User Manual

SIMB-M21

Intel® HM65 with Core™ i7/ i5/ i3/ Celeron Mini-ITX Motherboard

ADVANTECH

Enabling an Intelligent Planet

Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

The symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

Conventions used in this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This manual contains the following parts:

■ Chapter 1 and 2: Product introduction
This chapter describes the features of the motherboard and the new technology it supports. This chapter also lists the hardware setup procedures that you have to perform when installing system components. It includes description of the jumpers and connectors on the motherboard.

■ Chapter 3: BIOS setup
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. Advanetch websites
The Advantech website provides updated information on Advantech hardware and software products. Refer to the Advantech contact information. www.advantech.com.tw

1. Optional documentation
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions Used in This Guide

To make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

Warning! *Information to prevent injury to yourself when trying to complete a task.*

Caution! *CAUTION: Information to prevent damage to the components when trying to complete a task.*

Important! Instructions that you MUST follow to complete a task.

Note! Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select
Italics	Used to emphasize a word or a phrase
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: <Ctrl>+<Alt>+<D>
Command	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets. Example: At the DOS prompt, type the command line: afudos /i[filename] afudos /iP5P800VM.ROM

Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x SIMB-M21 Mini ITX main board
- 1 x CD ROM per carton, which contains the followings:
  - User's Manual in PDF file
  - Drivers
- 1 x SATA cable kit (SATA/Power)
- 1 x I/O Shield
- 1 x Startup Manual per carton

If any of the above items is damaged or missing, please contact your retailer.

Contents

Chapter 3 BIOS Setup 37

Chapter 1

Product Overview

1.1 Specifications Summary

1.1.1 System

- **CPU:** Supports Intel rPGA988 Socket (Socket G2) Intel Mobile Core i7/ i5/ i3 CPU
- **BIOS:** AMI 64Mb SPI
- **System Chipset:** Intel® HM65
- **I/O Chipset:** Nuvoton NCT6776F
- **Memory:** Two 204-pin SODIMM support up to 16GB dual channel DDR3 1066/ 1333, up to 16GB
- **Watchdog Timer:** Reset: 1 to 255 sec/min per step
- **H/W Status Monitor:** Monitoring temperature, voltage and cooling fan status. Auto throttling control when CPU overheats.
- **Expansion Slots:** 1 PCI-E x16, 1 Mini PCI-E x 1, 1 CFast Card Connector
- **Power State:** S1, S3, S4, S5
- **Wake up on LAN or Ring:** LAN (WOL) and Ring (WO)
- **Smart Fan Control:** Yes
- **Smart Fan Control:** Supports 3 modes (Silent/Optimal/Performance)

1.1.2 Display

- **Chipset:** Intel® GMA HD 2000/ 3000 supports DirectX 10.1, OpenGL 3.0
- **Display Memory:** Shared Memory, up to 1.7GB
- **Dual Display:** VGA + LVDS, VGA + DisplayPort, VGA + HDMI, DisplayPort + HDMI, LVDS + HDMI, LVDS + DisplayPort
- **VGA:** Onboard, supports max resolution 2048 x 1536
- **HDMI:** Onboard HDMI 1.3, supports max resolution 1920 x 1080
- **Display Port:** Onboard, supports max resolution 2560 x 1600
- **LVDS:** Onboard dual channel 24-bit LVDS supports max resolution 1600 x 1200
- **LVDS Backlight:** Yes, through internal LVDS Backlight Connector

1.1.3 Audio

- **Audio Codec:** Realtek ALC892, 5.1 Channel HD Audio
- **Audio Interface:** Line-in, Line-out, Mic-in, Front Audio Header

1.1.4 TPM

- **TPM:** Infineon SLB9635 supports TPM 1.2

1.1.5 Ethernet

- **LAN1:** Intel 82579LM
- **LAN2:** Intel 82583V

1.1.6 I/O Port

Back Panel:

- 1 x VGA Port,
- 1 x HDMI Port,
- 1 x DisplayPort,
- 1 x COM RS-232 Port
- 4 x USB 2.0/1.1 Ports,

- 2 x LAN RJ45 Ports,
- 1 x Audio I/O (3 Jacks)

Internal I/O:

- 3 x USB Connectors supports 6 USB Ports,
- 3 x COM RS-232 Connectors with 5V/ 12V Power,
- 5 x SATA Connectors (2 SATA 3.0, 3 SATA II),
- 1 x Front Panel Connector,
- 1x Front Audio,
- 1 x CPU Fan Connector (3-pin),
- 1 x System Fan Connector (3-pin),
- 1 x LVDS (2 x 20-pin),
- 1 x LVDS Backlight Power Connector,
- 1 x Clear CMOS Jumper (3-pin),
- 1 x GPIO

1.1.7 Mechanical & Environmental

Power Requirement	+12V (4.86A), +5V (1.28A), +3.3V (1.05A), -12V (0.41A), 5VSB (0.36A)
Power Type	ATX (supports AT Mode)
Power Connector	1 x 20-pin ATX Power Connector, 1 x 4-pin ATX 12V Power Connector
Operating Temperature	0° C to 50° C (32° F to 122° F)
Operating Humidity	0% to 90% relative humidity, non-condensing
Size (L x W)	6.69" x 6.69" (170 x 170mm)
Weight	1.03 lbs (0.47 Kg)

* Specifications are subject to change without notice.

1.2 Block Diagram
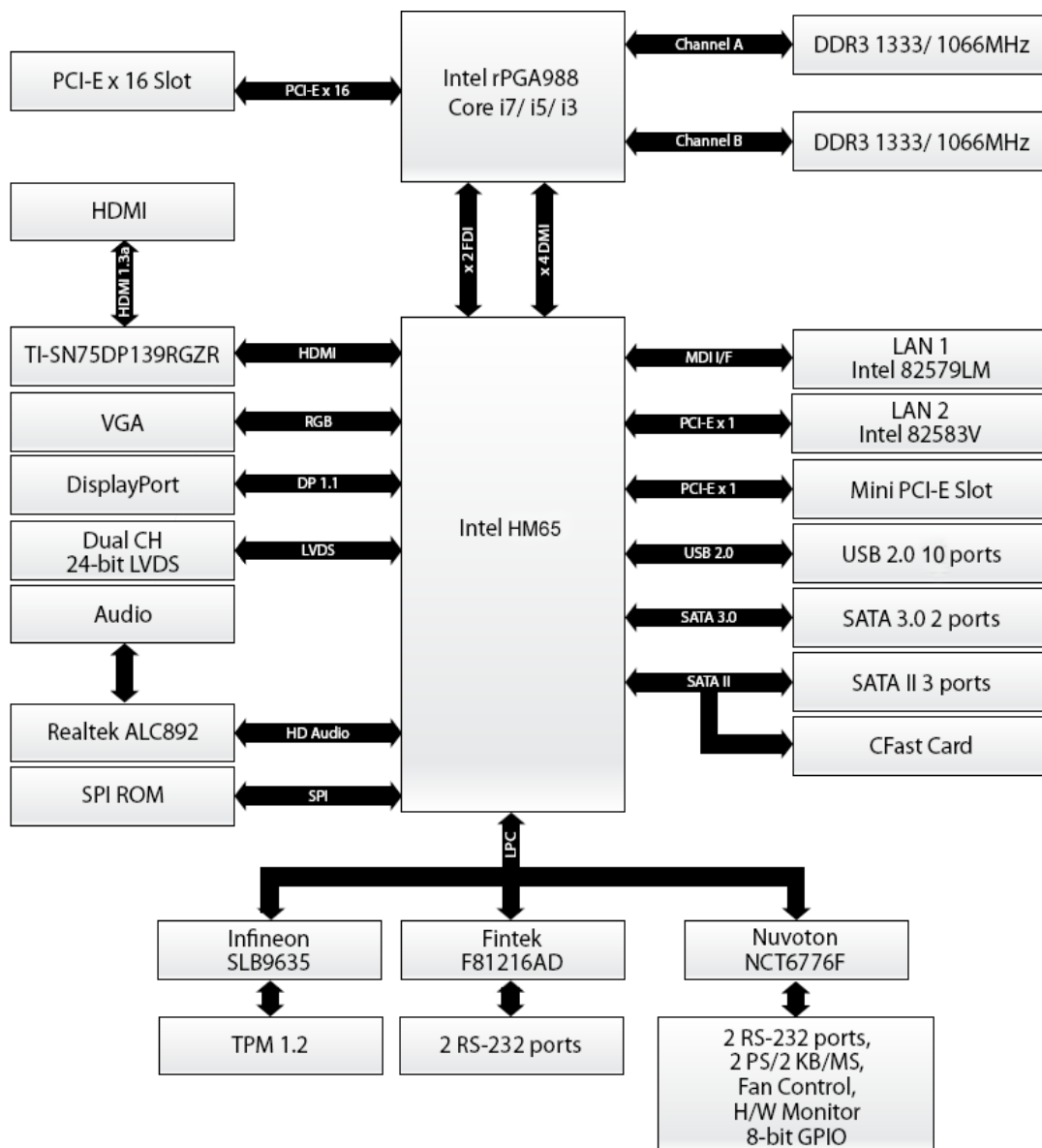
Figure 1.1 Block Diagram

Chapter 2

Product Introduction

2.1 Product highlights

2.1.1 Product Overview

SIMB-M21 supports the latest Intel rPGA998 CPU-socket interface processor, the 2nd Generation Intel® Core i3, i5, i7, Celeron mobile processors which are built on 32 nm technologies to provide smart performance and responsiveness. SIMB-M21 has 2 SATAIII and 2 SATAII connects, and also has integrated 5.1-channel HD Audio and dual Gigabit LAN.

2.1.2 Platform Features and Benefits

- Integrated Gfx (Intel® HD Graphics 3000/2000) with enhanced operating modes to enable excellent graphics performance in power and cost sensitive embedded applications
- DirectX® 10.1 & Open GL 3.0 for awesome graphics performance, stunning 3D visual effects and dynamic interactivity
- Memory support: low voltage DDR3
- Operating system support:
  - Microsoft
  - WindRiver
  - Redhat
  - Novell
  - Green Hills
  - QNX
  - LinuxWorks

2.1.3 Key Architecture Features

- Supports Intel LGA 1155 CPU, the 2nd Generation Intel Core i3, i5, i7 desktop processors.
  - 32nm monolithic die
  - Integrated Gfx (Intel? HD Graphics 3000/2000) & memory controller
  - 4 &2 Cores, up to 6MB LLC
  - HW accelerated video CODECs
  - Compatible with high speed DDR3-1333
  - PCIe* (CPU): Gen 2.0, 5GT/s, up to 20 lanes (4 ctls)**
  - TDP: 17W-45W (Low Power), 65W-95W (Scalable)
- Intel Turbo Boost Technology
  - More efficient power sharing between CPU and Graphics
- Intel Hyper-Threading Technology
- Intel Advanced Vector Extensions (Intel? AVX)
- Intel AES-New Instructions
- Integrated Display Interfaces
  - Dual Independent Display Support
  - HDMI
  - DisplayPort
  - Analog VGA
  - LVDS
- Intel HD Graphics 3000/2000
  - DirectX 10.1
  - Improved realism for DX 3D applications. Improved rendering.

- – OpenGL 3.0
- – Improved realism for OGL 3D based application
- – UVD (Unified Video Decoder) 2.01
  Hardware decode of most common HD codecs (MPEG-2, H.264/AVC
  MPEG-4 and VC-1)
- – Supports ATI Hybrid CrossFireX Technology
- ◼ Intel Quick Sync Video
  - – Enables faster and higher quality video editing, recording and sharing
- ◼ TPM
  - – Support TPM 1.2
- ◼ I/O
  - – PCI Express x 16 Gen 2 5GT/s
  - – Mini PCI Express x 1Gen 2 5GT/s
  - – CFast connector SATA II interface
  - – Five SATA ports (2 port of Gen 2.0 and 3 ports of Gen 3.0)
  - – Gigabit Ethernet Media Access Controller (GbE MAC)
    IPv4 and IPv6 Checksum Offload
  - – High Definition Audio
  - – USB: Gen 2.0, up to 10 ports
  - – SMBus 2.0
  - – LPC Bus
    Supports SPI devices
  - – Hardware Monitor
    Fan control (Voltage, Temp)
    Watchdog timer

2.2 Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

Caution! ◼ *Unplug the power cord from the wall socket before touching any component.*

◼ *Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity*

◼ *Hold components by the edges to avoid touching the ICs on them.*

◼ *Whenever you uninstall any component, place it on a grounded anti-static pad or in the bag that came with the component.*

◼ Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

2.3 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Warning! *Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.*

2.3.1 Placement Direction

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.3.2 Screw Holes

Attach the four (4) screws into the holes indicated by the red circles to secure the motherboard to the chassis.

Caution! *Do not over tighten the screws! Doing so can damage the motherboard.*
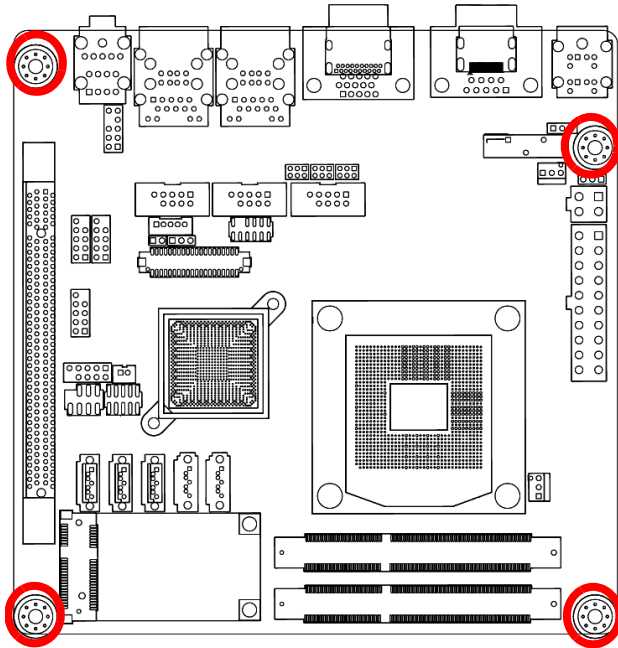
Place this side towards the rear of the chassis.

2.3.3 Motherboard Layout
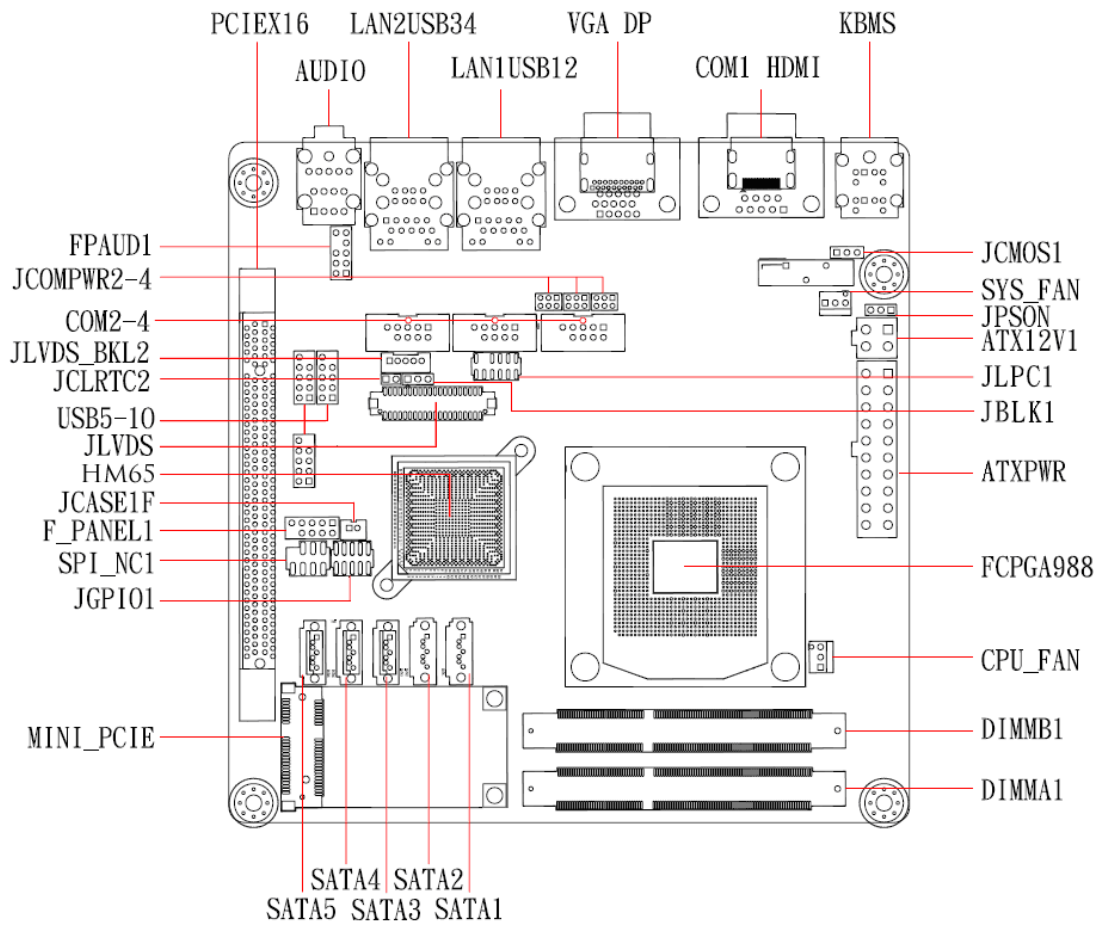
2.3.4 Layout Content List

Table 2.1: Slots & socket			
Label	Function	Note	Page
FCPGA988	FCPGA988 socket		
DIMMA1	204-pin DDR3 SO-DIMM Slot A1		23
DIMMB1	204-pin DDR3 SO-DIMM Slot B1		23
PCIEX16	PCI-e x16 Slot		26
MINI-PCIE	MINI PCI-e Slot		26
CFAST	Cfast Slot	Rear Side	

Table 2.2: Jumpers			
Label	Function	Note	Page
JCMOS1	Clear CMOS	3 x 1 header, pitch 2.54mm	27
PSON1	AT/ATX Mode Select	3 x 1 header, pitch 2.54mm	28
JBLK1	BL controller from SIO	3 x 1 header, pitch 2.54mm	
JCOMPWR3 JCOMPWR4 JCOMPWR5	COM3 COM4 COM5 RI/+5V/+12V Select	2 x 3 header, pitch 2.0 mm	

Table 2.3: Rear Panel Connector			
Label	**Function**	**Note**	**Page**
KBMS	PS/2 Keyboard and Mouse	6-pin Mini-Din	29
COM1	COM1 Connector	D-sub 9-pin, male	29
DP1	DisplayPort Connector	DisplayPort	
VGA1	VGA Port	D-sub 15-pin, female	29
HDMI1	HDMI Port	HDMI 1.3 19-pin	29
LAN1USB12	RJ-45 Ethernet Connector x 1 USB 2.0 Connector x 2		29
LAN2USB34	RJ-45 Ethernet Connector x 1 USB 2.0 Connector x 2		
Audio1	Audio Line-In , Line-Out , Mic.-In	5.1 Channel Audio I/O (3 jacks)	29

2.3.5 Internal Connector

Table 2.4: Internal Connector			
Label	**Function**	**Note**	**Page**
CPU_FAN1	CPU Fan Connector	3 x 1 wafer, pitch 2.54mm	26
SYS_FAN1	System Fan Connector	3 x 1 wafer, pitch 2.54mm	26
COM3 ~ 5	Serial Port Connector * 3	5 x 2 header, pitch 2.54mm	29
JGPIO	GPIO Connector	5 x 2 header, pitch 2.54mm	29
F_PANEL	Intel Front Panel connector	5 x 2 header, pitch 2.54mm	30
EATXPWR1	ATX power connectors	10 x 2 header	28
FPAUD1	Audio Mic.-In & Line-Out Connector	5 x 2 header, pitch 2.54mm	30
JLVDS	24-bit LVDS Connector	2 x 20 connector	
JLVDS_BKL2	LCD Inverter Connector	1 x 5 connector	
SPI	SPI Connector	4 x 2 header, pitch 2.54mm	32
SATA1 ~ 5	SATA Data Connector * 5	7P Male connector	33
USB45 USB89 USB1011	USB Connector * 6	5 x 2 header, pitch 2.54mm	35

2.4 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1155 socket designed for the Intel Core i7/ i5/ i3 processor in the 1155-land package.

Important! ■ *Your boxed Intel Core i7/ i5/ i3 Mobile processor package should come with installation instructions for the CPU, fan and heatsink assembly. If the instructions in this section do not match the CPU documentation, follow the latter.*

■ *Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/motherboard components. Advantech will shoulder the cost of repair only if the damage is shipment/transit-related.*

■ *Keep the cap after installing the motherboard. Advantech will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the FCPGA988 socket.*

■ *The product warranty does not cover damage to the socket pins resulting from incorrect CPU installation/removal, or misplacement/ loss/incorrect removal of the PnP cap.*

■ *Install the CPU fan and heatsink assembly before you install motherboard to the chassis.*

Caution! *If you purchased a separate CPU heatsink and fan assembly, make sure that you have properly applied Thermal Interface Material to the CPU heatsink or CPU before you install the heatsink and fan assembly.*

2.4.1 Installing the CPU

1. Locate the CPU socket on the motherboard.
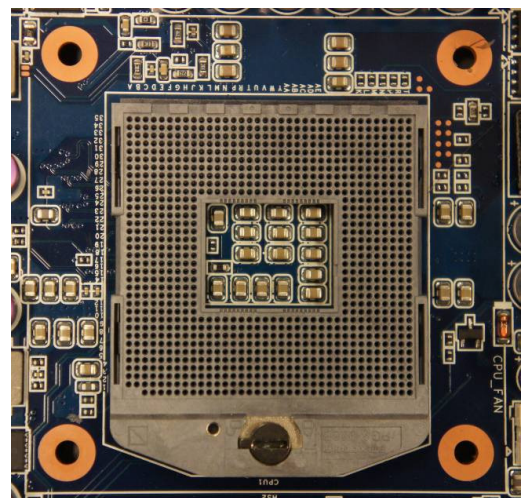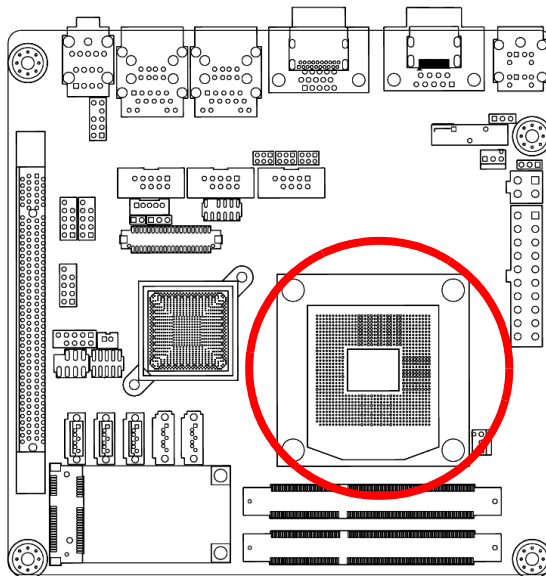
> **Caution!**   Before installing the CPU, make sure that the socket box is facing
> towards you and the load lever is on your left.

2.   Separate CPU cooler and its base first by screw drawer
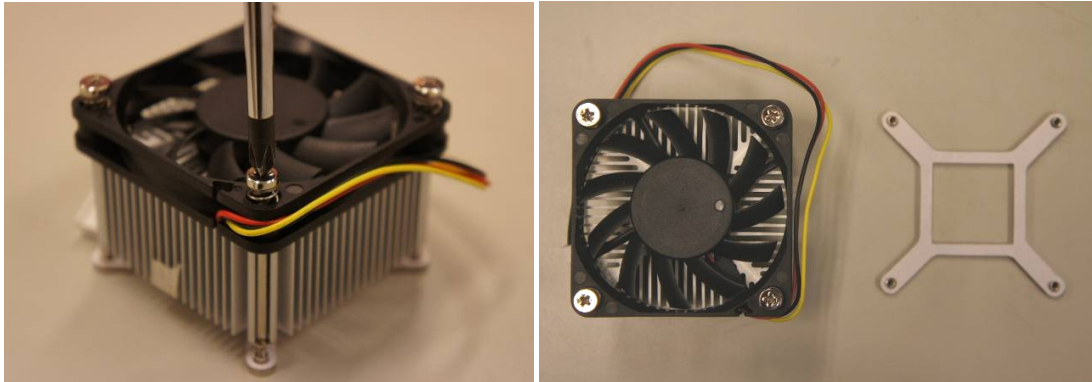
3.   Assemble the CPI FAN retention module
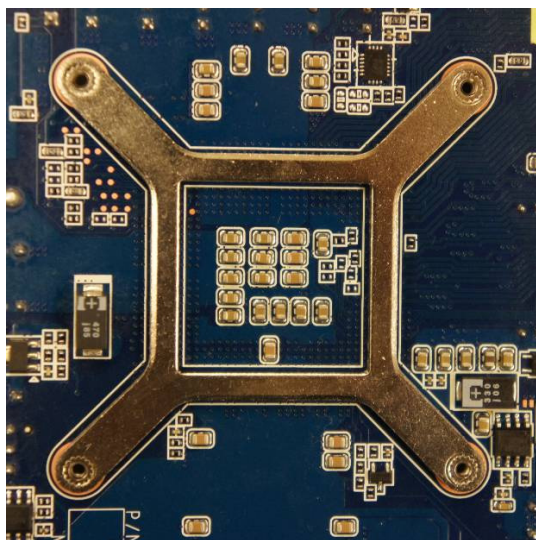
4. Position the CPU over the socket, making sure that the gold triangle is the same side as CPU Socket triangle.
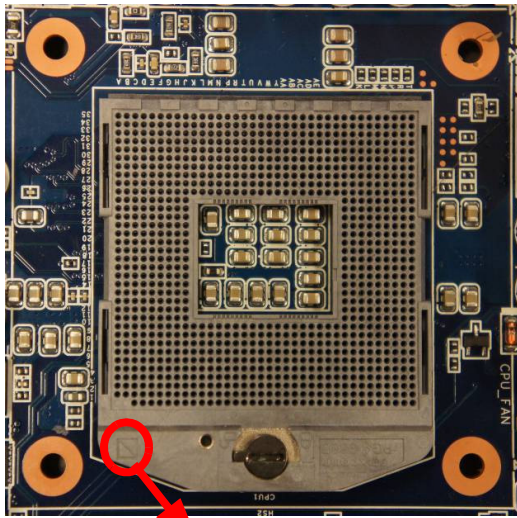
CPU Socket Triangle
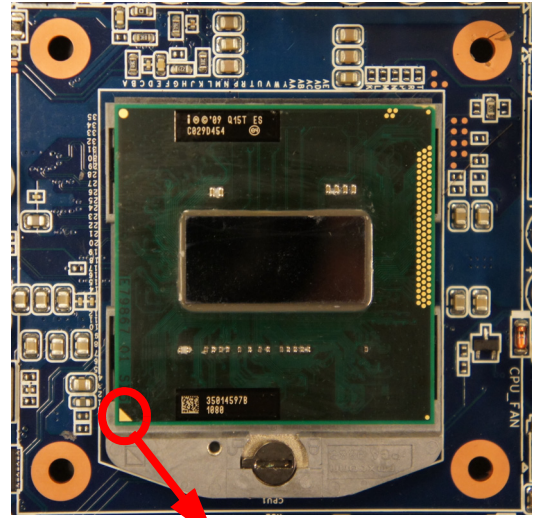
Gold Triangle

5. Turn the CPU lock clockwise to lock CUU
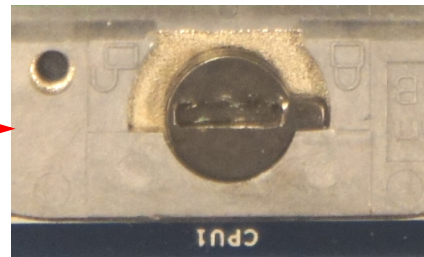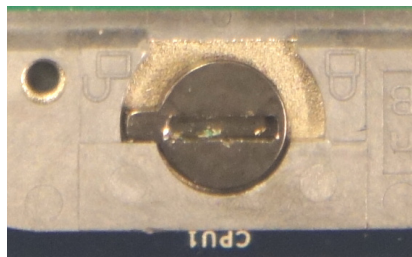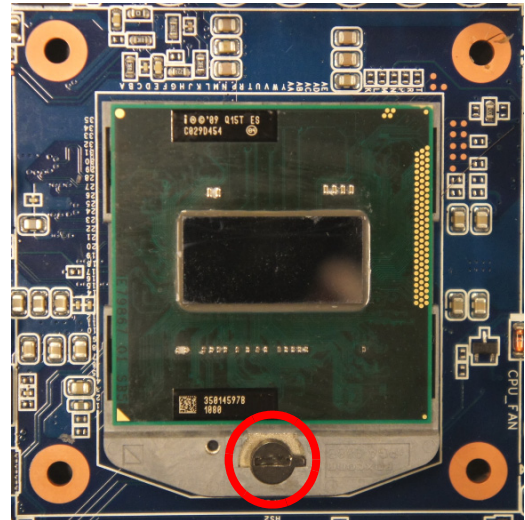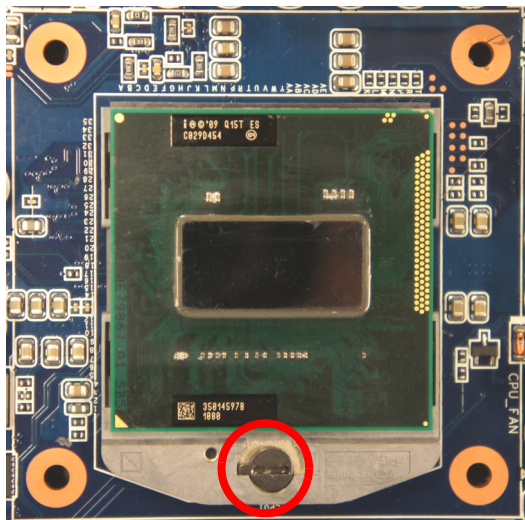
Caution! *The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!*

2.4.2 Installing the CPU Heatsink and Fan

1. Place the heatsink base on the relative bottom of motherboard.
2. Place the heatsink assembly on the top of the CPU, making sure that the four fasteners match the holes on the motherboard.
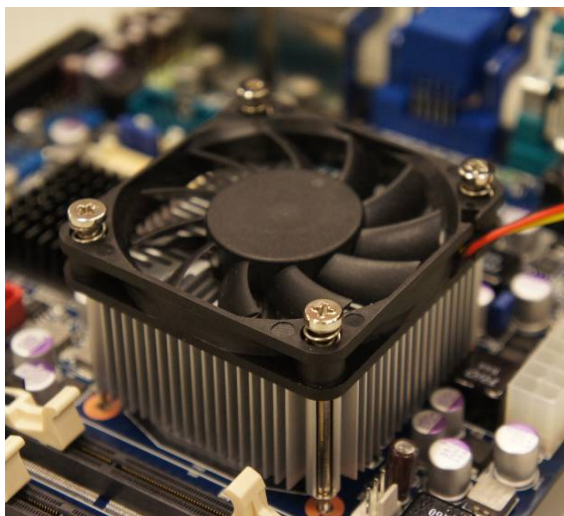
3. Screw tightly the four fasteners.

4. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.
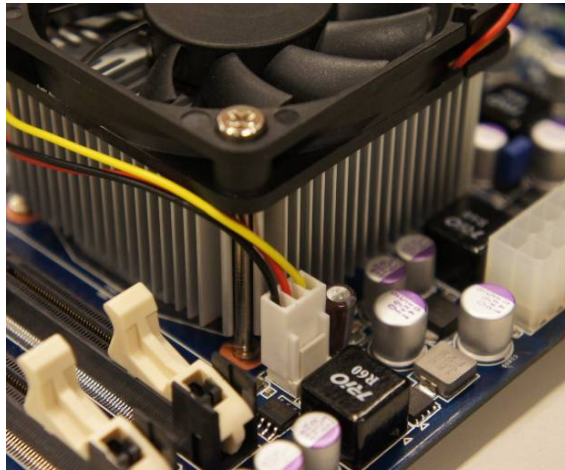
Important! *Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.*

2.5 System Memory

2.5.1 Overview

The motherboard comes with four 204-pin Double Data Rate 3 (DDR3) Small Outline Dual Inline Memory Modules (SO-DIMM) sockets.

A DDR3 module has the same physical dimensions as a DDR SO-DIMM but has a 204-pin footprint compared to the 204-pin DDR2 DIMM. DDR3 DIMMs are notched differently to prevent installation on a DDR2 DIMM socket. The following figure illustrates the location of the sockets:
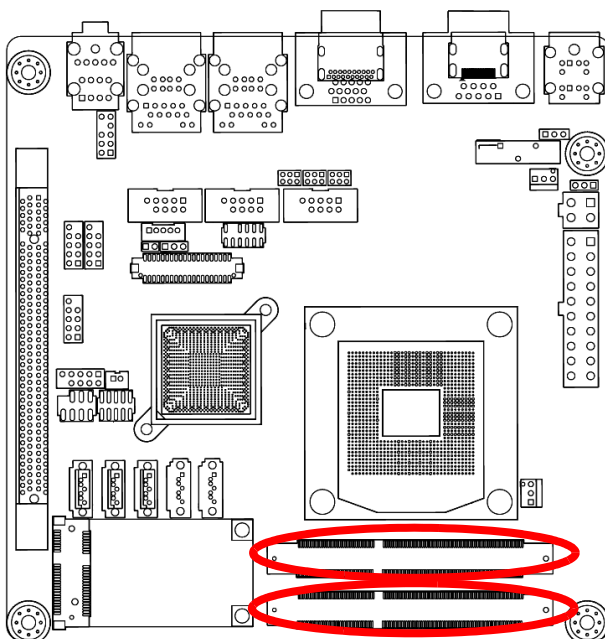
Table 2.5: 204-pin DDR3 DIMM sockets	
Channel	**Socket**
Channel A	DIMMA1
Channel B	DIMMB1

2.5.2 Memory Configurations

You may install 1 GB, 2 GB, and 4 GB unbuffered ECC or non-ECC DDR3 SO-DIMMs into the SO-DIMM sockets using the memory configurations in this section.

Important!

■ *If you installed four 1GB memory modules, the system may detect less than 3GB of total memory because of address space allocation for other critical functions. This limitation applies to Windows XP 32-bit version operating system since it does not support PAE (Physical Address Extension) mode.*

■ *If you install Windows XP 32-bit version operating system, we recommend that you install less than 3GB of total memory.*

■ *For dual-channel configuration, the total size of memory module(s) installed per channel must be the same for better performance (DIMMA1=DIMMB1).*

■ *Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Refer to the memory Qualified Vendors List on the next page for details.*

■ *Due to CPU limitation, DIMM modules with 128 Mb memory chips or double-sided x16 memory chips are not supported in this motherboard.*

2.5.3 Installing a SO-DIMM

1. Unlock a DIMM socket by pressing the retaining clips outward.
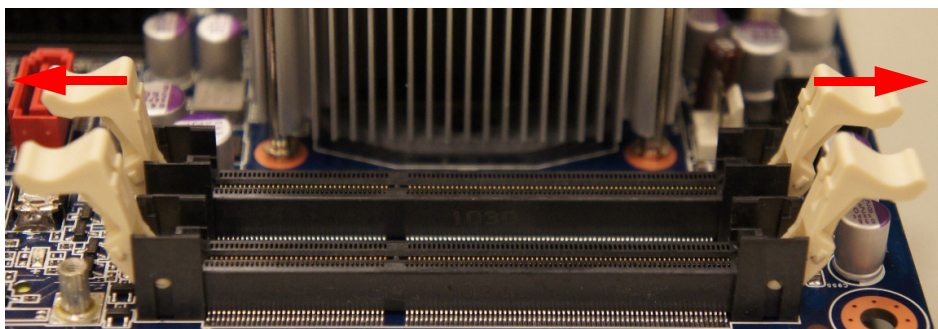
2. Align a SO-DIMM on the socket such that the notch on the SO-DIMM matches the break on the socket.

DDR3 SO-DIMM notch

Unlocked retaining clip
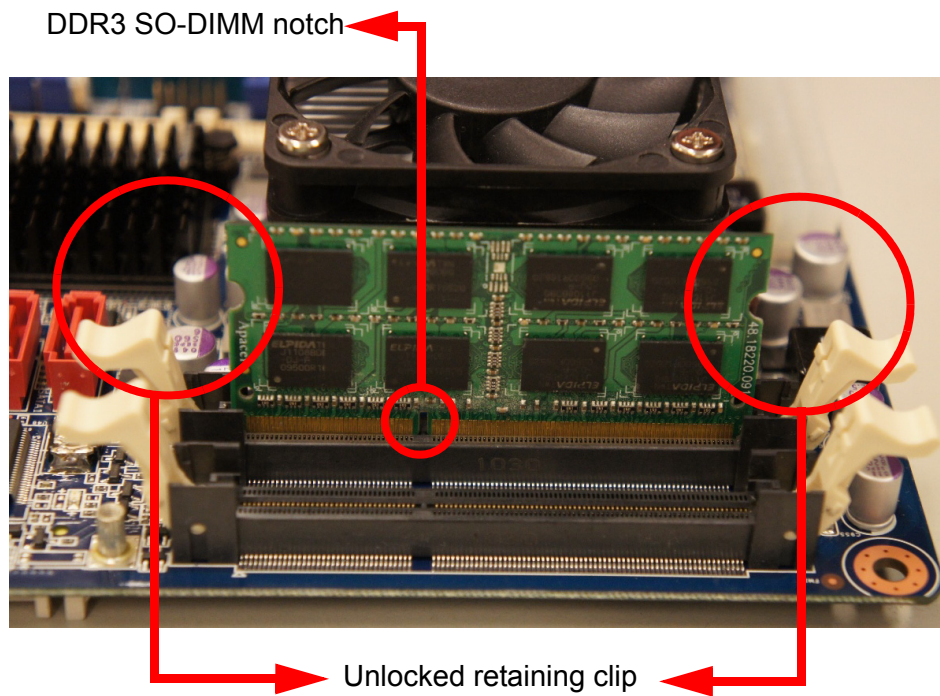
3. Firmly insert the SO-DIMM into the socket until the retaining clips snap back in place and the SO-DIMM is properly seated.

Locked retaining clip
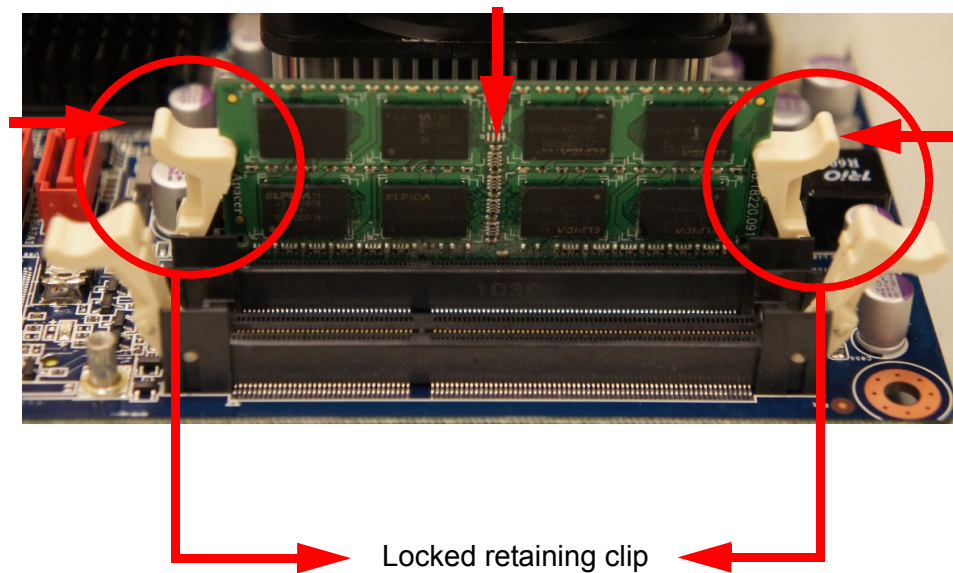
Important!

■ *A DDR3 SO-DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a SO-DIMM into a socket to avoid damaging the SO-DIMM.*

■ *The DDR3 SO-DIMM sockets do not support DDR SO-DIMMs. DO NOT install DDR2 SO-DIMMs to the DDR3 SO-DIMM socket.*

> *Caution!* *Make sure to unplug the power supply before adding or removing SO-DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.*

2.5.4 Removing a SO-DIMM

1. Simultaneously press the retaining clips downward to unlock the DIMM.
2. Remove the DIMM from the socket.

Unlocked retaining clip
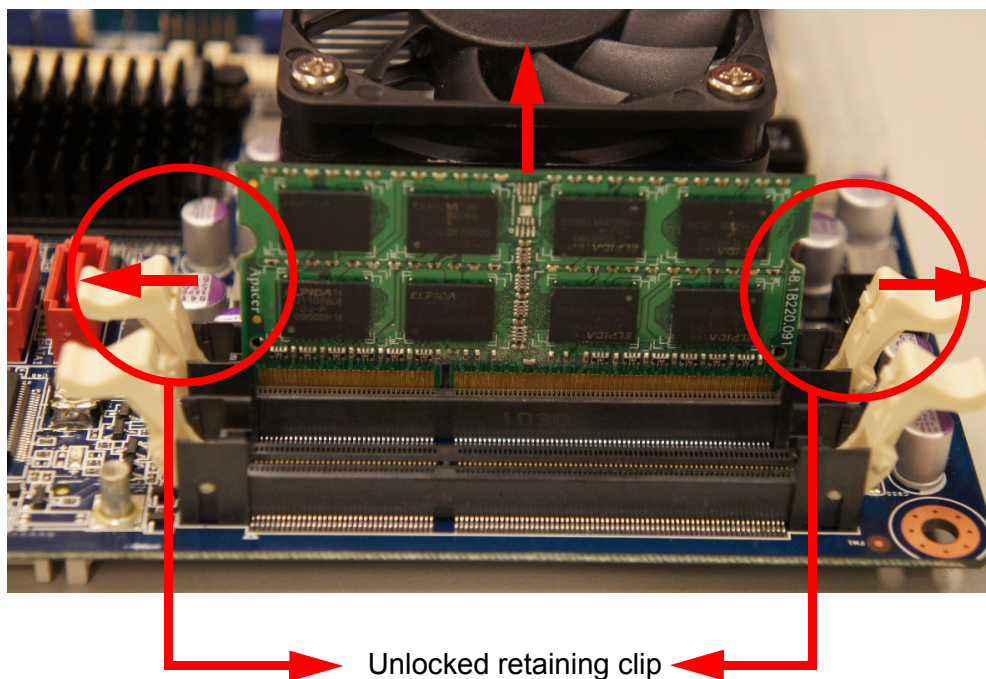
> *Note!* *Support the SO-DIMM lightly with your fingers when pressing the retaining clips. The SO-DIMM might get damaged when it flips out with extra force.*

2.6 Expansion Card

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.

> *Warning!* *Make sure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.*

2.6.1 Installing an Expansion Card

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.6.2 Configuring an Expansion Card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 2 for information on BIOS setup.
2. Assign an IRQ to the card if needed. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

2.6.3 PCI Express x16 slot

This motherboard supports one PCI Express x16. The following figure shows a graphics card installed on the PCI Express x16 slot.
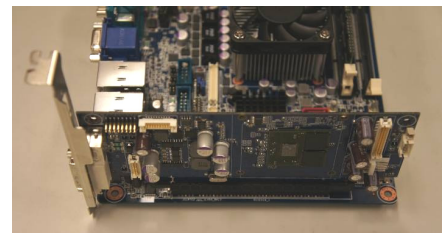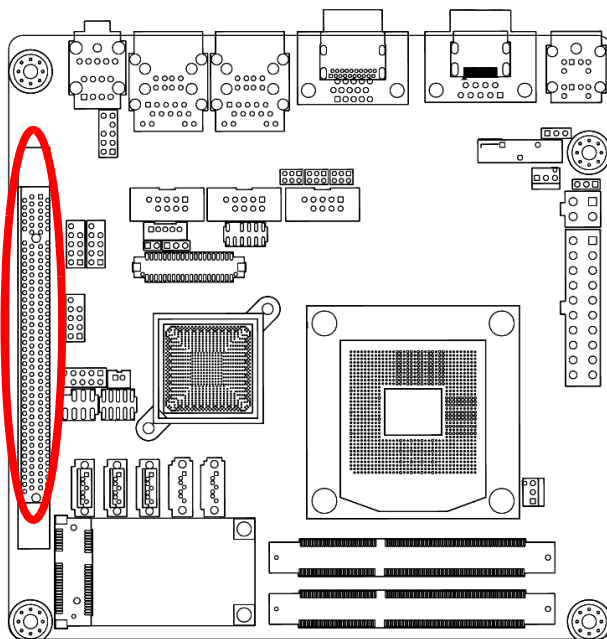
2.6.4 MINI PCI Express

This motherboard supports one MINI PCI Express. The following figure shows a Decode card installed on the MINI PCI Express slot.
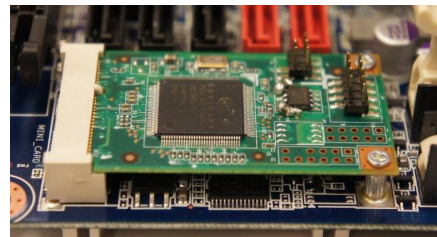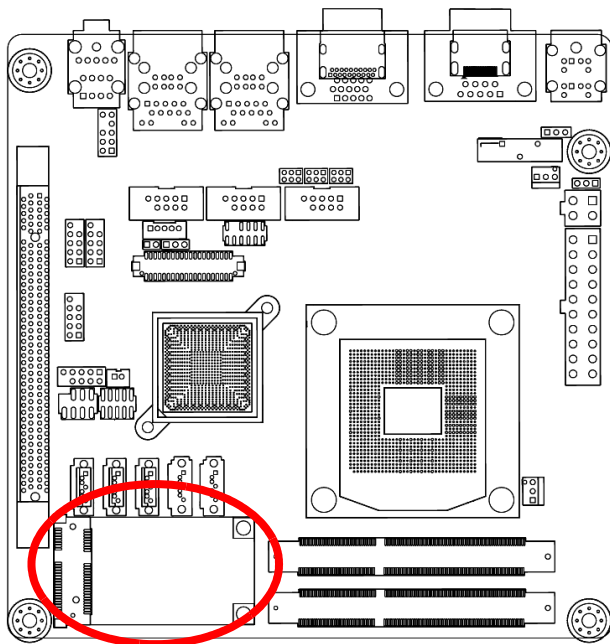
2.6.5 CFast Card

This motherboard supports one CFast Card connector and its location is on button side of MB. The following figure shows a CFast Card installed on the CFast Card connector.
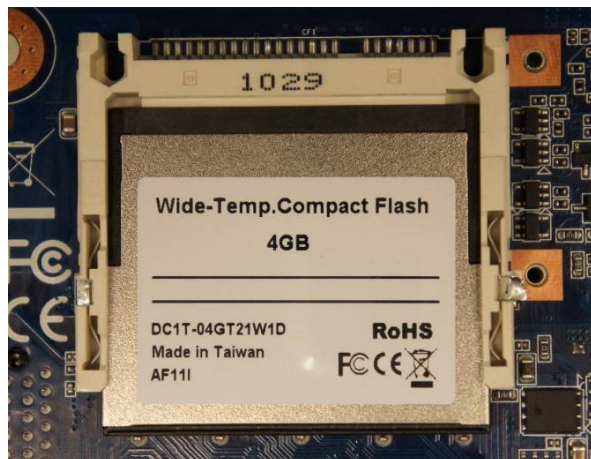
2.7 Jumpers

2.7.1 Clear CMOS (CMOS1)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

> **Caution!** *Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!*
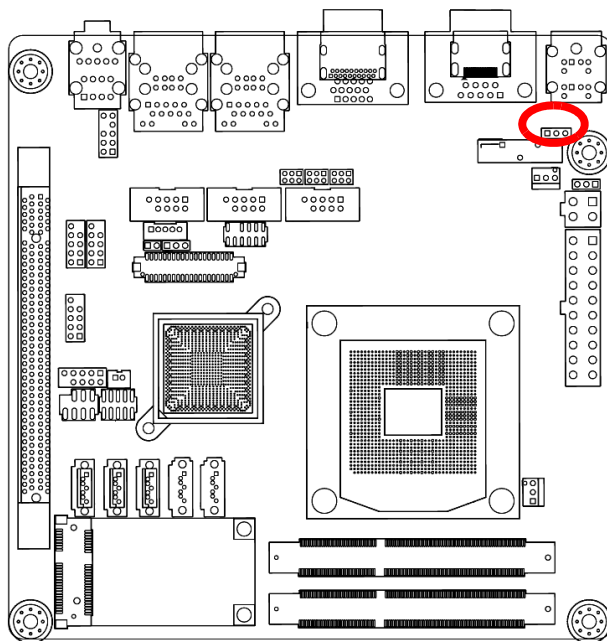
Normal(Default)   Clear CMOS
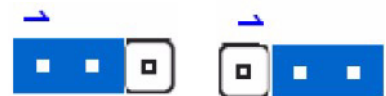
> **Note!** *You do not need to clear the RTC when the system hangs due to over-clocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.*

2.7.2 COM3, COM4, COM5 RI/+5V/+12V Select (JCOMPWR3 JCOMPWR4 JCOMPWR5)

This jumper allows you to select the power mode of COM PORTATX Mode or AT mode.

RI   +5V   +12V
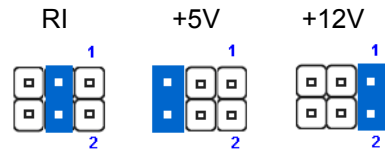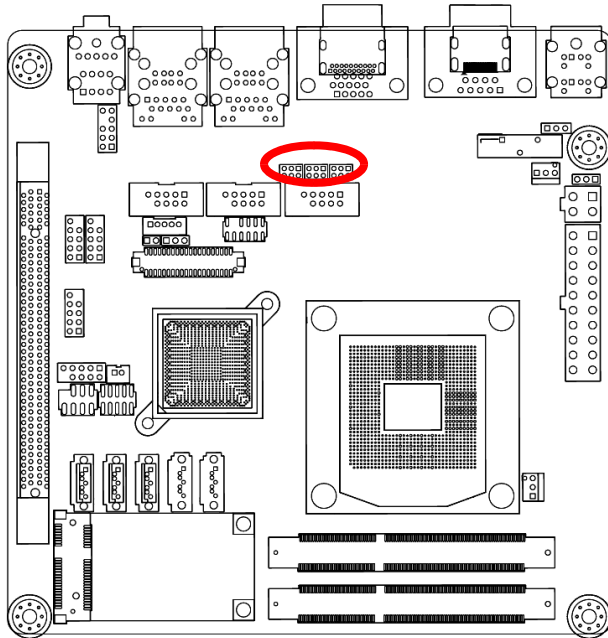
2.7.3 LVDS Back Light controller form SIO (JBLK1)

Linear   PWM
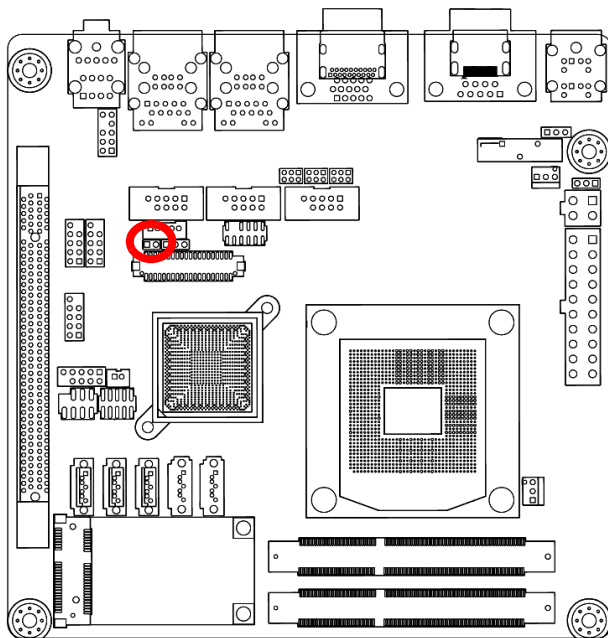
2.7.4 LVDS Back light power selection

+5 V   +3.3 V
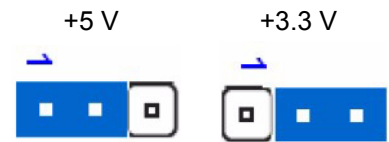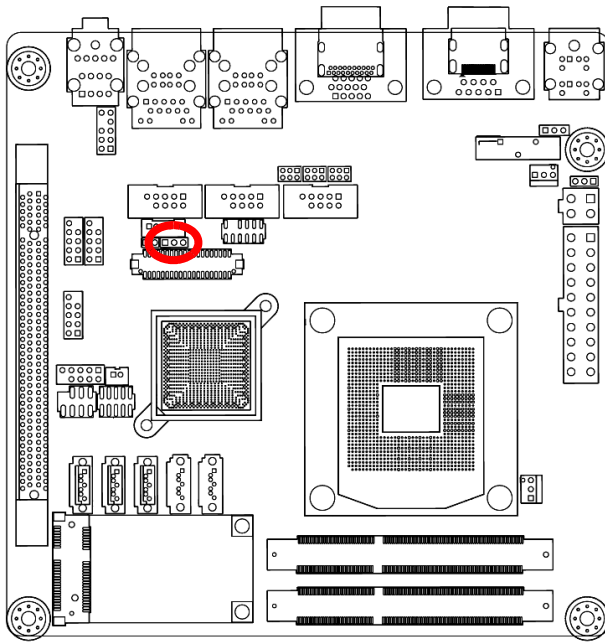
2.7.5 AT/ATX Power Mode Select (PSON1)

This jumper allows you to select ATX Mode or AT mode.

ATX MODE (Default)   AT MODE
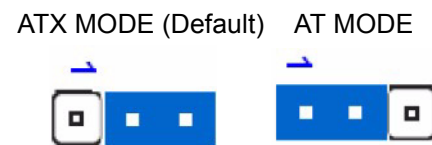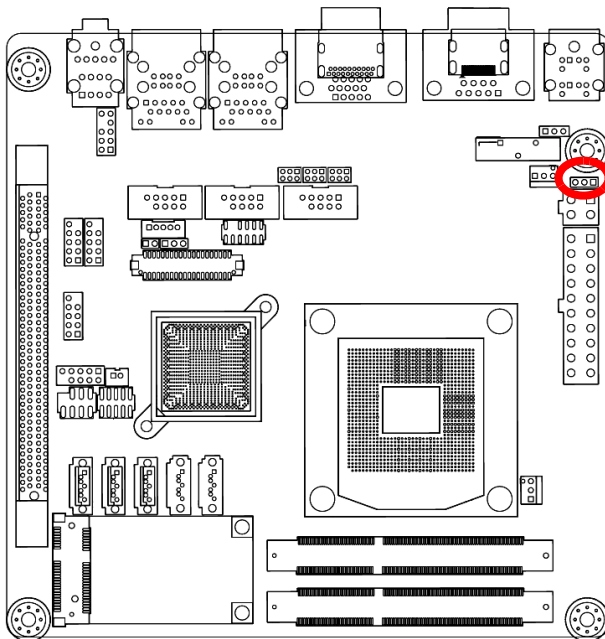
2.8 Connectors
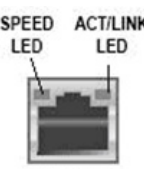
2.8.1 Rear panel connectors
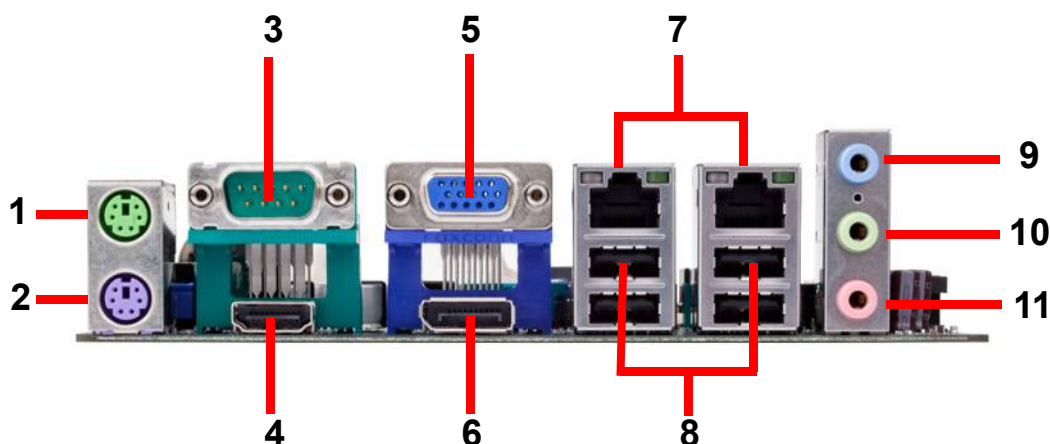
1. PS/2 mouse port (green). This port is for a PS/2 mouse.

2. PS/2 keyboard port (purple). This port is for a PS/2 keyboard.

3. Serial connector. This 9-pin COM1 & COM2 port is for serial devices.

4. DisplayPort. This 20-pin DisplayPort connect to a DisplayPort VGA monitor.

5. VGA port. This 15-pin VGA port connects to a VGA monitor.

6. HDMI port. This 19-pin HDMI 1.3 port connects to a HDMI monitor.

7. LAN (RJ-45) port. This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

Table 2.6: LAN port LED indications

Speed LED		ACT /LINK LED		
Status	Description	Status	Description	
OFF	10 Mbps connection	OFF	No link	
Orange	100 Mbps connection	Green	Link	
Green	1 Gbps connection	Blinking	Data activity	

8. USB 2.0 ports 1 ~ 4. These four 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

9. Line In port (light blue). This port connects a tape, CD, DVD player, or other audio sources.

10. Line Out port (lime). This port connects a headphone or a speaker.

In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.

11. Microphone port (pink). This port connects a microphone.

2.8.2 CPU and System fan connectors (CPU_FAN1, SYS_FAN1)

The fan connectors support cooling fans of 280mA (3.36 W max.) at 4800rpm or a total of 1A~2.22A (26.64W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure that the black wire of each cable matches the ground pin of the connector.

CPU_FAN1

3. CPUFAN1_IO_R
2. CPUFAN1_VCC (PWM)
1. GND

SYS_FAN1

1. GND
2. SYSFAN1_VCC (PWM)
3. SYSFAN1_IO_R
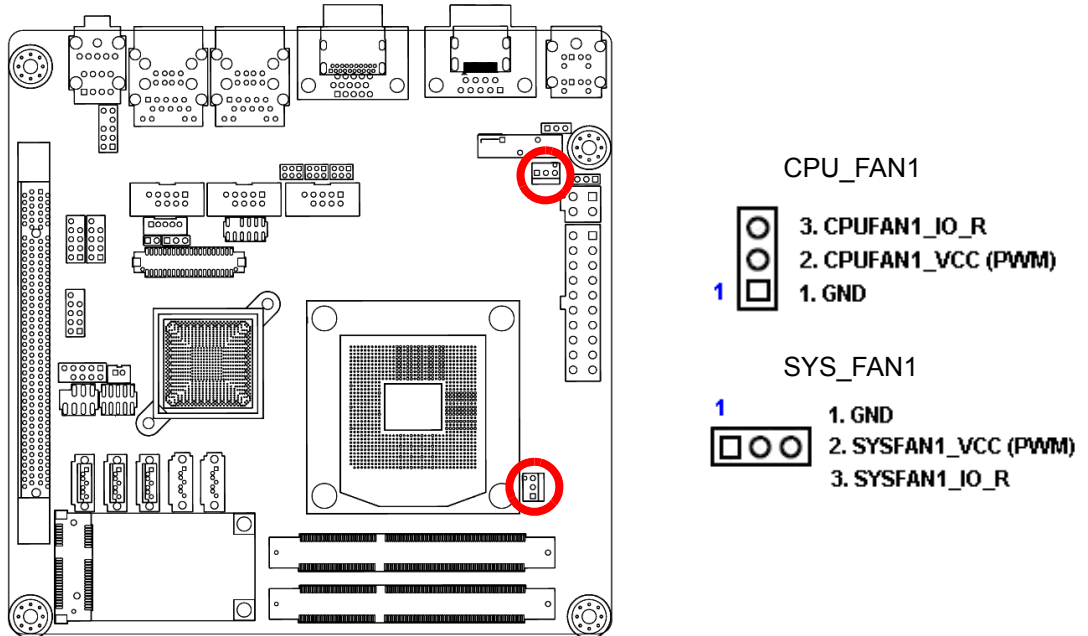
Caution! *Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.*

These are not jumpers! DO NOT place jumper caps on the fan connectors.

2.8.3 System Panel (F_PANEL)

This connector is for a chassis-mounted front panel. The functions are as following.

F_PANEL

1. HDDLED+	2. POWERLED+
3. HDDLED-	4. POWERLED-
5. GND	6. PWSWITCH
7. RESET	8. GND
9. NC	
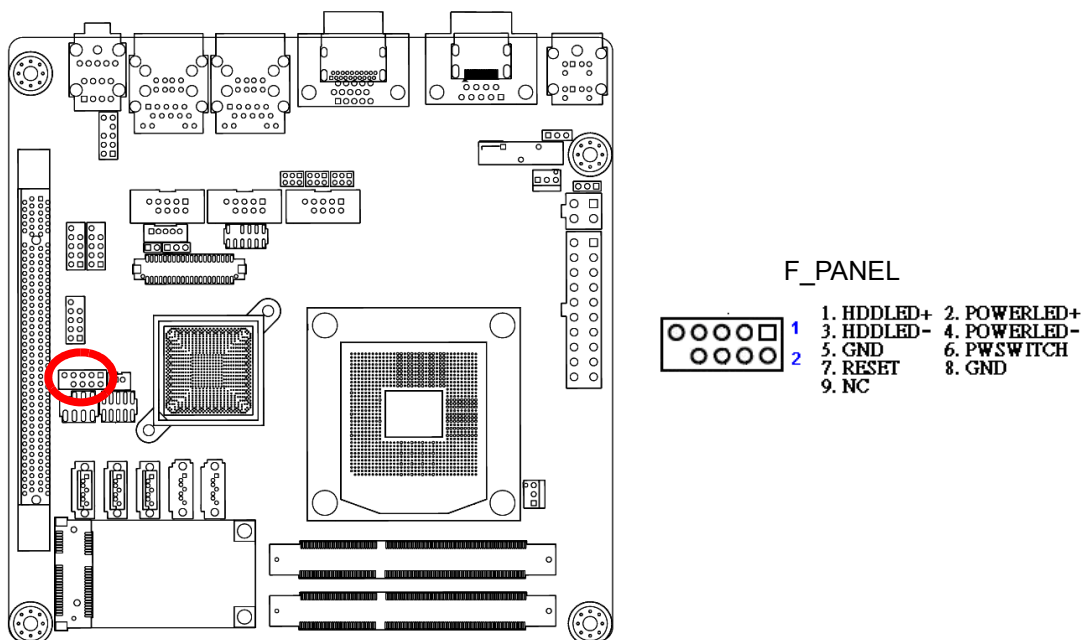
■ **ATX Power Button/Soft-off Button (Pin 6-8 PWRBT)**
This 2-pin connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch and holding it for more than four seconds while the system is ON turns the system OFF.

■ **Reset Button (Pin 5-7 SYS_RST)**
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

■ **Power LED (Pin 2-4 PWRLED)**
This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

■ **Hard Disk Drive Activity LED (Pin 1-3 HDLED)**
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

2.8.4 ATX power connectors (EATXPWR1, ATX12V1)

The connector is for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

Important!

- *Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.*

- *Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. See the table below for details.*

2.8.5 Serial Port connectors (COM3, COM4, COM5)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

COM3, COM4, COM5

9. NC   7. SRST#   5. GND   3. SATA LED#   1. HDD_LED+
      8. GND   6. PANSWIN#   4. GND   2. SUPLED
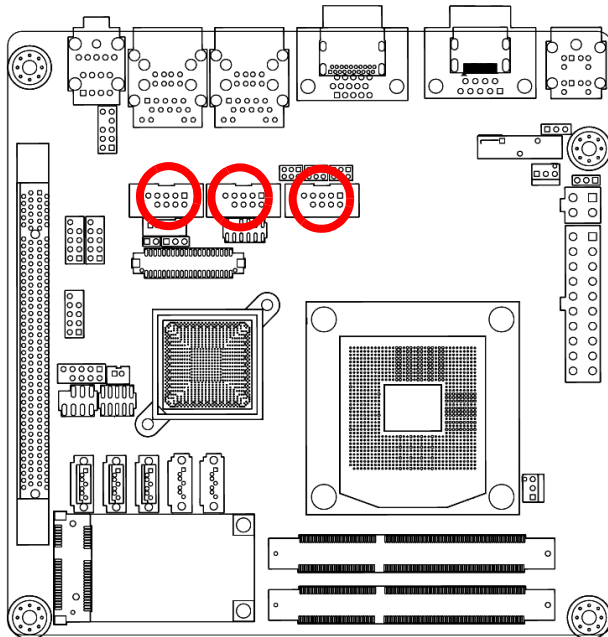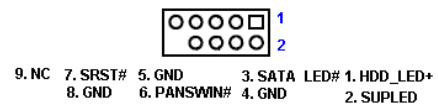
2.8.6 GPIO Connector (JGPIO)

This connector is for GPIO function.

JDIO1

1. SIO_GPIO0   6. SIO_GPIO6
2. SIO_GPIO4   7. SIO_GPIO3
3. SIO_GPIO1   8. SIO_GPIO7
4. SIO_GPIO5   9. VCC_GPIO
5. SIO_GPIO2   10. GND
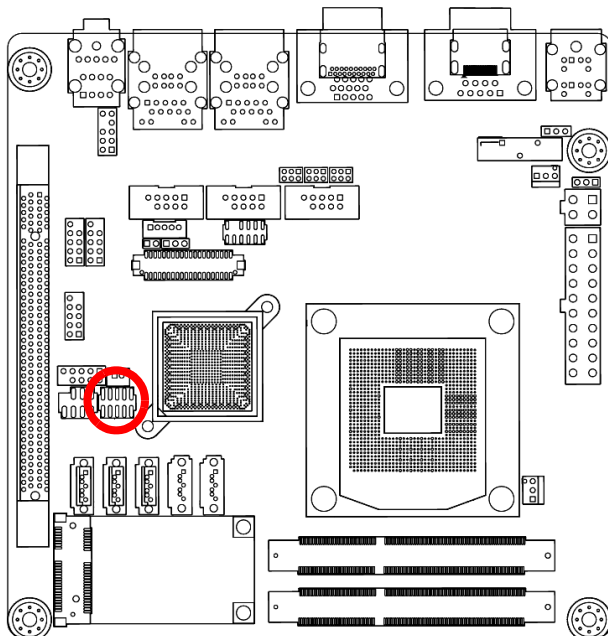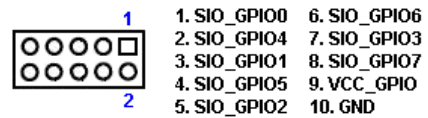
2.8.7 Audio Mic.-In & Line-Out Connector (FPAUD1)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 (optional) audio standard. Connect one end of the front panel audio I/O module cable to this connector.

FPAUD1

10. SENSE2_RTN	9. LIN2_L
8. NC	7. SENSE_B
6. SENSE1_RTN	5. LIN2_R
4. PRESENSE	3. MIC2_R
2. GND	1. MIC2_L
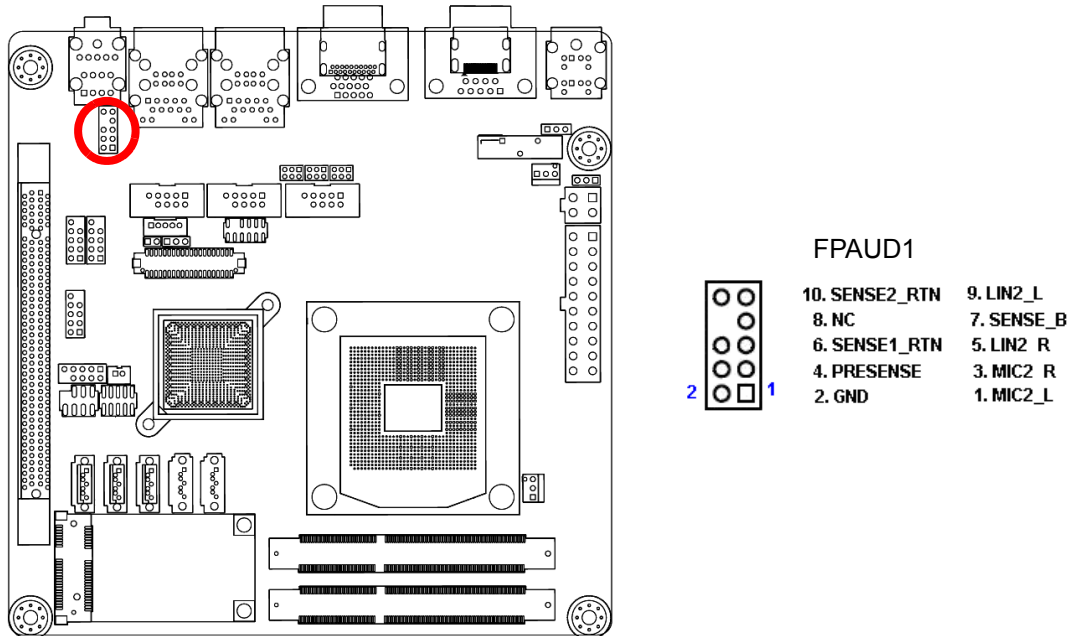
Important! *For motherboards with the optional HD Audio feature, we recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.*

2.8.8 LVDS Connector (LVDS1)

The connector is for 24-bit dual channel LVDS panel.

LVDS1

1. VDD(+3.3V)	11. LVDS_A1-	21. LVDS_B1+	31. GND
2. VDD(+5V)	12. LVDS_A0-	22. LVDS_B0+	32. GND
3. VDD(+3.3V)	13. GND	23. LVDS_B1-	33. LVDS_B_CK+
4. VDD(+5V)	14. GND	24. LVDS_B0-	34. LVDS_A_CK+
5. I2C_CLK	15. LVDS_A3+	25. GND	35. LVDS_B_CK-
6. I2C_DATA	16. LVDS_A2+	26. GND	36. LVDS_A_CK-
7. GND	17. LVDS_A3-	27. LVDS_B3+	37. GND
8. GND	18. LVDS_A2-	28. LVDS_B2+	38. GND
9. LVDS_A1+	19. GND	29. LVDS_B3-	39. VDD(+12V)
10. LVDS_A0+	20. GND	30. LVDS_B2-	40. VDD(+12V)
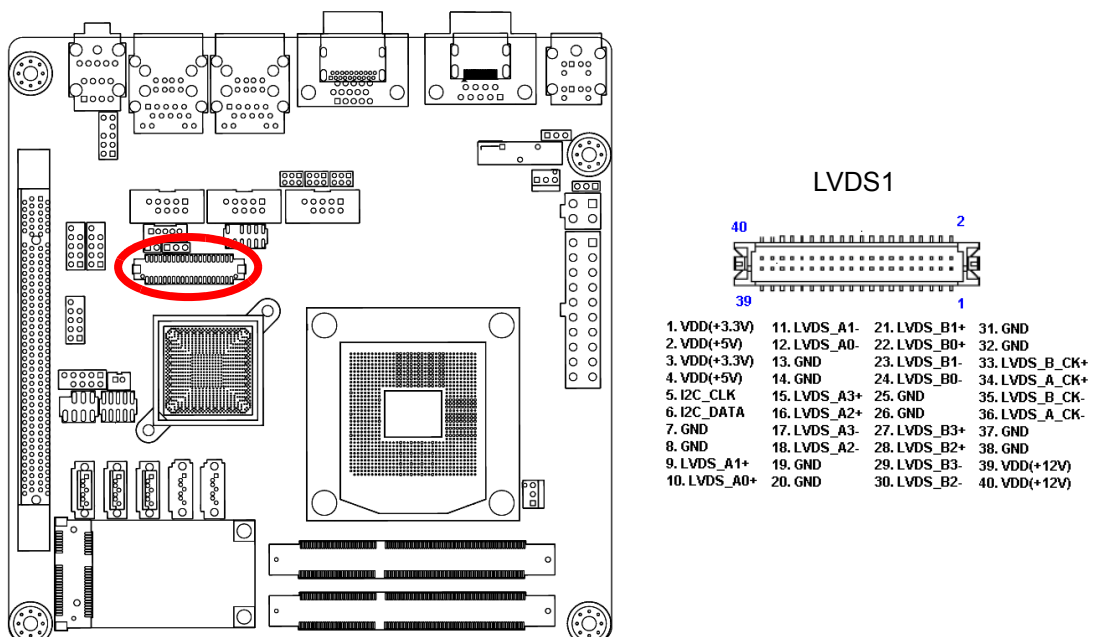
2.8.9 LCD Inverter Connector (JBL1)

The connector is for the control of internal LVDS brightness.

JLVDS_BKL2

```
1  1. +12V
   2. GND
□□□□□  3. ENBKL
   4. VR
   5. +5V
```
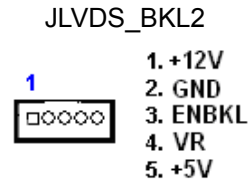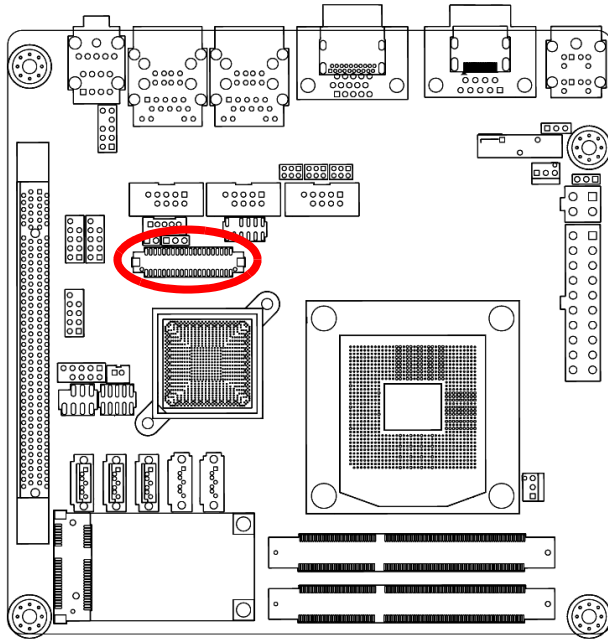
Table 2.7: Signal Description

Signal	Signal Description
	For inverter with adjustable Backlight function, it is possible to control the LCD brightness through the VR signal.
VR	Vadj=0.75V ~ 4.25V (Recommended: 4.7K Ω , > 1/16W)
ENBKL	LCD backlight ON/OFF control signal

2.8.10 SPI Connector (JSPI)

Is a point-to-point interface standard, which allows network equipment designers to develop an array of next-generation multi-service switches and routers to support multi-service traffic with aggregate bandwidths up to OC-192 (10 Gb/s) and beyond, enabling them to dramatically increase system performance.
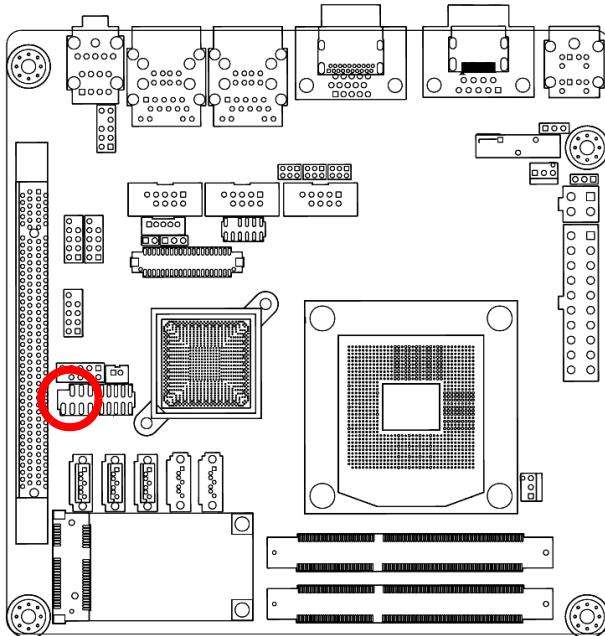
JSPI
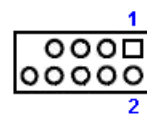
1. +3V	5. SPI_MISO
2. GND	6. SPI_MOSI
3. SPI_CS#	7. SIP_HOLD#
4. SPI_CLK	

2.8.11 LPC Connector (JLPC1)
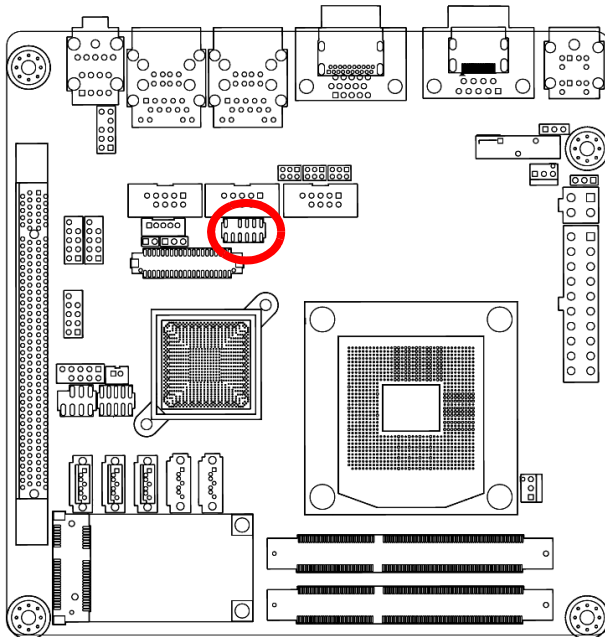
SATA1, SATA2
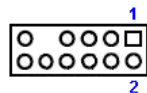
1. NC	7. LPC_FRAME#
2. +V3.3	8. LPC_AD0
3. LPC_AD3	9.
4. PRST_SIO#	10. GND
5. LPC_AD1	11. CLK33M_LPC
6. LPC_AD2	12. GND

2.8.12 Serial ATA 3 Connector (SATA1, SATA2)

These connectors support SATA 3.0 and are for the Serial ATA signal cables for Serial ATA hard disk drives.

SATA1, SATA2
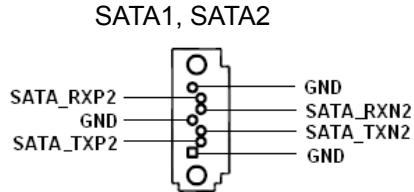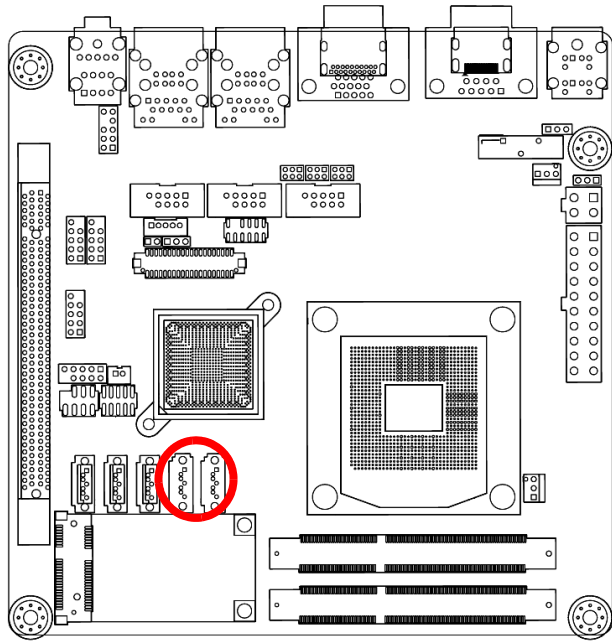
2.8.13 Serial ATA II Connector (SATA3, SATA4, SATA5)

These connectors support SATA 2.0 and are for the Serial ATA signal cables for Serial ATA hard disk drives.

SATA1, SATA2
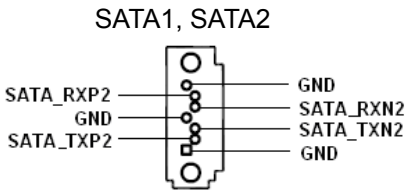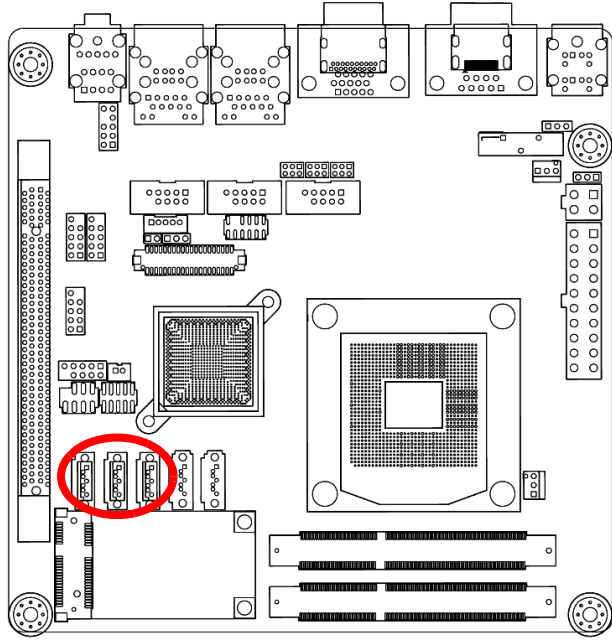
Note! *Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with large graphics cards.*

right angle side
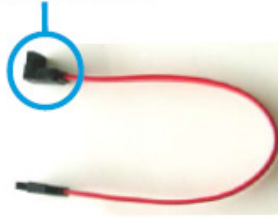
2.8.14 Case open connectors (JCASE1)

JCASE12

1. CASEOP IN
2. GND
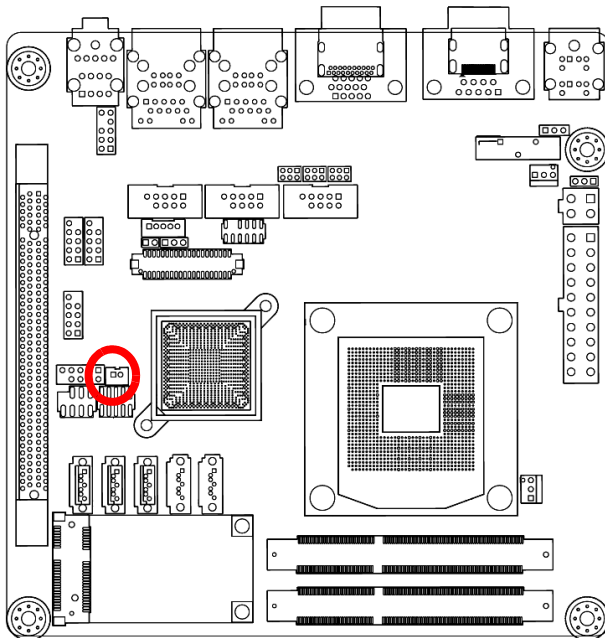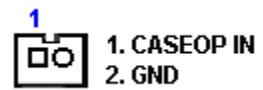
2.8.15 USB connectors (USB45, USB89, USB1011)

These connectors are for USB 2.0 ports. Connect the optional USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.
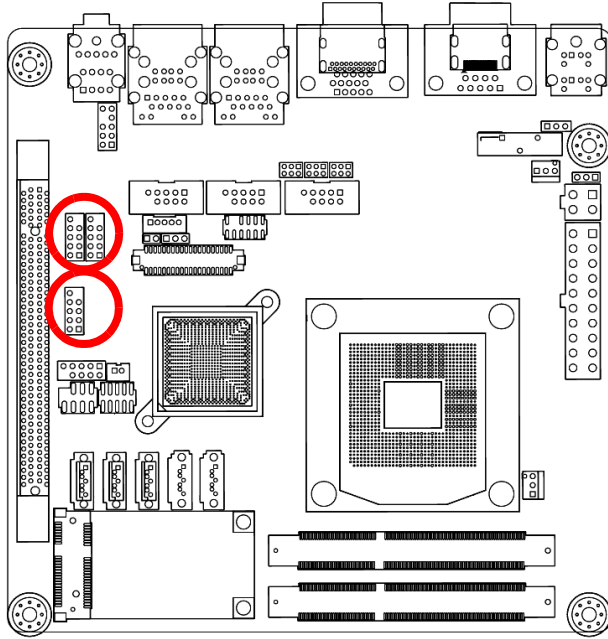
USB56, USB78, USB910, USB1112

9. NC	
8. GND	7. GND
6. USB +	5. USB +
4. USB -	3. USB -
2. USB+5V	1. USB+5V
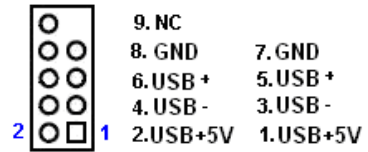
Caution!   *Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!*

Note!   *The USB module is purchased separately.*

Chapter 3

BIOS Setup

This chapter tells how to change the system setting through the BIOS setup menus. Detailed descriptions of the BIOS parameters are also provided.

3.1 BIOS Setup Program

This motherboard supports a programmable firmware chip that you can update using the provided utility. Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup". This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware hub.

The firmware hub on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On-Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

> *Important!* ■ *The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the Load Setup Defaults from the BIOS menu screen.*
>
> ■ *The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.*
>
> ■ *Visit the system builder's website to download the latest BIOS file for this motherboard.*

3.1.1 Legend Box

The keys in the legend bar allow you to navigate through the various setup menus.

Key(s)	Function Description
← , →	Select Screen
↑ , ↓	Select Item
+ -	Change Option / Field/ Value
Enter	Go to Sub Screen
PGDN	Next Page
PGUP	Previous Page
HOME	Go to Top of Screen
END	Go to Bottom of Screen
F1	General Help
F2	Previous Value
F3	Optimized Default
F4	Save & Exit Setup
ESC	Exit

3.1.2 List Box

This box appears only in the opening screen. The box displays an initial list of configurable items in the menu you selected.

3.1.3 Sub-menu

Note that a right pointer symbol appears to the left of certain fields. This pointer indicates that you can display a sub-menu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub-menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

Take some time to familiarize yourself with the legend keys and their corresponding functions. Practice navigating through the various menus and submenus. If you accidentally make unwanted changes to any of the fields, press <F6> to load the fail-safe default values. While moving around through the Setup program, note that explanations appear in the Item Specific Help window located to the right of each menu. This window displays the help text for the currently highlighted field.

3.2 BIOS Menu Screen

When you enter the BIOS, the following screen appears. The BIOS menu screen displays the items that allow you to make changes to the system configuration. To access the menu items, press the up/down/right/left arrow key on the keyboard until the desired item is highlighted, then press [Enter] to open the specific menu.
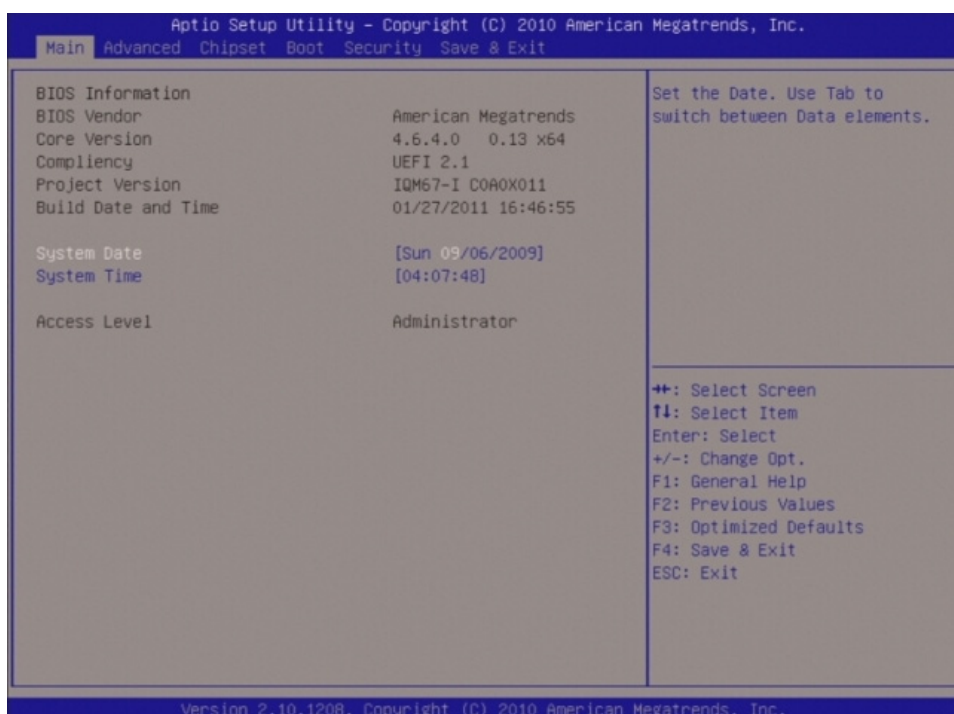
3.3 Main Setup

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu. Use this menu for basic system configurations, such as time, date etc.
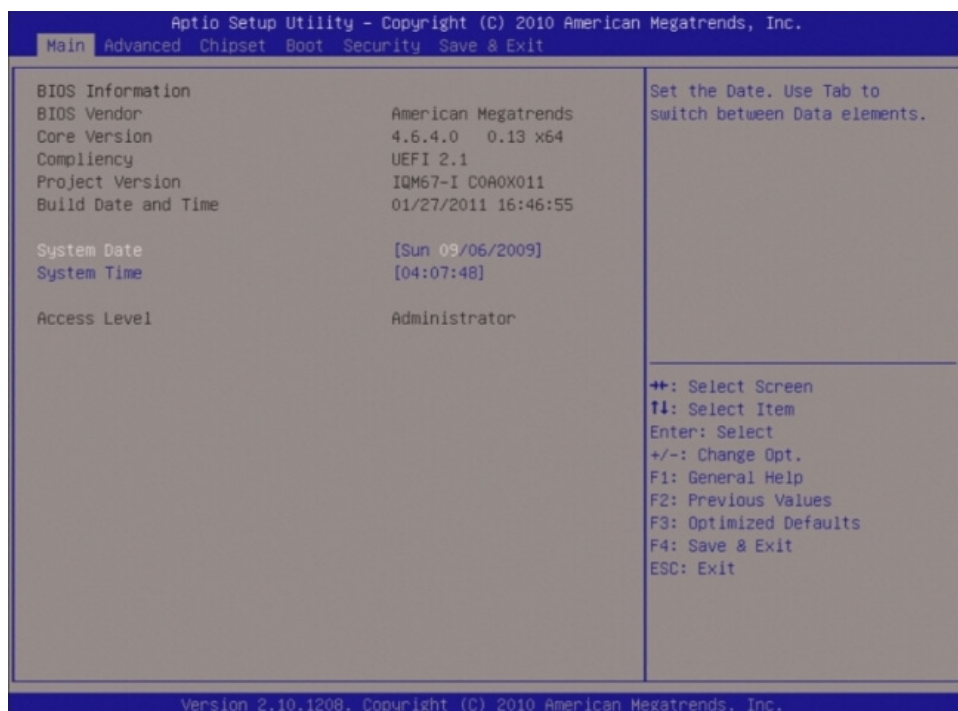
- ■ **BIOS Information**
  Display the auto-detected BIOS information.
- ■ **Memory Information**
  Displays the auto-detected system memory
- ■ **System Date**
  The date format is <Date>,<Month>,<Day>,<Year>.
- ■ **System Time**
  The time format is <Hour>,<Minute>,<Second>.
- ■ **Access Level**
  Displays the accessory information.

3.4 Advanced BIOS Setup

Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen.

You can select any of the items in the left frame of the screen, such as Chipset configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.
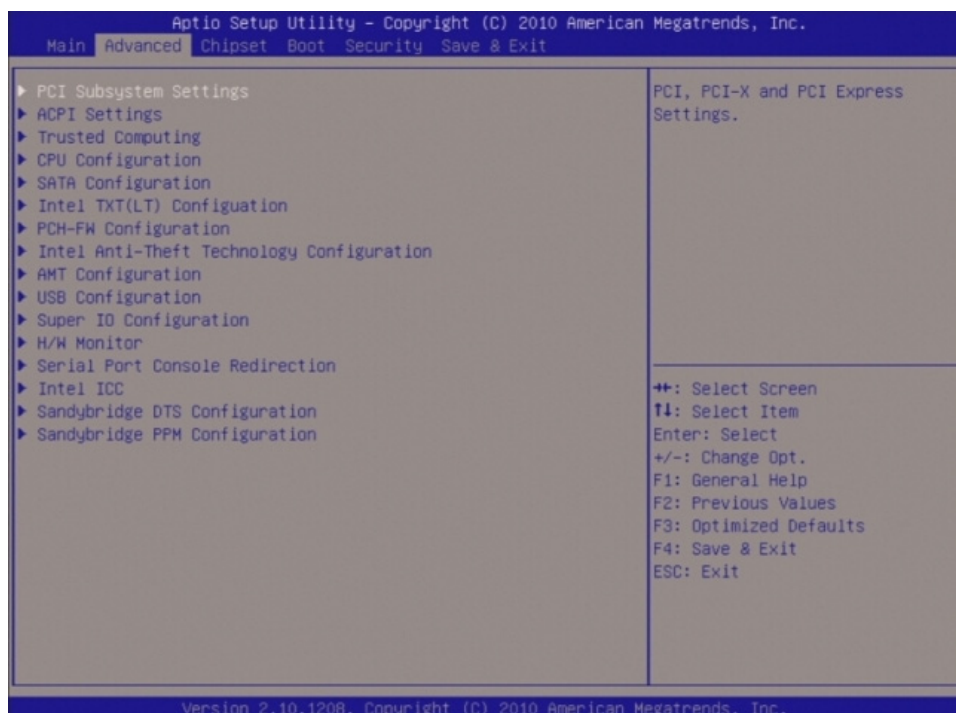
Caution!   Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

3.4.1 PCI Subsystem Setting

The PCI PnP menu items allow you to change the advanced settings for PCI/PnP devices. The menu includes setting IRQ and DMA channel resources for either PCI/ PnP or legacy ISA devices, and setting the memory size block for legacy ISA devices.

```
            Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
      Advanced

 PCI Bus Driver Version              V 2.03.00              In case of multiple Option
 PCI ROM Priority                    [EFI Compatible ROM]   ROMs (Legacy and EFI
                                                            Compatible), specifies what
 PCI Common Settings Settings                               PCI Option ROM to launch.
 PCI Latency Timer                   [32 PCI Bus Clocks]
 VGA Palette Snoop                   [Disabled]
 PERR# Generation                    [Disabled]
 SERR# Generation                    [Disabled]

 PCI Express Device Settings
 Relaxed Ordering                    [Disabled]
 Extended Tag                        [Disabled]
 No Snoop                            [Enabled]
 Maximum Payload                     [Auto]                 ++: Select Screen
 Maximum Read Request                [Auto]                 t↓: Select Item
                                                            Enter: Select
 PCI Express Link Settings                                  +/-: Change Opt.
 ASPM Support                        [Disabled]             F1: General Help
 WARNING: Enabling ASPM may cause some                      F2: Previous Values
          PCI-E devices to fail                             F3: Optimized Defaults
 Extended Synch                      [Disabled]             F4: Save & Exit
                                                            ESC: Exit

            Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

- ■ **PCI Bus Driver Version**
  Displays the information of PCI Bus Driver Version.
- ■ **PCI ROM Priority [EFI compatible ROM]**
  In case of multiple option ROMs (Legacy and EFI compatible), specifies what PCI option ROM to launch.

PCI Common Settings
- ■ **PCI Latency Timer [32 PCI Bus Clocks]**
  Allows the PCI Latency Timer to be adjusted. This option sets the latency of all PCI devices on the PCI bus.
  Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]
- ■ **VGA Palette Snoop [Disable]**
  Enables or disables VGA palette registers snooping.
  Configuration options: [Disabled] [Enabled].\
- ■ **PERR# Generation [Disable]**
  Enables or disables PCI devices to Generate PERR#.
  Configuration options: [Disabled] [Enabled].
- ■ **SPERR# Generation [Disable]**
  Enables or disables PCI devices to Generate SPERR#.
  Configuration options: [Disabled] [Enabled].

PCI Express Device Settings

- **Relaxed Ordering [Disable]**
  Enables or disables PCI Express devices Relaxed Ordering.
  Configuration options: [Disabled] [Enabled].

- **Extend Tag**
  If [Enabled] allows device to use 8-bit tag field as a requester.
  Configuration options: [Disabled] [Enabled].

- **No Snoop [Enabled]**
  Enables or disables PCI Express devices no snoop option.
  Configuration options: [Disabled] [Enabled].

- **Maximum payload [Auto]**
  Set maximum payload of PCI Express device or allow system BIOS to select the value.
  Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes].

- **Maximum Read Request [Auto]**
  Configuration options: [Auto] [128 Bytes] [256 Bytes] [512 Bytes] [1024 Bytes] [2048 Bytes] [4096 Bytes].

PCI Express Link Settings

- **ASPM Support [Disable]**
  Set the ASPM levels: Force L0 - Force all links to L0 state; AUTO - BIOS configuration; Disable - Disable ASPM.
  Configuration options: [Disable][Auto][Force L0].

Caution! *Enabling ASPM may cause some PCI Express devices to fail.*

- **Extended Sync [Disables]**
  If [Enabled] allows generation of extended synchronization patterns.
  Configuration options: [Disable][Enabled].

3.4.2 ACPI Settings

```
            Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
   Advanced

 ACPI Settings                                              Select the highest ACPI sleep
                                                            state the system will enter
 ACPI Sleep State                  [S3 (Suspend to RAM)]    when the SUSPEND button is
                                                            pressed.
 Resume On RTC Alarm               [Disabled]




                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



            Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

■ **ACPI Sleep State [S3 (suspend to RAM)]**
Select the highest ACPI sleep state the system will enter the SUSPEND button is press. Configuration options: [Suspend Disable][S1 (CPU Stop Clock)] [S3 (suspend to RAM)]

■ **Resume On RTC Alarm [Disable]**
Enable or disable system wake on alarm even. When enabled, system will wake upon the hr/min/sec specified.
Configuration options: [Disabled] [Enabled].

3.4.3 Trusted computing

Trusted computing (TPM) settings.
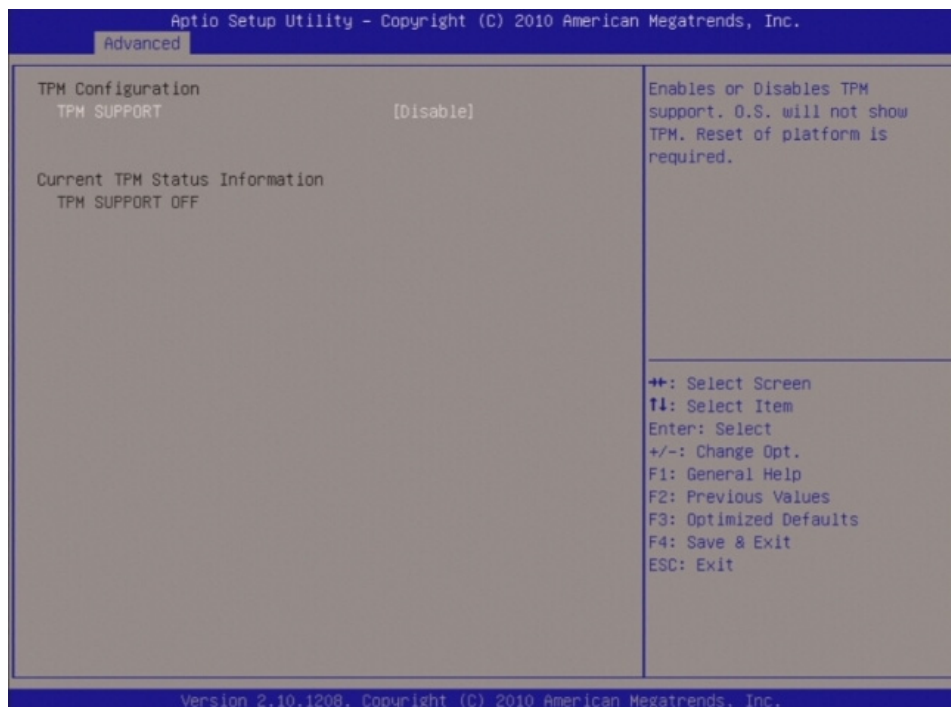
TPM configuration

■ **TPM SUPPORT [Disabled]**
Enable or disable TPM support.
Configuration options: [Disabled] [Enabled].

■ **Current TPM Status Information**
Displays the TPM status information [No TPM Hardware].

3.4.4 CPU configuration
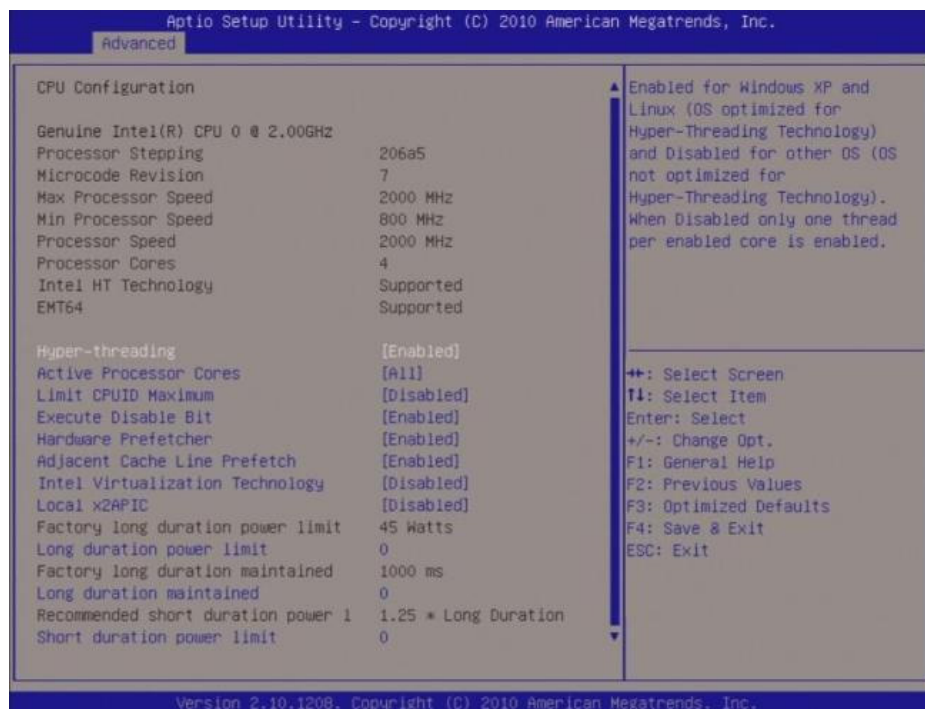
■ CPU configuration
  Displays the CPU information.
■ Hyper-threading [Enabled]
  Enable or disable Hyper-threading support.
  Configuration options: [Disabled] [Enabled].
■ Active Processor Cores [All]
  Select the numbers of cores in each processor package.
  Configuration options: [All] [1] [2] [3] [4] [5] [6] [7].

Caution! *It depends on each CPU type.*

■ **Limit CPUID Maximum [Disable]**
  Disable for Windows XP.
  Configuration options: [Disabled] [Enabled].
■ **Execute Disable Bit [Enable]**
  XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2 RedHat Enterprise 3 Update 3.)
  Configuration options: [Disabled] [Enabled].
■ **Hardware Prefetcher [Enable]**
  To turn on/off the Mid Level Cache (L2) streamer Prefetcher.
  Configuration options: [Disabled] [Enabled].
■ **Adjacent Cache Line Prefetcher [Enable]**
  To turn on/off prefetching of adjacent cache lines.
  Configuration options: [Disabled] [Enabled].

■ **Intel Virtualization Technology [Disable]**
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Configuration options: [Disabled] [Enabled].

■ **Power Technology [Energy efficient]**
Enable the power management features.
Configuration options: [Disabled] [Energy efficient] [Enabled].

■ **Local x2APIC [Disable]**
Enable Local x2APIC. Some OS do not support this.
Configuration options: [Disabled] [Enabled].

3.4.5 SATA Configuration
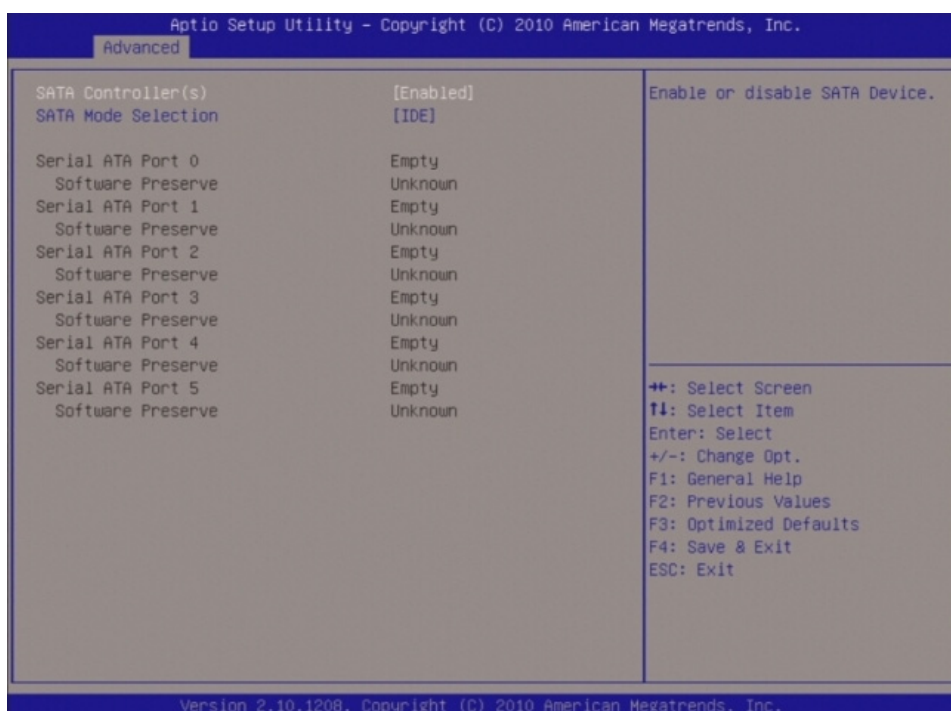
■ **SATA Mode [IDE Mode]**
Supports IDE, AHCI.
Configuration options: [Disable][IDE Mode][AHCI Mode].

■ **Serial-ATA Controller 0 [Compatible]**
Enabled/Disabled Serial-ATA Controller 0.
Configuration options: [Disable] [Enhanced] [Compatible].

■ **Serial-ATA Controller 1 [Enhanced]**
Enabled/Disabled Serial-ATA Controller 1.
Configuration options: [Disable] [Enhanced] [Compatible].

3.4.6 Intel TXT(LT) Configuration

Display Intel Trusted Execution Technology configuration.
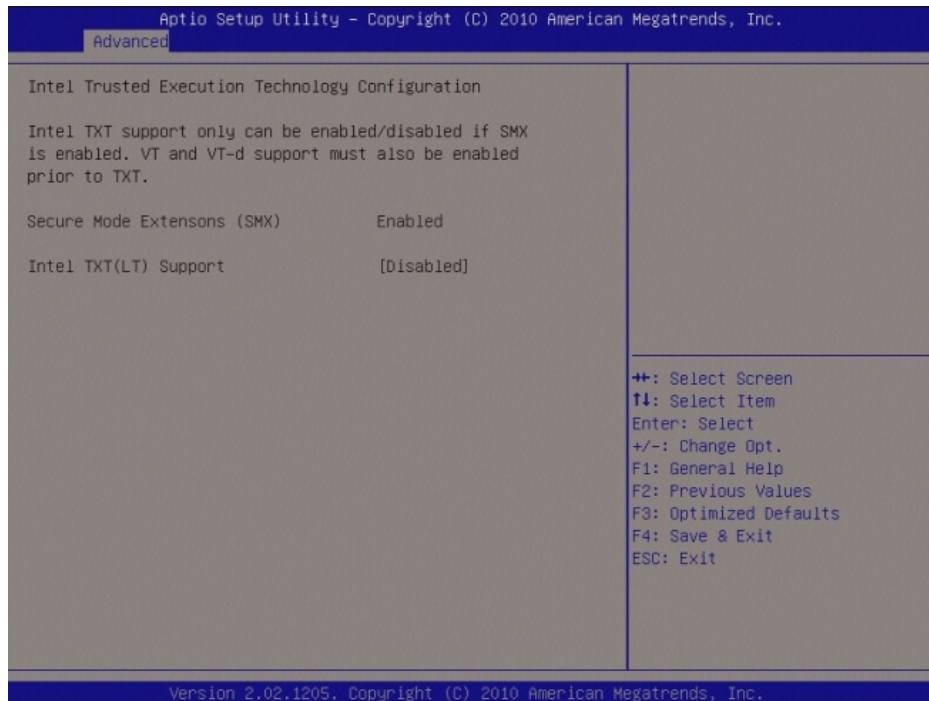
3.4.7 PCH-FW Configuration

Configuration Management Engine Technology Parameter.

■ **Display ME Firmware Information**
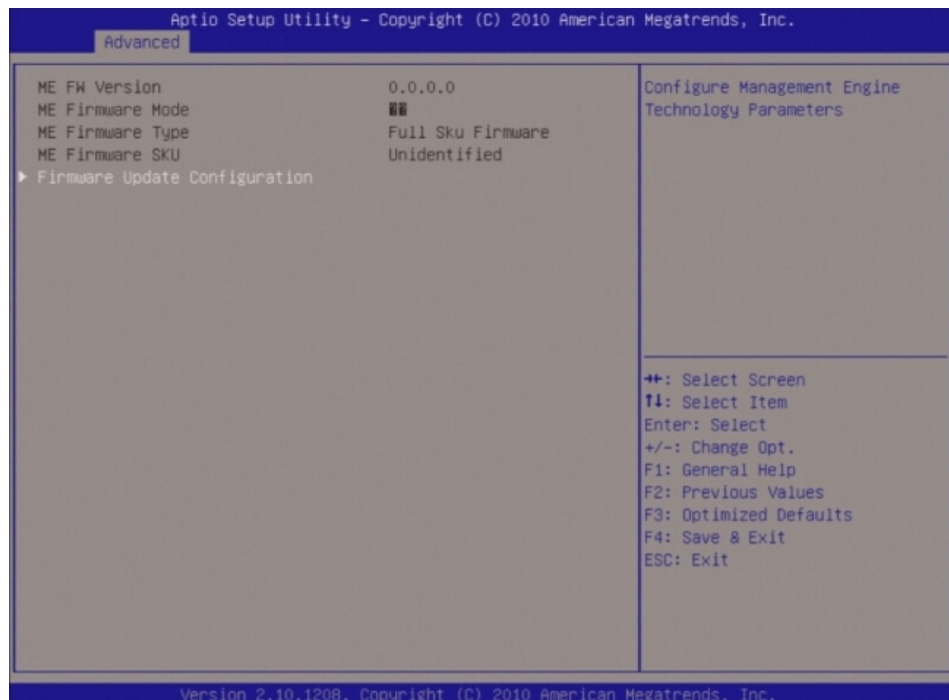
3.4.7.1 Firmware Update Configuration
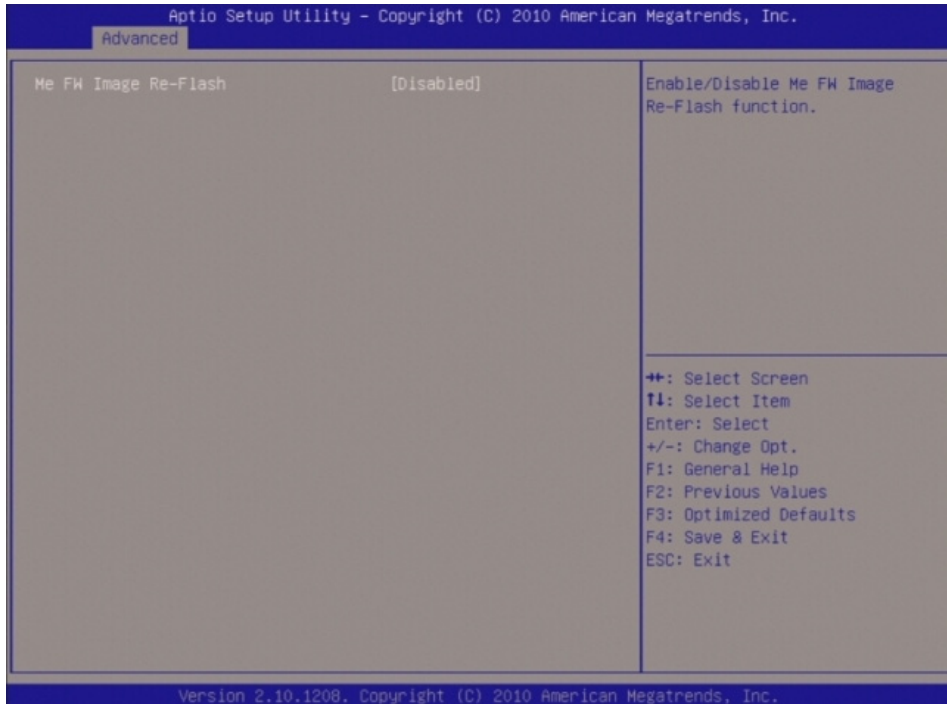
■ **Me FW Image Re-Flash[Disable]**
Enabled/Disabled Me FW Image Re-Flash function.
Configuration options: [Disable] [Enhanced].
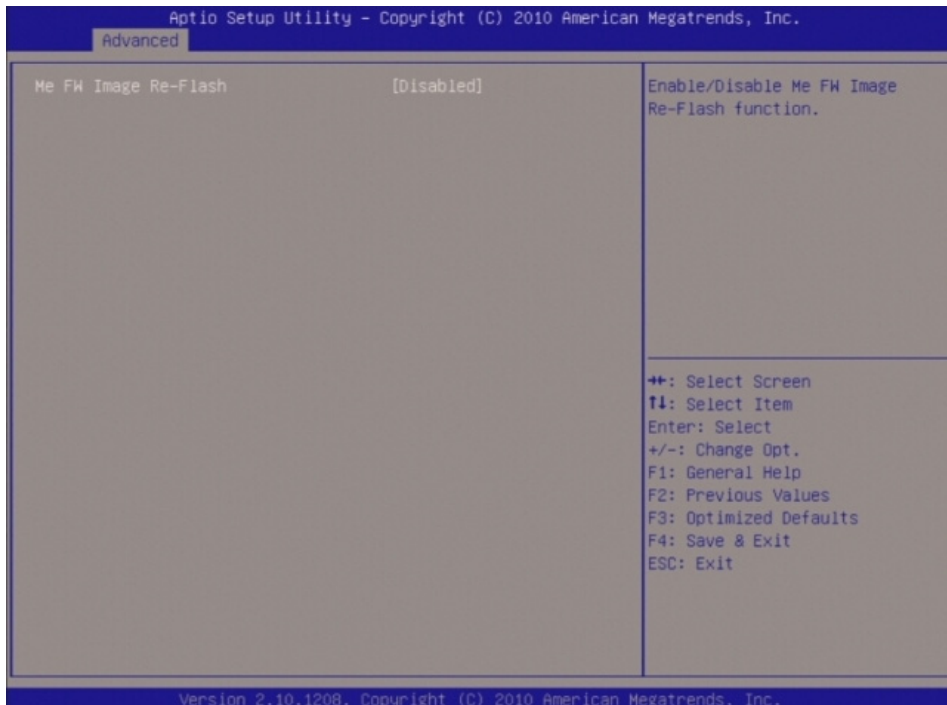
3.4.8 Intel Anti-Theft Technology Configuration

Disabling Intel AT allow users to login to platform. This is strictly for testing only. This does not disable AT services in ME.
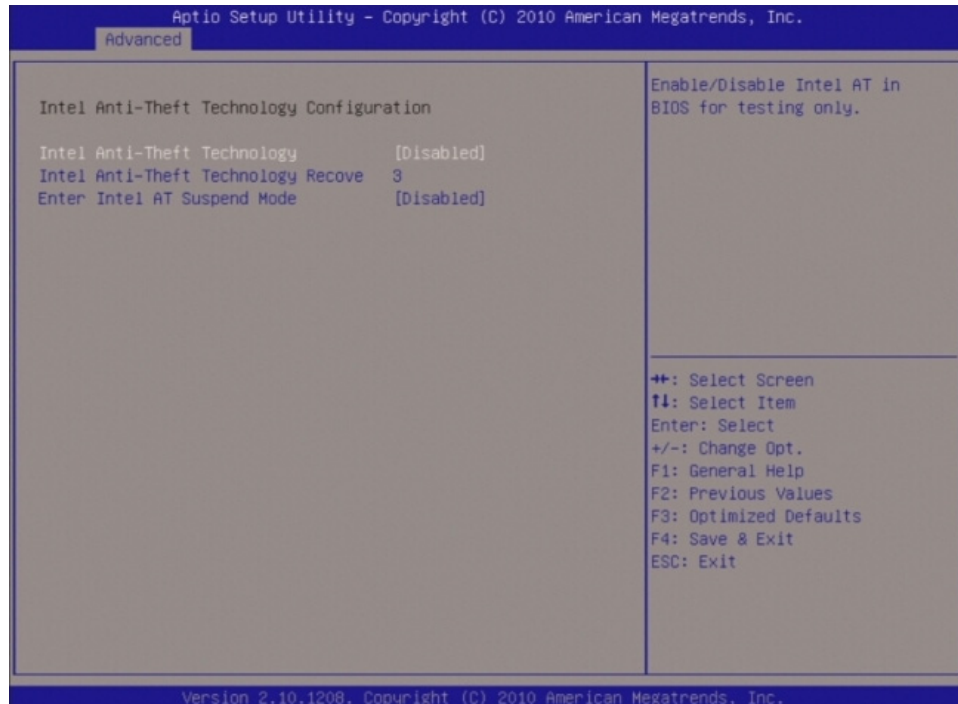
- ■ **Intel Anti-Theft Technology[Disable]**
  Enabled/Disabled Intel AT BIOS for testing only.
  Configuration options: [Disable] [Enhanced].
- ■ **Intel Anti-Theft Technology Recovery[3]**
  Set the number of times recovery attempted will be allowed.
- ■ **Enter Intel AT Suspend Mode[Disable]**
  Request that platform enter Intel AT support Mode.
  Configuration options: [Disable] [Enhanced].

3.4.9 USB Configuration

USB Configuration Parameters.
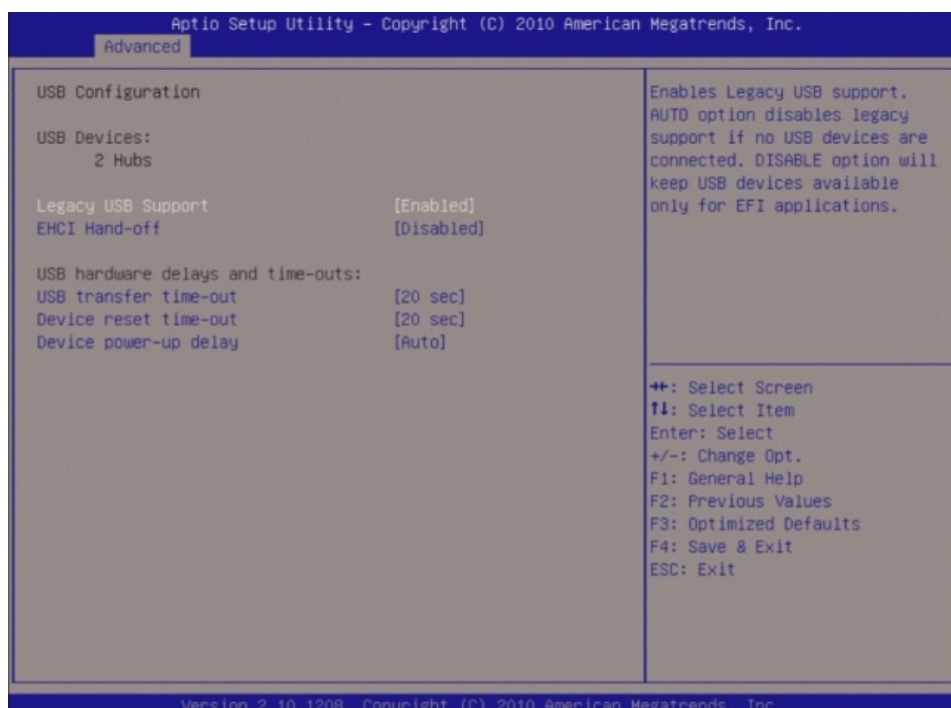
■ **USB Device**
Display how many devices are connected.

■ **Legacy USB Support [Enabled]|**
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
Configuration options: [Enabled] [Disabled][Auto].

■ **EHCI Hand-off [Disable]**
This is a workaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
Configuration options: [Disabled] [Enabled].

■ **Port 60/64 Emulation [Enabled]**
Enables I/O port 60h/64h emulation support. This should be enabled for complete USB keyboard legacy support for non-USB aware OS.
Configuration options: [Disabled] [Enabled].

USB hardware delays and time-outs:

■ **USB transfer time-out [20 sec]**
The time-out value for Control, Bulk, and Interrupt transfers.
Configuration options: [1 sec] [5 sec] [10 sec] [20 sec].

■ **Device reset time-out [20 sec]**
USB mass storage device Start Unit command time-out.
Configuration options: [10 sec] [20 sec] [30 sec] [40 sec].

■ **Device Power-up delay [Auto]**
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.
Configuration options: [Auto][Manual].

3.4.10 Super IO Configuration

System Super IO Chip Parameters.
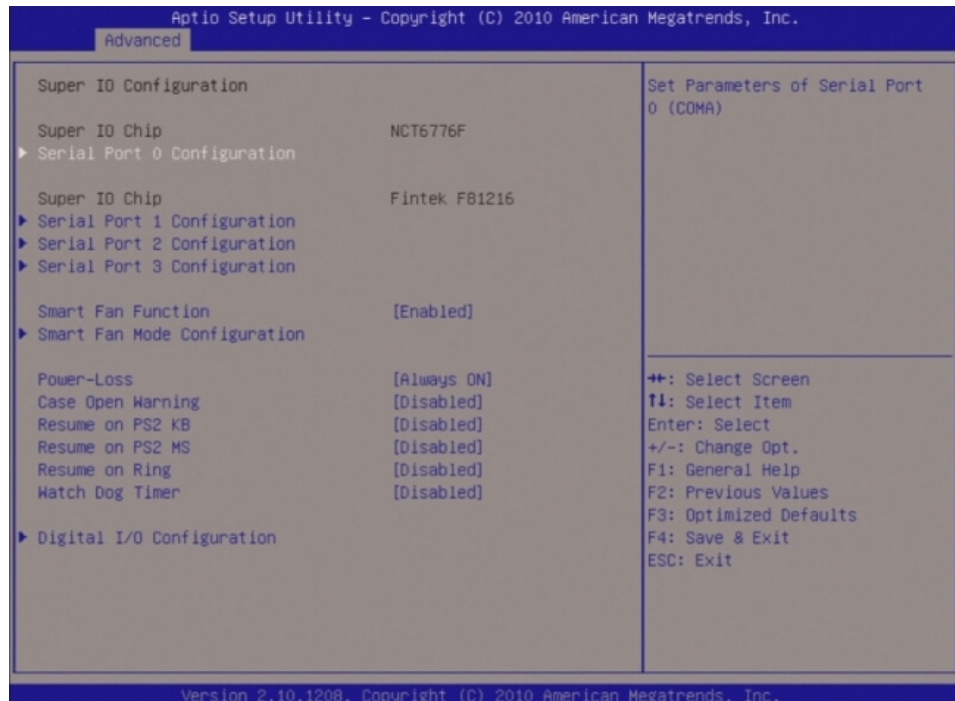
■ **Super IO Configuration**
■ **Super IO Chip [NCT6776F]**

3.4.10.1 Serial Port 0 configuration

Set Parameters of Serial Port 0 (COMA).
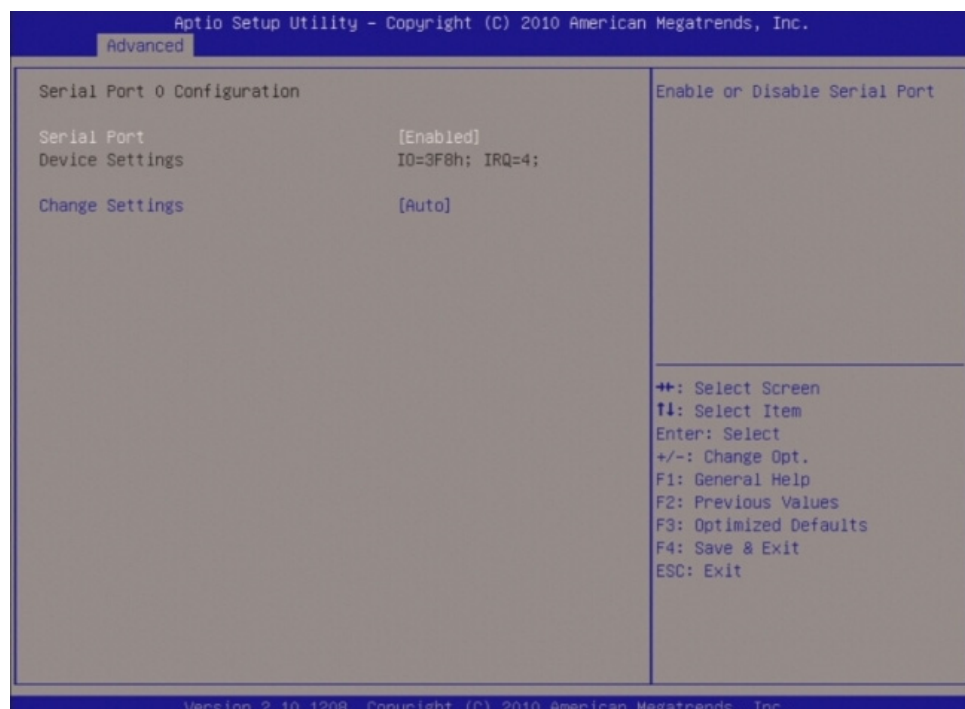
Serial Port 0 Configuration

■ **Serial Port [Enable]**
Enable or Disable Serial Port.
Configuration options: [Disabled] [Enabled].

■ **Device Setting [IO=3F8h; IRQ=4]**

■ **Change Setting[Auto]**
Select an optimal setting for Super IO device.
Configuration options: [Auto] [IO=3F8h; IRQ=4] [IO=3F8h; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12] [IO=3E8h; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12] [IO=2E8h; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12] .

Super IO Chip [Finteck F81216]

3.4.10.2 Serial Port 1 configuration
Set Parameters of Serial Port 3 (COM3).
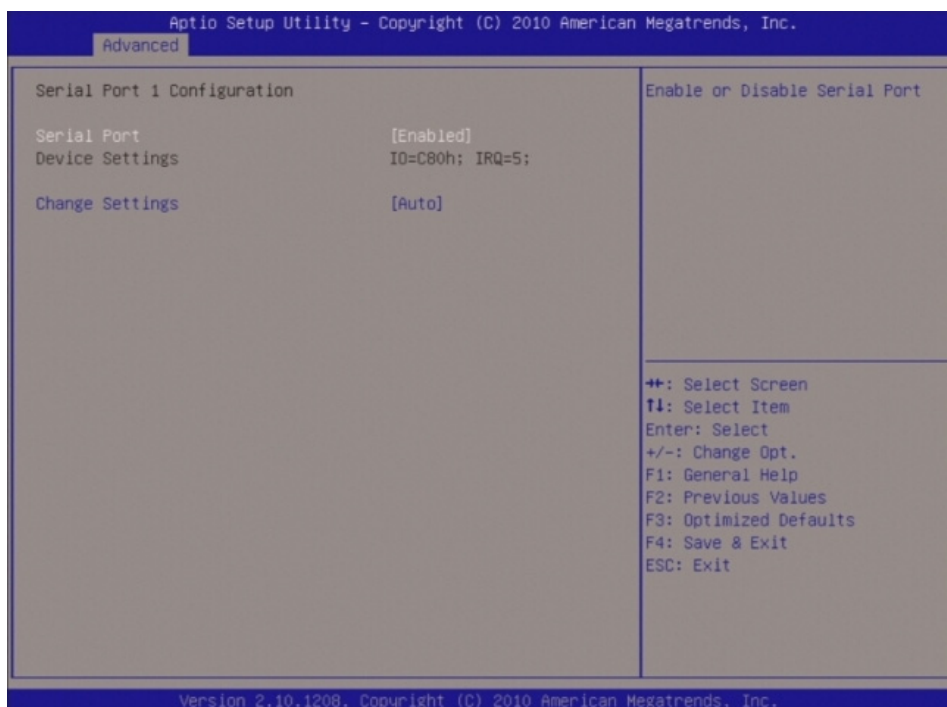
Serial Port 1 Configuration

■ **Serial Port [Enable]**
Enable or Disable Serial Port.
Configuration options: [Disabled] [Enabled].

■ **Device Setting [IO=C80h; IRQ=5]**

■ **Change Setting[Auto]**
Select an optimal setting for Super IO device.
Configuration options: [Auto] [IO=C80h; IRQ=5] [IO=C80h; IRQ=5, 7, 9. 10, 11]
[IO=C88h; IRQ=5, 7, 9. 10, 11] [IO=C90h; IRQ=5, 7, 9. 10, 11] [IO=C98h;
IRQ=5, 7, 9. 10, 11].

3.4.10.3 Serial Port 2 configuration

Set Parameters of Serial Port 4 (COM4).
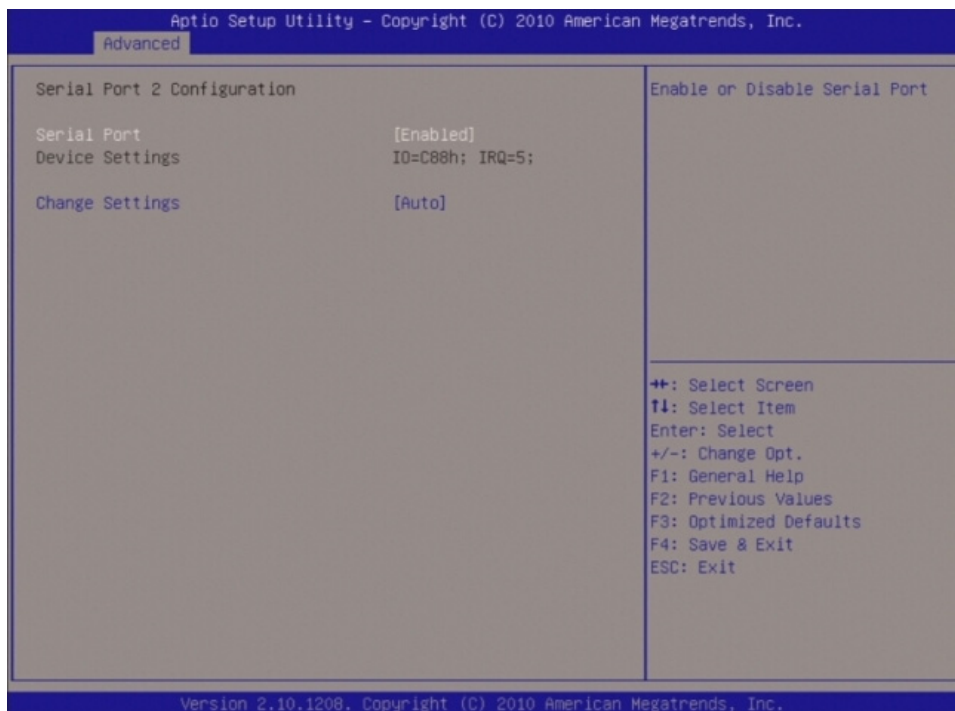
Serial Port 2 Configuration

■ **Serial Port [Enable]**
Enable or Disable Serial Port.
Configuration options: [Disabled] [Enabled].

■ **Device Setting [IO=C88h; IRQ=5]**

■ **Change Setting[Auto]**
Select an optimal setting for Super IO device.
Configuration options: [Auto] [IO=C88h; IRQ=5] [IO=C80h; IRQ=5, 7, 9. 10, 11]
[IO=C88h; IRQ=5, 7, 9. 10, 11] [IO=C90h; IRQ=5, 7, 9. 10, 11] [IO=C98h;
IRQ=5, 7, 9. 10, 11].

3.4.10.4 Serial Port 3 configuration

Set Parameters of Serial Port 5 (COM5)
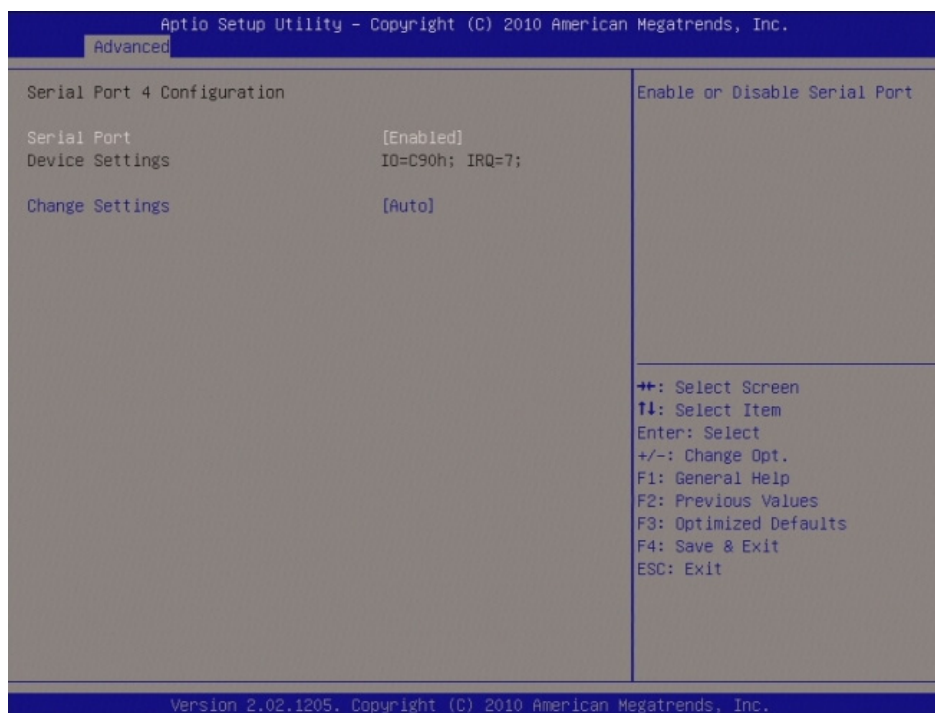
Serial Port 3 Configuration

- ■ **Serial Port [Enable]**
  Enable or Disable Serial Port.
  Configuration options: [Disabled] [Enabled].
- ■ **Device Setting [IO=C90h; IRQ=5]**
- ■ **Change Setting[Auto]**
  Select an optimal setting for Super IO device.
  Configuration options: [Auto] [IO=C90h; IRQ=5] [IO=C80h; IRQ=5, 7, 9. 10, 11]
  [IO=C88h; IRQ=5, 7, 9. 10, 11] [IO=C90h; IRQ=5, 7, 9. 10, 11] [IO=C98h;
  IRQ=5, 7, 9. 10, 11].

3.4.10.5 Smart Fan Mode Configuration
Smart Fan Mode configuration
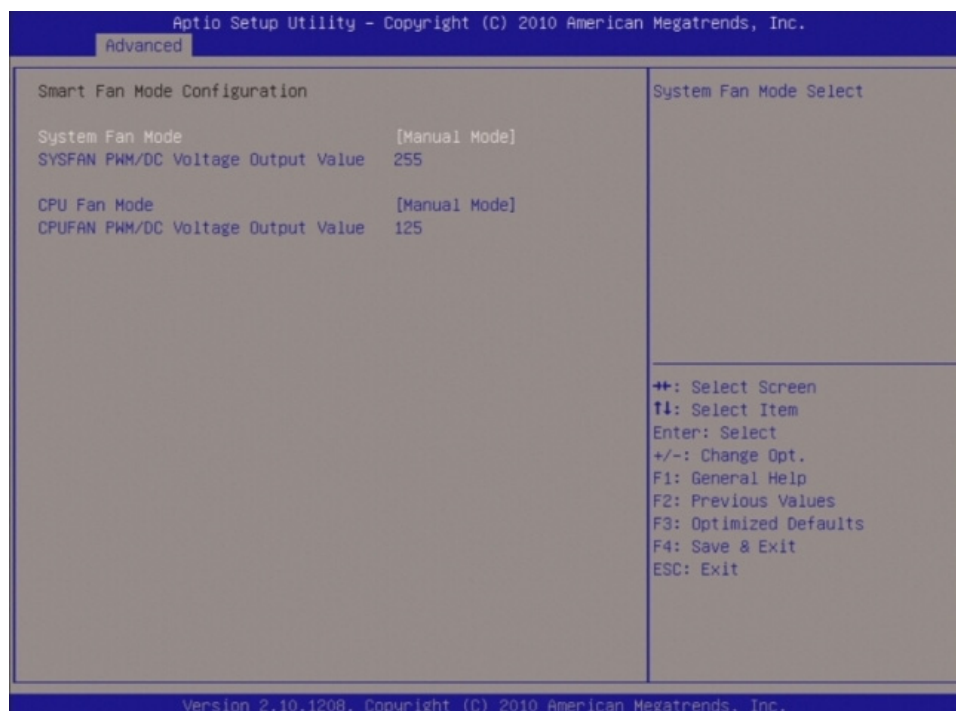
■ **System Fan Mode [Manual Mode]**
Select system Fan mode.
Configuration options: [Manual Mode] [Thermal Cruise Mode][SNART FAN IV Mode].

■ **CPU Fan Mode [Manual Mode]**
Select CPU Fan mode.
Configuration options: [Manual Mode] [Thermal Cruise Mode][SNART FAN IV Mode].

■ **Power-LossFailue [Aways on]**
Enable or Disable Power-Loss Function.
Configuration options: [Always OFF] [Always on][Auto].

■ **Case Open Warning [Disabled]**
Enable or Disable case open warning.
Configuration options: [Disabled] [Enabled].

■ **Resume on PS2 KB [Disabled]**
Enable or Disable Resume on PS2 KB Function.
Configuration options: [Disabled] [Enabled].

■ **Resume on PS2 MS[Disabled]**
Enable or Disable Resume on PS2 MS Function.
Configuration options: [Disabled] [Enabled].

■ **Resume on Ring [Disabled]**
Enable or Disable Resume on Ring Function.
Configuration options: [Disabled] [Enabled].

■ **Watch Dog Timer [Disabled]**
Enable or Disable Watch Dog Timer Function.
Configuration options: [Disabled] [Enabled].

3.4.10.6 Digital I/O Configuration

Digital I/O Configuration
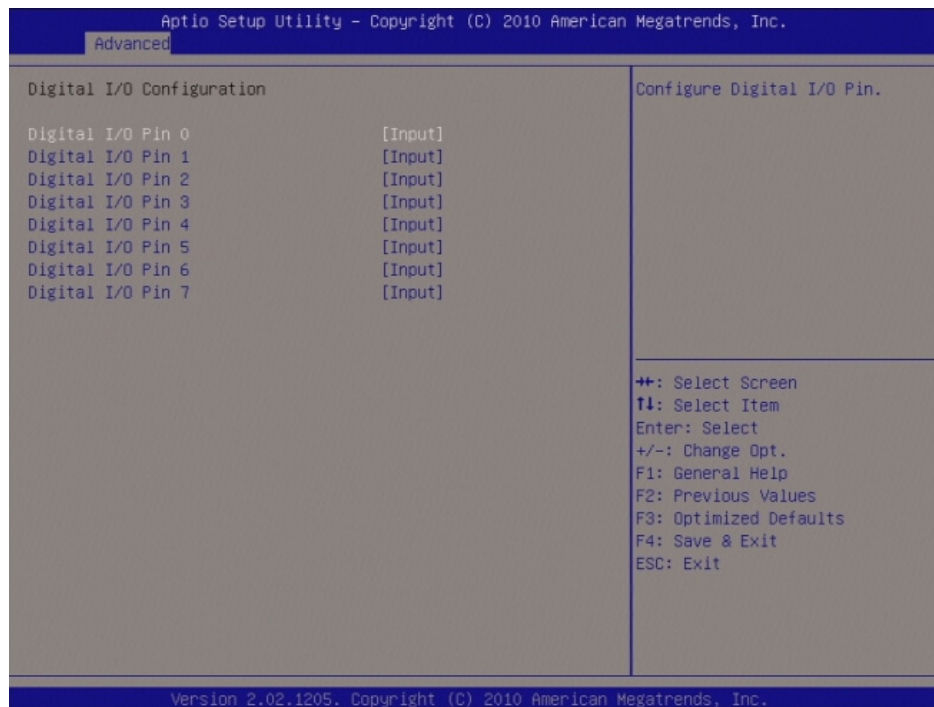
- ■ **Digital I/O Pin 0 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 1 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 2 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 3 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 4 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 5 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 6 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].
- ■ **Digital I/O Pin 7 [Input]**
  Configure Digital I/O Pin.
  Configuration options: [Input][Output High][Output Low].

3.4.11 Hardware Monitor

■ **PC Health Status**
Display system health status.

```
              Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
   Advanced

   Pc Health Status                                        Enabled or Disabled CPU
                                                           Warning Temperature function
   System temperture                 : +32 C
   CPU temperature (PECI)            : +49 C
   System Fan Speed                  : N/A
   CPU Fan Speed                     : 3628 RPM
   VCORE                             : +0.960 V
   +12V                              : +11.904 V
   +5V                               : +4.990 V
   +5VSB                             : +5.120 V
   VBAT                              : +3.216 V

   CPU Warning Temperature            [Disabled]
   ACPI Shutdown Temperature          [Disabled]          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

              Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

■ **CPU Warning Temperature [Disable]**
Enabled or Disabled CPU warning temperature Function.
Configuration options: [Disable] [50 C/122 F] [55 C/131] [60 C/140 F] [65 C/149 F] [70 C/158 F] [75 C/167 F].

■ **ACPI Shutdown Temperature [Disable]**
Enabled or Disabled CPU warning temperature Function.
Configuration options: [Disable] [70 C/158 F] [75 C/167 F] [80 C/176 F] [85 C/185] [90 C/194 F] [95 C/205 F].

3.4.12 Serial Port Console Redirection

Display COM console information.
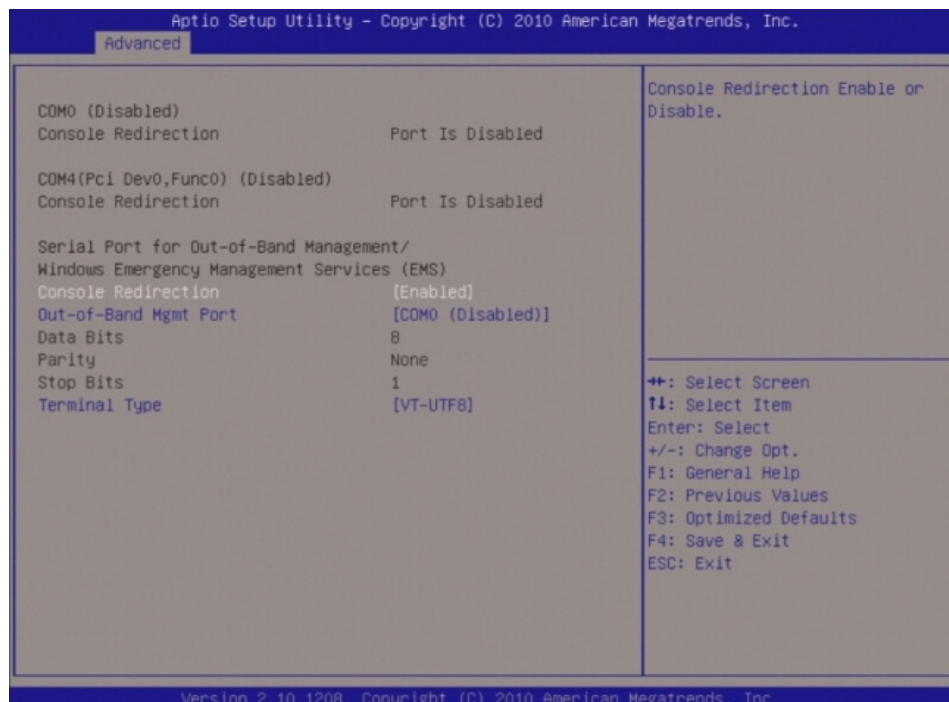
■ **Console Redirection [Enable]**
Console Redirection Enable or Disable.
Configuration options: [Disabled] [Enabled].

■ **Out-of-Band Mgmt port [COM0 (Disabled)]**
Microsoft Windows Emergency management Services (EMS) allows for remote management of a Windows Server OS though a serial port.
Configuration options: [COM0 (Disabled)][COM4 (Pci Dev0, Func0) (Disabled)].

■ **Terminal Type [VT-UTF8]**
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Setting page, for more help with Terminal Type/Emulation.
Configuration options: [VT100][VT100+][VT-UTF8][ANSI].

3.4.13 Intel ICC

Integrated Clock Control Option.

```
          Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
  Advanced

  Use Watchdog Timer for ICC       [Disabled]              Enable Watchdog Timer
  Turn off unused PCI/PCIe clocks  [Enabled]               operation for ICC. If enabled,
  Lock ICC registers               [Static only]           Watchdog Timer will be started
                                                           after ICC-related changes.
  Clock Manipulation                                       This timer detects platform
                                                           instability caused by wrong
  ICC Overclocking Lib             N/A                     clock settings.



                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

          Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

■ **Use Watchdog Timer for ICC[Disable]**
Enable Watchdog Timer operation for ICC.
Configuration options: [Disabled] [Enabled].

■ **Turn off unused PCI/PCIe clocks [Enable]**
Enable or Disable clocks for empty PCI/PCIe slots to save power.
Configuration options: [Disabled] [Enabled].

■ **Lock ICC registers[Static only]**
All registers : ICC registers will be locked.
Static only : only static ICC registers will be locked.
Configuration options: [All registers] [Static only].

3.4.14 Sandybridge DTS Configuration
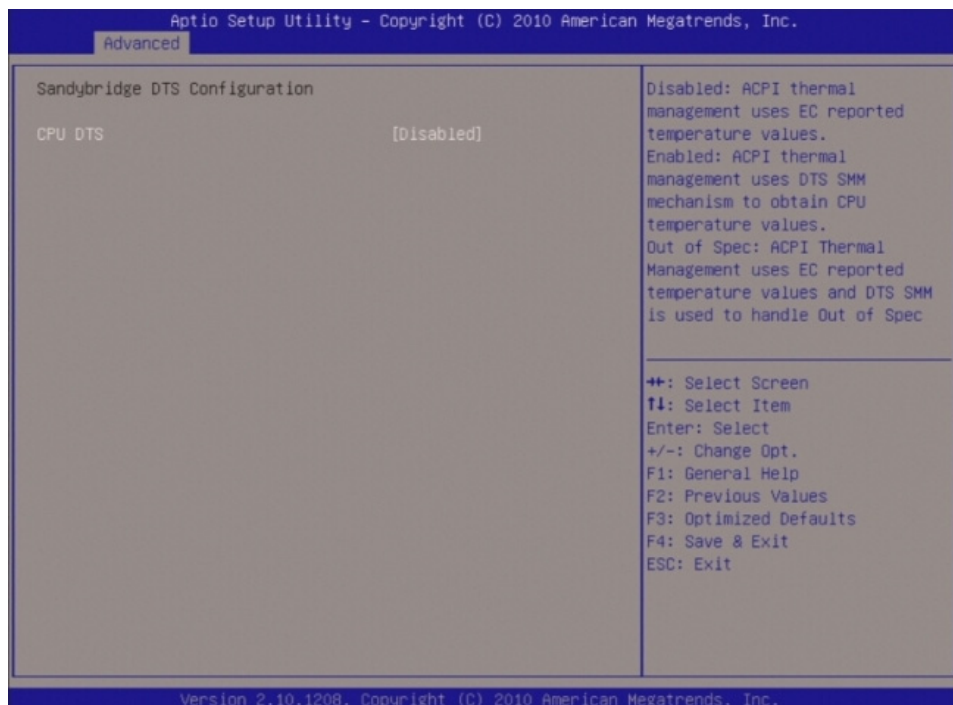
- **CPU DTS[Enable]**
  Enable or Disable CPU DTS.
  Configuration options: [Disabled] [Enabled].

3.4.15 Sandybridge PPM Configuration
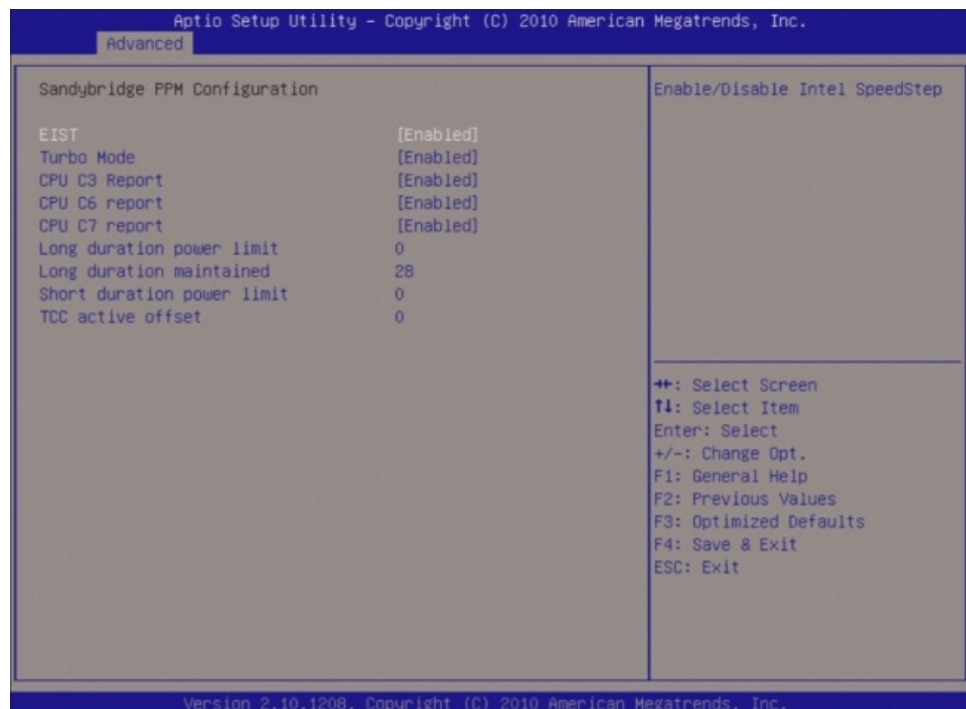
- **EIST [Enable]**
  Enable or Disable Intel Speedstep.
  Configuration options: [Disabled] [Enabled].

- ■ **Turbo Mode [Enable]**
  Enable or Disable Intel Turbo Mode.
  Configuration options: [Disabled] [Enabled].
- ■ **CPU C3 Report[Enable]**
  Enable or Disable CPU C3 report to SO.
  Configuration options: [Disabled] [Enabled].
- ■ **CPU C6 Report[Enable]**
  Enable or Disable CPU C6 report to SO.
  Configuration options: [Disabled] [Enabled].
- ■ **CPU C7 Report[Enable]**
  Enable or Disable CPU C7 report to SO.
  Configuration options: [Disabled] [Enabled].
- ■ **Long Duration power limit[0]**
  Long duration power limit in watts, 0 means use factory default.
- ■ **Long Duration power maintained[28]**
  Time window which long duration power is maintained.
- ■ **Short Duration power limit[0]**
  Short duration power limit in watts, 0 means use factory default.
- ■ **TCC active offset[0]**
  Offset from the factory TCC activation temperature.

3.5 Chipset
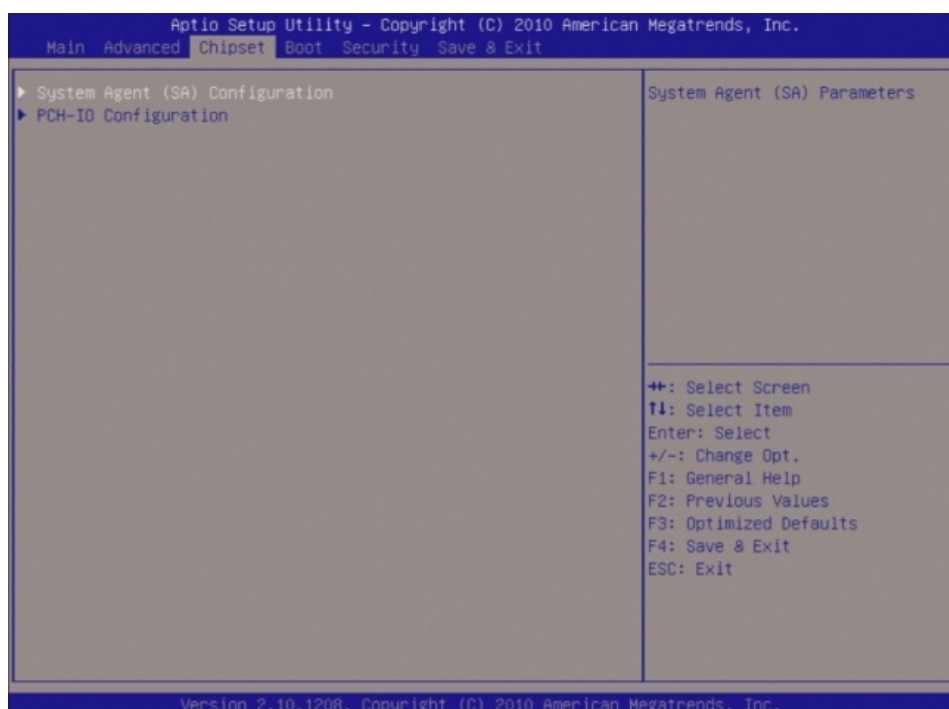
3.5.1 System Agent (SA) Configuration
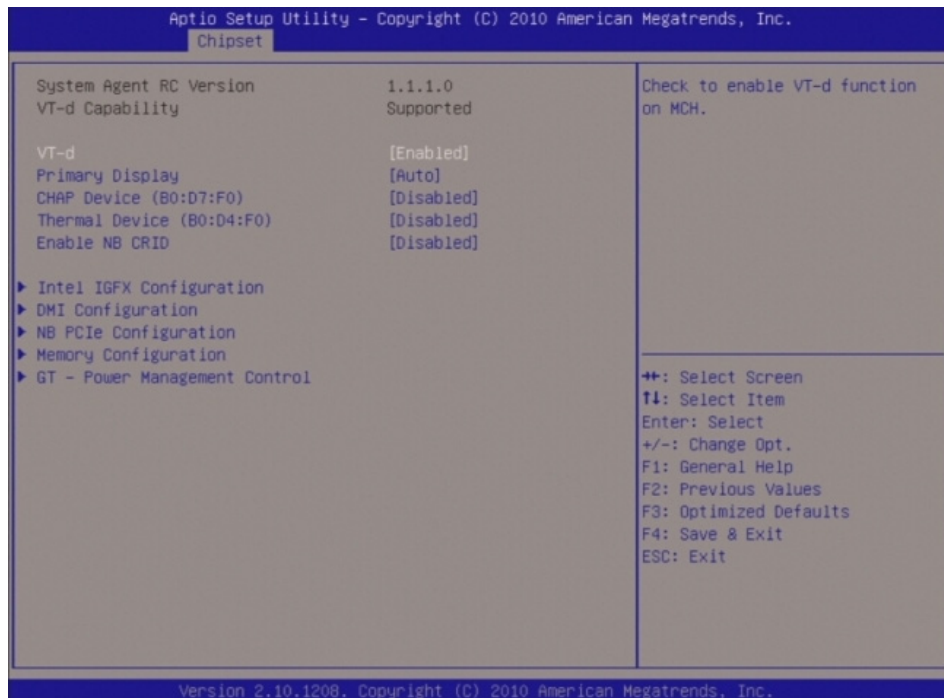
■ **System Agent RC version**
Display System Agent RC information.

■ **VT-d [Disable]**
Set VT-d Enable or Disable.
Configuration options: [Disabled] [Enabled].

■ **Primary Display [Auto]**
Select primary Display.
Configuration options: [Auto] [IGFX] [PEG] [PCI].

■ **CHAP Device (B0:D7:F0) [Disable]**
Enable or Disable SA CHAP Device.
Configuration options: [Disabled] [Enabled].

■ **Thermal Device (B0:D4:F0) [Disable]**
Enable or Disable SA Thermal Device.
Configuration options: [Disabled] [Enabled].

■ **Enable NB CRID [Disable]**
Enable or Disable NB CRID workaround.
Configuration options: [Disabled] [Enabled].

3.5.1.1 Intel IGFX Configuration
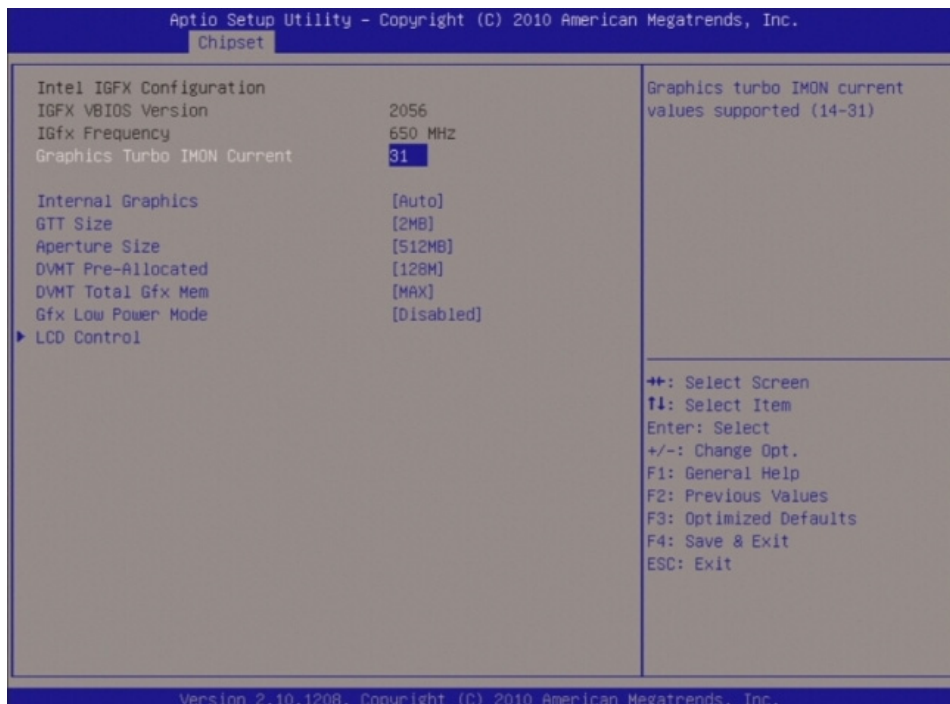
- **Intel IGFX Configuration**
  Display IGFX VBIOS version & IGFX Frequency.
- **Graphic Turbo IMNO Current[31]**
  Graphic Turbo IMNO Current values supported(14-31).
- **Internal Graphic[Auto]**
  Keep IGD enable based on the setup option.
  Configuration options: [Disabled] [Enabled].
- **GTT Size[2MB]**
  Set GTT size.
  Configuration options: [1MB][2MB].
- **Aperture Size[512MB]**
  Set Aperture Size.
  Configuration options: [128MB][256MB][512MB].
- **DVNT Pre-Allocation[128MB]**
  Internal graphic memory size.
  Configuration options: [0][32M] [64M] [96M] [128M] [160M] [192M] [224M] [256M] [288M] [320M] [352M] [384M] [416M] [448M] [480M] [512M].
- **DVMT Total GFX Mem[MAX]**
  Select DVMT5.0 total graphic memory size.
  Configuration options: [128MB][256MB] [MAX].
- **Gfx Low Power Mode[Disable]**
  This option is applicable for SFF only.
  Configuration options: [Disabled] [Enabled].

3.5.1.1.1LCD Control

LCD Control
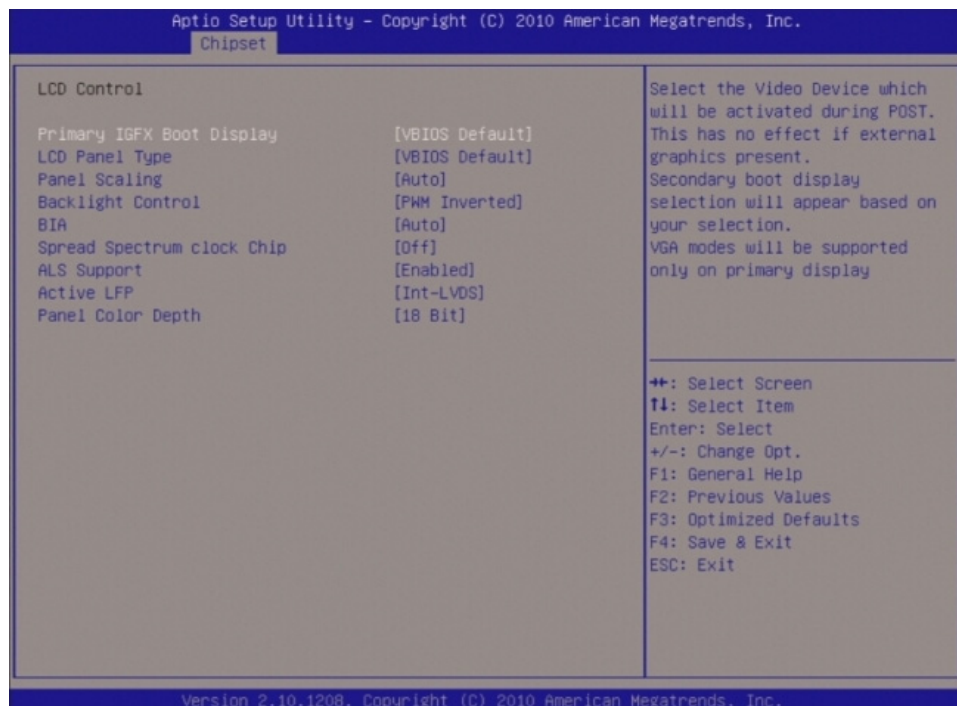
- **Primary IGFX Boot Display[VBIOS Default]**
  Select the display port which be activated during POST. This has no effect if external graphics present.
  Configuration options: [VBIOS Default] [CRT] [HDMI] [LFP] [DisplayPort].

- **LCD Panel Type[VBIOS Default]**
  Select LCD panel type for LVDS port.
  Configuration options: [800x600] [1024x768] [1280x1024] [1400x1050] [1600x1200] [1680x1050] [1600x900] [1280x800] [1280x600] [2048x1536] [1366x768].

- **Panel Scaling[Auto]**
  Select the LCD panel scaling option used by the Internal Graphics Device.
  Configuration options: [Auto][Off][Force Scaling].

- **Backlight Control[PWM Inverted]**
  Backlight control setting.
  Configuration options: [PWM Inverted] [PWM Normal] [GMBus Inverted] [GMBus Normal].

- **BIA[Auto]**
  Auto: GMCH use VBT Default.
  Level n: Enabled with selected Aggressiveness level.
  Configuration options: [Auto] [Disabled] [Level 1] [Level 2] [Level 3] [Level 4] [Level 5].

- **Spread Spectrum clock Chip[Off]**
  Hardware: Spectrum is controlled by Chip.
  Software: Spectrum is controlled by BIOS.
  Configuration options: [Off] [Hardware] [Software].

- **ALS Support[Enable]**
  Valid only for ACPI.
  Configuration options: [Disabled] [Enabled].

- ■ **Active LFP[Int-LVDS]**
  Select the active LFP configuration.
  Configuration options: [No LVDS] [Int-LVDS] [eDP Port-A][eDP Port-D].
- ■ **Panel Color Depth[18 Bit]**
  Select the LFP panel color depth.
  Configuration options: [18 Bit] [24 Bit].

3.5.1.2 DMI Configuration

```
Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
                Chipset

DMI Configuration                                    Enable or disable DMI Vc1

DMI                            X4  Gen2

DMI Vc1 Control                [Enabled]
DMI Vcp Control                [Enabled]
DMI Vcm Control                [Enabled]
DMI Link ASPM Control          [L0sL1]
DMI Extended Synch Control     [Disabled]
DMI Gen 2                      [Enabled]


                                                     →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

            Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

- ■ **DMI Vc1 Contorl[Enable]**
  Enable or disable DMI Vc1.
  Configuration options: [Disabled] [Enabled].
- ■ **DMI Vcp Contorl[Enable]**
  Enable or disable DMI Vcp.
  Configuration options: [Disabled] [Enabled].
- ■ **DMI Vcm Contorl[Enable]**
  Enable or disable DMI Vcm.
  Configuration options: [Disabled] [Enabled].
- ■ **DMI Link ASPM Contorl[L0sL1]**
  Enable or disable the control of active state power management on SA side of
  the DMI link.
  Configuration options: [Disabled] [L0s] [L1] [L0sL1].
- ■ **DMI Extended synch Contorl[Disable]**
  Enable or disable Extended synchronization.
  Configuration options: [Disabled] [Enabled].
- ■ **DMI Gen2 [Enable]**
  Set DMI Gen2 Enable or Disable.
  Configuration options: [Disabled] [Enabled].

3.5.1.3 NB PCIe Configuration
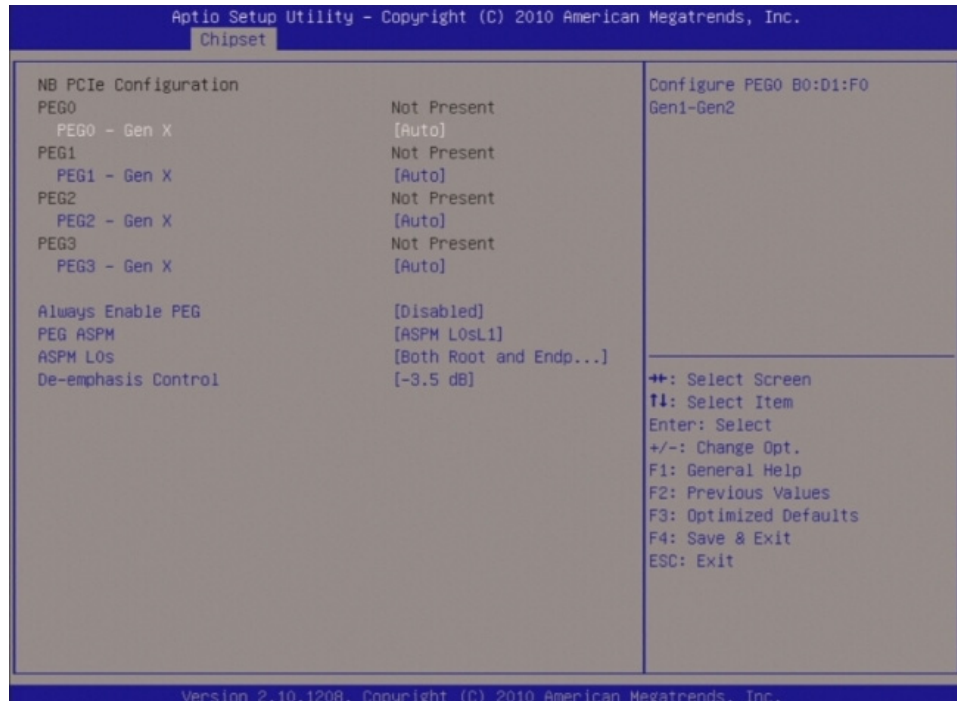
- ■ **PEG0 - Gen X**
  Configure PEG0 B0 :D1 :F0 Gen1-Gen2.
  Configuration options: [Auto] [Gen1] [Gen2].
- ■ **PEG1 - Gen X**
  Configure PEG1 B0 :D1 :F1 Gen1-Gen2.
  Configuration options: [Auto] [Gen1] [Gen2].
- ■ **PEG2 - Gen X**
  Configure PEG2 B0 :D1 :F2 Gen1-Gen2.
  Configuration options: [Auto] [Gen1] [Gen2].
- ■ **PEG3 - Gen X**
  Configure PEG3 B0 :D1 :F3 Gen1-Gen2.
  Configuration options: [Auto] [Gen1] [Gen2].
- ■ **Always Enable PEG[Disable]**
  To Enable the PEG slot..
  Configuration options: [Disabled] [Enabled].
- ■ **PEG ASPM[ASPM L0sL1]**
  Control ASPM support for the PEG device.
  Configuration options: [Disabled] [Auto] [L0s] [L1] [L0sL1].
- ■ **ASPM L0s[Both Boot and Endpoint Ports]**
  Enable PCIe ASPM L0s.
  Configuration options: [Boot Port only] [Endpoint Port only] [Both Boot and End-point Ports].
- ■ **De-emphasis Control[-3.5 dB]**
  Configure the De-emphasis control on PEG.
  Configuration options: [-6 dB] [-3.5 dB].

3.5.1.4 Memory Configuration

```
            Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
                       Chipset

    Memory Information                                        Select DIMM timing profile
                                                              that should be used.
    Memory RC Version              1.1.1.0
    Memory Frequency               1067 Mhz
    Total Memory                   2048 MB (DDR3)
    DIMM#0                         2048 MB (DDR3)
    DIMM#2                         Not Present
    CAS Latency (tCL)              7
    Minimum delay time
        CAS to RAS (tRCDmin)       7
        Row Precharge (tRPmin)     7
        Active to Precharge (tRASmin)  20

    DIMM profile                   [Default DIMM profile]   ++: Select Screen
    Memory Frequency               [Auto]                   ↑↓: Select Item
    Max TOLUD                      [Dynamic]                Enter: Select
    NMode Support                  [Auto]                   +/-: Change Opt.
    Memory Scrambler               [Disabled]               F1: General Help
    RMT Crosser Support            [Disabled]               F2: Previous Values
    MRC Fast Boot                  [Enabled]                F3: Optimized Defaults
    DIMM Exit Mode                 [Auto]                   F4: Save & Exit
                                                            ESC: Exit




            Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

■ **Memory Configuration**
Display system memory information.

■ **DIMM profile[Default DIMM profile]**
Select DIMM timing profile that should be used.
Configuration options: [Default DIMM profile] [XMP profile 1] [XMP profile 2].

■ **Memory Frequency[Auto]**
Select Memory Frequency in Mhz.
Configuration options: [Auto] [1067] [1333] [1600] [1867] [2133].

■ **Max TOLUD[Dynmic]**
Maximum Value of TOLUD.
Configuration options: [Dynamic] [1 GB] [1.25 GB] [1.5 GB] [1.75 GB] [2 GB] [2.25 GB] [2.5 GB] [2.75 GB] [3 GB].

■ **NMode Support[Auto]**
NMode support Option.
Configuration options: [Auto] [1N Mode] [2N Mode].

■ **Memory Scrambler [Disable]**
Enable or Disable Memory Scrambler support.
Configuration options: [Disabled] [Enabled].

■ **RMT Crosser Support[Disable]**
Enable or Disable RMT Crosser Support.
Configuration options: [Disabled] [Enabled].

■ **MRC Fast Boot[Ensable]**
Enable or Disable MRC fast boot.
Configuration options: [Disabled] [Enabled].

■ **DIMM Exit Mode[Auto]**
DIMM Exit Mode control.
Configuration options: [Auto] [Slow Exit] [Fast Exit].

3.5.1.5 GT - Power management Control
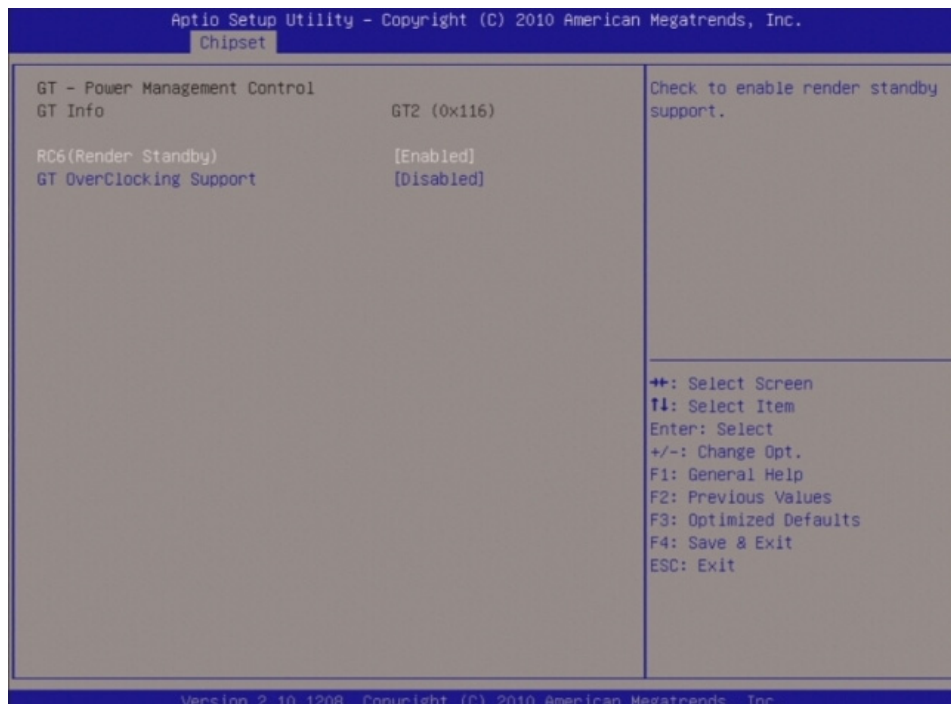
■ **RC6 (Pender Standby) [Enable]**
Check to enable render standby support.
Configuration options: [Disabled] [Enabled].

■ **GT Overclocking Support[Disable]**
Enable or Disable GT overclocking support.
Configuration options: [Disabled] [Enabled].

■ **IGD Multi-Monitor [Disable]**
Enable/Disable IGD Multi-Monitor by internal graphics device.
Configuration options: [Disabled] [Enabled].

■ **PCI Express Port**
Enable/Disable PCI Express Port.
Configuration options: [Disabled] [Enabled][Auto].

■ **PEG Force Gen1**
PCI Express Port PEG Force Gen1.
Configuration options: [Disabled] [Enabled][Auto].

■ **Detect Non-Compliance**
Detect Non-Compliance PCI Express device in PEG.
Configuration options: [Disabled] [Enabled][Auto].

3.5.2 PCH-IO Configuration

PCH Parameters
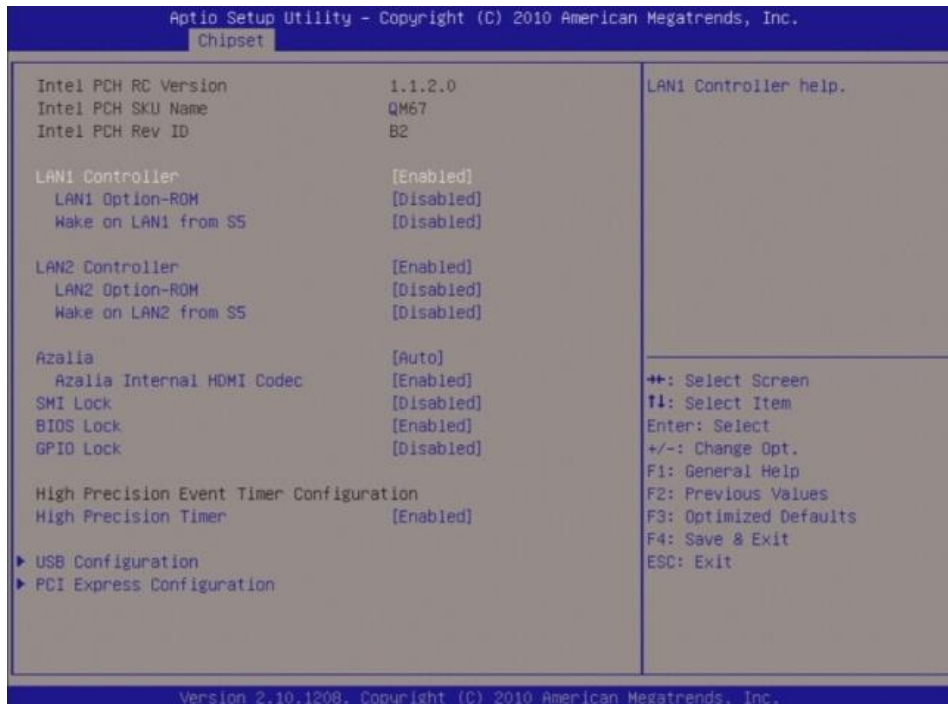
- ■ **Intel PCH Information**
- ■ **LAN1 Controller [Enable]**
  Enable/Disable LAN1 Controller.
  Configuration options: [Disabled] [Enabled].
- ■ **LAN1 Option-ROM [Disable]**
  Enable/Disable LAN1 boot option for legacy network devices.
  Configuration options: [Disabled] [Enabled].
- ■ **Wake on LAN1 from S5 [Disable]**
  Configuration options: [Disabled] [Enabled].
- ■ **LAN2 Controller [Enable]**
  Enable/Disable LAN1 Controller.
  Configuration options: [Disabled] [Enabled].
- ■ **LAN2 Option-ROM [Disable]**
  Enable/Disable LAN2 boot option for legacy network devices.
  Configuration options: [Disabled] [Enabled].
- ■ **Wake on LAN2 from S5 [Disable]**
  Configuration options: [Disabled] [Enabled].
- ■ **Azalia HD Audio [Enable]**
  Enable/Disable Azalia HD Audio.
  Configuration options: [Disabled] [Enabled].
- ■ **Azalia internal HDMI codec [Enable]**
  Enable/Disable Azalia internal HDMI codec.
  Configuration options: [Disabled] [Enabled].
- ■ **SMI Lock[Disable]**
  Enable or Disable SMI lockdown.
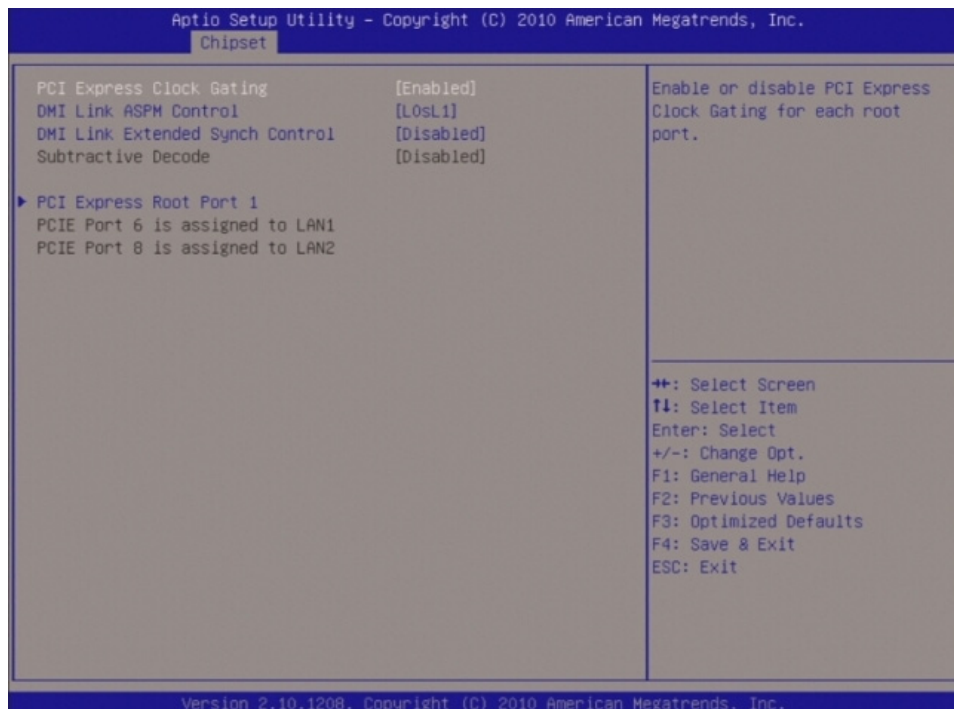 Configuration options: [Disabled] [Enabled].

- **BIOS Lock[Enable]**
  Enable or Disable BIOS interface lockdown.
  Configuration options: [Disabled] [Enabled].
- **GPIO Lock[Disable]**
  Enable or Disable SMI lockdown.
  Configuration options: [Disabled] [Enabled].
- **High Precision Timer [Enable]**
  Enable/Disable the High Precision Timer.
  Configuration options: [Disabled] [Enabled].

3.5.2.1 USB Configuration
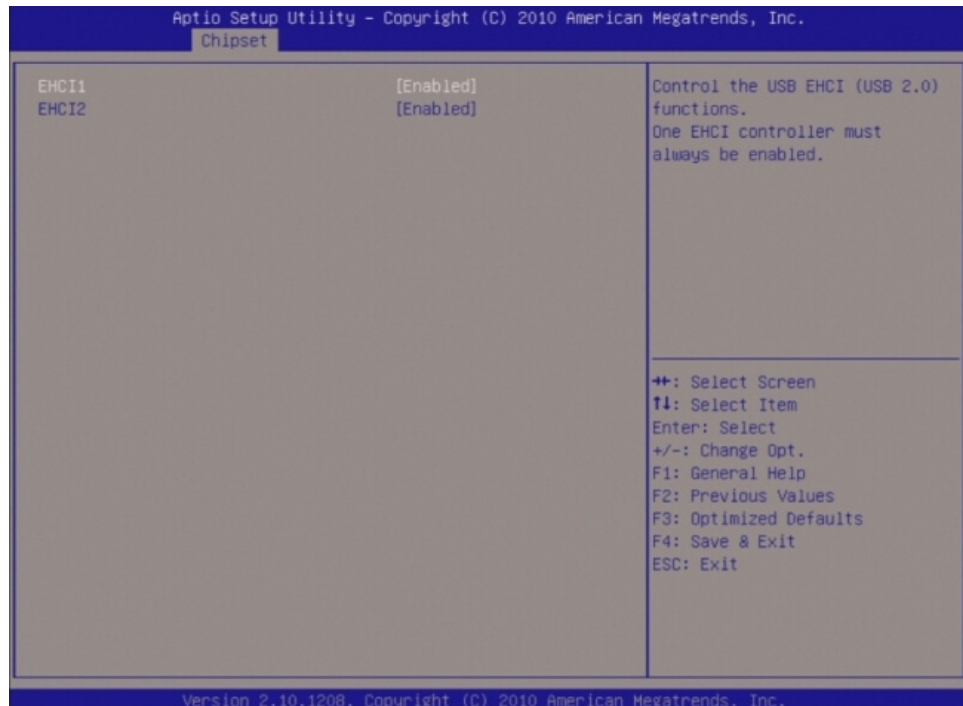
- **EHCI1 [Enabled]**
  Enable/Disable USB 2.0(EHCI) support.
  Configuration options: [Disabled] [Enabled].
- **EHCI2 [Enabled]**
  Enable/Disable USB 2.0(EHCI) support.
  Configuration options: [Disabled] [Enabled].

3.5.2.2 PCI Express Configuration

■ **PCI Express Clock Gating [Enable]**
Enable or Disable PCI Express clock gating for each root port.
Configuration options: [Disabled] [Enabled].

■ **DMI Link ASPM Contorl [L0sL1]**
Enable or disable the control of active state power management on SA side of the DMI link.
Configuration options: [Disabled] [L0s] [L1] [L0sL1].

■ **DMI Extended synch Contorl [Disable]**
Enable or disable Extended synchronization.
Configuration options: [Disabled] [Enabled].

3.5.2.2.1 PCI Express Root Port 1

PCI Express Root Port 1 setting.
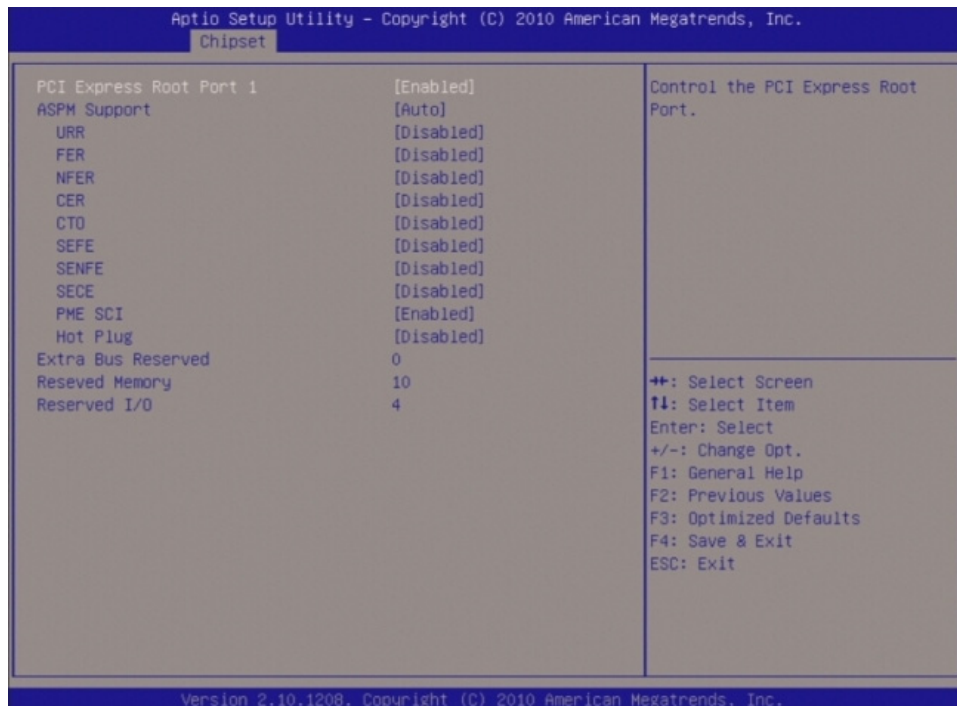
Configuration options: [Disabled] [Enabled][Auto].

■ **PCI Express Root Port 1 [Enable]**
Enable or Disable to cintrol PCI Express Root Port.
Configuration options: [Disabled] [Enabled][Auto].

■ **ASPM Support[Auto]**
URR[Disable]
FER[Disable]
NFER[Disable]
CER[Disable]
CTO[Disable]
SEFE[Disable]
SENFE[Disable]
SECE[Disable]
PME SCI[Disable]
Hot Plug[Disable]

■ **Exrea Bus Reserved[0]**

■ **Reserved Memory[0]**

■ **Reserved I/O[4]**

3.6 Boot

Boot Configuration
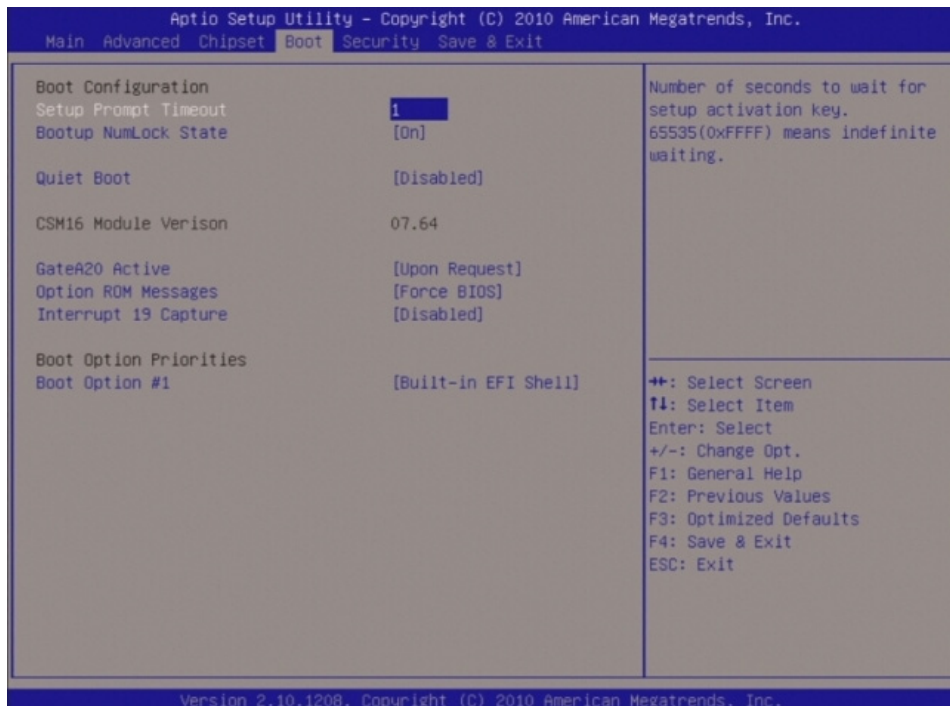
- **Setup Prompt Timeout [1]**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- **Bootup NumLock State [On]**
  Select the keyboard NumLock state.
  Configuration options: [On] [Off].
- **Quick Boot [Disable]**
  Configuration options: [Disable] [Enable].
- **Fast Boot [Disable]**
  Enable or disable boot with initialization of minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
  Configuration options: [Disable] [Enable].
- **CSM16 Module Version [07.64]**
  Display CSM16 Module Version.
- **GataA20 Active [Upon Request]**
  Upon Request - GA20 can be disable using BIOS services.
  Always - do not allow disabling GA20; this option is useful when any RT code is ececuted above 1MB.
  Configuration options: [Upon Request] [Always].
- **Option ROM Messages [Force BIOS]**
  Set display mode for option ROM.
  Configuration options: [Force BIOS] [Keep Current].
- **Interrupt 19 Capture [Disable]**
  Enabled : Allow option ROMs to trap Int19.
  Configuration options: [Disabled][Enabled].
- **Boot option priorities [Built-in EFI Shell]**
  Select the system boot order.
  Configuration options: [Built-in EFI Shell][Disabled].

3.7 Security
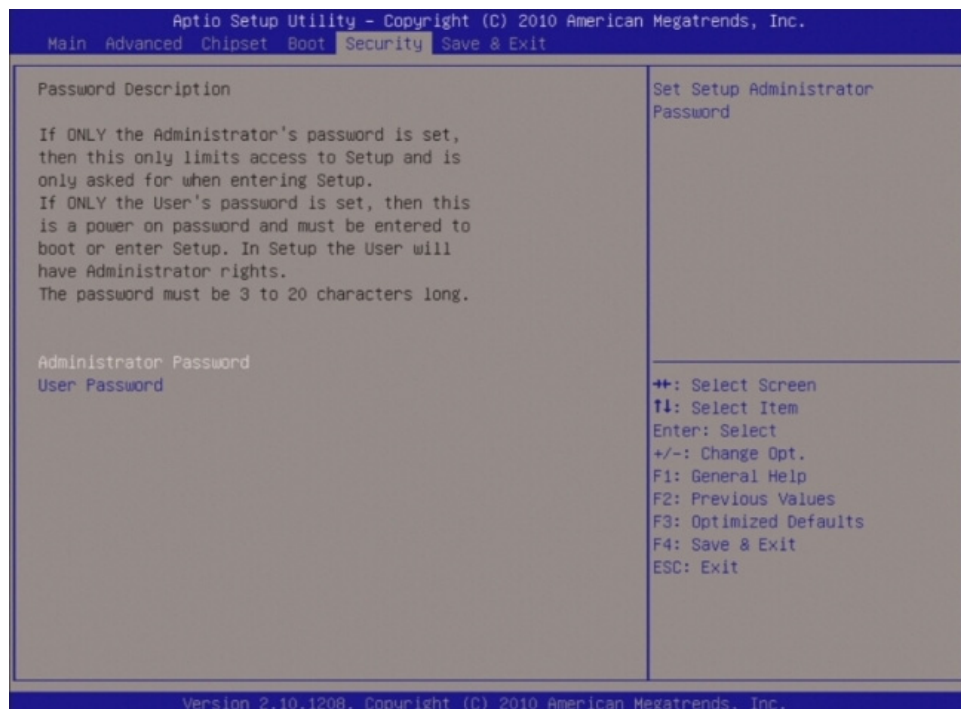
- **Administrator Password**
  Set setup Administrator Password.
- **User Password**
  Set User Password.

3.8 Save & Exit
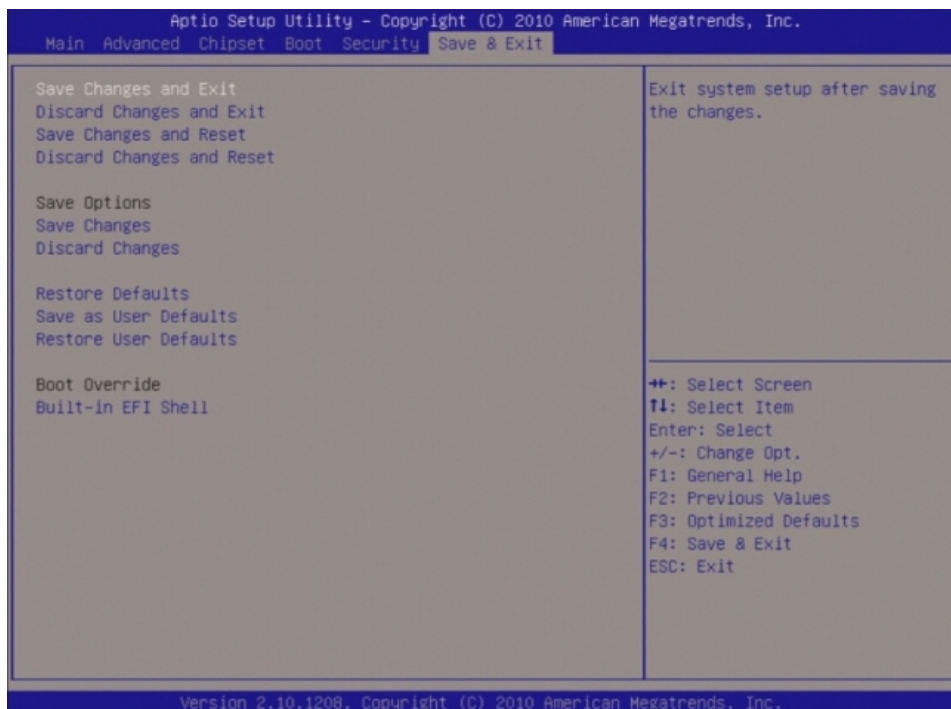
■ **Save changes and Exit**
Exit system setup after saving the changes.

■ **Discard changes and Exit**
Exit system setup without saving the changes.

■ **Save changes and Reset**
Reset the system after saving the changes.

■ **Discard changes and Reset**
Reset the system without saving the changes.

■ **Save changes**
Save changes done so for to any of the setup option.

■ **Discard changes**
Discard changes done so for to any of the setup option.

■ **Restore Defaults**
Restore/Load default values for all the setup option.

■ **Save as User Defaults**
Save the changes done so far as User Defaults.

■ **Restore User Defaults**
Restore the user defaults to all the setup options.

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com