ADE-6040

Intel® Core™ 2 Duo Desktop
Q965 Mini ITX

User's Manual

Rev. 1.0
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P/N: 600C002604010

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Technical Support

We hope you to get the maximum performance from your products and be willing to help if running into technical difficulties. For the most frequently asked questions, it's easily found answers from the product documentation and usually a lot more detailed, so please take reference to this manual first. If the answer still can not be found, gather all the information or questions applying to the problem, and with the product on hand, contact your distributor, sales representative, or customer service center for technical support. Most problems reported are minor and able to be easily solved over the phone. In addition, free technical support is available and always ready to give advices on application requirements or specific information on the installation and operation of any of our products.
Please have the following information ready before you call:

1. Product name and serial number
2. Description of your peripheral attachments
3. Description of your software (operating system, version, application software, etc.)
4. A complete description of the problem
5. The exact wording of any error messages

How to Use This Manual

This manual is written for the system integrator, PC technician and knowledgeable PC end user. It describes how to configure your ADE-6040 to meet various operating requirements. The user's manual is divided into four chapters, with each chapter addressing a basic concept and operation of the server board.

Chapter 1: Introduction - presents what you have inside the box and gives you an overview of the product specifications and basic system architecture for the ADE-6040 server board.

Chapter 2: Hardware Configuration Setting - shows the definitions and locations of Jumpers and Connectors so that you can easily configure your system.

Chapter 3: System Installation - describes how to properly mount the CPU, main memory, and M-System Flash disk for a safe installation. It will also introduce and show you the driver installation procedure for the Graphics Controller and Ethernet Controller.

Chapter 4: BIOS Setup Information - specifies the meaning of each setup parameter, how to get advanced BIOS performance and update to a new BIOS.

Note:

(1) Memory type support dual-channel interleaved mode assuming DDR2, all DIMMs in a system must be of the same type, the speed in all channels is the speed of the slowest DIMM in the system.

Table of Content

Revision History

Revision	Date	Comment
Rev.1.0	Apr. 2007	Initial released

CHAPTER 1

1. Introduction

1.1 Description

The leading ADE-6040 Mini-ITX adopts Intel® energy-efficient dual-core processing to fit a high performance Intel® Core™ 2 Duo Desktop based in the LGA775 package processors and compatible for high-end computing applications with PCI-E bus architecture to adapt to today's demands and keep complete compatibility with hardware and software designed. The onboard devices support one PCI Express x16 slot for flexible expansibility of graphics interfaces, integrated graphics, and onboard dual Marvell Gigabit Ethernet controllers. It's beneficial to build up a high performance and fast transmission availability system for VARs, or system integrators.

The ADE-6040 supports Intel® LGA775 Core™ 2 Duo Desktop processors in E6000, 600, 500, 400, and 300 sequences via Intel® Q965 and ICH8 chipset integrated GMA 3000 graphics with DVMT 4.0 display memory up to 256 MB for optional dual display function by VGA/LVDS and VGA/DVI through optional ADD2 card. The board supports two DIMMs up to 4 GB SDRAM with dual channel DDR2 533/667/800, enhanced onboard four SATA high-speed data transferring at up to 300 MB/s, integrated Realtek ALC883 7.1 + 2 CH high definition audio codec. The onboard Super I/O Winbond W83627DHG chipset supports two RS-232 serial port interfaces, Hardware Monitor function, eight Hi-speed USB 2.0 ports, and two 6-pin Mini-DIN connectors for PS/2 mouse and keyboard. Besides, one 24-pin standard connector designed to support ATX power function, and a feature of CPU overheat protection will provide user more security and stability.

Combing with these outstanding features in the Mini-ITX form factor, ADE-6040 is definitely the most excellent choice for embedded applications like Network, Point of Sales (POS), automated KIOSKs, security products, medical instruments, and gaming machines.

1.2 Packing Check List

The ADE-6040 Series package includes the following basic items accompany with this manual.

- One ADE-6040 series Mini ITX
- One Quick Installation Guide for ADE-6040
- Two Serial ATA cables
- One Serial port cable for COM2
- One USB 2.0 cable
- One I/O Shield
- One Supporting CD-ROM contains User's Manual and internal VGA display driver and Marvell Gigabit Ethernet network controller driver and on board devices drivers

If any of these items is damaged or missed, please contact your vendor and save all packing materials for future replacement and maintenance.

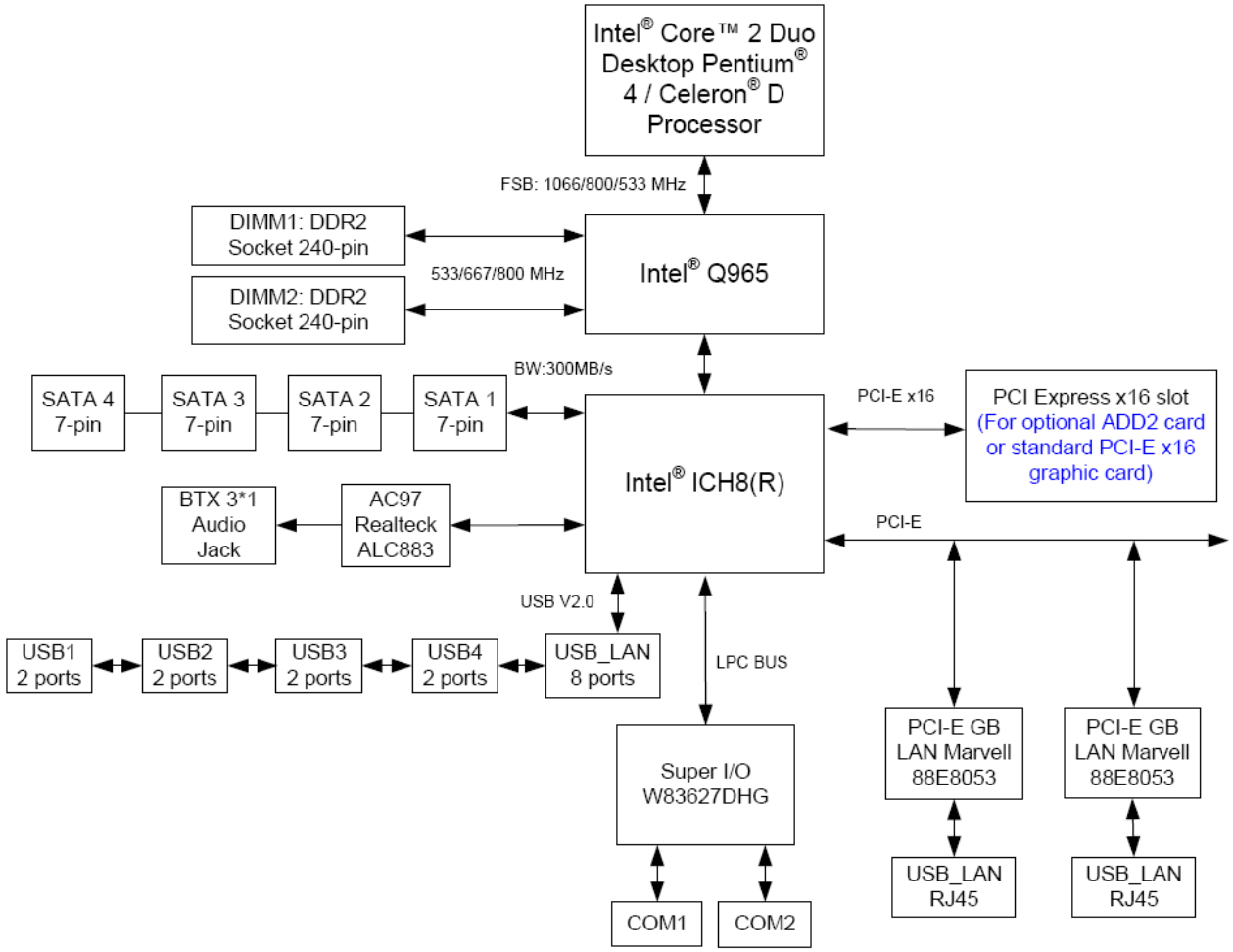
1.3 Specifications

System	
CPU	Intel® Core™ 2 Duo Desktop / Pentium® 4 / Celeron® D processor in the LGA775 package (E6000, 600, 500, 300 sequences)
FSB	1066/800/533 MHz
BIOS	AMI BIOS with 8 Mb SPI Flash EEPROM
System Chipset	Intel® Q965 + ICH8
I/O Chip	Winbond W83627DHG I/O controller
System Memory	2 x 240-pin DIMM sockets support dual channel DDR2 533/667/800 SDRAM Max. up to 4 GB memory
Storage	4 x Serial ATA 300 ports
RAID	Optional ICH8R supports RAID 0, 1, 5, 10 function
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring system temperature, voltage, and cooling fan status. Auto throttling control when CPU overheats. System automatically restored on recovery of AC power loss.
GPIO	On-board programmable 8-bit Digital I/O interface
Expansion	1 x PCI-E x16 interface
MIO	
Internal I/O	1 x RS-232, 4 x USB 2.0
Back Panel I/O	1 x VGA, 1 x Audio jack, 2 x RJ-45, 1 x RS-232, 4 x USB 2.0, 1 x KB, 1 x Mouse
Display	
Chipset	Intel® Q965 Integrated Intel® GMA 3000 graphics
Display Memory	Intel® DVMT 4.0 supports up to 256 MB video memory
Resolution	Analog display : up to 2048 x 1536 @ 75Hz (QXGA) Digital CRT/HDTV : up to 1920 x 1080 @ 85 Hz
VGA/LCD Interface	DSUB-15 connector for VGA output
LVDS	Optional Chrontel CH7308 LVDS transmitter by ADD2 card
DVI	Optional Chrontel CH7307 DVI transmitter by ADD2 card

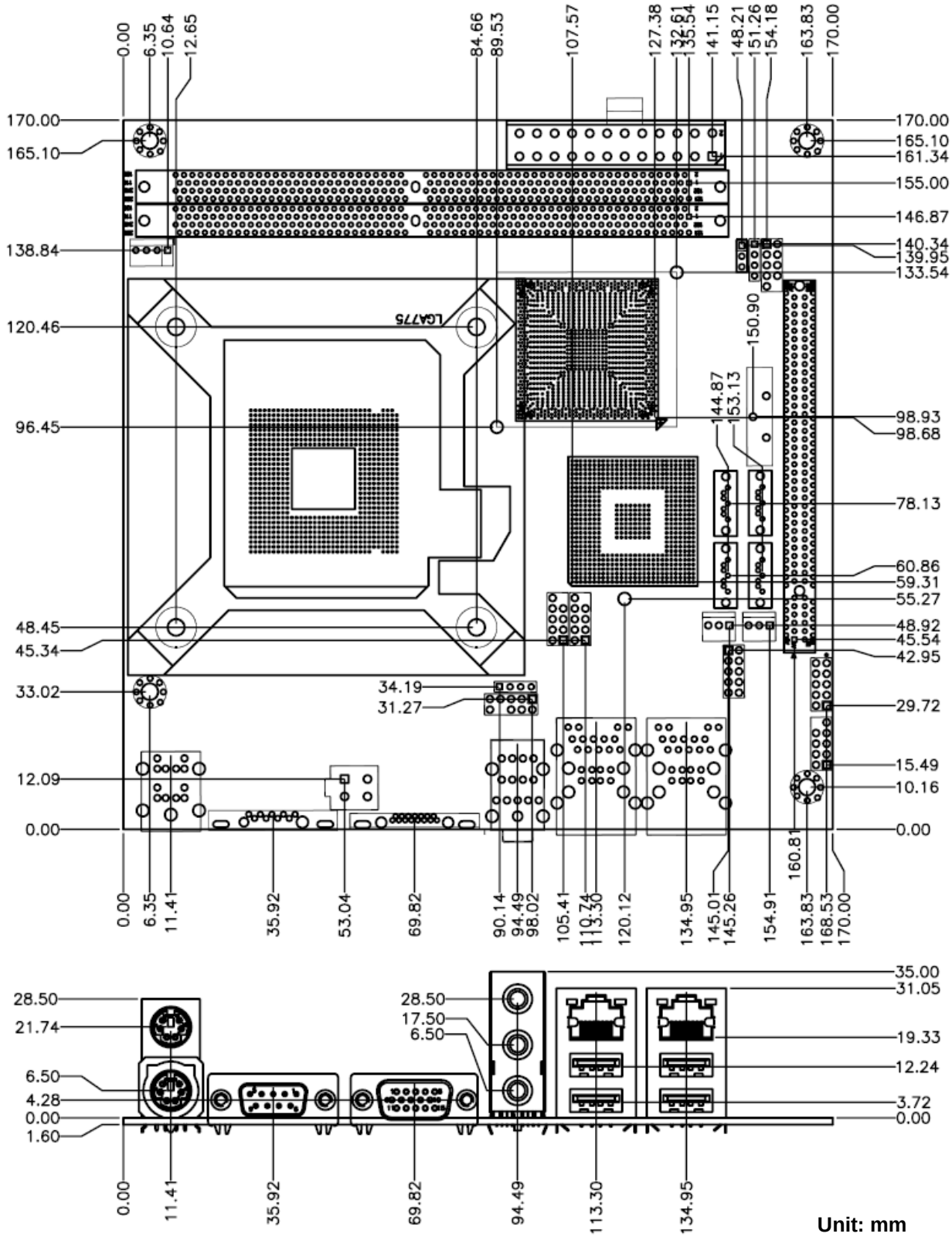
Audio	
HDAC	Realtek ALC883 7.1 + 2 CH audio interface
Audio Interface	Mic in, Line in, CD Audio in, Line out, Rear out and Center/Subwoofer out
Ethernet	
Chipset	Dual Marvell® 88E8053 PCI Express™ Gigabit Ethernet controllers
Ethernet Interface	IEEE 802.3 10BASE-T/100BASE-TX/1000BASE-T
Mechanical & Environmental	
Power Requirement	+3.3 V @ 3.3 A, +5 V @ 1.9 A, +12 V @ 4 A, 5 Vsb @ 500 mA (w/ Intel® Core™ 2 Duo E6700 2.66 GHz & 2 x 512 MB DDR2 800 MHz SDRAM in Dos Mode)
Power Type	24-pin ATX power connector, 1x 4-pin ATX 12V power connector
Operating Temperature	0~60°C (32~140°F)
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	6.69" x 6.69" (170 mm x 170 mm)
Weight	0.94 lbs (0.43 Kg)

1.4 System Architecture

All of details operating relations are shown in ADE-6040 series system block diagram.



1.5 Dimensions



Unit: mm

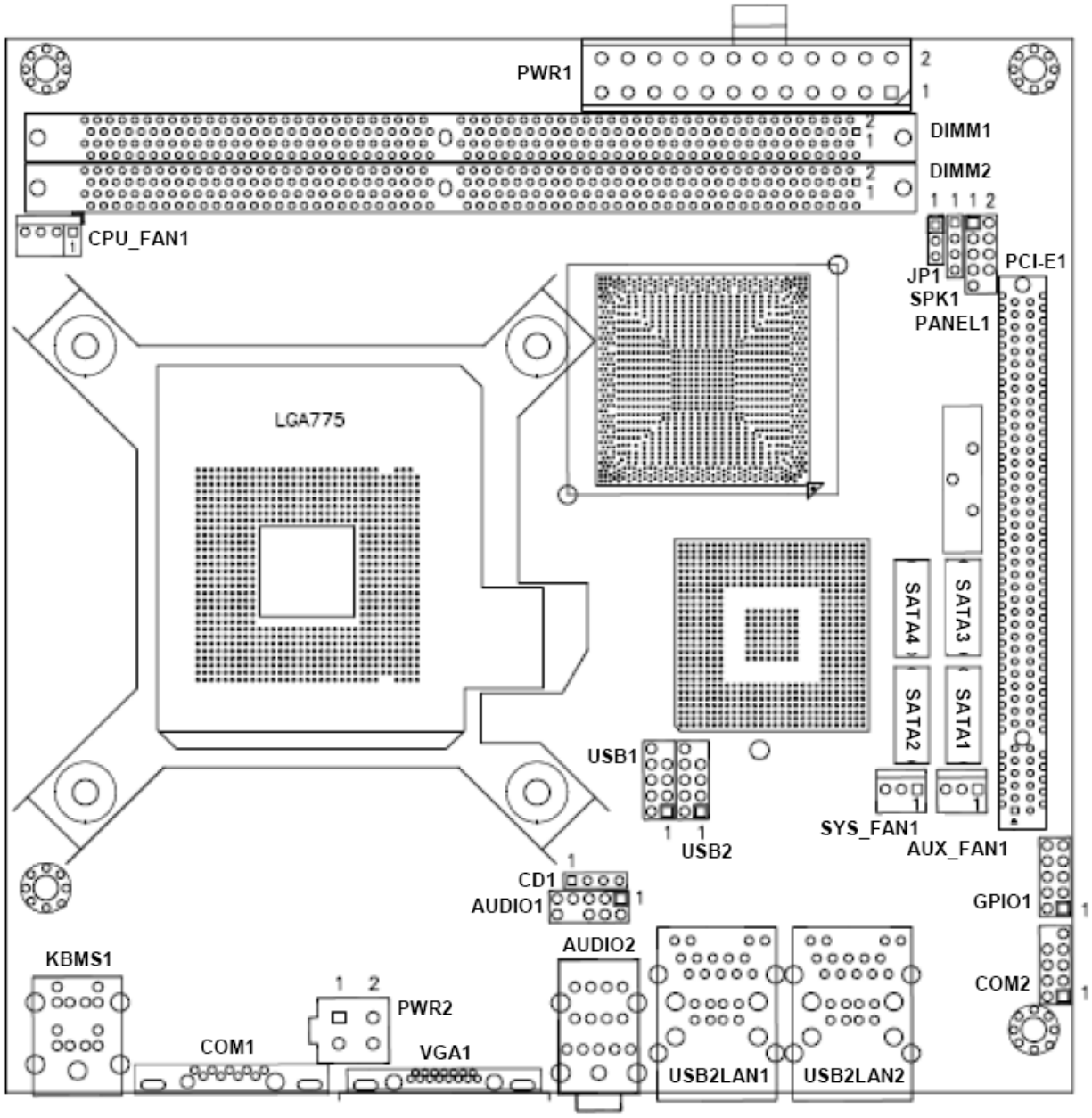
CHAPTER 2

2. Hardware Configuration Setting

This chapter gives the definitions and shows the positions of jumpers, headers and connectors. All of the configuration jumpers on ADE-6040 series are in the proper position. The default settings shipped from factory are marked with an asterisk (★).

In general, jumpers on the Mini ITX are used to select options for certain features. Some of the jumpers are designed to be user-configurable, allowing for system enhancement. The others are for testing purpose only and should not be altered. To select any option, cover the jumper cap over (SHORT) or remove (NC) it from the jumper pins according to the following instructions. Here, NC stands for "Not Connect".

2.1 Board Layout



2.2 Jumpers & Connectors

JUMPERS	FUNCTION	REMARK
JP1	RTC CMOS clear select	3 x 1 header

CONNECTORS	FUNCTION	REMARK
AUDIO1	Internal audio for chassis	2 x 5 header
AUDIO2	Audio connector	Audio jack x 3
AUX_FAN1	Auxiliary fan connector	1 x 3 wafer
CD1	CD-In from CD-ROM	1 x 4 header
COM1	D-sub 9-pin serial port 1 connector	
COM2	Serial port 2 connector	2 x 5 header
CPU_FAN1	CPU fan connector	1 x 4 wafer
DIMM1, DIMM2	240-pin DDR2 SDRAM 1 & 2 socket	
GPIO1	GPIO connector	2 x 5 header
KBMS1	PS/2 keyboard & mouse connector	
PANEL1	Front side indicators: IDE1 active LED (1-3) System power on LED (2-4) System reset (5-7) System power on switch (6-8)	2 x 5 header
PCI-E1	PCI Express x16 slot	
PWR1	24-pin ATX power connector	
PWR2	4-pin ATX power connector	
SATA1, SATA2	Serial ATA 1 & 2 connectors	
SATA3, SATA4	Serial ATA 3 & 4 connectors	
SPK1	Internal speaker connector	1 x 4 header
SYS_FAN1	System fan connector	1 x 3 wafer
USB1, USB2	Internal USB 5, 6 & 7, 8 connectors	2 x 5 header
USB2LAN1	USB 1, 2 & RJ-45 LAN 1 connectors	
USB2LAN2	USB 3, 4 & RJ-45 LAN 2 connectors	
VGA1	D-sub 15-pin VGA connector	

2.3 Jumpers/Connectors Setting

2.3.1 RTC CMOS Clear Select (JP1)

PIN No.	Description
1-2	Clear CMOS
2-3	Normal operation ★

2.3.2 Internal Audio for Chassis (AUDIO1)

PIN No.	Description
1	MIC2-L
2	Ground
3	MIC2-R
4	+3.3V
5	LINE2-R
6	Ground
7	Front I/O sense
8	Key
9	LINE2-L
10	Ground

2.3.3 Audio Connector (AUDIO2)

PIN No.	Description
1 (Blue)	Line-in
2 (Green)	Speaker out
3 (Red)	MIC-in

2.3.4 Auxiliary/CPU/System Connectors (AUX_FAN1, CPU_FAN1, SYS_FAN1)

PIN No.	Description
1	GND
2	+12V
3	SENSE
4	Control (CPU_FAN1 only)

2.3.5 CD-In from CD-ROM (CD1)

PIN No.	Description
1	CD-L
2	CD-Ground
3	CD-Ground
4	CD-R

2.3.6 COM1 / COM2 Connector (COM1, COM2)

PIN No.	Description
1	Data Carrier Detect
2	Received Data
3	Transmit Data
4	Data Terminal Ready
5	Ground
6	Data Set Ready
7	Request To Send
8	Clear To Send
9	Ring Indicator
10	COM2 Key

2.3.7 GPIO Connector (GPIO1)

PIN No.	Description
1	+3.3V
2	General Purpose I/O bit 27
3	General Purpose I/O bit 8
4	General Purpose I/O bit 28
5	General Purpose I/O bit 15
6	General Purpose I/O bit 33
7	General Purpose I/O bit 20
8	General Purpose I/O bit 34
9	General Purpose I/O bit 26
10	Ground

2.3.8 PS/2 Keyboard & Mouse (KBMS1)

PIN No.	Description
1	Keyboard Data
2	Mouse Data
3	Ground
4	+5V
5	Keyboard Clock
6	Mouse Clock

2.3.9 Front Side Indicators (PANEL1)

IDE1 Active LED

PIN No.	Signal Description
1	+5V (Pull-up for HDD LED)
3	HDD active# (LED cathode terminal)

System Power On LED

PIN No.	Signal Description
2	+5V (Pull-up for Power LED)
4	Ground

System Reset

PIN No.	Signal Description
5	Ground
7	Reset

System Power On Switch

PIN No.	Signal Description
6	Power button control signal
8	Ground

2.3.10 24-pin ATX Power Connector (PWR1)

Description	PIN No.	PIN No.	Description
+3.3V	13	1	+3.3V
-12V	14	2	+3.3V
Ground	15	3	Ground
PS_ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	PW_OK
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

2.3.11 4-pin ATX Power Connector (PWR2)

PIN No.	Description
1	+12V
2	Ground
3	+12V
4	Ground

2.3.12 Serial ATA 1/2/3/4 Connectors (SATA1, SATA2, SATA3, SATA4)

These SATA connectors support Serial ATA 300. Each SATA connector can only support one serial ATA device.

Note: With most storage devices, there is a power cable that you need attach to a power source (power supply).

2.3.13 Internal Speaker Connector (SPK1)

PIN No.	Description
1	SPK Active#
2	SPK Active#
3	Key
4	+5V

2.3.14 LAN 1/2 & USB 1/2/3/4 Connectors (USB2LAN1, USB2LAN2)

LAN 1/2

PIN No.	Description	PIN No.	Description
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI1-	8	MDI3-

USB 1/2/3/4

PIN No.	Description	PIN No.	Description
1	+5 V (fused)	5	+5 V (fused)
2	USBP0-/3-	6	USBP1-/2-
3	USBP0+/3+	7	USBP1+/2+
4	Ground	8	Ground

2.3.15 Internal USB 5/6/7/8 Connectors (USB1, USB2)

PIN No.	Description
1	5VSB
2	5VSB
3	DATA_6- / DATA_8-
4	DATA_7- / DATA_9-
5	DATA_6+ / DATA_8+
6	DATA_7+ / DATA_9+
7	Key
8	Ground
9	NC
10	NC

Note :

1) This mainboard provides 4 USB headers on the board allowing for 4 additional USB ports. To make use of these headers, you must attach a USB bracket/cable with USB ports (some models will come packaged with a USB 4-port bracket-cable). The optionally packaged bracket will have two connectors that you can connect to the headers (USB1, USB2). The other end (bracket containing the USB ports) is attached to the computer casing.
2) If you are using a USB 2.0 device with Windows 2000/XP, you will need to install the USB 2.0 driver from the Microsoft® website. If you are using Service pack 1 (or later) for Windows® XP, and using Service pack4 (or later) for Windows® 2000, you will not have to install the driver.

2.3.16 VGA Connector (VGA1)

Description	PIN No.	PIN No.	Description
Green Signal	2	1	Red Signal
NC	4	3	Blue Signal
Ground	6	5	Ground
Ground	8	7	Ground
Ground	10	9	+5V
DCC_DATA	12	11	NC
VSYNC	14	13	HSYNC
		15	DCC_CLK

CHAPTER 3

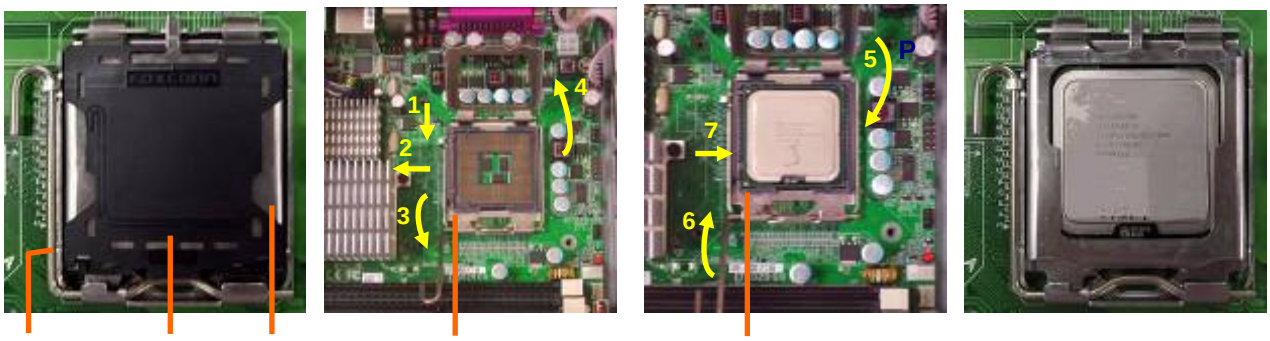
3. System Installation

This chapter provides you with instructions on how to setup your system. The additional information shows you how to install CPU/ FAN and memory.

3.1 Intel® µFC-LGA775 Processor

3.1.1 Installing Intel® Core™ 2 Duo / Pentium® 4 / Celeron® D CPU

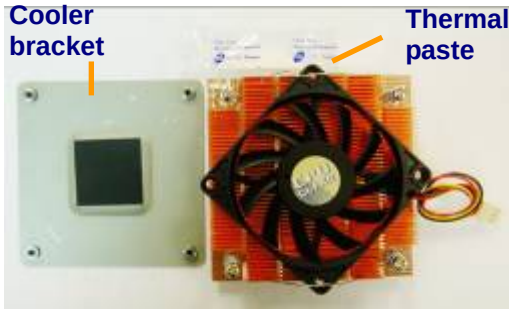
- The board comes with a surface mount LGA775 socket designed for the Intel® Pentium® 4 processor in the 775-land package.
- Remove the plastic cap to install the µFC-LGA 775 Pentium 4 CPU.
- Unlock the socket by pressing the metal lever sideways to lift it up, and open the load plate. (1, 2, 3, 4)
- Position the CPU above the socket and the gold triangular mark on the CPU must align with pin 1 of the CPU socket. Then Insert the CPU gently seated in place.
- Close the load plate and push it back to the original position. (5, 6, 7)



Note:

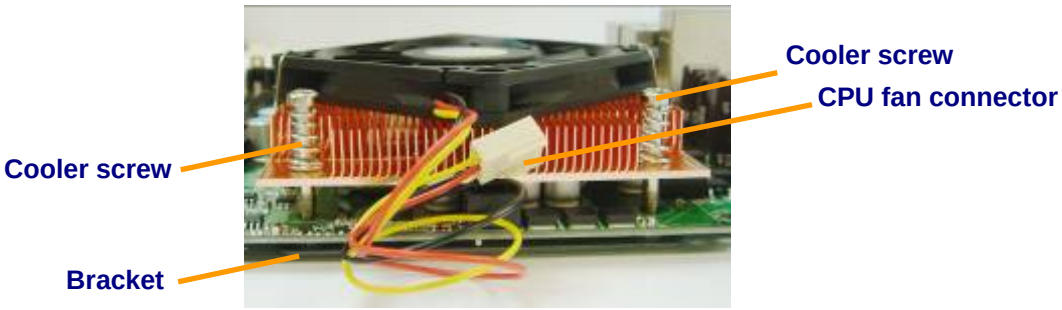
Do not force the CPU into the socket. It may bend the pins and damage the CPU.

3.2 Installing 1 U Cooler for Intel® µFC-LGA775 Processor



1. Unpacked the cooler with 1 U Cooler Fan & the Thermal paste enclosed.

2. Place Cooler Bracket under the board to make the bracket holes right to the board holes, then smear the Thermal paste on the top of CPU.



3-1. Place the cooler above CPU and make sure four Cooler screws to the right position.
3-2. Fasten four Cooler screws.
3-3. Plug in the CPU Fan connector.

Note:

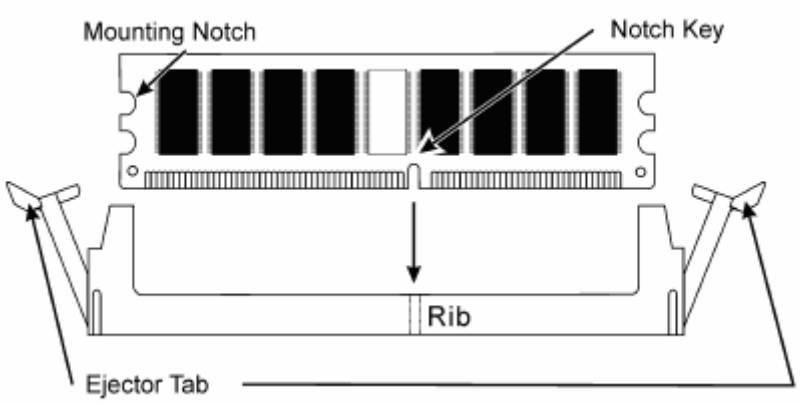
For a safety landing, avoid leaving prongs on hard surface.

3.3 Main Memory

ADE-6040 series provide 2 DIMMs (240-pin Dual In-line Memory Module) to support 1.5V DDRAM (Synchronized DRAM) as on-board main memory. The maximum memory size is 256 MB ~ 4 GB with using 256MB/512MB/1GB/2GB technology. Supports up to 2 double sided DIMMs at DDR2 800 MHz. The memory architecture adopts 128-bit data interface to support for x8 and x16 DDRAM(DDR2) device width. In addition, it only supports Non-ECC memory.

For system compatibility and stability, don't use memory module without brand. You can also use the single or double-side DIMM .The three DIMMs can be out of order. You can install different size of DDRAM module on DIMM1, DIMM2 or all to boot up system.

Without out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedure to install your DDRAM module into memory socket. Before locking, make sure that the module has been fully inserted into the DIMM slot.



NOTE: For maintaining system stability, do not change any of DDR2 memory parameters in BIOS setup to upgrade your system performance without acquiring technical information.

3.4 Installing the Mini-ITX

To install your ADE-6040 series into standard chassis or proprietary environment, you need to perform the following steps:

1. Check all jumpers setting on proper position
2. Install and configure CPU and memory module on right position
3. Place ADE-6040 series into the dedicated position in your system
4. Attach cables to existing peripheral devices and secure it

NOTE: Please refer section 3.4 to install display and Ethernet drivers and setup your system.

WARNING: Please ensure that your SBC properly inserted and fixed by mechanism. Otherwise, the system might be unstable or do not work from bad contact of golden finger.

3.4.1 Dual Marvell Gigabit Ethernet Controllers

Dual Marvell Gigabit Ethernet 10/100/1000BASE-TX controller by PCI Express.

The ADE-6040 series provide two LED indicators on RJ-45 connectors to show LAN interface status. These messages will give you a guide for troubleshooting.

Yellow LED indicates transmit and receive activity.

Blinking: indicates transmit/receive activity

On: indicates no activity but link is valid

Off: link is invalid

Green LED indicates Link speed

On: link speed at 1000Mbps

On: link speed at 100Mbps

Off: link speed at 10Mbps

3.4.2 Drivers Support

ADE-6040 series provide on CD-Title to support on-board VGA and Ethernet device drivers in various operating systems. Before installing the device drivers, please see the reference files in each sub-directory. You cannot install drivers from CD-Title directly.

Intel Q965 Chipset Integrated Graphics supports Win2000, XP, Win2003 and 64 bit Windows environment.

Intel Q965 & ICH8(R) Chipset Driver supports Win2000, XP, Win2003 and 64 bit Windows environment.

Dual Marvell Gigabit Ethernet Controllers support Win2000, XP, Win2003, and 64 bit Windows environment.

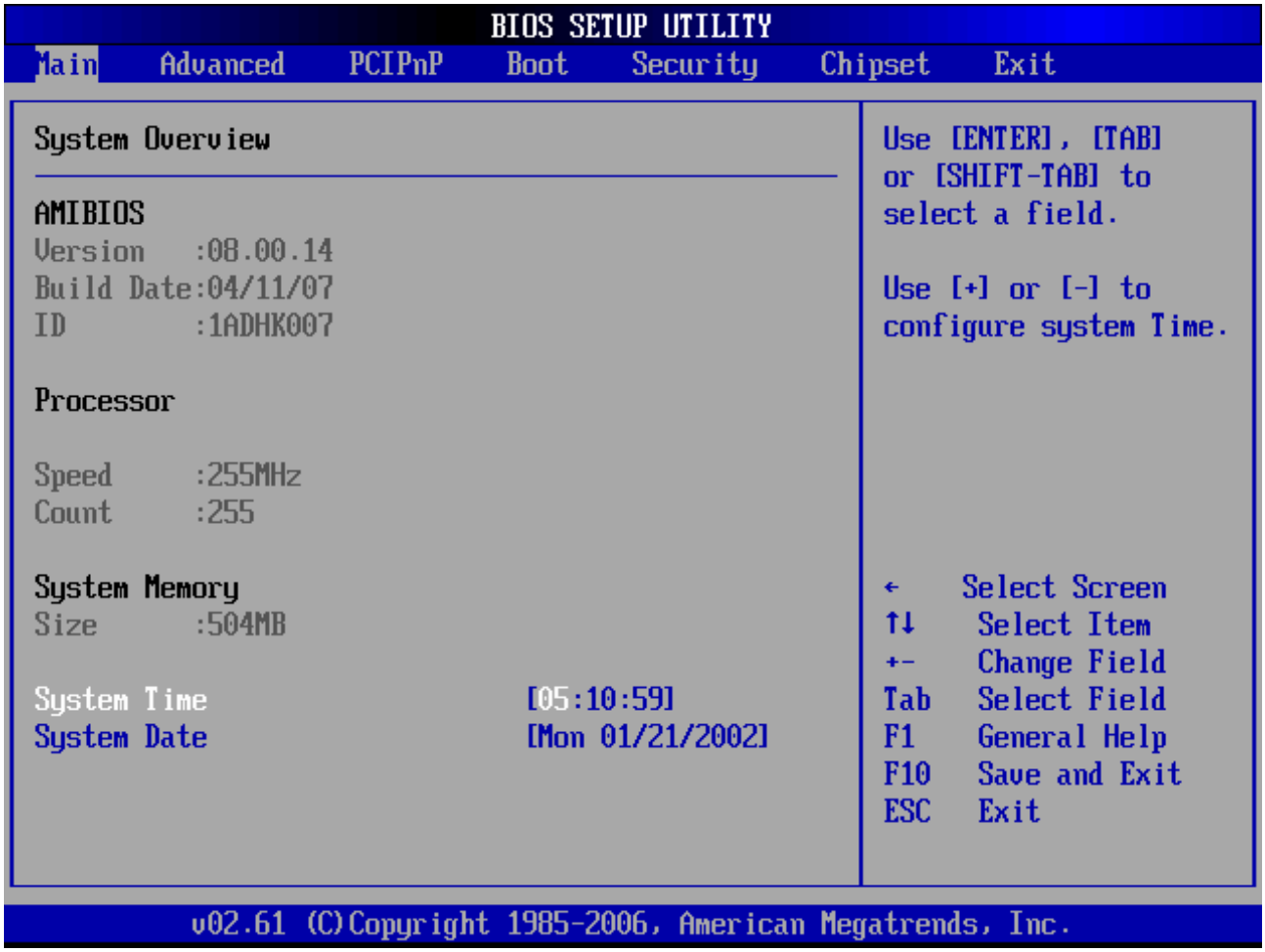
CHAPTER 4

4. BIOS Setup

4.1 Entering Setup

AMI BIOS has a built-in setup program that allows users to modify the basic system configuration. This information is stored in CMOS RAM whose power is supplied by a battery so that it can retain the setup information even when the power is turned off. Press Delete when you Power on or Reboot the computer system. (i.e. After the logo appears at the center of the screen, please press Delete to enter the BIOS setup program). In the BIOS, make sure that everything is working fine before you try to optimize it for maximum performance.

4.1.1 Main Menu

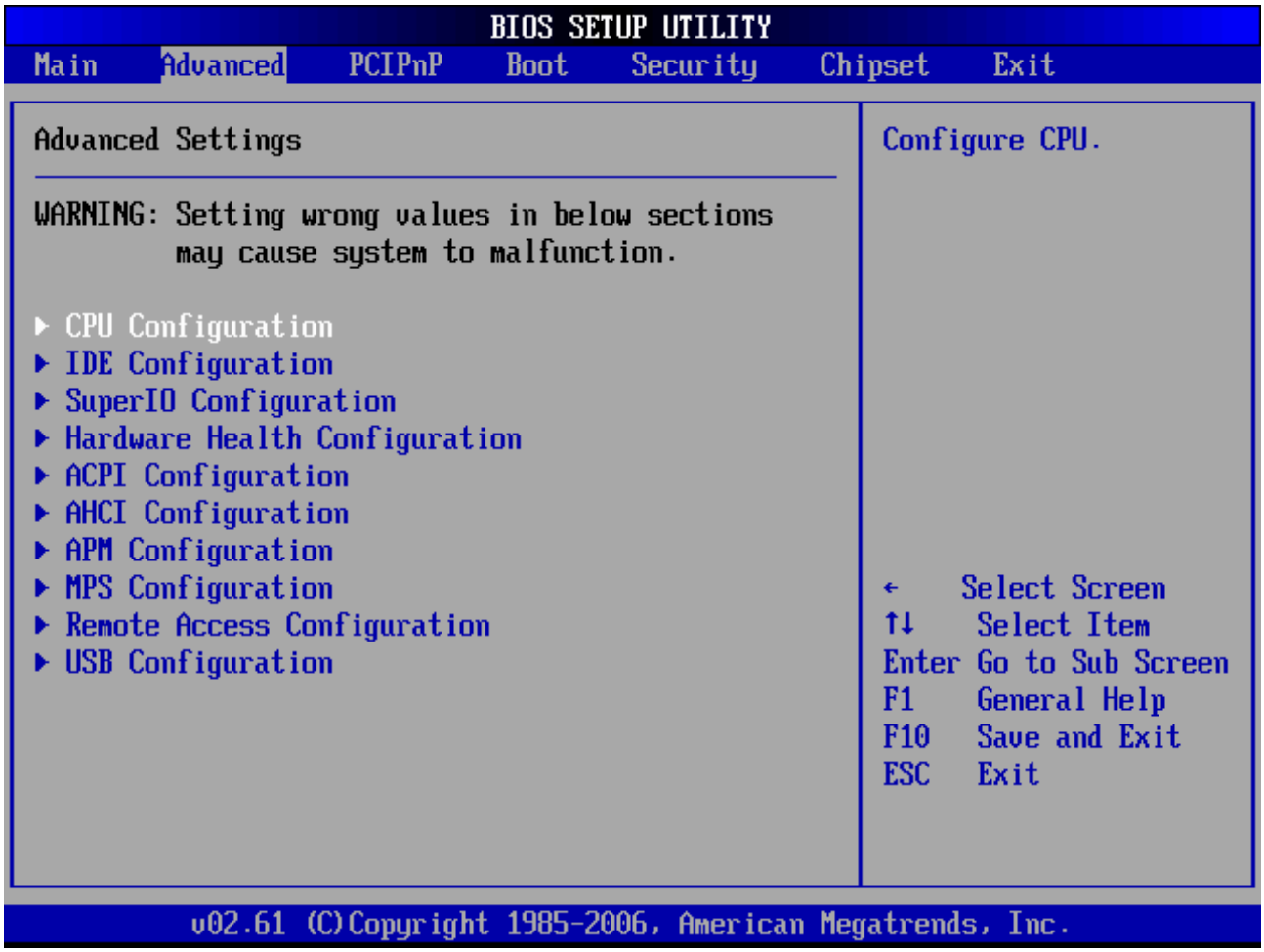


When you enter the AMI CMOS Setup Utility, the **Main** will appear on the screen. The Main allows you to select several configuration options. Use the left/right arrow keys to highlight a particular configuration screen from the top menu bar or use the down arrow key to access and configure the information below.

4.1.1.1 System Time / System Date

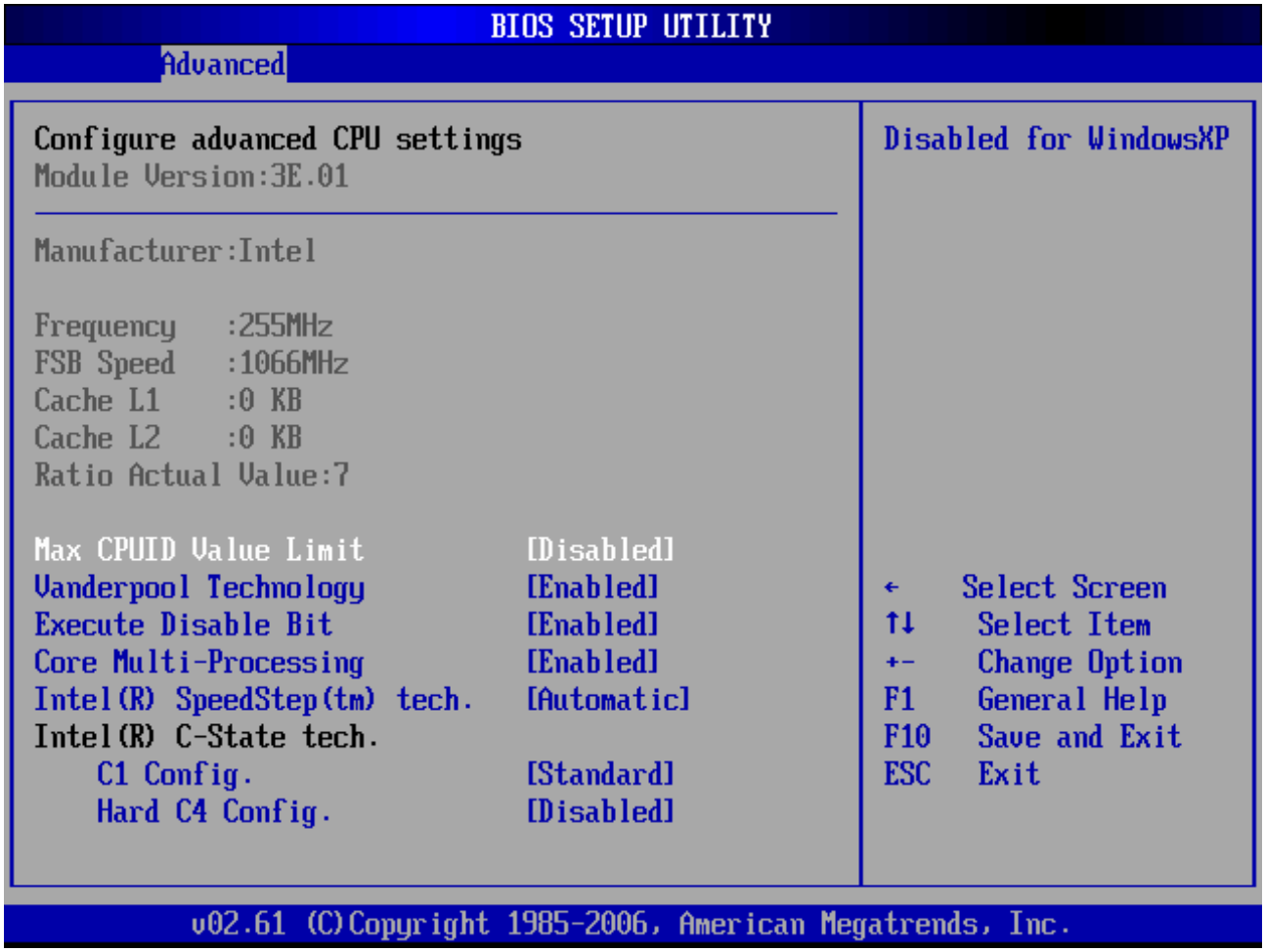
Use this option to change the system time and date. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.1.2 Advanced Setting



4.1.2.1 CPU Configuration

The CPU Configuration setup screen varies depending on the installed processor.



4.1.2.1.1 Max CPUID Value Limit

The Intel® Processor Identification Utility requires the 'Max CPUID Value Limit' in the system BIOS to be disabled for proper processor identification. Once processor identification has taken place, the option can be re-enabled if desired.

4.1.2.1.2 Vanderpool Technology

Vanderpool Technology allows a platform to run multiple operating systems and applications in independent partitions. With VT, one computer system can function as multiple "virtual" systems.

Note: After any change to this option, system must be powered off to take effect.

4.1.2.1.3 Execute Disable Bit

A feature designed to stop buffer overflow attacks against the operating system. Buffer overflow attacks are one of the most common tactics used to attack personal computers. The processor prevents the execution of code in data-only memory pages while enabled and will not restrict code execution in any memory area if disabled. This makes the processor more vulnerable to buffer overflow attacks

4.1.2.1.4 Core Multi-Processing

This item allows to select Core Multi-Processing mode.

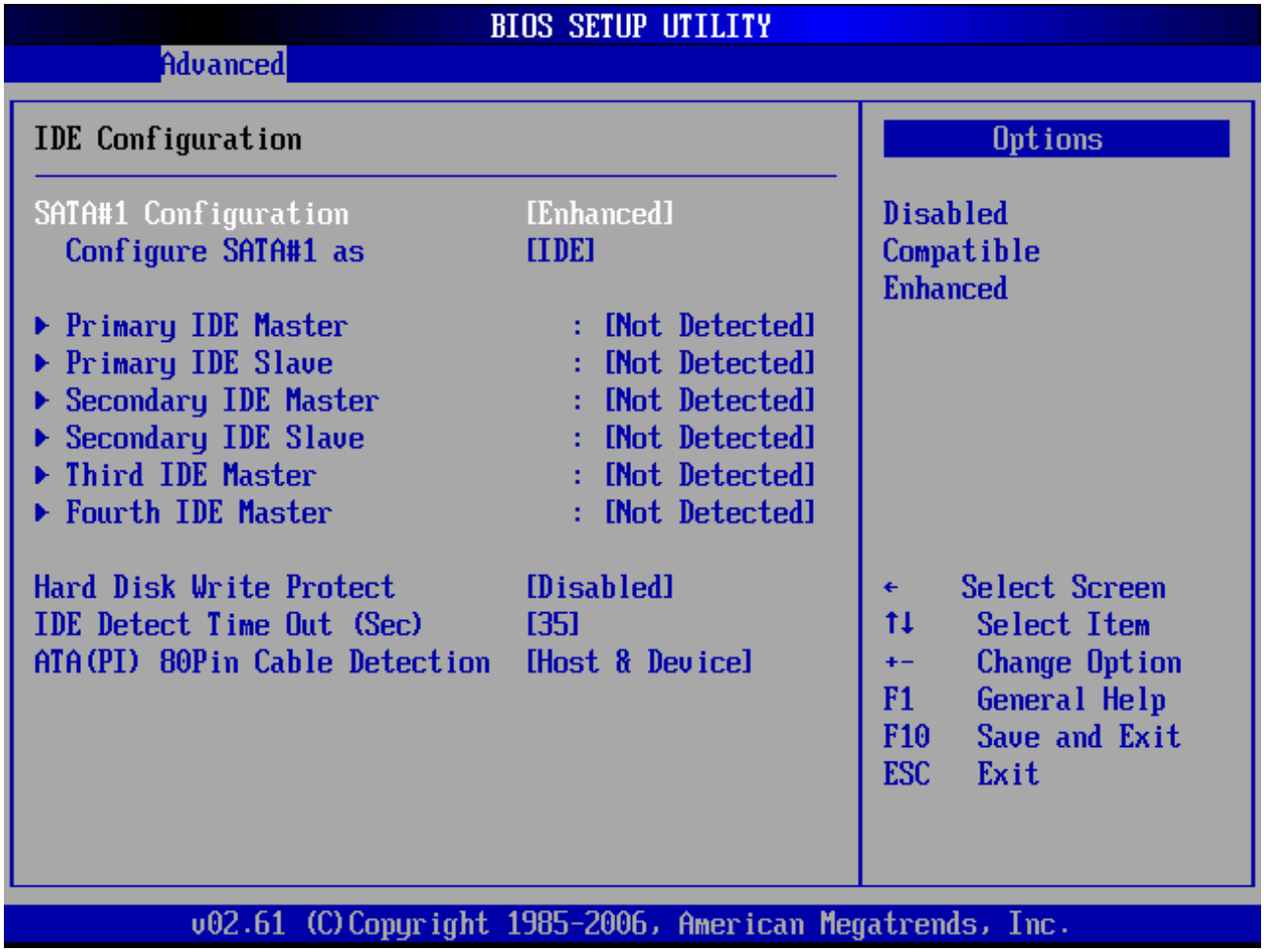
4.1.2.1.5 Intel® SpeedStep (tm) tech.

Intel (R) SpeedStep(tm) tech. is Intel's new power saving technology. Processor can switch between multiple frequency and voltage points to enable power savings. If you select [Auto], you need to set the "Power Schemes" as "Portable/Laptop" to enable this function. This option will be hidden if the current CPU does not support Intel SpeedStep(tm) tech..

4.1.2.1.6 Intel C-State tech

Specific C-State supports. Standard = Conventional C-State. Enhanced = Enhanced C-State.

4.1.2.2 IDE Configuration



4.1.2.2.1 SATA#1 Configuration

Option: [Disabled], [Enhanced].

4.1.2.2.2 Configure SATA#1 as

Option: [IDE], [RAID]

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

Select one of the hard disk drives to configure it. Press <Enter> to access the sub menu. The options on the sub menu are described in the following sections.

4.1.2.2.4 Hard Disk Write Protect

Set this option to protect the hard disk drive from being overwritten. The Optimal and Fail-Safe default setting is Disabled.

4.1.2.2.5 IDE Detect Time Out (Sec)

Set this option to stop the AMIBIOS from searching for IDE devices within the specified number of seconds. Basically, this allows you to fine-tune the settings to allow for faster boot times. Adjust this setting until a suitable timing that can detect all IDE disk drives attached is found.

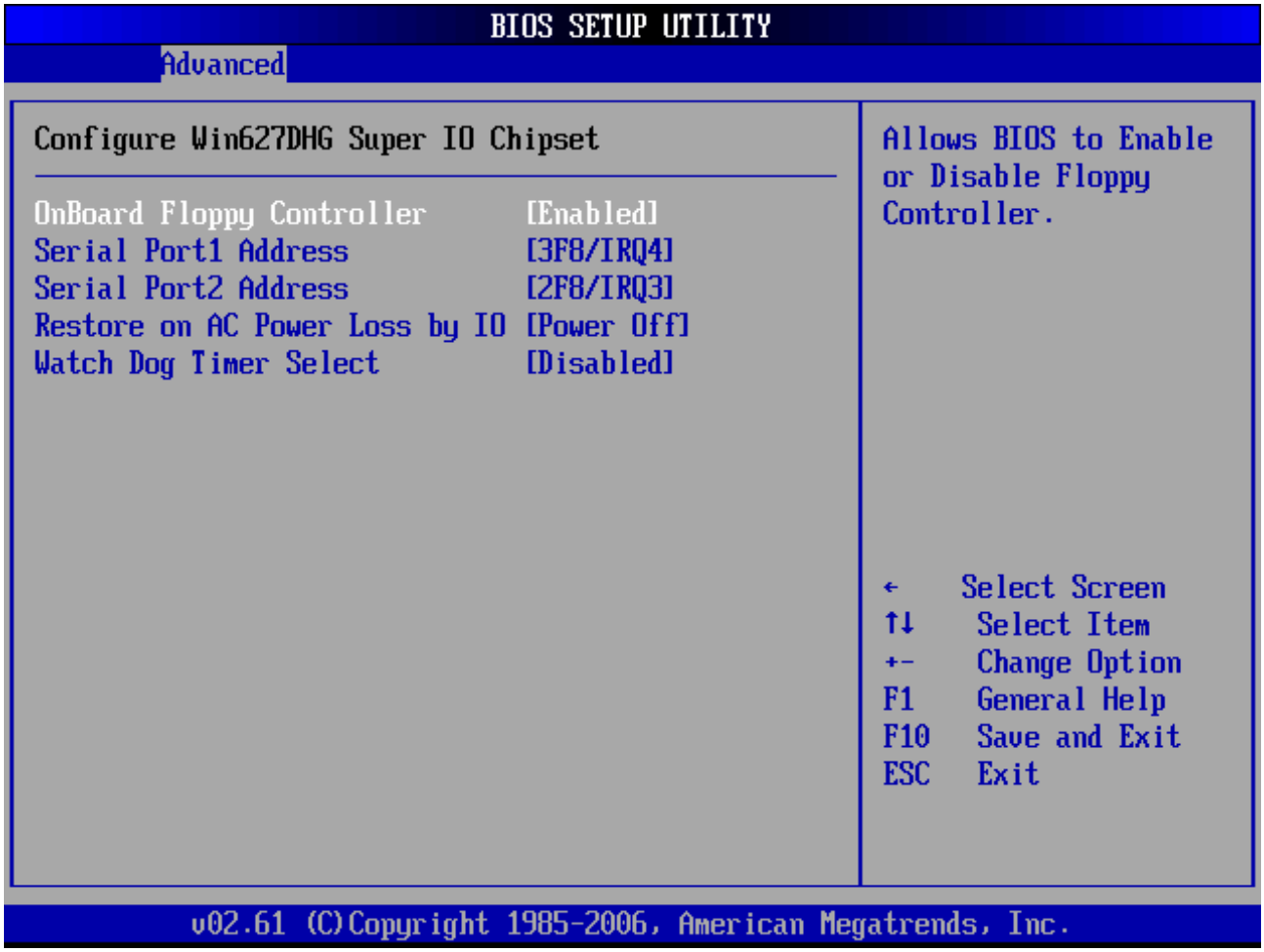
The options: 0, 5, 10, 15, 20, 25, 30, 35 sec.

4.1.2.2.6 ATA(PI) 80Pin Cable Detection

Set this option to select the method used to detect the ATA (PI) 80 pin cable. The Optimal and Fail-Safe setting is Host & Device.

Item	Description
Host & Device	Set this value to use both the motherboard onboard IDE controller and IDE disk drive to detect the type of IDE cable used. This is the default setting.
Host	Set this value to use motherboard onboard IDE controller to detect the type of IDE cable used.
Device	Set this value to use IDE disk drive to detect the type of IDE cable used.

4.1.2.3 Super IO Configuration



4.1.2.3.1 Serial Port1/2 Address

This option specifies the base I/O port address and Interrupt Request address of serial port 1/2. The Optimal setting is 3F8/IRQ4. The Fail-Safe default setting is Disabled.

Item	Description
Disabled	Set this value to prevent the serial port from accessing any system resources. When this option is set to *Disabled*, the serial port physically becomes unavailable.
3F8/IRQ4	Set this value to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. This is the default setting. The majority of serial port 1 or COM1 ports on computer systems use IRQ4 and I/O Port 3F8 as the standard setting. The most common serial device connected to this port is a mouse. If the system will not use a serial device, it is best to set this port to *Disabled*.
2F8/IRQ3	Set this value to allow the serial port to use 2F8 as its I/O port address and IRQ 3 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.
3E8/IRQ4	Set this value to allow the serial port to use 3E8 as its I/O port address and IRQ 4 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.
2E8/IRQ3	Set this value to allow the serial port to use 2E8 as its I/O port address and IRQ 3 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.

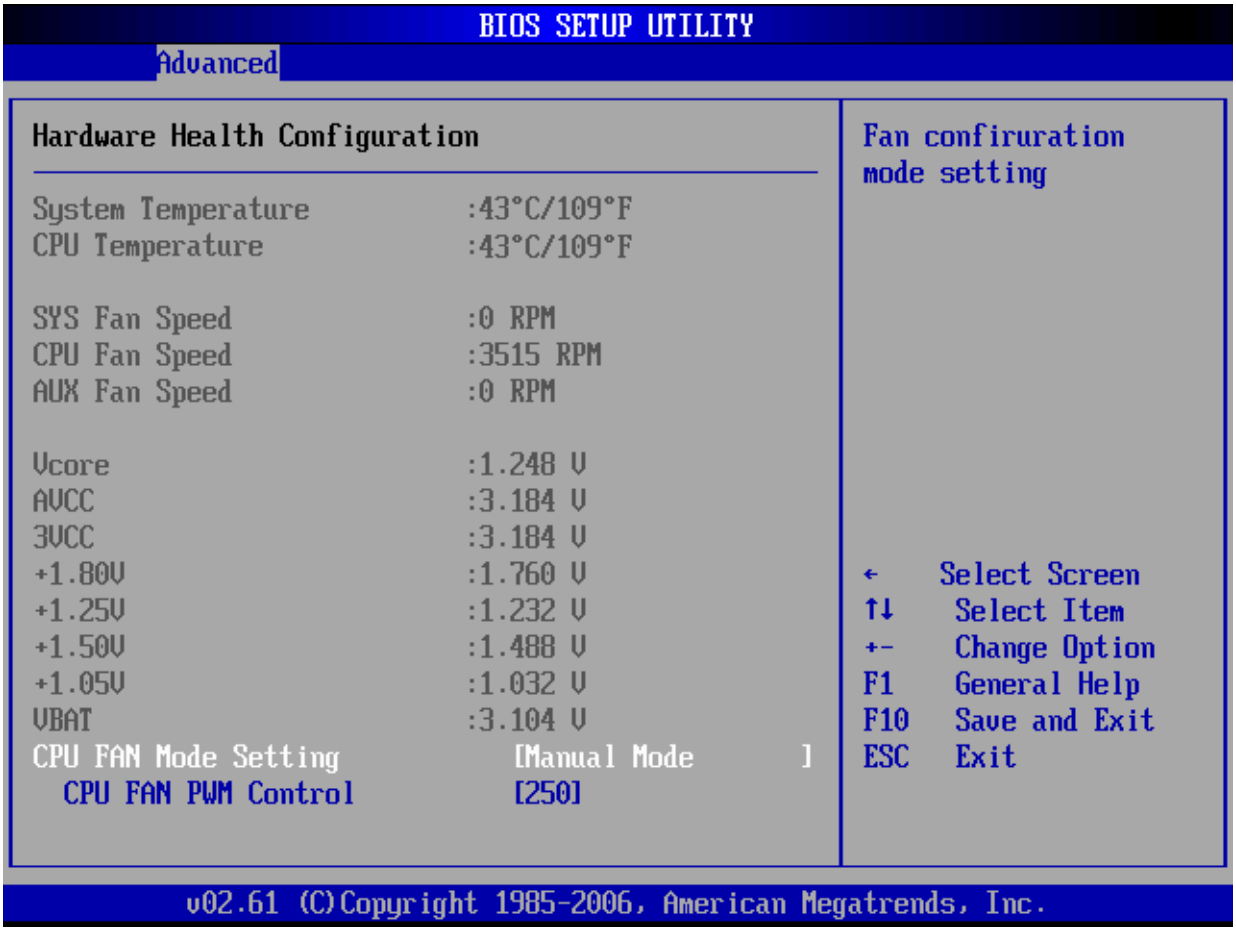
4.1.2.3.2 Restore on AC Power Loss by IO

This item allows you to select if you want to power on the system after power failure.
Option: [Power On], [Power Off], [Last state].

4.1.2.3.3 Watch Dog Timer Select

Enable to set Watch Dog Timer.
The options: 10, 20, 30, 40 Sec., 1, 2, 4 Min.

4.1.2.4 Hardware Health Configuration



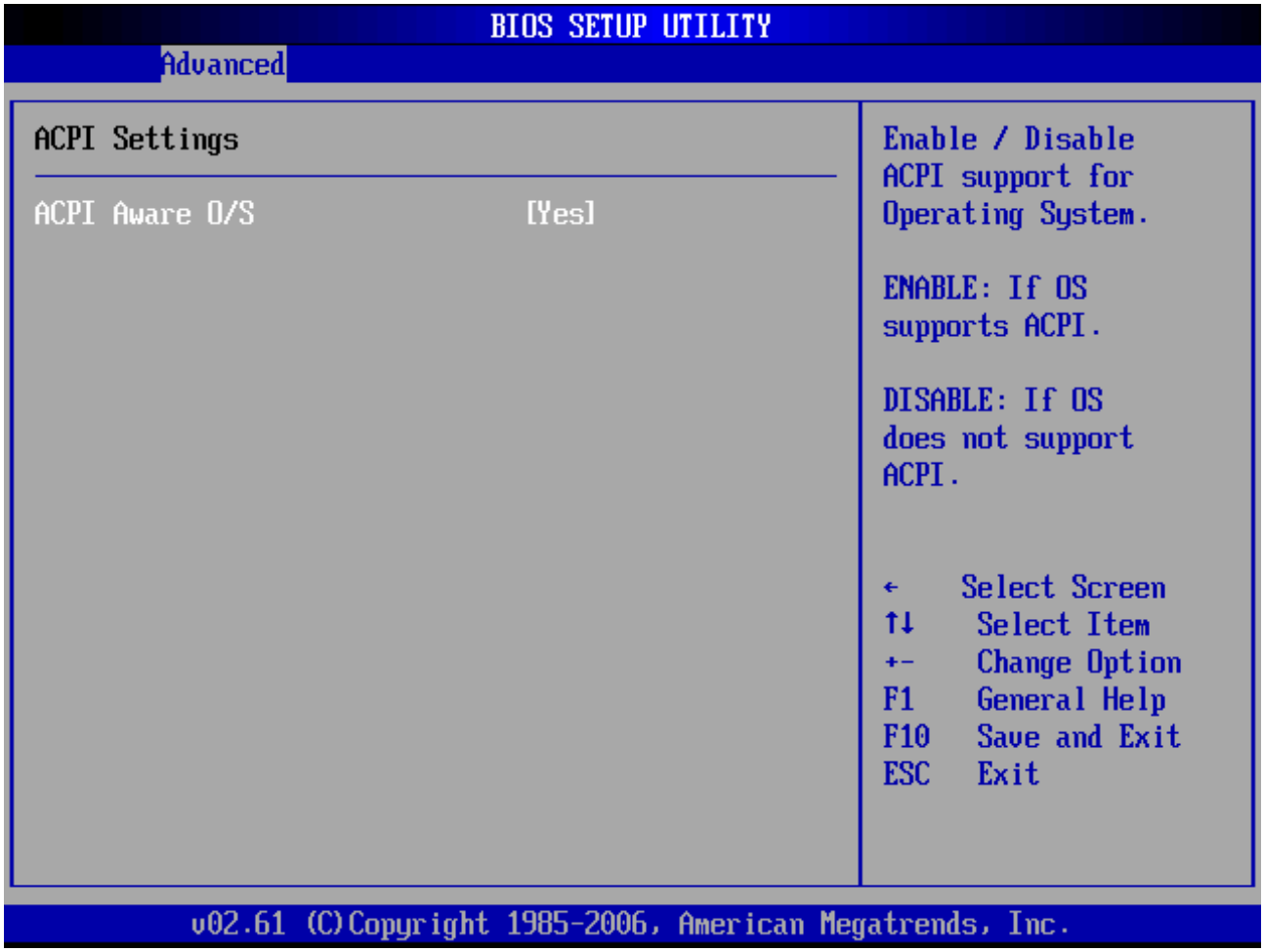
4.1.2.4.1 CPU FAN PWM Control

Enable CPU Fan mode.

4.1.2.4.2 CPU FAN PWM Control

This item allows you to set CPU FAN PWM Control mode.

4.1.2.5 ACPI Configuration

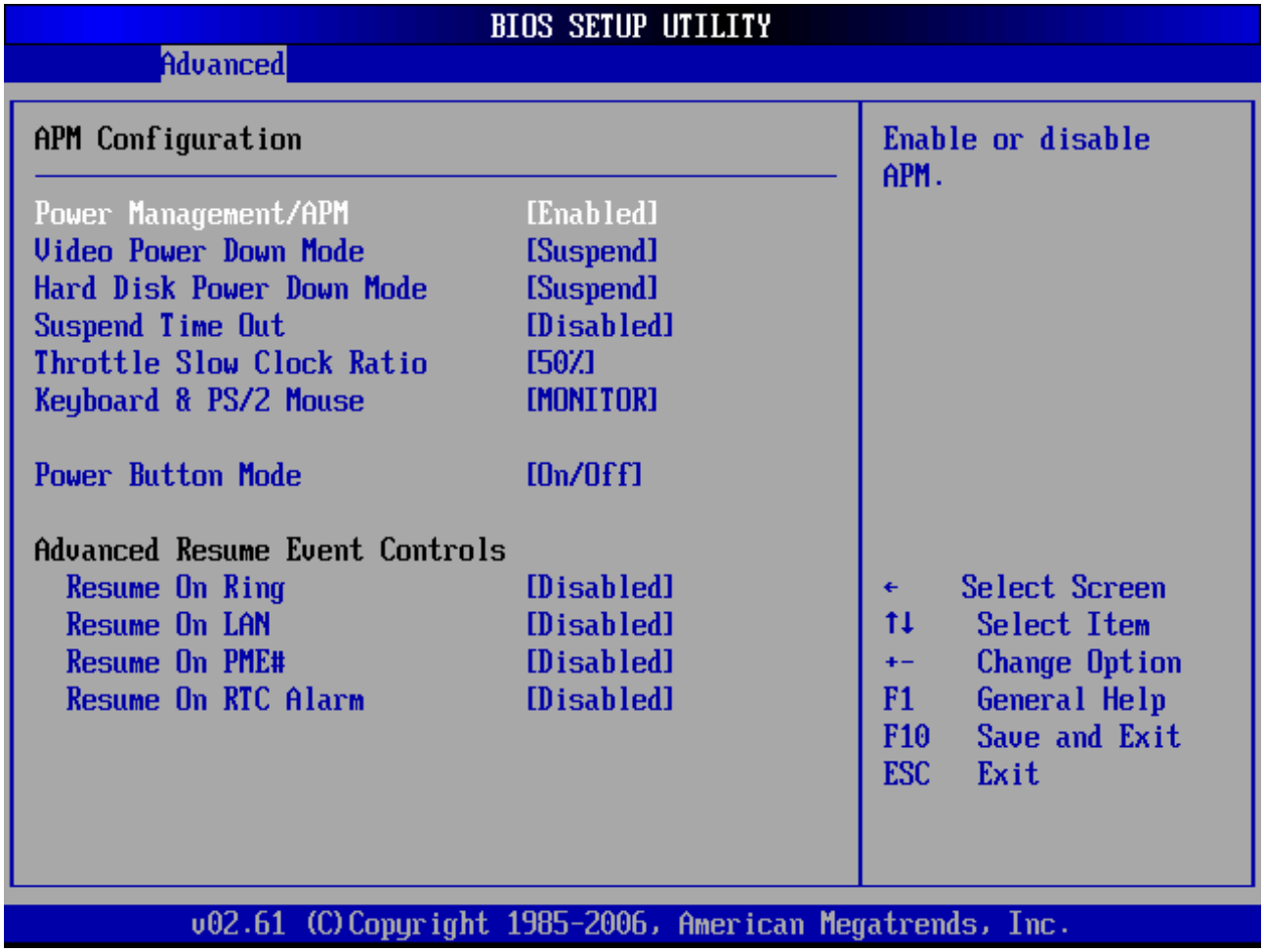


4.1.2.5.1 ACPI Aware O/S

Set this value to allow the system to utilize the Intel ACPI (Advanced Configuration and Power Interface) specification.

Item	Description
No	This setting should be set if the operating system in use does not comply with the ACPI (Advanced Configuration and Power Interface) specification. DOS®, Windows 3.x®, and Windows NT® are examples of non-ACPI aware operating systems.
Yes	This setting should be set if the operating system complies with the ACPI (Advanced Configuration and Power Interface) specification. This is the default setting. Windows 95®, Windows 98® and Windows 2000® are examples of ACPI aware operating systems.

4.1.2.6 APM Configuration



4.1.2.6.1 Power Management/APM

Set this value to allow Power Management/APM support.

4.1.2.6.2 Video Power Down Mode

This option specifies the length of time the system waits before it enters suspend mode.

The options: Disabled, 1, 5, 10 Min.

4.1.2.6.3 Hard Disk Power Down Mode

This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.

The options: Disabled, Standby, Suspend.

4.1.2.6.4 Suspend Time Out

Go into Suspend in the specified time.

4.1.2.6.5 Throttle Slow Clock Ratio

In a power management state, the BIOS can throttle the CPU clock to reduce power consumption. For example, a throttle ratio of *50%* means the clock is turned off half of its normal operational time.

The options: 87.5%, 75.0%, 62.5%, 50%, 37.5%, 25%, 12.5%.

4.1.2.6.6 Keyboard & PS/2 Mouse

Monitor KBC Ports 60/64.

4.1.2.6.7 Power Button Mode

This option specifies how the externally mounted power button on the front of the computer chassis is used.

The options: On/Off, Standby, Suspend.

4.1.2.6.8 Resume On Ring

Disable/Enable RI to generate a wake event.

4.1.2.6.9 Resume On LAN

Disable/Enable LAN GPI to generate a wake event.

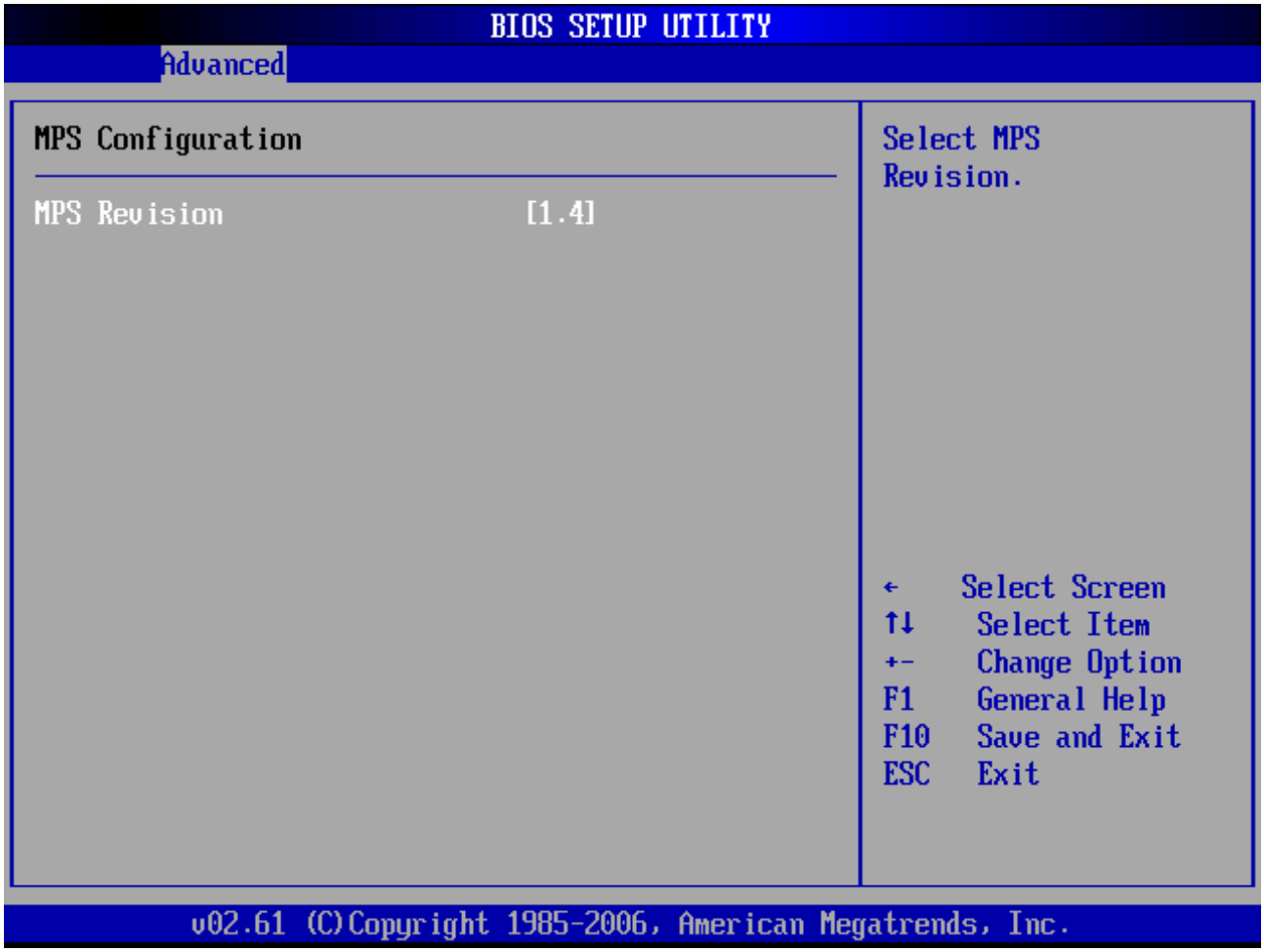
4.1.2.6.10 Resume On PME#

Disable/Enable PME to generate a wake event.

4.1.2.6.11 Resume On RTC Alarm

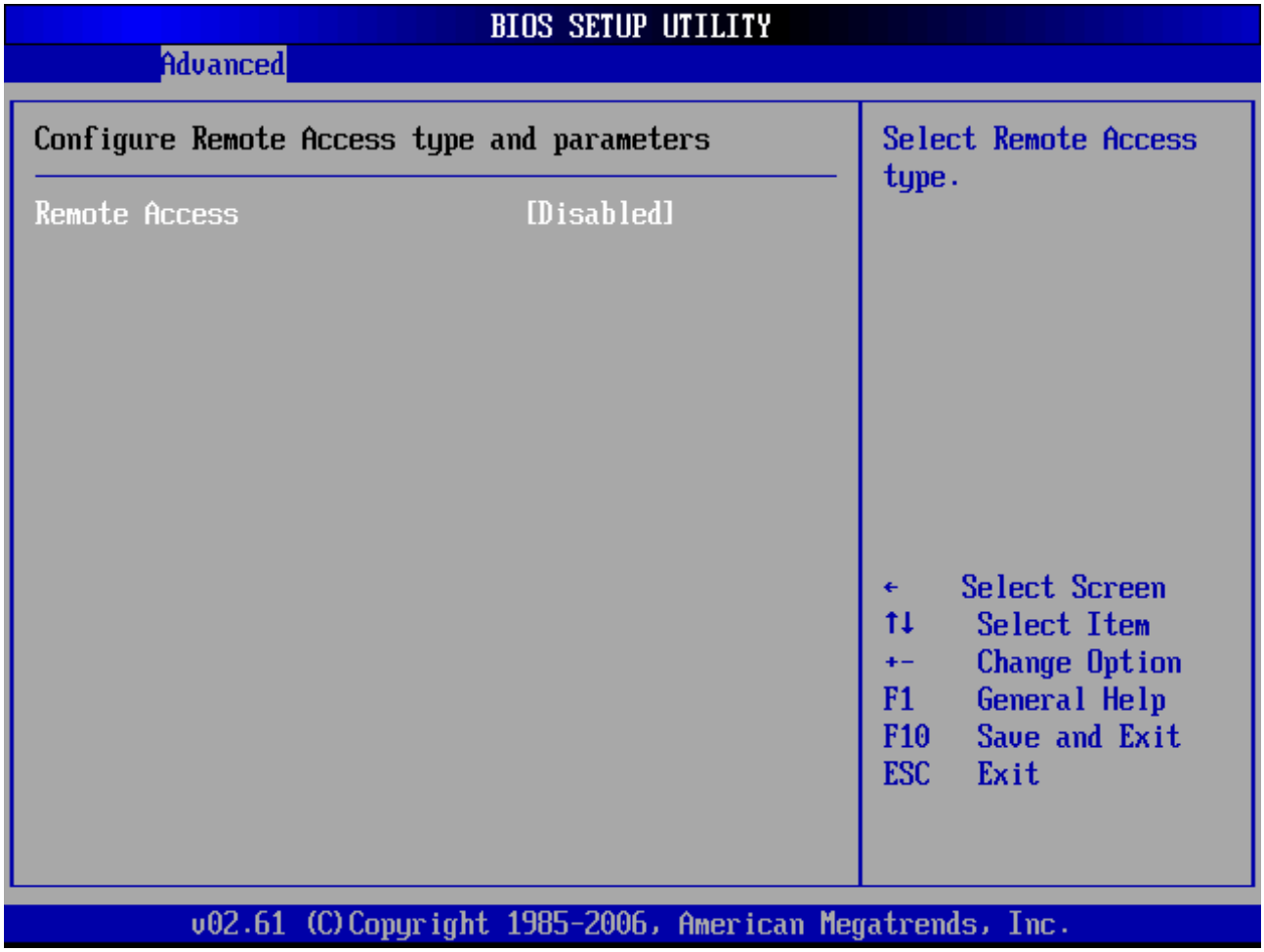
Disable/Enable RTC to generate a wake event.

4.1.2.7 MPS Configuration



Select MPS Revision.

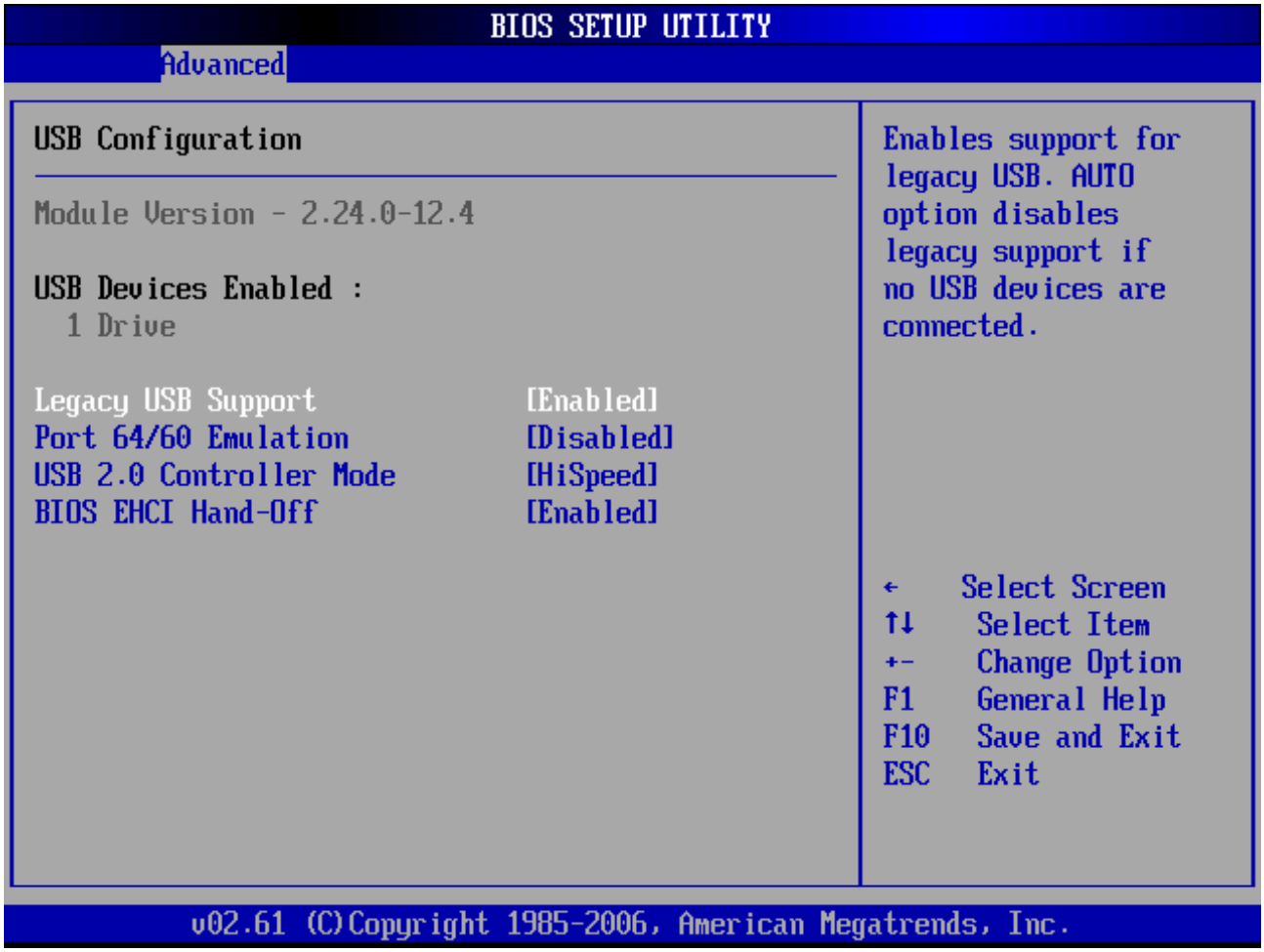
4.1.2.8 Remote Access Configuration



4.1.2.8.1 Remote Access

You can disable or enable the BIOS remote access feature here.

4.1.2.9 USB Configuration



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

4.1.2.9.2 Port 64/60 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

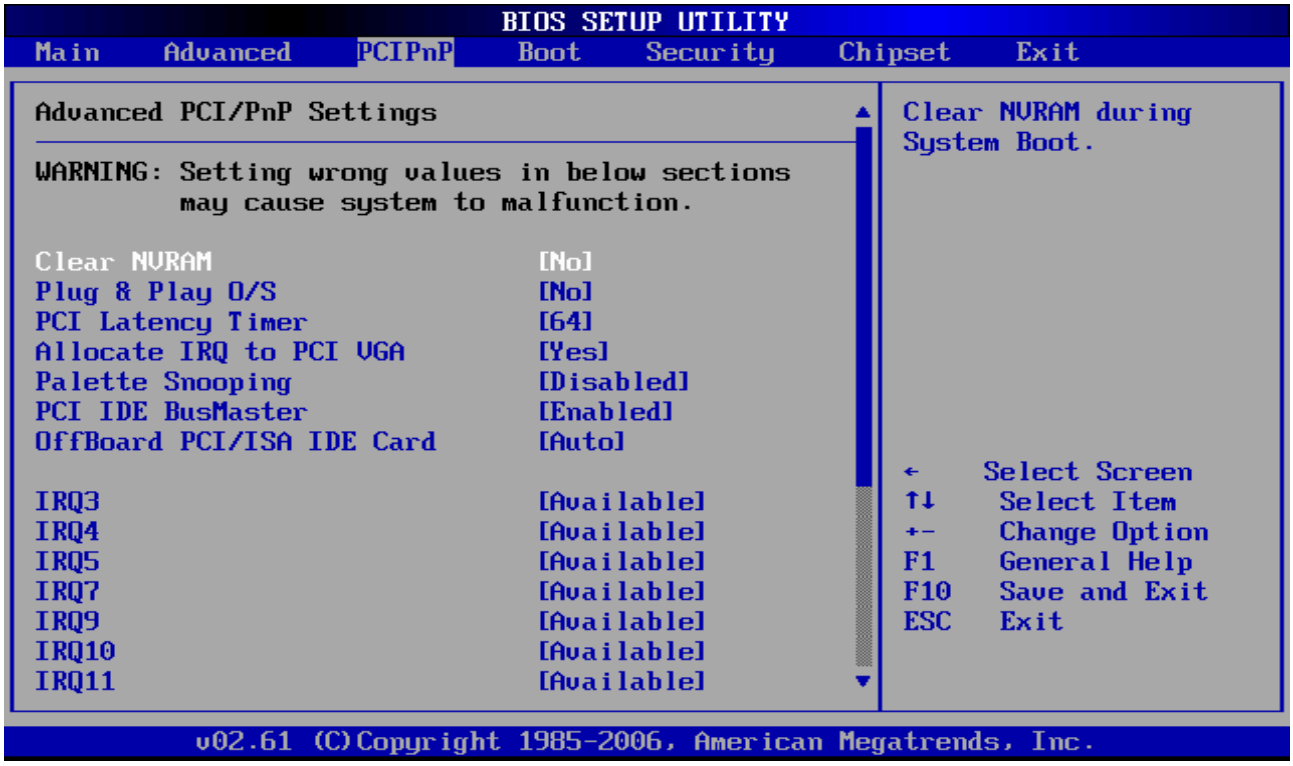
4.1.2.9.3 USB 2.0 Controller Mode

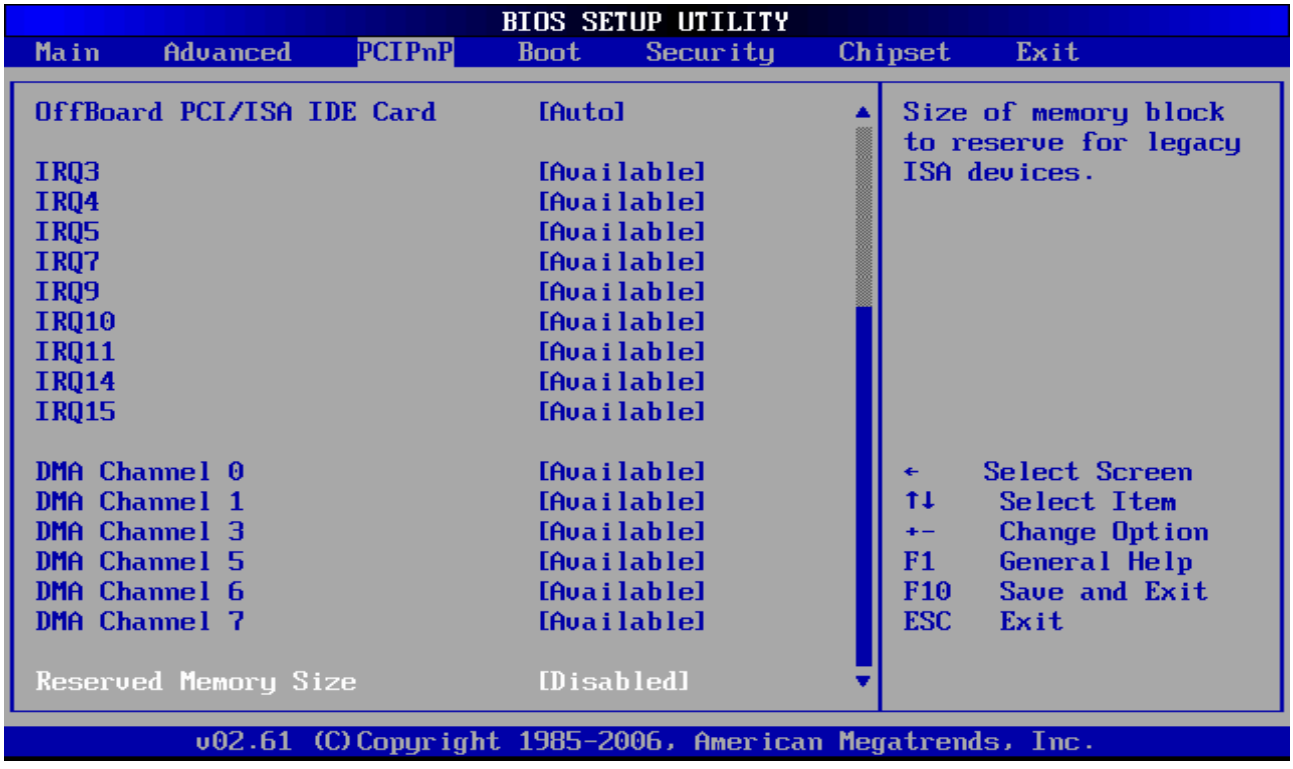
Configures the USB 2.0 controller in HiSpeed (480Mbps) or FullSpeed (12Mbps).

4.1.2.9.4 BIOS EHCI Hand-Off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.

4.1.3 Advanced PCI/PnP Setting





4.1.3.1 Clear NVRAM

Clear NVRAM during System Boot.

4.1.3.2 Plug & Play O/S

Set this value to allow the system to modify the settings for Plug and Play operating system support.

Item	Description
No	The *No* setting is for operating systems that do not meet the Plug and Play specifications. It allows the BIOS to configure all the devices in the system.
Yes	The *Yes* setting allows the operating system to change the interrupt, I/O, and DMA settings. Set this option if the system is running Plug and Play aware operating systems.

4.1.3.3 PCI Latency Timer

Set this value to allow the PCI Latency Timer to be adjusted. This option sets the latency of all PCI devices on the PCI bus.

The options: 32, 64, 96, 128, 160, 192, 224, 248 PCI clock cycles.

4.1.3.4 Allocate IRQ to PCI VGA

Set this value to allow or restrict the system from giving the VGA adapter card an interrupt address.

4.1.3.5 Palette Snooping

Set this value to allow the system to modify the Palette Snooping settings.

Item	Description
Disabled	This is the default setting and should not be changed unless the VGA card manufacturer requires Palette Snooping to be Enabled.
Enabled	This setting informs the PCI devices that an ISA based Graphics device is installed in the system. It does this so the ISA based Graphics card will function correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with your adapter card's manuals first, before modifying the default settings in the BIOS.

4.1.3.6 PCI IDE BusMaster

Set this value to allow or prevent the use of PCI IDE busmastering.

4.1.3.7 OffBoard PCI/ISA IDE Card

Set this value to allow the OffBoard PCI/ISA IDE Card to be selected.

4.1.3.8 IRQ3/4/5/7/9/10/11/14/15

Set this value to allow the IRQ settings to be modified.

Item	Description
Available	This setting allows the specified IRQ to be used by a PCI/PnP device.
Reserved	This setting allows the specified IRQ to be used by a legacy ISA device.

4.1.3.9 DMA Channel 0/1/3/5/6/7

Set this value to allow the DMA setting to be modified.

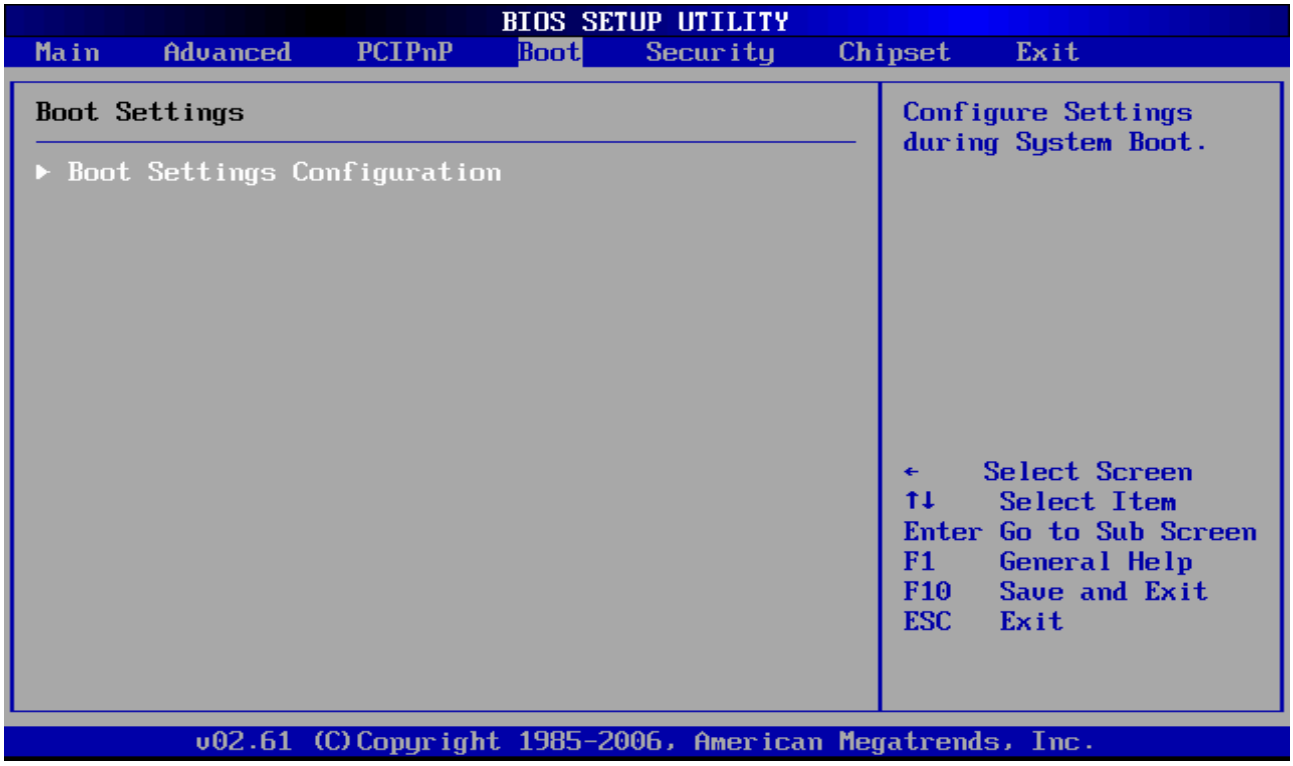
Item	Description
Available	This setting allows the specified DMA to be used by PCI/PnP device.
Reserved	This setting allows the specified DMA to be used by a legacy ISA device.

4.1.3.10 Reserved Memory Size

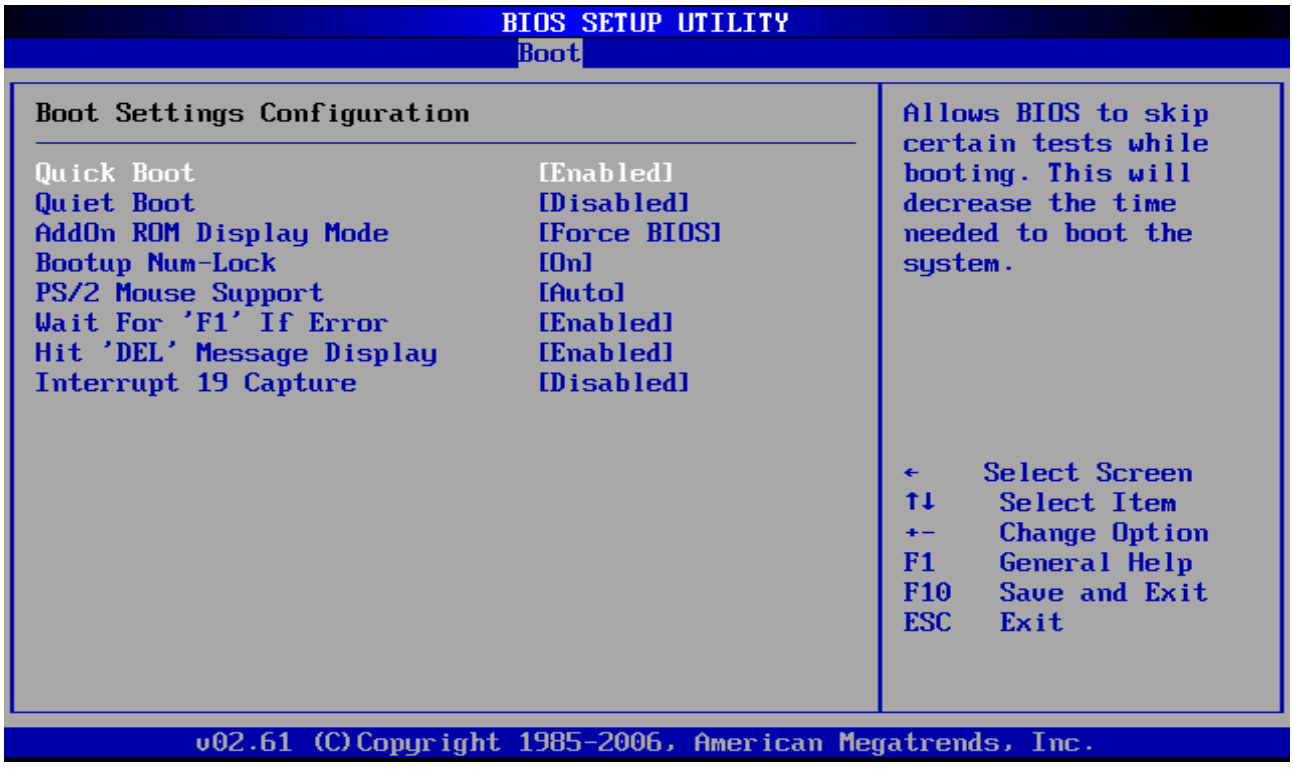
Set this value to allow the system to reserve memory that is used by ISA devices

The options: Disabled, 16K, 32K, 64K.

4.1.4 Boot Settings



4.1.4.1 Boot Settings Configuration



4.1.4.1.1 Quick Boot

The Optimal and Fail-Safe default setting is *Disabled*. Allow to set this value to allow the BIOS to skip certain POST tests to boot faster or disabled to perform all POST tests.

4.1.4.1.2 Quiet Boot

Set this value to allow the boot up screen options to be modified between POST messages or OEM logo. The Optimal and Fail-Safe default setting is *Enabled.*

4.1.4.1.3 AddOn ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages.

Item	Description
Force BIOS	Set this value to allow the computer system to force a third party BIOS to display during system boot. This is the default setting.
Keep Current	Set this value to allow the computer system to display the information during system boot.

4.1.4.1.4 Bootup Num-Lock

Set this value to allow the Number Lock setting to be modified during boot up.

4.1.4.1.5 PS/2 Mouse Support

This item allows to set PS/2 Mouse Support function.

4.1.4.1.6 Wait For 'F1' If Error

Set this value to allow the Wait for 'F1' Error setting to be modified.

Item	Description
Disabled	This prevents the to wait on an error for user intervention. This setting should be used if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached. If this setting is set, the system will continue to boot up in to the operating system. If 'F1' is enabled, the system will wait until the BIOS setup is entered.
Enabled	Set this value to allow the system BIOS to wait for any error. If an error is detected, pressing <F1> will enter Setup and the BIOS setting can be adjusted to fix the problem. This normally happens when upgrading the hardware and not setting the BIOS to recognize it. This is the default setting.

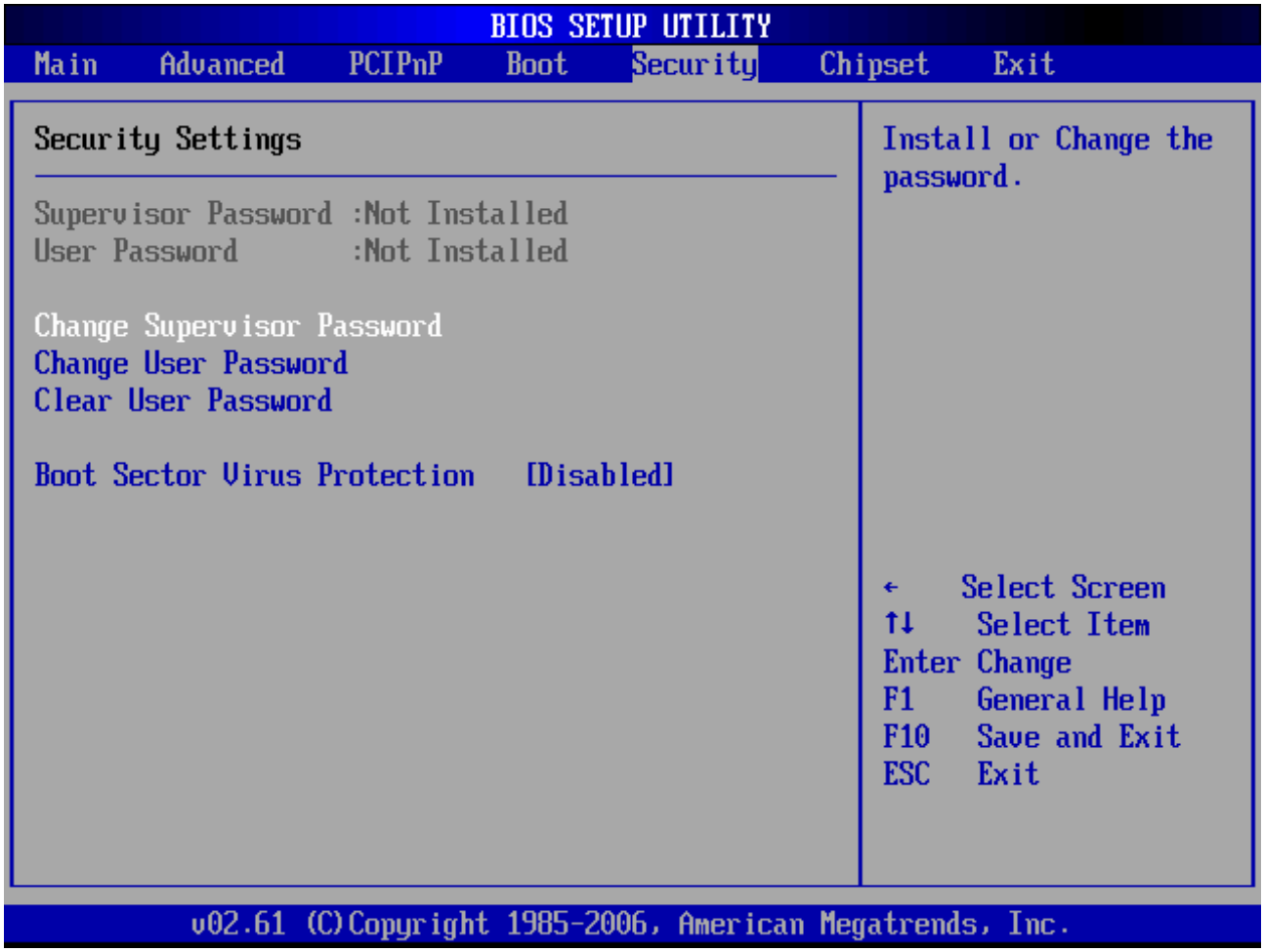
4.1.4.1.7 Hit 'DEL' Message Display

Set this value to allow the *Hit "DEL" to enter Setup* Message Display to be modified.

4.1.4.1.8 Interrupt 19 Capture

Enabled: Allows option ROMs to trap interrupt 19. This is required by some PCI cards that provide a ROM based setup utility.

4.1.5 Security Settings



4.1.5.1 Change Supervisor Password

Indicates whether a supervisor password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

4.1.5.2 Change User Password

Indicates whether a user password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

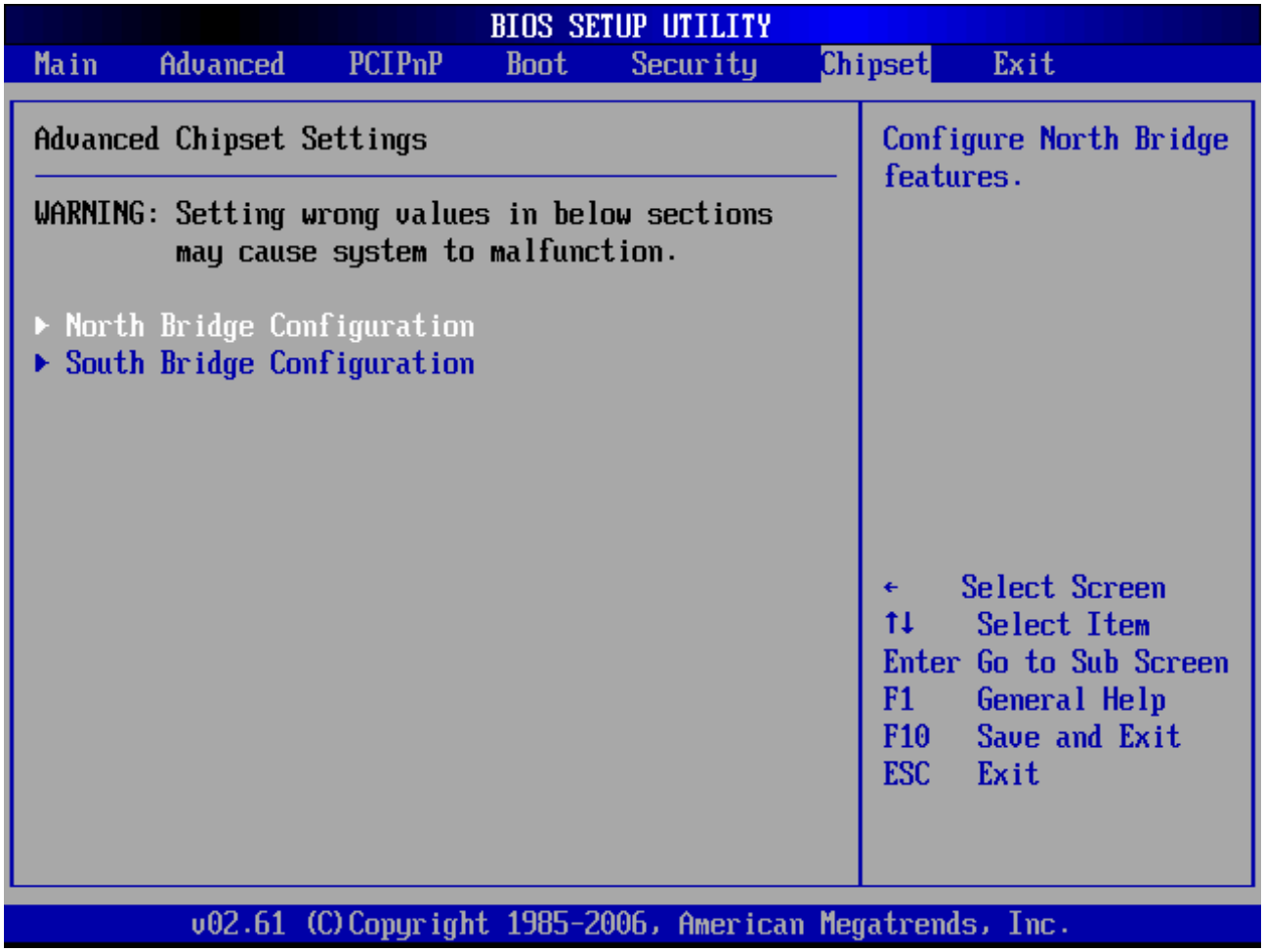
4.1.5.3 Clear User Password

Select Clear User Password from the Security Setup menu.

4.1.5.4 Boot Sector Virus Protection

Enable/Disable Boot Sector Virus Protection.

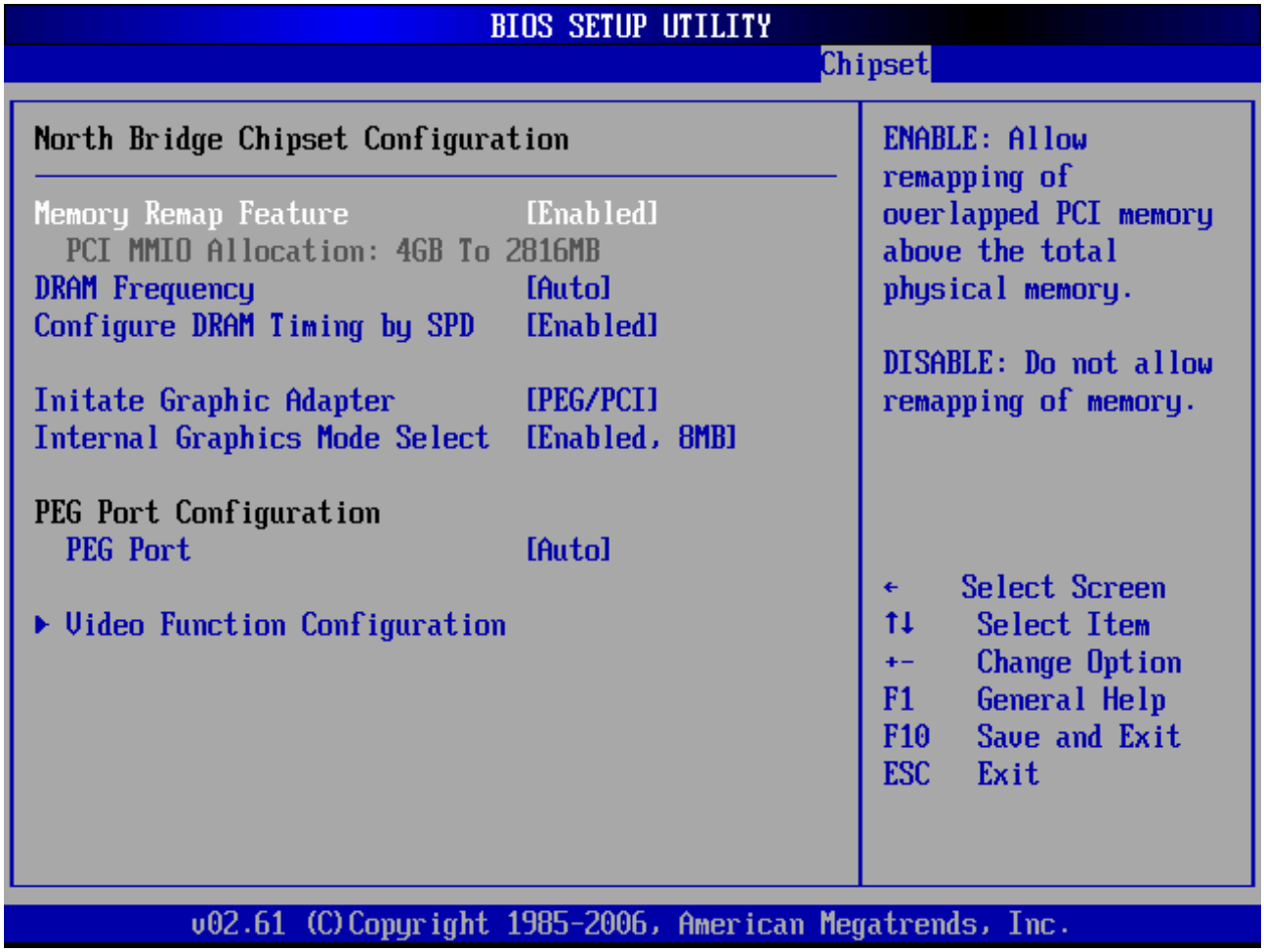
4.1.6 Advanced Chipset Settings



4.1.6.1 North Bridge Configuration

You can use this screen to select options for the North Bridge 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.

Note: The North Bridge Configuration setup screen varies depending on the supported North Bridge chipset.



4.1.6.1.1 Memory Remap Feature

ENABLE: Allow remapping of overlapped PCI memory above the total physical memory.
DISABLE: Do not allow remapping of memory.

4.1.6.1.2 DRAM Frequency

The item allows you to set the DRAM frequency.

4.1.6.1.3 Configure DRAM Timing by SPD

Select the operating system that is selecting DRAM timing, so select SPD for setting DRAM timing by SPD.

The choice: [Enable], [Disable]

4.1.6.1.4 Initate Graphic Adapter

Select which graphics controller to use as the primary boot device.

4.1.6.1.5 Internal Graphics Mode Select

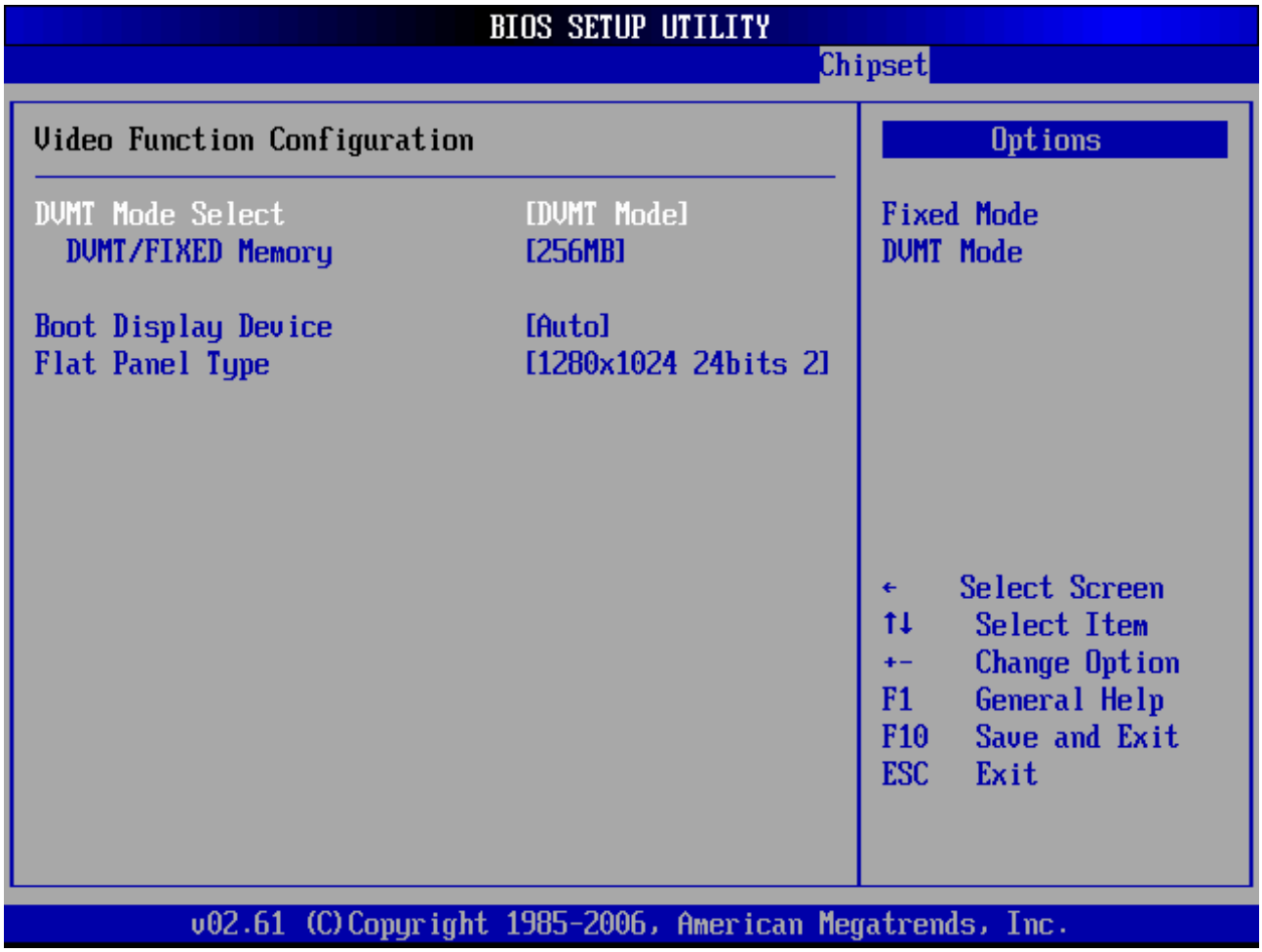
Select the amount of system memory used by the internal graphics device.

4.1.6.1.6 PEG Port

This item allows you to control the PEG or on-chip VGA.

The choice: [Auto], [Disabled].

4.1.6.1.7 Video Function Configuration



4.1.6.1.7.1 DVMT Mode Select

This item allows you to select the DVMT mode.

The choice: FIXED, DVMT, BOTH.

4.1.6.1.7.2 DVMT/FIXED Memory

This item allows you to select the DVMT or FIXED memory size.

4.1.6.1.7.3 Boot Display Device

This item allows you to select the boot display device.

4.1.6.1.7.4 Flat Panel Type

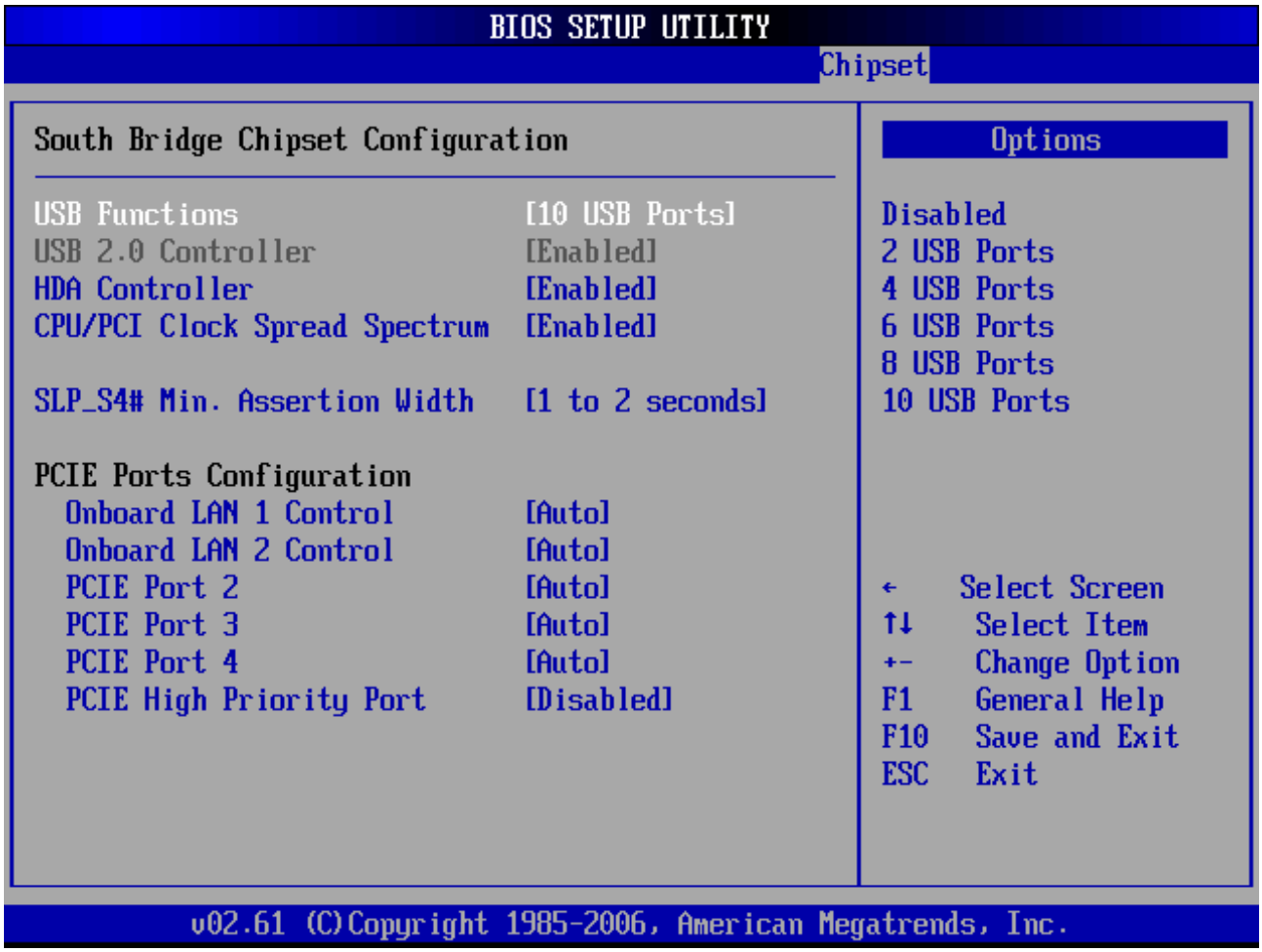
This item allows you to select the panel resolution.

The options: 1024 x 768 18-bit 1 CH, 1280 x 1024 24-bit 2 CH, 1400 x 1050 24-bit 2 CH, 1600 x 1200 24-bit 2 CH.

4.1.6.2 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.

Note: The South Bridge Configuration setup screen varies depending on the supported South Bridge chipset.



4.1.6.2.1 USB Functions

This item allows you to active USB ports.

4.1.6.2.2 USB 2.0 Controller

Select "Enabled" if your system contains a Universal Serial Bus 2.0 (USB 2.0) controller and you have USB peripherals.

The choice: Enabled, Disabled.

4.1.6.2.3 HDA Controller

This item allows you to select the chipset family to support High Definition Audio Controller.

The choice: Disabled, Enabled.

4.1.6.2.4 CPU/PCI clock Spread Spectrum

This feature is used to set the CPU/PCI clock Spread Spectrum to be center spread type or down spread type.

The options are: Enabled, Disabled

4.1.6.2.5 SLP_S4# Min. Assertion Width

The item allows you to select the assertion width of SLP_S4#.

The choice: 4 to 5 sec., 3 to 4 sec., 2 to 3 sec, 1 to 2 sec.

4.1.6.2.6 Onboard Giga LAN 1/2

Select "Enabled" if your system has a LAN device installed on the system board and you wish to use it.

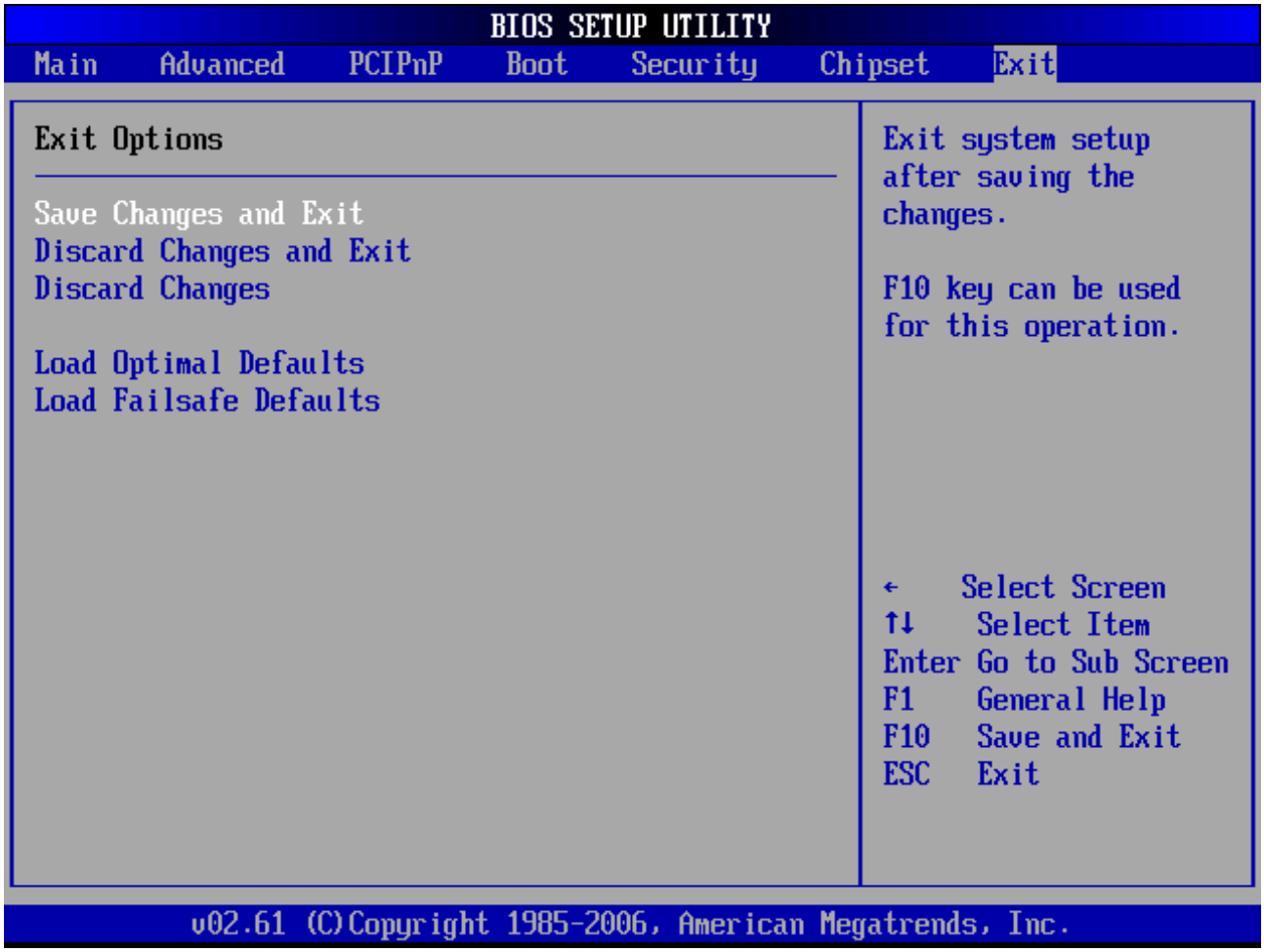
The choice: Enabled, Disabled

4.1.6.2.7 PCIE Port 2/3/4

4.1.6.2.8 PCI# High Priority Port

This item is allows to select PCI high priority port mode.

4.1.7 Exit Options



4.1.7.1 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.

4.1.7.2 Discard Changes and Exit

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

4.1.7.3 Discard Changes

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

4.1.7.4 Load Optimal Defaults

Load Optimal Default values for all the setup questions. F9 key can be used for this operation.

4.1.7.5 Load Failsafe Defaults

Load Failsafe Default values for all the setup questions. F8 key can be used for this operation

Appendix

Appendix A: Watchdog Timer Programming

The Watchdog Timer (WDT) is a special hardware device that monitors the computer system during normal operation. The WDT has a clock circuit that times down from a set number to zero. If a monitored item occurs before that timer reaches zero, the WDT resets and counts down again. If for some reason the monitored item doesn't occur before the timer reaches zero, the WDT performs an action, such as a diagnostic operation (rebooting the computer) or generate an NMI.

Watchdog Configuration		
Address Port: 2Eh	**Data Port: 2Fh**	**Description**
87h	na	Enter Key
87h	na	Enter Key
07h	08h	Setup Watch Dog Function
2Dh	20h	Setup Watch Dog Function
30h	01h	Enable Watch Dog Function
F5h	00h	00h: select second mode, 08h: select minute mode
F6h	00h	Time-out occurs after 0~255 second/minute, 00h: Time-out disable

【C Language】Example:

```
1. outportb(0x2e,0x87);
2. outportb(0x2e,0x87);
3. outportb(0x2e,0x07);
4. outportb(0x2f,0x08);
5. outportb(0x2e,0x2d);
6. outportb(0x2f,0x20);
7. outportb(0x2e,0x30);
8. outportb(0x2f,0x01);
9. outportb(0x2e,0xf5)
10. outportb(0x2f,0x00)
11. outportb(0x2e,0xf6);
12. outportb(0x2f,0x05);
```

Appendix B: GPI/O Programming

The General Purpose I/O pins are provided for custom system design. The pin programming as input mode or output mode is depending on the configuration. The pin definitions are as the following table:

GPIOBASE Address: 480h			
Pin No.	**IN/OUT Register Address**	**Data Register Address**	**PIN BIT**
2	GPIOBASE + 04h + 3	GPIOBASE + 0Ch + 3	3
3	GPIOBASE + 04h + 1	GPIOBASE + 0Ch + 1	0
4	GPIOBASE + 04h + 3	GPIOBASE + 0Ch + 3	4
5	GPIOBASE + 04h + 1	GPIOBASE + 0Ch + 1	7
6	GPIOBASE + 34h + 0	GPIOBASE + 38h + 0	1
7	GPIOBASE + 04h + 2	GPIOBASE + 0Ch + 2	4
8	GPIOBASE + 34h + 0	GPIOBASE + 38h + 0	2
9	GPIOBASE + 04h + 3	GPIOBASE + 0Ch + 3	2

IN/OUT Register

0: The respective GPIO PIN is programmed as an output port

1: The respective GPIO PIN is programmed as an input port

Data Register

Read/Write: for output port

Read Only: for input port

Configure pin 2 to be an output port and output LOW

【C Language】Example:

```
1. int iret = inportb(0x487);
2. iret = iret & ~0x08;        // set bit3 to 0
3. outportb(0x487, iret);      // set pin2 to be an output port
4. iret = inportb(0x48F);
5. iret = iret & ~0x08;        // set bit3 to 0
6. outportb(0x48F, iret);      // set pin2 to output low
```