information on default settings.

Starting AMIBIOS Setup

When POST completes, the following appears:

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

Press <Del> to run AMIBIOS Setup.

Warning Message

A warning is displayed when STANDARD CMOS SETUP, ADVANCED CMOS SETUP, or ADVANCED CHIPSET SETUP is selected. Press <Enter> to display the next screen.

AMIBIOS Setup Keys

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 setting 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 settings resident when the current Setup session began. These settings are taken from CMOS RAM if CMOS RAM was uncorrupted at the start of the session. Otherwise, the BIOS Setup default settings are used.
<F6>	Loads all options in ADVANCED CMOS SETUP and ADVANCED CHIPSET SETUP with the BIOS Setup defaults.
<F7>	Loads all options in ADVANCED CMOS SETUP and ADVANCED CHIPSET SETUP with the Power-On defaults.
<F10>	Saves all changes made to Setup and returns to DOS.

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

AMIBIOS Setup Main Menu

```
          AMIBOIS SETUP PROGRAM -- BIOS SETUP UTILITIES
     (C) Copyright 2001 American Megatrends, Inc. All Rights Reserved

                      STANDARD CMOS SETUP
                      ADVANCED CMOS SETUP
                      ADVANCED CHIP SETUP
               AUTO CONFIGURATION WITH BOIS 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.
```

Chapter 5 AMIBIOS Setup

Auto Configuration With BIOS Defaults

Auto Configuration With BIOS Defaults uses the default system settings for all AMIBIOS Setup options. The BIOS defaults are best-case settings that optimize system performance. If CMOS RAM is corrupted, the BIOS default settings are automatically loaded. Highlight this option, type *Y,* and press <Enter> to use BIOS defaults. The following appears:

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

Auto Configuration With Power-On Defaults

This option configures the Power-On default settings for all AMIBIOS Setup options. These are not optimal for system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is erratic. Highlight this option, type *Y*, and press <Enter> to use the Power-On defaults. The following appears:

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

Change Password

The AMIBIOS password feature provides password control over the use of AMIBIOS Setup and the system itself.

AUTO DETECT HARD DISK

When enabled, this option displays the parameters for IDE hard disk drives. You can accept or reject the parameters. If accepted, these parameters are displayed in STANDARD CMOS SETUP. The parameters are displayed as follows:

```
        AMIBOIS SETUP PROGRAM – HARD DISK AUTO DELETE
     (C) Copyright 2001 American Megatrends , Inc. All Rights  Reserved

HARD DRIVE TYPE          Cyln  Head   WPcom    LZone    Sect  Size
                         960   12      960      960      34   200 MB

                Auto  delete  hard   disk  drive   parameters.
```

Write to CMOS and Exit

The selected options and new password (if any) are stored in CMOS RAM. A checksum is calculated and written to CMOS RAM. Control is passed to AMIBIOS.

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

appears when you press <Enter> when this option is highlighted. 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 AMIBIOS. After this option is highlighted and you press <Enter>, type *N* and press <Enter> to return to the Main Menu. Type *Y* and press <Enter> to continue to boot without saving.

Section 2

STANDARD CMOS SETUP

STANDARD CMOS SETUP is the first option on the Main Menu. Press <Enter> when *STANDARD CMOS SETUP* is highlighted. The following screen appears.

```
┌─────────────────────────────────────────────────────────────────────┐
│           AMIBOIS SETUP PROGRAM -- CMOS SETUP PROGRAME                │
│          (C) 2001 American Megatrends Inc .. All Rights Reserved      │
├─────────────────────────────────────────────────────────────────────┤
│ Date (mn/date/year) : Fri , Aug 07 2001          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, Z  MB, 5 ¼                                   │
│ Floppy Drive B:     : 1.44 MB, 3 ½                                    │
│ Primary Display     : VGA/PGA/EGA        ┌────┬────┬────┬────┬────┬────┬────┐│
│ Keyboard            : Installed          │Sun │Mon │Tue │Wed │Thu │Fri │Sat ││
│                                          ├────┼────┼────┼────┼────┼────┼────┤│
│                                          │ 30 │ 31 │  1 │  2 │  3 │  4 │  5 ││
│ ┌─────────────────────────────────┐      │  6 │  7 │  8 │  9 │ 10 │ 11 │ 12 ││
│ │ Month : Jan , Feb,......Dec      │      │ 13 │ 14 │ 15 │ 16 │ 17 │ 18 │ 19 ││
│ │ 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   FZ:Color  PU/PD : Modify └────┴────┴────┴────┴────┴────┴────┘│
└─────────────────────────────────────────────────────────────────────┘
```

STANDARD CMOS SETUP Options

Date And Day Configuration

Move the cursor to the Date field via ↓ or ↑ and set the Date and Day by pressing <PgUp> and <PgDn> to change the settings. Ranges for each setting are shown in the lower right corner of the screen.

Time Configuration

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

Hard Disk Drive C: and D:

Use <PgUp or <PgDn> to select a hard disk drive type. *Not Installed* is used for diskless workstations and SCSI hard disk drives. Type 47 can be used for both hard disks C: and D:, and is primarily for IDE drives. The parameters for type 47 for drives C: and D: can be different, permitting user-definable hard disk drives.

Using Auto Detect Hard Disk

If you select the Auto Detect Hard Disk option from the AMIBIOS Main Menu screen, the AMIBIOS automatically finds all IDE hard disk drive parameters. AMIBIOS places the hard disk drive parameters that it finds in the Hard Dive C: or Hard Drive D: field in STANDARD CMOS SETUP and sets Type 47. All you have to do is accept these values. Otherwise, you must enter the hard drive parameters, described in the following table. The hard disk drive type parameters are shown on the following page.

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 in the disk drive.
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 disk drive compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This is the track number where write precompensation begins.
Landing Zone	This number is the cylinder location where the heads 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 drives can have even more sectors per track.
Capacity	The formatted capacity of the drive is the Number of Heads x Number of Cylinders x Number of Sectors per Track x 512 bytes (Bytes per Sector).

STANDARD CMOS SETUP Options, Continued

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 PARAMETERS PROVIDED BY HARD DRIVE MANUFACTURER					

Floppy Drive A and Floppy Drive B:

Use <PgUp or <PgDn> to select a setting. 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*, which could be used for diskless workstations. The BIOS does not generate error messages if *Not Installed* is selected.

Primary Display

Use <PgUp or <PgDn> to select a setting. The settings are *Monochrome*, *Color 40x25*, *Color 80x25*, *VGA/PGA/EGA*, or *Not Installed*, which could be used for network file servers. The BIOS does not generate missing monitor messages if *Not Installed* is selected.

Keyboard

Use <PgUp or <PgDn> to select a setting. The settings are *Installed* or *Not Installed*. Use *Not Installed* in a keyboardless system such as a file server. The BIOS does not generate error message for a missing keyboard if *Not Installed* is selected.

Section 3

ADVANCED CMOS SETUP

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

```
••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
•         AMIBIOS SETUP PROGRAM – ADVANCED CMOS SETUP                  •
•     (C) 1993 American Megatrends, Inc. All rights reserved          •
••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
• Typematic Rate Programming : Enabled • System   ROM Shadow F000,64K: Shadowed•
• Typematic Rate Delay (msec): 500     • Shadow RAM Write Protection : Enabled •
• Typematic Rate (Chars/Sec) : 30      • BootSector Virus Protection : Disabled•
• Mouse Support Option       : Disabled• LBD Sampling Point          : 2T      •
• Above 1 MB Memory Test     : Enabled • Cache Write Back            : Enabled •
• Memory Test Tick Sound     : Enabled • Non-Cacheable Area 1        : DRAM    •
• Memory Parity Error Check  : Enabled • Non-Cacheable Area 1 Size   : 0 KB    •
• System Boot Up Num Lock    : On      • Non-Cacheable Area 1 Start  : Disabled•
• Floppy Drive Seek At Boot  : Disabled• I/O Recovery Select         : 3 BCLKs •
• System Boot Up Sequence    : C:,A:   • Hidden Refresh              : Enabled •
• System Boot Up CPU Speed   : High    •                                      •
• External Cache Memory      : Enabled •                                      •
• Internal Cache Memory      : Enabled •                                      •
• Password Checking Option   : Setup   •                                      •
• Video   ROM Shadow C000,32K: Shadowed•                                      •
• Adaptor ROM Shadow C800,32K: Disabled•                                      •
• Adaptor ROM Shadow D000,64K: Disabled•                                      •
• Adaptor ROM Shadow E000,64K: Disabled•                                      •
••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
•••••••••••••ESC:Exit ↑→↓←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color  •••••••••
•••••••••••••F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults  •••••••••
```

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 Options

Typematic Rate Programming
Typematic Rate Delay
Typematic Rate

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. The defaults are:

Option	BIOS default	Power-On default
Typematic Rate Programming	*Enabled*	*Disabled*
Typematic Rate Delay	*500*	*500*
Typematic Rate	*30*	*15*

Mouse Support Option

When enabled, AMIBIOS supports a PS/2-type mouse. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On default is *Disabled.*

Above 1 MB Memory Test

This feature, when enabled, executes POST memory routines on the RAM above 1 MB (if present on the system). If disabled, AMIBIOS only checks the first 1 MB of RAM. The BIOS Setup default is *Enabled.* The Power-On default is *Disabled.*

Memory Test Tick Sound

This option enables the ticking sound during the memory test. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Enabled.*

Memory Parity Error Checking

This option enables or disables parity error checking for system RAM. The settings are *Enabled* (all system RAM parity is checked) or *Disabled* (parity is checked only on the first 1 MB of system RAM). The BIOS Setup default is *Enabled.* The Power-On default is *Disabled.*

System Boot Up Num Lock

If *Off* is selected, the Num Lock key on the keyboard when the system is powered on is turned off, so you can use →, ←, ↑, or ↓ on both the numeric keypad and the keyboard. The settings are *On* or *Off.* The BIOS Setup and Power-On defaults are *On.*

Floppy Drive Seek At Boot

If enabled, a Seek instruction is performed on floppy drive A: at system boot time. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.* The Power-On default is *Enabled.*

System Boot Up Sequence

This option specifies the boot drive sequence (either hard disk drive C: or floppy drive a: is first) after AMIBIOS POST completes and attempts to boot DOS. The settings are *A:,C:* or *C:, A:.* The BIOS Setup default is *C:,A:.* The Power-On default is *A:,C:.*

ADVANCED CMOS SETUP Options, Continued

System Boot UP CPU Speed

This option sets the speed at which the system boots. The settings are *High* or *Low*. The BIOS Setup and Power-On defaults are *High*.

External Cache Memory

When this option is enabled, AMIBIOS recognizes external (secondary) cache memory. The settings are *Enabled* or *Disabled*. The BIOS Setup default is *Enabled*. The Power-On default is *Disabled*.

Internal Cache Memory

When this option is enabled, AMIBIOS uses the cache memory internal to the 486 microprocessor. The settings are *Enabled* or *Disabled*. The BIOS Setup default is *Enabled*. The Power-On default is *Disabled*.

Password Checking Option

This option enables password checking. If *Always* is chosen, a user password prompt appears every time the system is turned on. The BIOS Setup and Power-On defaults are *Setup*. If *Setup* is chosen, the password prompt appears if Setup is run. See page 79 for instructions on passwords.

Video ROM Shadow C000,32K

This option controls the shadowing and caching of the contents of shadowed Video ROM. In ROM shadowing, BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. This option permits the contents of memory locations C0000h – C7FFFh to be copied from ROM to RAM for quicker execution and controls whether the contents can be written to or read from cache memory. The settings are:

Setting	Description
Shadowed (the BIOS Setup default)	The contents of video ROM are copied to RAM but cannot be stored in cache memory.
Disabled (the Power-On default)	There is no shadowing or caching or video ROM.
Cached	The contents of video ROM are copied to RAM and can be stored in cache memory. ***You must be reasonably certain that no application will write to video ROM memory area while this option is enabled.***

Adaptor ROM Shadow C800,32K
Adaptor ROM Shadow D000,64K
Adaptor ROM Shadow E000,64K

These options control shadowing of the contents of the adaptor ROMs that begin at the specified addresses. These options permit the memory segment beginning at the base address in the option name to be shadowed from ROM to RAM. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled* for all above options.

System ROM Shadow F000,64K

This option controls the shadowing and caching of the contents of shadowed system BIOS ROM. In ROM shadowing, BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. This option permits the contents of memory locations F0000h – FFFFFh to be copied from ROM to RAM for quicker execution and controls whether these contents can be written to or read from cache memory. The settings are:

Setting	Description
Shadowed (the BIOS Setup and Power-On default)	The contents of video ROM are copied to RAM but cannot be stored in cache memory.
Cached	The contents of video ROM are copied to RAM and can be stored in cache memory. ***You must be reasonably certain that no application will write to video ROM memory area while this option is enabled.***

Shadow RAM Write Protection

When enabled, this option makes sure that Adaptor ROM code that resides in ROM and has been shadowed to RAM cannot be overwritten. This option should usually be enabled. However, this option may have to be disabled in some adapter cards if Adaptor ROM is shadowed to RAM. Or Adaptor ROM shadowing could be disabled to help these adapter cards work. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Enabled.*

Boot Sector Virus Protection

When enabled, the BIOS issues a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The settings are *Enabled* or *Disabled.*

If enabled, the following is displayed if any program attempts to write to the boot sector. You may have to type *N* several times to prevent the boot sector write.

```
                Boot Sector Write!!!
      Possible VIRUS: Continue (Y/N)? _
```

The following is displayed if any program attempts to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard Disk Drive Service:

```
                    Format!!!
      Possible VIRUS: Continue (Y/N)? _
```

The BIOS Setup and Power-On default is *Disabled.*

LBD Sampling Point

This option specifies the sampling point for the LDEV# signal from the local bus target. The settings must be chosen based on the motherboard frequency, as shown below.

Frequency	Setting
25 MHz	*2T*
33 MHz	*2T*
50 MHz	*3T*

Cache Write Back

If this option is enabled, a write-back caching algorithm is used. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Enabled.*

Non-Cacheable Area 1

You can select a block of memory that cannot be cached and therefore cannot be written to inadvertently. This option selects the allocation method used for the Non-Cacheable Block. The settings are *DRAM* (local DRAM) or *AT Bus* (DRAM is disabled and the AT bus is used). The BIOS Setup and Power-On Defaults are *DRAM*.

Non-Cacheable Area 1 Size

This option sets the size of the non-cacheable memory block. If the **Non-Cacheable Area 1 Start** option setting is 512KB, the settings are *Disabled* or *128KB*. If the **Non-Cacheable Area 1 Start** option setting is any value other than 512KB, the settings are *0 KB, 64 KB, 128 KB, 256 KB, 512 KB, 1 MB, 2 MB,* or *4 MB*. The BIOS Setup and Power-On Default is *0 KB*.

Non-Cacheable Area 1 Start

This option sets the starting (or base address) of the non-cacheable memory block. The settings are *Disabled* or an value equal to the setting of the **Non-Cacheable Area 1 Size** option or an increment of the **Non-Cacheable Area 1 Size** setting. If the **Non-Cacheable Area 1 Size** is less than 1 MB, the **Non-Cacheable Area 1 Start** setting can only be *512KB*. The BIOS Setup and Power-On default is *Disabled.*

I/O Recovery Select

This option sets a delay between consecutive I/O operations. The settings are *3 BCLKs, 4 BCLKs, 5 BCLKs,* or *11 BCLKs.* The BIOS Setup and Power-On defaults are *3 BCLKs.* The settings should be based on the motherboard frequency and the CPU type, as shown below.

Frequency	Setting
25 MHz DX	*3 BCLKs*
33 MHz DX	*3 BCLKs*
50 MHz DX2	*5 BCLKs*
66 MHz DX2	*11 BCLKs*

Hidden Refresh

The settings are *Enabled* or *Disabled.* If *Enabled* is chosen, the CPU can operate from its internal cache memory or external (secondary) cache memory during system memory refresh cycles. CPU accesses to main system memory on the AT bus are blocked until the memory refresh cycle completes.

If *Disabled* is chosen, the CPU is put on hold during system memory refresh cycles.

The BIOS Setup and Power-On defaults are *Disabled.*

On Board Serial Port 1 FIFO
On Board Serial Port 2 FIFO

These two options enable the First-In First-Out buffer for the onboard serial ports. These options can only be enabled if the device connected to these serial ports supports National Semiconductor 16550 UARTs. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults for both options is *Disabled.*

Section 4

ADVANCED CHIPSET SETUP

The ADVANCED CHIPSET SETUP screen is shown below. Use the ↑ and ↓ keys to scroll through the options.

```
..............................................................................
•         AMIBIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP           •
•      (C) 1993 American Megatrends, Inc. All rights reserved      •
..............................................................................
• On Board Serial Port 1    : Disabled•                            •
• On Board Serial Port 2    : Disabled•                            •
• On Board Parallel Port    : Disabled•                            •
• On Board Floppy Controller : Disabled•                           •
• On Board IDE Controller    : Disabled•                           •
• On Board Serial Port 1 FIFO: Disabled•                           •
• On Board Serial Port 2 FIFO: Disabled•                           •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
•                            •                                     •
..............................................................................
...........ESC:Exit ↑→↓←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color  ........
...........F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults  ........
```

ADVANCED CHIPSET SETUP Options

On Board Serial Port 1

This option enables serial port 1 on the motherboard. The settings are *Disabled, 3F8h,* or *3E8h.* The BIOS Setup and Power-On defaults are *Disabled.*

J22 on the motherboard sets the IRQ for serial port 1. Short Pins 1-2 to select IRQ3. Short Pins 2-3 to select IRQ4 (the default). Leave J22 OPEN to disable the IRQ for serial port 1.

ADVANCED CHIPSET SETUP, Continued

On Board Serial Port 2

This option enables serial port 2 on the motherboard. The settings are *Disabled, 2F8h,* or *2E8h.* The BIOS Setup and Power-On defaults are *Disabled.* J23 on the motherboard sets the IRQ for serial port 1. Short Pins 1-2 to select IRQ3 (the default). Short Pins 2-3 to select IRQ4. Leave J23 OPEN to disable the IRQ for serial port 2.

On Board Parallel Port

This option enables the parallel port on the motherboard. The settings are *Disabled, 3F8h,* or *3E8h.* The BIOS Setup and Power-On defaults are *Disabled.* J21 on the motherboard sets the IRQ for the onboard parallel port. Short Pins 1-2 to select IRQ5. Short Pins 2-3 to select IRQ7 (the default). Leave J21 OPEN to disable the IRQ for the parallel port.

On Board Floppy Controller

This option enables the floppy controller on the motherboard. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

On Board IDE Controller

This option enables the IDE controller on the motherboard. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

On Board Serial Port 1 FIFO
On Board Serial Port 2 FIFO

These two options enable the First-In First-Out buffer for the onboard serial ports. These options can only be enabled if the device connected to these serial ports supports National Semiconductor 16550 UARTs. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults for both options is *Disabled.*

Section 5

AMIBIOS Password Support

AMIBIOS Setup has an optional password feature. The system can be configured so that all users must enter a password every time the system boots or when Setup is executed.

Setting a Password

The password check option is enabled in ADVANCED CMOS SETUP (see page 70) by choosing either *Always* (the password prompt appears every time the system is powered on) or *Setup* (the password prompt appears only when AMIBIOS Setup is run). The password is stored in CMOS RAM.

The system asks for a password.

Enter a 1 – 6 character password. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain CMOS RAM and reconfigure the system.

If You Do Not Want to Use a Password

Just press <Enter> when the password prompt appears.

Changing a Password

Select the *Change Password* option from the Setup Main Menu.

Enter the password and press <Enter>. The screen does not display the characters entered. After the new password is entered, retype the new password as prompted and press <Enter>.

If the password confirmation is incorrect, an error message appears. If the new password is entered without error, press <Esc> to return to the Main Setup menu. The password is stored in CMOS RAM after Setup completes. The next time the system boots, you are prompted for the password if the password function is present and is enabled.

Password Options Control Prompt

When and if the prompt appears depends on the Password Option settings in ADVANCED CMOS SETUP. If *Always* was set in ADVANCED CMOS SETUP, the prompt appears when the system is powered on. If *Setup* was set, the prompt appears when Setup is executed.

Remember the Password

Keep a record of the new password when the password is changed.

If you forget the password, remove the computer cover, and replace the Real Time Clock/CMOS RAM chip. The reconfigure the system.

Section 6

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 is preformatted.	Page 84
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page 85
Media Analysis	Analyzes each hard disk drive track to determine whether it is usable. The track is labeled bad if unusable.	Page **Error! Bookmark not defined.**

The hard disk utility error messages are described on page **Error! Bookmark not defined.**.

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.

```
          AMIBOIS SETUP PROGRAM — HARD DISK DIAGNOSTICS
          (C) 2001 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 chaned form the STANDARD SETUP option in main menu



                         Hard Disk Format
                         Auto Interleave
                         Media Analysis



       ESC:Exit      ↑→↓← :Sel     FZ: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 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.

```
             AMIBOIS SETUP PROGRAM – DIAGNOSTICS
          (C) 2001 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
```

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.

```
        AMIBOIS SETUP PROGRAM — HARD DISK  DIAGNOSTICS
        (C) 2001 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 disk 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.

```
      AMIBOIS SETUP PROGRAM — HARD DISK DIAGNOSTICS
         (C) 2001 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 ─┐
  │                         │  │ Add an Entry          │  │ No.  Cyln.  Head│
  │ Disk Drive (C / D)   ? C│  │ Revise an Entry       │  │                 │
  │ Disk Drive Type      ? 40│ │ Delete an Entry       │  │                 │
  │ Mark Bad Tracks (Y / N) ? Y│ Clear Bad Trk List    │  │                 │
  │ Proceed  (Y / N)     ?   │  └───────────────────────┘  │                 │
  └─────────────────────────┘                              │                 │
              ┌─── 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.

```
        AMIBOIS SETUP PROGRAM — HADR DISK  DIAGNOSTICS
       (C) 2001 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  │
     │  Proceed  (Y / N)        ? N  │
     └──────────────────────────────┘



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

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.
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 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 flagged as bad.
Controller Has Failed	A diagnostic command issued to the controller failed.
Drive Not Ready	An operation on the hard disk drive timed out. The hard disk drive utility 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 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

Temperature and Power Considerations

Temperature Ranges

The values in the following table are ambient temperatures inside the computer case. The board temperatures reflect the 80486 CPU Heat dissipation requirements because it is the hottest component. Temperature specifications vary with the CPU frequency.

Frequency	Heat Sink	Airflow over CPU	Airflow over other components	Temperature Range
20 or 25 MHz	NO	400 feet per minute	Not critical	0 ° through 47 ° C.
33 MHz	NO	400 feet per minute	Not critical	0 ° through 36 ° C.
50 MHz	YES	200 feet per minute	Not critical	0 ° through 50 ° C.

Humidity

The recommended humidity range for operation of the American Megatrends Enterprise-IV EISA VLB motherboard is 20% to 80% non-condensing.

Power Considerations

Power Supply Requirements

The Enterprise-IV EISA VLB motherboard requires +5V, -5V, +12V, -12V, and about 44 Amps maximum.

Power Consumption

The four SIMM memory banks consume 2 Amps each, for a total of 8 Amps.

Each EISA expansion slot is gated at 4.5 Amps maximum. There are eight EISA expansion slots, so the total power consumption for EISA expansion slots is 36 Amps. The total maximum power consumption is 44 Amps at +5V with a 220 Watt power supply.

Power Source

Three power connectors (P1, P2, and P3) are provided on the Enterprise-IV EISA VLB motherboard. These connectors provide seven +5V connects. Each is rated at approximately 5 Amps. The total power consumption for all three connectors is approximately 35 Amps.

Conclusion

The minimum rating of the power supply should be 230 Watts for a fully loaded motherboard, including a 12V power source. The maximum power consumption on each EISA slot is 4.5 Amps at 5V.

Appendix B

Heat Dissipation

The 50 MHz 80486DX and 66 MHz 80486DX2 and P24T 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 5 – 8 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 that have a 50 MHz 80486DX/DX2 or 66 MHz 80486DX2 CPU.

Since American Megatrends manufactures only the motherboard and CPU Card system components, American Megatrends 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 CPU always operates within a safe operating temperature range.

Heat Dissipation, Continued

Test Procedure to Assure Proper Operating Temperatures:

1. Install the motherboard 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.

Appendix B Heat Dissipation

Appendix C

EISA Configuration Worksheets

Two-page worksheets for seven EISA adapter cards follow. Complete a worksheet for each EISA adapter card in the system to simplify the EISA configuration process. These worksheets can be used in conjunction with the American Megatrends EISA Configuration Utility (ECU) and the Enterprise-IV motherboard EISA configuration files — !AMI87A1.CFG and AMI87A1.OVL.

Motherboard Configuration

```
Serial Number _____

Revision Number _____

ECN Number _____

Memory Type for Bank0 and Bank1:      ___ 1 MB x 9 SIMMs
(check the type used)                 ___ 4 MB x 9 SIMMs
                                      ___ 16 MB x 9 SIMMs

Memory Type for Bank2, Bank3,         ___ 1 MB x 9 SIMMs
Bank5, and Bank6:                     ___ 4 MB x 9 SIMMs
                                      ___ 16 MB x 9 SIMMs


Memory Installed:                     ___ Bank0
(check the banks installed)           ___ Bank1
                                      ___ Bank2
                                      ___ Bank3

Total Amount of Memory:               _____ MB


Other Options:                        ___ Weitek
(check the options installed)
```

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

Appendix C EISA Configuration Worksheets

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

Appendix C EISA Configuration Worksheets

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

Appendix C EISA Configuration Worksheets

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

Appendix C EISA Configuration Worksheets

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 (VL-BUS SLOT-1)

Card Description: _____

Manufacturer: _____

VL-Bus 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

Appendix C EISA Configuration Worksheets

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 NON-MASTER Slot 7 (VL-BUS SLOT 2)

Card Description: _____

Manufacturer: _____

VL-Bus 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

Appendix C EISA Configuration Worksheets

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

_____

_____

_____

Appendix D

Flash EPROM Support

The American Megatrends Enterprise-IV EISA VLB motherboard can be configured with a Flash EPROM. This Appendix explains how the Flash EPROM is programmed. *You need to read this Appendix only if the Enterprise-IV EISA VLB motherboard that you received has a Flash EPROM.*

Flash Programming

The version of the American Megatrends Enterprise-IV EISA VLB motherboard that you have received uses Flash EPROM to store the system BIOS. The advantage of using a Flash EPROM is that the EPROM chip does not have to be replaced to update the BIOS. The end user can actually reprogram the BIOS, using a ROM file supplied by American Megatrends. There are two methods for programming the Flash EPROM:

- programming from system boot, or
- running the AMIFlash utility.

Programming from System Boot

Using the floppy disk with the new BIOS file, you can simply press and hold down the <Home> key to reprogram the Enterprise-IV EISA VLB motherboard Flash EPROM-based AMIBIOS before DOS boots.

Using AMIFlash

AMIFlash is a DOS utility that is executed from the DOS command line. You can reprogram the Enterprise-IV EISA VLB motherboard Flash EPROM-based AMIBIOS from the DOS command prompt using AMIFlash.

Reprogramming from System Boot

When you reprogram from system boot, the American Megatrends Flash utility:

1. reads S87P.ROM from the root directory of the floppy disk in drive A:,
2. erases the Flash EPROM,
3. programs the Flash EPROM with the data read from the floppy disk in drive A:, and
4. generates a CPU reset, rebooting the system.

The AMIFlash portion of Flash EPROM is not programmed.

S87P.ROM

S87P.ROM resides on a floppy disk and contains the updated main BIOS code. American Megatrends will provide this file when the AMIBIOS for the Series 87 Enterprise-IV EISA VLB motherboard must be updated.

S87P.ROM must be present in the root directory of the floppy disk before the onboard Flash EPROM can be reprogrammed. The file that has the main BIOS code must be named S87P.ROM.

Programming the Flash EPROM

Step	Action
1	Turn system power off.
2	Place the floppy disk that has the latest S87P.ROM BIOS file in floppy drive A:.
3	Make sure that the system has a speaker that is connected.
4	Turn system power on while pressing and holding down the <Home> key.

Sequence of Operation

Step	Expected behavior
1 Look for floppy disk.	The system beeps one time before the BIOS attempts to read from floppy drive A:.
2 Look for S87P.ROM on the floppy disk.	S87P.ROM must be in the root directory of the floppy disk in drive A:. No beep if successful.
3 Read the floppy disk.	The floppy disk is read. No beep if this step is successful.
4 Check for BIOS file size.	The BIOS file size is checked. No beep if this step is successful.
5 Check for Flash EPROM.	The BIOS looks for an Intel i28F001BX-T Flash EPROM. It does not beep if this step is successful.
6 Erase the Flash EPROM.	Two beeps when the BIOS begins erasing the Flash EPROM.
7 Program the Flash EPROM.	Three beeps when the AMIFlash Code begins reprogramming the Flash EPROM.
8 Continue programming the Flash EPROM.	Four beeps when reprogramming has successfully completed.
9 AMIFlash does a reset.	A CPU reset is generated (the system reboots).
10 Reboot	Reboot the system.

Beep Codes

During normal operation, the Flash utility beeps to indicate: step completion (as shown above), an error. Error beeps are in a coded sequence and have different meanings depending on when they occur:

Step	Beeps	Description
—	None	Successful completion.
1	Continuous single beep	There is no floppy disk in Drive A:.
2	Five beeps	S87P.ROM is not present in the root directory of the floppy disk in the A: drive.
3	Seven beeps	Floppy Read Error.
4	Six beeps	BIOS File Size Error.
5	Eight beeps	An Intel i28F001BX-T Flash EPROM is not present.
6	Two continuous beeps	Problem erasing the Flash EPROM.
7	Three continuous beeps	Problem programming the Flash EPROM.
9	Four continuous beeps	The BIOS cannot reset the CPU or the Flash Programming jumper is still shorted.

AMIFlash Checkpoint Codes

Code	Description
02h	Verify the AMIFlash BIOS checksum and disable internal cache memory.
0Eh	Make the CMOS RAM checksum bad and initialize the CMOS RAM status registers.
10h	Disable DMA Controllers 1 and 2. Disable Interrupt Controllers 1 and 2.
13h	Initialize the chipset registers.
18h	If the main BIOS is good, transfer control to the main BIOS.
1Bh	Initialize the system timer.
1Dh	Begin the refresh test.
20h	Begin the 16 KB base memory test.
23h	Initialize the interrupt vectors.
28h	Determine the CPU clock frequency.
30h	Program the system speed-dependent parameters according to the CPU clock frequency.
40h	Begin the memory test.
50h	The memory test has completed.
65h	Initialize the DMA controller.
67h	Initialize the interrupt controller.
80h	Initialize the I/O chipset, if any.
85h	Enable the appropriate IRQs.
86h	Enable the internal cache memory.
88h	Initialize the floppy drives.
90h	Indicate an error. The BIOS stops here if there is an error.
A0h	Reading the floppy disk in drive A: to program the Flash EPROM.
E0h	Configure the proper stack.
E3h	Display a message to ask the user to insert the AMIFlash Floppy Disk in drive A:.
E4h	Floppy read error.
E5h	Begin the search for the S87P.ROM file in the floppy disk root directory.
E6h	The S87P.ROM file not present in the floppy disk root directory.
E7h	Begin reading the File Allocation Table.
E8h	Begin reading S87P.ROM, sector by sector.
E9h	S87P.ROM is not the proper size.
EFh	Disable internal cache memory.
F0h	Enable and reset flash memory.
F1h	Detect the flash type if present.
F2h	Flash memory not detected.
F3h	Begin erasing flash blocks.
F4h	Begin programming flash blocks.
FFh	Flash programming successful and the system reboots, if possible.

AMIFlash

Starting AMIFlash

Type

```
AMIFlash
```

and press <Enter> at the DOS prompt. AMIFlash will prompt for the filename. Type

```
S87P.ROM
```

and press <Enter>. Pressing <Esc> exits AMIFlash any time before Flash EPROM reprogramming begins.

General Operation

If Flash EPROM is present, AMIFlash asks if you want to save the existing BIOS file. If you choose to save the BIOS, enter the filename where the existing BIOS will be saved.

ContainsDatafor

PostscriptOnly.

Enter the filename with which Flash EPROM will be reprogrammed (S87P.ROM). AMIFlash reads the file and displays a startup message. A Press any key to continue. After Flash programming starts, programming activity is indicated by a rotating ⁄ character. AMIFlash informs you when Flash programming is successful (as shown below). Press any key to reboot the system.

ContainsDatafor

PostscriptOnly.

Errors During Flash Programming

If an error occurs during programming, an error messages is displayed and the system halts. Turn power off and replace the Flash EPROM with a new programmed Flash EPROM to make the system usable.

AMIFlash Messages

Message	Explanation
Save Existing BIOS ?	Press Y to save the existing BIOS.
Enter Filename:	Enter the filename in which the existing BIOS will be saved in the following format: Drive:\Pathname\Filename.Ext and press <Enter>.
Enter BIOS Filename:	Enter the filename with which the Flash EPROM will be programmed in the following format: Drive:\Pathname\Filename.Ext and press <Enter>.
Programming Flash EPROM	Displayed when the Flash EPROM is being programmed.
Saving BIOS File in Disk	Displayed when the existing BIOS is saved to disk.
Reading BIOS File from Disk	Displayed when the file with which Flash EPROM will be programmed is being read from the disk.
Press <ESC> to Exit	When this message is displayed, you can exit AMIFlash by pressing <Esc>.
Press Any Key to Exit	Usually displayed below another message when a fatal error occurs, for example, no Flash EPROM present in system or the hardware is not accessible.
Press Any Key to ReBoot	Displayed after successful Flash EPROM programming.
Want to Continue (Y/N)?	Displayed after an error message.
Want to Exit (Y/N)?	Displayed when you press <Esc>.
Please Wait..	Displayed when Flash programming is occurring.
Put Off System Power	Displayed if there is an error during Flash programming. Replace the Flash EPROM with a new programmed Flash EPROM.
No Flash EPROM present	Displayed if no Flash EPROM is present in the system.
Memory Allocation Error	Displayed when scratch memory is not available.
File Creation Error	Displayed when the specified BIOS save file could not be created.
File Does Not Exist	Displayed when the Flash EPROM program file could not be found.
File I/O Error	Displayed during a read or write error.
Disk Full	Displayed when the disk where the existing BIOS was to be saved has no space.
Flash EPROM Programming Error.	Displayed if an error occurs during Flash programming. The system is not usable unless the existing Flash EPROM is replaced with the new Programmed Flash EPROM.
Flash EPROM Programming Successful	Displayed when Flash programming is successful.
BIOS File Not Of Proper Size	Displayed when the file size of the new program does not match the Flash EPROM size.

AMIFlash Messages, Continued

Message	Explanation
Flash EPROM Programming is going to start	The system is not usable until Flash EPROM programming is completed successfully. If an error occurs, the existing Flash EPROM must be replaced by a new programmed Flash EPROM. The system must not be turned off during programming. The system reboots if programming is completed successfully.

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