Merlin PCI

Pentium® Pro

ISA Motherboard

User's Guide

MAN-735
4/16/96

American Megatrends, Inc.
5555 Oakbrook Parkway, Building 200,
Norcross, GA 30093

Trademarks

Revision History

4/16/96 Initial release of preliminary version.

Table of Contents

Preface

To the OEM

Thank you for purchasing the high performance American Megatrends Merlin ISA motherboard. This product is a state of the art 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 Merlin 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 Merlin PCI motherboard. It explains how to assemble a system based on the Merlin 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 770-246-8645.

American Megatrends BBS

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

Data Transmission Rates The American Megatrends BBS automatically handles modems with data transmission rates from 1,200 to 28,800 bps.

BBS Phone Numbers The following table lists the characteristics of the BBS phone numbers. The BBS requires no parity, eight data bits, and one stop bit.

Phone Number	Characteristics
770-246-8780	28,800 baud rate. Supports v.34.
770-246-8781	28,800 baud rate. Supports v.34.
770-246-8782	Supports HST and v.42.
770-246-8783	Supports HST and v.42.

Packing List

You should have received the following:

- a Merlin PCI motherboard,
- two serial cables,
- one parallel cable,
- a Warranty Card, and
- the *American Megatrends Merlin PCI Pentium Pro Motherboard User's Guide*.

1 Hardware Installation

Overview

The American Megatrends Merlin PCI Pentium Pro ISA motherboard features include:

- support for an Intel Pentium Pro CPU operating at 133, 150, 166, 180, 200 MHz or higher,
- support for up to 512 MB of system memory,
- parity checking or ECC,
- interleaved memory,
- PCI local bus throughput of 132 megabytes per second,
- four ISA expansion slots, and
- four PCI expansion slots.

ISA DMA or Bus Masters The Merlin Pentium Pro PCI ISA motherboard conforms to the PCI Version 2.1 specification, if the **PCI 2.1 Compliance** option in Chipset Setup is set to *Enabled*. The Version 2.1 PCI specification requires a deterministic latency for PCI devices. Computers that use ISA DMA or ISA bus masters will experience longer access latencies if the **PCI 2.1 Compliance** Chipset Setup option is set to *Enabled*.

AMIBIOS automatically configures the PCI slots. The PCI slots are synchronous with the CPU clock:

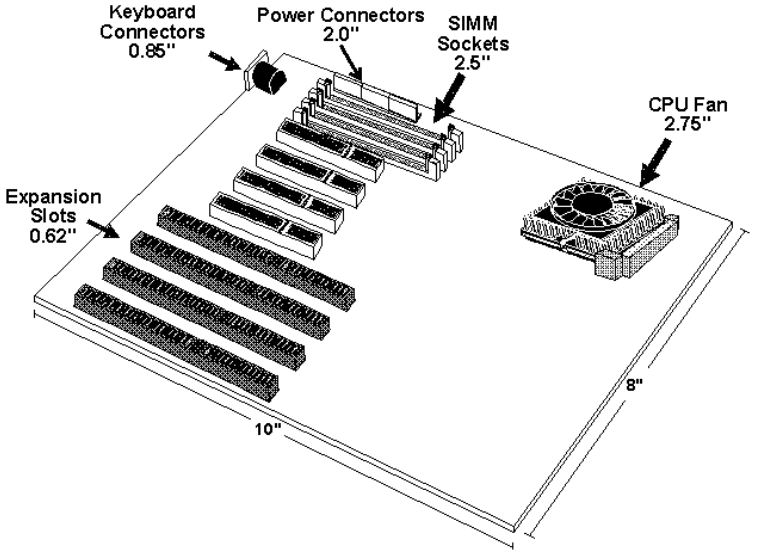
CPU External Clock Frequency	PCI Expansion Slot Frequency
66 MHz	33 MHz
60 MHz	30 MHz
50 MHz	25 MHz

Onboard I/O The Merlin Pentium Pro ISA motherboard includes:

- two 40-pin IDE connectors for 1 – 4 IDE drives,
- a 34-pin floppy drive connector,
- two serial port connectors,
- a 25-pin parallel port connector,
- a keyboard DIN connector, and
- a 9-pin berg mouse connector

Merlin PCI Dimensions

The motherboard is approximately 8” by 10” (the standard baby AT size and mounting holes).



Installation Steps

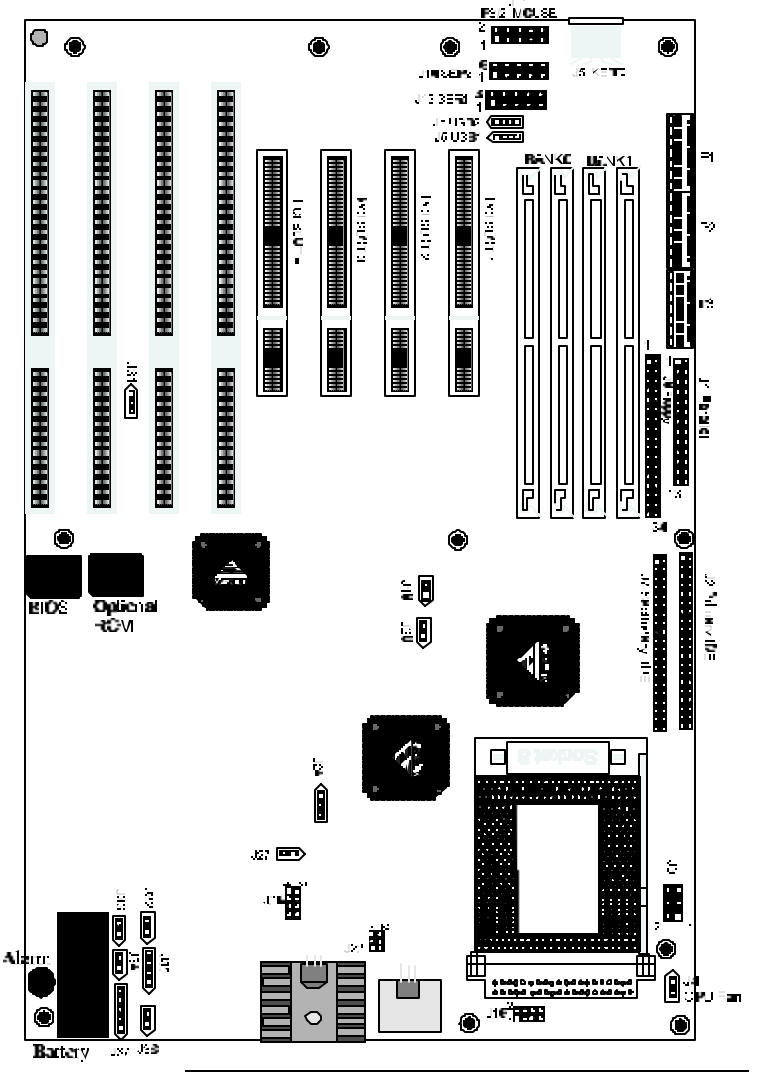
Step	Action	Turn to
1	Unpack the motherboard.	Page5
2	Configure the CPU.	Page6
	Configure the CPU.	Page6
	Select the CPU 3.3V Power Source	Page6
	Select the CPU Voltage.	Page7
	Select the CPU Speed.	Page7
	Install the CPU.	Page10
3	Install memory.	Page12
	Install System Memory.	Page12
4	Install the Motherboard.	Page15
5	Attach cables to connectors.	Page17
	Connect the Power Supply.	Page18
	Attach the Keyboard Cable.	Page20
	Connect the Mouse Cable.	Page21
	Attach Cables.	Page21
	Connect Onboard I/O.	Page21
	Connect the Serial Ports.	Page21
	Connect the Parallel Port.	Page21
	Connect Floppy Drive(s).	Page23
	Connect the IDE Drive(s).	Page27
6	Test and Configure.	Page32

Warning

This motherboard contains sensitive electronic components that can be easily damaged by static electricity. Follow the instructions carefully to ensure correct installation and to avoid static damage.

Merlin PCI Motherboard Layout

Pin 1 is identified by a square pin □
and by a pointed box on the silkscreen. ⬭



Step 1 Unpack the Motherboard

Step	Action
1	Inspect the cardboard carton for obvious damage. If damaged, call 770-246-8645. 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 megaohm resistor instead of the anti-static mat. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 megaohm 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.
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.

Set Jumpers Set all jumpers and install the CPU before placing the motherboard in the chassis.

Avoid Static Electricity

Static electricity can damage the motherboard and other computer components. Keep the motherboard in the anti-static bag until it is to be installed. Wear an anti-static wrist grounding strap before handling the motherboard. Make sure you stand on an anti-static mat when handling the motherboard.

Avoid contact with any component or connector on any adapter card, printed circuit board, or memory module. Handle these components by the mounting bracket.

Step 2 Configure CPU

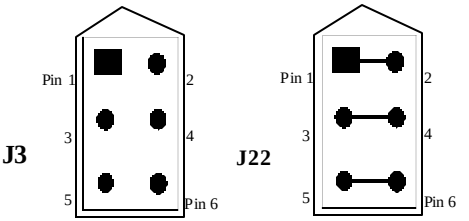
Jumpers J16, J19, J20, J24, AND J28 select the CPU type. See the drawing on page 4 for the jumper locations. Set the jumpers described below before installing a CPU.

> ***Important***
>
> If you are not sure about the voltage specification for the CPU to be installed, call Intel to make sure that you set J16 correctly. The wrong voltage can damage the CPU.

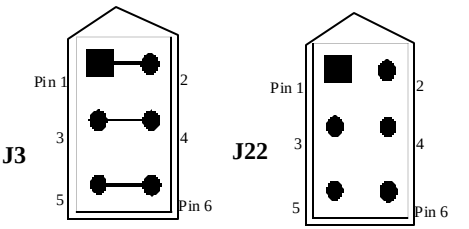
3.3V CPU Power J3 and J22 are six-pin bergs that select the 3.3V CPU power source. 3.3V power is available: via the regulator (default), or via a 3.3V power supply.

> ***Important***
>
> *J3 and J22 must not be jumpered at the same time*

Regulator Power Set J3 and J22 as follows to configure 3.3V power from the regulator:

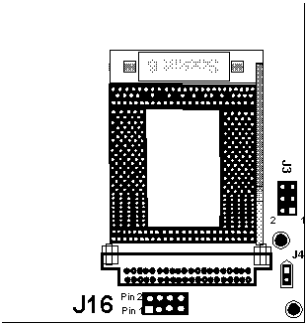


From 3.3V Power Supply Set J3 and J22 as follows to configure 3.3V power from the 3.3V power supply:



Cont'd

CPU Voltage J16is an 8-pin berg that sets the core CPU voltage. J16 is near the CPU, as shown below:



Core CPU Voltage	J16 Setting
3.5V	Short Pins 1-2 Short Pins 3-4 Short Pins 5-6 Short Pins 7-8
3.4V	Short Pins 1-2 Short Pins 3-4 Short Pins 5-6
3.3V (Factory Setting)	Short Pins 1-2 Short Pins 3-4 Short Pins 7-8
3.2V	Short Pins 1-2 Short Pins 3-4
3.1V	Short Pins 1-2 Short Pins 5-6 Short Pins 7-8
3.0V	Short Pins 1-2 Short Pins 5-6
2.9V	Short Pins 1-2 Short Pins 7-8
2.8V	Short Pins 1-2
2.7V	Short Pins 3-4 Short Pins 5-6 Short Pins 7-8
2.6V	Short Pins 3-4 Short Pins 5-6
2.5V	Short Pins 3-4 Short Pins 7-8
2.4V	Short Pins 3-4
2.3V	Short Pins 5-6 Short Pins 7-8
2.2V	Short Pins 5-6
2.1V	Short Pins 7-8
No Voltage	OPEN

Cont'd

Step 2 Configure CPU, Continued

Set CPU External Speed J19 and J20 set the external CPU speed, as follows:

External CPU Speed	J19	J20
50 MHz	Shorted	Shorted
60 MHz	OPEN	Shorted
66.66 MHz	Shorted	OPEN

J28 CPU Clock Multiplier J28 sets the CPU clock multiplier as follows:

Clock Multiplier	J28 Pins 1-2	J28 Pins 3-4	J28 Pins 5-6	J28 Pins 7-8
2	Shorted	Shorted	Shorted	Shorted
2.5	OPEN	Shorted	Shorted	Shorted
3	Shorted	OPEN	Shorted	Shorted
3.5	OPEN	OPEN	Shorted	Shorted
4	Shorted	Shorted	OPEN	OPEN

Important

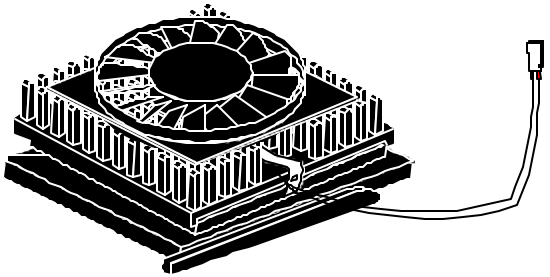
Please contact American Megatrends technical support at 770-246-8645 to support a CPU running at a higher speed.

Internal CPU Speed	External CPU Speed	Multiplier	J19	J20	J28
150	60	2.5	OPEN	Shorted	Short 3-4 Short 5-6 Short 7-8
166	66.66	2.5	Shorted	OPEN	Short 3-4 Short 5-6 Short 7-8
180	60	3	OPEN	Shorted	Short 1-2 Short 5-6 Short 7-8
200	66.66	3	Shorted	OPEN	Short 1-2 Short 5-6 Short 7-8

Cont'd

Connect CPU Fan J4 (shown below) is a two-pin berg that connects the fan on the CPU heat sink.

All Pentium Pro CPUs are shipped with *a heat sink and a CPU fan*. As shown below, the wire from the CPU fan has two leads. The fan cable has a red lead and a black lead. *Connect the Red lead to +12V.*



STOP

Warning

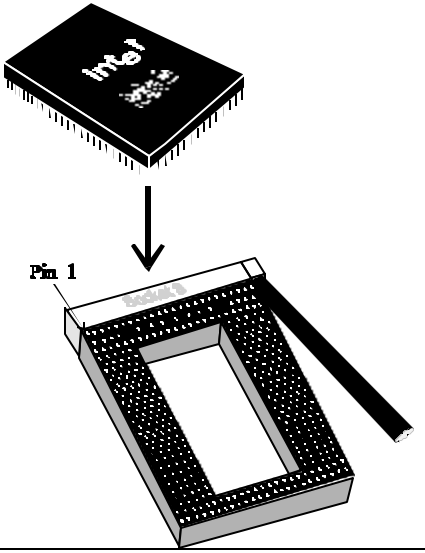
The red wire from the CPU fan must be connected to Pin 1 of J4.

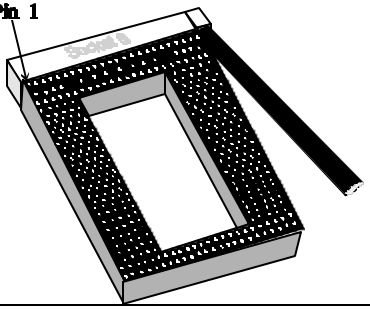
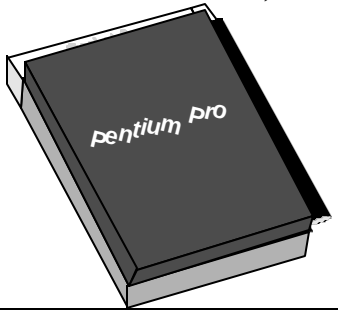
Cont'd

Step 2 Configure CPU, Continued

Install CPU Install the CPU in the ZIF (zero insertion force) socket by performing the following steps. The CPU socket is near one edge of the motherboard, as shown on page 4.

> ***Warning***
>
> *Improper CPU installation can damage the CPU and the motherboard. You must follow the procedures in this section exactly as documented. Make sure you wear an antistatic wristband while installing the CPU. Follow all antistatic procedures described on page 5.*

Step	Action
1	Lift the lever on the ZIF socket. The empty CPU socket looks like this. 

Step	Action
2	Check for bent pins on the CPU. Gently straighten any bent pins with pliers. Place the CPU in the middle of the socket, as shown below. Make sure that pin 1 of the CPU is aligned with pin 1 of the socket. *Make sure you are properly grounded while handling the CPU.* **Pin 1** 
3	Complete installation by lifting the ZIF lever to the other side of the socket, as shown below. 

Step 3 Install Memory

System Memory There are four 32-bit SIMM (Single Inline Memory Module) sockets. System memory must be populated one bank at a time. Each bank has two sockets. Bank0 includes U9 and U5. Bank1 includes U4 and U1. Each bank must be populated with the same type of SIMM. If a 4 MB SIMM is installed in the first socket in Bank0, then the same type of 4 MB SIMM must be installed in the second Bank0 SIMM socket. The minimum amount of system memory supported my the Merlin PCI is 8 MB. Each socket can hold one SIMM. You can use:

- 1 MB x 32 (or 36),
- 2 MB x 32 (or 36),
- 4 MB x 32 (or 36),
- 8 MB x 32 (or 36), or
- 16 MB x 32 (or 36) SIMMs.

Fast Page Mode, EDO, and Burst EDO SIMMs cannot be mixed. The motherboard supports SIMMs operating at 50, 60, or 70 ns (RAS access time). Set the Chipset Setup **DRAM Speed (ns)** option correctly.

Memory Display System memory is reported by AMIBIOS as it boots and again when the AMIBIOS System Configuration Screen is displayed just before the operating system boots. The memory displayed by AMIBIOS on the System Configuration Screen is 384 KB less than the total memory installed.

Cont'd

Step 3 Install Memory, Continued

Select SIMMs SIMMs must meet the following specifications:

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

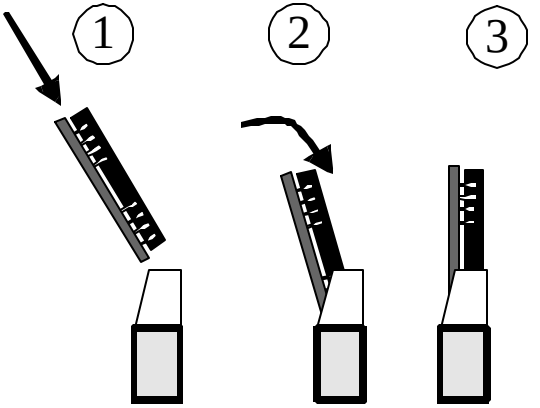
SIMM Part Numbers

Type	Manufacturer	Part Number
1 MB x 36	Micron	MT12D136M-7
"	Mitsubishi	MH1M36ADJ-7
"	PNY	P361000-70
"	Motorola	MCM36100AS-70
"	Oki	MSC2355-70YS12
"	Samsung	KMM5361000AV-7
2 MB x 36	PNY	P362000-70
"	Samsung	EMM53620036-70
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
16 MB x 36	To be supplied.	

Cont'd

Installing SIMMs The four SIMM sockets on the motherboard can be filled with either 1 MB x 32 (or 36), 2 MB x 32 (or 36), 4 MB x 32 (or 36), 8 MB x 32 (or 36), or 16 MB x 32 (or 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 an angle, then push it up. When properly inserted, the SIMM clicks into place as the latching pins engage. The SIMM installation process is shown below:



Step 4 Install the Motherboard

The motherboard mounting hole pattern is the same as the mounting hole pattern on the standard baby AT motherboard. Standoffs and mounting screws are not supplied with the motherboard. The chassis manufacturer should supply these parts.

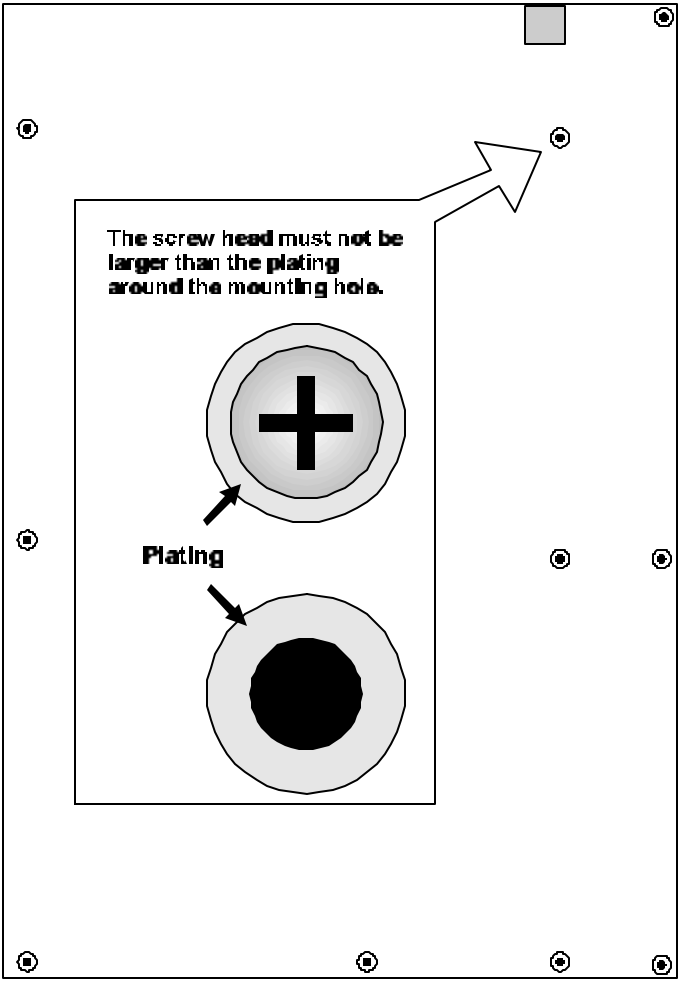
Step	Action
1	Place the chassis on an anti-static mat. Connect the chassis to ground to avoid static damage during installation. Connect an alligator clip with a wire lead to any unpainted part of the chassis. Ground the other end of the lead at the same point as the mat and the wristband.
2	Rotate the chassis so the front is to the right, and the rear is to the left. The side facing you is where the motherboard is mounted. The power supply is mounted at the far end of the chassis.
3	Hold the motherboard, component side up, with the edge with the SIMM sockets toward you and the edge with the power supply connector away from you. The keyboard, mouse, and video connectors should be to the left.
4	Carefully slide the motherboard into the chassis. Make certain the edge connectors fit the ports in the rear of the chassis. The motherboard should rest level with the chassis.
5	Place the mounting screws in the holes provided and tighten them. If necessary, shift the motherboard slightly to align the mounting holes on the motherboard with the holes on the chassis. See the drawing on the next page.

Warning

If using metallic screws, make sure you use them only in the plated mounting holes. If using metallic screws, make sure the head of the screw fits completely inside the plated mounting holes.

See the graphic on the following page.

Cont'd

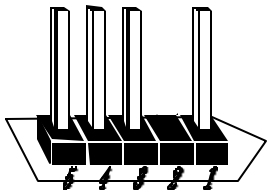

The screw head must not be larger than the plating around the mounting hole.
Plating

Step 5 Attach Cables

Connectors The Merlin PCI motherboard includes many connectors. Connection instructions, illustrations of connectors, and pinouts are supplied in the following pages. A list of all connectors described in this section follows:

Connector	Turn to
Power supply connectors P1, P2, and P3	pages 18 through 20
Keyboard connector J8	page 20
Mouse connector J11	page 21
Green PC power supply connector J10	page 22
Reset switch J32	page 22
Speaker J35	page 22
Keyboard lock connector J37	page 23
Turbo LED connector J34	page 23
IDE LED connector J36	page 23
Serial port connectors J12 and J13	page 24
Parallel port connector J1	page 25
Floppy connector J6	page 26
IDE drive connectors J2 and J7	pages 29 through 31

Cable Connector Ends When connecting chassis connectors to the motherboard, make sure to connect the correct connector end. Most connector wires are color-coded. Match the color of the wires leaving the switch or LED to the same pin on the connector end. There may be more than one connector with the same color-coded wires. If so, follow the wire to the switch or LED. All motherboard components are outlined by a white rectangular box with a broad arrow at one end. Pin 1 is always at the arrow end of the white outlined box, as shown below:



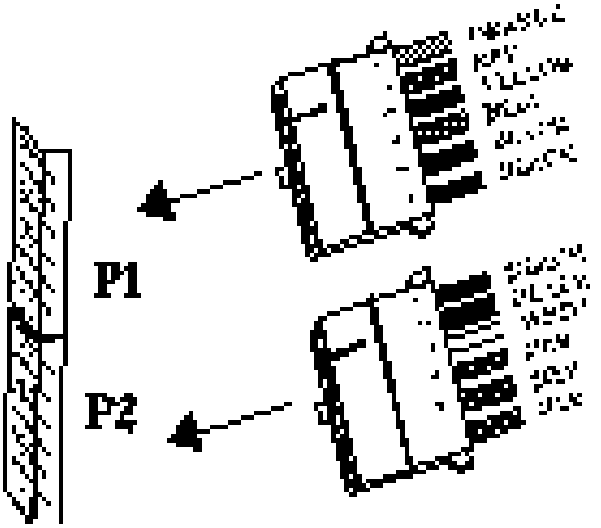
Cont'd

Step 5 Attach Cables, Continued

Connect Power Supply The power supply should match the physical configuration of the chassis. Make sure the power switch is off before assembly.

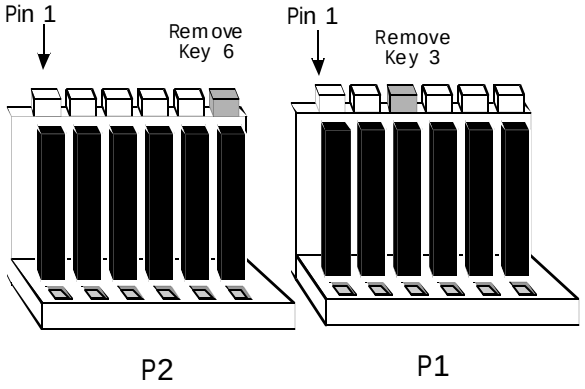
Before attaching all components, make sure the proper voltage has been selected. Power supplies often can run on a wide range of voltages and must be set (usually via a switch) to the proper range. Use at least a 240 watt power supply, which should have built-in filters to suppress radiated emissions.

Connect Power Cables Attach the power supply cables to the power connector (P1 and P2) on the motherboard. AT-compatible power supplies have two six-pin connectors, attached as shown below. The six-pin connector on the power cable with three red wires and two black wires is attached to P1 pins 1-6. The other connector on the end of the power cable is attached to P2 pins 1-6.



Cont'd

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



P1 Pinout

Pin	Description
1	Power Good (Orange wire) (Not used)
2	VCC (Red wire)
3	+12 Volts (Yellow wire)
4	-12 Volts (Blue wire)
5	Ground (Black wire)
6	Ground (Black wire)

P2 Pinout

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

Cont'd

P3 Pinout P3 provides optional 3.3V power.

Pin	Description
1	Ground (Black wire)
2	Ground (Black wire)
3	-5 Volts (White wire)
4	3.3V
5	3.3V
6	3.3V

Keyboard Connector The keyboard connector (J8) is a six-pin DIN socket. The J5 pinout is shown below. The keyboard connector position is shown on page 4.

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

Cont'd

Connect Mouse Cable The mouse connector (J11) is a 10-pin berg. The mouse cable is the same as the serial cable in the Merlin PCI motherboard. Two serial cables are shipped with the motherboard. Use one of these cables for the mouse, or you can make your own cable using the following pinout.

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

PS/2 Mouse IRQ J31 is a three-pin berg that enables the PS/2 mouse interrupt (IRQ12). Short Pins 1-2 of J31 to enable IRQ12 as the PS/2 mouse interrupt. You should always short Pins 1-2 of J31 to enable the PS/2 mouse interrupt. The only reason you would ever have to short Pins 2-3 of J31 is if you wanted an adapter card on the ISA bus to use IRQ12. You would then have to set the **Mouse Support** option in Advanced Setup to *Disabled.*

J31 Pins 1-2 Shorted
IRQ12 used for PS/2 Mouse

Cont'd

Step 5 Attach Cables, Continued

J10 Green PC Power J10 is a two-pin berg that connects to a Green PC power supply. When the computer enters a power conserving state, a signal is sent from this berg to the power supply to permit the power supply to switch to a low power, high-efficiency mode.

The + on Pin 2 identifies the positive connector.

J32 Reset Switch Connector J32 is a two-pin single-inline berg that is attached via a cable to an externally-mounted reset switch.

When the reset switch is pressed, the system performs a hard reset. Pin 1 is ground and Pin 2 is Hard Reset.

J35 Speaker Connector J35 is a four-pin single-inline berg that is optionally attached via a cable to a standard system speaker. AMIBIOS signals hardware problems through the speaker. Pin 1 on the motherboard is identified by the arrow on the white box around the berg.The Merlin PCI motherboard also has a built-in speaker mounted on the motherboard.

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

Cont'd

Keyboard Lock J37 is a five pin single line berg that is attached via a cable to the keyboard lock connector (or separate keyboard lock and Power LED connectors). The computer chassis may not include the keyboard lock and Power LED on a single connector. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use. Pin 1 on the motherboard is identified by the broad arrow.

Pin	Description
1	VCC
2	Ground
3	Ground
4	Keyboard Lock (KBDINH)
5	Ground

J34 Turbo LED J34 is a two-pin berg that is attached via a cable to the externally-mounted bipolar Turbo LED. The LED lights when the motherboard is running at high speed.

J36IDE LED J36 is a two-pin berg that is attached via a cable to the externally-mounted IDE Activity LED. This LED lights when the IDE drive is running.

Warning

In some IDE drives, you may have to disable the IDE LED mounted on the drive by changing a jumper or setting a switch on the IDE drive itself, before the IDE drive sends a signal to J36.

Cont'd

Step 5 Attach Cables, Continued

Onboard Adapters The Merlin PCI motherboard has:

- two serial ports (J12 and J13),
- a parallel port (J1),
- an IDE controller on the PCI bus. The primary IDE connector is J2.
- The secondary IDE connector is J7.
- a floppy controller (J6).

The serial and parallel port connectors are described below. The IDE connector is described on page 27. The floppy connector is described on page 25.

Conflicts AMIBIOS minimizes conflicts between onboard and offboard I/O devices.

AMIBIOS automatically checks the adapter cards installed in the expansion slots on the Merlin PCI motherboard for a hard disk or floppy controller and serial or parallel ports.

J13 SER1, J12 SER2 J13 and J12 are 10-pin connectors that provide an AT-compatible serial port interface. Connect the cables supplied with the motherboard to J13 and J12. The serial port base I/O port address and other serial port settings can be selected in Peripheral Setup in WINBIOS Setup.

The J13 and J12 pinout is shown below.

Pin	Description	Pin	Signal Description
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	Ground	10	CUT PIN

Cont'd

J1 Parallel Port J1 is a 26-pin connector for a parallel port. The J1 pinout is shown below. Connect the 16-pin to DB25 cable provided with the motherboard to J6. The parallel port interface supports the standard Centronics-compatible, ECP (Extended Capabilities Port), and EPP (Enhanced Parallel Port) parallel ports.

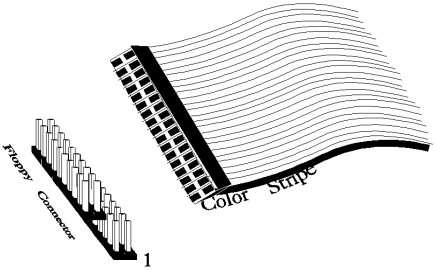
All parallel port settings must be correctly configured through Peripheral Setup in WINBIOS Setup.

Pin	Signal Description	Pin	Signal Description
1	STROBE#	2	PD0
3	PD1	4	PD2
5	PD3	6	PD4
7	PD5	8	PD6
9	PD7	10	ACK#
11	BUSY	12	PE
13	SLCT	14	AUTOFD#
15	ERROR#	16	INIT#
17	SLCTIN#	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground	26	Ground

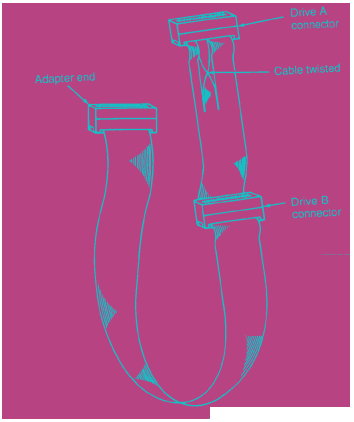
Cont'd

J6 Floppy

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



The motherboard supports up to two 720 KB, 1.44 MB, or 2.88 MB 3½" drives and 360 KB and 1.2 MB 5¼" drives. The connecting cable is a 34-pin ribbon connector with two 34-pin edge connectors for attaching the floppy disk drives. There is a small twist in the cable between the floppy connectors. The last (end) connector should be connected to floppy drive A: as shown below.



Cont'd

J6 Floppy Connector Pinout

Pin	Use	Pin	Use
1	GND	2	DENSE1
3	GND	4	N/C
5	GND	6	DRATE0
7	GND	8	-INDEX
9	GND	10	-MOTOR0
11	GND	12	-FDSEL1
13	GND	14	-FDSEL0
15	GND	16	-MOTOR1
17	GND	18	DIR
19	GND	20	-
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

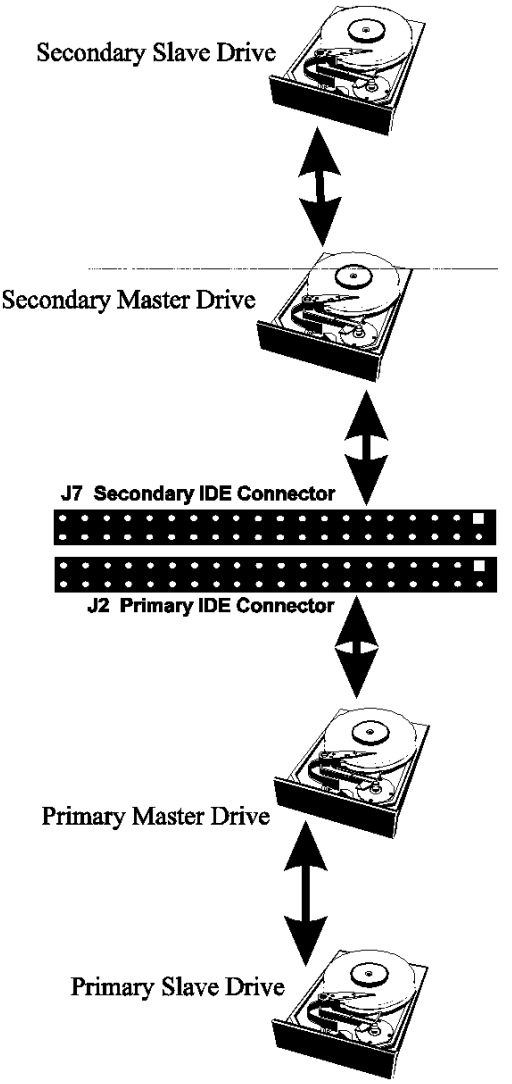
Twist in Floppy Cable

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	

Cont'd

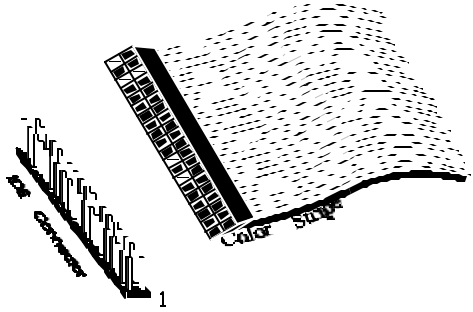
IDE Drives

Attach the IDE drives in the following manner. Choose Peripheral Setup in WINBIOS Setup to enable the onboard IDE controller.



Cont'd

Attach IDE Cable to J2 J2 is the primary IDE (Integrated Drive Electronics) hard disk drive connector. Both the primary master and the primary slave IDE drives must be connected by cable to J2, as shown below.



J2 is a 40-pin dual-inline berg that connects an IDE drive to the primary onboard IDE connector. This motherboard supports IDE Modes 0, 1, 2, 3, and 4, IDE prefetch, LBA (Logical Block Address) mode, high capacity drives (over 528 MB), 32-bit data transfer, and fast IDE transfer. These IDE features are configured in Peripheral Setup in the WINBIOS Setup utility.

Disable the onboard IDE interface in Peripheral Setup to use an ISA ESDI, RLL, MFM, or SCSI hard disk drive controller.

Cont'd

J2 Pinout The J2 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	-REQ	22	GND
23	-IOW	24	GND
25	-IOR	26	GND
27	IDERDY	28	Pullup
29	-ACK	30	GND
31	INT14	32	N/C
33	HA1	34	N/C
35	HA0	36	HA2
37	-CS0	38	-CS1
39	-IDEACT	40	GND

J7 Secondary IDE Controller J7, the secondary IDE connector, is a 40-pin dual-inline berg that connects the secondary primary and slave IDE drives to the secondary onboard IDE controller.

Attach the secondary master and slave IDE drives to J7 via a standard 40-pin IDE cable as shown on page 29.

Cont'd

J7 Pinout The J7 pinouts:

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	-REQ	22	GND
23	-IOW	24	GND
25	-IOR	26	GND
27	IDERDY	28	Pullup
29	-ACK	30	GND
31	INT15	32	N/C
33	HA1	34	N/C
35	HA0	36	HA2
37	-CS2	38	-CS3
39	N/C	40	GND

Step 6 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,
- make sure the CPU is seated properly,
- make sure there are no screws or other foreign material on the motherboard,
- plug the system into a surge-protected power strip, and
- make sure blank back panels are installed on the back of the chassis to minimize RF emissions.

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

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

If POST does not run successfully, it will beep or display error messages. Beeps indicate a serious problem with the system configuration or hardware. The Beep Code indicates the problem. AMIBIOS Beep Codes are defined in the *AMIBIOS Technical Reference*. Make sure the affected part is properly seated and connected. An error message is displayed if the error is less serious. Recheck the system configuration or the connections.

Configure the System Run WINBIOS Setup. You must enter the requested information and save the configuration data in NVRAM. The system will then reset, run POST, and boot the operating system. See page 36 for information on configuring the computer.

2 WINBIOS Setup

In ISA and EISA computers, the system parameters (such as amount of memory, type of disk drives and video displays, and many other elements) are stored in NVRAM (Non-Volatile Random Access Memory), also called CMOS RAM. Unlike the DRAM (dynamic random access memory) that is used for standard system memory, NVRAM requires very little power. When the computer is turned off, a back-up battery provides power to NVRAM, which retains the system parameters. Every time the computer is powered-on, the computer is configured with the values stored in NVRAM by the system BIOS, which gains control when the computer is powered on.

The system parameters are configured by a system BIOS Setup utility. Historically, BIOS Setup utilities have been character-based, required keyboard input, and have had user interfaces that were not very intuitive.

Graphical Setup

American Megatrends has a new type of system BIOS Setup utility. WINBIOS Setup has a graphical user interface the end user can access using a mouse. The WINBIOS Setup code is so compact that it can reside on the same ROM as the system BIOS. The system configuration parameters are set by WINBIOS Setup.

Since WINBIOS Setup resides in the ROM BIOS, it is available each time the computer is turned on.

Starting WINBIOS Setup

As POST executes, the following appears:

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

Press <Del> to run WINBIOS Setup.

Using a Mouse with WINBIOS Setup

WINBIOS Setup has a built-in mouse driver and can be accessed by either a serial mouse or PS/2-style mouse. WINBIOS Setup supports Microsoft-Compatible serial mice and all PS/2-type mice.

The mouse click functions are: single click to change or select both global and current fields and double-click to perform an operation in the selected field.

Using the Keyboard with WINBIOS Setup

WINBIOS has a built-in keyboard driver that uses simple keystroke combinations:

Keystroke	Action
<Tab>	Change or select a global field.
<→, ←, ↑, ↓	Change or select the current field.
<Enter>	Perform an operation in the current field
+	Increment a value.
–	Decrement a value.
<Esc>	Abort any window function.
<PgUp>	Return to the previous page
<PgDn>	Advance to the next page.
<Home>	Returns to the beginning of the text.
<End>	Advance to the end of the text.
<Ctrl><Alt><+>	Change to high speed
<Ctrl><Alt><->	Change to low speed.

WINBIOS Setup Menu

The WINBIOS Setup main menu, shown below, is organized into four sections. Each of these sections corresponds to a section in this chapter.

Each section contains several icons. Clicking on each icon activates a specific AMIBIOS function. The WINBIOS Setup main windows and related functions are described on the next page.

Main Windows The WINBIOS Setup main windows are:

WINBIOS Setup Windows	See Section	on page
The Setup icons allow you to set system configuration options such as date, time, hard disk type, and floppy type.	1	page 36
The Utilities section allows you to change the WINBIOS Setup screen colors and to change the language that WINBIOS Setup screen message are written in.	2	page 65
The Security icons allow you to configure passwords and enable AMIBIOS anti-virus protection.	3	page 62
Default has three icons that permit you to select a group of settings for all AMIBIOS WINBIOS Setup options.	4	page 66

Section 1 Setup

Standard Setup

Standard Setup options are displayed by choosing the Standard icon from the WINBIOS Setup main menu. All Standard Setup options are described in this section.

Date/Time Select the Date and Time icon. The current values for each category are displayed. Enter new values through the keyboard.

Floppy Drive A: and B Move the cursor to these fields via the PgUp and PgDn keys and select the floppy type.

The settings are 360 KB 5¼ inch, 1.2 MB 5¼ inch, 720 KB 3½ inch, 1.44 MB 3½ inch, or 2.88 MB 3½ inch.

Cont'd

Pri Master, Pri Slave, Sec Master, Sec Slave Select one of these hard disk drive icons to configure the hard disk drive named in the option. Select *Auto* from the drive parameters screen to let AMIBIOS automatically configure the drive. A screen with a list of drive parameters appears. Click on *OK* to configure the drive.

Drive Type	How to Configure
SCSI	Select *Type*. Select *Not Installed* in the drive parameter screen.
IDE	Select *Type.* Select *Auto* to let AMIBIOS determine the parameters. Click on OK when AMIBIOS displays the drive parameters. Select *LBA/Large Mode* . Select On if the drive has a capacity greater than 540 MB. Select *Block Mode* . Select On to allow block mode data transfers. Select *32-Bit Transfer* . Select On to allow 32-bit data transfers. Select the *PIO Mode* . It is best to select Auto to allow AMIBIOS to determine the PIO mode. If you select a PIO mode that is not supported by the IDE drive, the drive will not work properly. If you are absolutely certain that you know the drive's PIO mode, select PIO mode 0 - 5.
CD-ROM	Select *Type*. Select CDROM. Click on OK when AMIBIOS displays the drive parameters.
Standard MFM Drive	Select *Type.* You must know the drive parameters. Select the drive type that exactly matches your drive's parameters.
Non-Standard MFM Drive	Select *Type.* If the drive parameters do not match the drive parameters listed for drive types 1 - 46, select User and enter the drive parameters for you hard disk drive.

Cont'd

Entering Drive Parameters You can also enter the hard disk drive parameters. The drive parameters are:

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 the number of heads times the number of cylinders times the number of sectors per track) times 512 (bytes per sector).

Cont'd

MFM 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

Advanced Setup

Advanced Setup options are displayed by choosing the Advanced icon from the WINBIOS Setup main menu. All Advanced Setup options are described in this section.

Typematic Rate This option sets the rate at which characters on the screen repeat when a key is pressed and held down. The settings are *Slow* or *Fast.*

The Optimal and Fail-Safe default settings are *Fast.*

System Keyboard This option does not specify if a keyboard is attached to the computer. Rather, it specifies if error messages are displayed if a keyboard is not attached. This option permits you to configure workstations with no keyboards. The settings are *Absent* or *Present.*

The Optimal and Fail-Safe default settings are *Present.*

Primary Display This option configures the type of monitor attached to the computer. The settings are *Mono, CGA40x25, CGA80x25, VGA/EGA,* or *Absent.* The Optimal and Fail-Safe default settings are *VGA/EGA.*

Mouse Support Set this option to *Enabled* to enable AMIBIOS support for a PS/2-type mouse. Pins 1-28 on the motherboard must be shorted together to enable PS/2 mouse support. The settings are *Enabled* or *Disabled.*

The Optimal and Fail-Safe default settings are *Enabled.*

Cont'd

Hit <DEL> Message Display Set this option to *Disabled* to prevent

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

from appearing when the system boots. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Enabled*.

Wait for <F1> If Error If AMIBIOS POST runs system diagnostic tests that can generate a message followed by:

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

If this option is set to *Enabled*, AMIBIOS waits for the end user to press <F1> before continuing. If this option is set to *Disabled*, AMIBIOS continues the boot process without waiting for <F1> to be pressed. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Enabled*.

Boot Up Num Lock Set this option to *On* to turn off the Num Lock key when the system is powered on so you can use the arrow keys on both the numeric keypad and the keyboard.

The settings are *On* or *Off*. The Optimal default setting is *Off*. The Fail-Safe default setting is *On*.

Password Check This option enables password checking every time the system boots or when you run WINBIOS 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 WINBIOS is executed. See page 62 for instructions on changing a password. The Optimal and Fail-Safe defaults are *Setup*.

OS/2 Compatible Mode Set this option to *Enabled* if running OS/2 operating system and using more than 64 MB of system memory on the motherboard. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Cont'd

Advanced Setup, Continued

Floppy Drive Seek When this option is set to *Enabled*, AMIBIOS performs a Seek command on floppy drive A: before booting the system. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Disabled*. The Fail-Safe default setting is *Enabled*.

Floppy Drive Swap Set this option to *Enabled* to permit drives A: and B: to be swapped. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Quick Boot Set this option to *Enabled* to allow the BIOS to boot to the operating system within 5 seconds after the computer power switch is turned on. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

Boot Up Sequence This option sets the sequence of boot drives (floppy drive A:, hard disk drive C:, or a CD-ROM drive) AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are *C:,A:,CDROM, A:,C:,CDROM, or CDROM,C:,A:*. The Optimal default setting is *C:,A:,CDROM*. The Fail-Safe default setting is *A:,C:,CDROM*.

L1/L2 Cache Set this option to *Enabled* to enable L1 internal and L2 secondary cache memory. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

Cont'd

System BIOS Cacheable When this option is set to *Enabled*, the contents of the F0000h system memory segment can be read from or written to L2 secondary cache memory. The contents of the F0000h memory segment are always copied from the BIOS ROM to system RAM for faster execution. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Enabled*. The Fail-Safe default setting is *Disabled*.

Caching Controller Set this option to *Present* if a cache controller is installed in the computer. The Optimal and Fail-Safe default settings are *Absent*.

Setting	Description
Absent (the Optimal and Fail-Safe default setting)	To comply with the PCI specifications, PCI adapter cards must be reset every time the CPU is reset. When the end user forces a soft reset by pressing <Ctrl> <Alt> <Del>, only the CPU is reset. When this option is set to No, all soft resets are converted to hard resets, and all PCI adapter cards are reset when the CPU is reset.
Present	Soft resets still behave like soft resets when *Present* is selected. Select this option if a caching controller is installed in the computer. Soft resets must not generate a hard reset if a caching controller is used. If a hard reset is generated, a PCI caching controller card may not be able to flush data from its cache memory to a hard disk drive before the reset.

Cont'd

Video Shadow C000, 32K This option specifies the way that the 32 KB of video ROM beginning at C0000h is treated. The settings are:

Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Cached	The contents of the video ROM area from C0000h - C7FFFh are not only copied from ROM to RAM, the contents of the C0000h - C7FFFh RAM area can be written to or read from cache memory.
Shadow	The contents of the video ROM area from C0000h - C7FFFh are copied (shadowed) from ROM to RAM for faster execution.

The Optimal default setting is *Cached*. The Fail-Safe default setting is *Disabled*.

Shadow C800,16K
Shadow CC00,16K
Shadow D000,16K
Shadow D400,16K
Shadow D800, 16K
Shadow DC00,16K These options enable shadowing of the contents of the ROM area named in the option title. The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards. The settings are:

Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Cached	The contents of the video ROM area from C0000h - C7FFFh are not only copied from ROM to RAM, the contents of the C0000h - C7FFFh RAM area can be written to or read from cache memory.
Shadow	The contents of the video ROM area from C0000h - C7FFFh are copied (shadowed) from ROM to RAM for faster execution.

The Optimal and Fail-Safe default setting is *Disabled*.

Chipset Setup

Chipset Setup options are displayed by choosing the Chipset icon from the WINBIOS Setup main menu. All Chipset Setup options are described in this section.

PCI 2.1 Compliance Set this option to *Enabled* to program the chipset to comply with the PCI V2.1 specification. The Version 2.1 PCI specification requires a deterministic latency for PCI devices. Computers that use ISA DMA or ISA bus masters will experience longer access latencies if the **PCI 2.1 Compliance** Chipset Setup option is set to *Enabled*.

Set this option to *Disabled* to program the chipset to comply with the PCI V2.0 specification. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

DRAM Speed (ns) This option specifies the RAS access time (in nanoseconds) of the DRAM used in the computer for system memory. The settings are *50 ns*, *60 ns*, or *70 ns*. The Optimal and Fail-Safe default settings are *70 ns*.

Cont'd

DRAM ECC Mode This option sets the type of system memory checking. The settings are:

Setting	Description
Disabled	No error checking or error reporting is done.
Level I	Multibit errors are detected and reported as parity errors. Single-bit errors are corrected by the chipset. Corrected bits of data from memory are not written back to DRAM system memory. If *Level I* is selected, the J27 External SMI software jumper on the Series 735 board is disabled.
Level II	Multibit errors are detected and reported as parity errors. Single-bit errors are corrected by the chipset and are written back to DRAM system memory. If a soft (correctable) memory error occurs, writing the fixed data back to DRAM system memory will resolve the problem. Most DRAM errors are soft errors. If a hard (uncorrectable) error occurs, writing the fixed data back to DRAM system memory does not solve the problem. In this case, the second time the error occurs in the same location, a Parity Error is reported, indicating an uncorrectable error. If *Level II* is selected, AMIBIOS automatically sets the **Standard Power Management** option in Power Management Setup to *Enabled* to make sure that the System Management Interrupt (SMI) is enabled. If you do not want to enable power management, set the **Advanced Power Management (APM)** option to *Disabled* and set all Power Management Setup timeout options to *Disabled*. To enable power management, set **Advanced Power Management (APM)** to *Enabled* and set the power management timeout options as desired.

The following illustrates the difference between *Level I* and *Level II* ECC. Suppose a DRAM SIMM has a single bit uncorrectable error. Even writing fixed data to this bit will not remove the error.

Setting	then...
Level I	The data error is fixed during the memory read cycle every time the bad bit is accessed and the system continues to run, although every time the bad bit is read and corrected, CPU cycles are wasted.
Level II	The system tries to write the corrected data back to the bad bit in the DRAM SIMM. Since the bad bit in the SIMM cannot be fixed, writing data to the bad bit has no effect. The next time the error location is read, the chipset will once again find a bad bit. The chipset generates a Parity Error, indicating an uncorrectable memory error.

The Optimal and Fail-Safe default is *Disabled*.

Cont'd

ISA VGA USWC/Video Frame Buffer Specify the starting address of the VGA USWC/video frame buffer. The settings:

Setting	Description
Disabled	No VGA video frame buffer is available.
A0000h	The system memory segment beginning at A0000h is used for the VGA USWC/video frame buffer.
B0000h	The system memory segment beginning at B0000h is used for the VGA USWC/video frame buffer.
Both	The 128 KB of system memory from A0000h through BFFFFh is used for the VGA USWC/video frame buffer.

VGA card drivers may not behave correctly when this option is not set to *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

PCI VGA USWC/Video Frame Buffer Set this option to *Enabled* to enable the USWC attribute and improve video performance when a PCI video adapter is installed. However, VGA card drivers may not behave correctly when this option is set to *Enabled*. The settings are *Disabled* or *Enabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Optional ROM *The Merlin PCI Pentium Pro motherboard has an empty option ROM socket near the ISA expansion slots. See page 4 for the exact location of this ROM socket. You can install a 32 KB ROM in this socket. The starting memory address of this ROM can be either C000h* ***(only if this computer does not have a VGA controller)****, C800h, D000h, or D800h. The following three Chipset Setup options configure the option ROM only if you have installed a ROM chip in the option ROM socket.*

Optional ROM Decode This option specifies the starting address of an adapter ROM to be decoded. The settings are *C000h, C800h, D000h, D800h*, or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Cont'd

Optional ROM Shadow Before Init Set this option to *Enabled* to permit the contents of the option ROM to be copied to RAM before being initialized by AMIBIOS during Power On Self Test. This option dose not appear if the **Optional ROM Decode** option is set to *Disabled*. The settings are *Disabled* or *Enabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Optional ROM Cacheable Set this option to *Enabled* to allow the contents of the option ROM to be read from or written to cache memory. This option does not appear if the **Optional ROM Shadow Before Init** option is set to *Disabled*. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Watchdog Timer This motherboard has an integrated system watchdog timer. The watchdog timer reboots the computer if the computer locks up (if there is no bus activity for several seconds).

Set this option to *Enabled* when running applications (such as a security system) that require continuous monitoring. The computer then automatically resets after it locks up and the application can continue running with no human intervention required.

The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

CPU Thermal Alarm Set this option to *Enabled* to enable an alarm if the Pentium Pro CPU overheats. The settings are *Enabled* or *Disabled*. The Optimal and Fail-Safe default settings are *Disabled*.

Cont'd

ISA 8 Bit I/O Recovery Time This option specifies the length of the delay that is added to the CPU cycle between consecutive 8-bit I/O operations. The length of the delay is related to the CPU type and frequency. The settings are *1 Sysclock, 2 Sysclocks, 3 Sysclocks, 4 Sysclocks, 5 Sysclocks, 6 Sysclocks, 7 Sysclocks, 8 Sysclocks,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

ISA 16 Bit I/O Recovery This option specifies the length of the delay that is added to the CPU cycle between consecutive 16-bit I/O operations. The length of the delay is related to the CPU type and frequency. The settings are *1 Sysclock, 2 Sysclocks, 3 Sysclocks, 4 Sysclocks,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Memory Hole This option specifies the location of an area of memory that cannot be addressed on the ISA bus. The settings are *Disabled, 15 MB-16 MB,* or *512KB-640KB.* The Optimal and Fail-Safe default settings are *Disabled.*

Deturbo Frequency (MHz) This option specifies the deturbo frequency (in megahertz). The settings are *6 MHz, 8 MHz, 12 MHz,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Power Management Setup

The AMIBIOS Setup options described in this section are selected by choosing the Power Management Setup icon from the Setup section on the AMIBIOS Setup main menu.

Standard Power Management Set this option to *Enabled* to enable standard power management, including SMI support. The settings are *Enabled, Instant On,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Advanced Power Management (APM) Set this option to *Enabled* to enable APM. The settings are *Enabled* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Instant-On Timeout (Minutes) This option specifies the length of a period of system inactivity while the computer is in Full power on state. When this length of time expires, the computer enters a low power consumption state, but the computer can return to full power instantly when any system activity occurs. *This option is only available if supported by the computer hardware.* The settings are *Disabled* and *1 Min.* through *15 Min* in 1 minute intervals. The Optimal and Fail-Safe default settings are *Disabled.*

Auxiliary Power Supply Timeout This option specifies the power state that the auxiliary power supply enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are *Megakey (the power savings state determined by the Megakey keyboard controller), Standby, Suspend* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Cont'd

DPMS Video Power Down Mode This option specifies the power state that a DPMS (Display Power Management Specification)-compliant video subsystem enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are *Standby, Suspend* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Green PC Monitor Power State This option specifies the power state that the green PC-compliant video monitor enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are *Off, Standby, Suspend,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Hard Disk Power Down Mode This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The settings are *Disabled, Standby,* or *Suspend.* The Optimal and Fail-Safe default settings are *Disabled.*

Hard Disk Timeout (Minutes) This option specifies the length of a period of hard disk drive inactivity. When this length of time expires, the computer enters power-conserving state specified in the **Hard Disk Power Down Mode** option (see the previous page). The settings are *Disabled* and *1 Min.* through *15 Min* in 1 minute intervals. The Optimal and Fail-Safe default settings are *Disabled.*

Cont'd

Power Management Setup, Continued

Standby Timeout This option specifies the length of a period of system inactivity while in Full power on state. When this length of time expires, the computer enters Standby power state. The settings are *Disabled* and *1 Min.* through *15 Min* in 1 minute intervals. The Optimal and Fail-Safe default settings are *Disabled.*

Suspend Timeout This option specifies the length of a period of system inactivity while in Standby state. When this length of time expires, the computer enters Suspend power state. The settings are *Disabled* and *1 Min.* through *15 Min* in 1 minute intervals. The Optimal and Fail-Safe default settings are *Disabled.*

Slow Clock Ratio This option specifies the speed at which the system clock runs in power saving states. The settings are expressed as a ratio between the normal CPU clock speed and the CPU clock speed when the computer is in the power-conserving state. The settings are *1:1, 1:2, 1:4, 1:8, 1:16, 1:32, 1:64,* and *1:128.* The Optimal and Fail-Safe defaults are *1:8.*

Cont'd

IRQ3
IRQ4
IRQ5
IRQ7
IRQ9
IRQ10
IRQ11
IRQ12
IRQ15

When set to *Monitor*, these options enable event monitoring on the specified hardware interrupt request line. If set to *Monitor* and the computer is in a power saving state, AMIBIOS watches for activity on the specified IRQ line. The computer enters the full on power state if any activity occurs. AMIBIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified IRQ line. The settings for each of these options are *Monitor* or *Ignore*. The Optimal and Fail-Safe default settings are *Disabled* for all the above options except **IRQ3, IRQ4, IRQ7, IRQ12, IRQ14, IRQ15**. The Optimal default setting for these options is *Monitor*.

PCI/PnP Setup

Choose the PCI/PnP Setup icon from the WINBIOS Setup screen to display the PCI and Plug and Play Setup options, described below.

PCI VGA Palette Snoop When this option is set to *Enabled*, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example: if there are two VGA devices in the computer (one PCI and one ISA) and:

VGA Palette Snoop Bit Setting	Action
Disabled	Data read and written by the CPU is only directed to the PCI VGA device's palette registers.
Enabled	Data read and written by the CPU is directed to the both the PCI VGA device's palette registers and the ISA VGA device palette registers, permitting the palette registers of both devices to be identical.

This option must be set to *Enabled* if any ISA adapter card installed in the system requires VGA palette snooping. The Optimal and Fail-Safe default settings are *Disabled*.

Cont'd

PCI Slot-1 Latency Timer
PCI Slot-2 Latency Timer
PCI Slot-3 Latency Timer
PCI Slot-4 Latency Timer These options specify the latency timings (in PCI clocks) for PCI devices installed in the four PCI expansion slots. The settings are *32*, *64*, *96*, *128*, *160*, *192*, *224*, or *248*. The Optimal and Fail-Safe default settings are *64*.

PCI Slot-1 IRQ Preference
PCI Slot-2 IRQ Preference
PCI Slot-3 IRQ Preference
PCI Slot-4 IRQ Preference These options specify the IRQ priority for PCI devices installed in the four PCI expansion slots. The settings are *Auto*, *IRQ3*, *IRQ4*, *IRQ5*, *IRQ7*, *IRQ9*, *IRQ10*, *IRQ11*, *IRQ12*, *IRQ 14*, and *IRQ15*, in priority order. The Optimal and Fail-Safe default settings are *Auto*.

Cont'd

IRQ3
IRQ4
IRQ5
IRQ7
IRQ9
IRQ10
IRQ11
IRQ12
IRQ14
IRQ15

These options specify the bus that the specified IRQ line is used on. These options allow you to reserve IRQs for legacy ISA adapter cards.

These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these options to reserve the IRQ by assigning an *ISA/EISA* setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as *PCI/PnP*.

IRQ12 only appears if the **Mouse Support** option in Advanced Setup is set to *Disabled*.

IRQ14 and 15 will not be available if the onboard Triton PCI IDE is enabled. If all IRQs are set to ISA/EISA and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ9 will still be available for PCI and PnP devices, because at least one IRQ must be available for PCI and PnP devices.

The settings are *ISA/EISA* or *PCI/PnP*. The Optimal and Fail-Safe default settings for IRQ3 through 7 are *ISA/EISA*. The Optimal and Fail-Safe default settings for IRQ0 through 15 are *PCI/PnP*.

Cont'd

Reserved Memory Size This option specifies the size of the memory area reserved for legacy ISA adapter cards. The settings are *Disabled, 16K, 32K,* or *64K.* The Optimal and Fail-Safe default settings are *Disabled.*

Reserved Memory Address This option specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards.

This option dose not appear if the **Reserved Memory Size** option is set to *Disabled.* The settings are *C0000, C4000, C8000, CC000, D0000, D4000, D8000,* or *DC000.* The Optimal and Fail-Safe default settings are *N/A.*

Peripheral Setup

Peripheral Setup options are displayed by choosing the Peripheral Setup icon from the WINBIOS Setup main menu. All Peripheral Setup options are described in this section.

Onboard Floppy Controller Set this option to *Enabled* to enable the floppy drive controller on the motherboard. The settings are *Auto (AMIBIOS automatically determines if the floppy controller should be enabled), Enabled,* or *Disabled.* The Optimal and Fail-Safe default settings are *Enabled.*

Onboard Primary/Secondary IDE This option specifies the IDE channel used by the onboard IDE controller. The settings are *Disabled, Primary, Secondary,* or *Both.* The Optimal and Fail-Safe default settings are *Disabled.*

Onboard IDE Bus Master Set this option to *Enabled* if the onboard IDE controller is a PCI bus mastering device. The settings are *Enabled* or *Disabled.* The Optimal and Fail-Safe default settings are *Enabled.*

Onboard Primary Prefetch This option enables the prefetch feature for the specified IDE device attached to the onboard Primary IDE controller. The settings are *Master, Slave, Both,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Onboard Secondary Prefetch This option enables the prefetch feature for the specified IDE device attached to the onboard Secondary IDE controller. The settings are *Master, Slave, Both,* or *Disabled.* The Optimal and Fail-Safe default settings are *Disabled.*

Cont'd

Offboard PCI/ISA IDE Card This option specifies the expansion slot that the offboard PCI or ISA IDE Controller adapter card is installed in. The **Onboard Primary/Secondary IDE** option must be set to *Disabled* if this option is set to any value except *Disabled*.

The settings are *Absent, ISA, Slot1, Slot2, Slot3,* or *Slot4*. The Optimal and Fail-Safe default settings are *Absent*.

Offboard Primary/Secondary This option specifies the IDE channel used by the offboard PCI controller. The settings are *Primary, Secondary,* or *Both*. The Optimal and Fail-Safe default settings are *Primary*.

Offboard PCI IDE Primary IRQ
Offboard PCI IDE Secondary IRQ These options specify the PCI interrupt used by the primary and secondary IDE channels if an offboard IDE controller is installed in the computer. The settings are *Disabled, Hardwired, INTA, INTB, INTC,* or *INTD*. The Optimal and Fail-Safe default settings are *Disabled*.

Serial Port1 IRQ This option specifies the IRQ (Interrupt Request Line) used by serial port 1. The settings are *IRQ 4* or *Disabled*. The Optimal default setting is *IRQ 4*. The Fail-Safe default setting is *Disabled*.

Serial Port1 Address This option specifies the base I/O port address for serial port 1. The settings are *3E8h, 3F8h,* or *Disabled*. The Optimal default setting is *3F8h*. The Fail-Safe default setting is *N/A*.

Cont'd

Serial Port1 FIFO This option enables the FIFO buffer for the first serial port. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Disabled*. The Fail-Safe default setting is *N/A*.

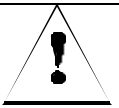
Caution

Do not enable the Serial Port 1 FIFO option if a mouse is attached to COM1.

Serial Port2 IRQ This option specifies the IRQ (Interrupt Request Line) used by serial port 1. The settings are *IRQ 3*, *IRQ 4* or *Disabled*. The Optimal default setting is *IRQ 3*. The Fail-Safe default setting is *Disabled*.

Serial Port2 Address This option specifies the base I/O port address for serial port 2. The settings are *2F8h*, *2E8h*, or *Disabled*. The Optimal default setting is *2F8h*. The Fail-Safe default setting is *N/A*.

Serial Port2 FIFO This option enables the FIFO buffer for the second serial port. The settings are *Enabled* or *Disabled*. The Optimal default setting is *Disabled*. The Fail-Safe default setting is *N/A*.



Caution

Do not enable the Serial Port2 FIFO option if a mouse is attached to COM2.

Parallel Port IRQ This option specifies the IRQ (Interrupt Request Line) used by the parallel port. The settings are *Disabled*, *IRQ 5*, or *IRQ 7*. The Optimal default setting is *IRQ 7*. The Fail-Safe default setting is *Disabled*.

Cont'd

Parallel Port Address This option specifies the base I/O port address for the parallel port. The settings are *378h*, *278h*, or *Disabled*. The Optimal default setting is *378h*. The Fail-Safe default setting is *N/A*.

Parallel Port Mode This option specifies the parallel port mode. ECP and EPP are both bidirectional data transfer modes that adhere to the IEEE P1284 specifications. The settings are:

Setting	Description
Normal	The standard AT-compatible parallel port mode is used.
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bidirectional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve data transfer rates up to 2.5 Megabits per second. ECP provides symmetric bidirectional communication.

The Optimal default setting is *Normal*. The Fail-Safe default setting is *N/A*.

Parallel Port DMA Channel This option is only available if the setting for the **Parallel Port Mode** option is *Extended* or *ECP*. This option sets the DMA channel used by the parallel port. The settings are *DMA CH 1*, or *DMA CH 3*. The Optimal and Fail-Safe default settings are *Disabled*.

Section 2 Security

Three icons appear in this part of the WINBIOS Setup screen:

- Supervisor (Password),
- User (Password), and
- Anti-Virus (see page 64).

Two Levels of Passwords Both the Supervisor and the User icons configure password support. If you use both, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when WINBIOS Setup is executed, using either or both the Supervisor password or User password.

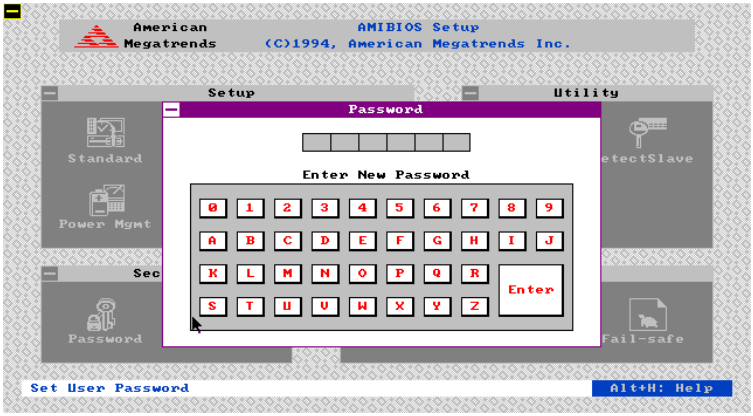
AMIBIOS Password Support

The Supervisor and User icons activate two different levels of password security. If

WINBIOS 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 WINBIOS Setup is executed.

Setting a Password

The password check option is enabled in Advanced Setup (see page 41) by choosing either *Always* (the password prompt appears every time the system is powered on) or *Setup* (the password prompt appears only when WINBIOS is run). The password is encrypted and stored in NVRAM.



As shown on the above screen, you are prompted for a 1 – 6 character password. You can either type the password on the keyboard or select each letter of the password, one at a time, using the mouse. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and reconfigure.

If You Do Not Want to Use a Password Just press <Enter> when the password prompt appears.

Changing a Password

Select the *Supervisor* or *User* icon from the Security section of the WINBIOS 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>. The password is stored in NVRAM after WINBIOS completes. The next time the system boots, a password prompt appears if the password function is present and enabled.

Remember the Password Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM (Non-Volatile Random Access Memory). See page 71 for information about erasing system configuration information.

Anti-Virus

When this icon is selected from the Security section of the WINBIOS Setup main menu, 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*. 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 appears 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)? _
```

Section 3 Utility

The following icons appear in this section of the WINBIOS Setup main screen:

Color Set Color Set sets the Setup screen colors.

Language If this feature is enabled, you can select WINBIOS Setup messages in different languages.

Section 4 Default

The icons in this section permit you to select a group of settings for all WINBIOS Setup options. Not only can you use these icons to quickly set system configuration parameters, you can choose a group of settings that have a better chance of working when the system is having configuration-related problems.

Original Choose the Original icon to return to the system configuration values present in WINBIOS Setup when you first began this WINBIOS Setup session.

Optimal You can load the optimal default settings for the WINBIOS by selecting the Optimal icon. The Optimal default settings are best-case values that should optimize system performance. If NVRAM is corrupted, the Optimal settings are loaded automatically.

Fail-Safe You can load the Fail-Safe WINBIOS Setup option settings by selecting the Fail-Safe icon from the Default section of the WINBIOS Setup main menu.

The Fail-Safe settings provide far from optimal system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is behaving erratically.

3 Programming Flash ROM

All versions of the Merlin PCI motherboard use Flash EPROM to store the system BIOS. The advantage of Flash EPROM is 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.

Programming the Flash EPROM

Step	Action
1	Turn power off. Make sure the computer has a working speaker.
2	Insert the floppy disk with the S735P.ROM file in drive A:.
3	Press and hold the <Ctrl> and <Home> keys down while turning the power on. Continue to hold the <Ctrl> and <Home> keys down until the access light on the floppy drive comes on. It may take 10 seconds or more before this light turns on.
4	Release the <Ctrl> and <Home> keys. AMIBIOS issues a series of beep codes that indicate that the system BIOS ROM file is being updated.
5	When the flash ROM has successfully been programmed, the computer will reboot.
6	When the computer reboots, check the BIOS Release text at the bottom of the first boot screen to make sure that the correct BIOS has been used.
7	The error message `NVRAM checksum bad, NVRAM cleared` will appear during the first boot after a successful BIOS ROM update. This message indicates that the NVRAM area in the system BIOS has been cleared. AMIBIOS will reconstruct the NVRAM area before the computer boots completely, so you can safely ignore this message.

Cont'd

Bootblock Actions When you reprogram from system boot, the bootblock code:

Reads S735P.ROM from the root directory of the floppy disk in drive A:.

Erases the Flash EPROM.

Programs the Flash EPROM with the data read from the floppy disk in drive A:.

Generates a CPU reset, rebooting the computer.

The bootblock part of the Flash EPROM is not programmed. Should you inadvertently open the disk drive door or turn power off to the computer while programming the Flash EPROM, the bootblock will be unaffected. Simply turn power back on and begin the Flash ROM programming process again.

S735P.ROM S735P.ROM resides on a floppy disk and contains the updated main BIOS code. American Megatrends will provide this file when the AMIBIOS for the Merlin PCI ISA motherboard must be updated.

S735P.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 S735P.ROM.

Cont'd

Beep Codes

The bootblock code produces a series of beeps during Flash ROM programming 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 error beep codes and when they can occur are:

Number of Beeps	Description
1	Insert diskette in floppy drive A:.
2	The AMIBOOT.ROM file was not found in the root directory of the diskette in floppy drive A:.
3	Base memory error.
4	Flash program successful.
5	Floppy read error.
6	Keyboard controller BAT command failed.
7	No Flash EPROM detected.
8	Floppy controller failure.
9	Boot Block BIOS checksum error.
10	Flash erase error.
11	Flash Program error.
12	AMIBOOT.ROM file size error.
Continuous beep	Flash Programming successful. Turn power off. Then turn power on again to restart.

Bootblock Code Checkpoint Codes

Code	Description
E0h	Verify the Boot Block BIOS checksum. Disable the internal cache, DMA, and interrupt controllers. Initialize the system timer. Start memory refresh.
E1h	Initialize the chipset registers. Set the BIOS size to 128K. Make the 512 KB base memory available.
E2h	Test the base 64 KB of system memory. Send the BAT command to the keyboard controller. Make sure that <Ctrl> <Home> was pressed. Verify the system BIOS checksum.
E3h	The system BIOS is good. Transfer control to the BIOS.
E4h	Start the memory test.
E5h	The memory test is over. Initialize the interrupt vector table.
E6h	Initialize the DMA and interrupt controllers.
E7h	Determine the CPU internal clock frequency.
E8h	Initialize the I/O chipset, if any.
E9h	Program the CPU clock-dependent chip set parameters.
EAh	Enable the timer and the floppy diskette interrupt. Enable the internal cache. Copy the boot block BIOS and pass control to the boot block BIOS in the 0000h segment.
EDh	Initialize the floppy drive.
EEh	Look for a diskette in drive A:. Read the first sector of the diskette.
EFh	Floppy read error.
F0h	Search for AMIBOOT.ROM in the root directory of the floppy diskette in drive A:.
F1h	The AMIBOOT.ROM file is not in the root directory.
F2h	Read the FAT table. Analyze the FAT to find the clusters occupied by the AMIBOOT.ROM.
F3h	Start reading the AMIBOOT.ROM file, cluster by cluster.
F4h	The AMIBOOT.ROM file is not the correct size.
F5h	Disable the internal cache. Raise the Vpp. Enable Flash write and reset the Flash ROM.
FBh	Detect the flash type.
FCh	Start erasing flash blocks.
FDh	Program the Flash ROM in the E0000-EFFFFh region.
FEh	Start programming Flash at F0000-FFFFF region.
FFh	Flash programming is successful. The computer reboots.

4 Deleting a Password

If you forget the passwords you set up through WINBIOS Setup, the only way you can restart the computer is to erase the system configuration information where the passwords are stored. System configuration data is stored in CMOS RAM, a type of memory that consumes very little power.

Erase Old Password You can drain CMOS RAM power via J33 on the motherboard. J33 is a 2-pin berg that is normally always OPEN. Perform the following steps to erase the old password.

> ***Important***
>
> *Make sure you are properly grounded before performing the following procedure. You must be certain that no electrostatic discharge (ESD) occurs. ESD can ruin your motherboard. Wear an antistatic wristband attached to a ground. See "Avoid Static Electricity" on the following page.*

Step	Action
1	Turn the computer power off and remove the computer cover.
2	Place a shorting bridge on J33.
3	Turn on computer power for about 10 seconds.
4	Turn the computer off again.
5	Remove the shorting bridge from J33.
6	Turn on computer power again. Since you drained power from CMOS RAM, all system configuration information has been erased. You must now re-enter the system configuration information by running WINBIOS Setup.

Avoid Static Electricity

Static electricity can damage the motherboard and other computer components. Keep the motherboard in the anti-static bag until it is to be installed. Wear an anti-static wrist grounding strap before handling the motherboard. Make sure you stand on an anti-static mat when handling the motherboard.

Avoid contact with any component or connector on any adapter card, printed circuit board, or memory module. Handle these components by the mounting bracket.

Index

K

L

M

N

O

P

Q

R

S

T

U

V

W