MODEL:

NANO-QM871

EPIC SBC with 4th Generation 22nm Intel® Mobile Core™ i7/i5/i3 or Celeron® Processor, Dual HDMI, LVDS, VGA, Dual GbE, SATA 6Gb/s, USB 3.0, PCIe Mini, PCIe/104, Intel® AMT 9.0, Audio and RoHS

User Manual

Rev. 1.01 – 24 April, 2014

RoHS Lead Free

Revision

Date	Version	Changes
24 April, 2014	1.01	Modified LAN pinouts
24 December, 2013	1.00	Initial release

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Table of Contents

List of Figures

List of Tables

BIOS Menus

Chapter

1

Introduction

1.1 Introduction
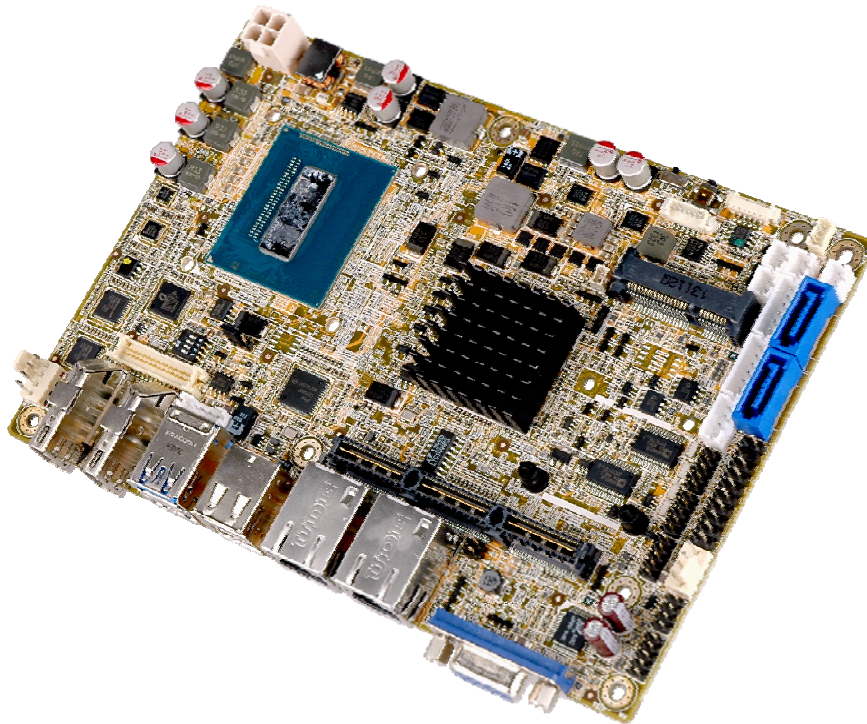
Figure 1-1: NANO-QM871

The NANO-QM871 is an EPIC SBC with a 4th generation 22nm Intel® mobile Core™ i7/i5/i3 or Celeron® processor and Intel® QM87 Express Chipset. Storage on the board is handled by two SATA 6Gb/s ports and one PCIe Mini socket for connecting a hard drive, optical drive or SSD.

The board has three types of graphics outputs that support triple independent display. A VGA output connects to a VGA monitor. One LVDS connector supports 18/24-bit dual-channel display. Two HDMI connectors support HDMI 1.4a specification.

Other slots and connectors include PCIe/104 Type 2 slot, RS-232 ports, RS-422/485 port, Gigabit Ethernet, USB 3.0 ports, USB 2.0 ports, TPM, SMBus and digital I/O.

1.2 Features

Some of the NANO-QM871 motherboard features are listed below:

- EPIC form factor
- 4th generation 22nm Intel® mobile Core™ i7/i5/i3 or Celeron® processor
- One 204-pin 1600/1333 MHz DDR3/DDR3L (1.35V) SO-DIMM supported (system max. 8.0 GB)
- Dual GbE
- Intel® AMT 9.0 support
- Supports triple independent display with dual HDMI+VGA/dual HDMI+LVDS/HDMI+VGA+LVDS
- One PCIe Mini card slot with mSATA support
- One PCIe/104 Type 2 slot
- Complete I/O with six USB (two USB 3.0, four USB 2.0), two SATA 6Gb/s, three COM (two RS-232, one RS-422/485) and audio
- RoHS compliant

1.3 Connectors

The connectors on the NANO-QM871 are shown in the figure below.
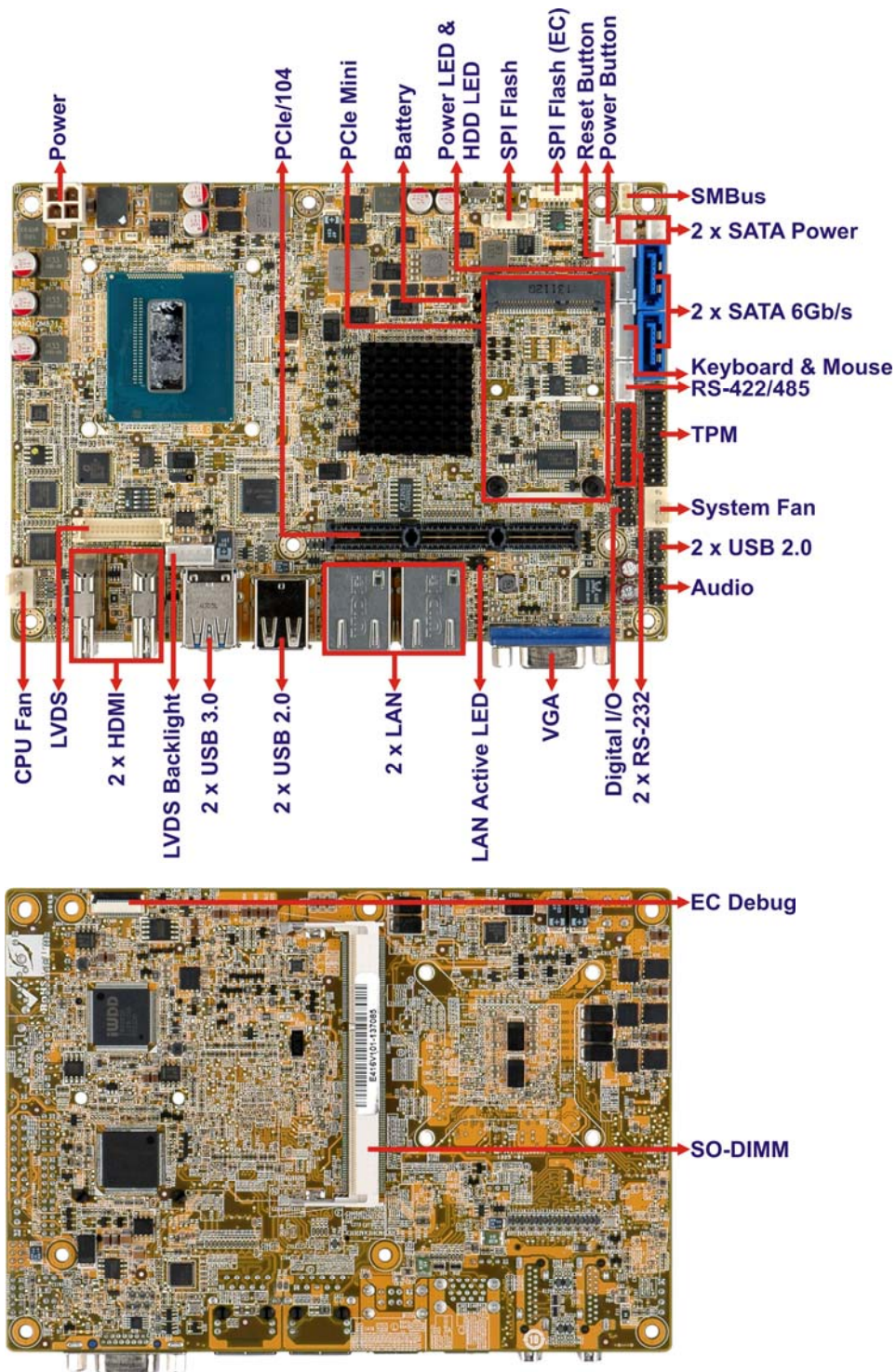
Figure 1-2: Connectors

1.4 Dimensions

The main dimensions of the NANO-QM871 are shown in the diagram below.
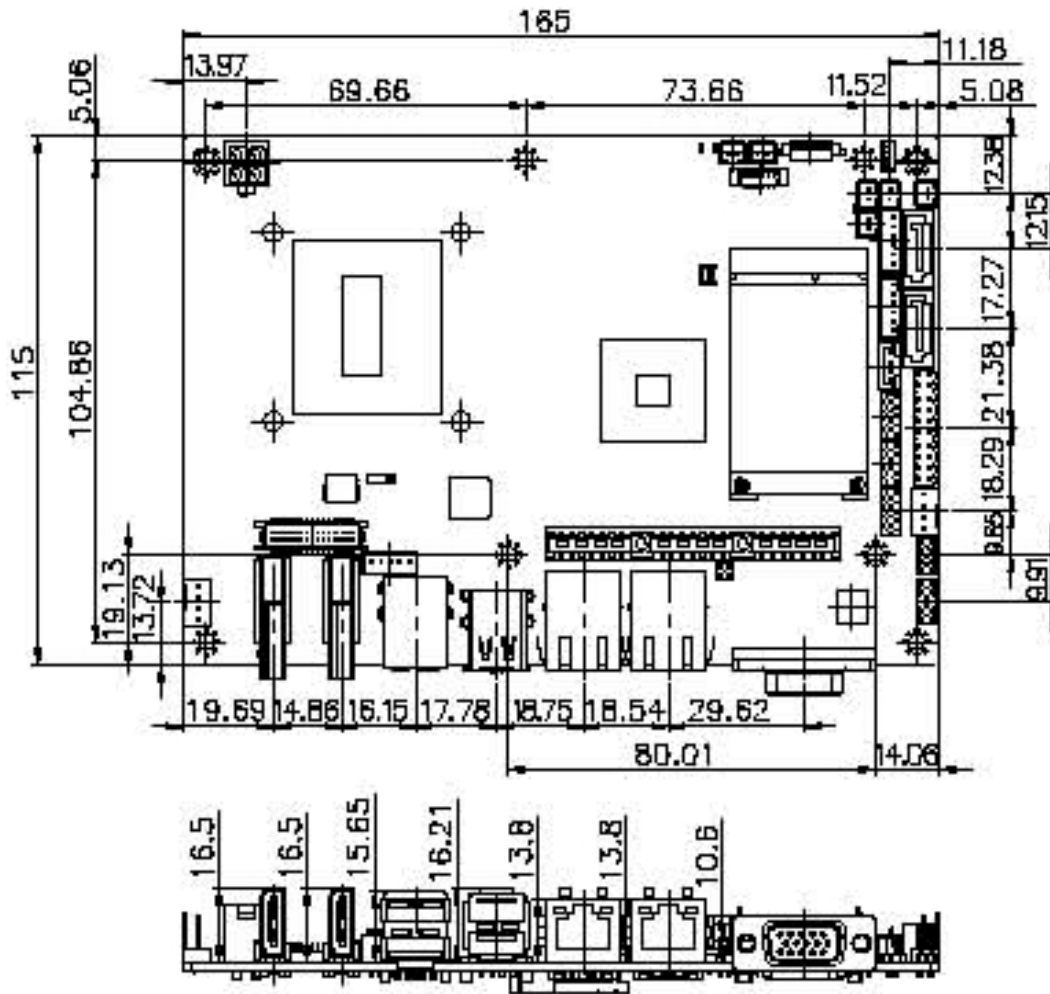
Figure 1-3: NANO-QM871 Dimensions (mm)

1.5 Data Flow

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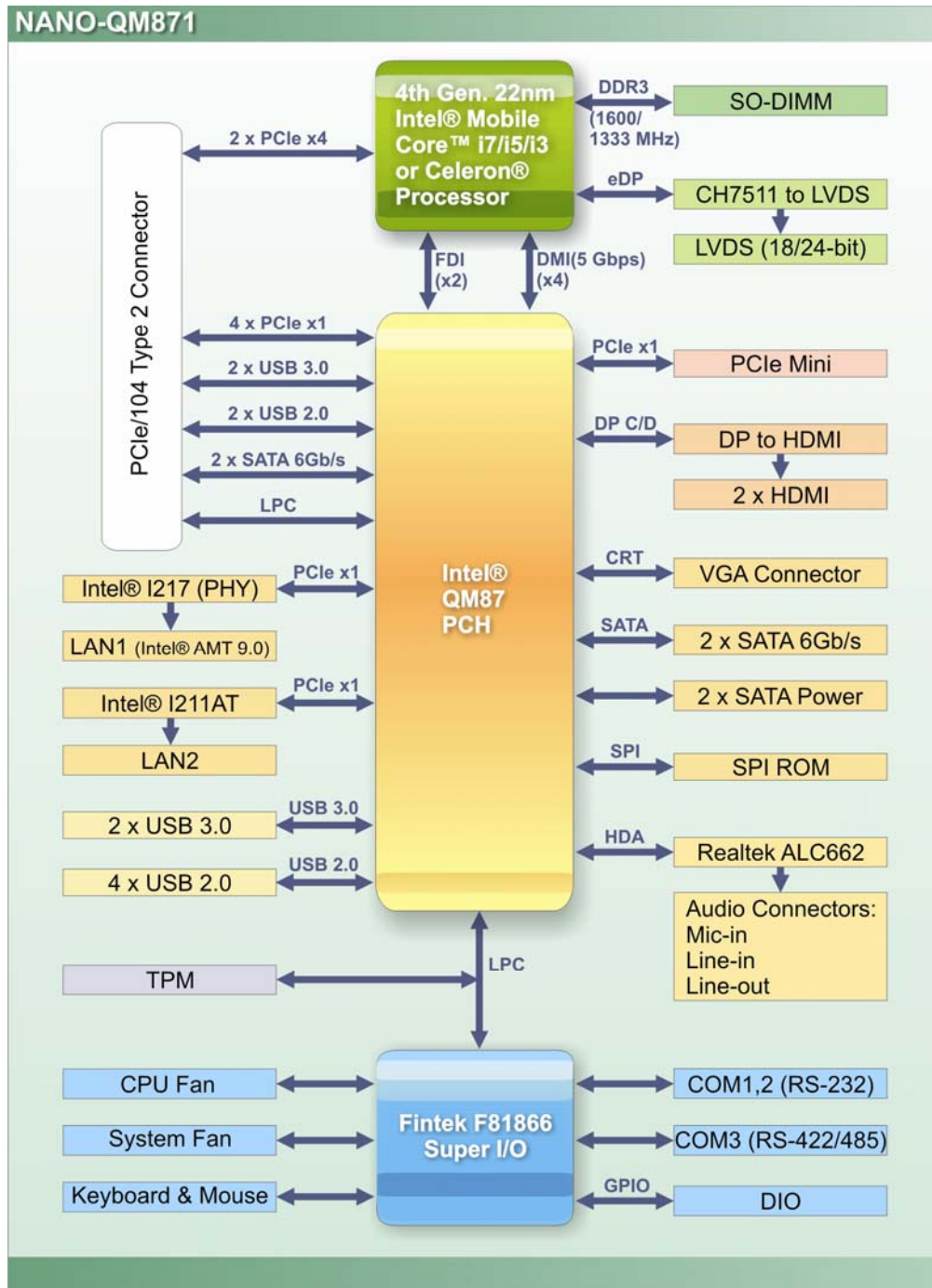
Figure 1-4: Data Flow Diagram

1.6 Technical Specifications

The NANO-QM871 technical specifications are listed in **Table 1-1**.

Specification	NANO-QM871
Form Factor	EPIC
CPU	4th generation 22nm Intel® mobile Core™ i7/i5/i3 or Celeron® CPU
PCH	Intel® QM87
Memory	One 204-pin 1600/1333 MHz DDR3/DDR3L SO-DIMM supported (system max. 8 GB)
Graphics Engine	Gen 7.5 Intel® HD Graphics with DirectX 11.1, OpenGL 3.2 and OpenCL 1.2 support
Display Output	1 x VGA (1920x1200@60) 1 x 18/24-bit dual-channel LVDS (2500x1600@60) 2 x HDMI with v1.4a compliant (2500x1600@60) Supports triple independent display with dual HDMI+VGA/ dual HDMI+LVDS/HDMI+VGA+LVDS
Ethernet Controllers	**LAN1:** Intel® I217 PHY with Intel® AMT 9.0 support **LAN2:** Intel® I211AT PCIe Ethernet controller
Audio	Realtek ALC662 HD Audio codec One internal audio connector (10-pin header)
Super I/O Controller	Fintek F81866
Embedded Controller	iWDD
BIOS	UEFI BIOS
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	1 x Full-size PCIe Mini card slot with mSATA support 1 x PCIe/104 Type 2 slot
Digital I/O	8-bit, 4-bit input/4-bit output
Fan Connectors	1 x 4-pin wafer for CPU fan 1 x 4-pin wafer for system fan

Front Panel	1 x 6-pin wafer connector for power LED and HDD LED
	1 x 2-pin wafer connector for power button
	1 x 2-pin wafer connector for reset button
LAN Active LED	1 x 4-pin (2x2) header
Keyboard/Mouse	1 x 6-pin wafer connector for PS/2 keyboard/mouse
Serial Ports	2 x RS-232 COM connectors (10-pin header)
	1 x RS-422/485 COM connector (4-pin wafer)
USB Ports	4 x USB 2.0 ports (two by 8-pin header, two on rear I/O)
	2 x USB 3.0 ports (on rear I/O)
SATA	2 x SATA 6Gb/s ports with 5V power connectors (RAID 0/1/5/10 supported)
SMBus	1 x 4-pin wafer connector
TPM	1 x 20-pin header
Power Supply	12V only, AT/ATX support
	1 x Internal 4-pin (2x2) power connector
Power Consumption	12V@3.78A (1.6 GHz Intel® Core™ i5-4402E CPU with 4 GB 1333 MHz DDR3 memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 85ºC
Operating Humidity	5% ~ 95% (non-condensing)
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-QM871 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-QM871 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The NANO-QM871 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-QM871 SBC with CPU cooler	
2	SATA and power cable (**P/N:** 32801-000201-300-RS)	
1	Audio cable (**P/N**: 32000-072100-RS)	
1	Power cable (**P/N**: 32100-087100-RS)	
2	RS-232 cable (**P/N:** 32200-000049-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
Dual USB cable (wo bracket) (**P/N:** 32000-070301-RS)	
RS-422/485 cable (200 mm) (**P/N**: 32205-003800-300-RS)	
KB/MS PS/2 Y-cable (**P/N**: 32000-023800-RS)	

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.
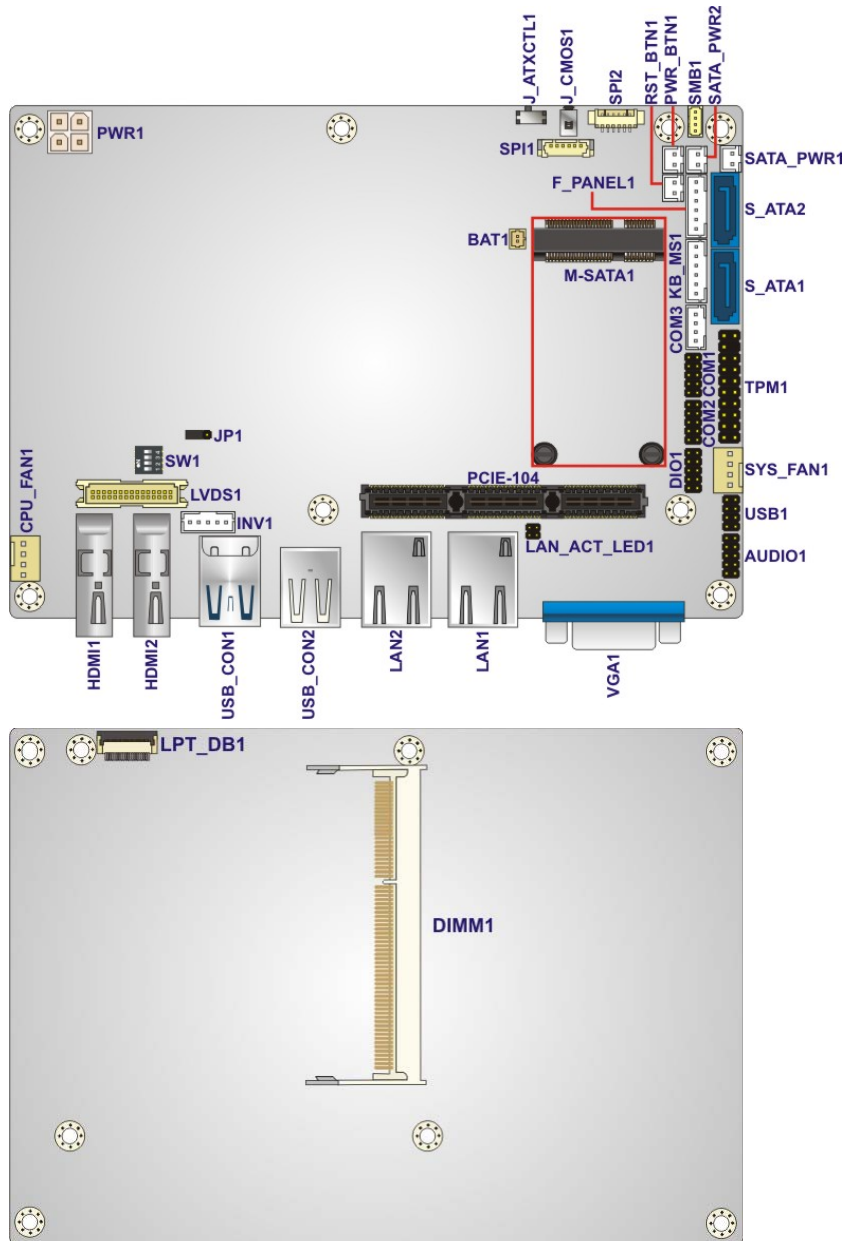
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the NANO-QM871.
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
EC debug port	20-pin header	LPT_DB1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	4-pin wafer	SYS_FAN1
Power LED and HDD LED connector	6-pin wafer	F_PANEL1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN active LED connector	4-pin header	LAN_ACT_LED1
LVDS connector	30-pin crimp	LVDS1
LVDS backlight connector	5-pin wafer	INV1
PCIe Mini card slot	PCIe Mini card slot	M-SATA1
PCIe/104 slot	PCIe/104 slot	PCIE-104
Power button	2-pin wafer	PWR_BTN1
Power connector (12V)	4-pin connector	PWR1
Reset button	2-pin wafer	RST_BTN1
RS-232 serial ports	10-pin header	COM1, COM2
RS-422/485 serial port	4-pin wafer	COM3
SATA 6Gb/s connectors	SATA connector	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	SATA_PWR1, SATA_PWR2
SMBus connector	4-pin wafer	SMB1
SO-DIMM connector	SO-DIMM connector	DIMM1

Connector	Type	Label
SPI Flash connector	6-pin wafer	SPI1
SPI Flash connector (EC)	6-pin wafer	SPI2
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-QM871. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
Ethernet connectors	RJ-45	LAN1, LAN2
HDMI connectors	HDMI	HDMI1, HDMI2
USB 2.0 connector	USB 2.0	USB_CON2
USB 3.0 connector	USB 3.0	USB_CON1
VGA connector	DB-15	VGA1

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-QM871.

3.2.1 Audio Connector

CN Label:	**AUDIO1**
CN Type:	10-pin header
CN Location:	See **Figure 3-2**
CN Pinouts:	See **Table 3-3**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.
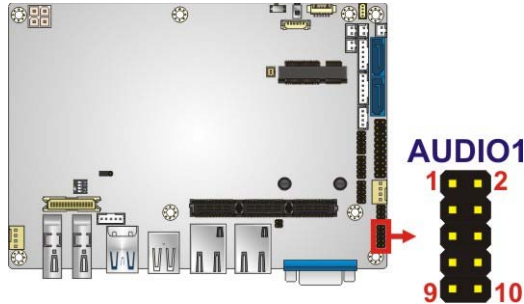
Figure 3-2: Audio Connector Location

Pin	Description	Pin	Description
1	SPK_OUT-R	2	LINE_IN-R
3	GND	4	GND
5	SPK_OUT-L	6	LINE_IN-L
7	GND	8	GND
9	MIC-R	10	MIC-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 3-3**

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.
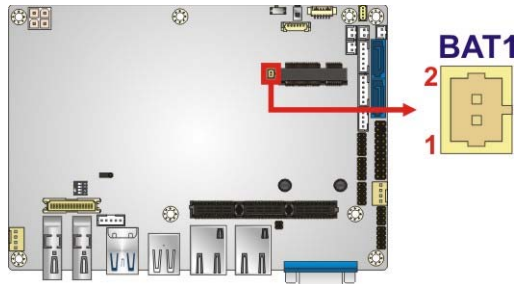
Figure 3-3: Battery Connector Location

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 3-4**

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.
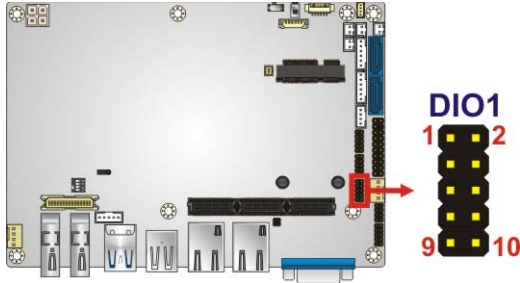
Figure 3-4: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

Table 3-5: Digital I/O Connector Pinouts

3.2.4 EC Debug Port

CN Label:	**LPT_DB1**
CN Type:	20-pin header
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

The connector is for EC debug only.

LPT_DB1
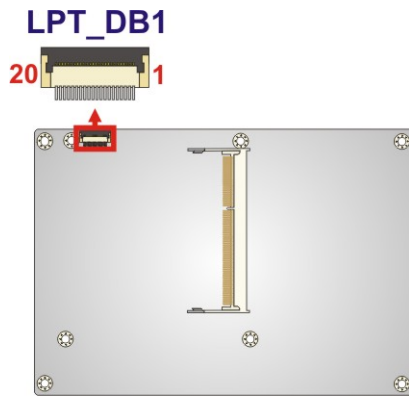
Figure 3-5: EC Debug Port Location

Pin	Description	Pin	Description
1	KSI0	2	KSO0
3	KSO1	4	KSO2
5	KSO3	6	KSO4
7	KSO5	8	KSO6
9	KSO7	10	KSO8
11	KSO9	12	KSO10
13	KSO12	14	KSI1
15	KSO11	16	KSI2
17	KSI3	18	GND
19	GND	20	GND

Table 3-6: EC Debug Port Pinouts

3.2.5 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer

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

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

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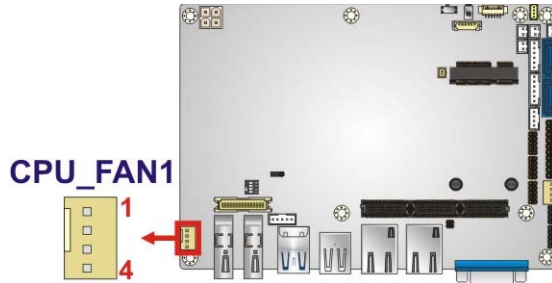
Figure 3-6: CPU Fan Connector Location

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

Table 3-7: CPU Fan Connector Pinouts

3.2.6 Fan Connector (System)

CN Label:	**SYS_FAN1**
CN Type:	4-pin wafer
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-8**

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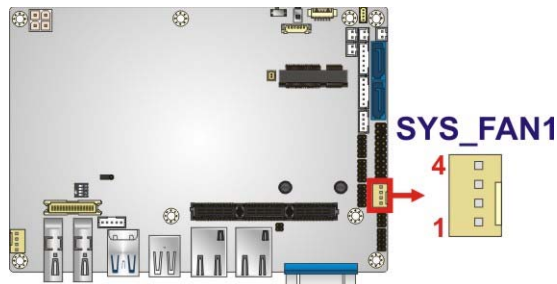
Figure 3-7: System Fan Connector Location

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

Table 3-8: System Fan Connector Pinouts

3.2.7 Keyboard and Mouse Connector

CN Label: **KB_MS1**

CN Type: 6-pin wafer

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

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.
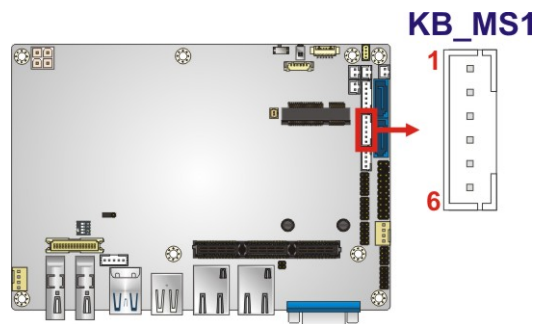
Figure 3-8: Keyboard/Mouse Connector Location

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 LAN Active LED Connector

CN Label:	**LAN_ACT_LED1**
CN Type:	4-pin header
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-10**

The connector is for active LED connection of the external LAN ports.
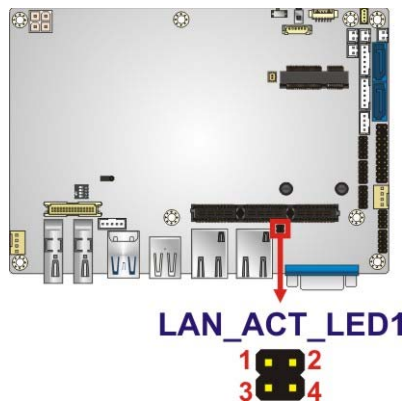
Figure 3-9: LAN Active LED Connector Location

Pin	Description	Pin	Description
1	LAN1_LINK_ACT-	2	V_3P3_LAN
3	LAN2_LINK_ACT-	4	+3.3A

Table 3-10: LAN Active LED Connector Pinouts

3.2.9 LVDS Connector

CN Label:	**LVDS1**
CN Type:	30-pin crimp
CN Location:	See **Figure 3-10**
CN Pinouts:	See **Table 3-11**

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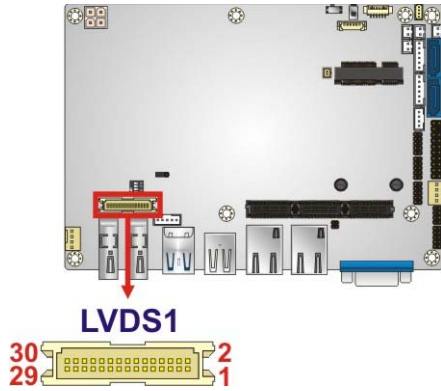
Figure 3-10: LVDS Connector Location

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 3-11: LVDS Connector Pinouts

3.2.10 LVDS Backlight Connector

CN Label: **INV1**

CN Type: 5-pin wafer

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

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

The backlight inverter connector provides power to the LCD panel connected to the board.
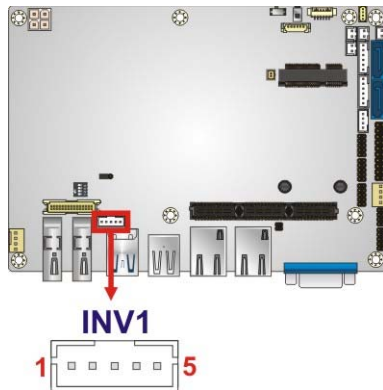
Figure 3-11: LVDS Backlight Inverter Connector

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

Table 3-12: Backlight Inverter Connector Pinouts

3.2.11 PCIe Mini Card Slot

CN Label: **M-SATA1**

CN Type: PCIe Mini card slot

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

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

The PCIe Mini card slot enables a PCIe Mini card expansion module to be connected to the board. Cards supported include among others PCIe Mini cards and mSATA cards.
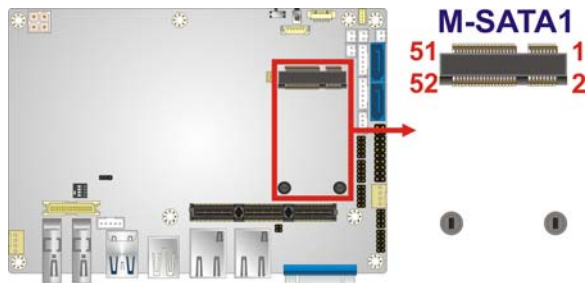
Figure 3-12: PCIe Mini Card Slot Location

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 (SATA_RX4+)	24	3VDual
25	PERP2 (SATA_RX4-)	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2 (SATA_TX4-)	32	SMBDATA
33	PETP2 (SATA_TX4+)	34	GND
35	GND	36	USBD-
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C
43	SATA_DET4_R_N	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V

Pin	Description	Pin	Description
49	N/C	50	GND
51	MSATA_SEL#	52	VCC3

Table 3-13: PCIe Mini Card Slot Pinouts

3.2.12 PCIe/104 Slot

CN Label: PCIE-104

CN Type: PCIe/104 slot

CN Location: See Figure 3-13

CN Pinouts: See Table 3-14

The PCIe/104 slot is for installing a PCIe/104 expansion module.
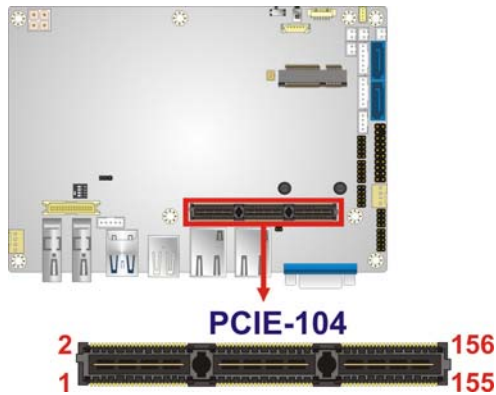
Figure 3-13: PCIe/104 Slot Location

Pin	Description		Description	Pin
1	USB_OC#		PE_RST#	2
3	3.3V		3.3V	4
5	USB_1p		USB_0p	6
7	USB_1n	+5 Volts	USB_0n	8
9	GND		GND	10
11	PEx1_1Tp		PEx1_0Tp	12
13	PEx1_1Tn		PEx1_0Tn	14
15	GND		GND	16

Pin	Description		Description	Pin
17	PEx1_2Tp		PEx1_3Tp	18
19	PEx1_2Tn		PEx1_3Tn	20
21	GND		GND	22
23	PEx1_1Rp		PEx1_0Rp	24
25	PEx1_1Rn		PEx1_0Rn	26
27	GND		GND	28
29	PEx1_2Rp		PEx1_3Rp	30
31	PEx1_2Rn		PEx1_3Rn	32
33	GND	+5 Volts	GND	34
35	PEx1_1Clkp		PEx1_0Clkp	36
37	PEx1_1Clkn		PEx1_0Clkn	38
39	+5V_SB		+5V_SB	40
41	PEx1_2Clkp		PEx1_3Clkp	42
43	PEx1_2Clkn		PEx1_3Clkn	44
45	DIR		PWRGOOD	46
47	SMB_DAT		PEx_x4_Clkp	48
49	SMB_CLK		PEx_x4_Clkn	50
51	SMB_ALERT		PSON#	52
53	STK0 / WAKE#		STK1 / PEG_ENA#	54
55	GND		GND	56
57	PEx4_1T(0)p		PEx4_0T(0)p	58
59	PEx4_1T(0)n		PEx4_0T(0)n	60
61	GND		GND	62
63	PEx4_1T(1)p	+5 Volts	PEx4_0T(1)p	64
65	PEx4_1T(1)n		PEx4_0T(1)n	66
67	GND		GND	68
69	PEx4_1T(2)p		PEx4_0T(2)p	70
71	PEx4_1T(2)n		PEx4_0T(2)n	72
73	GND		GND	74
75	PEx4_1T(3)p		PEx4_0T(3)p	76
77	PEx4_1T(3)n		PEx4_0T(3)n	78

Pin	Description		Description	Pin
79	GND		GND	80
81	SATA_T1p		SATA_T0p	82
83	SATA_T1n		SATA_T0n	84
85	GND		GND	86
87	SSTX1p		SSTX0p	88
89	SSTX1n	+5 Volts	SSTX0n	90
91	GND		GND	92
93	Reserved		Reserved	94
95	Reserved		Reserved	96
97	GND		GND	98
99	SATA_DET#1		SATA_DET#0	100
101	SATA_PWREN#1		SATA_PWREN#0	102
103	GND		GND	104
105	STK2 / SDVO_DAT		LPC_CLK	106
107	GND		GND	108
109	PEx4_1R(0)p		PEx4_0R(0)p	110
111	PEx4_1R(0)n		PEx4_0R(0)n	112
113	GND		GND	114
115	PEx4_1R(1)p		PEx4_0R(1)p	116
117	PEx4_1R(1)n		PEx4_0R(1)n	118
119	GND		GND	120
121	PEx4_1R(2)p	+12 Volts	PEx4_0R(2)p	122
123	PEx4_1R(2)n		PEx4_0R(2)n	124
125	GND		GND	126
127	PEx4_1R(3)p		PEx4_0R(3)p	128
129	PEx4_1R(3)n		PEx4_0R(3)n	130
131	GND		GND	132
133	SATA_R1p		SATA_R0p	134
135	SATA_R1n		SATA_R0n	136
137	GND		GND	138
139	SSRX1p		SSRX0p	140

Pin	Description		Description	Pin
141	SSRX1n		SSRX0n	142
143	GND		GND	144
145	LPC_AD0		LPC_DRQ#	146
147	LPC_AD1	+12 Volts	LPC_SERIRQ#	148
149	GND		GND	150
151	LPC_AD2		LPC_FRAME#	152
153	LPC_AD3		LPC_Battery	154
155	GND		GND	156

Table 3-14: PCIe/104 Slot Pinouts

3.2.13 Power Button Connector

CN Label: **PWR_BTN1**

CN Type: 2-pin wafer

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

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

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.
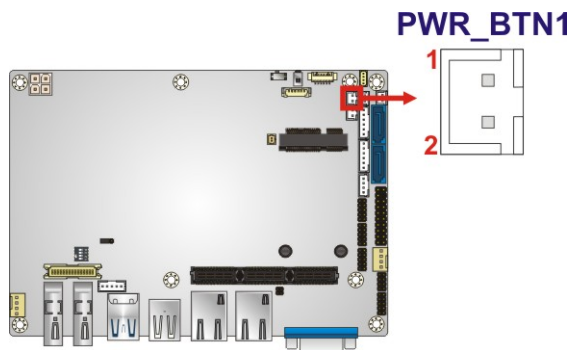
Figure 3-14: Power Button Connector Location

Pin	Description
1	PWR_BTN+
2	PWR_BTN-

Table 3-15: Power Button Connector Pinouts

3.2.14 Power Connector (12V)

CN Label: **PWR1**

CN Type: 4-pin connector

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

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

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.
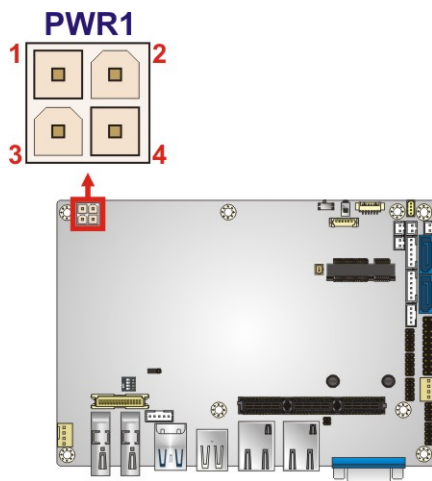
Figure 3-15: Power Connector Location

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

Table 3-16: Power Connector Pinouts

3.2.15 Power LED and HDD LED Connector

CN Label: **F_PANEL1**

CN Type: 6-pin wafer

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

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

The LED connector connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.
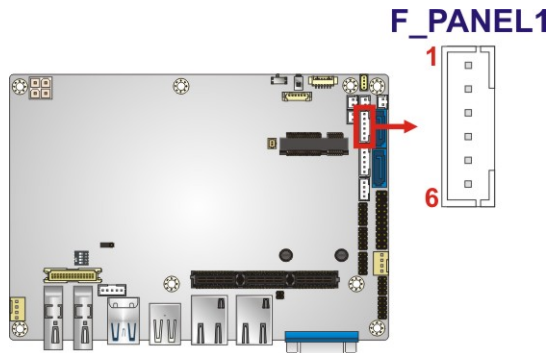
Figure 3-16: Power LED and HDD LED Connector Location

Pin	Description
1	+5V
2	GND
3	PWR_LED+
4	PWR_LED-
5	HDD_LED+
6	HDD_LED-

Table 3-17: Power LED and HDD LED Connector Pinouts

3.2.16 Reset Button Connector

CN Label: RST_BTN1

CN Type: 2-pin wafer

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

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

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.
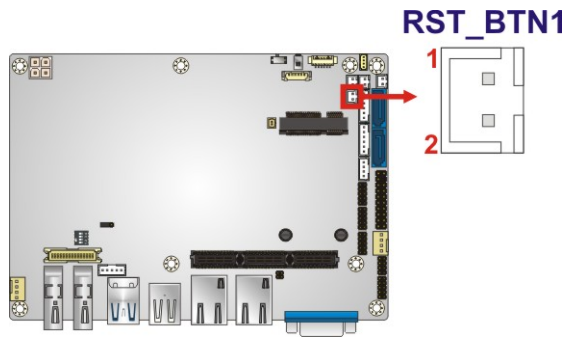
Figure 3-17: Reset Button Connector Location

Pin	Description
1	RST_BTN+
2	RST_BTN-

Table 3-18: Reset Button Connector Pinouts

3.2.17 RS-232 Serial Port Connectors

CN Label: **COM1, COM2**

CN Type: 10-pin header

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

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

The 10-pin serial port connector provides one RS-232 serial communication channel. The COM serial port connector can be connected to an external RS-232 serial port device.
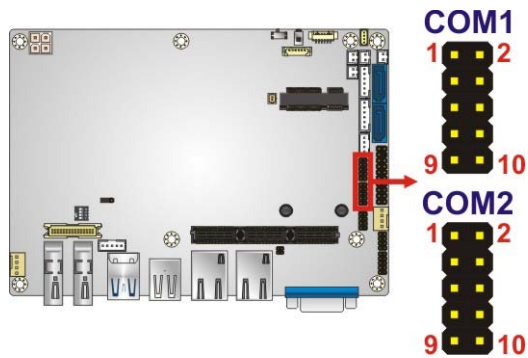
Figure 3-18: RS-232 Serial Port Connector Location

Pin	Description	Pin	Description
1	-NDCD	2	-NDSR
3	NSIN	4	-NRTS
5	NSOUT	6	-NCTS
7	-NDTR	8	-XRI
9	GND	10	GND

Table 3-19: RS-232 Serial Port Connector Pinouts

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

CN Label: **COM3**

CN Type: 4-pin wafer

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

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

This connector provides RS-422 or RS-485 communications.
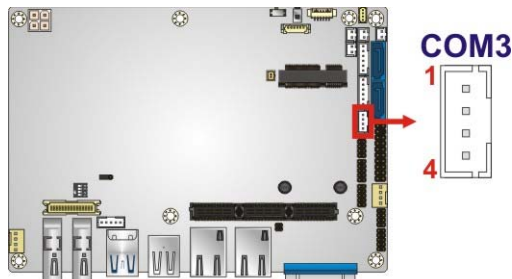
Figure 3-19: RS-422/485 Serial Port Connector Location

Pin	Description
1	RXD422-
2	RXD422+
3	TXD422+/TXD485+
4	TXD422-/TXD485-

Table 3-20: 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 3-21: DB-9 RS-422/485 Pinouts

3.2.19 SATA 6Gb/s Drive Connectors

CN Label: S_ATA1, S_ATA2

CN Type: 7-pin SATA drive connectors

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

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

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 6Gb/s.
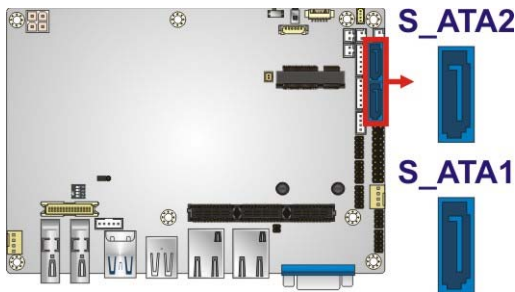
Figure 3-20: SATA 6Gb/s Drive Connector Locations

Pin	Description
1	GND
2	TX+
3	TX-
4	GND

Pin	Description
5	RX-
6	RX+
7	GND

Table 3-22: SATA 6Gb/s Drive Connector Pinouts

3.2.20 SATA Power Connectors

CN Label: **SATA_PWR1, SATA_PWR2**

CN Type: 2-pin wafer

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

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

Use the SATA Power Connector to connect to SATA device power connections.
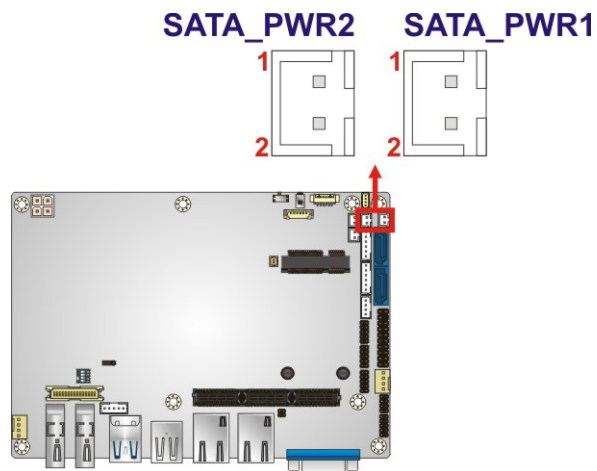
Figure 3-21: SATA Power Connector Locations

Pin	Description
1	+V5S
2	GND

Table 3-23: SATA Power Connector Pinouts

3.2.21 SMBus Connector

CN Label:	**SMB1**
CN Type:	4-pin wafer
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Table 3-24**

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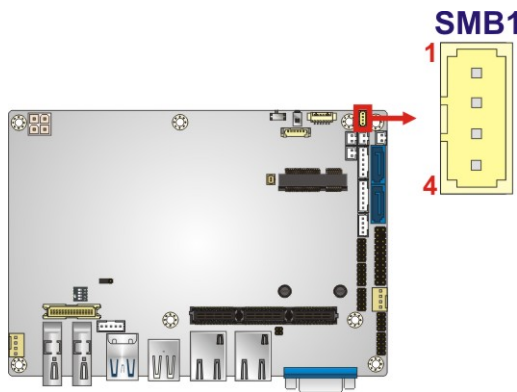
Figure 3-22: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-24: SMBus Connector Pinouts

3.2.22 SO-DIMM Connector

CN Label:	**DIMM**
CN Type:	204-pin DDR3 SO-DIMM connector
CN Location:	See **Figure 3-23**

The SO-DIMM connector is for installing memory on the system.
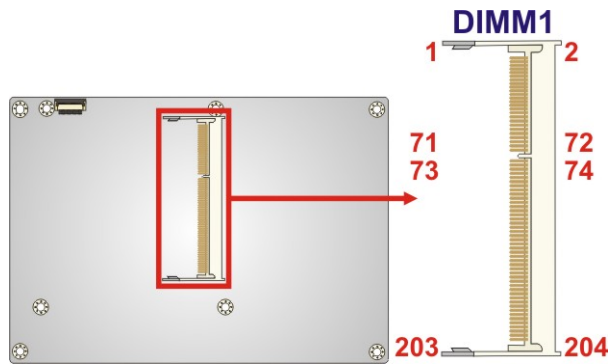
Figure 3-23: SO-DIMM Connector Locations

3.2.23 SPI Flash Connector

CN Label:	**SPI1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-24**
CN Pinouts:	See **Table 3-25**

The 6-pin SPI Flash connector is used to flash the BIOS.
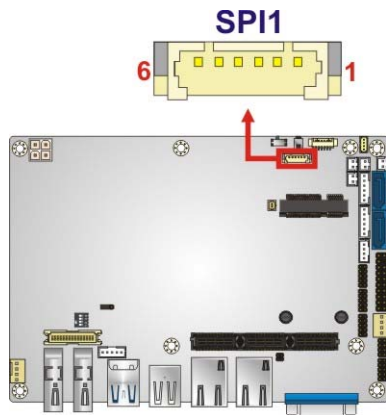
Figure 3-24: SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON
2	SPI_CS#0_CN
3	SPI_SO_SW

Pin	Description
4	SPI_CLK_SW
5	SPI_SI_SW
6	GND

Table 3-25: SPI Flash Connector Pinouts

3.2.24 SPI Flash Connector (EC)

CN Label: **SPI2**

CN Type: 6-pin wafer

CN Location: See **Figure 3-25**

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

The 6-pin EC SPI Flash connector is used to flash the BIOS.
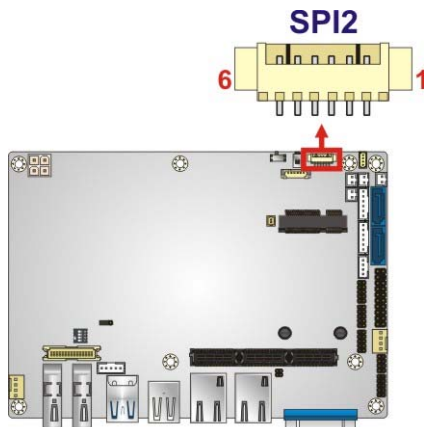
Figure 3-25: EC SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON_EC
2	SPI_CS#0_CN_EC
3	SPI_SO_SW_EC
4	SPI_CLK_SW_EC
5	SPI_SI_SW_EC
6	GND

Table 3-26: EC SPI Flash Connector Pinouts

3.2.25 TPM Connector

CN Label:	**TPM1**
CN Type:	20-pin header
CN Location:	See **Figure 3-26**
CN Pinouts:	See **Table 3-27**

The Trusted Platform Module (TPM) connector secures the system on bootup.
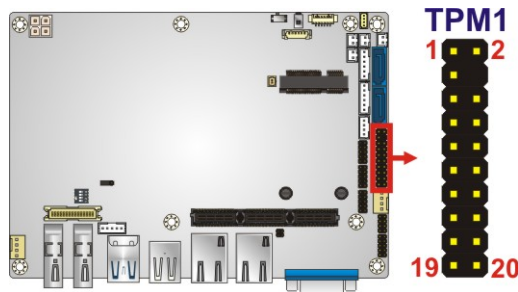
Figure 3-26: TPM Connector Location

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 3-27: TPM Connector Pinouts

3.2.26 USB 2.0 Connector

CN Label:	**USB1**
CN Type:	8-pin header
CN Location:	See **Figure 3-27**
CN Pinouts:	See **Table 3-28**

The USB header can connect to two USB devices.
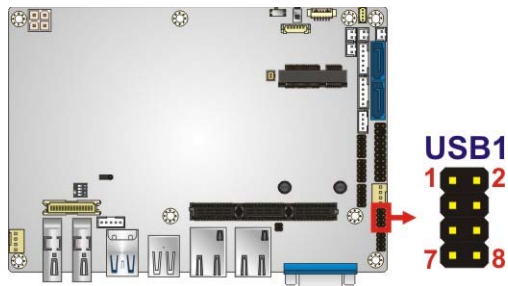
Figure 3-27: USB Connector Locations

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

Table 3-28: USB Port Connector Pinouts

3.3 External Interface Connectors

The NANO-QM871 on-board external interface connectors are shown in **Figure 3-28.**
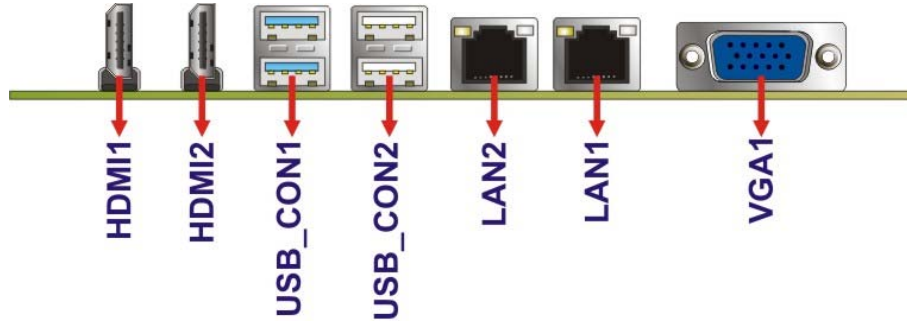
Figure 3-28: External Interface Connectors

3.3.1 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45 connector

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

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

The NANO-QM871 is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

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

Table 3-29: LAN Pinouts
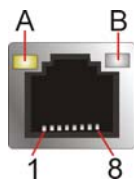
Figure 3-29: Ethernet Connector

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 3-30: Connector LEDs

3.3.2 HDMI Connectors

CN Label: **HDMI1, HDMI2**

CN Type: HDMI connector

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

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

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

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

Table 3-31: HDMI Connector Pinouts
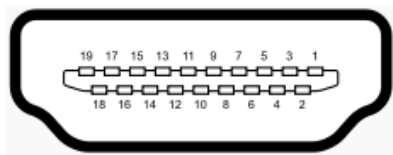
Figure 3-30: HDMI Connector

3.3.3 USB 2.0 Connector

CN Label:	**USB_CON2**
CN Type:	Dual USB 2.0 port
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-32**

The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VBUS
2	D1-
3	D1+
4	GND

Table 3-32: External USB 2.0 Port Pinouts

3.3.4 USB 3.0 Connector

CN Label:	**USB_CON1**
CN Type:	Dual USB 3.0 port
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-33**

The NANO-QM871 has two external USB 3.0 ports. Each USB 3.0 port can be connected to a USB device.

Pin	Description
1	VBUS
2	D1-
3	D1+
4	GND1
5	STDA_SSRX1_N
6	STDA_SSRX1_P
7	GND_DRAIN

Pin	Description
8	STDA_SSTX1_N
9	STDA_SSTX1_P

Table 3-33: External USB 3.0 Port Pinouts

3.3.5 VGA Connector

CN Label:	**VGA1**
CN Type:	15-pin Female
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Figure 3-31** and **Table 3-34**

Connects to a monitor that accepts a standard VGA input.
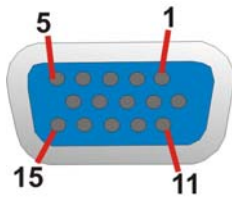
Figure 3-31: VGA Connector

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

Table 3-34: VGA Connector 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-QM871. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the NANO-QM871, 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-QM871, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-QM871.
- **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-QM871 is installed. All installation notices pertaining to the installation of NANO-QM871 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-QM871 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-QM871, NANO-QM871 components and injury to the user.

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

- **Read the user manual**:
  o The user manual provides a complete description of the installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  o 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**:
  o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power off**:
  o 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-QM871 **DO NOT:**

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

4.3 Cooling Kit Installation

An IEI CPU cooling kit can be purchased separately (See **Chapter 2**). The cooling kit is comprised of a CPU heat sink and a cooling fan.

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

To install the cooling kit, please follow the steps below.

Step 1: **Install the support bracket.** Remove the tape from the support bracket. From the solder side of the board, align the support bracket to the holes on board and stick in place.
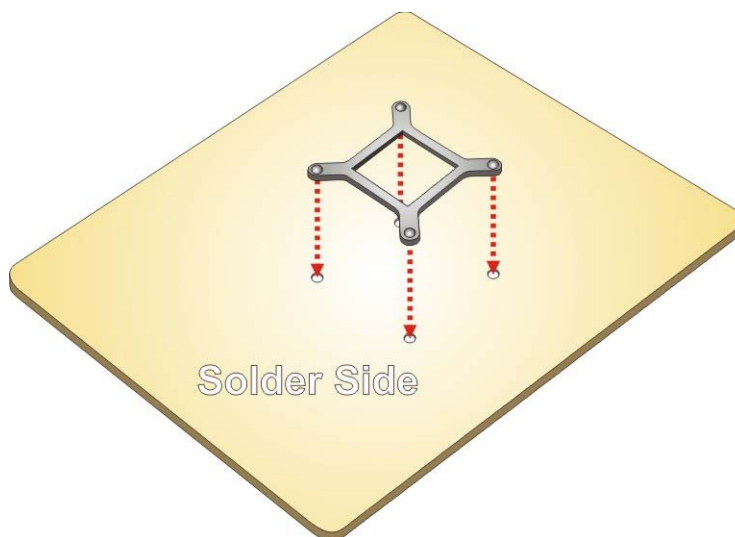
Figure 4-1: Install Support Bracket

Step 2: **Properly orient the cooling kit**. The CPU fan cable must not interfere with the fan or other moving parts. Make sure the cable can be routed away from the moving parts.

Step 3: **Properly align the cooling kit**. Line up the four screws with the screw holes on the support bracket below the board (**Figure 4-2**).
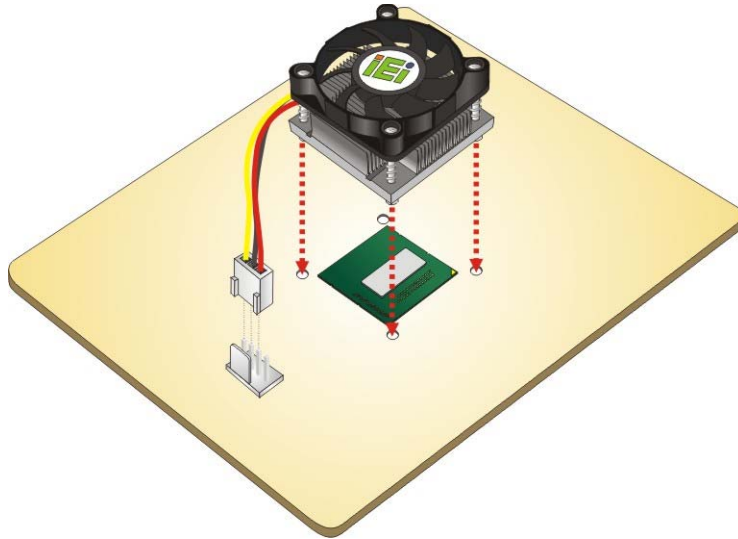
Figure 4-2: Align the Cooling Kit

Step 4: **Place the cooling kit onto the CPU**. Push down the fan with some pressure to secure the cooling kit with the support bracket. See **Figure 4-3**.

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. In a diagonal pattern, tighten each screw a few turns then move to the next one, until they are all secured. Do not overtighten the screws. See **Figure 4-3**.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the board. Carefully route the cable away from heat generating chips and fan blades.
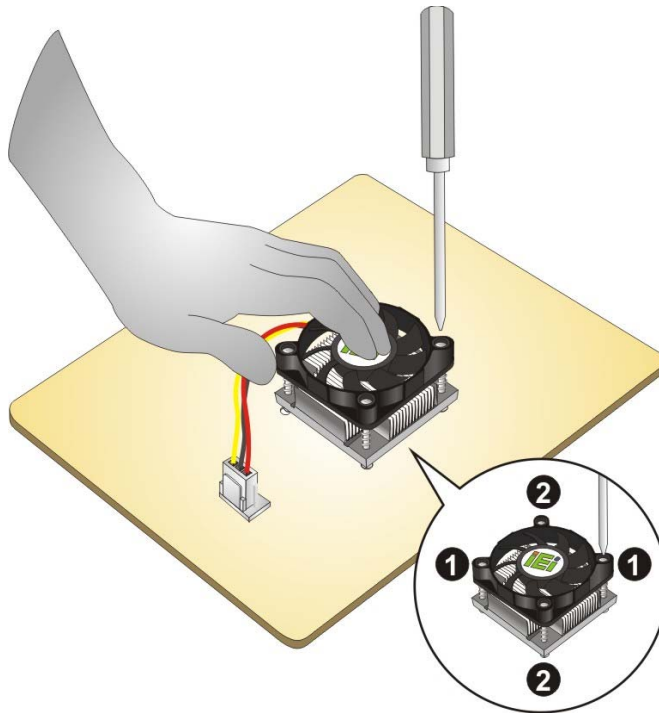
Figure 4-3: Secure the Cooling Kit

4.4 SO-DIMM Installation

⚠️ **WARNING:**

> Using incorrectly specified SO-DIMM may cause permanent damage to the NANO-QM871. Please make sure the purchased SO-DIMM complies with the memory specifications of the NANO-QM871. SO-DIMM specifications compliant with the NANO-QM871 are listed in Chapter 1.

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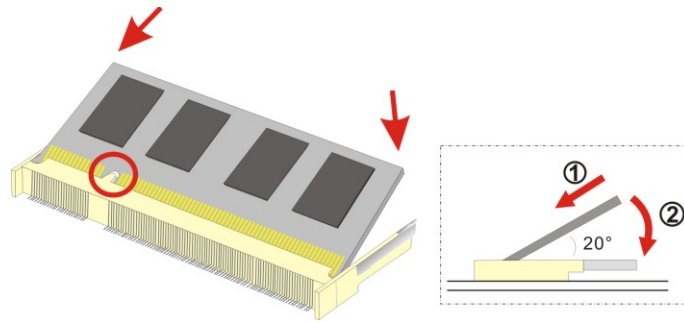
Figure 4-4: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the NANO-QM871 on an anti-static pad with the solder side facing up.

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 4-4**)

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

4.5 PCIe Mini Card Installation

One PCIe Mini card slot is located on the NANO-QM871. To install the PCIe Mini card, please refer to the diagram and instructions below.
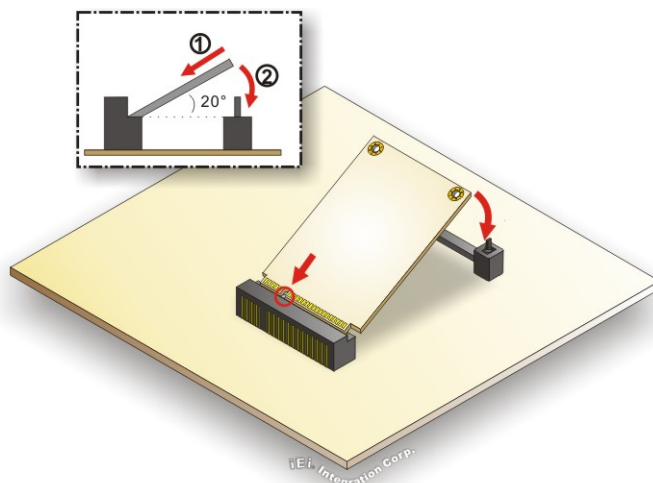
Figure 4-5: PCIe Mini Card Installation

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.

4.6 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.
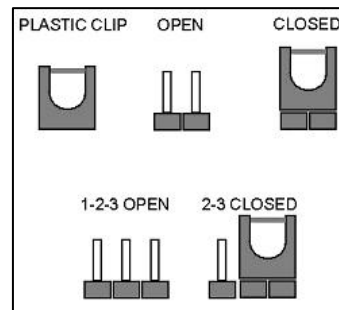
Before the NANO-QM871 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-QM871 are listed in Table 4-1.

Description	Label	Type
AT/ATX mode selection	J_ATXCTL1	Switch
Clear CMOS	J_CMOS1	Push-button
LVDS voltage selection	JP1	3-pin header
LVDS resolution selection	SW1	DIP switch

Table 4-1: Jumpers

4.6.1 AT/ATX Mode Selection

Jumper Label:	**J_ATXCTL1**
Jumper Type:	Switch
Jumper Settings:	See **Figure 4-6**
Jumper Location:	See **Figure 4-6**

Set the switch to select AT or ATX power mode for the NANO-QM871. 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. To configure, see the diagram below.
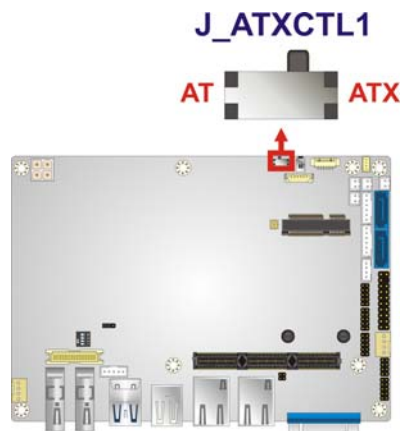
Figure 4-6: AT/ATX Mode Selection Jumper Location

4.6.2 Clear CMOS

Jumper Label:	**J_CMOS1**
Jumper Type:	Push button
Jumper Location:	See **Figure 4-7**

If the NANO-QM871 fails to boot due to improper BIOS settings, the clear CMOS button clears the CMOS data and resets the system BIOS information. To do this, push the clear CMOS button for three seconds, then restart the system.

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.
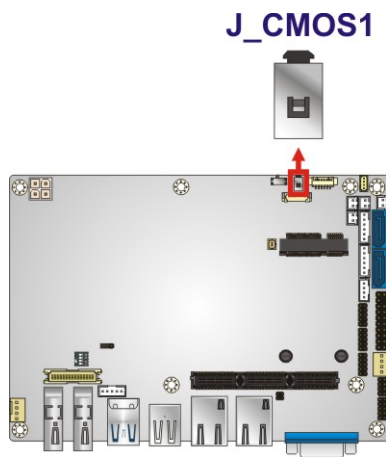
Figure 4-7: Clear CMOS Jumper Location

4.6.3 LVDS Voltage Selection

Jumper Label:	**JP1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-2**
Jumper Location:	See **Figure 4-8**

Selects the voltage of the LVDS connector.

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

Table 4-2: LVDS Voltage Selection Jumper Settings
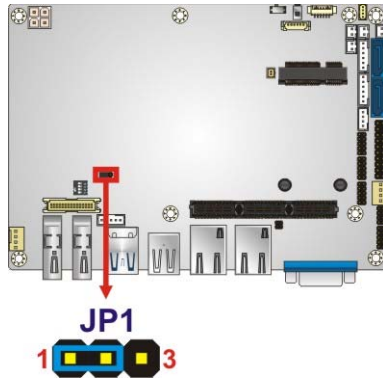
Figure 4-8: LVDS Voltage Selection Jumper Location

4.6.4 LVDS Resolution Selection

Jumper Label:	**SW1**
Jumper Type:	DIP switch
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-9**

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

* ON=0, OFF=1; S= Single, D=Dual

SW1 (4-3-2-1)	Description
0000	800x600 18bit S (default)
0001	1024x768 18bit S
0010	1024x768 24bit S
0011	1280x768 18bit S
0100	1280x800 18bit S
0101	1280x960 18bit S
0110	1280x1024 24bit D
0111	1366x768 18bit S
1000	1366x768 24bit S
1001	1440x960 24bit D
1010	1400x1050 24bit D
1011	1600x900 24bit D

SW1 (4-3-2-1)	Description
1100	1680x1050 24bit D
1101	1600x1200 24bit D
1110	1920x1080 24bit D
1111	1920x1200 24bit D

Table 4-3: LVDS Resolution Selection Jumper Settings
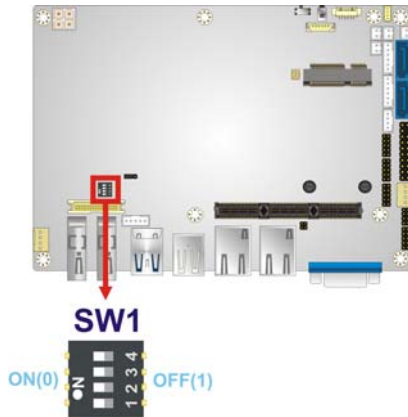
Figure 4-9: LVDS Resolution Selection Jumper Location

4.7 Chassis Installation

4.7.1 Airflow

⚠️ **WARNING:**

Airflow is critical for keeping components within recommended operating temperatures. The chassis should have fans and vents as necessary to keep things cool.

The NANO-QM871 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.

4.7.2 Motherboard Installation

To install the NANO-QM871 motherboard into the chassis please refer to the reference material that came with the chassis.

4.8 Internal Peripheral Device Connections

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

4.8.1 AT/ATX Power Connection

Follow the instructions below to connect the NANO-QM871 to an AT or ATX power supply.

WARNING:

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-QM871.

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 power connector on the motherboard. See **Figure 4-10**.
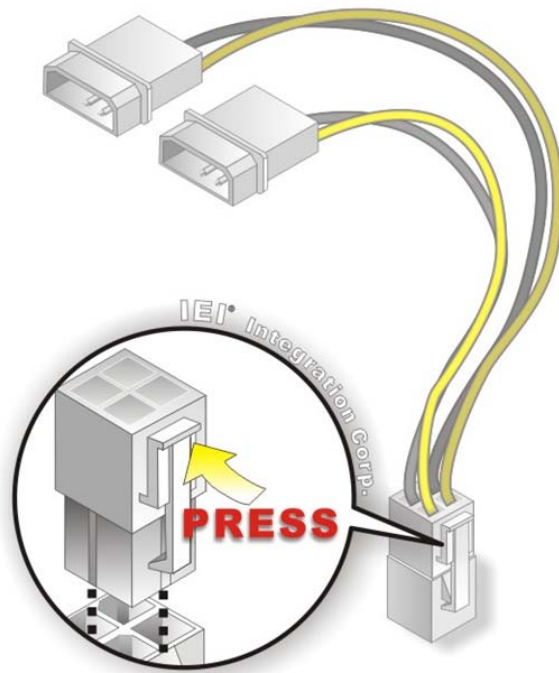
Figure 4-10: Power Cable to Motherboard Connection

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

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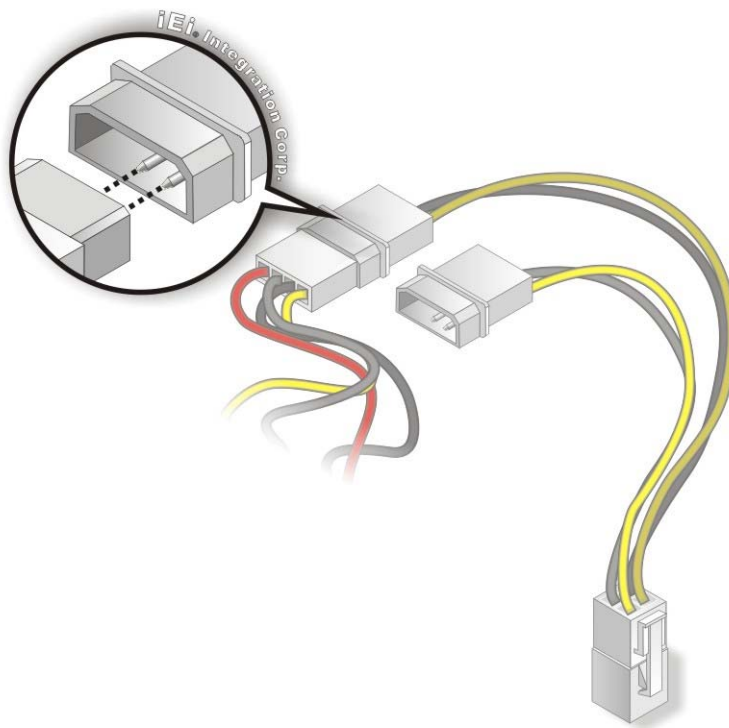
Figure 4-11: Connect Power Cable to Power Supply

4.8.2 Audio Kit Installation

The Audio Kit that came with the NANO-QM871 connects to the 10-pin audio connector on the NANO-QM871. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two 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**.
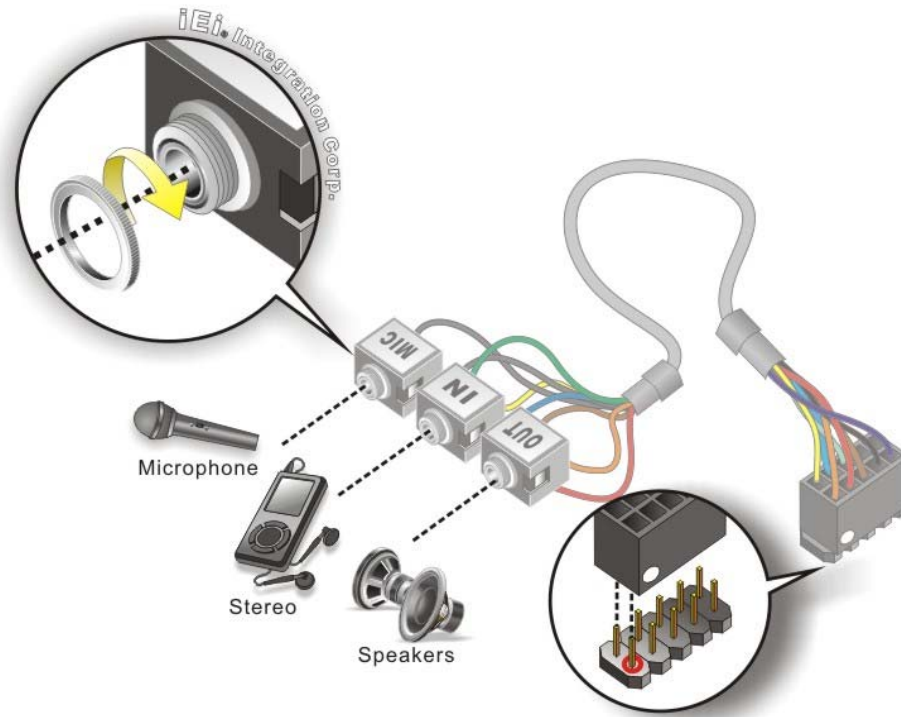
  Figure 4-12: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one

speaker to the line-out audio jack and a microphone to the mic-in audio jack.

4.8.3 LVDS LCD Installation

The NANO-QM871 can be connected to a TFT LCD screen through the LVDS crimp
connectors on the board. To connect a TFT LCD to the NANO-QM871, please follow the
steps below.

Step 1: **Locate the connector**. The location of the LVDS connector is shown in

Chapter 3.

Step 2: **Insert the cable connector**. Insert the connector from the LVDS PCB driving

board to the LVDS connector as shown in **Figure 4-13**. When connecting the

connectors, make sure the pins are properly aligned.

> ⚡ **WARNING:**
>
> The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.
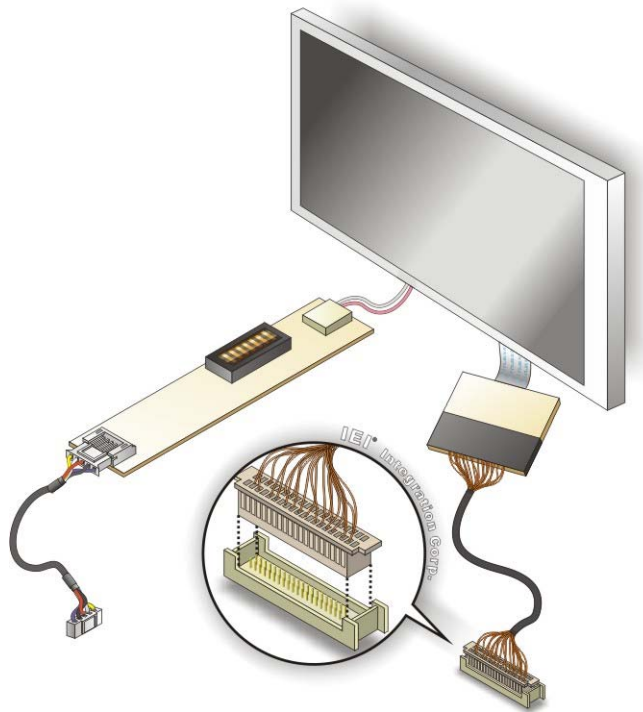
Figure 4-13: LVDS Connector

Step 3: **Locate the backlight inverter connector**. The location of the backlight inverter connector is shown in **Chapter 3**.

Step 4: **Connect backlight connector**. Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 4-14**. When inserting the cable connector, make sure the pins are properly aligned.
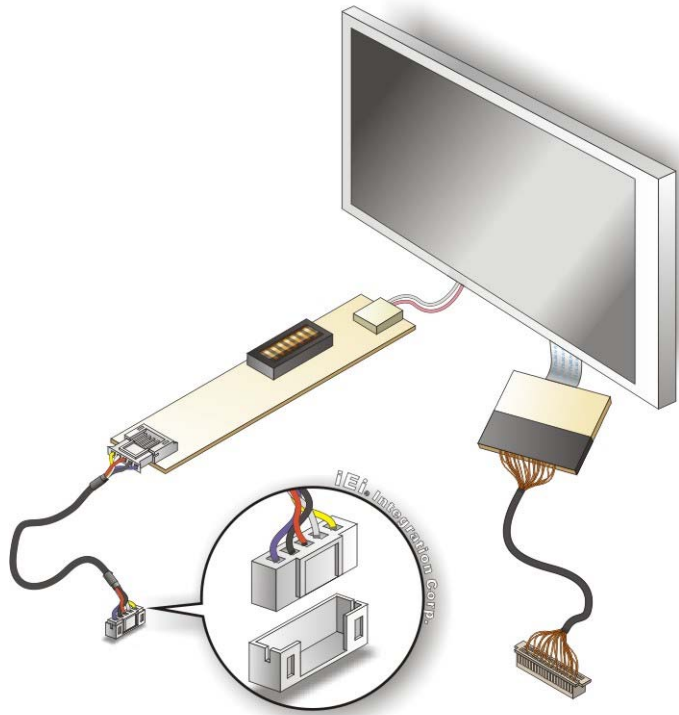
Figure 4-14: Backlight Inverter Connection

4.8.4 SATA Drive Connection

The NANO-QM871 is shipped with two SATA drive cables. 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 4-15**.
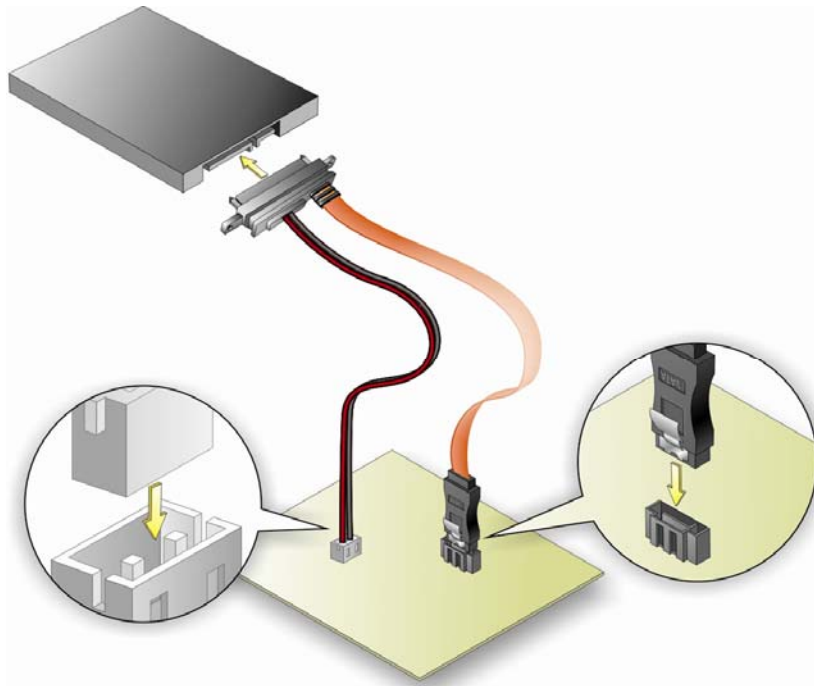
Figure 4-15: SATA Drive Cable Connection

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 4-15**.

Step 4: To remove the SATA cable from the SATA connector, press the clip on the connector at the end of the cable.

4.8.5 Single RS-232 Cable

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 locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port header. See **Figure 4-16**. A key on the front of the cable connector ensures the connector can only be installed in one direction.
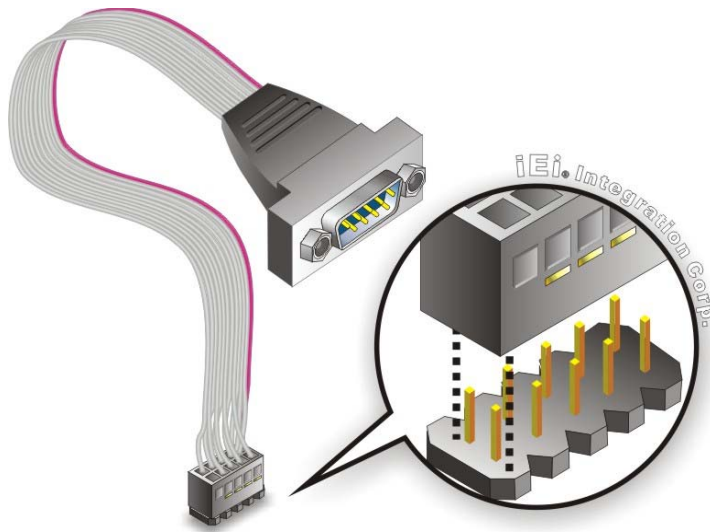
Figure 4-16: Single RS-232 Cable Installation

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.

4.9 External Peripheral Interface Connection

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

4.9.1 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-QM871, follow the steps below.

Step 1: **Locate the HDMI connectors**. The locations are 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.
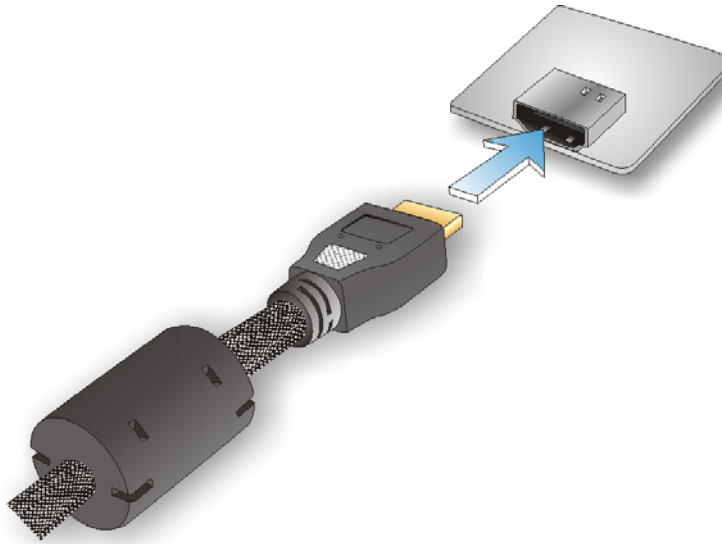
Figure 4-17: HDMI Connection

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.

4.9.2 LAN Connection

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

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

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-QM871. See **Figure 4-18**.
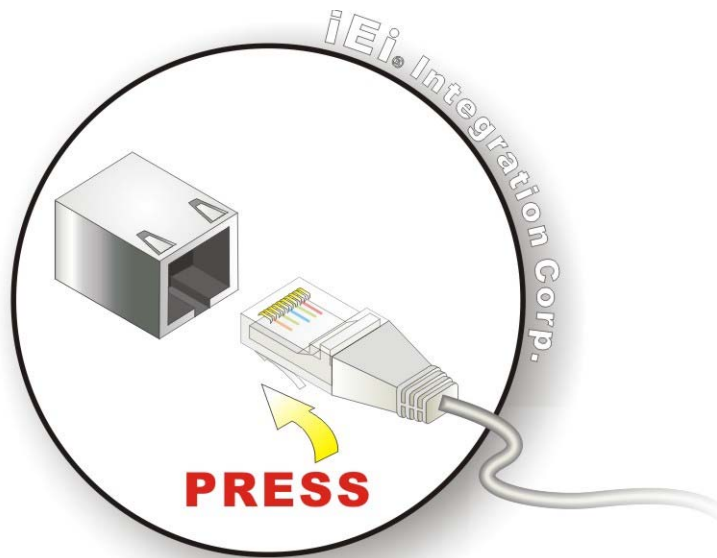
Figure 4-18: LAN Connection

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.

4.9.3 USB Connection (Dual Connector)

The external USB 2.0/3.0 connectors provide easier and quicker access to external USB

devices. Follow the steps below to connect USB devices to the NANO-QM871.

Step 1: **Locate the USB 2.0/3.0 connectors**. The locations of the USB 2.0/3.0

connectors are shown in **Chapter 3**.

Step 2: **Insert a USB 2.0/3.0 plug**. Insert the USB 2.0/3.0 plug of a device into the

USB 2.0/3.0 on the external peripheral interface. See **Figure 4-19**.
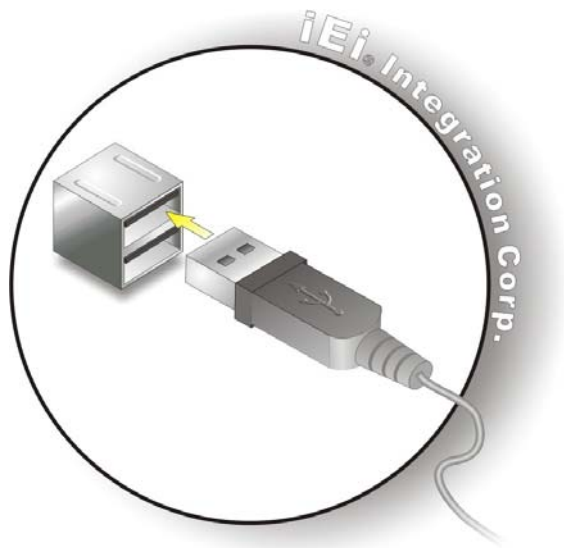
Figure 4-19: USB Connector

4.9.4 VGA Monitor Connection

The NANO-QM871 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the NANO-QM871, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the NANO-QM871. See **Figure 4-20**.
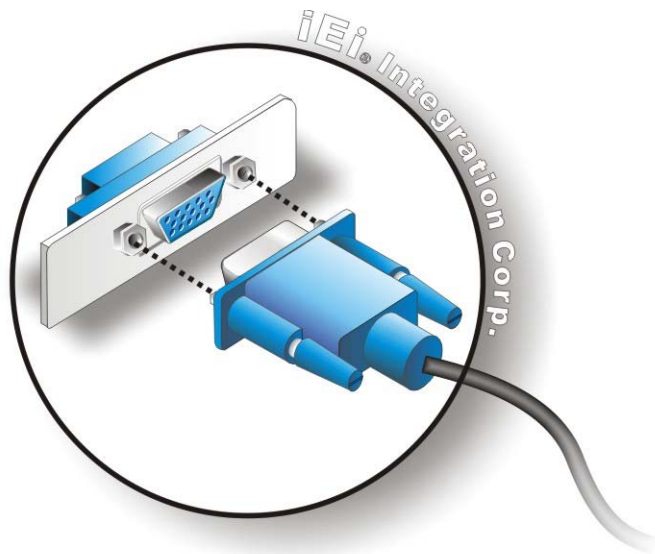
Figure 4-20: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA

monitor to the external interface by tightening the two retention screws on either

side of the connector.

4.10 Intel® AMT Setup Procedure

The NANO-QM871 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 6.8**.

Step 5: Configure the Intel® Management Engine BIOS extension (MEBx). To get into

the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up

process. Enter the Intel® current ME password as it requires (the Intel® default

password is **admin**).

![NOTE icon] **NOTE:**

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

Chapter

5

BIOS

5.1 Introduction

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

![NOTE icon] **NOTE:**

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration are 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) 2012 American Megatrends, Inc.
     Main    Advanced   Chipset      Boot     Security  Save & Exit

 BIOS Information                                          Set the Date. Use Tab to
 BIOS Vendor                   American Megatrends         switch between Date
 Core Version                  4.6.5.4                     elements.
 Compliancy                    UEFI 2.3.1; PI 1.2
 Project Version               E416AR05.ROM
 Build Date and Time           08/28/2013 14:08:15

 iWDD Vendor                   iEi
 iWDD Version                  B271ER15.bin

 Processor Information
 Name                          Haswell
 Brand String                  Intel(R) Core(TM) i5-440
 Frequency                     2700 MHz
 Processor ID                  306c3
 Stepping                      CO
 Number of Processors          2Core(s) / 4Thread(s)
 Microcode Revision            7
 GT Info                       GT3 (800 MHz)

 IGFX VBIOS Version            2167
 Memory RC Version             1.0.0.0
 Total Memory                  2048 MB (DDR3)
 Memory Frequency              1333 MHz

 PCH Information
 Name                          LynxPoint
 PCH SKU                       QM87
 Stepping                      04/C1
 LAN PHY Revision              A3                          --------------------

 ME FW Version                 9.0.10.1372
 ME Firmware SKU               5MB                         →←: Select Screen
                                                           ↑ ↓: Select Item
 SPI Clock Frequency                                       Enter: Select
 DOFR Support                  Unsupported                 +/-:  Change Opt.
 Read Status Clock Frequnecy   50 MHz                      F1:   General Help
 Write Status Clock Frequnecy  50 MHz                      F2:   Previous Values
 Fast Read Status Clock Frequnecy 50 MHz                   F3:   Optimized Defaults
                                                           F4:   Save & Exit
 System Date                   [Tue 10/15/2013]            ESC:  Exit
 System Time                   [15:10:27]

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

BIOS Menu 1: Main

➔ **System Overview**

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

- ▪ BIOS Information
- ▪ Processor Information
- ▪ Memory Information
- ▪ PCH Information
- ▪ SPI Clock Frequency

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) 2012 American Megatrends, Inc.
   Main    Advanced   Chipset    Boot    Security  Save & Exit

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

      Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
　　BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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

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

ACPI Settings                                        Select ACPI sleep state
                                                     the system will enter
ACPI Sleep State              [S1 only(CPU Stop C1…] when the SUSPEND button
                                                     is pressed.


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

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

      Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
　　BIOS Menu 3: ACPI Settings

➔ **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**) enables the system to wake at the specified time.

```
      Aptio Setup Utility – Copyright (C) 2012 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
                                                          date::hr::min::sec
                                                          specified

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

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

BIOS Menu 4: RTC Wake Settings

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

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled** D<small>EFAULT</small> The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up every day

Wake up date

Wake up hour

Wake up minute

Wake up second

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

5.3.3 Trusted Computing

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

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

Configuration                                               Enables or Disables BIOS
  Security Device Support          [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
                                                            +/-:  Change Opt.
                                                            F1:   General Help
                                                            F2:   Previous Values
                                                            F3:   Optimized Defaults
                                                            F4:   Save & Exit
                                                            ESC:  Exit
     Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 5: Trusted Computing

➔ **Security Device Support [Disable]**

Use the **Security Device Support** option to configure support for 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) 2012 American Megatrends, Inc.
             Advanced

 CPU Configuration                                       Enabled for Windows XP
                                                         and Linux (OS optimized
 Intel(R) Core(TM) i5-4400E CPU @ 2.70GHz               for Hyper-Threading
 CPU Signature                     306c3                 Technology) and Disabled
 Microcode Patch                   7                     for other OS (OS not
 Max CPU Speed                     2700 MHz              optimized for
 Min CPU Speed                     800 MHz               Hyper-Threading
 CPU Speed                         2700 MHz              Technology). When
 Processor Cores                   2                     Disabled only one thread
 Intel HT Technology               Supported             per enabled core is
 Intel VT-x Technology             Supported             enabled.
 Intel SMX Technology              Supported
 64-bit                            Supported             ---------------------
 EIST Technology                   Supported
                                                         →←: Select Screen
 L1 Data Cache                     32 kB x 2             ↑ ↓: Select Item
 L1 Code Cache                     32 kB x 2             Enter: Select
 L2 Cache                          256 kB x 2            +/-:  Change Opt.
 L3 Cache                          3072 kB               F1:   General Help
                                                         F2:   Previous Values
 Hyper-threading                   [Enabled]             F3:   Optimized Defaults
 Intel Virtualization Technology   [Disabled]            F4:   Save & Exit
 Intel TXT(LT) Support             [Disabled]            ESC:  Exit

          Version 2.15.1236. Copyright (C) 2012 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 Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.

- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- EIST Technology: Indicates if the Enhanced Intel SpeedStep® Technology (EIST) 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** BIOS option to enable or disable the Intel Hyper-Threading Technology.

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

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

➔ **Intel Virtualization Technology [Disabled]**

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

➔ **Disabled**   DEFAULT   Disables Intel Virtualization Technology.

➔ **Enabled**   Enables Intel Virtualization Technology.

➔ **Intel TXT(LT) Support [Disabled]**

Use the **Intel TXT(LT) Support** BIOS option to enable or disable the Intel Trusted Execution Technology.

➔ **Disabled**   DEFAULT   Disables the Intel Trusted Execution Technology.

➔ **Enabled**   Enables the Intel Trusted Execution 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) 2012 American Megatrends, Inc.
            Advanced

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

S_ATA1                              Empty                  --------------------
S_ATA2                              Empty
S_ATA3                              Empty                  →←: Select Screen
S_ATA4                              Empty                  ↑ ↓: Select Item
M-SATA1                             Empty                  Enter: Select
                                                           +/-:  Change Opt.
                                                           F1:   General Help
                                                           F2:   Previous Values
                                                           F3:   Optimized Defaults
                                                           F4:   Save & Exit
                                                           ESC: Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

   BIOS Menu 7: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

Use the **SATA Controller(s)** option to configure the SATA controller.

➔ **Enabled**   DEFAULT   Enable SATA controller.

➔ **Disabled**   Disable SATA controller.

➔ **SATA Mode Selection [IDE]**

Use the **SATA Mode Selection** option to configure SATA devices.

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

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

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

NOTE:

Before accessing the RAID configuration utility, ensure to set the **Option ROM Messages** BIOS option in the **Boot** menu to **Force BIOS**. This is to allow the "Press <CTRL+I> to enter Configuration Utility……" message to appear during POST. Press Ctrl+I when prompted to enter the RAID configuration utility.

5.3.6 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology** (**BIOS Menu 8**) menu to configure Intel® Rapid Start Technology support.

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

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


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

BIOS Menu 8: Intel(R) Rapid Start Technology

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

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

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

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

5.3.7 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 9**) allows the advanced power management options to be configured.

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

 Intel AMT                        [Enabled]            Enable/Disable Intel (R)
 Un-Configure ME                  [Disabled]           Active Management
                                                       Technology BIOS
                                                       Extension. Note: iAMT H/W
                                                       is always enabled.
                                                       This option just controls
                                                       the BIOS extension
                                                       execution.
                                                       If enabled, this requires
                                                       additional firmware in the
                                                       SPI device.
                                                       --------------------
                                                       →←: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1:  General Help
                                                       F2:  Previous Values
                                                       F3:  Optimized Defaults
                                                       F4:  Save & Exit
                                                       ESC:  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
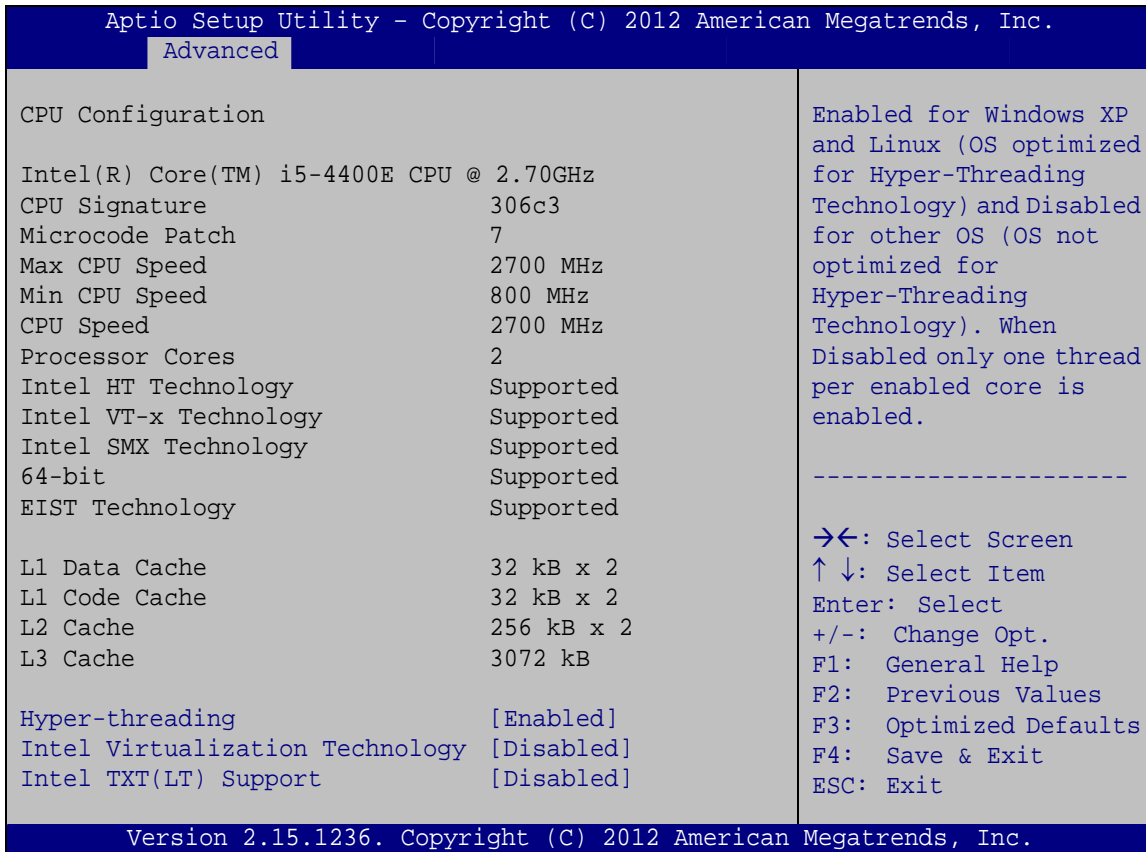BIOS Menu 9: AMT Configuration

➔ **Intel AMT [Enabled]**

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

➔ **Disabled**   Intel® AMT is disabled

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

➔ **Un-Configure ME [Disabled]**

Use the **Un-Configure ME** option to perform ME unconfigure without password operation.

➔ **Disabled**   D<small>EFAULT</small>   Not perform ME unconfigure

➔ **Enabled**   To perform ME unconfigure

5.3.8 USB Configuration

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

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

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

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

BIOS Menu 10: USB Configuration

➔ **USB Devices**

The **USB Devices** 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**   D<small>EFAULT</small>   Legacy USB support enabled

➔ **Disabled**   Legacy USB support disabled

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

5.3.9 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 11**) displays the CPU temperature and CPU fan speed, and contains the fan configuration submenu.

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

PC Health Status                                    Smart Fan Mode Select

CPU temperature                 : +60 C
CPU_FAN1 Speed                  : 5504 RPM
SYS_FAN1 Speed                  : N/A                --------------------
                                                    →←: Select Screen
> Smart Fan Mode Configuration                      ↑ ↓: Select Item
                                                    Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 11: iWDD H/W Monitor

➔ **PC Health Status**

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

- CPU Temperature
- CPU Fan Speed
- System Fan Speed

5.3.9.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 12**) to configure the smart fan temperature and speed settings.

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

Smart Fan Mode Configuration                        Smart Fan Mode Select

Fan 1 Smart Fan Control         [Auto Mode]
Auto mode fan start temperature 50
Auto mode fan off temperature   40                  ---------------------
Auto mode fan start PWM         30
Auto mode fan slope PWM         1                    ←→: Select Screen
Fan 2 Smart Fan Control         [Auto Mode]          ↑ ↓: Select Item
                                                     Enter Select
                                                     + -  Change Opt.
                                                     F1   General Help
                                                     F2   Previous Values
                                                     F3   Optimized Defaults
                                                     F4   Save & Exit
                                                     ESC  Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
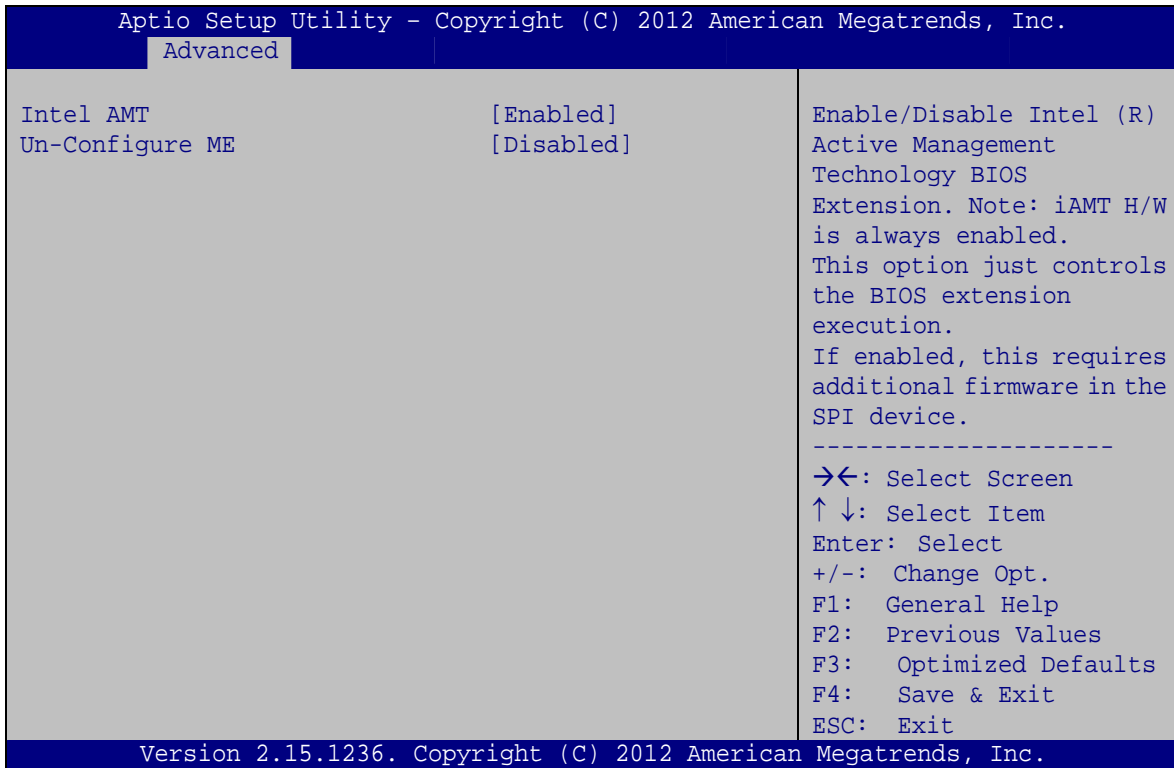
BIOS Menu 12: Smar Fan Mode Configuration

➔ **Fan 1/2 Smart Fan Control [Auto Mode]**

Use the **Fan 1/2 Smart Fan Control** option to configure the CPU/System Smart Fan.

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

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

➔ **Auto mode fan start/off temperature**

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

➔ **Auto mode fan start PWM**

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

➔ **Auto mode fan slope PWM**

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

5.3.10 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 13**) to set or change the configurations for the serial ports.

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

 F81866 Super IO Configuration                            Set Parameters of Serial
                                                          Port 1 (COMA)
 F81866 Super IO Chip            F81866
 > Serial Port 1 Configuration
 > Serial Port 2 Configuration                            --------------------
 > Serial Port 3 Configuration                            →←: Select Screen
                                                          ↑ ↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 13: F81866 Super IO Configuration

5.3.10.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 14**) to configure the serial port n.

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

 Serial Port n Configuration                              Enable or Disable Serial
                                                          Port (COM)
 Serial Port                     [Enabled]
 Device Settings                 IO=3F8h; IRQ=4
                                                          --------------------
 Change Settings                 [Auto]                   →←: Select Screen
                                                          ↑ ↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 14: 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**	**DEFAULT**	Enable the serial port

➔ **Change Settings [Auto]**

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

➔	**Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔	**IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔	**IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
➔	**IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
➔	**IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4
➔	**IO=2C8h; IRQ=3, 4**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

5.3.10.1.2 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;**
IRQ=3   Serial Port I/O port address is 2F8h and the interrupt address is IRQ3

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

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

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

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

5.3.10.1.3 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**   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=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt

    IRQ=10   address is IRQ10

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

    IRQ=10, 11   address is IRQ10, 11

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

    IRQ=10, 11   address is IRQ10, 11

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

    IRQ=10, 11   address is IRQ10, 11

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

    IRQ=10, 11   address is IRQ10, 11

5.3.11 F81866 H/W Monitor

The **F81866 H/W Monitor** menu (**BIOS Menu 15**) displays the system temperature and voltages.

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

PC Health Status

  System temperature          : +40 C
  +VCC_CORE                    : +1.720 V
  +V5S                         : +5.087 V          --------------------
  +V12S                        : +11.704 V         →←: Select Screen
  +V1.5                        : +1.584 V          ↑↓: Select Item
  +V3.3S                       : +3.344 V          Enter: Select
  VSB3V                        : +3.344 V          +/-:  Change Opt.
  VBAT                         : +3.056 V          F1:   General Help
                                                   F2:   Previous Values
                                                   F3:   Optimized Defaults
                                                   F4:   Save & Exit
                                                   ESC:  Exit

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

BIOS Menu 15: F81866 H/W Monitor

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) 2012 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
  COM3                                             ↑ ↓: Select Item
  Console Redirection            [Disabled]        Enter: Select
> Console Redirection Settings                     +/-: Change Opt.
                                                   F1:  General Help
  COM4 (Disabled)                                  F2:  Previous Values
  Console Redirection          Port Is Disabled    F3:  Optimized Defaults
                                                   F4:  Save & Exit
  COM5 (Disabled)                                  ESC: Exit
  Console Redirection          Port Is Disabled

  COM6 (Disabled)
  Console Redirection          Port Is Disabled

  iAMT SOL

  COM7(Pci Bus0,Dev0,Func0) (Disabled)
  Console Redirection          Port Is Disabled

      Version 2.15.1236. Copyright (C) 2012 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

 NOTE:

The following five options appear when the **Console Redirection** option is enabled.

➔ **Terminal Type [ANSI]**

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

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

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

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

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

➔ **Bits per second [115200]**

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

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

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

➔ **38400** Sets the serial port transmission speed at 38400.

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

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

➔ **Data Bits [8]**

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

➔ **7** Sets the data bits at 7.

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

➔ **Parity [None]**

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

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

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

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

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

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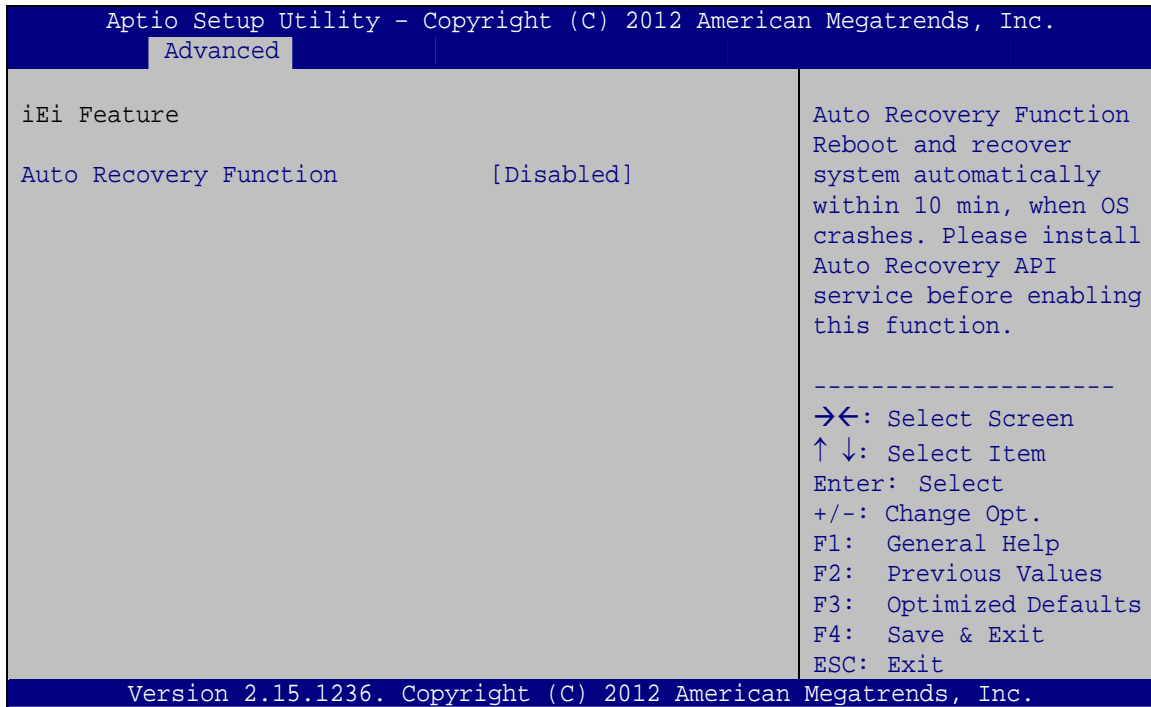
➔ **Stop Bits [1]**

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

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

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

5.3.13 iEi Feature

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

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

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

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

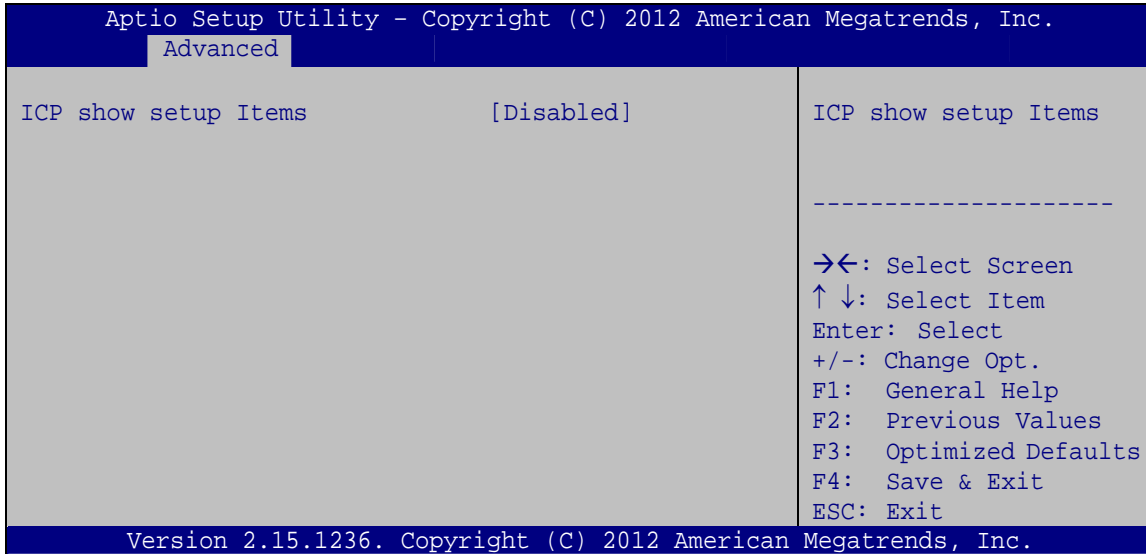**BIOS Menu 17: iEi Feature**

➔ **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

5.3.14 ICP Board

Use the **ICP Board** menu (**BIOS Menu 17**) to show detailed setup items.

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

     ICP show setup Items              [Disabled]              ICP show setup Items


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

                                                              →←: Select Screen
                                                              ↑ ↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1:  General Help
                                                              F2:  Previous Values
                                                              F3:  Optimized Defaults
                                                              F4:  Save & Exit
                                                              ESC: Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
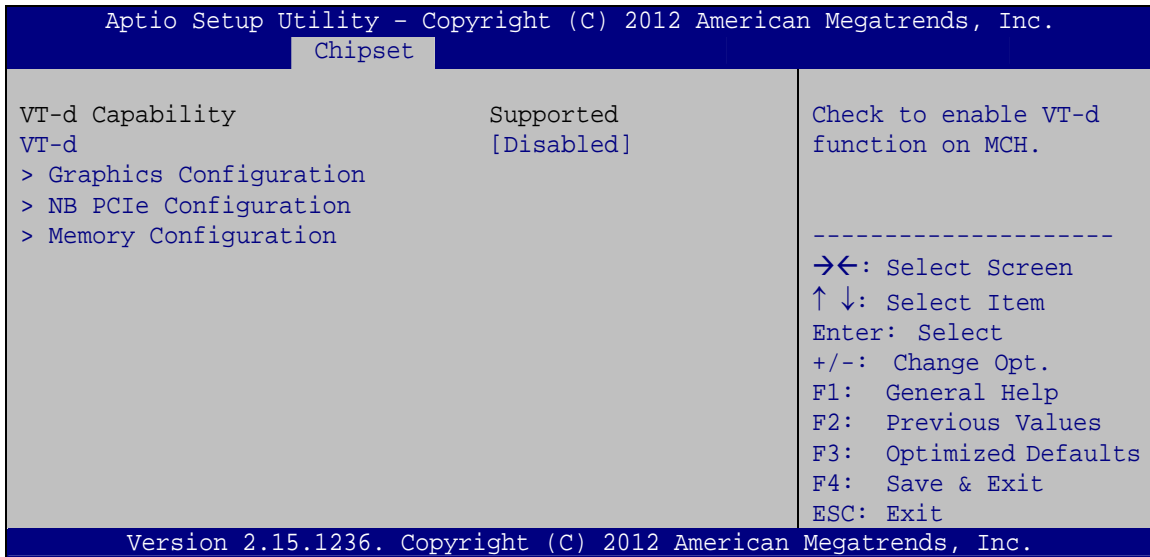
BIOS Menu 18: ICP Board

➔ **ICP show setup Items [Disabled]**

Use the **ICP show setup Items** BIOS option to enable or disable configuring the ICP board parameters.

➔ **Disabled**   DEFAULT   Disables to show detailed setup items.

➔ **Enabled**   If selected, the following BIOS menus appear, allowing you to configure detailed setup items:

PCI Subsystem Settings

Thermal Configuration

PCH-FW Configuration

Intel(R) Anti-Theft Technology Configuration

AMT Configuration

Acoustic Management Configuration

SMART Settings

Intel(R) Smart Connect Technology

ME Update

Platform Misc Configuration

Intel ICC

Network Stack

Intel RC Drivers Version Detail

Switchable Graphics

Intel(R) Ethernet Network Connection i217-LM

Intel(R) I211 Gigabit Network Connection

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 19**) to access the PCH IO and System Agent (SA) configuration menus.

![WARNING icon] **WARNING!**

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

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

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


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

        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 19: Chipset

5.4.1 System Agent (SA) Configuration

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

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

VT-d Capability                 Supported            Check to enable VT-d
VT-d                            [Disabled]           function on MCH.
> Graphics Configuration
> NB PCIe Configuration
> Memory Configuration                               --------------------
                                                     →←: Select Screen
                                                     ↑ ↓: Select Item
                                                     Enter: Select
                                                     +/-:  Change Opt.
                                                     F1:   General Help
                                                     F2:   Previous Values
                                                     F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC: Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 20: System Agent (SA) Configuration

➔ **VT-d [Disabled]**

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

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

➔ **Enabled** Enables VT-d support.

5.4.1.1 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 21**) menu to configure the video device connected to the system.

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

Graphics Configuration                                  Select which of
Primary Display              [Auto]                      IGFX/PEG/PCI Graphics
DVMT Pre-Allocated           [256M]                      device should be Primary
DVMT Total Gfx Mem           [MAX]                       Display Or select SG for
                                                         Switchable Gfx.
Primary IGFX Boot Display     [VBIOS Default]
LCD Panel Type               [800x600 18Bit]            ----------------------
Backlight Control            [Inverted]                 →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-:  Change Opt.
                                                        F1:   General Help
                                                        F2:   Previous Values
                                                        F3:   Optimized Defaults
                                                        F4:   Save & Exit
                                                        ESC:  Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 21: Graphics Configuration

➔ **Primary Display [Auto]**

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

- Auto   **Default**
- IGFX
- PEG
- PCIE

➔ **DVMT Pre-Allocated [256M]**

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
- 128M
- 256M   **Default**
- 512M

➔ **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**
- CRT
- LVDS
- Display port 1
- HDMI 1
- HDMI 2

➔ **LCD Panel Type [800x600 18Bit]**

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

- 640x480 18Bit
- 800x600 18Bit **DEFAULT**
- 1024x768 18Bit
- 1024x768 24Bit
- 1280x800 24Bit
- 1280x1024 48Bit
- 1366x768 24Bit
- 1440x900 48Bit
- 1440x1050 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.

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

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

5.4.1.2 NB PCIe Configuration

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

NB PCIe Configuration                                Configure PCIEx16
PCIEX16                        Not Present           Gen1-Gen3
  PCIEX16 – Gen X              [Auto]
Enable PEG                     [Auto]
Detect Non-Compliance Device   [Disabled]            ----------------------
                                                     →←: Select Screen
                                                     ↑ ↓: Select Item
                                                     Enter: Select
                                                     +/-:  Change Opt.
                                                     F1:   General Help
                                                     F2:   Previous Values
                                                     F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC: Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 22: NB PCIe Configuration

➔ **PCIEX16 – Gen X [Auto]**

Use the **PCIEX16 – Gen X** option to select the support type of the PCI Express x16 slot. The following options are available:

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

➔ **Enable PEG [Auto]**

Use the **Enable PEG** option to enable or disable the PCI Express controller. The following options are available:

- Disabled
- Enabled
- Auto   **Default**

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

Use the **Detect Non-Compliance Device** option to enable or disable detecting a non-compliance PCI Express device in the PEG. The following options are available:

- Disabled   **Default**
- Enabled

5.4.1.3 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 23**) to view memory information.

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

Memory Information

Total Memory                    2048 MB (DDR3)
DIMM1                           2048 MB (DDR3)
DIMM2                           Not Present

                                                ---------------------
                                                →←: Select Screen
                                                ↑ ↓: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1:  General Help
                                                F2:  Previous Values
                                                F3:  Optimized Defaults
                                                F4:  Save & Exit
                                                ESC: Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
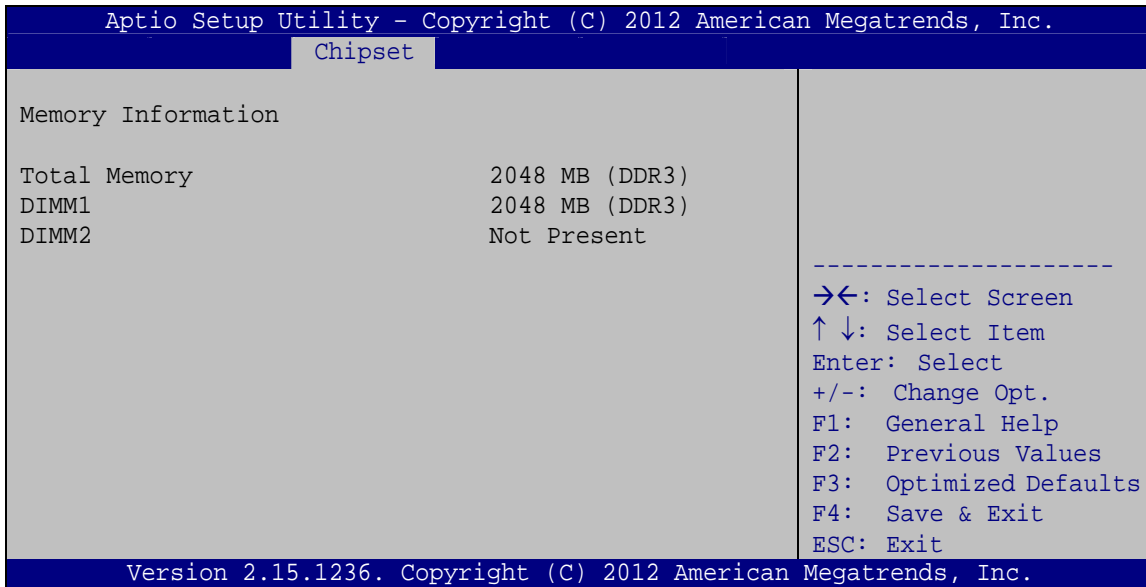
BIOS Menu 23: Memory Configuration

5.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 24**) to configure the PCH parameters.

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

Auto Power Button Status         [Enable (AT)]          Select AC power state
                                                         with power is re-applied
Azalia                           [Enabled]               after a power failure.
Power Saving Function(ERP)       [Disabled]              When Auto Power Button
                                                         Function select Enabled
> PCI Express Configuration                              the AC power loss will
                                                         always power on.
USB Power SW1                     [+5V DUAL]


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

BIOS Menu 24: PCH-IO Configuration

➔ **Azalia [Enabled]**

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

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

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

➔ **Power Saving Function [Disabled]**

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

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

➔ **Enabled**   Enable to reduce power consumption in system off state.

➔ **USB Power SW1 [+5V DUAL]**

Use the **USB Power SW1** BIOS option to configure the power of USB port by software.

➔ **+5V**   Sets to +5V

➔ **+5V DUAL**   DEFAULT   Sets to +5V DUAL

5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 25**) to select the support type of the PCI Express or PCIe Mini slots.

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

PCI Express Configuration                            Select PCI Express port
                                                     speed.
M-SATA1 PCIE Port
PCIe Speed                       [Auto]
Detect Non-Compliance Device     [Disabled]          ----------------------
                                                     ➔←: Select Screen
MINI-PCIE1 PCIE Port                                 ↑ ↓: Select Item
PCIe Speed                       [Auto]              Enter: Select
Detect Non-Compliance Device     [Disabled]          +/-:  Change Opt.
                                                     F1:  General Help
                                                     F2:  Previous Values
                                                     F3:  Optimized Defaults
                                                     F4:  Save & Exit
                                                     ESC: Exit
         Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
   BIOS Menu 25: PCI Express Configuration

➔ **PCIe Speed [Auto]**

Use PCIe Speed option to select the speed type of the PCI Express or PCIe Mini slots. The following options are available:

   ▪ Auto   **Default**
   ▪ Gen1
   ▪ Gen2

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

Use the **Detect Non-Compliance Device** option to enable or disable the "detect no-compliance PCIe device" function.

➔ **Disabled** DEFAULT   Detect no-compliance PCIe device function is disabled

➔ **Enabled**   Detect no-compliance PCIe device function is enabled. If will take more time at POST if it is enabled.

5.5 Boot

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

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

Boot Configuration                                        Select the keyboard
Bootup NumLock State             [On]                     NumLock state
Quiet Boot                       [Enabled]
Option ROM Messages              [Force BIOS]
Launch PXE OpROM                 [Disabled]               --------------------
UEFI Boot                        [Disabled]
                                                          ➔←: Select Screen
Boot Option Priorities                                    ↑↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
          Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 26: Boot

➔ **Bootup NumLock State [On]**

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

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

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

➔ **Quiet Boot [Enabled]**

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

➔ **Disabled**　　　　　　Normal POST messages displayed

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

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

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

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

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

➔ **Launch PXE OpROM [Disabled]**

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

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

➔ **Enabled**　　　　　　Load PXE Option ROMs.

➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** BIOS option to allow the system to boot from the UEFI devices.

➔ **Disabled** DEFAULT Disables to boot from the UEFI devices.

➔ **Enabled** Enables to boot from the UEFI devices.

5.6 Security

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

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

 Password Description                                 Set 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
 boot or enter Setup. In Setup the User will          ➔←: Select Screen
 have Administrator rights.                           ↑ ↓: Select Item
 The password length must be                          Enter: Select
 in the following range:                              +/-:  Change Opt.
 Minimum length                  3                    F1:   General Help
 Maximum length                 20                    F2:   Previous Values
                                                      F3:   Optimized Defaults
 Administrator Password                               F4:   Save & Exit
 User Password                                        ESC:  Exit

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

BIOS Menu 27: Security

➔ **Administrator Password**

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

➔ **User Password**

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

5.7 Save & Exit

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

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

 Save Changes and Reset                            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
                                                   +/-:  Change Opt.
                                                   F1:   General Help
                                                   F2:   Previous Values
                                                   F3:   Optimized Defaults
                                                   F4:   Save & Exit
                                                   ESC: Exit
        Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 28: Save & Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

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

The following drivers can be installed on the system:

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

Installation instructions are given below.

6.2 Starting the Driver Program

To access the driver installation programs, please do the following.

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

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

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

Figure 6-1: Start Up Screen

Step 3: Click NANO-QM871.

Step 4: The list of drivers in **Figure 6-2** appears.
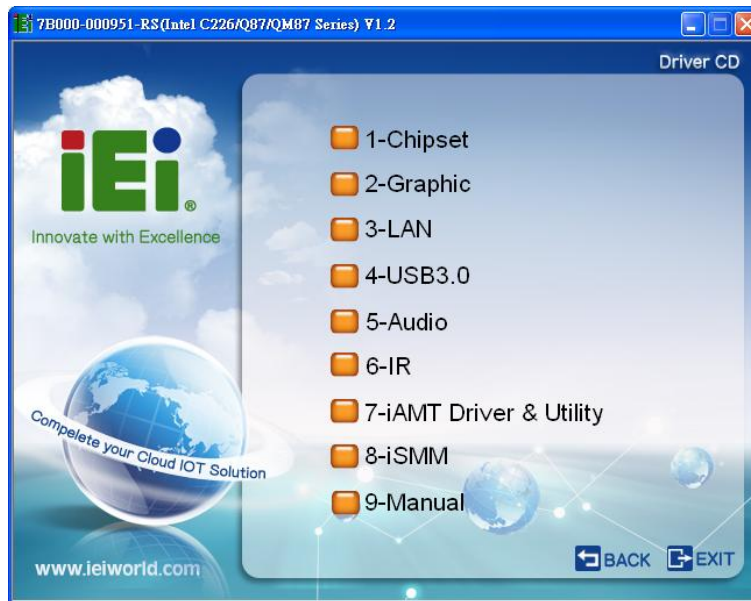
Figure 6-2: Drivers

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

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

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

Step 4: The **Welcome Screen** in **Figure 6-3** appears. Click **Next** to continue.

Figure 6-3: Chipset Driver Welcome Screen

Step 5: The license agreement in **Figure 6-4** appears.

Step 6: Read the **License Agreement**.

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

Figure 6-4: Chipset Driver License Agreement

Step 8: The **Read Me** file in **Figure 6-5** appears.

Step 9: Click **Next** to continue.
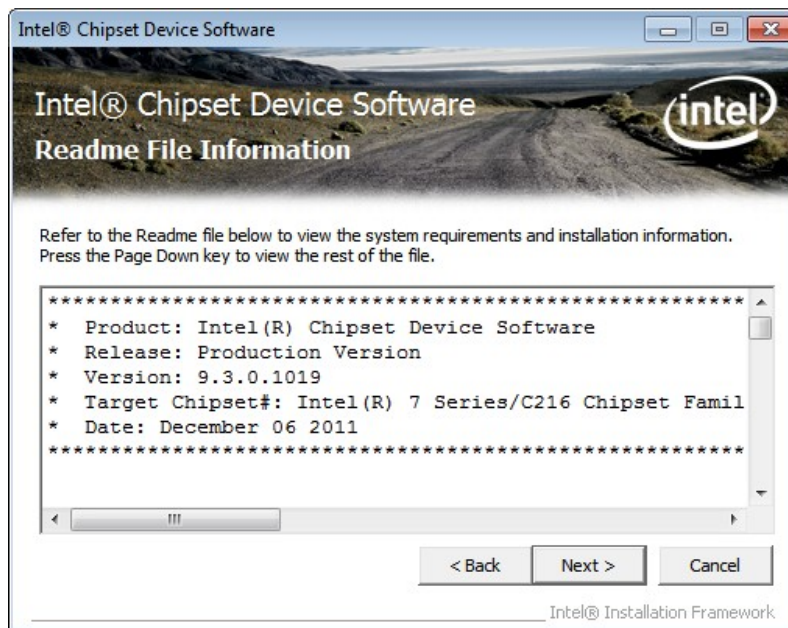
Figure 6-5: Chipset Driver Read Me File

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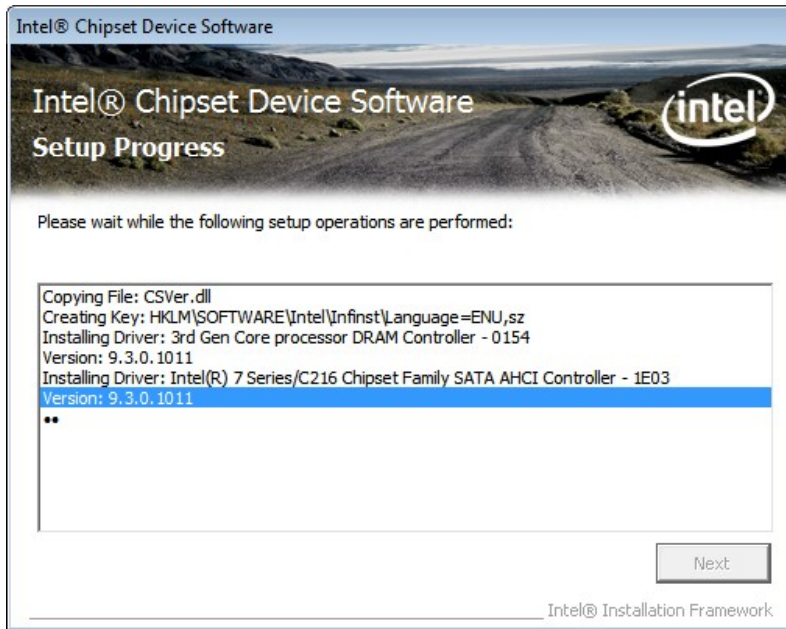
Figure 6-6: Chipset Driver Setup Operations

Step 11: Once the **Setup Operations** are complete, click **Next** to continue.

Step 12: The **Finish** screen in **Figure 6-7** appears.

Step 13: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon.

See **Figure 6-7**.

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

Step 4: The **Welcome Screen** in **Figure 6-8** appears. Click **Next** to continue.
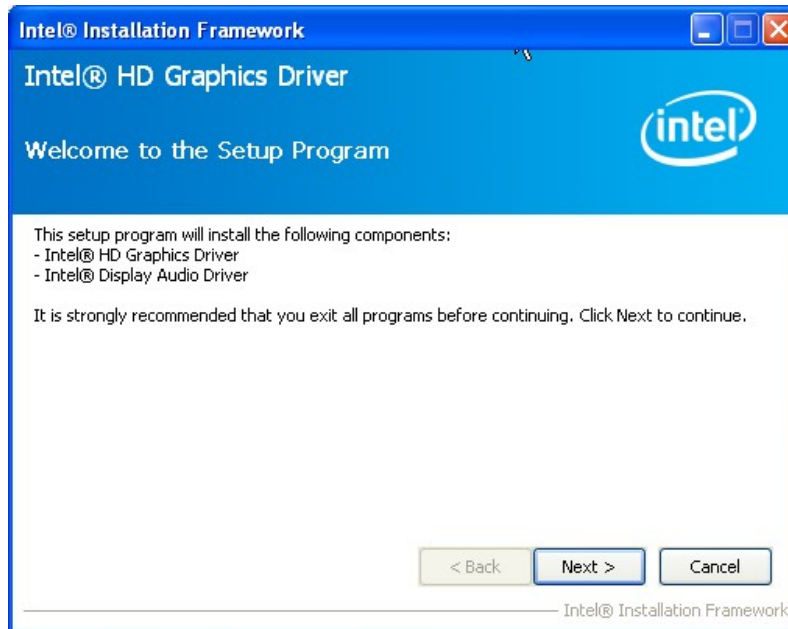
Figure 6-8: Graphics Driver Welcome Screen

Step 5: The license agreement in **Figure 6-9** appears. Read the **License Agreement**.

Step 6: Click **Yes** to continue.
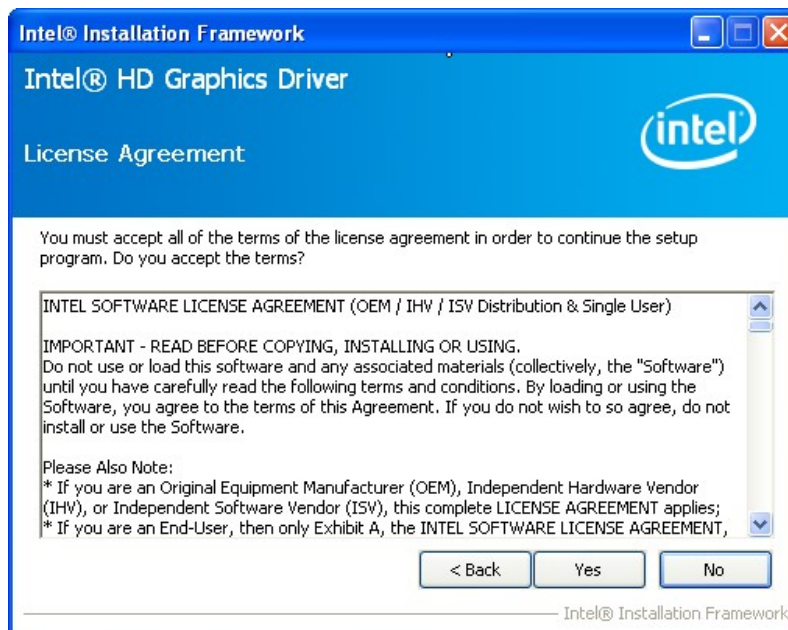
Figure 6-9: Graphics Driver License Agreement

Step 7: The Read Me file in **Figure 6-10** appears.

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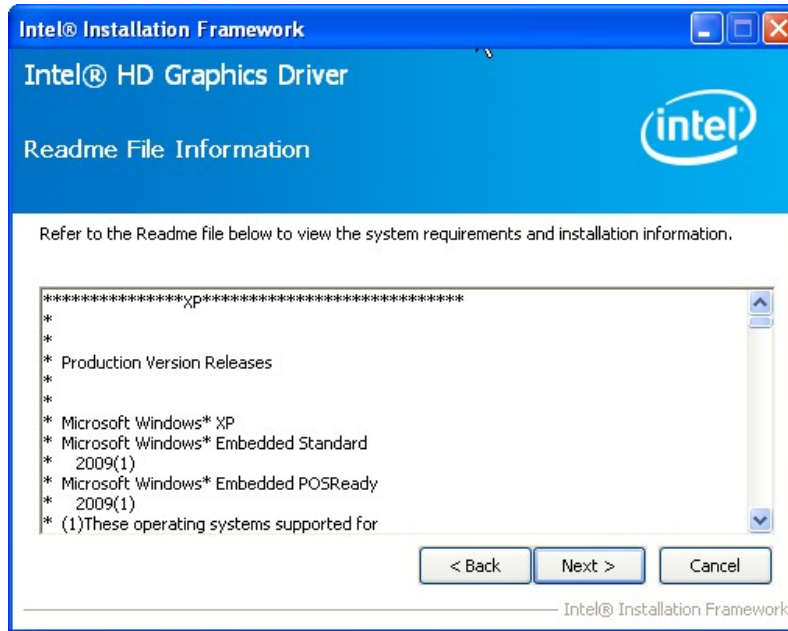
Figure 6-10: Graphics Driver Read Me File

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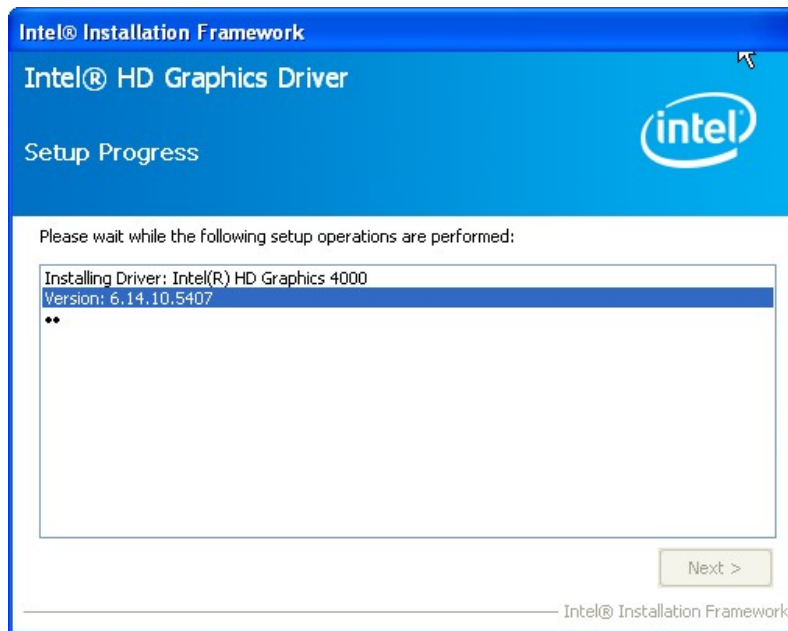
Figure 6-11: Graphics Driver Setup Operations

Step 10: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 11: The **Finish** screen appears.

Step 12: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon.

See **Figure 6-12**.

Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

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

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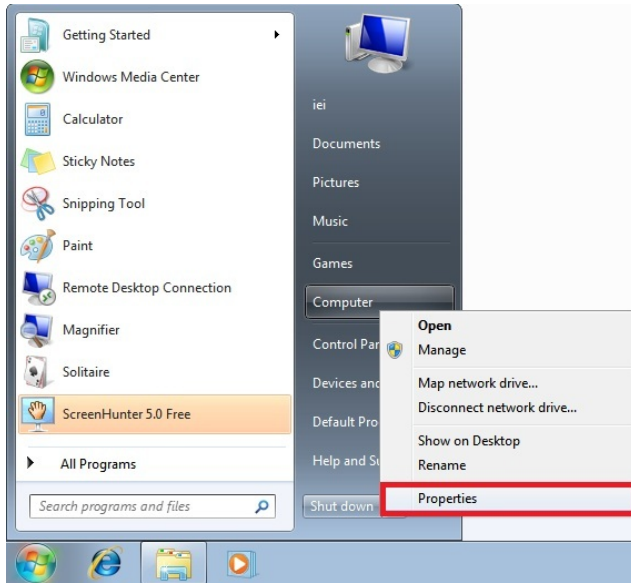
Figure 6-13: Windows Control Panel

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

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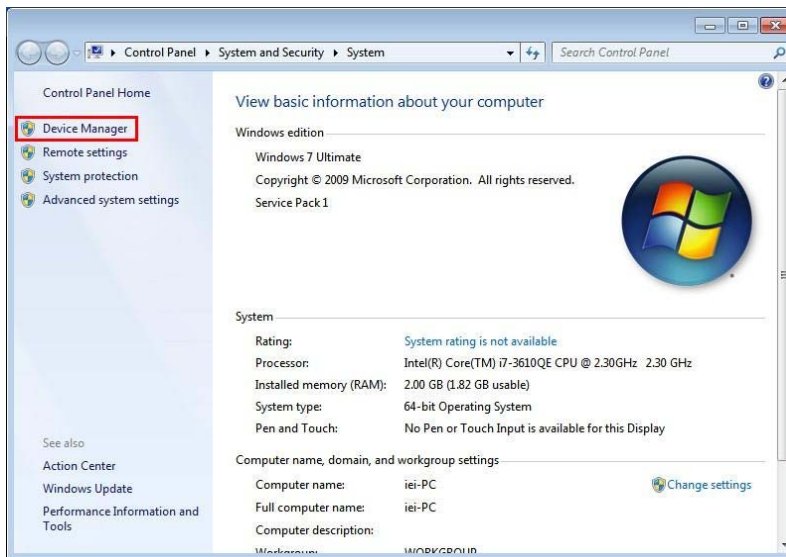
Figure 6-14: System Control Panel

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

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

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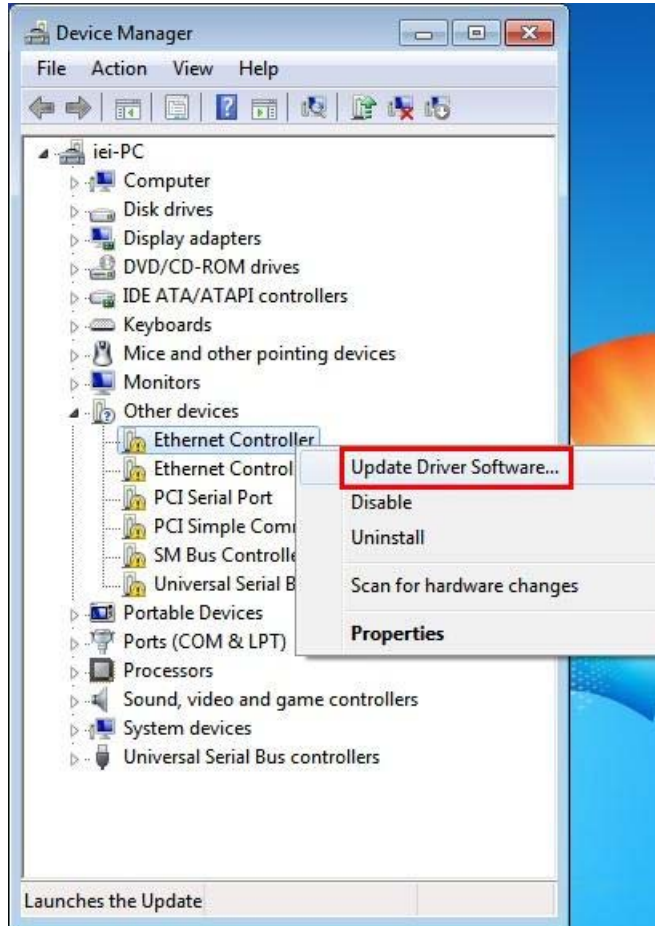
Figure 6-15: Device Manager List

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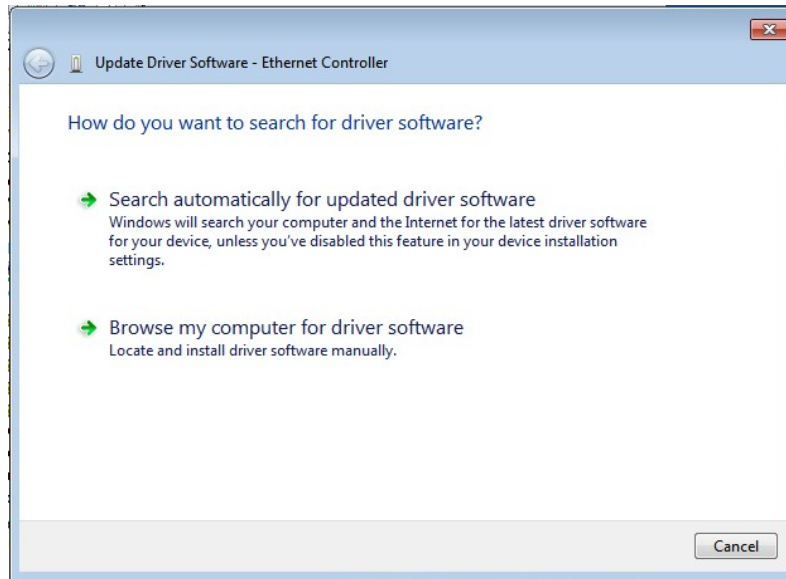
Figure 6-16: Update Driver Software Window

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

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

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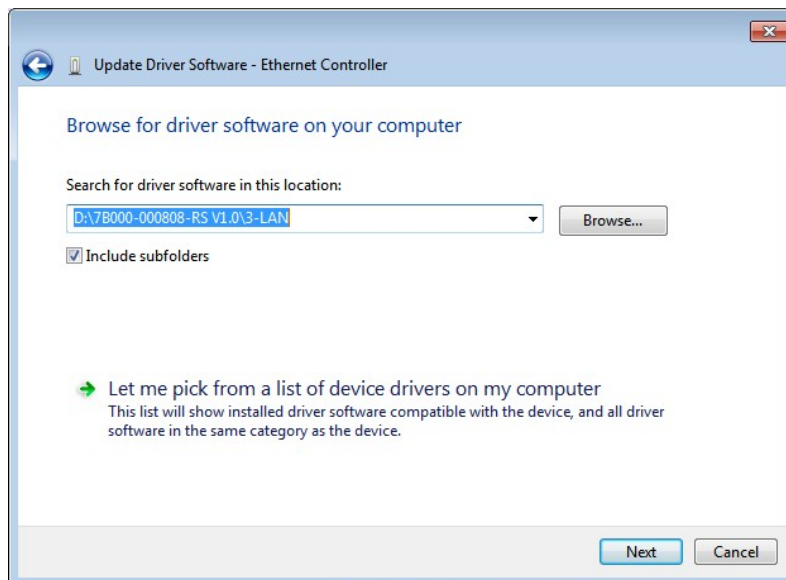
Figure 6-17: Locate Driver Files

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

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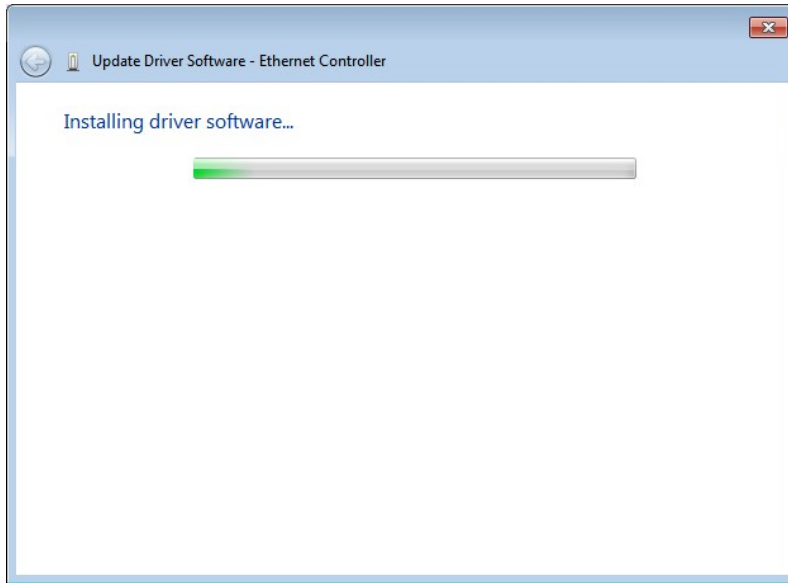
Figure 6-18: LAN Driver Installation

Step 12: The **Finish** screen in **Figure 6-19** appears. Click **Close** to exit.
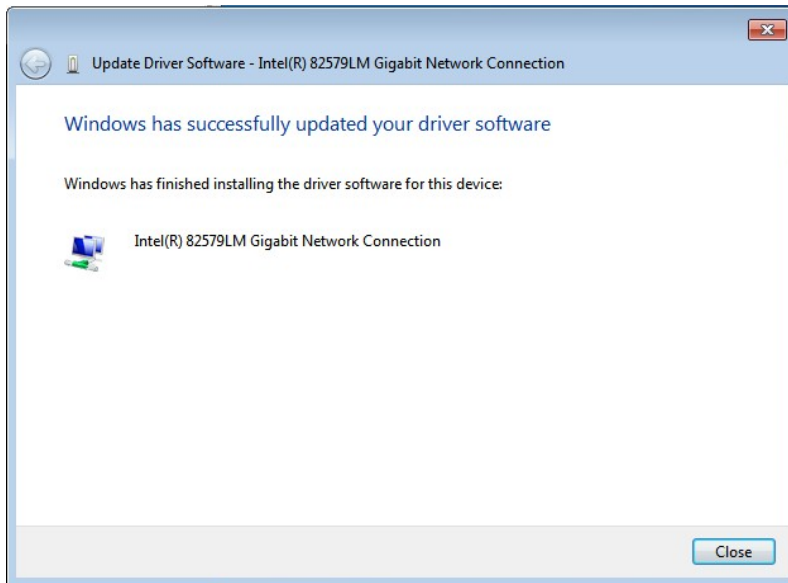
Figure 6-19: LAN Driver Installation Complete

6.6 USB 3.0 Driver Installation

![WARNING icon] **WARNING:**

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

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

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

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

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

Step 4: The **Welcome Screen** in **Figure 6-20** appears.

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

Figure 6-20: USB 3.0 Driver Welcome Screen

Step 6: The license agreement in **Figure 6-21** appears.

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

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

Figure 6-21: USB 3.0 Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-22** appears.

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

Figure 6-22: USB 3.0 Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-23**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
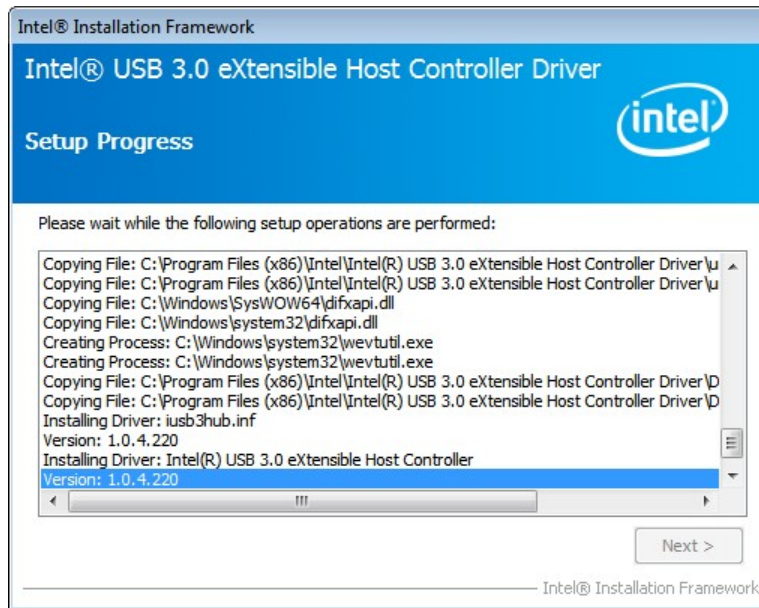
Figure 6-23: USB 3.0 Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-24** appears.

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

Figure 6-24: USB 3.0 Driver Installation Finish Screen

6.7 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 "**5-Audio**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

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

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-25**).
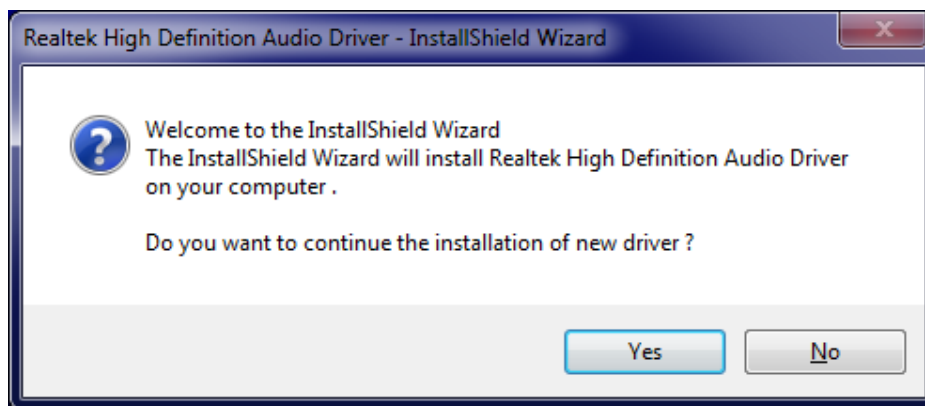
Figure 6-25: Audio Driver Welcome Screen

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

Step 7: The program begins to install. See **Figure 6-26**.
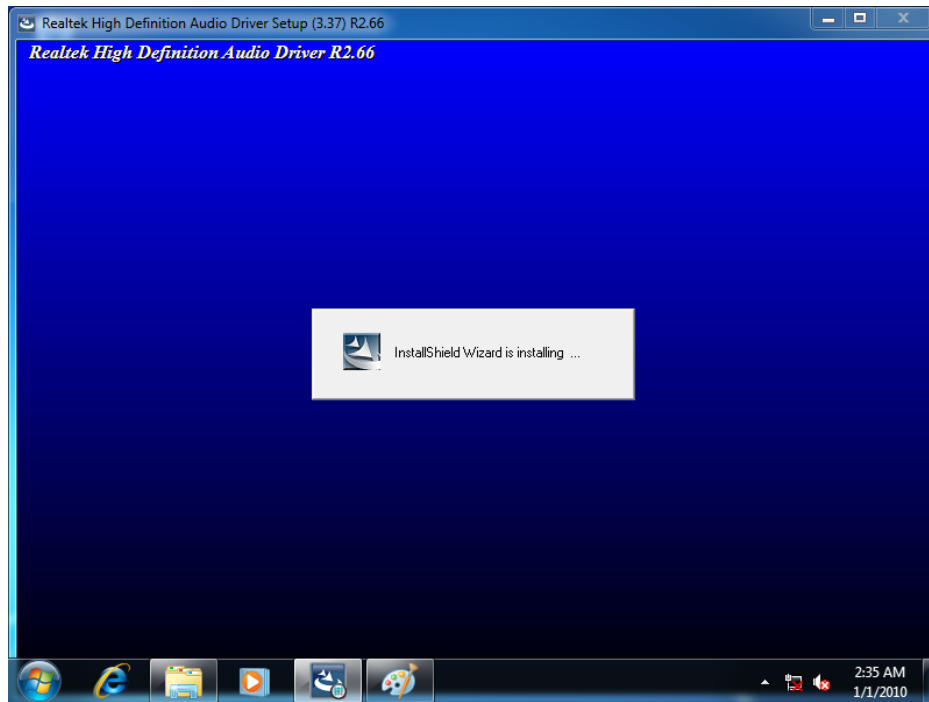
Figure 6-26: Audio Driver Installation

Step 8: When the driver installation is complete, the screen in **Figure 6-27** appears.
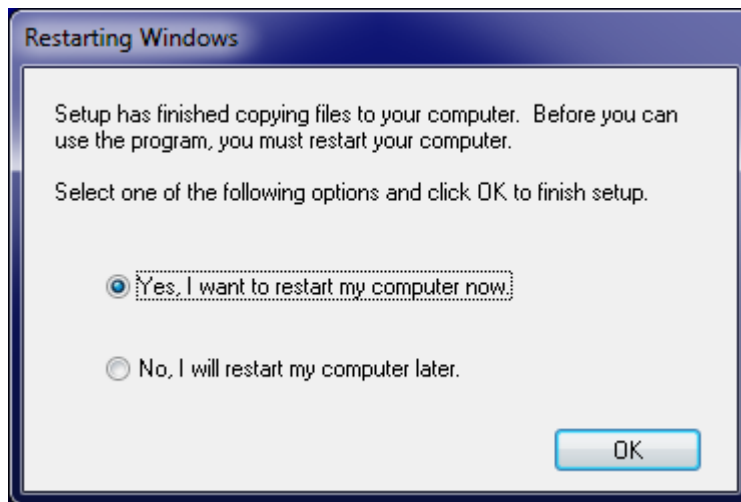
Figure 6-27: Audio Driver Installation Complete

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

Step 10: The system reboots.

6.8 Intel® AMT Driver Installation

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

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

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

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

Step 4: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-28** appears.

Step 5: Click **Next** to continue.
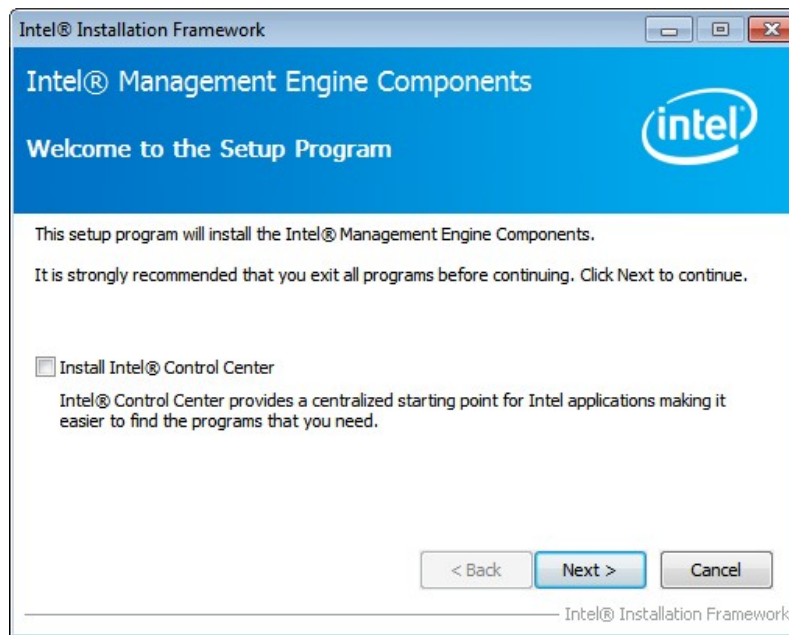
Figure 6-28: Intel® ME Driver Welcome Screen

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

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

Step 8: Click **Yes** to continue.
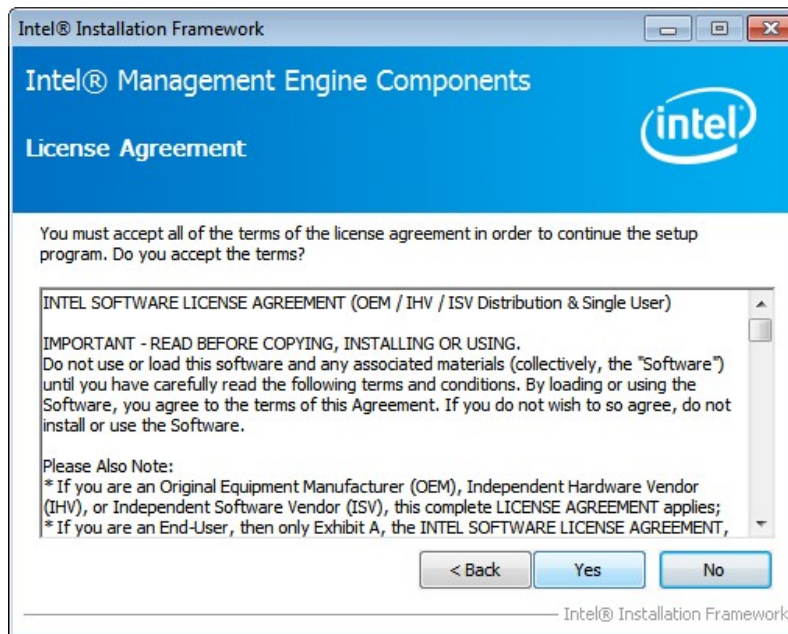
Figure 6-29: Intel® ME Driver License Agreement

Step 9: **Setup Operations** are performed as shown in **Figure 6-30**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.
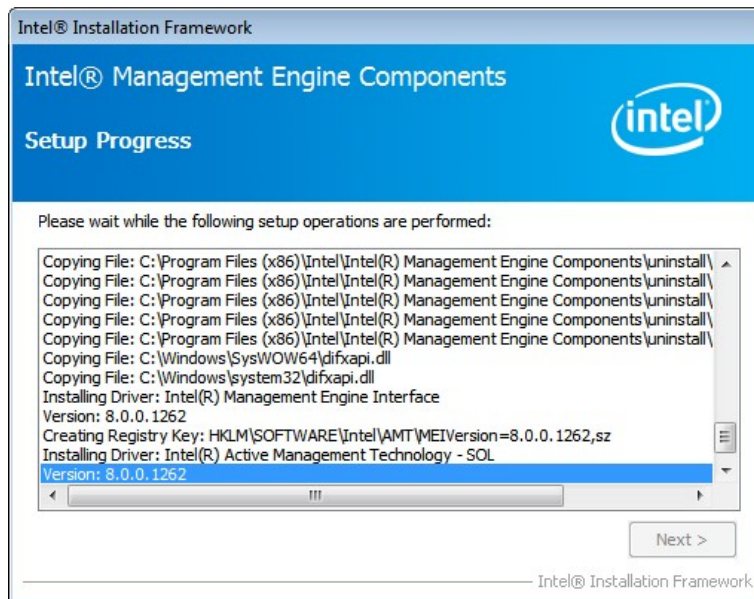
Figure 6-30: Intel® ME Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-31** appears.

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.
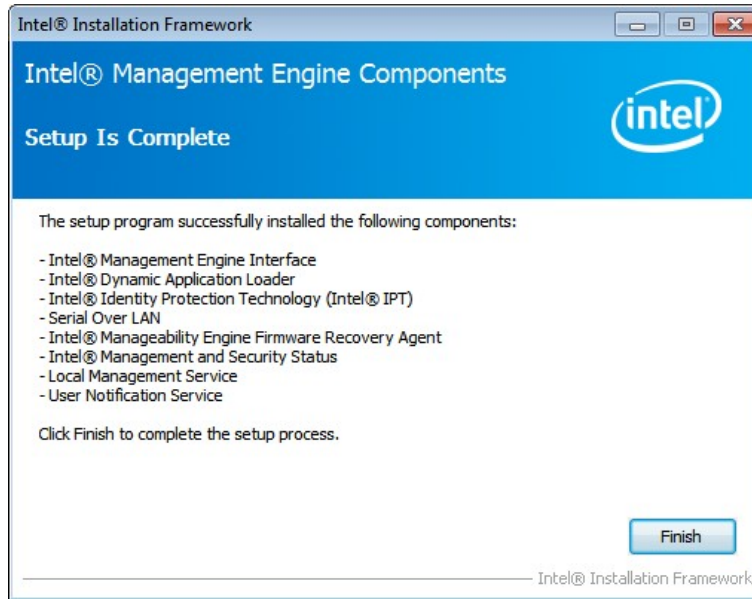
Figure 6-31: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

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

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 icon] **NOTE:**

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

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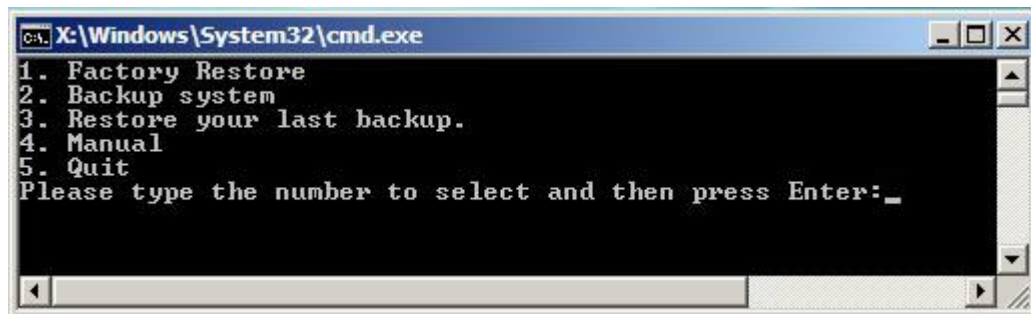
Figure B-1: IEI One Key Recovery Tool Menu

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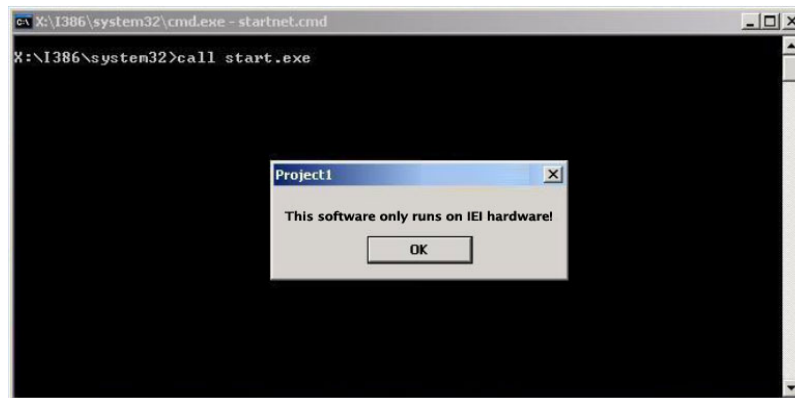
To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

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:

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:

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!
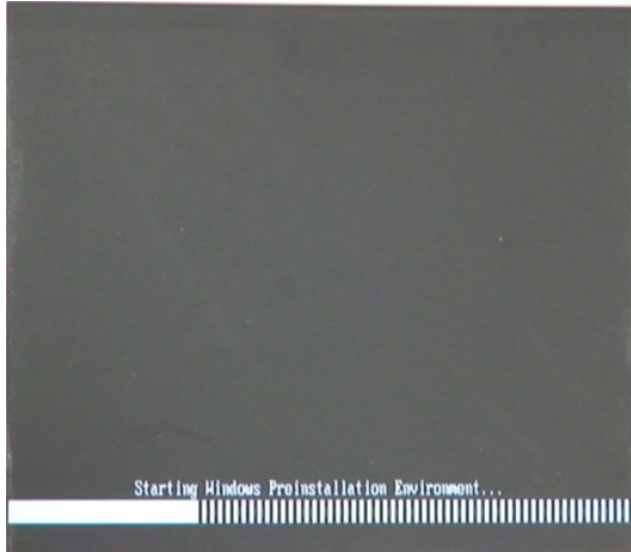
Figure B-2: Launching the Recovery Tool
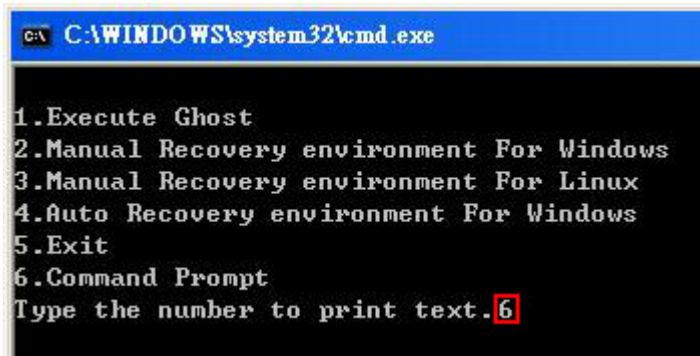
Step 3: The recovery tool setup menu is shown as below.
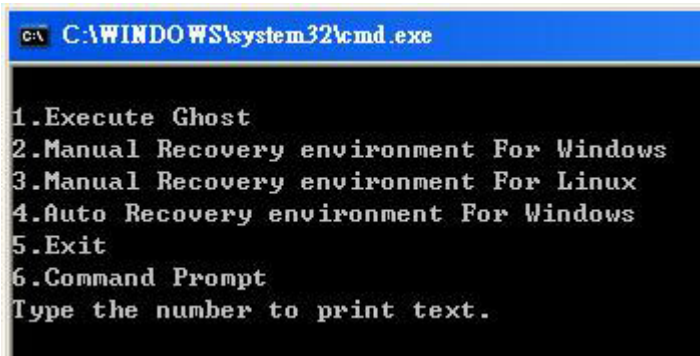
Figure B-3: Recovery Tool Setup Menu

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

Figure B-4: Command 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.

```
X:\I386\SYSTEM32>diskpart

Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JVC

DISKPART> sel disk 0

Disk 0 is now the selected disk.

DISKPART> list part

  Partition ###  Type              Size      Offset
  -------------  ----------------  -------   -------
  Partition 1    Primary           2000 MB     32 KB
  Partition 2    Primary           1804 MB   2000 MB

DISKPART> exit
```

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!
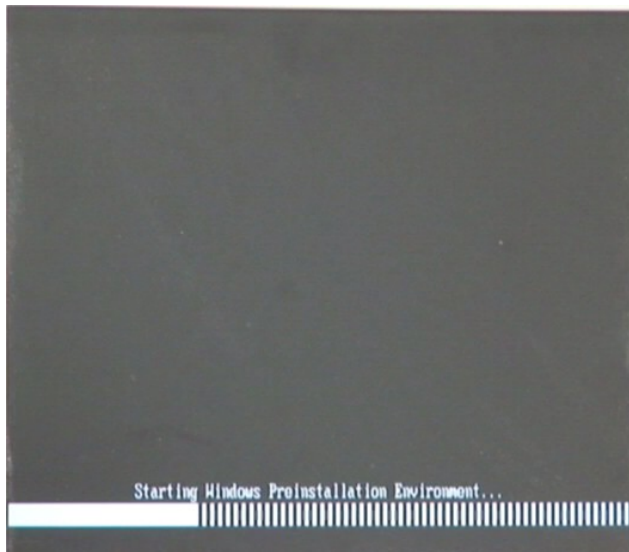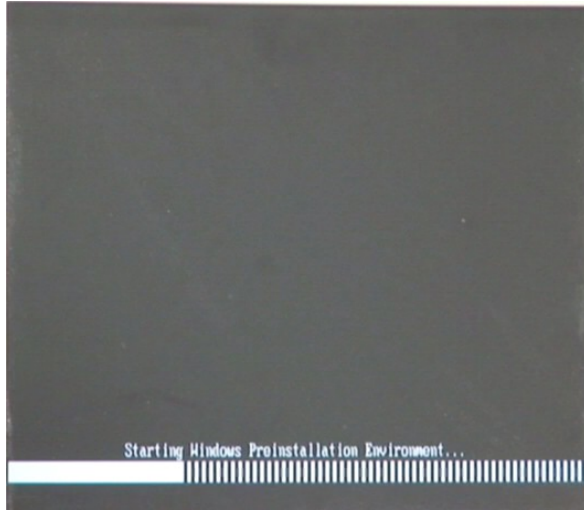

Figure B-6: Launching the Recovery Tool

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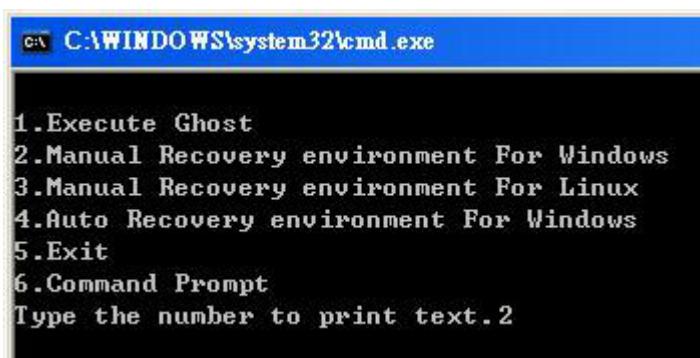
Figure B-7: Manual Recovery Environment for Windows

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.
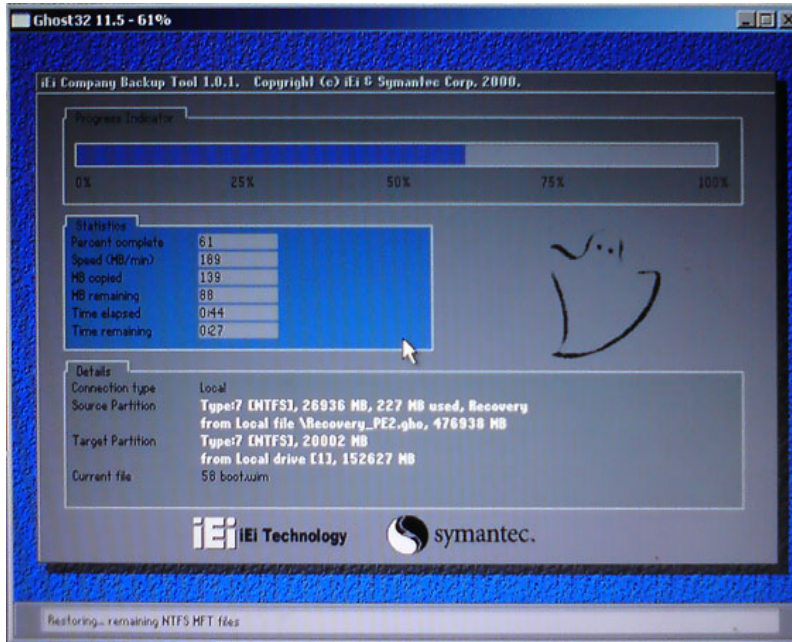
Figure B-8: Building the Recovery Partition

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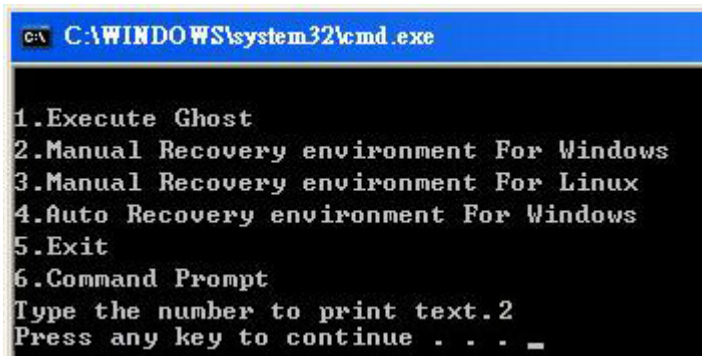
Figure B-9: Press Any Key to Continue

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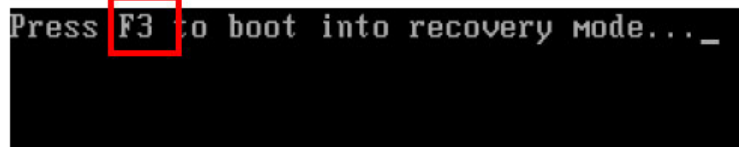
Figure B-10: Press F3 to Boot into Recovery Mode

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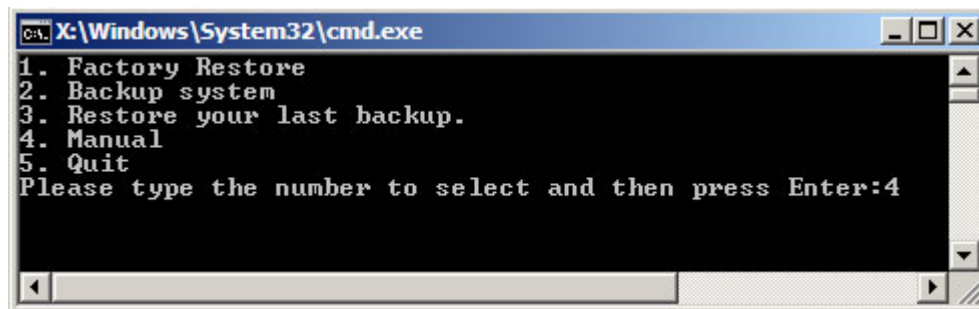
Figure B-11: Recovery Tool Menu

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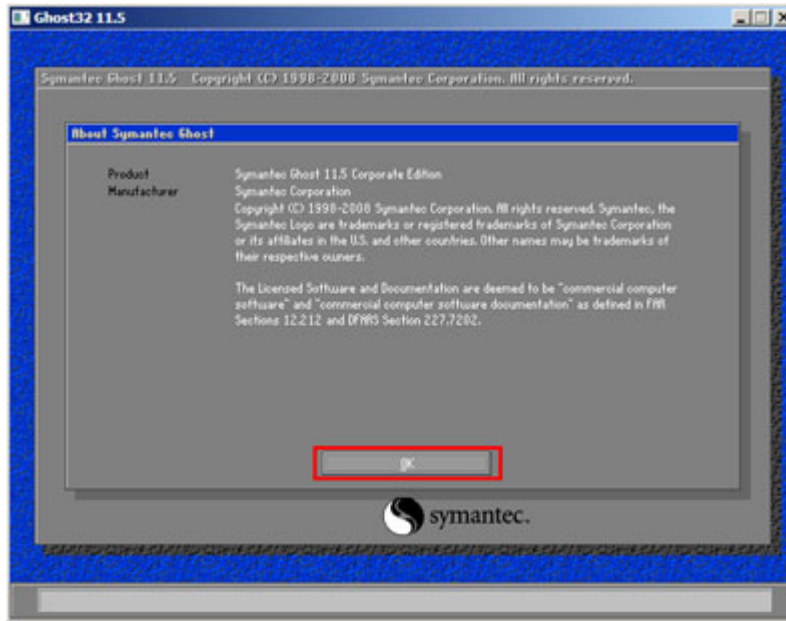
Figure B-12: About Symantec Ghost Window

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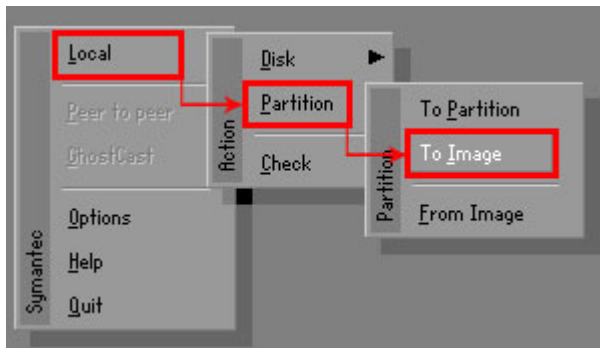
Figure B-13: Symantec Ghost Path

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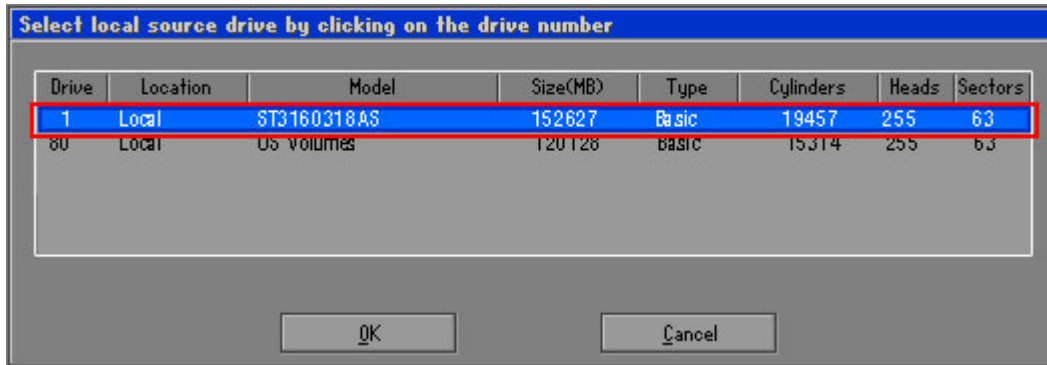
Figure B-14: Select a Local Source Drive

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

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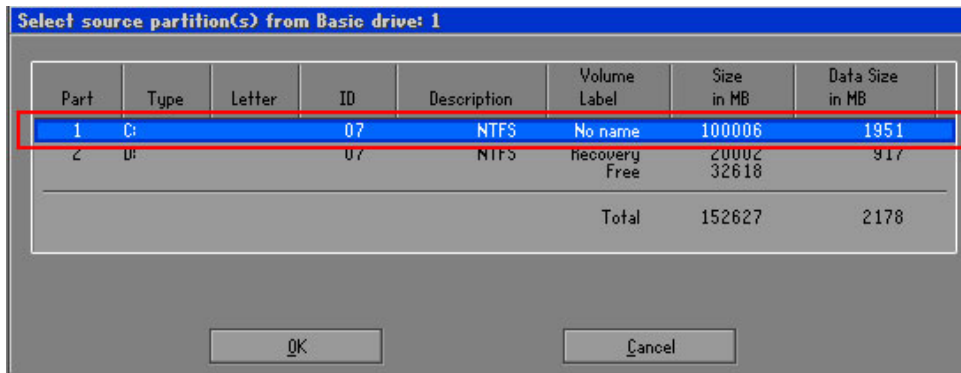
Figure B-15: Select a Source Partition from Basic Drive

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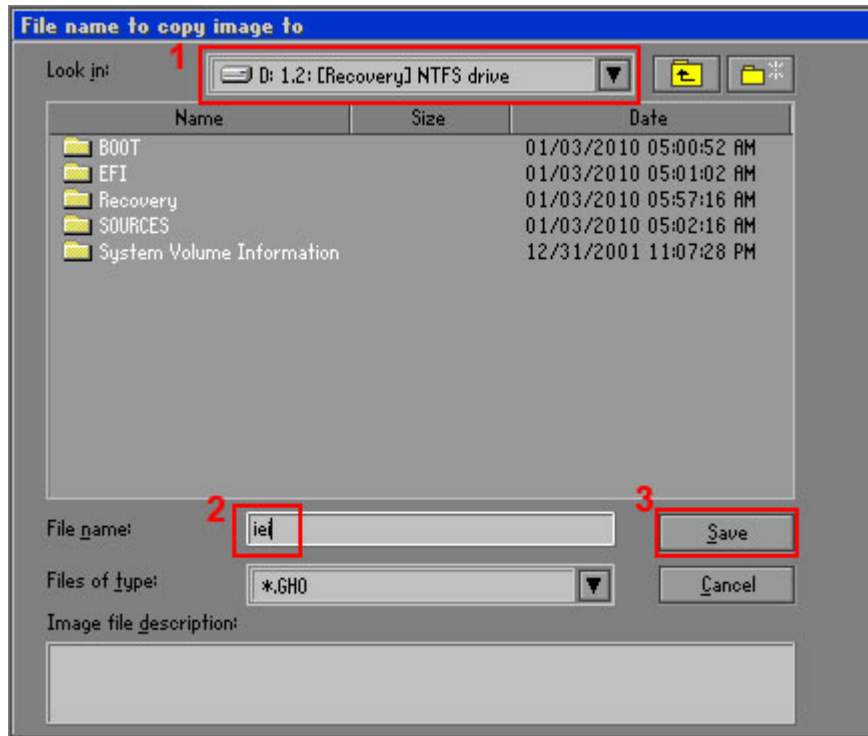
Figure B-16: File Name to Copy Image to

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

the image file smaller.
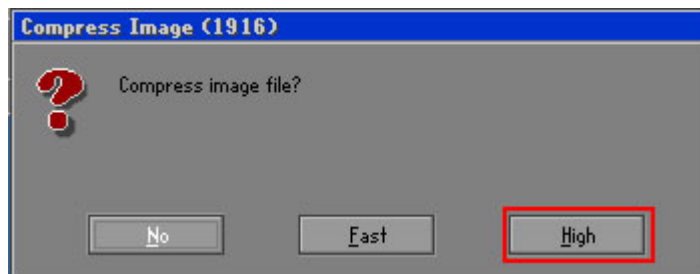
Figure B-17: Compress Image

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

continue.
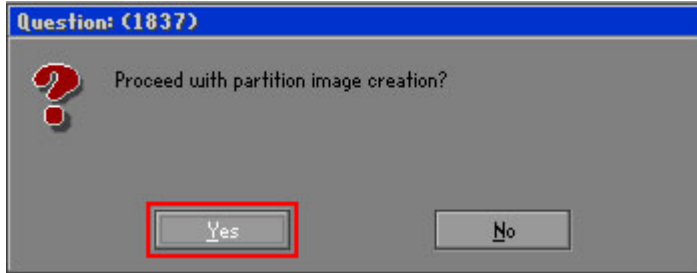
Figure B-18: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure B-19**).
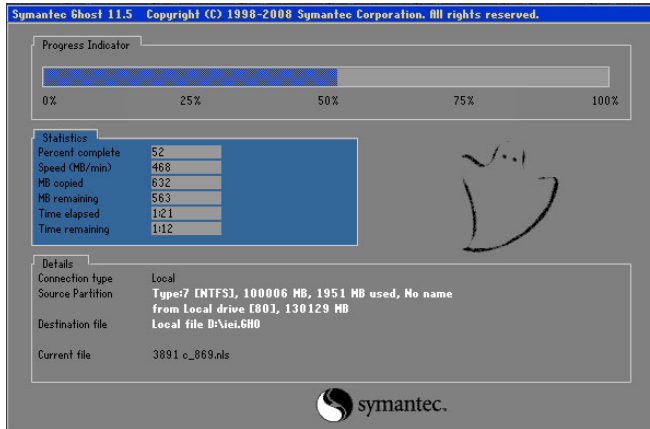
Figure B-19: Image Creation Complete
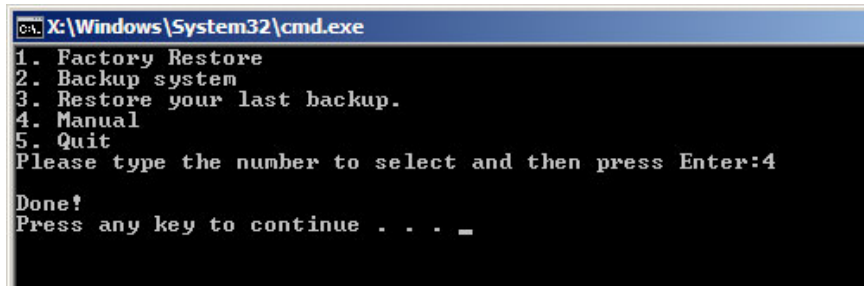
Step 11: When the image creation completes, a screen prompts as shown in **Figure B-20**.

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 7
>
> ▪ Windows XP   ▪ Windows XP Embedded
>
> ▪ Windows Vista   ▪ Windows Embedded Standard 7

> ⚠️ **CAUTION:**
>
> The setup procedure may include a step to create a factory default image. It is suggested to configure the system to a factory default environment before the configuration, including driver and application installations.

Step 1: Follow the steps described in **Section 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)
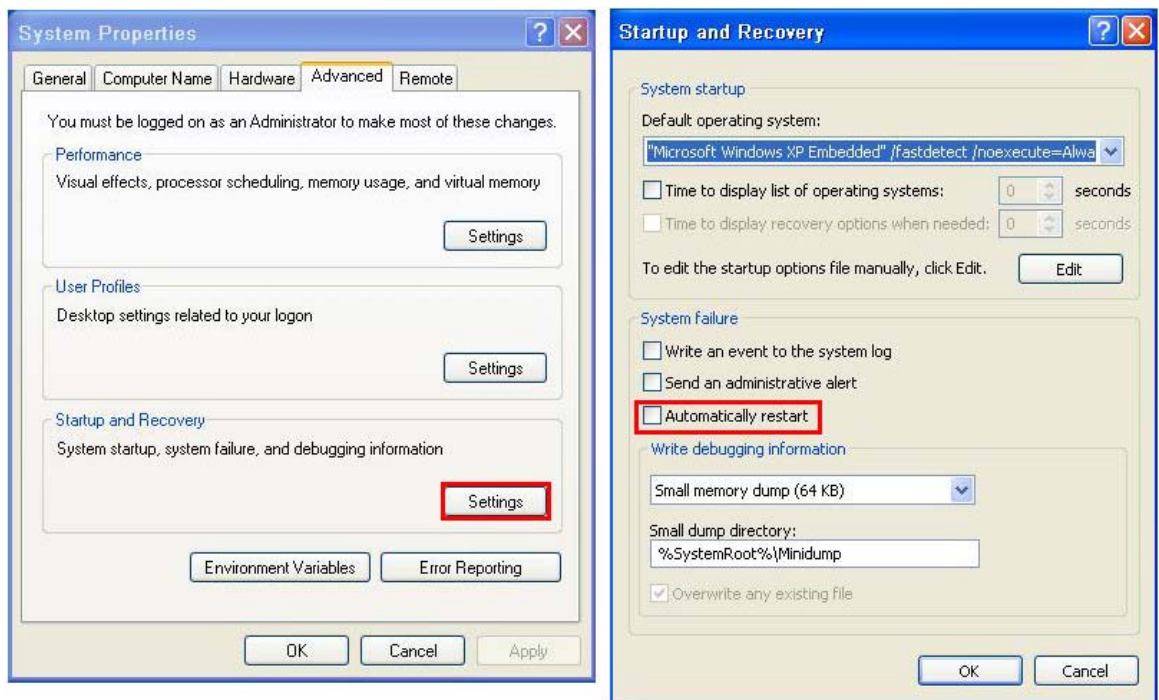
Figure B-23: Disable Automatically Restart

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>.
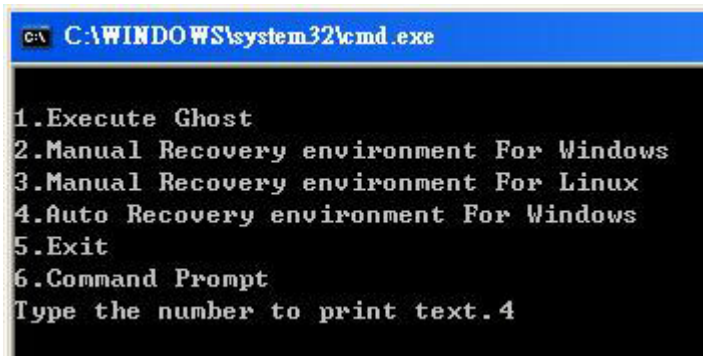
Figure B-25: Auto Recovery Environment for Windows

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.
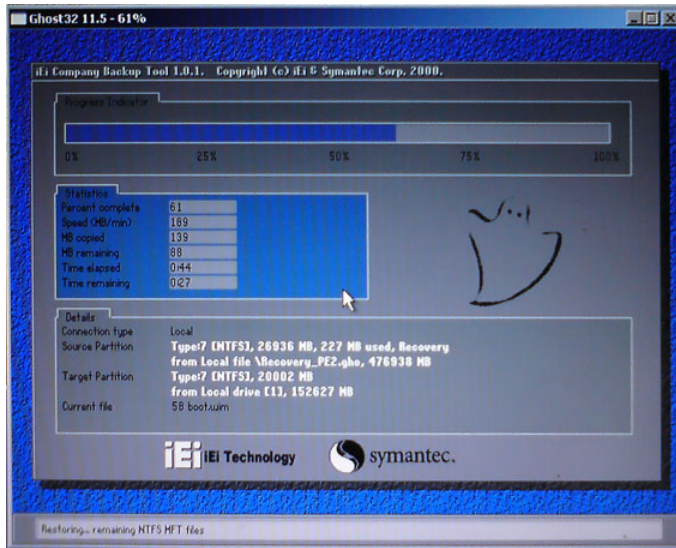
Figure B-26: Building the Auto Recovery Partition

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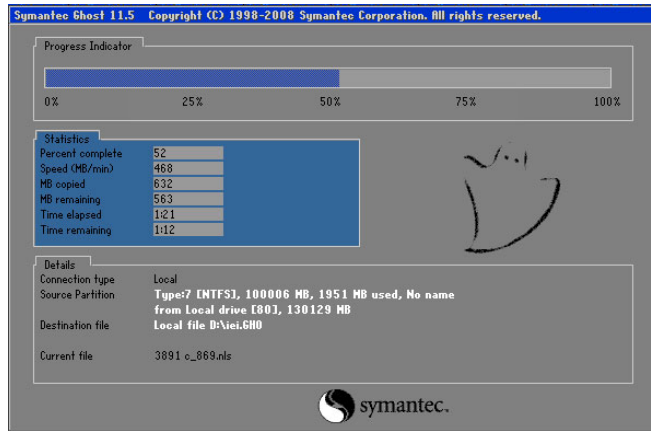
Figure B-28: Image Creation Complete

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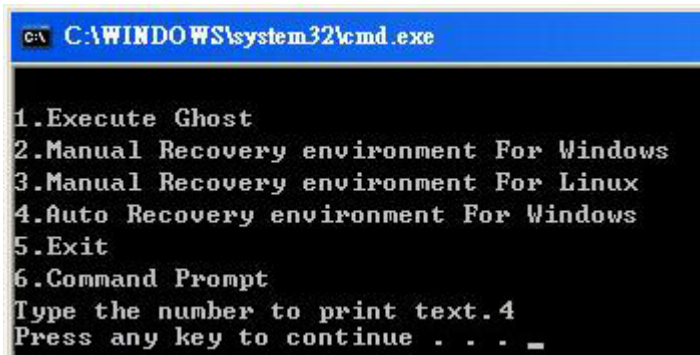
Figure B-29: Press any key to continue

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.
```
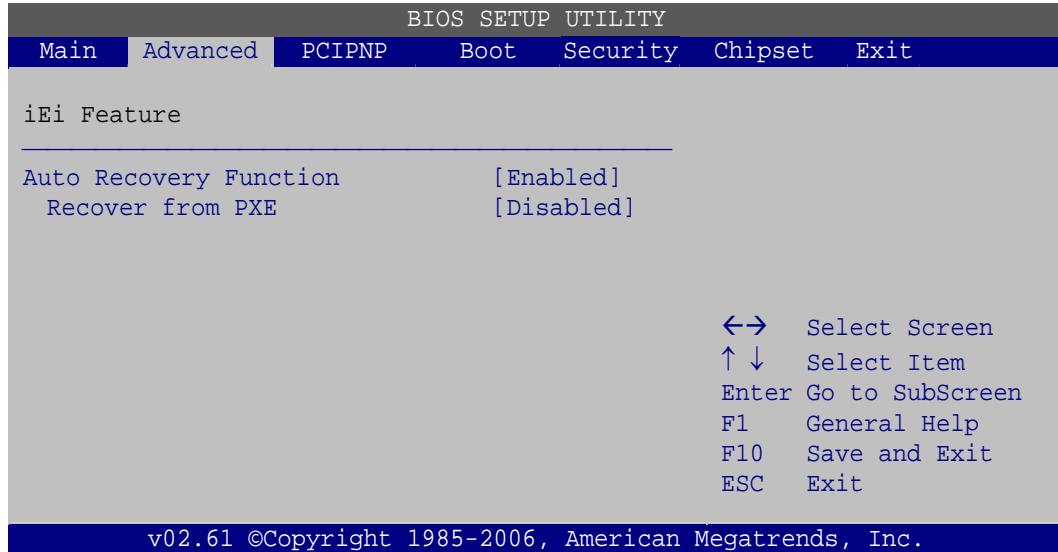
Figure B-30: IEI Feature

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 icon] **NOTE:**

Please reserve enough space for partition 3 for saving recovery images.
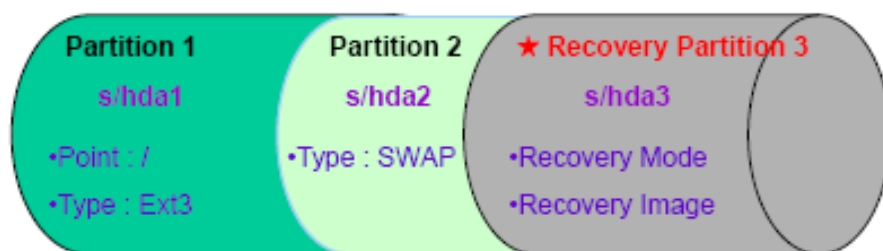
Figure B-31: Partitions for Linux
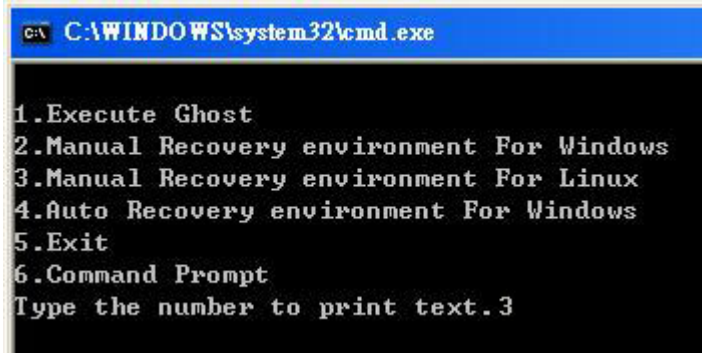
Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section B.2.2**. Then type the following commands (marked in red) to create a partition for recovery images.

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.
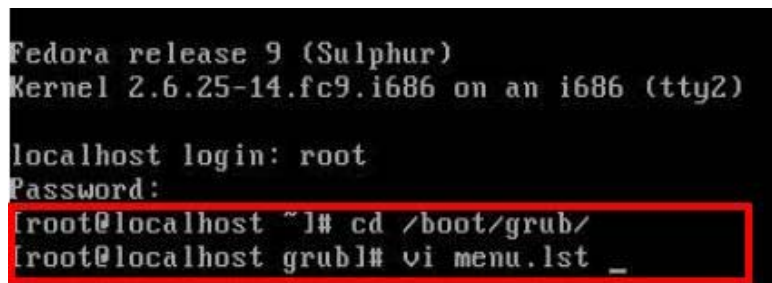
Figure B-32: Manual Recovery Environment for Linux

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.
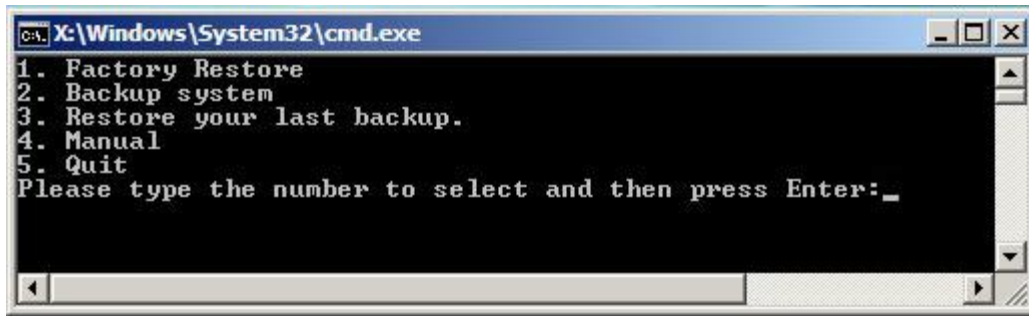
Figure B-35: Recovery Tool Main Menu

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 icon] **WARNING:**

Please do not turn off the system power during the process of system recovery or backup.

![Warning icon] **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.
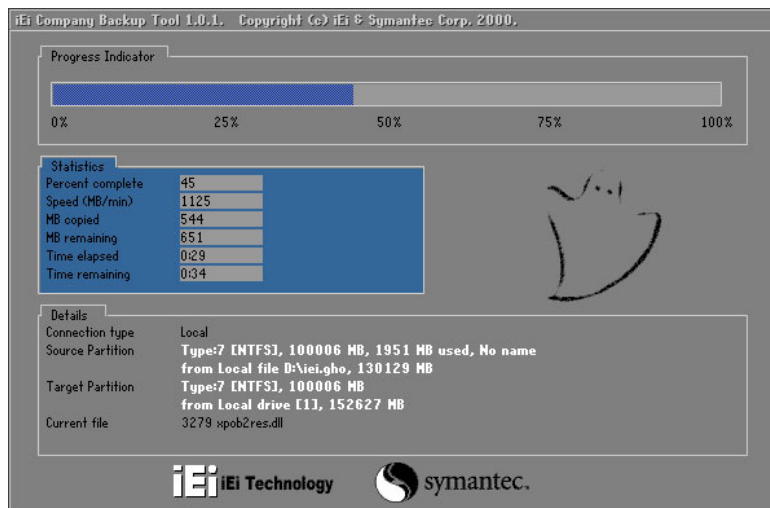
Figure B-36: Restore Factory Default

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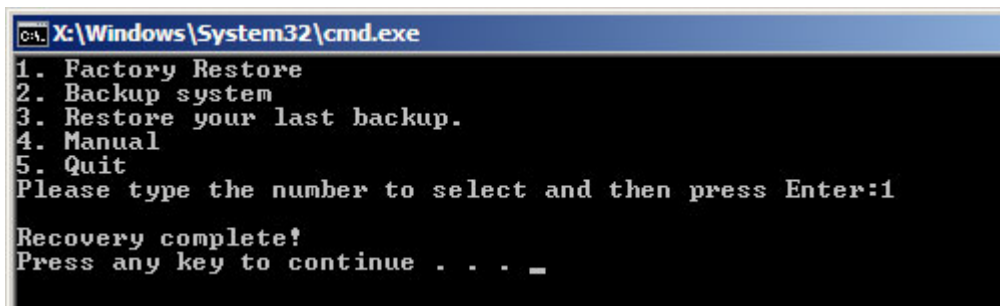
Figure B-37: Recovery Complete Window

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.
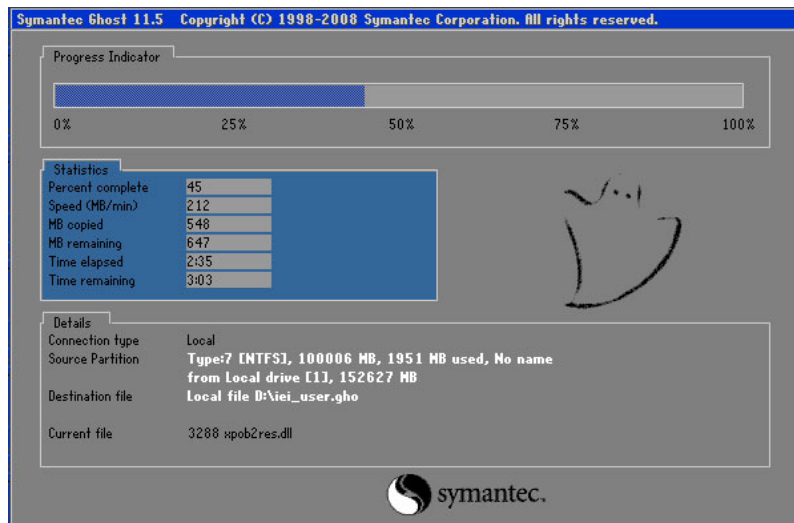
Figure B-38: Backup System

Step 3: The screen shown in **Figure B-39** appears when system backup is complete. Press any key to reboot the system.
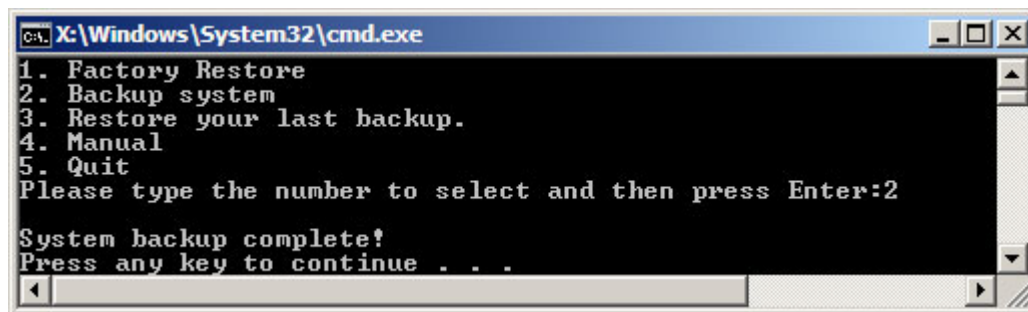
Figure B-39: System Backup Complete Window

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).
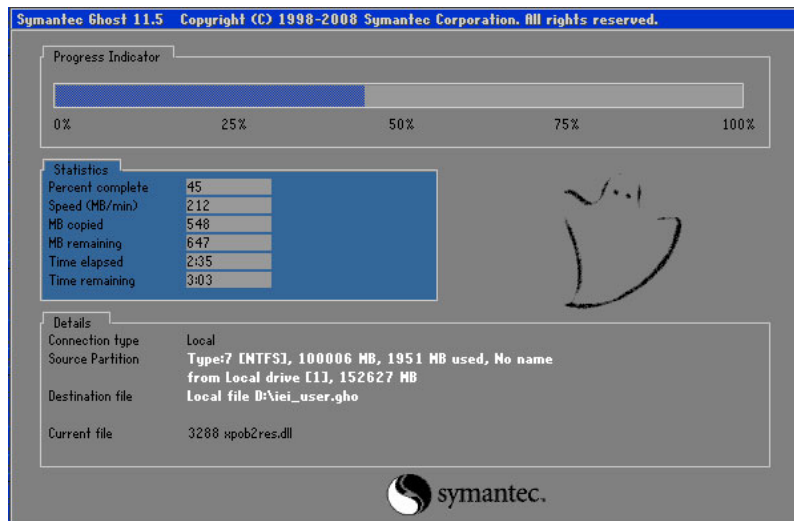
Figure B-40: Restore Backup

Step 3: The screen shown in **Figure B-41** appears when backup recovery is complete.

Press any key to reboot the system.
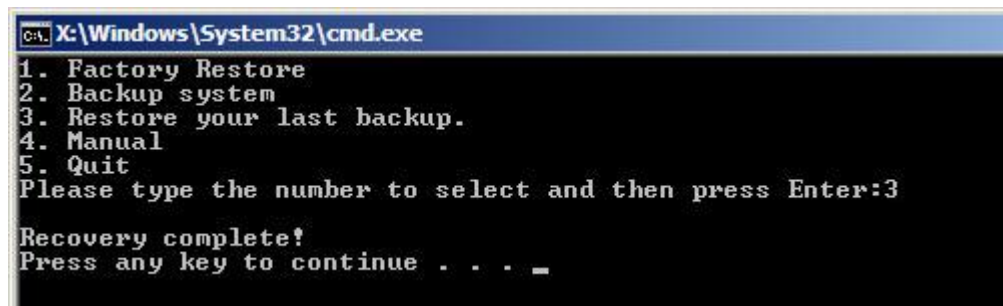
Figure B-41: Restore System Backup Complete Window

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.
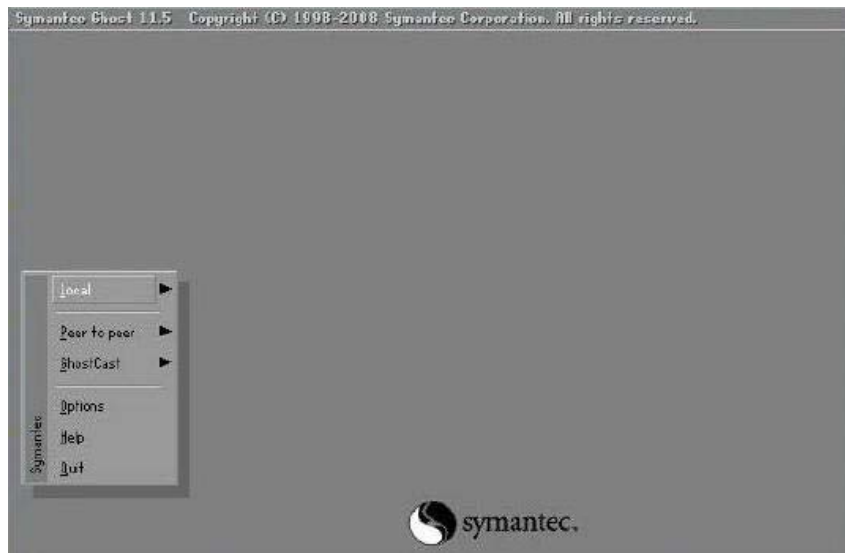
Figure B-42: Symantec Ghost Window

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.
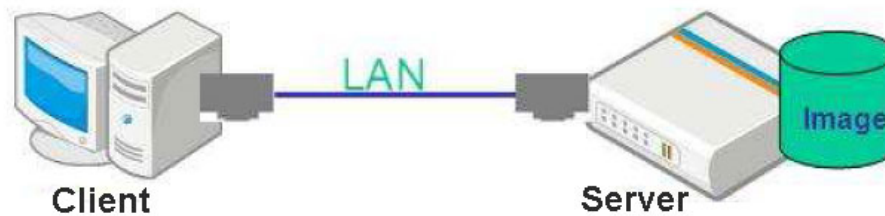
⚠ **CAUTION:**

The supported client OS includes:

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

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

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

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

B.6.1 Configure DHCP Server Settings

Step 1: Install the DHCP

#yum install dhcp (CentOS, commands marked in red)

#apt-get install dhcp3-server (Debian, commands marked in blue)

Step 2: Confirm the operating system default settings: dhcpd.conf.

<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:

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

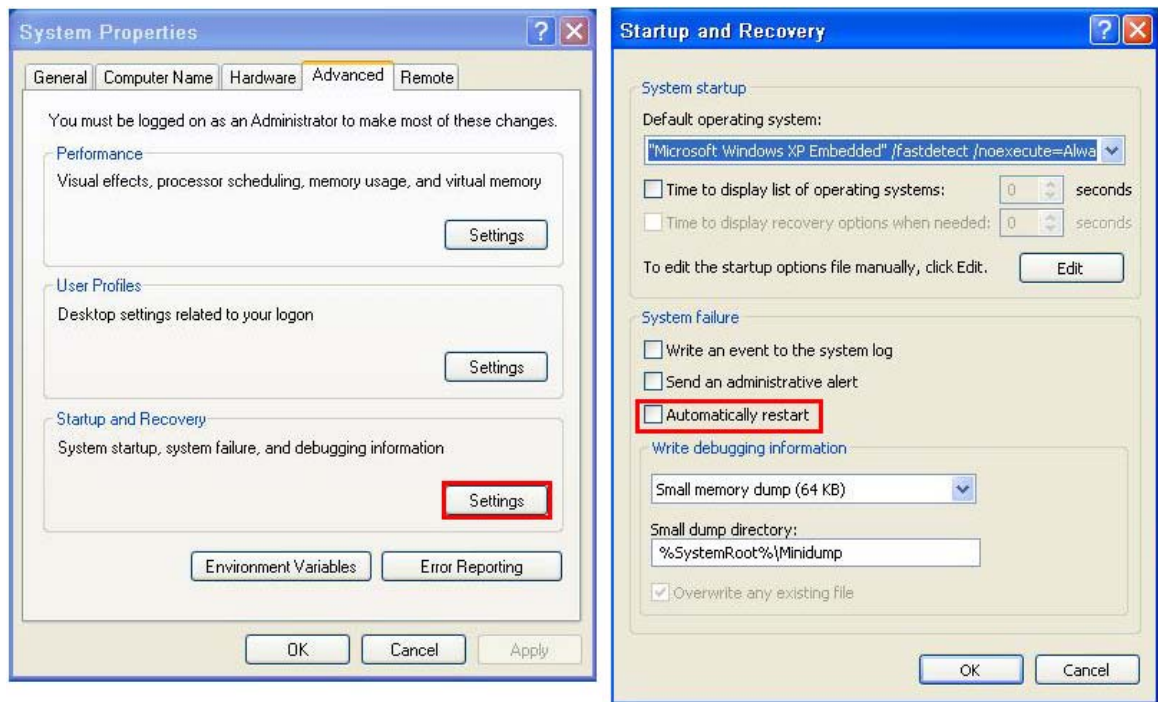   OK to save the settings and exit. (See Figure B-23)

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.
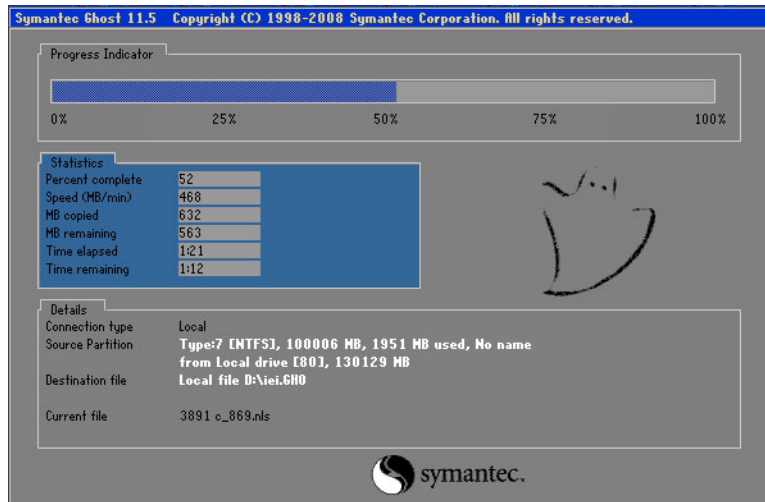

Step 6: Restart the client system from LAN. If the system encounters a Blue Screen of

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.

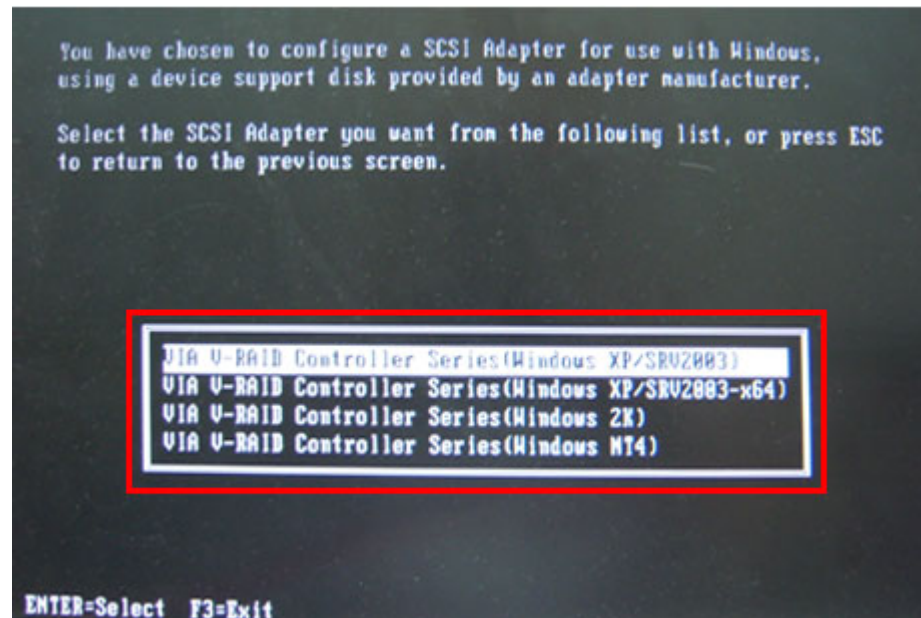**Step 4:** When launching the recovery tool, press **<F6>**.
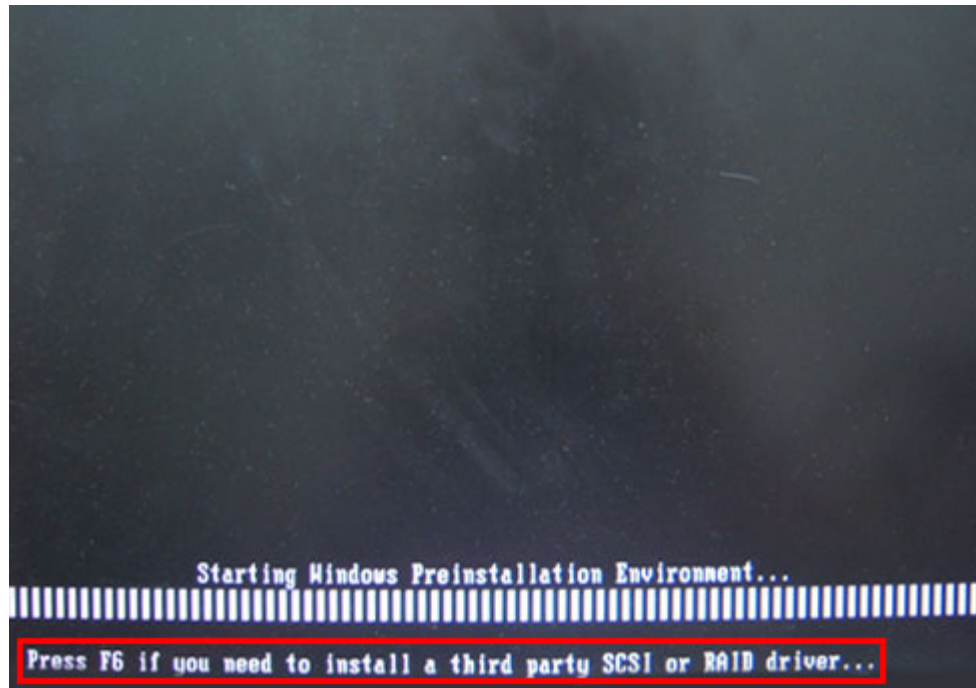
Step 5: When the following window appears, press **<S>** to select "Specify Additional

Device".
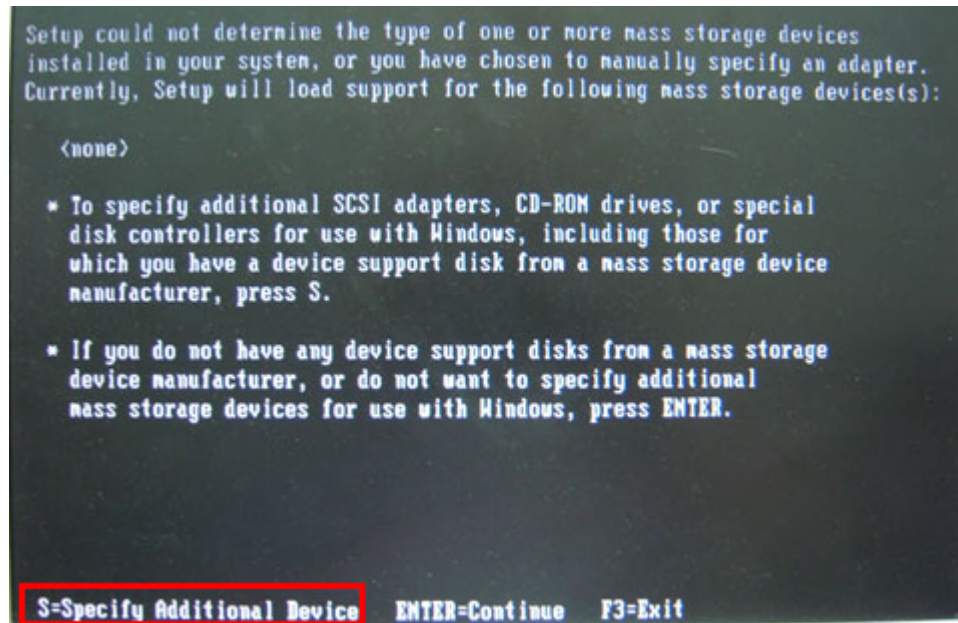
Step 6:   In the following window, select a SATA controller mode used in the system. Then

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.

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-QM871 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 icon] **NOTE:**

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

D.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP27	General purpose I/O port 2 bit 7.
4	Output 2	GP26	General purpose I/O port 2 bit 6.
5	Output 1	GP25	General purpose I/O port 2 bit 5.
6	Output 0	GP24	General purpose I/O port 2 bit 4.
7	Input 3	GP23	General purpose I/O port 2 bit 3.
8	Input 2	GP22	General purpose I/O port 2 bit 2
9	Input 1	GP21	General purpose I/O port 2 bit 1
10	Input 0	GP20	General purpose I/O port 2 bit 0

Table D-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

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

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

D.3.2 Enable the DIO Output Function

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

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

Appendix

E

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	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O
O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006						

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						