

American Megatrends, Inc.
Series 50 Super Voyager
80486 Motherboard
User's Guide

MAN-650
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Preface

To the OEM, VAR, or System Integrator

Thank you for purchasing the high performance Series 50 Super Voyager AT-compatible motherboard from American Megatrends. It is assumed that you have also licensed the rights to use the American Megatrends technical documentation for the Super Voyager. This manual was written for American Megatrends customers who are system integrators, VARs, or OEMs to assist in the proper installation and operation of the Super Voyager motherboard. This manual is not meant to be read by the computer owner who purchases a computer with the Super Voyager 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 a Super Voyager motherboard fails to operate as described or you are in doubt about a configuration option, please call technical support at 404-246-8600.

Acknowledgments

This manual was written by Vivek Saxena, Uma S. Mondal, Paul Narushoff, and Robert Cheng.

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 on the BBS.

Data Transmission Rates

The BBS automatically handles modems with data transmission rates from 1,200 to 14,400 bps.

If using an HST modem, call 404-246-8780.

If using a non-HST modem, call 404-246-8782.

BBS Phone Numbers

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

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

Chapter 1

Introduction

The American Megatrends Series 50 80486 Super Voyager is an AT®-compatible motherboard, approximately 8.55 inches wide by 13 inches in length, the approximate size of a standard baby AT motherboard. The mounting hole locations allow it to be used in a baby AT chassis. The height of the board components is no more than 1½ inches, but you should allow 2 inches of clearance for the power supply connectors. See the following graphic for more information on height requirements.

Specifications

Microprocessor

The Super Voyager has either an Intel® 80486DX processor operating at 25, 33, or 50 MHz, an Intel 80486DX2 operating at 25 (50 MHz internally) or 33 (66 MHz internally) MHz, or an Intel 80486SX or P23T processor operating at 20 or 25 MHz.

Heat Sink for 50 and 66 MHz CPUs

The Series 50 Super Voyager motherboard has a heat sink for all motherboards equipped with an Intel 80486DX 50 or 66 MHz processor to help dissipate heat. See Appendix B on page for additional information about heat dissipation.

Processor Speeds

The microprocessor has two clock speeds, high and low. High speed is set at time of manufacture to the processor speed (20, 25, 33, or 50 MHz). Low speed is simulated by turning off the external and internal cache. The clock speeds can be changed via the <Ctrl> <Alt> <+> and <Ctrl> <Alt> <-> keychords. The keychords can be changed via AMIBCP.

Cache Memory

The external cache memory size can be either 64 KB or 256 KB. 32 MB of system memory can be cached if 256 KB of cache memory is installed. 16 MB of system RAM can be cached if 64 KB of cache memory is available. There are 0 wait states for cache memory read and write at 20, 25, or 33 MHz and 1 wait state for both read and write at 50 MHz. Burst mode is supported for caching.

Specifications, Continued

SRAM Type

50 MHz Super Voyager motherboards use 15 ns SRAM DIPs for cache memory. 20, 25, or 33 MHz Super Voyager motherboards use 20 ns SRAM DIPs.

Built-in Battery

The Super Voyager motherboard has a built-in rechargeable 3.6 volt NiCad battery.

Main Memory

The Super Voyager supports up to 32 MB via two banks of 4 MB x 9 SIMMs on the motherboard. 256 KB x 9 or 1 MB x 9 SIMMs can also be used. Each bank consists of 4 SIMM slots.

33 and 50 MHz Super Voyagers use 70 ns SIMMs. 20 and 25 MHz Super Voyagers use 80 ns SIMMs.

ROM

The Super Voyager has 64 KB of Read Only Memory (ROM) used for the system BIOS at F0000h.

Shadow RAM

The Super Voyager system BIOS is always shadowed from ROM to RAM. You can select video BIOS shadowing through AMIBIOS Setup.

Onboard I/O

The Super Voyager has an IDE controller, floppy controller, two serial ports, and one parallel port on the motherboard.

Specifications, Continued

System BIOS

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

CMOS RAM

The Super Voyager has 128 bytes of CMOS RAM to store system configuration data. CMOS RAM is backed by a rechargeable onboard battery.

Math Coprocessor

Super Voyagers equipped with an 80486SX support an optional Intel 80487SX math coprocessor.

Expansion Slots

The Super Voyager has seven 16-bit AT -compatible expansion slots and one 8-bit expansion slot.

Specifications, Continued

System Support Functions

The Super Voyager supports all standard ISA functions and some nonstandard functions:

- seven Direct Memory Access (DMA) channels:
Channels 0 - 3 are used for 8-bit data transfer;
Channels 5 - 7 are used for 16-bit data transfers.
- sixteen interrupt levels:
eleven levels of interrupt are supported, including:
IRQ3-IRQ7, IRQ9-IRQ12, IRQ14, and IRQ15.
- three programmable timers, and a
- system clock.
- ability to access 32-, 16-, and 8-bit memory devices
and 16- and 8-bit I/O devices.
- standard ISA I/O port addresses: 0100h through
03FFh.
- 24-bit memory addresses that can access 16 MB of
memory address space.
- uses an *I/O channel check* to generate NMIs.
- supports I/O wait state generation.
- has an open bus structure that permits multiple
microprocessors to share system resources, including system
memory.
- the bus operates at:
 - 8.00 MHz for 20 MHz motherboards,
 - 8.25 MHz for 33 MHz motherboards, and
 - 8.33 MHz for 25 or 50 MHz motherboards.
- permits system memory refresh from channel
microprocessors.

Specifications, Continued

Real Time Clock

The Super Voyager has a standard crystal-controlled AT-type real time clock. The real time clock is powered by a rechargeable onboard battery.

Keyboard

The Super Voyager has a standard five-pin DIN connector for an AT-compatible keyboard. The Super Voyager also has a keyboard lock function to prevent unauthorized access to the system.

Upgrade Socket

The Super Voyager motherboard has a 169-pin LIF socket designed for an 80487SX (if an 80486SX is used on the motherboard) or future Intel upgradable processor, such as the Intel P23T.

CPU Socket

The Super Voyager has a 168-pin PGA socket designed to be occupied by an Intel 80486DX, 80486SX, or 80486DX2 microprocessor.

Speaker

The Super Voyager has an attachment for an audio speaker.

Chapter 2

Installation

Unpacking

Step	Action
1	<p data-bbox="578 699 1128 758">Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 404-246-8600.</p> <p data-bbox="578 783 1062 814">Leave the motherboard in its original packing.</p>
2	<p data-bbox="578 825 1136 1073">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.</p>
3	<p data-bbox="578 1089 1136 1220">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. Save the original packing material in case of reshipment.</p>
4	<p data-bbox="578 1241 1092 1295">Place the motherboard on a grounded anti-static surface component-side up.</p>
5	<p data-bbox="578 1310 1117 1365">Inspect the motherboard for damage. Do not apply power to the motherboard if damaged.</p>
6	<p data-bbox="578 1379 1117 1434">Press down on all ICs mounted in sockets to verify proper seating.</p>
7	<p data-bbox="578 1449 1109 1503">If the motherboard is undamaged, it is ready to be installed.</p>

Series 50 Motherboard Layout

Installation Steps

The steps for assembling a system with a Super Voyager motherboard are shown below. Each step is discussed in detail in the following pages.

Step	Action	Turn to
1	Set switch and jumper options.	Page
2	Install memory.	Page
3	Install math coprocessor or Upgradable Processor.	Page
4	Install motherboard.	Page
5	Connect the power supply.	Page
6	Connect the keyboard.	Page
7	Connect cables.	Page
8	Install floppy drive.	Page
9	Install hard disk drive.	Page
10	Install adapter cards.	Page
11	Perform initial test and configuration.	Page

Standoffs and mounting screws are not supplied with the 80486 Super Voyager motherboard. These should be supplied with the chassis.

Step 1 Set Switch and Jumper Options

Set all user-configurable jumpers and switches before installing the motherboard. The Series 50 Super Voyager has two switches and seven jumpers:

SW1	Cache Memory Size Select
SW2	DIAG and Display
J12	Processor Type
J13	Serial Port 1 IRQ
J14	Serial Port 2 IRQ
J17	Clock Select
J23	Power Good Signal Select
J24	Parallel Port IRQ

J33 CMOS Drain

Step 1 Set Switch and Jumper Options, Continued

SW1 Cache Select

SW1 is a four-position two-bit DIP switch. See the graphic on page for the location of SW1. If all four switches are OFF, 64 KB of cache memory is configured. 256 KB cache memory is configured if all switches are ON.

SW2 Diagnostics and Color

SW2 consist of two switches. The diagnostic switch is used for manufacturing diagnostics and should not be changed. The motherboard is shipped with this switch OFF. The switch should remain OFF.

The COL/MONO switch sets the type of video adapter card. This switch has no effect if an EGA or VGA adapter is used. This switch is factory-set to OFF for a monochrome display adapter. Set ON for a color graphics adapter (CGA).

J13 Serial Port 1 Select

J13 is a three-pin single-inline berg. Short pins 2-3 to select IRQ4 for serial port 1 (this is the default setting). Short pins 1-2 to select IRQ3 for serial port 1.

Step 1 Set Switch and Jumper Options, Continued

J14 Serial Port 2 IRQ Select

J14 is a three-pin single-inline berg. Short pins 2-3 to select IRQ3 for serial port 2 (this the default setting). Short pins 1-2 to select IRQ4 for serial port 2.

J24 Parallel Port IRQ Select

J24 is a three-pin single-inline berg. Short pins 1-2 to select IRQ5 for the parallel port. Short pins 2-3 to select IRQ7 for the parallel port (this is the default value).

Step 1 Set Switch and Jumper Options, Continued

J12 Select Processor Type

J12 is a four-pin single-inline berg that selects the processor type. Pins 1-2 and 3-4 are shorted if the Super Voyager motherboard has an 80486DX or 80486DX2 microprocessor. Pins 2-3 are shorted if the motherboard has an 80486SX processor. See the following graphic.

J17 Clock Select

J17 is a three-pin single-inline berg. Pins 1-2 are shorted if this Super Voyager has a 25, 33, or 50 MHz processor. Pins 2-3 are shorted if it has a 20 MHz processor. See the following graphic.

Step 1 Set Switch and Jumper Options, Continued

J23 POWERGOOD Signal Source

J23 is a three-pin berg. Pins 1-2 are shorted if the Internal POWERGOOD signal is used. Pins 2-3 are shorted if an External POWERGOOD Signal is used.

J33 CMOS RAM Drain

J33 is a three-pin single-inline berg. In normal operation, pins 1-2 are shorted. Short pins 2-3 to drain power from CMOS RAM.

If you forget the system password, you must remove the battery to drain CMOS RAM for at least 20 minutes to erase the current password. J33 provides a quicker method. By shorting pins 2-3 of J33, you can quickly drain CMOS RAM power. Then you must run AMIBIOS Setup to reconfigure the system.

Step 2 Install Memory

The main memory subsystem on the Super Voyager motherboard consists of two 32-bit memory banks of four SIMM sockets each. Both banks house SIMM (Single In-line Memory Module) DRAM packages.

The SIMM banks accept 256 KB x 9, 1 MB x 9, or 4 MB x 9 bit SIMMs in the combinations shown in the following table. Do not mix SIMM types in the same SIMM bank. If used, SIMM banks must be completely filled, no matter which type of SIMMs are used.

Bank0	Bank1	Total RAM
256 KB x 9	None	1 MB
256 KB x 9	256 KB x 9	2 MB
1 MB x 9	None	4 MB
1 MB x 9	1 MB x 9	8 MB
4 MB x 9	None	16 MB
4 MB x 9	4 MB x 9	32 MB

Memory Features

If both SIMM banks are filled, all memory is interleaved. Fast page access is supported. Burst support is provided. Hidden refresh is supported.

Memory Configuration

The 80486 Super Voyager supports 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB memory configurations on the motherboard using SIMMs. The memory configuration is automatically detected by the Super Voyager.

Step 2 Install Memory, Continued

Reporting Memory

The system memory configuration is reported by AMIBIOS as it boots and again in the BIOS System Configuration Screen displayed when the BIOS boots DOS.

If the system has up to 8 MB of RAM, the memory shown by the BIOS is 128 KB less than the total amount of memory installed because parts of the memory between 640K and 1 MB are used for system and video BIOS shadowing.

If the system has 16 MB of RAM or more, the memory shown by the BIOS is 384 KB less than the total amount of memory installed.

SIMM Part Numbers

Memory Type	Manufacturer	Part Number
256 K x 9	Siemens®	HYB514256AJ-70
1 MB x 9	Fujitsu®	MB85235-70
	Toshiba®	THM91070AS-70 THM91000AS-70
	Motorola®	MCM91000S-70 MCM91430S-70
	Oki®	MSC2312A-704S9
	NEC®	MC-42100A9-70
	Samsung®	KMM591000AN-7
	Siemens	HYM910005-70
4 MB x 9	Motorola	MCM94000A-70
	Samsung	KMM594000A-70
	Oki	MSC2340-70459

Step 2 Install Memory, Continued

Installing SIMMs

Bank 0 and Bank 1 have four SIMM sockets each. These sockets can be filled with 256 KB x 9, 1 MB x 9, or 4 MB x 9 SIMMs.

Use only one type of module to fill each bank.

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

Step 3 Install Math Coprocessor or Upgradable Processor

For Use Only with 80487SX Math Coprocessor

The only math coprocessor that can be used on the Super Voyager motherboard is an Intel 80487SX. And it can be used only if the processor on the Super Voyager is an Intel 80486SX. It is installed in U33, the Intel Upgradable Processor socket. Make sure the 80487SX coprocessor speed is the same as the 80486SX speed (20 or 25 MHz).

Step 3 Install Math Coprocessor, Continued

Installing the Upgrade Processor or 80487SX

U33 is the empty 169-pin PGA socket between the cache memory and the microprocessor. Either an Intel Overdrive® Upgrade Processor or an optional 80487SX can be installed. The 80487SX can only be installed if the installed CPU is an 80486SX.

Pin 1 of the socket is on a chamfered corner that corresponds to pin 1 of the 80487SX, also on a chamfered corner. Check for bent pins on the 80487SX. Gently straighten any bent pins with a pair of pliers. Install the component in the socket. Align the pins and press the 80487SX firmly in the socket, making sure that pin 1 is aligned with pin 1 on U33. See the following figure.

Step 3 Install Math Coprocessor, Continued

Test for Math Coprocessor

The BIOS System Configuration screen shown at boot up indicates if a math coprocessor is configured. If the coprocessor is shown as Absent, reinstall the coprocessor, as follows.

Step	Action
1	Turn the power off.
2	Check the coprocessor orientation.
3	Press the chip firmly to make sure that it is properly inserted.
4	Visually inspect the coprocessor to make certain that all pins are connected.
5	Power the system up again. Call Technical Support at 404-246-8600 if still not configured.

Upgradeable Processor

U33 can also be used to install a 169-pin Intel Overdrive Upgrade Processor, such as an Intel P23T. The installation process is the same as installing an Intel 80487SX.

Step 4 Install the Motherboard

The Super Voyager motherboard has the same mounting hole pattern as any baby AT motherboard. See the following graphic.

Step 4 Install the Motherboard, Continued

Perform the following steps to install the Super Voyager motherboard in a computer chassis. Refer to the graphic on the preceding page.

Step	Action
1	Make sure you are wearing an antistatic wristband. Place the chassis for the Super Voyager motherboard on an anti-static mat.
2	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.
3	Rotate the chassis so that the front is to the right, and the rear is to the left. The side facing you is where the motherboard is mounted. The power supply is mounted near the back end of the chassis. See the graphic on the preceding page.
4	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place.
5	Find the slots provided for the standoffs on the chassis. Hold the Super Voyager motherboard, component-side up, with the edge with three standoffs toward you, and the edge with the power supply connector away from you. The edge connectors for the adapter cards should be on the left.
6	Carefully slide the motherboard into the chassis. Make certain that the standoffs fit the slots provided for them. If the standoffs are properly locked, the motherboard should not slide. It should also rest level with the chassis. The far edge should fit the slots in the plastic clips.
7	Place the two mounting screws in the holes provided for them and tighten them. If necessary, shift the motherboard slightly to align the mounting holes on the motherboard with the holes on the chassis. Refer to the Super Voyager graphic shown on page .

Standoffs and mounting screws are not supplied with the 80486 Super Voyager motherboard. These should be supplied with the chassis.

Step 5 Connect the Power Supply

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

Before attaching all components, make sure that the proper voltage is selected. Power supplies often can run on a wide range of voltages, but must be set (usually with a switch) to the proper range. Use at least a 200 watt power supply. It should have built-in filters to suppress radiated emissions.

AT-compatible power supplies have two six-pin connectors that are inserted in P2 and P3. The six-pin connector with 3 red wires and 2 black wires is connected to P3 and the connector with the Orange Line 1 is connected to P2.

Step 5 Connect the Power Supply, Continued

The connectors should be keyed to prevent connecting the plugs to the wrong connectors. The keys on the connector must be cut to fit on some power supplies. See the following graphic.

Step 6 Connect the Keyboard

The keyboard connector is a five-pin DIN socket (see the graphic below) and is labeled KEYBRD and J3 on the motherboard. It accepts a standard AT-compatible keyboard.

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

Step 7 Connect Cables

When connecting chassis connectors to the motherboard, make sure you attach the correct end.

Most connector wires are color-coded. Match the color of the wires leaving pin 1 on the switch or LED to pin 1 on the connector end.

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

Pin 1 of all connectors is labeled on the graphic on page as well as on the Super Voyager motherboard to identify the pin orientation when plugging in cables.

Summary of Connectors

The following cables should be connected to the motherboard from the chassis:

- Reset Switch cable to J22,
- Speaker cable to J15,
- Keyboard Lock cable to J18,
- Turbo LED cable to J16,
- Turbo switch cable to J21,
- Cable to IDE hard disk drive activity LED to J2,
- External Battery Connector to J1,
- Serial Port connectors to P1 and P4,
- Parallel Port connector to P5,
- Floppy disk controller connector to P6, and
- IDE Controller connector to P7.

Step 7 Connect Cables, Continued

J22 Reset Switch Connector

J22 is a two-pin single-inline berg attached via a two-wire cable to the externally-mounted Reset switch. A hard reset is done when the Reset switch is pressed. Pin 1 is ground and Pin 2 is Hard Reset. See the following illustration.

J15 Speaker Cable

J15 is a 4 pin single-in-line berg that is attached via a four-wire cable to the system speaker. AMIBIOS signals hardware problems through the speaker. Pin 1 on the motherboard is labeled by a plus (+).

Pin	Description
1	VCC
2	Key
3	Ground
4	Data Out

Step 7 Connect Cables, Continued

J18 Keyboard Lock Connector

J18 is a five-pin single-inline berg that attached via a five-pin cable to the keyboard lock. The keyboard lock allows you to lock the keyboard, protecting the system from unauthorized use. This connector is keyed with a blank hole. Pin 1 on the motherboard is labeled with a plus (+) sign. The connector and the J18 pinout is shown below.

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

J16 Turbo LED

J16 is a two-pin berg that connects to the Turbo LED via a cable. The LED lights when the board is running at high speed. Connect the Turbo LED to J16 as shown below.

Step 7 Connect Cables, Continued

J21 Turbo Switch

J21 is a two-pin berg that connects to the Turbo switch mounted on the chassis via a cable, as shown below. The Turbo switch is bipolar. You can select Low or High speed by pressing the Turbo switch.

J2 IDE Activity Indicator LED

J2 is a two-pin single-inline berg. Connect a two-wire cable from the hard disk LED activity light to J2.

Step 7 Connect Cables, Continued

J1 External Battery Connector

The Super Voyager has a built-in rechargeable battery on the motherboard and does not need an external battery. However, an external battery can be used with the Super Voyager. Connect the external battery to J1.

If you connect an external battery to J1, the built-in battery on the motherboard is automatically electrically isolated.

J1 is a four-pin berg that connects to a 6-volt external battery. The positive (+) terminal, indicated by a red wire, connects to the pin labeled +. The J1 pinout is:

Pin	Description
1	6 Volt DC
2	Not used
3	Not used
4	Ground

Step 7 Connect Cables, Continued

Connecting to Onboard I/O

The Super Voyager has two serial ports (P1 and P4), a parallel port (P5), a floppy controller (P6), and an IDE controller (P7) on the motherboard. Pin 1 of these bergs is marked with a 1. Pin 1 of the corresponding cable is usually identified by a colored stripe.

P1 and P4 Serial Port Connectors

P1 and P4 are 10-pin dual-inline bergs, as shown below. P1 is serial port 1 and P4 is serial port 2.

P1 and P4 connect a serial port receptacle on the chassis to the motherboard. The serial ports are National Semiconductor 16450-compatible. These connectors provide an AT-compatible serial port interface. The connecting cable is a 10-pin double-row ribbon that connects the motherboard to a male 9-pin D-sub connector fastened to the chassis. The serial port pinout is shown below.

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)

Step 7 Connect Cables, Continued

Cutting the Pins

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

A close-up view of the 10-pin serial connector is illustrated below.

Step 7 Connect Cables, Continued

P5 Parallel Port for Printer

P5 is a 26 pin dual-inline berg, illustrated below. A 26-pin double-row ribbon cable connects P5 on the motherboard and a female 25-pin D-sub connector on the chassis. The P5 pinout:

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

Step 8 Install Floppy Drive

P6 Floppy Disk Drive Connector

P6 is a 34-pin dual-inline berg. Connect the cable from the floppy drive to P6 as shown below. The onboard floppy controller cannot be used if a hard disk adapter card with a floppy controller is installed.

The Super Voyager supports up to two floppy disk drives, both connected to the interface. Any combination of 720 KB 3½", 1.44 MB 3½", 360 KB 5¼", or 1.2 MB 5¼" drives are supported. The connecting cable is a 34-pin ribbon connector with two 34-pin edge connectors connected to the floppy disk drives. There should be a small twist in the cable between the floppy connectors, and the last (end) connector should be connected to the Drive A: floppy, as shown below.

Step 8 Install Floppy Drive, Continued

Floppy Pinout

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

Twist in Floppy Cable

| Floppy B to Floppy A |
|----------------------|----------------------|----------------------|----------------------|
| 10 to 16 | 12 to 14 | 14 to 12 | 16 to 10 |
| 11 to 15 | 13 to 13 | 15 to 11 | N/C |

Step 9 Install Hard Disk

P7 IDE Hard Disk Connector

P7 is a 40-pin dual-inline berg. Connect the cable from the IDE hard disk to P7. Disable the onboard IDE interface to use

an ISA bus ESDI, RLL, ARLL, or MFM controller. The P7 pinout is shown on the following page.

Step 9 Install Hard Disk, Continued

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	N/C	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 10 Install Adapter Cards

The Super Voyager has seven 16-bit AT-compatible expansion slots and one 8-bit XT-compatible slot.

Avoiding Resource Conflicts

The AMIBIOS tries to avoid resource conflicts among I/O device as follows:

If it finds...	then...
----------------	---------

a hard disk controller,	the onboard IDE controller is disabled unless otherwise configured in ADVANCED CHIPSET SETUP (see page).
a floppy disk controller,	the onboard floppy controller is disabled unless otherwise configured in ADVANCED CHIPSET SETUP (see page).
a serial or parallel port controller,	the onboard serial or parallel port, respectively, is disabled unless configured in ADVANCED CHIPSET SETUP (see pages -).

Step 10 Install Adapter Cards, Continued

16-Bit Adapter Card Pinout

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

Step 10 Install Adapter Cards, Continued

16-Bit Adapter Card Pinout, cont'd

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

Step 11 Perform Initial Test and Configuration

Before powering up the system to perform the initial test, review the following checklist:

- ✓ make sure that all adapter cards are seated properly,
- ✓ make sure all connectors are properly seated,
- ✓ if a math coprocessor or Upgradable 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.

Step 11 Initial Test and Configuration, Continued

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 at 404-246-8600 if there are problems.

AMIBIOS Errors

If the system operates normally, a memory display should appear on the monitor. AMIBIOS Power On Self Test (POST) should run. POST beeps or displays error messages is unsuccessful.

Configure the System

Run AMIBIOS Setup to configure the system. The system then resets, runs POST, and boots the operating system. See page for a description of AMIBIOS STANDARD CMOS SETUP configuration options (hard disk drive, floppy, monitor, and so on).

In Case of Errors

If the system beeps during POST (power on self test), a serious problem exists with the system configuration or hardware. The beeps are part of a Beep Code (see page) that indicates a bad component.

If AMIBIOS is able to initialize the system video monitor, messages are displayed on the screen. These messages are described on page . Recheck the system configuration or the connections to assure that the installation procedures were followed.

Chapter 3

BIOS Power-On Self Test

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

POST Phases

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

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

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

BIOS Error Reporting

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

Beep Codes

Fatal errors, listed below, are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal. Fatal errors halt the boot process. In most cases, displayed errors allow the system to continue. AMIBIOS displayed errors are described on page .

Beeps	Error message	Description
1	Refresh Failure	Memory refresh circuitry 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	Bad memory in the first 64 KB of memory or Timer 1 is not functioning.
5	Processor error	The CPU generated an error.
6	8042 - Gate A20 Failure	Cannot switch the CPU to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or has bad VRAM.
9	ROM Checksum Error	The ROM checksum does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.
11	Cache memory bad — do not enable cache	The cache memory test failed. Cache memory is disabled.

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.
8 times...	RAM error on the video adapter. Replace the video adapter or the RAM on the video adapter.
9 times...	the BIOS chip is bad. The system probably needs a new BIOS ROM chip.
11 times...	reseat the cache memory on the motherboard. If it still beeps, replace the cache memory.
4, 5, 7, or 10 times...	the motherboard must be replaced.

AMIBIOS Displayed Error Messages

Error message are displayed as follows:

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

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

```
RUN SETUP UTILITY.
```

Error Message	Explanation
8042 Gate-A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
C: Drive Error	Drive C: may be missing. If installed, run the Hard Disk Utility. Check the C: hard disk type in STANDARD CMOS SETUP.
C: Drive Failure	No response from hard disk drive C:. Replace drive C:.
Cache Memory Bad, Do Not Enable Cache!	Cache memory on the motherboard is defective. Test cache memory with AMIDiag.
CH-2 Timer Error	Error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM settings are saved, a checksum is generated. The previous checksum differs from the current checksum. Run AMIBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run AMIBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run AMIBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run AMIBIOS Setup.
CMOS Time & Date Not Set	Run STANDARD CMOS SETUP to set the date and time in CMOS RAM.
D: Drive Error	No response from hard disk drive D:. Drive D: may be missing. Run the Hard Disk Utility. Check the D: hard disk type in STANDARD CMOS SETUP.
D: drive failure	No response from hard disk drive D:. Replace drive D:.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
Display Switch Not Proper	Some systems require a video switch on the motherboard be set to either color or monochrome. Turn the system off, set the switch properly, then power on.

DMA Error	Error in the DMA controller on the motherboard.
DMA #1 Error	Error in the first DMA channel on the motherboard.
DMA #2 Error	Error in the second DMA channel on the motherboard.
FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all connectors after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the diskette in floppy drive A:, but it cannot boot the system with it. Use another boot diskette and follow the screen instructions.
Keyboard Is Locked...Unlock It	The keyboard lock is engaged. The system must be unlocked to continue the boot process.
Keyboard Error	Timing problem with the keyboard. Set <i>Keyboard</i> in STANDARD CMOS SETUP to <i>Not Installed</i> to skip the keyboard POST tests.
KB/Interface Error	Error in the keyboard connector on the motherboard.
No ROM BASIC	Cannot find a proper bootable sector on either drive A: or hard disk drive C:. ROM Basic (INT 18h) does not run. The BIOS cannot find ROM Basic.
Off Board Parity Error	Parity error in adapter card memory. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) XXXX is the hex address where the error occurred. Run AMIDiag.
On Board Parity Error	Parity error in motherboard memory. The format is: ON BOARD PARITY ERROR ADDR (HEX) = (XXXX) XXXX is the hex address where the error occurred. Run AMIDiag.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag.

NMI Messages

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

BIOS Configuration Summary Screen

AMIBIOS System Configuration (C) Copyright 1985-1991 American Megatrends			
Main Processor	: 486DX	Base Memory Size	: 640 KB
Numeric Processor	: Present	Ext. Memory Size	: 7808 KB
Floppy Drive A:	: 1.2 MB 5 $\frac{1}{4}$	Hard Disk C: Type	: 44
Floppy Drive B:	: 1.44 MB 5 $\frac{1}{4}$	Hard Disk D: Type	: None
Display Type:	: VGA or EGA	Serial Port(s)	: 3F8
AMIBIOS Date:	: 12/12/91	Parallel Port(s)	: 378

64KB CACHE MEMORY
50 MHz CPU Clock

POST Memory Test

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

```
AMIBIOS (C) 1991 American Megatrends Inc.,
BIOS Release 50020692
xxxxx KB OK
Press <DEL> if you want to run SETUP

(C) American Megatrends Inc.,
XX-XXXX-XXXXXX-XXXXXXXX-XXXXX-XXXX-X
```

A BIOS Identification String appears in the left bottom corner of the screen, below the copyright message. Press <Ins> during system boot to display two additional BIOS Identification Strings. These strings contain the BIOS options. If a problem occurs:

Step	Action
1	Enable the <i>Wait for <F1> If any Error</i> in ADVANCED CMOS SETUP option before using this method to freeze the screen.
2	When a problem occurs, freeze the screen by powering on the system and holding a key down on the keyboard.
3	Copy the BIOS ID Strings on a sheet of paper before calling technical support at 404-246-8600.
4	Press <F1> to continue the boot process.
5	Hit if you want to run SETUP is displayed. Press to access AMIBIOS Setup.

Chapter 4

AMIBIOS Setup

Keyboard Speed Switching

You can increase processor speeds at any time by pressing <Ctrl> <Alt> <+>. Processor speed can be decreased by pressing <Ctrl> <Alt> <->.

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

AMIBIOS Setup

AMIBIOS Setup is divided into three parts:

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

AMIBIOS Setup, Continued

STANDARD CMOS SETUP

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

ADVANCED CMOS SETUP

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

ADVANCED CHIPSET SETUP

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

Section 1

Running AMIBIOS Setup

AMIBIOS Setup provides a method for storing system configuration parameters. AMIBIOS Setup resides in ROM BIOS (Read Only Memory Basic Input/Output System) and is available each time the computer is turned on. The system parameters (such as amount of memory, number and type of disk drives, and video display type) are stored in CMOS RAM. When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains these parameters.

Default System Settings

AMIBIOS Setup contains a set of default values that can be used before the user-entered configuration values have been set. When the system is powered on for the first time, it is configured with these settings, unless CMOS RAM is corrupted.

Additional Default Values

Once the initial system configuration parameters have been established, AMIBIOS defines two other sets of default parameters for each AMIBIOS Setup options: BIOS default values and Power-On default values. These default values are discussed on page .

Starting AMIBIOS Setup

When POST completes, the following appears:

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

Press to run AMIBIOS Setup.

AMIBIOS Setup Keys

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

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

AMIBIOS Setup Main Menu Options

AMIBIOS Setup Main Menu options are shown below. Each option is explained in detail in this section.

Warning Message

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

Auto Configuration With BIOS Defaults

Auto Configuration With BIOS Defaults uses the default system settings for all BIOS options. The BIOS defaults are best-case settings that optimize system performance. If CMOS RAM is corrupted, the BIOS default settings are automatically loaded.

Type *Y* and press <Enter> to use BIOS defaults. The following message 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 BIOS options. These are worst-case settings for system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is behaving erratically. Type *Y* and press <Enter> to use the Power-On defaults. The following appears:

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

Write to CMOS and Exit

The options selected and configured in STANDARD SETUP, ADVANCED CMOS SETUP, ADVANCED CHIPSET SETUP, and the new password (if any) are stored in CMOS RAM when this option is selected. A CMOS RAM checksum is calculated and written to CMOS RAM. Control is then passed to the BIOS. The following prompt appears:

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

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

Do Not Write to CMOS RAM and Exit

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

Section 2

STANDARD CMOS SETUP

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

STANDARD CMOS SETUP Options

Date And Day Configuration

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

STANDARD CMOS SETUP Options, Continued

Time Configuration

This option uses a 24 hour clock format (for PM numbers, add 12 to the hour. For example, 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 that corresponds to the parameters of the hard disk drive in your system by pressing <PgUp> and <PgDn>. The hard disk drive parameters are described below. The hard drive types are listed on the following page. Select *Not Installed* for SCSI drives, Type 1 for ESDI drives, and Type 47 for IDE drives.

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

STANDARD CMOS SETUP Options, Continued

Hard Disk Drive Types

Type	Cylinders	Heads	Write Precompensation	Landing Zone	Sectors	Size
1	306	4	128	305	17	10 MB
2	615	4	300	615	17	20 MB
3	615	6	300	615	17	31 MB
4	940	8	512	940	17	62 MB
5	940	6	512	940	17	47 MB
6	615	4	65535	615	17	20 MB
7	462	8	256	511	17	31 MB
8	733	5	65535	733	17	30 MB
9	900	15	65535	901	17	112 MB
10	820	3	65535	820	17	20 MB
11	855	5	65535	855	17	35 MB
12	855	7	65535	855	17	50 MB
13	306	8	128	319	17	20 MB
14	733	7	65535	733	17	43 MB
16	612	4	0	663	17	20 MB
17	977	5	300	977	17	41 MB
18	977	7	65535	977	17	57 MB
19	1024	7	512	1023	17	60 MB
20	733	5	300	732	17	30 MB
21	733	7	300	732	17	43 MB
22	733	5	300	733	17	30 MB
23	306	4	0	336	17	10 MB
24	925	7	0	925	17	54 MB
25	925	9	65535	925	17	69 MB
26	754	7	754	754	17	44 MB
27	754	11	65535	754	17	69 MB
28	699	7	256	699	17	41 MB
29	823	10	65535	823	17	68 MB
30	918	7	918	918	17	53 MB
31	1024	11	65535	1024	17	94 MB
32	1024	15	65535	1024	17	128 MB
33	1024	5	1024	1024	17	43 MB
34	612	2	128	612	17	10 MB
35	1024	9	65535	1024	17	77 MB
36	1024	8	512	1024	17	68 MB
37	615	8	128	615	17	41 MB

38	987	3	987	987	17	25 MB
39	987	7	987	987	17	57 MB
40	820	6	820	820	17	41 MB
41	977	5	977	977	17	41 MB
42	981	5	981	981	17	41 MB
43	830	7	512	830	17	48 MB
44	830	10	65535	830	17	69 MB
45	917	15	65535	918	17	114 MB
46	1224	15	65535	1223	17	152 MB
47	Enter hard disk drive parameters provided by the hard disk drive manufacturer.					

STANDARD CMOS SETUP Options, Continued

Hard Disk Drive C:, cont'd

Hard Disk Drive D: cont'd

Type 47 can be used for both hard disks C: and D:. The parameters for type 47 under Hard Disk C: and Hard Disk D: can be different, permitting two different user-definable hard disk drives.

Floppy Drive A

Floppy Drive B:

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

Primary Display

Move the cursor to this field via ↓ and ↑ and select the type of video display installed in the system by pressing <PgUp> and <PgDn>. The settings are *Monochrome*, *Color 40x25*, *VGA/PGA/EGA*, *Color 80x25*, or *Not Installed*, which could be used for network file servers.

Keyboard

Move the cursor to this field via ↓ and ↑ and select the settings by pressing <PgUp> and <PgDn>. The settings are *Installed* or *Not Installed*. Use *Not Installed* in a keyboardless system such as a file server. *Not Installed* prevents error messages about a missing keyboard, it does not necessarily mean that the keyboard is not attached to the system. If a keyboard is attached, it will still work if *Not Installed* is selected in this option.

Section 3

ADVANCED CMOS SETUP

The following options appear in ADVANCED CMOS SETUP. These options are described in this section.

Typematic Rate Programming,
Typematic Rate Delay (msec),
Typematic Rate (Chars/Sec),
Above 1 MB Memory Test,
Hard Disk Type 47 RAM Area,
System Boot Up Num Lock,
Floppy Drive Seek At Boot,
System Boot Up Sequence,
System Boot Up CPU Speed,
External Cache Memory,
Password Checking Option, and
Video ROM Shadow C000,32K.

Help Screens

ADVANCED CMOS SETUP has a series of help screens, accessed by pressing <F1>, which displays the settings for a Setup option when that option is highlighted.

Warning Message

A warning message is displayed each time STANDARD CMOS SETUP, ADVANCED CMOS SETUP, or ADVANCED CHIPSET SETUP is selected. Press any key to continue.

ADVANCED CMOS SETUP Screen

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

ADVANCED CMOS SETUP Options

Typematic Rate Programming, Rate, and Delay

Typematic 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, 16, 24, or 30 characters per second) control the speed at which a keystroke is repeated. A character is displayed when a key is pressed and held down. After a delay (the Typematic Rate Delay), it repeats at the Typematic Rate. When two or more keys are pressed and held down together, only the last key is repeated.

Above 1 MB Memory Test

Executes the POST memory routines on the RAM above 1 MB. If disabled, the BIOS only checks the first 1 MB of RAM. The settings are Enabled or Disabled.

ADVANCED CMOS SETUP Options, Continued

Hard Disk Type 47 RAM Area

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

System Boot Up Num Lock

The settings are On or Off. This option turns off Num Lock when the system is powered on so you can use the arrow keys on both the numeric keypad and the keyboard. The BIOS and Power-On Defaults are On.

ADVANCED CMOS SETUP Options, Continued

Floppy Drive Seek At Boot

If enabled, a Seek is performed on floppy drive A: at system boot. The defaults are *Disabled*. The settings are *Enabled* or *Disabled*.

System Boot Up Sequence

Sets the boot sequence. The settings are *C:,A:* or *A:,C:*. The BIOS Default is *C:,A:*. The Power-On Default is *A:,C:*.

System Boot Up CPU Speed

Sets the system boot speed. The settings are *High* or *Low*. The BIOS and Power-On Defaults are *Low*.

External Cache Memory

Enables cache memory external to the microprocessor. The settings are *Enabled* or *Disabled*. The BIOS Default is *Enabled*. The Power-On Default is *Disabled*.

Password Checking Option

Enables the password feature every time the system boots or Setup is run. The settings are *Setup* (The BIOS and Power-On Default) or *Always*. *Always* displays a user password prompts every time the system is turned on. *Setup* displays the password prompt if AMIBIOS Setup is run. See page for more information on passwords.

Video ROM Shadow C000,32K

Enables shadowing of 32 KB of Video ROM at C000h–C7FFh. The settings are *Enabled* or *Disabled*. The BIOS Default is *Enabled*. The Power-On Default is *Disabled*.

Section 4

ADVANCED CHIPSET SETUP

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

Help Screens

As with all AMIBIOS Setup screens, each ADVANCED CHIPSET SETUP option has context-sensitive Help information. Press <F1> when the option is highlighted to display the Help screen for that option.

Warning Screen

A warning screen appears when ADVANCED CHIPSET SETUP is selected. Press any key to continue.

ADVANCED CHIPSET SETUP Options

On Board Serial Port 1

This option enables or disables serial port 1 on the Super Voyager motherboard. The settings are the starting serial I/O port: *3F8*, *3E8*, or *Disabled*. The BIOS and Power-On Defaults are *3F8*.

If the configuration data stored in CMOS RAM is corrupted when the system is powered on, the BIOS automatically configures onboard serial port 1 according to the presence or absence of serial ports on adapter cards in the expansion slots. Autoconfiguration only occurs when CMOS RAM data is corrupted, as follows:

Offboard Port	the Onboard Serial Port 1 is Autoconfigured to	
None	3F8	Can be disabled or changed to 3E8h via AMIBIOS Setup.
3F8	3E8	Can be disabled via AMIBIOS Setup. If changed to 3F8h, an I/O port address conflict occurs.
3E8	3F8	Can be disabled via AMIBIOS Setup. If changed to 3E8h, an I/O port address conflict occurs.
3F8, 3E8	Disabled	If changed to 3F8h or 3E8h, an I/O port address conflict occurs.

P1 is serial port 1 on the Super Voyager motherboard. If disabled through Setup, do not attach any device to P1.

J13 configures the IRQ for onboard serial port 1. If onboard serial port 1 is disabled, remove the jumper block from J13 to disable the onboard serial port 1 interrupt. The J13 settings are:

Pins Shorted	Description
None	IRQ disabled.
Pins 1-2	IRQ3 selected for onboard serial port 1.
Pins 2-3	IRQ4 selected for onboard serial port 1 (Default).

ADVANCED CHIPSET SETUP Options, Continued

On Board Serial Port 2

This option enables or disables serial port 2 on the Super Voyager motherboard. The settings are the starting serial I/O Port: *2F8*, *2E8*, or *Disabled*. The BIOS and Power-On Defaults are *2F8*.

If the configuration data in CMOS RAM is corrupted when the system is powered on, the BIOS automatically configures onboard serial port 2 according to the presence or absence of serial ports on adapter cards in the expansion slots. Autoconfiguration only occurs when CMOS RAM data is corrupted:

Offboard Port	the Onboard Serial Port 2 is Autoconfigured to	
None	2F8	Can be disabled or changed to 2E8 via AMIBIOS Setup.
2F8	2E8	Can be disabled via AMIBIOS Setup. An I/O port conflict occurs if changed to 2F8.
2E8	2F8	Can be disabled via AMIBIOS Setup. An I/O port conflict occurs if changed to 2E8.
2F8, 2E8	Disabled	An I/O port conflict occurs if changed to 3F8 or 3E8.

P4 is serial port 2 on the Super Voyager motherboard. If disabled via Setup, do not attach any device to P4.

J14 configures the IRQ for onboard serial port 2. The J14 settings:

Pins Shorted	Description
None	IRQ disabled.
Pins 1-2	IRQ4 selected for onboard serial port 2.
Pins 2-3	IRQ3 selected for onboard serial port 2 (Default).

If onboard serial port 2 is disabled, remove the jumper block from J14 to disable the onboard serial port 2 interrupt.

ADVANCED CHIPSET SETUP Options, Continued

On Board Parallel Port

This option enables or disables the onboard parallel port. The settings are the starting parallel I/O port: *378*, *278*, or *Disabled*. The BIOS and Power-On Defaults are *378*. P5 is the onboard parallel port.

If the configuration data in CMOS RAM is corrupted when the system is powered on, AMIBIOS automatically configures the onboard parallel port according to the presence or absence of parallel ports on adapter cards (offboard parallel ports). Autoconfiguration only occurs when CMOS RAM data is corrupted, as follows:

Offboard Port	the Onboard Parallel Port is Autoconfigured to	
None or 3BC	378	Can be disabled or changed to 278h via AMIBIOS Setup.
378	278	Can be disabled via AMIBIOS Setup. If changed to 378h, an I/O port conflict occurs.
278	378	Can be disabled via AMIBIOS Setup. If changed to 278h, an I/O port conflict occurs.
378, 278	Disabled	If changed to 378h or 278h, an I/O port conflict occurs.

P5 is the parallel port on the motherboard. If disabled through Setup, do not attach any device to P5.

J24 configures the IRQ for the onboard parallel Port. If the onboard parallel port is disabled, remove the jumper block from J24 to disable the onboard parallel port interrupt. The J24 settings are:

Pins Shorted	Description
None	IRQ disabled.
Pins 1-2	IRQ5 selected for the onboard parallel port.
Pins 2-3	IRQ7 selected for the onboard parallel port (Default).

ADVANCED CHIPSET SETUP Options, Continued

On Board Floppy Controller

Disable this option if a floppy controller on an adapter card is used. Enable to use the onboard floppy controller, making sure that the floppy cable is connected to P6 on the motherboard. The settings are Enabled or Disabled. The BIOS and Power-On Defaults are Enabled.

On Board IDE Controller

Disable this option if a hard disk drive controller on an adapter card is used. Enable to use the onboard IDE hard disk drive controller, making sure that the IDE cable is connected to P7 on the motherboard. The settings are Enabled or Disabled. The BIOS and Power-On Defaults are Disabled.

8-bit AT Cycle Wait State

The settings are 4 WS or 5 WS. The BIOS Default is 4 WS. The Power-On Default is 5 WS.

16-bit AT Cycle Wait State

The settings are 1 WS or 2 WS. The BIOS Default is 1 WS. The Power-On Default is 2 WS.

Cache Write Back

The settings are Enabled or Disabled. Enabled means that a write-back caching algorithm is used. Disabled means that a write-through caching algorithm is used. The BIOS and Power-On Defaults are Disabled.

ADVANCED CHIPSET SETUP Options, Continued

C000 Shadow RAM Cacheable

The settings are Enabled or Disabled. If Enabled, the 32K address segment at C000h can be cached in the 8 KB 80486 internal cache. The BIOS and Power-On Defaults are Disabled. This internal cache memory cannot be write-protected. It may be corrupted by an external program. Before enabling this option, you must be reasonably certain that the applications running on this system will not write to the C000:0 – 07FFFh area.

Non-Cacheable Block-1

This option selects the allocation method used for Non-Cacheable Block 1. The settings are DRAM (local DRAM is used) or ATBus (DRAM is disabled and the AT bus is used). The BIOS and Power-On Defaults are DRAM.

Non-Cacheable Block-1 Size

If the Non-Cacheable Block-1 Base address is 512KB, the block size settings are 128KB or Disabled. The BIOS and Power-On Defaults are Disabled. If the Base Address is any other setting, the settings are 64KB, 128KB, 256KB, 512KB, 1MB, 2MB, 4MB, or Disabled.

Non-Cacheable Block-1 Base

The base address can change in increments of the Non-Cacheable Block-1 Size. If below 1 MB, the Non-Cacheable Block-1 Base Address can only be 512KB. The BIOS and Power-On Defaults are 512KB.

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 or Setup. The password is stored in CMOS RAM.

The following prompt appears when the system boots.

Enter CURRENT Password:

Enter a 1 – 6 character password. Make sure you write it down. If you forget it, you must drain CMOS RAM and totally 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 AMIBIOS Setup Main Menu.

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

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

Password Options Control Prompt

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

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password and password protection is enabled, the only way to boot the system is to disable CMOS RAM by removing the shorting block from J33 to drain CMOS RAM power, replacing it, rebooting, and reconfiguring 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.

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

Warning

Hard Disk Format destroys all hard disk data. Back up the data on the hard disk before running.

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 that 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.

Hard Disk Format, Continued

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.

<p><i>Warning</i> <i>Data on the hard drive will be irrevocably lost.</i></p>

Auto Interleave

Warning

Auto Interleave destroys hard disk data. Back up the data on the hard disk before running.

Auto Interleave 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

Media Analysis 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 received from the hard disk drive.
Bad ECC on Disk Read	When the hard disk drive utility writes to the disk, it also calculates an ECC (Error Correction Code) value for the data being written. This ECC value is written to the drive and then read back. The value read back is different from the one calculated.
Bad Sector Flag Detected	An operation was performed on a sector 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 (explained above) read from the disk is not the same value which was written to the disk. The data is not correct. An attempt was made to correct the data, but the ECC value is not corrected.
Requested Sector Not Found	The requested sector could not be found.
Reset Failed	The reset command did not properly reset the hard disk.
Seek Operation Failed	A seek command failed. A seek operation is the act of finding a particular sector on the hard disk.
Undefined Error - Command Aborted	An unidentifiable error condition occurred.
Write Fault on Selected Drive	A write fault occurred during the write operation on the hard disk drive.

Appendix A

Upgrading to 256 KB Cache

Parts

To upgrade to 256 KB of cache memory, you will need 28-pin 32 KB x 8 static RAM chips with an access time of 15 or 20 ns, depending on the processor speed. If the Super Voyager motherboard has a 50 MHz processor, use 15 ns SRAM. For processors operating at any other speeds, use 20 ns SRAM for cache memory.

Procedure

Step	Action
1.	Move all switches on SW1 to ON.
2.	Remove all old SRAM chips from U22, U25, U26, U30, U31, U34, U35, and U44.
3.	Place the new 28-pin 32 KB x 8 static RAM chips in U22, U25, U26, U30, U31, U34, U35, and U44. Make sure that the pins are straight and that all pins are inserted in the receptacles.
4.	Turn the system on. The Boot Screen should display 256 KB of cache memory. If 256 KB does not display, check for bent pins on the new SRAM chips.

SRAM Locations

The figures on the following page shows the location of SRAM chips and SW1, discussed above.

Appendix B

Heat Dissipation

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

These CPUs can dissipate up to 5 watts of power. Since this power is concentrated in a small area, it is necessary to remove the heat generated by this power consumption. For this reason we have supplied a heat sink with all American Megatrends motherboards with these CPUs.

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

Heat Dissipation, Continued

Test Procedure to Assure Proper Operating Temperatures:

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

Expected Results

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

Identifying a Problem

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

Potential Solutions

- Install a fan to increase the air flow over the CPU. Some power supplies may have larger or more powerful fans.
- Install a different heat sink with a greater surface area.
- Different case styles may have better ventilation allowing for more air-flow over the CPU.

Appendix C

Using QEMM®

Using QEMM Version 5.0 and higher with a system built on the Super Voyager Motherboard

This discussion applies to the systems built with the American Megatrends Series 50 Super Voyager motherboard running at any frequency.

When the DesqView® QEMM is used with no command line options, it checks the chipset on the motherboard to determine if it is a C&T® 386 or C&T NEAT CHIPSet.

QEMM incorrectly determines that a C&T CHIPSet is installed on the Series 50 motherboard and tries to program I/O registers specific to the C&T CHIPSet. This feature was written only for motherboards containing the C&T CHIPSet and causes the Series 50 motherboard to reboot.

To prevent QEMM from programming the I/O registers, add:

```
Device = drive:path\QEMM.SYS NOSH
```

to CONFIG.SYS. The **NOSH** parameter does not effect system operation or performance.

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