American Megatrends, Inc.

Super Voyager VLB-II

ISA Motherboard

User's Guide

MAN-682
12/2/93

American Megatrends, Inc.
6145F Northbelt Parkway
Norcross, GA 30071

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 on the motherboard warranty card. 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.

Limitations of Liability

In no event shall American Megatrends be held liable for any loss, expenses, or damages of any kind whatsoever, whether direct, indirect, incidental, or consequential, arising from the design or use of this product or the support materials provided with the product.

Trademarks

Intel and Overdrive are registered trademarks of Intel Corporation.
VESA and VL-Bus are registered trademarks of the Video Electronics Standards Association.
MS-DOS, Xenix, Microsoft Windows, and Microsoft are registered trademarks of Microsoft Corporation.
SMC is a registered trademark of SMC Corporation.
IBM, AT, VGA, PS/2, OS/2, and EGA are registered trademarks of International Business Machines Corporation. XT and CGA are trademarks of International Business Machines Corporation.
Fujitsu is a registered trademark of Fujitsu America, Inc.
Motorola is a registered trademark of Motorola Corporation.
Hitachi is a registered trademark of Hitachi America, Ltd.
PNY is a registered trademark of PNY Corporation.
Oki is a registered trademark of Oki America, Inc.
NEC is a registered trademark of NEC Corporation.
Samsung is a registered trademark of Samsung Electronics Corporation.
Siemens is a trademark of Siemens Corporation.
Mitsubishi is a registered trademark of Mitsubishi Electronics of America.
Micron is a registered trademark of Micron Corporation.
Unix is a registered trademark of American Telephone and Telegraph Company Bell Laboratories.
Weitek is a trademark of Weitek, Inc.
Toshiba is a registered trademark of Kabushiki Kaisha Toshiba.

Revision History

5/6/93	Initial release.
7/19/93	Corrected graphics in manual.
9/25/93	Revised cache upgrade information and added SMC 665 support.
12/2/93	Corrected mistakes in manual.

Table of Contents

Preface

To the OEM

Thank you for purchasing the high performance American Megatrends Series 82 Super Voyager VLB-II ISA motherboard. This product is a state of the art 486-based motherboard that includes the famous AMIBIOS. It is assumed that you have also licensed the rights to use the American Megatrends documentation for the American Megatrends Super Voyager VLB-II motherboard

This manual was written for the OEM to assist in the proper installation and operation of this motherboard. This manual describes the specifications and features of the Series 82 Super Voyager VLB-II motherboard. It explains how to assemble a system based on the Super Voyager VLB-II motherboard and how to use the AMIBIOS that is specifically designed for this motherboard.

This manual is not meant to be read by the computer owner who purchases a computer with this 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 American Megatrends motherboard fails to operate as described or you are in doubt about a configuration option, please call technical support at 404-246-8600.

Acknowledgments

This manual was written by Robert Cheng and Paul Narushoff. The writers gratefully acknowledge the assistance of Vivek Saxena and Uma S. Mondal.

American Megatrends BBS

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

Data Transmission Rates

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

BBS Phone Numbers

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

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

Chapter 1

System Overview

The American Megatrends Super Voyager VLB-II is an ISA motherboard with two VESA® (Video Electronics Standards Association) VL-Bus® Local Bus bus mastering expansion slots as well as seven standard ISA expansion slots.

The VL-Bus Local Bus

The American Megatrends Super Voyager VLB-II Motherboard conforms to the VESA VL-Bus specifications. The VL-Bus is designed to standardize the hardware interface of peripherals connected to a microprocessor-level local bus. The VL-Bus is designed to be compatible with the Intel® i486 microprocessor 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.

The American Megatrends Super Voyager VLB-II motherboard has two expansion slots for VL-Bus adapter cards. These slots are standard ISA 16-bit slots with an inline 16-bit MCA expansion socket. The two connectors together make up the VL-Bus connector, shown below.

Super Voyager VLB-II Dimensions

The Super Voyager VLB-II motherboard is approximately 8.5 inches wide by 13 inches long (the standard Baby AT® size with similar mounting hole locations). The dimensions and height restrictions are shown below. *The x 36 SIMMs require additional vertical space.*

Description

Processor Type and Speed

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 ZIF socket is the upgrade socket. If both the PQFP and ZIF sockets contain CPUs, the CPU in the ZIF socket will be the active CPU. The PQFP CPU must be disabled by placing a shorting bridge on J45 before the CPU in the ZIF socket can become the active CPU. The Super Voyager VLB-II motherboard supports future Intel processors.

Programmable Crystal Oscillator

The Super Voyager VLB-II motherboard has a programmable crystal oscillator that supports all possible motherboard frequencies.

Heat Sink

A heat sink is provided for all 50 and 66 MHz CPUs on all American Megatrends motherboards with these CPUs.

ZIF Socket for Upgrade CPUs

The Super Voyager VLB-II motherboard can have an Intel 486DX or 486SX CPU in the PQFP socket. It also supports an Intel 80487SX (if the CPU is an 80486SX), Intel Overdrive® CPU, P24T, or other Intel upgradeable processors operating at 25 or 33 MHz via the 240-pin ZIF CPU socket.

Processor Speed

The Super Voyager VLB-II motherboard has two clock speeds: high and low. High clock speed is factory-set to 25, 33, or 50 MHz. Low clock speed is achieved by adding the appropriate number of software delays, depending on the speed of the processor, and emulates an IBM® AT running at approximately 8 MHz. Speed selection is through the turbo switch or the keyboard. Press <Ctrl> <Alt> <+> for high speed and <Ctrl> <Alt> <-> for low speed.

Cache Memory

The Super Voyager VLB-II motherboard supports 64 KB or 256 KB of direct mapped, write-through or write-back L2 external (secondary) cache memory.

Secondary cache memory size	SRAM Type	Maximum System Memory Cached
64 KB	8 KB x 8	16 MB
256 KB	32 KB x 8	64 MB

Intel 486 CPUs have 8 KB of internal cache memory. All system memory can be cached in internal cache memory. The cache read has zero wait states at 25 or 33 MHz and one wait state if the motherboard is operating at higher speeds. Burst mode is supported. Cache memory is enabled and disabled through the keyboard: <Ctrl> <Alt> <Shift> <+> enables cache and <Ctrl> <Alt> <Shift> <-> disables it.

Main System Memory

The Super Voyager VLB-II motherboard supports up to 64 MB of onboard memory via four banks of SIMMs that can contain 256 KB x 36, 1 MB x 36, or 4 MB x 36 SIMMs. Each memory socket holds a x 36 SIMM that is actually equivalent to a bank of memory. The SIMMs can be logical single bank, physical single bank, or double-sided.

SIMM Types Supported

The Super Voyager VLB-II motherboard supports 256 KB x 36, 1 MB x 36, or 4 MB x 36 fast page mode SIMMs operating at 70 ns (RAS access time).

Shadow RAM

The system BIOS memory area (F0000h – FFFFFh) is always shadowed from ROM to RAM. The video BIOS area (C0000h – C7FFFh) and Adaptor ROM (C8000h – EFFFFh) can be shadowed via AMIBIOS Setup in 32 KB increments.

System BIOS

The Super Voyager VLB-II motherboard has a 64 KB AMIBIOS at F0000h - FFFFFh with built-in AMIBIOS Setup, hard disk drive diagnostics, and user-definable hard disk drive types. AMIBIOS Setup allows you to bypass error messages for missing video, keyboard, or floppy drives to facilitate the building of file servers. The system BIOS is stored in Read-Only Memory (ROM).

CMOS RAM

The Super Voyager VLB-II motherboard has 128 bytes of nonvolatile CMOS RAM with built-in rechargeable battery backup for configuration. The battery is on the CMOS RAM/RTC chip.

Real Time Clock

The Super Voyager VLB-II motherboard has a real time clock and CMOS RAM with built-in battery backup for AMIBIOS Setup. The battery is on the CMOS RAM/RTC.

Timer Features

The Super Voyager VLB-II motherboard has five programmable 16-bit counter/timers.

Refresh Generation

The Super Voyager VLB-II motherboard has a refresh generation feature.

I/O Capability

The Super Voyager VLB-II motherboard accesses 16- or 8-bit I/O devices on the ISA bus.

Description, Continued

ISA Bus

The ISA bus in the motherboard has a system clock generated by the bus clock (BCLK).

Expansion Slots

The motherboard has seven 16-bit expansion slots for ISA adapter cards. Two of these slots are used as VL-Bus expansion slots.

Local Bus

The motherboard has two VESA VL-Bus Local Bus expansion slots. These slots can also be used as standard ISA expansion slots. Both VESA slots support bus mastering adapter cards.

Keyboard and Mouse

The keyboard connector is a 5-pin IBM AT-compatible DIN keyboard connector. Adjacent to the keyboard connector is a 10-pin berg connector for the PS/2 mouse. A five-pin berg keyboard lock connector is provided on the motherboard to attach a keyboard lock.

Speaker

The motherboard has a standard speaker attachment.

Onboard I/O

The Super Voyager VLB-II motherboard uses an SMC FDC37C665 Universal Peripheral Controller. The motherboard includes a standard IDE hard disk drive controller. It also has a floppy controller, two 16550 UARTs for serial ports, and one parallel port on the motherboard. The parallel port is bidirectional.

Parallel Port

The parallel port can be operated in Standard Mode, EPP (Enhanced Parallel Port) Mode, or ECP (Extended Capabilities Port) Mode. Both EPP and ECP enhance the performance of the standard parallel port. The approximate data transfer in EPP or ECP mode is about 2 MBs. Both EPP and ECP specifications conform to the IEEE P1284 specification. To use EPP or ECP, the device attached to the parallel port must be EPP- or ECP-compatible.

Onboard NS16550s

The motherboard has two National Semiconductor NS16550 UARTs for serial port, which provide enhanced serial port features. The end user can enable FIFO for Serial ports 1 and 2 through Peripheral Setup in AMIBIOS Setup. Microsoft Windows 3.1 programs these ports automatically as 16550-compatible. Call American Megatrends Technical Support at 404-246-8600 to download an utility which will enable 16550 UARTs under DOS.

Floppy Drive Support

The motherboard supports up to two floppy drives, including 720 KB, 1.44 MB, and 2.88 MB 3½" drives and 1.2 MB 5¼" drives.

I/O Address Space

The Super Voyager VLB-II motherboard uses I/O addresses 0100h through 03FFh for ISA-compatible I/O.

Memory Addresses

The motherboard uses 32-bit memory addresses to access 4 gigabytes of memory address space on the VL-Bus expansion slots. The ISA expansion slots use 16-bit memory addresses to access up to 24 MB.

I/O Channel Check

The motherboard supports the use of the I/O channel check to generate NMIs.

I/O Wait State Generation

The motherboard has an open bus structure, allowing multiple microprocessors to share the system resources, including memory. The motherboard supports refresh of system memory from channel microprocessors.

Seven DMA Channels

The motherboard has seven DMA channels. Any DMA channel can be set for 8 or 16-bit DMA device sizes.

Fifteen Interrupt Levels

The motherboard uses 15 hardware interrupt levels. The NMI takes precedence over all 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	Bus
5	IRQ 10	Bus
6	IRQ 11	Bus
7	IRQ 12	Onboard PS/2 Mouse *or* AT bus through a jumper
8	IRQ 13	Coprocessor Error
9	IRQ 14	Bus (Hard disk drive controller)
10	IRQ 15	Bus

11	IRQ 3	Bus (Serial Port 2)
12	IRQ 4	Bus (Serial Port 1)
13	IRQ 5	Bus (Parallel Port 2)
14	IRQ 6	Bus and floppy disk controller
15	IRQ 7	Bus (Parallel Port 1)

Chapter 2

Installation

Installation Steps

The steps for assembling a system that uses the Super Voyager VLB-II motherboard are shown in the following table. Each step is discussed in detail in the following pages.

Step	Action	Turn to
1	Unpack the motherboard	Page
2	Set switch and jumper options	Page
3	Install memory	Page
4	Install upgrade processor	Page
5	Install motherboard	Page
6	Connect the power supply	Page
7	Connect the keyboard	Page
8	Connect the mouse	Page
9	Connect cables	Page
10	Connect onboard I/O	Page
11	Install floppy disk drives	Page
12	Install hard disk drive	Page
13	Install adapter cards	Page
14	Test and configure	Page

Warning
This motherboard contains sensitive electronic components which can be easily damaged by static

electricity. Follow the instructions carefully to ensure correct installation and to avoid static damage.

Step 1 Unpacking the Motherboard

Step	Action
1.	Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 404-246-8600. Leave the motherboard in its original packing.
2.	Perform all unpacking and installation procedures on a ground connected anti-static mat. The operator should wear an anti-static wristband, grounded at the same point as the anti-static mat. Or use a sheet of conductive aluminum foil grounded through a 1 megohm resistor instead of the anti-static mat. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 megohm resistor serves the same purpose as the wristband.
3.	Inside the carton, the motherboard is packed in an anti-static bag, and sandwiched between sheets of sponge. Remove the sponge and remove the anti-static bag. Place the motherboard on a grounded anti-static surface component side up. Save the original packing material in case of reshipment.
4.	Inspect the motherboard for damage. Press down on all ICs mounted in sockets to verify proper seating. Do not apply power to the motherboard if it has been damaged.
5.	If the motherboard is undamaged, it is ready to be installed.

Step 2 Set Switch and Jumper Options

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

SW1	Cache Memory
SW2	Diagnostics and CGA
J21	Serial Port 1 IRQ Select
J20	Serial Port 2 IRQ Select
J22	Enable onboard PS/2 mouse

J43, J44, J45	Processor Type Select,
J23	Local Bus ID, and
J13	Parallel Port IRQ Select.

SW1

SW1 is a four-position two-bit DIP switch that controls cache memory configuration. See the graphic on page for the location of SW1.

SW1 Switches	Cache Memory Configured
All OFF	64 KB
All ON	256 KB

SW2 Diag and Color

SW2 has two two-position switches.

SW2-1 is the Manufacturing Diagnostics switch. The motherboard is shipped with this switch Off. The switch should remain Off.

SW2-2 is the COL/MONO switch. SW2-2 sets the type of video display adapter card in the system. This switch is factory-set to Off, for a monochrome display adapter (MDA). Set On for a color graphics adapter (CGA™). This switch has no effect if an EGA® or VGA® adapter is installed in the system.

J20 Serial Port 2 IRQ Select

J20 is a three-pin single-inline berg. Short pins 2-3 to select IRQ4 for serial port 2. Short pins 1-2 (the default) to select IRQ3 for serial port 2.

J21 Serial Port 1 IRQ Select

J21 is a three-pin single-inline berg. Short pins 1-2 to select IRQ3 for serial port 1. Short pins 2-3 (the default) to select IRQ4 for serial port 1.

J13 Parallel Port IRQ Select

J13 is a three-pin berg that selects the IRQ for the parallel port. Short pins 1-2 to select IRQ5. Short pins 2-3 to select IRQ7 (the factory or default setting), as shown below.

CPU Clock Speed

The CPU Clock speed options will be specified in an American Megatrends Technical Tip to be supplied later.

J22 Onboard PS/2 Mouse Enable

J22 is a three-pin single-inline berg. Short pins 2-3 to disable the onboard PS/2 mouse. Short pins 1-2 to enable the onboard PS/2 mouse (the default). *IRQ12 cannot be used by any ISA or VL-Bus adapter card when the onboard mouse is enabled.*

J43, J44, J45 CPU Select

J43 (a four-pin berg), J44 (a three-pin berg), and J45 (a two-pin berg) together select the CPU type.

CPU in ZIF Socket	PQFP CPU	J45	J43	J44
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

The graphics below depict the jumper settings.

J43 Select CPU Type

J44 Select CPU Type

J45 Select CPU Type

J23 Local Bus ID

J23 is a three-pin single-inline berg. In normal operation, pins 1-2 are shorted when running Local Bus Adapter Cards at 20, 25, or 33 MHz (the default). Short pins 2-3 if running Local Bus Adapter Cards at speeds higher than 33 MHz. J23 is shown below. See the graphic on page for the location.

Step 3 Install Memory

The main memory subsystem on the Super Voyager VLB-II motherboard consists of four 32-bit memory sockets. Each socket can hold one SIMM unit, which contains four SIMMs (Single In-line Memory Module) DRAM packages. One x 36 SIMM packages is the equivalent of four x 9 SIMM packages (and is actually a bank of memory in itself). You can use 256 KB x 36, 1 MB x 36, or 4 MB x 36 SIMMs.

If 256 KB x 36 SIMMs are used, only two SIMMS are supported (the system will only have 2 MB of RAM).

The SIMMs can be logical single bank, physical single bank, or double-sided. The Super Voyager VLB-II motherboard uses fast page mode SIMMs operating at 70 ns (RAS access time).

Motherboard Memory Configurations

The Super Voyager VLB-II motherboard supports the following motherboard memory configurations.

BANK0	BANK1	BANK2	BANK3	Total
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
1 MB x 36	1 MB x 36	None	None	8 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
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

Selecting SIMMs

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

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

SIMM Part Numbers

Suggested SIMM manufacturers and part numbers follow.

Memory Type	Manufacturer	Part Number
256 KB x 36	Micron®	MT9D25636M-7
	Mitsubishi®	MH26636BJ-7
	Motorola®	MCM36256S-70
	Oki®	MSC2320A-70YS9
	PNY®	P36256-70
	Samsung®	KMM536256B-7
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

Installing SIMMs

There are four x 36 SIMM sockets located on the Super Voyager VLB-II motherboard and each socket is actually a memory bank. Each x 36 SIMM is the equivalent of four x 9 SIMMs. These sockets can be filled with either 256 KB x 36, 1 MB x 36, or 4 MB x 36 SIMMs.

Place the motherboard on an anti-static mat. With the component side of the SIMM facing you, firmly push the SIMM into the socket at a 45 degree angle, then push it up to a vertical position. When properly inserted, the SIMM clicks into place as the latching pins engage.
The 1 MB x 36 SIMMs look like this:

Step 3 Install Memory, Continued

Reporting Memory

The system memory is reported by AMIBIOS as it boots and again when the AMIBIOS System Configuration Screen is displayed just before DOS is booted.

If the system has 8 MB of system memory, the memory reported by AMIBIOS is 128 KB less than the total amount of memory installed in the system because some of the memory between 640K and 1024K is used to shadow the video and system BIOS.

If the system has 16 MB of memory or more, the memory displayed by AMIBIOS on the System Configuration Screen is 384 KB less than the total memory installed, because all of the memory between 640K and 1024K is used by AMIBIOS for shadowing and EMS.

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 Super Voyager VLB-II 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 Super Voyager VLB-II 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.

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

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

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 all components, make sure that the proper voltage has been selected. Power supplies often can run on a wide range of voltages and must be set (usually via a switch) to the proper range. Use at least a 230 watt power supply, which should have built-in filters to suppress radiated emissions.

Connect to P1 and P2

Attach the power supply cables to P1 and P2 on the motherboard. AT-compatible power supplies have two 6-pin connectors. The 6-pin connector with 3 red wires and 2 black wires is connected to P2 and the remaining 6-pin connector is connected to P1, as shown below.

Power Supply Connectors are Keyed

The power connectors are keyed to prevent incorrect installation. The keys on the connector must be cut to fit on some power supplies, as shown below.

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)

Step 7 Connect the Keyboard Cable

The keyboard attaches via a standard 5-pin DIN keyboard connector. Adjacent to the keyboard connector is a 10-pin berg for attaching a PS/2-type mouse.

The keyboard connector is a 5-pin DIN socket labeled KEYBRD and J3 on the motherboard. The keyboard connector position is shown on page . Attach a standard AT-compatible keyboard cable. Use a 5-pin DIN to 6-pin miniDIN converter to connect a PS/2-type keyboard.

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

Step 8 Connect the Mouse Cable

The mouse connector (J1) is a ten-pin dual-inline berg. Attach a customized serial cable from the mouse connector to a DB9 serial port connector. You can order this cable from the many parts suppliers. Ask for a **Cable Assembly DB9, Male, 10-Pin**. J1 Pin 10 should be cut. The connector position is shown on page . The J1 pinout is:

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

The DB9 connector pinout is:

Pin	Assignment	Pin	Assignment
1	Clock	2	N/C
3	N/C	4	N/C
5	Ground	6	N/C
7	N/C	8	Vcc
9	Data	N/A	N/A

Step 9 Connect Cables

When connecting chassis connectors to the motherboard, make sure to connect the correct connector end. Most connector wires are color-coded. Match the color of the wires leaving the switch or LED to the same pin on the connector end.

There may be more than one connector with the same color-coded wires. If so, follow the wire to the switch or LED.

All motherboard components are outlined by a white rectangular box with a broad arrow at one end. Pin 1 is always at the arrow end of the white outlined box, as shown in the following drawing.

The following cables should be connected to the motherboard:

- Reset Switch cable to J24,
- Speaker cable to J29,
- Keyboard Lock cable to J31,
- Turbo LED cable to J30,
- Turbo Switch cable to J32, and
- IDE LED Activity Indicator LED cable to J8.

J24 Reset Switch Connector

J24 is a two-pin single-inline berg that is attached via a cable to an externally-mounted reset switch. When the reset switch is pressed, the system performs a hard reset. Pin 1 is ground and Pin 2 is Hard Reset.

J29 Speaker Connector

J29 is a four-pin single-inline berg that is attached via a cable to the system speaker. AMIBIOS signals hardware problems through the speaker. Pin 1 on the motherboard is identified by the arrow on the white box around the berg.

Pin	Description
1	Data Out
2	Key
3	N/C
4	VCC

J31 Keyboard Lock Connector

J31 is a five-pin single-inline berg that is attached via a cable to the keyboard lock connector. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use. This connector is keyed with a blank hole. Pin 1 on the motherboard is identified by the arrow on the white box around the berg.

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

J30 Turbo LED

J30 is a two-pin berg that is attached via a cable to the externally-mounted bipolar Turbo LED. The LED lights when the motherboard is running at high speed.

J8 IDE Activity Indicator LED

J8 is a two-pin berg that is attached via a cable to the externally-mounted IDE Activity LED. This LED lights when the IDE drive is running. Some IDE drives require a jumper change on the drive before they can generate the signal to this berg. See the specifications for the IDE drive that is being installed in the computer.

J32 Turbo Switch Connector

J32 is a two-pin single-inline berg that is attached via a cable to the externally-mounted bipolar Turbo switch on the chassis. The turbo switch allows the user to change the motherboard clock speed between high and low speeds.

Step 10 Connect Onboard I/O

Onboard Adapters

The Super Voyager VLB-II motherboard has two serial ports (J10 and J9) and a parallel port (J4) onboard. It also has an IDE (J7) and a floppy controller (J6).

The serial and parallel port connectors are described below. The IDE connector is described on page . The floppy connector is described on page .

Checking for Conflicts

AMIBIOS is designed to minimize conflicts between onboard and offboard I/O.

AMIBIOS automatically checks the adapter cards installed in the expansion slots on the Super Voyager VLB-II motherboard for a hard disk or floppy controller and serial or parallel ports.

J10 Serial Port 1 (COM1) and **J9 Serial Port 2 (COM2)**

J10 and J9 are 10-pin dual-inline bergs that connect via 10-pin double-row ribbons to male 9-pin D-sub connectors fastened to the chassis to provide an AT-compatible serial port interface. The serial port pinout is shown below. Be sure to properly connect the cables to the berg connectors. Pin 1 of each of the bergs is labeled "1". The wire leading to pin 1 on the cable usually has a colored stripe.

Pin	Use	Pin	Use
1	Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	GND	10	Key (N/C)

Attaching the Serial Port Cables

Two serial port cables are supplied with the motherboard. Attach the cables to J10 and J9 and to the external serial port connectors on the chassis as shown below.

J4 Parallel Port

J4 is a 26-pin dual-inline berg. The parallel port is bidirectional. A 26-pin double-row ribbon cable connects J4 and a female 25-pin D-sub connector on the chassis, as shown on the previous page. The J4 pinout is:

Pin	Use	Pin	Use
1	-STROBE	14	-AUTOFEED
2	PD0	15	-ERROR
3	PD1	16	-INIT
4	PD2	17	-SLCTIN
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	-ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	N/C

Attaching the Parallel Port Cable

A parallel port cable is supplied with the motherboard to connect the P3 to the external parallel port, as shown below.

Cutting Pins

Pins must be cut on the two serial sockets and the parallel socket as shown in the following graphic.

Step 11 Install Floppy Drive

J6 Floppy Disk Drive Connector

J6 is a 34-pin dual-inline berg. Connect the cable from the floppy drive to J6, as shown below. The onboard floppy controller cannot be used if a hard disk adapter card with floppy controller is installed.

The motherboard supports up to two 720 KB, 1.44 MB, or 2.88 MB 3½" drives and 360 KB and 1.2 MB 5¼" drives.

The connecting cable is a 34-pin ribbon connector with two 34-pin edge connectors for attaching the floppy disk drives. There should be a small twist in the cable between the floppy connectors. The last (end) connector should be connected to floppy drive A: as shown below.

J6 Floppy Connector Pinout

Pin	Use	Pin	Use
1	GND	2	RPM/LC
3	GND	4	N/C
5	GND	6	DRATE0
7	GND	8	-INDEX
9	GND	10	-MOTOR0
11	GND	12	-FDSEL1
13	GND	14	-FDSEL0
15	GND	16	-MOTOR1
17	GND	18	DIR
19	GND	20	-STEP
21	GND	22	-WDATA
23	GND	24	-WGATE
25	GND	26	-TRK0
27	GND	28	-WRPROT
29	GND	30	-RDATA
31	GND	32	HDSEL
33	GND	34	DSKCHNG

Twist in Floppy Cable

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

Step 12 Install Hard Disk

Attach IDE Cable to J7

J7 is a 40-pin dual-inline berg that connects an IDE hard disk drive to the onboard IDE Controller. Attach the 40-wire IDE ribbon cable to J7 as shown below.

When you use the onboard IDE controller in conjunction with another hard drive controller, you must make sure that there are no conflicts in IRQ and I/O port addresses. The onboard IDE uses IRQ14 and I/O port addresses 01F0h – 01F7h. If there is a conflict, the IDE interface can be disabled via PERIPHERAL MANAGEMENT SETUP (see page). The J7 pinout is:

Pin	Use	Pin	Use
1	-RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	KEY (N/C)
21	N/C	22	GND
23	-IOW	24	GND
25	-IOR	26	GND
27	IOCHRDY	28	ALE
29	N/C	30	GND

31	INT14	32	-IOCS16
33	HA1	34	N/C
35	HA0	36	HA2
37	-CS0	38	-CS1
39	-IDEACT	40	GND

Step 13 Install Adapter Cards

The Super Voyager VLB-II motherboard provides full compatibility with all IBM XT and AT-compatible adapter cards. It has seven ISA (AT-compatible) expansion slots and two VL-Bus expansion slots. The VL-Bus slots can accept ISA or XT adapter cards as well as VL-Bus cards.

The standard ISA expansion slots accept both 8-bit and 16-bit XT- and AT-compatible adapter cards.

VL-Bus Adapter Cards

Most of the VL-Bus adapter card connectors are AT-compatible, but VL-Bus connectors also have an additional set of connectors. The second set of connectors is a 112-pin MCA®-type connector inline with the standard ISA connectors. The following graphic shows the VL-Bus slots.

The following graphic illustrates a typical VL-Bus Adapter Card edge connector. The connector on the left is a 16-bit MCA card edge connector; the one on the right is a standard 16-bit ISA card connector.

8-Bit ISA Slot Pinout

Pin	Use	Pin	Use
A1	IOCHCK-	B1	GND
A2	SD07	B2	RSTDRV
A3	SD06	B3	+5V
A4	SD05	B4	IRQ9
A5	SD04	B5	-5V
A6	SD03	B6	DREQ2
A7	SD02	B7	-12V
A8	SD01	B8	OWS-
A9	SD00	B9	+12V
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	RESH-
A20	SA11	B20	SYSCLK
A21	SA10	B21	IRQ7
A22	SA09	B22	IRQ6
A23	SA08	B23	IRQ5
A24	SA07	B24	IRQ4
A25	SA06	B25	IRQ3

A26	SA05	B26	DACK2-
A27	SA04	B27	T/C
A28	SA03	B28	BALE
A29	SA02	B29	+5
A30	SA01	B30	OSC
A31	SA00	B31	GND

16-Bit ISA Extension Pinout

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

Pin	Use	Pin	Use
C1	SBHE-	D1	MEMCS16-
C2	LA23	D2	IOCS16-
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ15
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	+5V
C17	SD14	D17	MASTER-
C18	SD15	D18	GND

VL-Bus Pinout

The first two expansion slots are for VL-Bus adapter cards. VL-Bus slots include a 112-pin connector inline with the standard ISA connector.

VL-Bus Pinout, cont'd

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
A26	ADR22	B26	ADR23
A27	VCC	B27	ADR21
A28	ADR20	B28	ADR19
A29	ADR18	B29	GND
A30	ADR16	B30	ADR17
A31	ADR14	B31	ADR15
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	N/C	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	ADS#	B45	W/R#
A46	KEY	B46	KEY
A47	KEY	B47	KEY
A48	LRDY#	B48	RDYRTN#
A49	LDEV<>#	B49	GND
A50	LREEQ<>#	B50	IRQ9
A51	GND	B51	BRDY#
A52	LGNT<>#	B52	BLAST#
A53	VCC	B53	ID0
A54	ID2	B54	ID1
A55	ID3	B55	GND
A56	ID4	B56	LCLK
A57	LKEN#	B57	VCC

A58	LEADS#	B58	LBS16#

Step 14 Test and Configure

Review the following points before powering up:

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

Start the Test

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

BIOS Errors

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

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

Configure the System

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

Chapter 3

AMIBIOS Power-On Self Test

AMIBIOS provides all IBM-standard POST routines as well as enhanced AMIBIOS POST routines and CPU internal diagnostics. AMIBIOS POST codes can be accessed via the Manufacturing Test Port (I/O Port 80h). AMIBIOS POST checkpoint codes are described in the *ISA and EISA Hi-Flex AMIBIOS Technical Reference.*

POST Phases

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

- *System Test and Initialization* (test and initialize motherboards for normal operations), and
- *System Configuration Verification* (compare defined configuration with there hardware actually installed).

AMIBIOS Error Reporting

The AMIBIOS performs diagnostic when the system is powered up. Error s are reported in one of two ways:

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

Beep Codes

Errors may occur during POST (Power On Self Test), performed every time the system is powered on. Fatal errors are communicated through a series of audible beeps.

Beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity error in the first 64 KB of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB or Timer 1 on the motherboard is not functioning.
5	Processor error	The CPU (Central Processing Unit) on the motherboard has generated an error.
6	8042 - Gate A20 Failure	AMIBIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU on the motherboard generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in AMIBIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.

What to Do If the Computer Beeps

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...	memory error on the video adapter. Replace the video adapter, or the RAM on the video adapter.
9 times...	the BIOS ROM 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

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

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

Press <F1> to continue the boot process. The system does not halt if *Wait for <F1> If Any Error* in ADVANCED CMOS SETUP is *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	No response from drive C:. Run the Hard Disk Utility. Check the C: hard disk type in STANDARD CMOS SETUP.
C: Drive Failure	No response from drive C:. It may be necessary to replace the hard disk.
Cache Memory Bad, Do Not Enable Cache!	Cache memory on the motherboard is defective. Consult the cache memory manufacturer.
CH-2 Timer Error	Most AT motherboards include two timers. An error occurred with timer #2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. This message appears if the previous value is different from the current value. Run AMIBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run AMIBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by AMIBIOS. 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 the STANDARD CMOS SETUP to set the date and time in CMOS RAM.
D: Drive Error	No response from drive D:. Run the Hard Disk Utility. Check the D: hard disk type in STANDARD CMOS SETUP.
D: drive failure	No response from drive D:. It may be necessary to replace the hard disk.
Diskette Boot Failure	The boot diskette in floppy drive A: cannot be used to boot the system. Use another boot diskette and follow the screen instructions.
Display Switch Not Proper	Some systems require 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	AMIBIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	AMIBIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel #1 has failed POST.
INTR #2 Error	Interrupt channel #2 has failed POST.
Invalid Boot Diskette	AMIBIOS 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. Make sure a keyboard controller AMIBIOS is installed. Set the *Keyboard* option in STANDARD CMOS SETUP to *Not Installed* to skip the keyboard POST routines.
KB/Interface Error	Error in the keyboard connector on the motherboard.
No ROM BASIC	Cannot find a proper bootable sector on either diskette drive A: or hard disk drive C:. Use a bootable disk.
Off Board Parity Error	Parity error in offboard memory. The format is: `OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)` *XXXX* is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Onboard Parity Error	Parity error in motherboard memory. The format is: `Onboard PARITY ERROR ADDR (HEX) = (XXXX)` *XXXX* is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag to find and correct memory problems.

NMI Messages

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

AMIBIOS Configuration Summary Screen

The AMIBIOS displays the following screen when the POST routines are successfully completed.

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

Main Processor      :  80486DX2       Base Memory Size       :  640 KB
Numeric Coprocessor :  Present        Ext. Memory Size       :  7808 KB
Floppy Drive A:     :  1.2 MB ½       Hard Disk C: Type      :  Type 47
Floppy Drive B:     :  1.44 MB ¼      Hard Disk D: Type      :  Type 47
Display Type        :  VGA/PGA/EGA    Serial Port(s)         :  3F8, 3E8
AMIBIOS Date        :  11/11/92       Parallel Port(s)       :  378
```

80486DX(SX)-33MHz CPU

POST Memory Test

Normally, the only visible POST routine is the memory test. The screen that appears when the system is powered on is shown below.

```
AMIBIOS (C) 1993 American Megatrends Inc.
xxxxx KB OK

BIOS Release 82042193


Press <DEL> if you want to run SETUP









40-0100-004682-00111111-111192-AMIS82-H
```

The AMIBIOS Identification string appears in the left bottom corner of the screen. Press <Ins> during system boot to display two additional BIOS Identification strings. These strings contain system information. The AMIBIOS Identification String are described in the *ISA and EISA Hi-Flex AMIBIOS Technical Reference*.

When a problem occurs, freeze the screen by powering on the system and holding a key down, which causes a *Keyboard Error* message. Copy the BIOS Identification Strings and report this information to American Megatrends Technical Support. Press <F1> to continue.

Enable the *Wait for <F1> If any Error* option in ADVANCED CMOS SETUP before using this method to freeze the screen.

The following message is displayed after POST is completed:

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

Press <Del> to access AMIBIOS Setup.

Chapter 4

AMIBIOS Setup

BIOS features

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

Keyboard Speed Switching

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

Enable Cache Memory

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

AMIBIOS Setup Parts

AMIBIOS Setup has three parts:

- STANDARD CMOS SETUP,
- ADVANCED CMOS SETUP, and
- PERIPHERAL MANAGEMENT SETUP.

STANDARD CMOS SETUP

STANDARD CMOS SETUP permits you to configure and set system components such as floppy drives, hard disk drives, time and date, monitor type, and keyboard. STANDARD CMOS SETUP is described on pages through .

ADVANCED CMOS SETUP

ADVANCED CMOS SETUP allows you to configure more advanced parts of memory configuration, peripheral support, and password support. ADVANCED CMOS SETUP is discussed on pages through .

PERIPHERAL MANAGEMENT SETUP

PERIPHERAL MANAGEMENT SETUP configures the features of the SMC FDC37C665 Universal Peripheral Controller.

Section 1

Running AMIBIOS Setup

The system parameters (such as amount of memory, disk drives, video displays, and numeric coprocessors) is stored in CMOS RAM. When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains the system parameters. Every time the system is powered-on, it is configured with these values, unless CMOS RAM has been corrupted.

The system configuration parameters are set via AMIBIOS Setup. AMIBIOS Setup resides in the ROM BIOS (Read Only Memory Basic Input/Output System) and is available each time the computer is turned on.

Default System Parameters

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

Starting AMIBIOS Setup

As POST executes, the following appears:

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

Press <Del> to run AMIBIOS Setup.

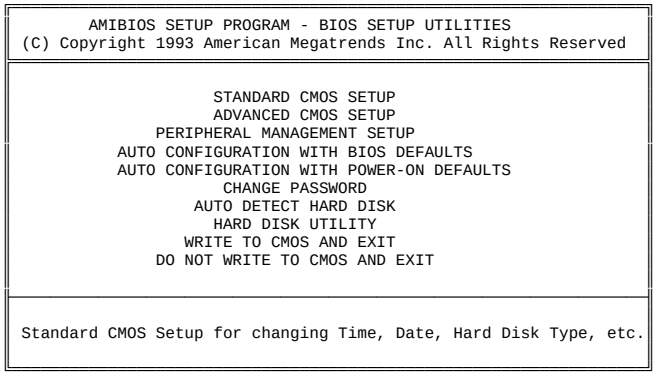
AMIBIOS Setup Key Use

Keystroke	Action
<Esc>	Returns to previous screen.
→, ←, ↑, and ↓	Move the cursor from one option to the next.
<PgUp> and <PgDn>; <Ctrl><PgUp> <Ctrl><PgDn>	Modify the default value of the options for the highlighted parameter. If there are fewer than 10 options, <Ctrl> <PgUp> and <Ctrl> <PgDn> operate like <PgUp> and <PgDn>. <Ctrl> can also be used to increment a setting.
<F1>	Displays Help.
<F2>	Change background colors.
<F3>	Change foreground colors.
<F5>	Restores the values resident when the current Setup session began. These values are taken from CMOS RAM if CMOS RAM was uncorrupted at the start of the session. Otherwise, AMIBIOS Setup default values are used.
<F6>	Loads all features in ADVANCED CMOS SETUP and PERIPHERAL MANAGEMENT SETUP with the BIOS Setup defaults.
<F7>	Loads all features in ADVANCED CMOS SETUP and PERIPHERAL MANAGEMENT SETUP with the Power-On defaults.
<F10>	Saves all changes made to Setup and continues the boot process.

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

AMIBIOS Setup Main Menu

The AMIBIOS Setup Main Menu is shown below.



The options on the Main Menu are explained on the following pages:

Main Menu Option	**turn to**
STANDARD CMOS SETUP	page
ADVANCED CMOS SETUP	page
PERIPHERAL MANAGEMENT SETUP	page
AUTO CONFIGURATION WITH BIOS DEFAULTS	page
AUTO CONFIGURATION WITH POWER ON DEFAULTS	page
CHANGE PASSWORD	page
AUTO DETECT HARD DISK	page
HARD DISK UTILITY	page
WRITE TO CMOS AND EXIT	page
DO NOT WRITE TO CMOS AND EXIT	page

Setup Default Values

AMIBIOS has default settings for all options. In STANDARD CMOS SETUP, default values are only loaded if CMOS RAM is corrupt. All STANDARD CMOS SETUP default settings are disabled (floppy, hard disk, monitor, keyboard). In all other type of Setup, both BIOS and Power-On defaults are provided for most options.

Loading the BIOS Setup Defaults

You can load the BIOS Setup defaults for the AMIBIOS Setup screen currently being displayed by pressing <F6>. The BIOS Setup default value are best-case values that should optimize system performance. If CMOS RAM is corrupted, the BIOS defaults are loaded automatically.

Loading the Power-On Defaults

You can load the Power-On defaults for the AMIBIOS Setup screen currently being displayed by pressing <F7>. Power-On default values are worst-case values for system performance, but are the most stable values. Use this option as a diagnostic aid if the system is behaving erratically.

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>. The following appears:

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

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 as follows:
If an IDE drive is found, 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.

Write to CMOS and Exit

The specified configurations settings are stored in CMOS RAM when this option is selected. A CMOS RAM checksum is calculated and written to CMOS RAM and control is passed to the system BIOS.

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

appears. Press *N* and <Enter> to return to the Main Menu. Press *Y* to save the system parameters and continue the boot process. AMIBIOS either reboots the system (if any new settings change the memory map) or continues to boot.

Do Not Write to CMOS RAM and Exit

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

Section 2

STANDARD CMOS SETUP

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

STANDARD CMOS SETUP Options

Date And Day Configuration

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

Time Configuration

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

Hard Disk Drive C:
Hard Disk Drive D:

Move the cursor to these fields via ↑ and ↓ and select the hard disk drive type by pressing <PgUp> and <PgDn>. *Not Installed* is used for diskless workstations and SCSI hard disks.

Type 47 is used for IDE drives and can be used for both hard disks C: and D:. If you select Type 47, you must enter the hard disk drive parameters (described below). The hard drive manufacturer should provide all necessary parameters.

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

	per track x 512 bytes per sector.

Hard Disk Drive Types

Type	Cylinders	Heads	Write Precompensation	Landing Zone	Sectors	Capacity
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	USER-DEFINED HARD DRIVE - Enter user-supplied parameters.					

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.

Floppy Drive A:
Floppy Drive B:

Move the cursor to these fields via ↑ and ↓ and select the floppy type via <PgUp> and <PgDn>. The settings are *360 KB 5¼ inch*, *1.2 MB 5¼ inch*, *720 KB 3½ inch*, *1.44 MB 3½ inch*, *2.88 MB 3½ inch,* or *Not Installed*. *Not Installed* is used for diskless workstations.

Monitor

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

Keyboard

Move the cursor to this field via ↑ and ↓ and select the monitor type via <PgUp> and <PgDn>. The settings are *Installed* or *Not Installed* (used for network file servers).

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 : Disabled | Adaptor  ROM Shadow C800,32K: Disabled
 Typematic Rate Delay (msec): 500      | Adaptor  ROM Shadow D000,32K: Disabled
 Typematic Rate (Chars/Sec) : 15       | Adaptor  ROM Shadow D800,32K: Disabled
 Mouse Support Option       : Disabled | Adaptor  ROM Shadow E000,32K: Disabled
 Above 1 MB Memory Test     : Disabled | Adaptor  ROM Shadow E800,32K: Disabled
 Memory Test Tick Sound     : Enabled  | System BIOS Cacheable       : Disabled
 Memory Parity Error Check  : Enabled  | Shadow RAM Write Protection : Enabled
 Hit <DEL> Message Display  : Disabled | BootSector Virus Protection : Disabled
 Hard Disk Type 47 RAM Area : 0:300    | External Cache Write Mode   : Wr-Back
 Wait For <F1> If Any Error : Enabled  | Non-Cacheable Block         : DRAM
 System Boot Up Num Lock    : On       | Non-Cacheable Block Size    : Disabled
 Floppy Drive Seek At Boot  : Enabled  | Non-Cacheable Block Base    : 512KB
 System Boot Up Sequence    : C:,A:    | 8/16 Bit I/O Recovery       : 4/2 CLK
 System Boot Up CPU Speed   : High     | Local Bus Ready Transparent : Disabled
 External Cache Memory      : Enabled  |
 Internal Cache Memory      : Enabled  |
 Password Checking Option   : Setup    |
 Video   ROM Shadow C000,32K: Enabled  |

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	*Disabled*	*Disabled*
Typematic Rate Delay	*500*	*500*
Typematic Rate	*15*	*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.* Onboard PS/2 mouse support is enabled through jumper J22 on the motherboard. If Pins 1-2 are shorted, the onboard PS/2 mouse is enabled. This is the factory setting. If Pins 2-3 of J22 are shorted, the onboard mouse 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 and 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.*

Hit <DEL> Message Display

Disabling this option prevents `Hit <DEL> if you want to run Setup` from appearing when the system boots. The settings are *Enabled* or *Disabled.*

Hard Disk Type 47 RAM Area

You can specify a user-defined hard disk type for drives C: and D: in STANDARD CMOS SETUP (see page). This option specifies the type 47 data storage area: *0:300h* in lower system RAM or the *top 1 KB* of applications memory (starting at 639K or 511K, depending on the amount of base memory). Type 47 data is stored in shadow RAM if shadowing is enabled. If shadow is disabled, the type 47 parameters are stored in RAM. The defaults are *0:300.*

ADVANCED CMOS SETUP Options, Continued

Wait for <F1> If Any Error

POST runs system diagnostic tests that can generate a message followed by:

```
Press <F1> to continue
```

If this option is enabled, AMIBIOS waits for you to press <F1> before continuing. If this option is disabled, AMIBIOS continues the boot process and does not wait for <F1> to be pressed. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Enabled.*

System Boot Up Num Lock

If Off, 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 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:.*

System Boot UP CPU Speed

This option sets the speed at which the system boots. The settings are *High* or *Low.*

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 for instructions on passwords.

Video ROM Shadow C000,32K

This option controls the shadowing and caching of the contents of shadowed Video ROM. ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. This option permits C0000h – C7FFFh to be shadowed from ROM to RAM for quicker execution. The settings are:

Setting	Description
Shadowed	The contents of video ROM are copied to RAM but cannot be stored in cache memory.
Disabled	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 D000,32K
Adaptor ROM Shadow D800,32K
Adaptor ROM Shadow E000,32K
Adaptor ROM Shadow E800,32K

These options control the shadowing of the contents of the adaptor ROM beginning at the specified addresses. ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. This option permits the memory segment beginning at the base address specified in the option name to be shadowed from ROM to RAM for quicker execution. The settings are Enabled or Disabled. The BIOS Setup and Power-On defaults are *Disabled* for all of these options.

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 default is *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.*

External Cache Write Mode

This option selects the type of caching algorithm used by cache memory. The settings are *Wr-Back* (use a write-back caching algorithm) or *Wr-Thru* (write-through caching algorithm). The BIOS Setup default is *Wr-Back.* The Power-On default is *Wr-Thru.*

Non-Cacheable Block

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 *ATBus* (DRAM is disabled and the AT bus is used). The BIOS Setup and Power-On Defaults are *DRAM.*

Non-Cacheable Block Size

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

Non-Cacheable Block Base

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 Block Size** option or an increment of the **Non-Cacheable Block Size** setting. If the **Non-Cacheable Block Size** is less than 1 MB, the **Non-Cacheable Block Base** setting can only be *512KB.* The BIOS Setup and Power-On default is *512KB.*

8/16 Bit I/O Recovery Time

This option sets a delay between consecutive I/O operations. The first number in the setting is for 8-bit I/O. The second number is for 16-bit I/O. The settings are related to the system frequency as shown in the following table:

Setting	Frequency
4/2	20 MHz
4/2	33 MHz
7/3	50 MHz
11/5	66 MHz

The settings are *16/8 CLK, 11/5 CLK, 7/3 CLK,* or *4/2 CLK.* The BIOS Setup default is *4/2 CLK.* The Power-On default is *16/8 CLK.*

Local Bus Ready Transparent

If this option is enabled, the LRDY signal from the local bus is passed to the CPU with a gate delay of 10 ns. The settings are *Enabled* (LRDY from the VL-Bus slave is passed to the CPU with a gate delay of 10 ns) or *Disabled* (LRDY from the VL-Bus slave is clocked and passed to the CPU). The BIOS Setup and Power-On defaults are *Disabled*.

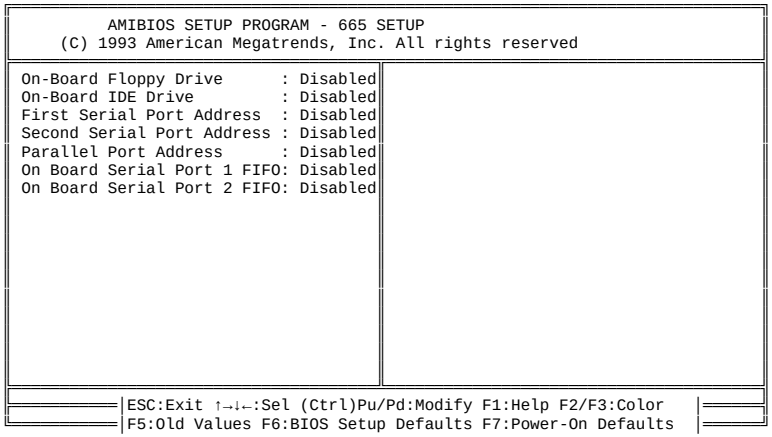
Warning

Some VL-Bus Adapter Cards may not work properly if *Enabled* is selected for this option.

Section 4

PERIPHERAL SETUP

The PERIPHERAL SETUP screen is shown below. This type of Setup manages the SMC FDC37C665 Universal Peripheral Controller.



PERIPHERAL SETUP Options

On-Board Floppy Drive

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

On-Board IDE Drive

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

First Serial Port Address

This option enables serial port 1 on the motherboard and sets the serial port 1 base I/O port address. The BIOS Setup and Power-On defaults are *Disabled.* The settings are *Disabled, 3F8,* or *3E8.* J21 on the motherboard controls the serial port 1 IRQ. If Pins 1-2 of J21 are shorted, IRQ3 is used for serial port 1. If Pins 2-3 of J21 are shorted, IRQ4 is used for serial port 1 (this is the default setting).

Second Serial Port Address

This option enables serial port 2 on the motherboard and sets the serial port 2 base I/O port address. The BIOS Setup and Power-On defaults are *Disabled.* The settings are *Disabled, 2F8,* or *2E8.* J20 on the motherboard controls the serial port 2 IRQ. If Pins 1-2 of J20 are shorted, IRQ3 is used for serial port 2 (this is the default setting). If Pins 2-3 of J20 are shorted, IRQ4 is used for serial port 2.

Parallel Port Address

This option enables the parallel port on the motherboard and sets the base I/O port address of the parallel port. The settings are *Disabled, 378,* or *278.* The BIOS Setup and Power-On defaults are *Disabled.* J13 on the motherboard controls the parallel port IRQ. If J13 pins 1-2 are shorted, IRQ5 is used for the parallel port (the default setting). If J13 pins 2-3 are shorted, IRQ7 is used for the parallel port.

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) 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 AMIBIOS Setup Main Menu. The password is stored in CMOS RAM after AMIBIOS Setup completes. The next time the system boots, you are prompted for the password if the password function is present and is enabled.

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must replace the CMOS RAM/Real Time Clock chip and then run AMIBIOS Setup to 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
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page
Media Analysis	Analyzes each hard disk drive track to determine whether it is usable. The track is labeled bad if unusable.	Page 55

The hard disk utility error messages are described on page .

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.

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.

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.
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.
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.

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

Upgrading Cache Memory

Cache memory American Megatrends Super Voyager VLB-II motherboard can be upgraded from 64 KB to 256 KB. Eight 32 KB x 8 15 ns SRAMs are required.

Recommended Parts

Manufacturers of the 32 KB x 8 15 ns SRAMs are:

Manufacturer	Part Number
Paradigm	PDM41256SA15P
Samsung	KM68257BP-15
Motorola	MCM6206CP15

How to Upgrade Cache Memory

Step	Action
1	Turn the system off. If the motherboard is already installed in a computer case, remove the cover and expose the motherboard.
2	Make sure you are properly grounded to prevent electrostatic discharge.
3	Remove the 8 KB x 8 SRAMs located in sockets U7, U8, U10, U11, U17, U18, U19, and U20. See the motherboard graphic on the following page for the locations of these sockets.
4	Install the new 32 KB x 8 SRAM in sockets U7, U8, U10, U11, U17, U18, U19, and U20. Make sure that Pin 1 of the socket matches Pin 1 of the SRAM.

5	Turn all switches on SW1 ON.

Turn system power on. The system should report 256 KB of cache memory now. If it does not, repeat the cache memory installation procedure.

Appendix B

Heat and Power Consumption

Temperature Ranges

The following values are ambient temperatures inside the computer case. The board temperatures reflect the 80486 CPU Heat dissipation requirements because it will be 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 66 MHz	YES	200 feet per minute	Not critical	0 ° through 50 ° C.

Humidity

The recommended humidity range for operation of the American Megatrends Super Voyager VLB-II motherboard is 20% to 80% non-condensing.

The American Megatrends Super Voyager VLB-II motherboard requires +5V and 7A. The +12V supply current to the ISA Bus is limited by the power connector.

Power Supply Requirements

The Super Voyager VLB-II ISA motherboard requires +5V, -5V, +12V, -12V, and about 44 Amps maximum.

Power Consumption

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

Each ISA expansion slot is gated at 3.0 Amps maximum. Each VL-Bus expansion slot is gated at 4.5 Amps maximum. There are six ISA-only expansion slots and two VL-Bus slots, so the total maximum power consumption for the expansion slots is 27 Amps. The total maximum power consumption is 35 Amps at +5V with a 220 Watt power supply.

Power Source

Two power connectors (P1 and P2) are provided on the Super Voyager VLB-II motherboard.

Conclusion

The minimum rating of the power supply should be 220 Watts for a fully loaded motherboard, including a 12V power source.

Appendix C

Flash EPROM Support

The Super Voyager VLB-II 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 Super Voyager VLB-II motherboard that you received has a Flash EPROM.*

Flash Programming

The version of the American Megatrends Super Voyager VLB-II 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 Super Voyager VLB-II 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 Super Voyager VLB-II 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 S82P.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.

S82P.ROM

S82P.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 82 Super Voyager VLB-II motherboard must be updated.

S82P.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 S82P.ROM.

Programming the Flash EPROM

Step	Action
1	Turn system power off.
2	Place the floppy disk that has the latest S82P.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 S82P.ROM on the floppy disk.	S82P.ROM must be in the root directory of the floppy disk in drive A:. There is 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. No 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 been 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), or to signal an error. Error beeps are arranged in a coded sequence and have different meanings depending on when they occur:

Step	Beeps	Description
—	None	Successful completion.
1	Continuous single beep	No floppy disk in Drive A:.
2	Five beeps	S82P.ROM is not 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	Intel i28F001BX-T Flash EPROM 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 S82P.ROM file in the floppy disk root directory.
E6h	The S82P.ROM file not present in the floppy disk root directory.
E7h	Begin reading the File Allocation Table.
E8h	Begin reading S82P.ROM, sector by sector.

E9h	S82P.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

```
S82P.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.

Enter the filename with which Flash EPROM will be reprogrammed (S82P.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.

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.
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.

Index

Index, Continued

Index, Continued

Index, Continued

Index, Continued