American Megatrends, Inc.

Excalibur VLB Pentium®

ISA Motherboard

User's Guide

MAN-675
5/5/95

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

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Revision History

11/29/93	Initial release.

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Preface

To the OEM

Thank you for purchasing the high performance American Megatrends Series 75 Excalibur VLB Pentium ISA motherboard. This product is a state of the art Pentium-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 Excalibur VLB Pentium 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 75 Excalibur VLB Pentium motherboard. It explains how to assemble a system based on this 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.

Acknowledgments

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

Chapter 1

System Overview

The American Megatrends Excalibur VLB Pentium motherboard is an Intel Pentium®-based ISA motherboard that also has two VESA® (Video Electronics Standards Association) VL-Bus® Local Bus expansion slots.

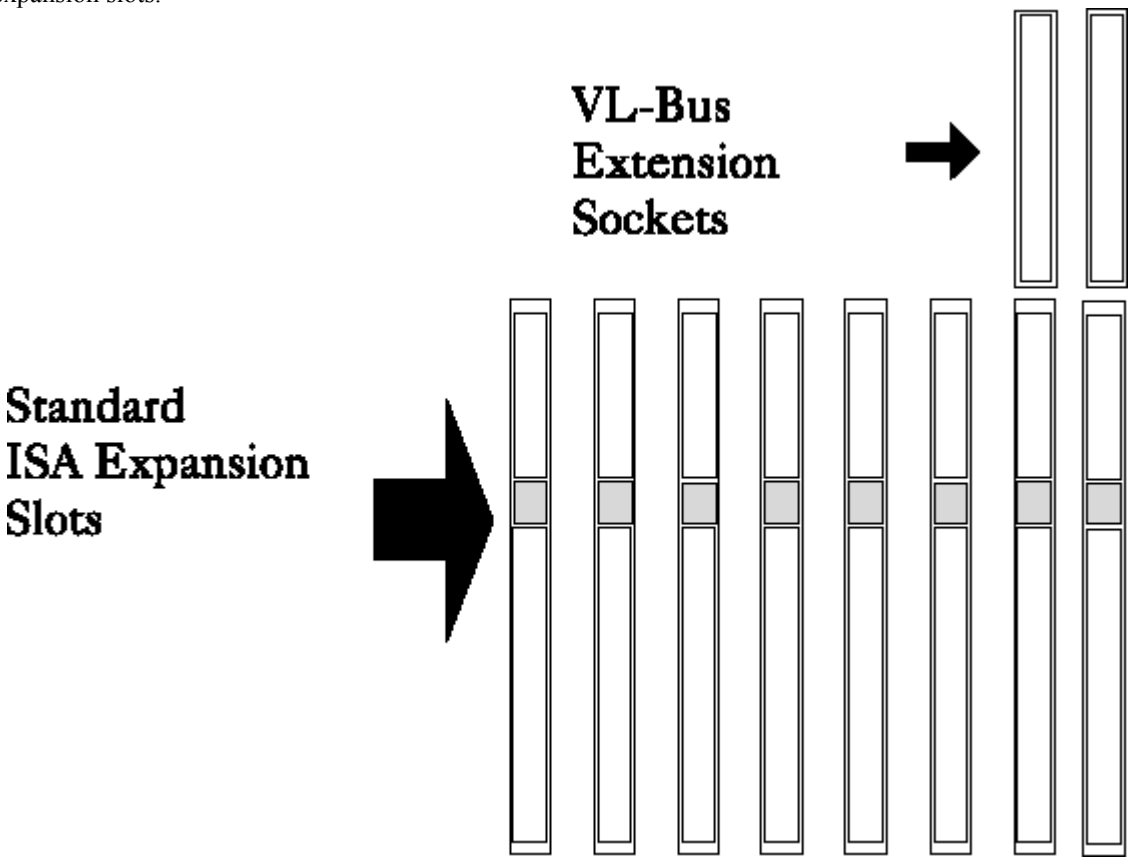
The VL-Bus Local Bus

The American Megatrends Excalibur VLB Pentium Motherboard conforms to the VESA VL-Bus specifications. The VL-Bus is designed to standardize the hardware interface of peripherals connected to a microprocessor-level local bus. The VL-Bus is designed to be compatible with the Intel Pentium microprocessor local bus. The VL-Bus Specification is a standard set of interface, architecture, timings, electrical, and physical specifications that permits all VL-Bus products to be totally interchangeable.

American Megatrends VL-Bus Design

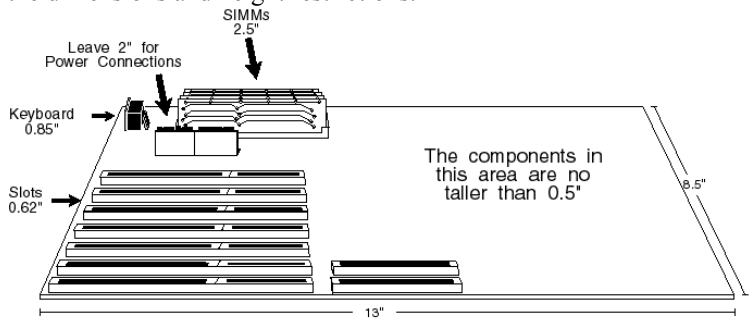
Motherboard VL-Bus Design

The American Megatrends Excalibur VLB Pentium motherboard has two expansion slots for VL-Bus adapter cards. These slots are standard ISA 16-bit slots with an inline 16-bit MCA expansion socket. The two connectors make up the VL-Bus connector. The following graphic shows the ISA and VL-Bus expansion slots.



Excalibur VLB Motherboard Dimensions

The American Megatrends Excalibur VLB Pentium motherboard is approximately 8.5 inches wide by 13 inches long (the standard Baby AT motherboard size with similar mounting hole locations). The following graphic illustrates the dimensions and height restrictions.



Series 75 Excalibur VLB Pentium ISA Motherboard

Description

Processor Type and Speed

The Excalibur VLB Pentium motherboard uses an Intel Pentium CPU operating at 60 MHz.

Heat Sink

A heat sink with a fan must be used with all Intel Pentium CPUs on all motherboards.

Processor Speed

The Excalibur VLB Pentium motherboard has two clock speeds: high or low. High speed is factory-set to 60 MHz. Low speed is achieved by adding the appropriate number of software delays and approximates the speed of an 8 MHz IBM® AT. Speed selection is through the keyboard: <Ctrl> <Alt> <+> for High speed or <Ctrl> <Alt> <->) for Low speed, or through the turbo switch on the front panel.

Cache Memory

The motherboard supports 256 KB or 512 KB of direct mapped, adaptive, write-back L2 external (secondary) cache memory. The end user can define an area of memory (512 KB to 4 MB) whose contents cannot be read from or written to secondary cache memory in AMIBIOS Setup.

The L2 secondary cache memory uses socketed 15 ns 32 KB x 8 SRAM DIPs for data and 12 ns 8 KB x 8 SOJs SRAM for tag RAM. There is a dirty bit through a 15 ns 64 KB x 1 SOJ SRAM.

There are two banks of write-back cache memory. Each bank must be populated in full. Each bank provides 256 KB of L2 secondary cache memory. Cache memory can be upgraded by the end user. Jumpers J30, J31, J52, J53, and J54 control cache memory configuration. Shadowed ROM areas such as the system BIOS and Video BIOS can be cached and write-protected via ADVANCED CMOS SETUP.

The Intel Pentium has 16 KB of internal cache memory. All system memory can be cached in internal cache memory.

The cache read wait states are 3-2-2-2. Burst mode is supported. Cache memory is enabled and disabled through AMIBIOS Setup ADVANCED CMOS SETUP.

Main System Memory

Up to 128 MB of onboard DRAM system memory on the Excalibur VLB motherboard is organized in 64 bits with parity. There are two banks of system memory. Each bank has two SIMM (Single Inline Memory Module) sockets. Bank1 must be fully populated before Bank2 is populated. Bank1 is U16 and U9. Bank 2 is U2 and U1. There are four SIMM sockets. Single-density or double-density x 36 70 ns fast page mode SIMMs are used.

SIMMs must be installed two at a time. Two SIMMs must be installed at a time. System memory configuration does not require any jumper settings.

The DRAM memory uses the following SIMM types:

SIMM Type	Number of Sides
256 KB x 36 SIMMs	Single-sided
1 MB x 36 SIMMs	Single-sided
2 MB x 36 SIMMs	Double-sided
4 MB x 36 SIMMs	Single-sided
8 MB x 36 SIMMs	Double-sided

The SIMMs can be logical single bank, physical single bank, or double-sided.

The Excalibur VLB Pentium motherboard requires Fast Page Mode SIMMs operating at 70 ns (RAS access time). The Excalibur VLB Pentium motherboard uses a One level Posted write Memory Write Buffer.

Additional Memory

The Excalibur VLB Pentium motherboard supports any amount of additional memory mounted on ISA or VL-Bus adapter cards.

Shadow RAM

The system BIOS memory area (F0000h – FFFFFh) is always shadowed. Video BIOS is shadowed through AMIBIOS Setup ADVANCED CMOS SETUP. Adaptor ROM BIOS is also shadowed via ADVANCED CMOS SETUP in 16 KB increments.

System BIOS

The Excalibur VLB Pentium motherboard has a 128 KB AMIBIOS at address E0000h through FFFFFh with built-in AMIBIOS Setup, hard disk drive diagnostics, and user-definable hard disk drive types. AMIBIOS Setup allows you to bypass error messages for missing video, keyboard, or floppy drives to facilitate the building of file servers. The BIOS is stored in Flash EPROMs and can be reprogrammed via software without removing the ROM.

CMOS RAM

The Excalibur VLB Pentium motherboard has 114 bytes of nonvolatile CMOS RAM with rechargeable battery backup. A Ni-Cad battery is mounted on the motherboard. The motherboard also has an external battery connector.

Real Time Clock

The Excalibur VLB Pentium motherboard has a real time clock and CMOS RAM with built-in battery backup for ISA BIOS Setup. An external battery connector is also provided.

Onboard I/O

The Excalibur VLB Pentium motherboard includes:

- a 40-pin IDE connector for up to two IDE drives, with local bus IDE Mode 2 support,
- a 34-pin connector to a floppy controller that supports up to two 720 KB, 1.2 MB, 1.44 MB, or 2.88 MB floppy drives,
- two ten-pin connectors for serial ports, and
- a 26-pin connector for one parallel port on the motherboard.
- either a keyboard miniDIN plug and PS/2 mouse miniDIN or a Keyboard DIN connector and a 10-pin berg for a PS/2 mouse connector.

Seven DMA Channels

The motherboard has seven DMA channels.

Fifteen Interrupt Levels

The motherboard has 15 hardware interrupt levels. The NMI takes precedence over all hardware interrupts.

Priority	Label	Typical Interrupt Source
1	IRQ 0	Interval Timer 1, Counter 0 OUT
2	IRQ 1	Keyboard
3-10	IRQ 2	Used internally for IRQ 8 through IRQ 15
3	IRQ 8	Real-Time-Clock
4	IRQ 9	Bus
5	IRQ 10	Bus
6	IRQ 11	Bus
7	IRQ 12	Onboard PS/2 Mouse *or* AT bus through a jumper
8	IRQ 13	Coprocessor Error
9	IRQ 14	Bus (Hard disk drive controller)
10	IRQ 15	Bus
11	IRQ 3	Bus (Serial Port 2)
12	IRQ 4	Bus (Serial Port 1)
13	IRQ 5	Bus (Parallel Port 2)
14	IRQ 6	Bus and floppy disk controller
15	IRQ 7	Bus (Parallel Port 1)

Description, Continued

Timer Features

The Excalibur VLB Pentium motherboard has three programmable 16-bit counter/timers.

Refresh Generation

The Excalibur VLB Pentium motherboard has a refresh generation feature.

I/O Capability

The Excalibur VLB Pentium motherboard accesses 16- or 8-bit I/O devices on the ISA bus. and 32-bit devices on the VL-Bus.

ISA Bus

The ISA bus in the Excalibur VLB Pentium motherboard has a system clock that is generated by the bus clock (BCLK) and operates at approximately 8.33 MHz.

Expansion Slots

The Excalibur VLB Pentium motherboard has seven 16-bit expansion slots for ISA adapter cards. Two of these slots can also be used as VL-Bus expansion slots.

Local Bus

The Excalibur VLB Pentium motherboard has two VESA bus mastering VL-Bus Local Bus expansion slots. These slots can also be used as standard ISA expansion slots.

I/O Address Space

I/O addresses 0100h through 03FFh are available on the ISA bus.

Memory Address on ISA Bus

Up to 16 MB of memory can be addresses on the ISA bus.

Memory Addresses on Local Bus

The Excalibur VLB Pentium motherboard uses 32-bit memory addresses to access 4 gigabytes of memory address space on the local bus expansion slots.

I/O Channel Check

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

Keyboard

The Excalibur VLB Pentium motherboard uses a five-pin circular ISA DIN connector and has a five-pin keyboard lock connector to prevent unauthorized access.

PS/2 Mouse

The Excalibur VLB Pentium motherboard has a 10-pin berg header that can be attached via a standard serial cable to a PS/2-type mouse.

Speaker

The Excalibur VLB Pentium motherboard has a standard four-pin speaker connector.

Hardware Reset Switch

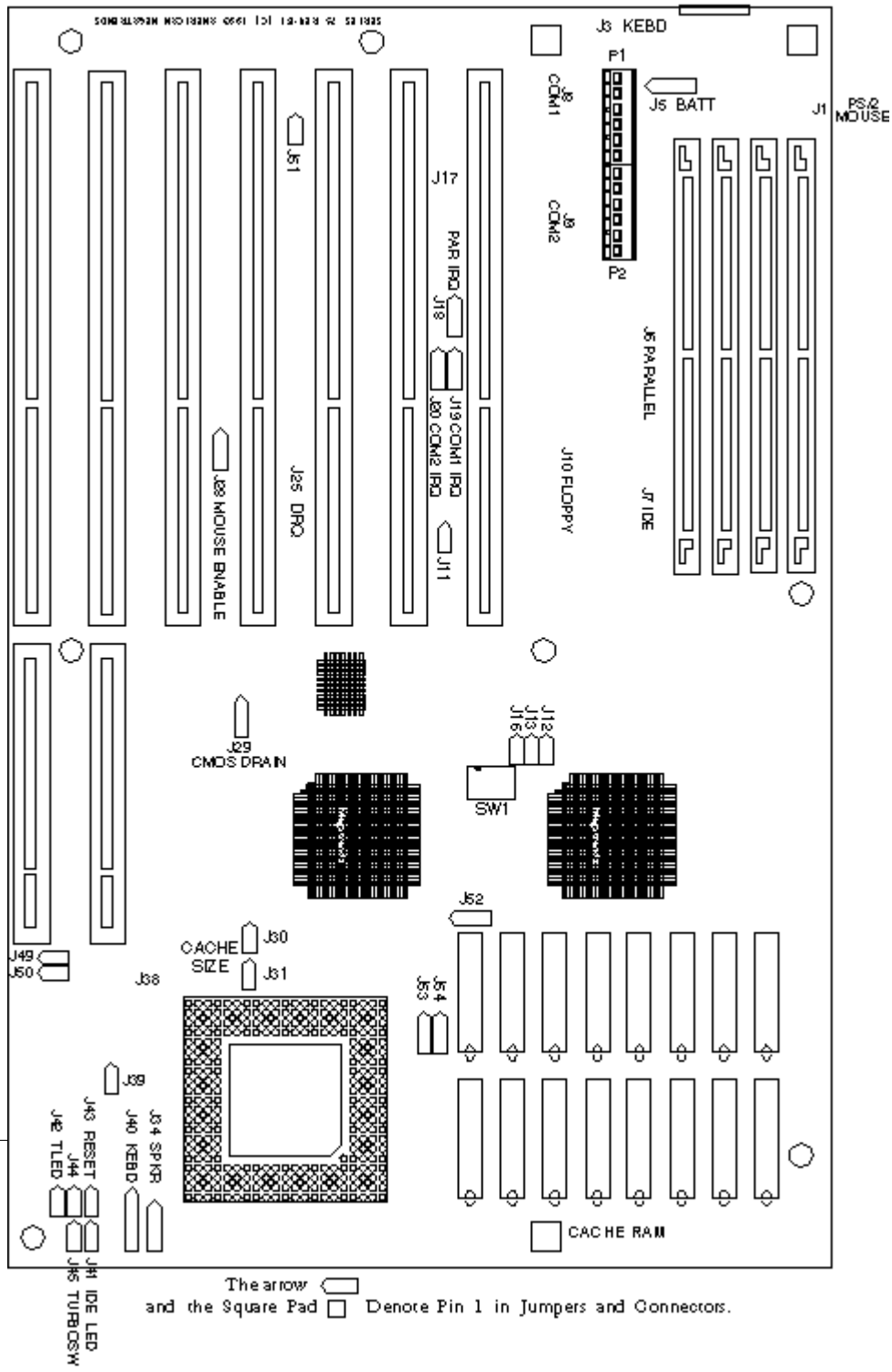
The Excalibur VLB Pentium motherboard has a standard two-pin reset connector.

Chapter 2

Installation

Unpacking the Motherboard

Step	Action
1.	Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 770-246-8600. Leave the motherboard in its original packing.
2.	Perform all unpacking and installation procedures on a ground connected anti-static mat. The operator should wear an anti-static wristband, grounded at the same point as the anti-static mat. Or use a sheet of conductive aluminum foil grounded through a 1 megohm resistor instead of the anti-static mat. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 megohm resistor serves the same purpose as the wristband.
3.	Inside the carton, the motherboard is packed in an anti-static bag, and sandwiched between sheets of sponge. Remove the sponge and remove the anti-static bag. Place the motherboard on a grounded anti-static surface component side up. Save the original packing material in case of reshipment.
4.	Inspect the motherboard for damage. Press down on all ICs mounted in sockets to verify proper seating. Do not apply power to the motherboard if it has been damaged.
5.	If the motherboard is undamaged, it is ready to be installed.


J3 KEBD
P1
J5 BATT
J1 PS/2 MOUSE
J8 COM1
J9 COM2
P2
J51
J17
PAR IRQ
J18
J19 COM1 IRQ
J20 COM2 IRQ
J11
J25 DRQ
J88 MOUSE ENABLE
J10 FLOPPY
J6 PARALLEL
J7 IDE
J29 CMOS DRAIN
J12
J13
J16
SW1
J52
CACHE SIZE
J30
J31
J38
J49
J50
J54
J53
J39
J43 RESET
J40 KEBD
J34 SPKR
J42 TLED
J44
J41 IDE LED
J45 TURBOSW
CACHE RAM
The arrow
and the Square Pad
Denote Pin 1 in Jumpers and Connectors.

Installation Steps

Step	Action	Turn to
1	Set switch and jumper options	Page 28
2	Install memory	Page 34
3	Install motherboard	Page 38
4	Connect the power supply	Page 38
5	Connect the keyboard	Page 41
6	Connect the mouse	Page 41
7	Connect cables	Page 42
8	Connect onboard I/O	Page 46
9	Install floppy disk drives	Page 50
10	Install hard disk drive	Page 50
11	Install adapter cards	Page 53
12	Test and configure	Page 59

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 Switch and Jumper Options

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

J30, J31, J52, J53, J54	Cache Memory Configuration
SW1	Diagnostics and CGA
J19	Serial Port 1 IRQ Select
J20	Serial Port 2 IRQ Select
J18	Parallel Port IRQ Select
J28	Mouse IRQ Select
J39	POWERGOOD Signal Detect
J17 and J25	Extended Parallel Port DMA Select
J29	Drain CMOS RAM Power
J51	Flash Programming Enable

J30, J31, J52, J53, J54 Cache Memory Configuration

J30 and J31 are two-pin bergs and J52, J53, and J54 are three-pin bergs that control the L2 secondary cache memory configuration on the motherboard. See the graphic on page 27 for the jumper locations.

Cache Memory Configuration	J30	J31	J52	J53	J54
128 KB	OFF	OFF	Short Pins 2-3	Short Pins 2-3	Short Pins 2-3
256 KB	OFF	ON	Short Pins 1-2	Short Pins 1-2	Short Pins 1-2
512 KB	ON	ON	Short Pins 2-3	Short Pins 2-3	Short Pins 2-3

SW1 Diag and Color

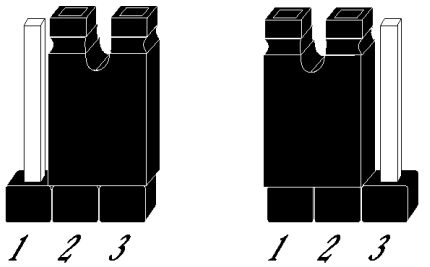
SW1 has two two-position switches.

SW1-1 is the Manufacturing Diagnostics switch. The motherboard is shipped with this switch Off. The switch should remain Off.

SW1-2 is the COL/MONO switch. SW2-2 sets the type of video display adapter card in the system. This switch is factory-set to Off, for a monochrome display adapter (MDA™). Set On for a color graphics adapter (CGA). This switch has no effect if an EGA or VGA adapter is installed.

J20 Serial Port 2 IRQ Select

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

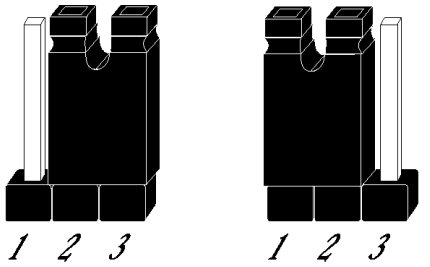


Select IRQ4
Pins 2-3 Shorted

Select IRQ3 (Default)
Pins 1-2 Shorted

J19 Serial Port 1 IRQ Select

J19 is a three-pin single-inline berg. Short pins 2-3 to select IRQ3 for serial port 1. Short pins 1-2 (the default) to select IRQ4 for serial port 1.

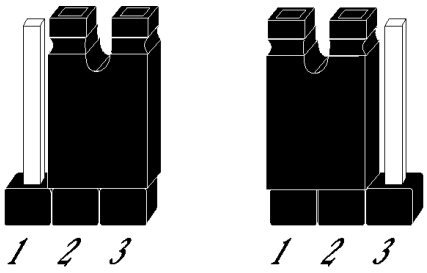


Select IRQ3
Pins 2-3 Shorted

Select IRQ4 (Default)
Pins 1-2 Shorted

J18 Parallel Port IRQ Select

J18 is a three-pin single-inline berg. Short pins 2-3 to select IRQ5 for the parallel port. Short pins 1-2 (the default) to select IRQ7 for the parallel port.



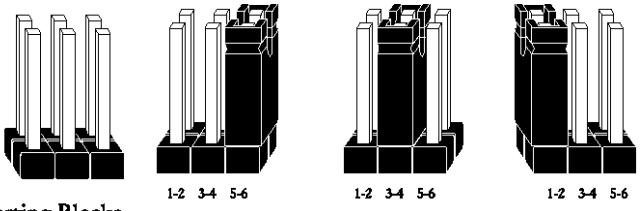
Select IRQ5
Pins 2-3 Shorted

Select IRQ7
Pins 1-2 Shorted

J17 and J25 Extended Parallel Port DMA Select

J17 and J25 are six-pin single-inline bergs that select the EPP (Enhanced Parallel Port) DMA channels, shown below.

DMA Channel	J17	J25
DRQ0	Short Pins 1-2	Short Pins 1-2
DRQ1	Short Pins 3-4	Short Pins 3-4
DRQ3	Short Pins 5-6	Short Pins 5-6.
None (the factory setting)	OPEN	OPEN



No Shorting Blocks
No DMA
Channels Selected

Short Pins 5-6
Select DRQ3

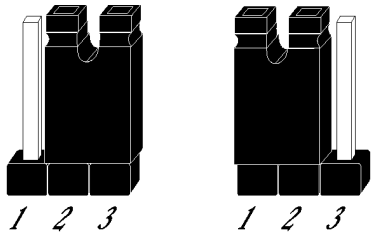
Short Pins 3-4
Select DRQ1

Short Pins 1-2
Select DRQ0

Step 1 Set Switch and Jumper Options, Continued

J28 Onboard Mouse IRQ Select

J28 is a three-pin single-inline berg that selects the mouse IRQ. Short pins 1-2 to select IRQ12 from the onboard mouse. Short pins 2-3 to select IRQ12 from a bus mouse. *IRQ12 cannot be used by any ISA or VL-Bus adapter card when the onboard mouse is enabled.*



Disable onboard mouse
Pins 2-3 Shorted

Enable onboard mouse
Pins 1-2 Shorted

J38 Set CPU Speed

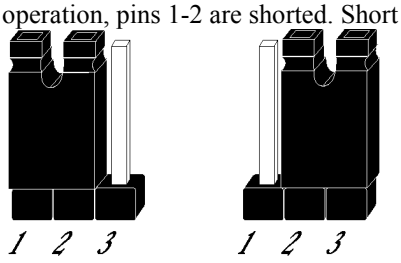
J38 is a six-pin dual-inline berg that sets the Pentium CPU speed. Shorting bridges are installed on Pins 1-2 and 5-6 at the factory. The J38 jumper setting should not be modified.

J39 POWERGOOD Signal

J39 is a two-pin single-inline berg. Pins 1-2 are shorted only if the power monitor U79 is not mounted. The factory setting is OPEN (not installed).

J29 CMOS RAM Drain

J29 is a three-pin single-inline berg. In normal operation, pins 1-2 are shorted. Short pins 2-3 to drain CMOS RAM.



Normal
Pins 1-2 Shorted

Drain CMOS RAM
Pins 2-3 Shorted

With many motherboards, if you forget the system password, you must remove the battery for at least 20 minutes to erase the password. J22 provides a quicker method. By shorting J22 pins 1–2, you can quickly drain power from CMOS RAM. Then you must run AMIBIOS Setup to reconfigure.

J51 Flash EPROM Program Enable

J51 is a two-pin berg that specifies if +12V is supplied to the Flash EPROM for reprogramming. Leave J51 OPEN at all times except when reprogramming the AMIBIOS with a BIOS file supplied by American Megatrends.

Jumper Settings that Must Not Change

J11 A two-pin berg that must always be shorted.
J12 A two-pin berg that must always be open.
J49 A two-pin berg that must always be open.
J50 A two-pin berg that must always be shorted.
J13 A two-pin berg that must always be open.
J16 A two-pin berg that must always be open.

Step 2 Install Memory

The main memory subsystem on the motherboard includes four 64-bit memory banks organized with parity. Two DRAM sockets make up each memory bank. All banks house SIMM (Single In-line Memory Module) DRAM packages. Bank1 must be poulated before Bank2. Bank1 is U16 and U9. Bank2 is U2 and U1. There are no jumper settings for system memory configuration.

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 SIMMs can be single-sided or double-sided. The Excalibur VLB Pentium motherboard uses fast page mode SIMMs operating at 70 ns RAS access time.

Motherboard Memory Configurations

The Excalibur VLB Pentium motherboard supports the following memory configurations on the motherboard. All possible valid memory configurations are listed.

Bank 1 SIMM Type		Bank 2 SIMM Type		Total
U16	U9	U2	U1	
256 KB x 36	256 KB x 36	None	None	2 MB
1 MB x 36	1 MB x 36	None	None	8 MB
2 MB x 36	2 MB x 36	None	None	16 MB
4 MB x 36	4 MB x 36	None	None	32 MB
8 MB x 36	8 MB x 36	None	None	64 MB
256 KB x 36	256 KB x 36	256 KB x 36	256 KB x 36	4 MB
1 MB x 36	1 MB x 36	1 MB x 36	1 MB x 36	16 MB
2 MB x 36	2 MB x 36	2 MB x 36	2 MB x 36	32 MB
4 MB x 36	4 MB x 36	4 MB x 36	4 MB x 36	64 MB
8 MB x 36	8 MB x 36	8 MB x 36	8 MB x 36	128 MB
256 KB x 36	256 KB x 36	1 MB x 36	1 MB x 36	10 MB
1 MB x 36	1 MB x 36	4 MB x 36	4 MB x 36	40 MB
256 KB x 36	256 KB x 36	4 MB x 36	4 MB x 36	34 MB

Selecting SIMMs

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

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

SIMM Part Numbers

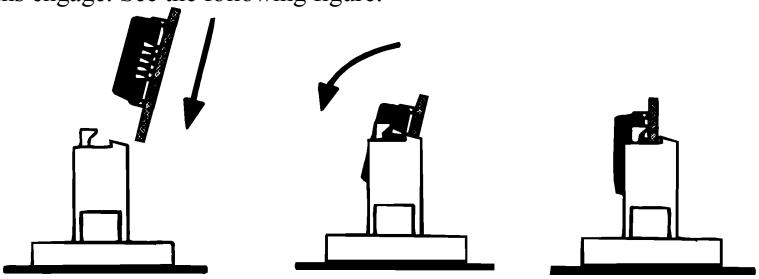
Memory Type	Manufacturer	Part Number
256 KB x 36	Micron®	MT9D25636M-7
	Mitsubishi®	MH26636BJ-7
	Motorola®	MCM36256S-70
	Oki®	MSC2320A-70YS9
	PNY®	P36256-70
	Samsung®	KMM536256B-7
1 MB x 36	Micron	MT12D136M-7
	Mitsubishi	MH1M36ADJ-7
	PNY	P361000-70
	Motorola	MCM36100AS-70
	Oki	MSC2355-70YS12
	Samsung	KMM5361000AV-7
4 MB x 36	Micron	MT12D436M-7
	Mitsubishi	MH4M36SAJ-7
	Motorola	MCM36400S-70
	PNY	P364000-70
	Samsung	KMM5364100-7
8 MB x 36	Motorola	MCM36800S-70
	PNY	P368000-707
	Samsung	KMM5368100-7

Step 2 Install Memory, Continued

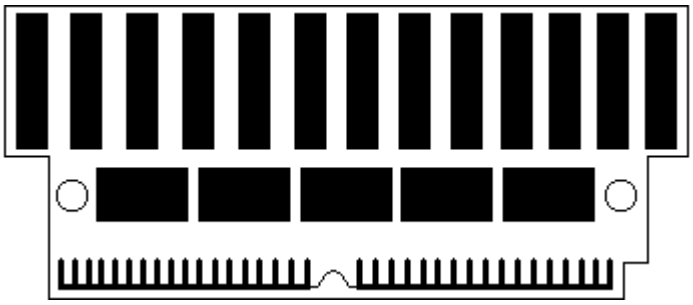
Installing SIMMs

The SIMM sockets can be filled with either 256 KB x 36, 1 MB x 36, or 4 MB x 36 SIMMs. Use only one type of SIMM to fill each bank.

Place the motherboard on an anti-static mat. With the component side of the SIMM facing you, firmly push the card 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.



The 1 MB 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 DOS is booted.

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

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

Step 3 Install the Motherboard

The mounting hole pattern on the Excalibur VLB Pentium motherboard is the same as the mounting hole pattern on a Baby AT motherboard. Standoffs and mounting screws are not supplied with the motherboard. The following table describes the installation.

Step	Action
1	Place the chassis for the motherboard on an anti-static mat. Connect the chassis to ground to avoid static damage during installation. Connect an alligator clip with a wire lead to any unpainted part of the chassis. Ground the other end of the lead at the same point as the mat and the wristband.
2	Rotate the chassis so that the front is to the right, and the rear is to the left. The side facing you is where the motherboard is mounted. The power supply is mounted at the far end of the chassis.
3	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place. Find the slots provided for the standoffs on the chassis. Hold the motherboard, component-side up, with the edge with the standoffs toward you and the edge with the power supply connector away from you. The edge connectors for the adapter cards should be to the left.
4	Carefully slide the motherboard into the chassis. Make certain that the standoffs fit the slots provided for them. If the standoffs are properly locked, the motherboard should not slide. It should also rest level with the chassis. The far edge should fit the slots in the plastic clips.
5	Place the two mounting screws in the holes provided for them and tighten them. If necessary, shift the motherboard slightly to align the mounting holes on the motherboard with the holes on the chassis. Refer to the graphic on page 27.

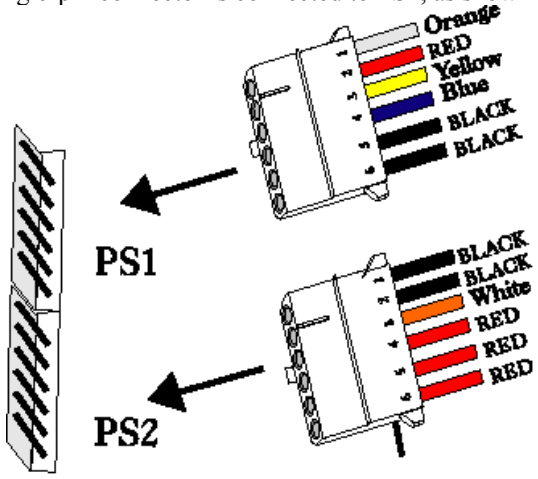
Step 4 Connect the Power Supply

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

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

~~Connect to PS1 and PS2~~

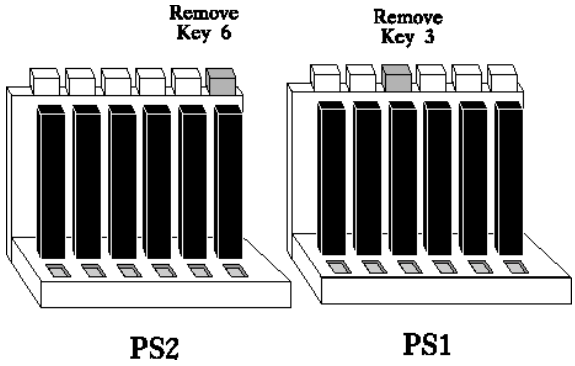
Attach the power supply cables to PS1 and PS2 on the motherboard. Se the drawing on page 27 for the location. AT-compatible power supplies have two 6-pin connectors. The 6-pin connector with 3 red wires and 2 black wires is connected to PS2 and the remaining 6-pin connector is connected to PS1, as shown below.



Power Supply Connectors

Power Supply Connectors are Keyed

The power connectors are keyed. The connector keys must be cut to fit some power supplies, as shown below.



PS1 Pinout

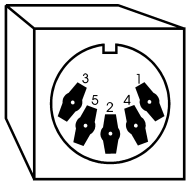
Pin	Description
1	Power Good (Orange wire)
2	VCC (Red wire)
3	+12 Volts (Yellow wire)
4	-12 Volts (Blue wire)
5	Ground (Black wire)
6	Ground (Black wire)

PS2 Pinout

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

Step 5 Connect the Keyboard Cable

The keyboard connector is a 5-pin DIN socket labeled KEYBD and J3 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.



5-Pin Keyboard Connector

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

Step 6 Connect the Mouse Cable

The mouse connector (J1) 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 for the mouse. The pinout follows. Because Pin 10 is unused, it should be cut.

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

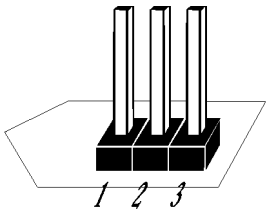
The Excalibur VLB Pentium motherboard can be special ordered in a configuration that includes two miniDIN connectors to permit a PS/2-type keyboard and mouse to be directly attached to the motherboard. Call American Megatrends Hardware Sales at 404-246-8600 for additional information.

Step 7 Connect Cables

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

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

Pin 1 of all connectors is labeled on the motherboard to identify the pin orientation when plugging in cables. See the following graphic.



Pin 1 is always toward the pointed end of the box

Locating pin 1

The following cables should be connected to the motherboard:

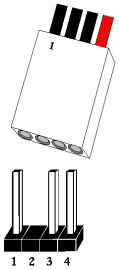
- Reset Switch cable to J43,
- Speaker cable to J34,
- Keyboard Lock cable to J40,
- Turbo LED cable to J42,
- Turbo Switch cable to J45,
- External battery connector to J5 (optional), and
- IDE LED Activity Indicator LED cable to J41.

J43 Reset Switch Connector

J43 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.

J34 Speaker Connector

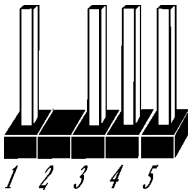
J34 is a four-pin single-inline berg that is attached via a cable to the system speaker. AMIBIOS signals hardware problems through the speaker.



Pin	Description
1	Speaker data
2	N/C
3	Ground
4	VCC

J40 Keyboard Lock Connector

J40 is a five-pin single-inline berg that is attached via a cable to the keyboard lock connector. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use.



Pin	Description
1	Vcc
2	N/C
3	Ground
4	Keyboard lock (KBDINH)
5	Ground

J42 Turbo LED

J42 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.

J41 IDE Activity Indicator LED

J41 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.

J5 External Battery Connector

The motherboard has a built-in rechargeable battery on the motherboard and does not need an external battery, but an external battery can be used. Connect the external battery to J5 via a four-wire cable. If you attach an external battery to J5, the built-in battery on the motherboard is automatically electrically isolated. J5 is a four-pin berg that connects to a 6-volt external battery. The positive (+) terminal, indicated by a red wire, connects to J5 Pin 1. The J5 pinout and connector are shown below.

Pin	Description
1	6 Volt DC (Battery In)
2	N/C
3	Ground
4	Ground

Step 7 Connect Cables, Continued

J45 Turbo Switch Connector

J45 is a two-pin single-inline berg that is attached via a cable to the externally-mounted bipolar Turbo switch on the chassis. The turbo switch allows the user to change the motherboard clock speed between high and low speeds.

Step 8 Connect Onboard I/O

Onboard Adapters

The Excalibur VLB motherboard has two serial ports (J8 and J9) and a parallel port (J6) onboard. It also has an IDE (J7) and a floppy controller (J10). The serial and parallel port connectors are described below. The IDE connector is described on page 54. The floppy connector is described on page 50.

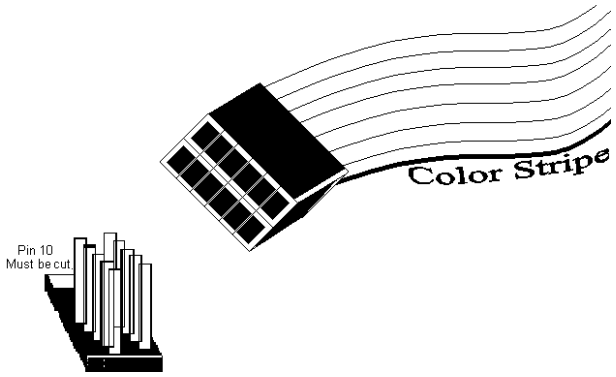
J8 Serial Port 1 (COM1) and J9 Serial Port 2 (COM2)

J8 and J9 are 10-pin dual-inline bergs that connect via 10-pin double-row ribbons to male 9-pin D-sub connectors fastened to the chassis to provide an AT-compatible serial port interface. The serial port pinout is shown below. Be sure to properly connect the cables to the berg connectors. Pin 1 of each of the bergs is labeled "1". The wire leading to pin 1 on the cable usually has a colored stripe.

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

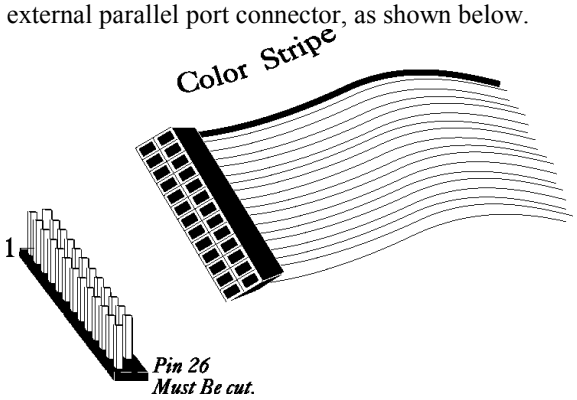
Attaching the Serial Port Cables

Two serial port cables are supplied with the Excalibur VLB motherboard to attach the serial port connectors (J8 and J9) to the external serial port DB25 or DB9 connectors on the chassis. Install the cables as shown below.

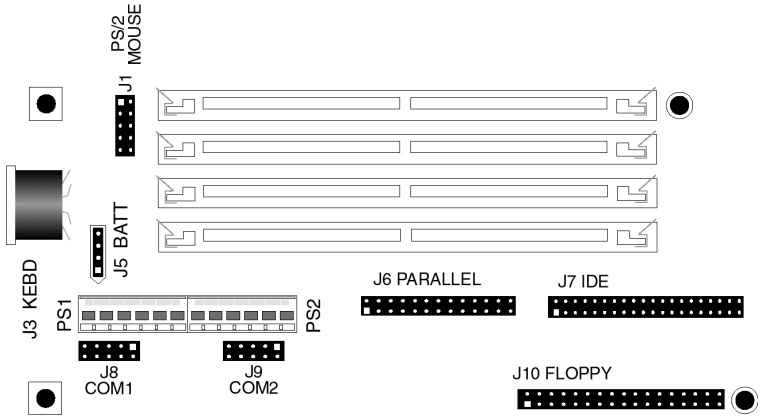


Attaching the Parallel Port Cable

A parallel port cable is supplied with the motherboard to connect the parallel port connector (J6) to the external parallel port connector, as shown below.



The portion of the motherboard where the parallel port connector is located is shown below.



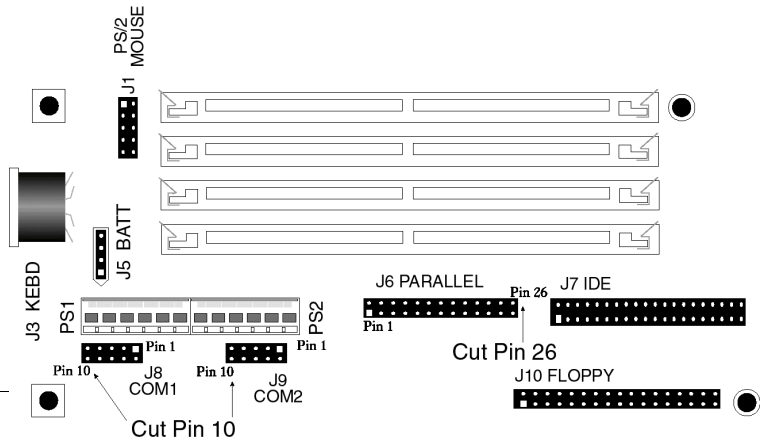
J6 Parallel Port

J6 is a 26-pin dual-inline berg. Use a 26-pin double-row ribbon cable to connect J6 and a female 25-pin D-sub connector on the chassis. The J6 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

Cutting Pins

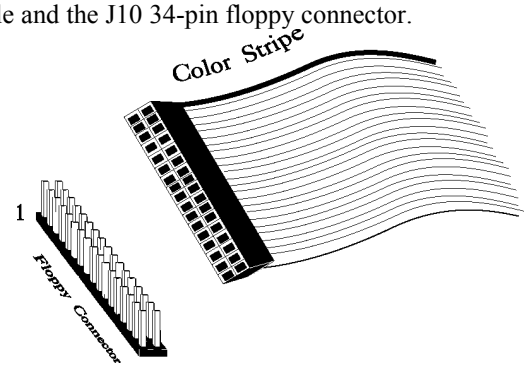
Pins must be cut on the two serial sockets and the parallel connectors as shown below. Cut pin 10 on both serial connectors and pin 26 on the parallel port connector.



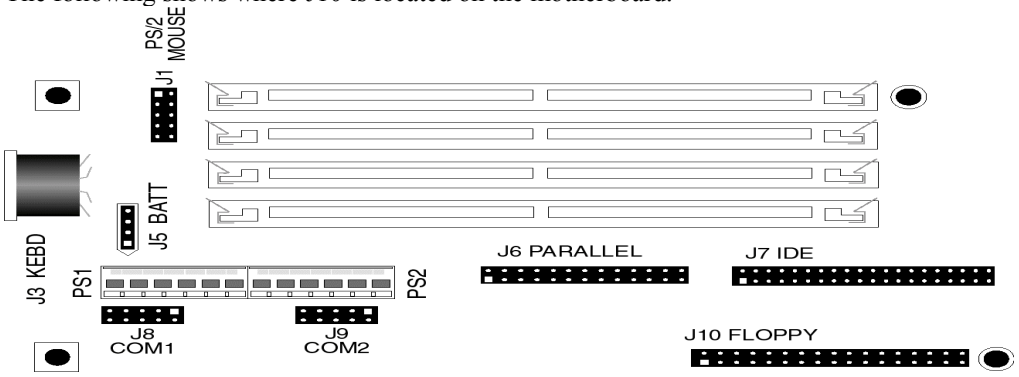
Step 9 Install Floppy Drive

J10 Floppy Disk Drive Connector

J10 is a 34-pin dual-inline berg. Connect the cable from the floppy drive to J10. The onboard floppy controller cannot be used if a hard disk adapter card with floppy controller is installed. The following graphic depicts a floppy cable and the J10 34-pin floppy connector.



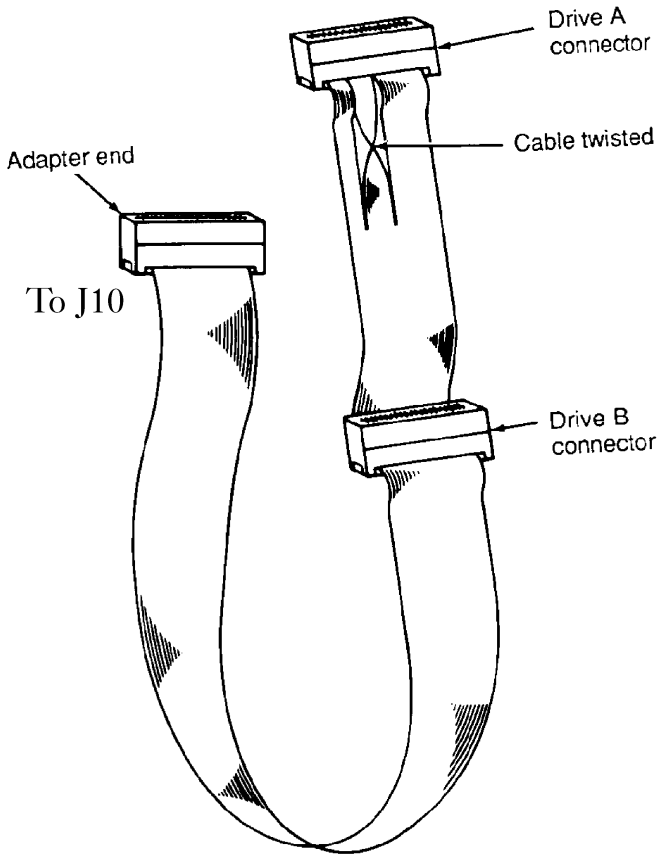
The following shows where J10 is located on the motherboard.



The motherboard supports 3½" and 5¼" floppy disk drive in low density (360 KB or 720 KB) and high density (1.2 MB, 1.44 MB, or 2.88 MB). Up to two floppy disk drives can be connected.

Step 9 Install Floppy Drive, Continued

The connecting cable that attaches to the floppy connector (J10) is a 34-pin ribbon connector with two 34-pin edge connectors for attaching the floppy disk drives. There should be a small twist in the cable between the floppy connectors, and the last (end) connector should be connected to the floppy drive that will be drive A. See the illustration below.



J10 Floppy Connector Pinout

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

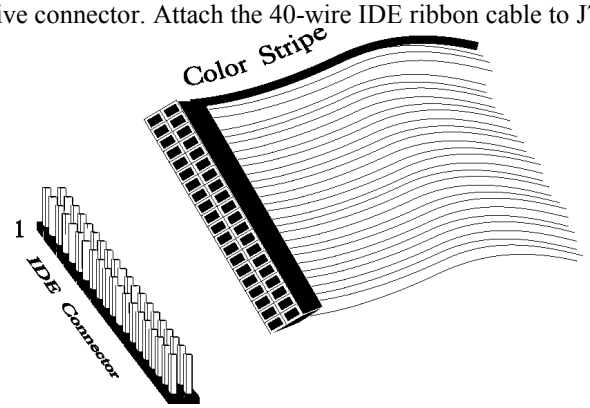
Twist in Floppy Cable

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

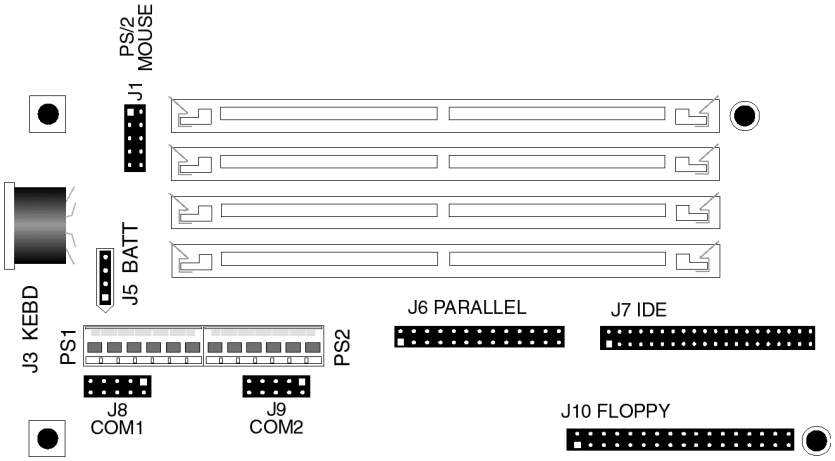
Step 10 Install Hard Disk

Attach IDE Cable to J7

J7 is the IDE hard disk drive connector. Attach the 40-wire IDE ribbon cable to J7 as shown below.



The following graphic shows where J7 is located on the motherboard.



J7 IDE Hard Disk Connector

J7 is a 40-pin dual-inline berg that connects a hard disk drive that has an Integrated Drive Electronics Interface to the onboard IDE Controller.

The IDE interface can be disabled via the Enable IDE Controller option in ADVANCED CHIPSET SETUP (see page 70). Disable the onboard IDE interface to use an ISA ESDI, RLL, MFM, or SCSI hard disk drive controller. The J7 pinout is:

Pin	Use	Pin	Use
1	-RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	KEY (N/C)
21	N/C	22	GND
23	-IOW	24	GND
25	-IOR	26	GND
27	IDERDY	28	ALE
29	N/C	30	GND
31	INT14	32	-IOCS16
33	HA1	34	N/C
35	HA0	36	HA2
37	-CS0	38	-CS1
39	-IDEACT	40	GND

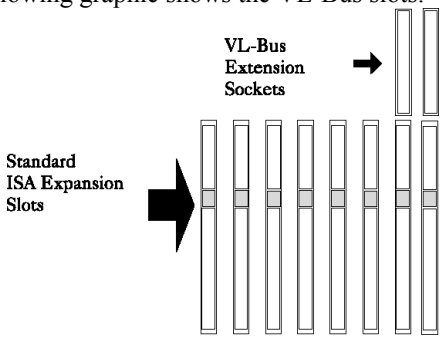
Step 11 Install Adapter Cards

The Excalibur VLB motherboard provides full compatibility with all IBM XT and AT-compatible adapter cards. It has seven ISA (AT-compatible) expansion slots. The slots are numbered from SLOT1 through SLOT8. The first two slots also accept VL-Bus adapter cards. A summary of the slots follows.

Slot	Description
1 – 2	VL-Bus master slots. These slots accept any ISA adapter card as well as 32-bit VL-Bus adapter cards.
3 – 7	Standard ISA expansion slots. Accepts both 8-bit and 16-bit XT- and AT-compatible adapter cards.

VL-Bus Adapter Cards

Most of the VL-Bus adapter card connectors are AT-compatible, but VL-Bus connectors also have an additional set of connectors. The second set of connectors is a 64-pin MCA®-type connector inline with the standard ISA connectors. The following graphic shows the VL-Bus slots.



The following graphic illustrates a typical VL-Bus Adapter Card edge connector.

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	RESH-
A20	SA11	B20	SYSCLK
A21	SA10	B21	IRQ7
A22	SA09	B22	IRQ6
A23	SA08	B23	IRQ5
A24	SA07	B24	IRQ4
A25	SA06	B25	IRQ3
A26	SA05	B26	DACK2-
A27	SA04	B27	T/C
A28	SA03	B28	BALE
A29	SA02	B29	+5
A30	SA01	B30	OSC
A31	SA00	B31	GND

16-Bit ISA Extension Pinout

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

Pin	Use	Pin	Use
C1	SBHE-	D1	MEMCS16-
C2	LA23	D2	IOCS16-
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ15
C7	LA18	D7	IRQ14
C8	LA17	D8	DACK0-
C9	MEMR-	D9	DREQ0
C10	MEMW-	D10	DACK5-
C11	SD08	D11	DREQ5
C12	SD09	D12	DACK6-
C13	SD10	D13	DREQ6
C14	SD11	D14	DACK7-
C15	SD12	D15	DREQ7
C16	SD13	D16	+5
C17	SD14	D17	MASTER-
C18	SD15	D18	GND

VL-Bus Pinout

The first two expansion slots are for VL-Bus adapter cards. VL-Bus slots include a 64-pin connector inline with the standard ISA connector. Side A is the component side. Side B is the solder side.

Pin	Use	Pin	Use
A1	DAT01	B1	DAT00
A2	DAT03	B2	DAT02
A3	GND	B3	DAT04
A4	DAT05	B4	DAT06
A5	DAT07	B5	DAT08
A6	DAT09	B6	GND
A7	DAT11	B7	DAT10
A8	DAT13	B8	DAT12
A9	DAT15	B9	VCC
A10	GND	B10	DAT14
A11	DAT17	B11	DAT16
A12	VCC	B12	DAT18
A13	DAT19	B13	DAT20
A14	DAT21	B14	GND
A15	DAT23	B15	DAT22
A16	DAT25	B16	DAT24
A17	GND	B17	DAT26
A18	DAT27	B18	DAT28
A19	DAT29	B19	DAT30
A20	DAT31	B20	VCC
A21	ADR30	B21	ADR31
A22	ADR28	B22	GND
A23	ADR26	B23	ADR29
A24	GND	B24	ADR27
A25	ADR24	B25	ADR25
A26	ADR22	B26	ADR23
A27	VCC	B27	ADR21
A28	ADR20	B28	ADR19
A29	ADR18	B29	GND
A30	ADR16	B30	ADR17
A31	ADR14	B31	ADR15
A32	ADR12	B32	VCC
A33	ADR10	B33	ADR13
A34	ADR08	B34	ADR11
A35	GND	B35	ADR09
A36	ADR06	B36	ADR07
A37	ADR04	B37	ADR05
A38	N/C	B38	GND
A39	BE0#	B39	ADR03
A40	VCC	B40	ADR02
A41	BE1#	B41	N/C
A42	BE2#	B42	RESET#
A43	GND	B43	D/C#
A44	BE3#	B44	M/IO#
A45	ADS#	B45	W/R#
A46	KEY	B46	KEY
A47	KEY	B47	KEY
A48	LRDY#	B48	RDYRTN#
A49	LDEV<>#	B49	GND
A50	LREEQ<>#	B50	IRQ9
A51	GND	B51	BRDY#
A52	LGNT<>#	B52	BLAST#
A53	VCC	B53	ID0
A54	ID2	B54	ID1
A55	ID3	B55	GND
A56	ID4	B56	LCLK
A57	LKEN#	B57	VCC
A58	LEADS#	B58	LBS16#

Step 12 Test and Configure

Review the following points before powering up:

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

Start the Test

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

BIOS Errors

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

If POST does not run successfully, it will beep or display error messages. Beeps indicate a serious problem with the system configuration or hardware. The Beep Code (see page 46) indicates the problem. Make sure the affected part is properly seated and connected. An error message is displayed if the error is less serious. Recheck the system configuration or the connections.

Configure the System

Run AMIBIOS Setup. You must enter the requested information and save the configuration data in CMOS RAM. The system will then reset, run POST, and boot the operating system. See page 59 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 the hardware actually installed).

AMIBIOS Error Reporting

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

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

Beep Codes

Errors may occur during POST (Power On Self Test), performed every time the system is powered on. Fatal errors are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal.

Beeps	Error message	Description
1	Refresh Failure	Bad memory refresh circuitry.
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. If the system still beeps, replace memory.
6 times...	Try a different keyboard or replace the keyboard fuse, if the keyboard has one.
8 times...	there is a memory error on the video adapter. Replace the video adapter, or the RAM on the video adapter.
9 times...	the BIOS ROM chip is bad. The system needs a new BIOS. The ROM can be reprogrammed with AMIFlash.
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 47. 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.
CH-2 Timer Error	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

AMIBIOS Displayed Error Messages, Continued

Error Message	Explanation
	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.

BIOS Configuration Summary Screen

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

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

• Main Processor      :  Pentium™      • Base Memory Size       :  640 KB      •
• Numeric Coprocessor :  Present       • Ext. Memory Size       :  16000 KB    •
• Floppy Drive A:     :  1.2 MB ½      • Hard Disk C: Type      :  Type 47     •
• Floppy Drive B:     :  1.44 MB ¼     • Hard Disk D: Type      :  Type 47     •
• Display Type        :  VGA/PGA/EGA   • Serial Port(s)         :  3F8, 3E8    •
• AMIBIOS Date        :  11/11/92      • Parallel Port(s)       :  378         •
••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••

        512 KB Cache Memory
        60 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 750080893


         Press <DEL> if you want to run SETUP









XX-XXXX-XXXXXX-XXXXXXXX-XXXXXX-XXXX-X
```

A BIOS Identification string appears in the left bottom corner of the screen, below the copyright message. Press <Ins> during system boot to display two additional BIOS Identification strings. The BIOS 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 the <Del> key to run AMIBIOS Setup.

Chapter 4

AMIBIOS Setup

AMIBIOS Features

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

Keyboard Speed Switching

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

AMIBIOS Setup

AMIBIOS Setup has four parts:

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

STANDARD CMOS SETUP

STANDARD CMOS SETUP permits you to configure and set system components such as floppy drives, hard disk drives, time and date, monitor type, and keyboard. STANDARD CMOS SETUP is described on pages 59 through 62.

ADVANCED CMOS SETUP

ADVANCED CMOS SETUP allows you to configure more advanced parts of memory configuration, peripheral support, and password support. ADVANCED CMOS SETUP is discussed on pages 63 through 68.

ADVANCED CHIPSET SETUP

ADVANCED CHIPSET SETUP configures features that are more technical and affect the system configuration. These options are described on pages 69 through 70.

PERIPHERAL MANAGEMENT SETUP

PERIPHERAL MANAGEMENT SETUP configures the onboard serial ports, parallel port, floppy, and local bus IDE.

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. These values are the BIOS Setup 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.

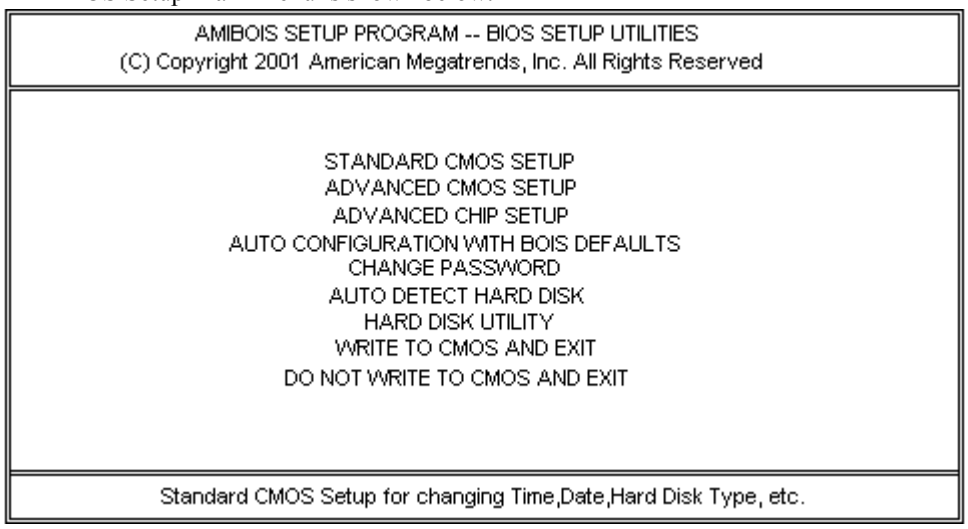
AMIBIOS Setup Key Use

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.
<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 59
ADVANCED CMOS SETUP	page 63
ADVANCED CHIPSET SETUP	page 69
PERIPHERAL MANAGEMENT SETUP	page 56
AUTO CONFIGURATION WITH BIOS DEFAULTS	page 56
CHANGE PASSWORD	page 75
AUTO DETECT HARD DISK	page 57
HARD DISK UTILITY	page 77
WRITE TO CMOS AND EXIT	page 58
DO NOT WRITE TO CMOS AND EXIT	page 58

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 types of AMIBIOS Setup, BIOS Setup 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.

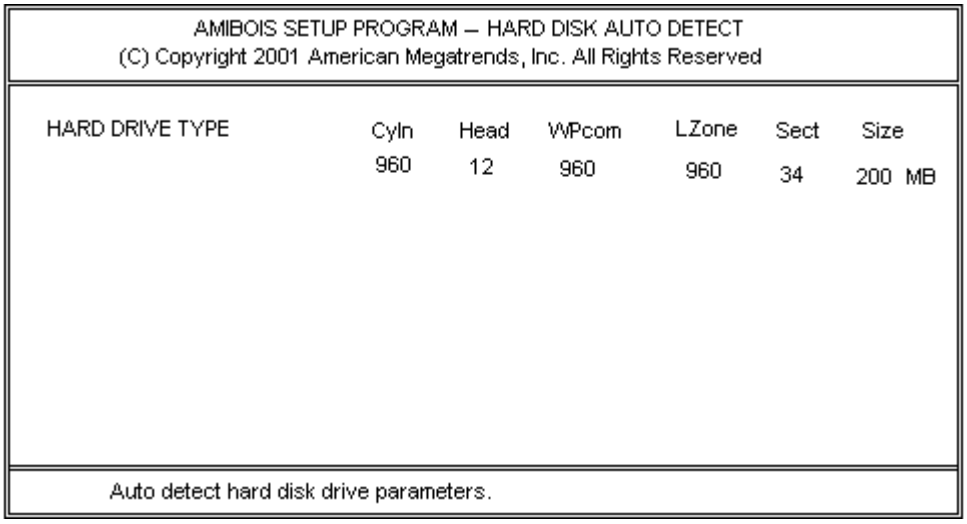
Auto Configuration With BIOS Defaults

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 DETECT HARD DISK

When enabled, this option displays the parameters for non-standard hard disk drives, such as RLL, ESDI, IDE, or SCSI drives. You can accept or reject the parameters. If accepted, these parameters are displayed in STANDARD CMOS SETUP as follows:



Write to CMOS and Exit

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

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

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

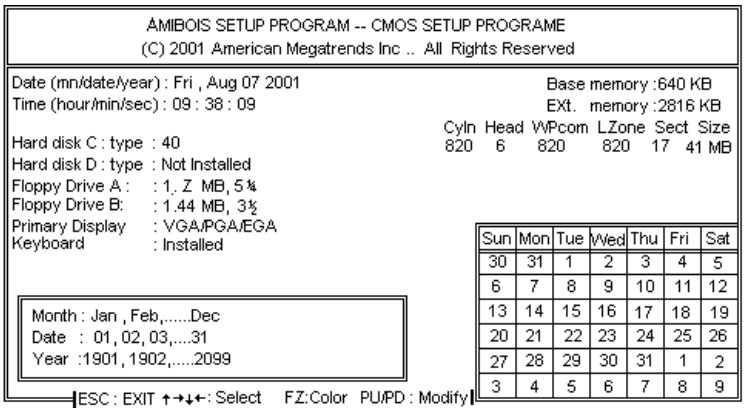
Do Not Write to CMOS RAM and Exit

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

Section 2

STANDARD CMOS SETUP

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



STANDARD CMOS SETUP Options

Date And Day Configuration

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

Time Configuration

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

Hard Disk Drive Type C: and D:

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

Type 47 is used for IDE drives and can be used for both hard disks C: and D:. If you select Type 47, you must enter the hard disk drive parameters (described on page 62). The hard drive manufacturer should provide all necessary parameters. The parameters for type 47 under Hard Disk C: and Hard Disk D: can be different, which effectively allows two different user-definable hard disk types.

Hard Disk Drive Types

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.					

STANDARD CMOS SETUP Options, Continued

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 based on the Number of heads x the Number of cylinders x the Number of sectors per track x 512 bytes per sector.

Floppy Drive A: and B:

Use ↑ and ↓ and select the floppy type via <PgUp> and <PgDn>. The settings are *360 KB 5¼"*, *1.2 MB 5¼"*, *720 KB 3½"*, *1.44 MB 3½"*, *2.88 MB 3½",* or *Not Installed*.

Monitor

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

Keyboard

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

Section 3

ADVANCED CMOS SETUP

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

```
•••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
•          AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP                                •
•     (C) 1993 American Megatrends, Inc. All rights reserved                         •
•••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
• Typematic Rate Programming : Disabled• Adaptor ROM Shadow D400,16K : Disabled•
• Typematic Rate Delay (msec): 500     • Adaptor ROM Shadow D800,16K : Disabled•
• Typematic Rate (Chars/Sec) : 30      • Adaptor ROM Shadow DC00,16K : Disabled•
• Mouse Support Option       : Enabled • Adaptor ROM Shadow E000,64K : Disabled•
• Above 1 MB Memory Test     : Enabled • BootSector Virus Protection : Disabled•
• Memory Parity Error Check  : Enabled •                                          •
• System Boot Up Num Lock    : On      •                                          •
• Floppy Drive Seek At Boot  : Disabled•                                          •
• System Boot Up Sequence    : C:,A:   •                                          •
• System Boot Up CPU Speed   : High    •                                          •
• Cache Memory               : Both    •                                          •
• Password Checking Option   : Setup   •                                          •
• Video   ROM Shadow C000,16K: Enabled •                                          •
• Video   ROM Shadow C400,16K: Enabled •                                          •
• Adaptor ROM Shadow C800,16K: Disabled•                                          •
• Adaptor ROM Shadow CC00,16K: Disabled•                                          •
• Adaptor ROM Shadow D000,16K: Disabled•                                          •
•••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••••
•••••••••••••ESC:Exit ↑→↓←:Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color   •••••••••
•••••••••••••F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults  •••••••••
```

Help Screens

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

Warning Message

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

ADVANCED CMOS SETUP Options

Typematic Rate Programming
Typematic Rate Delay
Typematic Rate

Typematic Rate Programming enables or disables the following two options. Typematic Rate Delay *(250, 500, 750, or 1,000 milliseconds)* and Typematic Rate *(6, 8, 10, 12, 14, 15, 20, 24, or 30* characters per second) control the speed at which a keystroke is repeated.

When a key is pressed and held down, the associated character is displayed. After a delay specified by the Typematic Rate Delay, the character repeats at the Typematic Rate. The default settings are:

Option	BIOS Setup default
Typematic Rate Programming	*Disabled*
Typematic Rate Delay	*500*
Typematic Rate	*30*

Mouse Support Option

When this option is enabled, AMIBIOS supports a PS/2-type mouse. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.* The mouse is enabled through jumper J12. If Pins 1-2 are shorted, IRQ12 is connected to the mouse. If Pins 2-3 of J12 are shorted (the default setting), IRQ12 is connected to the AT Bus.

Above 1 MB Memory Test

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

Memory Parity Error Check

This option enables parity error checking of 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.*

System Boot Up Num Lock

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

Floppy Drive Seek At Boot

When this option is enabled, AMIBIOS performs a seek operation on the floppy drive before booting the system. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.*

System Boot Up Sequence

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

Cache Memory

This option enables internal and secondary cache memory.

Setting	Description
Internal	Only the cache memory on the Pentium processor is enabled.
Both	Both secondary L2 (external) cache memory and the internal cache memory on the Pentium processor are enabled.
Disabled	Neither the Pentium internal cache memory nor secondary cache memory is enabled.

The BIOS Setup default is *Both.*

Password Checking Option

This option enables the password check option every time the system boots or the end user runs AMIBIOS Setup. If *Always* is chosen, a user password prompt appears every time the system is turned on. If *Setup* is chosen, the password prompt appears if AMIBIOS Setup is run. See page 75 for instructions on changing a password.

Video ROM Shadow C000,16K
Video ROM Shadow C400,16K

These options control the shadowing of the contents of shadowed Video ROM. ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. This option permits the memory segment at C0000h – C7FFFh to be shadowed from ROM to RAM for quicker execution. The settings are *Enabled* or *Disabled.* The BIOS Setup defaults are *Enabled.*

Adaptor ROM Shadow C800,16K
Adaptor ROM Shadow CC00,16K
Adaptor ROM Shadow D000,16K
Adaptor ROM Shadow D400,16K
Adaptor ROM Shadow D800,16K
Adaptor ROM Shadow DC00,16K
Adaptor ROM Shadow E000,64K

These options control the shadowing of the contents of adaptor ROM beginning at the specified addresses. ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the corresponding DRAM.

This option permits the memory segment that begins at the address specified in the option title to be shadowed from ROM to RAM for quicker execution.

The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.*

Do not enable shadowing of the E000h ROM segment. Always set the **Adaptor ROM Shadow E000,64K** option to *Disabled.* The E000h segment is used by the Flash EPROM. Shadowing of this option may cause unpredictable system behavior.

Boot Sector Virus Protection

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

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

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

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

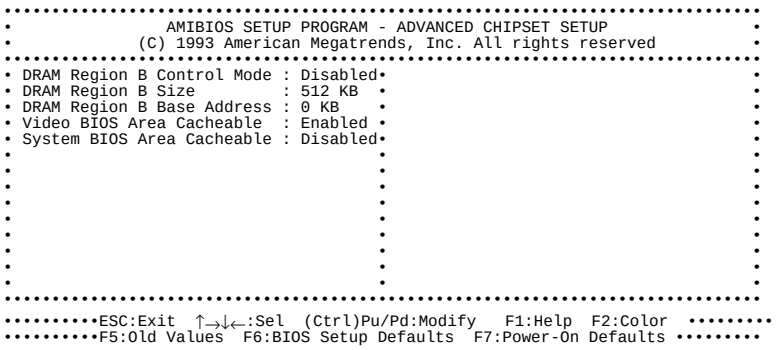
```
        Format!!!
Possible VIRUS: Continue (Y/N)? _
```

The BIOS Setup default is *Disabled.*

Section 4

ADVANCED CHIPSET SETUP

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



ADVANCED CHIPSET SETUP Options

DRAM Region B Control Mode

This option defines how system memory Region B is used. Region B must be located above 1 MB. The settings are *Disabled* (system memory is treated as one contiguous area), *WR-Thru* (the contents of Region B can be read from or written to secondary cache memory, but only via a write-through caching algorithm), or *Hole* (make Region B a hole in memory). *Do not select Wr-Thru.* The BIOS Setup default is *Disabled.*

Hole defines a hole in DRAM system memory. The hole starting address is specified in the **DRAM Region B Base Address** option. The size of the hole is specified in the **DRAM Region B Size** option. The hole is reserved on the VL-bus local bus and ISA bus for adapter cards. If *Hole* is specifed, make sure that the operating system recognizes the hole and can still access DRAM beyond the hole.

DRAM Region B Size

This option sets the memory Region B size. This option cannot be used to set the size of a non-cacheable area of memory. The settings are *512K, 1M, 2M,* or *4M.* The BIOS Setup default is *512KB.*

DRAM Region B Base Address

This option defines the beginning of system memory Region B. This option cannot be used to set the starting address of a non-cacheable area of memory. The base address must be a multiple of the **DRAM Region B Size** option setting and must not be less than 1 MB if the **DRAM Region B Control Mode** option is set to *Hole.* The BIOS Setup default is *0 KB.*

Video BIOS Area Cacheable

If this option is enabled, the contents of the video BIOS shadow RAM area can be read from or written to secondary cache memory, which will improve video performance. This option can be enabled only when Video ROM Shadow C000,16K and Video ROM Shadow C400,16K are set to *Enabled* in ADVANCED CMOS SETUP. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Enabled.*

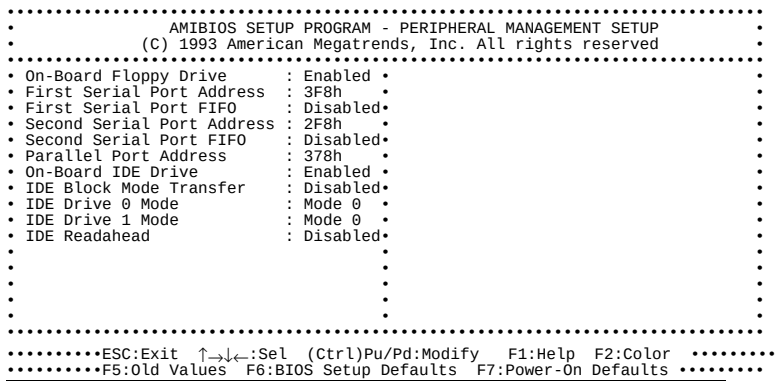
System BIOS Area Cacheable

If this option is enabled, the contents of the system BIOS shadow RAM area can be read from or written to secondary cache memory, which improves performance. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.*

Section 5

Peripheral Setup

The Peripheral Setup screen is shown below. Press the →, ←, ↑, and ↓ keys to scroll through the options.



Peripheral Setup Options

On-Board Floppy Drive

This option enables the use of the floppy drive controller on the motherboard. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Enabled.*

First Serial Port Address

This option sets the base I/O port address of serial port 1 on the motherboard. The settings are *Disabled, 3F8h,* or *3E8h.* The BIOS Setup default is *3E8h.*

First Serial Port FIFO

This option enables the FIFO buffer for the first serial port. The settings are *Enabled* or *Disabled.* The default is *Disabled.*

Second Serial Port Address

This option sets the base I/O port address of serial port 2 on the motherboard. The settings are *Disabled, 2F8h,* or *2E8h.* The BIOS Setup default is *2F8h.*

Second Serial Port FIFO

This option enables the FIFO buffer for the second serial port. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.*

Parallel Port Address

This option enables the parallel port on the motherboard. The settings are *Disabled, 378,* or *278.* The BIOS Setup default is *378h.*

On-Board IDE Drive

This option enables the use of the IDE controller on the motherboard. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Enabled.*

IDE Block Mode Transfer

This option enables multiple sector reads and writes for IDE drives. The settings are *Enabled* or *Disabled.* The BIOS Setup default is *Disabled.*

IDE Drive 0 Mode

This option sets the IDE mode for the first IDE drive in the computer (IDE Drive 0). The settings are *Mode 0, Mode 1,* or *Mode 2.* The BIOS Setup default is *Mode 0.* Make sure that the IDE drive attached to the computer supports all IDE modes. If you are not certain which IDE modes the drive supports, set to *Mode 0.*

IDE Drive 1 Mode

This option sets the IDE mode for the second IDE drive in the computer (IDE Drive 1). The settings are *Mode 0, Mode 1,* or *Mode 2.* The BIOS Setup default is *Mode 0.* Make sure that the IDE drive attached to the computer supports all IDE modes. If you are not certain which IDE modes the drive supports, set to *Mode 0.*

IDE Readahead

When this option is set to *Enabled,* the readahead buffer on the IDE drive is enabled, permitting faster reads. The settings are *Enabled* or *Disabled.* The BIOS Setup default setting is *Disabled.* The IDE drive installed in the computer must have a readahead capability.

Section 6

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 66) by choosing either *Always* (the password prompt appears every time the system is powered on) or *Setup* (the password prompt appears only when AMIBIOS Setup is run). The password is stored in CMOS RAM.

The system asks for a password.

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

If You Do Not Want to Use a Password

Just press <Enter> when the password prompt appears.

Changing a Password

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

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

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

Password Options Control Prompt

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

Remember the Password

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

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

Section 7

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 has been preformatted.	Page 79
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page 81
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 83.

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

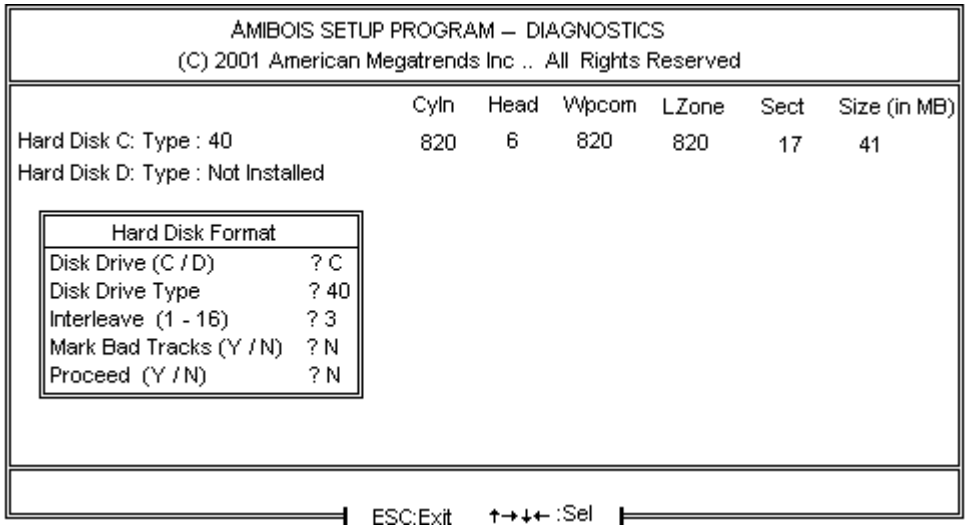
When	Conditions	Run...
Installing a new hard disk.	The hard disk drive manufacturer provided a list of bad tracks, the system documentation includes the optimum interleave factor, and the drive is preformatted .	None
Installing a new hard disk.	You do not have a list of bad tracks.	Media Analysis
Installing 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, select an option from the screen and press <Enter>.

Hard Disk Format Utility

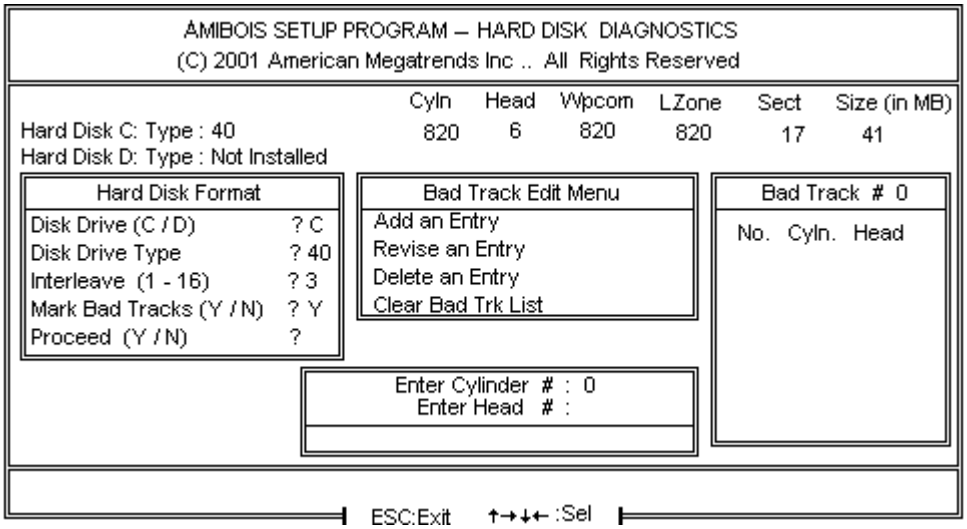
Warning
The Hard Disk Format utility destroys all hard disk data. Back up the data on the hard disk before running this utility.

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 developed bad tracks as a result of aging or poor handling. Select Media Analysis to find bad tracks. The following screen appears when Hard Disk Format is selected.



Answer the questions on the screen. The first two questions are already completed if only one hard disk drive was selected in Standard CMOS Setup and the cursor is on *Interleave*. The Disk Drive Type is read from CMOS RAM. The interleave factor can be selected manually or determined by the Auto Interleave routine.

The hard disk drive manufacturer usually provides a list of bad tracks. Enter these tracks. They are then labeled as bad to prevent data from being stored on them. The following screen is displayed after entering *Y* in Mark Bad Tracks, pressing <Enter>, and selecting add, delete, revise, or clear from the Bad Track Edit Menu.



Type *Y* and press <Enter>. A warning screen appears. Press any key to continue.

Warning
Data on the hard drive will be irrevocably lost.

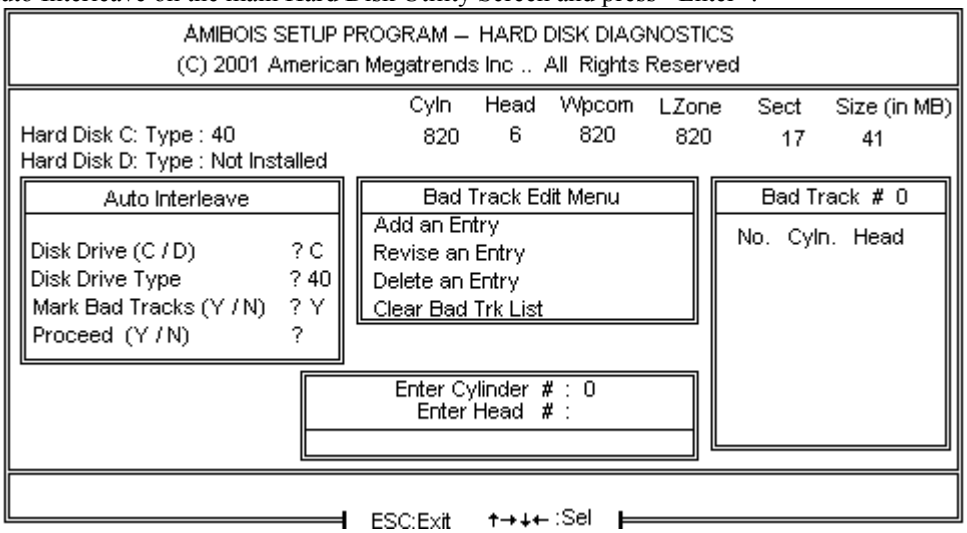
Auto Interleave Utility

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>.

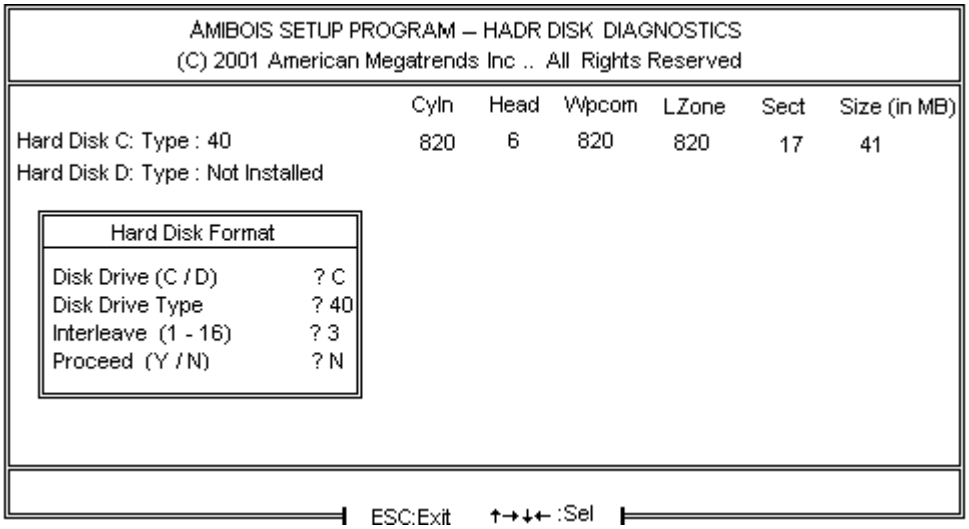


The cursor is on *Mark Bad Tracks.* The default is *N*. To mark additional bad tracks, type *Y* and press <Enter>. After selecting options from the Bad Tracks Edit Menu, press <Esc>. Type *Y* and press <Enter> to proceed with the Auto Interleave process. A warning screen appears. Press <Enter> to return 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 in the BUS slot.
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 has been received from the hard disk drive.
Bad ECC on Disk Read	When the hard disk drive utility writes to the disk, it also calculates an ECC (Error Correction Code) value for the data being written. This ECC value is written to the drive and then read back. The value read back is different from the one calculated.
Bad Sector Flag Detected	An operation was performed on a sector that has been flagged as bad.
Controller Has Failed	A diagnostic command was issued to the controller failed.
Drive Not Ready	An operation on the hard disk drive has timed out. The hard disk drive utility has waited beyond a preset specified time limit.
Drive Parameter Activity Failed	A reset command was sent to the controller followed by drive parameters. Using these parameters, the controller did not get a response from the hard disk. Make sure the drive type is correct.
ECC Corrected Data Error	The ECC value (explained above) read from the disk is not the same value which was written to the disk. The data is not correct. An attempt was made to correct the data, but the ECC value is not corrected.
Requested Sector Not Found	The requested sector could not be found.
Reset Failed	The reset command did not properly reset the hard disk.
Seek Operation Failed	A seek command failed. A seek operation is the act of finding a particular sector on the hard disk.
Undefined Error - Command Aborted	An unidentifiable error condition occurred.
Write Fault on Selected Drive	A write fault occurred during the write operation on the hard disk drive.

Chapter 5

Flash Programming

The American Megatrends Excalibur VLB Pentium 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 two methods for programming the Flash EPROM:

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

Programming from System Boot

First you must place a two-pin shorting bridge on both pins of J51. Then using the floppy disk with the new BIOS file, press and hold down the <Home> key to reprogram the motherboard Flash EPROM-based AMIBIOS before DOS boots. *Remember to remove the shorting bridge from J51 after Flash programming has completed.*

Using AMIFlash

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

Reprogramming from System Boot

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

1. reads S75P.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.

S75P.ROM

S75P.ROM resides on a floppy disk and contains the updated main BIOS code. American Megatrends will provide this file when the AMIBIOS for the Excalibur VLB Pentium motherboard must be updated.

S75P.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 S75P.ROM.

Programming the Flash EPROM

Step	Action
1	Turn system power off.
2	Place the floppy disk that has the latest S75P.ROM BIOS file in floppy drive A:.
3	Make sure that the system has a speaker that is connected.
4	Turn system power on while pressing and holding down the <Home> key.

Reprogramming from System Boot, Continued

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 S75P.ROM on the floppy disk.	S75P.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	S75P.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 or J2 is still shorted.

AMIFlash Checkpoint Codes

Code	Description
02h	Verify the AMIFlash BIOS checksum and disable internal cache memory.
0Eh	Make the CMOS RAM checksum bad and initialize the CMOS RAM status registers.
10h	Disable DMA Controllers 1 and 2. Disable Interrupt Controllers 1 and 2.
13h	Initialize the chipset registers.
18h	If the main BIOS is good, transfer control to the main BIOS.
1Bh	Initialize the system timer.
1Dh	Begin the refresh test.
20h	Begin the 16 KB base memory test.
23h	Initialize the interrupt vectors.
28h	Determine the CPU clock frequency.
30h	Program the system speed-dependent parameters according to the CPU clock frequency.
40h	Begin the memory test.
50h	The memory test has completed.

AMIFlash Checkpoint Codes, Continued

Code	Description
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 S75P.ROM file in the floppy disk root directory.
E6h	The S75P.ROM file not present in the floppy disk root directory.
E7h	Begin reading the File Allocation Table.
E8h	Begin reading S75P.ROM, sector by sector.
E9h	S75P.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
```

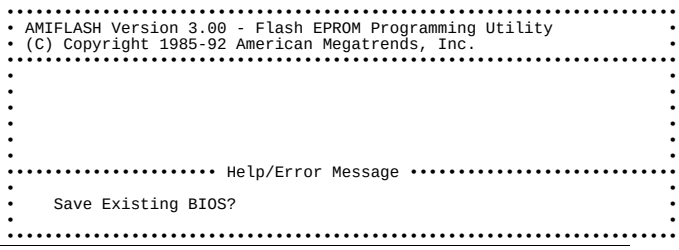
and press <Enter> at the DOS prompt. AMIFlash will prompt for the filename. Type

```
S75P.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 (S75P.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.

```
• AMIFLASH Version 3.00 - Flash EPROM Programming Utility           •
• (C) Copyright 1985-92 American Megatrends, Inc.                   •
•                                                                   •
•                                                                   •
•                                                                   •
•                                                                   •
•                                                                   •
•                                                                   •
•                                                                   •
•                    Help/Error Message                             •
•                                                                   •
•    Flash EPROM Programming Successful                             •
•                                                                   •
•                                                                   •
```

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	The Flash EPROM is being programmed.
Saving BIOS File in Disk	The existing BIOS is being saved to disk.
Reading BIOS File from Disk	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	Successful Flash EPROM programming.
Want to Continue (Y/N)?	Displayed after an error message.
Want to Exit (Y/N)?	Displayed when you press <Esc>.
Please Wait..	Displayed when Flash programming is occurring.
Put Off System Power	Error during Flash programming. Replace the Flash

AMIFlash Messages, Continued

Message	Explanation
	EPROM with a new programmed Flash EPROM.
No Flash EPROM present	No Flash EPROM is installed in the system.
Memory Allocation Error	Scratch memory is not available.
File Creation Error	Displayed when the specified BIOS save file could not be created.
File Does Not Exist	The Flash EPROM program file could not be found.
File I/O Error	Read or write error.
Disk Full	The existing BIOS save disk has no space.
Flash EPROM Programming Error.	An error occurred during Flash programming. The system is not usable unless the existing Flash EPROM is replaced with the new Programmed Flash EPROM.
Flash EPROM Programming Successful	Flash programming is successful.
BIOS File Not Of Proper Size	The file size of the new program does not match the Flash EPROM size.
Flash EPROM Programming is going to start	The computer cannot be used until Flash programming completes successfully. The existing Flash EPROM must be replaced by a new programmed Flash EPROM if an error occurs. The computer must not be turned off during programming. The computer reboots if programming is completed successfully.

Chapter 6

Upgrading Cache Memory

Cache memory American Megatrends Excalibur VLB ISA motherboard can be upgraded from 256 KB to 512 KB. Eight additional 32 KB x 8 15 ns SRAMs are required for 512 KB of cache memory.

Recommended Parts

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

Manufacturer	Part Number
Paradigm	PDM41256SA15P
Samsung	KM68257BP-15
Motorola	MCM6206CP15

How to Upgrade Cache Memory

Step	Action
1	Turn the system off. If the motherboard is already installed in a computer case, remove the cover and expose the motherboard. An illustration of the motherboard appears on the following page.
2	Make sure you are properly grounded to prevent electrostatic discharge.
3	Install the new 32 KB x 8 SRAM in sockets U8, U15, U18, U20, U30, U38, U40, and U45. Make sure that Pin 1 of the socket matches Pin 1 of the SRAM.
5	Place shorting bridges on Pins 2-3 of J52, J53, and J54. Place a shorting bridge on J31. Place a shorting bridge on J30.
6	Turn system power on. The system should report 512 KB of cache memory. If it does not, repeat the cache memory installation procedure.

Appendix A

Engineering Specifications

Temperature Ranges

The following values are ambient temperatures inside the computer case. The board temperatures reflect the Pentium 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
60 MHz	YES	200 feet per minute	Not critical	0 ° through 50 ° C.

Humidity

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

The Excalibur VLB motherboard requires +5V ~7A. The ISA bus requirements are:

+5V ~13A
-5V 1.6A
+12V 5A
-12V 2.4A
The +5V supply current to the ISA Bus is limited by the power connector.

Power Consumption

The two SIMM memory banks consume 2 Amps each, for a total of 4 Amps.

Each ISA expansion slot is gated at 3.0 Amps maximum. Each VL-Bus expansion slot is gated at 4.5 Amps maximum. There are six ISA-only expansion slots and two VL-Bus slots, so the total maximum power consumption for the expansion slots is 27 Amps. The total maximum power consumption is 31 Amps at +5V with a 220 Watt power supply. If the third power connector is used, ~28A can be used by VL-Bus and ISA Bus adapter cards. If the third power connector is not used, only 13A can be used by adapter cards.

Conclusion

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

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