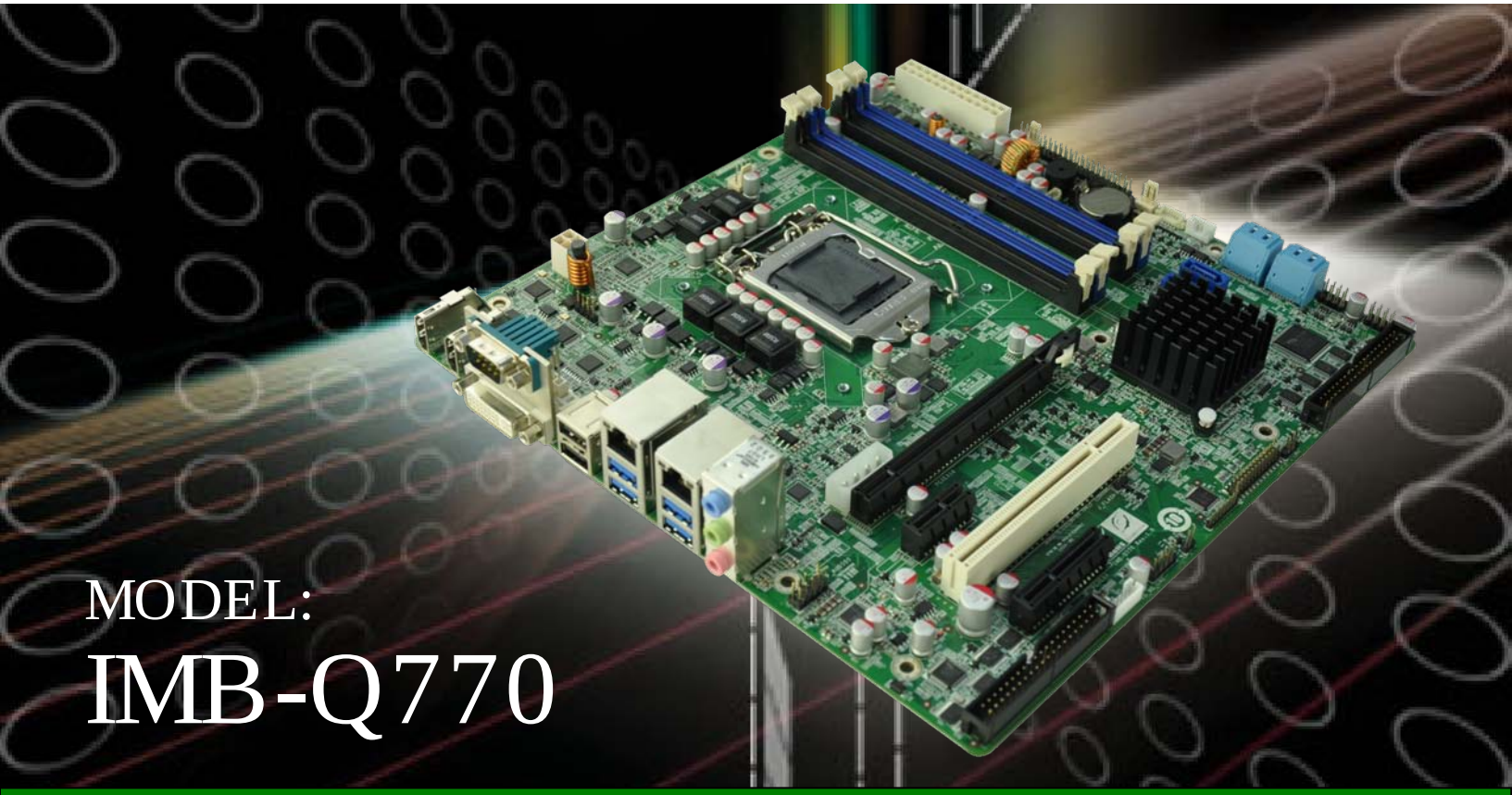
IEI Technology Corp.



MODEL:

IMB-Q770

microATX Motherboard Supports 22nm LGA1155 Intel® Core™ i7/i5/i3 CPU with Intel® Q77, DDR3, Three Independent Displays via Dual HDMI/DVI-I, Dual Intel® PCIe GbE, USB 3.0, SATA 6Gb/s, Ten Serial Ports, HD Audio and RoHS

User Manual

Rev. 1.00 – 30 August, 2012

RoHS Lead Free

Revision

Date	Version	Changes
30 August, 2012	1.00	Initial release

Copyright

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TRADEMARKS

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Chapter

1

Introduction

1.1 Introduction

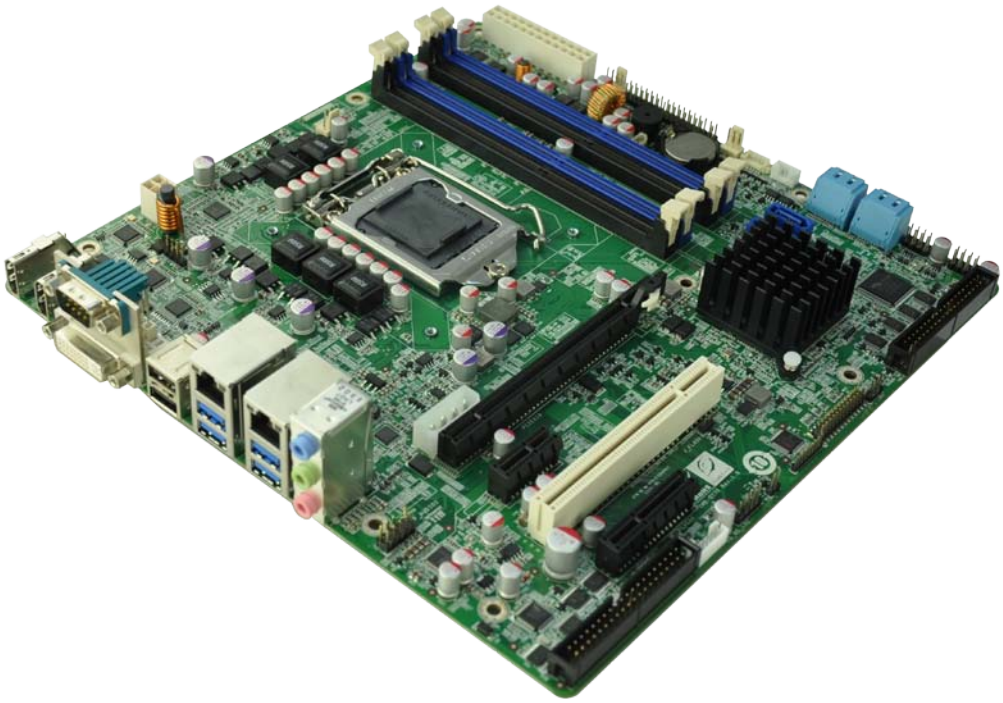


Figure 1-1: IMB-Q770

The IMB-Q770 is an ATX motherboard. It accepts a socket LGA1155 Intel® Core™ i7/i5/i3 quad/dual core processor and supports four 240-pin 1600/1333MHz dual-channel DDR3 SDRAM unbuffered DIMMs (system max. 32GB).

The integrated Intel® Q77 system Chipset supports two GbE LAN: one through the Intel® 82579 PHY with Intel® AMT 8.0 support and the other through the Intel® 82583V PCIe controller.

The IMB-Q770 includes two HDMI connectors and one DVI-I connector. Expansion and I/O include one PCI slot, one PCIe x16 slot, one PCIe x4 slot, one PCIe x1 slot, four USB 3.0 ports on the rear panel, two USB 2.0 on the rear panel, four USB 2.0 by pin header, four SATA 3Gb/s connectors, two SATA 6Gb/s connectors. Serial device connectivity is provided by eight internal RS-232 connectors, one external RS-232 connector and one internal RS-232/422/485 connector.

1.2 Benefits

Some of the IMB-Q770 motherboard benefits include:

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

1.3 Features

Some of the IMB-Q770 motherboard features are listed below:

- LGA1155 Intel® Core™ i7/i5/i3 processor supported
- Dual-channel DDR3 1600/1333MHz supports up to 32GB
- Intel® PCIe GbE with Intel® AMT 8.0 supported
- Supports three displays with two displays in combination of HDMI, DVI and VGA
- Supports PCI-Express generation 3.0 at 8GT/s I/O bandwidth
- USB 3.0 and SATA 6Gb/s supported
- Supports much scalable serial ports
- IEI One Key Recovery solution allows you to create rapid OS backup and recovery

1.4 Connectors

The connectors on the IMB-Q770 are shown in the figure below.

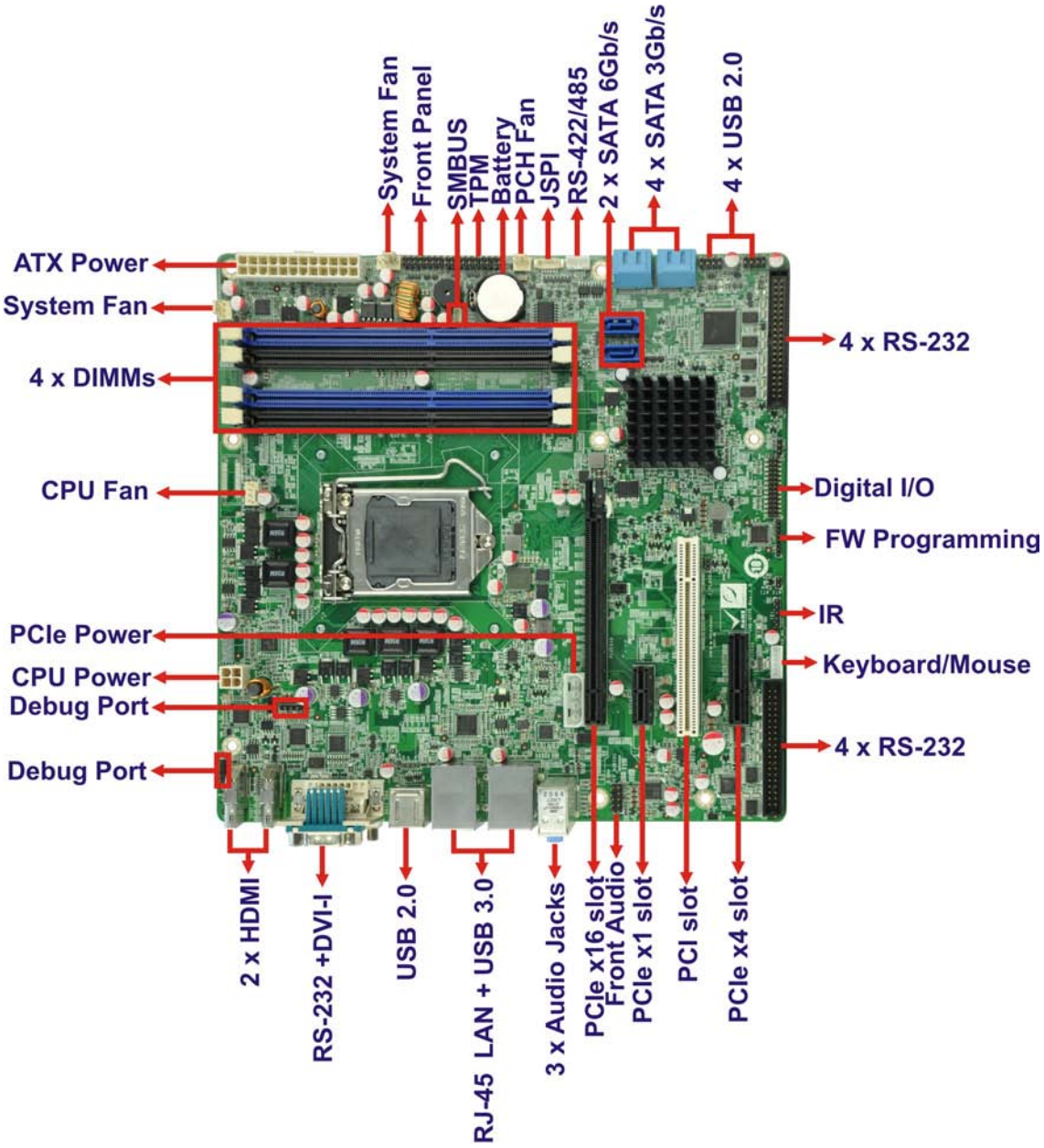


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMB-Q770 are shown in the diagram below.

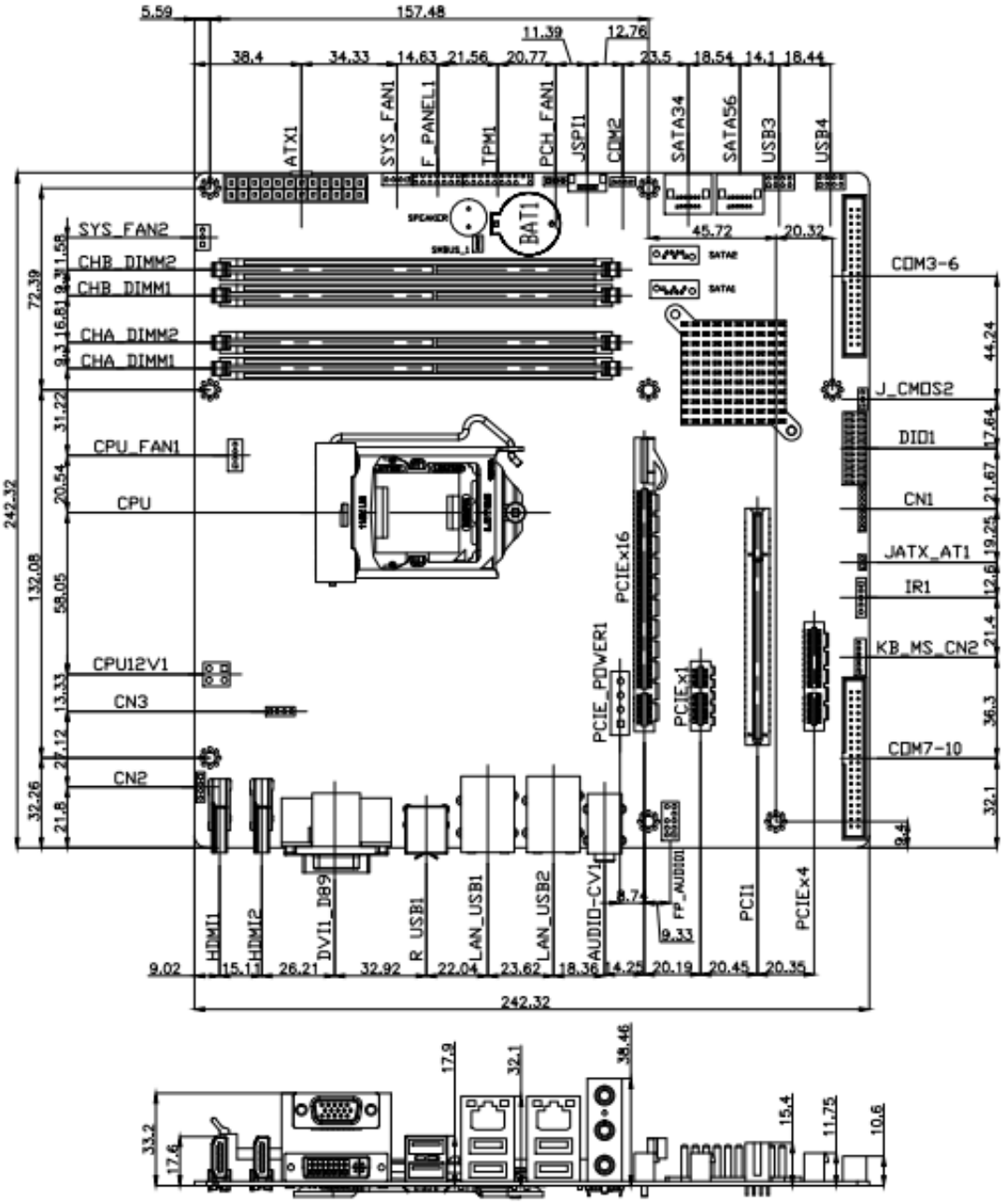


Figure 1-3: IMB-Q770 Dimensions (mm)

1.6 Data Flow

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

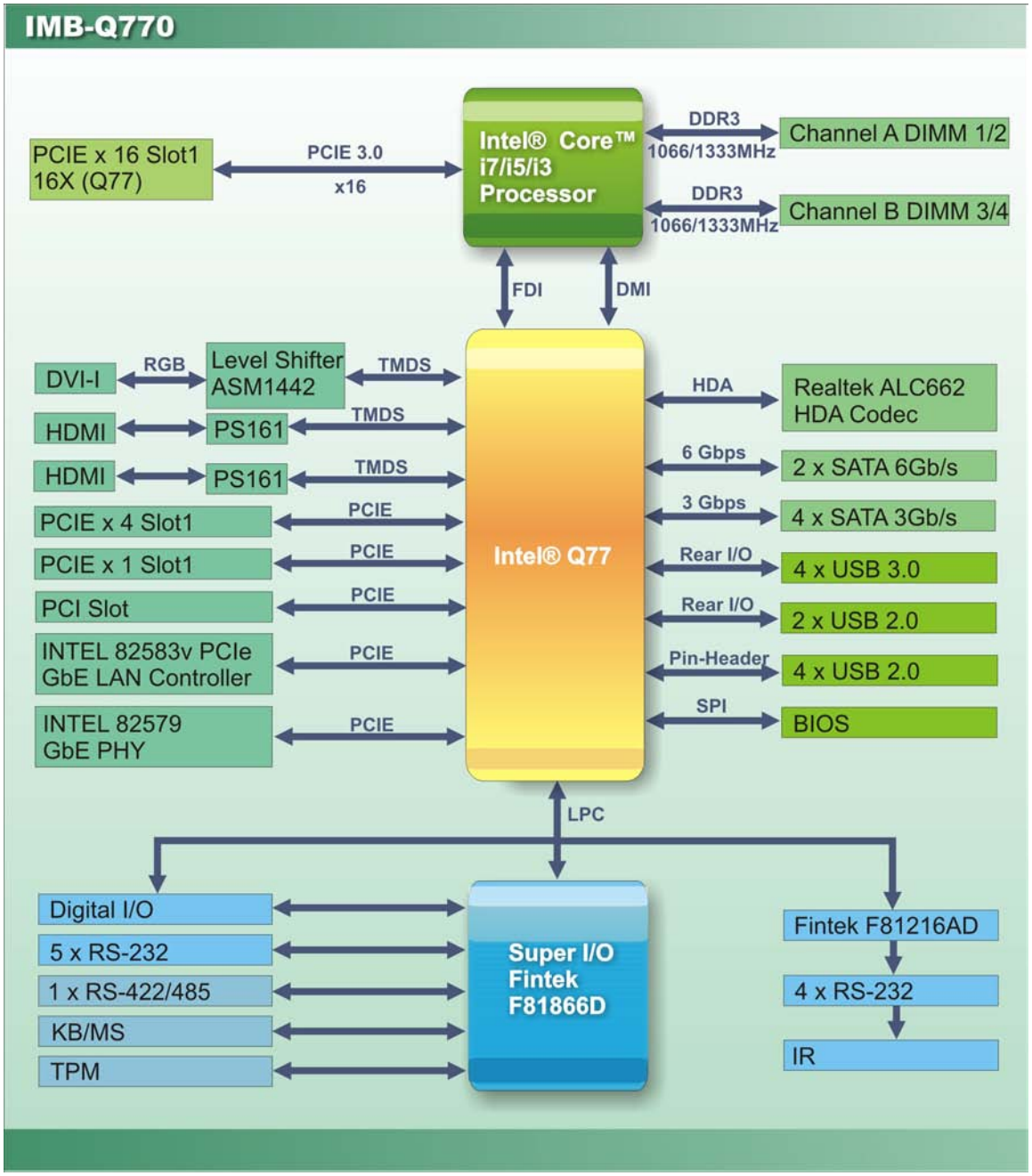


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMB-Q770 technical specifications are listed below.

Specification/Model	IMB-Q770
Form Factor	Micro-ATX
CPU	LGA1155 socket supports Intel® Core™ i7/i5/i3 quad/dual core processor
System Chipset	Intel® Q77
Graphics Engine	Intel® HD Graphics Gen 7 supports DX11 and OpenCL 1.1 Full MPEG2, VC1, AVC Decode
Display Output	Dual HDMI integrated in the Intel® Q77 DVI-I integrated in the Intel® Q77
Memory	Four 240-pin 1600/1333MHz dual-channel DDR3 SDRAM unbuffered DIMMs supported (system max. 32GB)
Audio	Realtek ALC662 HD audio codec (Line-in, Line-out, Mic)
BIOS	UEFI BIOS
Digital I/O	24-bit Digital I/O (12-bit input, 12-bit output)
Ethernet	Intel® 82583V PCIe controller Intel® 82579 PHY with Intel® AMT 8.0 supported
Super I/O	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	One PCI slot
PCIe	One PCIe x16 slot One PCIe x4 slot One PCIe x1 slot
I/O Interface Connectors	
Audio Connectors	Three external audio jacks (Line-in, Line-out, Mic)

Specification/Model	IMB-Q770
Display port	One DVI-I port Two HDMI ports
Ethernet	Two RJ-45 GbE ports
Keyboard/Mouse	One 6-pin wafer for PS/2 KB/MS
TPM	One 20-pin header
Front Panel	1 x Front panel connector (power LED, HDD LED, speaker, power button, reset button)
Front Audio	One 10-pin header
SMBUS	One 4 pin wafer
I2C	One 4 pin wafer
IR	One 5 pin header
Fan	One 4-pin CPU fan connector Two 3-pin system fan connectors
Serial Ports	One external RS-232 serial port Eight RS-232 via internal two 40-pin box headers One RS-422/485 via internal 4-pin wafer
USB ports	Four external USB 3.0 ports on rear IO Two external USB 2.0 ports on rear IO Four internal USB 2.0 ports by pin header
Serial ATA	Two SATA 6Gb/s connectors Four SATA 3Gb/s connectors
Environmental and Power Specifications	
Power Supply	ATX power supply
Power Consumption	3.3V@0.31A, 5V@2.91A, 12V@0.51A, 12V@2.12A, -12V@0.10A (Intel® Core™ i3 3200 3.2GHZ CPU with four 1333MHz 1GB DDR3 memory)
Operating Temperature	-10ºC ~ 60ºC
Humidity	5% ~ 95% (non-condensing)

Specification/Model	IMB-Q770
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight GW/NW	1200 g / 700 g

Table 1-1: IMB-Q770 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMB-Q770 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 IMB-Q770 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMB-Q770 is shipped with the following components:

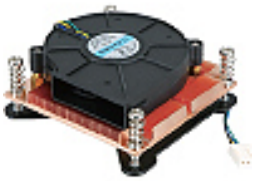
Quantity	Item and Part Number	Image
1	IMB-Q770 motherboard	
1	DVI-I to VGA adapter (**P/N**: 33Z00-000031-RS)	
4	SATA cable (**P/N**: 32801-000703-200-RS)	
1	I/O shielding (**P/N**: 45014-0042C0-00-RS)	
1	Mini jumper pack (2.54mm)	
1	Utility CD	

Quantity	Item and Part Number	Image
1	One Key Recovery CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable with bracket (**P/N**: 19800-003100-100-RS)	
Quad-port RS-232 cable without bracket (40/40/40/40cm) (**P/N**: 32205-001203-100-RS)	
RS-422/485 cable, 200mm (**P/N**: 32205-003800-100-RS)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
PS/2 KB/MS Y-cable with bracket, 220mm (**P/N**: 19800-000075-RS)	
High performance LGA1155/LGA1156 cooler kit, 1U chassis compatible, 73W (**P/N**: CF-1156A-RS)	

Item and Part Number	Image
High performance LGA1155/LGA1156 cooler kit, 95W (**P/N**: CF-1156B-RS)	
LGA1155/LGA1156 cooler kit, 1U chassis compatible, 45W (**P/N**: CF-1156C-RS)	
LGA1155/LGA1156 cooler kit, 1U chassis compatible, 65W (**P/N**: CF-1156D-RS)	
20-pin Infineon TPM module, SW management tool, firmware v3.17 (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-Q770 Layout

The figures below show all the connectors and jumpers.

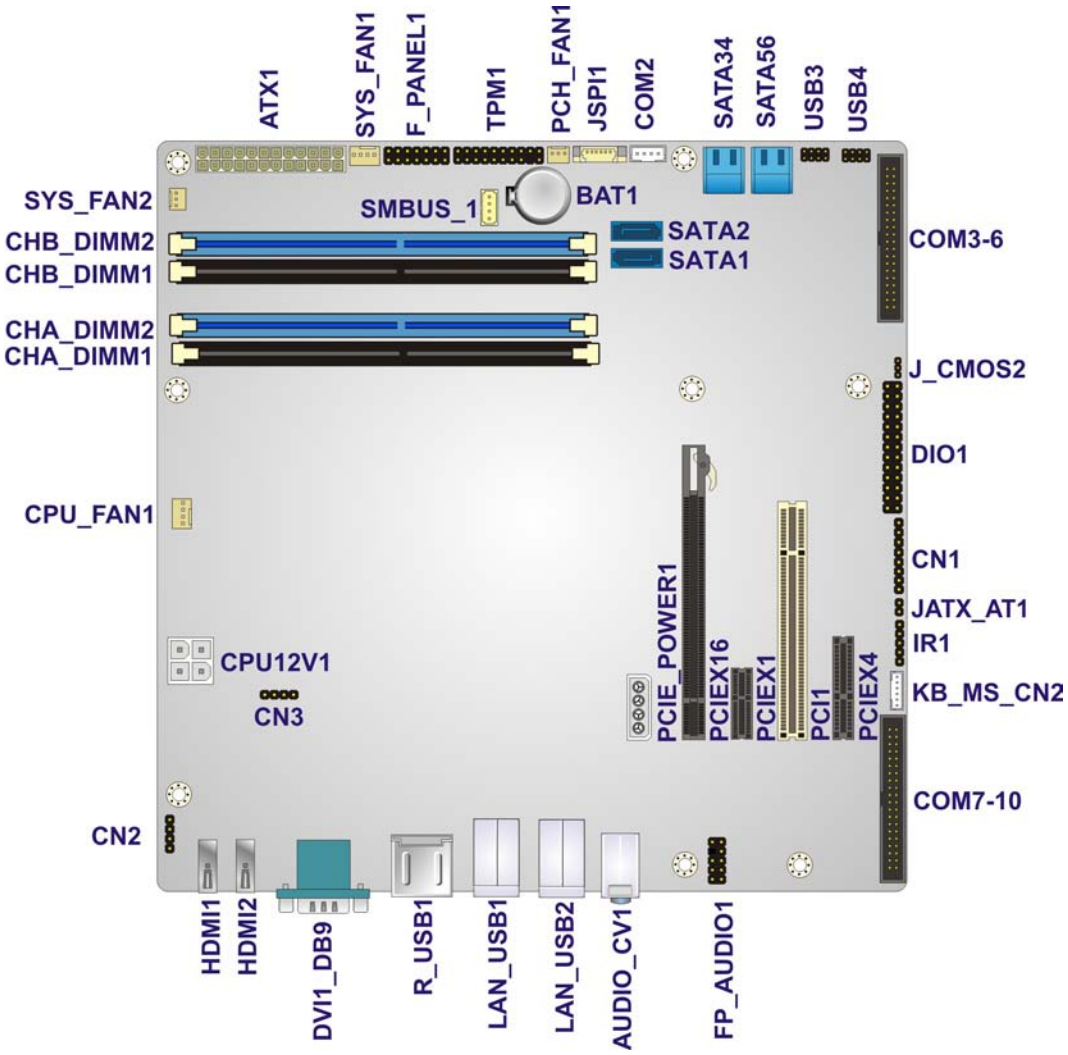


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX power connector	24-pin ATX	ATX1
Battery connector	battery holder	BAT1
CPU power connector	4-pin Molex	CPU12V1
DDR3 DIMM slots	DDR3 DIMM slot	CHA_DIMM1 CHA_DIMM2 CHB_DIMM1 CHB_DIMM2
Debug port connector	4-pin header	CN2, CN3
Digital I/O connector	26-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connectors (system)	4-pin wafer	SYS_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN2
Fan connector (PCH)	3-pin wafer	PCH_FAN1
Front panel audio connector	10-pin header	FP_AUDIO1
Front panel connector	14-pin header	F_PANEL1
FW programming connector	8-pin header	CN1
Infrared interface connector	5-pin header	IR1
Keyboard/mouse connector	6-pin wafer	KB_MS_CN2
PCIe power connector	4-pin Molex	PCIE_POWER1
PCI slot	PCI slot	PCI1
PCIe x16 slot	PCIe x16 slot	PCIEX16
PCIe x4 slot	PCIe x4 slot	PCIEX4
PCIe x1 slot	PCIe x1 slot	PCIEX1
SATA 3Gb/s drive connectors	14-pin SATA connector	SATA34, SATA56

Connector	Type	Label
SATA 6Gb/s drive connectors	7-pin SATA connector	SATA1, SATA2
Serial port connector, RS-422/485	4-pin wafer	COM2
Serial port connectors, RS-232	40-pin box header	COM3-6,COM7-10
SMBus connector	4-pin wafer	SMBUS_1
SPI ROM connector	6-pin header	JSPI1
TPM connector	20-pin header	TPM1
USB connectors	8-pin header	USB3, USB4

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Audio connector	Audio jack	AUDIO_CV1
DVI and serial port connector	24-pin female, DB-9 male	DVI1_DB9
Ethernet and USB 3.0 ports	RJ-45, USB 3.0	LAN_USB1, LAN_USB2
HDMI ports	HDMI port	HDMI1,HDMI2
USB 2.0 ports	USB 2.0	R_USB1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMB-Q770.

3.2.1 ATX Power Connector

CN Label: ATX1

CN Type: 24-pin ATX

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

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

The ATX power connector connects to an ATX power supply.

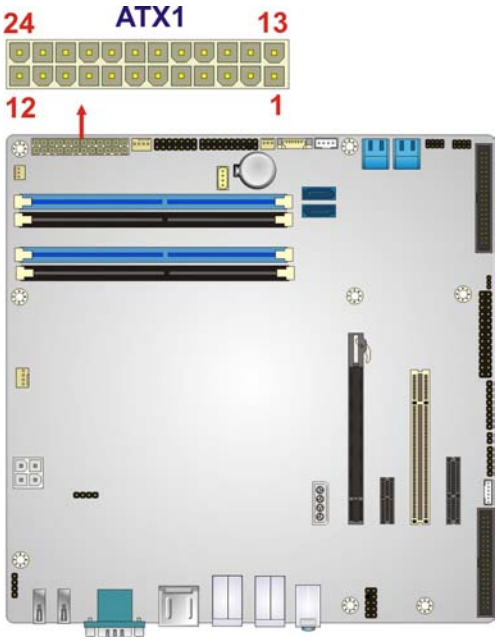


Figure 3-2: ATX Power Connector Pinout Location

Pin	Description	Pin	Description
1	+3.3V	2	+3.3V
3	GND	4	+5V
5	GND	6	+5V
7	GND	8	PWRGD_PS
9	5VSB	10	+12V
11	+12V	12	+3.3V
13	+3.3V	14	-12V
15	GND	16	IO_PSON#
17	GND	18	GND
19	GND	20	NC
21	+5V	22	+5V
23	+5V	24	GND

Table 3-3: ATX Power Connector Pinouts

3.2.2 Battery Connector

CN Label: BAT1

CN Type: Battery holder

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

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

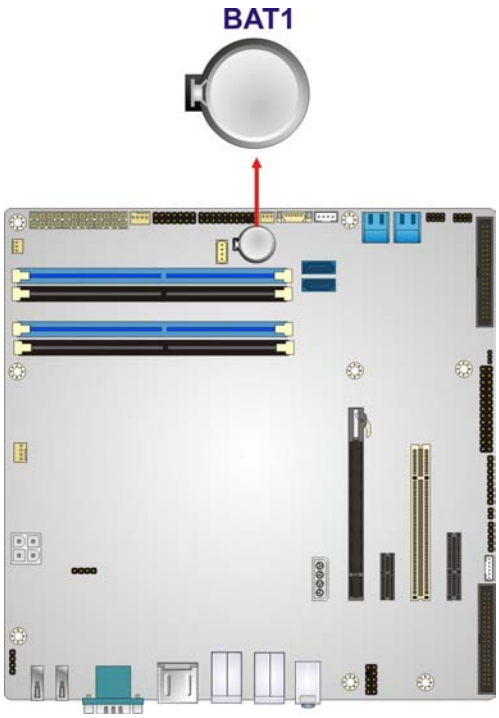


Figure 3-3: Battery Connector Locations

3.2.3 CPU Power Connector

CN Label: CPU12V1

CN Type: 4-pin Molex

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

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

The CPU power input connector provides power to the CPU.

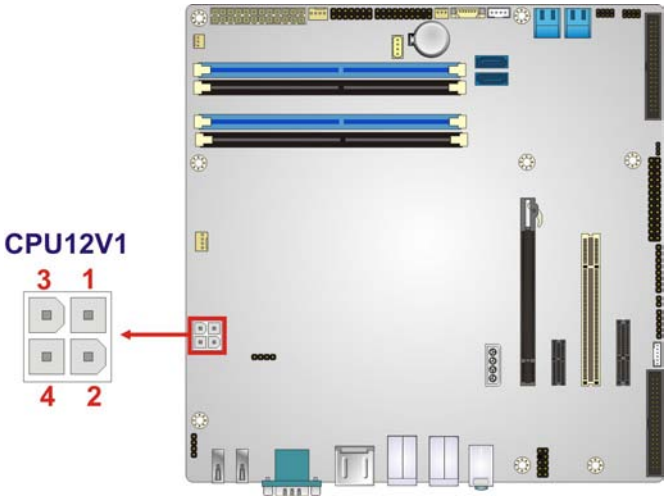


Figure 3-4: CPU Power Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	VREG_12V	4	VREG_12V

Table 3-4: CPU Power Connector Pinouts

3.2.4 DDR3 DIMM Slots

CN Label: CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2

CN Type: DDR3 DIMM slot

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

The DIMM slots are for DDR3 DIMM memory modules.

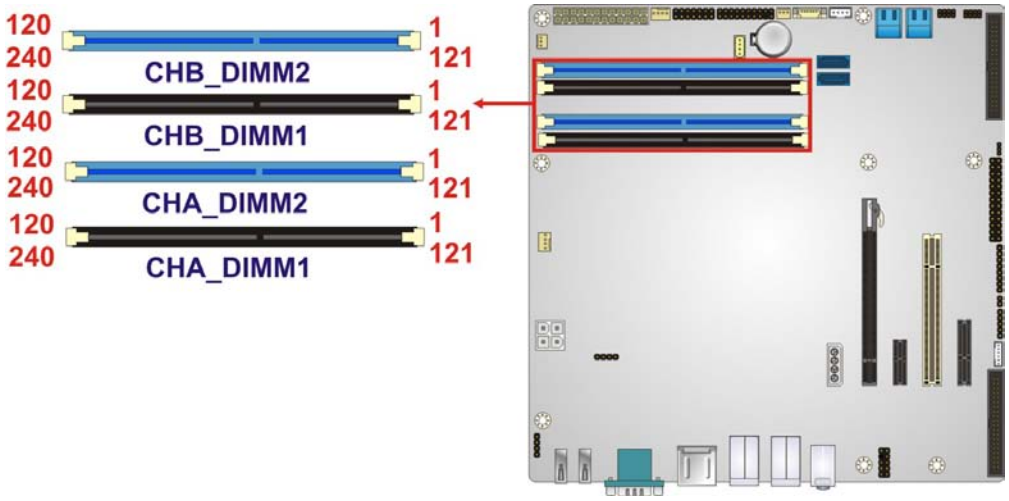


Figure 3-5: DDR3 DIMM Slot Locations

3.2.5 Debug Port Connector

CN Label:	**CN2,CN3**
CN Type:	4-pin header
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-5**

The debug port connector is for system debug.

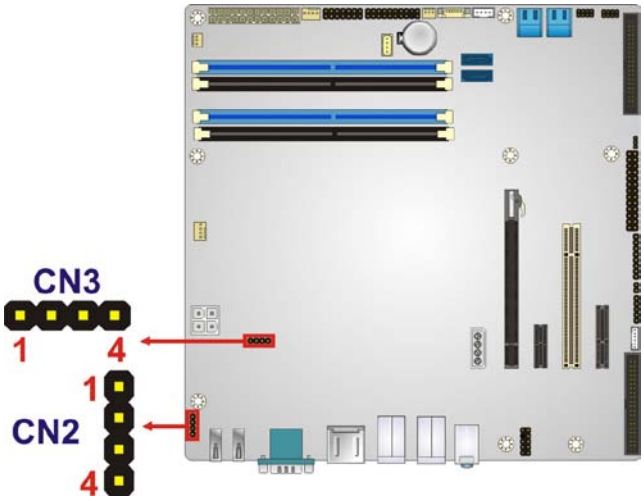


Figure 3-6: Debug Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	GND
3	CSDA_1/2	4	CSCL_1/2

Table 3-5: Debug Port Connector Pinouts

3.2.6 Digital I/O Connector

CN Label: DIO1

CN Type: 26-pin header

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

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

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 12-bit output and 12-bit input.

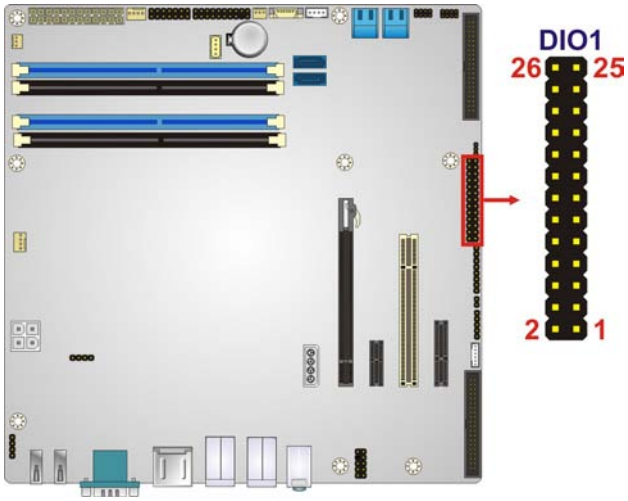


Figure 3-7: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	D_IN0	4	D_OUT0
5	D_IN1	6	D_OUT1
7	D_IN2	8	D_OUT2
9	D_IN3	10	D_OUT3

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
11	D_8IN0	12	D_8OUT0
13	D_8IN1	14	D_8OUT1
15	D_8IN2	16	D_8OUT2
17	D_8IN3	18	D_8OUT3
19	D_8IN4	20	D_8OUT4
21	D_8IN5	22	D_8OUT5
23	D_8IN6	24	D_8OUT6
25	D_8IN7	26	D_8OUT7

Table 3-6: Digital I/O Connector Pinouts

3.2.7 Fan Connector (CPU)

CN Label: CPU_FAN1

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

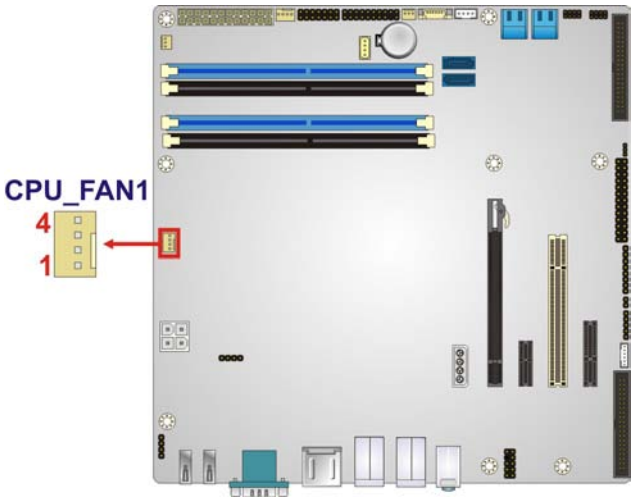


Figure 3-8: CPU Fan Connector Location

Pin	Description	Pin	Description
1	GND	2	+12 V
3	FANIO1	4	FANOUT1

Table 3-7: CPU Fan Connector Pinouts

3.2.8 Fan Connector (System)

CN Label: SYS_FAN1, SYS_FAN2

CN Type: 4-pin wafer and 3-pin wafer

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

CN Pinouts: See **Table 3-8** and **Table 3-9**

The fan connector attaches to a cooling fan.

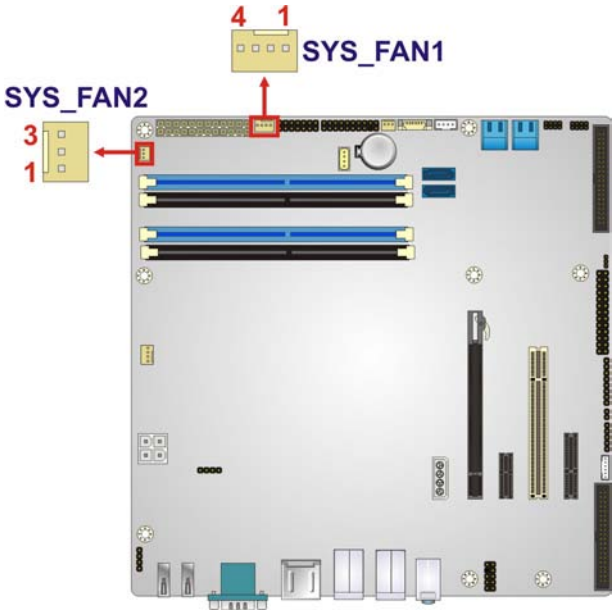


Figure 3-9: System Fan Connector Location

Pin	Description	Pin	Description
1	GND	2	+12 V
3	FANIO3	4	FANOUT3

Table 3-8: System Fan Connector Pinouts (SYS_FAN1)

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

Table 3-9: System Fan Connector Pinouts (SYS_FAN2)

3.2.9 Fan Connector (PCH)

CN Label: PCH_FAN1

CN Type: 3-pin wafer

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

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

The fan connector attaches to a PCH cooling fan.

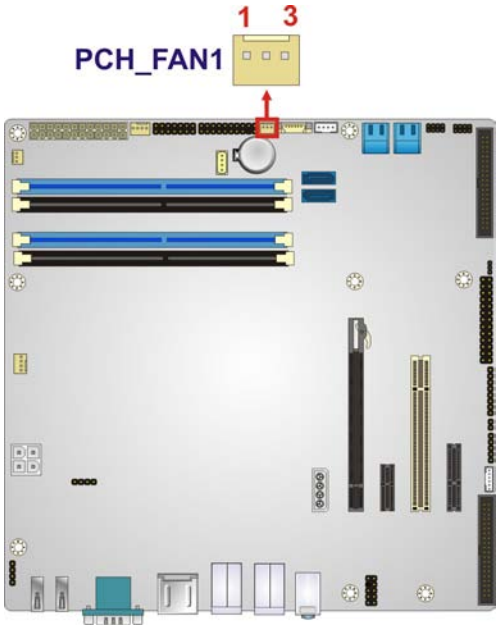


Figure 3-10: PCH Fan Connector Location

Pin	Description	Pin	Description
1	FANIO2	2	FANOUT2
3	GND		

Table 3-10: PCH Fan Connector Pinouts

3.2.10 Front Panel Audio Connector

CN Label: FP_AUDIO1

CN Type: 10-pin header

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

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

This connector connects to speakers, a microphone and an audio input.

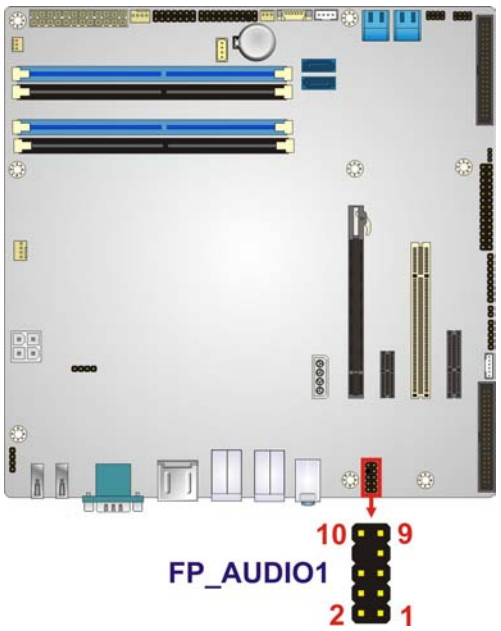


Figure 3-11: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	MIC2_L	2	GND_AUDIO
3	MIC2_R	4	FP_AUD_DETECT
5	LINE2-R	6	GND_AUDIO
7	F_SENSE	8	NC
9	LINE2_L	10	GND_AUDIO

Table 3-11: Front Panel Audio Connector Pinouts

3.2.11 Front Panel Connector

CN Label: F_PANEL1

CN Type: 14-pin header

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

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

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

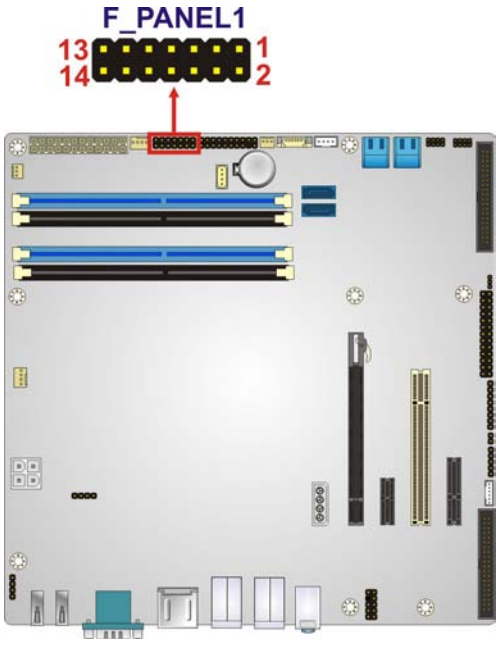


Figure 3-12: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	ACPILED	Speaker	2	BEEP_PWR
	3	NC		4	NC
	5	GND		6	NC
Power Button	7	PWRBTN_SW#_C		8	PC_BEEP
	9	GND	Reset	10	NC
HDD LED	11	IDELED		12	EXTRST#
	13	IDELED#		14	GND

Table 3-12: Front Panel Connector Pinouts

3.2.12 FW Programming Connector

CN Label: CN1

CN Type: 8-pin header

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

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

The FW Programming connector is used for programming the firmware.

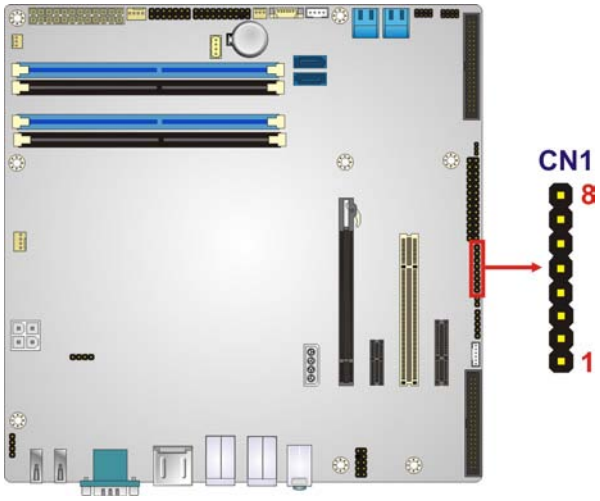


Figure 3-13: FW Programming Connector Location

Pin	Description	Pin	Description
1	+3.3V	2	TDO
3	TDI	4	NC
5	NC	6	TMS
7	GND	8	TCK

Table 3-13: FW Programming Connector Pinouts

3.2.13 Infrared Interface Connector

CN Label: IR1

CN Type: 5-pin header

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

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

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

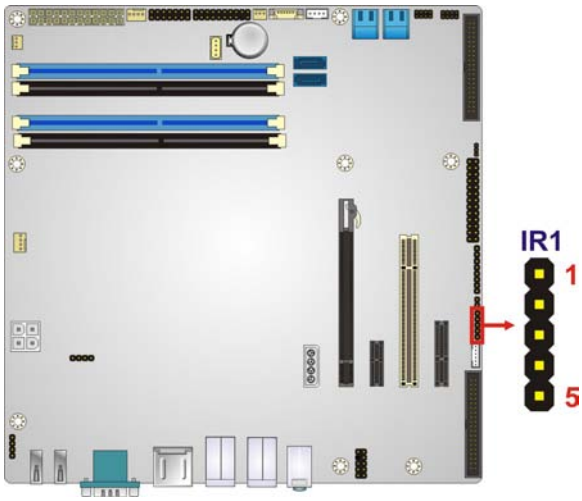


Figure 3-14: Infrared Connector Location

Pin	Description
1	+5V
2	NC
3	IR_RX
4	GND
5	IR_TX

Table 3-14: Infrared Connector Pinouts

3.2.14 Keyboard/Mouse Connector

CN Label: KB_MS_CN2

CN Type: 6-pin wafer

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

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

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

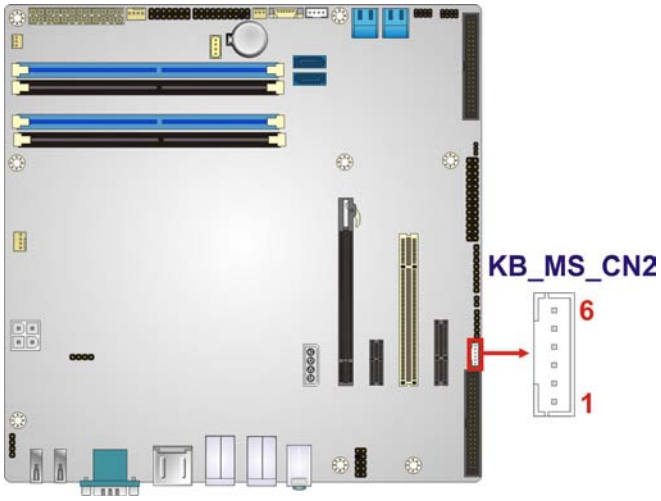


Figure 3-15: Keyboard/Mouse Connector Location

Pin	Description
1	+5V_KBMS
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	GND

Table 3-15: Keyboard/Mouse Connector Pinouts

3.2.15 PCIe Power Connector

CN Label: PCIE_POWER1

CN Type: 4-pin Molex

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

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

PCIe power connector provides extra power to the PCIe x16 card.

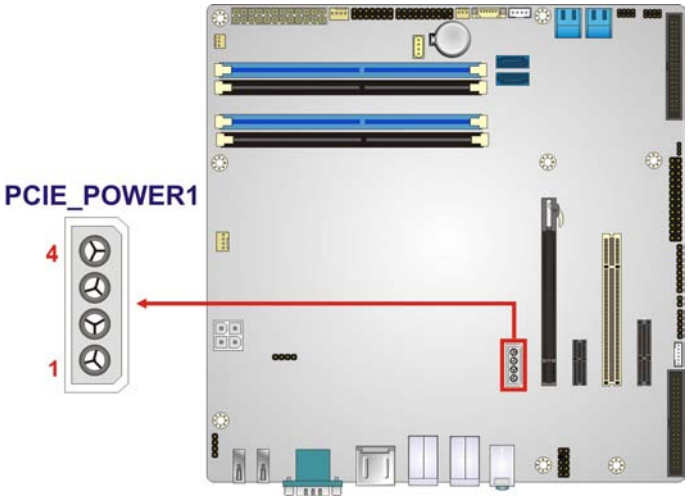


Figure 3-16: PCIe Power Location

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

Table 3-16: PCIe Power Pinouts

3.2.16 PCI Slot

CN Label: PCI1

CN Type: PCI Slot

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

The PCI slot enables a PCI expansion module to be connected to the board.

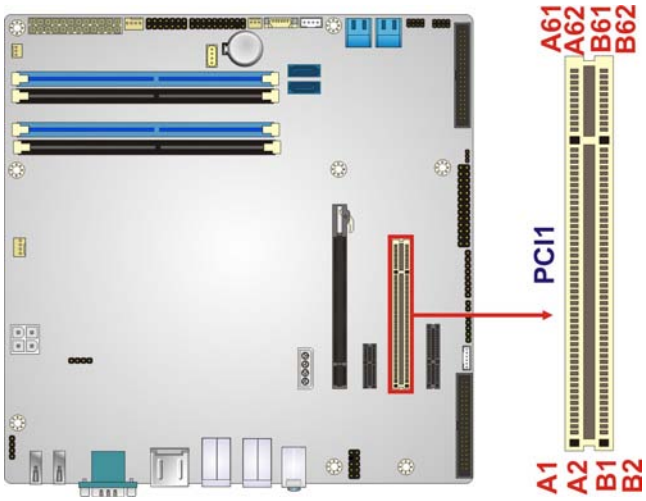


Figure 3-17: PCI Slot Locations

3.2.17 PCIe x16 Slot

CN Label: PCIEX16

CN Type: PCIe x16 slot

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

The PCIe x16 slot is for PCIe x16 expansion cards.

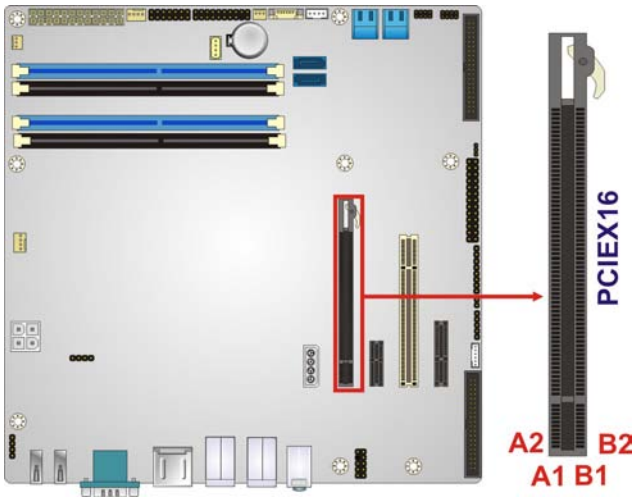


Figure 3-18: PCIe x16 Slot Location

3.2.18 PCIe x4 Slot

CN Label: PCIEX4

CN Type: PCIe x4 slot

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

The PCIe x4 slot is for PCIe x4 expansion cards.

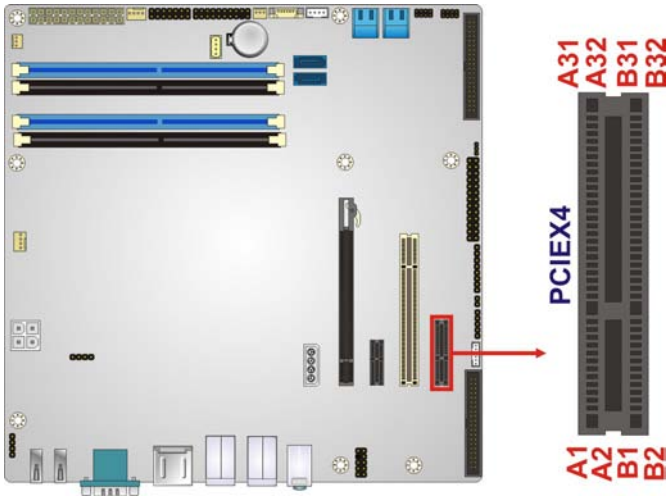


Figure 3-19: PCIe x4 Slot Locations

3.2.19 PCIe x1 Slot

CN Label: PCIEX1

CN Type: PCIe x1 slot

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

The PCIe x1 slot is for PCIe x1 expansion cards.

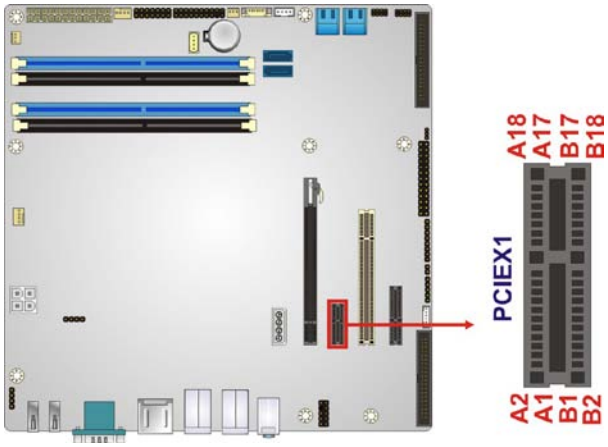


Figure 3-20: PCIe x1 Slot Locations

3.2.20 SATA 3Gb/s Drive Connectors

CN Label: SATA34, SATA56

CN Type: 14-pin SATA connector

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

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

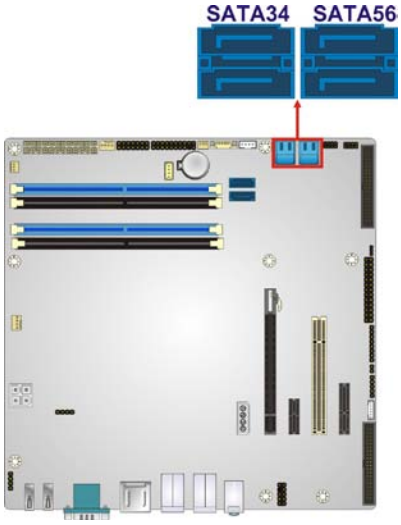


Figure 3-21: SATA 3Gb/s Drive Connector Location

3.2.21 SATA 6Gb/s Drive Connectors

CN Label: SATA1, SATA2

CN Type: 7-pin SATA drive connector

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

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

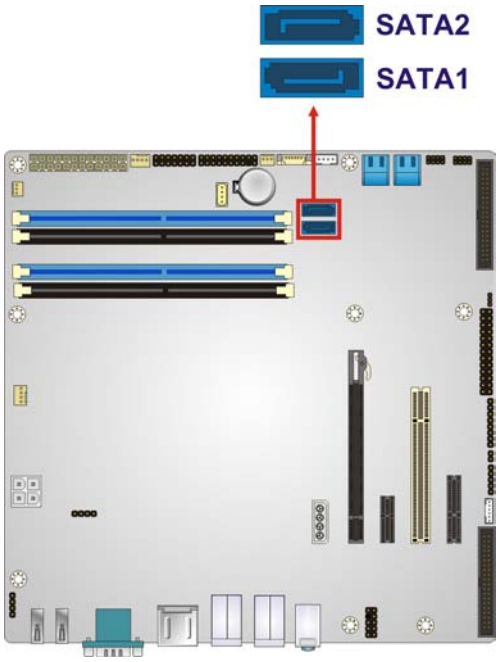


Figure 3-22: SATA 6Gb/s Drive Connector Location

3.2.22 Serial Port Connector, RS-422/485

CN Label: COM2

CN Type: 4-pin wafer

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

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

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

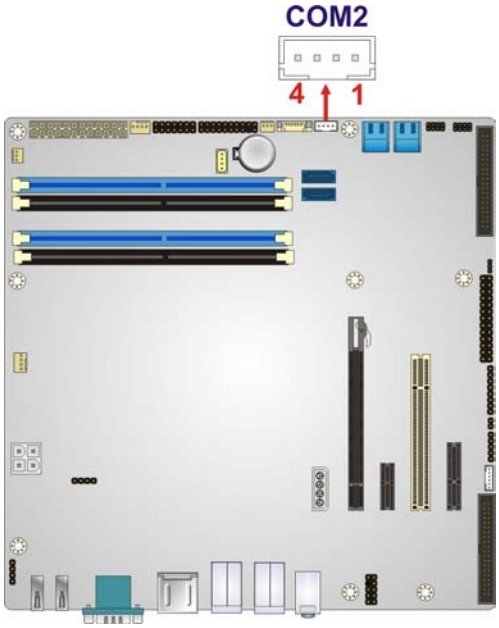


Figure 3-23: RS-422/485 Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RXD485#	2	RXD485
3	TXD485	4	TXD485#

Table 3-17: RS-422/485Connector Pinouts

3.2.23 Serial Port Connectors, RS-232

CN Label: COM3-6, COM7-10

CN Type: 40-pin box header

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

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

Each of these connectors provides RS-232 connections.

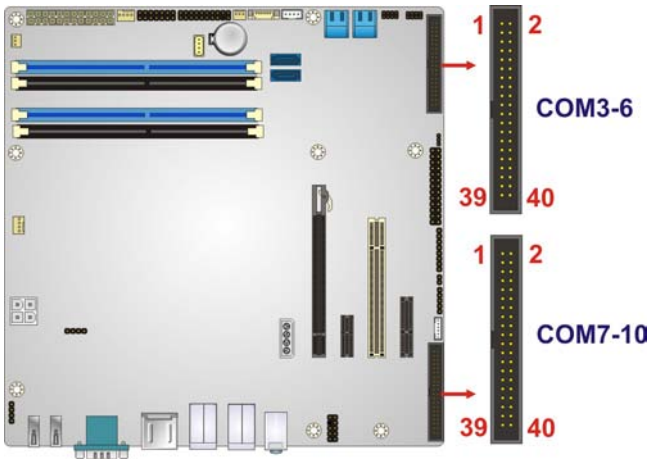


Figure 3-24: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD3/7#	6	NDSR3/7#
2	NRXD3/7	7	NRTS3/7#
3	NTXD3/7	8	NCTS3/7#
4	NDTR3/7#	9	NRI3/7#
5	GND	10	GND
11	NDCD4/8#	12	NDSR4/8#
13	NRXD4/8	14	NRTS4/8#
15	NTXD4/8	16	NCTS4/8#
17	NDTR4/8#	18	NRI4/8#
19	GND	20	GND
21	NDCD5/9#	22	NDSR5/9#
23	NRXD5/9	24	NRTS5/9#
25	NTXD5/9	26	NCTS5/9#
27	NDTR5/9#	28	NRI5/9#
29	GND	30	GND
31	NDCD6/10#	32	NDSR6/10#
33	NRXD6/10	34	NRTS6/10#
35	NTXD6/10	36	NCTS6/10#
37	NDTR6/10#	38	NRI6/10#
39	GND	40	GND

Table 3-18: Serial Port Connector Pinouts

3.2.24 SMBus Connector

CN Label: SMBUS_1

CN Type: 4-pin wafer

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

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

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

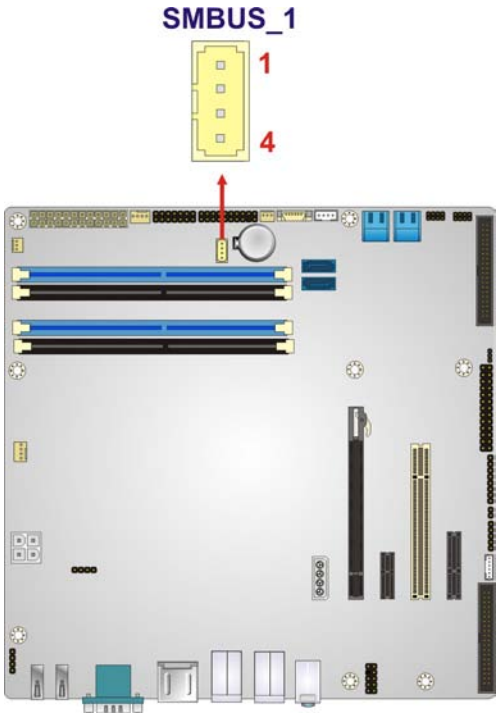


Figure 3-25: SMBus Connector Location

Pin	Description
1	+5V_DUAL
2	SMBCLK_RESUME
3	SMBDATA_RESUME
4	GND

Table 3-19: SMBus Connector Pinouts

3.2.25 SPI ROM Connector

CN Label: JSPI1

CN Type: 8-pin header

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

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

The SPI connector is used to flash the BIOS.

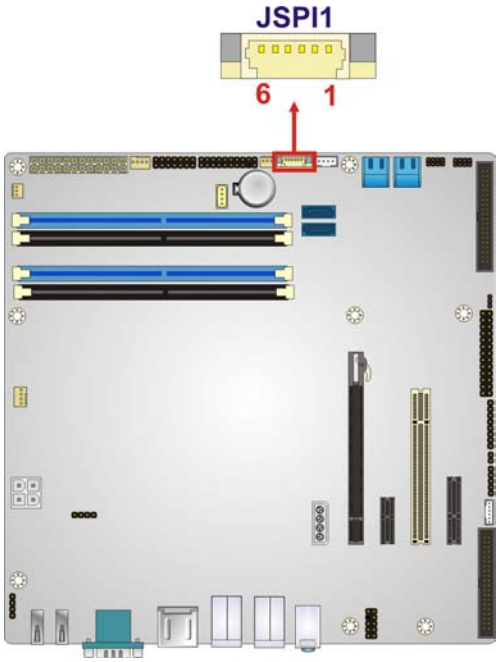


Figure 3-26: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+SPI_VCC	2	SPI_CS0#_CN
3	SPI_SO0_CN	4	SPI_CLK0_CN
5	SPI_SI0_CN	6	GND

Table 3-20: SPI Connector Pinouts

3.2.26 TPM Connector

CN Label: TPM1

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

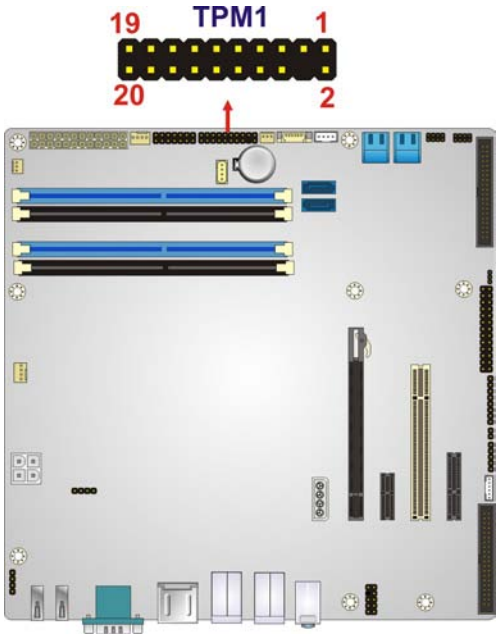


Figure 3-27: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TPMPCLK	2	GND
3	LPC_FRAME#	4	NC
5	BUF_PCIRST#	6	+5V
7	LPC_AD3	8	LPC_AD2
9	+3.3V	10	LPC_AD1
11	LPC_AD0	12	GND
13	SMBCLK_RESUME	14	SMBDATA_RESUME
15	+3.3V	16	SERIRQ
17	GND	18	+3.3V
19	LPCPD_N	20	LDRQ0#

Table 3-21: TPM Connector Pinouts

3.2.27 USB Connectors

CN Label: USB3, USB4

CN Type: 8-pin header

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

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

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

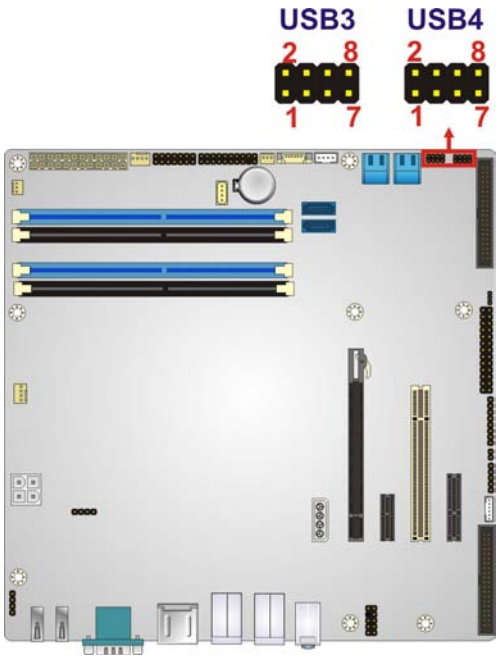


Figure 3-28: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+USB_PWR5/2	2	GND
3	USB20_C_N4/8	4	USB20_C_P5/9
5	USB20_C_P4/8	6	USB20_C_N5/9
7	GND	8	+USB_PWR5/2

Table 3-22: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

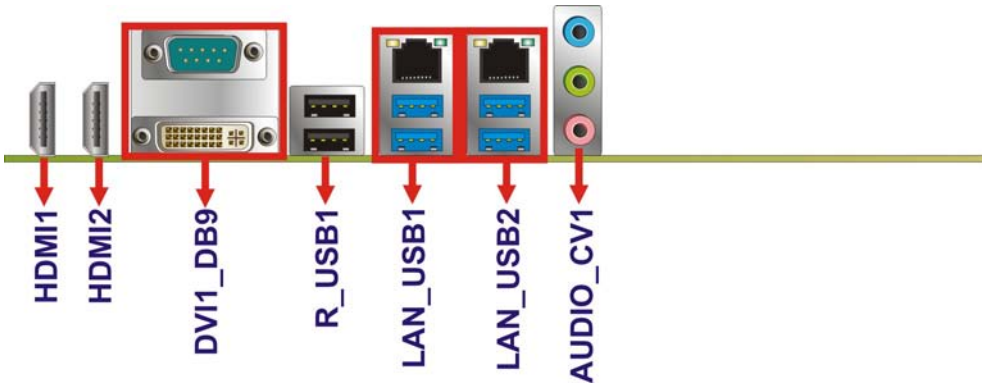


Figure 3-29: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label:	AUDIO_CV1
CN Type:	Audio jack
CN Location:	See **Figure 3-29**

The audio jacks connect to external audio devices.

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

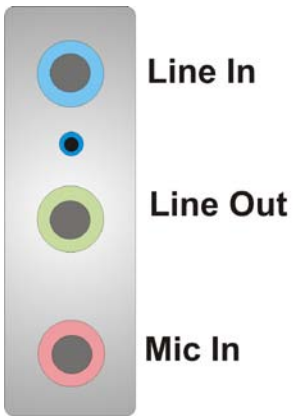


Figure 3-30: Audio Connector

3.3.2 DVI Connector

CN Label: DVI1

CN Type: 24-pin Female

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

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

The DVI (Digital Visual Interface) port connects to a monitor that supports DVI video input.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DVI_TMDS_C_DATA2#	2	DVI_TMDS_C_DATA2
3	GND	4	NC
5	NC	6	DVI_DDC_SCLK
7	DVI_DDC_SDATA	8	CRT_VSYNC
9	DVI_TMDS_C_DATA1#	10	DVI_TMDS_C_DATA1
11	GND	12	NC
13	NC	14	+5V_DVI
15	GND	16	DVI_HPD
17	DVI_TMDS_C_DATA0#	18	DVI_TMDS_C_DATA0
19	GND	20	NC
21	NC	22	GND
23	DVI_TMDS_C_CLK	24	DVI_TMDS_C_CLK#

Table 3-23: DVI Connector Pinouts

3.3.3 Ethernet and USB Connector

CN Label: LAN_USB1, LAN_USB2, R_USB1

CN Type: RJ-45, USB 3.0 and USB 2.0 connectors

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

CN Pinouts: See **Table 3-25 , Table 3-26** and **Table 3-27**

The LAN connector connects to a local network.

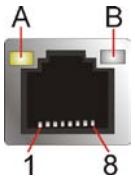


Figure 3-31: Ethernet Connector

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

Table 3-24: Connector LEDs

The USB connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
U1	+USB3_PWR1	U10	+USB3_PWR1
U2	USB20_C_N0	U11	USB20_C_N1
U3	USB20_C_P0	U12	USB20_C_P1
U4	GND	U13	GND
U5	USB3_RX1_DN	U14	USB3_RX2_DN
U6	USB3_RX1_DP	U15	USB3_RX2_DP
U7	GND	U16	GND
U8	USB3_TX1_DN_C	U17	USB3_TX2_DN_C
U9	USB3_TX1_DP_C	U18	USB3_TX2_DP_C
R1	+1.9V_LAN1	L1	L1_1000#
R2	TRD1P0	L2	L1_100#

PIN	DESCRIPTION	PIN	DESCRIPTION
R3	TRD1N0	L3	L1_LINK_ACT#
R4	TRD1P1	L4	+3.3V_LAN1
R5	TRD1N1		
R6	TRD1P2		
R7	TRD1N2		
R8	TRD1P3		
R9	TRD1N3		
R10	GND		

Table 3-25: LAN and USB Connector Pinouts (LAN_USB1)

PIN	DESCRIPTION	PIN	DESCRIPTION
U1	+USB3_PWR2	U10	+USB3_PWR2
U2	USB20_C_N2	U11	USB20_C_N3
U3	USB20_C_P2	U12	USB20_C_P3
U4	GND	U13	GND
U5	USB3_RX3_DN	U14	USB3_RX4_DN
U6	USB3_RX3_DP	U15	USB3_RX4_DP
U7	GND	U16	GND
U8	USB3_TX3_DN_C	U17	USB3_TX4_DN_C
U9	USB3_TX3_DP_C	U18	USB3_TX4_DP_C
R1	+1.05V_LAN2	L1	L2_1000#
R2	TRD2P0	L2	L2_100#
R3	TRD2N0	L3	L2_LINK_ACT#
R4	TRD2P1	L4	+3.3V_LAN
R5	TRD2N1		
R6	TRD2P2		
R7	TRD2N2		
R8	TRD2P3		
R9	TRD2N3		
R10	GND		

Table 3-26: LAN and USB Connector Pinouts (LAN_USB2)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+USB_PWR1	2	USB20_C_P12
3	USB20_C_N12	4	GND
5	+USB_PWR1	6	USB20_C_P13
7	USB20_C_N13	8	GND

Table 3-27: USB Connector Pinouts (R_USB1)

3.3.4 HDMI Connector

CN Label: **HDMI1, HDMI2**

CN Type: HDMI type A connector

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

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

The HDMI (High-Definition Multimedia Interface) connector connects to digital audio or video sources.

Pin	Description	Pin	Description
1	HDMI_DATA2-1/2_L	2	GND
3	HDMI_DATA2#-1/2_L	4	HDMI_DATA1-1/2_L
5	GND	6	HDMI_DATA1#-1/2_L
7	HDMI_DATA0-1/2_L	8	GND
9	HDMI_DATA0#-1/2_L	10	HDMI_CLK-1/2_L
11	GND	12	HDMI_CLK#-1/2_L
13	NC	14	NC
15	HDMI_SCL-1/2	16	HDMI_SDA-1/2
17	GND	18	VCC5
19	HDMI_HPD-1/2		

Table 3-28: HDMI Connector Pinouts

3.3.5 Serial Port Connector

CN Label: DB9

CN Type: DB-9 connector

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

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

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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD1#	2	NRXD1
3	NTXD1	4	NDTR1#
5	GND	6	NDSR1#
7	NRTS1#	8	NCTS1#
9	NRI1#		

Table 3-29: Serial Port Connector Pinouts

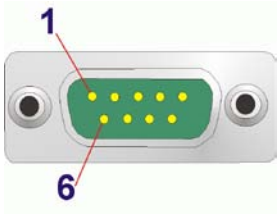


Figure 3-32: Serial Port Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMB-Q770 may result in permanent damage to the IMB-Q770 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-Q770. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-Q770 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMB-Q770, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMB-Q770.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

WARNING:

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

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

- Read the user manual:
  - The user manual provides a complete description of the IMB-Q770 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMB-Q770 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMB-Q770 off:
  - When working with the IMB-Q770, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMB-Q770 **DO NOT:**

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

4.2.1 Socket LGA1155 CPU Installation

WARNING:

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

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

To install the CPU, follow the steps below.

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

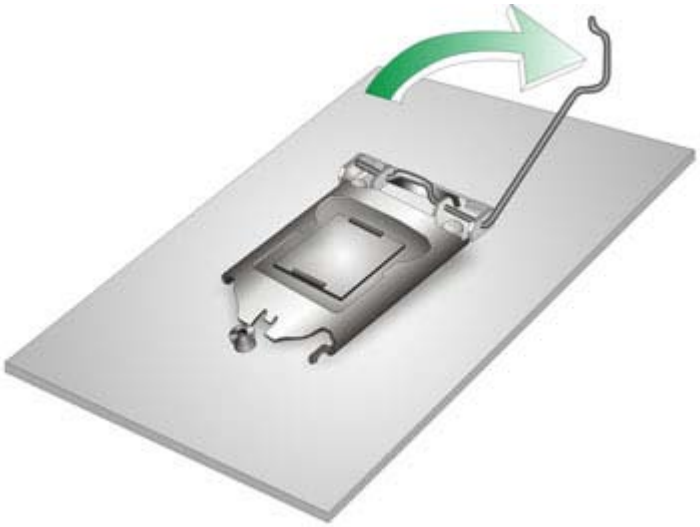


Figure 4-1: Disengage the CPU Socket Load Lever

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

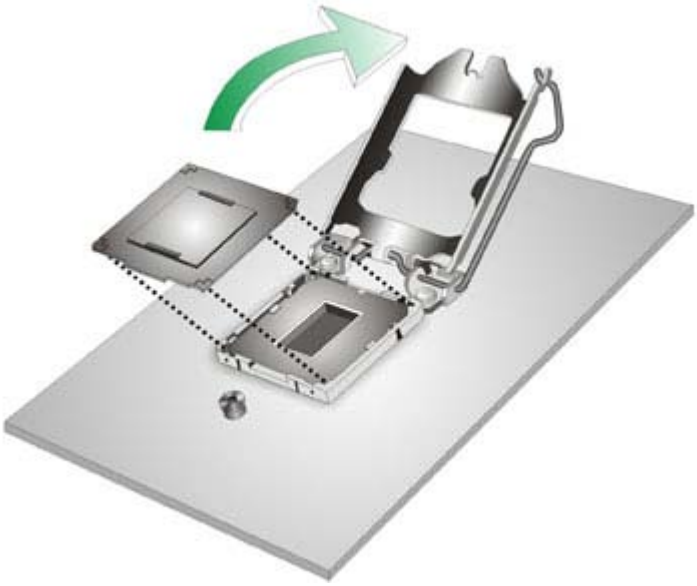


Figure 4-2: Remove Protective Cover

Step 3: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

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

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

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

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

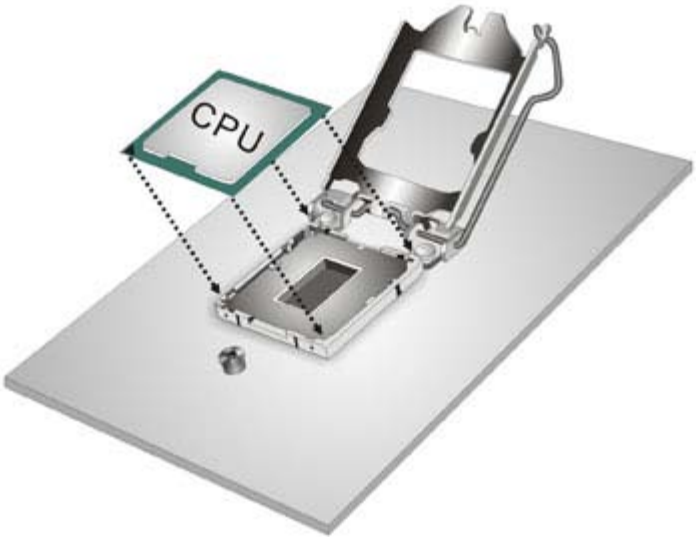


Figure 4-3: Insert the Socket LGA1155 CPU

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

Figure 4-4: Close the Socket LGA1155

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

4.2.2 Socket LGA1155 Cooling Kit Installation

WARNING:

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

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

Figure 4-5: Cooling Kits (CF-1156A-RS, CF-1156B-RS, CF-1156C-RS, CF-1156D-RS)

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

WARNING:

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

To install the cooling kit, follow the instructions below.

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

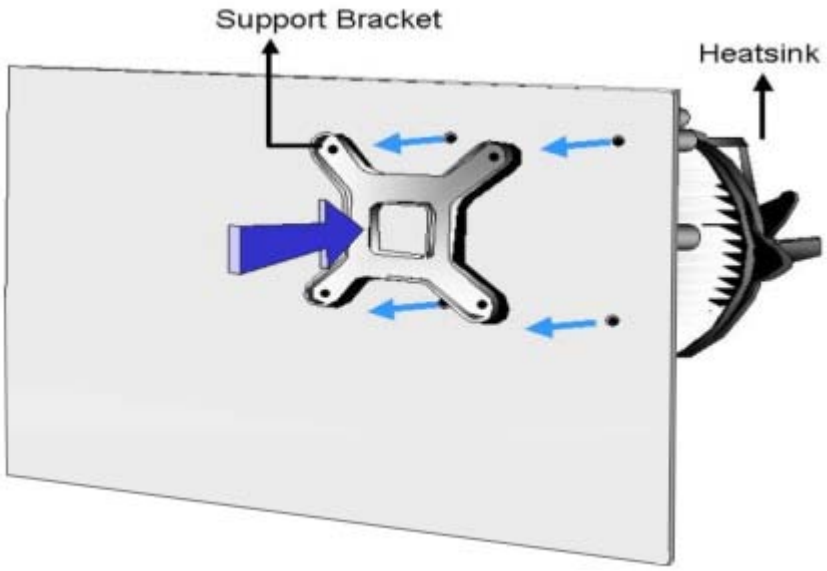


Figure 4-6: Cooling Kit Support Bracket

Step 2: **Place the cooling kit onto the socket LGA1155 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

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

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

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMB-Q770. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

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

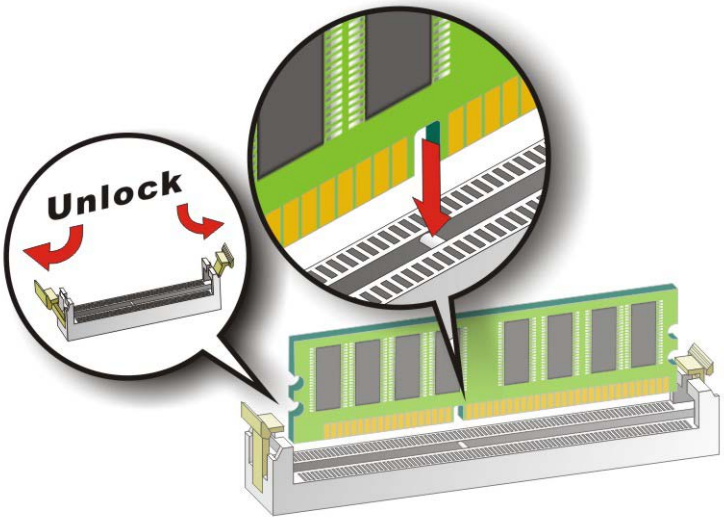


Figure 4-7: DIMM Installation

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

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

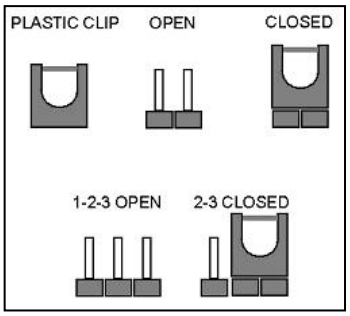
Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-7**.

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

4.3 Jumper Settings

NOTE:

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



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

Description	Label	Type
AT/ATX power select	JATX_AT1	2-pin header
Clear CMOS jumper	J_CMOS2	3-pin header

Table 4-1: Jumpers

4.3.1 AT/ATX Power Select Jumper

Jumper Label: JATX_AT1

Jumper Type: 2-pin header

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

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

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

Setting	Description
Closed	ATX Mode (Default)
Open	AT Mode

Setting	Description

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

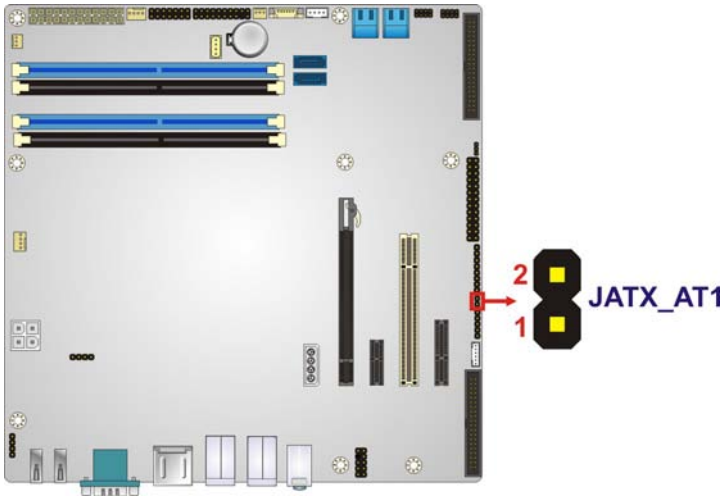


Figure 4-8: AT/ATX Power Select Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: J_CMOS2

Jumper Type: 3-pin header

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

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

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

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

Table 4-3: Clear BIOS Jumper Settings

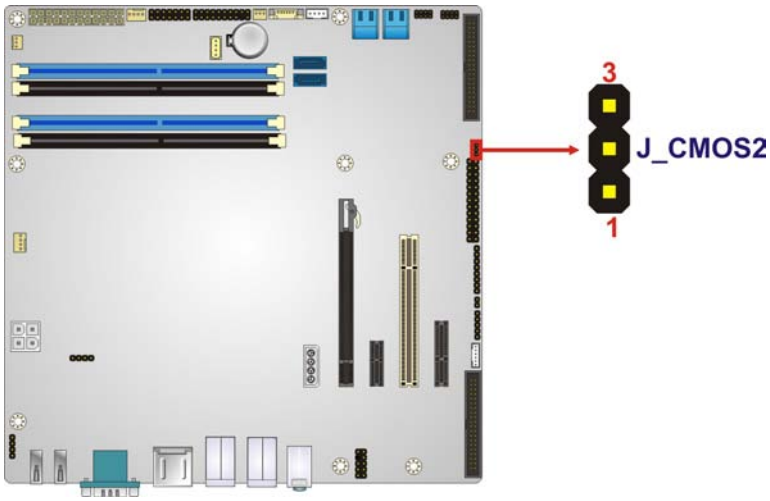


Figure 4-9: Clear BIOS Jumper Location

4.4 Internal Peripheral Device Connections

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

4.4.1 SATA Drive Connection

The IMB-Q770 is shipped with four SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

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

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 4-10**.

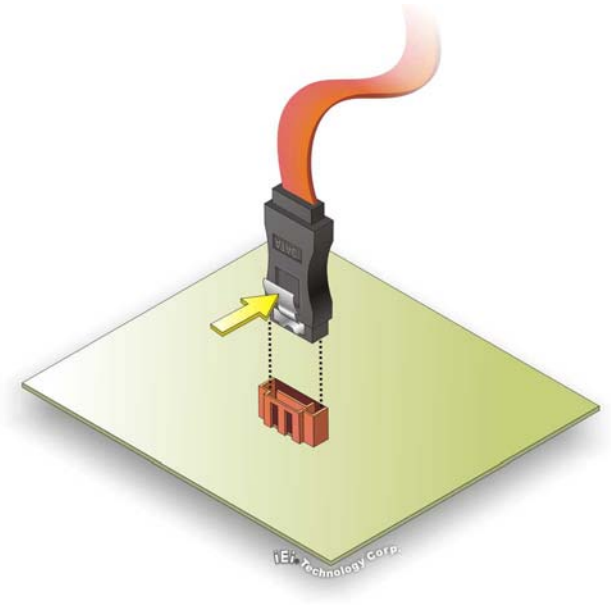


Figure 4-10: SATA Drive Cable Connection

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 4-11**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-11**.

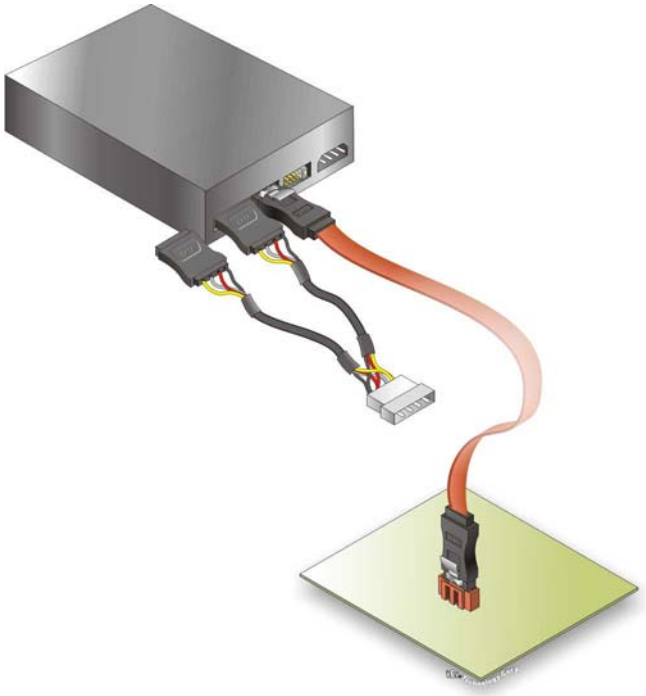


Figure 4-11: SATA Power Drive Connection

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

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMB-Q770.

4.5.1 Audio Connection

The audio jacks on the external audio connector enable the IMB-Q770 to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output. The light blue (top) audio jack does not support input from a microphone. To install the audio devices, follow the steps below.

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

Step 2: **Plug the audio plugs into the audio jacks**. Plug the audio plugs into the audio jacks. If the plugs on your speakers are different, an adapter will need to be used to plug them into the audio jacks.

Line In port (Light Blue): Connects a CD-ROM, DVD player, or other audio devices.

Line Out port (Lime): Connects to a headphone or a speaker.

Microphone (Pink): Connects a microphone.

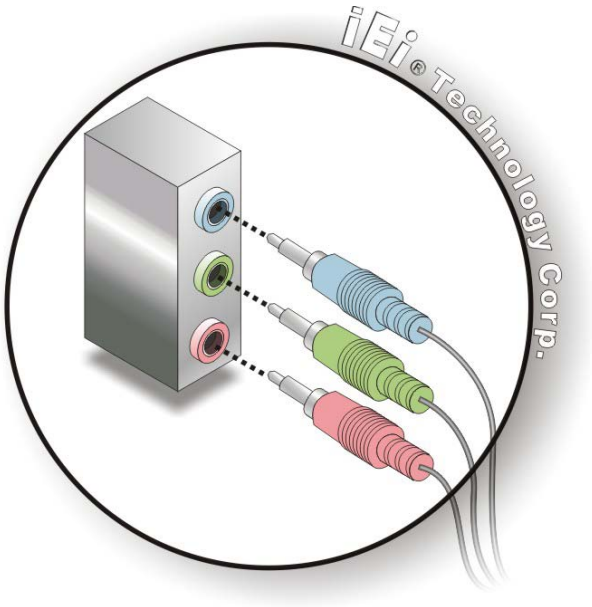


Figure 4-12: Audio Connector

Step 3: **Check audio clarity**. Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

4.5.2 DVI Display Device Connection

The IMB-Q770 has a single female DVI-D connector on the external peripheral interface panel. The DVI-D connector is connected to a digital display device. To connect a digital display device to the IMB-Q770, please follow the instructions below.

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

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

Step 3: **Insert the DVI-D connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the IMB-Q770. See Figure 4-13.

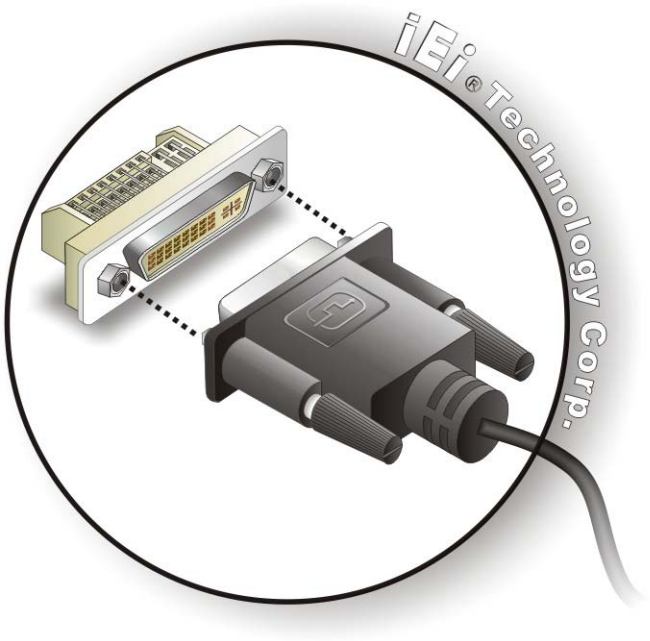


Figure 4-13: DVI Connector

Secure the connector. Secure the DVI-D connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.

4.5.3 HDMI Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the IMB-Q770, follow the steps below.

Step 1: **Locate the HDMI connector**. The location is shown in a previous section.

Step 2: **Align the connector.** Align the HDMI connector with the HDMI port. Make sure the orientation of the connector is correct

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

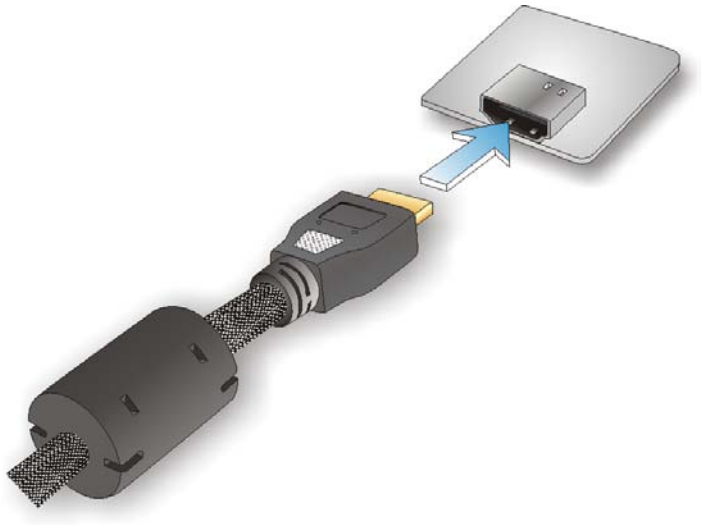


Figure 4-14: HDMI Connection

4.5.4 LAN Connection

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

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMB-Q770. See **Figure 4-15**.

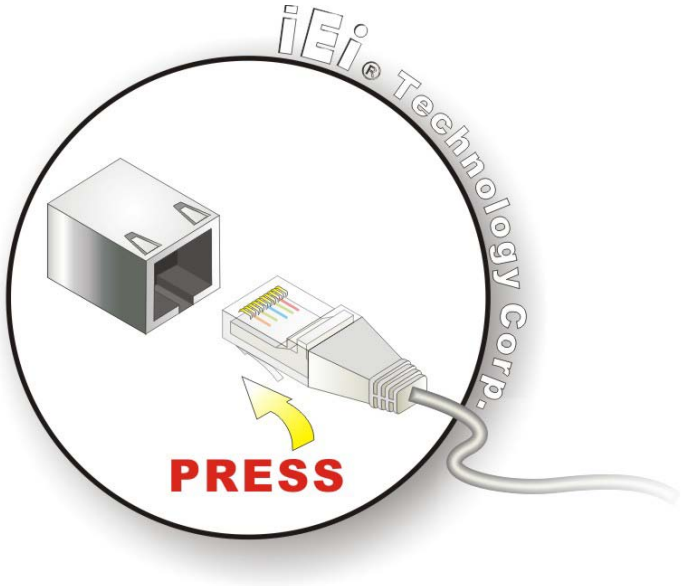


Figure 4-15: LAN Connection

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

4.5.5 Serial Device Connection

The IMB-Q770 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMB-Q770.

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 4-16**.

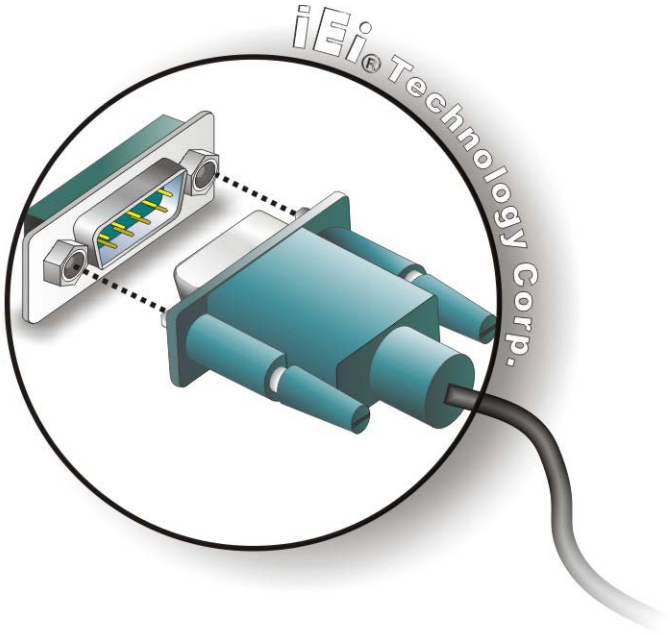


Figure 4-16: Serial Device Connector

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

4.5.6 USB Connection

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMB-Q770.

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

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 4-17**.

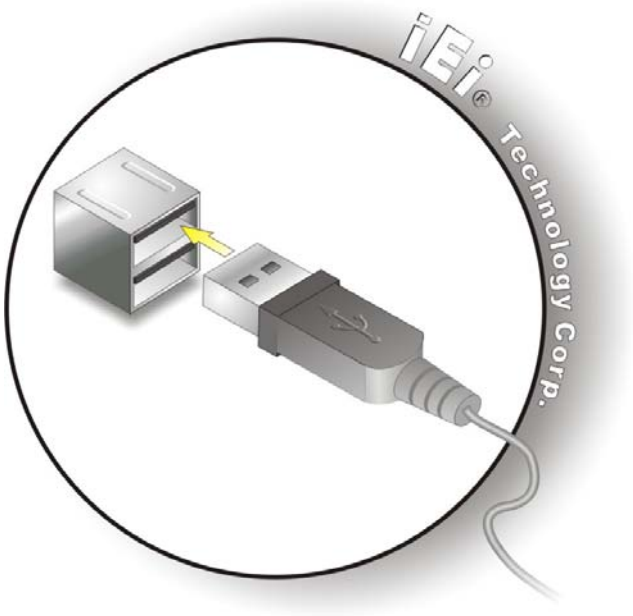


Figure 4-17: USB Connector

4.6 Intel® AMT Setup Procedure

The IMB-Q770 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

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

Step 2: Connect an Ethernet cable to the RJ-45 connector which supports AMT.

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

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

Step 5: Configure the Intel® Management Engine BIOS extension (MEBx). To get into the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up process. Enter the Intel® current ME password as it requires (the Intel® default password is **admin**).

NOTE:

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

Chapter

5

BIOS

5.1 Introduction

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page

Key	Function
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F9	Load optimized defaults
F10	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

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

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

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

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

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

BIOS Information                                     Set the Date. Use Tab to
BIOS Vendor                      American Megatrends switch between Date
Core Version                     4.6.5.3             elements.
Compliency                       UEFI 2.3; PI 1.2
Project Version                  SA45AR11.ROM
Build Date                       08/28/2012 14:07:08

Processor Information
Name                             IvyBridge
Brand String                     Genuine Intel(R)CPU
Frequency                        240 MHz
Processor ID                     306a5
Stepping                         K0/M0
Number of Processors             2Core(s) / 4Thread(s)
Microcode Revision               7
GT Info                          GT2 (900 MHz)

IGFX VBIOS Version               2137
Memory RC Version                1.5.0.0
Total Memory                     1024 MB (DDR3 1333)
Memory Frequency                 1333 MHz

PCH Information
Name                             PantherPoint
Stepping                         04/C1
TXT Capability of Platform/PCH   Unsupported
LAN PHY Revision                 C0

ME FW Version                    8.0.4.1441
ME Firmware SKU                  5MB
                                                     ----------------------
SPI Clock Frequency
DOFR Support                     Supported           ←→: Select Screen
Read Status Clock Frequnecy      33 MHz              ↑ ↓: Select Item
Write Status Clock Frequnecy     33 MHz              EnterSelect
Fast Read Status Clock Frequnecy 33 MHz              F1   General Help
                                                     F2   Previous Values
System Date                      [Wed 08/29/2012]    F3   Optimized Defaults
System Time                      [19:43:27]          F4   Save
                                                     ESC  Exit
Access Level                     Administrator
      Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 1: Main

The Main menu lists the following system details:

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

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!

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

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

> ACPI Settings                                   System ACPI Parameters
> RTC Wake Settings
> Trusted Computing
> CPU Configuration
> SATA Configuration
> Intel(R) Rapid Start Technology                 ----------------------
> Intel TXT(LT) Configuration                     ←→: Select Screen
> AMT Configuration                               ↑ ↓: Select Item
> USB Configuration                               EnterSelect
> F81216 Second Super IO Configuration            F1   General Help
> F81866 Super IO Configuration                   F2   Previous Values
> F81866 H/M Monitor                              F3   Optimized Defaults
> Serial Port Console Redirection                 F4   Save
> iEi Feature                                     ESC  Exit

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

BIOS Menu 2: Advanced

5.3.1 ACPI Configuration

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

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
Advanced

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

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

                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        EnterSelect
                                                        F1   General Help
                                                        F2   Previous Values
                                                        F3    Optimized
                                                        Defaults
                                                        F4    Save
                                                        ESC   Exit

Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 3: ACPI Configuration

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

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

➔ **S1 (CPU Stop Clock)** DEFAULT	The system enters S1 (POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
➔ **S3 (Suspend to RAM)**	The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 RTC Wake Settings

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

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

Wake system with Fixed Time      [Disabled]

Enable or disable System
wake on alarm event. When
enabled, System will
wake on the
dat::hr::min::sec
specified

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

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

BIOS Menu 4: RTC Wake Settings

➔ Wake system with Fixed Time [Disabled]

Use the **Wake system with Fixed Time** option to 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 date Wake up hour Wake up minute Wake up second After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 Trusted Computing

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

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

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

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

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

BIOS Menu 5: Trusted Computing

➔ Security Device Support [Disable]

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

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

➔ **Enable** TPM support is enabled.

5.3.4 CPU Configuration

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

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

CPU Configuration                                   Enabled for Windows XP
                                                    and Linux (OS optimized
Genuine Intel(R) CPU @ 2.40GHz                      for Hyper-Threading
CPU Signature                    306a5              Technology)and Disabled
Microcode Patch                  7                  for other OS (OS not
Max CPU Speed                    2400 MHz           optimized for
Min CPU Speed                    1600 MHz           Hyper-Threading
CPU Speed                        2400 MHz           Technology). When
Processor Cores                  2                  Disabled only one thread
Intel HT Technology              Supported          per enabled core is
Intel VT-x Technology            Supported          enabled.
Intel SMX Technology             Not Supported
64-bit                           Supported          ----------------------

L1 Data Cache                    32 KB x 4          ←→: Select Screen
L1 Code Cache                    32 KB x 4          ↑ ↓: Select Item
L2 Cache                         256 KB x 4         EnterSelect
L3 Cache                         3072 KB            F1   General Help
                                                    F2   Previous Values
Hyper-threading                  [Enabled]          F3    Optimized
Intel Virtualization Technology  [Disabled]         Defaults
                                                    F4    Save
                                                    ESC   Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 6: CPU Configuration

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

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed
- Processor Core: Lists the number of the processor cores
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.

- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- 64-bit: Indicates if 64-bit is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ Hyper-Threading [Enabled]

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

➔ **Disabled**		Disables the use of hyper threading technology
➔ **Enabled**	**DEFAULT**	Enables the use of hyper threading technology

➔ Intel Virtualization Technology [Disabled]

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

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

5.3.5 SATA Configuration

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

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

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

Serial ATA Port 0               Empty              ---------------------
Serial ATA Port 1               Empty
Serial ATA Port 2               Empty              ←→: Select Screen
Serial ATA Port 3               Empty              ↑ ↓: Select Item
Serial ATA Port 4               Empty              EnterSelect
Serial ATA Port 5               Empty              F1   General Help
                                                   F2   Previous Values
                                                   F3    Optimized
                                                   Defaults
                                                   F4    Save
                                                   ESC   Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 7: SATA Configuration

➔ SATA Controller [Enabled]

Use the **SATA Controller** option to enable or disable the SATA device.

- ➔ **Disabled** Disables the SATA device.
- ➔ **Enabled** **DEFAULT** Enables the SATA device.

➔ SATA Mode Selection [IDE]

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

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

5.3.6 Intel(R) Rapid Start Technology

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

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

Intel(R) Rapid Start Technology     [Disabled]

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

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

BIOS Menu 8: Intel(R) Rapid Start Technology

➔ Intel(R) Rapid Start Technology [Disabled]

Use **Intel(R) Rapid Start Technology** option to configure Intel® Rapid Start Technology function.

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

5.3.7 Intel TXT(LT) Configuration

Use the **Intel TXT(LT) Configuration** menu (**BIOS Menu 9**) to configure Intel® Trusted Execution Technology support.

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

Intel Trusted Execution Technology Configuration

Intel TXT support only can be enabled/disabled if SMX
is enabled. VT and VT-d support must also be enabled prior
to TXT.

Secure Mode Extensons (SMX)      Disabled

Intel TXT(LT) Support            [Disabled]

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

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

BIOS Menu 9: Intel TXT(LT) Configuration

5.3.8 AMT Configuration

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

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

Intel AMT                        [Enabled]
Unconfigure AMT/ME               [Disabled]

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

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

BIOS Menu 10: AMT Configuration

➔ Intel AMT [Enabled]

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

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

➔ Unconfigure AMT/ME [Disabled]

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

➔ **Disabled**	**DEFAULT**	Not perform AMT/ME unconfigure
➔ **Enabled**		To perform AMT/ME unconfigure

5.3.9 USB Configuration

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

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

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

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

BIOS Menu 11: USB Configuration

➔ USB Devices

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

➔ Legacy USB Support [Enabled]

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

➔	**Enabled**	**DEFAULT**	Legacy USB support enabled
➔	**Disabled**		Legacy USB support disabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

5.3.10 F81216 Second Super IO Configuration

The **F81216 Second Super IO Configuration** (**BIOS Menu 12**) displays IO chip type and the submenus for configuring the external SATA ports 7, 8, 9, and 10.

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

  F81216 Second Super IO Configuration                  Set Parameters of Serial
                                                        Port 7 (COMG)
  F81216 Second Super IO Chip        F81216 SecondIO
> Serial Port 7 Configuration
> Serial Port 8 Configuration
> Serial Port 9 Configuration
> Serial Port 10 Configuration                          ---------------------
                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        EnterSelect
                                                        +/-:  Change Opt.
                                                        F1:   General Help
                                                        F2:   Previous Values
                                                        F3:   Optimized Defaults
                                                        F4:   Save & Exit
                                                        ESC:  Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 12: Secondary Super IO Configuration

5.3.10.1 Serial Port n Configuration

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

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
Advanced

Serial Port 7 Configuration                             Enable or Disable Serial
                                                        Port (COM)
Serial Port                      [Enabled]
Device Settings                  IO=2B0h; IRQ=11
                                                        ---------------------
Change Settings                  [Auto]                 ←→: Select Screen
Device Mode                      [Serial Port Functi…]  ↑ ↓: Select Item
                                                        EnterSelect
                                                        F1    General Help
                                                        F2    Previous Values
                                                        F3     Optimized
                                                        Defaults
                                                        F4     Save
                                                        ESC    Exit
Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 13: Serial Port n Configuration Menu

5.3.10.2 Serial Port 7 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=2B0h; IRQ=11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ11
➔ **IO=2B0h; IRQ=10, 11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
➔ **IO=2B8h; IRQ=10, 11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

➔ Device Mode [Normal]

Use the Device Mode option to change the serial port mode.

➔ **Serial Port Function Mode**	**DEFAULT**	Enables the serial port to function in serial port function mode.

➔ **IR Mode, Pusle 1.6us, Full Duplex**	Enables the serial port to function in IR mode, pulse 1.6 us at full duplex.
➔ **IR Mode, Pusle 1.6us, Half Duplex**	Enables the serial port to function in IR mode, pulse 1.6 us at half duplex.
➔ **IR Mode, Pusle 3/16 Bit Time, Full Duplex**	Enables the serial port to function in IR mode, pulse 3/16 bit time at full duplex.
➔ **IR Mode, Pusle 3/16 Bit Time, Half Duplex**	Enables the serial port to function in IR mode, pulse 3/16 bit time at half duplex.

5.3.10.3 Serial Port 8 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=2B8h; IRQ=11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ11
➔ **IO=2B0h; IRQ=10, 11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
➔ **IO=2B8h; IRQ=10, 11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11

- **IO=2C0h; IRQ=10, 11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- **IO=2C8h; IRQ=10, 11** — Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.10.4 Serial Port 9 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=2C0h; IRQ=11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ11
- **IO=2B0h; IRQ=10, 11** — Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
- **IO=2B8h; IRQ=10, 11** — Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11
- **IO=2C0h; IRQ=10, 11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- **IO=2C8h; IRQ=10, 11** — Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.10.5 Serial Port 10 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=2C8h; IRQ=11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ11
➔ **IO=2B0h; IRQ=10, 11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
➔ **IO=2B8h; IRQ=10, 11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.11 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 14**) to set or change the configurations for the serial ports.

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

F81866 Super IO Configuration                    Set Parameters of Serial
                                                 Port 1 (COMA)
F81866 Super IO Chip            F81866
> Serial Port 1 Configuration
> Serial Port 2 Configuration                    ---------------------
> Serial Port 3 Configuration                    ←→: Select Screen
> Serial Port 4 Configuration                    ↑ ↓: Select Item
> Serial Port 5 Configuration                    EnterSelect
> Serial Port 6 Configuration                    F1   General Help
                                                 F2   Previous Values
                                                 F3    Optimized
                                                 Defaults
                                                 F4    Save
                                                 ESC   Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 14: Super IO Configuration

5.3.11.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 15**) to configure the serial port n.

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

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

BIOS Menu 15: Serial Port n Configuration Menu

5.3.11.1.1 Serial Port 1 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4
➔ **IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4

5.3.11.1.2 Serial Port 2 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

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

5.3.11.1.3 Serial Port 3 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2D0h; IRQ=10**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

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

5.3.11.1.4 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=2D8h; IRQ=10**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
➔ **IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.11.1.5 Serial Port 5 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2E0h; IRQ=10**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
➔ **IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.11.1.6 Serial Port 6 Configuration

➔ Serial Port [Enabled]

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

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

➔ Change Settings [Auto]

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

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2E8h; IRQ=10** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
- ➔ **IO=2D0h; IRQ=10, 11** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
- ➔ **IO=2D8h; IRQ=10, 11** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E0h; IRQ=10, 11** Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h; IRQ=10, 11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.12 F81866 H/W Monitor

The **F8186 H/W Monitor** menu (**BIOS Menu 16**) shows the operating temperature, fan speeds and system voltages.

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

PC Health Status                                  Enable or Disable Smart
                                                  Fan
  Smart Fan Function              [Enabled]
> Smart Fan Mode Configuration

CPU temperature                   :+42 C
SYS temperature                   :+31 C
PCH temperature                   :+42 C
CPU_FAN1 Speed                    :2325 RPM       ---------------------
SYS_FAN1 Speed                    :N/A            ←→: Select Screen
SYS_FAN2 Speed                    :N/A            ↑ ↓: Select Item
VCC3V                             :+3.408 V       EnterSelect
+CPU_VCCIO                        :+1.024 V       F1   General Help
+5V                               :+8.997 V       F2   Previous Values
+12V                              :+11.704 V      F3    Optimized
+1.5V_DDR3                        :+1.320 V       Defaults
VSB5V                             :+5.040 V       F4    Save
VSB3V                             :+3.376 V       ESC   Exit
VBAT                              :+3.184 V

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

BIOS Menu 16: Hardware Health Configuration

➔ PC Health Status

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

- System Temperatures:
  - CPU Temperature
  - SYS Temperature
  - CPH Temperature
- Fan Speeds:
  - CPU_FAN1 Speed
  - SYS_FAN1 Speed
  - SYS_FAN2 Speed
- Voltages:

- VCC3V
- +CPU_VCCIO
- +5V
- +12V
- +1.5V_DDR3
- VSB5V
- VSB3V
- VBAT

➔ Smart Fan Function [Enabled]

Use the **Smart Fan Function** option to enable or disable the smart fan function.

➔ **Disabled**		Disables the smart fan function.
➔ **Enabled**	**DEFAULT**	Enables the smart fan function.

5.3.12.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 17**) to configure the smart fan temperature and speed settings.

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

Smart Fan Mode Configuration                          Smart Fan Mode Select

CPU_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode]
CPU Temperature 1               60
CPU Temperature 2               50
CPU Temperature 3               40
CPU Temperature 4               30
PCH_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode]   ---------------------
PCH Temperature 1               60                       ←→: Select Screen
PCH Temperature 2               50                       ↑ ↓: Select Item
PCH Temperature 3               40                       EnterSelect
PCH Temperature 4               30                       + -   Change Opt.
SYS_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode]   F1    General Help
SYS Temperature 1               60                       F2    Previous Values
SYS Temperature 2               50                       F3    Optimized Defaults
SYS Temperature 3               40                       F4    Save & Exit
SYS Temperature 4               30                       ESC   Exit

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

BIOS Menu 17: FAN 1 Configuration

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

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

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

➔ CPU Temperature n

Use the + or – key to change the fan **CPU Temperature n** value. Enter a decimal number between 1 and 100.

➔ PCH_FAN1 Smart Fan Control [Auto Duty-Cycle Mode]

Use the **PCH_FAN1 Smart Fan Control** option to configure the PCH Smart Fan.

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

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

➔ PCH Temperature n

Use the + or – key to change the fan **PCH Temperature n** value. Enter a decimal number between 1 and 100.

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

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

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

➔ SYS Temperature n

Use the + or – key to change the fan **SYS Temperature n** value. Enter a decimal number between 1 and 100.

5.3.13 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 18**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

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

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

  COM2
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM3
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM4
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM5
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM6
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM7
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM8
  Console Redirection            [Disabled]
> Console Redirection Settings

  COM9                                          ---------------------
  Console Redirection            [Disabled]     ←→: Select Screen
> Console Redirection Settings                  ↑ ↓: Select Item
                                                EnterSelect
  COM10                                         F1   General Help
  Console Redirection            [Disabled]     F2   Previous Values
> Console Redirection Settings                  F3    Optimized
                                                Defaults
  COMA(Pci Bus0, Dev0,Func0) (Disabled)         F4    Save
  Console Redirection            Port is Disabled ESC   Exit

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

BIOS Menu 18: Serial Port Console Redirection

➔ Console Redirection [Disabled]

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

- **Disabled** **DEFAULT** Disabled the console redirection function
- **Enabled** Enabled the console redirection function

5.3.13.1 Console Redirection Settings

The **Console Redirection Settings** menu (**BIOS Menu 19**) allows the console redirection options to be configured. The option is active when Console Redirection option is enabled.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
Advanced

COM1                                          Emulation: ANSI:
Console Redirection Settings                  Extended ASCII char set.
                                              VT100: ASCII char set.
Terminal Type                  [ANSI]         VT100+: Extends VT100 to
Bits per second                [115200]       support color, function
Data Bits                      [8]            keys, etc. VT-UTF8: Uses
Parity                         [None]         UTF8 encoding to map
Stop Bits                      [1]            Unicode chars onto 1 or
                                              more bytes.

                                              ---------------------
                                              ←→: Select Screen
                                              ↑ ↓: Select Item
                                              EnterSelect
                                              F1   General Help
                                              F2   Previous Values
                                              F3    Optimized
                                              Defaults
                                              F4    Save
                                              ESC   Exit

Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 19: Console Redirection Settings

- Terminal Type [ANSI]

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

- **VT100** The target terminal type is VT100
- **VT100+** The target terminal type is VT100+
- **VT-UTF8** The target terminal type is VT-UTF8
- **ANSI** **DEFAULT** The target terminal type is ANSI

➔ Bits per second [115200]

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

➔ **9600**		Sets the serial port transmission speed at 9600.
➔ **19200**		Sets the serial port transmission speed at 19200.
➔ **38400**		Sets the serial port transmission speed at 38400.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ Data Bits [8]

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

➔ **7**		Sets the data bits at 7.
➔ **8**	**DEFAULT**	Sets the data bits at 8.

➔ Parity [None]

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

➔ **None**	**DEFAULT**	No parity bit is sent with the data bits.
➔ **Even**		The parity bit is 0 if the number of ones in the data bits is even.
➔ **Odd**		The parity bit is 0 if the number of ones in the data bits is odd.
➔ **Mark**		The parity bit is always 1. This option does not provide error detection.
➔ **Space**		The parity bit is always 0. This option does not provide error detection.

➔ Stop Bits [1]

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

➔ **1**	**DEFAULT**	Sets the number of stop bits at 1.
➔ **2**		Sets the number of stop bits at 2.

5.3.14 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 20**) to configure One Key Recovery function.

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

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

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

BIOS Menu 20: 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 21**) to access the PCH-IO and System Agent (SA) configuration menus.

WARNING!

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

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

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

                                                  ---------------------
                                                  ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  EnterSelect
                                                  F1   General Help
                                                  F2   Previous Values
                                                  F3    Optimized
                                                  Defaults
                                                  F4    Save
                                                  ESC   Exit

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

BIOS Menu 21: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 22**) to configure the PCH chipset.

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

Auto Power Button Status        [Disabled]        Select AC power state
                                                  when power is re-applied
Restore AC Power Loss           [Last State]      after a power failure.
                                                  When Auto Power Button
Power Saving Function(ERP)      [Disabled]        Function select Enabled
                                                  the AC power loss will
> PCH Azalia Configuration                        always power on.

                                                  ---------------------
                                                  ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  EnterSelect
                                                  F1   General Help
                                                  F2   Previous Values
                                                  F3    Optimized
                                                  Defaults
                                                  F4    Save
                                                  ESC   Exit

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

BIOS Menu 22:PCH-IO Configuration

➔ Restore on AC Power Loss [Last State]

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

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

➔ Power Saving Function(ERP) [Disabled]

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

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

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

5.4.1.1 PCH Azalia Configuration

Use the **PCH Azalia Configuration** submenu (**BIOS Menu 23**) to configure the PCH Azalia device.

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

PCH Azalia Configuration                    Control Detection of the
                                            Azalia device.
Azalia                          [Enabled]   Disabled = Azalia will be
  Azalia Internal HDMI Codec    [Enabled]   unconditionally
     Azalia HDMI1 Codec         [Enabled]   disabled
     Azalia HDMI2 Codec         [Enabled]   Enabled = Azalia will be
                                            unconditionally enabled
                                            Auto = Azalia will be
                                            enabled if present,
                                            disabled otherwise.

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

BIOS Menu 23:PCH-IO Configuration

➔ Azalia [Enabled]

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

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

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

➔ Azalia internal HDMI Codec [Enabled]

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

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

➔ Azalia HDMI1 Codec [Enabled]

Use the **Azalia HDMI1 Codec** option to enable or disable the HDMI 1 for High Definition Audio.

➔ **Disabled**		Disable HDMI 1 for High Definition Audio
➔ **Enabled**	**DEFAULT**	Enable HDMI 1 for High Definition Audio

➔ Azalia HDMI2 Codec [Enabled]

Use the **Azalia HDMI2 Codec** option to enable or disable the HDMI 2 for High Definition Audio.

➔ **Disabled**		Disable HDMI 2 for High Definition Audio
➔ **Enabled**	**DEFAULT**	Enable HDMI 2 for High Definition Audio

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 24**) to configure the graphics setting and memory setting.

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

> Graphics Configuration                    Config Graphics Setting.
> Memory Configuration

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

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

BIOS Menu 24: System Agent (SA) Configuration

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** menu (**BIOS Menu 25**) to configure the video device connected to the system.

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

Graphics Configuration                      Select which of
                                            IGFX/PEG/PCI Graphics
Primary Display              [Auto]         device should be Primary
DVMT Pre-Allocated           [256M]         Display Or select SG for
DVMT Total Gfx Mem           [MAX]          Switchable Gfx.

> LCD Control                               ----------------------
                                            ←→: Select Screen
                                            ↑ ↓: Select Item
                                            Enter Select
                                            F1   General Help
                                            F2   Previous Values
                                            F3    Optimized
                                            Defaults
                                            F4    Save
                                            ESC   Exit

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

BIOS Menu 25: Graphics Configuration

➔ Primary Display [Auto]

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

- Auto **Default**
- IGFX
- PEG
- PCI

➔ DVMT Pre-Allocated [256MB]

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**

5.4.2.1.1 LCD Control

Use the **LCD Control** menu (**BIOS Menu 26**) to configure the video device connected to the system.

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

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

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

BIOS Menu 26: Graphics Configuration

➔ Primary IGFX Boot Display [VBIOS Default]

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

- VBIOS Default **Default**
- DVI
- HDMI1
- HDMI2

5.4.2.2 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 27**) to view memory information.

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

Memory Information

Total Memory                    2048 MB (DDR3 1333)
DIMM#0                          Not Present
DIMM#1                          2048 MB (DDR3 1333)
DIMM#2                          Not Present
DIMM#3                          Not Present

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

BIOS Menu 27: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 28**) to configure system boot options.

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

Boot Configuration                      Select the keyboard
Bootup NumLock State            [On]    NumLock state
Quiet Boot                      [Enabled]
Option ROM Messages             [Force BIOS]
Launch PXE OpROM                [Disabled]
UEFI Boot                       [Disabled]

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

BIOS Menu 28: Boot

➔ Bootup NumLock State [On]

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

➔ **On**	**DEFAULT**	Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.
➔ **Off**		Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ Quiet Boot [Enabled]

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

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

➔ Option ROM Messages [Force BIOS]

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

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

➔ Launch PXE OpROM [Disabled]

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

➔ **Disabled**	**DEFAULT**	Ignore all PXE Option ROMs
➔ **Enabled**		Load PXE Option ROMs.

➔ UEFI Boot [Disabled]

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

➔ **Auto**		If the first boot HDD is GPT then enable UEFI boot options, otherwise disable,
➔ **Enabled**		Boot from UEFI devices is enabled.
➔ **Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

5.6 Security

Use the **Security** menu (**BIOS Menu 29**) to set system and user passwords.

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

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

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

BIOS Menu 29: Security

➔ Administrator Password

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

➔ User Password

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 30**) to load default BIOS values, optimal failsafe values and to save configuration changes.

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

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

  Restore Defaults
  Save as User Defaults
  Restore User Defaults

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

BIOS Menu 30:Exit

➔ Save Changes and Reset

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

➔ Discard Changes and Reset

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

➔ Restore Defaults

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

➔ Save as User Defaults

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

➔ Restore User Defaults

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system:

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

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMB-Q770 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

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

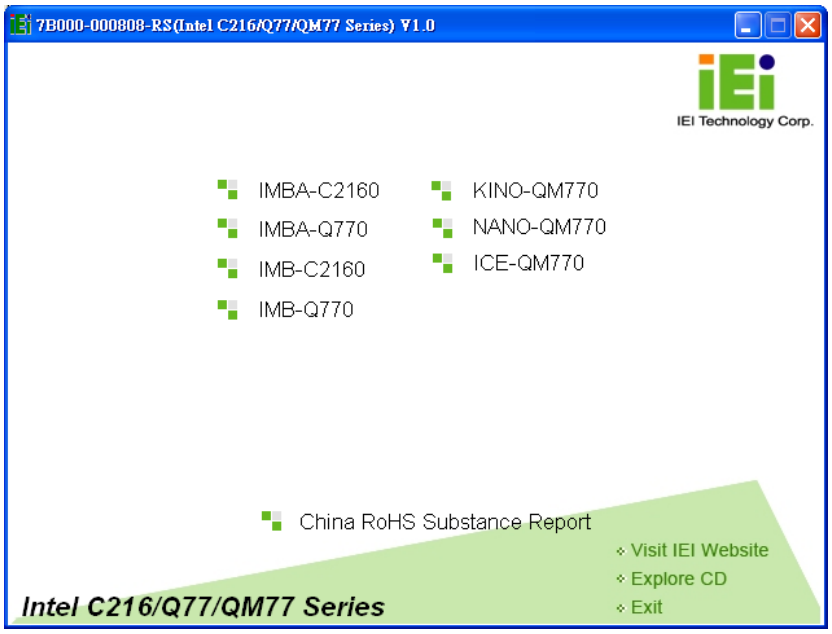


Figure 6-1: Introduction Screen

Step 3: Click IMB-Q770.

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

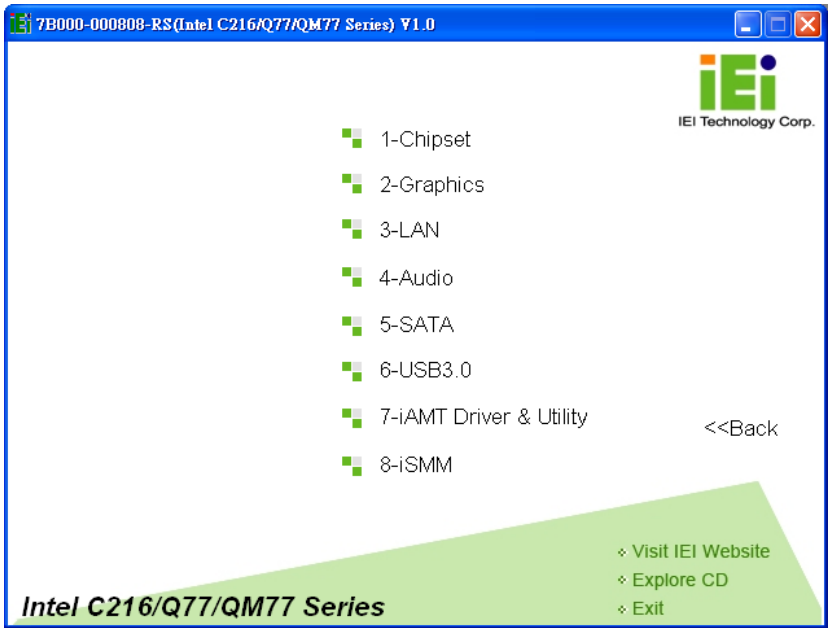


Figure 6-2: Available Drivers

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

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

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

Step 4: The **Welcome Screen** in Figure 6-3 appears.

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

Figure 6-3: Chipset Driver Welcome Screen

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

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

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

Figure 6-4: Chipset Driver License Agreement

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

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

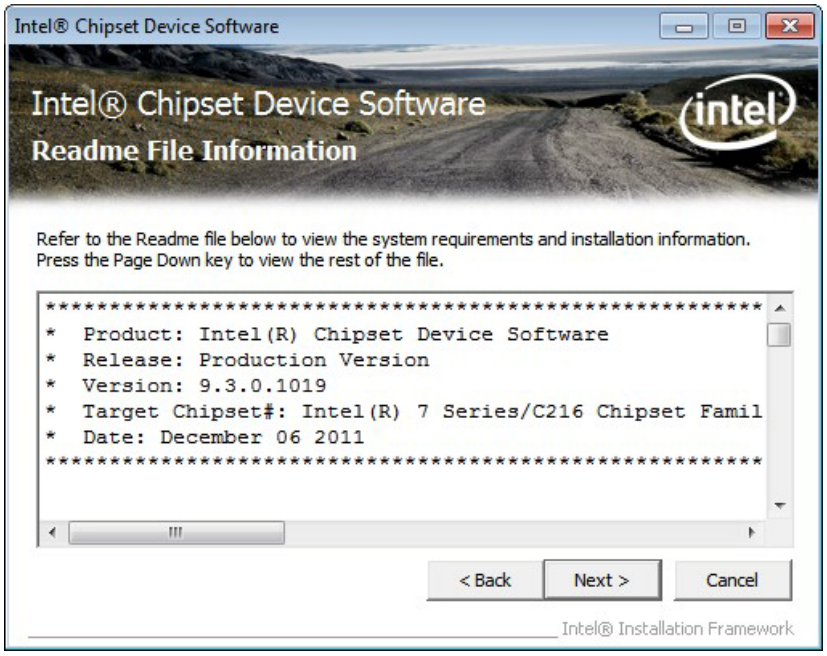


Figure 6-5: Chipset Driver Read Me File

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

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

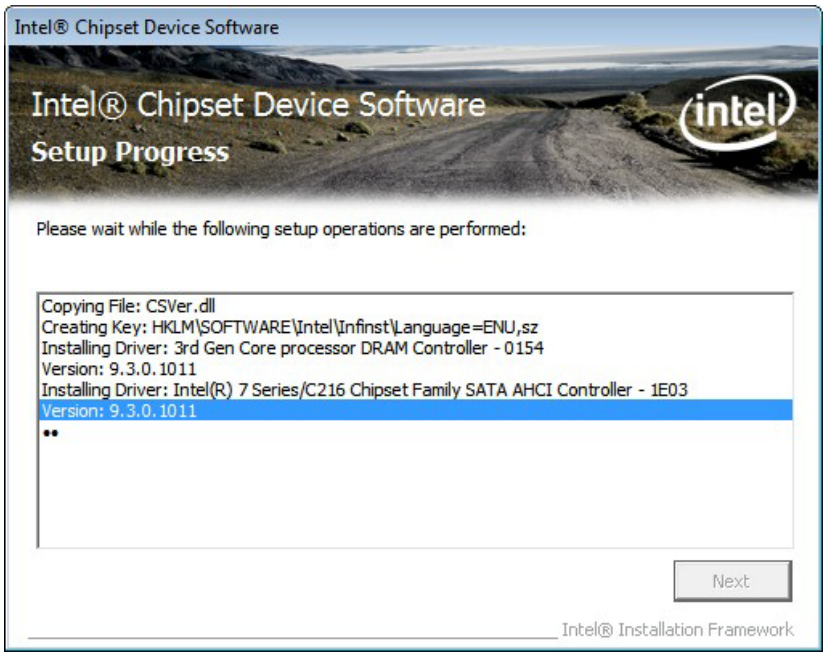


Figure 6-6: Chipset Driver Setup Operations

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

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

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

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

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

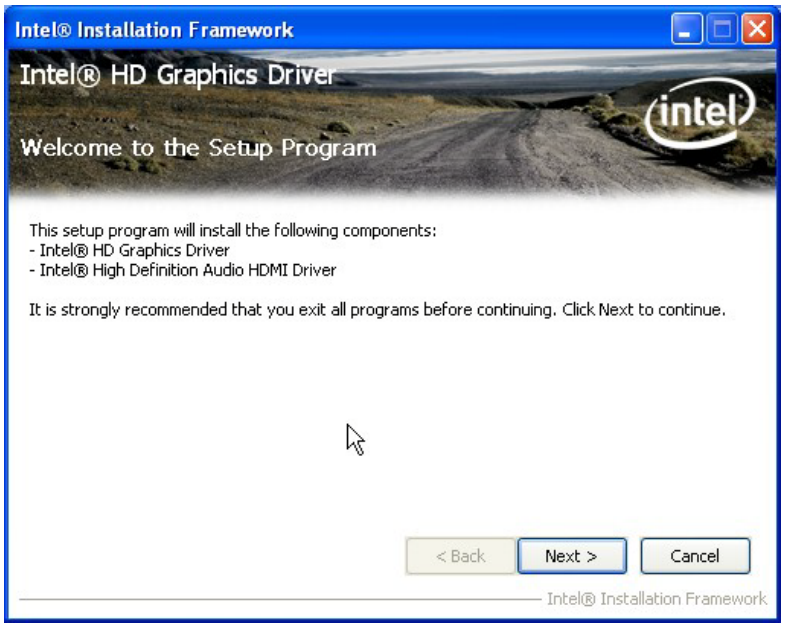


Figure 6-8: Graphics Driver Welcome Screen

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

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

Figure 6-9: Graphics Driver License Agreement

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

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

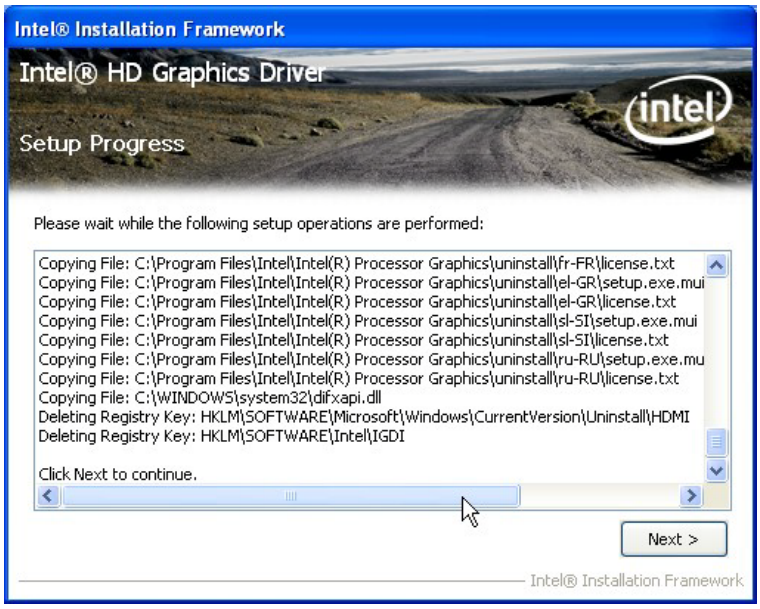


Figure 6-10: Graphics Driver Setup Operations

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

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

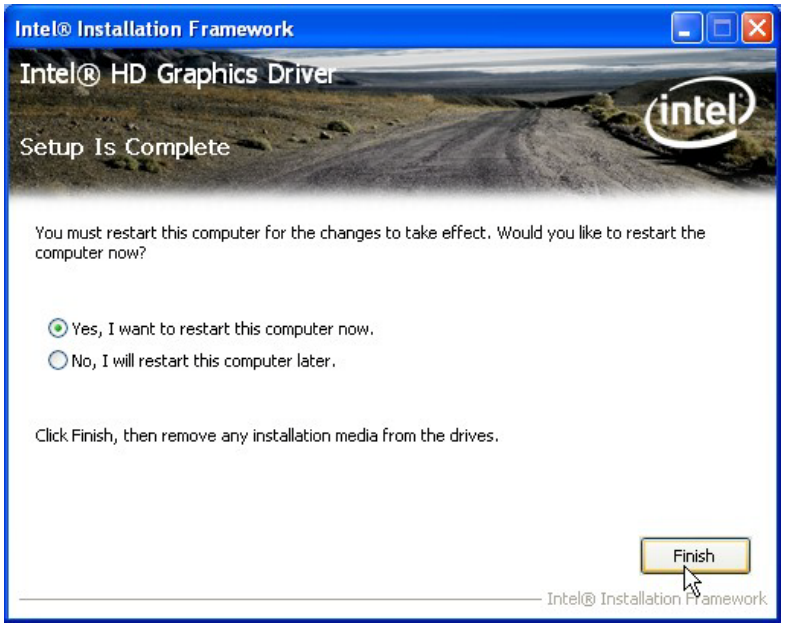


Figure 6-11: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

Step 1: Right-click the Computer button from the start menu and select **Properties**. (**Figure 6-12**).

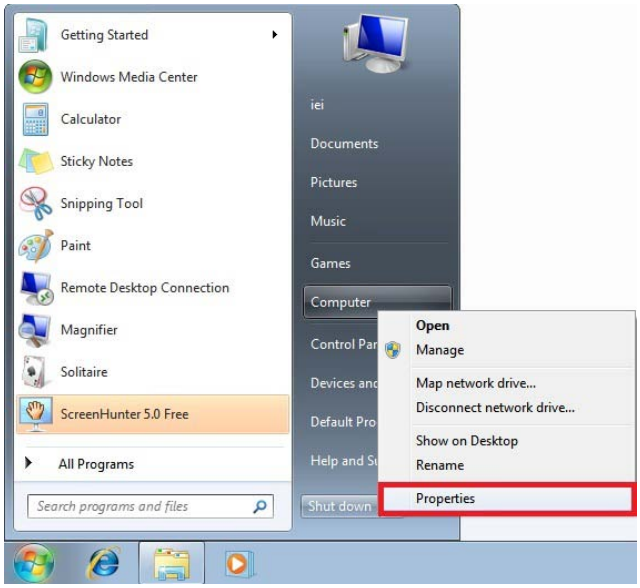


Figure 6-12: Windows Control Panel

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

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

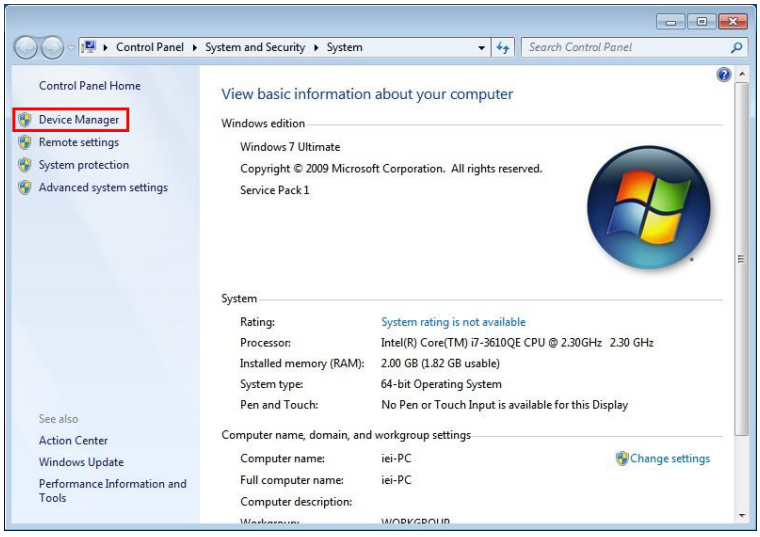


Figure 6-13: System Control Panel

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

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

Step 6: Select **Update Driver Software**.

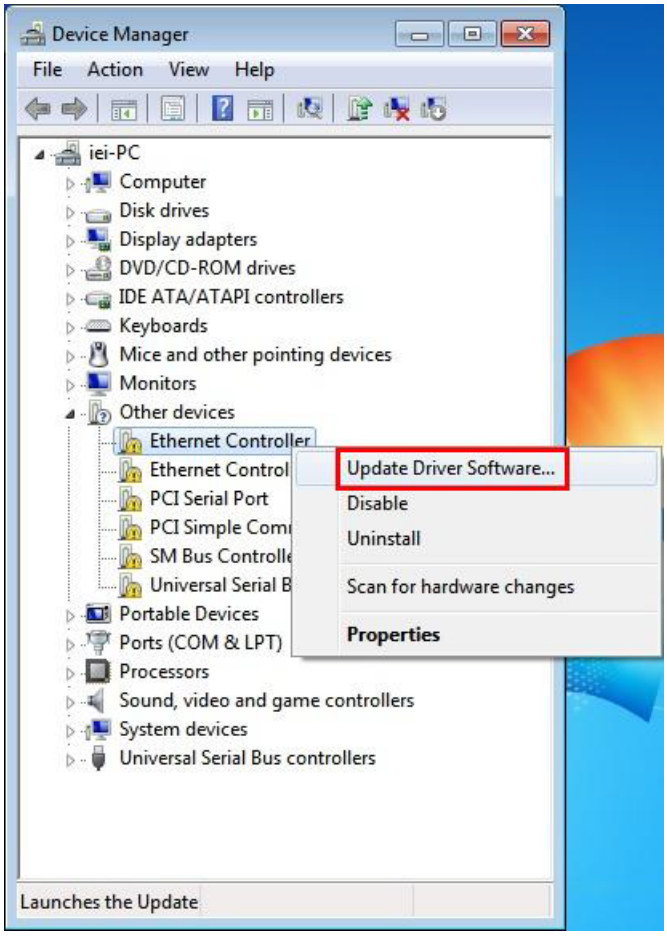


Figure 6-14: Device Manager List

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

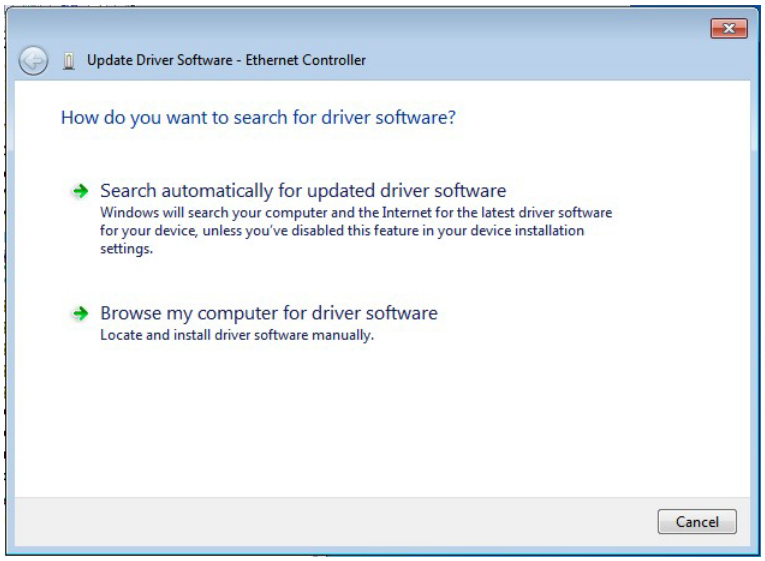


Figure 6-15: Update Driver Software Window

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

Step 9: Click Browse to select "**X:\3-LAN**" directory in the **Locate File** window, where "**X:\"** is the system CD drive. (**Figure 6-16**).

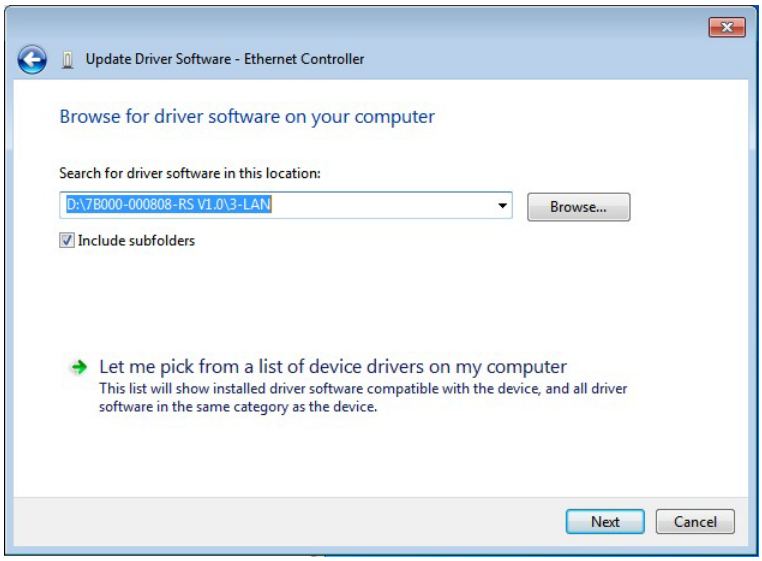


Figure 6-16: Locate Driver Files

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

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

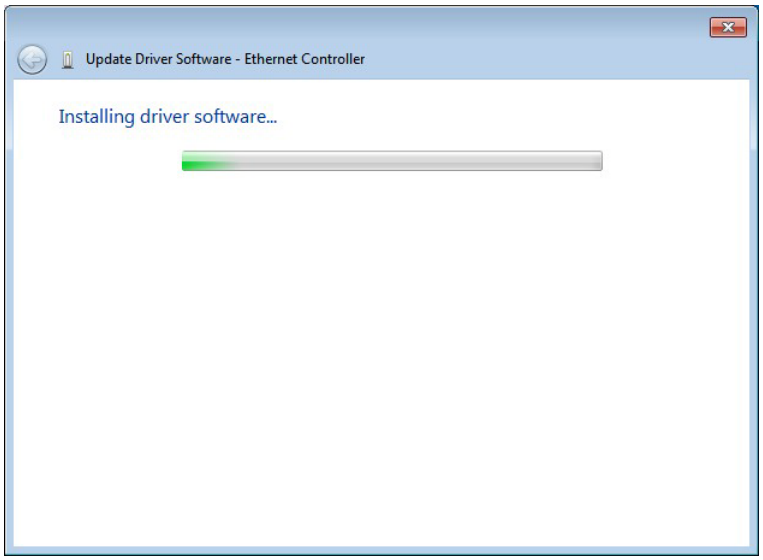


Figure 6-17: LAN Driver Installation

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

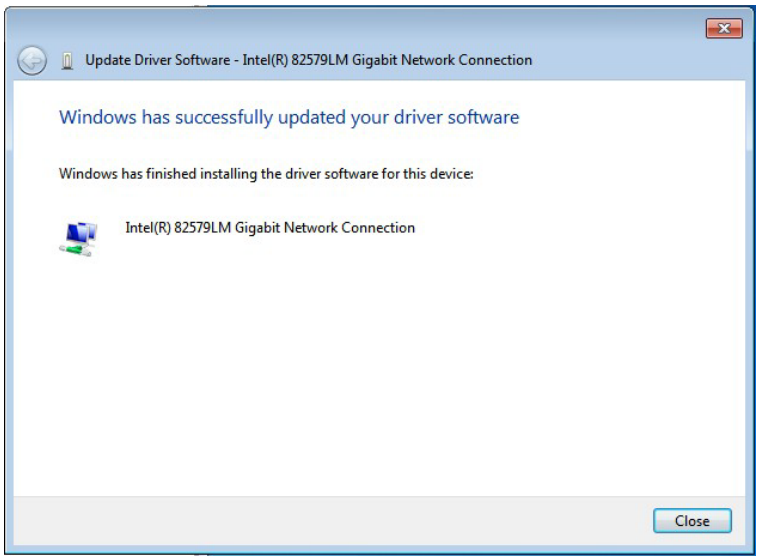


Figure 6-18: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

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

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

Step 3: Double click the setup file.

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

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

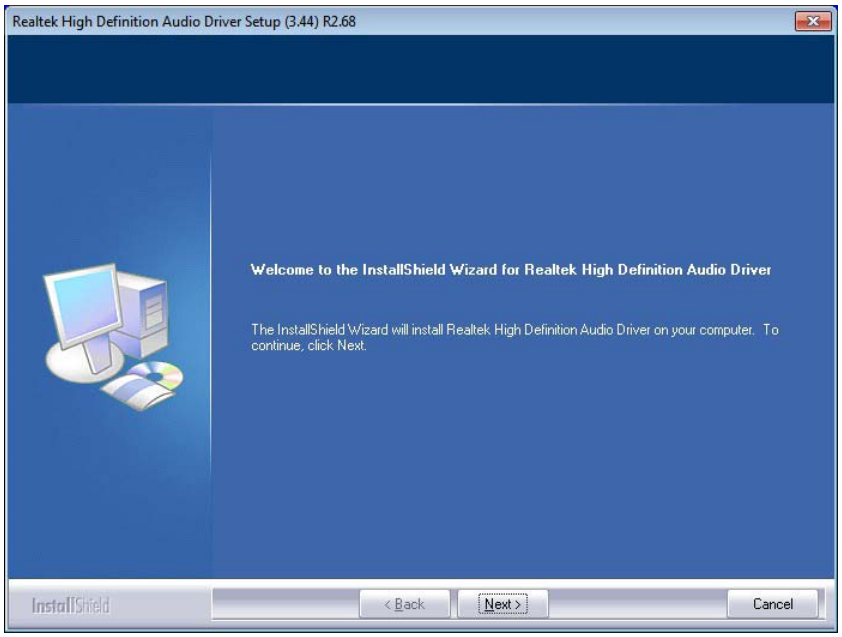


Figure 6-19: InstallShield Wizard Welcome Screen

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

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

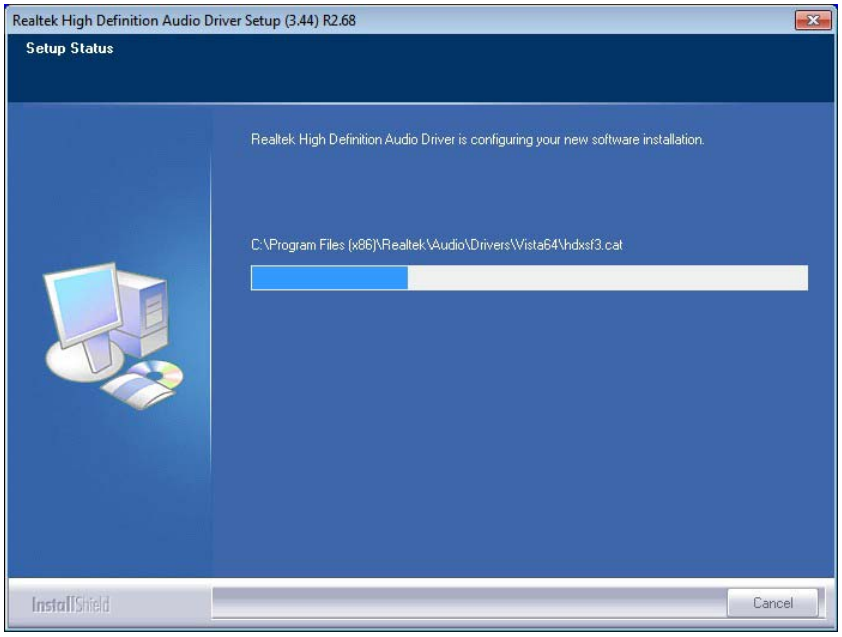


Figure 6-20: Audio Driver Software Configuration

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

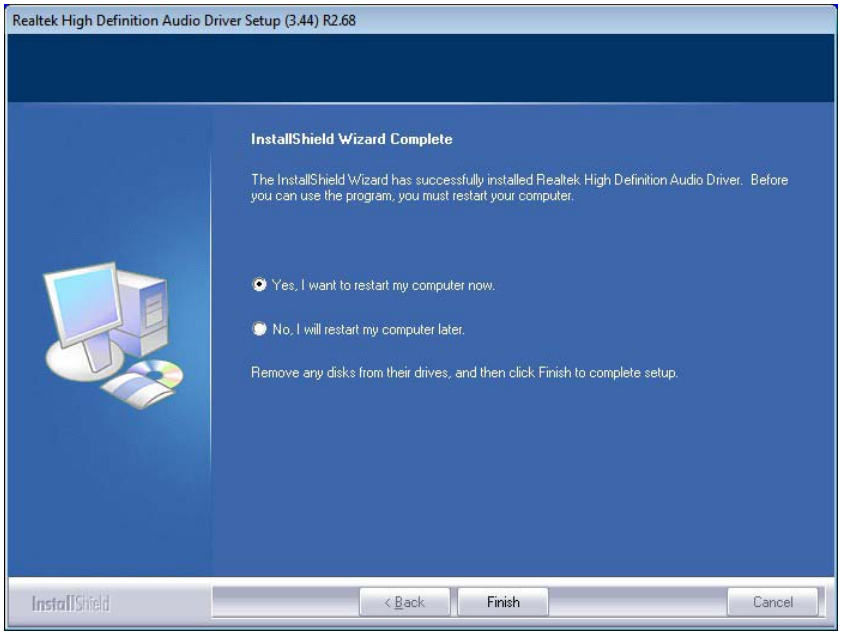


Figure 6-21: Restart the Computer

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

6.7 Intel® Rapid Storage Technology Driver Installation

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

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

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

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

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

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

Figure 6-22: SATA RAID Driver Welcome Screen

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

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

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

Figure 6-23: SATA RAID Driver License Agreement

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

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

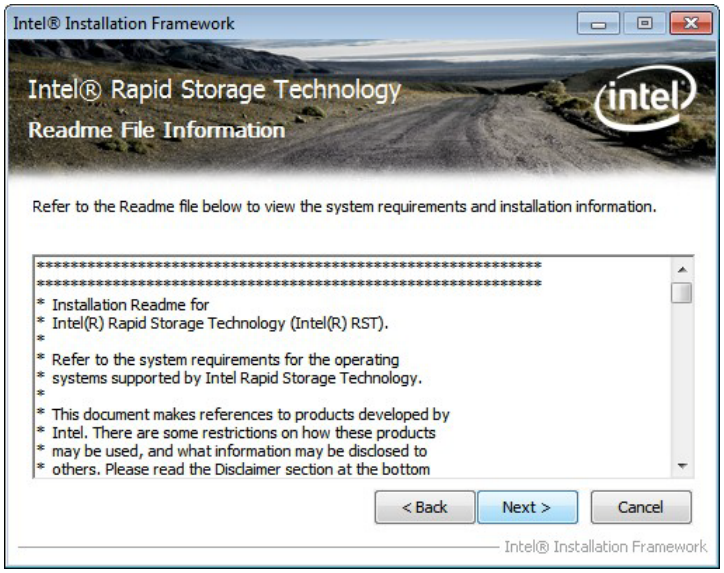


Figure 6-24: SATA RAID Driver Read Me File

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

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

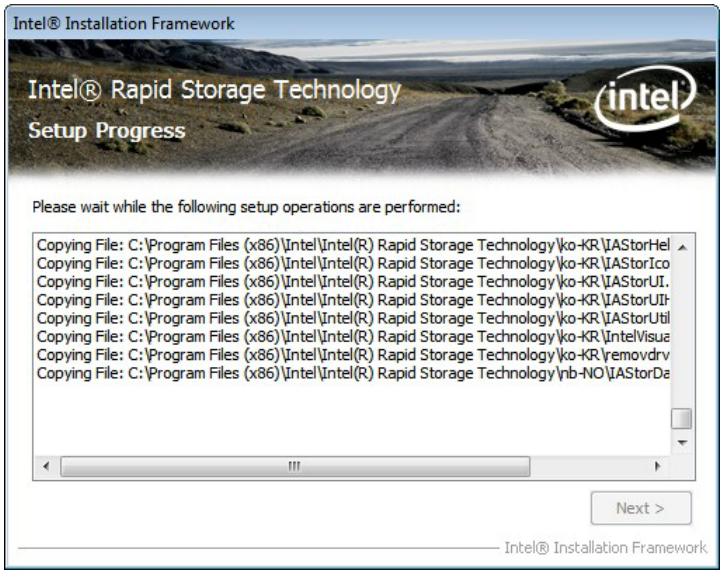


Figure 6-25: SATA RAID Driver Setup Operations

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

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

Figure 6-26: SATA RAID Driver Installation Finish Screen

6.8 USB 3.0 Driver Installation

WARNING:

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

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

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

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

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

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

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

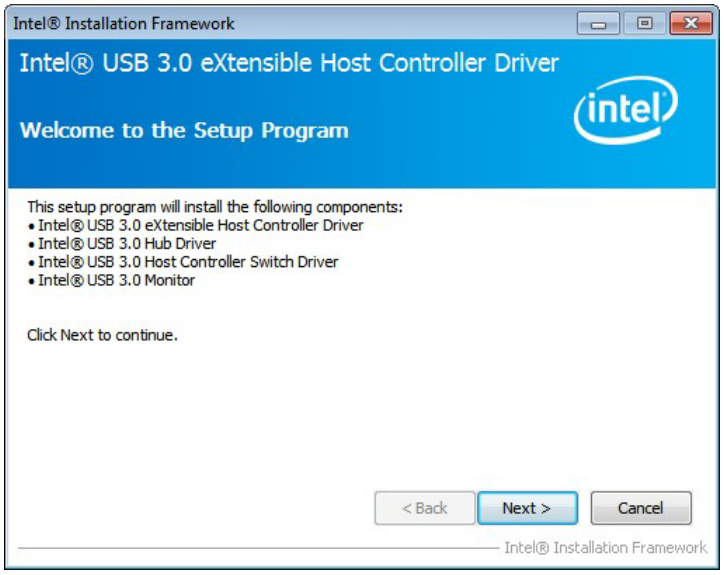


Figure 6-27: USB 3.0 Driver Welcome Screen

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

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

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

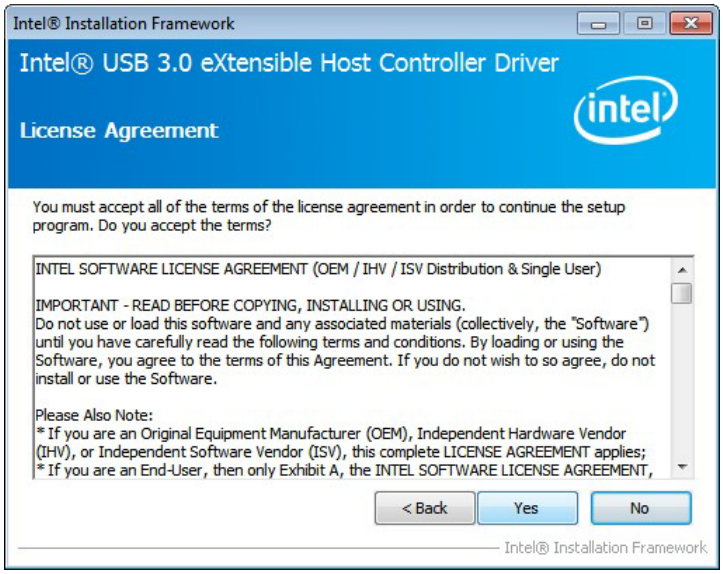


Figure 6-28: USB 3.0 Driver License Agreement

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

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

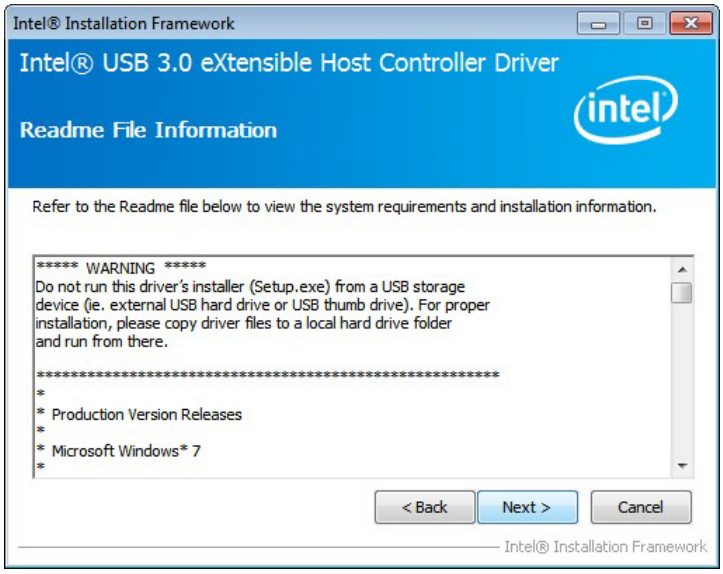


Figure 6-29: USB 3.0 Driver Read Me File

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

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

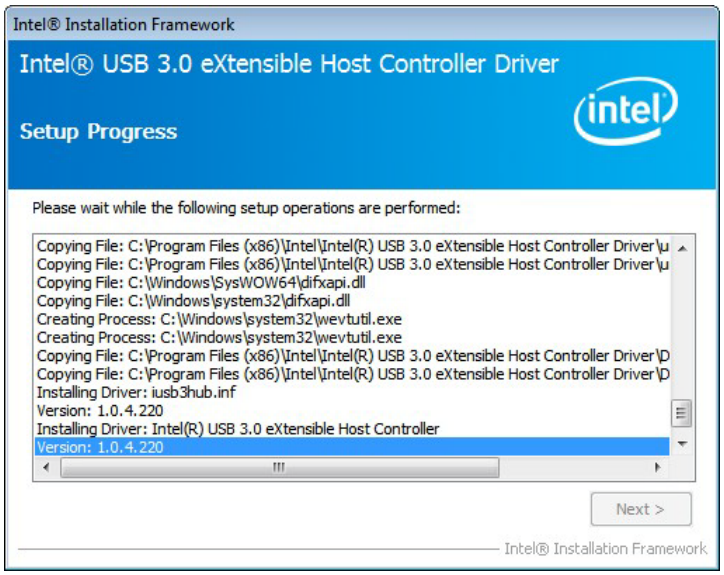


Figure 6-30: USB 3.0 Driver Setup Operations

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

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

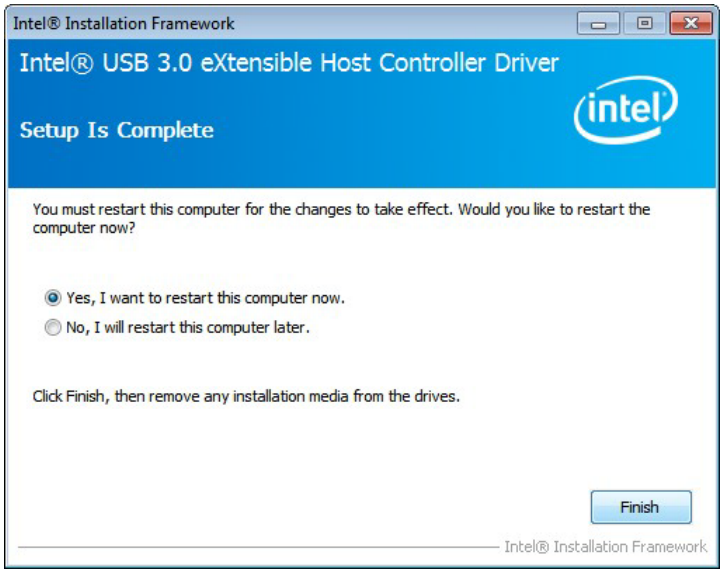


Figure 6-31: USB 3.0 Driver Installation Finish Screen

6.9 Intel® AMT Driver Installation

The package of the Intel® AMT components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Intel® Dynamic Application Loader
- Intel® Identity Protection Technology (Intel® IPT)
- Serial Over LAN (SOL)
- Intel® Manageability Engine Firmware Recovery Agent
- Intel® Management and Security Status
- Local Management Service (LMS)
- User Notification Service (UNS)

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

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

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

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

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

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

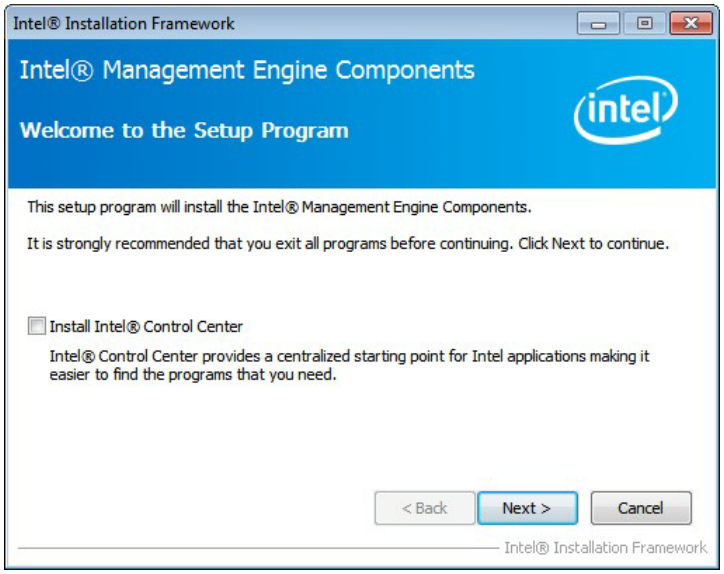


Figure 6-32: Intel® ME Driver Welcome Screen

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

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

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

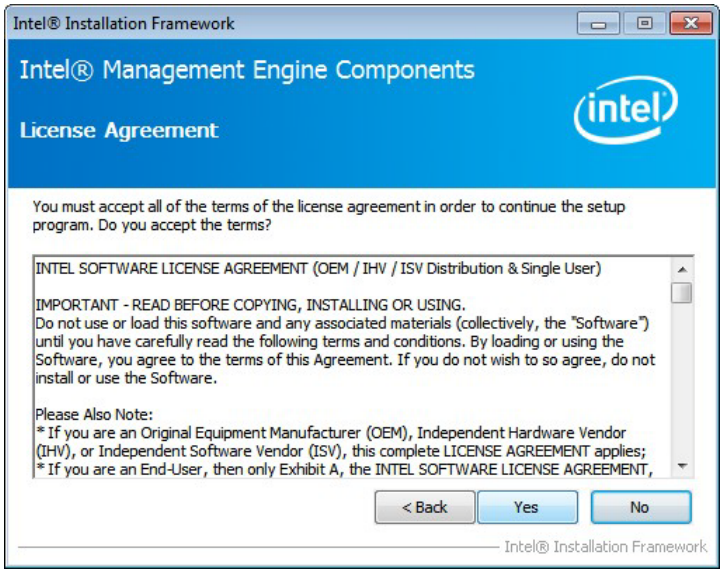


Figure 6-33: Intel® ME Driver License Agreement

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

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

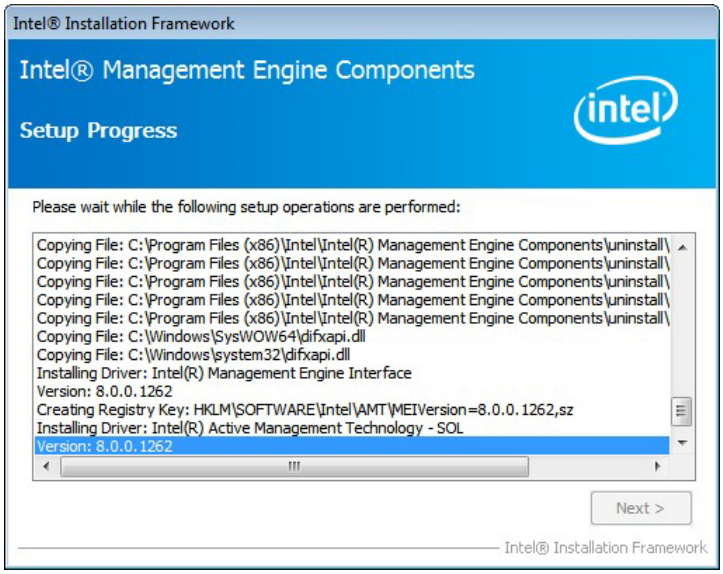


Figure 6-34: Intel® ME Driver Setup Operations

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

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

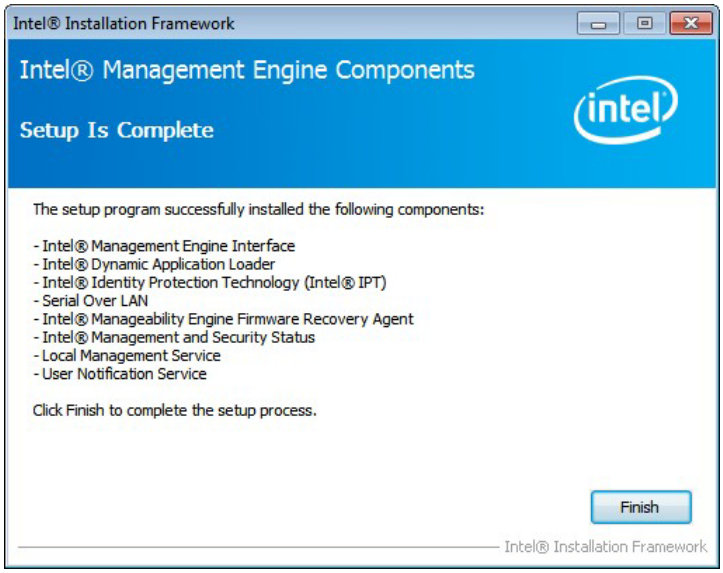


Figure 6-35: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

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

Appendix

B

One Key Recovery

B.1 One Key Recovery Introduction

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

NOTE:

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

The IEI One Key Recovery tool menu is shown below.

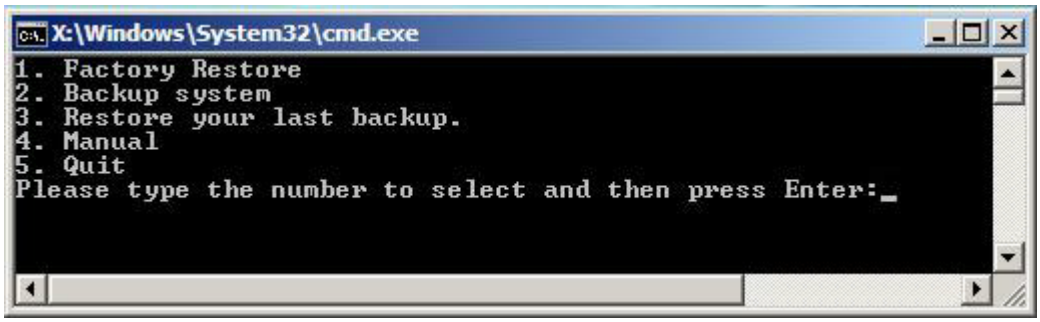


Figure B-1: IEI One Key Recovery Tool Menu

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

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

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

NOTE:

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

B.1.1 System Requirement

NOTE:

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

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

The partition created for recovery images must be big enough to contain both the factory default image and the user backup image. The size must be calculated before creating the partitions. Please take the following table as a reference when calculating the size of the partition.

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

NOTE:

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

B.1.2 Supported Operating System

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

- Microsoft Windows
  - Windows XP (Service Pack 2 or 3 required)
  - Windows Vista
  - Windows 7
  - Windows CE 5.0
  - Windows CE 6.0
  - Windows XP Embedded
- Linux
  - Fedora Core 12 (Constantine)
  - Fedora Core 11 (Leonidas)
  - Fedora Core 10 (Cambridge)
  - Fedora Core 8 (Werewolf)
  - Fedora Core 7 (Moonshine)

- RedHat RHEL-5.4
- RedHat 9 (Ghirke)
- Ubuntu 8.10 (Intrepid)
- Ubuntu 7.10 (Gutsy)
- Ubuntu 6.10 (Edgy)
- Debian 5.0 (Lenny)
- Debian 4.0 (Etch)
- SuSe 11.2
- SuSe 10.3

NOTE:

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

B.2 Setup Procedure for Windows

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

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

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

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

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

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

The detailed descriptions are described in the following sections.

NOTE:

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

B.2.1 Hardware and BIOS Setup

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

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

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

Step 4: Turn on the system.

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

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

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

B.2.2 Create Partitions

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

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

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

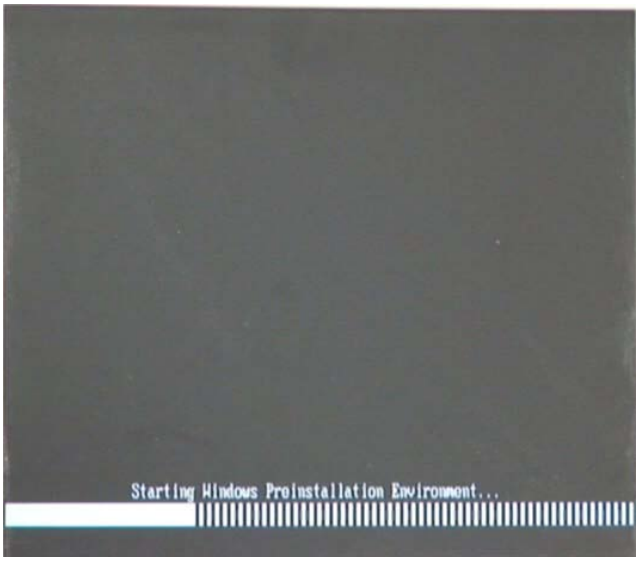


Figure B-2: Launching the Recovery Tool

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

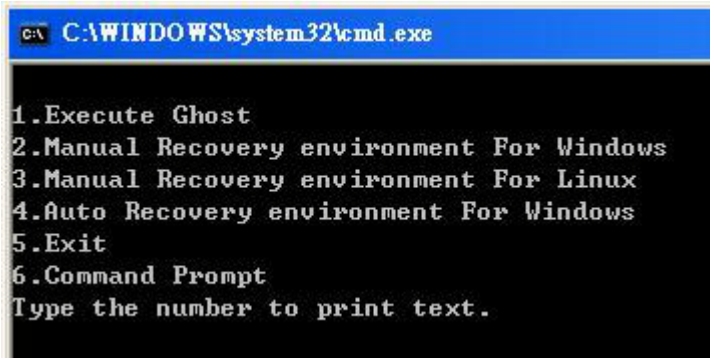


Figure B-3: Recovery Tool Setup Menu

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

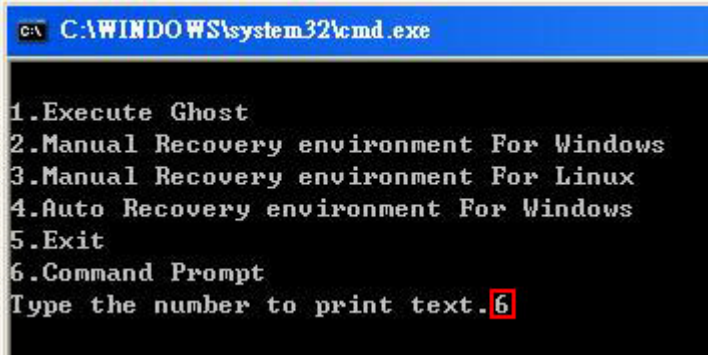


Figure B-4: Command Prompt

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

```
X:\I386\system32\CMD.EXE

X:\I386\SYSTEM32>diskpart          → Starts the Microsoft disk partitioning tool.

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

DISKPART> list vol                 → Show partition information

  Volume ###  Ltr  Label        Fs     Type        Size     Status     Info
  ----------  ---  -----------  -----  ----------  -------  ---------  --------
  Volume 0     X   CD_ROM       CDFS   DVD-ROM      405 MB  Healthy    Boot
  Volume 1     D                FAT32  Removeable  3854 MB  Healthy

DISKPART> sel disk 0               → Select a disk

Disk 0 is now the selected disk.

DISKPART> create part pri size=2000   → Create partition 1 and assign a size.
                                        This partition is for OS installation.
DiskPart succeeded in creating the specified partition.

DISKPART> assign letter=N          → Assign partition 1 a code name (N).

DiskPart successfully assigned the drive letter or mount point.

DISKPART> create part pri size=1800   → Create partition 2 and assign a size.
                                        This partition is for recovery images.
DiskPart succeeded in creating the specified partition.

DISKPART> assign letter=F          → Assign partition 2 a code name (F).

DiskPart successfully assigned the drive letter or mount point.

DISKPART> exit                     → Exit diskpart
X:\I386\SYSTEM32>format n: /fs:ntfs /q /y   → Format partition 1 (N) as NTFS format.
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 2000M
Creating file system structures.
Format complete.
   2048254 KB total disk space.
   2035620 KB are available.

X:\I386\SYSTEM32>format f: /fs:ntfs /q /v:Recovery /y
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 1804M
Creating file system structures.
Format complete.
   1847474 KB total disk space.
   1835860 KB are available.

X:\I386\SYSTEM32>exit              → Exit Windows PE
```

Formate partition 2 (F) as NTFS formate and name it as "Recovery".

Figure B-5: Partition Creation Commands

NOTE:

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

```
X:\I386\SYSTEM32>diskpart

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

DISKPART> sel disk 0

Disk 0 is now the selected disk.

DISKPART> list part

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

DISKPART> exit
```

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

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

B.2.3 Install Operating System, Drivers and Applications

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

NOTE:

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

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

B.2.4 Building the Recovery Partition

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

Step 2: Start the system.

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

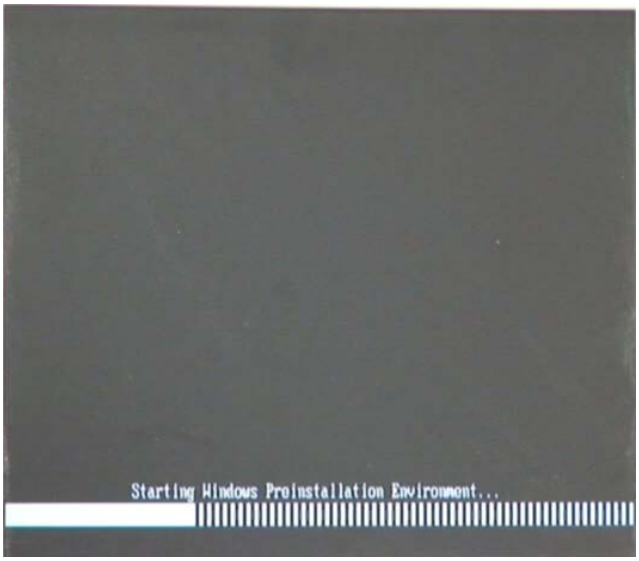


Figure B-6: Launching the Recovery Tool

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

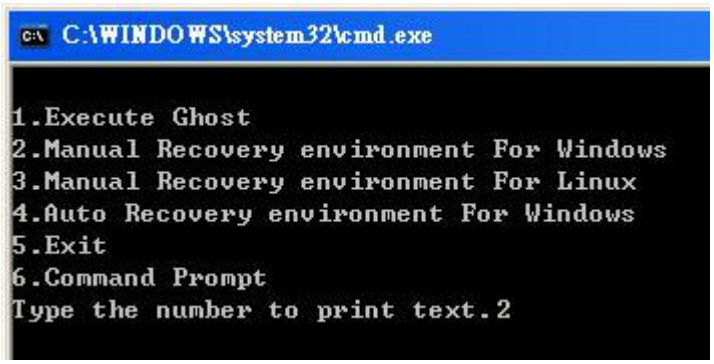


Figure B-7: Manual Recovery Environment for Windows

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

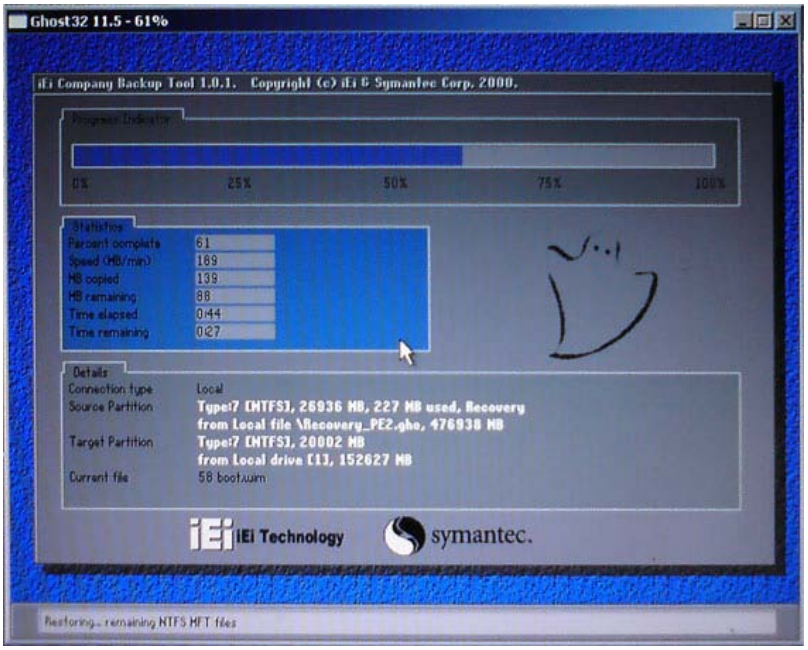


Figure B-8: Building the Recovery Partition

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

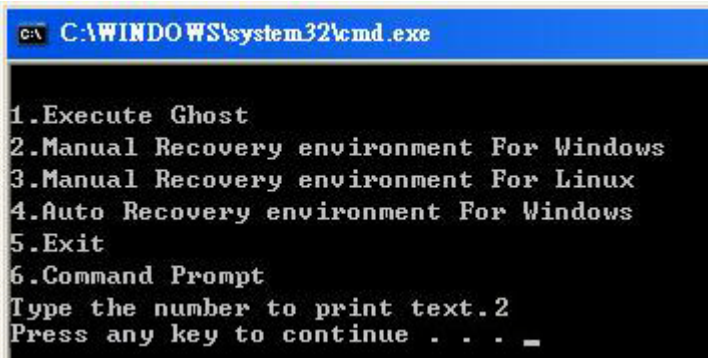


Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

B.2.5 Create Factory Default Image

NOTE:

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

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

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

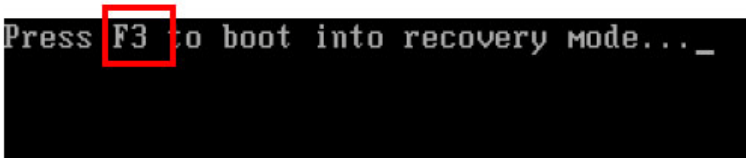


Figure B-10: Press F3 to Boot into Recovery Mode

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

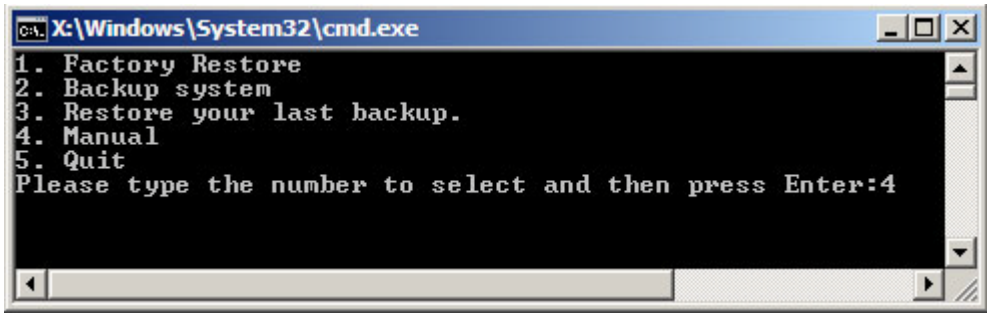


Figure B-11: Recovery Tool Menu

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

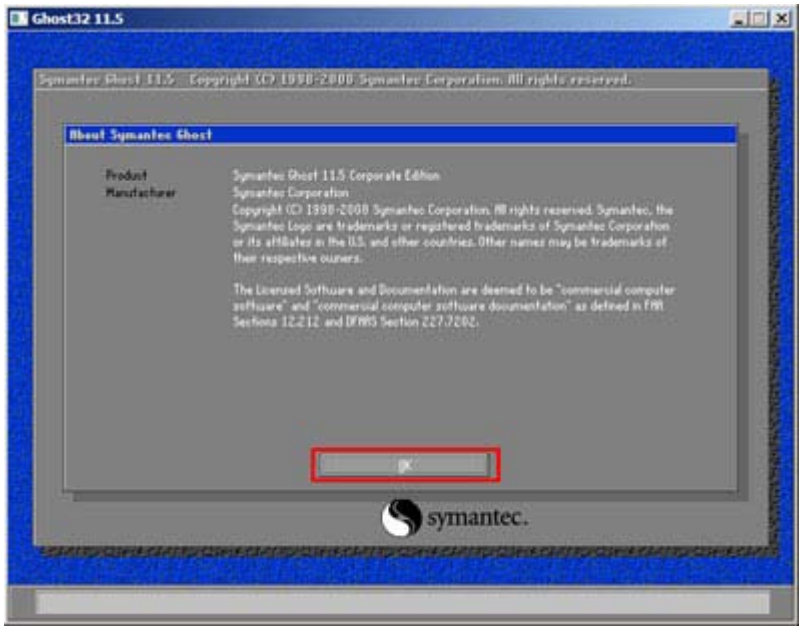


Figure B-12: About Symantec Ghost Window

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

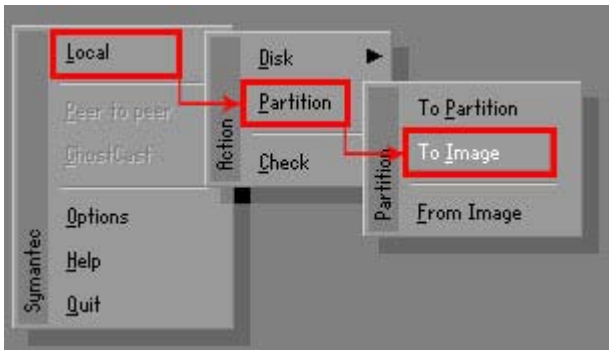


Figure B-13: Symantec Ghost Path

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

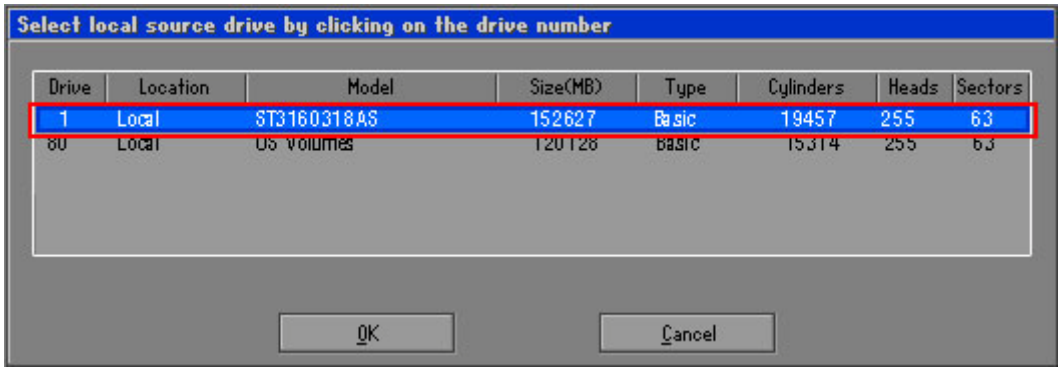


Figure B-14: Select a Local Source Drive

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

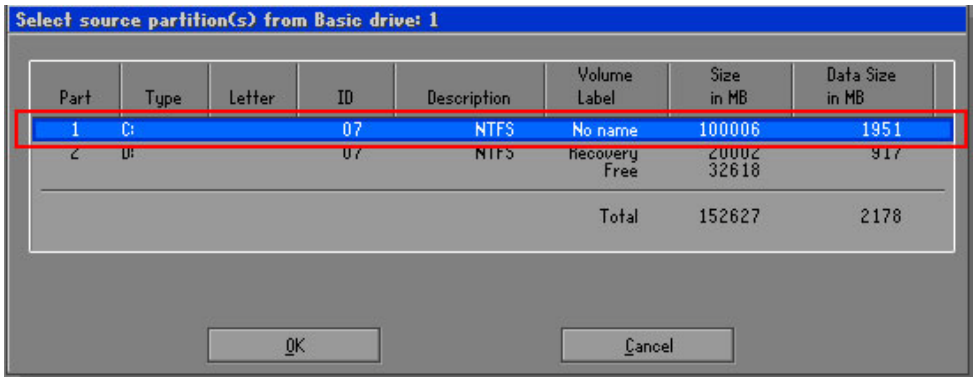


Figure B-15: Select a Source Partition from Basic Drive

Step 7: Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei** (**Figure B-16**). Click **Save**. The factory default image will then be saved in the selected recovery drive and named IEI.GHO.

WARNING:

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

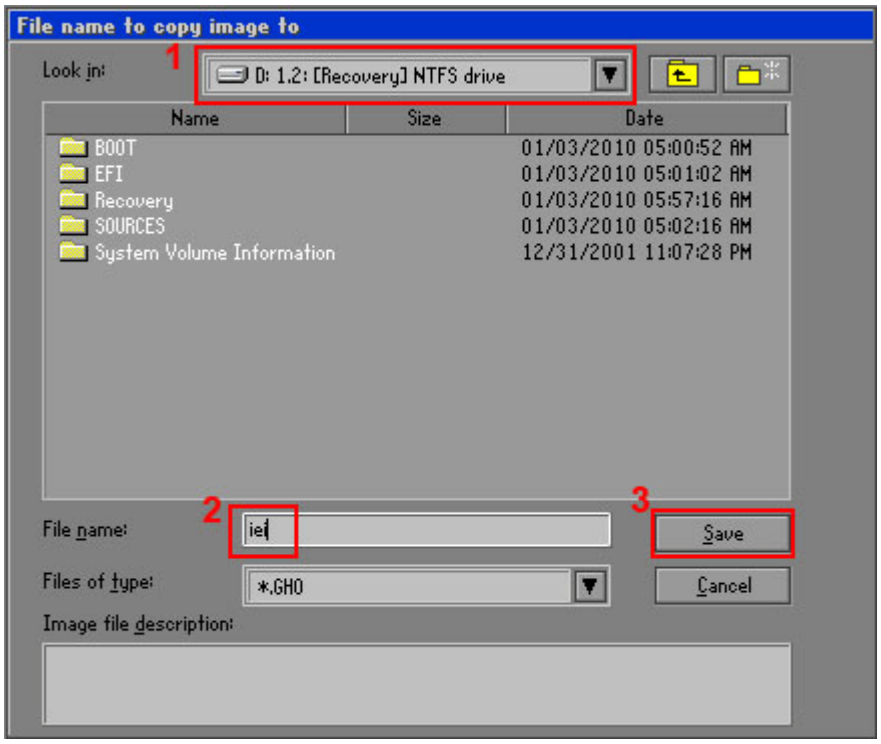


Figure B-16: File Name to Copy Image to

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

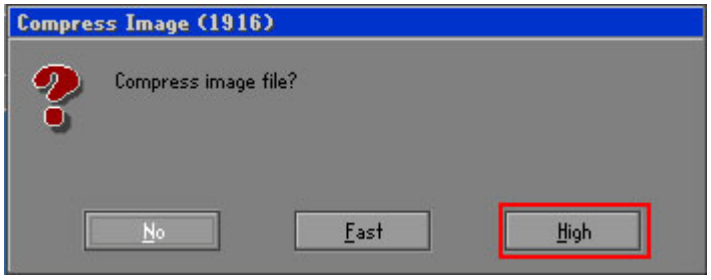


Figure B-17: Compress Image

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

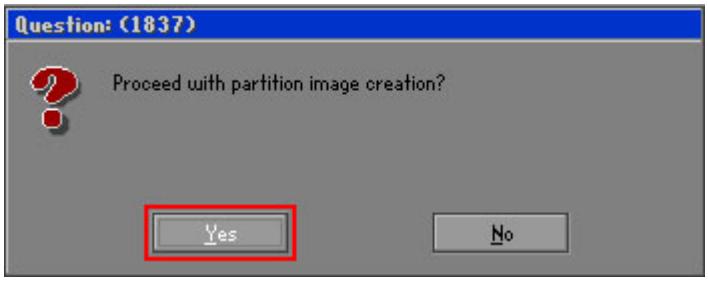


Figure B-18: Image Creation Confirmation

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

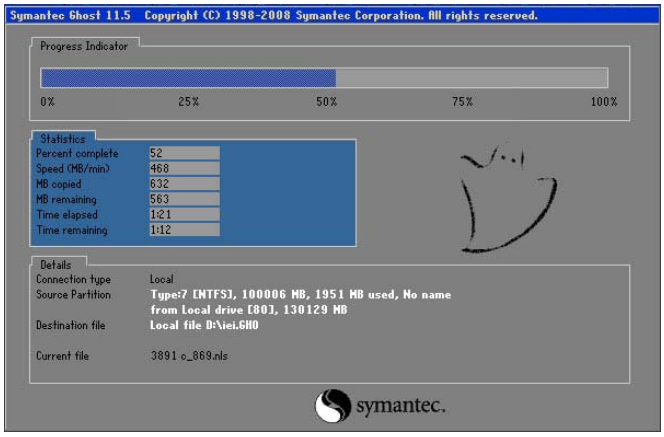


Figure B-19: Image Creation Complete

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

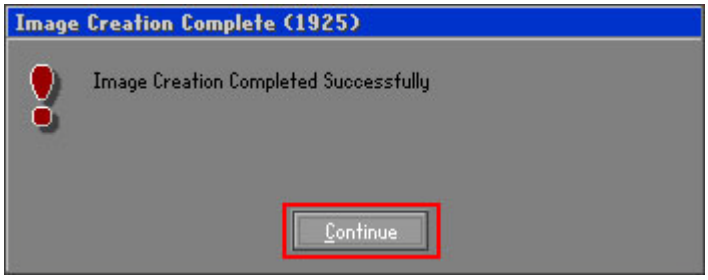


Figure B-20: Image Creation Complete

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

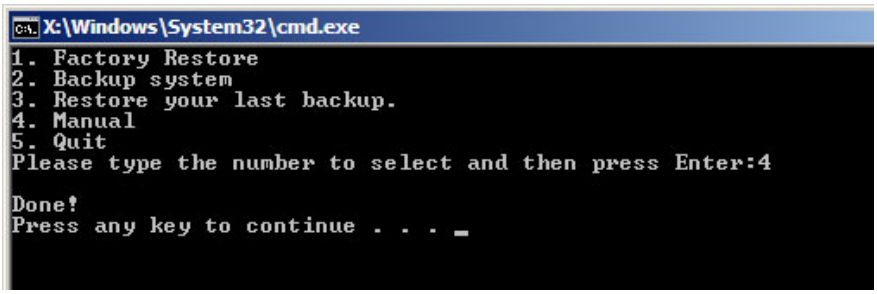


Figure B-21: Press Any Key to Continue

B.3 Auto Recovery Setup Procedure

The auto recovery function allows a system to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To use the auto recovery function, follow the steps described in the following sections.

CAUTION:

The 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: 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!

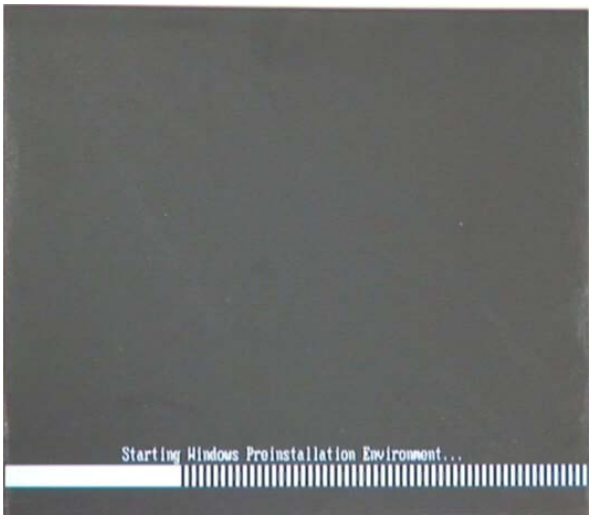


Figure B-23: Launching the Recovery Tool

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

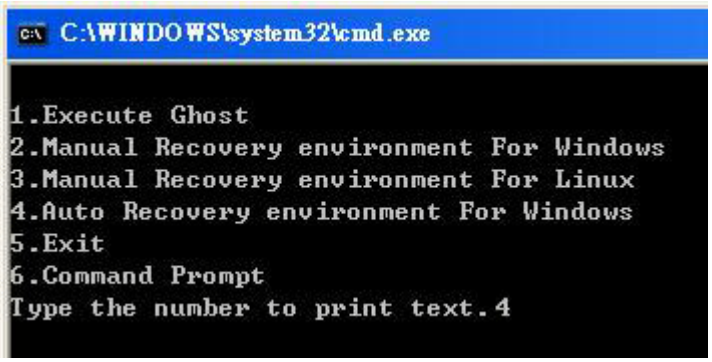


Figure B-24: Auto Recovery Environment for Windows

Step 5: 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.

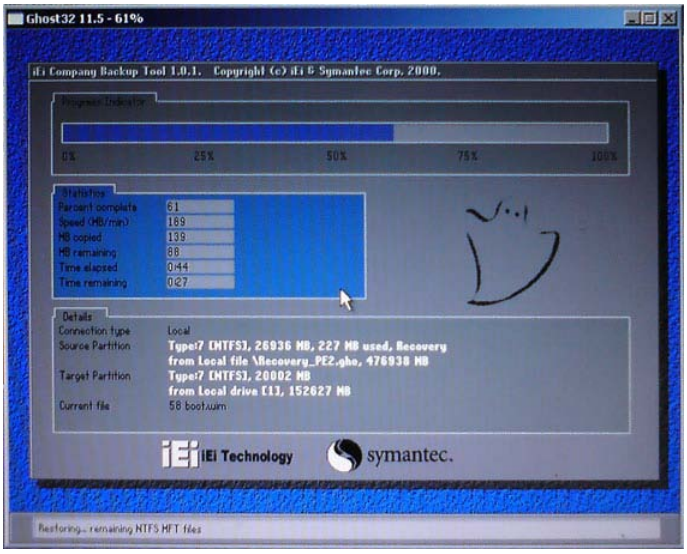


Figure B-25: Building the Auto Recovery Partition

Step 6: 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-26: Factory Default Image Confirmation

Step 7: The Symantec Ghost starts to create the factory default image (**Figure B-27**).

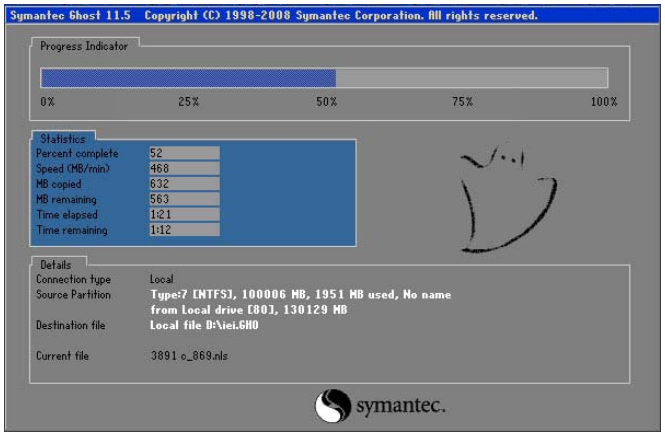


Figure B-27: Image Creation Complete

Step 8: After completing the system configuration, press any key in the following window to restart the system.

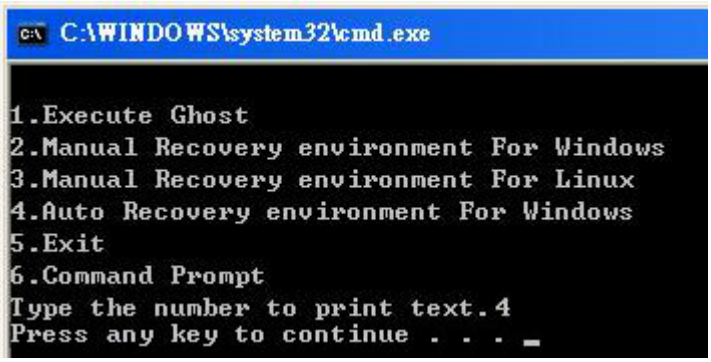


Figure B-28: Press any key to continue

Step 9: Eject the One Key Recovery CD and restart the system.

Step 10: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 11: Enable the Auto Recovery Function option (**Advanced → iEi Feature → Auto Recovery Function**).

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

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

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

BIOS Menu 31: IEI Feature

Step 12: 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.

CAUTION:

The auto recovery function can only apply on a Microsoft Windows system running the following OS versions:

- Windows XP
- Windows Vista
- Windows 7

B.4 Setup Procedure for Linux

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

Step 1: **Hardware and BIOS setup**. Refer to **Section B.2.1**.

Step 2: **Install Linux operating system**. Make sure to install GRUB (v0.97 or earlier) MBR type and Ext3 partition type. Leave enough space on the hard drive to create the recover partition later.

NOTE:

If the Linux OS is not installed with GRUB (v0.97 or earlier) and Ext3, the Symantec Ghost may not function properly.

While installing Linux OS, please create two partitions:

- Partition 1: ***/***
- Partition 2: **SWAP**

NOTE:

Please reserve enough space for partition 3 for saving recovery images.

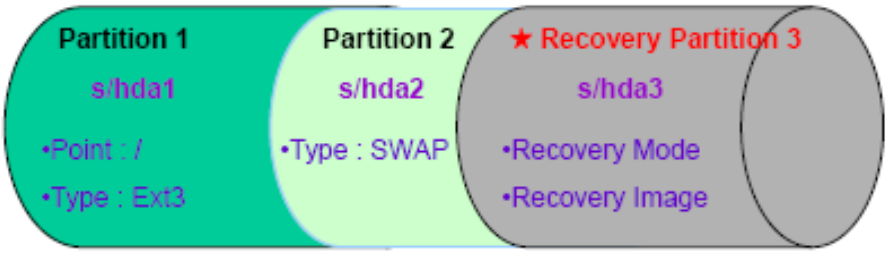


Figure B-29: Partitions for Linux

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-30**). 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.

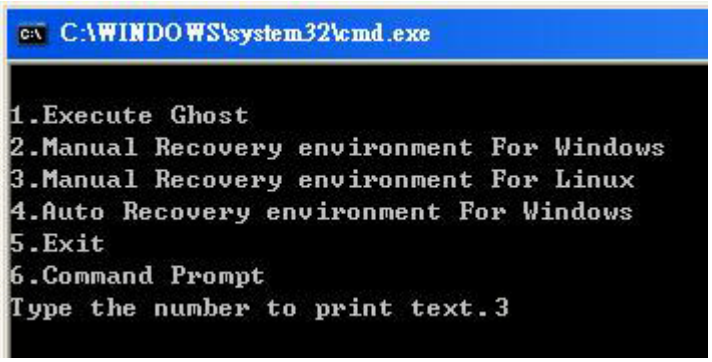


Figure B-30: Manual Recovery Environment for Linux

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

```
Fedora release 9 (Sulphur)
Kernel 2.6.25-14.fc9.i686 on an i686 (tty2)

localhost login: root
Password:
[root@localhost ~]# cd /boot/grub/
[root@localhost grub]# vi menu.lst _
```

Figure B-31: Access menu.lst in Linux (Text Mode)

Step 6: Modify the menu.lst as shown below.

```
#boot=/dev/sda
default=0
timeout=10          <- Modify timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Fedora (2.6.25-14.fc9.i686)
        root (hd0,0)
        kernel /vmlinuz-2.6.25-14.fc9.i686 ro root=UUID=10f1acd
ac38b5c78910 rhgb quiet
        initrd /initrd-2.6.25-14.fc9.i686.img

title   Recovery Partition
root    (hd0,2)
makeactive                  <- Type command
chainloader +1
```

- Type command:

  title Recovery Partition

  root (hd0,2)

  makeactive

  chainloader +1

Step 7: The recovery tool menu appears. (**Figure B-32**)

```
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:
```

Figure B-32: 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.

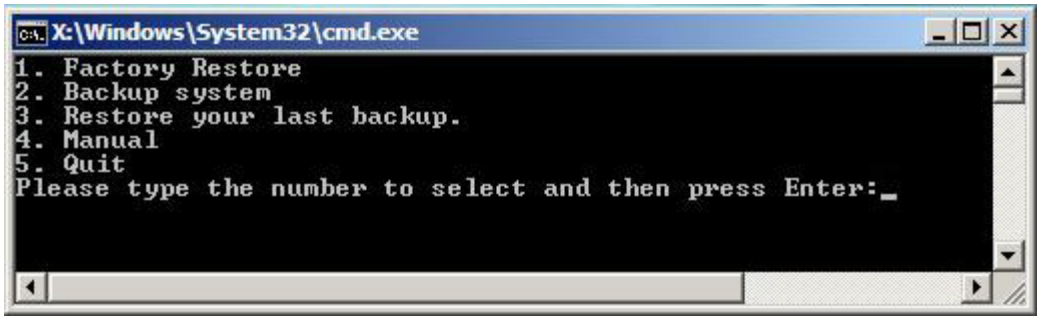


Figure B-33: Recovery Tool Main Menu

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.

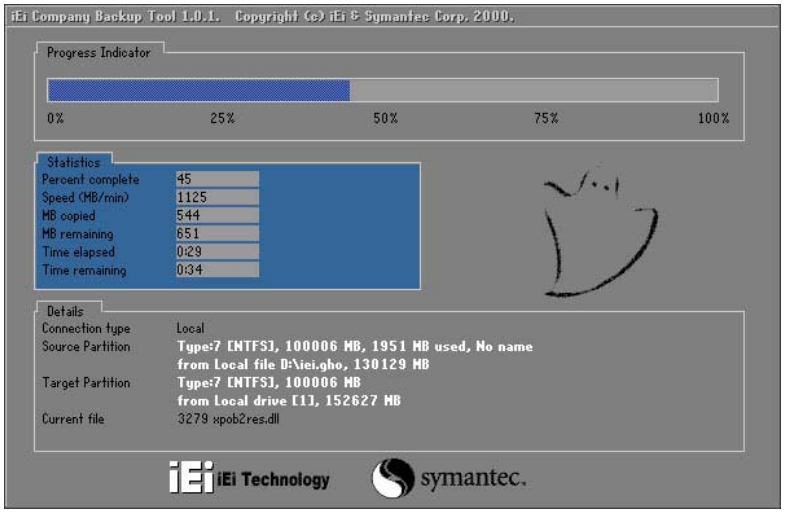


Figure B-34: Restore Factory Default

Step 3: The screen shown in **Figure B-35** appears when completed. Press any key to reboot the system.

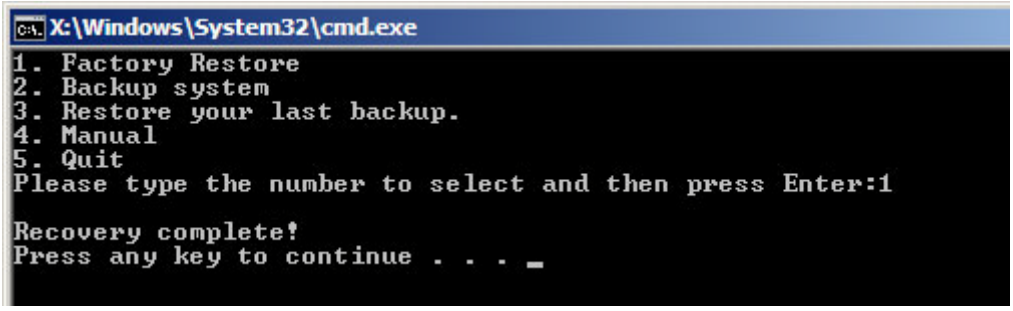


Figure B-35: Recovery Complete Window

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.

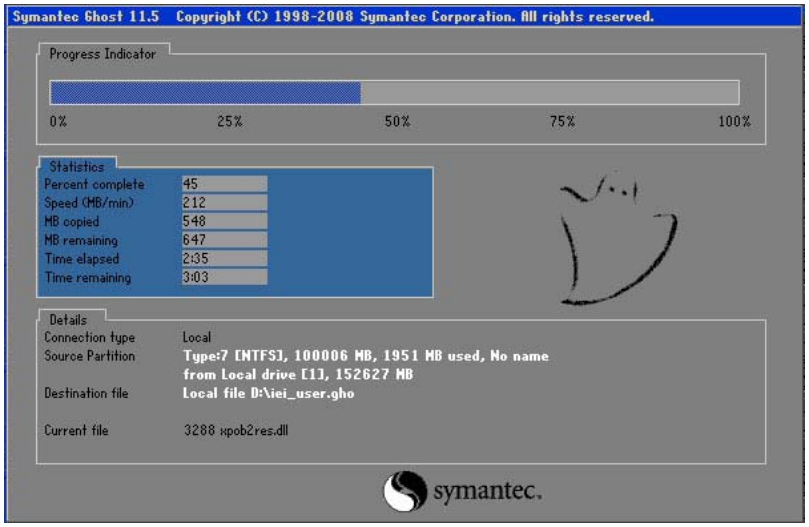


Figure B-36: Backup System

Step 3: The screen shown in **Figure B-37** appears when system backup is complete. Press any key to reboot the system.

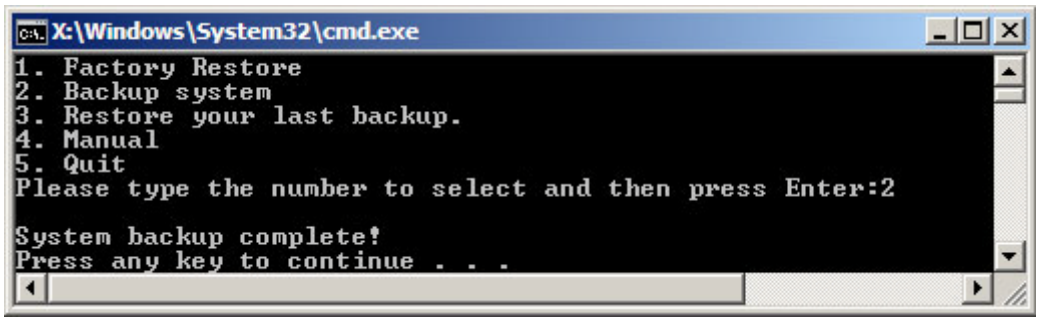


Figure B-37: System Backup Complete Window

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).

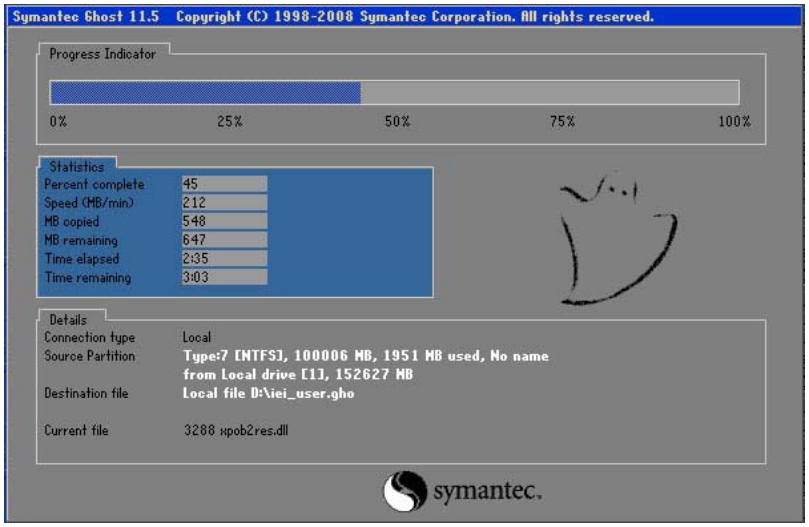


Figure B-38: Restore Backup

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

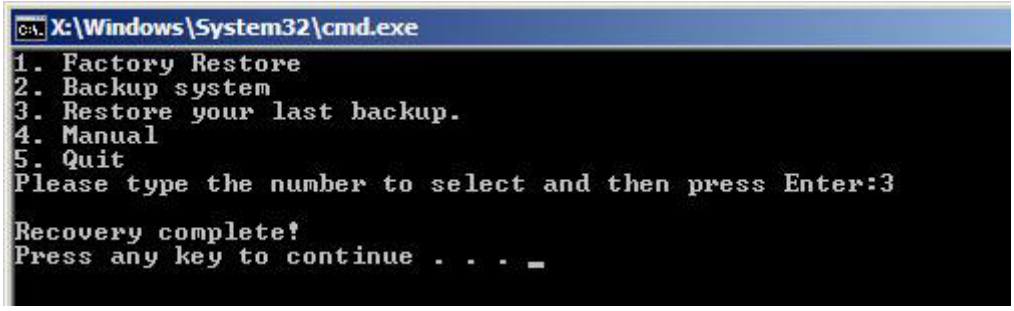


Figure B-39: Restore System Backup Complete Window

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.

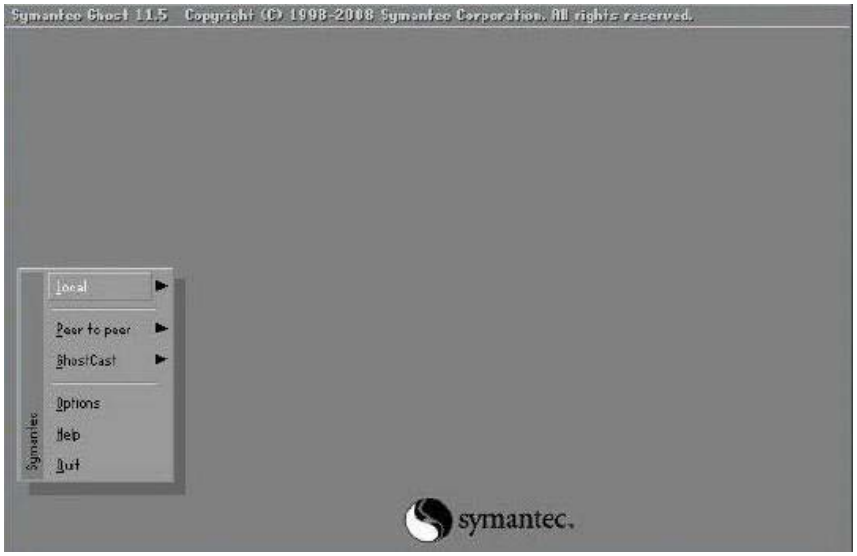
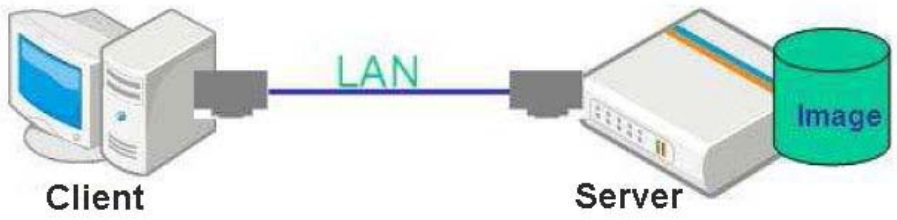


Figure B-40: Symantec Ghost Window

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.



NOTE:

The supported client OS includes:

- Windows 2000
- Windows XP
- Windows Vista
- Windows 7
- Windows CE
- Windows XP Embedded

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

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

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

B.6.1 Configure DHCP Server Settings

Step 1: Install the DHCP

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

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

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

CentOS

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

#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

```
# DHCP Server Configuration file.
#   see /usr/share/doc/dhcp*/dhcpd.conf.sample
#
```

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

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

subnet 192.168.0.0 netmask 255.255.255.0 {

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

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

Debian

#vi /etc/dhcpd.conf

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

next-server PXE server IP address;

filename “pxelinux.0”;

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

subnet 192.168.0.0 netmask 255.255.255.0 {

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

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

B.6.2 Configure TFTP Settings

Step 1: Install the tftp, httpd and syslinux.

#yum install tftp-server httpd syslinux (CentOS)

#apt-get install tftpd-hpa xinetd syslinux (Debian)

Step 2: Enable the TFTP server by editing the “/etc/xinetd.d/tftp” file and make it use the remap file. The “-vvv” is optional but it could definitely help on getting more information while running the remap file. For example:

CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

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

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

Debian

Replace the TFTP settings from “inetd” to “xinetd” and annotate the “inetd” by adding “#”.

#vi /etc/inetd.conf

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

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

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

#vi /etc/xinetd.d/tftp

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

B.6.3 Configure One Key Recovery Server Settings

Step 1: Copy the **Utility/RECOVERYR10.TAR.BZ2** package from the One Key Recovery CD to the system (server side).

Step 2: Extract the recovery package to /.

#cp RecoveryR10.tar.bz2 /

#cd /

#tar –xvjf RecoveryR10.tar.bz2

Step 3: Copy “pxelinux.0” from “syslinux” and install to “/tftboot”.

#cp /usr/lib/syslinux/pxelinux.0 /tftpboot/

B.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

CentOS

#service xinetd restart

#service httpd restart

#service dhcpd restart

Debian

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

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

B.6.5 Create Shared Directory

Step 1: Install the samba.

#yum install samba

Step 2: Create a shared directory for the factory default image.

#mkdir /share

#cd /share

#mkdir /image

#cp iei.gho /image

WARNING:

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

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

#vi /etc/samba/smb.conf

Modify:

[image]

comment = One Key Recovery

path = /share/image

browseable = yes

writable = yes

public = yes

create mask = 0644

directory mask = 0755

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

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

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

Step 5: Modify the hostname

#vi /etc/hostname

Modify: RecoveryServer

```
RecoveryServer
~
```

B.6.6 Setup a Client System for Auto Recovery

Step 1: 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 2: 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.

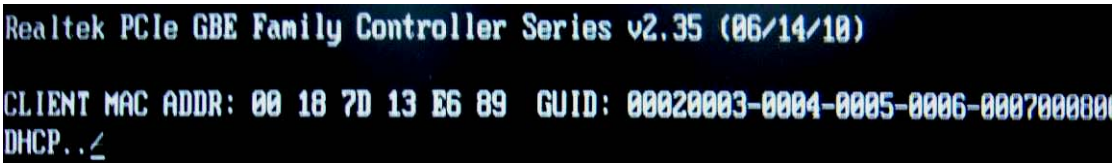
Boot Option #2 → select the boot from LAN option.

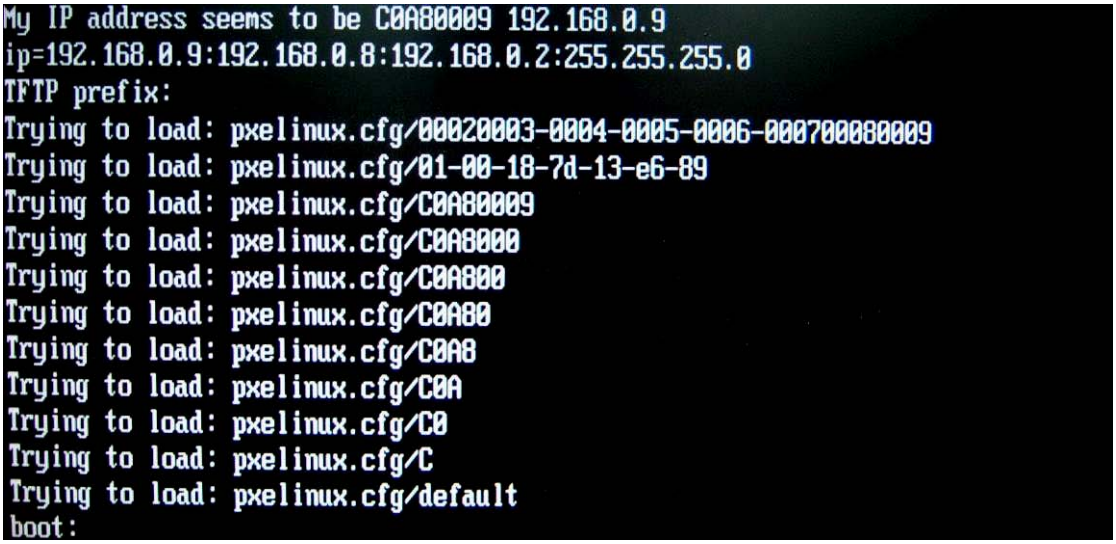
Step 3: Save changes and exit BIOS menu.

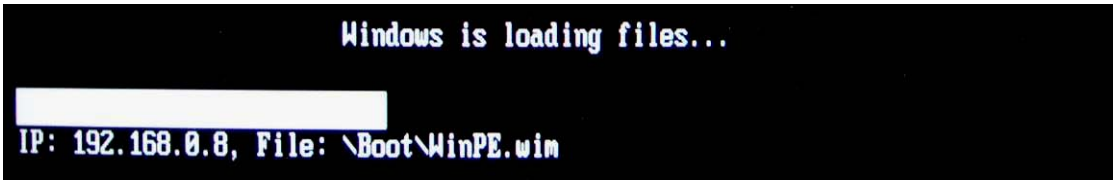
Exit → **Save Changes and Exit**

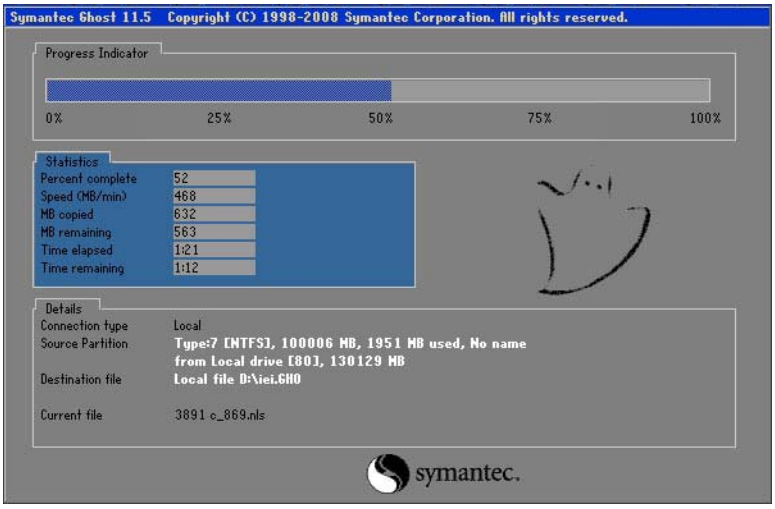
Step 4: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

Step 5: Restart the client system from LAN. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image. The following screens will show when the system starts auto recovering.









NOTE:

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

B.7 Other Information

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

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

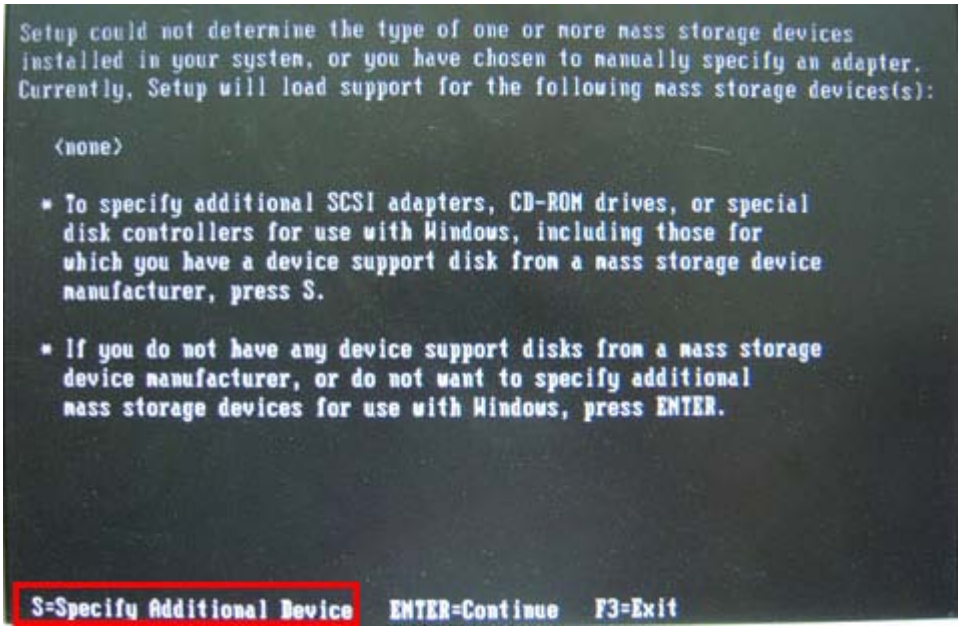
Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

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

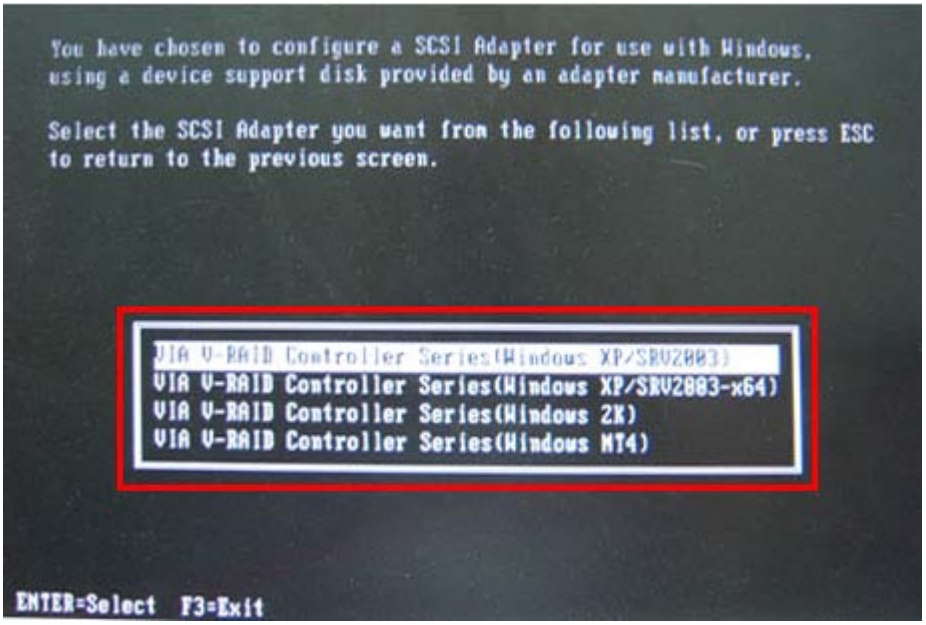
Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

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

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



Step 6: In the following window, select a SATA controller mode used in the system. Then press <**Enter**>. The user can now start using the SATA HDD.



Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

B.7.2 System Memory Requirement

To be able to access the recovery tool by pressing <**F3**> while booting up the system, please make sure to have enough system memory. The minimum memory requirement is listed below.

- **Using Award BIOS**: 128 MB system memory
- **Using AMI BIOS**: 512 MB system memory.

Appendix

C

Terminology

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

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

LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix A

ppendix

D

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. Contact IEI support or visit the IEI website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table D-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT     15H

;
; ADD THE APPLICATION PROGRAM HERE
;

        CMP     EXIT_AP, 1      ;is the application over?
        JNE     W_LOOP          ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H

;
; EXIT ;
```

Appendix

E

Hazardous Materials Disclosure

E.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

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

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

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