IEI Technology Corp.

MODEL:

IMBA-C604EN

ATX server board supports 32nm LGA1356 Intel® Xeon® E5-2400 series up to 8 cores CPU with Intel® C604, DDR3, VGA, PCIe Gen 3.0, Four SAS 3Gb/s, Two SATA 6Gb/s, Two SATA 6Gb/s, Ten COM and RoHS

User Manual

Rev. 1.00 – 31 July, 2012

RoHS Lead Free

Revision

Date	Version	Changes
31 July, 2012	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

Figure 1-1: IMBA-C604EN

The IMBA-C604EN is an ATX server motherboard. It accepts a socket LGA1356 Intel® Xeon® E5-2400 series processor with up to eight cores and supports six 240-pin 1600/1333MHz dual-channel DDR3 SDRAM sockets supported ECC UDIMMs or non-ECC RDIMMs/LRDIMMs (system max. 48GB UDIMMs/96GB RDIMMs/192GB LRDIMMs).

The integrated Intel® C604 system chipset supports two GbE LAN ports through dual Intel® 82574L PCIe controllers.

The IMBA-C604EN includes a VGA port. Expansion and I/O include two PCI slots, one PCIe x4 slot, three PCIe x8 slots, two USB 3.0 ports on the rear panel, four USB 2.0 on the rear panel, six USB 2.0 by pin header, one USB 2.0 by internal type A port, two SATA 3Gb/s connectors, two SATA 6Gb/s connectors, four SAS 3Gb/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 IMBA-C604EN motherboard benefits include:

- Storage application fulfill 4 to 8 driver bay needed
- Rich serial ports fulfill multiple communication devices
- Multiple expansion slots by PCIe and PCI interfaces for high speed add-on card infrastructure

1.3 Features

Some of the IMBA-C604EN motherboard features are listed below:

- Supports high-performance LGA1356 Intel® Xeon® E5 CPU with up to eight cores
- Increased channel counts by three channels (two DIMMs per channel). Six 1600/1333MHz DDR3 sockets support up to 48GB UDIMMs, 96GB RDIMMs or 192GB LRDIMMs
- Integrated PCI Express Gen 3 for improved bandwidth and connectivity support up to 24 lanes at 8GT/s
- Intel® Matrix RAID supports 0/1/10/5 for SATA and 0/1/10 for SAS hard drive interfaces
- VGA display output driver form on-board IC via AST1300 for all Xeon® E5-2400 series CPU
- IEI One Key Recovery solution allows you to create rapid OS backup and recovery

1.4 Connectors

The connectors on the IMBA-C604EN are shown in the figure below.

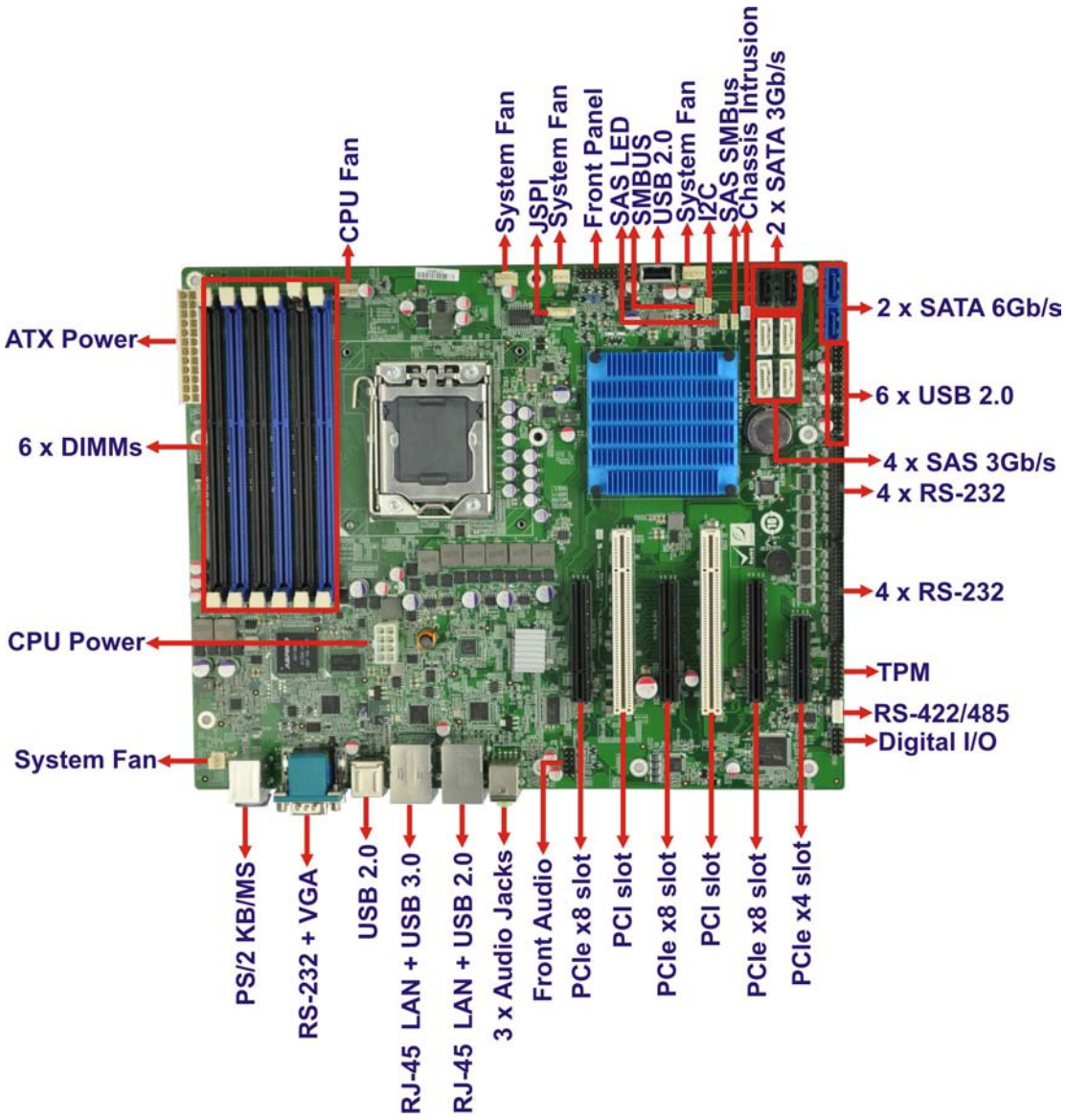


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMBA-C604EN are shown in the diagram below.

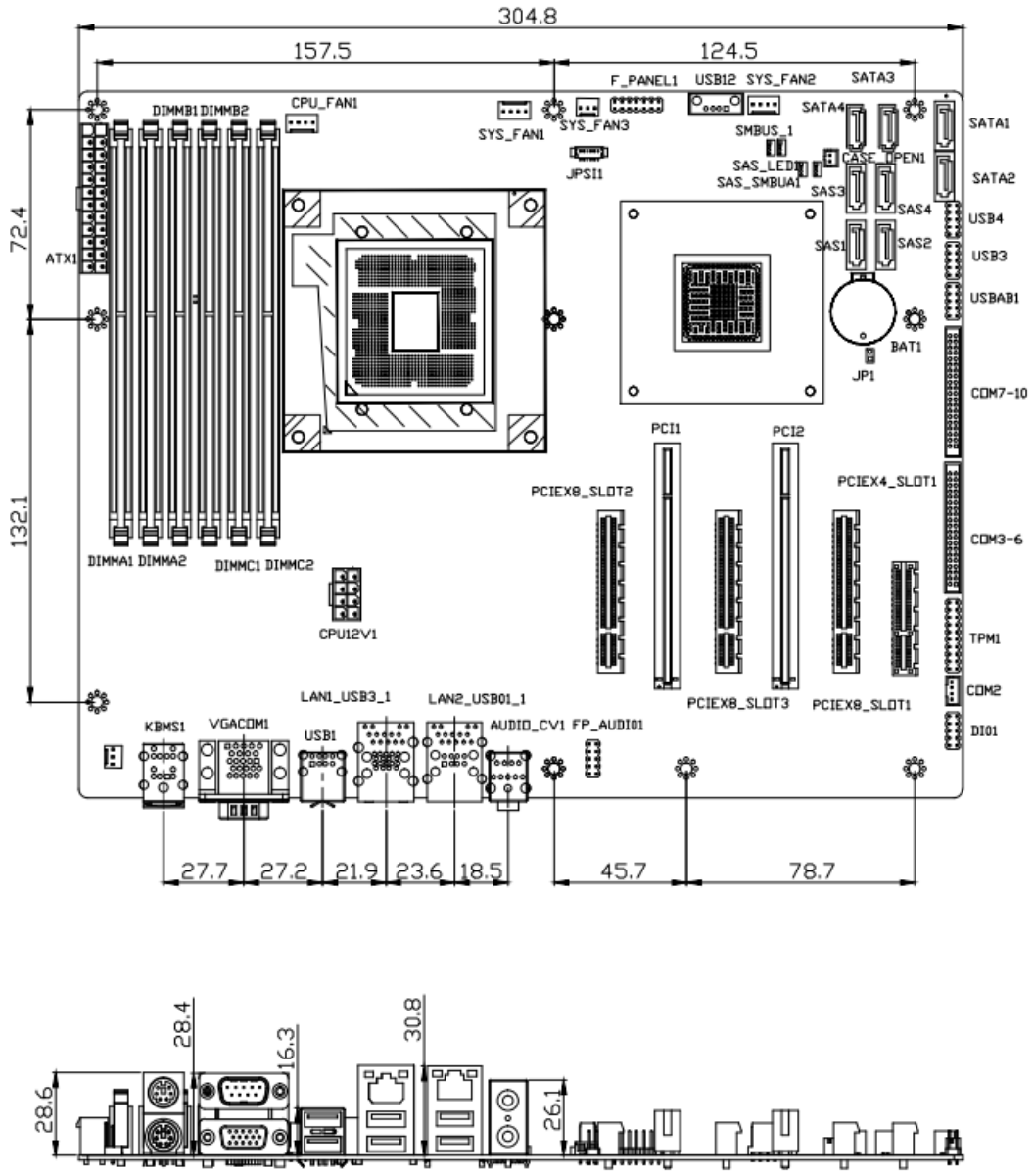


Figure 1-3: IMBA-C604EN Dimensions (mm)

1.6 Data Flow

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

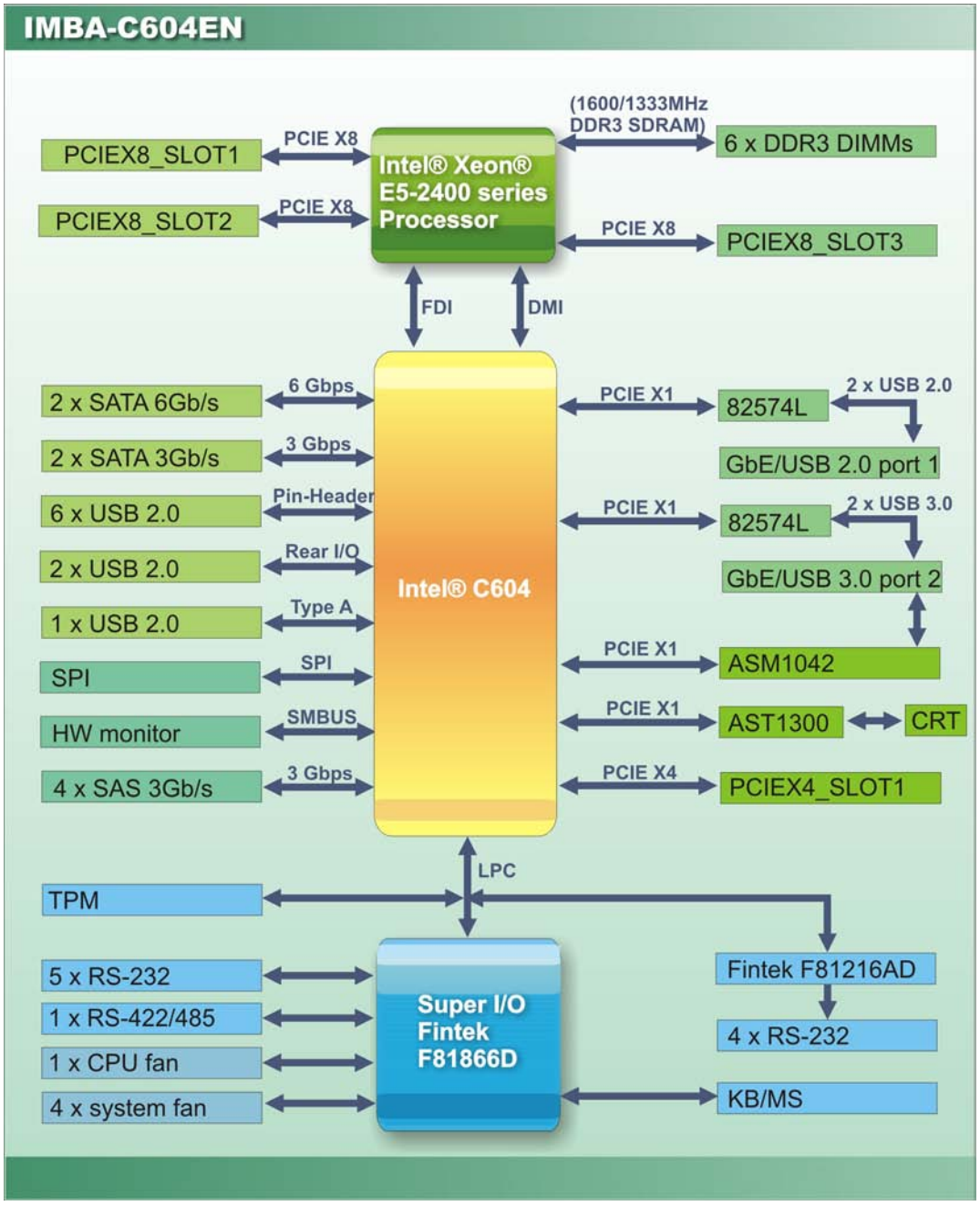


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMBA-C604EN technical specifications are listed below.

Specification/Model	IMBA-C604EN
Form Factor	ATX
CPU	LGA1356 socket supports Intel® Xeon® E5-2400 series processor with up to eight cores
System Chipset	Intel® C604
Graphics Engine	ASPEED AST1300 PCIe VGA/2D controller, 1920x1200@60Hz 32bpp
Display Output	Driver form AST1300
Memory	Six 240-pin 1600/1333MHz dual-channel DDR3 SDRAM sockets supported ECC UDIMMs or non-ECC RDIMMs/LRDIMMs (system max. 48GB UDIMMs/96GB RDIMMs/192GB LRDIMMs)
Audio	Realtek ALC662 HD Audio Codec (Line-out, Mic)
BIOS	UEFI BIOS
Digital I/O	8-bit Digital I/O (8-bit GPIO is for programming I/O)
Ethernet	Dual Intel® 82574L PCIe controller
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	Two PCI slots
PCIe	Three PCIe x8 slots One PCIe x4 slot
I/O Interface Connectors	
Audio Connectors	Two external audio jacks (line-out, mic-in)
Display port	One VGA port
Ethernet	Two RJ-45 GbE ports
Keyboard/Mouse	Dual PS/2 port

Specification/Model	IMBA-C604EN
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
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	Two external USB 3.0 ports on rear IO Four external USB 2.0 ports on rear IO Six internal USB 2.0 ports by pin header One internal USB 2.0 port by type A
Serial ATA	Two SATA 3Gb/s connectors Two SATA 6Gb/s connectors
SAS	Four SAS 3Gb/s connectors
Environmental and Power Specifications	
Power Supply	ATX/AT power supply
Power Consumption	12V@1.08A, Vcore@2.46A, 3.3V@0.61A, -12V@0.15A, 5V@2.33A (Intel® Xeon® 1.40GHz 28 GB DDR3 w/ECC memory)
Operating Temperature	-10ºC ~ 60ºC
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 305 mm
Weight GW/NW	1200 g / 700 g

Table 1-1: IMBA-C604EN 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 IMBA-C604EN 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 IMBA-C604EN was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMBA-C604EN is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMBA-C604EN motherboard	
4	SATA cable (**P/N**: 32000-062800-RS)	
1	I/O shielding (**P/N**: 45014-0039C0-00-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**: CB-USB02-RS)	
RS-232 cable (**P/N**: 19800-000051-RS)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
High performance LGA1355/LGA1356 cooler kit, 1U chassis compatible, for under 60W CPU (**P/N**: CF-1356A-RS)	
High performance LGA1355/LGA1356 cooler kit, 2U chassis compatible, for under 95W CPU (**P/N**: CF-1356B-RS)	

Item and Part Number	Image
20-pin Infineon TPM module, S/W 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 IMBA-C604EN Layout

The figures below show all the connectors and jumpers.

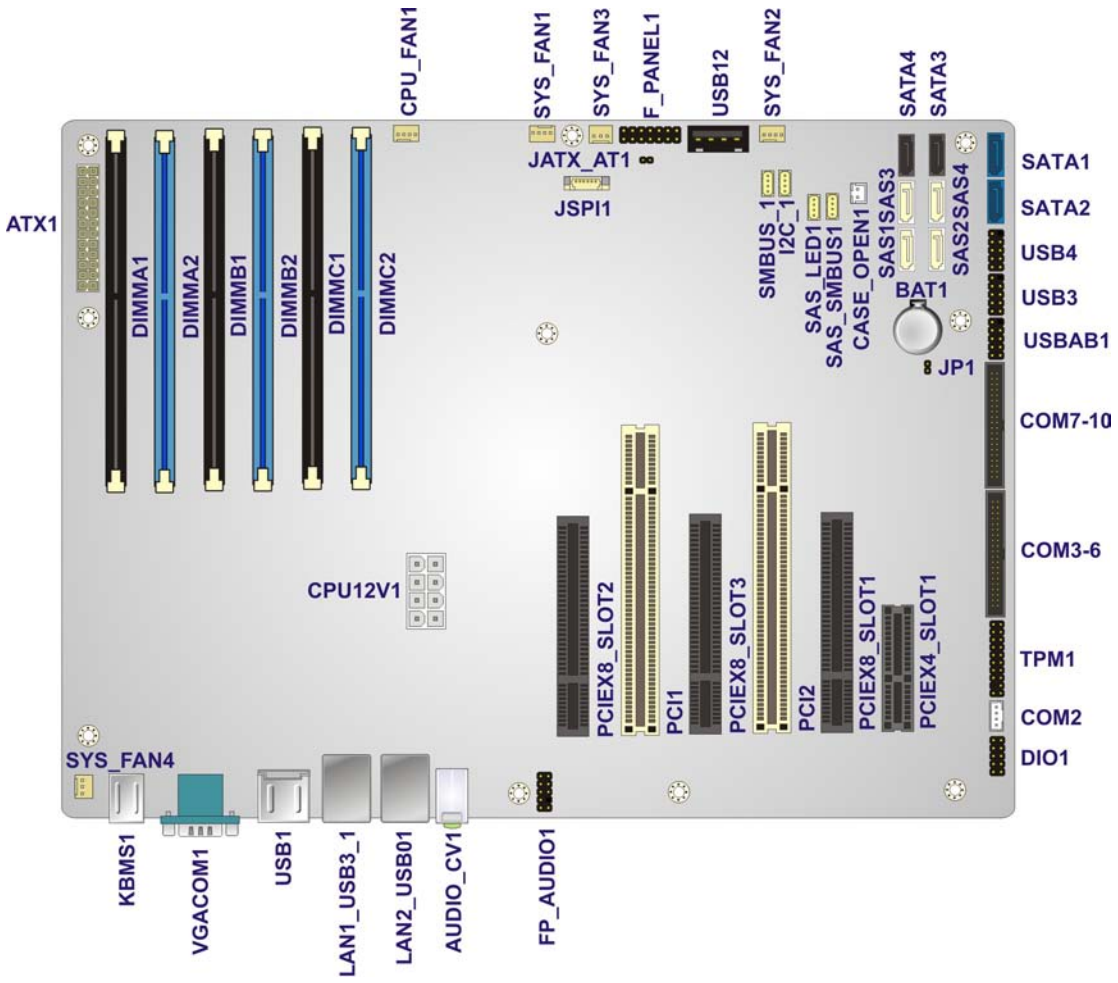


Figure 3-1: Connectors and Jumpers

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
Chassis intrusion connector	2-pin wafer	CASE_OPEN1
CPU power connector	8-pin Molex	CPU12V1
DDR3 DIMM slots	DDR3 DIMM slot	DIMMA1 DIMMA2 DIMMB1 DIMMB2 DIMMC1 DIMMC2
Digital I/O connector	10-pin header	DIO1
Fan connectors (system)	4-pin wafer	SYS_FAN1 SYS_FAN2
Fan connector (system)	3-pin wafer	SYS_FAN3 SYS_FAN4
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Front panel audio connector	10-pin header	FP_AUDIO1
Front panel connector	14-pin header	F_PANEL1
I2C connector	4-pin wafer	I2C_1
PCI slots	PCI slots	PCI1, PCI2
PCIe x4 slot	PCIe x4 slot	PCIEX4_SLOT1
PCIe x8 slots	PCIe x8 slot	PCIEX8_ SLOT1 PCIEX8_ SLOT2 PCIEX8_ SLOT3

Connector	Type	Label
SAS 3Gb/s drive connector	7-pin SAS connector	SAS1, SAS2 SAS3, SAS4
SAS LED connector	4-pin wafer	SAS_LED1
SAS SMBus connector	4-pin wafer	SAS_SMBUS1
SATA 3Gb/s drive connector	7-pin SATA connector	SATA3, SATA4
SATA 6Gb/s drive connector	7-pin SATA connector	SATA1, SATA2
Serial port, RS-422/485	4-pin wafer	COM2
Serial port, 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	USBAB1, USB3, USB4
USB connector	Type A connector	USB12

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
Ethernet and USB 2.0 ports	RJ-45, USB 2.0	LAN2_USB01
Ethernet and USB 3.0 ports	RJ-45, USB 3.0	LAN1_USB3_1
Keyboard and mouse connector	Dual PS/2	KBMS1
USB 2.0 ports	USB 2.0	USB1
VGA and serial port connector	15-pin female, DB-9 male	VGA COM1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMBA-C604EN.

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.

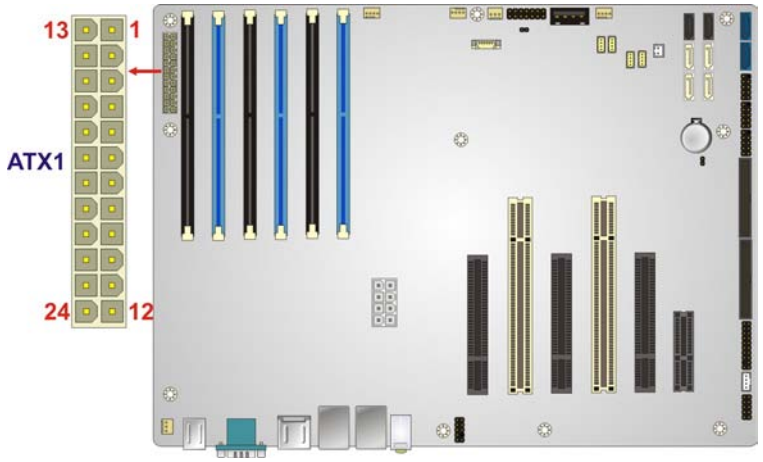


Figure 3-2: ATX Power Connector Pinout Location

Pin	Description	Pin	Description
1	+3.3V	2	+3.3V
3	GND	4	+5V
5	GND	6	+5V
7	GND	8	PWROK
9	5VSB	10	+12V
11	+12V	12	+3.3V
13	+3.3V	14	-12V
15	GND	16	PSON
17	GND	18	GND

Pin	Description	Pin	Description
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.

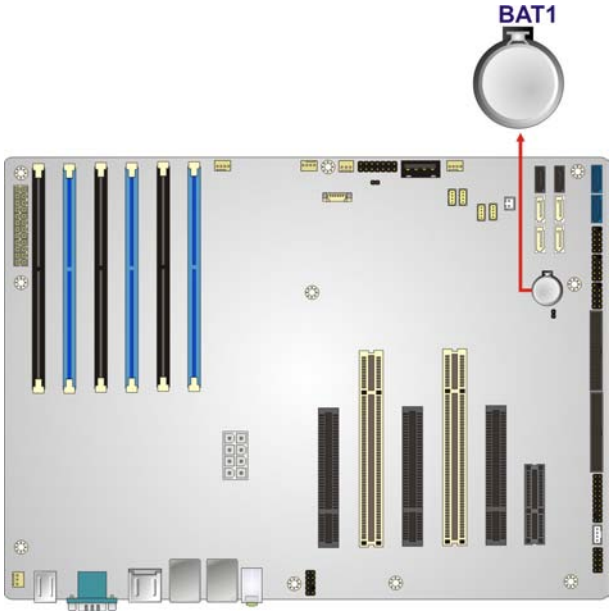


Figure 3-3: Battery Connector Locations

3.2.3 Chassis Intrusion Connector

CN Label: CASE_OPEN1

CN Type: 2-pin wafer

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

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

The chassis intrusion connector connects to a chassis intrusion sensor or switch to detect chassis intrusion event.

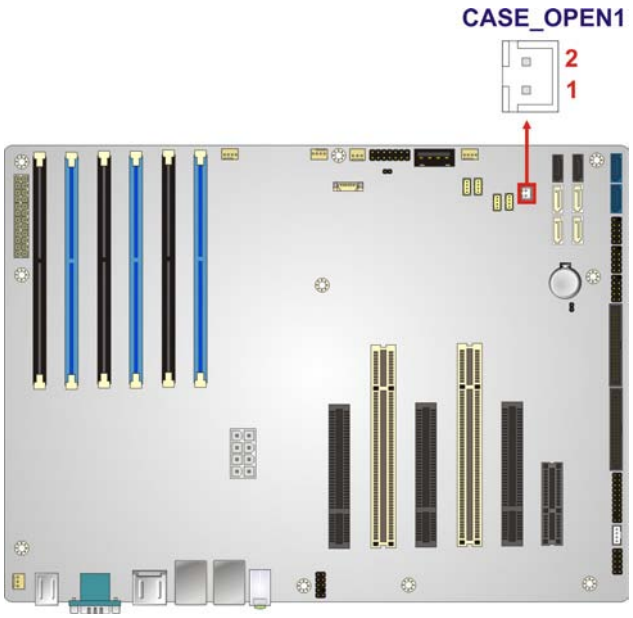


Figure 3-4: Chassis Intrusion Connector Location

Pin	Description
1	CASEOPEN#
2	GND

Table 3-4: Chassis Intrusion Connector Pinouts

3.2.4 CPU Power Connector

CN Label: CPU12V1

CN Type: 8-pin Molex

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

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

The CPU power input connector provides power to the CPU.

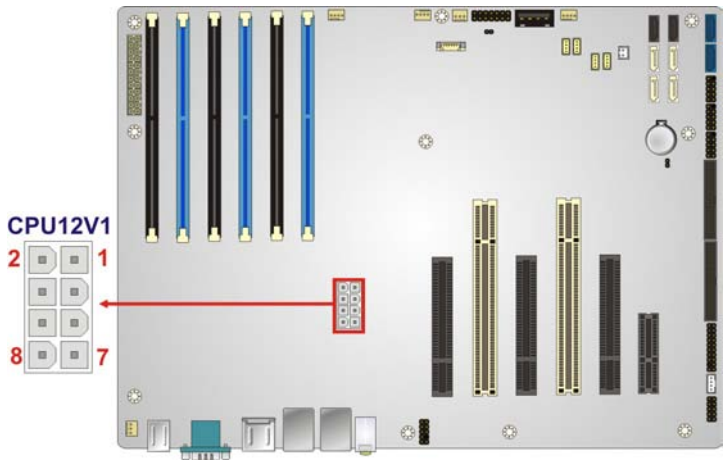


Figure 3-5: CPU Power Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	GND	4	GND
5	VREG_12V	6	VREG_12V
7	VREG_12V	8	VREG_12V

Table 3-5: CPU Power Connector Pinouts

3.2.5 DDR3 DIMM Slots

CN Label: DIMMA1, DIMMA2, DIMMB1, DIMMB2, DIMMC1, DIMMC2,

CN Type: DDR3 DIMM slot

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

The DIMM slots are for DDR3 DIMM memory modules.

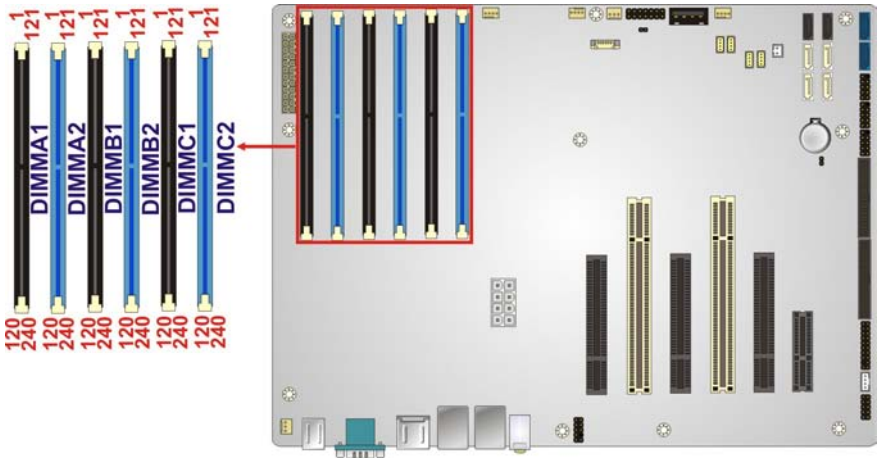


Figure 3-6: DDR3 DIMM Slot Locations

3.2.6 Digital I/O Connector

CN Label:	DIO1
CN Type:	10-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 4-bit output and 4-bit input.

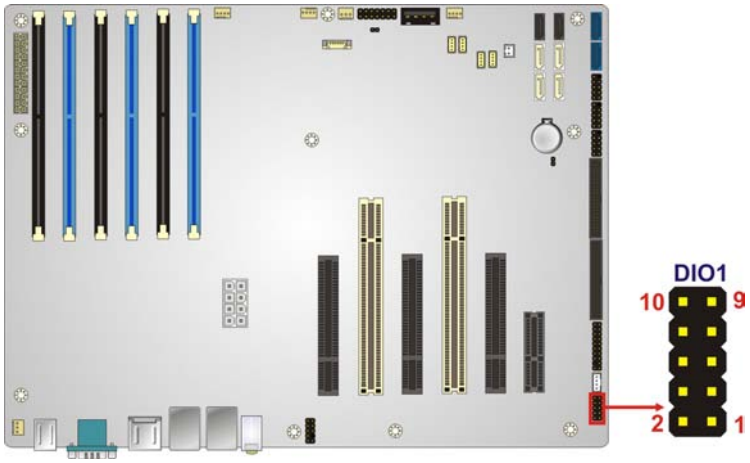


Figure 3-7: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	DOUT4	4	DOUT3
5	DOUT2	6	DOUT1
7	DIN4	8	DIN3
9	DIN2	10	DIN1

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.

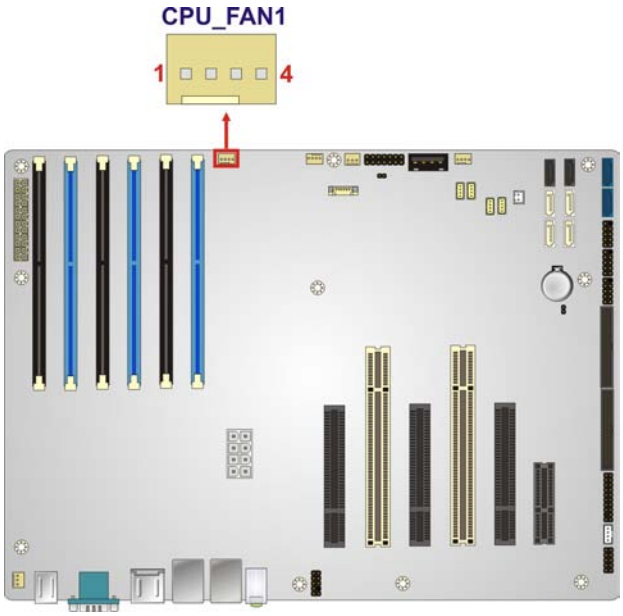


Figure 3-8: CPU Fan Connector Location

Pin	Description	Pin	Description
1	GND	2	+12 V

Pin	Description	Pin	Description
3	FANIO1	4	FANOUT1

Table 3-7: CPU Fan Connector Pinouts

3.2.8 Fan Connector (System)

CN Label: SYS_FAN1, SYS_FAN2, SYS_FAN3, SYS_FAN4

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.

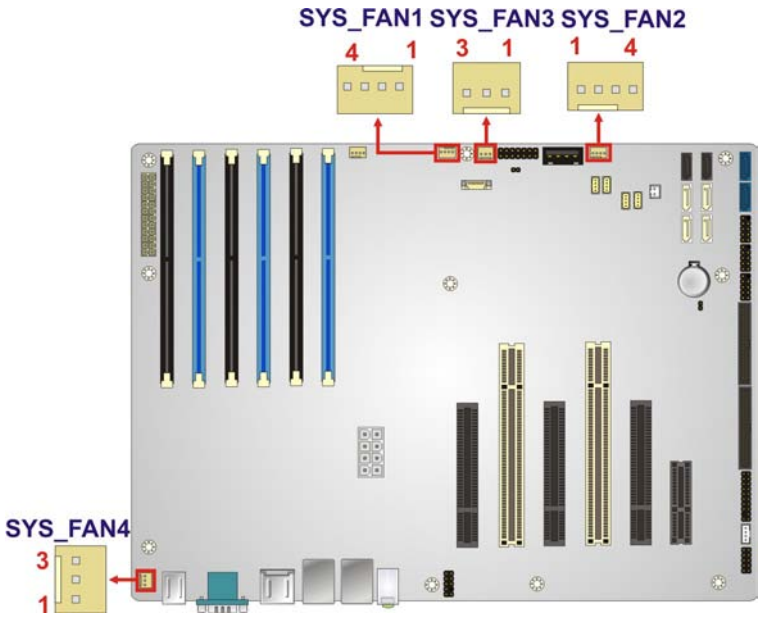


Figure 3-9: System Fan Connector Location

Pin	Description	Pin	Description
1	GND	2	+12 V
3	FANIO2/3	4	FANOUT2/3

Table 3-8: System Fan Connector Pinouts (SYS_FAN1, SYS_FAN2)

Pin	Description	Pin	Description
1	NC	2	+12 V

Pin	Description	Pin	Description
3	GND		

Table 3-9: System Fan Connector Pinouts (SYS_FAN3, SYS_FAN4)

3.2.9 Front Panel Audio Connector

CN Label: FP_AUDIO1

CN Type: 10-pin header

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

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

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

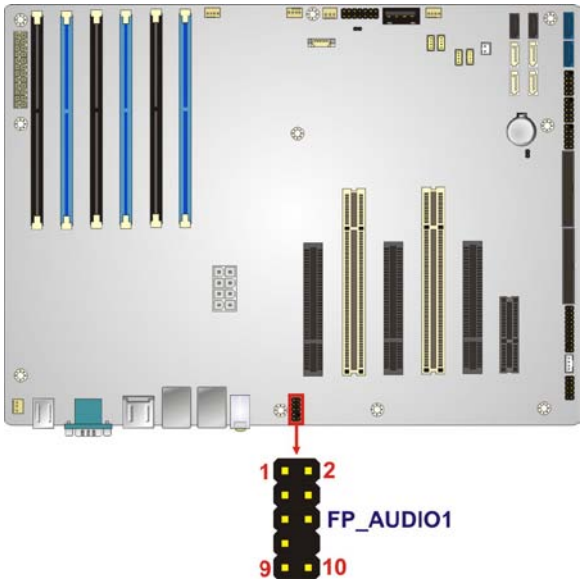


Figure 3-10: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	LMIC2_L	2	AUD_GND
3	LMIC2_R	4	F_PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	F_SENSE	8	NC
9	LLINE2-L	10	AUD_GND

Table 3-10: Front Panel Audio Connector Pinouts

3.2.10 Front Panel Connector

CN Label: F_PANEL1

CN Type: 14-pin header

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

CN Pinouts: See 错误！未找到引用源。

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

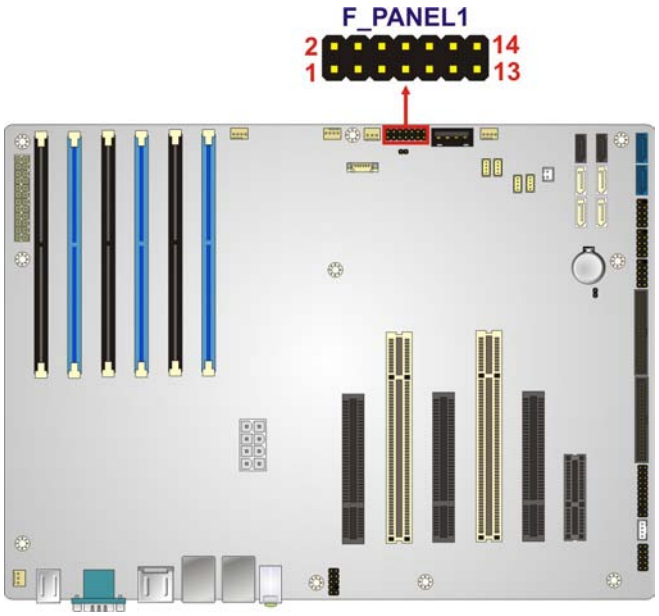


Figure 3-11: Front Panel Connector Location

Pin	Description	Pin	Description
1	ACPILED	2	BEEP_PWR
3	LAN1_LED#	4	LAN2_LED#
5	GND	6	+3V_DUAL
7	PWRBTN_SW#_C	8	PC_BEEP
9	GND	10	+3V_DUAL
11	IDELED	12	EXTRST-
13	IDELED-	14	GND

Table 3-11: Front Panel Connector Pinouts

3.2.11 I2C Connector

CN Label:	I2C_1
CN Type:	4-pin wafer
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-12**

The I2C connector is for system debug.

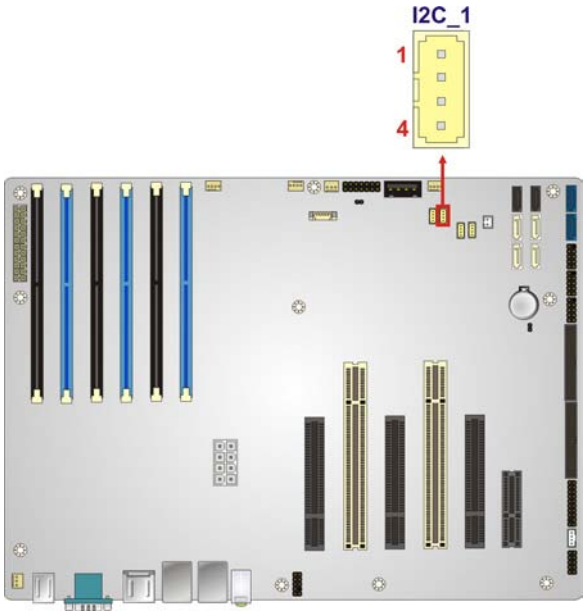


Figure 3-12: I2C Connector Location

Pin	Description
1	+5V_DUAL
2	I2C_DATA_GPIO
3	I2C_CLK_GPIO
4	GND

Table 3-12: I2C Connector Pinouts

3.2.12 PCI Slots

CN Label: PCI1, PCI2

CN Type: PCI Slot

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

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

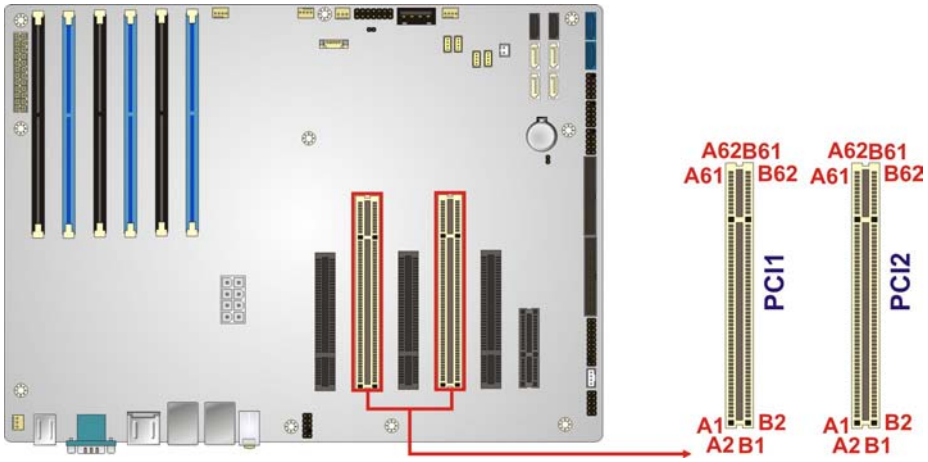


Figure 3-13: PCI Slot Locations

3.2.13 PCIe x4 Slot

CN Label: PCIEX4_SLOT1

CN Type: PCIe x4 slot

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

The PCIe x4 slot is for PCIe x4 expansion cards.

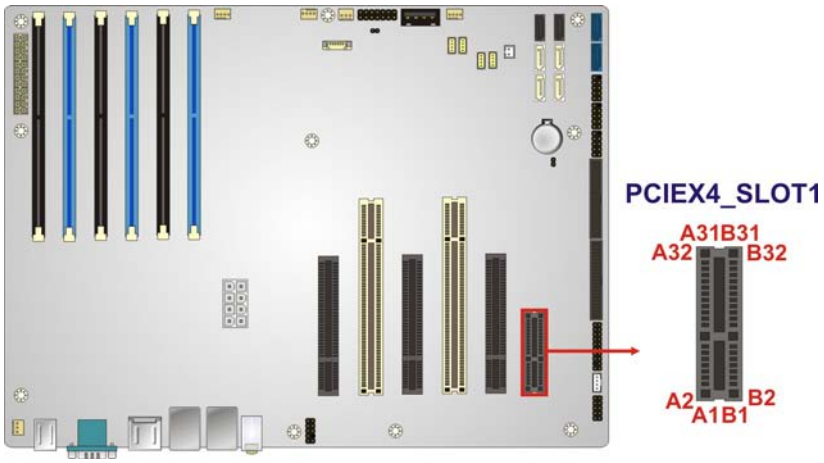


Figure 3-14: PCIe x4 Slot Locations

3.2.14 PCIe x8 Slot

CN Label: PCIEX8_SLOT1, PCIEX8_SLOT2, PCIEX8_SLOT3

CN Type: PCIe x16 slot

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

The PCIe x8 slot provide PCIe x8 signal for PCIe expansion cards.

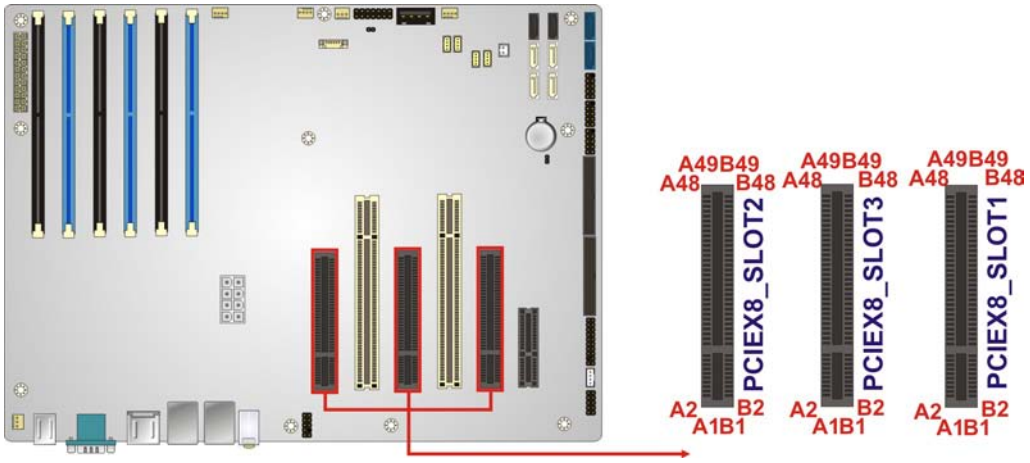


Figure 3-15: PCIe x8 Slot Location

3.2.15 SAS 3Gb/s Drive Connectors

CN Label: SAS1, SAS2, SAS3, SAS4

CN Type: 7-pin SAS connector

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

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

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

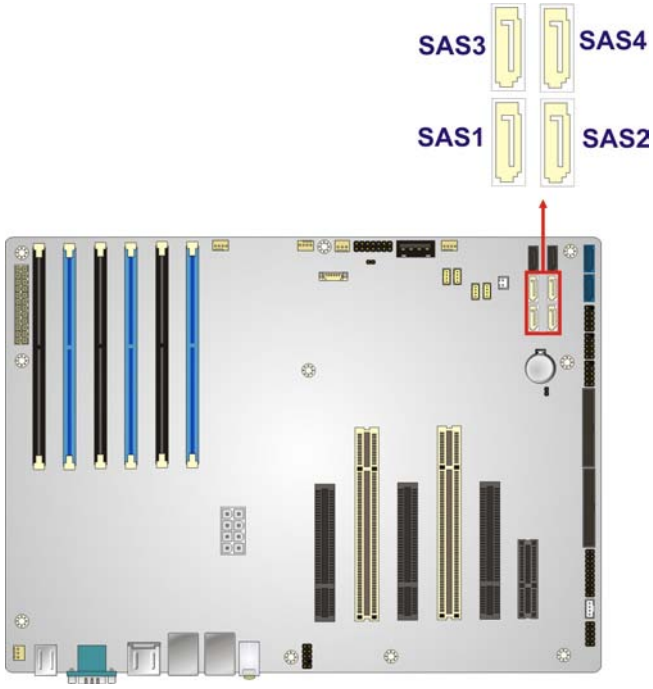


Figure 3-16: SAS 3Gb/s Drive Connector Location

Pin	Description	Pin	Description
1	GND	2	PCH_SAS_TX_DP0/1/2/3
3	PCH_SAS_TX_DN0/1/2/3	4	GND
5	PCH_SAS_RX_DN0/1/2/3	6	PCH_SAS_RX_DP0/1/2/3
7	GND		

Table 3-13: SAS 3Gb/s Drive Connector Pinouts

3.2.16 SAS LED Connector

CN Label: SAS_LED1

CN Type: 4-pin wafer

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

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

Use the SAS LED connector to connect SAS LED to the system.

Figure 3-17: SAS LED Connector Location

PIN	DESCRIPTION
1	GPIO_CLK1
2	SGPIO_LD1
3	SGPIO_DIN1
4	SGPIO_DO1

Table 3-14: SAS LED Connector Pinouts

3.2.17 SAS SMBus Connector

CN Label: SAS_SMBUS1

CN Type: 4-pin wafer

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

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

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

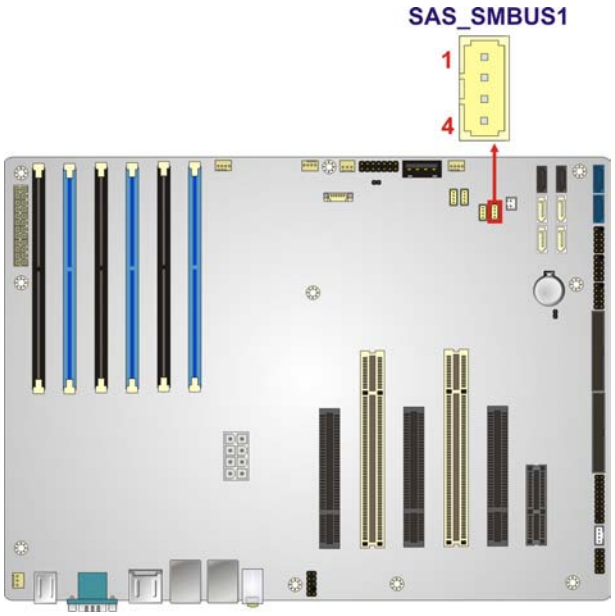


Figure 3-18: SAS SMBus Connector Location

Pin	Description
1	+3.3V
2	SMB_SASCLK0
3	SMB_SASDATA0
4	GND

Table 3-15: SAS SMBus Connector Pinouts

3.2.18 SATA 3Gb/s Drive Connectors

CN Label: SATA3, SATA4

CN Type: 7-pin SATA connector

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

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

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

Figure 3-19: SATA 3Gb/s Drive Connector Location

Pin	Description	Pin	Description
1	GND	2	SATA2/3TXP
3	SATA2/3TXN	4	GND
5	SATA2/3RXN	6	SATA2/3RXP
7	GND		

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

3.2.19 SATA 6Gb/s Drive Connectors

CN Label: SATA1, SATA2

CN Type: 7-pin SATA drive connector

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

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

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

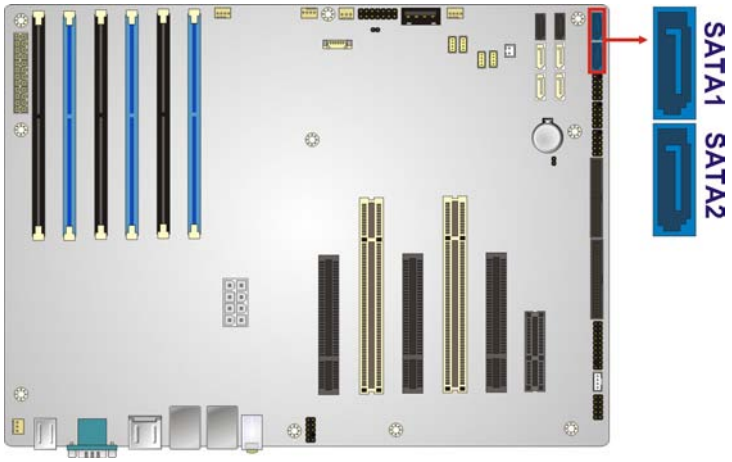


Figure 3-20: SATA 6Gb/s Drive Connector Location

Pin	Description
1	GND
2	SATA0/1TXP_GEN3
3	SATA0/1TXN_GEN3
4	GND
5	SATA0/1RXN_GEN3
6	SATA0/1RXP_GEN3
7	GND

Table 3-17: SATA 6Gb/s Drive Connector Pinouts

3.2.20 Serial Port Connector, RS-422/485

CN Label: COM2

CN Type: 4-pin wafer

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

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

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

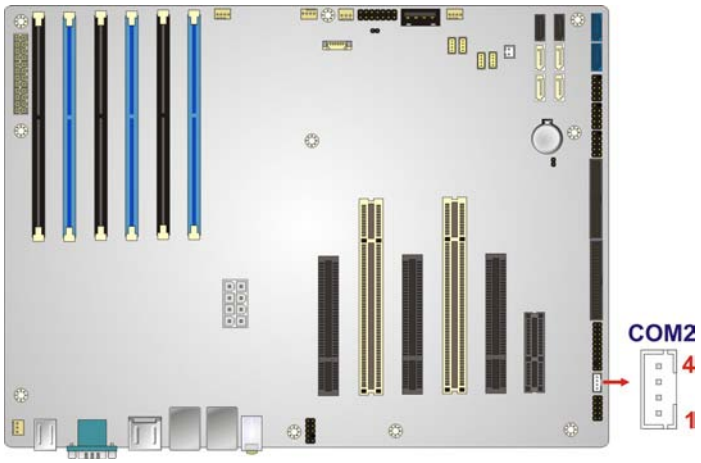


Figure 3-21: RS-422/485 Connector Location

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

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

3.2.21 Serial Port Connectors, RS-232

CN Label: COM3-6, COM7-10

CN Type: 40-pin box header

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

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

Each of these connectors provides RS-232 connections.

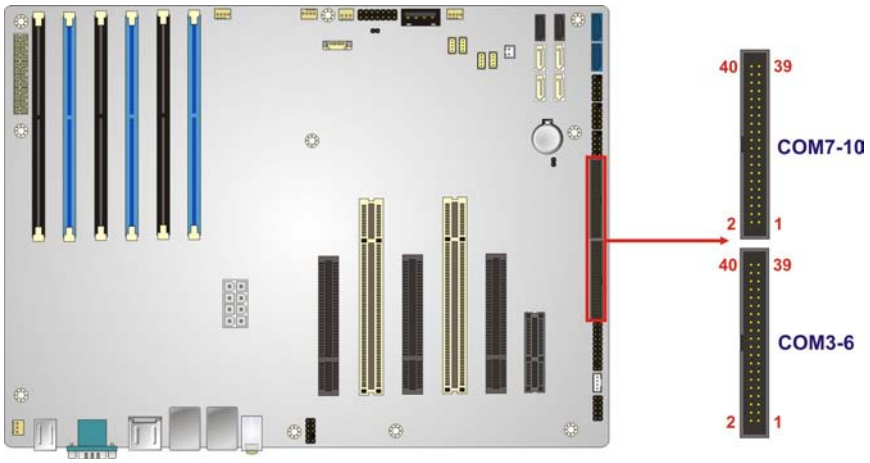


Figure 3-22: Serial Port Connector Location

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 3-19: Serial Port Connector Pinouts

3.2.22 SMBus Connector

CN Label: SMBUS_1

CN Type: 4-pin wafer

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

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

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

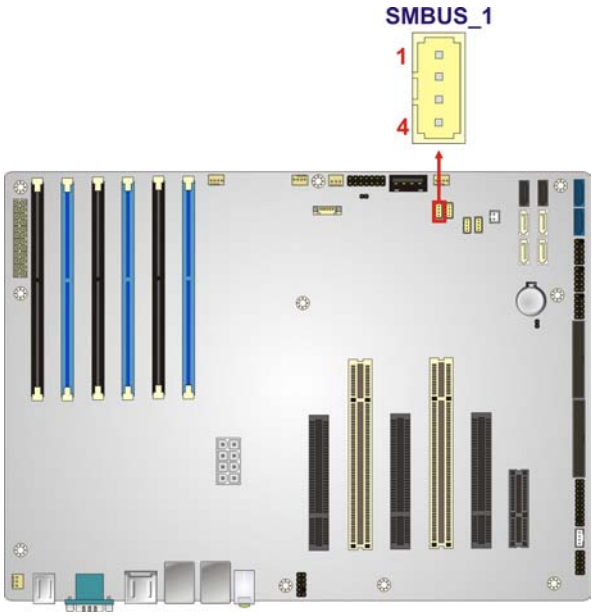


Figure 3-23: SMBus Connector Location

Pin	Description
1	+5V
2	SMB_HOST_3V3_CLK
3	SMB_HOST_3V3_DATA
4	GND

Table 3-20: SMBus Connector Pinouts

3.2.23 SPI ROM Connector

CN Label: JSPI1

CN Type: 8-pin header

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

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

The SPI connector is used to flash the BIOS.

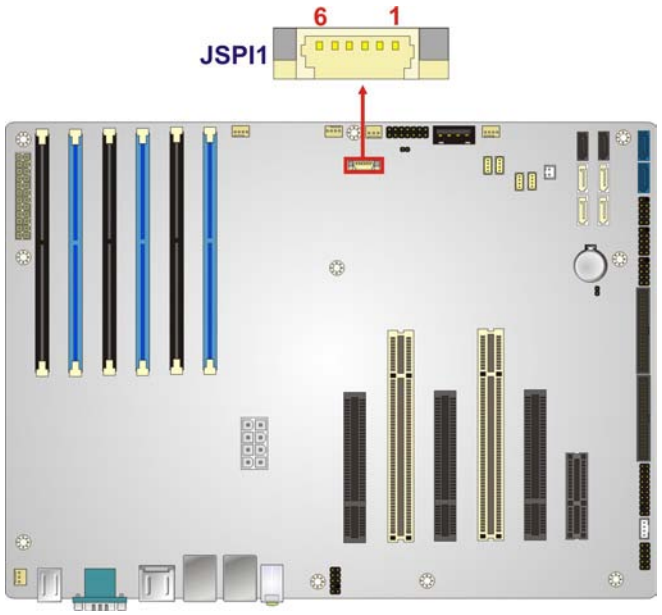


Figure 3-24: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V3.3M_SPI_CON	2	SPI_CS#0_CN
3	SPI_SO0_CN	4	SPI_CLK0_CN
5	SPI_SI0_CN	6	GND

Table 3-21: SPI Connector Pinouts

3.2.24 TPM Connector

CN Label: TPM1

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

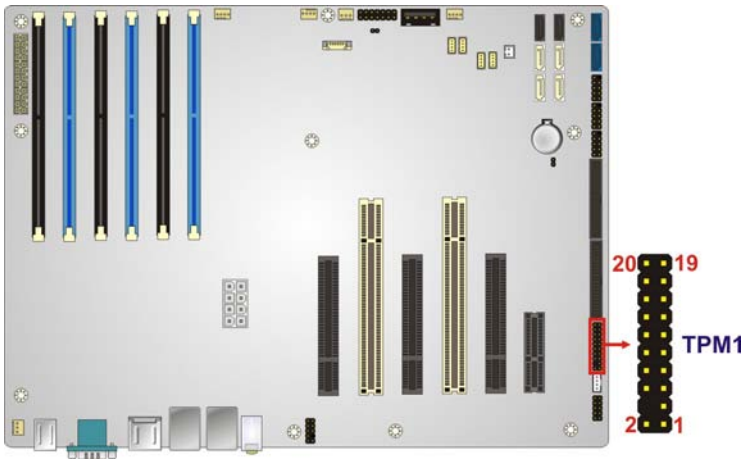


Figure 3-25: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CLK_33M_TPM	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	SMB_HOST_3V3STBY_CLK	14	SMB_HOST_3V3STBY_DATA
15	+3V_DUAL	16	SERIRQ
17	+3V_DUAL	18	+3.3V
19	LPCPD_N	20	LDRQ1#

Table 3-22: TPM Connector Pinouts

3.2.25 USB Connectors

CN Label: USB3, USB4, USBAB1

CN Type: 8-pin header

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

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

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

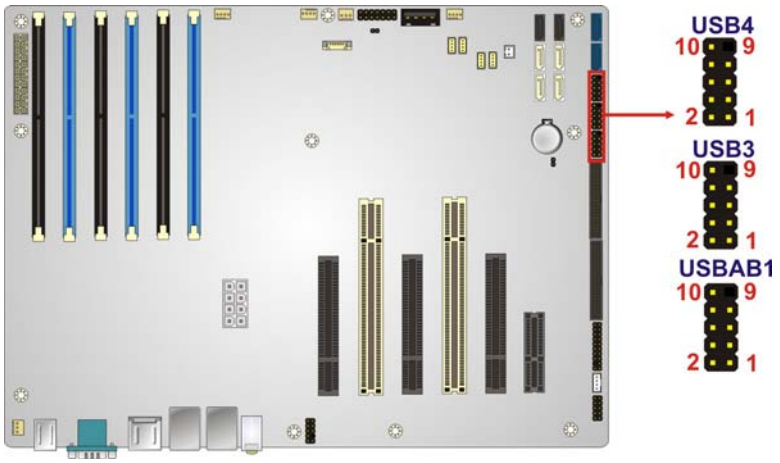


Figure 3-26: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FUSEVCC67/89/AB	2	FUSEVCC67/89/AB
3	P6/8/10-	4	P7/9/11-
5	P6/8/10+	6	P7/9/11+
7	GND	8	GND
9	NC	10	NC

Table 3-23: USB Port Connector Pinouts(USB3, USB4, USBAB1)

3.2.26 USB Connector (Type A)

CN Label: USB12

CN Type: Type A connector

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

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

The USB connector can be connected to a USB device.

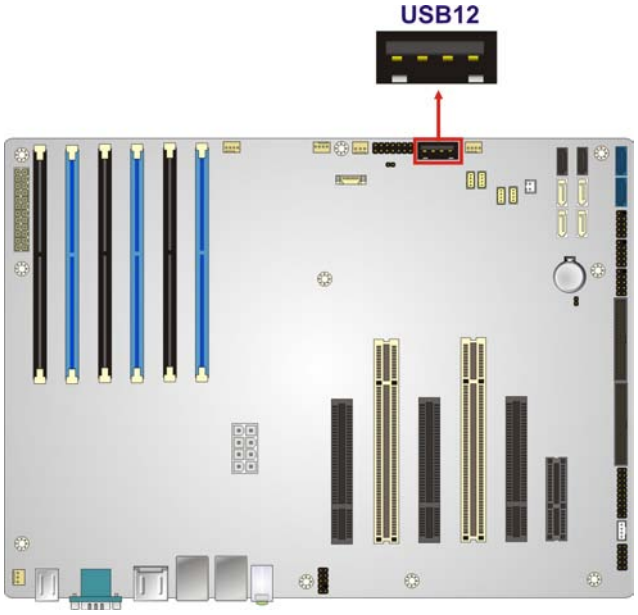


Figure 3-27: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FUSEVCCCD	2	P12-
3	P12+	4	GND

Table 3-24: 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:

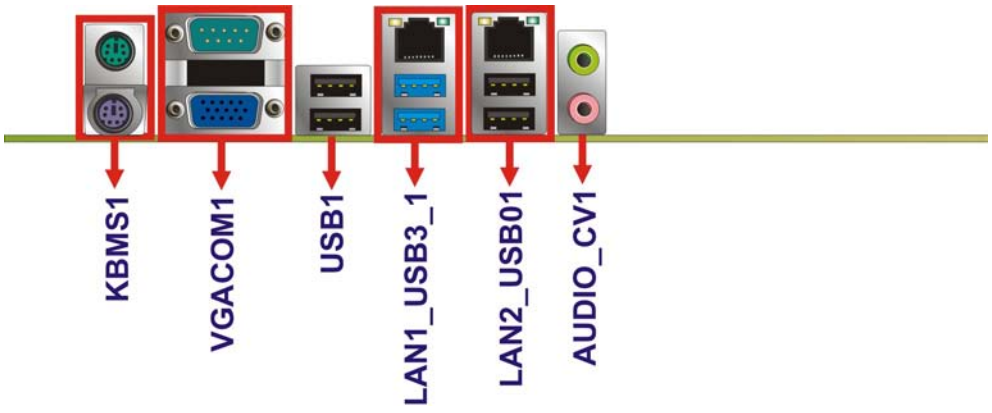


Figure 3-28: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label:	**AUDIO_CV1**
CN Type:	Audio jack
CN Location:	See **Figure 3-28**

The audio jacks connect to external 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 to a microphone.

Figure 3-29: Audio Connector

3.3.2 Ethernet and USB Connector

CN Label:	LAN1_USB3_1, LAN2_USB01, USB1
CN Type:	RJ-45, USB 3.0 and USB 2.0 connectors
CN Location:	See **Figure 3-28**
CN Pinouts:	See **Table 3-26 , Table 3-27** and **Table 3-28**

The LAN connector connects to a local network.

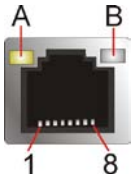


Figure 3-30: Ethernet Connector

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

Table 3-25: Connector LEDs

The USB connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USB_3P0_VCC1	2	USB2P0_DM1_L
3	USB2P0_DP1_L	4	GND
5	USB3P0_RXDN1	6	USB3P0_RXDP1
7	GND	8	USB3P0_TXDN1_C
9	USB3P0_TXDP1_C	10	USB_3P0_VCC2
11	USB2P0_DM2_L	12	USB2P0_DP2_L
13	GND	14	USB3P0_RXDN2
15	USB3P0_RXDP2	16	GND
17	USB3P0_TXDN2_C	18	USB3P0_TXDP2_C
19	1_9VLAN1	20	TRD1P0
21	TRD1N0	22	TRD1P1
23	TRD1N1	24	TRD1P2
25	TRD1N2	26	TRD1P3
27	TRD1N3	28	GND
29	+V3.3LAN1	30	L1_LINK_ACT-
31	L1_100-	32	L1_1000-
G1	GND	G2	GND
G3	GND	G4	GND
G5	GND	G6	GND
G7	GND	G8	GND

Table 3-26: LAN and USB Connector Pinouts (LAN1_USB3_1)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	FUSEVCC01	2	P1-
3	P1+	4	GND

PIN	DESCRIPTION	PIN	DESCRIPTION
5	FUSEVCC01	6	P0-
7	P0+	8	GND
9	GND	10	GND
11	GND	12	GND
13	GND	14	GND
15	GND	16	GND
P1	1_9VLAN2	P2	TRD2P0
P3	TRD2N0	P4	TRD2P1
P5	TRD2N1	P6	TRD2P2
P7	TRD2N2	P8	TRD2P3
P9	TRD2N3	P10	GND
P11	L2_100-	P12	L2_1000-
P13	L2_LINK_ACT-	P14	+V3.3LAN2

Table 3-27: LAN and USB Connector Pinouts (LAN2_USB01)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	FUSEVCC45	2	P4-
3	P4+	4	GND
5	FUSEVCC45	6	P5-
7	P5+	8	GND

Table 3-28: USB Connector Pinouts (USB1)

3.3.3 Keyboard/Mouse Connector

CN Label: KBMS1

CN Type: Dual PS/2

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

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

The PS/2 ports are for connecting a PS/2 mouse and a PS/2 keyboard.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Keyboard Data	7	Mouse Data

PIN	DESCRIPTION	PIN	DESCRIPTION
2	NC	8	NC
3	GND	9	GND
4	VCC	10	VCC
5	Keyboard Clock	11	Mouse Clock
6	NC	12	NC

Table 3-29: PS/2 Connector Pinouts

3.3.4 Serial Port Connector

CN Label: COM1

CN Type: DB-9 connector

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

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

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 3-30: Serial Port Connector Pinouts

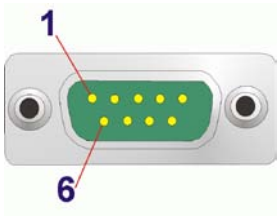


Figure 3-31: Serial Port Connector Pinouts

3.3.5 VGA Connector

CN Label: VGA

CN Type: 15-pin Female

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

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

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

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	Display_GND
5	GND	6	GND
7	GND	8	GND
9	GND	10	GND
11	NC	12	5VDDCDA
13	HSY	14	VSY
15	5VDDCLK		

Table 3-31: VGA Connector Pinouts

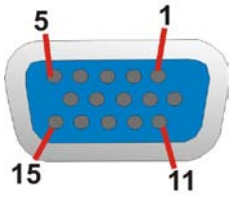


Figure 3-32: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMBA-C604EN may result in permanent damage to the IMBA-C604EN and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-C604EN. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-C604EN 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 IMBA-C604EN, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMBA-C604EN.
- ***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 IMBA-C604EN 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 IMBA-C604EN 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 IMBA-C604EN off:
  - When working with the IMBA-C604EN, 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 IMBA-C604EN **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 LGA1356 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**.

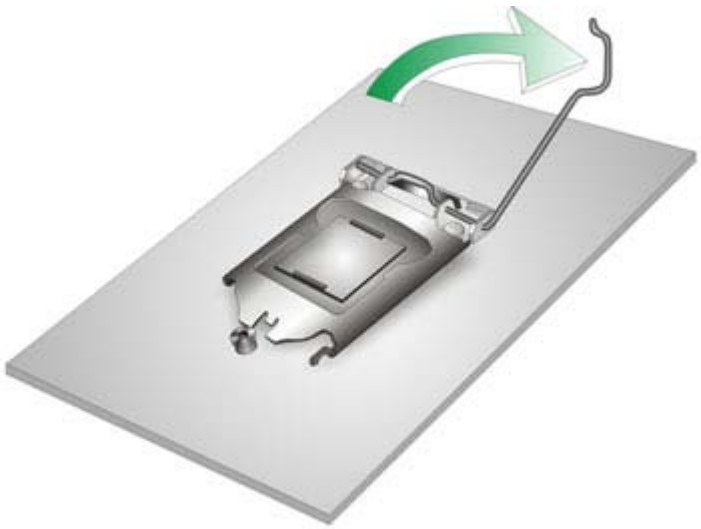


Figure 4-1: Disengage the CPU Socket Load Lever

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**.

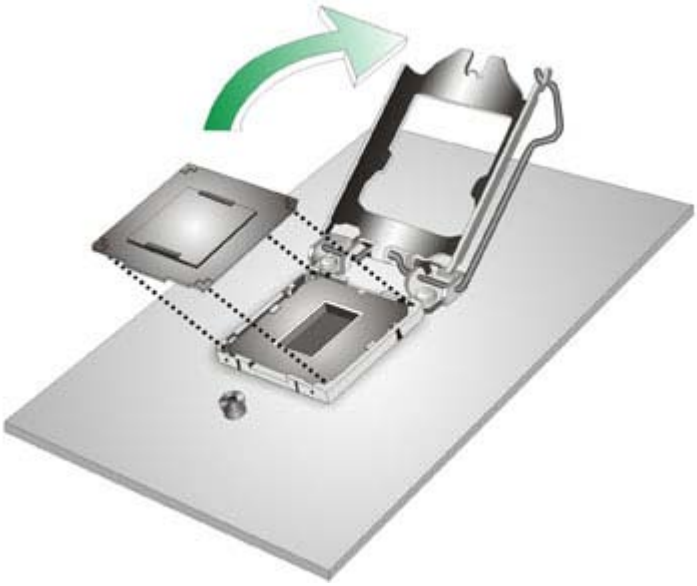


Figure 4-2: Remove Protective Cover

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**.

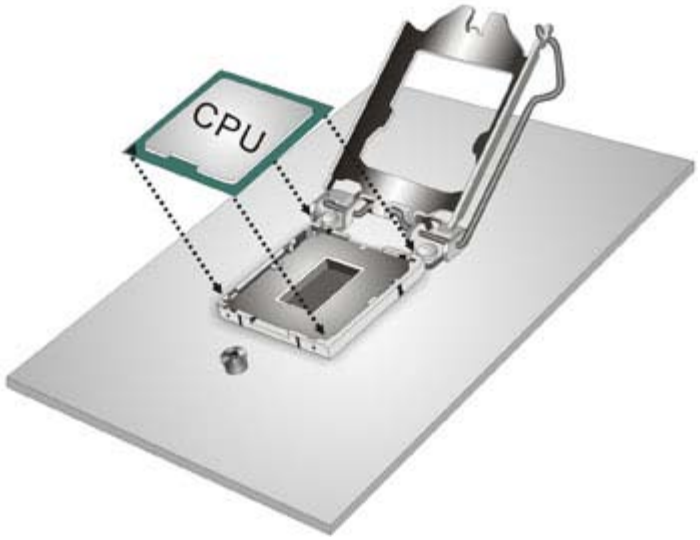


Figure 4-3: Insert the Socket LGA1356 CPU

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 LGA1356

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 LGA1356 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-1356A-RS, CF-1356B-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.**

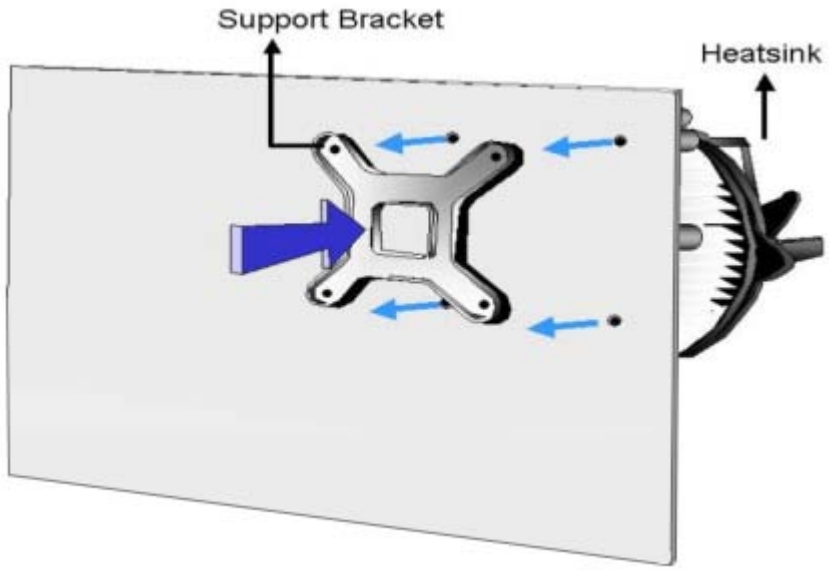


Figure 4-6: Cooling Kit Support Bracket

Step 2: **Place the cooling kit onto the socket LGA1356 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 IMBA-C604EN. 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**.

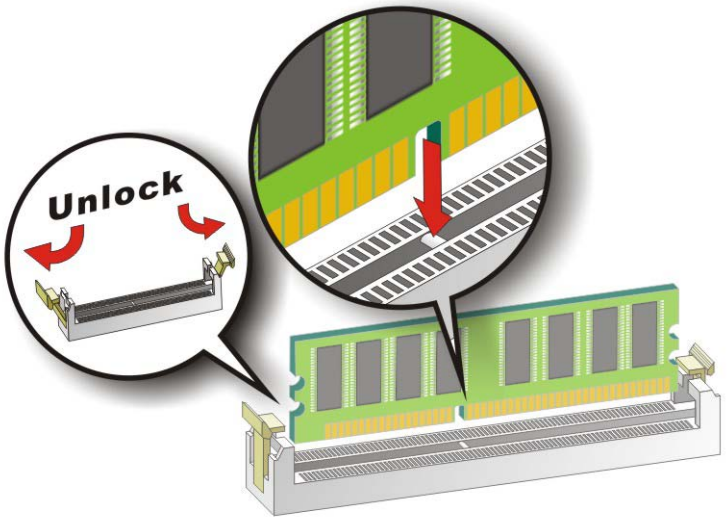


Figure 4-7: DIMM Installation

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**.

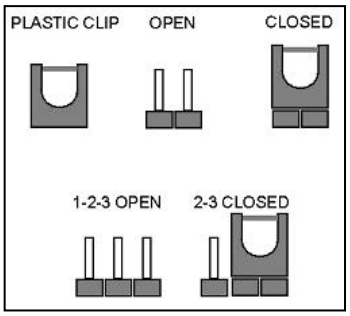
Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-7**.

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	JP1	2-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
Short	ATX power (Default)

Setting	Description
Open	AT power

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

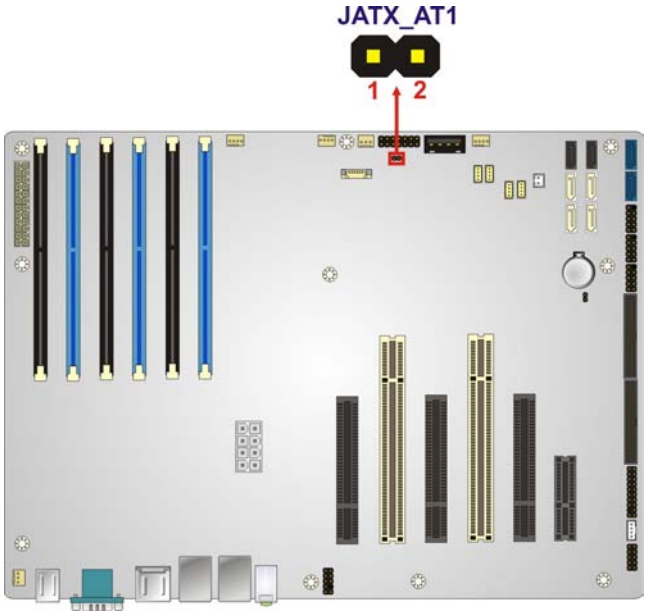


Figure 4-8: AT/ATX Power Mode Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: JP1

Jumper Type: 2-pin header

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

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

To clear the CMOS data and reset the system BIOS information, close the jumper for 3 seconds or more, and then open the jumper.

Setting	Description
Short	Clear CMOS Setup
Open	Keep CMOS Setup (Default)

Table 4-3: Clear BIOS Jumper Settings

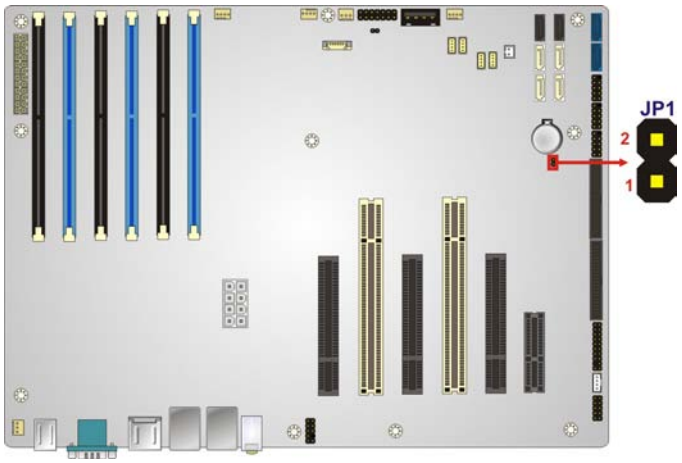


Figure 4-9: Clear BIOS Jumper Location

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 IMBA-C604EN 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**.

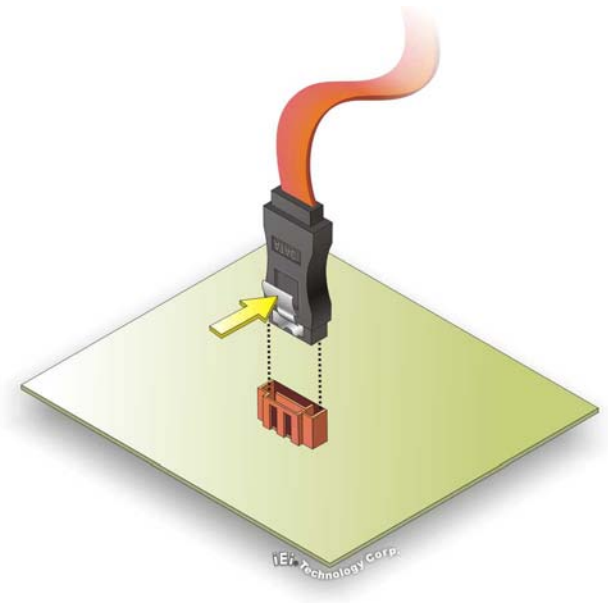


Figure 4-10: SATA Drive Cable Connection

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**.

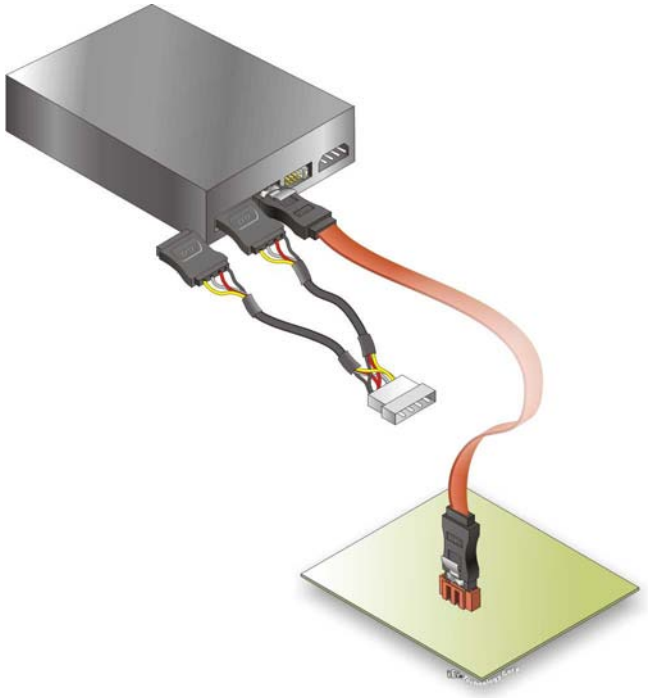


Figure 4-11: SATA Power Drive Connection

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 IMBA-C604EN.

4.5.1 Audio Connection

The audio jacks on the external audio connector enable the IMBA-C604EN to be connected to a stereo sound setup. 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. If audio plugs are plugged into the wrong jacks, sound quality will be very bad.

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 Out port (Lime):** Connects to a headphone or a speaker.
- **Microphone (Pink):** Connects to a microphone.

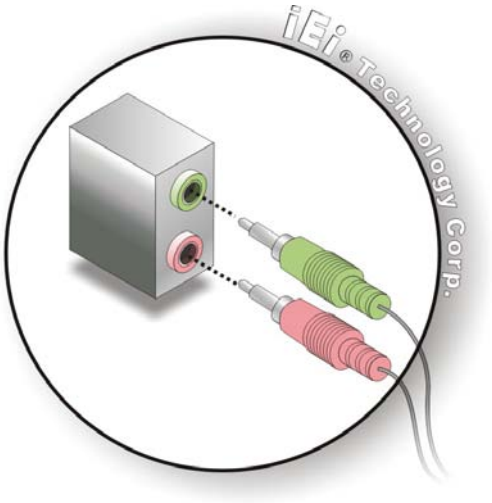


Figure 4-12: Audio Connector

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 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 IMBA-C604EN. See **Figure 4-13**.

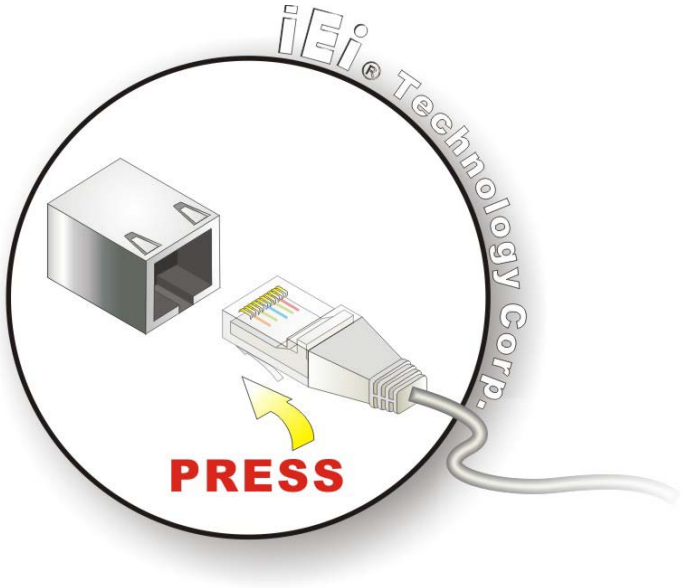


Figure 4-13: LAN Connection

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.

4.5.3 PS/2 Keyboard and Mouse Connection

The IMBA-C604EN has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the IMBA-C604EN.

Step 1: **Locate the dual PS/2 connector**. The location of the dual PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 4-14**.

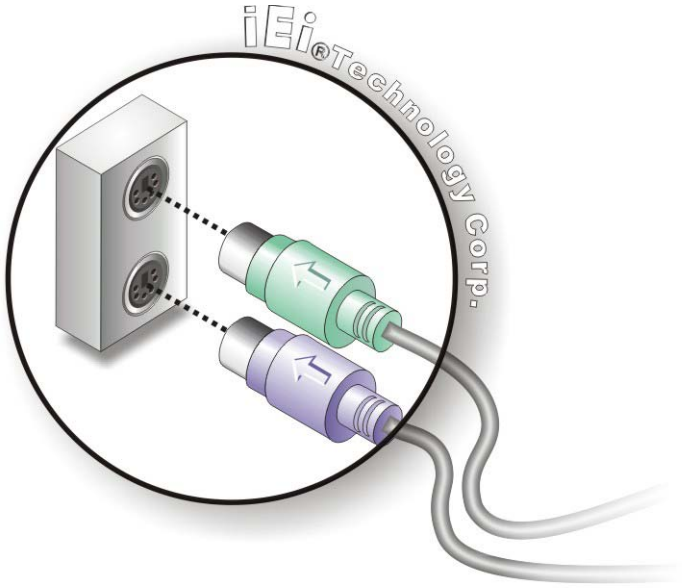


Figure 4-14: PS/2 Keyboard/Mouse Connector

4.5.4 Serial Device Connection

The IMBA-C604EN 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 IMBA-C604EN.

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 4-15**.

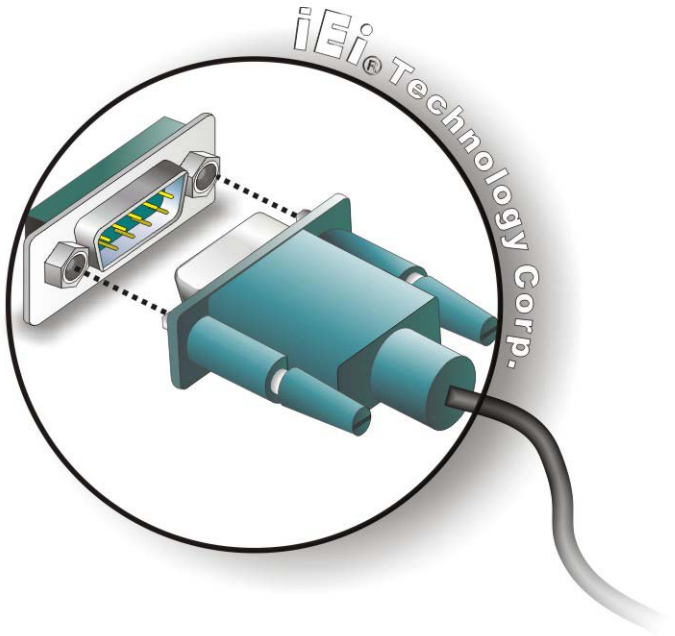


Figure 4-15: Serial Device Connector

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.

4.5.5 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 IMBA-C604EN.

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 4-16**.

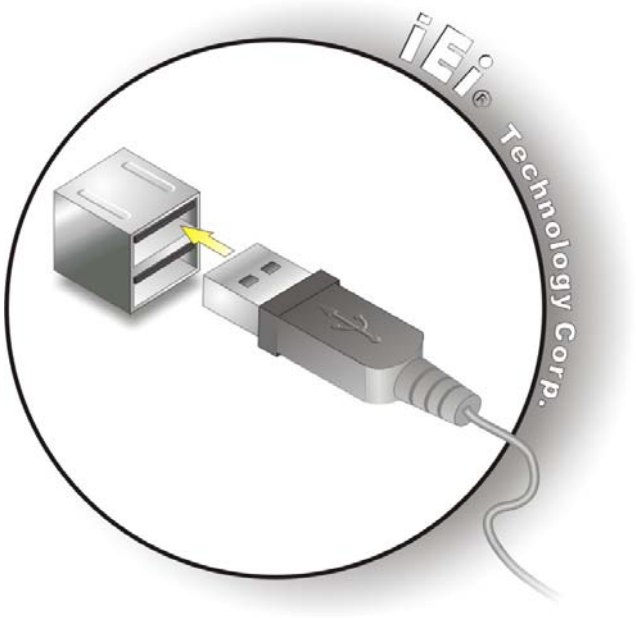


Figure 4-16: USB Connector

4.5.6 VGA Monitor Connection

The IMBA-C604EN has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMBA-C604EN, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMBA-C604EN. See **Figure 4-17**.

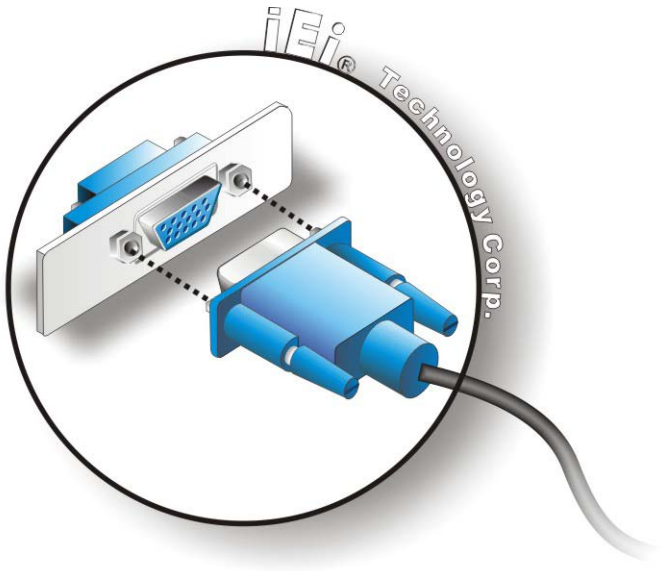


Figure 4-17: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

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

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

5.1.2 Using Setup

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

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

Key	Function
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Previous values
F3	Load optimized defaults
F4	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

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

5.1.5 BIOS Menu Bar

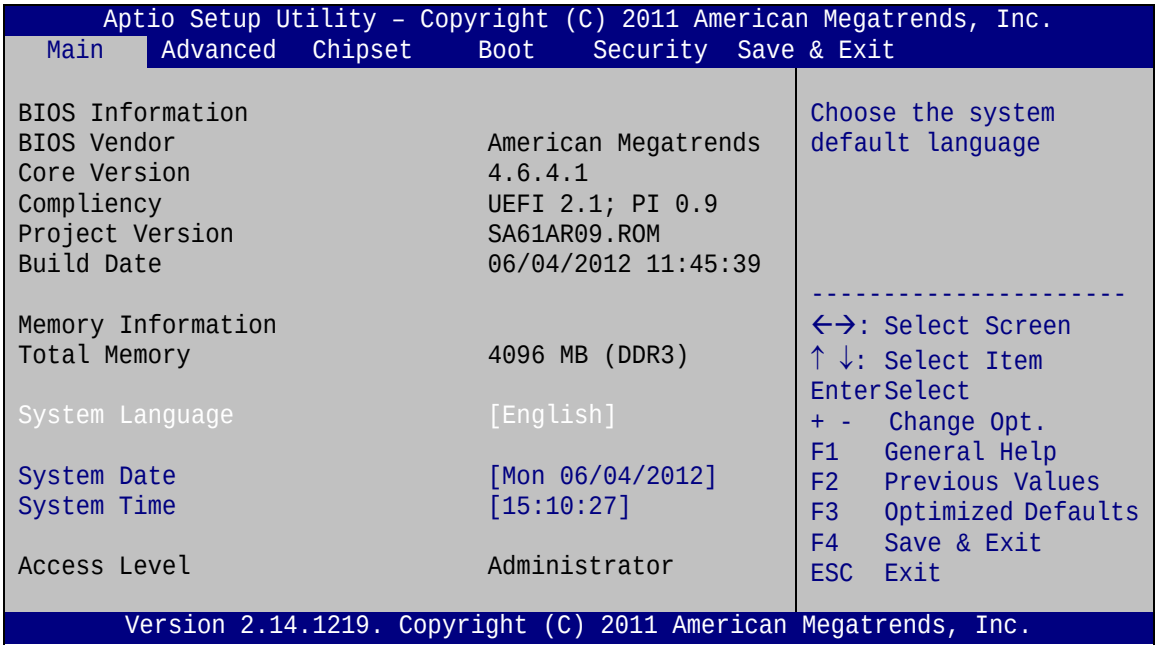
The **menu bar** on top of the BIOS screen has the following main items:

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

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

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

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

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Compliency:** Current compliant version
- **Project Version:** the board version
- **Build Date:** Date the current BIOS version was made

➔ Memory Information

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

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

The System Overview field also has two user configurable fields:

➔ System Date [xx/xx/xx]

Use the **System Date** option to set the system date. Manually enter the day, month and year.

➔ System Time [xx:xx:xx]

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

5.3 Advanced

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

WARNING!

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

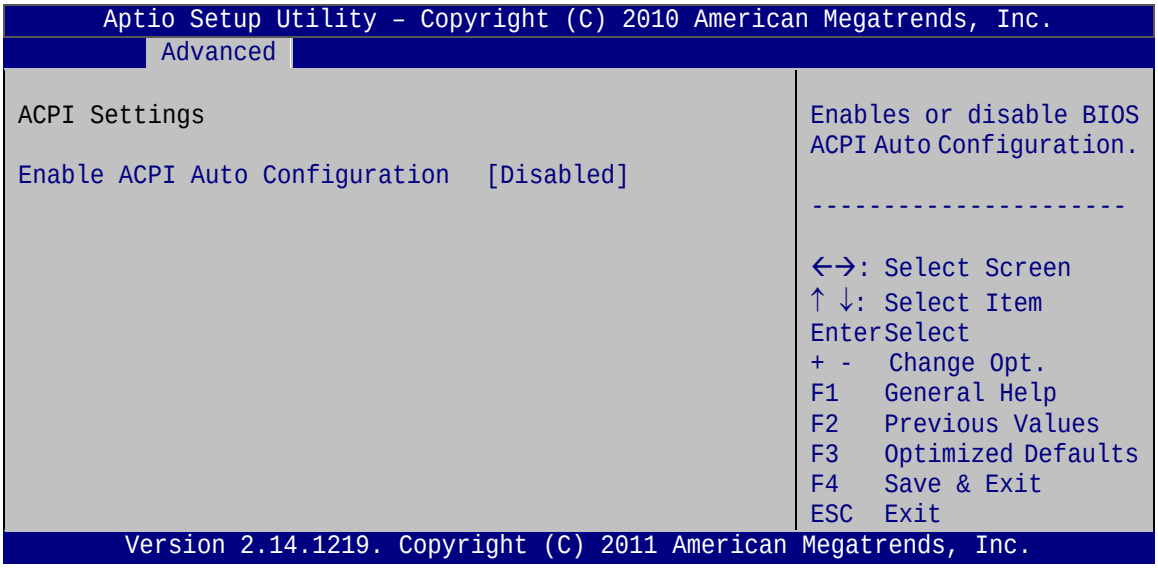
```
      Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
  Main    Advanced  Chipset     Boot     Security  Save & Exit

> ACPI Settings                                   System ACPI Parameters.
> RTC Wake Settings
> Trusted Computing
> CPU Configuration
> Runtime Error Logging
> SATA Configuration                              ----------------------
> SAS Configuration                               ←→: Select Screen
> USB Configuration                               ↑ ↓: Select Item
> F81216 Second Super IO Configuration            EnterSelect
> F81866 Super IO Configuration                   + -   Change Opt.
> F81866 H/M Monitor                              F1    General Help
> Serial Port Console Redirection                 F2    Previous Values
                                                  F3    Optimized Defaults
                                                  F4    Save & Exit
                                                  ESC   Exit
       Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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



BIOS Menu 3: ACPI Configuration

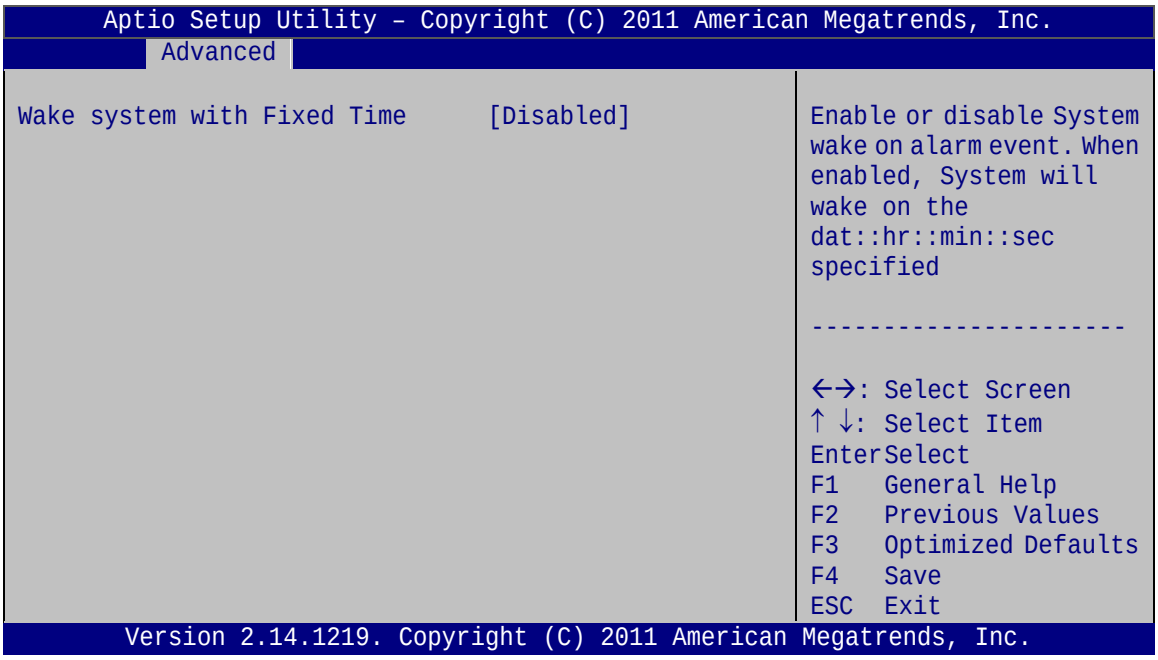
➔ Enable ACPI Auto Configuration [Disabled]

Use the **Enable ACPI Auto Configuration** option to enable or disable ACPI auto configuration function.

➔	**Disabled**	**DEFAULT**	Disable ACPI auto configuration function.
➔	**Enabled**		Enable ACPI auto configuration function.

5.3.2 RTC Wake Settings

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



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

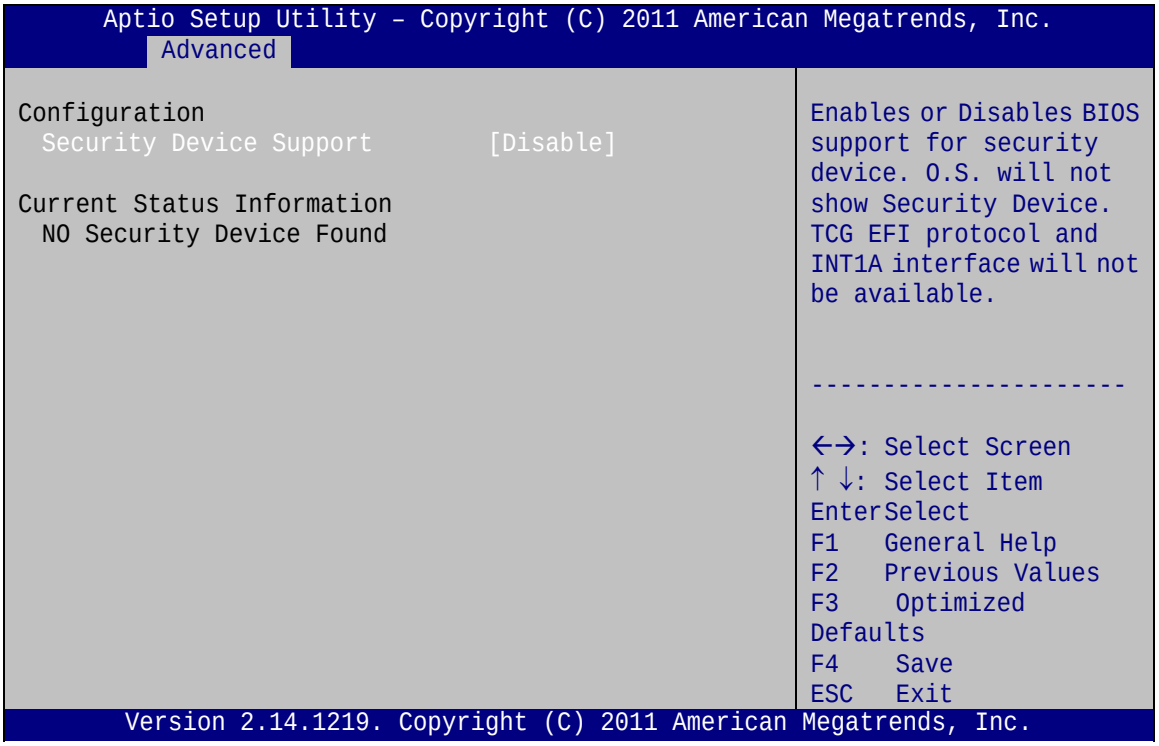
➔ **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

- 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).



BIOS Menu 5: Trusted Computing

➔ Security Device Support [Disable]

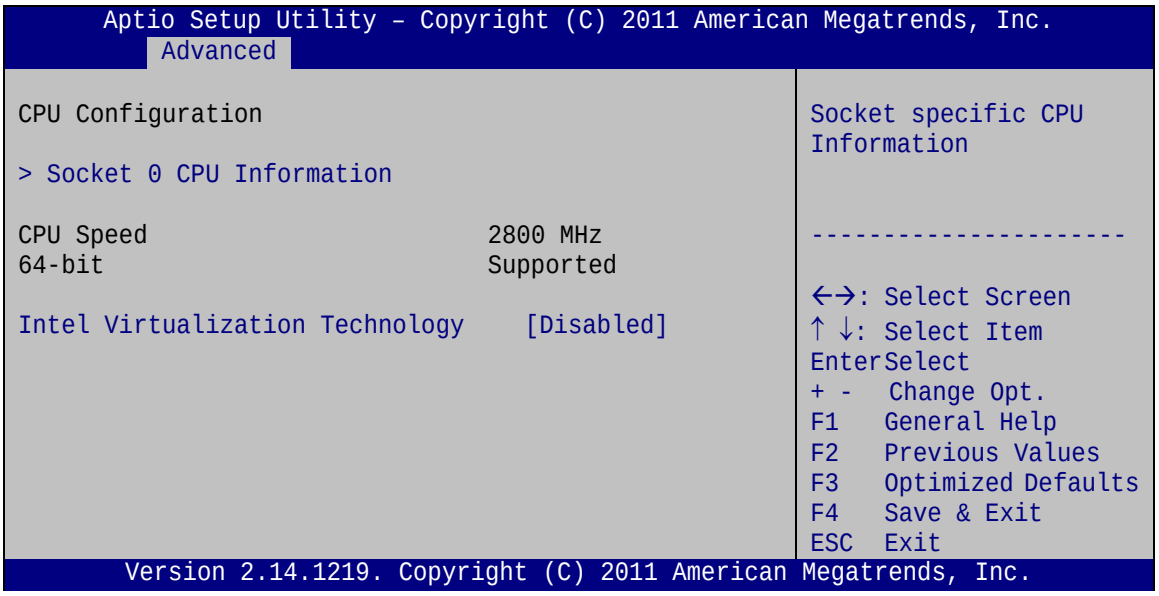
Use the **Security Device Support** option to configure support for the TPM.

➔ **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 enter the **CPU Information** submenu or enable Intel Virtualization Technology.



BIOS Menu 6: CPU Configuration

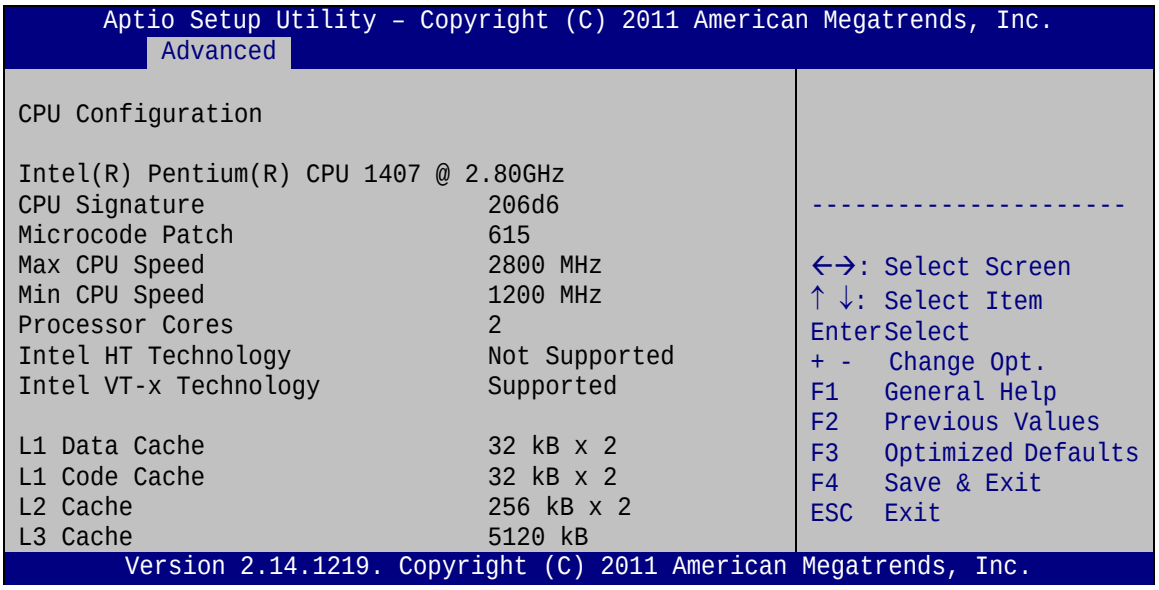
➔ Intel Virtualization Technology [Disabled]

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

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

5.3.4.1 CPU Information

Use the **CPU Information** submenu (**BIOS Menu 7**) to view detailed CPU specifications and configure the CPU.



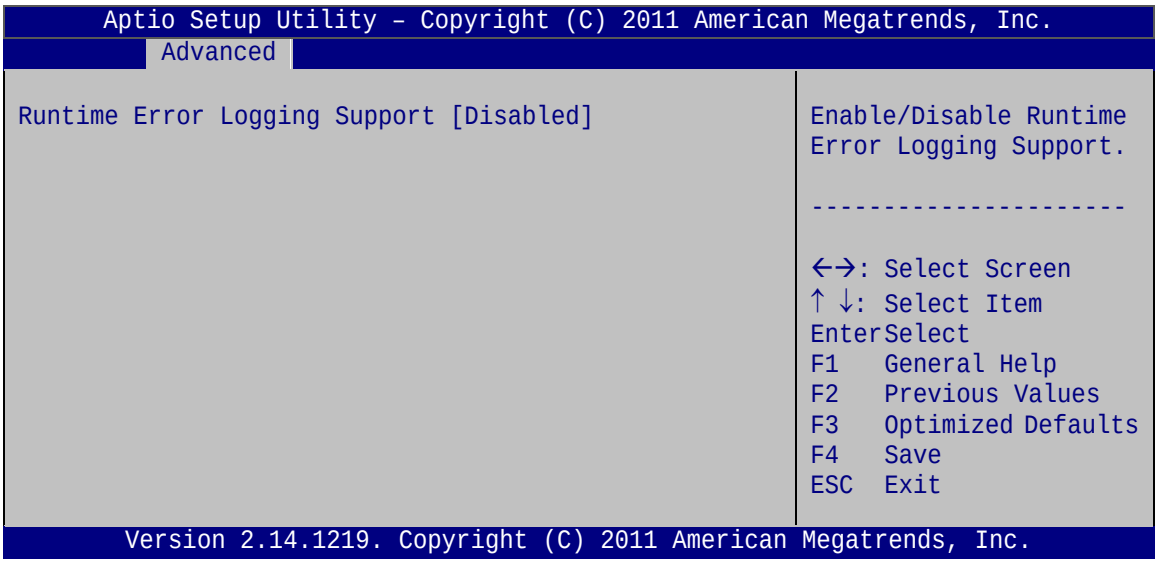
BIOS Menu 7: CPU Information

The CPU Information submenu (**BIOS Menu 7**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

5.3.5 Runtime Error Logging

The **Runtime Error Logging** menu (**BIOS Menu 8**) configures runtime error logging support function.



BIOS Menu 8: Runtime Error Logging

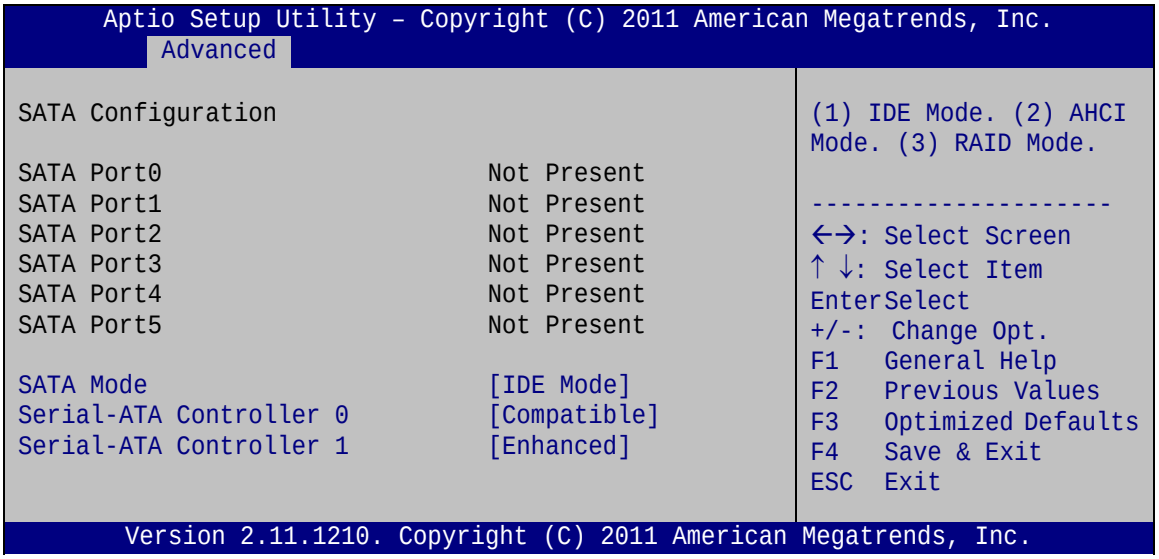
➔ Runtime Error Logging Support [Disabled]

Use the **Runtime Error Logging Support** option to enable or disable runtime error logging support function.

➔	**Disabled**	**DEFAULT**	Disable runtime error logging support function.
➔	**Enabled**		Enable runtime error logging support function.

5.3.6 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 9**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 9: SATA Configuration

➔ SATA Mode [IDE Mode]

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

➔	**Disable**		Disables SATA devices.
➔	**IDE Mode**	**DEFAULT**	Configures SATA devices as normal IDE device.
➔	**ACHI Mode**		Configures SATA devices as AHCI device.
➔	**RAID Mode**		Configures SATA devices as RAID device.

➔ Serial-ATA Controller 0 [Compatible]

Use the **Serial-ATA Controller 0** option to configure the Serial-ATA controller mode when the SATA mode is set to IDE Mode.

➔	**Disable**	Disables Serial-ATA controller.

➔ **Enhanced** Configures the Serial-ATA controller to be in enhanced mode. In this mode, IDE channels and SATA channels are separated. Some legacy OS do not support this mode.

➔ **Compatible** **DEFAULT** Configures the Serial-ATA controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels.

➔ Serial-ATA Controller 1 [Enhanced]

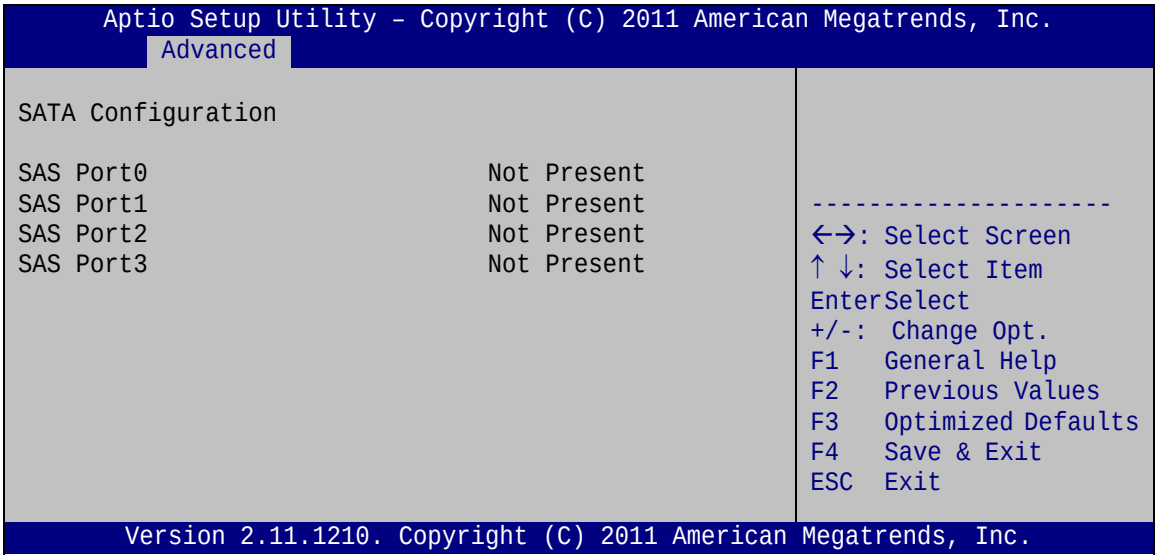
Use the **Serial-ATA Controller 1** option to configure the Serial-ATA controller mode when the SATA mode is set to IDE Mode.

➔ **Disable** Disables Serial-ATA controller.

➔ **Enhanced** **DEFAULT** Configures the Serial-ATA controller to be in enhanced mode. In this mode, IDE channels and SATA channels are separated. Some legacy OS do not support this mode.

5.3.7 SAS Configuration

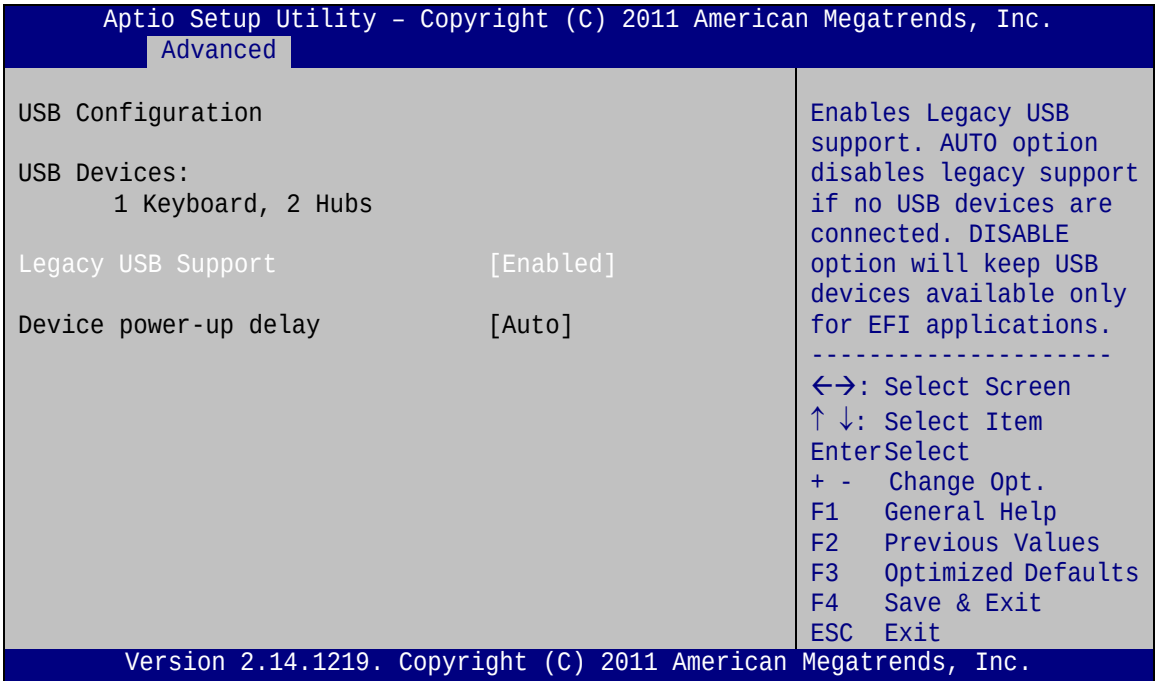
Use the **SAS Configuration** menu (**BIOS Menu 10**) to set the configuration of the SAS devices installed in the system.



BIOS Menu 10: SAS Configuration

5.3.8 USB Configuration

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



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]

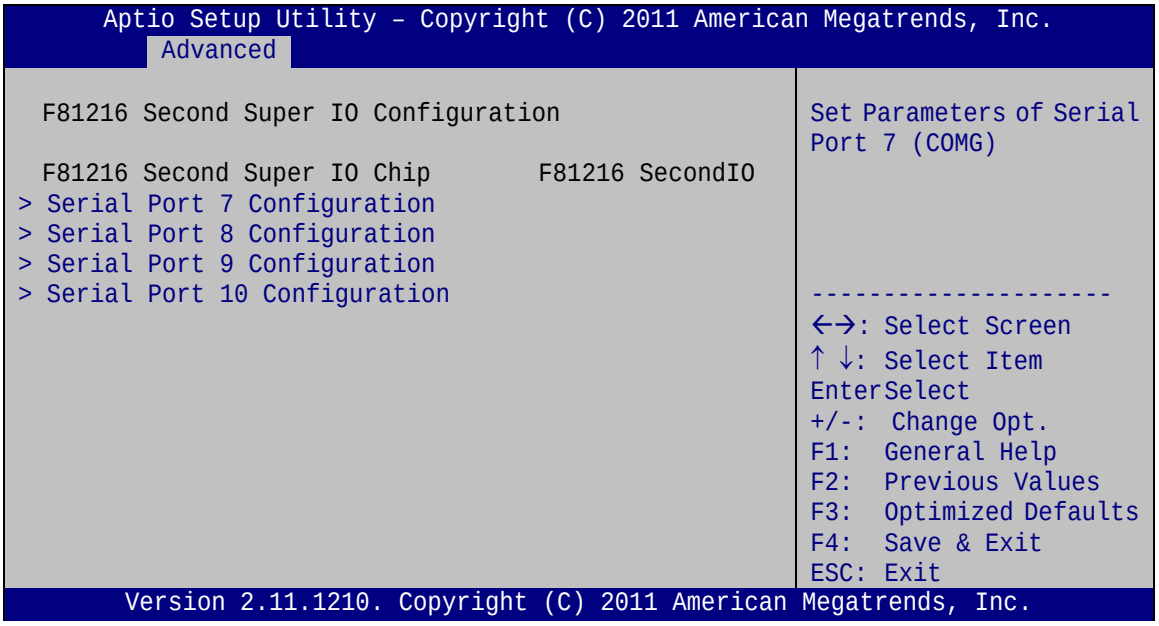
Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, 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

5.3.9 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.



BIOS Menu 12: Secondary Super IO Configuration

5.3.9.1 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=260h; IRQ=11**		Serial Port I/O port address is 260h and the interrupt address is IRQ11
➔ **IO=260h; IRQ=10, 11**		Serial Port I/O port address is 260h and the interrupt address is IRQ10, 11
➔ **IO=268h; IRQ=10, 11**		Serial Port I/O port address is 268h and the interrupt address is IRQ10, 11

5.3.9.2 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=268h; IRQ=11**		Serial Port I/O port address is 268h and the interrupt address is IRQ11
➔ **IO=260h; IRQ=10, 11**		Serial Port I/O port address is 260h and the interrupt address is IRQ10, 11
➔ **IO=268h; IRQ=10, 11**		Serial Port I/O port address is 268h and the interrupt address is IRQ10, 11

5.3.9.3 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=270h; IRQ=11** — Serial Port I/O port address is 270h and the interrupt address is IRQ11
- ➔ **IO=270h; IRQ=10, 11** — Serial Port I/O port address is 270h and the interrupt address is IRQ10, 11
- ➔ **IO=2E0h; IRQ=10, 11** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.9.4 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=2E0h; IRQ=11** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ11

➔ **IO=270h; IRQ=10, 11**	Serial Port I/O port address is 270h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**	Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.10 F81866 Super IO Configuration

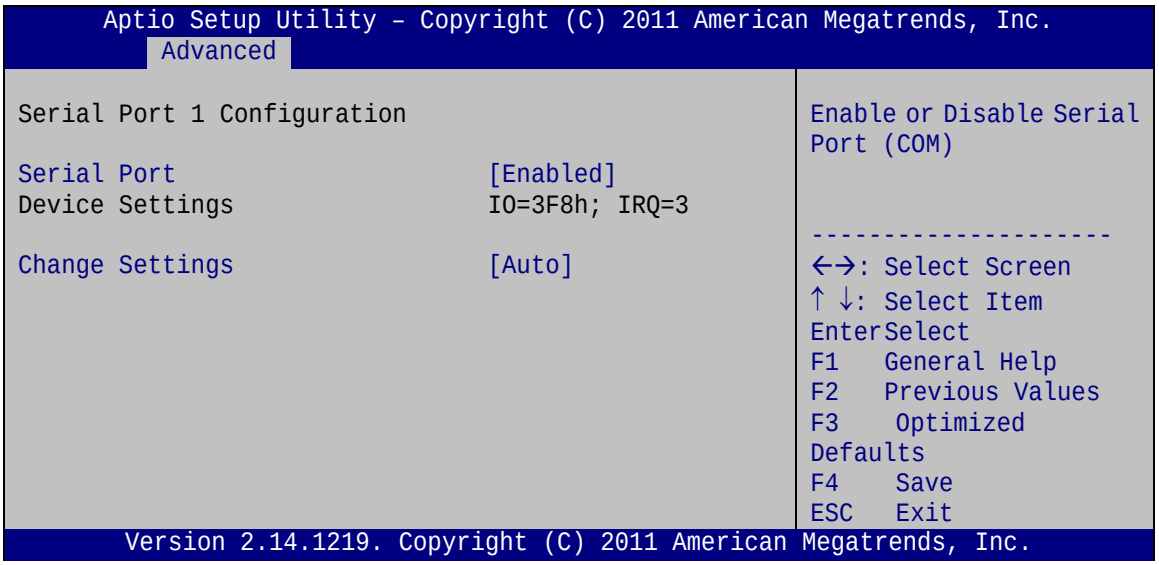
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 13**) to set or change the configurations for the serial ports.

```
      Aptio Setup Utility – Copyright (C) 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 13: Super IO Configuration

5.3.10.1 Serial Port n Configuration

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



BIOS Menu 14: Serial Port n Configuration Menu

5.3.10.1.1 Serial Port 1 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

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

➔ **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

5.3.10.1.2 Serial Port 2 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

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

5.3.10.1.3 Serial Port 3 Configuration

➔ Serial Port [Enabled]

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

➔ **Disabled**		Disable the serial port

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

➔ Change Settings [Auto]

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

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

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

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

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

5.3.10.1.4 Serial Port 4 Configuration

➔ Serial Port [Enabled]

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

➔ **Disabled** Disable the serial port

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

➔ Change Settings [Auto]

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

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

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

5.3.10.1.5 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=280h; IRQ=10**		Serial Port I/O port address is 280h and the interrupt address is IRQ10
➔ **IO=280h; IRQ=10, 11**		Serial Port I/O port address is 280h and the interrupt address is IRQ10, 11
➔ **IO=288h; IRQ=10, 11**		Serial Port I/O port address is 288h and the interrupt address is IRQ10, 11

5.3.10.1.6 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

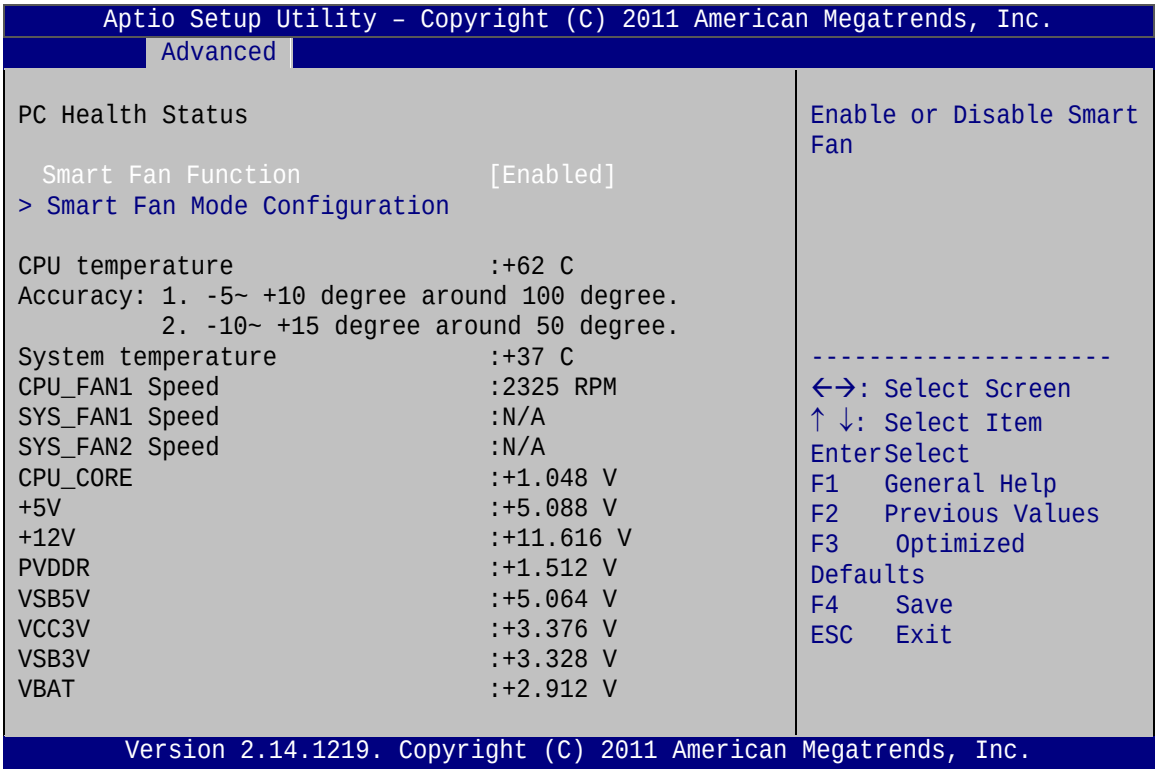
➔ Change Settings [Auto]

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=288h; IRQ=10**		Serial Port I/O port address is 288h and the interrupt address is IRQ10
➔ **IO=280h; IRQ=10, 11**		Serial Port I/O port address is 280h and the interrupt address is IRQ10, 11
➔ **IO=288h; IRQ=10, 11**		Serial Port I/O port address is 288h and the interrupt address is IRQ10, 11

5.3.11 F81866 H/W Monitor

The **F8186 H/W Monitor** menu (**BIOS Menu 15**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 15: Hardware Health Configuration

➔ PC Health Status

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

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

- CPU_CORE
- +5V
- +12V
- PVDDR
- VSB5V
- VCC3V
- VSB3V
- VBAT

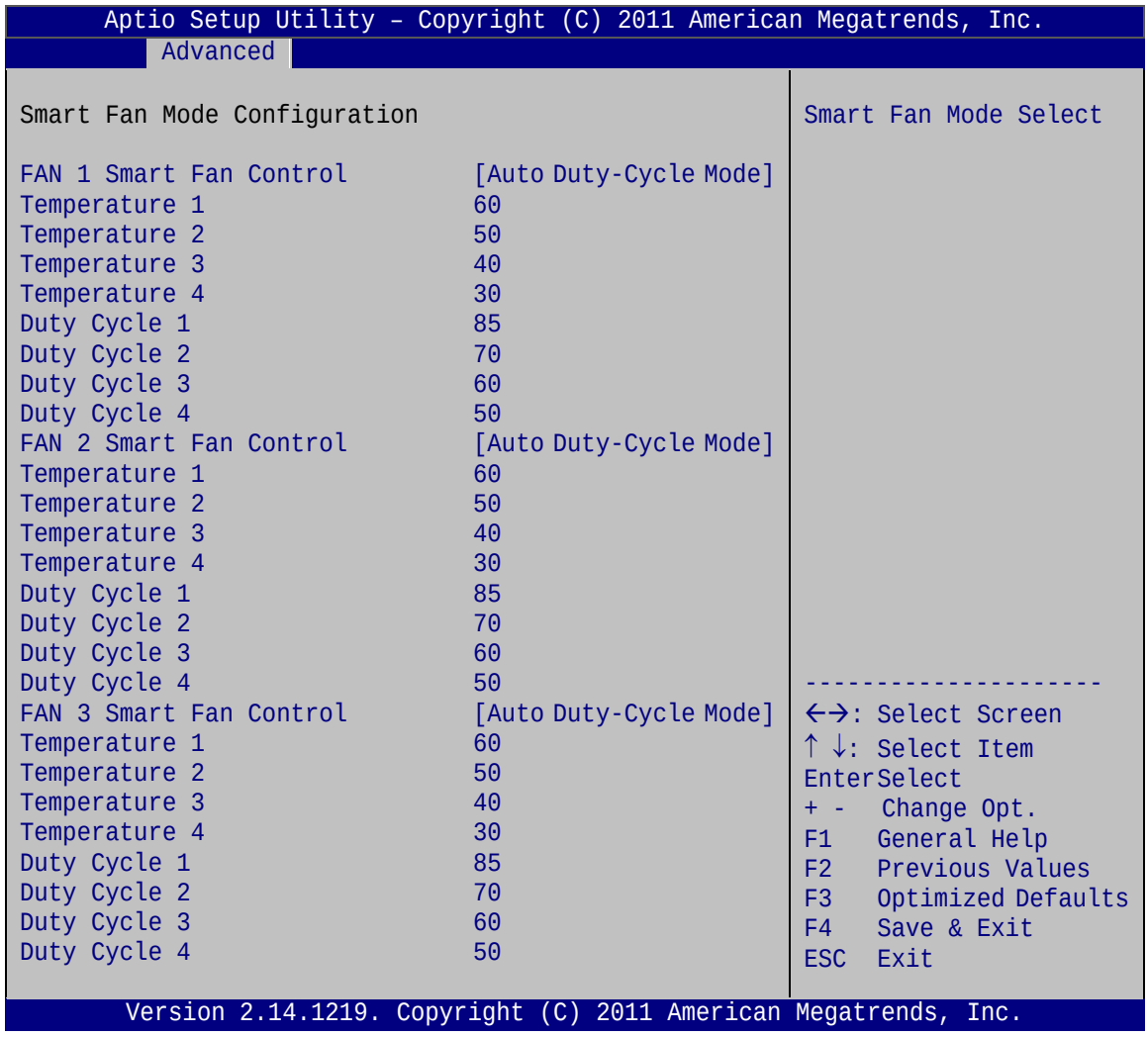
➔ Smart Fan Function [Enabled]

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.

5.3.11.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 16**) to configure the smart fan temperature and speed settings.



BIOS Menu 16: FAN 1 Configuration

➔ FAN 1 Smart Fan Control [Auto Duty-Cycle Mode]

Use the **FAN 1 Smart Fan Control** option to configure the FAN 1 Smart Fan.

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

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

➔ FAN 2 Smart Fan Control [Auto Duty-Cycle Mode]

Use the **FAN 2 Smart Fan Control** option to configure the FAN 2 Smart Fan.

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

➔ FAN 3 Smart Fan Control [Auto Duty-Cycle Mode]

Use the **FAN 3 Smart Fan Control** option to configure the FAN 3 Smart Fan.

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

➔ Temperature n

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

➔ Duty Cycle n

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

5.3.12 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 17**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

BIOS Menu 17: 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

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the Northbridge, Southbridge, Integrated Graphics, and ME Subsystem configuration menus.

WARNING!

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

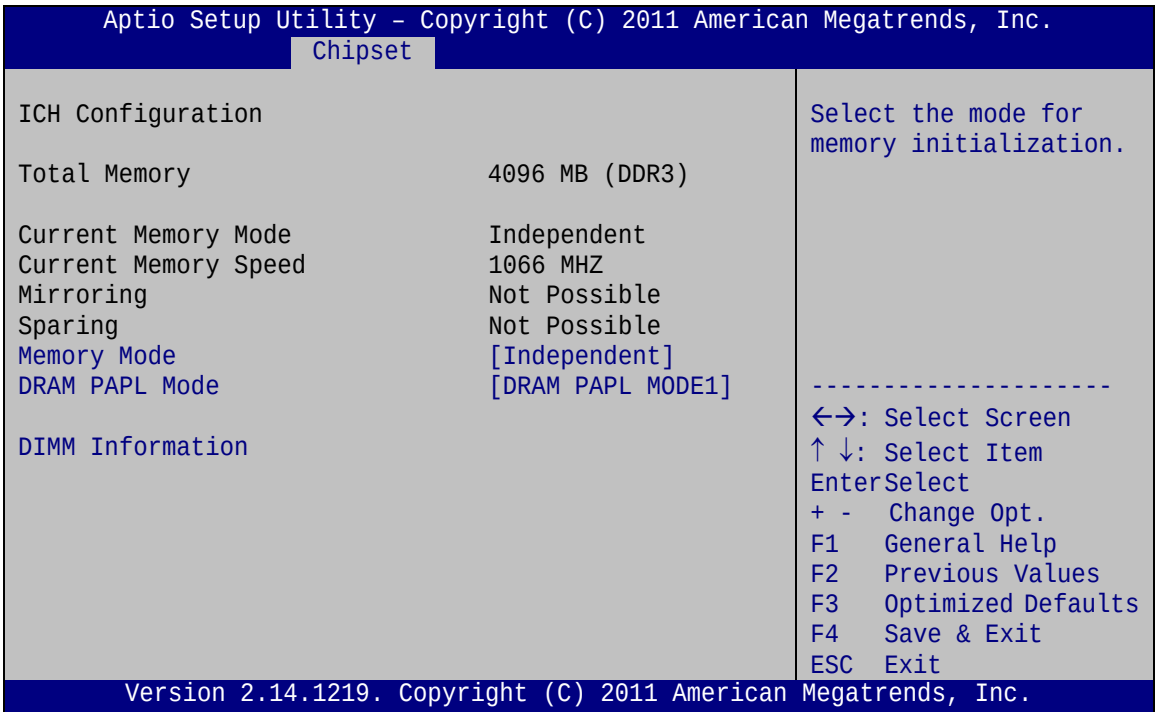
```
      Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
  Main    Advanced  Chipset    Boot    Security  Save & Exit

> North Bridge                                  North Bridge Parameters
> South Bridge
> ME Subsystem
> Chipset Reference Board                       ---------------------
                                                ←→: 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 18: Chipset

5.4.1 North Bridge

Use the **North Bridge** menu (**BIOS Menu 19**) to configure the Northbridge chipset.



BIOS Menu 19: Northbridge Chipset Configuration

➔ Memory Mode [Independent]

Use the **Memory Mode** option to configure memory mode.

➔ **Independent**	**DEFAULT**	Configures memory mode as independent mode.
➔ **Mirroring**		Configures memory mode as mirroring mode.
➔ **Lock Step**		Configures memory mode as lock step mode
➔ **Sparing**		Configures memory mode as sparing mode.

➔ DRAM PAPL Mode [DRAM PAPL MODE1]

Use the **DRAM PAPL Mode** option to configure DRAM PAPL mode.

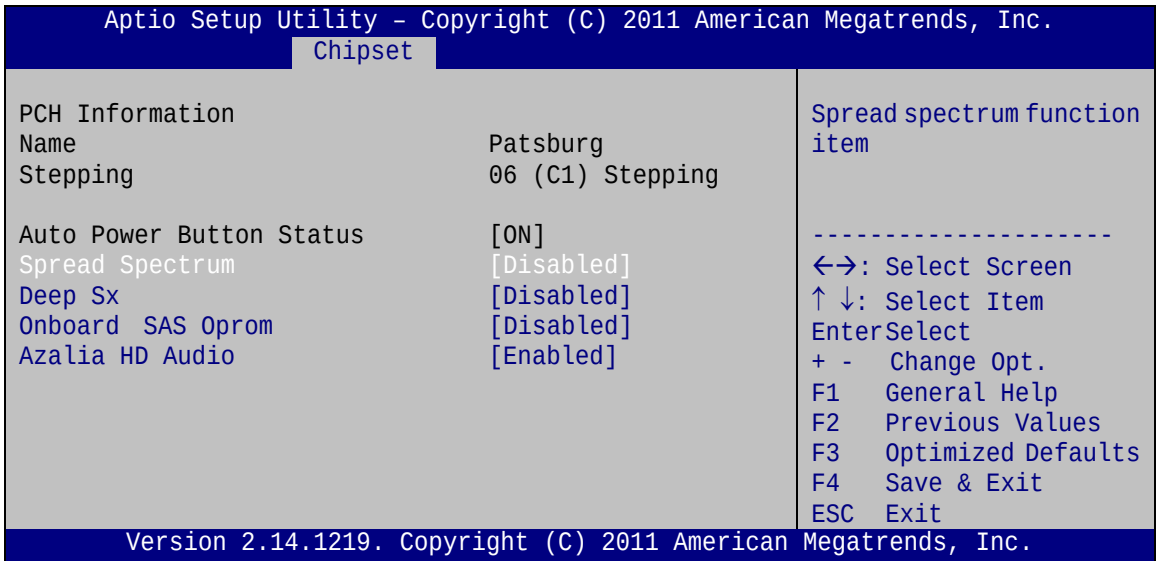
➔ **Disable**	Disable DRAM PAPL mode.

➔ **DRAM PAPL MODE0** Configures DRAM PAPL mode as DRAM PAPL MODE0.

➔ **DRAM PAPL MODE1** **DEFAULT** Configures DRAM PAPL mode as DRAM PAPL MODE1.

5.4.2 South Bridge

Use the **South Bridge** menu (**BIOS Menu 20**) to configure the Southbridge chipset.



BIOS Menu 20: Southbridge Chipset Configuration

➔ Spread Spectrum [Disabled]

Use the **Spread Spectrum** BIOS option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

➔ **Disabled** **DEFAULT** EMI not reduced.

➔ **Enabled** EMI reduced.

➔ Deep Sx [Disabled]

Use the **Deep Sx** BIOS option to configure Deep Sx function. Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only.

➔ **Disabled**	**DEFAULT**	Disable the Deep Sx function.
➔ **Enabled**		Enable the Deep Sx function.

➔ Onboard SAS Oprom [Disabled]

Use the **Onboard SAS Oprom** option to enable or disable the onboard SAS Oprom.

➔ **Disabled**		Disables the onboard SAS Oprom.
➔ **Enabled**	**DEFAULT**	Enables the onboard SAS Oprom.

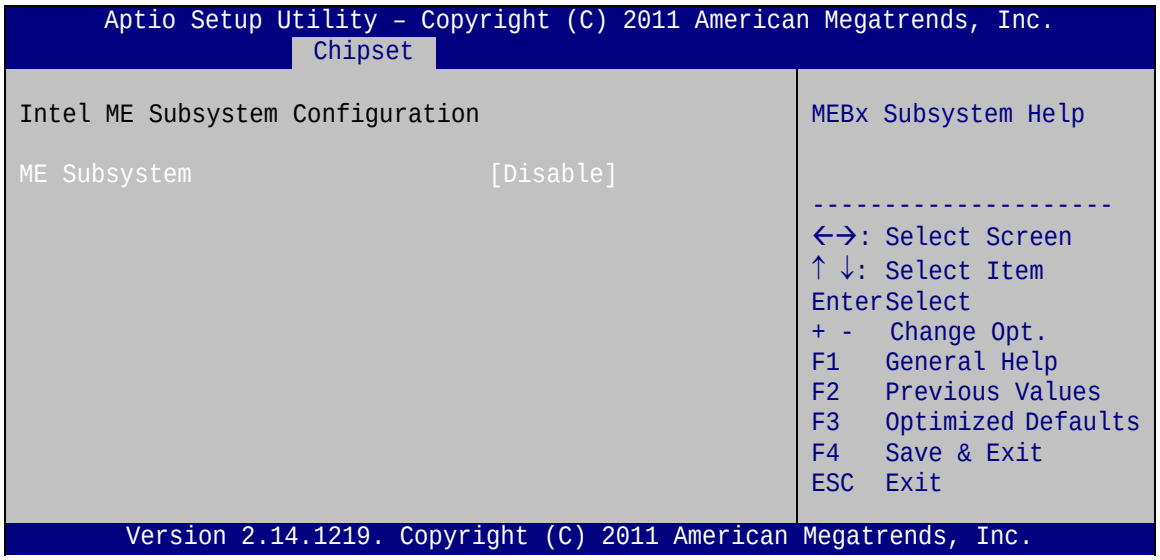
➔ Azalia HD Audio [Enabled]

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

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

5.4.3 ME Subsystem

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



BIOS Menu 21: ME Subsystem

➔ MEBx Subsystem [Disable]

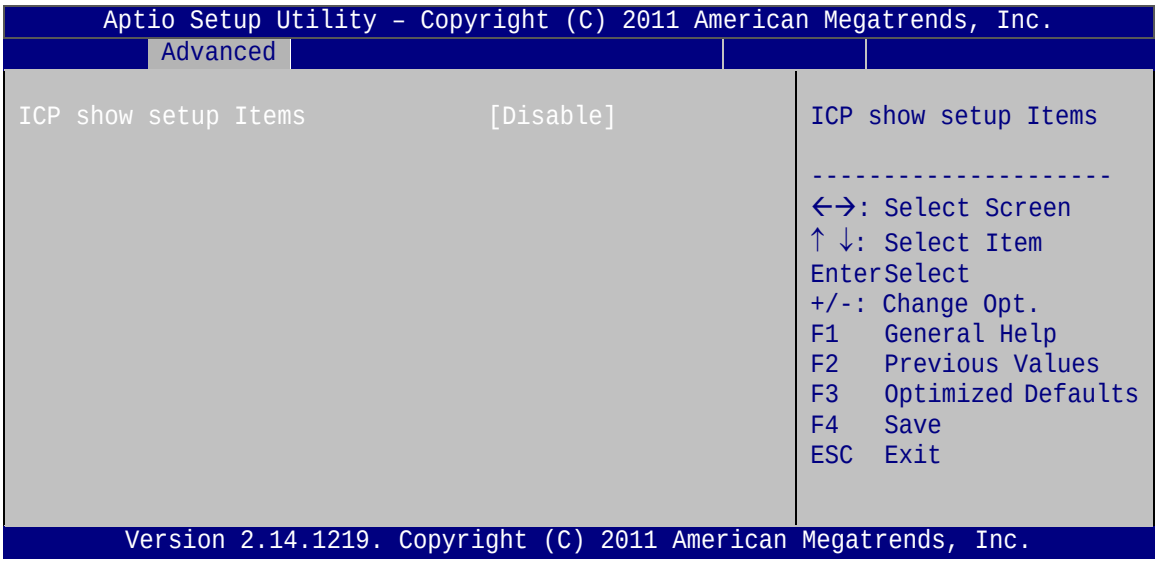
Use the **MEBx Subsystem** option to enable or disable MEBx subsystem help.

➔ **Disable** **DEFAULT** Disable MEBx subsystem help.

➔ **Enable** Enable MEBx subsystem help.

5.4.4 Chipset Reference Board

Use the **Chipset Reference Board** menu (**BIOS Menu 22**) to configure the ICP show setup items function.



BIOS Menu 22: Chipset Reference Board

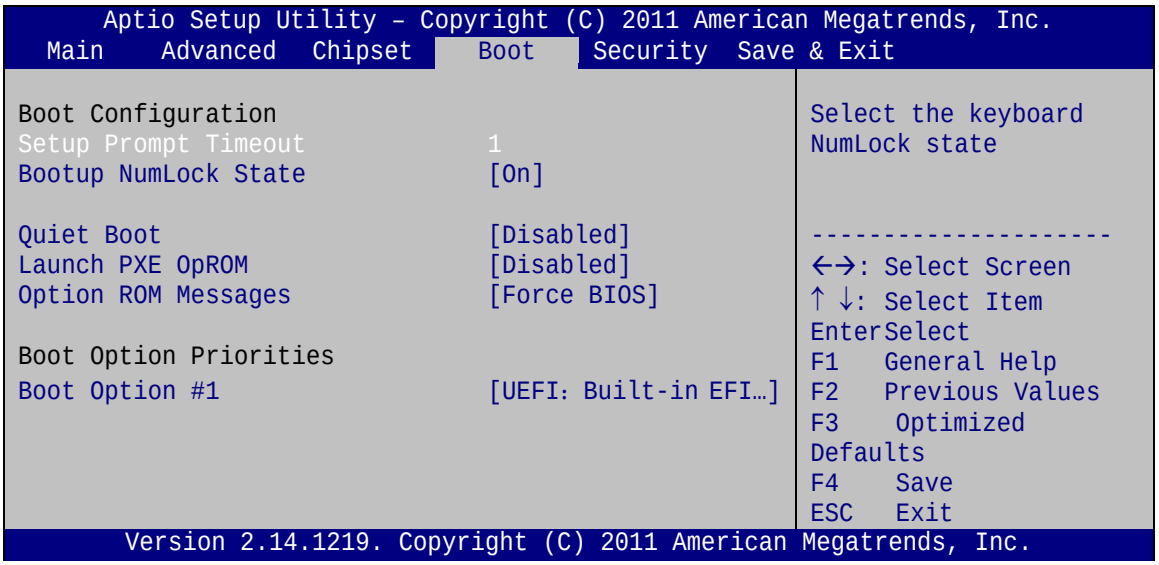
➔ ICP show setup Items [Disable]

Use the **ICP show setup Items** option to enable or disable the ICP show setup items function.

➔ **Disable**	**DEFAULT**	Disable the ICP show setup items function.
➔ **Enable**		Enable the ICP show setup items function.

5.5 Boot

Use the **Boot** menu (**BIOS Menu 23**) to configure system boot options.



BIOS Menu 23: Boot

➔ Setup Prompt Timeout

Use the + or – key to change the **Setup Prompt Timeout** value.

➔ 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 [Disabled]

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

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

➔ 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.

➔ Option ROM Messages [Force BIOS]

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

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

➔ Boot Option #1 [UEFI: Built-in EFI…]

Use **Boot Option #1** to enable or disable booting from the UEFI devices.

➔ **UEFI: Built-in EFI Shell** **DEFAULT** Enables booting from the built-in EFI shell.

➔ **Disabled** Disables booting from the built-in EFI shell.

5.6 Security

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

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

Password Description                          |  Set Administrator
                                              |  Password
If ONLY the Administrator's password is set,  |
then this only limits access to Setup and is  |
only asked for when entering Setup            |
If ONLY the User's password is set, then this |
is a power on password and must be entered to  |
boot or enter Setup. In Setup the User will   |  ----------------------
have Administrator rights.                    |  ←→: Select Screen
The password length must be                   |  ↑ ↓: Select Item
in the following range:                       |  EnterSelect
Minimum length                    3           |  + -   Change Opt.
Maximum length                    20          |  F1    General Help
                                              |  F2    Previous Values
Administrator Password                        |  F3    Optimized Defaults
User Password                                 |  F4    Save & Exit
                                              |  ESC   Exit
       Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 24: Security

➔ Administrator Password

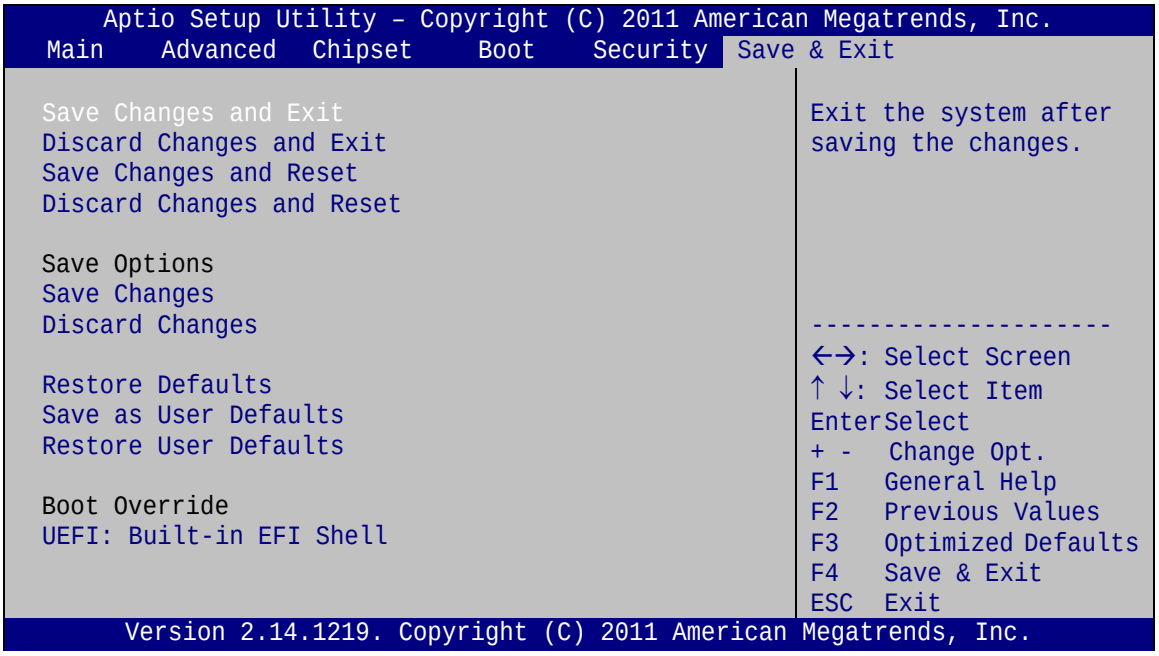
Use the **Administrator Password** to set or change a administrator password.

➔ User Password

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 25**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 25: Exit

➔ Save Changes and Exit

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 Exit

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

➔ Save Changes and Reset

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

➔ Discard Changes and Reset

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

➔ Save Changes

Use the **Save Changes** option to save the changes made to the BIOS options.

➔ Discard Changes

Use the **Discard Changes** option to discard the changes made to the BIOS options.

➔ 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
- USB 3.0

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMBA-C604EN 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).

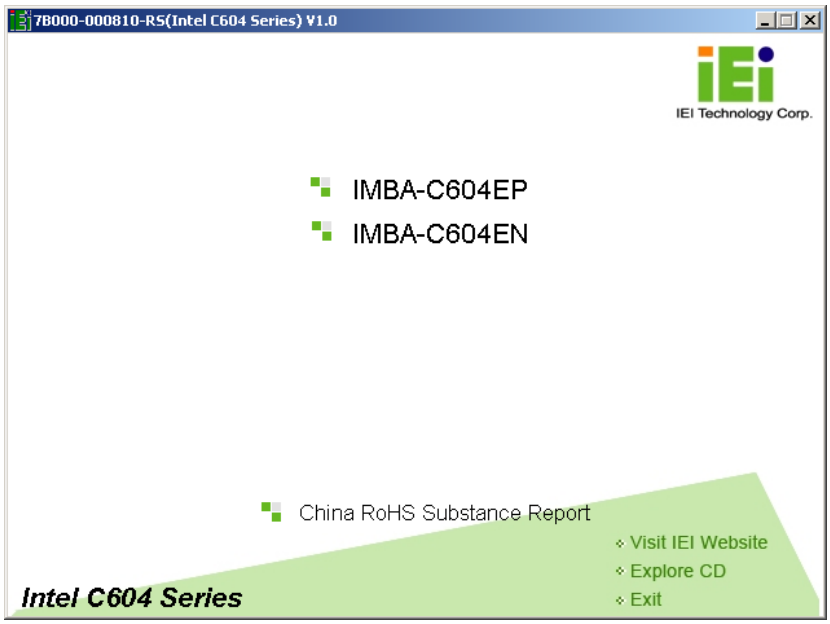


Figure 6-1: Introduction Screen

Step 3: Click IMBA-C604EN.

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

Figure 6-2: Available Drivers

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

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

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

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

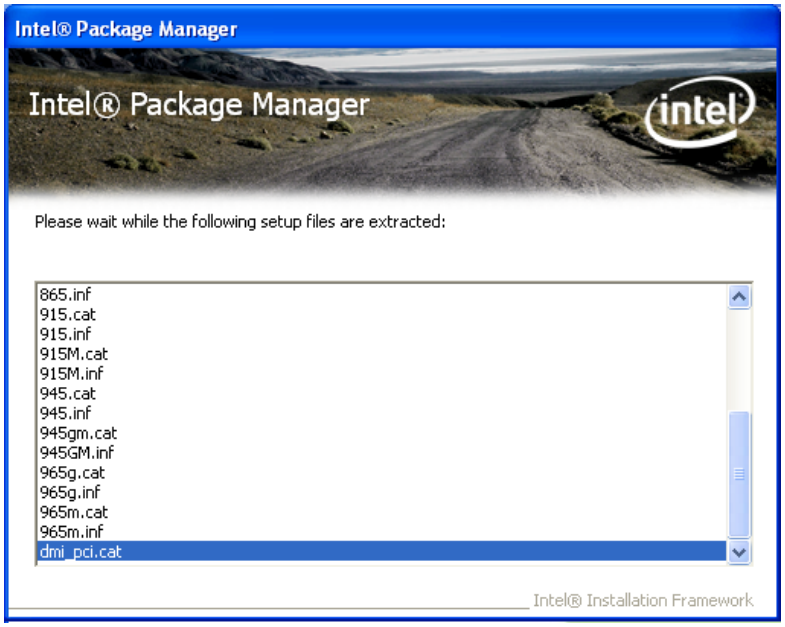


Figure 6-3: Chipset Driver Screen

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

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

Figure 6-4: Chipset Driver Welcome Screen

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

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

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

Figure 6-5: Chipset Driver License Agreement

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

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

Figure 6-6: Chipset Driver Read Me File

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

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

Figure 6-7: Chipset Driver Setup Operations

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

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

Figure 6-8: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

Step 2: Click "**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.

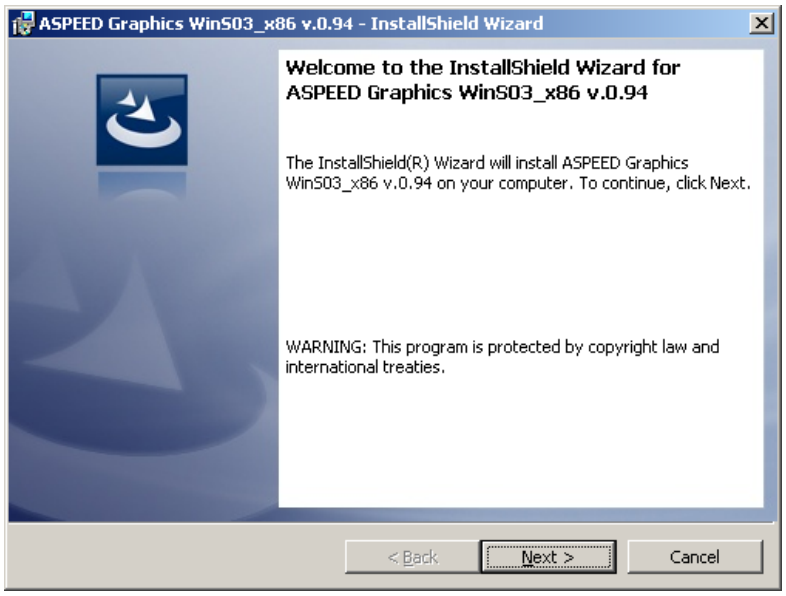


Figure 6-9: Graphics Driver Welcome Screen

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

Step 6: The **Ready to Install the Program** screen in Figure 6-10 appears.

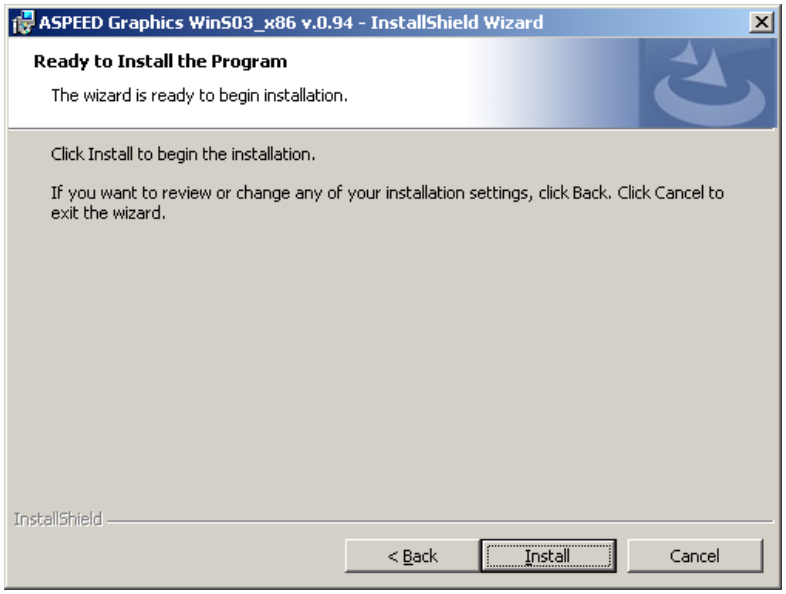


Figure 6-10: Graphics Driver License Agreement

Step 7: Click **Install** to proceed with the installation.

Step 8: The program begins to install.

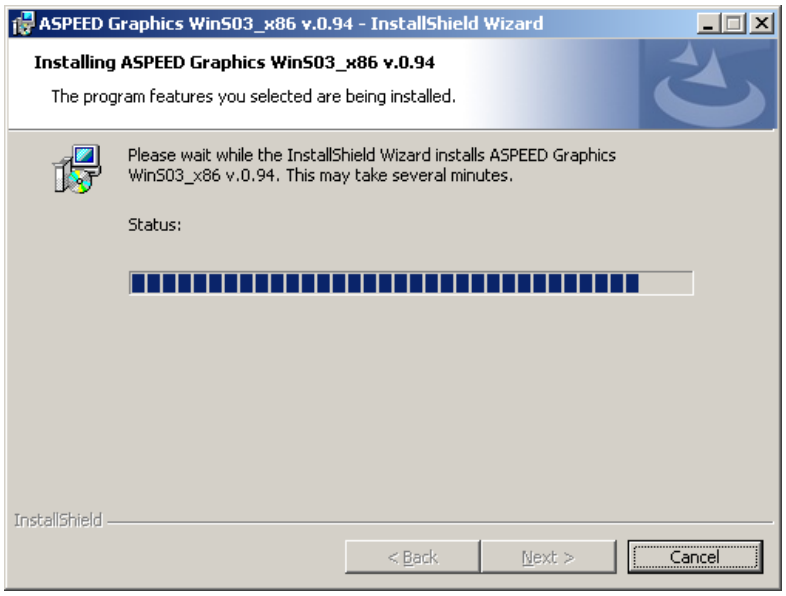


Figure 6-11: Graphics Driver Setup Operations

Step 9: When the driver installation is complete, the screen in Figure 6-12 appears.

Step 10: Click Finish to exit.

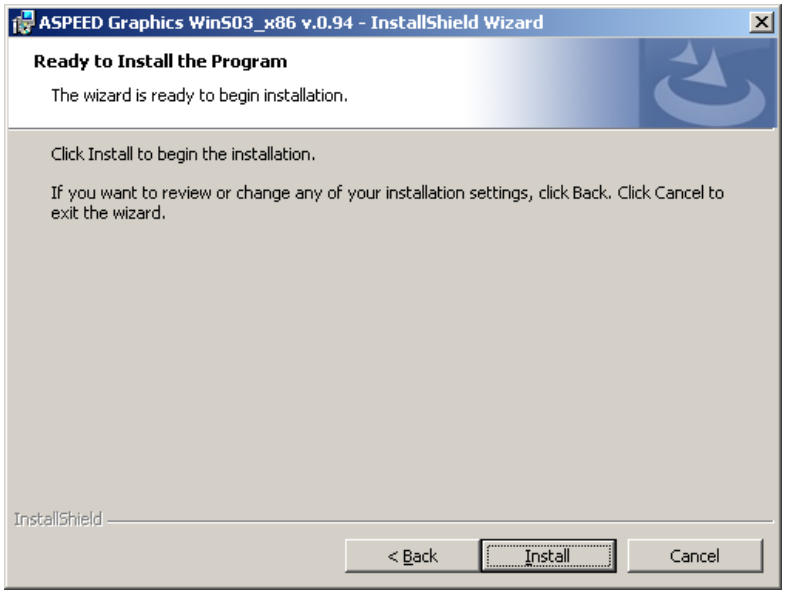


Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

Step 1: Right-click the Computer button from the start menu and select **Properties**. (**Figure 6-13**).

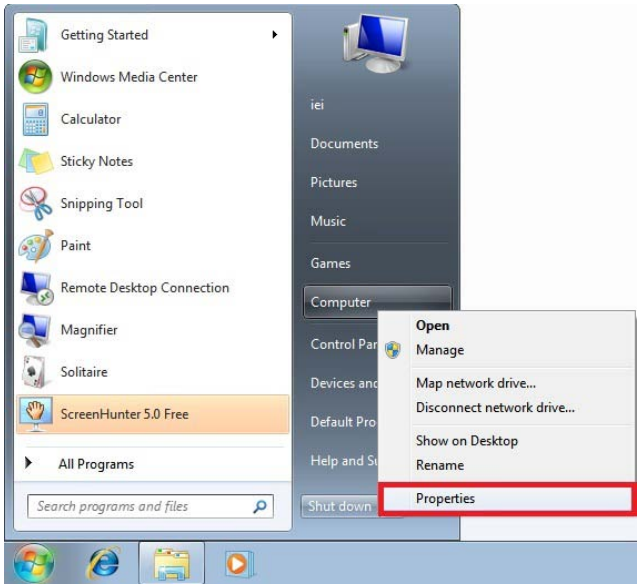


Figure 6-13: Windows Control Panel

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

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

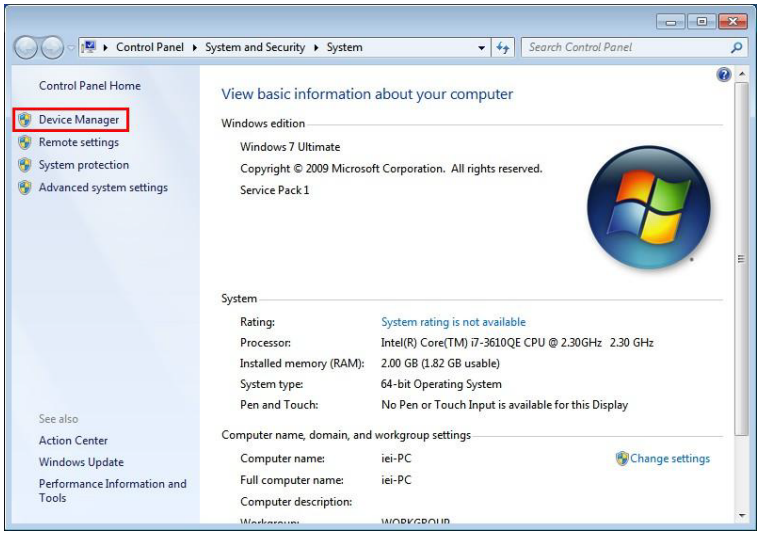


Figure 6-14: System Control Panel

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

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

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

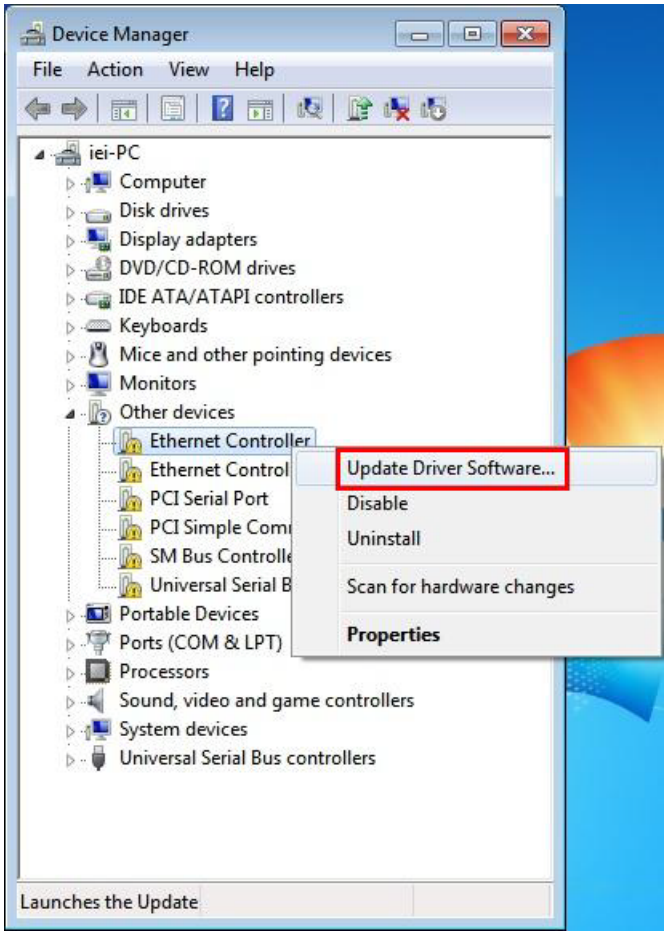


Figure 6-15: Device Manager List

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

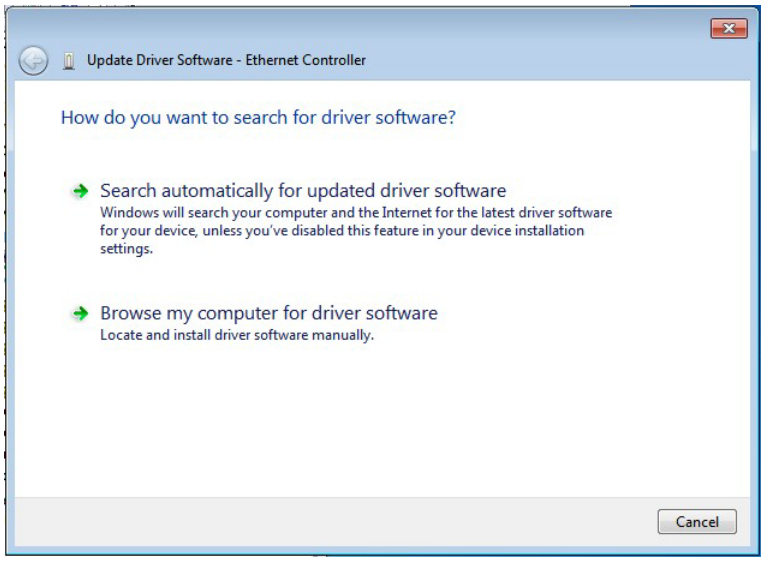


Figure 6-16: Update Driver Software Window

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

Step 9: Click Browse to select "**X:\3-LAN**" directory in the **Locate File** window, where "**X:\"** is the system CD drive. (**Figure 6-17**).

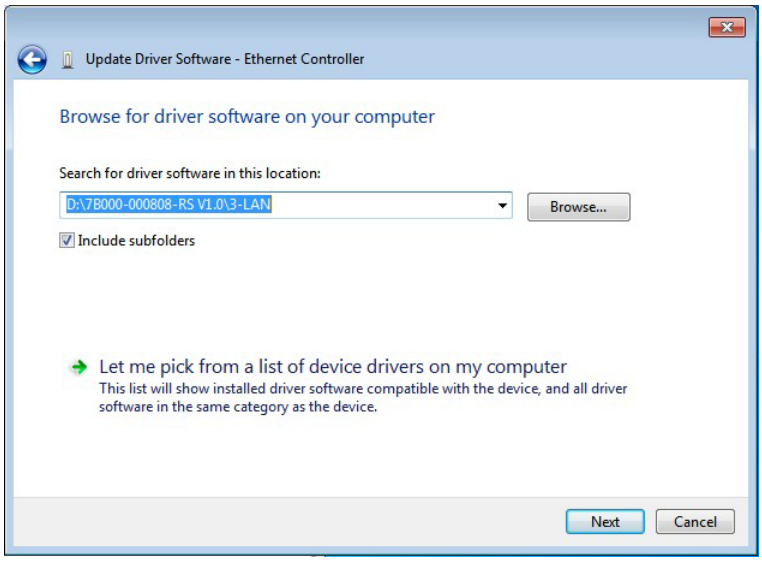


Figure 6-17: Locate Driver Files

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

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

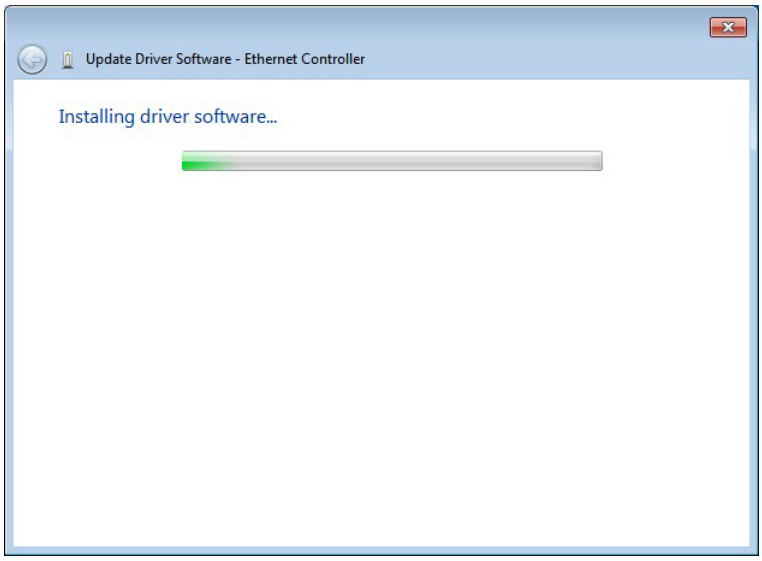


Figure 6-18: LAN Driver Installation

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

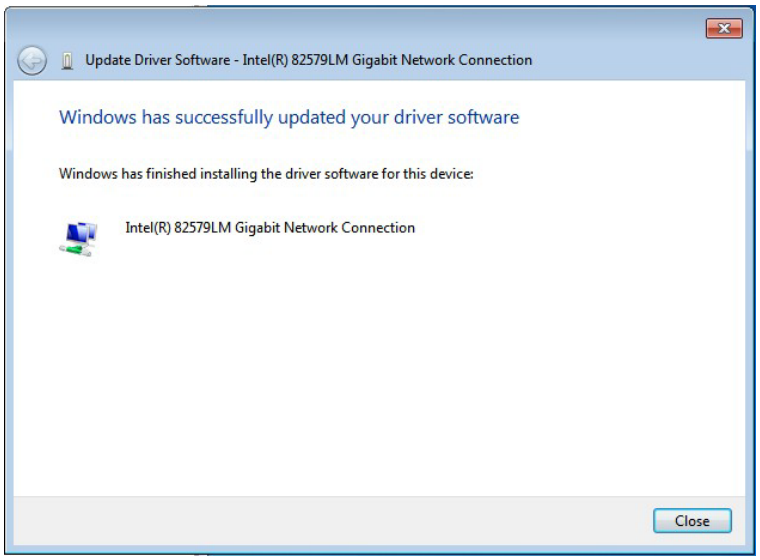


Figure 6-19: LAN Driver Installation Complete

6.6 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 6-20**).

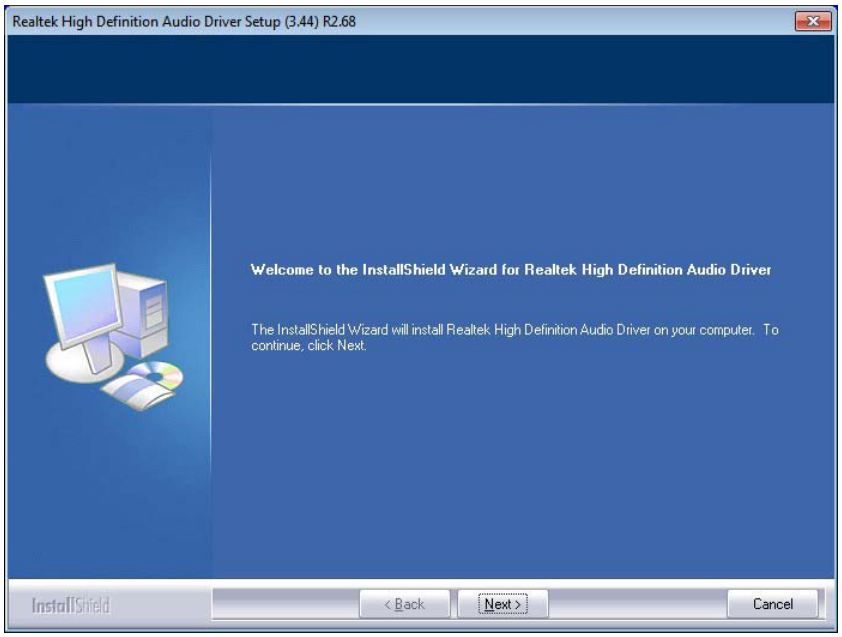


Figure 6-20: InstallShield Wizard Welcome Screen

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

Step 7: InstallShield starts to install the new software as shown in **Figure 6-21**.

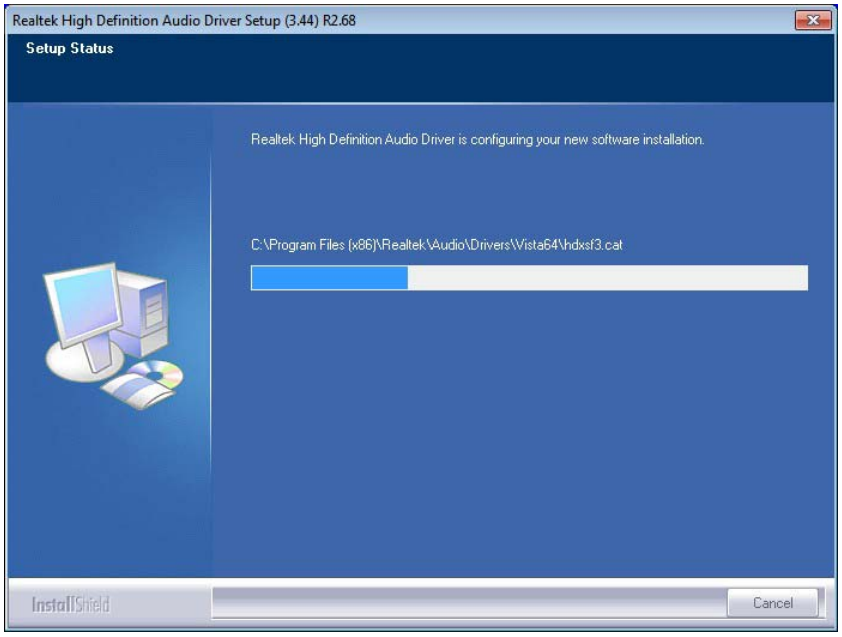


Figure 6-21: Audio Driver Software Configuration

Step 8: After the driver installation process is complete, a confirmation screen appears (**Figure 6-22**).

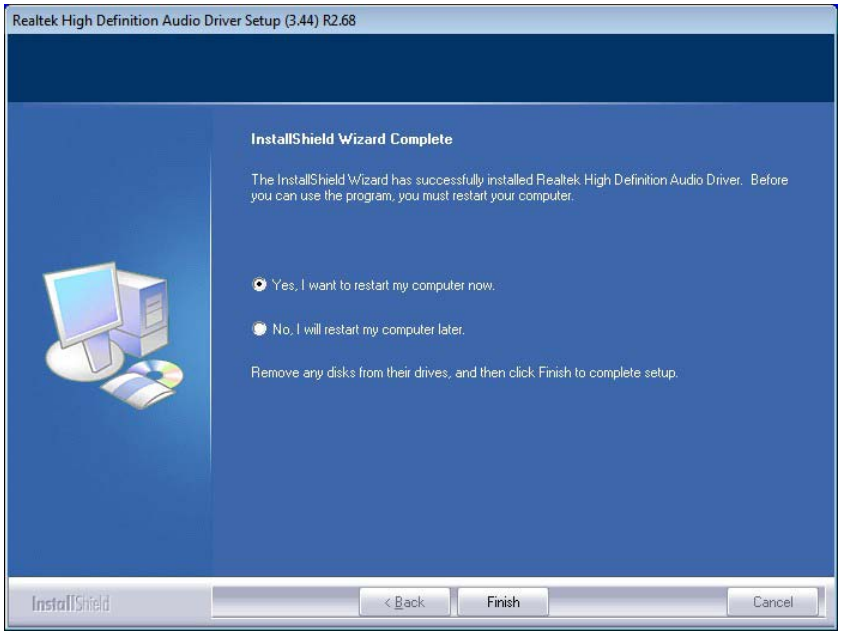


Figure 6-22: Restart the Computer

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 SATA Driver Installation

To install the SATA 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 6-23** appears.

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

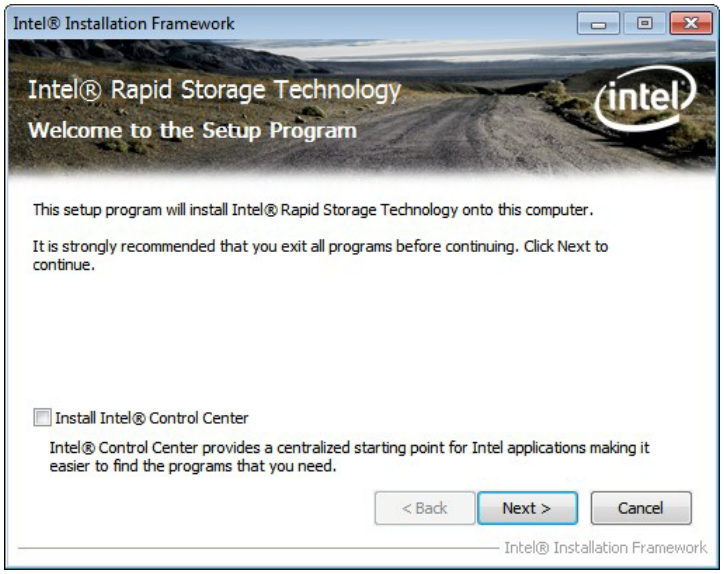


Figure 6-23: SATA RAID Driver Welcome Screen

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

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

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

Figure 6-24: SATA RAID Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-25** appears.

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

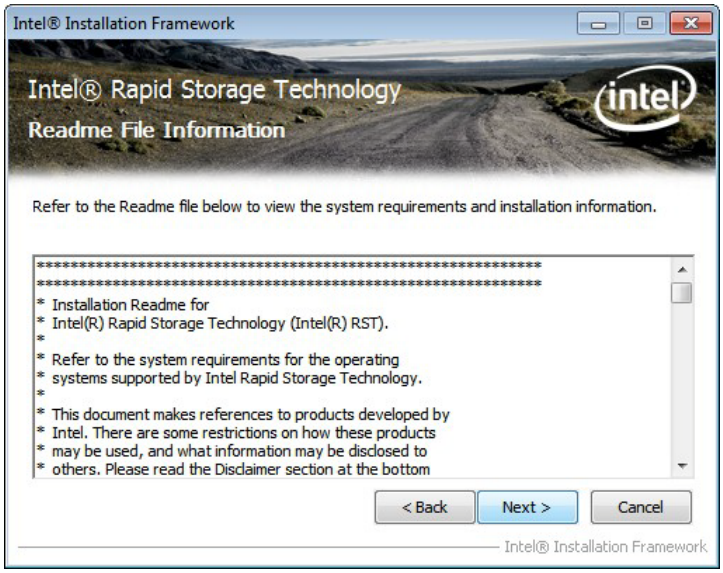


Figure 6-25: SATA RAID Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-26**.

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

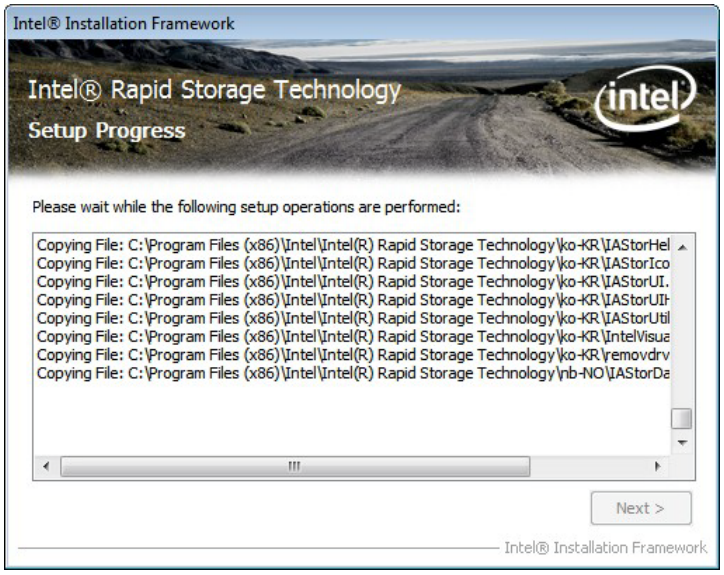


Figure 6-26: SATA RAID Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-27** appears.

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

Figure 6-27: SATA RAID Driver Installation Finish Screen

6.8 USB 3.0 Driver Installation

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: A **Welcome Screen** appears (**Figure 6-28**).

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

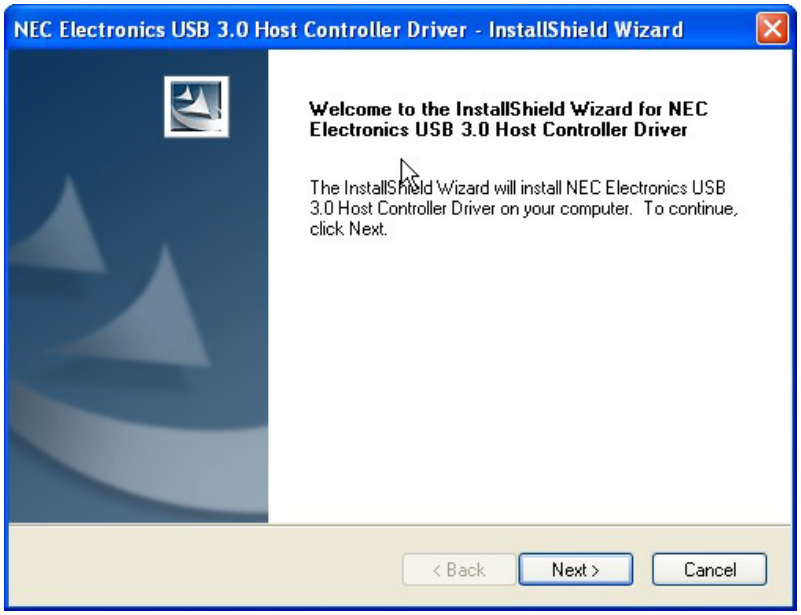


Figure 6-28: USB 3.0 Driver Welcome Screen

Step 6: The **License Agreement** shown in **Figure 6-29** appears.

Step 7: Accept the agreement by selecting “I accept the terms in the license agreement”.

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

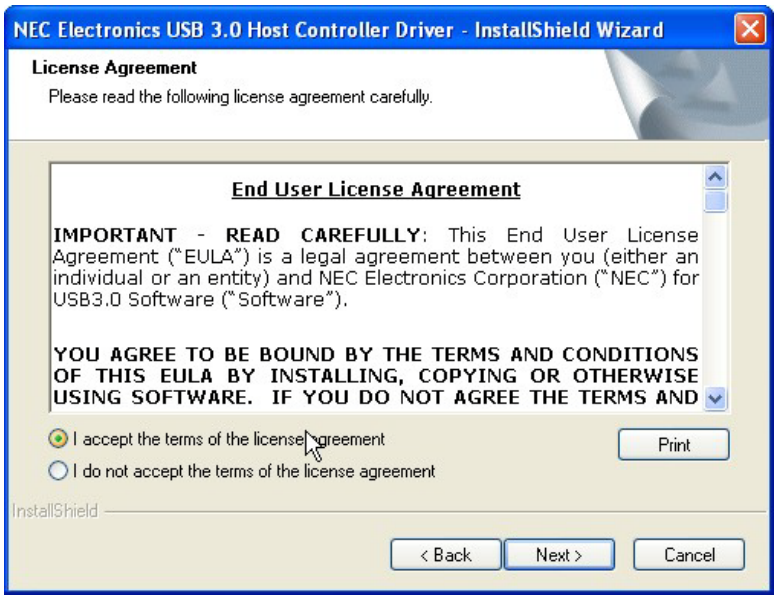


Figure 6-29: USB 3.0 Driver License Agreement

Step 9: Browse for an install location or use the one suggested (**Figure 6-30**).

Step 10: Click NEXT to continue.

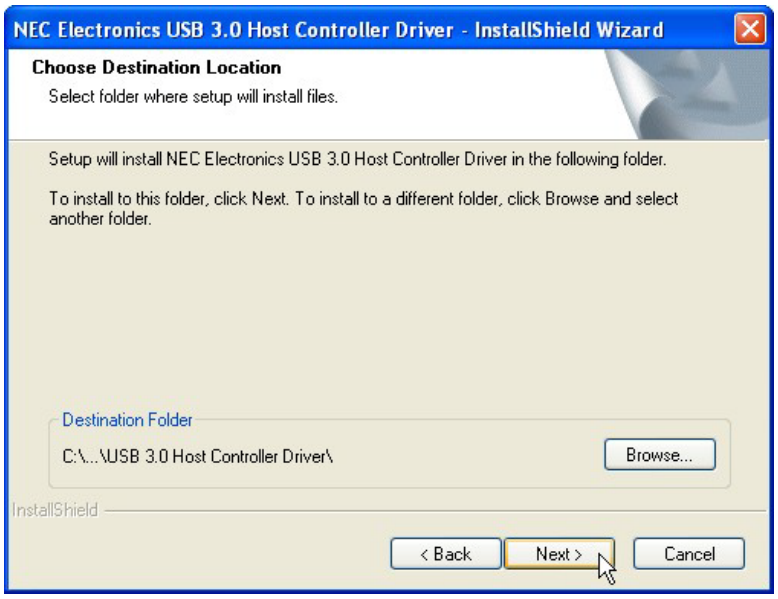


Figure 6-30: USB 3.0 Driver Choose Install Location

Step 11: The **Ready to Install the Program** screen in **Figure 6-31** appears.

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

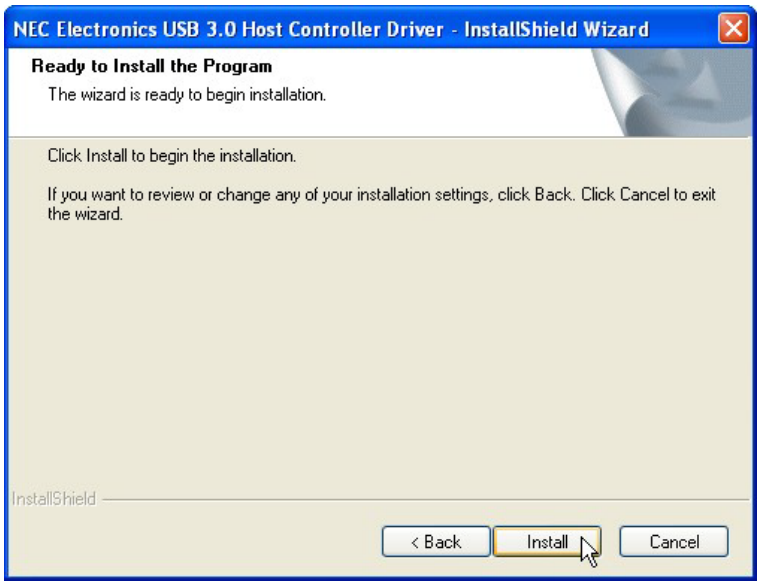


Figure 6-31: USB 3.0 Driver Installation

Step 13: The **Install** screen appears and displays the progress of the installation.

Step 14: When the installation is complete, click **Finish** to exit setup. (**Figure 6-32**).

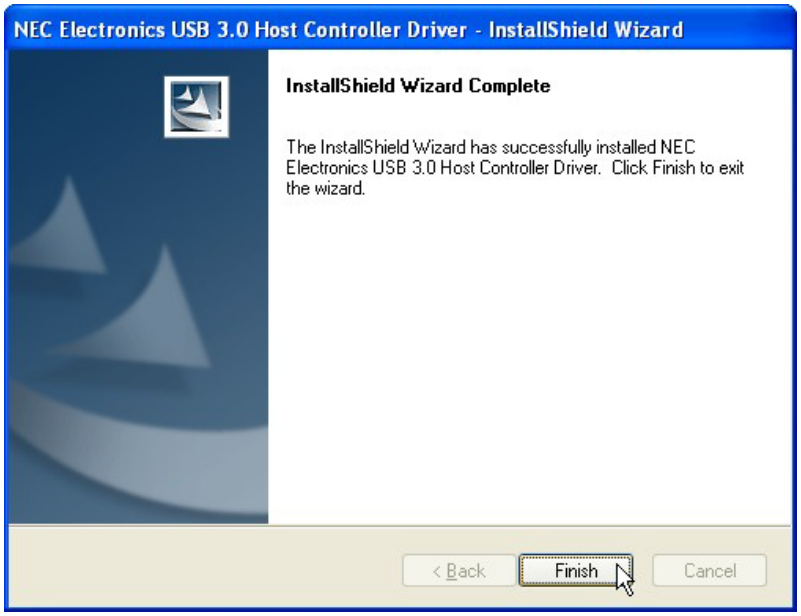


Figure 6-32: USB 3.0 Driver Update Complete

Appendix

A

BIOS Options

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

- System Overview 70
- Memory Information 70
- System Date [xx/xx/xx] 71
- System Time [xx:xx:xx] 71
- Enable ACPI Auto Configuration [Disabled] 72
- Wake system with Fixed Time [Disabled] 73
- Security Device Support [Disable] 74
- Intel Virtualization Technology [Disabled] 75
- Runtime Error Logging Support [Disabled] 77
- SATA Mode [IDE Mode] 78
- Serial-ATA Controller 0 [Compatible] 78
- Serial-ATA Controller 1 [Enhanced] 79
- USB Devices 81
- Legacy USB Support [Enabled] 81
- Serial Port [Enabled] 82
- Change Settings [Auto] 82
- Serial Port [Enabled] 83
- Change Settings [Auto] 83
- Serial Port [Enabled] 83
- Change Settings [Auto] 84
- Serial Port [Enabled] 84
- Change Settings [Auto] 84
- Serial Port [Enabled] 86
- Change Settings [Auto] 86
- Serial Port [Enabled] 87
- Change Settings [Auto] 87
- Serial Port [Enabled] 87
- Change Settings [Auto] 88
- Serial Port [Enabled] 88
- Change Settings [Auto] 88
- Serial Port [Enabled] 89
- Change Settings [Auto] 89
- Serial Port [Enabled] 90

- Change Settings [Auto] 90
- PC Health Status 91
- Smart Fan Function [Enabled] 92
- FAN 1 Smart Fan Control [Auto Duty-Cycle Mode] 93
- FAN 2 Smart Fan Control [Auto Duty-Cycle Mode] 94
- FAN 3 Smart Fan Control [Auto Duty-Cycle Mode] 94
- Temperature n 94
- Duty Cycle n 95
- Console Redirection [Disabled] 97
- Memory Mode [Independent] 98
- DRAM PAPL Mode [DRAM PAPL MODE1] 98
- Spread Spectrum [Disabled] 99
- Deep Sx [Disabled] 100
- Onboard SAS Oprom [Disabled] 100
- Azalia HD Audio [Enabled] 100
- MEBx Subsystem [Disable] 101
- ICP show setup Items [Disable] 102
- Setup Prompt Timeout 103
- Bootup NumLock State [On] 103
- Quiet Boot [Disabled] 104
- Launch PXE OpROM [Disabled] 104
- Option ROM Messages [Force BIOS] 104
- Boot Option #1 [UEFI: Built-in EFI…] 104
- Administrator Password 105
- User Password 105
- Save Changes and Exit 106
- Discard Changes and Exit 106
- Save Changes and Reset 106
- Discard Changes and Reset 107
- Save Changes 107
- Discard Changes 107
- Restore Defaults 107
- Save as User Defaults 107
- Restore User Defaults 107

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.

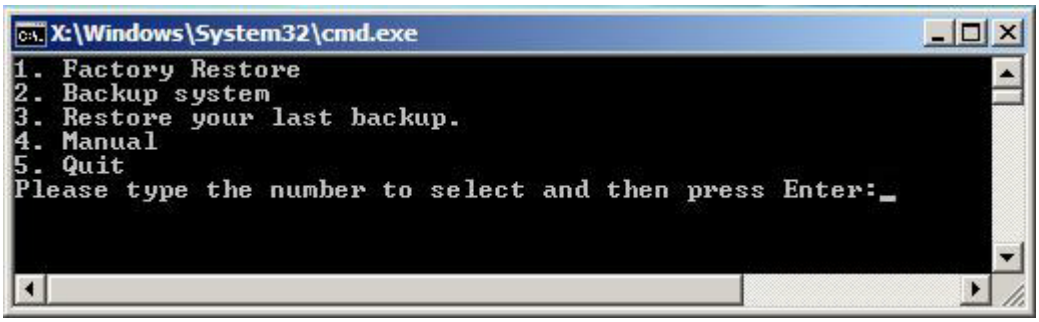


Figure B-1: IEI One Key Recovery Tool Menu

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!

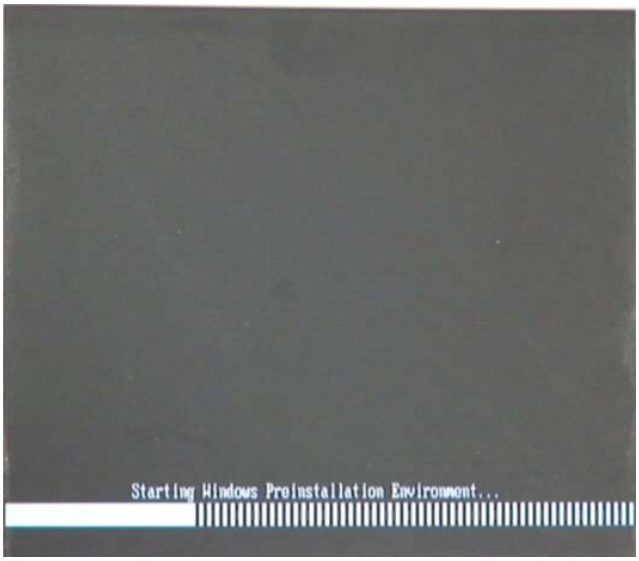


Figure B-2: Launching the Recovery Tool

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

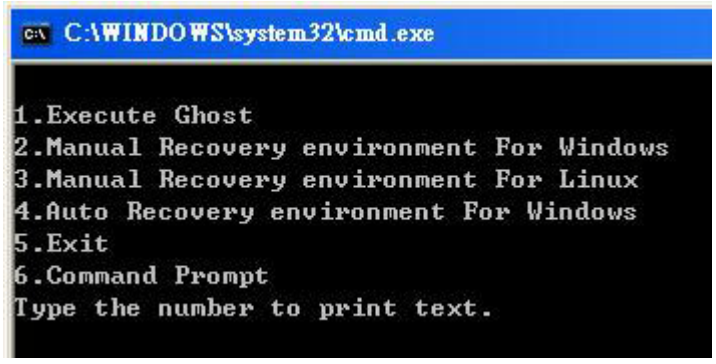


Figure B-3: Recovery Tool Setup Menu

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

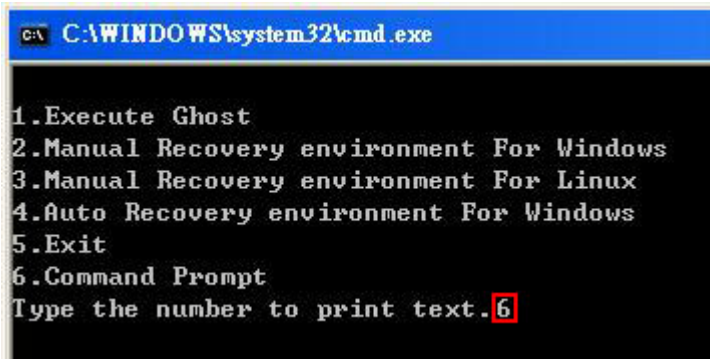


Figure B-4: Command Prompt

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

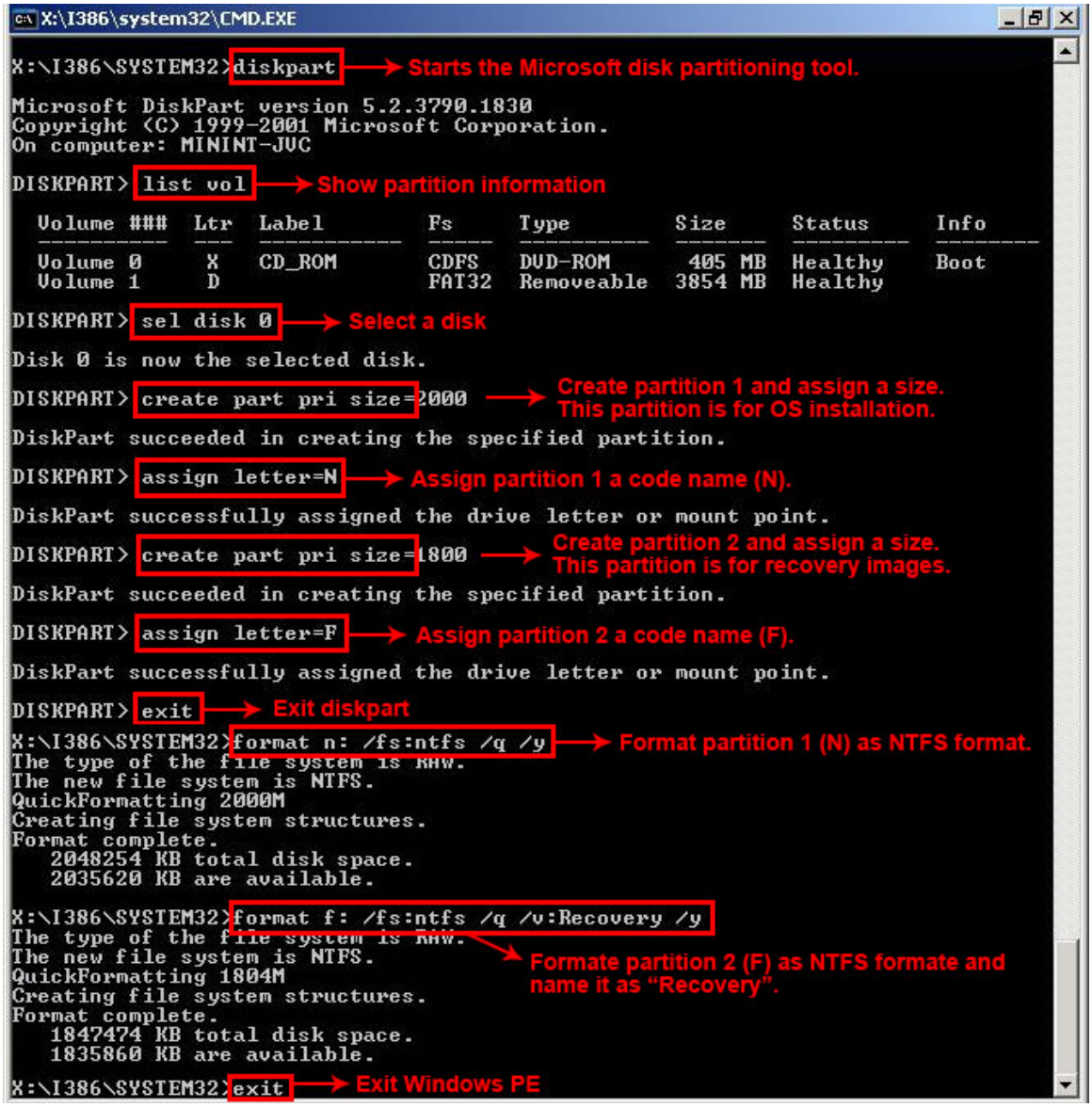
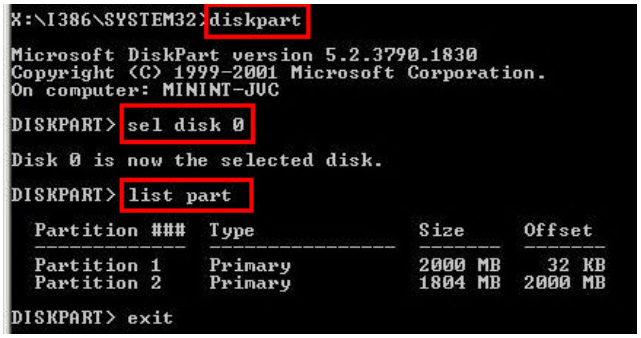


Figure B-5: Partition Creation Commands

NOTE:

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



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

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

B.2.3 Install Operating System, Drivers and Applications

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

NOTE:

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

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

B.2.4 Building the Recovery Partition

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

Step 2: Start the system.

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

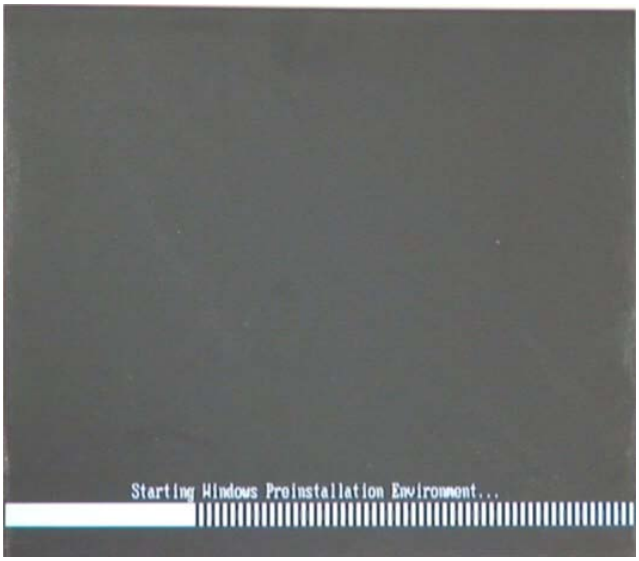


Figure B-6: Launching the Recovery Tool

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

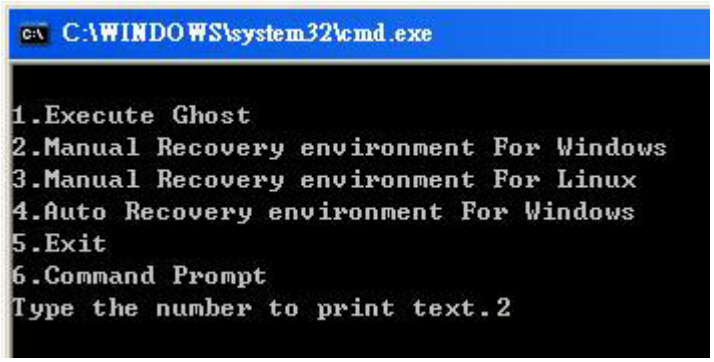


Figure B-7: Manual Recovery Environment for Windows

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

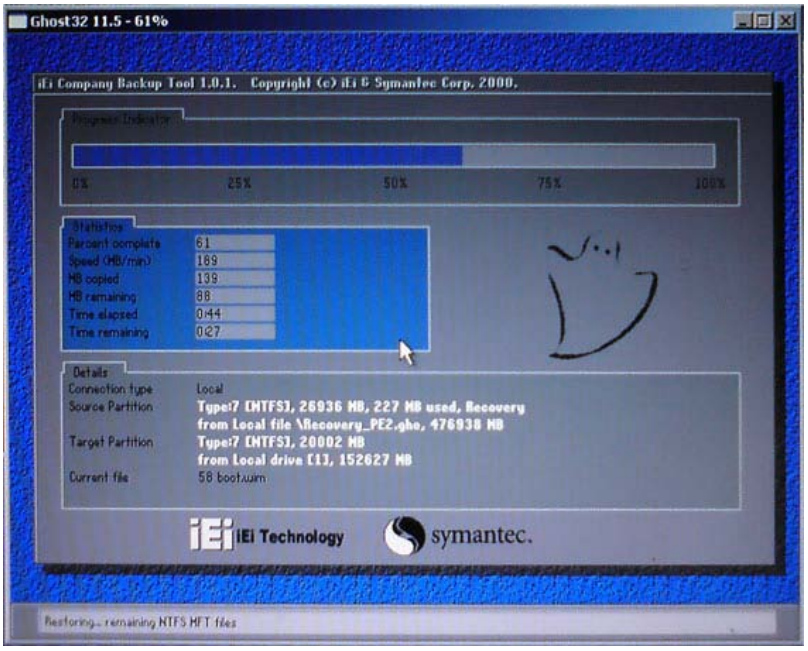


Figure B-8: Building the Recovery Partition

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

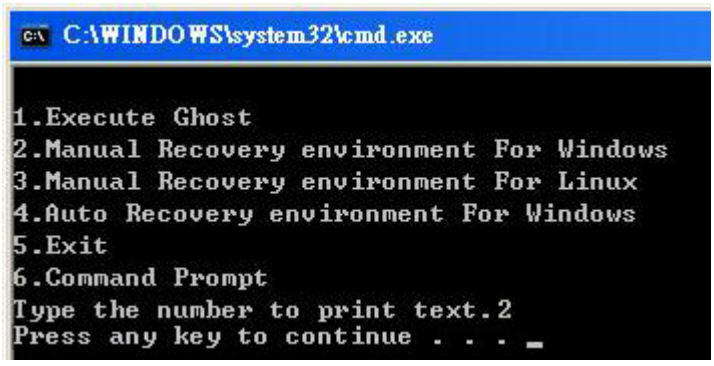


Figure B-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

B.2.5 Create Factory Default Image

NOTE:

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

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

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

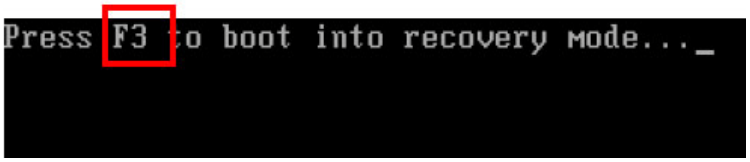


Figure B-10: Press F3 to Boot into Recovery Mode

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

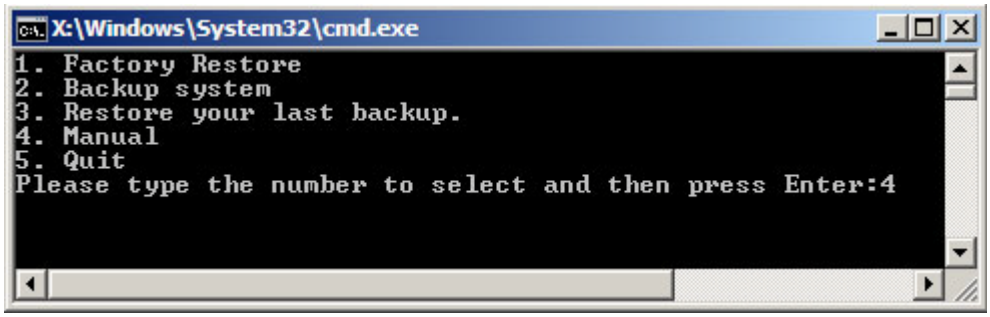


Figure B-11: Recovery Tool Menu

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

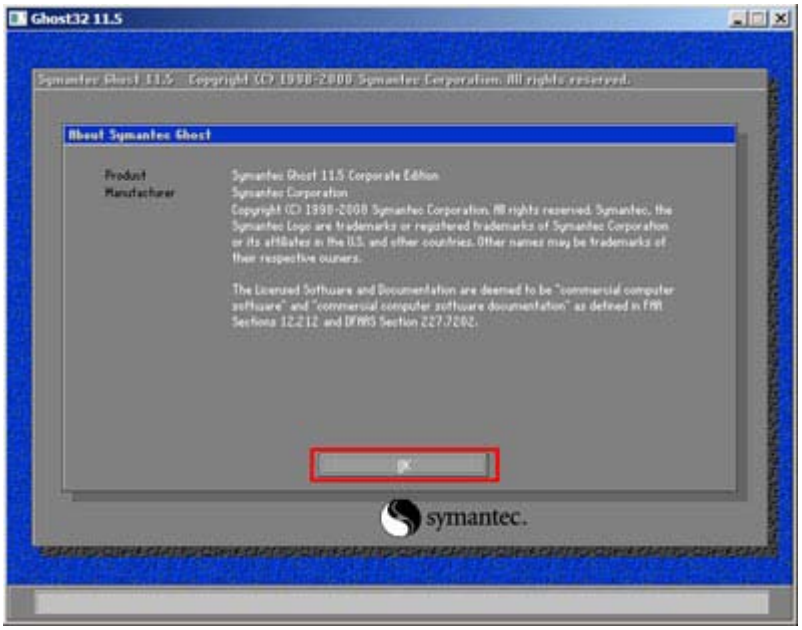


Figure B-12: About Symantec Ghost Window

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

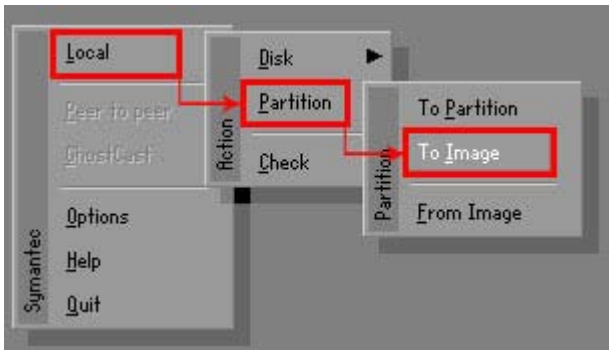


Figure B-13: Symantec Ghost Path

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

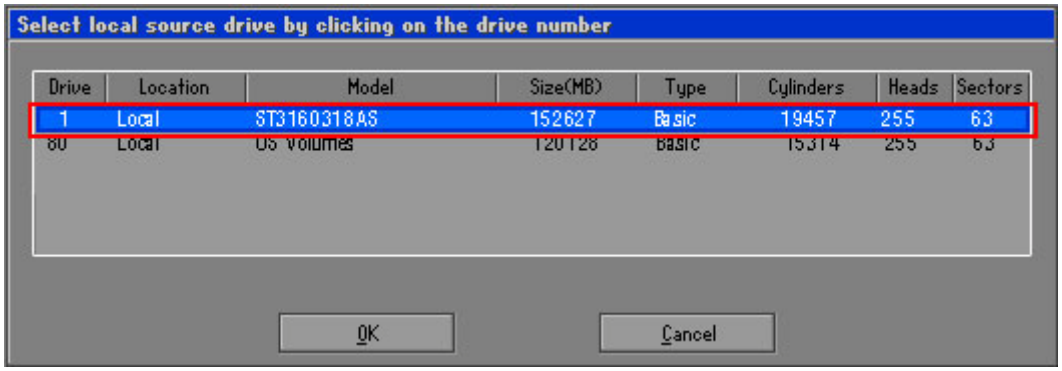


Figure B-14: Select a Local Source Drive

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

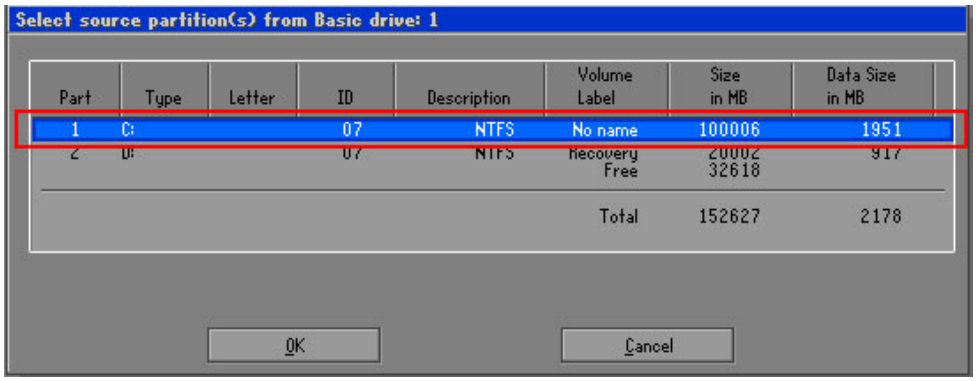


Figure B-15: Select a Source Partition from Basic Drive

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

WARNING:

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

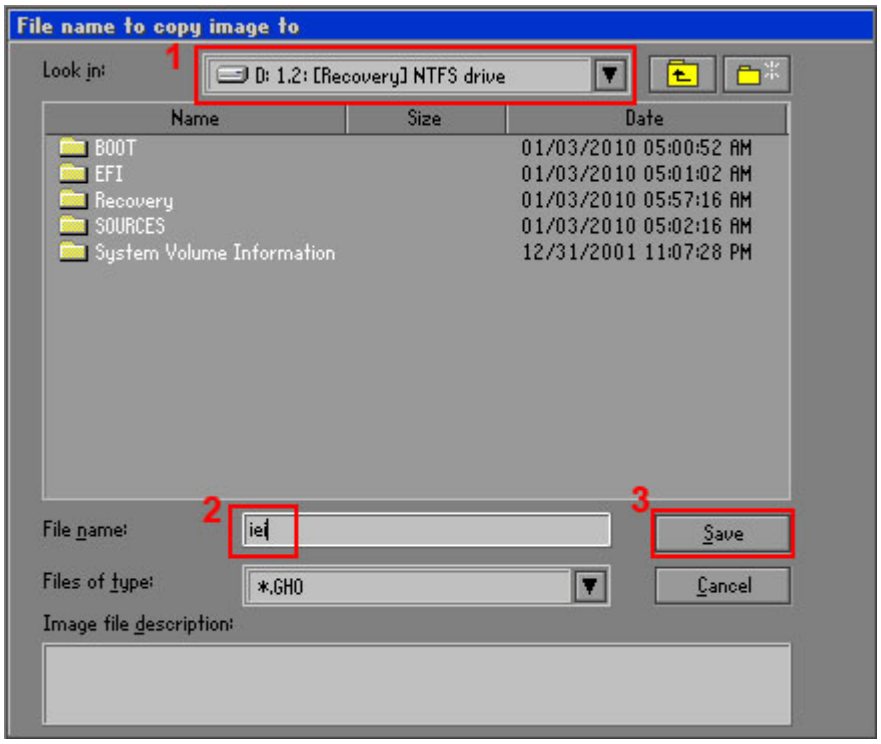


Figure B-16: File Name to Copy Image to

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

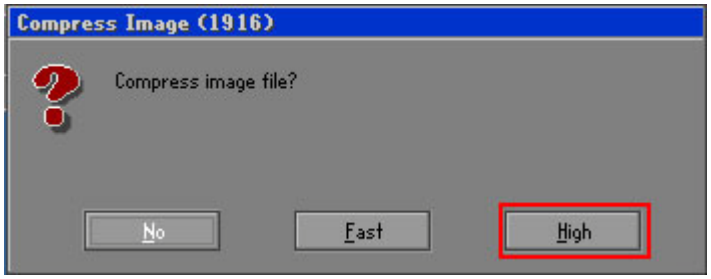


Figure B-17: Compress Image

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

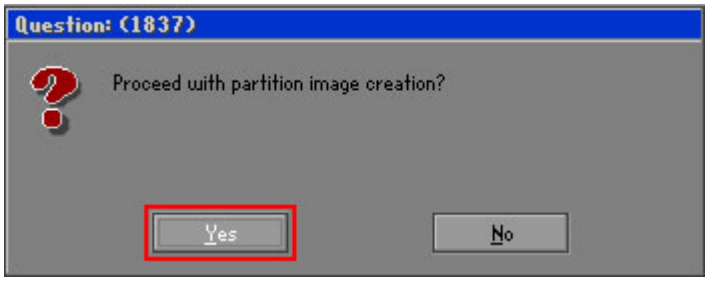


Figure B-18: Image Creation Confirmation

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

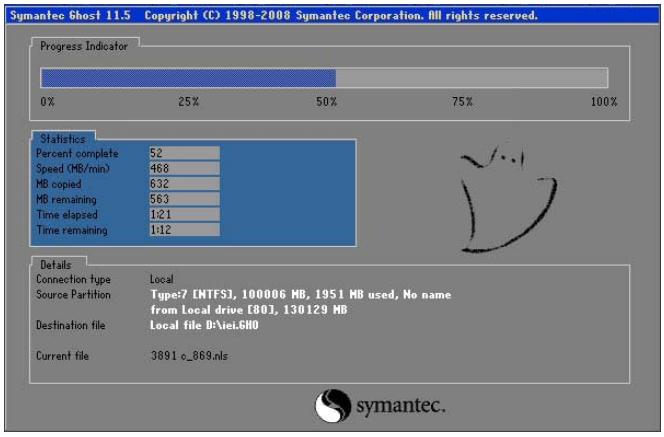


Figure B-19: Image Creation Complete

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

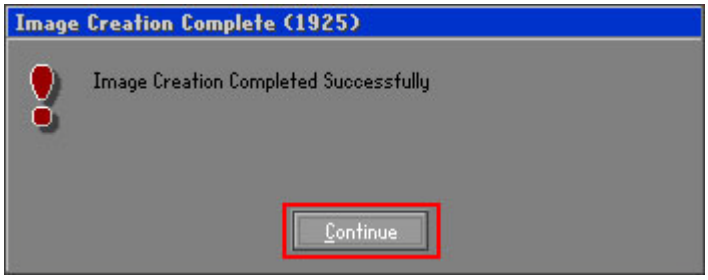


Figure B-20: Image Creation Complete

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

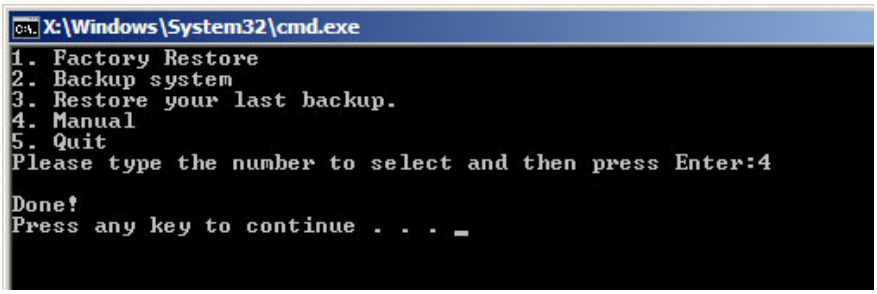


Figure B-21: Press Any Key to Continue

B.3 Auto Recovery Setup Procedure

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

CAUTION:

The 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!

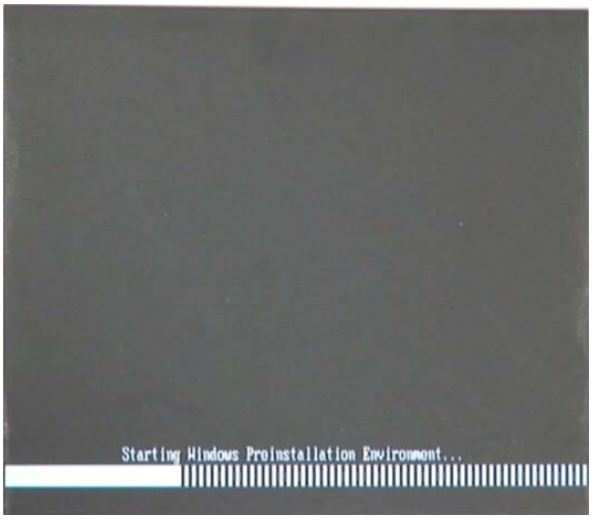


Figure B-23: Launching the Recovery Tool

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

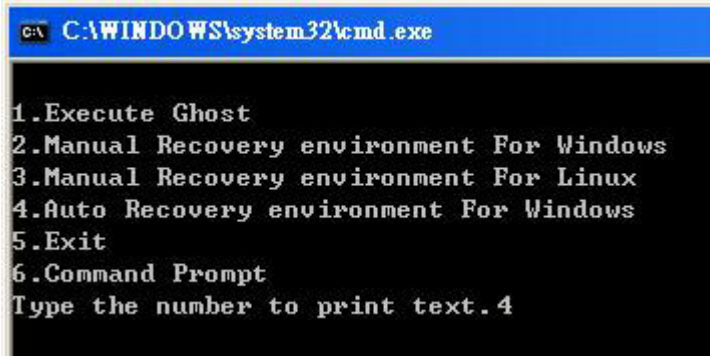


Figure B-24: Auto Recovery Environment for Windows

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.

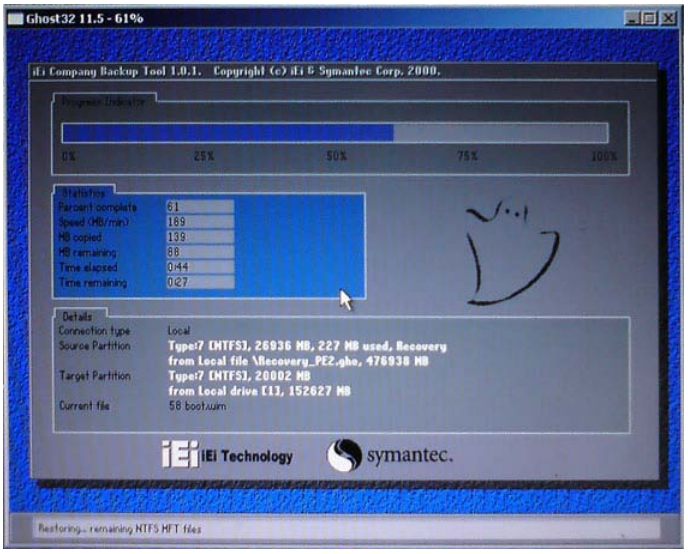


Figure B-25: Building the Auto Recovery Partition

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**).

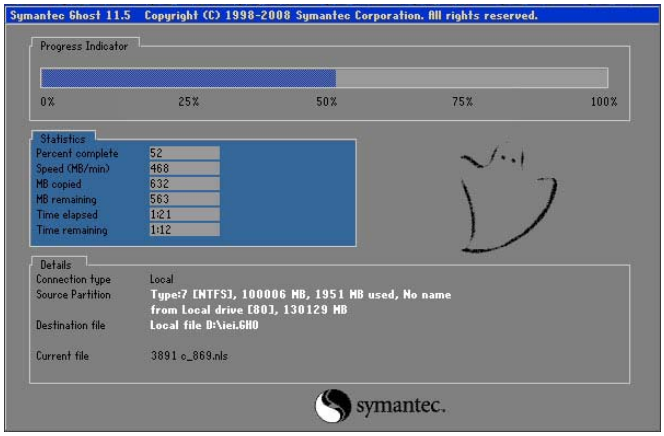


Figure B-27: Image Creation Complete

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

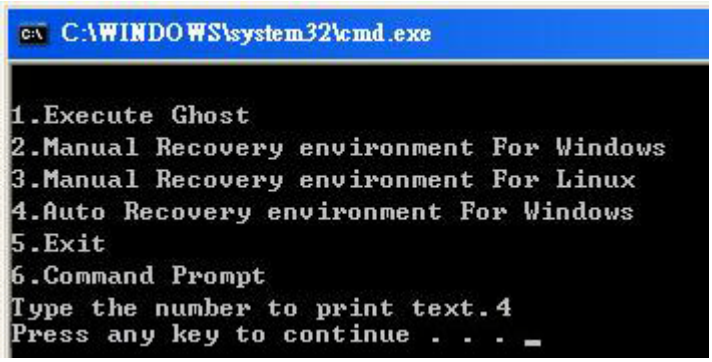
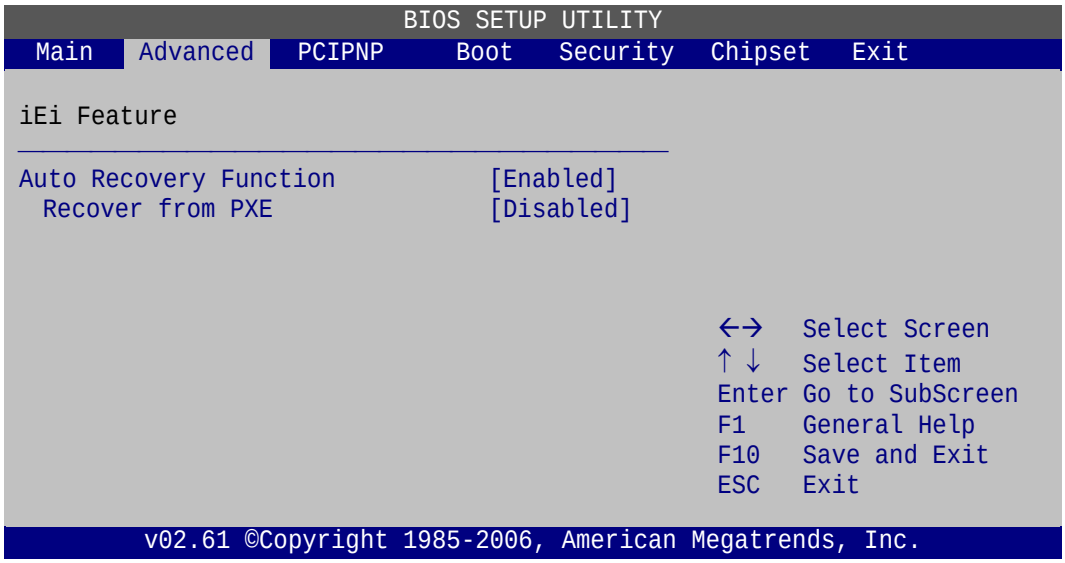


Figure B-28: Press any key to continue

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**).



BIOS Menu 26: 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.

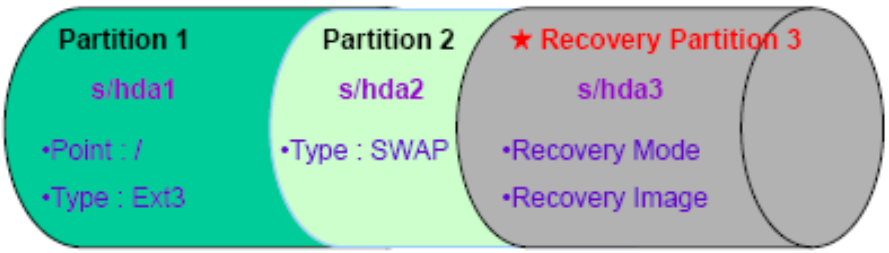


Figure B-29: Partitions for Linux

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.

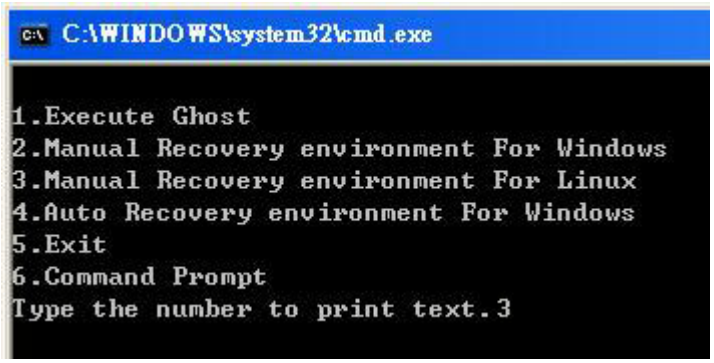


Figure B-30: Manual Recovery Environment for Linux

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

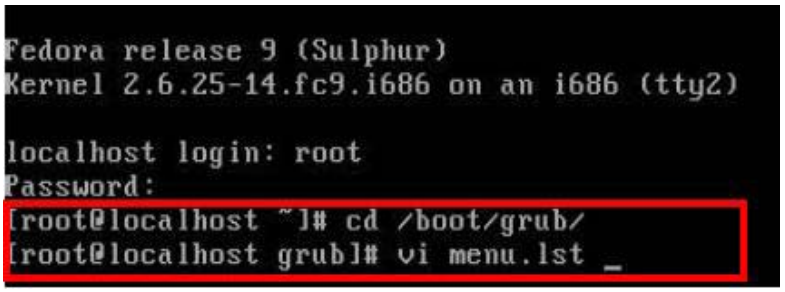
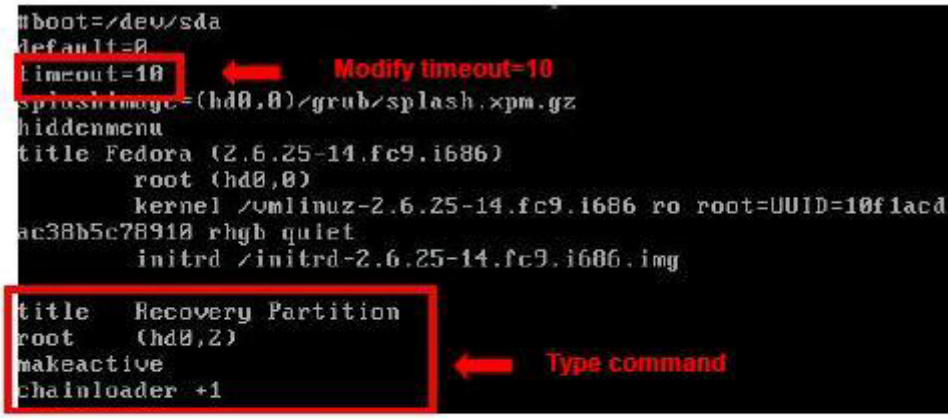


Figure B-31: Access menu.lst in Linux (Text Mode)

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



- Type command:

  title Recovery Partition

  root (hd0,2)

  makeactive

  chainloader +1

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

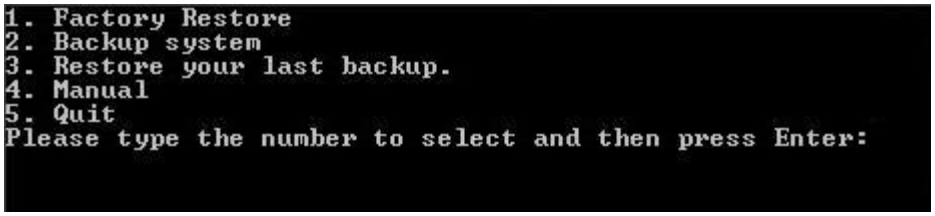


Figure B-32: Recovery Tool Menu

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.

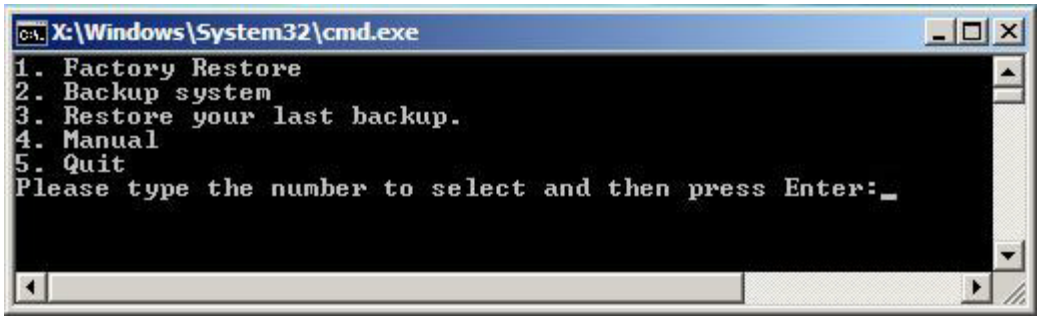


Figure B-33: Recovery Tool Main Menu

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.

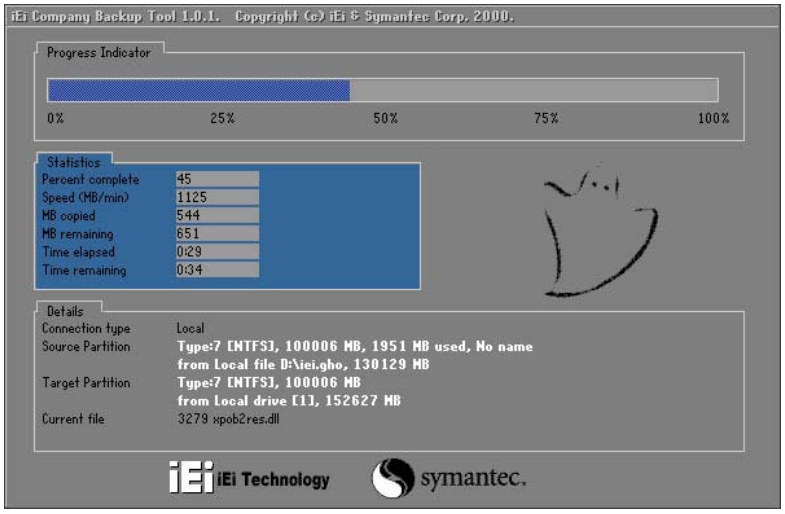


Figure B-34: Restore Factory Default

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

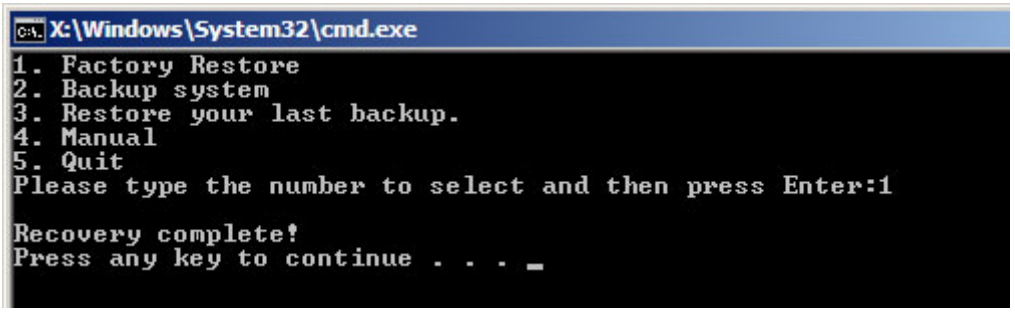


Figure B-35: Recovery Complete Window

B.5.2 Backup System

To backup the system, please follow the steps below.

Step 4: Type <**2**> and press <**Enter**> in the main menu.

Step 5: 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.

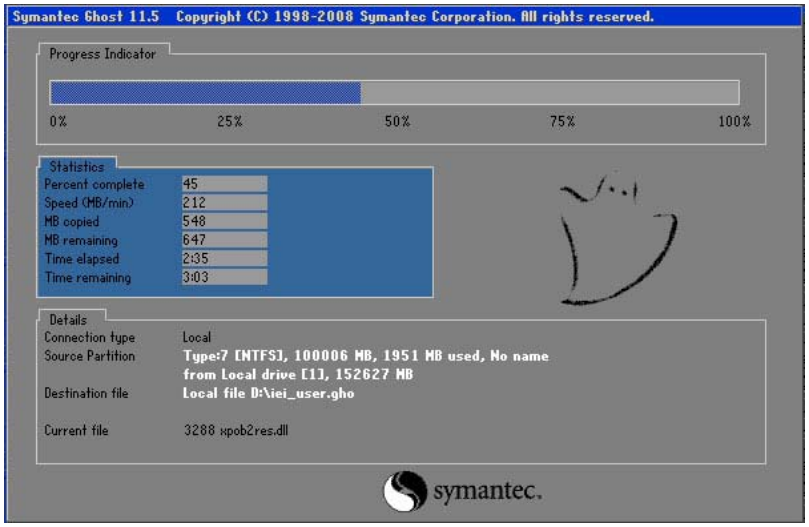


Figure B-36: Backup System

Step 6: The screen shown in **Figure B-37** appears when system backup is complete. Press any key to reboot the system.

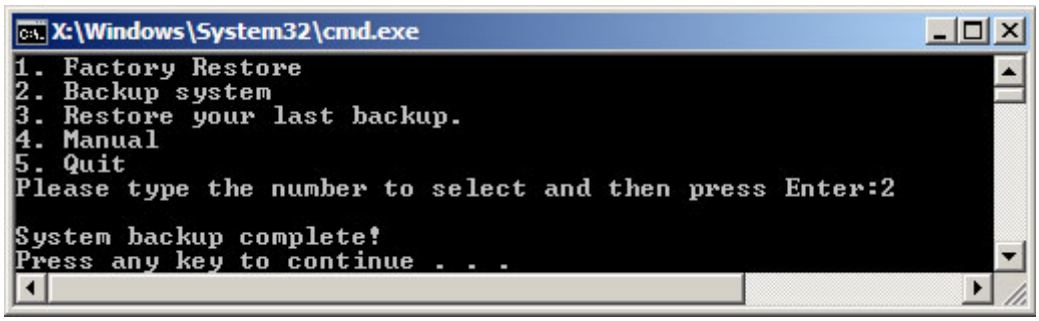


Figure B-37: System Backup Complete Window

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).

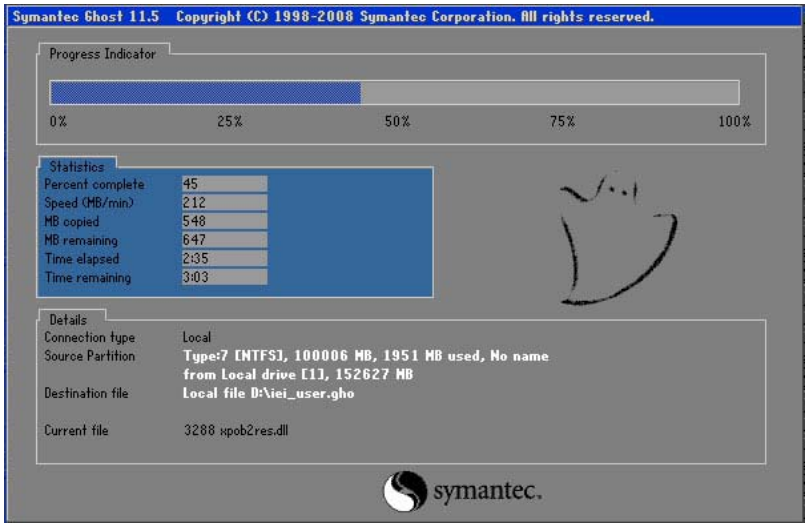


Figure B-38: Restore Backup

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

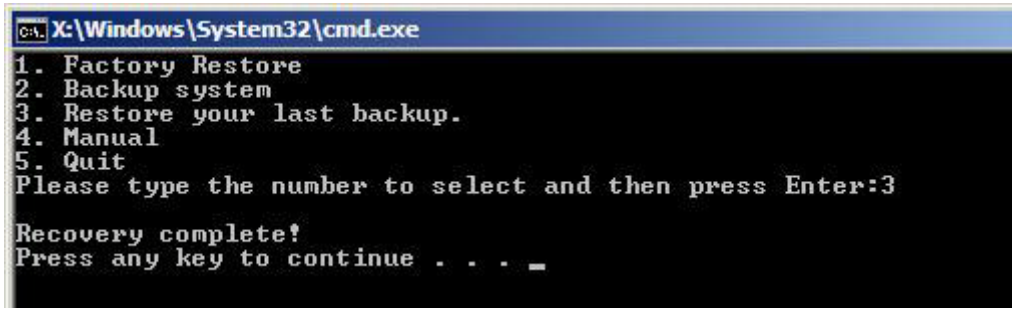


Figure B-39: Restore System Backup Complete Window

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.

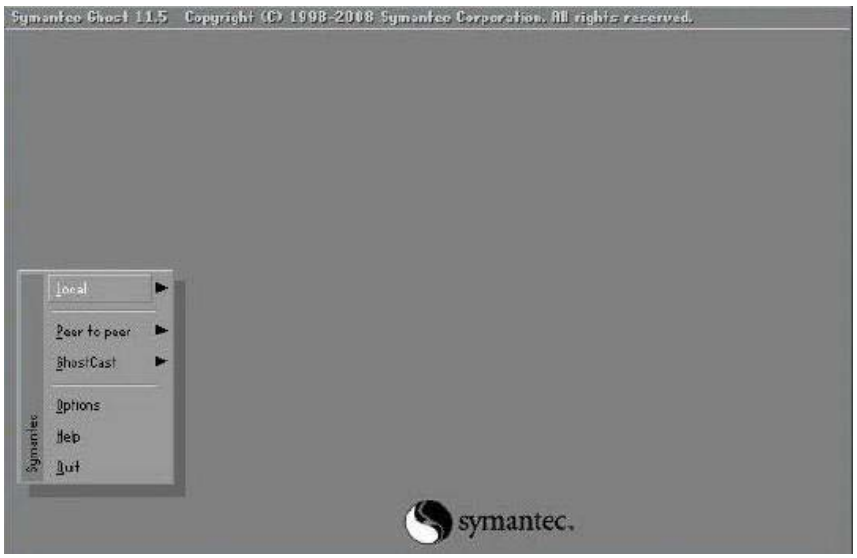
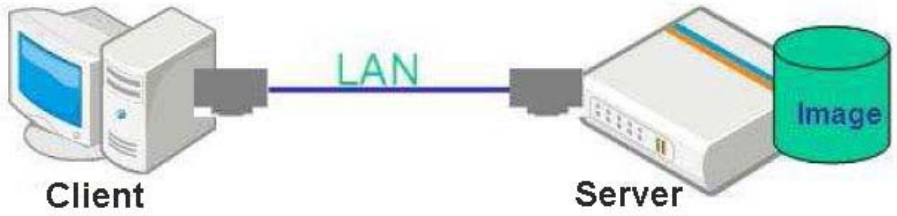


Figure B-40: Symantec Ghost Window

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:

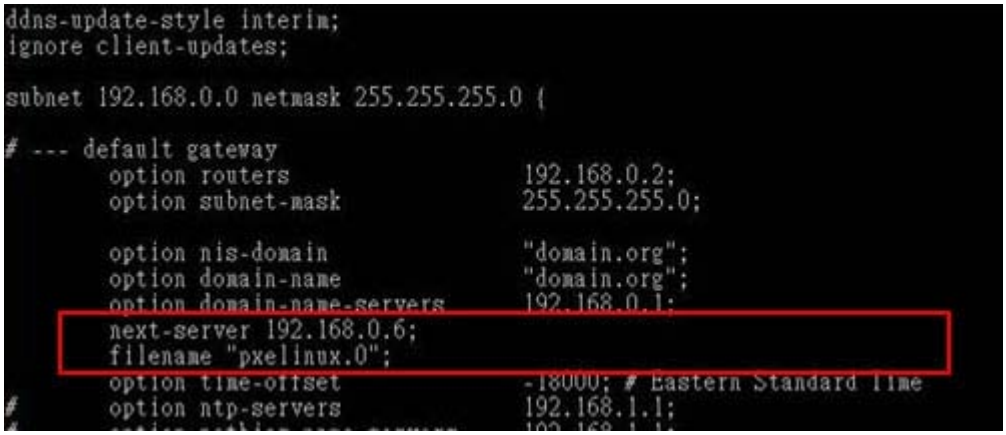
#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

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

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

#vi /etc/dhcpd.conf



Debian

#vi /etc/dhcpd.conf

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

next-server PXE server IP address;

filename “pxelinux.0”;

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

subnet 192.168.0.0 netmask 255.255.255.0 {

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

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

B.6.2 Configure TFTP Settings

Step 1: Install the tftp, httpd and syslinux.

#yum install tftp-server httpd syslinux (CentOS)

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

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

CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

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

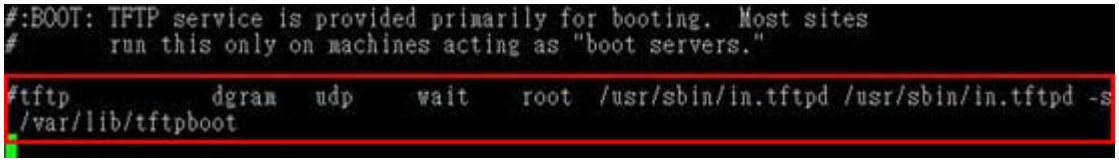
```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable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

Debian

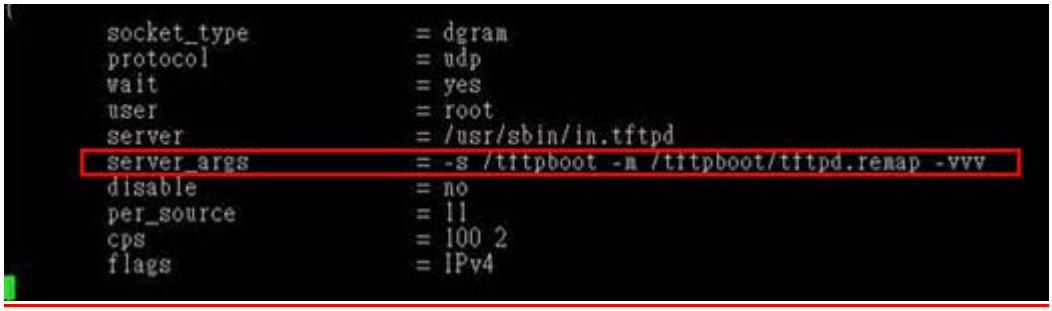
Replace the TFTP settings from “inetd” to “xinetd” and annotate the “inetd” by adding “#”.

#vi /etc/inetd.conf

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



#vi /etc/xinetd.d/tftp



B.6.3 Configure One Key Recovery Server Settings

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

Step 2: Extract the recovery package to /.

#cp RecoveryR10.tar.bz2 /

#cd /

#tar –xvjf RecoveryR10.tar.bz2

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

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

B.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

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.

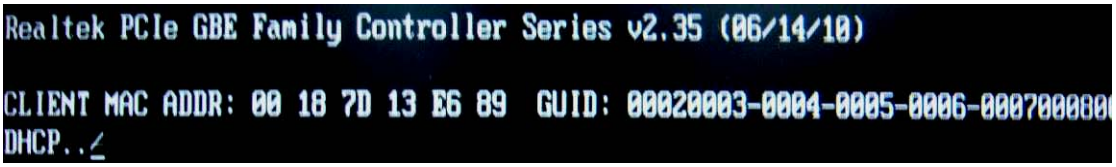
Boot Option #2 → select the boot from LAN option.

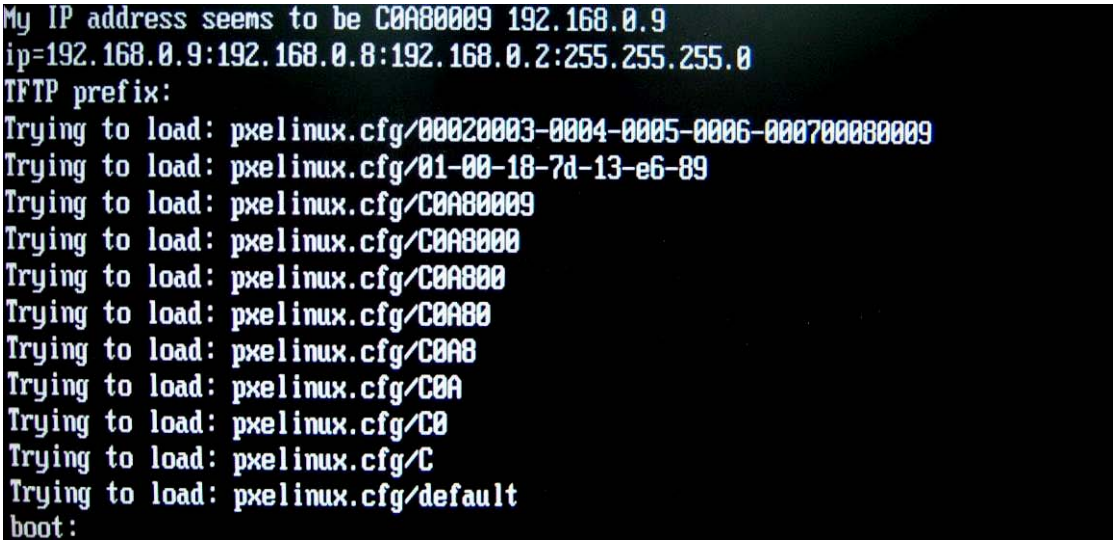
Step 3: Save changes and exit BIOS menu.

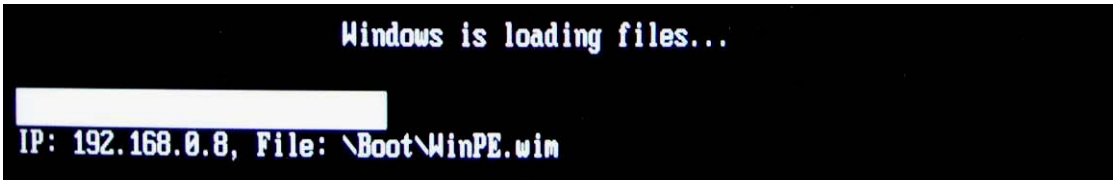
Exit → **Save Changes and Exit**

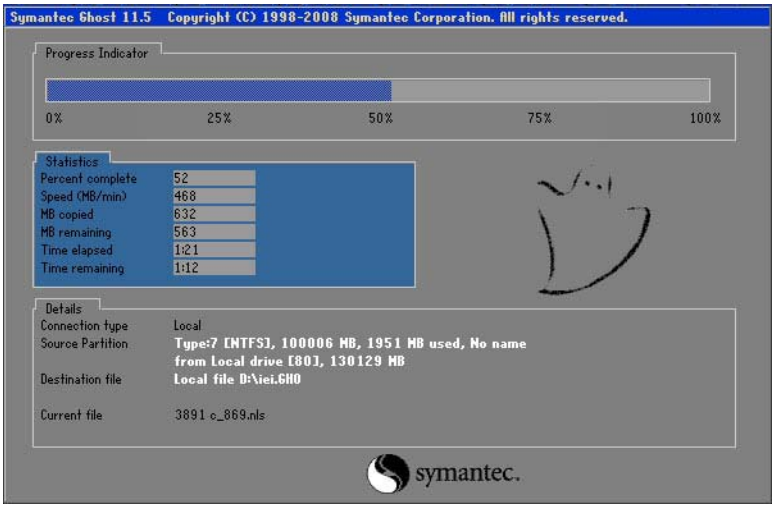
Step 4: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

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.

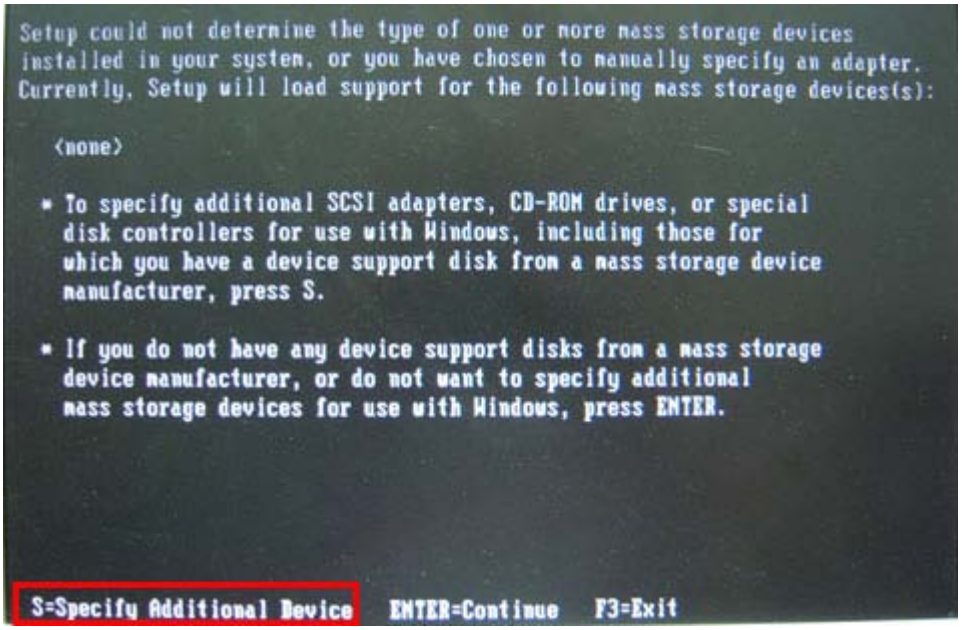
Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

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

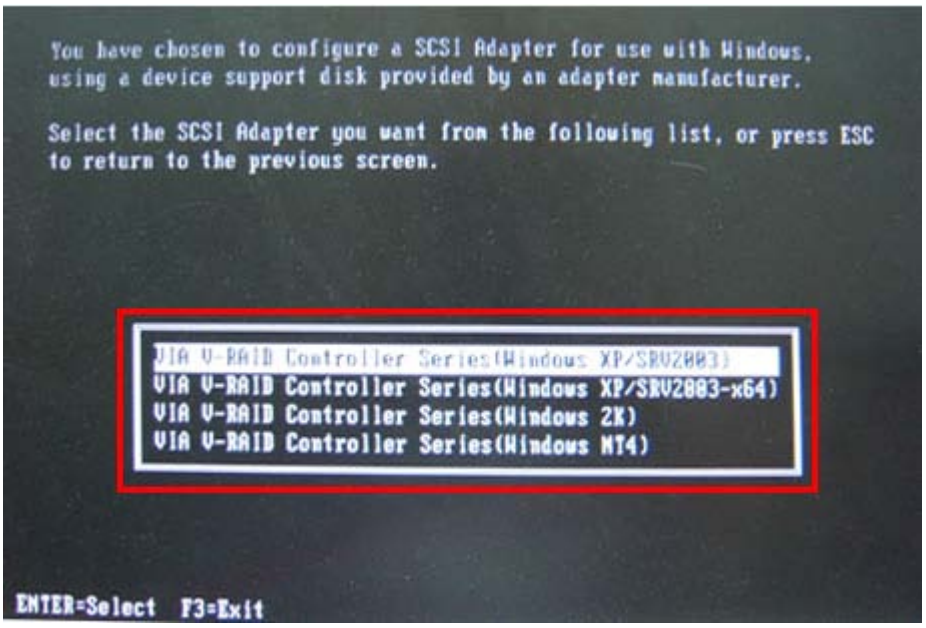
Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

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。						