IEI Integration Corp.

MODEL:

IMBA-C2160

ATX Motherboard for 22nm LGA 1155 Intel® Xeon® E3/Intel® Core™ i3 CPU, Intel® C216 Chipset, DDR3, VGA, Dual Intel® PCIe GbE, USB 3.0, SATA 6Gb/s, HD Audio and RoHS

User Manual

Rev. 1.03 – August 18, 2014

RoHS Lead Free

Revision

Date	Version	Changes
August 18, 2014	1.03	Modified spec of the PCIe x16 slots
April 24, 2014	1.02	Modified LAN pinouts Updated Chapter 2: Packing List
July 19, 2013	1.01	Added notes in 3.2.18 PCI Express x8 Slot and 3.2.19 PCI Express x16 Slot
July 17, 2012	1.00	Initial release

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Table of Contents

List of Figures

List of Tables

BIOS Menus

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: IMBA-C2160

The IMBA-C2160 is an ATX motherboard. It accepts a Socket LGA1155 Intel® Xeon® E3 or Intel® Core™ i3 quad/dual core processor and supports four 240-pin 1600/1333 MHz dual-channel DDR3 DIMM modules up to 32 GB.

The IMBA-C2160 supports two GbE interfaces through the Intel® 82579 Ethernet PHY (with Intel® AMT 8.0 support) and the Intel® 82574L Ethernet controller.

The IMBA-C2160 provides VGA display output. Expansion and I/O include two PCI slots, two PCIe x16 slots (share one PCIe x16 signal), two PCIe x4 slots, one PCIe x1 slot, four USB 3.0 by rear panel, four USB 2.0 by rear panel, six USB 2.0 by pin headers, two SATA 6Gb/s connectors, four SATA 3Gb/s connectors, six COM ports and one keyboard/mouse connector.

1.2 Features

Some of the IMBA-C2160 motherboard features are listed below:

- ATX form factor
- LGA1155 CPU socket
- Intel® C216 chipset
- Dual-channel DDR3 DIMMs support up to 32 GB
- Dual Intel® PCIe GbE (LAN1 with Intel® AMT 8.0 support)
- Supports USB 3.0 and SATA 6Gb/s
- Supports PCI Express Generation 3.0 at 8 GT/s I/O bandwidth
- High speed interface usage for two PCIe x8/two PCIe x4 add-on cards
- Two PCIe x16 slots (share one PCIe x16 signal)
- Two PCIe x4 slots
- One PCIe x1 slot
- Two PCI card expansion slots
- One external RS-232 serial port
- Four internal RS-232 serial port connectors
- One internal RS-422/485 serial port connector
- High Definition Audio
- RoHS compliant

1.3 Connectors

The connectors on the IMBA-C2160 are shown in the figure below.

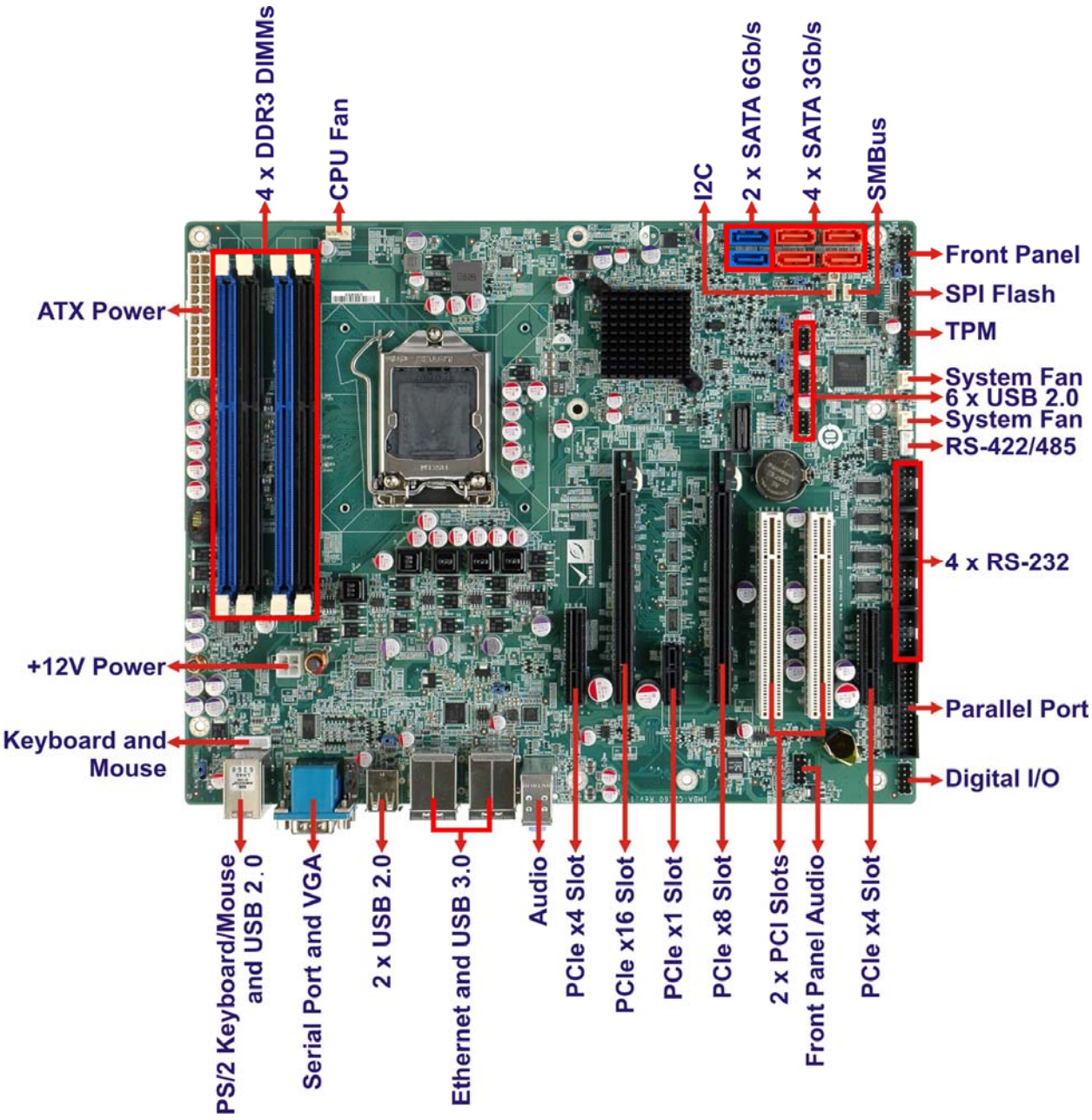


Figure 1-2: Connectors

1.4 Dimensions

The main dimensions of the IMBA-C2160 are shown in the diagram below.

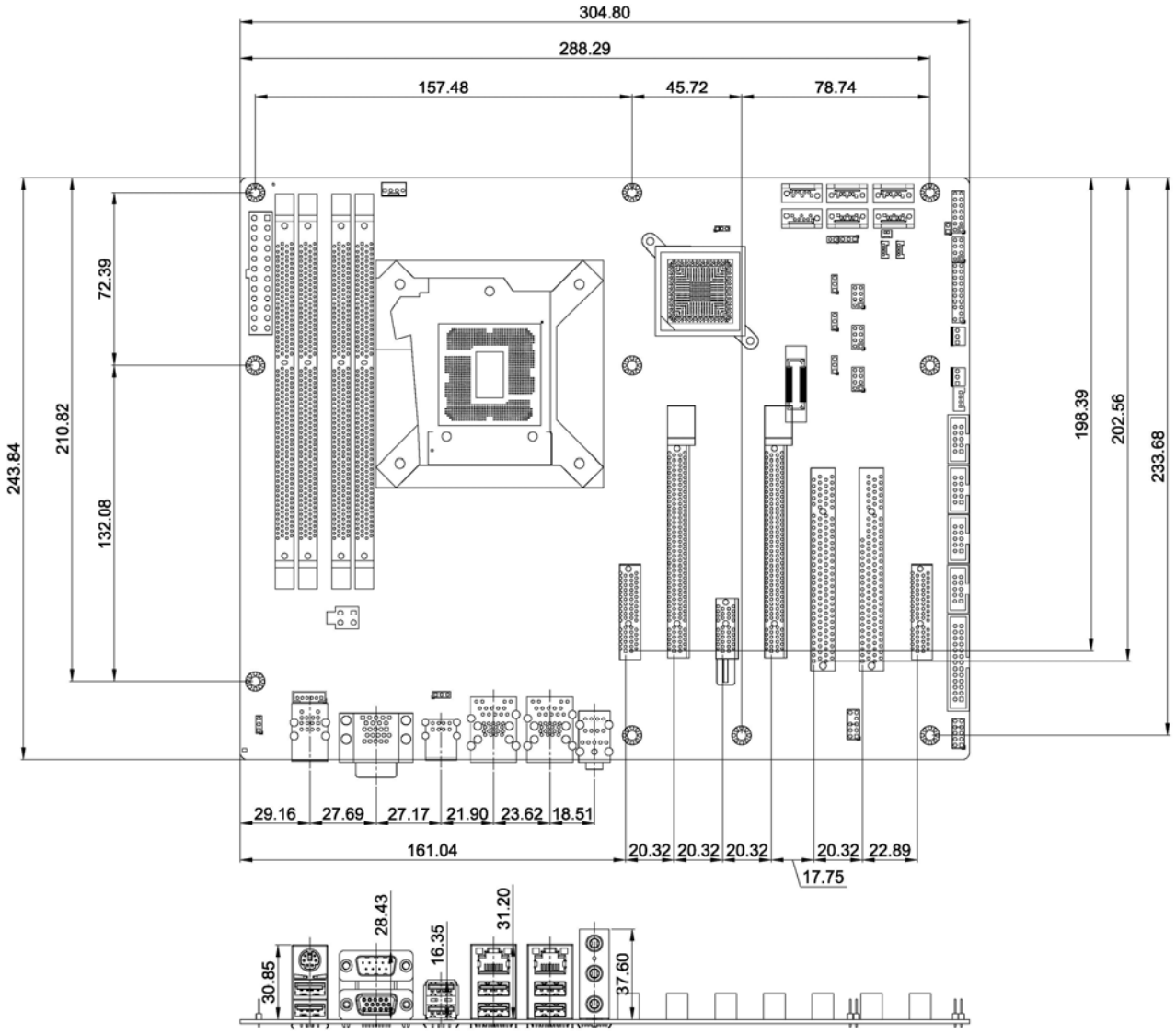


Figure 1-3: IMBA-C2160 Dimensions (mm)

1.5 Data Flow

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

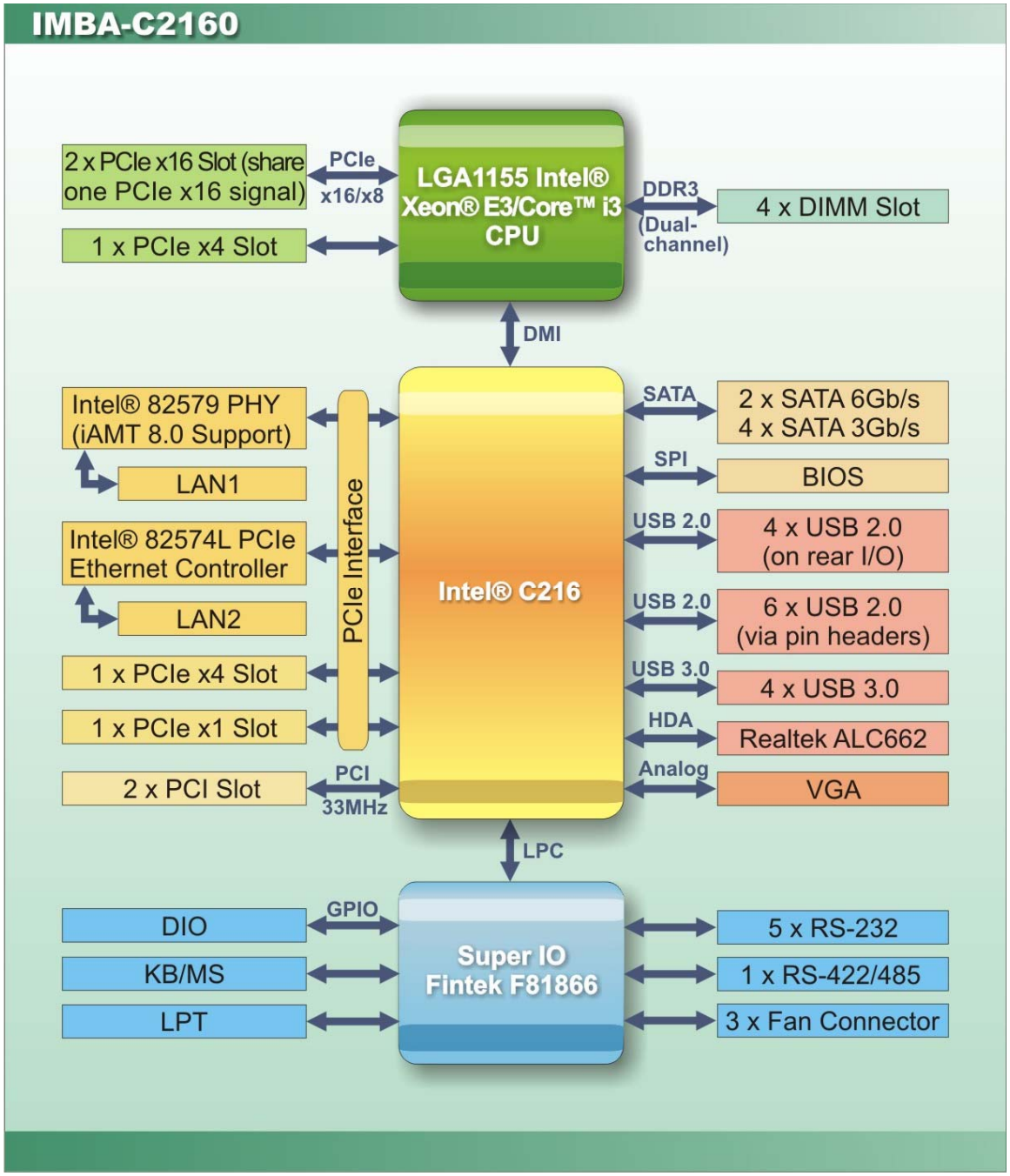


Figure 1-4: Data Flow Diagram

1.6 Technical Specifications

The IMBA-C2160 technical specifications are listed below.

Specification/Model	IMBA-C2160
Form Factor	ATX
CPU Supported	LGA1155 Intel® Xeon® E3/Core™ i3 quad/dual core CPU
Chipset	Intel® C216
Memory	Four 240-pin 1600/1333 MHz dual-channel ECC/non-ECC unbuffered DDR3 SDRAM DIMMs support (system max. 32 GB)
Graphics Engine	Intel® HD Graphics 2000/3000 Supports DirectX 10.1 and OpenGL 3.0 Full MPEG-2, VC1, AVC Decode
Ethernet Controllers	LAN1: Intel® 82579 PHY with Intel® AMT 8.0 support LAN2: Intel® 82574L PCIe Ethernet controller
Audio	Realtek ALC662 HD Audio codec (line-in, line-out, mic-in)
BIOS	UEFI BIOS
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	Two PCI slots
PCIe	Two PCIe x16 slots (share one PCIe x16 signal) Two PCIe x4 slots One PCIe x1 slot
I/O Interface Connectors	
Audio Connectors	Three external audio jacks (line-in, line-out, mic-in) One internal front panel audio connector (10-pin header)
Digital I/O	8-bit, 4-bit input/4-bit output
Display Ports	One VGA integrated in the Intel® C216
Ethernet	Two RJ-45 GbE ports (LAN1 with Intel® AMT 8.0 support)

Specification/Model	IMBA-C2160
Fan Connectors	One 4-pin CPU fan connector Two 3-pin system fan connectors
Front Panel	One 14-pin header (power LED, HDD LED, speaker, power button, reset button)
I2C	One 4-pin wafer connector
Keyboard/Mouse	One PS/2 keyboard/mouse port One internal keyboard and mouse connector via 6-pin wafer connector
Parallel Port	One parallel port via internal 26-pin box header
Serial ATA	Two SATA 6Gb/s connectors (support RAID 0, 1, 5, 10) Four SATA 3Gb/s connectors (support RAID 0, 1, 5, 10)
Serial Ports	One external RS-232 serial port Four RS-232 via internal box headers One RS-422/485 via internal 4-pin wafer connector
SMBus	One 4-pin wafer connector
TPM	One via 20-pin header
USB Ports	Four external USB 3.0 ports on rear IO Four external USB 2.0 ports on rear IO Six internal USB 2.0 ports by four pin headers
Environmental and Power Specifications	
Power Supply	ATX power supported
Power Consumption	3.3V@1.55A, 5V@3.43A, Vcore@3.12A, 12V@0.20A, 5VSB@0.18A (2.2 GHz Intel® Xeon® CPU with two 4 GB 1333 MHz DDR3 memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 70ºC
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 305 mm

Specification/Model	IMBA-C2160
Weight GW/NW	1200 g / 700 g

Table 1-1: IMBA-C2160 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMBA-C2160 is unpacked, please do the following:

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

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMBA-C2160 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The IMBA-C2160 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMBA-C2160 motherboard	
4	SATA cable (**P/N**: 32000-062800-RS)	
1	I/O shielding (**P/N**: 45014-0034C0-00-RS)	
1	Mini jumper pack	
1	One Key Recovery CD	
1	Utility CD	

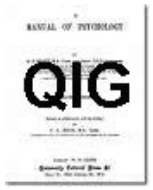
Quantity	Item and Part Number	Image
1	Quick Installation Guide	

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**: 19800-003100-300-RS)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
PS/2 KB/MS Y-cable with bracket (6-pin header) (220 mm) (**P/N**: 19800-000075-RS)	
Male PS/2 KB/MS Y-cable w/o bracket, 12 cm (KB) + 14 cm (MS) (**P/N**: 32006-000300-100-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
High-performance LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-1156E-R11)	
RS-422/485 cable (200 mm) (**P/N**: 32205-003800-300-RS)	

Item and Part Number	Image
Parallel port cable (**P/N**: 19800-000049-RS)	
Dual RS-232 cable (230 mm) (**P/N**: 19800-000051-RS)	
20-pin Infineon TPM module, S/W management tool, firmware v3.17 (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMBA-C2160 Layout

The figures below show all the connectors and jumpers.

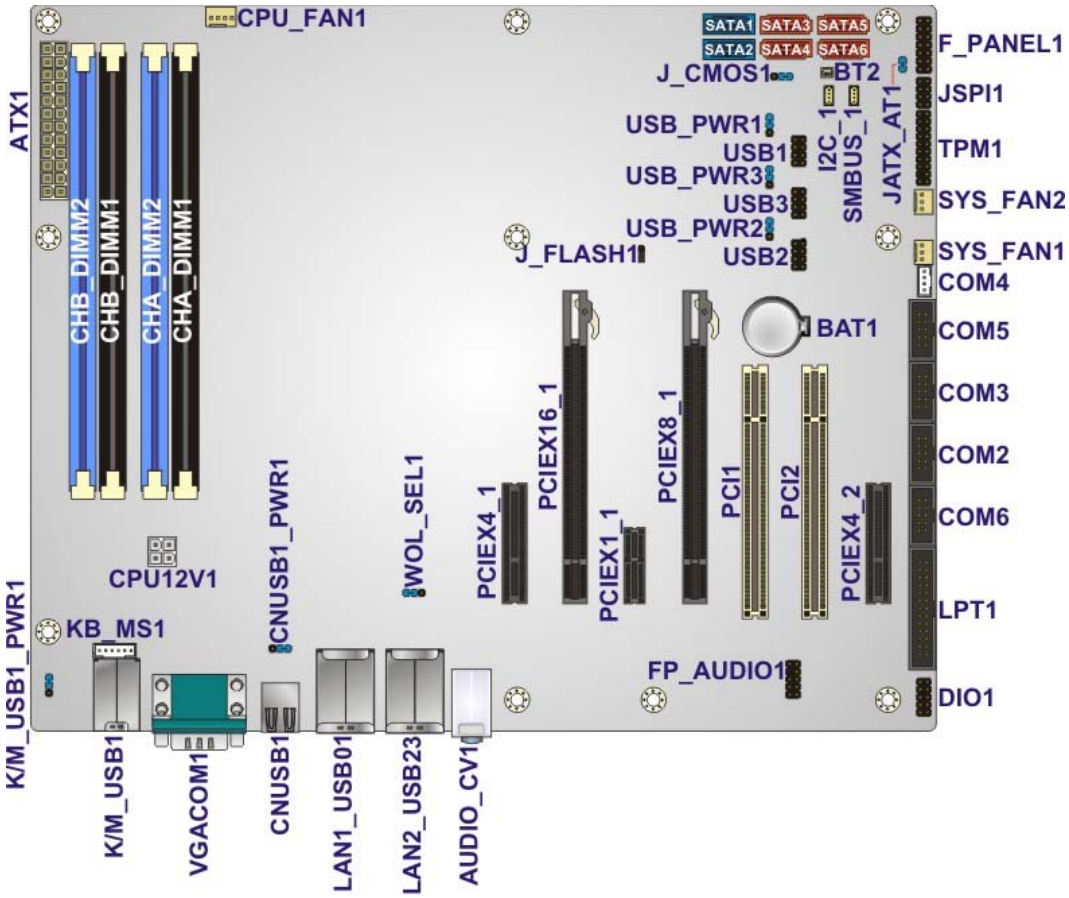


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
+12V ATX power supply connector	4-pin Molex	CPU12V1
ATX power connector	24-pin ATX	ATX1

Connector	Type	Label
Battery connector	2-pin wafer	BT2
Battery holder	CR2032 battery holder	BAT1
DDR3 DIMM slots	DDR3 DIMM slot	CHA_DIMM1 CHA_DIMM2 CHB_DIMM1 CHB_DIMM2
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connectors (system)	3-pin wafer	SYS_FAN1, SYS_FAN2
Front panel audio connector	10-pin header	FP_AUDIO1
Front panel connector	14-pin header	F_PANEL1
I2C connector	4-pin wafer	I2C_1
Keyboard/mouse connector	6-pin wafer	KB_MS1
Parallel port connector	26-pin box header	LPT1
PCI slots	PCI slots	PCI1, PCI2
PCIe x1 slot	PCIe x1 slot	PCIEX1_1
PCIe x4 slots	PCIe x4 slot	PCIEX4_1, PCIEX4_2
PCIe x8 slot	PCIe x16 slot	PCIEX8_1
PCIe x16 slot	PCIe x16 slot	PCIEX16_1
SATA 3Gb/s drive connector	7-pin SATA connector	SATA3, SATA4, SATA5, SATA6
SATA 6Gb/s drive connector	7-pin SATA connector	SATA1, SATA2
Serial port, RS-422/485	4-pin wafer	COM4
Serial ports, RS-232	10-pin box header	COM2, COM3, COM5, COM6
SMBus connector	4-pin wafer	SMBUS_1

Connector	Type	Label
SPI ROM connector	8-pin header	JSPI1
TPM connector	20-pin header	TPM1
USB 2.0 connectors	8-pin header	USB1, USB2, USB3

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Audio connector	Audio jack	AUDIO_CV1
Ethernet and USB 3.0 connectors	RJ-45, USB 3.0	LAN1_USB01 LAN2_USB23
KB/MS and USB 2.0 connectors	PS/2, USB 2.0	K/M_USB1
Serial port and VGA connector	DB-9, VGA	VGACOM1
USB 2.0 connectors	USB 2.0	CNUSB1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMBA-C2160.

3.2.1 +12V Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin Molex

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

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

The connector supports the +12V power supply.

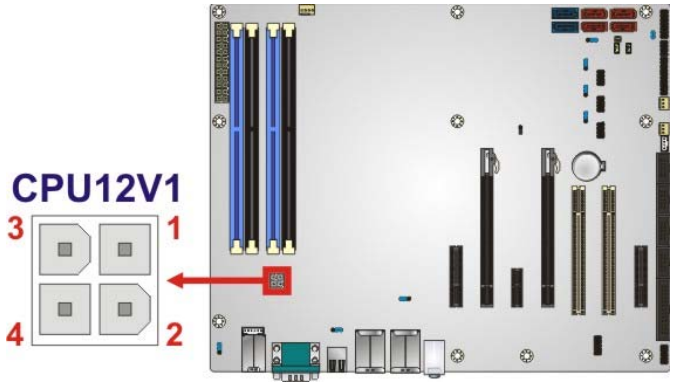


Figure 3-2: +12V Power Connector Location

Pin	Description
1	GND
2	GND
3	VREG_12V
4	VREG_12V

Table 3-3: +12V Power Connector Pinouts

3.2.2 Additional Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin connector

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

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

The additional power connector provides extra +12V and +5V power to the system.

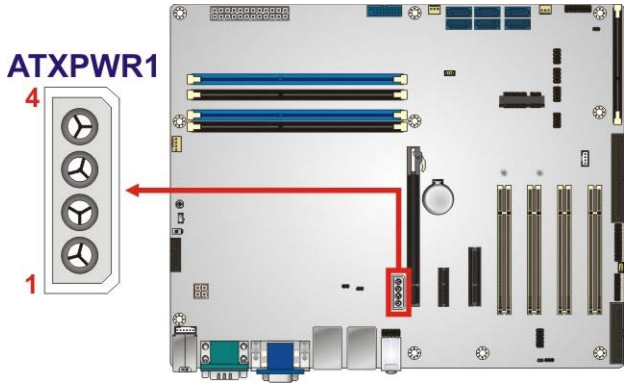


Figure 3-3: Additional Power Connector Location

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

Table 3-4: Additional Power Connector Pinouts

3.2.3 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin ATX

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

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

The ATX power connector connects to an ATX power supply.

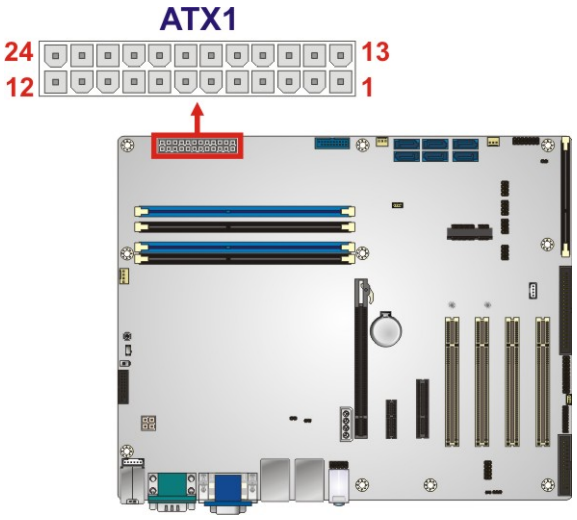


Figure 3-4: ATX Power Connector Location

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

Table 3-5: ATX Power Connector Pinouts

3.2.4 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin ATX

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

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

The ATX power connector connects to an ATX power supply.

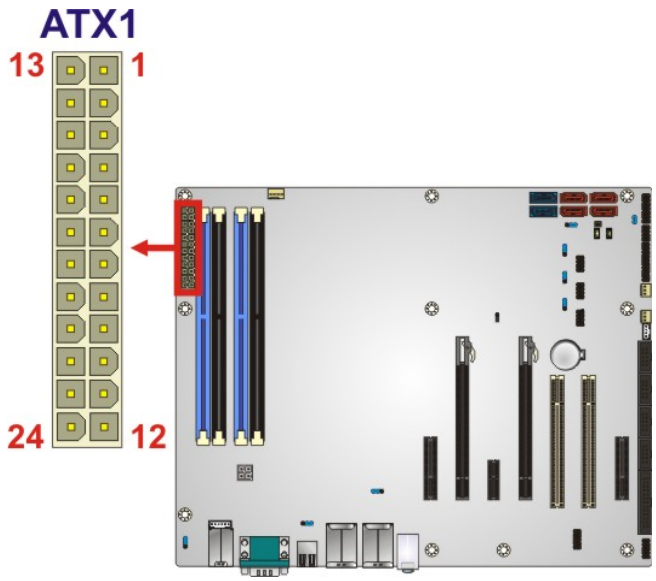


Figure 3-5: ATX Power Connector Pinout Location

Pin	Description	Pin	Description
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	-IO_PSON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWRGD_PS	20	NC
9	V_5P0_A	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Table 3-6: ATX Power Connector Pinouts

3.2.5 Battery Connectors

CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

CN Label:	**BAT1, BT2**
CN Type:	Battery holder and 2-pin wafer
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-7**

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

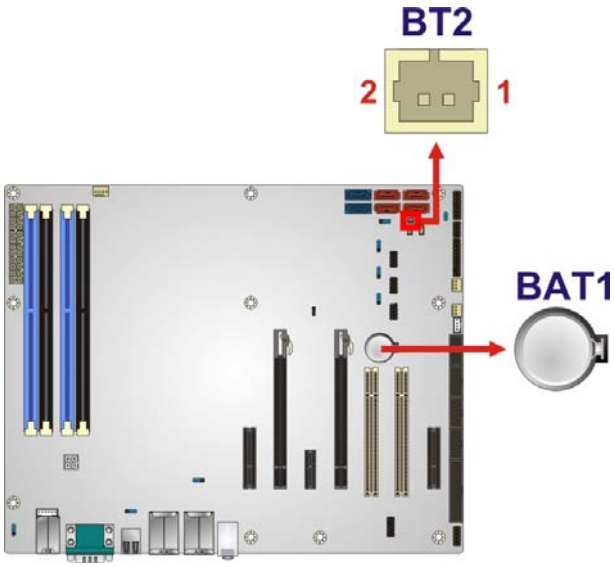


Figure 3-6: Battery Connector Locations

Pin	Description
1	VBATT
2	GND

Table 3-7: Battery Connector (BT2) Pinouts

3.2.6 DDR3 DIMM Slots

CN Label:	**CHA_DIMM1, CHA_DIMM2, CHB_DIMM1, CHB_DIMM2**
CN Type:	DDR3 DIMM slot
CN Location:	See **Figure 3-7**

The DIMM slots are for DDR3 DIMM memory modules.

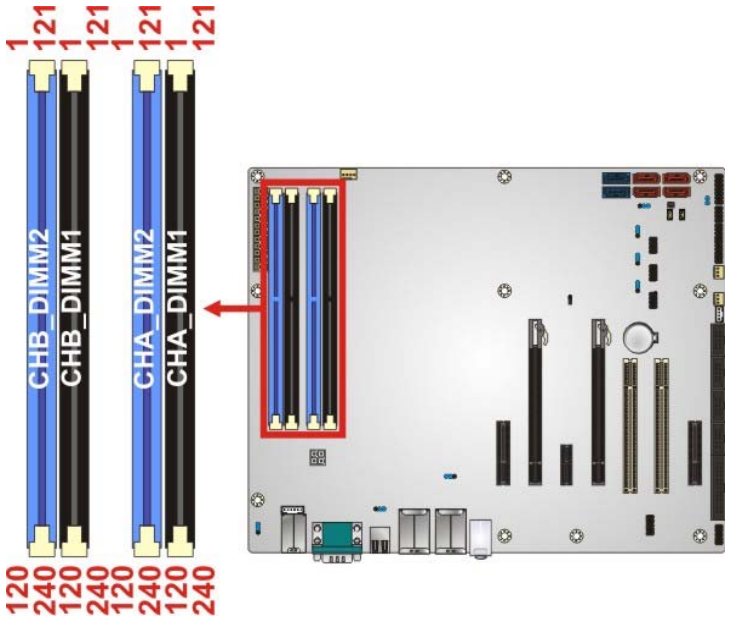


Figure 3-7: DDR3 DIMM Slot Locations

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 3-8**

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

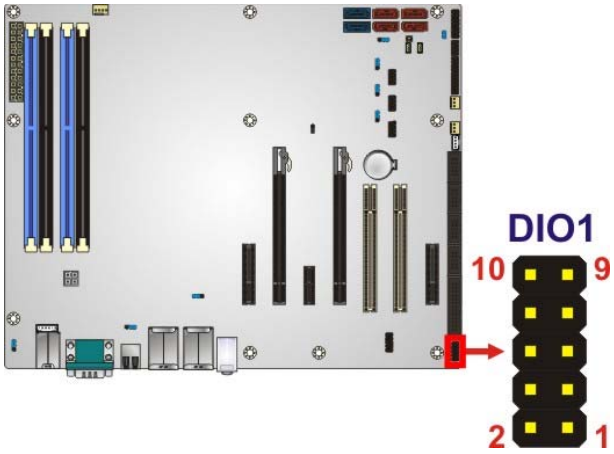


Figure 3-8: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-8: Digital I/O Connector Pinouts

3.2.8 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

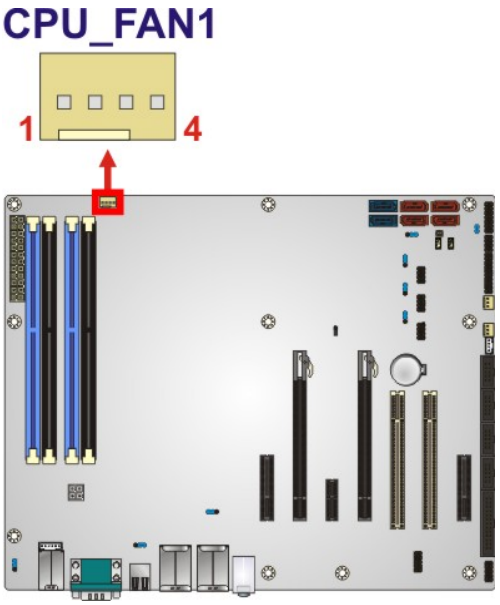


Figure 3-9: CPU Fan Connector Location

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

Table 3-9: CPU Fan Connector Pinouts

3.2.9 Fan Connectors (System)

CN Label: **SYS_FAN1, SYS_FAN2**

CN Type: 3-pin wafer

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

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

Each fan connector attaches to a cooling fan.

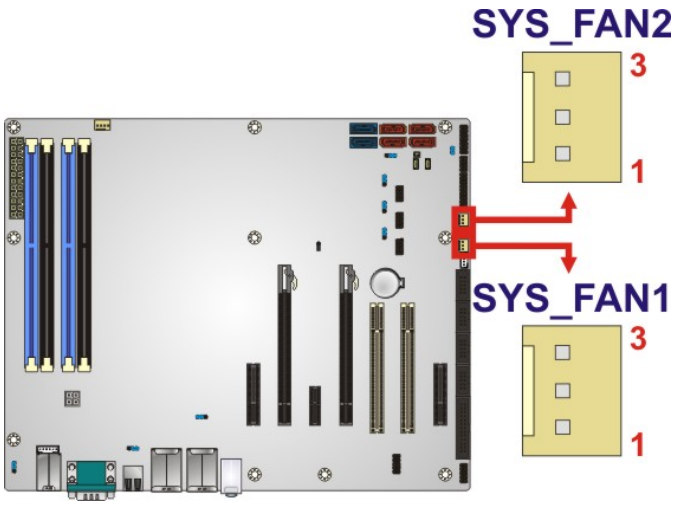


Figure 3-10: System Fan Connector Locations

Pin	Description
1	FANIO
2	+12 V (PWM)
3	GND

Table 3-10: System Fan Connector Pinouts

3.2.10 Front Panel Audio Connector

CN Label: **FP_AUDIO1**

CN Type: 10-pin header

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

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

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

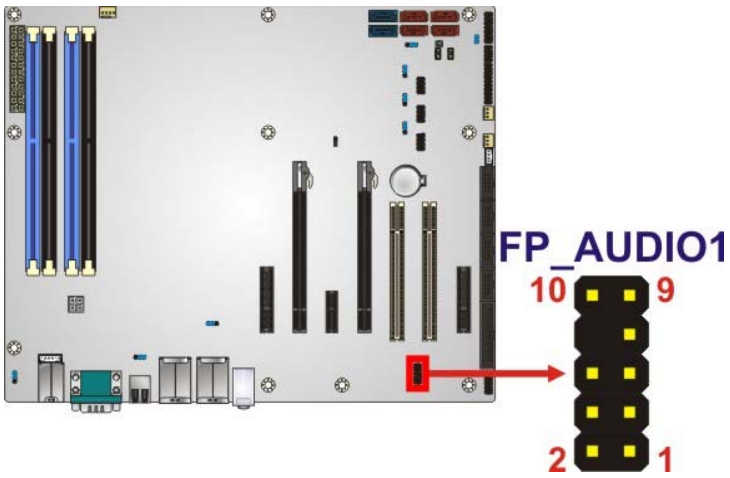


Figure 3-11: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	LMIC2_L	2	AUD GND
3	LMIC2_R	4	PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	F_SENSE	8	NC
9	LLINE2-L	10	LINE2-JD

Table 3-11: Front Panel Audio Connector Pinouts

3.2.11 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header

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

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

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

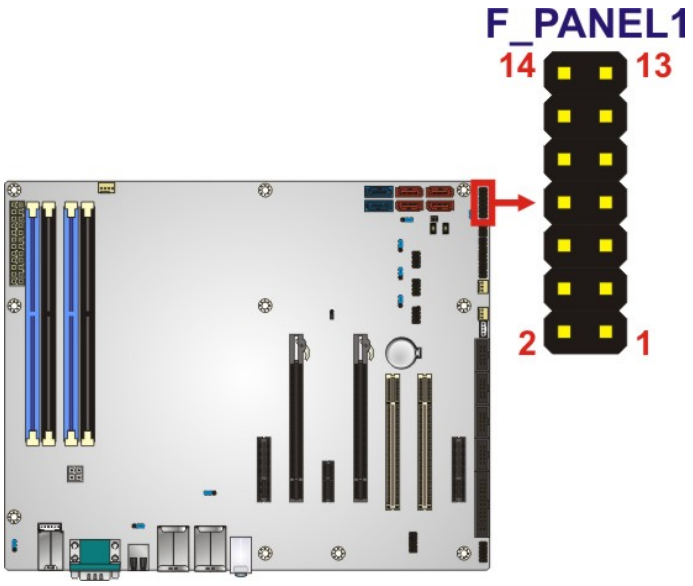


Figure 3-12: Front Panel Connector Location

Function	Pin	Description	Function	Pin	Description
Power LED	1	ACPILED	Speaker	2	Beep Power
	3	NC		4	NC
	5	GND		6	NC
Power Button	7	PWRBT_SW#_C		8	PC Beep
	9	GND	Reset	10	NC
HDD LED	11	HDDLED		12	EXTRST-
	13	HDDLED-		14	GND

Table 3-12: Front Panel Connector Pinouts

3.2.12 I2C Connector

CN Label: **I2C_1**

CN Type: 4-pin wafer

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

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

The I2C connector is for system debug.

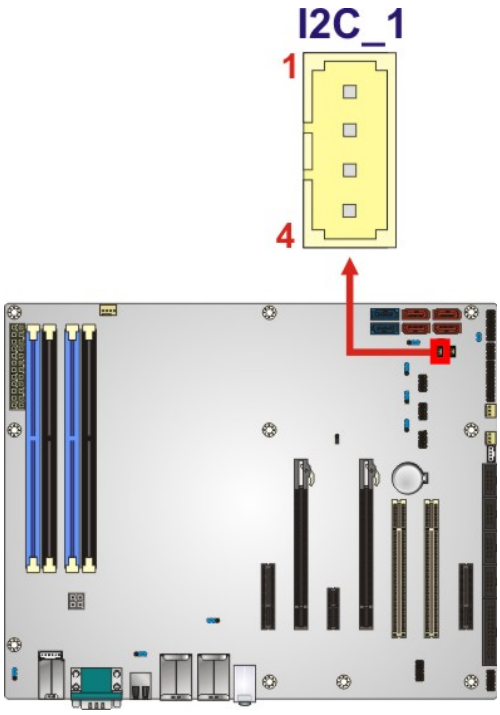


Figure 3-13: I2C Connector Location

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

Table 3-13: I2C Connector Pinouts

3.2.13 Keyboard/Mouse Connector

CN Label: **KB_MS1**

CN Type: 6-pin wafer

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

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

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

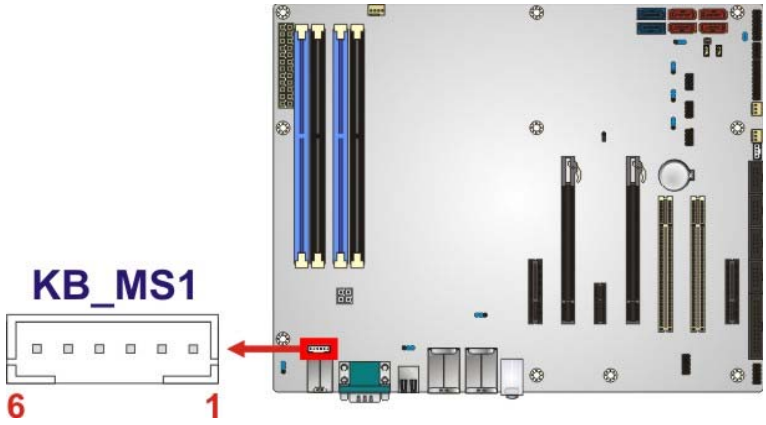


Figure 3-14: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	KBGND

Table 3-14: Keyboard/Mouse Connector Pinouts

3.2.14 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header

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

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

The parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

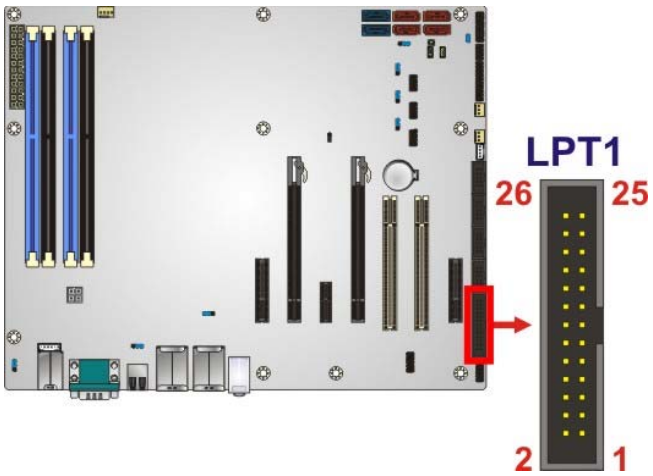


Figure 3-15: Parallel Port Connector Location

Pin	Description	Pin	Description
1	RSTROBE#	2	RPD0
3	RPD1	4	RPD2
5	RPD	6	RPD4
7	RPD5	8	RPD6
9	RPD7	10	SIO_ACK#
11	SIO_BUSY	12	SIO_PE
13	SIO_SLCT	14	SIO_AFD#
15	SIO_ERR#	16	SIO_INIT#
17	SIO_SLIN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	NC

Table 3-15: Parallel Port Connector Pinouts

3.2.15 PCI Slots

CN Label: **PCI1, PCI2**

CN Type: PCI Slot

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

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

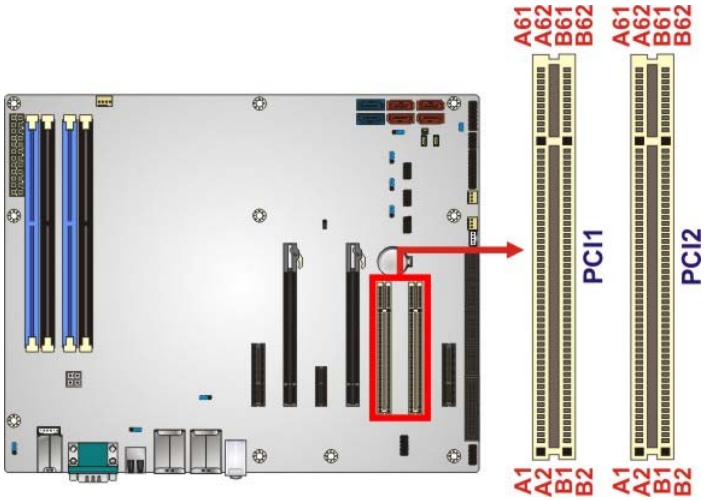


Figure 3-16: PCI Slot Locations

3.2.16 PCIe x1 Slot

CN Label:	**PCIEX1_1**
CN Type:	PCIe x1 slot
CN Location:	See **Figure 3-17**

The PCIe x1 slot is for PCIe x1 expansion card.

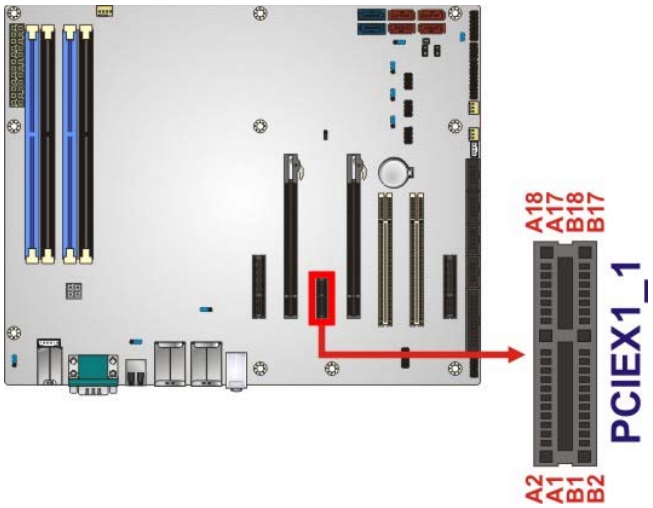


Figure 3-17: PCIe x1 Slot Location

3.2.17 PCI Express x4 Slot

CN Label:	**PCIEX4_1, PCIEX4_2**
CN Type:	PCIe x4 slot
CN Location:	See **Figure 3-18**

The PCIe x4 expansion card slots are for PCIe x4 expansion cards.

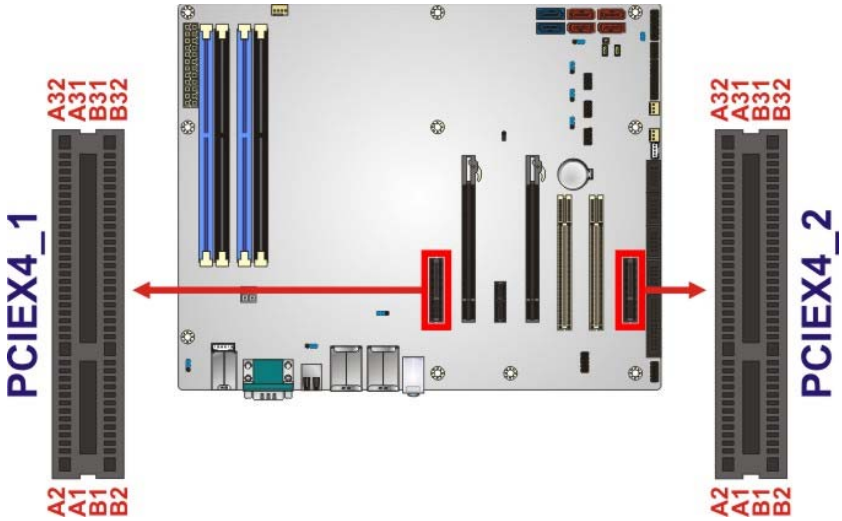


Figure 3-18: PCIe x4 Slot Locations

3.2.18 PCI Express x8 Slot

CN Label:	**PCIEX8_1**
CN Type:	PCIe x16 slot
CN Location:	See **Figure 3-19**

NOTE:

When the Intel® Core™ i3 series processor is installed, the PCIe x8 slot might not detect a PCIe x8 device. If this situation occurs, clear the CMOS. Refer to **Section 4.3.2** on how to clear the CMOS.

The PCIe x8 expansion card slot is for PCIe x8 expansion card.

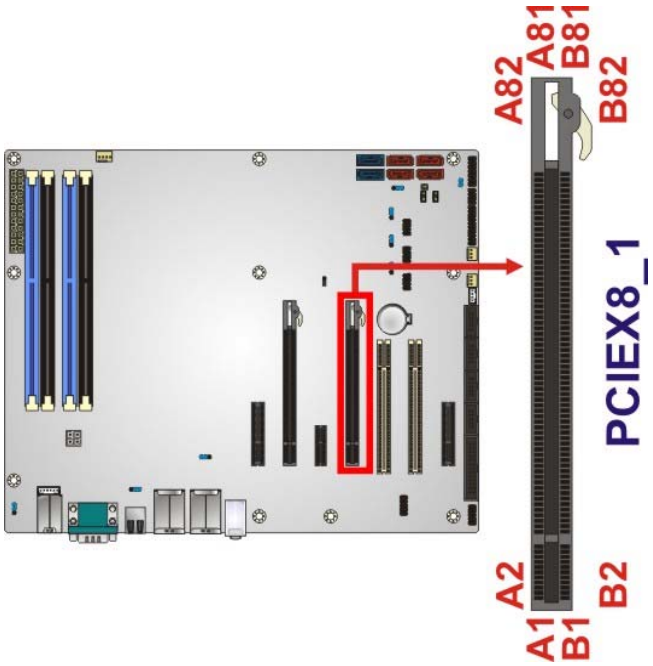


Figure 3-19: PCIe x8 Slot Location

3.2.19 PCI Express x16 Slot

CN Label:	**PCIEX16_1**
CN Type:	PCIe x16 slot
CN Location:	See **Figure 3-20**

NOTE:

When the Intel® Core™ i3 series processor is installed, the PCIe x16 slot might not detect a PCIe x8 device. If this situation occurs, clear the CMOS. Refer to **Section 4.3.2** on how to clear the CMOS.

The PCIe x16 expansion card slot is for PCIe x16 expansion card.

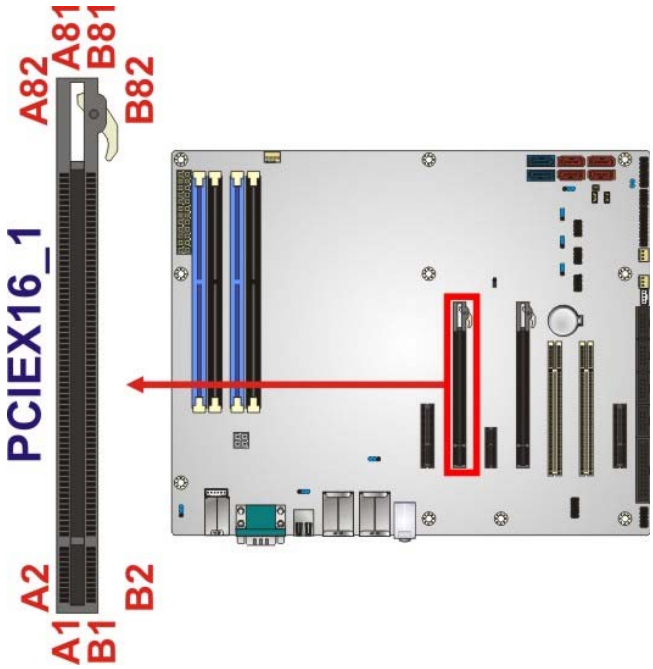


Figure 3-20: PCIe x16 Slot Location

3.2.20 SATA 3Gb/s Drive Connectors

CN Label:	**SATA3, SATA4, SATA5, SATA6**
CN Type:	7-pin SATA connector
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-16**

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

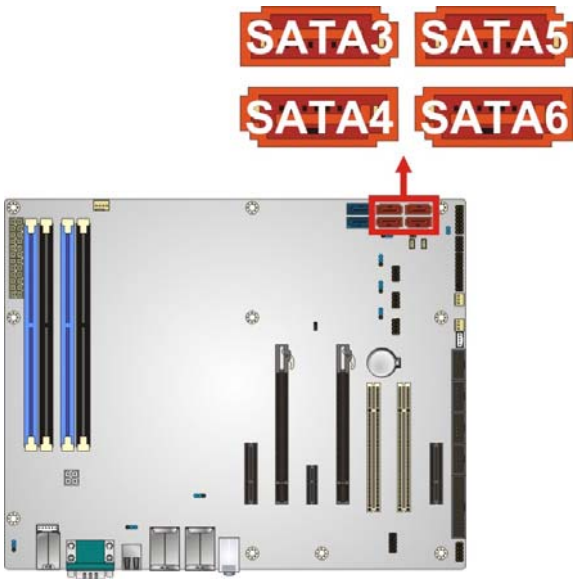


Figure 3-21: SATA 3Gb/s Drive Connector Locations

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

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

3.2.21 SATA 6Gb/s Drive Connectors

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA connector

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

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

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

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

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

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

3.2.22 Serial Port Connector, RS-422/485

CN Label: **COM4**

CN Type: 4-pin wafer

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

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

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

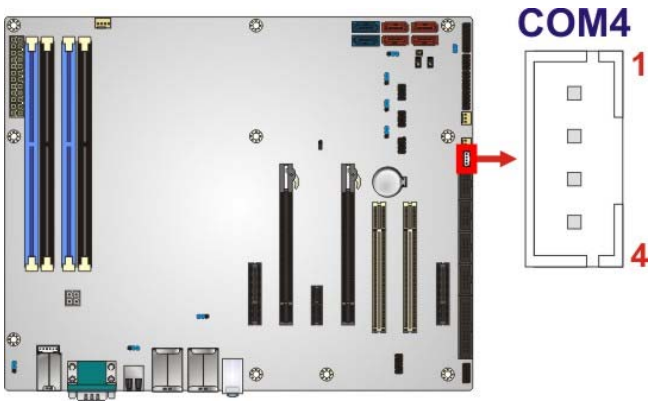


Figure 3-23: RS-422/485 Connector Location

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

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

Use the optional RS-422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

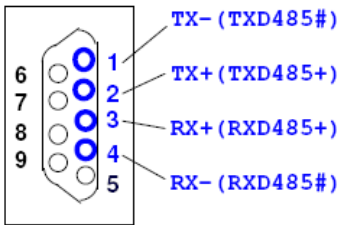
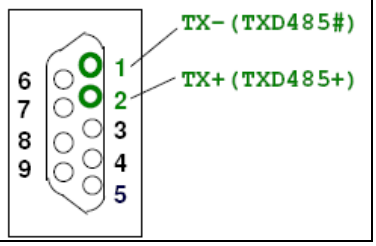
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-19: DB-9 RS-422/485 Pinouts

3.2.23 Serial Port Connectors, RS-232

CN Label: **COM2, COM3, COM5, COM6**

CN Type: 10-pin box header

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

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

Each of these connectors provides RS-232 connections.

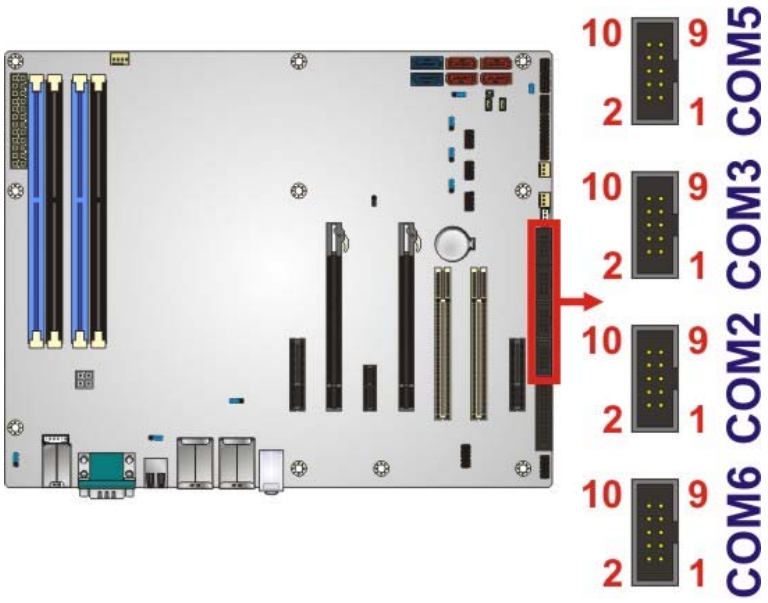


Figure 3-24: Serial Port Connector Locations

Pin	Description	Pin	Description
1	-NDCD1	6	-NCTS1
2	-NDSR1	7	-NDTR1
3	NSIN1	8	-XRI1
4	-NRTS1	9	GND
5	NSOUT1	10	GND

Table 3-20: RS-232 Serial Port Connector Pinouts

3.2.24 SMBus Connector

CN Label: **SMBUS_1**

CN Type: 4-pin wafer

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

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

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

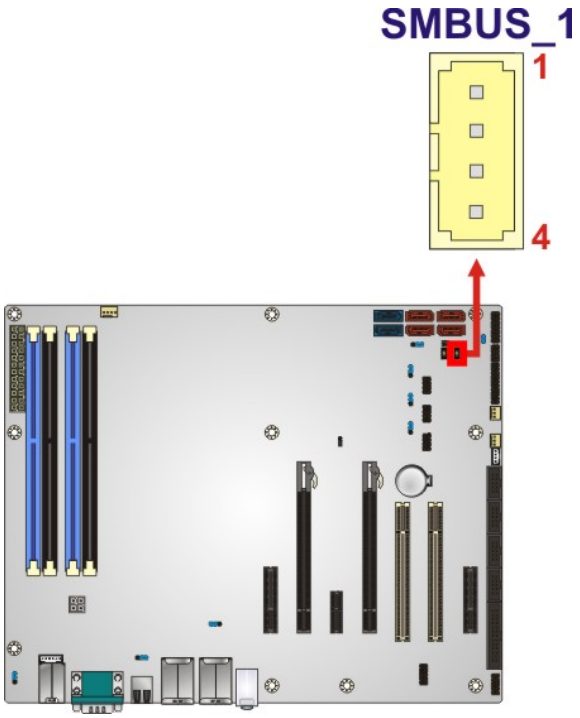


Figure 3-25: SMBus Connector Location

Pin	Description
1	+5V_DUAL
2	SMBCLK
3	SMBDATA
4	GND

Table 3-21: SMBus Connector Pinouts

3.2.25 SPI ROM Connector

CN Label: **JSPI1**

CN Type: 8-pin header

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

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

The SPI connector is used to flash the BIOS.

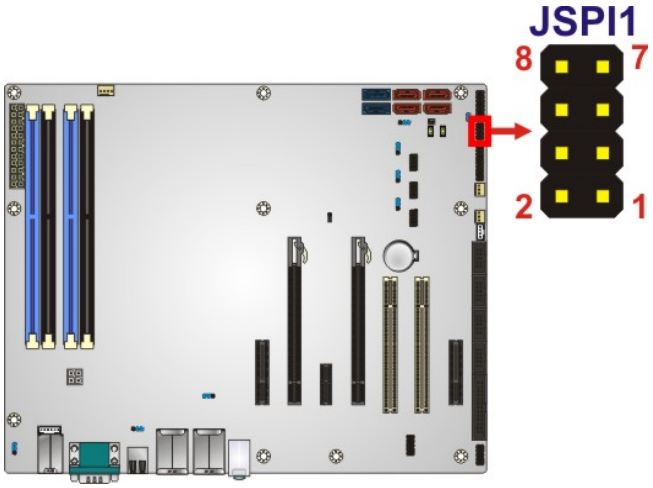


Figure 3-26: SPI Connector Location

Pin	Description	Pin	Description
1	+3.3V	2	GND
3	CS0	4	CLK
5	SO0	6	SI
7	NC	8	NC

Table 3-22: SPI Connector Pinouts

3.2.26 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

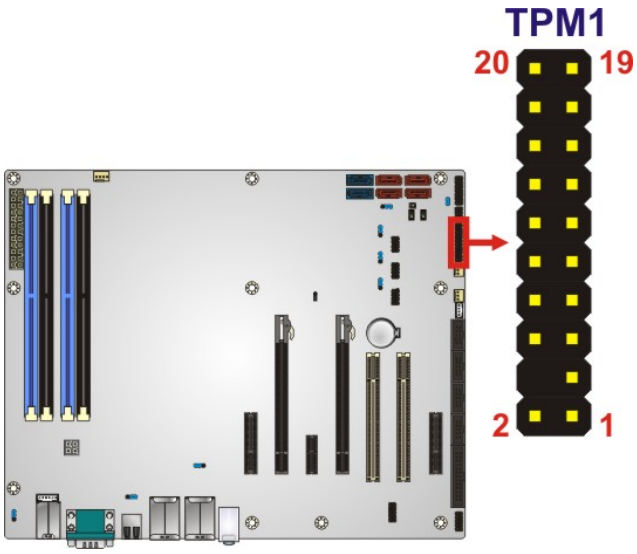


Figure 3-27: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND2
3	LERAME#	4	KEY
5	LRESRT#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND3
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND1	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-23: TPM Connector Pinouts

3.2.27 USB Connectors

CN Label: **USB1, USB2, USB3**

CN Type: 8-pin header

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

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

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

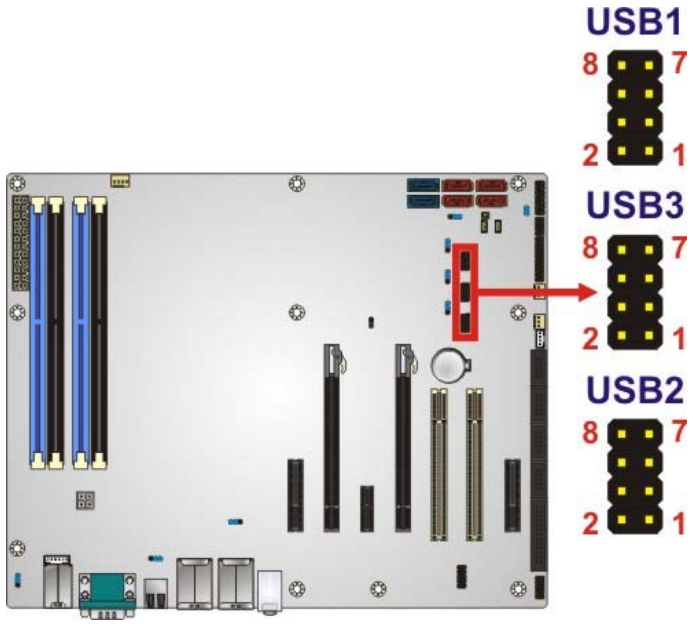


Figure 3-28: USB Connector Pinout Locations

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

Table 3-24: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

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

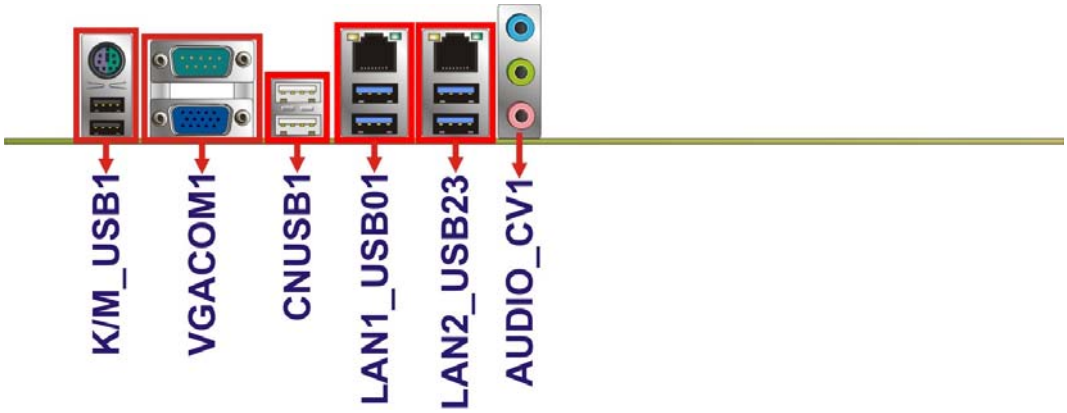


Figure 3-29: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label: **AUDIO_CV1**

CN Type: Audio jack

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

The audio jacks connect to external audio devices.

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

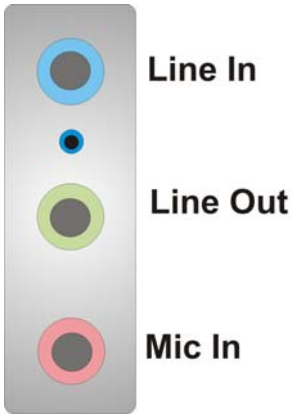


Figure 3-30: Audio Connector

3.3.2 Ethernet and USB 3.0 Connectors

CN Label: **LAN1_USB01, LAN2_USB23**

CN Type: RJ-45 and USB 3.0 ports

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

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

Each LAN connector connects to a local network.

Pin	Description	Pin	Description
1	MDIA3-	5	MDIA2+
2	MDIA3+	6	MDIA1+
3	MDIA1-	7	MDIA0-
4	MDIA2-	8	MDIA0+

Table 3-25: LAN Pinouts

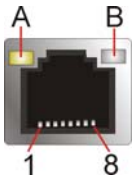


Figure 3-31: Ethernet Connector

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

Table 3-26: Connector LEDs

The IMBA-C2160 has four external USB 3.0 ports. Each USB 3.0 port can be connected to a USB device.

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

Pin	Description	Pin	Description
5	STDA_SSRX_N	6	STDA_SSRX_P
7	GND_DRAIN	8	STDA_SSTX_N
9	STDA_SSTX_P		

Table 3-27: USB 3.0 Port Pinouts

3.3.3 PS/2 Keyboard/Mouse and USB 2.0 Connectors

CN Label: **K/M_USB1**

CN Type: PS/2 and USB 2.0

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

CN Pinouts: See **Figure 3-32**, **Table 3-28**, **Table 3-29**

The keyboard and mouse connector is a standard PS/2 connector.

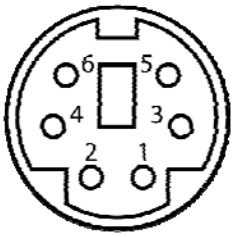


Figure 3-32: PS/2 Keyboard/Mouse Connector

Pin	Description
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 3-28: PS/2 Keyboard/Mouse Connector Pinouts

The IMBA-C2160 has four external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VCC
2	DATA -
3	DATA +
4	GND

Table 3-29: USB 2.0 Port Pinouts

3.3.4 Serial Port and VGA Connector

CN Label: **VGACOM1**

CN Type: DB-9 and 15-pin VGA connectors

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

CN Pinouts: See **Table 3-30**, **Figure 3-33**, **Table 3-31** and **Figure 3-34**

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

Pin	Description	Pin	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND		

Table 3-30: Serial Port Connector Pinouts

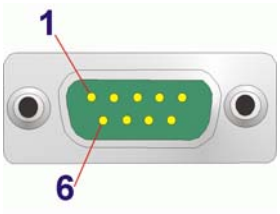


Figure 3-33: Serial Port Connector Pinouts

The 15-pin VGA connector connects to a monitor that accepts a standard VGA input.

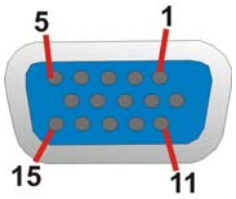


Figure 3-34: VGA Connector

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

Table 3-31: VGA Connector Pinouts

3.3.5 USB 2.0 Connectors

CN Label: **CNUSB1**

CN Type: USB 2.0 port

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

CN Pinouts: See **Table 3-25**

The IMBA-C2160 has four external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VCC
2	DATA -
3	DATA +
4	GND

Table 3-32: USB 2.0 Port Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMBA-C2160 may result in permanent damage to the IMBA-C2160 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-C2160. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-C2160 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMBA-C2160, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMBA-C2160.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

WARNING:

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

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

- Read the user manual:
  - The user manual provides a complete description of the IMBA-C2160 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMBA-C2160 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMBA-C2160 off:
  - When working with the IMBA-C2160, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMBA-C2160 **DO NOT:**

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

4.2.1 Socket LGA1155 CPU Installation

WARNING:

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

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

To install the CPU, follow the steps below.

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

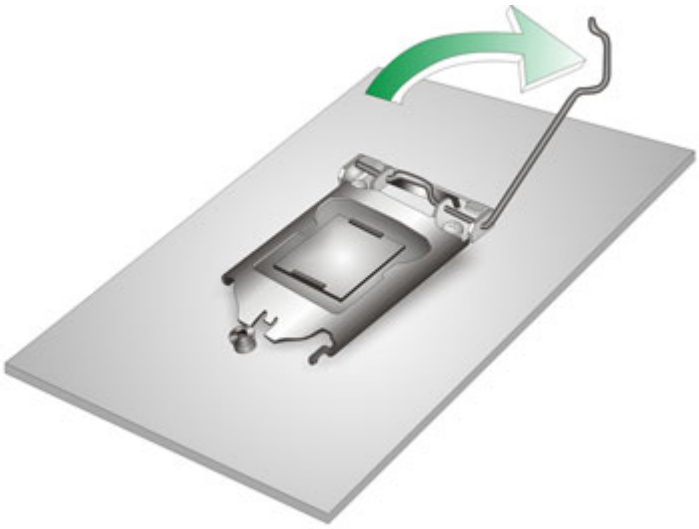


Figure 4-1: Disengage the CPU Socket Load Lever

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

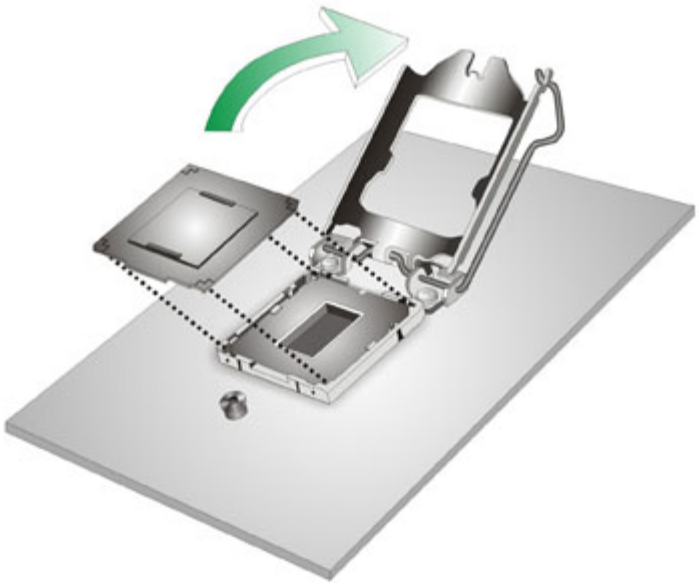


Figure 4-2: Remove Protective Cover

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

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

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

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

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

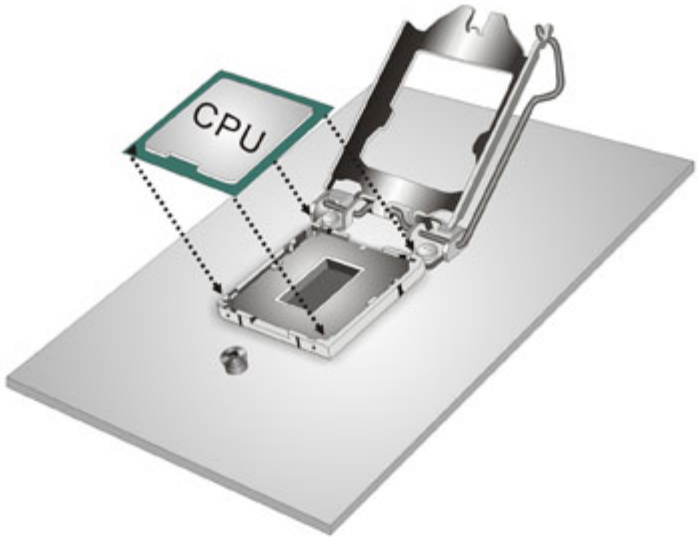


Figure 4-3: Insert the Socket LGA1155 CPU

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

Figure 4-4: Close the Socket LGA1155

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

4.2.2 Socket LGA1155 Cooling Kit Installation

WARNING:

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

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

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

WARNING:

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

To install the cooling kit, follow the instructions below.

Step 1: A cooling kit bracket is pre-installed on the rear of the motherboard. See **Figure 4-5.**

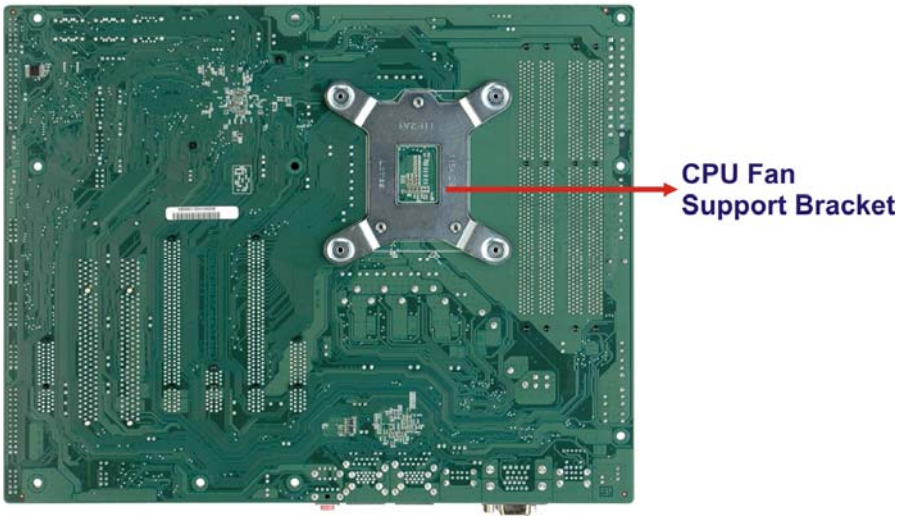


Figure 4-5: Cooling Kit Support Bracket

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

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

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

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMBA-C2160. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

To install a DIMM, please follow the steps below and refer to **Figure 4-6**.

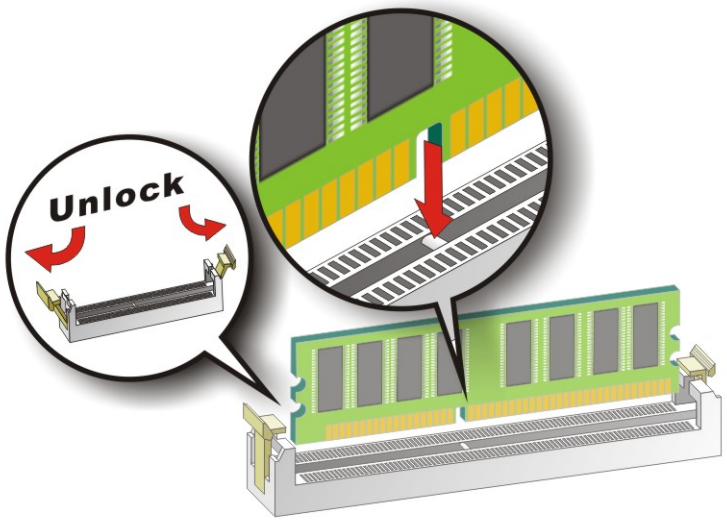


Figure 4-6: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-6**.

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 4-6**.

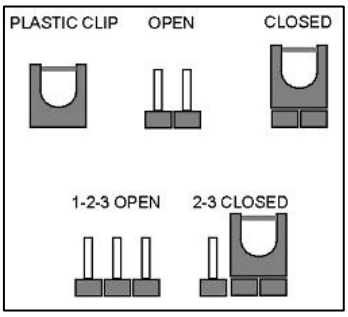
Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-6**.

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

4.3 Jumper Settings

NOTE:

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



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

Description	Label	Type
AT/ATX power select	JATX_AT1	2-pin header
Clear CMOS jumper	J_CMOS1	3-pin header
Flash descriptor security override	J_FLASH1	3-pin header
USB power select jumpers	K/M_USB1_PWR1, CNUSB1_PWR1, USB_PWR1, USB_PWR2, USB_PWR3	3-pin header
Wake-on LAN	WOL_SEL1	3-pin header

Table 4-1: Jumpers

4.3.1 AT/ATX Power Select Jumper

Jumper Label: **JATX_AT1**

Jumper Type: 2-pin header

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

Jumper Location: See **Figure 4-7**

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

Setting	Description
Closed	ATX power (Default)
Open	AT power

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

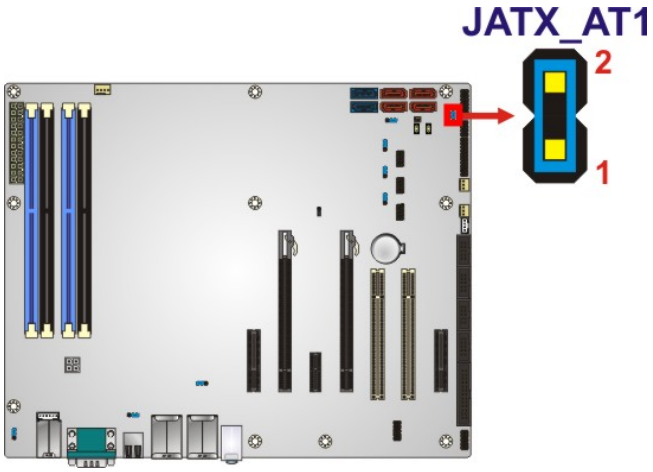


Figure 4-7: AT/ATX Power Mode Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

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

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

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

Setting	Description
Short 1-2	Normal (Default)
Short 2-3	Clear BIOS

Table 4-3: Clear BIOS Jumper Settings

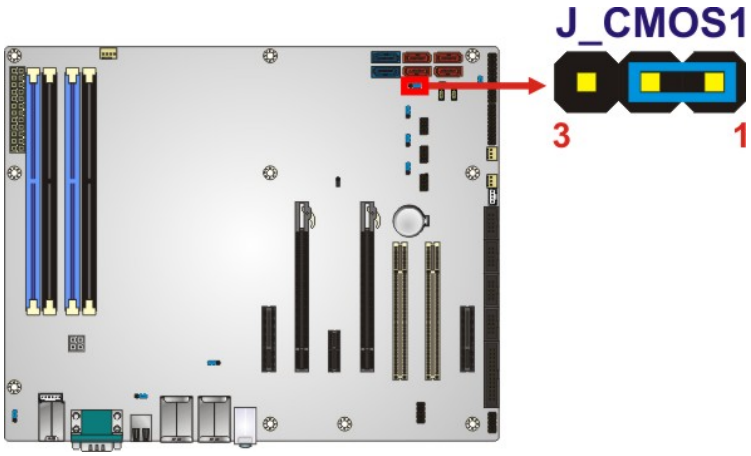


Figure 4-8: Clear BIOS Jumper Location

4.3.3 Flash Descriptor Security Override

Jumper Label: **J_FLASH1**

Jumper Type: 3-pin header

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

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

The Flash Descriptor Security Override jumper specifies whether to override the flash descriptor.

Setting	Description
Short 1-2	Disabled (Default)
Short 2-3	Enabled

Table 4-4: Flash Descriptor Security Override Jumper Settings

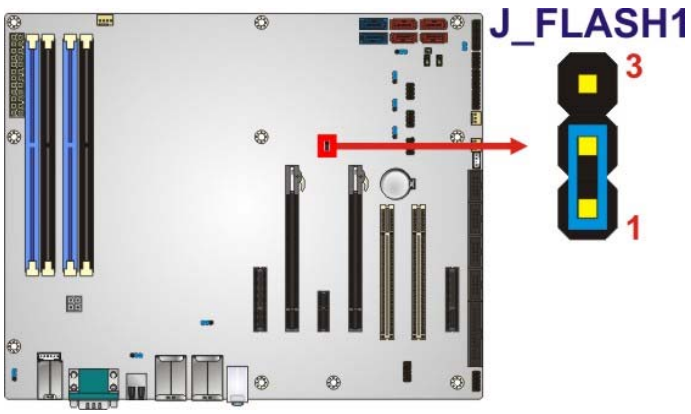


Figure 4-9: Flash Descriptor Security Override Jumper Location

4.3.4 USB Power Select Jumpers

Jumper Label:	**USB_PWR1, USB_PWR2, USB_PWR3, CNUSB1_PWR1, K/M_USB1_PWR1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-5**
Jumper Location:	See **Figure 4-10**

The USB Power Select jumper specifies the USB power.

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

Table 4-5: USB Power Select Jumper Settings

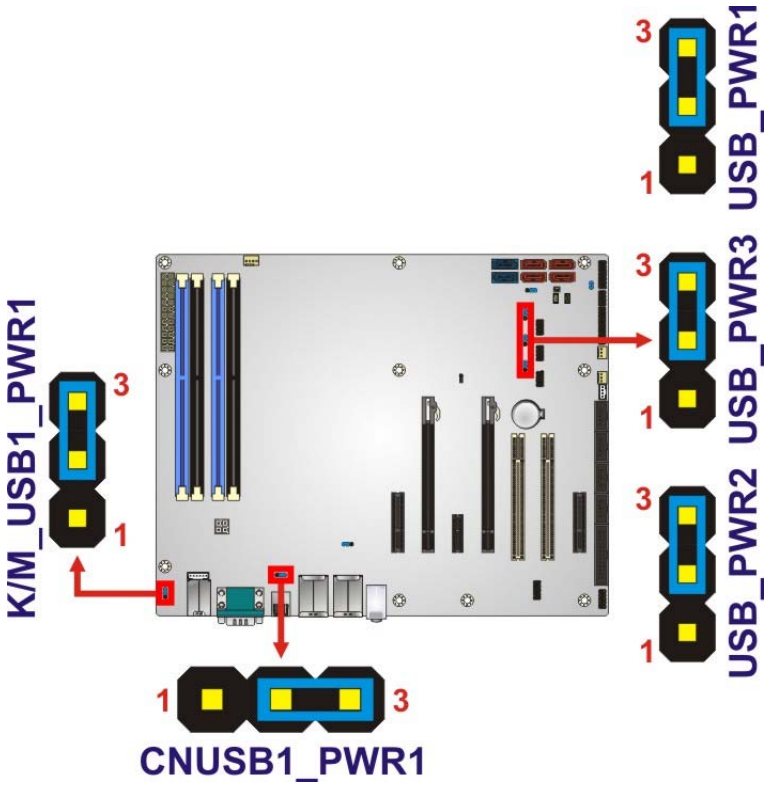


Figure 4-10: USB Power Select Jumper Locations

4.3.5 Wake-on LAN Jumper

CN Label: **WOL_SEL1**

CN Type: 3-pin header

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-6**

The Wake-on LAN connector allows the user to enable or disable the Wake-on LAN (WOL) function.

PIN NO.	DESCRIPTION
Short 1-2	Enable Wake-on LAN (Default)
Short 2-3	Disable Wake-on LAN

Table 4-6: Wake-on LAN Connector Pinouts

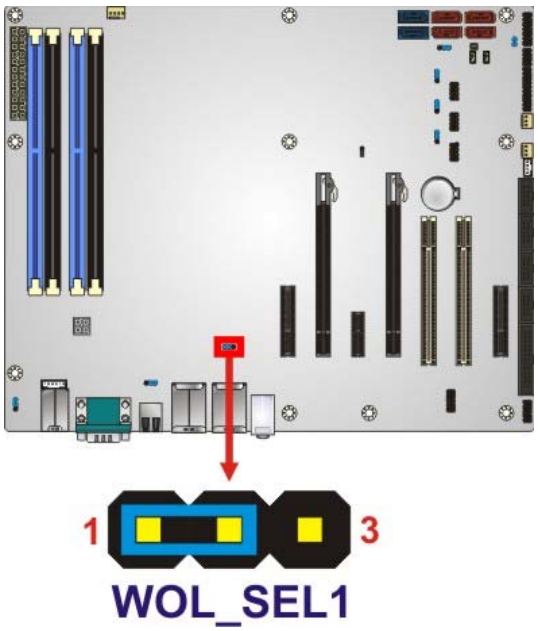


Figure 4-11: Wake-on LAN Connector Pinout Location

4.4 Internal Peripheral Device Connections

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

4.4.1 SATA Drive Connection

The IMBA-C2160 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**. Insert the cable connector into the on-board SATA drive connector until it clips into place. See **Figure 4-12**.

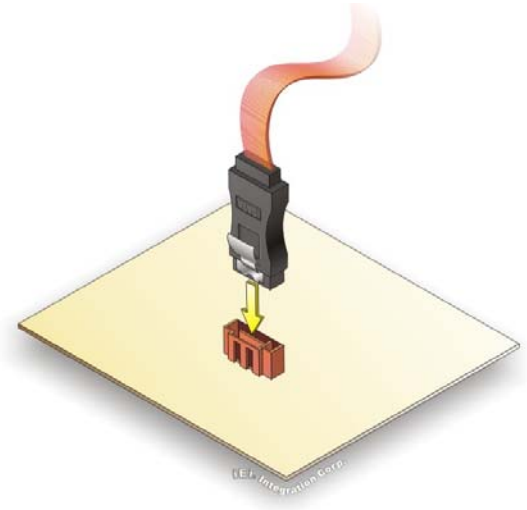


Figure 4-12: SATA Drive Cable Connection

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**.

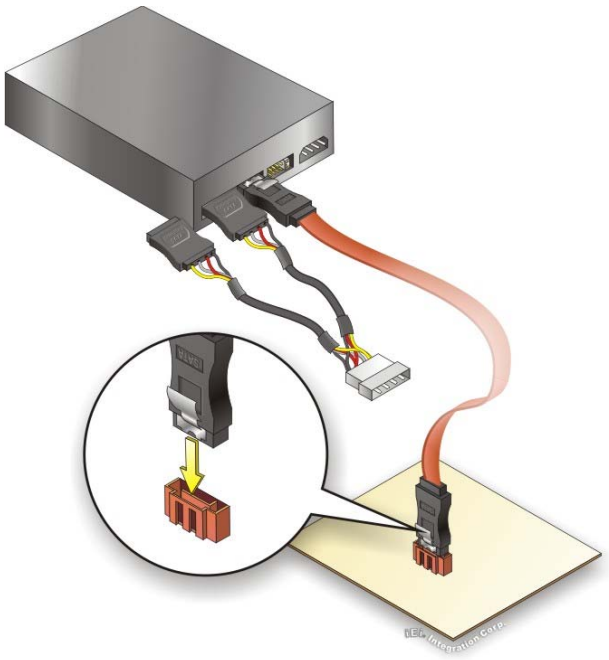


Figure 4-13: SATA Power Drive Connection

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

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMBA-C2160.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMBA-C2160 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 lime green (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.

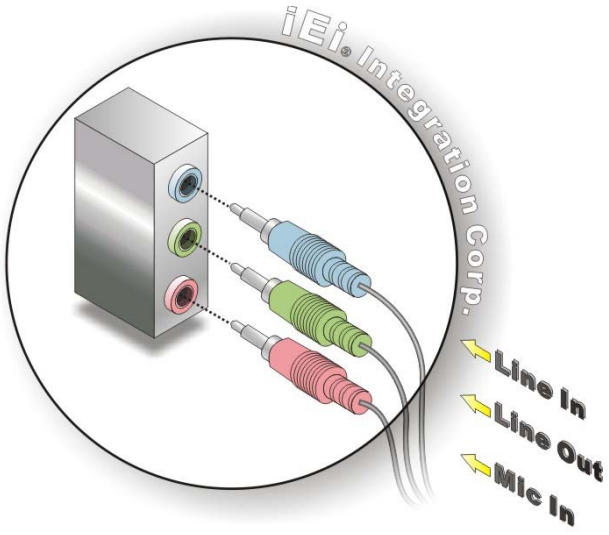


Figure 4-14: Audio Connector

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.

4.5.2 LAN Connection

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

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

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMBA-C2160. See **Figure 4-15**.

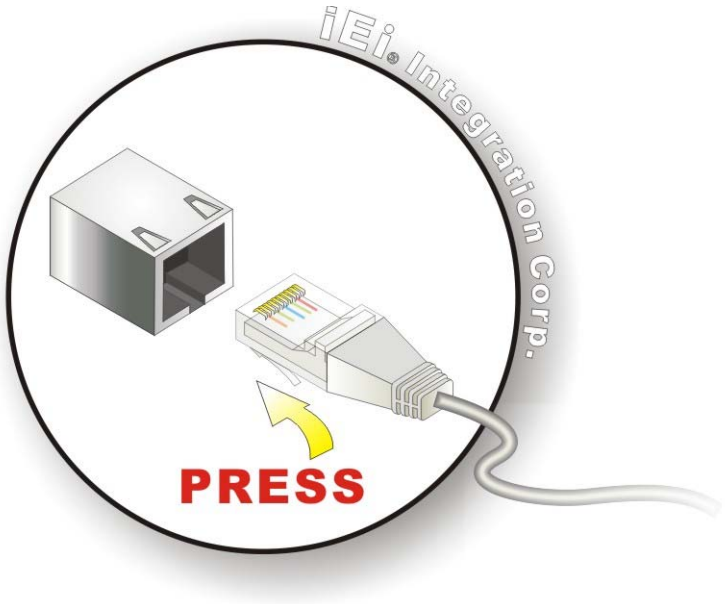


Figure 4-15: LAN Connection

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

4.5.3 PS/2 Keyboard/Mouse Connection

The IMBA-C2160 has a PS/2 connector on the external peripheral interface panel. The PS/2 connector is used to connect a keyboard or mouse to the system. Follow the steps below to connect a keyboard or mouse to the IMBA-C2160.

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

Step 2: **Align the PS/2 connector**. Align the PS/2 connector on the keyboard/mouse cable with the PS/2 connector on the external peripheral interface.

Step 3: **Insert the PS/2 connector** Once the connectors are properly aligned, insert the PS/2 connector from the keyboard/mouse into the PS/2 connector on the IMBA-C2160. See **Figure 4-16**.

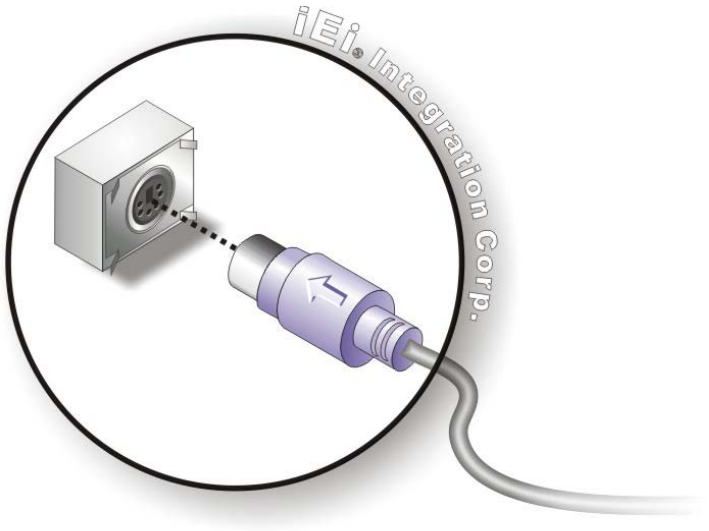


Figure 4-16: PS/2 Keyboard/Mouse Connection

4.5.4 Serial Device Connection

The IMBA-C2160 has one male DB-9 connector on the external peripheral interface panel for serial device connection. Follow the steps below to connect a serial device to the IMBA-C2160.

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 4-17**.

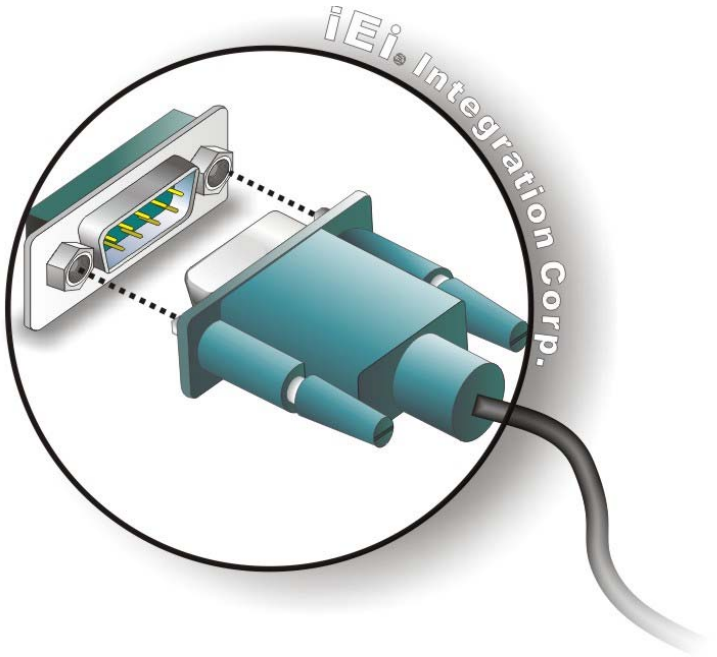


Figure 4-17: Serial Device Connection

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

4.5.5 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMBA-C2160.

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 4-18**.

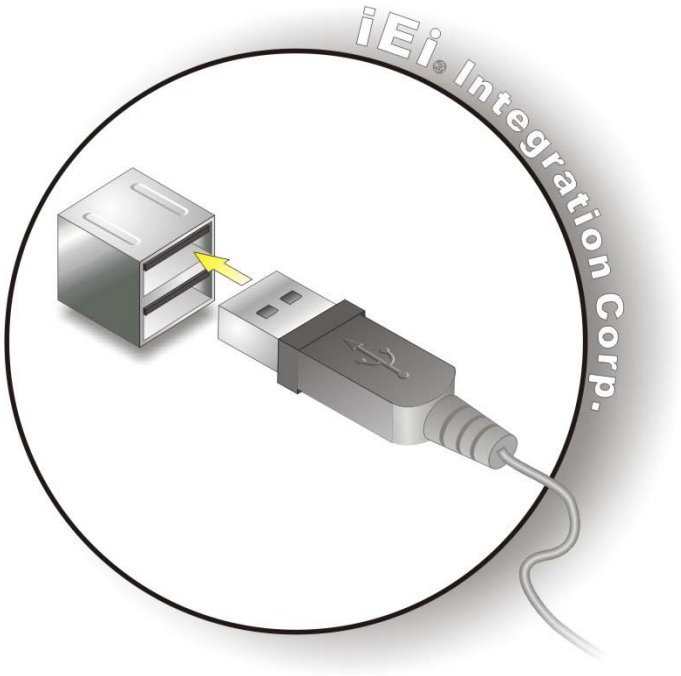


Figure 4-18: USB Connection

4.5.6 VGA Monitor Connection

The IMBA-C2160 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMBA-C2160, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMBA-C2160. See **Figure 4-19**.

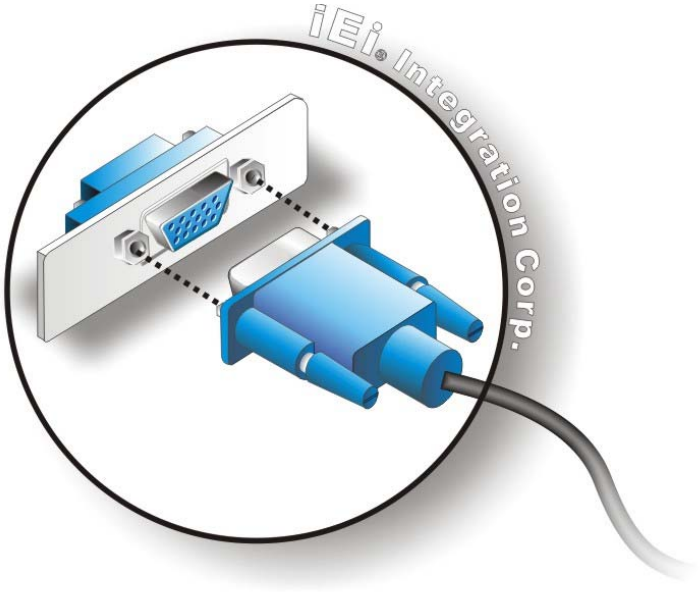


Figure 4-19: VGA Connection

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

4.6 Intel® AMT Setup Procedure

The IMBA-C2160 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

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

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2**.

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

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

Step 5: Configure the Intel® Management Engine BIOS extension (MEBx). To get into the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up

process. Enter the Intel® current ME password as it requires (the Intel® default password is **admin**).

NOTE:

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

Chapter

5

BIOS

5.1 Introduction

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

NOTE:

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

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

5.1.5 BIOS Menu Bar

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

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.

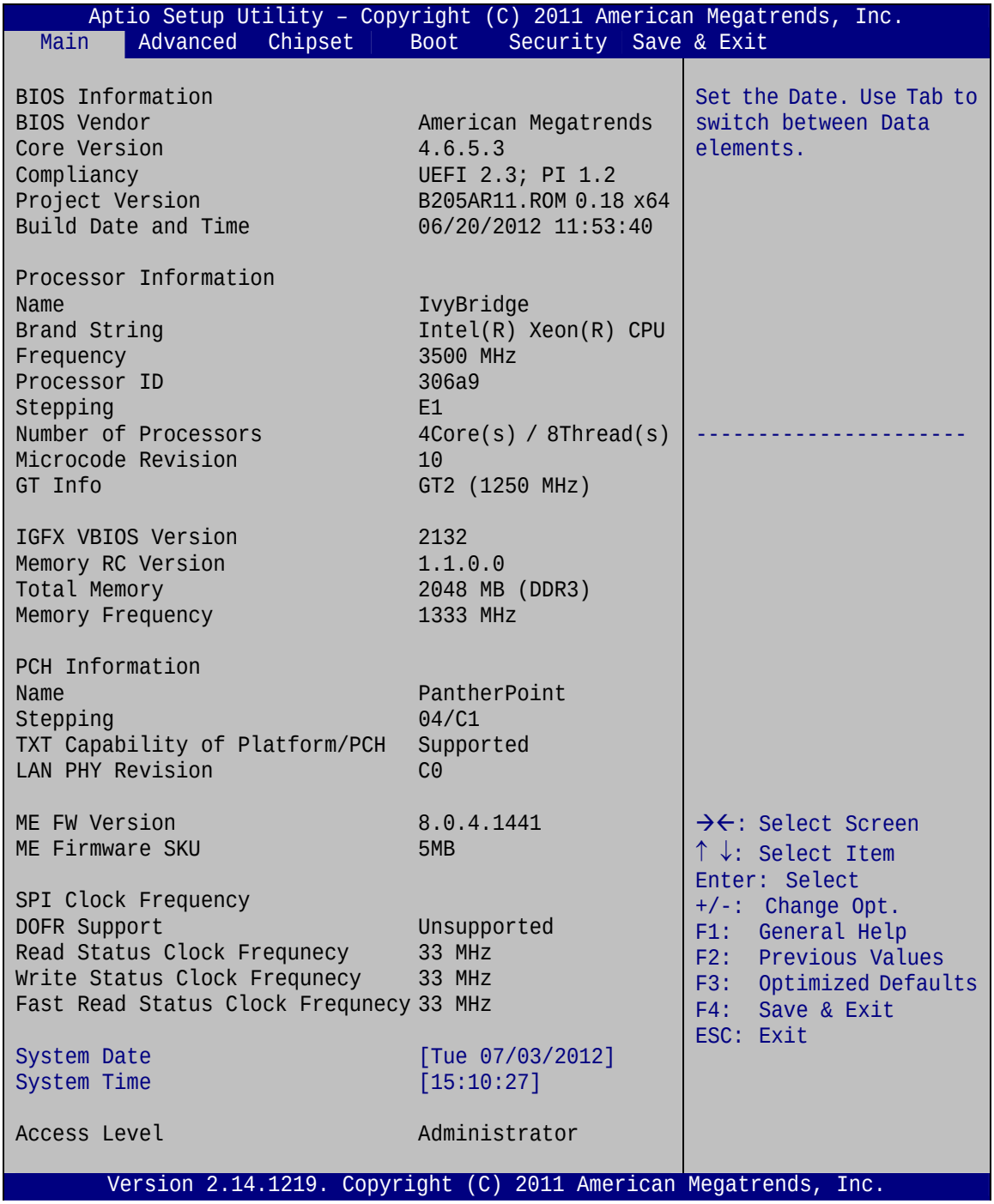
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

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

5.2 Main

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

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



BIOS Menu 1: Main

The Main menu lists the following system details:

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

The Main menu has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

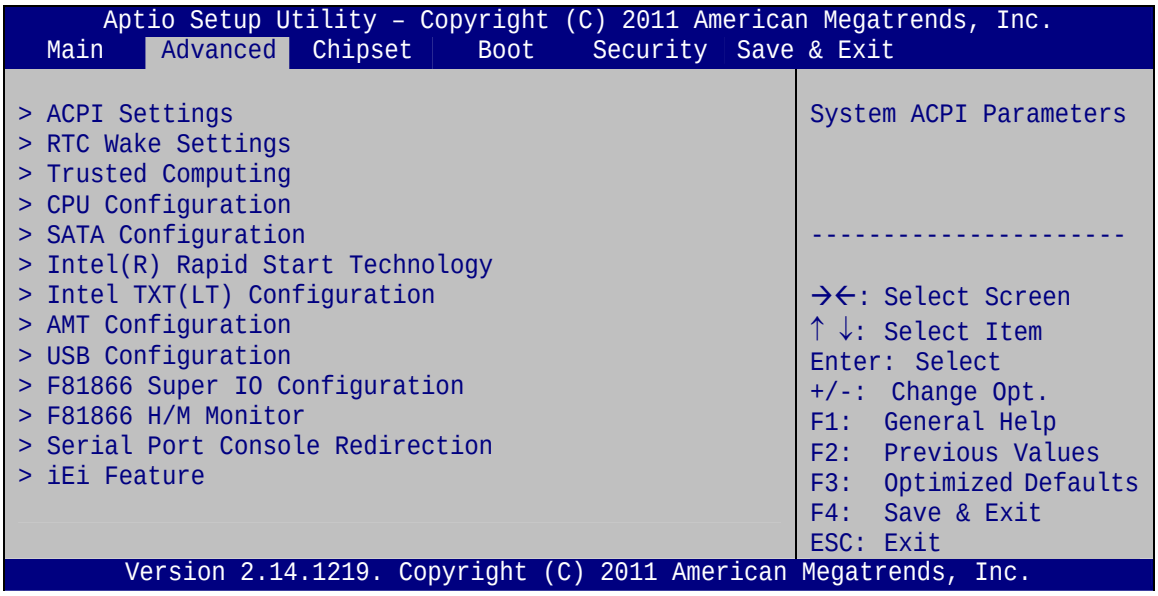
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING!

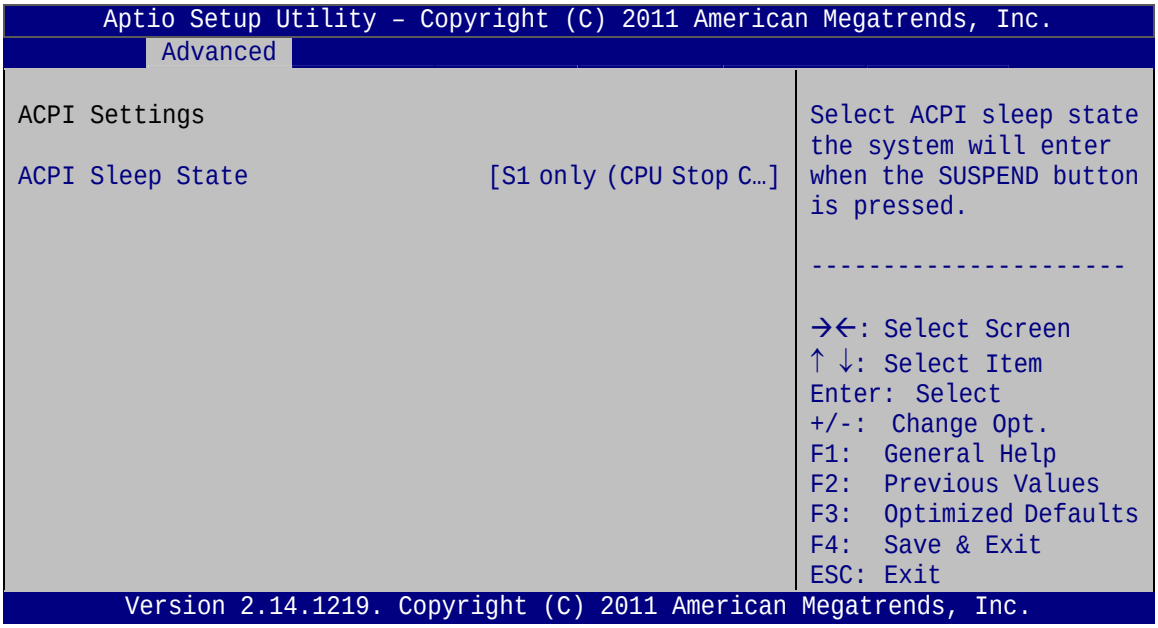
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



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 Settings

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

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

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

5.3.2 RTC Wake Settings

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

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

Wake system with Fixed Time      [Disabled]        Enable or disable System
                                                   wake on alarm event. When
                                                   enabled, System will
                                                   wake on the
                                                   date::hr::min::sec
                                                   specified

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

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

BIOS Menu 4: RTC Wake Settings

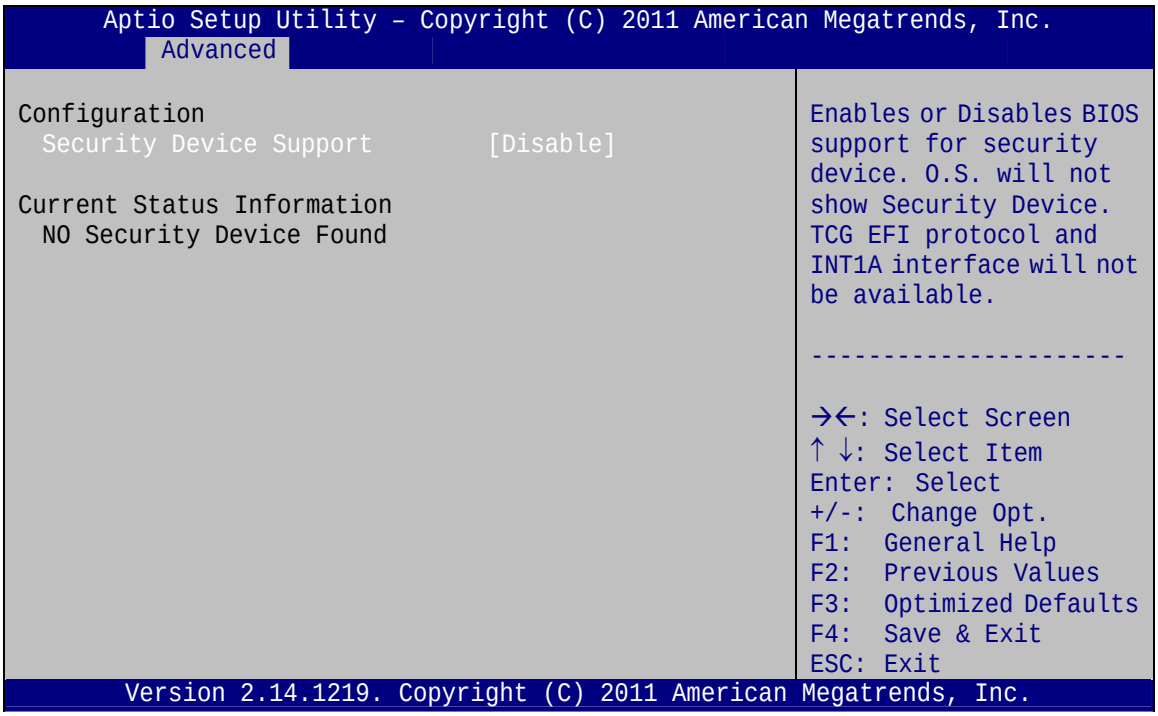
➔ **Wake System with Fixed Time [Disabled]**

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

➔ **Disabled**	**DEFAULT**	The real time clock (RTC) cannot generate a wake event
➔ **Enabled**		If selected, the following appears with values that can be selected: *Wake up every day *Wake up date *Wake up hour *Wake up minute *Wake up second After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 Trusted Computing

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



BIOS Menu 5: Trusted Computing

➔ **Security Device Support [Disable]**

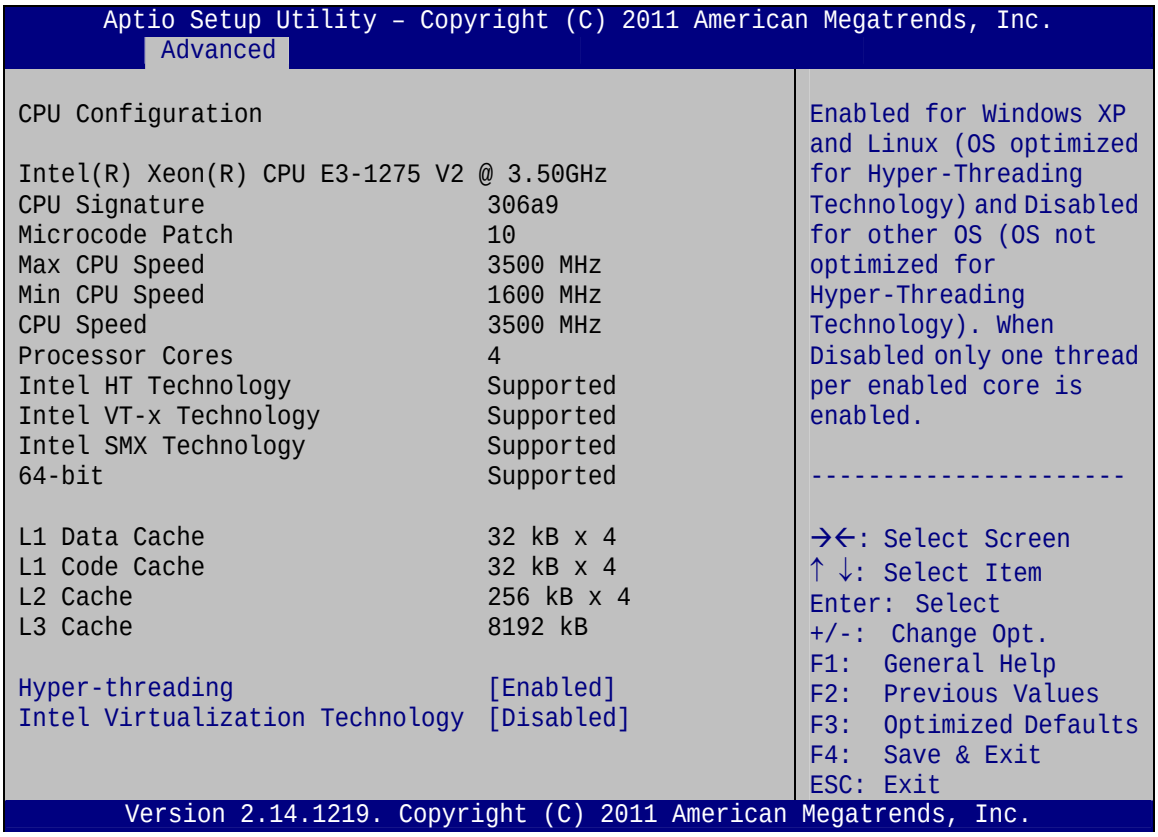
Use the **Security Device Support** option to configure support for the TPM.

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

➔ **Enable** TPM support is enabled.

5.3.4 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 6**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 6: CPU Configuration

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

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- 64-bit: Indicates if 64-bit is supported by the CPU.

- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **Hyper-threading [Enabled]**

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

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

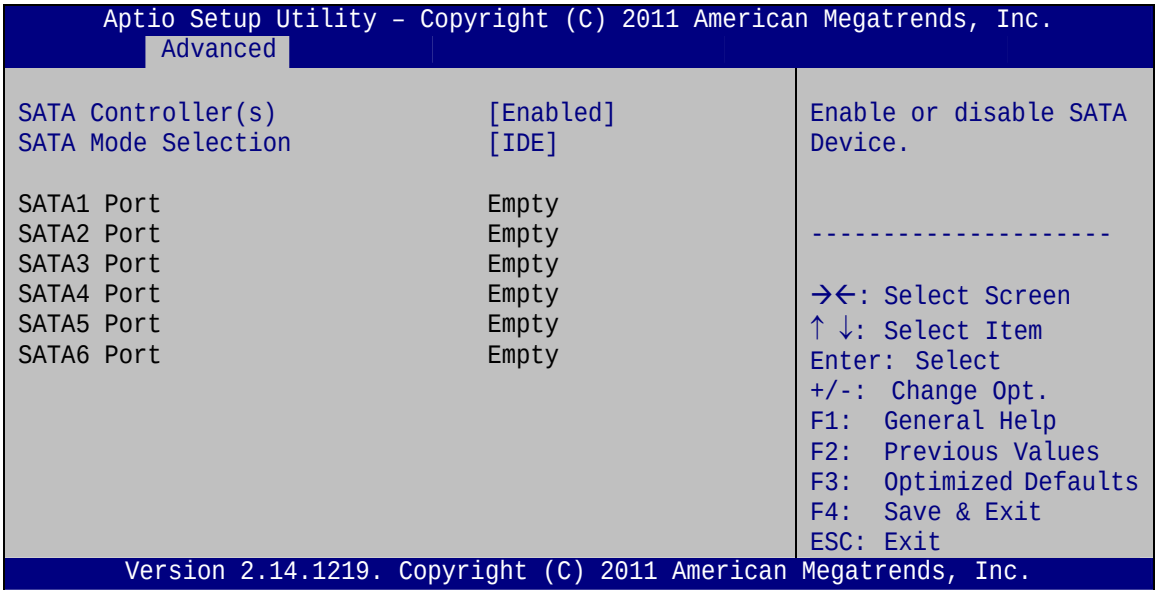
➔ **Intel Virtualization Technology [Disabled]**

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

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

5.3.5 SATA Configuration

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



BIOS Menu 7: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

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

- ➔ **Enabled** **DEFAULT** Enables the on-board SATA controller.
- ➔ **Disabled** Disables the on-board SATA controller.

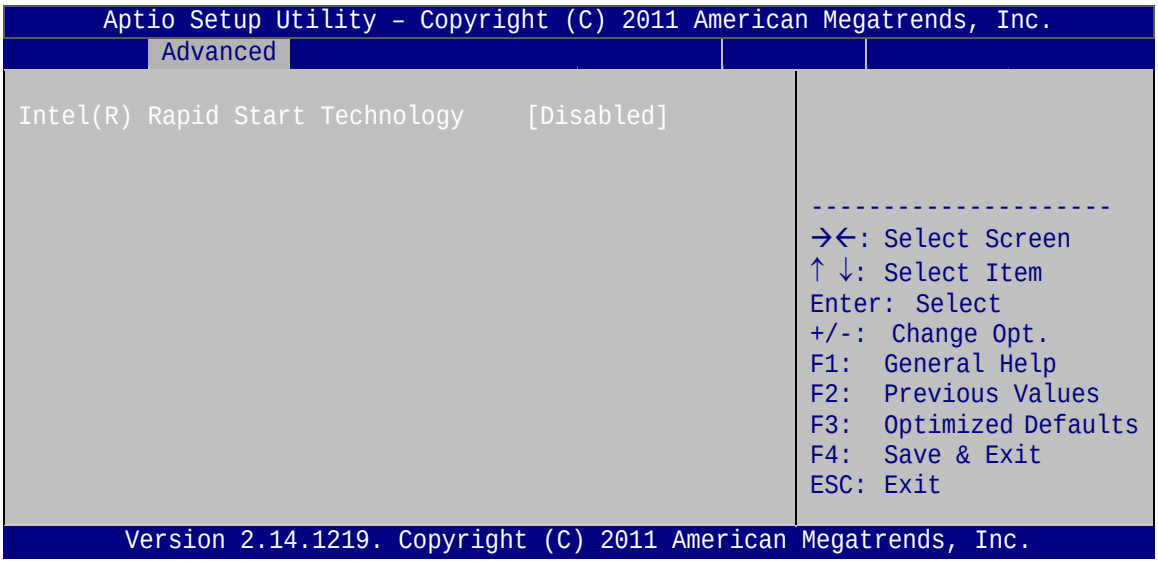
➔ **SATA Mode Selection [IDE]**

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

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

5.3.6 Intel(R) Rapid Start Technology

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



BIOS Menu 8: Intel(R) Rapid Start Technology

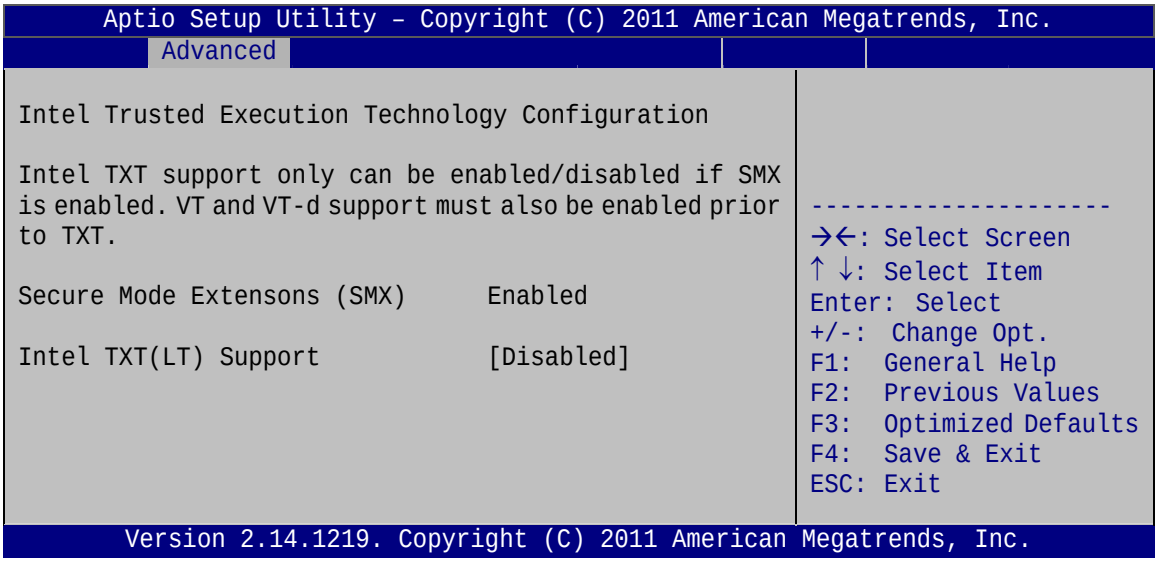
➔ **Intel(R) Rapid Start Technology [Disabled]**

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

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

5.3.7 Intel TXT(LT) Configuration

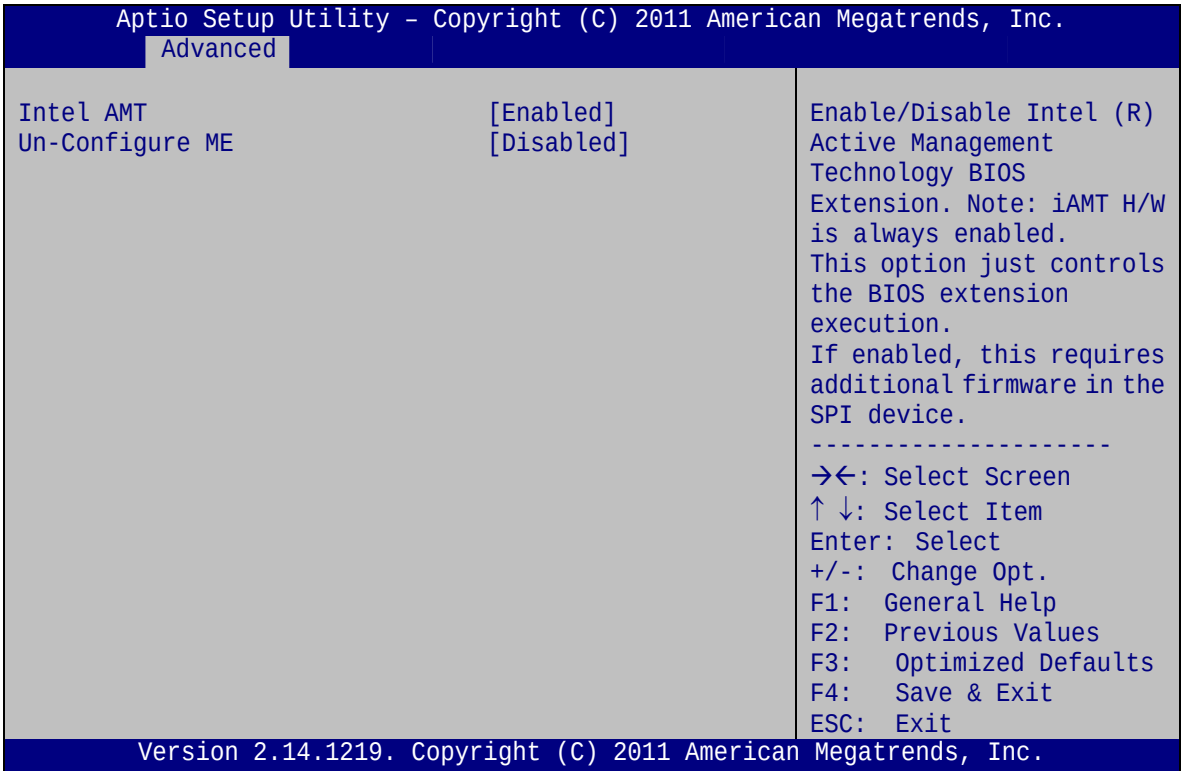
Use the **Intel TXT(LT) Configuration** (**BIOS Menu 9**) menu to configure Intel Trusted Execution Technology support.



BIOS Menu 9: Intel TXT(LT) Configuration

5.3.8 AMT Configuration

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



BIOS Menu 10: AMT Configuration

➔ **Intel AMT [Enabled]**

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

➔ **Disabled** Intel® AMT is disabled

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

➔ **Un-Configure ME [Disabled]**

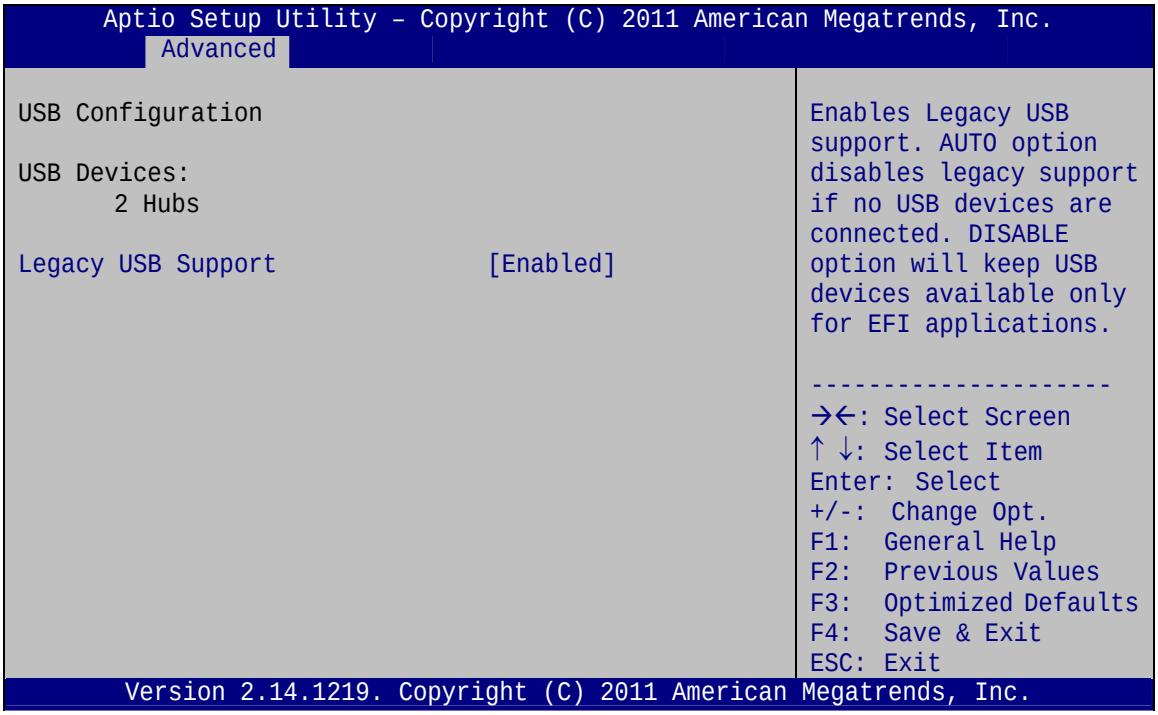
Use the **Un-Configure ME** option to perform ME unconfigure without password operation.

➔ **Disabled** **DEFAULT** Not perform ME unconfigure

➔ **Enabled** To perform ME unconfigure

5.3.9 USB Configuration

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



BIOS Menu 11: USB Configuration

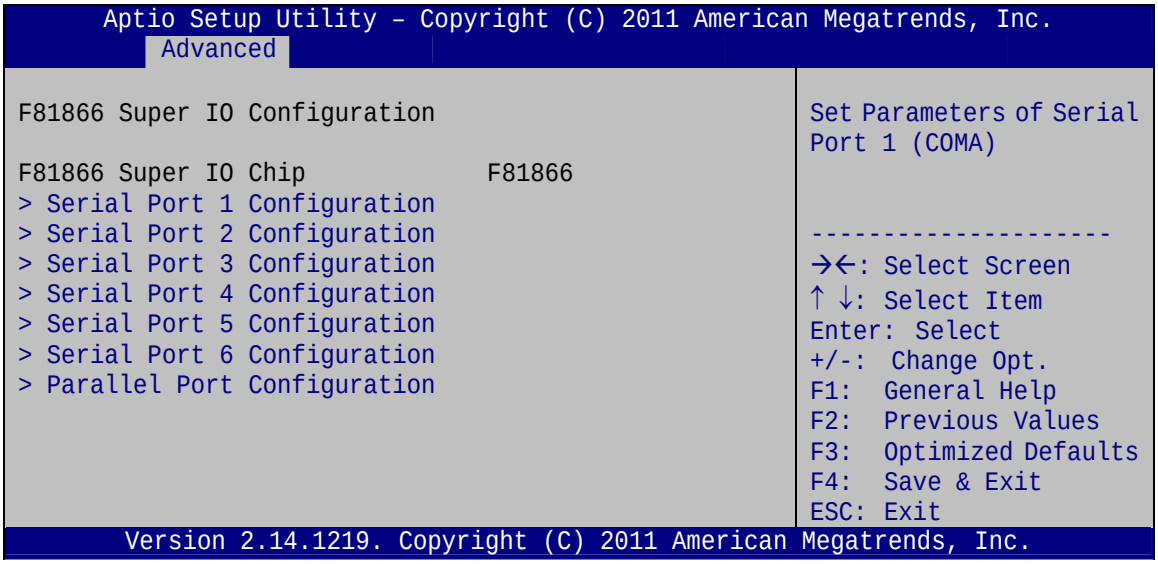
➔ **Legacy USB Support [Enabled]**

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

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

5.3.10 F81866 Super IO Configuration

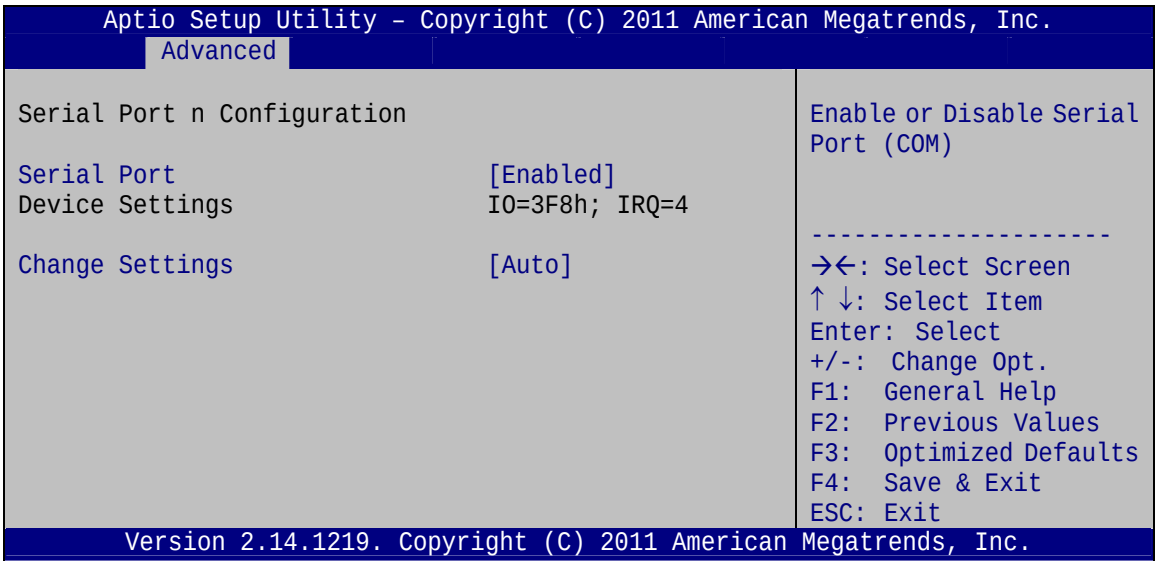
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 12**) to set or change the configurations for the parallel port and serial ports.



BIOS Menu 12: F81866 Super IO Configuration

5.3.10.1 Serial Port n Configuration

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



BIOS Menu 13: Serial Port n Configuration Menu

5.3.10.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

5.3.10.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

5.3.10.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

➔ **IO=3E8h; 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

5.3.10.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2E8h; IRQ=10**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
➔ **IO=3E8h; IRQ=10, 11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
➔ **IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

- **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

5.3.10.1.5 Serial Port 5 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

- **Auto** **DEFAULT** — The serial port IO port address and interrupt address are automatically detected.
- **IO=2C0h; IRQ=10** — Serial Port I/O port address is 2C0h 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

5.3.10.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

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

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

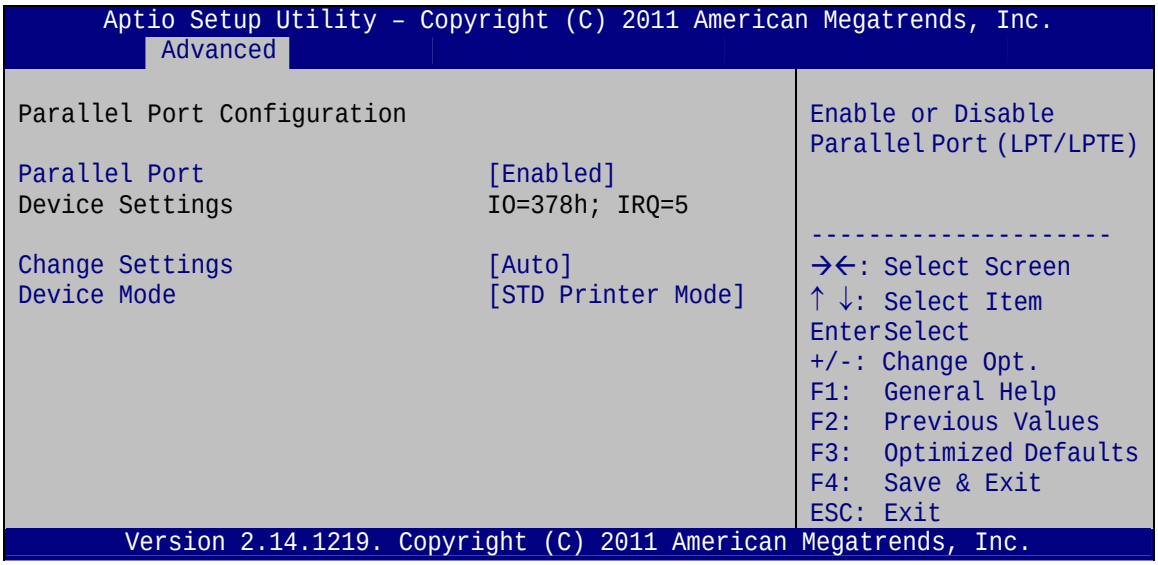
➔ **Change Settings [Auto]**

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

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

5.3.10.2 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 14**) to configure the parallel port.



BIOS Menu 14: Parallel Port Configuration Menu

➔ **Parallel Port [Enabled]**

Use the **Parallel Port** option to enable or disable the parallel port.

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

➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The parallel port IO port address and interrupt address are automatically detected.
➔ **IO=378h; IRQ=5**		Parallel Port I/O port address is 378h and the interrupt address is IRQ5
➔ **IO=378h; IRQ=5, 7**		Parallel Port I/O port address is 378h and the interrupt address is IRQ5, 7

➔ **IO=278h; IRQ=5, 7**	Parallel Port I/O port address is 278h and the interrupt address is IRQ5, 7
➔ **IO=3BCh; IRQ=5, 7**	Parallel Port I/O port address is 3BCh and the interrupt address is IRQ5, 7

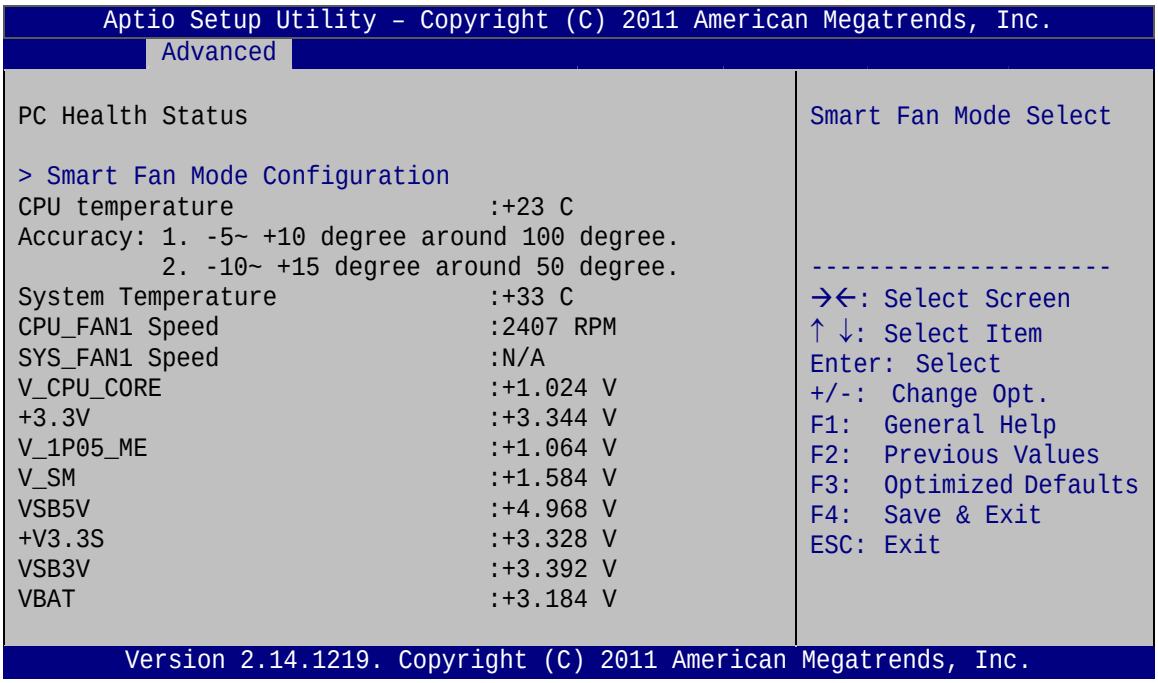
➔ **Device Mode [STD Printer Mode]**

Use the **Device Mode** option to select the mode the parallel port operates in. Configuration options are listed below.

- STD Printer Mode **Default**
- SPP Mode
- EPP-1.9 and SPP Mode
- EPP-1.7 and SPP Mode
- ECP Mode
- ECP and EPP 1.9 Mode
- ECP and EPP 1.7 Mode

5.3.11 F81866 H/W Monitor

The **F81866 H/W Monitor** menu (**BIOS Menu 15**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.



BIOS Menu 15: 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:
  - V_CPU_CORE
  - +3.3V
  - V_1P05_ME
  - V_SM
  - VSB5V
  - +V3.3S
  - VSB3V
  - VBAT

5.3.11.1 Smart Fan Mode Configuration

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

```
Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
        Advanced
Smart Fan Mode Configuration                    Smart Fan Mode Select

CPU_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode]
CPU Temperature 1               60
CPU Temperature 2               50
CPU Temperature 3               40
CPU Temperature 4               30
SYS_FAN1 Smart Fan Control      [Auto Duty-Cycle Mode]  ---------------------
System Temperature 1            60                      →←: Select Screen
System Temperature 2            50                      ↑ ↓: Select Item
System Temperature 3            40                      Enter: Select
System Temperature 4            30                      +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 16: Smart Fan Mode Configuration

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

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

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

➔ **CPU Temperature n**

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

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

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

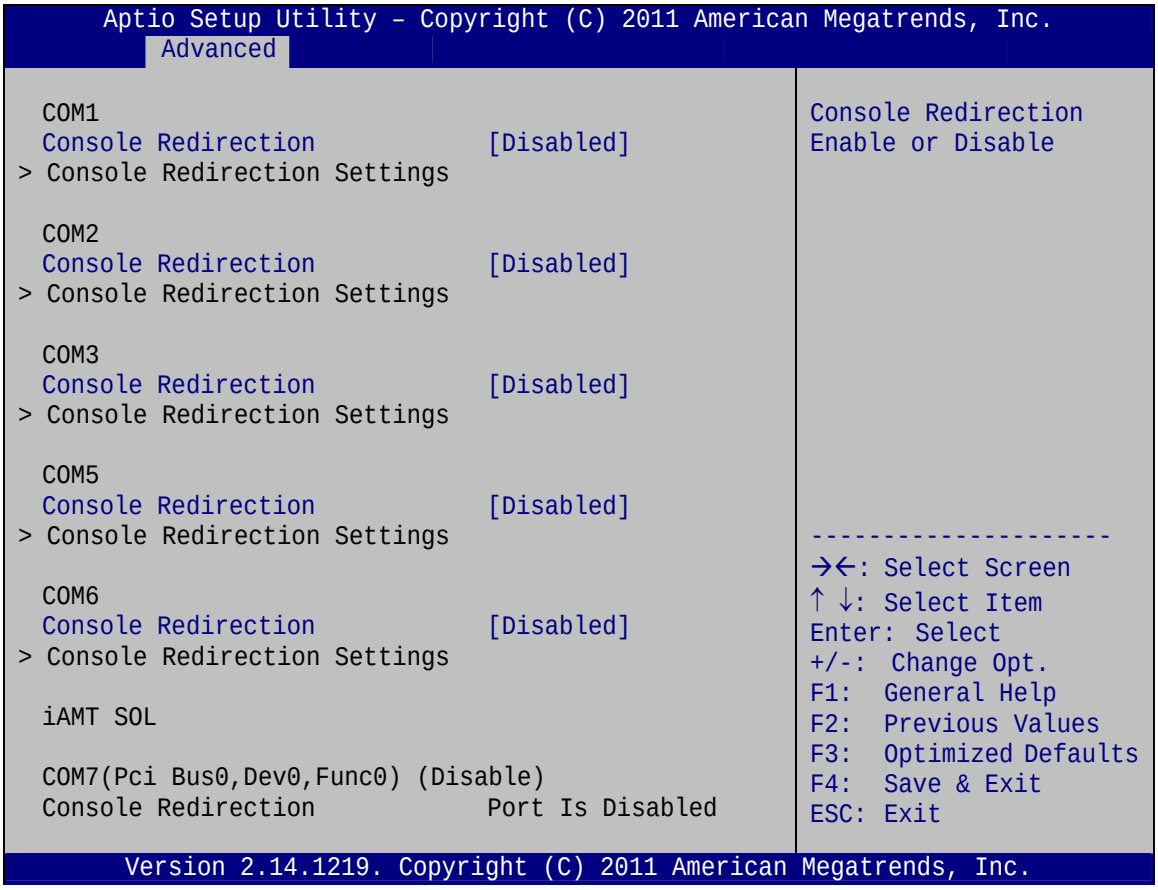
➔ **Manual Duty Mode**	The fan spins at the speed set in Manual by Duty Cycle settings
➔ **Auto Duty-Cycle Mode** **DEFAULT**	The fan adjusts its speed using Auto by Duty-Cycle settings

➔ **System Temperature n**

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

5.3.12 Serial Port Console Redirection

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



BIOS Menu 17: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

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

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

➔ **Enabled** Enabled the console redirection function

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

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

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

➔ **Data Bits [8]**

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

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

➔ **Parity [None]**

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

- ➔ **None** **DEFAULT** No parity bit is sent with the data bits.
- ➔ **Even** The parity bit is 0 if the number of ones in the data bits is even.
- ➔ **Odd** The parity bit is 0 if the number of ones in the data bits is odd.

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

➔ **Space** The parity bit is always 0. This option does not provide error detection.

➔ **Stop Bits [1]**

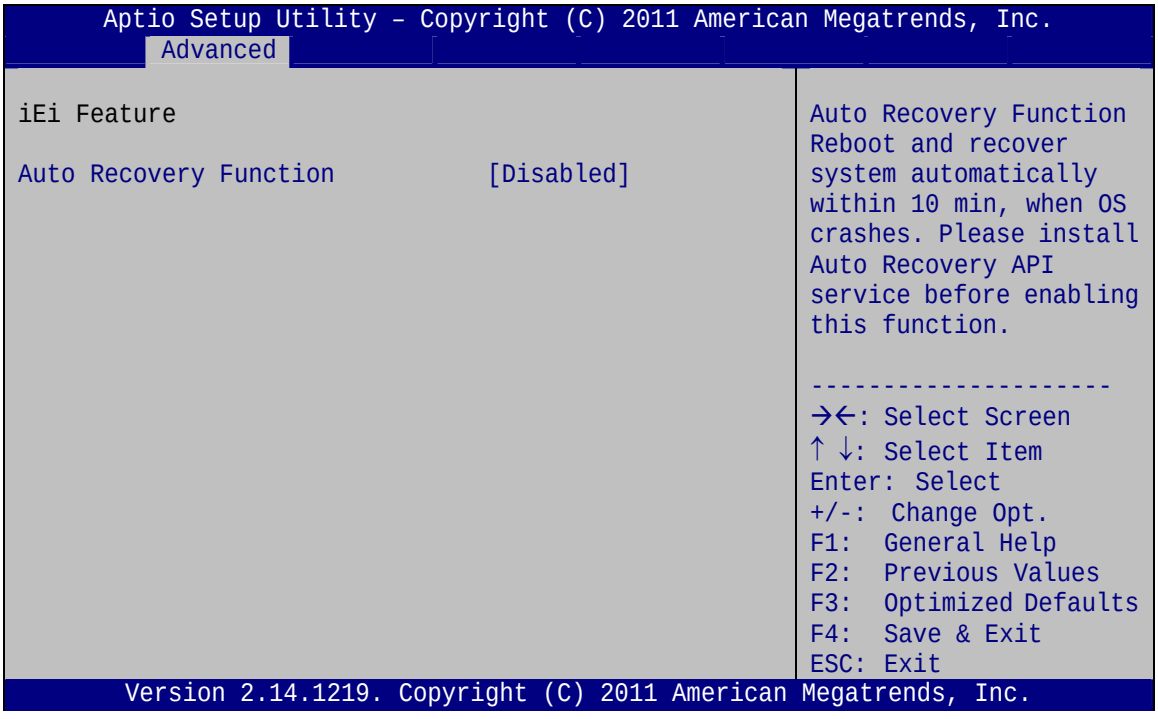
Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

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

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

5.3.13 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 18**) to configure One Key Recovery function.



BIOS Menu 18: 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.

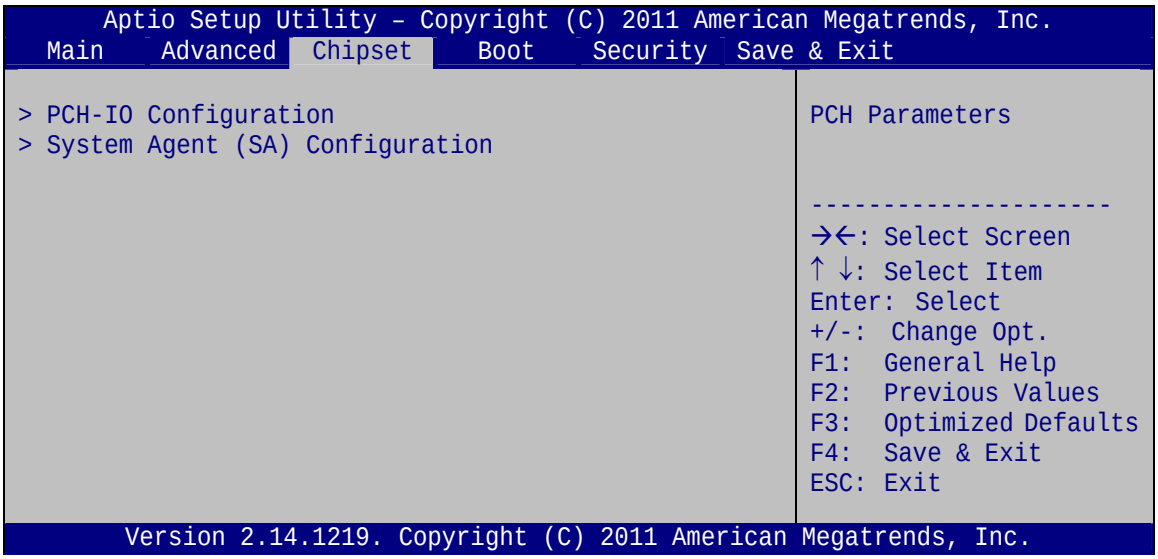
➔ **Disabled**	**DEFAULT**	Auto recovery function disabled
➔ **Enabled**		Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 19**) to access the Hostbridge and Southbridge configuration menus.

WARNING!

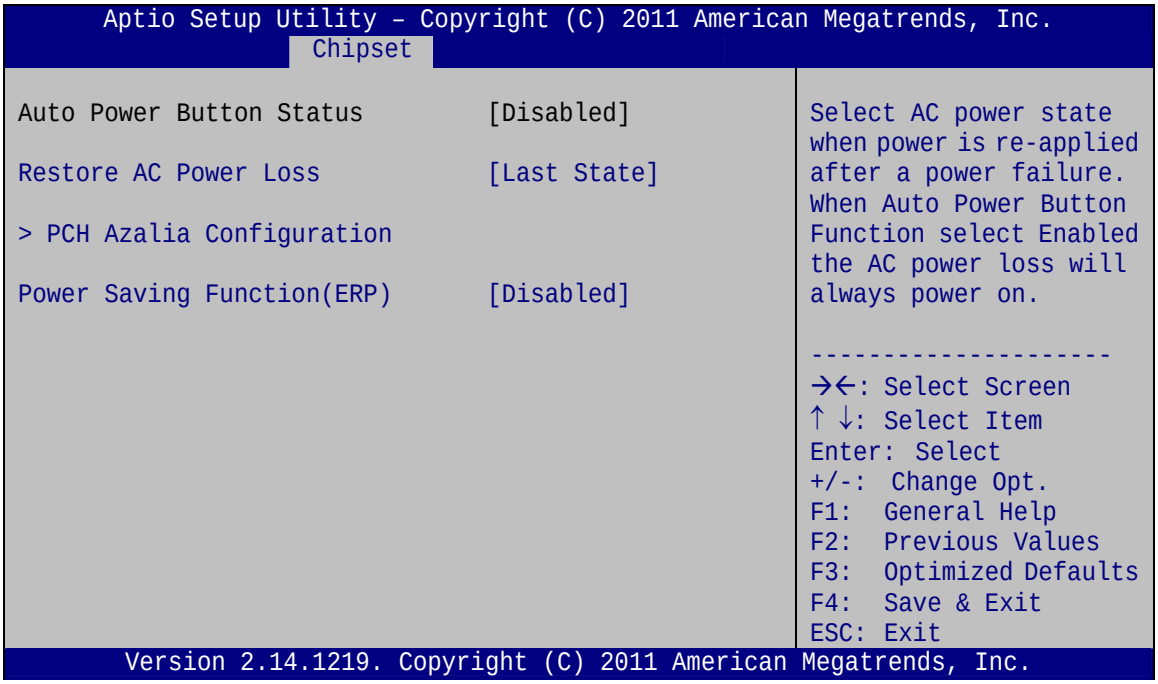
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 19: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 20**) to configure the PCH parameters.



BIOS Menu 20: PCH-IO Configuration

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

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

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

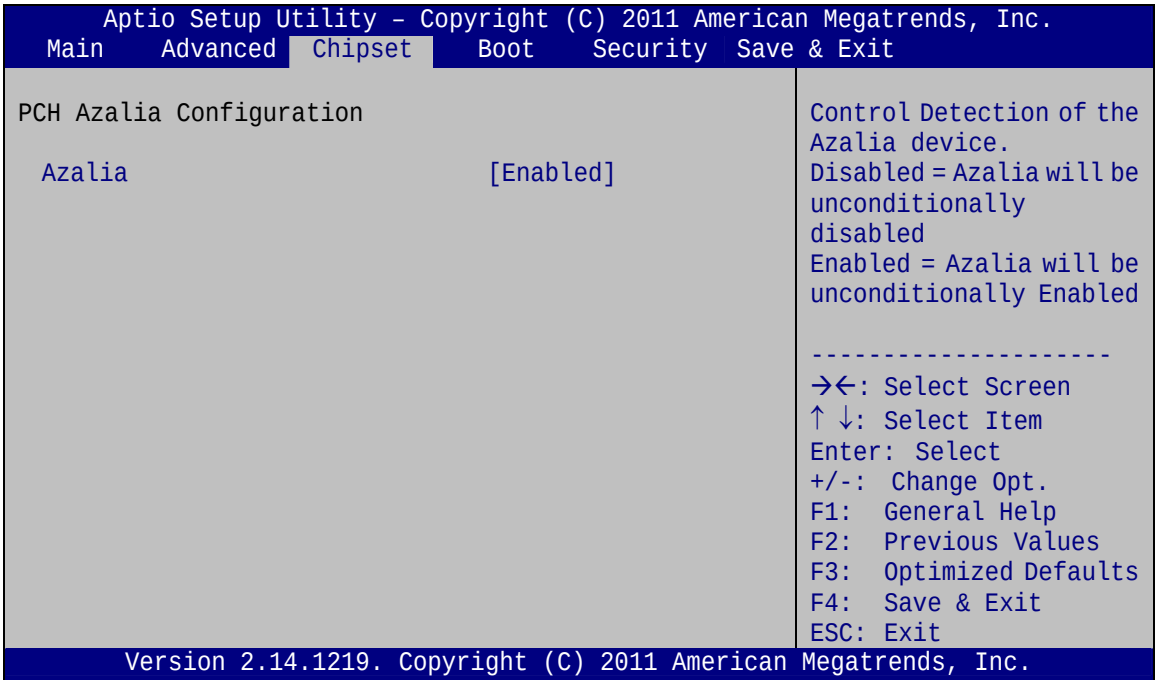
➔ **Power Saving Function(ERP) [Disabled]**

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

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

5.4.1.1 PCH Azalia Configuration

Use the **PCH Azalia Configuration** menu (**BIOS Menu 21**) to configure the PCH Azalia settings.



BIOS Menu 21: PCH Azalia Configuration Menu

➔ **Azalia [Enabled]**

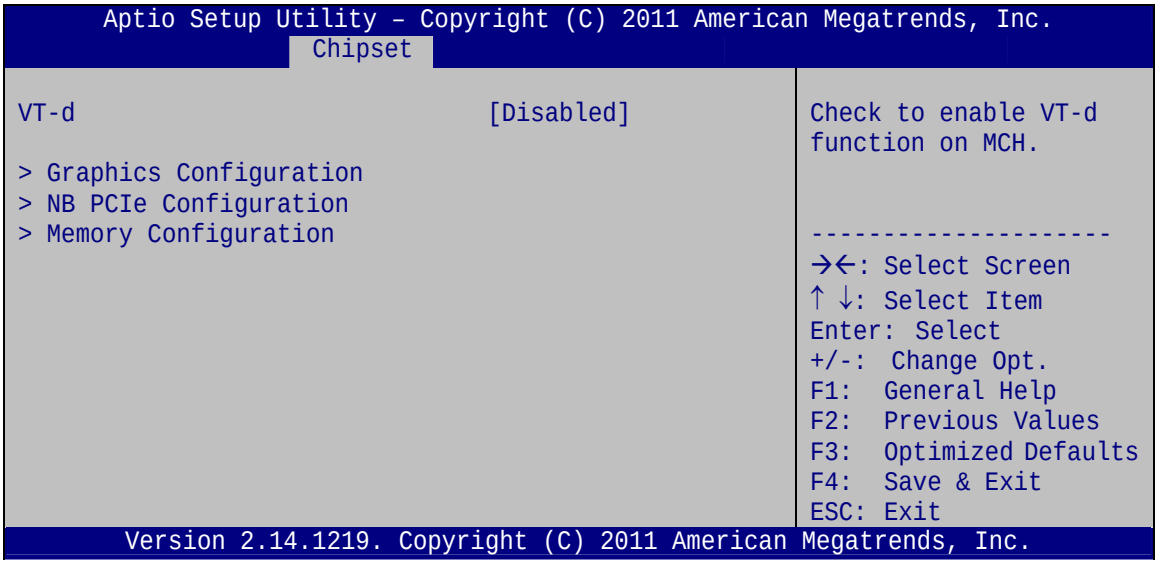
Use the **Azalia** option to enable or disable the High Definition Audio controller.

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

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

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 22**) to configure the System Agent (SA) parameters.



BIOS Menu 22: System Agent (SA) Configuration

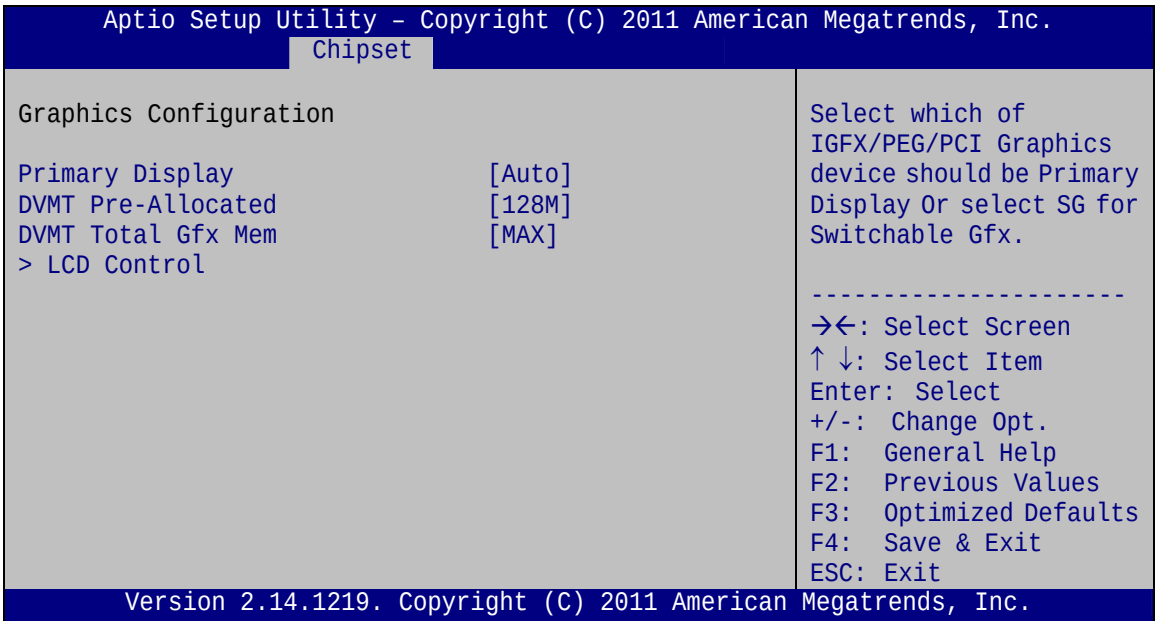
➔ **VT-d [Disabled]**

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

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

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 23**) menu to configure the video device connected to the system.



BIOS Menu 23: Graphics Configuration

➔ **Primary Display [Auto]**

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

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

➔ **DVMT Pre-Allocated [128M]**

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

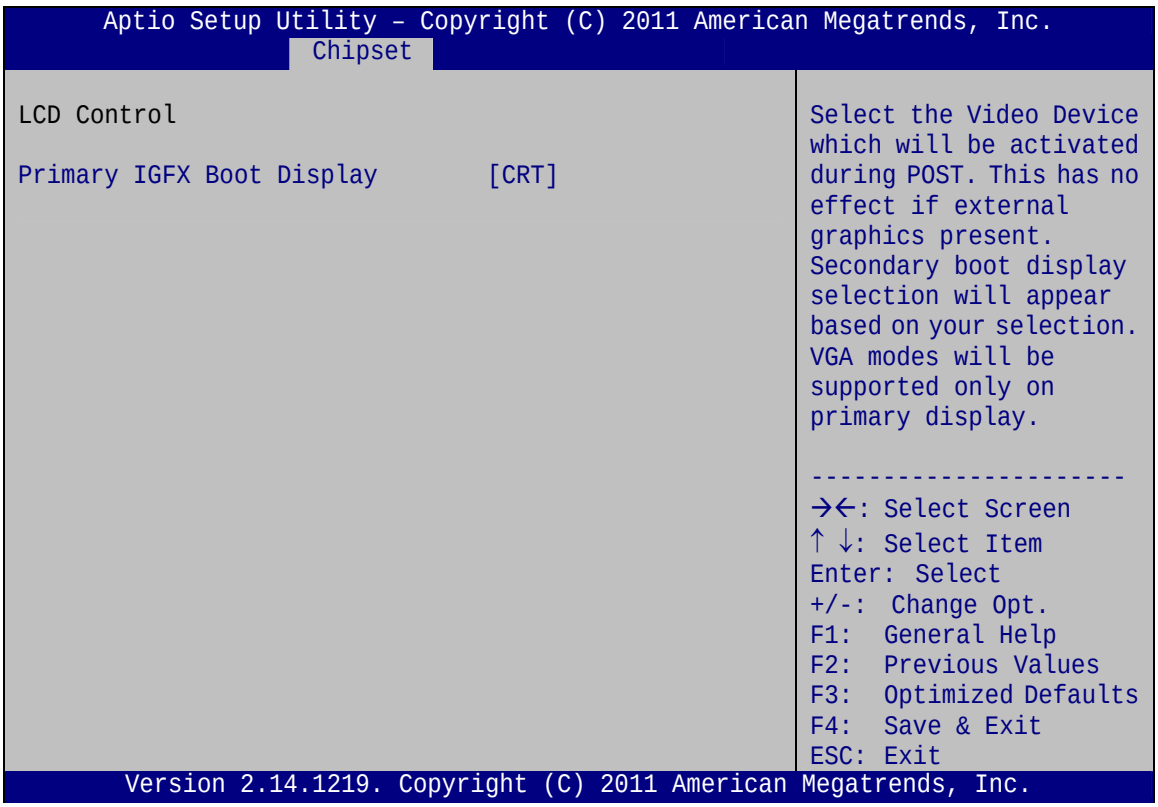
- 32M
- 64M
- 128M **Default**
- 256M
- 512M

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **Default**

5.4.2.1.1 LCD Control



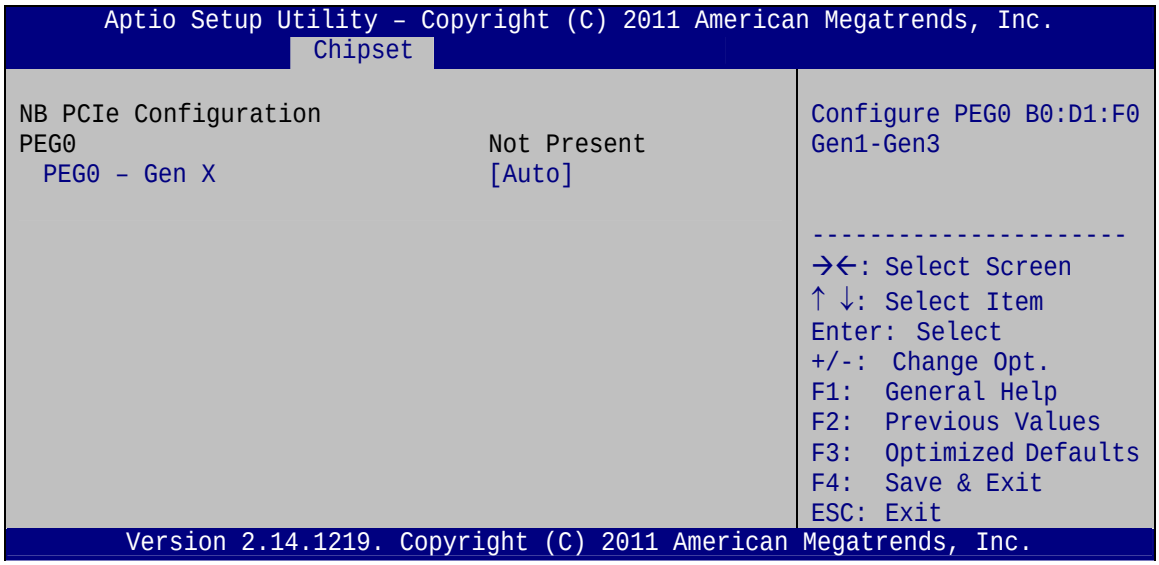
BIOS Menu 24: LCD Control

➔ **Primary IGFX Boot Display [VBIOS Default]**

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- CRT **DEFAULT**

5.4.2.2 NB PCIe Configuration



BIOS Menu 25: NB PCIe Configuration

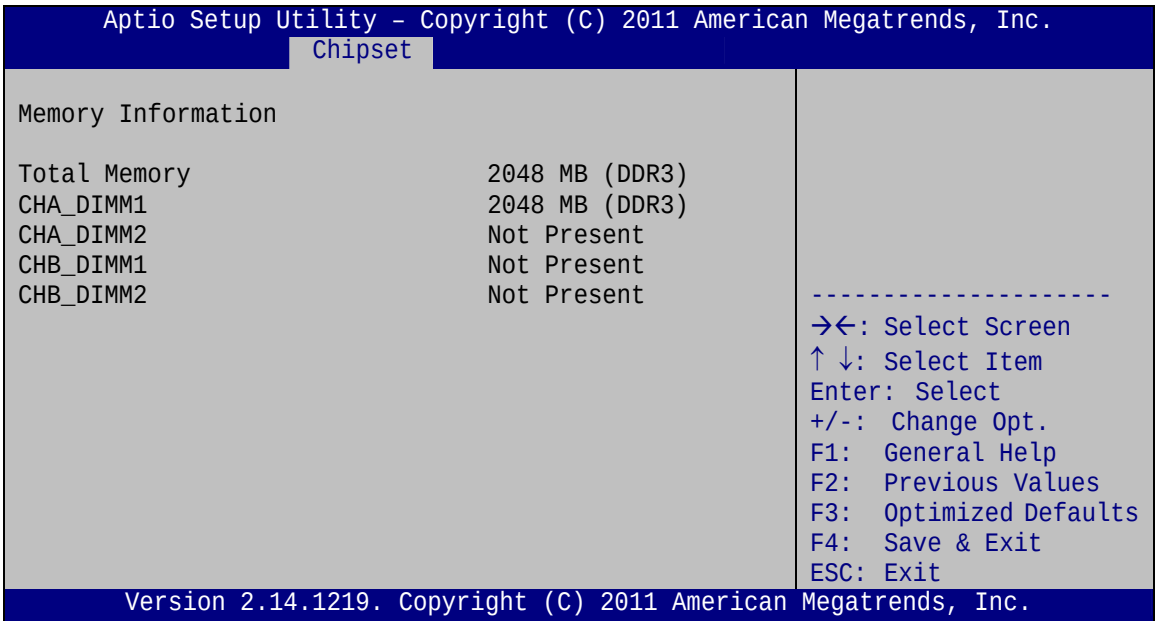
➔ **PEG0 – Gen X [Auto]**

Use the **PEG0 – Gen X** option to select the support type of the PCI express (PEG) controller. The following options are available:

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

5.4.2.3 Memory Configuration

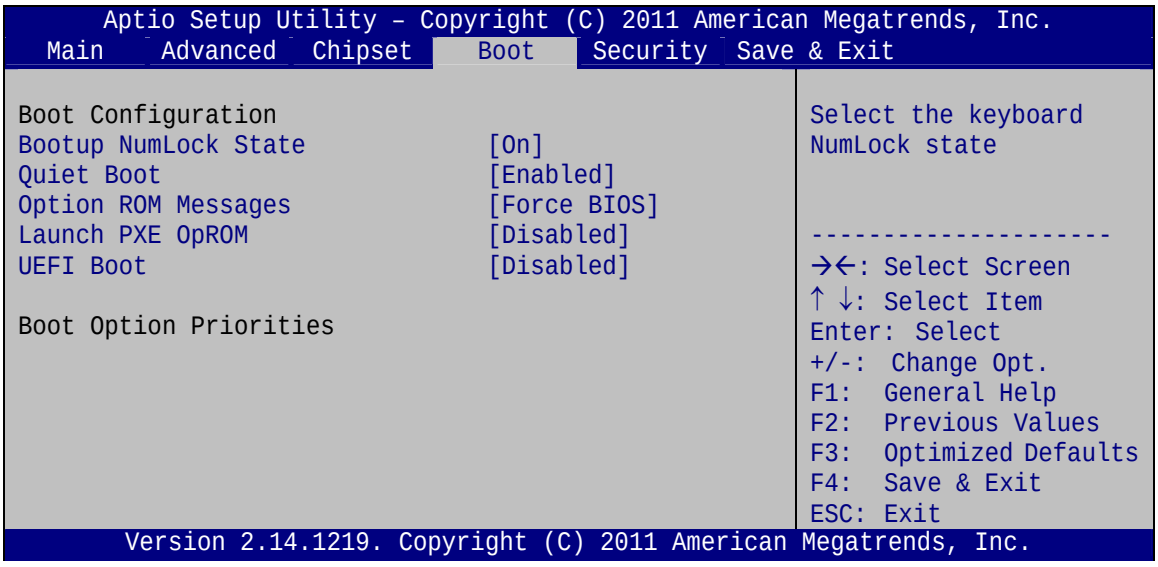
Use the **Memory Configuration** submenu (**BIOS Menu 26**) to view memory information.



BIOS Menu 26: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 27**) to configure system boot options.



BIOS Menu 27: Boot

➔ **Bootup NumLock State [On]**

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

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

➔ **Quiet Boot [Enabled]**

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

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

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

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

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

➔ **Launch PXE OpROM [Disabled]**

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

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

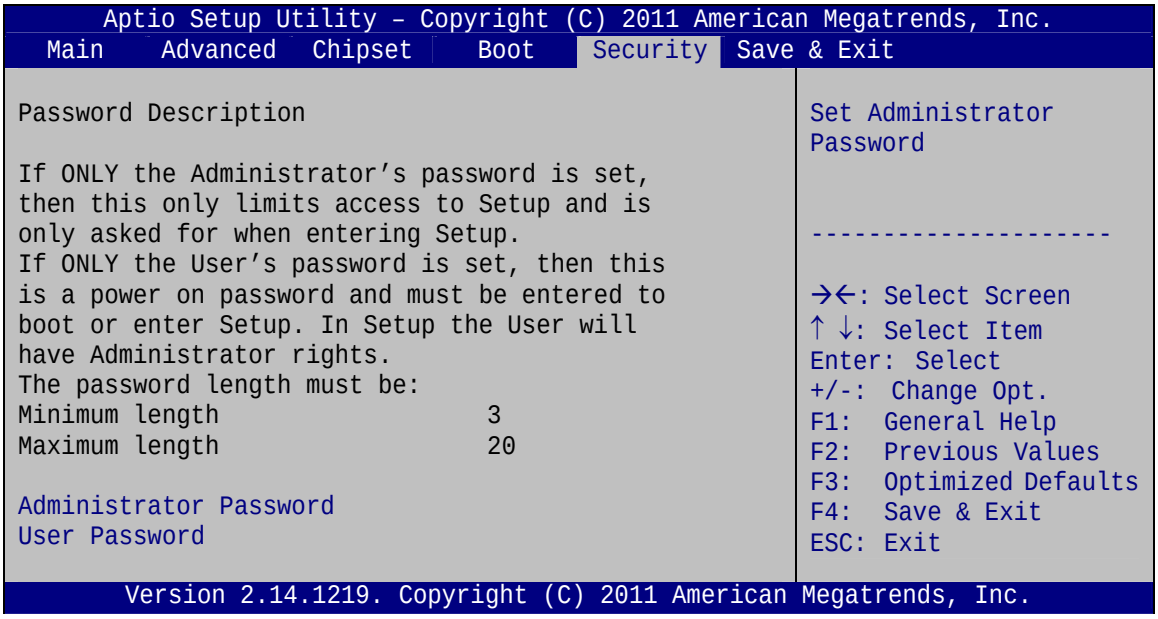
➔ **UEFI Boot [Disabled]**

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

➔	**Enabled**		Boot from UEFI devices is enabled.
➔	**Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

5.6 Security

Use the **Security** menu (**BIOS Menu 28**) to set system and user passwords.



BIOS Menu 28: Security

➔ **Administrator Password**

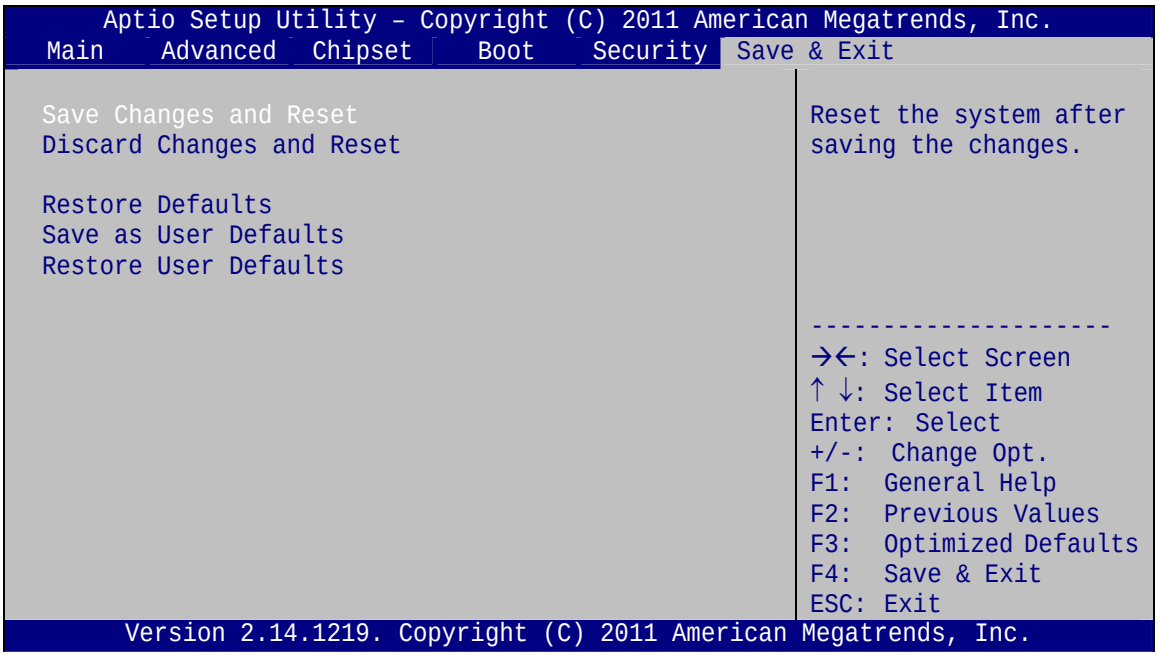
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.7 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 29**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 29: Save & Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system:

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

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMBA-C2160 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

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

Figure 6-1: Introduction Screen

Step 3: Click IMBA-C2160.

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

Figure 6-2: Available Drivers

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

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

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

Step 4: When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-3** appears.

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

Figure 6-3: Chipset Driver Welcome Screen

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

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

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

Figure 6-4: Chipset Driver License Agreement

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

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

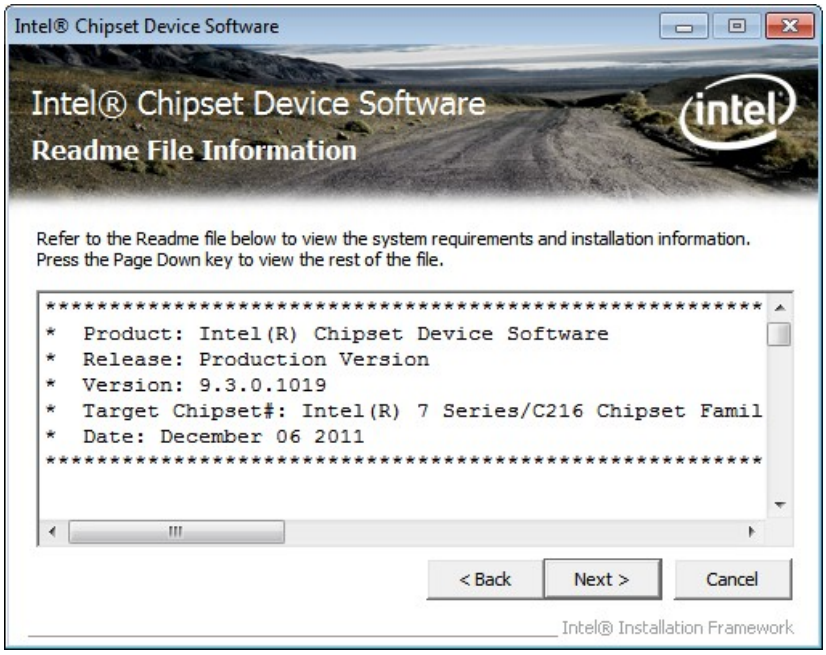


Figure 6-5: Chipset Driver Read Me File

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

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

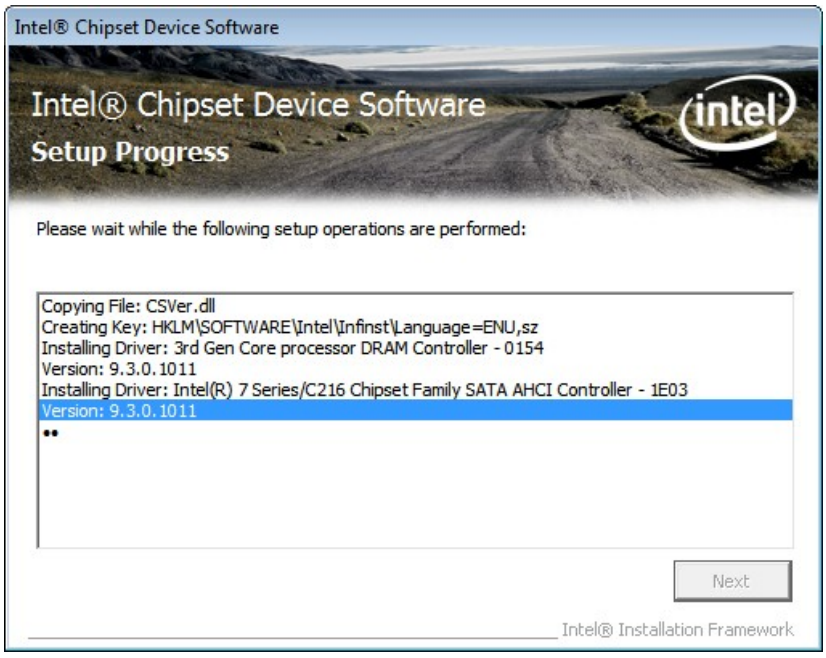


Figure 6-6: Chipset Driver Setup Operations

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

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

Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

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

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

Figure 6-8: Graphics Driver Welcome Screen

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

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

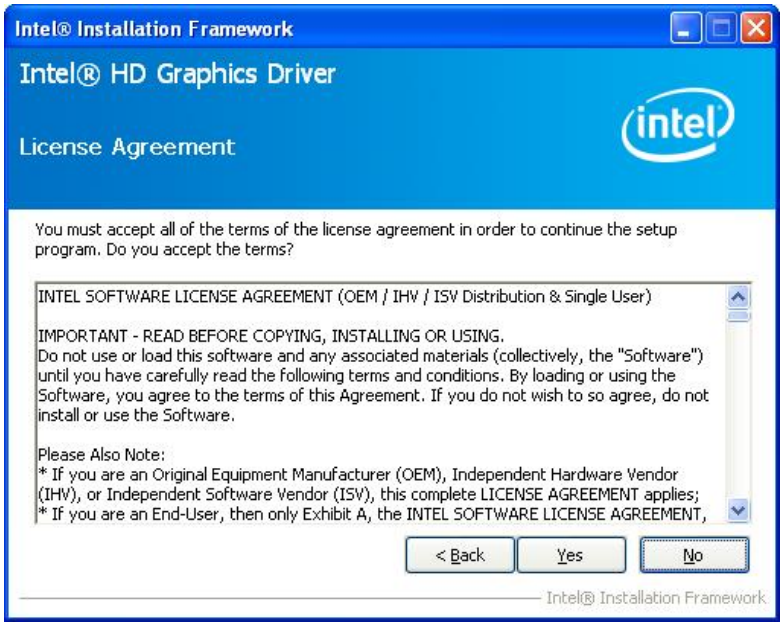


Figure 6-9: Graphics Driver License Agreement

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

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

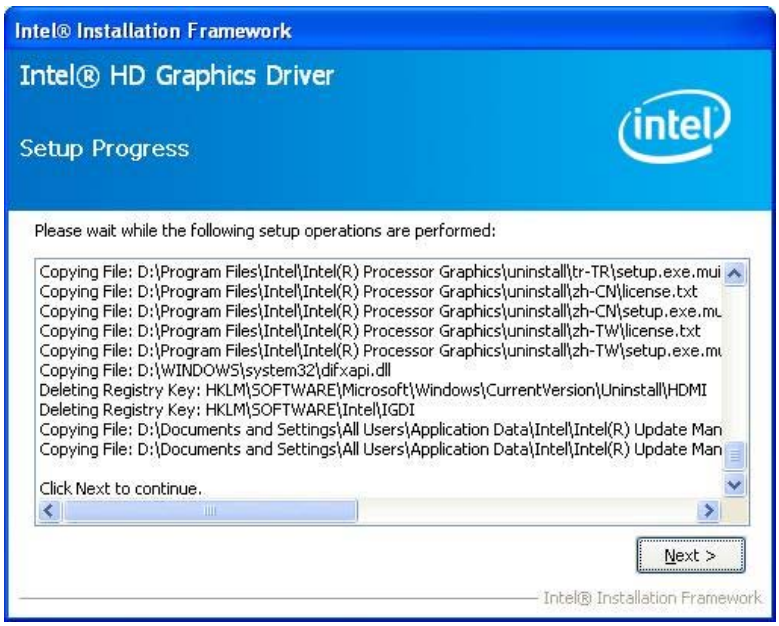


Figure 6-10: Graphics Driver Setup Operations

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

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

Figure 6-11: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

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

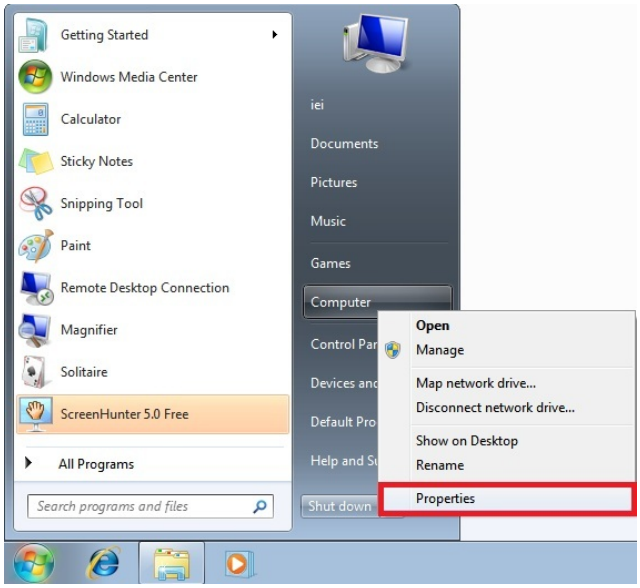


Figure 6-12: Windows Control Panel

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

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

Figure 6-13: System Control Panel

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

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

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

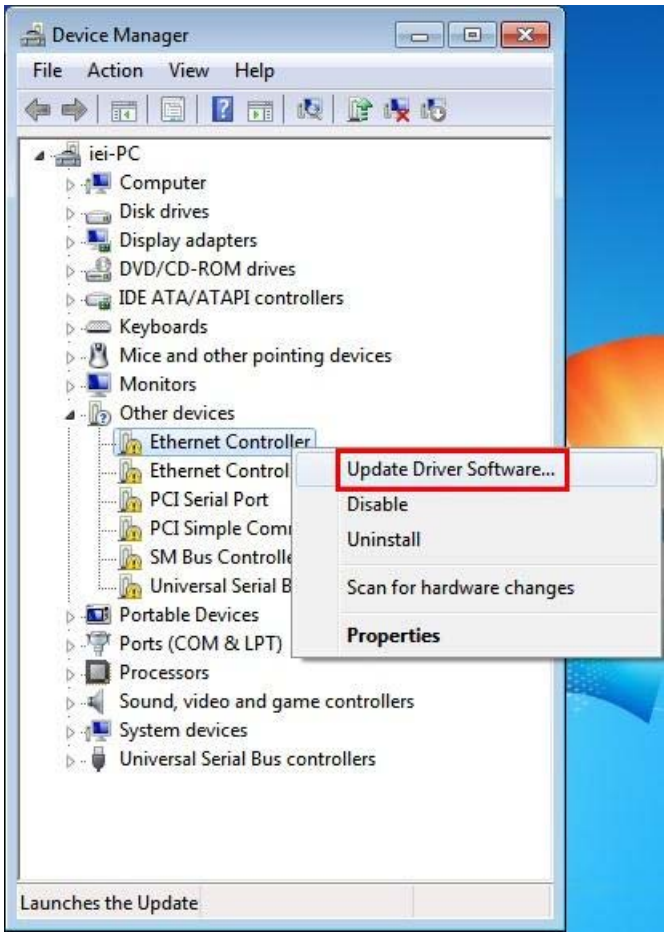


Figure 6-14: Device Manager List

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

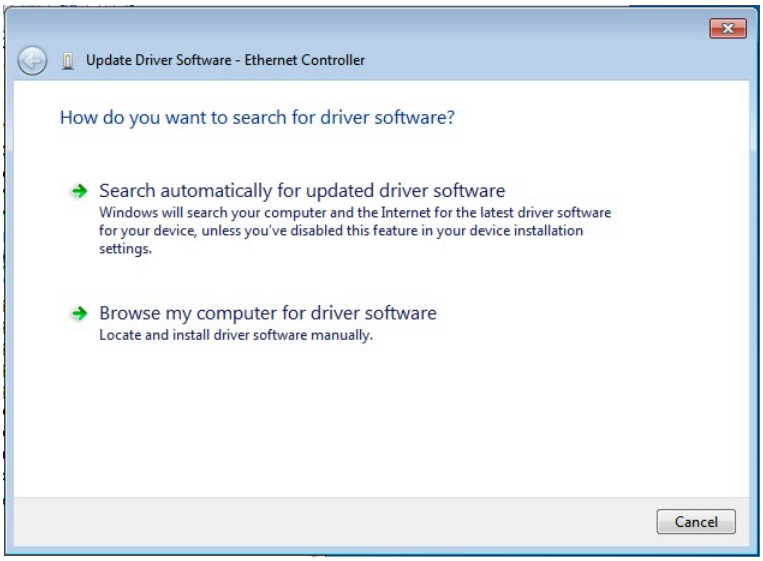


Figure 6-15: Update Driver Software Window

Step 8: Select "Browse my computer for driver software" to continue.

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

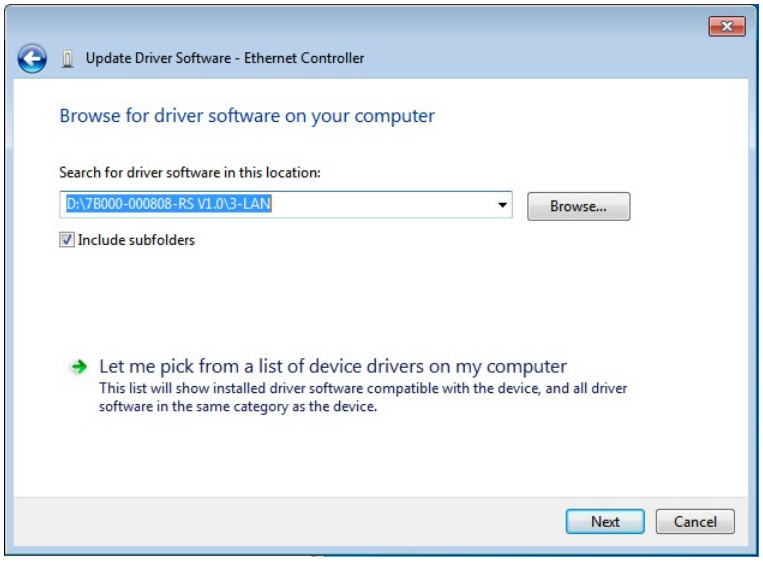


Figure 6-16: Locate Driver Files

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

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

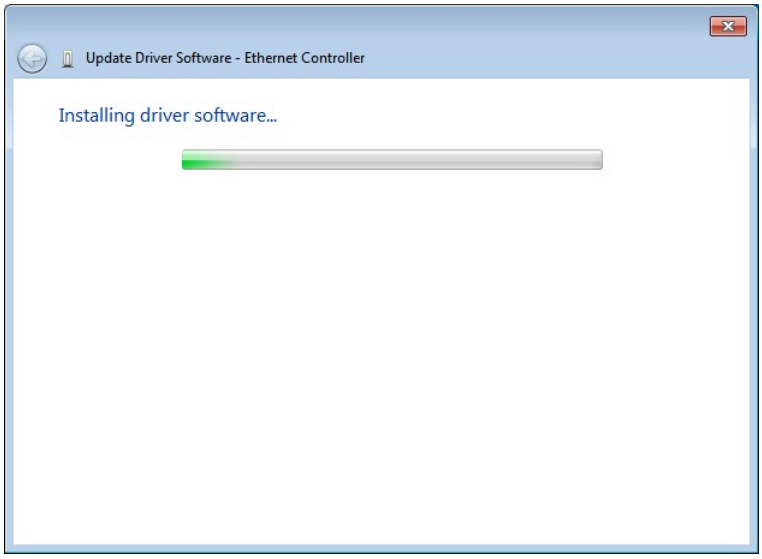


Figure 6-17: LAN Driver Installation

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

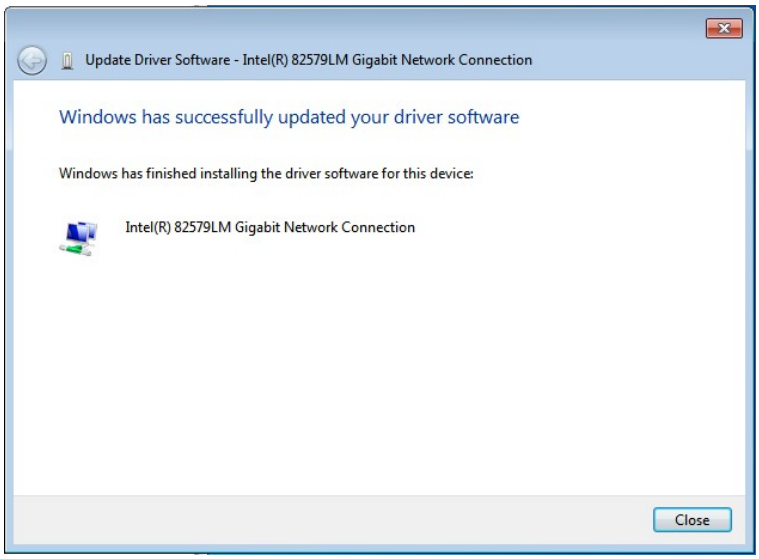


Figure 6-18: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

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

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

Step 3: Double click the setup file.

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

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

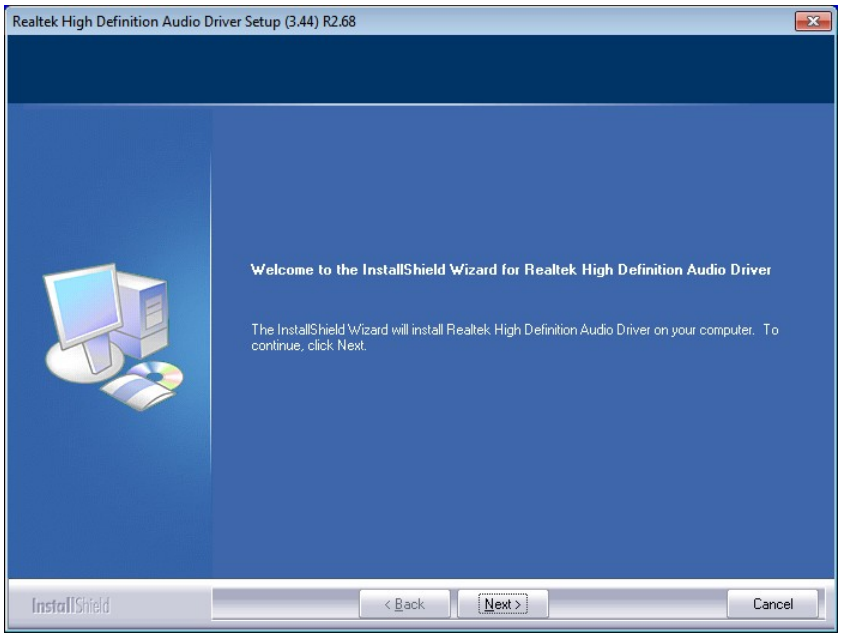


Figure 6-19: InstallShield Wizard Welcome Screen

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

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

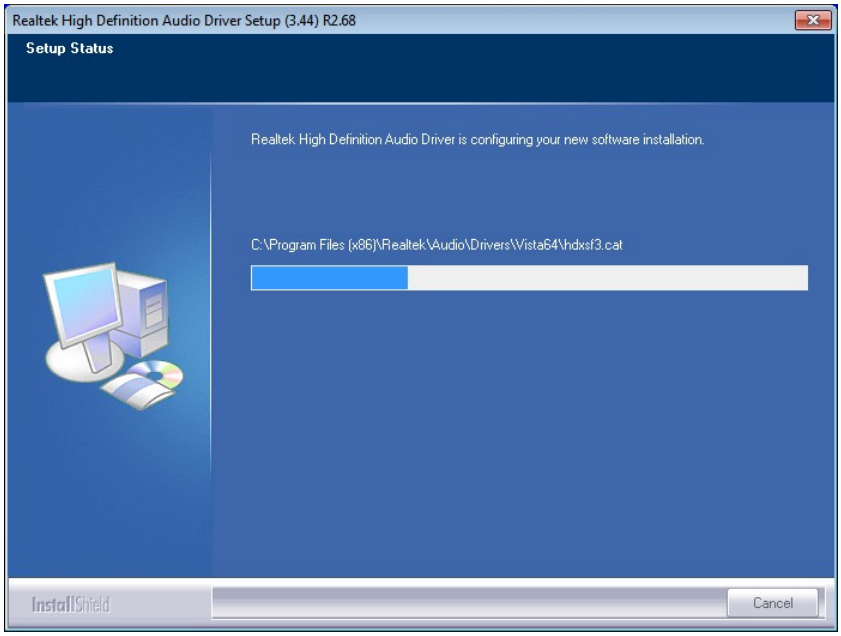


Figure 6-20: Audio Driver Software Configuration

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

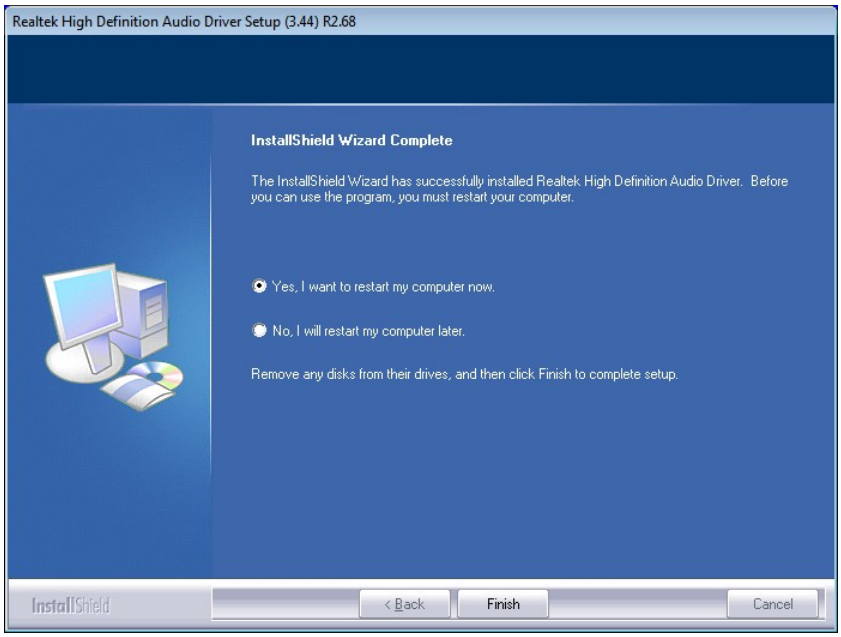


Figure 6-21: Restart the Computer

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

6.7 Intel® Rapid Storage Technology Driver Installation

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

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

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

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

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

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

Figure 6-22: SATA RAID Driver Welcome Screen

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

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

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

Figure 6-23: SATA RAID Driver License Agreement

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

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

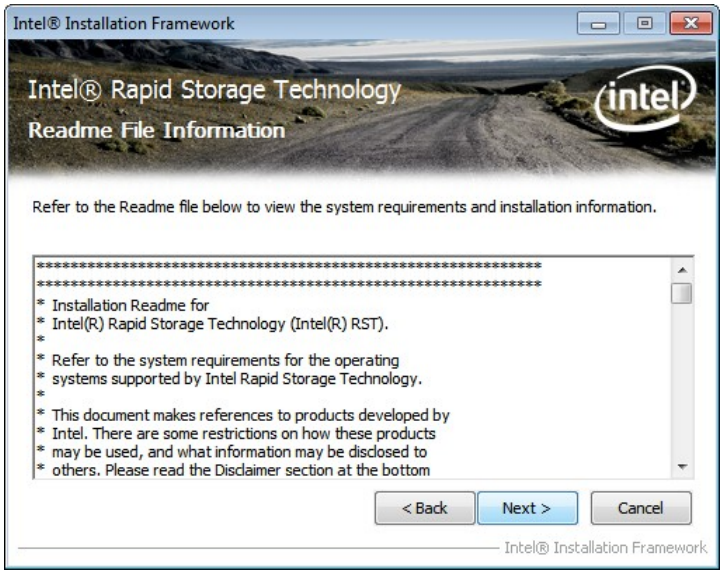


Figure 6-24: SATA RAID Driver Read Me File

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

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

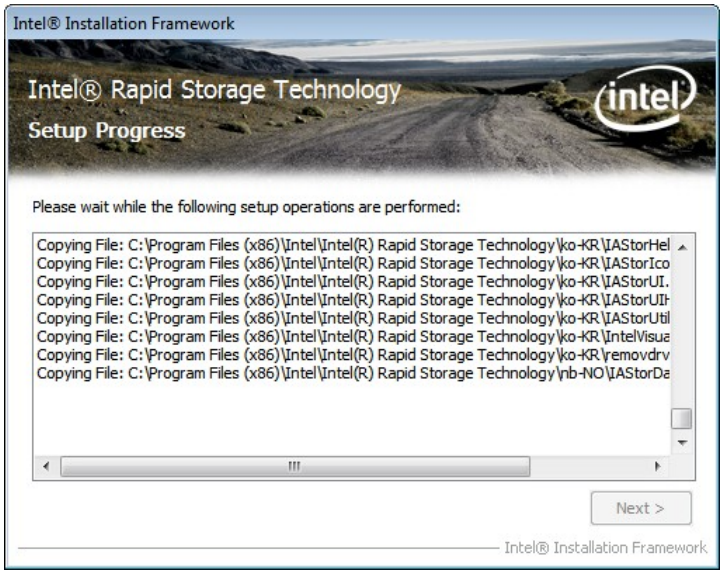


Figure 6-25: SATA RAID Driver Setup Operations

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

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

Figure 6-26: SATA RAID Driver Installation Finish Screen

6.8 USB 3.0 Driver Installation

WARNING:

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

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

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

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

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

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

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

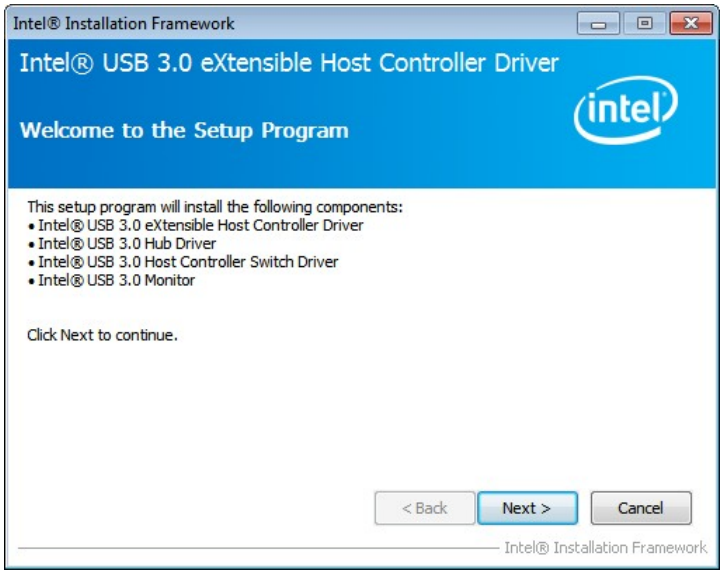


Figure 6-27: USB 3.0 Driver Welcome Screen

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

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

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

Figure 6-28: USB 3.0 Driver License Agreement

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

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

Figure 6-29: USB 3.0 Driver Read Me File

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

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

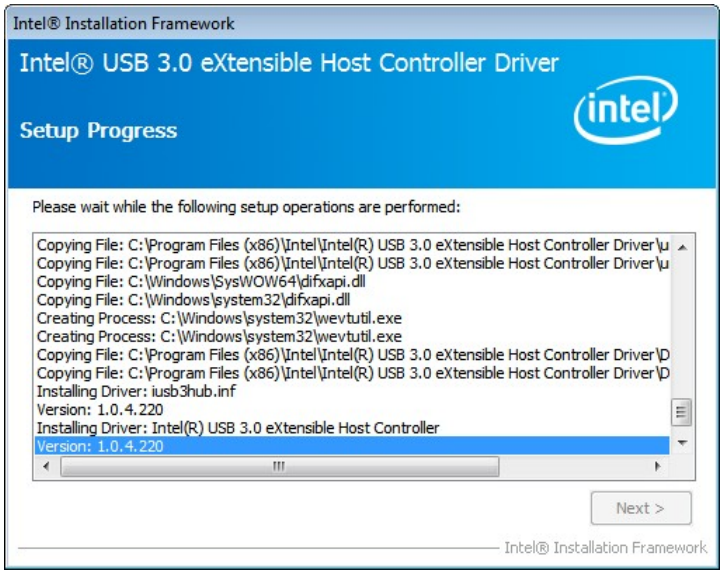


Figure 6-30: USB 3.0 Driver Setup Operations

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

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

Figure 6-31: USB 3.0 Driver Installation Finish Screen

6.9 Intel® AMT Driver Installation

The package of the Intel® AMT components includes

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

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

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

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

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

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

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

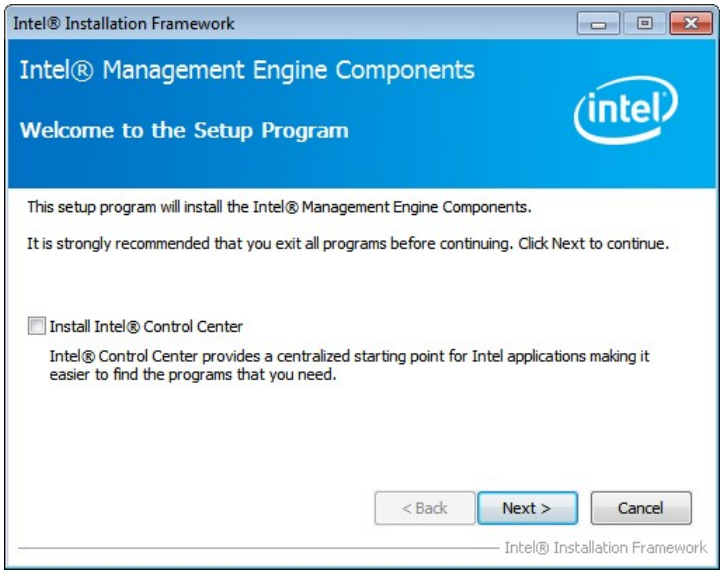


Figure 6-32: Intel® ME Driver Welcome Screen

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

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

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

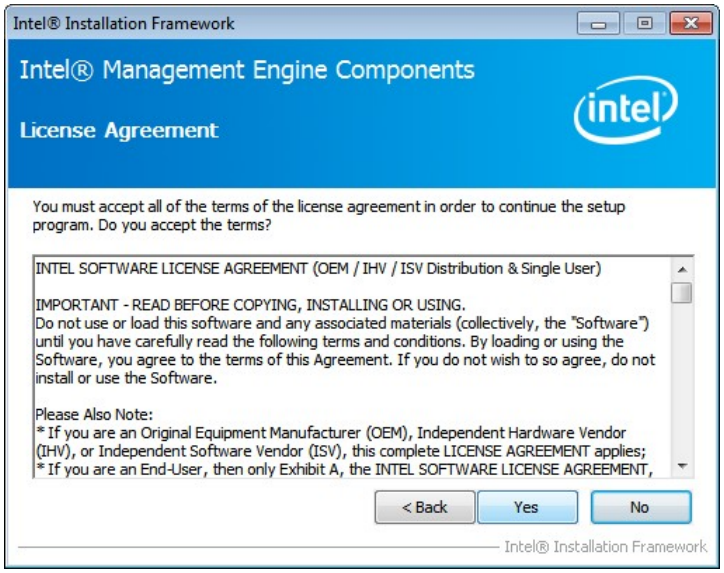


Figure 6-33: Intel® ME Driver License Agreement

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

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

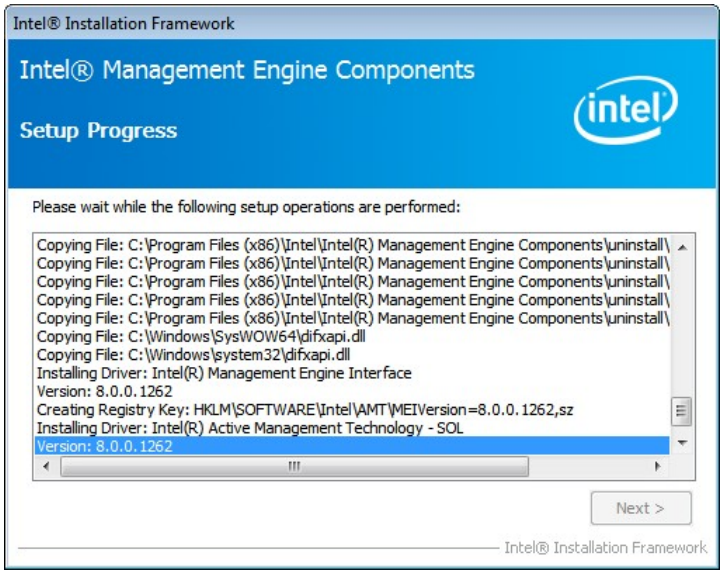


Figure 6-34: Intel® ME Driver Setup Operations

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

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

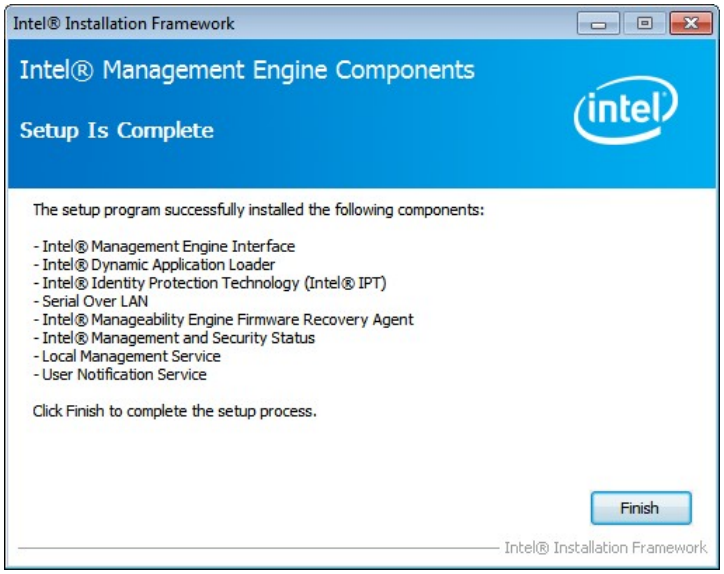


Figure 6-35: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

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

Appendix

B

Terminology

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

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

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

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the IMBA-C2160 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.

C.2 DIO Connector Pinouts

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

Table C-1: Digital I/O Connector Pinouts

C.3 Assembly Language Samples

C.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

C.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

D

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

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

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

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

NOTE:

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

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

;
; ADD THE APPLICATION PROGRAM HERE
;

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

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

;
; EXIT ;
```

Appendix

E

Intel® Matrix Storage Manager

E.1 Introduction

The IMBA-C2160 can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

E.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

E.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives
- Supported Operating Systems include: Windows XP, Windows Server 2003, Windows Server 2008, Windows Vista and Windows 7

E.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

Step 1: **Connect SATA drives to the system**. Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration. If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 2: **Enable SATA drives in BIOS**. Start the computer and access the BIOS setup program. Enable RAID support for all SATA devices. Refer to the applicable BIOS configuration section in this user manual.

Step 3: **Configure "Option ROM Messages"** BIOS option to **Force BIOS**. This is to allow the "Press <CTRL+I> to enter Configuration Utility……" message to

appear during the POST. Refer to the applicable BIOS configuration section in this user manual.

Step 4: **Save and Exit BIOS**. After the SATA support option is enabled, save and exit the BIOS.

Step 5: **Reboot the system**. Reboot the system after saving and exiting the BIOS.

Step 6: **Press Ctrl+I. during the system boot process**. Press Ctrl+I when prompted to enter the RAID configuration software.

Step 7: **Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

E.4 Installing the Operating System to the RAID Array

To install the operating system to the RAID array some extra steps are necessary during the installation process.

Step 1: **Prepare a RAID driver floppy disk on another computer**. If installing on the RAID array a RAID driver floppy disk must be made. The RAID driver floppy disk utility is on the CD in the “5-SATA/Floppy Configuration Utility” folder. The floppy disk will be formatted and the drivers installed.

Step 2: **Restart the system with a floppy drive attached**. Attach a normal floppy drive or USB floppy drive to the system.

Step 3: **Press F6 when prompted**. During the installation process, Windows OS prompts the user to press F6 to install the RAID drivers. Press F6 and choose from the drivers on the floppy disk.

Step 4: **Install the OS**. Continue with OS installation as usual.

Appendix

F

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

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

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

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

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

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

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