# SHB103 Series
# Intel® Socket 1156 Core™ i7 / Core™ i5 / Core™ i3 / Pentium® Processor
# ATX Industrial Motheroard
# User's Manual

## Disclaimers

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## CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.


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**Printed in Taiwan**

## ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

## Trademarks Acknowledgments

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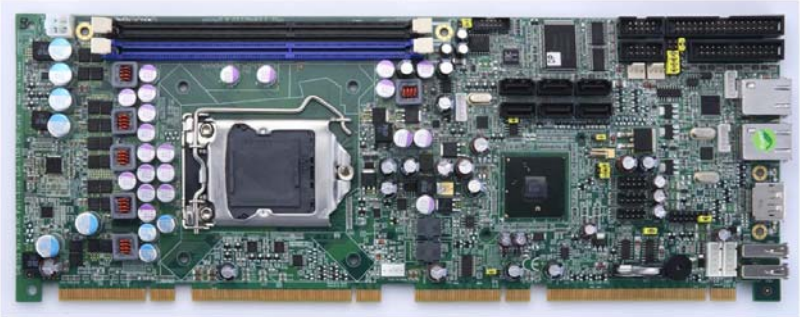
# CHAPTER 1
# INTRODUCTION



The **SHB103** PICMG 1.3 full-size Single Board Computer supports LAG1156 socket for **Intel® Pentium® Desktop Processor(G6950), Intel® Core™ i3 Desktop Processor, Intel® Core™ i5 Desktop Processor, Intel® Core™ i7-800 series Desktop Processor** with 32/45nm technology and Transfer Rate **1066/1333 MHz**. The board integrates Intel® **Q57** chipset that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There are four 240-pin DDR3 DIMM sockets for dual channel **DDR3 1066/1333**, maximum memory capacity up to **8GB(Assuming Dual Channel Mode with two x8 double sided unbuffered, non-ECC DIMM memory configuration)**. The board also features dual Gigabit Ethernet, six serial ATA ports at maximum transfer rate up to 3Gbs, and SATA RAID 0/1/5/10 byICH. Ten USB 2.0 high speed compliant ports and built-in Intel® HD Audio Digital Header can achieve the best stability and reliability for industrial applications.

## 1.1 Specifications

CPU

- **Intel® Pentium® Desktop Processor(G6950),**
- **Intel® Core™ i3 Desktop Processor,**
- **Intel® Core™ i5 Desktop Processor,**
- **Intel® Core™ i7-800 series Desktop Processor**

- **System Chipset**
  - **Intel® Q57**
- **CPU Socket**
  - **LAG1156 Socket**
- **DRAM Transfer Rate**
  - **1066/1333 MHz**
- **BIOS**
  - AMI BIOS via SPI interface with socket
- **System Memory**
  - Two 240-pin DDR3 DIMM sockets
  - Maximum up to 8GB DDR3 memory
  - Supports DDR3 1066/1333 memory
- **L1, L2, L3 Cache:** integrated in CPU
- **Onboard Multi-I/O**
  - Parallel Port: one 26-pin 2.54-pitch box-header, SPP/EPP/ECP supported
  - Serial Port: one for RS-232/422/485 with 10-pin, 2.54-pitch box-header (COM1) and one port for RS-232 with 10-pin, 2.54-pitch box-header (COM2)
  - Floppy controller: one 34-pin, 2.54-pitch box-header supports two drives (1.44MB for each)
- **USB Interface**
  - Ten USB ports compliant with USB Spec. Rev. 2.0 (8 ports on SHB103, 4 ports to SHB connector-C golden fingers)

- **VGA Controller**
  - Chipset -- Intel® integrated Graphics Gen5 on Intel® Q57 supports 3D, 2D, video capabilities
  - Memory Size -- Intel® DVMT 5.0 supported; preallocated memory for frame buffer option as OS option:
    1. Windows XP:
       * For Total System Memory < 1GB,
         Graphics sharing memory = 128 MB Maximum;
       * For 1 GB to 1.5 GB Total System Memory,
         Graphics sharing memory = 512 MB Maximum;
       * For 1.5 GB to 2 GB Total System Memory,
         Graphics sharing memory = 768 MB Maximum;
       * For 2 GB and Above Total System Memory,
         Graphics sharing memory = 1GB Maximum.
    2. Windows Vista:
       * Graphics sharing memory max to 0.5* (OS Ram Size – 512)
  - Resolution -- Analog output -- the analog port utilizes an integrated 350MHz 24-bit RAMDAC that can directly drive a standard progressive scan analog monitor up to a resolution of 2048x1536 pixels with 32-bit color at 75 Hz
  - Analog Output Interface -- CRT from DAC output via 15-pin D-Sub connector on the edge; CRT always ON supported
- **Ethernet**
  - The LAN1/LAN2 are WG82578DM/WG82583V Ethernet controller support 10/100/1000 Mb/s
  - Dual PCI-Express x1 LAN
- **Serial ATA**
  - Support Serial ATA/Serial ATA II
  - Six Serial ATA-II ports, 3GB/s performance and SATA RAID 0/1/5/10 by Q57

- **Audio**
  - 10-pin 2.54 pin-header (Intel® HD Audio Digital Header)
  - Hardware Monitoring
  - Monitoring temperatures, voltages, and cooling fan status
- **Watchdog Timer**
  - Reset Supported (1-255 level)
- **Dimensions**
  - 338mm x 126mm

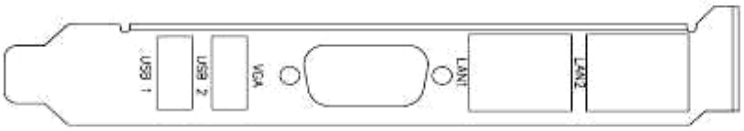
***NOTE*** *All specifications and images are subject to change without notice.*

## 1.2 Utilities Supported

Intel® Q45 Utility and Drivers

- VGA Drivers
- Ethernet Utility and Drivers
- RAID Utility
- iAMT Utility and Drivers
- TPM Utility

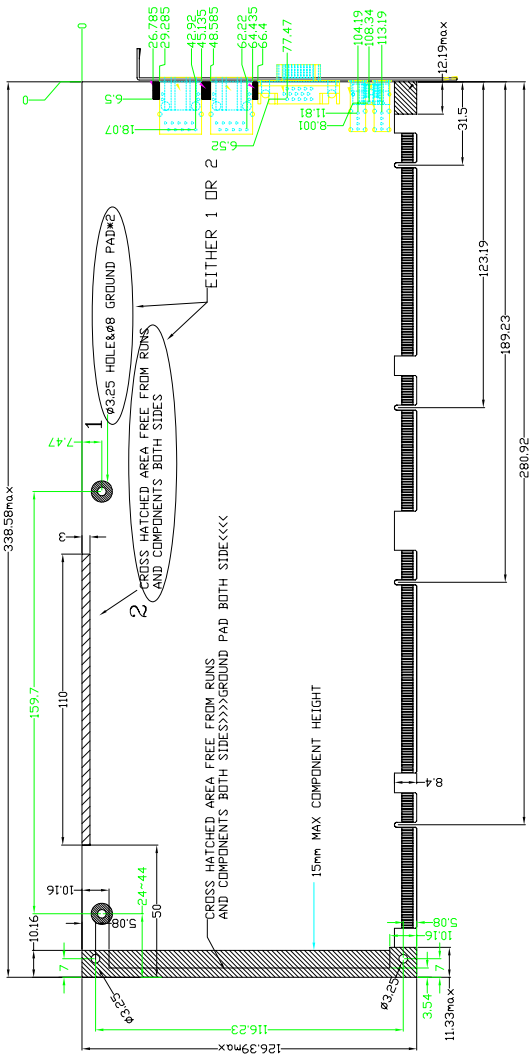
## 1.3 I/O Bracket



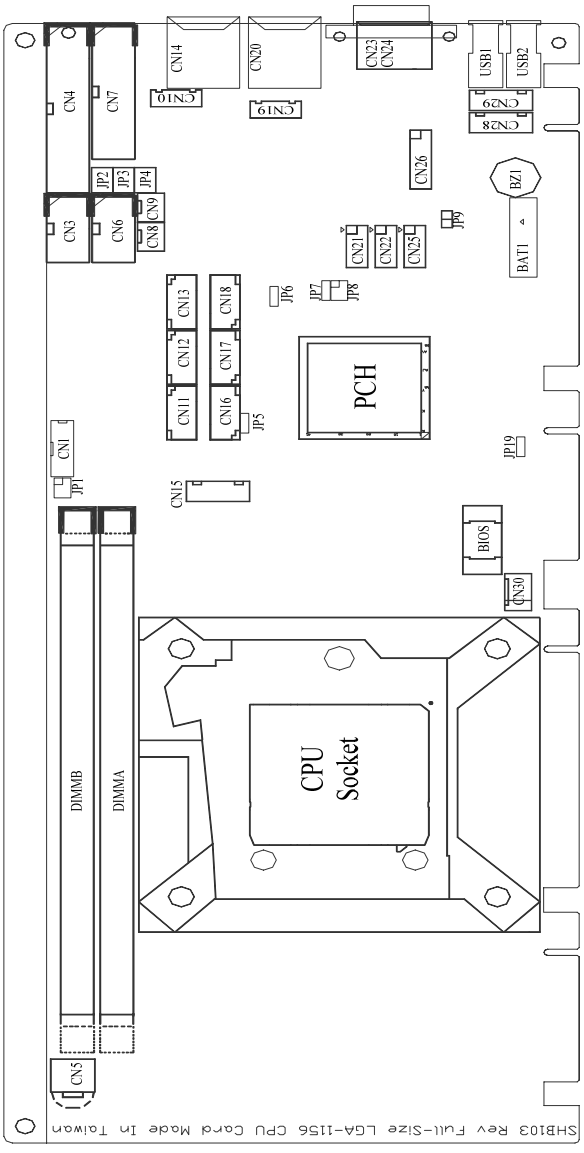
# CHAPTER 2

# JUMPERS AND CONNECTORS

## 2.1 Board Dimensions



## 2.2 Board Layout

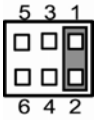
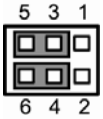
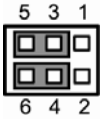
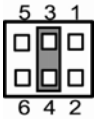
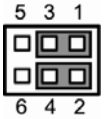
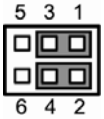
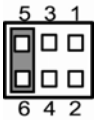
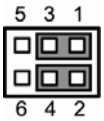
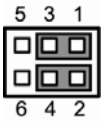


## 2.3 Jumper Settings

Proper jumper settings configure the **SHB103** to meet your application purpose.

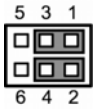
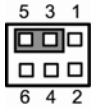
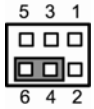
### 2.3.1 COM1 Mode Select Jumpers for RS-232/422/485 (JP2, JP3, JP4)

These jumpers select the COM1 port's communication mode to operate RS-232 or RS-422/485.

| Description | Function | Jumper Setting | | |
|---|---|---|---|---|
| COM1 | RS-232 (Default) | JP2  | JP3  | JP4  |
| | RS-422 | JP2  | JP3  | JP4  |
| | RS-485 | JP2  | JP3  | JP4  |

### 2.3.2 CMOS & RTC Clear Jumper (JP8)

You may need to use this jumper is to clear the CMOS memory if incorrect BIOS settings.

| Description | Function | Jumper Setting |
|---|---|---|
| CMOS & RTC Clear | Normal (Default) |   |
| | Clear CMOS |   |
| | Clear RTC |   |

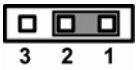
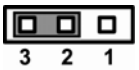
### 2.3.3 ATX Auto Power On/Off (JP9)

When Jumper **JP9** is removed for AC power input, the system will be automatically powered ON without pressing soft power button; when **JP9** is SHORT for AC power input, it is necessary to manually press soft power button to make the system power ON.

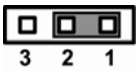
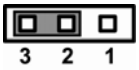
***Note*** *This function is similar to the feature of Power On after Power Failed, which is controlled by hardware circuitry instead of BIOS.*

| Description | Function | Jumper Setting |
|---|---|---|
| ATX Auto Power On/Off | Disable (Default) |   |
| | Enable |   |

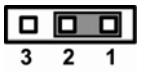
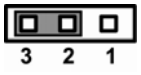
### 2.3.4 CPU Frequency Jumper (JP5)

| Description | Function | Jumper Setting |
|---|---|---|
| CPU Clock | 133MHz (Default) |  |
| | 100MHz |  |

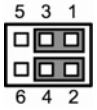
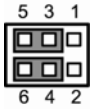
### 2.3.5 ME Disable/Enable Jumper (JP7)

| Description | Function | Jumper Setting |
|---|---|---|
| ME Disable/ Enable | Enable (Default) |  |
| | Disable ME in Manufacturing Mode |  |

### 2.3.6 TPM Disable/Enable Jumper (JP6, JP10)

| Description | Function | Jumper Setting |
|---|---|---|
| TPM Disable/ Enable | Enable (Default) |  |
| | Disable |  |

### 2.3.7 Audio Amplifier Jumper (JP1)

| Description | Function | Jumper Setting |
|---|---|---|
| Audio Amplifier | Disable (Default) |  |
| | Enable |  |

## 2.4 Connectors

Connectors connect this board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected.

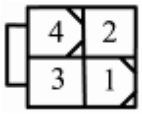
Here is a summary table shows you all connectors on the board.

| Connector | Label | Connector | Label |
|---|---|---|---|
| Audio Connector | CN1 | SATA 3 | CN17 |
| Case Open Setting | CN2 | SATA 5 | CN18 |
| COM2 | CN3 | LAN1 External LED | CN19 |
| FDD | CN4 | Lan1 Ouput Port | CN20 |
| CPU ATX 12V IN | CN5 | USB Port 2/3 | CN21 |
| COM1 | CN6 | USB Port 4/5 | CN22 |
| Parallel Port | CN7 | VGA Port | CN23 |
| AUX FAN | CN8 | Display Port (BOM Option) | CN24 |
| SYS FAN | CN9 | USB Port 6/7 | CN25 |
| LAN2 External LED | CN10 | Axiomtek Front Panel | CN26 |
| SATA 0 | CN11 | Mouse | CN28 |
| SATA 2 | CN12 | Keyboard | CN29 |
| SATA 4 | CN13 | CPU FAN | CN30 |
| Lan2 Ouput Port | CN14 | USB Port 1 | USB1 |
| SMBUS | CN15 | USB Port 2 | USB2 |
| SATA 1 | CN16 | DDRIII CHA DIMM0 | DIMMA |
| | | DDRIII CHB DIMM0 | DIMMB |

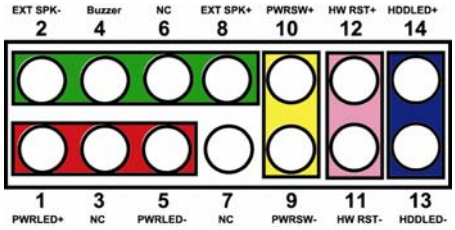
### 2.4.1 ATX 4 Pin 12V IN Connector (CN5)

You can connect it to the ATX12V power supply for CPU Core Voltage.

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | GND |
| 3 | +12V |
| 4 | +12V |




### 2.4.2 Front Panel Connector (CN26)




- **Power LED**

  This 3-pin connector denoted as Pin 1 and Pin 5 connects the system power LED indicator to such a switch on the case. Pin 1 is assigned as +, and Pin 5 as -. The Power LED lights up when the system is powered ON. Pin 3 is defined as GND.

- **External Speaker and Internal Buzzer Connector**

  Pin 2, 4, 6 and 8 can be connected to the case-mounted speaker unit or internal buzzer. While connecting the CPU card to an internal buzzer, please short pins 2-4; while connecting to an external speaker, you need to set pins 2-4 to Open and connect the speaker cable to pin 8 (+) and pin 2 (-).

- **ATX Power On/Off Button**

  This 2-pin connector denoted as Pin 9 and 10 connects the front panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.

- **System Reset Switch**

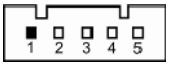
  Pin 11 and 12 can be connected to the case-mounted reset switch that reboots your computer instead of turning OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.

- **HDD Activity LED**

  This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

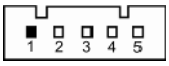
### 2.4.3 LAN1 LED Connectors (CN19)

| Pin | Signal |
|---|---|
| 1 | LINK_ACT LED(+) |
| 2 | LINK_ACT LED(-) |
| 3 | 100, Low Active |
| 4 | + 3.3V |
| 5 | 1000, Low Active |




### 2.4.4 LAN2 LED Connectors (CN10)

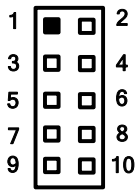
| Pin | Signal |
|---|---|
| 1 | LINK_ACT LED(+) |
| 2 | LINK_ACT LED(-) |
| 3 | 100, Low Active |
| 4 | + 3.3V |
| 5 | 1000, Low Active |



### 2.4.5 COM Port RS-232 Pin Assignment (CN3, CN6)

The serial interface for the board consists of CN3 port (COM2) support for RS-232, and CN6 (COM1) for RS-232/RS-422/RS-485.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Data Carrier Detect (DCD) | 2 | Data Set Ready (DSR) |
| 3 | Receive Data (RXD) | 4 | Request to Send (RTS) |
| 5 | Transmit Data (TXD) | 6 | Clear to Send (CTS) |
| 7 | Data Terminal Ready (DTR) | 8 | Ring Indicator (RI) |
| 9 | Ground (GND) | 10 | Disconnect(NI) |




### 2.4.6 COM2 RS-422/485 Pin Assignment

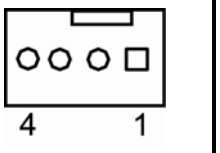
COM1 Serial Port 10-pin (Box-header) Connector Pin Assignment list

| Pin # | Signal Name | |
|---|---|---|
| | RS-422 | RS-485 |
| 1 | TX- | DATA- |
| 2 | No connector | No connector |
| 3 | TX+ | DATA+ |
| 4 | No connector | No connector |
| 5 | RX+ | No connector |
| 6 | No connector | No connector |
| 7 | RX- | No connector |
| 8 | No connector | No connector |
| 9 | GND | GND |
| 10 | NI | NI |

### 2.4.7 CPU Fan Connector (CN30)

A CPU fan is always needed for cooling CPU heat. The CPU fan connector **CN30** provides power to the CPU fan.

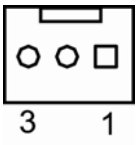
| Pin | Signal |
|---|---|
| 1 | Ground |
| 2 | +12V |
| 3 | Rotation Detection |
| 4 | Speed Control |




### 2.4.8 System & Auxiliary Fan Connectors (CN9, CN8)

You can connect the system cooling fan cable to **CN9/CN8** for system cooling fan power.

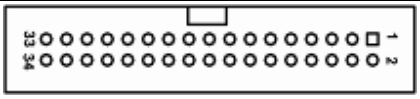
| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | Rotation Detection |



### 2.4.9 Floppy Disk Port Connector (CN4)

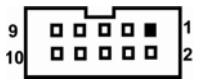
The board provides a 34-pin header type connector, **CN4**, supporting up to two floppy drives. The floppy drives may be any one of the following types: 5.25" 360KB/1.2MB and 3.5" 720KB/1.44MB/2.88MB.

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | GND | 2 | Drive Density Select | 3 | GND |
| 4 | No connector | 5 | GND | 6 | No connector |
| 7 | GND | 8 | Index# | 9 | GND |
| 10 | Motor enable A# | 11 | GND | 12 | No connector |
| 13 | GND | 14 | Drive select A# | 15 | GND |
| 16 | No connector | 17 | GND | 18 | Direction# |
| 19 | GND | 20 | STEP# | 21 | GND |
| 22 | Write data# | 23 | GND | 24 | Write gate# |
| 25 | GND | 26 | Track 0 # | 27 | GND |
| 28 | Write protect# | 29 | No connector | 30 | Read data# |
| 31 | GND | 32 | Head selection# | 33 | No connector |
| 34 | Disk change# | | | | |




### 2.4.10 Intel® HD Audio Digital Header (CN1)

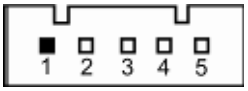
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | MIC IN | 2 | GND |
| 3 | LINE_IN_L | 4 | GND |
| 5 | LINE_IN_R | 6 | GND |
| 7 | LINE_OUT_L | 8 | GND |
| 9 | LINE_OUT_R | 10 | GND |



### 2.4.11 PS/2 Keyboard, Mouse Connectors (CN28, CN29)

The board provides theMouse (CN28)/ Keyboard (CN29) interface with a 5-pin connector.

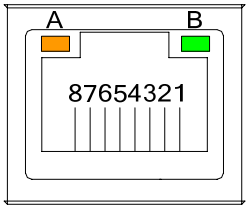
| Pin | Signal |
|---|---|
| 1 | Clock |
| 2 | DATA |
| 3 | No connector |
| 4 | GND |
| 5 | +5V |




### 2.4.12 Ethernet RJ-45 Connectors (CN14, CN20)

The RJ-45 connectors LAN1 and LAN2 are for Ethernet. To connect the board to 100-Base-T or 1000-Base-T hub, just plug one end of the cable into LAN1 and connect the other end (phone jack) to a 100-Base-T hub or 1000-Base-T hub.

| Pin | Signal |
|---|---|
| 1 | Tx+ (Data transmission positive) |
| 2 | Tx- (Data transmission negative) |
| 3 | Rx+(Data reception positive) |
| 4 | RJ-1(For 1000 base T-Only) |
| 5 | RJ-1(For 1000 base T-Only) |
| 6 | Rx- (Data reception negative) |
| 7 | RJ-1(For 1000 base T-Only) |
| 8 | RJ-1(For 1000 base T-Only) |
| A | Active LED |
| B | Speed LED |



### 2.4.13 Parallel Port Connector (CN7)

**Print Port Connector**

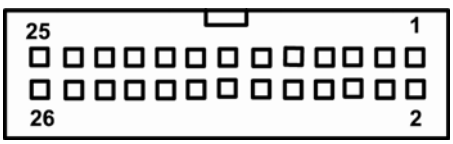
This board has a multi-mode parallel port to support:

1. **Standard Mode:**
   IBM PC/XT, PC/AT and PS/2™ are compatible with bi-directional parallel port.

2. **Enhanced Mode:**
   Enhance parallel port (EPP) is compatible with EPP 1.7 and EPP 1.9 (IEEE 1284 compliant).

3. **High Speed Mode:**
   Microsoft and Hewlett Packard extended capabilities port (ECP) is IEEE 1284 compliant.

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Strobe# | 2 | Auto Form Feed# |
| 3 | Data 0 | 4 | Error# |
| 5 | Data 1 | 6 | Initialize# |
| 7 | Data 2 | 8 | Printer Select In# |
| 9 | Data 3 | 10 | GND |
| 11 | Data 4 | 12 | GND |
| 13 | Data 5 | 14 | GND |
| 15 | Data 6 | 16 | GND |
| 17 | Data 7 | 18 | GND |
| 19 | Acknowledge# | 20 | GND |
| 21 | Busy | 22 | GND |
| 23 | Paper Empty# | 24 | GND |
| 25 | Printer Select | 26 | GND |



### 2.4.14 SATA Connectors (CN11, CN12, CN13, CN16, CN17, CN18)

These SATA connectors are for high-speed SATA interface ports and they can be connected to hard disk devices.

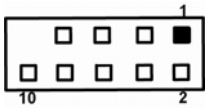
| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | SATA_TX+ |
| 3 | SATA_TX- |
| 4 | GND |
| 5 | SATA_RX- |
| 6 | SATA_RX+ |
| 7 | GND |


### 2.4.15 Internal USB Connectors (CN21, CN22, CN25)

The 10-pin standard Universal Serial Bus (USB) connectors, **CN21/22/25**, on this board are for installing versatile USB interface peripherals.

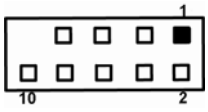
| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB_PWR | 2 | USB_PWR |
| 3 | USB2- | 4 | USB3- |
| 5 | USB2+ | 6 | USB3+ |
| 7 | GND | 8 | GND |
| | | 10 | GND |

CN21



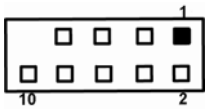

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB_PWR | 2 | USB_PWR |
| 3 | USB4- | 4 | USB5- |
| 5 | USB4+ | 6 | USB5+ |
| 7 | GND | 8 | GND |
| | | 10 | GND |

CN22



| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | USB_PWR | 2 | USB_PWR |
| 3 | USB4- | 4 | USB5- |
| 5 | USB4+ | 6 | USB5+ |
| 7 | GND | 8 | GND |
| | | 10 | GND |

CN25

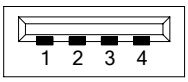



### 2.4.16 External USB Port Connectors (USB1, USB2)

The 4-pin standard Universal Serial Bus (USB) port connector on the board is for the installation of peripherals supporting the USB interface.

| Pin | Signal |
|---|---|
| 1 | USB_POWER |
| 2 | USB - |
| 3 | USB + |
| 4 | GND |

USB1

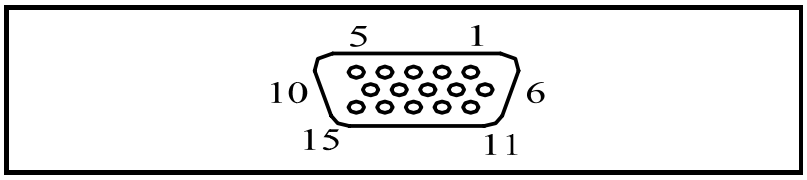



USB2


### 2.4.17 DB15 CRT Connector (CN23)

**CN23** is a DB15 connector commonly used for the CRT Monitor.

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | Red | 2 | Green | 3 | Blue |
| 4 | NC | 5 | GND | 6 | DETECT |
| 7 | GND | 8 | GND | 9 | VCC |
| 10 | GND | 11 | NC | 12 | DDC DATA |
| 13 | Horizontal Sync | 14 | Vertical Sync | 15 | DDC CLK |

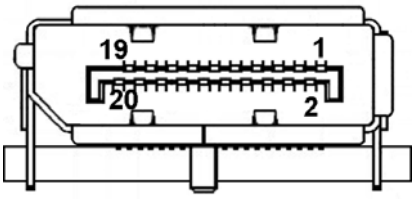



### 2.4.18 Display Port Connector (CN24)

**CN24** is a Standard Display Port Connector co-layout with CN23.

| Pin | Signal |
|---|---|
| 1 | DPB_LANE0 |
| 2 | GND |
| 3 | DPB_LANE0# |
| 4 | DPB_LANE1 |
| 5 | GND |
| 6 | DPB_LANE1# |
| 7 | DPB_LANE2 |
| 8 | GND |
| 9 | DPB_LANE2# |
| 10 | DPB_LANE3 |
| 11 | GND |
| 12 | DPB_LANE3# |
| 13 | Detect Pin |
| 14 | GND |
| 15 | DPB_AUX |
| 16 | GND |
| 17 | DPB_AUX# |
| 18 | DPB_HPDE |
| 19 | N.C. |
| 20 | 3.3V |

**CN24**



# CHAPTER 3

# HARDWARE INSTALLATION

Before installing the processor, please access Intel® website for more detailed information

**Processor Integration Video (LGA1156)**:

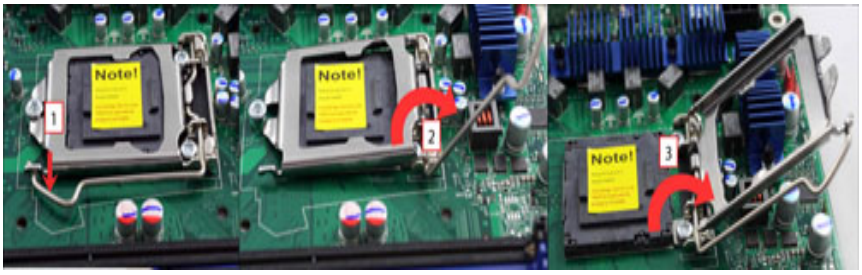
http://www.intel.com/support/tw/processors/sb/CS-030860.htm .

## 3.1 Installing the Processor

The LGA1156 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as below:

**Step1 Opening the Socket:**

1. Disengage load lever by releasing down and out on the hook. This will clear retention tab.
2. Rotate load lever to open position at approximately 135°.
3. Rotate load plate to open position at approximately 150°.



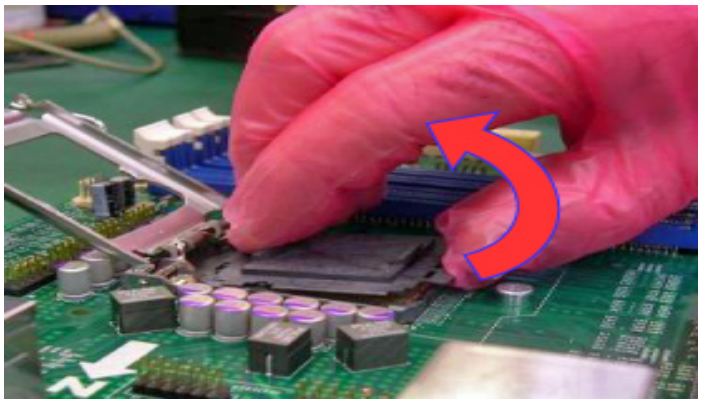

**Note: Apply pressure to corner with right-hand thumb when opening or closing load lever - otherwise lever will bounce back (as a mouse trap) causing bent contacts.**

**Step2 Removing the socket protective cover:**

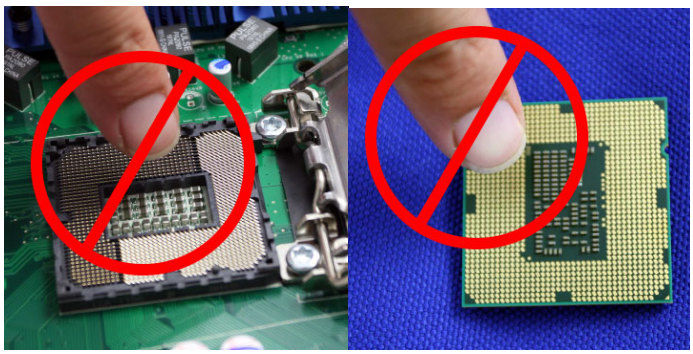
1. Place thumb against the front edge of the protective cover and rest index finger on the rear grip to maintain control of the cover.

2. Lift the front edge of the protective cover to disengage from the socket. Keep control of the cover by holding the rear grip with index finger.

3. Lift protective cover away from the socket, being careful not to touch the electrical contacts.



**Note: Vertical removal is NOT recommended, as it requires higher force and can lead to socket contact damage.**



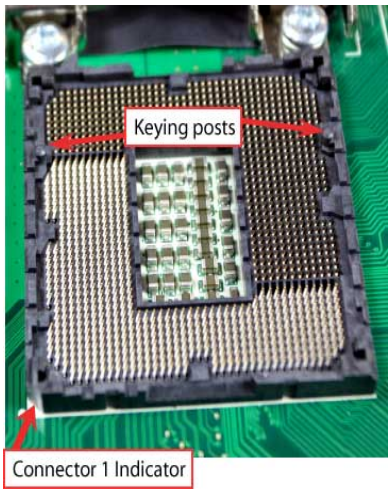
**Caution: Never Touch Fragile Socket Contacts to Avoid Damage and DO NOT TOUCH PROCESSOR SENSITIVE CONTACTS AT ANY TIME DURING INSTALLATION.**

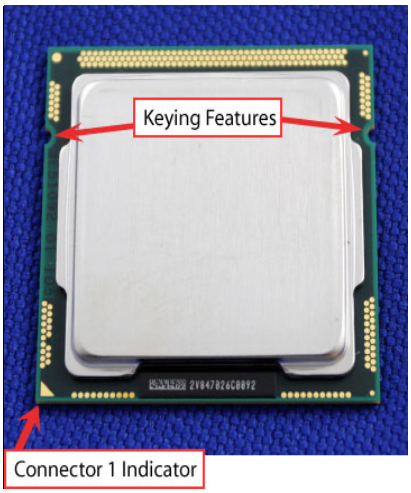
**Step3 Processor installation:**

1. Lift processor package from shipping media by grasping the substrate edges. Scan the processor package gold pads for any presence of foreign material. If necessary, the gold pads can be wiped clean with a soft lint-free cloth and isopropyl alcohol.

2. Scan the processor package gold pads for any presence of foreign material. If necessary, the gold pads can be wiped clean with a soft lint-free cloth and isopropyl alcohol.

3. Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.



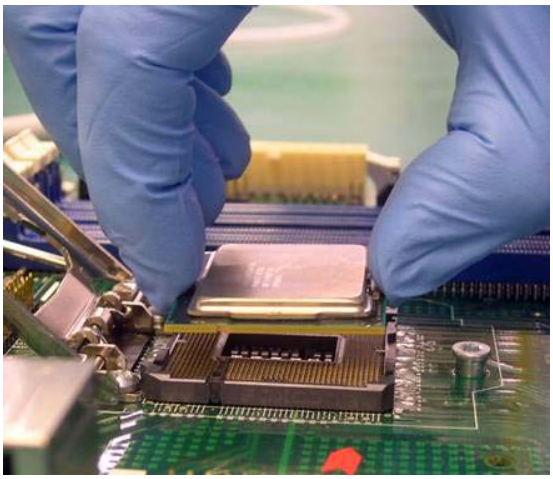




4. Grasp the processor with thumb and index finger along the top and bottom edges. (Do not touch the Orientation Notches.) The socket will have cutouts for your fingers to fit into (see image below).

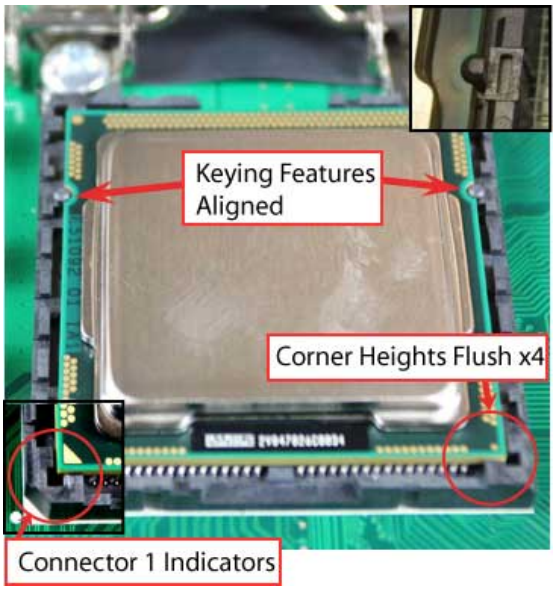
5. Carefully place the processor into the socket body vertically (see image below).

**Note: Tilting or roughly shifting it into place can damage socket contacts.**

**Caution: Do not use a vacuum pen for installation.**



6. Verify that package is within the socket body and properly connected to orientation keys.

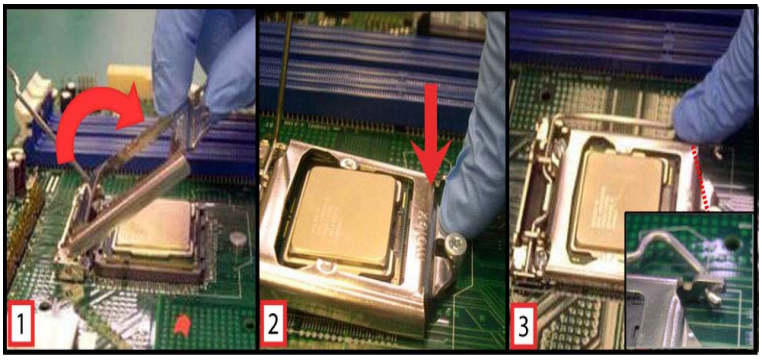


7. Close the socket (see image below):

   A. Gently lower the load plate.

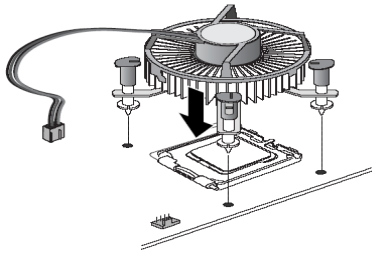
   B. Make sure load plate's front edge slides under the shoulder screw cap as the lever is lowered.

   C. Latch the lever under the top plate's corner tab, being cautious not to damage the motherboard with the tip of the lever.

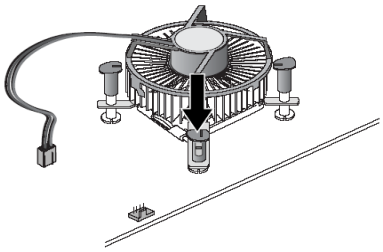


**Step4 Fan heatsink handling:**

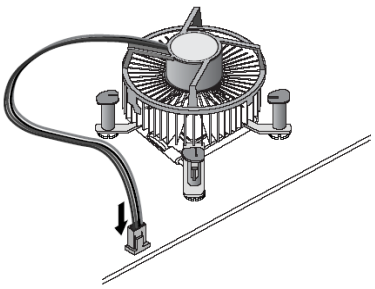
1. Orientate the CPU cooling fan to fixing holes on the board.



2. Screw the CPU cooling fan onto the board.



3. Make sure the CPU fan is plugged to the CPU fan connector.

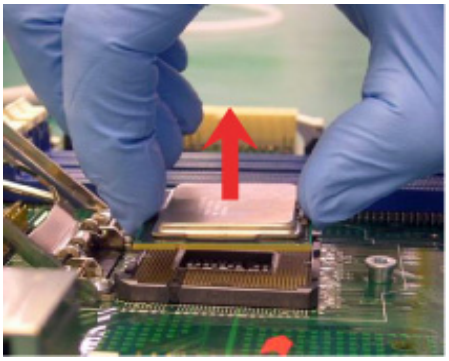


**Step5 Removing the processor:**

1. Open the socket:

    1. Disengage the load lever.
    2. Open the load plate.

2. Remove the Processor package, holding along the top and bottom edges, or by using a vacuum pen.
3. Maintain Processor horizontal and remove Processor with a vertical motion to avoid damaging the socket contacts.



4. Place the processor in a specially designed tray or ESD retainer for storage. Do not place directly on table resting on gold lands.
5. Assemble LGA1156 socket protective cover:

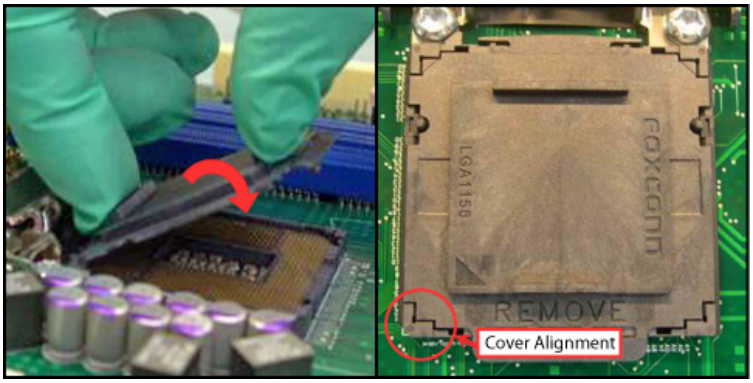
    1. Hold protective cover at 45 degree angle to the LGA1156 Socket
    2. Carefully lower protective cover on hinge side first, to contact with the outside wall of the LGA1156 Socket:

A. Engage protective cover retention features to outside of LGA1156 Socket, AND align 2 cover corners to socket corners (This step is critical to avoid Bent Contact Damage!)

B. Lower protective cover to attach to the LGA1156 Socket on Shoulder screw side

3. Perform Visual and Tactile verification that protective cover is properly seated in the LGA1156 Socket:

   *Hold cover and move gently "side to side" to feel the play within the cover and the LGA1156 Socket.



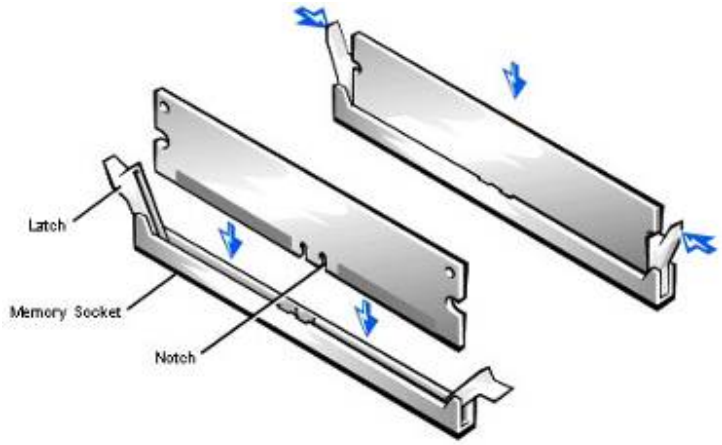
6. Close the socket load plate and engage the load lever (see image below).

## 3.2 Installing the Memory

The board supports four 240-pin DDR3 DIMM memory sockets with maximum memory capacity up to 16GB.

Please follow steps below to install the memory modules:

1 Push down latches on each side of the DIMM socket.
2 Align the memory module with the socket that notches of memory module must match the socket keys for a correct installation.
3 Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the DIMM.
4 Install any remaining DIMM modules.



# CHAPTER 4

# HARDWARE DESCRIPTION

## 4.1 Microprocessors

The **SHB103 Series** supports Intel® Core™ 2 Quad / Core™ 2 Duo/Celeron® processors, which make your system operated under Windows® XP and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

## 4.2 BIOS

The SHB103 Series uses AMI Plug and Play BIOS with a single 32Mbit SPI Flash.

## 4.3 System Memory

The **SHB103 Series** supports four 240-pin DDR3 DIMM sockets for a maximum memory of 16GB DDR3 SDRAMs. The memory module can come in sizes of 1GB, 2GB and 4GB.

## 4.4 I/O Port Address Map

The Intel® Core™2 Extreme/ Intel® Core™ 2 Quad / Core™ 2 Duo/Celeron® CPUs can communicate via I/O ports. There are total 1KB port addresses available for assignment to other devices via I/O expansion cards.

| Address | Devices |
|---|---|
| 000-01F | DMA controller #1 |
| 020-02D, 024-025 028-029, 02C-02D | Interrupt controller #1 |
| 02E-02F | Forwarded to LPC(LPC Super I/O ) |
| 030-031, 034-035 038-039, 03C-03D | Interrupt controller #2 |
| 040-043, 050-053 | Timer/Counter (8254) |
| 060 | Forwarded to LPC (Microcontroller) |
| 061 | NMI |
| 062-066 | Forwarded to LPC (Microcontroller) |
| 070-077 | Real time clock, NMI |
| 080-091 | DMA page register |
| 092 | Processor I/F(Reset Generator) |
| 093-09F | DMA page register |
| 0A0-0BF | Interrupt controller #2 |
| 0C0-0DF | DMA controller #2 |
| 0F0 | Processor I/F |
| 0F8-0FF | Math processor |
| 170-177 | Forward to SATA (SATA Controller) |
| 1F0-1F7 | Forward to SATA (SATA Controller) |
| 376 | Forward to SATA(SATA Controller) |
| 378-37F | Parallel Port (LPT) |
| 380-38F | SDLC #2 |
| 3A0-3AF | SDLC #1 |
| 3B0-3BF | MDA video card |

(to be continued)

| Address | Devices |
|---|---|
| 3C0-3CF | EGA card |
| 3D0-3DF | CGA card |
| 3F6 | Forward to SATA(SATA Controller) |
| 3F8-3FF | Serial port #1 (COM1) |
| 2F8-2FF | Serial port #2 (COM2) |

## 4.5 Interrupt Controller (IRQ) Map

The **SHB103 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines, and four out of them can be programmable. The mapping list of the 16 interrupt request lines is shown as the following table.

| IRQ | Parity check error |
|---|---|
| IRQ0 | System Timer Output |
| IRQ1 | Keyboard |
| IRQ2 | Interrupt rerouting from IRQ8 through IRQ15 |
| IRQ3 | Serial port #2 |
| IRQ4 | Serial port #1 |
| IRQ5 | PCI Device Share |
| IRQ6 | Floppy Disk Controller |
| IRQ7 | Parallel port |
| IRQ8 | Real time clock |
| IRQ9 | ACPI Controller |
| IRQ10 | PCI Device Share |
| IRQ11 | PCI Device Share |
| IRQ12 | PS/2 Mouse |
| IRQ13 | Math coprocessor |
| IRQ14 | SATA Primary (Legacy Mode) |
| IRQ15 | SATA Secondary (Legacy Mode) |

# CHAPTER 5

# AMI BIOS UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the AMIBIOS8 BIOS setup utility.

## 5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. 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 the Chipset and Power menus.

## 5.2 Navigation Keys

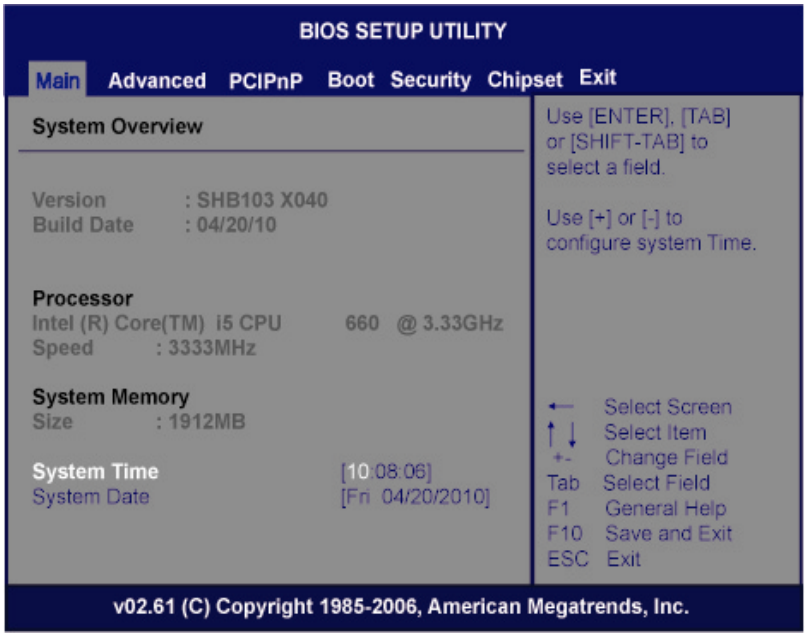
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.
These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.

***Note*** *Some of navigation keys differ from one screen to another.*

| | |
|---|---|
| **← Left/Right** | The Left <Arrow> keys allow you to select a setup screen. |
| **↑↓ Up/Down** | The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen. |
| **+– Plus/Minus** | The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item. |
| **Tab** | The <Tab> key allows you to select setup fields. |
| **F1** | The <F1> key allows you to display the General Help screen. |
| **F10** | The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> key to save your changes. |
| **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. |
| **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. |

## 5.3 Main Menu

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.



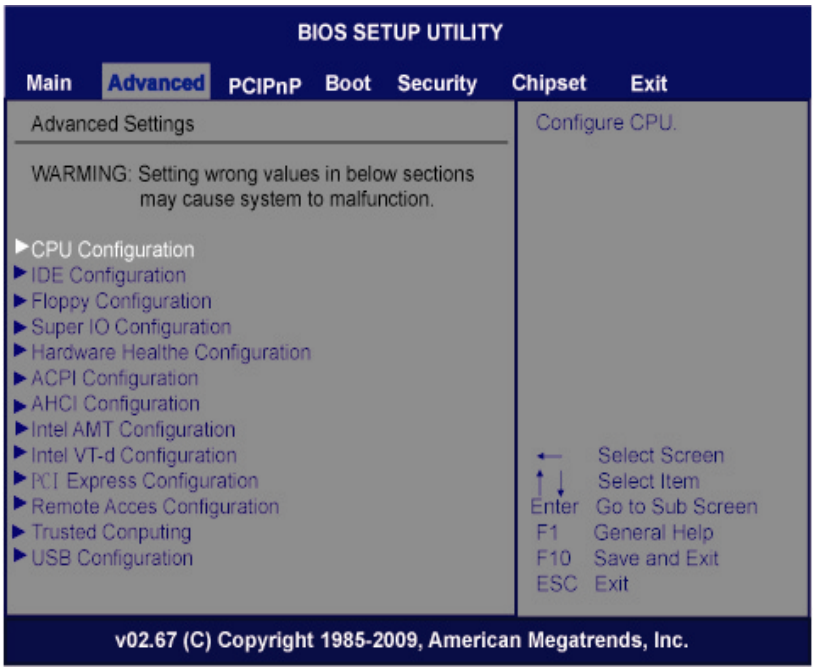

- **System Time/Date**
  Use this option to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is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

## 5.4 Advanced Menu

The Advanced menu allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

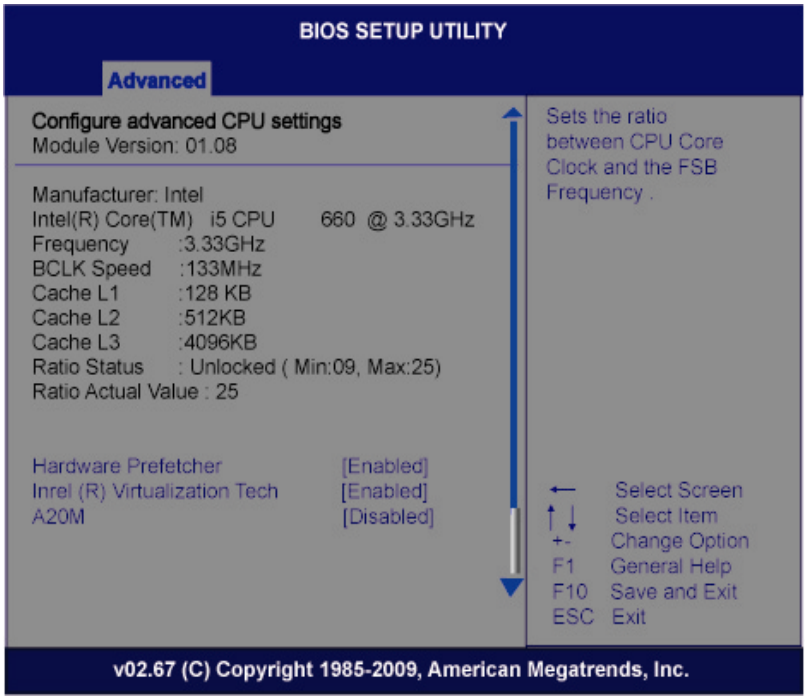
- CPU Configuration
- IDE Configuration
- Floppy Configuration
- Super IO Configuration
- Hardware Health Configuration
- ACPI Configuration
- AHCI Configuration
- Intel AMT Configuration
- Intel VT-d Configuration
- PCI Express Configuration
- Remote Acces Configuration
- Trusted Computing
- USB Configuration

For items marked with "►", please




press <Enter> for more options.

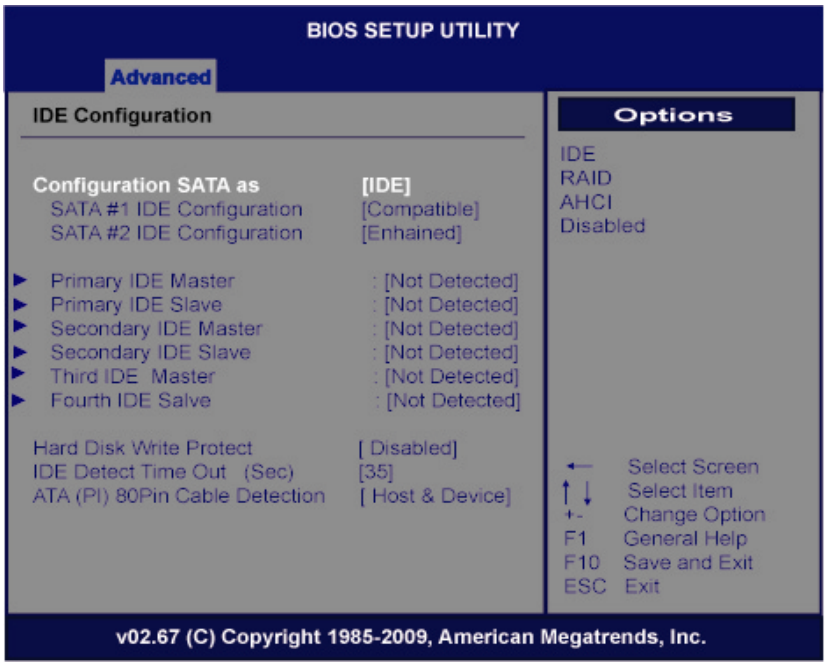
- **CPU Configuration**
  This screen shows the CPU Configuration, and you can change the value of the selected option.




  - **Max CPUID Value Limit**
    You can enable this item to let legacy operating systems boot even without support for CPUs with extended CPU ID functions.
  - **Execute-Disable Bit Capability**
    This item helps you enable or disable the No-Execution Page Protection Technology.
  - **Core Multi-Processing**
    This feature controls the functionality of the Core Multi-Processing to allow the processor to execute multitasking function.

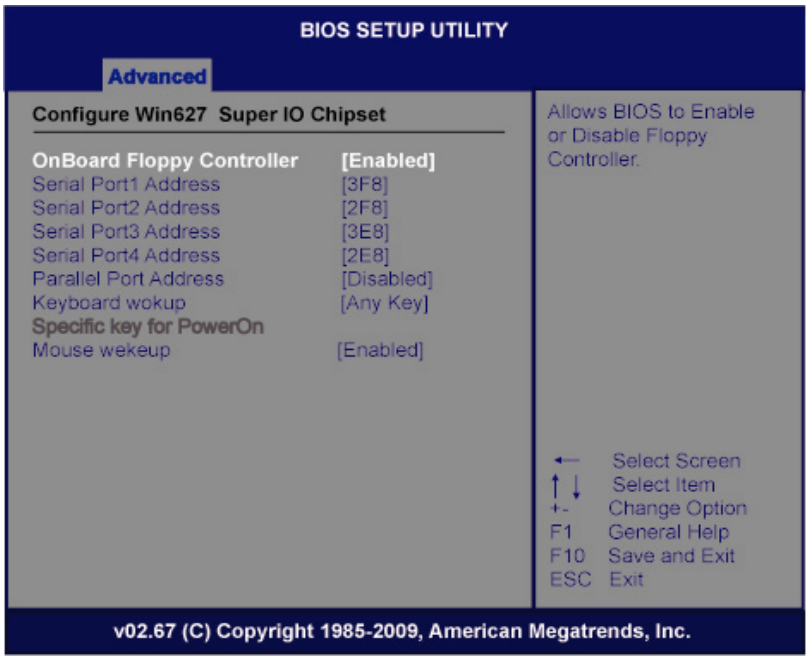
- **PECI**
  Use this item PECI (Platform Environment Control Interface) to execute the processor temperature monitoring and management.
- **Intel (R) C-STATE tech**
  Use this item to enable or disable the C-State technology.

- **IDE Configuration**
  You can use this screen to select options for the IDE Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



- **SATA#1 Configuration**
  Use this item to control the onboard SATA controller. Here are the options for your selection, *Compatible*, *Disabled*, and *Enhanced*.
- **Configure SATA#1 as**
  Use this item to choose the SATA operation mode. Here are the options for your selection, *IDE* and *AHCI*.
- **SATA#2 Configuration**
  Use this item to control the onboard SATA controller. Here are the options for your selection, *Enhanced* and *Disabled*.
- **Primary/Secondary/Third IDE Master**
  Select one of the hard disk drives to configure IDE devices installed in the system by pressing <Enter> for more options.
- **Fifth IDE Master**
  Select one of the hard disk drives to configure IDE devices installed in the system by pressing <Enter> for more options.

- **SuperIO Configuration**
  You can use this screen to select options for the SuperIO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

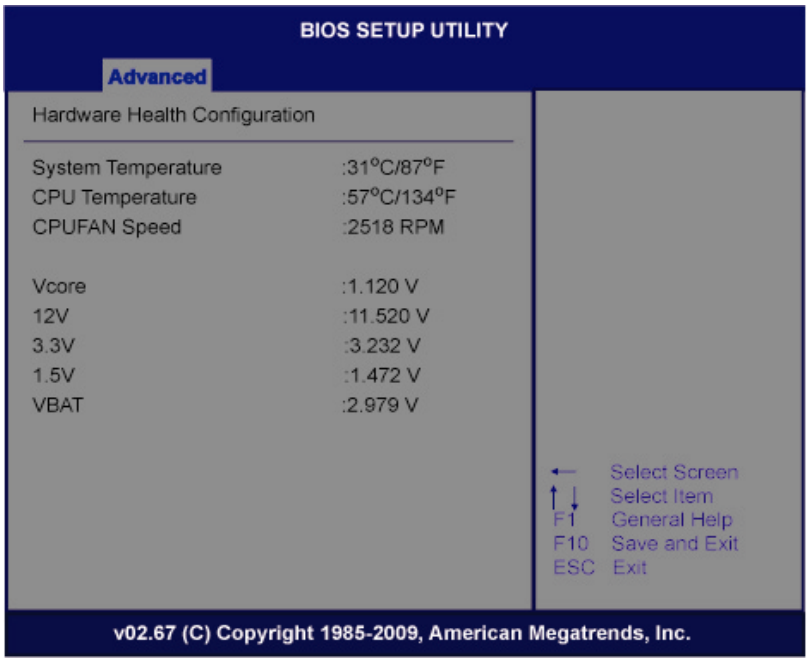



  - **Serial Port1 Address**
    This option specifies the base I/O port address and Interrupt Request address of serial port 1. The Optimal setting is *3F8/IRQ4*. The Fail-Safe default setting is *Disabled*.

  - **Serial Port2 Address**
    This option specifies the base I/O port address and Interrupt Request address of serial port 2. The Optimal setting is *2F8/IRQ3*. The Fail-Safe setting is *Disabled*.

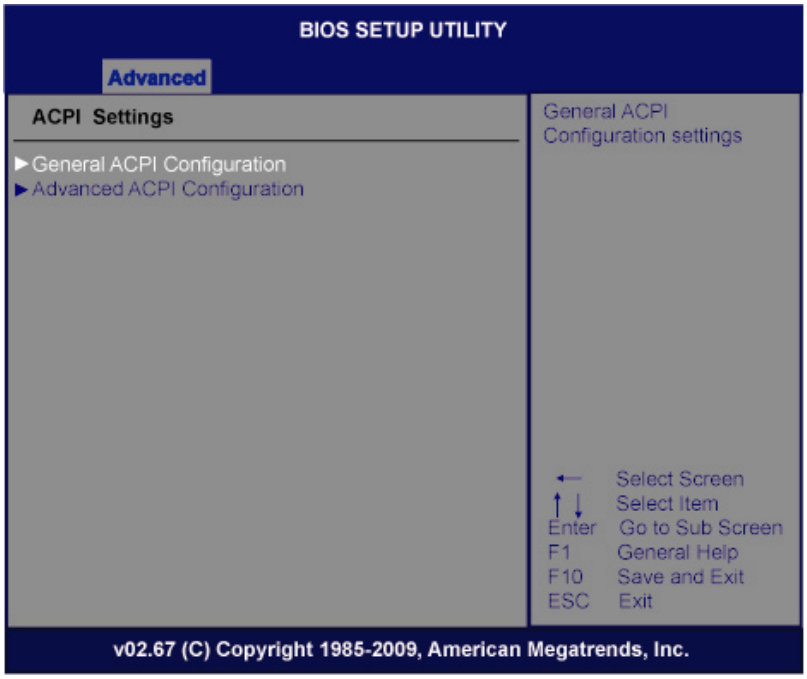
- **Parallel Port Address**
  This item allows you to determine the I/O address for onboard parallel port. There are several options for your selection.
  - **Parallel Port Mode**
    Select an operating mode for the onboard parallel (printer) port.
  - **Parallel Port IRQ**
    Use this item to set up the IRQ for onboard parallel port.
- **Serial Port3 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 3. The Optimal setting is *3E8/IRQ11*. The Fail-Safe default setting is *Disabled*.
- **Serial Port3 IRQ**
  This item specifies the IRQ used by the serial port 3.
- **Serial Port4 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 4. The Optimal setting is *2E8/IRQ10*. The Fail-Safe default setting is *Disabled*.
- **Serial Port4 IRQ**
  This item specifies the IRQ used by the serial port 4.

- **Hardware Health Configuration**
  This screen shows the Hardware Health Configuration, and a description of the selected item appears on the right side of the screen.



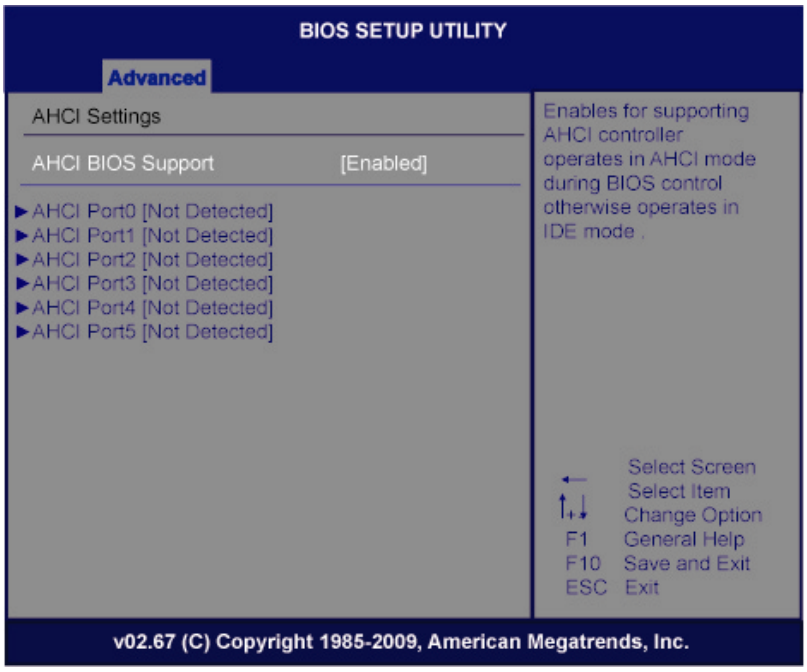

  - **H/W Health Configuration**
    This screen displays the temperature of CPU and System, Fan Speed, Vcore, etc.

- **ACPI Configuration**
  You can use this screen to select options for the ACPI Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



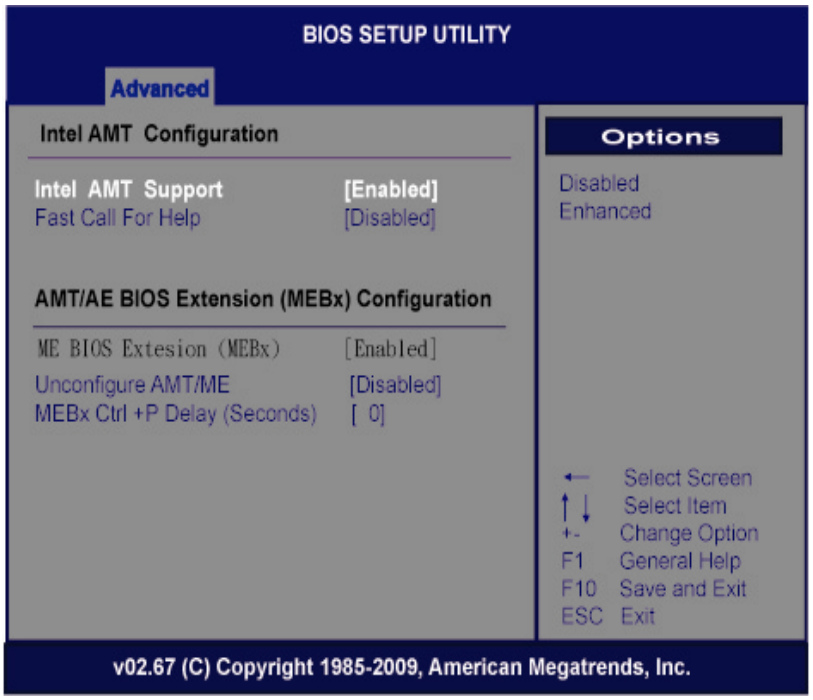

  - **General ACPI Configuration**
    Scroll to this item and press <Enter> to view the General ACPI Configuration sub menu, which contains General ACPI (Advanced Configuration and Power Management Interface) options for your configuration.
  - **Advanced ACPI Configuration**
    Scroll to this item and press <Enter> to view the Advanced ACPI Configuration sub menu, which contains Advanced ACPI (Advanced Configuration and Power Management Interface) options for your configuration.

- **AHCI Configuration**
  You can use this screen to select options for the AHCI Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



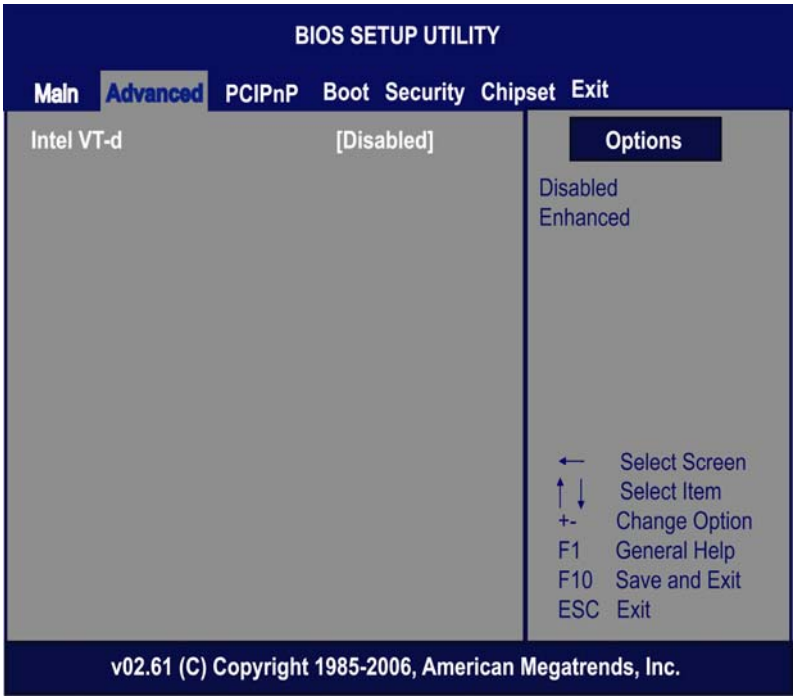

  - **AHCI BIOS Support**
    You can enable or disable this item to control the AHCI function of the SATA controller.

- **Intel AMT Configuration**
  You can use this screen to select options for the Intel AMT Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



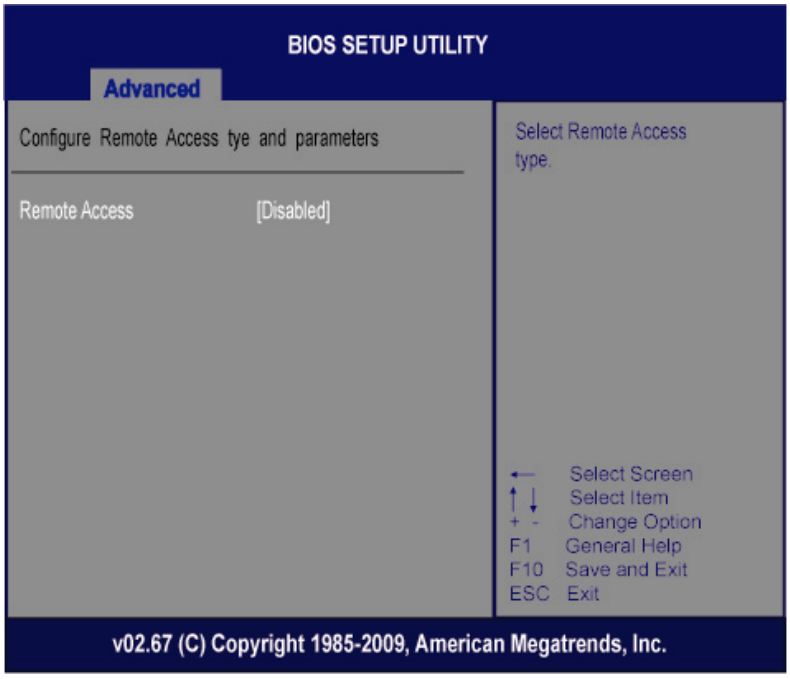

  - **Intel AMT Support**
    You can enable this item to support AMT (active management technology) function to follow up the procedure for the access to AMI program screen.
  - **Unconfigure AMT/ME**
    Use this item to unconfigure the AMT/ME settings.

- **Intel VT-d Configuration**
  You can use this screen to select options for the Intel VT-d Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



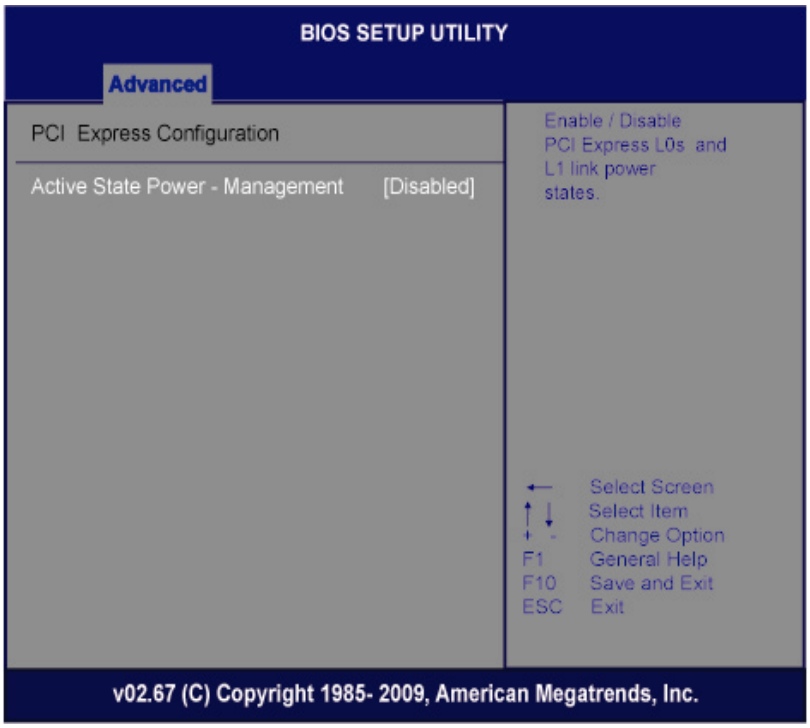

  - **Intel VT-d**
    Virtualization Technology for Directed I/O (VT-d) extends Virtualization Technology (VT) roadmap, by providing hardware assists for virtualization solution.
    VT-d can help end users improve security and reliability of the systems and also improve performance of I/O devices in virtualized environment. Here are the options for your selection, *Disabled* and *Enabled*.

- **Remote Access Configuration**
  You can use this screen to select options for the Remote Access Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



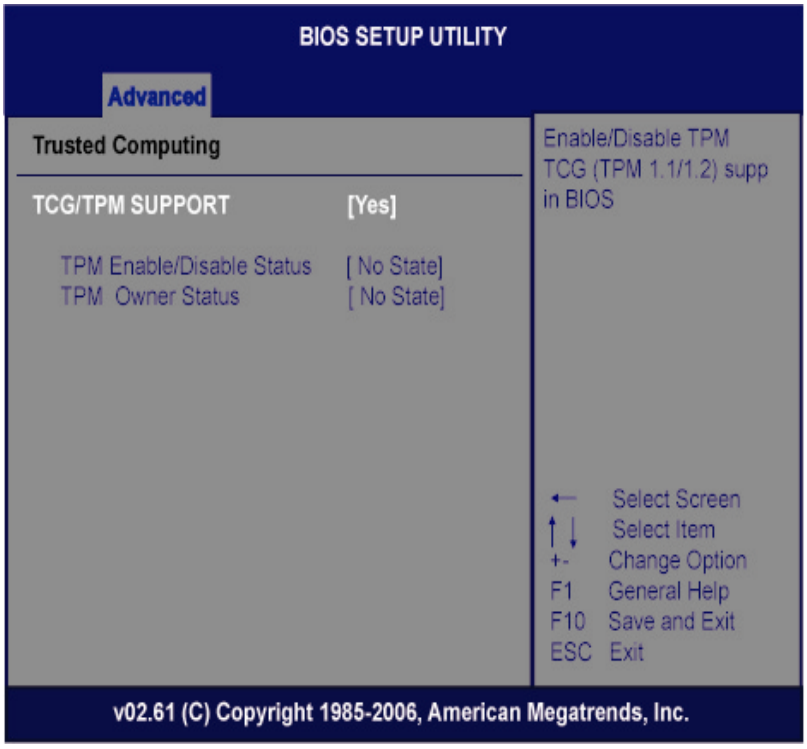

  - **Remote Access**
    Use this item to enable or disable the Remote Access function.

- **PCI Express Configuration**
  This screen shows the PCI Express Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.



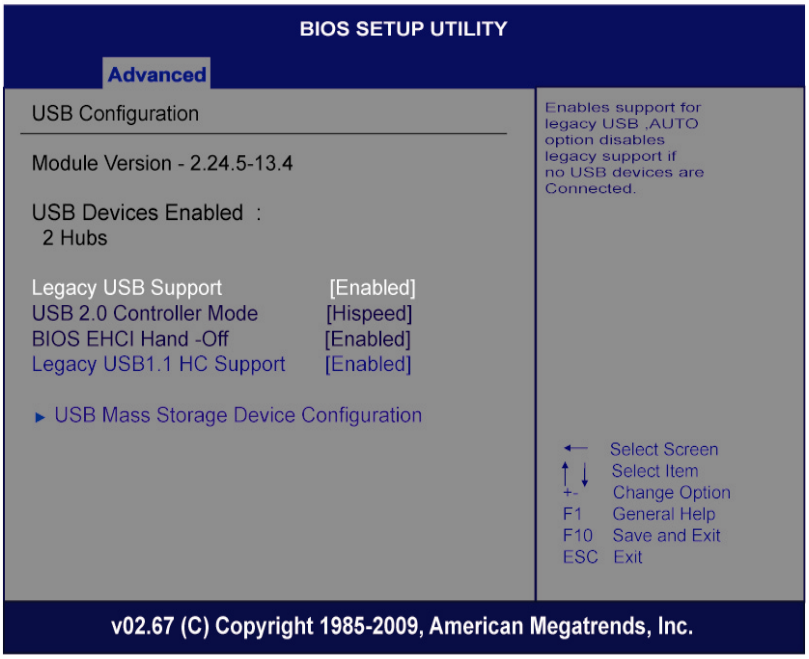

  - **Active State Power-Management**
    Use this item to enable or disable the function of Active State Power-Management to provide you with lower power consumption. The default setting is *Disabled*.

- **Trusted Computing**
  You can use this screen to select options for the Trusted Computing, and change the value of the selected option. A description of the selected item appears on the right side of the screen.




  - **TCG/TPM SUPPORT**
    Use this item to control the Trusted Platform Module (TPM) function.

- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

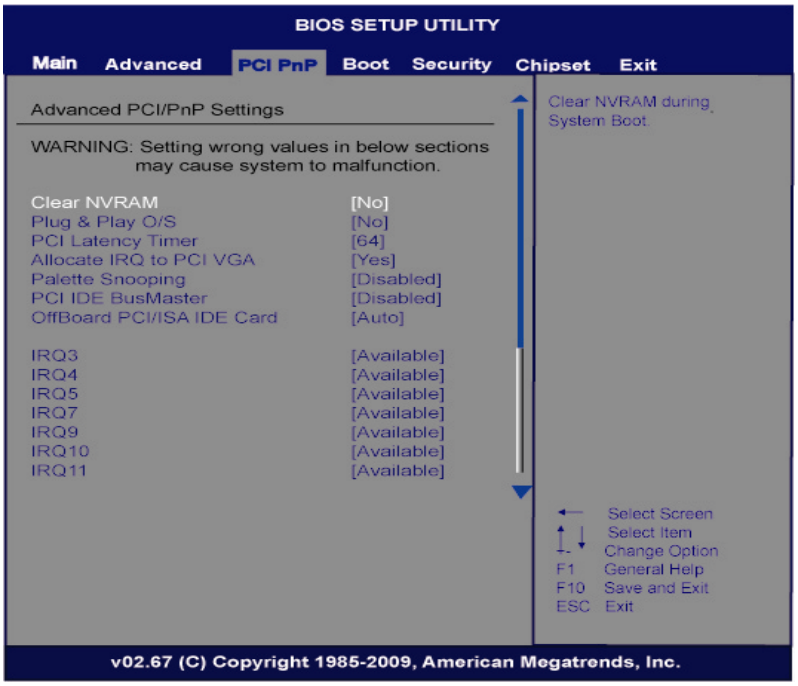



  - **USB Functions**
    This item allows you to enable or disable USB functions.
  - **Legacy USB Support**
    Use this item to enable or disable support for USB device on legacy operating system. The default setting is *Enabled*.
  - **USB 2.0 Controller Mode**
    Use this item to configure the USB 2.0 controller. The default setting is *HiSpeed*.
  - **BIOS EHCI Hand-Off**
    Enabling this item provide the support for operating systems without an EHCI hand-off feature. The default

setting is *enabled*.

## 5.5 PCI PnP Menu

The PCI PnP menu allows users to change the advanced settings for PCI/PnP devices.




- **Clear NVRAM**
  Use this item to clear the data in the NVRAM (CMOS). Here are the options for your selection, *No* and *Yes*.

- **Plug & Play O/S**
  When the setting is No, Use this item to configure all the devices in the system. When the setting is Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. The default setting is *No*.

- **PCI Latency Timer**
  This item controls how long a PCI device can hold the PCI bus before another takes over. The longer the latency, the longer the PCI device can retain control of the bus before handing it over to another PCI device. There are several options for your selection.

- **Allocate IRQ to PCI VGA**
  This item allows BIOS to choose an IRQ to assign for the PCI VGA card. Here are the options for your selection, *No* and *Yes*.

- **Palette Snooping**
  Some old graphic controllers need to "snoop" on the VGA palette, and then map it to their display as a way to provide boot information and VGA compatibility. This item allows such snooping to take place. Here are the options for your selection, *Disabled* and *Enabled*.

- **PCI IDE BusMaster**
  This item is a toggle for the built-in driver that allows the onboard IDE controller to perform DMA (Direct Memory Access) transfer. Here are the options for your selection, *Disabled* and *Enabled*.

- **OffBoard PCI/ISA IDE Card**
  This item is for any other non-onboard PCI/ISA IDE controller adapter. There are several options for your selection.

- IRQ3/4/5/7/9/10/11/

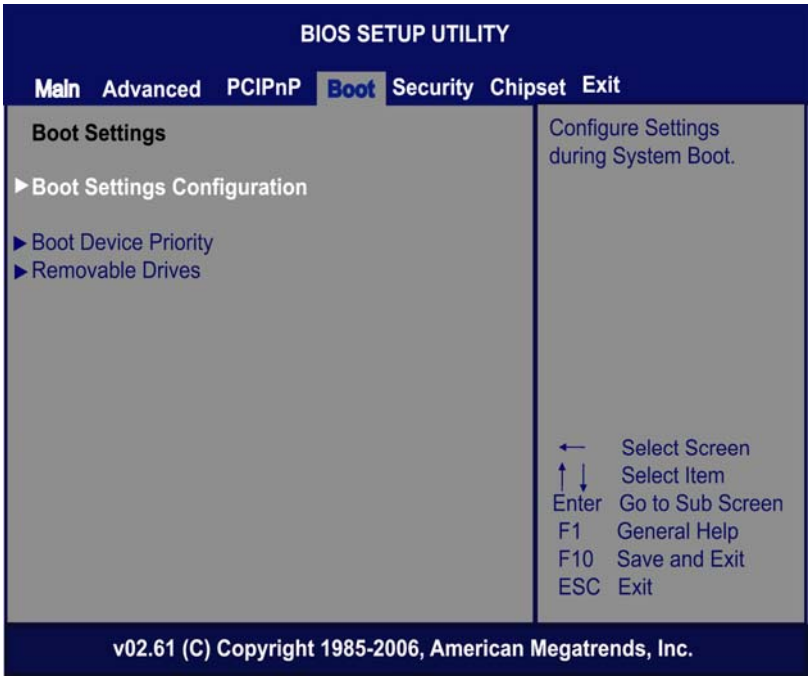
  These items will allow you to assign each system interrupt a type, depending on the type of device using the interrupt. The option "Available" means the IRQ is going to assign automatically. Here are the options for your selection, *Available* and *Reserved*.

## 5.6 Boot Menu

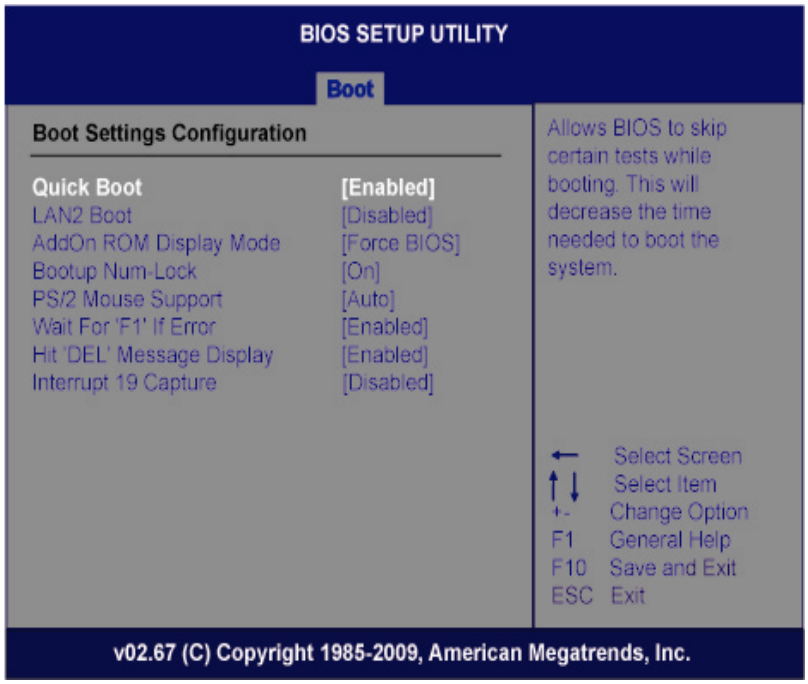
The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:

- Boot Settings Configuration
- Boot Device Priority
- Removable Drives

For items marked with "►", please press <Enter> for more options.



- **Boot Settings Configuration**




  - **Quick Boot**
    Enabling this item lets the BIOS skip some power on self tests (POST). The default setting is *Enabled*.

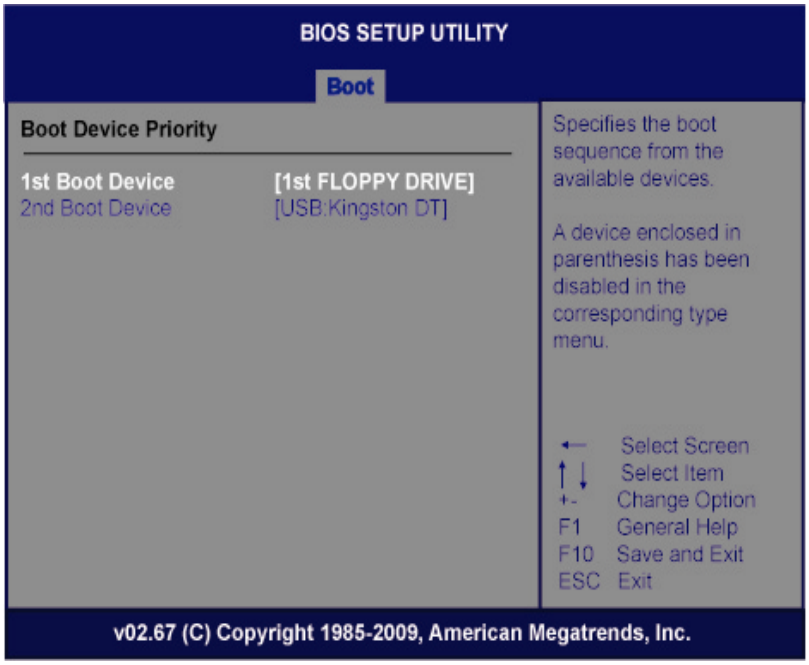
  - **AddOn ROM Display Mode**
    This item selects the display mode for option ROM. The default setting is *Force BIOS*.

  - **Boot Num-Lock**
    Use this item to select the power-on state for the NumLock. The default setting is *On*.

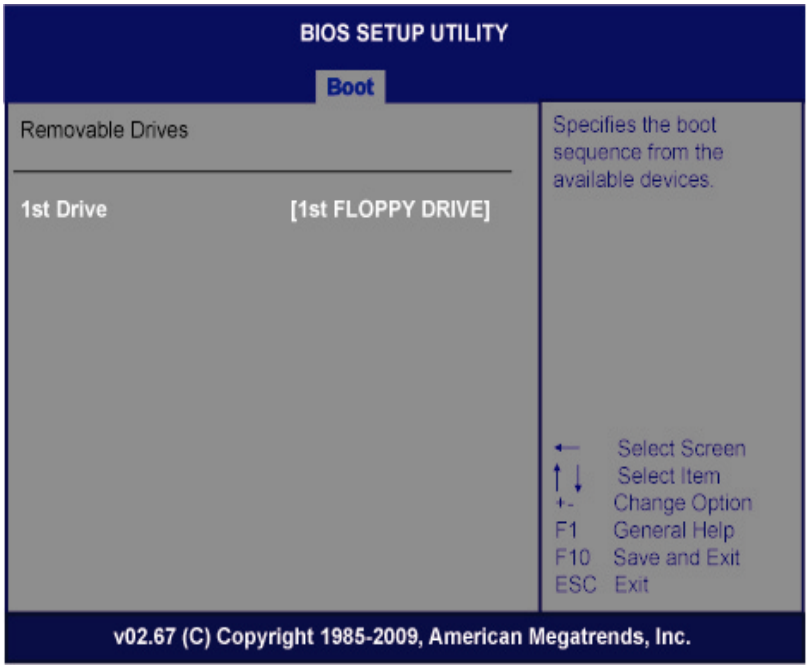
  - **PS/2 Mouse Support**
    This item determines if the BIOS should reserve IRQ12 for the PS/2 mouse or allow other devices to make use of this IRQ. Here are the options for your selection, *Auto*, *Enabled* and *Disabled*.

- **Wait For 'F1' Of Error**
  If this item is enabled, the system waits for the F1 key to be pressed when error occurs. The default setting is *Enabled*.
- **Hit 'DEL' Message Display**
  If this item is enabled, the system displays the message "Press DEL to run Setup" during POST. The default setting is *Enabled*.
- **Interrupt 19 Capture**
  If this item is enabled, this function makes the option ROMs to trap Interrupt 19. The default setting is *Disabled*.

- **Boot Device Priority**
  The Boot Device Priority screen specifies the boot device priority sequence from the available devices.

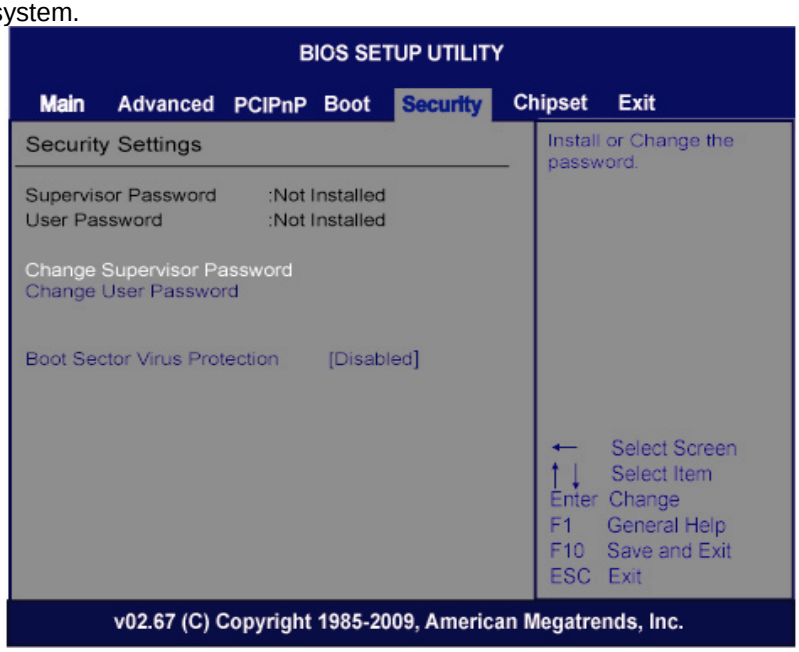


- **Removable Drives**
  Use this screen to view the removable drives in the system. The BIOS will attempt to arrange the removable drive boot sequence automatically. You can also change the booting sequence.



## 5.7 Security Menu

The Security menu allows users to change the security settings for the system.




- **Supervisor Password**
  This item indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **User Password**
  This item indicates whether a user password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **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

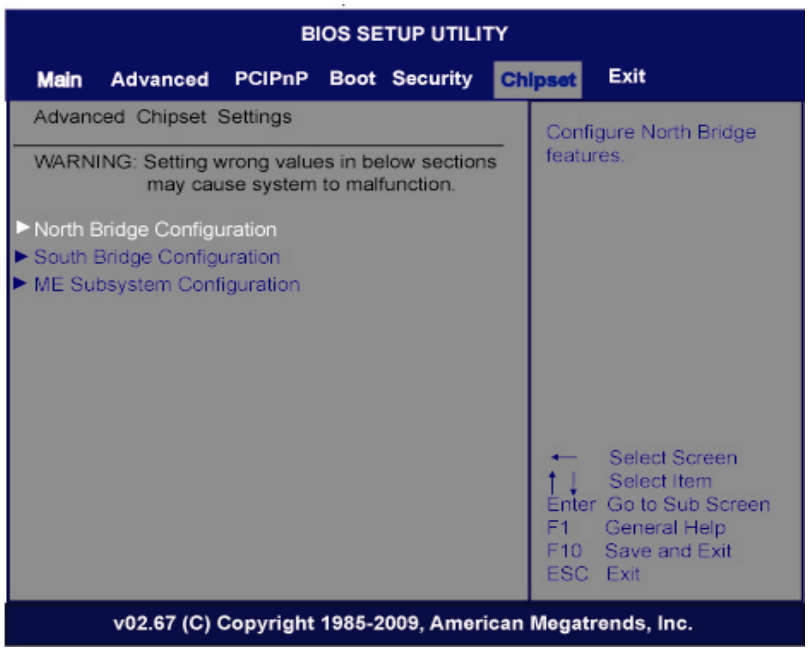
menu. You can use the sub menu to change the user password.

## 5.8 Chipset Menu

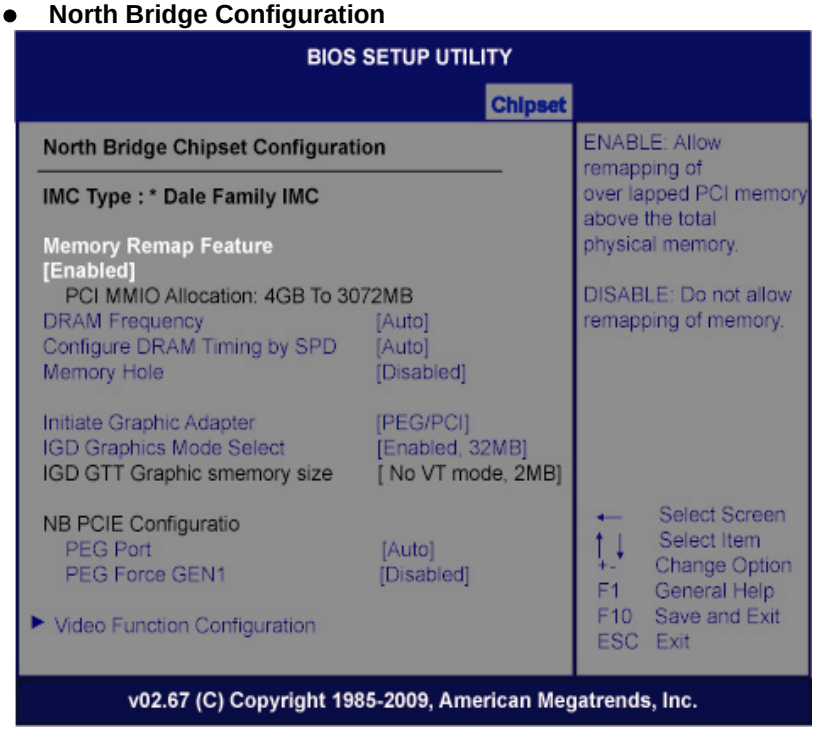
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- North Bridge Configuration
- South Bridge Configuration
- ME Subsystem Configuration

For items marked with "►", please press <Enter> for more options.



- **North Bridge Configuration**



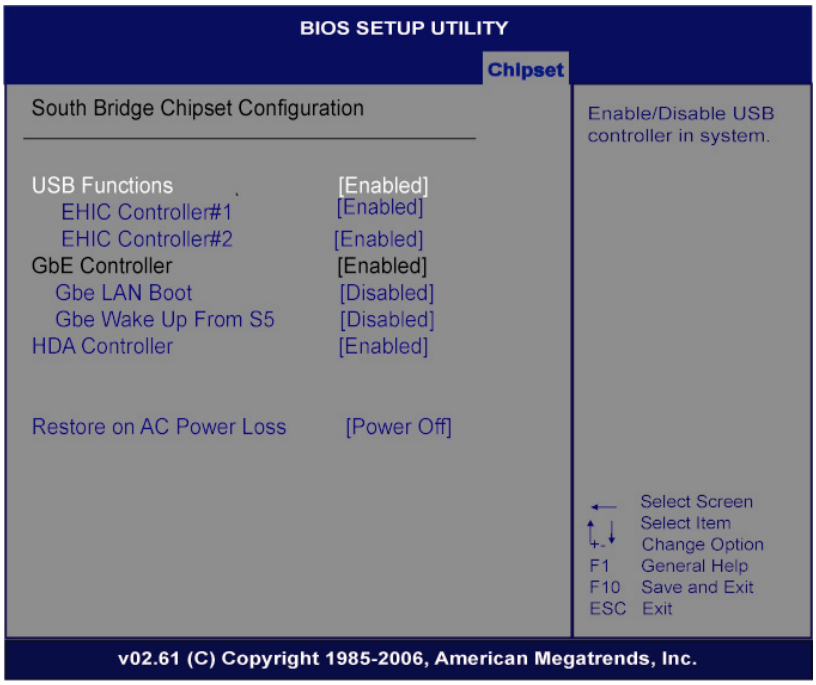

  - **Memory Remap Feature**
    Use this item to enable or disable the remapping of the overlapped PCI memory above the total physical memory. Only 64-bit OS supports this function.

  - **DRAM Frequency**
    This item allows you to control the Memory Clock.

  - **Configure DRAM Timing by SPD**
    This item can enable or disable DRAM timing by SPD (Serial Presence Detect) device, which is a small EEPROM chip on the memory module, containing important information about the module speed, size, addressing mode and various parameters.

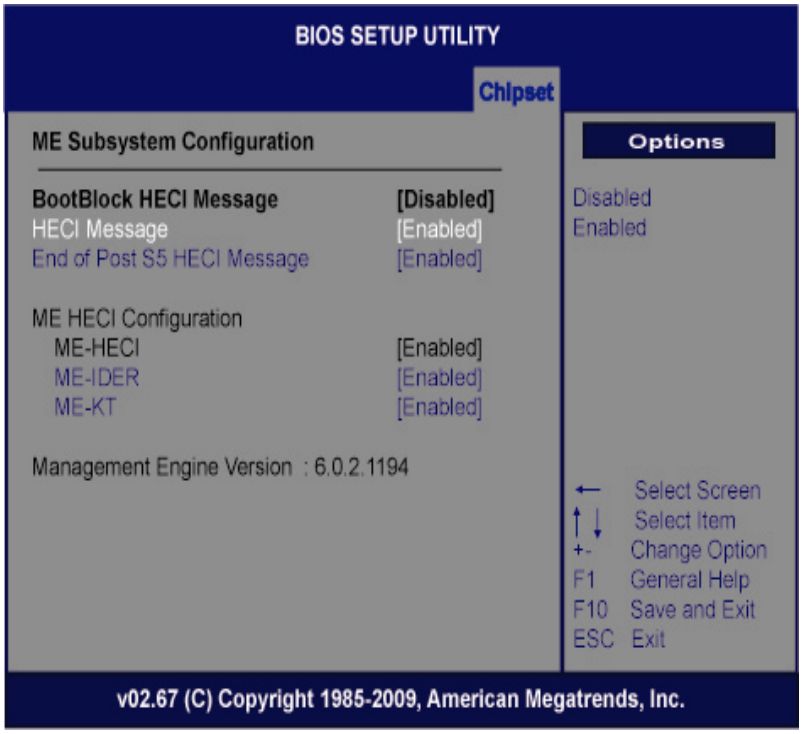
- **Memory Hole**
  You can reserve this area of system memory for ISA adapter ROM. When this area is reserved it cannot be cached. Check the user information of peripherals that need to use this area o f system memory for the memory requirements. Here are the options, *Disabled* and *15M-16M*.
- **Initiate Graphic Adapter**
  When using multiple graphics cards, this item can select which graphics controller to be the primary display device during boot.
- **IGD Graphics Mode Select**
  This item allows you to select the amount of system memory used by the internal graphics device.
- **PEG Port Configuration/PEG Port**
  This item is a toggle to enable or disable the PCI Express port. Here are the options for your selection, *Auto* and *Disabled*.
- **Video Function Configuration**
  Press <Enter> for the sub-menu for setting up video function.

- **South Bridge Configuration**



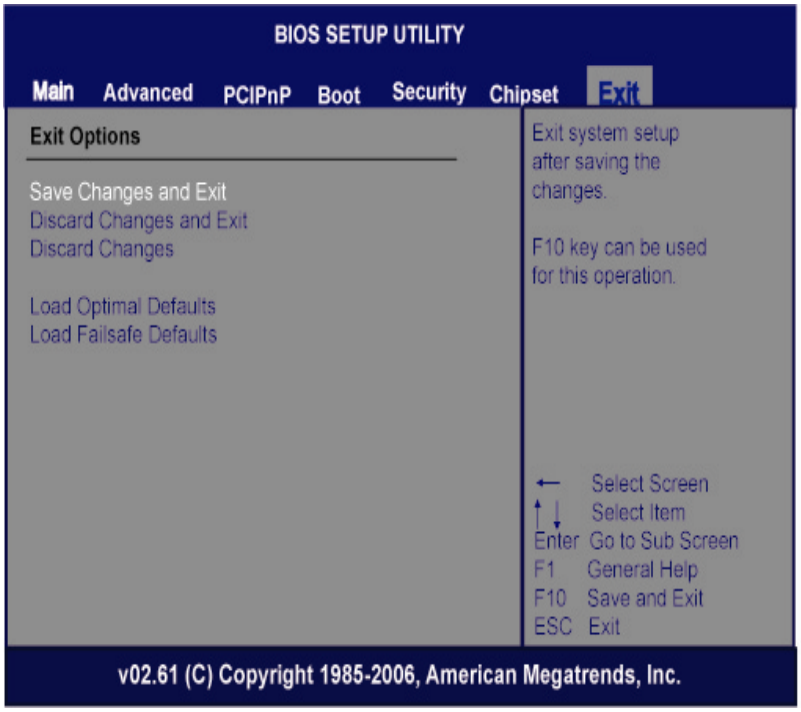

  - **GbE Wake Up From S5**
    This item specifies whether the system will be awakened from the S5 power.
  - **HDA Controller**
    This item allows you to enable or disable the HD audio support.
  - **Restore on AC Power Loss**
    This item can control how the PC will behave once power is restored following a power outage, or other unexpected shutdown.
  - **PCIE Port Configuration**
    This item allows you to set or disable the PCI Express Ports.

- **ME Subsystem Configuration**
  It is strongly recommended that you do not modify these options unless you are an advanced user.



## 5.9 Exit Menu

The Exit menu allows users to load your system configuration with optimal or failsafe default values.




- **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. Select *Save Changes and Exit* from the Exit menu and press <Enter>. Select Ok to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select *Discard Changes and Exit* from the Exit menu and press <Enter>. Select Ok to discard changes and exit.

- **Load Optimal Defaults**
  It 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>.

- **Load Fail-Safe Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer is experiencing system configuration problems.
  Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. Select Ok to load Fail-Safe defaults.

# APPENDIX A

# WATCHDOG TIMER

## Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

## Using the Watchdog Function

**Start**
↓
**Un-Lock WDT**
**:O 2E 87 ; Un-lock super I/O**
**O 2E 87 ; Un-lock super I/O**
↓
**Set WDT Function**
**O 2E 2D**
**O 2F 20**
**Select Logic device**
**O 2E 07**
**O 2F 08**
↓
**Activate WDT**
**:O 2E 30**
**O 2F 01**

**Set Second or Minute**
**O 2E F5**
**O 2F N N=00 or 08(See below table)**
↓
**Set base timer**
**:O 2E F6**
**O 2F M=00,01,02,…FF(Hex) ,Value=0 to 255**
↓
**WDT counting**

**re-set timer** **:O 2E F6**
**O 2F M ; M=00,01,02,…FF(See below table)**
↓
**IF No re-set timer** **:WDT time-out, generate RESET**

**IF to disable WDT** **:O 2E 30**
**O 2F 00 ; Can be disable at any time**

**N=00**

**M**= 00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 second
03h: Time-out occurs after 3 second
……
FFh: Time-out occurs after 255 second

**N=08**

**M**= 00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
……

FFh: Time-out occurs after 255 minutes

# APPENDIX B
# PCI IRQ ROUTING

### PICMG PCI IRQ Routing

| Device | ID | Slot | Int |
|---|---|---|---|
| PCI Slot 0 | 31 | 0 | BCDA |
| PCI Slot 1 | 30 | 1 | CDAB |
| PCI Slot 2 | 29 | 2 | DABC |
| PCI Slot 3 | 28 | 3 | ABCD |

# APPENDIX C
# CONFIGURING SATA FOR RAID FUNCTION

## Configuring SATA Hard Drive(s) for RAID Function (Controller: Intel® Q57 )

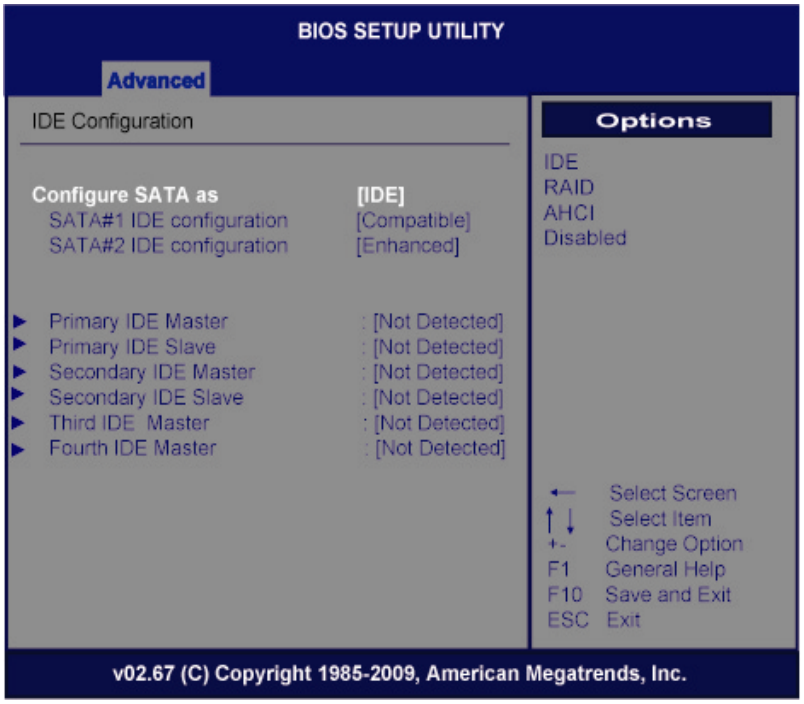
**Please follow up the steps below to configure SATA hard drive(s):**
(1) Install SATA hard drive(s) in your system.
(2) Enter the BIOS Setup to configure SATA controller mode and boot sequence.
(3) Configure RAID by the RAID BIOS.
(4) Create a floppy disk for the SATA controller driver.
(5) Install the SATA controller driver during the OS installation.

Before you begin the SATA configuration, please prepare:
(a) Two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.
(b) An empty formatted floppy disk
(c) Windows XP setup disk

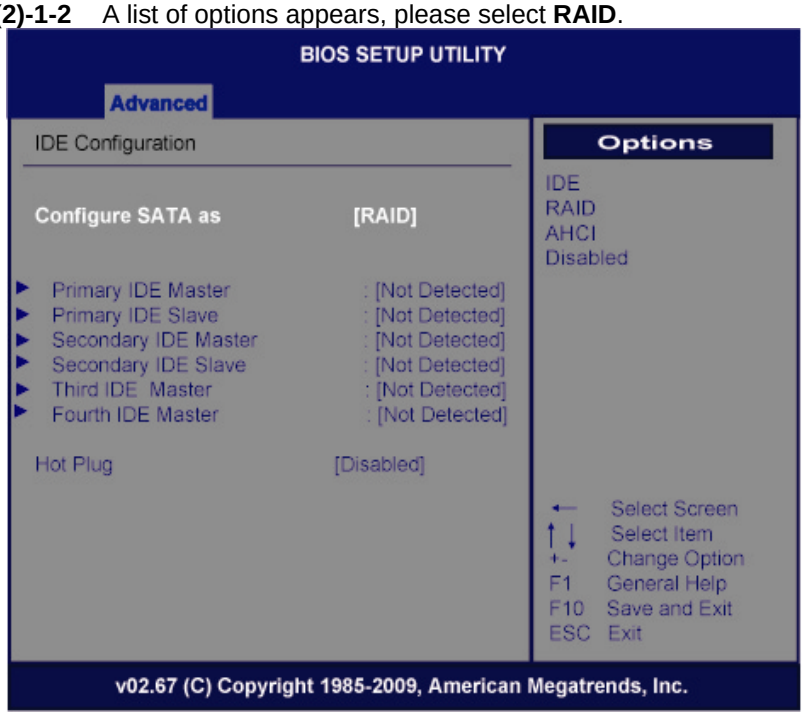
**(1) Installing SATA hard drive(s) in your system**
Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to available SATA port(s) on the board. Then, connect the power connector of power supply to the hard drive.

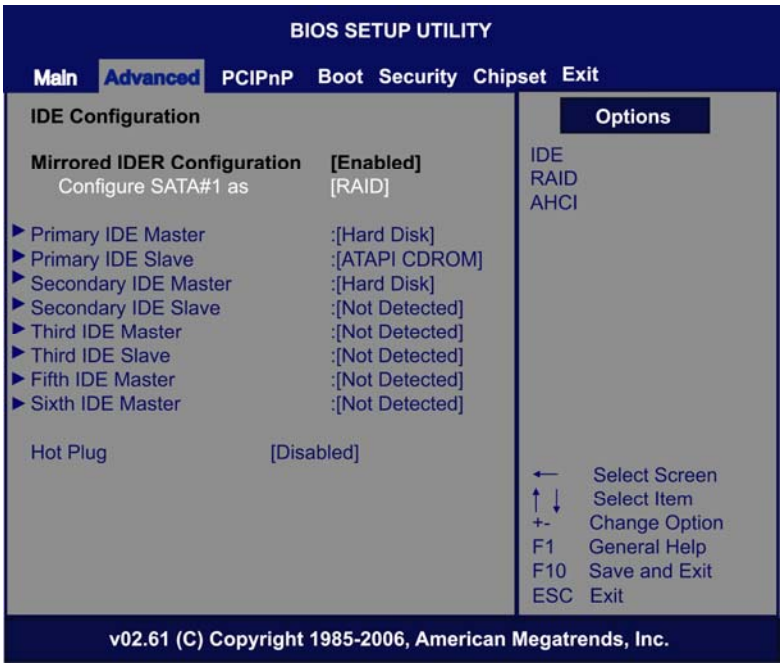
**(2) Configuring SATA controller mode and boot sequence by the BIOS Setup**
You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and set up BIOS boot sequence for the SATA hard drive(s).

**(2)-1-1** Turn on your system, and then press the Del button to enter BIOS Setup during running POST (Power-On Self Test). If you want to create RAID, just go to the Advanced Settings menu/IDE configuration, select the **Configure SATA#1 as**, and press <Enter> for more options.

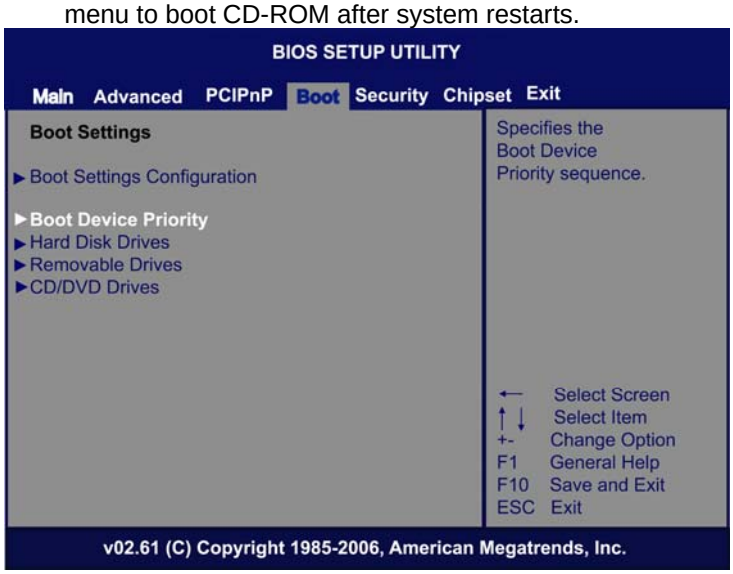


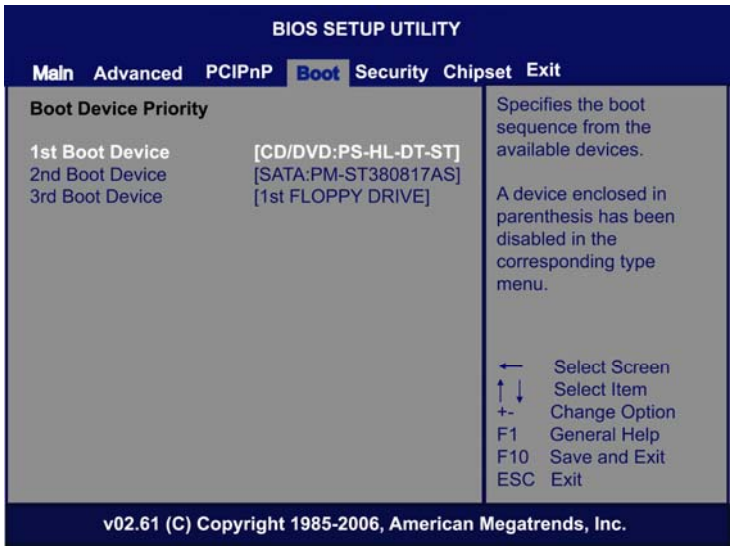
**(2)-1-2** A list of options appears, please select **RAID**.




BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
IDE Configuration
Mirrored IDER Configuration [Enabled]
Configure SATA#1 as [RAID]
Primary IDE Master :[Hard Disk]
Primary IDE Slave :[ATAPI CDROM]
Secondary IDE Master :[Hard Disk]
Secondary IDE Slave :[Not Detected]
Third IDE Master :[Not Detected]
Third IDE Slave :[Not Detected]
Fifth IDE Master :[Not Detected]
Sixth IDE Master :[Not Detected]
Hot Plug [Disabled]
Options
IDE
RAID
AHCI
Select Screen
Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.

**(2)-2** Set **CDROM** for **First Boot Device** under the **Boot Settings** menu to boot CD-ROM after system restarts.



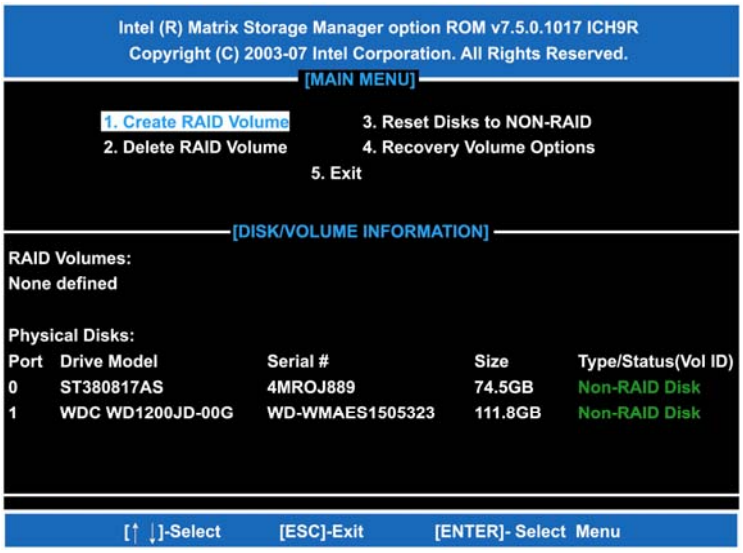



**(2)-3** Save and exit the BIOS Setup.

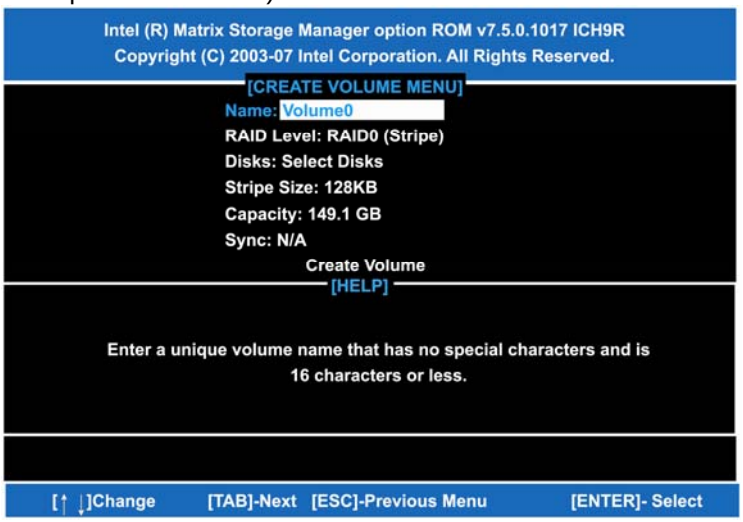
**(3) Configuring RAID by the RAID BIOS**
Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed to Section 4 if you do not want to create a RAID.

**(3)-1** After the POST memory testing and before the operating system booting, a message "*Press <Ctrl-I> to enter Configuration Utility*" shows up, accordingly, press <CTRL+ I> to enter the RAID BIOS setup utility.

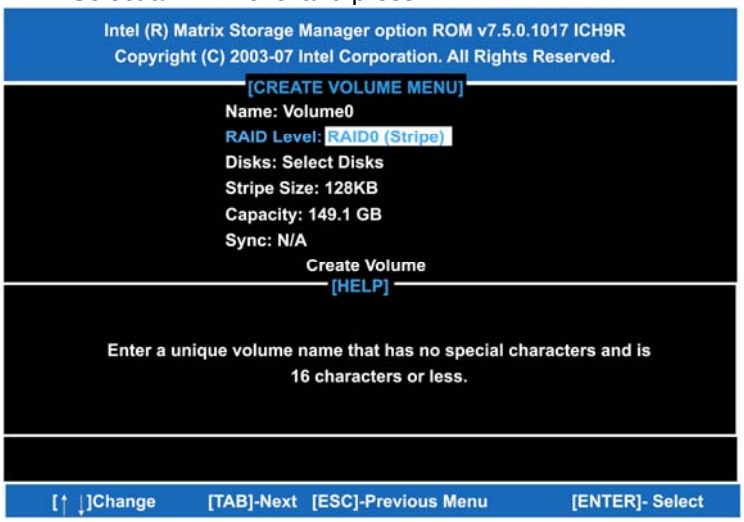

**(3)-2** After you press <CTRL+ I>, the **Create RAID Volume** screen will appear. If you want to create a RAID array, select the **Create RAID Volume** option in the Main Menu and press ENTER.


Intel (R) Matrix Storage Manager option ROM v7.5.0.1017 ICH9R
Copyright (C) 2003-07 Intel Corporation. All Rights Reserved.
[MAIN MENU]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to NON-RAID
4. Recovery Volume Options
5. Exit
[DISK/VOLUME INFORMATION]
RAID Volumes:
None defined
Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
0 ST380817AS 4MROJ889 74.5GB Non-RAID Disk
1 WDC WD1200JD-00G WD-WMAES1505323 111.8GB Non-RAID Disk
[↑ ↓]-Select [ESC]-Exit [ENTER]- Select Menu

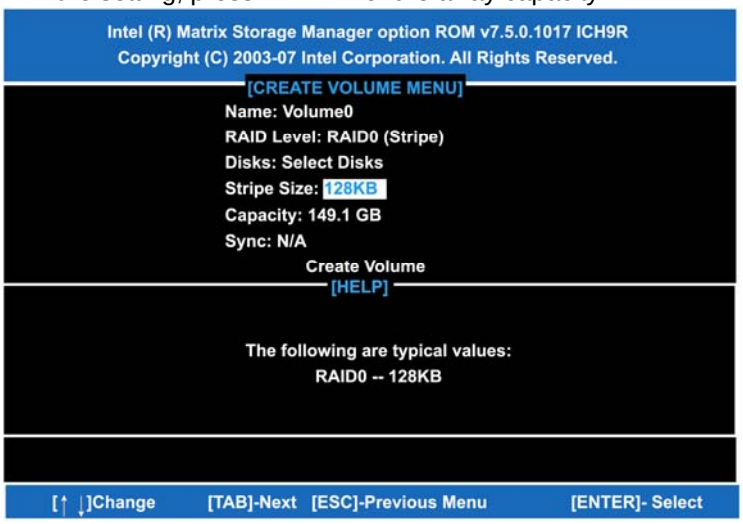
**(3)-3-1** After entering the **CREATE VOLUME MENU** screen, you can type the disk array name with 1~16 letters (letters cannot be special characters) in the item "Name".



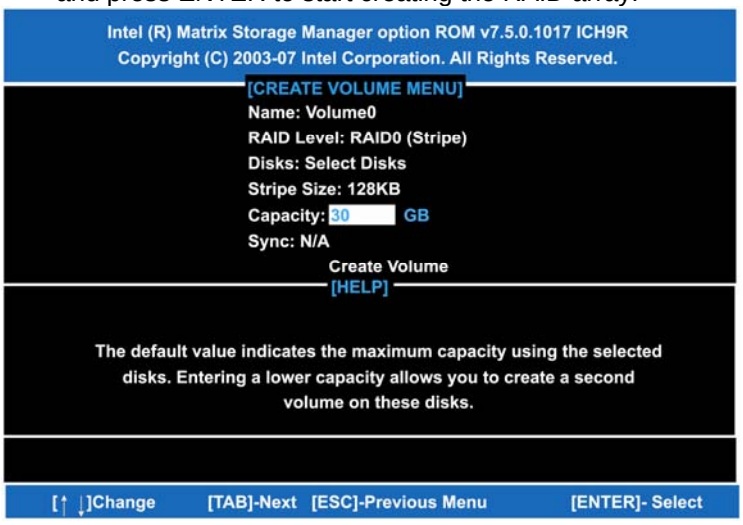

**(3)-3-2** When finished, press ENTER to select a RAID level. There are three RAID levels, RAID0, RAID1 and RAID5 & RAID10. Select a RAID level and press ENTER.



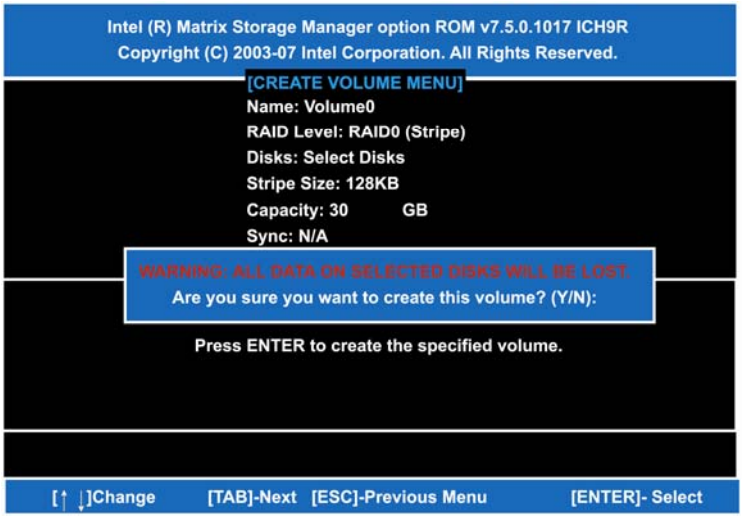
**(3)-4** Set the stripe block size. The *KB* is the standard unit of stripe block size. The stripe block size can be 4KB to 128KB. After the setting, press ENTER for the array capacity.



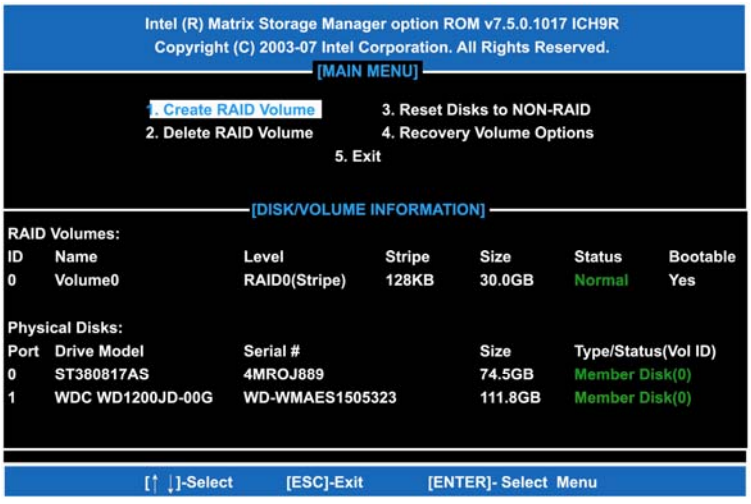

**(3)-5** After setting all the items on the menu, select **Create Volume** and press ENTER to start creating the RAID array.



**(3)-6** When prompting the confirmation, press "*Y*" to create this volume, or "*N*" to cancel the creation.

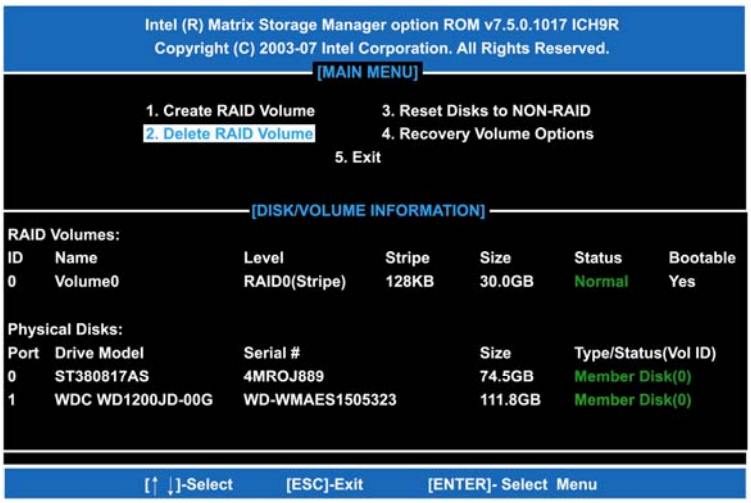



After the creation is completed, you can see detailed information about the RAID Array in the DISK/VOLUME INFORMATION section, including RAID mode, disk block size, disk name, and disk capacity, etc.



**Delete RAID Volume**

If you want to delete a RAID volume, select the **Delete RAID Volume** option in Main Menu. Press ENTER and follow on-screen instructions.




Please press [ESC] to exit the RAID BIOS utility.

Now, you can proceed to install a SATA driver controller and the operating system.

**(4) Making a SATA Driver Disk**

To install the operating system onto a serial ATA hard disk successfully, you need to install the SATA controller driver during the OS installation. Without the driver, the hard disk may not be recognized during the Windows setup process. First of all, please format a blank floppy disk. Secondly, follow up these steps below to produce a SATA driver disk.

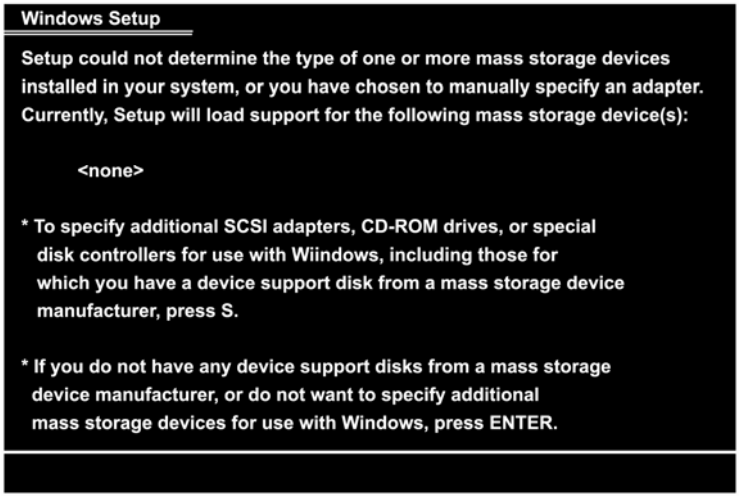
Users can insert the Driver CD and the formatted blank floppy disk in another system. And then, please copy all of file of the f6flpy32 folder in the Driver CD to a floppy disk.

***Note*** *Please copy all of file of the f6flpy64 folder, if installing 64-bit Windows Operating System.*

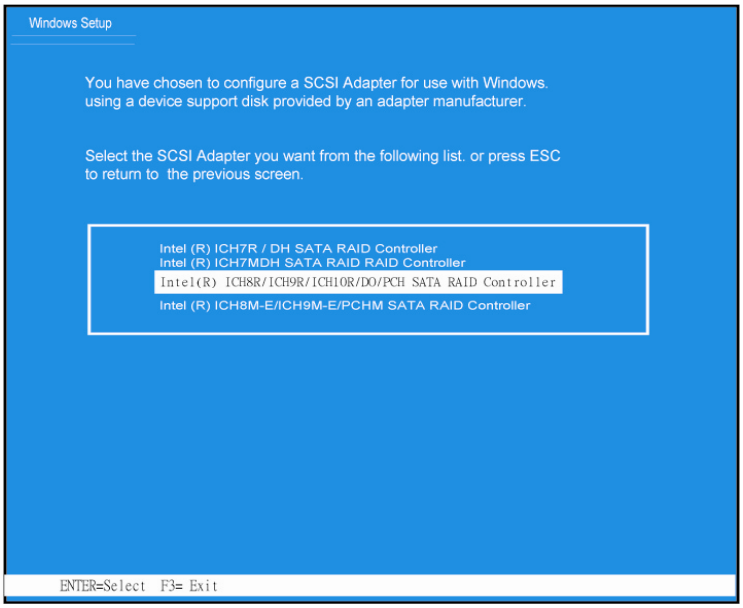
**(5) Installing the SATA controller driver during the OS installation**
Now, the SATA driver disk is ready, and BIOS settings configured, you can proceed to install Windows 2000/XP onto your SATA hard drive using the SATA driver. Here is an example for Windows XP installation.

**(5)-1** Restart your system to boot the Windows 2000/XP Setup disk, and press F6 button as soon as you see the message "*Press F6 if you need to install a 3rd party SCSI or RAID driver*". After pressing the F6 button, there will be a few moments for some files being loaded before next screen appears.

**(5)-2** When you see the screen below, insert the floppy disk containing the SATA driver and press "*S*".




**(5)-3** If the Setup correctly recognizes the driver of the floppy disk, a controller menu will appear below. Use the ARROW keys to select **Intel® ICH8R/ICH9R/ICH10R/DO/PCH SATA RAID Controller** and press ENTER**.** Then it will begin to load the SATA driver from the floppy disk.




***Note*** *If a message on the screen saying that one or some file(s) cannot be found, please check the floppy disk or copy the correct SATA driver again from the driver CD.*

# APPENDIX D

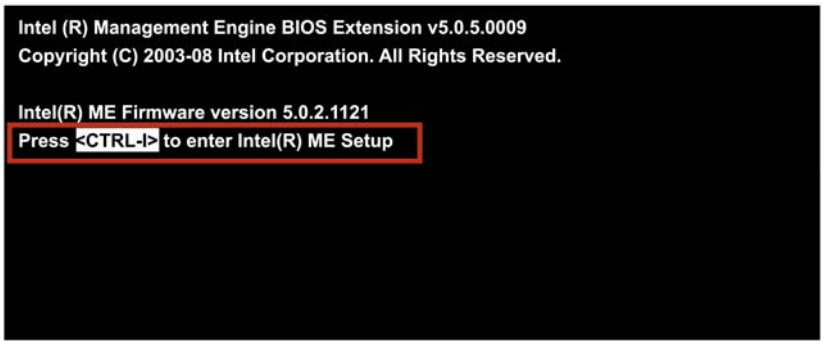
# iAMT SETTINGS

The Intel® Active Management Technology (Intel® iAMT) has decreased a major barrier to IT efficiency that uses built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.
In order to utilize Intel iAMT you must enter the ME BIOS (CTRL + P during system startup), change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

## D.1 Entering MEBx

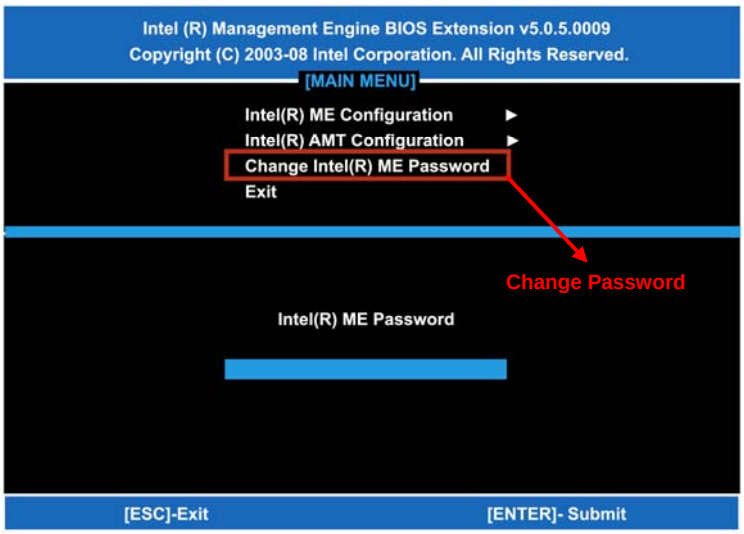
1. You must go to BIOS TO start iAMT function.
2. Exit from BIOS after starting iAMT, and press Ctrl+P to enter MEBx Setting.

***It is better to press Ctrl+P before the screen popping out.***

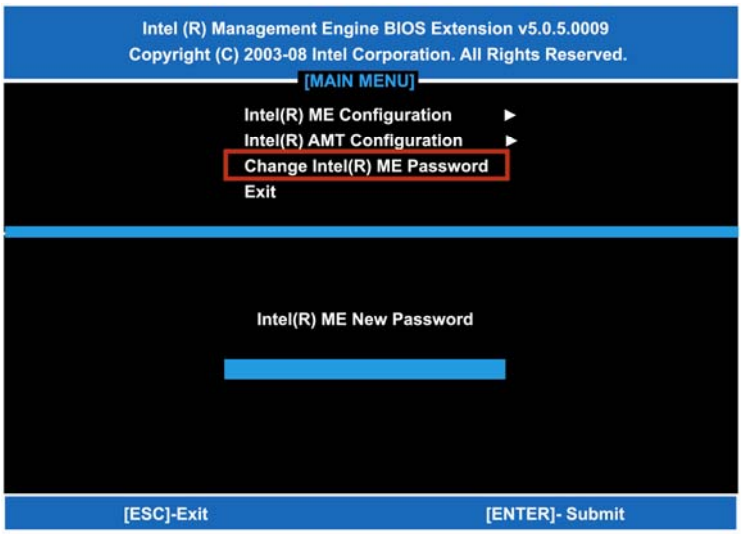


## D.2 Set & Change Password

1. You will be asked to set a password when first log in. The default password is 'admin'.




2. You will be asked to change the password before setting ME.



3. You must confirm your new password while revising. (as ***Remark 1***)

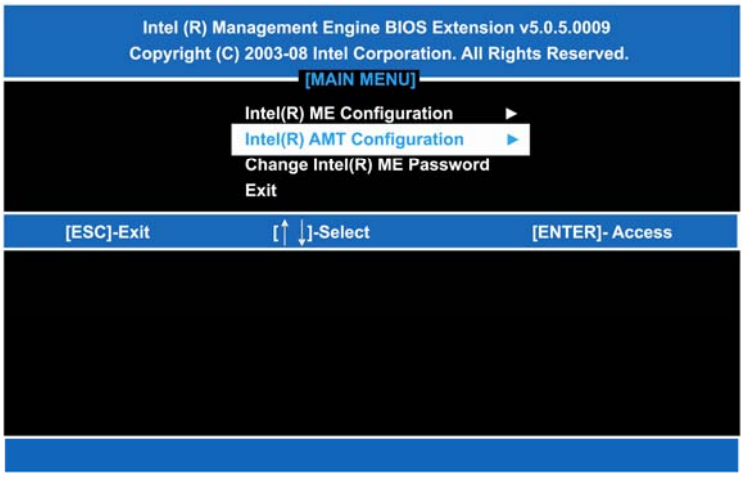
***Remark 1*** The new password must contain:
(example: **!!11qqQQ**) (default value)

- Eight characters
- One upper case
- One lower case
- One number
- One special symbol, such as **!** 、**$** or **;** ,
  (、**"** , excepted)

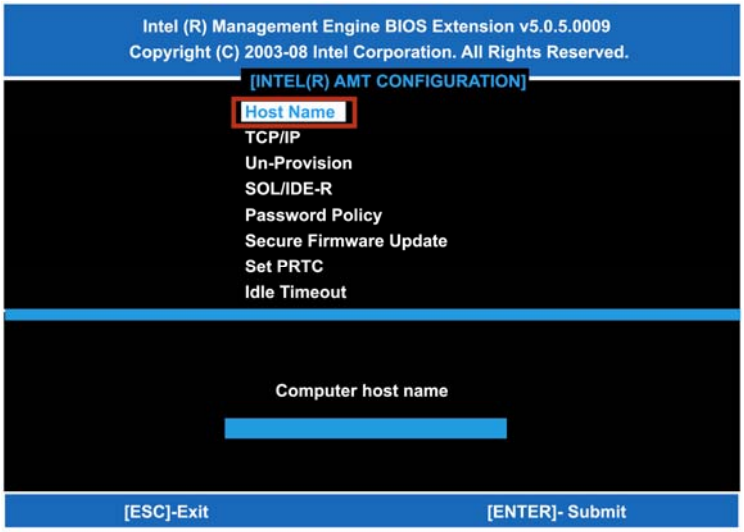
Underline ( _ ) and space are valid characters for password, but they won't make higher complexity.

## D.3 Intel® iAMT Settings

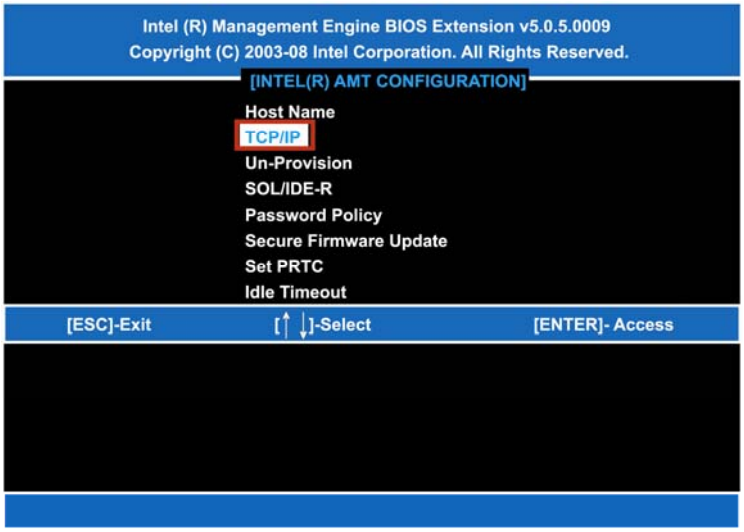
1. Select Intel® iAMT Configuration and press <ENTER>.



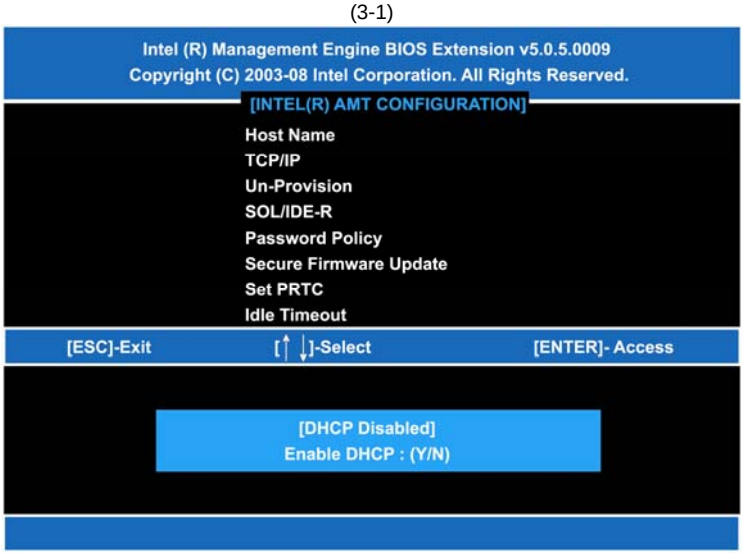

2. Key in the Host Name. If Intel® iAMT set to '***DHCP***', the Host name must be identical to the operating system mechanic.



3. Select TCP/IP to get into Network interface, and set it to '***ENABLED***'; into DHCP Mode, and set it to '***DISABLED***' (as ***Remark 2***) ; into Domain name, and set the Intel Management Engine domain name, such as '***AMT.intel.com***'.



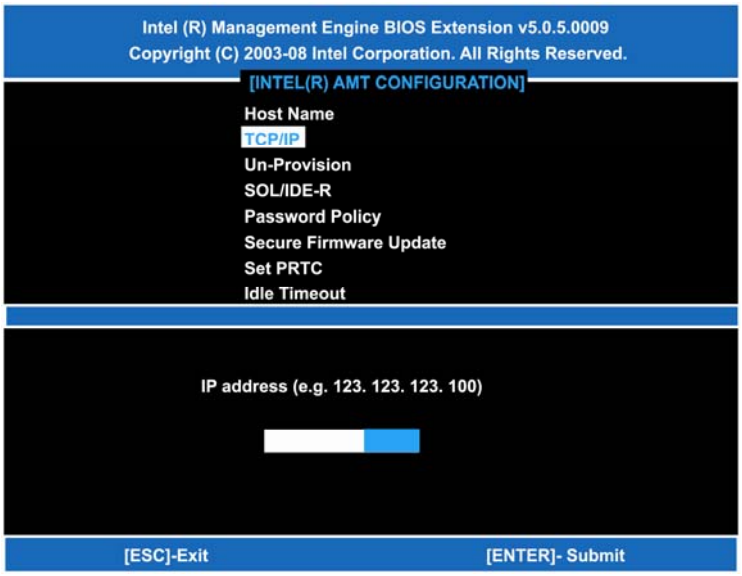

(3-1)



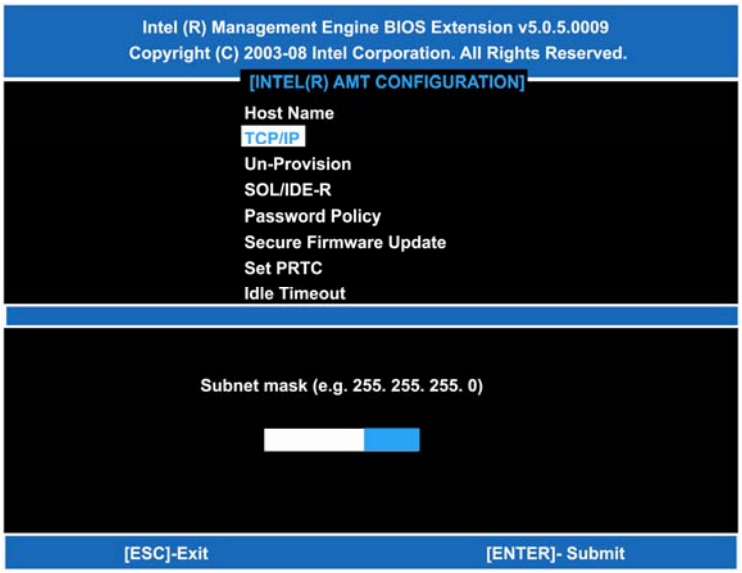

(3-2)

***Remark 2*** DHCP Mode '***DISABLED***': if DHCP Mode is disabled, you can make the following settings:

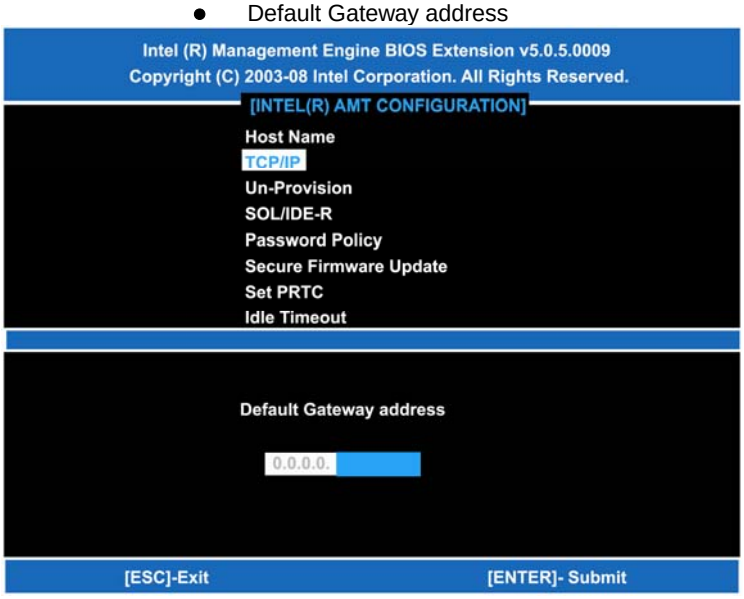
- IP address



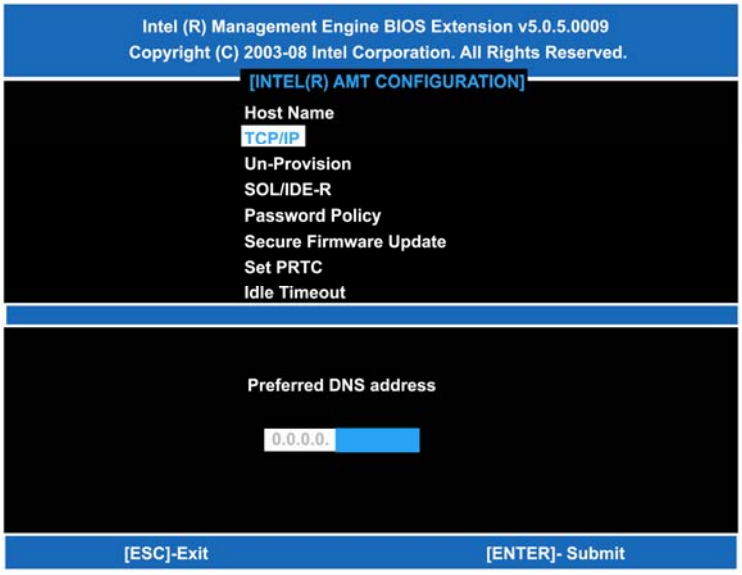

- Subnet mask



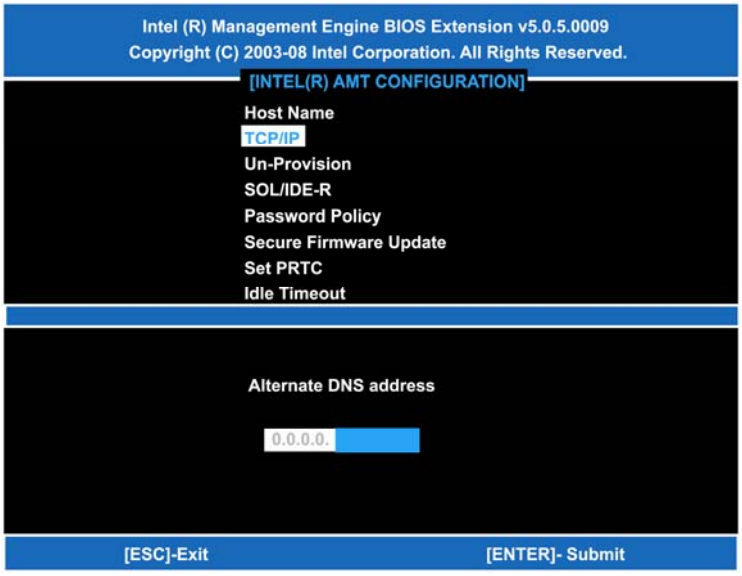
- Default Gateway address



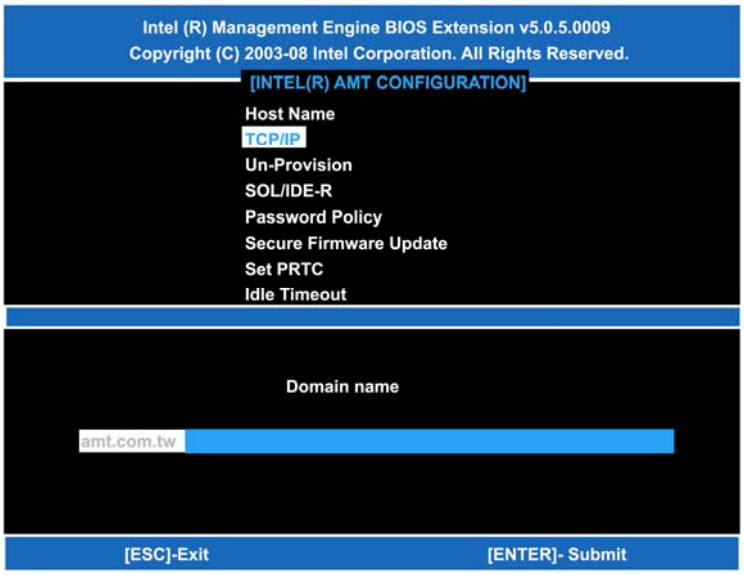

- Preferred DNS address



Alternate DNS address



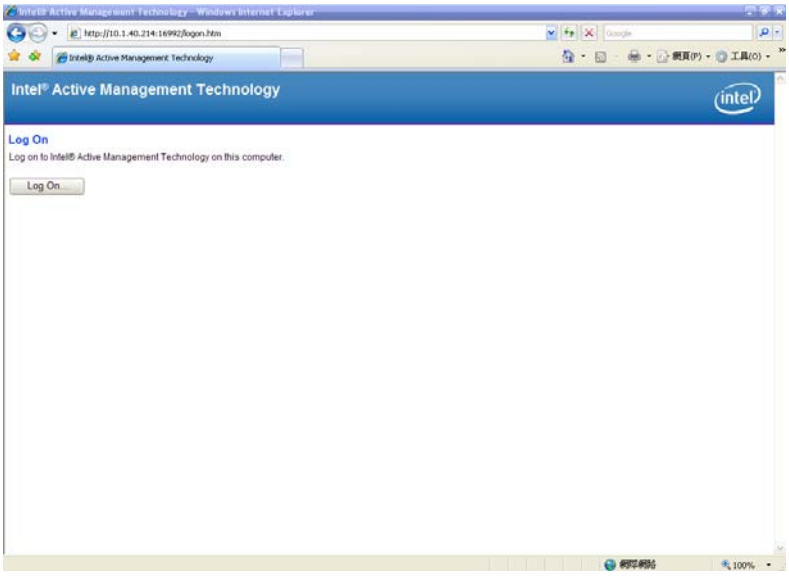

- Domain name




4. Exit from MEBx after completing the iAMT settings.

## D.4 iAMT Web Console

1. From a web browser, please type http://(IP ADDRESS):16992, which connects to iAMT Web.
   Example: http://10.1.40.214:16992

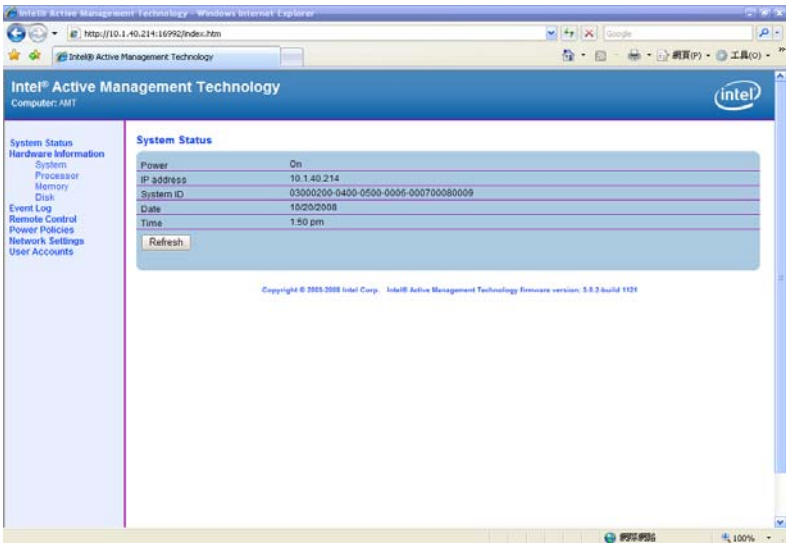



2. To log on, you will be required to type in username and password for access to the Web.

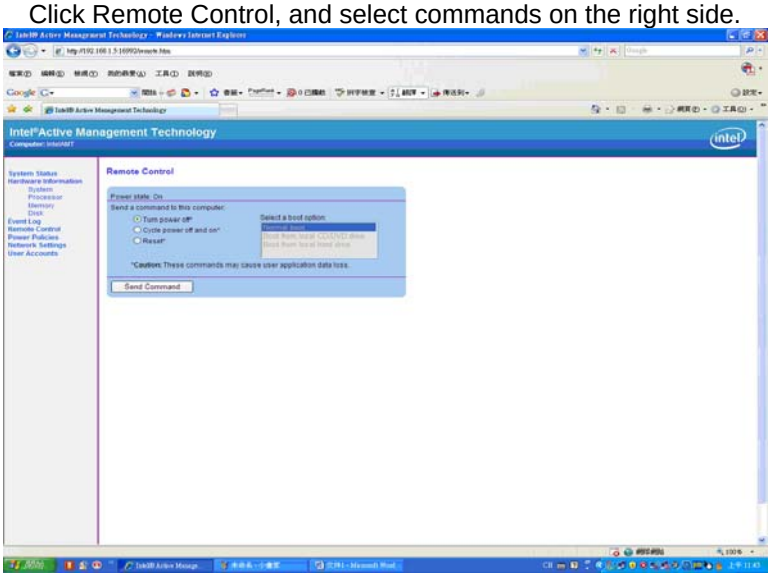
   USER: admin (default value)

   PASS: (MEBx password)

3. Enter the iAMT Web.




4. Click Remote Control, and select commands on the right side.




5. When you have finished using the iAMT Web console, close the Web browser.

# APPENDIX E

# PICMG v1.3 INTERFACE DEFINITION

| x16 PCIe Connector A | | | x16 PCIe Connector C | | |
|---|---|---|---|---|---|
| | Side B | Side A | | Side B | Side A |
| 1 | N.C | N.C | 1 | USB0P | GND |
| 2 | GND | GND | 2 | USB0N | GND |
| 3 | N.C | N.C | 3 | GND | USB1P |
| 4 | N.C | N.C | 4 | GND | USB1N |
| 5 | N.C | WAKE# | 5 | USB2P | GND |
| 6 | PWRBT# | PME# | 6 | USB2N | GND |
| 7 | PWRGD | PSON# | 7 | GND | USB3P |
| 8 | SHB_RST# | PERST# | 8 | GND | USB3N |
| 9 | CFG0 | CFG1 | 9 | USBOC0# | GND |
| 10 | CFG2 | CFG3 | 10 | GND | USBOC1# |
| 11 | RSVD | GND | 11 | USBOC2# | GND |
| Mechanical Key | | | | | |
| 12 | GND | N.C | 12 | GND | USBOC3# |
| 13 | b_PETp0 | GND | 13 | N.C | GND |
| 14 | b_PETn0 | GND | 14 | N.C | GND |
| 15 | GND | b_PERp0 | 15 | GND | N.C |
| 16 | GND | b_PERn0 | 16 | GND | N.C |
| 17 | b_PETp1 | GND | 17 | N.C | GND |
| 18 | b_PETn1 | GND | 18 | N.C | GND |
| 19 | GND | b_PERp1 | 19 | GND | N.C |
| 20 | GND | b_PERn1 | 20 | GND | N.C |
| 21 | b_PETp2 | GND | 21 | N.C | GND |
| 22 | b_PETn2 | GND | 22 | N.C | GND |
| 23 | GND | b_PERp2 | 23 | GND | N.C |
| 24 | GND | b_PERn2 | 24 | GND | N.C |
| 25 | b_PETp3 | GND | 25 | N.C | GND |
| 26 | b_PETn3 | GND | 26 | N.C | GND |
| 27 | GND | b_PERp3 | 27 | GND | N.C |
| 28 | GND | b_PERn3 | 28 | GND | N.C |

| Mechanical Key | | | | | |
|---|---|---|---|---|---|
| 29 | REFCLK0+ | GND | 29 | N.C | GND |
| 30 | REFCLK0- | GND | 30 | N.C | GND |
| 31 | GND | REFCLK1+ | 31 | N.C | N.C |
| 32 | RSVD | REFCLK1- | 32 | N.C | N.C |
| 33 | REFCLK2+ | GND | 33 | N.C | N.C |
| 34 | REFCLK2- | GND | 34 | N.C | GND |
| 35 | GND | REFCLK3+ | 35 | N.C | GND |
| 36 | RSVD | REFCLK3- | 36 | GND | N.C |
| 37 | REFCLK4+ | GND | 37 | GND | N.C |
| 38 | REFCLK4- | GND | 38 | N.C | GND |
| 39 | GND | N.C | 39 | N.C | GND |
| 40 | RSVD | N.C | 40 | GND | N.C |
| 41 | N.C | GND | 41 | GND | N.C |
| 42 | N.C | GND | 42 | +3.3V | +3.3V |
| 43 | GND | N.C | 43 | +3.3V | +3.3V |
| 44 | GND | N.C | 44 | +3.3V | +3.3V |
| 45 | a_PETp0 | GND | 45 | +3.3V | +3.3V |
| 46 | a_PETn0 | GND | 46 | +3.3V | +3.3V |
| 47 | GND | a_PERp0 | 47 | +3.3V | +3.3V |
| 48 | GND | a_PERn0 | 48 | +3.3V | +3.3V |
| 49 | a_PETp1 | GND | 49 | +3.3V | +3.3V |
| 50 | a_PETn1 | GND | 50 | +3.3V | +3.3V |
| 51 | GND | a_PERp1 | 51 | GND | GND |
| 52 | GND | a_PERn1 | 52 | GND | GND |
| 53 | a_PETp2 | GND | 53 | GND | GND |
| 54 | a_PETn2 | GND | 54 | GND | GND |
| 55 | GND | a_PERp2 | 55 | GND | GND |
| 56 | GND | a_PERn2 | 56 | GND | GND |
| 57 | a_PETp3 | GND | 57 | GND | GND |
| 58 | a_PETn3 | GND | 58 | GND | GND |
| 59 | GND | a_PERp3 | 59 | +5V | +5V |
| 60 | GND | a_PERn3 | 60 | +5V | +5V |
| 61 | a_PETp4 | GND | 61 | +5V | +5V |
| 62 | a_PETn4 | GND | 62 | +5V | +5V |
| 63 | GND | a_PERp4 | 63 | GND | GND |

| Mechanical Key | | | | | |
|---|---|---|---|---|---|
| 64 | GND | a_PERn4 | 64 | GND | GND |
| 65 | a_PETp5 | GND | 65 | GND | GND |
| 66 | a_PETn5 | GND | 66 | GND | GND |
| 67 | GND | a_PERp5 | 67 | GND | GND |
| 68 | GND | a_PERn5 | 68 | GND | GND |
| 69 | a_PETp6 | GND | 69 | GND | GND |
| 70 | a_PETn6 | GND | 70 | GND | GND |
| 71 | GND | a_PERp6 | 71 | GND | GND |
| 72 | GND | a_PERn6 | 72 | GND | GND |
| 73 | a_PETp7 | GND | 73 | +12V | +12V |
| 74 | a_PETn7 | GND | 74 | +12V | +12V |
| 75 | GND | a_PERp7 | 75 | +12V | +12V |
| 76 | GND | a_PERn7 | 76 | +12V | +12V |
| 77 | N.C | GND | 77 | +12V | +12V |
| 78 | +3.3V | +3.3V | 78 | +12V | +12V |
| 79 | +3.3V | +3.3V | 79 | +12V | +12V |
| 80 | +3.3V | +3.3V | 80 | +12V | +12V |
| 81 | +3.3V | +3.3V | 81 | +12V | +12V |
| 82 | RSVD | RSVD | 82 | +12V | +12V |
| **X8 PCIe Connector B** | | | **X8 PCIe Connector D** | | |
| | **Side B** | **Side A** | | **Side B** | **Side A** |
| 1 | +5Vaux | +5Vaux | 1 | INTB# | INTA# |
| 2 | GND | N.C | 2 | INTD# | INTC# |
| 3 | a_PETp8 | GND | 3 | GND | N.C |
| 4 | a_PETn8 | GND | 4 | REQ3# | GNT3# |
| 5 | GND | a_PERp8 | 5 | REQ2# | GNT2# |
| 6 | GND | a_PERn8 | 6 | PCI_RST# | GNT1# |
| 7 | a_PETp9 | GND | 7 | REQ1# | GNT0# |
| 8 | a_PETn9 | GND | 8 | REQ0# | SERR# |
| 9 | GND | a_PERp9 | 9 | N.C | +3.3V |
| 10 | GND | a_PERn9 | 10 | GND | N.C |
| 11 | N.C | GND | 11 | N.C | GND |

| Mechanical Key | | | | | |
|---|---|---|---|---|---|
| 12 | GND | N.C | 12 | CLKC | CLKD |
| 13 | a_PETp10 | GND | 13 | GND | +3.3V |
| 14 | a_PETn10 | GND | 14 | CLKA | CLKB |
| 15 | GND | a_PERp10 | 15 | +3.3V | GND |
| 16 | GND | a_PERn10 | 16 | AD31 | GND |
| 17 | a_PETp11 | GND | 17 | AD29 | +3.3V |
| 18 | a_PETn11 | GND | 18 | N.C | AD30 |
| 19 | GND | a_PERp11 | 19 | AD27 | AD28 |
| 20 | GND | a_PERn11 | 20 | AD25 | GND |
| 21 | a_PETp12 | GND | 21 | GND | AD26 |
| 22 | a_PETn12 | GND | 22 | C/BE3# | AD24 |
| 23 | GND | a_PERp12 | 23 | AD23 | +3.3V |
| 24 | GND | a_PERn12 | 24 | GND | AD22 |
| 25 | a_PETp13 | GND | 25 | AD21 | AD20 |
| 26 | a_PETn13 | GND | 26 | AD19 | N.C |
| 27 | GND | a_PERp13 | 27 | +5V | AD18 |
| 28 | GND | a_PERn13 | 28 | AD17 | AD16 |
| 29 | a_PETp14 | GND | 29 | C/BE2# | GND |
| 30 | a_PETn14 | GND | 30 | PCI_PRST# | FRAME# |
| 31 | GND | a_PERp14 | 31 | IRDY# | TRDY# |
| 32 | GND | a_PERn14 | 32 | DEVSEL# | +5V |
| 33 | a_PETp15 | GND | 33 | LOCK# | STOP# |
| 34 | a_PETn15 | GND | 34 | PERR# | GND |
| 35 | GND | a_PERp15 | 35 | GND | C/BE1# |
| 36 | GND | a_PERn15 | 36 | PAR | AD14 |
| 37 | N.C | GND | 37 | N.C | GND |
| 38 | N.C | N.C | 38 | GND | AD12 |
| 39 | GND | GND | 39 | AD15 | AD10 |
| 40 | GND | GND | 40 | AD13 | GND |
| 41 | GND | GND | 41 | GND | AD09 |
| 42 | GND | GND | 42 | AD11 | C/BE0# |
| 43 | GND | GND | 43 | AD08 | GND |
| 44 | +12V | +12V | 44 | GND | AD06 |
| 45 | +12V | +12V | 45 | AD07 | AD05 |
| 46 | +12V | +12V | 46 | AD04 | GND |
| Mechanical Key | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 47 | +12V | +12V | 47 | GND | AD02 |
| **48** | +12V | +12V | 48 | AD03 | AD01 |
| 49 | +12V | +12V | 49 | AD00 | GND |

***Note*** *Please contact your vendor to get the backplane design guide if it's required. The backplane design guide is NDA required.*