CP16

6137-xxx

No. 87-006140-000 Revision B

TECHNICAL REFERENCE

Intel® Pentium® M

PROCESSOR-BASED

SBC

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Return company address and contact
Model name and model # from the label on the back of the board
Serial number from the label on the back of the board
Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report for each board and return the product(s) to our Utica, NY facility:

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1001 Broad Street
Utica, NY 13501
Attn: Repair Department

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HANDLING PRECAUTIONS

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

To protect your single board computer (SBC) from electrostatic damage, be sure to observe the following precautions when handling or storing the board:

- Keep the SBC in its static-shielded bag until you are ready to perform your installation.
- Handle the SBC by its edges.
- Do not touch the I/O connector pins. Do not apply pressure or attach labels to the SBC.
- 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 SBC 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 CP16 (6137-xxx) SBC. Overall system performance may be affected by incorrect usage of these features.

MOUSE/KEYBOARD "Y" CABLE

When you are using an RTM25 Rear I/O Transition Module (6142-xxx) in conjunction with the CP16 SBC, be sure to use Trenton's "Y" cable, part number 5886-000, if you require a mouse/keyboard connection to the bracket mounted mouse/keyboard mini DIN. Using a non-Trenton cable may result in improper SBC operation.

DDR MEMORY

The memory module used in the CP16 may be either PC1600 or PC2100; size can range from 128MB to 2GB.

The DIMM must have the following features:

- 184-pin with gold-plated contacts
- ECC (72-bit) memory
- Registered configuration
- x4 or x8 construction
- Non-stacked (NS)

NOTE: Trenton recommends using a *non-stacked* DIMM in order to avoid potential physical interference on the SBC which may occur when using stacked memory.

IPMI SUPPORT

Intelligent Platform Management Interface (IPMI) support is an optional feature of the CP16. *Appendix B* of the *CP16 Technical Reference Manual* (#87-006140-000) details IPMI support on the CP16, along with installation procedures for American Megatrends' Unified Management Server (UMS) software.

COMPACTFLASH/ DRIVE POWER JUMPER

The P11A connector of the CP16 can be used for a Compact Media Daughter Card (CMDC), a Hard Drive Adapter Kit (HDAK) or a conventional IDE drive. The optional CMDC (Trenton part number 6245-000) provides support for either a CompactFlash™ or Microdrive® storage device. The optional HDAK (Trenton part number 6303-000) provides support for a laptop IDE hard drive.

The CompactFlash/Drive Power jumper (JU22) determines the voltage supplied to the device connected to connector P11A. The factory setting for this jumper is on the LEFT to supply +5 volts. If this is not the correct setting for your system, change the setting as required:

- Install on the LEFT to supply +5 volts to the CMDC or HDAK. (default)
- Install on the RIGHT to supply +3.3 volts to the CMDC.
- Remove to use a conventional IDE drive.

NOTE: "LEFT" and "RIGHT" are defined with the bracket end of the board to the left, the edge connectors to the right.

BOOT FROM LAN

The CP16 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.

POWER REQUIREMENTS

The following are typical values:

Processor Speed	+5V *	+12V **	+3.3V *	-12V *
1.8GHz *	6.25 Amps	0.20 Amps	4.10 Amps	< 100 mAmps
1.8GHz **	4.03 Amps	0.20 Amps	5.96 Amps	< 100 mAmps
1.6GHz *	6.20 Amps	0.20 Amps	3.99 Amps	< 100 mAmps
1.6GHz **	4.00 Amps	0.20 Amps	5.80 Amps	< 100 mAmps

* +5V (I/O) configured backplane
** +3.3V (I/O) configured backplane

Tolerance for all voltages is +/- 5%

FOR MORE INFORMATION

For more information on any of these features, refer to the appropriate sections of the *CP16 Technical Reference Manual* (#87-006140-000). The latest revision of this manual may be found on Trenton's website - www.TrentonTechnology.com.

Chapter 1 Specifications

INTRODUCTION

The CP16 is a full-featured CompactPCI® single board computer (SBC) which features an Intel® Pentium® M microprocessor, Intel® E7501 chipset, 400MHz system and memory buses, ATI Technologies® video interface, support for 2GB DDR memory, PCI Local Bus, cache memory, dual Gigabit Ethernet interfaces, a serial port and dual USB ports on a single CompactPCI card. The SBC is a 6U, single-slot CompactPCI SBC designed to fit a wide variety of applications.

The CP16 is used with a Rear I/O Transition Module (RTM), which provides a floppy controller, dual EIDE (Ultra ATA/100) interfaces, speaker port and rear I/O support including a video port, a serial port, dual USB ports, mouse/keyboard port and optional dual Ultra320 SCSI interfaces. (See *Appendix C - RTM25 Rear I/O Transition Module*.)

The CP16-NJ models have all of the standard features of the CP16, except they do not provide J4 I/O capability. These SBCs may be used as drone modules in non-system board slots in CompactPCI backplanes configured for H.110 applications.

Intelligent Platform Management Interface (IPMI) support is an optional feature of the CP16. The CP16-NI and CP16-NJI models have all of the standard features of the CP16 and CP16-NJ models, except they do not have IPMI capability.

MODELS

Model #	Model Name	Speed
Models with IPMI:		
Intel® Pentium® M Processor - 400MHz FSB/2MB cache:		
6137-208-xM	CP16/2.0C2	2.0GHz
6137-206-xM	CP16/1.8	1.8GHz
6137-205-xM	CP16/1.7C2	1.7GHz
6137-204-xM	CP16/1.6C2	1.6GHz
6137-203-xM	CP16/1.5C2	1.5GHz
Intel® Pentium® M Processor - 400MHz FSB/1MB cache:		
6137-005-xM	CP16/1.7	1.7GHz
6137-004-xM	CP16/1.6	1.6GHz
6137-003-xM	CP16/1.5	1.5GHz
6137-002-xM	CP16/1.4	1.4GHz
6137-001-xM	CP16/1.3	1.3GHz
Models without IPMI:		
Intel® Pentium® M Processor - 400MHz FSB/2MB cache:		
6137-708-xM	CP16/2.0C2-NI	2.0GHz
6137-706-xM	CP16/1.8-NI	1.8GHz
6137-705-xM	CP16/1.7C2-NI	1.7GHz
6137-704-xM	CP16/1.6C2-NI	1.6GHz
6137-703-xM	CP16/1.5C2-NI	1.5GHz

MODELS (CONTINUED)

Model #	Model Name	Speed
Models without IPMI (continued):		
Intel® Pentium® M Processor - 400MHz FSB/1MB cache:		
6137-505-xM	CP16/1.7-NI	1.7GHz
6137-504-xM	CP16/1.6-NI	1.6GHz
6137-503-xM	CP16/1.5-NI	1.5GHz
6137-502-xM	CP16/1.4-NI	1.4GHz
6137-501-xM	CP16/1.3-NI	1.3GHz

The following models have all of the standard features of the CP16, except they do not provide J4 I/O capability.

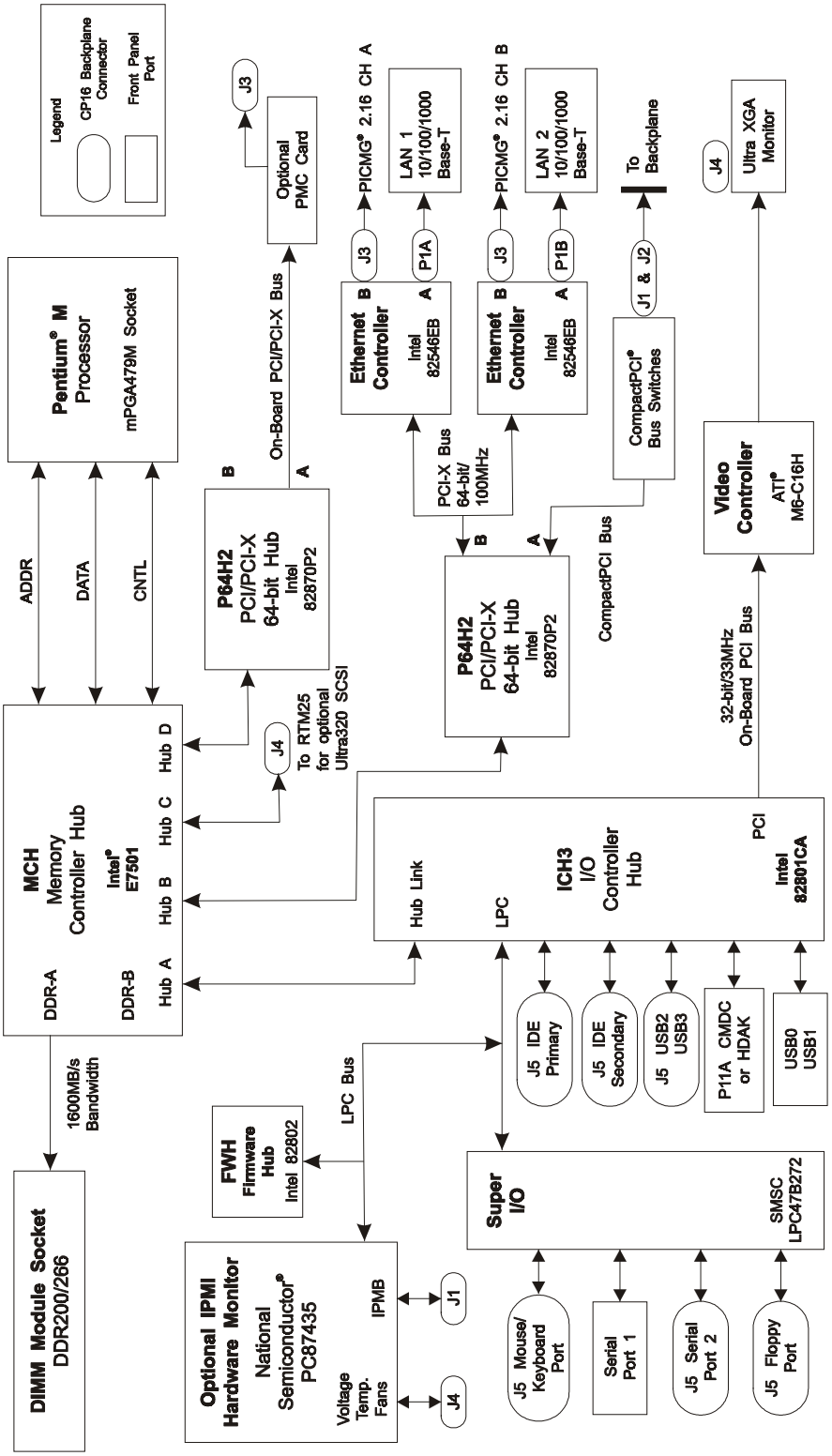
Model #	Model Name	Speed
"No J4" Models with IPMI:		
Intel® Pentium® M Processor - 400MHz FSB/2MB cache:		
6137-248-xM	CP16/2.0C2-NJ	2.0GHz
6137-246-xM	CP16/1.8-NJ	1.8GHz
6137-245-xM	CP16/1.7C2-NJ	1.7GHz
6137-244-xM	CP16/1.6C2-NJ	1.6GHz
6137-243-xM	CP16/1.5C2-NJ	1.5GHz
Intel® Pentium® M Processor - 400MHz FSB/1MB cache:		
6137-045-xM	CP16/1.7-NJ	1.7GHz
6137-044-xM	CP16/1.6-NJ	1.6GHz
6137-043-xM	CP16/1.5-NJ	1.5GHz
6137-042-xM	CP16/1.4-NJ	1.4GHz
6137-041-xM	CP16/1.3-NJ	1.3GHz
"No J4" Models without IPMI:		
Intel® Pentium® M Processor - 400MHz FSB/2MB cache:		
6137-748-xM	CP16/2.0C2-NJI	2.0GHz
6137-746-xM	CP16/1.8-NJI	1.8GHz
6137-745-xM	CP16/1.7C2-NJI	1.7GHz
6137-744-xM	CP16/1.6C2-NJI	1.6GHz
6137-743-xM	CP16/1.5C2-NJI	1.5GHz
Intel® Pentium® M Processor - 400MHz FSB/1MB cache:		
6137-545-xM	CP16/1.7-NJI	1.7GHz
6137-544-xM	CP16/1.6-NJI	1.6GHz
6137-543-xM	CP16/1.5-NJI	1.5GHz
6137-542-xM	CP16/1.4-NJI	1.4GHz
6137-541-xM	CP16/1.3-NJI	1.3GHz

where xM indicates memory size (0M = 0MB memory, 128M = 128MB memory, etc.)

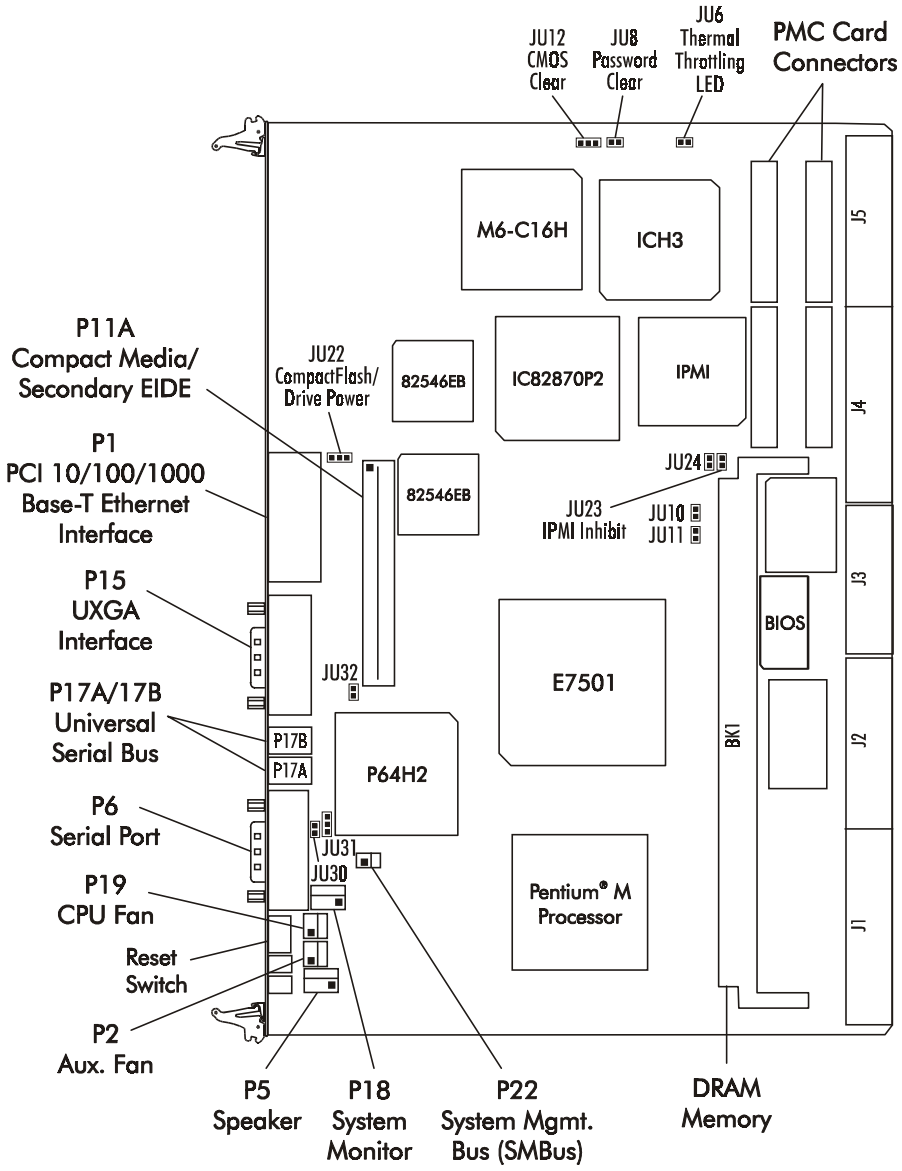
FEATURES

- Intel® Pentium® M microprocessor
  - 2.0GHz, 1.8GHz, 1.7GHz, 1.6GHz or 1.5GHz with 2MB cache and a 400MHz Front Side Bus
  - 1.7GHz, 1.6GHz, 1.5GHz, 1.4GHz or 1.3GHz with 1MB cache and a 400MHz Front Side Bus
- Intel® E7501 chipset with 400MHz system bus
- CompactPCI Bus operating in 64-bit/66MHz, 64-bit/33MHz, 32-bit/66MHz or 32-bit/33MHz mode
- PCI Local Bus operating in 64-bit/66MHz, 64-bit/33MHz, 32-bit/66MHz or 32-bit/33MHz mode
- PCI-X Bus (on-board only) operating in 64-bit/100MHz mode
- Compatible with PCI Industrial Computer Manufacturers Group (PICMG®) CompactPCI Specification
- Ultra XGA on-board video interface (ATI Technologies)
- Dual PCI Ethernet 10/100/1000Base-T interfaces
- Memory error checking and correction (ECC) support
- Supports up to 2GB of Double Data Rate (DDR) on-board memory
- Floppy drive and dual PCI EIDE Ultra ATA/100 disk drive connectivity via the optional Rear I/O Transition Module (RTM)
- Two high-speed serial ports: one on the front panel, one on the optional RTM
- Universal Serial Bus (USB) support
- Automatic or manual peripheral configuration
- Watchdog timer
- Dual Ultra320 SCSI via the optional RTM
- Supports Compact Flash™ or Microdrive® via an optional Compact Media Daughter Card (CMDC)

SBC BLOCK DIAGRAM



SBC BOARD LAYOUT



PROCESSOR

- Intel® Pentium® M microprocessor
  - 2.0GHz, 1.8GHz, 1.7GHz, 1.6GHz or 1.5GHz with 2MB cache and a 400MHz Front Side Bus
  - 1.7GHz, 1.6GHz, 1.5GHz, 1.4GHz or 1.3GHz with 1MB cache and a 400MHz Front Side Bus
- Processor uses the Micro-FCPGA packaging

BUS INTERFACES CompactPCI Bus compatible

DATA PATH

DDR Memory - 64-bit

PCI Local Bus - 32-bit or 64-bit

PCI-X Bus - 64-bit

CompactPCI Bus - 32-bit or 64-bit

Video - 32-bit

BUS SPEED - PCI PCI - 33MHz or 66MHz
PCI-X - 66MHz, 100MHz or 133MHz

BUS SPEED - COMPACTPCI 33MHz or 66MHz

BUS SPEED - SYSTEM 400MHz Front Side Bus

MECHANICAL DIMENSIONS 6U CompactPCI board - 233.35 mm x 160 mm
Single-slot - 4HP - 20.32 mm wide

MEMORY INTERFACE Double Data Rate (DDR) memory for 1600MB/s memory bandwidth

SYSTEM BUS The Intel E7501 chipset supports the system bus at 400MHz, which provides a higher bandwidth path for transferring data between main memory/chipset and the processor.

DMA CHANNELS The SBC is fully PC compatible with seven DMA channels, each supporting type F transfers.

INTERRUPTS The SBC is fully PC compatible with interrupt steering for PCI plug and play compatibility.

BIOS (FLASH) The BIOS is an AMIBIOS and with built-in advanced CMOS setup for system parameters, peripheral management for configuring on-board peripherals, PCI-to-PCI bridge support and PCI interrupt steering. The Flash BIOS resides in the Intel 82802 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 processor includes integrated on-die, 1MB or 2MB 8-way set associative level two (L2) cache, which implements the Advanced Transfer Cache architecture. The processor also includes a 32K level one (L1) instruction cache and a 32K write-back data cache. These cache arrays run at the full speed of the processor core.

DDR MEMORY

The Double Data Rate (DDR) memory interface consists of a single channel which terminates in a dual in-line memory module (DIMM) socket and supports auto detection of up to 2GB of memory. The System BIOS automatically detects memory type, size and speed.

The SBC uses an industry standard 72-bit wide gold finger PC1600 or PC2100 memory module in a 184-pin socket.

NOTE: The memory module may be either PC1600 or PC2100; size can range from 128MB to 2GB. Because the memory interface consists of a single channel, the SBC has a maximum memory bandwidth of 1600MB/s. The memory module must have gold contacts.

The SBC supports DIMMs which are PC1600/PC2100 compliant and have the following features:

- 184-pin with gold-plated contacts
- ECC (72-bit) memory
- Registered configuration
- x4 or x8 construction
- Non-stacked (NS)

NOTE: Trenton recommends using a *non-stacked* DIMM module in order to avoid potential physical interference on the SBC which may occur when using stacked memory.

The following DIMM sizes are supported:

DIMM Size	DIMM Type	ECC	Component Construction
128MB	Registered	16M x 72	x4, x8, NS
256MB	Registered	32M x 72	x4, x8, NS
512MB	Registered	64M x 72	x4, x8, NS
1GB	Registered	128M x 72	x4, x8, NS
2GB	Registered	256M x 72	x4, x8, NS

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.

PCI/PCI-X Bus Interfaces

The SBC is fully compliant with the PCI Local Bus 2.1 Specification. The SBC supports four independent PCI/PCI-X Bus interfaces.

The Primary PCI Bus interface is 32 bits wide and runs at 33MHz. This bus supports the video interface.

The PCI/PCI-X Bus interface which drives the local PMC slot can support 32-bit/64-bit PCI architectures operating at 33MHz or 66MHz and PCI-X 64-bit architectures operating at 66MHz, 100MHz or 133MHz. It provides connectivity for PMC option cards via an access slot in the SBC's front panel.

The on-board PCI-X Bus interface which supports the SBC's dual 10/100/1000Base-T controllers is 64 bits wide and runs at 100MHz. It provides full-speed Gigabit Ethernet functionality to the LAN ports and backplane connector J3. The interface to the backplane is compliant with the PICMG CompactPCI® Packet Switching Backplane Specification 2.16.

An additional PCI Bus interface is routed off-board through CompactPCI bus switches to drive PICMG compliant CompactPCI passive backplanes. It supports 32-bit/64-bit CompactPCI bus communication at 33MHz or 66MHz. See the *CompactPCI Bus* section below for further details.

CompactPCI Bus

The CompactPCI Bus interface to the backplane is compliant with the CompactPCI® 2.0 Core Specification. It supports 32-bit/64-bit CompactPCI bus communication at 33MHz or 66MHz. The CompactPCI bus switches automatically sense the presence of the CompactPCI bus and turn off the module's CompactPCI bus connection if a bus is not sensed. When the CP16 is used in a non-system slot of the backplane, the PCI Bus on the CP16 is turned off automatically.

Connectors J4 and J5 of the CompactPCI Bus are utilized by the SBC for connection to the Rear I/O Transition Module (RTM). The SBC and RTM are designed so that the signals on J4 and J5 must be routed *only* through those connectors between the SBC and RTM. No other connection of those signals should be made on the backplane. Specifically, the standard CP16 models must not be used in conjunction with a CompactPCI backplane that has signals on J3, J4 or J5 bussed to the SBC slot, i.e., some H.110 backplanes. The -NJ models of the CP16, which do not have J4 I/O capability, may be used as drone modules in non-system board slots of CompactPCI backplanes configured for H.110 applications.

Universal Serial Bus (USB)

The SBC supports four USB 1.1 ports for serial transfers at 12 or 1.5Mbit/sec. The Universal Serial Bus (USB) is an interface allowing for connectivity to many standard PC peripherals via an external port.

The connectors for two of the USB ports are on the front panel; the other two ports are routed to the Rear Transition Module.

Ultra XGA Interface

The ATI Technologies M6-C16H video controller enables 2D/3D video acceleration and provides 16MB of integrated video DDR memory. The video controller's DVI compliant 165MHz TMDS transmitter supports pixel resolutions from VGA (640 x 480) up to UXGA (1600 x 1200). Software drivers are available for most popular operating systems.

A video connector is available on the front panel of the SBC. The video port is also routed to the Rear I/O Transition Module (RTM) via the J4 edge connector. The second video port is not available on the CP16-NJ models.

Note that only one video connection may be used; the video device may be attached *either* to the front panel *or* to the RTM.

PCI ETHERNET INTERFACES (DUAL)

The dual PCI Ethernet interfaces are implemented using two Intel 82546EB Ethernet controllers. Channel A of each interface supports Gigabit, 10Base-T and 100Base-TX Fast Ethernet modes. The interfaces are compliant with IEEE 802.3 and PCI Local Bus 2.1 Specifications.

The main components of each 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 connector on the SBC's I/O bracket for direct connection to the network. The connector requires a category 5 (CAT5) unshielded twisted-pair (UTP) 2-pair cable for a 100-Mb/s network connection or a category3 (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.
- Activity and speed 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.

Channel B of each Ethernet controller provides a redundant 10/100/1000Base-T Ethernet interface to the CompactPCI backplane via the J3 edge connector. This allows Ethernet communication and control between the SBC and other boards in the CompactPCI chassis. The interface implementation is fully compatible with the CompactPCI® Packet Switching Backplane Specification 2.16.

HUB INTERFACE 2.0

The E7501 chipset utilizes a component interconnect called Hub Interface 2.0 (HI2.0), also known as Hub Link 2.0. The E7501 hub interface provides efficient, high-speed communication between chipset components in order to support high-speed I/O applications.

The E7501 Memory Controller Hub (MCH) has four Hub Link connections: Hub Links A, B, C and D. In the CP16, Hub Link A connects to the I/O Controller Hub (ICH3) and is a parity-protected, 266MB/s point-to-point Hub Interface 1.5 connected to ICH3. This link uses the 66MHz base clock running at 4x to provide 400MB/s data transfers. Hub Link A uses 64-bit addressing on inbound transactions with a maximum memory decode space of 16GB.

Hub Links B, C and D are 1GB/s point-to-point 16-bit connections that are ECC protected. The links use the 66MHz base clock running at 8x to provide 1GB/s data transfers. The link supports snooped and non-snooped inbound accesses along with 64-bit inbound addressing and 32-bit outbound addressing for PCI-X applications. Hub

Link B connects to a P64H2 to provide CompactPCI Bus connectivity. Hub Link C connects to the J4 I/O edge connector to provide SCSI capability via an optional Rear Transition Module (RTM). Hub Link D connects to a second P64H2 to provide PMC connectivity.

PCI ENHANCED IDE INTERFACES (DUAL)

The SBC supports dual high performance PCI Bus Master EIDE interfaces which 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.

The IDE interfaces are routed to the optional Rear I/O Transition Module (RTM), which has dual EIDE connectors. Ultra ATA/100 cables must be used with Ultra ATA/100 drives.

PLUG-IN MEDIA OPTIONS

Trenton provides two types of optional plug-in media for hard drive storage. The optional Compact Media Daughter Card (CMDC) plugs into connector P11A on the SBC and provides support for either a CompactFlash™ or Microdrive® storage device. The optional Hard Drive Adapter Kit (HDAK) uses connector P11A to provide support for a laptop IDE hard drive. The P11A connector can also be used for a conventional IDE drive.

The CompactFlash/Drive Power jumper (JU22) must be set according to the power requirements of the device installed. For a CMDC, the setting for JU22 can be either +5V or +3.3V, depending on the requirements of the specific device installed. For an HDAK, the setting for JU22 must be +5V. Refer to the *Configuration Jumpers* section later in this chapter for correct jumper settings.

FLOPPY DRIVE INTERFACE

The SBC supports two floppy disk drives. Drives can be 360K to 2.88MB, in any combination.

The floppy drive interface is routed to the RTM.

SERIAL INTERFACE

Two high-speed FIFO (16C550) serial ports with independently programmable baud rates are supported. The IRQ for each serial port has BIOS selectable addressing.

One serial port connector is on the front panel of the SBC and the second serial port is routed to the RTM. Serial devices may be attached to the front panel *and* to the RTM.

PS/2 MOUSE INTERFACE

The SBC is compatible with a PS/2-type mouse. The mouse interface is routed to the RTM. Mouse voltage is protected by a self-resetting fuse.

The mouse connection can be made on the RTM by using either the PS/2 mouse header or the bracket mounted mouse/keyboard mini DIN connector. The mouse may be connected directly to the mini DIN connector or to the "mouse" side of the "Y" adapter.

KEYBOARD INTERFACE

The SBC is compatible with an AT-type keyboard. The keyboard interface is routed to the RTM. Keyboard voltage is protected by a self-resetting fuse.

The keyboard connection can be made on the RTM by using either the keyboard header or the "keyboard" side of the "Y" adapter plugged into the bracket mounted mouse/ keyboard mini DIN connector.

NOTE: When using a "Y" cable attached to the bracket mounted mouse/keyboard mini DIN connector on the RTM, be sure to use Trenton's "Y" cable, part number 5886-000. Using a non-Trenton cable may result in improper SBC operation.

WATCHDOG TIMER

The watchdog timer is a hardware timer which resets the SBC 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 SBC.

The watchdog timer has programmable time-out periods of 30 mseconds, 10 seconds or 60 seconds. When enabled, the watchdog timer generates a system reset by deactivating the Power Good signal. Watchdog timer control is supplied via the ICH3 General Purpose I/O pins. The state of these GPIO signals are controlled by the GPIO Level Input or Output Register (GP_LVL). This 32-bit register is located at offset 0C(h) in the General Purpose I/O space at base address 500(h). Bits 19, 20 and 23 of this register are used for watchdog timer control. The register can also be accessed in byte mode; bits 23-16 reside at I/O address 50E(h).

The GP_LVL bit definitions are as follows:

Bit 19 - Watchdog Input (WDI)

When the watchdog timer is enabled, this bit must be toggled (0 to 1 or 1 to 0) within the selected watchdog time-out period. Failure to do so results in a system reset. This function is controlled by bit 19 of the GP_LVL register.

Bits 20 and 23 - Watchdog Select 0/Watchdog Select 1 (WDS0/WDS1)

These two bits of the GP_LVL register select the watchdog time-out period.

Time-out period options are as follows:

WDS1	WDS0	Time-out Period
0	0	30 mseconds
0	1	Disabled (power-on default)
1	0	10 seconds
1	1	60 seconds

The Watchdog Input (WDI) bit should be toggled immediately prior to changing the time-out period. Once the WDS1 and WDS0 bits have been set to select the desired time-out period, the WDI bit must be toggled within the selected period.

A set of watchdog timer software code and sample programs are available from Technical Support.

THERMAL MONITOR

The SBC's processor has a built-in thermal monitor feature designed to prevent processor failure at elevated operating temperature. The thermal monitor consists of an on-die temperature sensor and a fast-acting thermal control circuit (TCC).

The actual TCC activation point in a specific SBC application may vary as a function of processor loading, system case design, SBC location within a case and other factors. Critical temperature is determined by the processor and cannot be altered by the user.

When the TCC activates, the SBC's Thermal Throttling Activity LED turns on. Depending on the setting of the Thermal Throttling Activity LED jumper (JU6), the LED either goes off after the processor returns to normal temperature or remains on in a latched state to indicate that the processor's TCC has activated at least once. (See the *Configuration Jumpers* section later in this chapter for further explanation of the Thermal Throttling Activity LED jumper.)

Under normal operating conditions, the SBC's active cooling system generally prevents the TCC from activating.

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.

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.

POWER REQUIREMENTS

The following are typical values:

Processor Speed	+5V *	+12V **	+3.3V *	-12V *
1.8GHz *	6.25 Amps	0.20 Amps	4.10 Amps	< 100 mAmps
1.8GHz **	4.03 Amps	0.20 Amps	5.96 Amps	< 100 mAmps
1.6GHz *	6.20 Amps	0.20 Amps	3.99 Amps	< 100 mAmps
1.6GHz **	4.00 Amps	0.20 Amps	5.80 Amps	< 100 mAmps

* +5V (I/O) configured backplane
** +3.3V (I/O) configured backplane

Tolerance for all voltages is +/- 5%

TEMPERATURE/ ENVIRONMENT

Operating Temperature: 0^{o} C. to 55^{o} C. with 350 LFM of airflow

Storage Temperature: - 20^{o} C. to 70^{o} C. with 350 LFM airflow

Humidity: 5% to 90% non-condensing

MEAN TIME BETWEEN FAILURES (MTBF)

164,000 POH (Power-On Hours) at 40^{o} C., per Bellcore

UL RECOGNITION

This SBC is a UL recognized product listed in file #E208896.

This board was investigated and determined to be in compliance under the Bi-National Standard for Information Technology Equipment. This included the Electrical Business Equipment, UL 1950, Third Edition, and CAN/CSA C22.22 No. 950-95.

CONFIGURATION JUMPERS

The setup of the configuration jumpers on the SBC is described below. * indicates the default position of each jumper.

NOTE: For two-position jumpers (3-post), "LEFT" and "RIGHT" are defined with the bracket end of the board to the left, the edge connectors to the right.

Jumper	Description
JU6	**Thermal Throttling Activity LED** If the processor core gets to a critical temperature, it slows itself down to half its normal speed. This jumper sets the way in which the LED displays in response to this self-limiting mode. Install for real-time activity. The LED lights only when the processor is operating in slow-power mode. * Remove for latched activity. The LED lights and stays on once the processor has gone into slow-power mode.
	NOTE: Critical temperature is determined by the processor and cannot be altered by the user.
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

CONFIGURATION JUMPERS (CONTINUED)

Jumper	Description
JU12	**CMOS Clear**

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

NOTE: The CMOS Clear jumper works on power-up. To clear the CMOS, power down the system, install the jumper, then turn the power back on. Wait for at least two seconds and turn the power off. Then remove the jumper 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.

JU22 **CompactFlash™/Drive Power**

JU22 determines the voltage supplied to the device connected to connector P11A. The device may be a Compact Media Daughter Card (CMDC), a Hard Drive Adapter Kit (HDAK) or a conventional IDE drive. The CMDC supports either a CompactFlash™ or Microdrive® storage device. The HDAK supports a laptop IDE hard drive.

Install on the LEFT to supply +5 volts to the CMDC or HDAK. *
Install on the RIGHT to supply +3.3 volts to the CMDC.
Remove to use a conventional IDE drive.

JU23 **IPMI Inhibit**

Install to inhibit IPMI functionality.
Remove to enable IPMI functionality. *

NOTE: On SBCs with revision J-03 and later, the JU23 2-pin header is not populated on non-IPMI versions of the processor board. On IPMI versions of the SBC with revision J-03 and later, the 2-pin header is populated but the jumper shunt *must* remain uninstalled.

On revisions of the CP16 prior to J-03, this 2-pin header was populated on both IPMI and non-IPMI SBCs; the default was **Installed** (IPMI functionality inhibited). If you have one of these earlier SBC models which has JU23 and does support IPMI, remove the jumper to enable IPMI functionality.

CONFIGURATION JUMPERS (CONTINUED)

Jumper	Description
JU24	**Maximum PCI-X Speed to PMC** This jumper sets the maximum PCI-X speed for the on-board PCI/PCI-X Bus to the optional PMC card. Other speeds and modes for PMC are determined dynamically by the PMC card. This jumper should remain at the factory setting of 133MHz, i.e., removed. Remove for a maximum PCI-X speed of 133MHz. * Install for a maximum PCI-X speed of 100MHz. **NOTE:** The JU24 jumper is included on SBCs with revision J-03 and later.
JU30/JU31	**CompactPCI® Bus Mode to Backplane** These jumpers set the mode for the on-board CompactPCI Bus to the backplane. The jumpers should remain at the factory setting as follows: PCI 66MHz — JU30: Install * — JU31: Right * **NOTE:** The JU30 and JU31 jumpers are included on SBCs with revision J-03 and later.
JU32	**Front Side Bus (FSB) Speed** This jumper *must* be installed for the 400MHz Front Side Bus (FSB). **NOTE:** The JU32 jumper is included on SBCs with revision J-03 and later.

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.
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.

ETHERNET LEDS AND CONNECTORS (CONTINUED)

LED/Connector	Description
Speed LED	Yellow LED which identifies the connection speed.
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 the following categories of options:

- Main Menu
- Advanced Setup
- PCIPnP Setup
- Chipset Setup
- Boot Setup
- Security 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 Connectors - LAN1/LAN2
Dual RJ-45 connector, Amp/Tyco #1116353-4
Each individual RJ-45 connector is defined as follows:

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

P2 - Auxiliary Fan
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

P6 - Serial Port Connector
9 position “D” right angle, Spectrum #56-402-001

Pin	Signal	Pin	Signal
1	Carrier Detect	6	Data Set Ready-I
2	Receive Data-I	7	Request to Send-O
3	Transmit Data-O	8	Clear to Send-I
4	Data Terminal Ready-O	9	Ring Indicator-I
5	Signal Gnd		

CONNECTORS (CONTINUED)

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.

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

CONNECTORS (CONTINUED)

P17A - 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

P17B - 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

P18 - System Hardware Monitor Connector
4 pin single row header, Amp #640456-4

Pin	Signal
1	Gnd
2	GPO (General Purpose Output)
3	CI (Chassis Intrusion Input)
4	OVT (Over Temperature)

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

Pin	Signal
1	Gnd
2	+12V
3	FanTach

P22 - System Management Bus Connector
2 pin single row header, Amp #640456-2

Pin	Signal
1	SMB Clock
2	SMB Data

COMPACTPCI PIN ASSIGNMENTS

J1 and J2 of the 64-bit/66MHz CompactPCI Bus are defined by the CompactPCI Specification.

J3 is used for connection to the CompactPCI backplane and is compliant with the PICMG 2.16 Specification. J4 and J5 are used for connection to the Rear I/O Transition Module (RTM). The pin assignments for these connectors are defined in the tables which follow.

J3

Pin	F	E	D	C	B	A
19	GND	GND	GND	GND	GND	GND
18	GND	LPA_DC#	LPA_DC	GND	LPA_DA#	LPA_DA
17	GND	LPA_DD#	LPA_DD	GND	LPA_DB#	LPA_DB
16	GND	LPB_DC#	LPB_DC	GND	LPB_DA#	LPB_DA
15	GND	LPB_DD#	LPB_DD	GND	LPB_DB#	LPB_DB
14	GND	GND	GND	GND	GND	GND
13	GND	IO_5	IO_4	IO_3	IO_2	IO_1
12	GND	IO_10	IO_9	IO_8	IO_7	IO_6
11	GND	IO_15	IO_14	IO_13	IO_12	IO_11
10	GND	IO_20	IO_19	IO_18	IO_17	IO_16
9	GND	IO_25	IO_24	IO_23	IO_22	IO_21
8	GND	IO_30	IO_29	IO_28	IO_27	IO_26
7	GND	IO_35	IO_34	IO_33	IO_32	IO_31
6	GND	IO_40	IO_39	IO_38	IO_37	IO_36
5	GND	IO_45	IO_44	IO_43	IO_42	IO_41
4	GND	IO_50	IO_49	IO_48	IO_47	IO_46
3	GND	IO_55	IO_54	IO_53	IO_52	IO_51
2	GND	IO_60	IO_59	IO_58	IO_57	IO_56
1	GND	VIO	IO_64	IO_63	IO_62	IO_61

COMPACTPCI PIN ASSIGNMENTS (CONTINUED)

J4

Pin	F	E	D	C	B	A
25	GND	EXT1C#	EXT1C		EXT1A#	EXT1A
24	GND	EXT1D#	EXT1D		EXT1B#	EXT1B
23	GND	EXT2C#	EXT2C		EXT2A#	EXT2A
22	GND	EXT2D#	EXT2D		EXT2B#	EXT2B
21	GND	GND	GND		GND	GND
20	GND	LKACT1_A	LKACT2_A			VGASCL
19	GND	LKACT1_C	LKACT2_C	SPDLEDL1_C		VVSYNC
18	GND		GND	SPDLEDL2_C		VHSYNC
17	GND			+3,3V	+5V	VRED
16	GND			+3.3V	+5V	VGREEN
15	GND			+3.3V	+5V	VBLUE
14						
13			KEY			
12						
11	GND	GND				VGASDA
10	GND	PCLK66RTN	+12V			
9	GND	INTD#	+12V			GND
8	GND	PWRGOOD		GND	GND	GND
7	GND	PCIRST#	GND	EX1HI21	EX1HI13	EX1HI6
6	GND	GND	GND	EX1HI20	EX1HI12	EX1HI5
5	GND	EX1HUSTBS	GND	EX1HI18	EX1HI11	EX1HI4
4	GND	EX1HUSTBF	GND	EX1HI17	EX1HI10	EX1HI3
3	GND	GND	GND	EX1HI16	EX1HI9	EX1HI2
2	GND	EX1HSTBS	GND	EX1HI15	EX1HI8	EX1HI1
1	GND	EX1HSTBF	GND	EX1HI14	EX1HI7	EX1HI0

COMPACTPCI PIN ASSIGNMENTS (CONTINUED)

J5

Pin	F	E	D	C	B	A
22	GND	SDD7	PDD7	PIORDY	SIORDY	DRVDEN0
21	GND	SDD6	PDD6	BRSTDRV#	TACH1	DRVDEN1
20	GND	SDD5	PDD5	PCBL_DET	SCBL_DET	INDEX#
19	GND	SDD4	PDD4	PIDESEL#	SIDESEL#5	MTR0#
18	GND	SDD3	PDD3	PDREQ	SDREQ	DRV1#
17	GND	SDD2	PDD2	PDIOW#	SDIOW#	DRV0#
16	GND	SDD1	PDD1	PDIOR#	SDIOR#	MTR1#
15	GND	SDD0	PDD0	PDA2	SDA2	DIR
14	GND	SDD8	PDD8	BMC_TINT#	PWM1	STEP#
13	GND	SDD9	PDD9	GPO	RTS2	WDATA#
12	GND	SDD10	PDD10	BMC_TCK	TXD2	WGATE#
11	GND	SDD11	PDD11	BMC_TDI	DTR2	TRK0#
10	GND	SDD12	PDD12	BMC_TMS	+5V	WRPRT#
9	GND	SDD13	PDD13	BMC_TDO	DCD2	RDATA#
8	GND	SDD14	PDD14	OVT#	RXD2	HDSEL#
7	GND	SDD15	PDD15	INTRUDER#	RI2	DSKCHG#
6	GND	SDACK#	PDACK#	USB0C3	CTS2	TACH2
5	GND	IRQ15	IRQ14	USB0C2	DSR2	PWM2
4	GND	SDA1	PDA1	USBP3+	+3.3V	MDATA
3	GND	SDA0	PDA0	USBP3-	SPKR_OUT	MCLK
2	GND	SCS1#	PCS1#	USBP2+	FAULT	KDATA
1	GND	SCS3#	PCS3#	USBP2-	ICH_GPIO43	KCLK

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Chapter 2 System BIOS

BIOS OPERATION

Chapters 3 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:

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 chapter 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.

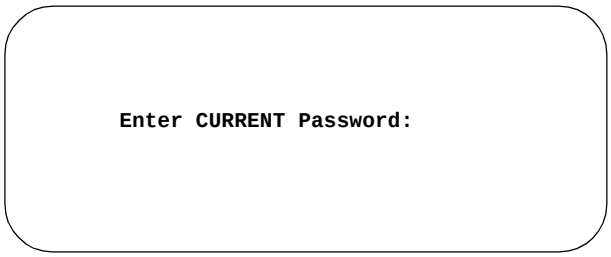
  In this case, after AMIBIOS loads the system, you may be requested to enter a password. (See *Password Entry* later in this section.)

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.

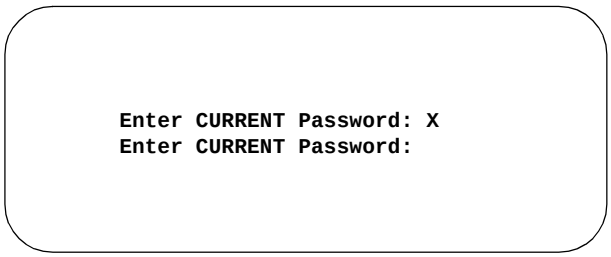
When password checking is enabled, the following password prompt displays:



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:



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    Chipset    Boot   Security   Exit
System Overview                                  Use [ENTER], {TAB]
_____________________________________________    or [SHIFT-TAB] to
                                                 select a field.
AMIBIOS
Version   : 08.00.xx                            Use [+] or [-] to
Build Date: 12/09/03                             configure System Time.
ID        : 0ABDR015

Processor
Type      : Intel(R) Pentium(R) M processor 1600M
Speed     : 600MHz
Count     : 1

                                                 ←→   Select Screen
System Memory                                    ↑↓   Select Item
Size      : 1024MB                               +-   Change Field
                                                 Tab  Select Field
System Time                [00:00:00]            F1   General Help
System Date                [Mon 01/01/2001]      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
        - Intel SpeedStep Tech.
    - IDE Configuration
        - OnBoard PCI IDE Controller
        - 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
        - Hard Disk Write Protect
        - IDE Detect Time Out (Sec)
        - ATA(PI) 80Pin Cable Detection
    - Floppy Configuration
        - Floppy A/Floppy B
    - SuperIO Configuration
        - OnBoard Floppy Controller

        - Serial Port1 Address/Serial Port2 Address
    - DMI Event Logging
        - View Event Log
        - Mark All Events as Read
        - Clear Event Log
        - Event Log Statistics
    - Remote Access Configuration
        - Remote Access
        - Serial Port Number
        - Serial Port Mode
        - Flow Control
        - Terminal Type
        - Send Carriage Return
        - Redirection After BIOS POST
    - USB Configuration
        - Legacy USB Support
        - USB Mass Storage Device Configuration
            - USB Mass Storage Reset Delay

- 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
    - PCI IDE BusMaster
    - OffBoard PCI/ISA IDE Card
        - OffBoard PCI IDE Primary IRQ
        - OffBoard PCI IDE Secondary
    - Onboard Gigabit LAN 1
    - Onboard Gigabit LAN 2
    - Onboard LAN Boot ROM
    - 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 **Chipset** to make changes to Chipset Setup parameters as described in the *Chipset Setup* chapter of this manual. The following options may be modified:
  - Intel E7500/E7501 NorthBridge Configuration
    - Chipset Memory Remap Feature
    - Memory Hole
  - Intel ICH3 SouthBridge Configuration
    - ICH3 Dev31 Func1, IDE
    - ICH3 Dev31 Func3, SMBUS
    - ICH3 Dev29 Func0, USB#1
    - ICH3 Dev29 Func1, USB#2
    - LPC 4Eh-4Fh Decode/LPC 2Eh/2Fh Decode
    - IOAPIC
    - Extended IOAPIC
    - CPU B.I.S.T.
    - ICH3 DMA Collection
    - DMA Types 0, 1, 2, 3, 5, 6 and 7
  - Intel PCI-64 Hub 2 Configuration
    - HotPlug Inhibit Bus Connect
    - PCI Bus Frequency

- 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
  - Boot Device Priority
  - Hard Disk Drives

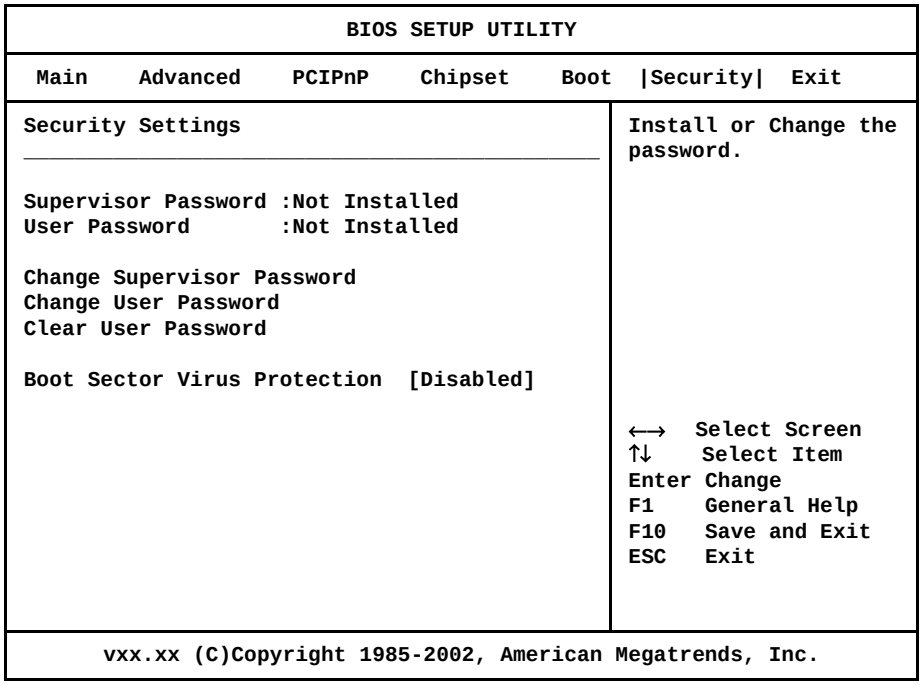
- Removable Drives
- ATAPI CDROM Drives
- Interrupt 19 Capture

- 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
    - Password Check
  - Clear User Password
  - Boot Sector Virus Protection

- 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

SECURITY SETUP

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



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 SBC. Refer to the explanations below for specific instructions about entering correct information.

SECURITY SETUP OPTIONS

The Security Setup options allow you to establish, change or clear the supervisor or user 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 SUPERVISOR PASSWORD

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

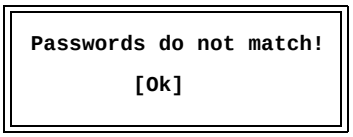
This is the message which displays before you have established a password, or if the last password entered was the null password. If a password has already been established, you are asked to enter the *current* password before being prompted to enter the *new* password.

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:

Re-key the new password as described above.

If the password confirmation is miskeyed, AMIBIOS Setup displays the following message:



No retries are permitted; you must restart the procedure.

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

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:

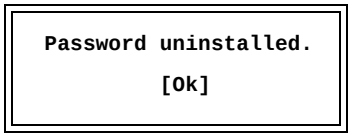
Password Check **[Setup]**

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:



CHANGE USER PASSWORD

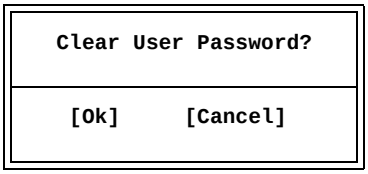
The **Change User Password** option is similar in functionality to the **Change Supervisor Password** and displays the same messages. If you have signed on under the user password, the **Change Supervisor Password** function is not available for modification.

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:



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.

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EXIT MENU

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

```
                        BIOS SETUP UTILITY
 Main    Advanced    PCIPnP    Chipset    Boot   Security  |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 OPTIONS

When you are running the BIOS Setup Utility program, you may either save or discard 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]
```

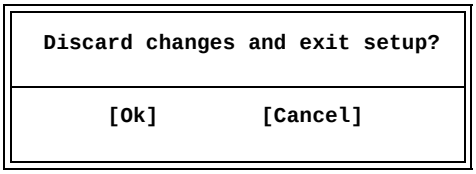
You have two options:

- 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:



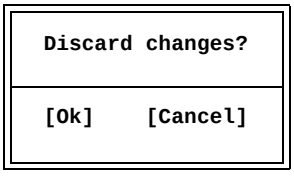
You have two options:

- 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:



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

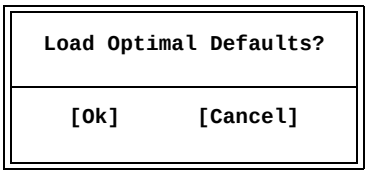
Each AMIBIOS Setup option has two default settings (Optimal and Failsafe). These settings can be applied to all AMIBIOS Setup options when you select the appropriate configuration option from the BIOS Setup Utility Main Menu.

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:



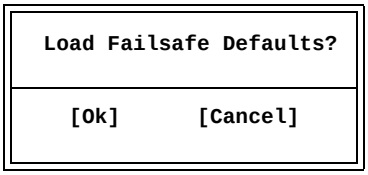
You have two options:

- 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:



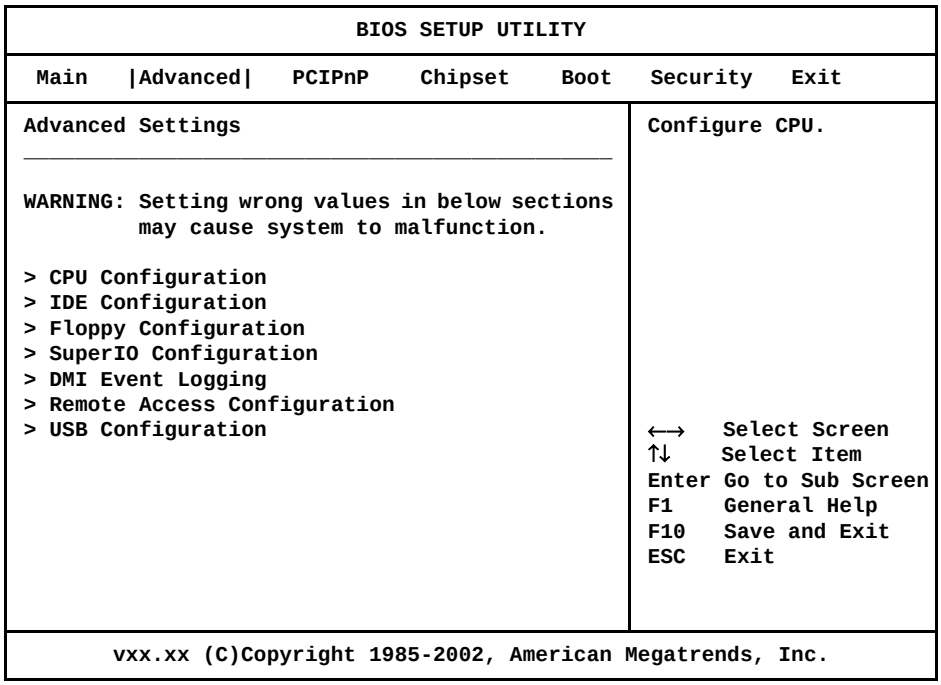
You have two options:

- 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:



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 SBC. 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 and allows you to modify the following option:

- Intel SpeedStep Tech.

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:

- OnBoard PCI IDE Controller
- 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
- Hard Disk Write Protect
- IDE Detect Time Out (Sec)
- ATA(PI) 80Pin Cable Detection

Floppy Configuration

The options on the **Floppy Configuration** subscreen allow you to set up or modify parameters for your floppy disk drive(s). The following options may be modified:

- Floppy A/Floppy B

SuperIO Configuration

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

- OnBoard Floppy Controller
- Serial Port1 Address/Serial Port2 Address

DMI Event Logging

The options on the **DMI Event Logging** subscreen allow you to set up or modify parameters for using the event log, which allows you to log errors and other events which occur in the system. The following options may be modified:

- View Event Log
- Mark All Events as Read
- Clear Event Log
- Event Log Statistics

Remote Access Configuration

The options on the **Remote Access Configuration** subscreen allow you to set up or modify parameters for configuring remote access type and parameters. The following options may be modified:

- Remote Access
- Serial Port Number
- Serial Port Mode
- Flow Control
- Terminal Type
- Send Carriage Return
- Redirection After BIOS POST

USB Configuration

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

- Legacy USB Support
- USB Mass Storage Device Configuration
    - USB Mass Storage Reset Delay

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.

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CPU CONFIGURATION

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

```
                              BIOS SETUP UTILITY
          |Advanced|
Configure Advanced CPU Settings                    Depending on AC or
_____________________________________________      Battery powered, CPU
                                                   speed will change
Manufacturer: Intel                                based on the
Brand String: Intel(R) Pentium(R) M processor 1600M selections.
Frequency   : 600MHz
FSB Speed   : 400MHz

Cache L1    : 32KB
Cache L2    : 1024 KB

Ratio Status: Locked
Ratio Actual Value  :6

                                                   ←→   Select Screen
Intel(R) SpeedStep(tm) Tech.  [Maximum Performance] ↑↓   Select Item
                                                   +-   Change Option
                                                   F1   General Help
                                                   F10  Save and Exit
                                                   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 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.

Intel(R) SpeedStep(tm) Tech.

This option allows you enable or disable Intel SpeedStep Technology.

The Setup screen displays the system option:

Intel(R) SpeedStep(tm) Tech. [Maximum Performance]

Available options are:

Disabled
Maximum Performance

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IDE CONFIGURATION

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

```
                        BIOS SETUP UTILITY
        |Advanced|
IDE Configuration                                  DISABLED: disables the
_____________________________________________      integrated IDE
                                                   Controller.
OnBoard PCI IDE Controller   [Both]                PRIMARY: enables only
                                                   the Primary IDE
> Primary IDE Master            : [Hard Disk]     Controller.
> Primary IDE Slave             : [Hard Disk]     SECONDARY: enables
> Secondary IDE Master          : [Not Detected]  only the Secondary IDE
> Secondary IDE Slave           : [ATAPI CDROM]   Controller.
                                                   BOTH: enables both IDE
Hard Disk Write Protect        [Disabled]          Controllers.
IDE Detect Time Out (Sec)      [35]
ATA(PI) 80Pin Cable Detection  [Host & Device]

                                                   ←→   Select Screen
                                                   ↑↓   Select Item
                                                   +-   Change Option
                                                   F1   General Help
                                                   F10  Save and Exit
                                                   ESC  Exit

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```

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 yet run Advanced Setup. Once values have been defined, they display each time Advanced Setup is run.

OnBoard PCI IDE Controller

This option specifies whether or not the on-board integrated drive electronics (IDE) controllers are to be used.

The Setup screen displays the system option:

OnBoard PCI IDE Controller [Both]

Available options are:

Disabled
Primary
Secondary
Both

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

The SBC 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. This EIDE interface allows disk drives greater than 528MB to be used. Each of the four drives may be a different type.

Devices attached to the primary and secondary controllers are detected automatically by AMIBIOS and displayed on the IDE Configuration screen.

The Setup screen displays the system options:

Primary IDE Master [Hard Disk]
Primary IDE Slave [Hard Disk]

Secondary IDE Master [Not Detected]
Secondary IDE Slave [ATAPI CDROM]

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 chapter.

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
                                                    to the system.
Device    :Hard Disk
Vendor    :ST38421A
Size      :8.6GB
LBA Mode  :Supported
Block Mode:32Sectors
PIO Mode  :4
Async DMA :MultiWord DMA-2
Ultra DMA :Ultra DMA-2
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 Advanced Setup is run indicates the drive(s) on your system which AMIBIOS detected upon initial bootup.

IDE DEVICE SETUP OPTIONS

The following options are available for each of the four IDE devices on the primary and 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:

Type [Auto]

Available options are:

Not Installed
Auto
CDROM
ARMD

If **Not Installed** is selected, **Type** is the only option which displays.

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 - 4)
UDMA1	
UDMA2	
UDMA3	
UDMA4	

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

An IDE drive on the PCI Local Bus can use a 32-bit data path.

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:

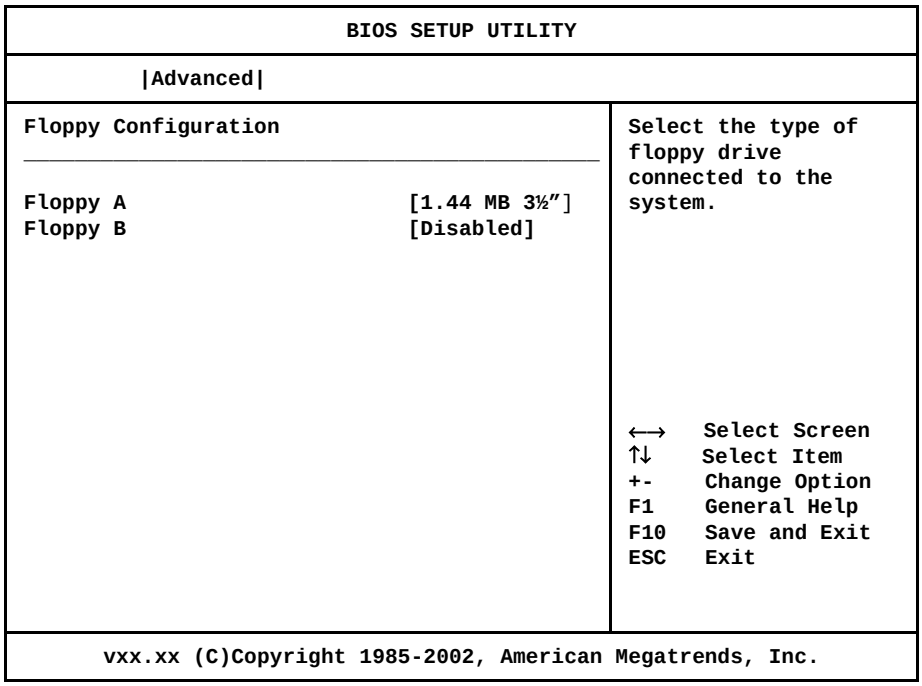
32Bit Data Transfer [Disabled]

Available options are:

Disabled
Enabled

FLOPPY CONFIGURATION

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



Floppy Configuration Screen

When you display the Floppy 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.

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

FLOPPY CONFIGURATION OPTIONS

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

Floppy A/Floppy B

The floppy drive(s) in your system can be configured using these options. The **Disabled** option can be used for diskless workstations.

The Setup screen displays the system options:

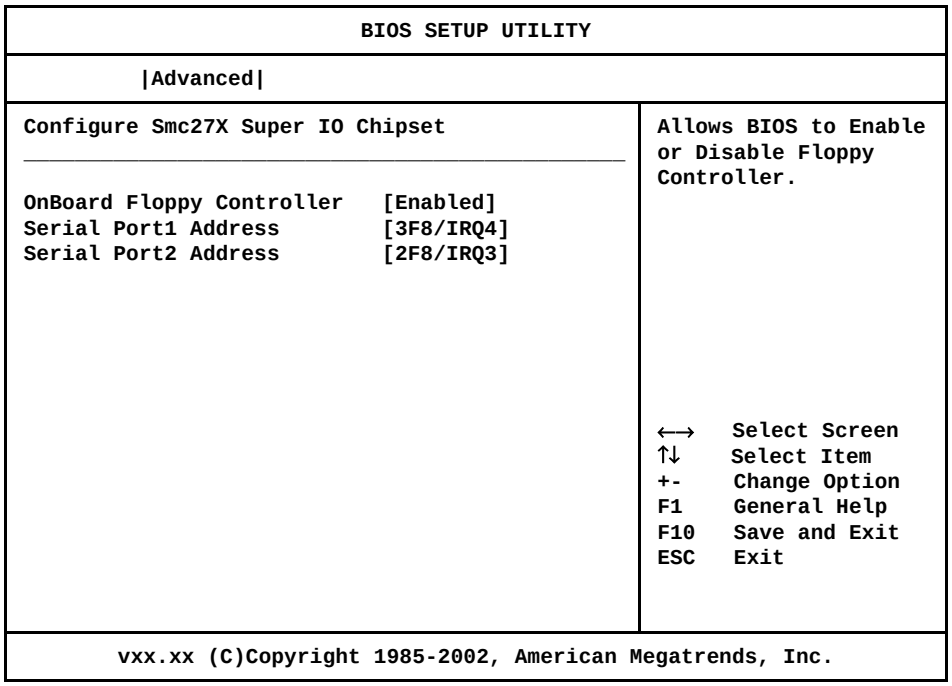
Floppy A	**[1.44 MB 3½"]**
Floppy B	**[Disabled]**

Available options are:

Disabled
360 KB 5¼”
1.2 MB 5¼”
720 KB 3½”
1.44MB 3½”
2.88MB 3½”

SUPERIO CONFIGURATION

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



SuperIO Configuration Screen

When you display the SuperIO 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.

SUPERIO CONFIGURATION OPTIONS

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

OnBoard Floppy Controller

The on-board floppy drive controller may be enabled or disabled using this option.

The Setup screen displays the system option:

OnBoard Floppy Controller [Enabled]

Available options are:

Disabled
Enabled

Serial Port1 Address/Serial Port2 Address

Each of these options enables the specified serial port on the SBC and establishes the base I/O address and the number of the interrupt request for the port.

The Setup screen displays the system option:

Serial Port1 Address	**[3F8/IRQ4]**
Serial Port2 Address	**[2F8/IRQ3]**

Available options are:

Disabled
3F8/IRQ4
3E8/IRQ4
2F8/IRQ3
2E8/IRQ3

NOTE: The values available for each on-board serial port may vary, depending on the setting previously selected for the other on-board serial port and any off-board serial ports. If an I/O address is assigned to another serial port, AMIBIOS automatically omits that address from the values available.

If the system has off-board serial ports which are configured to specific starting I/O ports via jumper settings, AMIBIOS configures the on-board serial ports to avoid conflicts.

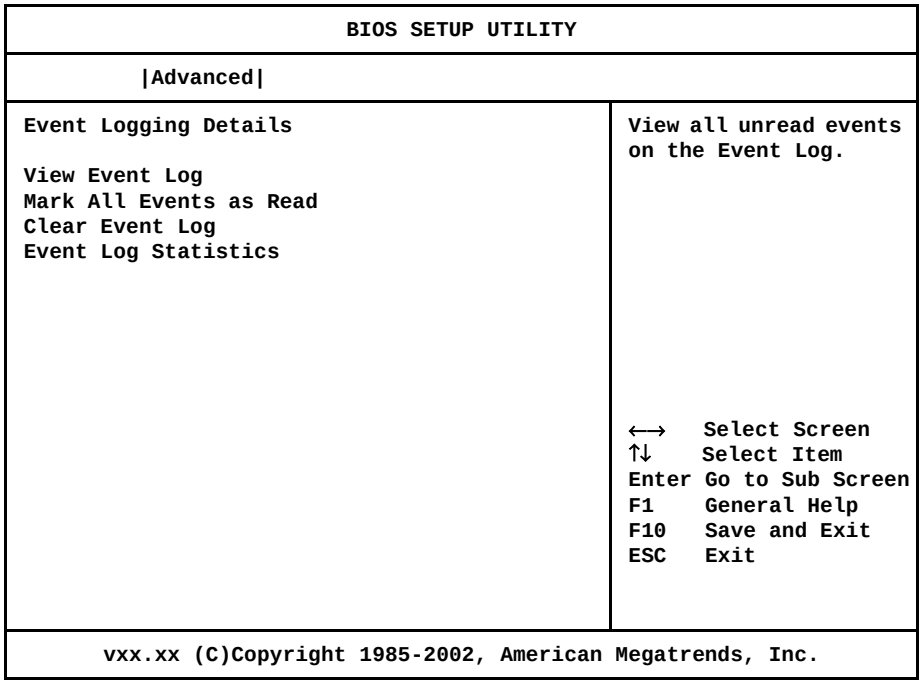
When AMIBIOS checks for serial ports, any off-board serial ports found are left at their assigned addresses. Serial Port1, the first on-board serial port, is configured with the first available address and Serial Port2, the second on-board serial port, is configured with the next available address. The default address assignment order is 3F8H, 2F8H, 3E8H, 2E8H. Note that this same assignment order is used by AMIBIOS to place the active serial port addresses in lower memory (BIOS data area) for configuration as logical COM devices.

For example, if there is one off-board serial port and its address is set to 2F8H, Serial Port1 is assigned address 3F8H and Serial Port2 is assigned address 3E8H. Configuration is then as follows:

COM1 - Serial Port1 (at 3F8H)
COM2 - off-board serial port (at 2F8H)
COM3 - Serial Port2 (at 3E8H)

DMI EVENT LOGGING

When you select **DMI Event Logging** from the Advanced Setup Menu, the following Setup screen displays:



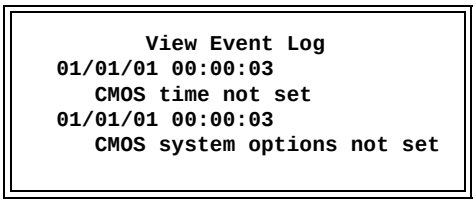
DMI Event Logging Screen

When you display the DMI Event Logging screen, the format is similar to the sample shown above. Highlight the option you wish to access and press <**Enter**>.

DMI EVENT LOGGING OPTIONS

View Event Log

When you select this option, a window similar to the following displays showing unread events in the Event Log:

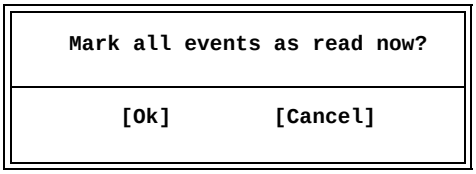


When you have finished viewing the Event Log, press <**Esc**> to continue.

Mark All Events As Read

After you have reviewed the events in the event log, you may select this option, which allows you to mark all event log entries as having been read.

The following window displays:

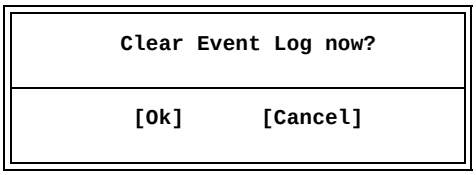


Selecting **Ok** marks *all* unread entries currently in the event log file as having been read. The next time you select the **View Event Log** option, only the new, unmarked events are displayed.

Clear Event Log

This option specifies whether or not the event log should be cleared.

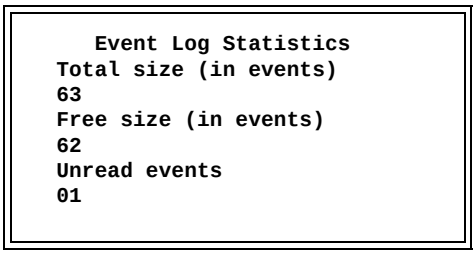
The following window displays:



Selecting **Ok** discards all entries in the Event Log. The next time you select the **View Event Log** option, only new entries will display.

Event Log Statistics

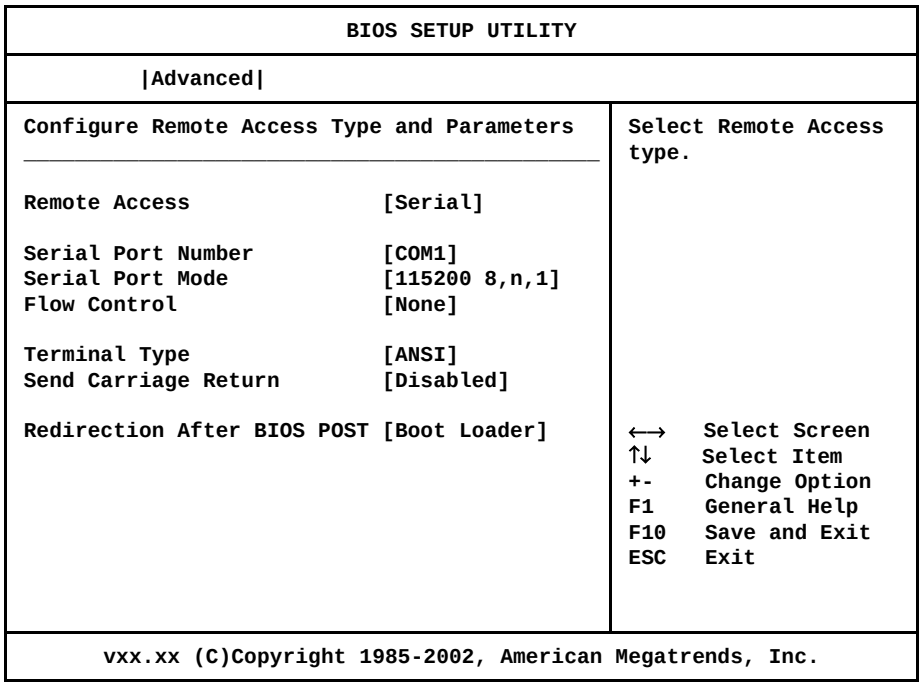
When you select this option, a window similar to the following displays showing statistics for events which have been logged:



When you have finished viewing the Event Log statistics, press **<Esc>** to continue.

REMOTE ACCESS CONFIGURATION

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



Remote Access Configuration Screen

When you display the Remote Access Configuration screen, the format is similar to the sample shown above if you have enabled **Remote Access**. 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.

REMOTE ACCESS CONFIGURATION OPTIONS

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

Remote Access

This option allows you to use a terminal connected to the serial port of the SBC to control changes to the BIOS settings.

The sample above shows the appearance of the screen if **Remote Access** is set to **Serial**. If this option is set to **Disabled**, which is the default, the other options on this screen do not display.

The Setup screen displays the system option:

Remote Access [Disabled]

Available options are:

Disabled
Serial

Serial Port Number

This option specifies the serial port on which remote access is to be enabled.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Serial Port Number [COM1]

Available options are:

COM1
COM2

Serial Port Mode

This option specifies settings for the serial port on which remote access is enabled. The settings indicate baud rate, eight bits per character, no parity and one stop bit.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Serial Port Mode [115200 8,n,1]

Available options are:

115200 8,n,1
57600 8,n,1
19200 8,n,1

Flow Control

This option allows you to select flow control for console redirection.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Flow Control [None]

Available options are:

None
Hardware

Terminal Type

This option allows you to select the target terminal type.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Terminal Type [ANSI]

Available options are:

ANSI
VT100

Send Carriage Return

This option allows you to specify whether or not a carriage return should be sent after each line of data.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Send Carriage Return [Disabled]

Two options are available:

- Select **Disabled** to send data without a carriage return.
- Select **Enabled** if the target terminal has more than 80 columns or does not wrap lines that exceed terminal width.

Redirection After BIOS POST

This option specifies when redirection should be active.

If the **Remote Access** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

Redirection After BIOS POST [Boot Loader]

Three options are available:

- Select **Disabled** to turn off the redirection after POST.
- Select **Boot Loader** to keep redirection active during POST and during Boot Loader.
- Select **Always** to always keep redirection active. Note that some operating systems may not work properly if this option is set to **Always**.

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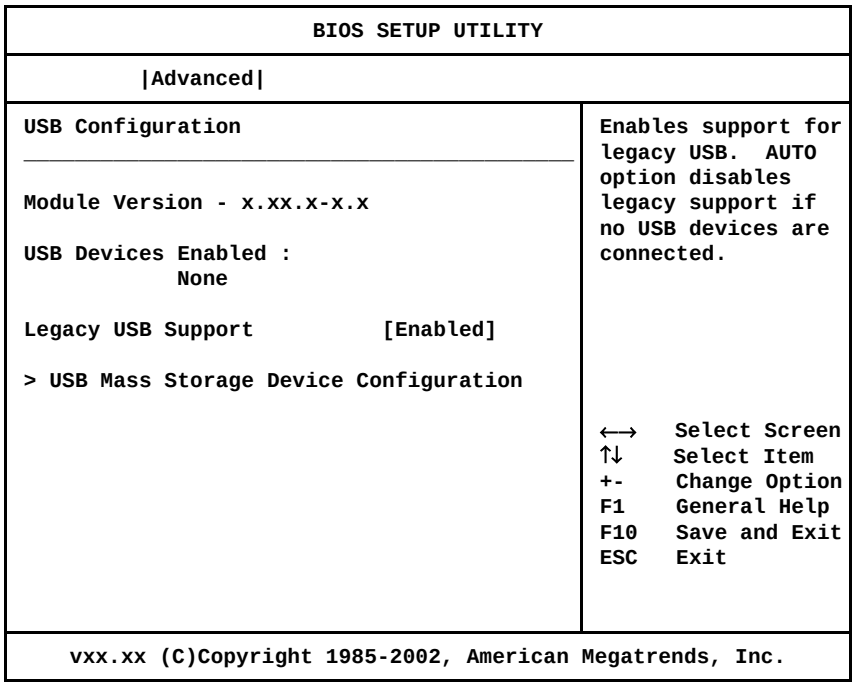
USB CONFIGURATION

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



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 the options on this screen allows you to continue to a subscreen designed to change parameters for that particular option. Highlight the option and press **<Enter>** to proceed to the subscreen.

USB CONFIGURATION OPTIONS

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

USB Devices Enabled

This option displays the Universal Serial Bus (USB) devices which are enabled. The USB devices are automatically detected by AMIBIOS and a descriptive string is displayed for each USB device in the system.

Legacy USB Support

This option allows you to enable support for older USB devices. When it is set to **Auto**, legacy support is disabled if no USB devices are connected.

The Setup screen displays the system option:

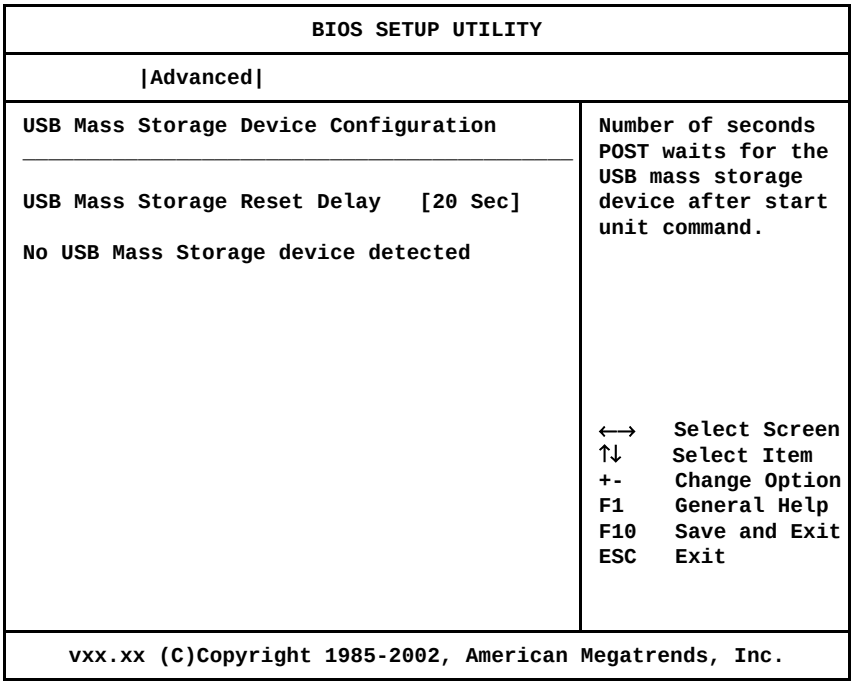
Legacy USB Support [Enabled]

Available options are:

Disabled
Enabled
Auto

USB Mass Storage Device Configuration

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



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

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Chapter 4 PCI Plug and Play Setup

PCI 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|   Chipset    Boot   Security   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
PCI IDE BusMaster               [Disabled]       system.
OffBoard PCI/ISA IDE Card       [Auto]

Onboard Gigabit LAN 1           [Enabled]
Onboard Gigabit LAN 2           [Enabled]
Onboard LAN Boot ROM            [Disabled]

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]

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```

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 SBC. 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 ISA 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, OS/2, Windows 3.x) 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. If this option is set to **No**, an IRQ is not assigned even if the card requests one.

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 an ISA 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

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 SBC 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 **OffBoard PCI IDE Primary IRQ** and **OffBoard PCI IDE Secondary** options 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

Onboard Gigabit LAN 1/Onboard Gigabit LAN 2

These options specify whether the on-board 10/100/1000Base-T (1GB) Ethernet devices on your system are enabled or disabled.

The Setup screen displays the system options:

Onboard Gigabit LAN 1 [Enabled]
Onboard Gigabit LAN 2 [Enabled]

Available options are:

Disabled
Enabled

Onboard LAN Boot ROM

This option indicates whether or not 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

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 ISA 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 ISA 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 ISA 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 ISA devices.

Reserved Memory Size

This option specifies the size of the memory area reserved for legacy ISA 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 ISA adapter cards.

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

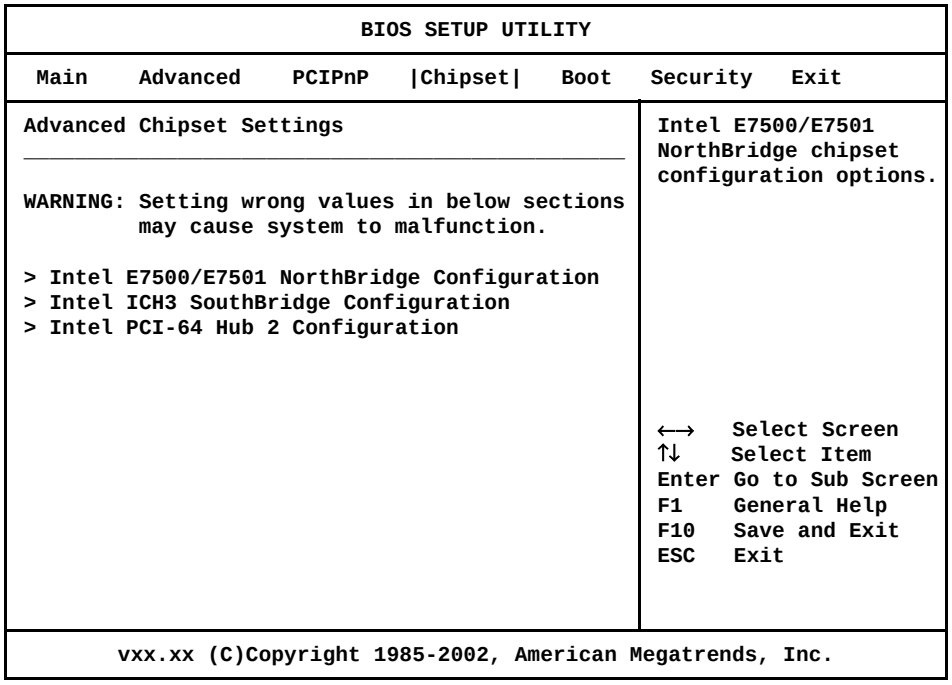
Saving and Exiting

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.

Chapter 5 Chipset Setup

CHIPSET SETUP

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



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 subscreens do not necessarily reflect the values appropriate for your SBC. Refer to the explanations following each 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.

Intel E7500/E7501 NorthBridge Configuration

The **Intel E7500/E7501 NorthBridge Configuration** subscreen allows you to change the setting of the following option:

- Chipset Memory Remap Feature
- Memory Hole

Intel ICH3 SouthBridge Configuration

The options on the **ICH3 SouthBridge Configuration** subscreen allow you to set up or modify parameters to configure the Intel ICH3 SouthBridge chip. The following options may be modified:

- ICH3 Dev31 Func1, IDE
- ICH3 Dev31 Func3, SMBUS
- ICH3 Dev29 Func0, USB#1
- ICH3 Dev29 Func1, USB#2
- LPC 4Eh-4Fh Decode/LPC 2Eh-2Fh Decode
- IOAPIC
- Extended IOAPIC
- CPU B.I.S.T.
- ICH3 DMA Collection
- DMA Types 0, 1, 2, 3, 5, 6 and 7

The **Intel PCI-64 Hub 2 Configuration** subscreen allows you to change the setting of the following option:

- HotPlug Inhibit Bus Connect
- PCI Bus Frequency

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.

INTEL E7500/ E7501 NORTHBRIDGE CONFIGURATION

When you select **Intel E7500/E7501 NorthBridge Configuration** from the Chipset Setup Screen, the following Setup screen displays:

```
                    BIOS SETUP UTILITY
                          |Chipset|
Configure advanced settings for NorthBridge   | ENABLE: Allow
_____________________________________________ | remapping of
                                              | overlapped PCI memory
Chipset Memory Remap Feature   [Enabled]      | above the total
Memory Hole                    [Disabled]     | physical memory.
                                              |
                                              | DISABLE: Do not allow
                                              | remapping of memory.
                                              |
                                              |
                                              |
                                              | ←→   Select Screen
                                              | ↑↓   Select Item
                                              | +-   Change Option
                                              | F1   General Help
                                              | F10  Save and Exit
                                              | ESC  Exit
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```

Intel E7500/E7501 NorthBridge Configuration Screen

When you display the Intel E7500/E7501 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.

E7500/E7501 NORTHBRIDGE CONFIGURATION OPTIONS

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

Chipset Memory Remap Feature

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

The Setup screen displays the system option:

Chipset Memory Remap Feature [Enabled]

Available options are:

Disabled
Enabled

Memory Hole

This option may be used to enable an area in memory (15M to 16M) for a memory hole.

The Setup screen displays the system option:

Memory Hole [Disabled]

Available options are:

Disabled
Enabled

INTEL ICH3 SOUTHBRIDGE CONFIGURATION

When you select **Intel ICH3 SouthBridge Configuration** from the Chipset Setup Screen, the following Setup screen displays:

```
                        BIOS SETUP UTILITY
                             |Chipset|
Configure advanced settings for SouthBridge   | Enable/Disable ICH3
_____________________________________________ | IDE Controller
                                              | function.
ICH3 Dev31 Func1, IDE          [Enabled]      |
ICH3 Dev31 Func3, SMBUS        [Enabled]      |
ICH3 Dev29 Func0, USB#1        [Enabled]      |
ICH3 Dev29 Func1, USB#2        [Enabled]      |
                                              |
LPC 4Eh-4Fh Decode             [Enabled]      |
LPC 2Eh-2Fh Decode             [Enabled]      |
                                              |
IOAPIC                         [Enabled]      |
Extended IOAPIC                [Enabled]      |
CPU B.I.S.T.                   [Enabled]      |
ICH3 DMA Collection            [Enabled]      |
                                              |
DMA-0 Type                     [PC/PCI]       | ←→   Select Screen
DMA-1 Type                     [PC/PCI]       | ↑↓   Select Item
DMA-2 Type                     [LPC DMA]      | +-   Change Option
DMA-3 Type                     [PC/PCI]       | F1   General Help
DMA-5 Type                     [PC/PCI]       | F10  Save and Exit
DMA-6 Type                     [PC/PCI]       | ESC  Exit
DMA-7 Type                     [PC/PCI]       |
      vxx.xx (C)Copyright 1985-2002, American Megatrends, Inc.
```

Intel ICH3 SouthBridge Configuration Screen

When you display the Intel ICH3 SouthBridge Configuration 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.

INTEL ICH3 SOUTHBRIDGE 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.

ICH3 Dev31 Func1, IDE

This option allows you to enable or disable ICH3 IDE Controller function.

The Setup screen displays the system option:

ICH3 Dev31 Func1, IDE [Enabled]

Available options are:

Disabled
Enabled

ICH3 Dev31 Func3, SMBUS

This option allows you to enable or disable ICH3 SMBUS Controller function.

The Setup screen displays the system option:

ICH3 Dev31 Func3, SMBUS [Enabled]

Available options are:

Disabled
Enabled

ICH3 Dev29 Func0, USB#1

This option allows you to enable or disable USB Host Controller #1 function.

The Setup screen displays the system option:

ICH3 Dev29 Func0, USB#1 [Enabled]

Available options are:

Disabled
Enabled

ICH3 Dev29 Func1, USB#2

This option allows you to enable or disable USB Host Controller #2 function.

The Setup screen displays the system option:

ICH3 Dev29 Func1, USB#2 [Enabled]

Available options are:

Disabled
Enabled

LPC 4Eh-4Fh Decode/LPC 2Eh-2Fh Decode

The **LPC 4Eh-4Fh Decode** option allows you to enable or disable decoding of I/O locations 4Eh and 4Fh to the LPC interface. The **LPC 2Eh-2Fh Decode** option cannot be modified.

The Setup screen displays the system options:

LPC 4Eh-4Fh Decode [Enabled]
LPC 2Eh-2Fh Decode [Enabled]

Available options are:

Disabled
Enabled

IOAPIC

This option allows you to enable or disable the ICH3 IOAPIC function.

The Setup screen displays the system option:

IOAPIC [Enabled]

Available options are:

Disabled
Enabled

Extended IOAPIC

This option allows you to enable or disable the extended mode of the ICH3 IOAPIC function.

The Setup screen displays the system option:

Extended IOAPIC [Enabled]

Available options are:

Disabled
Enabled

CPU B.I.S.T.

This option allows you to enable or disable the CPU Built-In Self Test.

The Setup screen displays the system option:

CPU B.I.S.T. [Enabled]

Available options are:

Disabled
Enabled

ICH3 DMA Collection

This option allows you to enable or disable the DMA collection buffer.

The Setup screen displays the system option:

ICH3 DMA Collection [Enabled]

Available options are:

Disabled
Enabled

DMA Types 0, 1, 2, 3, 5, 6 and 7

This option allows you to select the type of DMA performed on the specified channel.

The Setup screen displays the system option:

DMA-# Type [PC/PCI]

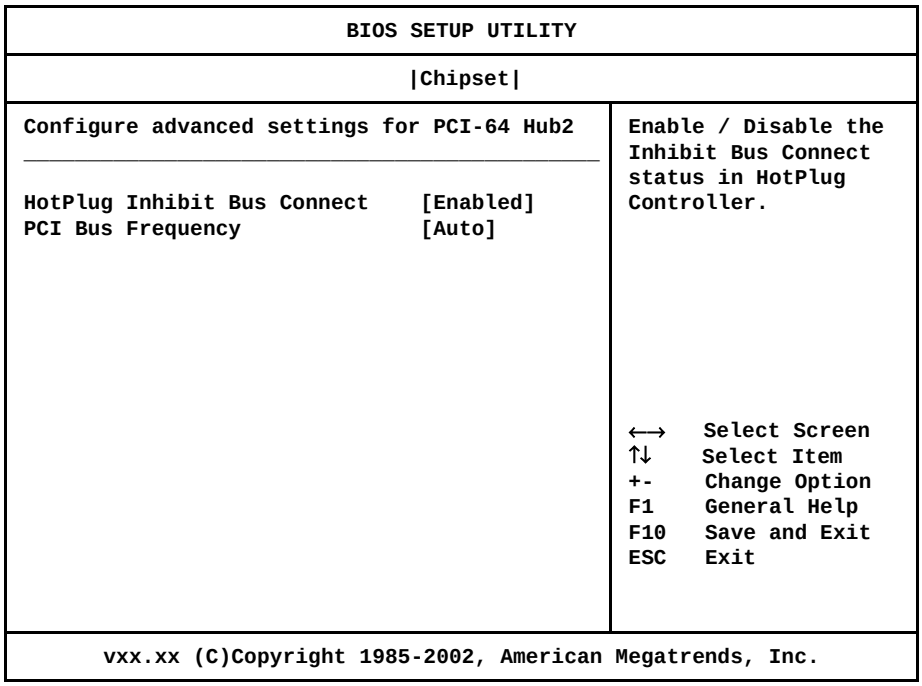
where # is the DMA number

Available options are:

PC/PCI
LPC DMA

INTEL PCI-64 HUB 2 CONFIGURATION

When you select **Intel PCI-64 Hub 2 Configuration** from the Chipset Setup Screen, the following Setup screen displays:



Intel PCI-64 Hub 2 Configuration Screen

When you display the Intel PCI-64 Hub 2 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-64 HUB 2 CONFIGURATION OPTIONS

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

HotPlug Inhibit Bus Connect

This options allows you to enable or disable the Inhibit Bus Connect status in the HotPlug controller.

The Setup screen displays the system option:

HotPlug Inhibit Bus Connect [Enabled]

Available options are:

Disabled
Enabled

PCI Bus Frequency

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

The Setup screen displays the system option:

PCI Bus Frequency [Auto]

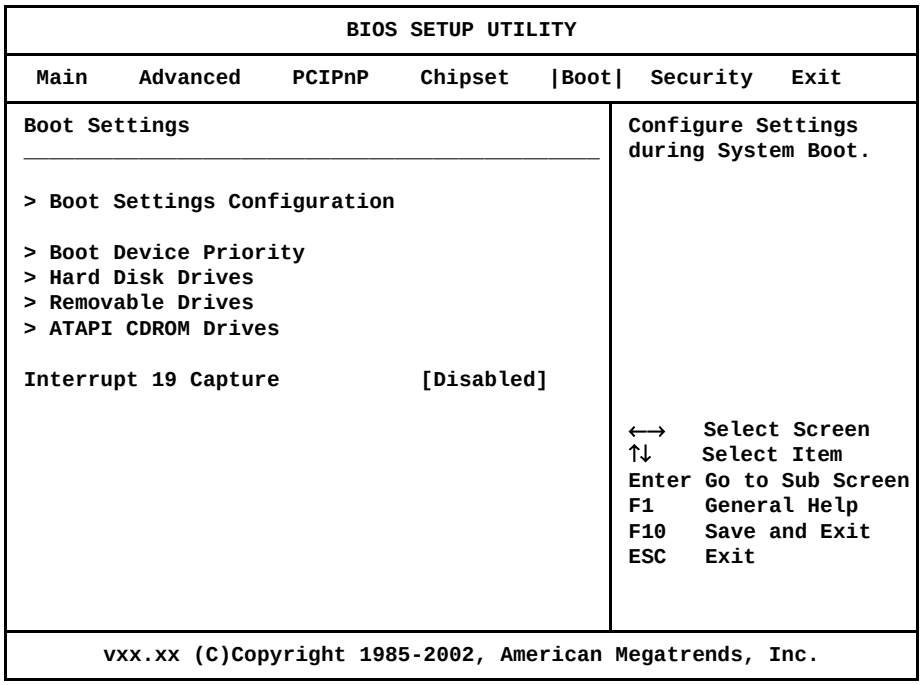
Available options are:

33 Mhz
66 Mhz
100 Mhz
133 Mhz
Auto

Chapter 6 Boot Setup

BOOT SETUP

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



Boot Setup Screen

When you display the Boot Setup 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.

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

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.

ATAPI CDROM Drives

The **ATAPI CDROM Drives** subscreen specifies the boot sequence of the ATAPI CDROM devices available in the system.

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

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.

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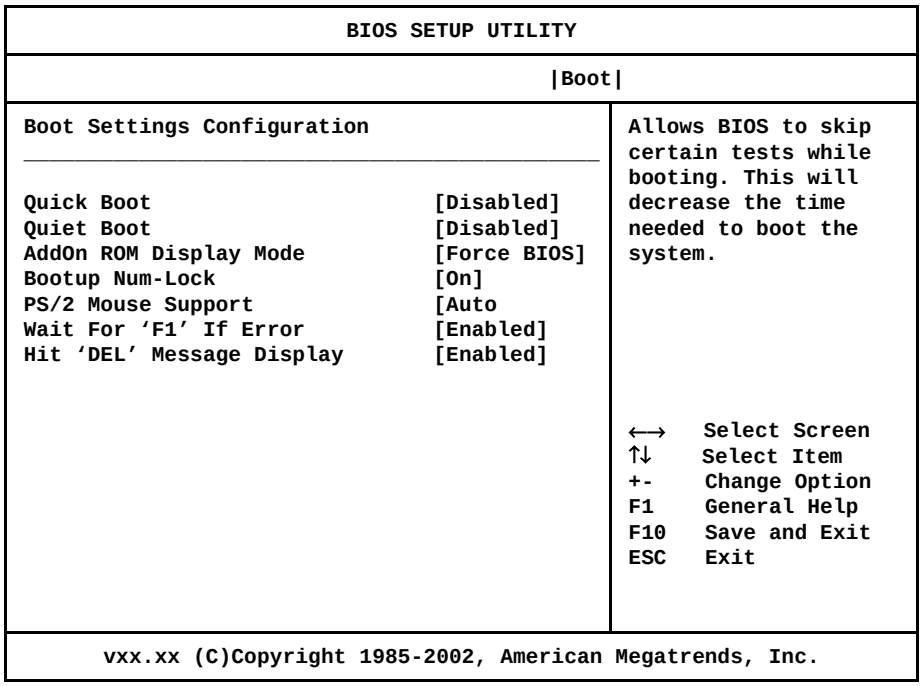
BOOT SETTINGS CONFIGURATION

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



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

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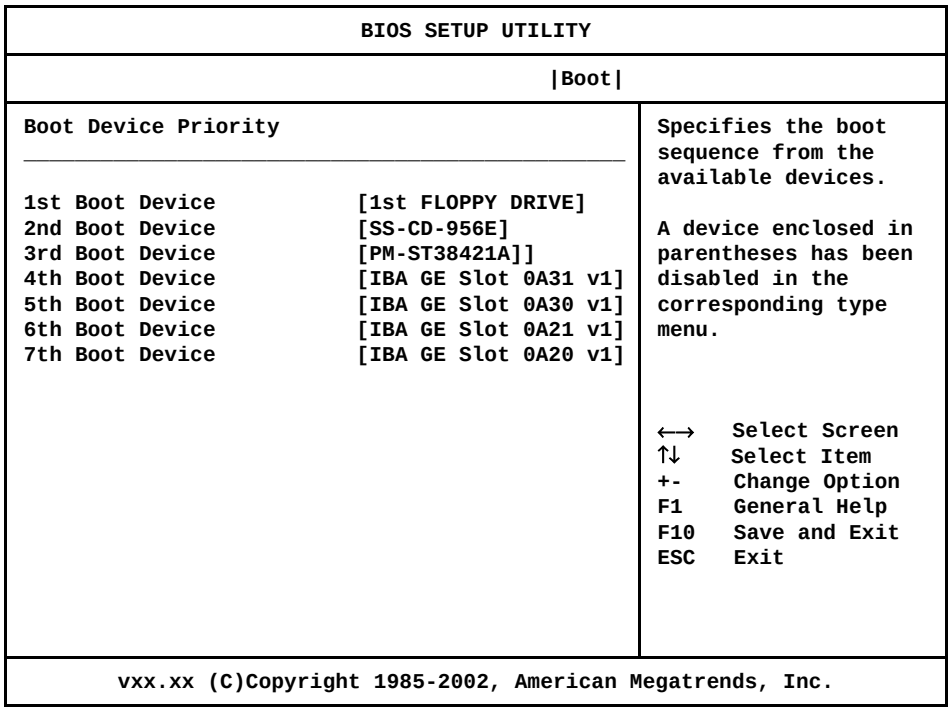
BOOT DEVICE PRIORITY

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



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 7th 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 SBC supports bootup from a LAN device. In the sample screen above, the 4th Boot Device through 7th Boot Device line items are boot from LAN options.

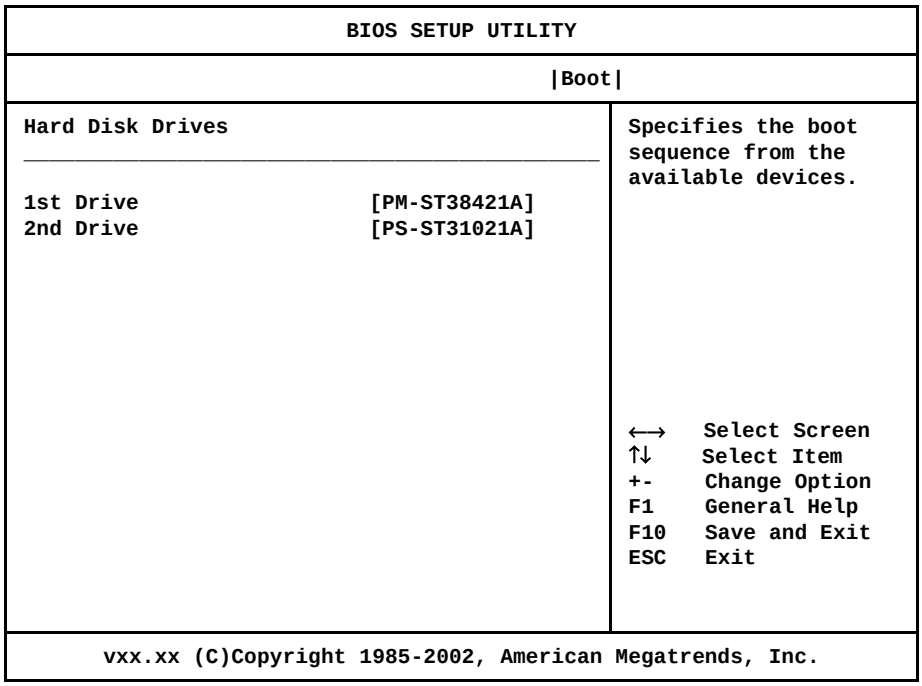
The Setup screen displays the system option(s):

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, the following Setup screen displays:



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 OPTIONS The SBC supports up to four hard disk drives through a primary and secondary controller 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.

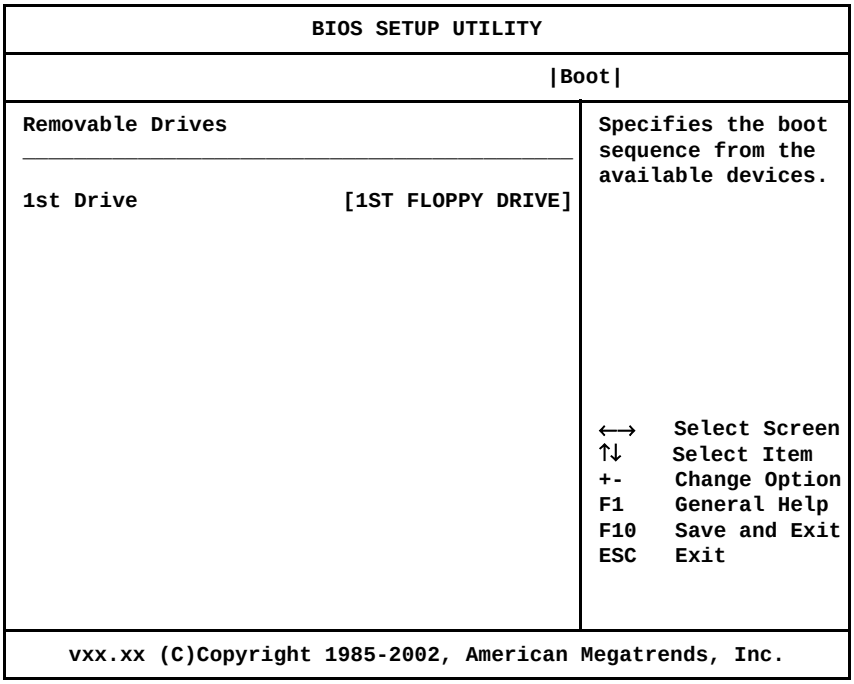
The Setup screen displays the system option(s):

Drive [xxxxxxxxx]

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

REMOVABLE DRIVES

When you select **Removable Devices** from the Boot Setup Menu, the following Setup screen displays:



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 SBC 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.

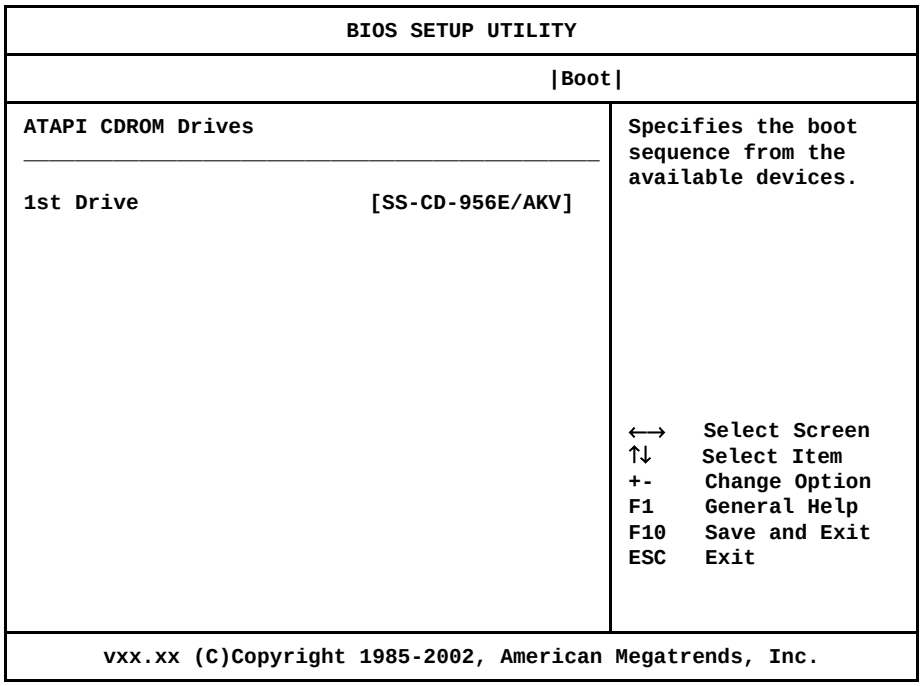
The Setup screen displays the system option(s):

Drive [xxxxxxxxx]

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

ATAPI CDROM DRIVES

When you select **ATAPI CDROM Drives** from the Boot Setup Menu, the following Setup screen displays:



ATAPI CDROM Drives Screen

When you display the ATAPI CDROM 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 ATAPI CDROM drives available.

ATAPI CDROM DRIVES OPTIONS

The SBC supports multiple ATAPI CDROM 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 ATAPI CDROM 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 ATAPI CDROM 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 ATAPI CDROM drive.

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 checkpoints that may occur during the Bootblock initialization portion of the BIOS:

Checkpoint	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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Appendix B IPMI Support

INTRODUCTION

Trenton Technology Inc. provides several series of CP16 single board computers which are compliant with the Intelligent Platform Management Interface (IPMI 1.5). This appendix details additions to AMIBIOS8 available only on IPMI-enabled CP16 SBCs, along with information about the AMI Unified Management Server (UMS) software which is supplied with the CP16. Refer to the *AMI Unified Management Server (UMS)* section later in this appendix for details of features supported and a quick start guide to assist you in installing the UMS application.

ONBOARD BMC CONTROLLER OPTION

If your CP16 SBC is IPMI-enabled, there is an additional line item on the PCI Plug and Play Setup screen which allows you to enable or disable the BMC and IPMI features of the SBC. If this option is set to **Enabled**, AMIBIOS adds an **IPMI 1.5 Configuration** line item to the Advanced Setup screen, allowing you to set up parameters for your system. If this option is set to **Disabled**, the IPMI screens will not be available for modification.

The Setup screen displays the system option:

Onboard BMC Controller [Enabled]

Available options are:

Disabled
Enabled

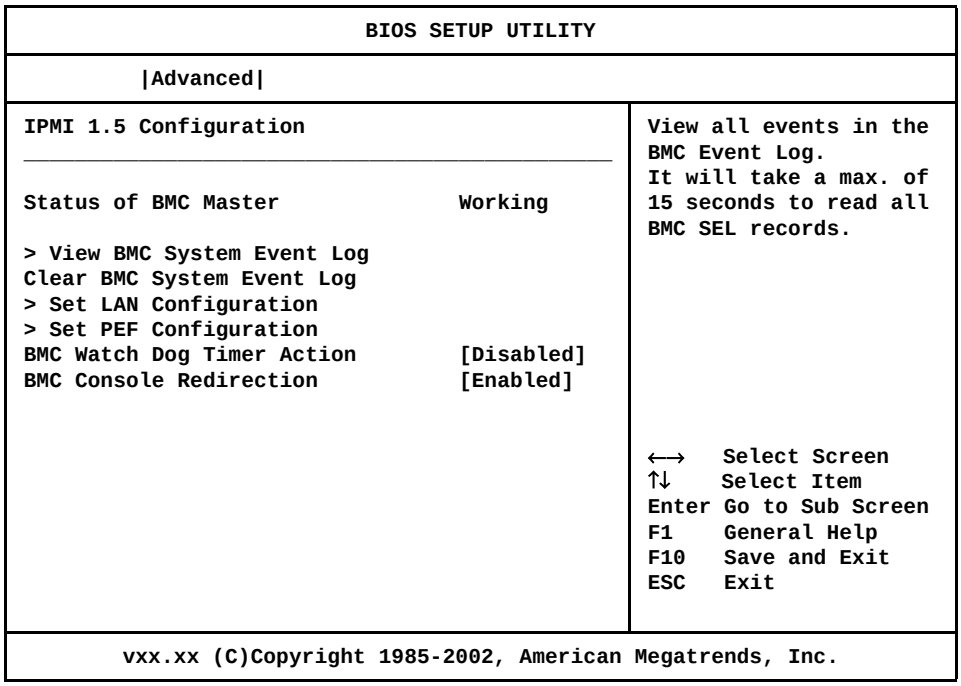
When the **Onboard BMC Controller** option on the PCI Plug and Play Setup screen is enabled, AMIBIOS8 adds the following line item to the Advanced Setup screen:

> IPMI 1.5 Configuration

Selecting this option allows you to continue to subscreens designed to configure IPMI for your system. These subscreens are detailed in the following sections of this appendix.

IPMI 1.5 CONFIGURATION

When you select **IPMI 1.5 Configuration** from the Advanced Setup Menu, the following Setup screen displays:



IPMI 1.5 Configuration Screen

When you display the IPMI 1.5 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.

NOTE: The values on the IPMI 1.5 Configuration screens do not necessarily reflect the values appropriate for your SBC. Refer to the explanations following each screen for specific instructions about entering correct information.

IPMI 1.5 CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run IPMI 1.5 Configuration Setup. Once values have been defined, they display each time IPMI 1.5 Configuration Setup is run.

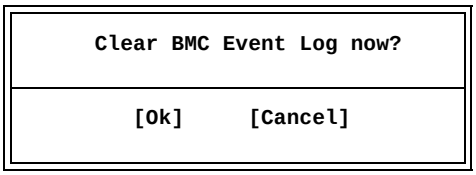
Status of BMC

This line item indicates whether or not the Baseboard Management Controller (BMC) is **Working** or **Not Working**. The status is determined by the system and cannot be changed manually.

Clear BMC System Event Log

This option allows you to clear the BMC System Event Log.

The following window displays:



Selecting **Ok** discards all entries in the BMC System Event Log. The next time you select the **View BMC System Event Log** option, only new entries will display.

BMC Watch Dog Timer Action

This option allows the BMC to reset or power down the system if the operating system crashes or hangs.

If this option is set to **Disabled**, the **BMC Watch Dog Time Out** option is not available.

The Setup screen displays the system option:

BMC Watch Dog Timer Action [Disabled]

Available options are:

Disabled
Reset System
Power Down
Power Cycle

BMC Watch Dog Time Out

This option specifies the amount of time for the BMC to wait before assuming the system has crashed and needs to be powered down or reset.

If the **BMC Watch Dog Timer Action** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

BMC Watch Dog Time Out [5 Min]

Available options are:

5 Min
1 Min
30 Sec
10 Sec

BMC Console Redirection

This option allows you to enable or disable console redirection through the BMC.

The Setup screen displays the system option:

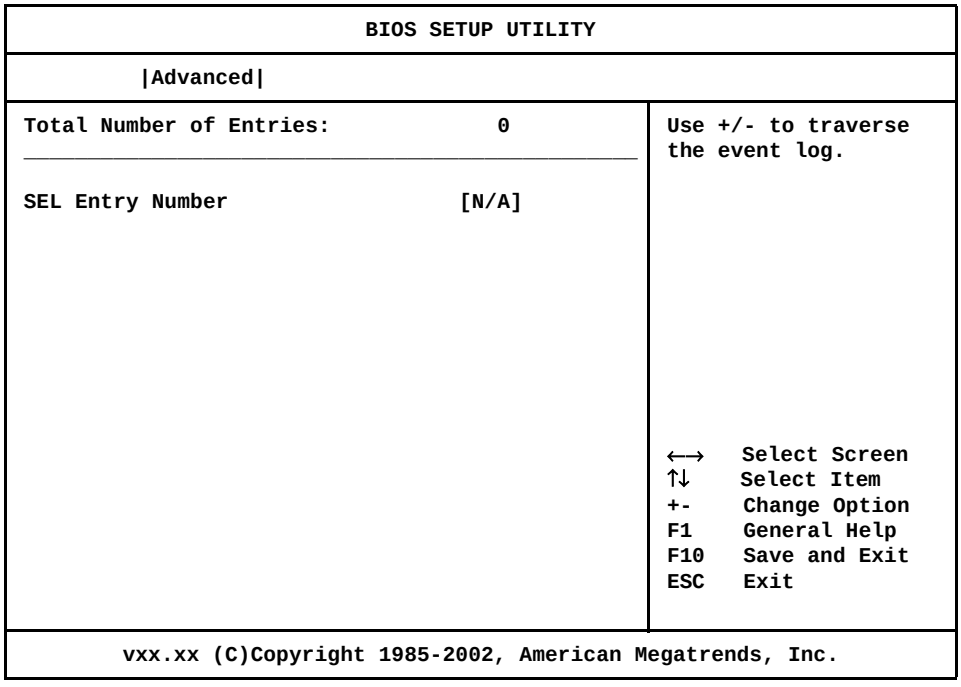
BMC Console Redirection [Enabled]

Available options are:

Disabled
Enabled

VIEW BMC SYSTEM EVENT LOG

When you select **View BMC System Event Log** from the IPMI 1.5 Configuration Menu, a screen similar to the following screen displays:

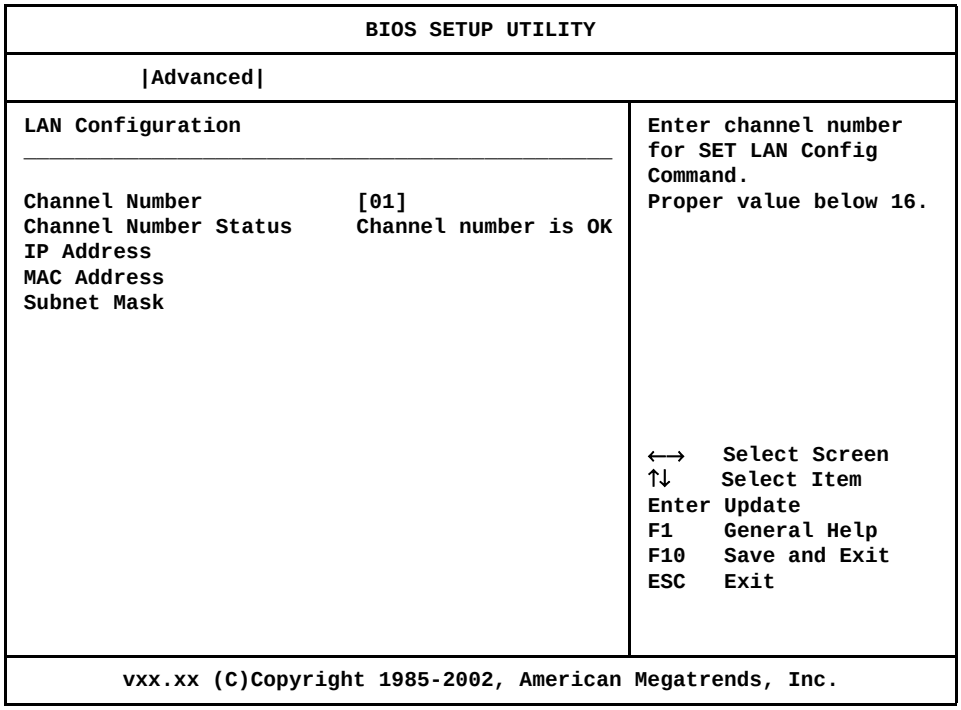


BMC System Event Log Screen

This screen displays the total number of entries in the System Event Log (SEL) of the BMC. If there are entries in the SEL, a complete description of each entry displays, including record ID, record type, event time stamp, generator ID, event sensor type, event sensor number, event dir type, event data, etc.

SET LAN CONFIGURATION

When you select **Set LAN Configuration** from the IPMI 1.5 Configuration Menu, a screen similar to the following screen displays:



Set LAN Configuration Screen

This screen allows you to program the BMC with a static IP address, MAC address and subnet mask. For further details on any of these line items, refer to the IPMI 1.5 Specification, Section 19.1.

NOTE: The line items on this screen only need to be configured if you are using a non-Windows operating system. If you are using a Windows operating system, Windows configures the correct values for you; changing them may cause unreliable system operation.

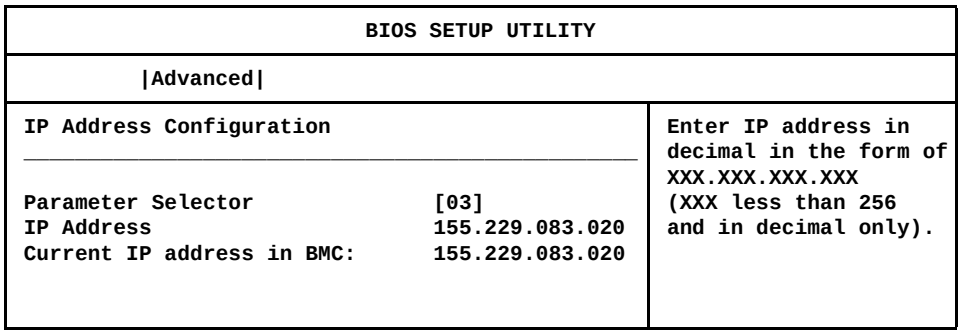
Channel Number

This option indicates the channel number. It should remain at “01” since IPMI communicates through LAN1.

The Channel Number Status line displays **Channel number is OK**. If the channel number is incorrect, **Wrong channel number** displays.

The IP Address, MAC Address and Subnet Mask options allow you to continue to subscreens designed to input parameters for each particular option. The partial screens shown below illustrate examples of appropriate parameters.

IP Address

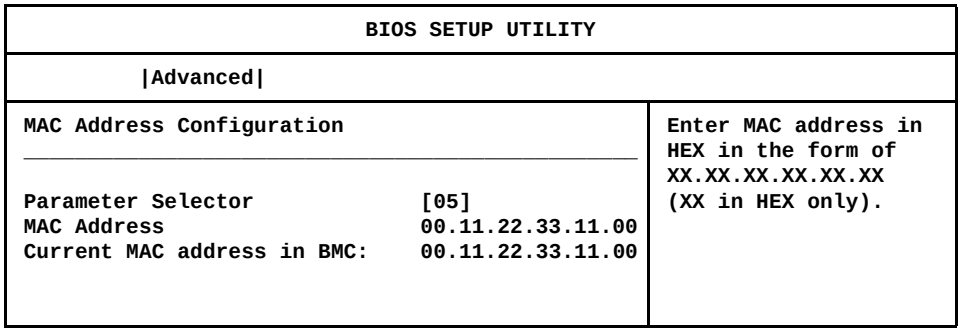


IP Address Screen

This screen allows you to program the BMC with a static IP address.

The value of the **Parameter Selector** is fixed by the system and cannot be changed. The **IP Address** must be in the format XXX . XXX . XXX . XXX, where XXX is decimal and must be less than 256. When you have entered the IP address successfully, the **Current IP address in BMC** line item changes to the value you have entered in the previous line.

MAC Address

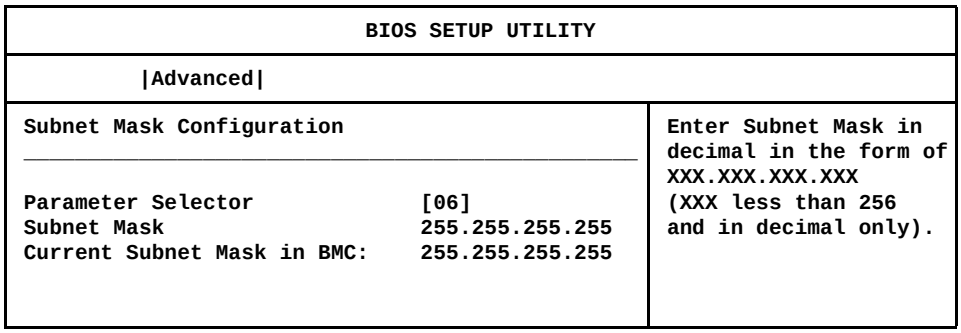


MAC Address Screen

This screen allows you to program the BMC with a Media Access Controller (MAC) address.

The value of the **Parameter Selector** is fixed by the system and cannot be changed. The **MAC Address** must be in the format XX . XX . XX . XX . XX . XX, where XX is hexadecimal. When you have entered the MAC address successfully, the **Current MAC address in BMC** line item changes to the value you have entered in the previous line.

Subnet Mask



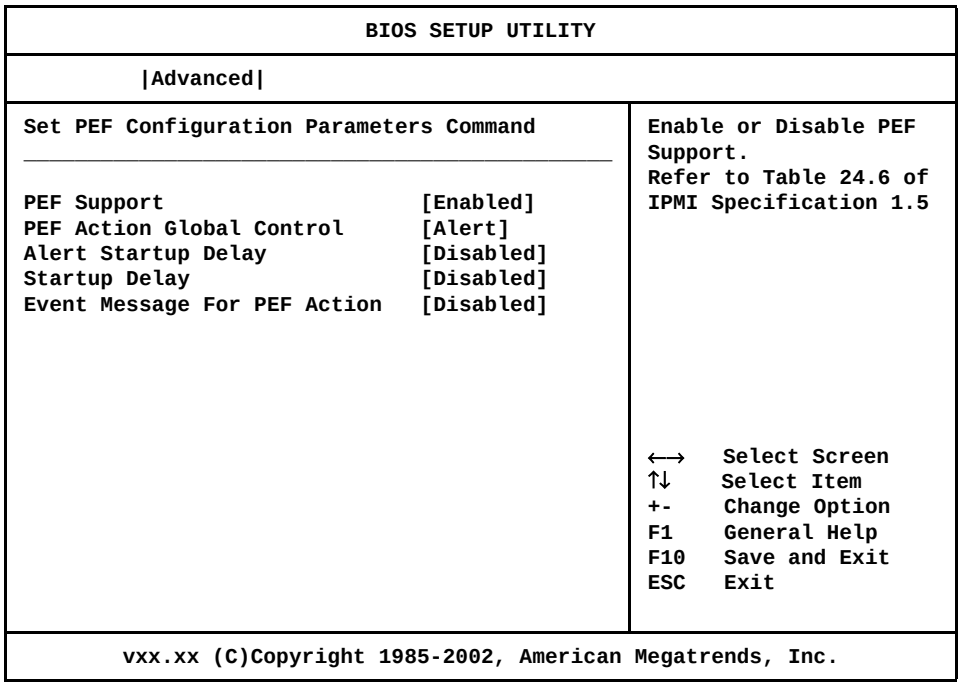
Subnet Mask Screen

This screen allows you to program the BMC with a subnet mask.

The value of the **Parameter Selector** is fixed by the system and cannot be changed. The **Subnet Mask** must be in the format XXX . XXX . XXX . XXX, where XXX is decimal and must be less than 256. When you have entered the subnet mask successfully, the **Current Subnet Mask in BMC** line item changes to the value you have entered in the previous line.

SET PEF CONFIGURATION

When you select **Set PEF Configuration** from the IPMI 1.5 Configuration Menu, a screen similar to the following screen displays:



Set PEF Configuration Screen

When you display the Set PEF Configuration screen, the format is similar to the sample shown above if you have enabled **PEF Support**. 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. For further details on any of these line items, refer to the IPMI 1.5 Specification, Section 24.3.

PEF CONFIGURATION OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not yet run IPMI 1.5 Configuration. Once values have been defined, they display each time IPMI 1.5 Configuration is run.

PEF Support

This option allows you to enable or disable PEF support.

The sample above shows the appearance of the screen if **PEF Support** is set to **Enabled**. If this option is set to **Disabled**, which is the default, the other options on this screen do not display.

The Setup screen displays the system option:

PEF Support [Disabled]

Available options are:

Disabled
Enabled

PEF Action Global Control

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

The Setup screen displays the system option:

PEF Action Global Control [Alert]

Available options are:

Alert
Power Down
Reset System
Power Cycle
OEM Action
Diagnostic Int.

Alert Startup Delay

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

The Setup screen displays the system option:

Alert Startup Delay [Disabled]

Available options are:

Disabled
Enabled

If you select **Enabled**, the **PEF Alert Startup Delay** option is added to the screen.

PEF Alert Startup Delay

This option allows you to select the time to delay alerts after system power-ups and resets.

If the **Alert Startup Delay** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

PEF Alert Startup Delay [No Delay]

Available options are:

No Delay
30 Sec
60 Sec
1.5 Min
2.0 Min

Startup Delay

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

The Setup screen displays the system option:

Startup Delay [Disabled]

Available options are:

Disabled
Enabled

If you select **Enabled**, the **PEF Startup Delay** option is added to the screen.

PEF Startup Delay

This option allows you to select the time to delay PEF after system power-ups and resets.

If the **Startup Delay** option is set to **Disabled**, this option is not available.

The Setup screen displays the system option:

PEF Startup Delay [No Delay]

Available options are:

No Delay
30 Sec
60 Sec
1.5 Min
2.0 Min

Event Message for PEF Action

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

The Setup screen displays the system option:

Event Message for PEF Action [Disabled]

Available options are:

Disabled
Enabled

AMI Unified Management Server (UMS)

As a service to its customers, Trenton supplies the American Megatrends, Inc. Unified Management Server (UMS) software with those CP16 SBCs which are IPMI-enabled. The features and functionality of the UMS utility may be affected by the configuration of your system. UMS features tested and supported by Trenton are listed in this appendix, along with a section to assist you in installing the UMS application. You may also choose to use another utility designed for use with IPMI.

The American Megatrends, Inc. Unified Management Server (UMS) utility was developed by AMI as a tool to allow you to manage multiple IPMI-enabled network servers from a single station. It is a server application that can be accessed through an Internet browser and allows system administrators to simplify hardware management.

The complete *UMS User's Guide* may be found on the AMI Unified Management Server CD distributed by Trenton (#89-006348-000). For further information, you may access American Megatrends' web site - www.ami.com.

UMS Features Supported

The following subset of AMI's Unified Management Server (UMS) features have been tested and are supported on Trenton Technology Inc.'s IPMI-enabled CP16 single board computers:

System Health Information

- CPU Temperature
- BMC Temperature
- BMC Analog Power
- BMC Power
- +12V
- -12V
- +5V
- +3.3V
- +1.8V
- +2.5V
- VCC_CORE
- VTT_CPU
- VBAT

Performance Monitoring (NOTE: UMS must be installed and running on the node which is to be monitored and the Ethernet connection must be on LAN 1 of the node.)

- CPU Information
  - Description
  - Model Name
  - Processor Type/Speed
  - Cache Size
  - Utilization
  - Operating System
- Memory Information
  - Total Memory
  - Available Memory
  - Used Memory

- Disk Information
  - Drive Name
  - Volume Name
  - File System
  - Total Space
  - Used Space

Remote Management

- Method Invocation
  - Power Reset

UMS System Requirements

AMI's UMS application requires a *minimum* of the following hardware and software for correct operation:

256MB of memory
Windows NT, Windows 2000, Windows XP, Windows 2003 Server
Internet Explorer 6.0 (http://www.microsoft.com/downloads)
Macromedia Flash Plug-in (http://www.macromedia.com/shockwave/download)

The Internet Explorer and Macromedia Flash Plug-in software must be installed before you install the UMS software. The latest versions of these applications can be obtained from the web sites listed above.

UMS Installation

NOTE: It is important to install the UMS application correctly. Follow the steps below carefully. If it is necessary to stop the UMS application, refer to the instructions at the end of this section. If the UMS software has been corrupted for any reason (e.g., by closing UMS incorrectly, power fail, etc.), remove UMS and then reinstall it.

To Install UMS:

Step 1 Insert the AMI Unified Management Server (UMS) CD and run Java 2 SDK setup (j2sdk-1_4_0_01-windows-i586) from the CD. Leave all options checked.

Step 2 Run UMS 2.0 setup (setup.exe) from the CD.
> For installation choice, select **Custom**, check all options and continue. This installs the UMS Server and Agent.
> Restart the machine and log back into Windows.

To Run UMS:

Step 1 Before running UMS, be sure the Ethernet connection is on LAN 1 of the node.
Go to **Start Menu**--> **Programs**--> **UMS**--> **Start UMS**.
> Allow the UMS window to load completely.

NOTE: Loading UMS may take a few minutes, depending on whether you are loading the UMS Server, Agent or both.

STEP 2 Open Internet Explorer and in the URL box, type: **http://<ip address>:8080/ums**

where <ip address> is the assigned IP address of your local machine.

STEP 3 Once the UMS Login is loaded, enter the UserID and Password. The default UserID and Password are "**Admin**," as shown below:

> UserID: Admin
> Password: Admin

NOTE: UserID and Password are case sensitive.

> Enter required user information and click **Submit**. You are now connected to the UMS server and the UMS startup screen displays.

STEP 4 At the top of the left-hand column, click on the **Discovery** tab if it has not already been selected.

> Click **Configure Discovery**.
> Click **Configure Network Model**.
> Click **Add Network Model**.
> Enter **Network Name**, **IP Address** and **Network Mask** of the node you are trying to discover (for example, IPMI_1, 155.229.81.160, 255.255.255.255)
> Check **Do Discovery** at the bottom of the page, and then click **Add**. The node will be added to the list on the screen.

Repeat these steps for additional nodes, if any.

> Be sure **Discover** is checked for each node you want to discover and click **Start Discovery**.

NOTE: Discovery may take from 10 seconds to 5 minutes, depending on how many nodes are being discovered.

STEP 5 Under the **Discovery** tab in the left-hand column, click **Discovered Nodes** to verify that all nodes have been discovered correctly. Nodes which have been discovered are shown on the node map. To display node details, highlight the node on the map.

If any of the nodes you have defined do not appear, return to step 4 to verify and correct the node information you entered. The following instructions do not work for nodes which have not been discovered correctly.

STEP 6 In the left-hand column, click on the **Devices** tab.
> Click **Select Device**.
> Click on the box next to the node name to expand the device menu.
> Click on the IPMI tab of the selected device.
i.e., IPMI (AMIRoot Template) for remote monitoring
or IPMI-INBAND for local monitoring

STEP 7 In the left-hand column, click the **Monitoring** tab to expand the menu.
> Click **Select Monitorable Attributes**.
> Check **Select All** and click **Submit**.

STEP 8 Under the **Monitoring** tab, click **System Health Information**.
> Click on **Get Live Values**.

STEP 9 Under the **Monitoring** tab, scroll down and click on **Performance Monitoring**.
> Click on **Performance** to view Memory/CPU/Disk/Net information.

NOTE: UMS Agent Software must be installed and running on the host node in order to view **Performance Monitoring** remotely.

To run the UMS Agent software, go to **Start Menu**--> **Programs**--> **UMS**--> **Start UMS Agent**. Allow the UMS window to load completely.

TO STOP UMS:

STEP 1 To stop the UMS software, go to **Start Menu**--> **Programs**--> **UMS**--> **Stop UMS**.

NOTE: Any other methods of closing UMS may corrupt UMS software, which may require a full reinstallation of UMS software. If this occurs or if the software is corrupted in any way, remove UMS and then reinstall it.

STEP 2 Close the UMS Internet Explorer browser.

FOR MORE INFORMATION For more information on these or additional features of the AMI Unified Management Server (UMS), refer to the complete *UMS User's Guide* which may be found on the AMI Unified Management Server CD distributed by Trenton (#89-006348-000). You may also access American Megatrends' web site - www.ami.com.

Appendix C RTM25 Rear I/O Transition Module

INTRODUCTION

The RTM25 is a Rear I/O Transition Module (RTM) for use with CompactPCI® single board computers (SBCs). It features connectivity for the following: mouse, keyboard, serial port, video and dual USB. It also provides dual EIDE, floppy, speaker and optional dual Ultra320 SCSI interfaces.

This board interfaces to the CompactPCI SBC through rJ4 and rJ5 of the CompactPCI Bus. The RTM25 is a 6U rear panel I/O board that is compatible with Trenton Technology's CP16 (6137-xxx) single board computer.

The RTM25-NS model has all of the standard features of the RTM25, except it does not include the Adaptec SCSI controller or the two Ultra320 SCSI ports.

The RTM25-NJ model, designed for use in H.110 applications, eliminates the rJ4 connector and therefore does not support the Ultra320 SCSI option or rear I/O panel video interface.

MODELS

Model #	Model Name	Description
6142-000	RTM25	Standard, with SCSI
6142-020	RTM25-NS	No SCSI
6142-040	RTM25-NJ	No J4 I/O

FEATURES

- Connectivity on rear panel for the following: mouse, keyboard, serial port, video and dual USB
- Dual EIDE Ultra ATA/100, floppy and speaker interfaces
- Available with or without dual Ultra320 SCSI interfaces
- 6U CompactPCI rear panel I/O board
- Compatible with PCI Industrial Computer Manufacturers Group (PICMG®) CompactPCI Specification

MECHANICAL DIMENSIONS

6U CompactPCI board - 233.35 mm x 80 mm
Single-slot - 4HP - 20.32 mm wide

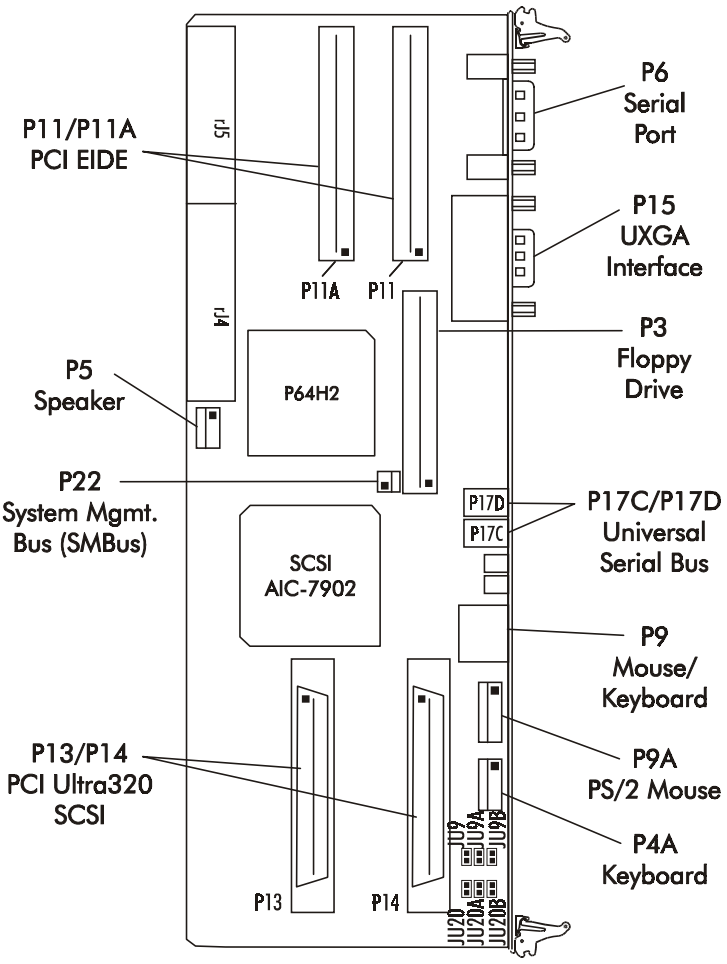
TEMPERATURE/ ENVIRONMENT

Operating Temperature: 0^{o} C. to 55^{o} C. with 350 LFM of airflow

Storage Temperature: - 20^{o} C. to 70^{o} C. with 350 LFM of airflow

Humidity: 5% to 90% non-condensing

RTM BOARD LAYOUT



CONFIGURATION JUMPERS

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

Jumper | Description

JU9/JU9A JU9B **SCSI Termination - Channel 0**

These three jumpers may be used to enable or disable on-board active termination for the Ultra320 SCSI interface - Channel 0.

	JU9	JU9A	JU9B
Enable active termination	Install*	Install*	Remove*
Disable active termination	Remove	Remove	Remove
Enable upper byte only	Remove	Install	Remove
Control via SCSI BIOS Utility	Remove	Remove	Install

JU20/JU20A JU20B **SCSI Termination - Channel 1**

These three jumpers may be used to enable or disable on-board active termination for the Ultra320 SCSI interface - Channel 1.

	JU20	JU20A	JU20B
Enable active termination	Install*	Install*	Remove*
Disable active termination	Remove	Remove	Remove
Enable upper byte only	Remove	Install	Remove
Control via SCSI BIOS Utility	Remove	Remove	Install

CONNECTORS

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

P3 - Floppy Drive Connector
34 pin dual row header, Amp #103308-7

Pin	Signal	Pin	Signal
1	Gnd	2	N-RPM
3	Gnd	4	NC
5	Gnd	6	D-Rate0
7	Gnd	8	P-Index
9	Gnd	10	N-Motoron 1
11	Gnd	12	N-Drive Sel2
13	Gnd	14	N-Drive Sel1
15	Gnd	16	N-Motoron 2
17	Gnd	18	N-Dir
19	Gnd	20	N-Stop Step
21	Gnd	22	N-Write Data
23	Gnd	24	N-Write Gate
25	Gnd	26	P-Track 0
27	Gnd	28	P-Write Protect
29	Gnd	30	N-Read Data
31	Gnd	32	N-Side Select
33	Gnd	34	Disk Chng

P4A - Keyboard Header
5 pin single row header, Amp #640456-5

Pin	Signal
1	Kbd Clock
2	Kbd Data
3	Key
4	Kbd Gnd
5	Kbd Power (+5V fused) with self-resetting fuse

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

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

CONNECTORS (CONTINUED)

P6 - Serial Port Connector
9 position "D" right angle, Spectrum #56-402-001

Pin	Signal	Pin	Signal
1	Carrier Detect	6	Data Set Ready-I
2	Receive Data-I	7	Request to Send-O
3	Transmit Data-O	8	Clear to Send-I
4	Data Terminal Ready-O	9	Ring Indicator-I
5	Signal Gnd		

P9 - PS/2 Mouse and Keyboard Connector
6 pin mini DIN, Kycon #KMDG-6S-B4T

Pin	Signal
1	Ms Data
2	Kbd Data
3	Gnd
4	Power (+5V fused) with self-resetting fuse
5	Ms Clock
6	Kbd Clock

P9A - PS/2 Mouse Header
6 pin single row header, Amp #640456-6

Pin	Signal
1	Ms Data
2	Reserved
3	Gnd
4	Power (+5V fused) with self-resetting fuse
5	Ms Clock
6	Reserved

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

CONNECTORS (CONTINUED)

P11 - Primary IDE Hard Drive Connector (continued)

Pin	Signal	Pin	Signal
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.

P13 - Ultra320 SCSI Connector - Channel 0
68 pin high density connector, Amp #749069-7

Pin	Signal	Pin	Signal
1	SCD12	35	SCD#12
2	SCD13	36	SCD#13
3	SCD14	37	SCD#14
4	SCD15	38	SCD#15
5	SCDPH	39	SCDPH#
6	SCD0	40	SCD#0
7	SCD1	41	SCD#1
8	SCD2	42	SCD#2
9	SCD3	43	SCD#3
10	SCD4	44	SCD#4

CONNECTORS (CONTINUED)

P13 - Ultra320 SCSI Connector - Channel 0 (continued)

Pin	Signal	Pin	Signal
11	SCD5	45	SCD#5
12	SCD6	46	SCD#6
13	SCD7	47	SCD#7
14	SCDPL	48	SCDPL#
15	Gnd	49	Gnd
16	DIFSENSE	50	Gnd
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	NC	53	NC
20	Gnd	54	Gnd
21	SCATN	55	SCATN#
22	Gnd	56	Gnd
23	SCBSY	57	SCBSY#
24	SCACK	58	SCACK#
25	SCRST	59	SCRST#
26	SCMSG	60	SCMSG#
27	SCSEL	61	SCSEL#
28	SCCD	62	SCCD#
29	SCREQ	63	SCREQ#
30	SCIO	64	SCIO#
31	SCD8	65	SCD#8
32	SCD9	66	SCD#9
33	SCD10	67	SCD#10
34	SCD11	68	SCD#11

P14 - Ultra320 SCSI Connector - Channel 1
68 pin high density connector, Amp #749069-7

Pin	Signal	Pin	Signal
1	SCD12	35	SCD#12
2	SCD13	36	SCD#13
3	SCD14	37	SCD#14
4	SCD15	38	SCD#15
5	SCDPH	39	SCDPH#
6	SCD0	40	SCD#0
7	SCD1	41	SCD#1
8	SCD2	42	SCD#2
9	SCD3	43	SCD#3
10	SCD4	44	SCD#4
11	SCD5	45	SCD#5
12	SCD6	46	SCD#6
13	SCD7	47	SCD#7
14	SCDPL	48	SCDPL#
15	Gnd	49	Gnd
16	DIFSENSE	50	Gnd
17	TERMPWR	51	TERMPWR

CONNECTORS (CONTINUED)

P14 - SCSI Connector - Channel 1 (continued)

Pin	Signal	Pin	Signal
18	TERMPWR	52	TERMPWR
19	NC	53	NC
20	Gnd	54	Gnd
21	SCATN	55	SCATN#
22	Gnd	56	Gnd
23	SCBSY	57	SCBSY#
24	SCACK	58	SCACK#
25	SCRST	59	SCRST#
26	SCMSG	60	SCMSG#
27	SCSEL	61	SCSEL#
28	SCCD	62	SCCD#
29	SCREQ	63	SCREQ#
30	SCIO	64	SCIO#
31	SCD8	65	SCD#8
32	SCD9	66	SCD#9
33	SCD10	67	SCD#10
34	SCD11	68	SCD#11

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

P17C - Universal Serial Bus (USB) Connector

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

Pin	Signal
1	+5V-USB2
2	USB2-
3	USB2+
4	Gnd-USB2

CONNECTORS (CONTINUED)

P17D - Universal Serial Bus (USB) Connector
USB vertical connector, Molex #67-329-0000
(+5V fused with self-resetting fuse)

Pin	Signal
1	+5V-USB3
2	USB3-
3	USB3+
4	Gnd-USB3

P22 - System Management Bus Connector
2 pin single row header, Amp #640456-2

Pin	Signal
1	SMB Clock
2	SMB Data

COMPACTPCI PIN ASSIGNMENTS

rJ4 and rJ5 are used for connection to the processor board. The pin assignments for these connectors are defined in the tables which follow.

rJ4

Pin	F	E	D	C	B	A
25	GND	EXT1C#	EXT1C		EXT1A#	EXT1A
24	GND	EXT1D#	EXT1D		EXT1B#	EXT1B
23	GND	EXT2C#	EXT2C		EXT2A#	EXT2A
22	GND	EXT2D#	EXT2D		EXT2B#	EXT2B
21	GND	GND	GND		GND	GND
20	GND	LKACT1_A	LKACT2_A			VGASCL
19	GND	LKACT1_C	LKACT2_C	SPDLEDL1_C		VVSYNC
18	GND		GND	SPDLEDL2_C		VHSYNC
17	GND			+3,3V	+5V	VRED
16	GND			+3.3V	+5V	VGREEN
15	GND			+3.3V	+5V	VBLUE
14						
13			KEY			
12						
11	GND	GND				VGASDA
10	GND	PCLK66EX1	+12V			
9	GND	BT_INTR#	+12V			GND
8	GND	PWRGOOD		GND	GND	GND
7	GND	EXPCIRST#	GND	P64HI21	P64HI13	P64HI6
6	GND	GND	GND	P64HI20	P64HI12	P64HI5
5	GND	P64HUSTBS	GND	P64HI18	P64HI11	P64HI4
4	GND	P64HUSTBF	GND	P64HI17	P64HI10	P64HI3
3	GND	GND	GND	P64HI16	P64HI9	P64HI2
2	GND	P64HSTBS	GND	P64HI15	P64HI8	P64HI1
1	GND	P64HSTBF	GND	P64HI14	P64HI7	P64HI0

COMPACTPCI PIN ASSIGNMENTS (CONTINUED)

rJ5

Pin	F	E	D	C	B	A
22	GND	SDD7	PDD7	PIORDY	SIORDY	DRVDEN0
21	GND	SDD6	PDD6	BRSTDRV#	TACH1	DRVDEN1
20	GND	SDD5	PDD5	PCBL_DET	SCBL_DET	INDEX#
19	GND	SDD4	PDD4	PIDESEL#	SIDESEL#5	MTR0#
18	GND	SDD3	PDD3	PDREQ	SDREQ	DRV1#
17	GND	SDD2	PDD2	PDIOW#	SDIOW#	DRV0#
16	GND	SDD1	PDD1	PDIOR#	SDIOR#	MTR1#
15	GND	SDD0	PDD0	PDA2	SDA2	DIR
14	GND	SDD8	PDD8	BMC_TINT#	PWM1	STEP#
13	GND	SDD9	PDD9	GPO	RTS2	WDATA#
12	GND	SDD10	PDD10	BMC_TCK	TXD2	WGATE#
11	GND	SDD11	PDD11	BMC_TDI	DTR2	TRK0#
10	GND	SDD12	PDD12	BMC_TMS	+5V	WRPRT#
9	GND	SDD13	PDD13	BMC_TDO	DCD2	RDATA#
8	GND	SDD14	PDD14	OVT#	RXD2	HDSEL#
7	GND	SDD15	PDD15	INTRUDER#	RI2	DSKCHG#
6	GND	SDACK#	PDACK#	USB1	CTS2	TACH2
5	GND	IRQ15	IRQ14	USB0	DSR2	PWM2
4	GND	SDA1	PDA1	USBP1+	+3.3V	MDATA
3	GND	SDA0	PDA0	USBP1-	SPKR_OUT	MCLK
2	GND	SCS1#	PCS1#	USBP0+	FAULT	KDATA
1	GND	SCS3#	PCS3#	USBP0-	ICH_GPIO43	KCLK

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