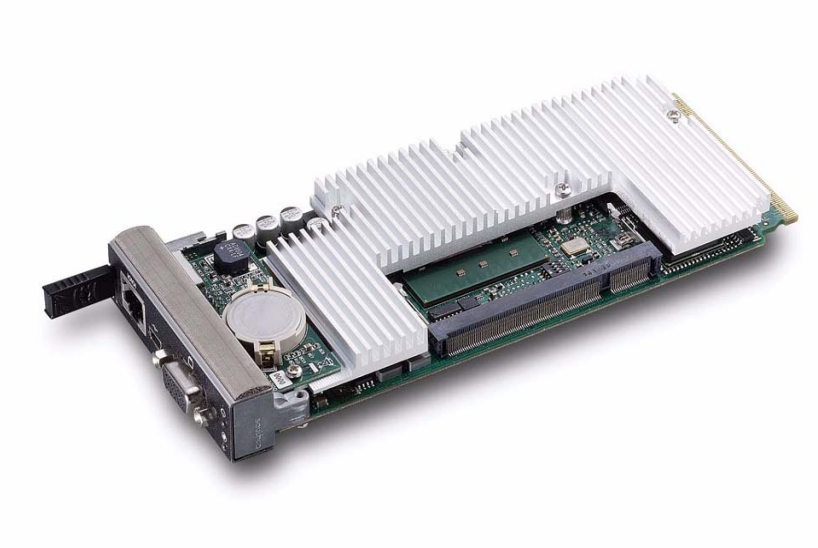
AMC-1000

AdvancedMC™ Processor Module
with Intel® Core™2 Duo Processor

User's Manual



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Revision Date:	March 26, 2009
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Revision History

Revision	Release Date	Description of Change(s)
2.00	2009/03/26	Initial Release

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Preface

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Using this Manual

Audience and Scope

The AMC-1000 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade CompactPCI modules.

Manual Organization

This manual is organized as follows:

Chapter 1, Overview: Introduces the AMC-1000, its features, block diagrams, and package contents.

Chapter 2, Specifications: Presents detailed specification information, power consumption, and technical drawings.

Chapter 3, Functional Description: Describes the AMC-1000 main functions and board interfaces.

Chapter 4, Connectors and Switches: Describes the connectors and swtiches of the AMC-1000.

Chapter 5, Getting Started: Describes the installation instructions of the AMC-1000.

Chapter 6, Driver Installation: Describes the driver installation procedures.

Chapter 7, Watchdog Timer: Describes the Watchdog Timer functionality.

Chapter 8, IPMI Interface: Describes the AMC-1000's IPMI interface.

Chapter 9, BIOS Setup Utility: Describes the AMIBIOS®8 BIOS setup utility.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.


NOTE:

Additional information, aids, and tips that help users perform tasks.


CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.


WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Overview

1.1 Introduction

The AMC-1000 is a single-width, mid-size AdvancedMC™ Processor Module combining a dual-core 64-bit low-power processor and server-class integrated 3100 chipset to optimize power consumption, computing power and I/O bandwidth. With dual Gigabit Ethernet links, flexible PCI-E x8 bandwidth, and a UXGA high-color analog display, the AMC-1000 provides AdvancedTCA® and MicroTCA™ adopters with flexible, high-speed data transport configurations that are ideal for the communications, military, medical, and industrial automation markets.

The AMC-1000 features a 64-bit Intel® Core™2 Duo 1.5GHz processor with 4MB L2 cache and 667MHz Front Side Bus. Its dual-core architecture offers advanced processing speed while addressing the power and heat constraints of the mid-size AMC form factor. The Intel® 3100 chipset combines server-class memory and I/O controller functions into a single component, providing low-latency, high-throughput data transfer capability without CPU intervention.

Specifically optimized for embedded communication applications requiring high bandwidth, the AMC-1000 is built with an industry standard DDR2-400 SO-RDIMM socket that supports up to 4GB system memory with ECC protection. Features such as a soldered down 4GB USB interface NAND flash, an onboard PLX PEX8508 PCI Express Switch and an ATI ES1000 graphics controller, make the AMC-1000 an optimum choice for various applications on AdvancedTCA® or MicroTCA™ platforms.

The AMC-1000 supports eight AMC.1 PCI Express® lanes, which can be configured as two x4 or one x4 and four x1 PCI-E ports (eight x1 ports by build option). It also supports two Gigabit Ethernet SerDes ports compliant to AMC.2 E2. In addition, two SATA v1.0 ports compliant to AMC.3 S2 SATA support off-board storage.

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1.2 Features

- Intel® Core™2 Duo processor, up to 1.5GHz
- Server class Intel® 3100 chipset
- DDR2-400 JEDEC standard SO-RDIMM (REG/ECC), up to 4GB
- Flexible PCI Express configurations
  - two PCI-E x4
  - one PCI-E x4 and four PCI-E x1
  - eight PCI-E x1 (build option)
- PICMG AMC.0 single-width, mid-size standard form factor
- AMC.1 PCI Express Type 1/4
- AMC.2 Gigabit Ethernet E2
- AMC.3 SATA S2
- On board 4GB USB interface NAND flash

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1.3 Block Diagram

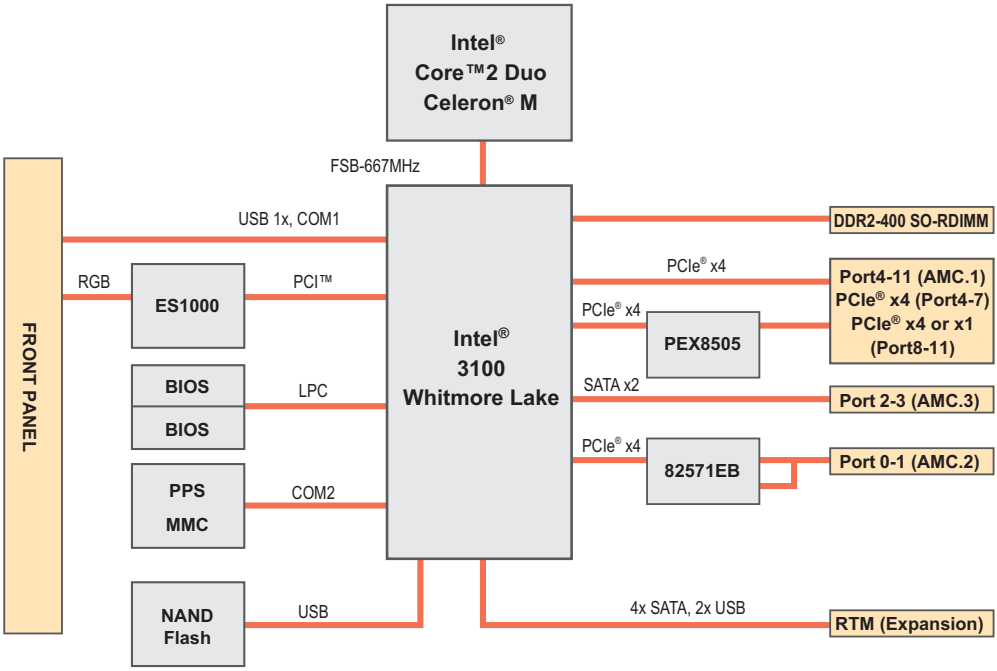


Figure 1-1: AMC-1000 Block Diagram

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1.4 Package Contents

The AMC-1000 is packaged with the following components. If any of the items on the contents list are missing or damaged, retain the shipping carton and packing material and contact the dealer for inspection. Please obtain authorization before returning any product to ADLINK.

- AMC-1000 AdvancedMC™ Processor Module (CPU, memory specifications will differ depending on options selected)
- RJ-45 to DB9 cable
- Mini-USB to Type A USB cable
- ADLINK All-in-one Driver CD
- User's manual

The contents of non-standard AMC-1000 configurations may vary depending on the customer's requirements.

CAUTION: This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

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2 Specifications

2.1 CPU/Chipset/Memory

Processor	µFC-BGA Intel® Core™ 2 Duo LV (L7400) 1.5 GHz, FSB 667MHz, 4 MB L2 cache
	µFC-BGA Intel® Celeron® M ULV (423) 1.06 GHz, FSB 533MHz, 1 MB L2 cache
Chipset	Intel® 3100 chipset
Memory	Single channel onboard registered ECC DDR2 SDRAM at 400MHz up to 4GB; one SO-RDIMM socket

2.2 Standards and Interfaces

AMC Standards	AMC.0 Advanced Mezzanine Card R2.0 AMC.1 PCI Express R1.0 AMC.2 Gigabit Ethernet R1.0 AMC.3 Storage R1.0
PCI Express	2x PCI-Express x4 on ports 4-7, 8-11 (ports 8-11 configurable to 4 channels x1)
Gigabit Ethernet	Intel® 82571EB PCI Express x4 Gigabit Ethernet controller 2x 1000BASE-BX channels on ports 0-1
Serial ATA	2x SATA-150 channels on ports 2-3 4x additional SATA-150 channels on ports 14-15, 17-18
Display	ATI ES1000 graphics controller with 2D accelerator DDR2-533 64MB memory Analog RGB up to 1600x1200@75Hz refresh rate
USB	1x mini-B USB 2.0 port (front panel) 2x USB 2.0 on port 19
Serial Port	1x RJ-45 RS-232 port (front panel)
Storage	On-board 4GB USB NAND Flash
Front Panel I/O	1x VGA port (DB-15) 1x USB 2.0 port (mini-B) 1x RS-232 port (RJ45) Three LEDs: Power, OOS, Hotswap Reset button

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2.3 Software

BIOS	Award BIOS with 8Mbit flash memory
Supported OS	Microsoft Windows XP Professional SP2 Microsoft Windows Server 2003 Microsoft Windows XP Embedded Feature Pack 2007 RedHat Enterprise Linux Release 5.1 MontaVista Linux Carrier Grade Edition 4.0 Contact ADLINK for other OS availability

2.4 Mechanical/Environmental

Form Factor	181.5mm x 73.5mm x 18.96mm (Mid-size) 181.5mm x 73.5mm x 28.95mm (Full-size)
Operating Temperature	-5 to 55°C
Storage Temperature	-20°C to 80°C
Humidity	5% to 95% non-condensing
Shock	15G peak-to-peak, 11ms duration, non-operation
Vibration	Non-operating: 1.88G rms, 5 to 500 Hz, each axis
	Operating: 0.5G rms 5 to 500Hz, each axis (w/ external storage) 1.88G rms 5 to 500Hz, each axis (w/ USB Flash only)
Compliance	CE, FCC Class A, CUL, NEBS Level 3 (design)

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2.5 Power Consumption

This section provides the information on the power consumption of AMC-1000.

The following tables indicate the current and power consumption using real applications with 12V power rail under Linux idle mode and Windows.

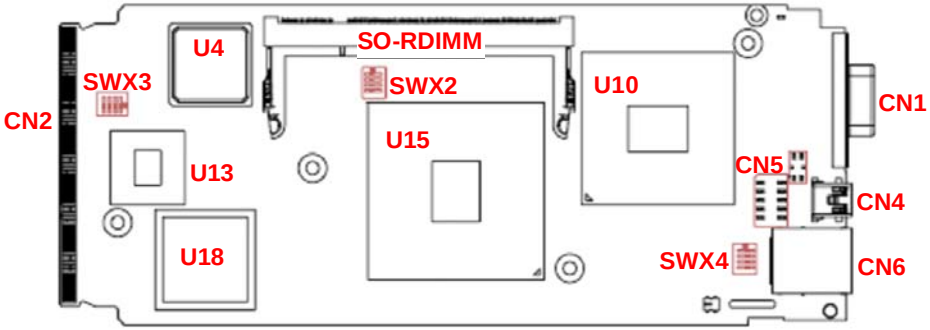
Processor	LINUX idle	Windows XP idle	Windows XP 100% usage
Core™2 Duo 1.5 GHz (L7400)	2.64 A / 31.64 W	2.84 A / 34.04 W	3.36 A / 40.32 W
Celeron M 1.06 GHz (423)	2.31 A / 27.73 W	2.32 A / 27.80 W	2.45 A / 29.38 W

Table 2-1: AMC-1000 Power Consumption

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2.6 Board Layout

AMC-1000 Board Layout

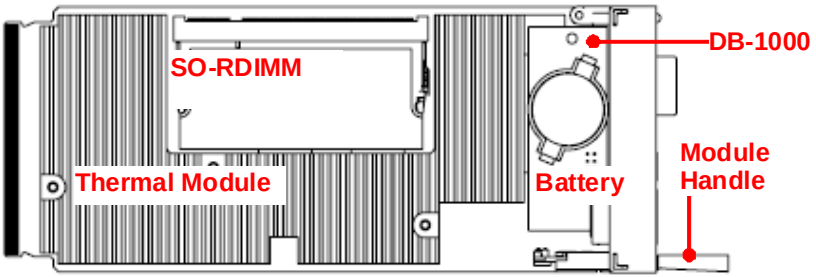


U10	Processor	**CN1**	VGA port
U15	Chipset	**CN2**	AMC golden finger
U4	Bridge	**CN4**	Mini-B USB port
U18	Graphics controller	**CN5**	To DB-1000 connector
U13	Ethernet controller	**CN6**	RJ45 COM port
SO-RDIMM	SO-RDIMM socket	**SWX2-4**	Switches

Figure 2-1: AMC-1000 Board Layout

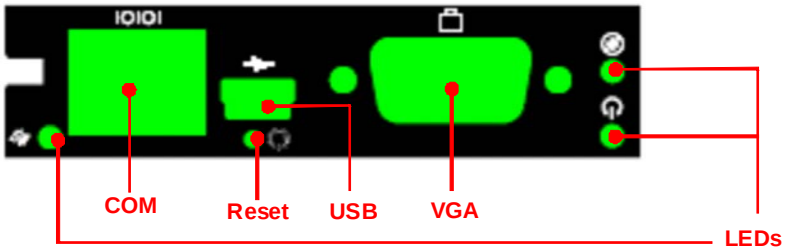
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AMC-1000 Assembly Outline



The DB-1000 is an adaptor board with battery and USB flash controller designed for the AMC-1000.

AMC-1000 Front Panel



Reset Button

Power LED (Green)

Out of Service LED (Red)

Hotswap LED (Blue)

Figure 2-2: AMC-1000 Front Panel

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3 Functional Description

The following sections describe the AMC-1000 main functions and board interfaces.

3.1 CPU

Intel® Core™2 Duo

The AMC-1000 supports the latest Intel® Intel® Core™2 Duo processor family up to speeds of 1.5 GHz with up to 667 MHz FSB. The Intel® Core™ Duo consists of two cores and up to 2 MB L2 cache shared by both cores. The Intel® Core™2 Duo consists of two cores, up to 4 MB L2 cache shared by both cores and Intel Extended Memory 64 Technology (Intel EM64T). The Intel® Core™2 Duo processors deliver optimized power-efficient computing and outstanding dual-core performance with low power consumption.

The Intel® Core™2 Duo supports the latest Intel's Virtualization Technology (VT), which allows a platform to run multiple operating systems and applications in independent partitions, such as performing system upgrades and maintenance without interrupting the system or the application, keeping software loads and virus attacks separate, combining multiple servers in one system, etc. With processor and I/O enhancements to Intel's various platforms, Intel Virtualization Technology improves the performance and robustness of today's software-only virtual machine solutions.

Furthermore, the Intel® Core™2 Duo also supports Intel Speed-Step technology which enables real-time dynamic switching of the voltage and frequency between several modes. This is achieved by switching the bus ratios, core operating voltage, and core processor speeds without resetting the system.

The following list sets out some of the key features of the Intel® Core™2 Duo processors:

- Two mobile execution cores in one single processor
- Support of Intel's Virtualization Technology (Vanderpool)
- Support of Intel Architecture with Dynamic Execution

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- Outstanding dual-core performance with low power consumption
- On die, primary 32 KB instruction cache and 32KB write-back data cache
- On die, L1 and L2 cache with Advanced Transfer Cache Architecture
- Advanced Branch Prediction and Data Prefetch Logic
- Streaming SIMD Extensions 3 (SSE3)
- Up to 667 MHz, Source-Synchronous Front Side Bus (FSB)
- Advanced Power Management features including Enhanced Intel SpeedStep technology
- Intel Extended Memory 64 Technology for 64-bit computing

Intel® Celeron® M

The AMC-1000 supports the low power 1.06 GHz Intel® Celeron® M processor with 533 MHz FSB. The Intel® Celeron® M consists of one core and 1 MB L2 cache.

The following list sets out some of the key features of the Intel® Celeron® M processor:

- Supports Intel architecture with dynamic execution
- High-performance, low-power core featuring architectural innovations like micro-ops fusion and advanced stack management that reduce the number of micro-ops handled by the processor.
- On-die, primary 32-kB instruction cache and 32-kB, write-back, data cache
- On-die, 1 MB second level cache with Advanced Transfer Cache architecture
- Advanced branch prediction and data prefetch logic
- Streaming SIMD extensions 2 (SSE2) that enables breakthrough levels of performance in multimedia applications

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including 3D graphics, video decoding/encoding, and speech recognition.

- 533-MHz, source-synchronous front side bus (FSB)
- Advanced power management features
- Maintained support for MMX_ technology (technology designed to accelerate multimedia and communications software)
- Compatible with IA-32 software

Supported Processors, Maximum Power Dissipation

The following tables indicate the processors supported on the AMC-1000 and their maximum power dissipation.

CPU	Intel® Celeron® M 1.06 GHz ULV (423)	Intel® Core 2 Duo 1.5GHz LV (L7400)
Package	FCBGA	FCBGA
L2 Cache	1MB	4MB
FSB	533 MHz	667 MHz
Maximum Power $HFM_{(1)}$	5.5W	17W

(1) HFM: High Frequency Mode (maximum frequency of the CPU)

Table 3-1: Supported Processors, Power Dissipation

3.2 Memory

The AMC-1000 supports a single channel DDR2-400 JEDEC standard SO-RDIMM (REG/ECC), up to 4GB capacity.

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3.3 Chipset

The Intel® 3100 Chipset is a single integrated chip that contains the functionality of a Memory Controller Hub and an I/O Controller Hub (see Block Diagram below). In this document the Memory Controller Hub unit and I/O Controller Hub unit in the Intel® 3100 Chipset are referenced as IMCH (Integrated Memory Controller Hub) and IICH (Integrated I/O Controller Hub) respectively.

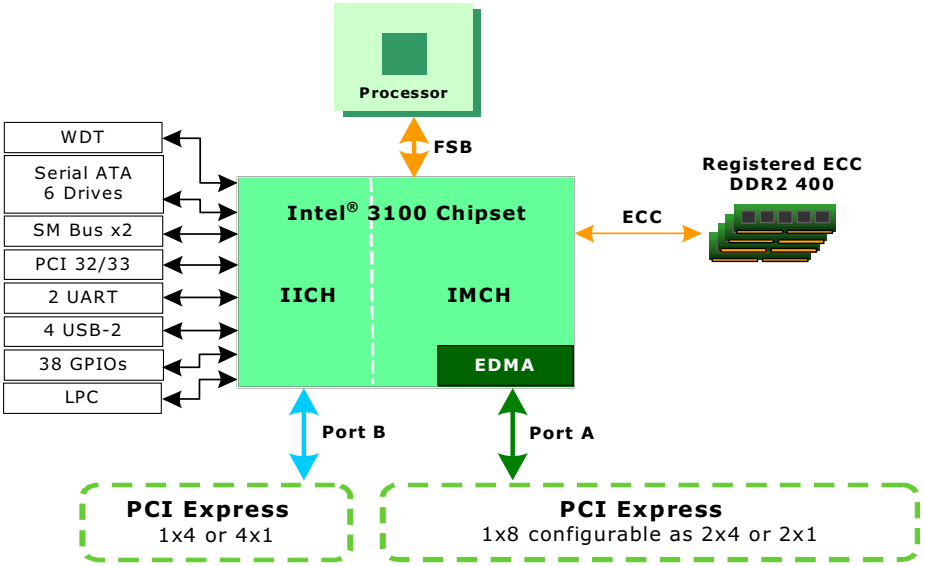


Figure 3-1: Intel® 3100 Chipset Block Diagram

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3.3.1 PCI Express

The Intel 3100 Chipset provides one configurable x8 PCI Express interface with a maximum theoretical bandwidth of 4 GByte/s. The x8 PCI Express interface may alternatively be configured as two independent x4 PCI Express interfaces with a maximum theoretical bandwidth of 2 GBytes/s each. The Intel® 3100 Chipset also supports an additional x4 PCI Express interface with a maximum theoretical bandwidth of 2 GBytes/s which may alternatively be configured as four independent x1 PCI Express interfaces.

The AMC-1000 supports two PCI Express x4 interfaces from the Intel® 3100 to the AMC connector. One PCI Express x4 is directly connected to AMC ports 4~7, the other PCI Express x4 is connected to the PLX PEX8508 switch and then to AMC ports 8~11. The PEX8508 is a fully non-blocking, low-latency, low-cost, and low-power 5-port, 8-lance PCI Express switch which enables a PCI Express x4 to be configured to 4 x1 lanes for more flexible applications. See **Onboard Switches**, “PCI Express Mode Switch (SWX3)” on page 27 for details.

3.3.2 IICH

I/O Controller Hub (IICH) functions are integrated into the Intel® 3100 Chipset, eliminating the requirement for a legacy I/O bridge.

I/O Controller Hub Feature set comprises:

- PCI Express Interface
- Low Pin Count (LPC) Interface
- Firmware Hub (FWH) Interface
- Integrated Serial ATA (SATA) Host Controllers:
  - Independent DMA operation on six ports
    - Four ports in SATA 1.0a and AHCI mode
    - Six ports in AHCI mode only
  - Data transfer rates up to 150 Mbyte/s
- Two controllers with up to four USB 2.0 ports:
  - One EHCI USB 2.0 Host Controller to support a total of four ports (shared with the UHCI ports)
  - Two UHCI Host Controllers to support a total of four ports (shared with the EHCI ports)

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- Interrupt Controller
- Power Management Logic
- DMA Controller
- Timers Based on 82C54
- High Precision Event Timers (HPET)
- Real Time Clock with 256-byte Battery-backed CMOS RAM
- System TCO Reduction Circuits
- SMBus
- Watchdog Timers
- PCI 2.3 Interface
- Two fully functional serial ports
- 38 General Purpose I/Os (GPIO)

3.3.3 IMCH

The Intel® 3100 Chipset provides an integrated memory controller for direct-connection to one channel of DDR2-400 (unstacked) registered memory devices with ECC. Peak theoretical memory data bandwidth using DDR2-400 is 3.2 GByte/s.

3.3.4 AMD ES1000 Graphics Controller

The AMC-1000 provides an analog VGA port on front panel with supported by the AMD (ATI) ES1000 2D graphics controller. The features of the ES1000 are as follows.

- 32-bit PCI bus (Rev 2.2), 3.3 V with bus mastering support
- Support for SPI Serial and Flash Memory video BIOS
- One CRT controller capable of supporting two identical simultaneous display paths
- Dual integrated DACs for CRT display support
- Support for external TMDS transmitter via 24-bit digital output to drive most popular TMDS transmitters up to 165MHz frequency
- Independent DDC lines for both DACs and TMDS connections; also full AppleSense support on DAC connection
- Static and dynamic Power Management support (APM and ACPI) with full VESA DPMS and Energy Star compliance

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- Comprehensive testability including full internal scan, memory BIST, I/O xor tree and Iddq
- Full ACPI 1.0b, OnNow, and IAPC (Instantly Available PC) power management, including PCI power management registers
- Bi-endian support for compliance on a variety of processor platforms
- Bus mastering of 2D display lists
- Triple 10-bit palette DAC supports pixel rates to 350MHz
- DDC1 and DDC2 for plug and play monitors
- Flexible memory support:
  - DDR1 and DDR2 SDRAM and SGRAM
  - 16-bit interface
  - 8MB to 256MB
- Up to 1GB/s bandwidth
- Single chip solution in 0.13 micron process, 1.2V CMOS technology in a BGA package
- Comprehensive HDKs, SDKs and utilities augmented by full engineering support

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3.4 Peripherals

The following peripherals are available on the AMC-1000 board:

3.4.1 Gigabit Ethernet Interfaces

The AMC-1000 module is designed with an Intel® 82571EB Dual Gigabit Ethernet Controller, using the Intel® 3100's PCI Express x4 interface to offer two 1000BASE-BX Ethernet ports for AMC.2 support.

The Intel® 82571EB Dual Gigabit Ethernet Controller's architecture is optimized to deliver high performance with the lowest power consumption. The controller's architecture includes independent transmit and receive queues and a PCI Express interface that maximizes the use of bursts for efficient bus usage.

3.4.2 USB Interfaces

The AMC-1000 supports four USB 2.0 ports:

- one mini-B type USB port on front panel
- two ports are routed to rear
- one channel for 4GB on-board NAND flash

The USB 2.0 ports are high-speed, full-speed, and low-speed capable. Hi-speed USB 2.0 allows data transfers of up to 480 Mb/s - 40 times faster than a full-speed USB (USB 1.1). One USB peripheral may be connected to each port.

To connect more USB devices than there are available ports, an external hub is required.

On the USB 2.0 front panel port, USB cable with up to 5 meters in length can be used. On the USB 2.0 Rear I/O ports, it is strongly recommended to use a cable below 3 meters in length for USB 2.0 devices.


NOTE:

The AMC-1000 host interfaces can be used with maximum 500 mA continuous load current as specified in the Universal Serial Bus Specification, Revision 2.0. Short-circuit protection is provided. All the signal lines are EMI-filtered.

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3.4.3 Serial Port

One PC-compatible serial RS-232 and is fully 16C550 compatible when set to RS-232 mode. The COM1 signal is routed to a RJ45 port on front panel of the AMC-1000. This port can also be used as a Module Management Controller (MMC) debug port (see “COM1 Mode Switch Settings (SWX4)” on page 27). The serial port includes a complete set of handshaking and modem control signals. Data transfer rates up to 115.2 kB/s are supported.

3.4.4 Serial ATA Interfaces

The AMC-1000 supports two SATA ports on AMC Connector Ports 2 & 3. Additionally, four Serial ATA ports are routed to rear I/O ports 14-15, 17-18 for expansion. All SATA ports can be used simultaneously.

3.4.5 Timer

The AMC-1000 is equipped with the following timers:

Real-Time Clock

The IICH contains real-time clock with 256-byte of battery-backed RAM.

The real-time clock performs timekeeping functions and includes 256 bytes of general purpose battery-backed CMOS RAM. Features include an alarm function, programmable periodic interrupt and a 100-year calendar. All battery-backed CMOS RAM data remains stored in an additional EEPROM. This prevents data loss in case the AMC-1000 is operated without battery.

Counter/Timer

Three 8254-style counter/timers are included on the AMC-1000 as defined for the PC/AT (System Timer, Refresh Request, Speaker Tone Output).

In addition to the three 8254-style counters, the IICH includes three High Precision Event Timers (HPET) that may be used by the operating system. They are implemented as a single counter each with its own comparator and value register. They support One-shot and periodic interrupts.

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3.4.6 Watchdog Timer

The AMC-1000 provides a Watchdog Timer that is programmable for a timeout period ranging from 1 µs to 1 sec, or from 1 ms to 1050 seconds. Failure to trigger the Watchdog Timer in time results in a system reset, an interrupt, or NMI. In the dual-stage mode, a combination of both NMI, and reset if the Watchdog is not serviced. A hardware status flag will be provided to determine if the Watchdog Timer generated the reset (see Chapter 7 “Watchdog Timer” on page 39.

3.4.7 Battery

The AMC-1000 is provided with a 3.0 V “coin cell” lithium battery for the RTC. To replace the battery, proceed as follows:

- Turn off power
- Remove the battery
- Place the new battery in the socket
- Make sure that you insert the battery correctly. The positive pole must be on the top.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer. Suitable batteries include the VARTA CR2025 and PANASONIC BR2020.


NOTE:

The user must be aware that the battery’s operational temperature range is less than that of the AMC-1000’s storage temperature range. For detailed information, refer to the battery manufacturer’s specifications.


NOTE:

Care must be taken to ensure that the battery is correctly replaced.The battery should be replaced only with an identical or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.The typical life expectancy of a 225 mAh battery (VARTA CR2032) is 4-5 years with an average on-time of 8 hours per working day at an operating temperature of 30°C. However, this typical value varies considerably because the life expectancy is dependent on the operating temperature and the standby time (shutdown time) of the system in which it operates.To ensure that the lifetime of the battery has not been exceeded, it is recommended to change the battery after 3-4 years.

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3.4.8 SMBus Devices

The AMC-1000 provides a System Management Bus (SMBus) for access to several system monitoring and configuration functions. The SMBus consists of a two-wire I2C bus interface.

The following table describes the function and address of each onboard SMBus device.

Device	SMBUS Address
Thermal Sensor	01001100(4C)
Watchdog Timer	10011100(9C)
DDR2	10100000(A0)

Table 3-2: SMBus Devices and Addresses

3.4.9 GPIO Signals

Four GPIO signals from the Intel® 3100 are connected as in the table below.

Pin (ICH6-M)	Input / Output	Signal	Description
GPO[16]	Output	FWH_WP-L	FWH Write Protect
GPO[17]	Output	FWH_TBL#	FWH Top Block Lock Output
GPO[18]	Output	WML_POST_OK	BIOS post OK
GPIO[27]	Output	DIS_82571_A-L	On-board LAN Disable

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3.4.10 FWH Flash Memory & Failover

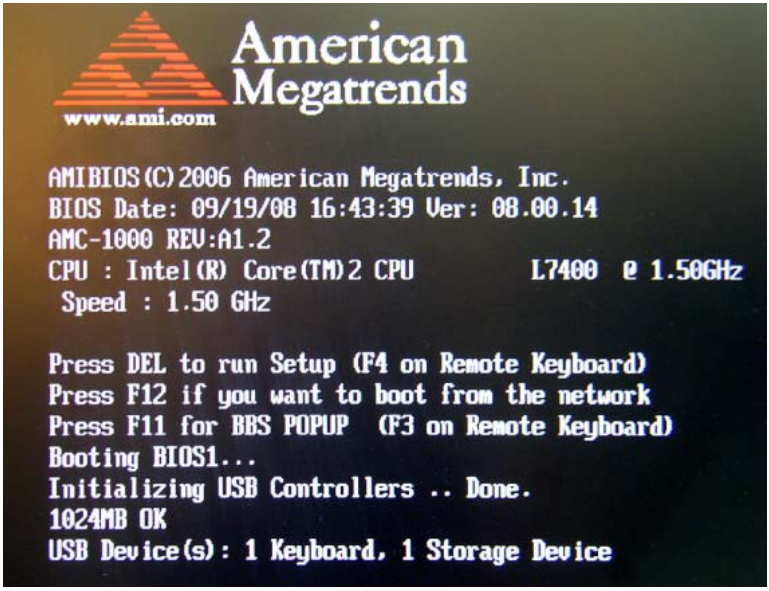
The AMC-1000 is designed with two on board 8Mbit Firmware Hub (FWH) devices for failover purposes, the BIOS1 FWH and BIOS2 FWH. The system BIOS will be flashed to both BIOS1 and BIOS2 FWHs at the factory. The BIOS1 device is the default boot BIOS. If the BIOS1 FWH fails to boot, the system will trigger the flash recovery procedure that will display the following messages on screen, indicating that the contents of the BIOS2 FWH are being copied to the BIOS1 FWH.



After the flash recovery procedure is complete, the display will show “Booting BIOS1...” and then the system will reboot automatically.

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After reboot, the standard boot screen will display as shown below.



If the BIOS1 FWH fails to be properly flashed with the contents of the BIOS2 FWH or the BIOS1 FWH is not functional, the display will show “Booting BIOS2...” and the system will boot directly from the BIOS2 FWH.

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4 Connectors and Switches

See “AMC-1000 Board Layout” on page 8 for connector and switch locations.

4.1 Front Panel Connectors

VGA Connector

The 15-pin female connector is used to connect a VGA analog monitor to the AMC-1000 board.

Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
+5V.	9	10	GND
N.C.	11	12	CRTDATA
HSYNC	13	14	VSYNC
CRTCLK	15		

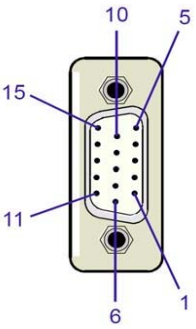


Table 4-1: VGA Connector Pin Definition

Front Panel USB Connector (Mini-USB)

Pin #	Signal Name
1	VCC
2	Data-
3	Data+
4	NC
5	GND



Table 4-2: Front Panel USB Connector Pin Definition

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COM Connector CN14 (RJ45)

Pin #	Signal	Function
1	DCD#	Data Carrier Detect
2	RTS#	Request to Send
3	DSR#	Data Set Ready
4	TXD	Transmit Data
5	RXD	Receive Data
6	GND	Ground
7	CTS#	Clear to Send
8	DTR#	Data Terminal Ready

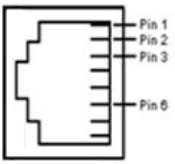


Table 4-3: COM Connector Pin Definition

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4.2 Onboard Switches

PCI Express Mode Switch (SWX3)

Set switch SWX3 to configure AMC ports 8~11 to PCI-E 1 x4 or 4 x1. See **Chipset**, “PCI Express” on page 15 for a detailed explanation of the AMC-1000’s PCI Express functions.

Function	Pin 1	Pin 2	Pin 3	Pin 4
PCI-E x4 (default)	ON	OFF	ON	ON
4x PCI-E x1	ON	ON	ON	OFF

Table 4-4: PCI Express Mode Switch Settings

COM1 Mode Switch Settings (SWX4)

Mode	Pin 1	Pin 2	Pin 3	Pin 4
RS-232 (default)	ON	ON	OFF	OFF
MMC Debug	OFF	OFF	ON	ON

Table 4-5: COM1 Mode Switch Settings

When the switch SWX4 is set to MMC debug mode, the pin assignment of the RJ45 connector is as below.

Pin #	Signal	Function
1	NC	Not connected
2	NC	Not connected
3	NC	Not connected
4	DBG_TX	IPMI Transmit Data
5	DBG_RX	IPMI Receive Data
6	GND	Ground
7	NC	Not connected
8	NC	Not connected

Table 4-6: MMC Debug Port Connector Pin Definition

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BIOS FWH Boot Selection (SWX2)

Set Pin 3 of switch SWX2 to determine whether the AMC-1000 boots from BIOS1 or BIOS2 FWH. Setting the module to boot from BIOS2 FWH effectively makes BIOS2 the default FWH.

Mode	Pin 1	Pin 2	Pin 3	Pin 4
Boot from BIOS1	OFF*	OFF*	OFF	ON*
Boot from BIOS2	—	—	ON	—

Table 4-7: FWH Boot Selection Switch Settings



NOTE:

Pins marked (*) are for debugging purposes only. Please do not change the settings.

Use this setting if it is necessary to update the contents of the BIOS2 FWH (see “BIOS Update Procedure” on page 35). Be sure to set the module to boot from the BIOS1 FWH after the BIOS2 FWH update procedure has been completed.

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4.3 AMC Module Card-edge Interface

The AMC Connector supports 170 contacts which are allocated to the five functional groups as follows:

- 40 signal pairs allocated to the Fabric Interface
- 5 signal pairs allocated to the AMC Clock Interface
- 5 contacts allocated to the JTAG Test Interface
- 9 contacts allocated to the System Management Interface
- 8 contacts allocated to Payload Power
- 56 contacts to allocated to Logic Ground
- 2 contacts reserved

The AMC-1000 connector is designed to be compliant with PICMG AMC.0 and fully compatible to the any standard AMC Carrier Board. The AMC-1000 is hot-swappable.

AMC-1000 Card-edge Interface Pin Assignments

The AMC-1000 Connector is a single-part Z-Pluggable Connector containing groups of contacts for power, general purpose connections, and very high speed transmissions. The pin assignments are as follows.

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Pin#	Signal	Function	Pin#	Signal	Function
85	GND	Logic Ground	86	GND	Logic Ground
84	P12V_ PWR	12V Payload Power	87	PEX_CON_RX4-	Port 8 Receiver - for PCI-E
83	PS0#	Presence 0	88	PEX_CON_RX4+	Port 8 Receiver + for PCI-E
82	GND	Logic Ground	89	GND	Logic Ground
81	PCIEREF-	Fabric Clock A-	90	PEX_CON_TX4-	Port 8 Transmitter - for PCI-E
80	PCIEREF+	Fabric Clock A+	91	PEX_CON_TX4+	Port 8 Transmitter + for PCI-E
79	GND	Logic Ground	92	GND	Logic Ground
78	NC	Not Connected	93	PEX_CON_RX6-	Port 9 Receiver - for PCI-E
77	NC	Not Connected	94	PEX_CON_RX6+	Port 9 Receiver + for PCI-E
76	GND	Logic Ground	95	GND	Logic Ground
75	NC	Not Connected	96	PEX_CON_TX6-	Port 9 Transmitter - for PCI-E
74	NC	Not Connected	97	PEX_CON_TX6+	Port 9 Transmitter + for PCI-E
73	GND	Logic Ground	98	GND	Logic Ground
72	P12V_PWR	12V Payload Power	99	PEX_CON_RX8-	Port 10 Receiver - for PCI-E
71	IPMB_SDA_0	IPMI-L Data	100	PEX_CON_RX8+	Port 10 Receiver + for PCI-E
70	GND	Logic Ground	101	GND	Logic Ground
69	PCIEB_WML_RX3-	Port 7 Receiver - for PCI-E	102	PEX_CON_TX8-	Port 10 Transmitter - for PCI-E
68	PCIEB_WML_RX3+	Port 7 Receiver + for PCI-E	103	PEX_CON_TX8+	Port 10 Transmitter + for PCI-E
67	GND	Logic Ground	104	GND	Logic Ground
66	PCIEB_TX3-	Port 7 Transmitter - for PCI-E	105	PEX_CON_RX10-	Port 11 Receiver - for PCI-E
65	PCIEB_TX3+	Port 7 Transmitter + for PCI-E	106	PEX_CON_RX10+	Port 11 Receiver + for PCI-E
64	GND	Logic Ground	107	GND	Logic Ground
63	PCIEB_WML_RX2-	Port 6 Receiver - for PCI-E	108	PEX_CON_TX10-	Port 11 Transmitter - for PCI-E
62	PCIEB_WML_RX2+	Port 6 Receiver + for PCI-E	109	PEX_CON_TX10+	Port 11 Transmitter + for PCI-E
61	GND	Logic Ground	110	GND	Logic Ground
60	PCIEB_TX2-	Port 6Transmitter - for PCI-E	111	NC	Not Connected
59	PCIEB_TX2+	Port 6 Transmitter + for PCI-E	112	NC	Not Connected
58	GND	Logic Ground	113	GND	Logic Ground
57	P12V_PWR	12V Payload Power	114	NC	Not Connected
56	IPMB_SCL_0	IPMB-L Clock	115	NC	Not Connected
55	GND	Logic Ground	116	GND	Logic Ground

Table 4-8: AMC Module Card-edge Interface Pin Assignment

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Pin#	Signal	Function	Pin#	Signal	Function
54	PCIEB_WML_RX1-	Port 5 Receiver - for PCI-E	117	NC	Not Connected
53	PCIEB_WML_RX1+	Port 5 Receiver + for PCI-E	118	NC	Not Connected
52	GND	Logic Ground	119	GND	Logic Ground
51	PCIEB_TX1-	Port 5Transmitter - for PCI-E	120	NC	Not Connected
50	PCIEB_TX1+	Port 5 Transmitter + for PCI-E	121	NC	Not Connected
49	GND	Logic Ground	122	GND	Logic Ground
48	PCIEB_WML_RX0-	Port 4 Receiver - for PCI-E	123	SATA_RX2-	Port 14 Receiver - for SATA
47	PCIEB_WML_RX0+	Port 4 Receiver + for PCI-E	124	SATA_RX2+	Port 14 Receiver + for SATA
46	GND	Logic Ground	125	GND	Logic Ground
45	PCIEB_TX0-	Port 4Transmitter - for PCI-E	126	SATA_TX2-	Port 14 Transmitter - for SATA
44	PCIEB_TX0+	Port 4 Transmitter + for PCI-E	127	SATA_TX2+	Port 14 Transmitter + for SATA
43	GND	Logic Ground	128	GND	Logic Ground
42	P12V_PWR	12V Payload Power	129	SATA_RX3-	Port 15 Receiver - for SATA
41	ENABLE-#	AMC Enable	130	SATA_RX3+	Port 15 Receiver + for SATA
40	GND	Logic Ground	131	GND	Logic Ground
39	SATA_RX1-	Port 3 Receiver - for SATA	132	SATA_TX3-	Port 15 Transmitter - for SATA
38	SATA_RX1+	Port 3 Receiver + for SATA	133	SATA_TX3+	Port 15 Transmitter + for SATA
37	GND	Logic Ground	134	GND	Logic Ground
36	SATA_TX1-	Port 3 Transmitter - for SATA	135	NC	Not Connected
35	SATA_TX1+	Port 3 Transmitter + for SATA	136	NC	Not Connected
34	GND	Logic Ground	137	GND	Logic Ground
33	SATA_RX0-	Port 2 Receiver - for SATA	138	NC	Not Connected
32	SATA_RX0+	Port 2 Receiver + for SATA	139	NC	Not Connected
31	GND	Logic Ground	140	GND	Logic Ground
30	SATA_TX0-	Port 2 Transmitter - for SATA	141	SATA_RX4-	Port 17 Receiver - for SATA
29	SATA_TX0+	Port 2 Transmitter + for SATA	142	SATA_RX4+	Port 17 Receiver + for SATA
28	GND	Logic Ground	143	GND	Logic Ground
27	P12V_PWR	12V Payload Power	144	SATA_TX4-	Port 17 Transmitter - for SATA
26	GA2	Geographic Addr. 2	145	SATA_TX4+	Port 17 Transmitter + for SATA
25	GND	Logic Ground	146	GND	Logic Ground
24	LAN_A_SRDS_RXB-	Port 1 Receiver - for GbE	147	SATA_RX5-	Port 18 Receiver - for SATA

Table 4-7: AMC Module Card-edge Interface Pin Assignment (cont'd)

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Pin#	Signal	Function	Pin#	Signal	Function
23	LAN_A_SRDS_RXB+	Port 1 Receiver + for GbE	148	SATA_RX5+	Port 18 Receiver + for SATA
22	GND	Logic Ground	149	GND	Logic Ground
21	LAN_A_SRDS_TXB-	Port 1 Transmitter - for GbE	150	SATA_TX5-	Port 18 Transmitter - for SATA
20	LAN_A_SRDS_TXB+	Port 1 Transmitter + for GbE	151	SATA_TX5+	Port 18 Transmitter + for SATA
19	GND	Logic Ground	152	GND	Logic Ground
18	P12V_PWR	12V Payload Power	153	USB1-	Port 19 Receiver - for USB
17	GA1	Geographic Addr.1	154	USB1+	Port 19 Receiver + for USB
16	GND	Logic Ground	155	GND	Logic Ground
15	LAN_A_SRDS_RXA-	Port 0 Receiver - for GbE	156	USB3-	Port 19 Transmitter – for USB
14	LAN_A_SRDS_RXA+	Port 0 Receiver + for GbE	157	USB3+	Port 19 Transmitter + for USB
13	GND	Logic Ground	158	GND	Logic Ground
12	LAN_A_SRDS_TXA-	Port 0 Transmitter - for GbE	159	NC	Not Connected
11	LAN_A_SRDS_TXA+	Port 0 Transmitter + for GbE	160	NC	Not Connected
10	GND	Logic Ground	161	GND	Logic Ground
9	P12V_PWR	12V Payload Power	162	NC	Not Connected
8	NC	Not Connected	163	NC	Not Connected
7	GND	Logic Ground	164	GND	Logic Ground
6	NC	Not Connected	165	TCK	JTAG Test Clock Input
5	GA0	Geographic Addr. 0	166	TMS	JTAG Test Mode Select In
4	P3V3_MP	+3.3V Management Power	167	TRST#	JTAG Test Reset Input
3	PS1#	Presence 1	168	TDO	JTAG Test Data Output
2	P12V_PWR	12V Payload Power	169	TDI	JTAG Test Data Input
1	GND	Logic Ground	170	GND	Logic Ground

Table 4-7: AMC Module Card-edge Interface Pin Assignment (cont'd)

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5 Getting Started

The AMC-1000 has been designed for easy installation. However, the following standard precautions, installation procedures, and general information must be observed to ensure proper installation and to preclude damage to the module, other system components, or injury to personnel.

5.1 Safety Requirements

The following safety precautions must be observed when installing or operating the AMC-1000. ADLINK assumes no responsibility for any damage resulting from failure to comply with these requirements.

Exercised due care when handling the module as the heat sink can get very hot. Do not touch the heat sink when installing or removing the module. The module should not be placed on any surface or in any form of storage container until the module and heat sink have cooled down to room temperature.

When first installing modules in an empty chassis or onto a carrier card, it is recommended to start at the left of the card cage and work to the right. When inserting or removing a module in a slot adjacent to other modules, pay attention to avoid damage to the pins and components located on front and rear sides of the modules.

This AMC module contains electrostatically sensitive devices. Please observe the necessary precautions to avoid damage to your product:

- Discharge your clothing before touching the assembly. Tools must be discharged before use.
- Do not touch components, connector-pins or traces.
- Work at an anti-static workbench with professional discharging equipment.

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5.2 Installing the AMC-1000

The AMC-1000 module can be installed into a MicroTCA chassis or ATCA carrier board with slots compliant to AMC.3. The target module slot must properly match the width and height of the AMC-1000. The AMC-1000 is designed to support hot swap to allow the module to be inserted into a fully powered system.

1. Be sure to follow proper antistatic procedures such as using an ESD wrist strap and connecting the end of the strap to ground of an anti-ESD table.
2. Refer to the chassis or carrier board user guide before installing the AMC-1000. Be sure to select the correct slot depending on the operational purpose of the module. The system power may now be powered on or off.
3. Remove the blank face panel from the selected slot, if necessary.
4. Pull out the Module Handle. Carefully align the edges of the module with the card guides in the appropriate slot of the chassis or carrier board. A slight resistance may be felt when inserting the module. If the resistance is too strong, check if there are bent pins on the backplane or if the board's connector pins are properly aligned with the connectors on the backplane.
5. Apply equal and steady pressure and slide the module in until the module is fully engaged with the internal AMC connector. If the system power is on, the blue LED (Hot Swap) and red LED (Out of Service) will light up.
6. Power on the system if necessary.
7. Press the Module Handle in towards the faceplate. The blue LED will turn off, the red LED will blink, the green LED (power) will turn on. This means the module has been powered on and BIOS self test is executing.
8. Upon a successful power up self-test, the red LED will turn off and green LED will stay on, indicating that the module is operating properly.

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5.3 Removing the AMC-1000

The AMC-1000 module is hot-swappable and can be removed from the chassis or carrier board without powering down the system.

1. Stop the operating system or software that is running on the module.
2. Pull out the Module Handle. The blue LED will blink, indicating the module is in the process of being de-activated.
3. Once the module has been de-activated, the blue LED will stay on continuously.
4. Extract the module by gently pulling on the module handle.

5.4 BIOS Update Procedure

The AMC-1000 is shipped with the system BIOS flashed on both BIOS1 and BIOS2 FWHs. BIOS updates can be downloaded from AMC-1000 product page of the ADLINK website. You may follow the steps below to update the BIOS.

1. Prepare a DOS bootable device and unzip the new BIOS files to this device. Make sure all the files are in the same directory.
2. Boot the system to DOS.
3. Execute the *.bat file in the directory (e.g. "P.bat") to begin the update process.
4. Reboot the system and enter the BIOS setup menu to confirm the update was successful.



NOTE:

Only the BIOS on the BIOS1 FWH will be updated. If it is necessary to update the contents of the BIOS2 FWH, set the module to boot from BIOS2 as described in “BIOS FWH Boot Selection (SWX2)” on page 28. Be sure to set the module to boot from the BIOS1 FWH after the BIOS2 FWH update procedure has been completed.

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6 Driver Installation

The AMC-1000 drivers are available from the ADLINK All-In-One CD at **X:\AMC-1000**, or from the ADLINK website (**http://www.adlinktech.com**). The following describes the driver installation procedures for Windows® 2000 and Windows® XP.

Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.

We recommend using the chipset, VGA, and LAN drivers provided on the ADLINK All-in-One CD or downloaded from the ADLINK website to ensure compatibility. Contact ADLINK to get support for other operating systems.

6.1 Chipset Driver

Install the chipset driver by running the program **...\Chipset\InfInst_AUTOL.exe**.

6.2 VGA Driver

Follow the instructions below to install the VGA driver for Windows 2000 and Windows XP.

Windows 2000

1. Click **Start**, right-click on **My Computer**, then select **Properties** from the drop-down menu.
2. Click on the **Hardware** tab, then click **Device Manager**.
3. Right-click on the **Video Controller** (VGA Compatible) item, then click **Properties** from the drop-down menu.
4. From the **General** tab, click **Reinstall Driver**.
5. Click **Next** when the **Upgrade Device Driver Wizard** window appears.
6. Select **Search for a suitable driver for my device** (recommended), then click **Next**.
7. Check the **Specify a location** option, then click **Next**.

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8. When prompted to locate the file, click **Browse**, then select **C2_29263.inf** from this driver CD directory: …\ES1000\2KXP_INF\
9. When the file is found, click OK, then click Next.
10. Follow screen procedures to install the drivers, then restart the system to complete installation.

Windows XP

1. Follow steps 1 to 4 of the previous section.
2. When the **Hardware Update Wizard** window appears, select the **Yes, this time only** option, then click **Next**.
3. Select the **Install from a list or specific location** (Advanced) option, then click Next.
4. Select the **Search** for a best driver in these locations option, uncheck the **Search removable media** (floppy, CD-ROM...), then check **Include this location in the search** option.
5. When prompted to locate the file, click **Browse**, then open this driver CD directory: …\ES1000\2KXP_INF\
6. Click **Continue Anyway** from the **Hardware Installation** window.
7. After installation is complete, click **Finish**, then restart the system.

6.3 LAN Driver

Install the LAN drivers by running the program **...\LAN\PRO2KXP.exe**.

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7 Watchdog Timer

7.1 WDT Overview

This section explains the operation of the AMC-1000's Watchdog Timer (WDT). The primary function of the WDT is to monitor the AMC-1000 operation and to reset the system if a software application fails to function as programmed. The following WDT functions may be controlled using a software application:

- enabled and disabled
- reloading timeout value



Figure 7-1: AMC-1000 Watchdog Timer Architecture

The AMC-1000 implements the internal WDT unit of the Intel 3100 chipset and its LPC interface. It contains registers of device6 at

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the internal IO to control the WDT and retrieve its status. The basic functions of the WDT include:

- Setting the watchdog timeout interval
- Starting the timer countdown
- Selecting 1 step or 2 step WDT
- Enabling or disabling WDT
- Reloading the timeout value to keep the watchdog from timing out
- Setting the range of the timeout period from 1 µs to 1 second, or from 1 ms to 1050 seconds

When the watchdog times out, it will send a RESET signal to the system.

7.2 Using the Watchdog Timer in an Application

The following section describes the WDT functions in an application. The WDT reset function is explained in the previous section. This can be controlled through the registers in the WDT unit of the Intel 3100 chipset .

An application using the reset feature enables the watchdog function, sets the count-down period, and reloads the timeout value periodically to keep it from resetting the system. If the timer countdown value is not reloaded, the watchdog resets the system hardware after its counter registers zero.

A detailed programming sample is provided below:

```
#include<dos.h>
#include<conio.h>
#include<stdio.h>
#include<stdlib.h>

#defineconfig_port_index0x4E
#defineconfig_port_data0x4F

/* Pre-declaration */
/* access configuration registers routines */
void enter_config_mode();
void exit_config_mode();
```

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```
void write_config_data_byte(unsigned
     char,unsigned char);
unsigned char read_config_data_byte(unsigned
     char);
unsigned int read_wdt_io_base();
/* access wdt I/O registers routines */
void write_preload_val2_reg(unsigned long int);
void clear_preload_val1_reg();
void unlocking_reg();

/* Global parameter */
unsigned int wdt_io_base;

void main(void)
{
//   unsigned int wdt_io_base;
     unsigned long int time_out_val=0;

     wdt_io_base=read_wdt_io_base();

     printf("Intel 3100 Chipset Watch-Dog Timer
     test utility.\n");
     printf("Intel 3100 WDT IO Base Address ==
     0x%x\n",wdt_io_base);

     while(1)//
     (time_out_val==0)||(time_out_val>1050))
     {
//3sec     printf("Please input the time to count
     down (1-1050 sec): ");
//3sec     scanf("%d",&time_out_val);
     }


//3sectime_out_val=time_out_val*1000;//transfer
     to msec unit.
     time_out_val=time_out_val+3000;   //3sec
     clear_preload_val1_reg();//we don't need
     preload_val1 caused internal interrupt.

     write_preload_val2_reg(time_out_val);//
     write preload_val2 ,it will cause external
     interrupt.(WDT_TOUT#)
```

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```
        outportb(wdt_io_base+0x18,2);//watchdog
        timer enable!!

        printf("\nPlease waiting for Watch-Dog Timer
        time-out!!");
}
/***********************************/
unsigned int read_wdt_io_base()
{
        unsigned char_wdt_io_base[2];
        int   *p_wdt_io_base;
        p_wdt_io_base=&_wdt_io_base;

        enter_config_mode();

        write_config_data_byte(0x07,6);//select
        logic 6 - WDT


        _wdt_io_base[1]=read_config_data_byte(0x60)
        ;

        _wdt_io_base[0]=read_config_data_byte(0x61)
        ;

        exit_config_mode();

        return (*p_wdt_io_base);
}
/***********************************/
void enter_config_mode()
{
        outportb(config_port_index,0x80);

        outportb(0xeb,00); //io delay

        outportb(config_port_index,0x86);
}
/***********************************/
void exit_config_mode()
{
        outportb(config_port_index,0x68);
```

```
      outportb(0xeb,00); //io delay

      outportb(config_port_index,0x08);
}
/***********************************/
unsigned char read_config_data_byte(unsigned char
      _index)
{
      unsigned char r_data;

      outportb(config_port_index,_index);

      outportb(0xeb,00); //io delay

      r_data=inportb(config_port_data);

      return(r_data);
}
/***********************************/
void write_config_data_byte(unsigned char
      _index,unsigned char _data)
{
      outportb(config_port_index,_index);

      outportb(0xeb,00); //io delay

      outportb(config_port_data,_data);
}
/***********************************/
void write_preload_val2_reg(unsigned long int
      _time_out_val)
{
      unsigned char *p_data;
//    "unsigned char" declaration --> p_data++ =
      addr. BYTE increased.
      p_data=&_time_out_val;
//    printf("%x\n",*p_data);

      unlocking_reg();
      outportb(wdt_io_base+4,*p_data);
      p_data++;
//    printf("%x\n",*p_data);
```

```
        unlocking_reg();
        outportb(wdt_io_base+5,*p_data);
        p_data++;
//      printf("%x\n",*p_data);

        unlocking_reg();
        outportb(wdt_io_base+6,*p_data);
}
/***********************************/
void clear_preload_val1_reg()
{
        unlocking_reg();
        outportb(wdt_io_base,0x00);

        unlocking_reg();
        outportb(wdt_io_base+1,0x00);

        unlocking_reg();
        outportb(wdt_io_base+2,0x00);

}
/***********************************/
void unlocking_reg()
{
        outportb(wdt_io_base+12,0x80);

        outportb(0xeb,00); //io delay

        outportb(wdt_io_base+12,0x86);
```

8 IPMI Interface

The AMC-1000 implements an onboard Module Management Controller (MMC) as specified in the AMC.0 specification, based on the Atmel ATMega128L. The MMC provides an Intelligent Platform Management Interface (IPMI) which will communicate with AdvancedTCA and MicroTCA shelf managers. The MMC firmware is based on Pigeon Point System's (PPS) MMC firmware. This MMC controls and monitors the following:

- Hot Swap
- System temperature
- Voltage (+3.3V, 12V) monitoring
- FRU and Electronic keying information
- Hot Swap, OOS, Power LED indication
- Dual BIOS status

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8.1 Command List

The following table shows the command list supported by the MMC. The “IPM Controller Req” column indicates if a particular command is required by the relevant specifications.

Command	IPMI/PICMG Spec Ref.	NetFn	CMD	IPM Controller Req
IPM Device “Global” Commands				
Get Device ID	17.1	App	01h	Mandatory
Cold Reset	17.2	App	02h	Optional
Warm Reset	17.3	App	03h	Optional
IPMI Messaging Support Commands				
Send Message	18.7	App	34h	Optional
BMC Watchdog Timer				
Reset Watchdog Timer	21.5	App	22h	Mandatory
Set Watchdog Timer	21.6	App	24h	Mandatory
Get Watchdog Timer	21.7	App	25h	Mandatory
Event Commands				
Set Event Receiver	23.1	S/E	00h	Mandatory
Get Event Receiver	23.2	S/E	01h	Mandatory
Platform Event (a.k.a. “Event Message”)	23.3	S/E	02h	Mandatory
Sensor Device Commands				
Get Device SDR Info	29.2	S/E	20h	Mandatory
Get Device SDR	29.3	S/E	21h	Mandatory
Reserve Device SDR Repository	29.4	S/E	22h	Mandatory
Get Sensor Reading Factors	29.5	S/E	23h	Optional
Set Sensor Hysteresis	29.6	S/E	24h	Optional
Get Sensor Hysteresis	29.7	S/E	25h	Optional
Set Sensor Threshold	29.8	S/E	26h	Optional
Get Sensor Threshold	29.9	S/E	27h	Optional
Set Sensor Event Enable	29.10	S/E	28h	Optional
Get Sensor Event Enable	29.11	S/E	29h	Optional
Rearm Sensor Events	29.12	S/E	2Ah	Optional

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Command	IPMI/PICMG Spec Ref.	NetFn	CMD	IPM Controller Req
Get Sensor Event Status	29.13	S/E	2Bh	Optional
Get Sensor Reading	29.14	S/E	2Dh	Mandatory
Get Sensor Type	29.16	S/E	2Fh	Optional
FRU Device Commands				
Get FRU Inventory Area Info	28.1	Storage	10h	Mandatory
Read FRU Data	28.2	Storage	11h	Mandatory
Write FRU Data	28.3	Storage	12h	Mandatory
AdvancedTCA™ Commands				
Get PICMG Properties	3-10	PICMG	00h	Mandatory
FRU Control	3-25	PICMG	04h	Mandatory
FRU Control Capabilities	3-24	PICMG	1Eh	Mandatory
Get FRU LED Properties	3-27	PICMG	05h	Mandatory
Get LED Color Capabilities	3-28	PICMG	06h	Mandatory
Set FRU LED State	3-29	PICMG	07h	Mandatory
Get FRU LED State	3-30	PICMG	08h	Mandatory
Get Device Locator Record ID	3-35	PICMG	0Dh	Mandatory
AMC® Commands				
Set AMC Port State	3-26	PICMG	19h	Mandatory
Get AMC Port State	3-27	PICMG	1Ah	Mandatory
HPM.1 Upgrade Commands (HPM.1)				
Get target upgrade capabilities	3-3	PICMG	2Eh	Mandatory
Get component properties	3-5	PICMG	2Fh	Mandatory
Abort Firmware Upgrade	3-15	PICMG	30h	Optional
Initiate upgrade action	3-8	PICMG	31h	Optional
Upload firmware block	3-9	PICMG	32h	Mandatory
Finish firmware upload	3-10	PICMG	33h	Mandatory
Activate firmware	3-11	PICMG	35h	Mandatory
Query Self-test Results	3-12	PICMG	36h	Optional
Query Rollback status	3-13	PICMG	37h	Optional
Initiate Manual Rollback	3-14	PICMG	38h	Optional

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8.2 FRU Data Table

The AMC-1000 includes the standard FRU data records with the following information.

Board Information

Item	Content Example	Comment
Version	A2	Hardware revision
Language Code	en	English
Mfg Date/Time	03/08/2008	MM/DD/YYYY
Manufacturer	ADLINK Technology	
Product Name	AMC-1000	
Serial Number	7C37EA3003	
Part Number	AMC-1000	
FRU Programmer File ID	FRU V1.1	

Module Current

Current Draw = 3.5

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9 BIOS Setup Utility

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

9.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
   < Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



NOTE: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

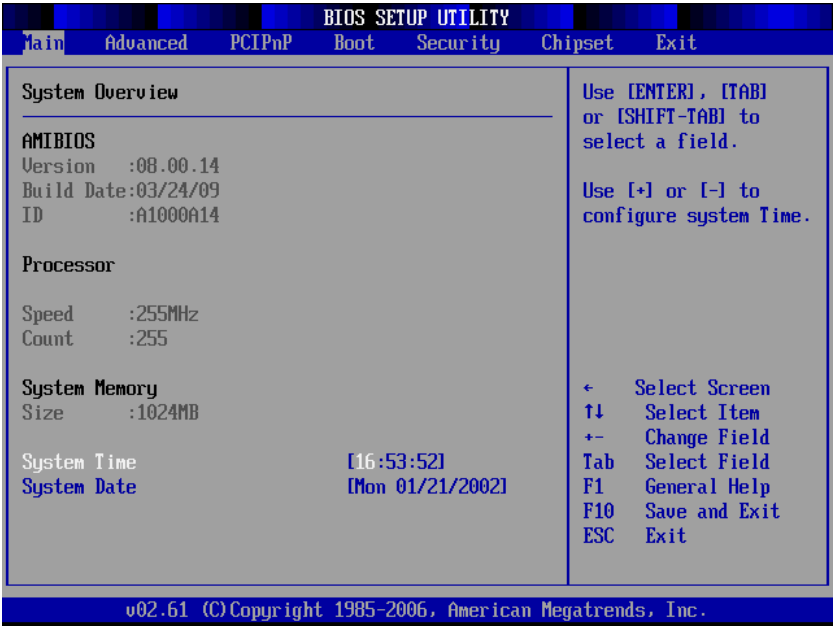
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Setup Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

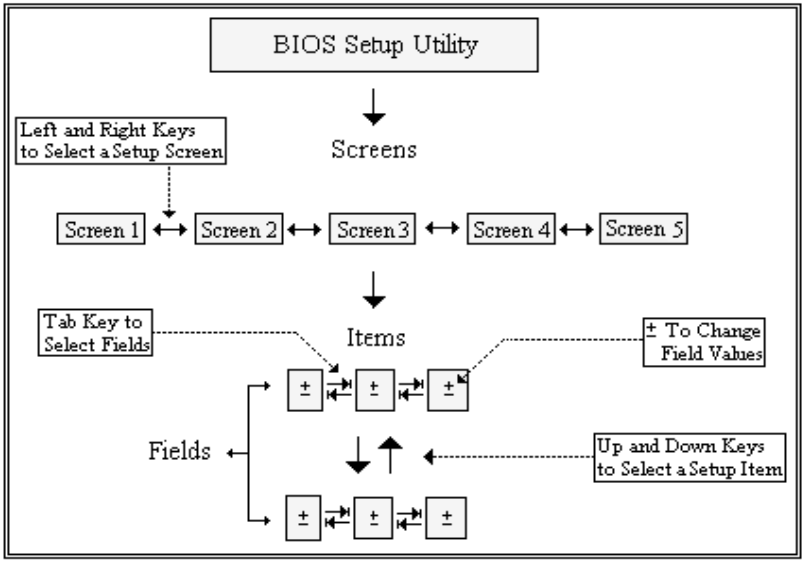


Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

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These keys include < F1 >, < F10 >, < Enter >, < ESC >, < Arrow > keys, and so on. .



NOTE: There is a hot key legend located in the right frame on most setup screens.

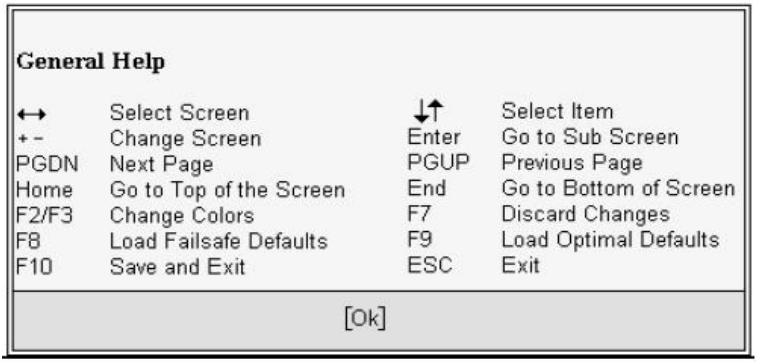
The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

Hotkey Descriptions

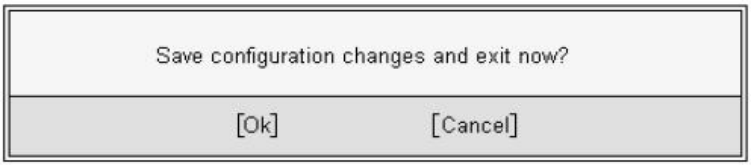
F1 The < F1 > key allows you to display the General Help screen.

Press the < F1 > key to open the General Help screen.

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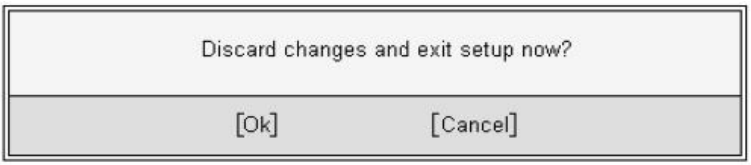


F10 The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

ESC The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:



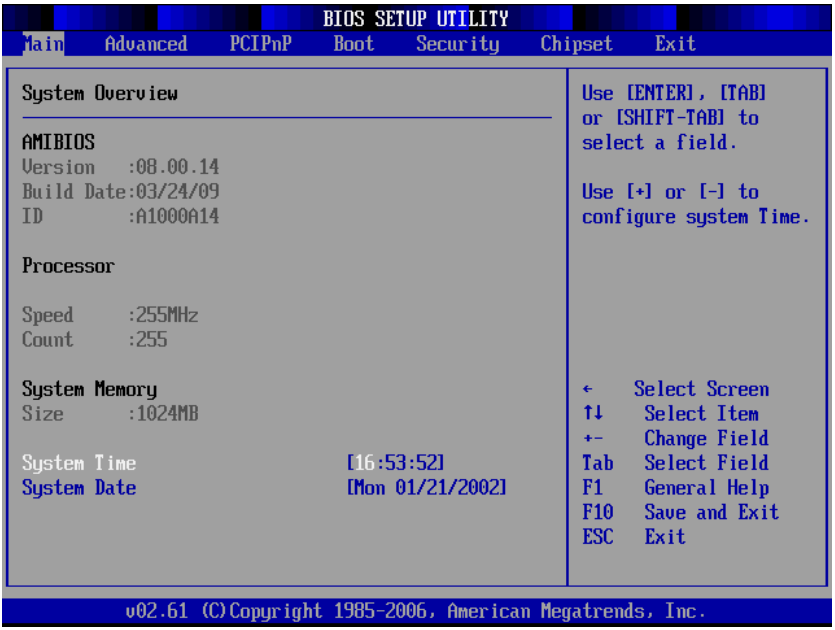
Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

Enter The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

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9.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

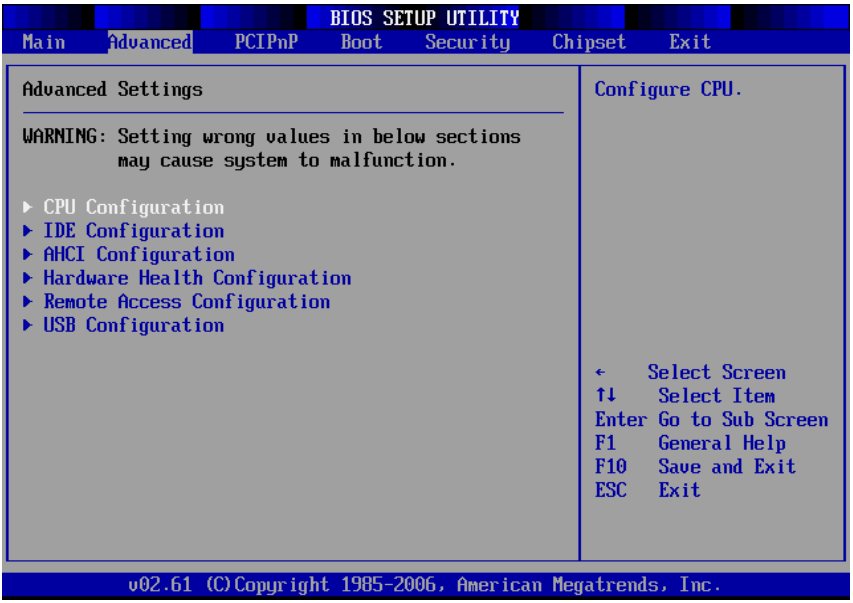
NOTE: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

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9.3 Advanced BIOS Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

The sub menus are described on the following pages.

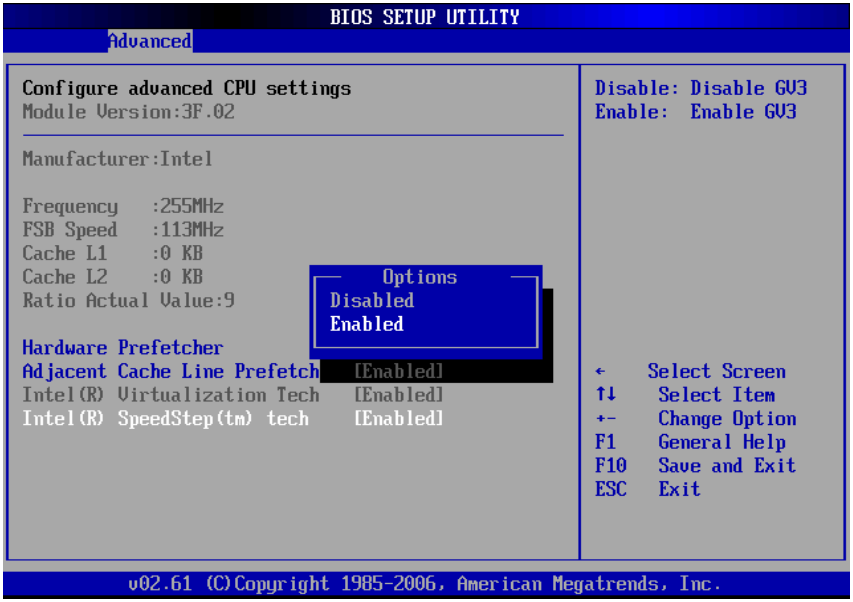


9.3.1 CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.

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Intel® Core™ 2 Duo LV (L7400)



Hardware Prefetcher

The processor has a hardware prefetcher that automatically analyzes its requirements and prefetches data and instructions from the memory into the Level 2 cache that are likely to be required in the near future. This reduces the latency associated with memory reads.

When enabled, the processor's hardware prefetcher will be enabled and allowed to automatically prefetch data and code for the processor.

When disabled, the processor's hardware prefetcher will be disabled.

Adjacent Cache Line Prefetch

The processor has a hardware adjacent cache line prefetch mechanism that automatically fetches an extra 64-byte cache line whenever the processor requests for a 64-byte cache line. This reduces cache latency by making the next cache line immediately available if the processor requires it as well.

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When enabled, the processor will retrieve the currently requested cache line, as well as the subsequent cache line.

When disabled, the processor will only retrieve the currently requested cache line.

Intel® Virtualization Technology

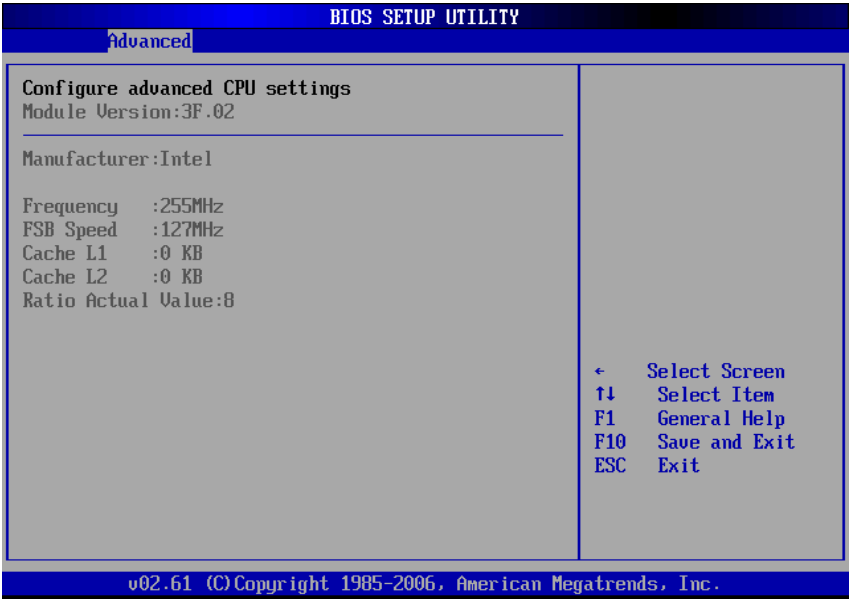
This is used to enable or disable the Intel® Virtualization Technology (IVT) extension, which is also known by the development code name of Vanderpool. It allow multiple operating systems to run simultaneously on the same system. It does this by creating virtual machines, each running its own x86 operating system. When **Enabled**, the IVT extensions will be enabled, allowing for hardware-assisted virtual machine management. When **Disabled**, the IVT extensions will be disabled. However, software virtual machine managers like VMware can still be used if virtualization is required.

Intel® SpeedStep™ Techology

This option allows the clock speed of the processor to be dynamically changed by Intel® SpeedStep™ Technology. Available options: **Maximum Speed**, **Minimum Speed**, **Auto** or **Disabled**.

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Intel® Celeron® M ULV (423)

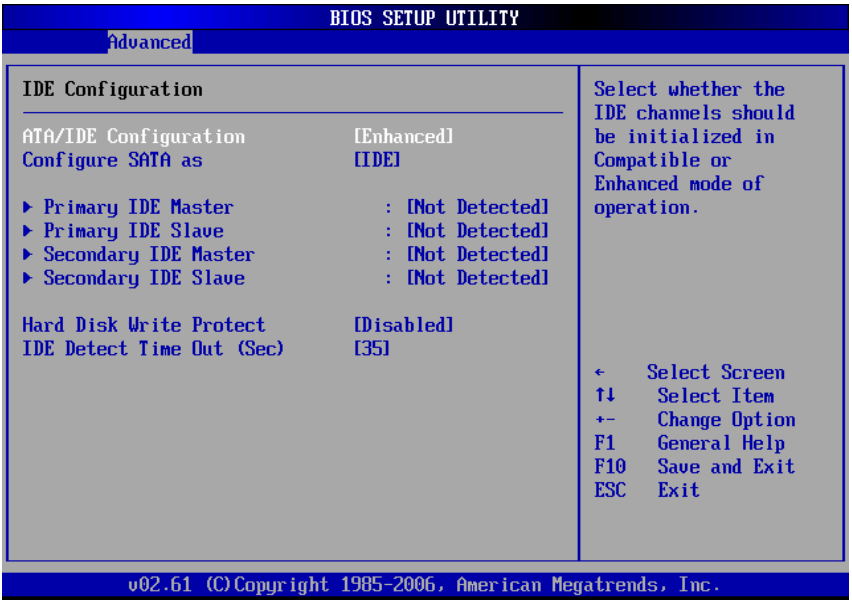


There are no options available for the Intel® Celeron® M ULV (423) CPU.

9.3.2 IDE Configuration

You can use this screen to select options for the IDE Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the IDE Configuration screen is shown below.

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ATA/IDE Configuration

This item specifies whether the IDE channels should be initialized in Compatible or Enhanced mode of operation. The settings are **Disabled**, **Compatible** and **Enhanced**.

Configure SATA as

This option controls the SATA controller's operating mode: **IDE mode** or **AHCI mode**.

Primary IDE Master/Slave, Secondary IDE Master/Slave

Select one of the hard disk drives to configure it. Press < Enter > to access its sub menu.

Hard Disk Write Protect

This will be effective only if the device is accessed through BIOS. The settings are **Enabled** and **Disabled**.

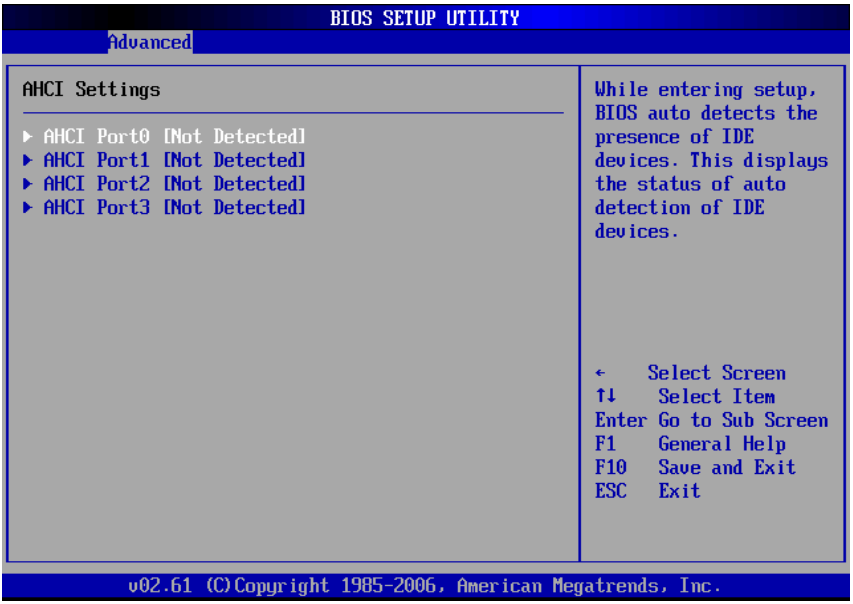
IDE Detect Time Out (Sec)

Select the time out value for detecting ATA/ATAPI devices.

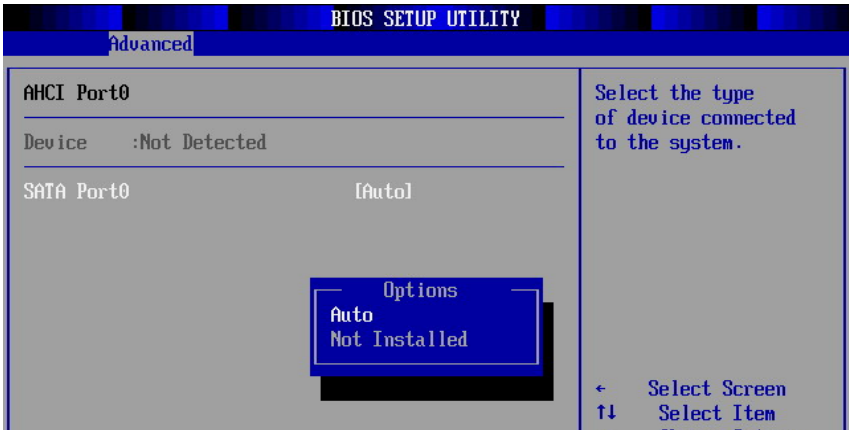
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9.3.3 AHCI Configuration

This function displays drive identity information if a SATA hard drive is detected by the AHCI ports. It is only available if Configure SATA has been set to AHCI.



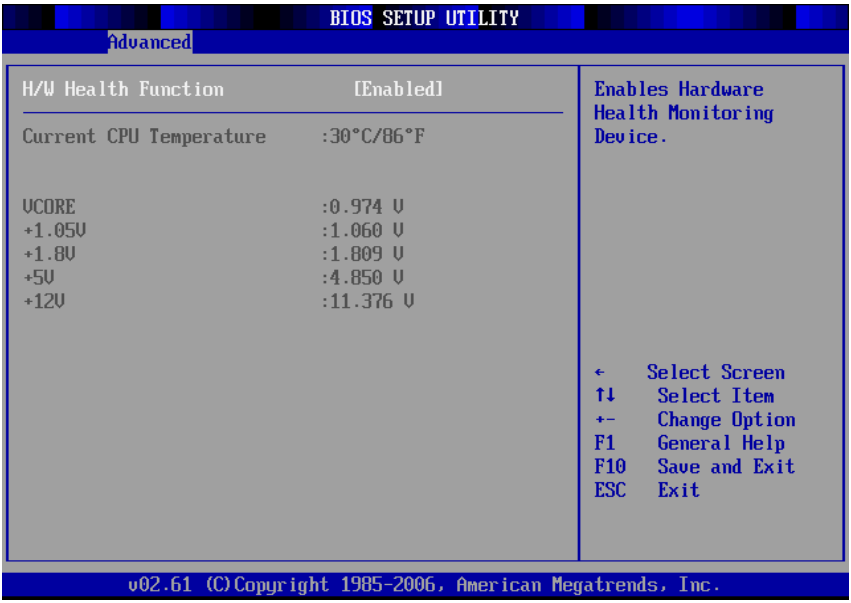
Each AHCI port can be set to auto-detect (Auto) or can be disabled (Not Installed).



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9.3.4 Hardware Health Configuration

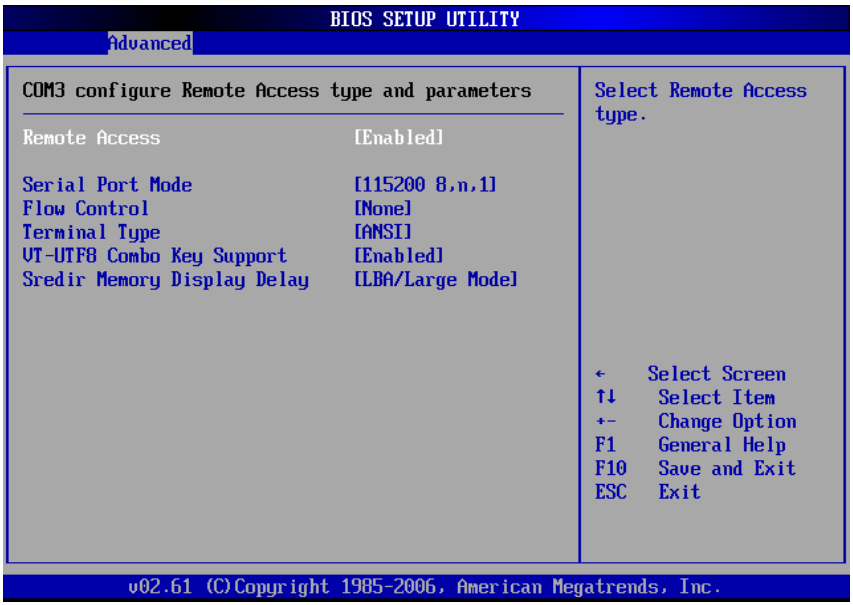
This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures. The options are **Enabled** and **Disabled**.



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9.3.5 Configuration

Remote access configuration provides the settings to allow remote access by another computer to get POST messages and send commands by serial port access.



Remote Access

Select this option to **Enable** or **Disable** the BIOS remote access feature here.

NOTE: Remote Access requires a dedicated serial port connection. If both serial ports are configured to disabled, you should set this value to Disabled or it may cause abnormal boot up.

Serial Port Mode

Select the baud rate you want the serial port to use for console redirection. The options are **115200 8,n,1; 57600 8,n,1; 19200 8,n,1;** and **09600 8,n,1**.

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Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are **None**, **Hardware**, or **Software**.

Terminal Type

This option is used to select either VT100/VT-UTF8 or ANSI terminal type. The settings for this value are **ANSI**, **VT100**, or **VT-UTF8**.

VT-UTF8 Combo Key Support

This option enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals. The settings for this value are **Enabled** or **Disabled**.

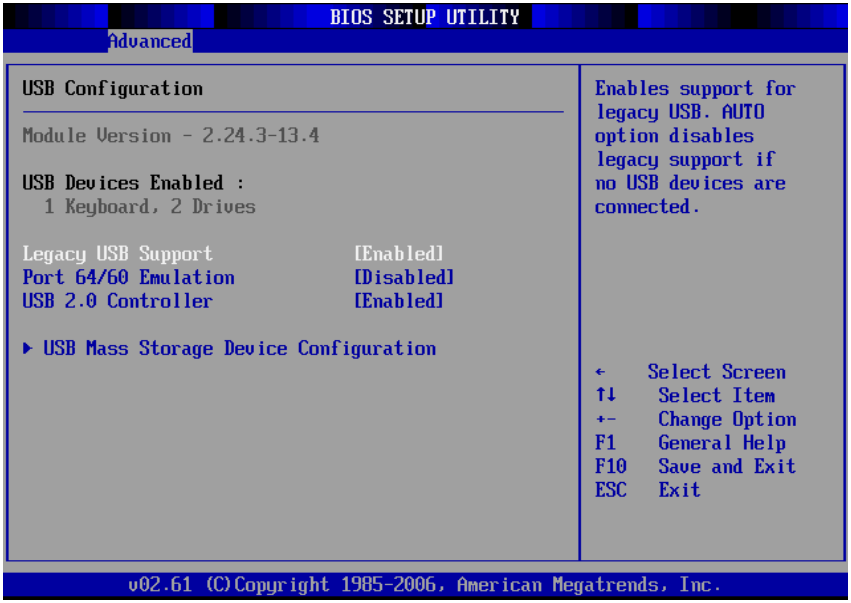
Sredir Memory Display Delay

This option gives the delay in seconds to display memory information. The options for this value are **No Delay, Delay 1 Sec, Delay 2 Sec,** or **Delay 4 Sec**.

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9.3.6 USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Legacy USB Support

Legacy USB Support refers to the USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB drivers loaded on the system. Set this value to enable or disable the Legacy USB Support.

Disabled Set this value to prevent the use of any USB device in DOS or during system boot.

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Enabled Set this value to allow the use of USB devices during boot and while using DOS.

Auto This option auto detects USB Keyboards or Mice and if found, allows them to be utilized during boot and while using DOS.

Port 64/60 Emulation

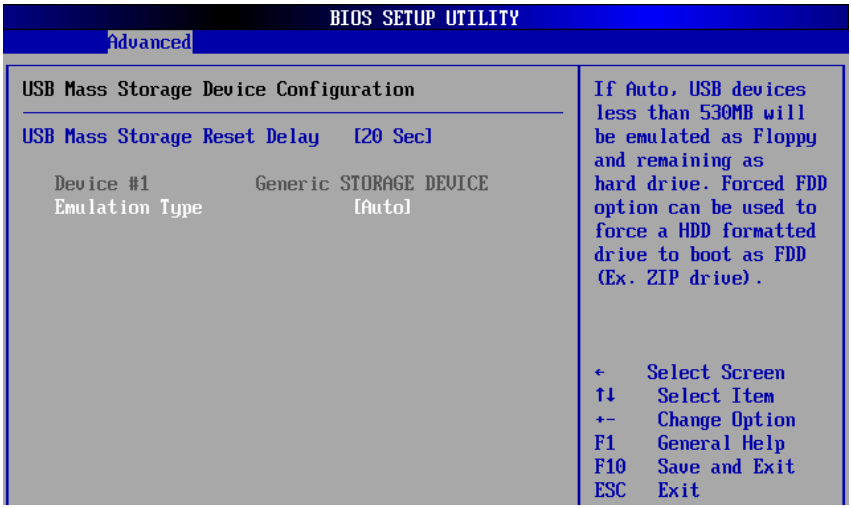
It uses USB to receive the IO port 64/60 trap to emulate the legacy keyboard controller.

USB 2.0 Controller Mode

The USB 2.0 Controller Mode configures the data rate of the USB port. The options are **FullSpeed (12 Mbps)** and **HiSpeed (480 Mbps)**.

USB Mass Storage Device Configuration

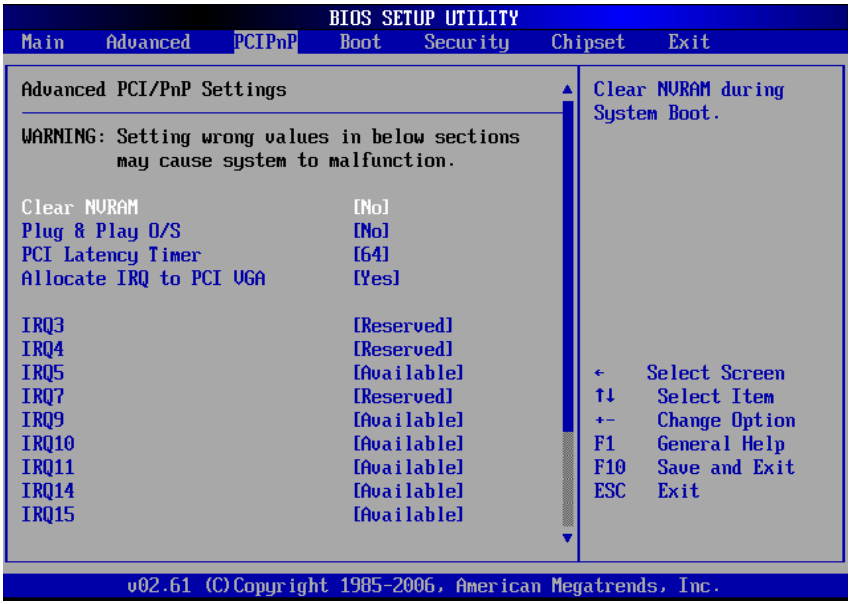
This is a submenu for configuring the USB Mass Storage Class Devices when BIOS finds they are in use on the USB ports. Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.



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9.4 PCI/PnP Setup

Select the PCI/PnP tab from the setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the < Arrow > keys. The Plug and Play BIOS Setup screen is shown below.



Clear NVRAM

Set this to "Yes" clear NVRAM during system boot.

Plug & Play O/S

No: Allow the BIOS to configure all devices in the system.

Yes: Allow the operating system to configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.

PCI Latency Timer

The value in units of PCI clocks for PCI device latency timer register.

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Allocate IRQ to PCI VGA

No: Does not assign IRQ to PCI VGA card even if card requests an IRQ

Yes: Assigns IRQ to PCI VGA card if card requests IRQ

IRQ/DMA Channel

Set this value to allow the IRQ/DMA channel settings to be modified. Available – This setting allows the specified IRQ/DMA channel to be used by a PCI/PnP device. Reserved – This setting allows the specified IRQ/DMA channel to be used by a legacy ISA device.

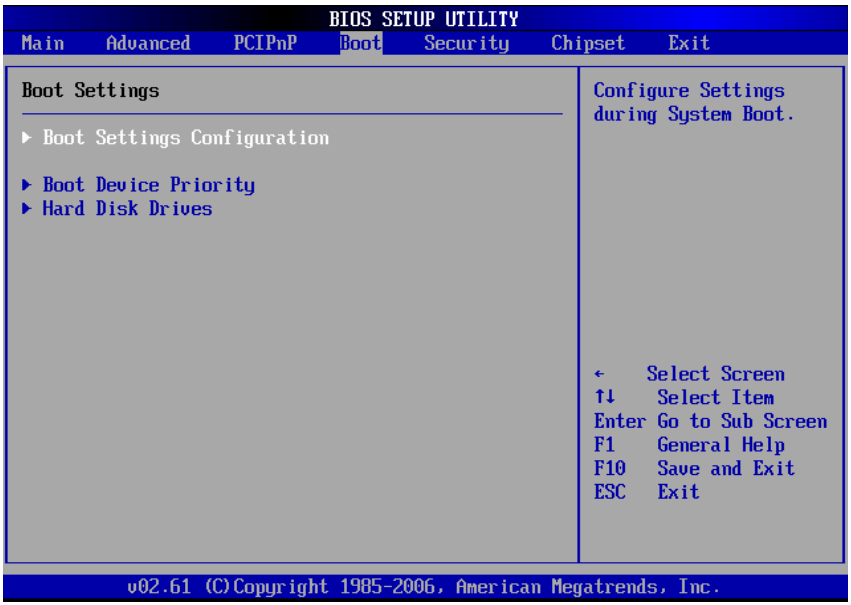
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9.5 Boot Setup

Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys. Select an item on the Boot Setup screen to access the sub menu for:

- Boot Settings Configuration
- Boot Device Priority
- Hard Disk Drives

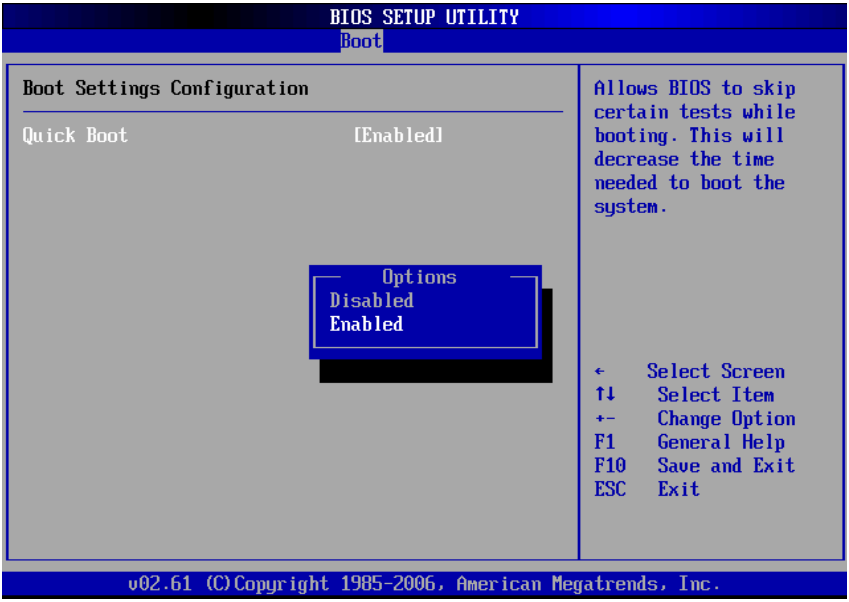
The Boot Settings screen is shown below:



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9.5.1 Boot Setting Configuration

Use this screen to select options for the Boot Settings Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

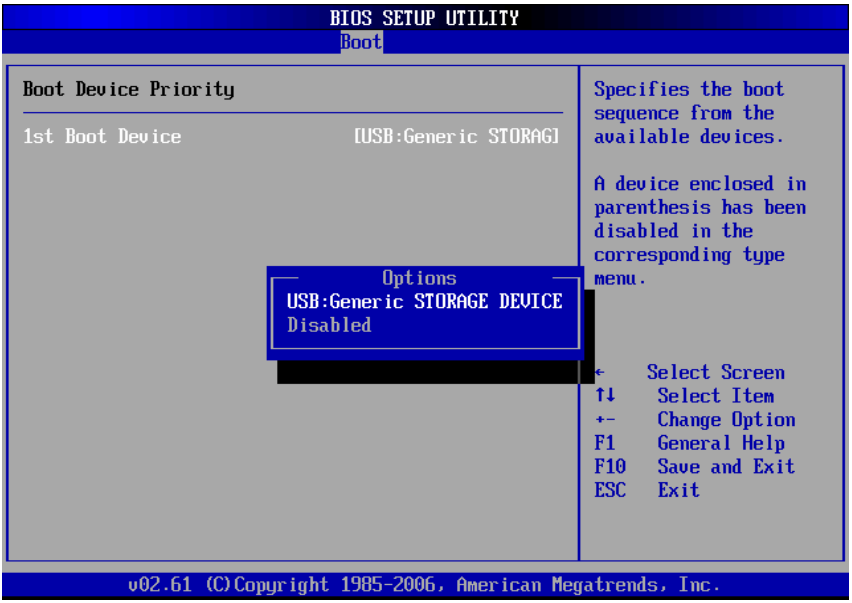


Quick Boot

Disabled – Set this value to allow the BIOS to perform all POST tests.
Enabled – Set this value to allow the BIOS to skip certain POST tests to boot faster.

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9.5.2 Boot Device Priority

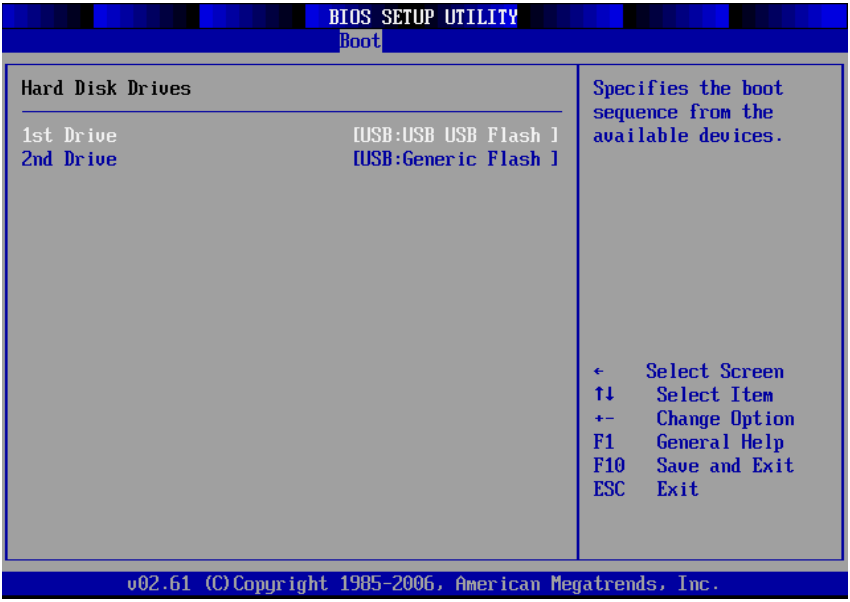


Boot Devices Priority

This setting specifies the boot sequence from the available devices. The 1st Boot Device is the primary device.

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9.5.3 Hard Disk Drives

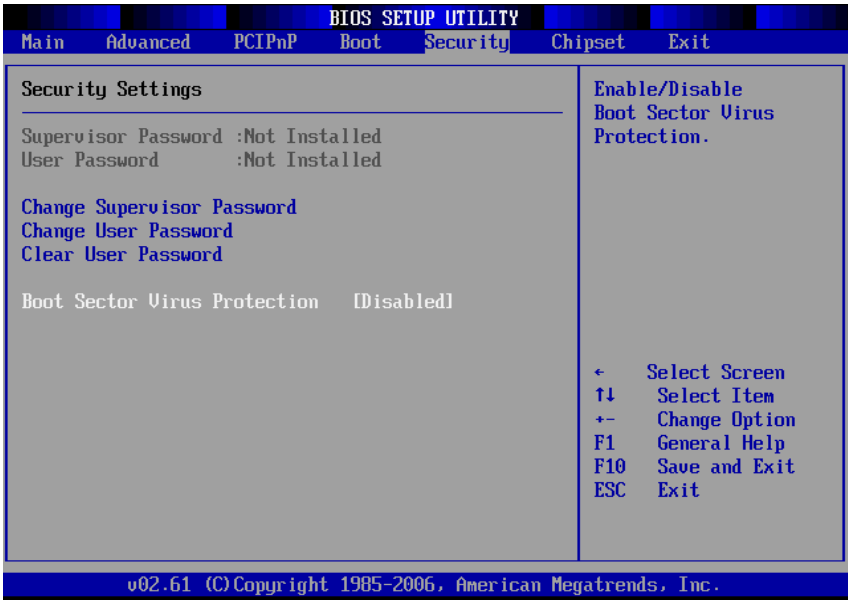


Hard Disk Device Priority

This setting specifies the boot sequence from the available devices. The 1st Boot Device is the primary device.

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9.6 Security Setup



Password Support

Two Levels of Password Protection

Provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

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

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and re-configure.

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Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the sub menu for the following items, select the item and press < Enter >:

- Change Supervisor Password
- Change User Password
- Clear User Password

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the user password.

Clear User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to clear the user password.

9.6.1 Change Supervisor Password

Select Change Supervisor Password from the Security Setup menu and press < Enter >.

Enter New Password:

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Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after setup completes.

9.6.2 Change User Password

Select Change User Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after setup completes.

9.6.3 Clear User Password

Select Clear User Password from the Security Setup menu and press < Enter >.

Clear New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after setup completes.

9.6.4 Boot Sector Virus Protection

Protects the system from virus attacks during POST. The settings are Disabled and Enabled.

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9.7 Chipset Setup

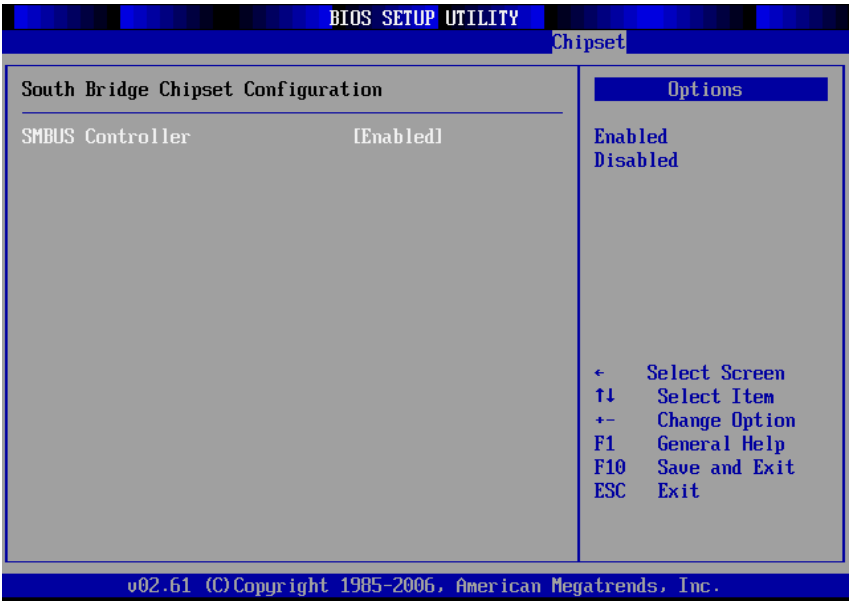
Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of the items in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. You can display a Chipset BIOS Setup option by highlighting it using the < Arrow > keys. The Chipset BIOS Setup screen is shown below.



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9.7.1 South Bridge Configuration

You can use this screen to select options for the South Bridge Configuration. South Bridge is a chipset on the motherboard that controls the basic I/O functions, USB ports, audio functions, modem functions, IDE channels, and PCI slots. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



SMBUS Controller

This setting controls the SMBUS controller. Options are Disabled and Enabled

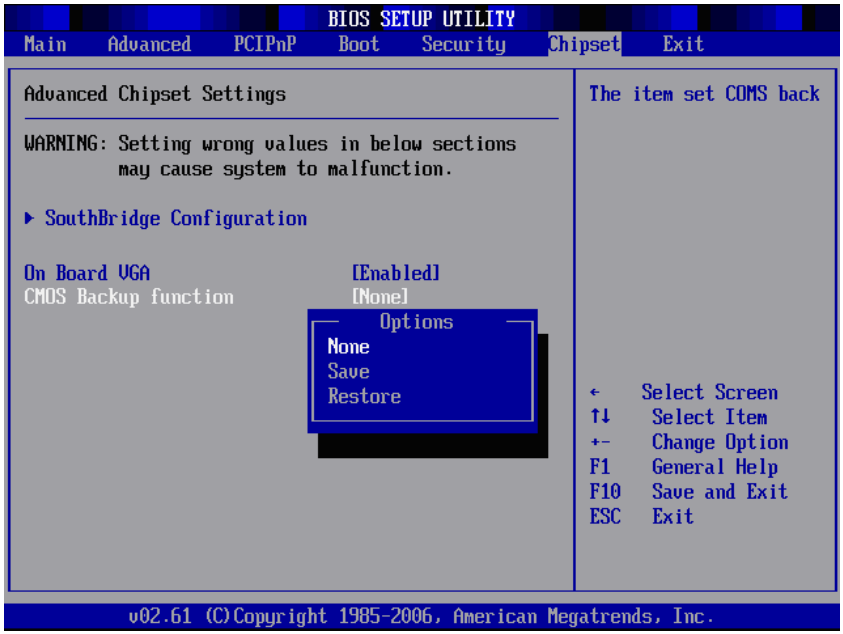
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9.7.2 Onboard VGA

You can use this option to control the onboard VGA. The settings are **Enabled** and **Disabled**.

9.7.3 CMOS Backup Function

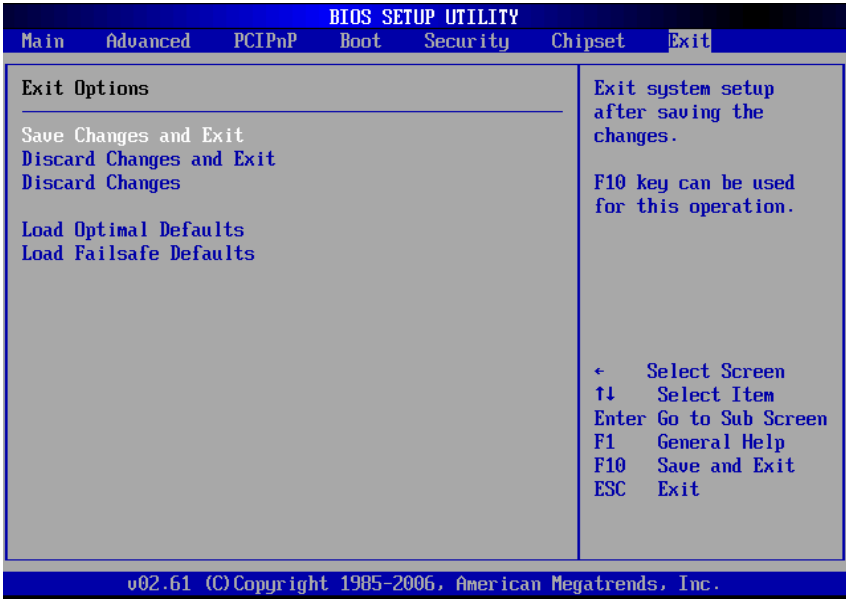
The option controls the CMOS backup function. When set to **None**, the system does not perform the CMOS backup function. When set to **Save**, the system backs up the BIOS settings from CMOS to the BIOS1 FWH NVRAM once. After reboot, the setting returns to None. When set to **Restore**, the system restores the BIOS data from the BIOS1 FWH NVRAM to CMOS once. After reboot, the setting returns to **None**.



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9.8 Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by high-lighting it using the < Arrow > keys. The Exit BIOS Setup screen is shown below.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Save Configuration Changes and Exit Now?

[Ok] [Cancel]

appears in the window. Select Ok to save changes and exit.

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Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

Discard Changes and Exit Setup Now?

[Ok] [Cancel]

appears in the window. Select Ok to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press < Enter >.

Select Ok to discard changes.

Load Optimal Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press < Enter >.

Select Ok to load optimal defaults.

Load Failsafe Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Failsafe settings are designed for maximum system stability, but not maximum performance. Select the FailSafe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press < Enter >.

Load FailSafe Defaults?

[Ok] [Cancel]

appears in the window. Select Ok to load FailSafe defaults.

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Important Safety Instructions

Please read and follow all instructions marked on the product and in the documentation before operating the system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User's Manual for future reference.
- The equipment should be operated within the recommended operating temperature.
- The equipment should be operated only from the type of power source indicated on the rating label. Make sure the voltage of the power source is correct when connecting the equipment to the power outlet.
- If the user's equipment has a voltage selector switch, make sure that the switch is set to the proper position for the area. The voltage selector switch is set at the factory to the correct voltage.
- For pluggable equipment, ensure they are installed near a socket-outlet that is easily accessible.
- Secure the power cord to prevent unnecessary accidents. Do not place anything over the power cord.
- If the equipment will not be in use for long periods of time, disconnect the equipment from mains to avoid being damaged by transient overvoltage.
- All cautions and warnings on the equipment should be noted.
- Please keep this equipment away from humidity.
- Do not use this equipment near water or a heat source.
- Place this equipment on a reliable surface when installing. A drop or fall could cause injury.
- Never pour any liquid into the opening, this could cause fire or electrical shock.

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- Openings in the case are provided for ventilation. Do not block or cover these openings. Make sure there is adequate space around the system for ventilation when setting up the work area. Never insert objects of any kind into the ventilation openings.
- To avoid electrical shock, always unplug all power and modem cables from the wall outlets before removing covers.
- Lithium Battery provided (real time clock battery)

  “CAUTION - Risk of explosion if battery is replaced by an incorrect type. Dispose used batteries as instructed in the instructions”
- The equipment should be checked by service personnel if one of the following situation arises:
  - The power cord or plug is damaged.
  - Liquid has penetrated the equipment.
  - The equipment has been exposed to moisture.
  - The equipment is not functioning or does not function according to the user’s manual.
  - The equipment has been dropped and damaged.
  - If the equipment has obvious sign of breakage.
- Never open the equipment. For safety reasons, the equipment should only be opened by qualified service personnel.

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Getting Service

Contact us should you require any service or assistance.

ADLINK Technology Inc.
Address: 9F, No.166 Jian Yi Road, Chungho City,
Taipei County 235, Taiwan
台北縣中和市建一路 166 號 9 樓
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology Inc.
Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology Beijing
Address: 北京市海淀区上地东路 1 号盈创动力大厦 E 座 801 室
(100085)
Rm. 801, Power Creative E, No. 1, B/D
Shang Di East Rd., Beijing 100085, China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8625
Email: market@adlinktech.com

ADLINK Technology Shanghai
Address: 上海市漕河泾高科技开发区钦江路 333 号 39 幢 4 层
(200233)
Tel: +86-21-6495-5210
Fax: +86-21-5450-0414
Email: market@adlinktech.com

ADLINK Technology Shenzhen
Address: 深圳市南山区科技园南区高新南七道 数字技术园
A1 栋 2 楼 C 区 (518057)
2F, C Block, Bld. A1, Cyber-Tech Zone,
Gao Xin Ave. Sec 7, High-Tech Industrial Park S.,
Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

ADLINK Technology Inc. (German Liaison Office)
Address: Nord Carree 3, 40477 Duesseldorf, Germany
Tel: +49-211-495-5552
Fax: +49-211-495-5557
Email: emea@adlinktech.com

ADLINK (French Liaison Office)
Address: 15 rue Emile Baudot, 91300 MASSY Cedex, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology Japan Corporation
Address: 151-0072 東京都渋谷区幡ヶ谷
1-1-2 朝日生命幡ヶ谷ビル 8F
Asahiseimei Hatagaya Bldg. 8F
1-1-2 Hatagaya, Shibuya-ku, Tokyo 151-0072, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5333-6040
Email: japan@adlinktech.com

ADLINK Technology Inc. (Korean Liaison Office)
Address: 서울시 강남구 논현동 60-12 동성빌딩 4 층 402 호
No.402, Dongsung B/D, 60-12, Nonhyeon-Dong
Gangnam-gu, Seoul, 135-010, Korea.
Tel: +82-2-2057-0565
Fax: +82-2-2057-0563
Email: korea@adlinktech.com

ADLINK Technology Singapore Pte Ltd.
Address: 84 Genting Lane #07-02A, Cityneon Design Centre,
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte Ltd. (Indian Liaison Office)
Address: No. 1357, "Anupama", Sri Aurobindo Marg, 9th Cross,
JP Nagar Phase I, Bangalore - 560078, India
Tel: +91-80-65605817
Fax: +91-80-22443548
Email: india@adlinktech.com

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