



***AXIOMTEK***

## **MANO861**

**Intel® LGA1155 Socket Supports  
22nm / 32nm Intel® Core™ i7 /  
Core™ i5 / Core™ i3 / Pentium® /  
Celeron®  
Mini ITX Motherboard**

**User's Manual**



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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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## 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.

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## Conventions Used in This Manual

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**

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.

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# Chapter 1

## Introduction



The MANO861 supports latest Intel® Desktop LGA1155 CPU-socket interface processor. Intel® LGA1155 socket supports 22nm/32nm Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® / Celeron® desktop CPU, which are built on 22nm/32nm technologies to provide smart performance and responsiveness on executing tasks. It combines the CPU and GPU to offer fantastic HD media and graphics, especially on 3D gaming experience. Doubles the bandwidth of your system memory up to 21GB/s and pumps up the system performance at lower power.

DMI (Direct Media Interface) architecture connects between the processor and chipset at 5.0Gb/s which twice the speed of previous version. The exceptionally increased interconnect bit rate from 2.5Gb/s up to 5.0Gb/s would effectively eliminates the bottle neck of the system performance and brings the most terrific computing experience from the present to the future.

There are 3 SATA ports 3.0Gb/s devices for backward compatibility.

### 1.1 Features

- LGA1155 socket 3<sup>rd</sup> Generation Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® processors
- 2 DDR3 1333/1066MHz up to 16GB
- 1 PCI-Express x4
- 6 USB 2.0 supported
- 3 SATA 2.0 supported
- 6 COM ports supported
- Dual view display

## 1.2 Specifications

- **CPU**
  - Intel® Core™ i7 processor.
  - Intel® Core™ i7 processor.
  - Intel® Core™ i5 processor.
  - Intel® Core™ i3 processor.
  - Intel® Pentium® processor.
  - Intel® Celeron® processor.
- **System Chipset**
  - Intel® H61.
- **DRAM Transfer Rate**
  - 1333/1066MHz.
- **BIOS**
  - AMI 32Mb SPI ROM.
- **System Memory**
  - Two 204-pin unbuffered DDR3 SO-DIMM sockets.
  - Maximum up to 16GB DDR3 1333/1066MHz memory with two SO-DIMMs.
- **Onboard Multi I/O**
  - Serial ports: One RS-232/422/485 (COM1) and five RS-232 (COM2~6).
  - One PS/2 keyboard/mouse.
- **Serial ATA**
  - Three SATA 2.0 ports (3Gb/s performance).
- **USB Interface**
  - Six USB 2.0 ports.
- **Display**
  - One VGA
  - One DVI-D
  - One LVDS.
- **Ethernet**
  - 1<sup>st</sup> port as 10/100/1000Mbps supports WOL, PXE with Realtek 8111E (LAN1).
  - 2<sup>nd</sup> port as 10/100/1000Mbps supports WOL, PXE with Realtek 8111E (LAN2).
- **Audio**
  - HD audio compliant (as MIC-in/line-out) via Realtek ALC892.
- **Digital I/O**
  - Eight channels (four digital inputs and four digital outputs).
- **Expansion Interface**
  - One PCI-Express x4 slot.
  - One PCI-Express Mini Card
- **Hardware Monitoring**
  - Detect CPU/system temperature, voltage and fan speed.

- **Watchdog Timer**
  - 1~255 seconds; up to 256 levels.
- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).
- **Form Factor**
  - Mini ITX form factor.



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

**Note**

### 1.3 Utilities Supported

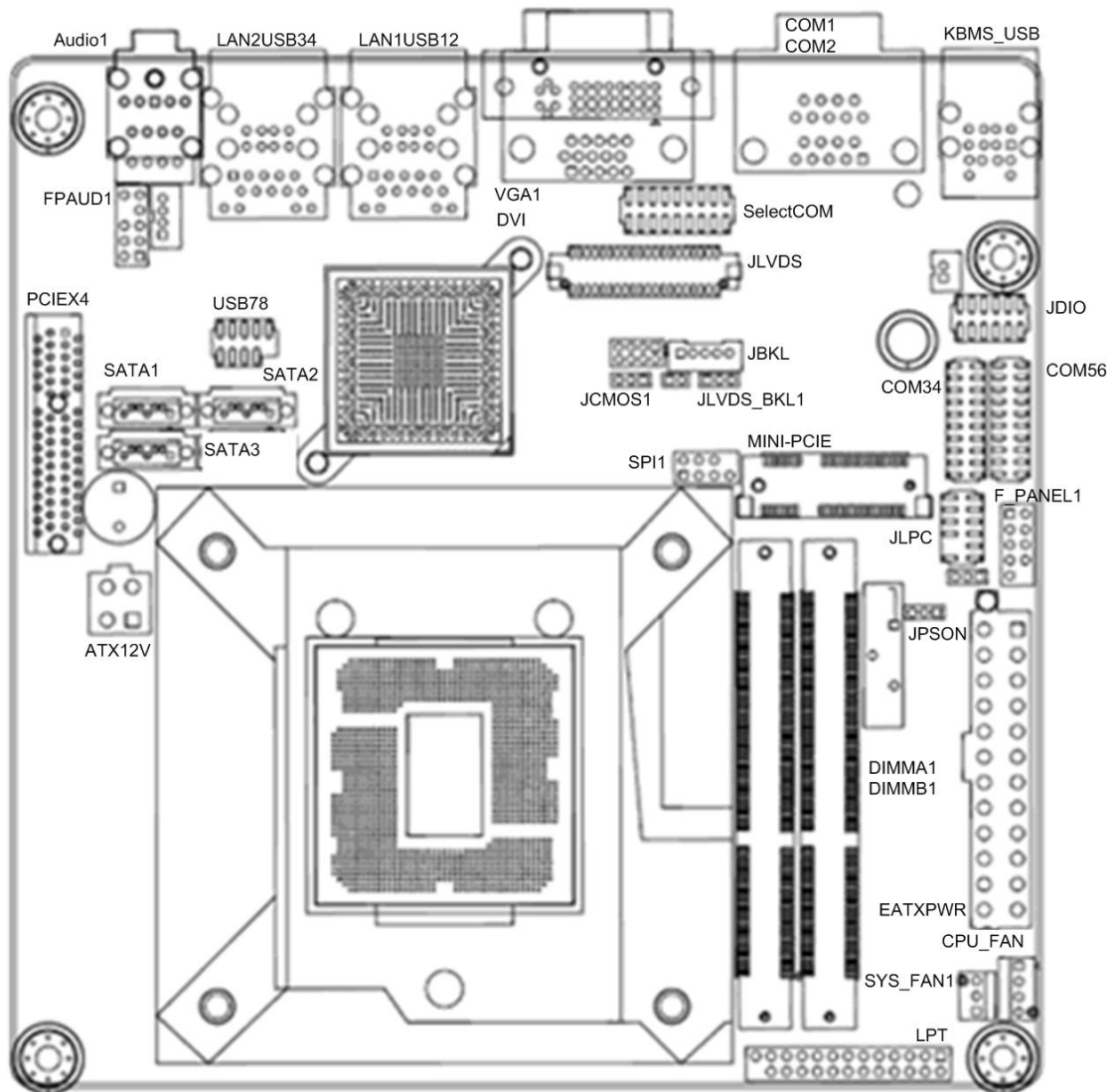
- Chipset driver
- Ethernet driver
- Graphics driver
- Audio driver

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# Chapter 2

## Board and Pin Assignments

### 2.1 Board Layout

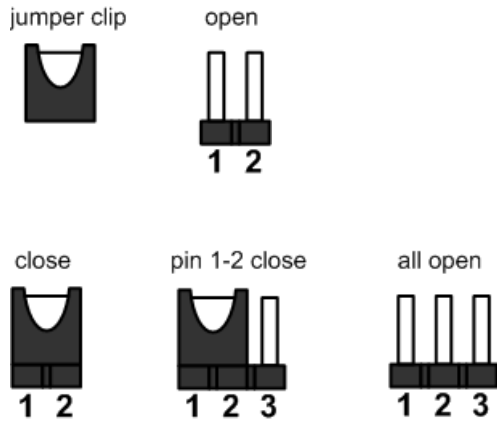


### 2.2 Rear Panel I/O



## 2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.



Before applying power to MANO861 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table and onboard default settings.

Jumper	Description	Setting
JCMOS1	Clear CMOS Default: Normal Operation	1-2 close
JPSON	AT/ATX Power Mode Selection Default: ATX Mode	2-3 close
JLVDS_BKL1	LVDS Backlight Power Selection Default: +5V	1-2 close

### 2.3.1 Clear CMOS (JCMOS1)

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:

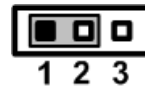
1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
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 this jumper default position. Removing the cap will cause system boot failure!**

Function	Setting
Normal operation (Default)	1-2 close
Clear CMOS	2-3 close



Note

**You do not need to clear the RTC when the system hangs due to overclocking. 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.**

### 2.3.2 AT/ATX Power Mode Selection (JPSON)

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

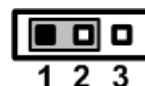
Function	Setting
AT mode	1-2 close
ATX mode (Default)	2-3 close



### 2.3.3 LVDS Backlight Power Selection (JLVDS\_BKL1)

This jumper allows you to select LVDS backlight power.

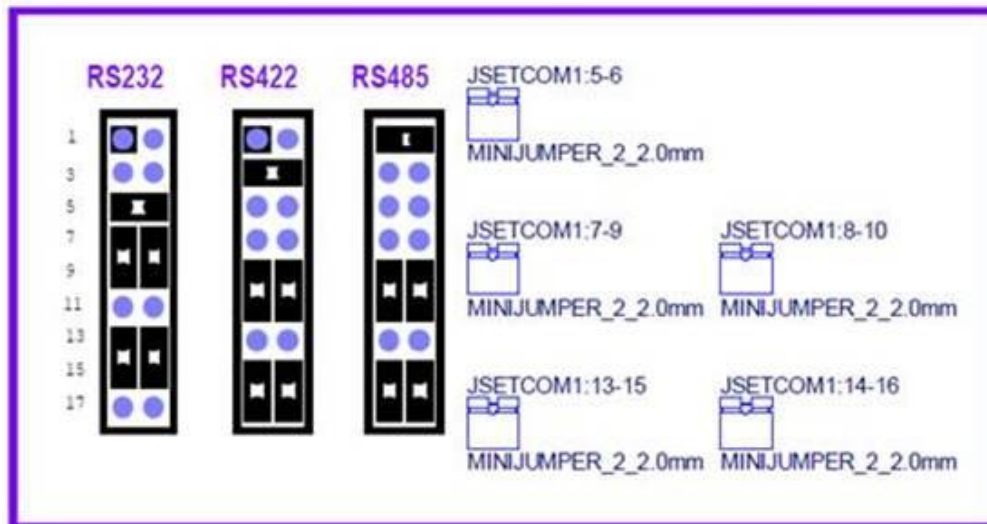
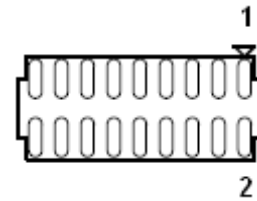
Function	Setting
+5V (Default)	1-2 close
+3.3V	2-3 close



### 2.3.4 SelectCOM Connector (SelectCOM)

Select COM for RS-232/422/485.

Pin	Signal	Pin	Signal
1	UART1_RXD	2	COM1_485_RXD
3	UART1_RXD	4	COM1_422_RXD
5	UART1_RXD	6	COM1_232_RXD
7	COM1_BUF_DCD#	8	COM1_BUF_TXD
9	COM1_DCD#	10	COM1_TXD
11	COM1_TXD422-	12	COM1_RXD422+
13	COM1_BUF_RXD	14	COM1_BUF_DTR#
15	COM1_RXD	16	COM1_DTR#
17	COM1_TXD422+	18	COM1_RXD422-



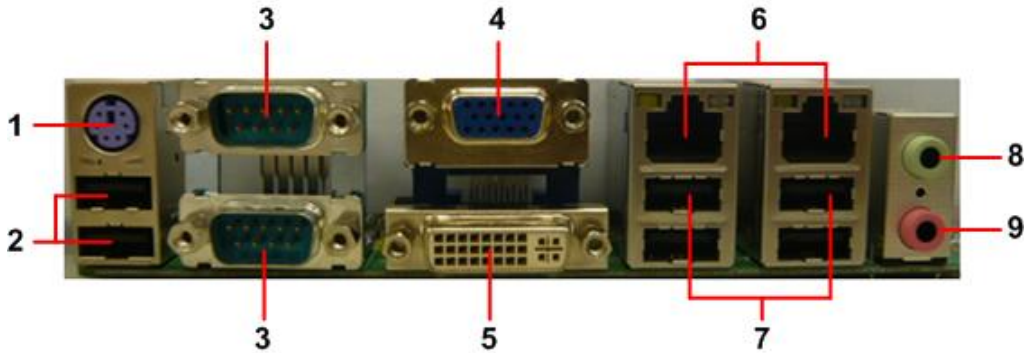


## 2.4 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

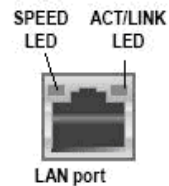
Connector	Description
KBMS_USB	USB 2.0, PS/2 Keyboard and Mouse Connector
COM1~2	COM1 and COM2 Connector
DVI	DVI Port
VGA1	VGA Port
LAN1USB12	LAN1, USB 2.0 Port 1 and 2
LAN2USB34	LAN2, USB 2.0 Port 3 and 4
AUDIO1	Audio Jack
DIMMA1	204-pin DDR3 SO-DIMM Slot A1
DIMMB1	204-pin DDR3 SO-DIMM Slot B1
PCIEX4	PCI-Express x4 Slot
MINI-PCIE	PCI-Express Mini Card Connector
CPU_FAN	CPU Fan Connector
SYS_FAN1	System Fan Connector
COM3~6	COM3~COM6 Connectors
JDIO	GPIO Connector
F_PANEL1	Front Panel Connector
EATXPWR	EATX Power Connector
FPAUD1	Internal Audio Connector
JLVDS	LVDS Connector
JBKL	LCD Inverter Connector
SATA1~3	Serial ATA Connectors
ATX12V	ATX Power Connector
USB78	USB Connector
SelectCOM	SelectCOM Connector
SPI1	SPI Connector
JLPC	LPC Connector
LPT	LPT Connector

### 2.4.1 Rear Panel Connectors



1. **PS/2 port (purple).** This port is for a PS/2 keyboard and mouse.
2. **USB 2.0 ports 5 and 6.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
3. **Serial connectors.** These 9-pin COM1 and COM2 ports are for serial devices.
4. **VGA port.** This 15-pin VGA port connects to a VGA monitor.
5. **DVI-D port.** This 29-pin DVI-D port is for a DVI monitor.
6. **LAN (RJ-45) ports.** Each of these ports allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

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



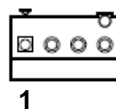
7. **USB 2.0 ports 1~4.** These four 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8. **Line-out port (Green).** This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes front speaker-out.
9. **Microphone port (pink).** This port connects a microphone.

### 2.4.2 FAN Connectors (CPU\_FAN and 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.

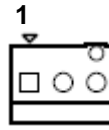
CPU fan interface is available through CPU\_FAN, see table below.

Pin	Signal
1	GND
2	+12V
3	Tach
4	PWM



System fan interface is available through SYS\_FAN1, see table below.

Pin	Signal
1	GND
2	SYSFAN1_VCC(PWM)
3	SYSFAN1_IO



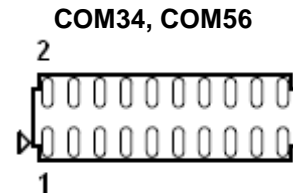
Caution

**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.**

### 2.4.3 COM Connectors (COM34 and COM56)

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

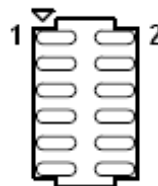
Pin	Signal	Pin	Signal
1	DCD#	2	DSR#
3	RXD	4	RTS#
5	TXD	6	CTS#
7	DTR#	8	RI#
9	GND	10	GND
11	DCD#	12	DSR#
13	RXD	14	RTS#
15	TXD	16	CTS#
17	DTR#	18	RI#
19	GND	20	GND



### 2.4.4 GPIO Connector (JDIO)

This connector is for GPIO function.

Pin	Signal
1	SIO_GPIO0
2	SIO_GPIO4
3	SIO_GPIO1
4	SIO_GPIO5
5	SIO_GPIO2
6	SIO_GPIO6
7	SIO_GPIO3
8	SIO_GPIO7
9	SMB_CLK_MAIN
10	SMB_DAT_MAIN
11	GND
12	VCC GPIO



### 2.4.5 Front Panel Connector (F\_PANEL1)

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

Pin	Signal
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.

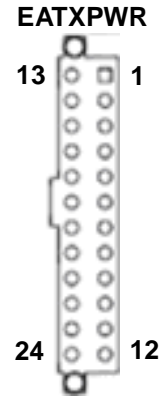
#### Hard Disk Drive Activity LED (Pin 1-3 HDLED)

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.

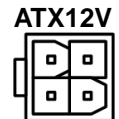
### 2.4.6 Power Connectors (EATXPWR and ATX12V)

Both connectors are 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.

Pin	Signal	Pin	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS-ON# (power supply remote on/off)
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	PWRGD (Power Good)	20	No connect
9	+5V (Standby)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	Ground



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



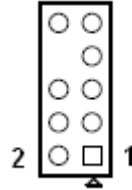
**Note**

- *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.*

### 2.4.7 Internal Audio 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.

Pin	Signal
1	MIC2_L
2	GND
3	MIC2_R
4	PRESENSE
5	LIN2_R
6	MIC2_JD
7	FIO_SENSE
8	NC
9	LIN2_L
10	LINE_JD



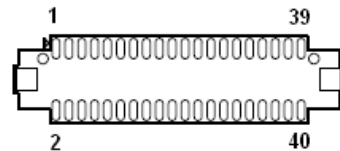
**Important**

*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.*

### 2.4.8 LVDS Connector (JLVDS)

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

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



### 2.4.9 LCD Inverter Connector (JBKL)

The connector is for the control of internal LVDS brightness.

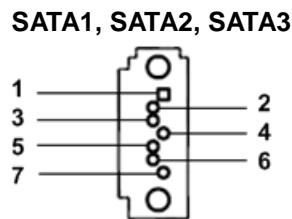
Pin	Signal
1	+12V
2	GND
3	BL_EN
4	BRIGHT1
5	+5V



### 2.4.10 Serial ATA Connectors (SATA1~SATA3)

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

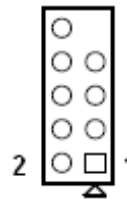
Pin	Signal
1	GND
2	SATA_TXP2
3	SATA_TXN2
4	GND
5	SATA_RXN2
6	SATA_RXP2
7	GND



### 2.4.11 USB Connector (USB78)

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.

Pin	Signal	Pin	Signal
1	USB+5V	2	USB+5V
3	USB-	4	USB-
5	USB+	6	USB+
7	GND	8	GND
9	NC		



### 2.4.12 SPI Connector (SPI1)

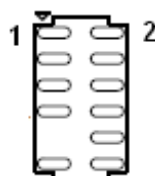
Is a point-to-point interface standard, which allows network equipment designers to develop an array of next-generation multi-service switches and routers to support multi-service traffic with aggregate bandwidths up to OC-192 (10Gb/s) and beyond, enabling them to dramatically increase system performance.

Pin	Signal
1	+3V
2	GND
3	SPI_CS#
4	SPI_CLK
5	SPI_MISO
6	SPI_MOSI
7	SPI_HOLD#



### 2.4.13 LPC Connector (JLPC)

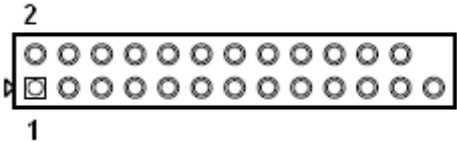
Pin	Signal
1	NC
2	+3.3
3	LPC_AD3
4	PRST_SIO#
5	LPC_AD1
6	LPC_AD2
7	LPC_FRAME#
8	LPC_AD0
9	
10	GND
11	CLK33M_LPC
12	GND





2.4.14 LPT Connector (LPT)

Pin	Signal	Pin	Signal
1	STB#	2	AFD#
3	DATA0	4	ERR#
5	DATA1	6	INIT#
7	DATA2	8	SLIN#
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	NC



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# Chapter 3

## Hardware Installation

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.*

### 3.1 Motherboard Overview

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



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.*

#### 3.1.1 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.

#### 3.1.2 Screw Holes

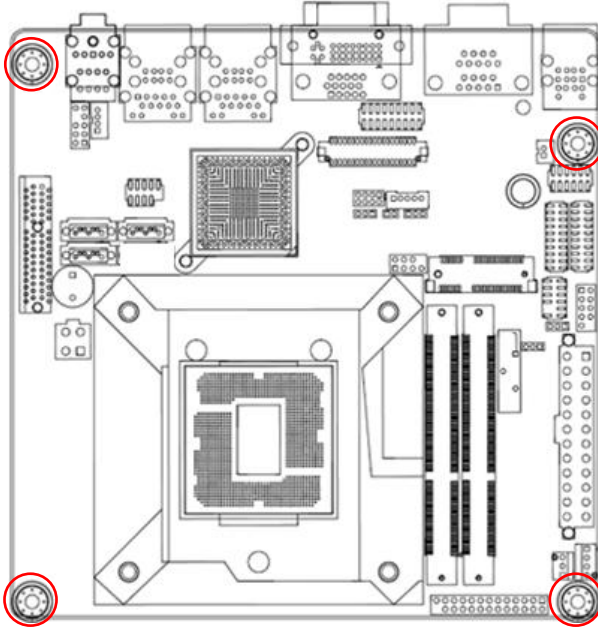
Place four (4) screws into the holes indicated by circles to secure the motherboard to the chassis.



Caution

*Do not over-tighten the screws! Doing so can damage the motherboard.*

Place this side towards the rear of the chassis.



### 3.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount Intel® LGA1155 socket supports 22nm/32nm Intel® Core™ i7 / i5 / i3 / Pentium® / Celeron® processor in the LGA1155 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. Axiomtek will shoulder the cost of repair only if the damage is shipment/transit-related.**
- **Keep the cap after installing the motherboard. Axiomtek will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1155 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.**

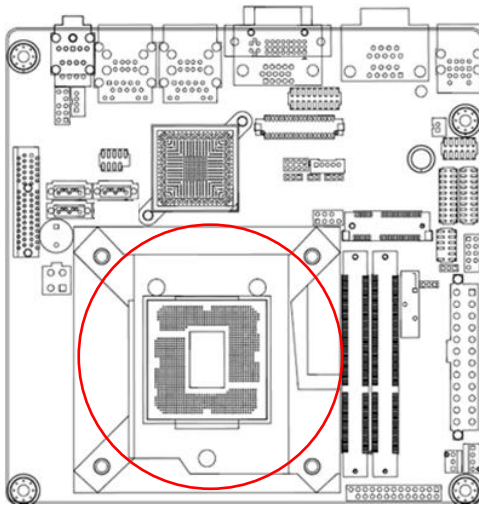


Caution

**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.**

### 3.2.1 Installing the CPU

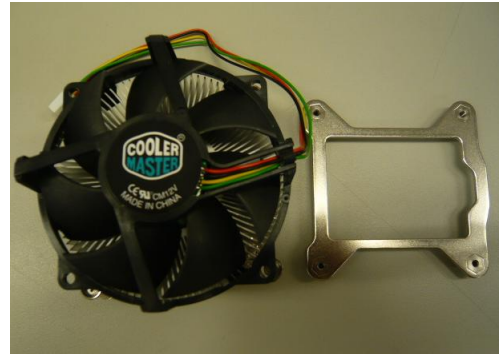
1. Locate the CPU socket on the motherboard.



Caution

*Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.*

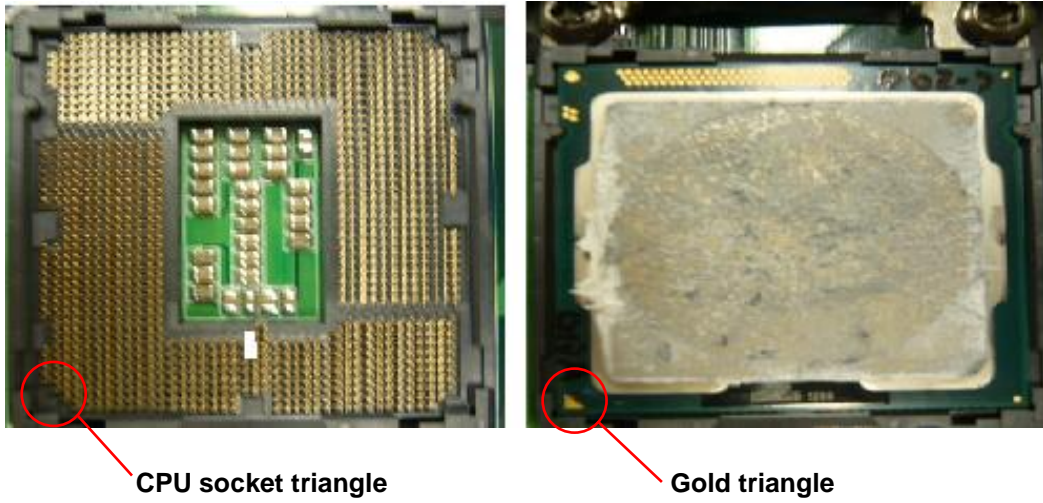
2. Separate CPU cooler and its base first with screw driver.



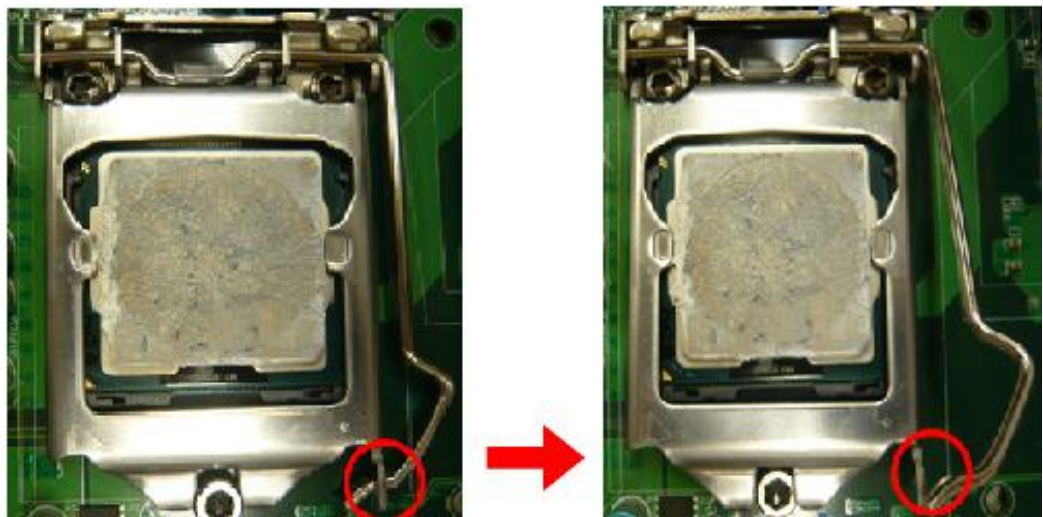
3. Assemble the CPU fan retention module.



4. Position the CPU over the socket, making sure that the gold triangle is the same side as CPU socket triangle.



5. Lock and unlock CPU.



***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!***

### 3.2.2 Installing the CPU Heatsink and Fan

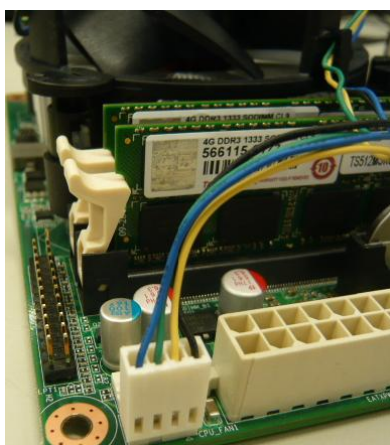
1. Place the heatsink base on the relative bottom of motherboard.
2. Place the heatsink assembly on the top of the CPU, making sure that the four fasteners match the holes on the motherboard.



3. Screw tightly the four fasteners.



4. Connect the CPU fan cable to the connector on the motherboard labeled CPU\_FAN.



**Important**

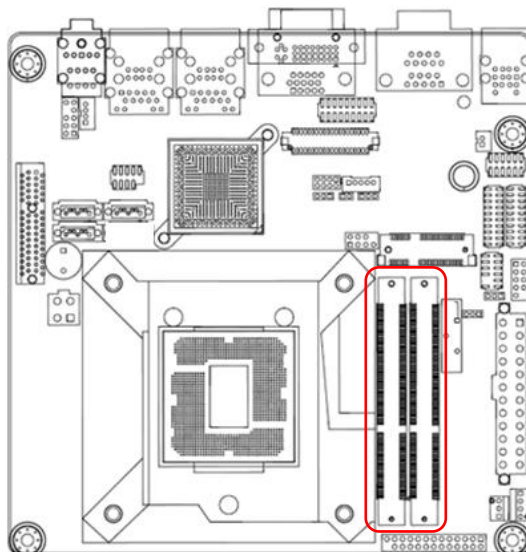
***Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.***

### 3.3 System Memory

#### 3.3.1 Overview

The motherboard comes with two 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:



Channel	Slot
Channel A	DIMMA1
Channel B	DIMMB1



204-pin DDR3 SO-DIMM sockets



### 3.3.2 Memory Configurations

You may install 1GB, 2GB, and 4GB 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 SO-DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.*
- *Due to CPU limitation, SO-DIMM modules with 128Mb memory chips or double-sided x16 memory chips are not supported in this motherboard.*

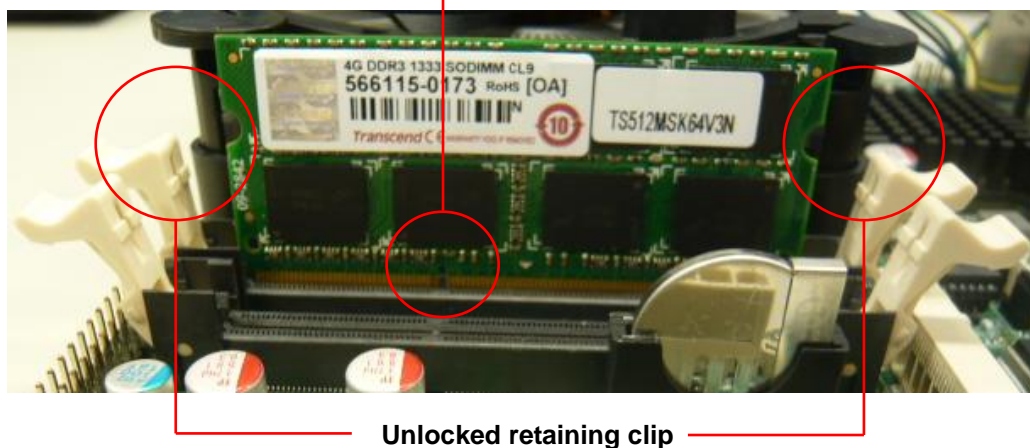
### 3.3.3 Installing a SO-DIMM

1. Unlock a SO-DIMM socket by pressing the retaining clips outward.



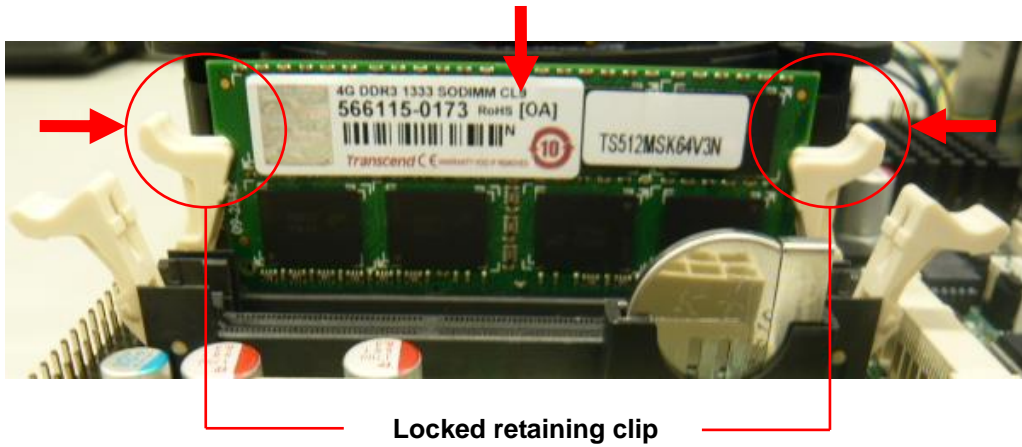
2. Align a SO-DIMM on the socket such that the notch on the SO-DIMM matches the break on the socket.

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.



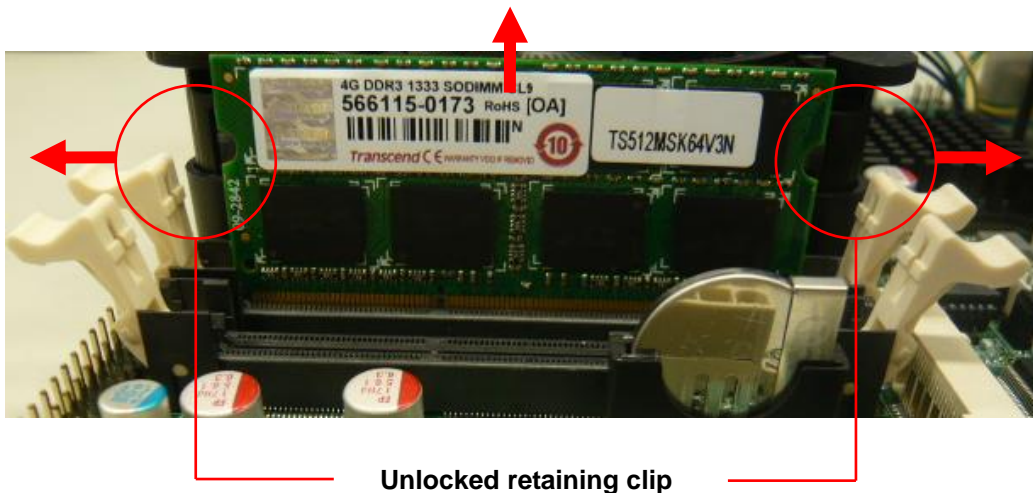
- A DDR3 SO-DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a SO-DIMM into a socket to avoid damaging the SO-DIMM.
- The DDR3 SO-DIMM sockets do not support DDR2 SO-DIMMs. DO NOT install DDR2 SO-DIMM to the DDR3 SO-DIMM socket.



**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.**

### 3.3.4 Removing a SO-DIMM

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



**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.**

## 3.4 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.



**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.**

### 3.4.1 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.

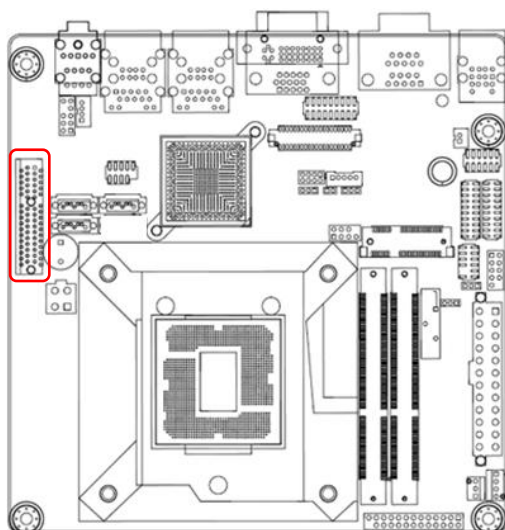
### 3.4.2 Configuring an Expansion Card

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 5 for information on BIOS setup.
2. Assign an IRQ to the card if needed.
3. Install the software drivers for the expansion card.

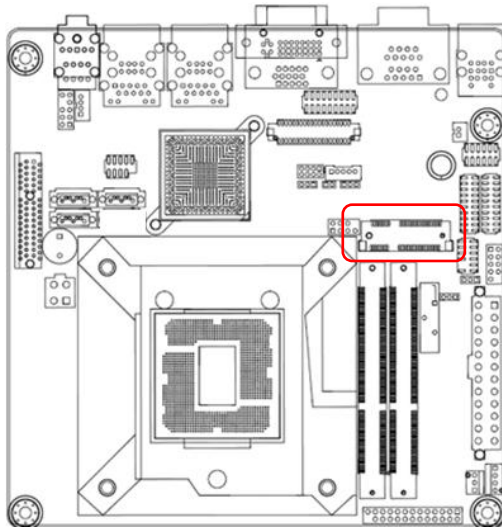
### 3.4.3 PCI-Express x4 Slot

This motherboard supports one PCI-Express x4. The following figure shows a graphics card installed on the PCI-Express x4 slot.



### 3.4.4 PCI-Express Mini Card Connector

This motherboard supports one PCI-Express Mini Card connector. The following figure shows a Decode card installed on this connector.



# Chapter 4

## Hardware Description

### 4.1 Microprocessors

The MANO861 Series supports Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® / Celeron® processors, which enable your system to operate under Windows® XP, Windows® 7 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 MANO861 Series uses AMI Plug and Play BIOS with a single 32Mbit SPI Flash.

### 4.3 System Memory

The MANO861 Series supports two 204-pin DDR3 SO-DIMM sockets for a maximum memory of 16GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB and 4GB.

## 4.4 I/O Port Address Map
















































The Intel® Core™ i7 / Core™ i5 / Core™ i3 / Pentium® / Celeron® processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

[00000000 - 0000001F]	Direct memory access controller
[00000000 - 00000CF7]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000024 - 00000025]	Programmable interrupt controller
[00000028 - 00000029]	Programmable interrupt controller
[0000002C - 0000002D]	Programmable interrupt controller
[0000002E - 0000002F]	Motherboard resources
[00000030 - 00000031]	Programmable interrupt controller
[00000034 - 00000035]	Programmable interrupt controller
[00000038 - 00000039]	Programmable interrupt controller
[0000003C - 0000003D]	Programmable interrupt controller
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[0000004E - 0000004F]	Motherboard resources
[00000050 - 00000053]	System timer
[00000061 - 00000061]	Motherboard resources
[00000062 - 00000063]	Motherboard resources
[00000063 - 00000063]	Motherboard resources
[00000065 - 00000065]	Motherboard resources
[00000065 - 0000006F]	Motherboard resources
[00000067 - 00000067]	Motherboard resources
[00000070 - 00000070]	Motherboard resources
[00000070 - 00000077]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000091]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000088 - 00000088]	Motherboard resources
[0000008C - 0000008E]	Motherboard resources
[00000090 - 0000009F]	Motherboard resources
[00000092 - 00000092]	Motherboard resources
[00000093 - 0000009F]	Direct memory access controller
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000A4 - 000000A5]	Programmable interrupt controller
[000000A8 - 000000A9]	Programmable interrupt controller
[000000AC - 000000AD]	Programmable interrupt controller
[000000B0 - 000000B1]	Programmable interrupt controller
[000000B2 - 000000B3]	Motherboard resources
[000000B4 - 000000B5]	Programmable interrupt controller
[000000B8 - 000000B9]	Programmable interrupt controller
[000000BC - 000000BD]	Programmable interrupt controller
[000000C0 - 000000DF]	Direct memory access controller
[000000E0 - 000000EF]	Motherboard resources

- [000000F0 - 000000FF] Numeric data processor
- [00000200 - 0000020F] Motherboard resources
- [000002E0 - 000002E7] Communications Port (COM5)
- [000002E8 - 000002EF] Communications Port (COM4)
- [000002F0 - 000002F7] Communications Port (COM6)
- [000002F8 - 000002FF] Communications Port (COM2)
- [00000378 - 0000037F] Printer Port (LPT1)
- [000003B0 - 000003BB] Standard VGA Graphics Adapter
- [000003C0 - 000003DF] Standard VGA Graphics Adapter
- [000003E8 - 000003EF] Communications Port (COM3)
- [000003F8 - 000003FF] Communications Port (COM1)
- [00000400 - 00000453] Motherboard resources
- [00000454 - 00000457] Motherboard resources
- [00000458 - 0000047F] Motherboard resources
- [000004D0 - 000004D1] Motherboard resources
- [000004D0 - 000004D1] Programmable interrupt controller
- [00000500 - 0000057F] Motherboard resources
- [00000680 - 0000069F] Motherboard resources
- [00000A00 - 00000A1F] Motherboard resources
- [00000A20 - 00000A2F] Motherboard resources
- [00000A30 - 00000A3F] Motherboard resources
- [00000D00 - 0000FFFF] PCI bus
- [0000164E - 0000164F] Motherboard resources
- [0000D000 - 0000D0FF] Realtek PCIe GBE Family Controller #2
- [0000D000 - 0000DFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 6 - 1C1A
- [0000E000 - 0000E0FF] Realtek PCIe GBE Family Controller
- [0000E000 - 0000EFFF] Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 5 - 1C18
- [0000F000 - 0000F03F] Standard VGA Graphics Adapter
- [0000F040 - 0000F05F] Intel(R) 6 Series/C200 Series Chipset Family SMBus Controller - 1C22
- [0000F060 - 0000F06F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F070 - 0000F07F] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F080 - 0000F083] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F090 - 0000F097] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0A0 - 0000F0A3] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0B0 - 0000F0B7] Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
- [0000F0C0 - 0000F0CF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0D0 - 0000F0DF] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0E0 - 0000F0E3] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F0F0 - 0000F0F7] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F100 - 0000F103] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000F110 - 0000F117] Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
- [0000FFFF - 0000FFFF] Motherboard resources
- [0000FFFF - 0000FFFF] Motherboard resources

















































## 4.5 Interrupt Controller (IRQ) Map





































The interrupt controller (IRQ) mapping list is shown as follows:

	(ISA) 0x00000000 (00)	System timer
	(ISA) 0x00000003 (03)	Communications Port (COM2)
	(ISA) 0x00000004 (04)	Communications Port (COM1)
	(ISA) 0x00000005 (05)	Communications Port (COM3)
	(ISA) 0x00000005 (05)	Communications Port (COM4)
	(ISA) 0x00000008 (08)	System CMOS/real time clock
	(ISA) 0x0000000A (10)	Communications Port (COM5)
	(ISA) 0x0000000A (10)	Communications Port (COM6)
	(ISA) 0x0000000D (13)	Numeric data processor
	(ISA) 0x00000051 (81)	Microsoft ACPI-Compliant System
	(ISA) 0x00000052 (82)	Microsoft ACPI-Compliant System
	(ISA) 0x00000053 (83)	Microsoft ACPI-Compliant System
	(ISA) 0x00000054 (84)	Microsoft ACPI-Compliant System
	(ISA) 0x00000055 (85)	Microsoft ACPI-Compliant System
	(ISA) 0x00000056 (86)	Microsoft ACPI-Compliant System
	(ISA) 0x00000057 (87)	Microsoft ACPI-Compliant System
	(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
	(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
	(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
	(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
	(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
	(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
	(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
	(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
	(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
	(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
	(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
	(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
	(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
	(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
	(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
	(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
	(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
	(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
	(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System



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 (ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
 (ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
 (ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
 (ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
 (ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
 (ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
 (ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
 (ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
 (ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
 (ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
 (ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
 (ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
 (ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
 (ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
 (ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
 (ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
 (ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
 (ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
 (ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
 (ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
 (ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
 (ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
 (ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
 (ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System

	(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
	(PCI) 0x0000000A (10)	Intel(R) 6 Series/C200 Series Chipset Family SMBus Controller - 1C22
	(PCI) 0x0000000B (11)	Intel(R) 6 Series/C200 Series Management Engine Interface - 1C3A
	(PCI) 0x00000010 (16)	Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - 1C2D
	(PCI) 0x00000010 (16)	Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 1 - 1C10
	(PCI) 0x00000010 (16)	Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 5 - 1C18
	(PCI) 0x00000011 (17)	Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 6 - 1C1A
	(PCI) 0x00000013 (19)	Intel(R) 6 Series/C200 Series Chipset Family 4 port Serial ATA Storage Controller - 1C00
	(PCI) 0x00000013 (19)	Intel(R) 6 Series/C200 Series Chipset Family 2 port Serial ATA Storage Controller - 1C08
	(PCI) 0x00000016 (22)	High Definition Audio Controller
	(PCI) 0x00000017 (23)	Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - 1C26
	(PCI) 0xFFFFFFF0 (-3)	Realtek PCIe GBE Family Controller #2
	(PCI) 0xFFFFFFF2 (-2)	Realtek PCIe GBE Family Controller

## 4.6 Memory Map

The memory mapping list is shown as follows:

[000A0000 - 000BFFFF]	PCI bus
[000A0000 - 000BFFFF]	Standard VGA Graphics Adapter
[000D0000 - 000D3FFF]	PCI bus
[000D4000 - 000D7FFF]	PCI bus
[000D8000 - 000DBFFF]	PCI bus
[000DC000 - 000DFFFF]	PCI bus
[000E0000 - 000E3FFF]	PCI bus
[000E4000 - 000E7FFF]	PCI bus
[20000000 - 201FFFFFF]	System board
[40004000 - 40004FFF]	System board
[DFA00000 - DFA00FFF]	Motherboard resources
[DFA00000 - FEFFFFFF]	PCI bus
[E0000000 - EFFFFFFF]	Standard VGA Graphics Adapter
[F0000000 - F0003FFF]	Realtek PCIe GBE Family Controller #2
[F0000000 - F000FFFF]	Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 6 - 1C1A
[F0004000 - F0004FFF]	Realtek PCIe GBE Family Controller #2
[F0100000 - F0103FFF]	Realtek PCIe GBE Family Controller
[F0100000 - F010FFFF]	Intel(R) 6 Series/C200 Series Chipset Family PCI Express Root Port 5 - 1C18
[F0104000 - F0104FFF]	Realtek PCIe GBE Family Controller
[F7800000 - F7BFFFFFF]	Standard VGA Graphics Adapter
[F7C00000 - F7C03FFF]	High Definition Audio Controller
[F7C05000 - F7C050FF]	Intel(R) 6 Series/C200 Series Chipset Family SMBus Controller - 1C22
[F7C06000 - F7C063FF]	Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - 1C26
[F7C07000 - F7C073FF]	Intel(R) 6 Series/C200 Series Chipset Family USB Enhanced Host Controller - 1C2D
[F7C09000 - F7C0900F]	Intel(R) 6 Series/C200 Series Management Engine Interface - 1C3A
[F8000000 - FBFFFFFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED10000 - FED17FFF]	Motherboard resources
[FED18000 - FED18FFF]	Motherboard resources
[FED19000 - FED19FFF]	Motherboard resources
[FED1C000 - FED1FFFF]	Motherboard resources
[FED20000 - FED3FFFF]	Motherboard resources
[FED40000 - FED44FFF]	System board
[FED45000 - FED8FFFF]	Motherboard resources
[FED90000 - FED93FFF]	Motherboard resources
[FEE00000 - FEEFFFFFF]	Motherboard resources
[FF000000 - FFFFFFFF]	Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF]	Motherboard resources

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# Chapter 5

## AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI 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 <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

### 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>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.



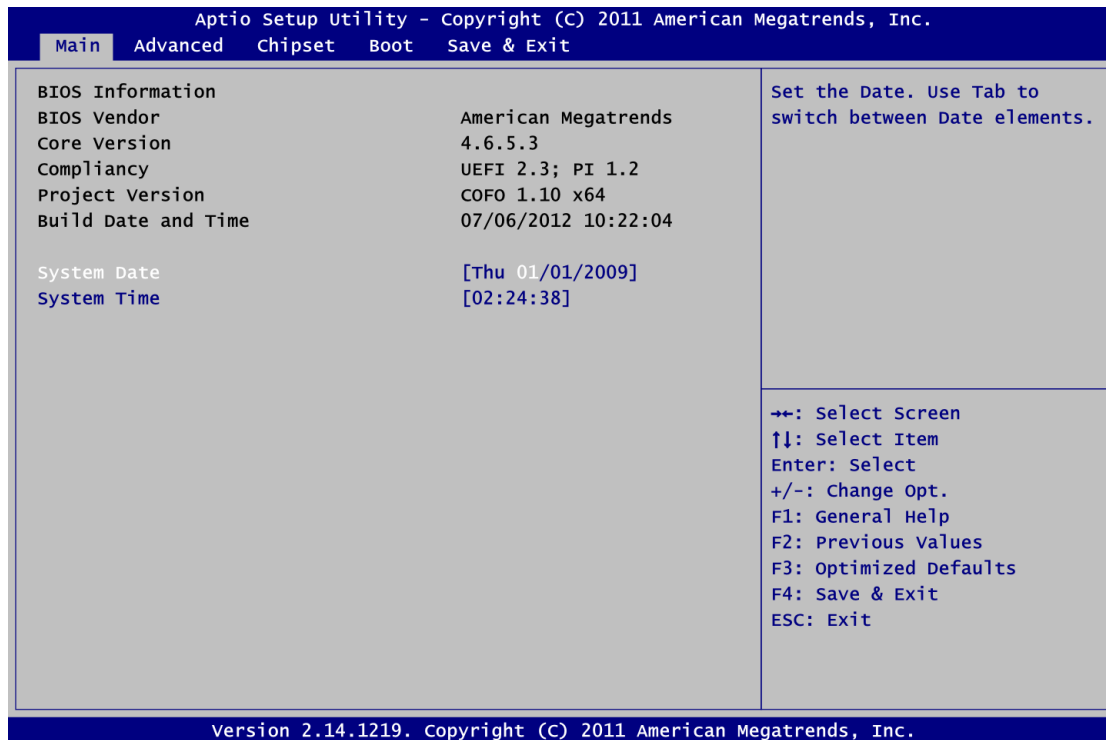
**Note**

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

Hot Keys	Description
<b>→← Left/Right</b>	The Left and Right <Arrow> keys allow you to select a setup screen.
<b>↑↓ Up/Down</b>	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
<b>+– Plus/Minus</b>	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
<b>Tab</b>	The <Tab> key allows you to select setup fields.
<b>F1</b>	The <F1> key allows you to display the General Help screen.
<b>F2</b>	The <F2> key allows you to Load Previous Values.
<b>F3</b>	The <F3> key allows you to Load Optimized Defaults.
<b>F4</b>	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
<b>Esc</b>	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.
<b>Enter</b>	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. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



### BIOS Information

Display the auto-detected BIOS information.

### System Date/Time

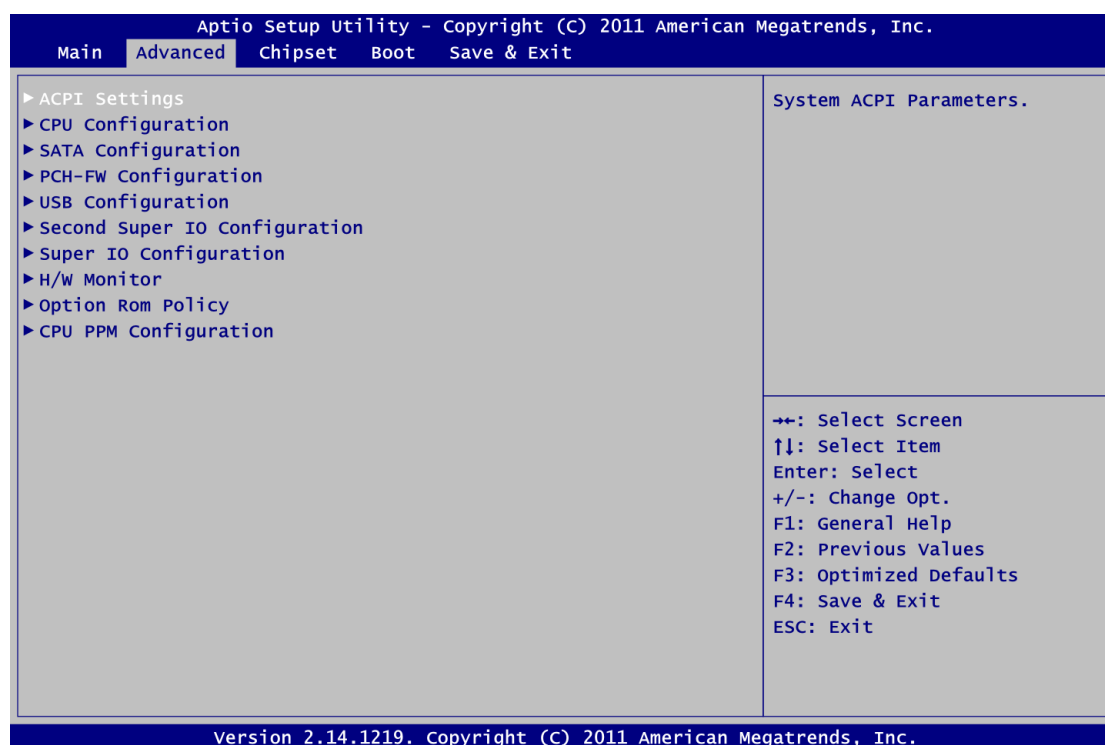
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

## 5.4 Advanced Menu

The Advanced menu also 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:

- ▶ ACPI Settings
- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ PCH-FW Configuration
- ▶ USB Configuration
- ▶ Second Super IO Configuration
- ▶ Super IO Configuration
- ▶ H/W Monitor
- ▶ Option Rom Policy
- ▶ CPU PPM Configuration

For items marked with “▶”, please press <Enter> for more options.



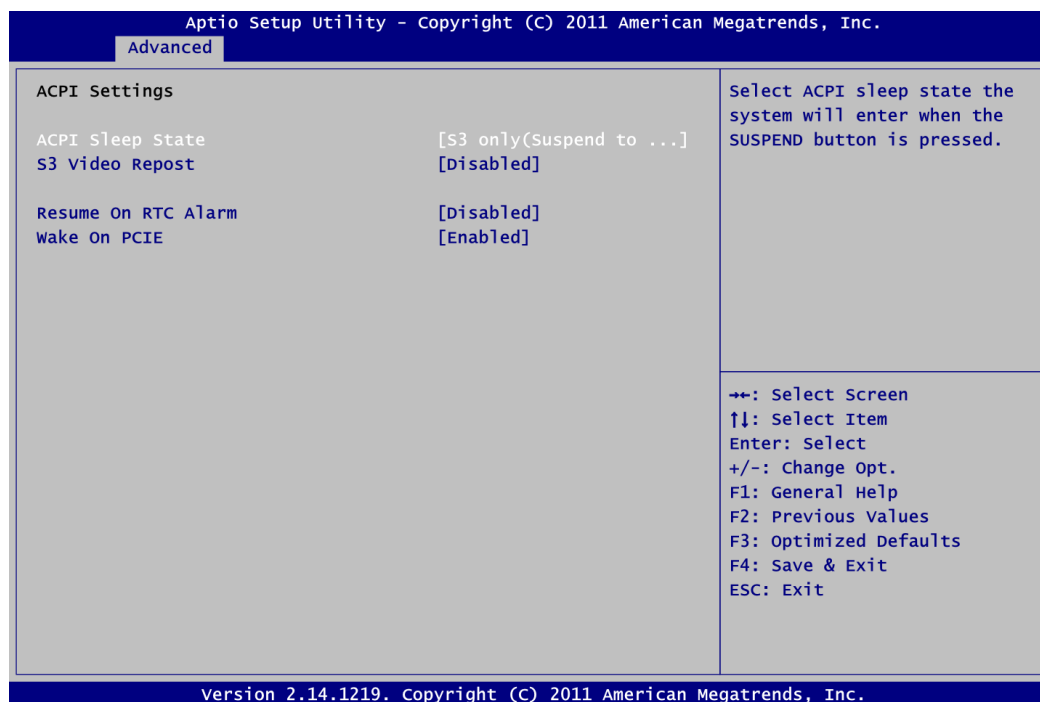
**Caution**

***Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.***



- **ACPI Settings**

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.



#### **ACPI Sleep State**

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend Disabled, S1 only (CPU Stop Clock), and S3 only (Suspend to RAM).

To correctly support wake by use of USB from the S3 system power state, please refer to the following Microsoft's link:

<http://support.microsoft.com/kb/841858/en-us>

#### **S3 Video Repost**

Enable or disable video repost.

#### **Resume On RTC Alarm**

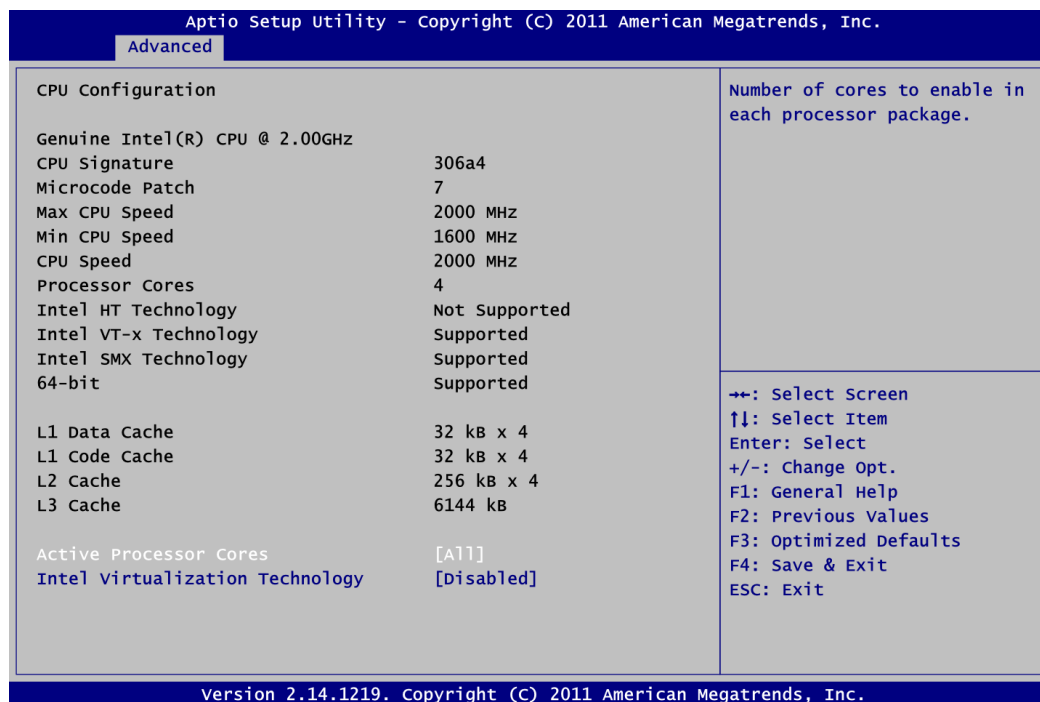
Enable or disable system wake on alarm even. When enabled, system will wake upon the hr/min/sec specified.

#### **Wake On PCIE#**

Enable or disable PCIE to generate a wake event.

- **CPU Configuration**

This screen shows the CPU information.



**Active Processor Cores**

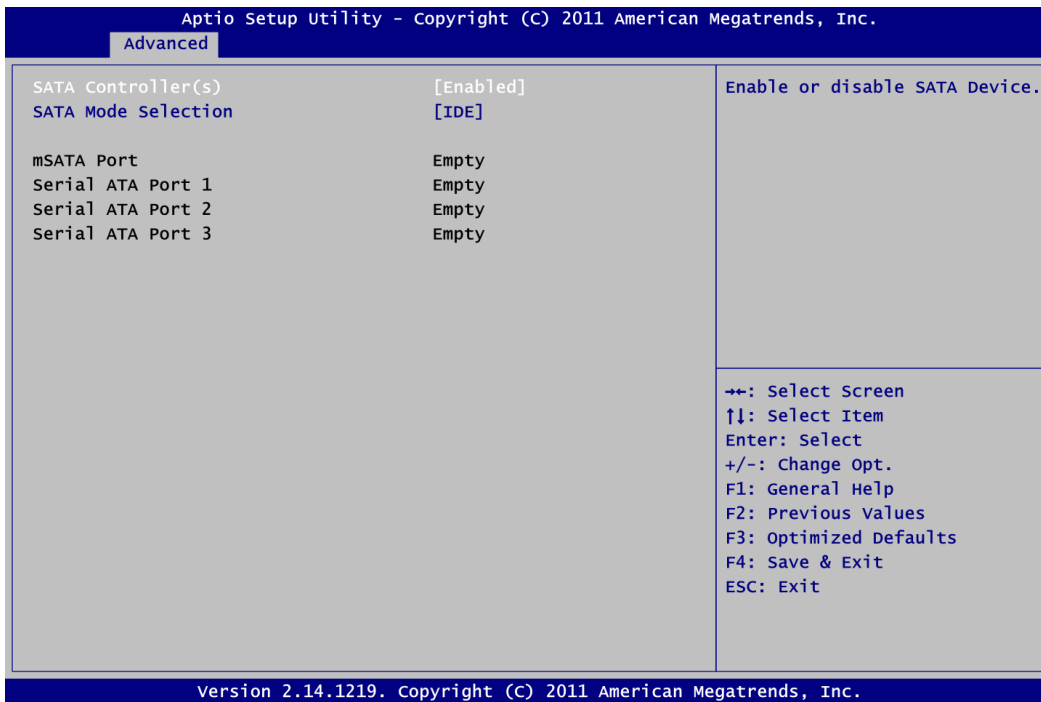
Allow users to set how many processor cores should be active.

**Intel Virtualization Technology**

This item allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

- **SATA Configuration**

In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



**SATA Controller(s)**

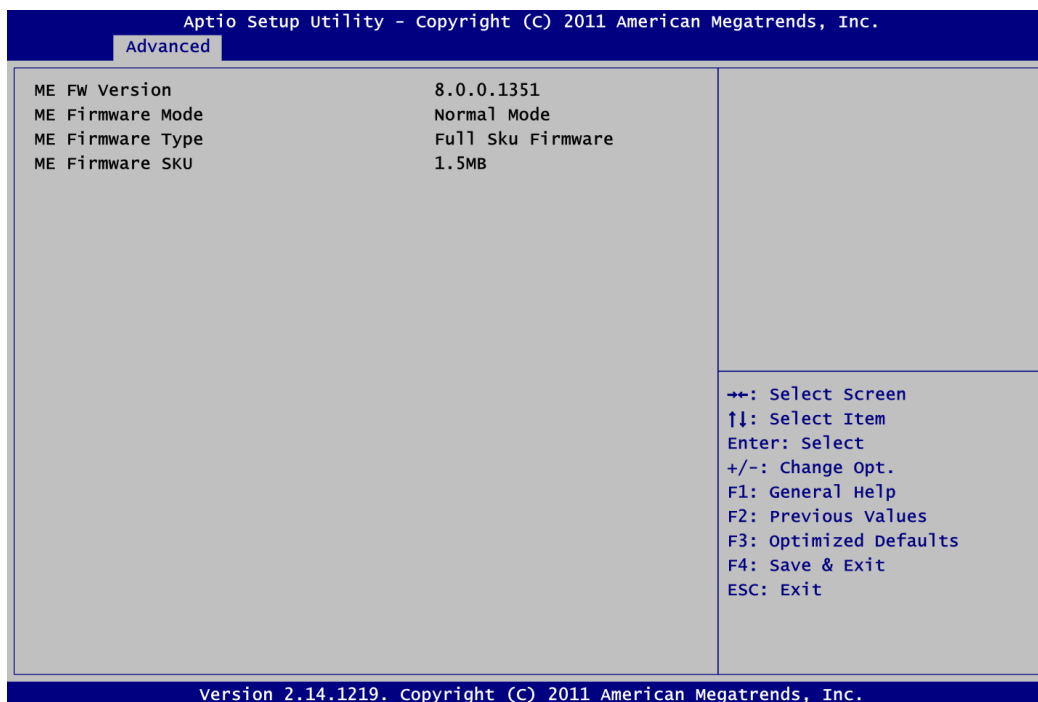
Enable or disable SATA device.

**SATA Mode Selection**

Determine how SATA controller(s) operate. Operation mode options are: IDE Mode, AHCI Mode and RAID Mode.

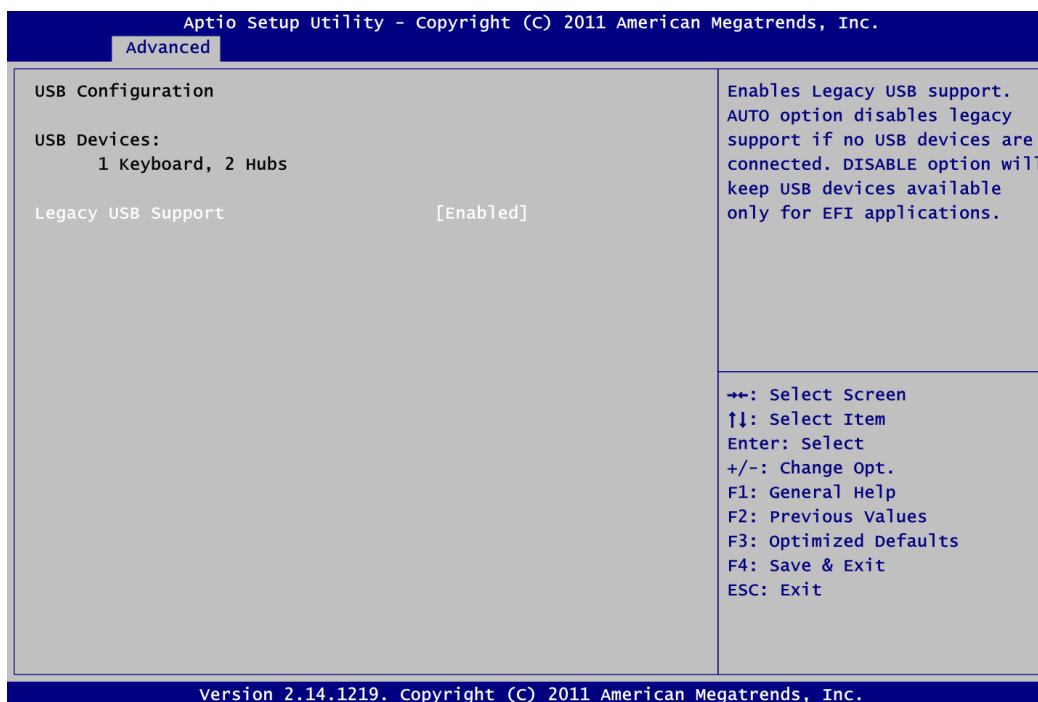
- **PCH-FW Configuration**

This screen displays Management Engine (ME) Firmware information.



- **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 Devices**

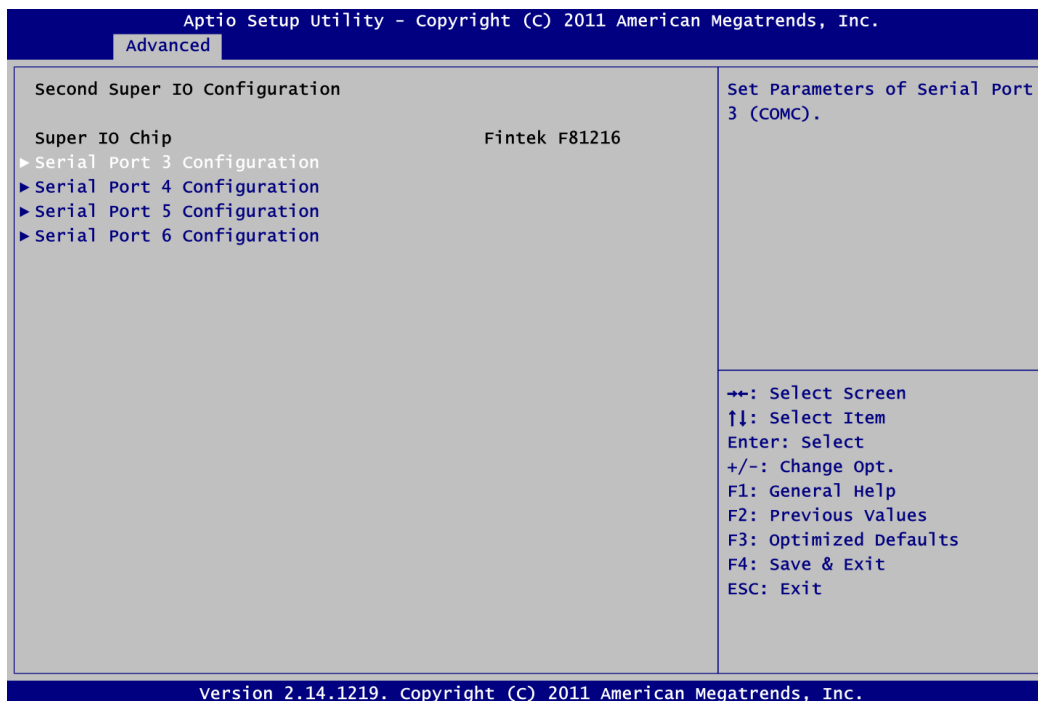
Display all detected USB devices.

**Legacy USB Support**

Use this item to enable or disable support for USB device on legacy operating system. The default setting is Enabled. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

- **Second Super IO Configuration**

You can use this screen to select options for the Second Super IO 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.

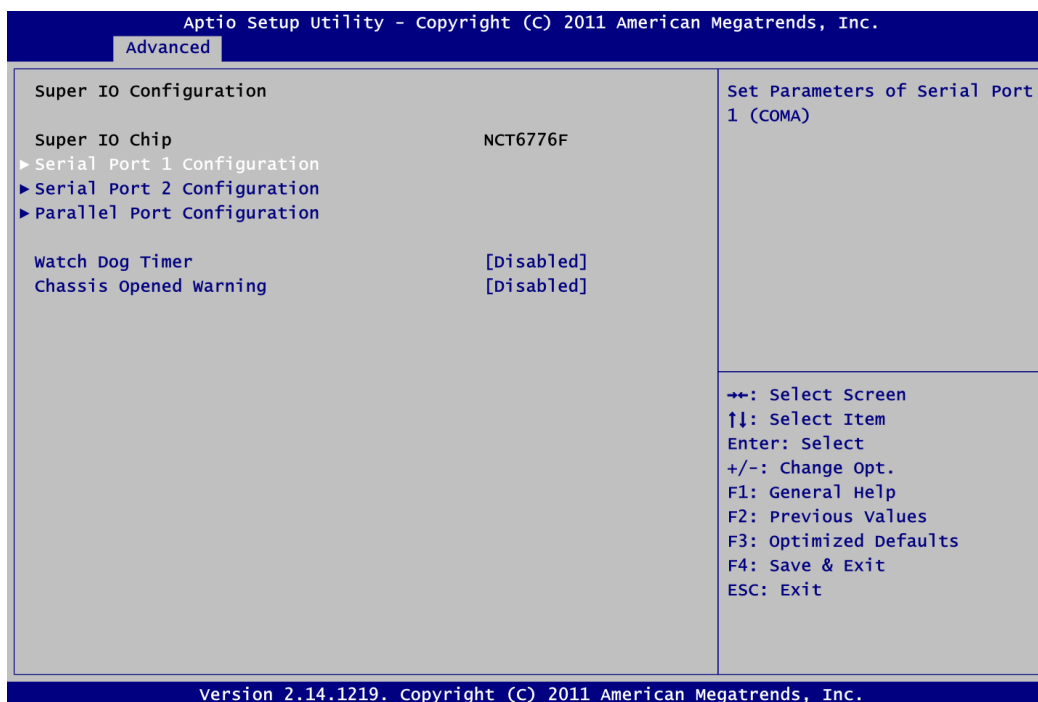


**Serial Port 3~6 Configuration**

Use these items to set parameters of serial port 3~6.

- **Super IO Configuration**

You can use this screen to select options for the Super IO 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.



#### **Serial Port 1~2 Configuration**

Use these items to set parameters of serial port 1~2.

#### **Parallel Port Configuration**

Use this item to set parameters of parallel port.

#### **Watch Dog Timer**

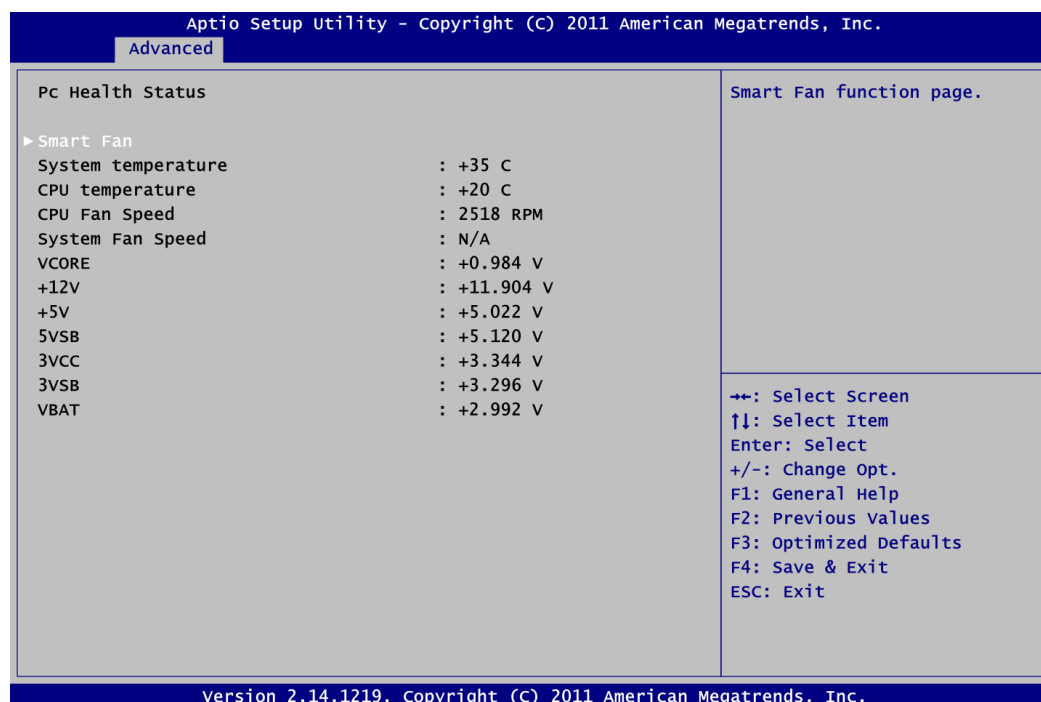
Enable or disable watchdog timer function.

#### **Chassis Opened Warning**

Enable or disable chassis opened warning setting.

- **H/W Monitor**

Use this screen for Smart Fan configuration and hardware health status monitoring.



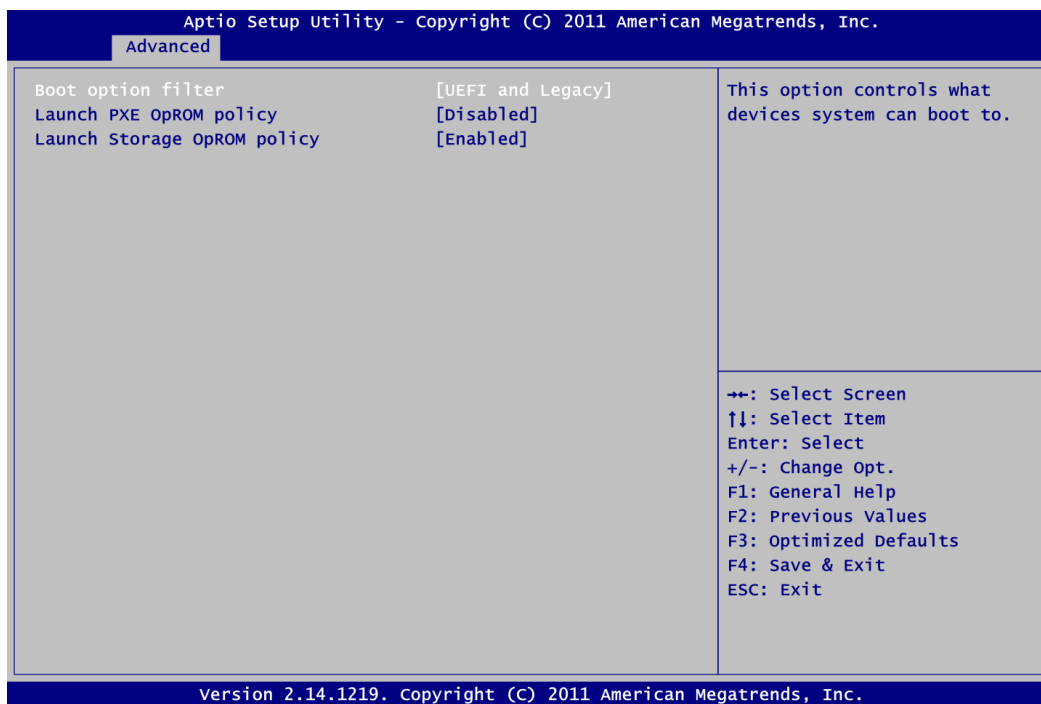
This screen displays the temperature of system and CPU, cooling fan speed in RPM and system voltages (VCORE, +12V, +5V, 5VSB, etc).

**Smart Fan**

This option allows users to configure Smart Fan function.



- **Option Rom Policy**



**Boot Option Filter**

This option controls what devices system can boot to.

**Launch PXE OpROM policy**

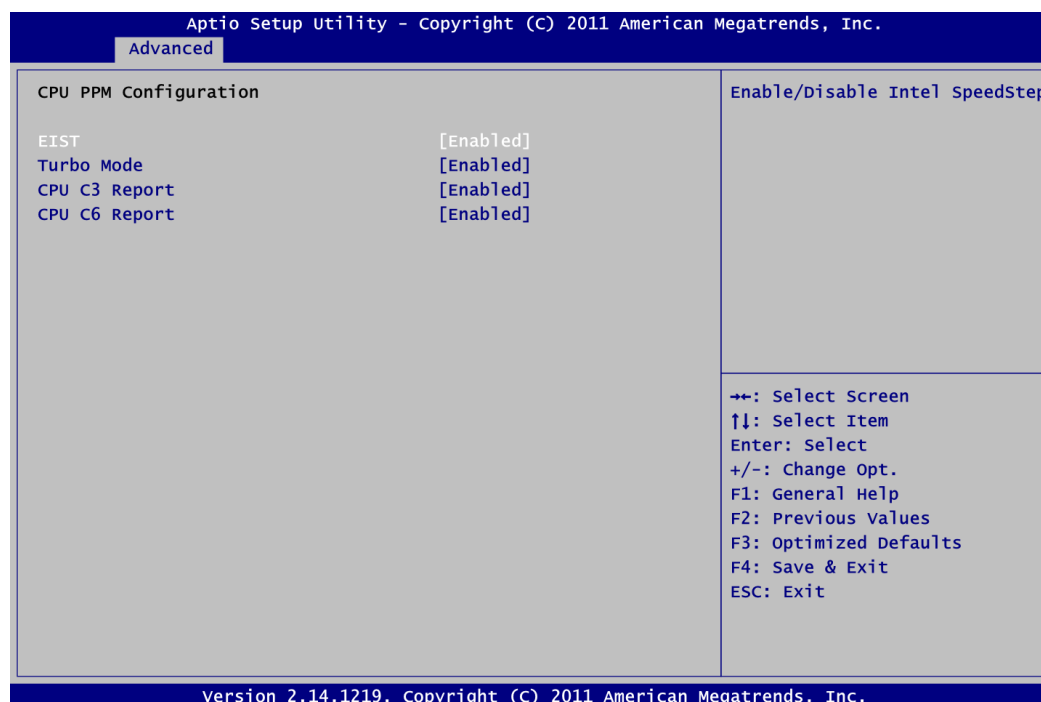
Enable or disable boot options for legacy network devices.

**Launch Storage OpROM policy**

Control the execution of UEFI and legacy storage OpROM.

- **CPU PPM Configuration**

Use this screen for CPU PPM configuration.



**EIST**

Enable or disable Intel® SpeedStep. When enabled, CPU speed is controlled by the operating system. When disabled, CPU runs at its default speed.

**Turbo Mode**

This item is for enabling or disabling turbo mode. When enabled, it allows processor cores to run faster than marked frequency under certain conditions.

**CPU C3 Report**

Enable or disable CPU C3 report to the operating system.

**CPU C6 Report**

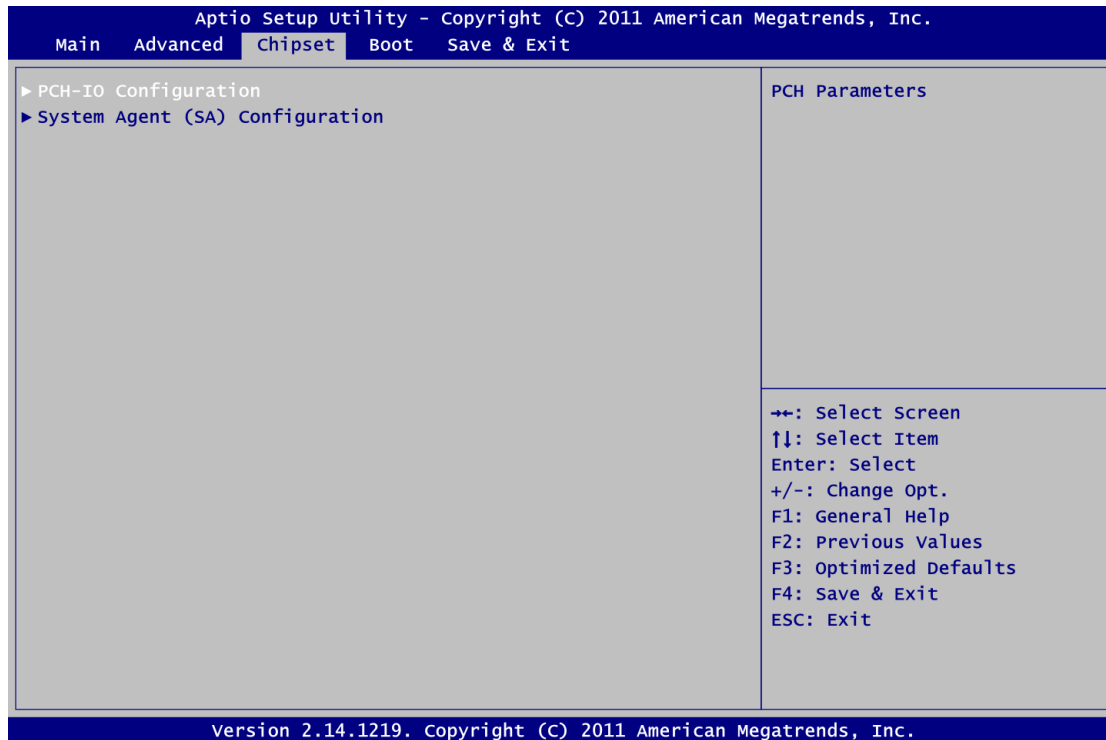
Enable or disable CPU C6 report to the operating system.

## 5.5 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:

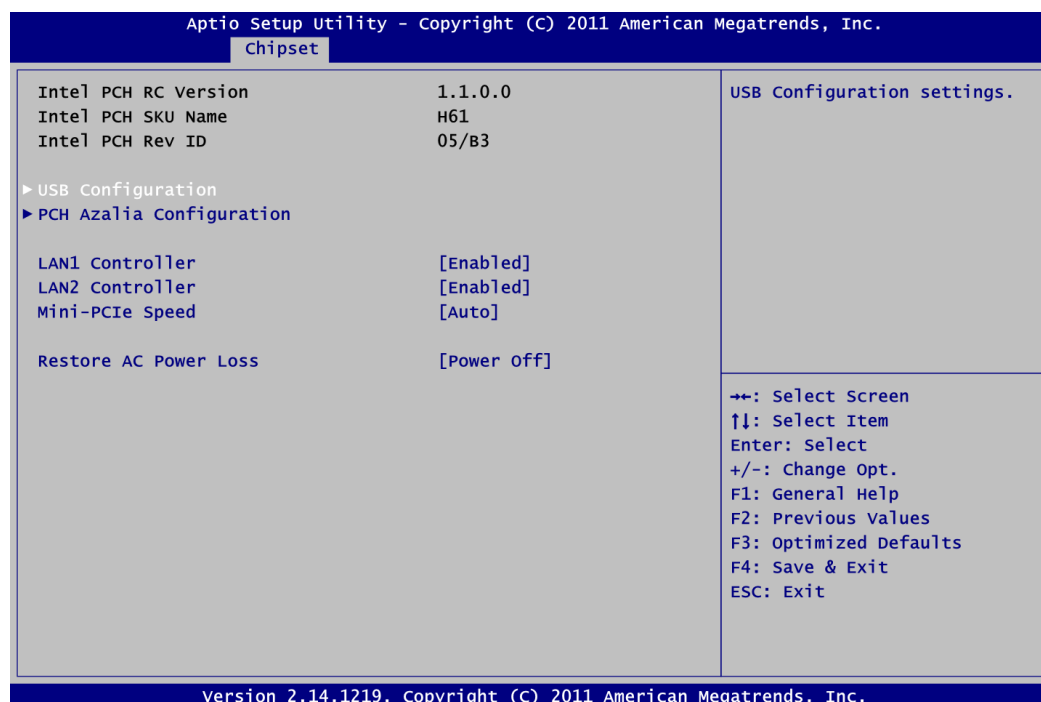
- ▶ PCH-IO Configuration
- ▶ System Agent (SA) Configuration

For items marked with “▶”, please press <Enter> for more options.



- **PCH-IO Configuration**

This screen allows users to set PCH parameters.



**USB Configuration**

USB configuration settings.

**PCH Azalia Configuration**

PCH Azalia device configuration settings.

**LAN1 Controller**

Enable or disable LAN1 controller.

**LAN2 Controller**

Enable or disable LAN2 controller.

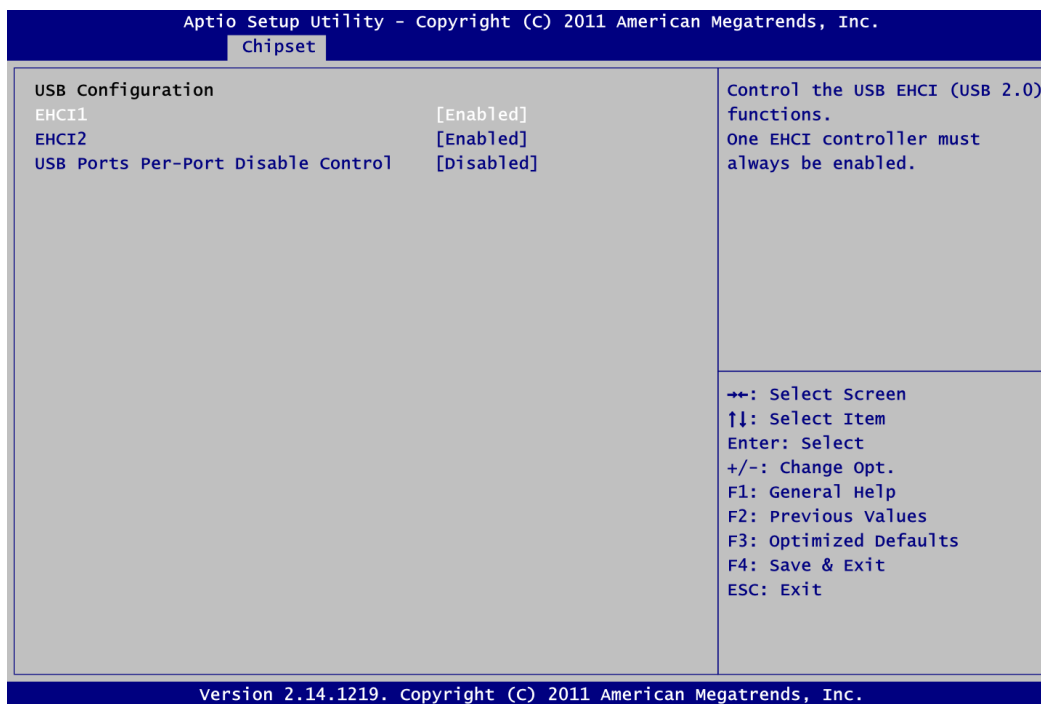
**Mini-PCIe Speed**

Allow you to select mini PCI-Express speed.

**Restore AC Power Loss**

Set the system power status when power returns from a power failure situation. The system power status options are Power Off, Power On and Last State.

- **PCH USB Configuration**

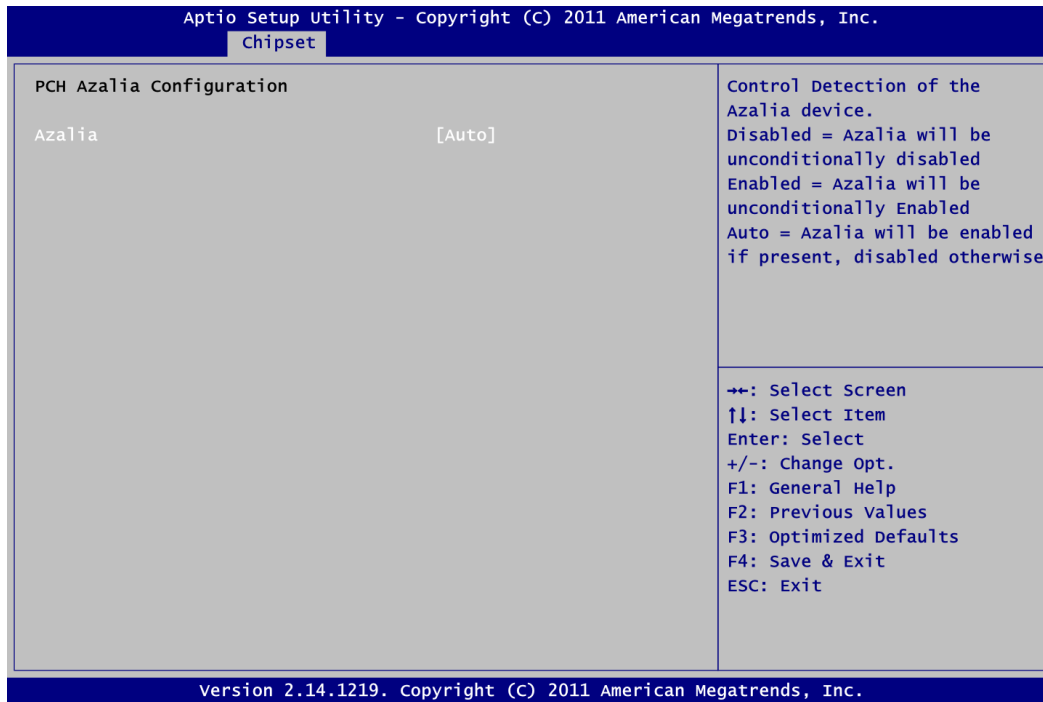
**EHCI1/EHCI2**

Enable or disable the EHCI controller.

**USB Ports Per-Port Disable Control**

Enable or disable each USB port individually.

- **PCH Azalia Configuration**

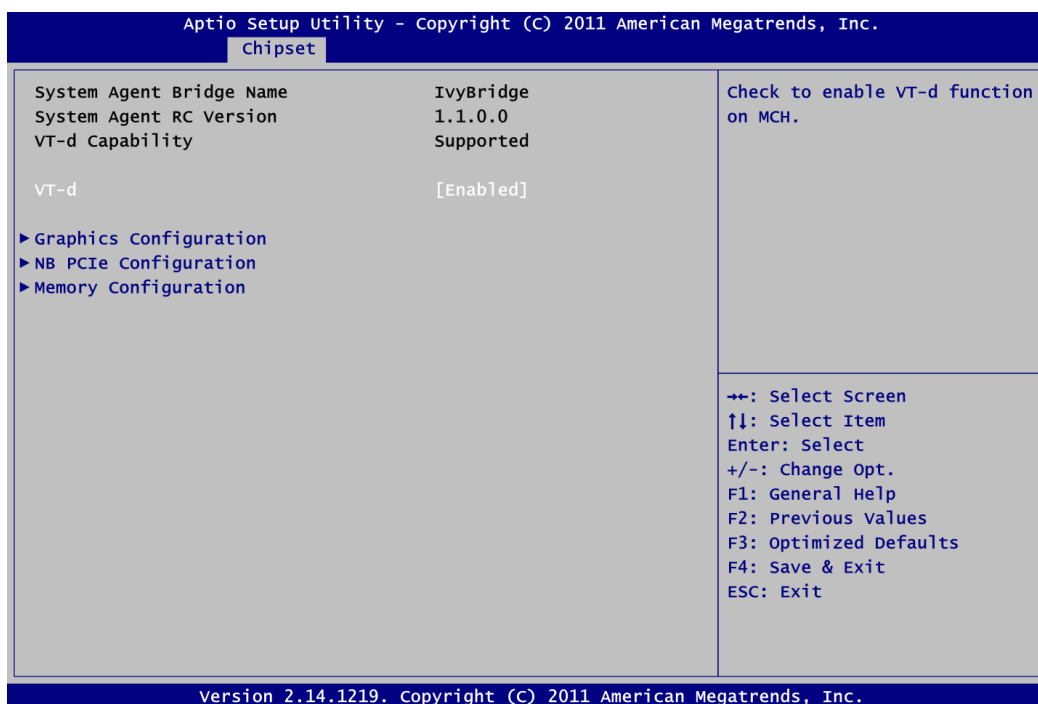


**Azalia**

Control detection of the Azalia device. Configuration options are Disabled, Enabled and Auto.

- **System Agent (SA) Configuration**

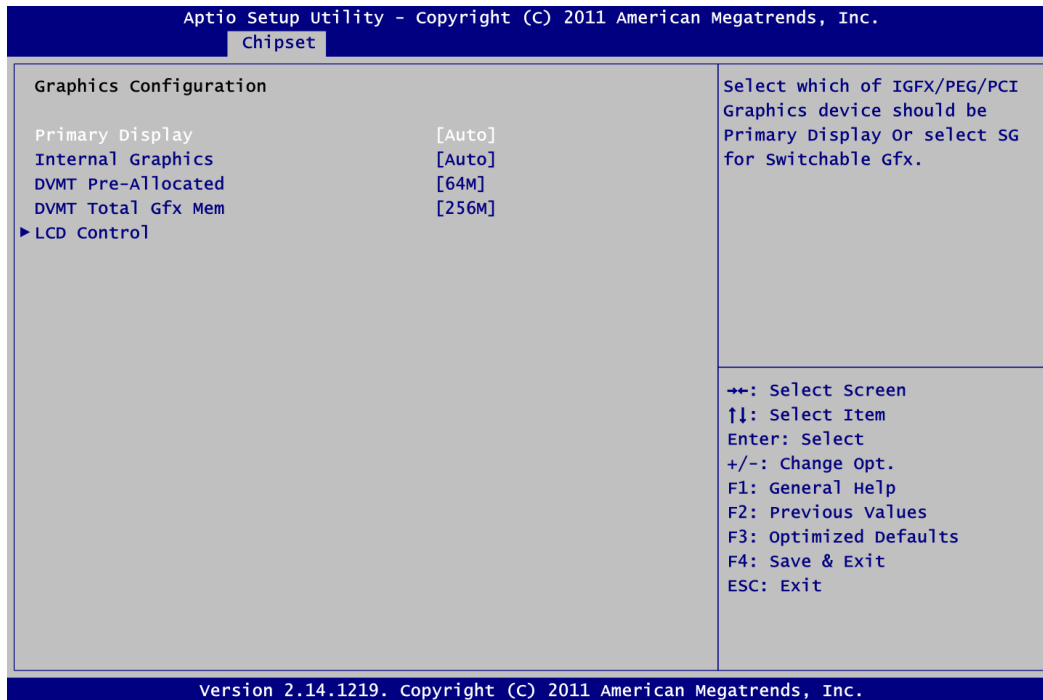
This screen shows System Agent information and provides function for specifying related parameters. For items marked with “▶”, please press <Enter> for more options.



#### VT-d

Enable or disable Intel® chipset virtualization technology for directed I/O. VT-d can help end users improve security and reliability of the systems and also improve performance of I/O devices in virtualized environment.

- **Graphics Configuration**



**Primary Display**

Allow you to select which graphics controller to use as the primary boot device.

**Internal Graphics**

Enable or disable IGD.

**DVMT Pre-Allocated**

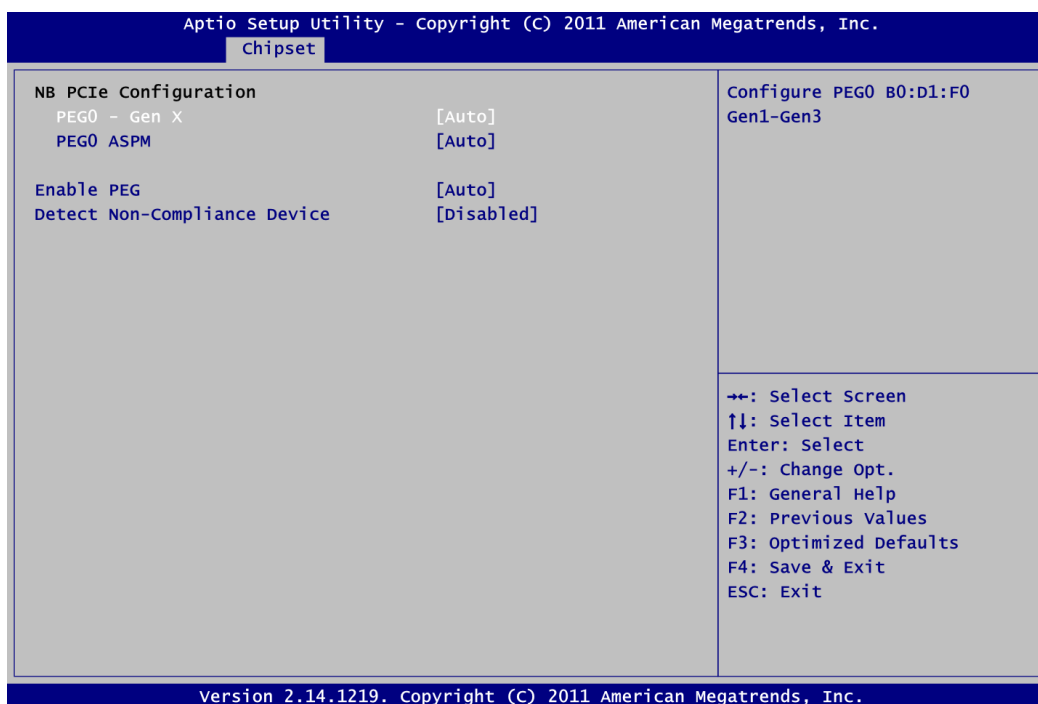
Select DVMT pre-allocated memory size.

**DVMT Total Gfx Mem**

Select DVMT total memory size.



- **NB PCIe Configuration**

**PEG0 - Gen X**

Select PEG0 speed.

**PEG0 ASPM**

Control ASPM support for the PEG device.

**Enable PEG**

Enable or disable PEG always.

**Detect Non-Compliance Device**

Enable or disable the detection of a non-compliance PCI-Express device in PEG.

- **Memory Configuration**

This screen displays system memory information.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.  
Chipset

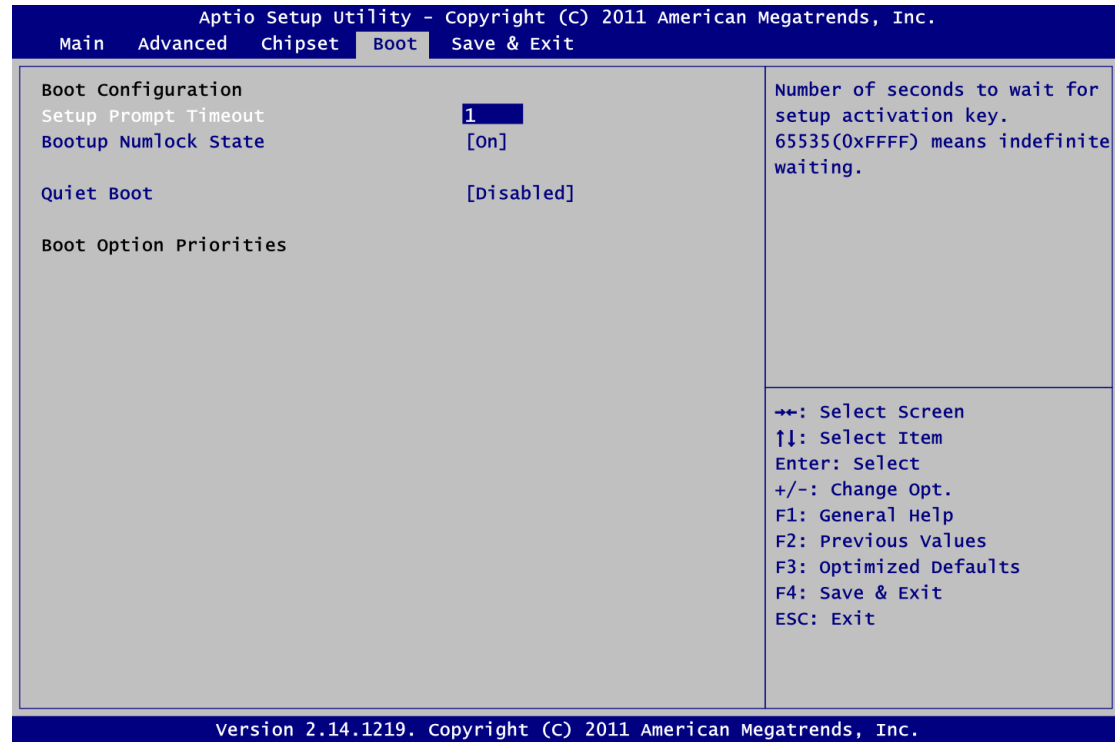
Memory Information	
Memory RC Version	1.5.0.0
Memory Frequency	1067 Mhz
Total Memory	1024 MB (DDR3)
DIMMA1	1024 MB (DDR3)
DIMMB1	Not Present
CAS Latency (tCL)	7
Minimum delay time	
CAS to RAS (trCDmin)	7
Row Precharge (trPmin)	7
Active to Precharge (trASmin)	20
XMP Profile 1	Not Supported
XMP Profile 2	Not Supported

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

Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

## 5.6 Boot Menu

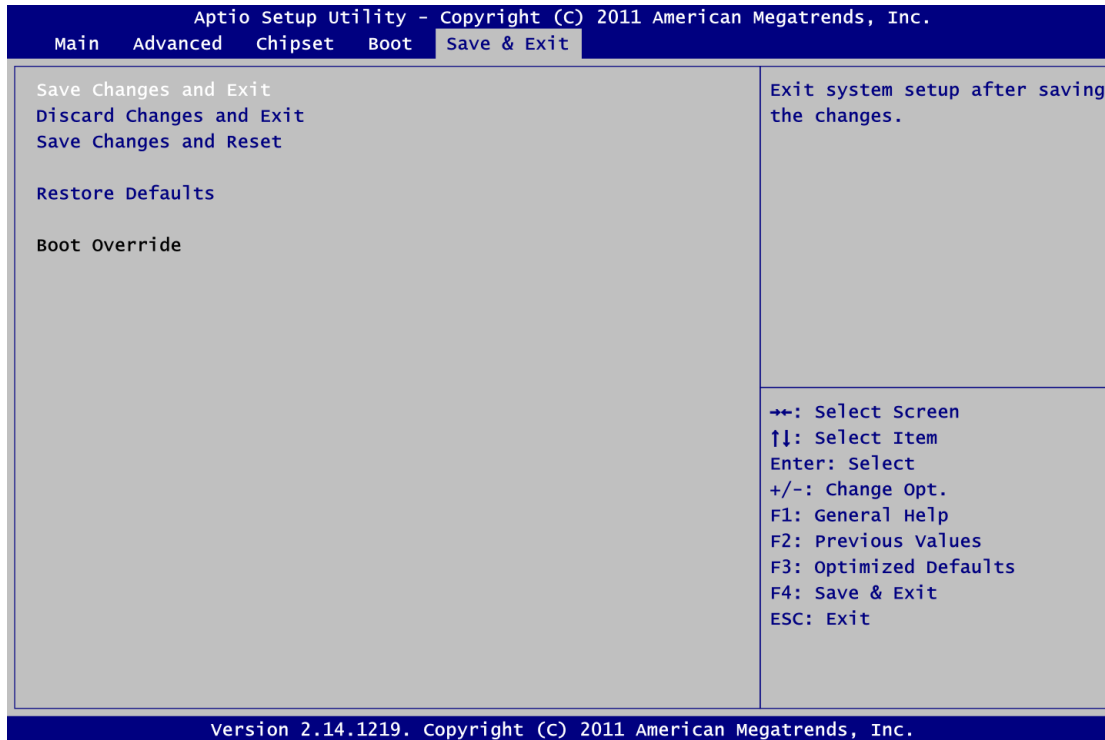
The Boot menu allows users to change boot options of the system.



- Setup Prompt Timeout**  
 Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- Bootup NumLock State**  
 Use this item to select the power-on state for the keyboard NumLock.
- Quiet Boot**  
 Select to display either POST output messages or a splash screen during boot-up.
- Boot Option Priorities**  
 These are settings for boot priority. Specify the boot device priority sequence from the available devices.

## 5.7 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- Save Changes and Exit**  
When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.
- Discard Changes and Exit**  
Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.
- Save Changes and Reset**  
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 Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.
- Restore Defaults**  
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.
- Boot Override**  
Select a drive to immediately boot that device regardless of the current boot order.

# Appendix A

## Watchdog Timer

### About Watchdog Timer

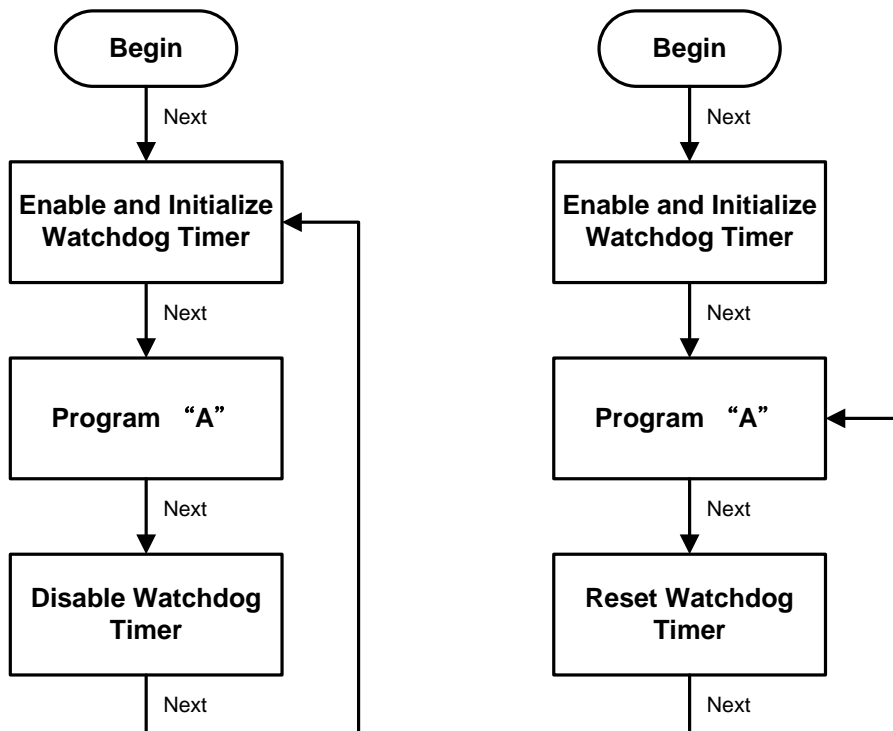
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot. The integrated watchdog timer can be set up by programming. There are 1~255 levels available.

### How to Use Watchdog Timer

Assume that program A needs to keep running in a system. The value of watchdog timer must be set bigger than the running time of program A. Then, after the running time of program A is finished, either to disable or to reset watchdog timer.

When program A has problems that cause system shut down, the system can be rebooted by watchdog timer when the value of watchdog timer has counted down to 0.



## Sample Program

Assembly sample code :

```
#define NCT6776F_CONFIG_INDEX          0x2e
#define NCT6776F_CONFIG_DATA          0x2f
#define NCT6776F_CONFIG_MODE_ENTER_VALUE 0x87
#define NCT6776F_CONFIG_MODE_EXIT_VALUE 0xAA
#define NCT6776F_LDN_SEL_REGISTER     0x07
#define NCT6776F_ACTIVATE_REGISTER    0x30
#define NCT6776F_LDN_GPIO3           0x09
#define NCT6776F_LDN_WDT              0x08

#ifdef Oem_NCT6776F_WDT_PRESENT
#if Oem_NCT6776F_WDT_PRESENT

UINT8          Data8=0;

IOWrite8(NCT6776F_CONFIG_INDEX, NCT6776F_CONFIG_MODE_ENTER_VALUE);
IOWrite8(NCT6776F_CONFIG_INDEX, NCT6776F_CONFIG_MODE_ENTER_VALUE);

IOWrite8(NCT6776F_CONFIG_INDEX,0x2B); //Pin80 function selection to GP34
Data8 = IORead8(NCT6776F_CONFIG_DATA) | 0x10;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX, NCT6776F_LDN_SEL_REGISTER); //LDN 0x09
IOWrite8(NCT6776F_CONFIG_DATA, NCT6776F_LDN_GPIO3);

IOWrite8(NCT6776F_CONFIG_INDEX,NCT6776F_ACTIVATE_REGISTER); //CR 30h
Data8 = IORead8(NCT6776F_CONFIG_DATA) | 0x08;
IOWrite8(NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,0xE4); //Set GP34 to output mode
Data8 = IORead8(NCT6776F_CONFIG_DATA) & 0xEF;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,0xE5); //Set GP34 to output High
Data8 = IORead8(NCT6776F_CONFIG_DATA) | 0x10;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,0xEA); // selection Pin 34 to WDT0
Data8 = IORead8(NCT6776F_CONFIG_DATA) | 0x10;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,NCT6776F_LDN_SEL_REGISTER); //LDN 0x08
IOWrite8 (NCT6776F_CONFIG_DATA , NCT6776F_LDN_WDT1);

IOWrite8(NCT6776F_CONFIG_INDEX,NCT6776F_ACTIVATE_REGISTER); //CR 30h
Data8 = IORead8(NCT6776F_CONFIG_DATA) | gSetup.WDT_Control;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,0xF5); //Watchdog Timer: CR F5h Bit3
Data8 = IORead8(NCT6776F_CONFIG_DATA) | gSetup.WDT_CountMode;
IOWrite8 (NCT6776F_CONFIG_DATA , Data8);

IOWrite8(NCT6776F_CONFIG_INDEX,0xF6); //Watchdog Timer Counter Register
IOWrite8(NCT6776F_CONFIG_DATA, gSetup.WDT_TimeOut);

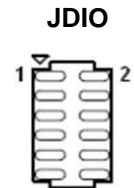
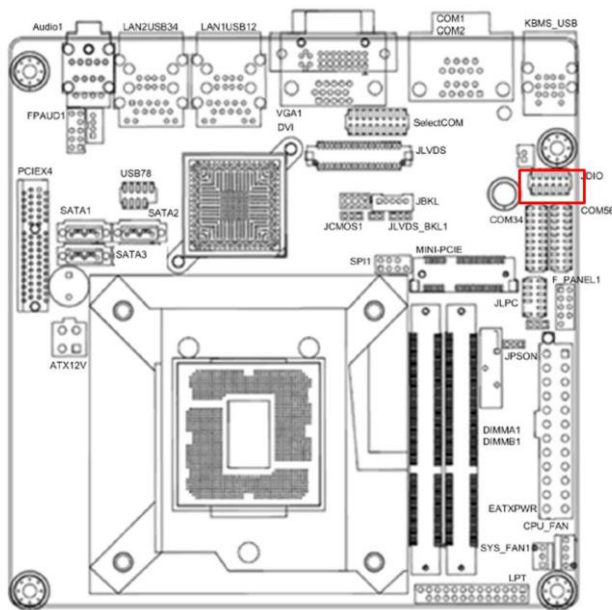
IOWrite8(NCT6776F_CONFIG_INDEX,NCT6776F_CONFIG_MODE_EXIT_VALUE);
#endif // #if Oem_NCT6776F_WDT_PRESENT
#endif // #ifdef Oem_NCT6776F_WDT_PRESENT
```

# Appendix B

## Digital I/O

### About Digital I/O

The onboard digital I/O has 8 bits. Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs where all of these pins are set to 1.



Pin	Signal
1	SIO_GPIO0
2	SIO_GPIO4
3	SIO_GPIO1
4	SIO_GPIO5
5	SIO_GPIO2
6	SIO_GPIO6
7	SIO_GPIO3
8	SIO_GPIO7
9	SMB_CLK_MAIN
10	SMB_DAT_MAIN
11	GND
12	VCC GPIO

### Digital I/O Programming

Assembly sample code :

```

#define NCT6776F_CONFIG_INDEX          0x2e
#define NCT6776F_CONFIG_DATA          0x2f
#define NCT6776F_CONFIG_MODE_ENTER_VALUE 0x87
#define NCT6776F_CONFIG_MODE_EXIT_VALUE 0xAA
#define NCT6776F_LDN_SEL_REGISTER     0x07
#define NCT6776F_ACTIVATE_REGISTER    0x30
#define NCT6776F_LDN_GPIO1            0x07
#define NCT6776F_LDN_GPIO3            0x09

#ifndef Oem_NCT6776F_Digital_IO_PRESENT
#define Oem_NCT6776F_Digital_IO_PRESENT
#endif

UINT8 Data8=0;

IoWrite8(NCT6776F_CONFIG_INDEX , NCT6776F_CONFIG_MODE_ENTER_VALUE);
IoWrite8(NCT6776F_CONFIG_INDEX , NCT6776F_CONFIG_MODE_ENTER_VALUE);
    
```

```
IoWrite8(NCT6776F_CONFIG_INDEX,0x27); //CR27 bit6, bit7 need to set 1, GP70 to GP77
Data8 = IoRead8(NCT6776F_CONFIG_DATA) | 0xC0;
IoWrite8 (NCT6776F_CONFIG_DATA , Data8);
```

```
IoWrite8 (NCT6776F_CONFIG_INDEX , NCT6776F_LDN_SEL_REGISTER);
IoWrite8 (NCT6776F_CONFIG_DATA , NCT6776F_LDN_GPIO3);
```

```
IoWrite8 (NCT6776F_CONFIG_INDEX , NCT6776F_ACTIVATE_REGISTER);
Data8=IoRead8(NCT6776F_CONFIG_DATA)|0x80;//Active GPIO7
IoWrite8 (NCT6776F_CONFIG_DATA , Data8);
```

```
IoWrite8 (NCT6776F_CONFIG_INDEX , NCT6776F_LDN_SEL_REGISTER);
IoWrite8 (NCT6776F_CONFIG_DATA , NCT6776F_LDN_GPIO1);
```

```
IoWrite8(NCT6776F_CONFIG_INDEX, 0xE0);
IoWrite8(NCT6776F_CONFIG_DATA, 0xFF);
```

```
IoWrite8 (NCT6776F_CONFIG_INDEX , NCT6776F_CONFIG_MODE_EXIT_VALUE);
#endif // #if Oem_NCT6776F_Digital_IO_PRESENT
#endif // #if def Oem_NCT6776F_Digital_IO_PRESENT
```