MODEL:

NANO-QM770

**EPIC SBC with 3rd Generation 22nm Intel® Mobile CPU
Up to 8.0 GB DDR3, DVI, HDMI, LVDS, Dual GbE,
SATA 6Gb/s, USB 3.0, PCIe Mini, Intel® AMT, RoHS**

User Manual

Rev. 1.01 – 26 November, 2013

Revision

Date	Version	Changes
26 November, 2013	1.01	Updated Appendix D.2: DIO Connector Pinouts
24 May, 2012	1.00	Initial release

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Introduction

1.1 Introduction
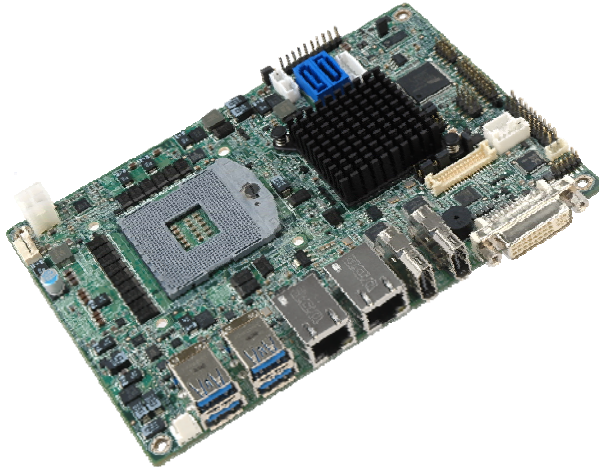
Figure 1-1: NANO-QM770

The NANO-QM770 is an EPIC SBC with a 3rd generation 22nm Intel® mobile CPU and Intel® QM77 Express Chipset. Storage on the board is handled by the SATA 6Gb/s ports for connecting a hard drive, optical drive or SSD. The PCIe Mini slot allows an mSATA card to be installed.

The board has three types of graphics outputs. A DVI-I output connects to a DVI monitor or a traditional VGA monitor. One LVDS connector supports 24-bit dual-channel display and two HDMI connectors support HDMI 1080p display.

Other slots and connectors include RS-232, RS-422/485, gigabit Ethernet, USB 3.0 ports, USB 2.0 ports and digital I/O.

1.2 Benefits

Some of the NANO-QM770 motherboard benefits include:

- Low power consumption
- Wide range of I/O interfaces
- Triple independent display support

1.3 Features

Some of the NANO-QM770 motherboard features are listed below:

- EPIC form factor
- RoHS compliant
- Intel® AMT 8.0 support
- Dual GbE
- Supports HDMI, LVDS and DVI-I interface for triple independent display (HDMI V1.3a compliant)
- Six USB ports (two USB 2.0, four USB 3.0)
- Three serial ports
- PCIe Mini card slot

1.4 Connectors

The connectors on the NANO-QM770 are shown in the figure below.
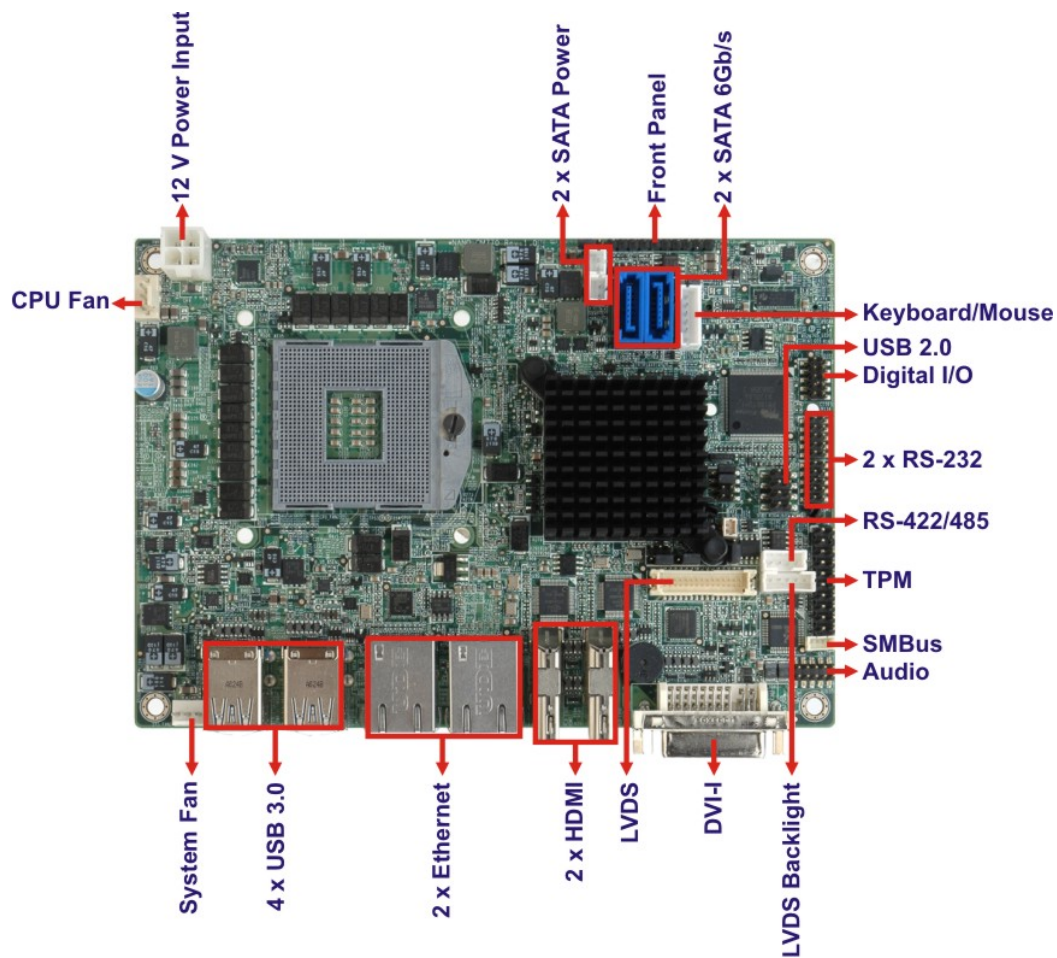
Figure 1-2: Connectors (Front)
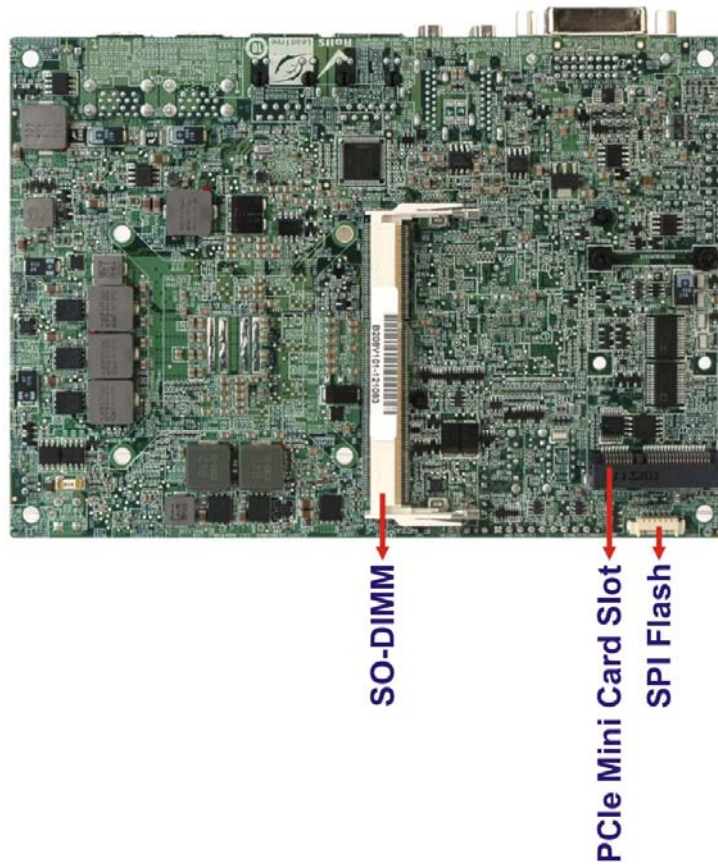
Figure 1-3: Connectors (Solder Side)

1.5 Dimensions

The main dimensions of the NANO-QM770 are shown in the diagram below.
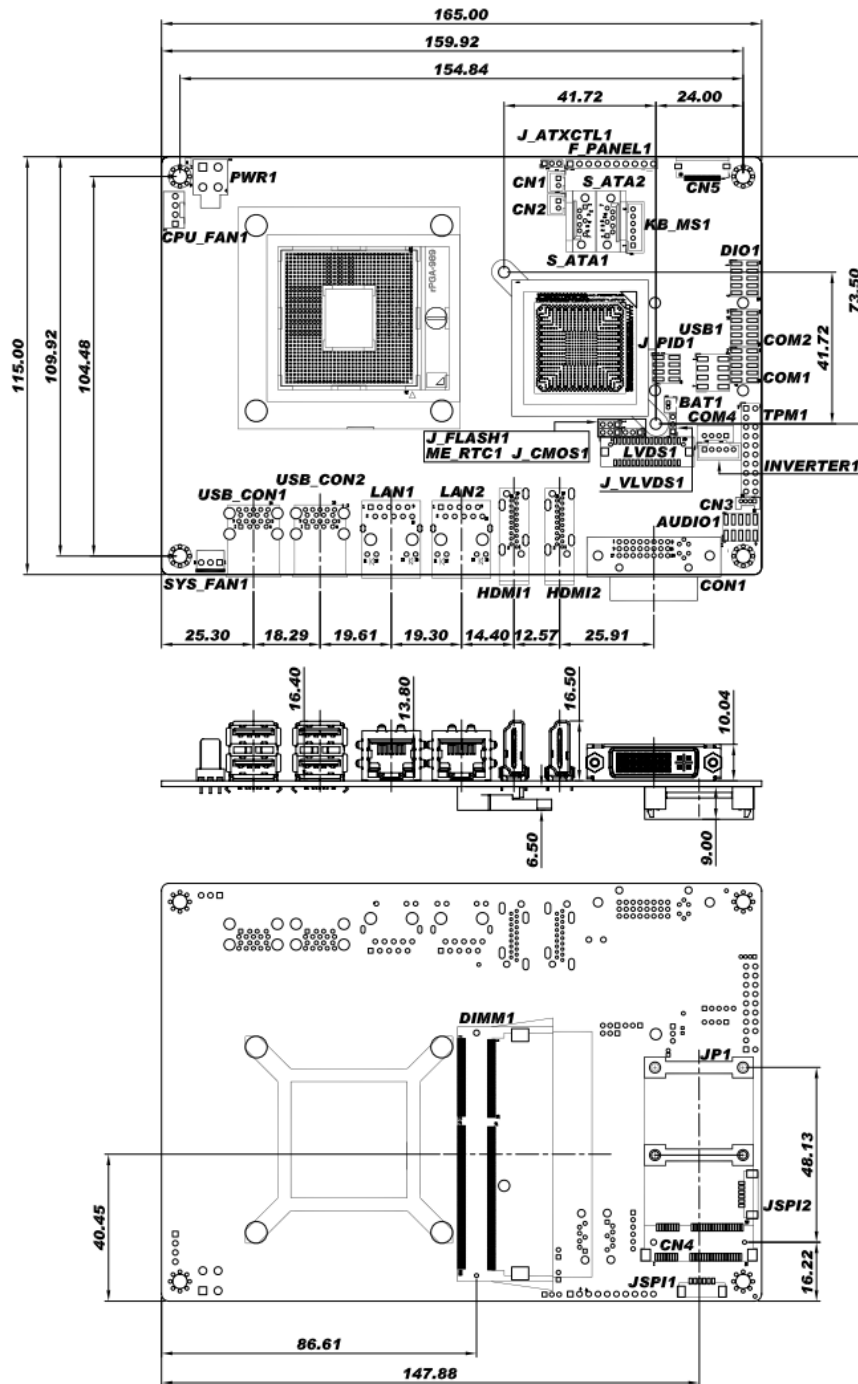
Figure 1-4: Dimensions (mm)

1.6 Data Flow

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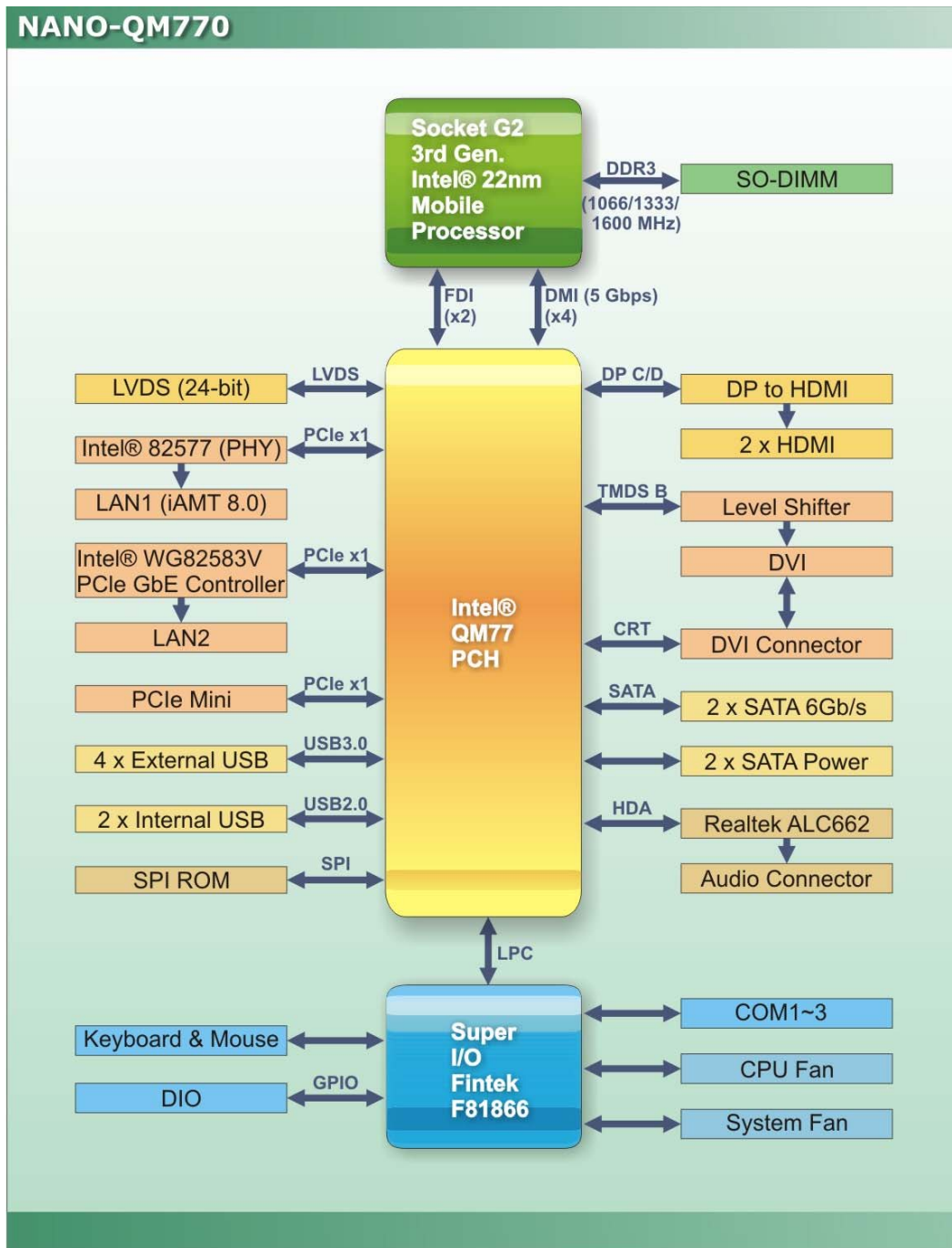
Figure 1-5: Data Flow Diagram

1.7 Technical Specifications

NANO-QM770 technical specifications are listed in Table 1-1.

Specification	NANO-QM770
Form Factor	EPIC
CPU Socket	Socket G2
CPU	3rd generation 22nm Intel® mobile CPU
System Chipset	Intel® QM77
Memory	One 204-pin 1600/1333/1066 MHz DDR3 SO-DIMM supported (system max. 8GB)
Graphics Engine	Intel® Gen 7 with DirectX 11, OGL 3.1, OCL 1.1
BIOS	UEFI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	Intel® 82579 PHY with Intel® AMT 8.0 support (LAN1) Intel® 82583V PCIe Ethernet controller
Audio	Realtek ALC662 HD Audio codec
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	1 x Full-size PCIe Mini slot supports mSATA SSD
I/O Interface Connectors	
Display Output Ports (Triple Display Supported)	1 x DVI-I with analog CRT and DVI support 2 x HDMI (1080p) Dual-channel 24-bit LVDS, resolution up to 1600x1200
Fan connector	One 4-pin wafer for CPU fan One 3-pin wafer for system fan
Keyboard/Mouse	One internal 6-pin wafer connector
Serial Ports	Two RS-232 COM connectors (10-pin header) One RS-422/485 COM connector (4-pin wafer)

USB Ports	Two USB 2.0 (via pin header) Four external USB 3.0 ports
SMBus	One 4-pin wafer connector
Storage	
SATA	Two independent SATA channels with 6Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	12V only, AT/ATX support
Power Connector	1 x Internal 4-pin (2x2) power connector
Power Consumption	12V@5.87A (2.30GHz Intel® Core™ i7-3610QE CPU with 4GB 1333MHz DDR3 memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 70ºC
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	115 mm x 165 mm
Weight GW/NW	850 g/350 g

Table 1-1: Technical 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 NANO-QM770 is unpacked, please do the following:

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

2.3 Packing List

![NOTE icon] **NOTE:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the NANO-QM770 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The NANO-QM770 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-QM770 SBC	
2	SATA and power cable (**P/N:** 32801-000201-100-RS)	
2	RS-232 cable (**P/N:** 32205-002700-100-RS)	
1	Audio cable (**P/N:** 32000-072100-RS)	
1	AT 12V Cable (**P/N**: 32100-087100-RS)	
1	Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	

Quantity	Item and Part Number	Image
1	Utility CD	
1	One Key Recovery CD	
1	Quick installation guide	

Table 2-1: Packing List

2.4 Optional Items

These optional items are available.

Item and Part Number	Image
RS-422/485 cable (**P/N**: 32205-003800-100-RS)	
Dual USB port cable (**P/N**: 32001-008600-100-RS)	
ATX cable (**P/N**: 32100-043403-RS)	
KB/MS PS/2 Y-cable (**P/N**: 32000-023800-RS)	
CPU cooler (**P/N**: CF-989A-RS-R12)	

Item and Part Number	Image
Infineon TPM module (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connector Pinouts

3.1 Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. Section 3.1.2 lists all the peripheral interface connectors seen in Section 3.1.1.

3.1.1 Layout

The figure below shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
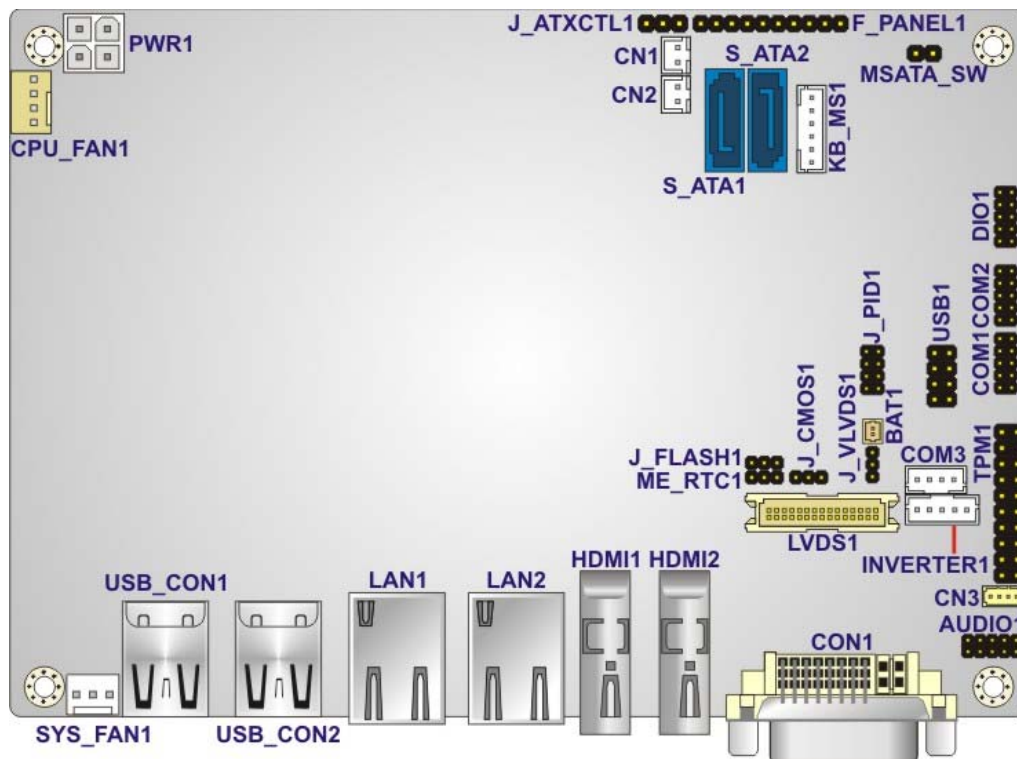
Figure 3-1: Connector and Jumper Locations
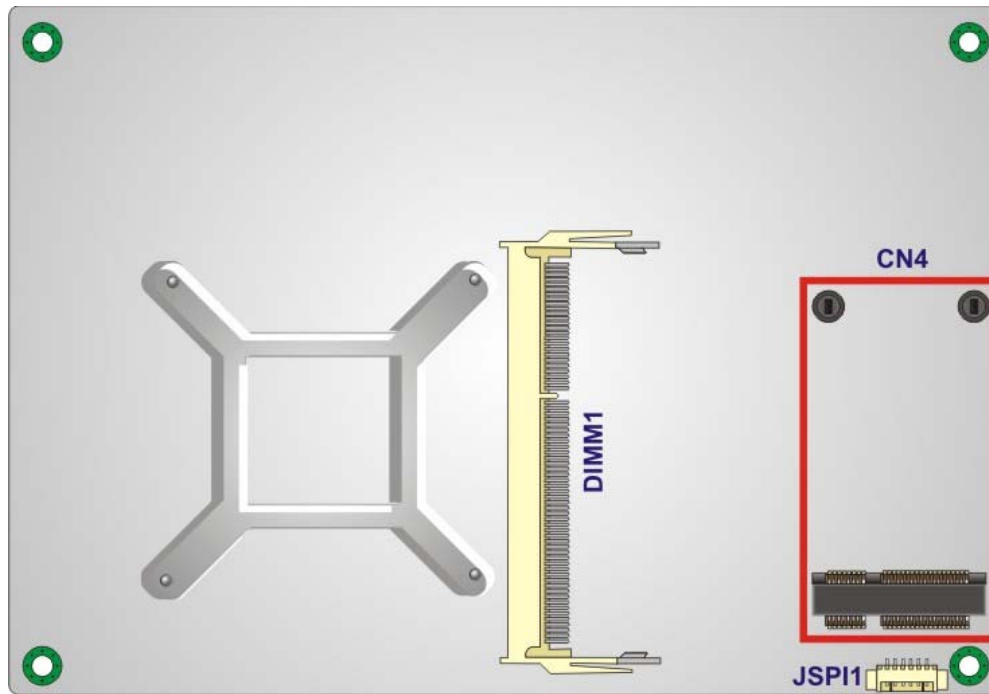
Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the NANO-QM770. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BAT1
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
Keyboard/mouse connector	6-pin wafer	KB_MS1
LVDS connector	30-pin crimp	LVDS1
LVDS backlight connector	5-pin wafer	INVERTER1

Connector	Type	Label
PCIe Mini card slot	PCIe Mini card slot	CN4
Power connector (12V)	4-pin connector	PWR1
RS-232 serial ports (COM1, COM2)	10-pin header	COM1, COM2
RS-422/485 serial port (COM3)	4-pin wafer	COM3
SATA connectors	SATA connector	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	CN1, CN2
SMBus connector	4-pin wafer	CN3
SO-DIMM connector	SO-DIMM connector	DIMM1
SPI Flash	6-pin wafer	JSPI1
TPM connector	20-pin header	TPM1
USB 2.0 connector	8-pin header	USB1

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the rear panel connectors on the NANO-QM770. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
DVI-I connector	DVI-I	CON1
Ethernet connectors	RJ-45	LAN1, LAN2
HDMI connectors	HDMI	HDMI1, HDMI2
USB 3.0 connectors	USB 3.0	USB_CON1 USB_CON2

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NANO-QM770.

3.2.1 Audio Connector

CN Label:	**AUDIO1**
CN Type:	10-pin header
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-3**

This connector connects to speaker, microphone and audio input connectors on the front panel.
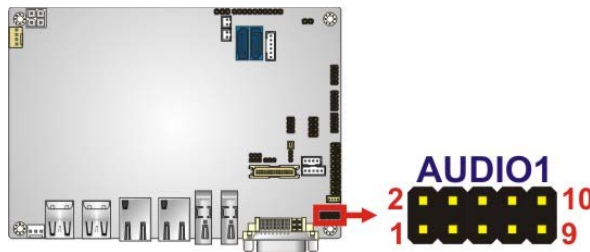
Figure 3-3: Audio Connector Location

Pin	Description	Pin	Description
1	LFRONT-R	2	LLINE-R
3	GND	4	GND
5	LFRONT-L	6	LLINE-L
7	GND	8	GND
9	LMIC1-CONN-R	10	LMIC1-CONN-L

Table 3-3: Audio Connector Pinouts

3.2.2 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 3-4**

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.
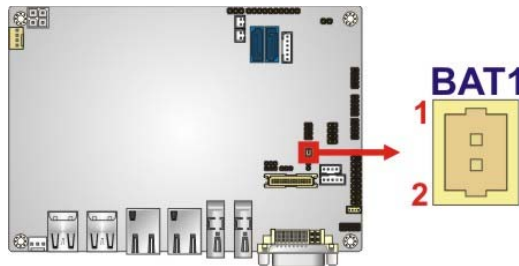
Figure 3-4: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-4: Battery Connector Pinouts

3.2.3 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

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

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.
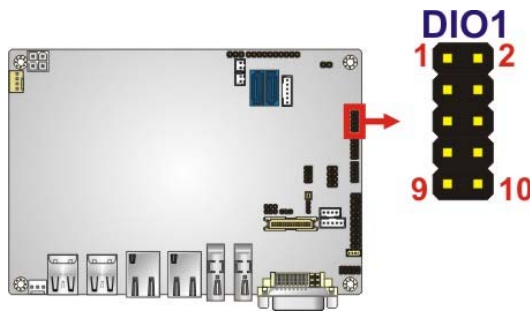
Figure 3-5: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+V5S
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-5: Digital I/O Connector Pinouts

3.2.4 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.
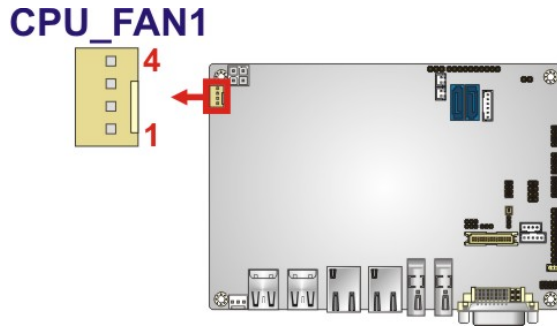
Figure 3-6: CPU Fan Connector Location

Pin	Description
1	GND
2	+V12S
3	Rotation Signal
4	PWM Control Signal

Table 3-6: CPU Fan Connector Pinouts

3.2.5 Fan Connector (System)

CN Label: **SYS_FAN1**

CN Type: 3-pin wafer

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

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

The fan connector attaches to a system cooling fan.
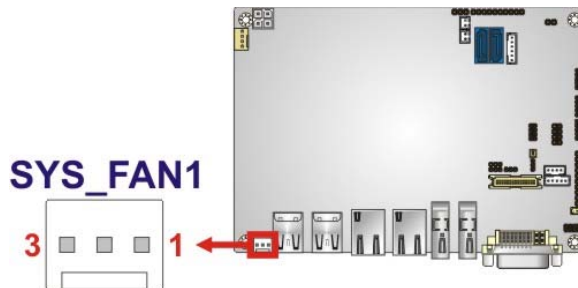
Figure 3-7: System Fan Connector Location

Pin	Description
1	Rotation Signal
2	+12V
3	GND

Table 3-7: System Fan Connector Pinouts

3.2.6 Front Panel Connector

CN Label:	**F_PANEL1**
CN Type:	10-pin header
CN Location:	See **Figure 3-8**
CN Pinouts:	See **Table 3-8**

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.
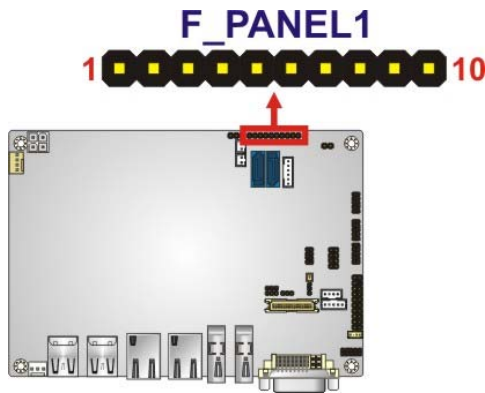
Figure 3-8: Front Panel Connector Location

	Pin	Description		Pin	Description
	1	NC	Power	6	LED_PWR
Power	2	GROUND	LED	7	LED_PWR
Button	3	PWR_BTN-		8	GROUND
HDD	4	IDE_LED_PWR	Reset	9	EXTRST-
LED	5	SATA_LED#		10	Ground

Table 3-8: Front Panel Connector Pinouts

3.2.7 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-9**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.
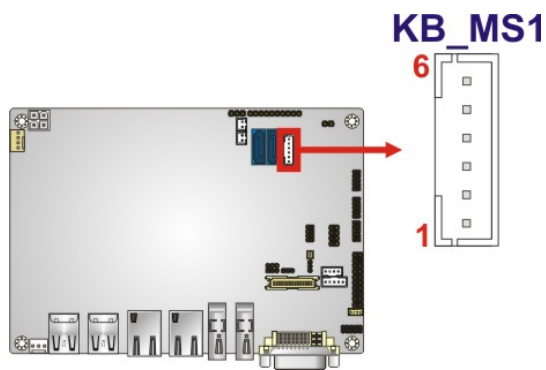
Figure 3-9: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-9: Keyboard/Mouse Connector Pinouts

3.2.8 LVDS Connector

CN Label:	**LVDS1**
CN Type:	30-pin crimp
CN Location:	See **Figure 3-10**

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

The LVDS connector is for an LCD panel connected to the board.
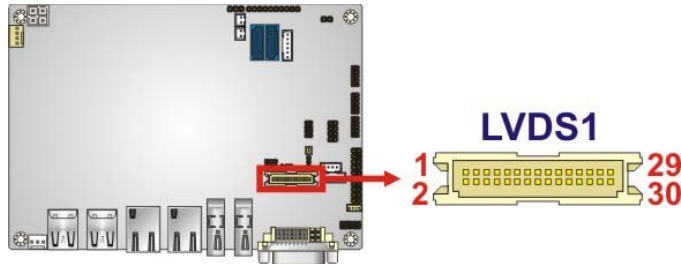
Figure 3-10: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND	14	GND
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND	26	GND
27	VCC/VCC3	28	VCC/VCC3
29	VCC/VCC3	30	VCC/VCC3

Table 3-10: LVDS Connector Pinouts

3.2.9 LVDS Backlight Connector

CN Label:	**INVERTER1**
CN Type:	5-pin wafer
CN Location:	See **Figure 3-11**
CN Pinouts:	See **Table 3-11**

The backlight inverter connectors provide power to LCD panels.
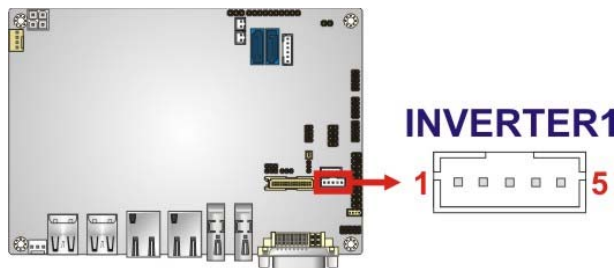
Figure 3-11: LVDS Backlight Inverter Connector

Pin	Description
1	BRIGHTNESS
2	GROUND
3	+12VS_LCD_BKL
4	GROUND
5	BACKLIGHT ENABLE

Table 3-11: Backlight Inverter Connector Pinouts

3.2.10 PCIe Mini Card Slot

CN Label:	**CN4**
CN Type:	PCIe Mini card slot
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-12**

The PCIe Mini card slot enables a PCIe Mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards and IEI PCIe Mini disk on module (DOM) SSD cards.
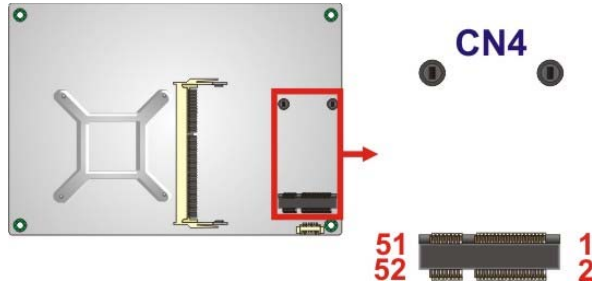
Figure 3-12: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	CLK-	12	N/C
13	CLK+	14	N/C
15	GND	16	N/C
17	PCIRST#	18	GND
19	N/C	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	N/C	38	USBD+
39	N/C	40	GND

Pin	Description	Pin	Description
41	N/C	42	N/C
43	N/C	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 3-12: PCIe Mini Card Slot Pinouts

3.2.11 Power Connector (12V)

CN Label: **PWR1**

CN Type: 4-pin connector

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

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

The power connector is connected to an external power supply and supports 12V power input. Power is provided to the system, from the power supply through this connector.
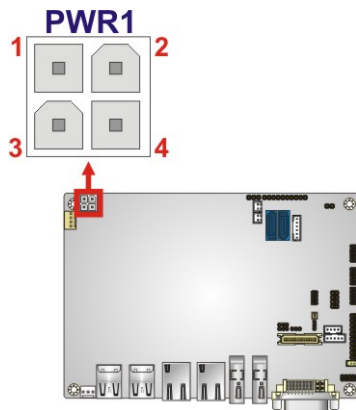
Figure 3-13: Power Connector Location

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

Table 3-13: Power Connector Pinouts

3.2.12 RS-232 Serial Port Connectors (COM1, COM2)

CN Label: **COM1, COM2**

CN Type: 10-pin header

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

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

The 10-pin serial port connectors provide two RS-232 serial communications channels. The COM serial port connectors can be connected to external RS-232 serial port devices.
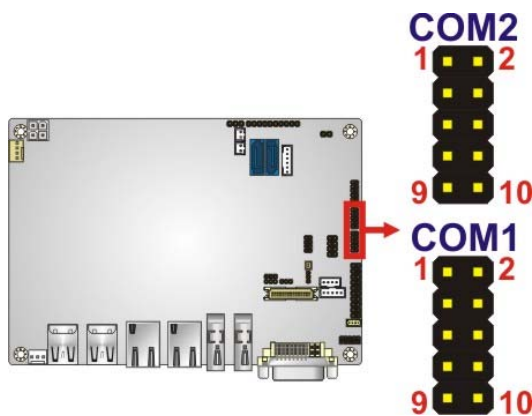
Figure 3-14: RS-232 Serial Port Connector Locations

Pin	Description	Pin	Description
1	-NDCD2	6	-NCTS2
2	-NDSR2	7	-NDTR2
3	NSIN2	8	-XRI2
4	-NRTS2	9	GND
5	NSOUT2	10	GND

Table 3-14: Serial Port Connector Pinouts

3.2.13 RS-422/485 Serial Port Connector (COM3)

CN Label: **COM3**

CN Type: 4-pin wafer

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

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

This connector provides RS-422 or RS-485 communications.
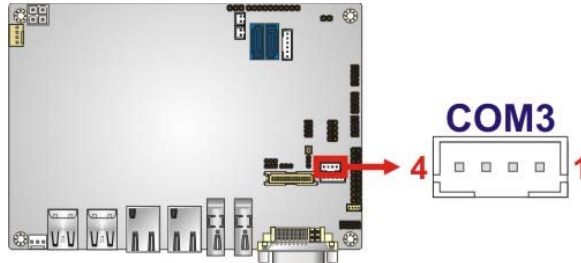
Figure 3-15: RS-422/485 Serial Port Connector Location

Pin	Description
1	RXD485#
2	RXD485+
3	TXD485+
4	TXD485#

Table 3-15: RS-422/485 Serial Port Connector Pinouts

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

Table 3-16: DB-9 RS-422/485 Pinouts

3.2.14 SATA Drive Connectors

CN Label: **S_ATA1, S_ATA2**

CN Type: 7-pin SATA drive connectors

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

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

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 6Gb/s.
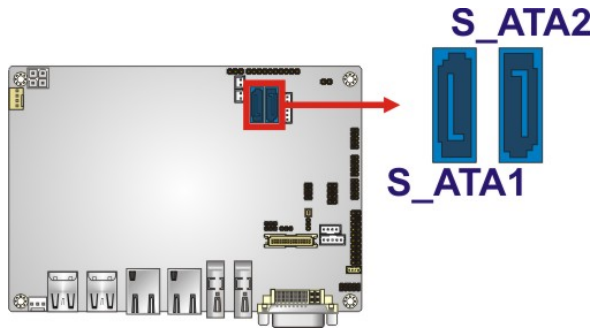
Figure 3-16: SATA Drive Connector Locations

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

Table 3-17: SATA Drive Connector Pinouts

3.2.15 SATA Power Connectors

CN Label: **CN1, CN2**

CN Type: 2-pin wafer

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

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

Use the SATA Power Connector to connect to SATA device power connections.
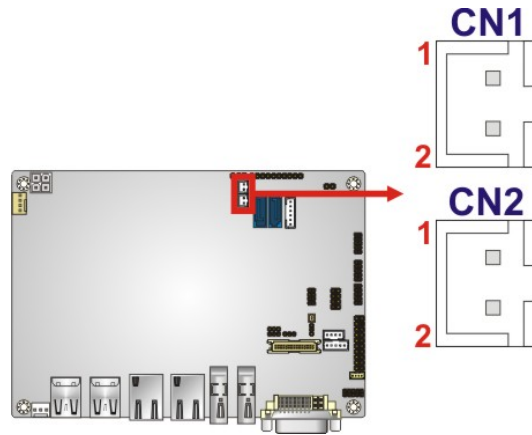
Figure 3-17: SATA Power Connector Locations

Pin	Description
1	+V5S
2	GND

Table 3-18: SATA Power Connector Pinouts

3.2.16 SMBus Connector

CN Label:	**CN3**
CN Type:	4-pin wafer
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-19**

The SMBus (System Management Bus) connector provides low-speed system management communications.
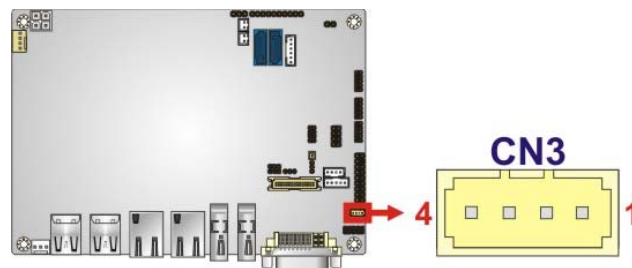
Figure 3-18: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-19: SMBus Connector Pinouts

3.2.17 SO-DIMM Connector

CN Label: DIMM1

CN Type: 204-pin DDR3 SO-DIMM connector

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

The SO-DIMM connector is for installing memory on the system.
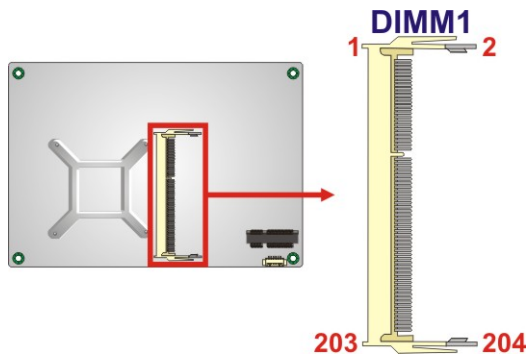
Figure 3-19: SO-DIMM Connector Location

3.2.18 SPI Flash Connector

CN Label: JSPI1

CN Type: 6-pin header

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

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

The 6-pin SPI Flash connector is used to flash the BIOS.
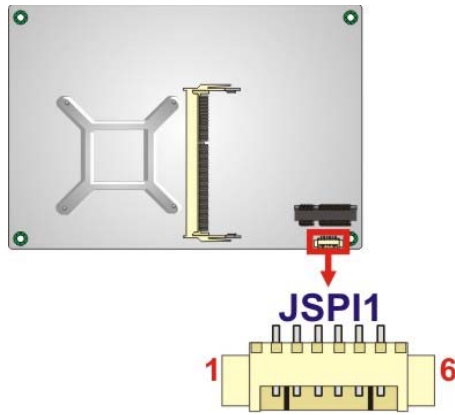
Figure 3-20: SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON
2	SPI_CS
3	SPI_SO_SW
4	SPI_CLK_SW
5	SPI_SI_SW
6	GND

Table 3-20: SPI Flash Connector Pinouts

3.2.19 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header

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

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

The Trusted Platform Module (TPM) connector secures the system on bootup.
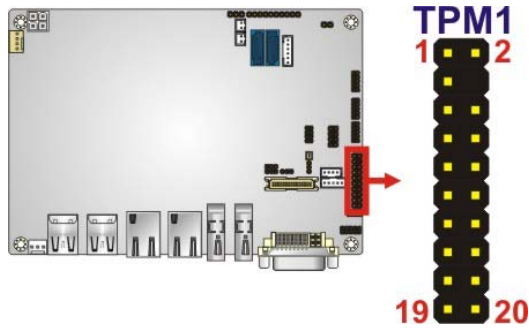
Figure 3-21: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-21: TPM Connector Pinouts

3.2.20 USB 2.0 Connector

> **CN Label:** **USB1**
>
> **CN Type:** 8-pin header
>
> **CN Location:** See **Figure 3-22**
>
> **CN Pinouts:** See **Table 3-22**

The USB header can connect to two USB devices.
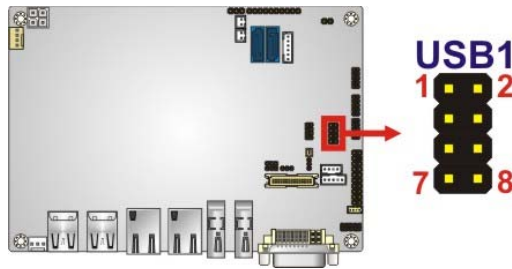
Figure 3-22: USB Connector Location

Pin	Description	Pin	Description
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-22: USB Port Connector Pinouts

3.3 External Interface Connectors

Figure 3-23 shows the NANO-QM770 motherboard external interface connectors. The NANO-QM770 on-board external interface connectors are shown in Figure 3-23.
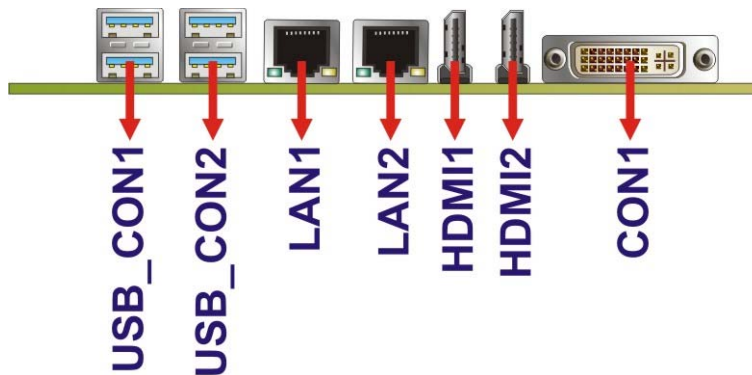
Figure 3-23: External Interface Connectors

3.3.1 DVI Connector

CN Label: **CON1**

CN Type: DVI connector

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

CN Pinouts: See **Table 3-23** and **Figure 3-24**

The 24-pin Digital Visual Interface (DVI) connector connects to high-speed, high-resolution digital displays. The DVI-I connector supports both digital and analog signals.

Pin	Description	Pin	Description	Pin	Description
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+
3	GND	11	GND	19	GND
4	N/C	12	NC	20	NC
5	N/C	13	NC	21	NC
6	DDC Clock [SCL]	14	5V	22	GND
7	DDC Data [SDA]	15	GND	23	TMDS Clock +
8	5VSYNC	16	HPD	24	TMDS Clock -
C1	BR	--	--	--	--
C2	BG	--	--	--	--
C3	BB	--	--	--	--
C4	5HSync	--	--	--	--
C5	GND	--	--	--	--

Table 3-23: DVI Connector Pinouts
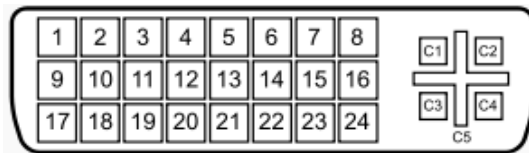
Figure 3-24: DVI-I Connector

3.3.2 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45

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

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

The LAN connector connects to a local network.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

Table 3-24: LAN Pinouts
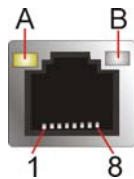
Figure 3-25: Ethernet Connector

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

3.3.3 HDMI Connectors

CN Label: **HDMI1, HDMI2**

CN Type: HDMI connector

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

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

The HDMI connector connects to a display device with HDMI interface.

Pin	Description	Pin	Description
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD
8	GND	20	HDMI_GND
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

Table 3-26: HDMI Connector Pinouts
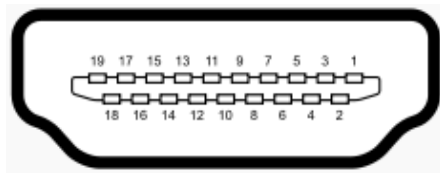
Figure 3-26: HDMI Connector

3.3.4 USB 3.0 Connectors

CN Label: **USB_CON1, USB_CON2**

CN Type: USB 3.0 port

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

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

The USB 3.0 connector can be connected to a USB device.

Pin	Description	Pin	Description
1	VBUS	2	DATA1-
3	DATA1+	4	GND
5	SSRX1-	6	SSRX1+
7	GND	8	SSTX1-
9	SSTX1+	10	VBUS
11	DATA2-	12	DATA2+
13	GND	14	SSRX2-
15	SSRX2+	16	GND
17	SSTX2-	18	SSTX2+

Table 3-27: USB Port Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

⚡ WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the product and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-QM770. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the NANO-QM770, or any other electrical component, is handled.

- *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 NANO-QM770, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-QM770.
- *Only handle the edges of the PCB*:-: When handling the PCB, hold it by the edges.

4.2 Installation Considerations

✓ NOTE:

The following installation notices and installation considerations should be read and understood before the NANO-QM770 is installed. All installation notices pertaining to the installation of NANO-QM770 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-QM770 and injury to the person installing the motherboard.

⚠ **WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-QM770, NANO-QM770 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 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 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 off**:
  ○ Make sure the product is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the NANO-QM770 **DO NOT:**

▪ **DO NOT** remove any of the stickers on the PCB board. These stickers are required for warranty validation.
▪ **DO NOT** use the product before verifying all the cables and power connectors are properly connected.
▪ **DO NOT** allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 SO-DIMM Installation

To install an SO-DIMM, please follow the steps below and refer to Figure 4-1.
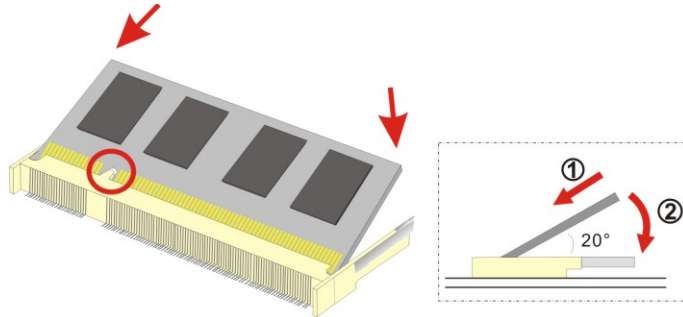
Figure 4-1: SO-DIMM Installation

Step 1:   **Locate the SO-DIMM socket**. Place the board on an anti-static mat.

Step 2:   **Align the SO-DIMM with the socket**. Align the notch on the memory with the notch on the memory socket.

Step 3:   **Insert the SO-DIMM**. Push the memory in at a 20⁰ angle. (See Figure 4-1)

Step 4:   **Seat the SO-DIMM**. Gently push downwards and the arms clip into place. (See Figure 4-1)

4.4 PCIe Mini Card Installation

A PCIe Mini card slot is located on the solder side of the NANO-QM770. To install the PCIe Mini card, please refer to the diagram and instructions below.
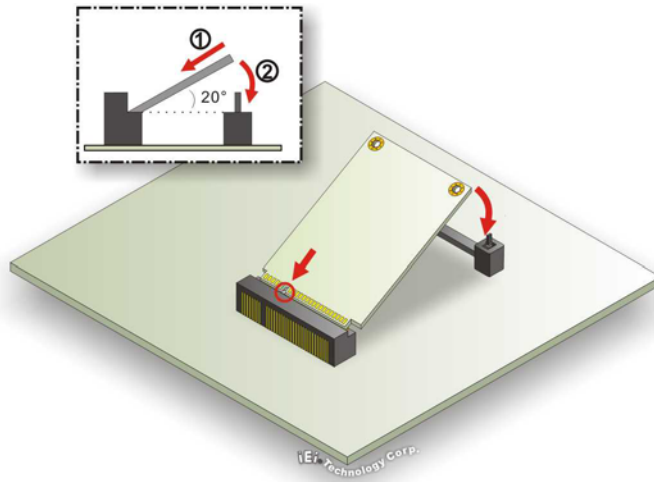
Figure 4-2: PCIe Mini Card Installation

Step 1: **Insert into the socket at an 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.

4.5 Jumper Settings

  NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two 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.
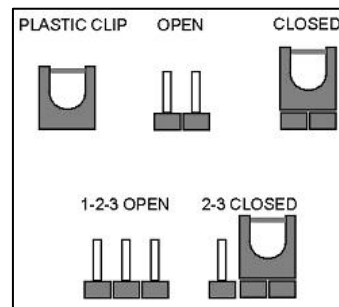
Before the NANO-QM770 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-QM770 are listed in Table 4-1.

Description	Label	Type
AT/ATX mode selection	J_ATXCTL1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
Clear ME RTC registers	ME_RTC1	3-pin header
Flash descriptor security override	J_FLASH1	3-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
LVDS resolution selection	J_PID1	8-pin header
PCIe Mini/mSATA mode selection	MSATA_SW	2-pin header

Table 4-1: Jumpers

4.5.1 AT/ATX Mode Selection

Jumper Label:	**J_ATXCTL1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-2**
Jumper Location:	See **Figure 4-3**

Set both of the jumpers select AT or ATX power mode for the NANO-QM770. AT power mode limits the system to on/off. ATX allows the system to use various power saving states and enter a standby state, so the system can be turned on remotely over a network. The settings on both jumpers should be the same.

Pin	Description
Short 1-2	ATX mode (Default)
Short 2-3	AT mode

Table 4-2: AT/ATX Mode Selection Jumper Settings
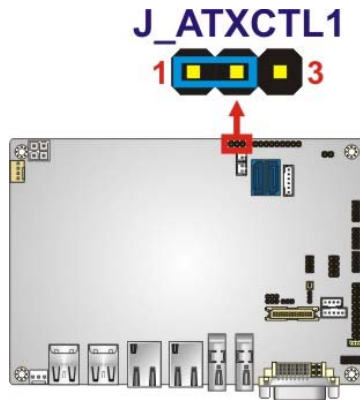
Figure 4-3: AT/ATX Mode Selection Jumper Location

4.5.2 Clear CMOS

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-4**

If the NANO-QM770 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in Table 4-3.

Pin	Description
Short 1-2	Keep CMOS Setup (Default)
Short 2-3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings
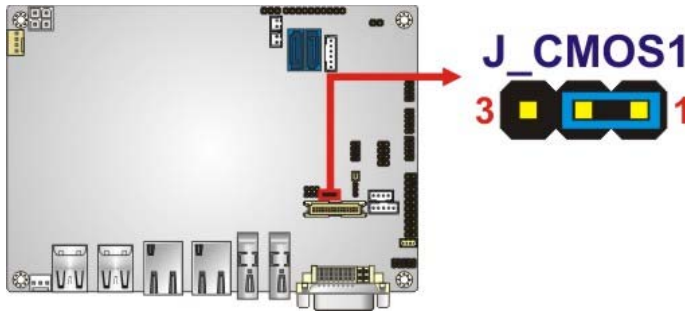
Figure 4-4: Clear CMOS Jumper Location

4.5.3 Clear ME RTC Registers

Jumper Label:	**ME_RTC1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-5**

Resets the RTC registers used for the Intel® Management Engine when the on-board battery is changed.

Pin	Description
Short 1-2	Save ME RTC registers (Default)
Short 2-3	Clear ME RTC registers

Table 4-4: Clear ME RTC Registers Jumper Settings
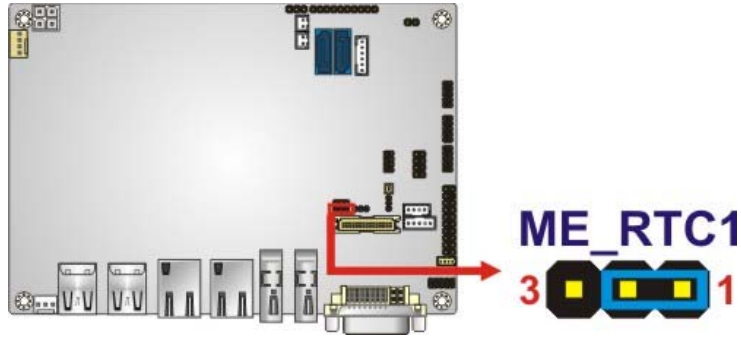
Figure 4-5: Clear ME RTC Registers Jumper Location

4.5.4 Flash Descriptor Security Override

Jumper Label:	**J_FLASH1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-5**
Jumper Location:	See **Figure 4-6**

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

Setting	Description
Short 1-2	No override
Short 2-3	Override

Table 4-5: Flash Descriptor Security Override Jumper Settings
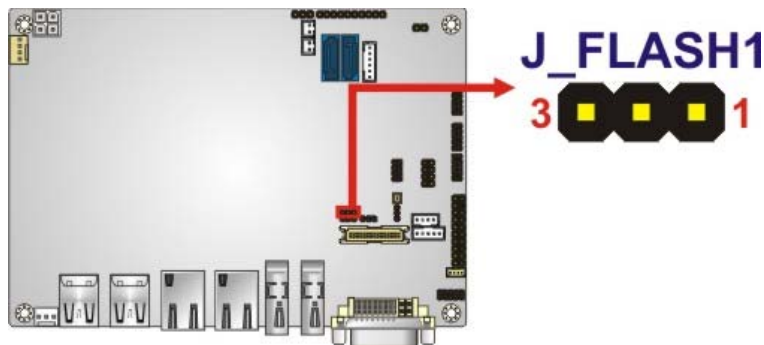
Figure 4-6: Flash Descriptor Security Override Jumper Location

4.5.5 LVDS Voltage Selection

Jumper Label:	J_VLVDS1
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-6**
Jumper Location:	See **Figure 4-7**

Selects the voltage of the LVDS connector.

Pin	Description
Short 1-2	+3.3 V (Default)
Short 2-3	+5 V

Table 4-6: LVDS Voltage Selection Jumper Settings
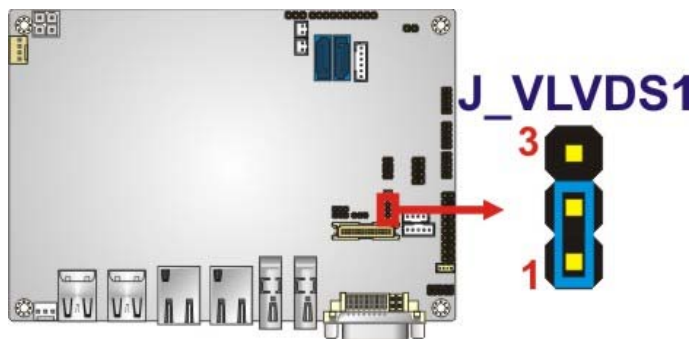
Figure 4-7: LVDS Voltage Selection Jumper Location

4.5.6 LVDS Resolution Selection

Jumper Label:	J_PID1
Jumper Type:	8-pin header
Jumper Settings:	See **Table 4-7**
Jumper Location:	See **Figure 4-8**

Selects the resolution of the LCD panel connected to the LVDS connector.

Pin	Description
OPEN	640 X 480 (18bit)
1-2	800 X 600 (18bit)

Pin	Description
3-4	1024 X 768 (18bit)
1-2 & 3-4	1024 X 768 (24bit) Default
5-6	1280 X 800 (24bit)
1-2 & 5-6	1280 X 1024 (48bit)
3-4 & 5-6	1366 X 768 (24bit)
1-2 & 3-4 & 5-6	1440 X 900 (48bit)
7-8	1400 X 1050 (48bit)
1-2 & 7-8	1600 X 900 (48bit)
3-4 & 7-8	1600 X 1200 (48bit)
1-2 & 3-4 & 7-8	1680 X 1050 (48bit)
5-6 & 7-8	1920 X 1080 (48bit)
1-2 & 5-6 & 7-8	1920 X 1200 (48bit)
3-4 & 5-6 & 7-8	2048 X 1536 (48bit)
1-2 & 3-4 & 5-6 & 7-8	LVDS disabled

Table 4-7: LVDS Screen Resolution Jumper Settings
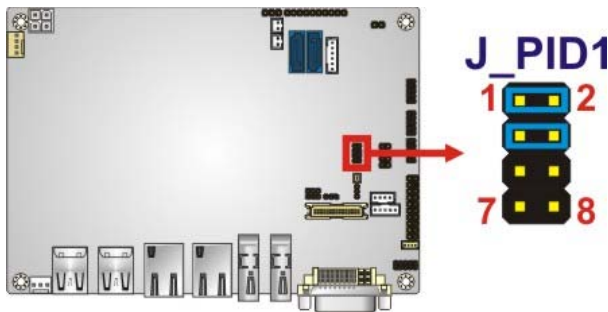
Figure 4-8: LVDS Resolution Selection Jumper Location

4.5.7 PCIe Mini/mSATA Mode Selection

Jumper Label: **MSATA_SW**

Jumper Type: 2-pin header

Jumper Settings: See **Table 4-8**

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

Sets the PCIe Mini slot (M_PCIE1) as the PCIe Mini card slot or mSATA drive slot.

Pin	Description
Closed	PCIe Mini (Default)
Open	mSATA

Table 4-8: PCIe Mini/mSATA Mode Selection Jumper Settings
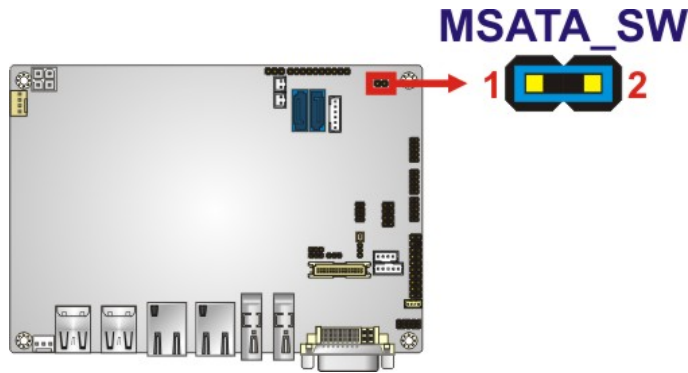
Figure 4-9: PCIe Mini/mSATA Mode Selection Jumper Location

4.6 Chassis Installation

4.6.1 Airflow

> ⚠️ **WARNING:**
>
> Airflow is critical for keeping components within recommended operating termperatures. The chassis should have fans and vents as necessary to keep things cool.

The NANO-QM770 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.

4.6.2 Motherboard Installation

To install the NANO-QM770 motherboard into the chassis please refer to the reference material that came with the chassis.

4.7 Internal Peripheral Device Connections

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

4.7.1 AT Power Connection

Follow the instructions below to connect the NANO-QM770 to an AT power supply.

⚠️ **WARNING:**

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-QM770.

Step 1: **Locate the power cable**. The power cable is shown in the packing list in **Chapter 2**.

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the AT power connector on the motherboard. See Figure 4-10.
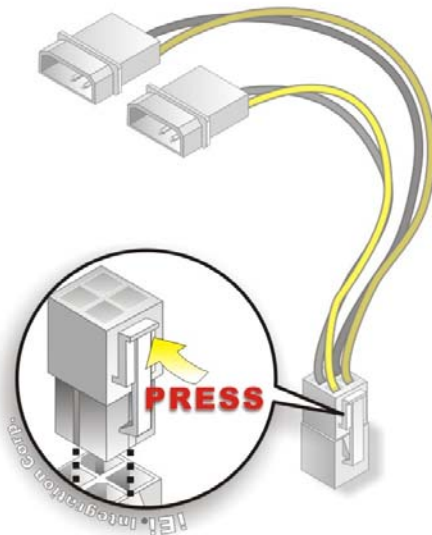
Figure 4-10: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex

type power cable connectors to an AT power supply. See Figure 4-11.
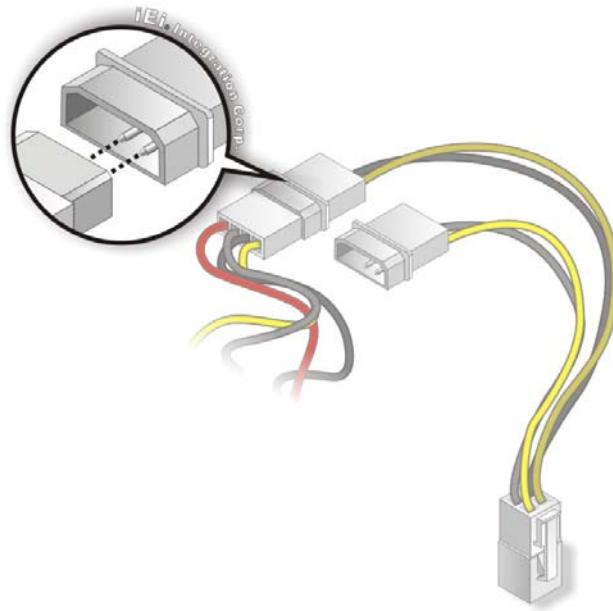
Figure 4-11: Connect Power Cable to Power Supply

4.7.2 Audio Kit Installation

The Audio Kit that came with the NANO-QM770 connects to the audio connector on the
NANO-QM770. The audio kit consists of three audio jacks. Mic-in connects to a
microphone. Line-in provides a stereo line-level input to connect to the output of an audio
device. Line-out, a stereo line-level output, connects to two amplified speakers. To install
the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is

shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit

connector. Pin 1 on the audio kit connector is indicated with a white dot. See

Figure 4-12.
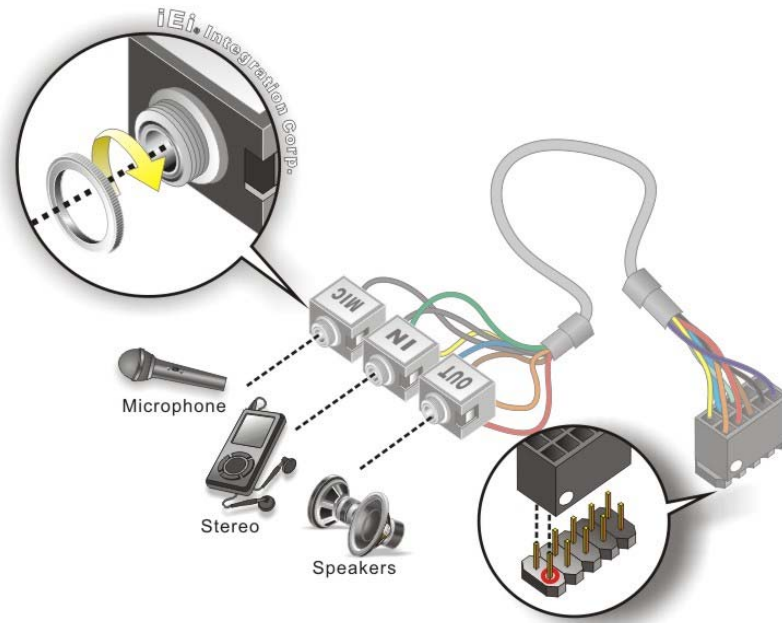
Figure 4-12: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect speakers to the line-out audio jack. Connect the output of an audio device to the line-in audio jack. Connect a microphone to the mic-in audio jack.

4.7.3 SATA Drive Connection

The NANO-QM770 is shipped with two SATA drive cable. To connect the SATA drive to the connector, please follow the steps below.

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

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector and the SATA power connector. See **Figure 4-13**.
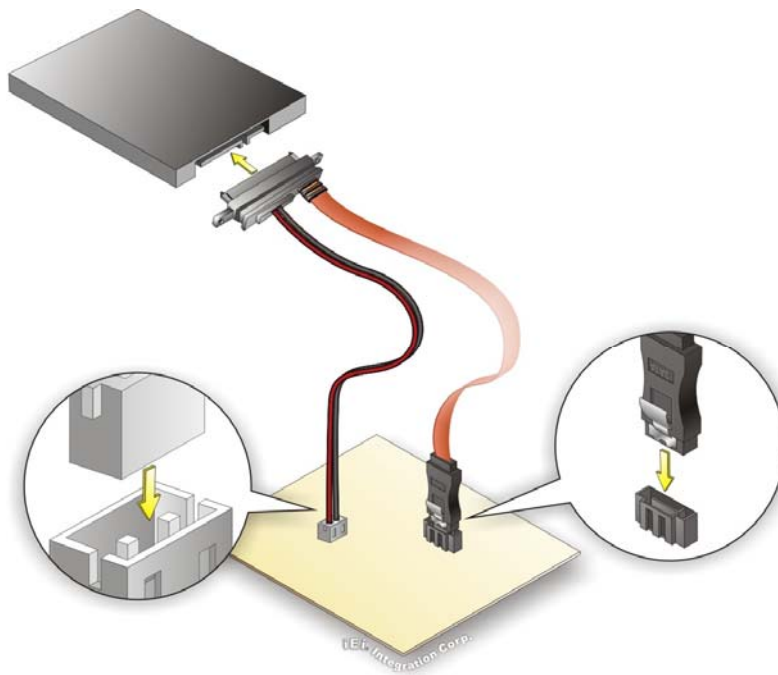
Figure 4-13: SATA Drive Cable Connection

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: To remove the SATA cable from the SATA connector, press the clip on the
connector at the end of the cable.

4.7.4 Single RS-232 Cable (w/o Bracket)

The single RS-232 cable consists of one serial port connector attached to a serial
communications cable that is then attached to a D-sub 9 male connector. To install the
single RS-232 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in
Chapter 3.

Step 2: **Insert the cable connector**. Insert the connector into the serial port pin header.
See Figure 4-14. A key on the front of the cable connectors ensures the
connector can only be installed in one direction.
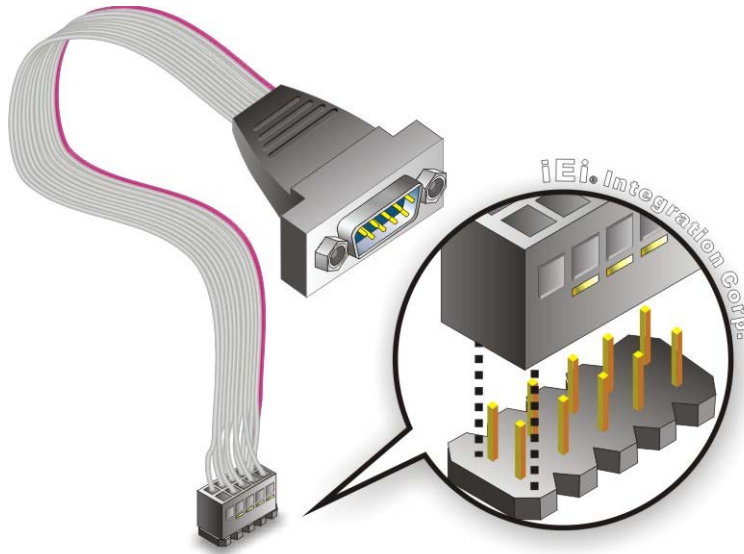
Figure 4-14: Single RS-232 Cable Installation

Step 3: **Secure the bracket**. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 4: **Connect the serial device**. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

4.8 External Peripheral Interface Connection

Devices can be connected to the external connectors. To install external devices, follow the directions in the subsections below.

4.8.1 DVI Display Device Connection

The NANO-QM770 has a single female DVI-I connector on the external peripheral interface panel. The DVI-I connector is connected to a digital display device. To connect a digital display device to the NANO-QM770, please follow the instructions below.

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

Step 2: **Align the DVI-I connector**. Align the male DVI-I connector on the digital display device cable with the female DVI-I connector on the external peripheral interface.

Step 3: **Insert the DVI-I connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the NANO-QM770. See Figure 4-15.
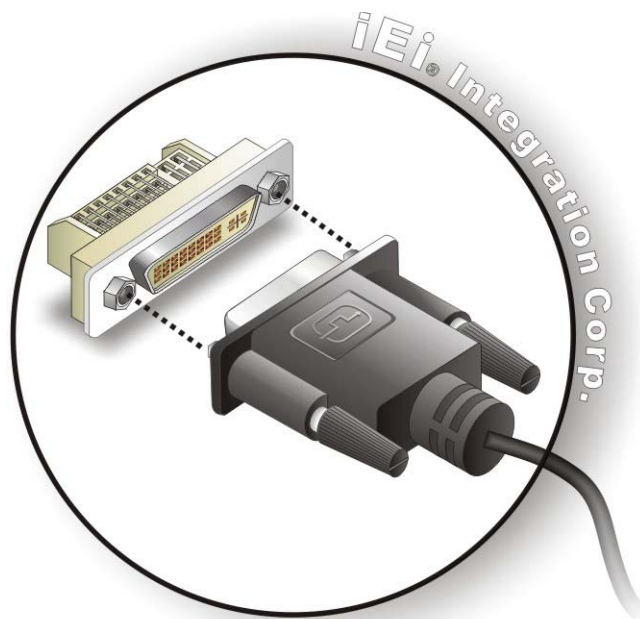
Figure 4-15: DVI Connector

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

4.8.2 HDMI Display Device Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the NANO-QM770, follow the steps below.

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

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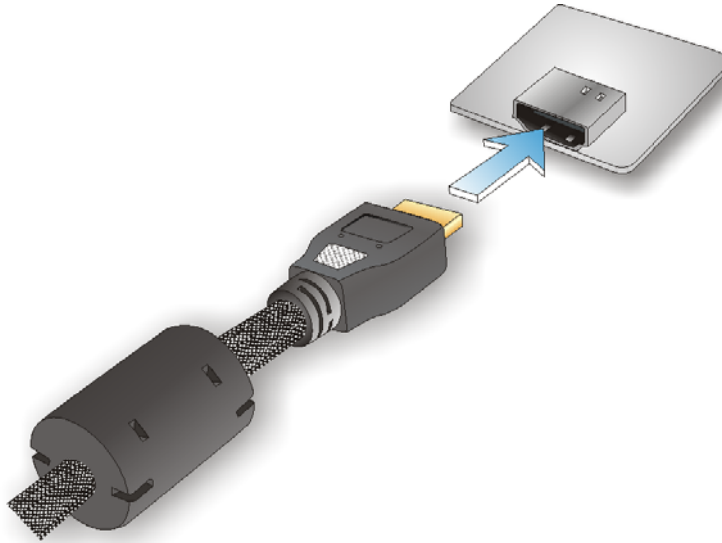
Figure 4-16: HDMI Connection

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

4.8.3 LAN Connection

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

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

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-QM770. See Figure 4-17.
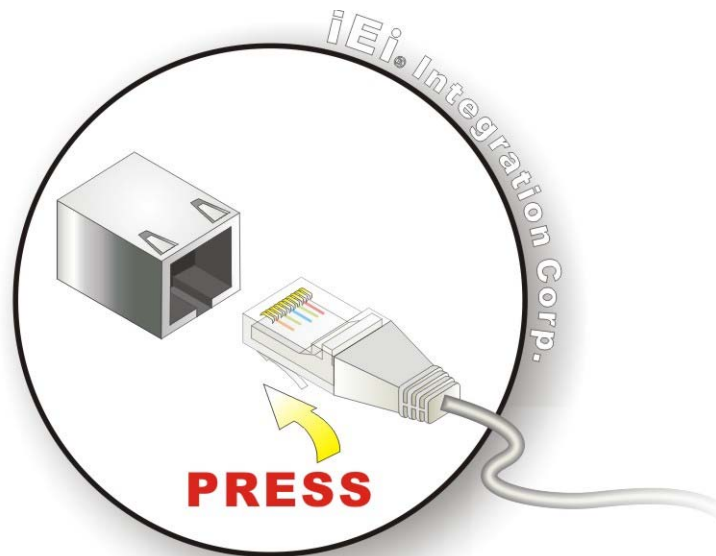
Figure 4-17: LAN Connection

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

4.8.4 USB Connection

The external USB 3.0 connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the NANO-QM770.

Step 1: **Locate the USB 3.0 connectors**. The locations of the USB 3.0 connectors are shown in **Chapter 3**.

Step 2: **Insert a USB 3.0 plug**. Insert the USB 3.0 plug of a device into the USB 3.0 on the external peripheral interface. See Figure 4-18.
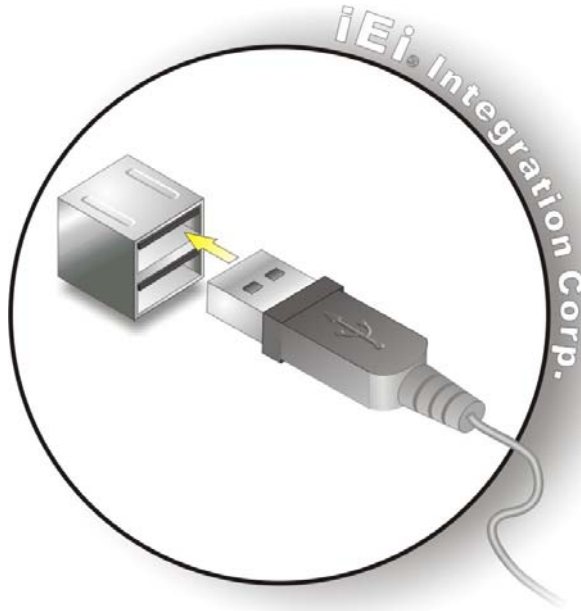
Figure 4-18: USB Connector

4.9 Intel® AMT Setup Procedure

The NANO-QM770 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure the **DIMM1** socket is installed with one DDR3 SO-DIMM.

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

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

Step 4: Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD. See **Section 6.9**.

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.

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

If the message disappears before the DELETE 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 the item above
Down arrow	Move to the item below
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
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page

Key	Function
Esc	Main Menu – Quit and do 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
F9	Load optimized defaults
F10	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.

```
         Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main     Advanced   Chipset    Boot     Security  Save & Exit

 BIOS Information                                         Set the Date. Use Tab to
 BIOS Vendor                     American Megatrends      switch between Date
 Core Version                    4.6.5.3 0.18             elements.
 Compliency                      UEFI 2.3; PI 1.2
 Project Version                 B208AR01.ROM
 Build Date                      05/10/2012 10:09:44      ---------------------

                                                          ←→: Select Screen
 System Date                     [Tue 01/02/2012]         ↑ ↓: Select Item
 System Time                     [14:20:27]               Enter Select
                                                          F1   General Help
 Access Level                    Administrator            F2   Previous Values
                                                          F3   Optimized Defaults
                                                          F4   Save
                                                          ESC  Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 1: Main

➔ **BIOS Information**

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

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.

```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Advanced   Chipset     Boot     Security  Save & Exit

 > ACPI Settings                                    System ACPI Parameters
 > RTC Wake Settings
 > Trusted Computing
 > CPU Configuration
 > SATA Configuration                               ----------------------
 > Intel(R) Rapid Start Technology
 > Intel TXT(LT) Configuration
 > AMT Configuration                                ←→: Select Screen
 > USB Configuration                                ↑↓: Select Item
 > F81866 Super IO Configuration                    Enter Select
 > F81866 H/M Monitor                               F1   General Help
 > Serial Port Console Redirection                  F2   Previous Values
 > iEi Feature                                      F3   Optimized Defaults
                                                    F4   Save
                                                    ESC  Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Configuration

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

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

ACPI Settings                                         Select ACPI sleep state
                                                      the system will enter
ACPI Sleep State              [S1 only (CPU Stop C…]  when the SUSPEND button
                                                      is pressed.


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

                                                      ←→: Select Screen
                                                      ↑ ↓: Select Item
                                                      Enter Select
                                                      F1   General Help
                                                      F2   Previous Values
                                                      F3   Optimized Defaults
                                                      F4   Save
                                                      ESC  Exit
            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 3: ACPI Configuration

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

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

➔ **S1 only (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 only (Suspend to RAM)** — The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event.

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

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


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

                                                         ←→: Select Screen
                                                         ↑↓: Select Item
                                                         Enter Select
                                                         F1   General Help
                                                         F2   Previous Values
                                                         F3   Optimized Defaults
                                                         F4   Save
                                                         ESC  Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 4: RTC Wake Settings

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

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

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

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

*Wake up every day

*Wake up date

*Wake up hour

*Wake up minute

*Wake up second

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

5.3.3 Trusted Computing

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

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

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


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

                                                       ←→: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter Select
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 5: Trusted Computing

➔ **Security Device Support [Disable]**

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

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

➔ **Enable**   TPM support is enabled.

5.3.4 CPU Configuration

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

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

 CPU Configuration                                        Enabled for Windows XP
                                                          and Linux (OS optimized
 Intel(R) Core(TM) i7-3610QE CPU @ 2.30GHz               for Hyper-Threading
 CPU Signature                   306a9                    Technology) and Disabled
 Microcode Patch                 c                        for other OS (OS not
 Max CPU Speed                    2300 MHz                optimized for
 Min CPU Speed                    1200 MHz                Hyper-Threading
 CPU Speed                        2300 MHz                Technology). When
 Processor Cores                  4                       Disabled only one thread
 Intel HT Technology              Supported               per enabled fore is
 Intel VT-x Technology            Supported               enabled.
 Intel SMX Technology             Supported
 6-bit                            Supported               ----------------------

 L1 Data Cache                    32 KB x 4               ←→: Select Screen
 L1 Code Cache                    32 KB x 4               ↑↓: Select Item
 L2 Cache                         256 KB x 4              Enter Select
 L3 Cache                         6144 KB                 F1   General Help
                                                          F2   Previous Values
 Hyper-Threading                 [Enabled]                F3    Optimized
 Intel Virtualization Technology [Disabled]               Defaults
                                                          F4    Save
                                                          ESC   Exit
         Version 2.14.1219. 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.
- CPU Speed: Lists the CPU processing speed
- Processor Core: Lists the number of the processor cores
- 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.
- 64-bit: Indicates if 64-bit is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **Hyper Threading [Enabled]**

Use the **Hyper Threading** to enable or disable the CPU hyper threading function.

➔ **Disabled**   Disables the use of hyper threading technology

➔ **Enabled**   DEFAULT   Enables the use of 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   Virtualization
                              Technology.

➔ **Enabled**   Enables Intel Virtualization Technology.

5.3.5 SATA Configuration

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

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

SATA Mode Selection               [AHCI]                Determines how SATA
                                                        controller(s) operate.
Serial ATA Port0                  Empty
  Software Preserve               Unknown
  Hot Plug                        [Disabled]            ---------------------
Serial ATA Port1                  Empty
  Software Preserve               Unknown               ←→: Select Screen
  Hot Plug                        [Disabled]            ↑ ↓: Select Item
                                                        Enter Select
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3    Optimized
                                                        Defaults
                                                        F4    Save
                                                        ESC   Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 7: SATA Configuration

➔ **SATA Mode Selection [AHCI]**

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

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

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

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

➔ **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.

5.3.6 Intel(R) Rapid Start Technology

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

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

Intel(R) Rapid Start Technology     [Disabled]


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

          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
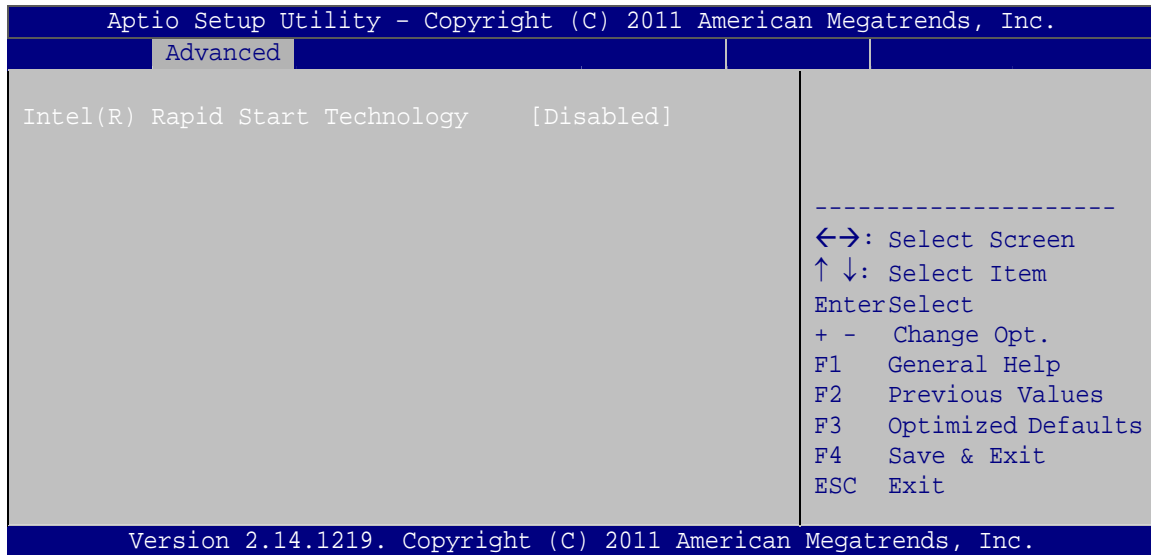
BIOS Menu 8: Intel(R) Rapid Start Technology

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

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

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

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

5.3.7 Intel TXT(LT) Configuration

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

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

Intel Trusted Execution Technology Configuration

Intel TXT support only can be enabled/disabled if SMX
is enabled. VT and VT-d support must also be enabled prior    --------------------
to TXT.
                                                              ←→: Select Screen
Secure Mode Extensons (SMX)        Disabled                   ↑ ↓: Select Item
                                                              Enter Select
Intel TXT(LT) Support              [Disabled]                 + -  Change Opt.
                                                              F1   General Help
                                                              F2   Previous Values
                                                              F3   Optimized Defaults
                                                              F4   Save & Exit
                                                              ESC  Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 9: Intel TXT(LT) Configuration

5.3.8 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.

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

Intel AMT                          [Enabled]      Enable/Disable Intel (R)
Unconfigure AMT/ME                 [Disabled]     Active Management
                                                  Technology BIOS
                                                  Extension. Note: iAMT H/W
                                                  is always enabled.
                                                  This option just controls
                                                  the BIOS extension
                                                  execution.
                                                  If enabled, this requires
                                                  additional firmware in the
                                                  SPI device.
                                                  --------------------
                                                  ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  Enter Select
                                                  F1   General Help
                                                  F2   Previous Values
                                                  F3    Optimized Defaults
                                                  F4    Save
                                                  ESC   Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
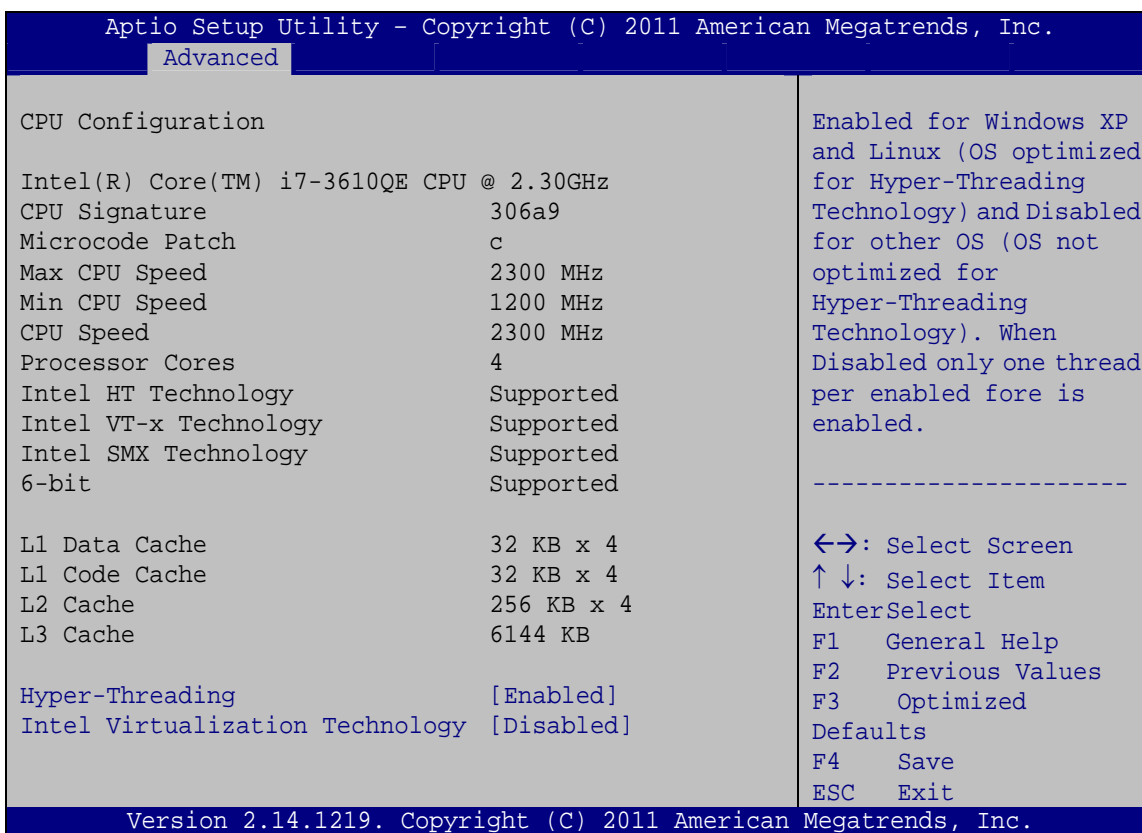**BIOS Menu 10: AMT Configuration**

➔   **Intel AMT [Enabled]**

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

➔   **Disabled**   Intel® AMT is disabled

➔   **Enabled**   DEFAULT   Intel® AMT is enabled

➔   **Unconfigure ME [Disabled]**

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

➔   **Disabled**   DEFAULT   Not perform ME unconfigure

➔   **Enabled**   To perform ME unconfigure

5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 11**) to read USB configuration information and configure the USB settings.

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

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

                                                        --------------------
                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        EnterSelect
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3    Optimized
                                                        Defaults
                                                        F4    Save
                                                        ESC   Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 11: USB Configuration

➔ **USB Devices**

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

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Enabled**   DEFAULT   Legacy USB support enabled

➔ **Disabled**   Legacy USB support disabled

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

5.3.10 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 12**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

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

F81866 Super IO Configuration                          Set Parameters of Serial
                                                       Port 1 (COMA)
F81866 Super IO Chip            F81866
> Serial Port 1 Configuration
> Serial Port 2 Configuration                          --------------------
> Serial Port 3 Configuration                          ←→: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter Select
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
           Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 12: Super IO Configuration

5.3.10.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 13**) to configure the serial port n.

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

Serial Port 1 Configuration                               Enable or Disable Serial
                                                          Port (COM)
Serial Port                       [Enabled]
Device Settings                   IO=3F8h; IRQ=4
                                                          --------------------
Change Settings                   [Auto]                  ←→: Select Screen
                                                          ↑ ↓: Select Item
                                                          Enter Select
                                                          F1   General Help
                                                          F2   Previous Values
                                                          F3    Optimized
                                                          Defaults
                                                          F4    Save
                                                          ESC   Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
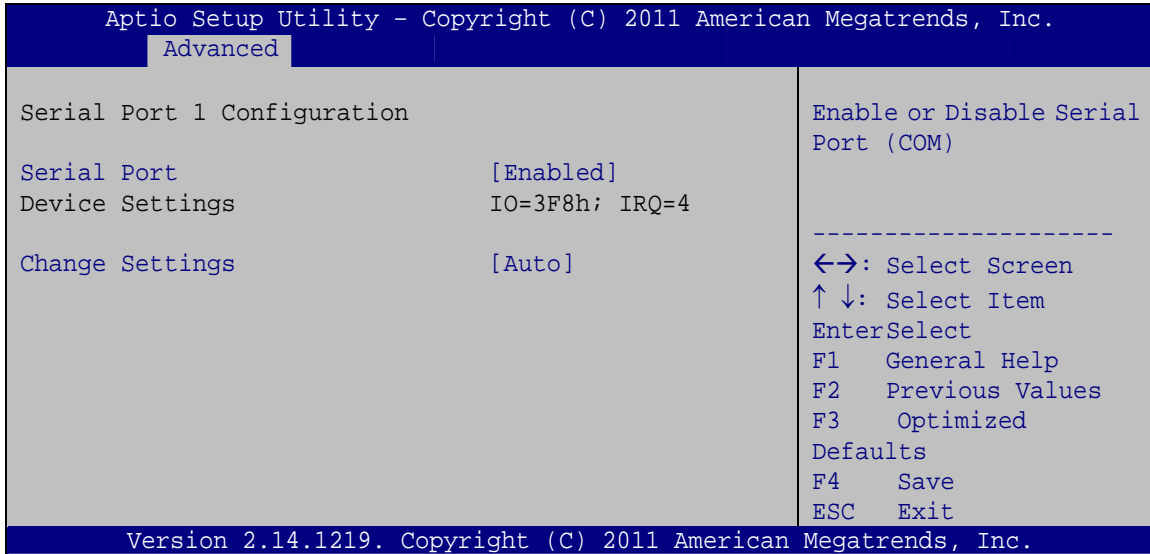 **BIOS Menu 13: Serial Port n Configuration Menu**

5.3.10.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**   Disable the serial port

➔ **Enabled**   D<small>EFAULT</small>   Enable the serial port

➔ **Change Settings [Auto]**

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

➔ **Auto**   D<small>EFAULT</small>   The serial port IO port address and interrupt address are automatically detected.

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

➔ **IO=3F8h;**   Serial Port I/O port address is 3E8h and the interrupt

IRQ=3, 4   address is IRQ3, 4

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

IRQ=3, 4   address is IRQ3, 4

➔ **IO=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt

IRQ=3, 4   address is IRQ3, 4

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

IRQ=3, 4   address is IRQ3, 4

5.3.10.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**   Disable the serial port

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

➔ **Change Settings [Auto]**

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

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

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

IRQ=3   address is IRQ3

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

IRQ=3, 4   address is IRQ3, 4

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

IRQ=3, 4   address is IRQ3, 4

➔ **IO=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt

IRQ=3, 4   address is IRQ3, 4

➔ **IO=2E8h;**   Serial Port I/O port address is 2E8h and the interrupt
    IRQ=3, 4   address is IRQ3, 4

5.3.10.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**   Disable the serial port

➔ **Enabled**   D<small>EFAULT</small>   Enable the serial port

➔ **Change Settings [Auto]**

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

➔ **Auto**   D<small>EFAULT</small>   The serial port IO port address and interrupt address are automatically detected.

➔ **IO=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt
    IRQ=5   address is IRQ5

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

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

➔ **IO=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt
    IRQ=5, 7   address is IRQ5, 7

➔ **IO=2E8h;**   Serial Port I/O port address is 2E8h and the interrupt
    IRQ=5, 7   address is IRQ5, 7

➔ **IO=2E0h;**   Serial Port I/O port address is 2E0h and the interrupt
    IRQ=5, 7   address is IRQ5, 7

5.3.11 F81866 H/W Monitor

The **F8186 H/W Monitor** menu (**BIOS Menu 14**) shows the operating temperature, fan speeds and system voltages.

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

PC Health Status                                        Smart Fan Mode Select

CPU temperature                        :+62 C
Accuracy: 1. -5~ +10 degree around 100 degree.
         2. -10~ +15 degree around 50 degree.
System temperature                     :+37 C
CPU Fan Speed                          :2325 RPM
SYS Fan Speed                          :N/A                --------------------
+5VS                                   :+5.171 V
+V12S                                  :+12.056 V         ←→: Select Screen
+V1.5                                  :+1.632 V          ↑ ↓: Select Item
VSB5V                                  :+5.016 V          Enter Select
VCC3V                                  :+3.360 V          F1   General Help
VSB3V                                  :+3.344 V          F2   Previous Values
VBAT                                   :+3.312 V          F3   Optimized
                                                          Defaults
> Smart Fan Mode Configuration                            F4   Save
                                                          ESC  Exit

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

BIOS Menu 14: Hardware Health Configuration

➔ **PC Health Status**

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

- System Temperatures:
  - ○ CPU Temperature
  - ○ System Temperature
- Fan Speeds:
  - ○ CPU Fan Speed
  - ○ System Fan Speed
- Voltages:
  - ○ +5VS
  - ○ +V12S
  - ○ +V1.5

o   VSB5V

o   VCC3V

o   VSB3V

o   VBAT

5.3.11.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 15**) to configure the smart fan temperature and speed settings.

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

      Smart Fan Mode Configuration                          Smart Fan Mode Select
                                                            (Reference System
      CPU_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode] Temperature)
      CPU Temperature 1               60
      CPU Temperature 2               50
      CPU Temperature 3               40
      CPU Temperature 4               30                     --------------------
      SYS_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode] ←→: Select Screen
      System Temperature 1            60                     ↑ ↓: Select Item
      System Temperature 2            50                     Enter Select
      System Temperature 3            40                     + -   Change Opt.
      System Temperature 4            30                     F1   General Help
                                                             F2   Previous Values
                                                             F3   Optimized Defaults
                                                             F4   Save & Exit
                                                             ESC  Exit

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

BIOS Menu 15: FAN 1 Configuration

➔   **CPU_FAN1 Smart Fan Control [Auto Duty-Cycle Mode]**

Use the **CPU_FAN1 Smart Fan Control** option to configure the CPU Smart Fan (CPU_FAN1).

➔ **Manual Duty Mode**   The fan spins at the speed set in Manual by Duty Cycle settings

➔ **Auto Duty-Cycle Mode**   The fan adjusts its speed using Auto by Duty-Cycle settings

➔ **SYS_FAN1 Smart Fan Control [Auto Duty-Cycle Mode]**

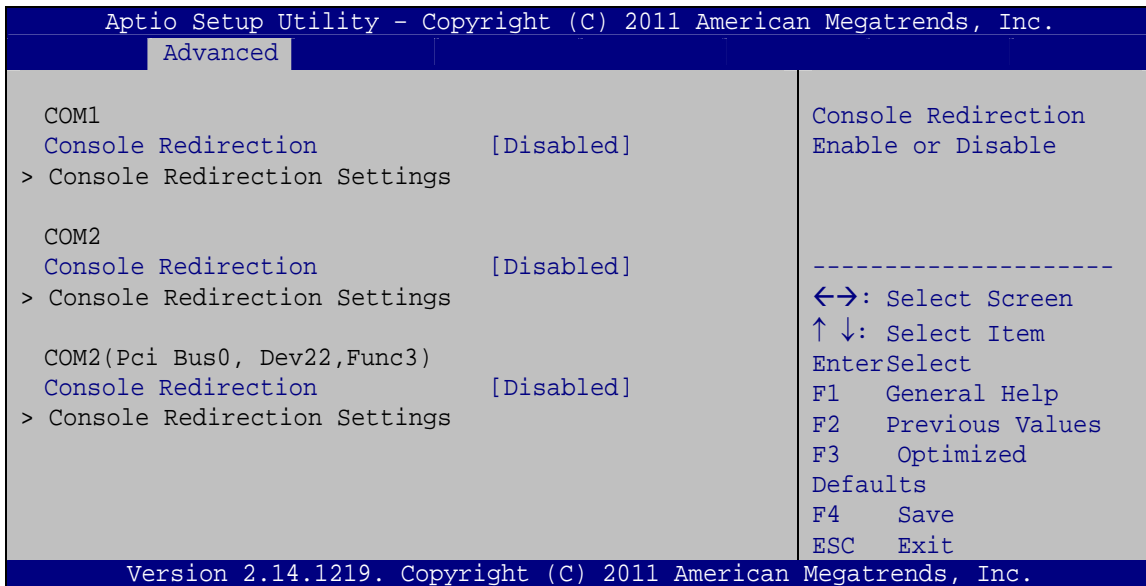Use the **SYS_FAN1 Smart Fan Control** option to configure the System Smart Fan (SYS_FAN1).

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

➔ **Temperature n**

Use the + or – key to change the fan **Temperature n** value. Enter a decimal number between 0 and 85.

5.3.12 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 16**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

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

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


  COM2
  Console Redirection            [Disabled]        ---------------------
> Console Redirection Settings
                                                   ←→: Select Screen
                                                   ↑↓: Select Item
  COM2(Pci Bus0, Dev22,Func3)                      Enter Select
  Console Redirection            [Disabled]        F1   General Help
> Console Redirection Settings                     F2   Previous Values
                                                   F3    Optimized
                                                   Defaults
                                                   F4    Save
                                                   ESC   Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
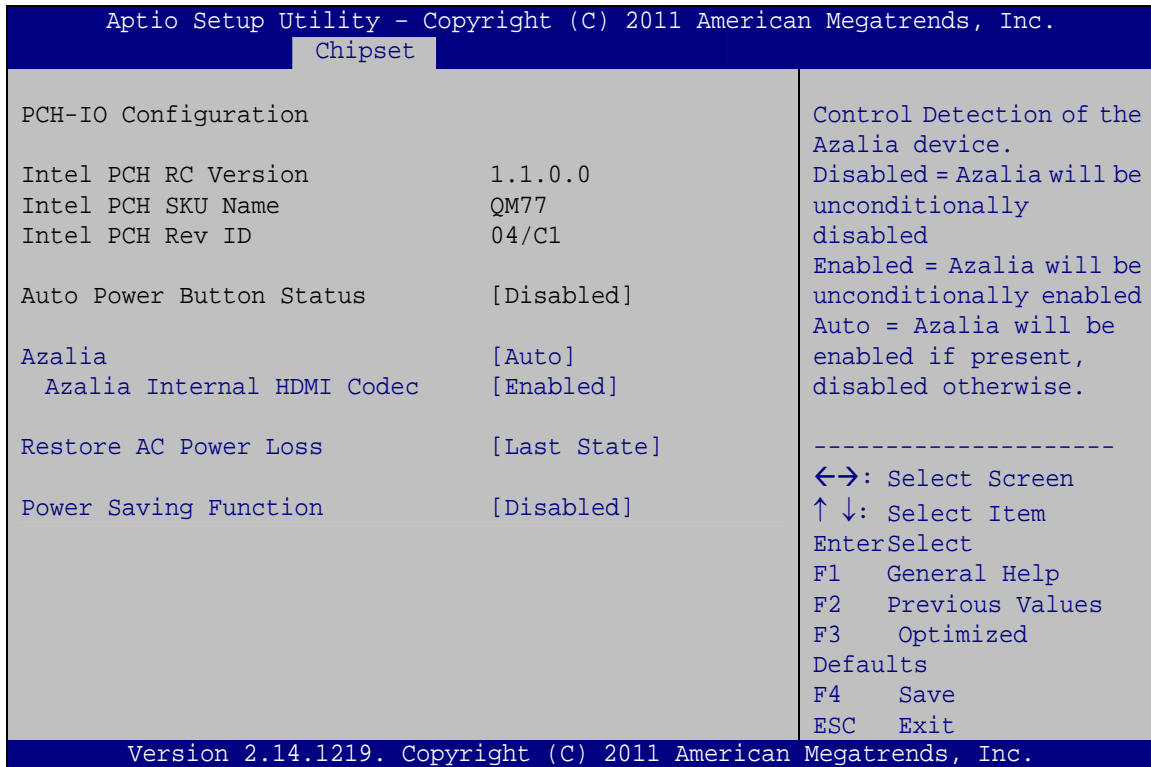
BIOS Menu 16: Serial Port Console Redirection

➔ **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

5.3.13 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 17**) to configure One Key Recovery function.

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

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


                                                     --------------------
                                                     ←→: Select Screen
                                                     ↑↓: Select Item
                                                     Enter Select
                                                     F1   General Help
                                                     F2   Previous Values
                                                     F3    Optimized
                                                     Defaults
                                                     F4    Save
                                                     ESC   Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
   BIOS Menu 17: 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 18**) to access the Hostbridge and Southbridge configuration menus.

WARNING!

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

```
        Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
   Main    Advanced  Chipset    Boot    Security  Save & Exit

 > PCH-IO Configuration                          Host Bridge Parameters
 > System Agent (SA) Configuration

                                                 ---------------------
                                                 ←→: Select Screen
                                                 ↑ ↓: Select Item
                                                 Enter Select
                                                 F1   General Help
                                                 F2   Previous Values
                                                 F3    Optimized
                                                 Defaults
                                                 F4    Save
                                                 ESC   Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 18: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 19**) to configure the PCH chipset.

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

PCH-IO Configuration                                    Control Detection of the
                                                        Azalia device.
Intel PCH RC Version           1.1.0.0                  Disabled = Azalia will be
Intel PCH SKU Name             QM77                     unconditionally
Intel PCH Rev ID               04/C1                    disabled
                                                        Enabled = Azalia will be
Auto Power Button Status       [Disabled]               unconditionally enabled
                                                        Auto = Azalia will be
Azalia                         [Auto]                   enabled if present,
  Azalia Internal HDMI Codec   [Enabled]                disabled otherwise.

Restore AC Power Loss          [Last State]             --------------------
                                                        ←→: Select Screen
Power Saving Function          [Disabled]               ↑ ↓: Select Item
                                                        Enter Select
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3   Optimized
                                                        Defaults
                                                        F4   Save
                                                        ESC  Exit
       Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 19:PCH-IO Configuration

➔ **Azalia [Auto]**

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

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

➔ **Enabled**   The onboard High Definition Audio controller automatically detected and enabled

➔ **Auto**   DEFAULT   The onboard High Definition Audio controller automatically detected and enabled

➔ **Azalia internal HDMI codec [Enabled]**

Use the **Azalia internal HDMI codec** option to enable or disable the internal HDMI codec for High Definition Audio.

➔ **Disabled**   Disable internal HDMI codec for High Definition Audio

➔ **Enabled**   DEFAULT   Enable internal HDMI codec for High Definition Audio

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

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

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

➔ **Power On**   The system turns on

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

➔ **Power Saving Function [Disabled]**

Use the **Power Saving Function** BIOS option to enable or disable the power saving function.

➔ **Disabled**   DEFAULT   Power saving function is disabled.

➔ **Enabled**   Power saving function is enabled. It will reduce power consumption when the system is off.

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 20**) to configure the Southbridge chipset.

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

System Agent Bridge Name        IvyBridge              Enabled to reduce power
System Agent RC Version         1.1.0.0                consumption in system
VT-d Capability                 Supported              off state.


VT-d                            [Enabled]
> Graphics Configuration                               ---------------------
> Memory Configuration
                                                       ←→: Select Screen
                                                       ↑↓: Select Item
                                                       Enter Select
                                                       F1    General Help
                                                       F2    Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 20: System Agent (SA) Configuration

➔ **VT-d [Enabled]**

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

➔ **Disabled**   Disables VT-d support.

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

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** menu to configure the video device connected to the system.

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

Graphics Configuration                                   Select which of
IGFX VBIOS Version                2132                    IGFX/PEG/PCI Graphics
Igfx Frequency                    350 MHz                 device should be Primary
                                                          Display Or select SG for
Primary Display                   [IGFX]                  Switchable Gfx.
  PEG0 – Gen X                    [Gen1]

DVMT Pre-Allocated                [128M]                  ----------------------
DVMT Total Gfx Mem                [MAX]                    ←→: Select Screen
                                                          ↑ ↓: Select Item
Primary IGFX Boot Display         [VBIOS Default]         Enter Select
LCD Panel Type                    [By  Hardware]          F1   General Help
Backlight Control                 [Inverted]              F2   Previous Values
                                                          F3    Optimized
                                                          Defaults
                                                          F4    Save
                                                          ESC   Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 21: Graphics Configuration

➔ **Primary Display [IGFX]**

Use the **Primary Display** option to select the primary graphics controller the system uses. The following options are available:

- IGFX   **Default**
- PEG

➔ **PEG0 – Gen X [Gen1]**

Use the **PEG0 – Gen X** option to configure PEG0 B0:D1:F0. The following options are available:

- Gen1   **Default**
- Gen2
- Gen3

➔ **DVMT Pre-Allocated [128MB]**

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can

then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 32M
- 64M
- 96M
- 128M **Default**
- 256M
- 512M
- 1024M

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

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

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

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

- VBIOS Default **DEFAULT**
- DVI
- LVDS
- HDMI 1
- HDMI 2

➔ **LCD Panel Type [By Hardware]**

Use the **LCD Panel Type** option to select the type of flat panel connected to the system. Configuration options are listed below.

- By Hardware **DEFAULT**
- 640x480 18BIT

- 800x600   18BIT

- 1024x768   18BIT

- 1024x768   24BIT

- 1280x800   24BIT

- 1280x1024   48BIT

- 1366x768   24BIT

- 1440x900   48BIT

- 1400x1050   48BIT

- 1600x900   48BIT

- 1600x1200   48BIT

- 1680x1050   48BIT

- 1920x1080   48BIT

- 1920x1200   48BIT

- 2048x1536   48BIT

➔ **Backlight Control [Inverted]**

Use the **Backlight Control** option to select the backlight control mode.

➔ **Inverted**   DEFAULT   The LVDS backlight is brighter at high voltage level.

➔ **Normal**   The LVDS backlight is brighter at low voltage level.

5.4.2.2 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 22**) to view memory information.

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

Memory Information

Memory RC Version                  1.1.0.0
Memory Frequency                   1333 MHz
Total Memory                       2048 MB (DDR3)
DIMM#0                             2048 MB (DDR3)
CAS Latency (tCL)                  9                    ----------------------
Minimum delay time                                      ←→: Select Screen
   CAS to RAS (tRCDmin)            9                    ↑↓: Select Item
   Row Precharge (tRPmin)          9                    Enter Select
   Active to Precharge (tRASmin)  24                    +/-:  Change Opt.
XMP Profile 1                      Not Supported        F1   General Help
XMP Profile 2                      Not Supported        F2   Previous Values
                                                        F3   Optimized Defaults
                                                        F4   Save & Exit
                                                        ESC  Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 22: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 23**) 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]
Fast Boot                      [Disabled]               ----------------------
                                                        ←→: Select Screen
CSM16 Module Version           07.69                    ↑↓: Select Item
                                                        Enter Select
Option ROM Messages            [Force BIOS]             F1   General Help
Launch PXE OpROM               [Disabled]               F2   Previous Values
UEFI Boot                      [Disabled]               F3    Optimized
                                                        Defaults
Boot Option Priorities                                  F4    Save
                                                        ESC   Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 23: 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

➔ **Fast Boot [Disabled]**

Use the **Fast Boot** option to enable or disable boot with initialization of a minimal set of devices required to launch active boot option. It has no effect for BBS boot options.

➔ **Disabled**   DEFAULT   Disable fast boot.

➔ **Enabled**   Enable fast boot

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

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

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

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

➔ **Launch PXE OpROM [Disabled]**

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

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

➔ **Enabled**   Load PXE Option ROMs.

➔ **UEFI Boot [Disabled]**

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

➔ **Enabled**   Boot from UEFI devices is enabled.

➔ **Disabled**   DEFAULT   Boot from UEFI devices is disabled.

5.6 Security

Use the **Security** menu (**BIOS Menu 24**) to set system and user passwords.

```
         Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
  Main    Advanced  Chipset    Boot    Security  Save & Exit

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

 UEFI Secure Boot Management


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

BIOS Menu 24: 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 25**) to load default BIOS values, optimal failsafe values and to save configuration changes.

```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Main    Advanced   Chipset      Boot     Security   Save & Exit

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

 Restore Defaults
 Save as User Defaults
 Restore User Defaults

                                                    --------------------
                                                    ←→: Select Screen
                                                    ↑ ↓: Select Item
                                                    Enter Select
                                                    F1   General Help
                                                    F2   Previous Values
                                                    F3    Optimized
                                                    Defaults
                                                    F4    Save
                                                    ESC   Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 25:Exit

➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- Audio
- SATA (Intel® Rapid Storage Technology)
- USB 3.0
- Intel® AMT

Installation instructions are given below.

6.2 Software Installation

All the drivers for the NANO-QM770 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**).
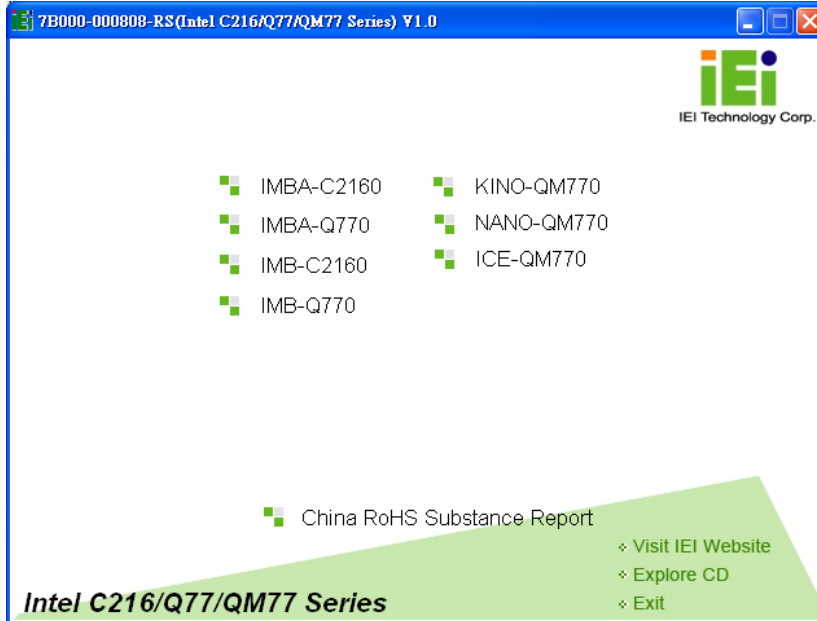
Figure 6-1: Introduction Screen

Step 3: Click NANO-QM770.

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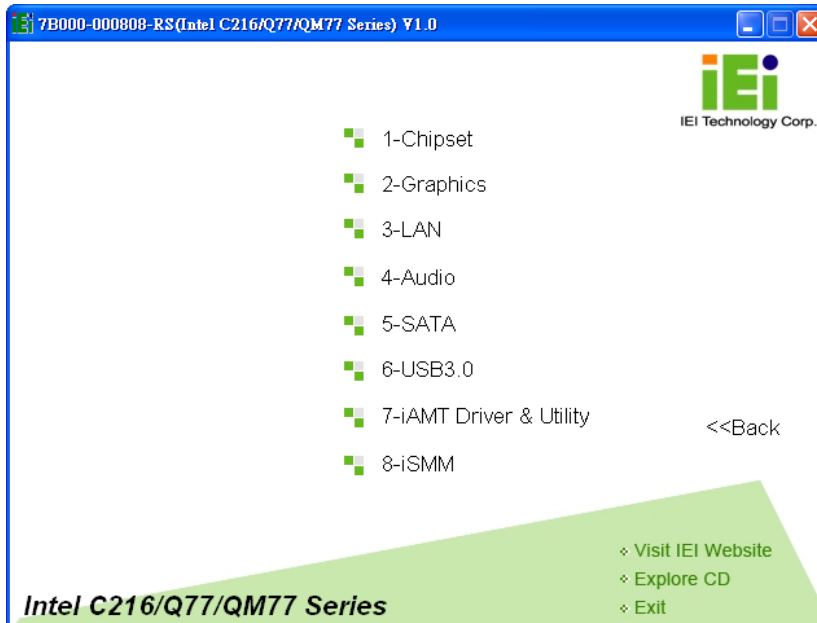
Figure 6-2: Available Drivers

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 **Welcome Screen** in **Figure 6-3** appears.

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

Figure 6-3: Chipset Driver Welcome Screen

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

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

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

Figure 6-4: Chipset Driver License Agreement

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

Step 10: Click **Next** to continue.
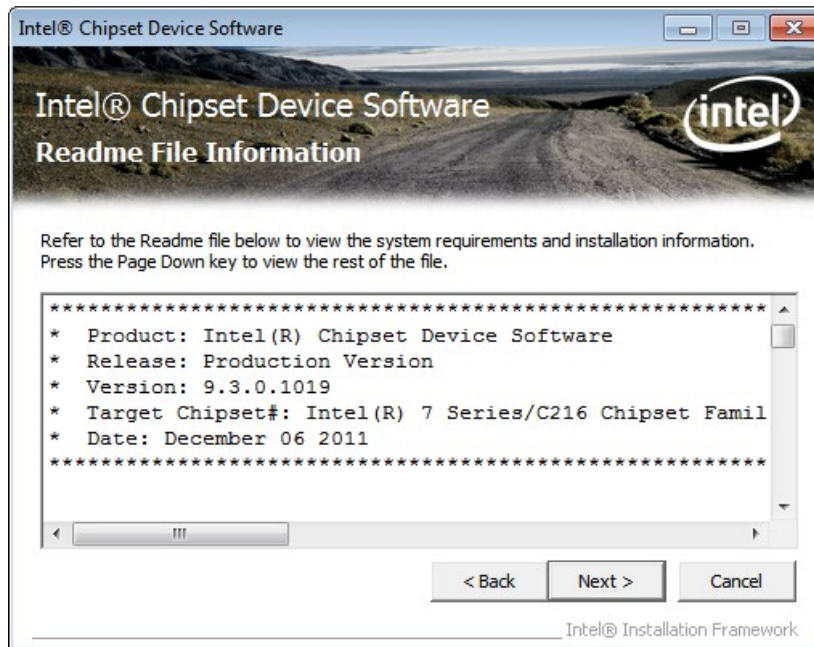
Figure 6-5: Chipset Driver Read Me File

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

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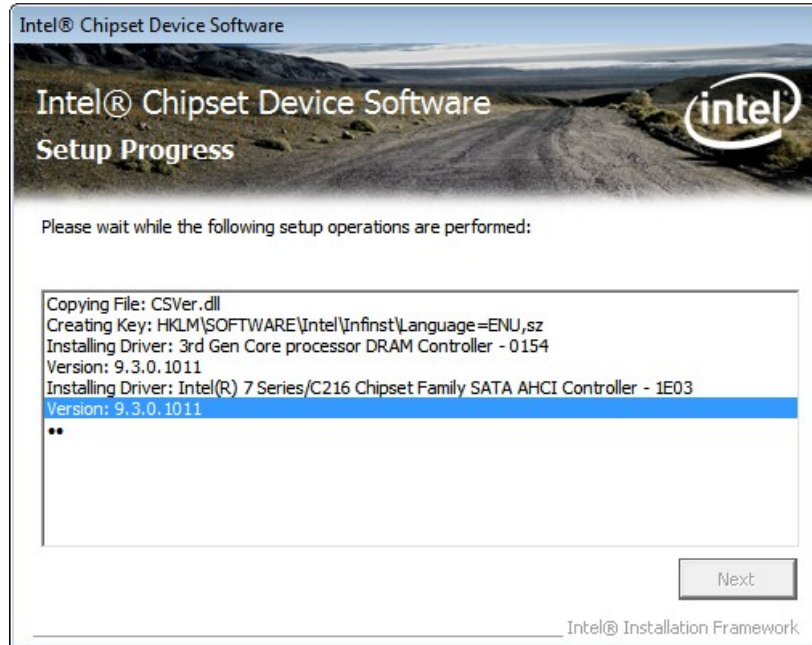
Figure 6-6: Chipset Driver Setup Operations

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

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

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

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

Step 5: Click **Next** to continue.
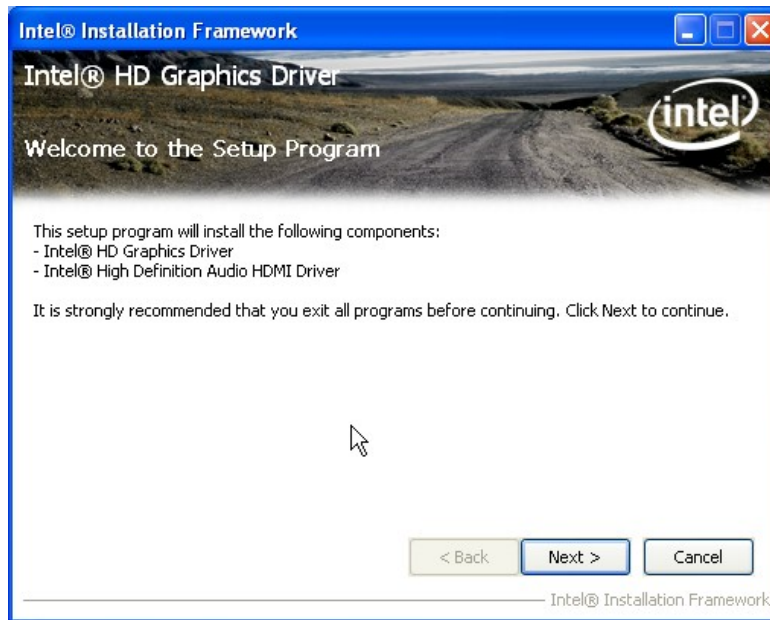
Figure 6-8: Graphics Driver Welcome Screen

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

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

Figure 6-9: Graphics Driver License Agreement

Step 8: **Setup Operations** are performed as shown in **Figure 6-10**.

Step 9: Once the **Setup Operations** are complete, click **Next** to continue.
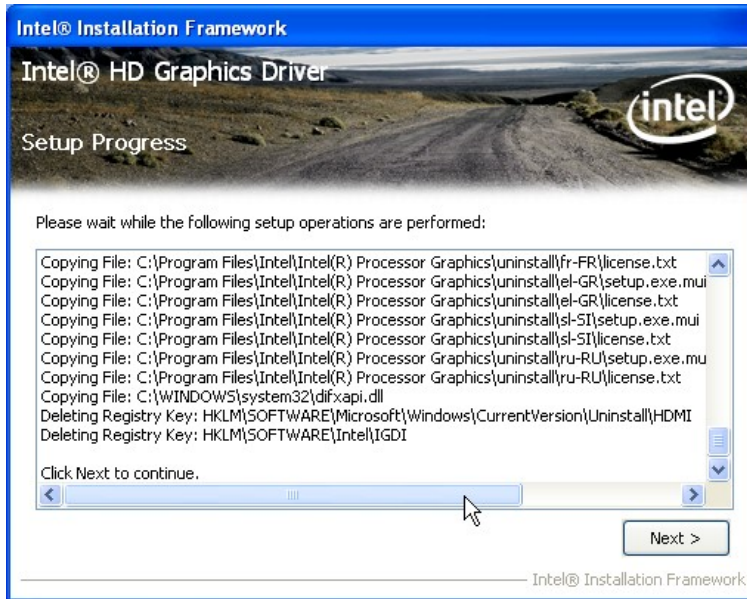
Figure 6-10: Graphics Driver Setup Operations

Step 10: The **Finish** screen in **Figure 6-11** appears.

Step 11: Select "**Yes, I want to restart this computer now**" and click **Finish**.
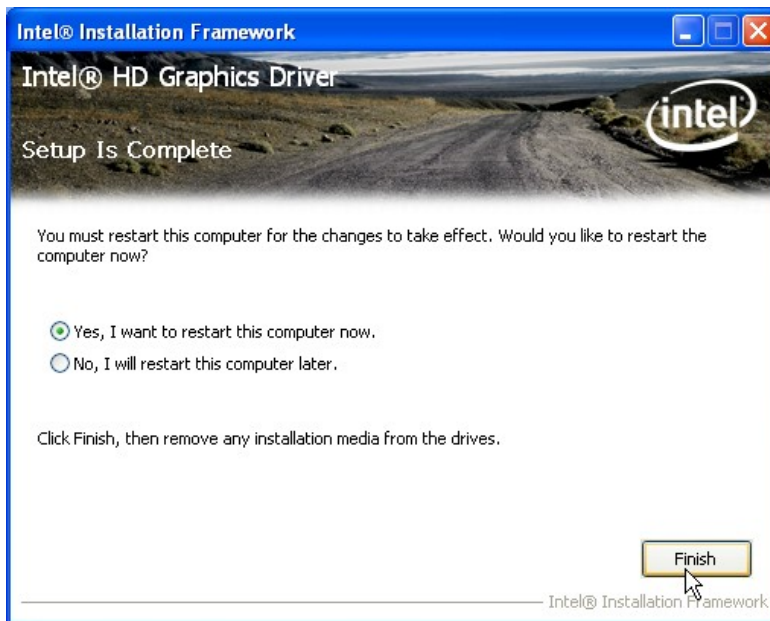
Figure 6-11: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

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

(**Figure 6-12**).
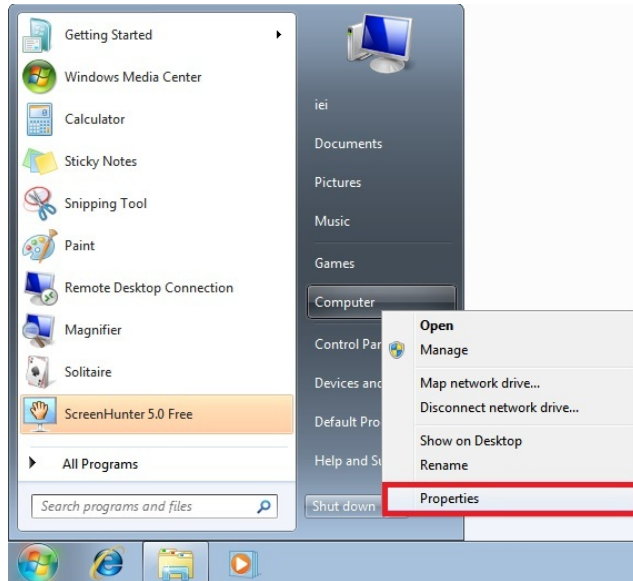
Figure 6-12: Windows Control Panel

Step 2: The system control panel window in **Figure 6-13** appears.

Step 3: Click the Device Manager link (**Figure 6-13**).
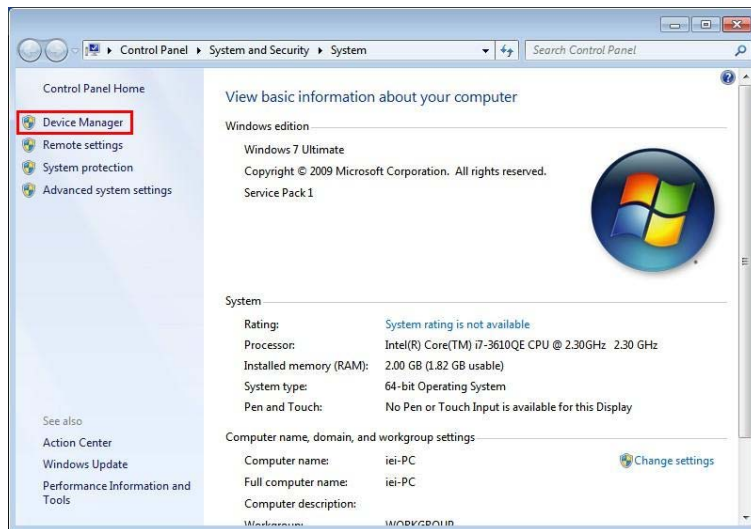
Figure 6-13: System Control Panel

Step 4: A list of system hardware devices appears (**Figure 6-14**).

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

Step 6: Select **Update Driver Software**.
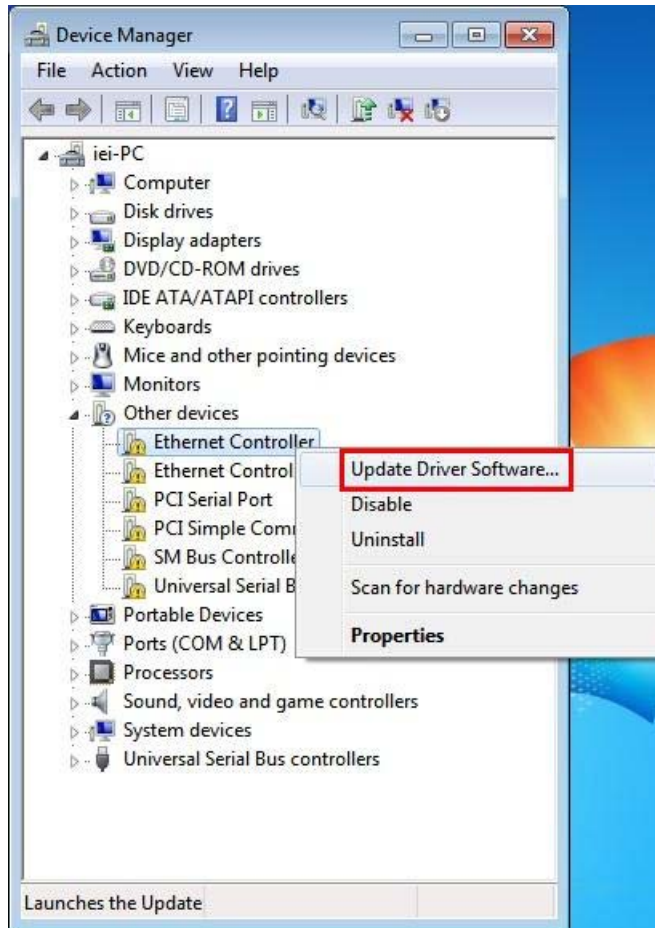
Figure 6-14: Device Manager List

Step 7: The Update Driver Software Window appears (**Figure 6-15**).
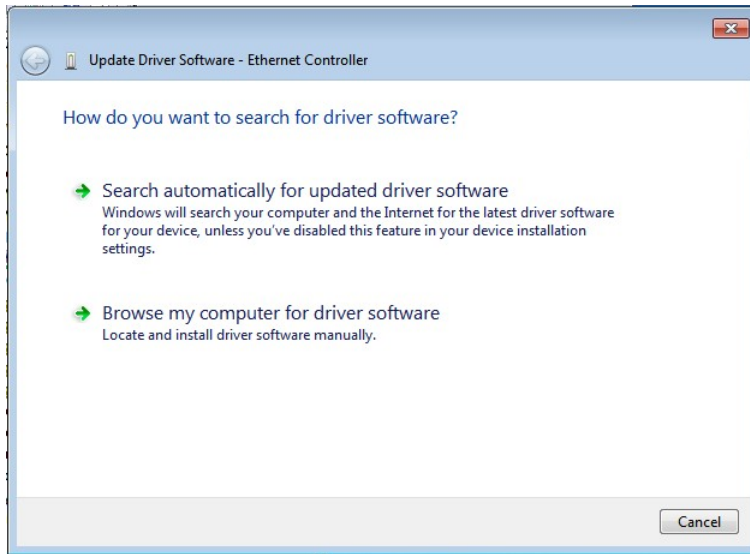
Figure 6-15: Update Driver Software Window

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

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

"**X:**" is the system CD drive. (**Figure 6-16**).
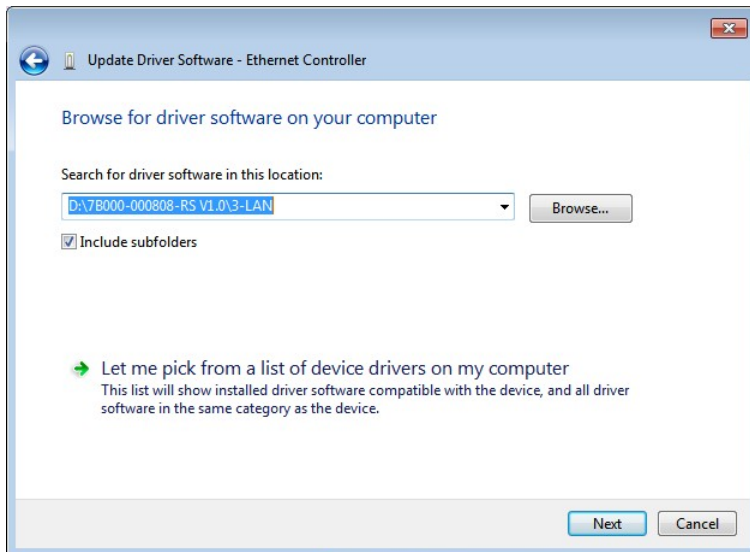
Figure 6-16: Locate Driver Files

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

Step 11: Driver Installation is performed as shown in **Figure 6-17**.
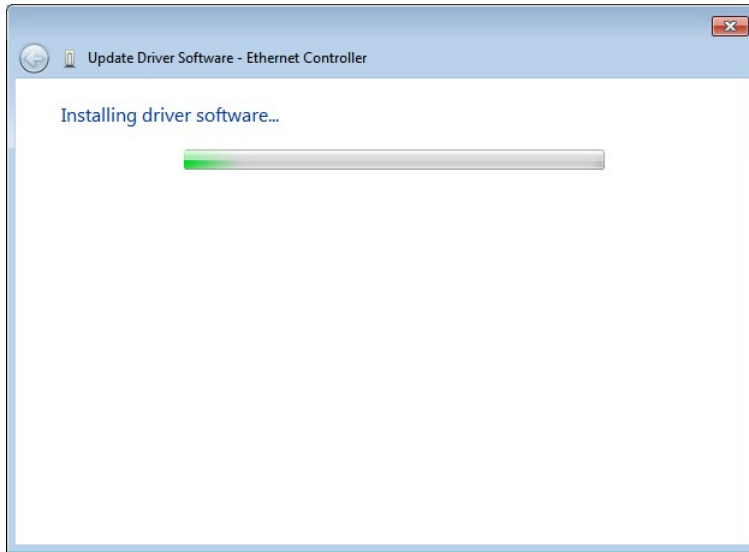
Figure 6-17: LAN Driver Installation

Step 12: The **Finish** screen in **Figure 6-18** appears. Click **Close** to exit.
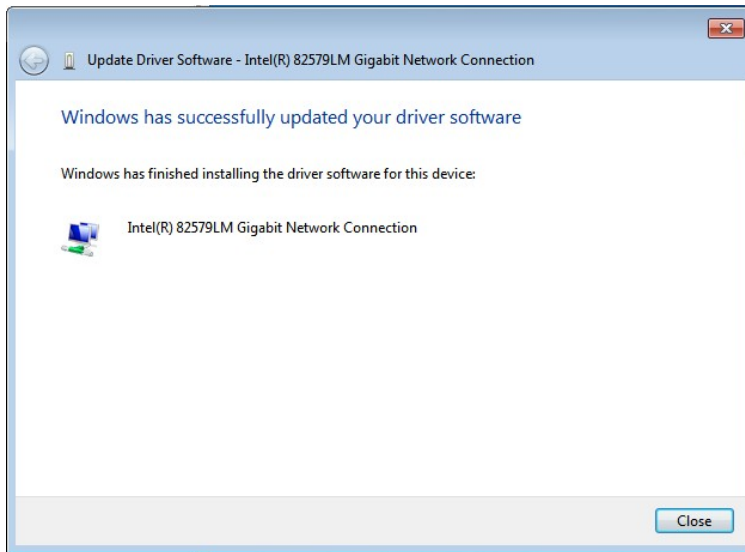
Figure 6-18: LAN Driver Installation Complete

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** is prepared to guide the user through the rest of the process.

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-19**).
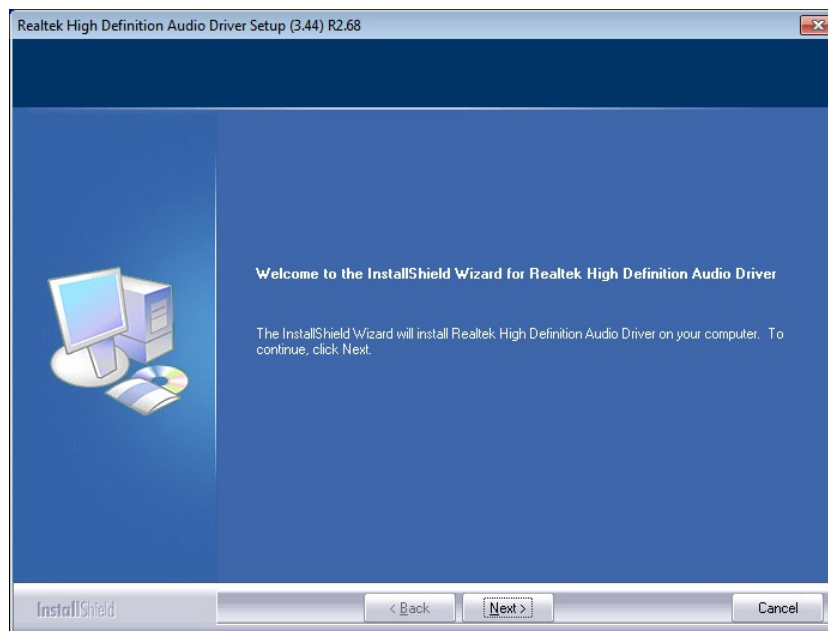
Figure 6-19: InstallShield Wizard Welcome Screen

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

Step 7: InstallShield starts to install the new software as shown in **Figure 6-20**.
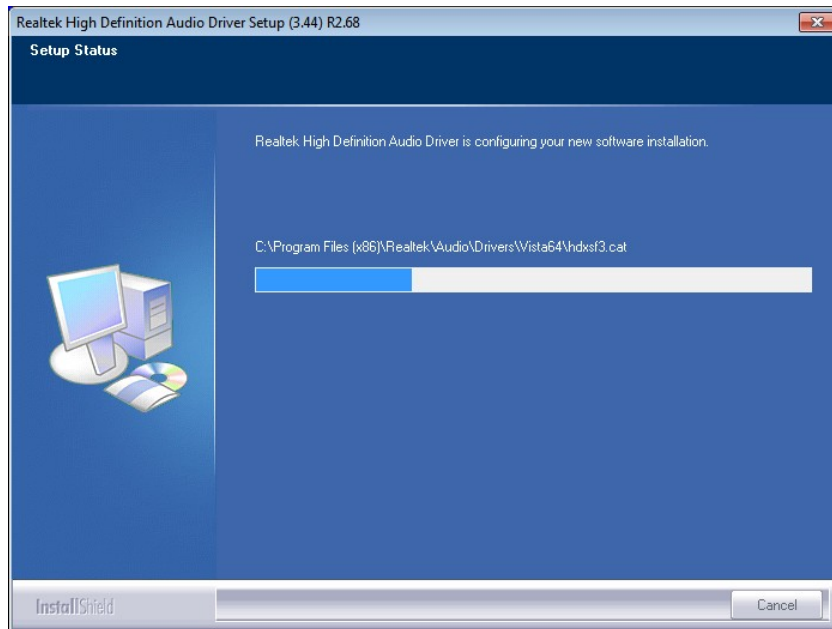
Figure 6-20: Audio Driver Software Configuration

Step 8: After the driver installation process is complete, a confirmation screen appears (**Figure 6-21**).
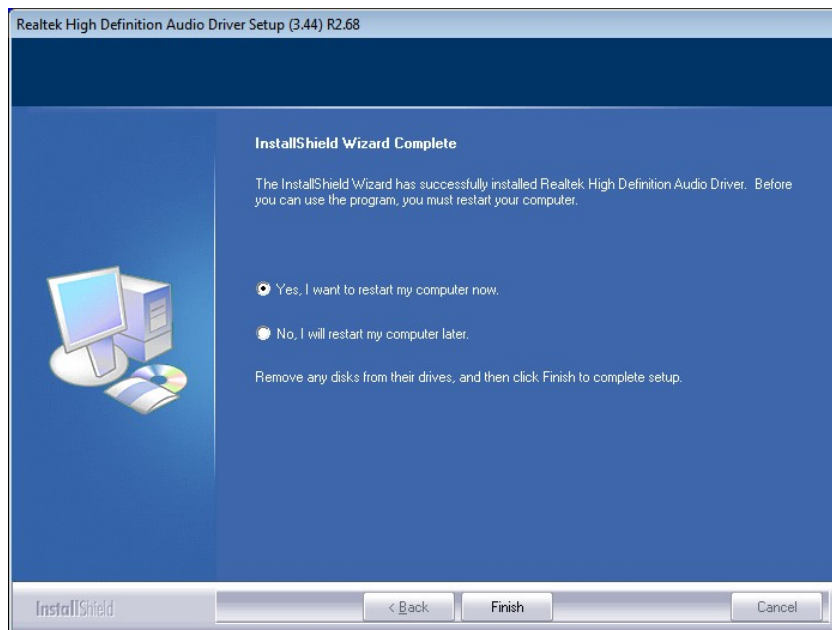
Figure 6-21: Restart the Computer

Step 9: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

6.7 Intel® Rapid Storage Technology Driver Installation

To install the Intel® Rapid Storage Technology driver, please do the following.

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

Step 2: Click "**SATA**".

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

Step 4: The **Welcome Screen** in **Figure 6-22** appears.

Step 5: Click **Next** to continue.
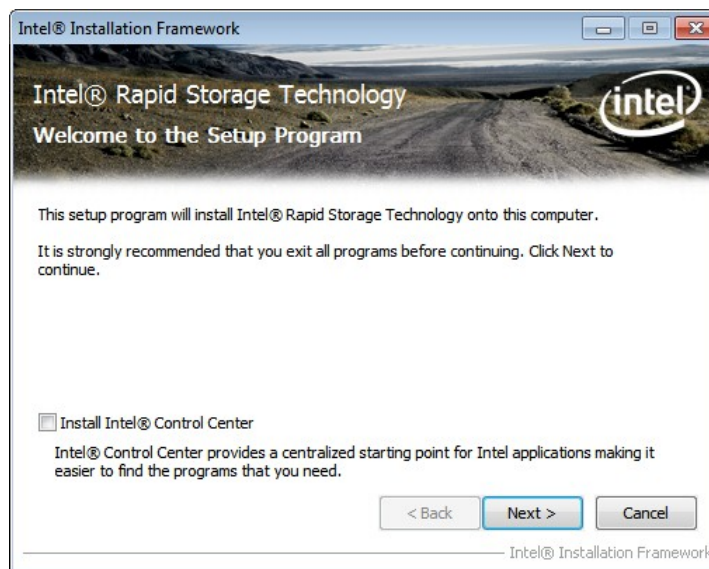
Figure 6-22: SATA RAID Driver Welcome Screen

Step 6: The license agreement in **Figure 6-23** appears.

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

Step 8: Click **Yes** to continue.
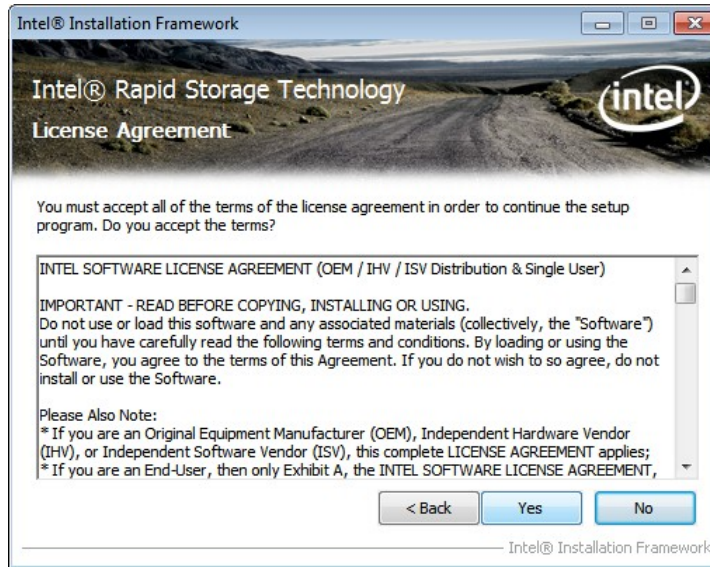
Figure 6-23: SATA RAID Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-24** appears.

Step 10: Click **Next** to continue.
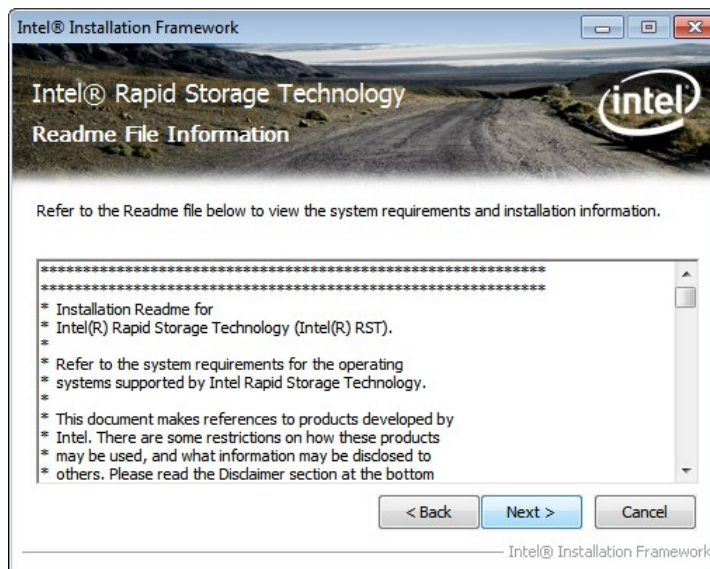
Figure 6-24: SATA RAID Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-25**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
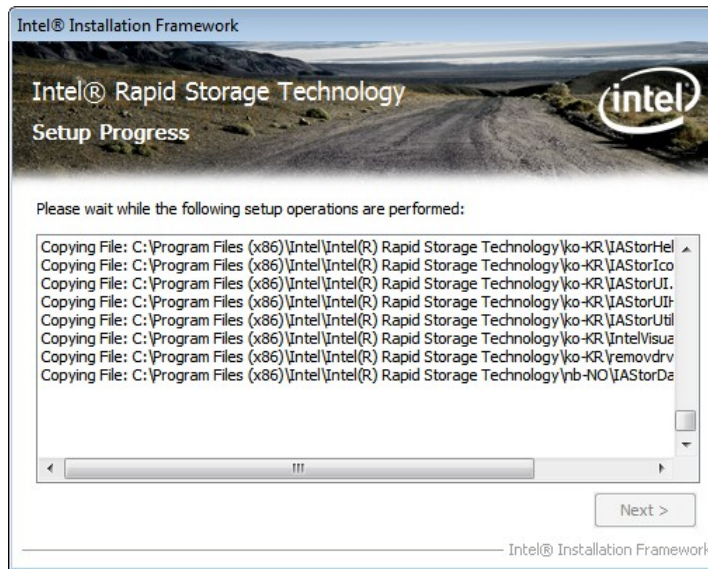
Figure 6-25: SATA RAID Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-26** appears.

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

Figure 6-26: SATA RAID Driver Installation Finish Screen

6.8 USB 3.0 Driver Installation

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

To install the touch panel software driver, please follow the steps below.

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

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

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

Step 4: The **Welcome Screen** in **Figure 6-27** appears.

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

Figure 6-27: USB 3.0 Driver Welcome Screen

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

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

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

Figure 6-28: USB 3.0 Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-29** appears.

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

Figure 6-29: USB 3.0 Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-30**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
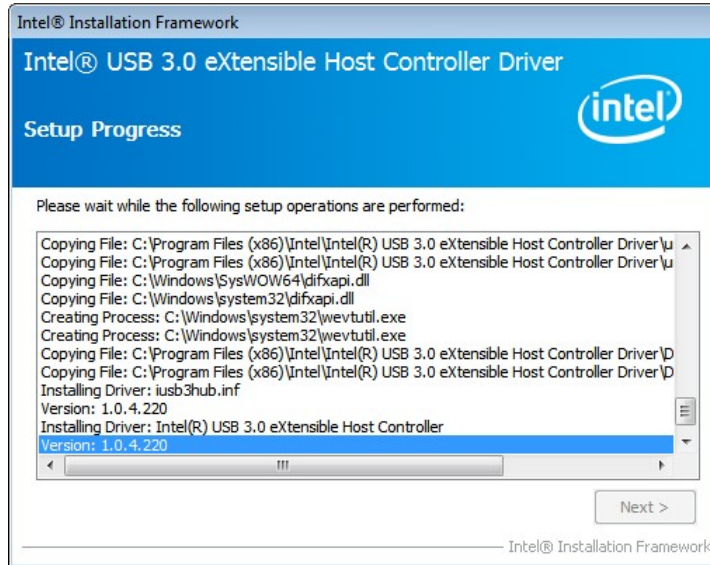
Figure 6-30: USB 3.0 Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-31** appears.

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

Figure 6-31: USB 3.0 Driver Installation Finish Screen

6.9 Intel® AMT Driver Installation

The package of the Intel® AMT components includes

- Intel® Management Engine Interface (Intel® ME Interface)

- Intel® Dynamic Application Loader

- Intel® Identity Protection Technology (Intel® IPT)

- Serial Over LAN (SOL)

- Intel® Manageability Engine Firmware Recovery Agent

- Intel® Management and Security Status

- Local Management Service (LMS)

- User Notification Service (UNS)

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

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

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

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

Step 4: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-32** appears.

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

Figure 6-32: Intel® ME Driver Welcome Screen

Step 6: The license agreement in **Figure 6-33** appears.

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

Step 8: Click **Yes** to continue.
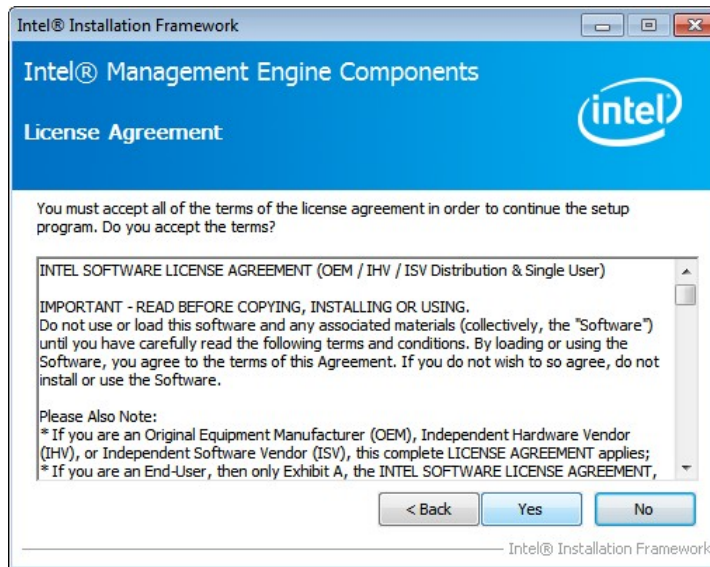
Figure 6-33: Intel® ME Driver License Agreement

Step 9: **Setup Operations** are performed as shown in **Figure 6-34**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.
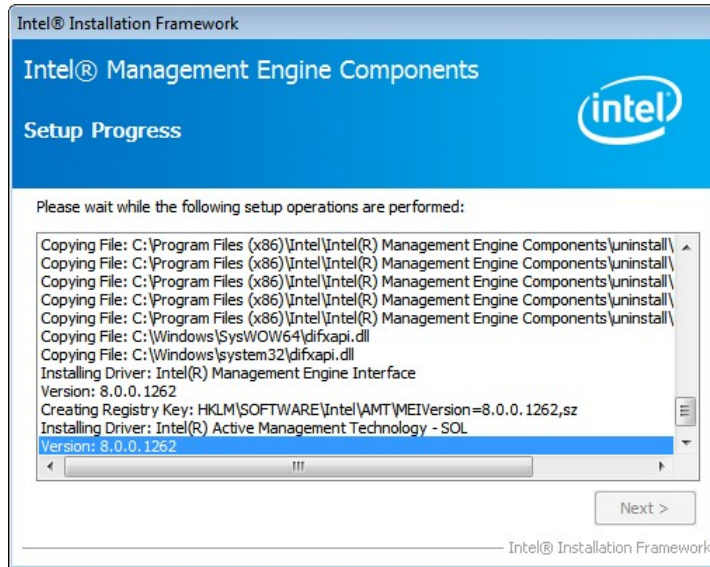
Figure 6-34: Intel® ME Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-35** appears.

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.
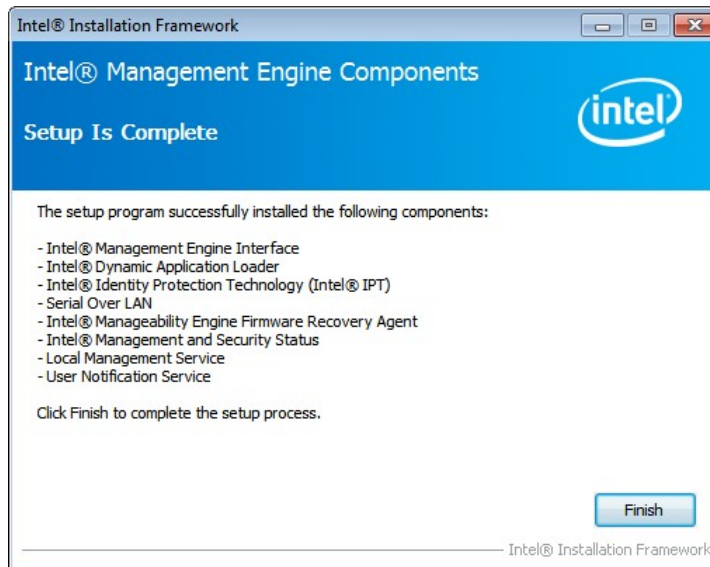
Figure 6-35: Intel® ME Driver Installation Finish Screen

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.
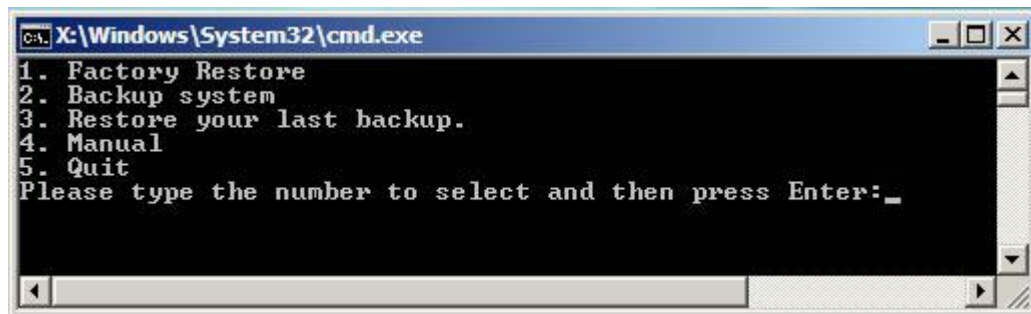
Figure B-1: IEI One Key Recovery Tool Menu

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 the 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 icon] **NOTE:**

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

B.1.1 System Requirement

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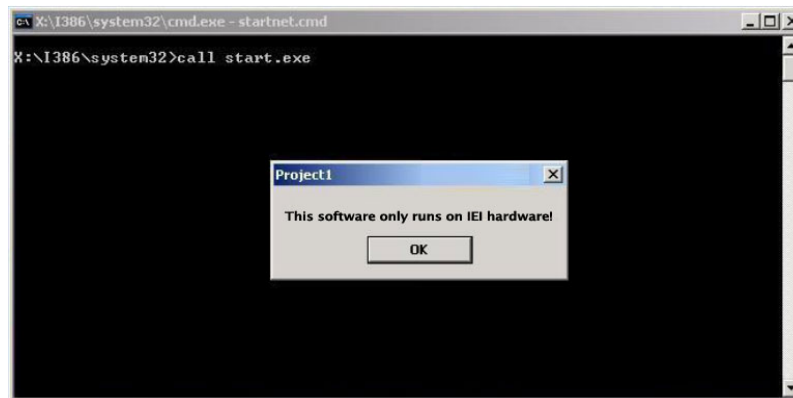
To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

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 icon] **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 systems (OS). The supported OS versions are listed below.

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

![NOTE icon] **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

    o   Fedora Core 12 (Constantine)

    o   Fedora Core 11 (Leonidas)

    o   Fedora Core 10 (Cambridge)

    o   Fedora Core 8 (Werewolf)

    o   Fedora Core 7 (Moonshine)

    o   RedHat RHEL-5.4

    o   RedHat 9 (Ghirke)

    o   Ubuntu 8.10 (Intrepid)

    o   Ubuntu 7.10 (Gutsy)

    o   Ubuntu 6.10 (Edgy)

    o   Debian 5.0 (Lenny)

    o   Debian 4.0 (Etch)

    o   SuSe 11.2

    o   SuSe 10.3

NOTE:

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

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!

Starting Windows Preinstallation Environment...
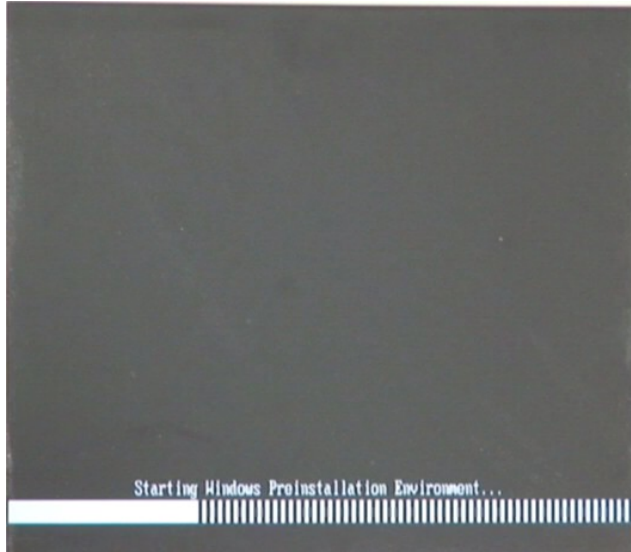
Figure B-2: Launching the Recovery Tool
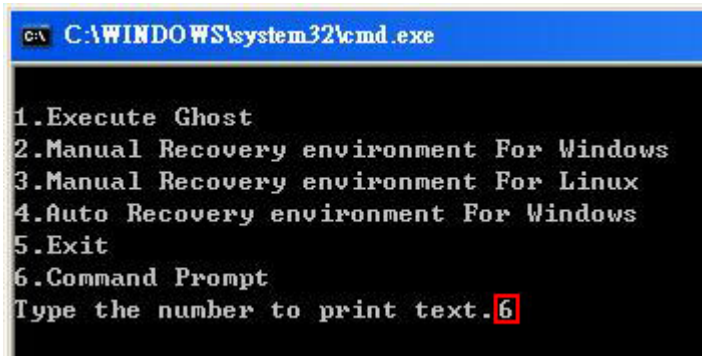
Step 3: The recovery tool setup menu is shown as below.


```
C:\WINDOWS\system32\cmd.exe

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

Figure B-3: Recovery Tool Setup Menu

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

Figure B-4: Command Prompt

Step 5: The command prompt window appears. Type the following commands (marked in red) to create two partitions. One is for the OS installation; the other is for saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>create part pri size= ___

DISKPART>assign letter=F

DISKPART>exit

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

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

system32>exit

Figure 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 Building the Recovery Partition

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

Step 2:   Start the system.

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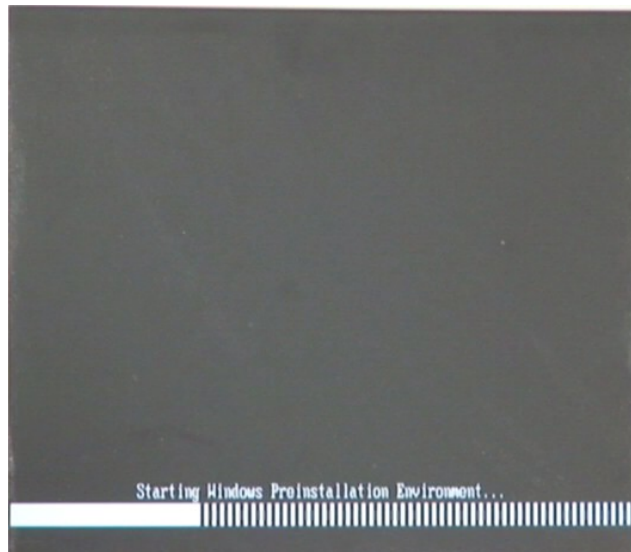
Figure B-6: Launching the Recovery Tool

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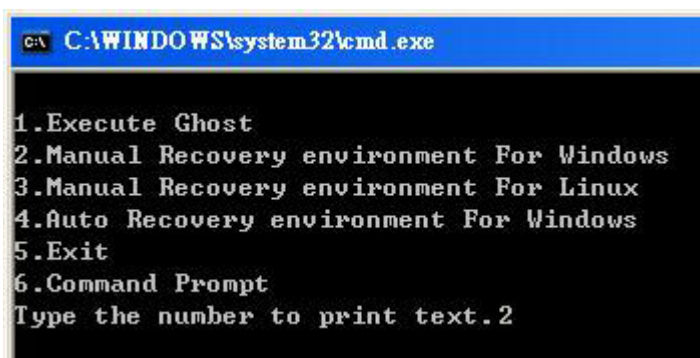
Figure B-7: Manual Recovery Environment for Windows

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.
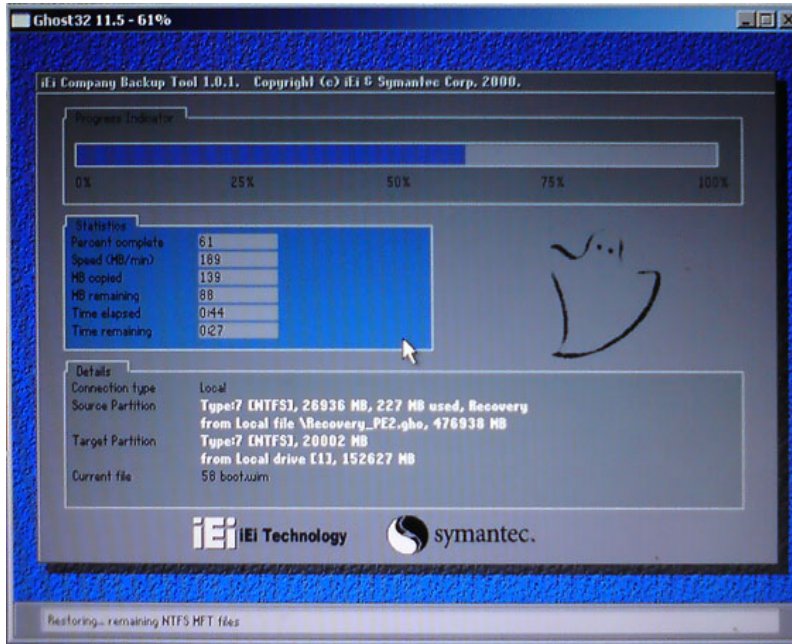
Figure B-8: Building the Recovery Partition

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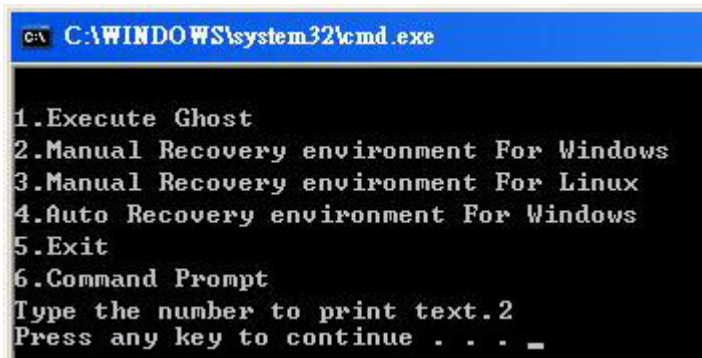
Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.
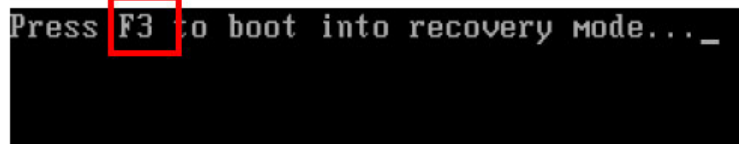
B.2.5 Create Factory Default Image

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**)
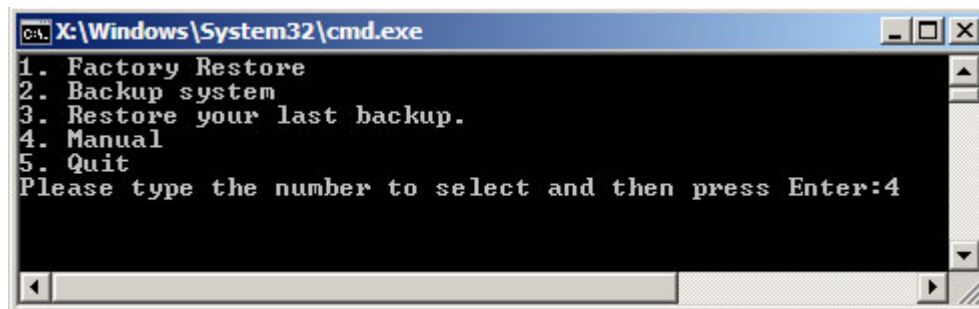
Figure B-11: Recovery Tool Menu

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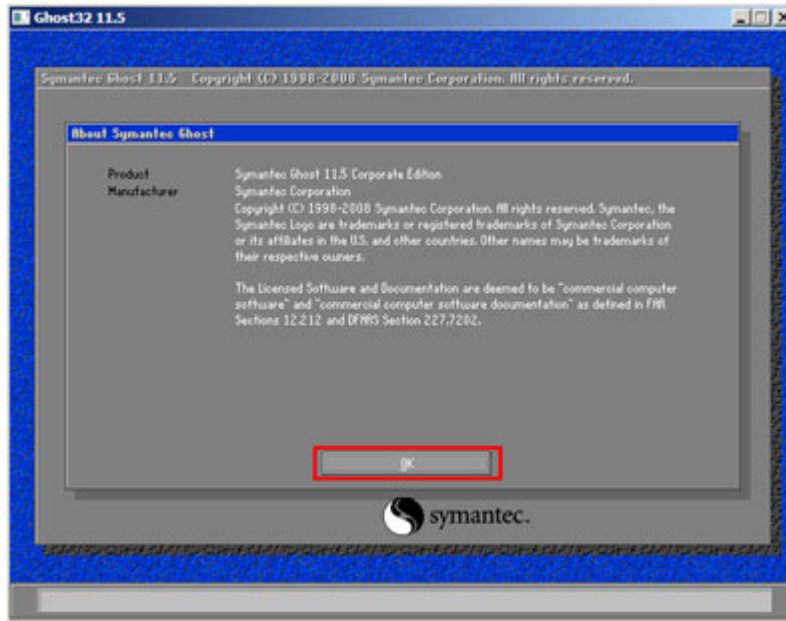
Figure B-12: About Symantec Ghost Window

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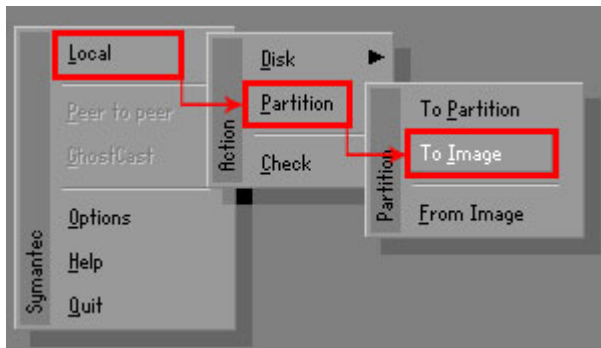
Figure B-13: Symantec Ghost Path

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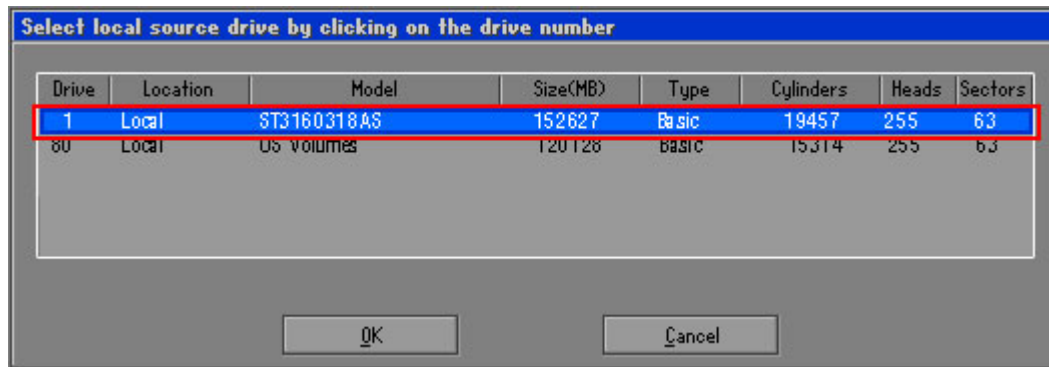
Figure B-14: Select a Local Source Drive

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

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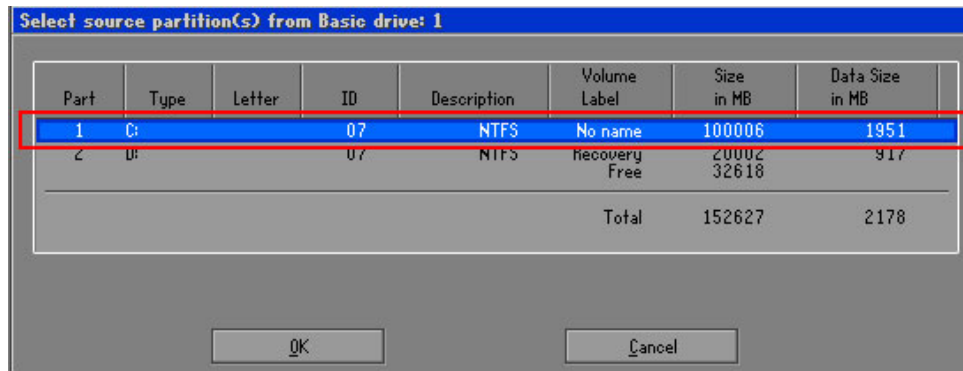
Figure B-15: Select a Source Partition from Basic Drive

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**.
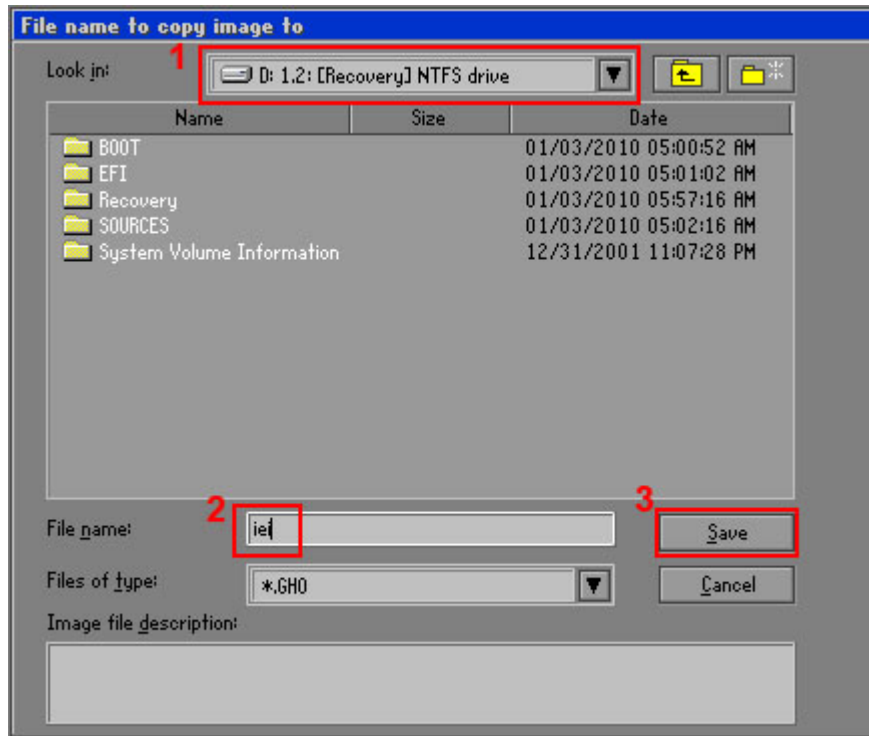
Figure B-16: File Name to Copy Image to

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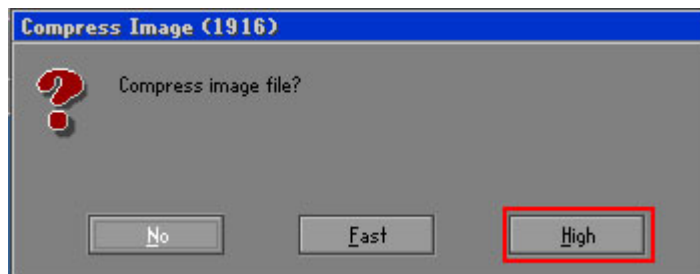
Figure B-17: Compress Image

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

continue.
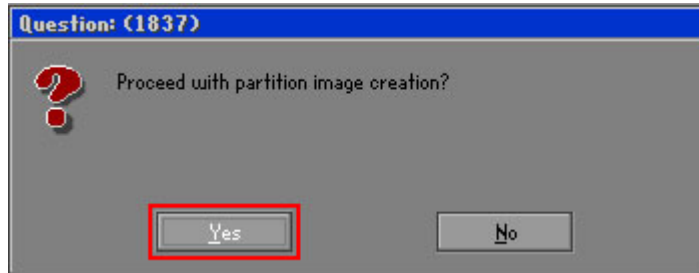
Figure B-18: Image Creation Confirmation

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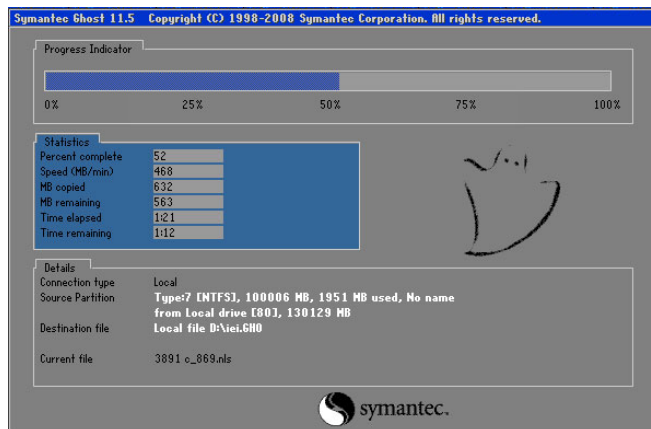
Figure B-19: Image Creation Complete

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.
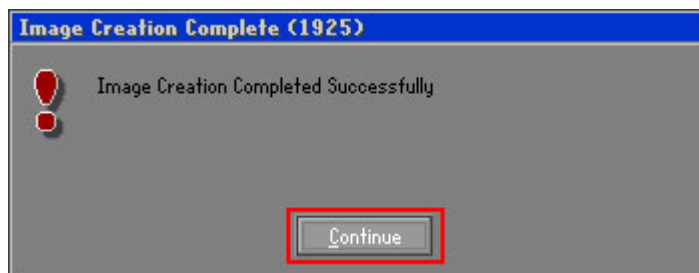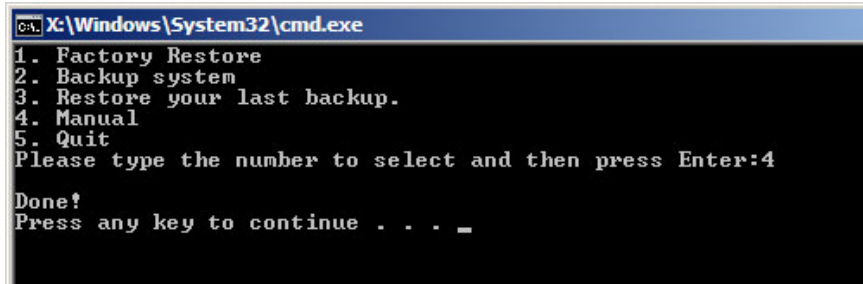
Figure B-20: Image Creation Complete

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)
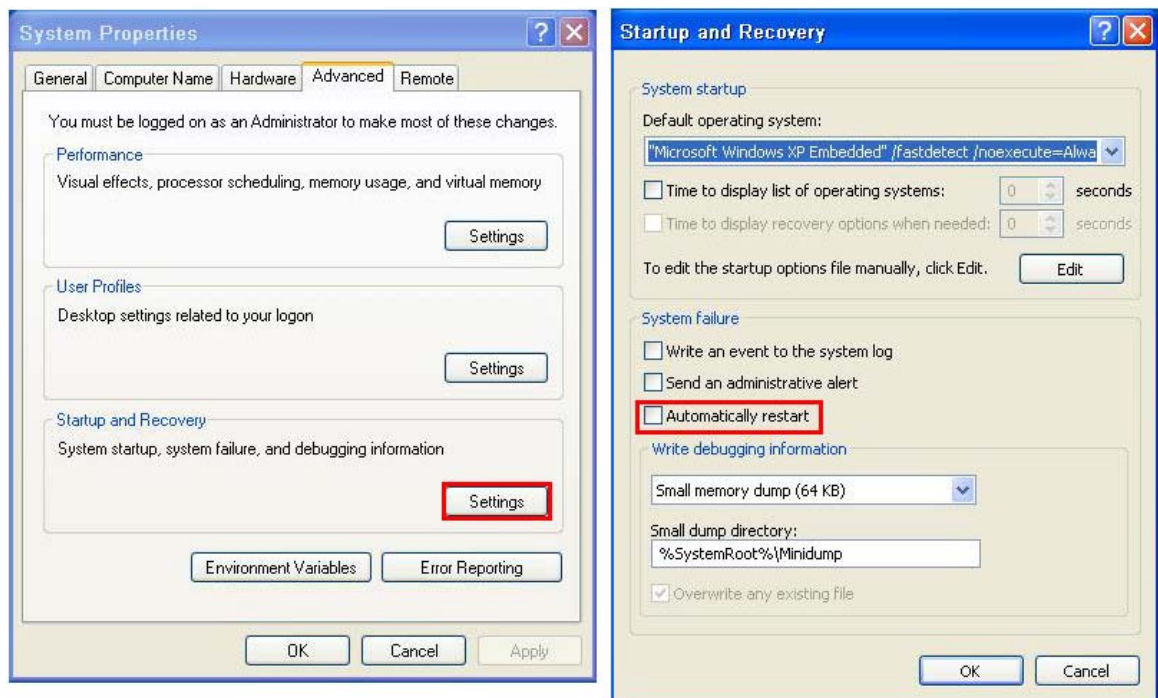
Figure B-23: Disable Automatically Restart

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!
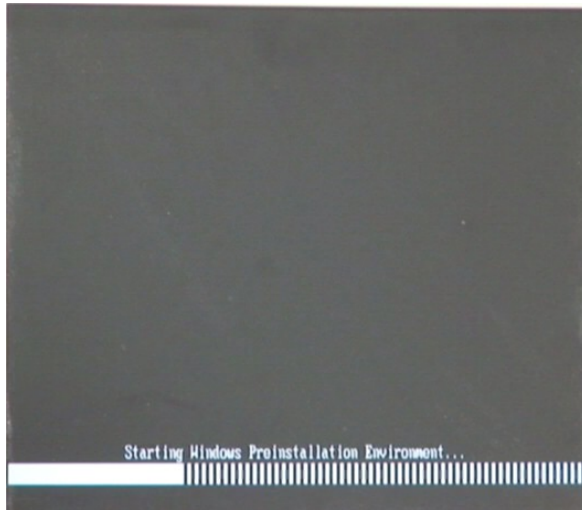
Figure B-24: Launching the Recovery Tool

Step 5: When the recovery tool setup menu appears, press <**4**> then <Enter>.
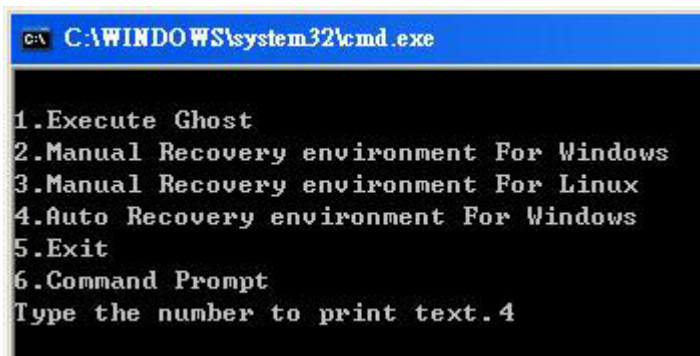
Figure B-25: Auto Recovery Environment for Windows

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.
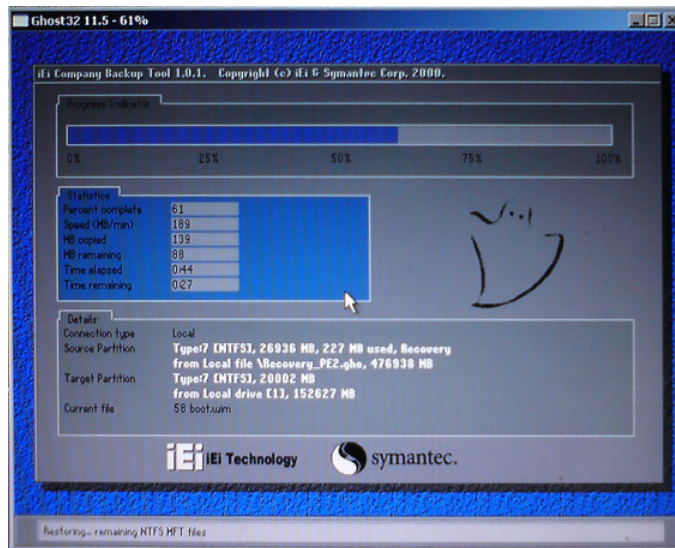
Figure B-26: Building the Auto Recovery Partition

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**).
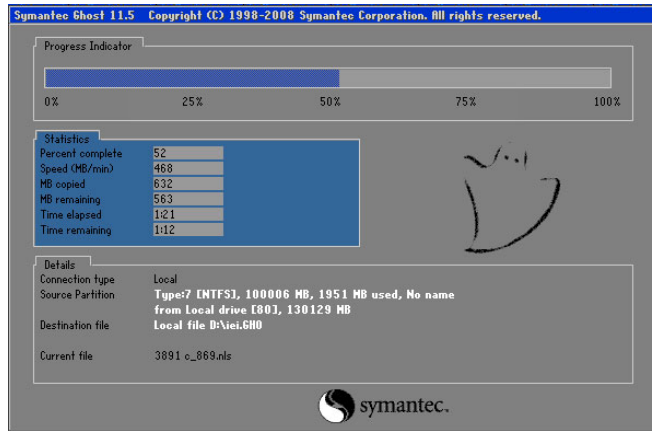
Figure B-28: Image Creation Complete

Step 9: After completing the system configuration, press any key in the following window to restart the system.
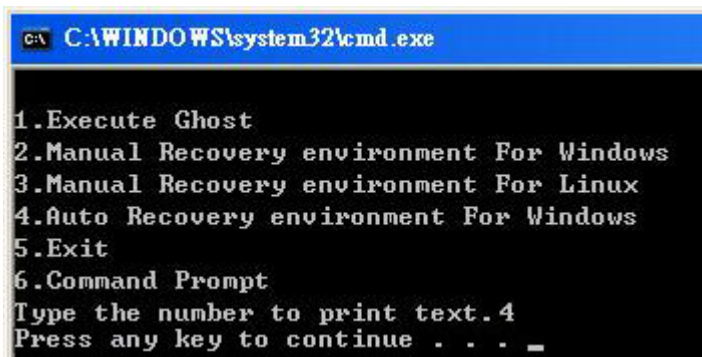
Figure B-29: Press any key to continue

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 SETUP UTILITY
  Main    Advanced   PCIPNP    Boot    Security   Chipset   Exit

 iEi Feature
 _____

 Auto Recovery Function          [Enabled]
   Recover from PXE              [Disabled]


                                         ←→    Select Screen
                                         ↑↓    Select Item
                                         Enter Go to SubScreen
                                         F1    General Help
                                         F10   Save and Exit
                                         ESC   Exit

       v02.61 ©Copyright 1985-2006, American Megatrends, Inc.
```
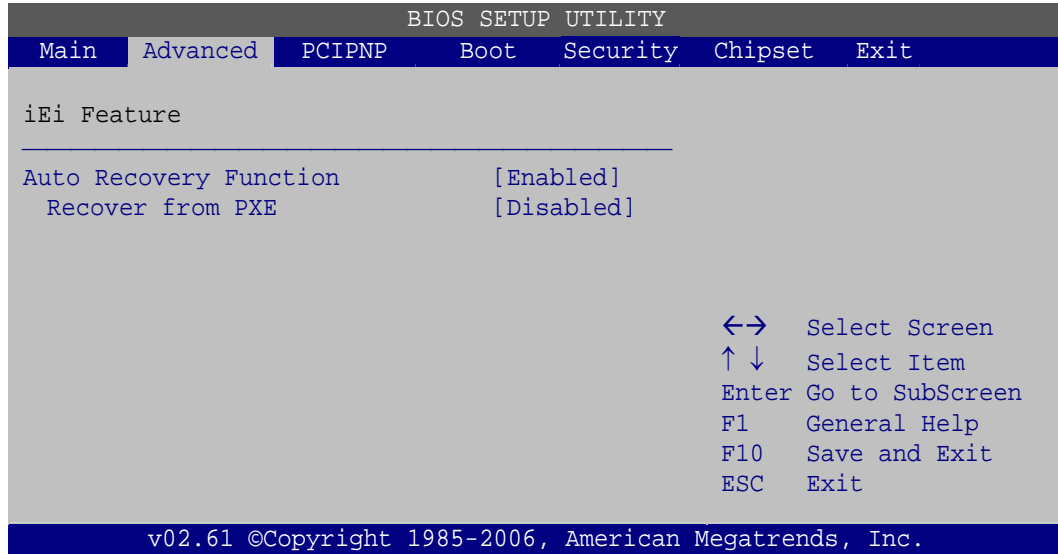
Figure B-30: IEI Feature

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 procedure for Linux system is mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup recovery tool for Linux OS.

Step 1: **Hardware and BIOS setup**. Refer to **Section 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.
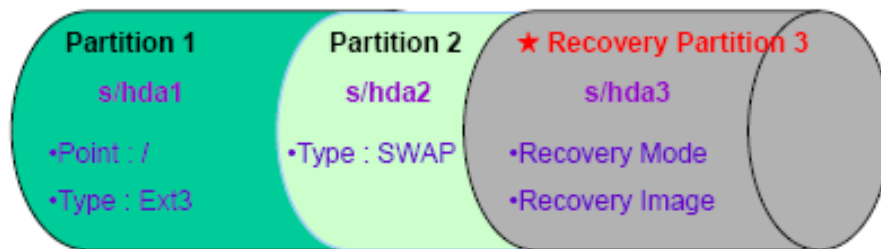
Figure B-31: Partitions for Linux

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.
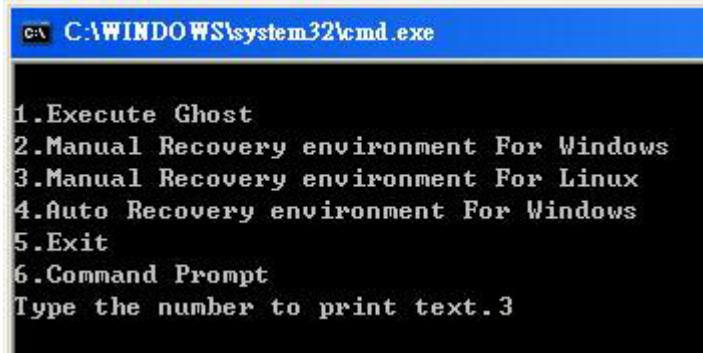
system32>diskpart

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 the recovery partition**. Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient. When the recovery tool setup menu appears, type **<3>** and press <Enter> (**Figure B-32**). The Symantec Ghost window appears and starts configuring the system to build a

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

reboot the system. Eject the recovery CD.
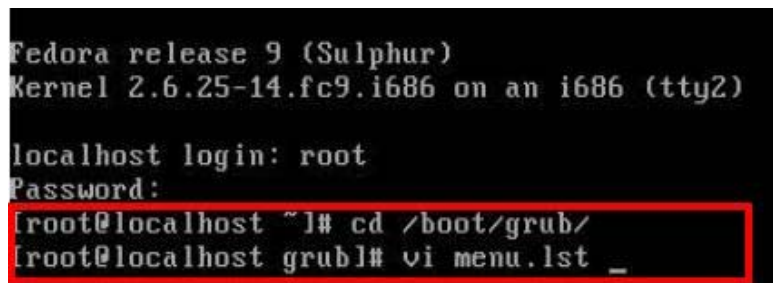
Figure B-32: Manual Recovery Environment for Linux

Step 5: **Access the recovery tool main menu by modifying the "menu.lst".** To first

access the recovery tool main menu, the menu.lst must be modified. In Linux,

enter Administrator (root). When prompt appears, type:

cd /boot/grub

vi menu.lst

Figure B-33: 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-34**)

Figure B-34: 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.
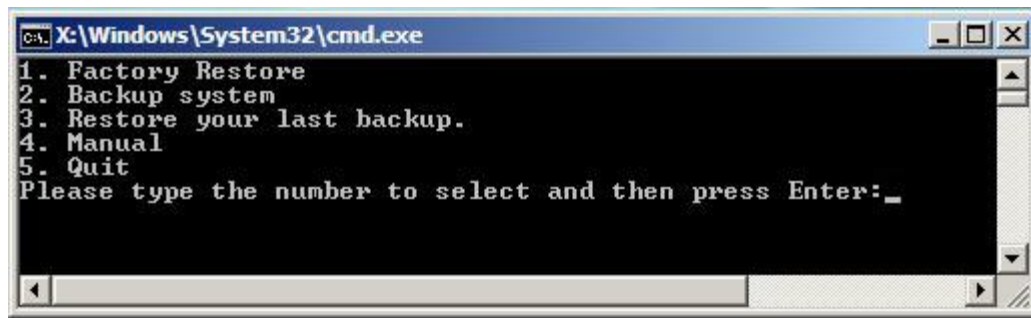
Figure B-35: Recovery Tool Main Menu

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.
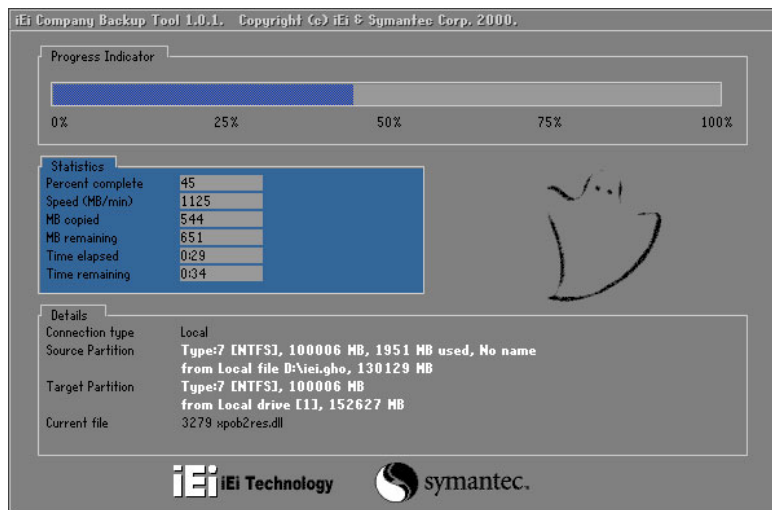
Figure B-36: Restore Factory Default

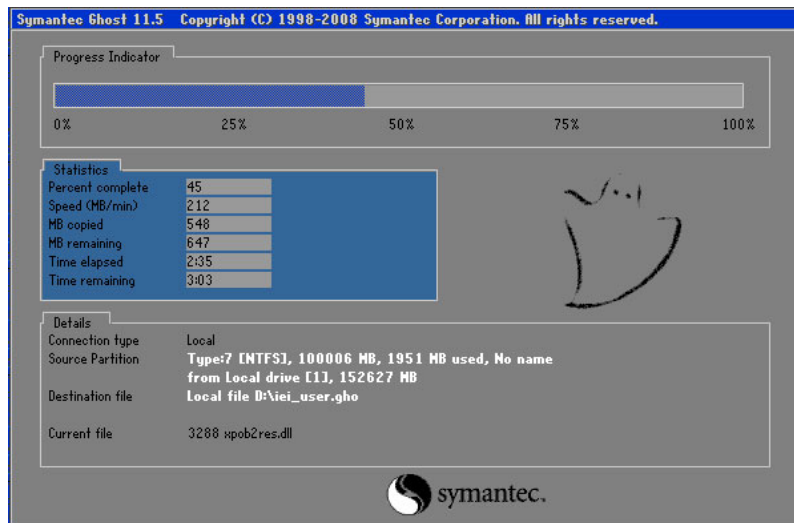**Step 3:** The screen shown in **Figure B-37** appears when completed. Press any key to reboot the system.
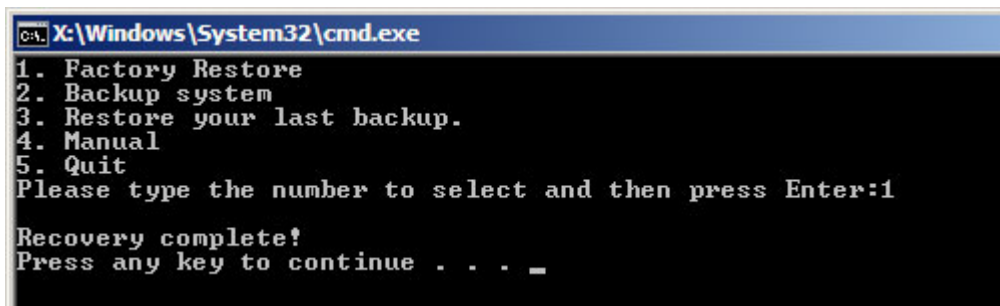
Figure B-37: Recovery Complete Window

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.
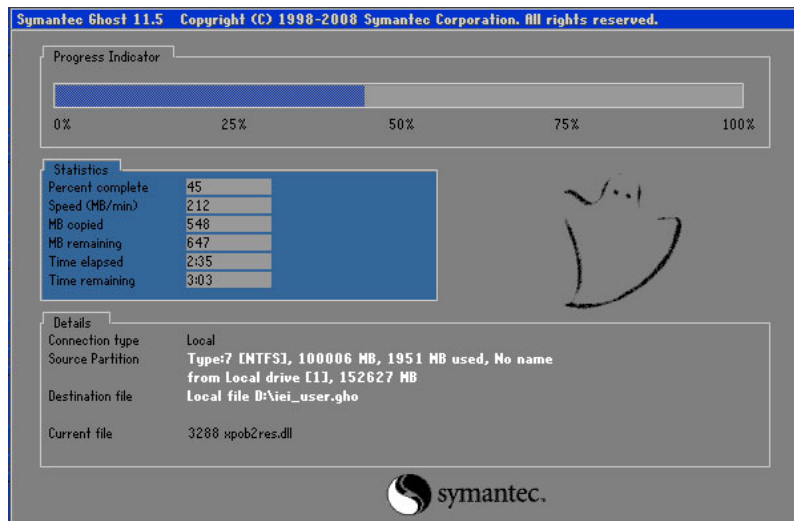
Figure B-38: Backup System

Step 3: The screen shown in **Figure B-39** appears when system backup is complete.

Press any key to reboot the system.
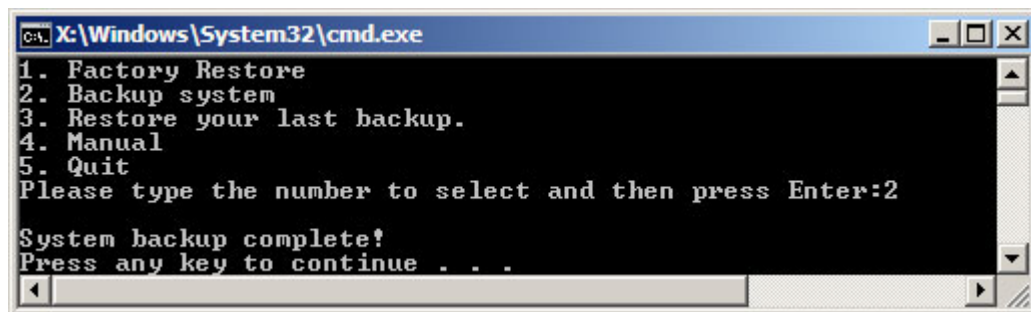
Figure B-39: System Backup Complete Window

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-40: Restore Backup

Step 3: The screen shown in **Figure B-41** appears when backup recovery is complete.
Press any key to reboot the system.
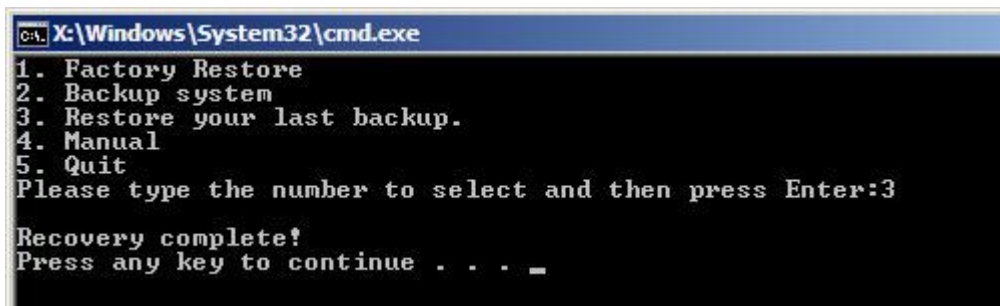
Figure B-41: Restore System Backup Complete Window

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.
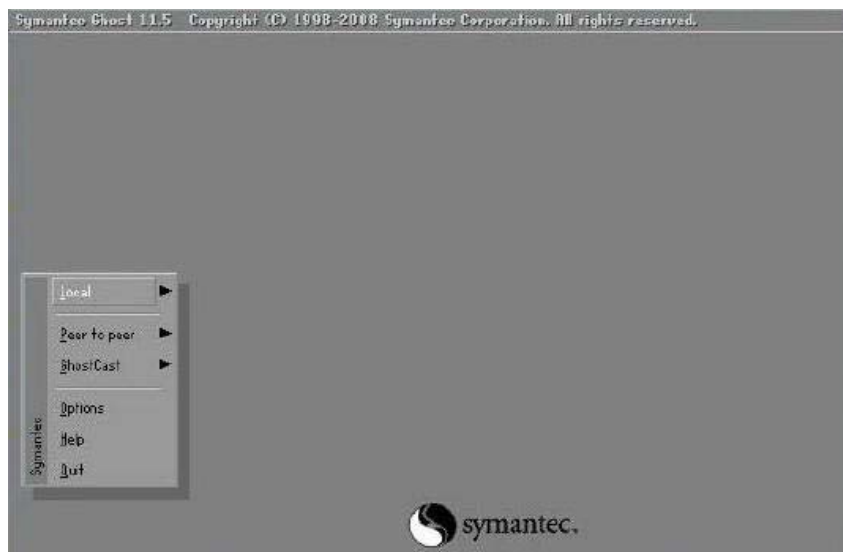
Figure B-42: Symantec Ghost Window

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.
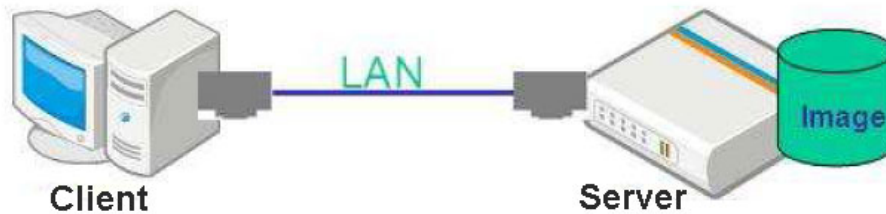
> ⚠️ **CAUTION:**

The supported client OS includes:

- Windows 2000   ▪ Windows 7
- Windows XP   ▪ Windows XP Embedded
- Windows Vista   ▪ Windows Embedded Standard 7

Prior to restoring client systems from a Linux server, a few setup procedures are required.

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

The detailed descriptions are described in the following sections. In this document, two types of Linux OS are used as examples to explain the configuration process – CentOS 5.5 (Kernel 2.6.18) and Debian 5.0.7 (Kernel 2.6.26).

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.

<u>CentOS</u>

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

#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

Use the following command to copy the DHCP server sample to etc/dhcpd.conf:

#cp /usr/share/doc/dhcp-3.0.5/dhcpd.conf.sample /etc/dhcpd.conf

#vi /etc/dhcpd.conf

<u>Debian</u>

#vi /etc/dhcpd.conf

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

next-server PXE server IP address;

filename "pxelinux.0";

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

Debian

Replace the TFTP settings from "inetd" to "xinetd" and annotate the "inetd" by

adding "#".

#vi /etc/inetd.conf

Modify: #tftp dgram udp wait root /usr/sbin....... (as shown below)

#vi /etc/xinetd.d/tftp

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:

<u>CentOS</u>

#service xinetd restart

#service httpd restart

#service dhcpd restart

<u>Debian</u>

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

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

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 icon] **WARNING:**

The file name of the factory default image must be **iei.gho**.

Step 3: Confirm the operating system default settings: smb.conf.

#vi /etc/samba/smb.conf

Modify:

[image]

    comment = One Key Recovery

    path = /share/image

    browseable = yes

    writable = yes

    public = yes

    create mask = 0644

    directory mask = 0755

Step 4: Edit "/etc/samba/smb.conf" for your environment. For example:

```
# "security = user" is always a good idea. This will require a Unix account
# in this server for every user accessing the server. See
# /usr/share/doc/samba-doc/htmldocs/Samba3-HOWTO/ServerType.html
# in the samba-doc package for details.
  security = share

[image]
   comment = One Key Recovery
   path = /share/image
   browseable = yes
   writable = yes
   public = yes
   create mask = 0644
   directory mask = 0755
```

Step 5: Modify the hostname

        #vi /etc/hostname

        Modify: RecoveryServer

```
RecoveryServer
~
```

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

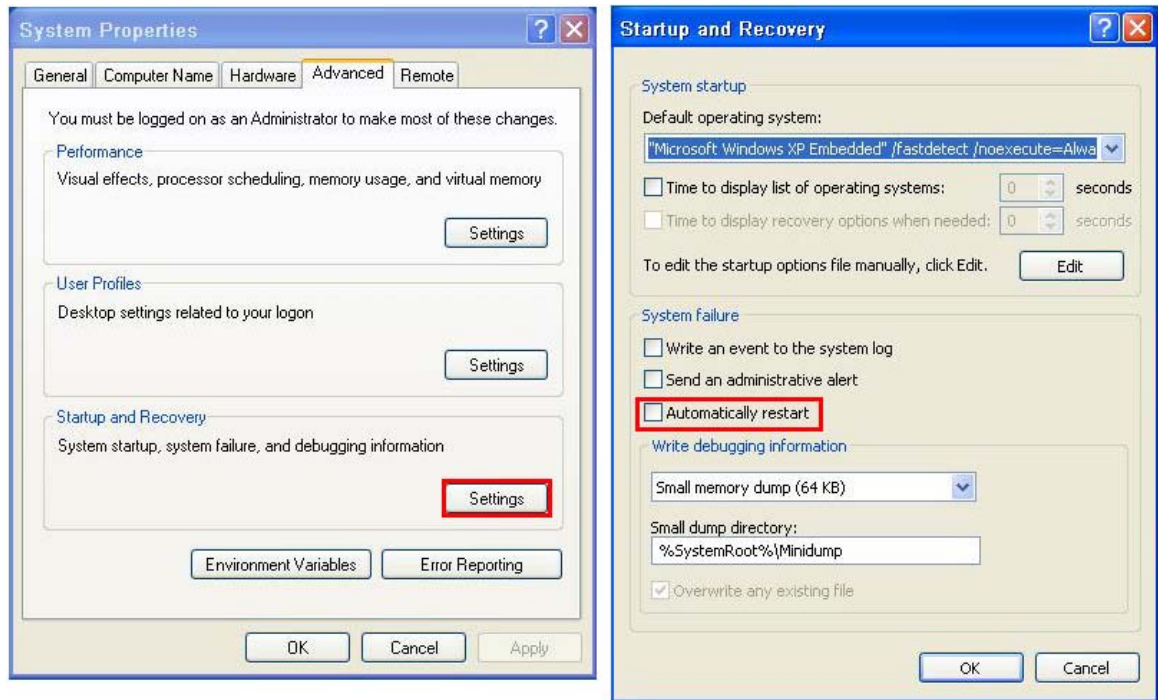   OK to save the settings and exit. (See Figure B-23)

Figure B-43: Disable Automatically Restart

Step 2: Configure the following BIOS options of the client system.

Advanced → iEi Feature → Auto Recovery Function → **Enabled**

Advanced → iEi Feature → Recover from PXE → **Enabled**

Boot → Launch PXE OpROM → **Enabled**

Step 3: Continue to configure the **Boot Option Priorities** BIOS option of the client

system:

Boot Option #1 → remain the default setting to boot from the original OS.

Boot Option #2 → select the boot from LAN option.

Step 4: Save changes and exit BIOS menu.

Exit → **Save Changes and Exit**

Step 5: Install the auto recovery utility into the system by double clicking the

Utility/AUTORECOVERY-SETUP.exe in the One Key Recovery CD. This utility

MUST be installed in the system, otherwise, the system will automatically

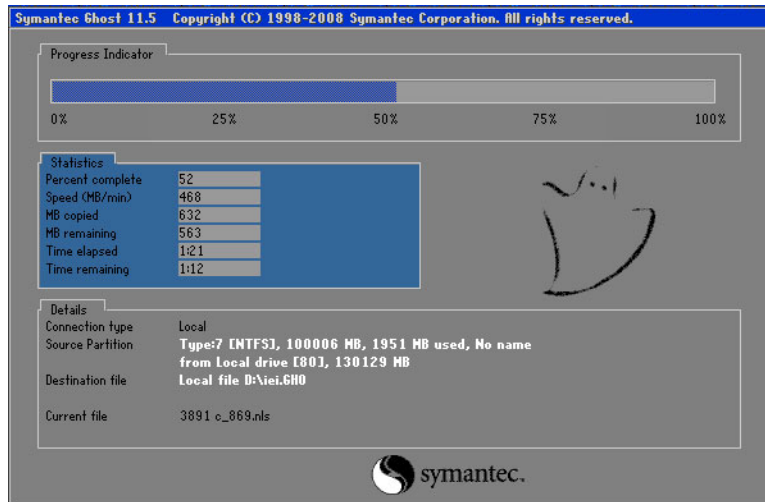restore from the factory default image every ten (10) minutes.

Step 6: Restart the client system from LAN. If the system encounters a Blue Screen of

Death (BSoD) or a hang for around 10 minutes, it will automatically restore from

the factory default image. The following screens will show when the system

starts auto recovering.

![NOTE icon] **NOTE:**

A firewall or a SELinux is not in use in the whole setup process described above. If there is a firewall or a SELinux protecting the system, modify the configuration information to accommodate them.

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**>.
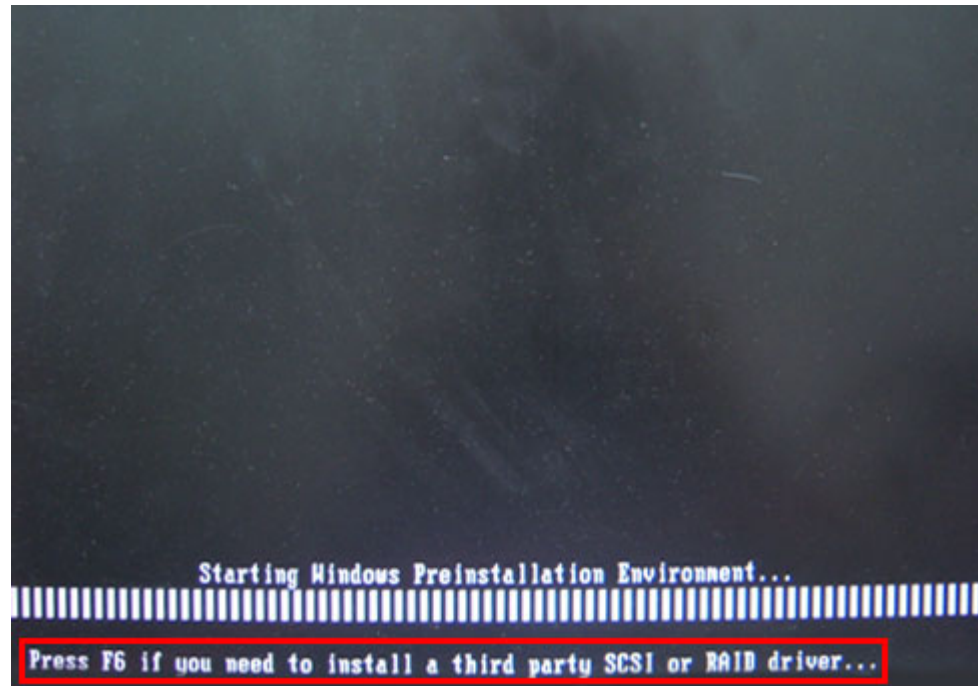
Step 5: When the following window appears, press <**S**> to select "Specify Additional

Device".
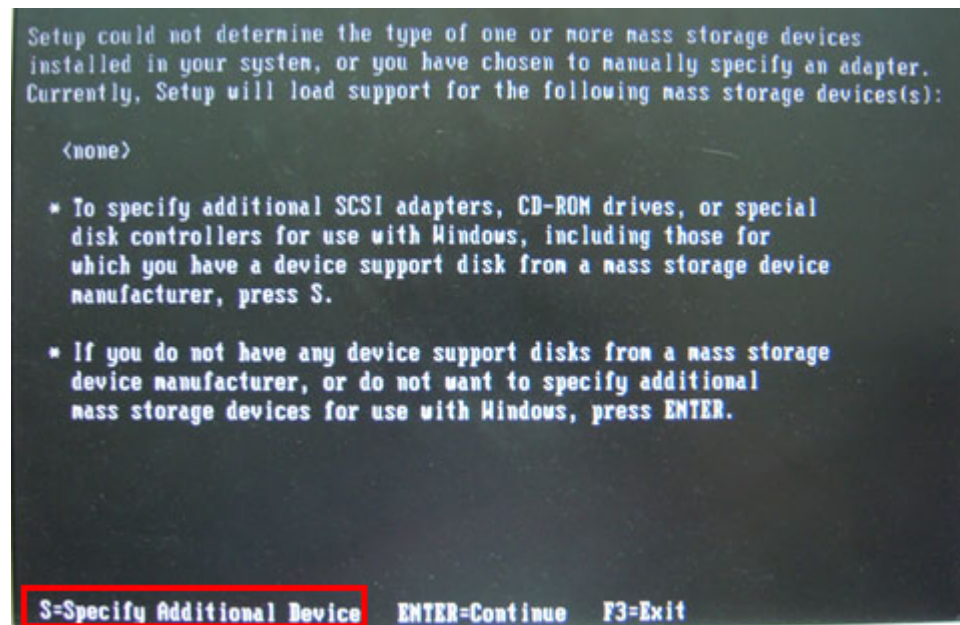
Step 6: In the following window, select a SATA controller mode used in the system. Then press <**Enter**>. The user can now start using the SATA HDD.
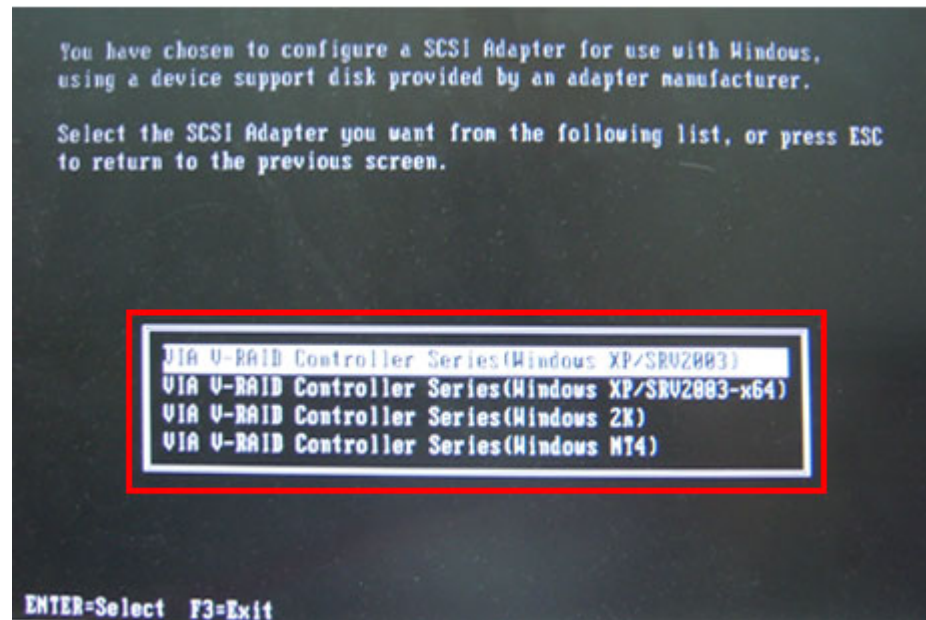
Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

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.

CompactFlash® CompactFlash® is a solid-state storage device. CompactFlash® devices
               use flash memory in a standard size enclosure. Type II is thicker than
               Type I, but a Type II slot can support both types.

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/Ouput Controll 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 NANO-QM770 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

> For further information, please refer to the datasheet for the Super I/O chipset.

D.2 DIO Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V5S
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 6-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

D.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Hazardous Materials Disclosure

E.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	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
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	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
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。						