IEi

IEI Integration Corp.

MODEL:

WAFER-ULT-i1

3.5" SBC with Intel® 4th Generation Mobile Core™ i7/i5/i3 or Celeron® ULT SoC, Dual PCIe GbE, VGA, LVDS, iDP, USB 3.0, SATA 6Gb/s, PCIe Mini, iRIS-1010, HD Audio and RoHS

User Manual

Rev. 1.00 – 23 April, 2014

RoHS Lead Free

Revision

Date	Version	Changes
23 April, 2014	1.00	Initial release

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Introduction

1.1 Introduction
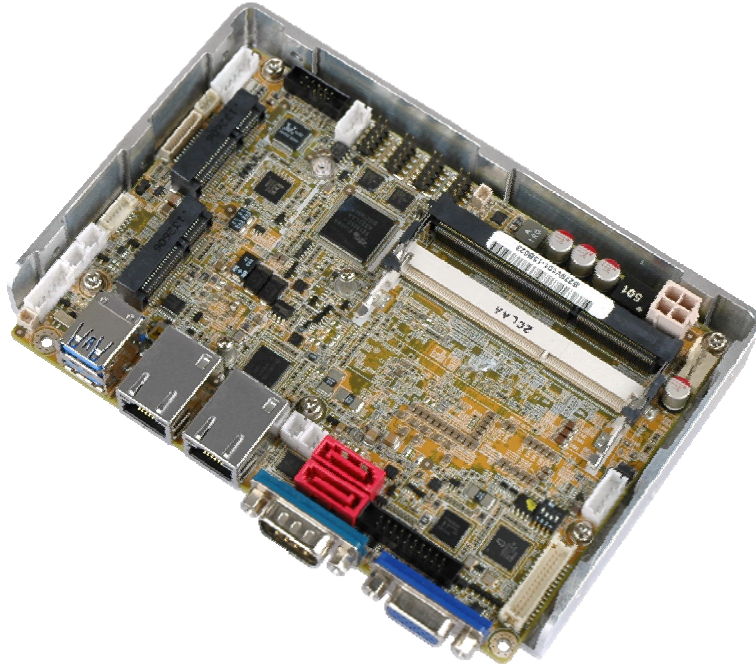
Figure 1-1: WAFER-ULT-i1

The WAFER-ULT-i1 3.5" SBC is an Intel® 4th generation mobile ULT SoC platform that supports two 1600/1333 MHz dual-channel DDR3L SO-DIMMs up to 16 GB. The WAFER-ULT-i1 provides two GbE interfaces through the Intel® I218 (with Intel® AMT 9.0 support) and the Intel® I210 GbE controllers. In addition, the WAFER-ULT-i1 includes VGA, LVDS and iDP interfaces for triple independent display. Two USB 3.0 on the rear panel, two USB 2.0 by pin header, two SATA 6Gb/s, three RS-232, one RS-422/485, one PCIe Mini card slot and one audio connector provide flexible expansion options.

1.2 Benefits

Some of the WAFER-ULT-i1 motherboard benefits include:

- Wide range temperature support
- Triple independent display support
- Heat sink enclosure design

1.3 Model Variations

The model variations of the WAFER-ULT-i1 are listed below.

Model No.	SoC
WAFER-ULT-i1-i7-R10	Intel® Core™ i7-4650U on-board SoC (1.7 GHz, dual-core, 4 MB cache, TDP=15W)
WAFER-ULT-i1-i5-R10	Intel® Core™ i5-4300U on-board SoC (1.9 GHz, dual-core, 3 MB cache, TDP=15W)
WAFER-ULT-i1-i3-R10	Intel® Core™ i3-4010U on-board SoC (1.7 GHz, dual-core, 3 MB cache, TDP=15W)
WAFER-ULT-i1-C-R10	Intel® Celeron® 2980U on-board SoC (1.6 GHz, dual-core, 2 MB cache, TDP=15W)

Table 1-1: WAFER-ULT-i1 Model Variations

1.4 Features

Some of the WAFER-ULT-i1 motherboard features are listed below:

- 3.5" form factor
- Intel® 4th generation mobile ULT SoC
- Two 204-pin 1600/1333 MHz dual-channel DDR3L SO-DIMMs support up to 16 GB
- Triple independent display by VGA, LVDS and iDP interfaces
- 18/24-bit dual-channel LVDS for high resolution panel
- Supports IPMI 2.0 via the optional iRIS-1010 module
- Two Intel® PCIe GbE connectors (LAN1 with Intel® AMT 9.0 support)
- One PCIe Mini card slot with mSATA support
- High Definition Audio
- RoHS compliant

1.5 Connectors

The connectors on the WAFER-ULT-i1 are shown in the figures below.
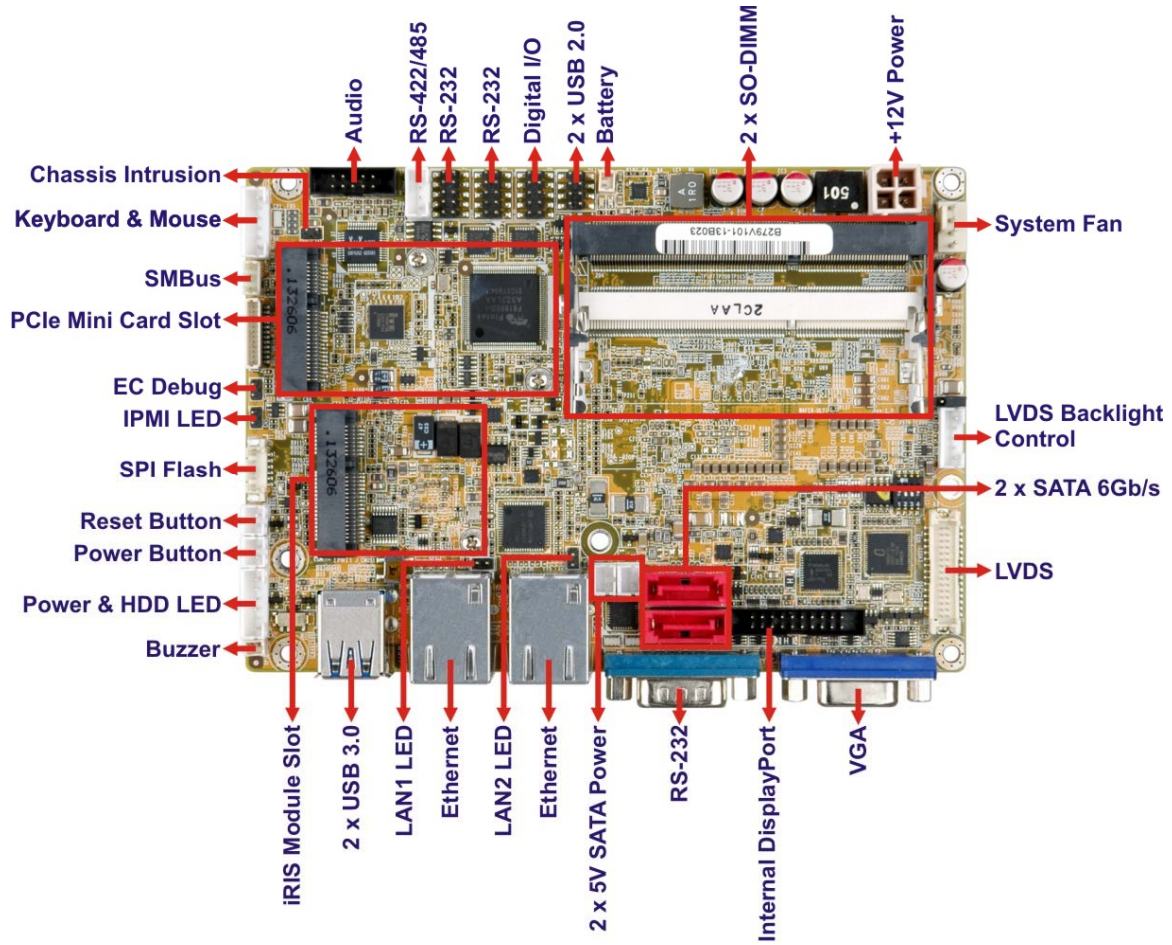
Figure 1-2: Connectors

1.6 Dimensions

The main dimensions of the WAFER-ULT-i1 are shown in the diagram below.
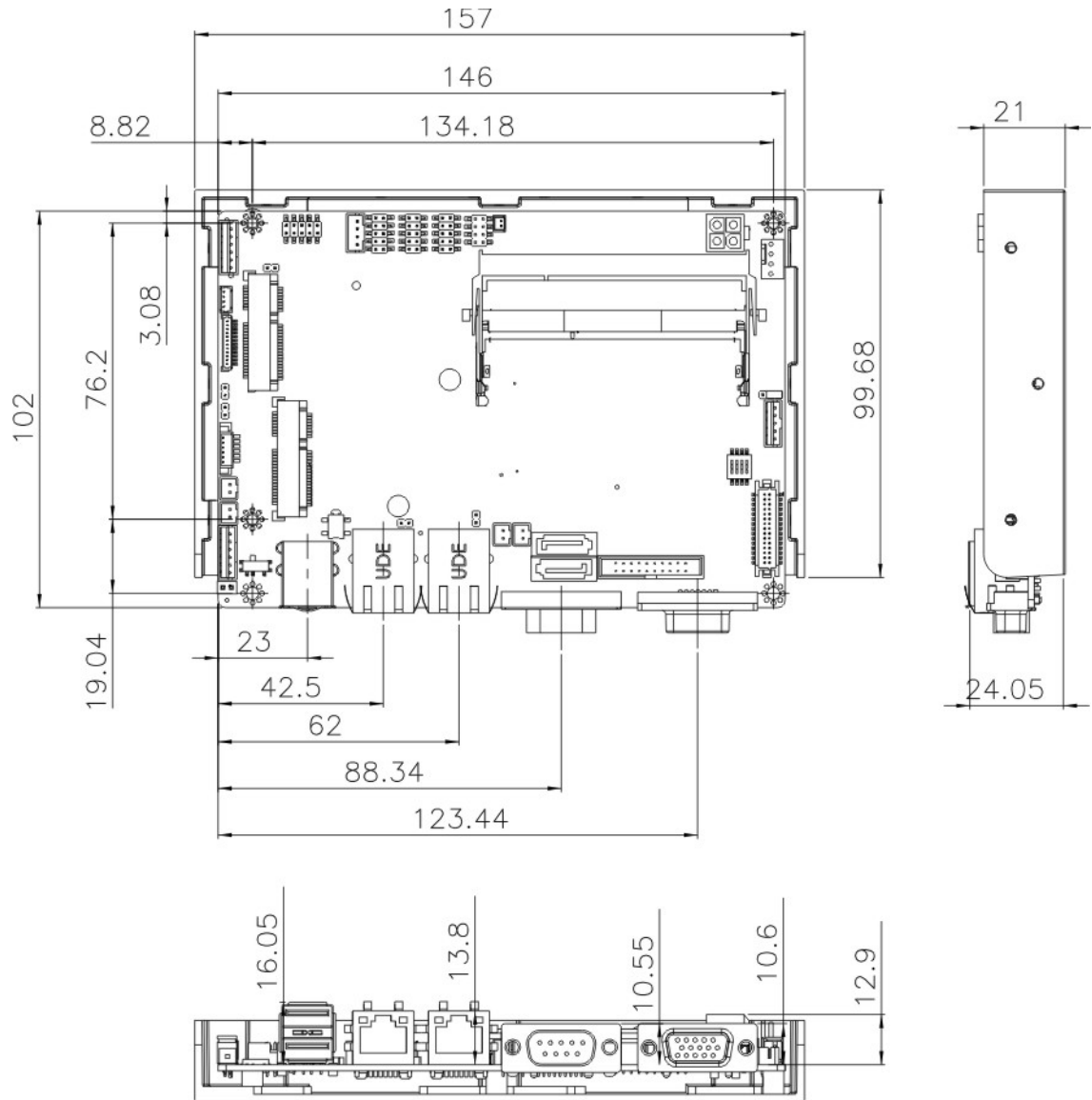
Figure 1-3: WAFER-ULT-i1 Dimensions (mm)

1.7 Data Flow

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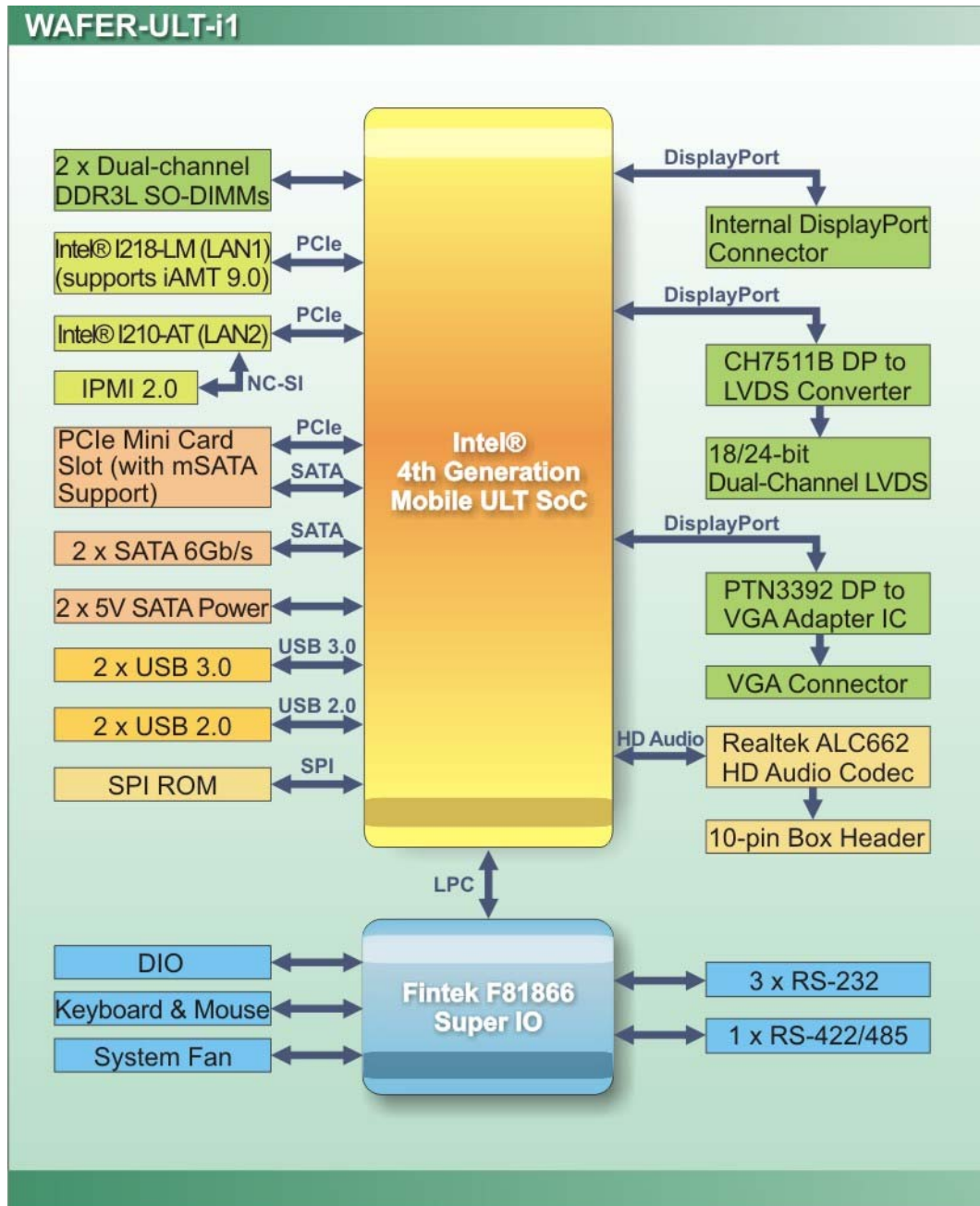
Figure 1-4: Data Flow Diagram

1.8 Technical Specifications

The WAFER-ULT-i1 technical specifications are listed in **Table 1-2**.

Specifications/Model	WAFER-ULT-i1
Form Factor	3.5"
SoC	Intel® Core™ i7-4650U on-board SoC (1.7 GHz, dual-core, 4 MB cache, TDP=15W) Intel® Core™ i5-4300U on-board SoC (1.9 GHz, dual-core, 3 MB cache, TDP=15W) Intel® Core™ i3-4010U on-board SoC (1.7 GHz, dual-core, 3 MB cache, TDP=15W) Intel® Celeron® 2980U on-board SoC (1.6 GHz, dual-core, 2 MB cache, TDP=15W)
Memory	Two 204-pin 1600/1333 MHz dual-channel unbuffered DDR3L SDRAM SO-DIMMs supported (up to 16 GB)
Graphics Engine	Intel® HD Graphics Gen 7.5 supports DirectX 11.1, OpenCL 1.2 and OpenGL 4.2 Full MPEG2, VC1, AVC decode
Display Output	Triple independent display support One VGA (up to 1920 x 1200, 60 Hz) One 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920 x 1200, 60 Hz) One iDP interface for HDMI, LVDS, VGA, DVI and DisplayPort (up to 3840 x 2160, 60 Hz)
BIOS	UEFI BIOS
Ethernet Controllers	**LAN1**: Intel® I218-LM PCIe GbE controller with Intel® AMT 9.0 support **LAN2**: Intel® I210-AT PCIe GbE controller with NC-SI support
Audio	Realtek ALC662 HD Audio codec One audio connector (10-pin box header)
Super I/O Controller	Fintek F81866

Specifications/Model	WAFER-ULT-i1
Watchdog Timer	Software programmable, supports 1~255 sec. system reset
Expansion	One full-size/half-size PCIe Mini card slot with mSATA support
IPMI 2.0	One iRIS module slot
IPMI LED	One 2-pin header for IPMI LED
Chassis Intrusion	One 2-pin header
Digital I/O	8-bit, 4-bit input/4-bit output
Fan Connector	One system fan connector (4-pin wafer)
Front Panel	One power & HDD LED connector (6-pin wafer) One power button connector (2-pin wafer) One reset button connector (2-pin wafer)
Keyboard and Mouse	One 6-pin wafer connector for PS/2 keyboard and mouse
LAN LEDs	Two 2-pin headers for LAN1 LED and LAN2 LED (link signal)
Serial ATA	Two SATA 6Gb/s connectors with RAID support Two 5V SATA power connectors
Serial Ports	One external RS-232 serial port Two RS-232 serial ports via internal pin headers One RS-422/485 via internal 4-pin wafer connector
SMBus	One 4-pin wafer connector
USB	Two USB 3.0 ports on rear panel Two USB 2.0 ports by pin header
Power Supply	12V only DC input AT/ATX power mode support One Internal 4-pin (2x2) power connector
Power Consumption	+12V@2.72A (Intel® Core™ i5-4300U on-board SoC with two 8 GB 1600 MHz DDR3L SO-DIMMs)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 85ºC

Specifications/Model	WAFER-ULT-i1
Operating Humidity	5% ~ 95% (non-condensing)
Dimensions	146 mm x 102 mm
Weight (GW/NW)	600 g/250 g

Table 1-2: 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 WAFER-ULT-i1 is unpacked, please do the following:

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

2.3 Packing List

  NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the WAFER-ULT-i1 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The WAFER-ULT-i1 is shipped with the following components:

Quantity	Item and Part Number	Image
1	WAFER-ULT-i1 SBC with heat sink enclosure	
2	SATA signal and power cable (**P/N:** 32801-000201-100-RS)	
1	Audio cable (**P/N**: 32000-072100-RS)	
1	Dual-port USB 2.0 cable (**P/N:** 32000-070301-RS)	
1	Power cable (**P/N**: 32100-087100-RS)	
1	Utility CD	

Quantity	Item and Part Number	Image
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
iRIS-1010 module, IPMI 2.0 adapter card with AST1010 BMC chip for PCIe Mini socket interface (**P/N**: iRIS-1010-R10)	
RS-232 cable (**P/N:** 19800-000300-200-RS)	
RS-422/485 cable (200 mm) (**P/N**: 32205-003800-300-RS)	
PS/2 keyboard and mouse Y cable (**P/N**: 32000-023800-RS)	
DisplayPort to 24-bit dual-channel LVDS converter board for IEI iDP connector (**P/N**: DP-LVDS-R10)	

Item and Part Number	Image
DisplayPort to HDMI converter board for IEI iDP connector (**P/N**: DP-HDMI-R10)	
DisplayPort to VGA converter board for IEI iDP connector (**P/N**: DP-VGA-R10)	
DisplayPort to DVI-D converter board for IEI iDP connector (**P/N**: DP-DVI-R10)	
DisplayPort to DisplayPort converter board for IEI iDP connector (**P/N**: DP-DP-R10)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the peripheral interface connectors.

3.1.1 Layout

The figures below show all the peripheral interface connectors.
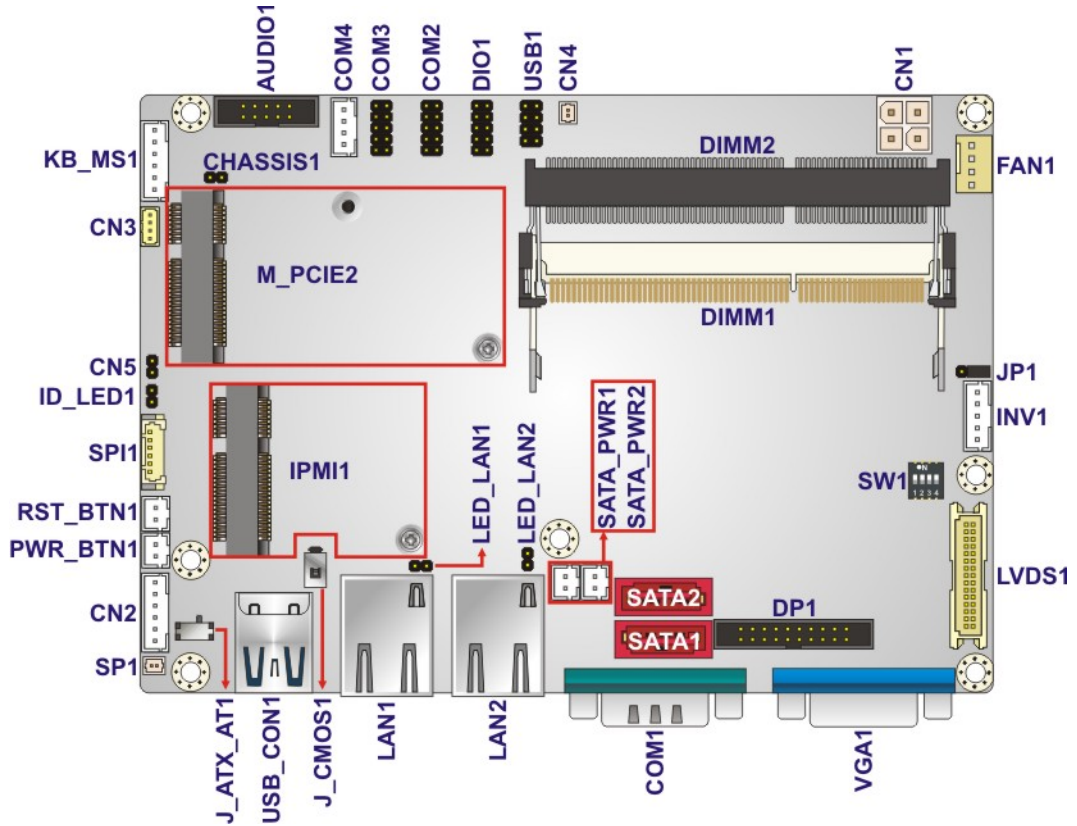
Figure 3-1: Peripheral Interface Connectors

3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the WAFER-ULT-i1. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+12V power connector	4-pin Molex power connector	CN1
5 V SATA power connectors	2-pin wafer	SATA_PWR1, SATA_PWR2
Audio connector	10-pin box header	AUDIO1
Battery connector	2-pin wafer	CN4
Buzzer connector	2-pin wafer	SP1
Chassis intrusion connector	2-pin header	CHASSIS1
Digital I/O connector	10-pin header	DIO1
EC debug connector	2-pin header	CN5
Internal DisplayPort connector	20-pin box header	DP1
IPMI LED connector	2-pin header	ID_LED1
iRIS module slot	iRIS module slot	IPMI1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN1 LED connector	2-pin header	LED_LAN1
LAN2 LED connector	2-pin header	LED_LAN2
LVDS backlight control connector	5-pin wafer	INV1
LVDS connector	30-pin crimp	LVDS1
PCIe Mini card slot	PCIe Mini card slot	M_PCIE2
Power and HDD LED connector	6-pin wafer	CN2
Power button connector	2-pin wafer	PWR_BTN1
Reset button connector	2-pin wafer	RST_BTN1
SATA 6Gb/s connectors	7-pin SATA connector	SATA1, SATA2

Connector	Type	Label
Serial port, RS-232	10-pin header	COM2, COM3
Serial port, RS-422/485	4-pin wafer	COM4
SMBus connector	4-pin wafer	CN3
SO-DIMM connectors	204-pin DDR3L SO-DIMM connector	DIMM1, DIMM2
SPI flash connector	6-pin wafer	SPI1
System fan connector	4-pin wafer	FAN1
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 WAFER-ULT-i1. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
Ethernet connectors	RJ-45	LAN1, LAN2
USB 3.0 ports	Dual USB 3.0 port	USB_CON1
RS-232 serial port	Male DB-9	COM1
VGA connector	15-pin female	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 WAFER-ULT-i1.

3.2.1 +12V Power Connector

CN Label: CN1

CN Type: 4-pin Molex power connector

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

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

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.
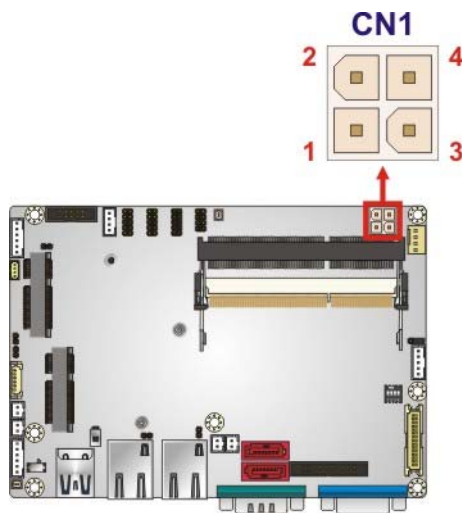
Figure 3-2: Power Connector Location

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

Table 3-3: Power Connector Pinouts

3.2.2 5 V SATA Power Connectors

CN Label: SATA_PWR1, SATA_PWR2

CN Type: 2-pin wafer

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

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

Use the 5 V SATA power connectors to connect to SATA device power connections.
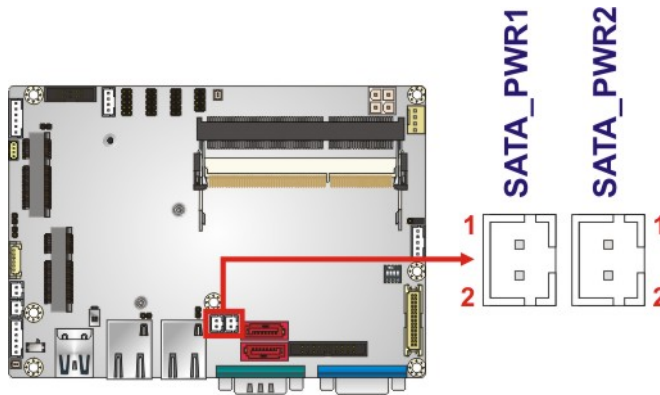
Figure 3-3: 5 V SATA Power Connector Locations

Pin	Description
1	+5V
2	GND

Table 3-4: 5 V SATA Power Connector Pinouts

3.2.3 Audio Connector

CN Label: **AUDIO1**

CN Type: 10-pin box header

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

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

This connector connects to speakers, a microphone and an audio input.
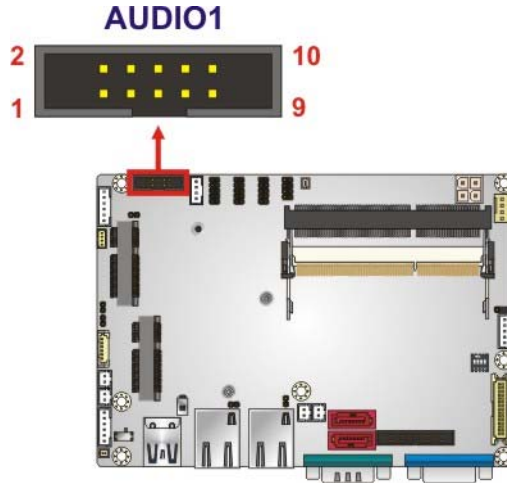
Figure 3-4: Audio Connector Location

Pin	Description	Pin	Description
1	LINEOUT1R	2	LINE1_R
3	AUD_GND	4	AUD_GND
5	LINEOUT1L	6	LINE1_L
7	AUD_GND	8	AUD_GND
9	FMIC1_R	10	FMIC1_L

Table 3-5: Audio Connector Pinouts

3.2.4 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: CN4

CN Type: 2-pin wafer

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

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

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.
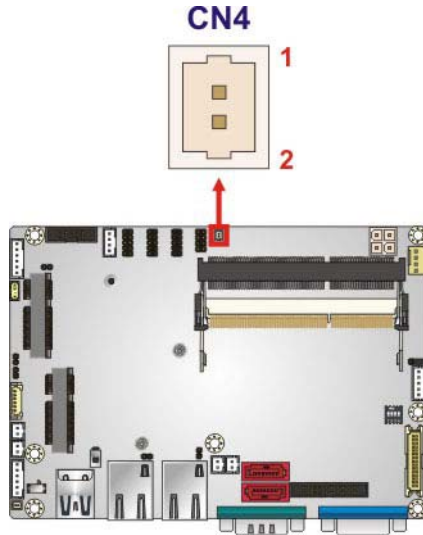
Figure 3-5: Battery Connector Location

Pin	Description
1	VBATT
2	GND

Table 3-6: Battery Connector Pinouts

3.2.5 Buzzer Connector

CN Label: **SP1**

CN Type: 2-pin wafer

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

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

This is connected to the buzzer cable.
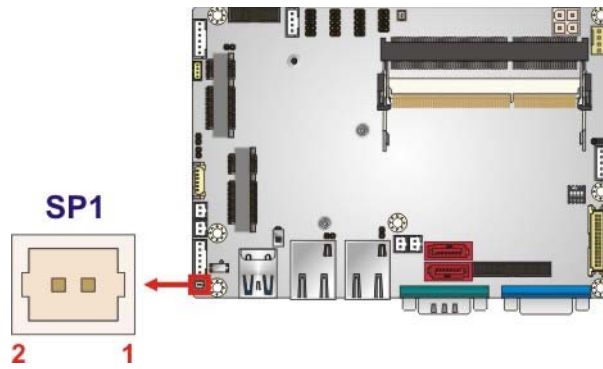
Figure 3-6: Buzzer Connector Location

Pin	Description
1	+V5S
2	GND

Table 3-7: Buzzer Connector Pinouts

3.2.6 Chassis Intrusion Connector

CN Label: **CHASSIS1**

CN Type: 2-pin header

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

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

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.
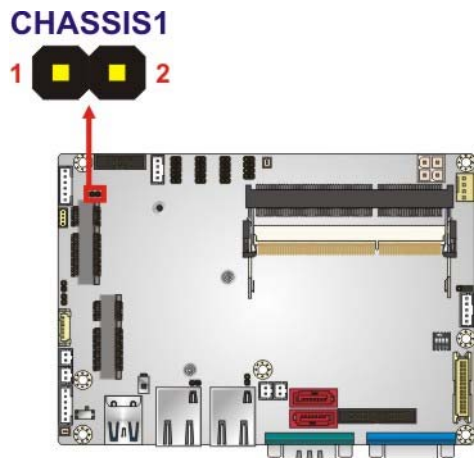
Figure 3-7: Chassis Intrusion Connector Location

Pin	Description
1	+3.3VSB
2	CHASSIS OPEN

Table 3-8: Chassis Intrusion Connector Pinouts

3.2.7 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

CN Pinouts: See **Table 3-9**

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.
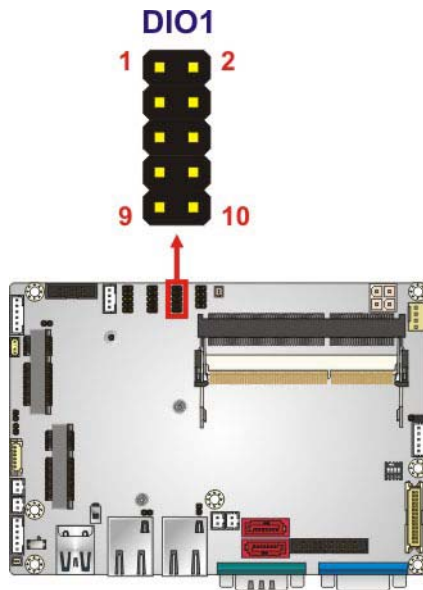
Figure 3-8: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0

Pin	Description	Pin	Description
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-9: Digital I/O Connector Pinouts

3.2.8 EC Debug Connector

CN Label: **CN5**

CN Type: 2-pin header

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

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

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.
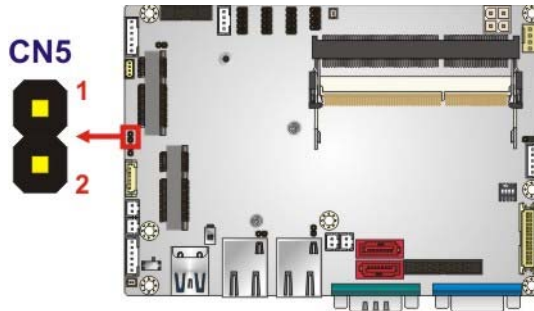
Figure 3-9: EC Debug Connector Location

Pin	Description
1	EC_SMBCLK
2	EC_SMBDAT

Table 3-10: EC Debug Connector Pinouts

3.2.9 Internal DisplayPort Connector

CN Label: **DP1**

CN Type: 20-pin box header

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

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

The DisplayPort connector supports HDMI, LVDS, VGA, DVI and DisplayPort graphics interfaces with up to 3840x2160 resolution.
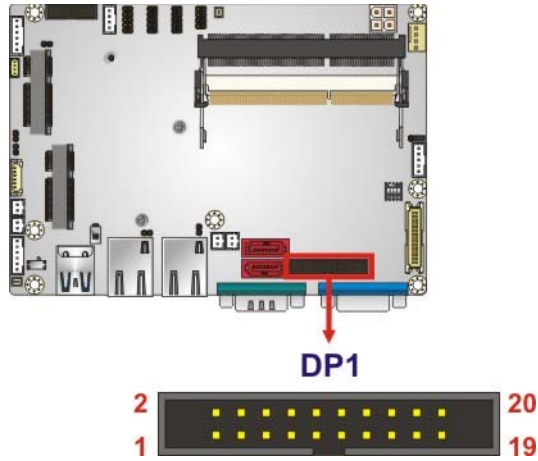
Figure 3-10: Internal DisplayPort Connector Location

Pin	Description	Pin	Description
1	+5V	11	AUXP
2	LANE1N	12	AUXN
3	LANE1P	13	GND
4	GND	14	LANE2P
5	LANE3N	15	LANE2N
6	LANE3P	16	GND
7	GND	17	LANE0P
8	AUX_CTRL_DET_D	18	LANE0N
9	GND	19	+3.3V
10	HPD	20	N/C

Table 3-11: Internal DisplayPort Connector Pinouts

3.2.10 IPMI LED Connector

CN Label: ID_LED1

CN Type: 2-pin wafer

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

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

The IPMI LED connector is used to connect to the IPMI LED indicator on the chassis.
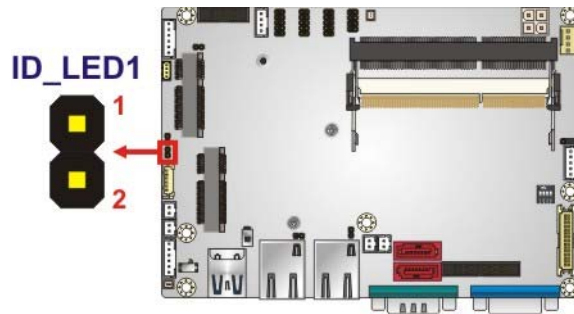
Figure 3-11: IPMI LED Connector Location

Pin	Description
1	ID_LED+
2	ID_LED-

Table 3-12: IPMI LED Connector Pinouts

3.2.11 iRIS Module Slot

CN Label: **IPMI1**

CN Type: iRIS module slot

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

The iRIS module slot allows installation of the iRIS-1010 module.
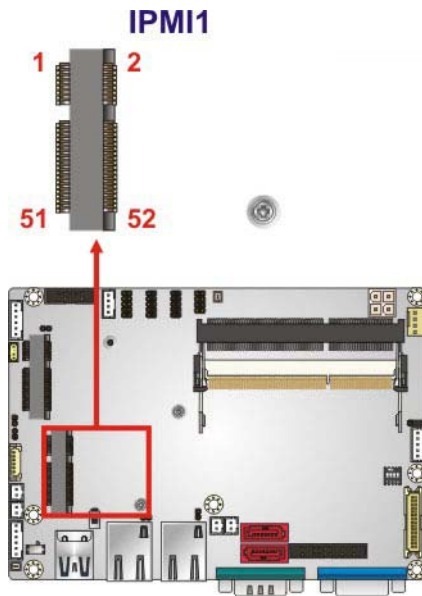
Figure 3-12: iRIS Module Slot Location

![WARNING icon] **WARNING:**

> The iRIS module slot is designed to install the iRIS-1010 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the WAFER-ULT-i1.

3.2.12 Keyboard and Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-13**
CN Pinouts:	See **Table 3-13**

The keyboard and mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.
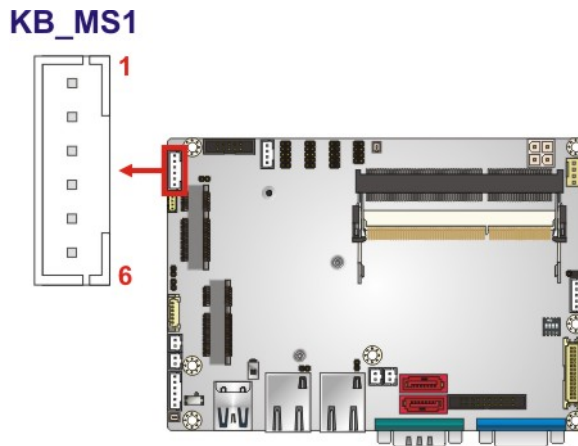
Figure 3-13: Keyboard and Mouse Connector Location

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

Table 3-13: Keyboard and Mouse Connector Pinouts

3.2.13 LAN LED Connectors

CN Label: **LED_LAN1, LED_LAN2**

CN Type: 2-pin header

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

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

The LAN LED connectors are used to connect to the LAN LED indicators on the chassis to indicate users the link activities of the two LAN ports.
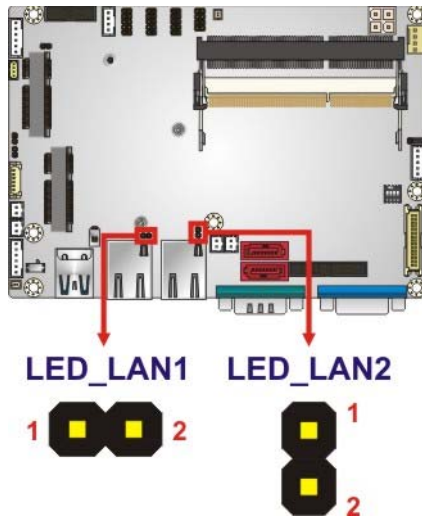
Figure 3-14: LAN LED Connector Locations

Pin	Description
1	+3.3V
2	LAN_LED_LINK#_ACT

Table 3-14: LAN LED Connector Pinouts

3.2.14 LVDS Backlight Control Connector

CN Label: INV1

CN Type: 5-pin wafer

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

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

The backlight control connector provides the backlight on the LCD display connected to the WAFER-ULT-i1 with +12V of power.
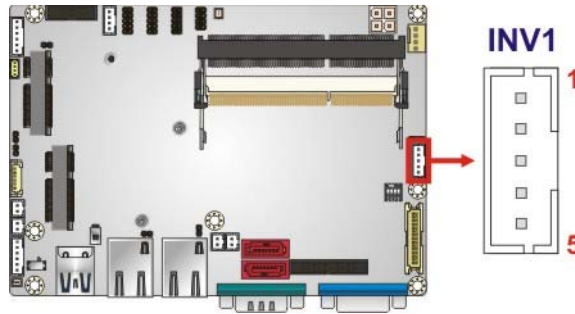
Figure 3-15: LVDS Backlight Control Connector Location

Pin	Description
1	LCD_BKLTCTL
2	GROUND
3	+12V
4	GROUND
5	BACKLIGHT ENABLE

Table 3-15: LVDS Backlight Control Connector Pinouts

3.2.15 LVDS Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp

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

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

The 30-pin LVDS LCD connector can be connected to an 18/24-bit dual-channel LVDS panel.
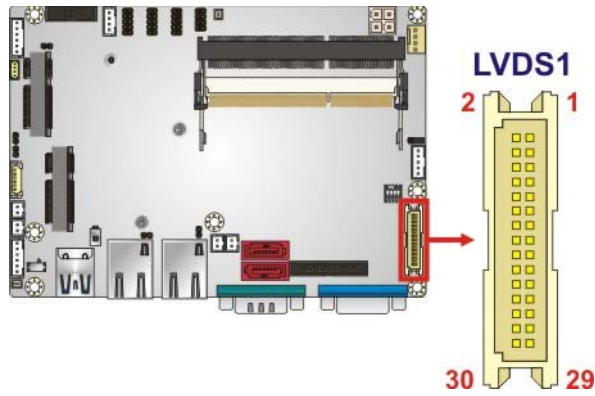
Figure 3-16: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	LVDS_DATA0	4	LVDS_DATA0#
5	LVDS_DATA1	6	LVDS_DATA1#
7	LVDS_DATA2	8	LVDS_DATA2#
9	LVDS_CLK1	10	LVDS_CLK1#
11	LVDS_DATA3	12	LVDS_DATA3#
13	GND	14	GND
15	LVDS_DATA4	16	LVDS_DATA4#
17	LVDS_DATA5	18	LVDS_DATA5#
19	LVDS_DATA6	20	LVDS_DATA6#
21	LVDS_CLK2	22	LVDS_CLK2#
23	LVDS_DATA7	24	LVDS_DATA7#
25	GND	26	GND
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 3-16: LVDS Connector Pinouts

3.2.16 PCIe Mini Card Slot

CN Label: **M_PCIE2**

CN Type: PCIe Mini card slot

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

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

The PCIe Mini card slot enables a full-size/half-size PCIe Mini card expansion module to be connected to the board.
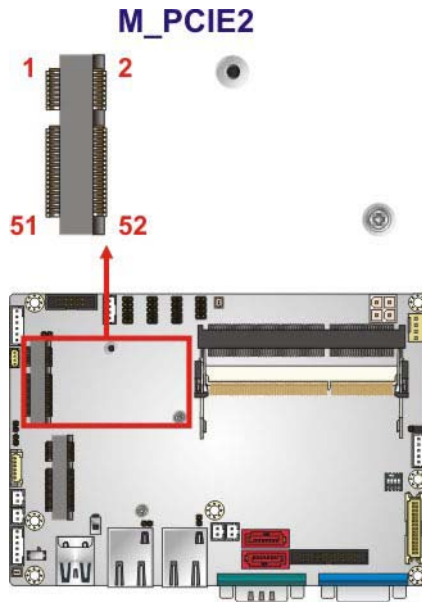
Figure 3-17: PCIe Mini Card Slot Location

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	PCIE_CLK#	12	N/C
13	PCIE_CLK	14	N/C
15	GND	16	N/C
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PCIRST#
23	PCIE_RXN	24	VCC3

Pin	Description	Pin	Description
25	PCIE_RXP	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIE_TXN	32	SMBDATA
33	PCIE_TXP	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	M-SATA Detect	52	VCC3

Table 3-17: PCIe Mini Card Slot Pinouts

3.2.17 Power and HDD LED Connector

CN Label:	**CN2**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-18**

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.
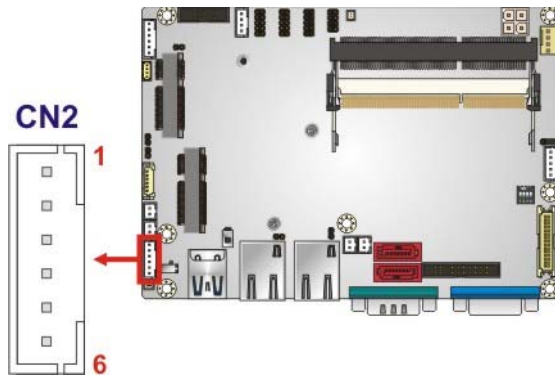
Figure 3-18: Power and HDD LED Connector Location

Function	Pin	Description
+5V	1	VCC
	2	GND
Power LED	3	PWRLED
	4	GND
HDD LED	5	VCC
	6	-HDLED

Table 3-18: Power and HDD LED Connector Pinouts

3.2.18 Power Button Connector

CN Label:	**PWR_BTN1**
CN Type:	2-pin wafer
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-19**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.
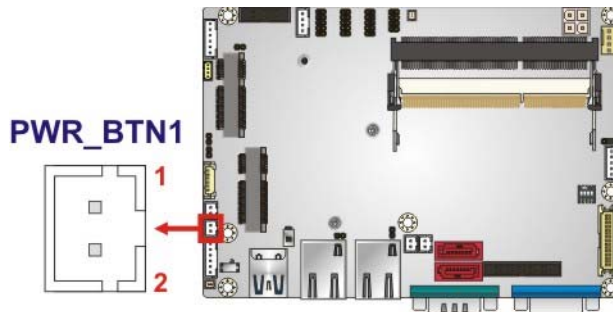
Figure 3-19: Power Button Connector Location

Pin	Description
1	PWRBTSW#
2	GND

Table 3-19: Power Button Connector Pinouts

3.2.19 Reset Button Connector

> **CN Label:** **RST_BTN1**
>
> **CN Type:** 2-pin wafer
>
> **CN Location:** See **Figure 3-20**
>
> **CN Pinouts:** See **Table 3-20**

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.
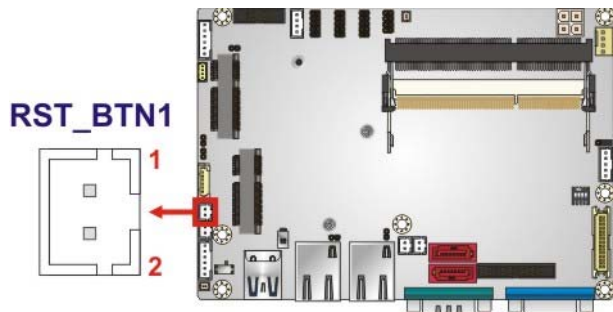
Figure 3-20: Reset Button Connector Location

Pin	Description
1	SYSRST
2	GND

Table 3-20: Reset Button Connector Pinouts

3.2.20 SATA 6Gb/s Connectors

CN Label: SATA1, SATA2

CN Type: 7-pin SATA drive connector

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

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

The SATA drive connectors can be connected to SATA drives and support up to 6Gb/s data transfer rate.
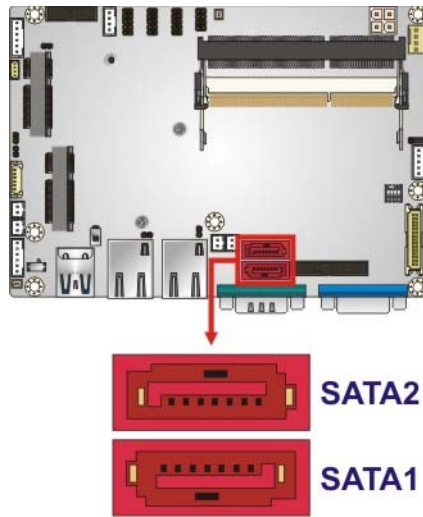
Figure 3-21: SATA 6Gb/s Connector Locations

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

Pin	Description
6	RX+
7	GND

Table 3-21: SATA 6Gb/s Drive Connector Pinouts

3.2.21 Serial Port Connector, RS-232

CN Label:	**COM2, COM3**
CN Type:	10-pin header
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Table 3-22**

The 10-pin serial port connector provides one RS-232 serial communications channel. The COM serial port connector can be connected to an external RS-232 serial port device.
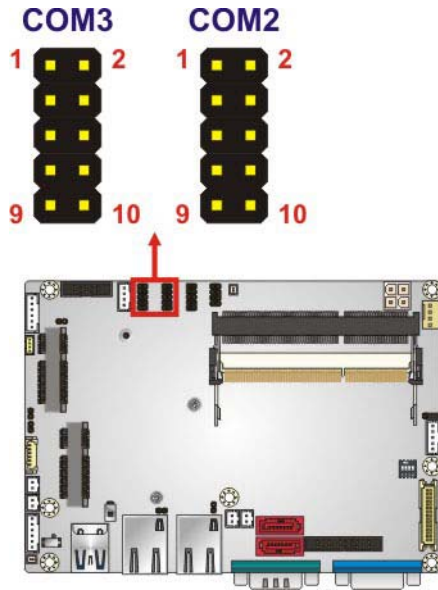
Figure 3-22: RS-232 Serial Port Connector Locations

Pin	Description	Pin	Description
1	DATA CARRIER DETECT (DCD)	2	DATA SET READY (DSR)
3	RECEIVE DATA (RXD)	4	REQUEST TO SEND (RTS)
5	TRANSMIT DATA (TXD)	6	CLEAR TO SEND (CTS)

Pin	Description	Pin	Description
7	DATA TERMINAL READY (DTR)	8	RING INDICATOR (RI)
9	GND	10	GND

Table 3-22: RS-232 Serial Port Connector Pinouts

3.2.22 Serial Port Connector, RS-422/485

CN Label:	**COM4**
CN Type:	4-pin wafer
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-23**

This connector provides RS-422 or RS-485 communications.
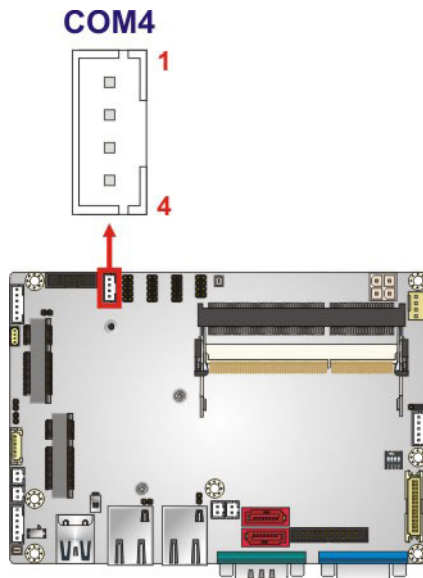
Figure 3-23: RS-422/485 Serial Port Connector Location

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

Table 3-23: 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 3-24: DB-9 RS-422/485 Pinouts

3.2.23 SMBus Connector

CN Label:	**CN3**
CN Type:	4-pin wafer
CN Location:	See **Figure 3-24**
CN Pinouts:	See **Table 3-25**

The SMBus (System Management Bus) connector provides low-speed system management communications.
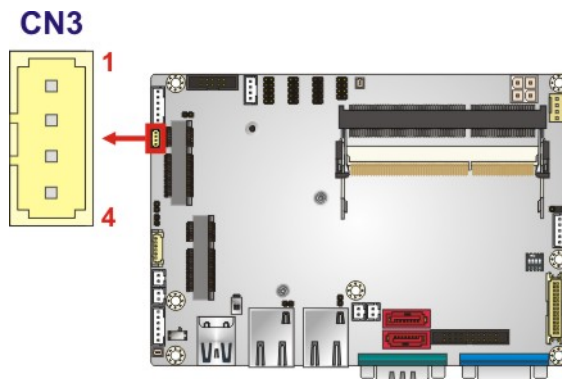
Figure 3-24: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA

Pin	Description
3	SMB_CLK
4	+5V

Table 3-25: SMBus Connector Pinouts

3.2.24 SO-DIMM Connectors

CN Label: **DIMM1, DIMM2**

CN Type: 204-pin DDR3L SO-DIMM connector

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

The SO-DIMM connectors are for installing the SO-DIMMs on the system.
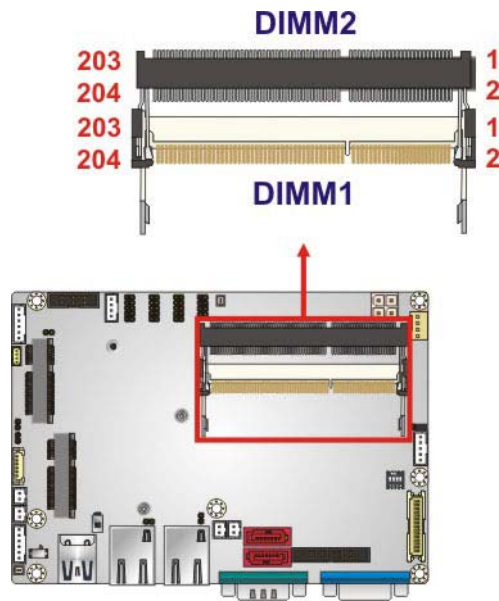
Figure 3-25: SO-DIMM Connector Locations

3.2.25 SPI Flash Connector

CN Label: **SPI1**

CN Type: 6-pin wafer

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

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

The SPI flash connector is used to flash the SPI ROM.
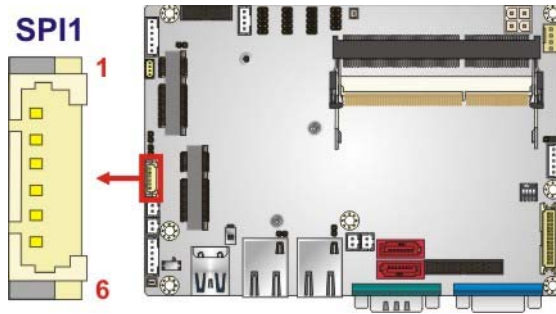
Figure 3-26: SPI Flash Connector Location

Pin	Description
1	SPI_VCC
2	SPI_2N_CS#
3	SPI_2N_MISO
4	SPI_2N_CLK
5	SPI_2N_MOSI
6	GND

Table 3-26: SPI Flash Connector Pinouts

3.2.26 System Fan Connector

CN Label: **FAN1**

CN Type: 4-pin wafer

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

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

The fan connector attaches to a system cooling fan.
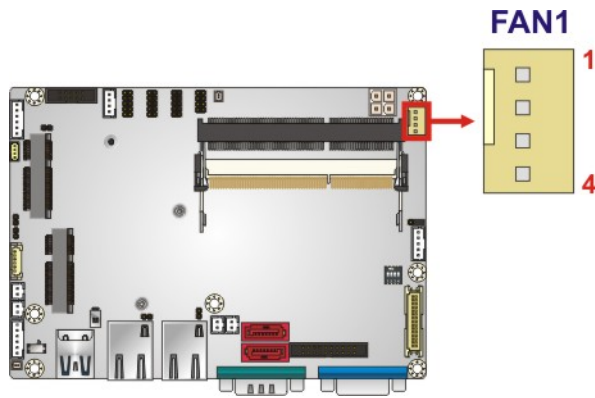
Figure 3-27: System Fan Connector Location

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

Table 3-27: System Fan Connector Pinouts

3.2.27 USB 2.0 Connector

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

The USB header can connect to two USB 2.0/1.1 devices.
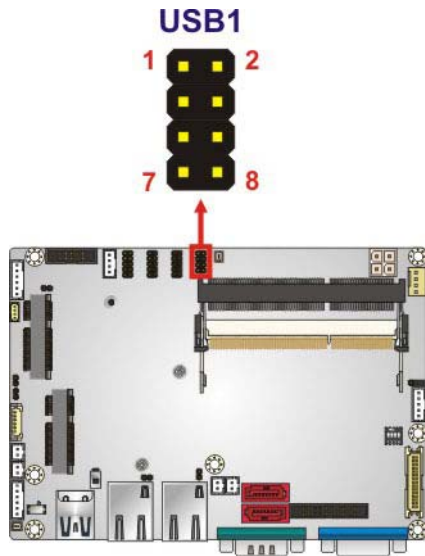
Figure 3-28: USB 2.0 Connector Location

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

Table 3-28: USB 2.0 Connector Pinouts

3.3 External Interface Connectors

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:
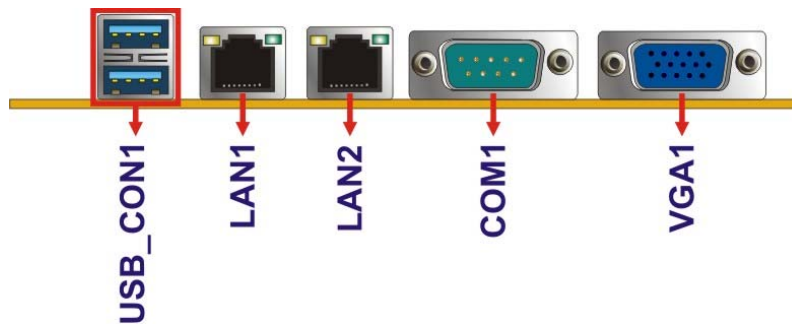
Figure 3-29: External Interface Connectors

3.3.1 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-29**

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

Each LAN connector connects to a local network.

Pin	Description	Pin	Description
1	LAN_MDI0+	7	LAN_MDI2+
2	LAN_MDI0-	8	LAN_MDI2-
3	LAN_MDI1+	9	LAN_MDI3+
4	LAN_MDI1-	10	LAN_MDI3-

Table 3-29: LAN Pinouts

3.3.2 USB 3.0 Ports

CN Label: **USB_CON1**

CN Type: Dual USB 3.0 port

CN Location: See **Figure 3-29**

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

The WAFER-ULT-i1 has two external USB 3.0 ports.

Pin	Description	Pin	Description
1	VCC	10	VCC
2	D-	11	D-
3	D+	12	D+
4	GND	13	GND
5	RX-	14	RX-
6	RX+	15	RX+
7	GND	16	GND

Pin	Description	Pin	Description
8	TX-	17	TX-
9	TX+	18	TX+

Table 3-30: USB 3.0 Port Pinouts

3.3.3 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: DB-9

CN Location: See **Figure 3-29**

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

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

Pin	Description	Pin	Description
1	DATA CARRIER DETECT (DCD)	6	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	7	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	8	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	9	RING INDICATOR (RI)
5	GND		

Table 3-31: Serial Port Pinouts
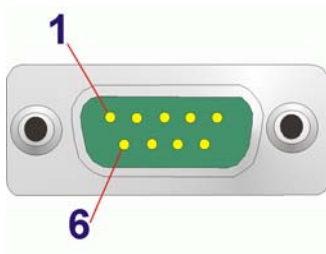
Figure 3-30: Serial Port

3.3.4 VGA Connector

CN Label:	**VGA1**
CN Type:	15-pin female
CN Location:	See **Figure 3-29**
CN Pinouts:	See **Figure 3-31** and **Table 3-32**

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

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

Table 3-32: VGA Connector Pinouts
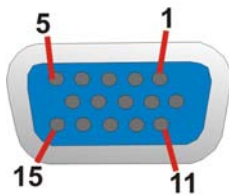
Figure 3-31: VGA Connector

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 WAFER-ULT-i1. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the WAFER-ULT-i1, 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 WAFER-ULT-i1, place it on an antic-static pad. This reduces the possibility of ESD damaging the WAFER-ULT-i1.
- **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 WAFER-ULT-i1 is installed. All installation notices pertaining to the installation of WAFER-ULT-i1 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the WAFER-ULT-i1 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 WAFER-ULT-i1, WAFER-ULT-i1 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 WAFER-ULT-i1, **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 SO-DIMM Installation

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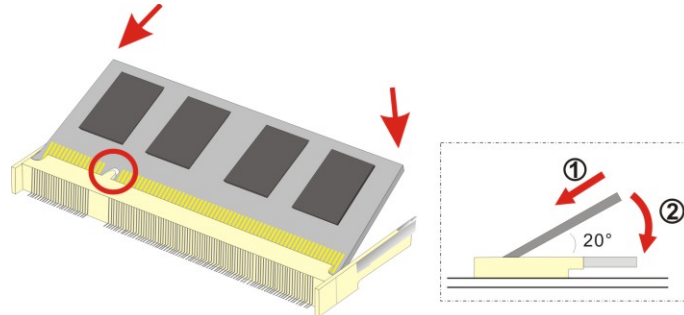
Figure 4-1: SO-DIMM Installation

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

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

Step 3: **Insert the SO-DIMM**. Push the memory in at a 20º angle. (See **Figure 4-1**)

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

4.4 iRIS-1010 Module Installation

WARNING:

The iRIS module slot is designed to install the iRIS-1010 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the WAFER-ULT-i1.

To install the iRIS-1010 module, please follow the steps below.

Step 1: **Locate the iRIS module slot**. See **Figure 3-12**.

Step 2: **Remove the retention screw**. Remove the retention screw as shown in **Figure 4-2**.
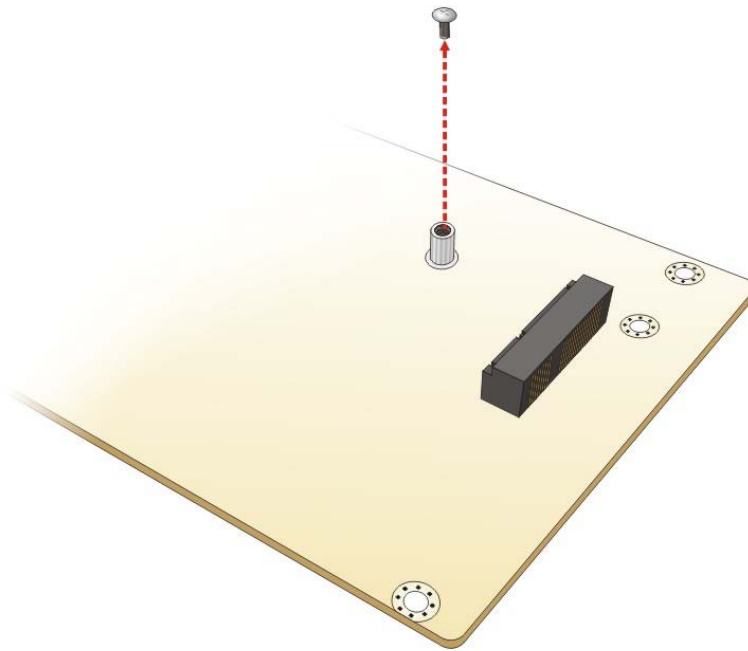
Figure 4-2: Removing the Retention Screw for the iRIS-1010 Module

Step 3: **Insert into the slot at an angle**. Line up the notch on the module with the notch

on the slot. Slide the iRIS-1010 module into the slot at an angle of about 20º
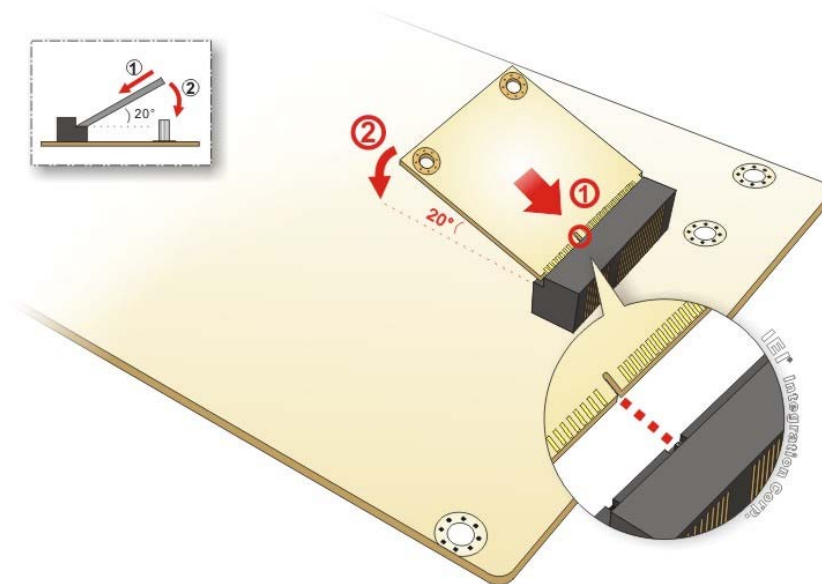
(**Figure 4-3**).

Figure 4-3: Inserting the iRIS-1010 Module into the Slot at an Angle

Step 4: **Secure the iRIS-1010 module**. Secure the iRIS-1010 module with the retention
screw previously removed (**Figure 4-4**).
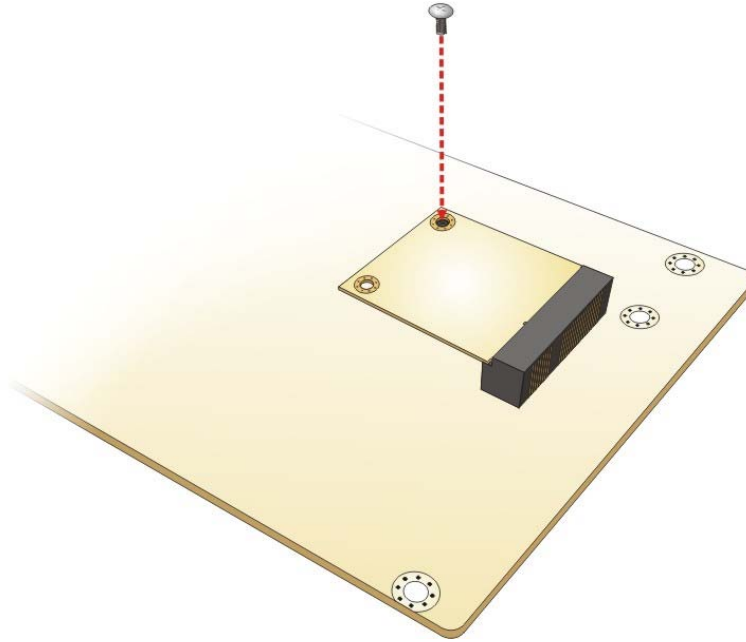
Figure 4-4: Securing the iRIS-1010 Module

NOTE:

After installing the iRIS-1010 module, use **LAN2** port to establish a
network connection. Please refer to **Section 4.11** for IPMI setup
procedures.

4.5 Full-size PCIe Mini Card Installation

The PCIe Mini card slot allows installation of either a full-size or half-size PCIe Mini card.
To install a full-size PCIe Mini card, please follow the steps below.

Step 1: **Locate the PCIe Mini card slot**. See **Figure 3-17**.

Step 2: **Remove the retention screw**. Remove the retention screw as shown in
Figure 4-5.
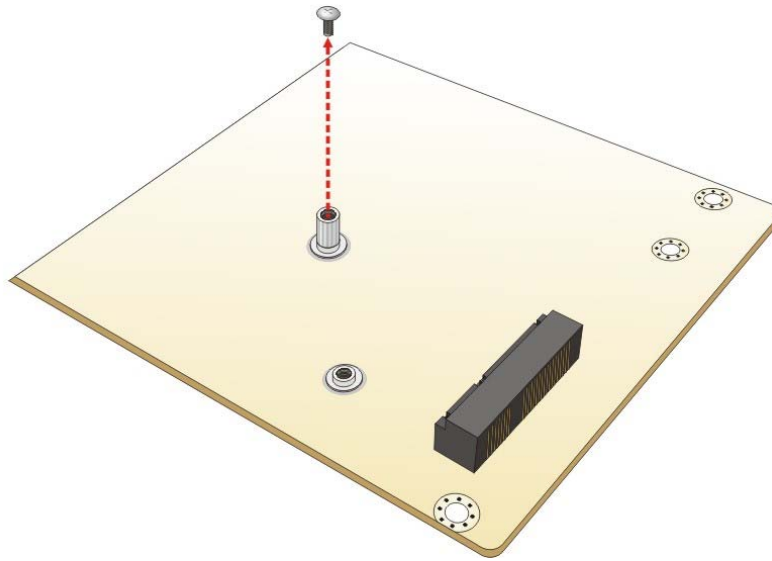
Figure 4-5: Removing the Retention Screw

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch

on the slot. Slide the PCIe Mini card into the socket at an angle of about 20⁰
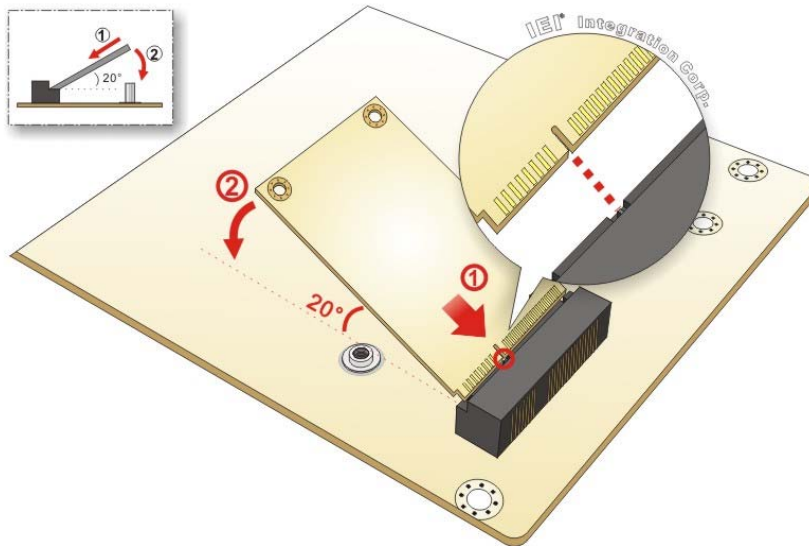
(**Figure 4-6**).

Figure 4-6: Inserting the Full-size PCIe Mini Card into the Slot at an Angle

Step 4: **Secure the full-size PCIe Mini card**. Secure the full-size PCIe Mini card with

the retention screw previously removed (**Figure 4-7**).
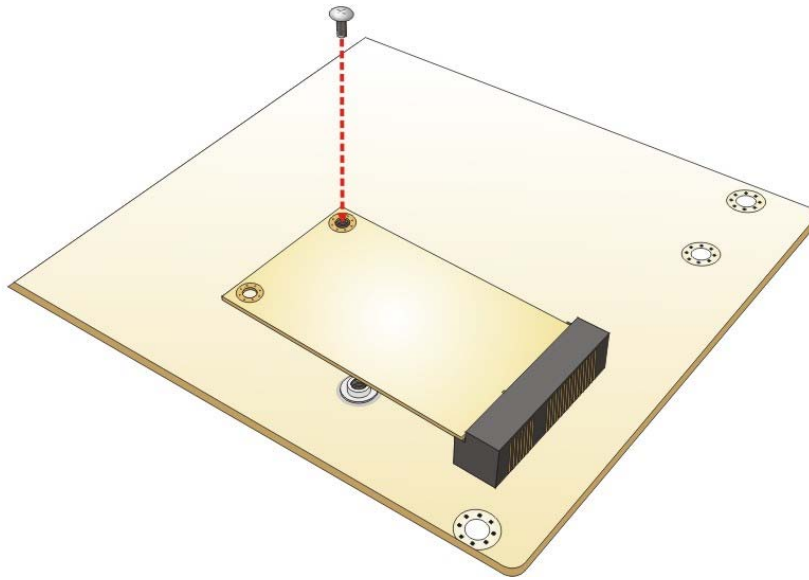
Figure 4-7: Securing the Full-size PCIe Mini Card

4.6 Half-size PCIe Mini Card Installation

The PCIe Mini card slot allows installation of either a full-size or half-size PCIe Mini card. To install a half-size PCIe Mini card, please follow the steps below.

Step 1: **Locate the PCIe Mini card slot**. See **Figure 3-17**.

Step 2: **Remove the retention screw**. Remove the retention screw as shown in **Figure 4-5**.

Step 3: **Remove the standoff**. Unscrew and remove the standoff secured on the motherboard as shown in **Figure 4-8**.
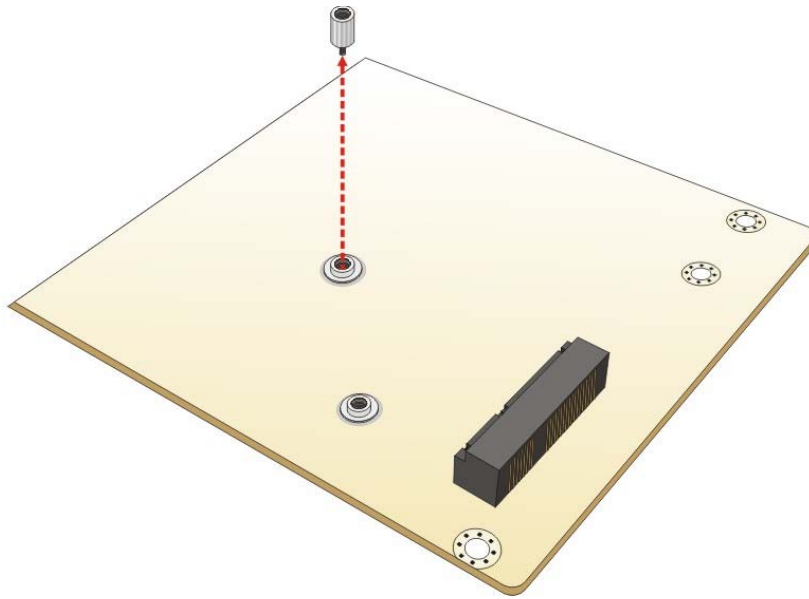
Figure 4-8: Removing the Standoff

Step 4:   **Install the standoff to the screw hole for the half-size PCIe Mini card**. Install

the previously removed standoff to the screw hole for the half-size PCIe Mini

card (**Figure 4-9**).
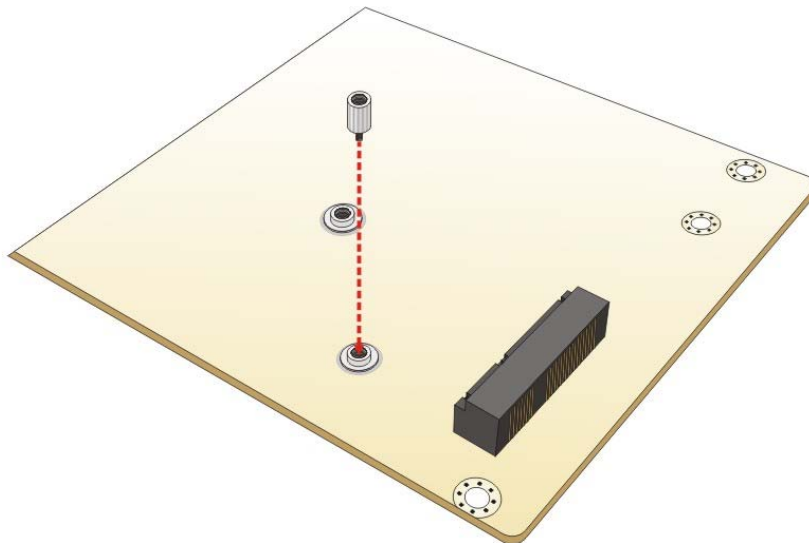
Figure 4-9: Installing the Standoff

Step 5: Insert into the socket at an angle. Line up the notch on the card with the notch
on the slot. Slide the PCIe Mini card into the slot at an angle of about 20⁰
(**Figure 4-10**).
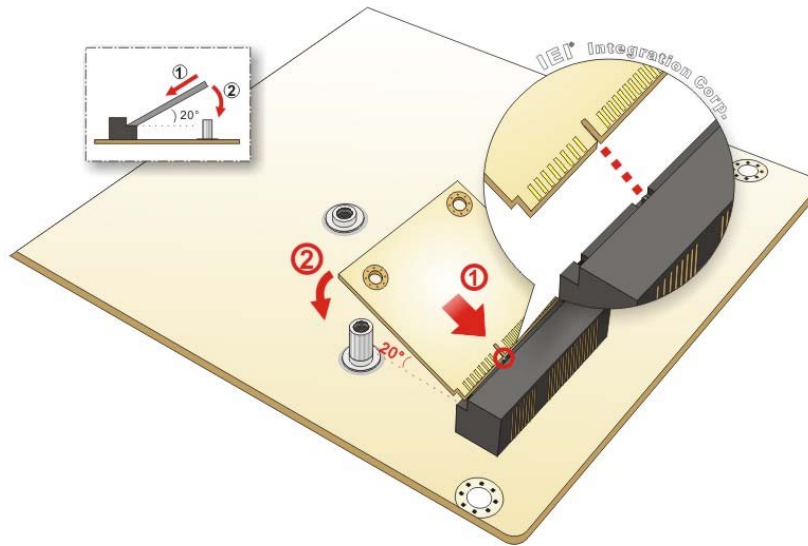
Figure 4-10: Inserting the Half-size PCIe Mini Card into the Slot at an Angle

Step 6: Secure the half-size PCIe Mini card. Secure the half-size PCIe Mini card with
the retention screw previously removed (**Figure 4-11**).
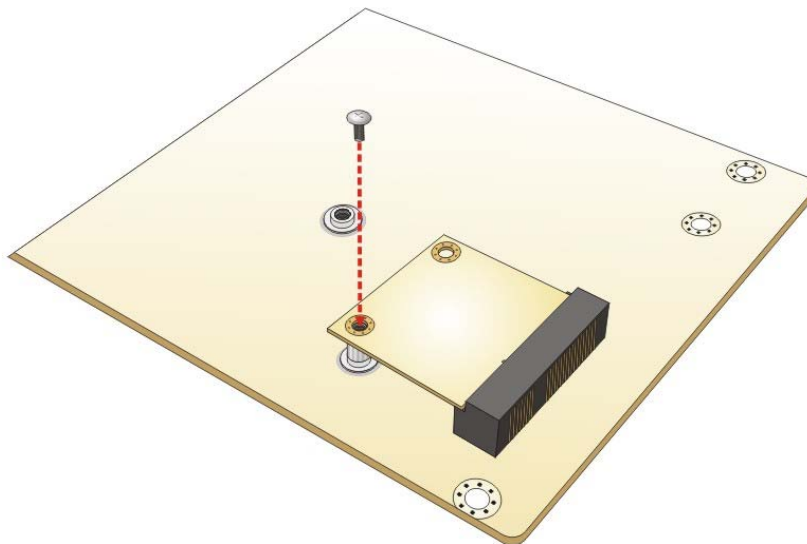
Figure 4-11: Securing the Half-size PCIe Mini Card

4.7 System Configuration

The system configuration is controlled by buttons, jumpers and switches. The system configuration should be performed before installation.

4.7.1 AT/ATX Power Mode Selection

The AT and ATX power mode selection is made through the AT/ATX power mode switch which is shown in **Figure 4-12**.
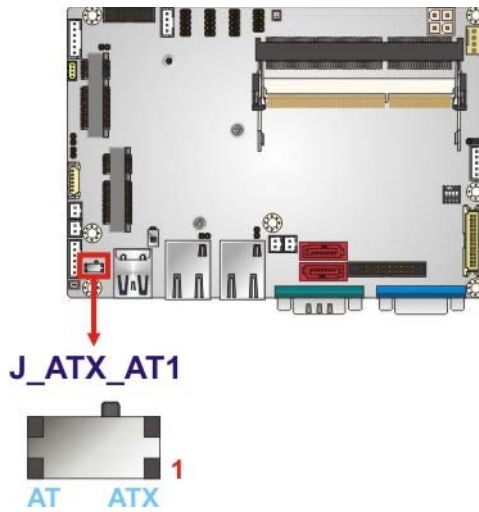
Figure 4-12: AT/ATX Power Mode Switch Location

Setting	Description
1-2	ATX power mode (default)
2-3	AT power mode

Table 4-1: AT/ATX Power Mode Switch Settings

4.7.2 Clear CMOS Button

To reset the BIOS, remove the on-board battery and press the clear CMOS button for three seconds or more. The clear CMOS button location is shown in **Figure 4-13**.
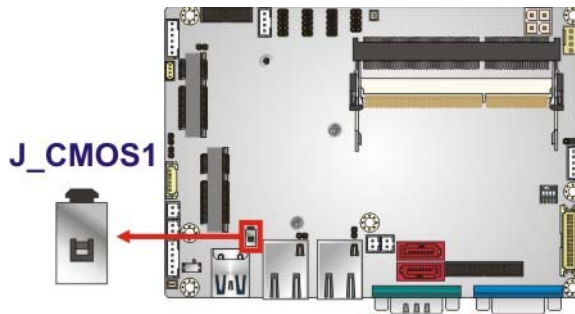
Figure 4-13: Clear CMOS Button Location

4.7.3 LVDS Panel Type Selection

Jumper Label:	**SW1**
Jumper Type:	DIP switch
Jumper Settings:	See **Table 4-2**
Jumper Location:	See **Figure 4-14**

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

* ON=0, OFF=1

SW1 (4-3-2-1)	EDID Resolution	Color Depth	Channel
0000 (default)	800 x 600 @ 60 Hz	18-bit	Single
0001	1024 x 768 @ 60 Hz	18-bit	Single
0010	1024 x 768 @ 60 Hz	24-bit	Single
0011	1280 x 768 @ 60 Hz	18-bit	Single
0100	1280 x 800 @ 60 Hz	18-bit	Single
0101	1280 x 960 @ 60 Hz	18-bit	Single
0110	1280 x 1024 @ 60 Hz	24-bit	Dual
0111	1366 x 768 @ 60 Hz	18-bit	Single
1000	1366 x 768 @ 60 Hz	24-bit	Single

SW1 (4-3-2-1)	EDID Resolution	Color Depth	Channel
1001	1440 x 900 @ 60 Hz	24-bit	Dual
1010	1440 x 1050 @ 60 Hz	24-bit	Dual
1011	1600 x 900 @ 60 Hz	24-bit	Dual
1100	1680 x 1050 @ 60 Hz	24-bit	Dual
1101	1600 x 1200 @ 60 Hz	24-bit	Dual
1110	1920 x 1080 @ 60 Hz	24-bit	Dual
1111	1920 x 1200 @ 60 Hz	24-bit	Dual

Table 4-2: LVDS Panel Type Selection
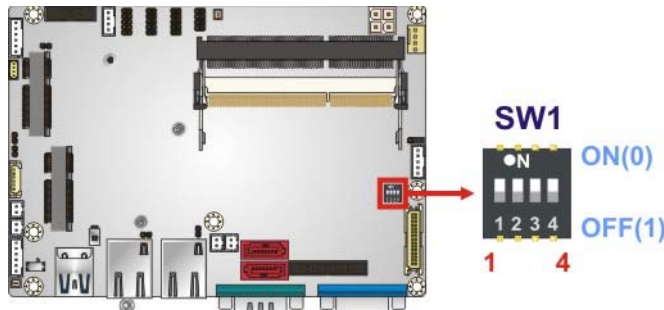
Figure 4-14: LVDS Panel Type Selection Switch Location

4.7.4 LVDS Voltage Selection

WARNING:

Permanent damage to the screen and WAFER-ULT-i1 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

Jumper Label:	**JP1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-15**

The LVDS voltage selection jumper allows setting the voltage provided to the monitor connected to the LVDS connector.

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

Table 4-3: LVDS Voltage Selection Jumper Settings
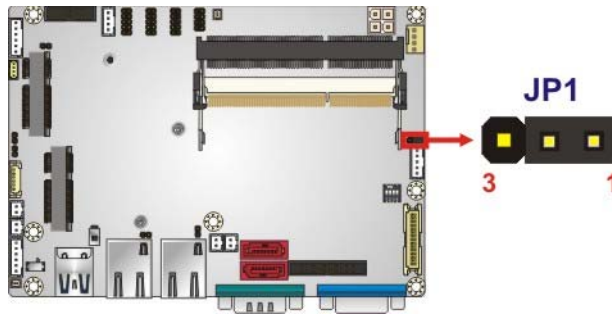
Figure 4-15: LVDS Voltage Selection Jumper Location

4.8 Chassis Installation

4.8.1 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 WAFER-ULT-i1 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.

4.8.2 Motherboard Installation

To install the WAFER-ULT-i1 motherboard into the chassis, please refer to the reference material that came with the chassis.

4.9 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the on-board connectors.

4.9.1 AT/ATX Power Connection

Follow the instructions below to connect the WAFER-ULT-i1 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 WAFER-ULT-i1.

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 4-16**.
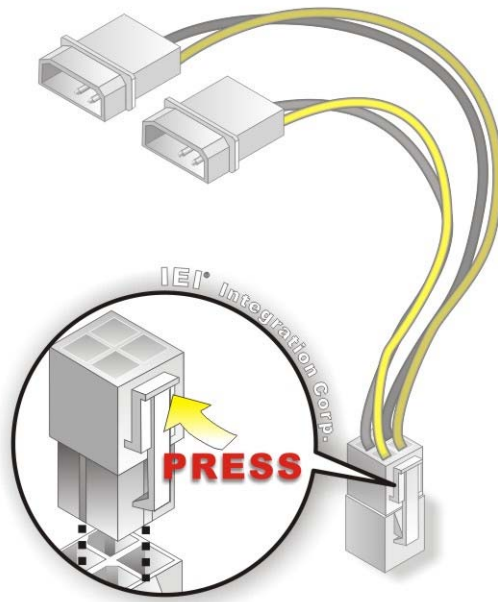
Figure 4-16: Power Cable to Motherboard Connection

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 4-17**.
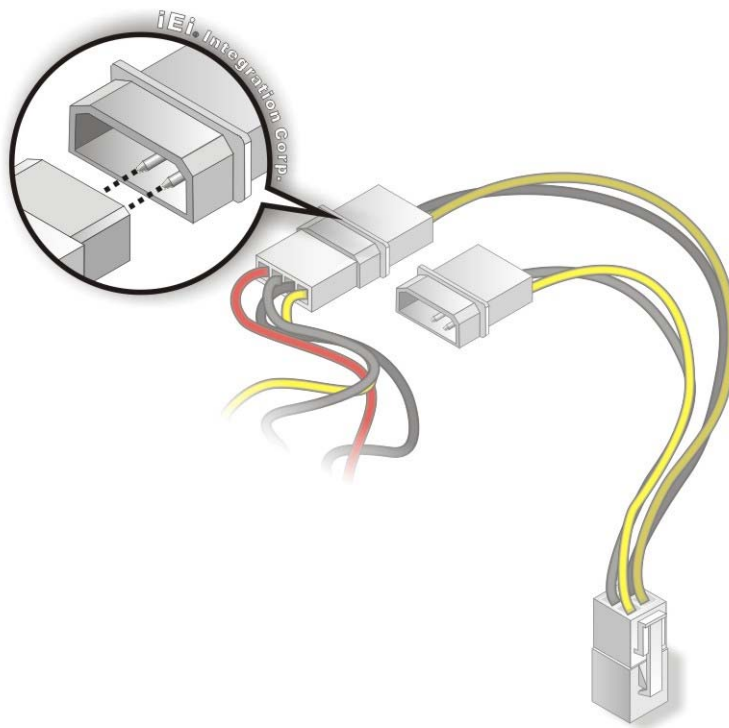
Figure 4-17: Connect Power Cable to Power Supply

4.9.2 Audio Kit Installation

The Audio Kit that came with the WAFER-ULT-i1 connects to the 10-pin audio connector on the WAFER-ULT-i1. 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 4-18**.
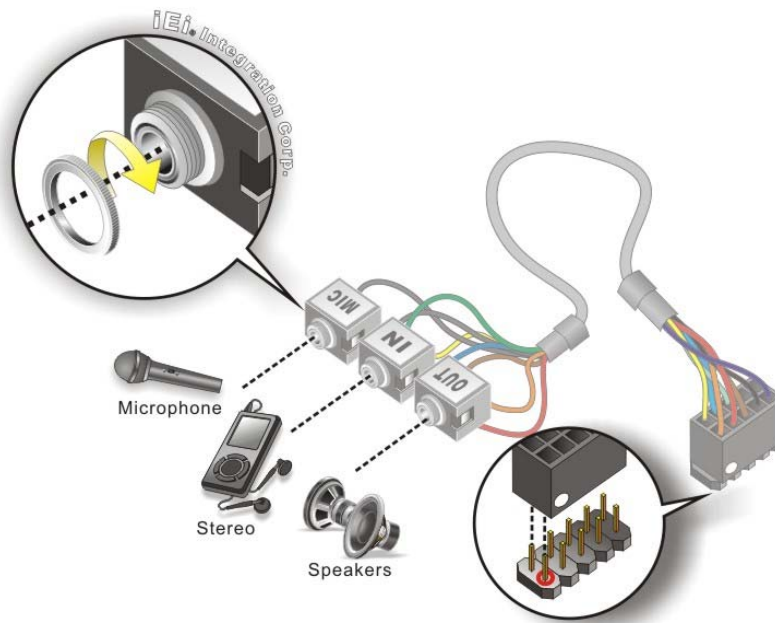
Figure 4-18: Audio Kit Cable Connection

Step 3:   **Connect the audio devices**. Connect speakers to the line-out audio jack.

Connect the output of an audio device to the line-in audio jack. Connect a

microphone to the mic-in audio jack.

4.9.3 LVDS LCD Installation

The WAFER-ULT-i1 can be connected to a TFT LCD screen through the LVDS crimp
connectors on the board. To connect a TFT LCD to the WAFER-ULT-i1, 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 4-19**. 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.
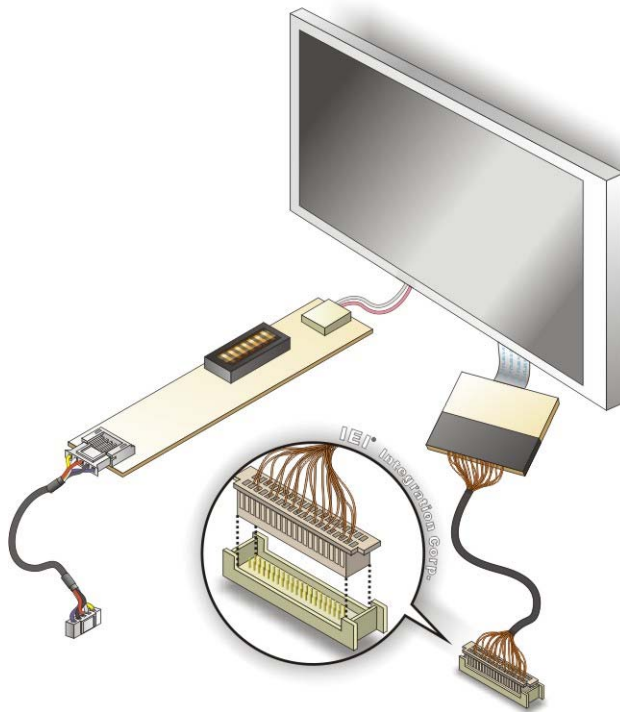
Figure 4-19: LVDS Connector

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 4-20**. When inserting the cable connector, make sure the pins are properly aligned.
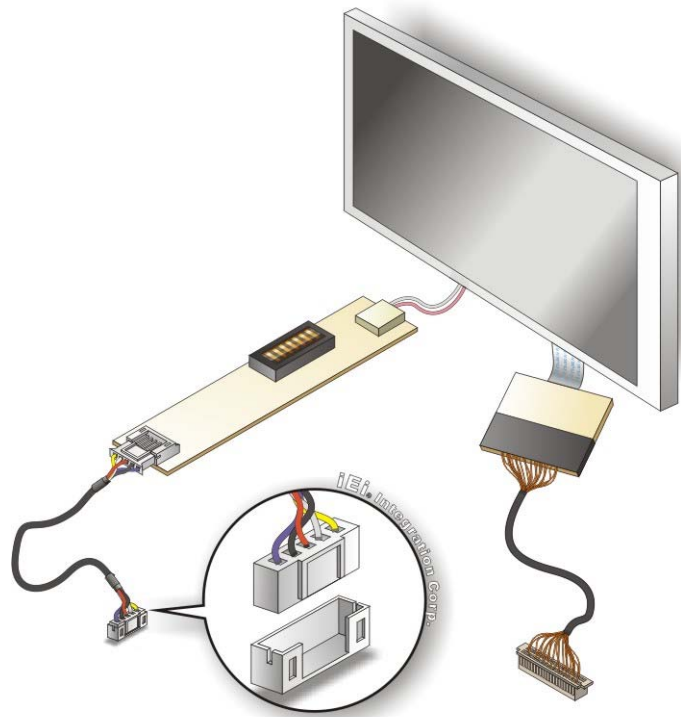
Figure 4-20: Backlight Inverter Connection

4.9.4 SATA Drive Connection

The WAFER-ULT-i1 is shipped with two SATA signal and power cables. To connect the SATA drive to the connectors, 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 connectors**. Insert the cable connectors into the on-board SATA drive connector and the SATA power connector. See **Figure 4-21**.
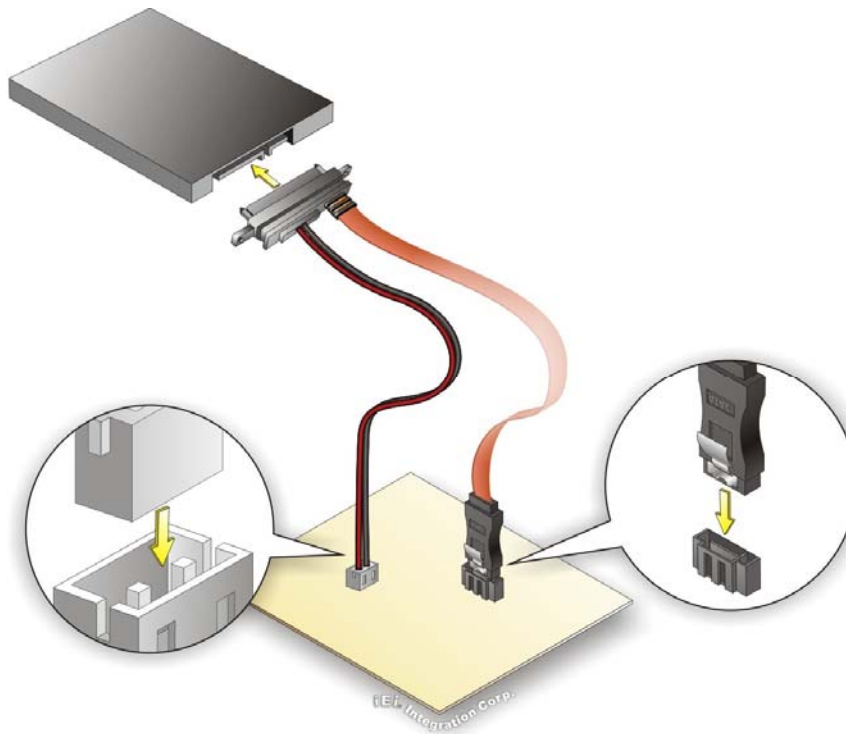
Figure 4-21: SATA Drive Cable Connection

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 4-21**.

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

4.9.5 USB Cable Installation

The WAFER-ULT-i1 is shipped with a dual-port USB 2.0 cable. To connect the USB cable
connector, please follow the steps below.

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

⚠️ **WARNING:**

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

> **Step 2:** **Align the connectors**. Correctly align pin 1on the cable connector with pin 1 on the WAFER-ULT-i1 USB connector.

> **Step 3:** **Insert the cable connectors**. Once the cable connector is properly aligned with the USB connector on the WAFER-ULT-i1, connect the cable connector to the on-board connector. See **Figure 4-22**.
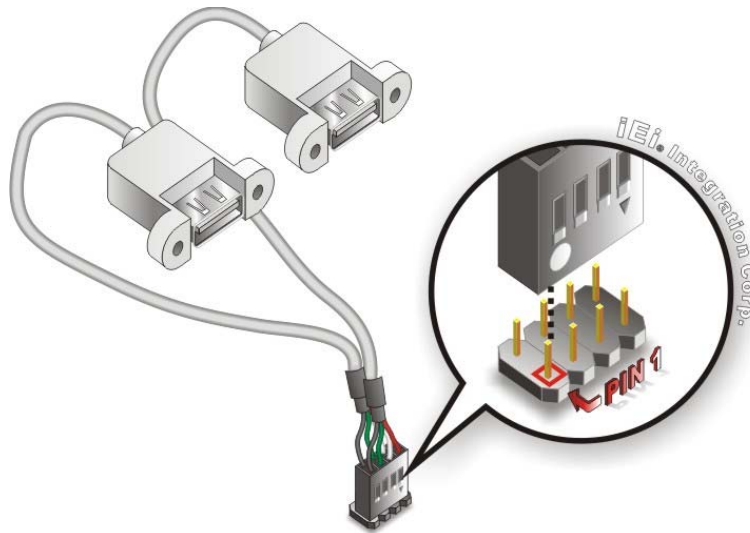
Figure 4-22: Dual-port USB Cable Connection

> **Step 4:** **Attach the USB connectors to the chassis**. Each of the USB 2.0 connectors has two retention screw holes. To secure the connectors to the chassis, please refer to the installation instructions that came with the chassis.

4.10 External Peripheral Interface Connection

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

4.10.1 LAN Connection

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

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

Step 2: **Align the connectors**. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the WAFER-ULT-i1. See **Figure 4-23**.
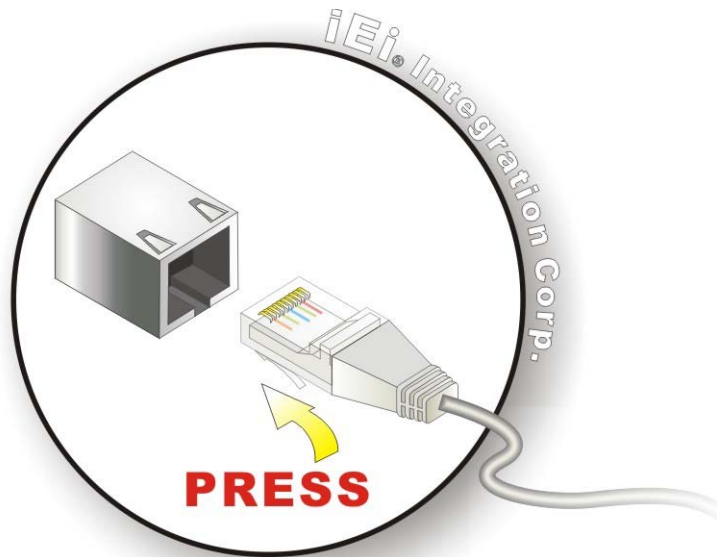
Figure 4-23: LAN Connection

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.

4.10.2 Serial Device Connection

The WAFER-ULT-i1 has a single male DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the WAFER-ULT-i1.

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

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-24**.
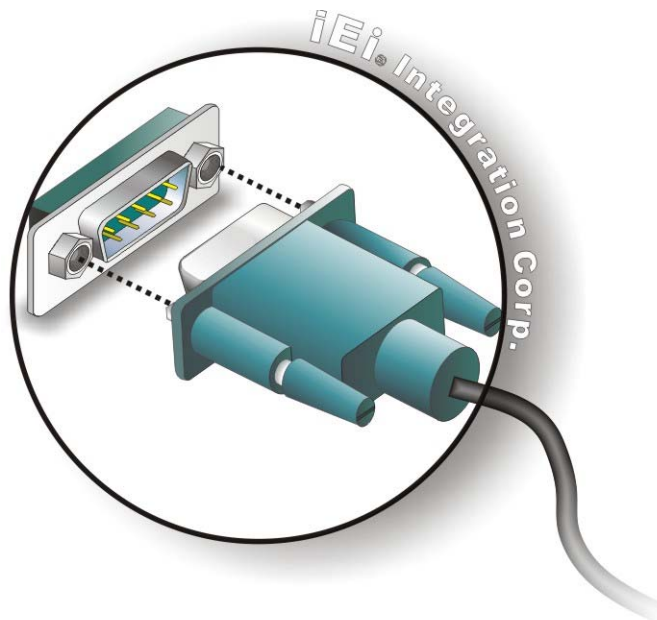
Figure 4-24: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external

interface by tightening the two retention screws on either side of the connector.

4.10.3 USB Connection

The external USB 3.0 connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the WAFER-ULT-i1.

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

shown in **Chapter 3**.

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

on the external peripheral interface. See **Figure 4-25**.
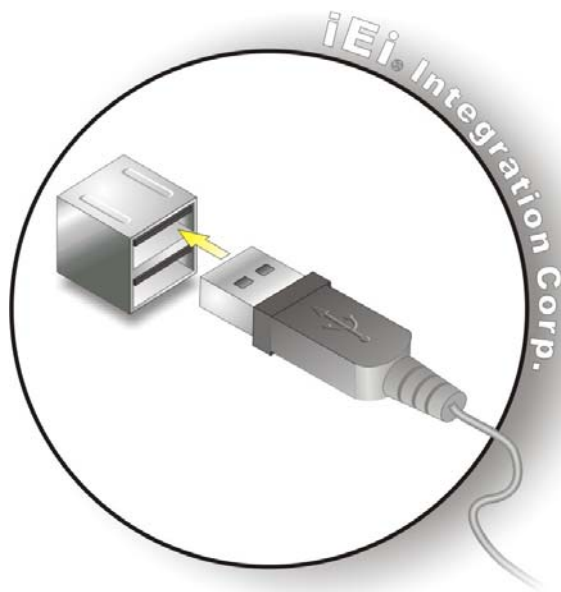
Figure 4-25: USB 3.0 Connectors

4.11 Heat Sink Enclosure

 WARNING:

Never run the WAFER-ULT-i1 without the heat sink secured to the board. The heat sink ensures the system remains cool and does not need addition heat sinks to cool the system.

 WARNING:

When running the WAFER-ULT-i1, do not put the WAFER-ULT-i1 directly on a surface that can not dissipate system heat, especially the wooden or plastic desk. It is highly recommended to run the WAFER-ULT-i1

→ on a heat dissipation surface or

→ using copper pillars to hold the board up from the desk below

When the WAFER-ULT-i1 is shipped, it is secured to a heat sink with five retention screws. If the WAFER-ULT-i1 must be removed from the heat sink, the five retention screws must be removed.
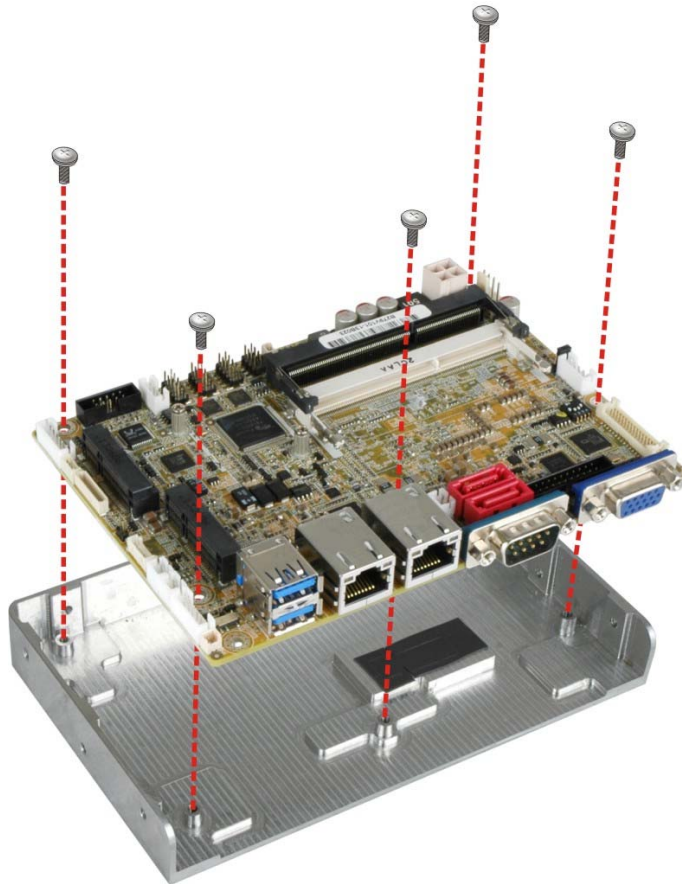
Figure 4-26: Heat Sink Retention Screws

4.12 Intel® AMT Setup Procedure

The WAFER-ULT-i1 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure at least one of the memory sockets is installed with a DDR3L 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).

4.13 IPMI Setup Procedure

The WAFER-ULT-i1 features Intelligent Platform Management Interface (IPMI) that helps lower the overall costs of server management by enabling users to maximize IT resources, save time and manage multiple systems. The WAFER-ULT-i1 supports IPMI 2.0 through the optional iRIS-1010 module. Follow the steps below to setup IPMI.

4.13.1 Managed System Hardware Setup

The hardware configuration of the managed system (WAFER-ULT-i1) is described below.

Step 1: Install an iRIS-1010 module to the iRIS module slot (refer to **Section 4.4**).

Step 2: Make sure a DDR3L SO-DIMM is installed in the SO-DIMM socket.

Step 3: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2** (**Figure 3-29**).

Chapter

5

BIOS

5.1 Introduction

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

NOTE:

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press ESC to quit. Navigation keys are shown in 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
-	Decrease the numeric value or make changes

Key	Function
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 clear CMOS button described in **Chapter 4**.

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.

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

BIOS Information                                        Set the Date. Use Tab to
BIOS Vendor                    American Megatrends      switch between Date
Core Version                   4.6.5.4                  elements.
Compliancy                     UEFI 2.3.1; PI 1.2
Project Version                B279AR10.ROM
Build Date and Time            02/27/2014 11:09:58

iWDD Vendor                    iEi
iWDD Version                   B279ER10.bin

Processor Information
Name                           Haswell ULT
Brand String                   Intel(R) Core(TM)
                               i5-4300U CPU @ 1.90GHz
Frequency                      2600 MHz                 ---------------------
Processor ID                   40651
Stepping                       Unknown
Number of Processors           2Core(s) / 4Thread(s)
Microcode Revision             15                      →←: Select Screen
GT Info                        GT2 (400 MHz)           ↑ ↓: Select Item
                                                       Enter: Select
IGFX VBIOS Version             2173                    +/-:  Change Opt.
Memory RC Version              1.6.1.2                 F1:  General Help
Total Memory                   4096 MB (DDR3)          F2:  Previous Values
Memory Frequency               1600 MHz                F3:  Optimized Defaults
                                                       F4:  Save & Exit
PCH Information                                         ESC:  Exit
Name                           LynxPoint-LP
PCH SKU                        Premium SKU
Stepping                       04/B2
LAN PHY Revision               N/A

ME FW Version                  9.5.10.1628
ME Firmware SKU                5MB

SPI Clock Frequency
DOFR Support                   Supported
Read Status Clock Frequnecy    33 MHz
Write Status Clock Frequnecy   33 MHz
Fast Read Status Clock Frequnecy 33 MHz

System Date                    [Tue 03/18/2014]
System Time                    [15:10:27]

Access Level                   Administrator
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 1: Main

The Main menu 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 icon]   **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
 > CPU Configuration
 > SATA Configuration                                 ---------------------
 > Intel(R) Rapid Start Technology
 > AMT Configuration                                  →←: Select Screen
 > USB Configuration                                  ↑↓: Select Item
 > F81866 Super IO Configuration                      Enter: Select
 > F81866 H/W Monitor                                 +/-:  Change Opt.
 > Serial Port Console Redirection                    F1:   General Help
 > iEi Feature                                        F2:   Previous Values
                                                      F3:   Optimized Defaults
                                                      F4:   Save & Exit
                                                      ESC: Exit
        Version 2.15.1231. 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 when the SUSPEND button
                                  Clock]           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 2.15.1231. 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 2.15.1231. 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**   DEFAULT   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 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to view detailed CPU specifications.

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

CPU Configuration                                    Enable for Windows XP and
                                                     Linux (OS optimized for
Intel(R) Core(TM) i5-4300U CPU @ 1.90GHz             Hyper-Threading
CPU Signature                  40651                 Technology and Disabled
Processor Family               6                     for other OS (OS not
Microcode Patch                15                    optimized for
FSB Speed                      100 MHz               Hyper-Threading
Max CPU Speed                  1900 MHz              Technology). When
Min CPU Speed                  800 MHz               Disabled only one thread
CPU Speed                      2600 MHz             per enabled core is
Processor Cores                2                     enabled.
Intel HT Technology            Supported
Intel VT-x Technology          Supported             ----------------------
Intel SMX Technology           Supported
64-bit                         Supported             →←: Select Screen
EIST Technology                Supported             ↑ ↓: Select Item
                                                     Enter: Select
L1 Data Cache                  32 kB x 2             +/-:  Change Opt.
L1 Code Cache                  32 kB x 2             F1:   General Help
L2 Cache                       256 kB x 2            F2:   Previous Values
L3 Cache                       3072 kB               F3:   Optimized Defaults
                                                     F4:   Save & Exit
Hyper-threading                [Enabled]             ESC: Exit
Intel Virtualization Technology  [Disabled]
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 5: CPU Configuration

➔ **Hyper-threading [Enabled]**

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

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

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

➔ **Intel Virtualization Technology [Disabled]**

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

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

➔ **Enabled**   Enables Intel Virtualization Technology.

5.3.4 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 6**) 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]
SATA Mode Selection             [AHCI]
                                                    --------------------
Serial ATA Port 0               Empty
  Hot Plug                      [Disabled]          →←: Select Screen
Serial ATA Port 1               Empty               ↑↓: Select Item
  Hot Plug                      [Disabled]          Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:   General Help
                                                    F2:   Previous Values
                                                    F3:   Optimized Defaults
                                                    F4:   Save & Exit
                                                    ESC: Exit

         Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 6: 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 [AHCI]**

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

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

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

➔ **Hot Plug [Disabled]**

Use the **Hot Plug** option to designate the SATA port as hot pluggable.

➔ **Disabled**   DEFAULT   Disables the hot-pluggable fucntion.

➔ **Enabled**   Enables the hot-pluggable fucntion.

5.3.5 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology** (**BIOS Menu 7**) 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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 7: Intel(R) Rapid Start Technology

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

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

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

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

5.3.6 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 8**) allows the Intel® AMT options to be configured.

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

Intel AMT                          [Enabled]                 Enable/Disable Intel (R)
Un-Configure ME                    [Disabled]                Active Management
                                                             Technology BIOS
                                                             Extension. Note: iAMT H/W
                                                             is always enabled.
                                                             This option just controls
                                                             the BIOS extension
                                                             execution.
                                                             If enabled, this requires
                                                             additional firmware in the
                                                             SPI device.
                                                             --------------------
                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-:  Change Opt.
                                                             F1:   General Help
                                                             F2:   Previous Values
                                                             F3:    Optimized Defaults
                                                             F4:    Save & Exit
                                                             ESC:   Exit
            Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 8: AMT Configuration

➔ **Intel AMT [Enabled]**

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

➔ **Disabled**   Intel® AMT is disabled

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

➔ **Un-Configure ME [Disabled]**

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

➔ **Disabled**   DEFAULT   Not perform ME unconfigure

➔ **Enabled**   To perform ME unconfigure

5.3.7 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 9**) 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 Module Version                8.10.27                disables legacy support
                                                          if no USB devices are
 USB Devices:                                             connected. DISABLE
       1 Keyboard, 1 Hub                                  option will keep USB
                                                          devices available only
 Legacy USB Support                [Enabled]              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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
   BIOS Menu 9: 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**   DEFAULT   Legacy USB support enabled

➔ **Disabled**   Legacy USB support disabled

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

5.3.8 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 10**) 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
> Serial Port 4 Configuration                        ↑↓: Select Item
                                                     Enter: Select
                                                     +/-:  Change Opt.
                                                     F1:   General Help
                                                     F2:   Previous Values
                                                     F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC: Exit
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 10: F81866 Super IO Configuration

5.3.8.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 11**) 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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
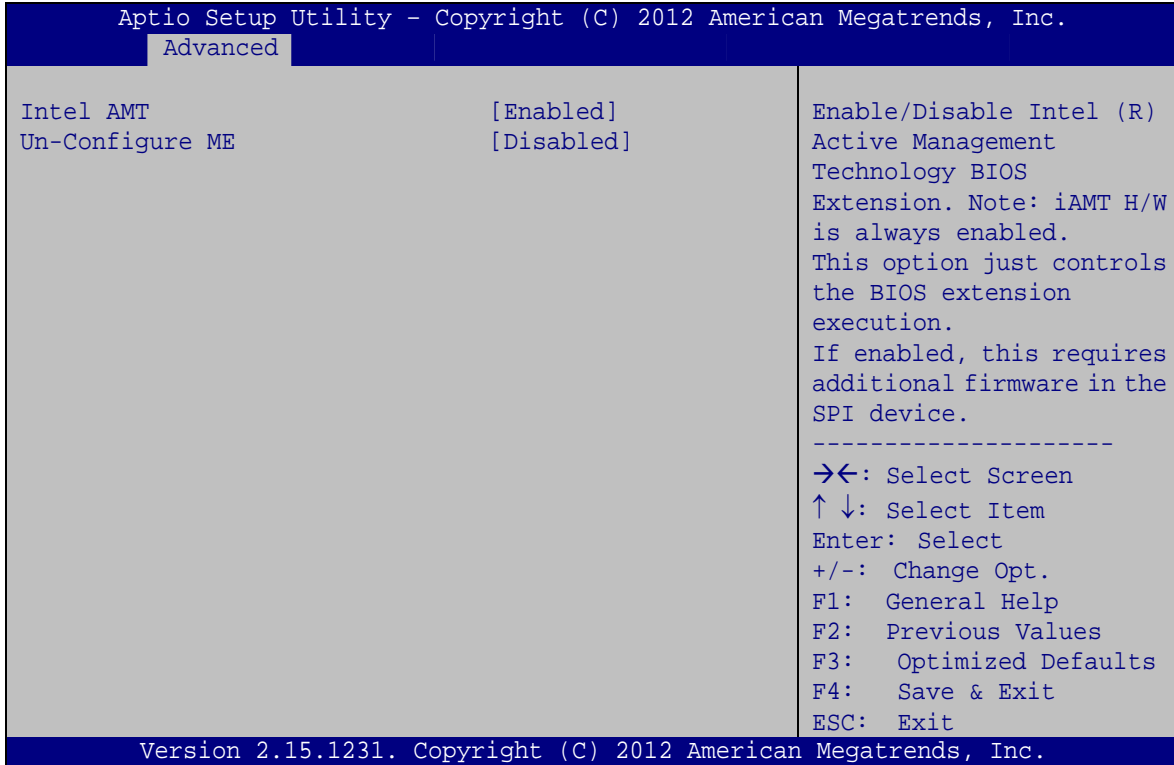**BIOS Menu 11: Serial Port n Configuration Menu**

5.3.8.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**   Disable the serial port

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

➔ **Change Settings [Auto]**

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

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

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

➔ **IO=3F8h;**
IRQ=3, 4,
5, 6, 7, 10,
11, 12

Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=2F8h;**
IRQ=3, 4,
5, 6, 7, 10,
11, 12

Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=3E8h;**
IRQ=3, 4,
5, 6, 7, 10,
11, 12

Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=2E8h;**
IRQ=3, 4,
5, 6, 7, 10,
11, 12

Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

5.3.8.1.2 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, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

➔ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

5.3.8.1.3 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=3, 4, address is IRQ3, 4, 5, 6, 7, 10, 11, 12
5, 6, 7, 10,
11, 12

➔ **IO=2E8h;** Serial Port I/O port address is 2E8h and the interrupt
IRQ=3, 4, address is IRQ3, 4, 5, 6, 7, 10, 11, 12
5, 6, 7, 10,
11, 12

➔ **IO=2F0h;** Serial Port I/O port address is 2F0h and the interrupt
IRQ=3, 4, address is IRQ3, 4, 5, 6, 7, 10, 11, 12
5, 6, 7, 10,
11, 12

➔ **IO=2E0h;** Serial Port I/O port address is 2E0h and the interrupt
IRQ=3, 4, address is IRQ3, 4, 5, 6, 7, 10, 11, 12
5, 6, 7, 10,
11, 12

5.3.8.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled** Disable the serial port

➔ **Enabled** DEFAULT Enable the serial port

➔ **Change Settings [Auto]**

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

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

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

→ **IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

→ **IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

→ **IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 2F0h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

→ **IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12** Serial Port I/O port address is 2E0h and the interrupt address is IRQ3, 4, 5, 6, 7, 10, 11, 12

5.3.9 F81866 H/W Monitor

The **F81866 H/W Monitor** menu (**BIOS Menu 12**) contains the fan configuration submenu and displays the system temperatures and voltages.

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

PC Health Status                                      Smart Fan Mode Select

> SYS_FAN1 Smart Fan Mode Configuration
CPU temperature                    : +45C
System temperature                 : +40 C            --------------------
CPU Fan Speed                      : N/A              →←: Select Screen
                                                      ↑ ↓: Select Item
                                                      Enter: Select
                                                      +/-:  Change Opt.
                                                      F1:   General Help
                                                      F2:   Previous Values
                                                      F3:   Optimized Defaults
                                                      F4:   Save & Exit
                                                      ESC: Exit
         Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 12: F81866 H/W Monitor

5.3.9.1 SYS_FAN1 Smart Fan Mode Configuration

Use the **SYS_FAN1 Smart Fan Mode Configuration** submenu (**BIOS Menu 13**) to configure the smart fan temperature and speed settings.

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

SYS_FAN1 Smart Fan Mode Configuration               SYS Smart Fan control
                                                    settings
SYS Smart Fan Control          [Auto PWM Mode]
Temperature of Off             75
Temperature Of Start           80
Start PWM                      30                   --------------------
Slope (Duty Cycle)             [4]
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:   General Help
                                                    F2:   Previous Values
                                                    F3:   Optimized Defaults
                                                    F4:   Save & Exit
                                                    ESC: Exit
         Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 13: SYS_FAN1 Smart Fan Mode Configuration

➔ **SYS Smart Fan Control [Auto PWM Mode]**

Use the **SYS Smart Fan Control** option to configure the system fan.

➔ **Full Mode**   The fan spins at full speed.

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

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

➔ **Temperature of Off**

Use the + or – key to change the **Temperature of Off** value. Enter a decimal number between 1 and 127. If the CPU temperature is lower than this setting, the fan spins at the lowest speed.

➔ **Temperature Of Start**

Use the + or – key to change the **Temperature Of Start** value. Enter a decimal number between 1 and 127. If the CPU temperature is between the settings of **Temperature of Off** and **Temperature Of Start**, the fan spins as the **Start PWM** settings.
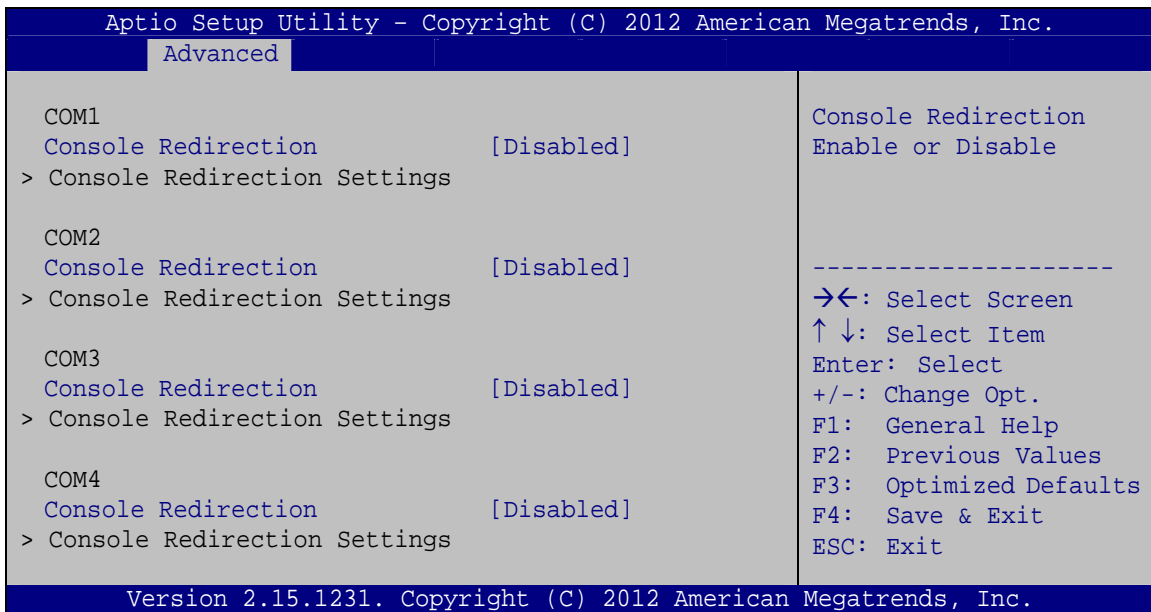
➔ **Start PWM**

Use the + or – key to change the **Start PWM** value. Enter a decimal number between 1 and 100.

➔ **Slope (Duty Cycle)**

If the CPU temperature is higher than the **Temperature Of Start** setting, the **Slope (Duty Cycle)** setting is increased with one degree.

5.3.10 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 14**) 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
                                                ↑↓: Select Item
  COM3                                          Enter: Select
  Console Redirection           [Disabled]      +/-: Change Opt.
> Console Redirection Settings                  F1:  General Help
                                                F2:  Previous Values
  COM4                                          F3:  Optimized Defaults
  Console Redirection           [Disabled]      F4:  Save & Exit
> Console Redirection Settings                  ESC: Exit

         Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 14: 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 options are available in the **Console Redirection Settings** submenu 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**   D EFAULT   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**   D EFAULT   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**   D EFAULT   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.

➔ **Flow Control [None]**

Use the **Flow Control** option to report the flow control method for the console redirection application.

➔ **None**   DEFAULT   No control flow.

➔ **Hardware**   Hardware is set as the console redirection.
RTS/CTS

➔ **VT-UTF8 Combo Key Support [Enabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

➔ **Disabled**   Disables the VT-UTF8 terminal keys.

➔ **Enabled** DEFAULT   Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals.

➔ **Recorder Mode [Disabled]**

Use the **Recorder Mode** option to enable or disable the recorder mode.

➔ **Disabled** DEFAULT   Disables the recorder mode.

➔ **Enabled**   Enables the recorder mode.

➔ **Resolution 100x31 [Disabled]**

Use the **Resolution 100x31** option to enable or disable 100x31 resolution of the extended terminal.

➔ **Disabled** DEFAULT   Disables 100x31 resolution of the extended terminal.

➔ **Enabled**   Enables 100x31 resolution of the extended terminal.

➔ **Legacy OS Redirection Resolution [80x24]**

Use the **Legacy OS Redirection Resolution** option to specify the resolution of the remote terminal.

➔ **80x24** DEFAULT   Sets the resolution of the remote terminal at 80x24.

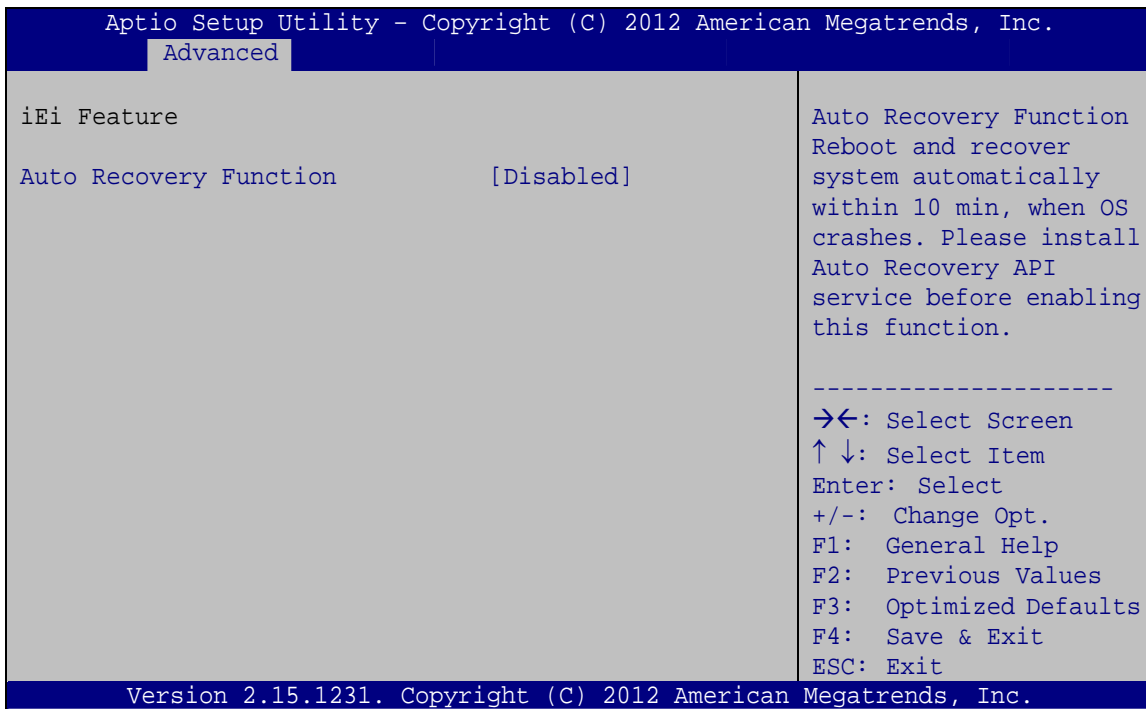➔ **80x25**   Sets the resolution of the remote terminal at 80x25.

➔ **Putty KeyPad [VT100]**

Use the **Putty KeyPad** option to select the function keys and keypad in Putty. Configuration options are listed below.

- VT100 **Default**
- LINUX
- XTERMR6
- SC0
- ESCN
- VT400

5.3.11 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 15**) 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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 15: iEi Feature

➔ **Auto Recovery Function [Disabled]**

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

➔ **Disabled**   **DEFAULT**   Auto recovery function disabled

➔ **Enabled**   Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 16**) to access the Northbridge and Southbridge configuration menus.

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

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

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

        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 16: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 17**) to configure the PCH parameters.

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

Intel PCH RC Version          1.6.1.0              Select AC power state
Intel PCH SKU Name            Premium SKU          when power is re-applied
Intel PCH Rev ID              04/B2                after a power failure.


Auto Power Button Function    [Disabled(ATX)]      --------------------
Restore AC Power Loss         [Last State]
Power Saving Function(EUP)    [Disabled]           →←: Select Screen
                                                    ↑ ↓: Select Item
                                                    Enter: Select
                                                    +/-:  Change Opt.
                                                    F1:  General Help
                                                    F2:  Previous Values
                                                    F3:  Optimized Defaults
                                                    F4:  Save & Exit
                                                    ESC: Exit
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
BIOS Menu 17: PCH-IO Configuration

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

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

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

➔ **Power On**   The system turns on

➔ **Last State**   DEFAULT   The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.
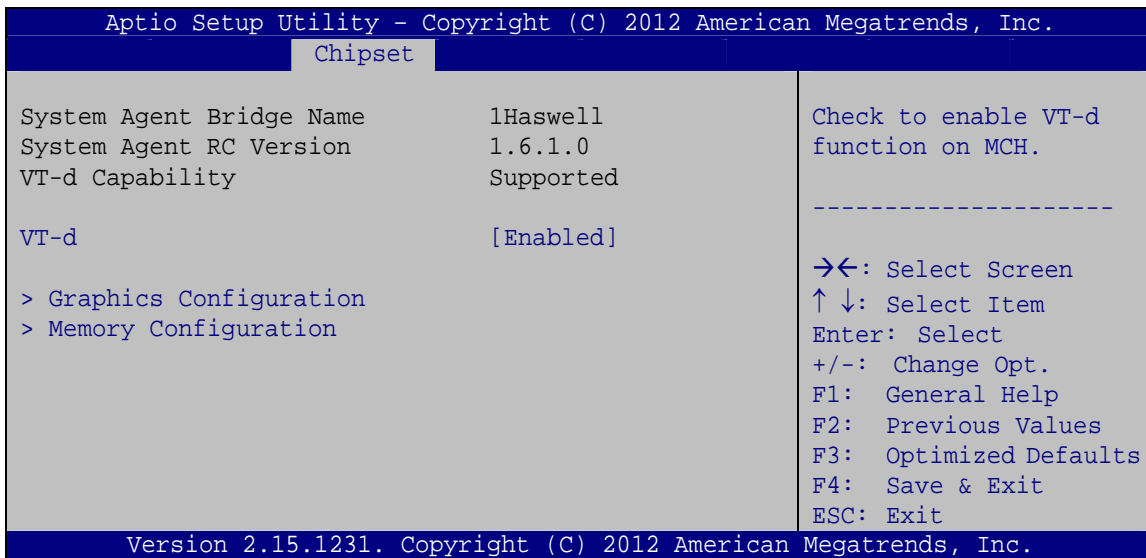
➔ **Power Saving Function(EUP) [Disabled]**

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

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

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

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 18**) to display the memory information.

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

System Agent Bridge Name      1Haswell           Check to enable VT-d
System Agent RC Version       1.6.1.0            function on MCH.
VT-d Capability               Supported
                                                 --------------------
VT-d                          [Enabled]
                                                 →←: Select Screen
> Graphics Configuration                         ↑ ↓: Select Item
> Memory Configuration                           Enter: Select
                                                 +/-:  Change Opt.
                                                 F1:   General Help
                                                 F2:   Previous Values
                                                 F3:   Optimized Defaults
                                                 F4:   Save & Exit
                                                 ESC: Exit
          Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 18: System Agent (SA) Configuration

➔ **VT-d [Enabled]**

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

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

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

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 19**) menu to configure the video device connected to the system.

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

Graphics Configuration                                    Select the Video Device
IGFX VBIOS Version                2173                    which will be activated
IGFX Frequency                    400 MHz                 during POST. This has no
                                                          effect if external
Primary IGFX Boot Display         [VBIOS Default]         graphics present.
Active LFP                        [eDP Port-A]            Secondary boot display
DVMT Pre-Allocated                [256M]                  selection will appear
DVMT Total Gfx Mem                [MAX]                   based on your selection.
                                                          VGA modes will be
                                                          supported only on
                                                          primary display

                                                          ----------------------
                                                          ➔←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
   BIOS Menu 19: Graphics Configuration

➔ **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
- DP port

→ **Active LFP [eDP Port-A]**

Use the **Active LFP** option to select the active LFP configuration.

→ **No LVDS** VBIOS does not enable LVDS.

→ **eDP Port-A** **DEFAULT** LFP is driven by the Int-DisplayPort encoder from Port-A.

→ **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**

5.4.2.2 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 20**) to view memory information.

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

Memory Information

Memory RC Version              1.6.1.2
Memory Frequency               1600 MHz
Total Memory                   4096 MB (DDR3)
Memory Voltage                 1.35v
DIMM#0                         4096 MB (DDR3)     --------------------
DIMM#1                         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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 20: Memory Configuration

5.5 Boot

Use the **Boot menu** (**BIOS Menu 21**) 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]
Boot option filter            [Legacy only]       --------------------
Launch PXE OpROM              [Disabled]          →←: Select Screen
                                                  ↑↓: Select Item
Boot Option Priorities                            Enter: Select
                                                  +/-:  Change Opt.
                                                  F1:   General Help
                                                  F2:   Previous Values
                                                  F3:   Optimized Defaults
                                                  F4:   Save & Exit
                                                  ESC: Exit
        Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 21: 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.

➔ **Boot option filter [Legacy only]**

Use the **Boot option filter** option to control what devices the system can boot to.

- UEFI and Legacy
- Legacy only   **DEFAULT**
- UEFI only

➔ **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.

5.6 Security

Use the **Security** menu (**BIOS Menu 22**) to set system and user passwords.

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

 Password Description                                      Set Administrator
                                                          Password
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup.                      --------------------
 If ONLY the User's password is set, then this
 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
                                                          F4:  Save & Exit
 Administrator Password                                   ESC: Exit
 User Password

         Version 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 22: 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 23**) 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 2.15.1231. Copyright (C) 2012 American Megatrends, Inc.
```
   BIOS Menu 23: 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
- Audio
- USB 3.0
- Intel® AMT

Installation instructions are given below.

6.2 Software Installation

All the drivers for the WAFER-ULT-i1 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

Step 2: The driver main menu appears.

Step 3: Click WAFER-ULT.

Step 4: A new screen with a list of available drivers appears.

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

Step 2: Click **Chipset**.

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

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-1** appears.

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

Figure 6-1: Chipset Driver Welcome Screen

Step 6: The license agreement in **Figure 6-2** appears.

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

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

Figure 6-2: Chipset Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-3** appears.

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

Figure 6-3: Chipset Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-4**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.
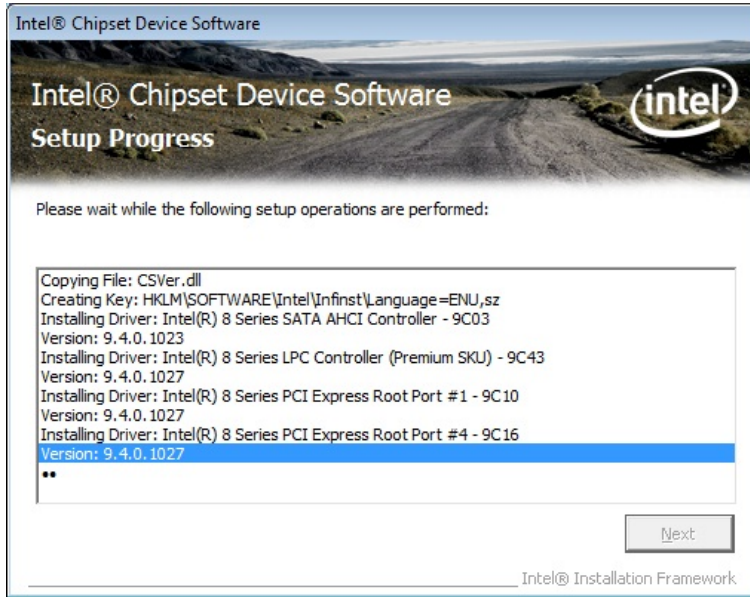
Figure 6-4: Chipset Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-5** appears.

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

Figure 6-5: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

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

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

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

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

Figure 6-6: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-7** appears.

Step 7: Click **Yes** to accept the agreement and continue.
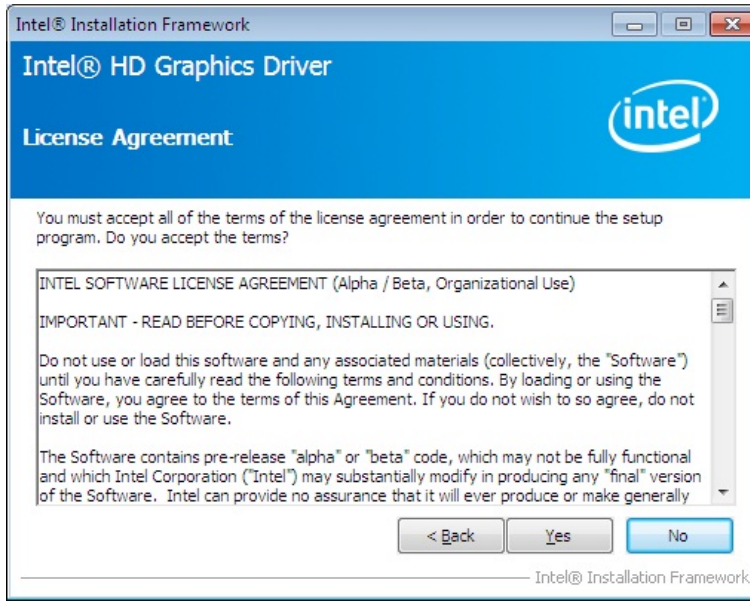
Figure 6-7: Graphics Driver License Agreement

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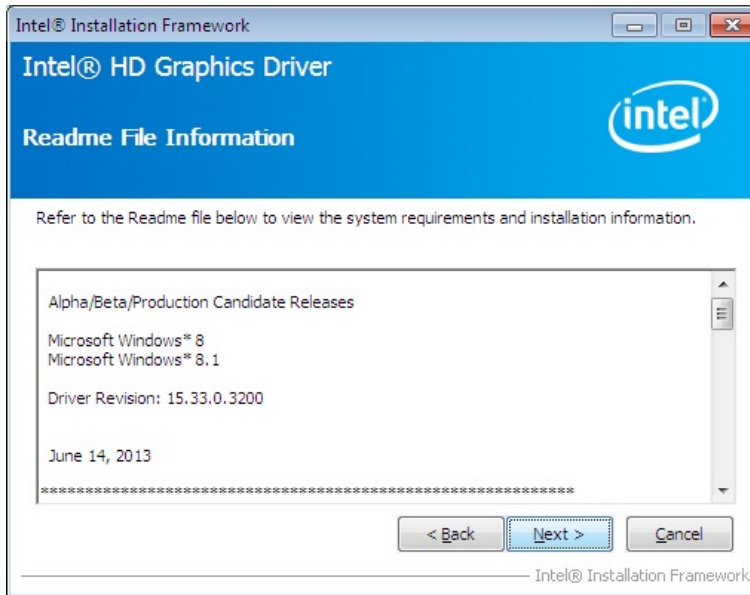
Figure 6-8: Graphics Driver Read Me File

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

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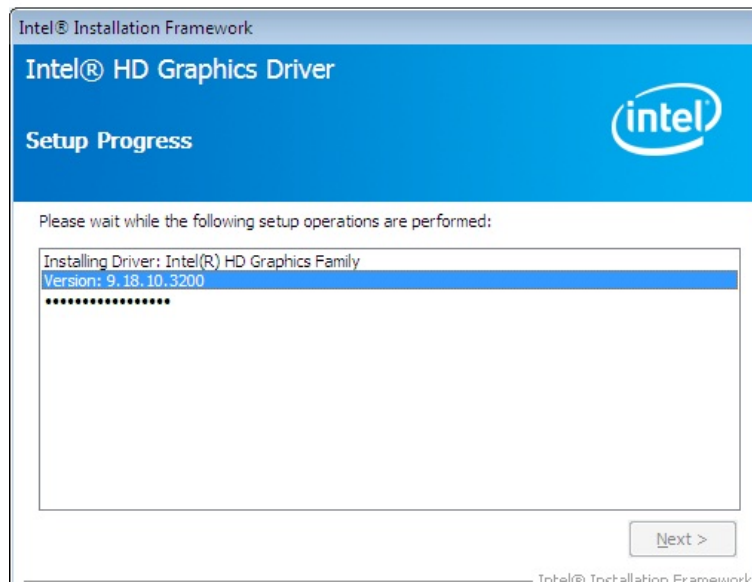
Figure 6-9: Graphics Driver Setup Operations

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

Step 12: Select "**Yes, I want to restart this computer now**" and click **Finish**.
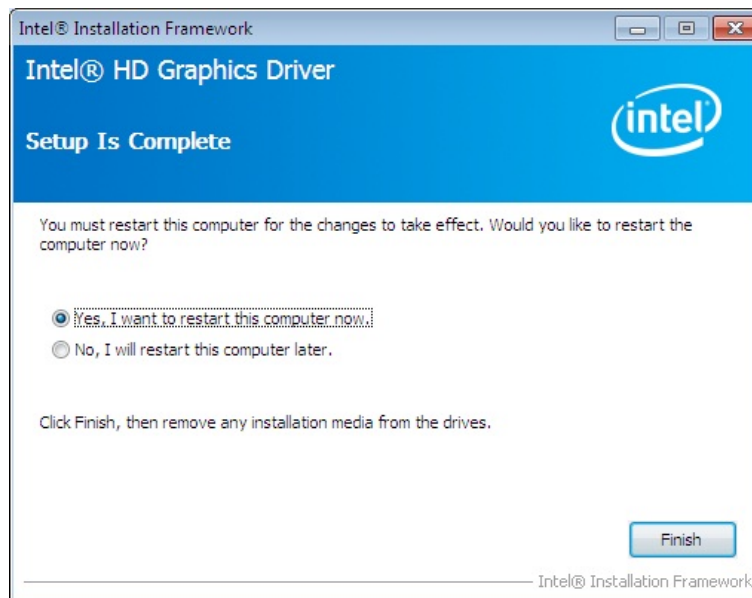
Figure 6-10: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

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

Step 2: Click **LAN**.

Step 3: Select the folder with the driver of correspondent LAN controller.

Step 4: Locate the Autorun file and double click on it.

Step 5: The Intel® Network Connection menu in **Figure 6-11** appears.

Step 6: Click **Install Drivers and Software**.
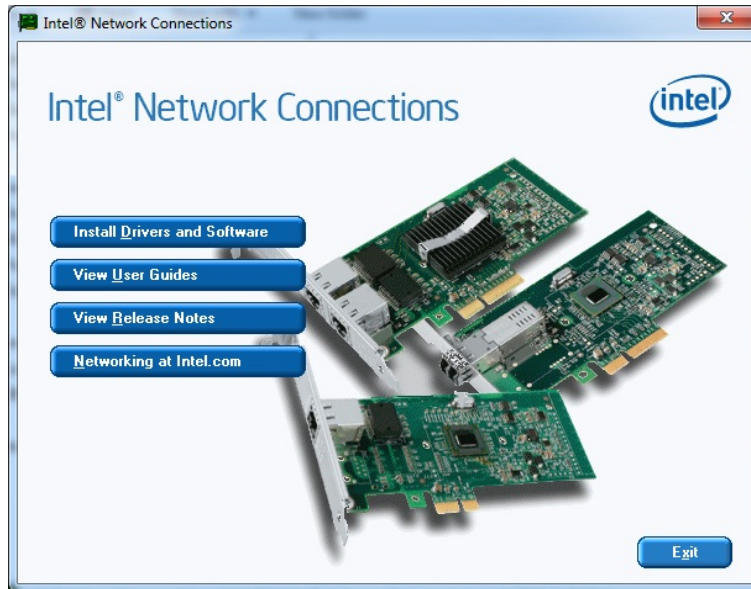
Figure 6-11: Intel® Network Connection Menu

Step 7: The **Welcome** screen in **Figure 6-12** appears.
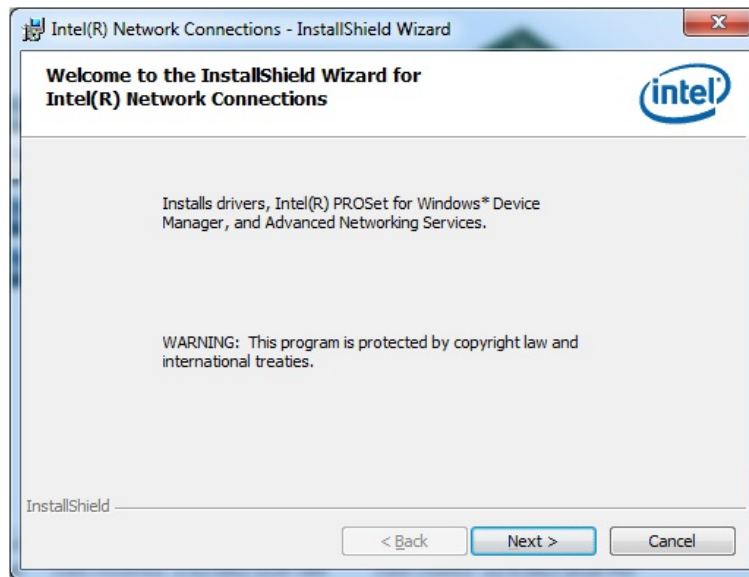
Figure 6-12: LAN Driver Welcome Screen

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

Step 9: The **License Agreement** in **Figure 6-13** appears.

Step 10: Accept the agreement by selecting "**I accept the terms in the license agreement**".

Step 11: Click **Next** to continue.
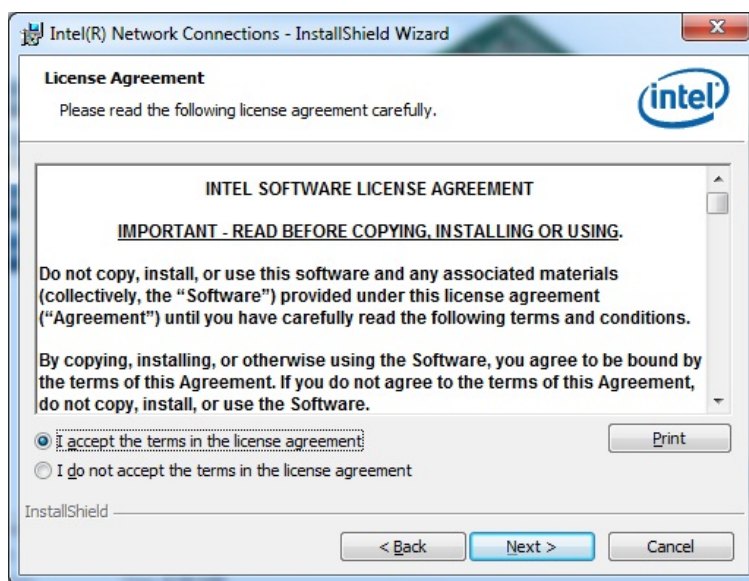
Figure 6-13: LAN Driver License Agreement

Step 12: The **Setup Options** screen in **Figure 6-14** appears.

Step 13: Select program features to install.

Step 14: Click **Next** to continue.
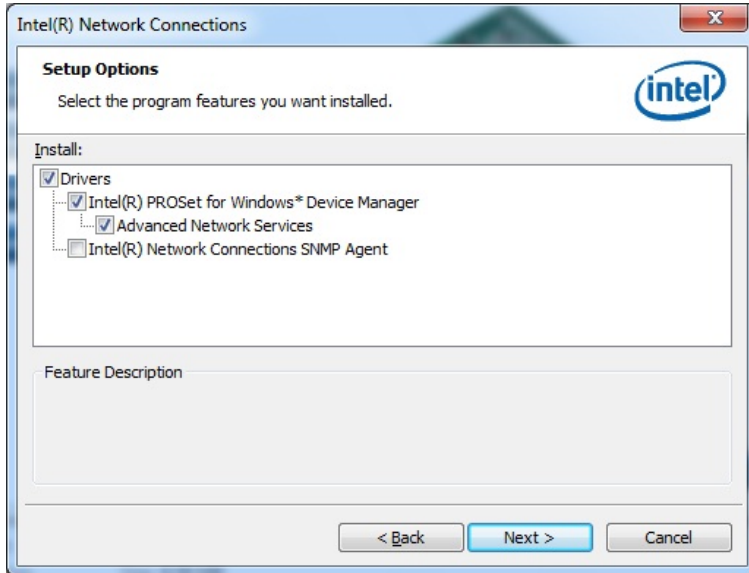
Figure 6-14: LAN Driver Setup Options

Step 15: The **Ready to Install the Program** screen in **Figure 6-15** appears.

Step 16: Click **Install** to proceed with the installation.
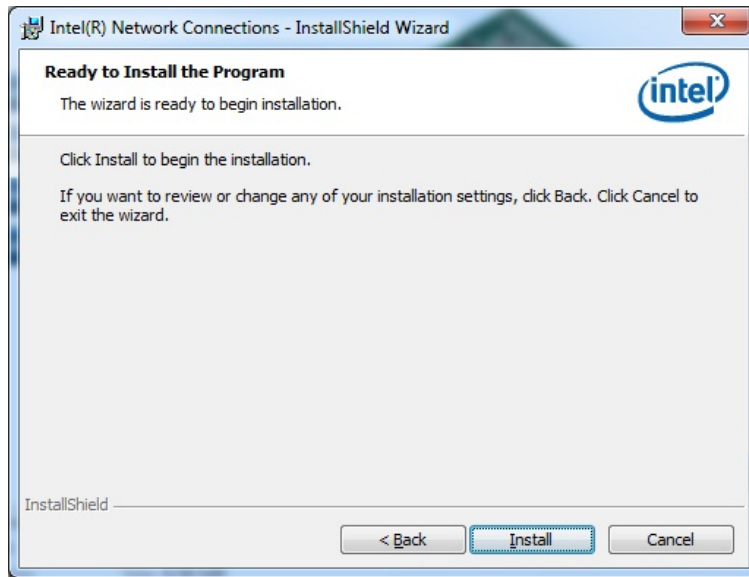
Figure 6-15: LAN Driver Installation

Step 17: The program begins to install.

Step 18: When the driver installation is complete, the screen in **Figure 6-16** appears.

Step 19: Click **Finish** to exit.
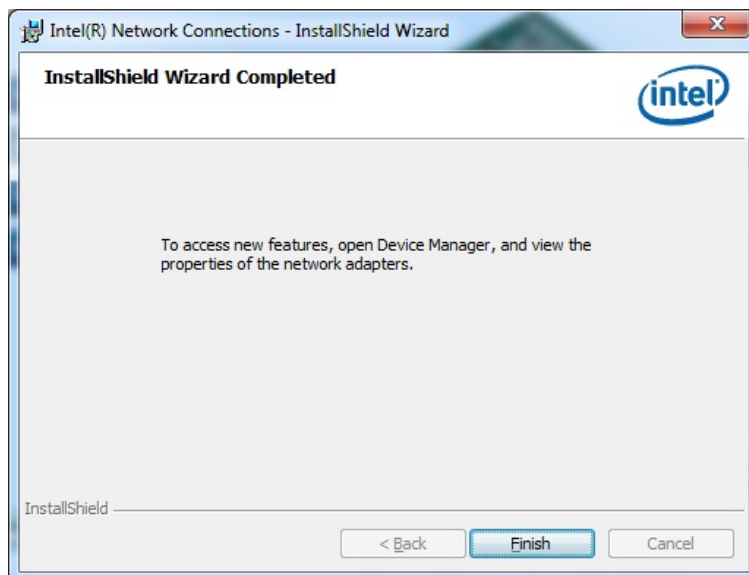
Figure 6-16: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

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

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

Step 3:   Double click the setup file.

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

Step 5:   Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-17**).
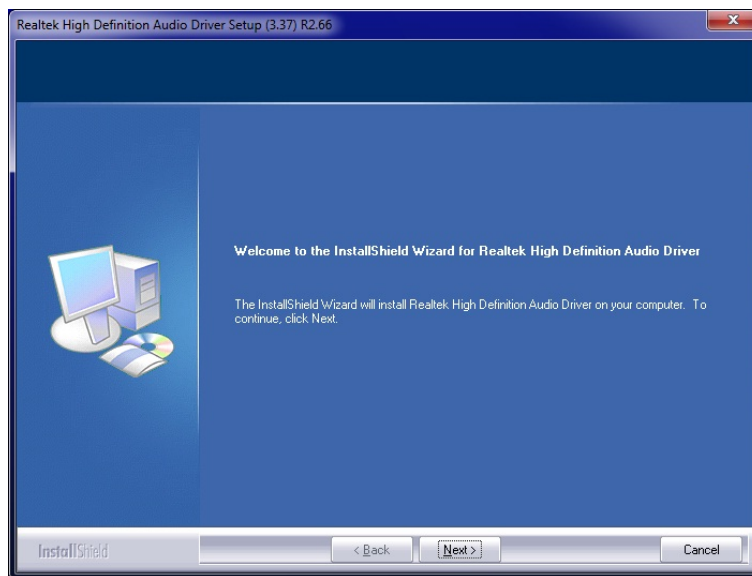
Figure 6-17: InstallShield Wizard Welcome Screen

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

Step 7:   InstallShield starts to install the new software as shown in **Figure 6-18**.
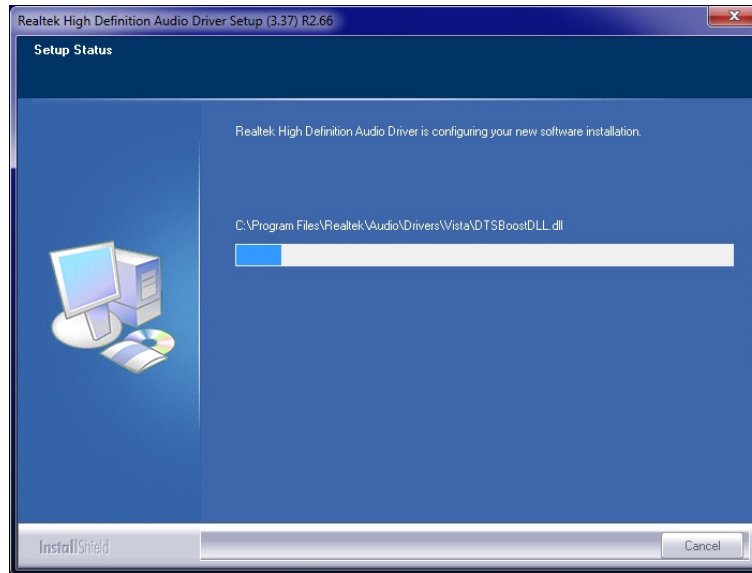
Figure 6-18: Audio Driver Software Configuration

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

(**Figure 6-19**).
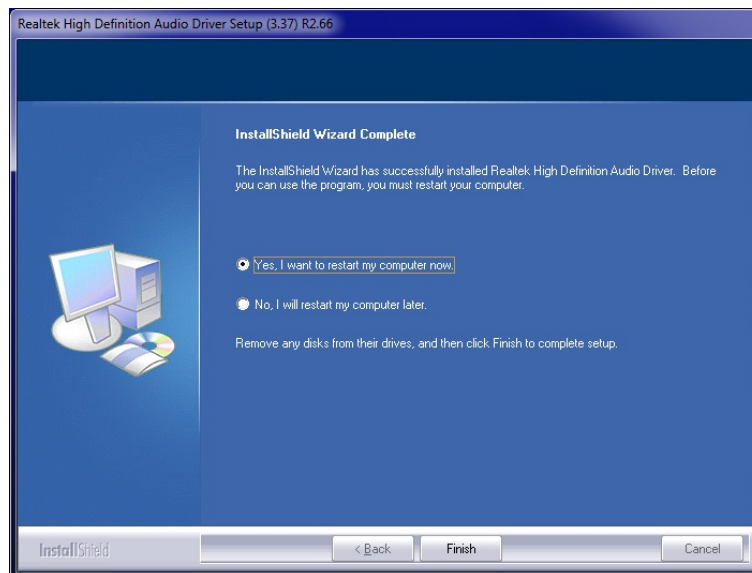
Figure 6-19: Restart the Computer

Step 9: The confirmation screen offers the option of restarting the computer now or later.

For the settings to take effect, the computer must be restarted. Click **Finish** to

restart the computer.

6.7 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 **USB3.0**.

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

Step 4: A **Welcome Screen** appears (**Figure 6-20**).

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.
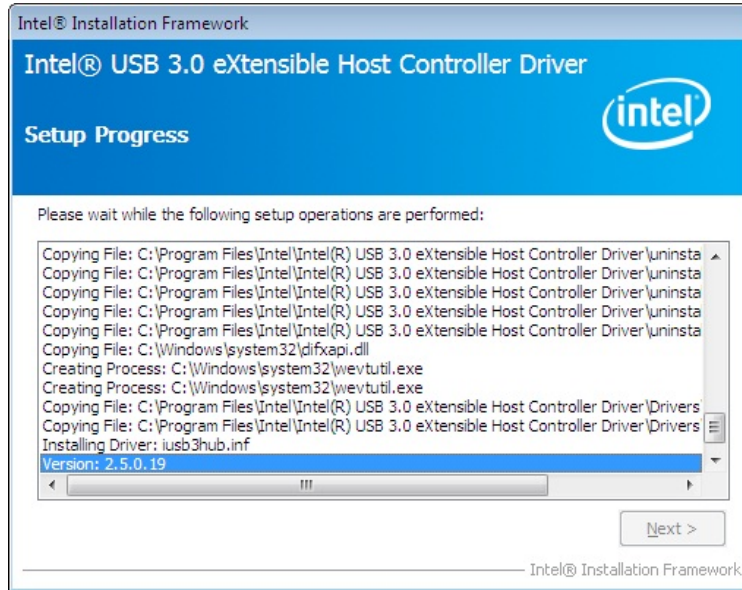
Figure 6-23: USB 3.0 Driver Setup Operations

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

6.8 Intel® AMT Driver Installation

The package of the Intel® ME components includes

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

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

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

Step 2: Click **iAMT Driver & Utility**.

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

Step 4: When the setup files are completely extracted the **Welcome Screen** in

Figure 6-25 appears.

Step 5: Click **Next** to continue.
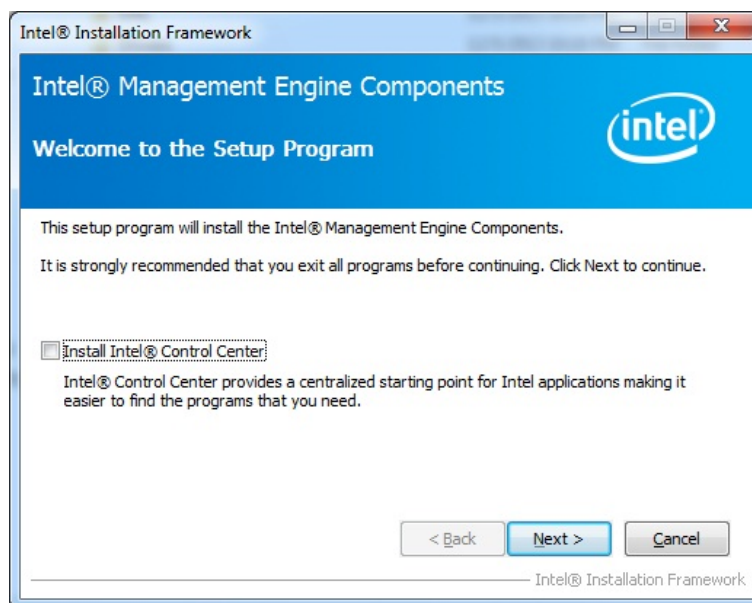
Figure 6-25: Intel® ME Driver Welcome Screen

Step 6: The license agreement in **Figure 6-26** appears.

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

Step 8: Click **Yes** to continue.
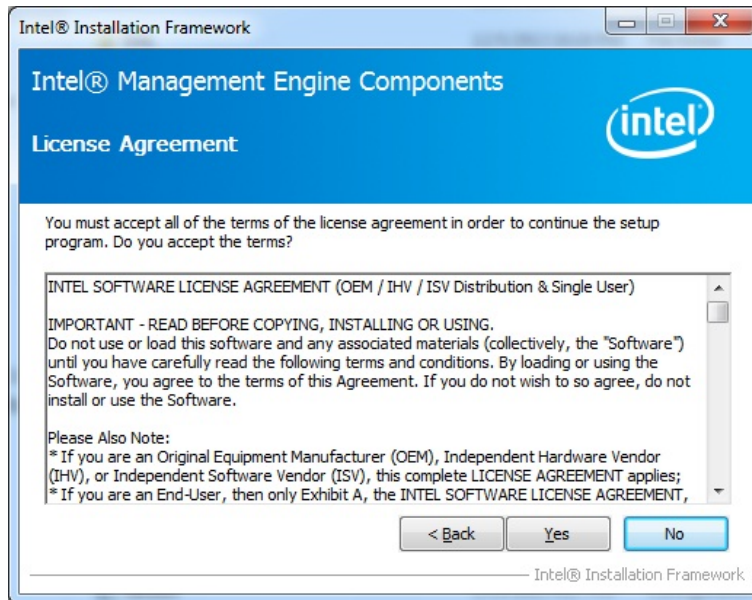
Figure 6-26: Intel® ME Driver License Agreement

Step 9: **Setup Operations** are performed as shown in **Figure 6-27**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.
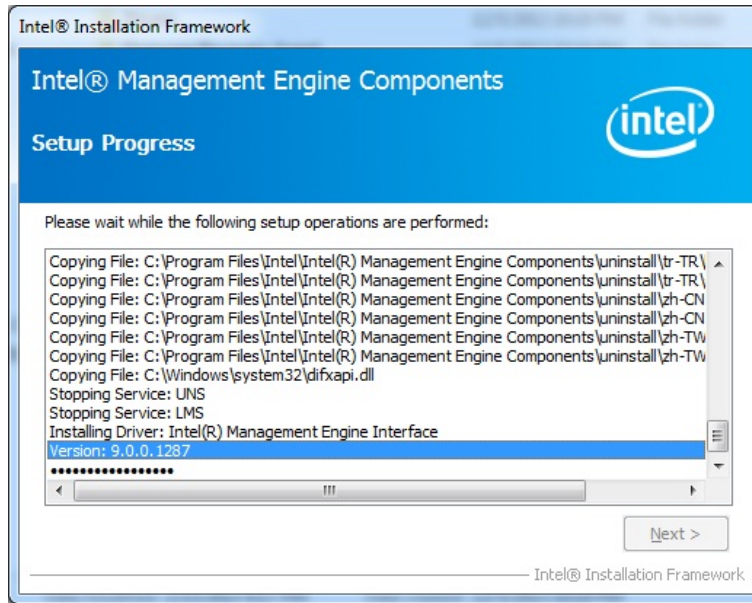
Figure 6-27: Intel® ME Driver Setup Operations

Step 11: The **Finish** screen in **Figure 6-28** appears.

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

Figure 6-28: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

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

Appendix

B

One Key Recovery

B.1 One Key Recovery Introduction

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

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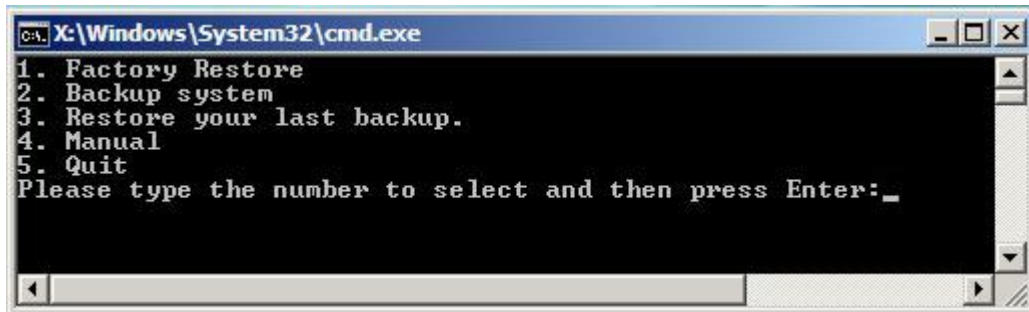
Figure B-1: IEI One Key Recovery Tool Menu

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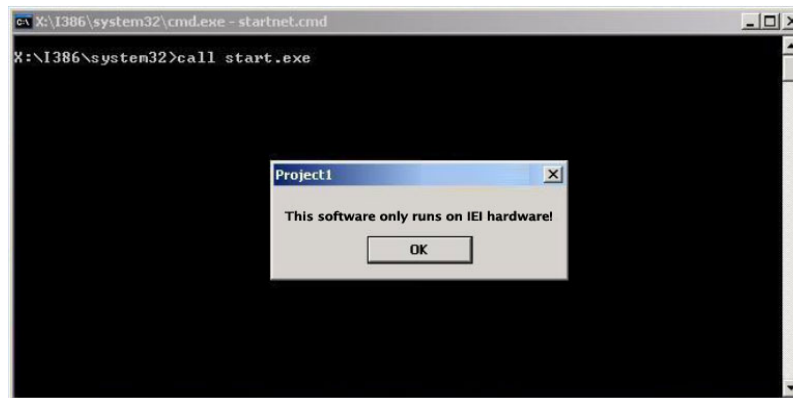
To create the system backup, the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

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 icon] **NOTE:**

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

B.1.2 Supported Operating System

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

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

![NOTE icon] **NOTE:**

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

- Linux

  o Fedora Core 12 (Constantine)

  o Fedora Core 11 (Leonidas)

  o Fedora Core 10 (Cambridge)

  o Fedora Core 8 (Werewolf)

  o Fedora Core 7 (Moonshine)

  o RedHat RHEL-5.4

  o RedHat 9 (Ghirke)

  o Ubuntu 8.10 (Intrepid)

  o Ubuntu 7.10 (Gutsy)

  o Ubuntu 6.10 (Edgy)

  o Debian 5.0 (Lenny)

  o Debian 4.0 (Etch)

  o SuSe 11.2

  o SuSe 10.3

NOTE:

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

B.2 Setup Procedure for Windows

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

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

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

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

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

partition (see **Section B.3**)

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

The detailed descriptions are described in the following sections.

 NOTE:

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

B.2.1 Hardware and BIOS Setup

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

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

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

Step 4: Turn on the system.

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

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

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

B.2.2 Create Partitions

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

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

Step 2: **Boot the system from recovery CD**. When prompted, press any key to boot

from the recovery CD. It will take a while to launch the recovery tool. Please be

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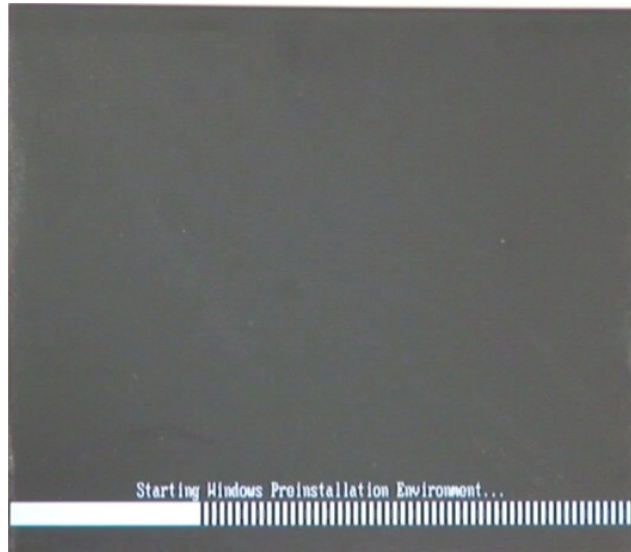
Figure B-2: Launching the Recovery Tool
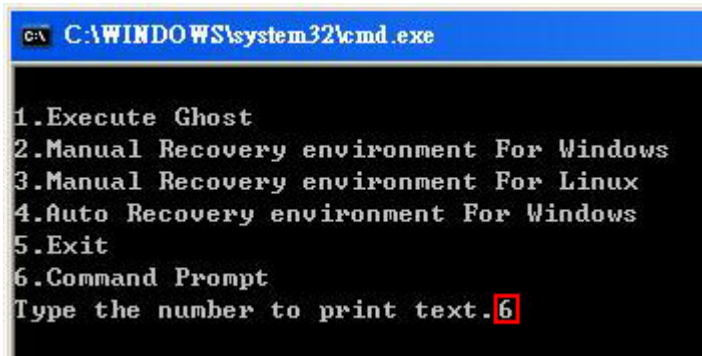
Step 3: The recovery tool setup menu is shown as below.

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.

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!
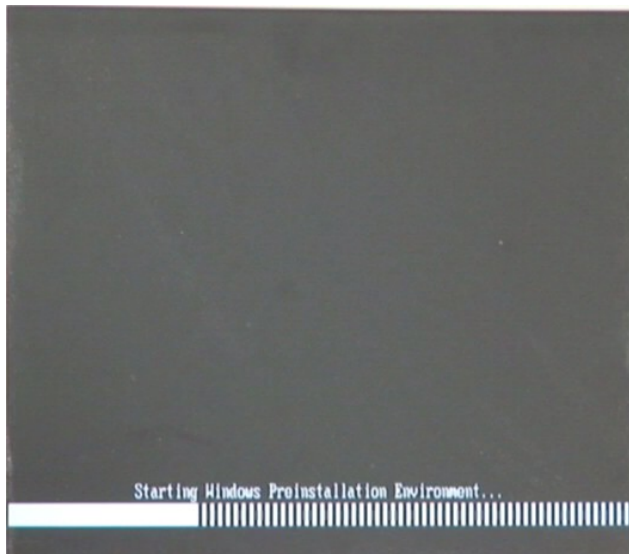
Figure B-6: Launching the Recovery Tool

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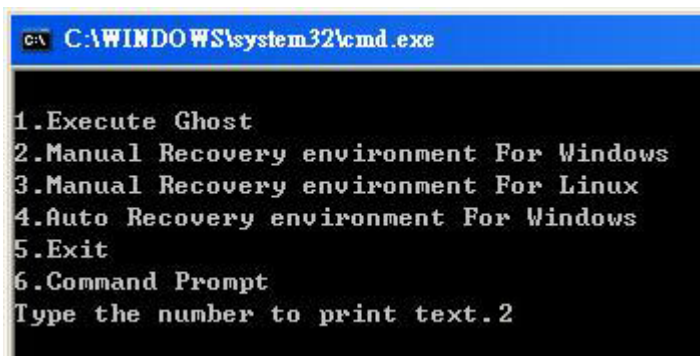
Figure B-7: Manual Recovery Environment for Windows

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.
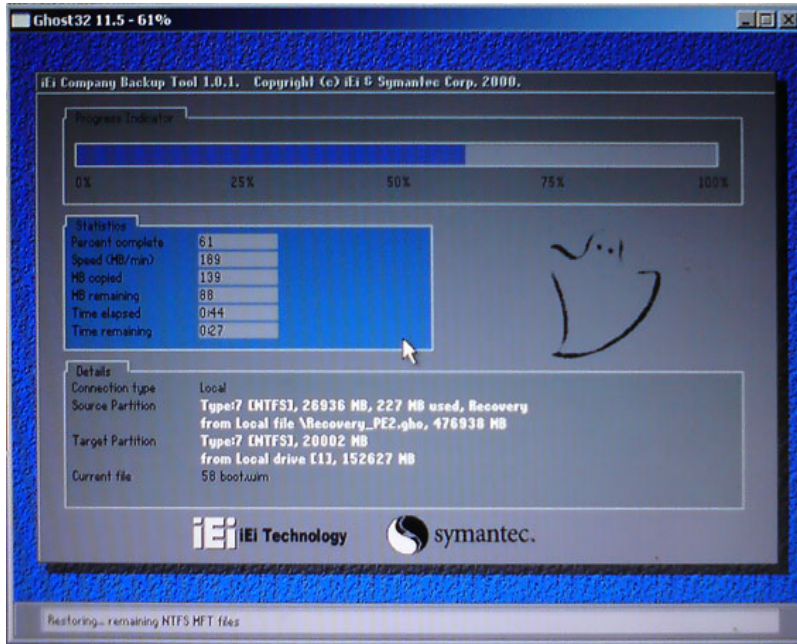
Figure B-8: Building the Recovery Partition

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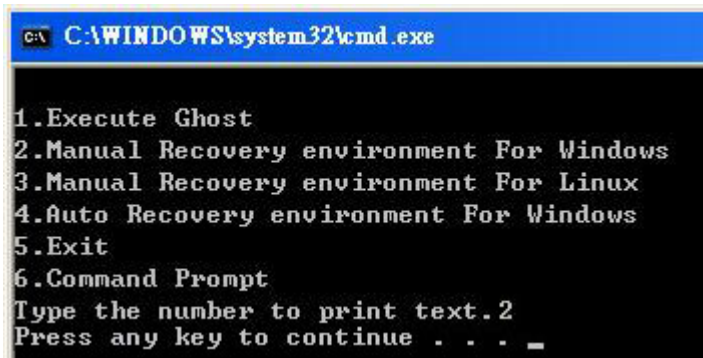
Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

B.2.5 Create Factory Default Image

> ![NOTE icon] **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.
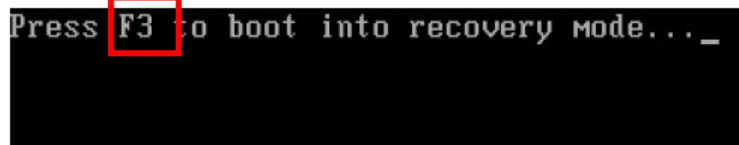
Figure B-10: Press F3 to Boot into Recovery Mode

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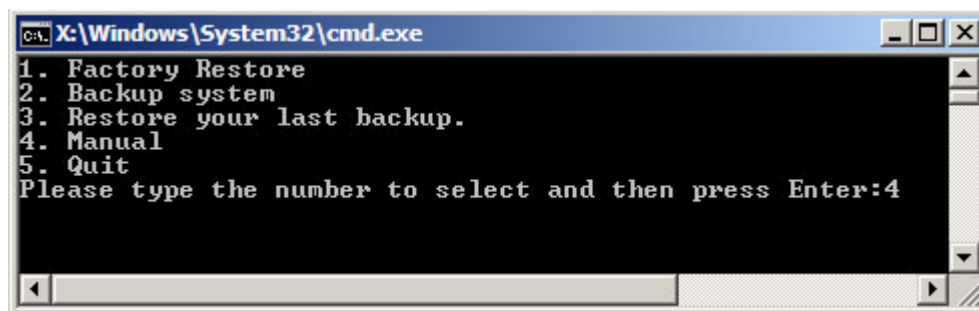
Figure B-11: Recovery Tool Menu

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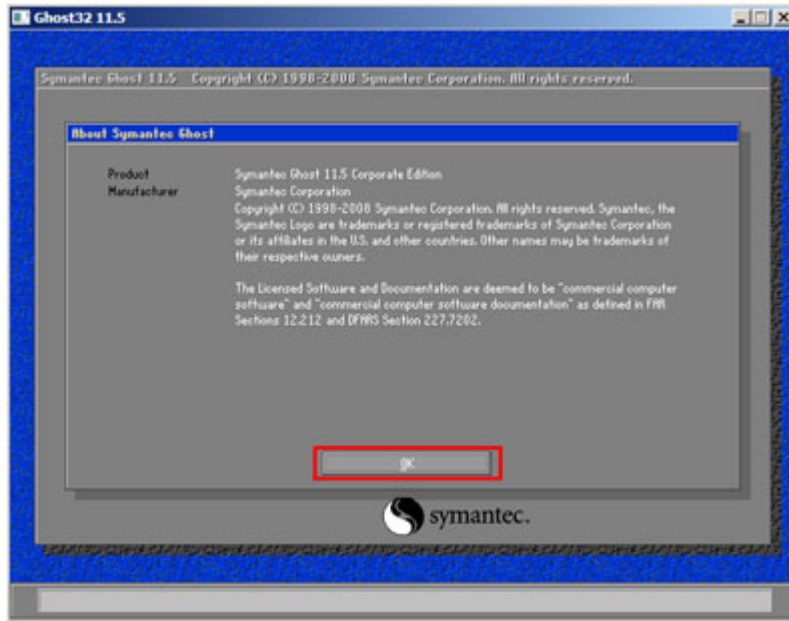
Figure B-12: About Symantec Ghost Window

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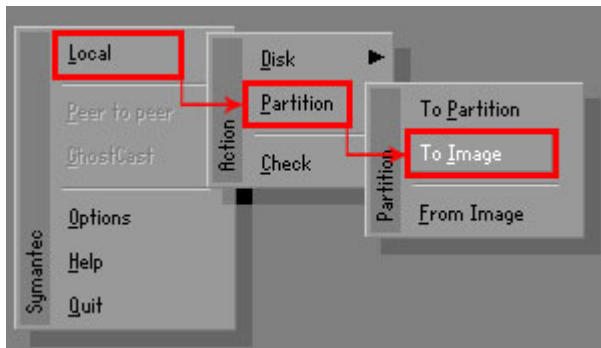
Figure B-13: Symantec Ghost Path

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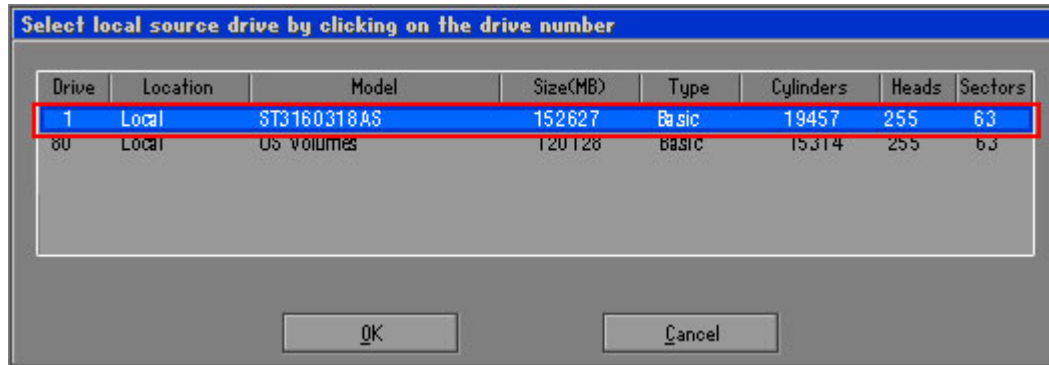
Figure B-14: Select a Local Source Drive

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

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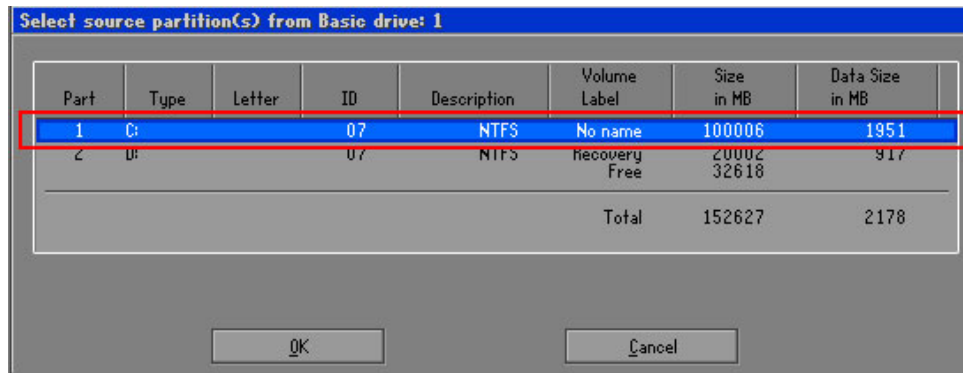
Figure B-15: Select a Source Partition from Basic Drive

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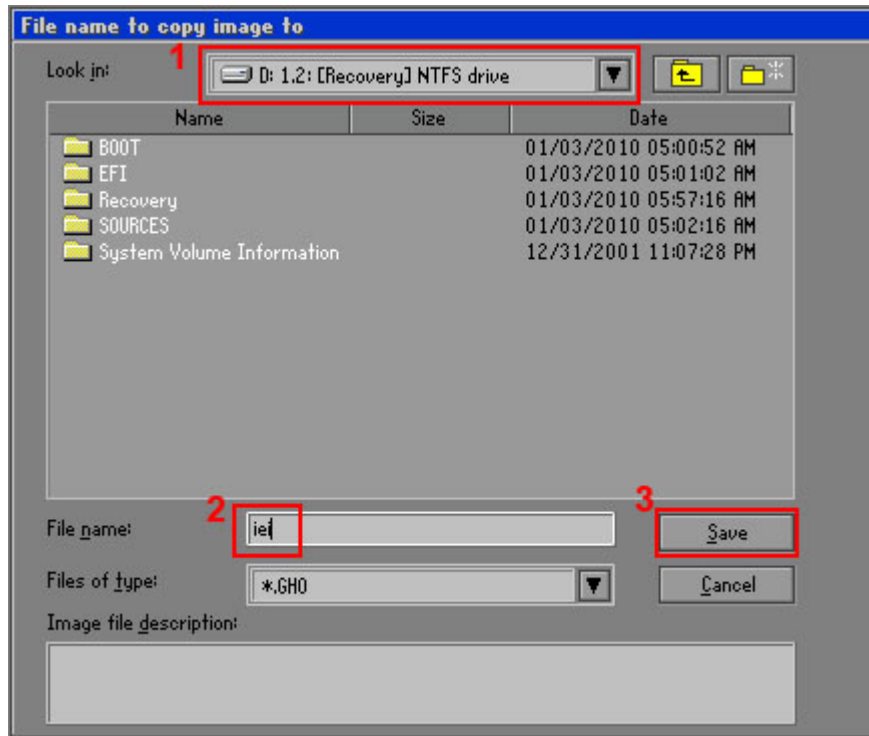
Figure B-16: File Name to Copy Image to

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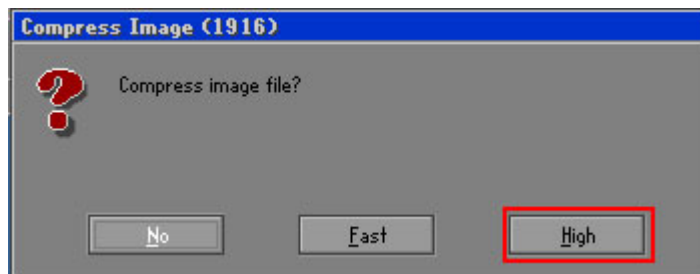
Figure B-17: Compress Image

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

continue.
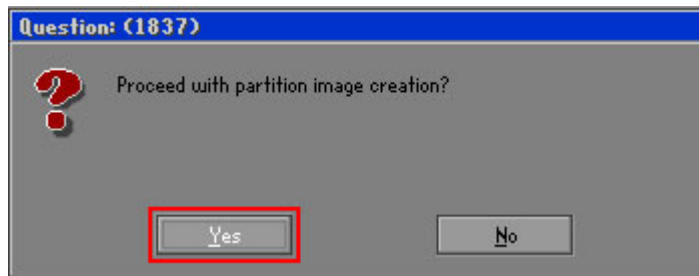
Figure B-18: Image Creation Confirmation

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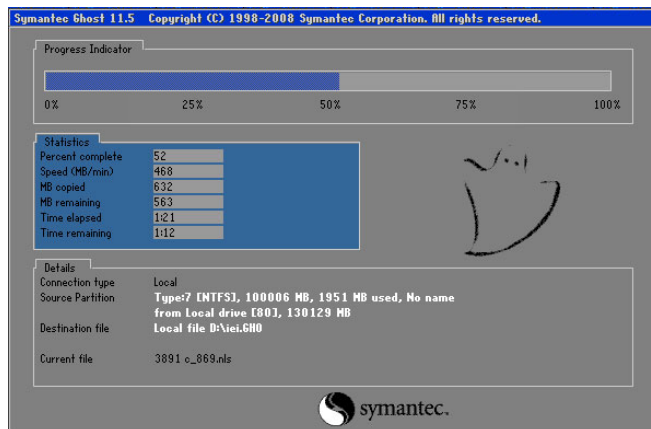
Figure B-19: Creating Image

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.
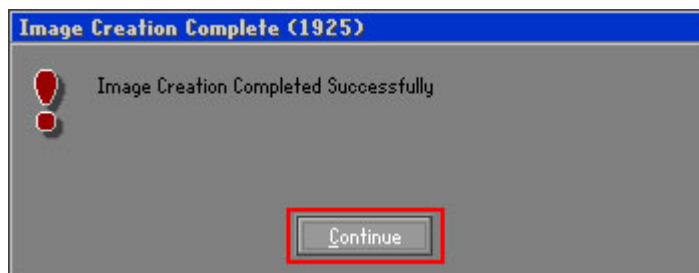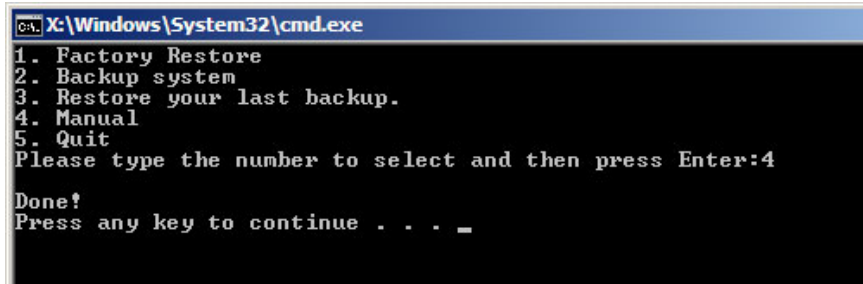
Figure B-20: Image Creation Complete

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)
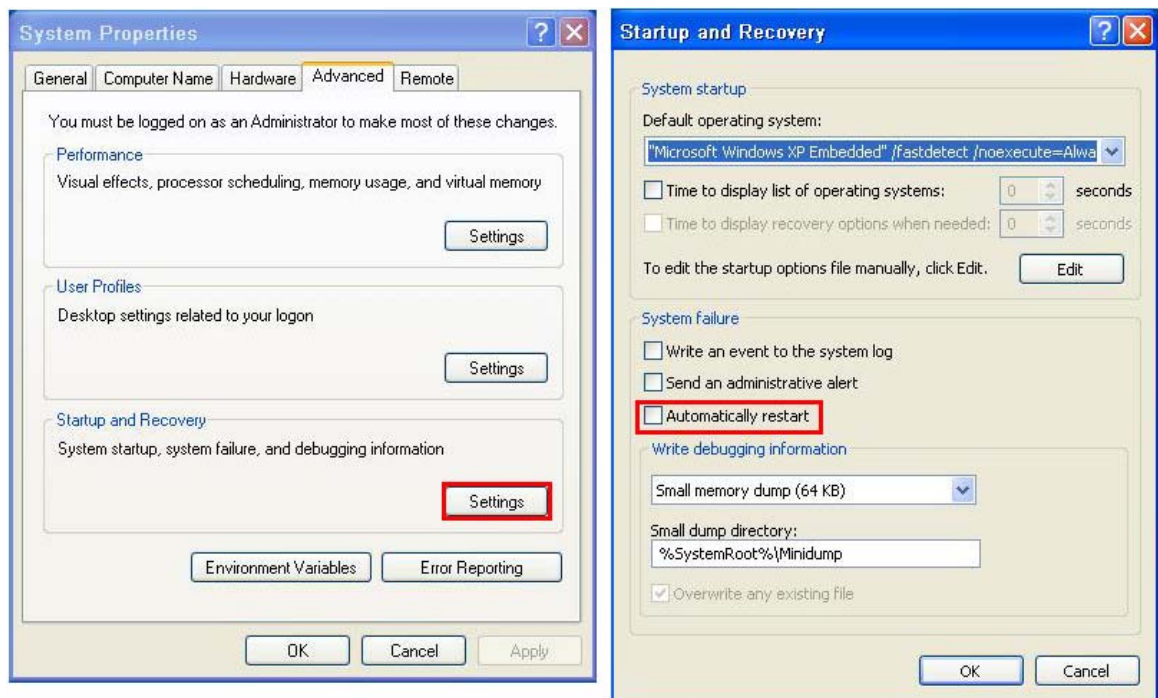
Figure B-23: Disable Automatically Restart

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!
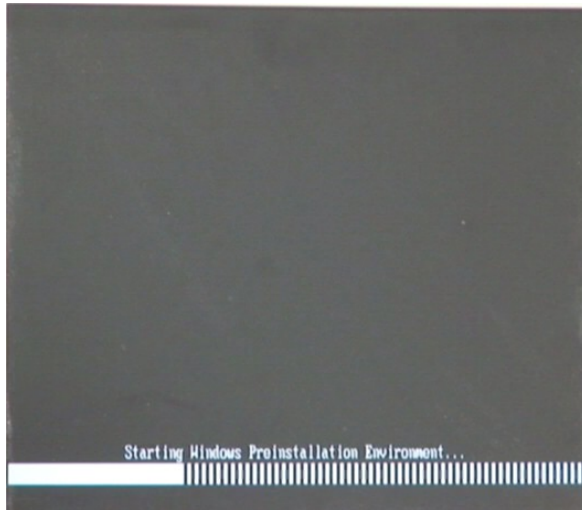
Figure B-24: Launching the Recovery Tool

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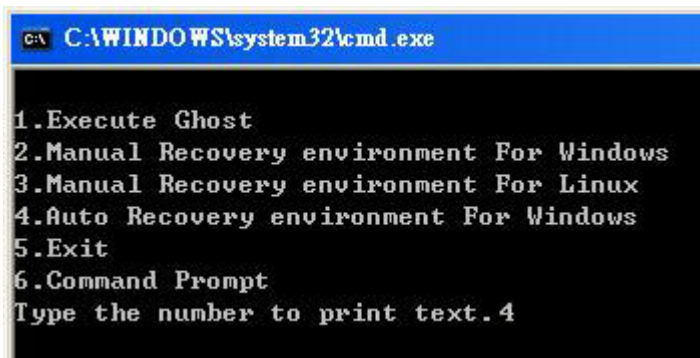
Figure B-25: Auto Recovery Environment for Windows

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.
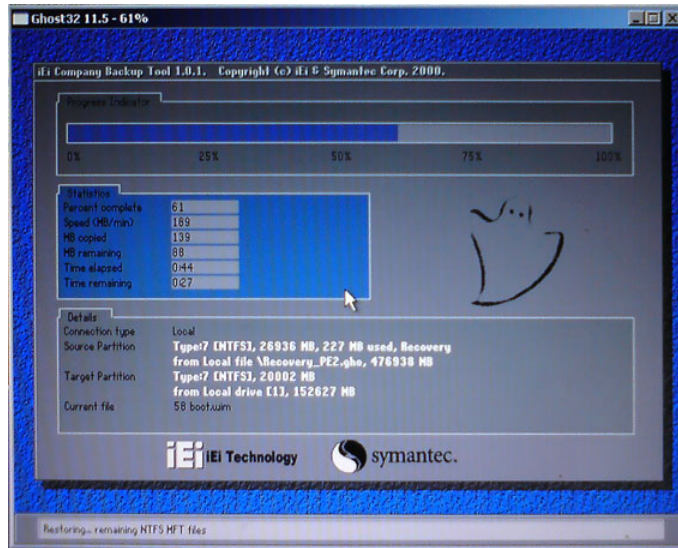
Figure B-26: Building the Auto Recovery Partition

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**).
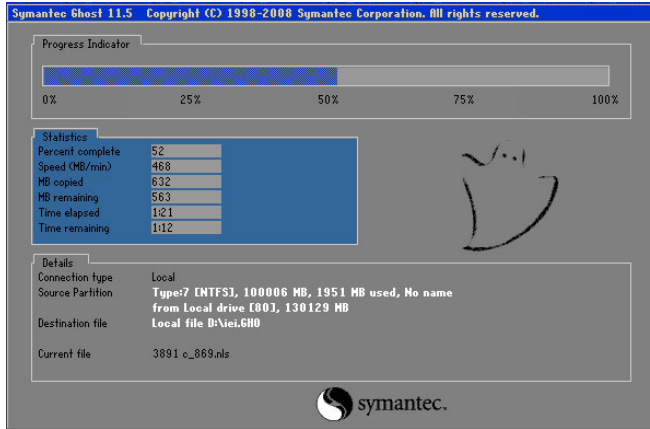
Figure B-28: Creating Image

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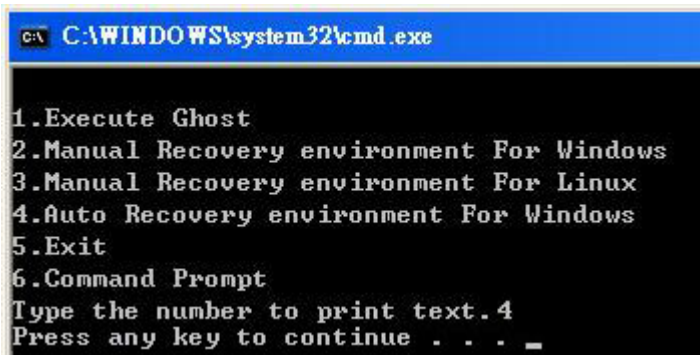
Figure B-29: Press Any Key to Continue

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.
```
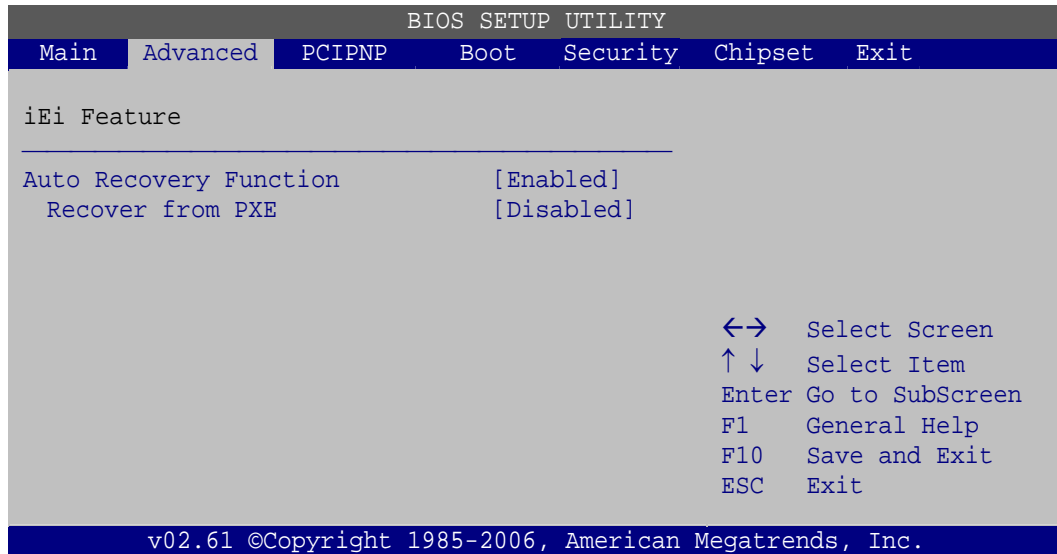
Figure B-30: IEI Feature BIOS Menu

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.
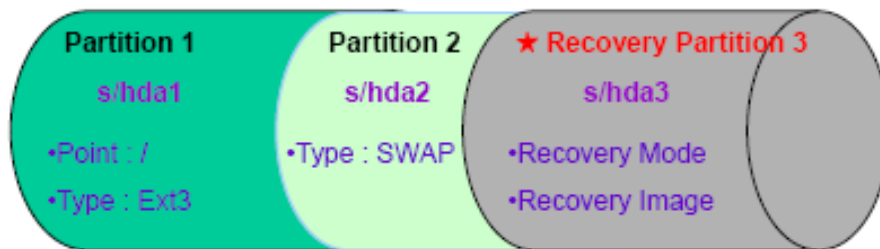
Figure B-31: Partitions for Linux

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.
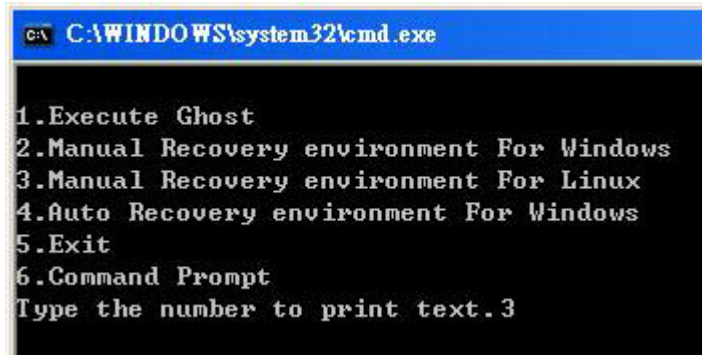
system32>diskpart

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.
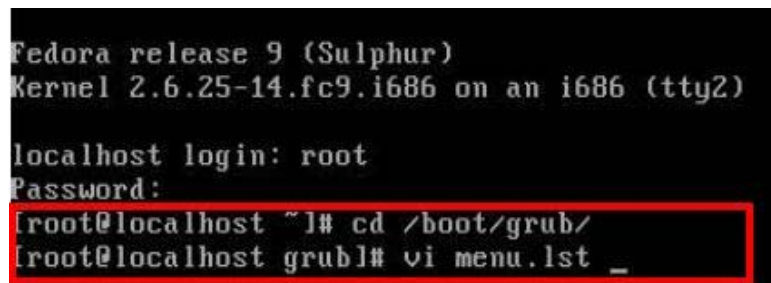
Figure B-32: Manual Recovery Environment for Linux

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.
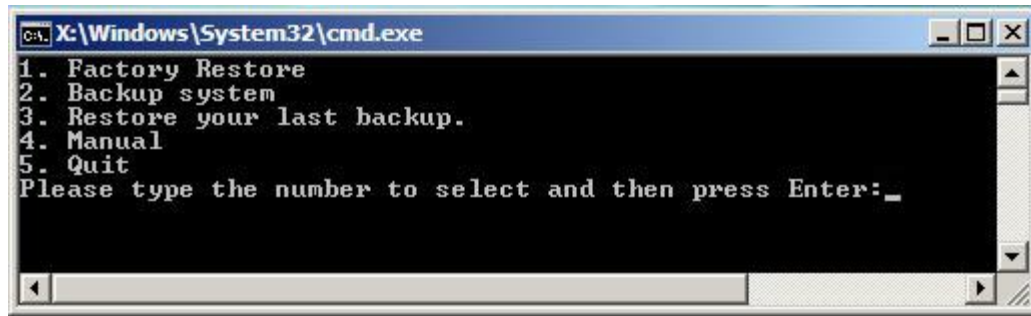
Figure B-35: Recovery Tool Main Menu

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:

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

WARNING:

All data in the system will be deleted during the system recovery. Please backup the system files before restoring the system (either Factory Restore or Restore Backup).

B.5.1 Factory Restore

To restore the factory default image, please follow the steps below.

Step 1: Type <**1**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the factory default. A factory default image called **iei.GHO** is created in the hidden Recovery partition.
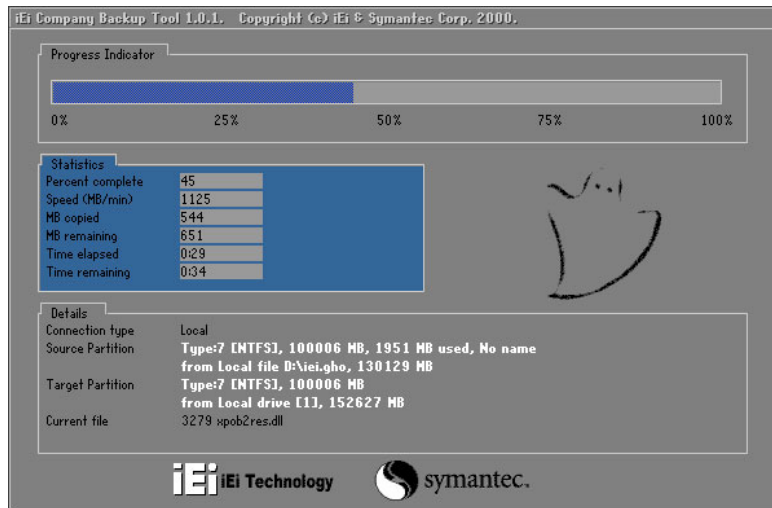

Figure B-36: Restore Factory Default

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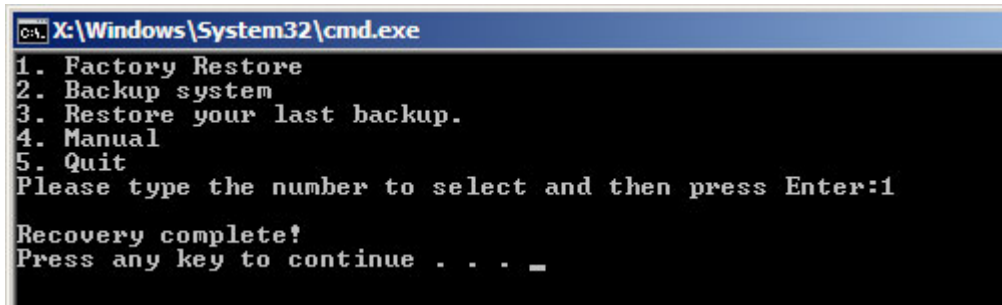
Figure B-37: Recovery Complete Window

B.5.2 Backup System

To backup the system, please follow the steps below.

Step 1:   Type <**2**> and press <**Enter**> in the main menu.

Step 2:   The Symantec Ghost window appears and starts to backup the system. A
backup image called **iei_user.GHO** is created in the hidden Recovery partition.
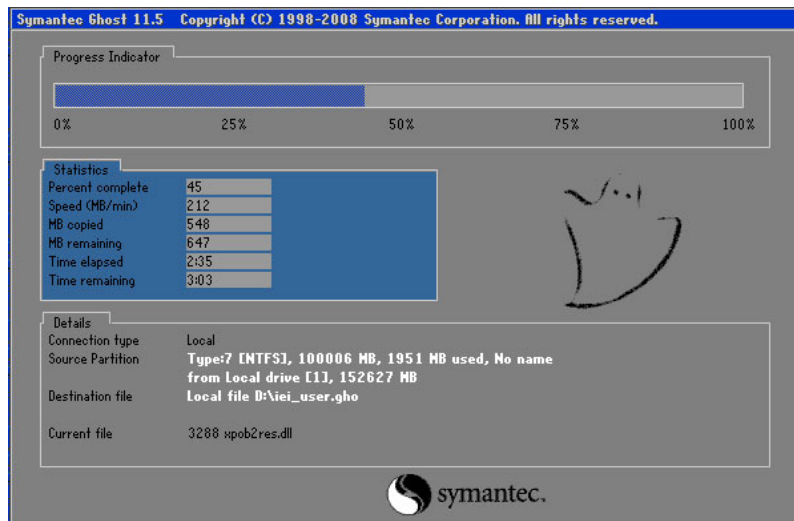
Figure B-38: Backup System

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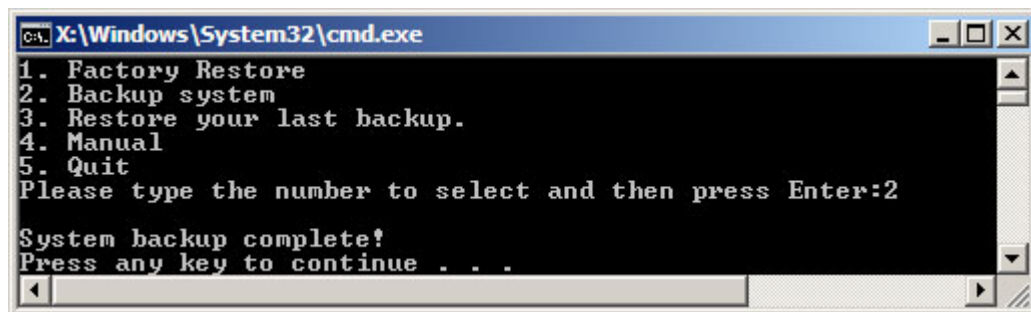
Figure B-39: System Backup Complete Window

B.5.3 Restore Your Last Backup

To restore the last system backup, please follow the steps below.

Step 1: Type <**3**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the last backup image (iei_user.GHO).
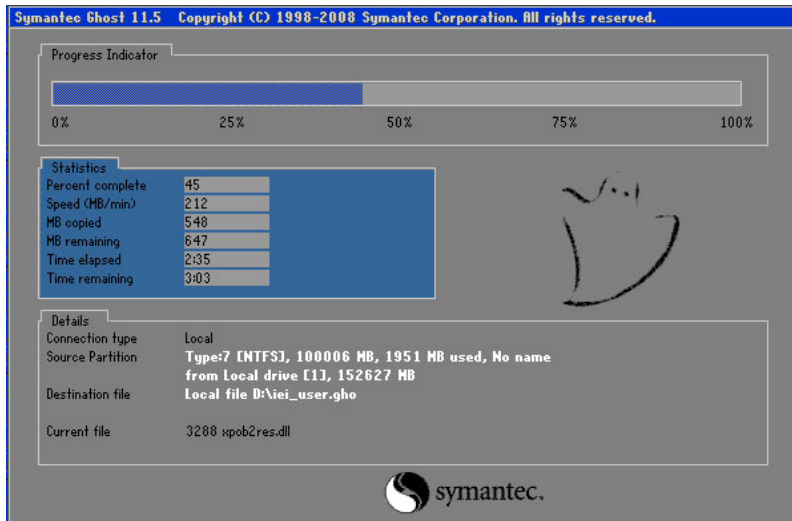
Figure B-40: Restore Backup

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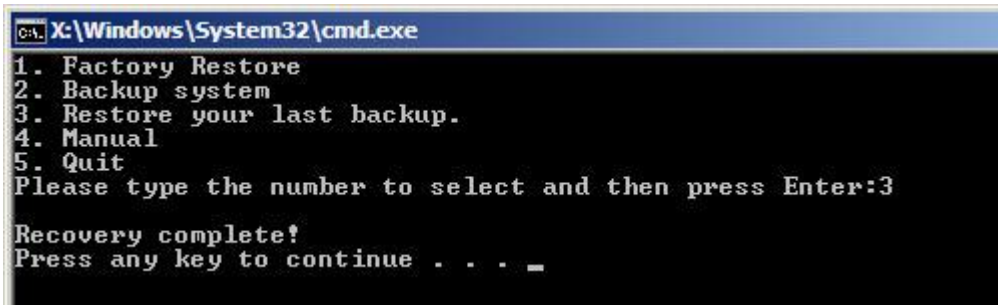

Figure B-41: Restore System Backup Complete Window

B.5.4 Manual

To restore the last system backup, please follow the steps below.

Step 1: Type <**4**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.
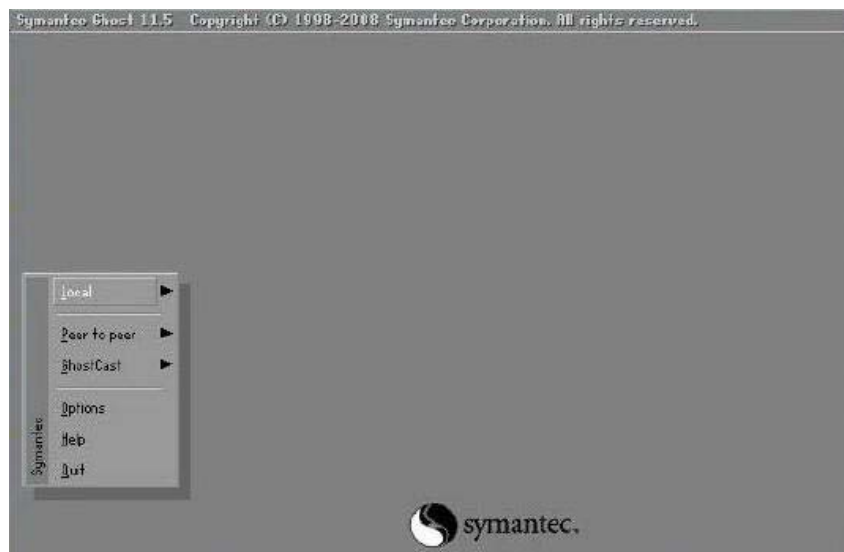

Figure B-42: Symantec Ghost Window

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

B.6 Restore Systems from a Linux Server through LAN

The One Key Recovery allows a client system to automatically restore to a factory default image saved in a Linux system (the server) through LAN connectivity after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To be able to use this function, the client system and the Linux system MUST reside in the same domain.
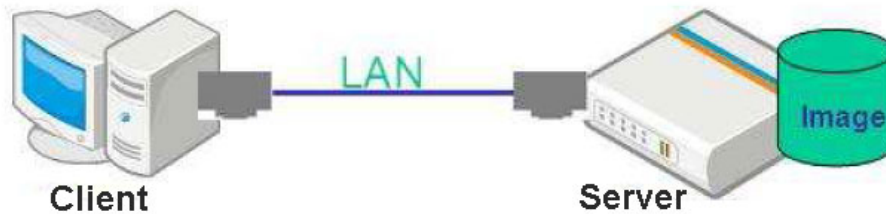
⚠️ **CAUTION:**

The supported client OS includes:

- Windows 2000
- Windows 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

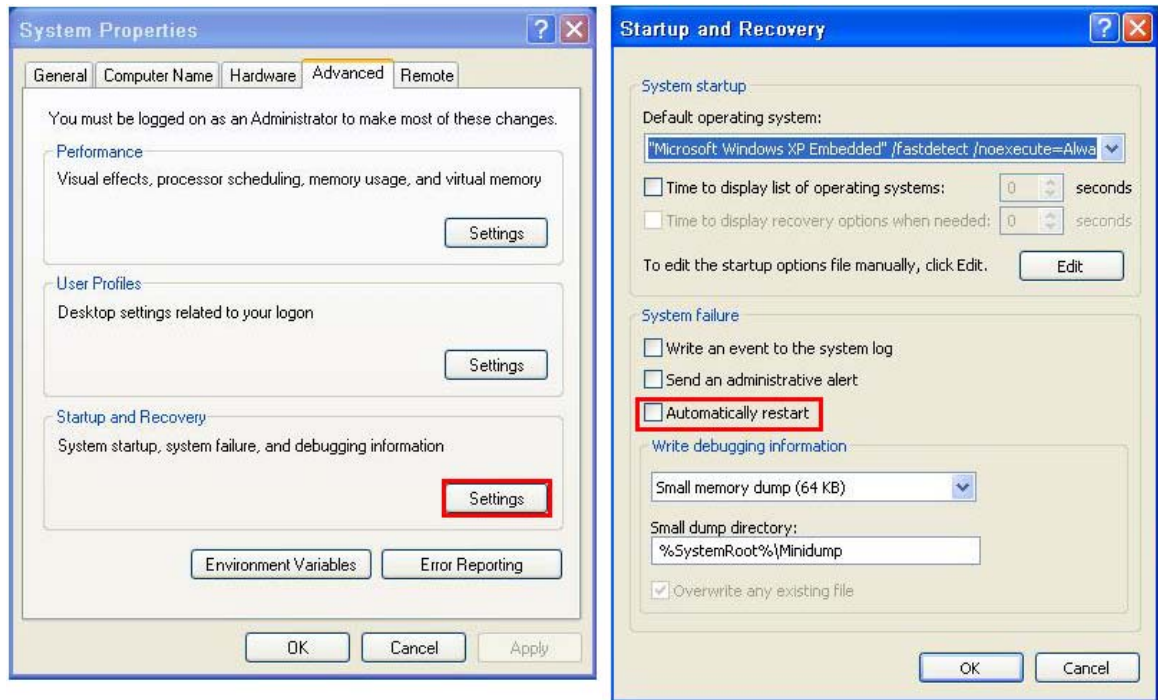OK to save the settings and exit. (See **Figure B-23**)

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

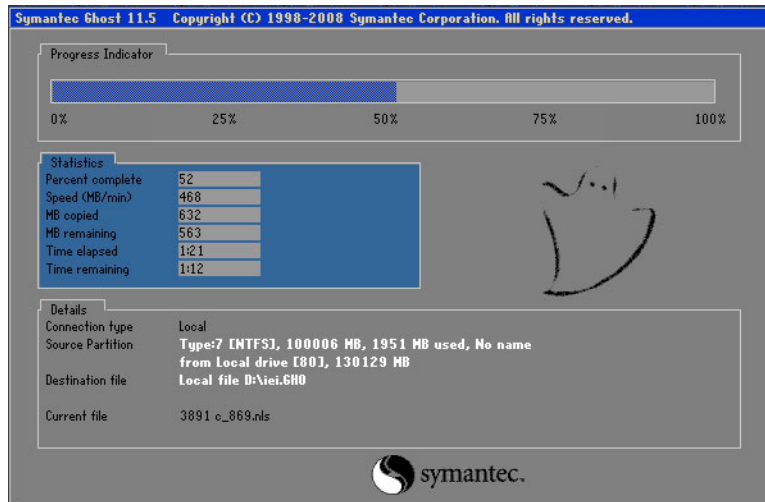restore from the factory default image every ten (10) minutes.

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.

```
Symantec Ghost 11.5   Copyright (C) 1998-2008 Symantec Corporation. All rights reserved.

Progress Indicator

0%          25%          50%          75%          100%

Statistics
Percent complete    52
Speed (MB/min)      468
MB copied           632
MB remaining        563
Time elapsed        1:21
Time remaining      1:12

Details
Connection type     Local
Source Partition    Type:7 [NTFS], 100006 MB, 1951 MB used, No name
                    from Local drive [80], 130129 MB
Destination file    Local file D:\iei.GHO

Current file        3891 c_869.nls

                    symantec.
```

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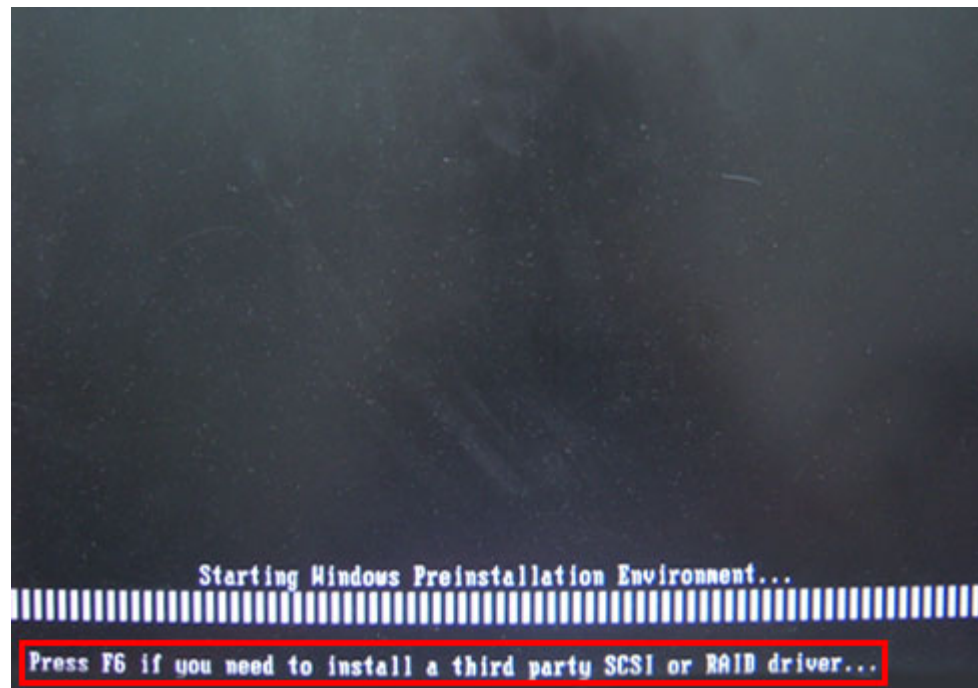
Step 5:   When the following window appears, press <**S**> to select "Specify Additional

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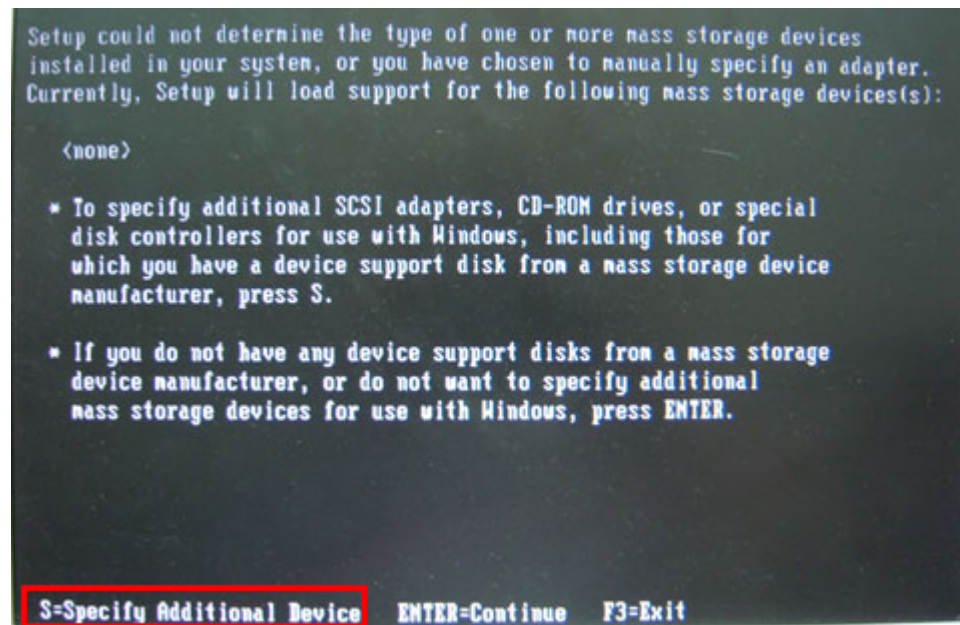
Step 6: In the following window, select a SATA controller mode used in the system. Then press <**Enter**>. The user can now start using the SATA HDD.
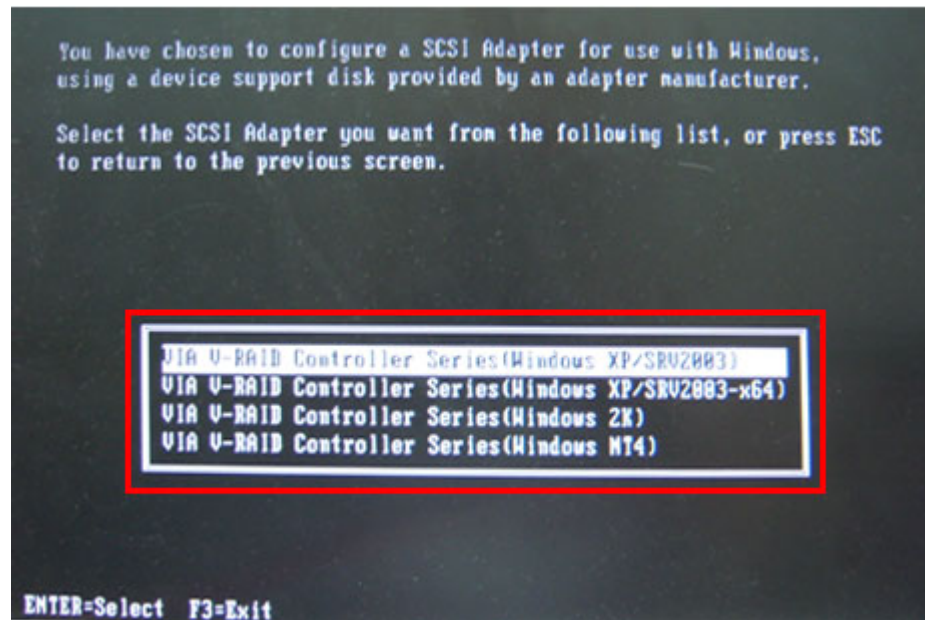
Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

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.

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 WAFER-ULT-i1 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

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

D.2 DIO Connector Pinouts

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

Table 6-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

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

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

D.3.2 Enable the DIO Output Function

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

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

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。