IEI Integration Corp.

MODEL:

PCIE-Q670 Series

Full-Size PICMG 1.3 CPU Card Supports 32nm LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron® CPU, Intel® Q67 Chipset, DDR3, VGA, DVI-D, Dual Intel® PCIe GbE, Two SATA 6Gb/s Ports, PCIe Mini, HD Audio and RoHS

User Manual

Rev. 2.00 – 8 May, 2014

RoHS Lead Free

Revision

Date	Version	Changes
8 May, 2014	2.00	Modified for R20 version Modified LAN pinouts Updated Chapter 2: Packing List
9 July, 2013	1.03	Updated the optional LPT cable
16 October, 2012	1.02	Updated Section 1.7: Technical Specifications
3 February, 2012	1.01	Updated Section 1.6: Data Flow Updated Appendix B: One Key Recovery
15 November, 2011	1.00	Initial release

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Introduction

1.1 Introduction

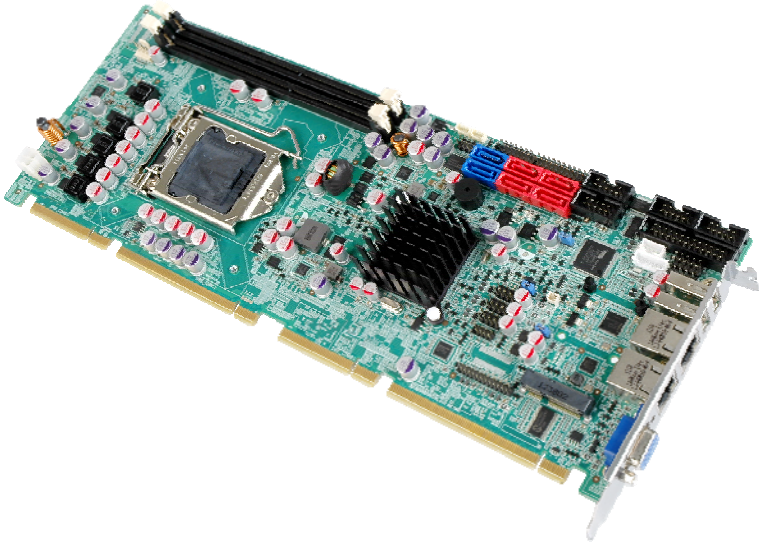


Figure 1-1: PCIE-Q670 Series

The PCIE-Q670 Series PICMG 1.3 CPU card is a Socket LGA1155 32nm Intel® Core™ i3/i5/i7/Pentium®/Celeron® processor platform that supports two 240-pin 1066/1333 MHz dual-channel DDR3 DIMM modules up to 16.0 GB.

The PCIE-Q670 Series supports two GbE interfaces through the Intel® 82579 Ethernet PHY (with Intel® AMT 7.0 support) and the Intel® 82583V Ethernet controller.

The integrated Intel® Q67 chipset supports two SATA 6Gb/s and four SATA 3Gb/s drives. Two USB 2.0 on the rear panel, six USB 2.0 by pin header and one PCIe Mini interface provide flexible expansion options. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the PCIE-Q670 Series.

1.2 Model Variations

The model variations of the PCIE-Q670 Series are listed below.

Model No.	CPU Supported	DVI-D by 26-pin header
PCIE-Q670-DVI-R10	LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron®	Yes
PCIE-Q670-R10	LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron®	No

Table 1-1: PCIE-Q670 Series Model Variations

1.3 Features

Some of the PCIE-Q670 Series motherboard features are listed below:

- PICMG 1.3 full-size graphics grade solution
- LGA1155 CPU socket
- Intel® Q67 chipset
- Dual-channel DDR3 DIMMs support up to 16.0 GB
- Dual independent display by VGA and DVI-D (DVI model only)
- One PCIe Mini expansion slot
- Two Intel® PCIe Gigabit Ethernet connectors (LAN2 with Intel® AMT 7.0 support)
- Two SATA 6Gb/s connectors with RAID function
- Four SATA 3Gb/s connectors with RAID function
- TPM V1.2 hardware security function supported by the TPM module
- High Definition Audio
- RoHS compliant

1.4 Connectors

The connectors on the PCIE-Q670 Series are shown in the figure below.

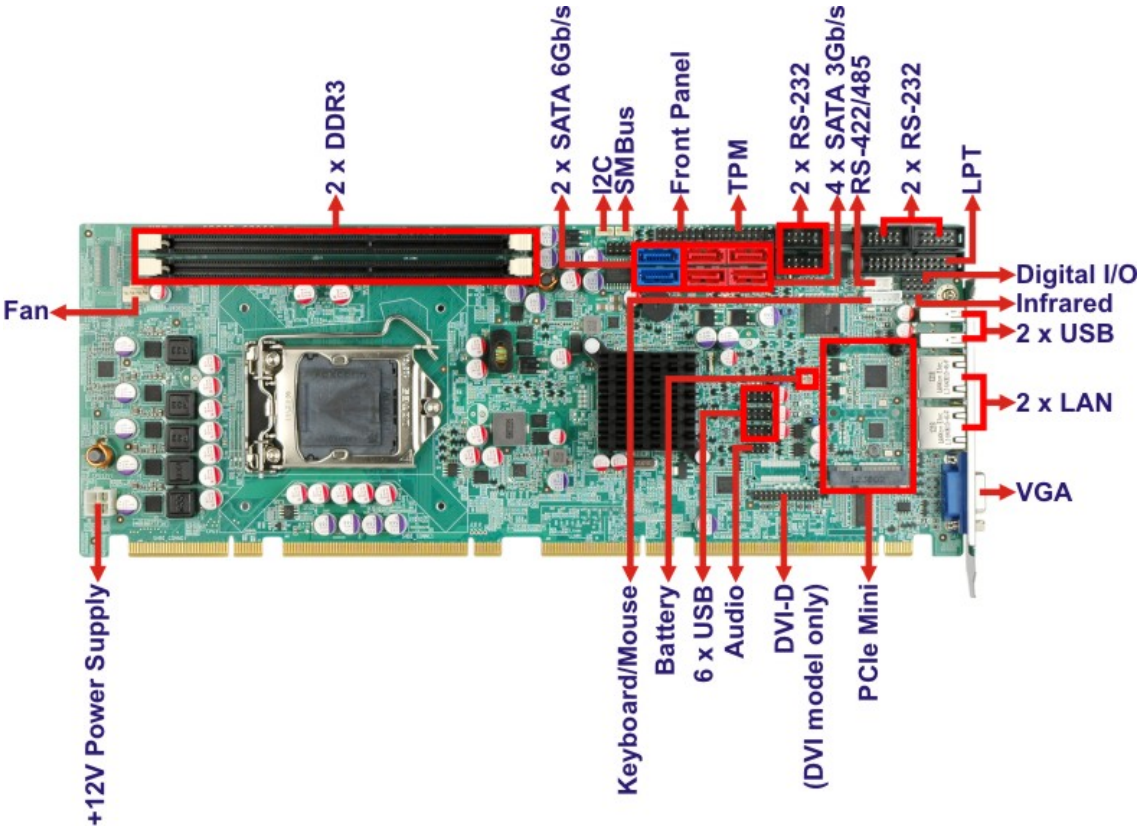


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the PCIE-Q670 Series are shown in the diagram below.

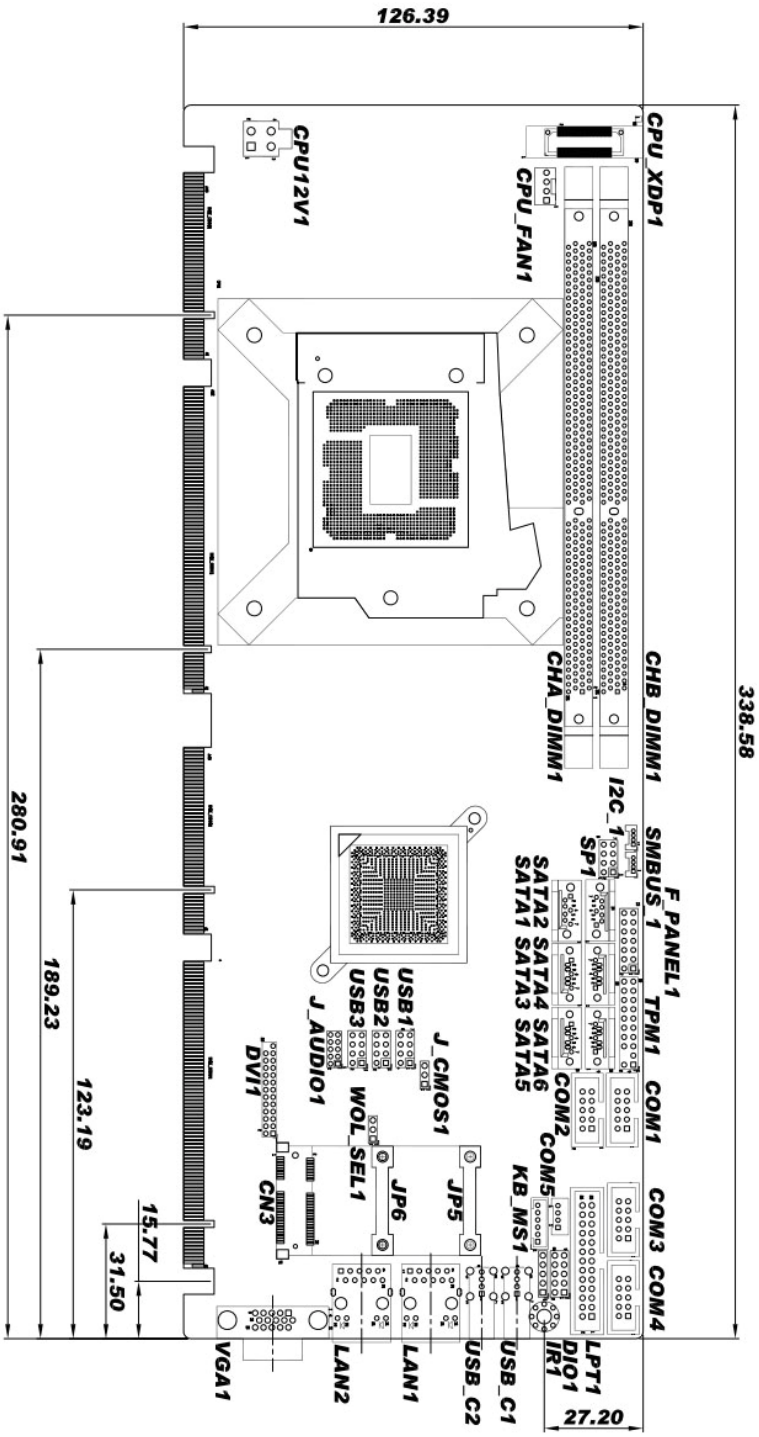


Figure 1-3: PCIE-Q670 Series Dimensions (mm)

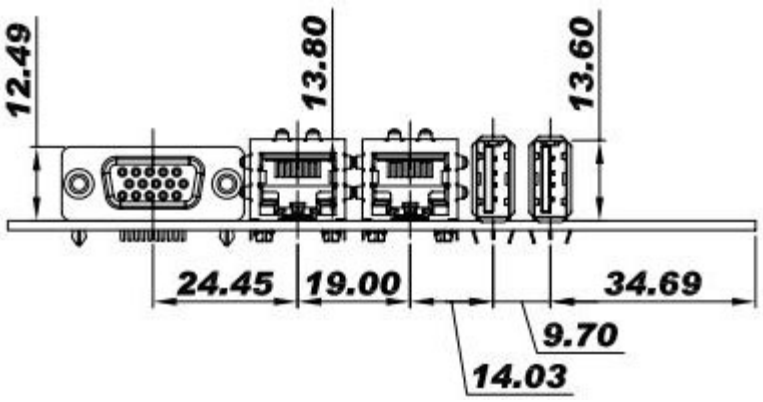


Figure 1-4: External Interface Panel Dimensions (mm)

1.6 Data Flow

Figure 1-5 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

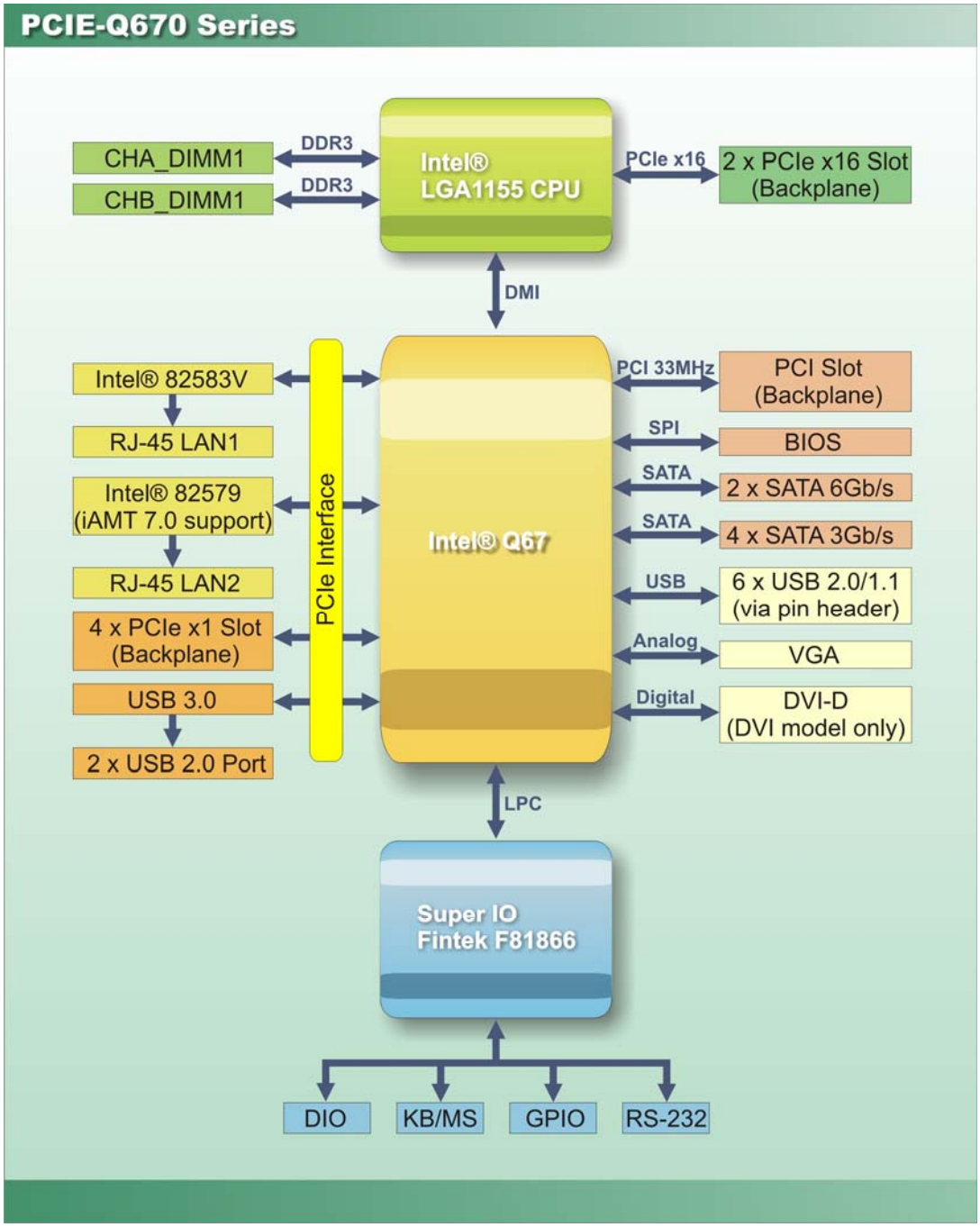


Figure 1-5: Data Flow Diagram

1.7 Technical Specifications

The PCIE-Q670 Series technical specifications are listed below.

Specification/Model	PCIE-Q670 Series
Form Factor	PICMG 1.3
CPU Supported	LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron® CPU
PCH	Intel® Q67
Memory	Two 240-pin 1333/1066 MHz dual-channel unbuffered DDR3 SDRAM DIMMs support (system max. 16.0 GB)
Graphics Engine	Supports DirectX 10.1 and OpenGL3.0 Full MPEG2, VC1, AVC Decode
Audio	Supports IEI AC-KIT-888HD audio kit
BIOS	UEFI BIOS
Ethernet Controllers	Intel® 82583V PCIe Ethernet controller Intel® 82579 PHY with Intel® AMT 7.0 support (LAN2)
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	One PCIe Mini slot (with USB 2.0/1.1 signal) PCIe signal and PCI signal via golden fingers Supports PCIe x1* or x4** slots on backplane * The BIOS version “B202ARxx.bin” is used for “PCIe x1 signal to four PCIe x1 slots”, such as the IEI PE-5S2-R40 backplane. ** The BIOS version “V0V2ARxx.bin” is used for “PCIe x4 signal to one PCIe x4 slot”, such as the IEI PE-5S-R40 backplane.
I/O Interface Connectors	
Audio Connector	One internal audio connector (10-pin header)
Digital I/O	8-bit, 4-bit input/4-bit output
Display Output	One VGA integrated in the Intel® Q67 (rear I/O) One DVI-D integrated in the Intel® Q67 (via 26-pin header to the DVI-D/USB kit; DVI model only)

Specification/Model	PCIE-Q670 Series
Ethernet	Two RJ-45 GbE ports
Fan	One 4-pin wafer connector
Front Panel	One 14-pin header (power LED, HDD LED, speaker, power button, reset button)
I^2C	One 4-pin wafer connector
Infrared	One via 5-pin header
Keyboard/Mouse	One 6-pin wafer connector
Parallel Port	One parallel port via internal 26-pin box header
Serial ATA	Four SATA 3Gb/s connectors (support RAID 0, 1, 5, 10) Two SATA 6Gb/s connectors (support RAID 0, 1, 5, 10)
Serial Ports	Four RS-232 via internal box headers One RS-422/485 via internal 4-pin wafer connector
SMBus	One 4-pin wafer connector
TPM	One via 20-pin header
USB Ports	Two external USB 2.0 ports on rear IO Six internal USB 2.0 ports by three pin headers
Environmental and Power Specifications	
Power Supply	5V/12V, AT/ATX power supported
Power Consumption	3.3V@1.69A, 5V@3.45A , 12V@0.32A, Vcore@5.24A, 5VSb@0.17 (3.40 GHz Intel® Core™ i7 2600 CPU with two 1333 MHz 2GB DDR3 memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 70ºC
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	338 mm x 126 mm

Specification/Model	PCIE-Q670 Series
Weight GW/NW	1200 g / 420 g

Table 1-2: PCIE-Q670 Series 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 PCIE-Q670 Series 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:

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 PCIE-Q670 Series was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The PCIE-Q670 Series is shipped with the following components:

Quantity	Item and Part Number	Image
1	PCIE-Q670 Series CPU card	
4	SATA cable (**P/N**: 32000-062800-RS)	
1	Dual RS-232 cable (**P/N**: 19800-000051-RS)	
1	Dual USB cable with bracket (**P/N**: 19800-003100-300-RS)	
1	Mini jumper pack	
1	DVI-D/USB kit (DVI model only) (**P/N**: IO-KIT-001-R20)	

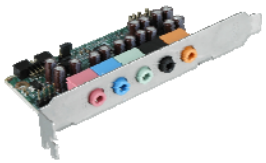
Quantity	Item and Part Number	Image
1	One Key Recovery CD (**P/N**: IEI-7B000-000478-RS)	
1	Utility CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
RS-422/485 cable, 200 mm (**P/N**: 32205-003800-300-RS)	
KB/MS cable with bracket (**P/N**: 19800-000075-RS)	
SATA to IDE/CF converter board (**P/N**: SAIDE-KIT01-R10)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
LPT cable (**P/N**: 19800-000049-RS)	

Item and Part Number	Image
7.1-channel HD audio kit with Realtek ALC892 audio codec supporting dual audio stream (**P/N**: AC-KIT-892HD-R10)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 45W) (**P/N**: CF-1156C-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 65W) (**P/N**: CF-1156D-RS)	
High-performance LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-1156E-R11)	
Intel® Core™ i5-2500T processor (LGA1155, quad core 2.3 GHz, 6M cache, 45W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i5-2500T)	
Intel® Core™ i5-2390T processor (LGA1155, dual core 2.7 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i5-2390T)	
Intel® Core™ i3-2120T processor (LGA1155, dual core 2.6 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i3-2120T)	

Item and Part Number	Image
Intel® Pentium® G630T processor (LGA1155, dual core 2.3 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-P-G630T)	
Intel® Celeron® G440 processor (LGA1155, single core 1.6 GHz, 1M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-C-G440)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 PCIE-Q670 Series Layout

The figures below show all the connectors and jumpers.

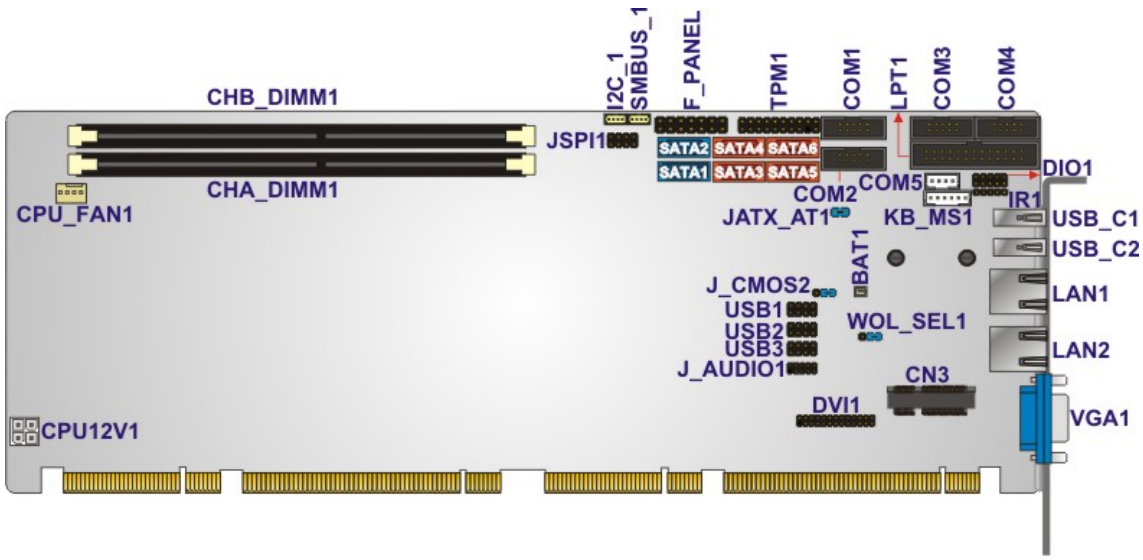


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
+12V ATX power supply connector	4-pin Molex power connector	CPU12V1
Audio kit connector	10-pin header	J_AUDIO1
Battery connector	2-pin wafer	BT2
DDR3 DIMM sockets	240-pin socket	CHA_DIMM1 CHB_DIMM1
Digital I/O connector	10-pin header	DIO1
DVI-D connector (DVI model only)	26-pin header	DVI1

Connector	Type	Label
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Front panel connector	14-pin header	F_PANEL1
I^2C connector	4-pin wafer	I2C_1
Infrared connector	5-pin header	IR1
Keyboard and mouse connector	6-pin wafer	KB_MS1
Parallel port connector	26-pin box header	LPT1
PCIe Mini slot	PCIe Mini	CN3
SATA 3Gb/s drive connector	7-pin SATA connector	SATA3, SATA4, SATA5, SATA6
SATA 6Gb/s drive connector	7-pin SATA connector	SATA1, SATA2
Serial port, RS-422/485	4-pin wafer	COM5
Serial port, RS-232	10-pin box header	COM1, COM2, COM3, COM4
SMBus connector	4-pin wafer	SMBUS_1
SPI ROM connector	8-pin header	JSPI1
TPM connector	20-pin header	TPM1
USB connectors	8-pin header	USB1, USB2, USB3

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
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
USB port	USB	USB_C1
USB port	USB	USB_C2

Connector	Type	Label
VGA connector	15-pin female	VGA1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the PCIE-Q670 Series.

3.2.1 12V Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin Molex power connector

CN Location: See **Figure 3-2**

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

The connector supports the 12V power supply.

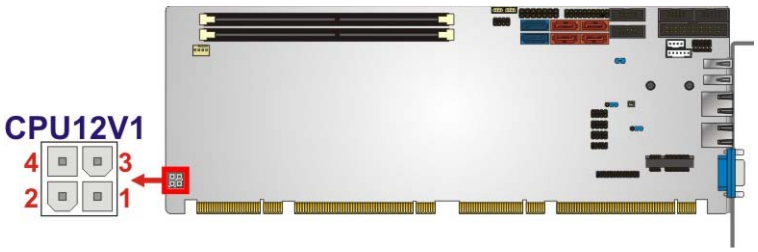


Figure 3-2: ATX Power Connector Pinout Location

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

Table 3-3: ATX Power Connector Pinouts

3.2.2 Audio Kit Connector

CN Label: **J_AUDIO1**

CN Type: 10-pin header

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

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

This connector connects to an external audio kit.

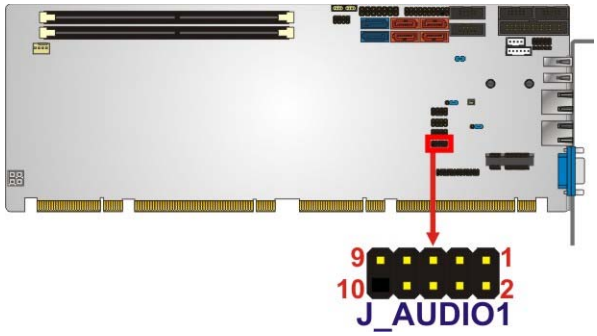


Figure 3-3: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	ACZ_SYNC	2	ACZ_BITCLK
3	ACZ_SDOUT	4	ACZ_PCBEEP
5	ACZ_SDIN	6	ACZ_RST#
7	ACZ_VCC	8	ACZ_GND
9	ACZ_12V	10	ACZ_GND

Table 3-4: Audio Connector Pinouts

3.2.3 Battery Connector

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: 2-pin wafer

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-5**

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.

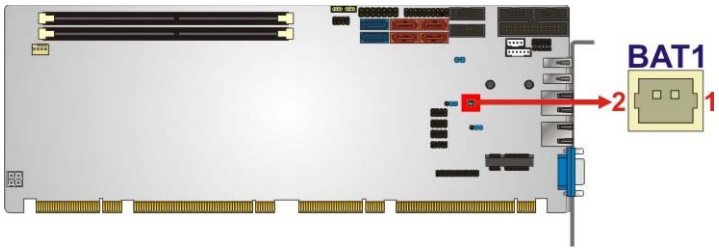


Figure 3-4: Battery Connector Location

Pin	Description
1	GND
2	Battery+

Table 3-5: Battery Connector Pinouts

3.2.4 DDR3 DIMM Slots

CN Label: **CHA_DIMM1, CHB_DIMM1**

CN Type: DDR3 DIMM slot

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

The DIMM slots are for DDR3 DIMM memory modules.

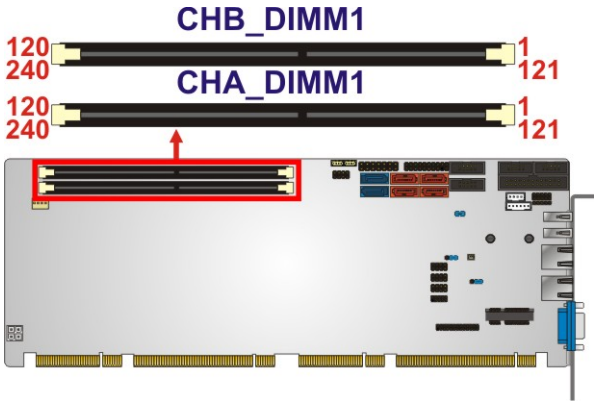


Figure 3-5: DDR3 DIMM Slot Locations

3.2.5 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-6**

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

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.

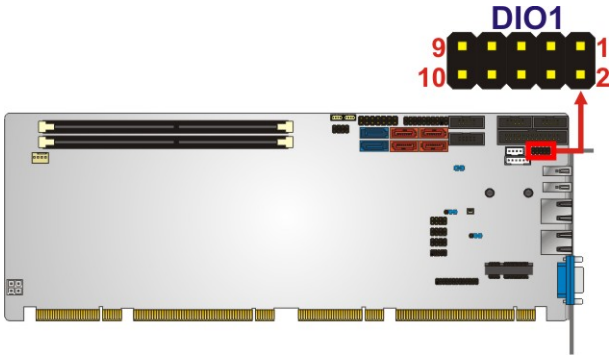


Figure 3-6: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-6: Digital I/O Connector Pinouts

3.2.6 DVI-D Connector (DVI Model Only)

CN Label: **DVI1**

CN Type: 26-pin header

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-7**

The DVI-D connector connects to a monitor that supports DVI video input via the DVI-D/USB kit.

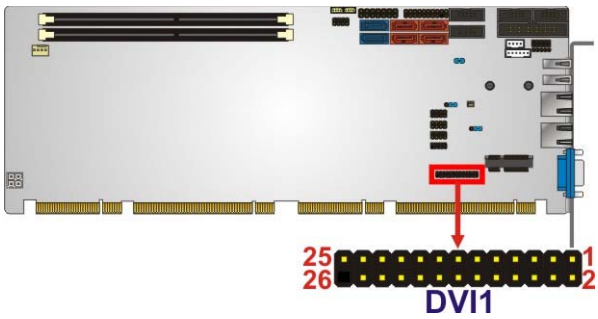


Figure 3-7: DVI-D Connector Location

Pin	Description	Pin	Description
1	Data 2-	2	Data 2+
3	GND	4	NC
5	NC	6	DDC Clock
7	DDC Data	8	NC
9	Data 1-	10	Data 1+
11	GND	12	NC
13	NC	14	VCC
15	GND	16	Hot Plug Detect
17	Data 0-	18	Data 0+

Pin	Description	Pin	Description
19	GND	20	NC
21	NC	22	GND
23	Clock +	24	Clock -
25	GND	26	NC

Table 3-7: DVI-D Connector Pinouts

3.2.7 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-8**

The fan connector attaches to a CPU cooling fan.

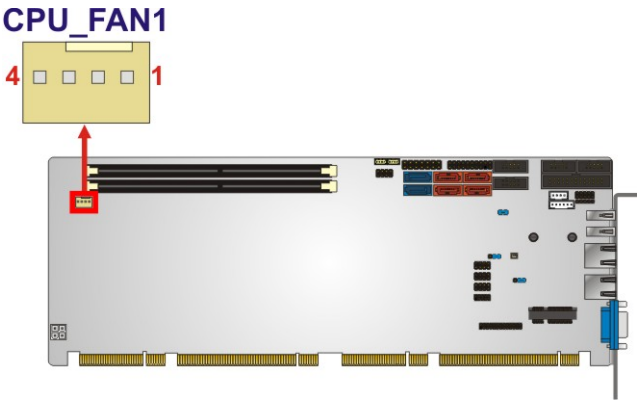


Figure 3-8: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12 V
3	Rotation Signal
4	PWM Control Signal

Table 3-8: CPU Fan Connector Pinouts

3.2.8 Front Panel Connector

CN Label:	**F_PANEL1**
CN Type:	14-pin header
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-9**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

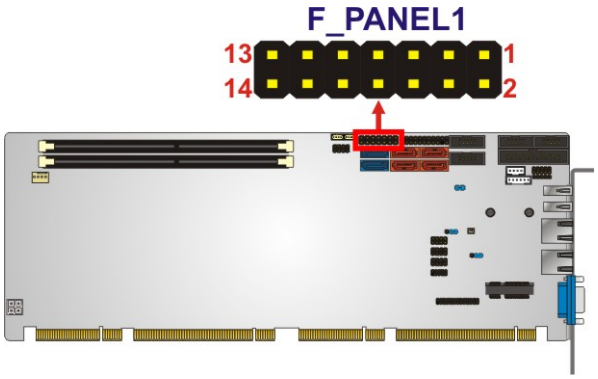


Figure 3-9: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	+5V
	3	N/C		4	N/C
	5	GROUND		6	N/C
Power Button	7	PWR_BTN+		8	Speaker
	9	PWR_BTN-	Reset	10	N/C
HDD LED	11	+5V		12	RESET-
	13	HDD_LED-		14	GROUND

Table 3-9: Front Panel Connector Pinouts

3.2.9 I²C Connector

CN Label: **I2C_1**

CN Type: 4-pin wafer

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

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

The I²C connector is for system debug.

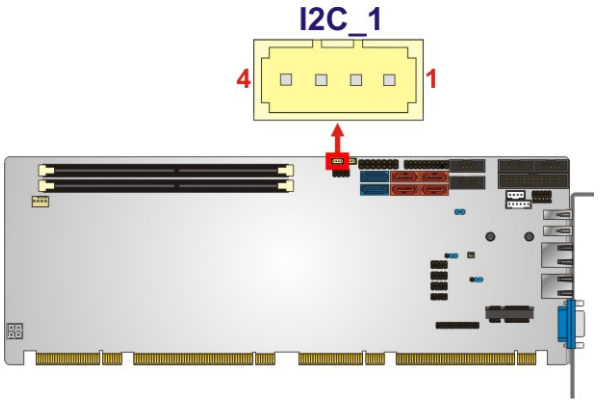


Figure 3-10: I²C Connector Location

Pin	Description
1	GND
2	PCH_GP38_PU
3	PCH_GP39_PU
4	+5VS

Table 3-10: I²C Connector Pinouts

3.2.10 Infrared Interface Connector

CN Label: **IR1**

CN Type: 5-pin header

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

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

The infrared connector attaches to an infrared receiver for use with remote controls.

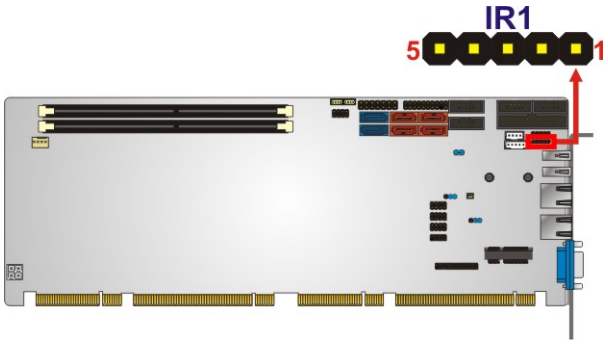


Figure 3-11: Infrared Connector Location

Pin	Description
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 3-11: Infrared Connector Pinouts

3.2.11 Keyboard/Mouse Connector

CN Label: **KB_MS1**

CN Type: 6-pin wafer

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

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

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.

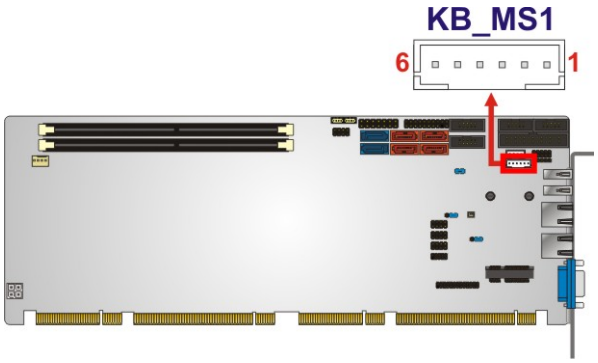


Figure 3-12: Keyboard/Mouse Connector Location

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

Table 3-12: Keyboard/Mouse Connector Pinouts

3.2.12 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header

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

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

The parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

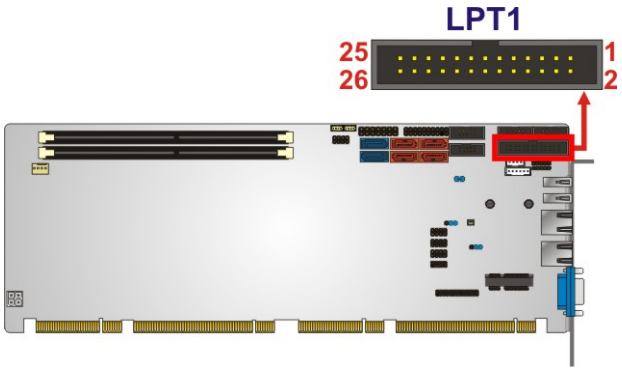


Figure 3-13: Parallel Port Connector Location

Pin	Description	Pin	Description
1	STROBE#	2	DATA0
3	DATA1	4	DATA2
5	DATA3	6	DATA4
7	DATA5	8	DATA6
9	DATA7	10	ACKNOWLEDGE#
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE#
17	PRINTER SELECT LN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

Table 3-13: Parallel Port Connector Pinouts

3.2.13 PCIe Mini Card Slot

CN Label: **CN3**

CN Type: PCIe Mini card slot

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-14**

The PCIe Mini card slot is for installing a PCIe Mini expansion card.

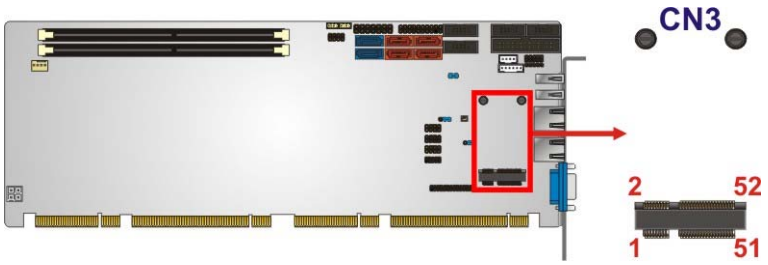


Figure 3-14: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	NC	4	GND
5	NC	6	1.5V
7	CLKREQ#	8	LFRAME#
9	GND	10	LAD3
11	CLK-	12	LAD2
13	CLK+	14	LAD1
15	GND	16	LAD0
17	PCIRST#	18	GND
19	LPC	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	NC	38	USBD+
39	NC	40	GND
41	NC	42	NC
43	NC	44	RF_LINK#
45	NC	46	BLUELED#

Pin	Description	Pin	Description
47	NC	48	1.5V
49	NC	50	GND
51	NC	52	VCC3

Table 3-14: PCIe Mini Card Slot Pinouts

3.2.14 SATA 3Gb/s Drive Connector

CN Label: **SATA3, SATA4, SATA5, SATA6**

CN Type: 7-pin SATA drive connector

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

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

The SATA drive connectors can be connected to SATA drives and support up to 3Gb/s data transfer rate.

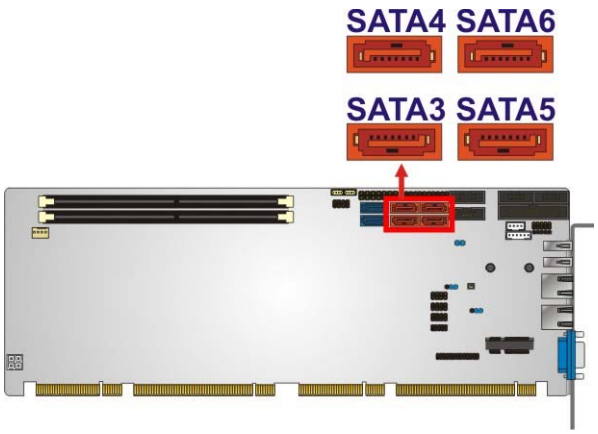


Figure 3-15: SATA 3Gb/s Drive Connector Location

Pin	Description	Pin	Description
1	GND	2	TX+
3	TX-	4	GND
5	RX-	6	RX+
7	GND		

Table 3-15: SATA 3Gb/s Drive Connector Pinouts

3.2.15 SATA 6Gb/s Drive Connector

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA drive connector

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

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

The SATA drive connectors can be connected to SATA drives and support up to 6Gb/s data transfer rate.

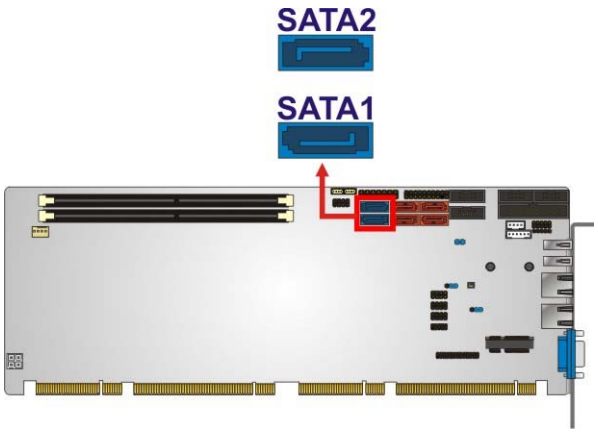


Figure 3-16: SATA 6Gb/s Drive Connector Location

Pin	Description	Pin	Description
1	GND	2	TX+
3	TX-	4	GND
5	RX-	6	RX+
7	GND		

Table 3-16: SATA 6Gb/s Drive Connector Pinouts

3.2.16 Serial Port Connectors, RS-232

CN Label: **COM1, COM2, COM3, COM4**

CN Type: 10-pin box header

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

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

Each of these connectors provides RS-232 connections.

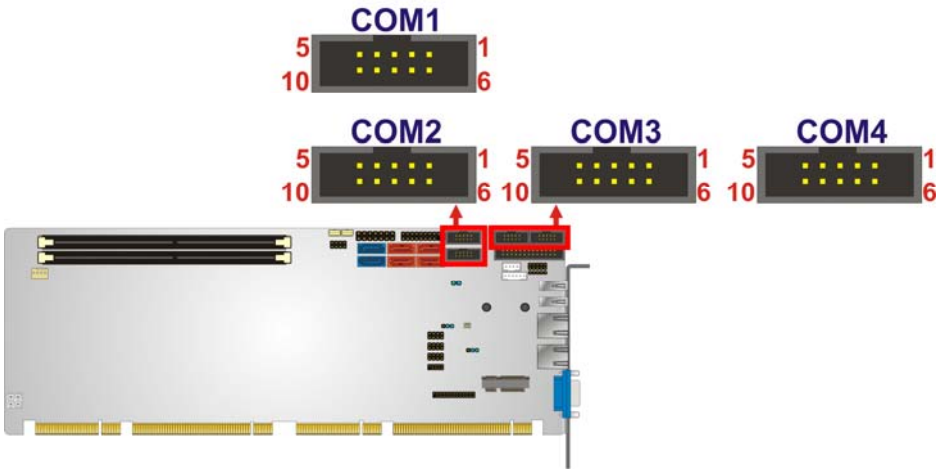


Figure 3-17: Serial Port Connector Location

Pin	Description	Pin	Description
1	Data Carrier Direct (DCD)	2	Receive Data (RXD)
3	Transmit Data (TXD)	4	Data Terminal Ready (DTR)
5	Ground (GND)	6	Data Set Ready (DSR)
7	Request To Send (RTS)	8	Clear To Send (CTS)
9	Ring Indicator (RI)	10	N/C

Table 3-17: Serial Port Connector Pinouts

3.2.17 Serial Port Connector, RS-422/485

CN Label: **COM5**

CN Type: 4-pin wafer

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-18**

This connector provides RS-422 or RS-485 communications.

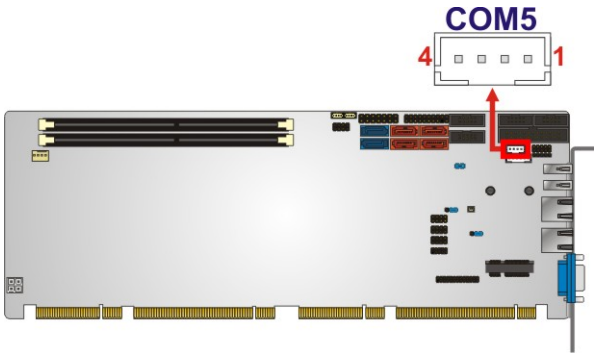


Figure 3-18: RS-422/485 Connector Location

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

Table 3-18: RS-422/485Connector Pinouts

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

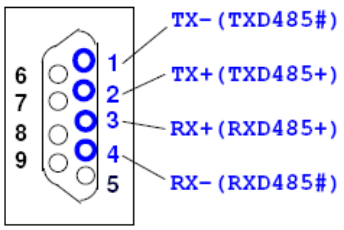
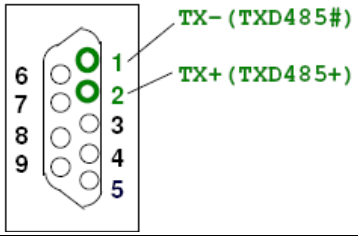
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-19: DB-9 RS-422/485 Pinouts

3.2.18 SMBus Connector

CN Label: **SMBUS_1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-19**

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

The SMBus (System Management Bus) connector provides low-speed system management communications.

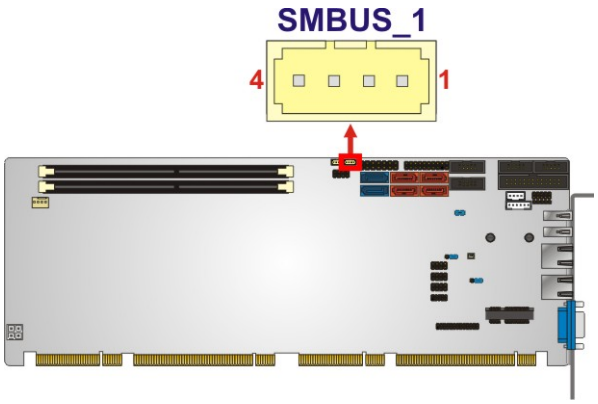


Figure 3-19: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-20: SMBus Connector Pinouts

3.2.19 SPI ROM Connector

CN Label: **JSPI1**

CN Type: 8-pin header

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

CN Pinouts: See **Table 3-21**

The SPI connector is used to flash the BIOS.

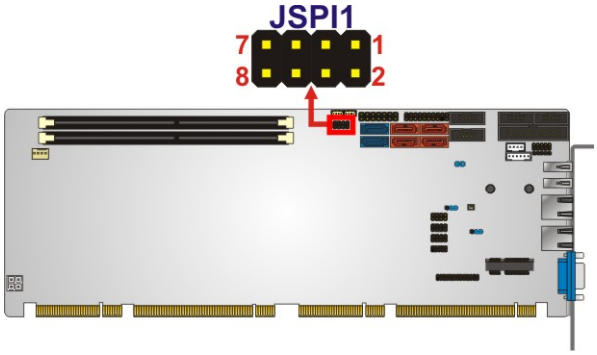


Figure 3-20: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	GND
3	SPI_CS0	4	SPI_CLK
5	SPI_SO0	6	SPI_SI
7	NC	8	NC

Table 3-21: SPI Connector Pinouts

3.2.20 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

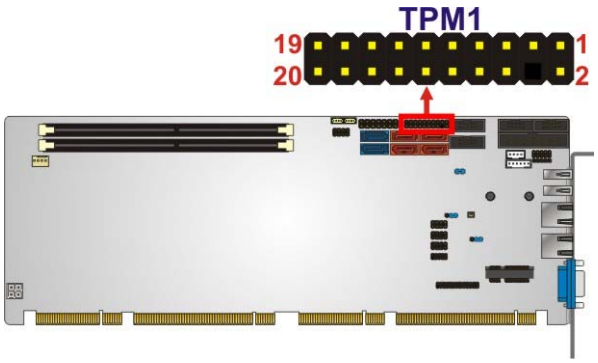


Figure 3-21: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CLK	2	GND
3	ERAME#	4	NC
5	RESRT#	6	+5V
7	AD3	8	AD2
9	+3V	10	AD1
11	AD0	12	GND
13	SMB_CLK	14	SMB_DATA
15	SB3V	16	SERIRQ
17	GND	18	CLKRUN#
19	PM_SUS_STAT#	20	DRQ#

Table 3-22: TPM Connector Pinouts

3.2.21 USB Connectors

CN Label: **USB1, USB2, USB3**

CN Type: 8-pin header

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

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

The USB connectors connect to USB devices. Each pin header provides two USB ports.

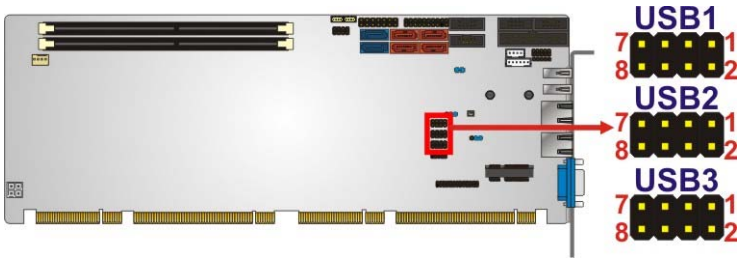


Figure 3-22: USB Connector Pinout Locations

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

Table 3-23: USB Port 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:

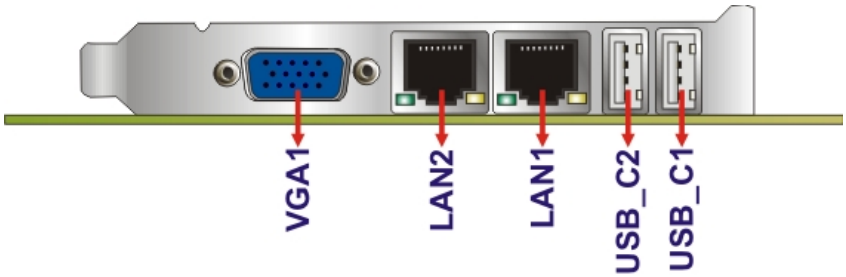


Figure 3-23: External Peripheral Interface Connector

3.3.1 Ethernet Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

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

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

The PCIE-Q670 Series is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

Pin	Description	Pin	Description
1	MDIA3-	5	MDIA2+
2	MDIA3+	6	MDIA1+
3	MDIA1-	7	MDIA0-
4	MDIA2-	8	MDIA0+

Table 3-24: LAN Pinouts

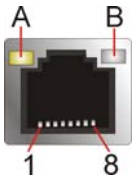


Figure 3-24: Ethernet Connector

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10 Mb/s green: 100 Mb/s orange: 1000 Mb/s

Table 3-25: Connector LEDs

3.3.2 USB Connectors

CN Label: **USB_C1 and USB_C2**

CN Type: USB port

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

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

The PCIE-Q670 Series has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VCC
2	DATA-

Pin	Description
3	DATA+
4	GROUND

Table 3-26: USB Port Pinouts

3.3.3 VGA Connector

CN Label: **VGA1**

CN Type: 15-pin Female

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

CN Pinouts: See **Figure 3-25** and **Table 3-27**

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

Pin	Description	Pin	Description
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VGAVCC	10	GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-27: VGA Connector Pinouts

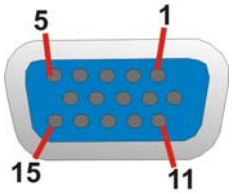


Figure 3-25: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the PCIE-Q670 Series may result in permanent damage to the PCIE-Q670 Series and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PCIE-Q670 Series. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PCIE-Q670 Series 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 PCIE-Q670 Series, place it on an antic-static pad. This reduces the possibility of ESD damaging the PCIE-Q670 Series.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

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:

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 PCIE-Q670 Series 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 PCIE-Q670 Series 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 PCIE-Q670 Series off:
  - When working with the PCIE-Q670 Series, 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 PCIE-Q670 Series **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 LGA1155 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**.

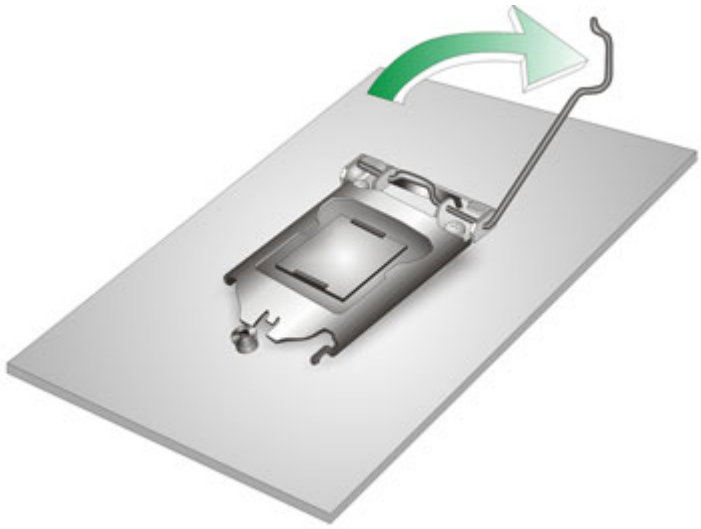


Figure 4-1: Disengage the CPU Socket Load Lever

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**.

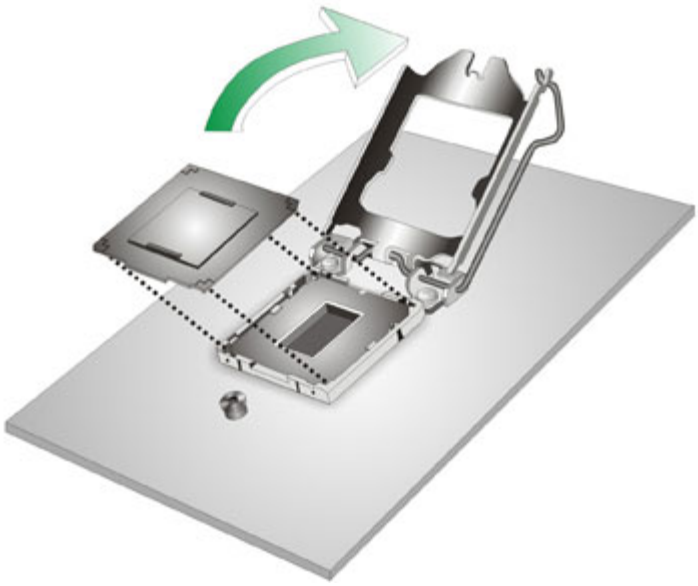


Figure 4-2: Remove Protective Cover

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.

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**.

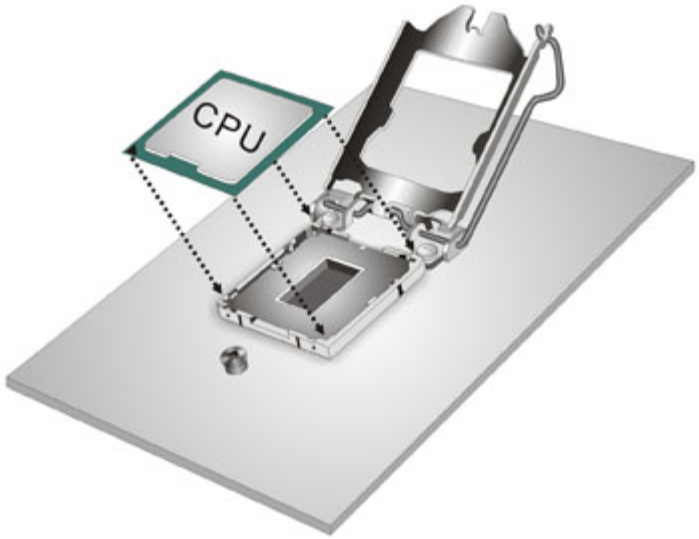


Figure 4-3: Insert the Socket LGA1155 CPU

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 LGA1155

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 LGA1155 Cooling Kit Installation

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 4-5.**

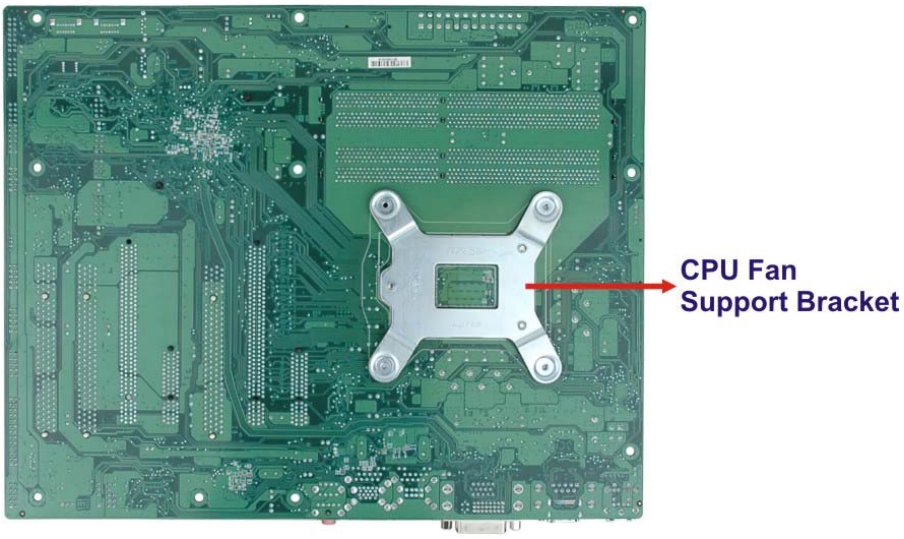


Figure 4-5: Cooling Kit Support Bracket

Step 2: **Place the cooling kit onto the socket LGA1155 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 PCIE-Q670 Series. 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 4-6**.

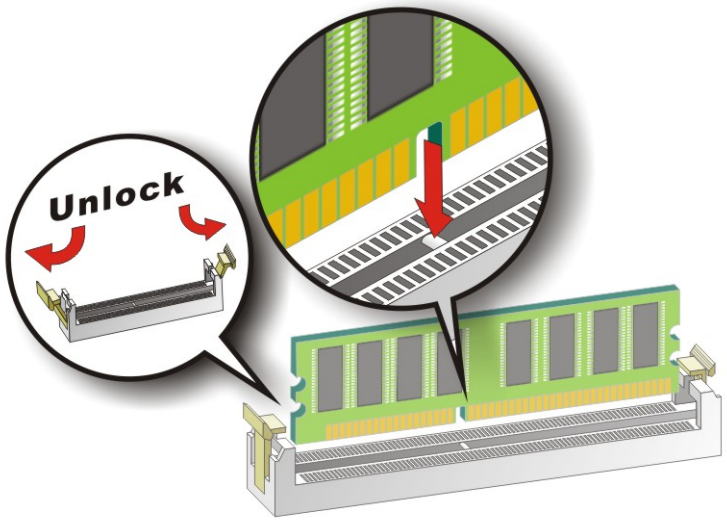


Figure 4-6: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-6**.

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 4-6**.

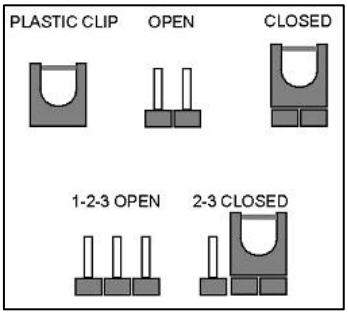
Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-6**.

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

4.3 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



The hardware jumpers must be set before installation. Jumpers are shown in **Table 4-1**.

Description	Label	Type
AT/ATX power select	JATX_AT1	2-pin header
Clear CMOS jumper	J_CMOS1	3-pin header
Wake-on LAN	WOL_SEL1	3-pin header

Table 4-1: Jumpers

4.3.1 AT/ATX Power Select Jumper

Jumper Label: **JATX_AT1**

Jumper Type: 2-pin header

Jumper Settings: See **Table 4-2**

Jumper Location: See **Figure 4-7**

The AT/ATX Power Select jumper specifies the systems power mode as AT or ATX.

Setting	Description
Closed	ATX power (Default)
Open	AT power

Table 4-2: AT/ATX Power Mode Jumper Settings

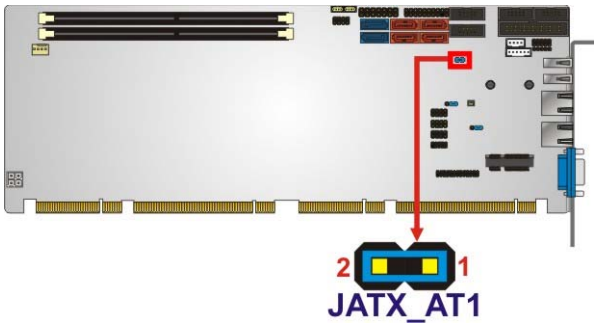


Figure 4-7: AT/ATX Power Mode Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-3**

Jumper Location: See **Figure 4-8**

To reset the BIOS, move the jumper to the "Clear BIOS" position for 3 seconds or more, and then move back to the default position.

Setting	Description
Short 1-2	Normal
Short 2-3	Clear BIOS

Table 4-3: Clear BIOS Jumper Settings

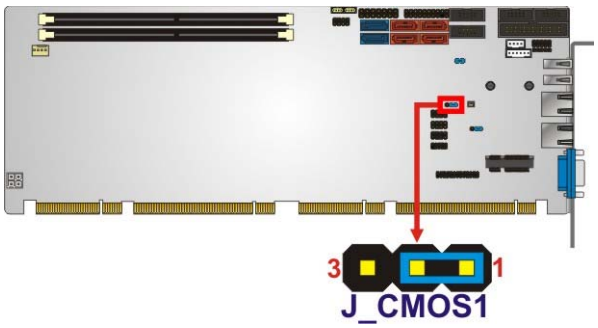


Figure 4-8: Clear BIOS Jumper Location

4.3.3 Wake-on LAN Jumper

CN Label: **WOL_SEL1**

CN Type: 3-pin header

CN Location: See **Figure 4-9**

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

The Wake-on LAN connector allows the user to enable or disable the Wake-on LAN (WOL) function.

PIN NO.	DESCRIPTION
Short 1-2	Enable Wake-on LAN (Default)
Short 2-3	Disable Wake-on LAN

Table 4-4: Wake-on LAN Connector Pinouts

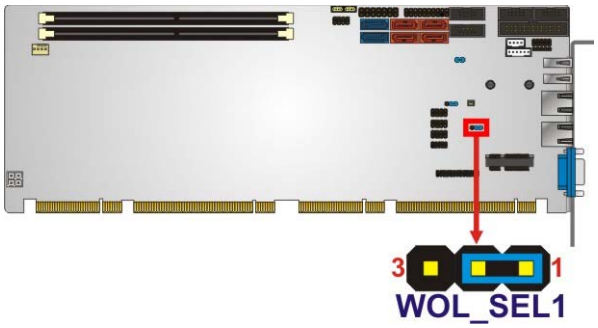


Figure 4-9: Wake-on LAN Connector Pinout Locations

4.4 Chassis Installation

4.4.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the PCIE-Q670 Series must have air vents to allow cool air to move into the system and hot air to move out.

The PCIE-Q670 Series must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

4.4.2 CPU Card Installation

To install the CPU card onto the backplane, carefully align the CPU card edge connector with the CPU card socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

4.5 Internal Peripheral Device Connections

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

4.5.1 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connectors**. Insert one connector into each serial port box headers (**Figure 4-10**). A key on the front of the cable connectors ensures the connector can only be installed in one direction.

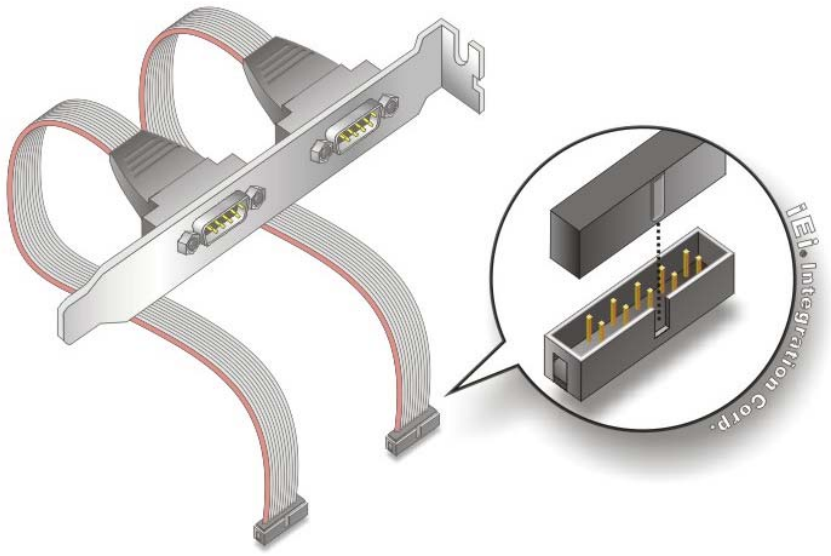


Figure 4-10: Dual RS-232 Cable Installation

Step 3: **Secure the bracket**. The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis.

4.5.2 DVI-D/USB Kit Installation (DVI Model Only)

The DVI-D/USB kit, consisting of one DVI-D and four USB ports, connects to the DVI-D and USB connectors on the PCIE-Q670 Series. To install the DVI-D/USB kit, please follow the steps below.

Step 1: **Connect the cables to the DVI-D/USB kit**. Connect the included cables to the DVI-D/USB kit.

Step 2: **Connect the cables to the board**. Connect the other ends of the included cables to the board.

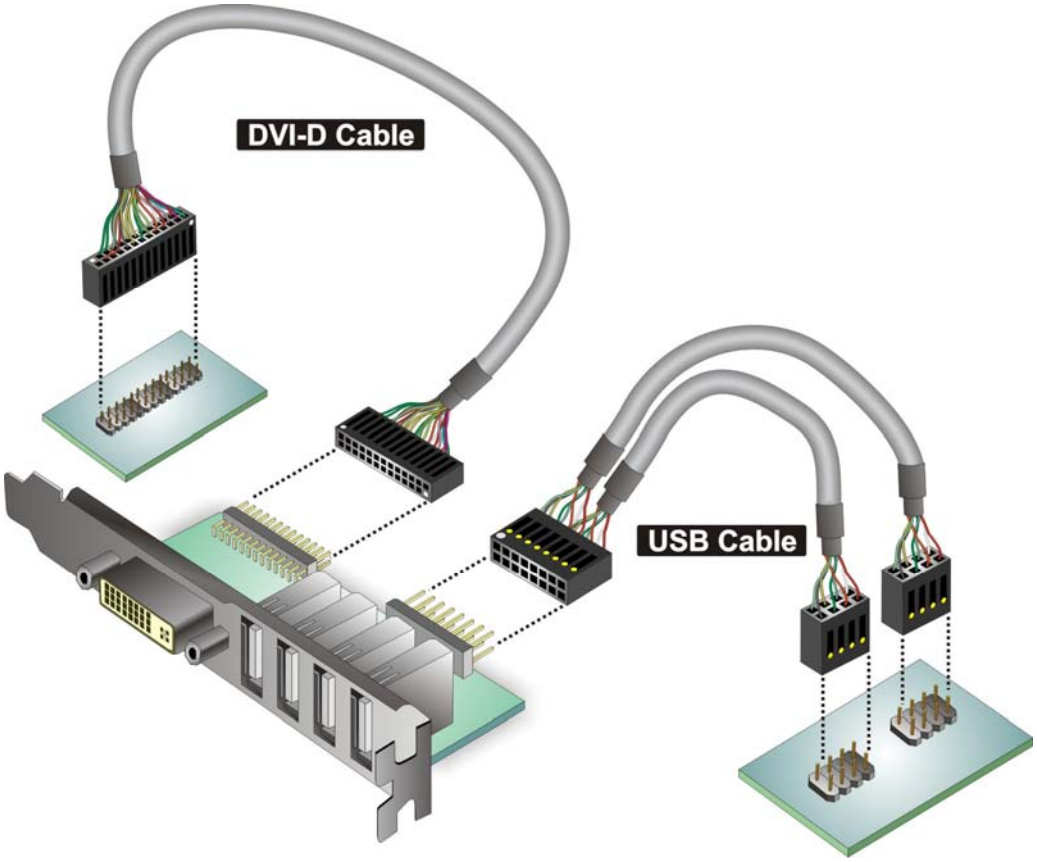


Figure 4-11: DVI-D/USB Kit Installation

Step 3: **Mount the DVI-D/USB kit onto the chassis**. Once the DVI-D/USB kit is connected to the board, secure the DVI-D/USB kit bracket to the system chassis.

4.5.3 SATA Drive Connection

The PCIE-Q670 Series is shipped with four 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 until it clips into place. See **Figure 4-12**.

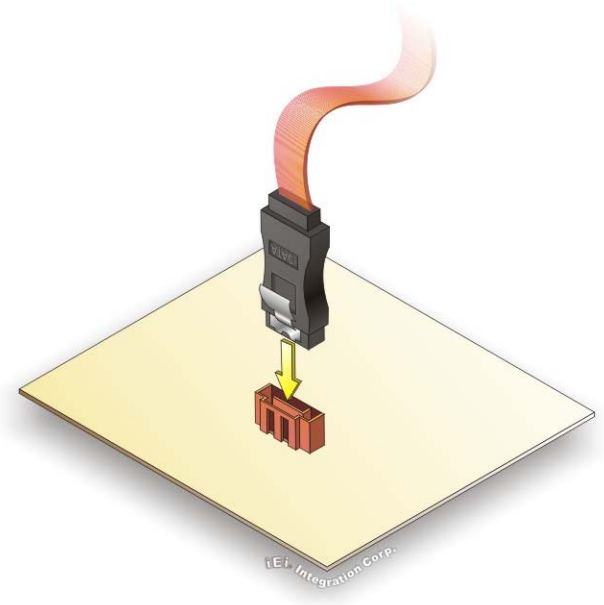


Figure 4-12: SATA Drive Cable Connection

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**.

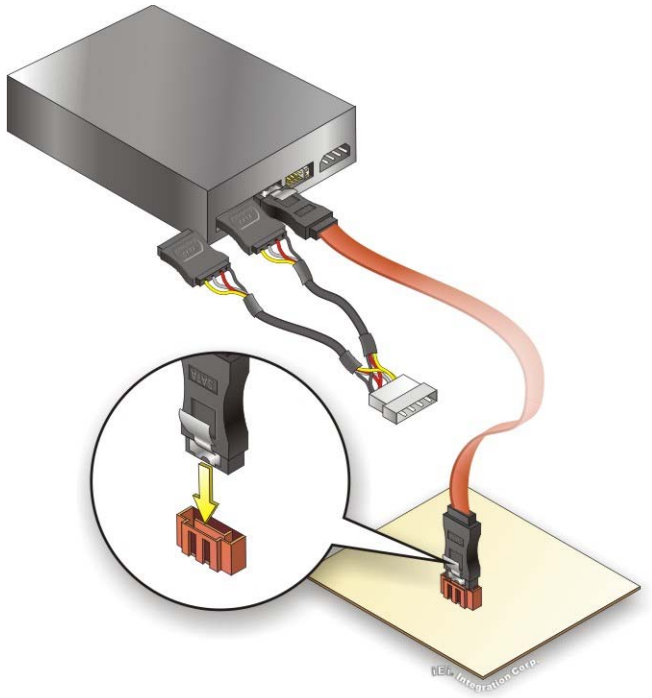


Figure 4-13: SATA Power Drive Connection

4.5.4 USB Cable (Dual Port) with Slot Bracket

The PCIE-Q670 Series is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the PCIE-Q670 Series USB connector.

Step 3: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the PCIE-Q670 Series, connect the cable connectors to the on-board connectors. See **Figure 4-14**.

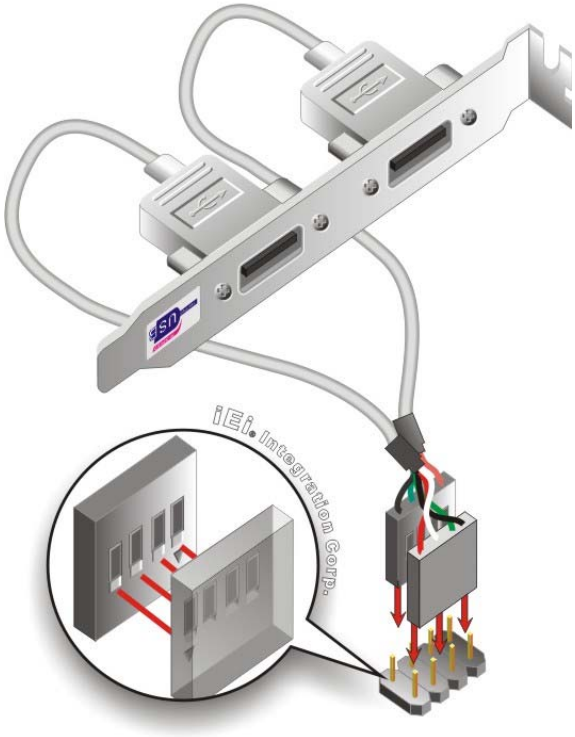


Figure 4-14: Dual USB Cable Connection

Step 4: **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

4.5.5 PCIe Mini Card Installation

To install the PCIe Mini card, please refer to the diagram and instructions below.

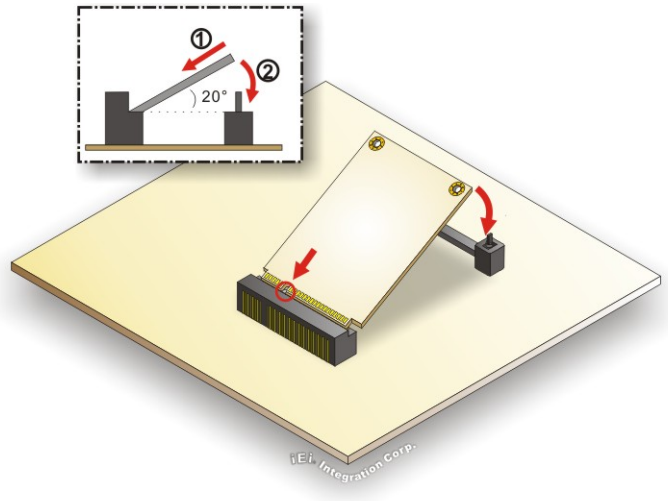


Figure 4-15: PCIe Mini Card Installation

Step 1: **Insert into the socket at and angle**. Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20º.

Step 2: **Push down until the card clips into place**. Push the other end of the card down until it clips into place on the plastic connector.

4.6 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the PCIE-Q670 Series.

4.6.1 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 RJ-45 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 PCIE-Q670 Series. See **Figure 4-16**.

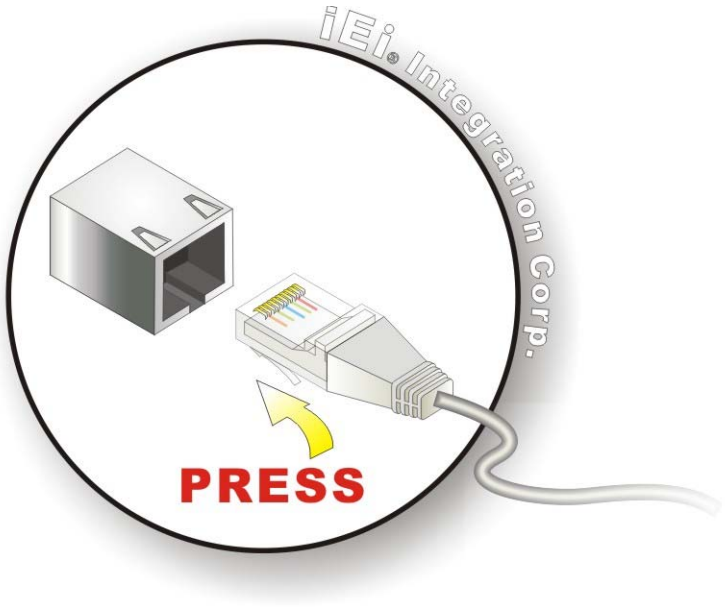


Figure 4-16: LAN Connection

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.

4.6.2 USB Device Connection (Single Connector)

There are two external USB 2.0 connectors. Both connectors are perpendicular to the PCIE-Q670 Series. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

Step 1: **Located the USB connectors**. The locations of the USB connectors are shown in **Chapter 3**

Step 2: **Align the connectors.** Align the USB device connector with one of the connectors on the PCIE-Q670 Series. See **Figure 4-17**.

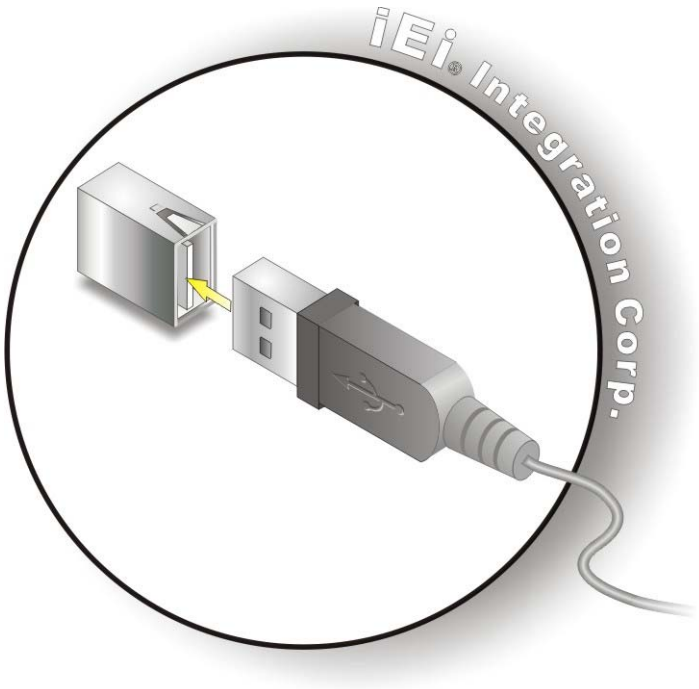


Figure 4-17: USB Device Connection

Step 3: **Insert the device connector.** Once aligned, gently insert the USB device connector into the on-board connector.

4.6.3 VGA Monitor Connection

The PCIE-Q670 Series 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 PCIE-Q670 Series, 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 PCIE-Q670 Series. See **Figure 4-18**.

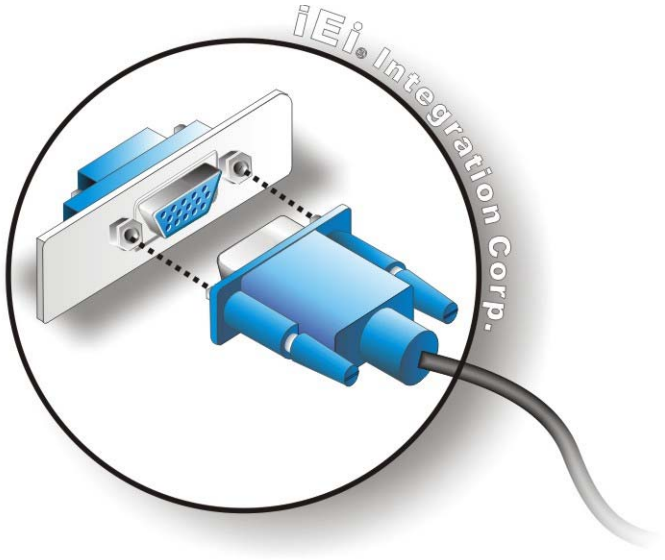


Figure 4-18: VGA Connector

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.

4.7 Intel® AMT Setup Procedure

The PCIE-Q670 Series is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure the **CHA_DIMM1** socket is installed with one DDR3 DIMM.

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2**.

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 6.7**.

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).

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.

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
Page Up key	Increase the numeric value or make changes
Page Dn key	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	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Previous values
F3	Load optimized defaults
F4	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 jumper described in Chapter **4**.

5.1.5 BIOS Menu Bar

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

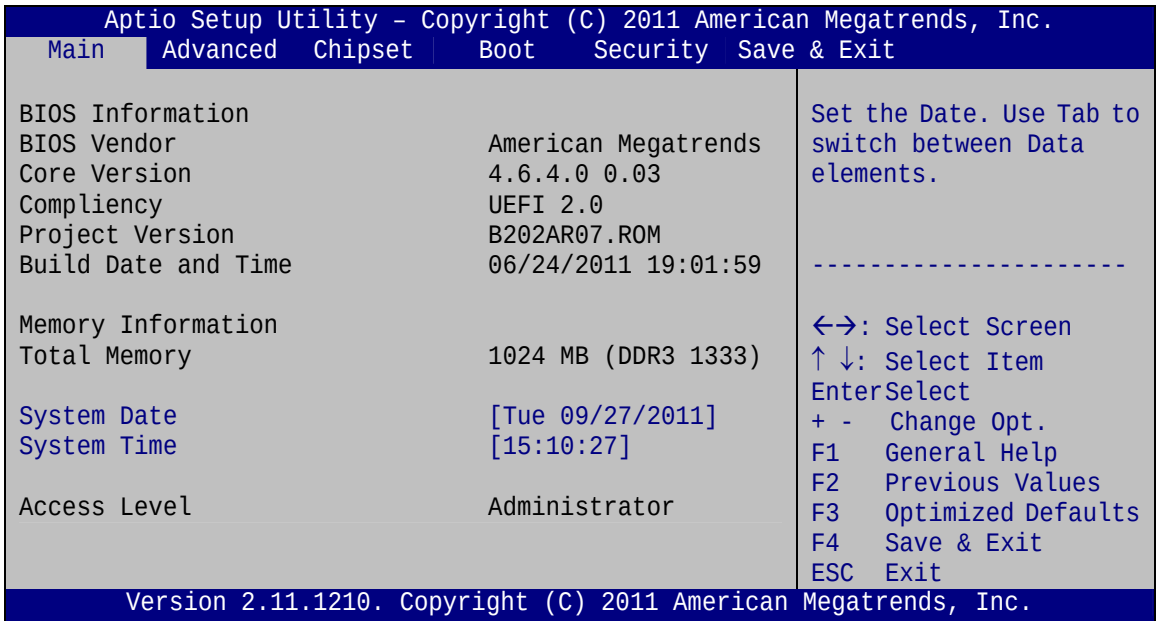
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.

- 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.



BIOS Menu 1: Main

➔ System Overview

The **BIOS Information** lists a brief summary of the BIOS. The fields in **BIOS Information** cannot be changed. The items shown in the system overview include:

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Project Version:** the board version
- **Build Date and Time:** Date and time the current BIOS version was made

➔ **Memory Information**

The **Memory Information** lists a brief summary of the on-board memory. The fields in **Memory Information** cannot be changed.

- Total Memory: Displays the auto-detected system memory size and type.

The System Overview field also 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]**

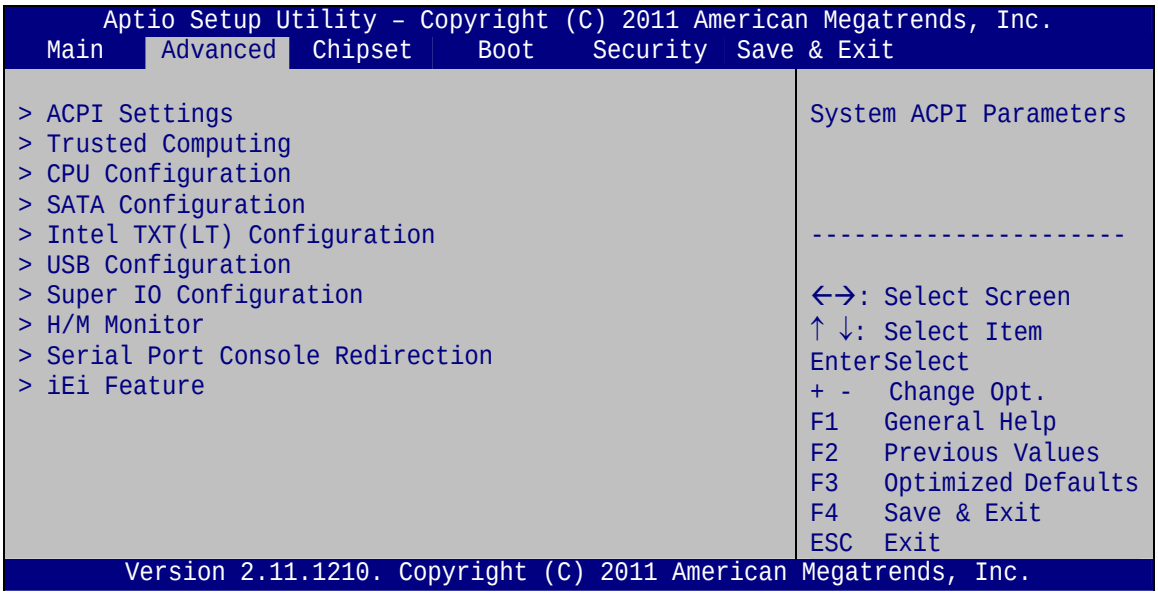
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING!

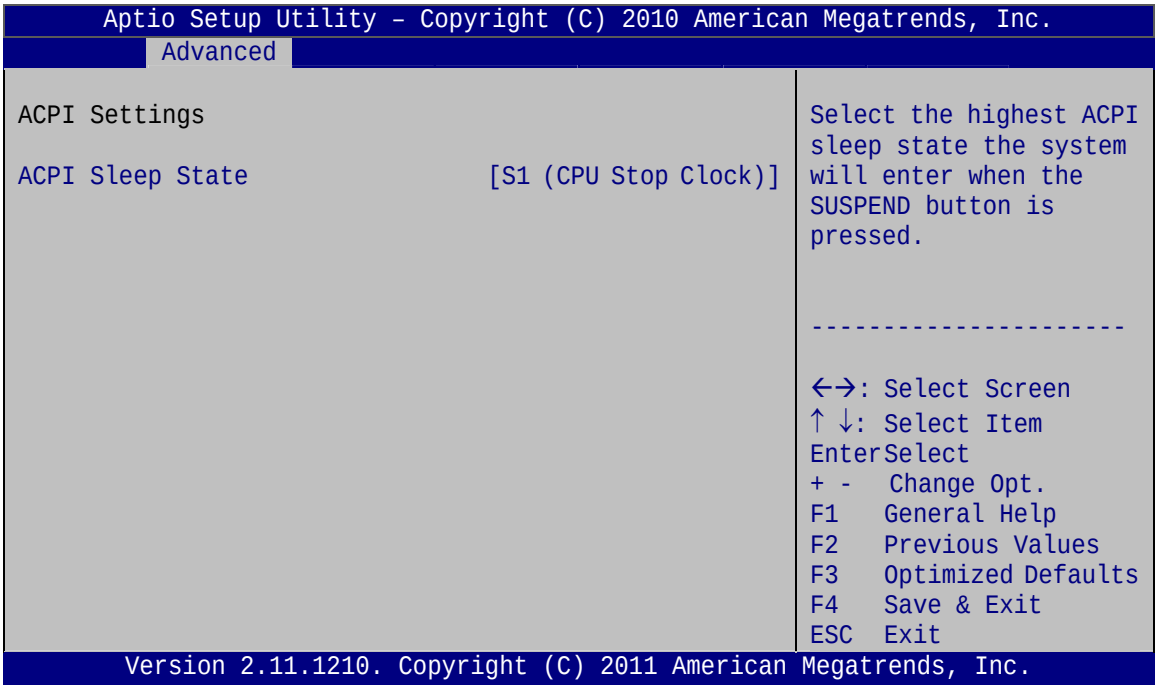
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



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.



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.

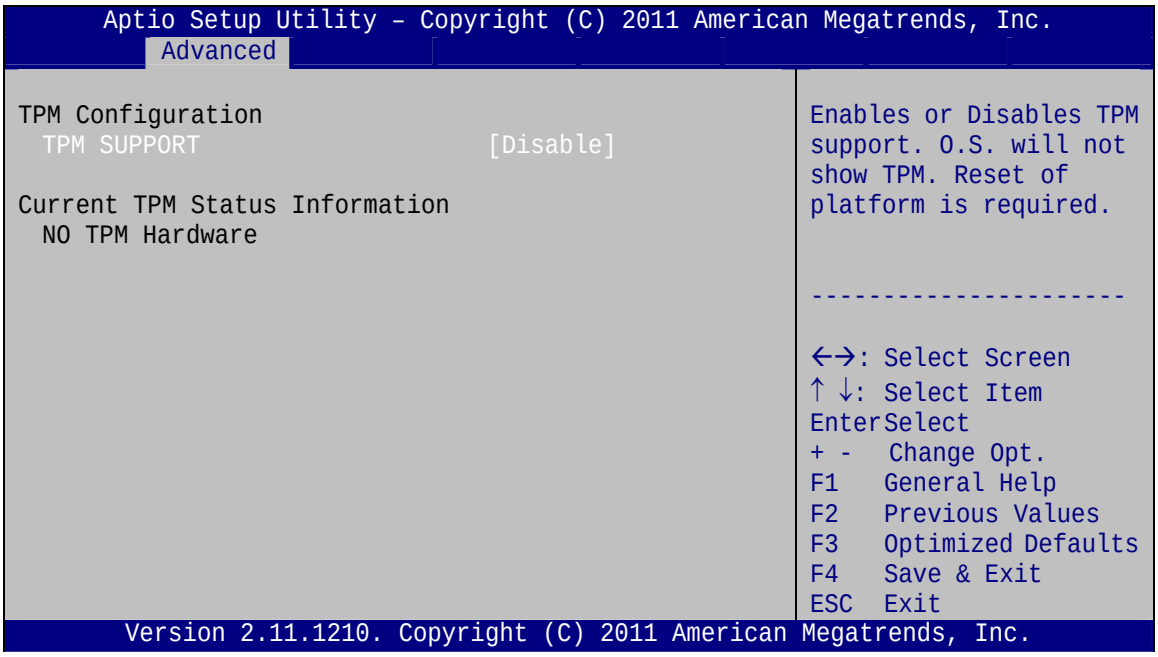
➔ **Suspend Disabled**

➔ **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 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 4**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 4: TPM Configuration

➔ **TPM Support [Disable]**

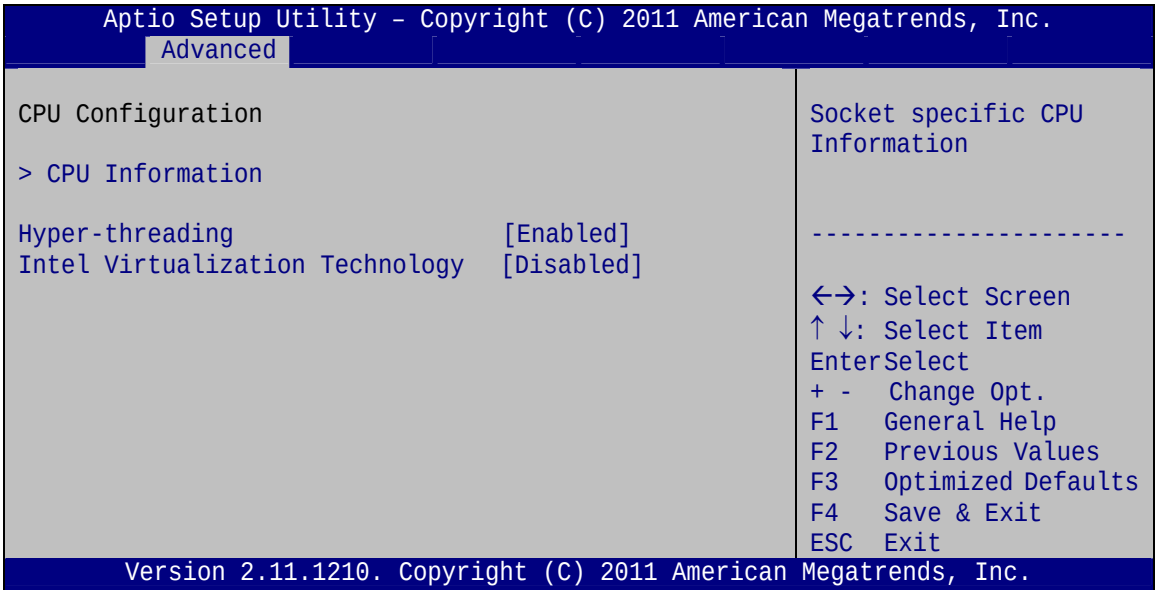
Use the **TPM Support** option to configure support for the TPM.

➔ **Disable** **DEFAULT** TPM support is disabled.

➔ **Enable** TPM support is enabled.

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to enter the **CPU Information** submenu or enable Intel Virtualization Technology.



BIOS Menu 5: CPU Configuration

➔ **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.

➔ **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 Technology.	Virtualization
➔ **Enabled**		Enables Intel Virtualization Technology.	

5.3.3.1 CPU Information

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

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

CPU Information                                  |
                                                 |
Intel(R) Core(TM) i3-2120 CPU 0 @ 3.30GHz        |
CPU Signature                   206a7            |  ----------------------
Microcode Patch                 17               |
Max CPU Speed                   3300 MHz         |  ←→: Select Screen
Min CPU Speed                   1600 MHz         |  ↑ ↓: Select Item
Processor Cores                 2                |  Enter Select
Intel HT Technology             Supported        |  + -   Change Opt.
Intel VT-x Technology           Supported        |  F1    General Help
Intel SMX Technology            Not Supported    |  F2    Previous Values
                                                 |  F3    Optimized Defaults
L1 Data Cache                   32 kB x 2        |  F4    Save & Exit
L1 Code Cache                   32 kB x 2        |  ESC   Exit
L2 Cache                        256 kB x 2       |
L3 Cache                        3072 kB          |
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 6: CPU Configuration

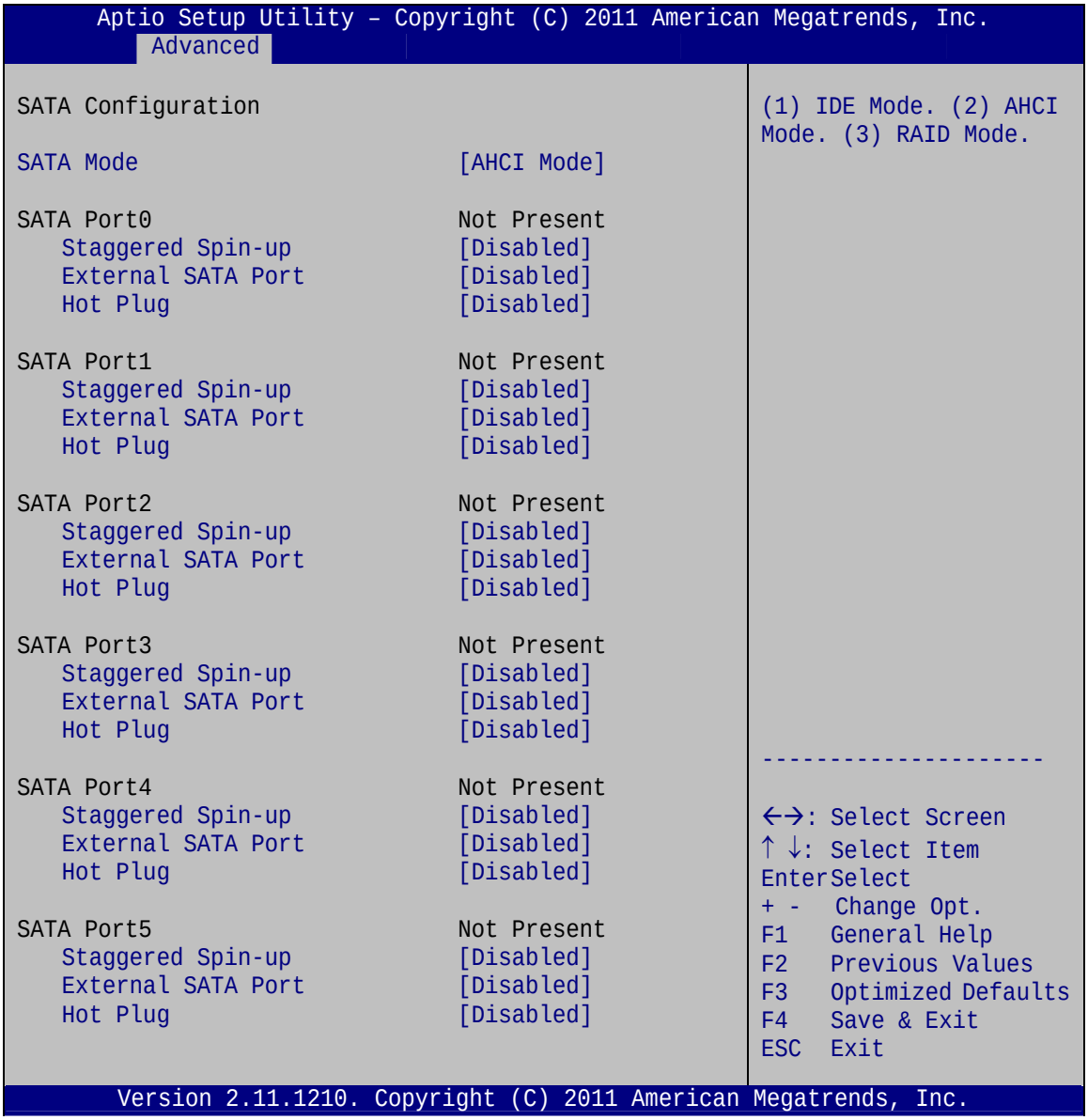
The CPU Configuration menu (**BIOS Menu 6**) lists the following CPU details:

- 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.

- 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.
- 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.

5.3.4 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.



BIOS Menu 7: SATA Configuration

➔ **SATA Mode [AHCI Mode]**

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

- ➔ **Disabled** Disables SATA devices.
- ➔ **IDE Mode** Configures SATA devices as normal IDE device.
- ➔ **AHCI Mode** **DEFAULT** Configures SATA devices as AHCI device.
- ➔ **RAID Mode** Configures SATA devices as RAID device.

➔ **Staggered Spin-up [Disabled]**

Staggered Spin-up allows the system to power up one drive at a time to prevent excess power consumption. Use the **Staggered Spin-up** option to enable or disable the staggered spin-up function.

- ➔ **Disabled** **DEFAULT** Disables staggered spin-up.
- ➔ **Enabled** Enables staggered spin-up.

➔ **External SATA Port [Disabled]**

Use the **External SATA Port** option to enable or disable the external SATA port.

- ➔ **Disabled** **DEFAULT** Disables the external SATA port.
- ➔ **Enabled** Enables the external SATA port.

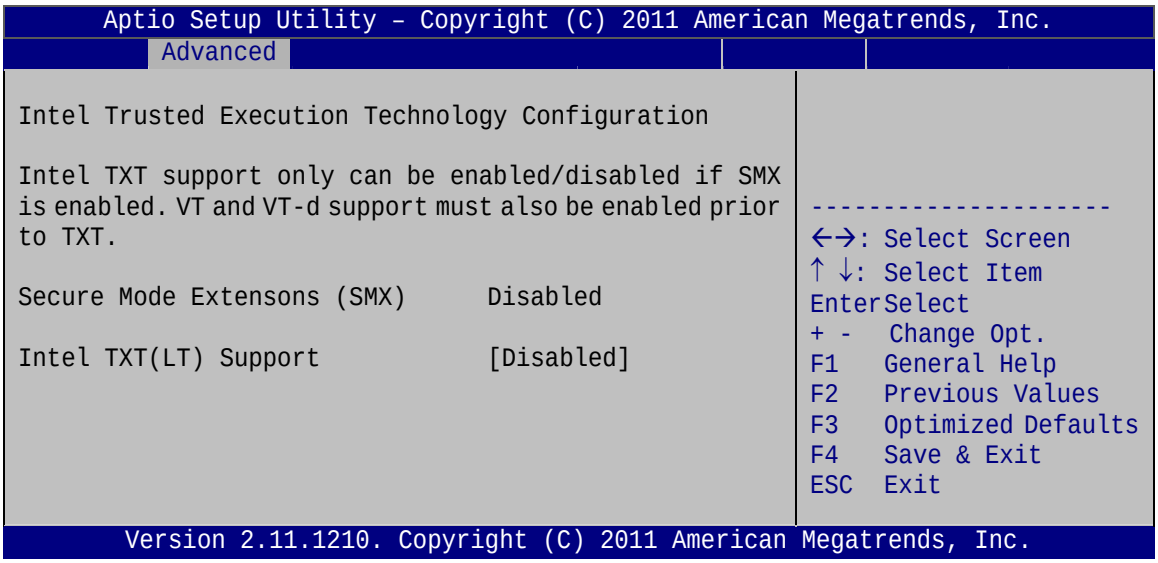
➔ **Hot Plug [Disabled]**

Use the **Hot Plug** option to enable or disable the hot plug function.

- ➔ **Disabled** **DEFAULT** Disables the hot plug function.
- ➔ **Enabled** Enables the hot plug function.

5.3.5 Intel TXT(LT) Configuration

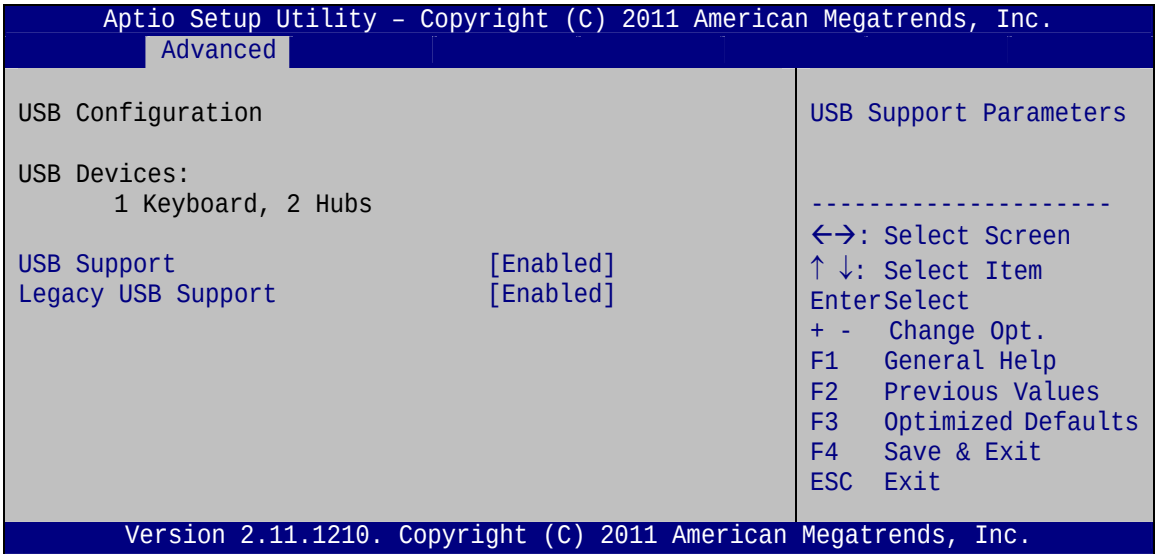
Use the **Intel TXT(LT) Configuration** menu to configure Intel Trusted Execution Technology support.



BIOS Menu 8: Intel TXT(LT) Configuration

5.3.6 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 9**) to read USB configuration information and configure the USB settings.



BIOS Menu 9: USB Configuration

➔ **USB Devices**

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

➔ **USB Support [Enabled]**

Use the **USB Support** option to enable or disable USB support on the system.

➔ **Disabled**		USB support disabled
➔ **Enabled**	**DEFAULT**	USB support enabled

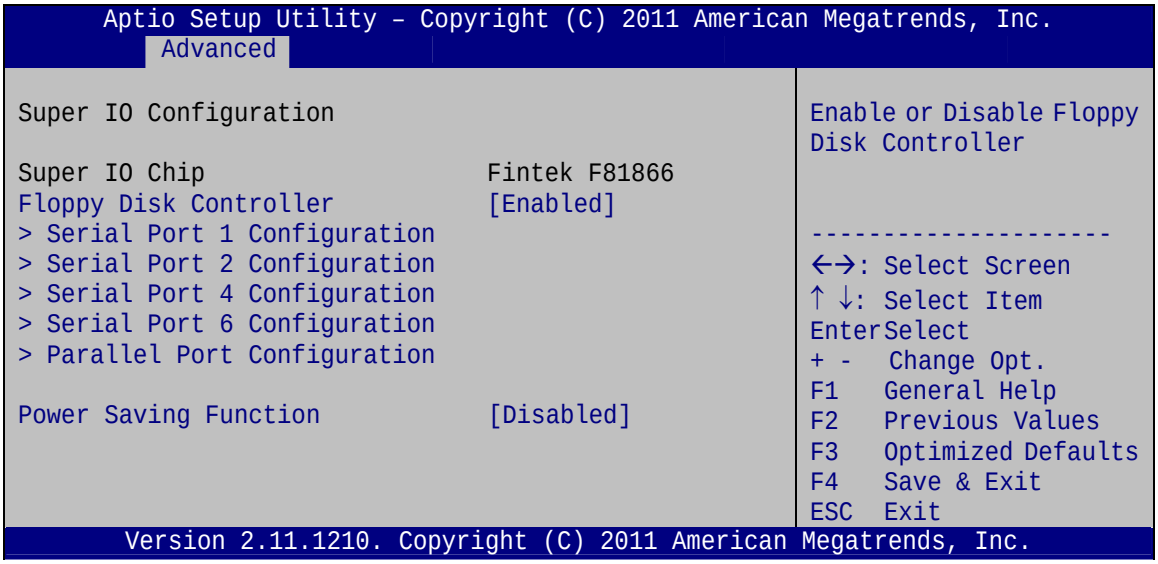
➔ **Legacy USB Support [Enabled]**

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

5.3.7 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 10**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 10: Super IO Configuration

➔ **Floppy Disk Controller [Enabled]**

Use the **Floppy Disk Controller** option to enable or disable the floppy disk controller.

➔ **Disabled** Floppy disk controller disabled

➔ **Enabled** **DEFAULT** Floppy disk controller enabled

➔ **Power Saving Function [Disabled]**

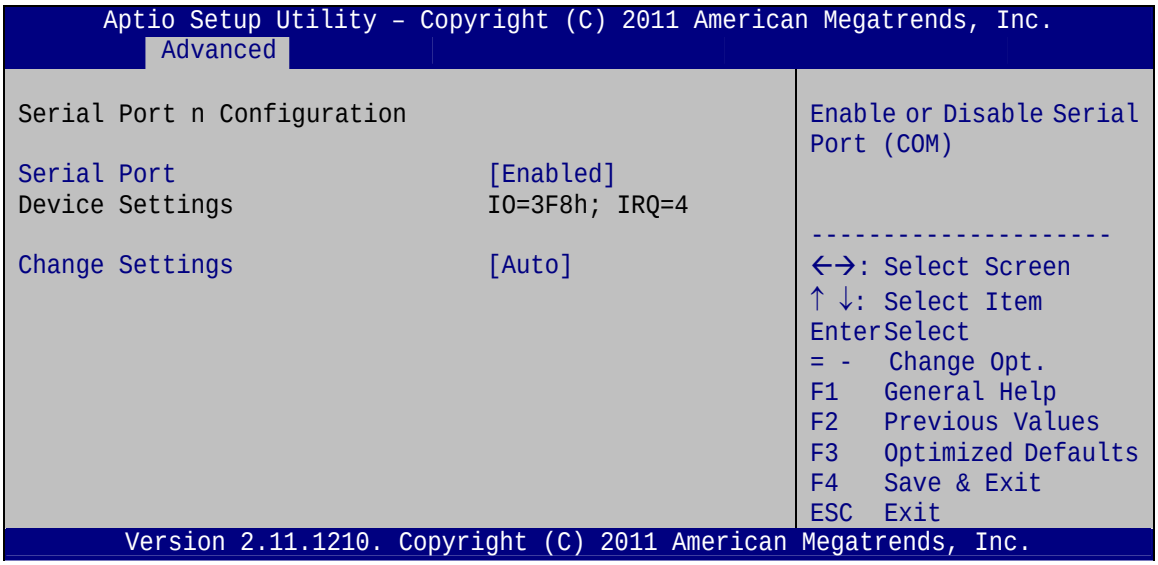
Use the **Power Saving Function** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

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

➔ **Enabled** Power Saving Function support enabled

5.3.7.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 11**) to configure the serial port n.



BIOS Menu 11: Serial Port n Configuration Menu

5.3.7.1.1 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** **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=3F8h; IRQ=4** — Serial Port I/O port address is 3F8h and the interrupt address is IRQ4

➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
➔ **IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
➔ **IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4
➔ **IO=2C8h; IRQ=3, 4**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

5.3.7.1.2 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; IRQ=3**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
➔ **IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
➔ **IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4

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

5.3.7.1.3 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; IRQ=10**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
➔ **IO=3E8h; IRQ=10, 11**		Serial Port I/O port address is 3E8h 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=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

5.3.7.1.4 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

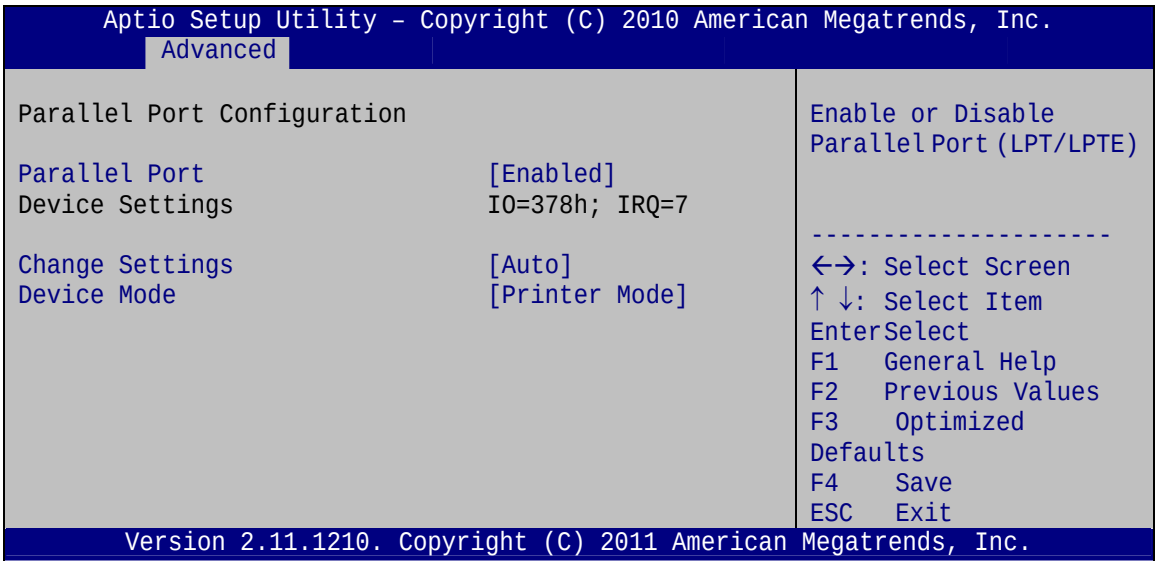
➔ **Change Settings [Auto]**

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; 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

5.3.7.2 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 11**) to configure the serial port n.



BIOS Menu 12: Parallel Port Configuration Menu

➔ **Parallel Port [Enabled]**

Use the **Parallel Port** option to enable or disable the parallel port.

- ➔ **Disabled** — Disable the parallel port
- ➔ **Enabled** **DEFAULT** — Enable the parallel port

➔ **Change Settings [Auto]**

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

- ➔ **Auto** **DEFAULT** — The parallel port IO port address and interrupt address are automatically detected.
- ➔ **IO=378h; IRQ=7** — Parallel Port I/O port address is 378h and the interrupt address is IRQ7
- ➔ **IO=278h; IRQ=7** — Parallel Port I/O port address is 278h and the interrupt address is IRQ7

➔ **IO=3BCh; IRQ=7** Parallel Port I/O port address is 3BCh and the interrupt address is IRQ7

➔ **Device Mode [Printer Mode]**

Use the **Device Mode** option to select the mode the parallel port operates in. Configuration options are listed below.

- Printer Mode **Default**
- SPP Mode
- EPP-1.9 and SPP Mode
- EPP-1.7 and SPP Mode
- ECP Mode
- ECP and EPP 1.9 Mode
- ECP and EPP 1.7 Mode

5.3.8 H/W Monitor

The 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) 2011 American Megatrends, Inc.
        Advanced
PC Health Status                                  Smart FAN Configuration

CPU Temperature                 :+46 C
SYS Temperature                 :+34 C
CPU FAN Speed                   :3957 RPM
VCC3V                           :+3.360 V
V_core                          :+1.032 V
+1.05V                          :+1.064 V
VDDR                            :+1.616 V
VSB3V                           :+3.424 V
VBAT                            :+3.200 V
5VSB                            :+4.968 V

> FAN 1 Configuration                             ---------------------
                                                  ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  EnterSelect
                                                  + -   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 13: H/W Monitor

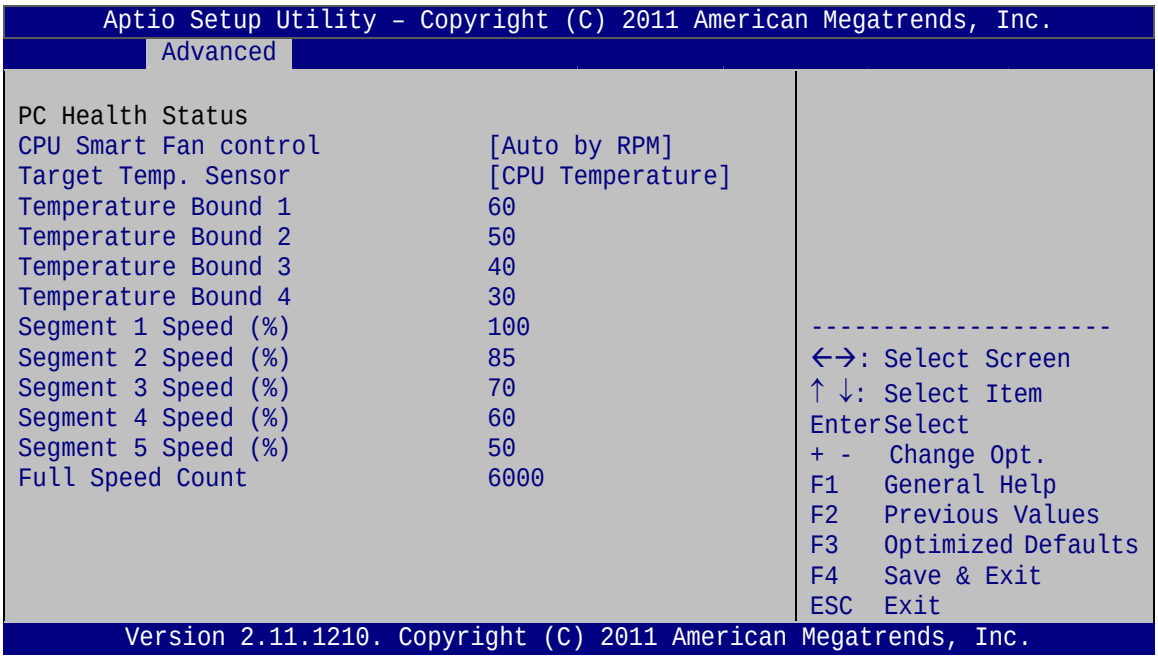
➔ **PC Health Status**

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
- Voltages:
  - VCC3V
  - Vcore
  - Vcc
  - +1.05V
  - VDDR
  - VSB3V
  - VBAT
  - 5VSB

5.3.8.1 FAN 1 Configuration

Use the **FAN 1 Configuration submenu** (**BIOS Menu 14**) to configure fan 1 temperature and speed settings.



BIOS Menu 14: FAN 1 Configuration

➔ **CPU Smart Fan control [Auto by RPM]**

Use the **CPU Smart Fan control** option to configure the CPU Smart Fan.

➔ **Auto by RPM**	**DEFAULT**	The fan adjusts its speed using Auto by RPM settings
➔ **Auto by Duty-Cycle**		The fan adjusts its speed using Auto by Duty-Cycle settings
➔ **Manual by RPM**		The fan spins at the speed set in Manual by RPM settings
➔ **Manual by Duty-Cycle**		The fan spins at the speed set in Manual by Duty Cycle settings

➔ **Target Temp. Sensor [CPU Temperature]**

Use the **Target Temp. Sensor** option to set the target CPU temperature.

➔ **CPU Temperature**	**DEFAULT**	Sets the target temperature sensor to the CPU temperature.

➔ **SYS Temperature** — Sets the target temperature sensor to the System Temperature setting.

➔ **Temperature Bound n**

Use the + or – key to change the fan **Temperature Bound n** value. Enter a decimal number between 0 and 127.

➔ **Segment n Speed (%)**

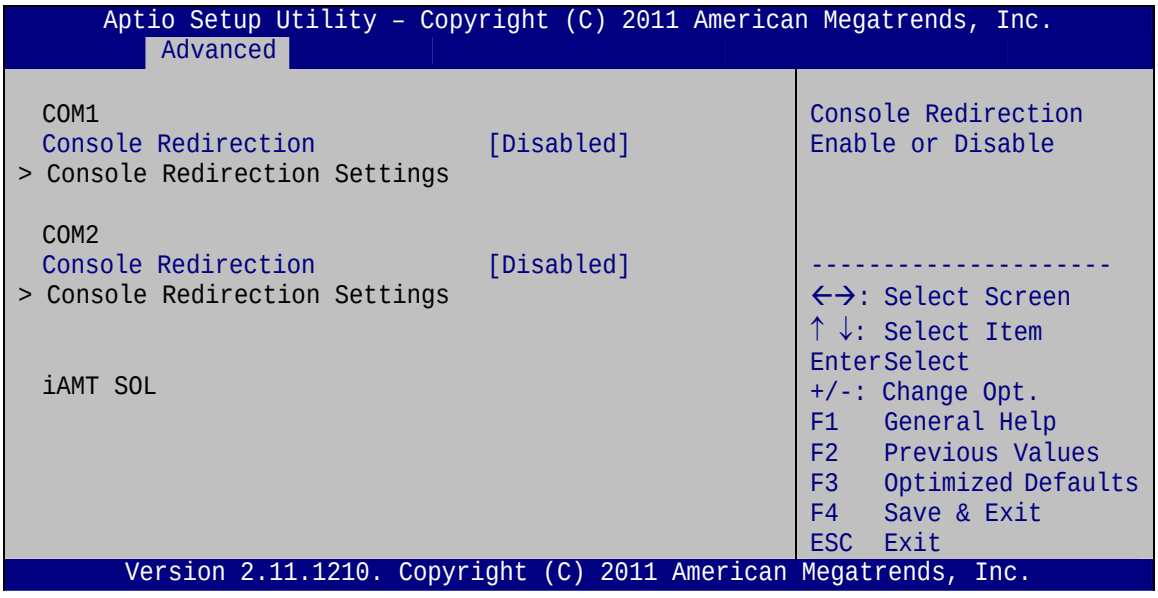
Use the + or – key to change the fan **Segment n Speed** value in percentage. Enter a decimal number between 0 and 100.

➔ **Full Speed Count**

Use the + or – key to change the fan **Full Speed Count** value. Enter a decimal number between 500 and 15000.

5.3.9 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.



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

➔ **Terminal Type [VT-100+]**

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

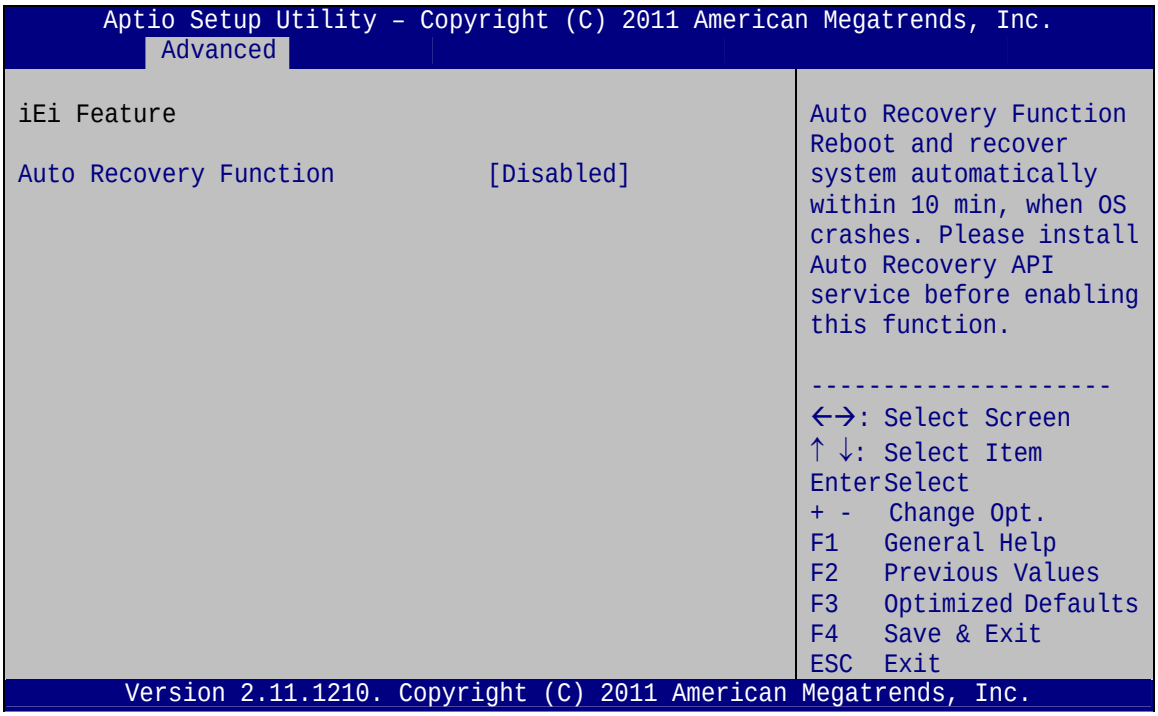
➔ **Bits per second [115200]**

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.
➔ **38400**		Sets the serial port transmission speed at 38400.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

5.3.10 iEi Feature

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



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** **DEFAULT** Auto recovery function disabled

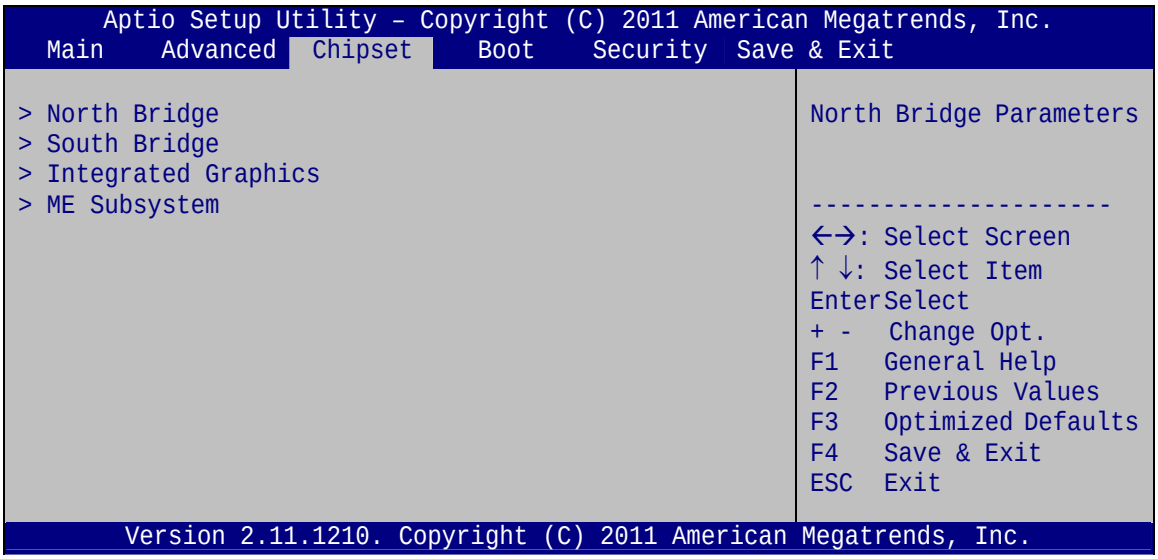
➔ **Enabled** Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the Northbridge, Southbridge, Integrated Graphics, and ME Subsystem configuration menus.

WARNING!

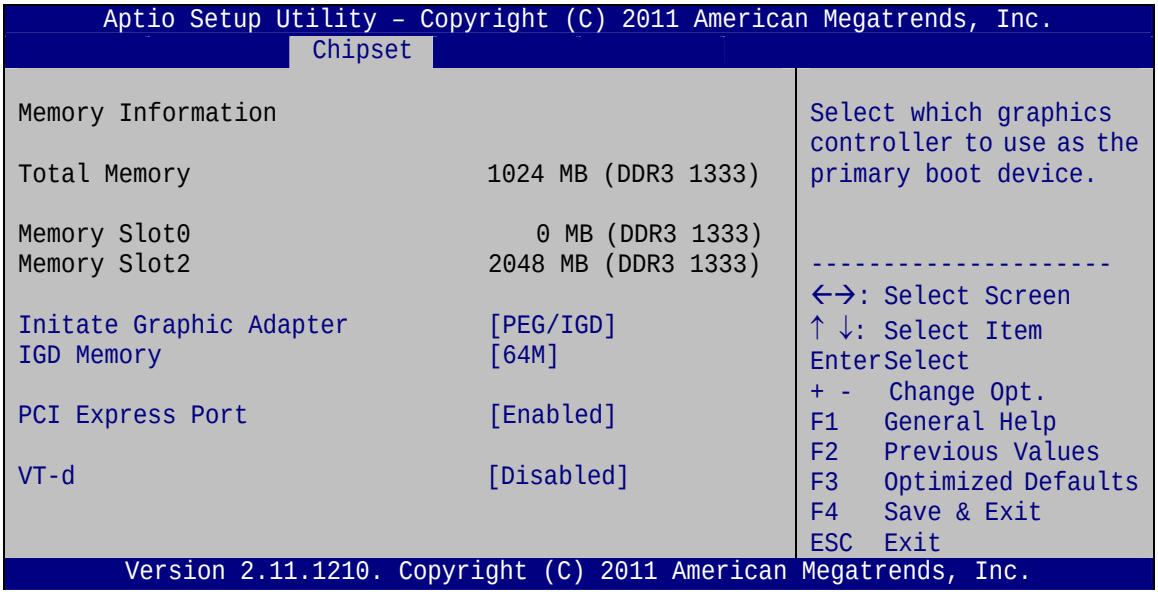
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 17: Chipset

5.4.1 Northbridge Configuration

Use the **North Bridge** menu (**BIOS Menu 18**) to configure the Northbridge chipset.



BIOS Menu 18:Northbridge Chipset Configuration

➔ **Initiate Graphic Adapter [PEG/IGD]**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD
- PCI/PEG
- PEG/IGD **DEFAULT**
- PEG/PCI

➔ **IGD Memory [64M]**

Use the **IGD Memory** option to specify the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**		
➔ **32M**		32 MB of memory used by internal graphics device
➔ **64M**	**DEFAULT**	64 MB of memory used by internal graphics device
➔ **96M**		96 MB of memory used by internal graphics device
➔ **128M**		128 MB of memory used by internal graphics device
➔ **160M**		160 MB of memory used by internal graphics device
➔ **192M**		192 MB of memory used by internal graphics device
➔ **224M**		224 MB of memory used by internal graphics device
➔ **256M**		256 MB of memory used by internal graphics device

- ➔ **288M** 288 MB of memory used by internal graphics device
- ➔ **320M** 320 MB of memory used by internal graphics device
- ➔ **352M** 352 MB of memory used by internal graphics device
- ➔ **384M** 384 MB of memory used by internal graphics device
- ➔ **416M** 416 MB of memory used by internal graphics device
- ➔ **448M** 448 MB of memory used by internal graphics device
- ➔ **480M** 480 MB of memory used by internal graphics device
- ➔ **512M** 512 MB of memory used by internal graphics device

➔ **PCI Express Port [Enabled]**

Use the **PCI Express Port** option to enable or disable the PCI Express port.

- ➔ **Disabled** Disables the PCI Express port.
- ➔ **Enabled** **DEFAULT** Enables the PCI Express port.

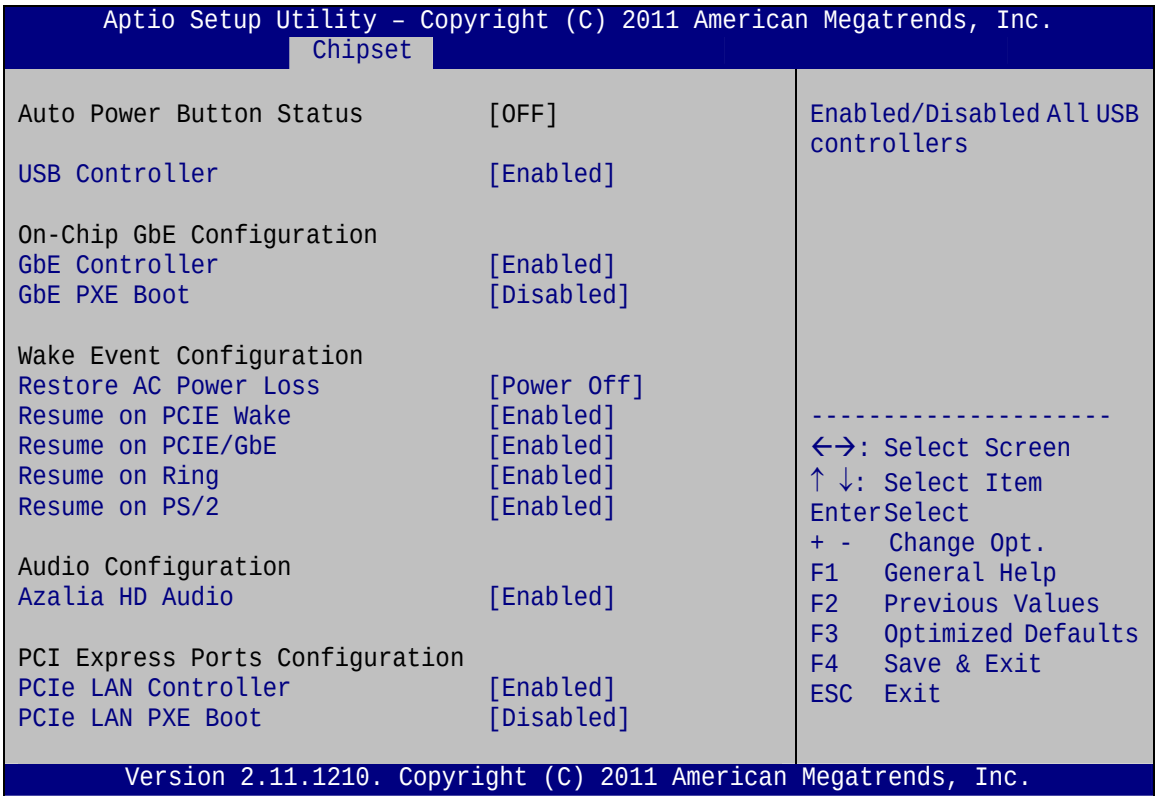
➔ **VT-d [Disabled]**

Use the **VT-d** option to enable or disable VT-d support.

- ➔ **Disabled** **DEFAULT** Disables VT-d support.
- ➔ **Enabled** Enables VT-d support.

5.4.2 Southbridge Configuration

Use the **South Bridge** menu (**BIOS Menu 19**) to configure the Southbridge chipset.



BIOS Menu 19: Southbridge Chipset Configuration

➔ **USB Controller [Enabled]**

Use the **USB Controller** option to enable or disable all USB controller.

➔ **Disabled** All of the onboard USB controllers are disabled

➔ **Enabled** **DEFAULT** All of the onboard USB controller are enabled

➔ **GbE Controller [Enabled]**

Use the **GbE Controller** option to enable or disable the GbE controller. Before disabling the GbE controller, the AMT function must be disabled.

➔ **Disabled** The onboard GbE controller is disabled

➔ **Enabled** **DEFAULT** The onboard GbE controller is enabled

➔ **GbE PXE Boot [Disabled]**

Use the **GbE PXE Boot** option to enable or disable the boot option for GbE devices.

➔ **Disabled** **DEFAULT** Disables the GbE PXE Boot option

➔ **Enabled** Enables the GbE PXE Boot option

➔ **Restore on AC Power Loss [Power Off]**

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** **DEFAULT** The system remains turned off

➔ **Power On** The system turns on

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

➔ **Resume on PCIE Wake [Enabled]**

Use the **Resume on PCIE Wake** option to enable or disable resuming from the PCIe wake message and WAKE# signal.

➔ **Disabled** Disables Resume on PCIe Wake option

➔ **Enabled** **DEFAULT** Enables Resume on PCIe Wake option

➔ **Resume on PME/GbE [Enabled]**

Use the **Resume on PME/GbE** option to enable or disable resuming from PCI PME# or GbE signal.

➔ **Disabled** Disables Resume on PCI PME/GbE option

➔ **Enabled** **DEFAULT** Enables Resume on PCI PME/GbE option

➔ **Resume on Ring [Enabled]**

Use the **Resume on Ring** option to enable or disable resuming from RI# signal.

➔ **Disabled**		Disables Resume on Ring option
➔ **Enabled**	**DEFAULT**	Enables Resume on Ring option

➔ **Resume on PS/2 [Enabled]**

Use the **Resume on PS/2** option to enable or disable resuming from PS/2 activation.

➔ **Disabled**		Disables Resume on PS/2 option
➔ **Enabled**	**DEFAULT**	Enables Resume on PS/2 option

➔ **Azalia HD Audio [Enabled]**

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

➔ **Disabled**		The onboard High Definition Audio controller is disabled
➔ **Enabled**	**DEFAULT**	The onboard High Definition Audio controller is detected automatically and enabled

➔ **PCIe LAN Controller [Enabled]**

Use the **PCIe LAN Controller** option to enable or disable the PCI Express LAN controller.

➔ **Disabled**		The onboard PCIe LAN controller is disabled
➔ **Enabled**	**DEFAULT**	The onboard PCIe LAN controller is ensabled

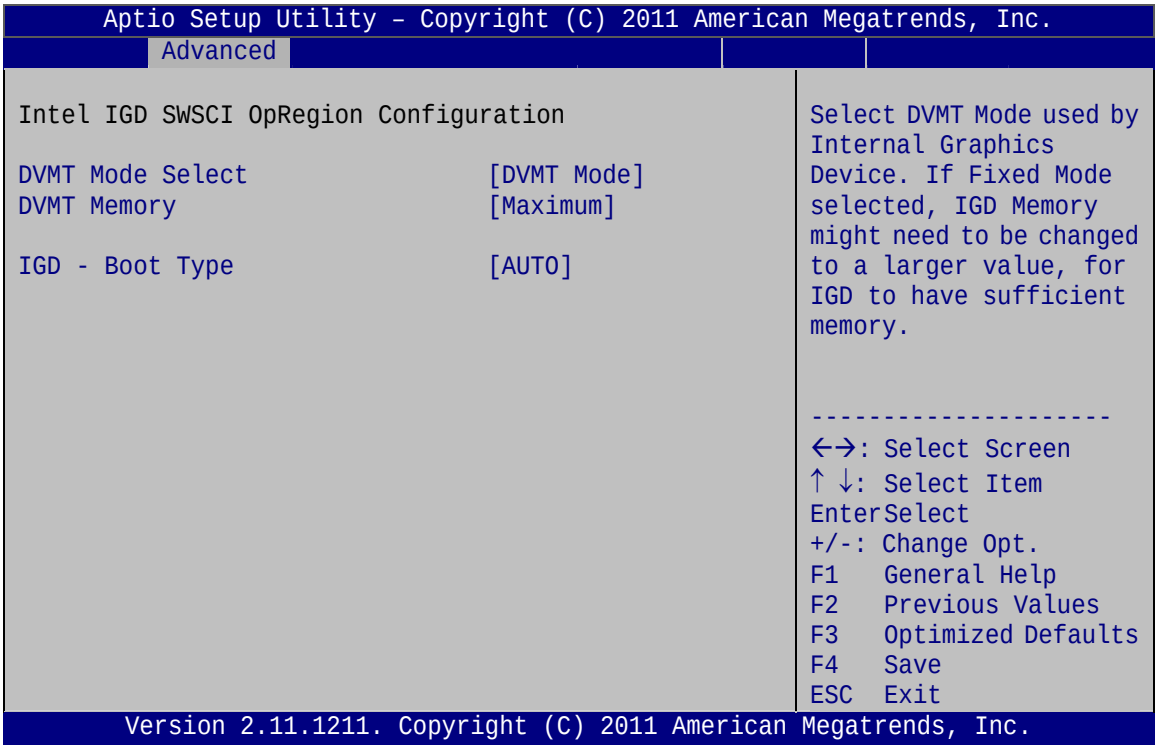
➔ **PCIe LAN PXE Boot [Disabled]**

Use the **PCIe LAN PXE Boot** option to enable or disable the boot option for the PCIe LAN PXE.

➔ **Disabled**	**DEFAULT**	Disables PCIe LAN PXE Boot option
➔ **Enabled**		Enables PCIe LAN PXE Boot option

5.4.3 Integrated Graphics

Use the **Integrated Graphics** menu (**BIOS Menu 20**) to configure the video device connected to the system.



BIOS Menu 20: Integrated Graphics

➔ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

➔ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.

➔ **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.

➔ **DVMT Memory [Maximum]**

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

- 128 MB
- 256 MB
- Maximum **DEFAULT**

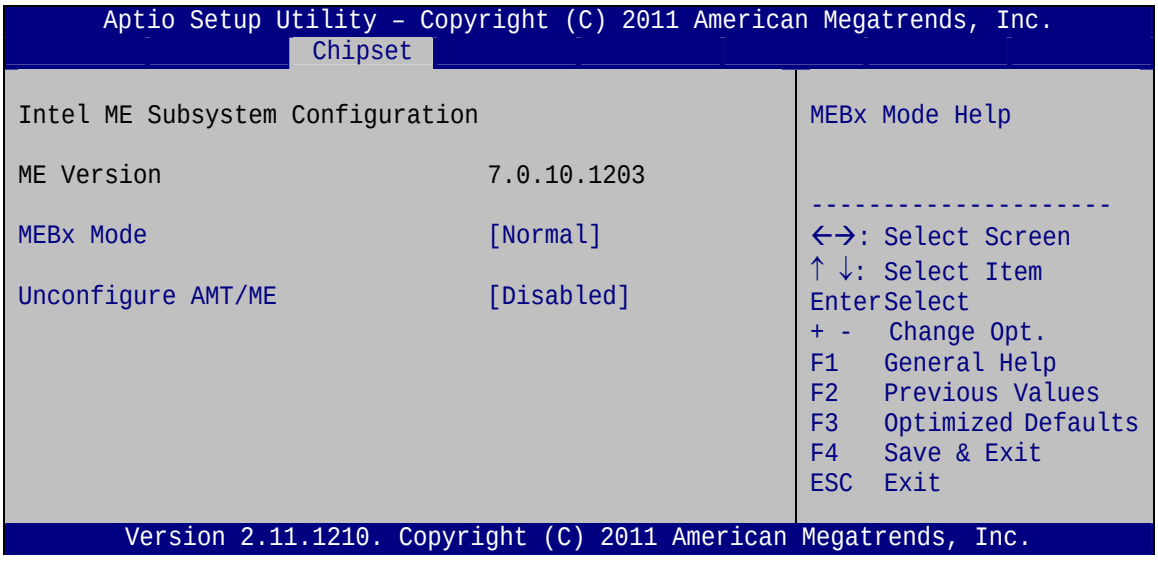
➔ **IGD - Boot Type [AUTO]**

Use the **IGD - Boot Type** option to select the display device used by the system when it boots. For dual display support, select "Auto." Configuration options are listed below.

- AUTO **DEFAULT**
- CRT
- DVI

5.4.4 ME Subsystem

Use the **ME Subsystem** menu (**BIOS Menu 21**) to configure the Intel® Management Engine (ME) configuration options.



BIOS Menu 21: ME Subsystem

➔ **MEBx Mode [Normal]**

Use the **MEBx Mode** option to configure MEBx Mode options.

➔ **Normal** **DEFAULT** Enables normal mode

➔ **Hidden Ctrl + P** Enables hidden Ctrl+P function

➔ **Enter MEBx Setup** Enables user to enter MEBx setup

➔ **Unconfigure AMT/ME [Disabled]**

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

➔ **Disabled** **DEFAULT** Disable AMT/ME unconfigure

➔ **Enabled** Enable AMT/ME unconfigure

5.5 Boot

Use the **Boot** menu (**BIOS Menu 22**) to configure system boot options.

```
      Aptio Setup Utility – Copyright (C) 2011 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             [Keep Current]

                                            ---------------------
Boot Option Priorities                      ←→: Select Screen
                                            ↑ ↓: Select Item
                                            EnterSelect
                                            + -   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 22: 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

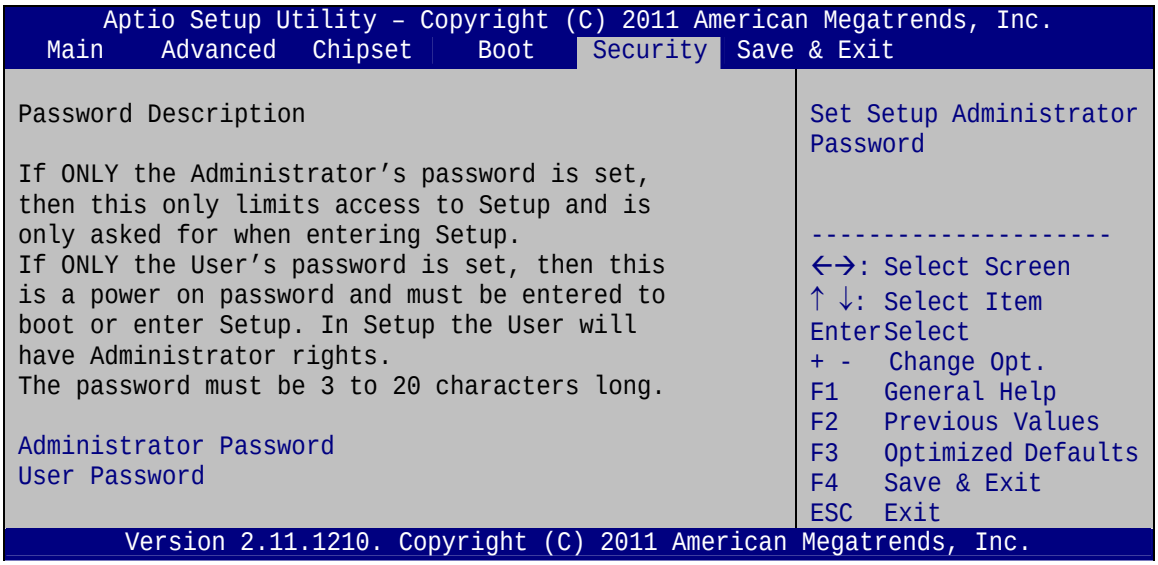
➔ **Option ROM Messages [Keep Current]**

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

➔	**Force BIOS**		Sets display mode to force BIOS.
➔	**Keep Current**	**DEFAULT**	Sets display mode to current.

5.6 Security

Use the **Security** menu (**BIOS Menu 23**) to set system and user passwords.



BIOS Menu 23: Security

➔ **Administrator Password**

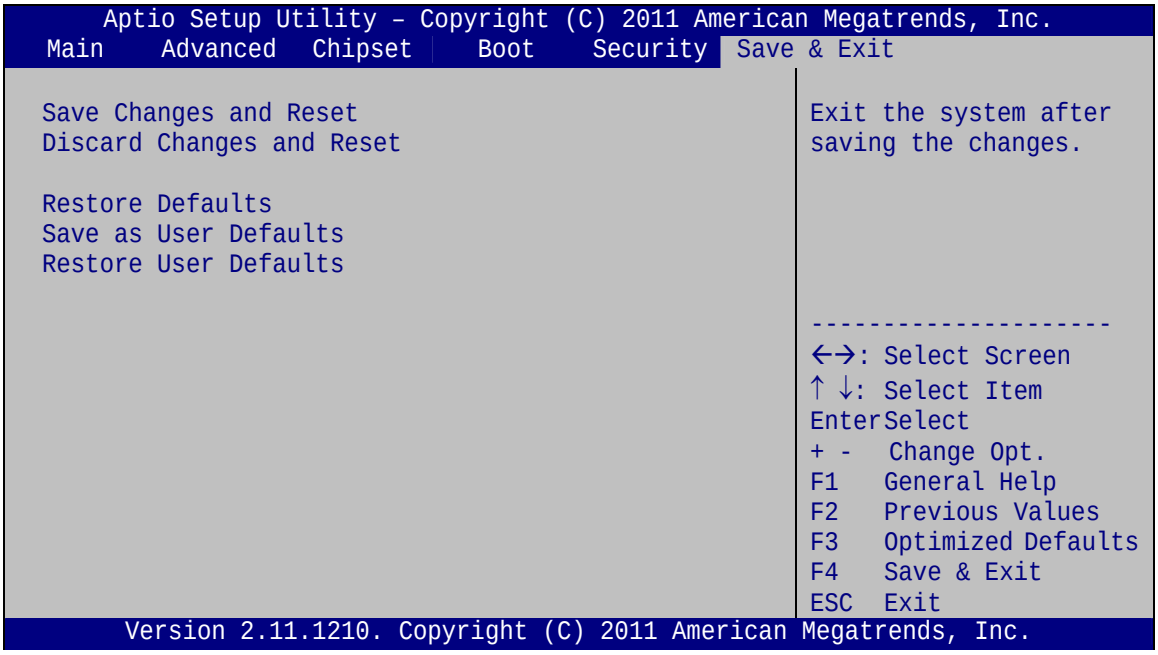
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 24: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
- Graphic
- LAN
- Audio
- Intel® AMT
  - Intel® Management Engine Components driver
  - Intel® IT Director application

Installation instructions are given below.

6.2 Software Installation

All the drivers for the PCIE-Q670 Series 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**).

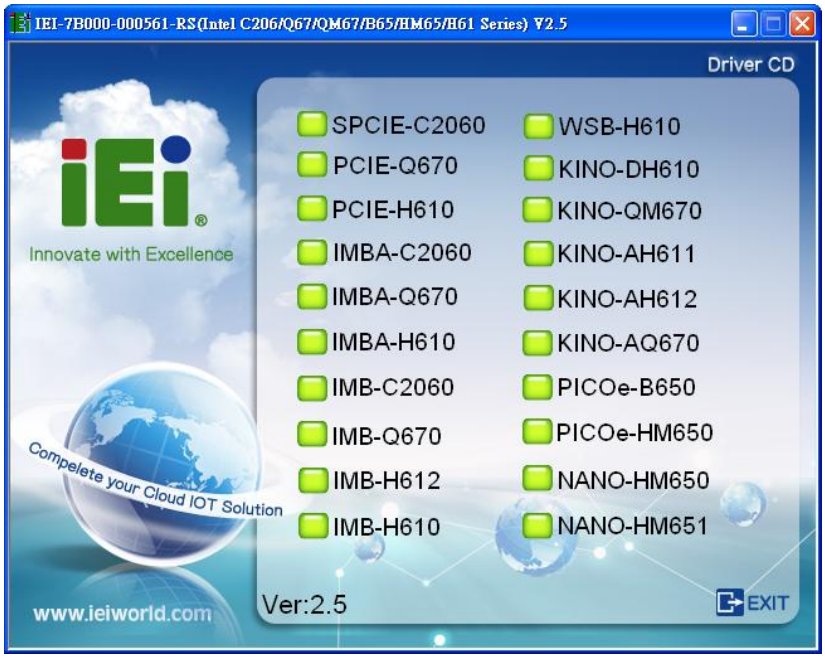


Figure 6-1: Introduction Screen

Step 3: Click PCIE-Q670.

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 "**Chipset**".

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

Step 4: The setup files are extracted as shown in **Figure 6-3**.

Figure 6-3: Chipset Driver Screen

Step 5: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-4** appears.

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

Figure 6-4: Chipset Driver Welcome Screen

Step 7: The license agreement in **Figure 6-5** appears.

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

Step 9: Click **Yes** to continue.

Figure 6-5: Chipset Driver License Agreement

Step 10: The **Read Me** file in **Figure 6-6** appears.

Step 11: Click **Next** to continue.

Figure 6-6: Chipset Driver Read Me File

Step 12: **Setup Operations** are performed as shown in **Figure 6-7**.

Step 13: Once the **Setup Operations** are complete, click **Next** to continue.

Figure 6-7: Chipset Driver Setup Operations

Step 14: The **Finish** screen in **Figure 6-8** appears.

Step 15: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-8: 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 "**VGA**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome Screen** in **Figure 6-9** appears.

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

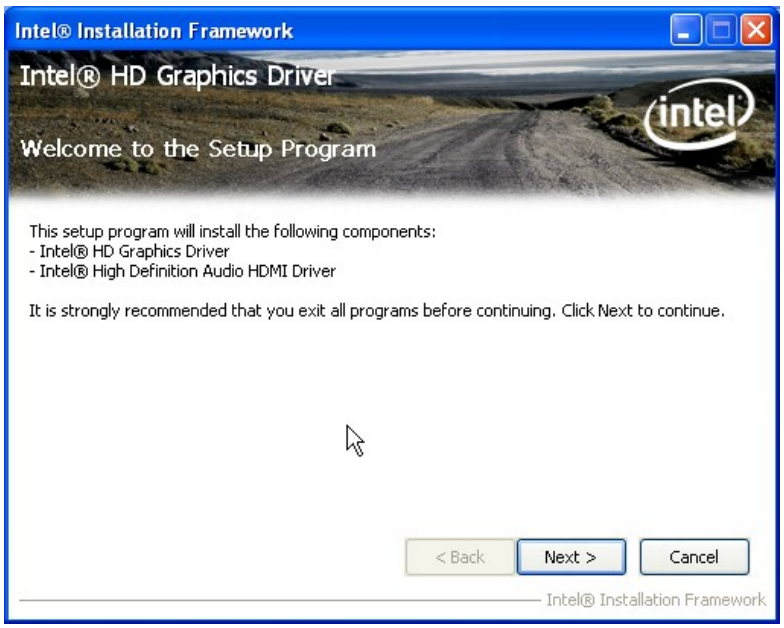


Figure 6-9: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-10** appears.

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

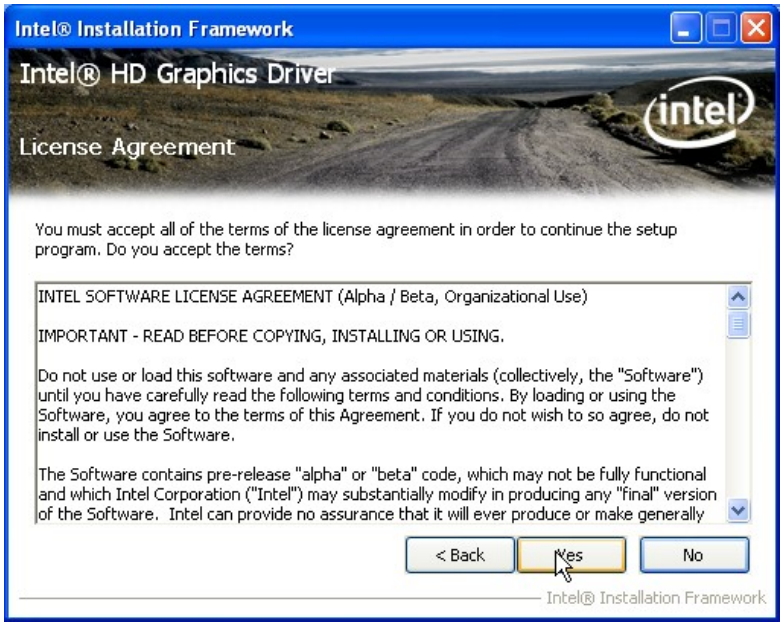


Figure 6-10: Graphics Driver License Agreement

Step 8: **Setup Operations** are performed as shown in **Figure 6-11**.

Step 9: Once the **Setup Operations** are complete, click **Next** to continue.

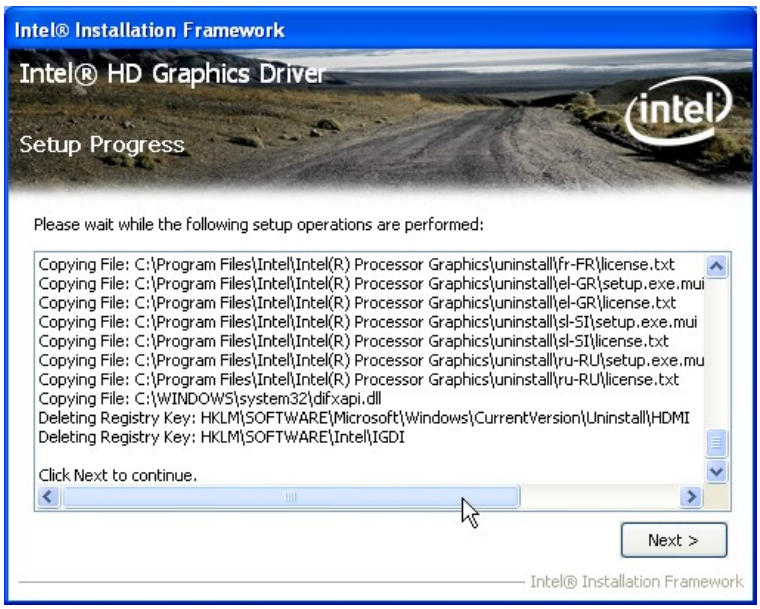


Figure 6-11: Graphics Driver Setup Operations

Step 10: The **Finish** screen in **Figure 6-12** appears.

Step 11: Select "**Yes, I want to restart this computer now**" and click **Finish**.

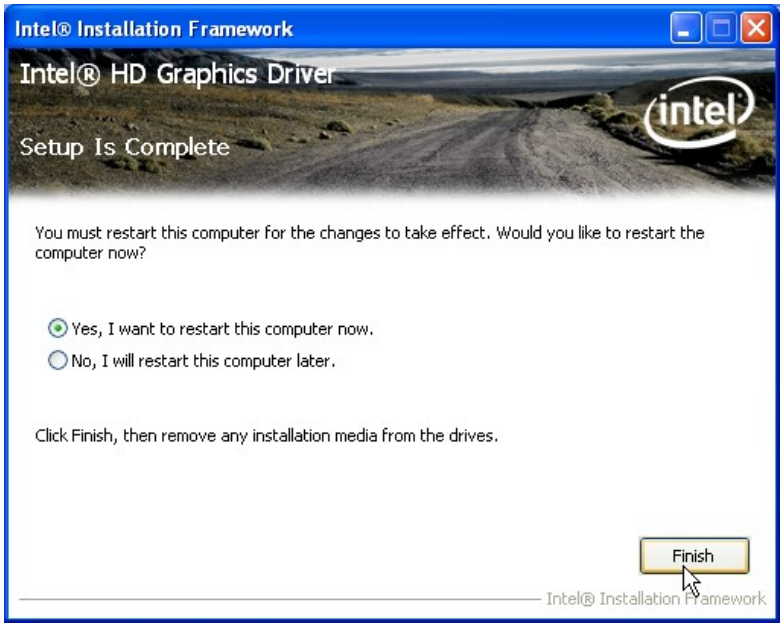


Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

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

Step 2: Click "**LAN**".

Step 3: Locate the Autorun file and double click it.

Step 4: The Intel® Network Connection menu in **Figure 6-13** appears.

Step 5: Click **Install Drivers and Software**.

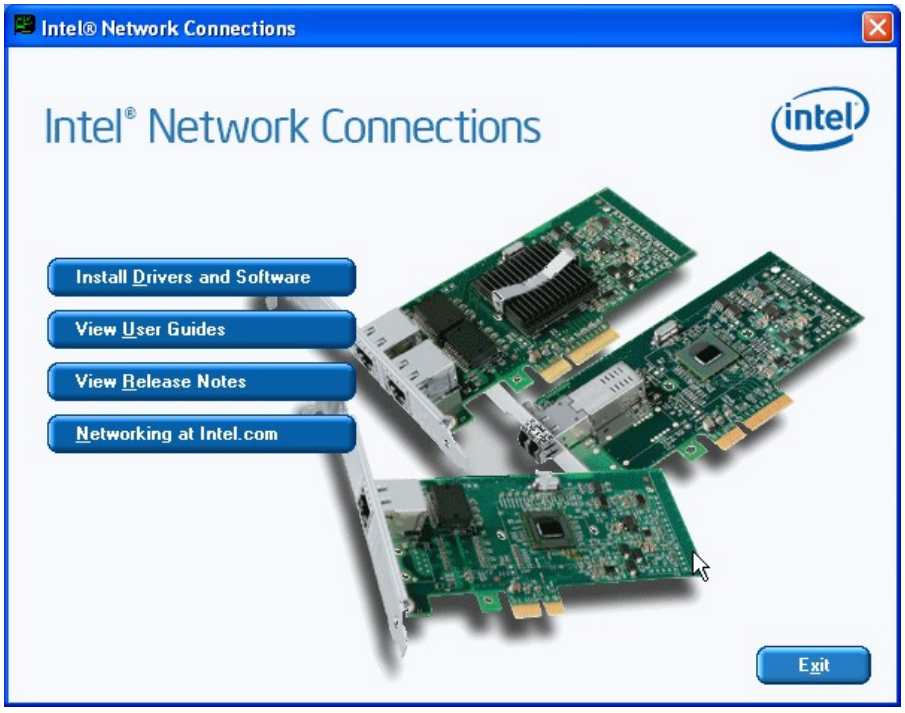


Figure 6-13: Intel® Network Connection Menu

Step 6: The **Welcome** screen in **Figure 6-14** appears.

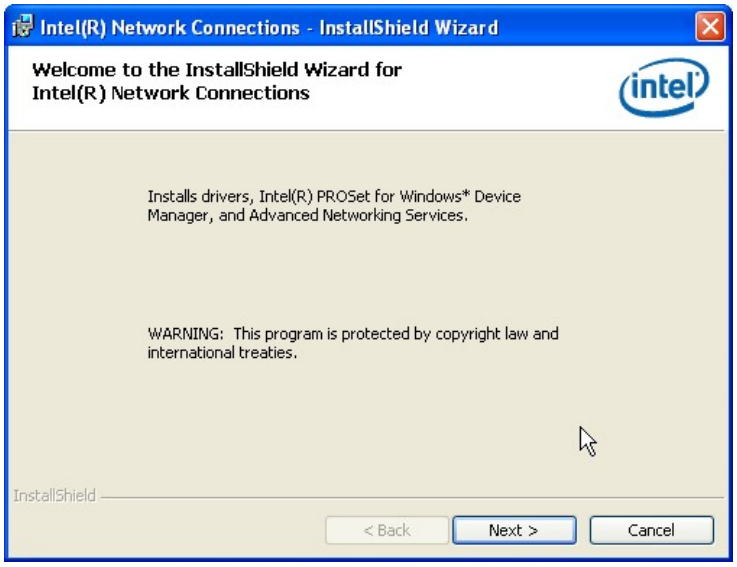


Figure 6-14: LAN Driver Welcome Screen

Step 7: Click **Next** to continue.

Step 8: The **License Agreement** in **Figure 6-15** appears.

Step 9: Accept the agreement by selecting “I accept the terms in the license agreement”.

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

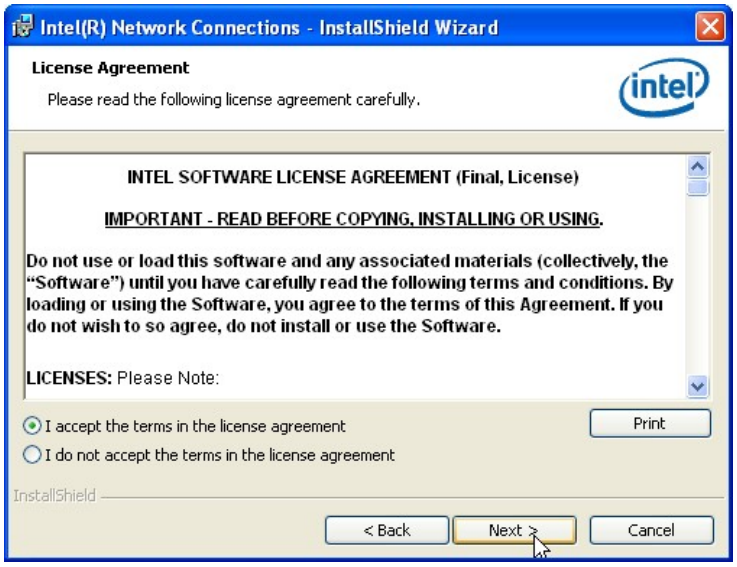


Figure 6-15: LAN Driver License Agreement

Step 11: The **Setup Options** screen in **Figure 6-16** appears.

Step 12: Select program features to install.

Step 13: Click **Next** to continue.

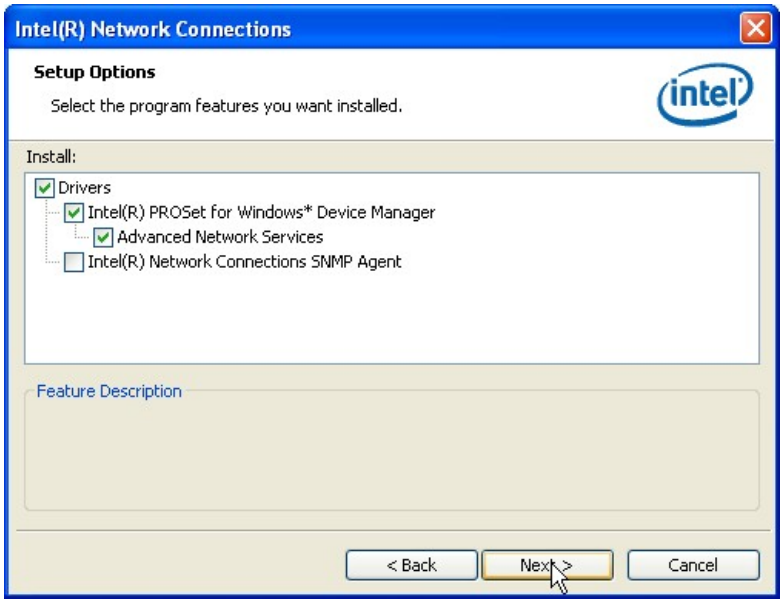


Figure 6-16: LAN Driver Setup Options

Step 14: The **Ready to Install the Program** screen in **Figure 6-17** appears.

Step 15: Click **Install** to proceed with the installation.

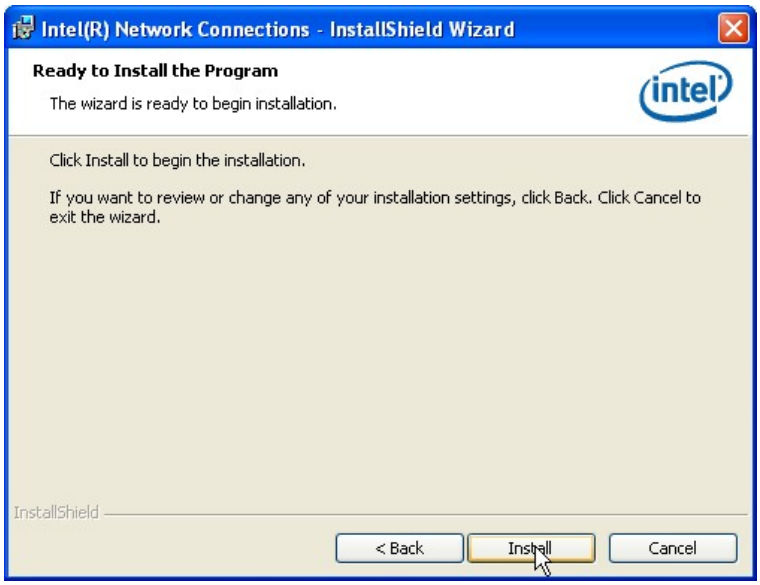


Figure 6-17: LAN Driver Installation

Step 16: The program begins to install.

Step 17: When the driver installation is complete, the screen in **Figure 6-18** appears.

Step 18: Click **Finish** to exit.

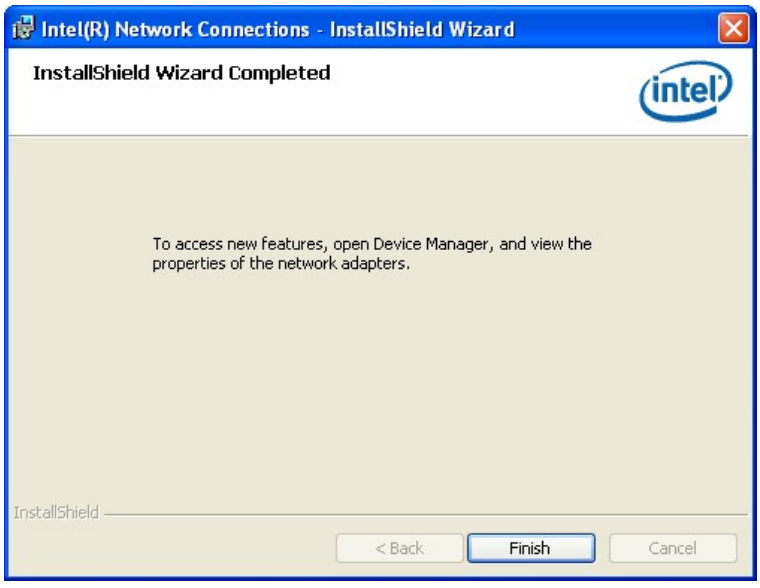


Figure 6-18: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

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

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

Step 3: Double click the setup file.

Step 4: The InstallShield Wizard starts to extracting files (**Figure 6-19**).

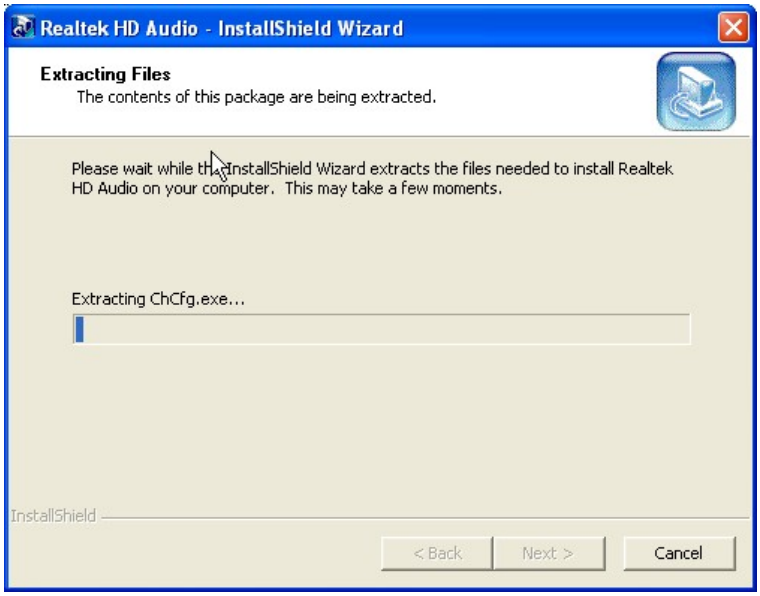


Figure 6-19: Audio Driver – Extracting Files

Step 5: The **Audio Driver Welcome** message in **Figure 6-20** appears.

Step 6: Click **Yes** to install the audio driver.

Figure 6-20: Audio Driver Welcome Screen

Step 7: The audio driver installation begins. See **Figure 6-21**.

Figure 6-21: Audio Driver Installation

Step 8: When the installation is complete, the screen in **Figure 6-22** appears.

Step 9: Select "**Yes, I want to restart my computer now**" and click **Finish**.

Figure 6-22: Audio Driver Installation Complete

6.7 Intel® AMT Driver and Application

6.7.1 Intel® Management Engine Components Installation

The package of the Intel® ME components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Serial Over LAN (SOL) driver
- Local Manageability Service (LMS)
- User Notification Service (UNS)
- Intel® ME WMI provider
- Intel® Active Management Technology NAC Posture Plug-in
- Intel Control Center
- Intel® Management and Security Status Application

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

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

Step 2: Click "**iAMT**".

Step 3: Double click the setup file in the **ME_SW_IS** 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 6-23** appears.

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

Figure 6-23: Intel® ME Driver Welcome Screen

Step 7: The license agreement in **Figure 6-24** appears.

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

Step 9: Click **Yes** to continue.

Figure 6-24: Intel® ME Driver License Agreement

Step 10: The **Read Me** file in **Figure 6-25** appears.

Step 11: Click **Next** to continue.

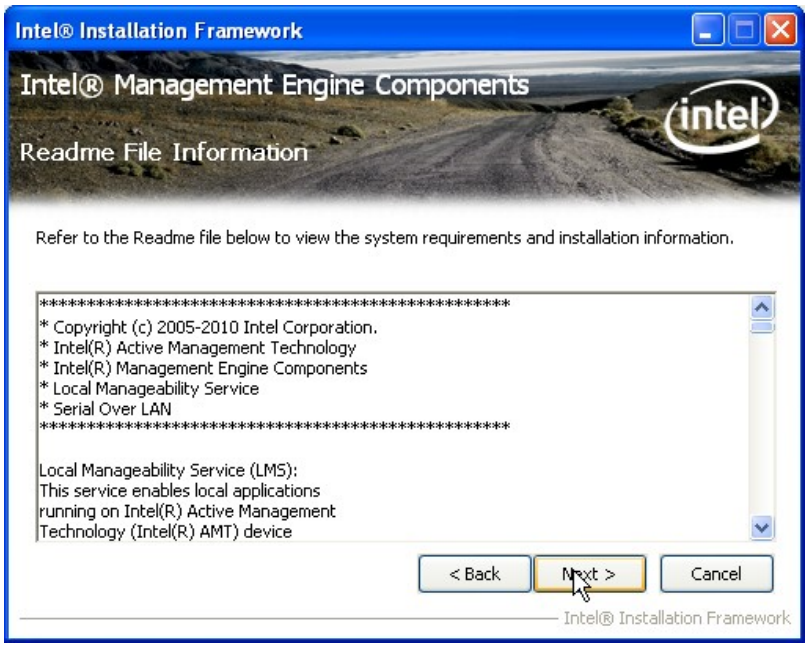


Figure 6-25: Intel® ME Driver Read Me File

Step 12: **Setup Operations** are performed as shown in **Figure 6-26**.

Step 13: Once the **Setup Operations** are complete, click **Next** to continue.

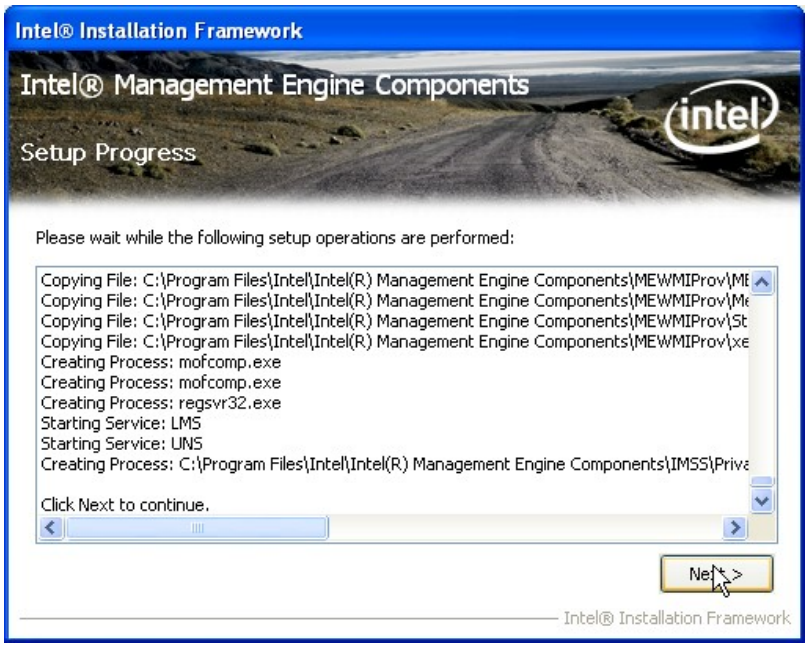


Figure 6-26: Intel® ME Driver Setup Operations

Step 14: The **Finish** screen in **Figure 6-27** appears.

Step 15: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-27: Intel® ME Driver Installation Finish Screen

6.7.2 Intel® IT Director Application Installation

Intel® IT Director is an application that helps address key IT security, data protection and network health concerns of small businesses. To install the Intel® IT Director application, please do the following.

NOTE:

For Windows XP system, please make sure to install the .net Framework 3.5 before installing the Intel® IT Director application. The .net Framework 3.5 setup file is located at **\7-iAMT, iTPM Driver & Utility\Microsoft .NET Framework 3.5** of the driver CD.

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

Step 2: Click "**iAMT**".

Step 3: Double click the setup file in the **Intel_ IT Director** folder.

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

Step 5: The **Welcome Screen** in **Figure 6-28** appears.

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

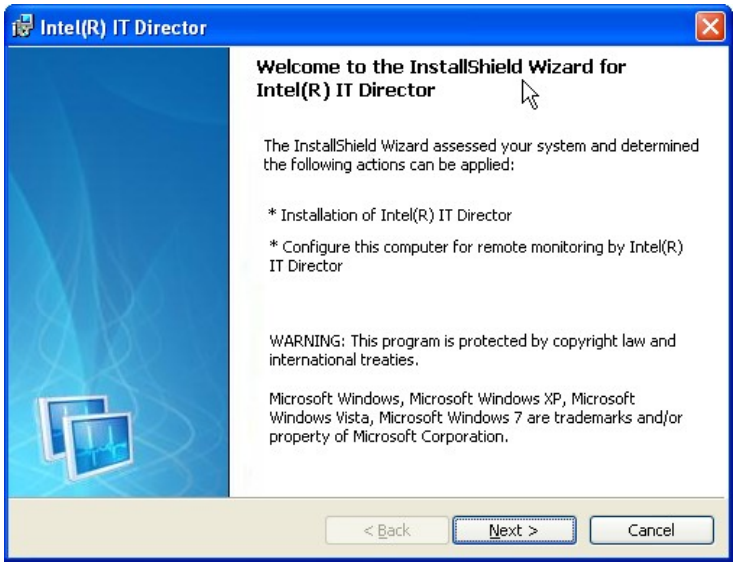


Figure 6-28: IT Director Welcome Screen

Step 7: The license agreement in **Figure 6-29** appears.

Step 8: Accept the agreement by selecting “I accept the terms in the license agreement”.

Step 9: Click **Next** to continue.

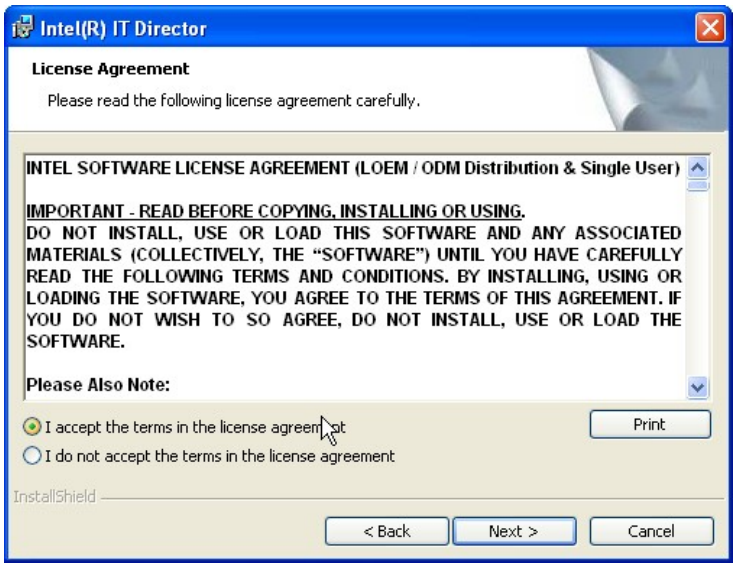


Figure 6-29: IT Director License Agreement

Step 10: Continue to choose the installation type and the destination folder for the IT

Director application.

Step 11: The **Ready to Install the Program** screen in **Figure 6-30** appears.

Step 12: Click **Install** to proceed with the installation.

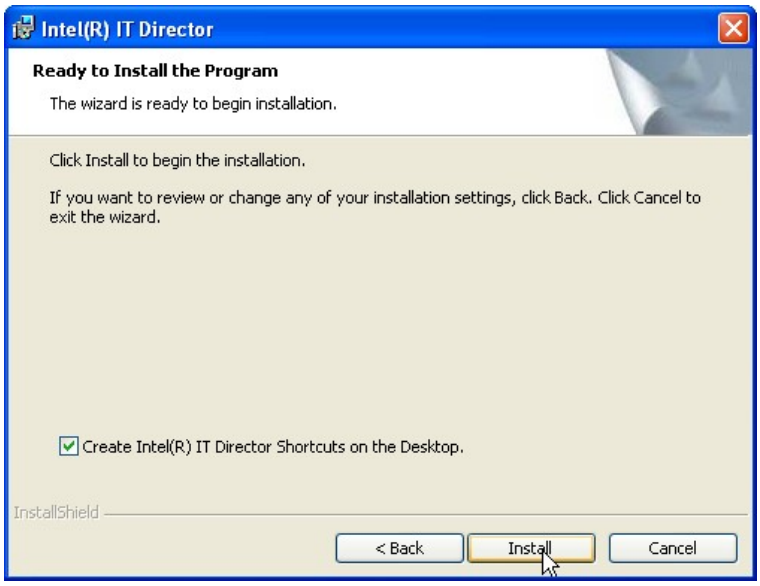


Figure 6-30: IT Director Installation

Step 13: The program begins to install.

Step 14: When the driver installation is complete, the screen in **Figure 6-31** appears.

Step 15: Click **Next** to configure the system for remote monitoring or Cancel to exit the program and configure the system later.

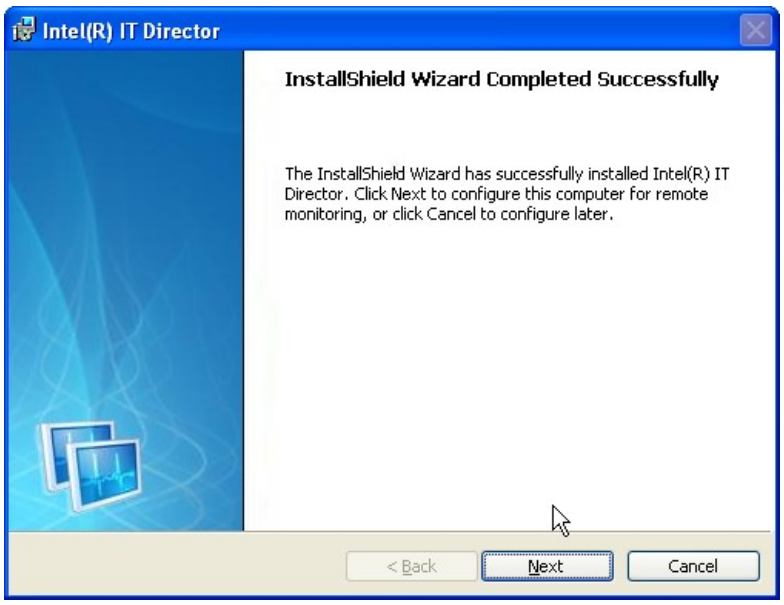


Figure 6-31: IT Director Installation Complete

Step 16: The Welcome Screen of the IT Director Configuration Tool in **Figure 6-32** appears.

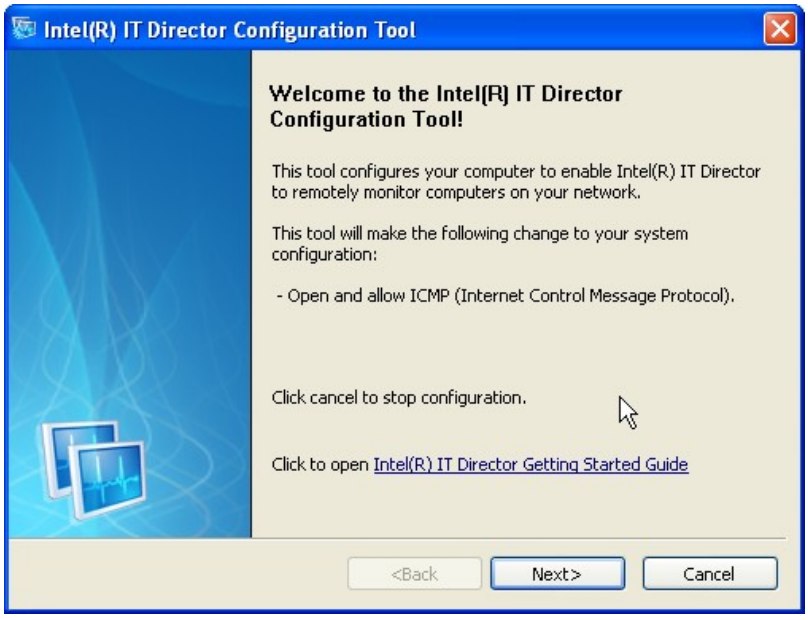


Figure 6-32: IT Director Configuration Tool Welcome Screen

NOTE:

It is recommended to open the Intel® IT Director Getting Started Guide shown in **Figure 6-32** to fully understand the configuration process.

Step 17: Select whether this is the first computer you are creating a password for IT Director. (**Figure 6-33**).

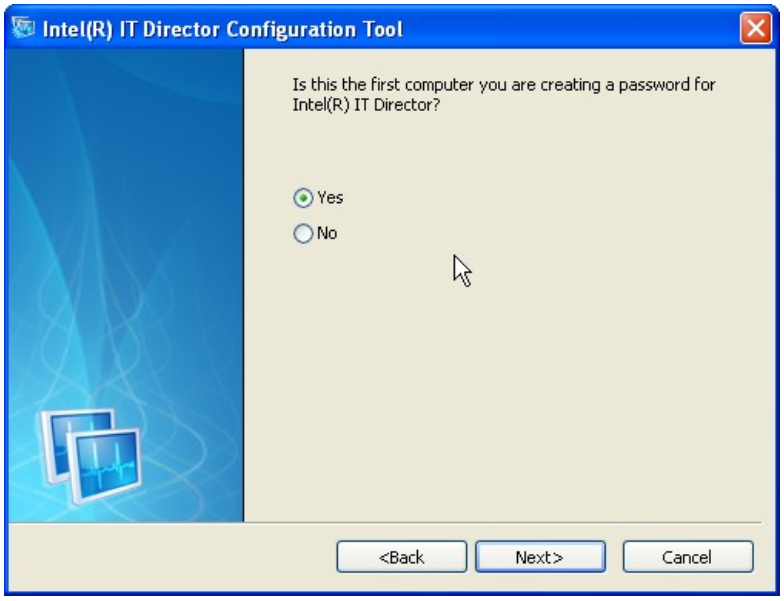


Figure 6-33: IT Director – Creating Password

Step 18: Follow the instructions to create a new password or enter the password created previously.

Step 19: When the configuration is complete, the screen in **Figure 6-34** appears.

Step 20: Click **Finish** to exit.

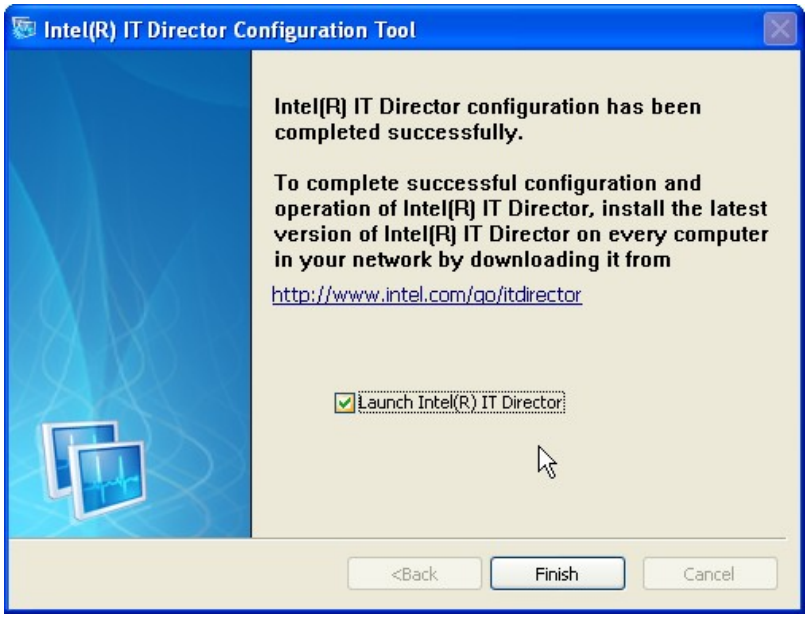


Figure 6-34: IT Director Configuration Complete

NOTE:

If the network connection doesn't work after installing the Intel® IT Director in a Windows Vista system, please install the network adapter driver. The driver is located at **\7-iAMT, iTPM Driver & Utility\AMT Hot Fix\V1.0C0206** of the driver CD. Follow the instruction in the Intel Website Message PDF file in the same folder to install the driver.

Appendix

A

BIOS Options

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

Appendix

B

One Key Recovery

B.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:

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 B.3 for the detailed setup procedure.

The IEI One Key Recovery tool menu is shown below.

Figure B-1: IEI One Key Recovery Tool Menu

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

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

NOTE:

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

B.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.

B.1.2 Supported Operating System

The recovery CD is compatible with both Microsoft Windows and Linux operating system (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 B.3) and the restore through LAN function (described in Section B.6) are not supported in the Windows CE 5.0/6.0 operating system environment.

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

NOTE:

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

B.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 **B.2.1**)

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

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

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

Step 5: Create factory default image (see **Section B.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 B.3**.

B.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.

B.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!

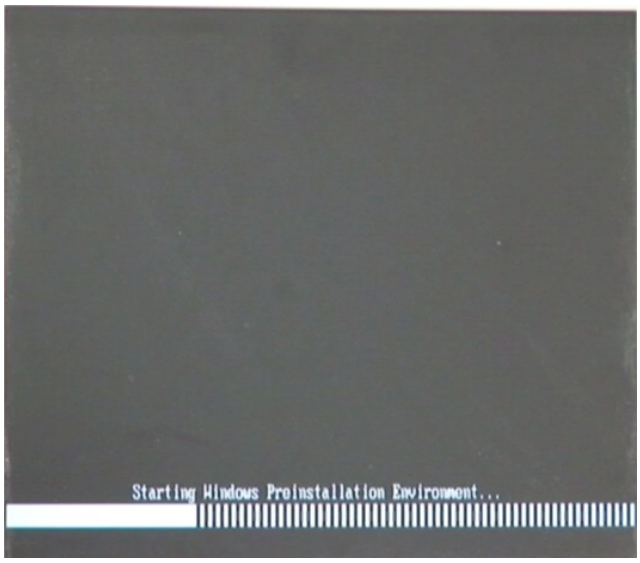


Figure B-2: Launching the Recovery Tool

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

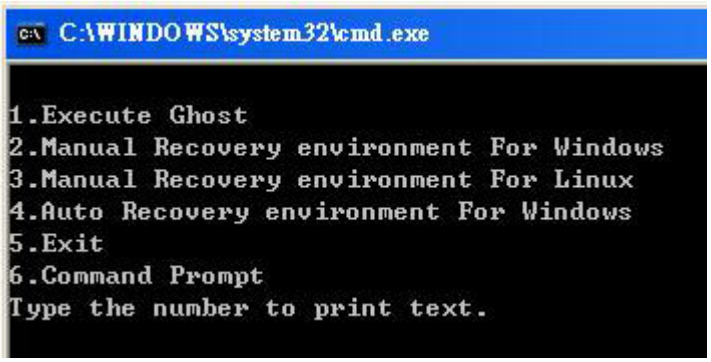


Figure B-3: Recovery Tool Setup Menu

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

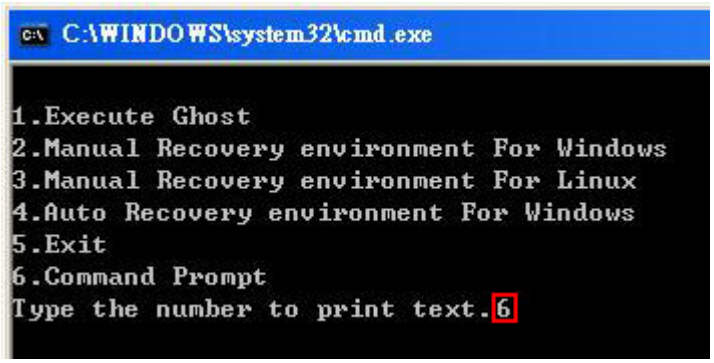


Figure B-4: Command Mode

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

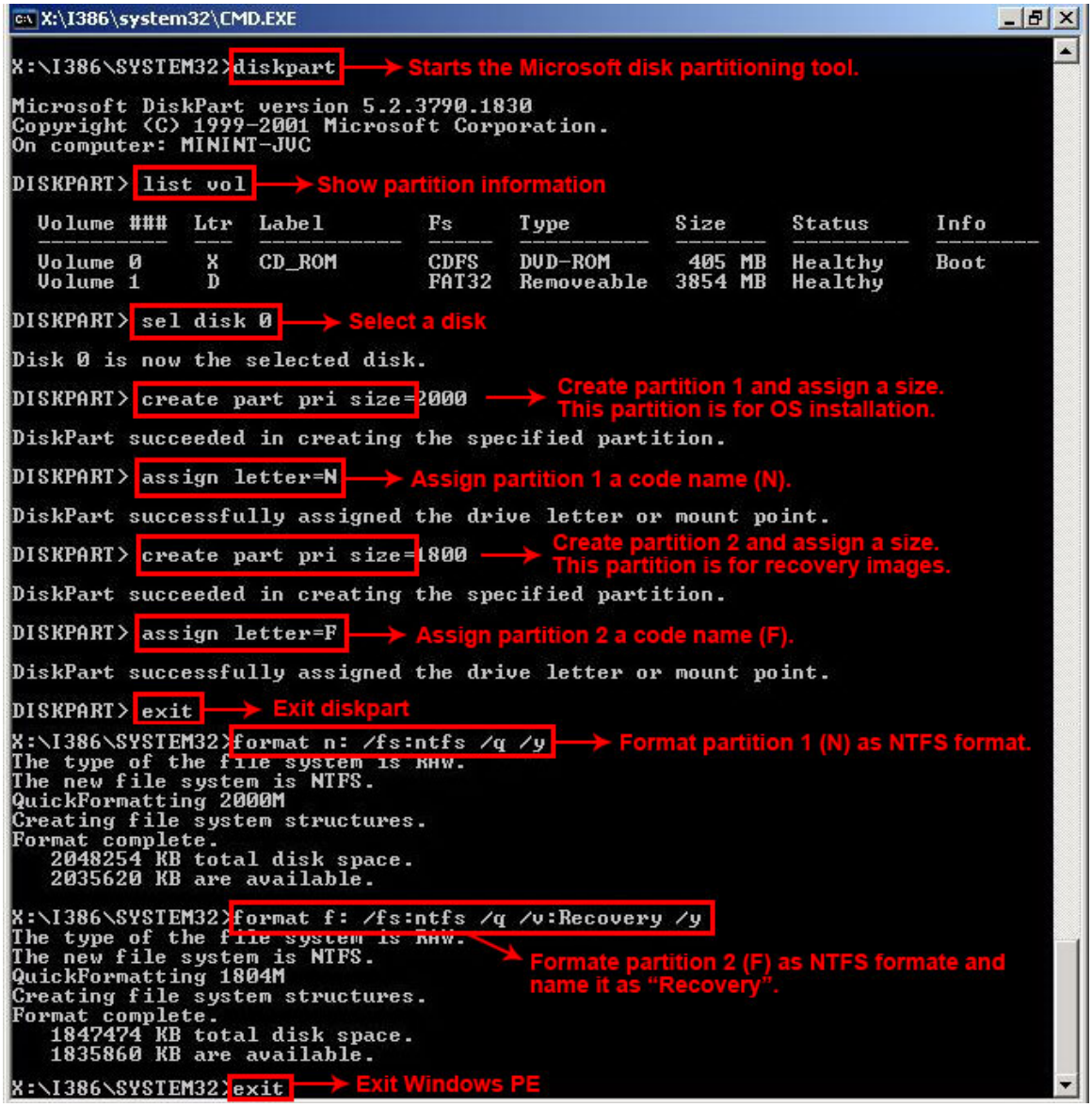
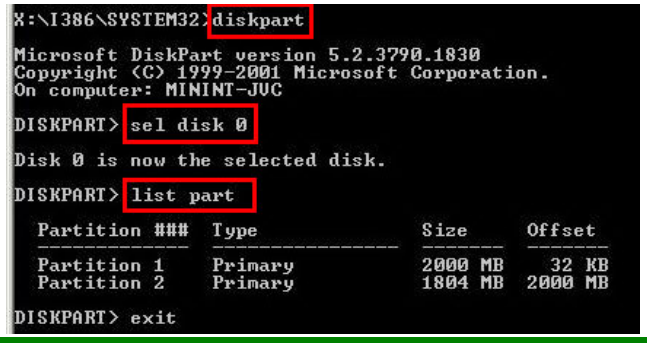


Figure B-5: Partition Creation Commands

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.

B.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.

B.2.4 Build-up 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!

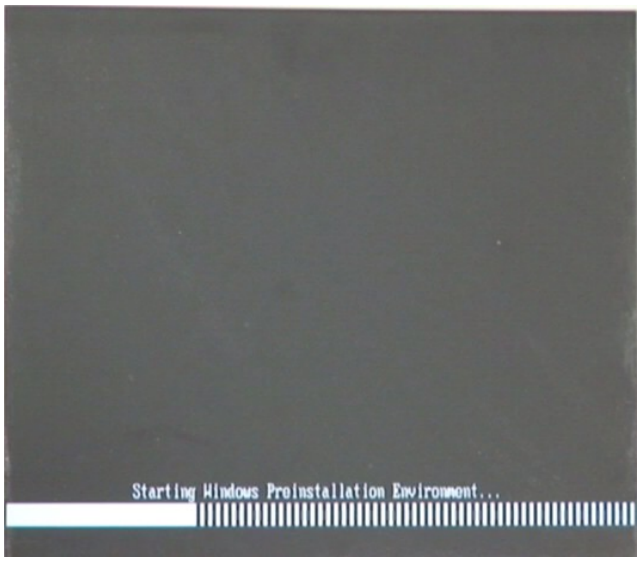


Figure B-6: Launching the Recovery Tool

Step 4: When the recovery tool setup menu appears, press <**2**> then <Enter>.

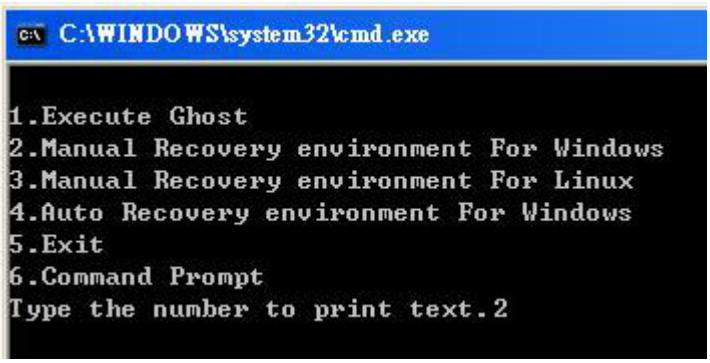


Figure B-7: Manual Recovery Environment for Windows

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 B.2.2** is hidden and the recovery tool is saved in this partition.

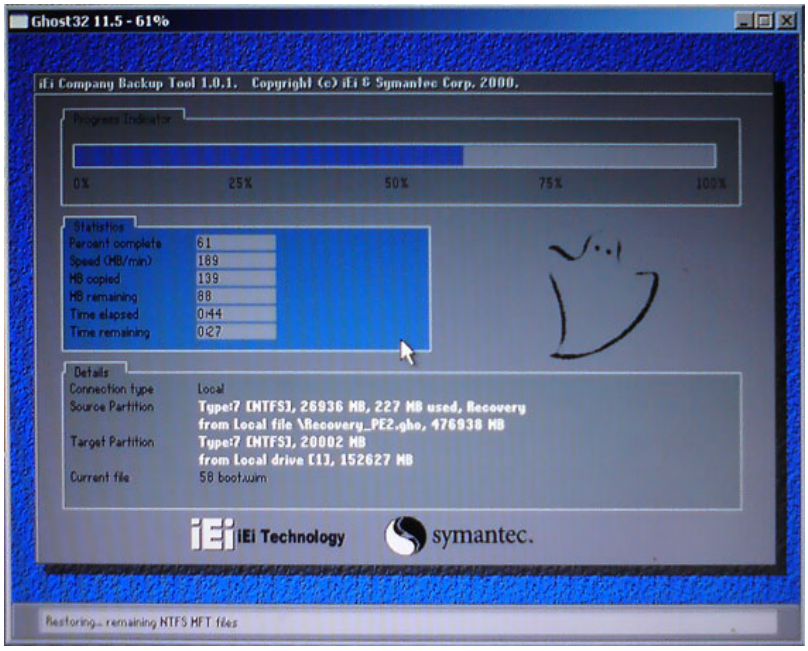


Figure B-8: Building the Recovery Partition

Step 6: After completing the system configuration, press any key in the following window to reboot the system.

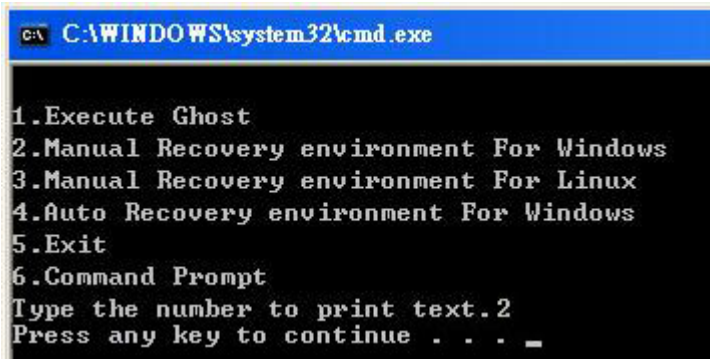


Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

B.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 B-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.

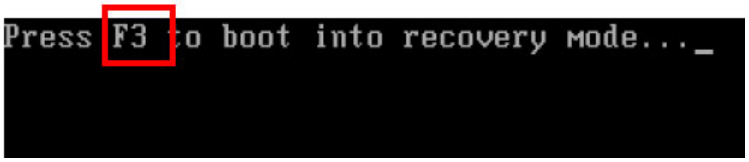


Figure B-10: Press F3 to Boot into Recovery Mode

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

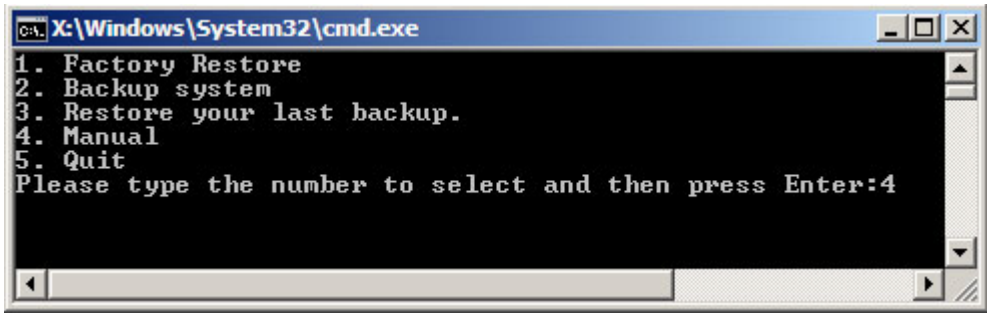


Figure B-11: Recovery Tool Menu

Step 3: The About Symantec Ghost window appears. Click **OK** button to continue.

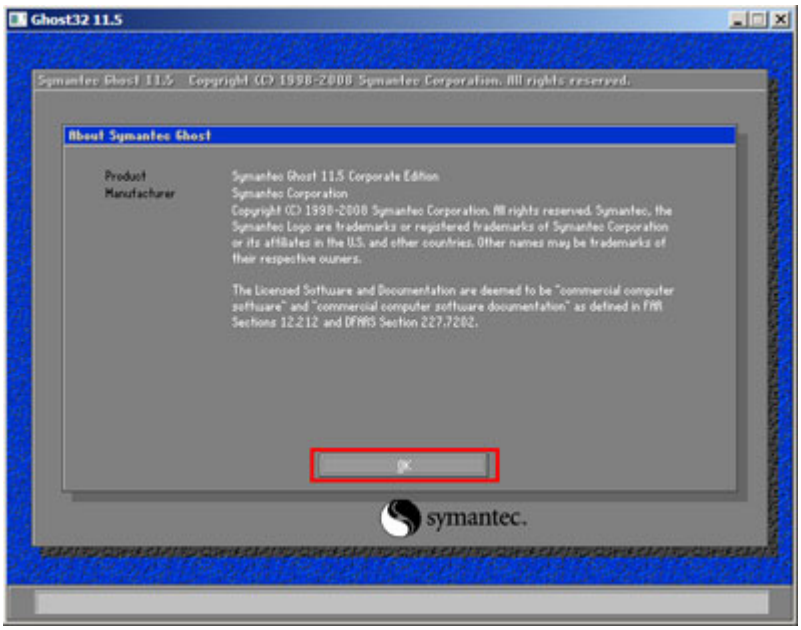


Figure B-12: About Symantec Ghost Window

Step 4: Use mouse to navigate to the option shown below (**Figure B-13**).

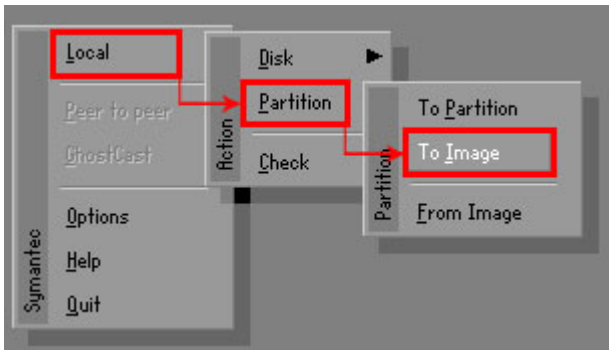


Figure B-13: Symantec Ghost Path

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

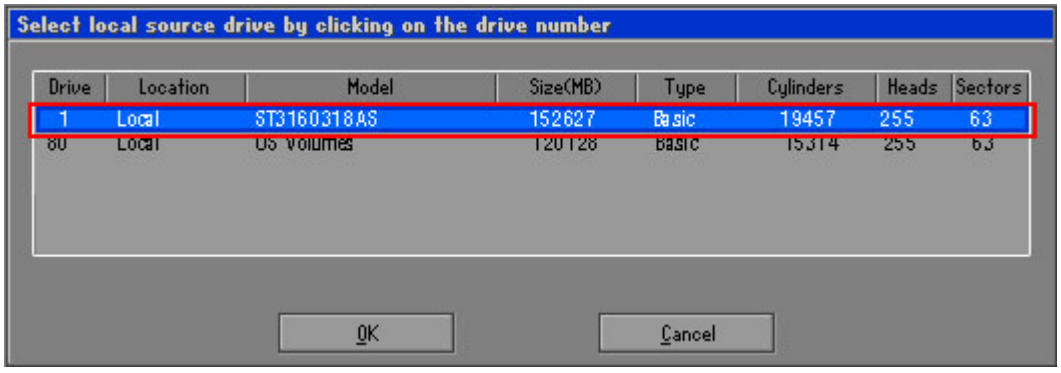


Figure B-14: Select a Local Source Drive

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

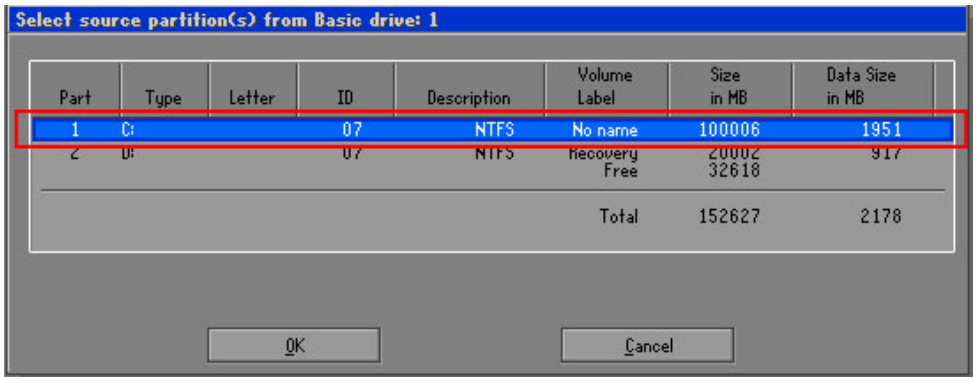


Figure B-15: Select a Source Partition from Basic Drive

Step 7: Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei** (**Figure B-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**.

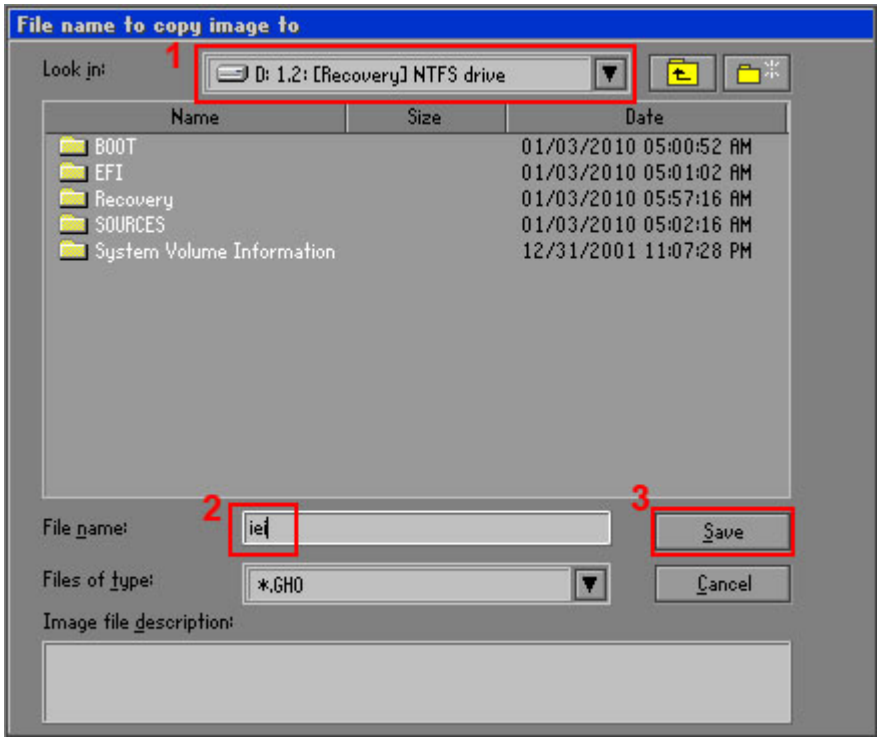


Figure B-16: File Name to Copy Image to

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

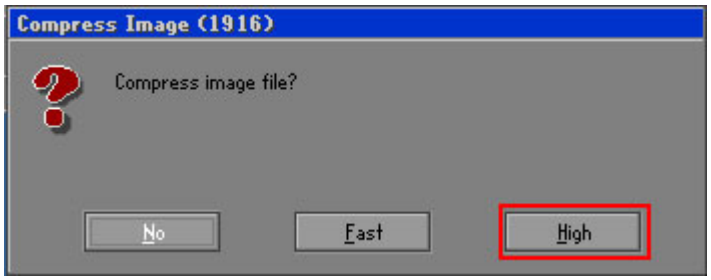


Figure B-17: Compress Image

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

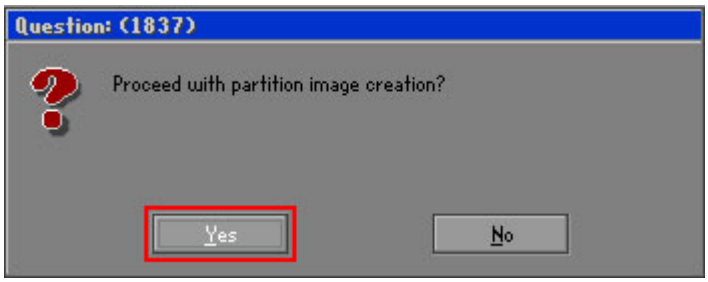


Figure B-18: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure B-19**).

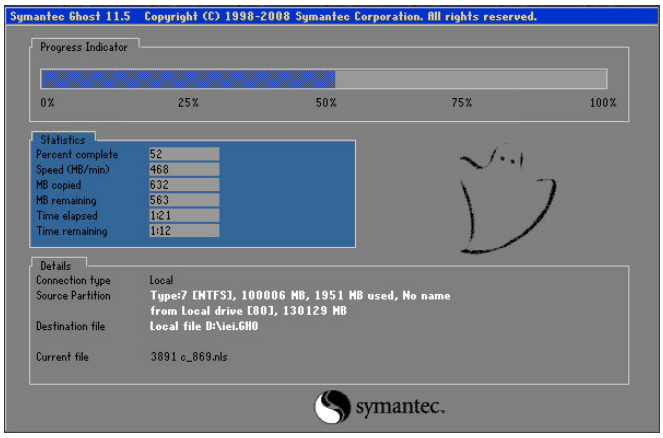


Figure B-19: Image Creation Complete

Step 11: When the image creation completes, a screen prompts as shown in **Figure B-20**. Click **Continue** and close the Ghost window to exit the program.

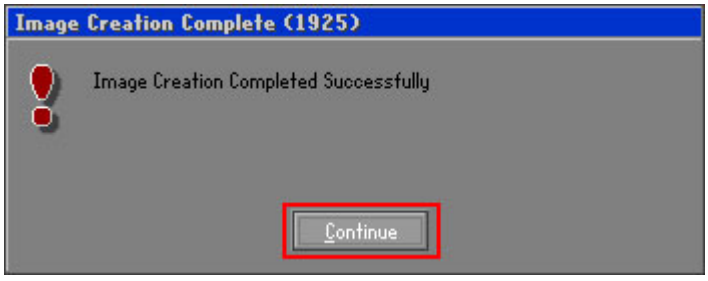


Figure B-20: Image Creation Complete

Step 12: The recovery tool main menu window is shown as below. Press any key to reboot the system.

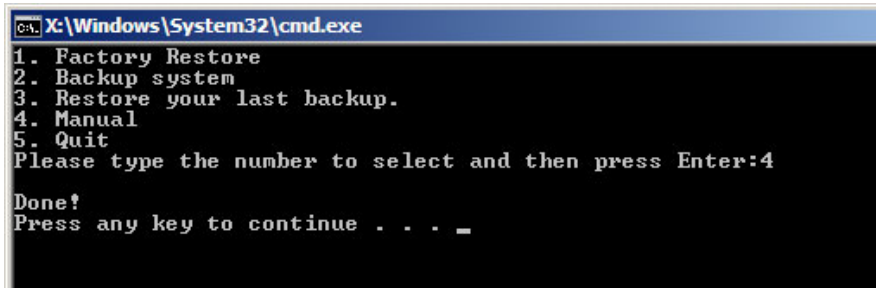


Figure B-21: Press Any Key to Continue

B.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 XP
- Windows Vista
- Windows 7
- Windows XP Embedded
- 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 B.2.1 ~ Section B.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 B-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 B-23)

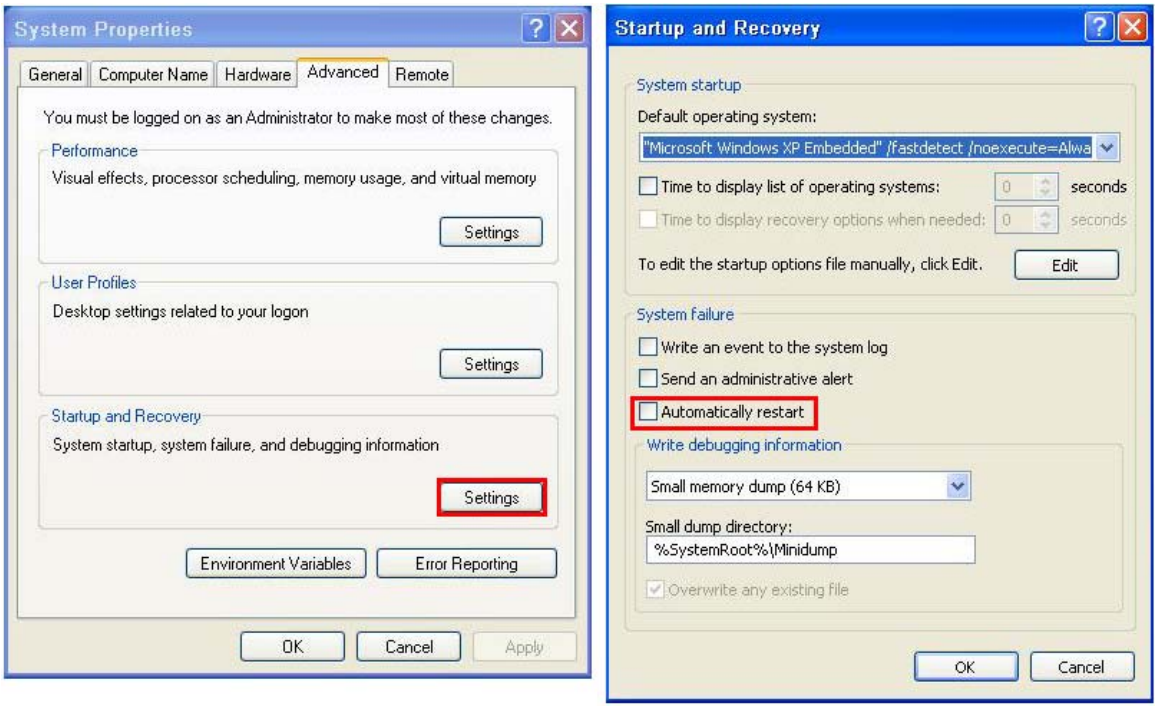


Figure B-23: Disable Automatically Restart

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!

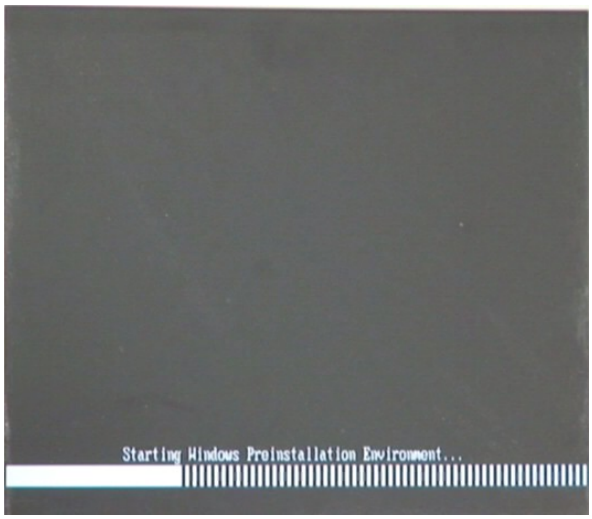


Figure B-24: Launching the Recovery Tool

Step 5: When the recovery tool setup menu appears, press <**4**> then <Enter>.

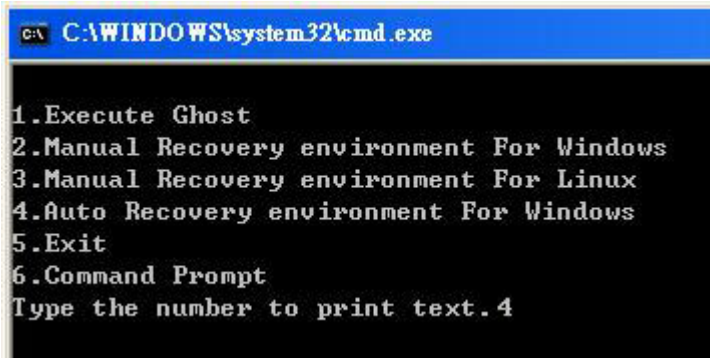


Figure B-25: Auto Recovery Environment for Windows

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 B.2.2** is hidden and the auto recovery tool is saved in this partition.

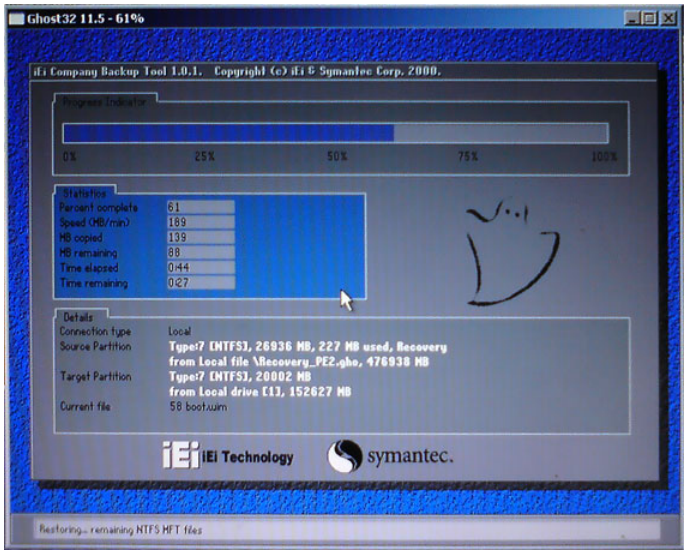


Figure B-26: Building the Auto Recovery Partition

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 B-27: Factory Default Image Confirmation

Step 8: The Symantec Ghost starts to create the factory default image (**Figure B-28**).

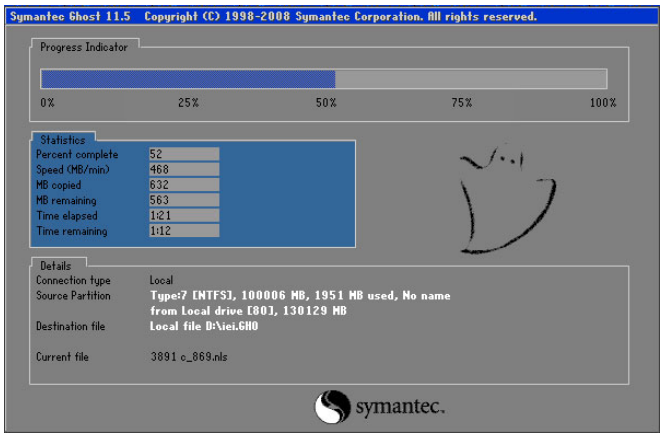


Figure B-28: Image Creation Complete

Step 9: After completing the system configuration, press any key in the following window to restart the system.

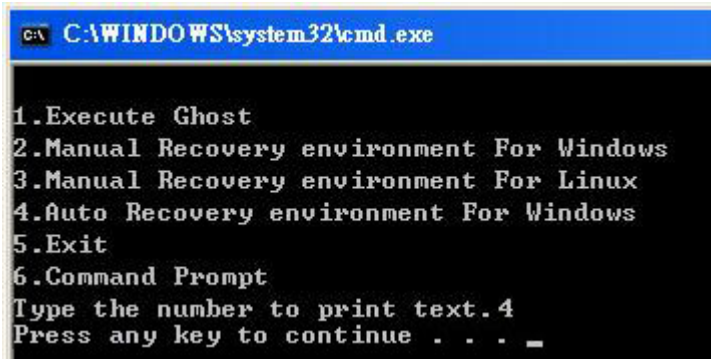
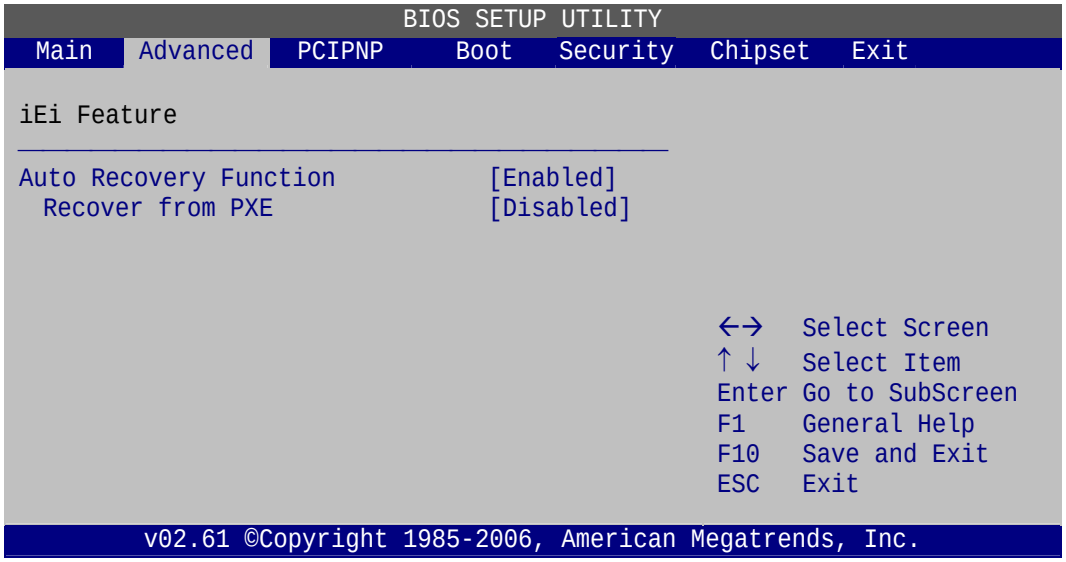


Figure B-29: Press any key to continue

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 Menu 25: 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.

B.4 Setup Procedure for Linux

The initial setup procedures for a Linux system are mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup the recovery tool for Linux OS.

Step 1: **Hardware and BIOS setup**. Refer to **Section B.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.

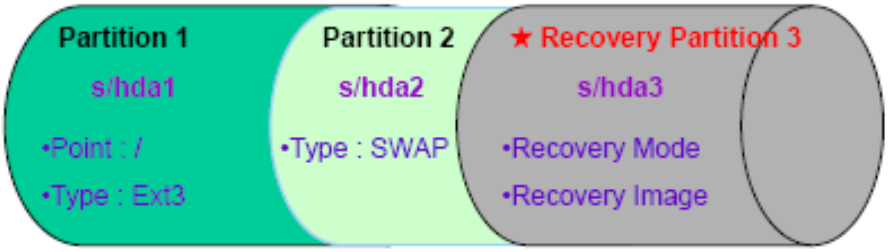


Figure B-30: Partitions for Linux

Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section B.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-up 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 B-31**). The Symantec Ghost window appears and starts configuring the system to build-up a

recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.

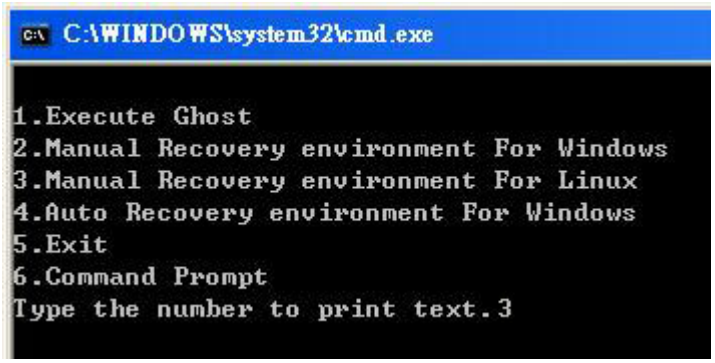


Figure B-31: System Configuration for Linux

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

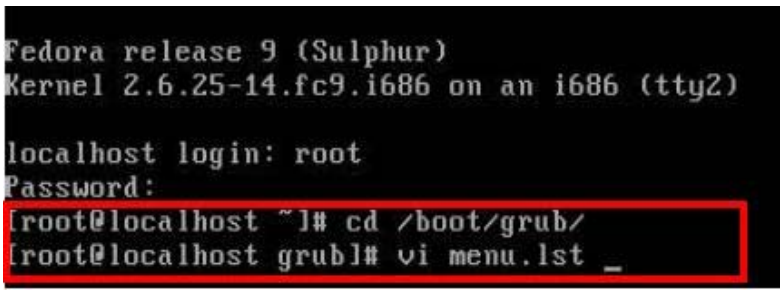
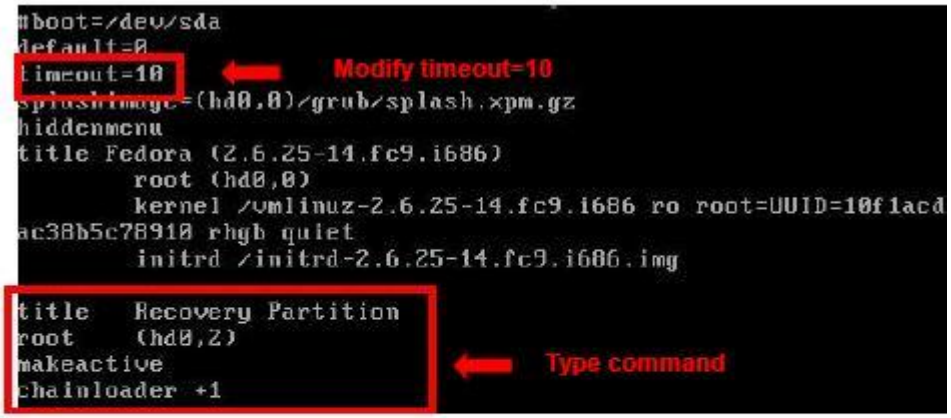


Figure B-32: Access menu.lst in Linux (Text Mode)

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 B-33**)

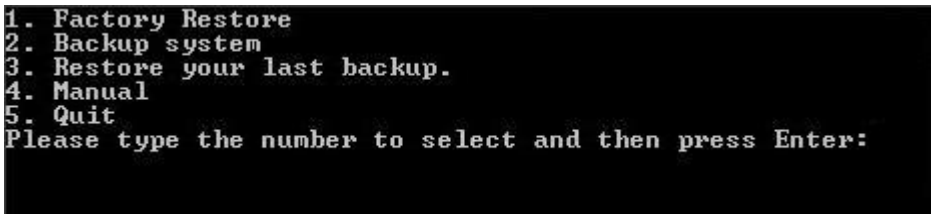


Figure B-33: Recovery Tool Menu

Step 8: **Create a factory default image**. Follow **Step 2** ~ **Step 12** described in **Section B.2.5** to create a factory default image.

B.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 B.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 B-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 B.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).

B.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.

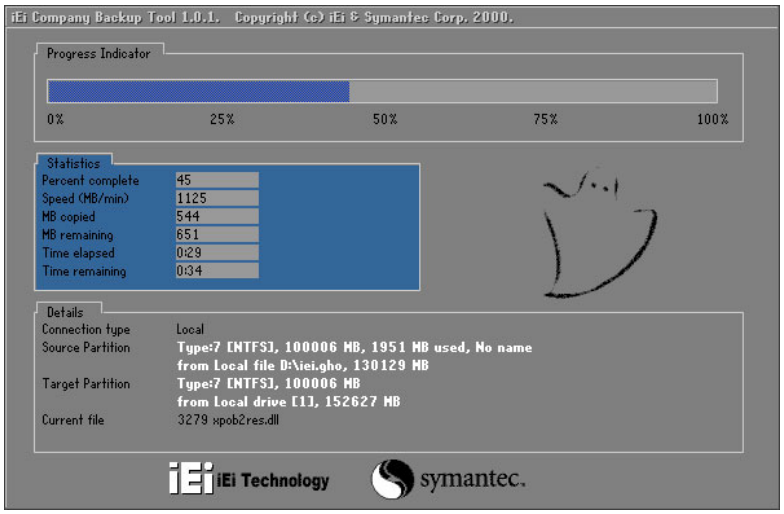


Figure B-35: Restore Factory Default

Step 3: The screen is shown in **Figure B-36** appears when completed. Press any key to reboot the system.

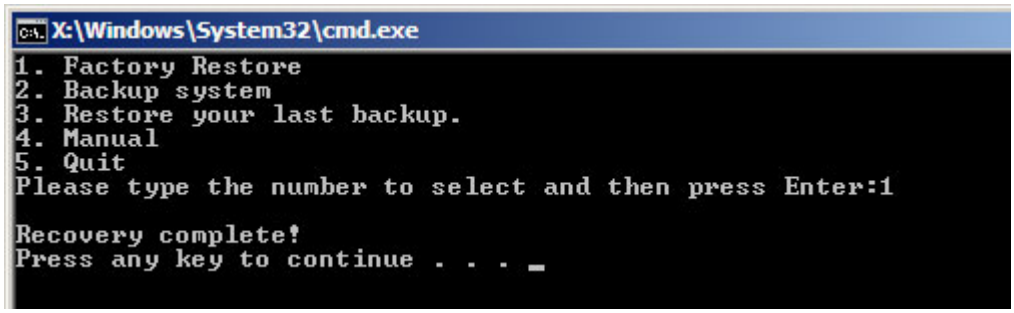


Figure B-36: Recovery Complete Window

B.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.

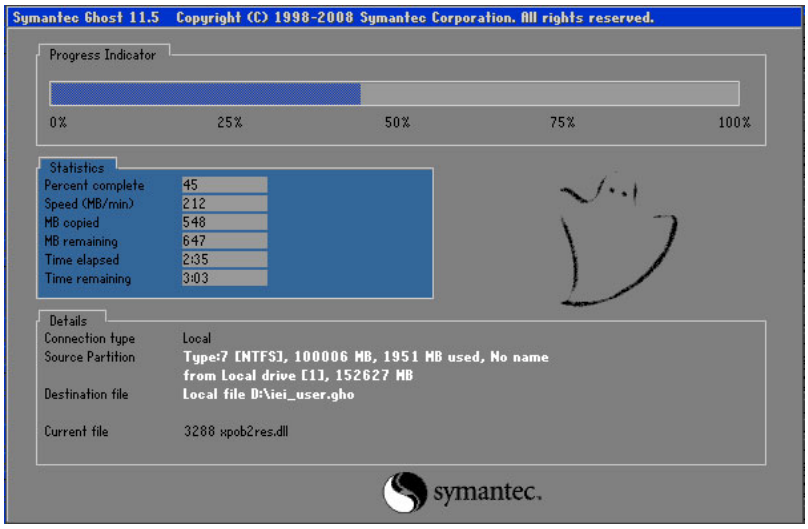


Figure B-37: Backup System

Step 3: The screen is shown in **Figure B-38** appears when system backup is complete. Press any key to reboot the system.

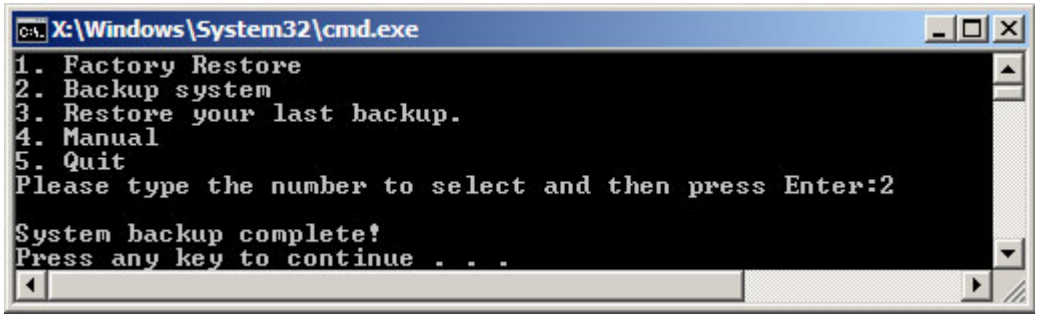


Figure B-38: System Backup Complete Window

B.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).

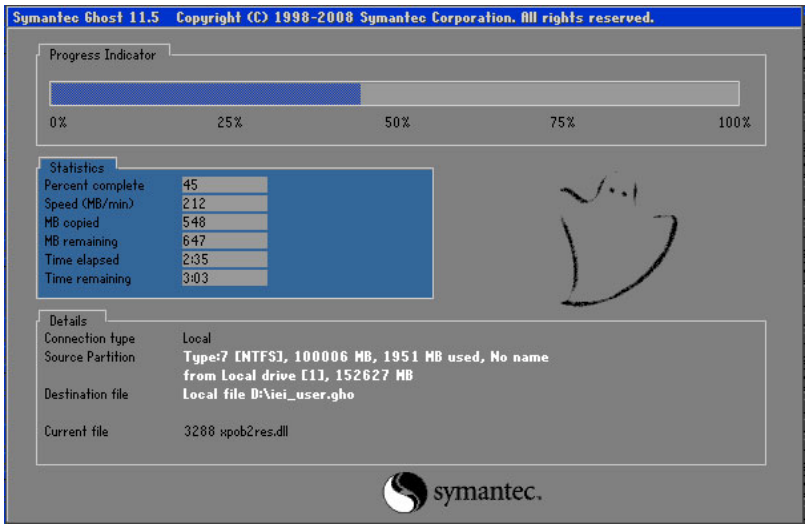


Figure B-39: Restore Backup

Step 3: The screen shown in **Figure B-40** appears when backup recovery is complete. Press any key to reboot the system.

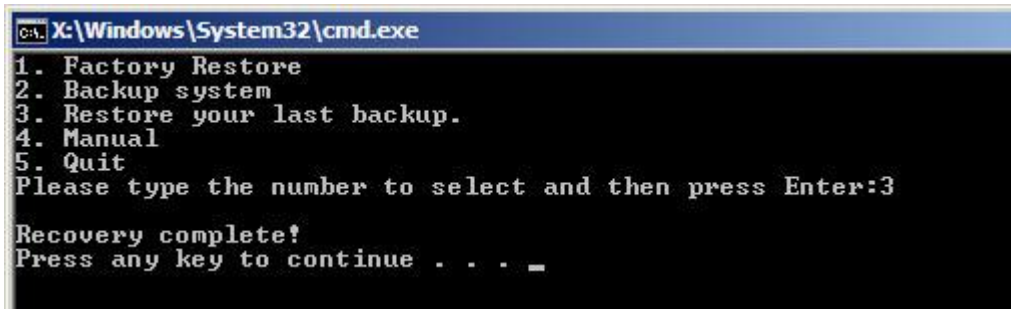


Figure B-40: Restore System Backup Complete Window

B.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.

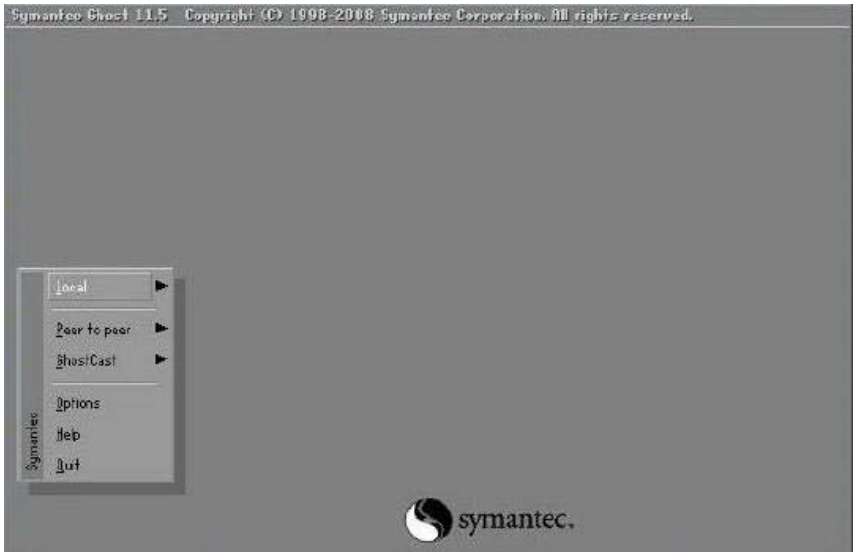
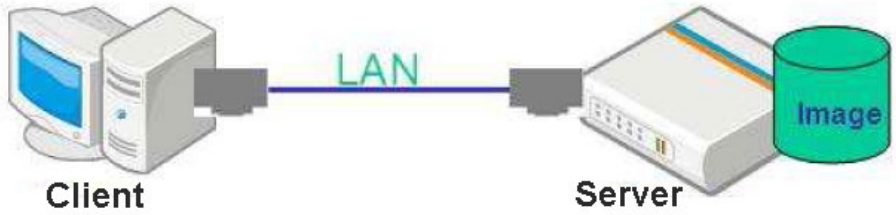


Figure B-41: Symantec Ghost Window

Step 3: When backup or recovery is completed, press any key to reboot the system.

B.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 XP
- Windows Vista
- Windows 7
- Windows XP Embedded
- 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).

B.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.

CentOS

Use the following command to show the DHCP server sample location:

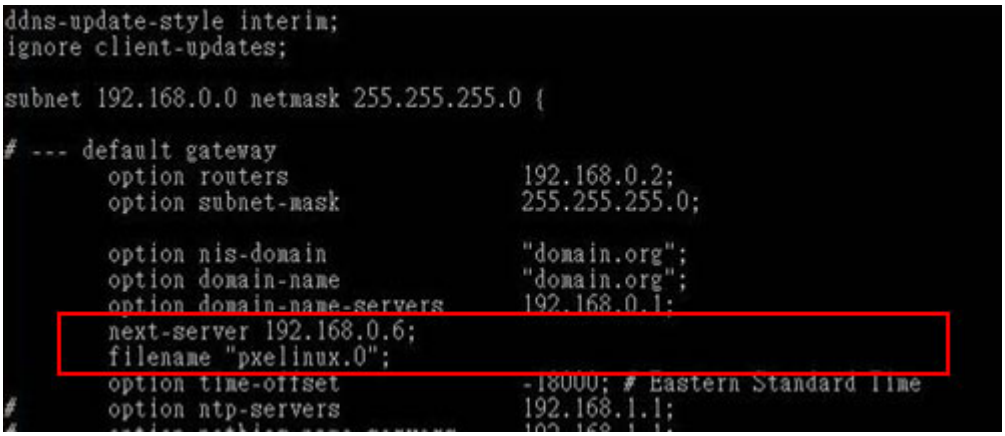
#vi /etc/dhcpd.conf

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



Debian

#vi /etc/dhcpd.conf

Edit “/etc/dhcpd.conf” for your environment. For example, add

next-server PXE server IP address;

filename “pxelinux.0”;

```
ddns-update-style interim;
ignore client-updates;

subnet 192.168.0.0 netmask 255.255.255.0 {

# --- default gateway
        option routers                  192.168.0.2;
        option subnet-mask              255.255.255.0;

        option nis-domain               "domain.org";
        option domain-name              "domain.org";
        option domain-name-servers      192.168.0.1;
        next-server 192.168.0.6;
        filename "pxelinux.0";
        option time-offset              -18000; # Eastern Standard Time
#       option ntp-servers              192.168.1.1;
```

B.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:

CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

server_args = -s /tftpboot –m /tftpboot/tftpd.remap -vvv_

```
{
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

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)

```
#:BOOT: TFTP service is provided primarily for booting.  Most sites
#       run this only on machines acting as "boot servers."

#tftp           dgram   udp     wait    root  /usr/sbin/in.tftpd /usr/sbin/in.tftpd -s
 /var/lib/tftpboot
```

#vi /etc/xinetd.d/tftp

```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

B.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/

B.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

CentOS

#service xinetd restart

#service httpd restart

#service dhcpd restart

Debian

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

#/etc/init.d/dhcp3-server restart

B.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

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
~
```

B.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 B-23)

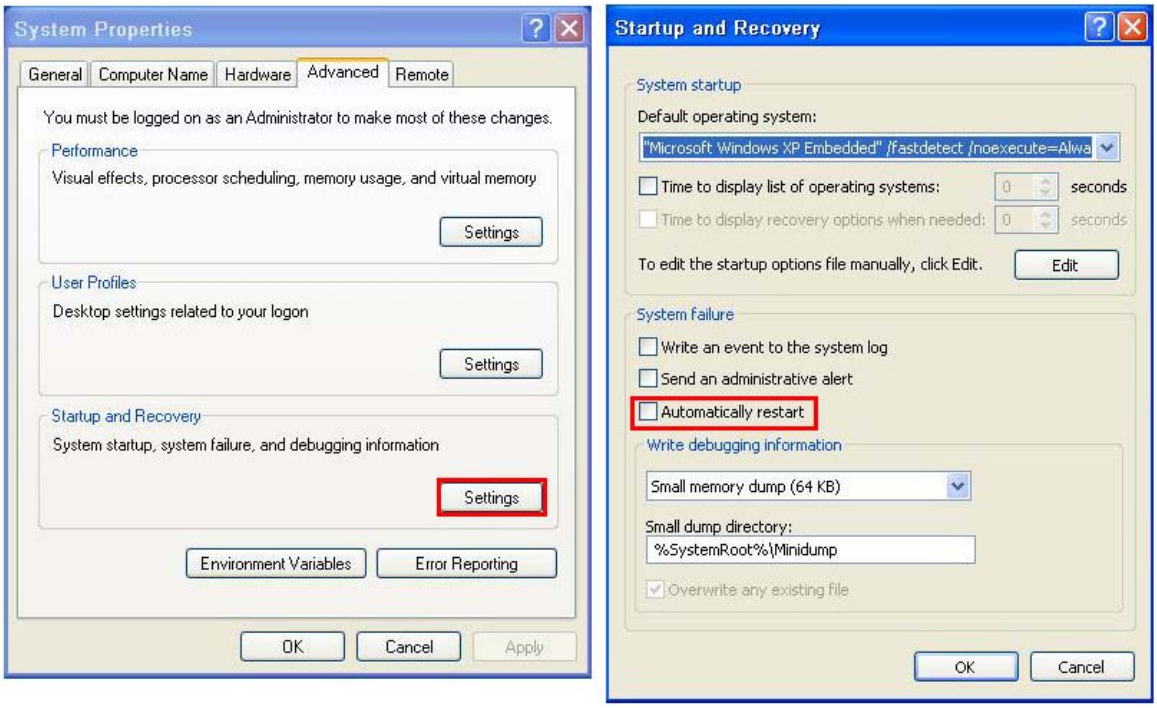


Figure B-42: Disable Automatically Restart

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.

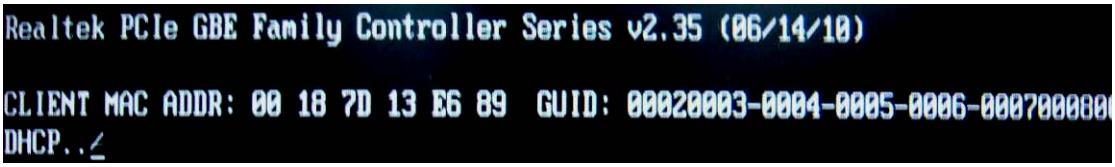
Step 4: Save changes and exit BIOS menu.

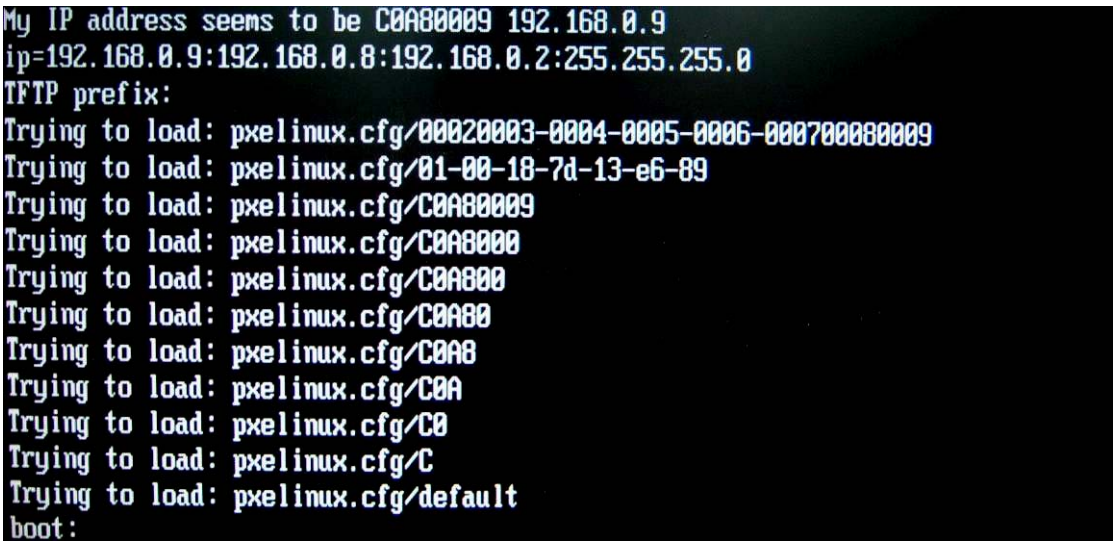
Exit → **Save Changes and Exit**

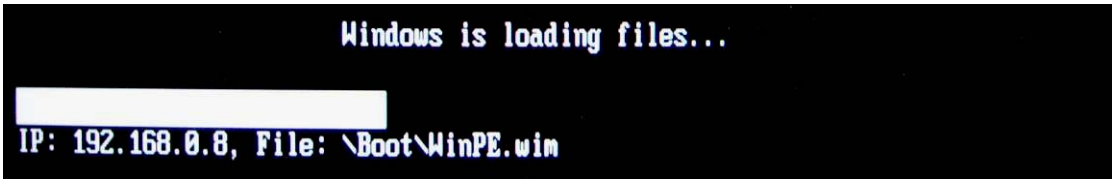
Step 5: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility

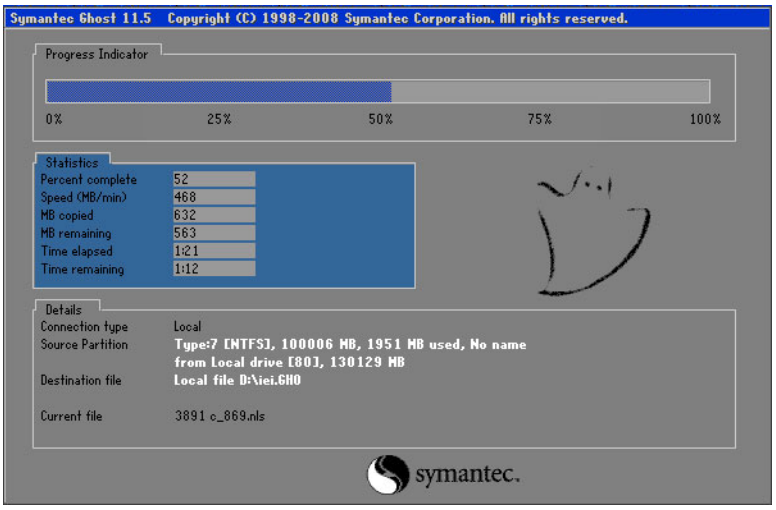
MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

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:

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.

B.7 Other Information

B.7.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

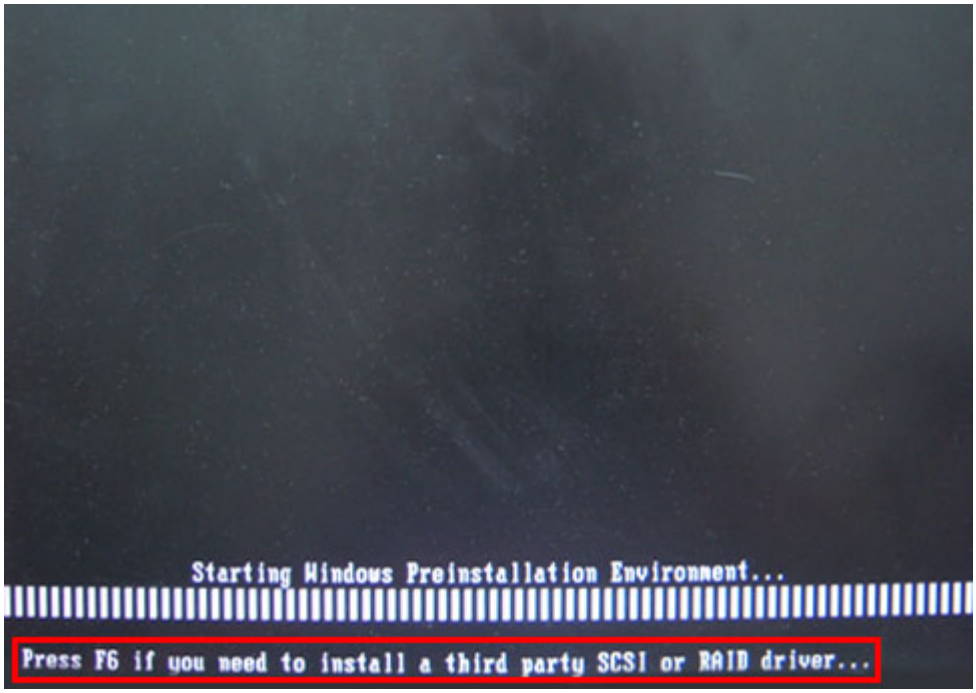
When the system uses AHCI mode or some specific SATA controllers such as ALi M5283 or VIA VT6421A, the SATA RAID/AHCI driver must be installed before using one key recovery. Please follow the steps below to install the SATA RAID/AHCI driver.

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.

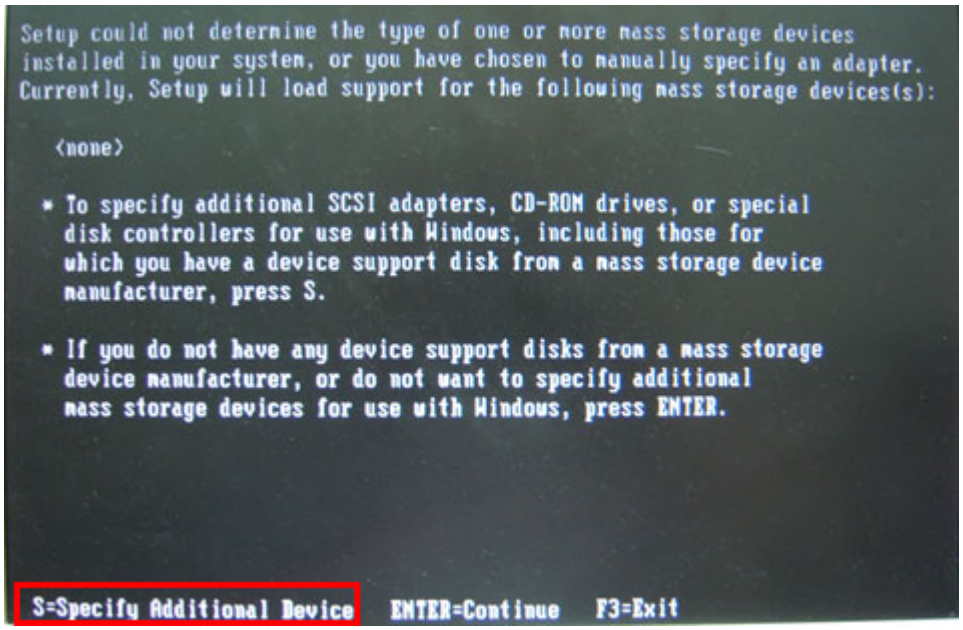
Step 2: Connect the USB floppy disk drive to the system.

Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

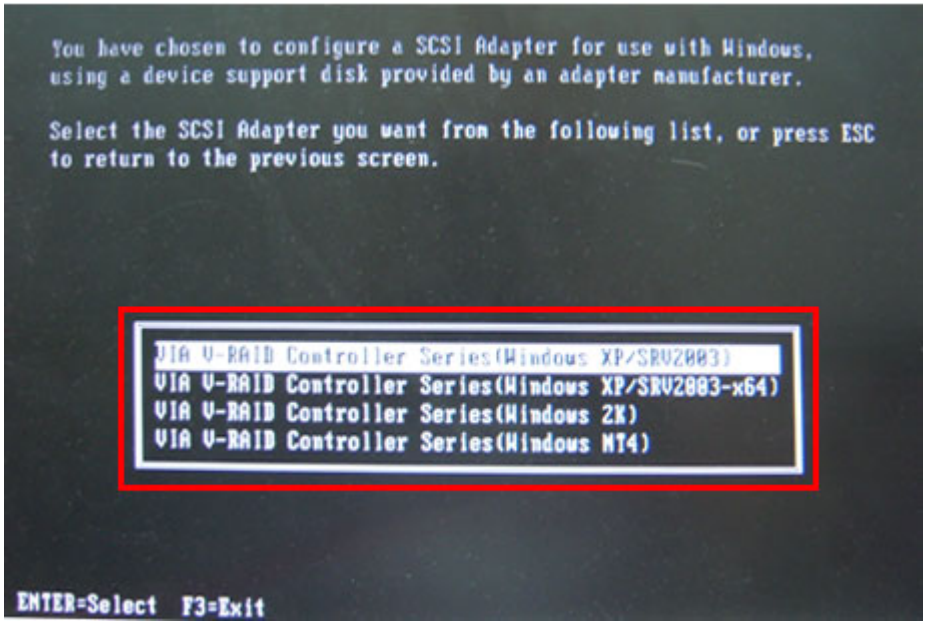
Step 4: When launching the recovery tool, press <**F6**>.



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 B.2.2 Create Partitions** to finish the whole setup process.

B.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

C

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.

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the PCIE-Q670 Series 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	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP27	General purpose I/O port 2 bit 7.
4	Output 2	GP26	General purpose I/O port 2 bit 6.
5	Output 1	GP25	General purpose I/O port 2 bit 5.
6	Output 0	GP24	General purpose I/O port 2 bit 4.
7	Input 3	GP23	General purpose I/O port 2 bit 3.
8	Input 2	GP22	General purpose I/O port 2 bit 2
9	Input 1	GP21	General purpose I/O port 2 bit 1
10	Input 0	GP20	General purpose I/O port 2 bit 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:

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

Intel® Matrix Storage Manager

F.1 Introduction

The PCIE-Q670 Series can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

F.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

F.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives
- Supported Operating Systems include: Windows XP, Windows Server 2003, Windows Server 2008, Windows Vista and Windows 7

F.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

Step 1: **Connect SATA drives to the system**. Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration. If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: **Enable SATA drives in BIOS**. Start the computer and access the BIOS setup program. Enable RAID support for all SATA devices. Refer to the applicable BIOS configuration section in this user manual.

Step 3: **Configure "Option ROM Messages"** BIOS option to **Force BIOS**. This is to allow the "Press <CTRL+I> to enter Configuration Utility……" message to

appear during the POST. Refer to the applicable BIOS configuration section in this user manual.

Step 4: **Save and Exit BIOS**. After the SATA support option is enabled, save and exit the BIOS.

Step 5: **Reboot the system**. Reboot the system after saving and exiting the BIOS.

Step 6: **Press Ctrl+I. during the system boot process**. Press Ctrl+I when prompted to enter the RAID configuration software.

Step 7: **Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

F.4 Installing the Operating System to the RAID Array

To install the operating system to the RAID array some extra steps are necessary during the installation process.

Step 1: **Prepare a RAID driver floppy disk on another computer**. If installing on the RAID array a RAID driver floppy disk must be made. The RAID driver floppy disk utility is on the CD in the “5-SATA/Floppy Configuration Utility” folder. The floppy disk will be formatted and the drivers installed.

Step 2: **Restart the system with a floppy drive attached**. Attach a normal floppy drive or USB floppy drive to the system.

Step 3: **Press F6 when prompted**. During the installation process, Windows OS prompts the user to press F6 to install the RAID drivers. Press F6 and choose from the drivers on the floppy disk.

Step 4: **Install the OS**. Continue with OS installation as usual.

Appendix

G

Hazardous Materials Disclosure

G.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。						