TRENTON

NLT

6313-xxx

No. 87-006316-000   Revision A

TECHNICAL REFERENCE

Intel® Xeon™

PROCESSOR-BASED

SHB

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HANDLING PRECAUTIONS

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WARNING: This product has components which may be damaged by electrostatic discharge.

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To protect your system host board (SHB) from electrostatic damage, be sure to observe the following precautions when handling or storing the board:

- Keep the SHB in its static-shielded bag until you are ready to perform your installation.

- Handle the SHB by its edges.

- Do not touch the I/O connector pins. Do not apply pressure or attach labels to the SHB.

- Use a grounded wrist strap at your workstation or ground yourself frequently by touching the metal chassis of the system before handling any components. The system must be plugged into an outlet that is connected to an earth ground.

- Use antistatic padding on all work surfaces.

- Avoid static-inducing carpeted areas.

SOLDER-SIDE COMPONENTS

This SHB has components on both sides of the PCB. It is important for you to observe the following precautions when handling or storing the board to prevent solder-side components from being damaged or broken off:

- Handle the board only by its edges.

- Store the board in padded shipping material or in an anti-static board rack.

- Do not place an unprotected board on a flat surface.

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Before You Begin

INTRODUCTION It is important to be aware of the system considerations listed below before installing your NLT SHB (6313-xxx). Overall system performance may be affected by incorrect usage of these features.

PS/2 REQUIREMENTS DURING BOOT-UP Certain operating systems require a PS/2 keyboard during boot-up. Since the NLT itself does not have a PS/2 mouse connector, you may also need Trenton's IOB30 (6391-000) I/O board in your system to provide this functionality.

Trenton has determined that the IOB30 is required when using Red Hat Linux 9.0, Fedora Linux 9.0, SUSE Linux 9.0, SCO ODT 5.05, UnixWare® 7.11, Sun® Solaris™ 9.0 and Microsoft® Windows® NT 4.0. Microsoft® Windows® 2000 Professional/Server, Windows® XP Home Edition/Professional/64-Bit (all requiring Service Packs 1, 1A or 2) and Windows® 2003 Server/64-Bit Server do *not* require the IOB30. If your operating system is not included here, contact Trenton for the latest information regarding IOB30 requirements.

MOUSE/KEYBOARD "Y" CABLE If you have an IOB30 I/O board in your system and you are using a "Y" cable attached to the bracket mounted mouse/keyboard mini Din connector, be sure to use Trenton's "Y" cable, part number 5886-000. Using a non-Trenton cable may result in improper SHB operation.

DDR2 MEMORY The memory modules used in the NLT must be PC2-3200 compliant and have the following features:

- 240-pin with gold-plated contacts

- ECC (72-bit) DDR2 memory

- Dual rank or single rank DIMMs

- Registered configuration

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NOTE: With the bracket end of the board to the right, the DIMM sockets are numbered 1B, 1A, 2B and 2A, from top to bottom. All memory modules must have gold contacts.
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Populating identical DIMMs in pairs (one each in the A and B channels) results in dual-channel operation, which theoretically doubles the memory bandwidth.

When a single DIMM is used, it should be installed in DIMM socket 1B and will operate as a single-channel interface with a theoretical memory bandwidth of 3.2GB/s.

Installing two DIMMs which are identical in type, size and rank in DIMM sockets 1B and 1A results in dual-channel operation, which doubles the theoretical memory interface bandwidth to 6.4GB/s. Additional DIMMs installed in sockets 2B and 2A must also be identical in type, size and rank to each other, but may be different in size from the pair installed in sockets 1B and 1A. If the modules in channel B and channel A (e.g., 1B and 1A) differ in size, the BIOS will use the size of the smallest DIMM.

Installing DIMMs only in sockets 1B and 2B results in single-channel mode, since both DIMMs are in the B channel.

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NOTE: The NLT supports a DDR2-400 memory interface speed. If modules of higher speeds are used, they will clock down to a DDR2-400 memory interface speed.

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DDR2 memory modules are available as either single rank or dual rank DIMMs. The DIMMs must be installed in the SHB's DIMM sockets using prescribed population rules to ensure proper memory interface operation and performance. Refer to the DDR2 Memory section of the *Specifications* chapter of the NLT manual for more details.

ATI M1 VIDEO DRIVER INSTALLATION

The Microsoft® Windows® 2000, Windows® XP and Windows® 2003 operating systems have built-in drivers for the ATI® Rage™ Mobility™ M1 video interface. However, to maximize performance, the ATI video drivers on Trenton's *SBC Technical Manuals and Software Drivers* CD (#89-005945-xxx) should be installed.

The Windows® operating systems display three "Unknown Devices" in the Device Manager. These "unknown devices" are for the ATI M1 video. The devices will be updated and removed once the ATI M1 driver is installed.

To install the ATI driver for Windows® NT, you must manually go into the display properties of Windows® NT and install the driver by pointing to the folder containing the Windows® NT driver located on Trenton's *SBC Technical Manuals and Software Drivers* CD. The file name for the driver is "atiin4b." Select "RAGE MOBILITY M1" to continue with installation of the driver.

BOOT FROM LAN

The NLT supports bootup from a LAN device. If you are not booting from a LAN device, the boot from LAN options on the **Boot Device Priority** screen should always be set to **Disabled** to eliminate unnecessary delays during the bootup process. This may be done via the **Boot Device Priority** option on the Boot Setup screen of the BIOS Setup Utility.

HYPER-THREADING

Hyper-Threading improves overall performance in many systems designed for multi-processing, high-demand multi-tasking and multi-threaded applications. If you are using a system which can take advantage of Hyper-Threading technology, the setting of the **Hyper-Threading** option of the system BIOS should remain **Enabled**, which is the factory setting.

For systems which use applications and operating systems which cannot take advantage of Hyper-Threading technology, such as versions of Linux before revision 2.4.x, the **Hyper-Threading** option should be changed to **Disabled**. Operating systems and applications which are not optimized for Hyper-Threading technology may actually experience some performance degradation if this option is not set correctly. You may use the BIOS Setup Utility to change the setting of the **Hyper-Threading** option to **Disabled**. This option is found on the **CPU Configuration** screen in the *Advanced Setup* section of the BIOS Setup Utility.

FOR MORE INFORMATION

For more information on any of these features, refer to the appropriate sections of the *NLT Technical Reference Manual* (#87-006316-000). The latest revision of this manual may be found on Trenton's website - www.TrentonTechnology.com.

Chapter 1   *Specifications*

INTRODUCTION   The NLT is a full-featured system host board (SHB) which features dual Intel® Xeon™ microprocessors, an 800MHz system bus, ATI Technologies® video interface, support for 8GB DDR2 memory, PCI Express® Bus, cache memory, dual Ultra ATA/100 EIDE interfaces, dual Gigabit Ethernet interfaces, dual Serial ATA ports, four USB ports and a speaker port. This single-slot high performance SHB plugs into PICMG® 1.3 backplanes and provides full PC compatibility for the system expansion slots.

MODELS

Model #	Model Name	Speed
6313-006-xM	NLT/3.6	3.6GHz
6313-004-xM	NLT/3.4	3.4GHz
6313-003-xM	NLT/3.2D	3.2GHz
6313-002-xM	NLT/3.0D	3.0GHz
6313-001-xM	NLT/2.8D	2.8GHz

where xM indicates memory size (0M = 0MB memory, 256M =256MB memory, etc.)

FEATURES   • Dual Intel® Xeon™ microprocessors

   • 3.6GHz, 3.4GHz, 3.2GHz, 3.0GHz or 2.8GHz with 1M cache and an 800MHz Front Side Bus (FSB)

• Intel® E7520 chipset with 800MHz system bus

• PCI Local Bus operating in 32-bit/33MHz mode, PCI-X Bus operating in 64-bit/66MHz mode and PCI Express™ Bus operating in x4 and x8 modes

• Ultra XGA on-board video interface (ATI Technologies®)

• Dual Ethernet interfaces for use with 10/100/1000Base-T networks

• Dual Serial ATA ports support two independent SATA storage devices

• Memory error checking and correction (ECC) support

• Compatible with PCI Industrial Computer Manufacturers Group (PICMG) 1.3 Specification

• Supports up to 8GB of Double Data Rate (DDR2) on-board memory

• Dual PCI EIDE Ultra ATA/100 drive interfaces

• Universal Serial Bus (USB 2.0) support

• Automatic or manual peripheral configuration

• Watchdog timer

• Full PC compatibility

**SHB BLOCK
DIAGRAM**

SHB BOARD LAYOUT

PROCESSORS	• Dual Intel® Xeon™ microprocessors
	• 3.6GHz, 3.4GHz, 3.2GHz, 3.0GHz or 2.8GHz with 1M cache and an 800MHz Front Side Bus (FSB)
	• Processor uses the FC-mPGA4 packaging (604-pin)
BUS INTERFACES	PCI Local Bus and PCI-X Bus compatible
DATA PATH	DDR2 Memory - 64-bit (per channel)
	PCI Bus - 32-bit
	PCI-X Bus - 64-bit
BUS SPEEDS	PCI - 33MHz (on-board only)
	PCI-X - 66MHz (on-board only)
	PCI Express - 2.5GHz per lane
BUS SPEED - SYSTEM	800MHz Front Side Bus
MEMORY INTERFACE	Dual Double Data Rate (DDR2) memory channels; theoretical memory interface bandwidth is 3.2GB/s for single-channel operation and 6.4GB/s for dual-channel operation
SYSTEM BUS	Intel® E7520 chipset supports the system bus at 800MHz, which provides a higher bandwidth path for transferring data between main memory/chipset and the processors.
DMA CHANNELS	The SHB is fully PC compatible with seven DMA channels, each supporting type F transfers.
INTERRUPTS	The SHB is fully PC compatible with interrupt steering for PCI plug and play compatibility.
BIOS (FLASH)	The BIOS is an AMIBIOS with built-in advanced CMOS setup for system parameters, peripheral management for configuring on-board peripherals and other system parameters. The Flash BIOS resides in the Intel® 82802AC Firmware Hub (FWH). The BIOS may be upgraded from floppy disk by pressing **<Ctrl>** + **<Home>** immediately after reset or power-up with the floppy disk in drive A:. Custom BIOSs are available.
CACHE MEMORY	The processors include integrated on-die, 8-way set associative level two (L2) cache, which implements the Advanced Transfer Cache architecture and runs at the full speed of the processor core. Intel® Xeon™ processors have 1M of L2 cache memory and a 16K level 1 (L1) data cache.
NETBURST™ MICRO-ARCHITECTURE	NetBurst micro-architecture defines the techniques Intel uses to enhance the processor's execution of the BIOS, operating system and application software. These techniques include hyper-pipelined technology, a rapid execution engine, advanced dynamic execution, enhanced floating point and multimedia unit and Streaming SIMD

Extensions 2 (SSE2). The processor's system bus speed and memory cache are also part of the NetBurst micro-architecture.

Hyper-pipelined technology doubles the pipeline depth inside the processor, which enables more instructions to be loaded, resulting in higher core frequencies. Advanced dynamic execution includes an improved speculative execution algorithm that minimizes processor instruction misdirects and results in faster instruction execution.

The rapid execution engine enables the two arithmetic logic units (ALUs) of the processor to operate at twice the core frequency. Many integer instructions can now execute in half the internal core clock period, resulting in improved software execution speeds.

NetBurst micro-architecture improvements in the floating point and multimedia unit include making the registers 128 bits wide and adding a separate register for moving data.

The SSE2 has 144 instructions which improve performance in secure transactions and multimedia processing. These instructions are used for double-precision floating point, SIMD integer and memory management improvements.

DDR2 MEMORY   The Double Data Rate (DDR2) memory interface supports up to 8GB of memory and can operate as either a single-channel or dual-channel interface. Each of the channels (A and B) terminates in two dual in-line memory module (DIMM) sockets. The System BIOS automatically detects memory type, size and speed.

The SHB uses industry standard 72-bit wide ECC gold finger memory modules in four 240-pin sockets. The DIMMs must be PC2-3200 compliant and have the following features:

- 240-pin with gold-plated contacts

- ECC (72-bit) DDR2 memory

- Dual rank or single rank DIMMs

- Registered configuration

The following DIMM sizes are supported:

DIMM Size	DIMM Type	ECC
256MB	Registered	32M x 72
512MB	Registered	64M x 72
1GB	Registered	128M x 72
2GB	Registered	256M x 72

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NOTE: With the bracket end of the board to the right, the DIMM sockets are numbered 1B, 1A, 2B and 2A, from top to bottom. All memory modules must have gold contacts.
_____

Populating identical DIMMs in pairs (one each in the A and B channels) results in dual-channel operation. In dual-channel mode, the DIMM pair operates in lockstep, theoretically doubling the memory bandwidth.

When a single DIMM is used, it should be installed in DIMM socket 1B. With this configuration, the interface operates as a single-channel interface with a theoretical memory bandwidth of 3.2GB/s.

Installing two DIMMs which are identical in type, size and rank in DIMM sockets 1B and 1A results in dual-channel operation, which doubles the theoretical memory interface bandwidth to 6.4GB/s. Installing additional DIMMs in sockets 2B and 2A also results in the higher bandwidth. In this case, the DIMMs installed in sockets 2B and 2A must be identical in type, size and rank to each other, but may be different in size from the pair installed in sockets 1B and 1A. If the modules in channel B and channel A (e.g., 1B and 1A) differ in size, the BIOS will use the size of the smallest DIMM.

Installing DIMMs only in sockets 1B and 2B results in single-channel mode, since both DIMMs are in the B channel. If the DIMMs are identical in type and size, they should be populated in sockets 1B and 1A to operate in dual-channel mode.
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NOTE: The NLT supports a DDR2-400 memory interface speed. If modules of higher speeds are used, they will clock down to a DDR2-400 memory interface speed.
_____

DDR2 memory modules are available as either single rank or dual rank DIMMs. A rank refers to the 72-bit unit of devices or DRAM chips that make up the PC2-3200 ECC registered 240-pin DDR2 DIMM. Single or dual rank memory modules must be placed in the SHB's DIMM sockets using prescribed population rules to ensure proper memory interface operation and performance.

The following table explains the DDR2 DIMM population rules:

	DIMM Socket			
	1B (top-most DIMM)	1A	2B	2A
1 Single Rank	Single Rank	Empty	Empty	Empty
1 Dual Rank	Dual Rank	Empty	Empty	Empty
2 Single Rank	Single Rank	Single Rank	Empty	Empty
1 Dual Rank, 1 Single Rank	Dual Rank	Single Rank	Empty	Empty
2 Dual Rank	Dual Rank	Dual Rank	Empty	Empty
3 Single Rank	Single Rank	Single Rank	Single Rank	Empty
1 Dual Rank, 2 Single Rank	Dual Rank	Single Rank	Single Rank	Empty
4 Single Rank	Single Rank	Single Rank	Single Rank	Single Rank

ERROR CHECKING AND CORRECTION   The memory interface supports ECC modes via BIOS setting for multiple-bit error detection and correction of all errors confined to a single nibble.

BUS INTERFACES   The PCI Local Bus, which is 32 bits wide and runs at 33MHz, interfaces to the ATI
Technologies RAGE Mobility-M1 video.

The PCI-X bus runs at 64-bit/66MHz and interfaces to the on-board 10/100/1000Base-T
Ethernet controller (Intel® 82546EB).

The NLT provides two x8 PCI Express links, one x4 PCI Express link and five PCI
Express reference clocks on Edge Connectors A and B. It also provides a x4 link to the
controlled impedance connector for use with PCI Express plug-in option cards.

UNIVERSAL SERIAL   The SHB supports four high-speed USB 2.0 ports for data transfers up to 480Mbit/sec. It
BUS (USB)   also supports USB 1.1 devices for data transfers at 12 or 1.5Mbit/sec. The Universal
Serial Bus (USB) is an interface allowing for connectivity to many standard PC periph-
erals.

The connectors for two of the USB ports are on the I/O bracket; the other two ports are
available via a header on the SHB.

ULTRA XGA   The ATI Technologies RAGE Mobility-M1™ video controller enables 2D/3D video
INTERFACE   acceleration and provides 8MB of integrated video DDR memory. In 2D mode the video
controller supports pixel resolutions up to 1600 x 1200; in 3D mode the maximum
resolution provided is 1280 x 1024. The maximum color depth supported at these
extremes is 16.7 million colors.

Software drivers are available for most popular operating systems.

ETHERNET   The dual Ethernet interfaces are implemented using an Intel® 82546EB Ethernet
INTERFACES   controller with two channels. These interfaces support Gigabit, 10Base-T and
(DUAL)   100Base-TX Fast Ethernet modes and are compliant with the IEEE 802.3 Specification.

The main components of the interface are:

- Intel® 82546EB for 10/100/1000-Mb/s media access control (MAC) with
  SYM, a serial ROM port and a PCI Bus Master interface

- Serial ROM for storing the Ethernet address and the interface configuration
  and control data

- Integrated RJ-45/Magnetics module connectors on the SHB's I/O bracket for
  direct connection to the network. The connectors require category 5 (CAT5)
  unshielded twisted-pair (UTP) 2-pair cables for a 100-Mb/s network
  connection or category3 (CAT3) or higher UTP 2-pair cables for a 10-Mb/s
  network connection. Category 5e (CAT5e) or higher UTP 2-pair cables are
  recommended for a 1000-Mb/s (Gigabit) network connection.

- Link status and activity LEDs on the I/O bracket for status indication (See
  Ethernet LEDs and Connectors later in this chapter.)

Software drivers are supplied for most popular operating systems.

HUB INTERFACE   The Intel® E7520 chipset utilizes a dedicated hub interface connection between the memory controller hub (MCH) and the I/O controller hub (ICH). The purpose of the hub interface is to provide efficient, high-speed communication between chipset components in order to support high-speed I/O applications. It is a parity-protected, 266MB/s point-to-point hub interface and uses an 8-bit 66MHz base clock running at 4x.

SERIAL ATA/150 PORTS (DUAL)   The primary and secondary Serial ATA (SATA) ports on the NLT comply with the SATA 1.0 specification and support two independent SATA storage devices such as hard disks and CD-RW devices. SATA technology provides lower pin counts, reduced signaling voltages, simplified cabling, CRC error detection and hot-plug support. SATA produces higher performance interfacing by providing data transfer rates up to 150MB per second on each port.

ENHANCED IDE INTERFACES (DUAL)   Dual high performance PCI Bus Master EIDE interfaces are capable of supporting two IDE disk drives each in a master/slave configuration. The interfaces support Ultra ATA/100 with synchronous ATA mode transfers up to 100MB per second. Ultra ATA/100 cables must be used with Ultra ATA/100 drives.

WATCHDOG TIMER   The watchdog timer is a hardware timer which resets the SHB if the timer is not refreshed by software periodically. The timer is typically used to restart a system in which an application becomes hung on an external event. When the application is hung, it no longer refreshes the timer. The watchdog timer then times out and resets the SHB.

The watchdog timer (WDT) is integrated into the E6300ESB I/O Controller Hub (ICH) and provides a resolution that ranges from 1 msecond to 10 minutes. The WDT provides a two-stage timer implementation: the first stage can be used to generate an IRQ, SMI or SCI interrupt after the programmed time interval has expired; the second stage can be used to generate a hard system reset.

The WDT uses a 35-bit down-counter, which is loaded with the value from the first preload register. The timer is then enabled and starts its down counting, which is the first stage. When the host fails to reload the WDT before the 35-bit down-counter reaches zero, the WDT generates an internal interrupt. After the interrupt is generated, the WDT loads the value from the second preload register into the 35-bit down-counter and starts counting down. The WDT is now in the second stage. If the host fails to reload the WDT before the second stage times out, a system RESET is generated.

POWER FAIL DETECTION   A hardware reset is issued when any of the monitored voltages drops below its specified nominal low voltage limit.

The monitored voltages and their nominal low limits are listed below.

Monitored Voltage	Nominal Low Limit	Voltage Source
+5V	4.5 volts	System Power Supply
+3.3V	2.97 volts	System Power Supply
+1.2V	1.056 volts	On-Board Regulator
+1.25V	1.1 volt	On-Board Regulator
+2.5V	2.452 volts	On-Board Regulator

BATTERY   A built-in lithium battery is provided, for ten years of data retention for CMOS memory.
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CAUTION: There is a danger of explosion if the battery is incorrectly replaced.
Replace it only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.
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POWER   The following are typical values:
REQUIREMENTS

Processor Speed	+5V	+12V	+3.3V	-12V
3.6GHz	3.75 Amps	17.00 Amps	3.50 Amps	< 100 mAmps
3.4GHz	3.75 Amps	16.00 Amps	3.50 Amps	< 100 mAmps
3.2GHz	3.75 Amps	15.40 Amps	3.50 Amps	< 100 mAmps
2.8GHz	3.75 Amps	13.50 Amps	3.50 Amps	< 100 mAmps

Tolerance for all voltages is +/- 5%

TEMPERATURE/   **Operating Temperature:** 0° C. to 45° C.
ENVIRONMENT

Storage Temperature: $- 40^o$ C. to 70° C.

Humidity: 5% to 90% non-condensing

CONFIGURATION JUMPERS The setup of the configuration jumpers on the SHB is described below. * indicates the default value of each jumper.

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NOTE: For two-position jumpers (3-post), "RIGHT" is toward the bracket end of the board; "LEFT" is toward the memory sockets.

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Jumper   Description

JU8   **Password Clear**

Install for one power-up cycle to reset the password to the
default (null password).
Remove for normal operation. *

JU10/JU11   **System Flash ROM Operational Modes**

The Flash ROM has two programmable sections: the Boot
Block for "flashing" in the BIOS and the Main Block for the
executable BIOS and PnP parameters. Normally only the
Main Block is updated when a new BIOS is flashed into the
system.

	JU10	JU11
All Blocks Write Enabled	Remove *	Remove *
Boot Block Write Protected	Install	Remove
Block 2-16 Write Protected	Remove	Install

JU12   **CMOS Clear**

Install on the LEFT to operate. *
Install on the RIGHT to clear.

_____

NOTE: To clear the CMOS, power down the system and
install the jumper on the RIGHT. Wait for at least two
seconds, move the jumper back to the LEFT and turn the
power on. When AMIBIOS displays the "CMOS Settings
Wrong" message, press F1 to go into the BIOS Setup Utility,
where you may reenter your desired BIOS settings, load
optimal defaults or load failsafe defaults.

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ETHERNET LEDS AND CONNECTORS   Each Ethernet interface has two LEDs for status indication and an RJ-45 network connector.

LED/Connector	Description
Activity LED	Green LED which indicates network activity. This is the lower LED on the LAN connector (i.e., toward the edge connectors).
Off	Indicates there is not a valid connection. Transmit and receive are not possible.
On (solid)	Indicates a link has successfully been established.
On (flashing)	Indicates network transmit or receive activity.
Speed LED	Yellow LED which identifies the connection speed. This is the upper LED on the LAN connector (i.e., toward the memory sockets).
Off	Indicates a 10Mb/s connection.
On (solid)	Indicates a 1000Mb/s connection.
On (flashing)	Indicates a 100Mb/s connection. The LED blinks twice per second.
RJ-45 Network Connector	The RJ-45 network connector requires a category 5 (CAT5) unshielded twisted-pair (UTP) 2-pair cable for a 100-Mb/s network connection or a category 3 (CAT3) or higher UTP 2-pair cable for a 10-Mb/s network connection. A category 5e (CAT5e) or higher UTP 2-pair cable is recommended for a 1000-Mb/s (Gigabit) network connection.

SYSTEM BIOS SETUP UTILITY   The System BIOS is an AMIBIOS with a ROM-resident setup utility. The BIOS Setup Utility allows you to select to the following categories of options:

- Main Menu
- Advanced Setup
- PCIPnP Setup
- Boot Setup
- Security Setup
- Chipset Setup
- Exit

Each of these options allows you to review and/or change various setup features of your system. Details are provided in the following chapters of this manual.

CONNECTORS   _____

NOTE: Pin 1 on the connectors is indicated by the square pad on the PCB.
_____

P1 -   10/100/1000Base-T Ethernet Connector - LAN 2
         8 pin shielded RJ-45 connector, Belfuse #0826-1X1T-23

Pin	Signal
1	TRP1+
2	TRP1-
3	TRP2+
4	TRP3+
5	TRP3-
6	TRP2-
7	TRP4+
8	TRP4-

P2 -   CPU Fan 2
         3 pin single row header, Molex #22-23-2031

Pin	Signal
1	Gnd
2	+12V
3	FanTach

P5 -   Speaker Port Connector
         4 pin single row header, Amp #640456-4

Pin	Signal
1	Speaker Data
2	Key
3	Gnd
4	+5V

P7 -   Universal Serial Bus (USB) Connector
         8 pin dual row header, Molex #702-46-0821
         (+5V fused with self-resetting fuses)

Pin	Signal	Pin	Signal
1	+5V-USB2	2	+5V-USB3
3	USB2-	4	USB3-
5	USB2+	6	USB3+
7	Gnd-USB2	8	Gnd-USB3

P10 -   External Reset Connector
         2 pin single row header, Amp #640456-2

Pin	Signal
1	External Reset In (Low Active)
2	Gnd

CONNECTORS
(CONTINUED)   **P11 -   Primary IDE Hard Drive Connector**
40 pin dual row header, 3M #30340-6002HB

Pin	Signal	Pin	Signal
1	Reset	2	Gnd
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Gnd	20	NC
21	DRQ 0	22	Gnd
23	IOW	24	Gnd
25	IOR	26	Gnd
27	IORDY	28	SELPDP
29	DACK 0	30	Gnd
31	IRQ 14	32	NC
33	Add 1	34	PCBL DET *
35	Add 0	36	Add 2
37	CS 1P	38	CS 3P
39	IDEACTP	40	Gnd

P11A -   Secondary IDE Hard Drive Connector
40 pin dual row header, 3M #30340-6002HB

Pin	Signal	Pin	Signal
1	Reset	2	Gnd
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Gnd	20	NC
21	DRQ 1	22	Gnd
23	IOW	24	Gnd
25	IOR	26	Gnd
27	IORDY	28	SELPDS
29	DACK 1	30	Gnd
31	IRQ 15	32	NC
33	Add 1	34	SCBL DET *
35	Add 0	36	Add 2
37	CS 1S	38	CS 3S
39	IDEACTS	40	Gnd

* For ATA/66 and ATA/100 drives, which should be set for Cable Select for
proper speed operation. If other drives are detected, pin definition is Gnd.

**CONNECTORS
(CONTINUED)**

P12 -   Hard Drive LED Connector
4 pin single row header, Amp #640456-4

Pin	Signal
1	LED +
2	LED -
3	LED -
4	LED +

P15 -   Video Interface Connector
15 pin connector, Amp #1-1470250-3

Pin	Signal	Pin	Signal	Pin	Signal
		6	Gnd		
1	Red			11	NC
		7	Gnd		
2	Green			12	EEDI
		8	Gnd		
3	Blue			13	HSYNC
		9	+5V		
4	NC			14	VSYNC
		10	Gnd		
5	Gnd			15	EECS

P16 -   10/100/1000Base-T Ethernet Connector - LAN 1
8 pin shielded RJ-45 connector, Belfuse #0826-1X1T-23

Pin	Signal
1	TRP1+
2	TRP1-
3	TRP2+
4	TRP3+
5	TRP3-
6	TRP2-
7	TRP4+
8	TRP4-

P17A -   Universal Serial Bus (USB) Connector
USB vertical connector, Molex #67-329-0000
(+5V fused with self-resetting fuse)

Pin	Signal
1	+5V-USB0
2	USB0-
3	USB0+
4	Gnd-USB0

**CONNECTORS
(CONTINUED)**

P17B -   **Universal Serial Bus (USB) Connector**
USB vertical connector, Molex #67-329-0000
(+5V fused with self-resetting fuse)

Pin	Signal
1	+5V-USB1
2	USB1-
3	USB1+
4	Gnd-USB1

P19 -   **CPU Fan 1**
3 pin single row header, Molex #22-23-2031

Pin	Signal
1	Gnd
2	+12V
3	FanTach

P20 -   **I/O Expansion Mezzanine Card Connector**
76 pin connector, Samtec #MIS-038-01-FD-K

Pin	Signal	Pin	Signal
1	+12V	2	+5V_STANDBY
3	NC	4	+5V_STANDBY
5	NC	6	+5V_DUAL
7	NC	8	+5V_DUAL
9	NC	10	NC
11	NC	12	NC
13	ICH_SMI#	14	ICH_RCIN#
15	ICH_SIOPME#	16	ICH_A20GATE
17	Gnd	18	Gnd
19	L_FRAME#	20	L_AD3
21	L_DRQ1#	22	L_AD2
23	L_DRQ0#	24	L_AD1
25	SERIRQ	26	L_AD0
27	Gnd	28	Gnd
29	PCLK14SIO	30	PCLK33LPC
31	Gnd	32	Gnd
33	SMBDATA_RESUME	34	IPMB_DAT
35	SMBCLK_RESUME	36	IPMB_CLK
37	SALRT#_RESUME	38	IPMB_ALRT#
39	Gnd	40	Gnd
41	EXP_CLK100	42	EXP_RESET#
43	EXP_CLK100#	44	ICH_WAKE#
45	Gnd	46	Gnd
47	C_PE_TXP4	48	C_PE_RXP4
49	C_PE_TXN4	50	C_PE_RXN4
51	Gnd	52	Gnd
53	C_PE_TXP3	54	C_PE_RXP3
55	C_PE_TXN3	56	C_PE_RXN3

CONNECTORS
(CONTINUED)

P20 - I/O Expansion Mezzanine Card Connector (continued)

Pin	Signal	Pin	Signal
57	Gnd	58	Gnd
59	C_PE_TXP2	60	C_PE_RXP2
61	C_PE_TXN2	62	C_PE_RXN2
63	Gnd	64	Gnd
65	C_PE_TXP1	66	C_PE_RXP1
67	C_PE_TXN1	68	C_PE_RXN1
69	Gnd	70	Gnd
71	+3.3V	72	+5V
73	+3.3V	74	+5V
75	+3.3V	76	+5V

P21 - Power Good LED
2 pin single row header, Amp #640456-2

Pin	Signal
1	LED -
2	LED +

P27 - SATA Port 1
7 pin vertical connector, Molex #67491-0031

Pin	Signal
1	Gnd
2	TX+
3	TX-
4	Gnd
5	RX-
6	RX+
7	Gnd

P28 - SATA Port 2
7 pin vertical connector, Molex #67491-0031

Pin	Signal
1	Gnd
2	TX+
3	TX-
4	Gnd
5	RX-
6	RX+
7	Gnd

Chapter 2   *System BIOS*

BIOS OPERATION   Sections 2 through 6 of this manual describe the operation of the American Megatrends AMIBIOS and the BIOS Setup Utility. Refer to *Running AMIBIOS Setup* later in this chapter for standard Setup screens, options and defaults. The available Setup screens, options and defaults may vary if you have a custom BIOS.

When the system is powered on, AMIBIOS performs the Power-On Self Test (POST) routines. These routines are divided into two phases:

1) **System Test and Initialization**. Test and initialize system boards for normal operations.

2) **System Configuration Verification**. Compare defined configuration with hardware actually installed.

If an error is encountered during the diagnostic tests, the error is reported in one of two different ways. If the error occurs before the display device is initialized, a series of beeps is transmitted. If the error occurs after the display device is initialized, the error message is displayed on the screen. See *BIOS Errors* later in this section for more information on error handling.

The following are some of the Power-On Self Tests (POSTs) which are performed when the system is powered on:

- CMOS Checksum Calculation
- Keyboard Controller Test
- CMOS Shutdown Register Test
- 8254 Timer Test
- Memory Refresh Test
- Display Memory Read/Write Test
- Display Type Verification
- Entering Protected Mode
- Memory Size Calculation
- Conventional and Extended Memory Test
- DMA Controller Tests
- Keyboard Test
- System Configuration Verification and Setup

AMIBIOS checks system memory and reports it on both the initial AMIBIOS screen and the AMIBIOS System Configuration screen which appears after POST is completed. AMIBIOS attempts to initialize the peripheral devices and if it detects a fault, the screen displays the error condition(s) which has/have been detected. If no errors are detected, AMIBIOS attempts to load the system from a bootable device, such as a floppy disk or hard disk. Boot order may be specified by the **Boot Device Priority** option on the Boot Setup Menu as described in the *Boot Setup* chapter later in this manual.

Normally, the only POST routine visible on the screen is the memory test. The following screen displays when the system is powered on:

```
AMIBIOS (C)2003 American Megatrends, Inc.
TRENTON Technology Inc.



Press DEL to run Setup
```
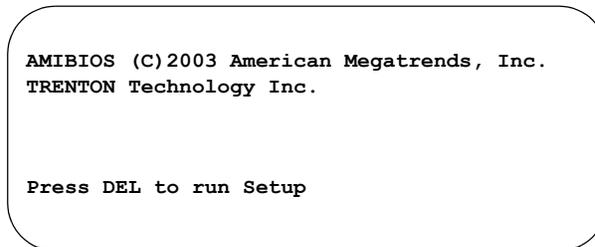
Initial Power-On Screen

You have two options:

- Press **<Del>** to access the BIOS Setup Utility.

  This option allows you to change various system parameters such as date and time, disk drives, etc. The *Running AMIBIOS Setup* section of this manual describes the options available.

  You may be requested to enter a password before gaining access to the BIOS Setup Utility. (See *Password Entry* later in this section.)

  If you enter the correct password or no password is required, the BIOS Setup Utility Main Menu displays. (See *Running AMIBIOS Setup* later in this section.)

- Allow the bootup process to continue without invoking the BIOS Setup Utility.

  In this case, after AMIBIOS loads the system, you may be requested to enter a password. (See *Password Entry* later in this section.)

Once the POST routines complete successfully, a screen displays showing the current configuration of your system, including processor type, base and extended memory amounts, floppy and hard drive types, display type and peripheral ports.

Password Entry

The system may be configured so that the user is required to enter a password each time the system boots or whenever an attempt is made to enter the BIOS Setup Utility. The password function may also be disabled so that the password prompt does not appear under any circumstances.

The **Password Check** option in the Security Menu allows you to specify when the password prompt displays: **Always** or only when **Setup** is attempted. This option is available only if the supervisor and/or user password(s) have been established. The supervisor and user passwords may be changed using the **Change Supervisor Password** and **Change User Password** options on the Security Menu. If the passwords are null, the password prompt does not display at any time. See the *Security Setup* section of this chapter for details on setting up passwords.

When password checking is enabled, the following password prompt displays:

```
                    Enter CURRENT Password:
```
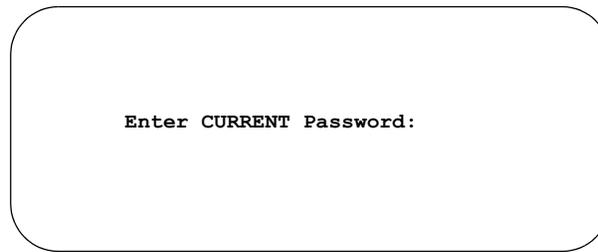
Type the password and press **<Enter>**.

_____

NOTE: The null password is the system default and is in effect if a password has not been assigned or if the CMOS has been corrupted. In this case, the password prompt does not display. To set up passwords, you may use the **Change Supervisor Password** and **Change User Password** options on the Security Menu of the BIOS Setup Utility. (See the *Security Setup* section later in this chapter.)

_____

If an incorrect password is entered, the following screen displays:

```
                    Enter CURRENT Password: X
                    Enter CURRENT Password:
```
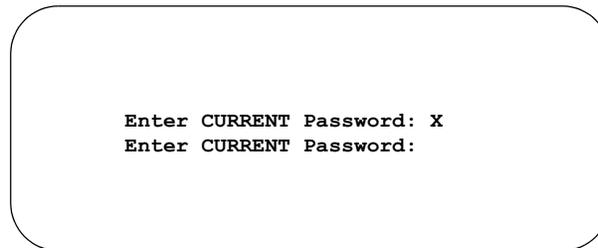
You may try again to enter the correct password. If you enter the password incorrectly three times, the system responds in one of two different ways, depending on the value specified in the **Password Check** option on the *Security* Menu:

1) If the **Password Check** option is set to **Setup**, the system does not let you enter Setup, but does continue the booting process. You must reboot the system manually to retry entering the password.

2) If the **Password Check** option is set to **Always**, the system locks and you must reboot. After rebooting, you will be requested to enter the password.

Once the password has been entered correctly, you are allowed to continue.

BIOS Errors

If an error is encountered during the diagnostic checks performed when the system is powered on, the error is reported in one of two different ways:

1) If the error occurs before the display device is initialized, a series of beeps is transmitted.

2) If the error occurs after the display device is initialized, the screen displays the error message. In the case of a non-fatal error, a prompt to press the **<F1>** key may also appear on the screen.

Explanations of the beep codes and BIOS error messages may be found in *Appendix A - BIOS Messages*.

As the POST routines are performed, test codes are presented on Port 80H. These codes may be helpful as a diagnostic tool and are listed in *Appendix A - BIOS Messages*.

If certain non-fatal error conditions occur, you are requested to run the BIOS Setup Utility. The error messages are followed by this screen:
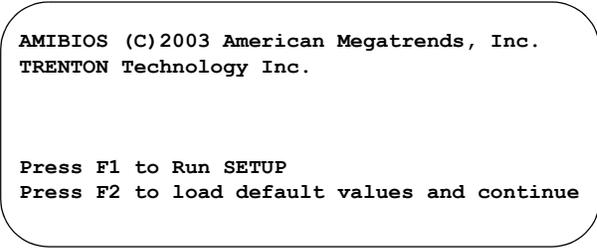
```
AMIBIOS (C)2003 American Megatrends, Inc.
TRENTON Technology Inc.



Press F1 to Run SETUP
Press F2 to load default values and continue
```

Press **<F1>**. You may be requested to enter a password before gaining access to the BIOS Setup Utility. (See *Password Entry* earlier in this section.)

If you enter the correct password or no password is required, the BIOS Setup Utility Main Menu displays.

**RUNNING
AMIBIOS SETUP**

AMIBIOS Setup keeps a record of system parameters, such as date and time, disk drives and other user-defined parameters. The Setup parameters reside in the Read Only Memory Basic Input/Output System (ROM BIOS) so that they are available each time the system is turned on. The BIOS Setup Utility stores the information in the complementary metal oxide semiconductor (CMOS) memory. When the system is turned off, a backup battery retains system parameters in the CMOS memory.

Each time the system is powered on, it is configured with these values, unless the CMOS has been corrupted or is faulty. The BIOS Setup Utility is resident in the ROM BIOS so that it is available each time the computer is turned on. If, for some reason, the CMOS becomes corrupted, the system is configured with the default values stored in this ROM file.

As soon as the system is turned on, the power-on diagnostic routines check memory, attempt to prepare peripheral devices for action, and offer you the option of pressing **<Del>** to run the BIOS Setup Utility.

If certain non-fatal errors occur during the Power-On Self Test (POST) routines which are run when the system is turned on, you may be prompted to run the BIOS Setup Utility by pressing **<F1>**.

BIOS SETUP UTILITY MAIN MENU

When you press **<F1>** in response to an error message received during the POST routines or when you press the **<Del>** key to enter the BIOS Setup Utility, the following screen displays:

```
┌─────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                             │
├─────────────────────────────────────────────────────────────────────┤
│   Main    Advanced    PCIPnP    Boot    Security   Chipset    Exit    │
├──────────────────────────────────────────────┬──────────────────────┤
│  System Overview                             │  Use [ENTER], {TAB}   │
│  _____ │  or [SHIFT-TAB] to    │
│                                              │  select a field.      │
│  AMIBIOS Version: 08.00.xx                   │                       │
│  BIOS Build Date: 03/29/05                   │  Use [+] or [-] to    │
│  BIOS ID       : 0ABGF014                    │  configure System     │
│                                              │  Time.                │
│  Processor                                   │                       │
│  Type          : Intel(R) Xeon(TM) CPU 2.80GHz│                      │
│  Speed         : 2800MHz                     │                       │
│  Count         : 2                           │                       │
│                                              │                       │
│  System Memory                               │  ←→     Select Screen │
│  Size          : 1024MB                      │  ↑↓     Select Item   │
│                                              │  +-     Change Field  │
│  System Time                    [00:00:00]   │  Tab    Select Field  │
│  System Date               [Mon 01/01/2001]  │  F1     General Help  │
│                                              │  F10    Save and Exit │
│                                              │  ESC    Exit          │
│                                              │                       │
├──────────────────────────────────────────────┴──────────────────────┤
│       vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.        │
└─────────────────────────────────────────────────────────────────────┘
```

BIOS Setup Utility Main Menu

When you display the BIOS Setup Utility Main Menu, the format is similar to the sample shown above. The data displayed on the top portion of the screen details parameters detected by AMIBIOS for your processor board and may not be modified. The system time and date displayed on the bottom portion of the screen may be modified.

BIOS SETUP UTILITY MAIN MENU OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not changed them yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

System Time/System Date

These options allow you to set the correct system time and date. If you do not set these parameters the first time you enter the BIOS Setup Utility, you will receive a "Run SETUP" error message when you boot the system until you set the correct parameters.

The Setup screen displays the system options:

> **System Time**   **[00:00:00]**
> **System Date**   **[Mon 01/01/2001]**

There are three fields for entering the time or date. Use the **<Tab>** key or the **<Enter>** key to move from one field to another and type in the correct value for the field.

If you enter an invalid value in any field, the screen will revert to the previous value when you move to the next field. When you change the value for the month, day or year field, the day of the week changes automatically when you move to the next field.

BIOS SETUP UTILITY OPTIONS

The BIOS Setup Utility allows you to change system parameters to tailor your system to your requirements. Various options which may be changed are listed below. Further explanations of these options and available values may be found in later chapters of this manual, as noted below.

_____

NOTE: Do *not* change the values for any option unless you understand the impact on system operation. Depending on your system configuration, selection of other values may cause unreliable system operation.

_____

Use the **Right Arrow** key to display the desired menu. The following menus are available:

- Select **Advanced** to make changes to Advanced Setup parameters as described in the *Advanced Setup* chapter of this manual. The following options may be modified:

  - CPU Configuration

    - Max CPUID Value Limit

    - CPU TM Function

    - Execute Disable Bit

    - Hardware Prefetcher

    - Adjacent Cache Line Prefetch

    - Hyper-Threading Technology

  - IDE Configuration

    - IDE Configuration

      - S-ATA Running Enhanced Mode

      - P-ATA Channel Selection

      - Combined Mode Option

      - S-ATA Ports Definition

      - Configure S-ATA as RAID

    - Primary IDE Master/Primary IDE Slave
      Secondary IDE Master/Secondary IDE Slave

      - Type

      - LBA/Large Mode

      - Block (Multi-Sector Transfer)

      - PIO Mode

- DMA Mode
- S.M.A.R.T.
- 32Bit Data Transfer
- Third IDE Master/Fourth IDE Master
- Hard Disk Write Protect
- IDE Detect Time Out (Sec)
- ATA(PI) 80Pin Cable Detection
- ACPI Configuration
  - General ACPI Configuration
    - Suspend Mode
    - Repost Video on S3 Resume
  - Advanced ACPI Configuration
    - ACPI 2.0 Features
    - ACPI APIC Support
    - AMI OEMB Table
    - Headless Mode
  - Chipset ACPI Configuration
    - APIC ACPI SCI IRQ
    - USB Device Wakeup From S3/S4
- MPS Configuration
  - MPS Revision
- PCI Express Configuration
  - Active State Power-Management
  - PCI Express Port A0
  - PCI Express Port B0
  - PCI Express Port B1
  - PCI Express Port C1
  - PCIe Jitter Tolerance
  - PCIe Compliance Mode
- USB Configuration
  - USB Function
  - Legacy USB Support
  - USB 2.0 Controller

- USB 2.0 Controller Mode

- BIOS EHCI Hand-Off

- USB Mass Storage Device Configuration

  - USB Mass Storage Reset Delay

  - Emulation Type

- Select **PCIPnP** to make changes to PCI Plug and Play Setup parameters as described in the *PCI Plug and Play Setup* chapter of this manual. The following options may be modified:

  - Plug & Play O/S

  - PCI Latency Timer

  - Allocate IRQ to PCI VGA

  - Palette Snooping

  - Onboard LAN Controllers

  - Onboard LAN Boot ROM

  - PCI IDE BusMaster

  - OffBoard PCI/ISA IDE Card

    - OffBoard PCI IDE Primary IRQ

    - OffBoard PCI IDE Secondary

  - IRQs 3, 4, 5, 7, 9, 10, 11, 14 and 15

  - DMA Channels 0, 1, 3 5, 6 and 7

  - Reserved Memory Size

  - Reserved Memory Address

- Select **Boot** to make changes to Boot Setup parameters as described in the *Boot Setup* chapter of this manual. The following options may be modified:

  - Boot Settings Configuration

    - Quick Boot

    - Quiet Boot

    - AddOn ROM Display Mode

    - Bootup Num-Lock

    - PS/2 Mouse Support

    - Wait For 'F1' If Error

    - Hit 'DEL' Message Display

    - Interrupt 19 Capture

- Boot Device Priority

- Hard Disk Drives

- Removable Drives

- CD/DVD Drives

- Select **Security** to establish or change the supervisor or user password or to enable boot sector virus protection. These functions are described later in this chapter. The following options may be modified:

    - Change Supervisor Password

        - User Access Level

        - Password Check

    - Change User Password

        - Unattended Start

        - Password Check

    - Clear User Password

    - Boot Sector Virus Protection

- Select **Chipset** to make changes to Chipset Setup parameters as described in the *Chipset Setup* chapter of this manual. The following options may be modified:

    - NorthBridge Configuration

        - Memory Remap Feature

        - Memory Mirroring/Sparing

        - DMA Controller

    - SouthBridge Configuration

        - Restore on AC Power Loss

    - Intel PCI-X Hub Configuration

        - PCI Bus Frequency

        - I/O Port Decode

        - RAS Sticky Error Handling

        - VGA 16-Bit Decode

- Select **Exit** to save or discard changes you have made to AMIBIOS parameters or to load the Optimal or Failsafe default settings. These functions are described later in this chapter. The following options are available:

    - Save Changes and Exit

    - Discard Changes and Exit

- Discard Changes
- Load Optimal Defaults
- Load Failsafe Defaults

This page intentionally left blank.

SECURITY SETUP   When you select **Security** from the BIOS Setup Utility Main Menu, the following Setup
                  screen displays:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                                 │
├─────────────────────────────────────────────────────────────────────────┤
│  Main    Advanced    PCIPnP    Boot  |Security|  Chipset    Exit          │
├───────────────────────────────────────────────┬─────────────────────────┤
│ Security Settings                              │ Install or Change the   │
│ _____  │ password.               │
│                                                │                         │
│ Supervisor Password :Not Installed             │                         │
│ User Password       :Not Installed             │                         │
│                                                │                         │
│ Change Supervisor Password                     │                         │
│ Change User Password                           │                         │
│ Clear User Password                            │                         │
│                                                │                         │
│ Boot Sector Virus Protection   [Disabled]      │                         │
│                                                │                         │
│                                                │ ←→   Select Screen       │
│                                                │ ↑↓    Select Item        │
│                                                │ Enter Change             │
│                                                │ F1   General Help        │
│                                                │ F10  Save and Exit       │
│                                                │ ESC  Exit                │
│                                                │                         │
├────────────────────────────────────────────────┴────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.             │
└─────────────────────────────────────────────────────────────────────────┘
```

Security Setup Screen

When you display the Security Setup screen, the format is similar to the sample shown
above. Highlight the option you wish to change and press **<Enter>**.
_____

NOTE: The values on this screen do not necessarily reflect the values appropriate for
your SHB. Refer to the explanations below for specific instructions about entering
correct information.
_____

SECURITY SETUP   The Security Setup options allow you to establish, change or clear the supervisor or user
OPTIONS   password and to enable boot sector virus protection.

                  The descriptions for the system options listed below show the values as they appear if
                  you have not changed them yet. Once values have been defined, they display each time
                  the BIOS Setup Utility is run.

CHANGE   This option allows you to establish a supervisor password, change the current password
SUPERVISOR   or disable the password prompt by entering a null password. The password is stored in
PASSWORD   CMOS RAM.

                  If you have signed on under the user password, this option is *not* available.

The **Change Supervisor Password** feature can be configured so that a password must be entered each time the system boots or just when a user attempts to enter the BIOS Setup Utility.

_____

NOTE: The null password is the system default and is in effect if a password has not been assigned or if the CMOS has been corrupted. In this case, the "Enter CURRENT Password" prompt is bypassed when you boot the system, and you must establish a new password.

_____

If you select the **Change Supervisor Password** option, the following window displays:

```
┌─────────────────────────────────┐
│                                 │
│  Enter New Password  ┌───────┐   │
│                      └───────┘   │
│                                 │
└─────────────────────────────────┘
```

This is the message which displays before you have established a password, or if the last password entered was the null password. If a password has already been established, you are asked to enter the *current* password before being prompted to enter the *new* password.

Type the new password and press **<Enter>**. The password cannot exceed six (6) characters in length. The screen displays an asterisk (*) for each character you type.

After you have entered the new password, the following window displays:
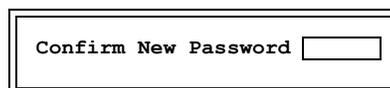
```
┌─────────────────────────────────┐
│                                 │
│  Confirm New Password ┌───────┐  │
│                       └───────┘  │
│                                 │
└─────────────────────────────────┘
```

Re-key the new password as described above.

If the password confirmation is miskeyed, AMIBIOS Setup displays the following message:
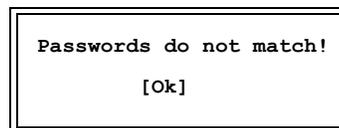
```
┌─────────────────────────────┐
│                             │
│  Passwords do not match!    │
│           [Ok]              │
│                             │
└─────────────────────────────┘
```

No retries are permitted; you must restart the procedure.

If the password confirmation is entered correctly, the following message displays:

```
┌─────────────────────────────┐
│                             │
│   Password installed.       │
│           [Ok]              │
│                             │
└─────────────────────────────┘
```

Press the **<Enter>** key to return to the Security screen. **Installed** displays on the screen next to the **Supervisor Password** option, indicating the password has been accepted. This setting will remain in effect until the supervisor password is either disabled or discarded upon exiting the BIOS Setup Utility.

If you have created a new password, be sure to select **Exit**, then **Save Changes and Exit** to save the password. The password is then stored in CMOS RAM. The next time the system boots, you are prompted for the password.

_____

NOTE: Be sure to keep a record of the new password each time it is changed. If you forget it, use the Password Clear jumper to reset it to the default (null password). See the *Specifications* chapter of this manual for details.

_____

If a password has been established, the following options and their default values are added to the screen:

```
User Access Level          [Full Access]
Password Check             [Setup]
```

User Access Level

This option allows you to define the level of access the user will have to the system.

The Setup screen displays the system option:

       User Access Level   **[Full Access]**

Four options are available:

- Select **No Access** to prevent user access to the BIOS Setup Utility.

- Select **View Only** to allow access to the BIOS Setup Utility for viewing, but to prevent the user from changing any of the fields.

- Select **Limited** to allow the user to change only a limited number of options, such as Date and Time.

- Select **Full Access** to allow the user full access to change any option in the BIOS Setup Utility.

Password Check

This option determines when a password is required for access to the system.

The Setup screen displays the system option:

       Password Check   **[Setup]**

Two options are available:

- Select **Setup** to have the password prompt appear only when an attempt is made to enter the BIOS Setup Utility program.

- Select **Always** to have the password prompt appear each time the system is powered on.

DISABLING THE SUPERVISOR PASSWORD

To *disable* password checking so that the password prompt does not appear, you may create a null password by selecting the **Change Supervisor Password** function and pressing **<Enter>** without typing in a new password. You will be asked to enter the current password before being allowed to enter the null password. After you press **<Enter>** at the **Enter New Password** prompt, the following message displays:

```
Password uninstalled.

        [Ok]
```
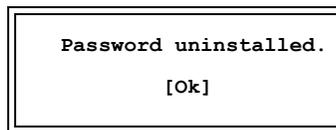
CHANGE USER PASSWORD

The **Change User Password** option is similar in functionality to the **Change Supervisor Password** and displays the same messages. If you have signed on under the user password, the **Change Supervisor Password** function is not available for modification.

If a user password has been established, the **Password Check** option and its default value is added to the screen. This option determines when a user password is required for access to the system. For details, refer to the description for **Password Check** under the **Change Supervisor Password** heading earlier in this section.

CLEAR USER PASSWORD

This option allows you to clear the user password. It disables the user password by entering a null password.

If you select the **Clear User Password** option, the following window displays:

```
Clear User Password?

[Ok]      [Cancel]
```
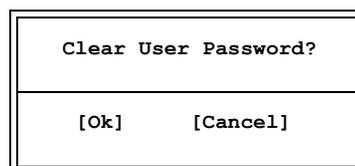
You have two options:

- Select **Ok** to clear the user password.

- Select **Cancel** to leave the current user password in effect.

BOOT SECTOR VIRUS PROTECTION

This option allows you to request AMIBIOS to issue 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 Setup screen displays the system option:

Boot Sector Virus Protection   **[Disabled]**

Available options are:

Disabled
Enabled
_____

NOTE: You should *not* enable boot sector virus protection when formatting a hard drive.
_____

This page intentionally left blank.

EXIT MENU   When you select **Exit** from the BIOS Setup Utility Main Menu, the following screen
                         displays:

```
                   ┌──────────────────────────────────────────────────────────────┐
                   │                    BIOS SETUP UTILITY                         │
                   ├──────────────────────────────────────────────────────────────┤
                   │  Main   Advanced   PCIPnP   Boot   Security   Chipset  |Exit| │
                   ├───────────────────────────────────────────┬──────────────────┤
                   │  Exit Options                             │ Exit system setup │
                   │  _____ │ after saving the  │
                   │                                           │ changes.          │
                   │  Save Changes and Exit                    │                   │
                   │  Discard Changes and Exit                 │ F10 key can be used│
                   │  Discard Changes                          │ for this operation.│
                   │  Load Optimal Defaults                     │                   │
                   │  Load Failsafe Defaults                    │                   │
                   │                                           │                   │
                   │                                           │                   │
                   │                                           │ ←→   Select Screen │
                   │                                           │ ↑↓    Select Item  │
                   │                                           │ Enter Go to Sub Screen│
                   │                                           │ F1    General Help │
                   │                                           │ F10   Save and Exit│
                   │                                           │ ESC   Exit         │
                   │                                           │                   │
                   ├───────────────────────────────────────────┴──────────────────┤
                   │     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.   │
                   └──────────────────────────────────────────────────────────────┘
```

Exit Menu Screen

When you display the Exit Menu screen, the format is similar to the sample shown
above. Highlight the option you wish to select and press **<Enter>**.

EXIT MENU   When you are running the BIOS Setup Utility program, you may either save or discard
OPTIONS   changes you have made to AMIBIOS parameters, or you may load the Optimal or
                         Failsafe default settings.

Save Changes and Exit

The features selected and configured in the Setup screens are stored in the CMOS when
this option is selected. The CMOS checksum is calculated and written to the CMOS.
Control is then passed back to the AMIBIOS and the booting process continues, using
the new CMOS values.

If you select the **Save Changes and Exit** option, the following window displays:

```
            ┌───────────────────────────────────────────────────┐
            │  Save configuration changes and exit setup?       │
            ├───────────────────────────────────────────────────┤
            │                                                   │
            │      [Ok]                    [Cancel]             │
            │                                                   │
            └───────────────────────────────────────────────────┘
```

You have two options:

- • Select **Ok** to save the system parameters and continue with the booting process.

- • Select **Cancel** to return to the BIOS Setup Utility screen.

Discard Changes and Exit

When the **Discard Changes and Exit** option is selected, the BIOS Setup Utility exits *without* saving the changes in the CMOS. Control is then passed back to AMIBIOS and the booting process continues, using the previous CMOS values.

If you select the **Discard Changes and Exit** option, the following window displays:

```
┌──────────────────────────────────────┐
│                                      │
│   Discard changes and exit setup?    │
│                                      │
├──────────────────────────────────────┤
│        [Ok]        [Cancel]          │
│                                      │
└──────────────────────────────────────┘
```
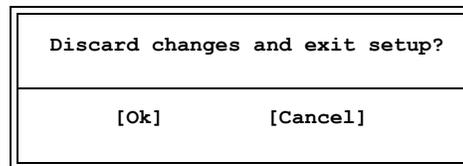
You have two options:

- • Select **Ok** to continue the booting process *without* writing any changes to the CMOS.

- • Select **Cancel** to return to the BIOS Setup Utility screen.

Discard Changes

When the **Discard Changes** option is selected, the BIOS Setup Utility resets any parameters you have changed back to the values at which they were set when you entered the Setup Utility. Control is then passed back to the BIOS Setup Utility screen.

If you select the **Discard Changes** option, the following window displays:

```
┌──────────────────────────┐
│                          │
│     Discard changes?     │
│                          │
├──────────────────────────┤
│   [Ok]     [Cancel]      │
│                          │
└──────────────────────────┘
```
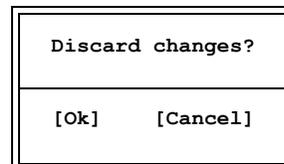
You have two options:

- • Select **Ok** to reset any parameters you have changed back to the values at which they were set when you entered the BIOS Setup Utility. This option then returns you to the BIOS Setup Utility screen.

- • Select **Cancel** to return to the BIOS Setup Utility screen *without* discarding any changes you have made.

Load Optimal or Failsafe Defaults

Each AMIBIOS Setup option has two default settings (Optimal and Failsafe). These settings can be applied to all AMIBIOS Setup options when you select the appropriate configuration option from the BIOS Setup Utility Main Menu.

You can use these configuration options to quickly set the system configuration parameters which should provide the best performance characteristics, or you can select a group of settings which have a better chance of working when the system is having configuration-related problems.

Load Optimal Defaults

This option allows you to load the Optimal default settings. These settings are best-case values which should provide the best performance characteristics. If CMOS RAM is corrupted, the Optimal settings are loaded automatically.

If you select the **Load Optimal Defaults** option, the following window displays:

```
┌──────────────────────────────┐
│                              │
│   Load Optimal Defaults?     │
│                              │
├──────────────────────────────┤
│                              │
│    [Ok]        [Cancel]      │
│                              │
└──────────────────────────────┘
```
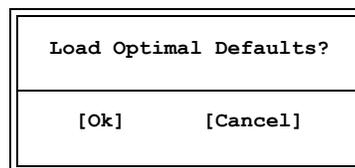
You have two options:

- Select **Ok** to load the Optimal default settings.

- Select **Cancel** to leave the current values in effect.

Load Failsafe Defaults

This option allows you to load the Failsafe default settings when you cannot boot your computer successfully. These settings are more likely to configure a workable computer. They may not provide optimal performance, but are the most stable settings. You may use this option as a diagnostic aid if your system is behaving erratically. Select the Failsafe settings and then try to diagnose the problem after the computer boots.

If you select the **Load Failsafe Defaults** option, the following window displays:

```
┌──────────────────────────────┐
│                              │
│   Load Failsafe Defaults?    │
│                              │
├──────────────────────────────┤
│                              │
│    [Ok]        [Cancel]      │
│                              │
└──────────────────────────────┘
```
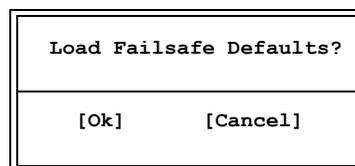
You have two options:

- Select **Ok** to load the Failsafe default settings.
- Select **Cancel** to leave the current values in effect.

Chapter 3   Advanced Setup

ADVANCED SETUP   When you select **Advanced** from the BIOS Setup Utility Main Menu, the following
Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                        │
├─────────────────────────────────────────────────────────────────┤
│   Main   |Advanced|   PCIPnP    Boot   Security   Chipset   Exit  │
├──────────────────────────────────────────────┬──────────────────┤
│  Advanced Settings                            │  Configure CPU.  │
│  _____ │                  │
│                                               │                  │
│  WARNING: Setting wrong values in below sections                 │
│           may cause system to malfunction.    │                  │
│                                               │                  │
│  > CPU Configuration                          │                  │
│  > IDE Configuration                          │                  │
│  > ACPI Configuration                         │                  │
│  > MPS Configuration                          │                  │
│  > PCI Express Configuration                  │                  │
│  > USB Configuration                          │                  │
│                                               │ ←→    Select Screen │
│                                               │ ↑↓    Select Item   │
│                                               │ Enter Go to Sub Screen │
│                                               │ F1    General Help  │
│                                               │ F10   Save and Exit │
│                                               │ ESC   Exit          │
│                                               │                  │
├──────────────────────────────────────────────┴──────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.   │
└─────────────────────────────────────────────────────────────────┘
```

Advanced Setup Screen

When you display the Advanced Setup screen, the format is similar to the sample shown
above, allowing you to continue to subscreens designed to change parameters for each of
the Advanced Setup options. Highlight the option you wish to change and press
<Enter> to proceed to the appropriate subscreen.

_____

NOTE: The values on the Advanced Setup subscreens do not necessarily reflect the
values appropriate for your SHB. Refer to the explanations following each screen for
specific instructions about entering correct information.

_____

ADVANCED SETUP   _____
OPTIONS
NOTE: Do *not* change the values for any Advanced Setup option unless you understand
the impact on system operation. Depending on your system configuration, selection of
other values may cause unreliable system operation.

_____

CPU Configuration

The **CPU Configuration** subscreen provides you with information about the processor in your system. The following options may be modified:

- CPU Configuration
    - Max CPUID Value Limit
    - CPU TM Function
    - Execute Disable Bit
    - Hardware Prefetcher
    - Adjacent Cache Line Prefetch
    - Hyper-Threading Technology

IDE Configuration

The options on the **IDE Configuration** subscreens allow you to set up or modify parameters for your IDE controller and hard disk drive(s). The following options may be modified:

- IDE Configuration
    - S-ATA Running Enhanced Mode
    - P-ATA Channel Selection
    - Combined Mode Option
    - S-ATA Ports Definition
    - Configure S-ATA as RAID
- Primary IDE Master/Primary IDE Slave
  Secondary IDE Master/Secondary IDE Slave
    - Type
    - LBA/Large Mode
    - Block (Multi-Sector Transfer)
    - PIO Mode
    - DMA Mode
    - S.M.A.R.T.
    - 32Bit Data Transfer
- Third IDE Master/Fourth IDE Master
- Hard Disk Write Protect
- IDE Detect Time Out (Sec)
- ATA(PI) 80Pin Cable Detection

ACPI Configuration

The **ACPI Configuration** subscreen allows you to set up or modify the following options:

- General ACPI Configuration
    - Suspend Mode
    - Repost Video on S3 Resume
- Advanced ACPI Configuration
    - ACPI 2.0 Features
    - ACPI APIC Support
    - AMI OEMB Table
    - Headless Mode
- Chipset ACPI Configuration
    - APIC ACPI SCI IRQ
    - USB Device Wakeup From S3/S4

MPS Configuration

The **MPS Configuration** subscreen allows you to modify the following option:

- MPS Revision

PCI Express Configuration

The **PCI Express Configuration** subscreen allows you to set up or modify the following options:

- PCI Express Configuration
    - Active State Power-Management
    - PCI Express Port A0
    - PCI Express Port B0
    - PCI Express Port B1
    - PCI Express Port C1
    - PCIe Jitter Tolerance
    - PCIe Compliance Mode

USB Configuration

The options on the **USB Configuration** subscreen allow you to set up or modify parameters for your on-board USB ports. The following options may be modified:

- USB Function
- Legacy USB Support
- USB 2.0 Controller
- USB 2.0 Controller Mode
- BIOS EHCI Hand-Off
- USB Mass Storage Device Configuration
    - USB Mass Storage Reset Delay
    - Emulation Type

Saving and Exiting

When you have made all desired changes to **Advanced** Setup, you may make changes to other Setup options by using the right and left arrow keys to access other menus. When you have made all of your changes, you may save them by selecting the **Exit** menu, or you may press **<Esc>** at any time to exit the BIOS Setup Utility without saving the changes.

CPU CONFIGURATION SETUP

When you select **CPU Configuration** from the Advanced Setup Screen, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                                 │
├─────────────────────────────────────────────────────────────────────────┤
│                  |Advanced|                                               │
├───────────────────────────────────────────────┬─────────────────────────┤
│ Configure advanced CPU settings                │ This should be enabled  │
│                                                │ in order to boot legacy │
│ Manufacturer: Intel                            │ OSes that cannot        │
│ Brand String: Intel(R) Xeon(TM) CPU 2.80GHz    │ support CPUs with       │
│ Frequency   : 2.80GHz                          │ extended CPUID          │
│ FSB Speed   : 800MHz                           │ functions.              │
│ Cache L1    : 16 KB                            │                         │
│ Cache L2    : 1024 KB                          │                         │
│ Ratio Status: Locked                           │                         │
│ Ratio Actual Value: 14                         │                         │
│                                                │                         │
│ Ratio CMOS Setting:           [ 14]            │                         │
│ Max CPUID Value Limit:        [Enabled]        │ ←→    Select Screen     │
│ CPU TM Function:              [TM1]            │ ↑↓    Select Item       │
│ Execute Disable Bit:          [Enabled]        │ +-    Change Option     │
│ Hardware Prefetcher:          [Enabled]        │ F1    General Help      │
│ Adjacent Cache Line Prefetch: [Enabled]        │ F10   Save and Exit     │
│ Hyper-Threading Technology    [Enabled]        │ ESC   Exit              │
│                                                │                         │
│                                                │                         │
├───────────────────────────────────────────────┴─────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.            │
└─────────────────────────────────────────────────────────────────────────┘
```

CPU Configuration Screen

When you display the CPU Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

CPU CONFIGURATION SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run Advanced Setup. Once you change the settings, the new settings display each time Advanced Setup is run.

Max CPUID Value Limit

The Setup screen displays the system option:

> **Max CPUID Value Limit: [Enabled**]

Available options are:

> Disabled
> Enabled

CPU TM Function

This option specifies the thermal monitor mechanism.

The Setup screen displays the system option:

CPU TM Function: [TM1]

Available options are:

Disabled
TM1

Execute Disable Bit

The Setup screen displays the system option:

Execute Disable Bit: [Enabled]

Available options are:

Disabled
Enabled

Hardware Prefetcher

The Setup screen displays the system option:

Hardware Prefetcher: [Enabled]

Available options are:

Disabled
Enabled

Adjacent Cache Line Prefetch

The Setup screen displays the system option:

Adjacent Cache Line Prefetch: [Enabled]

Available options are:

Disabled
Enabled

Hyper-Threading

Hyper-Threading is a feature which can be used to maximize the processor's efficiency and execution speed by using a single processor as two logical processors. The two

logical processors have separate architectural and local APIC states, but unlike separate physical processors, these logical processors share common execution resources.

Hyper-Threading improves overall performance in many systems designed for multi-processing, high-demand multi-tasking and multi-threaded applications. If you are using a system which can take advantage of Hyper-Threading technology, the setting of the **Hyper-Threading** option of the system BIOS should remain **Enabled**, which is the factory setting.

For systems which use applications and operating systems which cannot take advantage of Hyper-Threading technology, such as versions of Linux® before revision 2.4.x, the **Hyper-Threading** option should be changed to **Disabled**. Operating systems and applications which are not optimized for Hyper-Threading technology may actually experience some performance degradation if this option is not set correctly.

The Setup screen displays the system option:

> **Hyper-Threading**   [**Enabled**]

Available options are:

> Disabled
> Enabled

This page intentionally left blank.

IDE
CONFIGURATION

When you select **IDE Configuration** from the Advanced Setup Menu, a Setup screen similar to the following displays:

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                            BIOS SETUP UTILITY                                 │
├─────────────────────────────────────────────────────────────────────────────┤
│                 |Advanced|                                                    │
├──────────────────────────────────────────────────┬──────────────────────────┤
│  IDE Configuration                                 │ Select IDE Mode.         │
│  _____  │                          │
│                                                    │ P-ATA Only:              │
│   IDE Configuration         [P-ATA Only]           │   4 P-ATA & 2 S-ATA      │
│     S-ATA Running Enhanced Mode [Yes]              │                          │
│     P-ATA Channel Selection    [Both]              │ S-ATA Only:              │
│     S-ATA Ports Definition     [P0-3rd/P1-4th]     │   2 S-ATA                │
│     Configure S-ATA as RAID    [No]                │                          │
│                                                    │ P-ATA & S-ATA:           │
│  > Primary IDE Master  :  [Hard Disk]              │   2 P-ATA & 2 S-ATA      │
│  > Primary IDE Slave   :  [Hard Disk]              │                          │
│  > Secondary IDE Master:  [ATAPI CDROM]            │                          │
│  > Secondary IDE Slave :  [Not Detected]           │ ←→    Select Screen      │
│  > Third IDE Master    :  [Not Detected]           │ ↑↓    Select Item        │
│  > Fourth IDE Master   :  [Not Detected]           │ +-    Change Option      │
│                                                    │ F1    General Help       │
│  Hard Disk Write Protect      [Disabled]           │ F10   Save and Exit      │
│  IDE Detect Time Out (Sec)    [35]                 │ ESC   Exit               │
│  ATA(PI) 80Pin Cable Detection [Host & Device]     │                          │
│                                                    │                          │
├──────────────────────────────────────────────────┴──────────────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.               │
└─────────────────────────────────────────────────────────────────────────────┘
```

IDE Configuration Screen

When you display the IDE Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

Some of the options on this screen allow you to continue to subscreens designed to change parameters for that particular option. Highlight the option you wish to change and press **<Enter>** to proceed to the appropriate subscreen.

IDE
CONFIGURATION
OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

IDE Configuration

This option specifies which IDE ports are available for use. The line items which display below the **IDE Configuration** option vary depending on the setting of this option.

The Setup screen displays the system option:

IDE Configuration   [P-ATA Only]

Four options are available:

- Select **Disabled** to disable all IDE ports.

- Select **P-ATA Only** to allow up to six devices, four parallel and two serial. The number of devices available depends on the setting of the **S-ATA Running Enhanced Mode** option described below.

- Select **S-ATA Only** if only serial ATA devices are to be used. Two serial devices will be available.

- Select **P-ATA & S-ATA** if parallel and serial ATA devices are to be used. Four devices will be available, two parallel and two serial.

S-ATA Running Enhanced Mode

This option allows you to enable up to six devices, four parallel and two serial. It is available only when the **IDE Configuration** option described above is set to **P-ATA Only**.

The Setup screen displays the system option:

S-ATA Running Enhanced Mode   [Yes]

Two options are available:

- Select **Yes** to enable six devices (four parallel devices, two serial devices).

- Select **No** to enable only four devices (parallel devices only, no serial devices).

If this option is set to **No**, only the **P-ATA Channel Selection** option is available.

P-ATA Channel Selection

This option allows you to specify which parallel devices will be available when the **IDE Configuration** option is set to **P-ATA Only**. A total of four parallel devices will available as described below.

The Setup screen displays the system option:

P-ATA Channel Selection   [Both]

Three options are available:

- Select **Primary** to enable the primary parallel IDE channel (P11) for use. This enables only two parallel devices, primary master and primary slave.

- Select **Secondary** to enable the secondary parallel IDE channel (P11A) for use. This enables only two parallel devices, secondary master and secondary slave.

- Select **Both** to enable both the primary and secondary parallel IDE channels for use. Four parallel devices are available as primary master/slave (P11) and secondary master/slave (P11A).

Combined Mode Option

This option allows you to specify the configuration of the parallel and serial devices when the **IDE Configuration** option is set to **P-ATA & S-ATA**. A total of two parallel and two serial ATA devices will be available as described below.

The Setup screen displays the system option:

Combined Mode Option   **[P-ATA 1st Channel]**

Two options are available:

- Select **P-ATA 1st Channel** to enable the primary parallel IDE channel for use. The two devices on the primary IDE channel (P11) are then defined as primary master/slave, serial ATA devices (P27 and P28) are secondary master/slave, and the secondary IDE channel (P11A) is disabled.

- Select **S-ATA 1st Channel** to enable the secondary parallel IDE channel for use. The serial ATA devices (P27 and P28) are then defined as primary master/slave, the devices on the secondary IDE channel (P11A) are secondary master/slave, and the primary IDE channel (P11) is disabled.

S-ATA Ports Definition

This option specifies the definitions of the two serial ATA ports (P27 and P28).

If the **S-ATA Running Enhanced Mode** option is set to **No**, this option is not available.

The Setup screen displays the system option:

S-ATA Ports Definition   **[P0-3rd/P1-4th]**

Three sets of options are available:

- If the **IDE Configuration** is set to **P-ATA Only**, the serial ATA ports are defined as 3rd master and 4th master, but the order of these definitions may change as follows:

     P0-3rd/P1-4th (P27 = 3rd master/P28 = 4th master)
     P0-4th/P1-3rd (P27 = 4th master/P28 = 3rd master)

- If the **IDE Configuration** is set to **S-ATA Only**, the serial ATA ports become 1st master and 2nd master, since they are the only ports available, but the order of these definitions may change as follows:

     P0-1st/P1-2nd (P27 = 1st master/P28 = 2nd master)
     P0-2nd/P1-1st (P27 = 2nd master/P28 = 1st master)

- If the **IDE Configuration** is set to **P-ATA & S-ATA**, the serial ATA ports are defined as master and slave. They will be defined as either primary or secondary master and slave, depending on the setting of the **Combined Mode Option** described above. The available options are:

     P0-Master/P1-Slave (P27 = master/P28 = slave)
     P0-Slave/P1-Master (P27 = slave/P28 = master)

Configure S-ATA as RAID

If the **S-ATA Running Enhanced Mode** option is set to **No**, this option is not available.

The Setup screen displays the system option:

      Configure S-ATA as RAID   **[No]**

Available options are:

    No
    Yes

Primary IDE Master/Primary IDE Slave
Secondary IDE Master/Secondary IDE Slave
Third IDE Master/Fourth IDE Master

The SHB has an enhanced IDE (EIDE) interface which can support up to four IDE disk drives through a primary and secondary controller in a master/slave configuration, P11 and P11A. Each of the four drives may be a different type. Two serial ATA devices can also be supported (P27 and P28).

Devices attached to the primary and secondary controllers and the serial ATA ports are detected automatically by AMIBIOS and displayed on the IDE Configuration screen. The number of line items which display depends on the settings of the **IDE Configuration** options described above.

The Setup screen displays the system options:

        Primary IDE Master   **[Hard Disk]**
        Primary IDE Slave   **[Hard Disk]**
        Secondary IDE Master **[ATAPI CDROM]**
        Secondary IDE Slave   **[Not Detected]**
        Third IDE Master   **[Not Detected]**
        Fourth IDE Master   **[Not Detected]**

To view and/or change parameters for any IDE device, press **<Enter>** to proceed to the IDE Device Setup screen, which is described later in this section.

Hard Disk Write Protect

This option allows you to disable or enable device write protection. Write protection will be effective only if the device is accessed through the BIOS.

The Setup screen displays the system option:

      Hard Disk Write Protect   **[Disabled]**

Available options are:

    Disabled
    Enabled

IDE Detect Time Out (Sec)

This option allows you to select the time-out value (in seconds) for detecting an ATA/ ATAPI device.

The Setup screen displays the system option:

> **IDE Detect Time Out (Sec)   [35]**

Available options are:

> 0
> 5
> 10
> 15
> 20
> 25
> 30
> 35

ATA(PI) 80Pin Cable Detection

This option allows you to select the mechanism for detecting an 80-pin ATA(PI) cable.

The Setup screen displays the system option:

> **ATA(PI) 80Pin Cable Detection   [Host & Device]**

Available options are:

> Host & Device
> Host
> Device

This page intentionally left blank.

IDE DEVICE SETUP   When you select one of the IDE devices from the **IDE Configuration** screen, a Setup
screen similar to the following displays:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                               │
├─────────────────────────────────────────────────────────────────────────┤
│                  |Advanced|                                               │
├──────────────────────────────────────────────┬──────────────────────────┤
│  Primary IDE Master                           │  Select the type         │
│  _____ │  of device connected     │
│  Device    :Hard Disk                         │  to the system.          │
│  Vendor    :ST380823-A                         │                          │
│  Size      :840.0GB                            │                          │
│  LBA Mode  :Supported                          │                          │
│  Block Mode:16Sectors                          │                          │
│  PIO Mode  :4                                  │                          │
│  Async DMA :MultiWord DMA-2                     │                          │
│  Ultra DMA :Ultra DMA-5                         │                          │
│  S.M.A.R.T.:Supported                          │                          │
│  _____ │                          │
│  Type                         [Auto}           │  ←→    Select Screen     │
│  LBA/Large Mode               [Auto]           │  ↑↓    Select Item       │
│  Block (Multi-Sector Transfer) [Auto]          │  +-    Change Option     │
│  PIO Mode                     [Auto]           │  F1    General Help      │
│  DMA Mode                     [Auto]           │  F10   Save and Exit     │
│  S.M.A.R.T.                   [Auto]           │  ESC   Exit              │
│  32Bit Data Transfer          [Disabled]       │                          │
├──────────────────────────────────────────────┴──────────────────────────┤
│       vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.            │
└─────────────────────────────────────────────────────────────────────────┘
```

IDE Device Screen

When you display the IDE Device subscreen, the format is similar to the sample shown
above. The data displayed on the top portion of the screen details the parameters
detected by AMIBIOS for the specified device and may not be modified. The data
displayed on the bottom portion of the screen may be modified.

The drive information which displays the first time the BIOS Setup Utility is run
indicates the drive(s) on your system which AMIBIOS detected upon initial bootup.

IDE DEVICE SETUP   The following options are available for each of the IDE devices on the primary and
OPTIONS   secondary IDE controllers:

Type

This option allows you to specify what type of device is on the IDE controller.

The Setup screen displays the system option:

      T**ype**   **[Auto]**

Available options are:

> Not Installed
> Auto
> CDROM
> ARMD

If **Not Installed** is selected, the other options on the bottom portion of this screen do not display.

LBA/Large Mode

This option allows you to enable IDE LBA (Logical Block Addressing) Mode for the specified IDE drive. Data is accessed by block addresses rather than by the traditional cylinder-head-sector format. This allows you to use drives larger than 528MB.

The Setup screen displays the system option:

> **LBA/Large Mode   [Auto]**

Two options are available:

- Select **Disabled** to have AMIBIOS use the physical parameters of the hard disk and do no translation to logical parameters. The operating system which uses the parameter table will then see only 528MB of hard disk space even if the drive contains more than 528MB.

- Select **Auto** to enable LBA mode and translate the physical parameters of the drive to logical parameters. LBA Mode must be supported by the drive and the drive must have been formatted with LBA Mode enabled.

Block (Multi-Sector Transfer) Mode

This option supports transfer of multiple sectors to and from the specified IDE drive. Block mode boosts IDE drive performance by increasing the amount of data transferred during an interrupt.

If **Block Mode** is set to **Disabled**, data transfers to and from the device occur one sector at a time.

The Setup screen displays the system option:

> **Block (Multi-Sector Transfer)   [Auto]**

Available options are:

> Disabled
> Auto

PIO Mode

IDE Programmed I/O (PIO) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

Set the **PIO Mode** option to **Auto** to have AMIBIOS select the PIO mode used by the IDE drive being configured. If you select a specific value for the PIO mode, you must make *absolutely* certain that you are selecting the PIO mode supported by the IDE drive being configured.

The Setup screen displays the system option:

>   **PIO Mode**   **[Auto]**

Available options are:

>   Auto
>   0
>   1
>   2
>   3
>   4

DMA Mode

This option allows you to select DMA Mode for the device.

The Setup screen displays the system option:

>   **DMA Mode**   **[Auto]**

Available options are:

>   Auto
>   SWDMA0   (SingleWord DMA 0 - 2)
>   SWDMA1
>   SWDMA2
>   MWDMA0   (MultiWord DMA 0 - 2)
>   MWDMA1
>   MWDMA2
>   UDMA0   (UltraDMA 0 - 5)
>   UDMA1
>   UDMA2
>   UDMA3
>   UDMA4
>   UDMA5

S.M.A.R.T.

This option allows AMIBIOS to use the SMART (Self-Monitoring Analysis and Reporting Technology) protocol for reporting server system information over a network.

The Setup screen displays the system option:

        S.M.A.R.T.   **[Auto]**

Available options are:

        Auto
        Disabled
        Enabled

32Bit Data Transfer

If the **32Bit Data Transfer** parameter is set to **Enabled**, AMIBIOS enables 32-bit data transfers. If the host controller does not support 32-bit transfer, this feature *must* be set to **Disabled**.

The Setup screen displays the system option:

        32Bit Data Transfer   **[Disabled]**

Available options are:

        Disabled
        Enabled

ACPI
CONFIGURATION

When you select **ACPI Configuration** from the Advanced Setup Menu, the following Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                             │
├──────────────────────────────────────────────────────────────────────┤
│                            |Advanced|                                  │
├────────────────────────────────────────────┬─────────────────────────┤
│  ACPI Settings                             │  General ACPI            │
│ ──────────────────────────────────────────│  Configuration settings  │
│                                            │                          │
│  > General ACPI Configuration              │                          │
│  > Advanced ACPI Configuration             │                          │
│  > Chipset ACPI Configuration              │                          │
│                                            │                          │
│                                            │                          │
│                                            │                          │
│                                            │  ←→    Select Screen      │
│                                            │  ↑↓    Select Item        │
│                                            │  Enter Go to Sub Screen   │
│                                            │  F1    General Help       │
│                                            │  F10   Save and Exit      │
│                                            │  ESC   Exit               │
│                                            │                          │
├────────────────────────────────────────────┴─────────────────────────┤
│       vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.         │
└──────────────────────────────────────────────────────────────────────┘
```

ACPI Configuration Screen

When you display the ACPI Configuration screen, the format is similar to the sample shown above, allowing you to continue to subscreens designed to change parameters for each of the ACPI Configuration options. Highlight the option you wish to change and press **<Enter>** to proceed to the appropriate subscreen.

The subscreens allow you to set up or modify the following options:

- General ACPI Configuration

    - Suspend Mode

    - Repost Video on S3 Resume

- Advanced ACPI Configuration

    - ACPI 2.0 Features

    - ACPI APIC Support

    - AMI OEMB Table

    - Headless Mode

- Chipset ACPI Configuration
    - APIC ACPI SCI IRQ
    - USB Device Wakeup From S3/S4

GENERAL ACPI CONFIGURATION

When you select **General ACPI Configuration** from the ACPI Configuration Menu, the following Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                              │
│ ┌──────────────────────────────────────────────────────────────────┐ │
│ │        |Advanced|                                                  │ │
│ ├──────────────────────────────────────────────┬───────────────────┤ │
│ │ General ACPI Configuration                    │ Select the ACPI   │ │
│ │ ─────────────────────────────────────────────│ state used for    │ │
│ │                                               │ System Suspend.   │ │
│ │ Suspend Mode                    [S1 (POS)]    │                   │ │
│ │ Repost Video on S3 Resume       [No]          │                   │ │
│ │                                               │                   │ │
│ │                                               │                   │ │
│ │                                               │                   │ │
│ │                                               │                   │ │
│ │                                               │ ←→    Select Screen│ │
│ │                                               │ ↑↓    Select Item  │ │
│ │                                               │ +-    Change Option│ │
│ │                                               │ F1    General Help │ │
│ │                                               │ F10   Save and Exit│ │
│ │                                               │ ESC   Exit         │ │
│ │                                               │                   │ │
│ ├───────────────────────────────────────────────────────────────────┤│
│ │     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.       ││
│ └───────────────────────────────────────────────────────────────────┘│
└──────────────────────────────────────────────────────────────────────┘
```

General ACPI Configuration Screen

When you display the General ACPI Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

GENERAL ACPI CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

Suspend Mode

This option allows you to select the ACPI state used for System Suspend. If this option is set to **S1 (POS)**, the **Repost Video on S3 Resume** option is not available.

The Setup screen displays the system option:

>   **Suspend Mode**   **[S1 (POS)]**

Available options are:

>   S1 (POS)
>   S3 (STR)
>   Auto

Repost Video on S3 Resume

If the **Suspend Mode** option is set to **S1 (POS)**, this option is not available.

The Setup screen displays the system option:

Repost Video on S3 Resume   [No]

Available options are:

No
Yes

**ADVANCED ACPI
CONFIGURATION**

When you select **Advanced ACPI Configuration** from the ACPI Configuration Menu, the following Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                         │
├──────────────────────────────────────────────────────────────────┤
│              |Advanced|                                            │
├─────────────────────────────────────────┬────────────────────────┤
│  Advanced ACPI Configuration            │  Enable RSDP pointers   │
│  ─────────────────────────────────────  │  to 64-bit Fixed System │
│                                         │  Description Tables.     │
│  ACPI 2.0 Features            [No]      │                         │
│  ACPI APIC Support            [Enabled] │                         │
│  AMI OEMB Table               [Enabled] │                         │
│  Headless Mode                [Disabled]│                         │
│                                         │                         │
│                                         │                         │
│                                         │                         │
│                                         │  ←→    Select Screen    │
│                                         │  ↑↓    Select Item      │
│                                         │  +-    Change Option    │
│                                         │  F1    General Help     │
│                                         │  F10   Save and Exit    │
│                                         │  ESC   Exit             │
│                                         │                         │
├─────────────────────────────────────────┴────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.      │
└──────────────────────────────────────────────────────────────────┘
```

Advanced ACPI Configuration Screen

When you display the Advanced ACPI Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

**ADVANCED ACPI
CONFIGURATION
OPTIONS**

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

ACPI 2.0 Features

The Setup screen displays the system option:

> **ACPI 2.0 Features   [No]**

Available options are:

> No
> Yes

ACPI APIC Support

The Setup screen displays the system option:

      ACPI APIC Support   **[Enabled]**

Available options are:

        Disabled
        Enabled

AMI OEMB Table

The Setup screen displays the system option:

      AMI OEMB Table   **[Enabled]**

Available options are:

        Disabled
        Enabled

Headless Mode

The Setup screen displays the system option:

      Headless Mode   **[Disabled]**

Available options are:

        Disabled
        Enabled

CHIPSET ACPI CONFIGURATION

When you select **Chipset ACPI Configuration** from the ACPI Configuration Menu, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────┐
│                      BIOS SETUP UTILITY                          │
├─────────────────────────────────────────────────────────────────┤
│          |Advanced|                                             │
├──────────────────────────────────────────┬──────────────────────┤
│ Chipset ACPI Configuration               │ Enable/Disable        │
│ ──────────────────────────────────────   │ APIC ACPI SCI IRQ.    │
│                                          │                       │
│ APIC ACPI SCI IRQ            [Disabled]  │                       │
│ USB Device Wakeup From S3/S4  [Disabled] │                       │
│                                          │                       │
│                                          │                       │
│                                          │                       │
│                                          │                       │
│                                          │ ←→    Select Screen   │
│                                          │ ↑↓    Select Item     │
│                                          │ +-    Change Option   │
│                                          │ F1    General Help    │
│                                          │ F10   Save and Exit   │
│                                          │ ESC   Exit            │
│                                          │                       │
├──────────────────────────────────────────┴──────────────────────┤
│     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.     │
└─────────────────────────────────────────────────────────────────┘
```

Chipset ACPI Configuration Screen

When you display the Chipset ACPI Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

CHIPSET ACPI CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

APIC ACPI SCI IRQ

The Setup screen displays the system option:

APIC ACPI SCI IRQ   [Disabled]

Available options are:

Disabled
Enabled

USB Device Wakeup From S3/S4

The Setup screen displays the system option:

USB Device Wakeup From S3/S4   [Disabled]

Available options are:

Disabled
Enabled

**MPS
CONFIGURATION
SETUP**

When you select **MPS Configuration** from the Advanced Setup Screen, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────┐
│                       BIOS SETUP UTILITY                          │
├─────────────────────────────────────────────────────────────────┤
│           |Advanced|                                              │
├────────────────────────────────────────┬────────────────────────┤
│  MPS Configuration                      │  Select MPS Revision.   │
│  _____  │                        │
│                                         │                        │
│  MPS Revision               [1.4]       │                        │
│                                         │                        │
│                                         │                        │
│                                         │                        │
│                                         │                        │
│                                         │                        │
│                                         │  ←→    Select Screen   │
│                                         │  ↑↓    Select Item     │
│                                         │  +-    Change Option   │
│                                         │  F1    General Help    │
│                                         │  F10   Save and Exit   │
│                                         │  ESC   Exit            │
│                                         │                        │
├────────────────────────────────────────┴────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.     │
└─────────────────────────────────────────────────────────────────┘
```

MPS Configuration Screen

When you display the CPU Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

**MPS
CONFIGURATION
SETUP OPTION**

The description for the system option listed below shows the value as it appears if you have not yet run Advanced Setup. Once you change the setting, the new setting displays each time Advanced Setup is run.

MPS Revision

The Setup screen displays the system option:

  MPS Revision   [1.4]

Available options are:

    1.1
    1.4

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PCI EXPRESS
CONFIGURATION

When you select **PCI Express Configuration** from the Advanced Setup Menu, a Setup screen similar to the following displays:

```
┌────────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                          │
├────────────────────────────────────────────────────────────────────┤
│                    |Advanced|                                       │
├──────────────────────────────────────────────┬─────────────────────┤
│  PCI Express Configuration                    │ Enable/Disable      │
│  _____ │ PCI Express L0s and │
│                                               │ L1 link power states.│
│  Active State Power-Management   [Disabled]   │                     │
│  PCI Express Port A0             [Enabled]    │                     │
│  PCI Express Port B0             [Enabled]    │                     │
│  PCI Express Port B1             [Enabled]    │                     │
│  PCI Express Port C1             [Enabled]    │                     │
│  PCIe Jitter Tolerance           [Enabled]    │                     │
│  PCIe Compliance Mode            [Disabled]   │                     │
│                                               │                     │
│                                               │ ←→    Select Screen │
│                                               │ ↑↓    Select Item   │
│                                               │ +-    Change Option │
│                                               │ F1    General Help  │
│                                               │ F10   Save and Exit │
│                                               │ ESC   Exit          │
│                                               │                     │
├──────────────────────────────────────────────┴─────────────────────┤
│       vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.      │
└────────────────────────────────────────────────────────────────────┘
```

PCI Express Configuration Screen

When you display the PCI Express Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

PCI EXPRESS
CONFIGURATION
OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

Active State Power-Management

The Setup screen displays the system option:

Active State Power-Management [Disabled]

Available options are:

Disabled
Enabled

PCI Express Port A0/B0/B1/C0

The Setup screen displays the system options:

PCI Express Port A0	**[Enabled]**
PCI Express Port B0	**[Enabled]**
PCI Express Port B1	**[Enabled]**
PCI Express Port C0	**[Enabled]**

Three options are available:

- Select **Auto** to enable the PCI Express port only if there is a card in the port.

- Select **Enabled** to enable the PCI Express port.

- Select **Disabled** to disable the PCI Express port.

PCIe Jitter Tolerance

The Setup screen displays the system option:

PCIe Jitter Tolerance   **[Enabled]**

Available options are:

Disabled
Enabled

PCIe Compliance Mode

The Setup screen displays the system option:

PCIe Compliance Mode   **[Disabled]**

Available options are:

Disabled
Enabled

USB
CONFIGURATION

When you select **USB Configuration** from the Advanced Setup Menu, the following
Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                             │
├──────────────────────────────────────────────────────────────────────┤
│                            |Advanced|                                  │
├──────────────────────────────────────────┬───────────────────────────┤
│  USB Configuration                       │  Enables USB host          │
│  ─────────────────────────────────────   │  controllers.              │
│                                          │                            │
│  Module Version - x.xx.x-xx.x            │                            │
│                                          │                            │
│  USB Devices Enabled:                    │                            │
│    None                                  │                            │
│                                          │                            │
│  USB Function            [All USB Ports] │                            │
│  Legacy USB Support      [Enabled]       │                            │
│  USB 2.0 Controller      [Disabled]      │                            │
│  USB 2.0 Controller Mode [FullSpeed]     │                            │
│  BIOS EHCI Hand-Off      [Enabled]       │  ←→   Select Screen        │
│                                          │  ↑↓   Select Item          │
│  > USB Mass Storage Device Configuration │  +-   Change Option        │
│                                          │  F1   General Help         │
│                                          │  F10  Save and Exit        │
│                                          │  ESC  Exit                 │
│                                          │                            │
│                                          │                            │
├──────────────────────────────────────────┴───────────────────────────┤
│     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.           │
└──────────────────────────────────────────────────────────────────────┘
```

USB Configuration Screen

When you display the USB Configuration screen, the format is similar to the sample
shown above. Highlight the option you wish to change and press **<Enter>** to display the
available settings. Select the appropriate setting and press **<Enter>** again to accept the
highlighted value.

One of these options allows you to continue to a subscreen designed to change param-
eters for that particular option. Highlight the option and press **<Enter>** to proceed to the
appropriate subscreen.

USB
CONFIGURATION
OPTIONS

The descriptions for the system options listed below show the values as they appear if
you have not run the BIOS Setup Utility program yet. Once values have been defined,
they display each time the BIOS Setup Utility is run.

USB Function

This option allows you to enable the Universal Serial Bus (USB).

If this option is set to **Disabled**, the **Legacy USB Support**, **USB 2.0 Controller** and
USB 2.0 Controller Mode options are not available.

The Setup screen displays the system option:

USB Function   [All USB Ports]

Available options are:

> Disabled
> 2 USB Ports
> All USB Ports

Legacy USB Support

This option allows you to enable support for older USB devices. The **Auto** option disables legacy support if no USB devices are connected. If this option is set to **Disabled**, the **BIOS EHCI Hand-Off** option is not available.

If the **USB Function** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

> **Legacy USB Support   [Enabled]**

Available options are:

> Disabled
> Enabled
> Auto

USB 2.0 Controller

This option allows you to enable or disable the USB 2.0 controller. If it is set to **Disabled**, the USB 2.0 Controller Mode option is not available.

If the **USB Function** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

> **USB 2.0 Controller   [Disabled]**

Available options are:

> Disabled
> Enabled

USB 2.0 Controller Mode

This option allows you to configure the USB 2.0 controller in HiSpeed mode (480Mbps) or FullSpeed mode (12Mbps).

If the **USB Function** or **USB 2.0 Controller** options are set to **Disabled**, this option is not available.

The Setup screen displays the system option:

> **USB 2.0 Controller Mode   [FullSpeed]**

Available options are:

> HiSpeed
> FullSpeed

BIOS EHCI Hand-Off

This option is a work-around for operating systems without EHCI hand-off support.

If the **Legacy USB Support** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

> **BIOS EHCI Hand-Off**   **[Enabled]**

Available options are:

> Disabled
> Enabled

This page intentionally left blank.

USB MASS STORAGE DEVICE CONFIGURATION

When you select **USB Mass Storage Device Configuration** from the USB Configuration screen, the following Setup screen displays:

```
┌────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                          │
├────────────────────────────────────────────────────────────────────┤
│                  |Advanced|                                        │
├──────────────────────────────────────────┬─────────────────────────┤
│ USB Mass Storage Device Configuration    │ Number of seconds       │
│ _____ │ POST waits for the      │
│                                          │ USB mass storage        │
│ USB Mass Storage Reset Delay   [20 Sec]  │ device after start      │
│                                          │ unit command.           │
│   Device #1            TEAC FD-05PUB      │                         │
│   Emulation Type           [Auto]        │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
│                                          │                         │
│                                          │ ←→    Select Screen     │
│                                          │ ↑↓    Select Item       │
│                                          │ +-    Change Option     │
│                                          │ F1    General Help      │
│                                          │ F10   Save and Exit     │
│                                          │ ESC   Exit              │
│                                          │                         │
│                                          │                         │
├──────────────────────────────────────────┴─────────────────────────┤
│     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.       │
└────────────────────────────────────────────────────────────────────┘
```

USB Mass Storage Device Configuration Screen

When you display the USB Mass Storage Device Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

USB MASS STORAGE DEVICE CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

USB Mass Storage Reset Delay

This option specifies the number of seconds POST waits for the USB mass storage device after the start unit command.

The Setup screen displays the system option:

USB Mass Storage Reset Delay   [20 Sec]

Available options are:

> 10 Sec
> 20 Sec
> 30 Sec
> 40 Sec

Emulation Type

If this option is set to **Auto**, USB devices smaller than 530MB will be emulated as floppy devices. The **Forced FDD** option can be used to force a formatted hard drive to boot as a floppy device (e.g., a ZIP drive).

The Setup screen displays the system option:

> **Emulation Type**   **[Auto]**

Available options are:

> Auto
> Floppy
> Forced FDD
> Hard Disk
> CDROM

Chapter 4   Plug and Play Setup

PLUG AND PLAY
SETUP

When you select **PCIPnP** from the BIOS Setup Utility Main Menu, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                           │
├─────────────────────────────────────────────────────────────────────┤
│   Main    Advanced   |PCIPnP|   Boot   Security  Chipset   Exit      │
├───────────────────────────────────────────────┬─────────────────────┤
│  Advanced PCI/PnP Settings                     │ NO: lets the BIOS   │
│  _____ │ configure all the   │
│                                                │ devices in the system.│
│  WARNING: Setting wrong values in below sections│ YES: lets the       │
│          may cause system to malfunction.      │ operating system    │
│                                                │ configure Plug and  │
│  Plug & Play O/S            [No]               │ Play (PnP) devices not│
│  PCI Latency Timer         [64]                │ required for boot if │
│  Allocate IRQ to PCI VGA   [Yes]              │ your system has a Plug│
│  Palette Snooping          [Disabled]          │ and Play operating  │
│  Onboard LAN Controllers   [Both LAN0 & LAN1 E]│ system.             │
│  Onboard LAN Boot ROM      [Disabled]          │                     │
│                                                │                     │
│  PCI IDE BusMaster         [Disabled]          │                     │
│  OffBoard PCI/ISA IDE Card [Auto]             │                     │
│                                                │                     │
│  IRQ3                      [Available]          │                     │
│  IRQ4                      [Available]          │                     │
│  IRQ5                      [Available]          │                     │
│  IRQ7                      [Available]          │                     │
│  IRQ9                      [Available]          │                     │
│  IRQ10                     [Available]          │                     │
│  IRQ11                     [Available]          │                     │
│  IRQ14                     [Available]          │                     │
│  IRQ15                     [Available]          │                     │
│                                                │                     │
│  DMA Channel 0             [Available]          │                     │
│  DMA Channel 1             [Available]          │ ←→    Select Screen │
│  DMA Channel 3             [Available]          │ ↑↓    Select Item   │
│  DMA Channel 5             [Available]          │ +-    Change Option │
│  DMA Channel 6             [Available]          │ F1    General Help  │
│  DMA Channel 7             [Available]          │ F10   Save and Exit │
│                                                │ ESC   Exit          │
│  Reserved Memory Size      [Disabled]          │                     │
│  Reserved Memory Address   [C8000]            │                     │
├────────────────────────────────────────────────┴─────────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.      │
└─────────────────────────────────────────────────────────────────────┘
```

PCIPnP Setup Screen

When you display the PCIPnP Setup screen, the format is similar to the sample shown above, except the screen does not display all of the options at one time. If you need to change other options, use the down arrow key to locate the appropriate option. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

_____

NOTE: The values on the PCIPnP Setup screen do not necessarily reflect the values appropriate for your SHB. Refer to the explanations below for specific instructions about entering correct information.
_____

PCIPNP SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run PCIPnP Setup. Once values have been defined, they display each time PCIPnP Setup is run.
_____

NOTE: Do not change the values for any PCIPnP Setup option unless you understand the impact on system operation. Depending on your system configuration, selection of other values may cause unreliable system operation.
_____

Plug & Play O/S

This option indicates whether or not the operating system installed in the computer is Plug and Play-aware. AMIBIOS only detects and enables PnP adapter cards which are required for system boot. An operating system which is PnP-aware detects and enables all other PnP-aware adapter cards. Set this option to **No** if the operating system (such as DOS or OS/2) does *not* use PnP.
_____

NOTE: You *must* set this option correctly or PnP-aware adapter cards installed in your computer will not be configured properly.
_____

The Setup screen displays the system option:

> **Plug & Play O/S**   **[No]**

Two options are available:

- Select **No** to allow AMIBIOS to configure the devices in the system.

- Select **Yes** if your system has a Plug and Play operating system and you want to allow the operating system to configure all Plug and Play (PnP) devices which are not required for bootup.

PCI Latency Timer

This option specifies the latency of all PCI devices on the PCI Local Bus. The settings are in units equal to PCI clocks.

The Setup screen displays the system option:

> **PCI Latency Timer**   **[64]**

Available options are:

32	160
64	192
96	224
128	248

Allocate IRQ to PCI VGA

This option allows you to assign an IRQ to a PCI VGA card if the card requests an IRQ.

The Setup screen displays the system option:

> **Allocate IRQ to PCI VGA   [Yes]**

Available options are:

> Yes
> No

Palette Snooping

This option, when set to **Enabled**, indicates to the PCI devices that a graphics device is installed in the system so the card will function correctly.

The Setup screen displays the system option:

> **Palette Snooping   [Disabled]**

Available options are:

> Disabled
> Enabled

Onboard LAN Controllers

This option indicates which LAN devices are to be enabled.
_____

NOTE: When the setting for this option has been changed and saved, the system should be powered down and powered up in order for the new setting to take effect.
_____

The Setup screen displays the system option:

> **Onboard LAN Controllers   [Both LAN0 & LAN1 E]**

Available options are:

> Both LAN0 & LAN1 Enabled   (default)
> LAN0 Enabled & LAN1 Disabled
> Both LAN0 & LAN1 Disabled

Onboard LAN Boot ROM

This option, when set to **Enabled**, indicates that the option ROM for the on-board Gigabit LANs is to be executed.

The Setup screen displays the system option:

Onboard LAN Boot ROM   [Disabled]

Available options are:

Disabled
Enabled

PCI IDE BusMaster

This option specifies whether the IDE controller on the PCI Local Bus has bus mastering capability for reading and writing to IDE drives. The IDE drive(s) must support PCI bus mastering.

The Setup screen displays the system option:

PCI IDE BusMaster   [Disabled]

Available options are:

Disabled
Enabled

OffBoard PCI/ISA IDE Card

This option specifies the PCI expansion slot on the SHB where the off-board PCI IDE controller is installed, if any.

The Setup screen displays the system option:

OffBoard PCI/ISA IDE Card   [Auto]

Available options are:

Auto
PCI Slot1
PCI Slot2
PCI Slot3
PCI Slot4
PCI Slot5
PCI Slot6

If you select any value other than **Auto**, the following options and their default values are added to the screen:

OffBoard PCI IDE Primary IRQ/OffBoard PCI IDE Secondary

These options specify the PCI interrupts used by the primary and secondary IDE channels on the off-board PCI IDE controller. You may use the **INTA**, **INTB**, **INTC** and **INTD** options to assign IRQs to the Int Pin used by the specified channel.

If the **OffBoard PCI/ISA IDE Card** option is set to **Auto**, these options are not available.

The Setup screen displays the system options:

> **OffBoard PCI IDE Primary IRQ   [Disabled]**
> **OffBoard PCI IDE Secondary   [Disabled]**

Available options are:

> Disabled
> INTA
> INTB
> INTC
> INTD
> Hardwired

IRQ3/IRQ4/IRQ5/IRQ7/IRQ9/IRQ10/IRQ11/IRQ14/IRQ15

These options indicate whether the specified interrupt request (IRQ) is available for use by the system for PCI/Plug and Play devices or is reserved for use by legacy devices. This allows you to specify IRQs for use by legacy adapter cards.

The IRQ setup options indicate whether AMIBIOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices.

The Setup screen displays the system option:

> **IRQ#   [Available]**
>
> where # is the number of the interrupt request (IRQ)

Two options are available:

- Select **Available** to make the specified IRQ available for use by PCI/PnP devices.
- Select **Reserved** to reserve the specified IRQ for use by legacy devices.

DMA Channels 0, 1, 3, 5, 6 and 7

These options indicate whether the specified DMA channel is available for use by the system for PCI/Plug and Play devices or is reserved for use by legacy devices.

The Setup screen displays the system option:

DMA Channel #   **[Available]**

where # is the DMA Channel number

Two options are available:

- **Available** indicates that the specified DMA channel is available for use by PCI/PnP devices.

- **Reserved** indicates the specified DMA channel is reserved for use by legacy devices.

Reserved Memory Size

This option specifies the size of the memory area reserved for legacy devices.

If this option is set to **Disabled**, the **Reserved Memory Address** option is not available.

The Setup screen displays the system option:

Reserved Memory Size   **[Disabled]**

Available options are:

    Disabled
    16k
    32k
    64k

Reserved Memory Address

This option specifies the beginning address (in hexadecimal) of the ROM memory area reserved for use by legacy devices.

If the **Reserved Memory Size** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Reserved Memory Address   **[C8000]**

Available options are:

    C0000   D0000
    C4000   D4000
    C8000   D8000
    CC000   DC000

Saving and Exiting

When you have made all desired changes to **PCIPnP** Setup, you may make changes to other Setup options by using the right and left arrow keys to access other menus. When you have made all of your changes, you may save them by selecting the **Exit** menu, or you may press **<Esc>** at any time to exit the BIOS Setup Utility without saving the changes.

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Chapter 5   Boot Setup

BOOT SETUP   When you select **Boot** from the BIOS Setup Utility Main Menu, the following Setup
screen displays:

```
┌──────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                            │
├──────────────────────────────────────────────────────────────────────┤
│  Main    Advanced    PCIPnP   |Boot|  Security   Chipset    Exit       │
├──────────────────────────────────────────┬───────────────────────────┤
│ Boot Settings                            │ Configure Settings         │
│ _____ │ during System Boot.        │
│                                          │                            │
│ > Boot Settings Configuration            │                            │
│                                          │                            │
│ > Boot Device Priority                   │                            │
│ > Hard Disk Drives                       │                            │
│ > Removable Drives                       │                            │
│ > CD/DVD Drives                          │                            │
│                                          │                            │
│                                          │ ←→    Select Screen         │
│                                          │ ↑↓    Select Item           │
│                                          │ Enter Go to Sub Screen      │
│                                          │ F1    General Help          │
│                                          │ F10   Save and Exit         │
│                                          │ ESC   Exit                  │
│                                          │                            │
├──────────────────────────────────────────┴───────────────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.        │
└──────────────────────────────────────────────────────────────────────┘
```

Boot Setup Screen

When you display the Boot Setup screen, the format is similar to the sample shown
above, allowing you to continue to subscreens designed to change parameters for each
of the Boot Setup options. Highlight the option you wish to change and press **<Enter>**
to proceed to the appropriate subscreen.

_____

NOTE: If no device is found for one of the device types, the line item for that device
type does not display.

_____

**BOOT SETUP
OPTIONS**   The descriptions for the system option listed below show the values as they appear if you
have not yet run Boot Setup. Once values have been changed, they display each time
Boot Setup is run. You may also continue to subscreens to specify boot parameters and
the boot sequence of bootable devices in your system.

Boot Settings Configuration

The options on the **Boot Settings Configuration** subscreen allow you to set up or modify parameters for boot procedures. The following options may be modified:

- Quick Boot

- Quiet Boot

- AddOn ROM Display Mode

- Bootup Num-Lock

- PS/2 Mouse Support

- Wait For 'F1' If Error

- Hit 'DEL' Message Display

- Interrupt 19 Capture

Boot Device Priority

The options on the **Boot Device Priority** subscreen specify the order in which AMIBIOS attempts to boot devices available in the system. It allows you to select the drive which will be booted first, second, third, etc.

Hard Disk Drives

The **Hard Disk Drives** subscreen specifies the boot sequence of the hard drives available in the system.

Removable Drives

The **Removable Drives** subscreen specifies the boot sequence of the removable devices available in the system.

CD/DVD Drives

The **CD/DVD Drives** subscreen specifies the boot sequence of the CDROM and DVD devices available in the system.

Saving and Exiting

When you have made all desired changes to **Boot** Setup, you may make changes to other Setup options by using the right and left arrow keys to access other menus. When you have made all of your changes, you may save them by selecting the **Exit** menu, or you may press **<Esc>** at any time to exit the BIOS Setup Utility without saving the changes.

BOOT SETTINGS CONFIGURATION

When you select **Boot Settings Configuration** from the Boot Setup Menu, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                            BIOS SETUP UTILITY                                  │
├─────────────────────────────────────────────────────────────────────────────┤
│                                 |Boot|                                        │
├─────────────────────────────────────────────┬───────────────────────────────┤
│  Boot Settings Configuration                 │  Allows BIOS to skip          │
│  _____ │  certain tests while          │
│                                              │  booting. This will           │
│  Quick Boot                   [Disabled]     │  decrease the time            │
│  Quiet Boot                   [Disabled]     │  needed to boot the           │
│  AddOn ROM Display Mode        [Force BIOS]  │  system.                      │
│  Bootup Num-Lock              [On]           │                               │
│  PS/2 Mouse Support           [Auto]         │                               │
│  Wait For 'F1' If Error        [Enabled]     │                               │
│  Hit 'DEL' Message Display     [Enabled]     │                               │
│  Interrupt 19 Capture          [Disabled]    │                               │
│                                              │                               │
│                                              │  ←→    Select Screen          │
│                                              │  ↑↓    Select Item            │
│                                              │  +-    Change Option          │
│                                              │  F1    General Help           │
│                                              │  F10   Save and Exit          │
│                                              │  ESC   Exit                   │
│                                              │                               │
├──────────────────────────────────────────────┴───────────────────────────────┤
│         vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.              │
└─────────────────────────────────────────────────────────────────────────────┘
```

Boot Settings Configuration Screen

When you display the Boot Settings Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

BOOT SETTINGS CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the BIOS Setup Utility program yet. Once values have been defined, they display each time the BIOS Setup Utility is run.

Quick Boot

This option allows you to have the AMIBIOS boot quickly when the computer is powered on or go through more complete testing. If you set the **Quick Boot** option to **Enabled**, the BIOS skips certain tests while booting and decreases the time needed to boot the system.

The Setup screen displays the system option:

> **Quick Boot**   **[Disabled]**

Available options are:

> Disabled
> Enabled

Quiet Boot

This option specifies what will be displayed on the screen while the system is performing the POST routines when the computer is powered on or a soft reboot is performed.

The Setup screen displays the system option:

> **Quiet Boot**   **[Disabled]**

Two options are available:

- Select **Disabled** to display normal POST messages.

- Select **Enabled** to display the OEM logo instead of the POST messages.

AddOn ROM Display Mode

This option specifies the system display mode which is set at the time the AMIBIOS post routines initialize an optional option ROM.

The Setup screen displays the system option:

> **AddOn ROM Display Mode**   **[Force BIOS]**

Two options are available:

- Select **Force BIOS** to use the display mode currently being used by AMIBIOS.

- Select **Keep Current** to use the current display mode.

BootUp Num-Lock

This option enables you to turn off the Num-Lock option on the enhanced keyboard when the system is powered on. If Num-Lock is turned off, the arrow keys on the numeric keypad can be used, as well as the other set of arrow keys on the enhanced keyboard.

The Setup screen displays the system option:

> **BootUp Num-Lock**   **[On]**

Available options are:

> Off
> On

PS/2 Mouse Support

This option indicates whether or not a PS/2-type mouse is supported.

The Setup screen displays the system option:

> **PS/2 Mouse Support**   **[Auto]**

Available options are:

> Auto
> Disabled
> Enabled

Wait For 'F1' If Error

Before the system boots up, the AMIBIOS executes the Power-On Self Test (POST) routines, a series of system diagnostic routines. If any of these tests fail but the system can still function, a non-fatal error has occurred. The AMIBIOS responds with an appropriate error message followed by:

> **Press F1 to RESUME**

If this option is set to **Disabled**, a non-fatal error does not generate the "Press F1 to RESUME" message. The AMIBIOS still displays the appropriate message, but continues the booting process without waiting for the **<F1>** key to be pressed. This eliminates the need for any user response to a non-fatal error condition message. Non-fatal error messages are listed in *Appendix A - BIOS Messages*.

The Setup screen displays the system option:

> **Wait For 'F1' If Error**   **[Enabled]**

Available options are:

> Disabled
> Enabled

Hit 'DEL' Message Display

The "Hit DEL to run Setup" message displays when the system boots up. Disabling this option prevents the message from displaying.

The Setup screen displays the system option:

> **Hit 'DEL' Message Display**   **[Enabled]**

Available options are:

> Disabled
> Enabled

Interrupt 19 Capture

This option allows option ROMs to trap Interrupt 19.

The Setup screen displays the system option:

Interrupt 19 Capture   **[Disabled]**

Available options are:

Disabled
Enabled

**BOOT DEVICE
PRIORITY**

When you select **Boot Device Priority** from the Boot Setup Menu, a Setup screen
similar to the following displays:

```
┌────────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                              │
├────────────────────────────────────────────────────────────────────────┤
│                               |Boot|                                     │
├──────────────────────────────────────────────┬─────────────────────────┤
│  Boot Device Priority                         │  Specifies the boot     │
│  _____ │  sequence from the      │
│                                               │  available devices.     │
│  1st Boot Device          [TEAC USB FLOPPY]   │                         │
│  2nd Boot Device          [SS-CD-956E]        │                         │
│  3rd Boot Device          [PM-ST38421A]]      │                         │
│  4th Boot Device          [IBA GE Slot 0921 v1]│                        │
│  5th Boot Device          [IBA GE Slot 0920v1]│                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │  ←→    Select Screen    │
│                                               │  ↑↓    Select Item      │
│                                               │  +-    Change Option    │
│                                               │  F1    General Help     │
│                                               │  F10   Save and Exit    │
│                                               │  ESC   Exit             │
│                                               │                         │
├──────────────────────────────────────────────┴─────────────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.          │
└────────────────────────────────────────────────────────────────────────┘
```

Boot Device Priority Screen

When you display the Boot Device Priority screen, the format is similar to the sample
shown above. Highlight the option you wish to change and press **<Enter>** to display the
available settings. Select the appropriate setting and press **<Enter>** again to accept the
highlighted value.

_____

NOTE: The number of line items on this screen may vary depending on the number of
bootable devices available on your system.

_____

**BOOT DEVICE
PRIORITY OPTIONS**

1st Boot Device through 5th Boot Device

These options specify the order in which AMIBIOS attempts to boot the devices after the
POST routines complete. The setting for each boot device line item is the description of
the bootable device. The number of line items on this screen is dynamic. If new system
devices are added, the new devices are displayed at the end of the list as additional line
items.

The SHB supports bootup from a LAN device. In the sample screen above, the 4th Boot
Device and 5th Boot Device line items are boot from LAN options.

The Setup screen displays the system option(s):

Boot Device   **[xxxxxxxxx]**

where ### is the boot order and xxxxxxxxx is the description of the device.

_____

NOTE: Disabled is also available as an option if you do not want a particular device to be included in the boot sequence. Setting a device to **Disabled** will eliminate unnecessary delays during the bootup process. The boot from LAN options should always be set to **Disabled** if you are not booting from a LAN device.

_____

HARD DISK DRIVES   When you select **Hard Disk Drives** from the Boot Setup Menu, a Setup screen similar to the following displays:

```
┌─────────────────────────────────────────────────────────────────────┐
│                      BIOS SETUP UTILITY                               │
├─────────────────────────────────────────────────────────────────────┤
│                           |Boot|                                     │
├──────────────────────────────────────────┬──────────────────────────┤
│  Hard Disk Drives                        │  Specifies the boot      │
│  ─────────────────────────────────────── │  sequence from the       │
│                                          │  available devices.      │
│  1st Drive                [PM-ST38421A]  │                          │
│  2nd Drive                [PS-ST31021A]  │                          │
│                                          │                          │
│                                          │                          │
│                                          │                          │
│                                          │                          │
│                                          │  ←→    Select Screen     │
│                                          │  ↑↓    Select Item       │
│                                          │  +-    Change Option     │
│                                          │  F1    General Help      │
│                                          │  F10   Save and Exit     │
│                                          │  ESC   Exit              │
│                                          │                          │
├──────────────────────────────────────────┴──────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.        │
└─────────────────────────────────────────────────────────────────────┘
```

Hard Disk Drives Screen

When you display the Hard Disk Drives screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

_____

NOTE: The number of line items on this screen is determined by the number of hard disk drives available.

_____

HARD DISK DRIVES   The SHB supports up to four hard disk drives through a primary and secondary controller
OPTIONS   in a master/slave configuration.

1st Drive/2nd Drive

When the system boots up, it searches for all hard drives and displays the description of each disk drive it has detected.

If you have more than one hard disk drive, you may change the order in which the system will attempt to boot the available hard drives by changing these line items. The number of options displayed for each line item depends on the number of hard disk drives in your system.

Disabled is also available as an option if you do not want a particular drive to be included in the boot sequence.

The Setup screen displays the system option(s):

Drive   **[xxxxxxxxx]**

where ### is the boot order and xxxxxxxxx is the description of the hard disk drive.

REMOVABLE DRIVES

When you select **Removable Drives** from the Boot Setup Menu, a Setup screen similar to the following displays:

```
┌────────────────────────────────────────────────────────────────────┐
│                       BIOS SETUP UTILITY                            │
├────────────────────────────────────────────────────────────────────┤
│                            |Boot|                                   │
├───────────────────────────────────────────┬────────────────────────┤
│  Removable Drives                          │  Specifies the boot    │
│  ─────────────────────────────────────     │  sequence from the     │
│                                            │  available devices.    │
│  1st Drive              [TEAC USB FLOPPY]  │                        │
│                                            │                        │
│                                            │                        │
│                                            │                        │
│                                            │                        │
│                                            │                        │
│                                            │  ←→    Select Screen   │
│                                            │  ↑↓    Select Item     │
│                                            │  +-    Change Option   │
│                                            │  F1    General Help    │
│                                            │  F10   Save and Exit   │
│                                            │  ESC   Exit            │
│                                            │                        │
├────────────────────────────────────────────────────────────────────┤
│     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.        │
└────────────────────────────────────────────────────────────────────┘
```

Removable Drives Screen

When you display the Removable Drives screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

───

NOTE: The number of line items on this screen is determined by the number of removable devices available.

───

REMOVABLE DRIVES OPTIONS

The SHB supports multiple removable drives and allows you to change the boot sequence of these devices.

1st Drive/2nd Drive

When the system boots up, it searches for all removable devices and displays the description of each device it has detected.

If you have more than one removable device, you may change the order in which the system will attempt to boot the available devices by changing these line items. The number of options displayed for each line item depends on the number of removable devices in your system.

Disabled is also available as an option if you do not want a particular device to be included in the boot sequence.

The Setup screen displays the system option(s):

Drive   **[xxxxxxxxx]**

where ### is the boot order and xxxxxxxxx is the description of the removable drive.

CD/DVD DRIVES When you select **CD/DVD Drives** from the Boot Setup Menu, a Setup screen similar to the following displays:

```
┌─────────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                               │
├─────────────────────────────────────────────────────────────────────────┤
│                               |Boot|                                      │
├───────────────────────────────────────────────┬─────────────────────────┤
│ CD/DVD Drives                                  │ Specifies the boot      │
│ _____ │ sequence from the       │
│                                                │ available devices.      │
│ 1st Drive                   [SS-CD-956E/AKV]   │                         │
│                                                │                         │
│                                                │                         │
│                                                │                         │
│                                                │                         │
│                                                │                         │
│                                                │ ←→    Select Screen     │
│                                                │ ↑↓    Select Item       │
│                                                │ +-    Change Option     │
│                                                │ F1    General Help      │
│                                                │ F10   Save and Exit     │
│                                                │ ESC   Exit              │
│                                                │                         │
├────────────────────────────────────────────────┴─────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.            │
└─────────────────────────────────────────────────────────────────────────┘
```

CD/DVD Drives Screen

When you display the CD/DVD Drives screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

_____

NOTE: The number of line items on this screen is determined by the number of CDROM and DVD drives available.

_____

CD/DVD DRIVES OPTIONS The SHB supports multiple CDROM and DVD devices and allows you to change the boot sequence of these devices.

1st Drive/2nd Drive

When the system boots up, it searches for all CDROM and DVD drives and displays the description of each drive it has detected.

If you have more than one ATAPI CDROM drive, you may change the order in which the system will attempt to boot the available drives by changing these line items. The number of options displayed for each line item depends on the number of CDROM and DVD devices in your system.

Disabled is also available as an option if you do not want a particular drive to be included in the boot sequence.

The Setup screen displays the system option:

Drive   **[xxxxxxxxx]**

where ### is the boot order and xxxxxxxxx is the description of the CDROM or DVD drive.

Chapter 6   Chipset Setup

CHIPSET SETUP   When you select **Chipset** from the BIOS Setup Utility Main Menu, the following Setup
screen displays:

```
┌─────────────────────────────────────────────────────────────────────┐
│                         BIOS SETUP UTILITY                           │
├─────────────────────────────────────────────────────────────────────┤
│   Main    Advanced    PCIPnP    Boot    Security  |Chipset|   Exit   │
├──────────────────────────────────────────────────┬──────────────────┤
│ Advanced Chipset Settings                         │ Options for NB.  │
│ ───────────────────────────────────────────────   │                  │
│                                                   │                  │
│ WARNING: Setting wrong values in below sections   │                  │
│          may cause system to malfunction.         │                  │
│                                                   │                  │
│ > NorthBridge Configuration                       │                  │
│ > SouthBridge Configuration                       │                  │
│ > Intel PCI-X Hub Configuration                   │                  │
│                                                   │                  │
│                                                   │                  │
│                                                   │ ←→    Select Screen │
│                                                   │ ↑↓    Select Item   │
│                                                   │ Enter Go to Sub Screen │
│                                                   │ F1    General Help  │
│                                                   │ F10   Save and Exit │
│                                                   │ ESC   Exit          │
│                                                   │                  │
│                                                   │                  │
├───────────────────────────────────────────────────┴─────────────────┤
│        vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.      │
└─────────────────────────────────────────────────────────────────────┘
```

Chipset Setup Screen

When you display the Chipset Setup screen, the format is similar to the sample shown
above, allowing you to continue to subscreens designed to change parameters for each of
the Chipset Setup options. Highlight the option you wish to change and press **<Enter>**
to proceed to the appropriate subscreen.
_____

NOTE: The values on the Chipset Setup subscreen do not necessarily reflect the values
appropriate for your SHB. Refer to the explanations following the screen for specific
instructions about entering correct information.
_____

CHIPSET SETUP   _____
OPTIONS
NOTE: Do *not* change the values for any Chipset Setup option unless you understand
the impact on system operation. Depending on your system configuration, selection of
other values may cause unreliable system operation.
_____

NorthBridge Configuration

The options on the **NorthBridge Configuration** subscreen allow you to set up or modify parameters to configure the Intel® NorthBridge chip. The following options may be modified:

- Memory Remap Feature
- Memory Mirroring/Sparing
- DMA Controller

SouthBridge Configuration

The option on the **SouthBridge Configuration** subscreen allows you to set up or modify parameters to configure the Intel® SouthBridge chip. The following option may be modified:

- Restore on AC Power Loss

Intel PCI-X Hub Configuration

The **Intel PCI-X Hub Configuration** subscreen allows you to set up or modify the following options:

- PCI Bus Frequency
- I/O Port Decode
- RAS Sticky Error Handling
- VGA 16-Bit Decode

Saving and Exiting

When you have made all desired changes to **Chipset** Setup, you may make changes to other Setup options by using the right and left arrow keys to access other menus. When you have made all of your changes, you may save them by selecting the **Exit** menu, or you may press **<Esc>** at any time to exit the BIOS Setup Utility without saving the changes.

NORTHBRIDGE CONFIGURATION

When you select **NorthBridge Configuration** from the Chipset Setup Screen, the following Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────────┐
│                        BIOS SETUP UTILITY                              │
│                                                                        │
│                                                      |Chipset|         │
├────────────────────────────────────────────────┬─────────────────────┤
│ NorthBridge Chipset Configuration              │ ENABLE: Allow        │
│ _____ │ remapping of         │
│                                                │ overlapped PCI memory │
│ Memory Remap Feature          [Enabled]        │ above the total      │
│ Memory Mirroring/Sparing      [Disabled]       │ physical memory.     │
│ DMA Controller                [Disabled]       │                      │
│                                                │ DISABLE: Do not allow │
│                                                │ remapping of memory.  │
│                                                │                      │
│                                                │                      │
│                                                │                      │
│                                                │ ←→    Select Screen   │
│                                                │ ↑↓    Select Item     │
│                                                │ +-    Change Option   │
│                                                │ F1    General Help    │
│                                                │ F10   Save and Exit   │
│                                                │ ESC   Exit            │
│                                                │                      │
├────────────────────────────────────────────────┴─────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.          │
└──────────────────────────────────────────────────────────────────────┘
```

NorthBridge Configuration Screen

When you display the NorthBridge Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

NORTHBRIDGE CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run Chipset Setup. Once values have been defined, they display each time Chipset Setup is run.

Memory Remap Feature

This option allows the remapping of overlapped PCI memory above the total physical memory.

The Setup screen displays the system option:

> **Memory Remap Feature   [Enabled]**

Available options are:

> Disabled
> Enabled

Memory Mirroring/Sparing

This option allows you to enable the memory RAS feature. The **Mirroring** and **Sparing** options are available only if the memory configuration supports these features.

The Setup screen displays the system option:

Memory Mirroring/Sparing   [Disabled]

Available options are:

Disabled
Mirroring
Sparing

DMA Controller

This option enables or disables the DMA controller.

The Setup screen displays the system option:

DMA Controller   [Disabled]

Available options are:

Disabled
Enabled

SOUTHBRIDGE CONFIGURATION

When you select **SouthBridge Configuration** from the Chipset Setup Screen, the following Setup screen displays:

```
┌─────────────────────────────────────────────────────────────────────┐
│                       BIOS SETUP UTILITY                              │
├─────────────────────────────────────────────────┬───────────────────┤
│                                                  │      |Chipset|     │
├─────────────────────────────────────────────────┼───────────────────┤
│ SouthBridge Chipset Configuration                │ Specifies the state│
│ _____ │ the system should  │
│                                                  │ return to when power│
│ Restore on AC Power Loss        [Last State]     │ is restored after AC│
│                                                  │ power loss.        │
│                                                  │                    │
│                                                  │                    │
│                                                  │                    │
│                                                  │                    │
│                                                  │                    │
│                                                  │ ←→    Select Screen │
│                                                  │ ↑↓    Select Item   │
│                                                  │ +-    Change Option │
│                                                  │ F1    General Help  │
│                                                  │ F10   Save and Exit │
│                                                  │ ESC   Exit          │
│                                                  │                    │
├──────────────────────────────────────────────────────────────────────┤
│      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.         │
└──────────────────────────────────────────────────────────────────────┘
```

SouthBridge Configuration Screen

When you display the SouthBridge Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

SOUTHBRIDGE CONFIGURATION OPTION

The description for the system option listed below shows the value as it appears if you have not yet run Chipset Setup. Once a value has been defined, it displays each time Chipset Setup is run.

Restore on AC Power Loss

This option specifies the state the system should return to when power is restored after AC power loss.

The Setup screen displays the system option:

> **Restore on AC Power Loss   [Last State]**

Available options are:

> Power Off
> Power On
> Last State

This page intentionally left blank.

INTEL PCI-X HUB CONFIGURATION

When you select **Intel PCI-X Hub Configuration** from the Chipset Setup Screen, the following Setup screen displays:

```
┌──────────────────────────────────────────────────────────────────────────┐
│                          BIOS SETUP UTILITY                                │
├──────────────────────────────────────────────────┬───────────────────────┤
│                                          |Chipset|│                       │
├──────────────────────────────────────────────────┼───────────────────────┤
│  Configure Advanced Settings for PCI-X Hub        │  This question will   │
│  _____ │  allow you to select the│
│                                                    │  maximum PCI bus speed │
│  PCI Bus Frequency            [Auto]               │  to be programmed.    │
│  I/O Port Decode              [4K Decode]          │  Default will always  │
│  RAS Sticky Error Handling    [Clear Errors]       │  be set to AUTO where │
│  VGA 16-Bit Decode            [Enabled]            │  bus speed will be    │
│                                                    │  decided based on the │
│                                                    │  capabilities of the  │
│                                                    │  device on that bus.  │
│                                                    │                       │
│                                                    │  ←→    Select Screen  │
│                                                    │  ↑↓    Select Item    │
│                                                    │  +-    Change Option  │
│                                                    │  F1    General Help   │
│                                                    │  F10   Save and Exit  │
│                                                    │  ESC   Exit           │
│                                                    │                       │
├──────────────────────────────────────────────────┴───────────────────────┤
│     vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.               │
└──────────────────────────────────────────────────────────────────────────┘
```

Intel PCI-X Hub Configuration Screen

When you display the Intel PCI-X Hub Configuration screen, the format is similar to the sample shown above. Highlight the option you wish to change and press **<Enter>** to display the available settings. Select the appropriate setting and press **<Enter>** again to accept the highlighted value.

INTEL PCI-X HUB CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run Chipset Setup. Once values have been defined, they display each time Chipset Setup is run.

PCI Bus Frequency

This option allows you to select the maximum PCI bus speed to be programmed. If set to **Auto**, bus speed will be decided based on the capabilities of the device on the bus.

The Setup screen displays the system option:

> **PCI Bus Frequency**   **[Auto]**

Available options are:

Auto
33 Mhz PCI
66 Mhz PCI
66 Mhz PCI-X M1
100 Mhz PCI-X M1
133 Mhz PCI-X M1
66 Mhz PCI-X M2
100 Mhz PCI-X M2
133 Mhz PCI-X M2

I/O Port Decode

This option allows you to select the decode range for I/O.

The Setup screen displays the system option:

I/O Port Decode   **[4K Decode]**

Available options are:

4K Decode
1K Decode

RAS Sticky Error Handling

This option allows you to select the method of handling for Sticky RAS errors.

The Setup screen displays the system option:

RAS Sticky Error Handling   **[Clear Errors]**

Available options are:

Clear Errors
Leave Errors

VGA 16-Bit Decode

This option allows you to enable or disable decoding of the VGA for devices behind PXH.

The Setup screen displays the system option:

VGA 16-Bit Decode   **[Disabled]**

Available options are:

Disabled
Enabled

Appendix A   BIOS Messages

BIOS BEEP CODES   Errors may occur during the POST (Power-On Self Test) routines which are performed each time the system is powered on.

Non-fatal errors are those which, in most cases, allow the system to continue the bootup process. The error message normally appears on the screen. See *BIOS Error Messages* later in this section for descriptions of these messages.

Fatal errors are those which will not allow the system to continue the bootup procedure.

These fatal errors are usually communicated through a series of audible beeps. Each error message has its own specific beep code, defined by the number of beeps following the error detection. The following table lists the errors which are communicated audibly.

Beep Count	Description
1	Memory refresh timer error
2	Parity Error
3	Main memory read/write test error
4	Timer not operational
5	Processor error
6	Keyboard controller BAT test error
7	General exception error
8	Display memory error
9	ROM checksum error
10	CMOS shutdown register read/write error
11	Cache memory bad

BIOS BEEP CODE TROUBLESHOOTING

Beep Count	Troubleshooting Action
1, 2 or 3	Reseat the memory or replace with known good modules.
4-7, 9-11	Fatal error. Perform the following steps before calling Technical Support.
	Remove all expansion cards and try to reboot. If the beep code is still generated, call Technical Support. If the beep code is not generated, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem recurs. This will indicate the malfunctioning card.
8	The board may be faulty. Call Technical Support.

BIOS ERROR MESSAGES

If a non-fatal error occurs during the POST routines performed each time the system is powered on, the error message will appear on the screen in the following format:

> ERROR Message Line 1
> ERROR Message Line 2
> Press F1 to Resume

Note the error message and press the **<F1>** key to continue with the bootup procedure.

_____

NOTE: If the **Wait for 'F1' If Any Error** option in the Advanced Setup portion of the BIOS Setup Program has been set to **Disabled**, the "Press F1 to Resume" prompt will not appear on the last line. The bootup procedure will continue without waiting for operator response.

_____

For most of the error messages, there is no ERROR Message Line 2. Generally, for those messages containing an ERROR Message Line 2, the text will be "RUN SETUP UTILITY." Pressing the **<F1>** key will invoke the BIOS Setup Utility.

A description of each error message appears below.

MEMORY ERRORS

Message	Description
Gate20 Error	The BIOS is unable to properly control the SBC's Gate A20 function, which controls access to memory over 1MB. This may indicate a problem with the board.
Multi-Bit ECC Error	This message only occurs on systems using ECC enabled memory modules. ECC memory has the ability to correct single-bit errors that may occur from faulty memory modules. A multiple bit corruption of memory has occurred, and the ECC memory algorithm cannot correct it. This may indicate a defective memory module.
Parity Error	Fatal memory parity error. System halts after displaying this message.

BOOT ERRORS

Message	Description
Boot Failure ...	This is a generic message indicating the BIOS could not boot from a particular device. This message is usually followed by other information concerning the device.
Invalid Boot Diskette	A diskette was found in the drive, but it is not configured as a bootable diskette.
Drive Not Ready	The BIOS was unable to access the drive because it indicated it was not ready for data transfer. This is often reported by drives when no media is present.

BIOS ERROR MESSAGES (CONTINUED)

BOOT ERRORS (continued)

Message	Description
A: Drive Error	The BIOS attempted to configure the A: drive during POST, but was unable to properly configure the device. This may be due to a bad cable or faulty diskette drive.
B: Drive Error	The BIOS attempted to configure the B: drive during POST, but was unable to properly configure the device. This may be due to a bad cable or faulty diskette drive.
Insert BOOT diskette in A:	The BIOS attempted to boot from the A: drive, but could not find a proper boot diskette.
Reboot and Select proper Boot device or Insert Boot Media in selected Boot device	BIOS could not find a bootable device in the system and/or removable media drive does not contain media.
NO ROM BASIC	This message occurs on some systems when no bootable device can be detected.

STORAGE DEVICE ERRORS

Message	Description
The following errors are typically displayed when the BIOS is trying to detect and configure IDE/ATAPI devices in POST.	
XXXXXX Hard Disk Error XXXXXX - ATAPI Incompatible	Messages in this format indicate that the specified device could not be properly initialized by the BIOS. Possible message are: Primary Master Hard Disk Error Primary Slave Hard Disk Error Secondary Master Hard Disk Error Secondary Slave Hard Disk Error Primary Master Drive - ATAPI Incompatible Primary Slave Drive - ATAPI Incompatible Secondary Master Drive - ATAPI Incompatible Secondary Slave Drive - ATAPI Incompatible
The following messages can be reported by an ATAPI device using the S.M.A.R.T. error reporting standard. The S.M.A.R.T. failure message may indicate the need to replace the hard disk.	
S.M.A.R.T. Capable but Command Failed	The BIOS tried to send a S.M.A.R.T. message to a hard disk, but the command transaction failed.
S.M.A.R.T. Command Failed	The BIOS tried to send a S.M.A.R.T. message to a hard disk, but the command transaction failed.
S.M.A.R.T. Status BAD, Backup and Replace	A S.M.A.R.T. capable hard disk sends this message when it detects an imminent failure.
S.M.A.R.T. Capable and Status BAD	A S.M.A.R.T. capable hard disk sends this message when it detects an imminent failure.

BIOS ERROR MESSAGES (CONTINUED)

VIRUS RELATED ERRORS

Message	Description
The following messages only display if Virus Detection is enabled in the BIOS Setup Utility.	
BootSector Write !!	The BIOS has detected software attempting to write to a drive's boot sector. This is flagged as possible virus activity.
VIRUS: Continue (Y/N)?	The BIOS has detected possible virus activity.

SYSTEM CONFIGURATION ERRORS

Message	Description
DMA-2 Error	Error initializing secondary DMA controller. This is a fatal error, often indicating a problem with system hardware.
DMA Controller Error	POST error while trying to initialize the DMA controller. This is a fatal error, often indicating a problem with system hardware.
Checking NVRAM..Update Failed	BIOS could not write to the NVRAM block. This message appears when the FLASH part is write-protected or if there is no FLASH part (system uses a PROM or EPROM).
Microcode Error	BIOS could not find or load the CPU Microcode Update to the processor. This message only applies to Intel processors. The message is most likely to appear when a brand new processor is installed in an SBC with an outdated BIOS. In this case, the BIOS must be updated to include the Microcode Update for the new processor.
NVRAM Checksum Bad, NVRAM Cleared	There was an error while validating the NVRAM data. This causes POST to clear the NVRAM data.
Resource Conflict	More than one system device is trying to use the same non-shareable resources (memory or I/O).
NVRAM Ignored	The NVRAM data used to store Plug and Play (PnP) data was not used for system configuration in POST.
NVRAM Bad	The NVRAM data used to store Plug and Play (PnP) data was not used for system configuration in POST due to a data error.
Static Resource Conflict	Two or more static devices are trying to use the same resource space (usually memory or I/O).
PCI I/O Conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI ROM Conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI IRQ Conflict	A PCI adapter generated an I/O resource conflict when configured by BIOS POST.
PCI IRQ Routing Table Error	BIOS POST (DIM code) found a PCI device in the system but was unable to figure out how to route an IRQ to the device. Usually this error is caused by an incomplete description of the PCI Interrupt Routine of the system.

BIOS ERROR MESSAGES (CONTINUED)

SYSTEM CONFIGURATION ERRORS (continued)

Message	Description
Timer Error	Indicates an error while programming the count register of channel 2 of the 8254 timer. This may indicate a problem with system hardware.
Interrupt Controller-1 Error	BIOS POST could not initialize the Master Interrupt Controller. This may indicate a problem with system hardware.
Interrupt Controller-2 Error	BIOS POST could not initialize the Slave Interrupt Controller. This may indicate a problem with system hardware.

CMOS ERRORS

Message	Description
CMOS Date/Time Not Set	The CMOS Date and/or Time are invalid. This error can be resolved by readjusting the system time in the BIOS Setup Utility.
CMOS Battery Low	CMOS Battery is low. This message usually indicates that the CMOS battery needs to be replaced. It could also appear when the user intentionally discharges the CMOS battery.
CMOS Settings Wrong	CMOS settings are invalid. This error can be resolved by using the BIOS Setup Utility.
CMOS Checksum Bad	CMOS contents failed the Checksum check. Indicates that the CMOS data has been changed by a program other than the BIOS or that the CMOS is not retaining its data due to malfunction. This error can typically be resolved by using the BIOS Setup Utility.

MISCELLANEOUS ERRORS

Message	Description
Keyboard Error	Keyboard is not present or the hardware is not responding when the keyboard controller is initialized.
Keyboard/Interface Error	Keyboard Controller failure. This may indicate a problem with system hardware.
System Halted	The system has been halted. A reset or power cycle is required to reboot the machine. This message appears after a fatal error has been detected.

BOOTBLOCK INITIALIZATION CODE CHECKPOINTS

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of check-points that may occur during the Bootblock initialization portion of the BIOS:

Check-point	Description
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D1	Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
D0	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum.
D2	Disable cache before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.
D3	If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Reenable cache. Verify that flat mode is enabled.
D4	Test base 512K memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. See the *Bootblock Recovery Code Checkpoints* section of this appendix for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copy Main BIOS into memory. Leave all RAM below 1MB Read/Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (Execute POSTKernel). See the *POST Code Checkpoints* section of this appendix for more information.

BOOTBLOCK RECOVERY CODE CHECKPOINTS

The Bootblock recovery code gets control when the BIOS determines that a BIOS recovery needs to occur because the user has forced the update or the BIOS checksum is corrupt. The following table describes the type of checkpoints that may occur during the Bootblock recovery portion of the BIOS:

Check-point	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
E9 or EA	Determine information about root directory of recovery media.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

**POST CODE
CHECKPOINTS**

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Check-point	Description
03	Disable NMI, parity, video for EGA and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialize CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initialize data variables that are based on CMOS setup questions. Initialize both the 8259 compatible PICs in the system.
05	Initialize the interrupt controlling hardware (generally OPIC) and interrupt vector table.
06	Do read/write test to CH-2 count register. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initialize the processor. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after auto detection of keyboard/mouse using AMI KB-5.
0A	Initialize the 8042 compatible keyboard controller.
0B	Detect the presence of PS/2 mouse.
0C	Detect the presence of keyboard in KBC port.
0E	Testing and initialization of different input devices. Also, update the Kernel variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo and silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initialize different devices through DIM. See *DIM Code Checkpoints* section of this appendix for more information.
2C	Initialize different devices. Detects and initializes the video adapter installed in the system.
2E	Initialize all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initialize the silent boot module. Set the window for displaying text information.
37	Display sign-on message, processor information, setup key message and any OEM specific information.

POST CODE CHECKPOINTS (CONTINUED)

Check-point	Description
38	Initialize different devices through DIM. See *DIM Code Checkpoints* section of this appendix for more information.
39	Initialize DMAC-1 and DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (parallel ports, serial ports and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc.
50	Program the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initialize NUM-LOCK status and program the keyboard Typematic rate.
75	Initialize INT13 and prepare for IPL detection.
78	Initialize IPL devices controlled by BIOS and option ROMs.
7A	Initialize remaining option ROMs.
7C	Generate and write contents of ESCD in NVRAM.
84	Log errors encountered during POST.
85	Display errors to the user and get the user response for error.
87	Execute BIOS setup if needed/requested.
8C	Late POST initialization of chipset registers.
8E	Program the peripheral parameters. Enable/disable NMI as selected.
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Take care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initialize the Microsoft IRQ Routing Table. Prepare the runtime language module. Disable the system configuration display if needed.
A4	Initialize runtime language module.

POST CODE CHECKPOINTS (CONTINUED)

Check-point	Description
A7	Display system configuration screen if enabled. Initialize the processor before boot, which includes the programming of the MTRRs.
A8	Prepare processor for OS boot, including final MTRR values.
A9	Wait for user input at configuration display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitialize the ADM module.
AB	Prepare BBS for INT19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Pass control to OS Loader (typically INT19h)

DIM CODE CHECKPOINTS

The Device Initialization Manager module gets control at various times during BIOS POST to initialize different buses. The following table describes the main checkpoints where the DIM module is accessed:

Check-point	Description
2A	Initialize different buses and perform the following functions: Reset, Detect and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices and PnP ISA cards. It also assigns PCI Bus numbers. Function 1 initializes all static devices, which include manually configured on-board peripherals, memory and I/O decode windows in PCI-to-PCI bridges and non-compliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI or AGP video drivers.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all on-board peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.

**ADDITIONAL
CHECKPOINTS**

While control is in the different functions, additional checkpoints are output to Port 80H as word values to identify the routines being executed.

The low byte value indicates the main POST Code Checkpoint. The high byte is divided into two nibbles and contains two sets of information. The details of the high byte of these checkpoints are detailed in the following table:

HIGH BYTE XY

The upper nibble 'X' indicates the function number that is being executed. 'X' can be from 0 to 7.

0	Function 0. Disable all devices on the bus.
1	Function 1. Initialize static devices on the bus.
2	Function 2. Initialize output devices on the bus.
3	Function 3. Initialize input devices on the bus.
4	Function 4. Initialize IPL devices on the bus.
5	Function 5. Initialize general devices on the bus.
6	Function 6. Error reporting for the bus.
7	Function 7. Initialize add-on ROMs for all buses.
8	Function 8. Initialize BBS ROMs for all buses.

The lower nibble 'Y' indicates the bus on which the different routines are being executed. 'Y' can be from 0 to 5.

0	Generic DIM (Device Initialization Manager)
1	On-board system devices
2	ISA devices
3	EISA devices
4	ISA PnP devices
5	PCI devices

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