American Megatrends, Inc.

80486 Super Voyager PCI

Motherboard

User's Guide

MAN-676
10/6/93

Limited Warranty

Limitations of Liability

Trademarks

Revision History

10/6/93   Initial release of manual.

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Preface

Preface

To the OEM

Thank you for purchasing the high performance American Megatrends Series 76 Super Voyager PCI 80486 ISA motherboard. This product is a state of the art 80486-based motherboard that includes the famous AMIBIOS. It is assumed that you have also licensed the rights to use the American Megatrends documentation for the American Megatrends Super Voyager PCI 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 76 Super Voyager PCI motherboard. It explains how to assemble a system based on the Super Voyager PCI 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 Ganesan Viswanathan and Subhodip Ghosh.

American Megatrends BBS

The 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.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.

Organization of this Manual

The American Megatrends Super Voyager PCI ISA Green PC 486 Motherboard User's Guide is organized into three general areas:

Type of Information	Where to Find It	Turn to...
A description of the motherboard, its capabilities, and features.	Chapter 1 Introduction	pages 1 through 18
Explanation of how to install the Super Voyager PCI in a computer.	Chapter 2 Installation	pages 19 through 54
Description of AMIBIOS POST and features. Description of AMIBIOS Setup	Chapter 3 AMIBIOS POST Chapter 4 AMIBIOS Setup	pages 55 through 102
Explanation of how to program the Flash EPROM	Appendix A	pages 103 through 110

Chapter 1

System Overview

The American Megatrends Super Voyager PCI (Peripheral Component Interconnect) ISA motherboard includes an 80486 CPU and supports the EPA Green PC Specifications. This motherboard has two PCI Local Bus expansion slots and five ISA expansion slots.

Features

The American Megatrends Series 76 Super Voyager PCI motherboard has the following features:

- supports 256 KB of direct-mapped write-back secondary cache memory,

- supports from 2 to 128 MB of interleaved system memory via two to four x 36 single-sided or double-sided SIMMs on the motherboard,

- includes American Megatrends PRIDE™ high-speed IDE support on the PCI bus,

- includes an SMC FDC37C661 or FDC37C665 100-pin PQFP Universal Peripheral Controller that supports two NS16C550 serial ports, a parallel port, an IDE controller, and a floppy controller,

- includes a 128 KB flash EPROM for the system BIOS,

- has a battery-backed Real Time Clock with 128 bytes of CMOS RAM to store system configuration data, and

- has four ISA, two PCI expansion slots, and a future expansion slot. ISA adapter cards can be used in the future expansion slot (which looks like an EISA expansion slot but does not accept EISA adapter cards).

Green PC Features

The American Megatrends Super Voyager PCI motherboard has been designed with the EPA Green PC specifications in mind. The Green PC features include:

● a low power chipset,

● Sleep Mode, which allows the system to go to a low power consumption mode of operation when the PC is idle,

● the American Megatrends MEGAKEY keyboard controller BIOS places the computer in Sleep Mode if no keyboard, mouse, COM1, or COM2 activity occurs for an end user-specified time period,

● a clock generator IC is used that allows the main clock frequency to be set to 8 MHz during Sleep Mode. The frequency switching is within the specifications of the normal Intel® 486 family. This feature allows the clock frequency to be reduced without using a special static core microprocessor,. Thus a substantial power savings is realized without adding to the system cost,

● a special two-pin header issues a TTL level signal used to turn off the auxiliary AC power receptacle on Green PC power supplies while in Sleep Mode,

● a special 10-pin header can be connected to the feature connector of a standard VGA Controller card. A signal from this header drives HSYNC, VSYNC, and Enable Video Low during Sleep Mode. If a Green PC monitor is used, the monitor switches to its own low power mode during Sleep Mode.

Compliance with EPA Green PC Specifications

To meet the Green PC specifications, a computer system must be able to enter an idle state (Sleep Mode) that reduces the total system power use to 30 watts or less. The monitor and printer must also use no more than 30 watts.

Responsibility for Meeting Green PC Requirements

The system integrator is ultimately responsible for meeting all Green PC specifications and performing the tests necessary to obtain Energy Star approval, because the motherboard is only one component in the system. Other components have a major impact on system power use.

Green PC Test

The American Megatrends Super Voyager PCI motherboard has been tested and found to comply with the EPA Green PC specifications with the following system configuration. There was a margin of 3 watts, which should allow for some variation in the configuration.

- 8 MB of DRAM,

- an Intel 80486DX2-66 CPU,

- a Boca PN4430 VGA controller,

- a Western Digital Caviar IDE drive model number WDAC2200-32F,

- a Toshiba 1.2 MB floppy drive, model number ND-0801GR, and

- an Antec 220W Green PC Power Supply, model number PP-200U/220U.

Green PC Hot Keys

A keyboard hot key is any multiple keystroke operation that causes the keyboard controller to execute a complex system function transparent to the system operating system. The AMIBIOS system BIOS and the American Megatrends MEGAKEY keyboard controller used in the Super Voyager PCI motherboard provide several hot key features.

Because of the highly programmable nature of the MEGAKEY and the AMIBIOS, configuring the functionality and keystroke assignments can be done by the OEM. After system BIOS POST (Power On Self Test) completes, AMIBIOS initializes the MEGAKEY keyboard controller using values preset by the OEM via AMIBCP (American Megatrends BIOS Configuration Program). The MEGAKEY supports hot key control of: system security locking and system power down mode.

System Security Locking Hot Key

The default hot key option for this feature is <Ctrl> <Alt> <Backspace>, which can be changed by the OEM through AMIBCP. When the System Password feature is enabled in AMIBIOS Setup, the end user can enable the AutoKeyLock feature at any time by pressing <Ctrl> <Alt> <Backspace>. AutoKeyLock is used when the end user must leave the computer unattended and does not want anybody else to use it. Once AutoKeyLock is enabled, the MEGAKEY keyboard controller accepts no keyboard or mouse input until the correct password is entered. The Num Lock, Caps Lock, and Scroll Lock LEDs (and the Password LED if present) blink when the system is password locked.

Green PC Hot Keys, Continued

System Power Down Mode Hot Key

Three hot key sequences are provided for Green PC system power down mode. The hot keys are active if the Green PC system power saving mode is enabled in AMIBIOS Setup.

<Ctrl> <Alt> <\>   puts the system into immediate power down mode. All timers in the MEGAKEY are overridden and the MEGAKEY I/O pins that were defined for power management control are switched to low state. The key sequence can be changed by the OEM through AMIBCP. This feature allows the end user to place the system in power down mode immediately.

<Ctrl> <Alt> <[>   disables the Green PC power savings mode temporarily. All timers in the MEGAKEY are disabled. The key sequence can be changed by the OEM through AMIBCP. This feature allows the end user to disable the Green PC power down mode temporarily for CPU-intensive operations that may take a long time to execute with no activity on the keyboard, mouse, or device activity-sensing hardware.

<Ctrl> <Alt> <]>   enables the Green PC power down mode. All timers in the MEGAKEY are reactivated. The key sequence can be changed by the OEM through AMIBCP.

System State Indication in Various Modes

The system state can be indicated in various modes through the keyboard Num Lock, Caps Lock, Scroll Lock, Turbo LED, and Password LED (also possibly the Power LED) on the computer front panel.

Using the Turbo LED

The Turbo LED indicates if the system is using low or high operating frequency. The Turbo LED should be controlled by the same MEGAKEY I/O pin that controls the CPU clock switching. If the Turbo LED is on, the system is operating at high operating frequency. If the Turbo LED is off, the system is at low operating frequency.

Green PC Hot Keys, Continued

Indicating AutoKeyLock Status via LEDs

AutoKeyLock is indicated by the keyboard Num Lock, Caps Lock and Scroll Lock LEDs and also through a Password LED, if present. Blinking Num Lock, Caps Lock, and Scroll Lock LEDs indicate that the system is password locked. The Password LED also blinks if present. When the correct password is entered, the lock is deactivated.

Hot Key Sequence Summary

The following table lists the AMIBIOS and MEGAKEY Green PC hot key sequences and the state of Password LED in various modes:

System Condition	Password LED State	Other information
The password feature is enabled through AMIBIOS Setup and <Ctrl> <Alt> <Backspace> is pressed.	The LED blinks until the correct password is entered via the keyboard.	The Keyboard Num Lock, Caps Lock,and Scroll Lock LEDs also blink until the correct password is entered via the keyboard.
The password feature is enabled through AMIBIOS Setup and <Ctrl> <Alt> <\> is pressed to invoke immediate power down mode.	The LED blinks until the correct password is entered through the keyboard.	The keyboard LEDs also blink until the correct password is entered on the keyboard.
Both the Green PC power savings feature and the password feature are enabled. The system goes to power down state after the timeout period expires.	The LED blinks until the correct password is entered through the keyboard.	The keyboard LEDs also blink until the correct password is entered on the keyboard.
The Green PC power savings feature is enabled through AMIBIOS Setup and <Ctrl> <Alt> <[> is pressed.	No indication	The Green PC power savings feature is disabled until the <Ctrl> <Alt> <]> key sequence is pressed.
The Green PC power savings feature is enabled through AMIBIOS Setup and <Ctrl> <Alt> <]> is pressed.	No indication	The Green PC power savings feature is enabled.

Green PC Jumpers and Bergs

J7 Password LED Select

J7 is a three-pin berg that selects the Password LED.

If a Password LED is not mounted on the computer case, another LED, such as the Power LED, can be made to flash if Pins 1-2 of J7 are shorted.

J7 Pin Settings	LED selected
Short Pins 1-2	Front panel power LED is Password LED.
Short Pins 2-3	Separate Password LED using P19 *(Factory setting)*.

P19 Password LED

P19 is a two-pin berg that can be attached via a cable to an LED that flashes when the system has been inactive for a specified length of time and Pins 2-3 of J7 are shorted.

The end user must enter the correct system password if the Password LED is blinking. The system has experienced no system activity during the length of time specified in the AutoKeyLock option in AMIBIOS Setup ADVANCED CMOS SETUP. As a result of the AMIBIOS AutoKeyLock feature being enabled, AMIBIOS does not permit the system to be used until the correct password is entered.

The AMIBIOS system password feature and AMIBIOS Green PC AutoKeyLock feature must be enabled before the Password LED will blink when the correct system password must be entered by the end user.

P35 Sleep Switch

P35 is a two-pin berg that attaches to an externally-mounted switch via a two-wire cable. The computer enters Sleep Mode immediately when the end user presses this switch.

Green PC Implementation Disclaimers

Green PC Responsibility belongs to System Integrator

The system integrator must be responsible for Green PC compliance. American Megatrends has simply supplied the means to meet the Green PC requirements and cannot be held responsible for final system assembly.

When to Disable Sleep Mode

If a computer will be running an application that requires long durations of microprocessor activity with no input from the keyboard, mouse, COM1, or COM2, Sleep Mode should be disabled in AMIBIOS Setup.

If Sleep Mode is not disabled, the system will switch to sleep mode and the system performance will be greatly decreased. Some examples of such applications are: file servers, CAD systems, software compilers, screen savers, and many more.

No Need for Screen Savers

Important
Screen saver software should not be used with Sleep Mode enabled.

Sleep Mode serves the same purpose as a screen saver and obviates the need for a screen saver.

Buses are Slowed during Sleep Mode

The PCI and ISA bus run at a slow speed during Sleep Mode, which may cause compatibility problems if certain adapter cards are accessed during Sleep Mode.

PCI

PCI is an Intel specification for a CPU Local Bus standard. The PCI specification also provides the electrical specifications for peripheral chip makers and the logic requirements for a PCI Controller. While PCI defines a local bus standard, it also defines a standard component-level interface. PCI is a common I/O component interface.

When thought of only as a local bus, PCI is a multiplexed extension of the CPU bus. In PCI, the CPU bus control mechanisms have been extended to optimize I/O support.

The primary purpose of PCI is to establish a local bus standard in which a large variety of I/O components can be directly connected without using any glue logic.

Unlike other local bus specifications that can cause bottlenecking and actual interference with the CPU signals, the PCI specification provides for a standalone PCI Controller to manage the data transfer between PCI peripherals and the memory/CPU.

The PCI architecture is essentially a CPU-to-local bus bridge with FIFO buffers.

What PCI Accomplishes

PCI is a way to physically interconnect highly integrated peripheral components and processor/memory systems.

PCI Features

Up to ten PCI loads can be used in the same system on the PCI bus, including the PCI Controller and an expansion bus controller for EISA, ISA, or MCA. PCI decouples the CPU from the expansion bus and works at 33 MHz but can use either a 32-bit or 64-bit data connection path to the CPU.

PCI, Continued

PCI Features

PCI:

- is processor-independent,

- has a multiplexed burst mode operation,

- runs synchronous with the CPU at speeds up to 33 MHz,

- has a maximum data transfer rate of 120 MBs (with a peak rate of 132 MBs on a 32-bit data path),

- has a maximum data transfer rate of 240 MBs (with a peak rate of 264 MBs on a 64-bit data path),

- has an optional 64-bit data path that is transparently interoperable with the 32-bit data path,

- has low latency random accesses (about 60 ns write access latency) to slave registers from a PCI bus master on the PCI bus,

- is capable of full concurrency with the processor and PCI bus masters,

- has full multimaster capability, allowing any PCI Master peer-to-peer access to any PCI slave,

- has hidden and overlapped central arbitration,

- has a low pin count (master - 47; slave - 45),

- has address and data parity, and

- uses three physical address spaces: 32-bit memory, 32-bit I/O, and a 256 byte-per-agent configuration space.

PCI, Continued

PCI Diagram

The following is a typical PCI system block diagram.

Queued Reads and Writes

The PCI Controller queues reads and writes between the memory/CPU and PCI peripheral devices.

Concurrent Operation

The CPU in a PCI system runs concurrently with PCI bus mastering peripherals. Although bus mastering peripheral devices are arbitrated, significant data transfer rate improvements can be achieved without splitting resource utilization between the CPU and a bus mastering device. Peripheral devices can operate at up to 33 MHz in a PCI environment.

Bus Mastering

Bus mastering devices can operate simultaneously on the PCI bus. PCI devices can be bus masters, slaves, or a combination of bus master and slave.

Burst Mode

The PCI specification also provides for burst mode of any length for both reads and writes. However, the 486 CPU only permits burst mode on reads.

Multiplexing

PCI is a multiplexed bus. Multiplexing allows more than one signal to be sent on the same electrical path. The control mechanisms have been modified and extended to optimize I/O support.

Using PCI Adapter Cards

The American Megatrends Series 76 Super Voyager PCI motherboard has two PCI expansion slots. The PCI expansion slots can accept any adapter card that complies with the PCI Revision 2.0 specification.

PCI, Continued

The Super Voyager PCI Motherboard conforms to the Intel PCI specifications. PCI standardizes the hardware interface of peripherals connected to a microprocessor-level local bus. The PCI Local Bus Specification is a standard set of interface, architecture, timings, electrical, and physical specifications that permits all PCI Local Bus products to be totally interchangeable.

PCI Component Classes

PCI components must be one of three classes:

- bus master,
- slave, or
- master/slave combination.

Super Voyager PCI Dimensions

The Super Voyager PCI motherboard is approximately 8.5 inches wide by 13 inches long (the standard Baby AT® size with similar mounting hole locations). The following graphic shows the dimensions and height restrictions.

Specifications

The American Megatrends Series 76 Super Voyager PCI motherboard is a six-layer board in a Baby AT footprint.

The Super Voyager PCI motherboard has onboard PRIDE (Performance Rich Integrated Drive Electronics) on the PCI bus. The motherboard has a Universal I/O Controller that provide support for floppy drives, serial ports, and a parallel port. The American Megatrends proprietary PRIDE interface consistently outperforms ISA IDE drives and provides for IDE Mode 0, Mode 1, or Mode 2 transfer rates.

Motherboard Frequency

The Super Voyager PCI motherboard operates at either High or Low speed. High speed is the same as the speed of the CPU mounted on the motherboard. Low speed is approximately the same speed as that of an 8 MHz IBM® AT. Low speed is achieved by emulation.

Socketed CPUs

The following 25 or 33 MHz Intel CPUs are supported on the Super Voyager PCI motherboard:

in 196-pin PQFP socket	in 237-pin PGA socket
Intel 80486DX	Intel 80486SX
Intel 80486SX	Intel 80487SX
	Intel 80486DX
	Intel 80486DX2
	Pentium® Overdrive® (in write-through mode)

Other Surface-Mount Components

- 82424TX 208-pin PQFP Cache, DRAM, and PCI Controller,

- 82423TX 160-pin PQFP Data Path unit,

- 82378IB 208-pin PQFP, System I/O (PCI to ISA bridge),

Specifications, Continued

Cache Memory

The Super Voyager PCI motherboard has 256 KB of factory-installed L2 secondary cache memory. The cache memory architecture is direct-mapped write-back.

The Intel Pentium Overdrive CPU is supported in write-through mode only. The external cache memory will be in write-back mode.

Up to 128 MB of system memory DRAM can be read from or written to the 80486 internal cache memory.

Up to 64 MB of DRAM system memory can be read from or written to the L2 secondary (external) cache memory.

Onboard System Memory

The Series 76 Super Voyager PCI motherboard supports from 2 to 128 MB of system memory.

The Series 76 Super Voyager PCI motherboard can have two or four x 36 SIMMs in four SIMM sockets. The Super Voyager PCI motherboard supports 256 KB x 36, 1 MB x 36, and 4 MB x 36 single sided SIMMs and 512 KB x 36, 2 MB x 36, or 8 MB x 36 double-sided SIMMs.

70 ns fast page mode DRAMs are required. Memory is always interleaved. The memory architecture is paged. Parity is checked on all system memory reads to ensure data integrity.

Specifications, <small>Continued</small>

CMOS RAM

The Super Voyager PCI motherboard has 128 bytes of CMOS RAM on the Real Time Clock.

CMOS RAM is configured by AMIBIOS Setup, resident with the system BIOS on the Flash EPROM.

Write Buffers

The write buffers used in the Super Voyager PCI motherboard are:

● a four doubleword-deep write buffer on the CPU to memory port.

● a two doubleword-deep write buffer on the PCI bus to memory port.

● a four doubleword-deep write buffer on the CPU to PCI bus port.

Chipset

The Super Voyager PCI motherboard chipset consists of: a Cache and DRAM Controller, a Data Path Unit, and a System I/O Controller.

System BIOS

The system BIOS resides on a 128 KB boot block flash EPROM and supports shadowing between C0000h and EFFFFh in 16 KB granularity and between F0000h and FFFFFh in 64 KB granularity. Memory between C0000h and FFFFFh can also be read from or written to secondary cache memory and write-protected via AMIBIOS Setup options. The system BIOS can be updated through the AMIFlash software utility.

Specifications, Continued

Adaptor ROM BIOS

The Adaptor ROM BIOS can be shadowed, made cacheable, and can be write-protected with 16 KB granularity.

PCI Expansion Slots

The Super Voyager PCI motherboard has two bus mastering PCI slots operating at 25 or 33 MHz synchronous with the CPU clock.

ISA Expansion Slots and Bus Speed

The Super Voyager PCI motherboard has five ISA expansion slots — four standalone ISA expansion slots and a special ISA expansion slot (which looks like an EISA expansion slot but is not) that is reserved for future expansion or an ISA adapter card. This special ISA expansion slot shares a mounting bracket on the chassis with the adjacent PCI expansion slot. Either the PCI or ISA adapter card (not both) can be mounted on these two slots.

The ISA bus operates at 8.33 or 8.25 MHz.

Mouse

The Super Voyager PCI motherboard supports a PS/2- compatible mouse interface through a 10-pin dual-inline berg.

Keyboard

The standard Super Voyager PCI motherboard has a five-pin DIN keyboard connector.

Green PC Monitor Connector

The Super Voyager PCI motherboard has a 10-pin dual-inline berg for Green PC monitor support.

Onboard I/O

Universal Peripheral Controller

The Series 76 Super Voyager PCI motherboard has either an SMC FDC37C661 or FDC37C665 Universal Peripheral Controller. The FDC37C661 Universal Peripheral Controller supports up to two floppy drives (which can be 360 KB, 1.2 MB, 720 KB, 1.44 MB, or 2.88 MB), an IDE controller, two serial ports (National Semiconductor 16C450s), and one parallel port.

The FDC37C665 Universal Peripheral Controller supports two floppy drives (which can be 360 KB, 1.2 MB, 720 KB, 1.44 MB, or 2.88 MB), an IDE controller, two serial ports (National Semiconductor 16C550s), and one parallel port compatible with the Extended Capabilities Port (ECP).

PRIDE Interface

The Series 76 Super Voyager PCI motherboard implements a fast IDE on the PCI bus. This interface is the American Megatrends Performance Rich Integrated Drive Electronics interface. PRIDE performs faster than standard IDE controllers.

Chapter 2

Installation

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. 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 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.

Motherboard Drawing

Installation Steps

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

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

SW2	Processor and Speed Selection Switch
SW1	Diagnostics and CGA Selection Switch
J3	Parallel Port IRQ Select
J5, J6	Parallel Port DMA Select
J7	Password LED Select

Step 1 Set Switches and Jumpers, Continued

SW2 Processor and Speed Selection Switch

SW2 is an eight-position DIP switch that controls processor speed and type as well as other features. See the graphic on page for the location of SW2.

SW2 Switches 1, 5, 8 Pentium Overdrive Enable

Pentium Overdrive Status	Switch 1	Switch 5	Switch 8
Installed	OFF	ON	ON
Not Installed	ON	ON	OFF

SW2 Switches 2 and 3 Processor Types

Switch positions 2 and 3 control the processor type.

Processor Type	Switch 3	Switch 2
487SX or Pentium Overdrive	ON	ON
486DX or 486DX2	ON	OFF
486SX	OFF	N/A

SW2 Switch 4 PQFP CPU Enable

CPU	SW2 Switch 4
PQFP CPU installed. No CPU in ZIF socket.	OFF
CPU installed in the ZIF socket.	ON

SW2 Switch 6 Fboot Enable

Fboot (force boot) enabled forces the BIOS to boot from the boot block and reprogram the Flash EPROM.

Fboot	SW2 Switch 6
Enable Fboot	ON
Disable Fboot	OFF

SW2 Switch 7 Processor Speed

Processor Speed	Switch 7
25 MHz	ON
33 MHz	OFF

SW1 Switches 1 through 4 Diag

Switch 2 of SW1 controls the Diag mode.

Position	ON	OFF
1	Reserved	Reserved
2	Run Manufacturing Diagnostics in an infinite loop	Normal operation (Factory setting)
3	Reserved	Reserved
4	Reserved	Reserved

J3 Parallel Port IRQ Select

J3 is a three-pin header that sets the parallel port IRQ.

Pin Settings	LPT1
Short Pins 1-2	IRQ7 *(Factory setting)*
Short Pins 2-3	IRQ5

J5 and J6 Enhanced Parallel Port DMA Select

J5 and J6 are three-pin headers that select the parallel port DMA.

J5 and J6 Pin Settings	DMA Channel
Short Pins 1-2	1
Short Pins 2-3	3 *(Factory setting)*

Step 1 Set Switches and Jumpers, Continued

J7 Password LED Select

J7 is a three-pin berg that selects the Password LED.

The end user must enter the correct system password if the Password LED is blinking. If the password LED blinks, the system has experienced no system activity during the length of time specified in the AutoKeyLock option in AMIBIOS Setup ADVANCED CMOS SETUP. When the AMIBIOS AutoKeyLock feature is enabled, AMIBIOS does not permit the system to be used until the correct password is entered.

The AMIBIOS system password feature and AMIBIOS Green PC AutoKeyLock feature must be enabled before the Password LED will blink when the correct system password must be entered by the end user.

J7 Pin Settings	LED selected
Short Pins 1-2	Front panel power LED is Password LED.
Short Pins 2-3	Separate Password LED using P19 *(Factory setting)*.

Step 2 Install System Memory

The main memory subsystem on the Super Voyager PCI motherboard consists of four 32-bit memory sockets. Each socket is actually one memory bank. Either two or four memory banks must be installed; the memory banks are always interleaved.

One x 36 SIMM package is the equivalent of four x 9 SIMM packages. You can use 256 KB x 36, 512 KB x 36, 1 MB x 36, 2 MB x 36, 4 MB x 36, or 8 MB x 36 bit SIMMs. The Super Voyager PCI motherboard uses fast page mode SIMMs operating at 70 ns (RAS access time).

Motherboard System Memory Configurations

BANK0	BANK1	BANK2	BANK3	Memory reported by AMIBIOS
256 KB x 36	256 KB x 36	None	None	1,664,000
256 KB x 36	256 KB x 36	256 KB x 36	256 KB x 36	3,712,000
256 KB x 36	256 KB x 36	512 KB x 36	512 KB x 36	5,760,000
256 KB x 36	256 KB x 36	1 MB x 36	1 MB x 36	9,856,000
256 KB x 36	256 KB x 36	2 MB x 36	2 MB x 36	18,048,000
256 KB x 36	256 KB x 36	4 MB x 36	4 MB x 36	34,432,000
256 KB x 36	256 KB x 36	8 MB x 36	8 MB x 36	67,200,000
512 KB x 36	512 KB x 36	None	None	3,712,000
512 KB x 36	512 KB x 36	256 KB x 36	256 KB x 36	5,760,000
512 KB x 36	512 KB x 36	512 KB x 36	512 KB x 36	7,808,000
512 KB x 36	512 KB x 36	1 MB x 36	1 MB x 36	11,904,000
512 KB x 36	512 KB x 36	2 MB x 36	2 MB x 36	20,096,000
512 KB x 36	512 KB x 36	4 MB x 36	4 MB x 36	36,480,000
512 KB x 36	512 KB x 36	8 MB x 36	8 MB x 36	78,080,000
1 MB x 36	1 MB x 36	None	None	7,808,000
1 MB x 36	1 MB x 36	256 KB x 36	256 KB x 36	9,856,000
1 MB x 36	1 MB x 36	512 KB x 36	512 KB x 36	11,904,000
1 MB x 36	1 MB x 36	1 MB x 36	1 MB x 36	16,000,000
1 MB x 36	1 MB x 36	2 MB x 36	2 MB x 36	24,192,000
1 MB x 36	1 MB x 36	4 MB x 36	4 MB x 36	40,576,000
1 MB x 36	1 MB x 36	8 MB x 36	8 MB x 36	73,344,000
2 MB x 36	2 MB x 36	None	None	16,000,000
2 MB x 36	2 MB x 36	256 KB x 36	256 KB x 36	18,048,000
2 MB x 36	2 MB x 36	512 KB x 36	512 KB x 36	20,096,000
2 MB x 36	2 MB x 36	1 MB x 36	1 MB x 36	24,192,000
2 MB x 36	2 MB x 36	2 MB x 36	2 MB x 36	32,384,000
2 MB x 36	2 MB x 36	4 MB x 36	4 MB x 36	48,768,000
2 MB x 36	2 MB x 36	8 MB x 36	8 MB x 36	81,536,000
4 MB x 36	4 MB x 36	None	None	32,384,000
4 MB x 36	4 MB x 36	256 KB X 36	256 KB x 36	34,432,000
4 MB x 36	4 MB x 36	512 KB x 36	512 KB x 36	36,480,000
4 MB x 36	4 MB x 36	1 MB x 36	1 MB x 36	40,576,000

4 MB x 36	4 MB x 36	2 MB x 36	2 MB x 36	48,768,000
4 MB x 36	4 MB x 36	4 MB x 36	4 MB x 36	65,152,000
4 MB x 36	4 MB x 36	8 MB x 36	8 MB x 36	87,920,000
8 MB x 36	8 MB x 36	None	None	65,152,000
8 MB x 36	8 MB x 36	256 KB x 36	256 KB x 36	67,200,000
8 MB x 36	8 MB x 36	512 KB x 36	512 KB x 36	69,248,000
8 MB x 36	8 MB x 36	1 MB x 36	1 MB x 36	73,344,000
8 MB x 36	8 MB x 36	2 MB x 36	2 MB x 36	81,536,000
8 MB x 36	8 MB x 36	4 MB x 36	4 MB x 36	97,920,000
8 MB x 36	8 MB x 36	8 MB x 36	8 MB x 36	130,688,000

DRAM Memory Parameterss

Parameter	Specification
Page Mode	FAST
Refresh	CAS before RAS
t_{CAC}	≤ 20 ns
t_{RAC}	≤ 70 ns
t_{AA}	≤ 35 ns
t_{RP}	50 ns
t_{CPA}	≤ 40 ns

SIMM Part Numbers

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
512 KB x 36	Samsung	KMM536512W-7 (single-sided) KMM536512W3-7 (double-sided)
	Motorola	MCM36512S-70
1 MB x 36	Micron	MT12D136M-7
	Mitsubishi	MH1M36ADJ-7
	PNY	P361000-70
	Motorola	MCM36100AS-70
	Oki	MSC2355-70YS12
	Samsung	KMM5361000AV-7
2 MB x 36	Micron	MT24D236M-7
	Samsung	KMM5362000A-7
	Motorola	MCM36200S70
4 MB x 36	Micron	MT12D436M-7

	Mitsubishi	MH4M36SAJ-7
	Motorola	MCM36400S-70
	PNY	P364000-70
	Samsung	KMM5364100-7
8 MB x 36	Motorola	MCM36800S-70
	PNY	P368000-707
	Samsung	KMM5368100-7

Installing SIMMs

Four SIMM sockets are located at the expansion slot end of the motherboard. These sockets can be filled with either 256 KB x 36, 512 KB x 36, 1 MB x 36, 2 MB x 36, 4 MB x 36, or 8 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. See the following figure.
Normally, the x 36 SIMMs look like this:

Reporting Memory

The system memory configuration is reported by AMIBIOS as it boots and again when the AMIBIOS System Configuration Screen is displayed just before the operating system is booted. The memory reported by AMIBIOS is 384 KB less than the total amount of memory installed in the system because the memory between 640K and 1024K can be used to shadow the video, system, and other adapter BIOS.

Step 3 Install Upgrade Processor

In most cases, the CPU is already installed in the American Megatrends Super Voyager PCI motherboard. The only reason to remove the CPU is:

- CPU failure or
- to install an upgrade processor.

CPU failure is highly unlikely. If the CPU must be replaced, follow the procedures described in this step.

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

Processor Type and Speed

The empty ZIF (zero insertion force) CPU socket is a 237-pin socket near one edge of the motherboard. The following CPUs can be inserted in this socket. The CPU pin count is given because several of these CPUs do not use all 237 pins and must be carefully mounted in the center of the socket.

Processor	Frequency	Pins
80486DX	25 or 33 MHz	169 pins
80486DX2	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)	169 pins
80486SX	20 or 25 MHz	169 pins
P24	25 or 33 MHz	169 pins
Pentium Overdrive	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)	237 pins
486 Overdrive® CPU	25 MHz (50 MHz internal), 33 MHz (66 MHz internal)	169 pins

The 80486 Super Voyager PCI motherboard also supports future Intel processors and upgradeable processors.
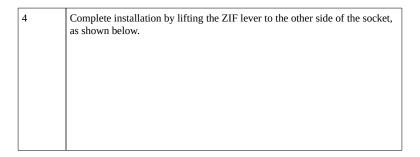
Installing an Upgrade Processor

The following discussion applies only to 169-pin processors, such as the 80486DX, 80486DX2, 80486SX, 80487SX, P23T, or P24 CPU.

If the motherboard already has a surface-mounted 486SX PQFP CPU, you must disable the onboard CPU by setting SW2 Switch 4 ON before you install the upgrade CPU.

CPU installation is easy because the Super Voyager PCI motherboard has a ZIF (zero insertion force) socket. The Super Voyager PCI motherboard does not have a separate socket for a coprocessor or upgrade CPU. Instead, upgrade processors are installed directly in the CPU socket.

Step	Action
1	Remove the CPU by lifting the lever on the ZIF socket and then extracting the CPU. The empty CPU 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 CPU. Check for bent pins on the CPU chip. Gently straighten any bent pins with pliers. Place the CPU 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 CPU is aligned with pin 1 of the socket.
3	The CPU socket is a 240-pin socket. But (as shown in the above table) 80486DX, 80486DX2, 80486SX, 80487SX, P24, and P23T CPUs 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 in the following illustration.

4	Complete installation by lifting the ZIF lever to the other side of the socket, as shown below.

Installing a Pentium Overdrive CPU

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

Setting SW2

Several SW2 switch positions must be set to specify the CPU type. These switch settings are listed on the following page.

Step 3 Install Upgrade Processor, Continued

SW2 Processor and Speed Selection Switch

SW2 is an eight-position bipolar DIP switch that controls processor speed and type, as well as other features. See the graphic on page for the location of SW2.

SW2 Switches 1, 5, 8 Pentium Overdrive Enable

Pentium Overdrive Status	Switch 1	Switch 5	Switch 8
Installed	OFF	ON	ON
Not Installed	ON	ON	OFF

SW2 Switches 2 and 3 Processor Types

Switch positions 2 and 3 control the processor type.

Processor Type	Switch 3	Switch 2
487SX or Pentium Overdrive	ON	ON
486DX or 486DX2	ON	OFF
486SX	OFF	N/A

SW2 Switch 4 PQFP CPU Enable

Turn SW2 Switch 4 ON to disable the onboard 486SX or 486DX PQFP CPU.

SW2 Switch 7 Processor Speed

Processor Speed	Switch 7
25 MHz	ON

33 MHz	OFF

Step 4 Install the Motherboard

The mounting hole pattern on the Super Voyager PCI motherboard is approximately the same as the mounting hole pattern on any Baby AT motherboard. Standoffs and mounting screws are not supplied with the motherboard.

Step	Action
1	Wear an anti-static wristband when performing this procedure.
2	Place the chassis 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 that you are wearing.
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 at the far end of the chassis.
4	Push four nylon standoffs from the solder side of the motherboard into 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.
5	Carefully slide the motherboard into the chassis. Make certain that the standoffs fit the slots provided for them. The motherboard should not slide If the standoffs are properly locked. The motherboard should also rest level with the chassis. The far edge should fit the slots in the plastic clips.
6	Place the two mounting screws in the proper holes and tighten. 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 .

The computer case manufacturer may supply installation instructions. If so, follow the computer case manufacturer installation procedures as well as the above procedures.

Step 5 Connect the Power Supply

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

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

Connect to P8 and P9

Attach the power supply cables to P8 and P9 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 P9 and the remaining 6-pin connector is connected to P8, as shown below. P11 is an auxiliary power supply connector.

| *Caution* |
| P11 is not a 5V power connector. |

Step 5 Connect the Power Supply, Continued

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.

P8 Pinout

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

Step 5 Connect the Power Supply, Continued

P9 Pinout

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

P11 Pinout

Pin	Description
1	3.3V VCC
2	3.3v VCC
3	3.3v VCC
4	Ground (Black wire)
5	Ground (Black wire)
6	Ground (Black wire)

Step 6 Connect the Keyboard Cable

The keyboard connector is a 5-pin DIN socket labeled KEYBRD on the motherboard. Attach a standard AT-compatible keyboard cable. A 5-pin DIN to 6-pin mini DIN converter is needed to connect a PS/2-type keyboard.

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

Step 7 Connect the Mouse Cable

The mouse connector (P1) is a ten-pin dual-inline berg. Attach a standard serial cable from the mouse connector to a standard DB9 serial port connector mounted externally on the chassis. Pin 10 should be cut because it is not used.

Pin	Assignment	Pin	Assignment
1	Mouse Clock	6	N/C
2	N/C	7	N/C
3	N/C	8	VCC
4	N/C	9	Mouse Data
5	GND	10	N/C

Step 8 Connect Cables

When attaching chassis connectors to the motherboard, make sure you connect the correct connector end. Most connector wires are color-coded. Match the color of the wires leaving the switch or LED to the same pin on the connector end. There may be more than one connector with the same color-coded wires. If so, follow the wire to the switch or LED. Pin 1 of all connectors can be determined easily. Each jumper is surrounded by a white line etched on the motherboard. One end of the white line always ends in a arrow. Pin 1 is always at the pointed end of the white line. Pin 1 is designated by a square pad on the motherboard graphic. Connect the following cables to the motherboard:

- Reset Switch cable to P36,
- Speaker cable to P34,
- Keyboard Lock cable to P31,
- Turbo Switch cable to P23,
- Onboard LED is P17,
- Turbo LED cable to P20,
- Password LED cable to P19,
- Sleep switch cable to P35, and
- IDE hard disk drive activity LED cable to P30.

Chapter 2 Installation

Step 8 Connect Cables, Continued

P19 Password LED

P19 is a two-pin berg that can be attached via a cable to an LED that flashes when the system has been inactive for a specified length of time and Pins 2-3 of J7 are shorted.

If a Password LED is not mounted on the computer case, another LED, such as the Power LED, can be made to flash if Pins 1-2 of J7 are shorted.

P35 Sleep Switch

P35 is a two-pin berg that attaches to an externally-mounted switch via a two-wire cable as shown below. The computer enters Sleep Mode immediately when the end user presses this switch.

P17 Onboard LED

P17 is an LED mounted on the motherboard for manufacturing tests.

Step 8 Connect Cables, Continued

P30 IDE LED

P30 is a four-pin berg that can be attached via a cable to an LED that is lit when IDE hard disk drive activity occurs.

P20 Turbo LED

P20 is a two-pin berg that is attached via a cable to the externally-mounted Turbo LED. The LED lights when the motherboard is running at high speed.

P36 Reset Switch Connector

P36 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, a hard reset is performed. Pin 1 is ground and Pin 2 is Hard Reset.

Step 8 Connect Cables, Continued

P34 Speaker Connector

P34 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	Description
1	Data Out
2	Key
3	Ground
4	VCC

P31 Keyboard Lock Connector

P31 is a five-pin single-inline berg that attaches via a cable to the keyboard lock connector. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use.

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

The front panel LED flashes if the system is in AMIBIOS AutoKeyLock feature is enabled and Pins 1-2 of J7 are shorted.

Step 8 Connect Cables, Continued

P23 Turbo Switch Connector

P23 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 set the motherboard clock speed to high or low speed.

Step 9 Connect Onboard I/O

Onboard Serial Ports, Parallel Port, Floppy, and IDE

The Super Voyager PCI motherboard has two serial ports (P3 and P4), a parallel port (P5), an IDE connector (P13), and a floppy connector (P12) onboard. The serial and parallel port connectors are described below, the IDE connector on page and the floppy connector on page .

Step 9 Connect Onboard I/O, Continued

Checking for Conflicts

AMIBIOS automatically checks the adapter cards installed in the expansion slots on the motherboard for a hard disk or floppy controller and serial or parallel ports and minimizes conflicts between onboard and offboard I/O.

If AMIBIOS...	then...
finds an IDE hard disk drive controller on an adapter card in an expansion slot,	the onboard IDE controller is automatically disabled.
finds a floppy drive controller on an adapter card in an expansion slot,	the onboard floppy controller is automatically disabled.
finds serial ports on an adapter card in an expansion slot,	the onboard serial ports are automatically disabled.
finds a parallel port on an adapter card in an expansion slot,	the onboard parallel port uses an alternative address

P3 Serial Port 1 and **P4 Serial Port 2**

P3 and P4 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 ISA serial port interface. The connector pinout is shown below. Pin 1 on 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)

Step 9 Connect Onboard I/O, Continued

Attaching the Serial Port Cables

Two serial port cables are supplied with the motherboard. Attach the cables to P2 and P3 and to the external serial port connectors on the chassis as shown below. See the drawing on page for the P2 and P3 location.

Step 9 Connect Onboard I/O, Continued

Attaching the Parallel Port Cable

A parallel port cable is supplied with the motherboard to connect P5, the parallel port connector on the motherboard, to the externally-mounted parallel port, as shown below. See the motherboard graphic on page for the P5 location.

P5 Parallel Port Connector

P5 is a 26-pin dual-inline berg. The parallel port is bidirectional. A 26-pin double-row ribbon cable connects P5 and a female 25-pin D-sub connector on the chassis, shown above. The P5 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

Step 9 Connect Onboard I/O, Continued

P2 Green PC Monitor Connector

Attach a 10-wire flat cable to P2, the Green PC monitor connector. The P2 pinout follows.

Pin	Signal Description	Pin	Signal Description
1	N/C	6	N/C
2	N/C	7	N/C
3	TTL output for SYNC enable	8	Open Collector output for HSYNC control
4	N/C	9	Open Collector output for VSYNC control
5	Ground		N/A

P2 Green PC Pin Arrangement

The P2 Green PC monitor connector pins are arranged as follows:

```
6       7       8       9
1       2       3       4       5
```

Cutting Pins

Pins must be cut on the two serial port connectors and the parallel port connector, as shown below.

Step 10 Install Floppy Drive

P12 Floppy Disk Drive Connector

P12 is a 34-pin dual-inline berg. Connect the cable from the floppy drive(s) to P12. The onboard floppy controller cannot be used if an adapter card with floppy controller is installed.

The motherboard supports up to two 720K, 1.44 MB, 2.88 MB 3½" drives and/or 360 KB and 1.2 MB 5¼" floppy drives. The 34-pin ribbon attaches to P12 and the drives. The cable has a small twist between the floppy connectors. The end connector is connected to floppy drive A:.

Step 10 Install Floppy Drive, Continued

P12 Floppy Connector 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 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	

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Step 11 Install Hard Disk

Attach IDE Cable to P13

The IDE hard disk drive connector is P13, a 40-pin dual-inline berg. Attach the 40-wire IDE ribbon cable from the IDE drive to P13.

The onboard IDE controller has an American Megatrends Performance Rich Integrated Drive Electronics (PRIDE) Interface. PRIDE outperforms standard IDE drives. Disable the onboard IDE in ADVANCED CHIPSET SETUP to use an ISA ESDI, RLL, MFM, or SCSI hard disk drive. The P13 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	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

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Step 12 Install Adapter Cards

The Super Voyager PCI motherboard provides full compatibility with all IBM XT and AT-compatible adapter cards via five ISA (AT-compatible) expansion slots. The Super Voyager PCI motherboard also has two PCI Local Bus expansion slots. A summary of the slots follows.

PCI Local Bus Expansion Slots

The PCI Local Bus expansion slot sockets are distinctly different than the standard ISA expansion slot sockets. These slots obviously accept a different kind of adapter card than the standard ISA adapter cards. The slots are much more compact and smaller.

ISA Adapter Cards

Two sets of pinouts are provided in the following pages for ISA expansion slot sockets.

The first is the 8-bit pinout that accepts PC- and XT-compatible adapter cards.

The second is the 16-bit extension to the 8-bit sockets that, together with the 8-bit sockets, accept 16-bit ISA adapter cards.

Step 12 Install Adapter Cards, Continued

8-Bit ISA Slot Pinout

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

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

Step 12 Install Adapter Cards, Continued

16-Bit ISA Extension Pinout

The following 16-bit pins are an extension of the 8-bit adapter card layout and are used in conjunction with the standard 8-bit 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	+5
C17	SD14	D17	MASTER-
C18	SD15	D18	GND

PCI Local Bus Pinout

The first two expansion slots in the Super Voyager PCI motherboard are for PCI Local Bus adapter cards.

Step 12 Install Adapter Cards, Continued

PCI Local Bus Pinout, cont'd

The 32-bit connector is from Pin 1 through Pin 62.

Pin	5V System Environment	
	Side B	**Side A**
1	-12V	TRST#
2	TCK	+12V
3	Ground	TMS
4	TDO	TDI
5	+5V	+5V
6	+5V	INTA#
7	INTB#	INTC#
8	INTD#	+5V
9	PRSNT1#	Reserved
10	Reserved	+5V(I/O)
11	PRSNT2#	Reserved
12	Ground	Ground
13	Ground	Ground
14	Reserved	Reserved
15	Ground	RST#
16	CLK	+5V (I/O)
17	Ground	GNT#
18	REQ#	Ground
19	+5V (I/O)	Reserved
20	AD[31]	AD[30]
21	AD[29]	+3.3V
22	Ground	AD[28]
23	AD[27]	AD[26]

24	AD[25]	Ground
25	+3.3V	AD[24]
26	C/BE[3]#	IDSEL
27	AD[23]	+3.3V
28	Ground	AD[22]
29	AD[21]	AD[20]
30	AD[19]	Ground
31	+3.3V	AD[18]
32	AD[17]	AD[16]
33	C/BE[2]#	+3.3V
34	Ground	FRAME#
35	IRDY#	Ground
36	+3.3V	TRDY#
37	DEVSEL#	Ground
38	Ground	STOP#
39	LOCK#	+3.3V
40	PERR#	SDONE
41	+3.3V	SBO#
42	SERR#	Ground
43	+3.3V	PAR
44	C/BE[1]#	AD[15]
45	AD[14]	+3.3V
46	Ground	AD[13]
47	AD[12]	AD[11]
48	AD[10]	Ground
49	Ground	AD[09]
50	5V Connector Key	
51	5V Connector Key	
52	AD[08]	C/BE[0]#
53	AD[07]	_3.3V

54	+3.3V	AD[06]
55	AD[05]	AD[04]
56	AD[03]	Ground
57	Ground	AD[02]
58	AD[01]	AD[00]
59	+5V (I/O)	+5V (I/O)
60	ACK64#	REQ64#
61	+5V	+5V
62	+5V	+5V

Step 13 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 American Megatrends Technical Support at 404-246-8600 if there are problems.

AMIBIOS Errors

If the system operates normally, a display should appear on the monitor. AMIBIOS 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.

Step 13 Test and Configure, Continued

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 AMIBIOS POST (Power On Self Test). Fatal errors are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal.

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

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        Hard Disk C: Type  :  Type 47
Floppy Drive B:     :  1.44 MB       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


   256 KB Cache Memory
   33 MHz CPU Clock
```

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 76080893


Press <DEL> if you want to run SETUP




40-0100-004676-00111111-080893-AMIS76A1-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 for the American Megatrends Series 76 Super Voyager PCI 80486 ISA motherboard includes Green PC support. AMIBIOS has several features that can be accessed from the keyboard at any time.

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 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 five parts:

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

AMIBIOS Setup Parts, Continued

STANDARD CMOS SETUP

STANDARD CMOS SETUP configures system components such as floppy drives, hard disk drives, time and date, and monitor type and is described on pages through .

ADVANCED CMOS SETUP

ADVANCED CMOS SETUP configures memory configuration, peripheral support, and password support and is discussed on pages through .

ADVANCED CHIPSET SETUP

ADVANCED CHIPSET SETUP configures advanced system features and is described on pages through .

Power Management Setup

Power Management Setup configures options that affect the system power consumption levels. It is described on pages through .

Peripheral Setup

Peripheral Setup configures onboard I/O, such as IDE, floppy, serial ports, and a parallel port. It is described on pages through .

AMIBIOS Options

Options

The AMIBIOS for the Super Voyager PCI motherboard sets the following AMIBIOS Setup options.

Miscellaneous Options

AMIBIOS Identification

The AMIBIOS for the Super Voyager PCI motherboard has the following identification parameters.

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, ADVANCED CHIPSET SETUP, and PERIPHERAL MANAGEMENT SETUP with the BIOS Setup defaults.
<F7>	Loads all features in ADVANCED CMOS SETUP, ADVANCED CHIPSET 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	Described on
STANDARD CMOS SETUP	page
ADVANCED CMOS SETUP	page
ADVANCED CHIPSET SETUP	page
POWER MANAGEMENT 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

BIOS 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 as shown below. You can accept or reject the parameters.

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.

STANDARD CMOS SETUP Options, Continued

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 Type C:
Hard Disk Drive Type 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. Match the drive parameters for the drive in your computer with the parameters in the hard drive type table on page . If none of the drive types match, use type 47.

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.

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)

STANDARD CMOS SETUP Options, Continued

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 make a selection 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 the ↑ and ↓ keys to scroll through the options. Press <PgUp> or <PgDn> to select a different setting.

```
            AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
        (C) 1993 American Megatrends, Inc. All rights reserved

Typematic Rate Programming : Enabled    ISA Adaptor ROM at C800,16K : Absent
Typematic Rate Delay (msec): 500        ISA Adaptor ROM at CC00,16K : Absent
Typematic Rate (Chars/Sec) : 30         ISA Adaptor ROM at D000,16K : Absent
Mouse Support Option       : Disabled   ISA Adaptor ROM at D400,16K : Absent
Above 1 MB Memory Test     : Enabled    ISA Adaptor ROM at D800,16K : Absent
Memory Test Tick Sound     : Enabled    ISA Adaptor ROM at DC00,16K : Absent
Memory Parity Error Check  : Enabled    BootSector Virus Protection : Disabled
Hit <DEL> Message Display  : Enabled    Performance Rich IDE        : Disabled
Wait For <F1> If Any Error : Enabled    Perf. Rich IDE Transfer Mode: Auto
System Boot Up Num Lock     : On        IDE Block Mode Transfer     : Disabled
Floppy Drive Seek At Boot  : Disabled
System Boot Up Sequence     : C:,A:
System Boot Up CPU Speed    : High
Cache Memory               : Both
External Cache Mode         : Wr-Back
Password Checking Option    : Setup
ISA Video   ROM at C000,32K: Absent

        ESC:Exit  →   :Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color
        F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults
```

Help Screens

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

Warning Message

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

ADVANCED CMOS SETUP Options

Typematic Rate Programming
Typematic Rate Delay
Typematic Rate

Typematic Rate Programming enables or disables the following two options. Typematic Rate Delay *(250, 500, 750, or 1,000 milliseconds)* and Typematic Rate *(6, 8, 10, 12, 14, 15, 20, 24, or 30* characters per second) control the speed at which a keystroke is repeated. When a key is pressed and held down, the associated character is displayed. After a delay specified by the Typematic Rate Delay, the character repeats at the Typematic Rate. The defaults are:

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

Mouse Support Option

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

Above 1 MB Memory Test

When this option is enabled, the BIOS memory test is performed on all system memory. When this option is disabled, the memory test is only performed on the first 1 MB of system memory. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Enabled.* The Power-On default is *Disabled.*

Memory Test Tick Sound

This option enables (turns on) or disables (turns off) the ticking sound during the memory test. The BIOS Setup and Power-On default is *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.* The BIOS Setup and Power-On default is *Enabled.*

Wait for <F1> If Any Error

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

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

If this option is enabled, AMIBIOS waits for the end user to press <F1> before continuing. If this option is disabled, AMIBIOS continues the boot process without waiting for <F1> to be pressed. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Enabled.* The Power-On default is *Disabled.*

System Boot Up Num Lock

When *On,* this option turns off *Num Lock* when the system is powered on so the end user can use the arrow keys on both the numeric keypad and the keyboard. The settings are *On* or *Off.* The BIOS Setup and Power-On default is *On.*

ADVANCED CMOS SETUP Options, Continued

Floppy Drive Seek At Boot

When this option is enabled, AMIBIOS performs a Seek command on floppy drive A: before booting the system. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.* The Power-On default is *Enabled.*

System Boot Up Sequence

This option sets the sequence of boot drives (either floppy drive A: or hard disk drive C:) that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are *C:,A:* or *A:,C:.* The BIOS Setup default is *C:,A:.* The Power-On default is *A:,C:.*

System Boot Up CPU Speed

This option sets the speed of the CPU at system boot time. The settings are *High* or *Low.* The BIOS Setup and Power-On default is *High.*

Cache Memory

This option enables cache memory. If *Both* is selected, internal cache and external cache memory is enabled. If *Internal* is chosen, only the internal cache memory in the 486 CPU is enabled. If *Disabled* is chosen, all cache memory is disabled. The settings are *Internal, Disabled,* or *Both.* The BIOS Setup default is *Both.* The Power-On default is *Disabled.*

External Cache Mode

This option selects the type of caching algorithm used by AMIBIOS and the computer for L2 (external) secondary cache memory. The settings are *Wr-Thru* or *Wr-Back.* The BIOS Setup default is *Wr-Back.* The Power-On default is *Wr-Thru.*

ADVANCED CMOS SETUP Options, Continued

Password Checking Option

This option enables the password check option every time the system boots or the end user runs Setup. If *Always* is chosen, a user password prompt appears every time the computer is turned on. If *Setup* is chosen, the password prompt appears if AMIBIOS Setup is executed. See page for instructions on changing a password. The BIOS Setup and Power-On defaults are *Setup.*

ISA Video ROM at C000,32K
ISA Adaptor ROM at C800,16K
ISA Adaptor ROM at CC00,16K
ISA Adaptor ROM at D000,16K
ISA Adaptor ROM at D400,16K
ISA Adaptor ROM at D800,16K
ISA Adaptor ROM at DC00,16K

These options enable shadowing of the contents of the ROM area named in the option title. For example, If the **ISA Adaptor ROM at CC00,16K** option is set to *Shadow,* the contents of the RAM area from CC000h - CFFFFh can be shadowed from ROM to RAM.

The settings are *Absent, NoShadow,* or *Shadow.* The BIOS Setup and Power-On defaults for all of the above options is *Absent.*

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

Boot Sector Virus Protection

When this option is enabled, AMIBIOS 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.* The BIOS Setup and Power-On default is *Disabled.* If enabled, the following appears when a write is attempted 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 after any attempt 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)? _
```

Performance Rich IDE

When this option is enabled, the American Megatrends PRIDE (Performance Rich IDE) circuitry is enabled. PRIDE improves IDE hard disk drive throughput. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

ADVANCED CMOS SETUP Options, Continued

Perf.Rich IDE Transfer Mode

This option sets the data transfer mode for the Performance Rich IDE circuitry. The settings are *Auto, Mode 0, Mode 1,* or *Mode 2.* If *Auto* is selected, AMIBIOS automatically determines the optimal mode. The BIOS Setup and Power-On defaults are *Auto.* The AMIBIOS Setup Auto Detect Hard Disk feature can detect and report all IDE drive parameters. Select **Auto Detect Hard Drive** from the AMIBIOS Setup main menu to determine which IDE Transfer Mode is supported by the IDE drive in your computer. See page for additional information about the AMIBIOS Setup Auto Detect hard drive feature.

IDE Block Mode Transfer

This option enables multiple sector reads and writes for IDE drives. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

Section 4

ADVANCED CHIPSET SETUP

The ADVANCED CHIPSET SETUP screen is shown below. Use the ↑ and ↓ keys to scroll through the options. Press <PgUp> or <PgDn> to select a different setting.

```
        AMIBIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP
     (C) 1993 American Megatrends, Inc. All rights reserved

Base Memory Size          : 640 KB
DRAM Performance Mode      : Enhanced
ISA VGA Frame Buffer Size  : Disabled
ISA VGA Frame Buf.Base Addr: (N/A)   d
ISA IRQ 9                  : Free
ISA IRQ 10                 : Free
ISA IRQ 11                 : Free
ISA IRQ 15                 : Free
PCI VGA Palette Snooping    : Disabled
PCI On Board SCSI BIOS      : Disabled




        ESC:Exit  →  :Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color
        F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults
```

ADVANCED CHIPSET SETUP Options

Base Memory Size

This option sets the size of the base system memory. The settings are *512 KB* or *640 KB.* The BIOS Setup default is *640 KB.* The Power-On default is *512 KB.*

DRAM Performance Mode

This option sets the DRAM system memory performance mode. The settings are *Standard* or *Enhanced.* The BIOS Setup default is *Enhanced.* The Power-On default is *Standard.*

ADVANCED CHIPSET SETUP Options, Continued

ISA VGA Frame Buffer Size

This option must be set to *Enabled* if the VGA card installed in the system requires a frame buffer. This option sets the size of the VGA frame buffer. The settings are *Disabled* or *Enabled.* The BIOS Setup and Power-On defaults are *Disabled.*

ISA VGA Frame Buf. Base Addr

This option sets the base address (or starting point) of the VGA frame buffer. This option must be set to *Enabled* if the VGA card installed in the system requires a frame buffer. The settings are not established at this time. The BIOS Setup and Power-On defaults are *(N/A).*

ISA IRQ 9

At least one IRQ must be free for each PCI Card in the system. If the PCI Card includes a multifunction device, at least two or more IRQs must be free. This option specifies if IRQ 9 is used. The settings are *Free* or *Used.* The BIOS Setup and Power-On defaults are *Free.*

ISA IRQ 10

At least one IRQ must be free for each PCI Card in the system. If the PCI Card includes a multifunction device, at least two or more IRQs must be free. This option specifies if IRQ 10 is used in ISA. The settings are *Free* or *Used.* The BIOS Setup and Power-On defaults are *Free.*

ADVANCED CHIPSET SETUP Options, Continued

ISA IRQ 11

At least one IRQ must be free for each PCI Card in the system. If the PCI Card includes a multifunction device, at least two or more IRQs must be free. This option specifies if IRQ 11 is used in ISA. The settings are *Free* or *Used.* The BIOS Setup and Power-On defaults are *Free.*

ISA IRQ 15

At least one IRQ must be free for each PCI Card in the system. If the PCI Card includes a multifunction device, at least two or more IRQs must be free. This option specifies if IRQ 15 is used in ISA. The settings are *Free* or *Used.* The BIOS Setup and Power-On defaults are *Free.*

PCI VGA Palette Snooping

This option must be set to *Enabled* if any ISA adapter card installed in the system requires VGA palette snooping. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On Defaults are *Disabled.*

ADVANCED CHIPSET SETUP Options, Continued

PCI On Board NCR SCSI BIOS

Set this option to *Enabled* to use the NCR SCSI BIOS on the motherboard. The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

Section 5

Power Management Setup

The Power Management Setup screen is shown below. Use the ↑ and ↓ keys to scroll through the options. Press <PgUp> or <PgDn> to select a different setting.

```
        AMIBIOS SETUP PROGRAM - POWER MANAGEMENT SETUP
    (C) 1993 American Megatrends, Inc. All rights reserved

CPU Low Power Mode        : Disabled
Monitor Low Power Mode    : Disabled
Auxiliary Power Shutodown  : Disabled













    ESC:Exit  →  :Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color
    F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults
```

Power Management Setup Options

Green PC Support

This option enables Green PC support features in AMIBIOS. The settings are *Disabled,* or the length of time of no mouse, keyboard, COM1, or COM2 activity after which the system will go to low power mode. The BIOS Setup and Power-On defaults are *Disabled.*

Auto Key-Lock Timeout

This option sets the timeout value for the AMIBIOS Green PC AutoKeyLock feature. If Password support is enabled, AutoKeyLock automatically locks the keyboard and mouse if there has been no system activity for the length of time specified in this option. The settings are *Disabled, 1 Min., 2 Min., 3 Min., 4 Min., 5 Min., 6 Min., 7 Min., 8 Min., 9 Min., 10 Min., 11 Min., 12 Min., 13 Min., 14 Min.,* or *15 Min.* The BIOS Setup and Power-On defaults are *Disabled.*

Section 6

Peripheral Setup

The Peripheral Setup screen is shown below. Use the ↑ and ↓ keys to scroll through the options. Press <PgUp> or <PgDn> to select a different setting.

```
              AMIBIOS SETUP PROGRAM - PERIPHERAL MANAGEMENT SETUP
                 (C) 1993 American Megatrends, Inc. All rights reserved

Programming Option          : Auto
On-Board Floppy Drive       : Disabled
On-Board IDE Drive          : Disabled
First Serial Port Address   : Disabled
Second Serial Port Address  : Disabled
Parallel Port Address       : Disabled










          ESC:Exit   →  :Sel  (Ctrl)Pu/Pd:Modify   F1:Help  F2:Color
          F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults
```

Peripheral Management Setup Options

Programming Option

The settings are *Auto* or *Manual.* When set to *Auto,* the BIOS automatically detects all adapter cards installed in the system and configures the onboard I/O (serial ports, parallel ports, floppy controllers, and IDE controller) automatically. All other Peripheral Setup option settings are ignored. Any serial port, parallel port, floppy controller, or IDE (Integrated Drive Electronics) controller on an adapter card in an expansion slot is configured before onboard I/O. If *Auto* is selected, the BIOS also attempts to avoid IRQ conflicts.

If the offboard serial ports are configured to specific starting I/O ports via jumper settings, the BIOS will configure the onboard serial ports to avoid conflicts. For example, if the default serial port starting I/O ports (serial port1 - 3F8h, serial port2 - 2F8h, serial port3 - 3E8h, serial port4 - 2E8h) are used, the following serial port configurations are possible:

If there are...	the ports are configured as...	and the two onboard serial ports are configured as...
two offboard serial ports	3E8h and 2F8h	3E8h and 2E8h
two offboard serial ports	3F8h and 3E8h	3F8h and Disabled
one offboard serial port	2F8h	3F8h and Disabled
one offboard serial port	3F8h	2F8h and Disabled

If *Manual* is selected, the settings chosen by the end user in Peripheral Setup apply.

AMIBIOS reports any I/O conflicts after displaying the BIOS Configuration Summary Screen, but only if *Manual* is chosen. The BIOS Setup and Power-On default is *Auto.*

Peripheral Management Setup Options, Continued

On-Board Floppy Drive

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

On-Board IDE Drive

This option enables the use of the IDE controller on the motherboard (if installed). The settings are *Enabled* or *Disabled.* The BIOS Setup and Power-On defaults are *Disabled.*

First Serial Port Address

IRQ4 is used for the first serial port (COM1). This option enables serial port 1 on the motherboard (if installed). The BIOS Setup and Power-On defaults are *Disabled.* The settings are *Disabled* or any valid I/O port address consisting of three hex digits.

Second Serial Port Address

IRQ3 is used for the second serial port (COM2). This option enables serial port 2 on the motherboard, if installed. The BIOS Setup and Power-On defaults are *Disabled.* The settings are *Disabled* or any valid I/O port address consisting of three hex digits.

Parallel Port Address

IRQ7 is used for the parallel port (LPT1). The IRQ can be changed to IRQ5 via J3. This option enables the parallel port on the motherboard, if installed. The settings are *Disabled* or any valid I/O port address consisting of three hex digits. The BIOS Setup and Power-On defaults are *Disabled.*

Section 7

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, remove the computer cover, set switch 1-2 (the DIAG switch) to ON, power on the computer. AMIBIOS will erase the password.

Section 8

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.

Hard Disk Format Utility, 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.

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

Flash EPROM Programming

The American Megatrends Super Voyager PCI motherboard 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 three methods for programming the Flash EPROM:

- program from system boot,
- set SW2 switch 6 ON, or
- run the AMIFlash utility.

Programming Flash from System Boot

Using the floppy disk with the new BIOS file, press and hold down <Ctrl> <Home> to reprogram the Super Voyager PCI 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 PCI motherboard Flash EPROM-based AMIBIOS from the DOS command prompt using AMIFlash.

Set SW2 Switch 6

Insert the floppy disk with the new BIOS in floppy drive A:. Set SW2 switch 6 ON to program the Flash EPROM.

Reprogramming from System Boot

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

1.   reads S76P.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.

S76P.ROM

S76P.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 76 Super Voyager PCI motherboard must be updated.

S76P.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 S76P.ROM.

Programming the Flash EPROM

Step	Action
1	Turn system power off.
2	Place the floppy disk that has the latest S76P.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 <Ctrl> and <Home> keys.

Sequence of Operation

The following table lists the sequence of operation and the expected behavior of the AMIFlash Code.

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 S76P.ROM on the floppy disk.	S76P.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. There is no beep if this step is successful.
4 Check for BIOS file size.	The BIOS file size is checked. There is no beep if this step is successful.
5 Check for Flash EPROM.	The BIOS looks for an Intel i28F001BX-T Flash EPROM. It does not beep if this step is successful.
6 Erase the Flash EPROM.	Two beeps sound when the BIOS begins erasing the Flash EPROM.
7 Program the Flash EPROM.	Three beeps sound when the AMIFlash Code begins reprogramming the Flash EPROM.
8 Continue programming the Flash EPROM.	Four beeps sound when reprogramming has been successfully completed.
9 AMIFlash does a reset.	A CPU reset is generated (the system reboots).
10 Reboot	Reboot the system.

Reprogramming from System Boot, Continued

Beep Codes

During normal operation, the Flash utility produces a series of beeps to:

- signify completion of a step (as shown on the previous page), or to
- signal an error.

Error beeps are arranged in a coded sequence and have different meanings depending on when they occur. The following list describes the error beep codes and when they can occur.

Step	Beeps	Description
—	None	Successful completion.
1	Continuous Single Beep	There is no floppy disk in Drive A:.
2	Five Beeps	S76P.ROM is not present in the root directory of the floppy disk in the A: drive.
3	Seven Beeps	Floppy Read Error.
4	Six Beeps	BIOS File Size Error.
5	Eight Beeps	An Intel i28F001BX-T Flash EPROM is not present.
6	Continuous Two Beeps	There is a problem in erasing the Flash EPROM.
7	Continuous Three Beeps	There is a problem in programming the Flash EPROM.
9	Continuous Four Beeps	The BIOS is not able to reset the CPU.

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 and 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 S76P.ROM file in the floppy root directory.

E6h	The S76P.ROM file not present in the floppy disk root directory.
E7h	Begin reading the File Allocation Table.
E8h	Begin reading S76P.ROM, sector by sector.
E9h	S76P.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

`S76P.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 (S76P.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?	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.
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.

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 PCI motherboard is 20% to 80% non-condensing.

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