IEI Integration Corp.

MODEL:

IMB-Q870-i2

microATX Motherboard with LGA1150 Intel® Core™ i7/i5/i3, Pentium® or Celeron® CPU, Intel® Q87 Chipset, Dual GbE, DDR3, DVI, HDMI, DisplayPort, VGA, USB 3.0, COM Ports Four SATA 6Gb/s Ports, IPMI 2.0 and RoHS

User Manual

Rev. 1.01 –13 March, 2014

RoHS Lead Free

Revision

Date	Version	Changes
13 March, 2014	1.01	Deleted I^{2}C information
7 January, 2014	1.00	Initial release

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Introduction

1.1 Introduction
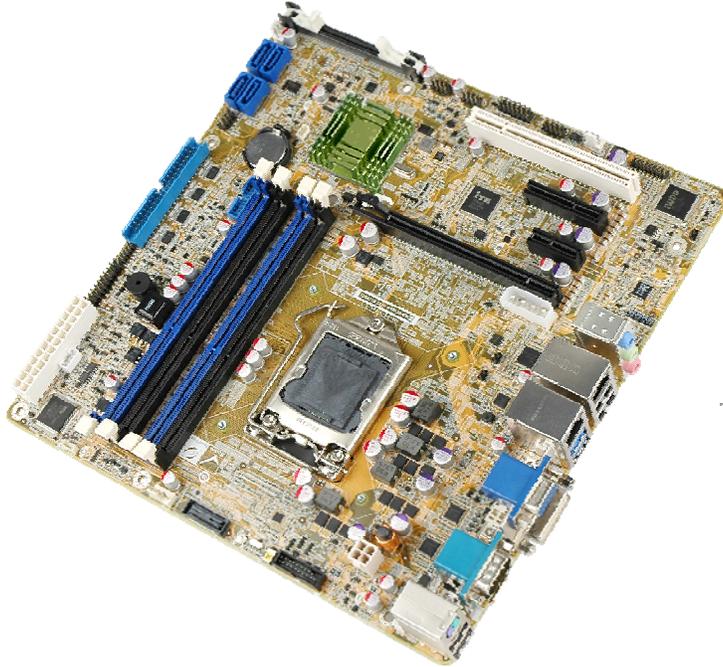
Figure 1-1: IMB-Q870-i2

The IMB-Q870-i2 is a microATX motherboard. It accepts a Socket LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor and supports four 240-pin 1333/1066 MHz dual-channel DDR3 DIMM modules up to 32.0 GB maximum. The IMB-Q870-i2 includes VGA, HDMI, and DVI-D display ports for triple independent display. Expansion and I/O include one PCI slot, one PCIe x16 slot, one PCIe x4 slot with x1 signal, one PCIe x1 slot, two USB 3.0 ports on the rear panel, two USB 3.0 ports by pin header, four USB 2.0 on the rear panel, four USB 2.0 by pin header, four SATA 6Gb/s connectors, six COM ports, and two keyboard/mouse connectors.

1.2 Benefits

Some of the IMB-Q870-i2 motherboard benefits include:

- Powerful graphics with multiple monitors
- Staying connected with both wired LAN connections
- Speedy running of multiple programs and applications

1.3 Features

Some of the IMB-Q870-i2 motherboard features are listed below:

- microATX form factor
- RoHS compliant
- LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor supported
- Intel® Q87 Chipset
- Four 240-pin 1333/1066 MHz dual-channel DDR3 DIMMs with up to 32.0 GB memory
- HDMI, DisplayPort, DVI-D and VGA interfaces support triple independent display
- Supports IPMI 2.0 via IEI iRIS-2400 module
- Two Intel® PCIe GbE connectors, LAN1 with Intel® AMT 9.0 support
- Four SATA 6Gb/s connectors support RAID 0, 1, 5, 10
- One PCI card expansion slot
- One PCIe x16 card expansion slot
- One PCIe x4 card expansion slot with x1 signal
- One PCIe x1 card expansion slot
- Multiple USB 3.0 and USB 2.0 ports
- High Definition Audio

1.4 Connectors

The connectors on the IMB-Q870-i2 are shown in the figure below.
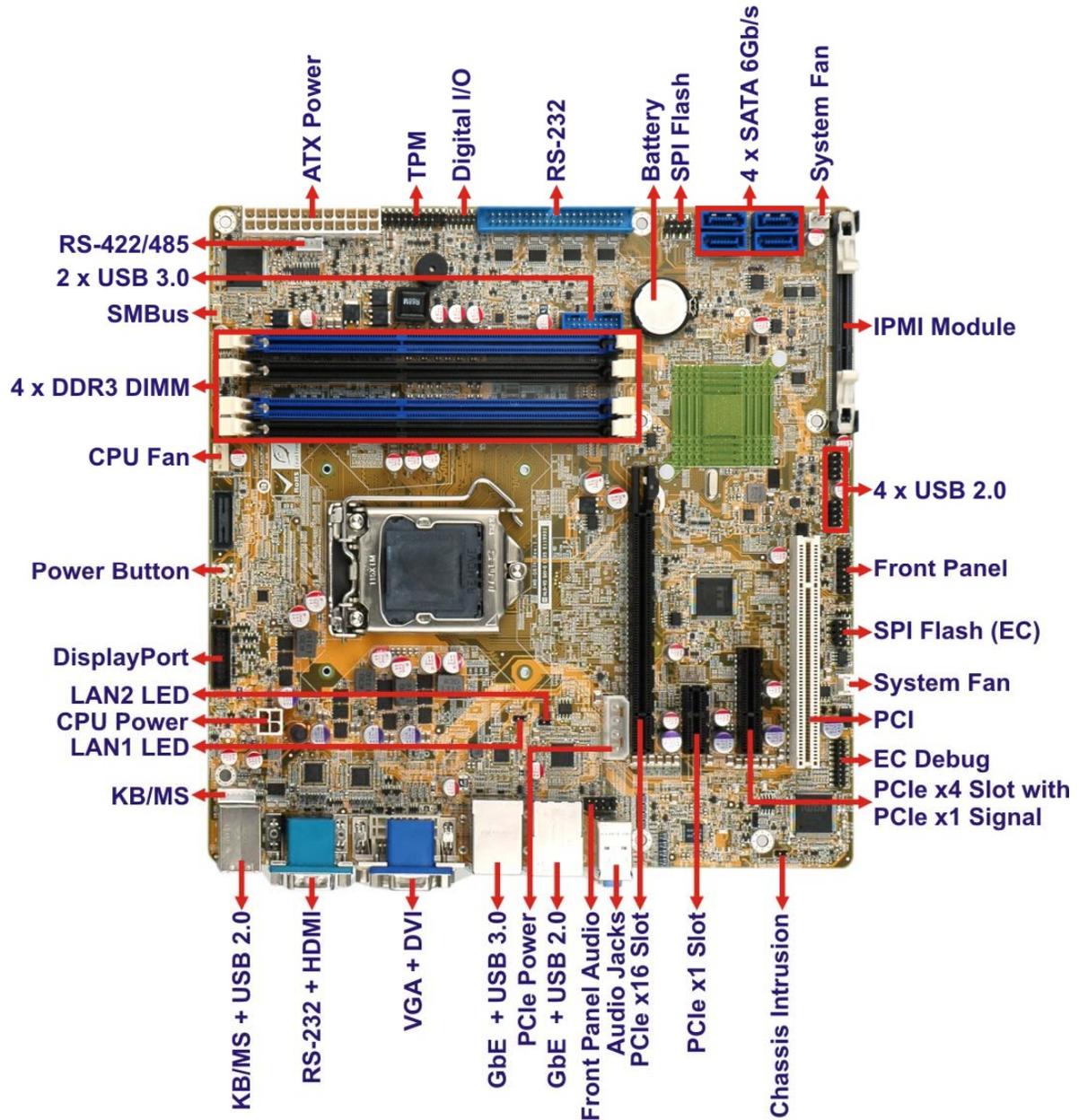
Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMB-Q870-i2 are shown in the diagram below.
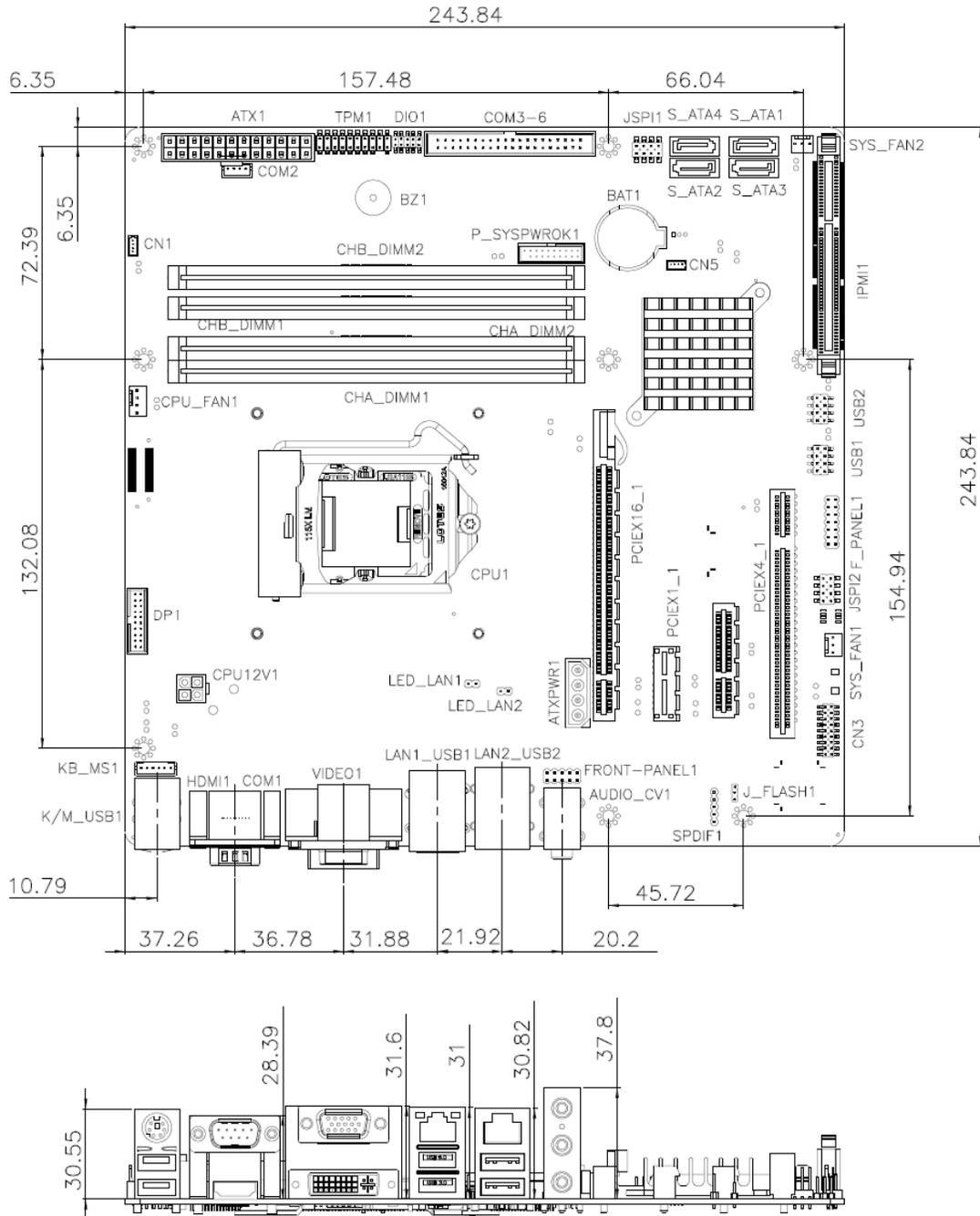
Figure 1-3: IMB-Q870-i2 Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.
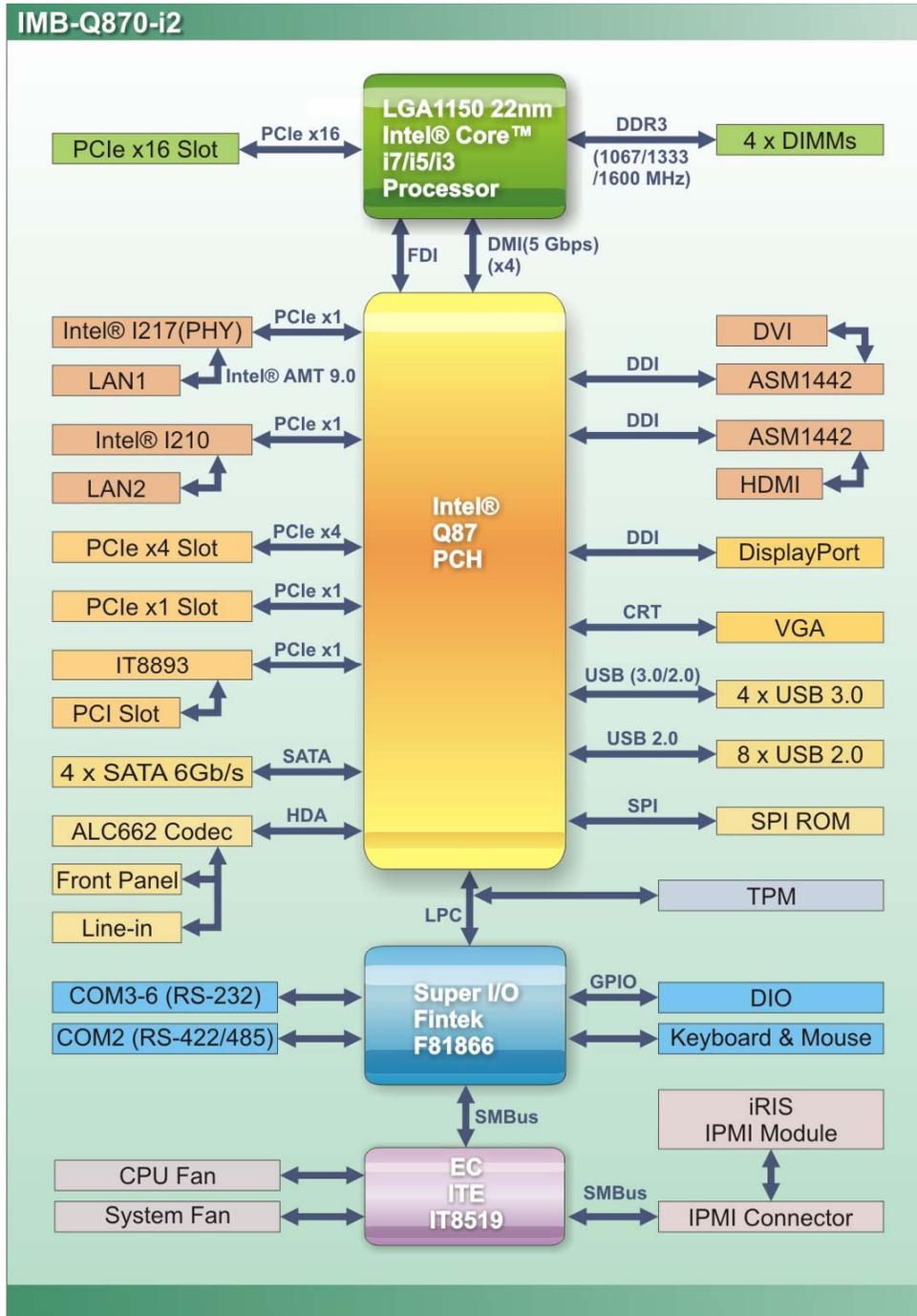
Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMB-Q870-i2 technical specifications are listed below.

Specification/Model	IMB-Q870-i2
Form Factor	microATX
CPU Supported	LGA1150 Intel® Core™ i7, Core™ i5, Core™ i3, Pentium® or Celeron® processor supported
Chipset	Intel® Q87
Integrated Graphics	Intel® HD Graphics Gen 7.5 supports DirectX 11.1, OpenCL 1.2, OpenGL 3.2, Full MPEG2, VC1, AVC Decode
Memory	Four 240-pin 1333/1066 MHz dual-channel DDR3 SDRAM DIMMs support up to 32.0 GB maximum
Audio	Realtek ALC662 HD Audio codec (line-in, line-out, mic-in)
BIOS	UEFI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	**LAN1:** Intel® I217LM PHY with Intel® AMT 9.0 support **LAN2**: Intel® I210-AT PCIe Ethernet controller with NCSI & IPMI 2.0 support
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	One PCI slot
PCIe	One PCIe x1 slot One PCIe x16 slot One PCIe x4 slot (with x1 signal)
I/O Interface Connectors	
Audio Connectors	One external audio jack (line-in, line-out, mic-in) One internal front panel audio connector (2x5 pin header)

Specification/Model	IMB-Q870-i2
Display Ports	One HDMI integrated in the Intel® Q87 (up to 2560x1600, 60Hz)
	One DVI-D integrated in the Intel® Q87 (up to 2560x1600, 60Hz)
	One VGA integrated in the Intel® Q87 (up to 1920x1200, 60Hz)
	One internal DisplayPort integrated in the Intel® Q87 supports HDMI, LVDS, VGA, DVI, DisplayPort (up to 3840x2160, 60Hz)
Ethernet	Two RJ-45 GbE ports
Keyboard/Mouse	One internal keyboard and mouse connector
	One PS/2 keyboard and mouse connector
TPM	One TPM connector via 20-pin header
Serial Ports	One external RS-232 serial port
	One RS-422/485 via internal wafer connector
	Four RS-232 via internal box headers
USB ports	Two external USB 3.0 ports on rear IO
	Two internal USB 3.0 ports by pin headers
	Four external USB 2.0 ports on rear IO
	Four internal USB 2.0 ports by pin headers
Serial ATA	Four SATA 6Gb/s connectors support RAID 0, 1, 5, 10
LAN LED	Two 2-pin LAN active LED connectors
Environmental and Power Specifications	
Power Supply	ATX power supported
Power Consumption	3.3V@0.53A, 5V@4.96A , 12V@0.12A, Vcore_12V@3.95A, 5VSB@0.18A (3.90GHz Intel® i7-4770K CPU with four 4GB 1333MHz DDR3 DIMMs)
Operating Temperature	-20ºC ~ 60ºC/-4°F ~ 140°F
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight GW/NW	1200 g / 680 g

Table 1-1: IMB-Q870-i2 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- *Wear an anti-static wristband*: Wearing an anti-static wristband can prevent electrostatic discharge.
- *Self-grounding*: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- *Use an anti-static pad*: When configuring any circuit board, place it on an anti-static mat.
- *Only handle the edges of the PCB*: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the IMB-Q870-i2 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

![NOTE icon]   **NOTE:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMB-Q870-i2 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.tw.

The IMB-Q870-i2 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMB-Q870-i2 single board computer	
2	SATA cable (**P/N**: 32000-062800-RS)	
1	I/O shielding (**P/N**: 45014-0046C0-00-RS)	
1	Mini jumper pack (2.54mm) (**P/N**:33101-000656-RS)	
1	Utility CD	

Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
IPMI 2.0 adapter card with AST2400 BMC chip (**P/N**: iRIS-2400-R10)	
Dual-port USB cable with bracket (**P/N**: 19800-003100-200-RS)	
Dual-port USB 3.0 cable with bracket (**P/N**: 19800-010500-100-RS)	
SATA Power Cable (**P/N**: 32102-000100-200-RS)	
RS-422/485 cable, 200mm (**P/N**: 32205-003800-100-RS)	
Quad port RS-232 cable with bracket (400/400/400/400MM) (**P/N**: 32205-001203-100-RS)	
KB/MS cable (**P/N**: 19800-000075-RS)	

Item and Part Number	Image
Parallel port cable (**P/N**:19800-000049-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-1156E-R11)	
DisplayPort to HDMI converter board for IEI IDP connector (**P/N**: DP-HDMI-R10)	
DisplayPort to 24-bit dual-channel LVDS converter board for iEi IDP connector (**P/N**: DP-LVDS-R10)	
DisplayPort to VGA converter board for iEi IDP connector (**P/N**: DP-VGA-R10)	
DisplayPort to DVI-D converter board for iEi IDP connector (**P/N**: DP-DVI-R10)	
DisplayPort to DisplayPort converter board for iEi IDP connector (**P/N**: DP-DP-R10)	

Item and Part Number	Image
20-pin Infineon TPM Module, S/W management tool, firmware V3.17 (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-Q870-i2 Layout

The figures below show all the connectors and jumpers.
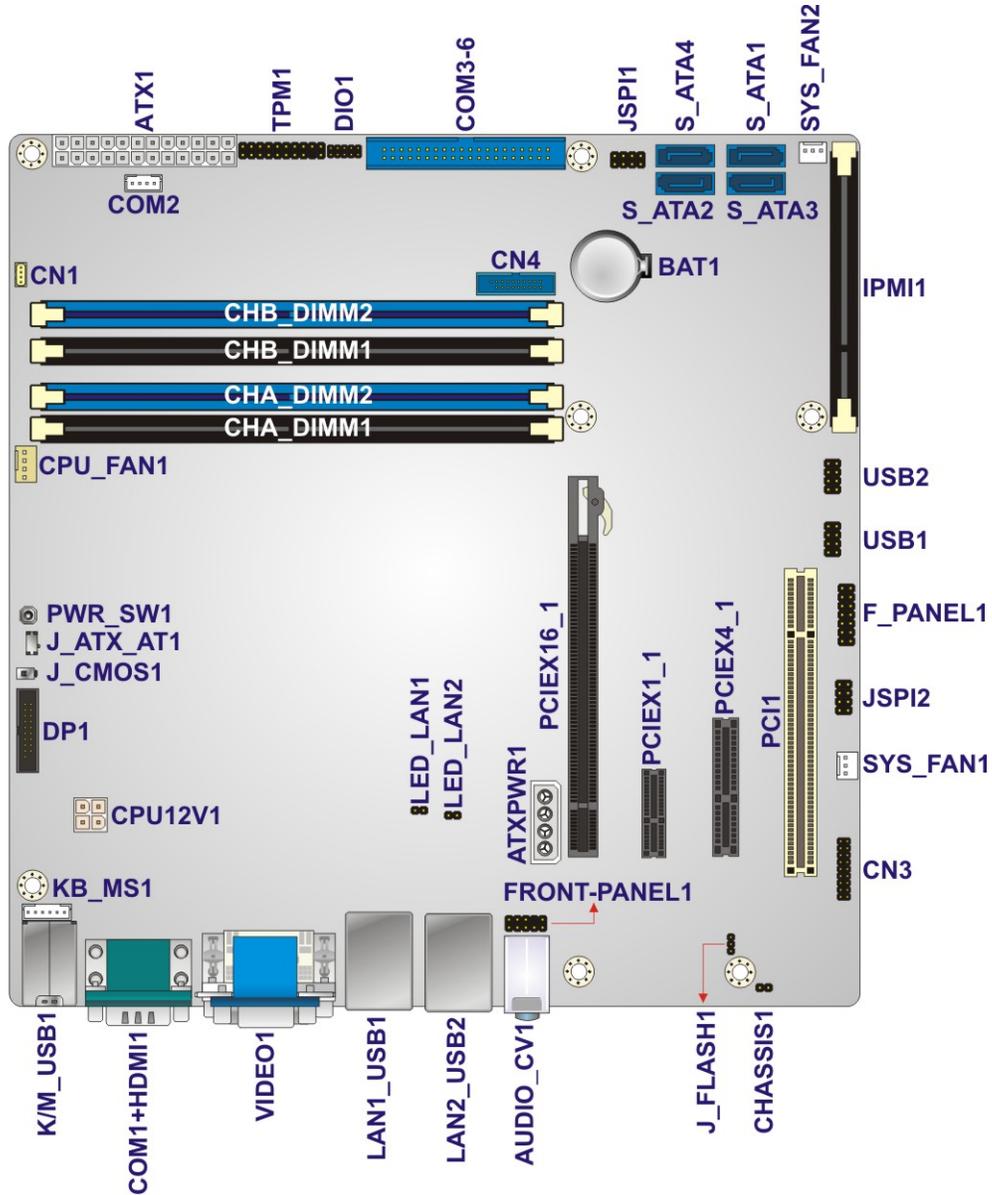
Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX Power connector	24-pin connector	ATX1
Battery connector	Battery holder	BAT1
Chassis intrusion connector	2-pin header	CHASSIS1
CPU power connector	4-pin connector	CPU12V1
Digital I/O connector	10-pin header	DIO1
DisplayPort connector	19-pin box header	DP1
EC debug connector	18-pin header	CN3
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connectors (system)	3-pin wafer	SYS_FAN1, SYS_FAN2
Front panel audio connector	10-pin header	FRONT-PANEL1
Front panel connector	14-pin header	F_PANEL1
iRIS module connector	204-pin DDR3 SO-DIMM slot	IPMI1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN1 LED connector	2-pin header	LED_LAN1
LAN2 LED connector	2-pin header	LED_LAN2
Memory card slot	DIMM slot	CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2
PCI slot	PCI slot	PCI1
PCIe x1 slot	PCIe x1 slot	PCIEX1_1
PCIe x16 slot	PCIe x16 slot	PCIEX16_1
PCIe x4 slot with PCIe x1 signal	PCIe x4 slot	PCIEX4_1
PCIe power connector	4-pin connector	ATXPWR1
Power button	Push button	PWR_SW1

Connector	Type	Label
SATA 6Gb/s drive connectors	7-pin SATA connector	S_ATA1, S_ATA2, S_ATA3, S_ATA 4
Serial port, RS-232	40-pin box header	COM3-6
Serial port, RS-422/485	4-pin wafer	COM2
SMBus connector	4-pin wafer	CN1
SPI flash connector	8-pin header	JSPI1
SPI flash connector, EC	8-pin header	JSPI2
TPM connector	20-pin header	TPM1
USB 2.0 connectors	8-pin headers	USB1, USB2
USB 3.0 connector	19-pin box header	CN4

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
Audio connector	Audio jacks	AUDIO_CV1
Keyboard/Mouse and USB 2.0 ports	PS/2, USB 2.0	K/M_USB1
Ethernet and USB 2.0 ports	RJ-45, USB 2.0	LAN2_USB2
Ethernet and USB 3.0 ports	RJ-45, USB 3.0	LAN1_USB1
HDMI connector	HDMI port	HDMI1
Serial Port connector (COM1)	9-pin male DB-9	COM1
VGA and DVI connector	15-pin female, 24-pin female	VIDEO1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMB-Q870-i2.

3.2.1 ATX Power Connector

CN Label:	**ATX1**
CN Type:	24-pin ATX
CN Location:	See **Figure 3-2**
CN Pinouts:	See **Table 3-3**

The ATX power connector connects to an ATX power supply.
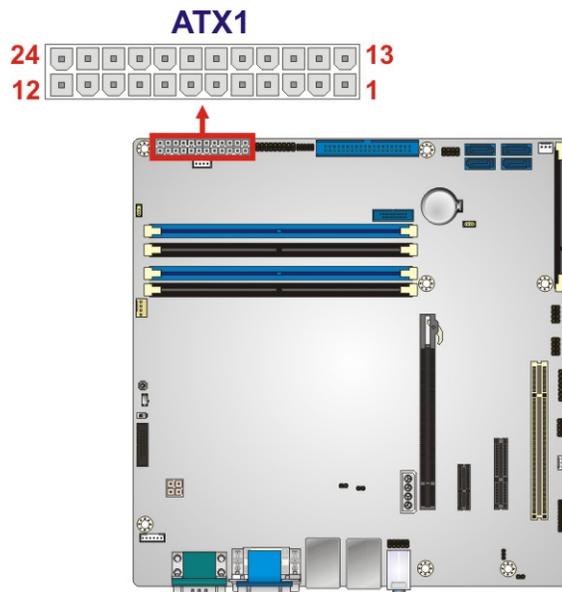
Figure 3-2: ATX Power Connector Location

Pin	Description	Pin	Description
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND

Pin	Description	Pin	Description
7	GND	19	GND
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Table 3-3: ATX Power Connector Pinouts

3.2.2 Battery Connector

> ![warning] **CAUTION:**
>
> Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.
>
> Dispose of used batteries according to instructions and local regulations.

CN Label: **BAT1**

CN Type: Battery holder

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-4**

A system battery is placed in the battery holder. The battery provides power to the system clock to retain the time when power is turned off.
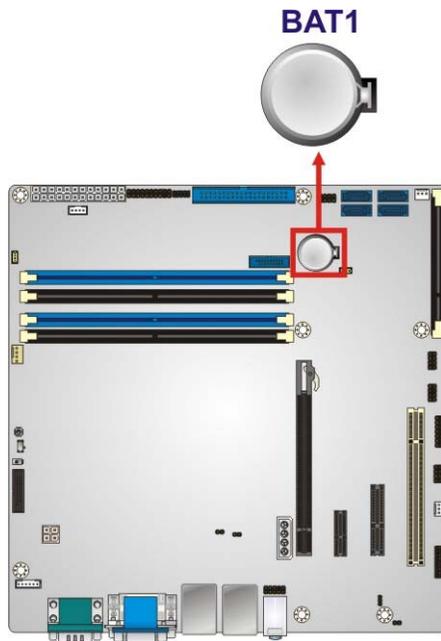
Figure 3-3: Battery Connector Location

Pin	Description
1	NC
2	BAT+
3	BAT-(GND)

Table 3-4: Battery Connector Pinouts

3.2.3 Chassis Intrusion Connector

CN Label:	**CHASSIS1**
CN Type:	2-pin header
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-5**

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.

Figure 3-4: Chassis Intrusion Connector Location

Pin	Description
1	+3.3VSB
2	CHASSIS OPEN

Table 3-5: Chassis Intrusion Connector Pinouts

3.2.4 CPU Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin connector

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-6**

The CPU power input connector provides power to the CPU.
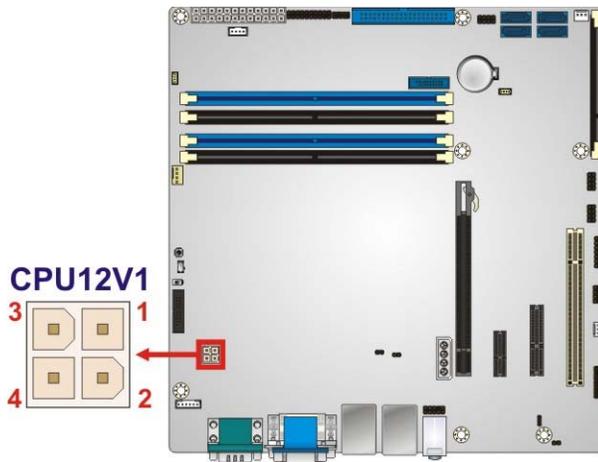
Figure 3-5: CPU Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 3-6: CPU Power Connector Pinouts

3.2.5 DisplayPort Connector

CN Label:　　DP1

CN Type:　　19-pin box header

CN Location:　See **Figure 3-6**

CN Pinouts:　See **Table 3-7**

The DisplayPort connector supports HDMI, LVDS, VGA, DVI and DisplayPort graphics interfaces with up to 3840x2160 resolutions.
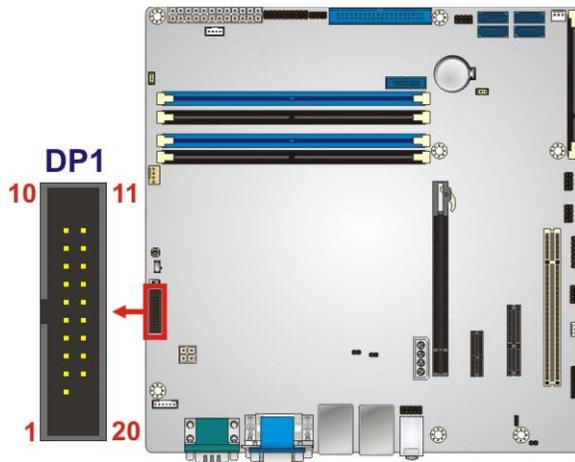
Figure 3-6: DisplayPort Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	11	AUXP
2	LANE1N	12	AUXN
3	LANE1P	13	GND
4	GND	14	LANE2P
5	LANE3N	15	LANE2N
6	LANE3P	16	GND
7	GND	17	LANE0P
8	AUX_CTRL_DET_D	18	LANE0N
9	GND	19	+3.3V
10	HPD		

Table 3-7: DisplayPort Connector Pinouts

3.2.6 Digital I/O Connector

CN Label:	**DIO1**
CN Type:	10-pin header
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-8**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

Figure 3-7: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-8: Digital I/O Connector Pinouts

3.2.7 EC Debug Connector

CN Label:　　CN3

CN Type:　　18-pin header

CN Location:　See **Figure 3-8**

CN Pinouts:　See **Table 3-9**

The EC debug connector is used for EC debug.
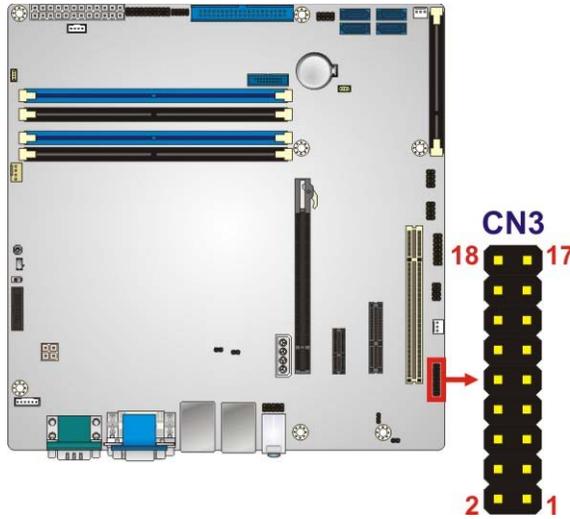
Figure 3-8: EC Debug Connector Location

Pin	Description	Pin	Description
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

Table 3-9: EC Debug Connector Pinouts

3.2.8 Fan Connector (CPU)

CN Label: CPU_FAN1

CN Type: 4-pin wafer

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The fan connector attaches to a CPU cooling fan.
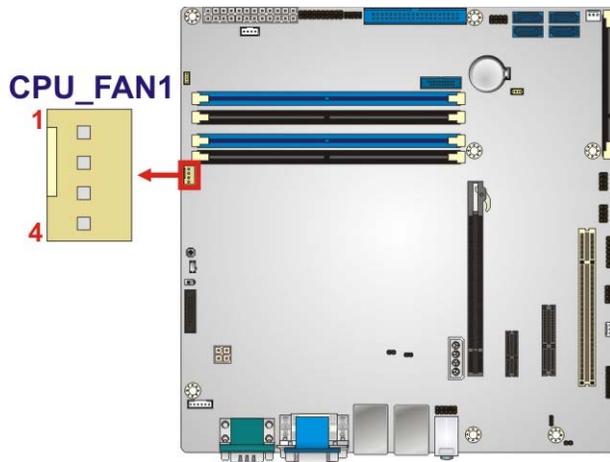
Figure 3-9: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	FANIO
4	PWM

Table 3-10: CPU Fan Connector Pinouts

3.2.9 Fan Connectors (System)

    CN Label: **SYS_FAN1, SYS_FAN2**

    CN Type: 3-pin wafer

    CN Location: See **Figure 3-10**

    CN Pinouts: See **Table 3-11**

Each fan connector attaches to a system cooling fan.
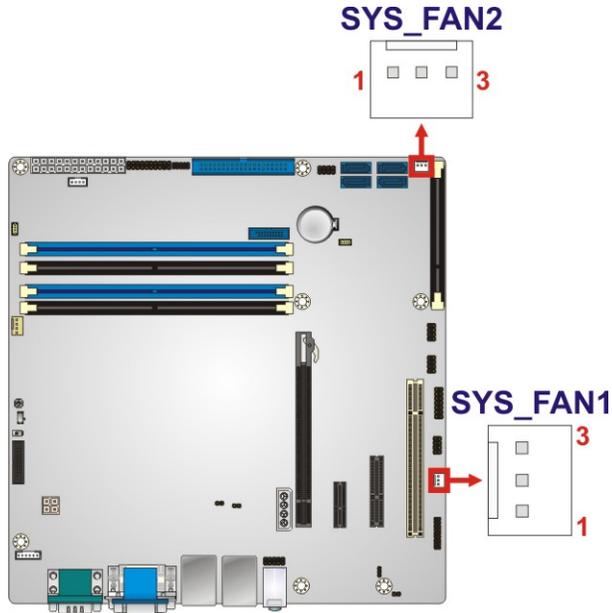
Figure 3-10: System Fan Connector Locations

PIN NO.	DESCRIPTION
1	FANIO
2	+12 V (PWM)
3	GND

Table 3-11: System Fan Connector Pinouts

3.2.10 Front Panel Audio Connector

CN Label: FRONT-PANEL1

CN Type: 10-pin header

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-12**

This connector connects to speakers, a microphone and an audio input.
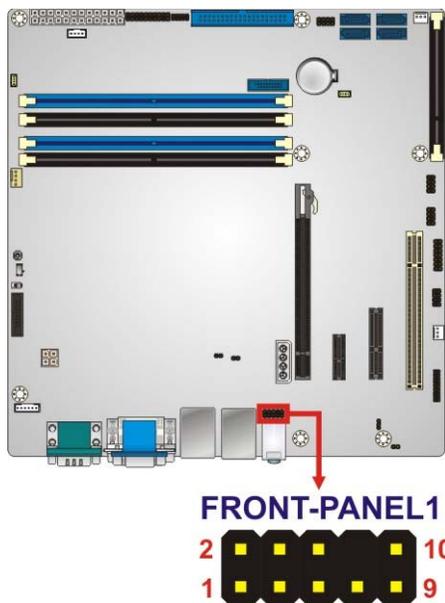
Figure 3-11: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	LMIC2-L	2	AUD_GND
3	LMIC2-R	4	PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LLINE2-L	10	LINE2-JD

Table 3-12: Front Panel Audio Connector Pinouts

3.2.11 Front Panel Connector

CN Label: F_PANEL1

CN Type: 14-pin header

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.
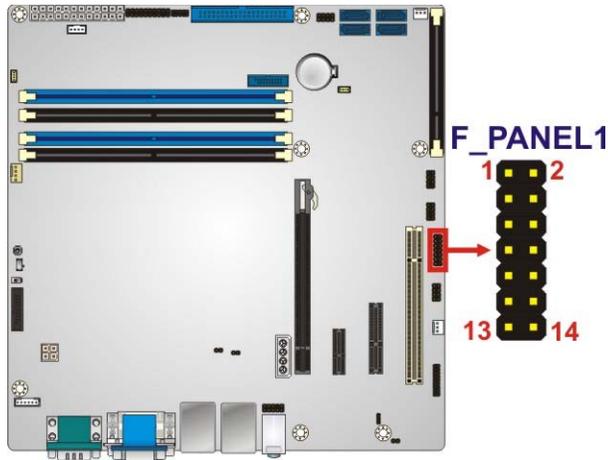
Figure 3-12: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	Beep Power
	3	NC	IPMI LED	4	IPMI ID_LED+
	5	GND		6	IPMI ID_LED-
Power Button	7	PWRBT_SW#	Speaker	8	PC Beep
	9	GND		10	NC
HDD LED	11	+5V	Reset	12	EXTRST-
	13	SATA_LED#		14	GND

Table 3-13: Front Panel Connector Pinouts

3.2.12 iRIS Module Slot

    CN Label: **IPMI1**

    CN Type: 204-pin DDR3 SO-DIMM slot

    CN Location: See **Figure 3-13**

The iRIS module slot is used to install the IEI iRIS-2400 IPMI 2.0 module.

⚠ WARNING:

The iRIS module slot is designed to install the IEI iRIS-2400 IPMI 2.0 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the IMB-Q870-i2.
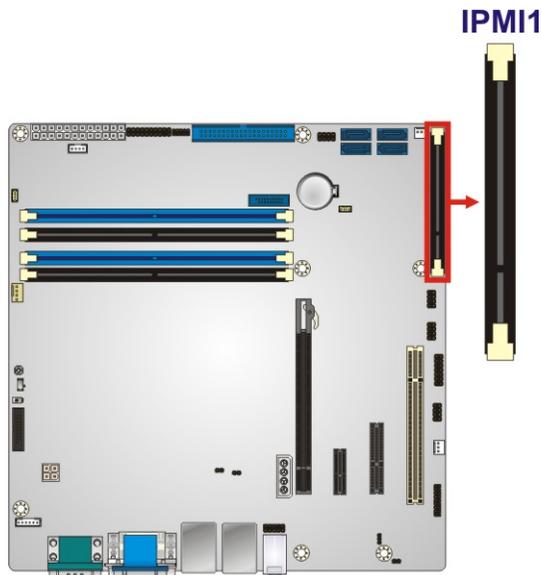
Figure 3-13: iRIS Module Slot Location

3.2.13 Keyboard and Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-14**
CN Pinouts:	See **Table 3-14**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.
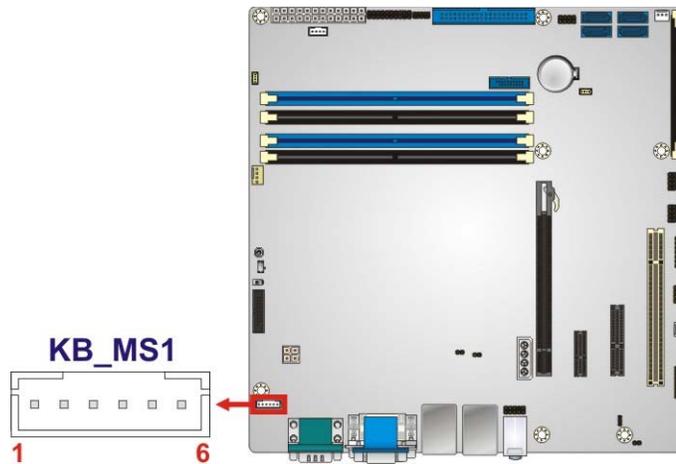
Figure 3-14: Keyboard and Mouse Location

Pin	Description
1	VCC
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-14: Keyboard and Mouse Connector Pinouts

3.2.14 LAN LED Connectors

CN Label: **LED_LAN1, LED_LAN2**

CN Type: 2-pin header

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-15** and **Table 3-16**

The LAN LED connectors are used to connect to the LAN LED indicators on the chassis to indicate users the link activities of the two LAN ports.
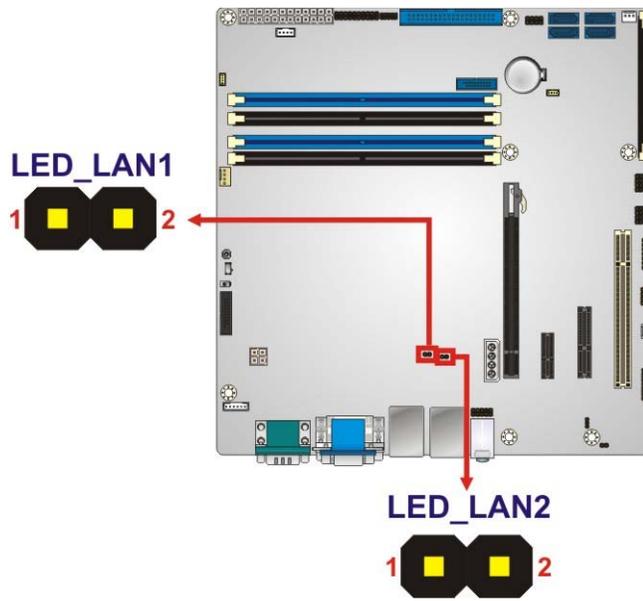
Figure 3-15: LAN LED Connector Locations

Pin	Description
1	+3.3V
2	LAN1_LED_LINK#_ACT

Table 3-15: LAN1 LED Connector (LED_LAN1) Pinouts

Pin	Description
1	+3.3V
2	LAN2_LED_LINK#_ACT

Table 3-16: LAN2 LED Connector (LED_LAN2) Pinouts

3.2.15 Memory Card Slots

CN Label: **CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2**

CN Type: DDR3 DIMM slot

CN Location: See **Figure 3-16**

The DIMM slots are for DDR3 DIMM memory modules.
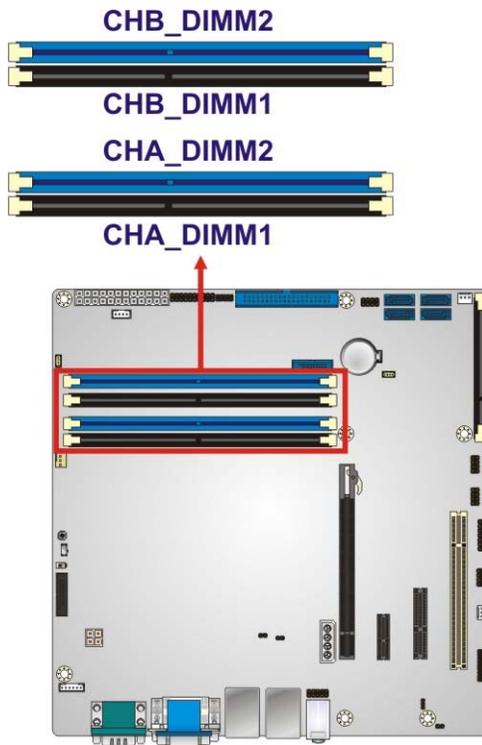
Figure 3-16: Memory Card Slot Locations

3.2.16 PCI Express Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin connector

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-17**

The PCIe power connector provides extra power to the PCIe expansion card.
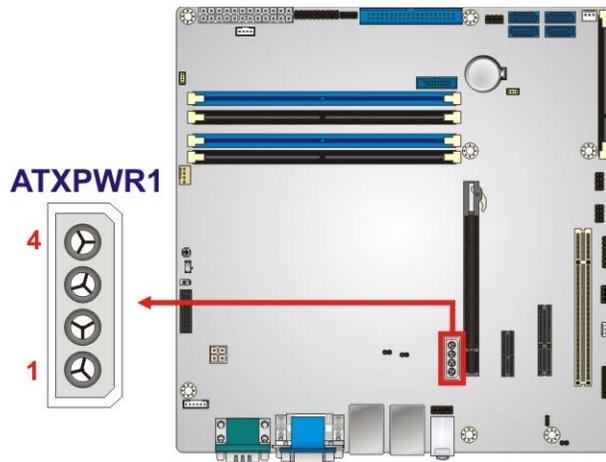
Figure 3-17: PCIe Power Location

Pin	Description
1	VCC +5V
2	GND
3	GND
4	VCC +12V

Table 3-17: PCIe Power Pinouts

3.2.17 Power Button

CN Label:	**PWR_SW1**
CN Type:	Push button
CN Location:	See **Figure 3-18**

The on-board power button controls system power.
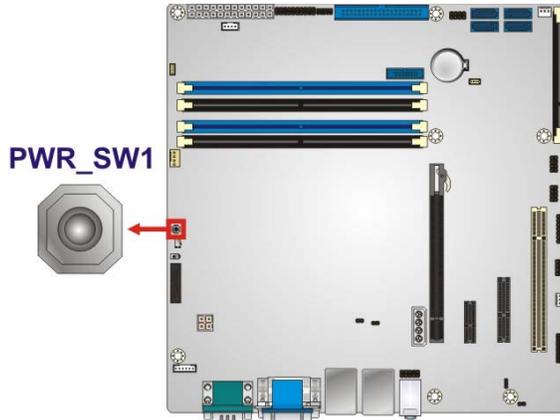
Figure 3-18: Power Button Location

3.2.18 SATA 6Gb/s Drive Connectors

CN Label:	**S_ATA1, S_ATA2, S_ATA3, S_ATA4**
CN Type:	7-pin SATA drive connectors
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-18**

The SATA drive connectors can be connected to SATA drives.
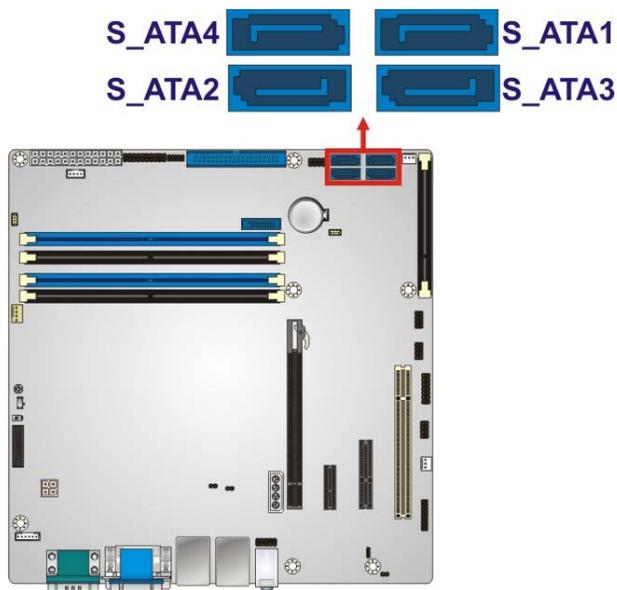
Figure 3-19: SATA 6Gb/s Drive Connector Locations

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

Table 3-18: SATA 6Gb/s Drive Connector Pinouts

3.2.19 Serial Port Connectors, RS-232

CN Label: **COM3-6**

CN Type: 40-pin box header

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-19**

The connector provides four RS-232 ports connection.
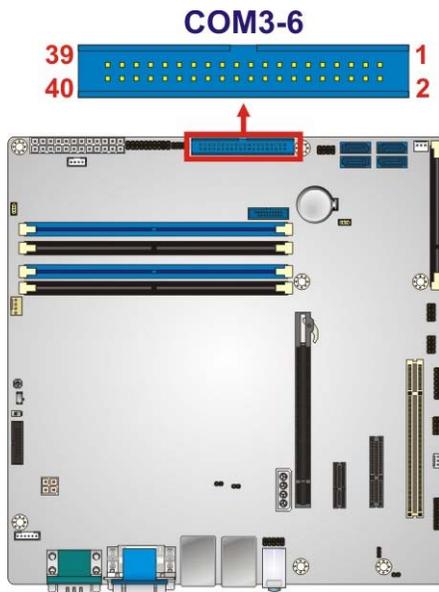
Figure 3-20: Serial Port Connector Location

	PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
COM3	1	DCD	2	DSR
	3	RXD	4	RTS
	5	TXD	6	CTS
	7	DTR	8	RI
	9	GND	10	GND
COM4	11	DCD	12	DSR
	13	RXD	14	RTS
	15	TXD	16	CTS
	17	DTR	18	RI
	19	GND	20	GND
COM5	21	DCD	22	DSR
	23	RXD	24	RTS
	25	TXD	26	CTS
	27	DTR	28	RI
	29	GND	30	GND
COM6	31	DCD	32	DSR
	33	RXD	34	RTS
	35	TXD	36	CTS
	37	DTR	38	RI
	39	GND	40	GND

Table 3-19: COM3~6 Serial Port Connector Pinouts

3.2.20 Serial Port Connector, RS-422/485

CN Label: **COM2**

CN Type: 4-pin wafer

CN Location: See **Figure 3-21**

CN Pinouts: See **Table 3-20**

Used for RS-422/485 communications.
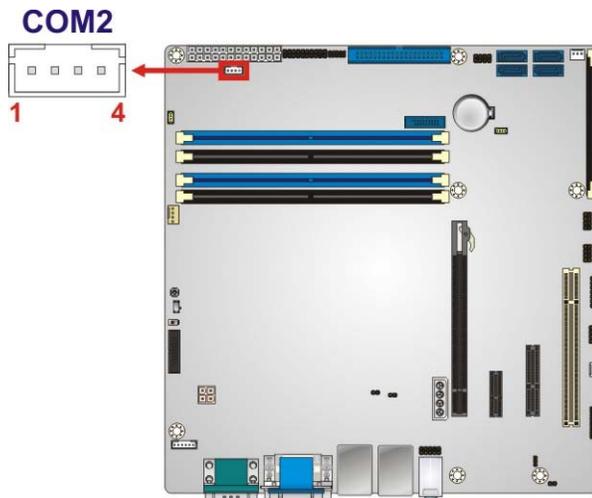
Figure 3-21: RS-422/485 Connector Location

PIN NO.	DESCRIPTION
1	RXD422-
2	RXD422+
3	TXD422+/TXD485+
4	TXD422-/TXD485-

Table 3-20: RS-422/485 Connector Pinouts

Use the optional RS-422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

Table 3-21: DB-9 RS-422/485 Pinouts

3.2.21 SMBus Connector

CN Label: **CN1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-22**

CN Pinouts: See **Table 3-22**

The SMBus (System Management Bus) connector provides low-speed system management communications.
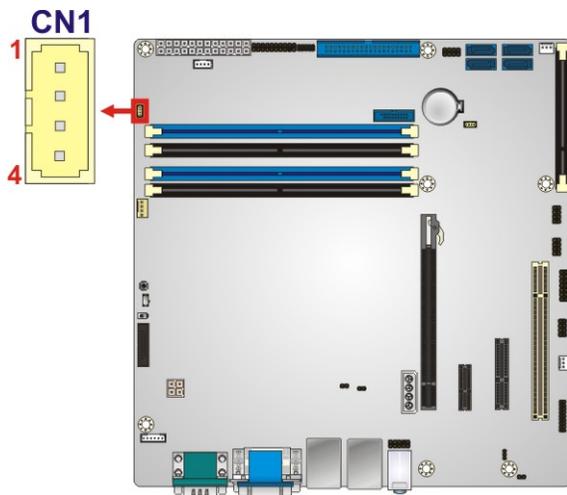
Figure 3-22: SMBus Connector Location

PIN	DESCRIPTION
1	GND
2	SMB_DATA
3	SMB_CLK
4	+5V

Table 3-22: SMBus Connector Pinouts

3.2.22 SPI Flash Connector

CN Label: **JSPI1**

CN Type: 8-pin header

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-23**

The SPI flash connector is used to flash the SPI ROM.

Figure 3-23: SPI Flash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	SPI_CS#
3	SPI_SO	4	NC
5	GND	6	SPI_CLK
7	SPI_SI	8	NC

Table 3-23: SPI Flash Connector Pinouts

3.2.23 SPI Flash Connector, EC

CN Label: JSPI2

CN Type: 8-pin header

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-24**

The SPI flash connector is used to flash the EC ROM.

Figure 3-24: SPI EC Flash Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	SPI_CS#
3	SPI_SO	4	NC
5	GND	6	SPI_CLK
7	SPI_SI	8	NC

Table 3-24: SPI EC Flash Connector Pinouts

3.2.24 TPM Connector

CN Label:	**TPM1**
CN Type:	20-pin header
CN Location:	See **Figure 3-25**
CN Pinouts:	See **Table 3-25**

The TPM connector connects to a TPM module.
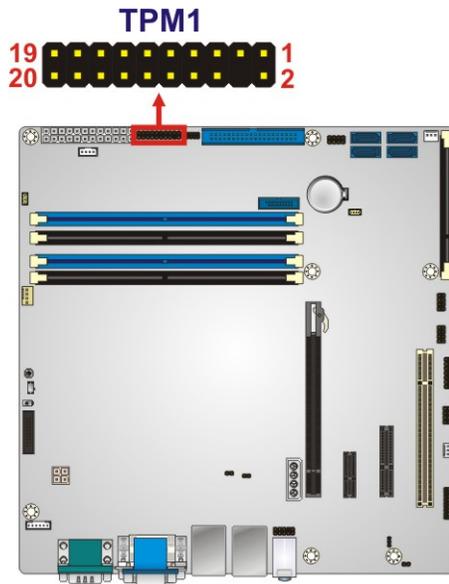
Figure 3-25: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-25: TPM Connector Pinouts

3.2.25 USB 2.0 Connectors

CN Label: **USB1, USB2**

CN Type: 8-pin header

CN Location: See **Figure 3-26**

CN Pinouts: See **Table 3-26**

The USB 2.0 connectors connect to USB 2.0 devices. Each pin header provides two USB 2.0 ports.
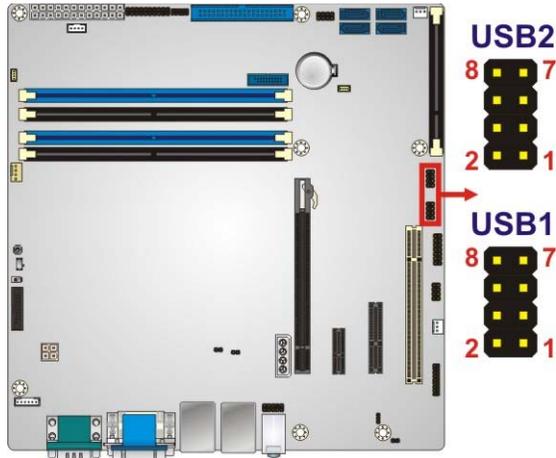
Figure 3-26: USB 2.0 Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC

Table 3-26: USB 2.0 Connector Pinouts

3.2.26 USB 3.0 Connector

CN Label: CN4

CN Type: 19-pin box header

CN Location: See **Figure 3-27**

CN Pinouts: See **Table 3-27**

The USB 3.0 connector connects to USB 3.0 devices. This connector provides two USB 3.0 ports.
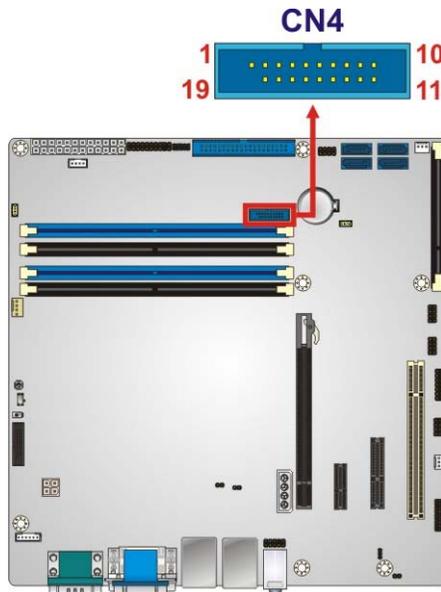
Figure 3-27: USB 3.0 Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	11	USB_DATA+
2	USB3_RX-	12	USB_DATA-
3	USB3_RX+	13	GND
4	GND	14	USB3_TX+
5	USB3_TX-	15	USB3_TX-
6	USB3_TX+	16	GND
7	GND	17	USB3_RX+
8	USB_DATA-	18	USB3_RX-
9	USB_DATA+	19	VCC
10	NC		

Table 3-27: USB 3.0 Connector Pinouts

3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:
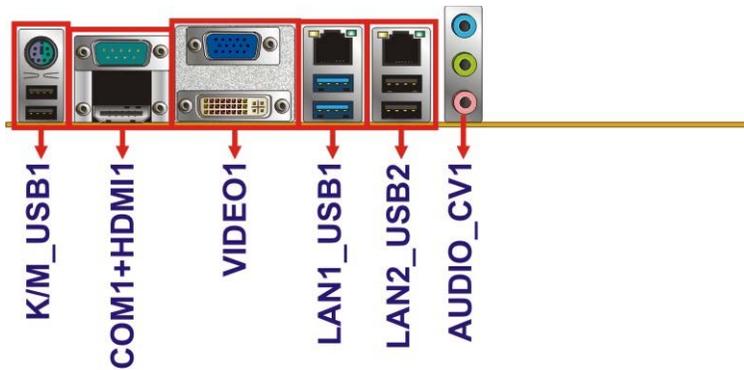
Figure 3-28: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label: **AUDIO_CV1**

CN Type: Audio jack

CN Location: See **Figure 3-28**

The audio jacks connect to external audio devices.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.
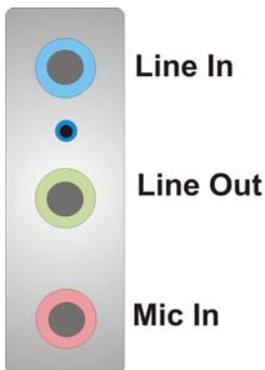
Figure 3-29: Audio Connector

3.3.2 Keyboard/Mouse and USB 2.0 Connectors

CN Label: **K/M_USB1**

CN Type: PS/2, USB 2.0

CN Location: See **Figure 3-28**

CN Pinouts: See **Table 3-28** and **Table 3-29**

The USB 2.0 connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND

Table 3-28: USB 2.0 Port Pinouts

The PS/2 port is for connecting a PS/2 mouse and a PS/2 keyboard.

PIN	DESCRIPTION
9	GND
10	Keyboard Data
11	Mouse Data
12	VCC
13	Keyboard Clock
14	Mouse Clock

Table 3-29: PS/2 Connector Pinouts

3.3.3 Ethernet and USB 2.0 Connectors

CN Label: **LAN2_USB2**

CN Type: RJ-45, USB 3.0

CN Location: See **Figure 3-28**

CN Pinouts: See **Table 3-30** and **Table 3-31**

The USB 2.0 connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND

Table 3-30: USB 2.0 Port Pinouts

A 10/100/1000 Mb/s connection can be made to a Local Area Network.

PIN	DESCRIPTION	PIN	DESCRIPTION
P2	TRD2P0	P6	TRD2P2
P3	TRD2N0	P7	TRD2N2
P4	TRD2P1	P8	TRD2P3
P5	TRD2N1	P9	TRD2N3

Table 3-31: LAN2 Pinouts

3.3.4 Ethernet and USB 3.0 Connectors

CN Label:	**LAN1_USB1**
CN Type:	RJ-45, USB 3.0
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-32** and **Table 3-33**

There are two external USB 3.0 connectors on the IMB-Q870-i2.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_ DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_ RX+

PIN	DESCRIPTION	PIN	DESCRIPTION
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+

Table 3-32: USB 3.0 Port Pinouts

A 10/100/1000 Mb/s connection can be made to a Local Area Network. LAN1 also supports Intel® AMT 9.0.

PIN	DESCRIPTION	PIN	DESCRIPTION
20	LAN1_MDI0P	24	LAN1_MDI2P
21	LAN1_MDI0N	25	LAN1_MDI2N
22	LAN1_MDI1P	26	LAN1_MDI3P
23	LAN1_MDI1N	27	LAN1_MDI3N

Table 3-33: LAN1 Pinouts

3.3.5 HDMI Port Connector

CN Label:	**HDMI1**
CN Type:	HDMI connector
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-34**

The HDMI port connects to an HDMI device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
8	GND	20	HDMI_GND
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

Table 3-34: HDMI Connector Pinouts

3.3.6 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: DB-9 connector

CN Location: See **Figure 3-28**

CN Pinouts: See **Table 3-35**

The serial port connects to a RS-232 serial communications device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI1
5	GND		

Table 3-35: Serial Port Connector Pinouts
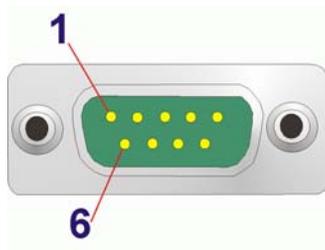
Figure 3-30: Serial Port Connector Pinouts

3.3.7 VGA and DVI Connectors

CN Label:	VIDEO1
CN Type:	15-pin Female, 24-pin header
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-36** and **Table 3-37**

The VGA connector connects to a monitor that accepts a standard VGA input.

PIN	DESCRIPTION	PIN	DESCRIPTION
V1	RED	V2	GREEN
V3	BLUE	V4	NC
V5	GND	V6	GND
V7	GND	V8	GND
V9	VCC	V10	GND
V11	NC	V12	DDCDA
V13	HSYNC	V14	VSYNC
V15	DDCCLK		

Table 3-36: VGA Connector Pinouts
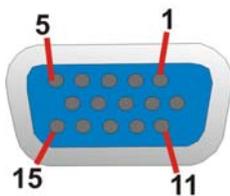
Figure 3-31: VGA Connector

The DVI connector connects to a monitor that supports DVI video input.

PIN	DESCRIPTION	PIN	DESCRIPTION
C1	RED	10	DVI_DATA1
C2	GREEN	11	GND
C3	BLUE	12	N/C
C4	HS	13	N/C

PIN	DESCRIPTION	PIN	DESCRIPTION
C5	GND	14	+5V
C6	NC	15	Hot Plug Detect
1	DVI_DATA2#	16	HPDET
2	DVI_DATA2	17	DVI_DATA0#
3	GND	18	DVI_DATA0
4	N/C	19	GND
5	N/C	20	N/C
6	DDC CLK	21	N/C
7	DDC DATA	22	N/C
8	VS	23	DVI_CLK
9	DVI_DATA1#	24	DVI_CLK#

Table 3-37: DVI Connector Pinouts
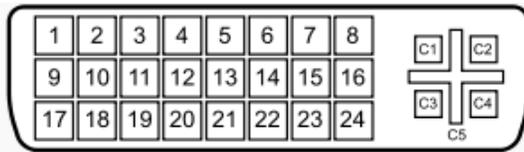
Figure 3-32: DVI-I Connector

Chapter

4

Installation

4.1 Anti-static Precautions

![WARNING icon] **WARNING:**

Failure to take ESD precautions during the installation of the IMB-Q870-i2 may result in permanent damage to the IMB-Q870-i2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-Q870-i2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-Q870-i2 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wristband*: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- *Self-grounding*:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- *Use an anti-static pad*: When configuring the IMB-Q870-i2, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMB-Q870-i2.
- *Only handle the edges of the PCB*:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

![NOTE icon] **NOTE:**

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

![Warning icon] **WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - The user manual provides a complete description of the IMB-Q870-i2 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMB-Q870-i2 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMB-Q870-i2 off:
  - When working with the IMB-Q870-i2, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMB-Q870-i2 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.2.1 Socket LGA1150 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

To install the CPU, follow the steps below.

Step 1: **Disengage the load lever** by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever. See **Figure 4-1**.
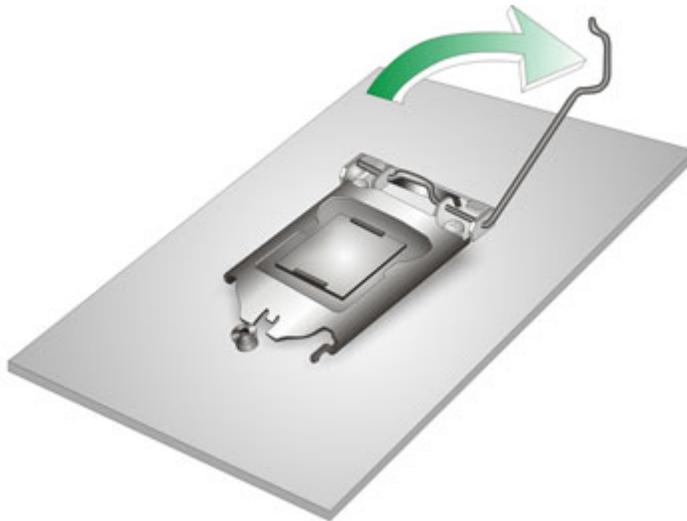
Figure 4-1: Disengage the CPU Socket Load Lever

Step 2: **Open the socket and remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 4-2**.
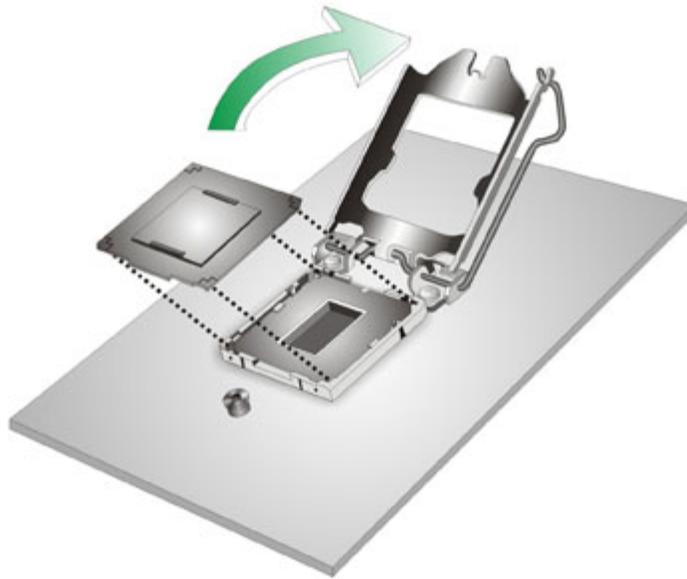
Figure 4-2: Remove Protective Cover

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the

socket contacts are free of foreign material. If any debris is found, remove it with

compressed air.

Step 4: **Orientate the CPU properly.** The contact array should be facing the CPU

socket.

⚠ **WARNING:**

DO NOT touch the pins at the bottom of the CPU. When handling the
CPU, only hold it on the sides.

Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the

CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-3**.
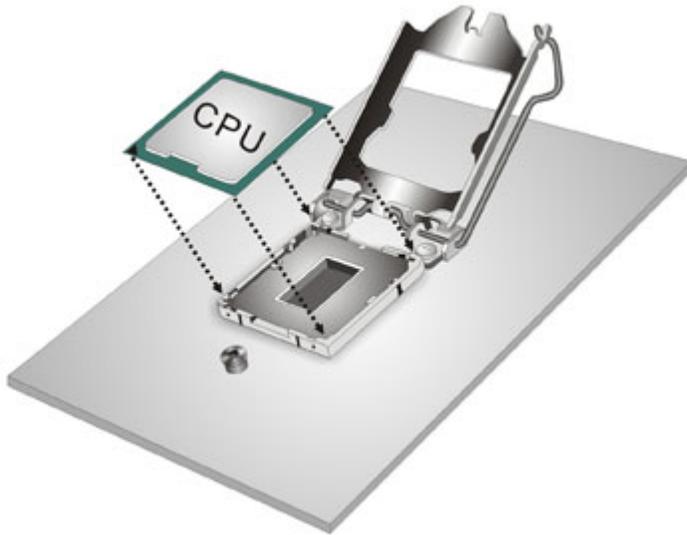
Figure 4-3: Insert the Socket LGA1150 CPU

Step 8: **Close the CPU socket.** Close the load plate and pull the load lever back a little to have the load plate be able to secure to the knob. Engage the load lever by pushing it back to its original position (**Figure 4-4**). There will be some resistance, but will not require extreme pressure.
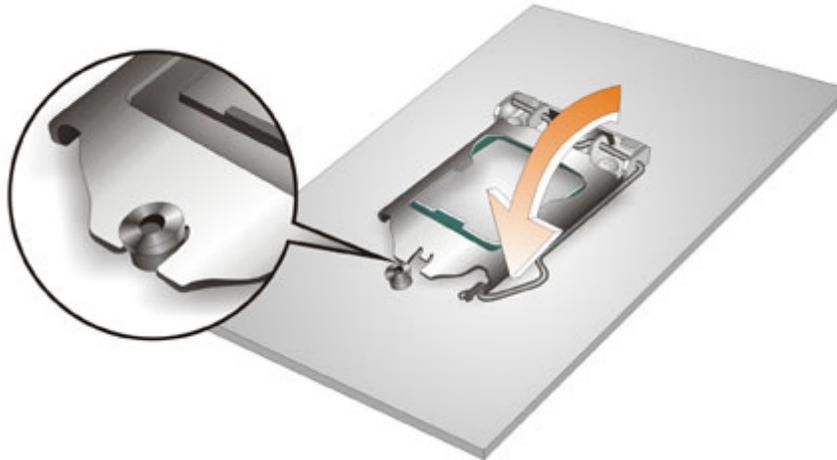
Figure 4-4: Close the Socket LGA1150

Step 9: **Connect the 12 V power to the board.** Connect the 12 V power from the power

supply to the board.

4.2.2 Socket LGA1150 Cooling Kit Installation

⚠️ **WARNING:**

DO NOT attempt to install a push-pin cooling fan.

The pre-installed support bracket prevents the board from bending and is ONLY compatible with captive screw type cooling fans.

Figure 4-5: Cooling Kits (CF-1156A-RS and CF-1156E-RS)

The cooling kit can be bought from IEI. The cooling kit has a heatsink and fan.

> ⚠ **WARNING:**
>
> Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, follow the instructions below.

Step 1: A cooling kit bracket is pre-installed on the rear of the motherboard. See **Figure 4-6**.
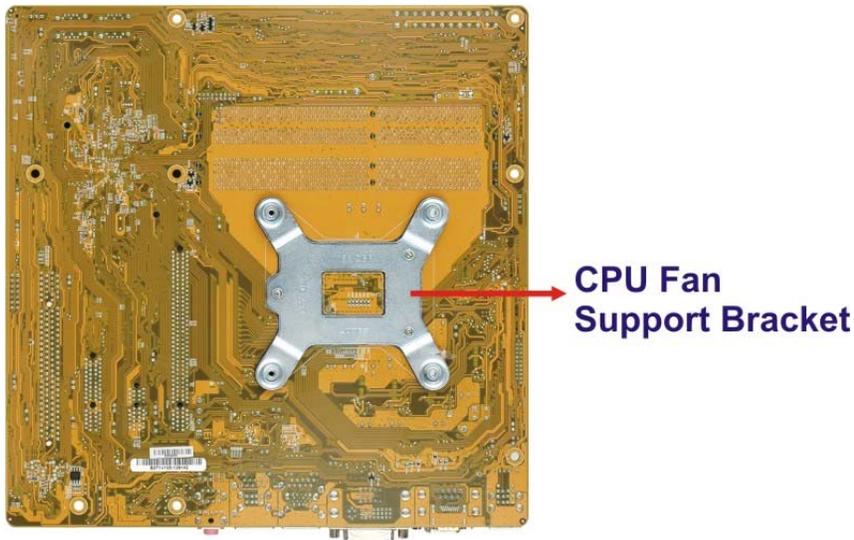
Figure 4-6: Cooling Kit Support Bracket

Step 2: Place the cooling kit onto the socket LGA1150 CPU. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 3: Mount the cooling kit. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the holes of the cooling kit bracket.

Step 4: Secure the cooling kit by fastening the four retention screws of the cooling kit.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMB-Q870-i2. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

To install a DIMM, please follow the steps below and refer to **Figure 4-7**.
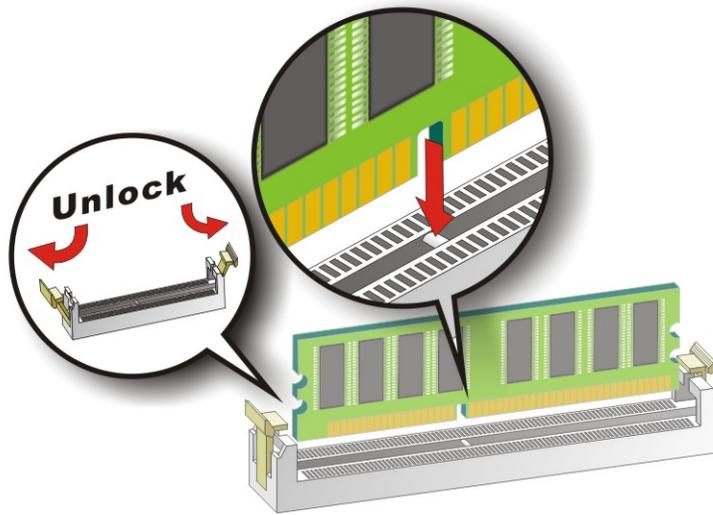
　Figure 4-7: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-7**.

Step 2: **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-7**.

Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-7**.

Step 4: **Removing a DIMM**. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

4.2.4 iRIS-2400 Module Installation

WARNING:

The iRIS module slot is designed to install the IEI iRIS-2400 IPMI 2.0 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the IMB-Q870-i2.

To install the iRIS-2400 module, please follow the steps below and refer to **Figure 4-8**.
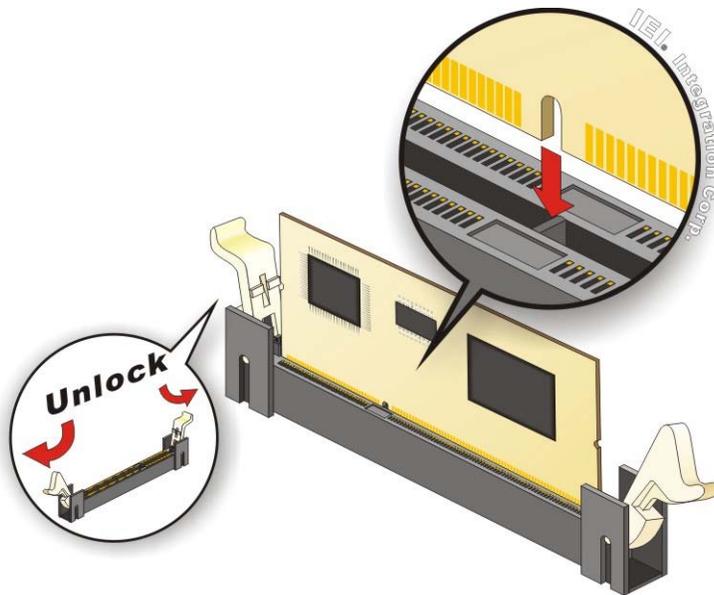
Figure 4-8: iRIS-2400 Module Installation

Step 1: **Locate the iRIS module slot**. See **Figure 3-13**.

Step 2: **Open the socket handles**. Open the two handles outwards as far as they can. See **Figure 4-8**.

Step 3: **Align the iRIS-2400 module with the socket**. Align the iRIS-2400 module so the notch on the module lines up with the notch on the socket. See **Figure 4-8**.

Step 4: **Insert the iRIS-2400 module**. Once aligned, press down until the iRIS-2400 module is properly seated. Clip the two handles into place. See **Figure 4-8**.

Step 5: **Removing the iRIS-2400 module**. To remove the iRIS-2400 module, push both handles outward. The module is ejected by a mechanism in the socket.

NOTE:

After installing the iRIS-2400 module, use **LAN2** port to establish a network connection. Please refer to **Section 4.7** for IPMI setup procedures.

4.3 System Configuration

The system configuration is controlled by buttons, switches and BIOS options. The system configuration must be performed before installation.

4.3.1 AT/ATX Power Mode Setting

The AT and ATX power mode selection is made through the AT/ATX power mode switch which is shown in **Figure 4-9**.
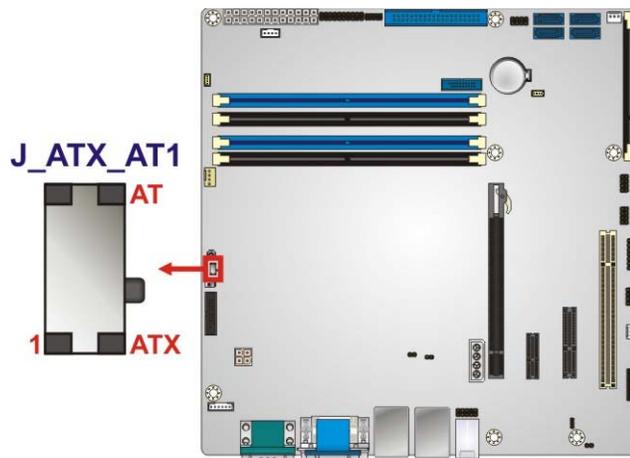
Figure 4-9: AT/ATX Power Mode Switch Location

4.3.2 Clear CMOS Button

To reset the BIOS, remove the on-board battery and press the clear CMOS button for three seconds or more. The clear CMOS button location is shown in **Figure 4-10**.

Figure 4-10: Clear CMOS Button Location

4.3.3 Flash Descriptor Security Override

The Flash Descriptor Security Override jumper specifies whether to override the flash descriptor.

Setting	Description
Short 1-2	No override (Default)
Short 2-3	Override

Table 4-1: Flash Descriptor Security Override Jumper Settings
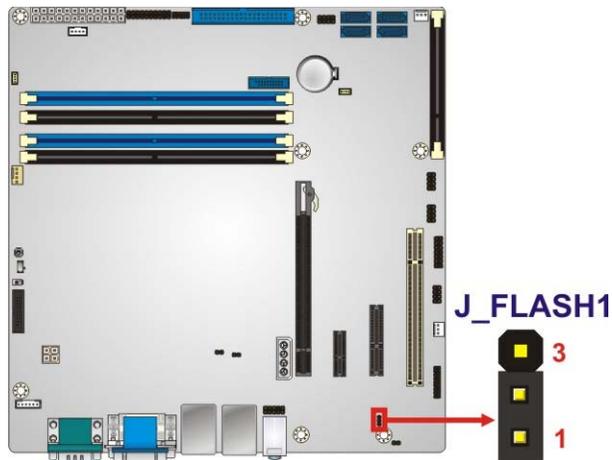
Figure 4-11: Flash Descriptor Security Override Jumper Location

4.3.4 PCIe x16 Interface Setup

The PCIe x16 interface setup is made through the BIOS options in "Chipset → PCH-IO Configuration" BIOS menu. Use the **PCIEX16 Power** option to configure the PCIe x16 channel mode.

BIOS Options	Description
1 x16 PCIE	Sets the PCIe x16 slot as one PCIe x16. (Default)

Table 4-2: PCIe x16 Interface Setup

Please refer to **Section 5.4.1** for detailed information.

4.3.5 USB Power Select

The USB power selection is made through the BIOS options in "Chipset → PCH-IO Configuration" BIOS menu. Use the **USB SW1 Power** and the **USB SW2 Power** BIOS options to configure the power source to the corresponding USB ports (see **Table 4-3**).

BIOS Options	Configured USB Ports
USB SW1 Power	K/M_USB1 (external USB 2.0 ports) LAN1_USB1 (external USB 3.0 ports)

BIOS Options	Configured USB Ports
USB SW2 Power	LAN2_USB2 (external USB 2.0 ports) USB1 (internal USB 2.0 ports) USB2 (internal USB 2.0 ports) CN4 (internal USB 3.0 ports)

Table 4-3: BIOS Options and Configured USB Ports

Please refer to **Section 5.4.1** for detailed information.

4.4 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.4.1 SATA Drive Connection

The IMB-Q870-i2 is shipped with two SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector. See **Figure 4-12**.
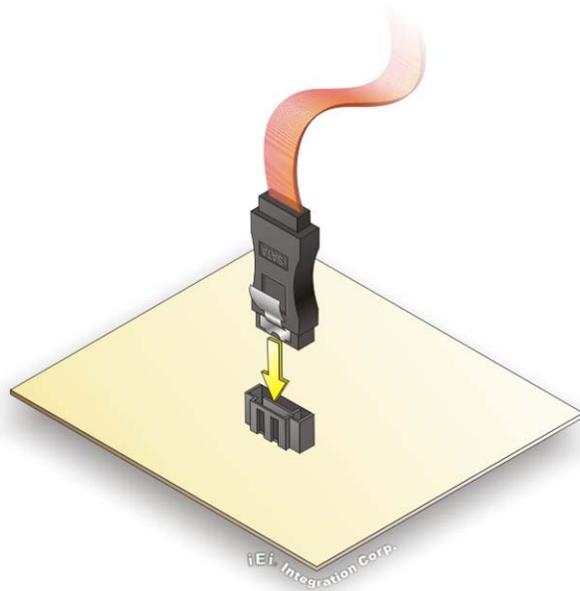
Figure 4-12: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end

of the cable to the connector at the back of the SATA drive. See **Figure 4-13**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power

connector to the back of the SATA drive. See **Figure 4-13**.
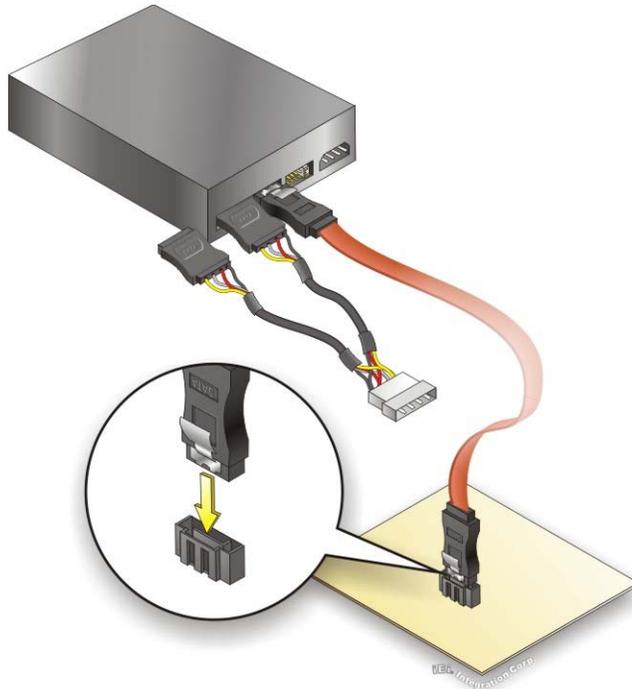
Figure 4-13: SATA Power Drive Connection

The SATA power cable can be bought from IEI. See Optional Items in Section 2.4.

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMB-Q870-i2.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMB-Q870-i2 to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output.   The lime green (top) audio jack does not support input from a microphone.   To install the audio devices, follow the steps below.

Step 1: **Identify the audio plugs**. The plugs on your home theater system or speakers may not match the colors on the rear panel.

Step 2: **Plug the audio plugs into the audio jacks**. Plug the audio plugs into the audio

jacks. If the plugs on your speakers are different, an adapter will need to be used

to plug them into the audio jacks.
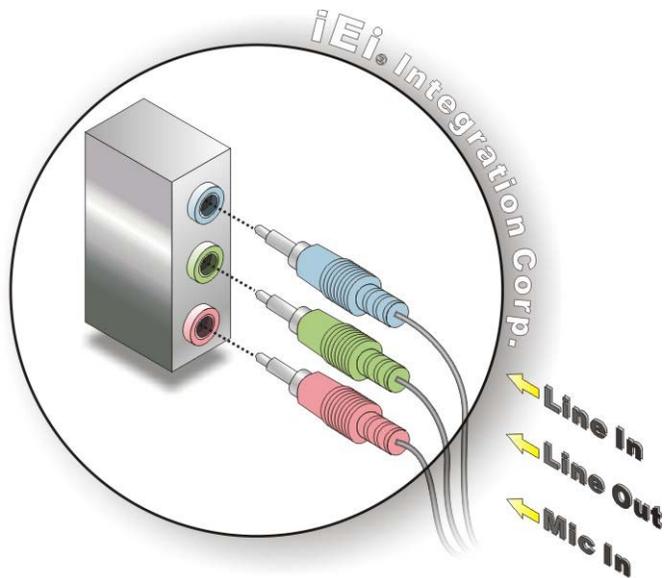
Figure 4-14: Audio Connector

Step 3: **Check audio clarity**. Check that the sound is coming through the right speakers

by adjusting the balance front to rear and left to right.

4.5.2 DVI Display Device Connection

The IMB-Q870-i2 has a single female DVI-I connector on the external peripheral interface
panel. The DVI-I connector is connected to a digital display device. To connect a digital
display device to the IMB-Q870-i2, please follow the instructions below.

Step 1: **Locate the DVI-I connector**. The location of the DVI-I connector is shown in

another chapter.

Step 2: **Align the DVI-I connector**. Align the male DVI-I connector on the digital display

device cable with the female DVI-I connector on the external peripheral

interface.

Step 3: **Insert the DVI-I connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the IMB-Q870-i2. See Figure 4-15.
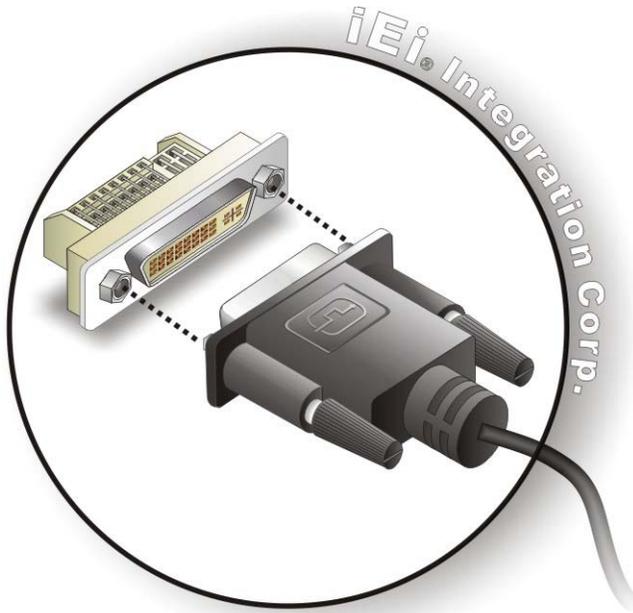
Figure 4-15: DVI Connector

Step 4: **Secure the connector.** Secure the DVI-I connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.

4.5.3 HDMI Display Device Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the IMB-Q870-i2, follow the steps below.

Step 1: **Locate the HDMI connector**. The location is shown in **Chapter 3**.

Step 2: **Align the connector.** Align the HDMI connector with the HDMI port. Make sure the orientation of the connector is correct.
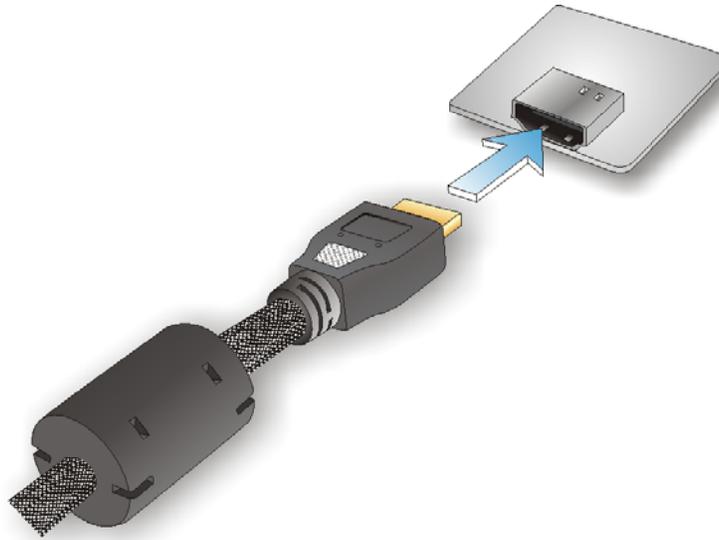
Figure 4-16: HDMI Connection

Step 3: **Insert the HDMI connector.** Gently insert the HDMI connector. The connector should engage with a gentle push. If the connector does not insert easily, check again that the connector is aligned correctly, and that the connector is being inserted with the right way up.

4.5.4 LAN Connection

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 3**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMB-Q870-i2. See **Figure 4-17**.
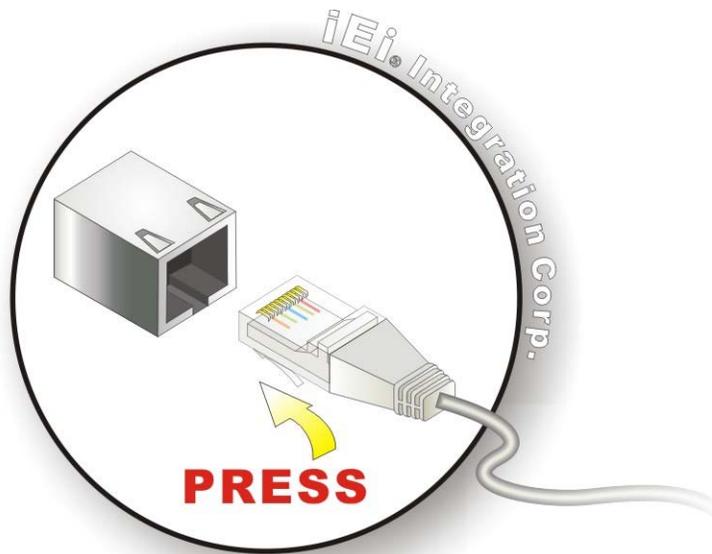
Figure 4-17: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

4.5.5 PS/2 Keyboard and Mouse Connection

The IMB-Q870-i2 has a PS/2 connector on the external peripheral interface panel. The PS/2 connector is used to connect to a keyboard or a mouse to the system. Follow the steps below to connect a keyboard or a mouse to the IMB-Q870-i2.

Step 1: **Locate the PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 4-18**.
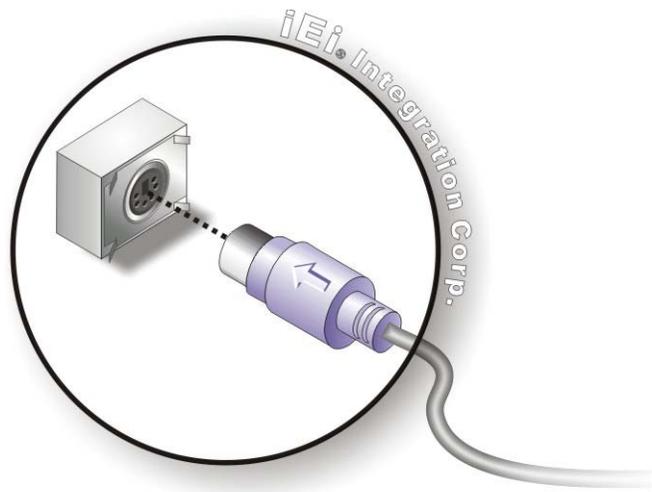
Figure 4-18: PS/2 Keyboard/Mouse Connector

4.5.6 Serial Device Connection

The IMB-Q870-i2 has a single male DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMB-Q870-i2.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-19**.
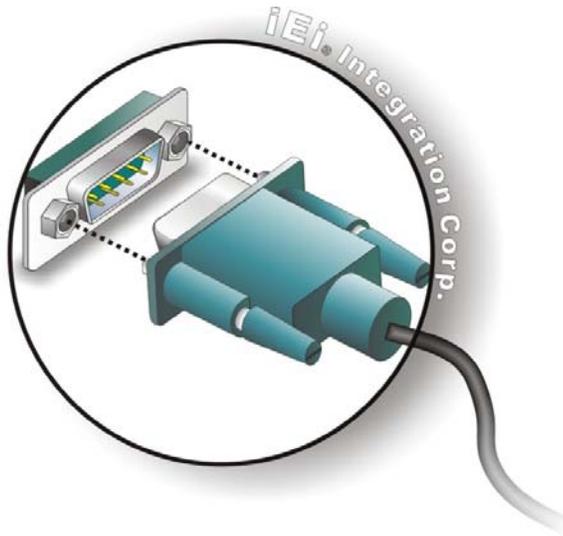
Figure 4-19: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

4.5.7 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMB-Q870-i2.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 4-20**.
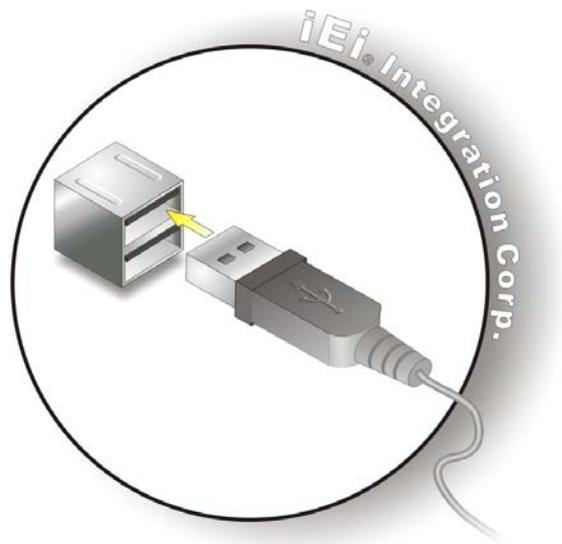
Figure 4-20: USB Connector

4.5.8 VGA Monitor Connection

The IMB-Q870-i2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMB-Q870-i2, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMB-Q870-i2. See **Figure 4-21**.
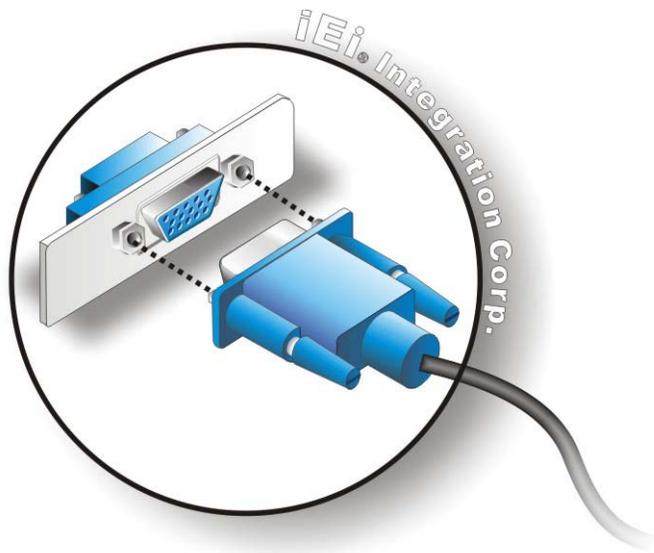
Figure 4-21: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

4.6 Intel® AMT Setup Procedure

The IMB-Q870-i2 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure at least one of the memory sockets is installed with a DDR3 DIMM.

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN1**.

Step 3: The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled,

Step 4: Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD. See **Section 6.8**.

Step 5: Configure the Intel® Management Engine BIOS extension (MEBx). To get into the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up

process. Enter the Intel® current ME password as it requires (the Intel® default password is **admin**).

> **NOTE:**
>
> To change the password, enter a new password following the strong password rule (containing at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters).

4.7 IPMI Setup Procedure

The IMB-Q870-i2 features Intelligent Platform Management Interface (IPMI) that helps lower the overall costs of server management by enabling users to maximize IT resources, save time and manage multiple systems. The IMB-Q870-i2 supports IPMI 2.0 through the optional iRIS-2400 module. Follow the steps below to setup IPMI.

4.7.1 Managed System Hardware Setup

The hardware configuration of the managed system (IMB-Q870-i2) is described below.

Step 1: Install an iRIS-2400 module to the IPMI module socket (refer to **Section 4.2.4**).

Step 2: Make sure at least one DDR3 DIMM is installed in one of the DIMM sockets. If multiple DIMMs are installed, all of the DIMMs must be same size, same speed and same brand to get the best performance.

Step 3: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2_USB2** (**Figure 3-28**).

4.7.2 Using the IEI iMAN Web GUI

To manage a client system from a remote console using IEI iMAN Web GUI, follow the steps below.

Step 1: Obtain the IP address of the managed system. It is recommended to use the IPMI Tool on the managed system to obtain the IP address. To use IPMI Tool to obtain IP address, follow the steps below:

a. Copy the **Ipmitool.exe** file to a bootable USB flash drive.

b. Insert the USB flash drive to the IMB-Q870-i2

c. The IMB-Q870-i2 boots from the USB flash drive

d. Enter the following command: **ipmitool 20 30 02 01 03 00 00**

(there is a space between each two-digit number)

e. A serial of number shows. The last four two-digit hexadecimal numbers are the IP address. Convert the hexadecimal numbers to decimal numbers.

Step 2: On the remote management console, open a web browser. Enter the managed system IP address in the web browser (**Figure 4-22**).
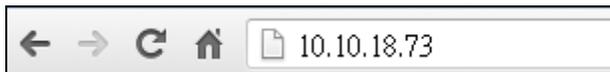
Figure 4-22: IEI iMAN Web Address

Step 3: The login page appears in the web browser.

Step 4: Enter the user name and password to login the system. The default login username and password are:

-Username: **admin**

-Password: **admin**

Step 5: Press the login button to login the system.

Step 6: The IEI iMAN Web GUI appears (**Figure 4-23**).
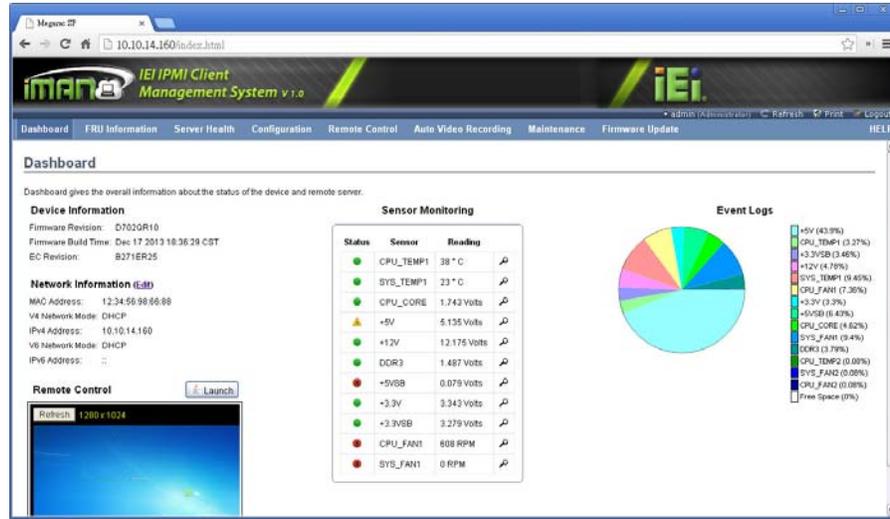
Figure 4-23: IEI iMAN Web GUI

NOTE:

To understand how to use the IEI iMAN Web GUI, please refer to the iRIS-2400 Web GUI user manual in the utility CD came with the IMB-Q870-i2. The user manual describes each function in detail.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

 NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

5.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DEL** or **F2** key as soon as the system is turned on or
2. Press the **DEL** or **F2** key when the "**Press DEL or F2 to enter SETUP**" message appears on the screen.

If the message disappears before the **DEL or F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press ESC to quit. Navigation keys are shown in **Table 5-1**.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes

Key	Function
-	Decrease the numeric value or make changes
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the clear CMOS button described in **Chapter 4**.

5.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.

```
          Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
    Main     Advanced   Chipset     Boot     Security  Save & Exit

  BIOS Information                                        Set the Date. Use Tab to
  BIOS Vendor              American Megatrends            switch between Data
  Core Version             4.6.5.4                        elements.
  Compliency               UEFI 2.3.1;PI1.2
  Project Version          B271AR11.ROM
  Build Date               11/25/2013 16:08:30

  iWDD Vendor              ICP
  iWDD Version             B271ER25.bin

  Processor Information
  Name                     Haswell
  Brand String             Intel(R) Core(TM) i3-433
  Frequency                3500MHz
  Processor ID             306c3
  Stepping                 C0
  Number of Processors     2Core(s) / 4Thread(s)
  Microcode Revision       16
  GT Info                  GT2 (700MHz)

  IGFX VBIOS Version       2178
  Memory RC Version        1.6.2.1
  Total Memory             4096 MB (DDR3)
  Memory Frequency         1333 Mhz

  PCH Information
  Name                     LynxPoint
  PCH SKU                  Q87
  Stepping                 05/C2
  LAN PHY Revision         A3

  ME FW Version            9.0.22.1467            ----------------------
  ME Firmware SKU          5MB
                                                 ←→: Select Screen
  SPI Clock Frequency                            ↑↓: Select Item
  DOFR Support             Supported             EnterSelect
  Read Status Clock Frequency  50MHz             + -: Change Opt.
  Write Status Clock Frequency 50MHz             F1:  General Help
  Fast Read Status Clock   50MHz                 F2:  Previous Values
  Frequency                                      F3:  Optimized Defaults
                                                 F4:  Save & Exit
  System Date                  [Tue 03/04/2013]  ESC: Exit
  System Time                  [15:10:27]

          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 1: Main

The System Overview field has two user configurable fields:

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

⚠ **WARNING!**

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
    Main    Advanced   Chipset    Boot    Security  Save & Exit

 > ACPI Settings                                      System ACPI Parameters
 > RTC Wake Settings
 > Trusted Computing
 > CPU Configuration
 > SATA Configuration                                 ----------------------
 > Intel(R) Rapid Start Technology
 > AMT Configuration                                  ←→: Select Screen
 > USB Configuration                                  ↑↓: Select Item
 > F81866 Super IO Configuration                      Enter Select
 > iWDD H/W Monitor                                   + -   Change Opt.
 > Serial Port Console Configuration                  F1   General Help
 > iEi Feature                                        F2   Previous Values
                                                      F3   Optimized Defaults
                                                      F4   Save & Exit
                                                      ESC  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.

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

ACPI Settings                                          Select the highest ACPI
                                                       sleep state the system
ACPI Sleep State                   [S1 (CPU Stop Clock)]  will enter when the
                                                       SUSPEND button is
                                                       pressed.


                                                       ----------------------

                                                       ←→: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter Select
                                                       + -  Change Opt.
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3   Optimized Defaults
                                                       F4   Save & Exit
                                                       ESC  Exit
        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 3: ACPI Configuration

➔ **ACPI Sleep State [S1 (CPU Stop Clock)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

➔ **Suspend Disabled**

➔ **S1 (CPU Stop Clock)** DEFAULT The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔	**S3 (Suspend to RAM)**	The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event. The RTC wake function is supported in ACPI (S3/S4/S5) and APM soft off modes.

```
      Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
         Advanced

Wake System with Fixed Time      [Disabled]              Enables or Disables
                                                         system wake on alarm
                                                         event. When enabled,
                                                         system will wake on the
                                                         date: hr: min: sec
                                                         specified.


                                                         ----------------------

                                                         ←→: Select Screen
                                                         ↑ ↓: Select Item
                                                         Enter Select
                                                         + -   Change Opt.
                                                         F1   General Help
                                                         F2   Previous Values
                                                         F3   Optimized Defaults
                                                         F4   Save & Exit
                                                         ESC  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 4: RTC Wake Settings

➔   **Wake System with Fixed Time [Disabled]**

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

➔	**Disabled**	**DEFAULT**	The real time clock (RTC) cannot generate a wake event

→ **Enabled**   If selected, the following appears with values that can be selected:

*Wake up every day

*Wake up date

*Wake up hour

*Wake up minute

*Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 5**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).

```
         Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
           Advanced

Configuration                                          Enables or Disables BIOS
   Security Device Support        [Disabled]           support for security
                                                       device. O.S. will not
Current TPM Status Information                          show Security Device.
  NO TPM Hardware                                       TCG EFI protocol and
                                                       INT1A interface will not
                                                       be available.


                                                       ----------------------

                                                       ←→: Select Screen
                                                       ↑↓: Select Item
                                                       Enter Select
                                                       + -  Change Opt.
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3   Optimized Defaults
                                                       F4   Save & Exit
                                                       ESC  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 5: Trusted Computing

➔ **Security Device Support [Disable]**

Use the **Security Device Support** option to configure support for security devices.

➔ **Disable** DEFAULT Security Device support is disabled.

➔ **Enable** Security Device support is enabled.

5.3.4 CPU Information

Use the **CPU Information** submenu (**BIOS Menu 6**) to view detailed CPU specifications and configure the CPU.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
             Advanced

 CPU Information                                        Enable for Windows XP and
                                                        Linux (OS optimized for
 Intel® COR(TM) i3-4330 CPU @ 3.50GHz                   Hyper-Threading
 Signature                       306c3                  Technology and Disabled
 Microcode Patch                 16                     for other OS (OS not
 Max CPU Speed                   3500 MHz               optimized for
 Min CPU Speed                   800 MHz                Hyper-Threading
 CPU Speed                       3500 MHz               Technology). When
 Processor Cores                 2                      Disabled only one thread
 Intel HT Technology             Supported              per enabled core is
 Intel VT-x Technology           Supported              enabled.
 Intel SMX Technology            Not Supported
 64-bit                          Supported
 EIST Technology                 Supported              ---------------------

 L1 Data ache                    32 kB x 2              ←→: Select Screen
 L1 Code Cache                   32 kB x 2              ↑ ↓: Select Item
 L2 Cache                        256 kB x 2             EnterSelect
 L3 Cache                        4096 kB                + -   Change Opt.
                                                        F1   General Help
 Hyper-Threading                 [Enabled]              F2   Previous Values
 Active Processor Cores          [All]                  F3   Optimized Defaults
 Intel Virtualization Technology [Disabled]             F4   Save & Exit
 EIST                            [Enabled]              ESC  Exit

        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 6: CPU Information

The CPU Configuration menu (**BIOS Menu 6**) lists the following CPU details:

▪ Processor Type: Lists the brand name of the CPU being used

▪ CPU Signature: Lists the CPU signature value.

- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed.
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- EIST Technology: Indicates if Enhanced Intel SpeedStep® Techonology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **Hyper-threading [Enabled]**

Use the **Hyper-threading** BIOS option to enable or disable the Intel Hyper-Threading Technology.

➔ **Disabled**   Disables the Intel Hyper-Threading Technology.

➔ **Enabled**   DEFAULT   Enables the Intel Hyper-Threading Technology.

➔ **Active Processor Cores [All]**

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

➔ **All**   DEFAULT   Enable all cores in the processor package.

➔ **1**   Enable one core in the processor package.

➔ **Intel Virtualization Technology [Disabled]**

Use the **Intel Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel® Virtualization technology allows several OSs to run on the same system at the same time.

| ➔ | **Disabled** | DEFAULT | Disables Intel Virtualization Technology. |
| ➔ | **Enabled** | | Enables Intel Virtualization Technology. |

➔ **EIST [Enabled]**

Use the **EIST** option to enable or disable Enhanced Intel SpeedStep® Techonology (EIST).

| ➔ | **Disabled** | | Disables Enhanced Intel SpeedStep® Techonology. |
| ➔ | **Enabled** | DEFAULT | Enables Enhanced Intel SpeedStep® Techonology. |

5.3.5 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 7**) to change and/or set the configuration of the SATA devices installed in the system.

```
         Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
              Advanced

SATA Controller(s)                 [Enabled]            Enable or disable SATA
SATA Mode Selection                [IDE]                Device

SATA1 Port                         Empty
SATA2 Port                         Empty
SATA3 Port                         Empty
SATA4 Port                         Empty


                                                        ---------------------

                                                        ←→: Select Screen
                                                        ↑↓: Select Item
                                                        Enter Select
                                                        + -   Change Opt.
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3   Optimized Defaults
                                                        F4   Save & Exit
                                                        ESC  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 7: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

Use the **SATA Controller(s)** option to enable or disable the serial ATA controller.

➔ **Enabled**   **DEFAULT**   Enables the on-board SATA controller.

➔ **Disabled**   Disables the on-board SATA controller.

➔ **SATA Mode Selection [IDE]**

Use the **SATA Mode Selection** option to configure SATA devices as normal IDE devices.

➔ **IDE**   **DEFAULT**   Configures SATA devices as normal IDE device.

➔ **AHCI**   Configures SATA devices as AHCI device.

➔ **RAID**   Configures SATA devices as RAID device.

5.3.6 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology** menu to configure Intel® Rapid Start Technology support.

```
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Advanced

Intel(R) Rapid Start Technology  [Disabled]        Enable or disable
                                                   Intel(R) Rapid Start
                                                   Technology.


                                                   ---------------------
                                                   ←→: Select Screen
                                                   ↑ ↓: Select Item
                                                   EnterSelect
                                                   + -   Change Opt.
                                                   F1   General Help
                                                   F2   Previous Values
                                                   F3   Optimized Defaults
                                                   F4   Save & Exit
                                                   ESC  Exit
       Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 8: Intel(R) Rapid Start Technology

➔ **Intel(R) Rapid Start Technology [Disabled]**

Use **Intel(R) Rapid Start Technology** option to enable or disable the Intel® Rapid Start Technology function.

➔ **Disabled**   DEFAULT   Intel® Rapid Start Technology is disabled

➔ **Enabled**   Intel® Rapid Start Technology is enabled

5.3.7 AMT Configuration

The **AMT Configuration** submenu (**BIOS Menu 9**) allows Intel® Active Management Technology (AMT) options to be configured.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
            Advanced

Intel AMT                          [Enabled]          Enable/Disable Intel(R)
Un-Configure ME                    [Disabled]         Active Management
                                                      Technology BIOS
                                                      Extension.
                                                      Note : iAMT H/W is always
                                                      enabled.
                                                      This option just
                                                      controls the BIOS
                                                      extension execution. If
                                                      enabled, this requires
                                                      additional firmware in
                                                      the SPI device.

                                                      --------------------
                                                      ←→: Select Screen
                                                      ↑ ↓: Select Item
                                                      Enter Select
                                                      + -  Change Opt.
                                                      F1   General Help
                                                      F2   Previous Values
                                                      F3   Optimized Defaults
                                                      F4   Save & Exit
                                                      ESC  Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
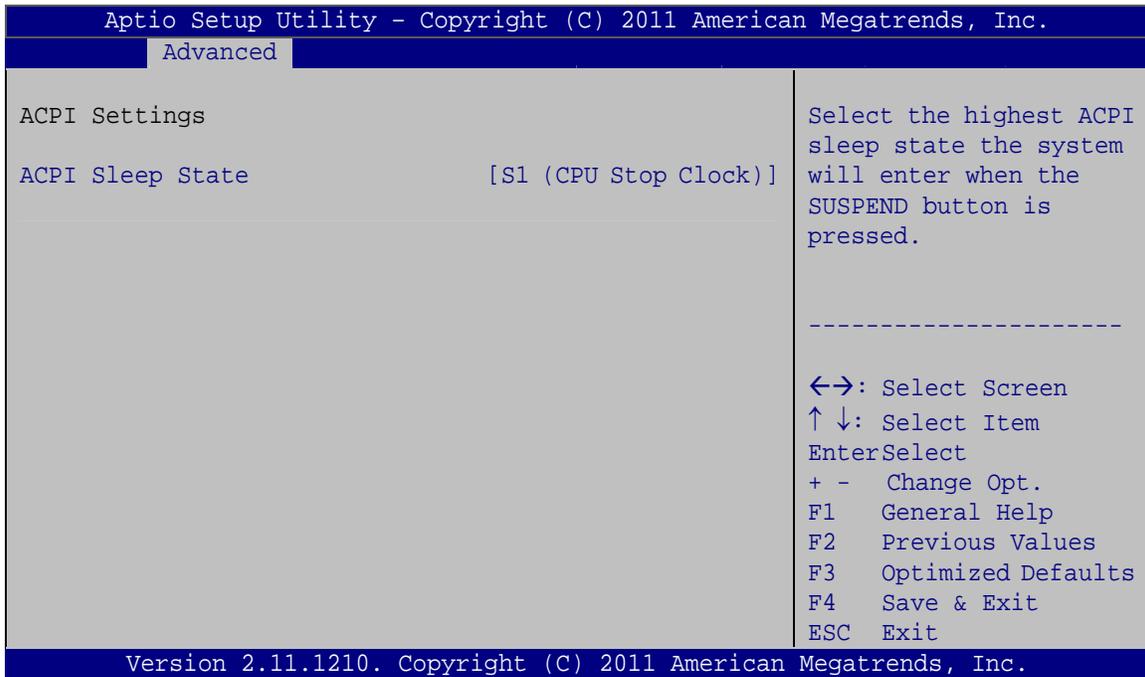
BIOS Menu 9: AMT Configuration

➔ **Intel AMT [Enabled]**

Use **Intel AMT** option to enable or disable the Intel® AMT BIOS Extension.

➔ **Disabled**   Intel® AMT BIOS Extension is disabled

➔ **Enabled**   D<small>EFAULT</small>   Intel® AMT BIOS Extension is enabled

➔ **Unconfigure ME [Disabled]**

Use the **Unconfigure ME** option to perform ME unconfigure without password operation.

➔ **Disabled**   DEFAULT   Disable ME unconfigure

➔ **Enabled**   Enable ME unconfigure

5.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 10**) to read USB configuration information and configure the USB settings.

```
          Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
           Advanced

 USB Configuration                                          Enables Legacy USB
                                                            support. AUTO option
 USB Devices:                                               disables legacy support
        1 Keyboard, 2 Hubs                                  if no USB devices are
                                                            connected. DISABLE
 Legacy USB Support              [Enabled]                  option will keep USB
                                                            devices available only
                                                            for EFI applications.

                                                            ---------------------
                                                            ←→: Select Screen
                                                            ↑ ↓: Select Item
                                                            Enter Select
                                                            + -  Change Opt.
                                                            F1   General Help
                                                            F2   Previous Values
                                                            F3   Optimized Defaults
                                                            F4   Save & Exit
                                                            ESC  Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 10: USB Configuration

➔ **USB Devices**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB

keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Enabled** DEFAULT Legacy USB support enabled

➔ **Disabled** Legacy USB support disabled

➔ **Auto** Legacy USB support disabled if no USB devices are connected

5.3.9 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 11**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
     Advanced

F81866 Super IO Configuration                          Set Parameters of Serial
                                                       Port 1 (COMA)
F81866 Super IO Chip            F81866
> Serial Port 1 Configuration
> Serial Port 2 Configuration                          ---------------------
> Serial Port 3 Configuration                          ←→: Select Screen
> Serial Port 4 Configuration                          ↑↓: Select Item
> Serial Port 5 Configuration                          Enter Select
> Serial Port 6 Configuration                          + -  Change Opt.
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3   Optimized Defaults
                                                       F4   Save & Exit
                                                       ESC  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 11: F81866 Super IO Configuration

5.3.9.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 12**) to configure the serial port n.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
              Advanced

        Serial Port n Configuration                           Enable or Disable Serial
                                                              Port (COM)
        Serial Port                      [Enabled]
        Device Settings                  IO=3F8h;IRQ=4
                                                              --------------------
        Change Settings                  [Auto]               ←→: Select Screen
                                                              ↑ ↓: Select Item
                                                              Enter Select
                                                              = -  Change Opt.
                                                              F1   General Help
                                                              F2   Previous Values
                                                              F3   Optimized Defaults
                                                              F4   Save & Exit
                                                              ESC  Exit
             Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 12: Serial Port n Configuration Menu

5.3.9.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**   Disable the serial port

➔ **Enabled**   D\ EFAULT   Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**   D\ EFAULT   The serial port IO port address and interrupt address are automatically detected.

➔ **IO=3F8h;**   Serial Port I/O port address is 3F8h and the interrupt
   IRQ=4   address is IRQ4

➔ **IO=3F8h;**   Serial Port I/O port address is 3F8h and the interrupt
    IRQ=3, 4   address is IRQ3,4

➔ **IO=2C0h;**   Serial Port I/O port address is 2C0h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

➔ **IO=2C8h;**   Serial Port I/O port address is 2C8h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

5.3.9.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**   Disable the serial port

➔ **Enabled**   **DEFAULT**   Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**   **DEFAULT**   The serial port IO port address and interrupt address
     are automatically detected.

➔ **IO=2F8h;**   Serial Port I/O port address is 2F8h and the interrupt
    IRQ=3   address is IRQ3

➔ **IO=3F8h;**   Serial Port I/O port address is 3F8h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

➔ **IO=2F8h;**   Serial Port I/O port address is 2F8h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

➔ **IO=2C0h;**   Serial Port I/O port address is 2C0h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

➔ **IO=2C8h;**   Serial Port I/O port address is 2C8h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

➔ **Device Mode [RS422/485]**

Use the **Device Mode** option to configure the COM2 serial port.

➔ **RS422/485** DEFAULT Enables serial port RS422/485 support.

5.3.9.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** DEFAULT Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** DEFAULT The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2D0h;**
IRQ=10 Serial Port I/O port address is 2D0h and the interrupt address is IRQ10

➔ **IO=2D0h;**
IRQ=10, 11 Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

➔ **IO=2E8h;**
IRQ=10, 11 Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

➔ **IO=2D8h;**
IRQ=10, 11 Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.9.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** DEFAULT Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** DEFAULT The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2E8h;** Serial Port I/O port address is 2E8h and the interrupt
IRQ=10 address is IRQ10

➔ **IO=3E8h;** Serial Port I/O port address is 3E8h and the interrupt
IRQ=10, 11 address is IRQ10, 11

➔ **IO=2E8h;** Serial Port I/O port address is 2E8h and the interrupt
IRQ=10, 11 address is IRQ10, 11

➔ **IO=2D0h;** Serial Port I/O port address is 2D0h and the interrupt
IRQ=10, 11 address is IRQ10, 11

➔ **IO=2D8h;** Serial Port I/O port address is 2D8h and the interrupt
IRQ=10, 11 address is IRQ10, 11

5.3.9.1.5 Serial Port 5 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled** Disable the serial port

➔ **Enabled** DEFAULT Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**   DEFAULT   The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2D0h; IRQ=10**   Serial Port I/O port address is 2D0h and the interrupt address is IRQ10

➔ **IO=2C0h; IRQ=10, 11**   Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11

➔ **IO=2C8h; IRQ=10, 11**   Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

➔ **IO=2D0h; IRQ=10, 11**   Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

➔ **IO=2D8h; IRQ=10, 11**   Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

➔ **IO=2E0h; IRQ=10, 11**   Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.9.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**   Disable the serial port

➔ **Enabled**   DEFAULT   Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**   DEFAULT   The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2D8h; IRQ=10**   Serial Port I/O port address is 2D8h and the interrupt address is IRQ10

➔ **IO=2C0h;**   Serial Port I/O port address is 2C0h and the interrupt

    IRQ=10, 11   address is IRQ10, 11

➔ **IO=2C8h;**   Serial Port I/O port address is 2C8h and the interrupt

    IRQ=10, 11   address is IRQ10, 11

➔ **IO=2D0h;**   Serial Port I/O port address is 2D0h and the interrupt

    IRQ=10, 11   address is IRQ10, 11

➔ **IO=2D8h;**   Serial Port I/O port address is 2D8h and the interrupt

    IRQ=10, 11   address is IRQ10, 11

➔ **IO=2E0h;**   Serial Port I/O port address is 2E0h and the interrupt

    IRQ=10, 11   address is IRQ10, 11

5.3.10 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 13**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

```
         Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
             Advanced

 PC Health Status                                          Smart FAN Configuration

 > Smart Fan Mode Configuration
 CPU Temperature                    :+49 C
 SYS Temperature                    :+27 C
 CPU_FAN1 Speed                     :709 RPM              ---------------------
 SYS_FAN1 Speed                     :N/A
 CPU_CORE                           :+1.743 V             ←→: Select Screen
 +5V                                :+5.126 V             ↑ ↓: Select Item
 +12V                               :+12.175 V            Enter Select
 DDR                                :+1.502 V             + -   Change Opt.
 +5VSB                              :+4.896 V             F1    General Help
 +3.3V                              :+3.357 V             F2    Previous Values
 +3.3VSB                            :+3.276 V             F3    Optimized Defaults
 VBAT                               :+3.074 V             F4    Save & Exit
                                                          ESC   Exit

         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 13: iWDD H/W Monitor

➔ **PC Health Status**

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - ○ CPU Temperature
  - ○ System Temperature
- Fan Speeds:
  - ○ CPU Fan Speed
  - ○ System Fan Speed
- Voltages:
  - ○ CPU_CORE
  - ○ +5V
  - ○ +12V
  - ○ DDR
  - ○ +5VSB
  - ○ +3.3V
  - ○ +3.3VSB
  - ○ VBAT

5.3.10.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 14**) to configure smart fan temperature and speed settings.

```
         Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
              Advanced

Smart Fan Mode Configuration                              Smart Fan Mode Select

CPU_FAN1 Smart Fan Control        [Auto Mode]
Fan start temperature             50
Fan off temperature               40
Fan start PWM                     30                      ---------------------
Fan slope PWM                     1
SYS_FAN1 Smart Fan Control        [Auto Mode]             ←→: Select Screen
Fan start temperature             50                      ↑ ↓: Select Item
Fan off temperature               40                      Enter Select
Fan start PWM                     30                      + -   Change Opt.
Fan slope PWM                     1                       F1   General Help
                                                          F2   Previous Values
                                                          F3   Optimized Defaults
                                                          F4   Save & Exit
                                                          ESC  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 14: Smart Fan Mode Configuration

➔ **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode]**

Use the **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control** option to configure the CPU/System Smart Fan.

➔ **Auto Mode** DEFAULT The fan adjusts its speed using Auto Mode settings.

➔ **Manual Mode** The fan spins at the speed set in Manual Mode settings.

➔ **Fan start/off temperature**

Use the + or – key to change the **Fan start/off temperature** value. Enter a decimal number between 1 and 100.

➔ **Fan start PWM**

Use the + or – key to change the **Fan start PWM** value. Enter a decimal number between 1 and 128.

➔ **Fan slope PWM**

Use the + or – key to change the **Fan slope PWM** value. Enter a decimal number between 1 and 64.

5.3.11 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 15**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

```
       Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
          Advanced

  COM1                                             Console Redirection
   Console Redirection         [Disabled]          Enable or Disable
 > Console Redirection Settings

  COM2
   Console Redirection         [Disabled]
 > Console Redirection Settings

  COM3
   Console Redirection         [Disabled]
 > Console Redirection Settings

  COM4
   Console Redirection         [Disabled]
 > Console Redirection Settings

  COM5
   Console Redirection         [Disabled]
 > Console Redirection Settings

  COM6
   Console Redirection         [Disabled]          --------------------
 > Console Redirection Settings
                                                   ←→: Select Screen
  COM7 (BMC)                                        ↑↓: Select Item
   Console Redirection         [Disabled]          EnterSelect
 > Console Redirection Settings                     +/-: Change Opt.
                                                   F1   General Help
                                                   F2   Previous Values
  iAMT SOL                                          F3   Optimized Defaults
                                                   F4   Save & Exit
  COM8(Pci Bus0,Dev22,Func3)                        ESC  Exit
   Console Redirection         [Disabled]
 > Console Redirection Settings
       Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 15: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

Use **Console Redirection** option to enable or disable the console redirection function.

➔ **Disabled**   DEFAULT   Disabled the console redirection function

➔ **Enabled**   Enabled the console redirection function

The following options are available in the **Console Redirection Settings** submenu when the Console Redirection option is enabled.

➔ **Terminal Type [VT100+]**

Use the **Terminal Type** option to specify the remote terminal type.

➔ **VT100**   The target terminal type is VT100

➔ **VT100+**   DEFAULT   The target terminal type is VT100+

➔ **VT-UTF8**   The target terminal type is VT-UTF8

➔ **ANSI**   The target terminal type is ANSI

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

➔ **9600**   Sets the serial port transmission speed at 9600.

➔ **19200**   Sets the serial port transmission speed at 19200.

➔ **57600**   Sets the serial port transmission speed at 57600.

➔ **115200**   DEFAULT   Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

Use the **Data Bits** option to specify the number of data bits.

➔ **7**   Sets the data bits at 7.

➔ **8**   DEFAULT   Sets the data bits at 8.

➔ **Parity [None]**

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

➔ **None**　　　DEFAULT　　No parity bit is sent with the data bits.

➔ **Even**　　　　　　　　The parity bit is 0 if the number of ones in the data bits is even.

➔ **Odd**　　　　　　　　The parity bit is 0 if the number of ones in the data bits is odd.

➔ **Mark**　　　　　　　The parity bit is always 1. This option does not provide error detection.

➔ **Space**　　　　　　The parity bit is always 0. This option does not provide error detection.
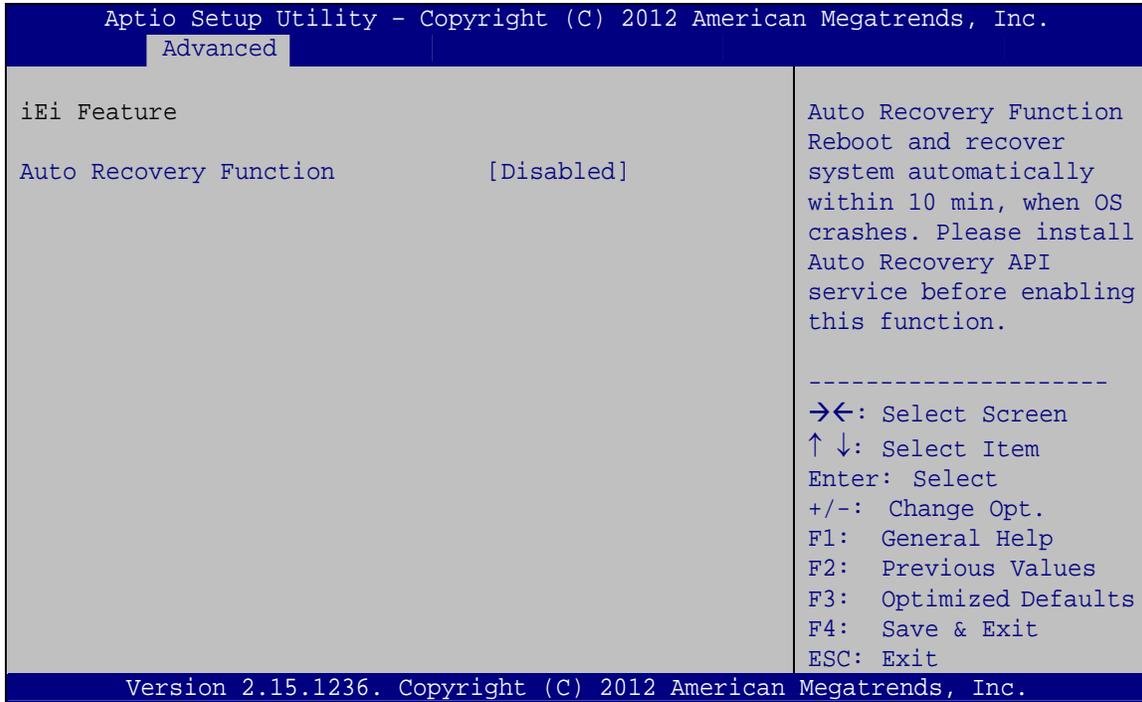
➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

➔ **1**　　　　　DEFAULT　　Sets the number of stop bits at 1.

➔ **2**　　　　　　　　　Sets the number of stop bits at 2.

5.3.12 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 16**) to configure IEI One Key Recovery function.

```
         Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
           Advanced

 iEi Feature                                          Auto Recovery Function
                                                      Reboot and recover
 Auto Recovery Function           [Disabled]          system automatically
                                                      within 10 min, when OS
                                                      crashes. Please install
                                                      Auto Recovery API
                                                      service before enabling
                                                      this function.

                                                      ---------------------
                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-:  Change Opt.
                                                      F1:   General Help
                                                      F2:   Previous Values
                                                      F3:   Optimized Defaults
                                                      F4:   Save & Exit
                                                      ESC:  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
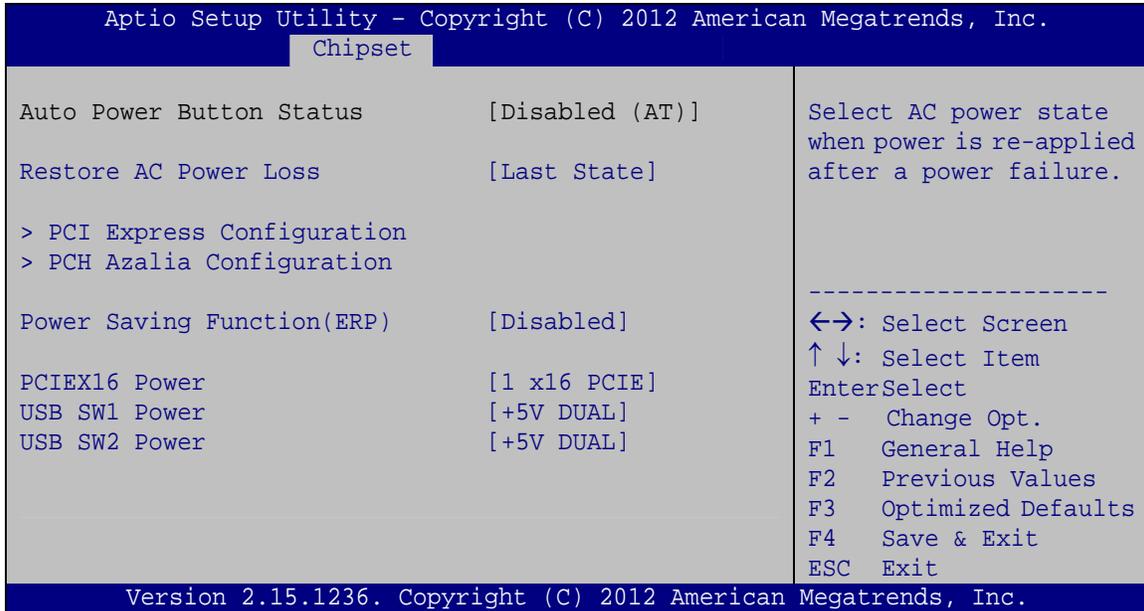
BIOS Menu 16: iEi Feature

➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔ **Disabled**   D EFAULT   Auto recovery function disabled

➔ **Enabled**   Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the PCH-IO and System Agent (SA) Subsystem configuration menus.

 WARNING!

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Main    Advanced   Chipset    Boot    Security  Save & Exit

> PCH-IO Configuration                          PCH Parameters.
> System Agent (SA) Configuration

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

        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 17: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 18**) to configure the PCH chipset.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                            Chipset

Auto Power Button Status          [Disabled (AT)]        Select AC power state
                                                         when power is re-applied
Restore AC Power Loss             [Last State]           after a power failure.

> PCI Express Configuration
> PCH Azalia Configuration
                                                         --------------------
Power Saving Function(ERP)        [Disabled]             ←→: Select Screen
                                                         ↑ ↓: Select Item
PCIEX16 Power                     [1 x16 PCIE]           EnterSelect
USB SW1 Power                     [+5V DUAL]             + -  Change Opt.
USB SW2 Power                     [+5V DUAL]             F1   General Help
                                                         F2   Previous Values
                                                         F3   Optimized Defaults
                                                         F4   Save & Exit
                                                         ESC  Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 18: PCH-IO Configuration

➔ **Restore on AC Power Loss [Last State]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔ **Power Off**   The system remains turned off

➔ **Power On**   The system turns on

➔ **Last State**   DEFAULT   The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **Power Saving Function [Disabled]**

Use the **Power Saving Function** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

➔ **Disabled**   DEFAULT   Power Saving Function support disabled

➔ **Enabled**   Power Saving Function support enabled

➔ **PCIEX16 Power [1 x16 PCIE]**

Use the **PCIEX16 Power** BIOS option to configure the PCIe x16 channel mode on the motherboard.

➔ **1 x16 PCIE**   DEFAULT   Configure the PCIe x16 slot as one PCIe x16

➔ **USB SW1 Power [+5V DUAL]**

Use the **USB SW1 Power** BIOS option to configure the USB power source for the corresponding USB connector (**Table 5-2**).

➔ **+5V**   Set the USB power source to +5V

➔ **+5V DUAL**   DEFAULT   Set the USB power source to +5V dual

➔ **USB SW2 Power [+5V DUAL]**

Use the **USB SW2 Power** BIOS option to configure the USB power source for the corresponding USB connector (**Table 5-2**).

➔ **+5V**   Set the USB power source to +5V

➔ **+5V DUAL**   DEFAULT   Set the USB power source to +5V dual

BIOS Options	Configured USB Ports
USB SW1 Power	K/M_USB1 (external USB 2.0 ports)
	LAN1_USB1 (external USB 3.0 ports)
USB SW2 Power	LAN2_USB2 (external USB 2.0 ports)
	USB1 (internal USB 2.0 ports)
	USB2 (internal USB 2.0 ports)
	CN4 (internal USB 3.0 ports)

Table 5-2: BIOS Options and Configured USB Ports

5.4.1.1 PCI Express Configuration

Use the **PCI Express Configuration** submenu (**BIOS Menu 19**) to configure the PCI Express slots.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                        Chipset

PCI Express Configuration                              PCIEX1_1 Setting

> PCIEx1_1 Slot
> PCIEx4_1 Slot                                        --------------------
                                                       ←→: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter Select
                                                       + -  Change Opt.
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3   Optimized Defaults
                                                       F4   Save & Exit
                                                       ESC  Exit

          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 19: PCI Express Configuration

➔ **PCIe Speed [Gen1]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

- Auto
- Gen 1   **DEFAULT**
- Gen 2

➔ **Detect Non-Compliance Device [Enabled]**

Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled**   Do not detect if a non-compliance PCI Express device is connected to the PCI Express port.

è **Enabled** DEFAULT Detect if a non-compliance PCI Express device is connected to the PCI Express port.

5.4.1.2 PCH Azalia Configuration

Use the **PCH Azalia Configuration** submenu (**BIOS Menu 20**) to configure the PCH Azalia codec.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                  Chipset

PCH Azalia Configuration                              Control Detection of the
                                                      Azalia device.
Azalia (HD Audio)              [Enabled]              Disabled=Azalia will be
                                                      unconditionally
                                                      disabled.
                                                      Enabled=Azalia will be
                                                      unconditionally
                                                      Enabled.

                                                      --------------------
                                                      ←→: Select Screen
                                                      ↑↓: Select Item
                                                      Enter Select
                                                      + -   Change Opt.
                                                      F1   General Help
                                                      F2   Previous Values
                                                      F3   Optimized Defaults
                                                      F4   Save & Exit
                                                      ESC  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 20: PCH Azalia Configuration

è **Azalia [Enabled]**

Use the **Azalia** option to enable or disable the High Definition Audio controller.

è **Disabled** The onboard High Definition Audio controller is disabled

è **Enabled** DEFAULT The onboard High Definition Audio controller is detected automatically and enabled

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 21**) to configure the video

device connected to the system.

```
        Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
           Advanced

                                                        Config Graphics
                                                        Settings.
 > Graphics Configuration
 > NB PCIe Configuration
 > Memory Configuration

                                                        --------------------
                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        Enter Select
                                                        +/-: Change Opt.
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3   Optimized Defaults
                                                        F4   Save
                                                        ESC  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
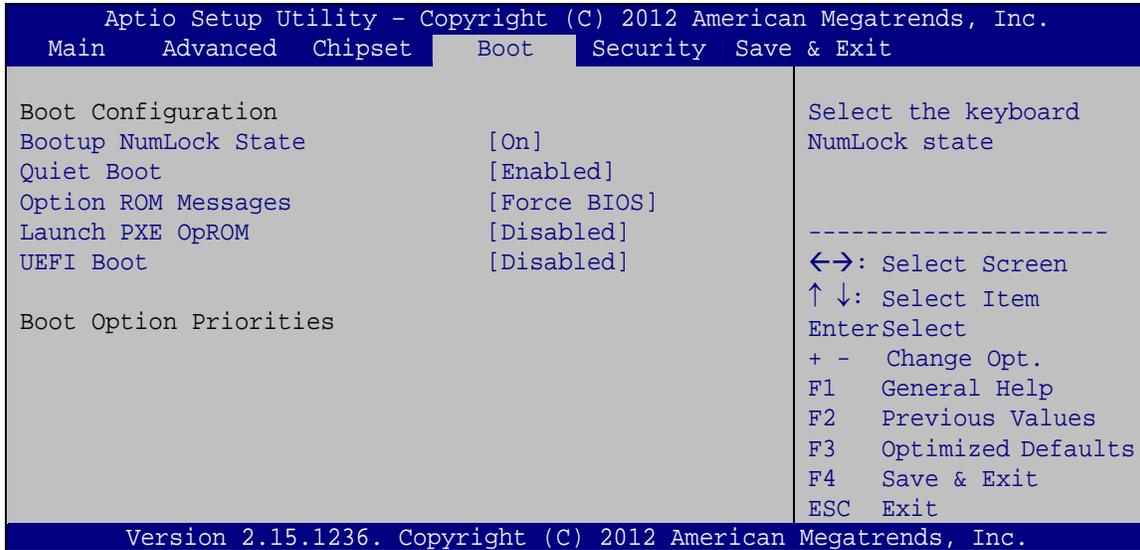
BIOS Menu 21: System Agent (SA) Configuration

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** submenu (**BIOS Menu 22**) to configure the graphics settings.

```
            Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                    Chipset

Graphics Configuration

Primary Display                    [Auto]
DVMT Pre-Allocated                 [256M]                    --------------------
DVMT Total Gfx Mem                 [MAX]            ←→: Select Screen
> LCD Control                                       ↑ ↓: Select Item
                                                    Enter Select
                                                    + -  Change Opt.
                                                    F1   General Help
                                                    F2   Previous Values
                                                    F3   Optimized Defaults
                                                    F4   Save & Exit
                                                    ESC  Exit

            Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 22: Graphics Configuration

➔ **Primary Display [Auto]**

Use the **Primary Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto   DEFAULT
- IGFX
- PEG
- PCIE/PCI

➔ **DVMT Pre-Allocated [256M]**

Use the **DVMT Pre-Allocated** option to specify the amount of system memory that can be used by the internal graphics device.

➔ **32M**   32 MB of memory used by internal graphics device

➔ **64M**   64 MB of memory used by internal graphics device

➔ **128M** 128 MB of memory used by internal graphics device

➔ **256M** D<small>EFAULT</small> 256 MB of memory used by internal graphics device

➔ **512M** 512 MB of memory used by internal graphics device

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128M
- 256M
- MAX **Default**

5.4.2.1.1 LCD Control

Use the **LCD Control** submenu (**BIOS Menu 23**) to select a display device which will be activated during POST.

```
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                      Chipset

LCD Control                                     Select the Video Device
                                                which will be activated
Primary IGFX Boot Display        [VBIOS Default] during POST. This has no
                                                effect if external
                                                graphics present.
                                                Secondary boot display
                                                selection will appear
                                                based on your selection.
                                                VGA modes will be
                                                supported only on
                                                primary display.

                                                ----------------------
                                                →←: Select Screen
                                                ↑ ↓: Select Item
                                                Enter: Select
                                                +/-:  Change Opt.
                                                F1:   General Help
                                                F2:   Previous Values
                                                F3:   Optimized Defaults
                                                F4:   Save & Exit
                                                ESC:  Exit
      Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 23: LCD Control

➔ **Primary IGFX Boot Display [VBIOS Default]**

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- VBIOS Default   DEFAULT
- CRT
- DVI
- DP
- HDMI

5.4.2.2 NB PCIe Configuration

Use the **NB PCIe Configuration** submenu (**BIOS Menu 24**) to configure the northbridge PCIe settings.

```
            Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                          Chipset

NB PCIe Configuration
PEG0                              Not Present
  PEG0-Gen X                      [Gen1]
                                                    --------------------
Enable PEG                        [Enabled]         ←→: Select Screen
Detect Non-Compliance Device      [Enabled]         ↑ ↓: Select Item
                                                    Enter Select
                                                    + -  Change Opt.
                                                    F1   General Help
                                                    F2   Previous Values
                                                    F3   Optimized Defaults
                                                    F4   Save & Exit
                                                    ESC  Exit

            Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 24: NB PCIe Configuration

➔ **PEG0-Gen X [Gen1]**

Use the **PEG0-Gen X** option to configure PEG0 B0:D1:F0. Configuration options are listed below.

- Auto
- Gen1   **Default**
- Gen2
- Gen3

➔ **Enable PEG [Enabled]**

Use the **Enable PEG** option to enable or disable PEG.

➔ **Disabled**   Disables PEG.

➔ **Enabled**   DEFAULT   Enables PEG.

➔ **Auto**   Automatically detect PEG

➔ **Detect Non-Compliance [Enabled]**

Use the **Detect Non-Compliance** option to detect non-compliance PCIe device in PEG.

➔ **Disabled** Do not detect non-compliance PCIe device in PEG

➔ **Enabled** DEFAULT Detect non-compliance PCIe device in PEG

5.4.2.3 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 25**) to configure the Memory settings.

```
    Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                    Chipset

Memory Information

Total Memory                    4096 MB (DDR3)
CHA_DIMM1                       4096 MB (DDR3)         --------------------
CHA_DIMM2                       Not Present           ←→: Select Screen
CHB_DIMM1                       Not Present           ↑ ↓: Select Item
CHB_DIMM2                       Not Present           Enter Select
                                                      + -  Change Opt.
                                                      F1   General Help
                                                      F2   Previous Values
                                                      F3   Optimized Defaults
                                                      F4   Save & Exit
                                                      ESC  Exit

    Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 25: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 26**) to configure system boot options.

```
         Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
   Main    Advanced   Chipset    Boot    Security  Save & Exit

Boot Configuration                                        Select the keyboard
Bootup NumLock State            [On]                      NumLock state
Quiet Boot                      [Enabled]
Option ROM Messages             [Force BIOS]
Launch PXE OpROM                [Disabled]                --------------------
UEFI Boot                       [Disabled]                ←→: Select Screen
                                                          ↑ ↓: Select Item
Boot Option Priorities                                    Enter Select
                                                          + -   Change Opt.
                                                          F1    General Help
                                                          F2    Previous Values
                                                          F3    Optimized Defaults
                                                          F4    Save & Exit
                                                          ESC   Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 26: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **On**   **DEFAULT**   Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Off**   Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **Quiet Boot [Enabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled** — Normal POST messages displayed

➔ **Enabled** DEFAULT — OEM Logo displayed instead of POST messages

➔ **Option ROM Messages [Force BIOS]**

Use the **Option ROM Messages** option to set the Option ROM display mode.

➔ **Force BIOS** DEFAULT — Sets display mode to force BIOS.

➔ **Keep Current** — Sets display mode to current.

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔ **Disabled** DEFAULT — Ignore all PXE Option ROMs

➔ **Enabled** — Load PXE Option ROMs

➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** option to enable or disable to boot from a UEFI device.

➔ **Disabled** DEFAULT — Disable to boot from a UEFI device.

➔ **Enabled** — Enable to boot from a UEFI device.

5.6 Security

Use the **Security** menu (**BIOS Menu 27**) to set system and user passwords.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
   Main    Advanced  Chipset    Boot    Security  Save & Exit

 Password Description                             Set Administrator
                                                  Password
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup.             --------------------
 If ONLY the User's password is set, then this   ←→: Select Screen
 is a power on password and must be entered to   ↑ ↓: Select Item
 boot or enter Setup. In Setup the User will     Enter Select
 have Administrator rights.                      + -  Change Opt.
 The password must be                            F1   General Help
 In the following range:                         F2   Previous Values
 Maximum length              3                    F3   Optimized Defaults
 Minimum length             20                    F4   Save & Exit
                                                  ESC  Exit
 Administrator Password
 User Password
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 27: Security

➔ **Administrator Password**

Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.7 Exit

Use the **Exit** menu (**BIOS Menu 28**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Main    Advanced  Chipset   Boot   Security  Save & Exit

  Save Changes and Reset                                Exit the system after
  Discard Changes and Reset                             saving the changes.

  Restore Defaults
  Save as User Defaults
  Restore User Defaults

                                                        --------------------
                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        Enter Select
                                                        + -  Change Opt.
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3   Optimized Defaults
                                                        F4   Save & Exit
                                                        ESC  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 28:Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ **Discard Changes and Reset**

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- USB 3.0
- Audio
- Intel® AMT

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMB-Q870-i2 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the installation program doesn't start automatically:
Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 6-1**).

Figure 6-1: Introduction Screen

Step 3: Click **IMB-Q870**.

Step 4: A new screen with a list of available drivers appears (**Figure 6-2**).
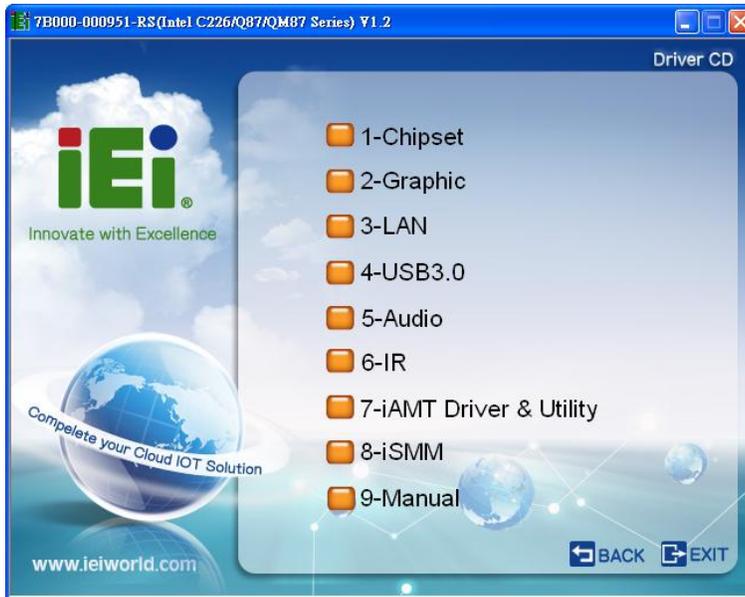
Figure 6-2: Available Drivers

Step 5: Install all of the necessary drivers in this menu.

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**1-Chipset**".

Step 3: Locate the setup file and double click on it.

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-3** appears.

Step 5: Click **Next** to continue.

Figure 6-3: Chipset Driver Welcome Screen

Step 6: The license agreement in **Figure 6-4** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

Figure 6-4: Chipset Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-5** appears.

Step 10: Click **Next** to continue.

Figure 6-5: Chipset Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-6**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
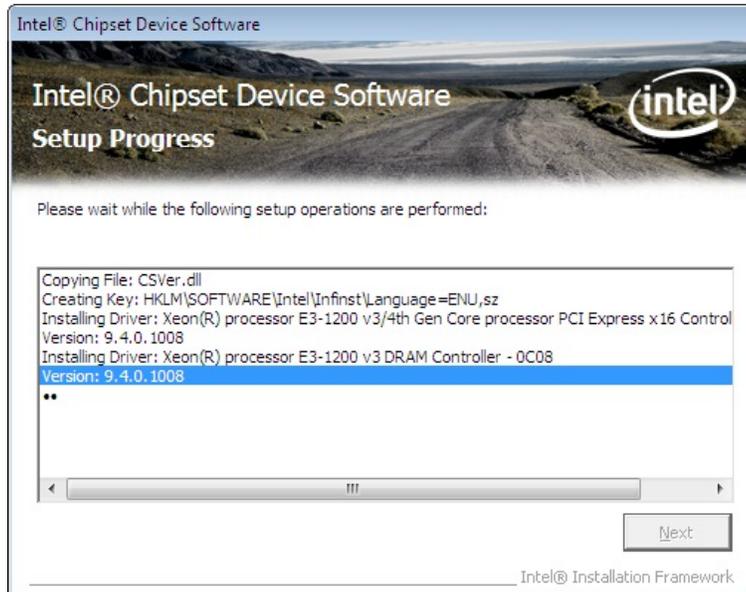
Figure 6-6: Chipset Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-7** appears.

Step 14: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

Step 1:   Access the driver list. (See **Section 6.2**)

Step 2:   Click "**2-Graphics**" and select the folder which corresponds to the operating

system.

Step 3:   Locate the setup file and double click on it.

Step 4:   The **Welcome Screen** in **Figure 6-8** appears.

Step 5:   Click **Next** to continue.

Figure 6-8: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-9** appears.

Step 7: Click **Yes** to accept the agreement and continue.

Figure 6-9: Graphics Driver License Agreement

Step 8: The **Read Me** file in **Figure 6-10** appears. Click **Next** to continue.
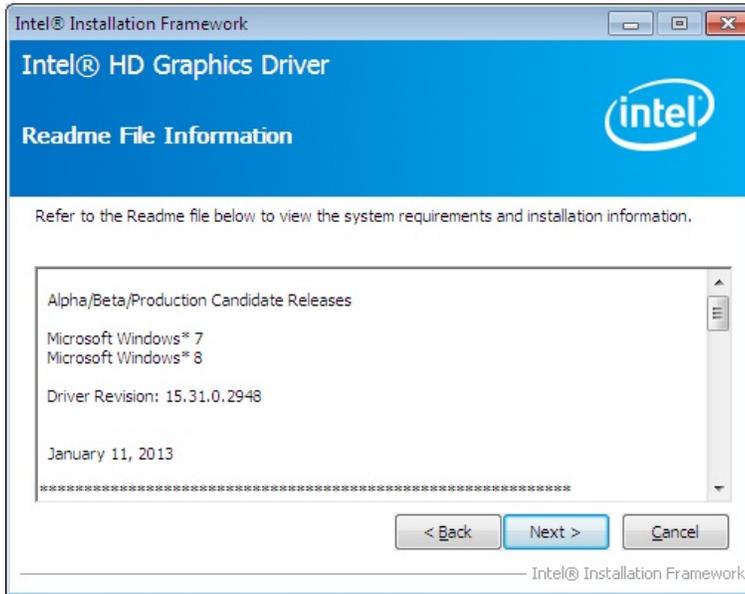
Figure 6-10: Graphics Driver Read Me File

Step 9: **Setup Operations** are performed as shown in **Figure 6-11**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.
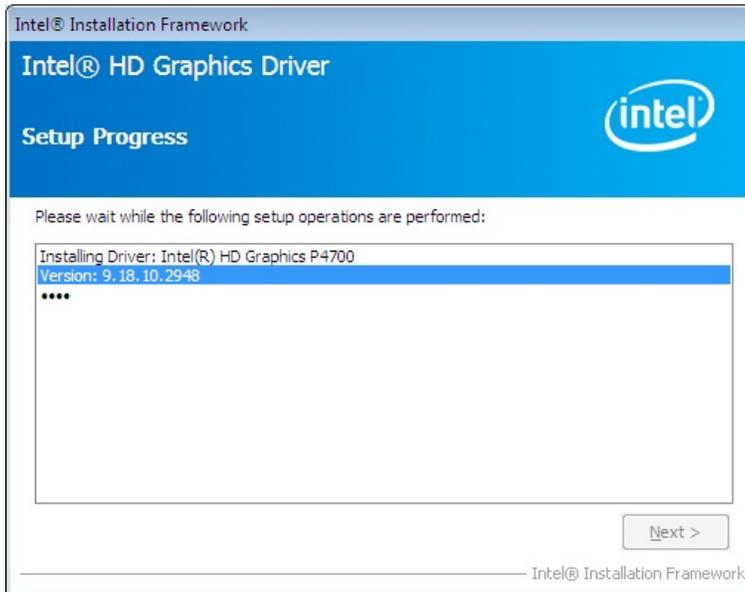
Figure 6-11: Graphics Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-12** appears.

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.
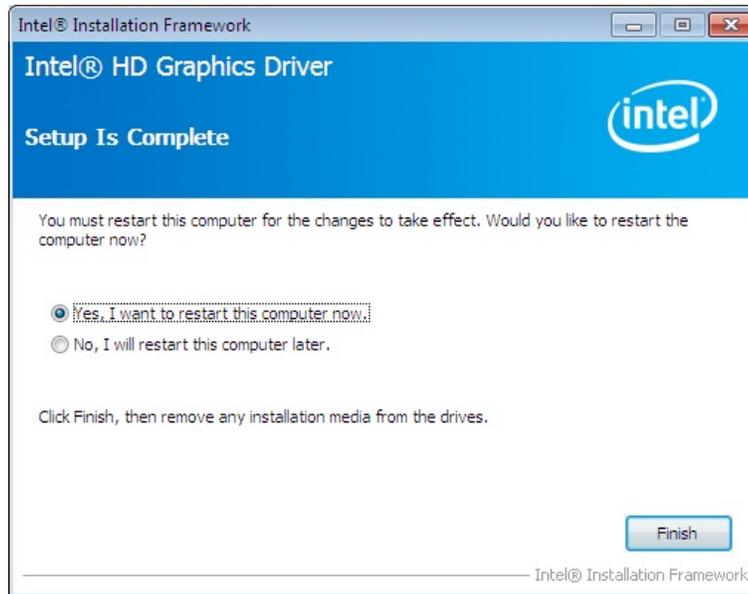
Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Right-click the Computer button from the start menu and select **Properties**.

(**Figure 6-13**).
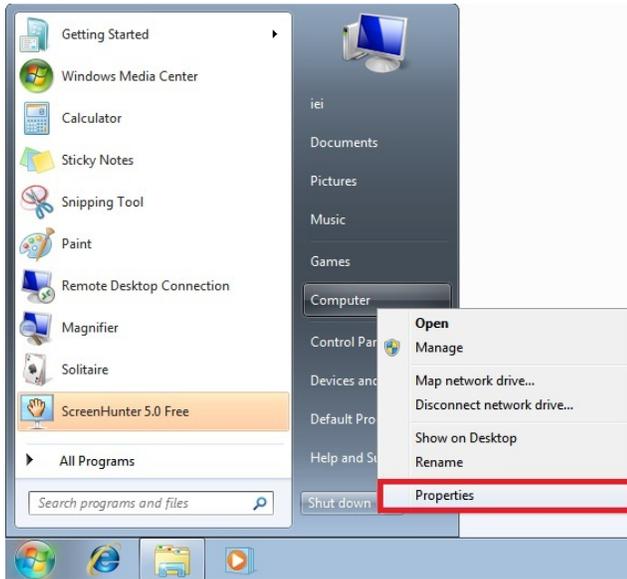
Figure 6-13: Windows Control Panel

Step 2: The system control panel window in **Figure 6-14** appears.

Step 3: Click the Device Manager link (**Figure 6-14**).
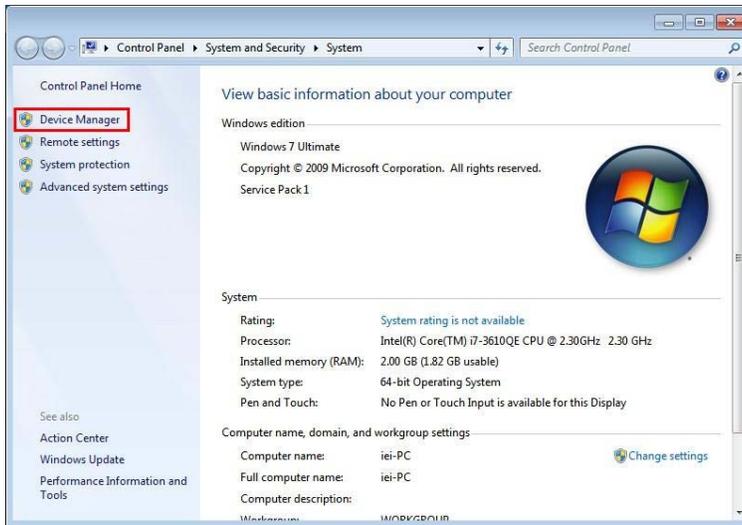
Figure 6-14: System Control Panel

Step 4: A list of system hardware devices appears (**Figure 6-15**).

Step 5: Right-click one of the Ethernet controllers that has question marks next to it (this means Windows does not recognize the device).

Step 6: Select **Update Driver Software**. See **Figure 6-15**.
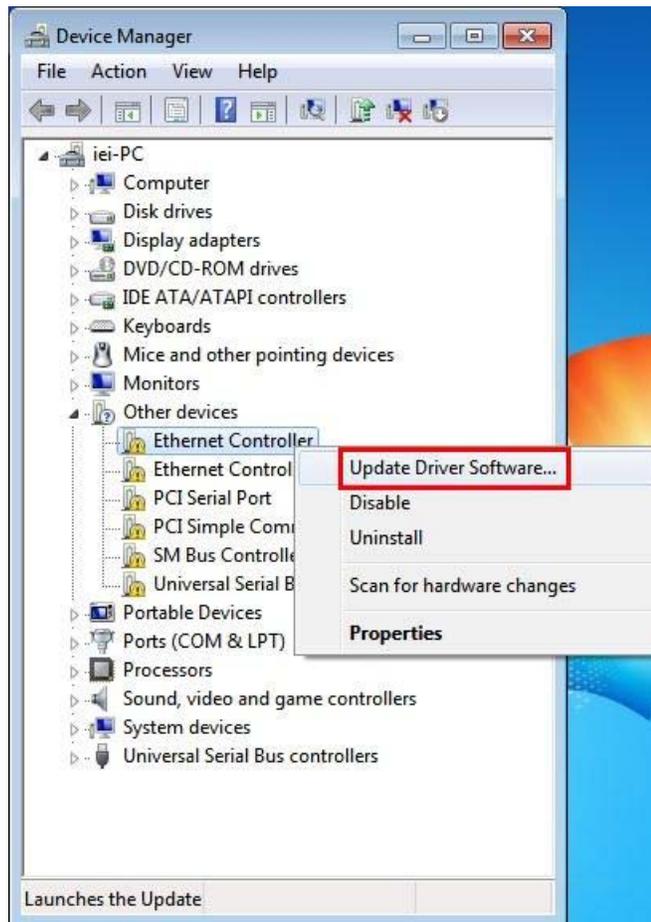
Figure 6-15: Device Manager List

Step 7: The Update Driver Software Window appears (**Figure 6-16**).
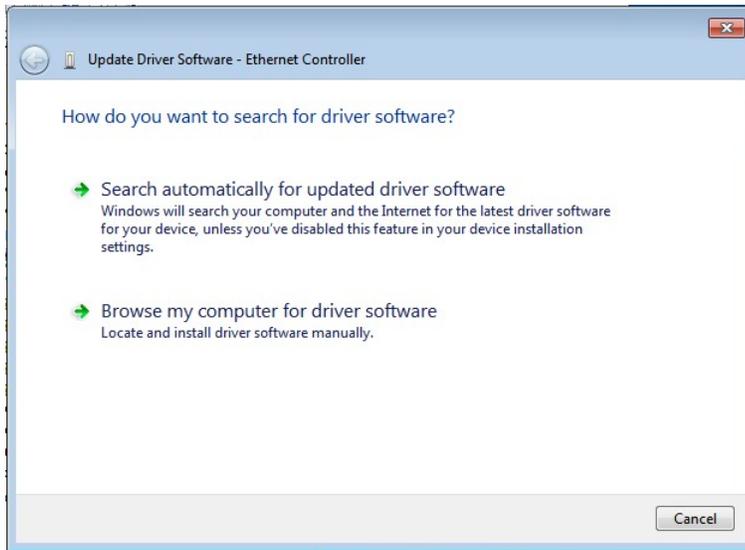
Figure 6-16: Update Driver Software Window

Step 8: Select "Browse my computer for driver software" and click **NEXT** to continue.

Step 9: Click Browse to select "**X:\3-LAN**" directory in the **Locate File** window, where

"**X:**" is the system CD drive. (**Figure 6-17**).

Figure 6-17: Locate Driver Files

Step 10: Click **NEXT** to continue.

Step 11: Driver Installation is performed as shown in **Figure 6-18**.
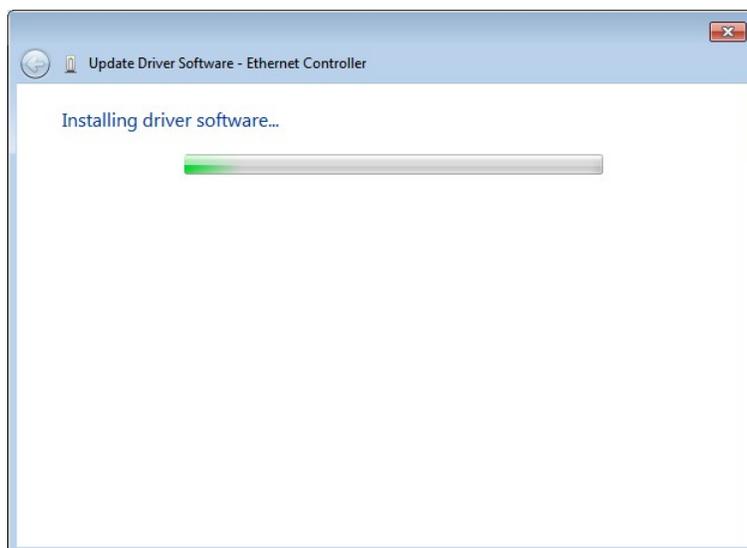
Figure 6-18: LAN Driver Installation

Step 12: The **Finish** screen appears. Click **Close** to exit.

Step 13: Right-click the other Ethernet controller that has question marks next to it as shown in **Figure 6-15**. Repeat **Step 6** ~ **Step 12** to install the second Ethernet controller driver.

6.6 USB 3.0 Driver Installation

WARNING!

Do not run this driver's installer (Setup.exe) from a USB storage device (ie. external USB hard drive or USB thumb drive). For proper installation, please copy driver files to a local hard drive folder and run from there.

To install the USB 3.0 driver, please follow the steps below.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**4-USB 3.0**".

Step 3: Locate the setup file and double click on it.

Step 4: A **Welcome Screen** appears (**Figure 6-19**).

Step 5: Click **Next** to continue.

Figure 6-19: USB 3.0 Driver Welcome Screen

Step 6: The license agreement in **Figure 6-20** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

Figure 6-20: USB 3.0 Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-21** appears.

Step 10: Click **Next** to continue.

Figure 6-21: USB 3.0 Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-22**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
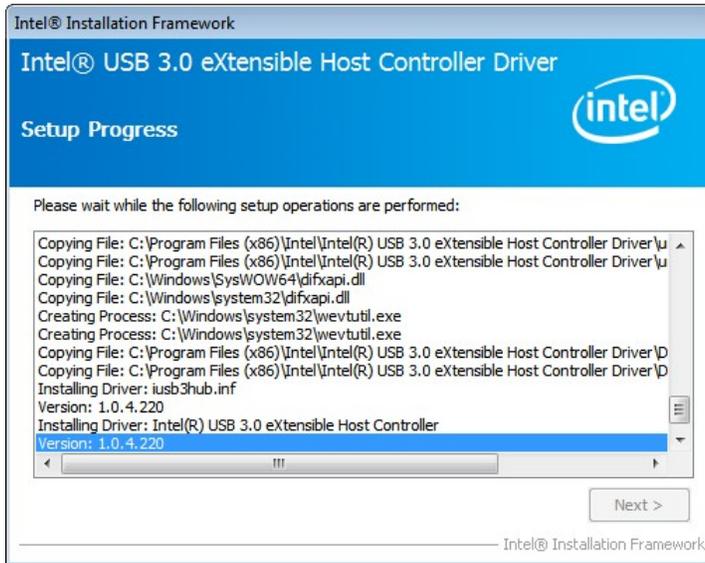
Figure 6-22: USB 3.0 Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-23** appears.

Step 14: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-23: USB 3.0 Driver Installation Finish Screen

6.7 Audio Driver Installation

To install the Realtek High Definition (HD) Audio driver, please follow the steps below.

6.7.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the PCH Azalia Configuration submenu. Enable the **Azalia** option. Refer to **Section 5.4.1.2**.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

6.7.2 Driver Installation

To install the audio driver please follow the steps below. To install the audio driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**5-Audio**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **InstallShield Wizard** is prepared to guide the user through the rest of the process.

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-24**).
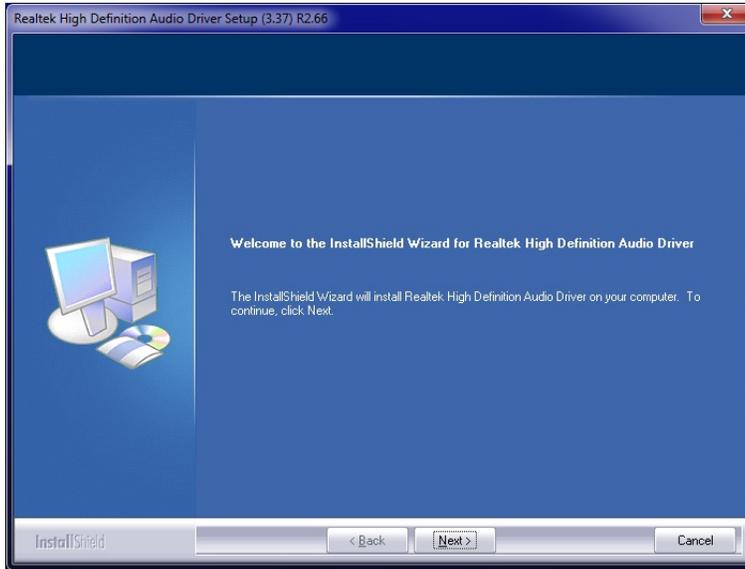
Figure 6-24: InstallShield Wizard Welcome Screen

Step 6: Click **Next** to continue the installation.

Step 7: InstallShield starts to install the new software as shown in **Figure 6-25**.
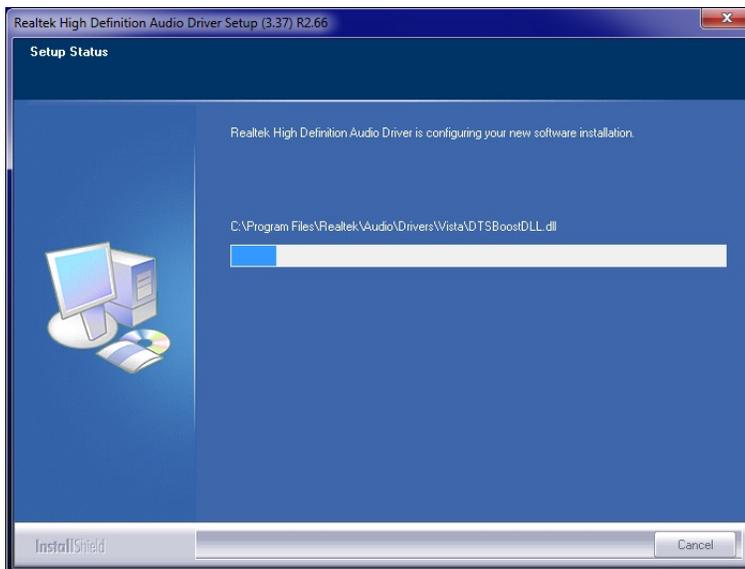
Figure 6-25: Audio Driver Software Configuration

Step 8: After the driver installation process is complete, a confirmation screen appears

(**Figure 6-26**).
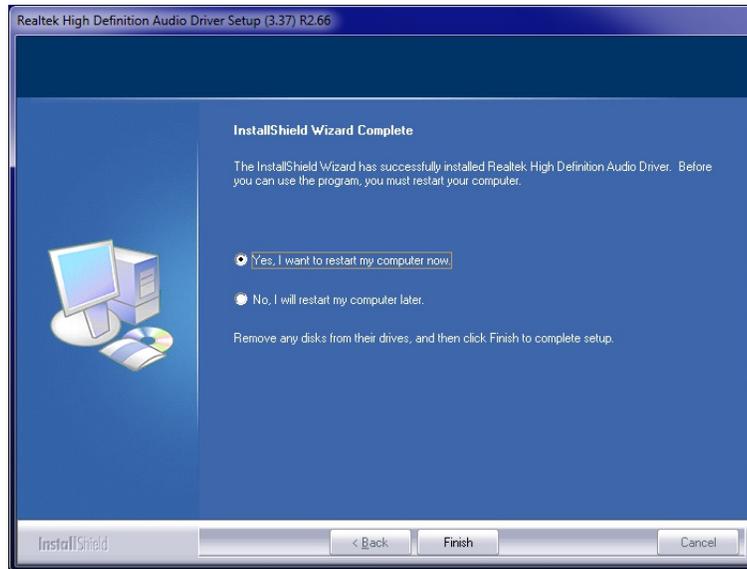
Figure 6-26: Restart the Computer

Step 1: The confirmation screen offers the option of restarting the computer now or later.
For the settings to take effect, the computer must be restarted. Click **Finish** to
restart the computer.

6.8 Intel® AMT Driver Installation

The package of the Intel® ME components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Intel® Dynamic Application Loader
- Intel® Identity Protection Technology (Intel® IPT)
- Serial Over LAN (SOL) driver
- Intel® Management and Security Status Application
- Local Manageability Service (LMS)

To install these Intel® ME components, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**7-iAMT Driver & Utility**".

Step 3: Double click the setup file in the **ME_SW** folder.

Step 4: Locate the setup file and double click it.

Step 5: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-27** appears.

Step 6: Click **Next** to continue.

Figure 6-27: Intel® ME Driver Welcome Screen

Step 7: The license agreement in Figure 6-28 appears.

Step 8: Read the **License Agreement**.

Step 9: Click **Yes** to continue.
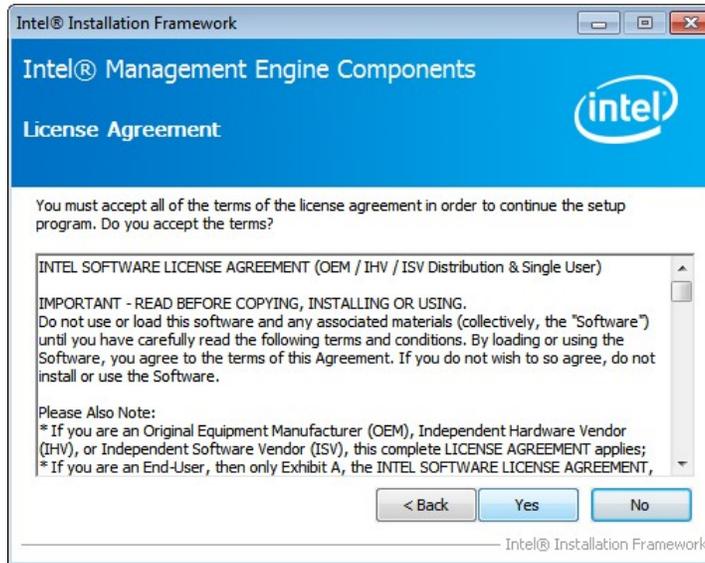
Figure 6-28: Intel® ME Driver License Agreement

Step 10: **Setup Operations** are performed as shown in Figure 6-29.

Step 11: Once the **Setup Operations** are complete, click **Next** to continue.
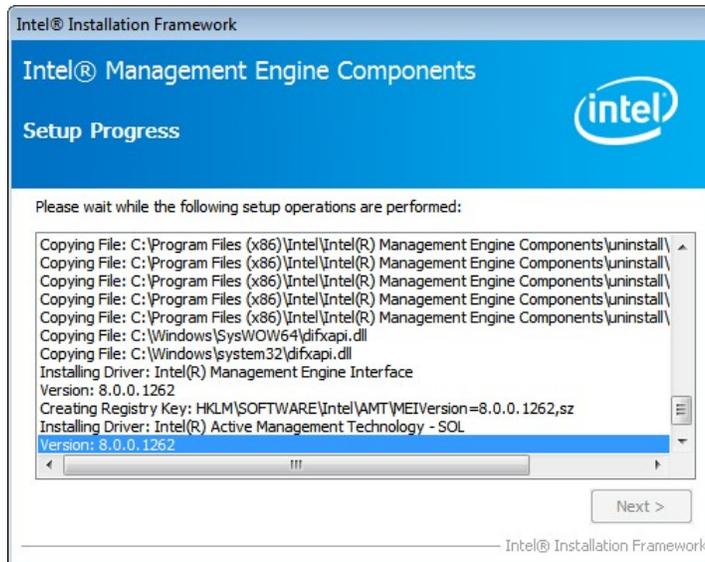
Figure 6-29: Intel® ME Driver Setup Operations

Step 12: The **Finish** screen in Figure 6-30 appears.

Step 13: Select "**Yes, I want to restart this computer now**" and click **Finish**.
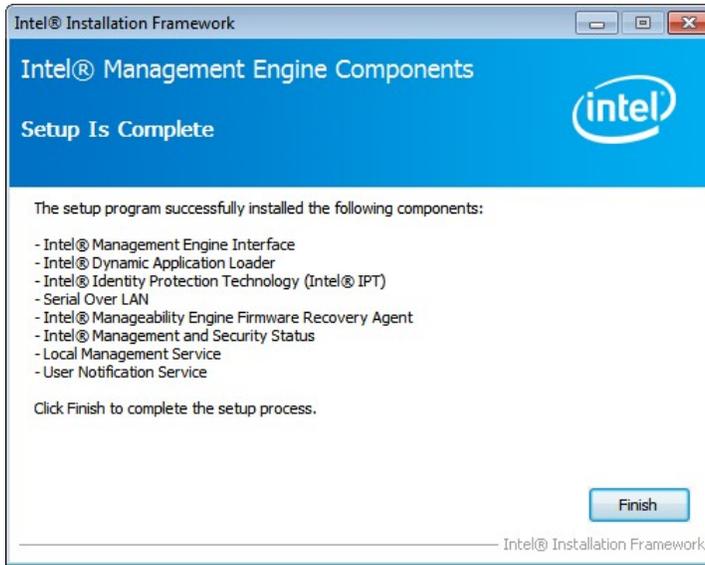
Figure 6-30: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

System Date [xx/xx/xx] 85

System Time [xx:xx:xx] 85

ACPI Sleep State [S1 (CPU Stop Clock)] 86

Wake System with Fixed Time [Disabled] 87

Security Device Support [Disable] 89

Hyper-threading [Enabled] 90

Active Processor Cores [All] 90

Intel Virtualization Technology [Disabled] 91

EIST [Enabled] 91

SATA Controller(s) [Enabled] 92

SATA Mode Selection [IDE] 92

Intel(R) Rapid Start Technology [Disabled] 93

Intel AMT [Enabled] 94

Unconfigure ME [Disabled] 94

USB Devices 95

Legacy USB Support [Enabled] 95

Serial Port [Enabled] 97

Change Settings [Auto] 97

Serial Port [Enabled] 98

Change Settings [Auto] 98

Device Mode [RS422/485] 99

Serial Port [Enabled] 99

Change Settings [Auto] 99

Serial Port [Enabled] 99

Change Settings [Auto] 100

Serial Port [Enabled] 100

Change Settings [Auto] 100

Serial Port [Enabled] 101

Change Settings [Auto] 101

PC Health Status 103

CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode] 104

Fan start/off temperature 104

Fan start PWM 104

Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.

DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

LVDS   Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.

POST   The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.

RAM   Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.

SATA   Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.

S.M.A.R.T   Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.

UART   Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.

UHCI   The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.

USB   The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.

VGA   The Video Graphics Array (VGA) is a graphics display system developed by IBM.

One Key Recovery

C.1 One Key Recovery Introduction

The IEI one key recovery is an easy-to-use front end for the Norton Ghost system backup and recovery tool. This tool provides quick and easy shortcuts for creating a backup and reverting to that backup or reverting to the factory default settings.

![NOTE icon] **NOTE:**

> The latest One Key Recovery software provides an auto recovery function that allows a system running Microsoft Windows OS to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. Please refer to Section C.3 for the detailed setup procedure.

The IEI One Key Recovery tool menu is shown below.
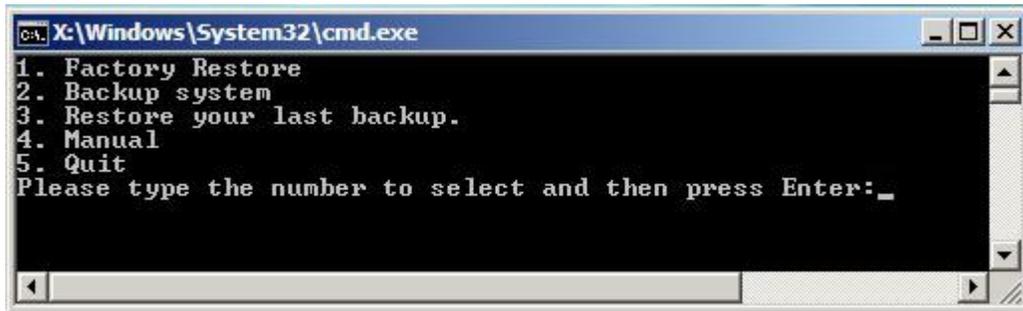
Figure C-1: IEI One Key Recovery Tool Menu

Prior to using the IEI One Key Recovery tool (as shown in **Figure C-1**) to backup or restore Windows system, five setup procedures are required.

1. Hardware and BIOS setup (see Section **C.2.1**)
2. Create partitions (see **Section C.2.2**)
3. Install operating system, drivers and system applications (see **Section C.2.3**)
4. Build the recovery partition (see **Section C.2.4**)
5. Create factory default image (see **Section C.2.5**)

After completing the five initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. The detailed information of each function is described in **Section C.5**.

NOTE:

The initial setup procedures for Linux system are described in **Section C.3**.

C.1.1 System Requirement

NOTE:

The recovery CD can only be used with IEI products. The software will fail to run and a warning message will appear when used on non-IEI hardware.

To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

The partition created for recovery images must be big enough to contain both the factory default image and the user backup image. The size must be calculated before creating the

partitions. Please take the following table as a reference when calculating the size of the partition.

	OS	OS Image after Ghost	Compression Ratio
Windows® 7	7 GB	5 GB	70%
Windows® XPE	776 MB	560 MB	70%
Windows® CE 6.0	36 MB	28 MB	77%

NOTE:

Specialized tools are required to change the partition size if the operating system is already installed.

C.1.2 Supported Operating System

The recovery CD is compatible with both Microsoft Windows and Linux operating systems (OS). The supported OS versions are listed below.

- Microsoft Windows
  - Windows 2000
  - Windows XP (Service Pack 2 or 3 required)
  - Windows Vista
  - Windows 7
  - Windows CE 5.0
  - Windows CE 6.0
  - Windows XP Embedded
  - Windows Embedded Standard 7

NOTE:

The auto recovery function (described in Section C.3) and the restore through LAN function (described in Section C.6) are not supported in the Windows CE 5.0/6.0 operating system environment.

- Linux
  o Fedora Core 12 (Constantine)
  o Fedora Core 11 (Leonidas)
  o Fedora Core 10 (Cambridge)
  o Fedora Core 8 (Werewolf)
  o Fedora Core 7 (Moonshine)
  o RedHat RHEL-5.4
  o RedHat 9 (Ghirke)
  o Ubuntu 8.10 (Intrepid)
  o Ubuntu 7.10 (Gutsy)
  o Ubuntu 6.10 (Edgy)
  o Debian 5.0 (Lenny)
  o Debian 4.0 (Etch)
  o SuSe 11.2
  o SuSe 10.3

NOTE:

Installing unsupported OS versions may cause the recovery tool to fail.

C.2 Setup Procedure for Windows

Prior to using the recovery tool to backup or restore, a few setup procedures are required.

Step 1: Hardware and BIOS setup (see **Section C.2.1**)

Step 2: Create partitions (see **Section C.2.2**)

Step 3: Install operating system, drivers and system applications (see **Section C.2.3**)

Step 4: Build the recovery partition (see **Section C.2.4**) or build the auto recovery partition (see **Section C.3**)

Step 5: Create factory default image (see **Section C.2.5**)

The detailed descriptions are described in the following sections.

> ✔️ **NOTE:**
>
> The setup procedures described below are for Microsoft Windows operating system users. For Linux, most of the setup procedures are the same except for several steps described in **Section C.3**.

C.2.1 Hardware and BIOS Setup

Step 1: Make sure the system is powered off and unplugged.

Step 2: Install a hard drive or SSD in the system. An unformatted and unpartitioned disk is recommended.

Step 3: Connect an optical disk drive to the system and insert the recovery CD.

Step 4: Turn on the system.

Step 5: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 6: Select the connected optical disk drive as the 1st boot device. (**Boot → Boot Device Priority → 1st Boot Device**).

Step 7: Save changes and restart the computer. Continue to the next section for instructions on partitioning the internal storage.

C.2.2 Create Partitions

To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the

second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

Step 1: Put the recovery CD in the optical drive of the system.

Step 2: **Boot the system from recovery CD**. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

Starting Windows Preinstallation Environment...
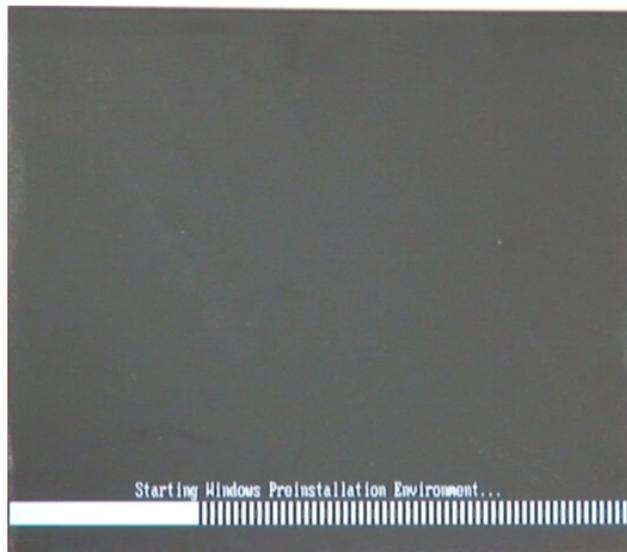
Figure C-2: Launching the Recovery Tool

Step 3: The recovery tool setup menu is shown as below.

C:\WINDOWS\system32\cmd.exe

1.Execute Ghost
2.Manual Recovery environment For Windows
3.Manual Recovery environment For Linux
4.Auto Recovery environment For Windows
5.Exit
6.Command Prompt
Type the number to print text.

Figure C-3: Recovery Tool Setup Menu

Step 4: Press <**6**> then <Enter>.

Figure C-4: Command Prompt

Step 5: The command prompt window appears. Type the following commands (marked

in red) to create two partitions. One is for the OS installation; the other is for

saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>create part pri size= ___

DISKPART>assign letter=F

DISKPART>exit

system32>format N: /fs:ntfs /q /y

system32>format F: /fs:ntfs /q /v:Recovery /y

system32>exit

Figure C-5: Partition Creation Commands

NOTE:

Use the following commands to check if the partitions were created successfully.

Step 6: Press any key to exit the recovery tool and automatically reboot the system.

Please continue to the following procedure: Build the Recovery Partition.

C.2.3 Install Operating System, Drivers and Applications

Install the operating system onto the unlabelled partition. The partition labeled "Recovery" is for use by the system recovery tool and should not be used for installing the operating system or any applications.

NOTE:

The operating system installation program may offer to reformat the chosen partition. DO NOT format the partition again. The partition has already been formatted and is ready for installing the new operating system.

To install the operating system, insert the operating system installation CD into the optical drive. Restart the computer and follow the installation instructions.

C.2.4 Building the Recovery Partition

Step 1: Put the recover CD in the optical drive.

Step 2: Start the system.

Step 3: **Boot the system from the recovery CD**. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!
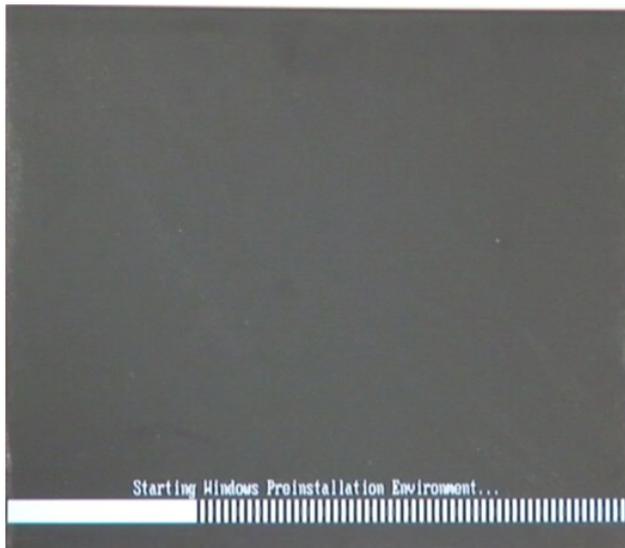
Figure C-6: Launching the Recovery Tool

Step 4: When the recovery tool setup menu appears, press <**2**> then <Enter>.
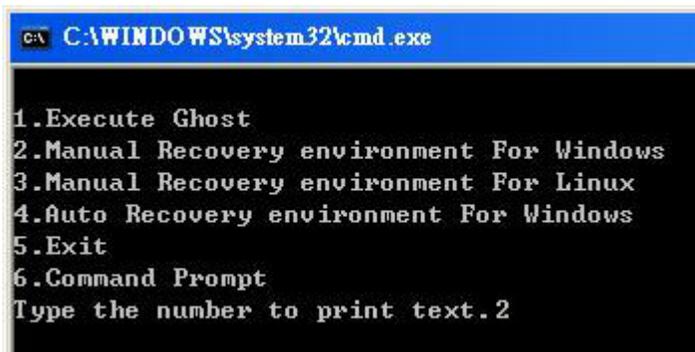
Figure C-7: Manual Recovery Environment for Windows

Step 5: The Symantec Ghost window appears and starts configuring the system to build a recovery partition. In this process the partition created for recovery files in **Section C.2.2** is hidden and the recovery tool is saved in this partition.
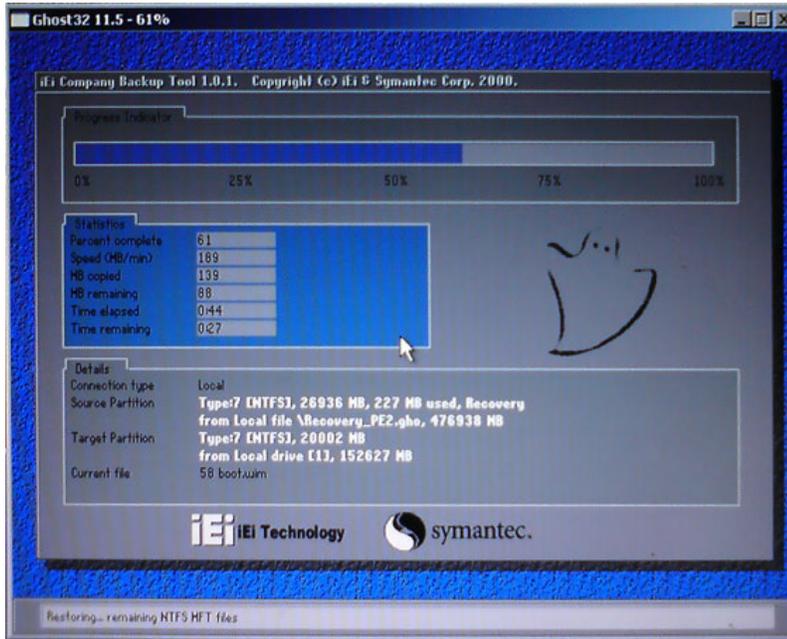
Figure C-8: Building the Recovery Partition

Step 6: After completing the system configuration, press any key in the following window to reboot the system.
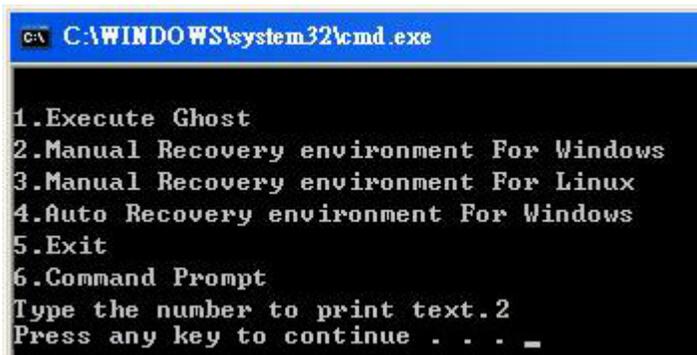
Figure C-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

C.2.5 Create Factory Default Image

 NOTE:

Before creating the factory default image, please configure the system to a factory default environment, including driver and application installations.

To create a factory default image, please follow the steps below.

Step 1: Turn on the system. When the following screen displays (**Figure C-10**), press the <**F3**> key to access the recovery tool. The message will display for 10 seconds, please press F3 before the system boots into the operating system.
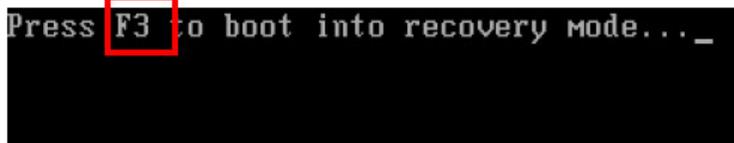
Figure C-10: Press F3 to Boot into Recovery Mode

Step 2: The recovery tool menu appears. Type <**4**> and press <**Enter**>. (**Figure C-11**)
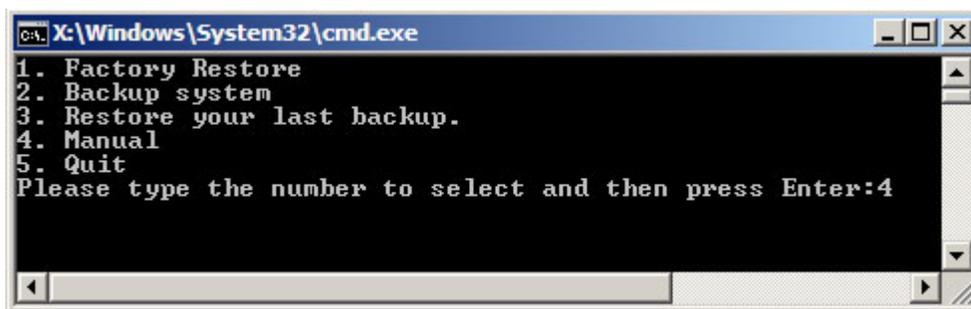
Figure C-11: Recovery Tool Menu

Step 3: The About Symantec Ghost window appears. Click **OK** button to continue.
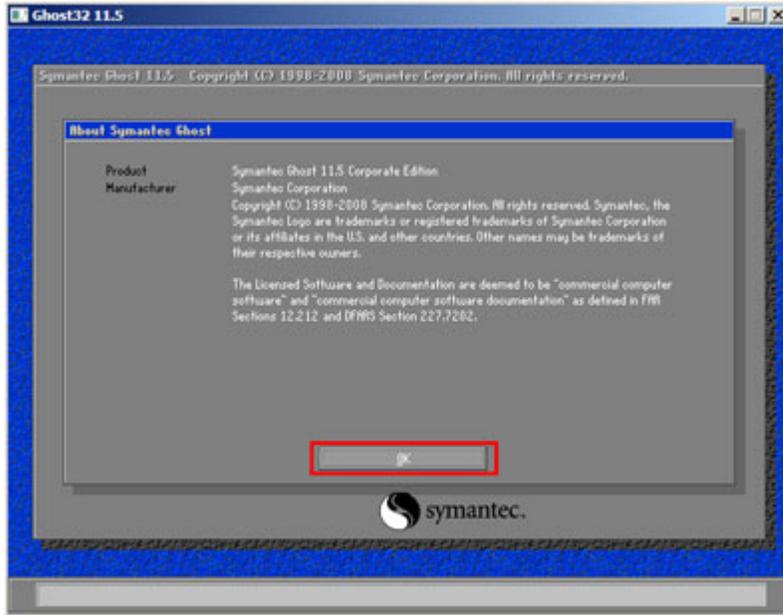
Figure C-12: About Symantec Ghost Window

Step 4: Use mouse to navigate to the option shown below (**Figure C-13**).
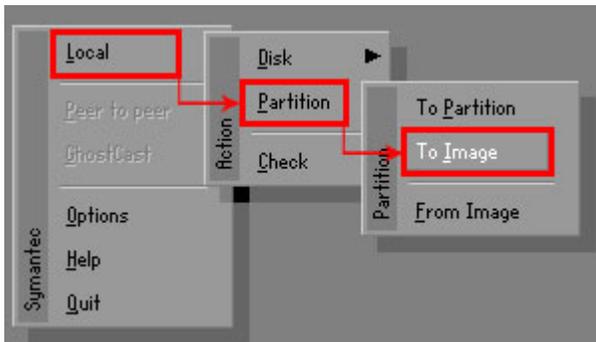
Figure C-13: Symantec Ghost Path

Step 5: Select the local source drive (Drive 1) as shown in **Figure C-14**. Then click OK.
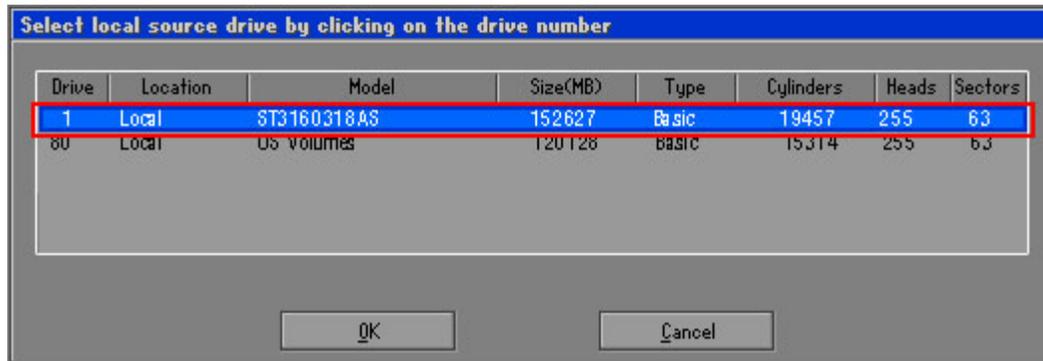
Figure C-14: Select a Local Source Drive

Step 6:   Select a source partition (Part 1) from basic drive as shown in **Figure C-15**.

Then click OK.
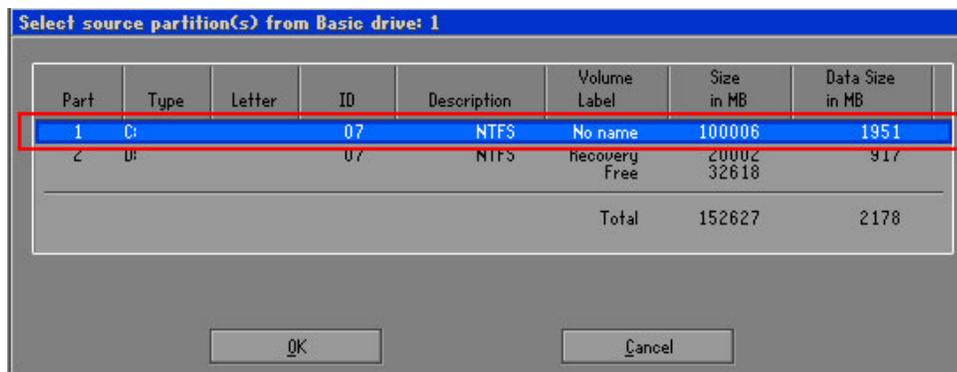
Figure C-15: Select a Source Partition from Basic Drive

Step 7:   Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei**

(**Figure C-16**). Click **Save**. The factory default image will then be saved in the

selected recovery drive and named IEI.GHO.

WARNING:

The file name of the factory default image must be **iei.GHO**.
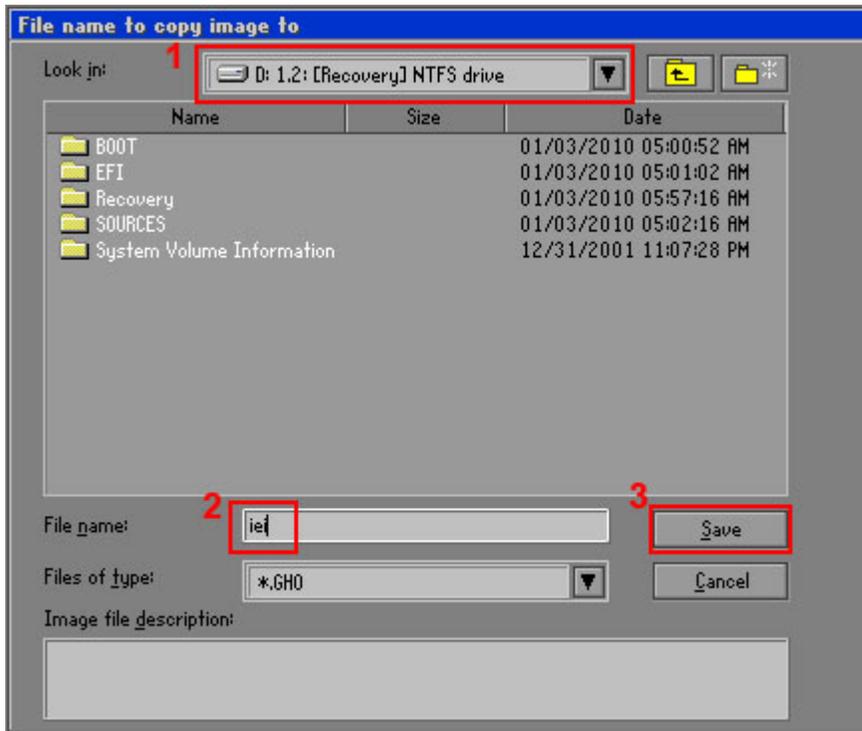
Figure C-16: File Name to Copy Image to

Step 8: When the Compress Image screen in **Figure C-17** prompts, click **High** to make the image file smaller.

Figure C-17: Compress Image

Step 9: The Proceed with partition image creation window appears, click **Yes** to

continue.
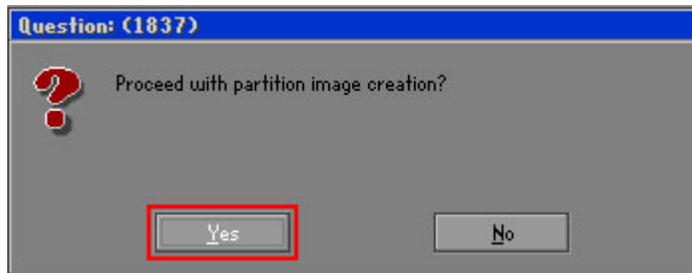
Figure C-18: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure C-19**).
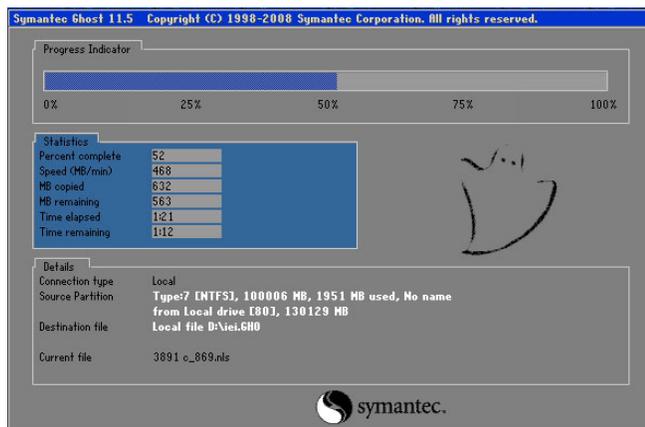
Figure C-19: Image Creation Complete

Step 11: When the image creation completes, a screen prompts as shown in **Figure C-20**.

Click **Continue** and close the Ghost window to exit the program.

Figure C-20: Image Creation Complete

Step 12: The recovery tool main menu window is shown as below. Press any key to
reboot the system.
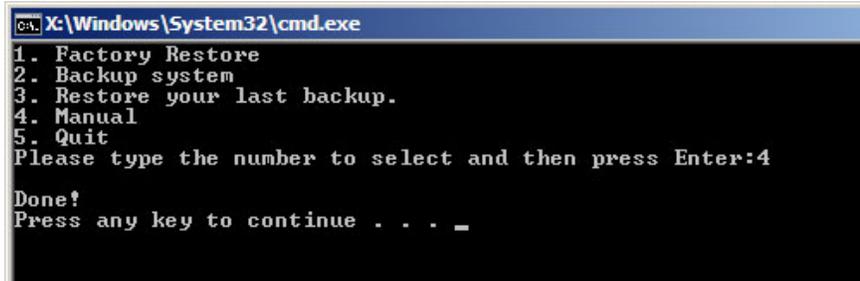
```
X:\Windows\System32\cmd.exe
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:4

Done!
Press any key to continue . . . _
```

Figure C-21: Press Any Key to Continue

C.3 Auto Recovery Setup Procedure

The auto recovery function allows a system to automatically restore from the factory
default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10
minutes. To use the auto recovery function, follow the steps described in the following
sections.

⚠️ **CAUTION:**

The auto recovery function can only run on a Microsoft Windows
system with the following OS versions:

- Windows 2000   - Windows 7

- Windows XP   - Windows XP Embedded

- Windows Vista   - Windows Embedded Standard 7

> ⚠️ **CAUTION:**
>
> The setup procedure may include a step to create a factory default image. It is suggested to configure the system to a factory default environment before the configuration, including driver and application installations.

Step 1: Follow the steps described in **Section C.2.1 ~ Section C.2.3** to setup BIOS, create partitions and install operating system.

Step 2: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

　Figure C-22: Auto Recovery Utility

Step 3: **Disable the automatically restart function before creating the factory default image**. Go to: My Computer → Properties → Advanced. Click the Settings button of Startup and Recovery. Deselect "Automatically restart". Click OK to save the settings and exit. (See Figure C-23)

Figure C-23: Disable Automatically Restart

Step 4: Reboot the system from the recovery CD. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

Starting Windows Preinstallation Environment...

Figure C-24: Launching the Recovery Tool

Step 5: When the recovery tool setup menu appears, press **<4>** then <Enter>.
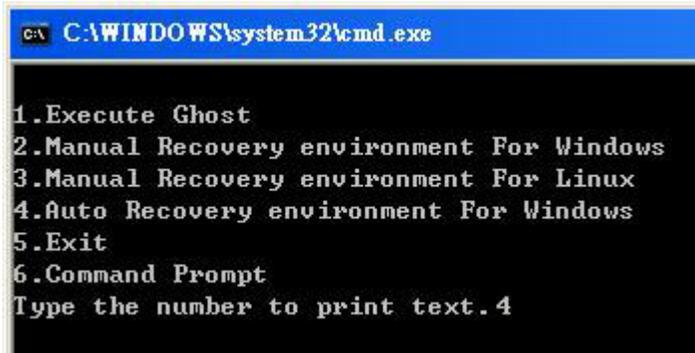
Figure C-25: Auto Recovery Environment for Windows

Step 6: The Symantec Ghost window appears and starts configuring the system to build an auto recovery partition. In this process the partition created for recovery files in **Section C.2.2** is hidden and the auto recovery tool is saved in this partition.

Figure C-26: Building the Auto Recovery Partition

Step 7: After completing the system configuration, the following message prompts to confirm whether to create a factory default image. Type **Y** to have the system create a factory default image automatically. Type **N** within 6 seconds to skip this

process (The default option is YES). It is suggested to choose YES for this

option.

Figure C-27: Factory Default Image Confirmation

Step 8: The Symantec Ghost starts to create the factory default image (**Figure C-28**).
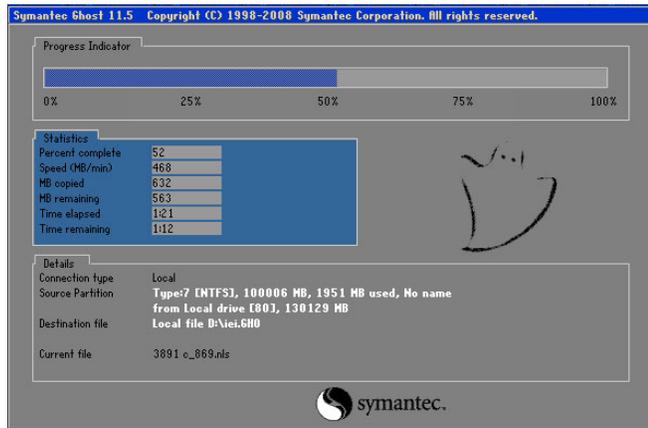
Figure C-28: Image Creation Complete

Step 9: After completing the system configuration, press any key in the following window
to restart the system.
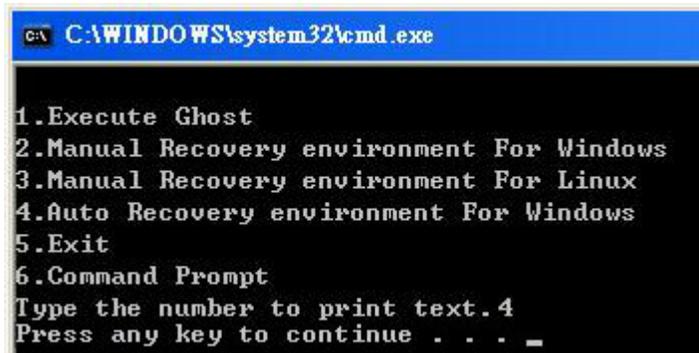
Figure C-29: Press any key to continue

Step 10: Eject the One Key Recovery CD and restart the system.

Step 11: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 12: Enable the Auto Recovery Function option (**Advanced → iEi Feature → Auto Recovery Function**).

```
                      BIOS SETUP UTILITY
   Main    Advanced   PCIPNP    Boot    Security   Chipset   Exit

 iEi Feature
 _____
 Auto Recovery Function          [Enabled]
   Recover from PXE              [Disabled]


                                      ←→    Select Screen
                                      ↑ ↓   Select Item
                                      Enter Go to SubScreen
                                      F1    General Help
                                      F10   Save and Exit
                                      ESC   Exit
         v02.61 ©Copyright 1985-2006, American Megatrends, Inc.
```
  BIOS Menu 29: IEI Feature

Step 13: Save changes and restart the system. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image.

C.4 Setup Procedure for Linux

The initial setup procedure for Linux system is mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup recovery tool for Linux OS.

Step 1: **Hardware and BIOS setup**. Refer to **Section C.2.1**.

Step 2: **Install Linux operating system**. Make sure to install GRUB (v0.97 or earlier) MBR type and Ext3 partition type. Leave enough space on the hard drive to create the recover partition later.

NOTE:

If the Linux OS is not installed with GRUB (v0.97 or earlier) and Ext3, the Symantec Ghost may not function properly.

While installing Linux OS, please create two partitions:

▪ Partition 1: **/**
▪ Partition 2: **SWAP**

NOTE:

Please reserve enough space for partition 3 for saving recovery images.
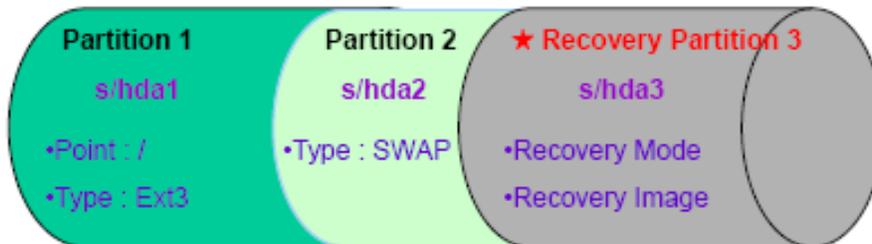
Figure C-30: Partitions for Linux

Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section C.2.2**. Then type the following commands (marked in red) to create a partition for recovery images.

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>exit

> **system32>**format N: /fs:ntfs /q /v:Recovery /y
>
> **system32>**exit

Step 4: **Build the recovery partition**. Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient. When the recovery tool setup menu appears, type <**3**> and press <Enter> (**Figure C-31**). The Symantec Ghost window appears and starts configuring the system to build a recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.
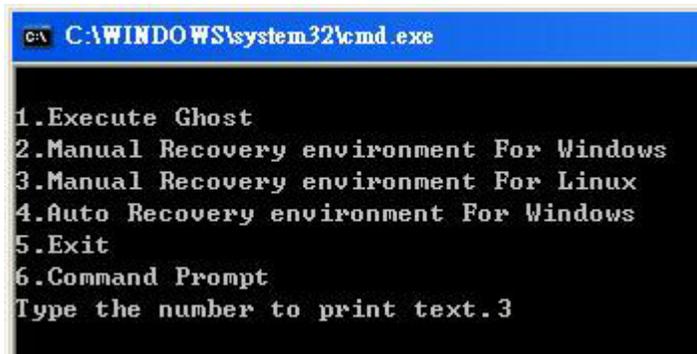
Figure C-31: Manual Recovery Environment for Linux

Step 5: **Access the recovery tool main menu by modifying the "menu.lst"**. To first access the recovery tool main menu, the menu.lst must be modified. In Linux, enter Administrator (root). When prompt appears, type:

cd /boot/grub
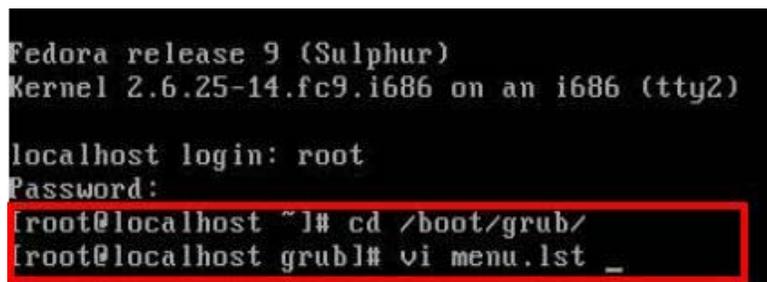
vi menu.lst

Figure C-32: Access menu.lst in Linux (Text Mode)

Step 6:   Modify the menu.lst as shown below.

- Type command:

  title Recovery Partition

  root (hd0,2)

  makeactive

  chainloader +1

Step 7:   The recovery tool menu appears. (**Figure C-33**)

Figure C-33: Recovery Tool Menu

Step 8:   **Create a factory default image**. Follow **Step 2** ~ **Step 12** described in **Section C.2.5** to create a factory default image.

C.5 Recovery Tool Functions

After completing the initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. However, if the setup procedure in Section C.3 has been completed and the auto recovery function is enabled, the system will automatically restore from the factory default image without pressing the F3 key. The recovery tool main menu is shown below.
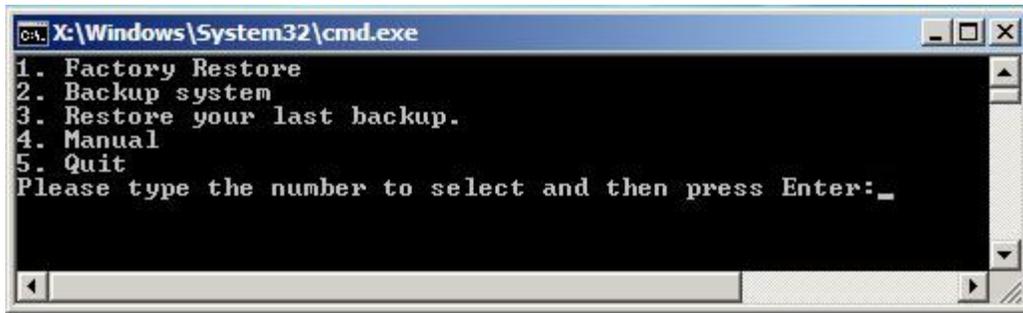
Figure C-34: Recovery Tool Main Menu

The recovery tool has several functions including:

1. **Factory Restore**: Restore the factory default image (iei.GHO) created in Section C.2.5.
2. **Backup system**: Create a system backup image (iei_user.GHO) which will be saved in the hidden partition.
3. **Restore your last backup**: Restore the last system backup image
4. **Manual**: Enter the Symantec Ghost window to configure manually.
5. **Quit**: Exit the recovery tool and restart the system.

> ⚠️ **WARNING:**
>
> Please do not turn off the system power during the process of system recovery or backup.

> ⚠️ **WARNING:**
>
> All data in the system will be deleted during the system recovery. Please backup the system files before restoring the system (either Factory Restore or Restore Backup).

C.5.1 Factory Restore

To restore the factory default image, please follow the steps below.

Step 1:   Type <**1**> and press <**Enter**> in the main menu.

Step 2:   The Symantec Ghost window appears and starts to restore the factory default. A

factory default image called **iei.GHO** is created in the hidden Recovery partition.
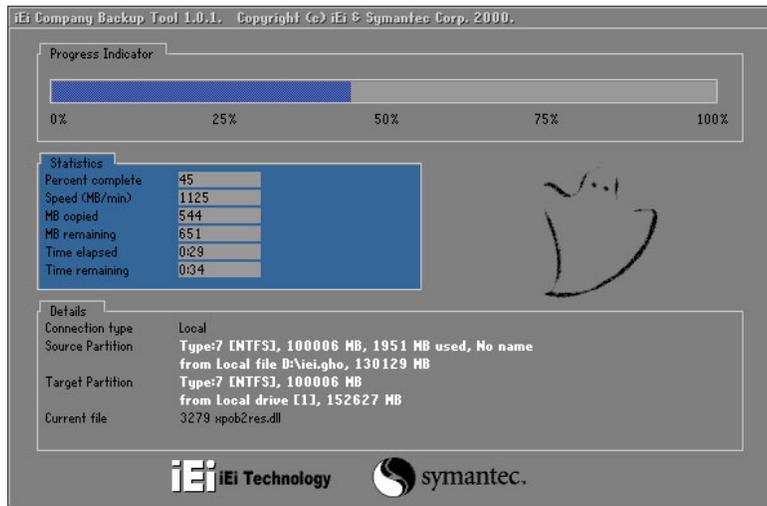
Figure C-35: Restore Factory Default

Step 3:   The screen shown in **Figure C-36** appears when completed. Press any key to

reboot the system.
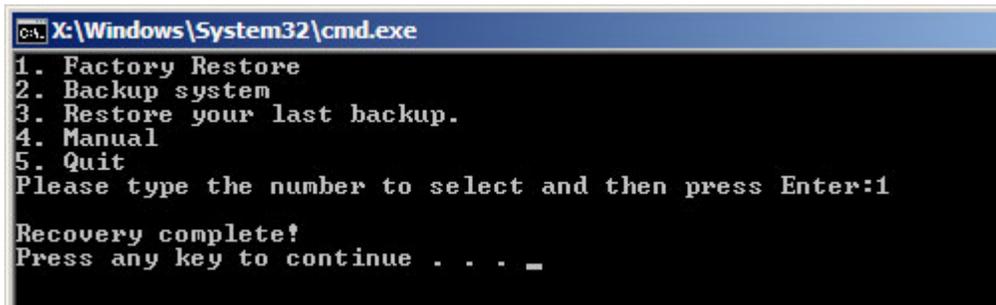
Figure C-36: Recovery Complete Window

C.5.2 Backup System

To backup the system, please follow the steps below.

Step 1:   Type <**2**> and press <**Enter**> in the main menu.

Step 2:   The Symantec Ghost window appears and starts to backup the system. A

backup image called **iei_user.GHO** is created in the hidden Recovery partition.
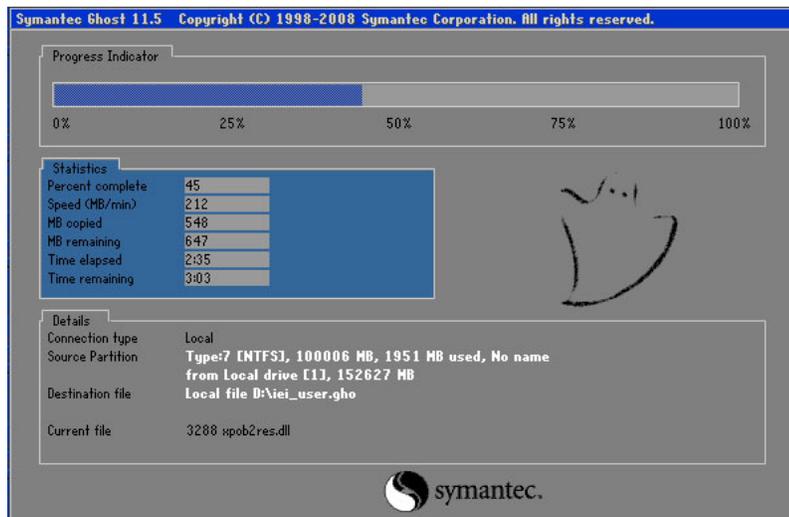
Figure C-37: Backup System

Step 3:   The screen shown in **Figure C-38** appears when system backup is complete.

Press any key to reboot the system.
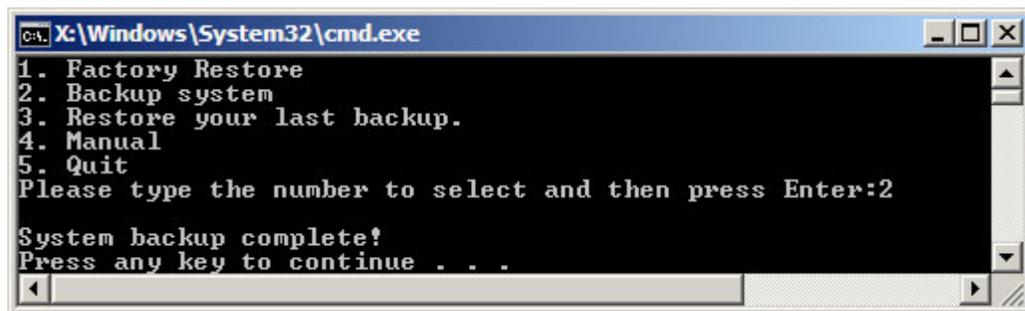
Figure C-38: System Backup Complete Window

C.5.3 Restore Your Last Backup

To restore the last system backup, please follow the steps below.

Step 1: Type <**3**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the last backup

image (iei_user.GHO).
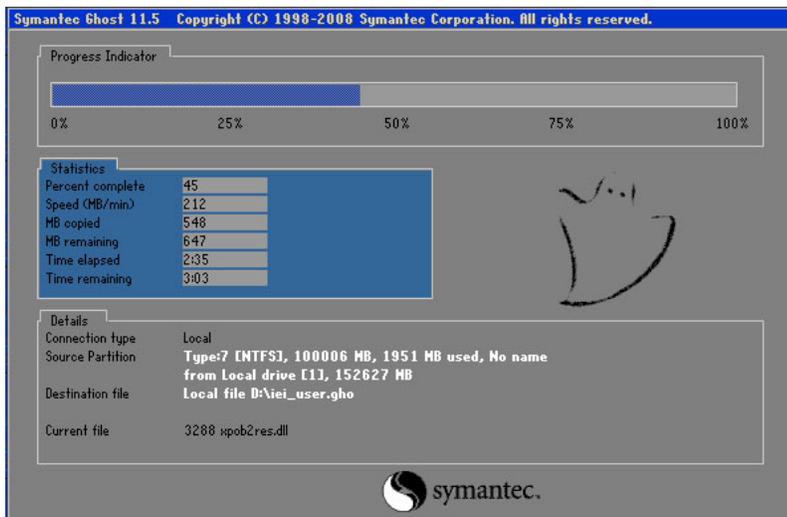
Figure C-39: Restore Backup

Step 3: The screen shown in **Figure C-40** appears when backup recovery is complete.

Press any key to reboot the system.
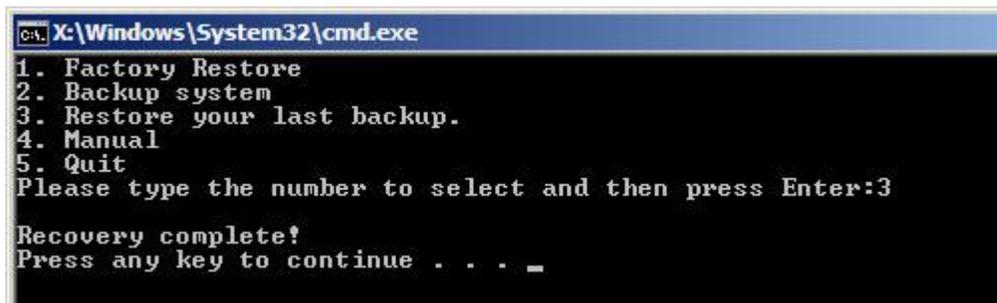
Figure C-40: Restore System Backup Complete Window

C.5.4 Manual

To restore the last system backup, please follow the steps below.

Step 1: Type <**4**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.
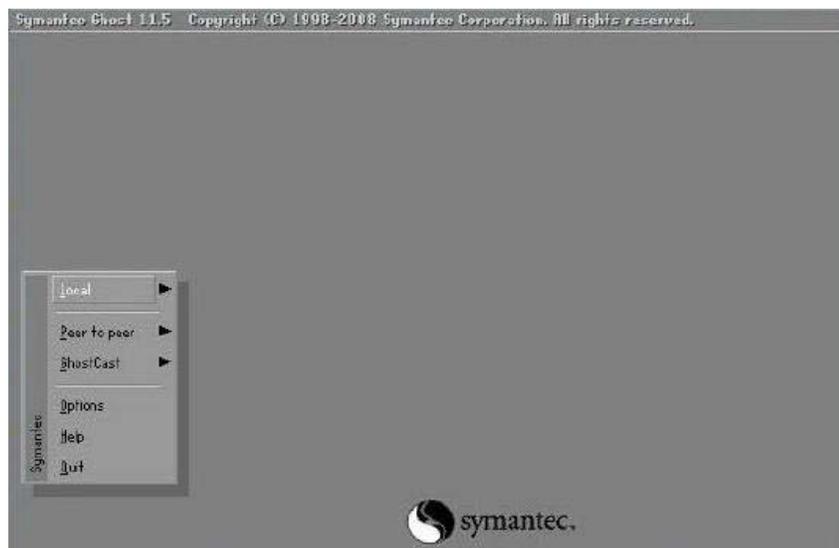
Figure C-41: Symantec Ghost Window

Step 3: When backup or recovery is completed, press any key to reboot the system.

C.6 Restore Systems from a Linux Server through LAN

The One Key Recovery allows a client system to automatically restore to a factory default image saved in a Linux system (the server) through LAN connectivity after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To be able to use this function, the client system and the Linux system MUST reside in the same domain.
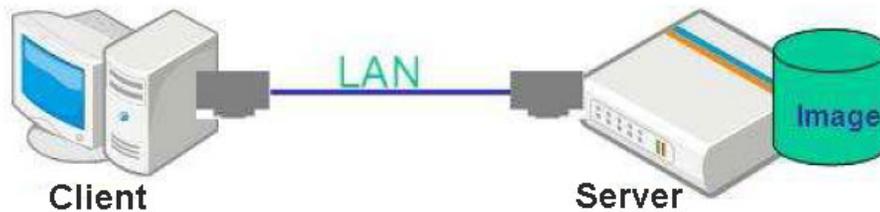
⚠️ **CAUTION:**

The supported client OS includes:

- Windows 2000	- Windows 7
- Windows XP	- Windows XP Embedded
- Windows Vista	- Windows Embedded Standard 7

Prior to restoring client systems from a Linux server, a few setup procedures are required.

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

The detailed descriptions are described in the following sections. In this document, two types of Linux OS are used as examples to explain the configuration process – CentOS 5.5 (Kernel 2.6.18) and Debian 5.0.7 (Kernel 2.6.26).

C.6.1 Configure DHCP Server Settings

Step 1: Install the DHCP

#yum install dhcp (CentOS, commands marked in red)

#apt-get install dhcp3-server (Debian, commands marked in blue)

Step 2: Confirm the operating system default settings: dhcpd.conf.

<u>CentOS</u>

Use the following command to show the DHCP server sample location:

#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

Use the following command to copy the DHCP server sample to etc/dhcpd.conf:

#cp /usr/share/doc/dhcp-3.0.5/dhcpd.conf.sample /etc/dhcpd.conf

#vi /etc/dhcpd.conf

<u>Debian</u>

#vi /etc/dhcpd.conf

Edit "/etc/dhcpd.conf" for your environment. For example, add

next-server PXE server IP address;

filename "pxelinux.0";

C.6.2 Configure TFTP Settings

Step 1: Install the tftp, httpd and syslinux.

#yum install tftp-server httpd syslinux (CentOS)

#apt-get install tftpd-hpa xinetd syslinux (Debian)

Step 2: Enable the TFTP server by editing the "/etc/xinetd.d/tftp" file and make it use the remap file. The "-vvv" is optional but it could definitely help on getting more information while running the remap file. For example:

<u>CentOS</u>

#vi /etc/xinetd.d/tftp

Modify:

disable = no

server_args = -s /tftpboot –m /tftpboot/tftpd.remap -vvv

Debian

Replace the TFTP settings from "inetd" to "xinetd" and annotate the "inetd" by

adding "#".

#vi /etc/inetd.conf

Modify: #tftp dgram udp wait root /usr/sbin....... (as shown below)

#vi /etc/xinetd.d/tftp

C.6.3 Configure One Key Recovery Server Settings

Step 1: Copy the **Utility/RECOVERYR10.TAR.BZ2** package from the One Key

Recovery CD to the system (server side).

Step 2: Extract the recovery package to /.

#cp RecoveryR10.tar.bz2 /

#cd /

#tar –xvjf RecoveryR10.tar.bz2

Step 3: Copy "pxelinux.0" from "syslinux" and install to "/tftboot".

#cp /usr/lib/syslinux/pxelinux.0 /tftpboot/

C.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

<u>**CentOS**</u>

#service xinetd restart

#service httpd restart

#service dhcpd restart

<u>**Debian**</u>

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

#/etc/init.d/dhcp3-server restart

C.6.5 Create Shared Directory

Step 1: Install the samba.

#yum install samba

Step 2: Create a shared directory for the factory default image.

#mkdir /share

#cd /share

#mkdir /image

#cp iei.gho /image

![IEI Integration Corp. logo]

![Warning icon] **WARNING:**

The file name of the factory default image must be **iei.gho**.

Step 3: Confirm the operating system default settings: smb.conf.

#vi /etc/samba/smb.conf

Modify:

[image]

    comment = One Key Recovery

    path = /share/image

    browseable = yes

    writable = yes

    public = yes

    create mask = 0644

    directory mask = 0755

Step 4: Edit "/etc/samba/smb.conf" for your environment. For example:

```
# "security = user" is always a good idea. This will require a Unix account
# in this server for every user accessing the server. See
# /usr/share/doc/samba-doc/htmldocs/Samba3-HOWTO/ServerType.html
# in the samba-doc package for details.
  security = share
```
```
[image]
  comment = One Key Recovery
  path = /share/image
  browseable = yes
  writable = yes
  public = yes
  create mask = 0644
  directory mask = 0755
```

Step 5: Modify the hostname

#vi /etc/hostname

Modify: RecoveryServer

```
RecoveryServer
~
```

C.6.6 Setup a Client System for Auto Recovery

Step 1: **Disable the automatically restart function before creating the factory default image**. Go to: My Computer → Properties → Advanced. Click the Settings button of Startup and Recovery. Deselect "Automatically restart". Click OK to save the settings and exit. (See Figure C-23)
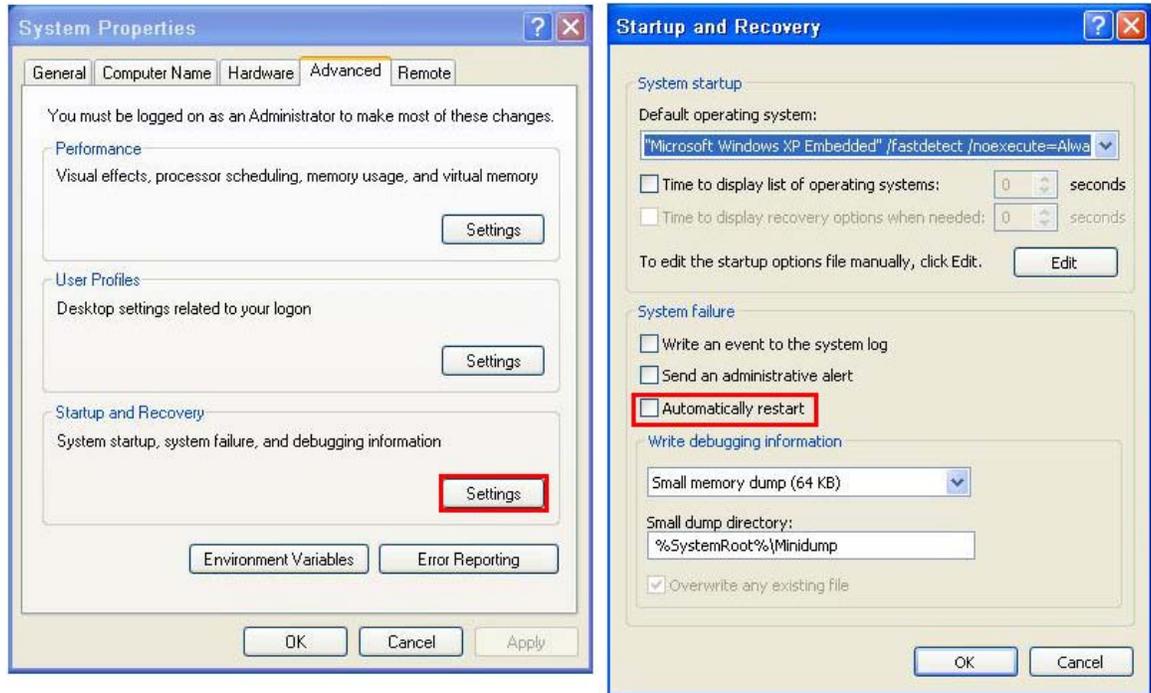
Figure C-42: Disable Automatically Restart

Step 2: Configure the following BIOS options of the client system.

Advanced → iEi Feature → Auto Recovery Function → **Enabled**

Advanced → iEi Feature → Recover from PXE → **Enabled**

Boot → Launch PXE OpROM → **Enabled**

Step 3: Continue to configure the **Boot Option Priorities** BIOS option of the client system:

Boot Option #1 → remain the default setting to boot from the original OS.

Boot Option #2 → select the boot from LAN option.

Step 4: Save changes and exit BIOS menu.

Exit → **Save Changes and Exit**

Step 5: Install the auto recovery utility into the system by double clicking the

Utility/AUTORECOVERY-SETUP.exe in the One Key Recovery CD. This utility

MUST be installed in the system, otherwise, the system will automatically

restore from the factory default image every ten (10) minutes.

Step 6: Restart the client system from LAN. If the system encounters a Blue Screen of

Death (BSoD) or a hang for around 10 minutes, it will automatically restore from

the factory default image. The following screens will show when the system

starts auto recovering.

![NOTE icon] **NOTE:**

A firewall or a SELinux is not in use in the whole setup process described above. If there is a firewall or a SELinux protecting the system, modify the configuration information to accommodate them.

C.7 Other Information

C.7.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

When the system uses AHCI mode or some specific SATA controllers such as ALi M5283 or VIA VT6421A, the SATA RAID/AHCI driver must be installed before using one key recovery. Please follow the steps below to install the SATA RAID/AHCI driver.

Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

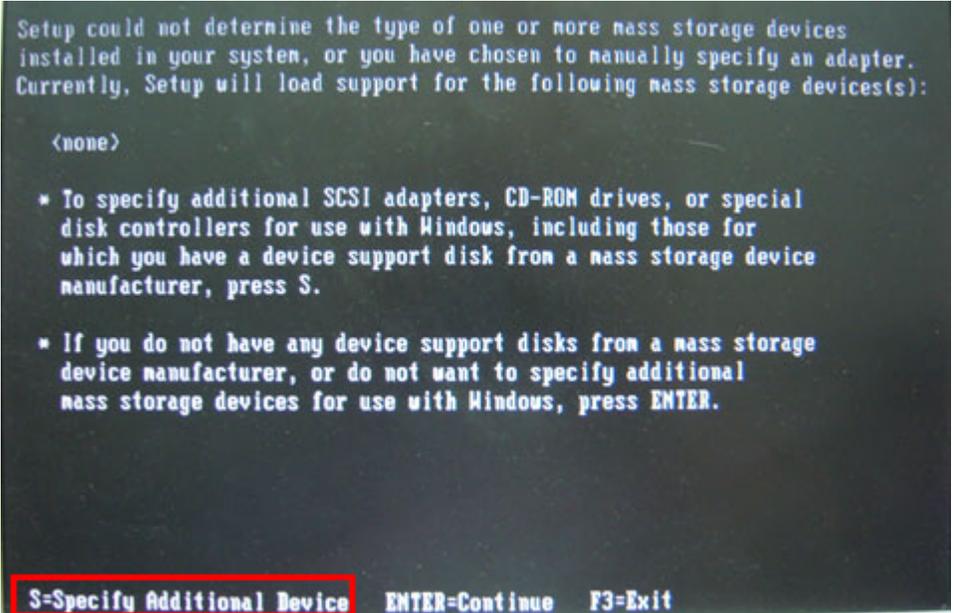**Step 2:** Connect the USB floppy disk drive to the system.

Step 3: Insert the One Key Recovery CD into the system and boot the system from the
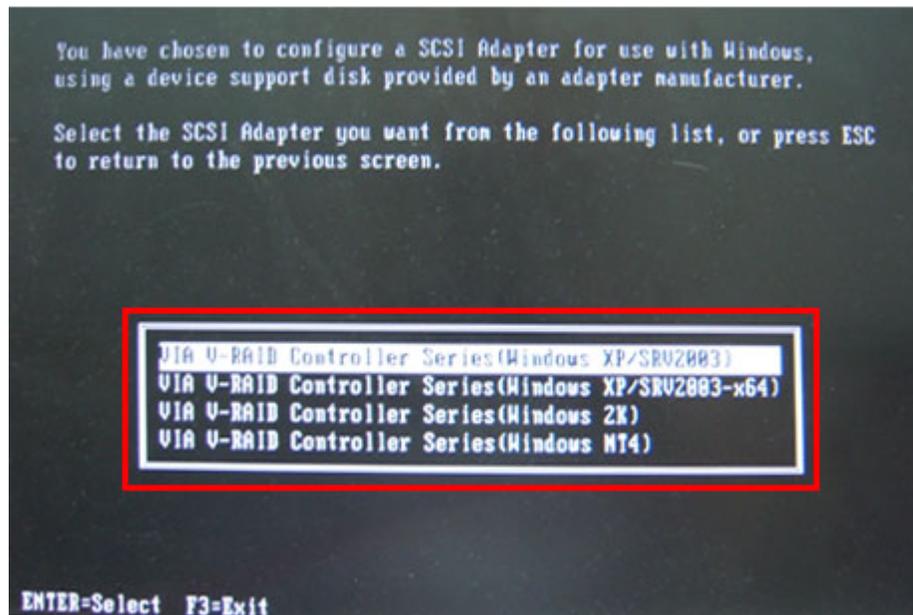
CD.

Step 4: When launching the recovery tool, press <**F6**>.
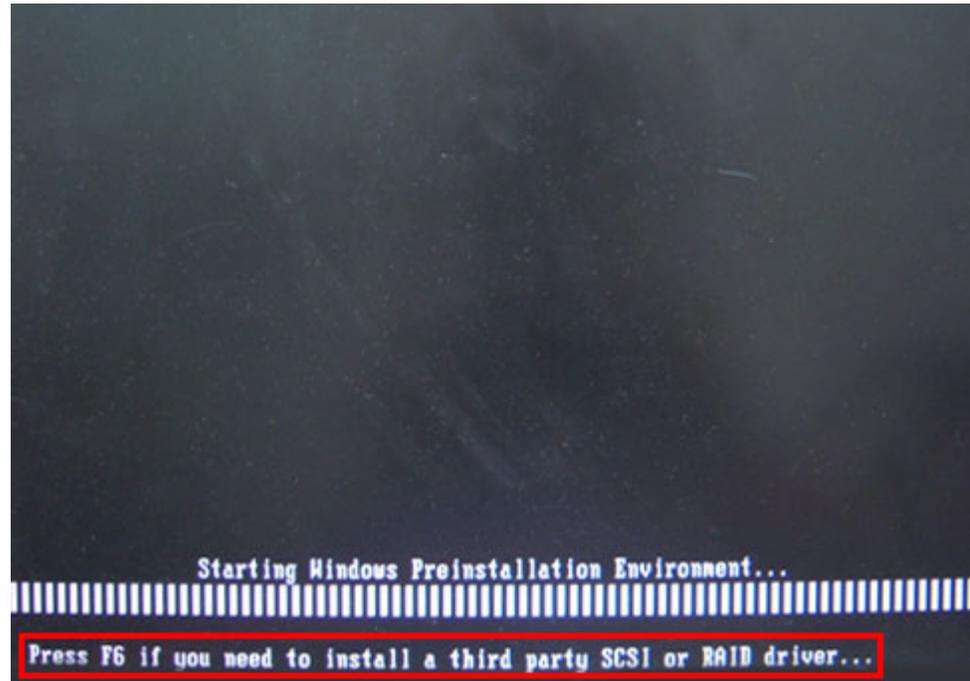
Step 5: When the following window appears, press <**S**> to select "Specify Additional

Device".

Step 6: In the following window, select a SATA controller mode used in the system. Then

press <**Enter**>. The user can now start using the SATA HDD.

Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section C.2.2 Create Partitions** to finish the whole setup process.

C.7.2 System Memory Requirement

To be able to access the recovery tool by pressing **<F3>** while booting up the system, please make sure to have enough system memory. The minimum memory requirement is listed below.

- **Using Award BIOS**: 128 MB system memory
- **Using AMI BIOS**: 512 MB system memory.

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the IMB-Q870-i2 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

D.2 DIO Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 6-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	AX, 6F08H	Sets the digital port as input
INT	15H	Initiates the INT 15H BIOS call

D.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

E

Watchdog Timer

> ![NOTE icon] **NOTE:**
>
> The following discussion applies to DOS environment. Contact IEI support
> or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table E-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer,

otherwise the system resets.

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

    MOV   AX, 6F02H   ;setting the time-out value
    MOV   BL, 30   ;time-out value is 48 seconds
    INT   15H

;
; ADD THE APPLICATION PROGRAM HERE
;

    CMP   EXIT_AP, 1   ;is the application over?
    JNE   W_LOOP   ;No, restart the application

    MOV   AX, 6F02H   ;disable Watchdog Timer
    MOV   BL, 0   ;
    INT   15H

;
; EXIT ;

Appendix

F

Hazardous Materials Disclosure

F.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						