



IEI Technology Corp.



MODEL:
IMB-H610

Micro ATX Motherboard supports LGA1155 Intel® Core™
i7/i5/i3/Pentium®/Celeron® CPU per Intel® H61, DDR3, VGA/DVI-D,
dual Realtek PCIe GbE, USB 2.0, COM, SATA 3Gb/s,
HD Audio and RoHS

User Manual

Rev. 1.01 –March 31, 2012



Revision

Date	Version	Changes
March 31, 2012	1.01	Update Section 2.4: Optional Items
October 14, 2011	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction



Figure 1-1: IMB-H610

The IMB-H610 is a Micro-ATX motherboard. It accepts a LGA1155 Intel® Core™ i7/i5/i3 quad/dual, Pentium® dual, Celeron® dual/single core processor and supports two 240-pin 1333/1066 MHz dual-channel DDR3 DIMM modules up to 16 GB.

The integrated Intel® H61 System Chipset supports two GbE LAN ports through dual Realtek RTL8111E PCIe GbE controllers (LAN1 with ASF 2.0 supported). The IMB-H610 includes a VGA and DVI-D port. Expansion and I/O include one PCIe x16 slot, three PCIe x1 slots, four USB 2.0 ports on the rear panel, six USB 2.0 ports by pin header, four SATA 3Gb/s connectors and one external PS/2 KB/MS port. Serial device connectivity is provided by one internal RS-422/485 connector, two external RS-232 and three internal RS-232 connectors for IMB-H610A or seven internal RS-232 connectors for IMB-H610B.

1.2 Model Variations

The model variations of the IMB-H610 series are listed below.

Models	CPU	Serial Ports
IMB-H610A-R10	Intel® Core™ i3/i5/i7, Pentium®, Celeron® processor	Six
IMB-H610B-R10	Intel® Core™ i3/i5/i7, Pentium®, Celeron® processor	Ten

Table 1-1: Model Variations

IMB-H610 Micro-ATX Motherboard

1.3 Benefits

Some of the IMB-H610 motherboard benefits include:

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

1.4 Features

Some of the IMB-H610 motherboard features are listed below:

- LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron® processor supported
- Up to 16 GB 1333 MHz dual-channel DDR3 SDRAM
- Intel® HD Graphics technology integrates high-performance graphics and media processing
- TPM V1.2 hardware security provided by the TPM module
- IEI One Key Recovery solution allows you to create rapid OS backup and recovery

1.5 Connectors

The connectors on the IMB-H610 are shown in the figure below.

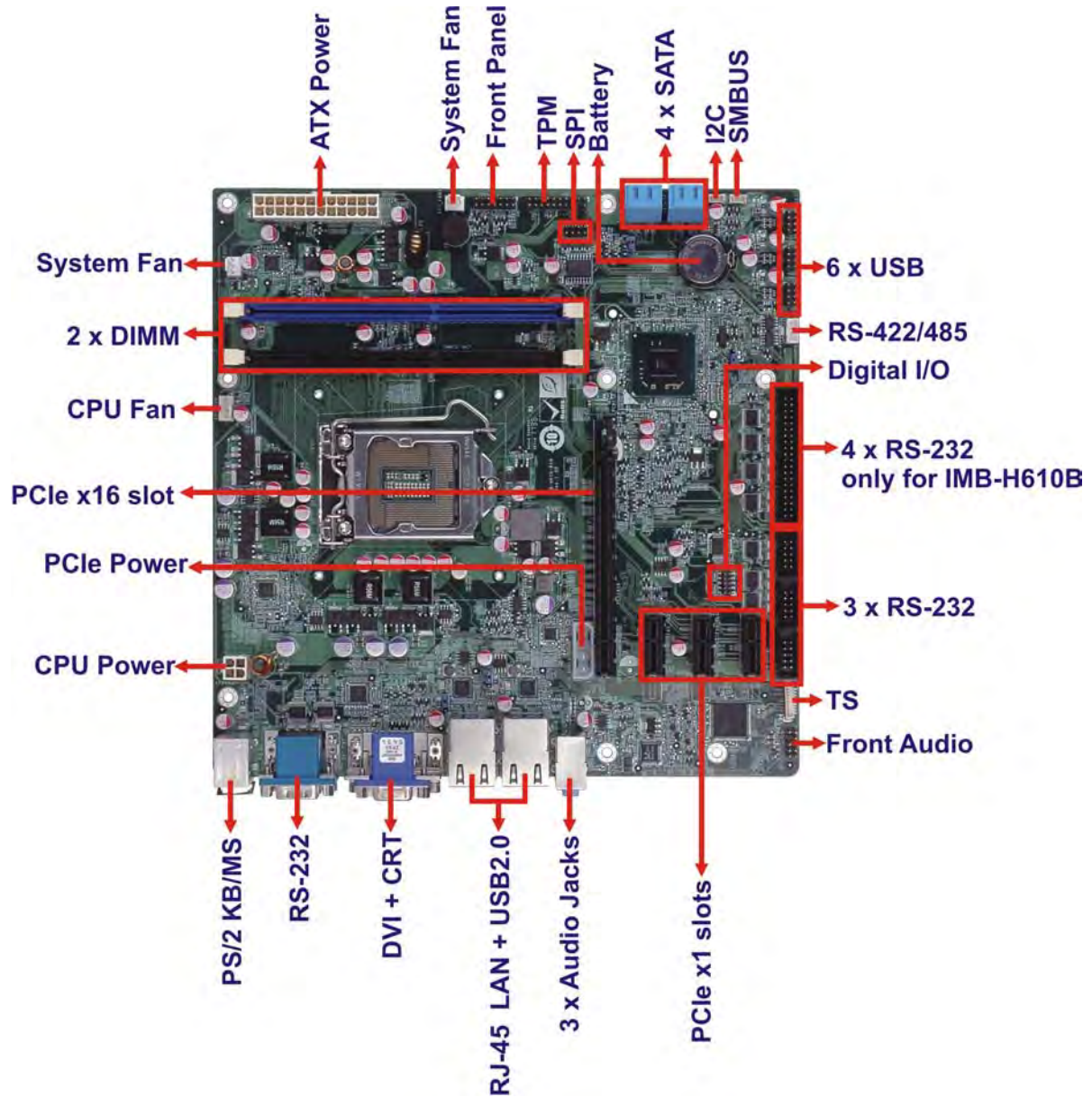


Figure 1-2: Connectors

IMB-H610 Micro-ATX Motherboard

1.6 Dimensions

The main dimensions of the IMB-H610 are shown in the diagram below.

- **Length:** 244 mm
- **Width:** 244 mm

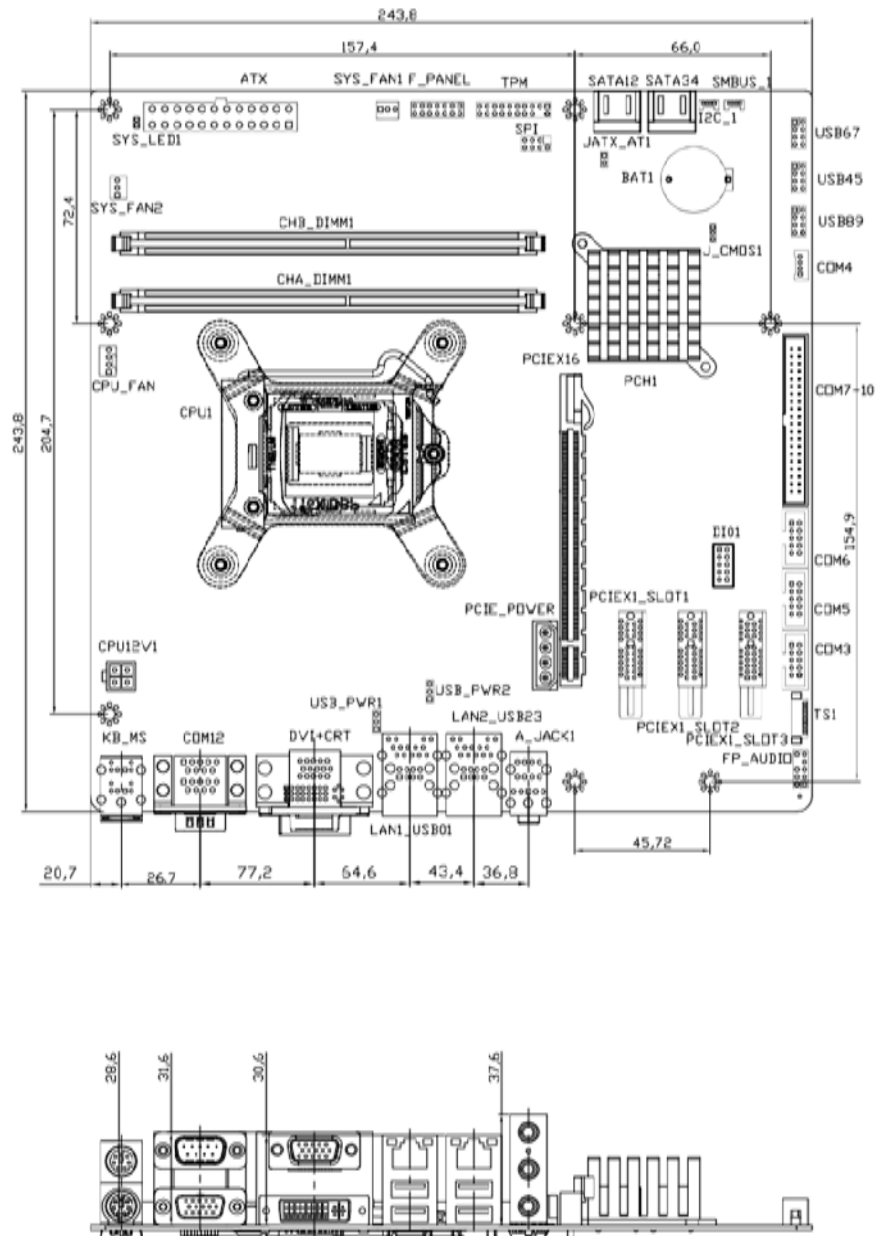


Figure 1-3: IMB-H610 Dimensions (mm)

1.+ Data Flow

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

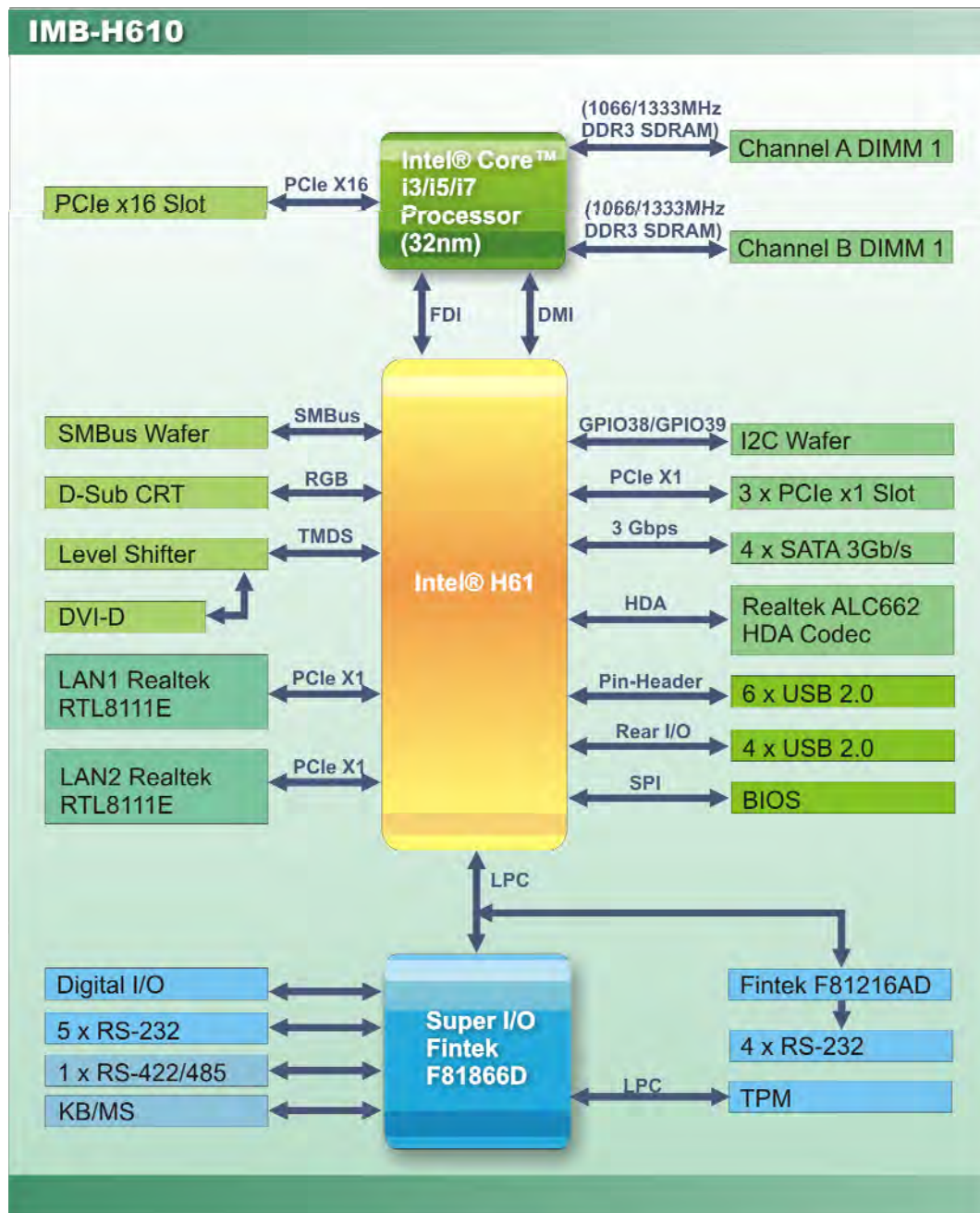


Figure 1-4: Data Flow Diagram

IMB-H610 Micro-ATX Motherboard

1.8 Technical Specifications

IMB-H610 technical specifications are listed below.

Specification/Model	IMB-H610
Form Factor	Micro-ATX
CPU Supported	LGA1155 socket supports Intel® Core™ i7/i5/i3 quad/dual, Pentium® dual, Celeron® dual/single core processor
System Chipset	Intel® H61
Graphic Engine	Intel® HD Graphics 2000/3000 (based on CPU type) Support for DX 10.1 and OpenGL 3.0 Full MPEG2, VC1, AVC Decode
Memory	Two 240-pin 1333/1066 MHz dual-channel unbuffered DDR3 SDRAM DIMMs supported (system max. 16 GB)
Audio	Realtek ALC662 HD Audio codec (Line-in, Line-out, Mic)
BIOS	UEFI BIOS
Digital I/O	8-bit digital I/O, 4-bit input/4-bit output
Ethernet Controllers	Dual Realtek RTL8111E PCIe GbE controllers (LAN1 with ASF 2.0 support)
Super I/O Controller	Fintek F81866
Watchdog Timer	Software Programmable supports 1~255 sec system reset
Expansion	
PCIe	One PCIe x16 slot Three PCIe x1 slots
I/O Interface Connectors	
Audio Connectors	Three external audio jack (Line-in, Line-out, Mic)
Display Port	One VGA integrated in Intel® H61 One DVI-D integrated in Intel® H61
Ethernet	Two RJ-45 ports
Keyboard/Mouse	One external PS/2 KB/MS port

Specification/Model	IMB-H610
TPM	One 20-pin header
Front Audio	One 10-pin header
Front Panel	One 14-pin header
SMBus	One 4-pin wafer
I2C	One 4-pin wafer
CPU	One 4-pin CPU fan connector Two 3-pin system fan connectors
Serial Ports	Two external RS-232 via DB-9 male connectors Three RS-232 via internal 10-pin headers Four RS-232 via internal 40-pin box headers for IMB-H610B One RS-422/485 via internal 4-pin header
USB ports	Four external USB 2.0 ports by rear IO Six internal USB 2.0 ports via three 8-pin headers
Serial ATA	Four SATA 3Gb/s connectors
Environmental and Power Specifications	
Power Supply	ATX / AT power supply
Power Consumption	3.3V@1.75A, 5V@6.61A, Vcore@3.68A, 12V@0.09A, 5VSB@0.12 A (Intel® 2.60GHz CPU with two 1333 MHz 4GB DDR3 DIMMs)
Operating Temperature	-10°C ~ 60°C
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight GW/NW	1200 g / 680 g

Table 1-2: IMB-H610 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions



WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMB-H610 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.

IMB-H610 Micro-ATX Motherboard







2.3 Packing List



NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMB-H610 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMB-H610 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMB-H610	
4	SATA cable (P/N: 32801-000703-200-RS))	
1	I/O shielding (P/N: 45014-0008C0-00-RS)	
1	Mini jumper pack (2.54mm)	
1	Utility CD	
1	One Key Recovery CD	


Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-Port USB cable with bracket (P/N: 19800-003100-200-RS)	
RS-422/485 cable (P/N: 32205-003800-100-RS)	
SATA power cable (P/N: 32102-000100-200-RS)	
High-performance LGA1155/LGA1156 cooler kit, 1U Chassis compatible, 73W (P/N: CF-1156A-RS)	
High-performance LGA1155/LGA1156 cooler kit, 95W (P/N: CF-1156B-RS)	
LGA1155/LGA1156 cooler kit, 1U Chassis compatible, 45W (P/N: CF-1156C-RS)	

IMB-H610 Micro-ATX Motherboard






Item and Part Number	Image
LGA1155/LGA1156 cooler kit, 1U Chassis compatible, 65W (P/N: CF-1156D-RS)	
Quad-port RS-232 cable without bracket for IMB-H610B (400/400/400/400MM) (P/N: 32205-001203-100-RS)	
RS232 cable (P/N: 19800-000114-RS)	
Dual-port RS232 cable (P/N: 19800-003600-100-RS)	
20-pin Infineon TPM module, SW management tool, firmware V3.17 (P/N: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

IMB-H610 Micro-ATX Motherboard

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-H610 Layout

The figures below show all the connectors and jumpers.

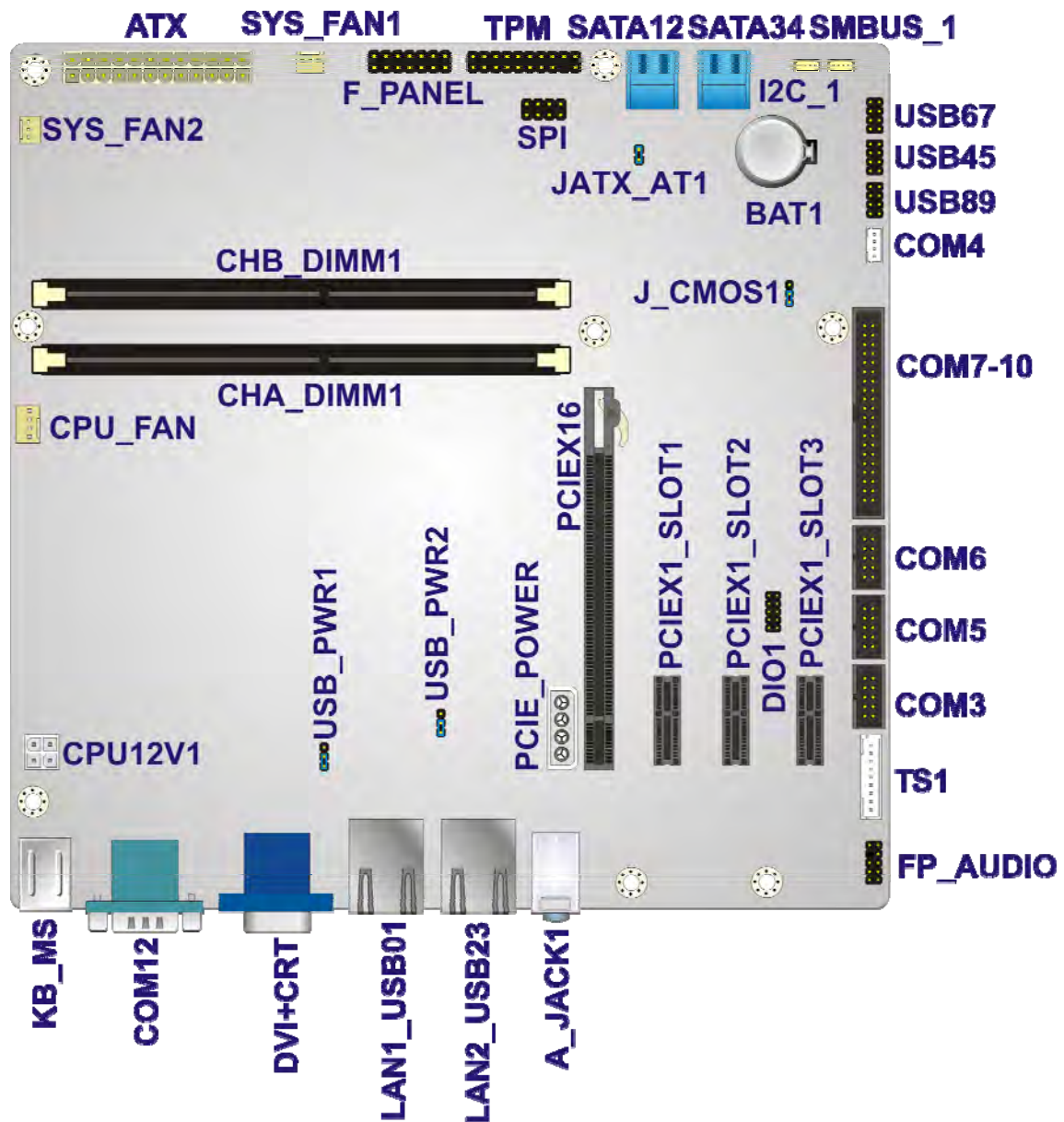


Figure 3-1: Connectors and Jumpers

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	ATX
Battery connector	Battery holder	BAT1
CPU fan connector	4-pin wafer	CPU_FAN
CPU power connector	4-pin Molex	CPU12V1
DDR3 DIMM slots	DDR3 DIMM slot	CHA_DIMM1, CHB_DIMM1
Debug port connector	9-pin header	TS1
Digital I/O connector	10-pin header	DIO1
Front panel audio connector	10-pin header	FP_AUDIO
Front panel connector	14-pin header	F_PANEL
I2C connector	4-pin wafer	I2C_1
PCIe power connector	4-pin Molex	PCIE_POWER
PCIe x16 slot	PCIe x16 slot	PCIEX16
PCIe x1 slots	PCIe x1 slot	PCIEX1_SLOT1, PCIEX1_SLOT2, PCIEX1_SLOT3,
SATA 3Gb/s drive connectors	14-pin SATA connector	SATA12, SATA34
Serial port connector, RS-422/485	4-pin wafer	COM4
Serial port connectors, RS-232	10-pin box header,	COM3, COM5, COM6
Serial port connectors, RS-232	40-pin box header	COM7-10
SMBus connector	4-pin wafer	SMBUS_1
SPI connector	8-pin header	SPI

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Connector	Type	Label
System fan connectors	3-pin wafer	SYS_FAN1, SYS_FAN2
TPM connector	20-pin header	TPM
USB connectors	8-pin header	USB45, USB67, USB89

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	A_JACK1
Ethernet and USB connectors	RJ-45, USB	LAN1_USB01, LAN2_USB23
Keyboard/Mouse	Dual PS/2	KB_MS
RS-232 serial port connector	DB-9 male	COM12
VGA and DVI connector	15-pin female, 24-pin header	DVI+CRT

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMB-H610.

3.2.1 ATX Power Connector

CN Label:	ATX
CN Type:	24-pin ATX (2x12)
CN Location:	See Figure 3-2
CN Pinouts:	See Table 3-3

The ATX power connector connects to an ATX power supply.

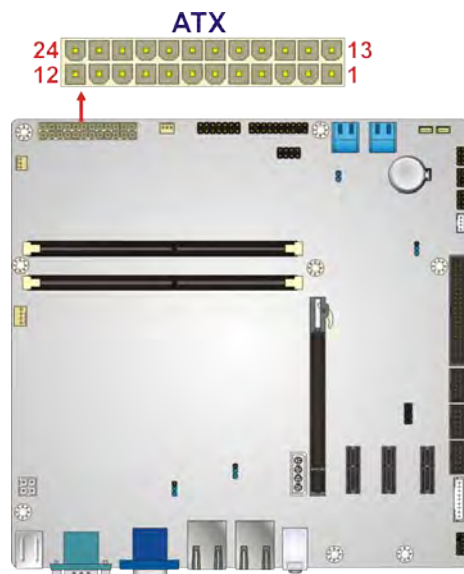


Figure 3-2: ATX Power Connector Location

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

Table 3-3: ATX Power Connector Pinouts

3.2.2 Battery Connector

CN Label: BAT1

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CN Type: Battery holder

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

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

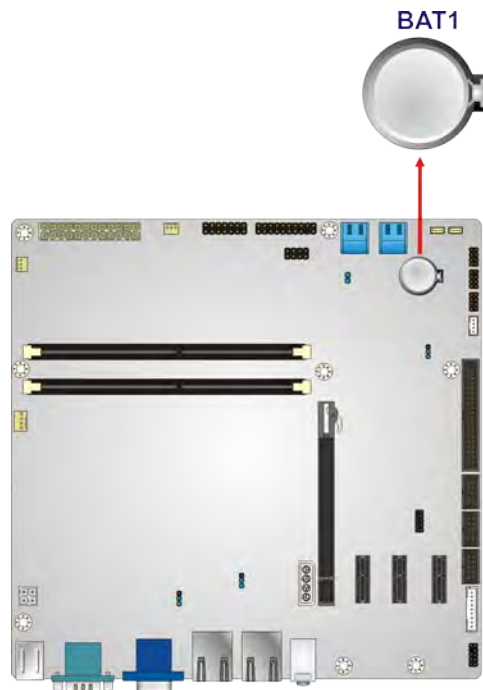


Figure 3-3: Battery Connector Location

3.2.3 CPU Fan Connector

CN Label: CPU_FAN

CN Type: 4-pin wafer

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

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

The CPU fan connector attaches to a CPU cooling fan.

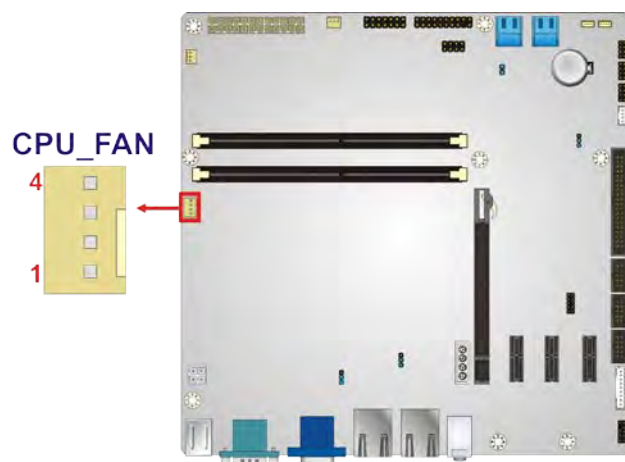


Figure 3-4: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	FANIO1
4	PWM

Table 3-4: CPU Fan Connector Pinouts

3.2.4 CPU Power Connector

CN Label: CPU12V1
 CN Type: 4-pin Molex
 CN Location: See **Figure 3-5**
 CN Pinouts: See **Table 3-5**

The CPU power connector provides power to the CPU.

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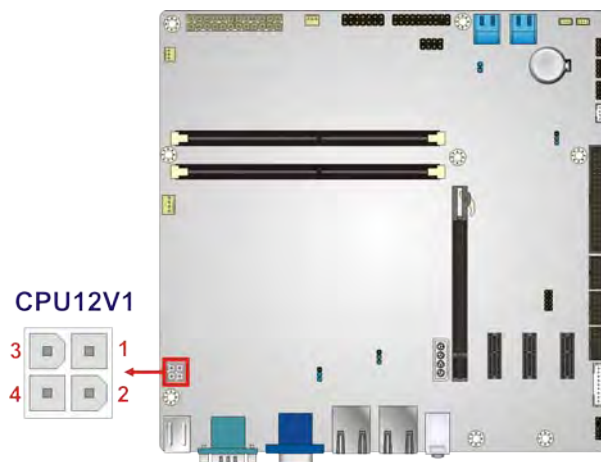


Figure 3-5: CPU Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 3-5: CPU Power Connector Pinouts

3.2.5 DDR3 DIMM Slots

CN Label: CHA_DIMM1, CHB_DIMM1

CN Type: DDR3 DIMM slot

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

The DDR3 DIMM slots are for DDR3 DIMM memory modules.

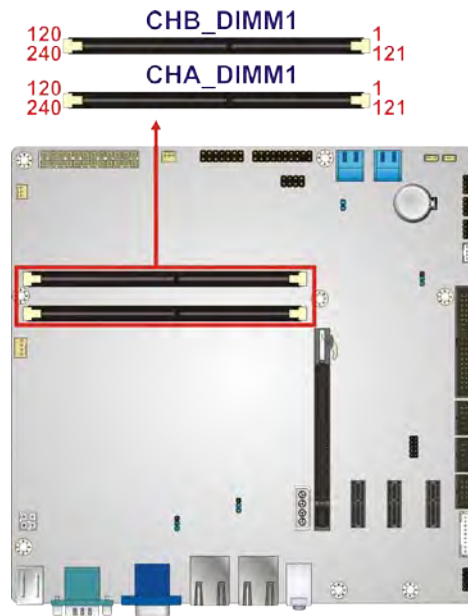


Figure 3-6: DDR3 DIMM Slot Locations

3.2.6 Debug Port Connector

CN Label:	TS 1
CN Type:	9-pin header
CN Location:	See Figure 3-7
CN Pinouts:	See Table 3-6

The debug port connector is for system debug.

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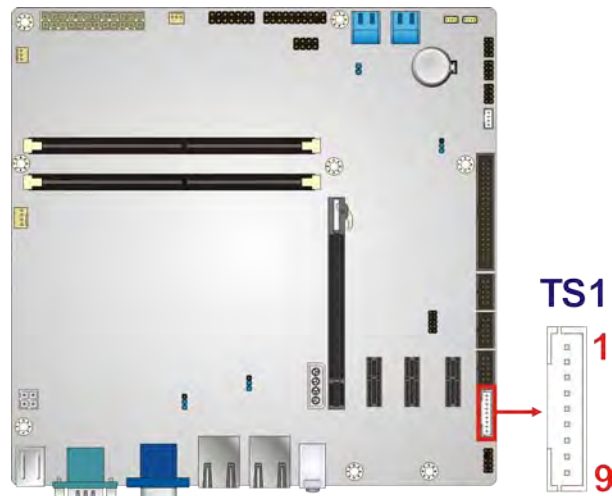


Figure 3-7: Debug Port Connector Location

Pin	Description	Pin	Description
1	RESET#	2	CLOCK
3	GND	4	LPC_AD3
5	LPC_AD2	6	LPC_AD1
7	LPC_AD0	8	LPC_FRAME#
9	NC	10	

Table 3-6: Debug Port Connector Pinouts

3.2.7 Digital I/O Connector

CN Label: DIO1
 CN Type: 10-pin header
 CN Location: See **Figure 3-8**
 CN Pinouts: See **Table 3-7**

The digital I/O connector provides programmable input and output for external devices.
 The digital I/O provides 4-bit output and 4-bit input.

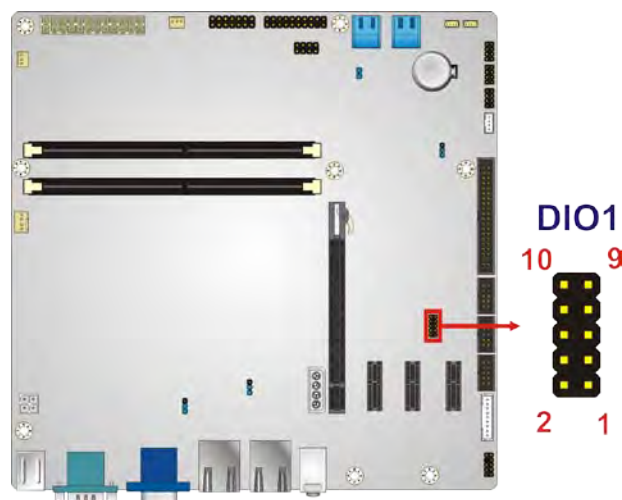


Figure 3-8: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	DGPO3	4	DGPO2
5	DGPO1	6	DGPO0
7	DGPI3	8	DGPI2
9	DGPI1	10	DGPI0

Table 3-7: Digital I/O Connector Pinouts

3.2.8 Front Panel Audio Connector

CN Label:	FP_AUDIO
CN Type:	10-pin header
CN Location:	See Figure 3-9
CN Pinouts:	See Table 3-8

The front panel audio connector connects to speakers, a microphone and an audio input.

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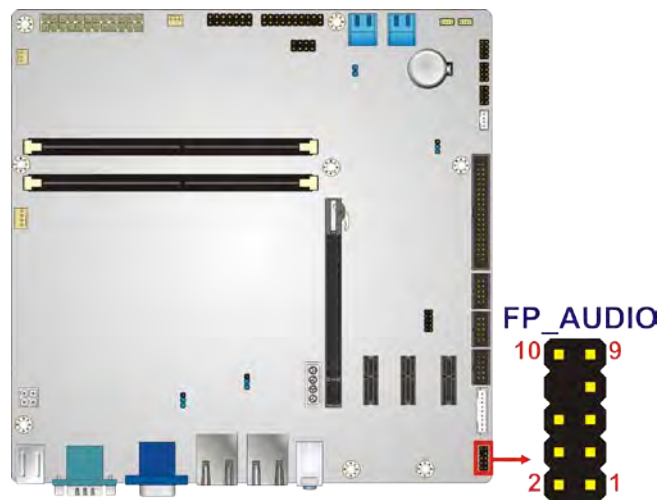


Figure 3-9: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	MIC_L	2	GND
3	MIC_R	4	FP_AUO_DETECT
5	LINE2_R	6	GND
7	F_SENCE	8	
9	LINE2_L	10	GND

Table 3-8: Front Panel Audio Connector Pinouts

3.2.9 Front Panel Connector

CN Label:	F_PANEL
CN Type:	14-pin header
CN Location:	See Figure 3-10
CN Pinouts:	See Table 3-9

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

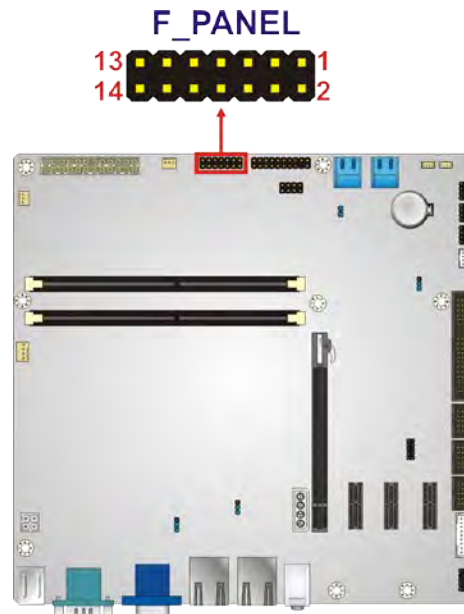


Figure 3-10: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
PWR_LED	1	ACPILED	BUZZER	2	BEEP_PWR
	3	NC		4	NC
	5	GND		6	NC
PWR_BTN	7	PWRBTN_SW#_C		8	PC_BEEP
	9	GND	RESET	10	NC
HDD_LED	11	IDELED		12	EXTRST-
	13	IDELED-		14	GND

Table 3-9: Front Panel Connector Pinouts

3.2.10 I2C Connector

CN Label: I2C_1
 CN Type: 4-pin wafer
 CN Location: See **Figure 3-11**
 CN Pinouts: See **Table 3-10**

The I2C connector is for system debug.

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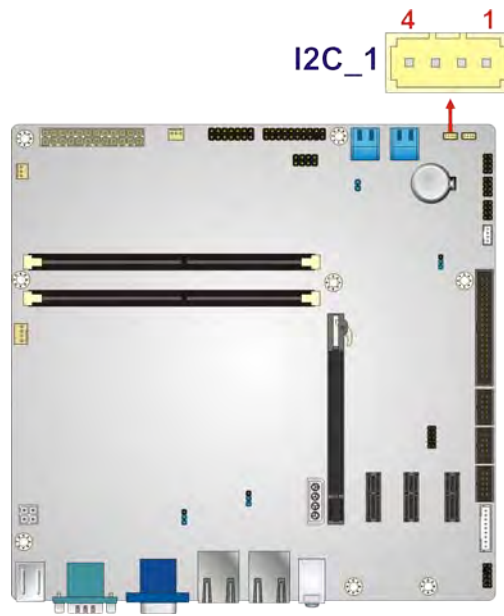


Figure 3-11: I2C Connector Location

Pin	Description
1	+5V_DUAL
2	PCH_GP38_PU
3	PCH_GP39_PU
4	GND

Table 3-10: I2C Connector Pinouts

3.2.11 PCIe Power Connector

CN Label:	PCIE_POWER
CN Type:	4-pin Molex
CN Location:	See Figure 3-12
CN Pinouts:	See Table 3-11

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

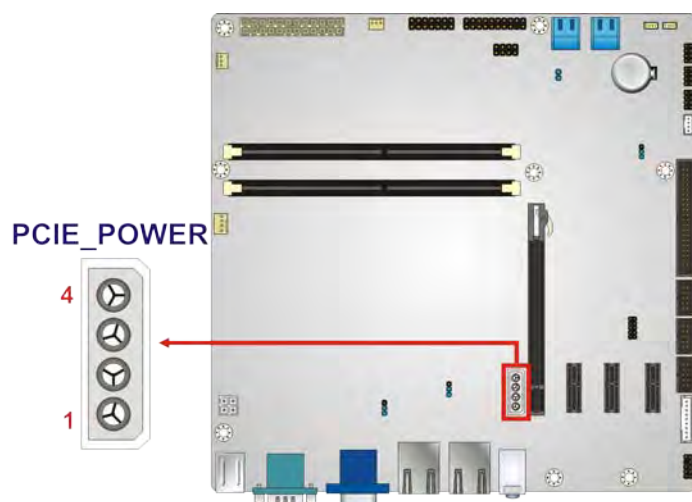


Figure 3-12: PCIe Power Location

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

Table 3-11: PCIe Power Pinouts

3.2.12 PCIe x16 Slot

CN Label: PCIEX16

CN Type: PCIe x16 slot

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

The PCIe x16 slot is for PCIe x16 expansion cards.

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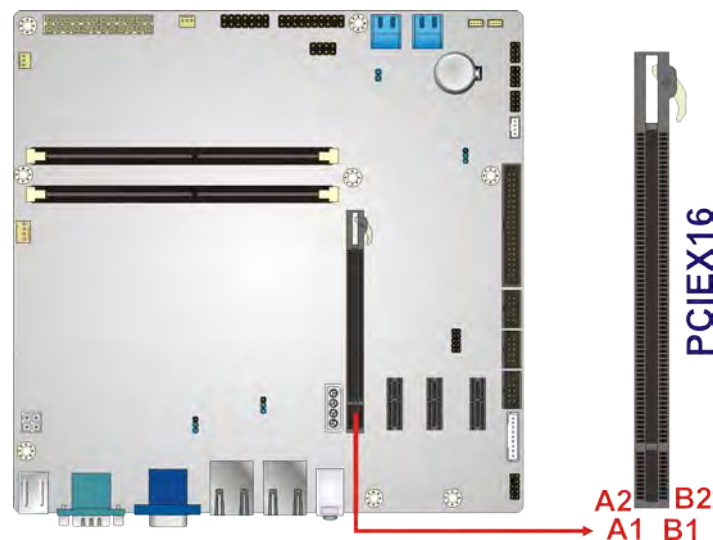


Figure 3-13: PCIe x16 Slot Location

3.2.13 PCIe x1 Slots

CN Label: PCIEX1_SLOT1, PCIEX1_SLOT2, PCIEX1_SLOT3

CN Type: PCIe x1 slot

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

The PCIe x1 slots are for PCIe x1 expansion cards.

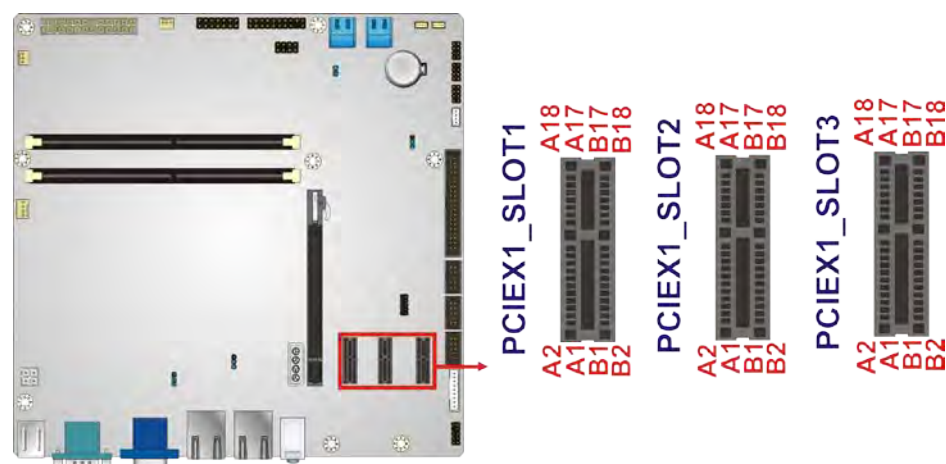


Figure 3-14: PCIe x1 Slot Locations

3.2.14 SATA 3Gb/s Drive Connectors

- CN Label: SATA12, SATA34
- CN Type: 14-pin SATA connector
- CN Location: See **Figure 3-15**
- CN Pinouts: See **Table 3-12**

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

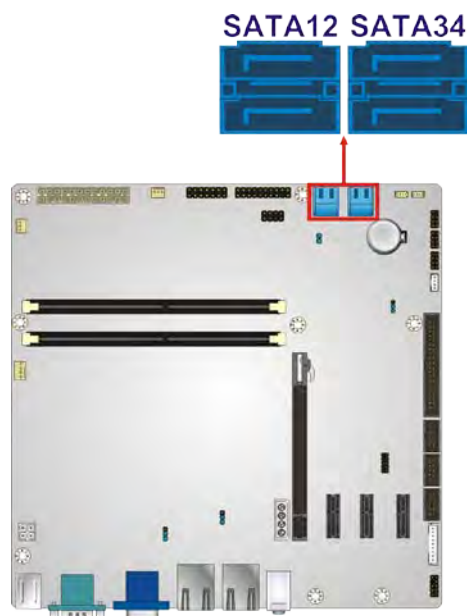


Figure 3-15: SATA 3Gb/s Drive Connector Locations

Pin	Description	Pin	Description
1	GND	2	TXP_A
3	TXN_A	4	GND
5	RXN_A	6	RXP_N
7	GND	8	GND
9	TXP_B	10	TXN_B
11	GND	12	RXN_B
13	RXP_B	14	GND

Table 3-12: SATA 3Gb/s Drive Connector Pinouts

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3.2.15 Serial Port Connector, RS-422/485

CN Label: COM4
 CN Type: 4-pin wafer
 CN Location: See **Figure 3-16**
 CN Pinouts: See **Table 3-13**

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

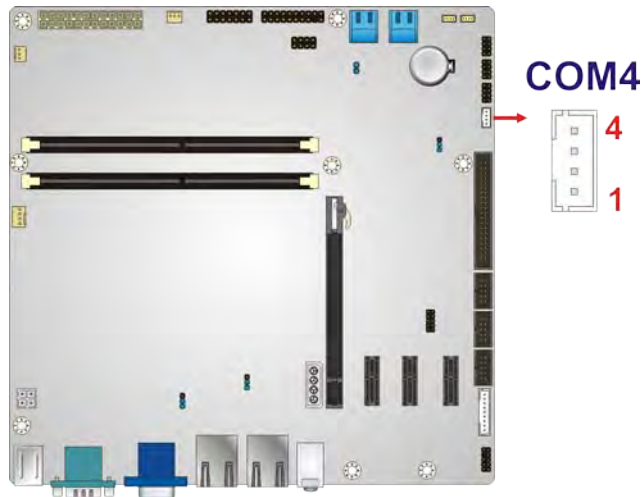


Figure 3-16: Serial Port Connector (RS-422/485) Location

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

Table 3-13: Serial Port Connector (RS-422/485) Pinouts

3.2.16 Serial Port Connectors, RS-232

CN Label: COM3, COM5, COM6, COM7-10
 CN Type: 10-pin box header (2x5) , 40-pin box header (2x20)
 CN Location: See **Figure 3-17**
 CN Pinouts: See **Table 3-14** and **Table 3-15**

Each of these connectors provides RS-232 connections.

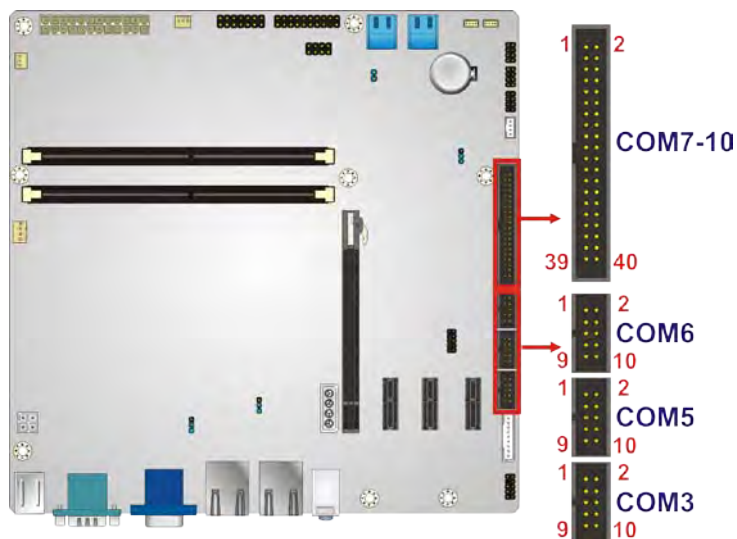


Figure 3-17: Serial Port Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD3/5/6	2	DSR3/5/6
3	RXD3/5/6	4	RTS3/5/6
5	TXD3/5/6	6	CTS3/5/6
7	DTR3/5/6	8	RI3/5/6
9	GND	10	GND

Table 3-14: Serial Port Connector Pinouts (COM3, COM5, COM6)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD7	2	DSR7
3	RXD7	4	RTS7
5	TXD7	6	CTS7
7	DTR7	8	RI7
9	GND	10	GND
11	DCD8	12	DSR8
13	RXD8	14	RTS8
15	TXD8	16	CTS8
17	DTR8	18	RI8

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PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
19	GND	20	GND
21	DCD9	22	DSR9
23	RXD9	24	RTS9
25	TXD9	26	CTS9
27	DTR9	28	RI9
29	GND	30	GND
31	DCD10	32	DSR10
33	RXD10	34	RTS10
35	TXD10	36	CTS10
37	DTR10	38	RI10
39	GND	40	GND

Table 3-15: Serial Port Connector Pinouts (COM7-10)

3.2.17 SMBus Connector

CN Label: SMBUS_1
 CN Type: 4-pin wafer
 CN Location: See **Figure 3-18**
 CN Pinouts: See **Table 3-16**

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

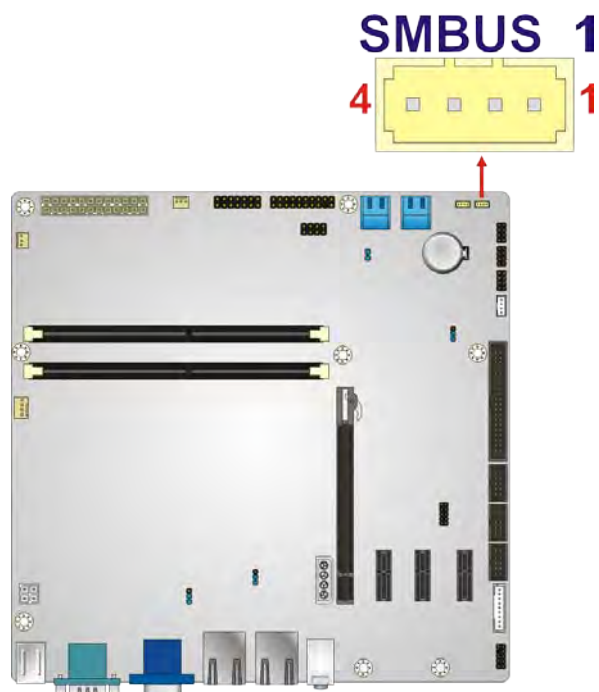


Figure 3-18: SMBus Connector Location

PIN	DESCRIPTION
1	+5V_DUAL
2	SMBCLK_RESUME
3	SMBDATA_RESUME
4	GND

Table 3-16: SMBus Connector Pinouts

3.2.18 SPI Connector

CN Label: SPI

CN Type: 8-pin header

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

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

The SPI connector is used to flash the BIOS.

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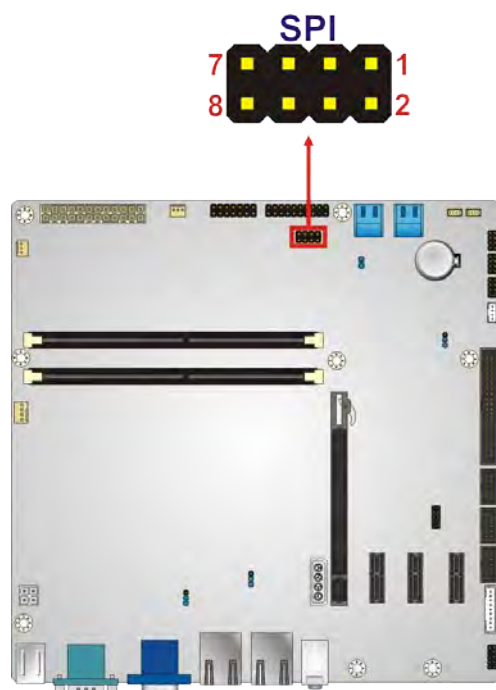


Figure 3-19: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	GND
3	CS0	4	CLK
5	SO0	6	SI
7	NC	8	NC

Table 3-17: SPI Connector Pinouts

3.2.19 System Fan Connector

CN Label: SYS_FAN1, SYS_FAN2

CN Type: 3-pin wafer

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

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

The fan connector attaches to a cooling fan.

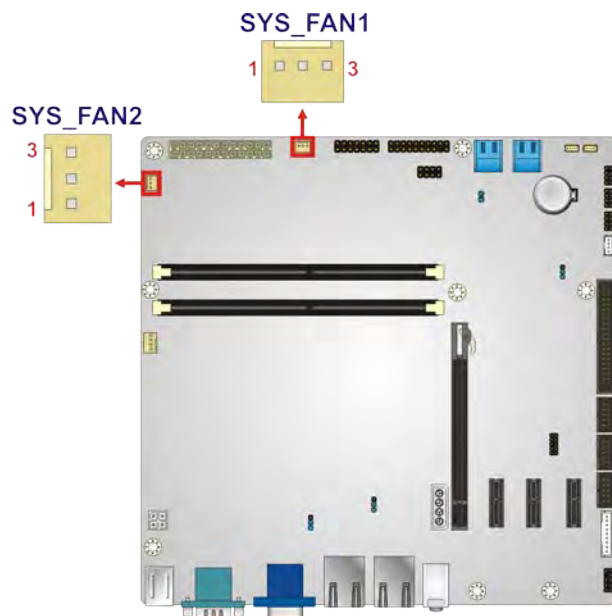


Figure 3-20: System Fan Connector Locations

PIN NO.	DESCRIPTION
1	NC
2	VCC12
3	GND

Table 3-18: System Fan Connector Pinouts

3.2.20 TPM Connector

CN Label: TPM
 CN Type: 20-pin header
 CN Location: See **Figure 3-21**
 CN Pinouts: See **Table 3-19**

The TPM connector connects to a TPM module.

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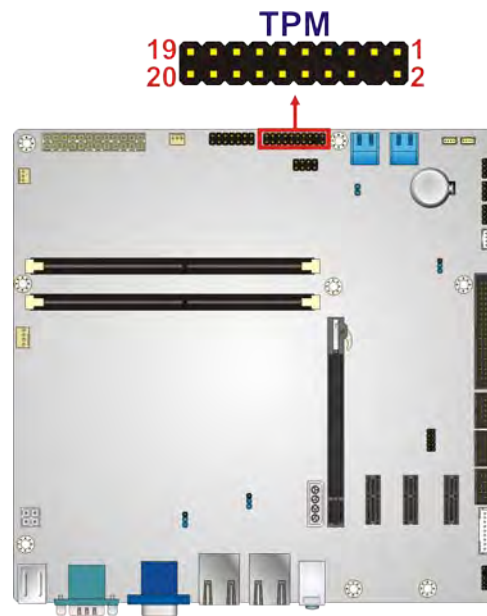


Figure 3-21: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Clock	2	GND
3	Frame#	4	NC(KEY)
5	Reset#	6	+5V
7	LAD3	8	LAD2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SMB CLK	14	SMB DATA
15	+3.3V Standby	16	Serial IRQ
17	GND	18	Clock Run#
19	Power Down#	20	DREQ#

Table 3-19: TPM Connector Pinouts

3.2.21 USB Connectors

CN Label: USB45, USB67, USB89

CN Type: 8-pin header (2x4)

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

CN Pinouts: See **Table 3-20**, **Table 3-21** and **Table 3-22**

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

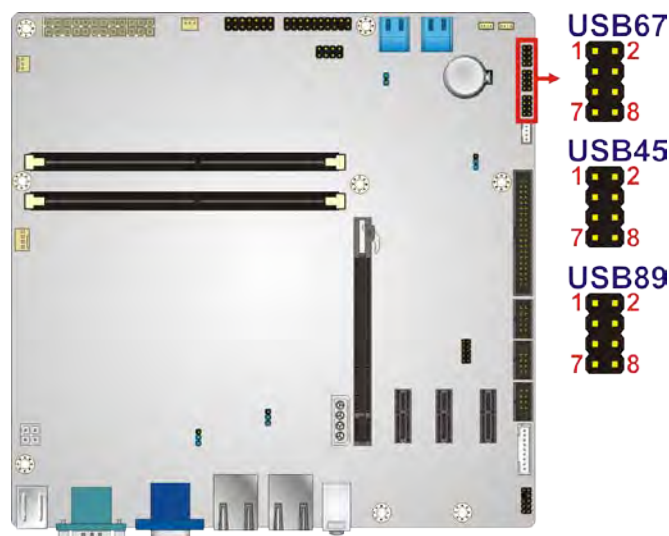


Figure 3-22: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA4_N	4	DATA5_P
5	DATA4_P	6	DATA5_N
7	GND	8	VCC

Table 3-20: USB Port Connector Pinouts (USB45)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA0_N	4	DATA1_P
5	DATA0_P	6	DATA1_N
7	GND	8	VCC

Table 3-21: USB Port Connector Pinouts (USB67)

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PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA10_N	4	DATA11_P
5	DATA10_P	6	DATA11_N
7	GND	8	VCC

Table 3-22: USB Port Connector Pinouts (USB89)

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:

- 3 x Audio jacks
- 1 x DVI connector
- 2 x Ethernet connectors
- 1 x Keyboard/Mouse connector
- 2 x RS-232 serial port connectors
- 4 x USB 2.0 connectors
- 1 x VGA connector

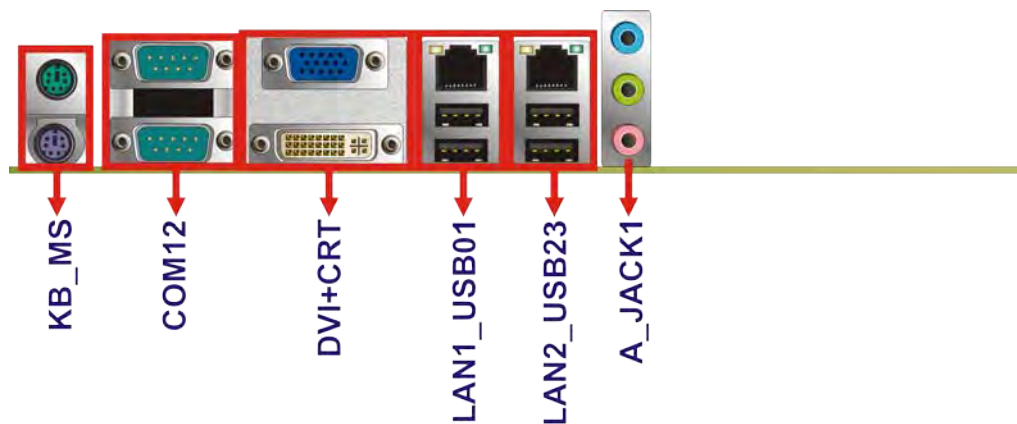


Figure 3-23: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label: A_JACK1

CN Type: Audio jack

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

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

The audio jacks connect to external audio devices.

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



Figure 3-24: Audio Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	MIC1_L
3	GND	4	JD_MIC
5	MIC1_R	6	LOUT
7	GND	8	JD_FRONT
9	ROUT	10	LINL
11	GND	12	JD_LINE
13	LINL		

Table 3-23: Audio Connector Pinouts

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3.3.2 Ethernet and USB Connectors

- CN Label: LAN1_USB01, LAN2_USB23
- CN Type: RJ-45, USB
- CN Location: See **Figure 3-23**
- CN Pinouts: See **Table 3-24, Table 3-25 and Table 3-26**

The LAN connector connects to a local network.

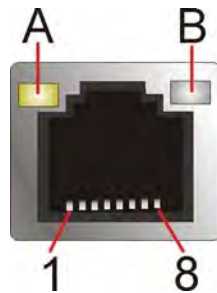


Figure 3-25: LAN Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
P1	TC	P2	LAN1/2_MDIO+
P3	LAN1/2_MDIO-	P4	LAN1/2_MDI1+
P5	LAN1/2_MDI1-	P6	LAN1/2_MDI2+
P7	LAN1/2_MDI2-	P8	LAN1/2_MDI3+
P9	LAN1/2_MDI3-	P10	GND
P11	LAN1/2_LINK1000	P12	LAN1/2_LINK1000
P13	LAN1/2_ACT-1 LED	P14	VCC
P15	GND	P16	GND
9	GND	10	GND
11	GND	12	GND
13	GND	14	GND
15	GND	16	GND

Table 3-24: LAN Connector Pinouts

The USB connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	VCC
3	DATA8_N	4	DATA9_N
5	DATA8_P	6	DATA9_P
7	GND	8	GND

Table 3-25: USB Connector Pinouts (USB01)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	VCC
3	DATA2_N	4	DATA3_N
5	DATA2_P	6	DATA3_P
7	GND	8	GND

Table 3-26: USB Connector Pinouts (USB23)

3.3.3 Keyboard/Mouse Connector

CN Label: KB_MS

CN Type: Dual PS/2

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

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

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

Table 3-27: PS/2 Connector Pinouts

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3.3.4 RS-232 Serial Port Connectors

CN Label: COM12

CN Type: DB-9 Male

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

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

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

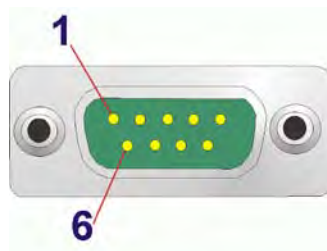


Figure 3-26: RS-232 Serial Port Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	RI1	10	DCD2
11	RXD2	12	TXD2
13	DTR2	14	GND
15	DSR2	16	RTS2
17	CTS2	18	RI2

Table 3-28: RS-232 Serial Port Connector Pinouts (COM1,COM2)

3.3.5 VGA and DVI Connector

CN Label: DVI+CRT

CN Type: 15-pin Female (VGA) , 24-pin Female (DVI)

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

CN Pinouts: See **Table 3-29** and **Table 3-30**

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

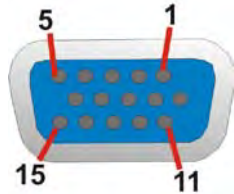


Figure 3-27: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	CRT_RED	2	CRT_GREEN
3	CRT_BLUE	4	GND
5	NC	6	NC
7	NC	8	NC
9	CRT_VCC	10	CRT_PLUG#
11	NC	12	CRT_DDC_DATA
13	CRT_HSYNC	14	CRT_VSYNC
15	CRT_DDC_CLK		

Table 3-29: VGA Connector Pinouts

The DVI connector connects to a monitor that supports DVI video input.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DATA2-	2	DATA2+
3	GND	4	NC
5	NC	6	DDC_CLOCK
7	DDC_DATA	8	NC
9	DATA1-	10	DATA1+
11	GND	12	NC
13	NC	14	VCC

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PIN	DESCRIPTION	PIN	DESCRIPTION
15	GND	16	HPD
17	DATA0-	18	DATA0+
19	GND	20	NC
21	NC	22	GND
23	CLOCK+	24	CLOCK-

Table 3-30: DVI Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the IMB-H610 may result in permanent damage to the IMB-H610 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-H610. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-H610 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the IMB-H610, place it on an anti-static pad. This reduces the possibility of ESD damaging the IMB-H610.
- ***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 IMB-H610, IMB-H610 components and injury to the user.

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

- Read the user manual:
 - The user manual provides a complete description of the IMB-H610 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
 - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMB-H610 on an antistatic pad:
 - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMB-H610 off:
 - When working with the IMB-H610, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMB-H610 **DO NOT**:

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

4.3 Basic Installation



WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, IMB-H610 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the IMB-H610. If one of these component is not installed the IMB-H610 cannot run.

4.3.1 Socket LGA1155 CPU Installation



NOTE:

To enable Hyper-Threading, the CPU and chipset must both support it.



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 outwards to clear the retention tab. Fully open the lever. See **Figure 4-1**.

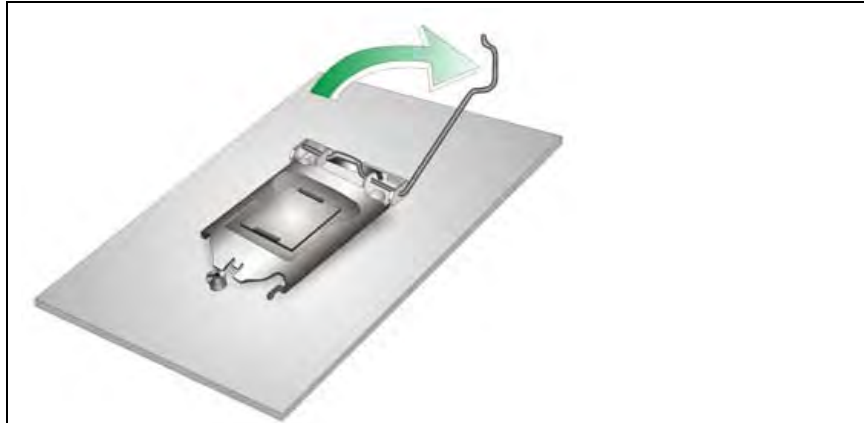


Figure 4-1: Disengage the CPU Socket Load Lever

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**.

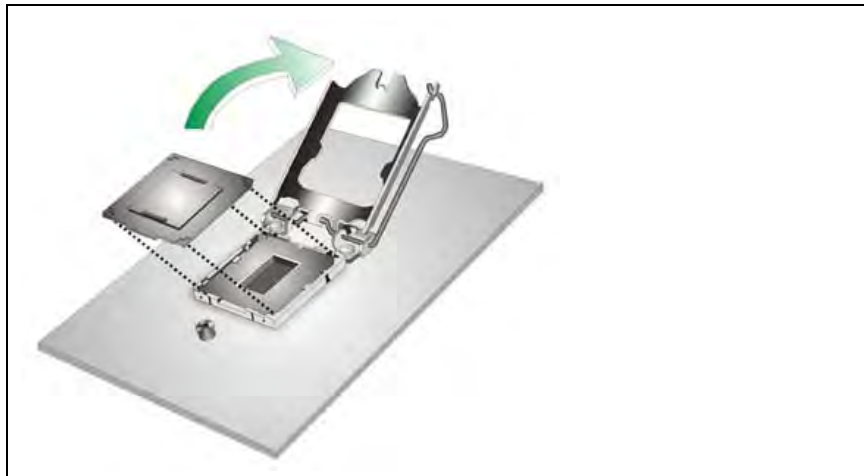


Figure 4-2: Remove Protective Cover

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.

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- 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 CPU edge on the CPU socket.
- Step 6: Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.
- Step 7: Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-3**.

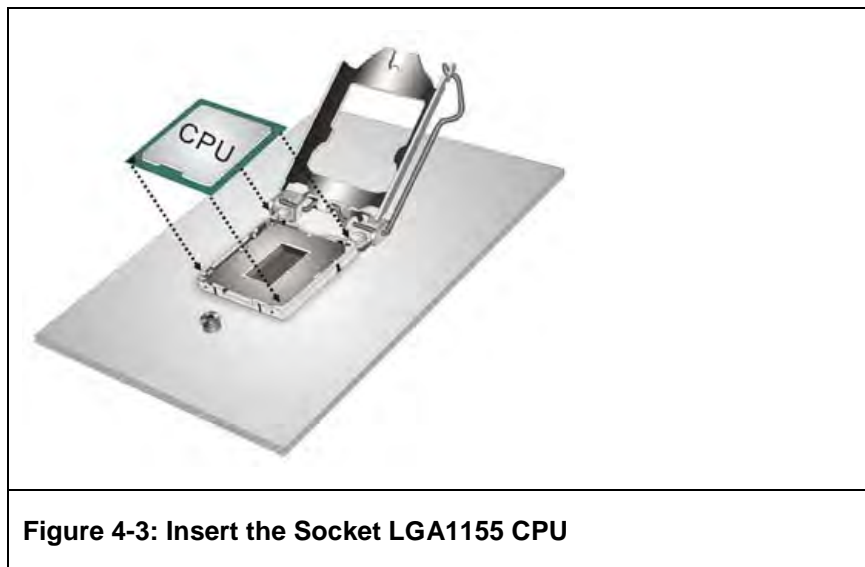
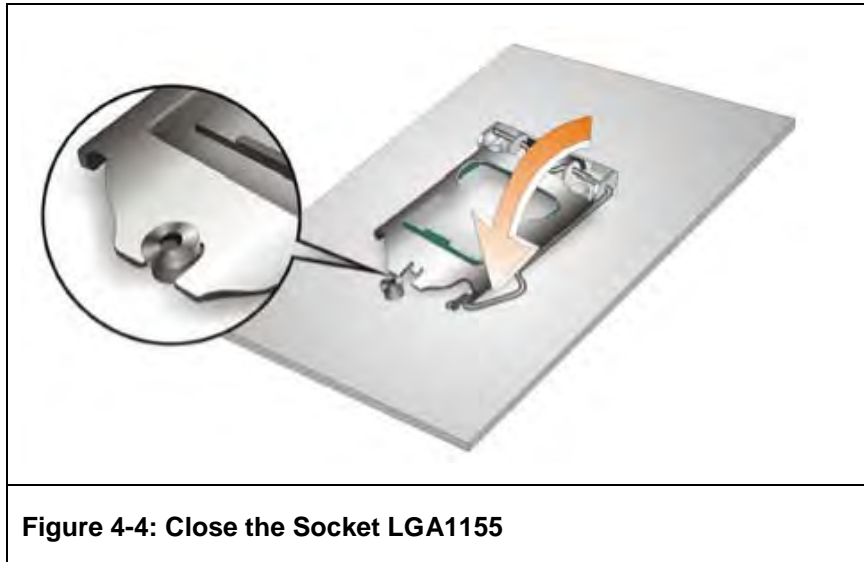


Figure 4-3: Insert the Socket LGA1155 CPU

- Step 8: Close the CPU socket.** Close the load plate and pull the load 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. See **Figure 4-4**. There will be some resistance, but will not require extreme pressure.



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

4.3.2 Cooling Kit Installation



WARNING:

DO NOT use the original Intel® heat sink and fan. A proprietary one is recommended.



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

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

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**WARNING:**

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

To install the cooling kit, follow the instructions below.

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

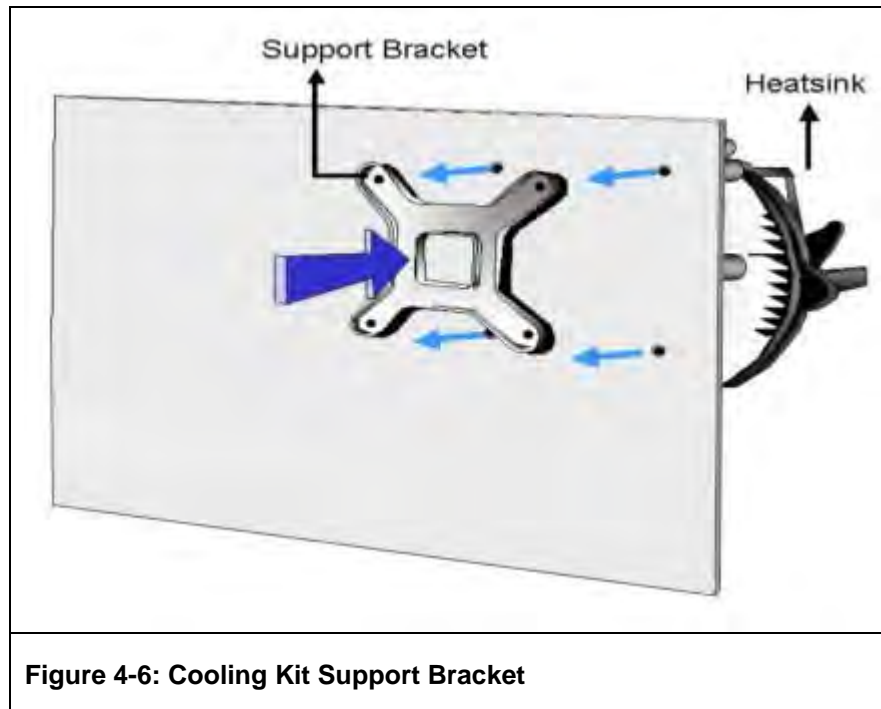


Figure 4-6: Cooling Kit Support Bracket

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

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

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

Step 5: **Connect the fan cable.** Connect the cooling kit fan cable to the fan connector on the IMB-H610. Carefully route the cable and avoid heat generating chips and fan blades.

4.3.3 DIMM Installation

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

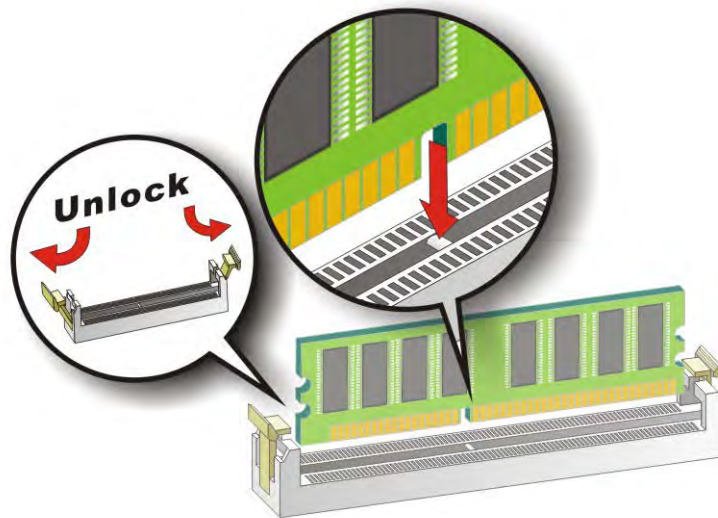


Figure 4-7: DIMM Installation

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.

4.4 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.

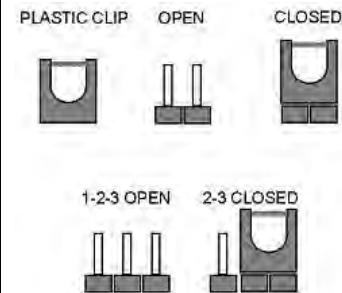


Figure 4-8: Jumper Locations

The jumpers on the IMB-H610 must be set in accordance with the desired configuration before installation. The jumpers on the IMB-H610 are listed in **Table 4-1**.

Description	Label	Type
AT/ATX power select	JATX_AT1	2-pin header
Clear CMOS	J_CMOS2	3-pin header
USB power select	USB_PWR1, USB_PWR2	3-pin header

Table 4-1: Jumpers

4.4.1 AT/ATX Power Select Jumper

Jumper Label: JATX_AT1
 Jumper Type: 2-pin header
 Jumper Settings: See **Table 4-2**
 Jumper Location: See **Figure 4-9**

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

Setting	Description
Closed	ATX Mode (Default)
Open	AT Mode

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

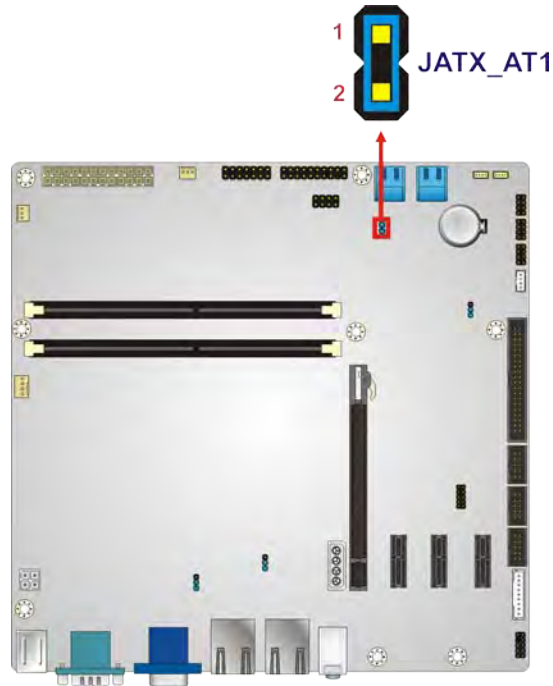


Figure 4-9: AT/ATX Power Select Jumper Location

4.4.2 Clear CMOS Jumper

Jumper Label:	J_CMOS2
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-3
Jumper Location:	See Figure 4-10

If the IMB-H610 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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

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

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

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

Table 4-3: Clear CMOS Jumper Settings

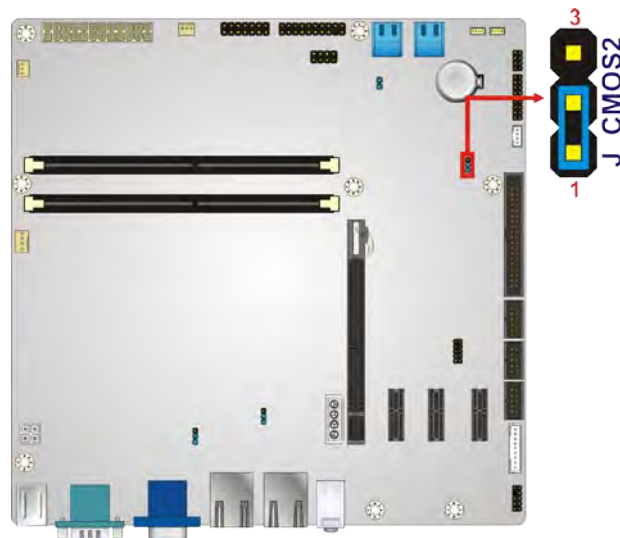


Figure 4-10: Clear CMOS Jumper Location

4.4.3 USB Power Select Jumpers

Jumper Label:	USB_PWR1, USB_PWR2
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-4
Jumper Location:	See Figure 4-11

The USB power select jumpers allow the user to select the USB power setting.

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

Table 4-4: USB Power Select Jumper Settings

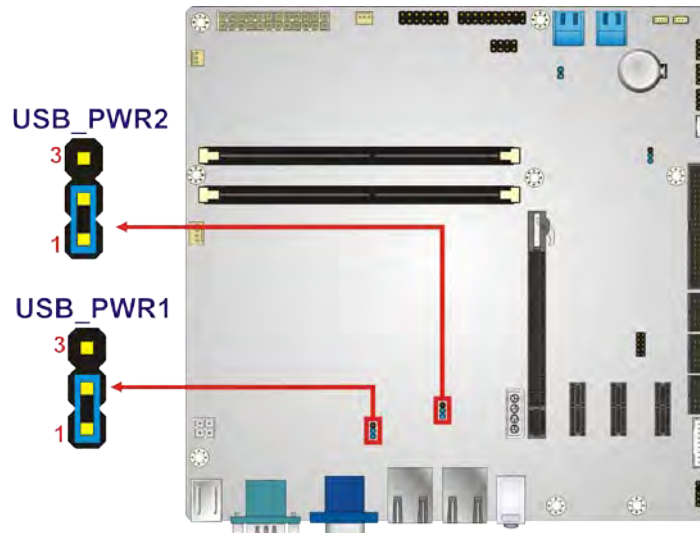


Figure 4-11: USB Power Select Jumpers Location

4.5 Internal Peripheral Device Connections

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

4.5.1 SATA Drive Connection

The IMB-H610 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 4-12**.

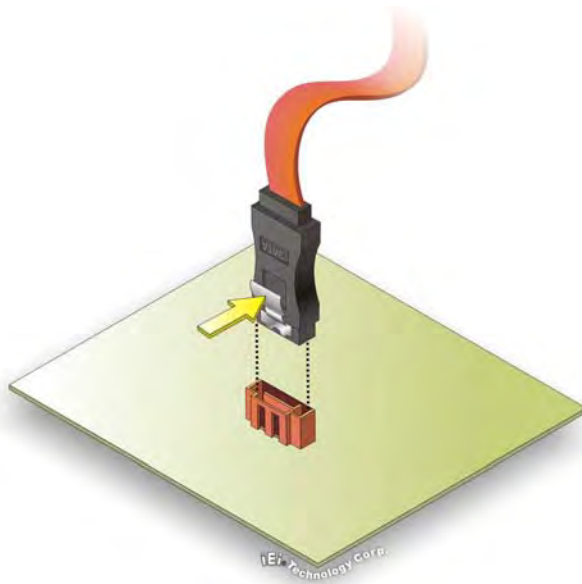


Figure 4-12: SATA Drive Cable Connection

- Step 3:** **Connect the cable to the SATA disk.** Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-13**.
- Step 4:** **Connect the SATA power cable (optional).** Connect the SATA power connector to the back of the SATA drive. See **Figure 4-13**.



Figure 4-13: SATA Power Drive Connection

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

4.6 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMB-H610.

4.6.1 Audio Connection

The audio jacks on the external audio connector enable the IMB-H610 to be connected to a stereo sound setup. Each jack supports both input and output. When connecting a device, the High Definition Audio utility will automatically detect input or output. The light blue (top) audio jack does not support input from a microphone. To install the audio devices, follow the steps below.

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

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

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- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker.
- **Microphone (Pink):** Connects a microphone.

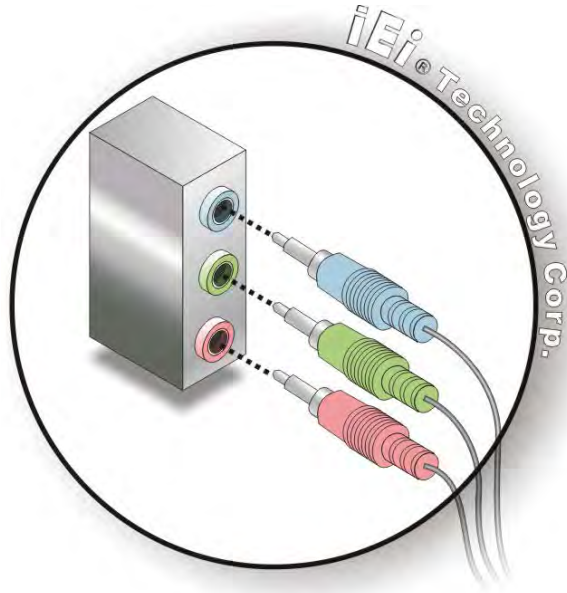


Figure 4-14: Audio Connector

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.

4.6.2 DVI Display Device Connection

The IMB-H610 has a single female DVI-I connector on the external peripheral interface panel. The DVI-I connector is connected to a digital display device. To connect a digital display device to the IMB-H610, please follow the instructions below.

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

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

Step 3: Insert the DVI-I connector. Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the IMB-H610. See **Figure 4-15**.

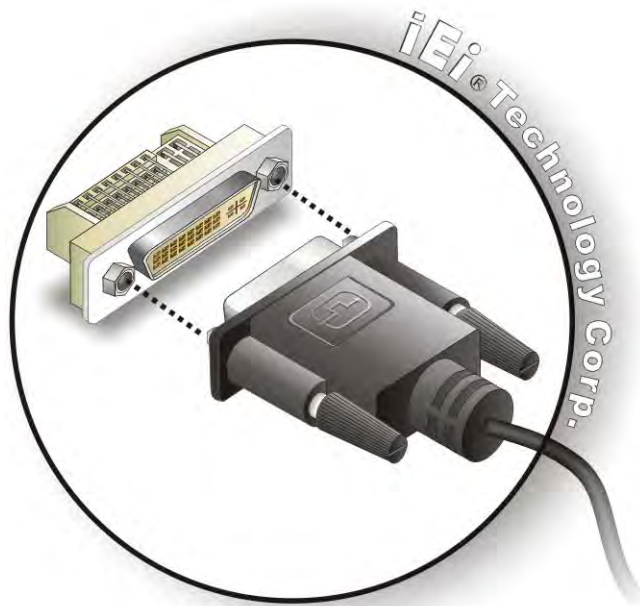


Figure 4-15: DVI Connector

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

4.6.3 LAN Connection

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

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

Step 2: Align the connectors. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMB-H610. See **Figure 4-16**.

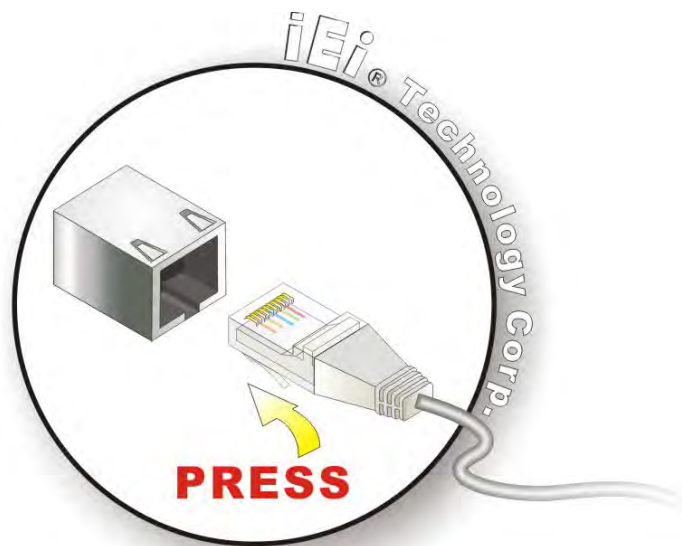


Figure 4-16: LAN Connection

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.

4.6.4 PS/2 Keyboard and Mouse Connection

The IMB-H610 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 IMB-H610.

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 4-17**.

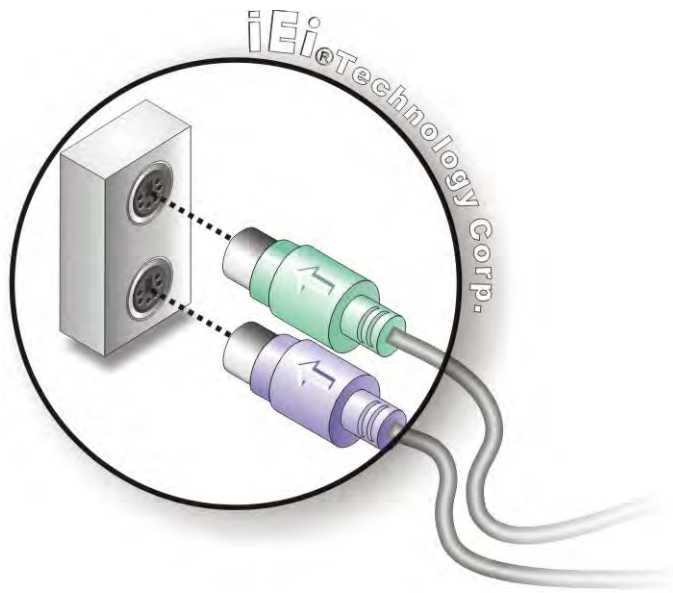


Figure 4-17: PS/2 Keyboard/Mouse Connector

4.6.5 Serial Device Connection

The IMB-H610 has two DB-9 male connectors on the external peripheral interface panel for serial devices. Follow the steps below to connect serial devices to the IMB-H610.

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 4-18**.

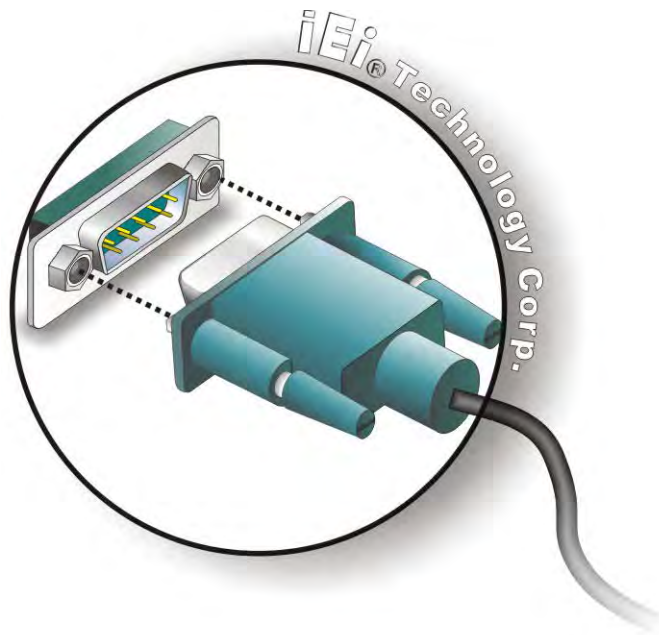


Figure 4-18: Serial Device Connector

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.

4.6.6 USB Connection

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMB-H610.

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 4-19**.

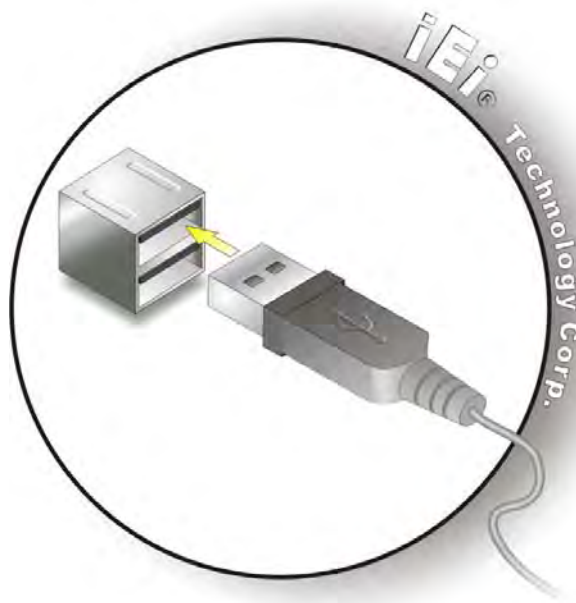


Figure 4-19: USB Connector

4.6.7 VGA Monitor Connection

The IMB-H610 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 IMB-H610, 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 IMB-H610. See **Figure 4-20**.

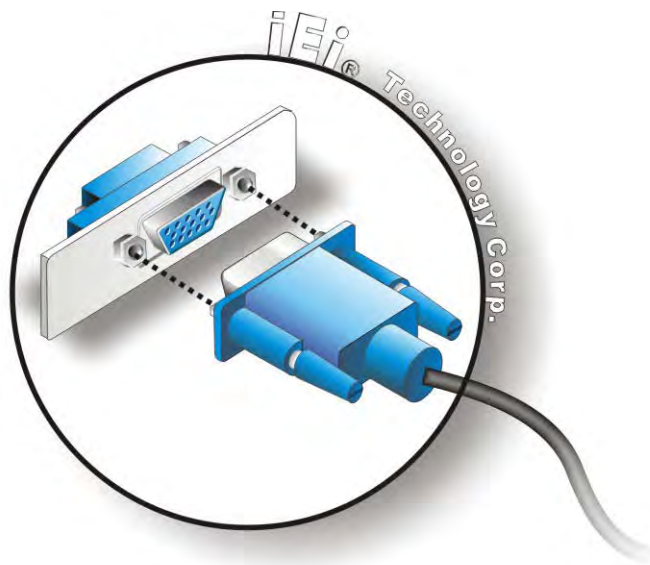


Figure 4-20: VGA Connector

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

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

If the message disappears before the **F2** or **DELETE** 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
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 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

Key	Function
F2 key	Load previous values.
F3 key	Load optimized defaults
F4 key	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.

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5.2 Main

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

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

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Main	Advanced	Chipset
BIOS Information	Boot	Security
BIOS Vendor	Save & Exit	
Core Version		
Compliancy		
Project Version		
Build Date and Time		
Memory Information		
Total Memory		
System Date		
System Time		
Access Level		
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.		

BIOS Menu 1: Main

→ System Overview

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

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Compliancy:** Current compliant version
- **Project Version:** the board version
- **Build Date and Time:** 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

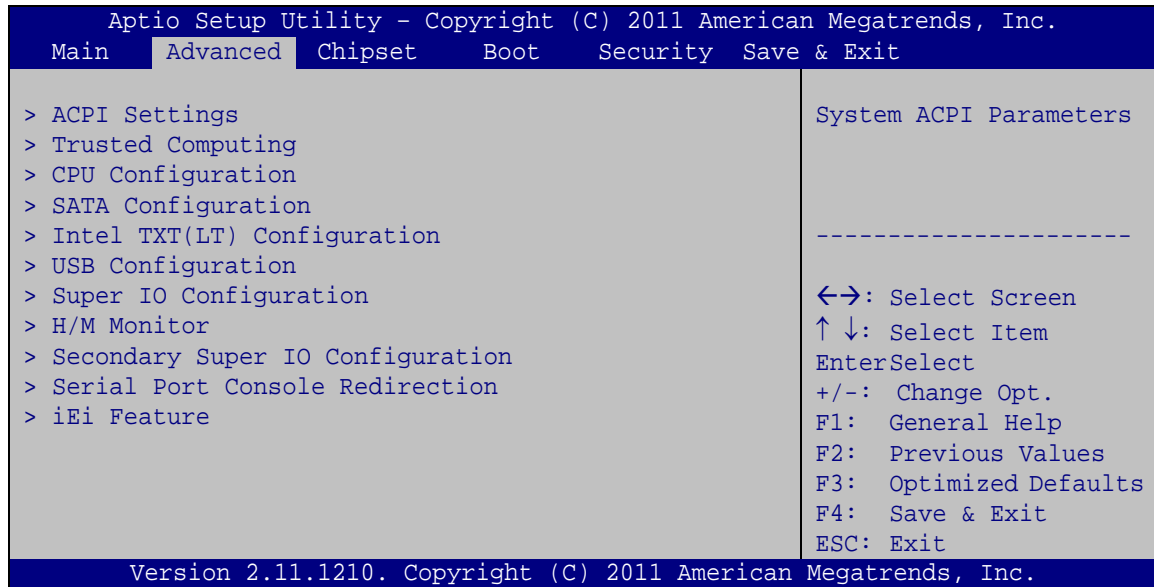
Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:



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.

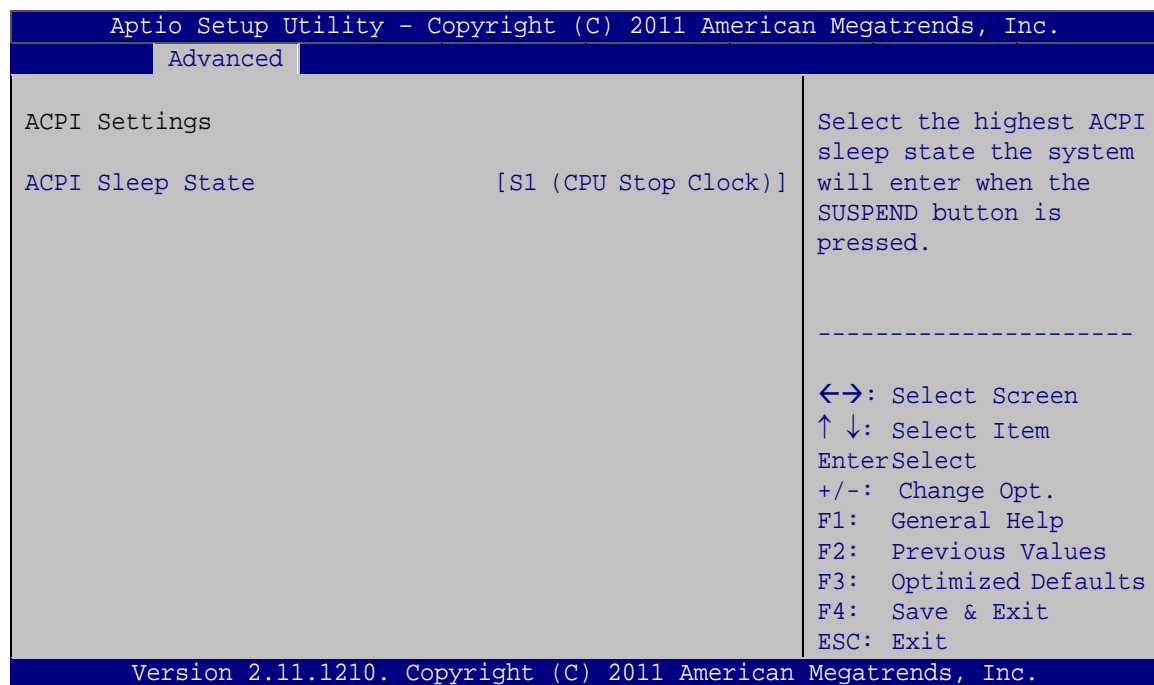
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BIOS Menu 2: Advanced

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

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

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

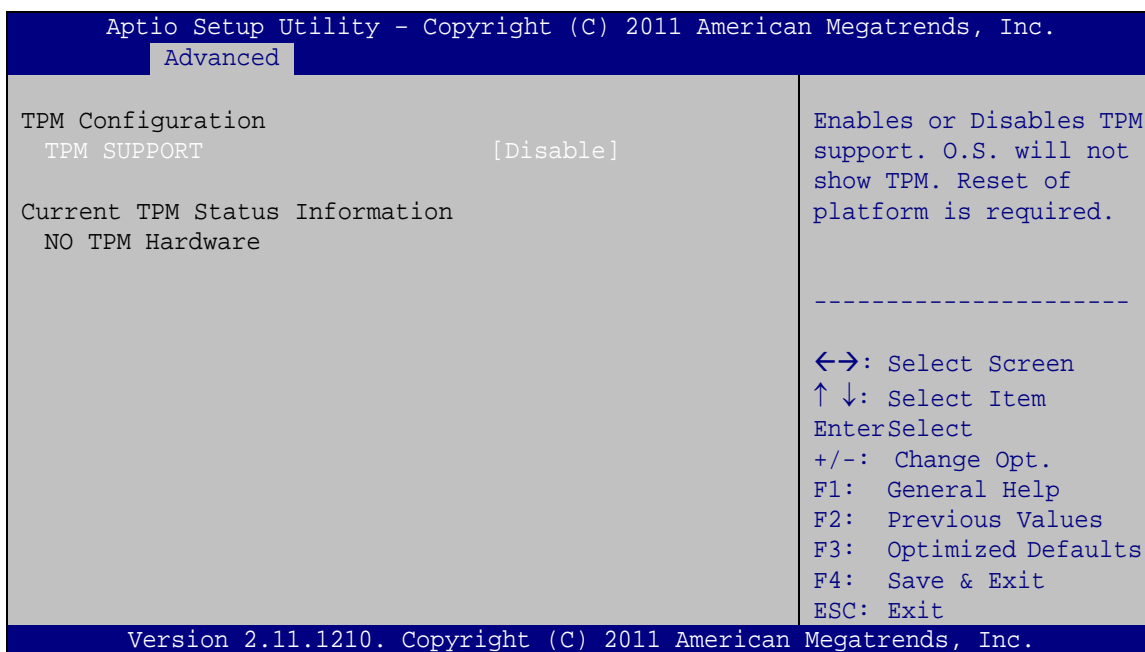
➔ **Suspend Disabled**

➔ **S1 (CPU Stop Clock)** **DEFAULT** The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **S3 (Suspend to RAM)** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 4**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 4: Trusted Computing

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→ TPM Support [Disable]

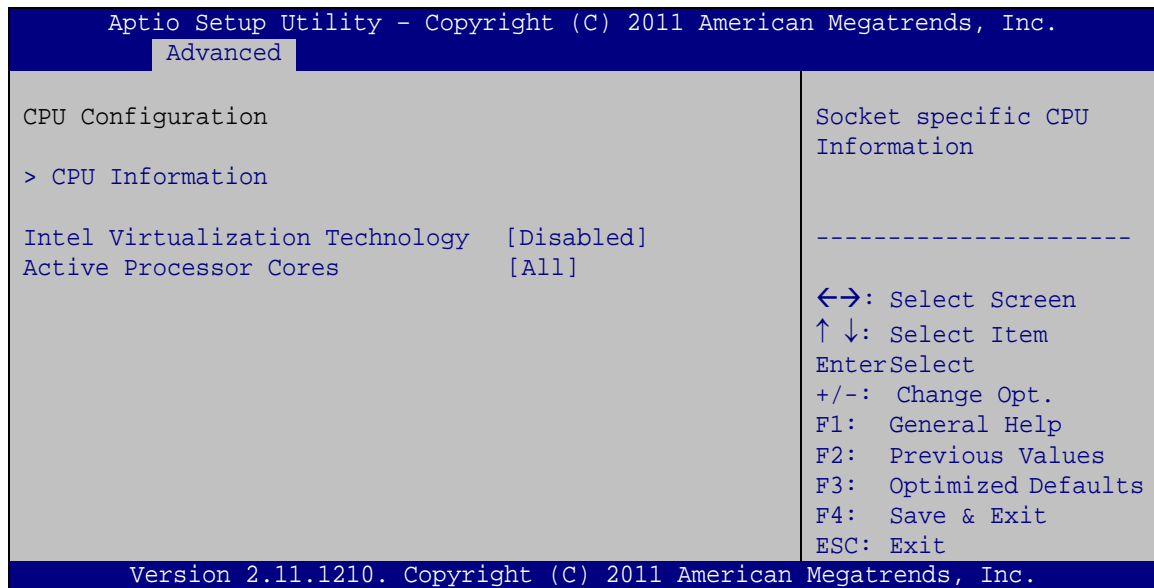
Use the **TPM Support** option to configure support for the TPM.

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

→ **Enable** TPM support is enabled.

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to enter the **CPU Information** submenu or enable Intel Virtualization Technology.



BIOS Menu 5: 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.

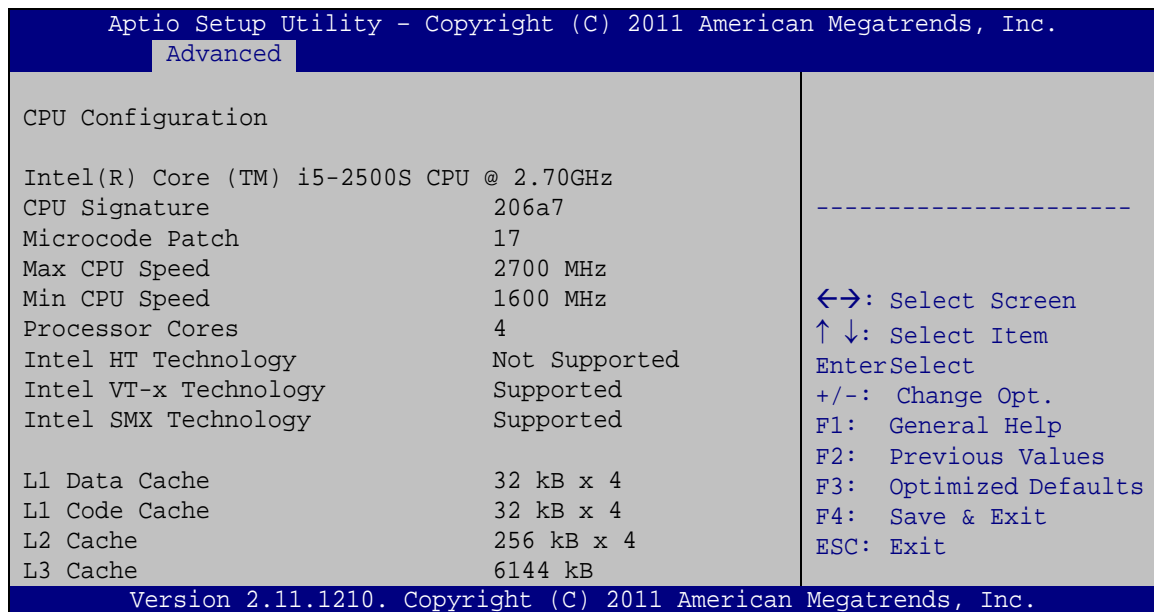
➔ **Active Processor Cores [All]**

Use the **Active Processor Cores** option to configure the number of the active processor cores.

- | | | | |
|---|------------|----------------|-------------------------------------|
| ➔ | All | DEFAULT | Active all of the processor cores |
| ➔ | 1 | | Active one of the processor cores |
| ➔ | 2 | | Active two of the processor cores |
| ➔ | 3 | | Active three of the processor cores |

5.3.3.1 CPU Information

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



BIOS Menu 6: CPU Configuration

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

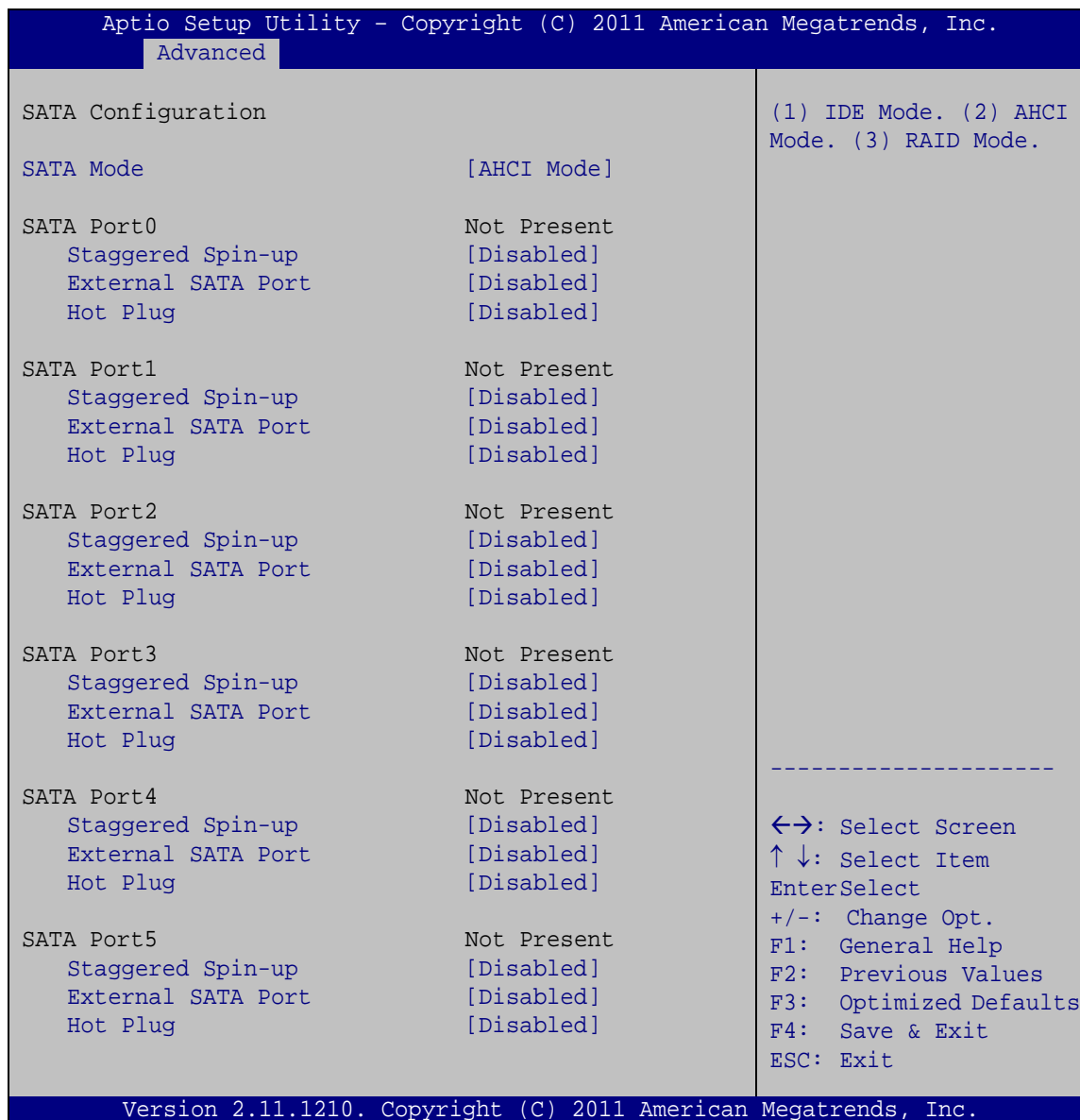
- **Processor Type:** Lists the brand name of the CPU being used
- **CPU Signature:** Lists the CPU signature value.
- **Microcode Patch:** Lists the microcode patch being used.
- **Max CPU Speed:** Lists the maximum CPU processing speed.

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- 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.
- Intel SMX Technology: Indicates if Intel SMX 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.

5.3.4 SATA Configuration

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



BIOS Menu 7: SATA Configuration

➔ SATA Mode [AHCI Mode]

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

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

➔ Staggered Spin-up [Disabled]

Staggered Spin-up allows the system to power up one drive at a time to prevent excess power consumption. Use the **Staggered Spin-up** option to enable or disable the staggered spin-up function.

- ➔ **Disabled** **DEFAULT** Disables staggered spin-up.
- ➔ **Enabled** Enables staggered spin-up.

➔ External SATA Port

Use the **External SATA Port** option to enable or disable the external SATA port.

- ➔ **Disabled** **DEFAULT** Disables the external SATA port.
- ➔ **Enabled** Enables the external SATA port.

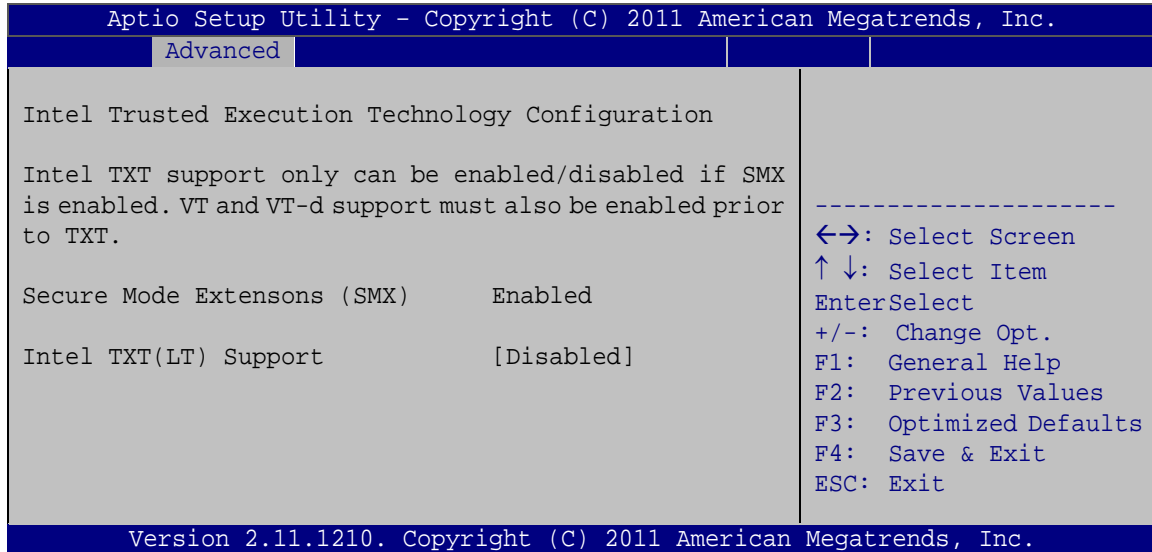
➔ Hot Plug

Use the **Hot Plug** option to enable or disable the hot plug function.

- ➔ **Disabled** **DEFAULT** Disables the hot plug function.
- ➔ **Enabled** Enables the hot plug function.

5.3.5 Intel TXT(LT) Configuration

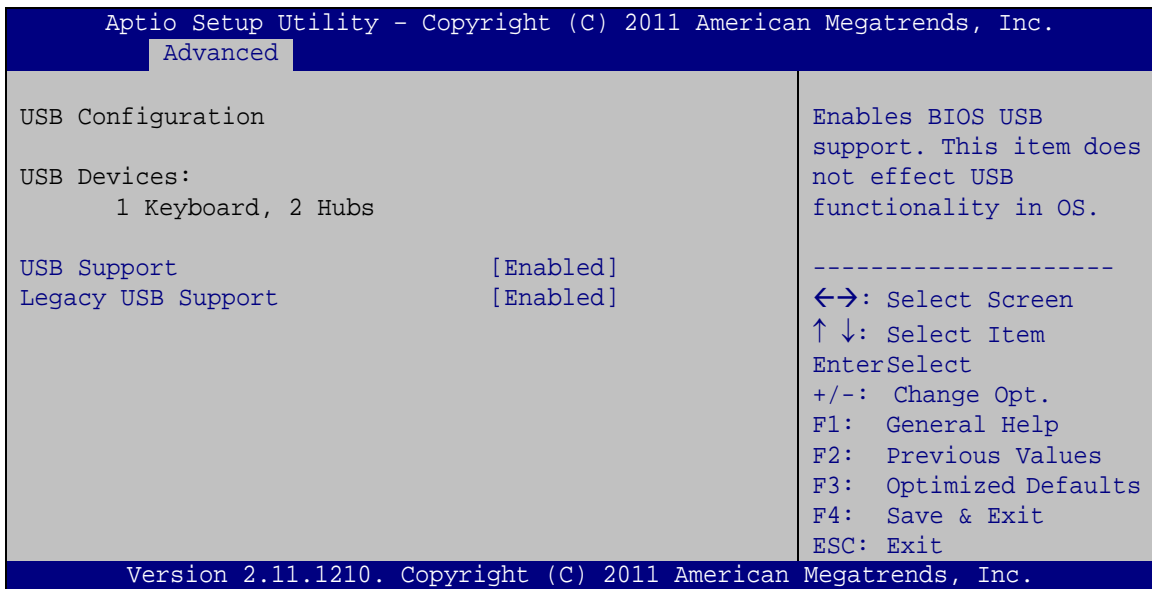
Use the **Intel TXT(LT) Configuration** menu (**BIOS Menu 8**) to configure Intel Trusted Execution Technology support.



BIOS Menu 8: Intel TXT(LT) Configuration

5.3.6 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 9**) to read USB configuration information and configure the USB settings.



BIOS Menu 9: USB Configuration

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➔ USB Devices

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

➔ USB Support [Enabled]

Use the **USB Support** option to enable or disable USB support on the system.

- ➔ **Disabled** USB support disabled
- ➔ **Enabled** **DEFAULT** USB support enabled

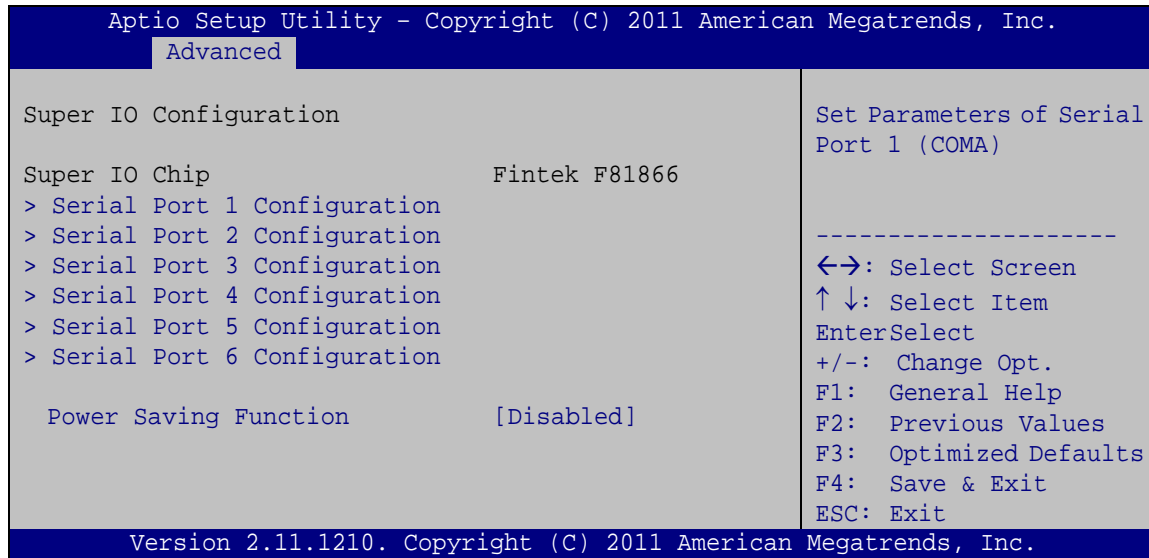
➔ Legacy USB Support [Enabled]

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.

- ➔ **Disabled** Legacy USB support disabled
- ➔ **Enabled** **DEFAULT** Legacy USB support enabled

5.3.7 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 10**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 10: Super IO Configuration

➔ **Power Saving Function [Disabled]**

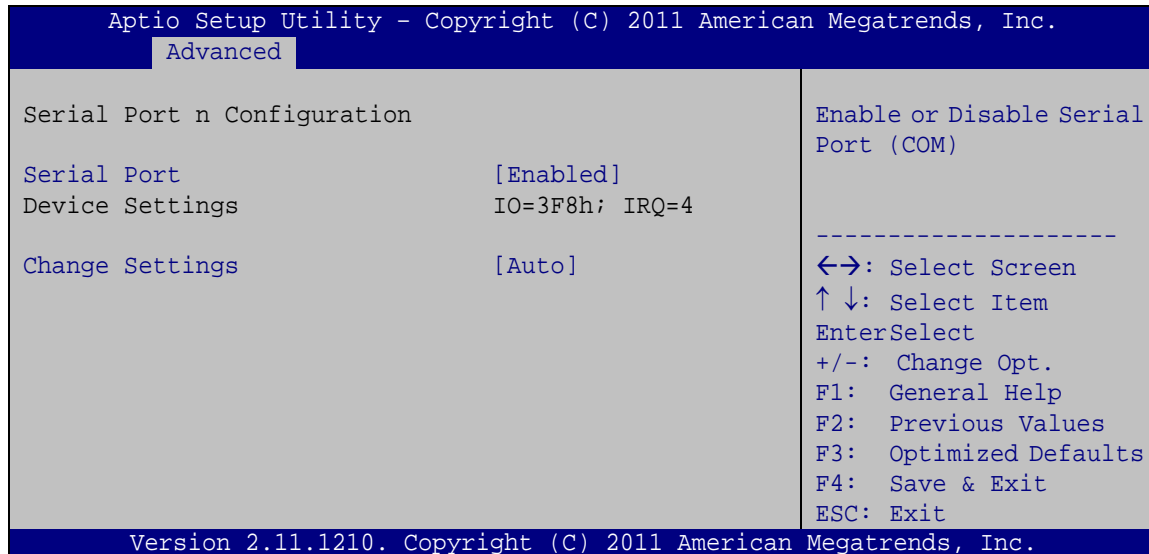
Use the **Power Saving Function** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

- ➔ **Disabled** **DEFAULT** Power Saving Function support disabled
- ➔ **Enabled** Power Saving Function support enabled

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5.3.7.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 11**) to configure the serial port n.



BIOS Menu 11: Serial Port n Configuration Menu

5.3.7.1.1 Serial Port 1 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

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

- ➔ **IO=3F8h;**
IRQ=3, 4 Serial Port I/O port address is 3F8h and the interrupt address is IRQ3,4
- ➔ **IO=2F8h;**
IRQ=3, 4 Serial Port I/O port address is 2F8h and the interrupt address is IRQ3,4
- ➔ **IO=2C0h;**
IRQ=10, 11 Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h;**
IRQ=10, 11 Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

5.3.7.1.2 Serial Port 2 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2F8h;**
IRQ=3 Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- ➔ **IO=3F8h;**
IRQ=3, 4 Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
- ➔ **IO=2F8h;**
IRQ=3, 4 Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
- ➔ **IO=2C0h;**
IRQ=10, 11 Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11

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

5.3.7.1.3 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
- ➔ **IO=2D0h;**
IRQ=10, 11 Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
- ➔ **IO=2D8h;**
IRQ=10, 11 Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.7.1.4 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 |
| → | IO=2D0h;
IRQ=10, 11 | | Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11 |
| → | IO=2D8h;
IRQ=10, 11 | | Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11 |

→ Device Mode [RS485]

Use the **Device Mode** option to enable or disable the serial port.

- | | | | |
|---|--------------|----------------|------------------------------------|
| → | RS422 | | Enables serial port RS422 support |
| → | RS485 | DEFAULT | Enables serial port RS485 support. |

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5.3.7.1.5 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=2D0h;
IRQ=10 | | Serial Port I/O port address is 2D0h and the interrupt address is IRQ10 |
| ➔ | IO=2C0h;
IRQ=10, 11 | | Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11 |
| ➔ | IO=2C8h;
IRQ=10, 11 | | Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11 |
| ➔ | IO=2D0h;
IRQ=10, 11 | | Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11 |
| ➔ | IO=2D8h;
IRQ=10, 11 | | Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11 |
| ➔ | IO=2E0h;
IRQ=10, 11 | | Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11 |

5.3.7.1.6 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]**

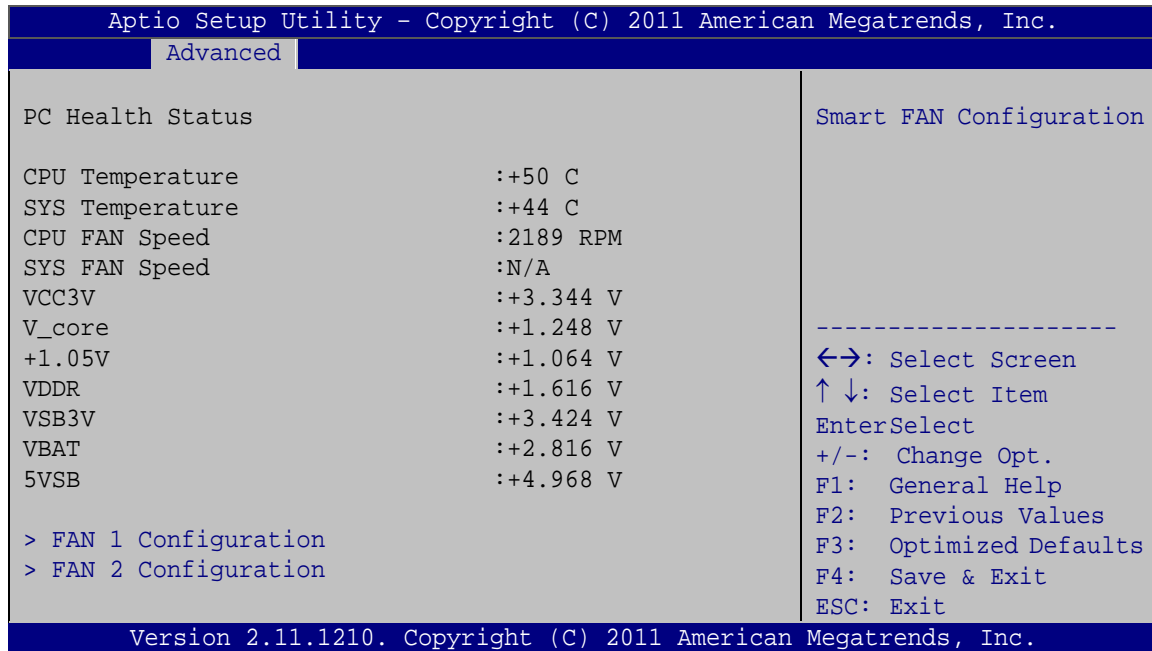
Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2D8h; IRQ=10** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10
- ➔ **IO=2C0h; IRQ=10, 11** Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h; IRQ=10, 11** Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h; IRQ=10, 11** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
- ➔ **IO=2D8h; IRQ=10, 11** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E0h; IRQ=10, 11** Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.8 H/W Monitor

The **H/W Monitor** menu (**BIOS Menu 12**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

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BIOS Menu 12: H/W Monitor

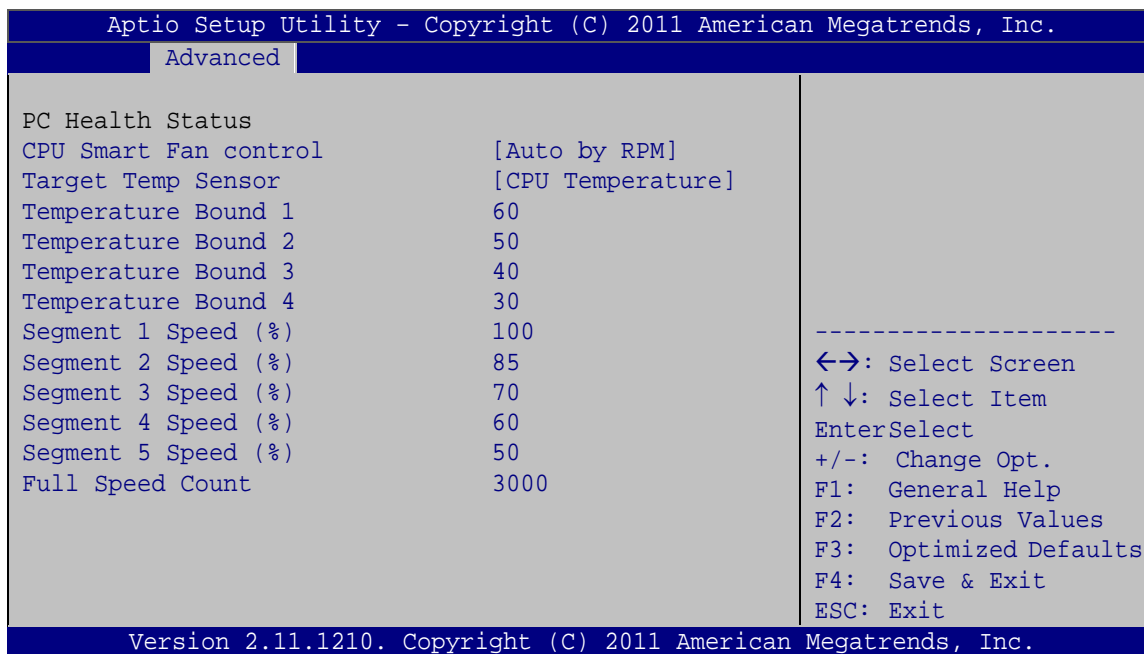
➔ PC Health Status

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

- System Temperatures:
 - CPU Temperature
 - System Temperature
- Fan Speeds:
 - CPU Fan Speed
 - System Fan Speed
- Voltages:
 - VCC3V
 - Vcore
 - +1.05V
 - VDDR
 - VS3V
 - VBAT
 - 5VSB

5.3.8.1 FAN 1 Configuration

Use the **FAN 1 Configuration** submenu (**BIOS Menu 13**) to configure fan 1 temperature and speed settings.



BIOS Menu 13: FAN 1 Configuration

→ CPU Smart Fan control [Auto by RPM]

Use the **CPU Smart Fan control** option to configure the CPU Smart Fan.

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

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➔ Target Temp. Sensor [CPU Temperature]

Use the **Target Temp. Sensor** option to set the target CPU temperature.

- | | | | |
|---|---------------------------|----------------|---|
| ➔ | CPU Temperature | DEFAULT | Sets the target temperature sensor to the CPU temperature. |
| ➔ | System Temperature | | Sets the target temperature sensor to the System Temperature setting. |

➔ Temperature Bound n

Use the + or – key to change the fan **Temperature Bound n** value. Enter a decimal number between 0 and 127.

➔ Segment n Speed (%)

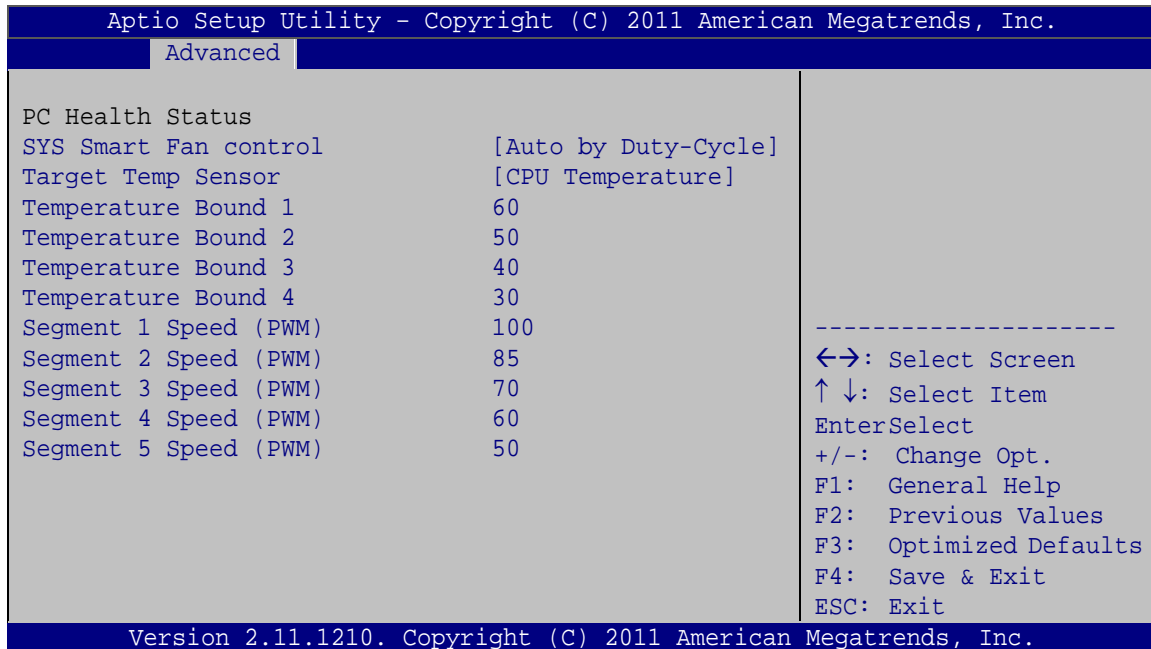
Use the + or – key to change the fan **Segment n Speed** value in percentage. Enter a decimal number between 0 and 100.

➔ Full Speed Count

Use the + or – key to change the fan **Full Speed Count** value. Enter a decimal number between 500 and 15000.

5.3.8.2 FAN 2 Configuration

Use the **FAN 2 Configuration** submenu (**BIOS Menu 14**) to configure fan 2 temperature and speed settings.



BIOS Menu 14: FAN 2 Configuration

→ CPU Smart Fan control [Auto by Duty-Cycle]

Use the **CPU Smart Fan control** option to configure the CPU Smart Fan.

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

→ Target Temp. Sensor [CPU Temperature]

Use the **Target Temp. Sensor** option to set the target CPU temperature.

- **CPU DEFAULT Temperature** Sets the target temperature sensor to the CPU temperature.

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- ➔ **System Temperature** Sets the target temperature sensor to the System Temperature setting.

➔ Temperature Bound n

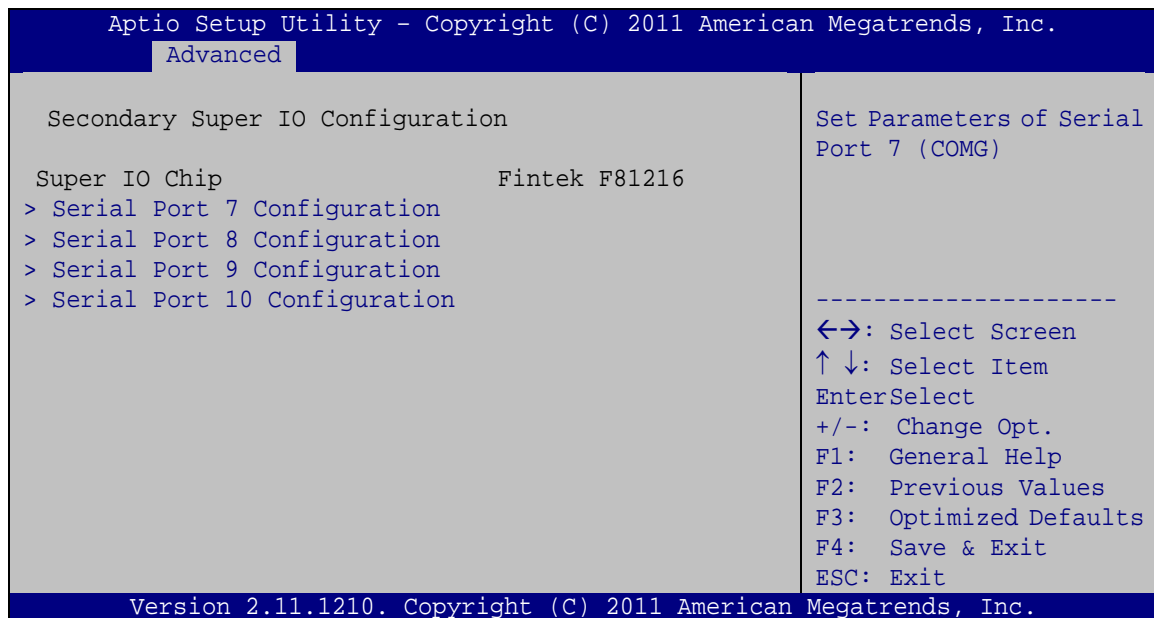
Use the + or – key to change the fan **Temperature Bound n** value. Enter a decimal number between 0 and 127.

➔ Segment n Speed (PWM)

Use the + or – key to change the fan **Segment n Speed** value in Pulse Width Modulation (PWM). Enter a decimal number between 0 and 100.

5.3.9 Secondary Super IO Configuration

The **Secondary Super IO Configuration (BIOS Menu 15)** displays IO chip type and the submenus for configuring the external SATA ports 7, 8, 9, and 10.



BIOS Menu 15: 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=2C0h;
IRQ=10 | | Serial Port I/O port address is 2C0h and the interrupt address is IRQ5 |
| → | IO=2E0h;
IRQ=10, 11 | | Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11 |
| → | IO=2C0h;
IRQ=10, 11 | | Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11 |
| → | IO=2C8h;
IRQ=10, 11 | | Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11 |
| → | IO=2B0h;
IRQ=10, 11 | | Serial Port I/O port address is 2B0h and the interrupt address is IRQ5 |
| → | IO=2B8h;
IRQ=10, 11 | | Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11 |

→ Device Mode [Normal]

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

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- | | | | |
|---|--|----------------|---|
| ➔ | Normal | DEFAULT | Enables the serial port to function in normal mode. |
| ➔ | IR Mode, Pulse 1.6us, Full Duplex | | Enables the serial port to function in IR mode, pulse 1.6 us at full duplex. |
| ➔ | IR Mode, Pulse 1.6us, Half Duplex | | Enables the serial port to function in IR mode, pulse 1.6 us at half duplex. |
| ➔ | IR Mode, Pulse 3/16 Bit Time, Full Duplex | | Enables the serial port to function in IR mode, pulse 3/16 bit time at full duplex. |
| ➔ | IR Mode, Pulse 3/16 Bit Time, Half Duplex | | Enables the serial port to function in IR mode, pulse 3/16 bit time at half duplex. |

5.3.9.2 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=2C8h;
IRQ=10 | | Serial Port I/O port address is 2C8h and the interrupt address is IRQ10 |
| ➔ | IO=2E0h;
IRQ=10, 11 | | Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11 |

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

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=2B0h;**
IRQ=10 Serial Port I/O port address is 2B0h and the interrupt address is IRQ10
- ➔ **IO=2E0h;**
IRQ=10, 11 Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C0h;**
IRQ=10, 11 Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h;**
IRQ=10, 11 Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

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

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=2B8h;**
IRQ=10 Serial Port I/O port address is 2B8h and the interrupt address is IRQ10
- ➔ **IO=2E0h;**
IRQ=10, 11 Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C0h;**
IRQ=10, 11 Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h;**
IRQ=10, 11 Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
- ➔ **IO=2B0h;**
IRQ=10, 11 Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
- ➔ **IO=2B8h;**
IRQ=10, 11 Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11

5.3.10 Serial Port Console Redirection

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

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BIOS Menu 16: Serial Port Console Redirection

➔ Console Redirection [Enabled]

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

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

➔ **Terminal Type [VT-100+]**

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

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

➔ **Bits per second [115200]**

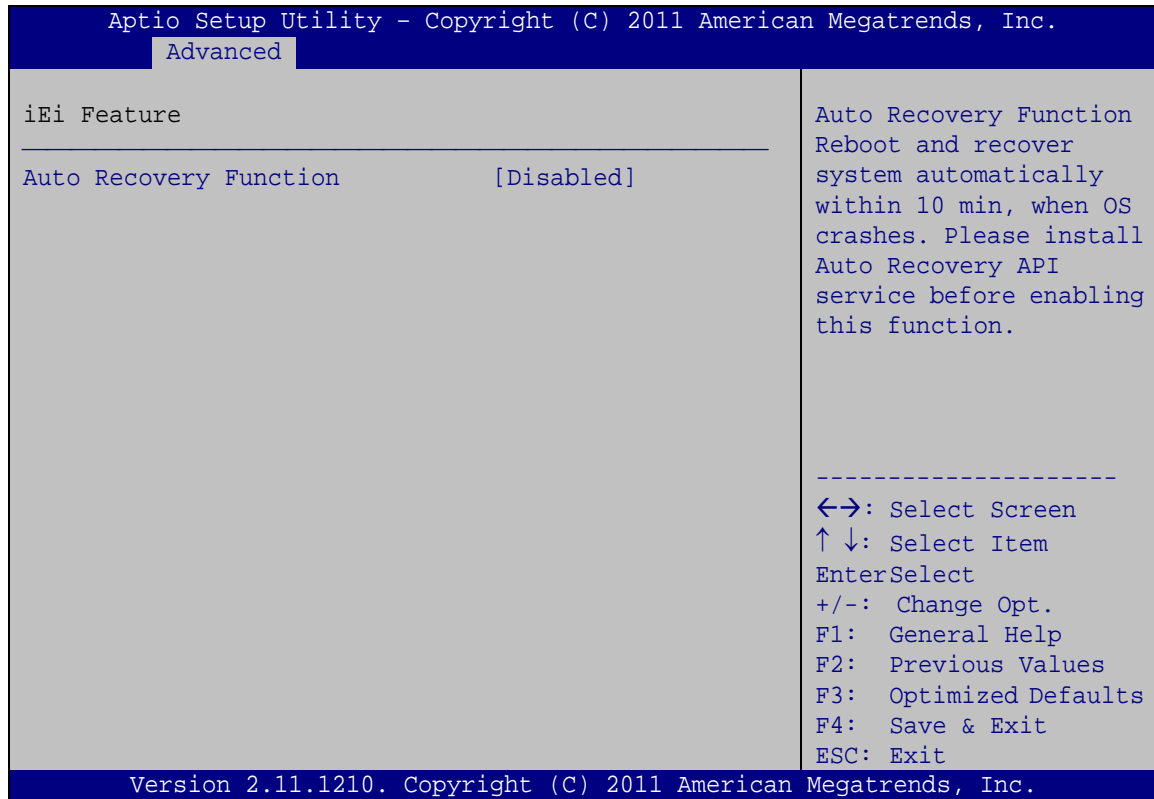
Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

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

5.3.11 IEI Feature

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

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BIOS Menu 17: IEI Feature

➔ Auto Recovery Function [Disabled]

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

- ➔ **Disabled** **DEFAULT** Auto recovery function disabled
- ➔ **Enabled** Auto recovery function enabled

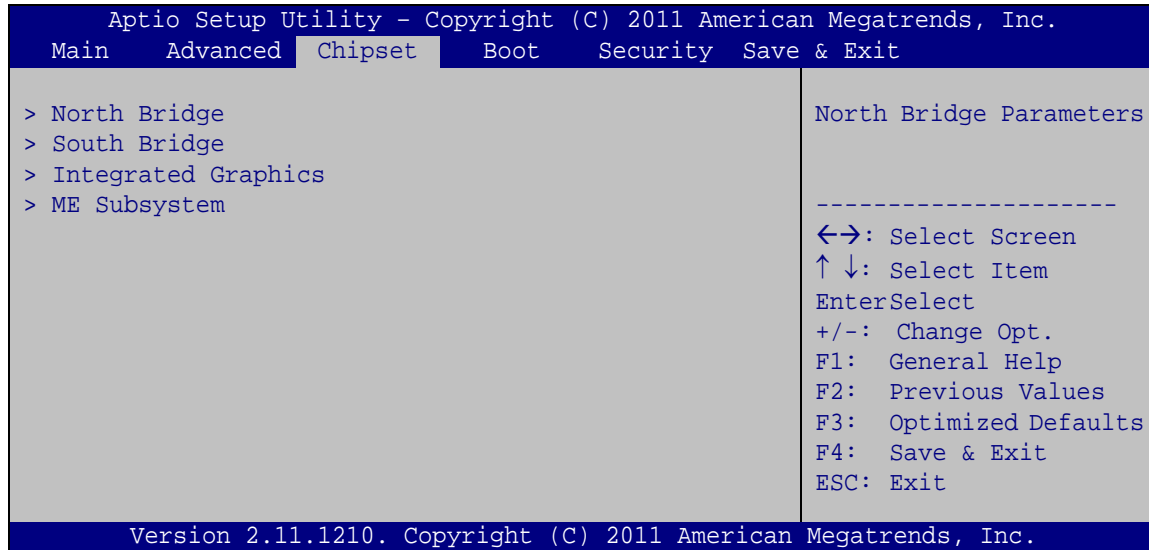
5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the 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.

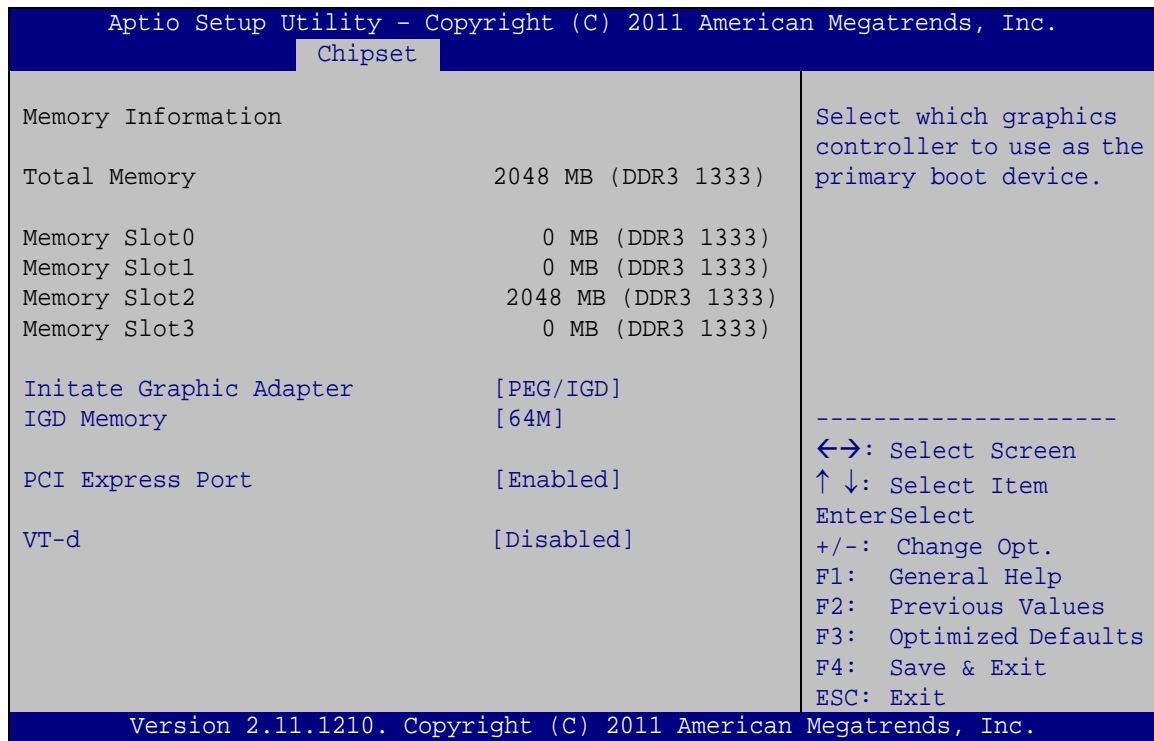


BIOS Menu 18: Chipset

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5.4.1 Northbridge Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 19**) to configure the Northbridge chipset.



BIOS Menu 19: Northbridge Chipset Configuration

➔ Initiate Graphic Adapter [PEG/IGD]

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD
- PCI/PEG
- PEG/IGD DEFAULT
- PEG/PCI

➔ **IGD Memory [64 M]**

Use the **IGD Memory** option to specify the amount of system memory that can be used by the Internal graphics device.

➔	Disable	
➔	32 M	32 MB of memory used by internal graphics device
➔	64 M	DEFAULT 64 MB of memory used by internal graphics device
➔	96 M	96 MB of memory used by internal graphics device
➔	128 M	128 MB of memory used by internal graphics device
➔	160 M	160 MB of memory used by internal graphics device
➔	192 M	192 MB of memory used by internal graphics device
➔	224 M	224 MB of memory used by internal graphics device
➔	256 M	256 MB of memory used by internal graphics device
➔	288 M	288 MB of memory used by internal graphics device
➔	320 M	320 MB of memory used by internal graphics device
➔	352 M	352 MB of memory used by internal graphics device
➔	384 M	384 MB of memory used by internal graphics device
➔	416 M	416 MB of memory used by internal graphics device
➔	448 M	448 MB of memory used by internal graphics device

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➔ **480 M** 480 MB of memory used by internal graphics device

➔ **512 M** 512 MB of memory used by internal graphics device

➔ PCI Express Port [Enabled]

Use the **PCI Express Port** option to enable or disable the PCI Express port.

➔ **Disabled** Disables the PCI Express port.

➔ **Enabled** **DEFAULT** Enables the PCI Express port.

➔ VT-d [Disabled]

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

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

➔ **Enabled** Enables VT-d support.

5.4.2 Southbridge Configuration

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

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
Auto Power Button Status	[OFF]	Enabled/Disabled All USB controllers
USB Controller	[Enabled]	
On-Chip GbE Configuration		
GbE Controller	[Enabled]	
GbE PXE Boot	[Disabled]	
Wake Event Configuration		
Restore AC Power Loss	[Power Off]	
Resume on PCIE Wake	[Enabled]	
Resume on PME/GbE	[Enabled]	
Resume on Ring	[Enabled]	
Resume on PS/2	[Enabled]	
Audio Configuration		-----
Azalia HD Audio	[Enabled]	←→: Select Screen
Azalia internal HDMI codec	[Enabled]	↑ ↓: Select Item
		EnterSelect
		+/-: Change Opt.
PCI Express Ports Configuration		F1: General Help
PCIe x4 Slot	[Enabled]	F2: Previous Values
PCIe LAN Controller	[Enabled]	F3: Optimized Defaults
PCIe LAN PXE Boot	[Disabled]	F4: Save & Exit
PCIe USB3.0 Controller	[Enabled]	ESC: Exit
PCIe x8 Slot (PCIe x1)	[Enabled]	
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.		

BIOS Menu 20: Southbridge Chipset Configuration

➔ USB Controller [Enabled]

Use the **USB Controller** option to enable or disable USB controller function.

➔ **Disabled** All USB controllers disabled

➔ **Enabled** **DEFAULT** All USB controllers enabled

➔ GbE Controller [Enabled]

Use the **GbE Controller** option to enable or disable the GbE controller. Before disabling the GbE controller, the AMT function must be disabled.

➔ **Disabled** The onboard GbE controller is disabled

➔ **Enabled** **DEFAULT** The onboard GbE controller is enabled

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→ GbE PXE Boot [Disabled]

Use the **GbE PXE Boot** option to enable or disable the boot option for GbE devices.

- **Disabled** **DEFAULT** Disables the GbE PXE Boot option
- **Enabled** Enables the GbE PXE Boot option

→ Restore on AC Power Loss [Power Off]

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

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

→ Resume on PCIe Wake [Enabled]

Use the **Resume on PCIe Wake** option to enable or disable resuming from the PCIe wake message and WAKE# signal.

- **Disabled** Disables Resume on PCIe Wake option
- **Enabled** **DEFAULT** Enables Resume on PCIe Wake option

→ Resume on PME/GbE [Enabled]

Use the **Resume on PME/GbE** option to enable or disable resuming from PCI PME#, on-chip GbE controller, or other on-chip devices.

- **Disabled** Disables Resume on PME/GbE option
- **Enabled** **DEFAULT** Enables Resume on PME/GbE option

→ Resume on Ring [Enabled]

Use the **Resume on Ring** option to enable or disable resuming from RI# signal.

- ➔ **Disabled** Disables Resume on Ring option
- ➔ **Enabled** **DEFAULT** Enables Resume on Ring option

➔ Resume on PS/2 [Enabled]

Use the **Resume on PS/2** option to enable or disable resuming from PS/2 activation.

- ➔ **Disabled** Disables Resume on PS/2 option
- ➔ **Enabled** **DEFAULT** Enables Resume on PS/2 option

➔ 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

➔ Azalia internal HDMI codec [Disabled]

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

- ➔ **Disabled** **DEFAULT** Disables the internal HDMI codec for High Definition Audio
- ➔ **Enabled** Enables the internal HDMI codec for High Definition Audio

➔ PCIe x4 Slot [Enabled]

Use the **PCIe x4 Slot** option to enable or disable the PCI Express x4 Slot.

- ➔ **Disabled** Disables the PCIe x4 Slot
- ➔ **Enabled** **DEFAULT** Enables the PCIe x4 Slot

➔ PCIe LAN Controller [Enabled]

Use the **PCIe LAN Controller** option to enable or disable the PCI Express LAN controller.

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- ➔ **Disabled** The onboard PCIe LAN controller is disabled
- ➔ **Enabled** **DEFAULT** The onboard PCIe LAN controller is enabled

➔ PCIe LAN PXE Boot [Disabled]

Use the **PCIe LAN PXE Boot** option to enable or disable the boot option for the PCIe LAN PXE.

- ➔ **Disabled** **DEFAULT** Disables PCIe LAN PXE Boot option
- ➔ **Enabled** Enables PCIe LAN PXE Boot option

➔ PCIe USB3.0 Controller [Enabled]

Use the **PCIe USB3.0 Controller** option to enable or disable the PCI Express USB 3.0 controller.

- ➔ **Disabled** The onboard USB 3.0 controller is disabled
- ➔ **Enabled** **DEFAULT** The onboard USB 3.0 controller is enabled

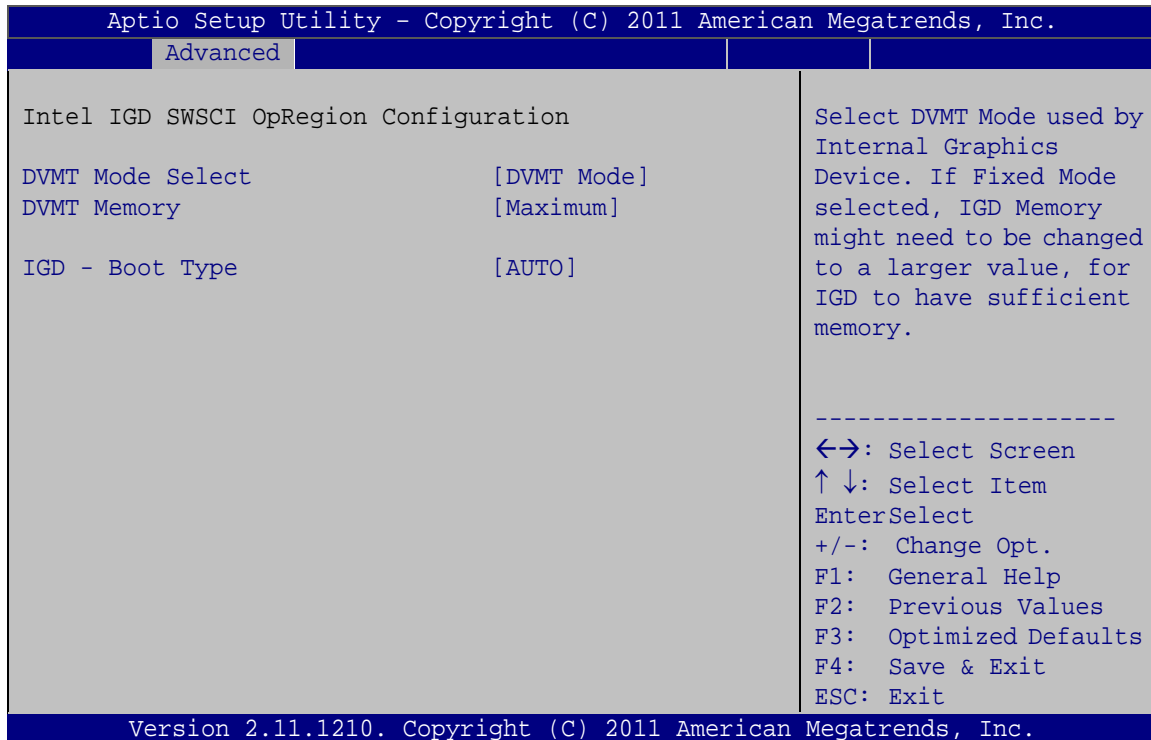
➔ PCIe x8 Slot [Enabled]

Use the **PCIe x8 Slot** option to enable or disable the PCI Express x8 Slot. This slot supports x1 mode only.

- ➔ **Disabled** Disables the PCIe x8 Slot
- ➔ **Enabled** **DEFAULT** Enables the PCIe x8 Slot

5.4.3 Integrated Graphics

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



BIOS Menu 21: Integrated Graphics

→ DVMT Mode Select [DVMT Mode]

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

- **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.
- **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.

→ DVMT Memory [Maximum]

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128 MB
- 256 MB
- Maximum **DEFAULT**

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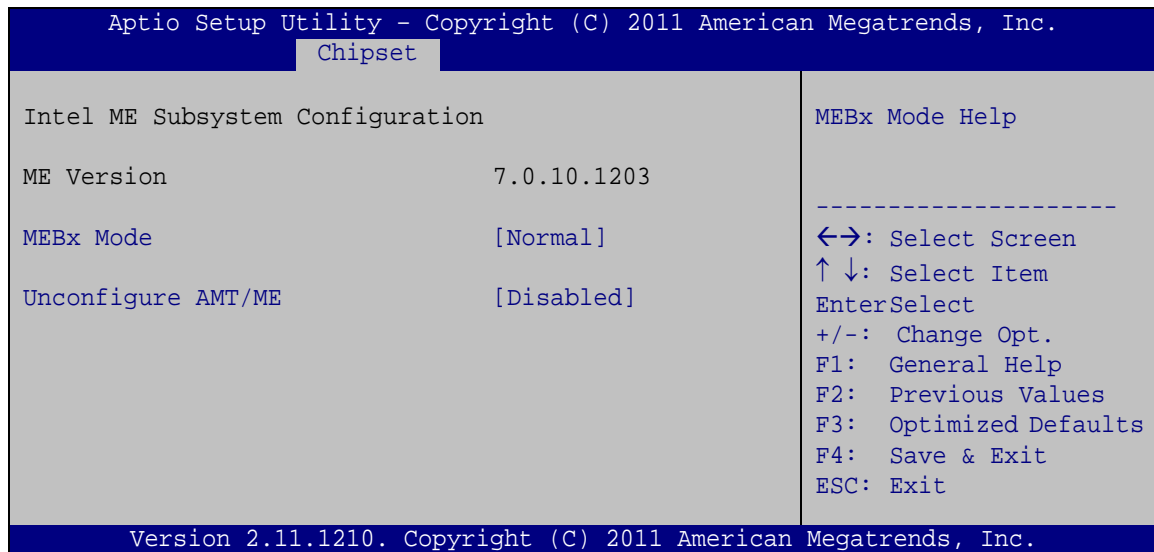
→ IGD - Boot Type [AUTO]

Use the **IGD - Boot Type** option to select the display device used by the system when it boots. For dual display support, select “Auto.” Configuration options are listed below.

- AUTO **DEFAULT**
- CRT
- DVI
- HDMI

5.4.4 ME Subsystem

Use the **ME Subsystem** menu (**BIOS Menu 22**) to configure the Intel® Management Engine (ME) configuration options.



BIOS Menu 22: ME Subsystem

→ MEBx Mode [Normal]

Use the **MEBx Mode** option to configure MEBx Mode options.

- **Normal** **DEFAULT** Enables normal mode
- **Hidden** Enables hidden Ctrl+P function
- Ctrl + P

- ➔ **Enter MEBx Setup** Enables user to enter MEBx setup

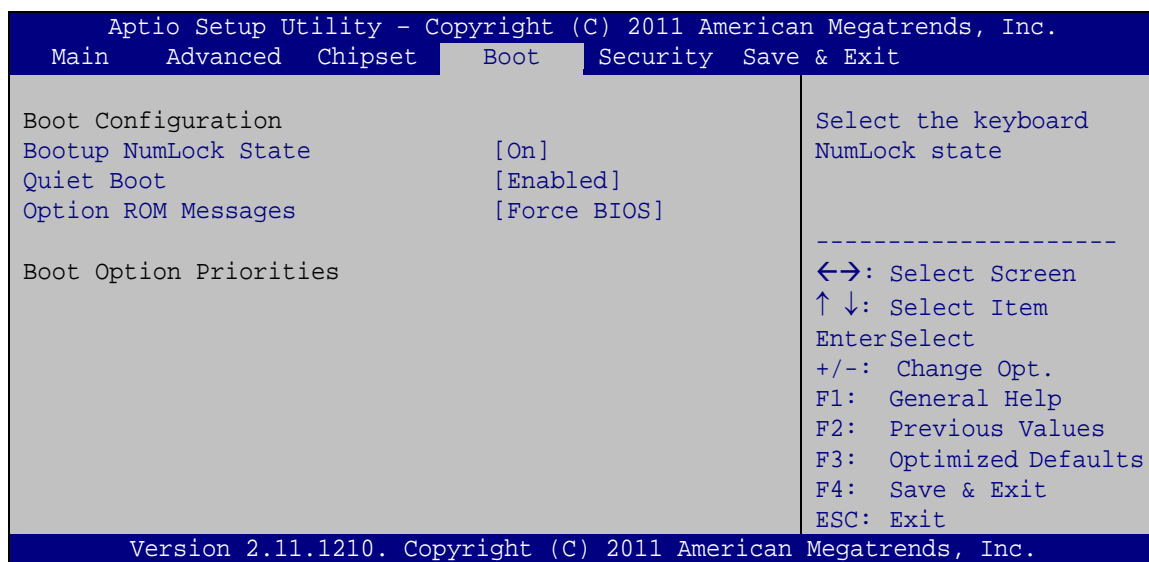
- ➔ **Unconfigure AMT/ME [Disabled]**

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

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

5.5 Boot

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



BIOS Menu 23: Boot

- ➔ **Bootup NumLock State [On]**

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

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

➔ Quiet Boot [Enabled]

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

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

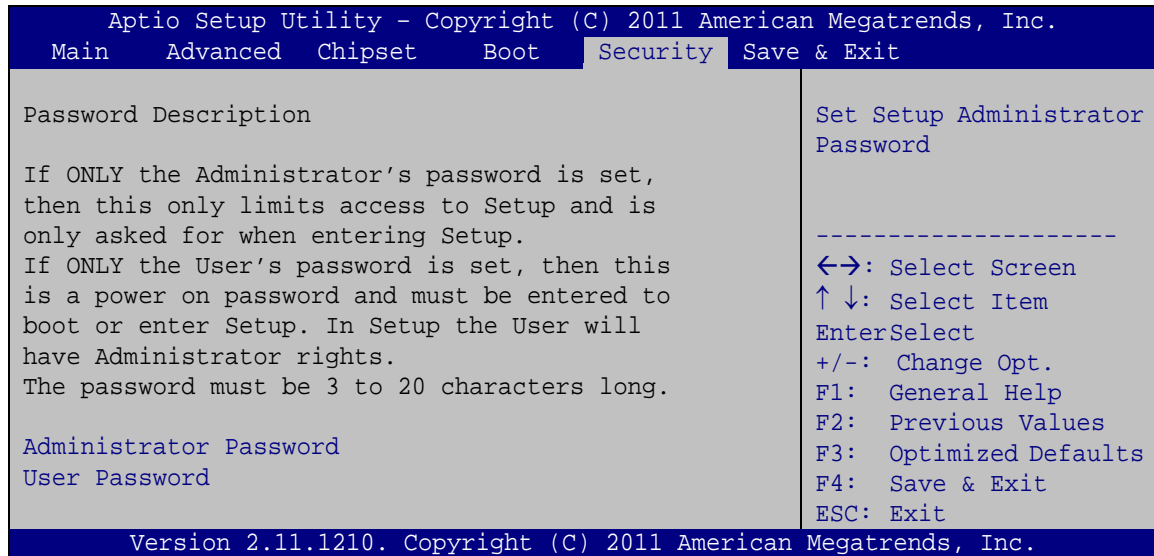
➔ Option ROM Messages [Force BIOS]

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

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

5.6 Security

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



BIOS Menu 24: Security

➔ Administrator Password

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

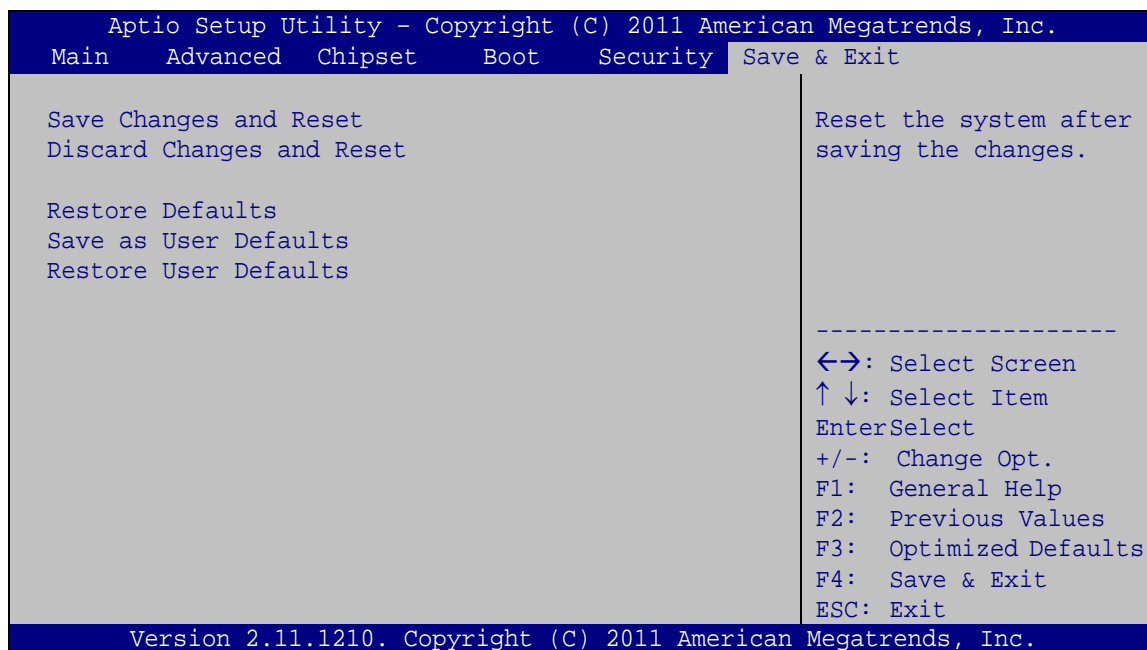
➔ User Password

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

5.7 Save & Exit

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

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BIOS Menu 25: Save & Exit

➔ Save Changes and Reset

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

➔ Discard Changes and Reset

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

➔ Restore Defaults

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

➔ Save as User Defaults

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

➔ Restore User Defaults

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

Chapter

6

Software Drivers

IMB-H610 Micro-ATX Motherboard

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
- Graphic
- LAN
- Audio

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMB-H610 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

**NOTE:**

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

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



Figure 6-1: Introduction Screen

Step 3: Click IMB-H610.

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

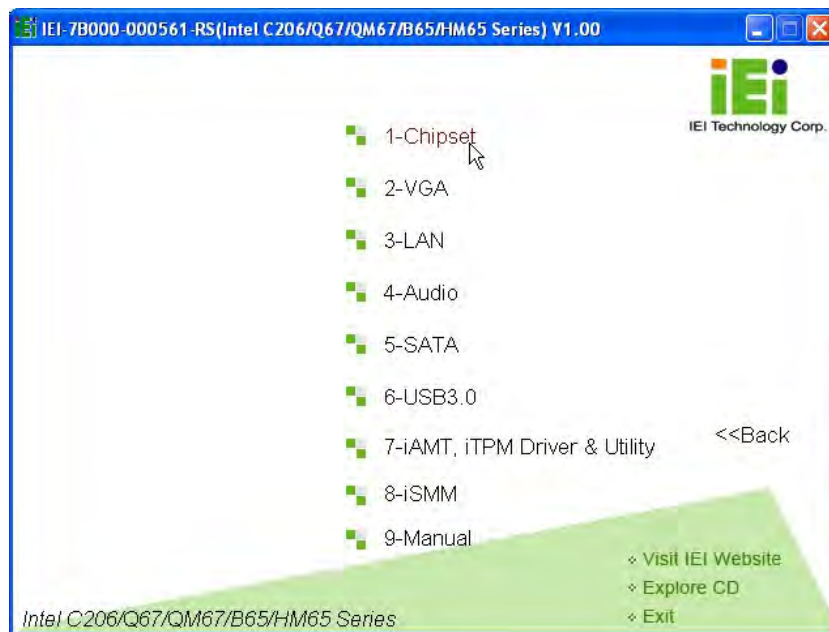


Figure 6-2: Available Drivers

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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**.

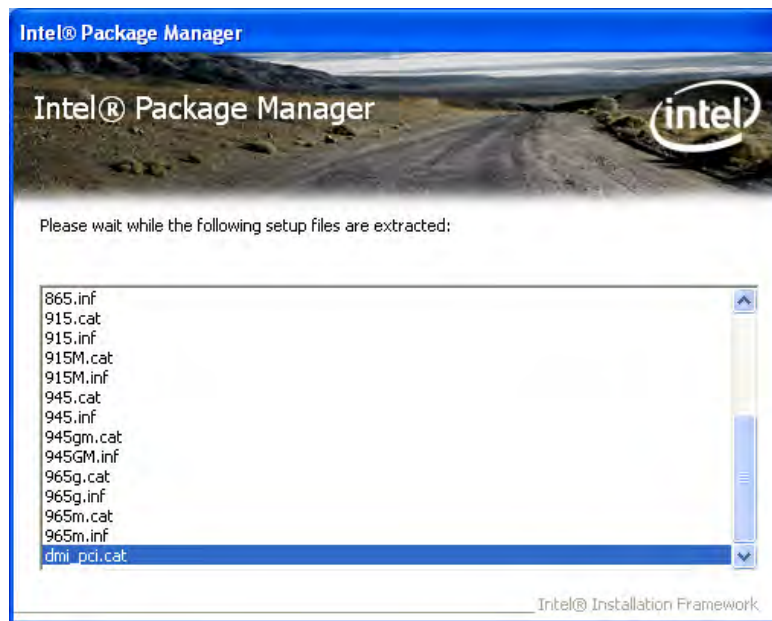


Figure 6-3: Chipset Driver Screen

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

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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

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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 **"VGA"** and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome Screen** in **Figure 6-9** appears.

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

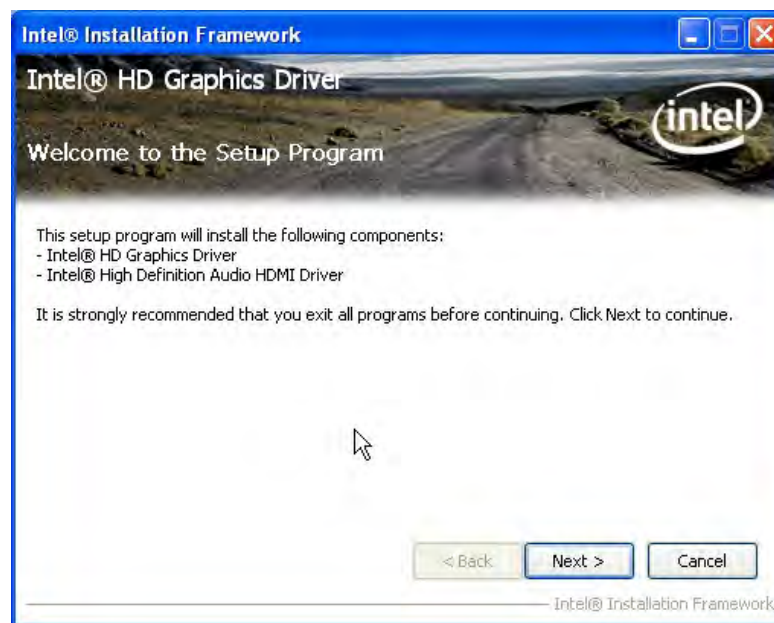


Figure 6-9: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-10** appears.

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



Figure 6-10: Graphics Driver License Agreement

Step 8: **Setup Operations** are performed as shown in **Figure 6-11**.

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

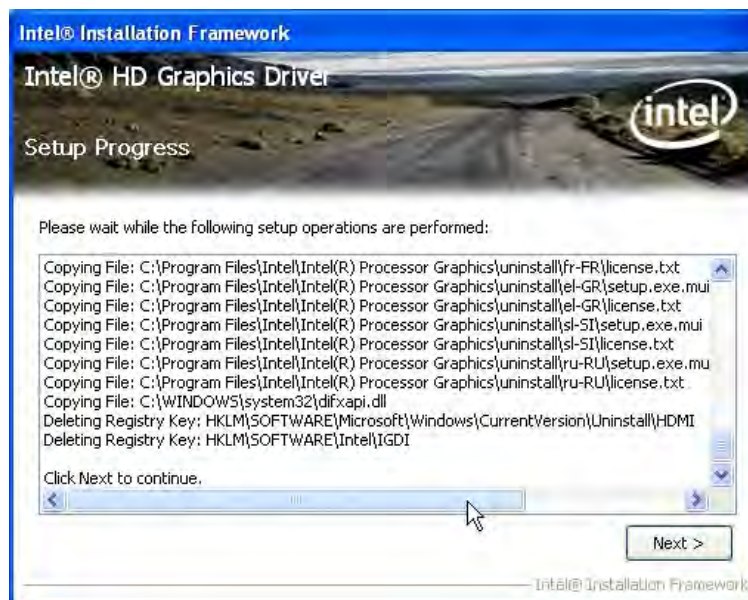


Figure 6-11: Graphics Driver Setup Operations

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Step 10: The **Finish** screen in **Figure 6-12** appears.

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



Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

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

Step 2: Click “**LAN**” and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome** screen in **Figure 6-13** appears.

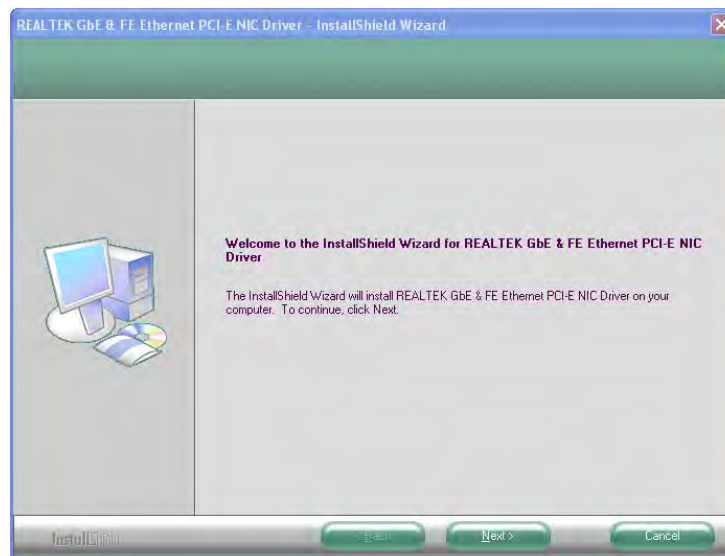


Figure 6-13: LAN Driver Welcome Screen

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

Step 6: The **Ready to Install the Program** Screen in **Figure 6-14** appears.

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

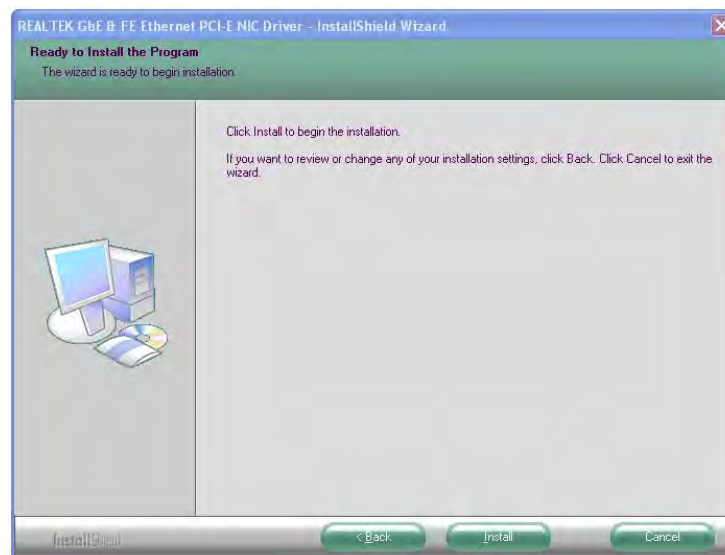


Figure 6-14: LAN Driver Ready to Install Screen

Step 8: The program begins to install.

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Step 9: The **Setup Status** screen in **Figure 6-15** appears.

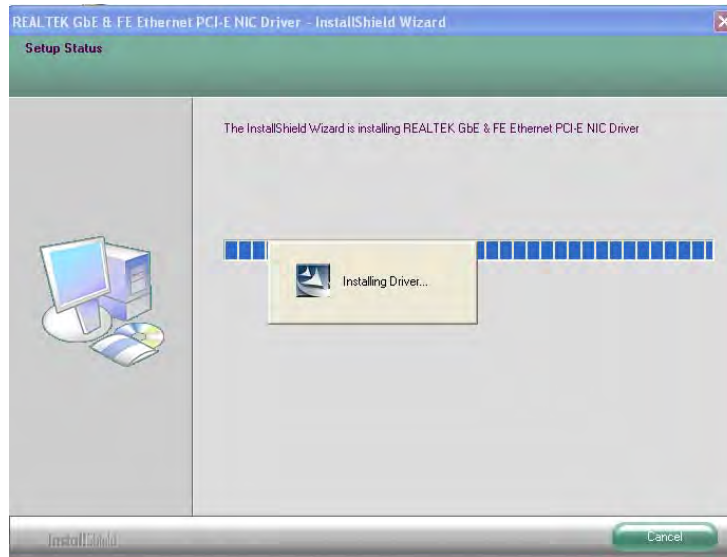


Figure 6-15: LAN Driver Setup Status Screen

Step 10: When the driver installation is complete, the screen in **Figure 6-16** appears.

Step 11: Click **Finish** to exit.

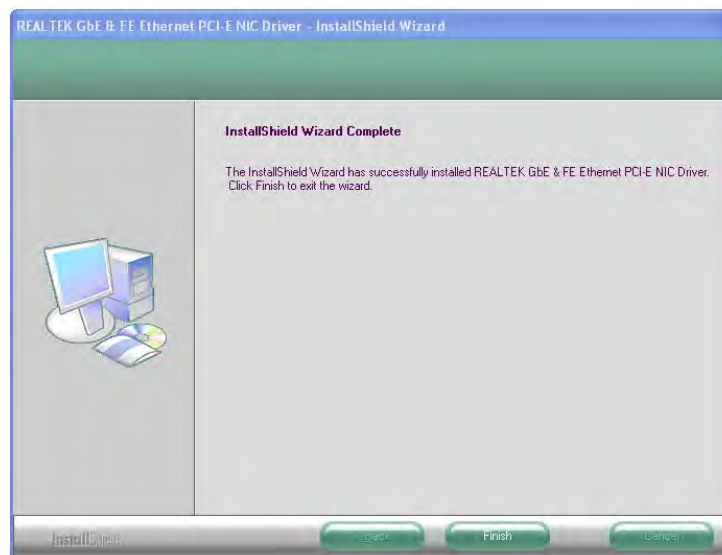


Figure 6-16: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

- Step 1:** Access the driver list. (See **Section 6.2**)
- Step 2:** Click **“Audio”** and select the folder which corresponds to the operating system.
- Step 3:** Double click the setup file.
- Step 4:** The InstallShield Wizard starts to extracting files (**Figure 6-17**).



Figure 6-17: Audio Driver – Extracting Files

- Step 5:** The **Audio Driver Welcome** message in **Figure 6-18** appears.
- Step 6:** Click **Yes** to install the audio driver.



Figure 6-18: Audio Driver Welcome Screen

Step 7: The audio driver installation begins. See **Figure 6-19**.



Figure 6-19: Audio Driver Installation

Step 8: When the installation is complete, the screen in **Figure 6-20** appears.

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



Figure 6-20: Audio Driver Installation Complete

Appendix

A

BIOS Options

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

➔ System Overview	71
➔ Memory Information	71
➔ System Date [xx/xx/xx]	72
➔ System Time [xx:xx:xx]	72
➔ ACPI Sleep State [S1 (CPU Stop Clock)]	74
➔ TPM Support [Disable]	75
➔ Intel Virtualization Technology [Disabled]	75
➔ Active Processor Cores [All]	76
➔ SATA Mode [AHCI Mode]	78
➔ Staggered Spin-up [Disabled]	79
➔ External SATA Port	79
➔ Hot Plug	79
➔ USB Devices	81
➔ USB Support [Enabled]	81
➔ Legacy USB Support [Enabled]	81
➔ Power Saving Function [Disabled]	82
➔ Serial Port [Enabled]	83
➔ Change Settings [Auto]	83
➔ Serial Port [Enabled]	84
➔ Change Settings [Auto]	84
➔ Serial Port [Enabled]	85
➔ Change Settings [Auto]	85
➔ Serial Port [Enabled]	86
➔ Change Settings [Auto]	86
➔ Device Mode [RS485]	86
➔ Serial Port [Enabled]	87
➔ Change Settings [Auto]	87
➔ Serial Port [Enabled]	87
➔ Change Settings [Auto]	88
➔ PC Health Status	89
➔ CPU Smart Fan control [Auto by RPM]	90
➔ Target Temp. Sensor [CPU Temperature]	91
➔ Temperature Bound n	91

➔ Segment n Speed (%)	91
➔ Full Speed Count	91
➔ CPU Smart Fan control [Auto by Duty-Cycle]	92
➔ Target Temp. Sensor [CPU Temperature]	92
➔ Temperature Bound n	93
➔ Segment n Speed (PWM)	93
➔ Serial Port [Enabled]	94
➔ Change Settings [Auto]	94
➔ Device Mode [Normal]	94
➔ Serial Port [Enabled]	95
➔ Change Settings [Auto]	95
➔ Serial Port [Enabled]	96
➔ Change Settings [Auto]	96
➔ Serial Port [Enabled]	97
➔ Change Settings [Auto]	97
➔ Console Redirection [Enabled]	99
➔ Terminal Type [VT-100+]	100
➔ Bits per second [115200]	100
➔ Auto Recovery Function [Disabled]	101
➔ Initiate Graphic Adapter [PEG/IGD]	103
➔ IGD Memory [64 M]	104
➔ PCI Express Port [Enabled]	105
➔ VT-d [Disabled]	105
➔ USB Controller [Enabled]	106
➔ GbE Controller [Enabled]	106
➔ GbE PXE Boot [Disabled]	107
➔ Restore on AC Power Loss [Power Off]	107
➔ Resume on PCIe Wake [Enabled]	107
➔ Resume on PME/GbE [Enabled]	107
➔ Resume on Ring [Enabled]	107
➔ Resume on PS/2 [Enabled]	108
➔ Azalia HD Audio [Enabled]	108
➔ Azalia internal HDMI codec [Disabled]	108
➔ PCIe x4 Slot [Enabled]	108
➔ PCIe LAN Controller [Enabled]	108

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➔	PCIe LAN PXE Boot [Disabled].....	109
➔	PCIe USB3.0 Controller [Enabled].....	109
➔	PCIe x8 Slot [Enabled].....	109
➔	DVMT Mode Select [DVMT Mode].....	110
➔	DVMT Memory [Maximum].....	110
➔	IGD - Boot Type [AUTO]	111
➔	MEBx Mode [Normal].....	111
➔	Unconfigure AMT/ME [Disabled]	112
➔	Bootup NumLock State [On].....	112
➔	Quiet Boot [Enabled]	113
➔	Option ROM Messages [Force BIOS].....	113
➔	Administrator Password	114
➔	User Password	114
➔	Save Changes and Reset	115
➔	Discard Changes and Reset	115
➔	Restore Defaults	115
➔	Save as User Defaults	115
➔	Restore User Defaults	115

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. The one key recovery provides quick and easy shortcuts for creating a backup and reverting to that backup or for reverting to the factory default settings.

The IEI One Key Recovery tool menu is shown below.

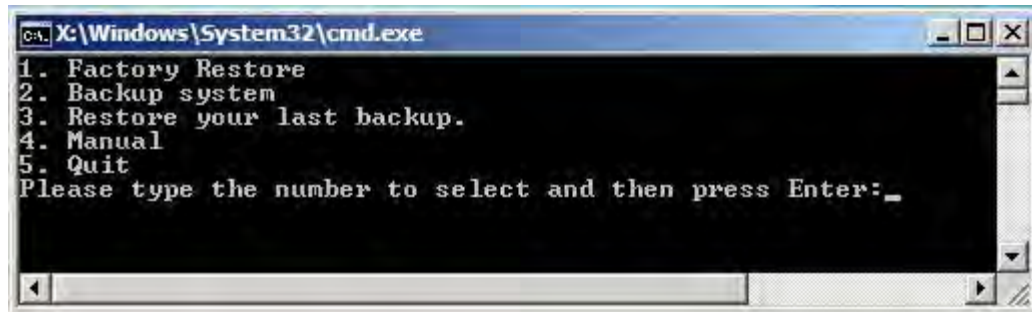


Figure B-1: IEI One Key Recovery Tool Menu

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.

3. Hardware and BIOS setup (see **Section B.2.1**)
4. Create partitions (see **Section B.2.2**)
5. Install operating system, drivers and system applications (see **Section B.2.3**)
6. Build-up recovery partition (see **Section B.2.4**)
7. 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.4**.



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 system (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 Windows system, 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-up recovery partition (see **Section B.2.4**)

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 system, most setup procedures are the same with Microsoft Windows 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.

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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.

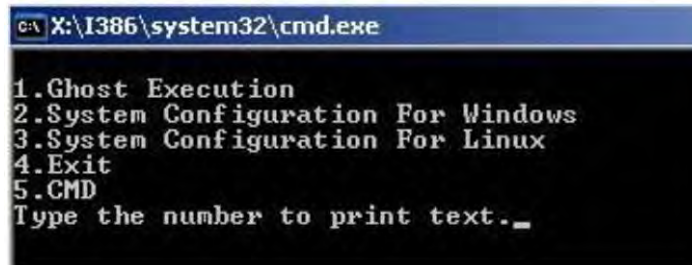
Step 1: Put the recovery CD in the optical drive of the system.

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.

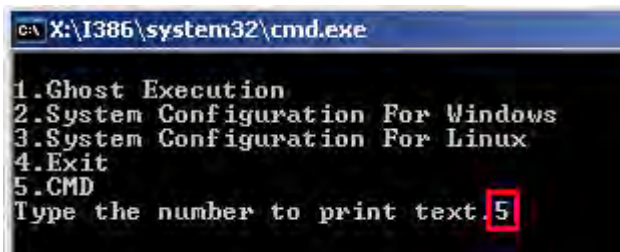
A screenshot of a command prompt window titled "C:\X:\I386\system32\cmd.exe". The window displays a menu with five options: 1. Ghost Execution, 2. System Configuration For Windows, 3. System Configuration For Linux, 4. Exit, and 5. CMD. Below the menu, it says "Type the number to print text._".

```
C:\X:\I386\system32\cmd.exe

1.Ghost Execution
2.System Configuration For Windows
3.System Configuration For Linux
4.Exit
5.CMD
Type the number to print text._
```

Figure B-3: Recovery Tool Setup Menu

Step 4: Press <5> then <Enter>.

A screenshot of the same command prompt window as in Figure B-3. The number '5' at the end of the line "Type the number to print text.5" is highlighted with a red square.

```
C:\X:\I386\system32\cmd.exe

1.Ghost Execution
2.System Configuration For Windows
3.System Configuration For Linux
4.Exit
5.CMD
Type the number to print text.5
```

Figure B-4: Command Mode

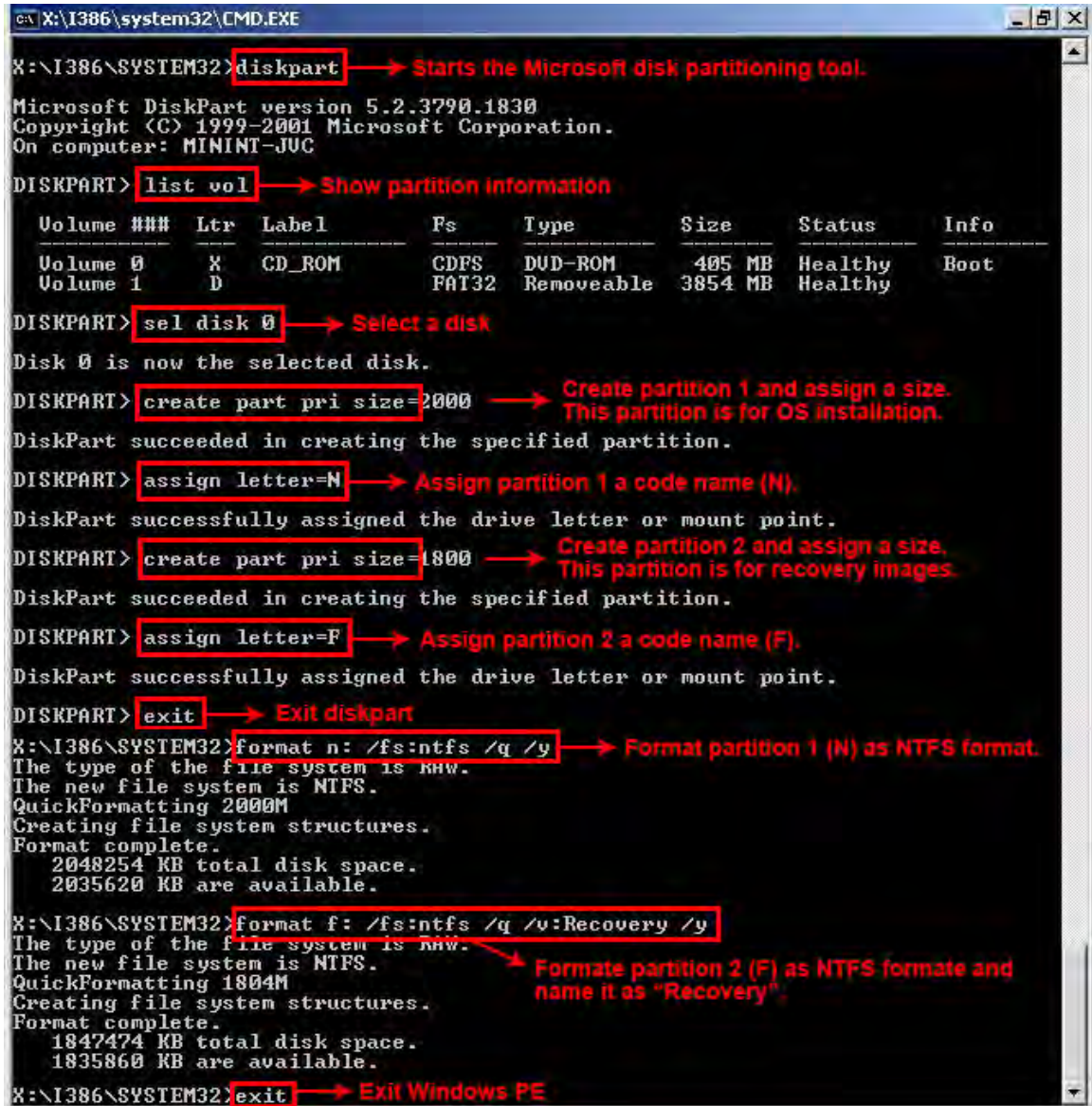
Step 5: The command prompt window appears. Type the following commands (marked in red) to create two partitions. One is for the OS installation; the other is for saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

```
system32>diskpart
DISKPART>list vol
DISKPART>sel disk 0
DISKPART>create part pri size= ____
DISKPART>assign letter=N
DISKPART>create part pri size= ____
DISKPART>assign letter=F
DISKPART>exit
system32>format N: /fs:ntfs /q /y
```

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

system32>exit



```
X:\I386\SYSTEM32\CMD.EXE
X:\I386\SYSTEM32>diskpart → Starts the Microsoft disk partitioning tool.
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JUC

DISKPART>list vol → Show partition information

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

DISKPART>sel disk 0 → Select a disk
Disk 0 is now the selected disk.

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

DISKPART>assign letter=N → Assign partition 1 a code name (N).
DiskPart successfully assigned the drive letter or mount point.

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

DISKPART>assign letter=F → Assign partition 2 a code name (F).
DiskPart successfully assigned the drive letter or mount point.

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

X:\I386\SYSTEM32>format f: /fs:ntfs /q /v:Recovery /y → Formate partition 2 (F) as NTFS formate and
                                                         name it as "Recovery".
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 1804M
Creating file system structures.
Format complete.
1847474 KB total disk space.
1835860 KB are available.

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

Figure B-5: Partition Creation Commands


NOTE:

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

```
K:\I386\SYSTEM32>diskpart
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JUC

DISKPART> sel disk 0
Disk 0 is now the selected disk.

DISKPART> list part

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

DISKPART> exit
```

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

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

B.2.3 Install Operating System, Drivers and Applications

Install the operating system onto the unlabelled partition. The partition labeled as "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.

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B.2.4 Build-up Recovery Partition

- Step 1:** Put the recover CD in the optical drive.
- Step 2:** Start the system.
- Step 3:** **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-6: Launching the Recovery Tool

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

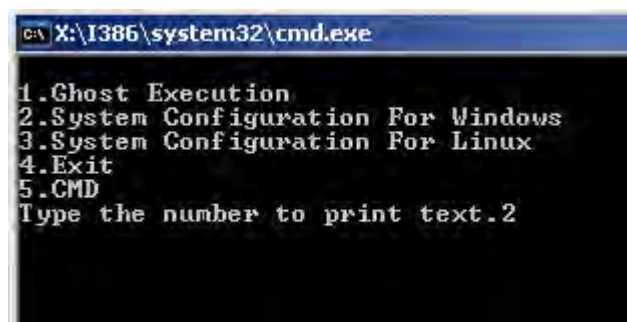


Figure B-7: System Configuration for Windows

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

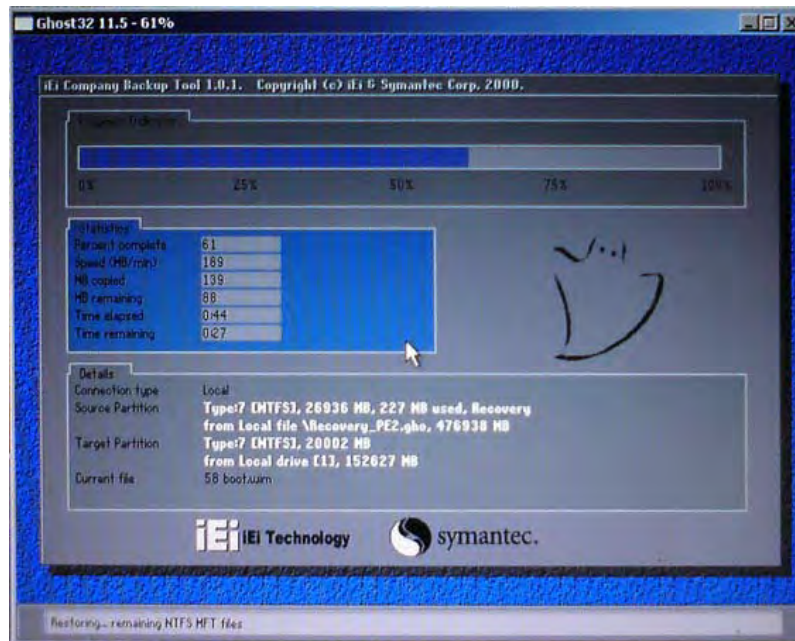


Figure B-8: Build-up Recovery Partition

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

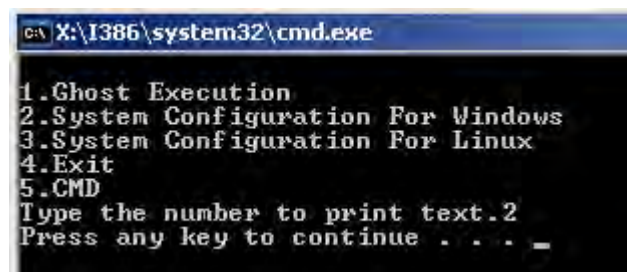


Figure B-9: Press any key to continue

Step 7: Eject the recovery CD.

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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.

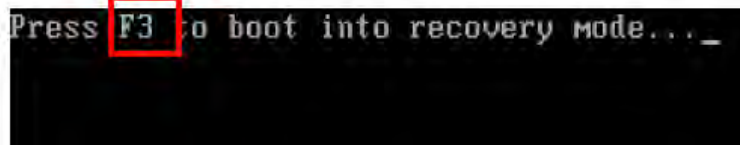


Figure B-10: Press F3 to Boot into Recovery Mode

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.

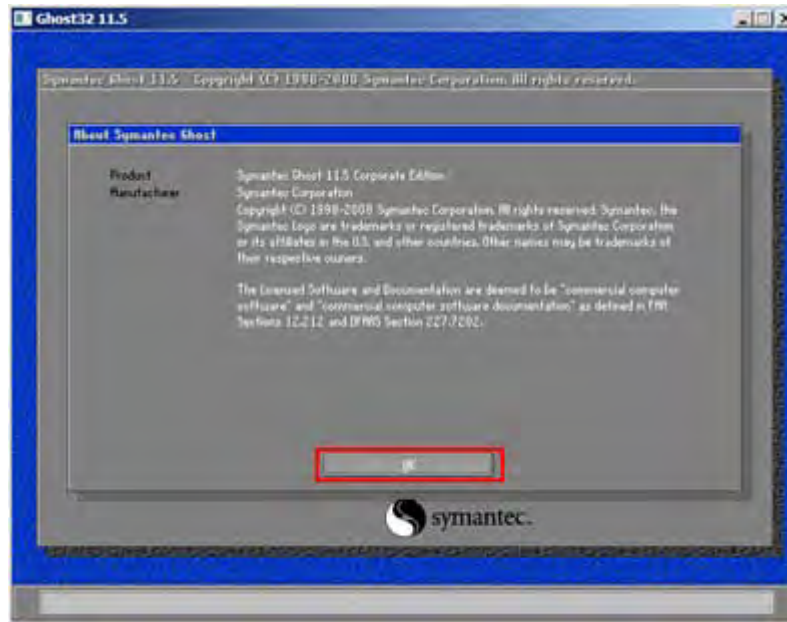


Figure B-12: About Symantec Ghost Window

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

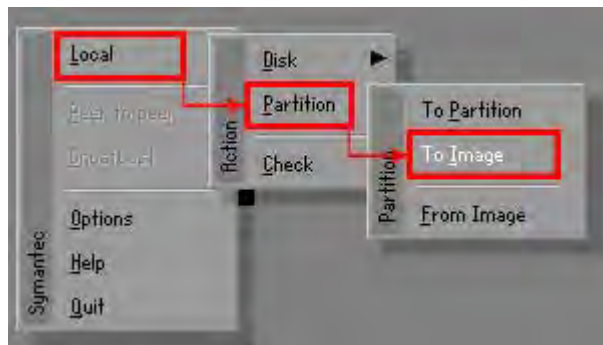


Figure B-13: Symantec Ghost Path

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

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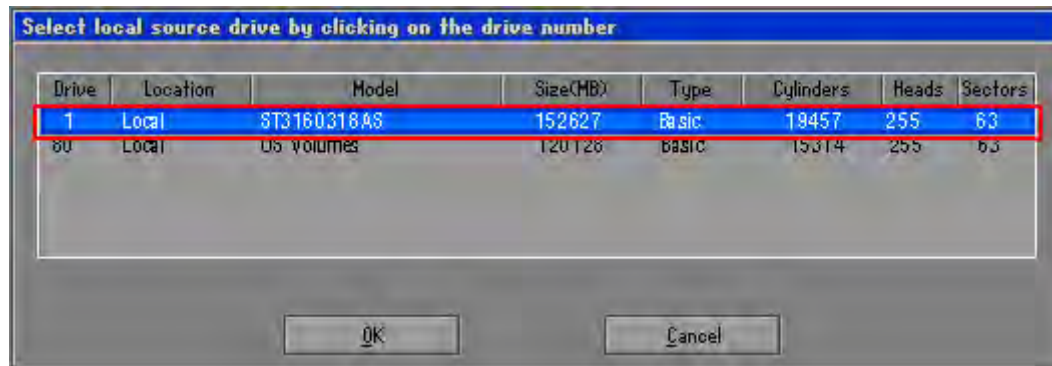


Figure B-14: Select a Local Source Drive

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

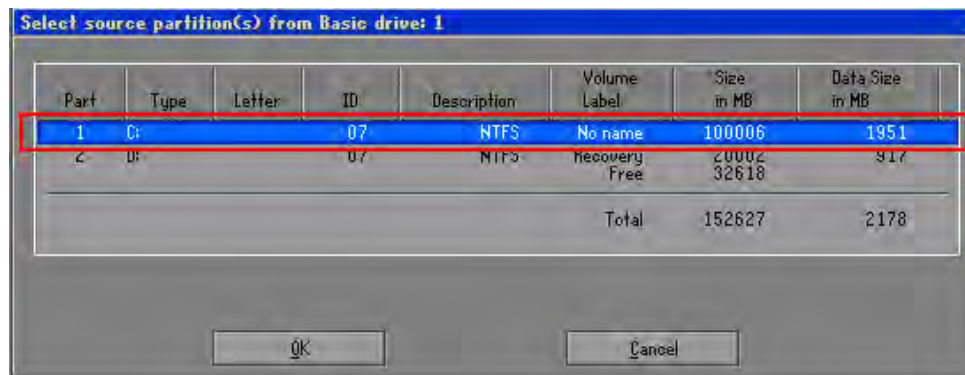


Figure B-15: Select a Source Partition from Basic Drive

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**.

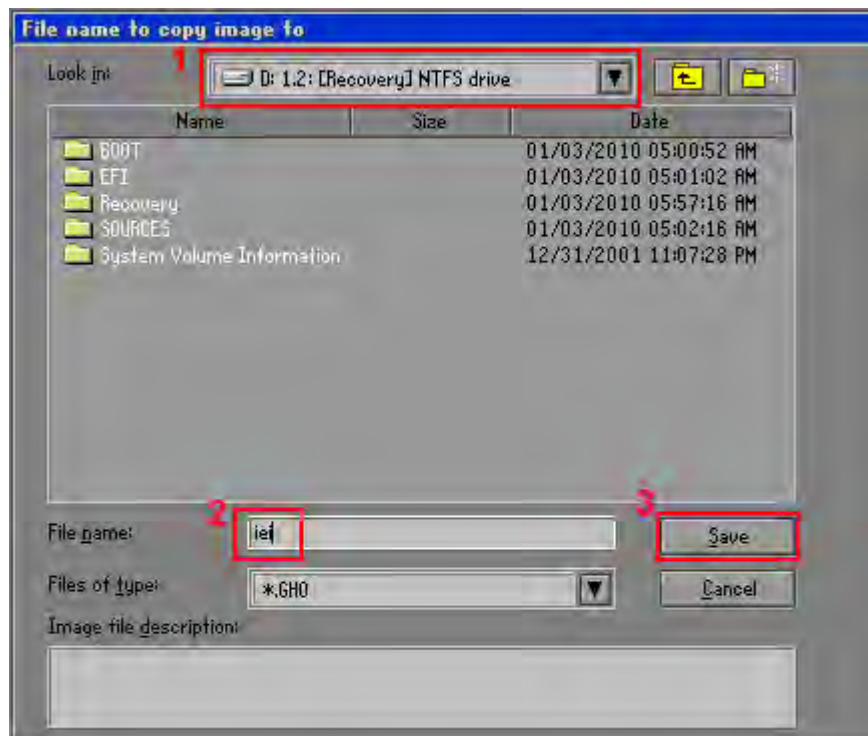


Figure B-16: File Name to Copy Image to

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

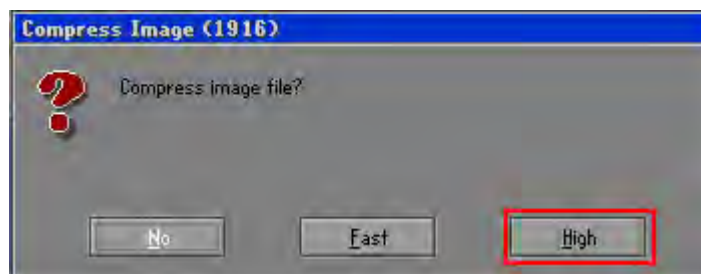


Figure B-17: Compress Image

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

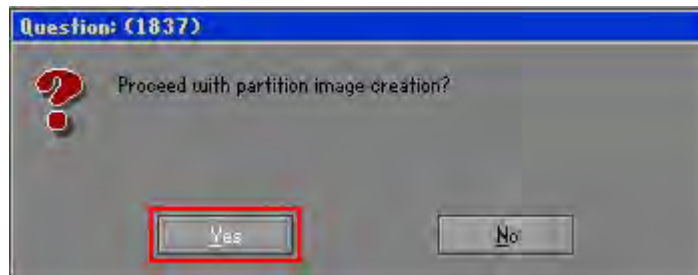


Figure B-18: Image Creation Confirmation

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

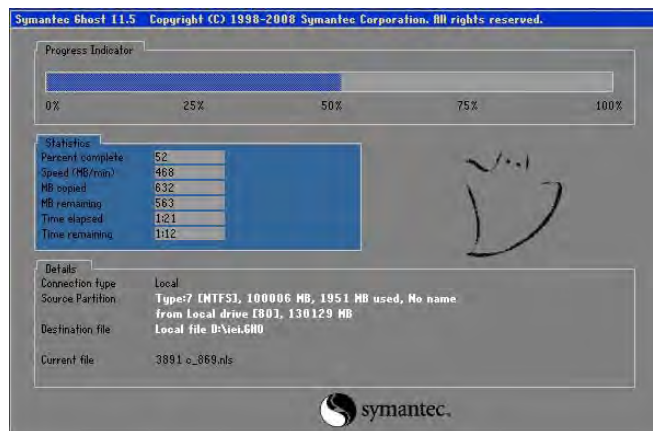


Figure B-19: Image Creation Process

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.

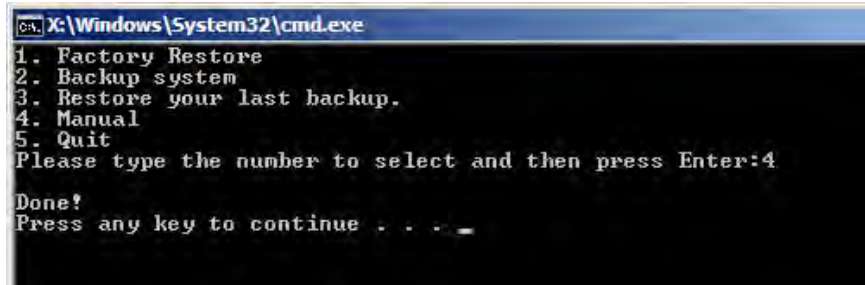


Figure B-21: Press Any Key to Continue

B.3 Setup Procedure for Linux

The initial setup procedures for a Linux system are mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup the 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.

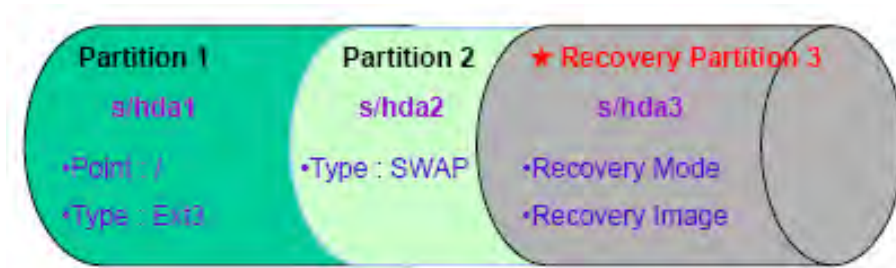


Figure B-22: Partitions for Linux

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-up 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-23**). The Symantec Ghost window appears and starts configuring the system to build-up a

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

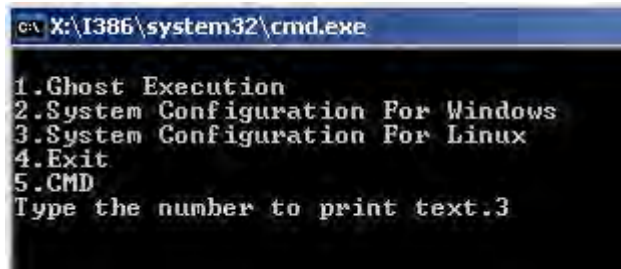


Figure B-23: System Configuration for Linux

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

cd /boot/grub

vi menu.lst

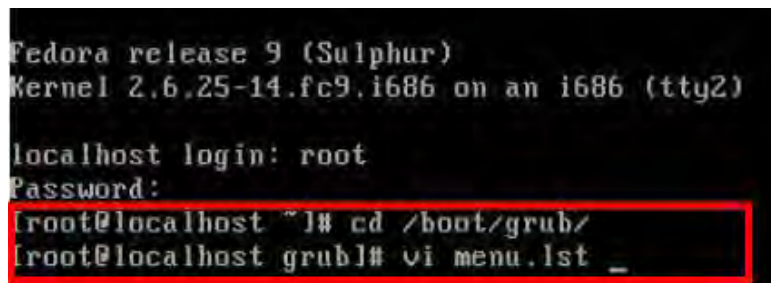


Figure B-24: Access menu.lst in Linux (Text Mode)

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

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

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

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

Step 7: The recovery tool menu appears. (Figure B-25)

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

Figure B-25: 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.4 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. The main menu of the recovery tool is shown below.

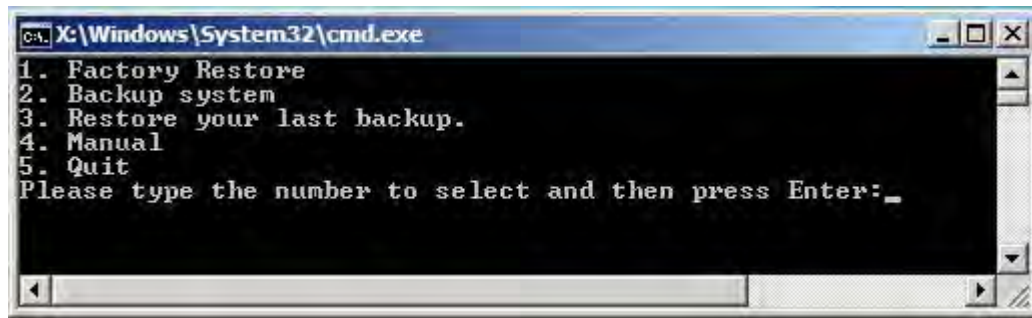


Figure B-26: Recovery Tool Main Menu

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).

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B.4.1 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.

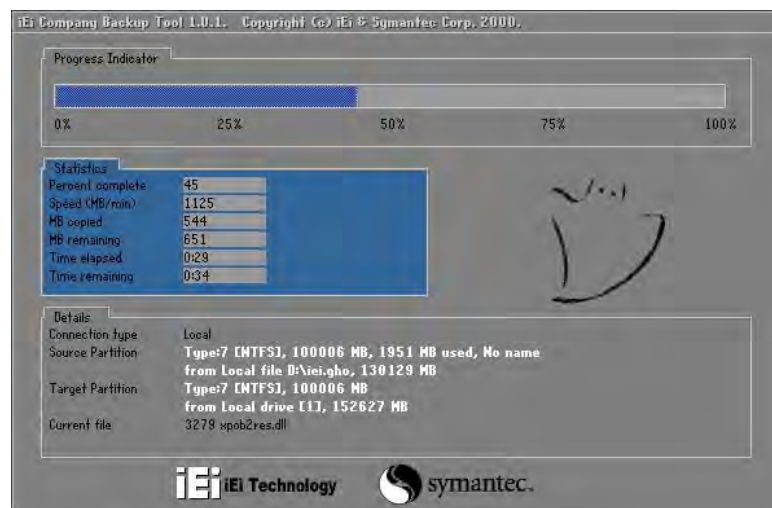


Figure B-27: Restore Factory Default

Step 3: The screen is shown as in **Figure B-28** when completed. Press any key to reboot the system.

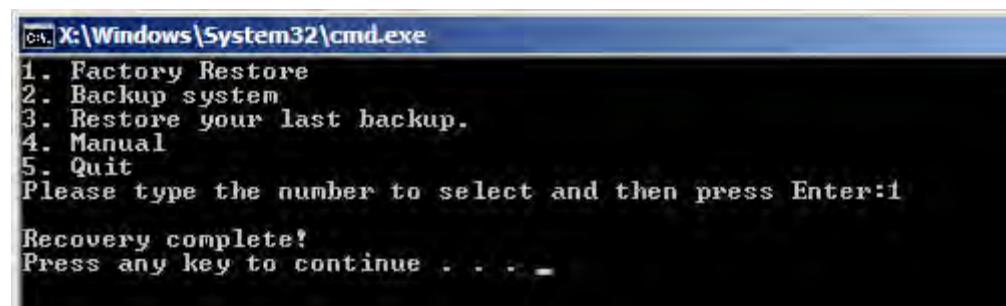


Figure B-28: Recovery Complete Window

B.4.2 Backup System

To backup the system, please follow the steps below.

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

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

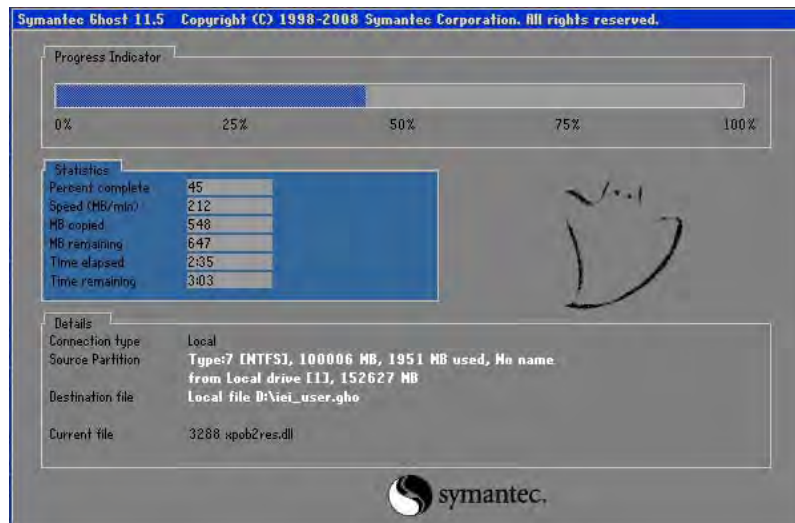


Figure B-29: Backup System

Step 3: The screen is shown as in **Figure B-30** when system backup is completed.

Press any key to reboot the system.

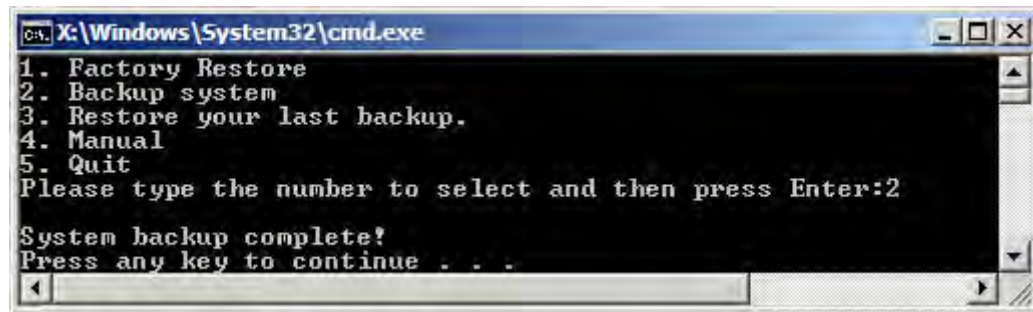


Figure B-30: System Backup Complete Window

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B.4.3 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).

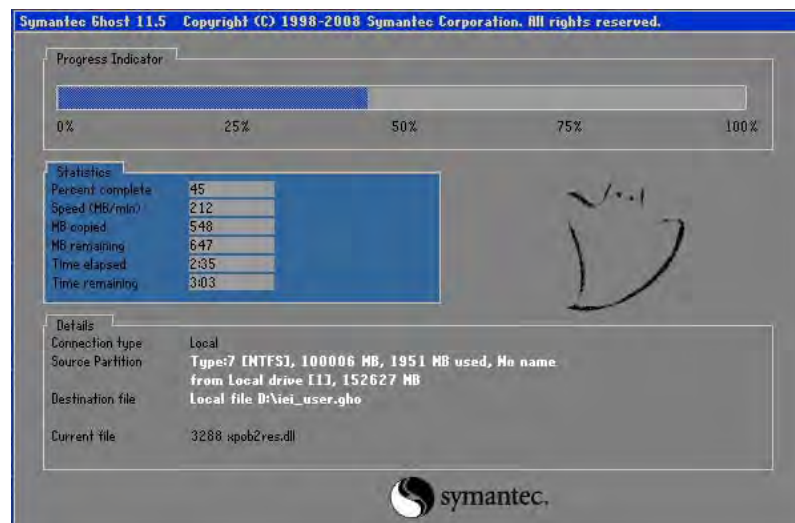


Figure B-31: Restore Backup

Step 3: The screen is shown as in **Figure B-32** when backup recovery is completed. Press any key to reboot the system.



Figure B-32: Restore System Backup Complete Window

B.4.4 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-33: Symantec Ghost Window

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

B.5 Other Information

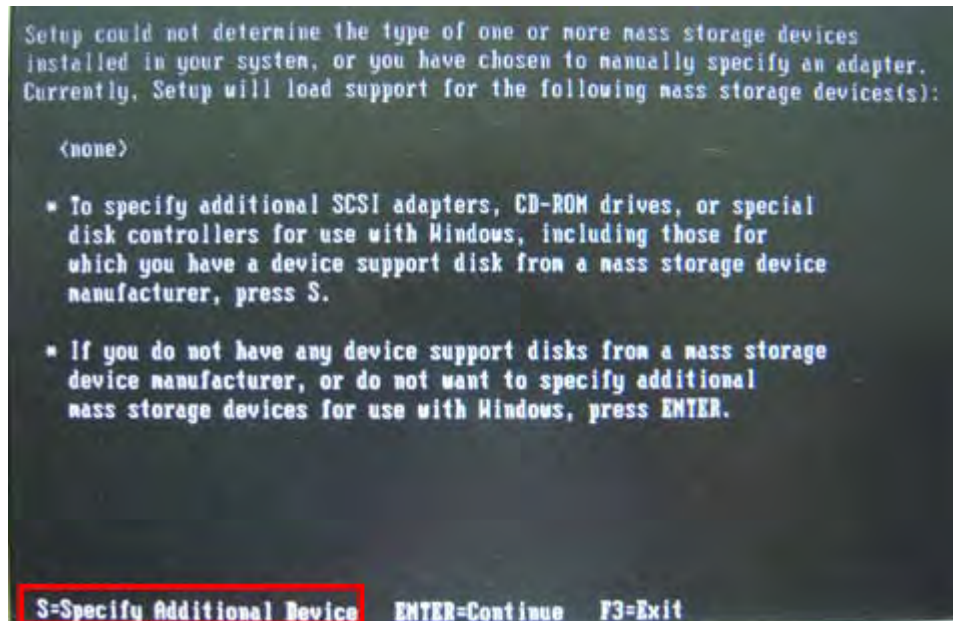
B.5.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

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.

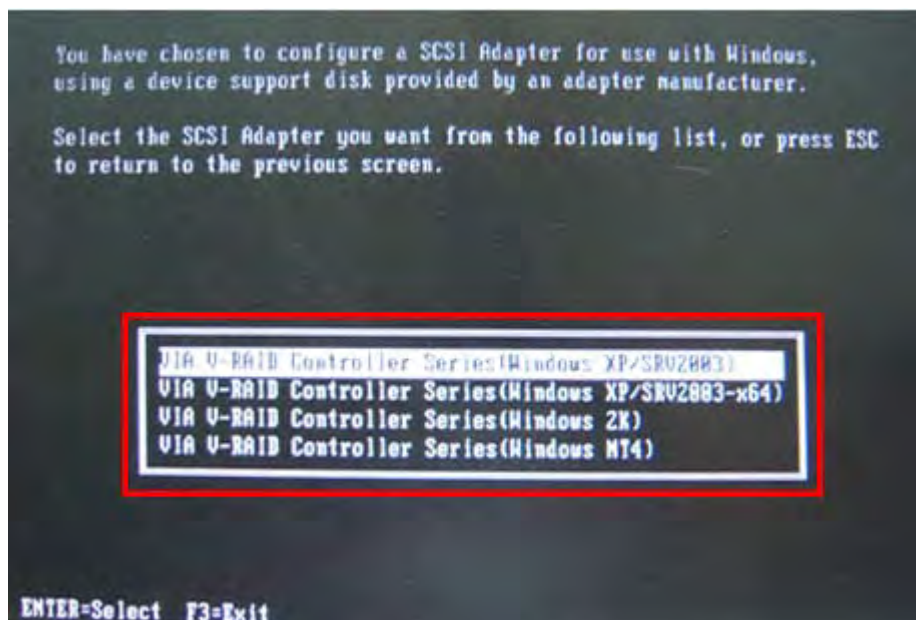
- Step 1:** Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.
- Step 2:** Connect the USB floppy disk drive to the system.
- Step 3:** Insert the One Key Recovery 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.



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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.5.2 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

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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.

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

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the IMB-H610 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



NOTE:

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

D.2 DIO Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	DGPO3	4	DGPO2
5	DGPO1	6	DGPO0
7	DGPI3	8	DGPI2
9	DGPI1	10	DGPI0

Table 6-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

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

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

D.3.2 Enable the DIO Output Function

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

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

Appendix

E

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 EMI 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 E-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

F

Compatibility

IMB-H610 Micro-ATX Motherboard



NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMB-H610

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMB-H610.

- Microsoft Windows XP
- Microsoft Windows 7 Ultimate
- Microsoft Windows Vista Ultimate
- Linux Fedora 14

F.2 Compatible Processors

The following Intel® Socket 1155 processors have been successfully tested on the IMB-H610

CPU	Model
Intel® Core™ Quad/Dual core processor series	i7/i5/i3

Table F-1: Compatible Processors

Appendix

G

Hazardous Materials Disclosure

G.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
<p>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</p> <p>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</p>						

IMB-H610 Micro-ATX Motherboard

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。						