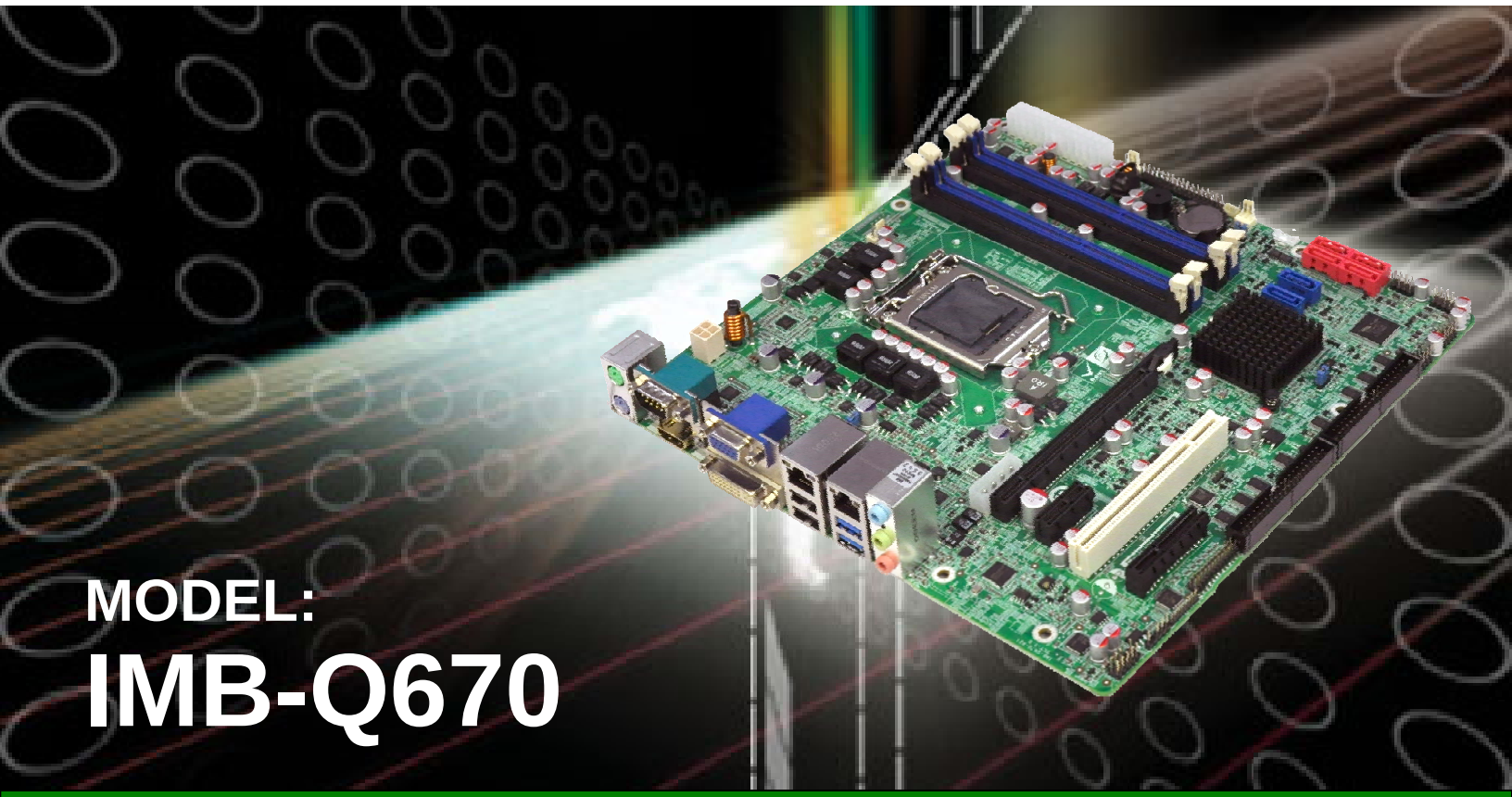
IEI Integration Corp.



MODEL:

IMB-Q670

Micro-ATX LGA1155 Motherboard for Intel® Core™ i7/i5 Quad Core or i3 Dual Core CPU, Intel® Q67, DDR3, VGA/DVI-D/HDMI Dual Intel® PCIe GbE, Two USB 3.0 ports, Ten COM ports Two SATA 6Gb/s ports, HD Audio and RoHS

User Manual

Rev. 3.01 – April 23, 2014

RoHS Lead Free

Revision

Date	Version	Changes
April 23, 2014	3.01	Modified LAN pinouts Updated Chapter 2: Packing List
November 28, 2013	3.00	Modified for R30 version
November 24, 2011	2.00	Modified for R20 version
August 16, 2011	1.02	Modified Section 4.3.1: AT/ATX Power Mode Jumper Added Section 4.6: Intel® AMT Setup Procedure Added Chapter 6: Software Drivers
June 30, 2011	1.01	Modified Section 4.2.2: Socket LGA1155 Cooling Kit Installation warning and procedure
April 28, 2011	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

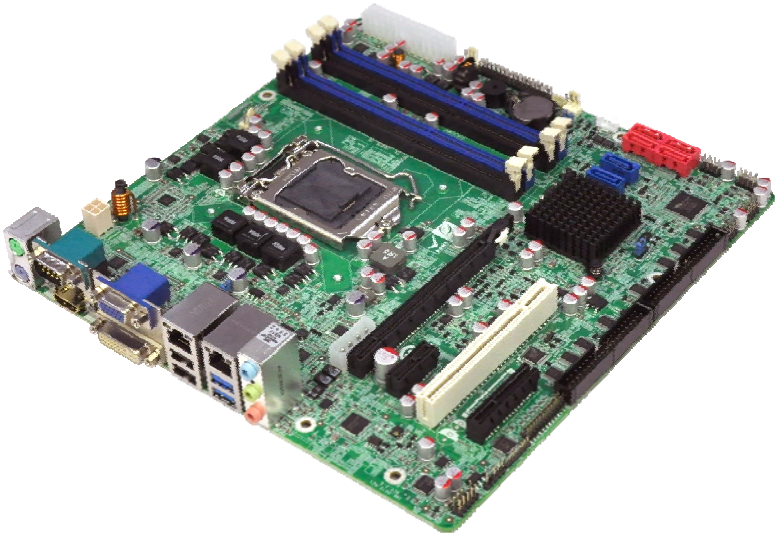


Figure 1-1: IMB-Q670

The IMB-Q670 is a MicroATX motherboard. It accepts a Socket LGA1155 Intel® Core™ i3/i5/i7 processor and supports four 240-pin 1333/1066 MHz dual-channel DDR3 DIMM modules up to 32.0 GB maximum. The IMB-Q670 includes a VGA, HDMI, and DVI-D port. Expansion and I/O include one PCI slot, one PCIe x16 slot, one PCIe x4 slot, one PCIe x1 slot, two USB 3.0 ports on the rear panel, two USB 2.0 on the rear panel, eight USB 2.0 by pin header, four SATA 3Gb/s connectors, two SATA 6Gb/s connectors, ten COM ports, and a keyboard/mouse connector.

1.2 Benefits

Some of the IMB-Q670 motherboard benefits include:

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

1.3 Features

Some of the IMB-Q670 motherboard features are listed below:

- Micro-ATX
- RoHS compliant
- LGA1155 CPU socket
- One PCI card expansion slot
- One PCIe x16 card expansion slot
- One PCIe x1 card expansion slot
- One PCIe x4 card expansion slot
- Supports two dual-channel DDR3 DIMMs
- One external RS-232 serial port
- Eight internal RS-232 serial ports connectors
- One internal RS-422/485 serial port connector
- Two Intel® PCIe Gigabit Ethernet connectors
- Four SATA 3Gb/s connectors with RAID 0/1/5/10 support
- Two SATA 6Gb/s connectors with RAID 0/1/5/10 support
- High Definition audio
- Intel® Q67 Chipset

1.4 Connectors

The connectors on the IMB-Q670 are shown in the figure below.

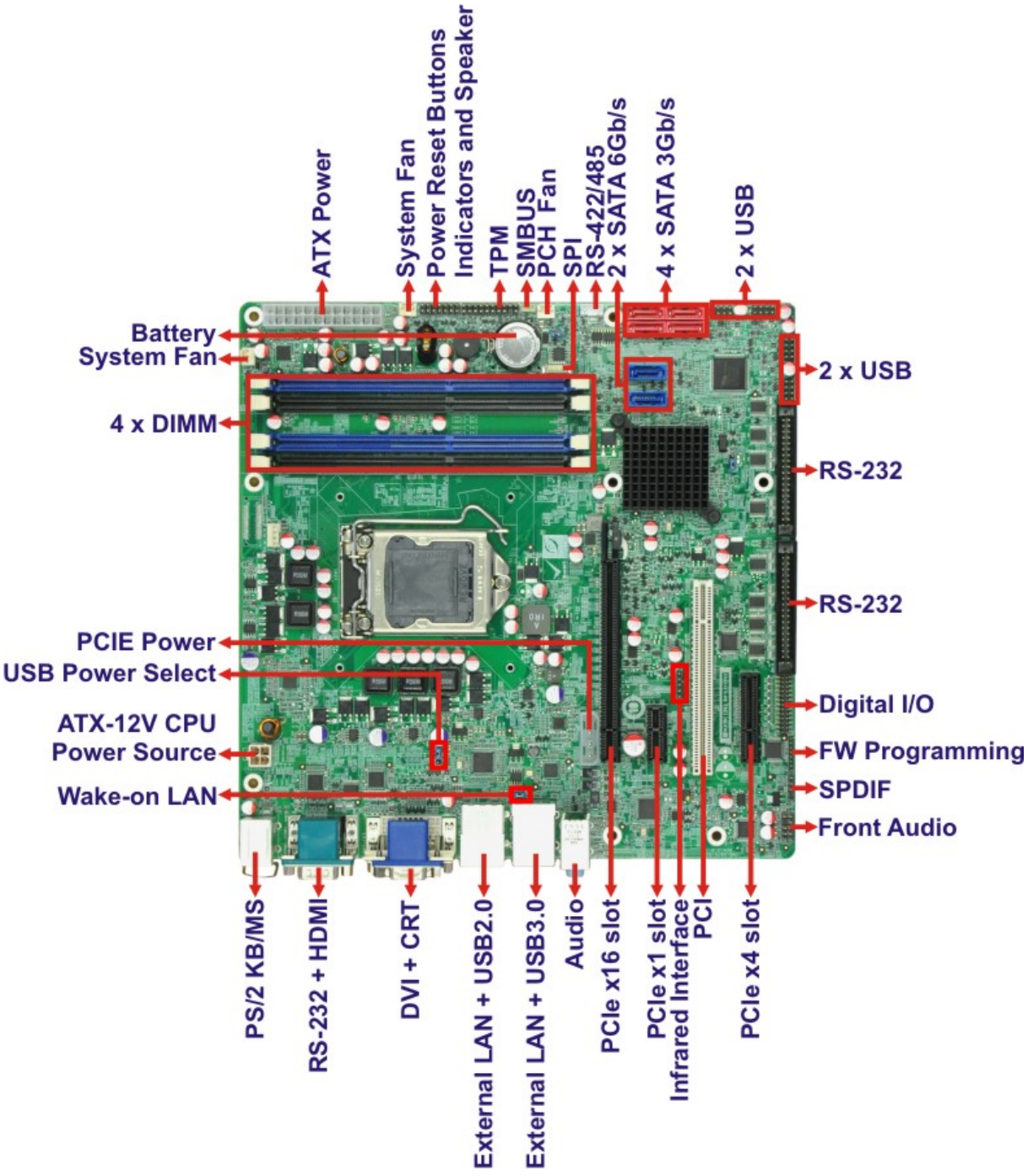


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMB-Q670 are shown in the diagram below.

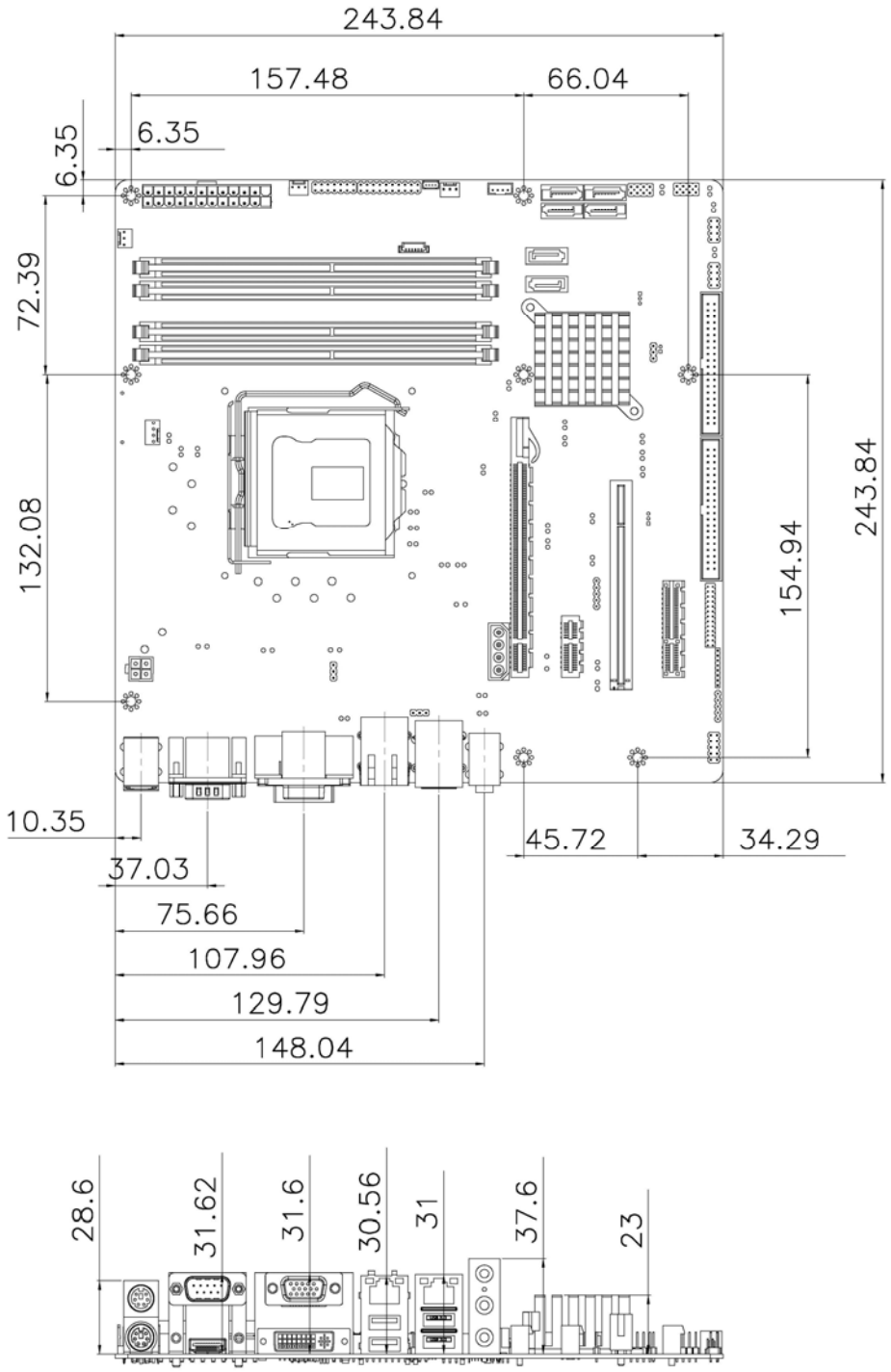


Figure 1-3: IMB-Q670 Dimensions (mm)

1.6 Data Flow

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

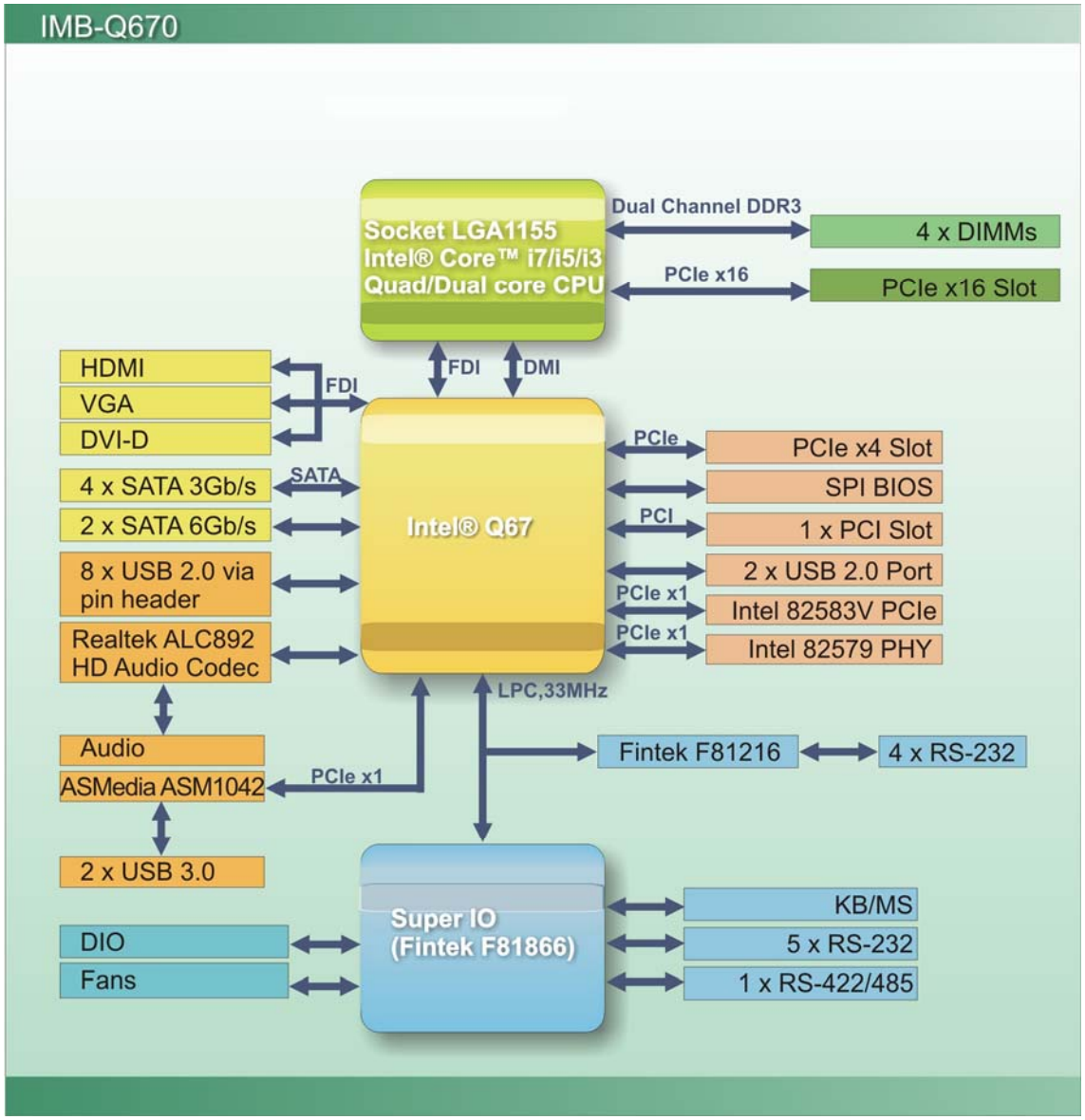


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMB-Q670 technical specifications are listed below.

Specification/Model	IMB-Q670
Form Factor	Micro-ATX
CPU Supported	LGA1155 Socket Intel® Core™ i7/i5/i3 Quad/Dual core
Northbridge Chipset	Intel® Q67
Integrated Graphics	Supports DirectX 10.1/OpenGL 3.0 Full MPEG2, VC1, AVC Decode
Memory	Four 240-pin 1333/1066 MHz Dual-Channel DDR3 SDRAM DIMMs support up to 32.0 GB maximum
Southbridge Chipset	Intel® Q67
Audio	Realtek ALC892 HD Audio codec (Line-in, Line-out, Mic)
BIOS	UEFI BIOS
Digital I/O	24-bit, 12-bit input/12-bit output
Ethernet Controllers	Intel® 82583V PCIe controller Intel® 82579 PHY with Intel® AMT 7.0 support (LAN2)
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	One PCI slot
PCIe	One PCIe x4 slot One PCIe x16 slot One PCIe x1 slot
I/O Interface Connectors	
Audio Connectors	One external audio jack (line-in, line-out, mic-in) One internal front panel audio connector (2x5 pin header)

Specification/Model	IMB-Q670
Display port	One VGA Integrated in the Intel® Q67 One HDMI Integrated in the Intel® Q67 One DVI-D Integrated in the Intel® Q67
Ethernet	Two RJ-45 ports
Keyboard/Mouse	Dual PS/2 port
TPM	2 x 10-pin pin header
Serial Ports	One external RS-232 serial port One RS-422/485 via internal box pin headers Eight RS-232 via internal box pin headers
USB ports	Two external USB 2.0 ports on rear IO Two external USB 3.0 ports on rear IO by ASMedia ASM1042 Eight internal USB 2.0 ports by pin header
Serial ATA	Four SATA 3Gb/s connectors with RAID 0/1/5/10 support Two SATA 6Gb/s connectors with RAID 0/1/5/10 support
Environmental and Power Specifications	
Power Supply	ATX/AT supported
Power Consumption	3.3V@1.75A, 5V@6.61A , 12V@3.68A, 12V@0.09A, 5VSb@0.12 (Intel® 2.60GHz CPU with 1333MHz DDR3 4GB x 4 Memory)
Operating Temperature	-20ºC ~ 60ºC/-4˚F ~ 140˚F
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight GW/NW	1200 g / 680 g

Table 1-1: IMB-Q670 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMB-Q670 is unpacked, please do the following:

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

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMB-Q670 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The IMB-Q670 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMB-Q670	
4	SATA cable (**P/N**: 32000-062800-RS)	
2	Quad-port RS-232 cable (**P/N**: 32205-001203-200-RS)	
1	I/O shielding (**P/N**: 45014-0028C0-01-RS)	
1	Mini jumper pack (2.54mm) (**P/N**:33100-000079-RS)	
1	One Key Recovery CD	

Quantity	Item and Part Number	Image
1	Utility CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable with bracket (**P/N**: 19800-003100-300-RS)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
RS-422/485 cable (200 mm) (**P/N**: 32205-003800-300-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 45W) (**P/N**: CF-1156C-RS)	

Item and Part Number	Image
LGA1155/LGA1156 cooler kit (1U chassis compatible, 65W) (**P/N**: CF-1156D-RS)	
LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-1156E-R11)	
20-pin Infineon TPM module, S/W management tool (**P/N**: TPM-IN01-R11)	
Intel® Core™ i5-2500T processor (LGA1155, quad core 2.3 GHz, 6M cache, 45W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i5-2500T)	
Intel® Core™ i5-2390T processor (LGA1155, dual core 2.7 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i5-2390T)	
Intel® Core™ i3-2120T processor (LGA1155, dual core 2.6 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-i3-2120T)	
Intel® Pentium® G630T processor (LGA1155, dual core 2.3 GHz, 3M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-P-G630T)	

Item and Part Number	Image
Intel® Celeron® G440 processor (LGA1155, single core 1.6 GHz, 1M cache, 35W, compatible with CF-1156C-RS CPU cooler kit) (**P/N**: CPU-DT-C-G440)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-Q670 Layout

The figures below show all the connectors and jumpers.

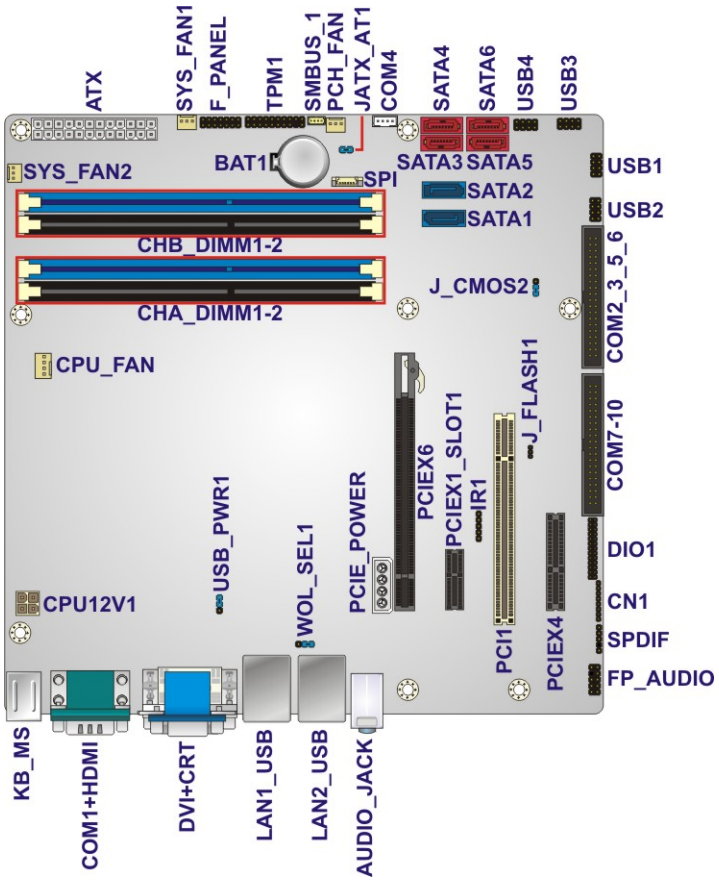


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX Power connector	24-pin ATX	ATX

Connector	Type	Label
Battery connector	3-pin wafer	BAT1
CPU fan	4-pin wafer	CPU_FAN
CPU power	4-pin box header	CPU12V1
Digital I/O	26-pin header	DIO1
Front panel audio	10-pin header	FP_AUDIO
Front panel	14-pin header	F_PANEL1
FW programming	8-pin header	CN1
Infrared interface	5-pin header	IR1
Memory card	DIMM slot	DIMM1, DIMM2
PCH fan connector	3-pin header	PCH_FAN1
PCI-E power	4-pin molex	PCIE_12V1
SATA 3Gb/s drive connector	16-pin SATA connector	SATA34, SATA56
SATA 6Gb/s drive connector	7-pin SATA connector	SATA1, SATA2
Serial port, RS-422/485	4-pin box headers	COM4
Serial port, RS-232	40-pin box headers	COM2-6, COM7-10
SMBus connector	4-pin wafer	SMBUS_1
SPDIF	5-pin header	SPDIF1
SPI connector	6-pin wafer	SPI
System fan connectors	3-pin wafer	SYS_FAN1, SYS_FAN2
TPM connector	20-pin header	TPM
USB connectors	8-pin headers	USB1, USB2, USB3, USB4

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Audio connector	Audio jack	AUDIO_JACK
Keyboard/Mouse	Dual PS/2	KBMS
Ethernet and USB 2.0 ports	RJ-45, USB 2.0	LAN1_USB
Ethernet and USB 3.0 ports	RJ-45, USB 3.0	LAN2_USB
HDMI connector	HDMI port	HDMI
Serial Port connector (COM1)	9-pin male DB-9	COM1
VGA and DVI connector	15-pin female, 24-pin header	DVI+CRT

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMB-Q670.

3.2.1 ATX Power Connector

CN Label: **ATX**

CN Type: 24-pin ATX (2x12)

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

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

The ATX power connector connects to an ATX power supply.

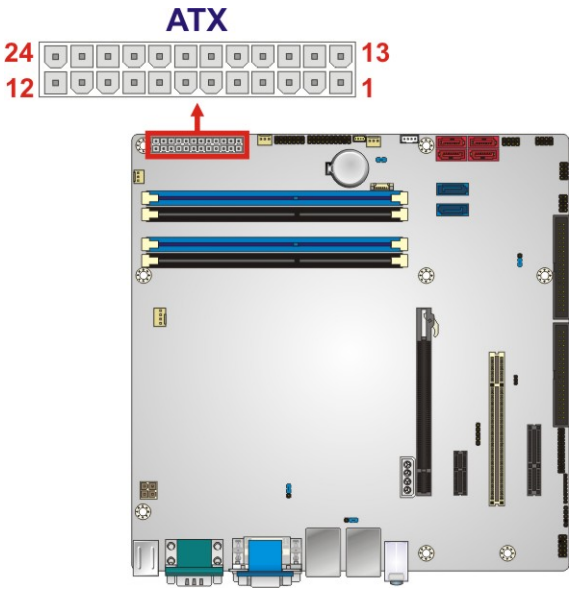


Figure 3-2: ATX/AT Power Connector Pinout Location

Pin	Description	Pin	Description
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	IO_PS_ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWRGD_PS	20	NC
9	+5VSB1	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	GND

Table 3-3: ATX/AT Power Connector Pinouts

3.2.2 Battery Connector

CAUTION:

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

Dispose of used batteries according to instructions and local regulations.

CN Label:	**BAT1**
CN Type:	3-pin slot
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

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

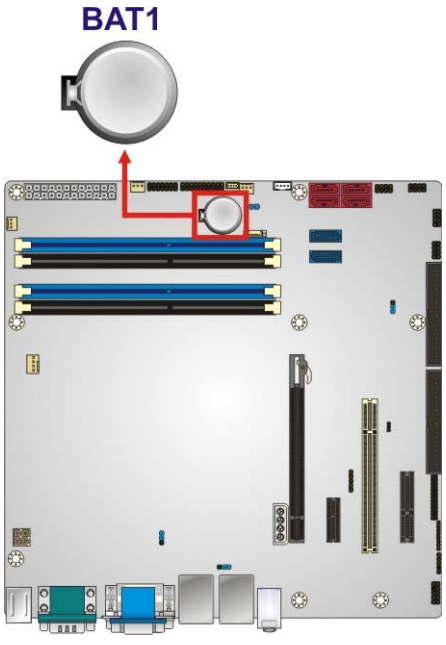


Figure 3-3: Battery Connector Location

Pin	Description
1	NC
2	BAT+
3	BAT-(GND)

Table 3-4: Battery Connector Pinouts

3.2.3 CPU Fan Connector

CN Label: **CPU_FAN**

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

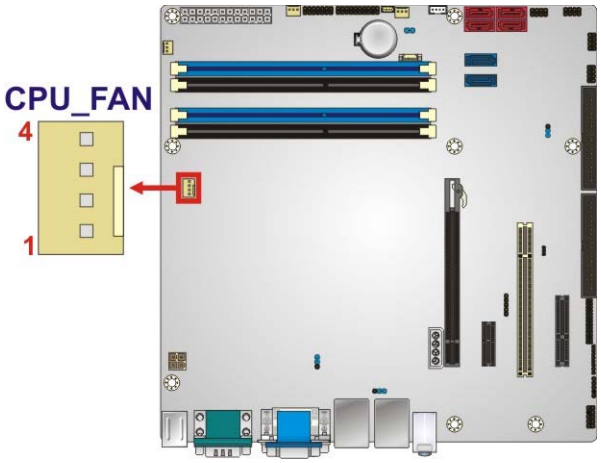


Figure 3-4: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	FANIN1
4	FANOUT1

Table 3-5: CPU Fan Connector Pinouts

3.2.4 CPU Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin box header

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

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

The CPU power input connector provides power to the CPU.

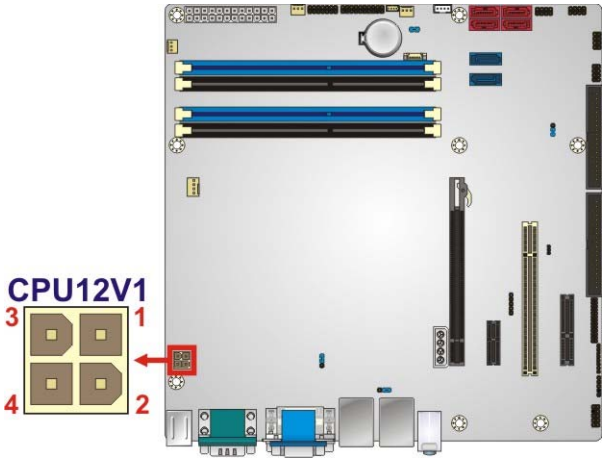


Figure 3-5: CPU Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	VREG_12V
4	VREG_12V

Table 3-6: CPU Power Connector Pinouts

3.2.5 Digital I/O Connector

CN Label: **DIO1**

CN Type: 26-pin header

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

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

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

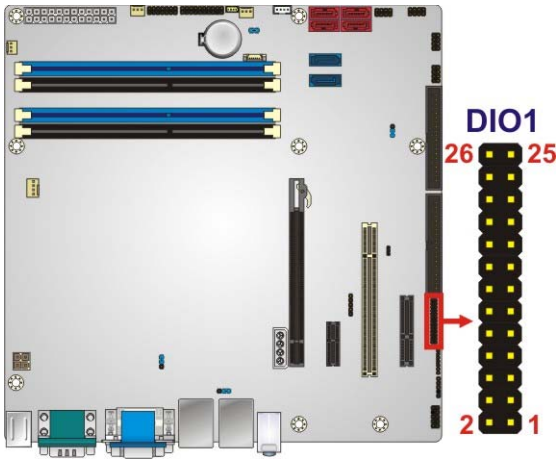


Figure 3-6: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	D_IN0	4	D_OUT0
5	D_IN1	6	D_OUT1
7	D_IN2	8	D_OUT2
9	D_IN3	10	D_OUT3
11	D_8IN0	12	D_8OUT0
13	D_8IN1	14	D_8OUT1
15	D_8IN2	16	D_8OUT2
17	D_8IN3	18	D_8OUT3
19	D_8IN4	20	D_8OUT4
21	D_8IN5	22	D_8OUT5
23	D_8IN6	24	D_8OUT6
25	D_8IN7	26	D_8OUT7

Table 3-7: Digital I/O Connector Pinouts

3.2.6 Front Panel Audio Connector

CN Label: **FP_AUDIO**

CN Type: 10-pin header

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

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

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

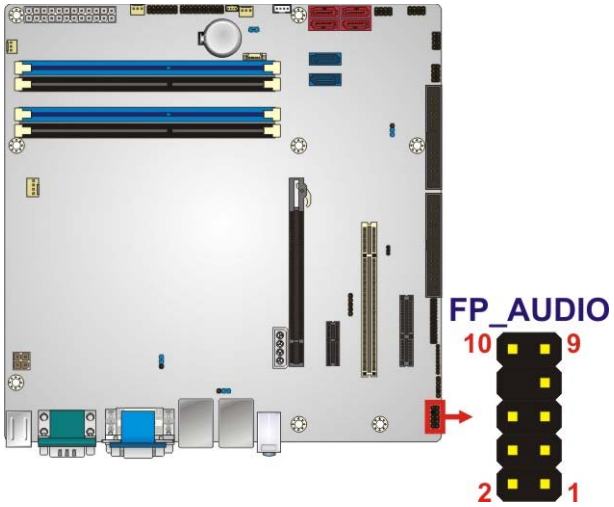


Figure 3-7: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	MIC_L	2	Audio GND
3	MIC_R	4	FP_AUO DETECT
5	Line_R	6	Audio GND
7	F_SENSE	8	NC
9	Line_L	10	Audio GND

Table 3-8: Front Panel Audio Connector Pinouts

3.2.7 Front Panel Connector

CN Label: **F_PANEL**

CN Type: 14-pin header

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

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

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

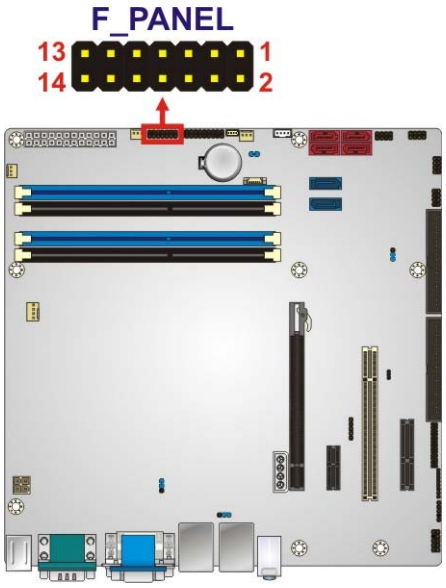


Figure 3-8: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	Power LED	Speaker	2	Beep Power
	3	NC		4	NC
	5	GND		6	NC
Power Button	7	PWRBTSW#		8	PC Beep
	9	GND	Reset	10	NC
HDD LED	11	HDDLED		12	EXTRST#
	13	HDDLED#		14	GND

Table 3-9: Front Panel Connector Pinouts

3.2.8 FW Programming

CN Label: **CN1**

CN Type: 8-pin header

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

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

The FW Programming connector is used for programming the firmware.

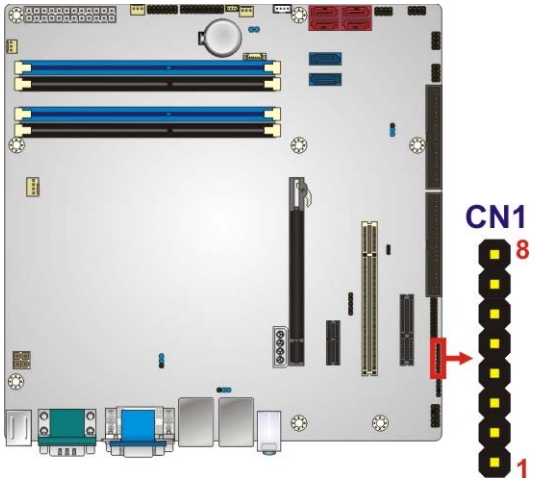


Figure 3-9: FW Programming Connector Location

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

Table 3-10: FW Programming Connector Pinouts

3.2.9 Infrared Interface Connector

CN Label: **IR1**

CN Type: 5-pin header (1x5)

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

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

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

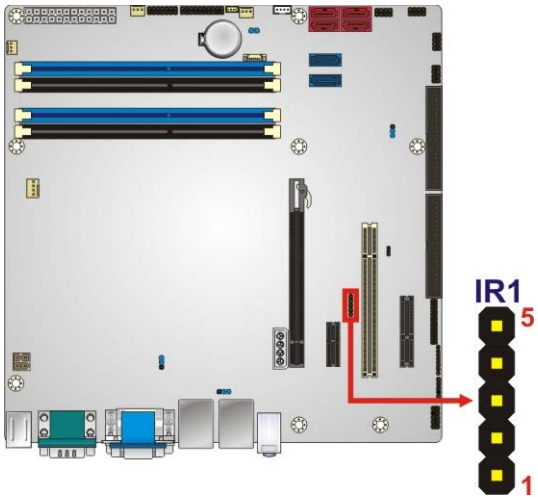


Figure 3-10: Infrared Connector Location

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

Table 3-11: Infrared Connector Pinouts

3.2.10 Memory Card Slot

CN Label: **DIMM1, DIMM2**

CN Type: DDR3 DIMM slot

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

The DIMM slots are for DIMM memory modules.

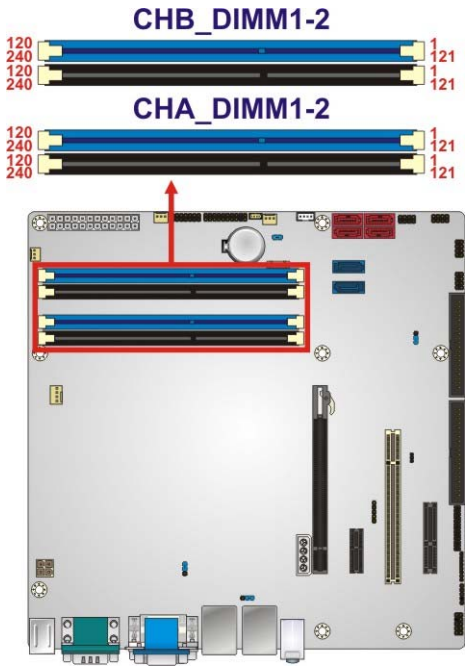


Figure 3-11: Memory Card Slot Location

3.2.11 PCH Fan Connector

CN Label:	**PCH_FAN**
CN Type:	3-pin header
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-12**

The PCH fan connector attaches to a PCH cooling fan.

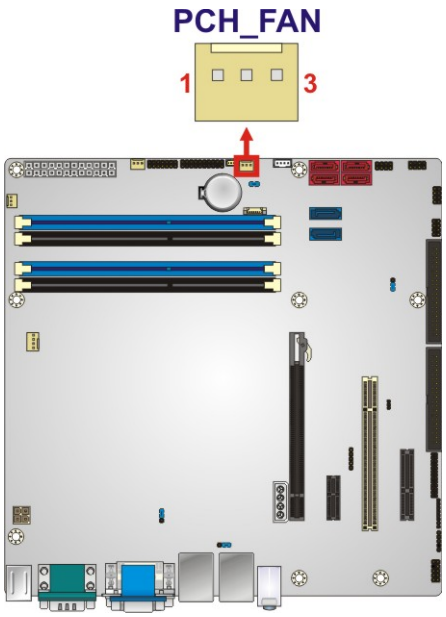


Figure 3-12: PCH Fan Connector Location

Pin	Description
1	FANIN2
2	FANOUT2
3	GND

Table 3-12: PCH Fan Connector Pinouts

3.2.12 PCI Express Power

CN Label: **PCIE_12V1**

CN Type: 4-pin Molex

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

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

Provides extra power to the PCIe x16 card.

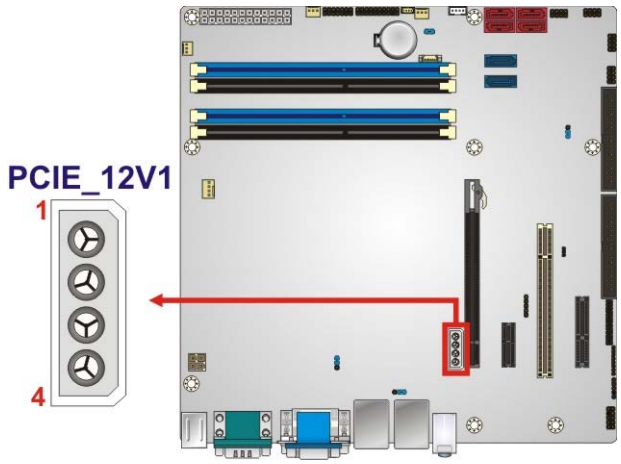


Figure 3-13: PCIe Power Location

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

Table 3-13: PCIe Power Pinouts

3.2.13 SATA 3Gb/s Drive Connector

CN Label: **SATA34, SATA56**

CN Type: 16-pin SATA connector

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

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

The SATA drive connectors can be connected to SATA drives.

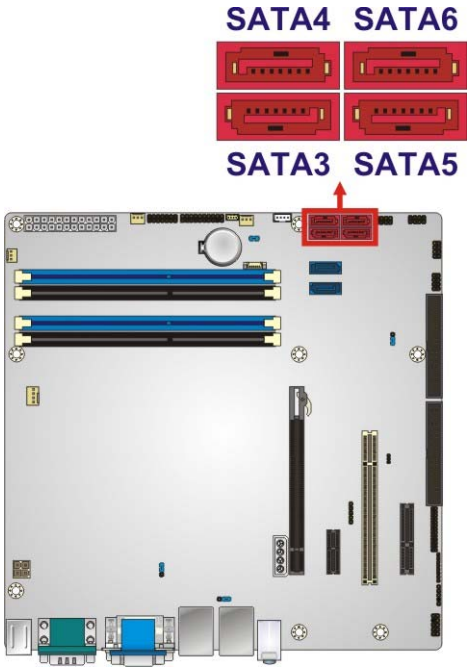


Figure 3-14: SATA 3Gb/s Drive Connector Location

Pin	Description
1	GND
2	SATA20_PTX_C_DRX_N2/3/4/5
3	SATA20_PTX_C_DRX_N2/3/4/5
4	GND
5	SATA20_PRX_C_DTX_N2/3/4/5
6	SATA20_PRX_C_DTX_P2/3/4/5
7	GND

Table 3-14: SATA 3Gb/s Drive Connector Pinouts

3.2.14 SATA 6Gb/s Drive Connector

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA drive connectors

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

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

The SATA drive connectors can be connected to SATA drives.

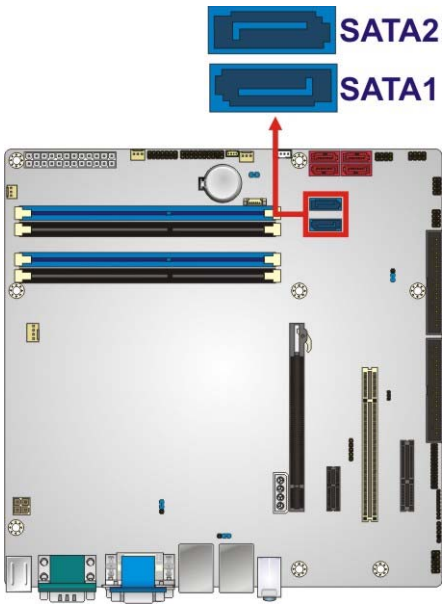


Figure 3-15: SATA 6Gb/s Drive Connector Location

Pin	Description
1	GND
2	SATA30_PTX_DRX_P0/1
3	SATA30_PTX_DRX_N0/1
4	GND
5	SATA30_PRX_DTX_N0/1
6	SATA30_PRX_DTX_P0/1
7	GND

Table 3-15: SATA 6Gb/s Drive Connector Pinouts

3.2.15 Serial Port Connector, RS-422/485

CN Label: **COM4**

CN Type: 4-pin box header (1x4)

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

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

Used for RS-422/485 communications.

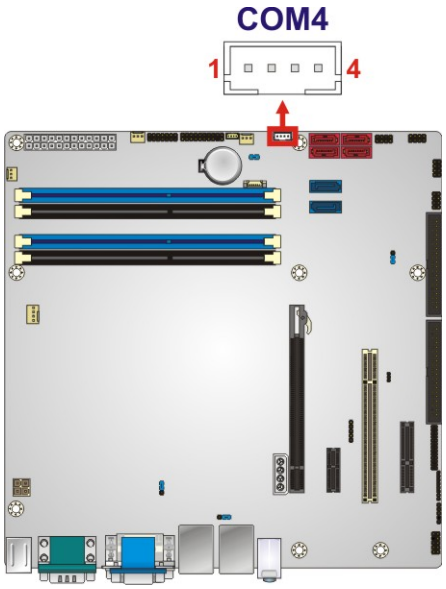


Figure 3-16: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RXD422-	2	RXD422+
3	TXD422+/TXD485+	4	TXD422-/TXD485-

Table 3-16: Serial Port Connector Pinouts

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

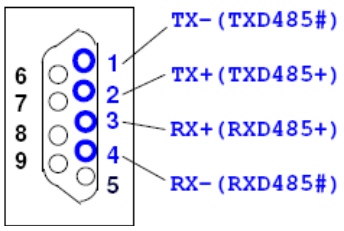
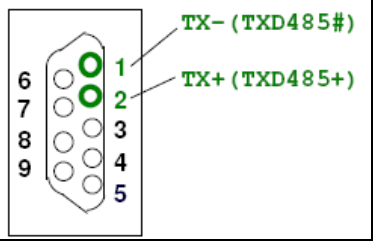
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-17: DB-9 RS-422/485 Pinouts

3.2.16 Serial Port Connectors, RS-232

CN Label: **COM2_3_5_6, COM7-10**

CN Type: 40-pin box header (2x20)

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

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

Each of these connectors provides RS-232 connections.

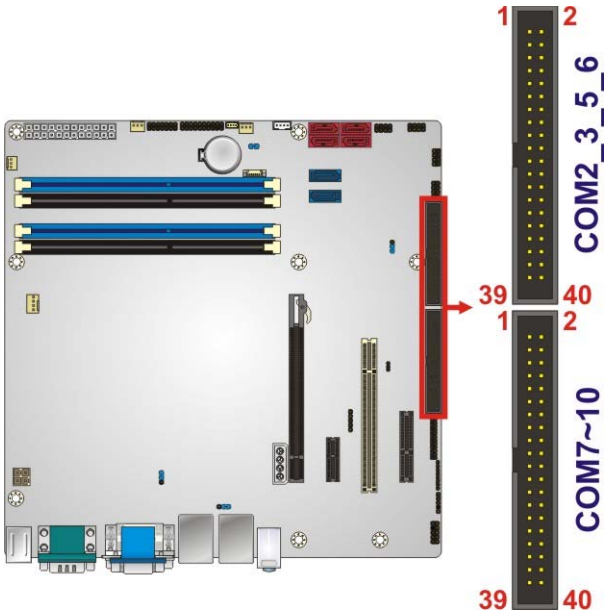


Figure 3-17: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD2/7#	2	NDSR2/7#
3	NRXD2/7	4	NRTS2/7#
5	NTXD2/7	6	NCTS2/7#
7	NDTR2/7#	8	NRI2/7#
9	GND	10	GND
11	NDCD3/8#	12	NDSR3/8#
13	NRXD3/8	14	NRTS3/8#
15	NTXD3/8	16	NCTS3/8#
17	NDTR3/8#	18	NRI3/8#
19	GND	20	GND
21	NDCD5/9#	22	NDSR5/9#
23	NRXD5/9	24	NRTS5/9#
25	NTXD5/9#	26	NCTS5/9#

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
27	NDTR5/9#	28	NRI5/9#
29	GND	30	GND
31	NDCD6/10	32	NDSR6/10#
33	NRXD6/10#	34	NRTS6/10#
35	NTXD6/10	36	NCTS6/10#
37	NDTR6/10#	38	NRI6/10#
39	GND	40	GND

Table 3-18: Serial Port Connector Pinouts

3.2.17 SMBus Connector

CN Label: **SMBUS_1**

CN Type: 4-pin wafer

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

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

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

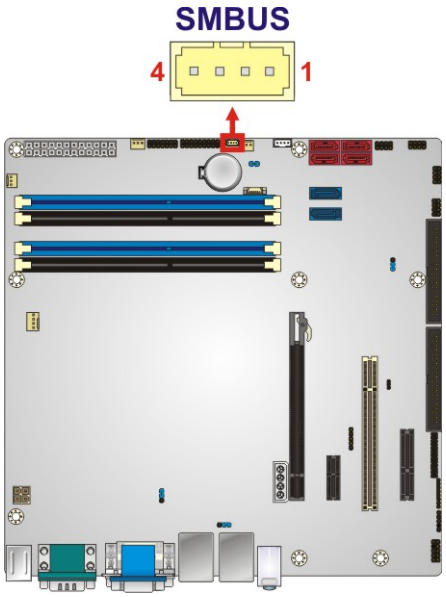


Figure 3-18: SMBus Connector Location

PIN	DESCRIPTION
1	5V
2	SMBCLK_RESUME
3	SMBDATA_RESUME
4	GND

Table 3-19: SMBus Connector Pinouts

3.2.18 SPDIF Connector

CN Label: **SPDIF**

CN Type: 5-pin header

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

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

Use the SPDIF connector to connect digital audio devices to the system.

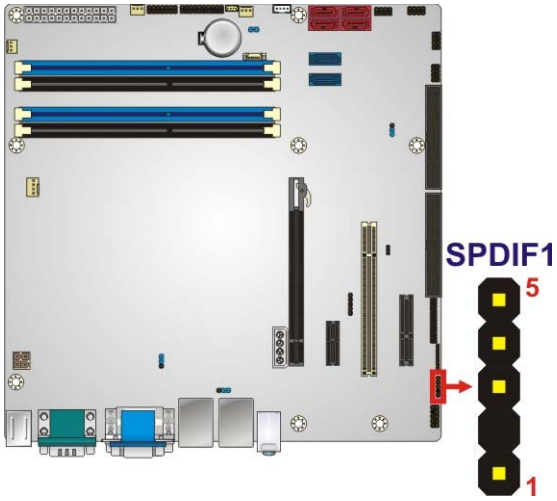


Figure 3-19: SPDIF Connector Location

PIN	DESCRIPTION
1	+5V
2	NC
3	SPDIFOUT
4	GND
5	SPDIFIN

Table 3-20: SPDIF Connector Pinouts

3.2.19 SPI Connector

CN Label: **SPI**

CN Type: 6-pin wafer

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

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

The SPI connector is used to flash the BIOS.

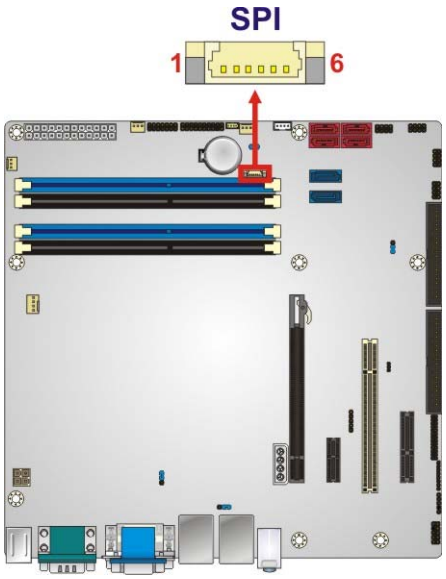


Figure 3-20: SPI Connector Location

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

Table 3-21: SPI Connector Pinouts

3.2.20 System Fan Connector

CN Label: **SYS_FAN1, SYS_FAN2**

CN Type: 3-pin wafer

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

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

The fan connector attaches to a cooling fan.

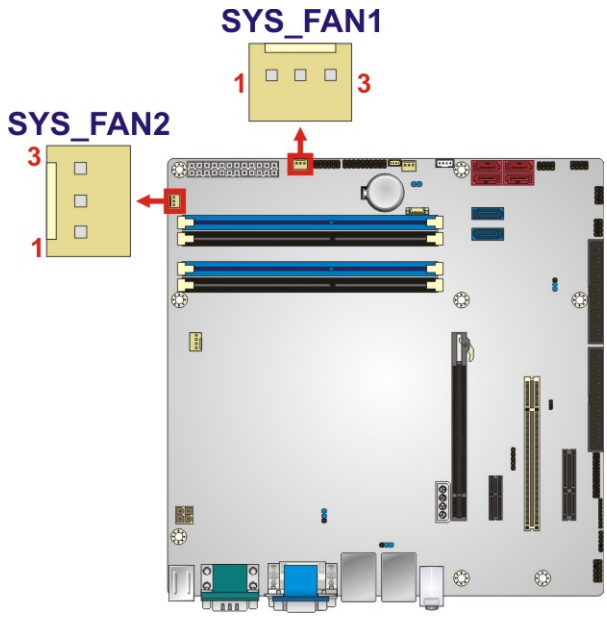


Figure 3-21: System Fan Connector Location

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

Table 3-22: System Fan Connector Pinouts

3.2.21 TPM Connector

CN Label: **TPM**

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

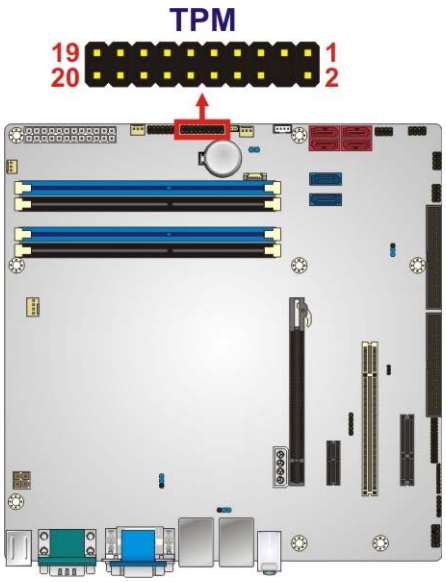


Figure 3-22: TPM Connector Location

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

Table 3-23: TPM Connector Pinouts

3.2.22 USB Connectors

CN Label: **USB1, USB2, USB3, USB4**

CN Type: 8-pin header (2x4)

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

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

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

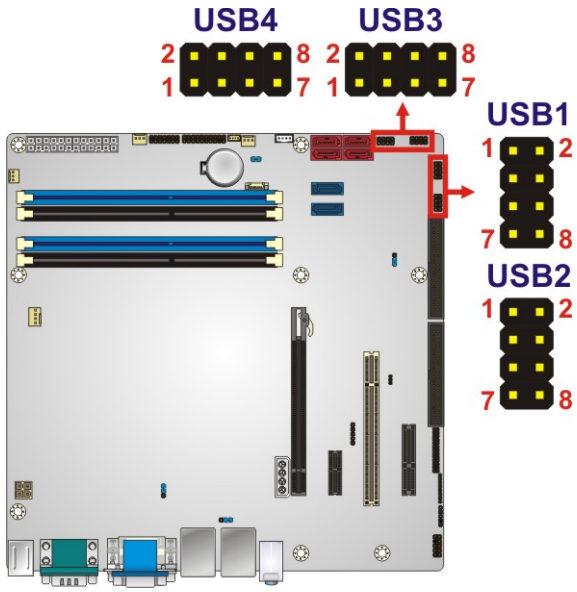


Figure 3-23: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N	4	USB20_C_P
5	USB20_C_P	6	USB20_C_N
7	GND	8	+5V

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:

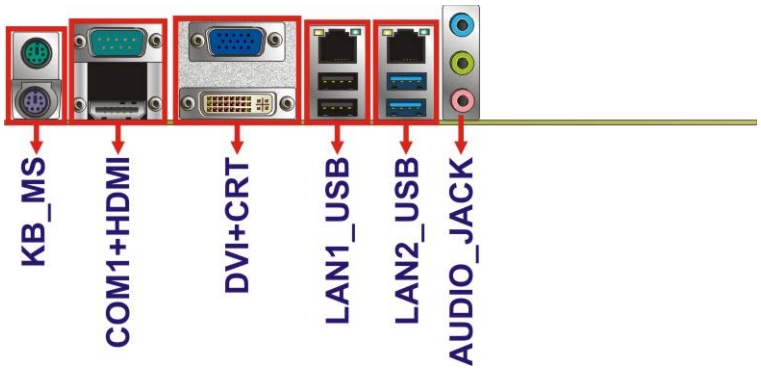


Figure 3-24: External Peripheral Interface Connector

3.3.1 Audio Connector

CN Label:	**AUDIO_JACK**
CN Type:	Audio jack
CN Location:	See **Figure 3-24**

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.

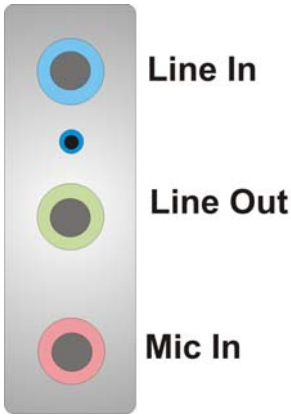


Figure 3-25: Audio Connector

3.3.2 Keyboard/Mouse Connector

CN Label: **KBMS**

CN Type: Dual PS/2

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

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

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

PIN	DESCRIPTION	PIN	DESCRIPTION
A1	KBDATA	B1	MSDATA
A2	NC	B2	NC
A3	GND	B3	GND
A4	+5 V	B4	+5 V
A5	KBCLK	B5	MSCLK
A6	NC	B6	NC
A7	GND	B7	GND
A8	GND	B8	GND
A9	GND		

Table 3-25: PS/2 Connector Pinouts

3.3.3 Ethernet and USB Connector

CN Label: **LAN1_USB, LAN2_USB**

CN Type: RJ-45, USB

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

CN Pinouts: See **Table 3-26, Table 3-28 and Table 3-29**

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 3-26: LAN Pinouts

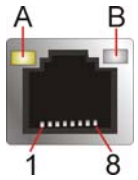


Figure 3-26: Ethernet Connector

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 3-27: Ethernet Connector LEDs

The USB connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USBPWR1/2	2	USB20_C_N0
3	USB20_C_P0	4	GND

PIN	DESCRIPTION	PIN	DESCRIPTION
5	USBPWR1/2	6	USB20_C_N1
7	USB20_C_P1	8	GND

Table 3-28: LAN1_USB Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USB_3P0_VCC1	2	USB2P0_DM1_L
3	USB2P0_DP1_L	4	GND
5	USB3P0_RXDN1	6	USB3P0_RXDP1
7	GND	8	USB3P0_TXDN1_C
9	USB3P0_TXDP1_C	10	USB_3P0_VCC2
11	USB2P0_DM2_L	12	USB2P0_DP2_L
13	GND	14	USB3P0_RXDN2
15	USB3P0_RXDP2	16	GND
17	USB3P0_TXDN2_C	18	USB3P0_TXDP2_C

Table 3-29: LAN2_USB Port Pinouts

3.3.4 HDMI Port Connector

CN Label: **HDMI**

CN Type: HDMI connector

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

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

The HDMI port connects to an HDMI device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_TMDS_C_DATA2	13	NC
2	GND	14	NC
3	HDMI_TMDS_C_DATA2#	15	HDMI_DDC_SCLK
4	HDMI_TMDS_C_DATA1	16	HDMI_DDC_SDATA
5	GND	17	GND
6	HDMI_TMDS_C_DATA1#	18	+5V

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
7	HDMI_TMDS_C_DATA0	19	HDMI_HPD
8	GND	20	GND
9	HDMI_TMDS_C_DATA0#	21	GND
10	HDMI_TMDS_C_CLK	22	GND
11	GND	23	GND
12	HDMI_TMDS_C_CLK#		

Table 3-30: HDMI Connector Pinouts

3.3.5 Serial Port Connectors (COM1)

CN Label: **COM1**

CN Type: DB-9 connector

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

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

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

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

Table 3-31: Serial Port Connector Pinouts

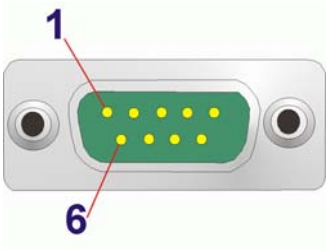


Figure 3-27: Serial Port Connector Pinouts

3.3.6 VGA and DVI Connector

CN Label: **DVI+CRT**

CN Type: 15-pin Female, 24-pin header

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

CN Pinouts: See **Table 3-32** and **Table 3-33**

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

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

Table 3-32: VGA Connector Pinouts

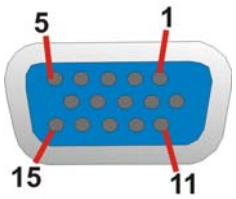


Figure 3-28: VGA Connector

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

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DVI_TMDS_C_DATA2#	2	DVI_TMDS_C_DATA2
3	GND	4	NC
5	NC	6	DVI_DDC_SCLK
7	DVI_DDC_SDATA	8	NC
9	DVI_TMDS_C_DATA1#	10	DVI_TMDS_C_DATA1

PIN	DESCRIPTION	PIN	DESCRIPTION
11	GND	12	NC
13	NC	14	+5V_DVI
15	GND	16	DVI_HPD
17	DVI_TMDS_C_DATA0#	18	DVI_TMDS_C_DATA0
19	GND	20	NC
21	NC	22	GND
23	DVI_TMDS_C_CLK	24	DVI_TMDS_C_CLK#

Table 3-33: DVI Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMB-Q670 may result in permanent damage to the IMB-Q670 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-Q670. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-Q670 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMB-Q670, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMB-Q670.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

WARNING:

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

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

- Read the user manual:
  - The user manual provides a complete description of the IMB-Q670 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMB-Q670 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMB-Q670 off:
  - When working with the IMB-Q670, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMB-Q670 **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

NOTE:

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

WARNING:

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

The LGA1155 socket is shown in **Figure 4-1**.

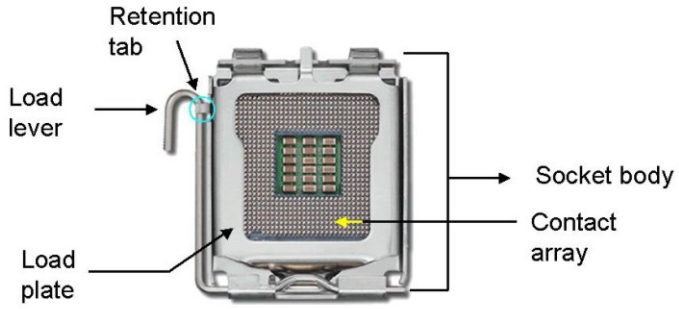


Figure 4-1: Intel LGA1155 Socket

To install the CPU, follow the steps below.

WARNING:

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

Step 1: **Remove the protective cover.** The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 4-2**.

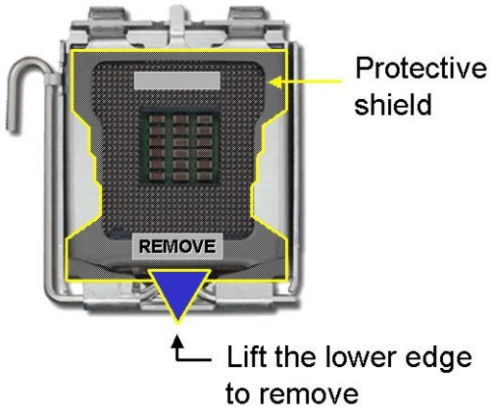


Figure 4-2: Remove Protective Cover

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever, then open the load plate. See **Figure 4-3**.

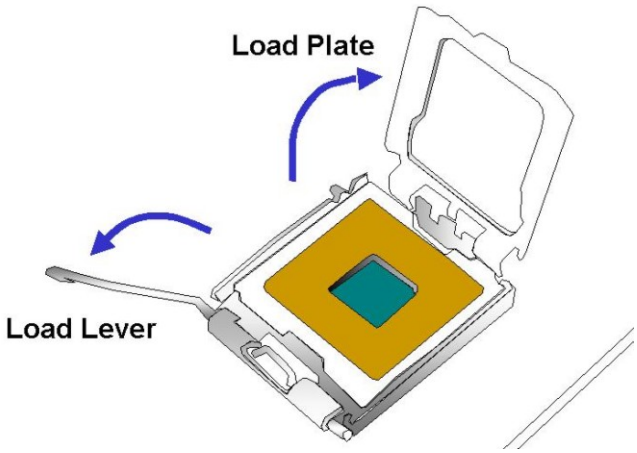


Figure 4-3: CPU Socket Load Plate

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 4-4**.

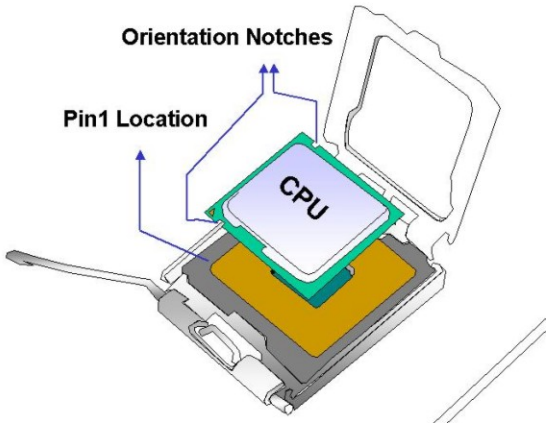


Figure 4-4: Insert the Socket LGA1155 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. There will be some resistance, but will not require extreme pressure.

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

4.2.2 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 solder side of the mainboard.

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

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

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

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMB-Q670. 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 4-5**.

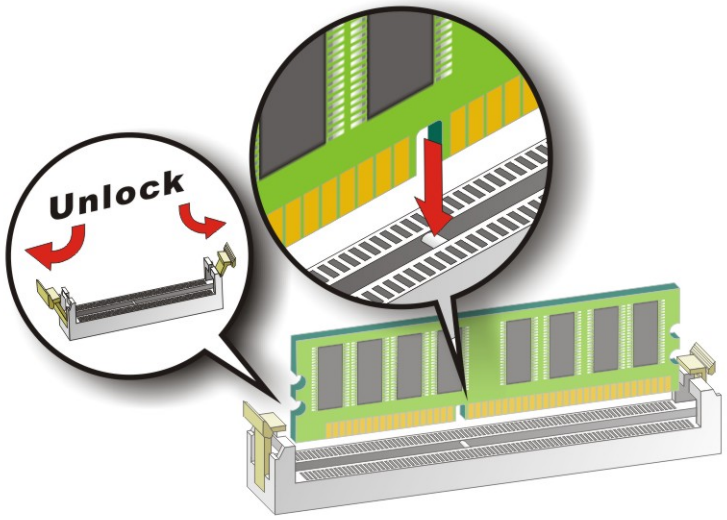


Figure 4-5: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-5**.

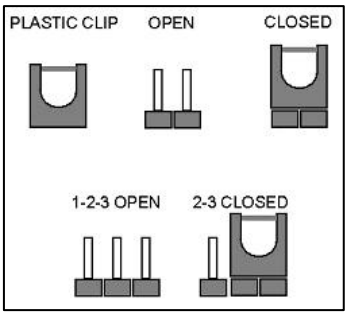
Step 2: **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-5**.

Step 3: **Insert the DIMM**. Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-5**.

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 Auto power setting jumper (by active hardware)	JATX_AT1	2-pin header
Clear CMOS jumper	J_CMOS2	3-pin header
ME Debug connector	J_FLASH1	3-pin header
USB power select jumper	USB_PWR1	3-pin header
Wake-on LAN	WOL_SEL1	3-pin header

Table 4-1: Jumpers

4.3.1 AT/ATX Power Mode Jumper (by active hardware)

Jumper Label: **JATX_AT1**

Jumper Type: 2-pin header

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

Jumper Location: See **Figure 4-6**

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

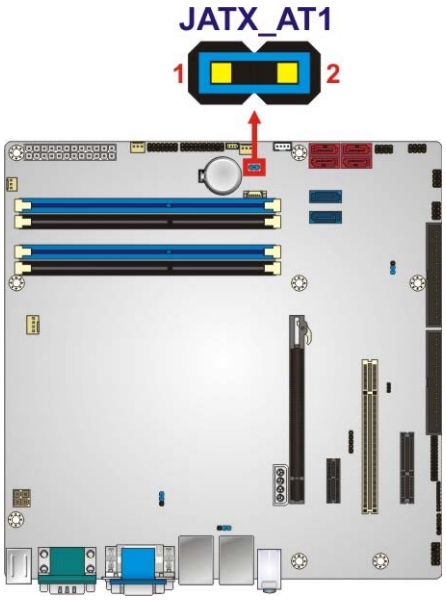


Figure 4-6: AT/ATX Power Mode Jumper Location

4.3.2 Clear CMOS Jumper

Jumper Label: **J_CMOS2**

Jumper Type: 3-pin header

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

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

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

Setting	Description
1-2	Normal
2-3	Clear BIOS

Table 4-3: Clear BIOS Jumper Settings

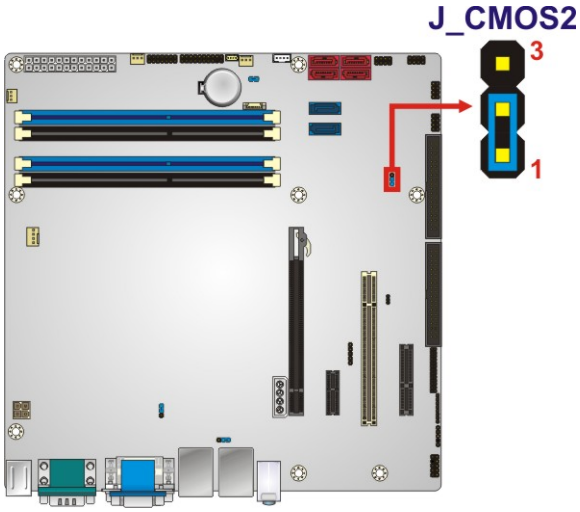


Figure 4-7: Clear BIOS Jumper Location

4.3.3 ME Debug Connector

CN Label:	**J_FLASH1**
CN Type:	3-pin header
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

The ME Debug connector allows ME firmware overwrite protection.

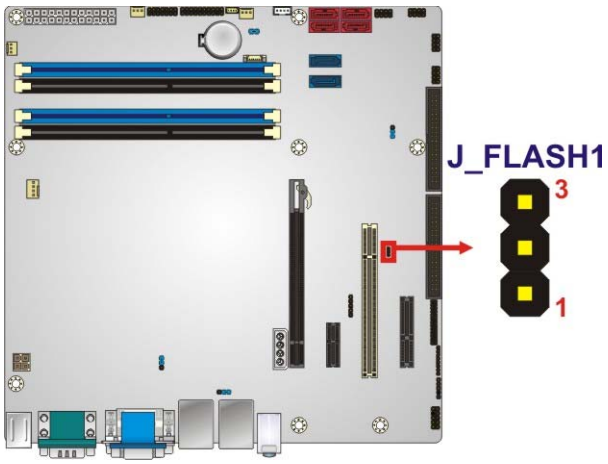


Figure 4-8: ME Debug Connector Location

PIN NO.	DESCRIPTION
Short 1-2	Overwrite disable
Short 2-3	Overwrite enable

Table 4-4: ME Debug Connector Pinouts

4.3.4 USB Power Select Jumper

Jumper Label: **USB_PWR1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-5**

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

The USB power connector allows the user to select the USB power setting.

Setting	Description
Short 1-2	+5V
Short 2-3	+5VSB

Table 4-5: USB Power Select Jumper Settings

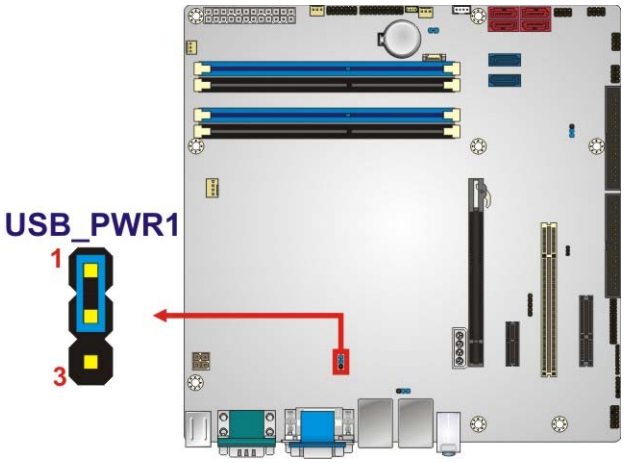


Figure 4-9: USB Power Select Jumper Location

4.3.5 Wake-on LAN Jumper

CN Label: **WOL_SEL1**

CN Type: 3-pin header

CN Location: See **Figure 4-10**

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

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

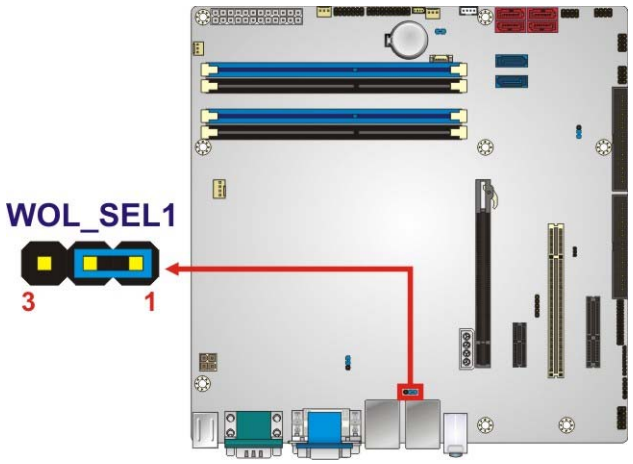


Figure 4-10: Wake-on LAN Connector Pinout Locations

PIN NO.	DESCRIPTION
Short 1-2	Wakeup Enable (Default)
Short 2-3	Disable

Table 4-6: Wake-on LAN Connector Pinouts

4.4 Internal Peripheral Device Connections

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

4.4.1 SATA Drive Connection

The IMB-Q670 is shipped with four SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

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

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 4-11**.

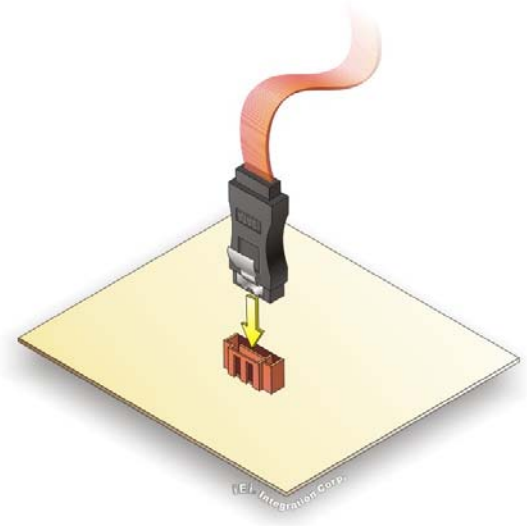


Figure 4-11: SATA Drive Cable Connection

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 4-12**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-12**.

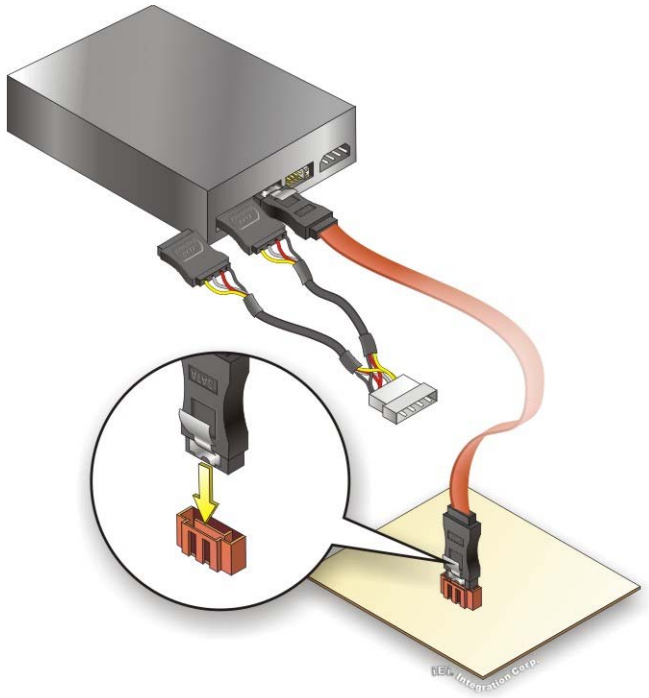


Figure 4-12: SATA Power Drive Connection

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

4.5 External Peripheral Interface Connection

This section describes connecting devices to the external connectors on the IMB-Q670.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMB-Q670 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.

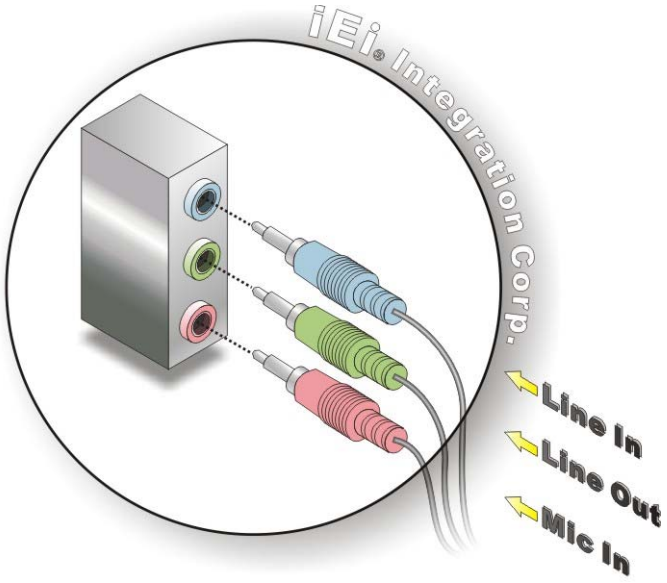


Figure 4-13: Audio Connector

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

4.5.2 LAN Connection

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

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

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMB-Q670. See **Figure 4-14**.

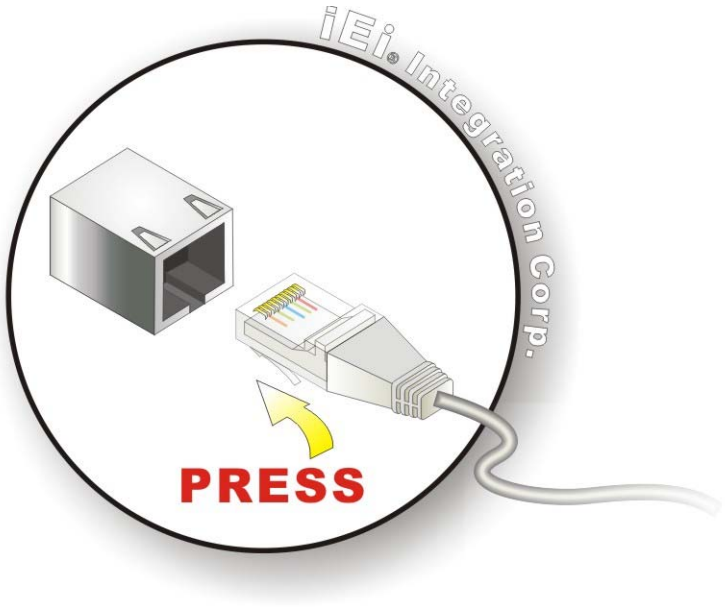


Figure 4-14: LAN Connection

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 Parallel Device Connection

The IMB-Q670 has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the IMB-Q670.

Step 1: **Locate the DB-25 connector**. The location of the DB-25 connector is shown in **Chapter 3**.

Step 2: **Insert the DB-25 connector**. Insert the DB-25 connector of a parallel device into the DB-25 connector on the external peripheral interface. See **Figure 4-15**.

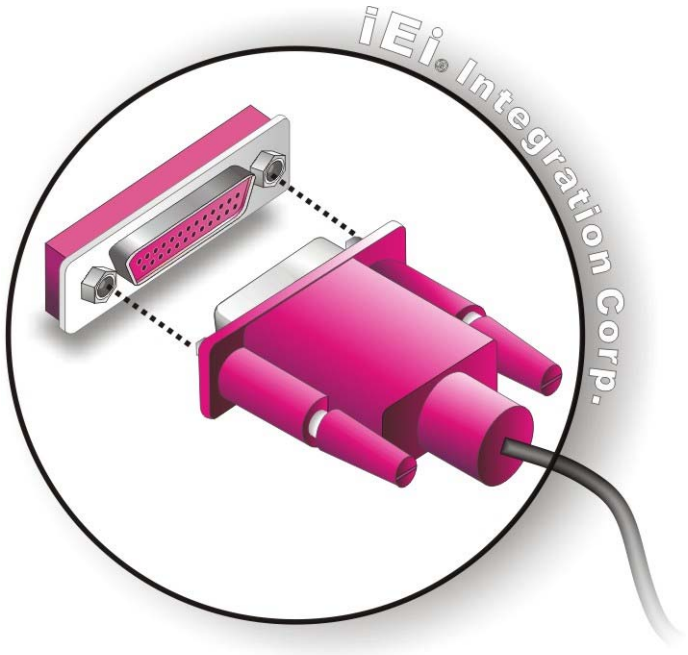


Figure 4-15: Parallel Device Connector

Step 3: **Secure the connector**. Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

4.5.4 PS/2 Keyboard and Mouse Connection

The IMB-Q670 has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the IMB-Q670.

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

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 4-16**.

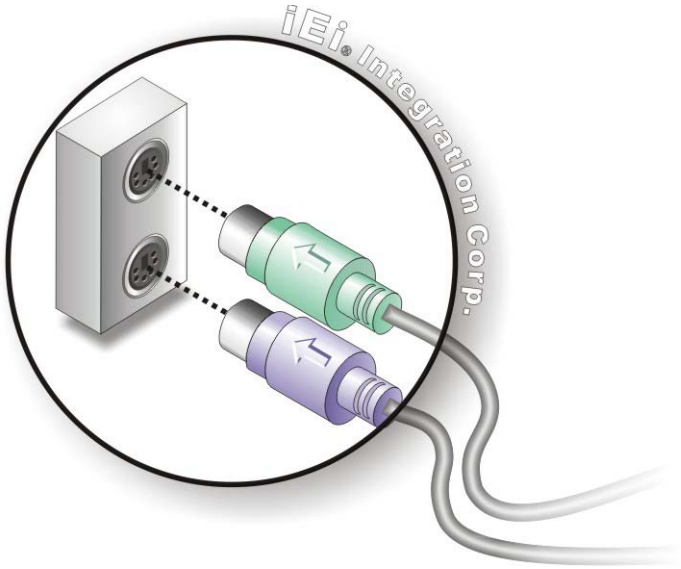


Figure 4-16: PS/2 Keyboard/Mouse Connector

4.5.5 Serial Device Connection

The IMB-Q670 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMB-Q670.

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**.

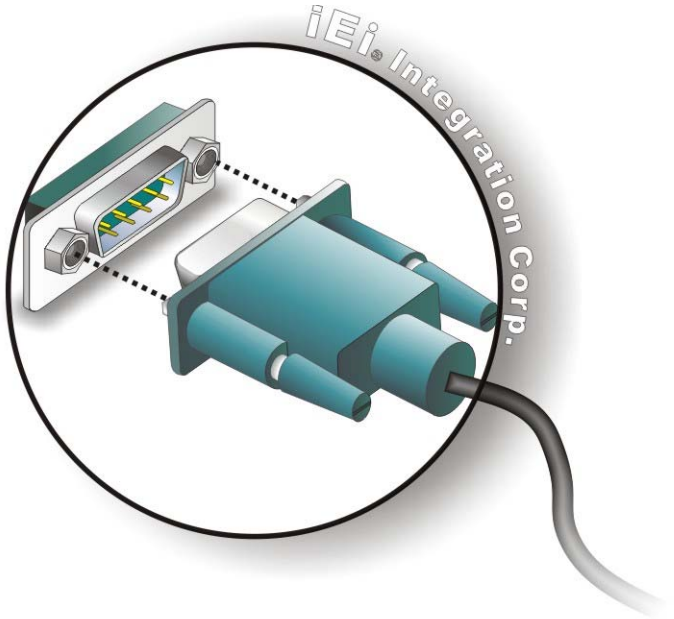


Figure 4-17: Serial Device Connector

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

4.5.6 USB Connection (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 IMB-Q670.

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**.

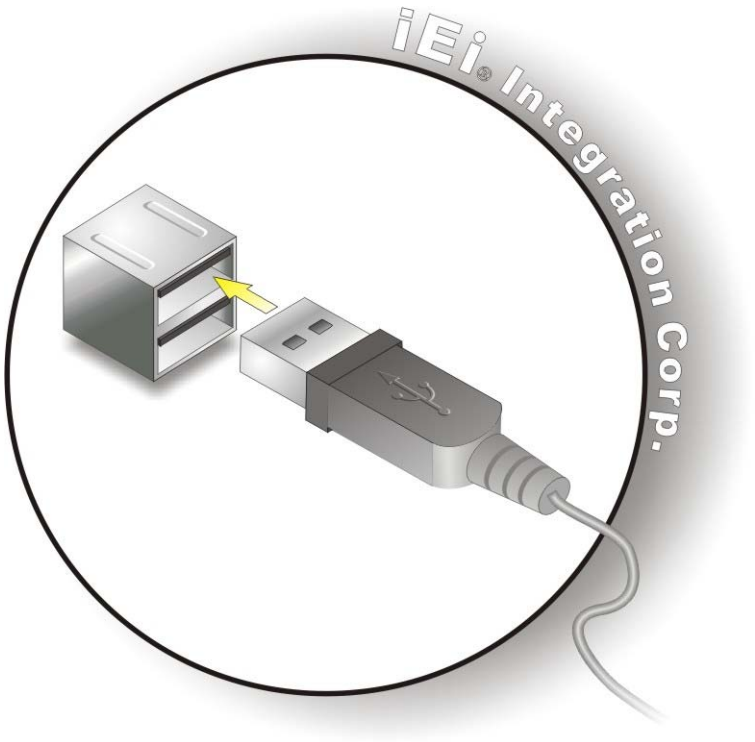


Figure 4-18: USB Connector

4.5.7 VGA Monitor Connection

The IMB-Q670 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMB-Q670, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMB-Q670. See **Figure 4-19**.

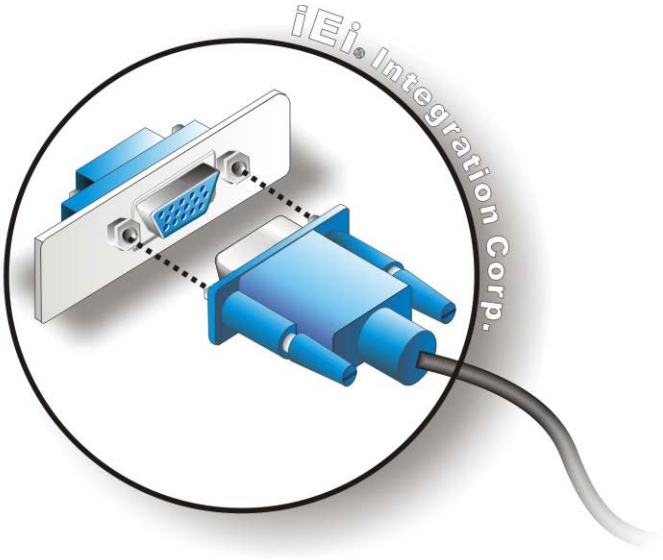


Figure 4-19: VGA Connector

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

4.6 Intel® AMT Setup Procedure

The IMB-Q670 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure the **CHA_DIMM1** socket is installed with one DDR3 DIMM.

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

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

Step 4: Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD. See **Section** 6.8

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

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

NOTE:

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

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

5.1.2 Using Setup

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

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

Key	Function
Page Up	Increase the numeric value or make changes
Page Dn	Decrease the numeric value or make changes
Esc	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

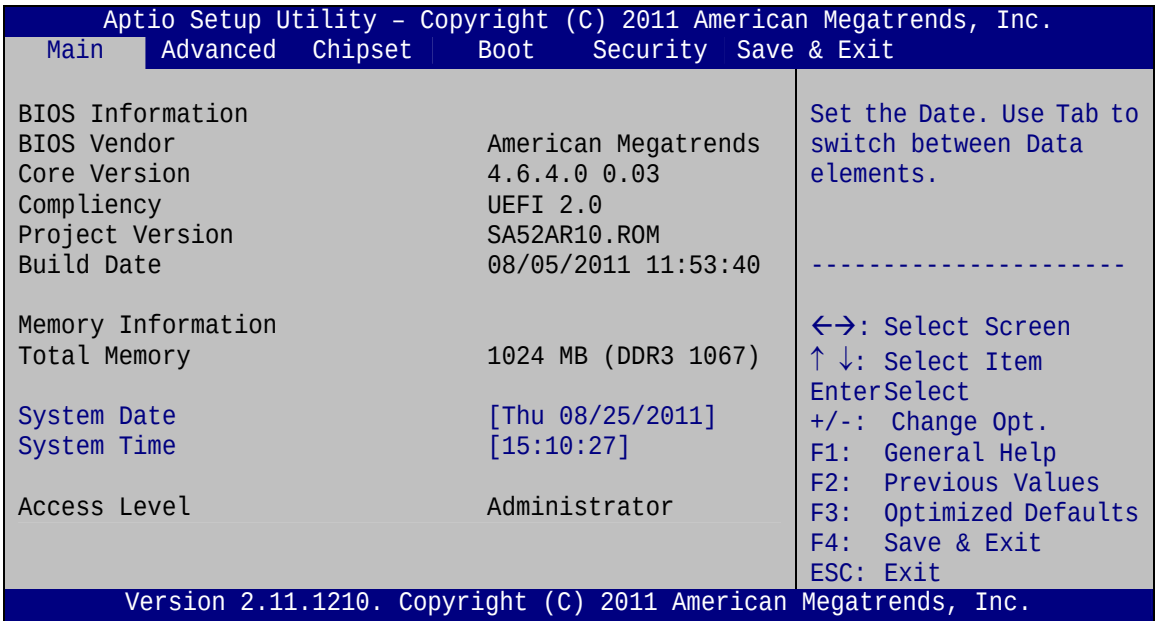
The **menu bar** on top of the BIOS screen has the following main items:

- 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

➔ System Overview

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

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

➔ **Memory Information**

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

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

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

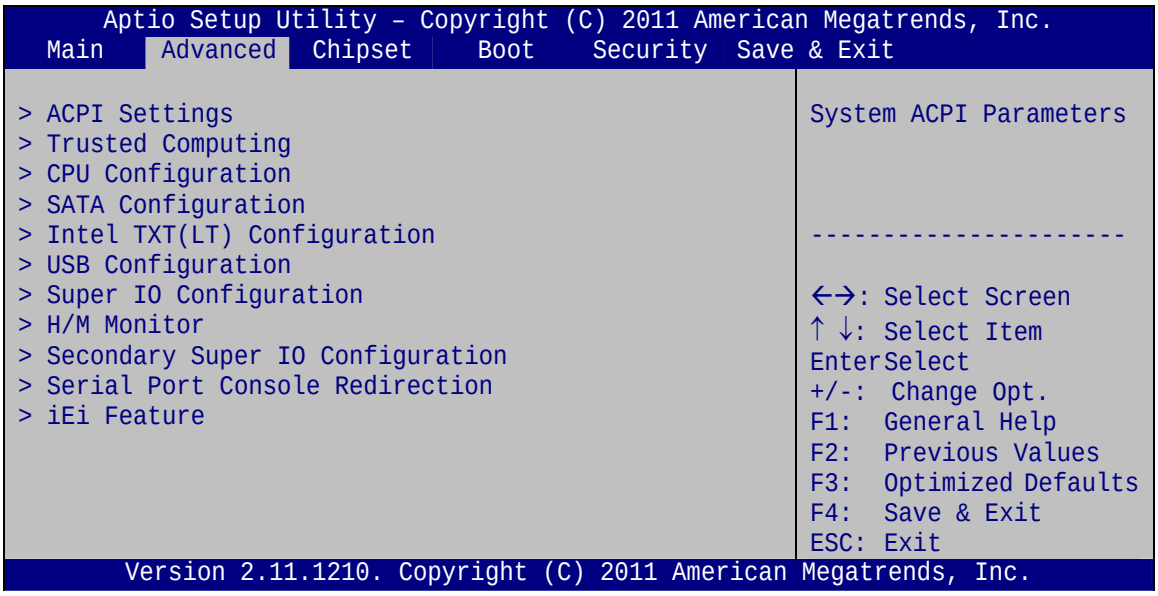
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING!

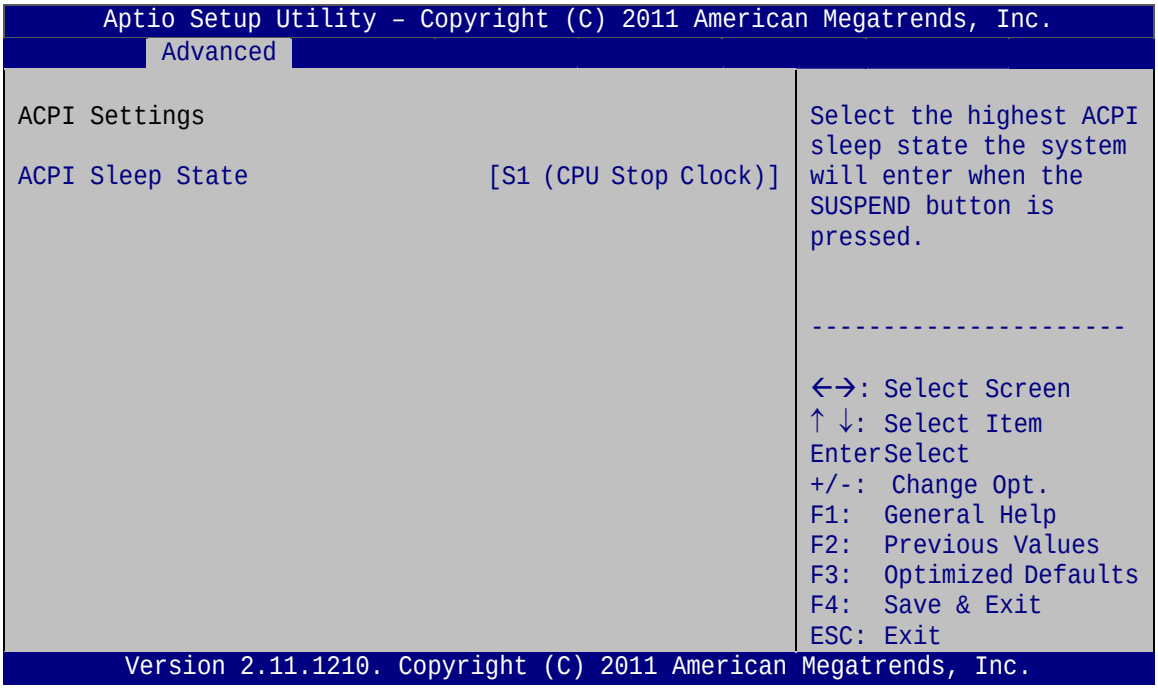
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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



BIOS Menu 3: ACPI Configuration

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

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

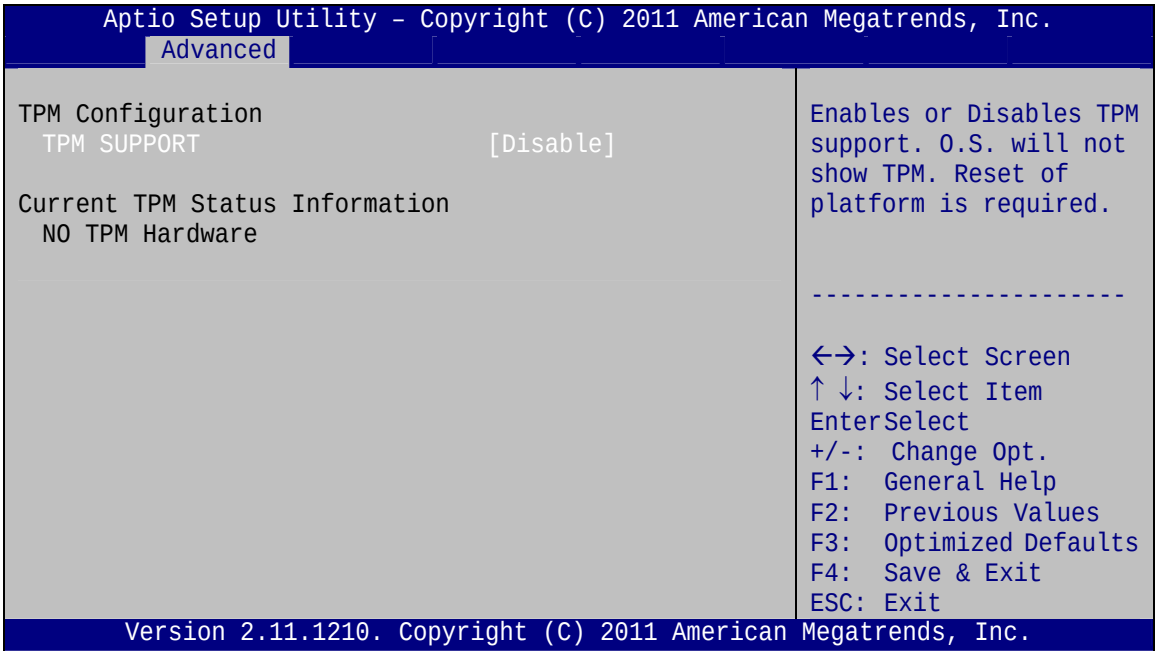
➔ **Suspend Disabled**

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

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

5.3.2 Trusted Computing

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



BIOS Menu 4: Trusted Computing

➔ **TPM Support [Disable]**

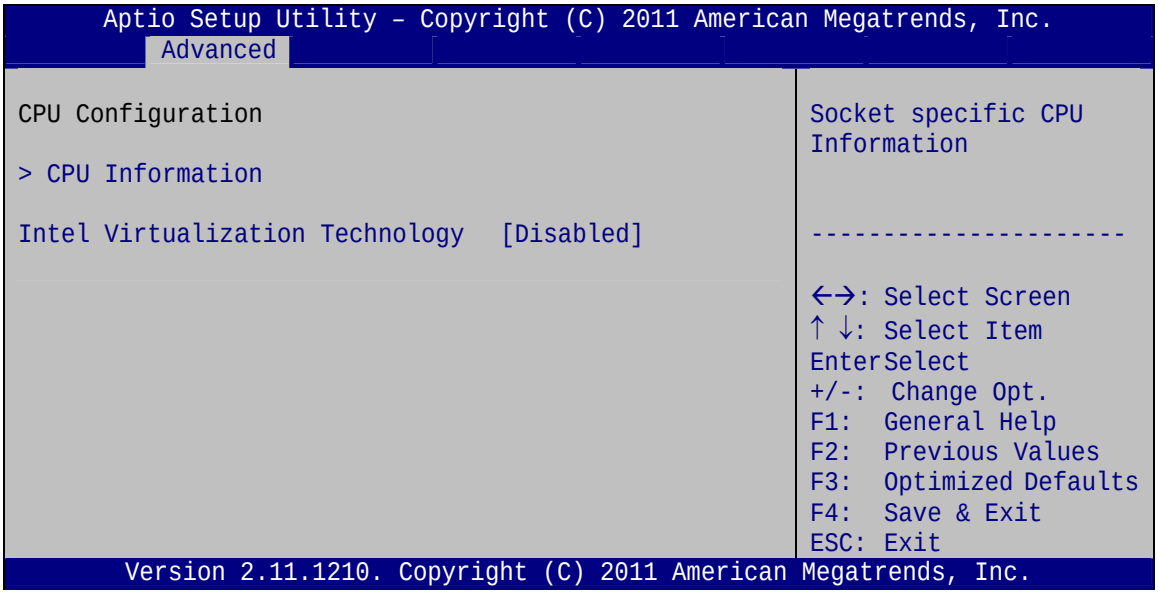
Use the **TPM Support** option to configure support for the TPM.

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

➔ **Enable** TPM support is enabled.

5.3.3 CPU Configuration

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



BIOS Menu 5: CPU Configuration

➔ **Intel® Virtualization Technology [Disabled]**

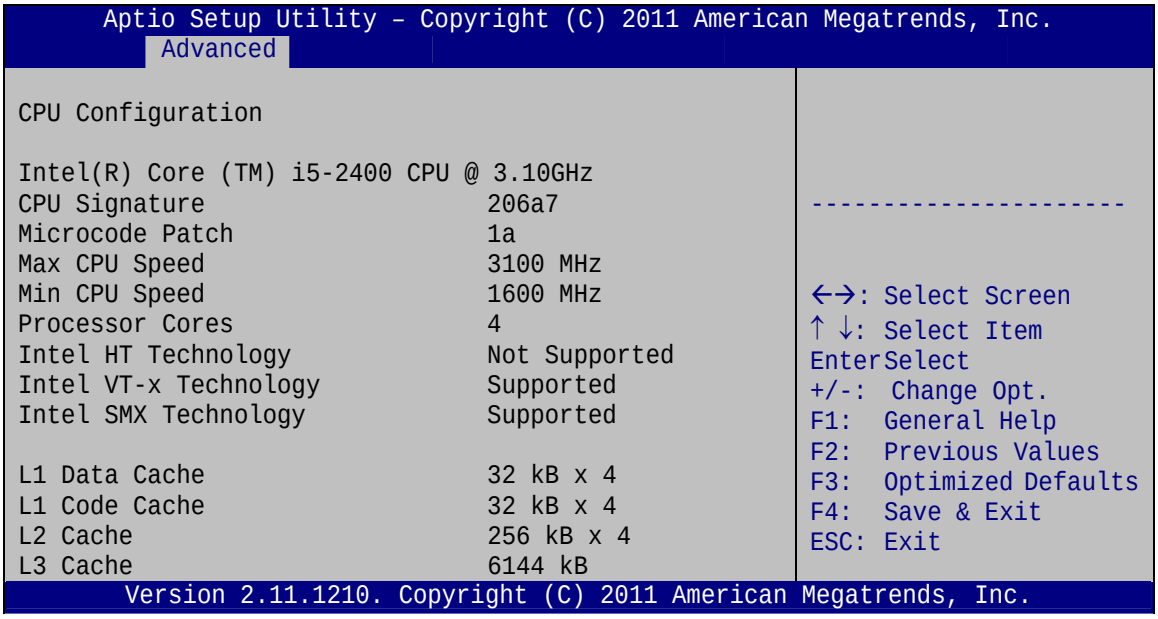
Use the **Intel® Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel Virtualization technology allows several OSs to run on the same system at the same time.

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

➔ **Enabled** Enables Intel Virtualization Technology.

5.3.3.1 CPU Information

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



BIOS Menu 6: CPU Configuration

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

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

- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

5.3.4 SATA Configuration

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

```
Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
    Advanced
SATA Configuration                          (1) IDE Mode. (2) AHCI
                                            Mode. (3) RAID Mode.
SATA Mode                    [AHCI Mode]

SATA Port0                   Not Present
   Staggered Spin-up         [Disabled]
   External SATA Port        [Disabled]
   Hot Plug                  [Disabled]

SATA Port1                   Not Present
   Staggered Spin-up         [Disabled]
   External SATA Port        [Disabled]
   Hot Plug                  [Disabled]

SATA Port2                   Not Present
   Staggered Spin-up         [Disabled]
   External SATA Port        [Disabled]
   Hot Plug                  [Disabled]

SATA Port3                   Not Present
   Staggered Spin-up         [Disabled]
   External SATA Port        [Disabled]
   Hot Plug                  [Disabled]
                                            ----------------------
SATA Port4                   Not Present
   Staggered Spin-up         [Disabled]     ←→: Select Screen
   External SATA Port        [Disabled]     ↑ ↓: Select Item
   Hot Plug                  [Disabled]     EnterSelect
                                            +/-:  Change Opt.
SATA Port5                   Not Present    F1:  General Help
   Staggered Spin-up         [Disabled]     F2:  Previous Values
   External SATA Port        [Disabled]     F3:  Optimized Defaults
   Hot Plug                  [Disabled]     F4:  Save & Exit
                                            ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 7: SATA Configuration

➔ **SATA Mode [AHCI Mode]**

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

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

➔ **Staggered Spin-up [Disabled]**

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

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

➔ **External SATA Port**

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

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

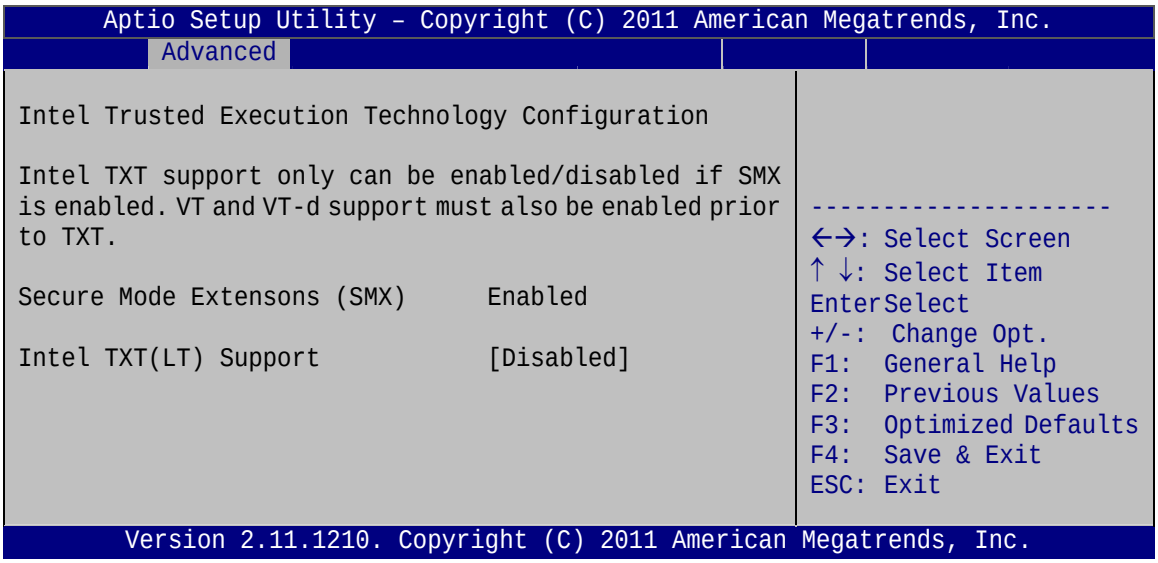
➔ **Hot Plug**

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

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

5.3.5 Intel TXT(LT) Configuration

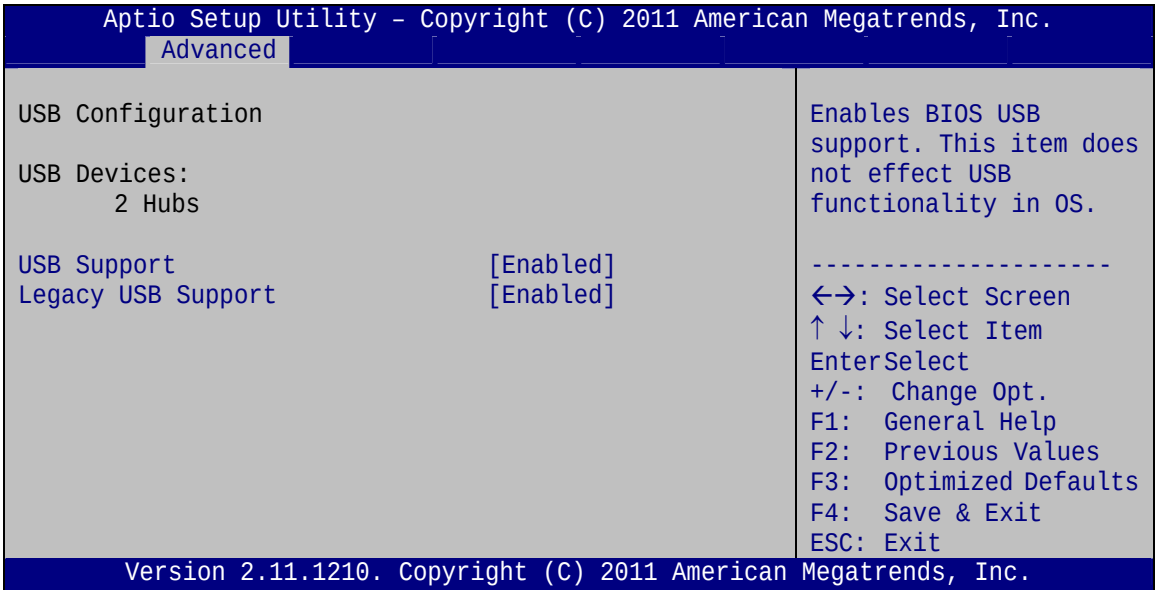
Use the **Intel TXT(LT) Configuration** menu (**BIOS Menu 8**) to configure Intel Trusted Execution Technology support.



BIOS Menu 8: Intel TXT(LT) Configuration

5.3.6 USB Configuration

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



BIOS Menu 9: USB Configuration

➔ **USB Devices**

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

➔ **USB Support [Enabled]**

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

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

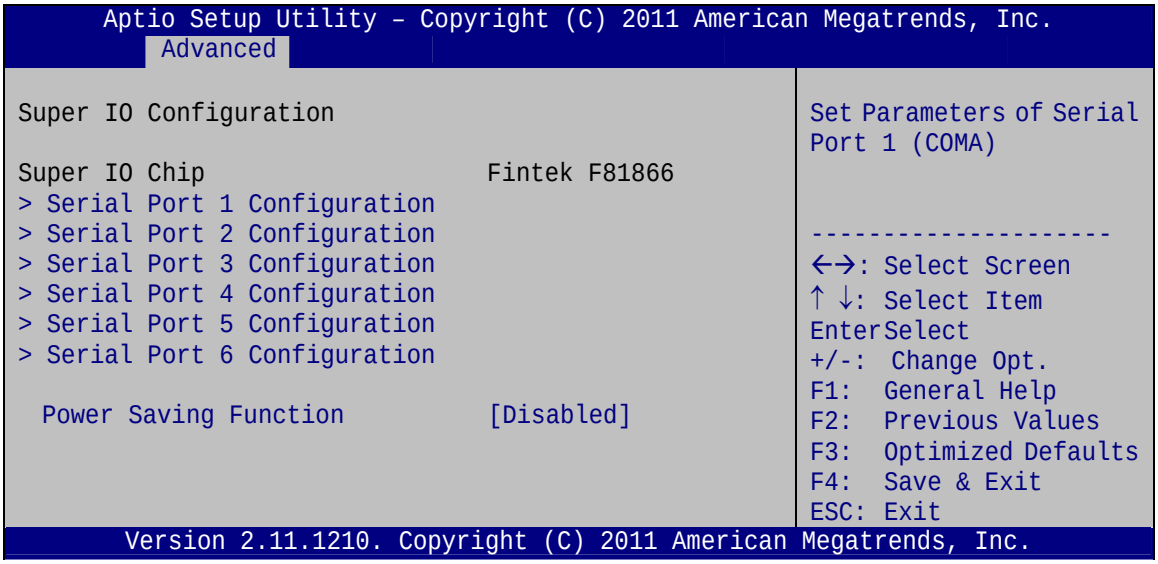
➔ **Legacy USB Support [Enabled]**

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

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

5.3.7 Super IO Configuration

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



BIOS Menu 10: Super IO Configuration

➔ **Power Saving Function [Disabled]**

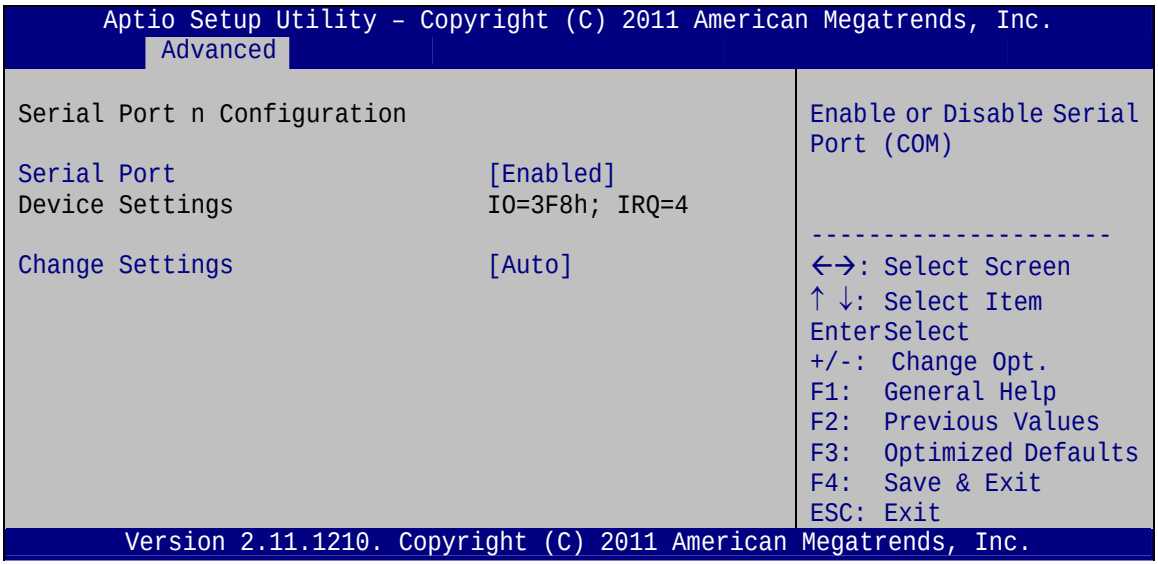
Use the **Power Saving Function** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

➔ **Disabled** **DEFAULT** Power Saving Function support disabled

➔ **Enabled** Power Saving Function support enabled

5.3.7.1 Serial Port n Configuration

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



BIOS Menu 11: Serial Port n Configuration Menu

5.3.7.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.7.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.7.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3E8h; IRQ=10**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ10
➔ **IO=3E8h; IRQ=10, 11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
➔ **IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.7.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2E8h; IRQ=10**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
➔ **IO=3E8h; IRQ=10, 11**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
➔ **IO=2E8h; IRQ=10, 11**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

➔ **Device Mode [RS485]**

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

➔ **Normal**		Sets the serial port mode to normal.
➔ **RS485**	**DEFAULT**	Enables serial port RS485 support.

5.3.7.1.5 Serial Port 5 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

5.3.7.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

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

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

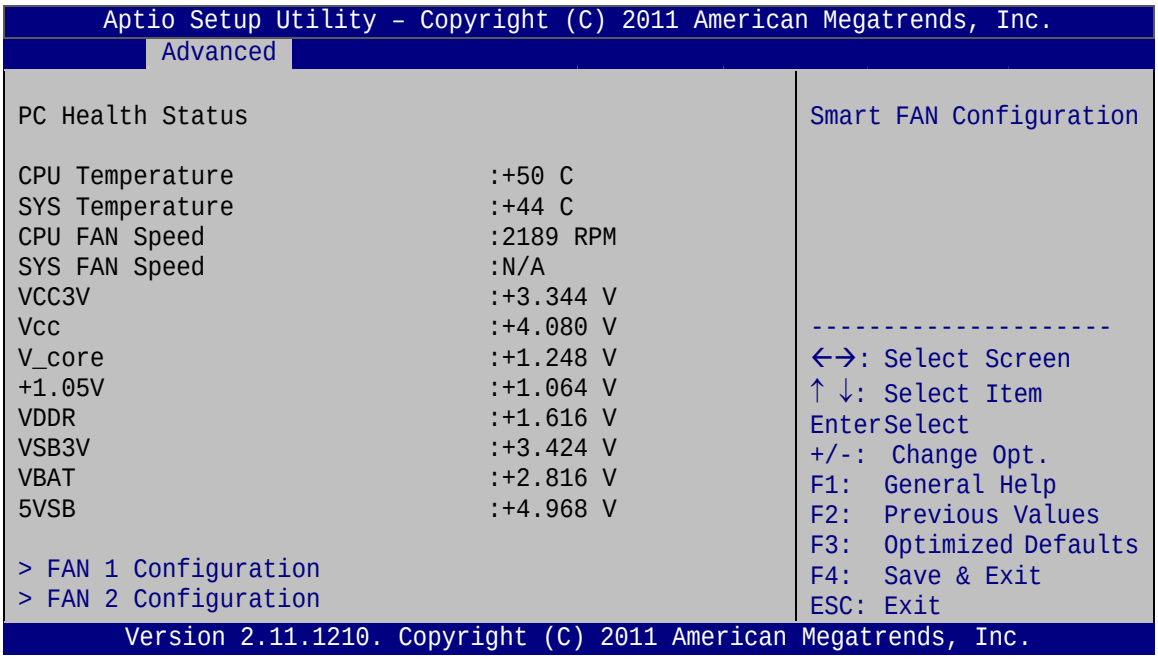
➔ **Change Settings [Auto]**

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

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

5.3.8 H/W Monitor

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



BIOS Menu 12: H/W Monitor

➔ **PC Health Status**

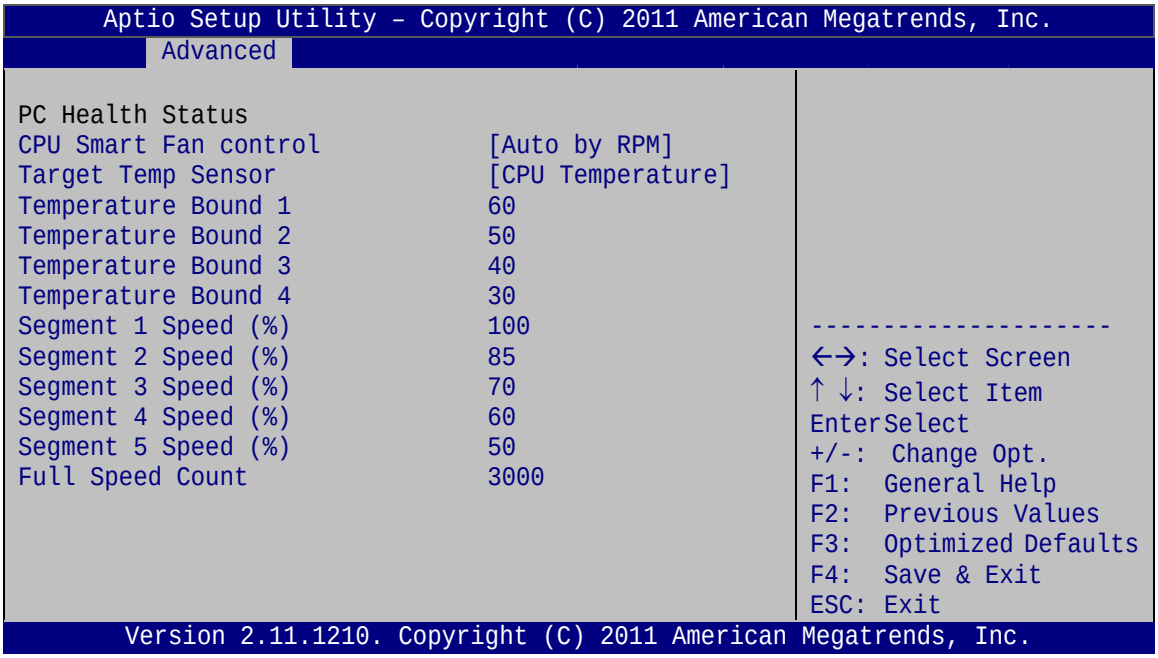
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - VCC3V
  - Vcore
  - Vcc
  - +1.05V
  - VDDR
  - VSB3V
  - VBAT

- 5VSB

5.3.8.1 FAN 1 Configuration

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



BIOS Menu 13: FAN 1 Configuration

➔ **CPU Smart Fan control [Auto by RPM]**

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

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

➔ **Target Temp. Sensor [CPU Temperature]**

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

➔ **CPU Temperature**	**DEFAULT**	Sets the target temperature sensor to the CPU temperature.
➔ **System Temperature**		Sets the target temperature sensor to the System Temperature1 setting.

➔ **Temperature Bound n**

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

➔ **Segment n Speed (%)**

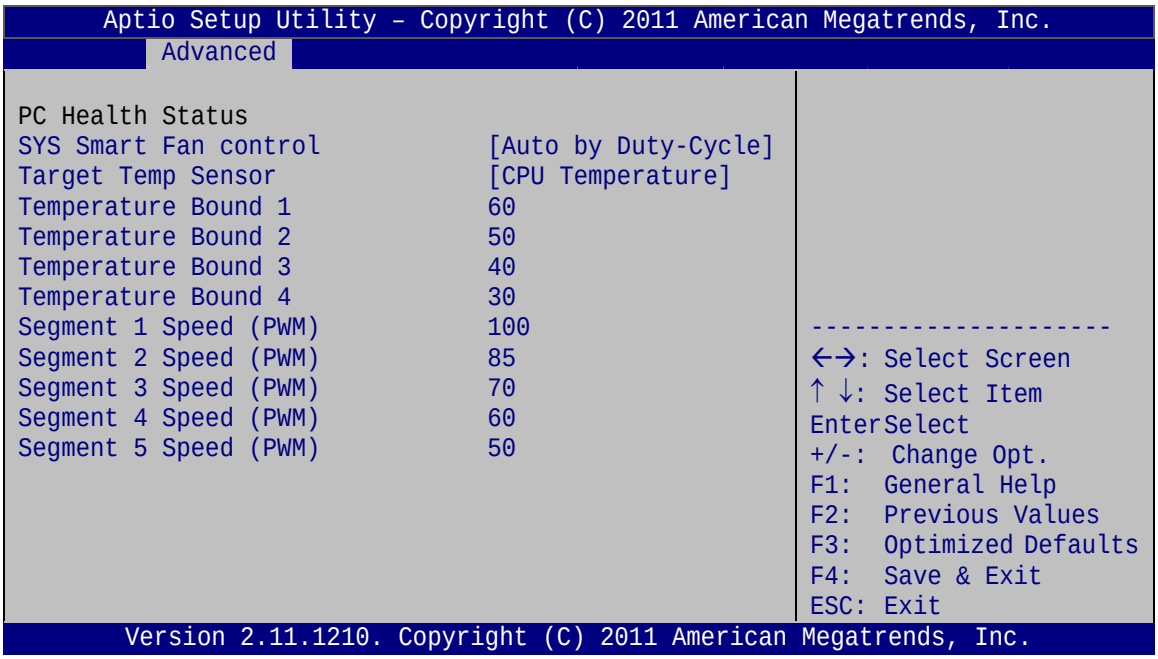
Use the + or – key to change the fan **Segment n Speed** value in percentage. Enter a decimal number between 0 and 100.

➔ **Full Speed Count**

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

5.3.8.2 FAN 2 Configuration

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



BIOS Menu 14: FAN 2 Configuration

➔ **CPU Smart Fan control [Auto by Duty-Cycle]**

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

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

➔ **Target Temp. Sensor [CPU Temperature]**

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

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

➔ **System Temperature1**	Sets the target temperature sensor to the System Temperature1 setting.
➔ **System Temperature2**	Sets the target temperature sensor to the System Temperature2 setting.

➔ **Temperature Bound n**

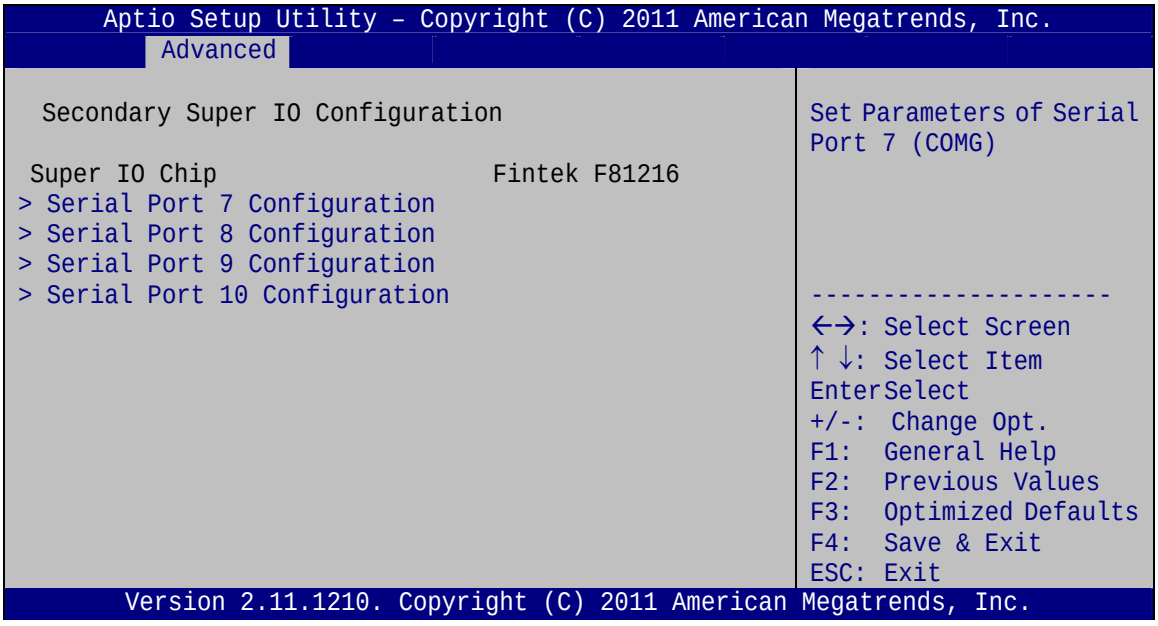
Use the + or – key to change the fan **Temperature Bound n** value. Enter a decimal number between 0 and 127.

➔ **Segment 1 Speed (PWM)**

Use the + or – key to change the fan **Segment 1 Speed** value in Pulse Width Modulation (PWM). Enter a decimal number between 0 and 100.

5.3.9 Secondary Super IO Configuration

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



BIOS Menu 15: Secondary Super IO Configuration

5.3.9.1 Serial Port 7 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2C0h; IRQ=10**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ5
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
➔ **IO=2B0h; IRQ=10, 11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ5
➔ **IO=2B8h; IRQ=10, 11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11

➔ **Device Mode [Normal]**

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

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

5.3.9.2 Serial Port 8 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.9.3 Serial Port 9 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

- ➔ **Auto** **DEFAULT** — The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2B0h; IRQ=10** — Serial Port I/O port address is 2B0h and the interrupt address is IRQ10
- ➔ **IO=2E0h; IRQ=10, 11** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C0h; IRQ=10, 11** — Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h; IRQ=10, 11** — Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

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

5.3.9.4 Serial Port 10 Configuration

➔ **Serial Port [Enabled]**

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

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

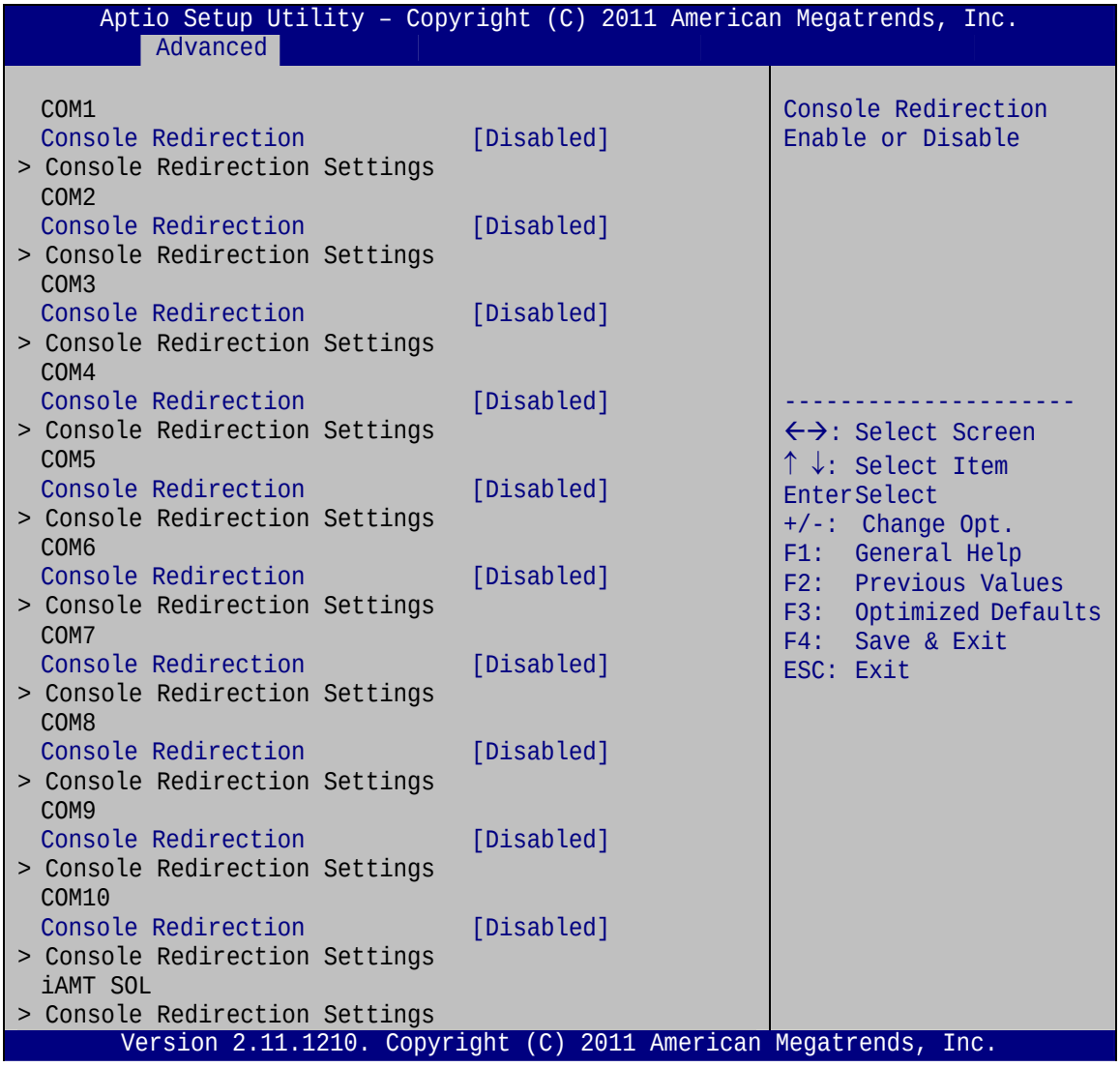
➔ **Change Settings [Auto]**

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2B8h; IRQ=10**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
➔ **IO=2B0h; IRQ=10, 11**		Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
➔ **IO=2B8h; IRQ=10, 11**		Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11

5.3.10 Serial Port Console Redirection

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



BIOS Menu 16: Serial Port Console Redirection

➔ **Console Redirection [Enabled]**

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

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

➔ **Terminal Type [VT-100+]**

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

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

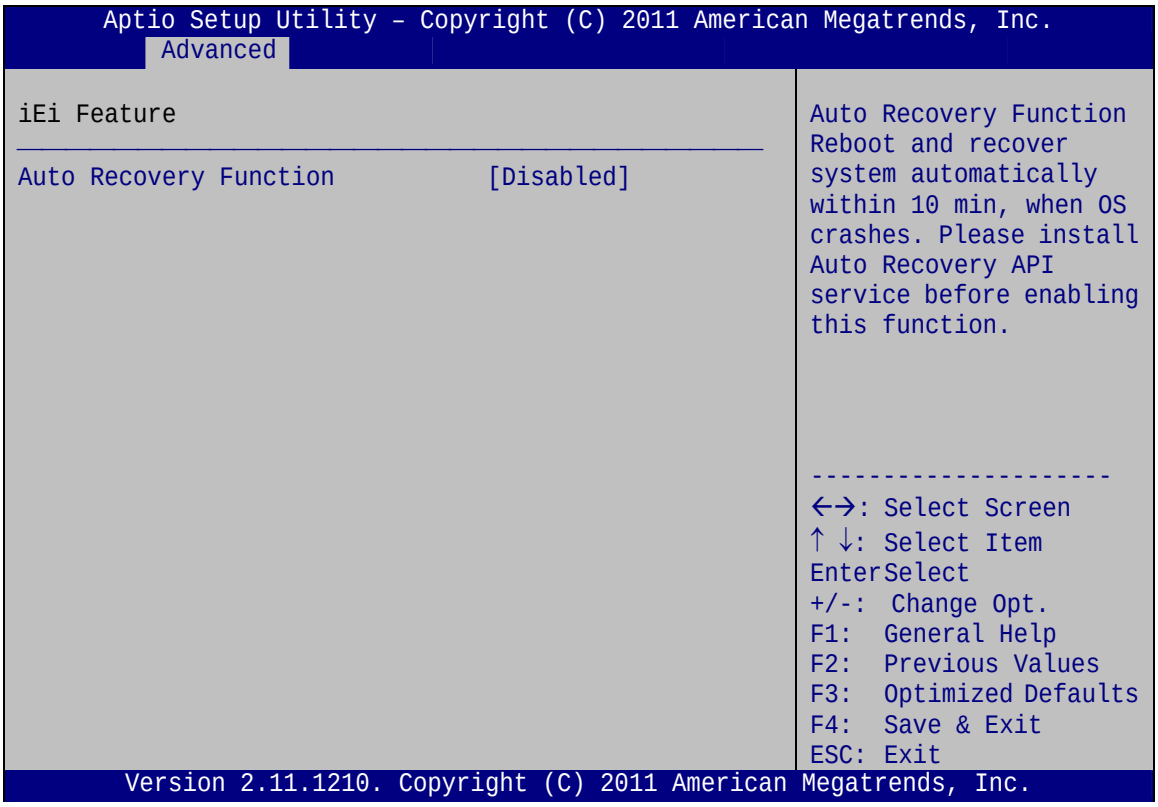
➔ **Bits per second [115200]**

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

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

5.3.11 IEI Feature

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



BIOS Menu 17: IEI Feature

➔ **Auto Recovery Function [Disabled]**

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

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

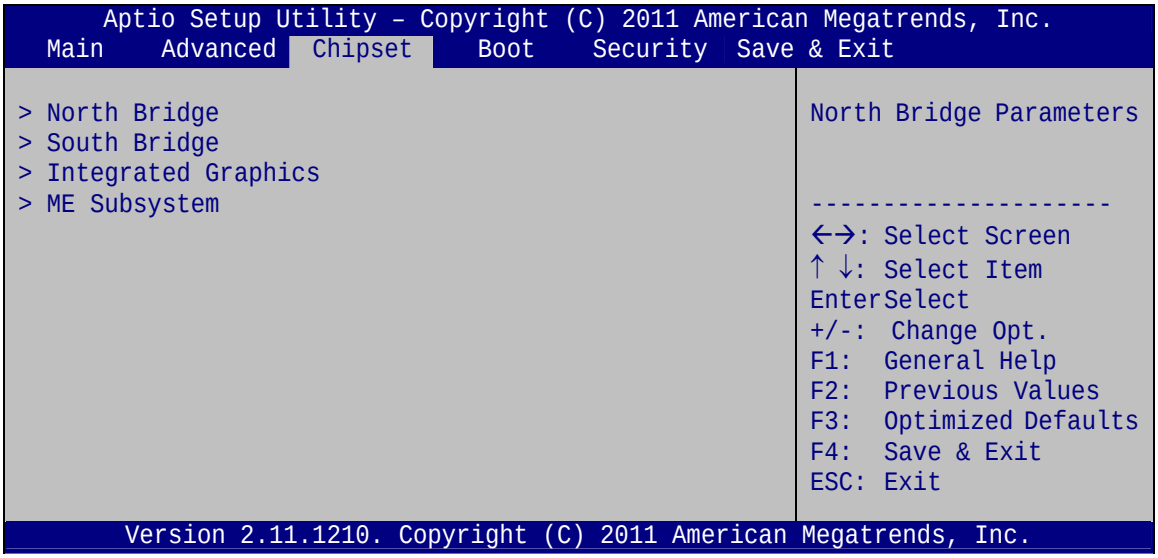
➔ **Enabled** Auto recovery function enabled

5.4 Chipset

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

WARNING!

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



BIOS Menu 18: Chipset

5.4.1 Northbridge Configuration

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

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

Memory Information                                  Select which graphics
                                                    controller to use as the
Total Memory                    1024 MB (DDR3 1067) primary boot device.

Memory Slot0                       0 MB (DDR3 1067)
Memory Slot1                       0 MB (DDR3 1067)
Memory Slot2                       0 MB (DDR3 1067)
Memory Slot3                    1024 MB (DDR3 1067)

Initate Graphic Adapter         [PEG/IGD]
IGD Memory                      [64M]               ----------------------
                                                    ←→: Select Screen
PCI Express Port                [Enabled]           ↑ ↓: Select Item
                                                    EnterSelect
VT-d                            [Disabled]          +/-:  Change Opt.
                                                    F1:   General Help
                                                    F2:   Previous Values
                                                    F3:   Optimized Defaults
                                                    F4:   Save & Exit
                                                    ESC:  Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 19: Northbridge Chipset Configuration

➔ **Initiate Graphic Adapter [PEG/IGD]**

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

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

➔ **IGD Memory [64 M]**

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

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

➔ **480 M**		480 MB of memory used by internal graphics device
➔ **512 M**		512 MB of memory used by internal graphics device

➔ **PCI Express Port [Enabled]**

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

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

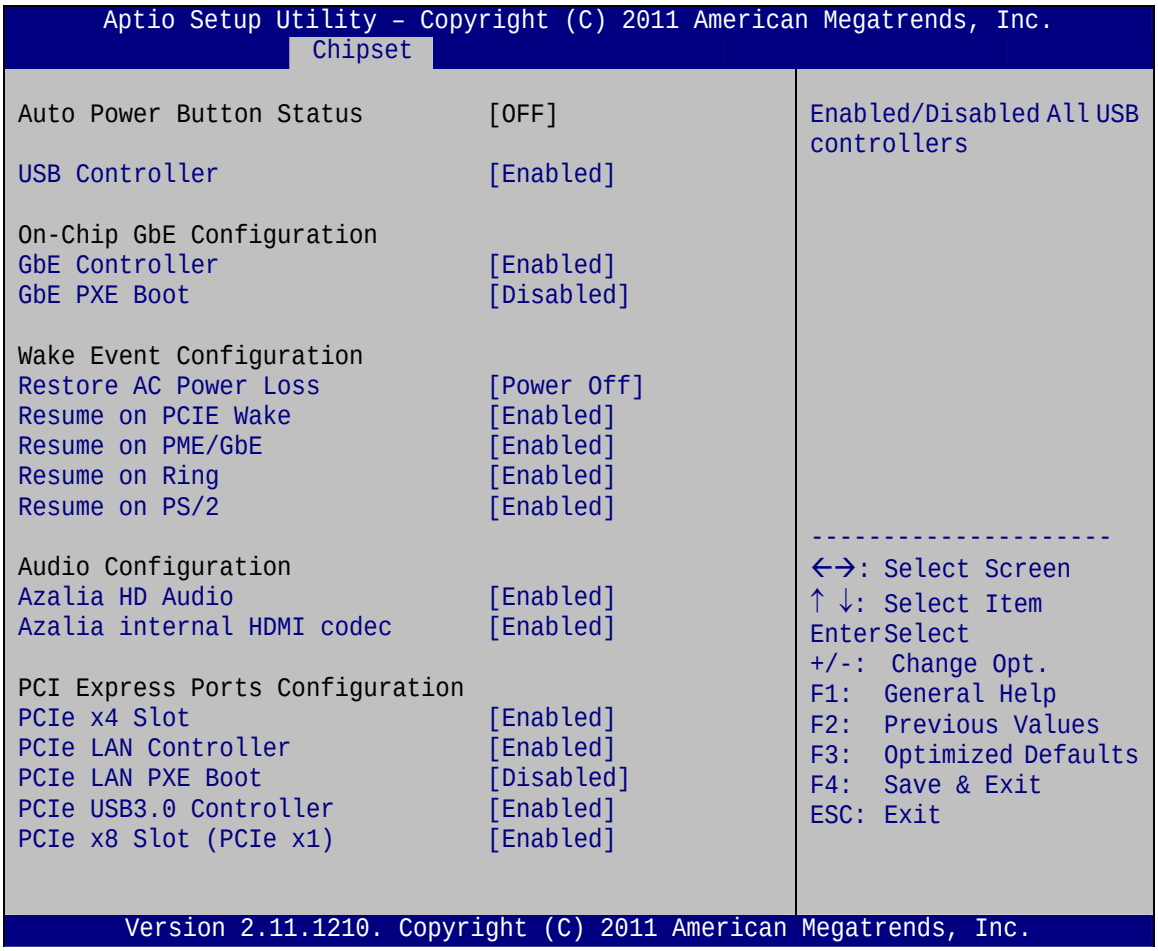
➔ **VT-d [Disabled]**

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

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

5.4.2 Southbridge Configuration

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



BIOS Menu 20: Southbridge Chipset Configuration

➔ **USB Controller [Enabled]**

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

➔ **Disabled** All USB controllers disabled

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

➔ **GbE Controller [Enabled]**

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

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

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

➔ **GbE PXE Boot [Disabled]**

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

➔ **Disabled** **DEFAULT** Disables the GbE PXE Boot option

➔ **Enabled** Enables the GbE PXE Boot option

➔ **Restore on AC Power Loss [Power Off]**

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

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

➔ **Power On** **DEFAULT** The system turns on

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

➔ **Resume on PCIe Wake [Enabled]**

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

➔ **Disabled** Disables Resume on PCIe Wake option

➔ **Enabled** **DEFAULT** Enables Resume on PCIe Wake option

➔ **Resume on PME/GbE [Enabled]**

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

➔ **Disabled** Disables Resume on PME/GbE option

➔ **Enabled** **DEFAULT** Enables Resume on PME/GbE option

➔ **Resume on Ring [Enabled]**

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

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

➔ **Resume on PS/2 [Enabled]**

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

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

➔ **Azalia HD Audio [Enabled]**

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

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

➔ **Azalia internal HDMI codec [Disabled]**

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

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

➔ **PCIe x4 Slot [Enabled]**

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

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

➔ **PCIe LAN Controller [Enabled]**

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

➔ **Disabled** The onboard PCIe LAN controller is disabled

➔ **Enabled** **DEFAULT** The onboard PCIe LAN controller is ensabled

➔ **PCIe LAN PXE Boot [Disabled]**

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

➔ **Disabled** **DEFAULT** Disables PCIe LAN PXE Boot option

➔ **Enabled** Enables PCIe LAN PXE Boot option

➔ **PCIe USB3.0 Controller [Enabled]**

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

➔ **Disabled** The onboard USB 3.0 controller is disabled

➔ **Enabled** **DEFAULT** The onboard USB 3.0 controller is enabled

➔ **PCIe x8 Slot [Enabled]**

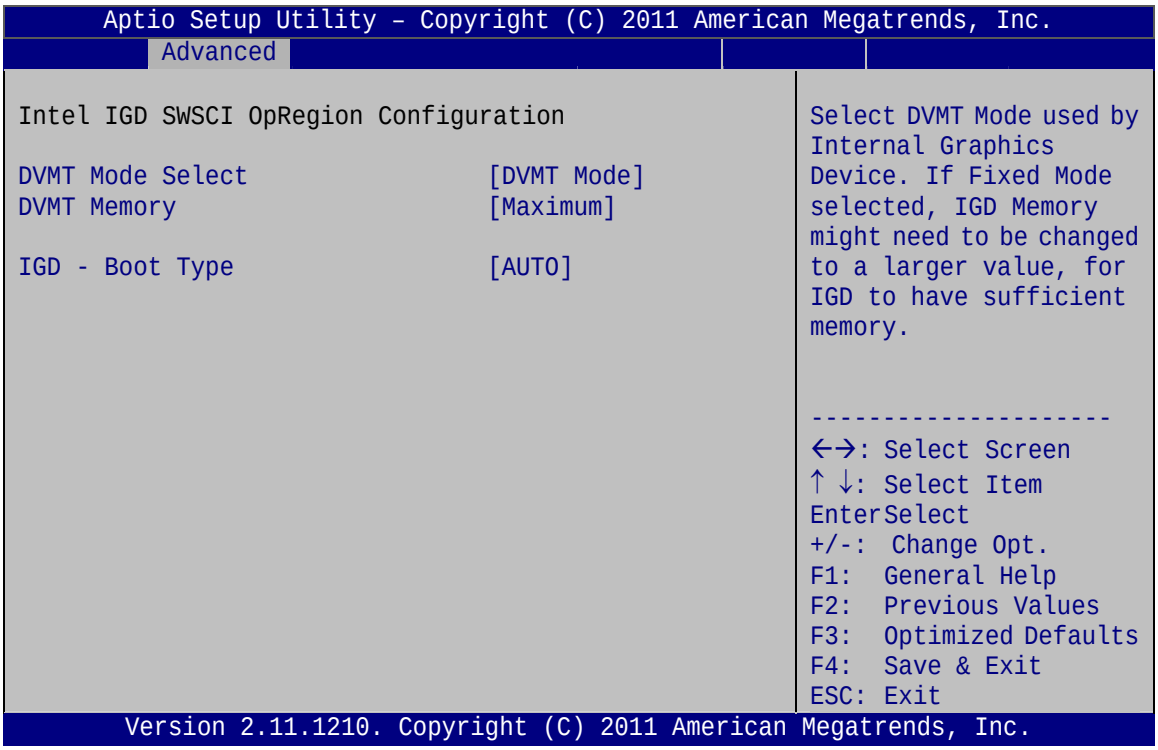
Use the **PCIe x8 Slot** option to enable or disable the PCI Express x8 Slot. This slot supports x1 mode only.

➔ **Disabled** Disables the PCIe x8 Slot

➔ **Enabled** **DEFAULT** Enables the PCIe x8 Slot

5.4.3 Integrated Graphics

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



BIOS Menu 21: Integrated Graphics

➔ **DVMT Mode Select [DVMT Mode]**

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

➔ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.

➔ **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.

➔ **DVMT Memory [Maximum]**

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

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

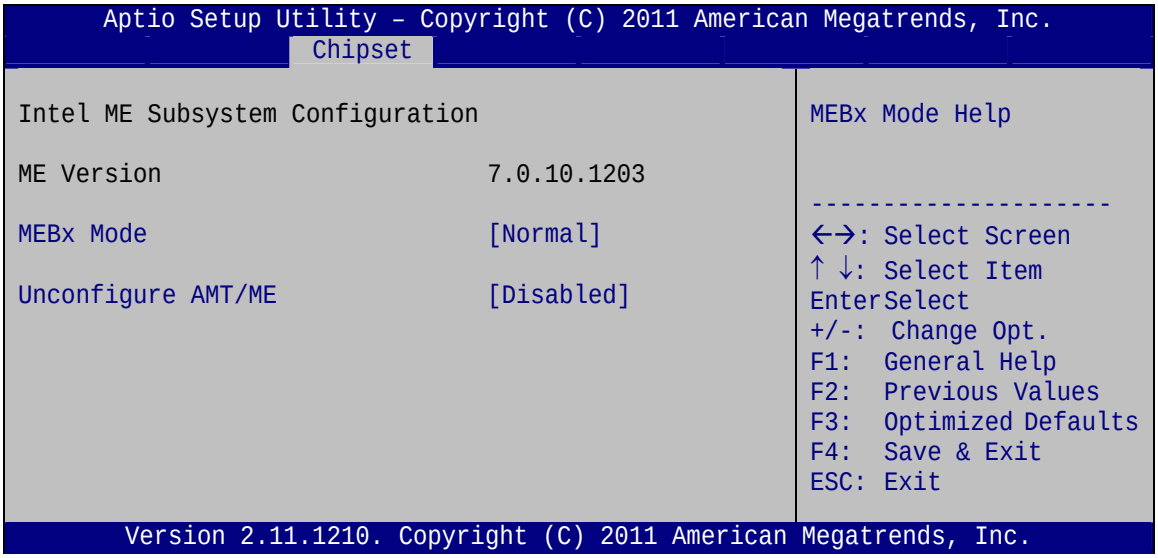
➔ **IGD - Boot Type [AUTO]**

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

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

5.4.4 ME Subsystem

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



BIOS Menu 22: ME Subsystem

➔ **MEBx Mode [Normal]**

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

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

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

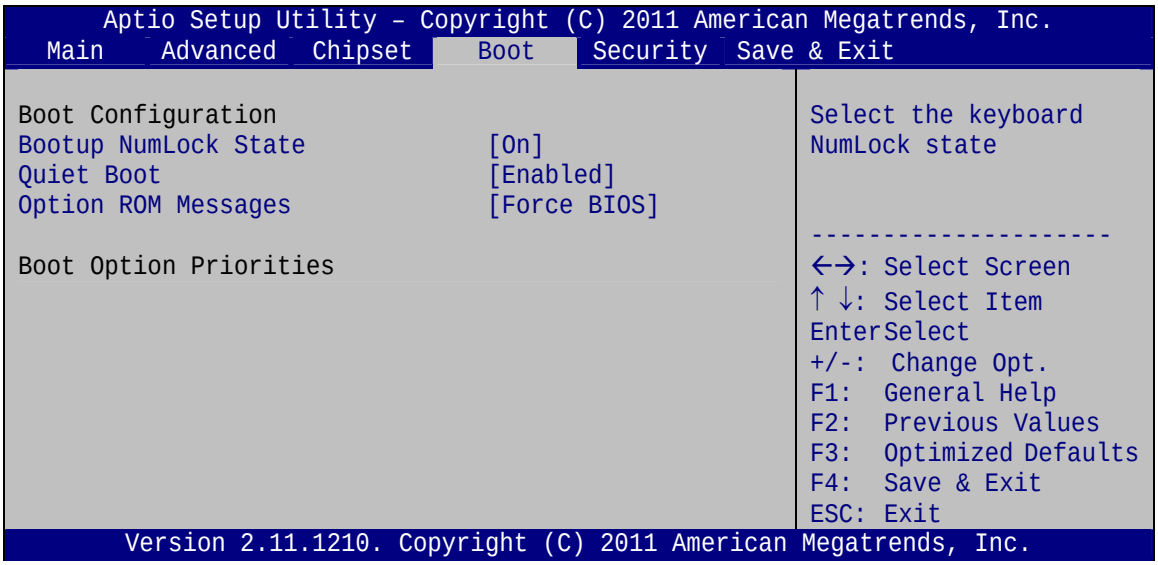
➔ **Unconfigure AMT/ME [Disabled]**

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

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

5.5 Boot

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



BIOS Menu 23: Boot

➔ **Bootup NumLock State [On]**

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

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

➔ **Quiet Boot [Enabled]**

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

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

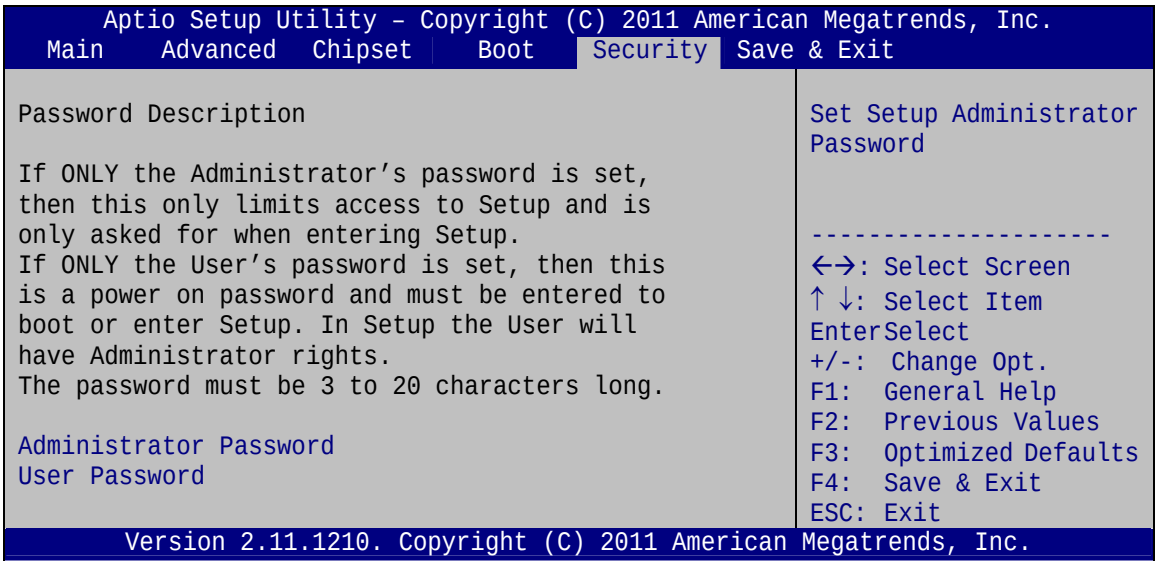
➔ **Option ROM Messages [Force BIOS]**

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

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

5.6 Security

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



BIOS Menu 24: Security

➔ **Administrator Password**

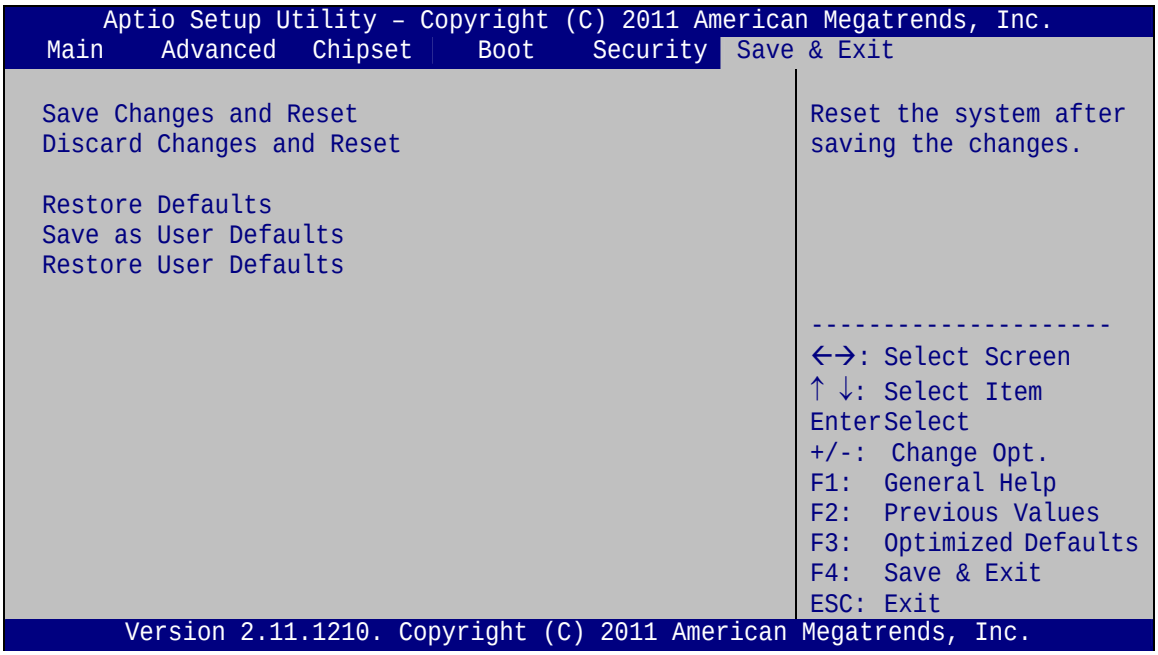
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.7 Save & Exit

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



BIOS Menu 25: Save & Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- Audio
- USB 3.0
- Intel® AMT
  - Intel® Management Engine Components driver
  - Intel® IT Director application

Installation instructions are given below.

6.2 Software Installation

All the drivers for the IMB-Q670 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

NOTE:

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

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

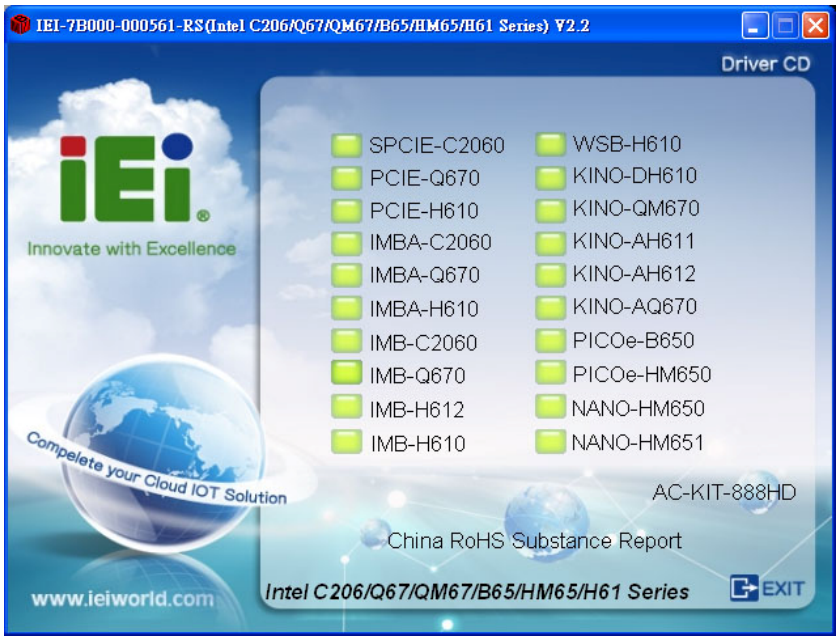


Figure 6-1: Introduction Screen

Step 3: Click IMB-Q670.

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

Figure 6-2: Available Drivers

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

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

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

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

Figure 6-3: Chipset Driver Screen

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

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

Figure 6-4: Chipset Driver Welcome Screen

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

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

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

Figure 6-5: Chipset Driver License Agreement

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

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

Figure 6-6: Chipset Driver Read Me File

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

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

Figure 6-7: Chipset Driver Setup Operations

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

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

Figure 6-8: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

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

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

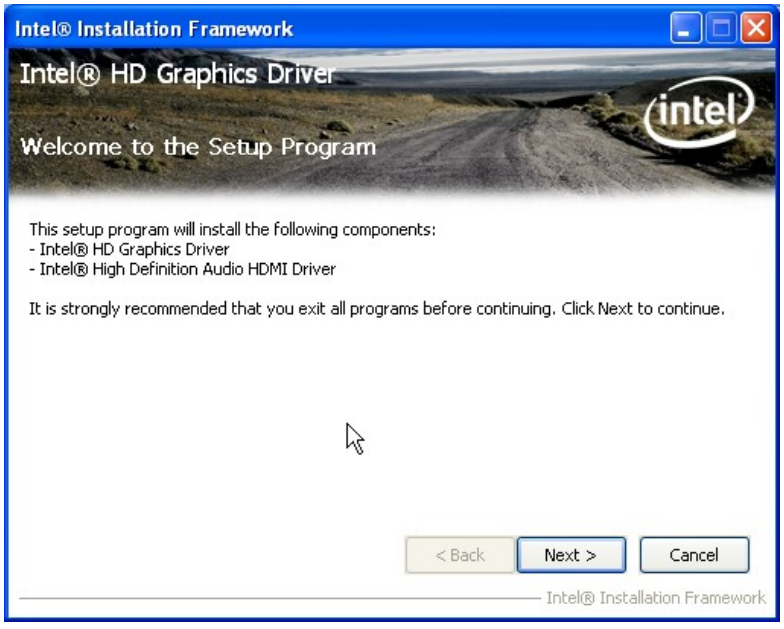


Figure 6-9: Graphics Driver Welcome Screen

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

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

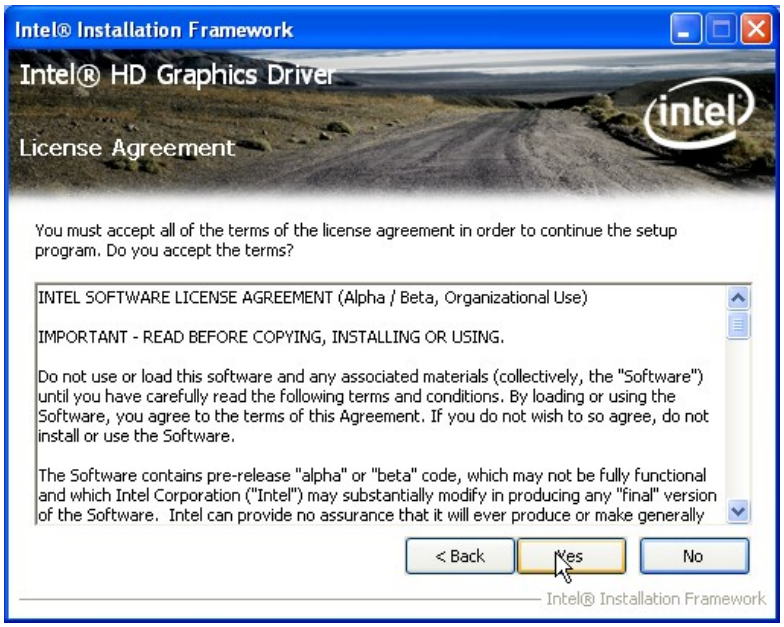


Figure 6-10: Graphics Driver License Agreement

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

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

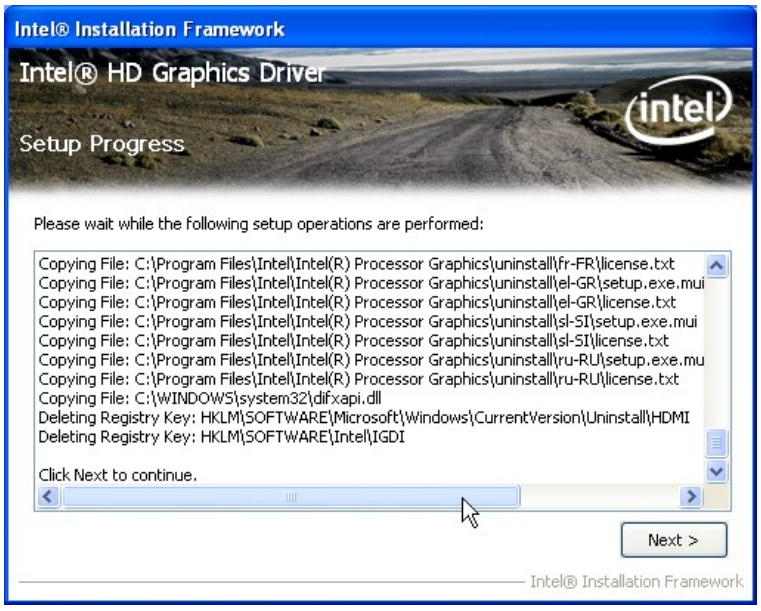


Figure 6-11: Graphics Driver Setup Operations

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

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

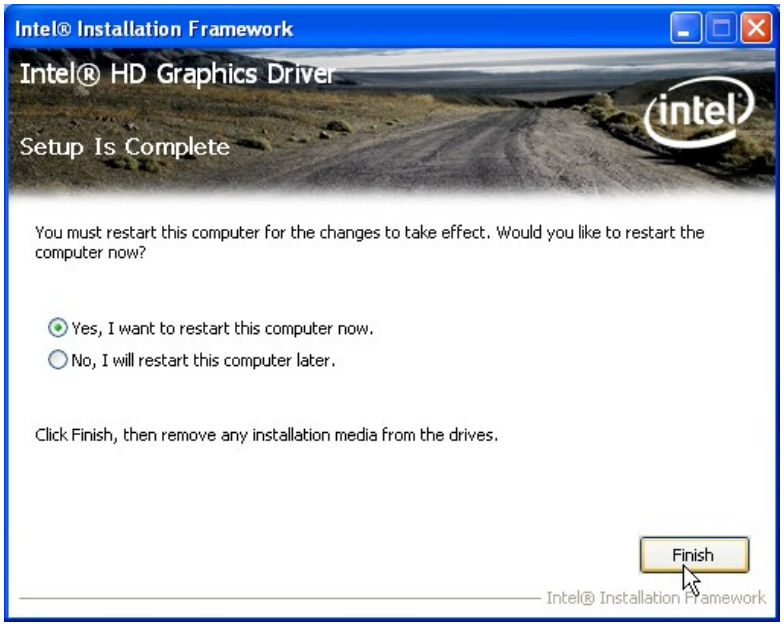


Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

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

Step 2: Click "**LAN**".

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

Step 4: The Intel® Network Connection menu in **Figure 6-13** appears.

Step 5: Click **Install Drivers and Software**.

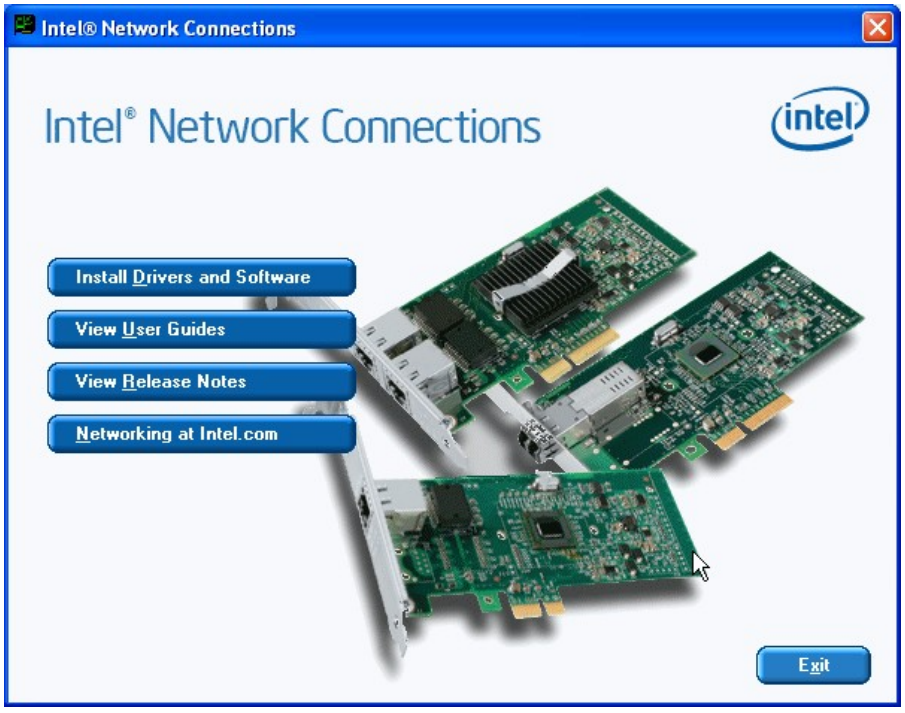


Figure 6-13: Intel® Network Connection Menu

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

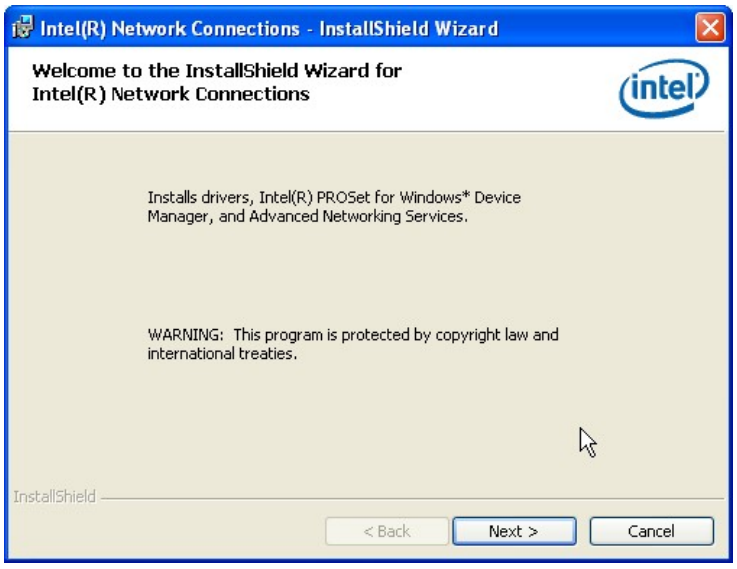


Figure 6-14: LAN Driver Welcome Screen

Step 7: Click **Next** to continue.

Step 8: The **License Agreement** in **Figure 6-15** appears.

Step 9: Accept the agreement by selecting "**I accept the terms in the license agreement**".

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

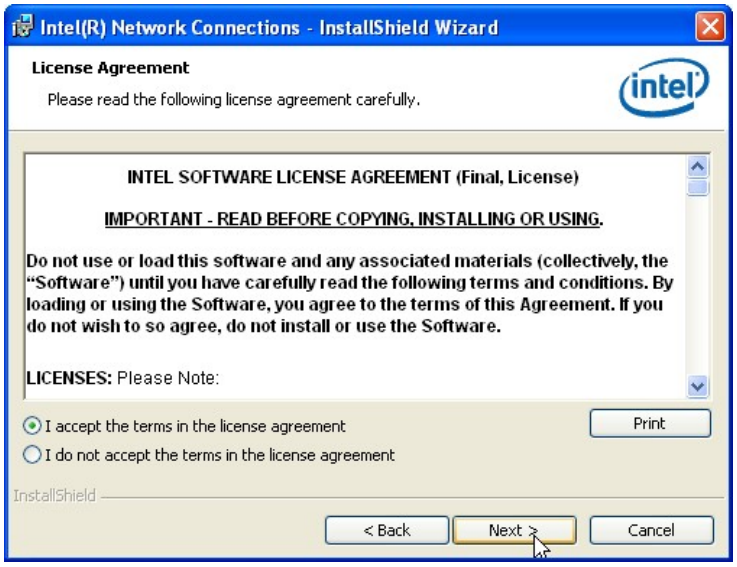


Figure 6-15: LAN Driver License Agreement

Step 11: The **Setup Options** screen in **Figure 6-16** appears.

Step 12: Select program features to install.

Step 13: Click **Next** to continue.

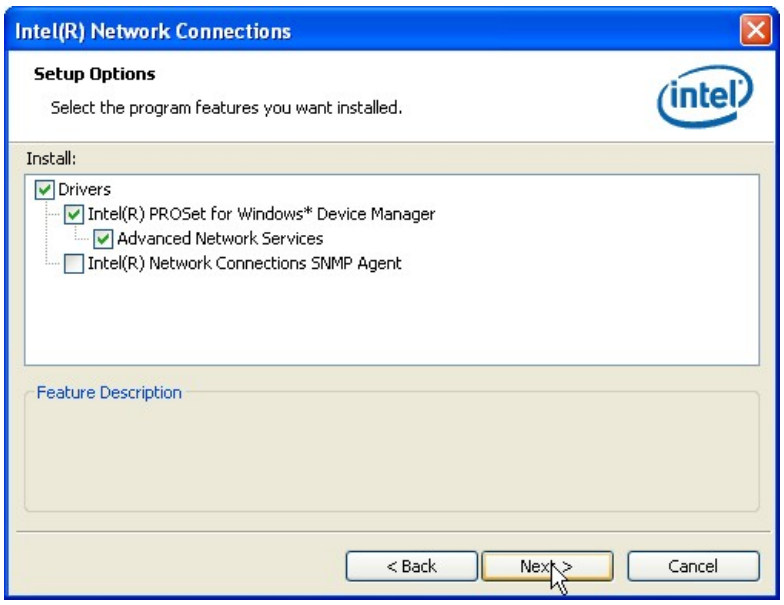


Figure 6-16: LAN Driver Setup Options

Step 14: The **Ready to Install the Program** screen in **Figure 6-17** appears.

Step 15: Click **Install** to proceed with the installation.

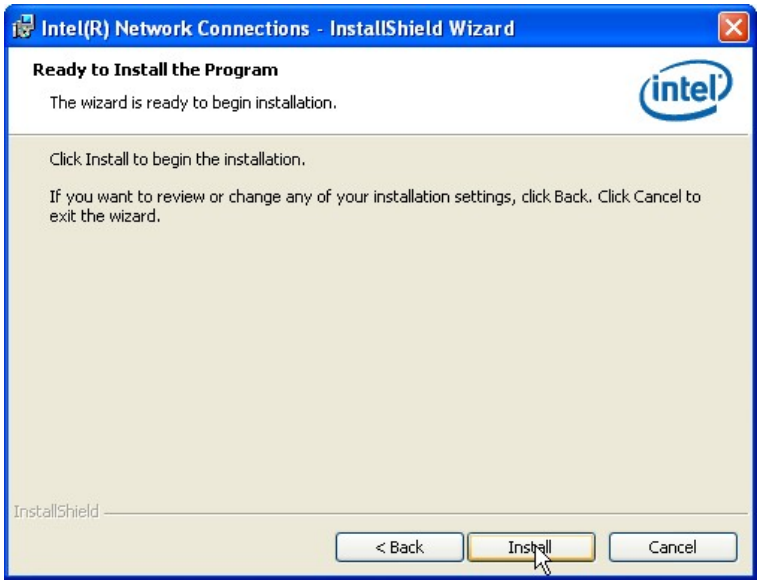


Figure 6-17: LAN Driver Installation

Step 16: The program begins to install.

Step 17: When the driver installation is complete, the screen in **Figure 6-18** appears.

Step 18: Click **Finish** to exit.

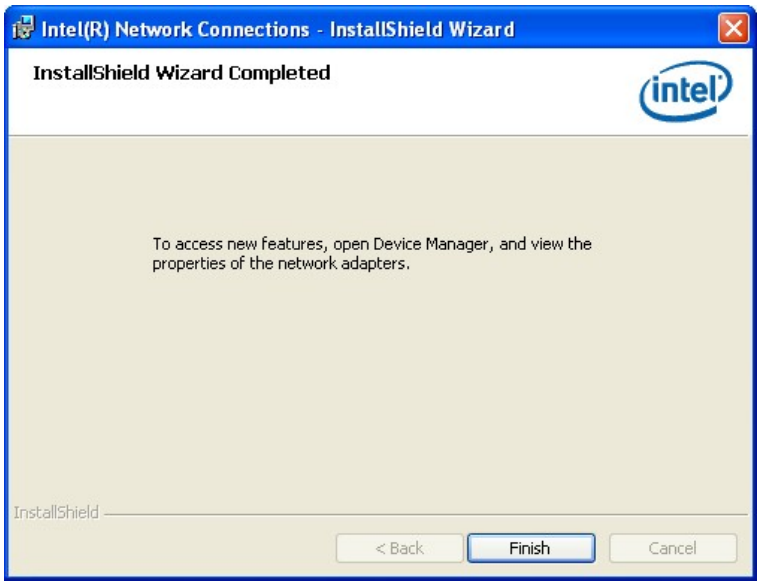


Figure 6-18: LAN Driver Installation Complete

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 starts to extracting files (**Figure 6-19**).

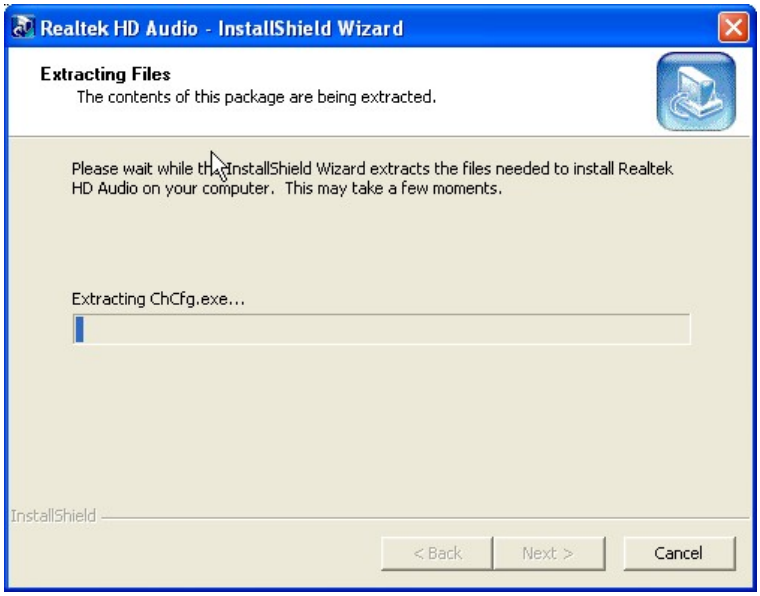


Figure 6-19: Audio Driver – Extracting Files

Step 5: The **Audio Driver Welcome** message in **Figure 6-20** appears.

Step 6: Click **Yes** to install the audio driver.

Figure 6-20: Audio Driver Welcome Screen

Step 7: The audio driver installation begins. See **Figure 6-21**.

Figure 6-21: Audio Driver Installation

Step 8: When the installation is complete, the screen in **Figure 6-22** appears.

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

Figure 6-22: Audio Driver Installation Complete

6.7 USB 3.0 Driver Installation

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: A **Welcome Screen** appears (**Figure 6-23**).

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

Figure 6-23: USB 3.0 Driver Welcome Screen

Step 6: The **License Agreement** shown in **Figure 6-24** appears.

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

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

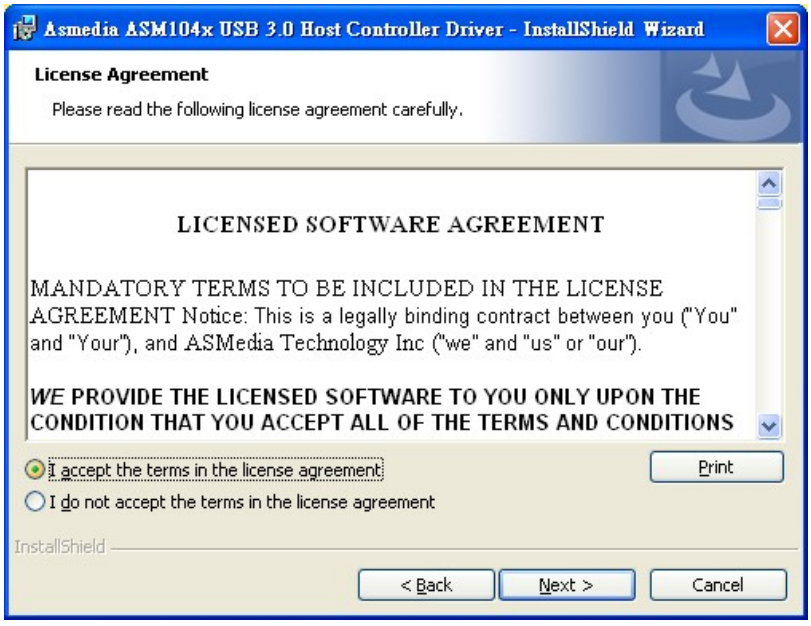


Figure 6-24: USB 3.0 Driver License Agreement

Step 9: The **Install** screen appears and displays the progress of the installation (**Figure 6-25**).

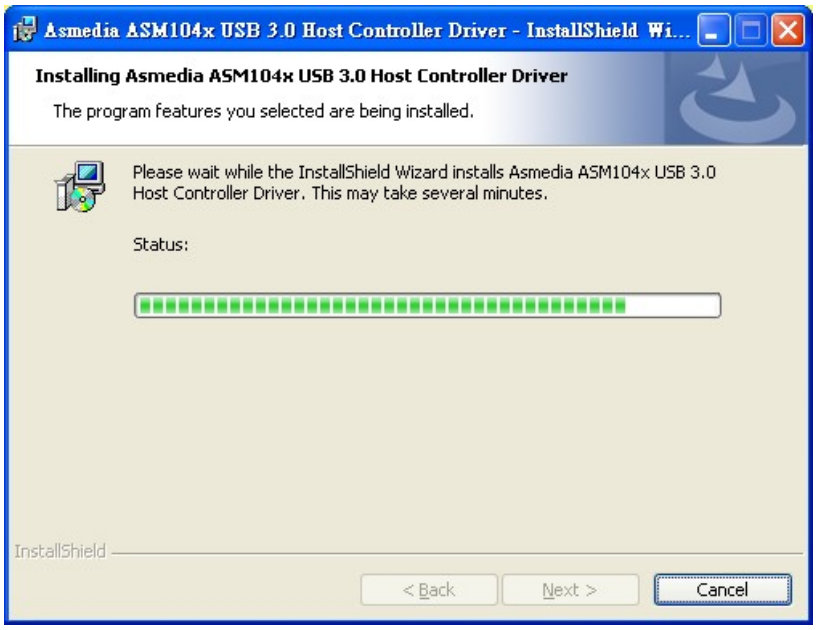


Figure 6-25: USB 3.0 Driver Installation Screen

Step 10: When the installation is complete, click **Finish** to exit setup. (**Figure 6-26)**.

Figure 6-26: USB 3.0 Driver Update Complete

6.8 Intel® AMT Driver and Application

6.8.1 Intel® Management Engine Components Installation

The package of the Intel® ME components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Serial Over LAN (SOL) driver
- Local Manageability Service (LMS)
- User Notification Service (UNS)
- Intel® ME WMI provider
- Intel® Active Management Technology NAC Posture Plug-in
- Intel Control Center
- Intel® Management and Security Status Application

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

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

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

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

Step 4: Locate the setup file and double click it.

Step 5: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-27** appears.

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

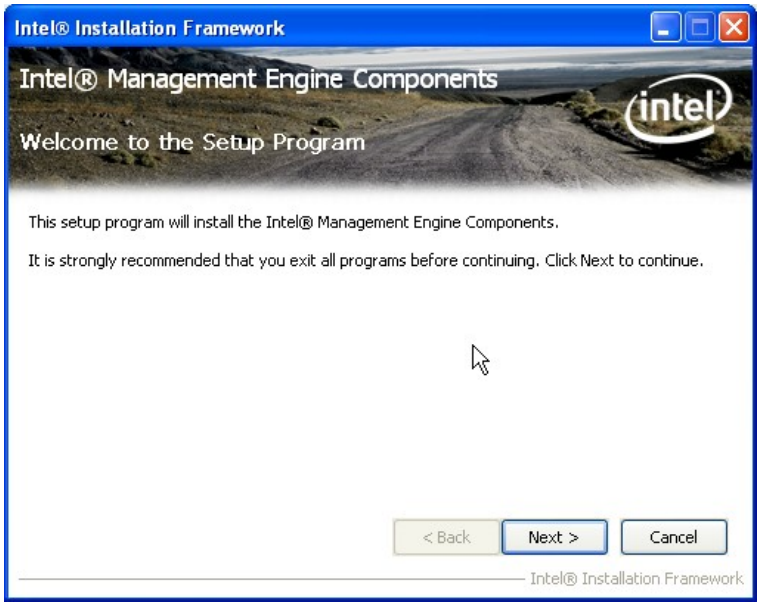


Figure 6-27: Intel® ME Driver Welcome Screen

Step 7: The license agreement in **Figure 6-28** appears.

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

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

Figure 6-28: Intel® ME Driver License Agreement

Step 10: The **Read Me** file in **Figure 6-29** appears.

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

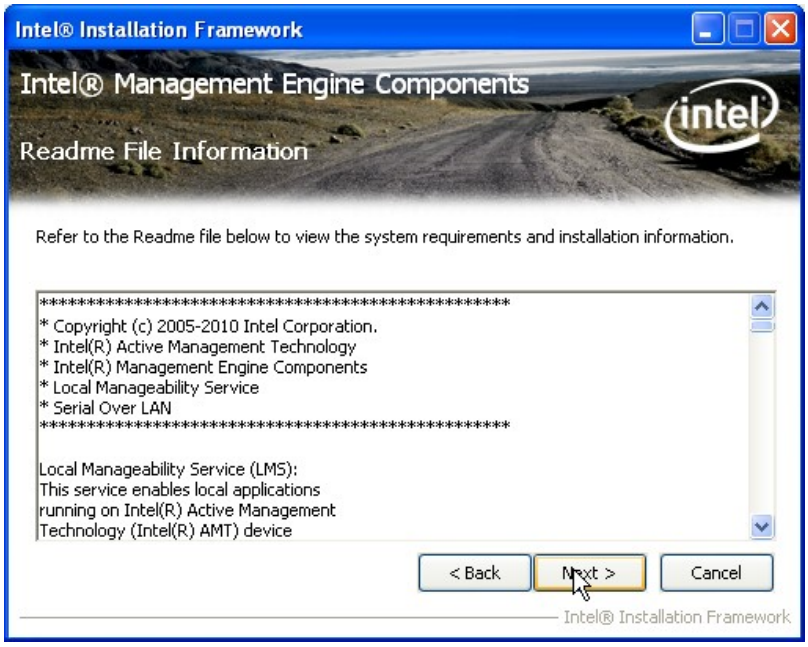


Figure 6-29: Intel® ME Driver Read Me File

Step 12: **Setup Operations** are performed as shown in **Figure 6-30**.

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

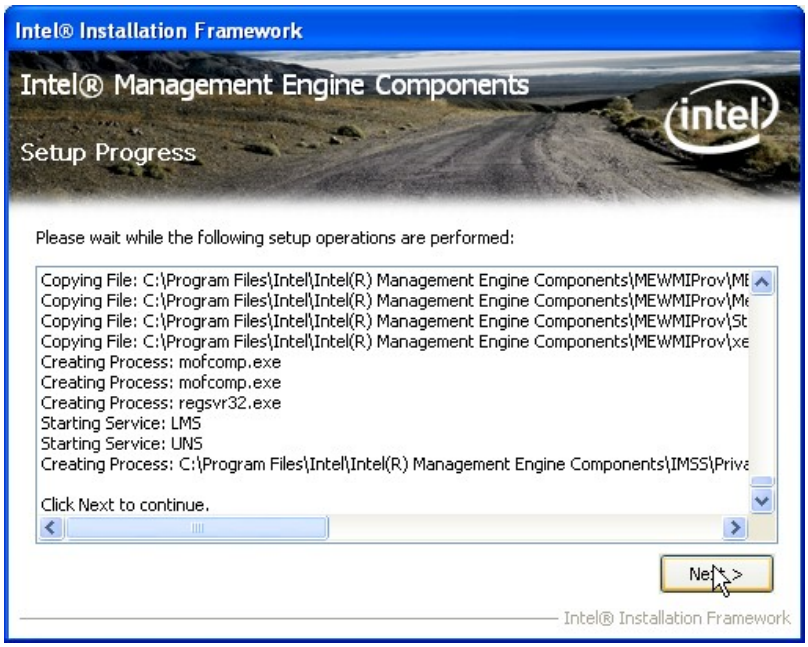


Figure 6-30: Intel® ME Driver Setup Operations

Step 14: The **Finish** screen in **Figure 6-31** appears.

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

Figure 6-31: Intel® ME Driver Installation Finish Screen

6.8.2 Intel® IT Director Application Installation

Intel® IT Director is an application that helps address key IT security, data protection and network health concerns of small businesses. To install the Intel® IT Director application, please do the following.

NOTE:

For Windows XP system, please make sure to install the .net Framework 3.5 before installing the Intel® IT Director application. The .net Framework 3.5 setup file is located at **\7-iAMT, iTPM Driver & Utility\Microsoft .NET Framework 3.5** of the driver CD.

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

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

Step 3: Double click the setup file in the **Intel_ IT Director** folder.

Step 4: Locate the **ITDirector_Setup.exe** setup file and double click it.

Step 5: The **Welcome Screen** in **Figure 6-32** appears.

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

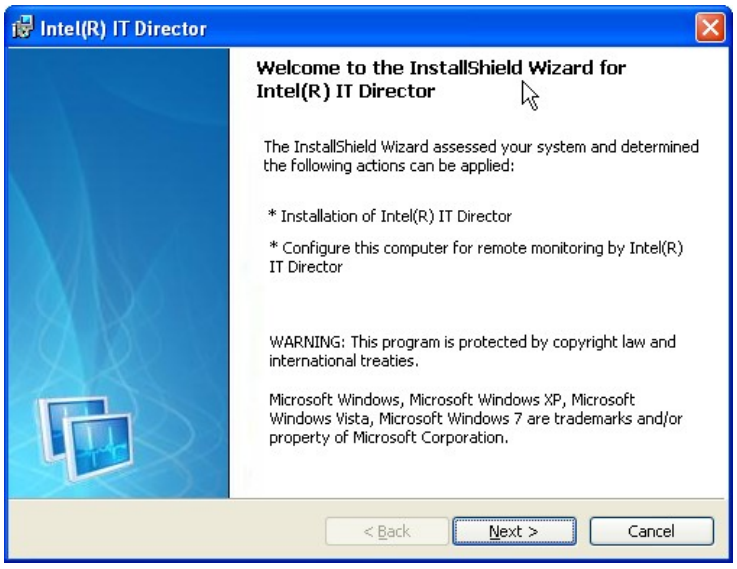


Figure 6-32: IT Director Welcome Screen

Step 7: The license agreement in **Figure 6-33** appears.

Step 8: Accept the agreement by selecting "**I accept the terms in the license agreement**".

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

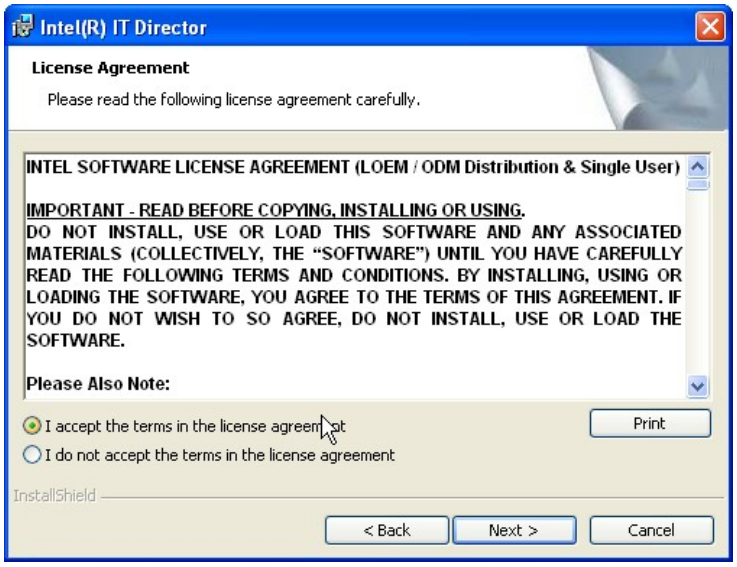


Figure 6-33: IT Director License Agreement

Step 10: Continue to choose the installation type and the destination folder for the IT Director application.

Step 11: The Ready to Install the Program screen in Figure 6-34 appears.

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

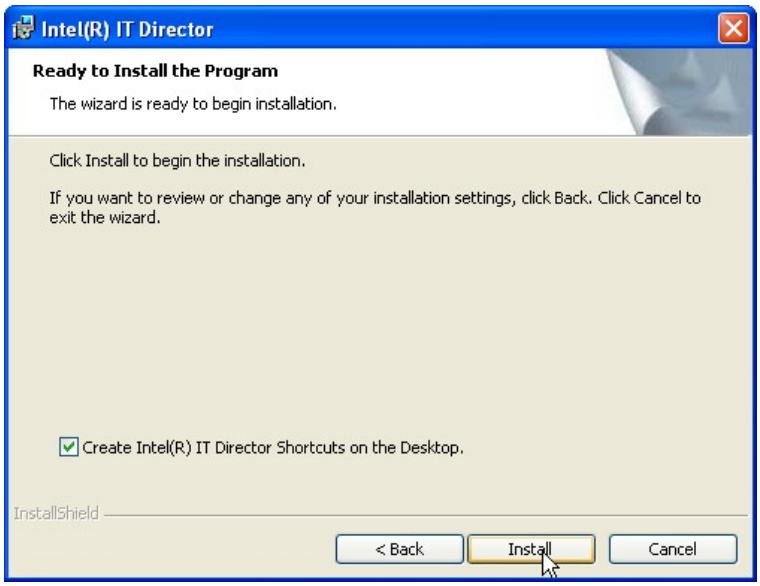


Figure 6-34: IT Director Installation

Step 13: The program begins to install.

Step 14: When the driver installation is complete, the screen in **Figure 6-35** appears.

Step 15: Click **Next** to configure the system for remote monitoring or Cancel to exit the program and configure the system later.

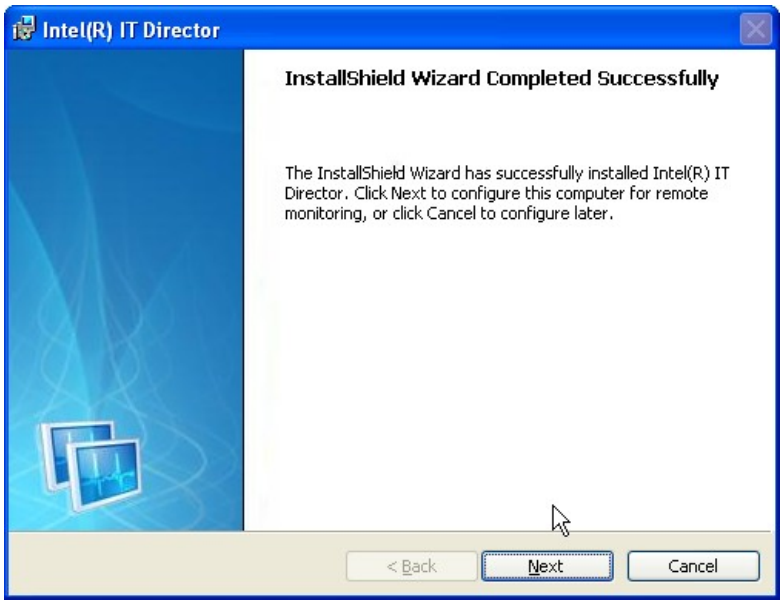


Figure 6-35: IT Director Installation Complete

Step 16: The Welcome Screen of the IT Director Configuration Tool in **Figure 6-36** appears.

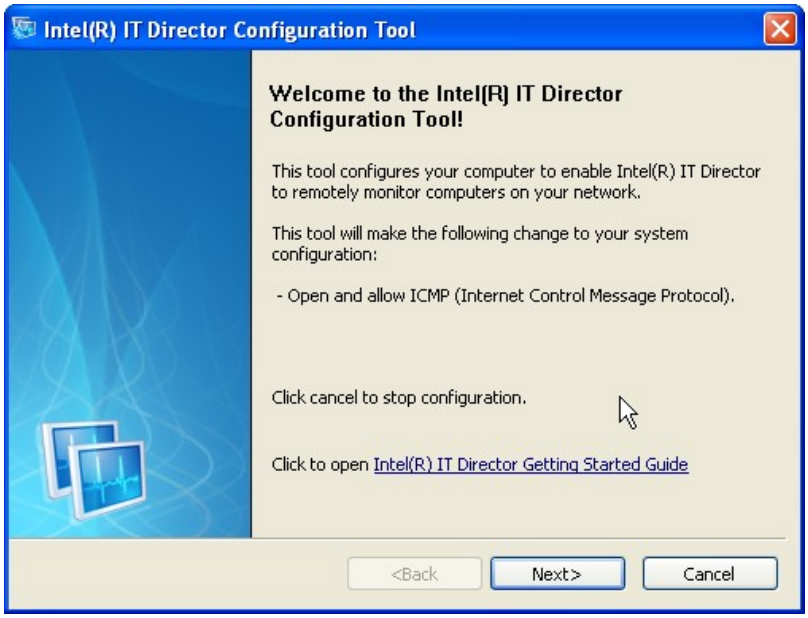


Figure 6-36: IT Director Configuration Tool Welcome Screen

NOTE:

It is recommended to open the Intel® IT Director Getting Started Guide shown in **Figure 6-36** to fully understand the configuration process.

Step 17: Select whether this is the first computer you are creating a password for IT Director. (**Figure 6-37**).

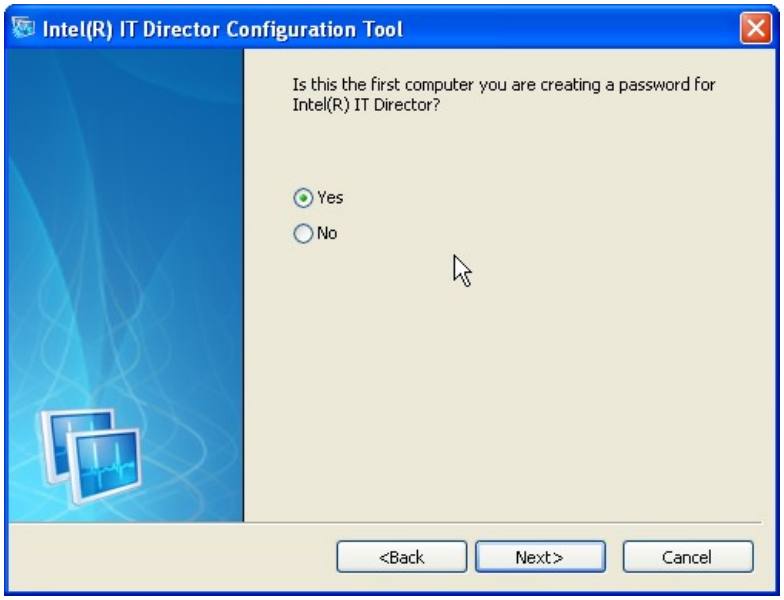


Figure 6-37: IT Director – Creating Password

Step 18: Follow the instructions to create a new password or enter the password created previously.

Step 19: When the configuration is complete, the screen in **Figure 6-38** appears.

Step 20: Click **Finish** to exit.

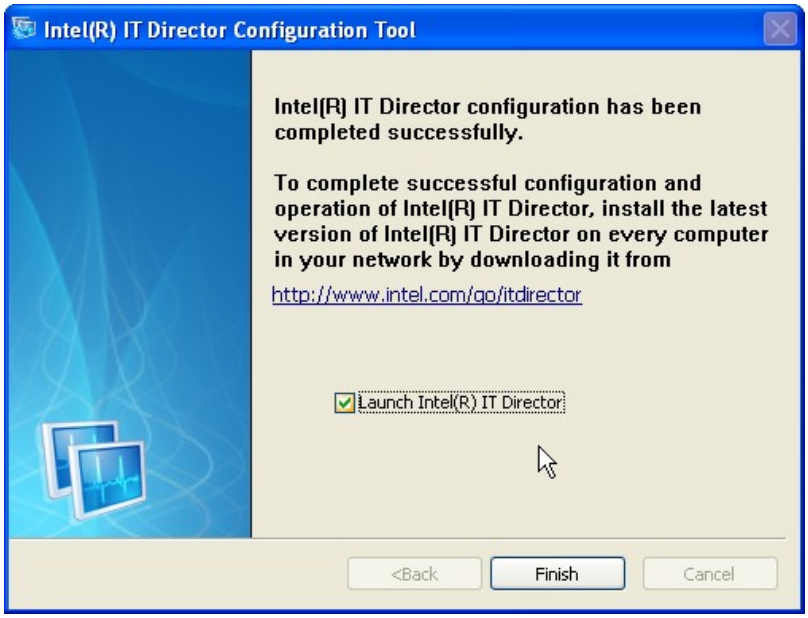


Figure 6-38: IT Director Configuration Complete

NOTE:

If the network connection doesn't work after installing the Intel® IT Director in a Windows Vista system, please install the network adapter driver. The driver is located at **\7-iAMT, iTPM Driver & Utility\AMT Hot Fix\V1.0C0206** of the driver CD. Follow the instruction in the Intel Website Message PDF file in the same folder to install the driver.

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 IMB-Q670 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 12-bit digital inputs and 12-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 NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	D_IN0	4	D_OUT0
5	D_IN1	6	D_OUT1
7	D_IN2	8	D_OUT2
9	D_IN3	10	D_OUT3
11	D_8IN0	12	D_8OUT0
13	D_8IN1	14	D_8OUT1
15	D_8IN2	16	D_8OUT2
17	D_8IN3	18	D_8OUT3
19	D_8IN4	20	D_8OUT4
21	D_8IN5	22	D_8OUT5
23	D_8IN6	24	D_8OUT6
25	D_8IN7	26	D_8OUT7

Table 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

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMB-Q670

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMB-Q670.

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

E.2 Compatible Processors

The following Intel® Socket 1155 processors have been successfully tested on the IMB-Q670

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

Table E-1: Compatible Processors

Appendix

F

Intel® Matrix Storage Manager

F.1 Introduction

The IMB-Q670 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.

F.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.

F.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 and Windows Vista

F.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.

F.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

G

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	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。						