IEI Integration Corp.

MODEL:

IMB-C2060

microATX LGA1155 Motherboard for Intel® Xeon™ E3 and Intel® Core™ i3 CPU, Intel® C206, DDR3, VGA/DVI/HDMI Dual Intel PCIe GbE, Two USB 3.0 ports, Ten COM ports Two SATA 6Gb/s ports, Audio and RoHS

User Manual

Rev. 2.01 –October 2, 2014

RoHS Lead Free

Revision

Date	Version	Changes
October 3, 2014	2.01	Updated Chapter 5 BIOS.
December 9, 2013	2.00	Updated for R20 version.
November, 12 2012	1.04	Modified Appendix E: Intel® Matrix Storage Manager
July 6, 2012	1.03	Modified Table 3-16: RS-422/485 Connector Pinouts
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 25, 2011	1.00	Initial release

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Introduction

1.1 Introduction

Figure 1-1: IMB-C2060

The IMB-C2060 is a microATX motherboard. It accepts a Socket LGA1155 Intel® Xeon™ E3 or Intel® Core™ i3 processor and supports four 240-pin 1333/1066 MHz dual-channel DDR3 DIMM modules up to 32.0 GB maximum. The IMB-C2060 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 x16 slot with x8 signal, two USB 3.0 ports on the rear panel by ASMedia ASM1042, 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-C2060 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-C2060 motherboard features are listed below:

- microATX
- RoHS compliant
- LGA1155 CPU socket
- One PCI card expansion slot
- One PCIe x16 card expansion slot
- One PCIe x16 card expansion slot with x8 signal
- One PCIe x4 card expansion slot
- Multiple PCIe expansion card configurations:

Slot	PCIe x16	PCIe x8	PCIe x4	PCI
Configuration 1	1	N/A	1	1
Configuration 2	N/A	2	1	1
Configuration 3	N/A	1	1	1

- 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
- Two SATA 6Gb/s connectors
- High Definition Audio
- Intel® C206 Chipset

1.4 Connectors

The connectors on the IMB-C2060 are shown in the figure below.

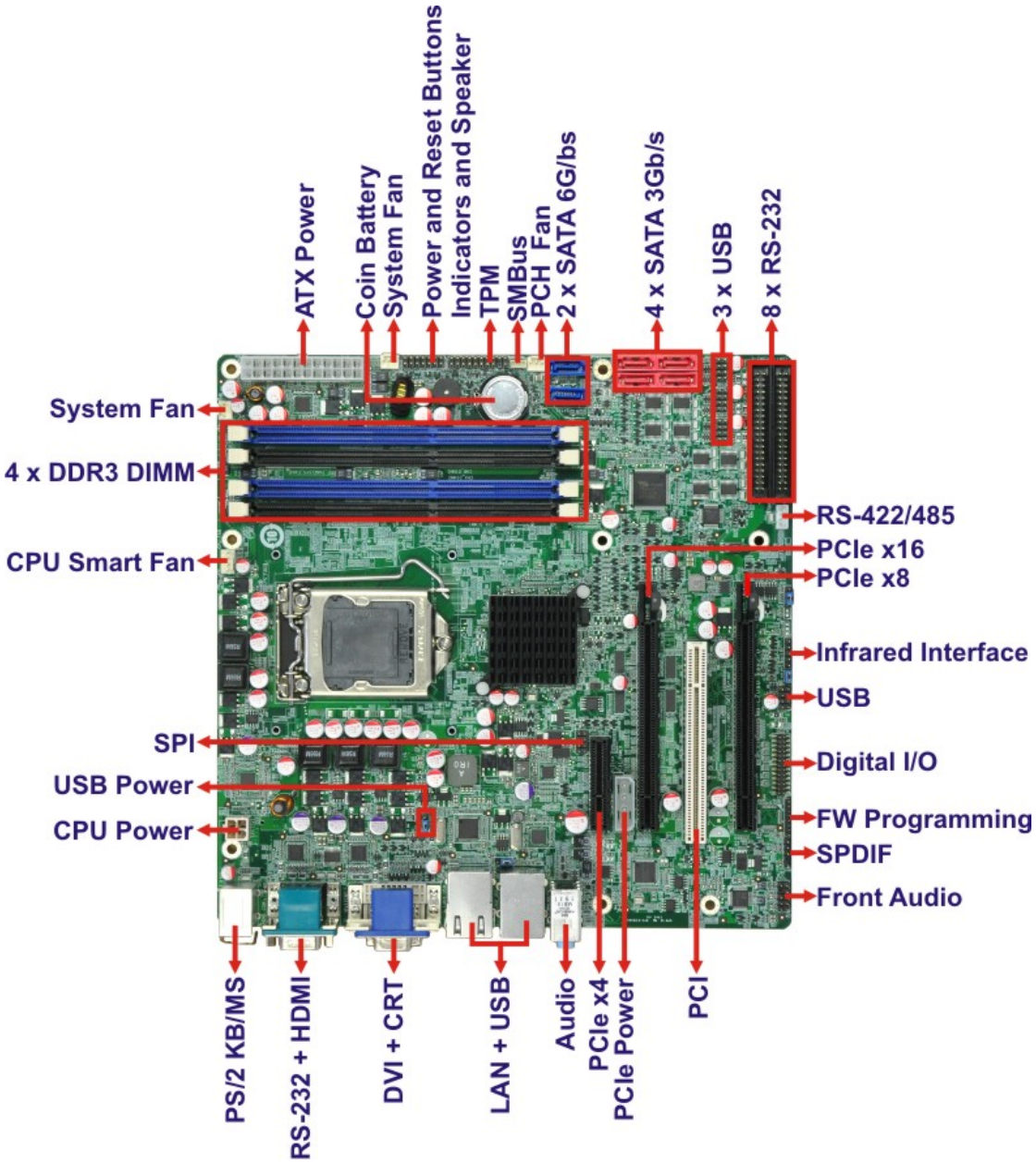


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMB-C2060 are shown in the diagram below.

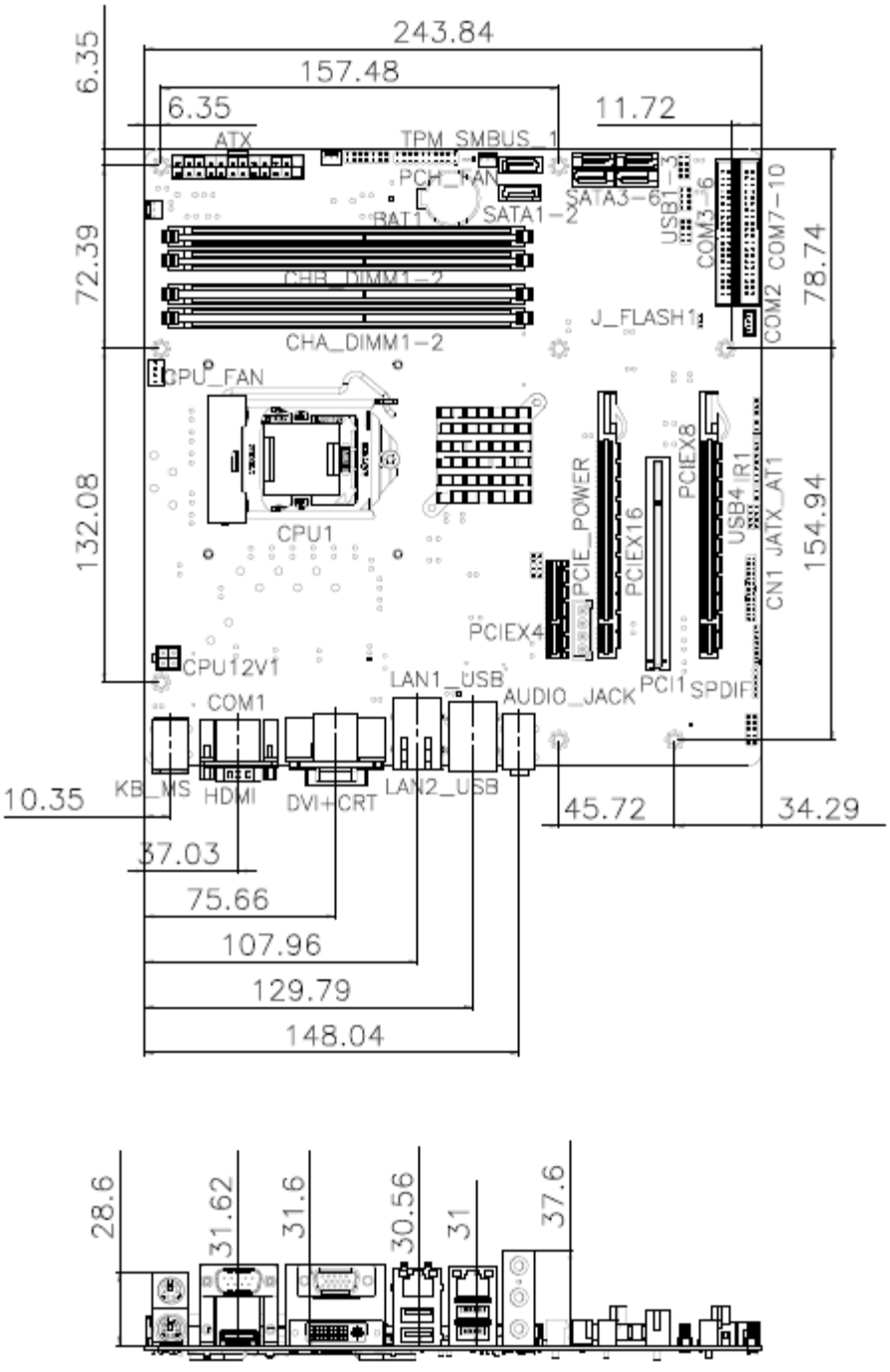


Figure 1-3: IMB-C2060 Dimensions (mm)

1.6 Data Flow

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

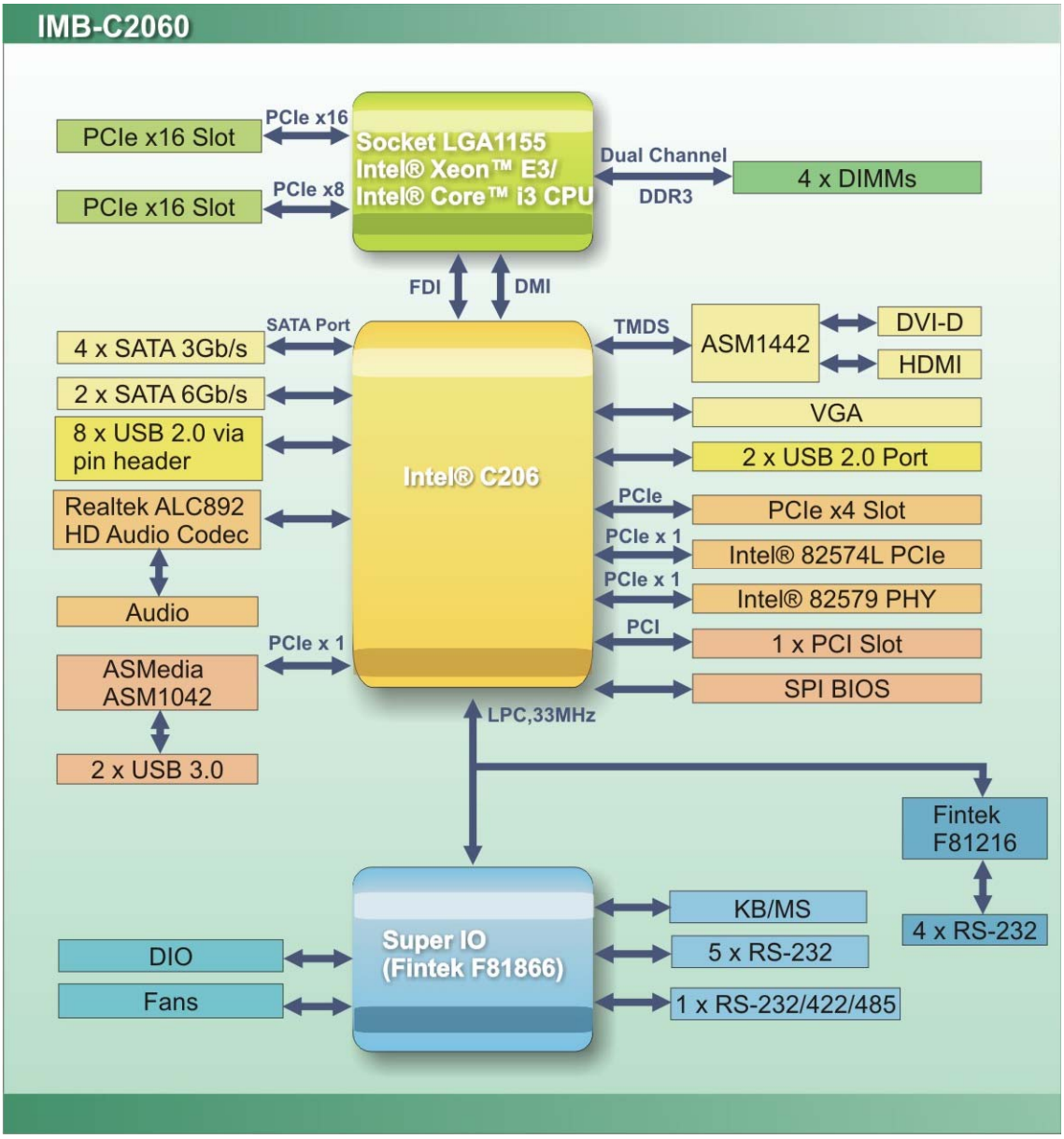


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

IMB-C2060 technical specifications are listed below.

Specification/Model	IMB-C2060
Form Factor	microATX
CPU Supported	LGA1155 Socket Intel® Xeon™ E3 and Intel® Core™ i3
Northbridge Chipset	Intel® C206
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® C206
Audio	Realtek ALC892 HD Audio codec (line-in, line-out, mic-in)
BIOS	UEFI BIOS
Digital I/O	24-bit, 12-bit input/12-bit output
Ethernet Controllers	**LAN1:** Intel® 82574L PCIe Ethernet controller **LAN2**: Intel® 82579 PHY with Intel® AMT 7.0 supported
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 x16 slot (with x8 signal)
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-C2060
Display port	One VGA Integrated in the Intel® C206 One HDMI Integrated in the Intel® C206 One DVI-D Integrated in the Intel® C206
Ethernet	Two RJ-45 ports
Keyboard/Mouse	Dual PS/2 port
TPM	2 x 10-pin header
Serial Ports	One external RS-232 serial port One RS-422/485 via internal wafer connector Eight RS-232 via internal box 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 channels with 3.0 Gb/s data transfer rates Two SATA 6Gb/s channels with 6.0 Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	ATX supported
Power Consumption	3.3V@1.75A, 5V@6.61A , 12V@3.68A, 12V@0.09A, 5VSb@0.12 (2.60GHz Intel® CPU with four 4GB 1333MHz DDR3 DIMMs)
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-C2060 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-C2060 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-C2060 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The IMB-C2060 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMB-C2060	
4	SATA cable (**P/N**: 32801-000703-200-RS)	
1	Quad port RS-232 cable (400/400/400/400mm) (**P/N**: 32205-001203-100-RS)	
1	I/O shielding (**P/N**: 45014-0028C0-01-RS)	
1	Mini jumper pack (2.54mm) (**P/N**:33100-000079-RS)	
1	Utility CD	

Quantity	Item and Part Number	Image
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

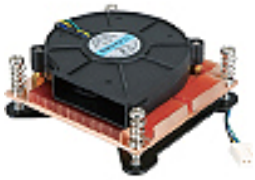
Item and Part Number	Image
Dual-port USB cable with bracket (**P/N**: 19800-003100-300-RS)	
SATA Power Cable (**P/N**: 32102-000100-200-RS)	
LGA1155/LGA1156 Cooler kit (1U Chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 Cooler kit (95W) (**P/N**: CF-1156E-R11)	
RS-422/485 cable, 200mm (**P/N**: 32205-003800-100-RS)	
20-Pin Infineon TPM Module, S/W management tool, firmware V3.17 (**P/N**: TPM-IN01-R11)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 IMB-C2060 Layout

The figures below show all the connectors and jumpers.

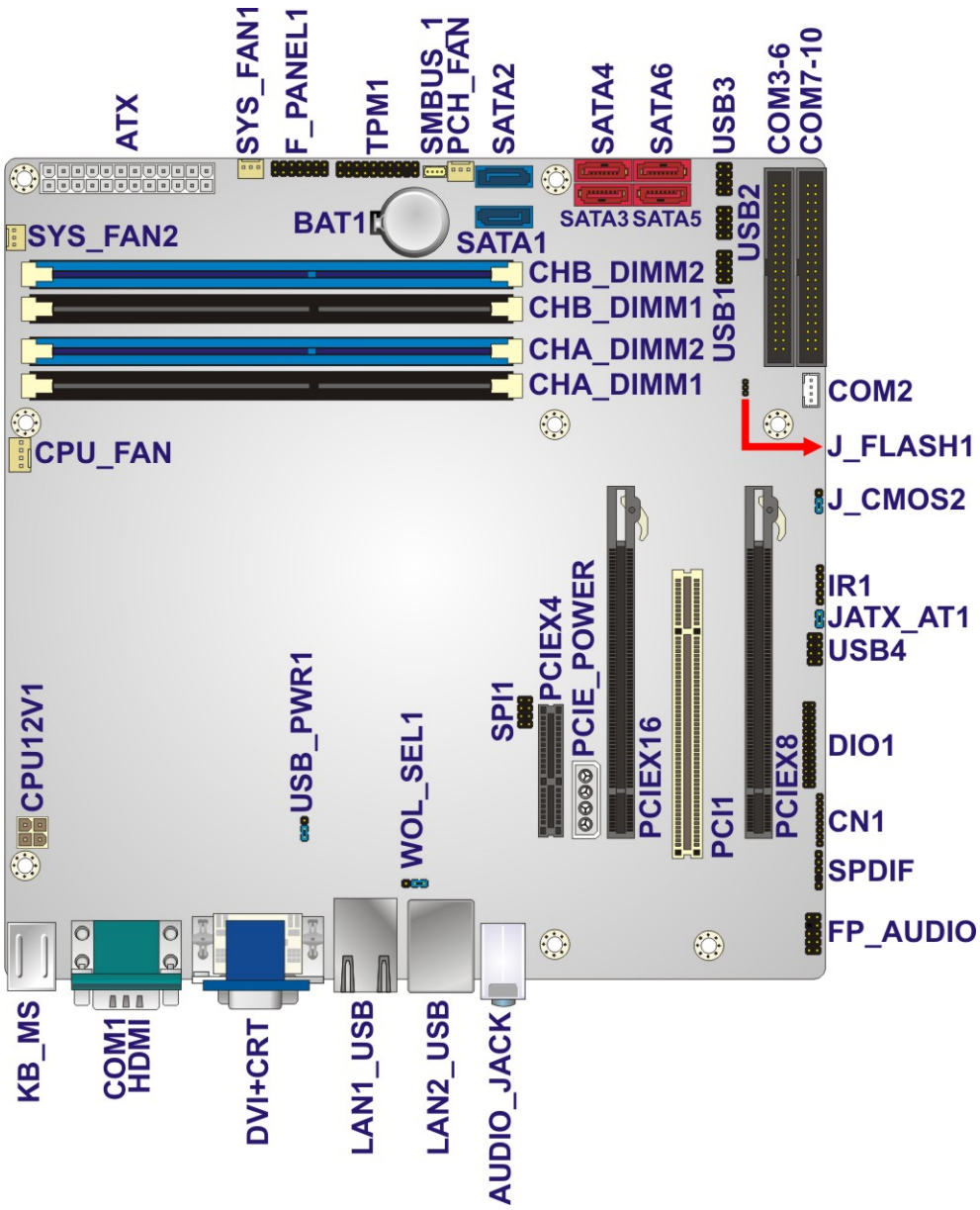


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
ATX Power connector	24-pin ATX	ATX
Battery connector	Battery holder	BAT1
CPU fan	4-pin wafer	CPU_FAN
CPU power	4-pin connector	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 wafer	PCH_FAN1
PCIe power	4-pin connector	PCIE_12V1
SATA 3Gb/s drive connector	16-pin SATA connector	SATA3, SATA 4, SATA5, SATA 6
SATA 6Gb/s drive connector	7-pin SATA connector	SATA1, SATA2
Serial port, RS-422/485	4-pin wafer	COM2
Serial port, RS-232	40-pin box headers	COM3-6, COM7-10
SMBus connector	4-pin wafer	SMBUS_1
SPDIF	5-pin header	SPDIF1
SPI connector	8-pin header	SPI
System fan connectors	3-pin wafer	SYS_FAN1, SYS_FAN2
TPM connector	20-pin header	TPM

Connector	Type	Label
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 ports	RJ-45, USB	LAN1_USB 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-C2060.

3.2.1 ATX Power Connector

CN Label: **ATX**

CN Type: 24-pin ATX

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

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

The ATX power connector connects to an ATX power supply.

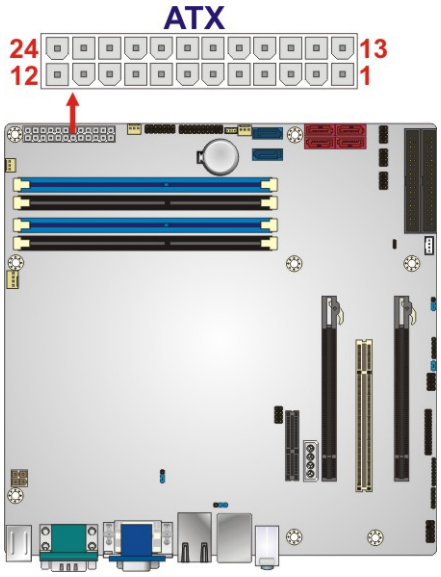


Figure 3-2: ATX Power Connector Location

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

Table 3-3: ATX 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:	Battery holder
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.

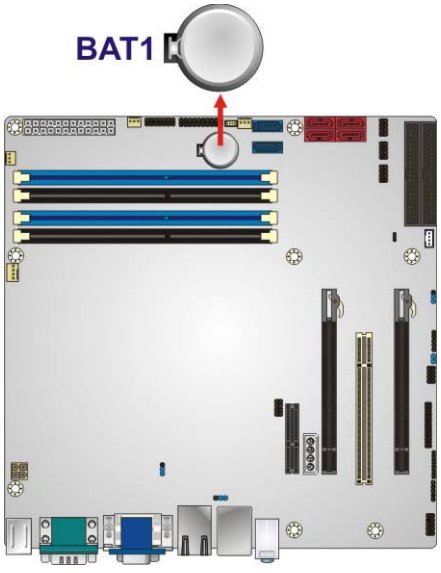


Figure 3-3: Battery Connector Location

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.

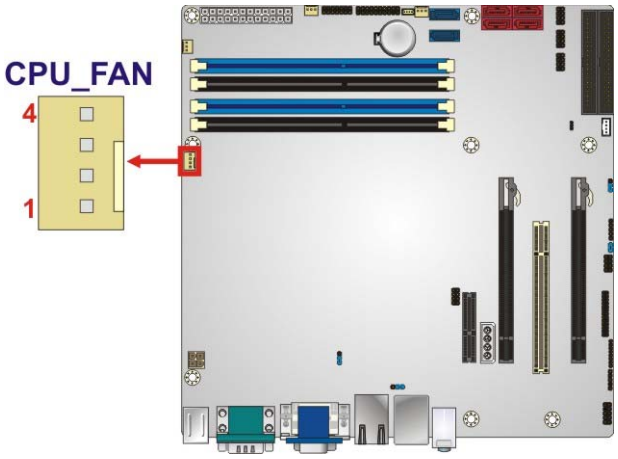


Figure 3-4: CPU Fan Connector Location

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

Table 3-5: CPU Fan Connector Pinouts

3.2.4 CPU Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin connector

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

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

The CPU power input connector provides power to the CPU.

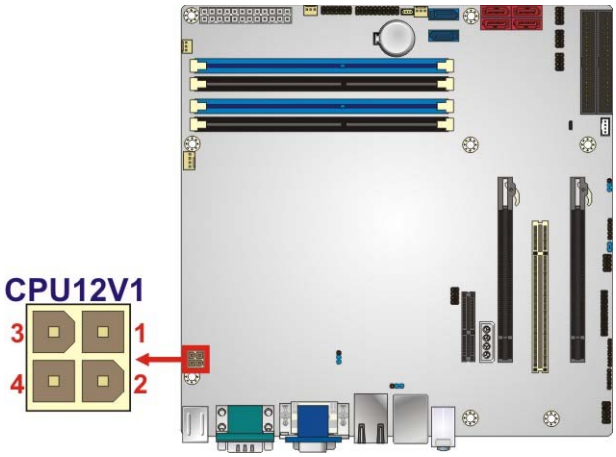


Figure 3-5: CPU Power Connector Location

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

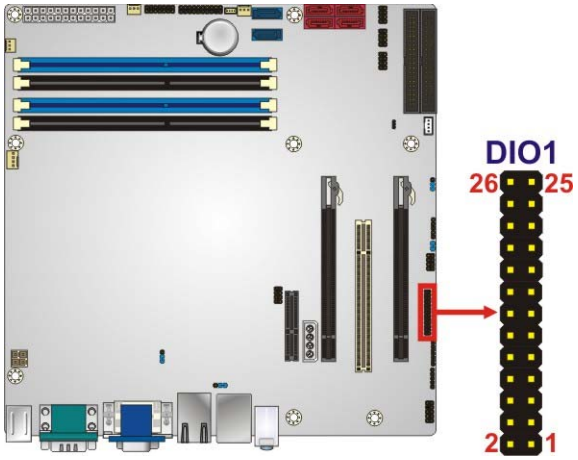


Figure 3-6: Digital I/O Connector Location

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.

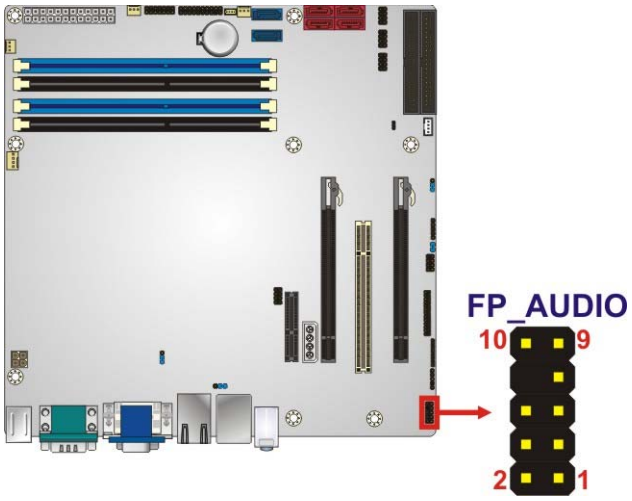


Figure 3-7: Front Panel Audio Connector Location

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

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.

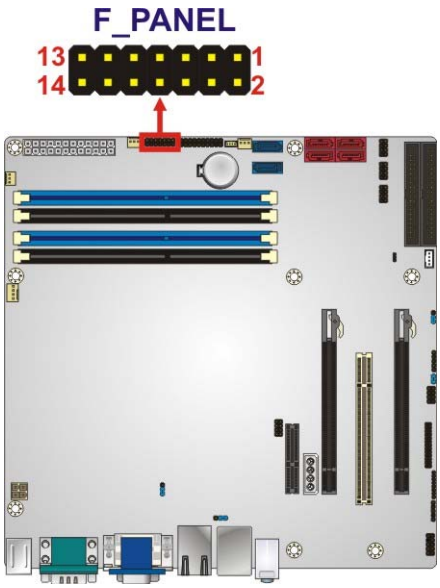


Figure 3-8: Front Panel Connector Location

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.

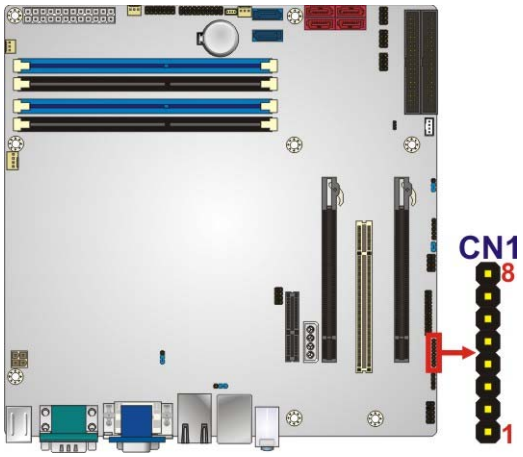


Figure 3-9: FW Programming Connector Location

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

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.

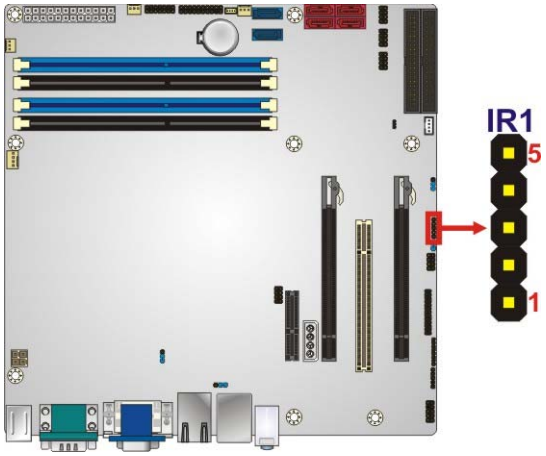


Figure 3-10: Infrared Connector Location

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.

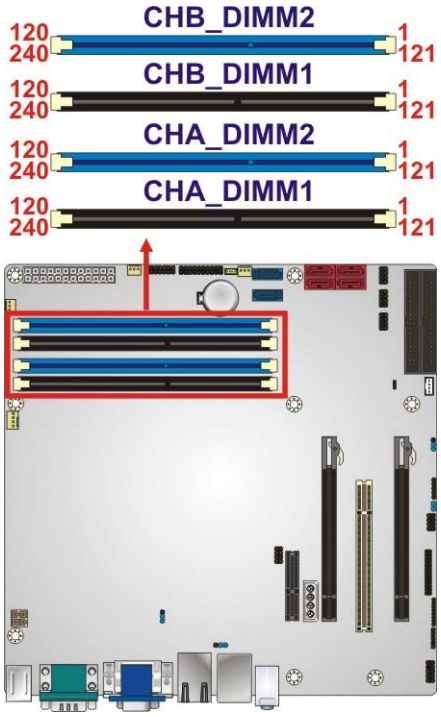


Figure 3-11: Memory Card Slot Location

3.2.11 PCH Fan Connector

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

The PCH fan connector attaches to a PCH cooling fan.

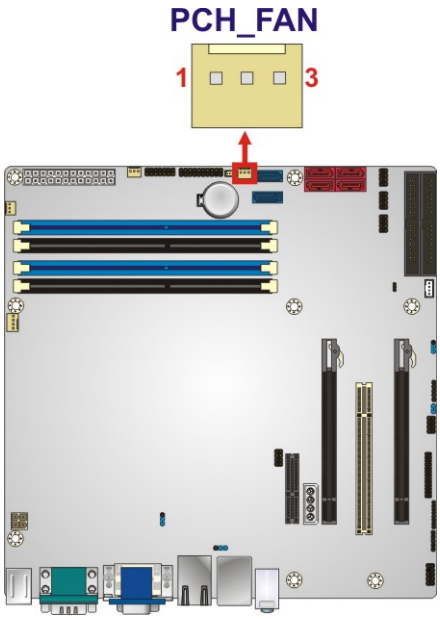


Figure 3-12: PCH Fan Connector Location

Pin	Description
1	FANIN
2	+12V
3	GND

Table 3-12: PCH Fan Connector Pinouts

3.2.12 PCI Express Power

CN Label: **PCIE_POWER**

CN Type: 4-pin connector

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

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

Provides extra power to the PCIe x16 card.

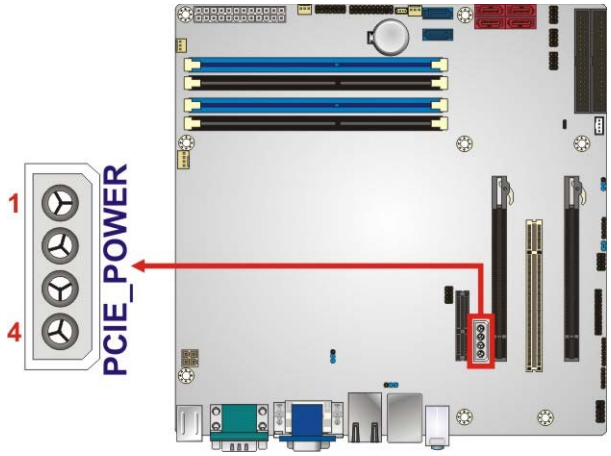


Figure 3-13: PCIe Power Location

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

Table 3-13: PCIe Power Pinouts

3.2.13 SATA 3Gb/s Drive Connectors

CN Label: **SATA3, SATA4, SATA5, SATA6**

CN Type: 7-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.

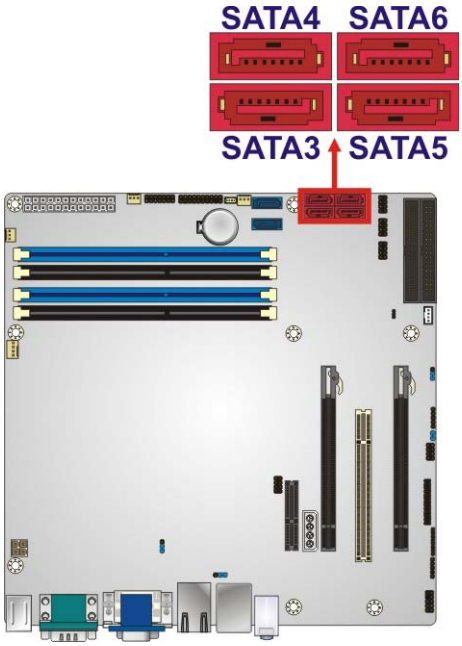


Figure 3-14: SATA 3Gb/s Drive Connector Locations

Pin	Description
1	GND
2	SATATXP
3	SATATXN
4	GND
5	SATARXN
6	SATARXP
7	GND

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

3.2.14 SATA 6Gb/s Drive Connectors

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.

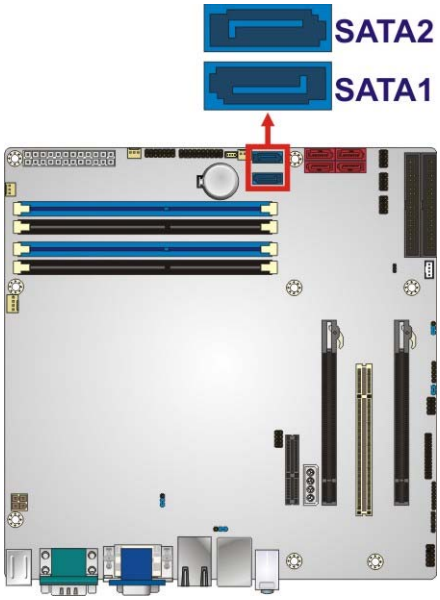


Figure 3-15: SATA 6Gb/s Drive Connector Locations

Pin	Description
1	GND
2	SATATXP
3	SATATXN
4	GND
5	SATARXN
6	SATARXP
7	GND

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

3.2.15 Serial Port Connector, RS-422/485

CN Label: **COM2**

CN Type: 4-pin wafer

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

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

Used for RS-422/485 communications.

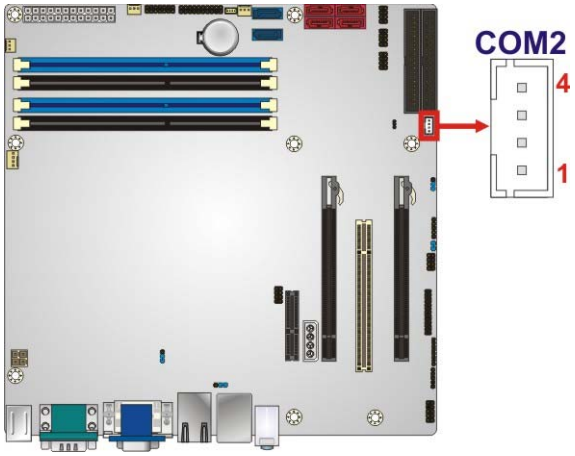


Figure 3-16: RS-422/485 Connector Location

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

Table 3-16: RS-422/485 Connector Pinouts

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

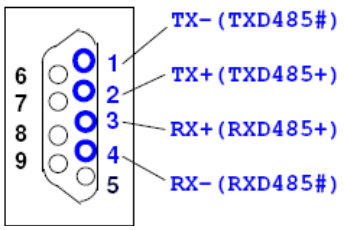
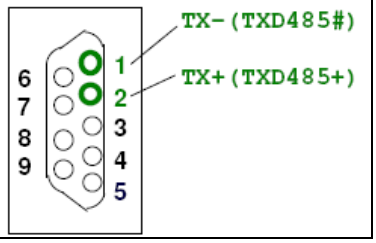
RS-422 Pinouts	RS-485 Pinouts
	

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

3.2.16 Serial Port Connectors, RS-232

CN Label: **COM3-6, COM7-10**

CN Type: 40-pin box header

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

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

Each of these connectors provides RS-232 connections.

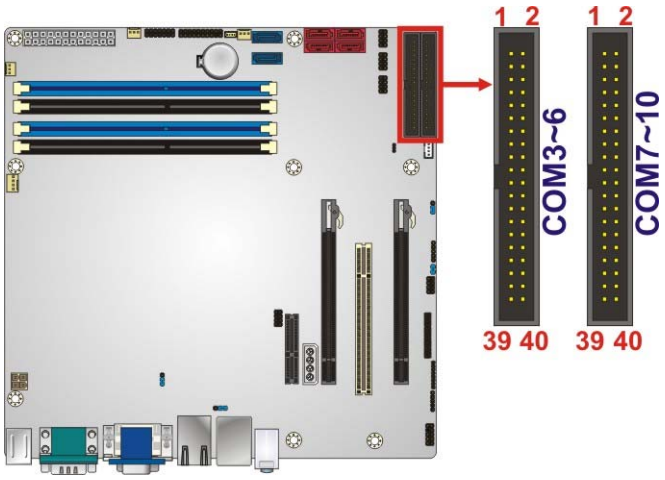


Figure 3-17: Serial Port Connector Locations

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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
33	NRXD6	34	NRTS6#
35	NTXD6	36	NCTS6#
37	NDTR6#	38	NRI6#
39	GND	40	GND

Table 3-18: COM3~6 Serial Port Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD7#	2	NDSR7#
3	NRXD7	4	NRTS7#
5	NTXD7	6	NCTS7#
7	NDTR7#	8	NRI7#
9	GND	10	GND
11	NDCD8#	12	NDSR8#
13	NRXD8	14	NRTS8#
15	NTXD8	16	NCTS8#
17	NDTR8#	18	NRI8#
19	GND	20	GND
21	NDCD9#	22	NDSR9#
23	NRXD9	24	NRTS9#
25	NTXD9	26	NCTS9#
27	NDTR9#	28	NRI9#
29	GND	30	GND
31	NDCD10#	32	NDSR10#
33	NRXD10	34	NRTS10#
35	NTXD10	36	NCTS10#
37	NDTR10#	38	NRI10#
39	GND	40	GND

Table 3-19: COM7~10 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 3-20**

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

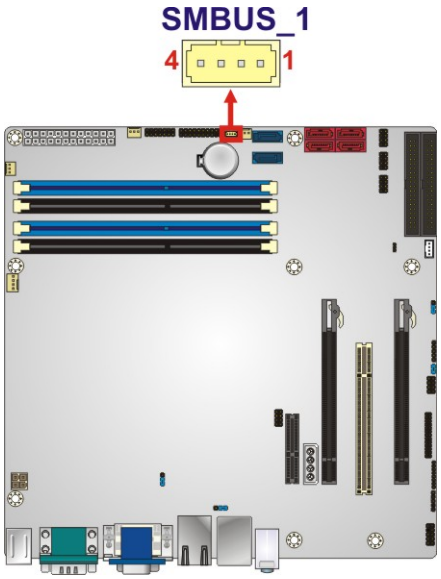


Figure 3-18: SMBus Connector Location

PIN	DESCRIPTION
1	+5V_DUAL
2	SMBCLK
3	SMBDATA
4	GND

Table 3-20: 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 3-21**

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

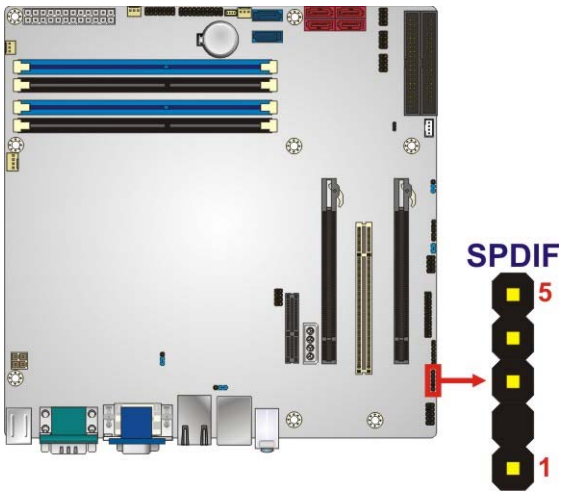


Figure 3-19: SPDIF Connector Location

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

Table 3-21: SPDIF Connector Pinouts

3.2.19 SPI Connector

CN Label: **SPI1**

CN Type: 8-pin header

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

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

The SPI connector is used to flash the BIOS.

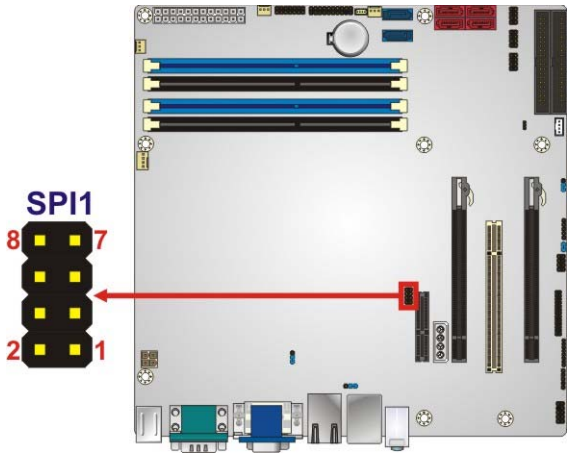


Figure 3-20: SPI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+SPI_VCC	2	GND
3	SPI_CS0#_CN	4	SPI_CLK0_CN
5	SPI_SO0_CN	6	SPI_SI0_CN
7	NC	8	NC

Table 3-22: SPI Connector Pinouts

3.2.20 System Fan Connectors

CN Label: **SYS_FAN1, SYS_FAN2**

CN Type: 3-pin wafer

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

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

The fan connector attaches to a cooling fan.

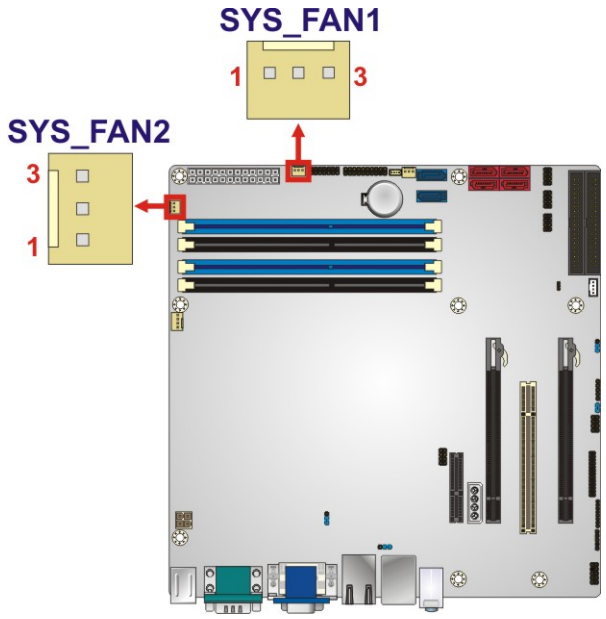


Figure 3-21: System Fan Connector Locations

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

Table 3-23: System Fan Connector Pinouts

3.2.21 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header

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

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

The TPM connector connects to a TPM module.

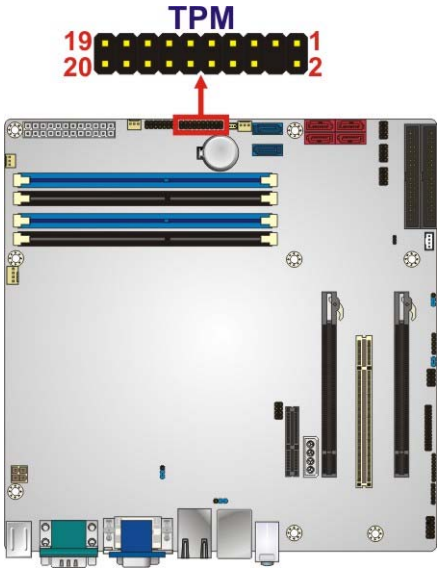


Figure 3-22: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TPMCLK	2	GND
3	LFRAME-	4	NC
5	PCIRST4-	6	+5V
7	LAD3	8	LAD2
9	LAD0	10	LAD1
11	GND	12	GND
13	SMBCLK_MAIN	14	SMBDATA_MAIN
15	+3.3V	16	SERIRQ
17	GND	18	CLKRUN-
19	+3.3V	20	LDRQ0-

Table 3-24: TPM Connector Pinouts

3.2.22 USB Connectors

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

CN Type: 8-pin header

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

CN Pinouts: See **Table 3-25 ~ Table 3-28**

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

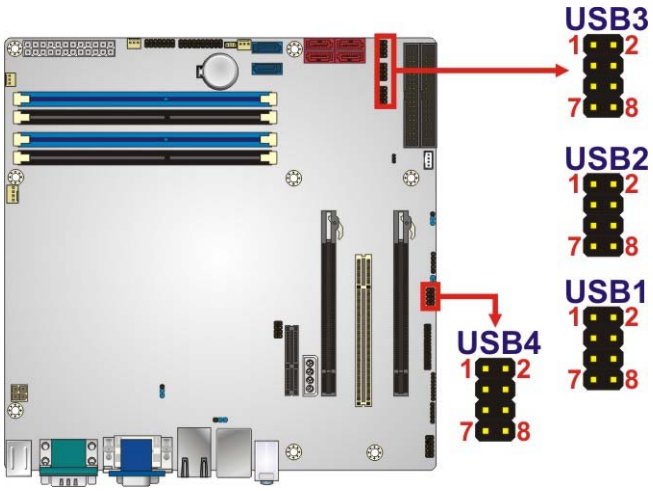


Figure 3-23: USB Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N2	4	USB20_C_P3
5	USB20_C_P2	6	USB20_C_N3
7	GND	8	+5V

Table 3-25: USB1 Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N10	4	USB20_C_P11
5	USB20_C_P10	6	USB20_C_N11
7	GND	8	+5V

Table 3-26: USB2 Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N12	4	USB20_C_P13
5	USB20_C_P12	6	USB20_C_N13

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
7	GND	8	+5V

Table 3-27: USB3 Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N8	4	USB20_C_P9
5	USB20_C_P8	6	USB20_C_N9
7	GND	8	+5V

Table 3-28: USB4 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:

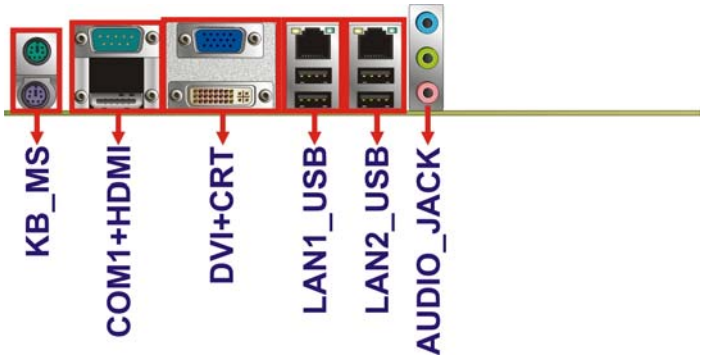


Figure 3-24: External Peripheral Interface Connector

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.

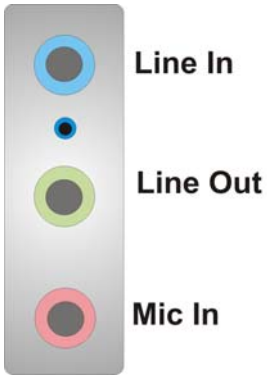


Figure 3-25: Audio Connector

3.3.2 Keyboard/Mouse Connector

CN Label: **KBMS**

CN Type: Dual PS/2

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

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

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

PIN	DESCRIPTION	PIN	DESCRIPTION
1	KB_DATA	8	NC
2	NC	9	GND
3	GND	10	KBPWR
4	KBPWR	11	MS_CLK
5	KB_CLK	12	NC

PIN	DESCRIPTION	PIN	DESCRIPTION
6	NC	13	KB_GND
7	MS_DATA	14	KB_GND

Table 3-29: 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 3-30** and **Table 3-31**

The LAN connector connects to a local network.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	1.9V_LAN1/ 1.05V_LAN2	2	TRD1/2P0
3	TRD1/2N0	4	TRD1/2P1
5	TRD1/2N1	6	TRD1/2P2
7	TRD1/2N2	8	TRD1/2P3
9	TRD1/2N3	10	GND
11	L1/2_LINK_100#	12	L1/2_LINK_1000#
13	L1/2_LINK_ACT#	14	3.3V_LAN/LAN1

Table 3-30: LAN Pinouts

The USB connector can be connected to a USB device.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	USBPWR1/2	2	USBDATA0/8-
3	USBDATA0/8+	4	GND
5	USBPWR1/2	6	USBDATA1/9-
7	USBDATA1/9+	8	GND

Table 3-31: 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 3-32**

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
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 3-32: 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 3-33**

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 3-33: Serial Port Connector Pinouts

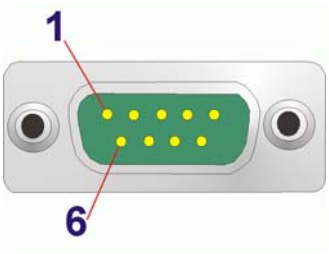


Figure 3-26: Serial Port Connector Pinouts

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 3-34** and **Table 3-35**

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

PIN	DESCRIPTION	PIN	DESCRIPTION
15	CRT_DDC_CLK		

Table 3-34: VGA Connector Pinouts

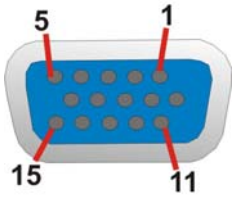


Figure 3-27: VGA Connector

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
11	GND	12	NC
13	NV	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 3-35: DVI Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMB-C2060 may result in permanent damage to the IMB-C2060 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMB-C2060. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMB-C2060 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-C2060, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMB-C2060.
- ***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-C2060 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-C2060 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-C2060 off:
  - When working with the IMB-C2060, 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-C2060 **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**.

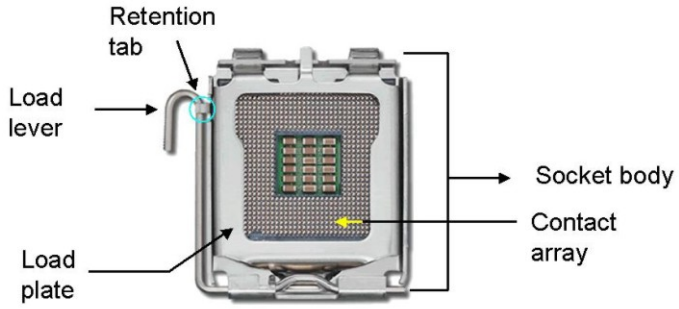


Figure 4-1: Intel LGA1155 Socket

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**.

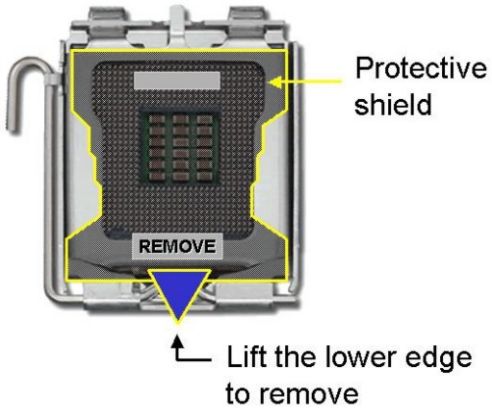


Figure 4-2: Remove Protective Cover

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**.

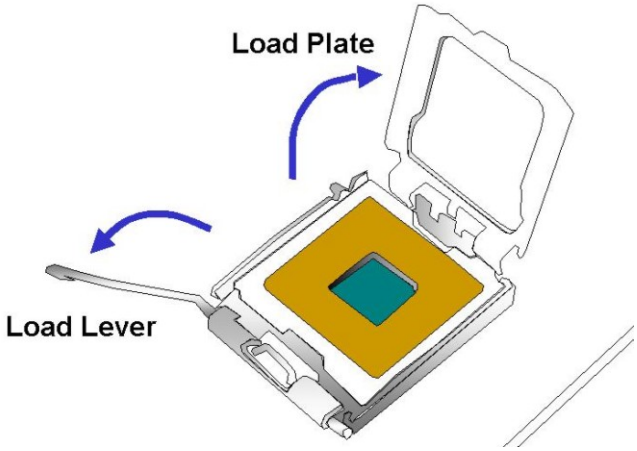


Figure 4-3: CPU Socket Load Plate

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**.

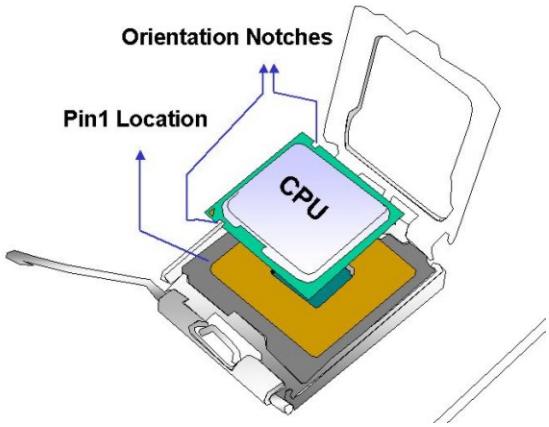


Figure 4-4: Insert the Socket LGA1155 CPU

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.

Figure 4-5: Cooling Kits (CF-1156A-RS and CF-1156E-RS)

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

WARNING:

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

To install the cooling kit, follow the instructions below.

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

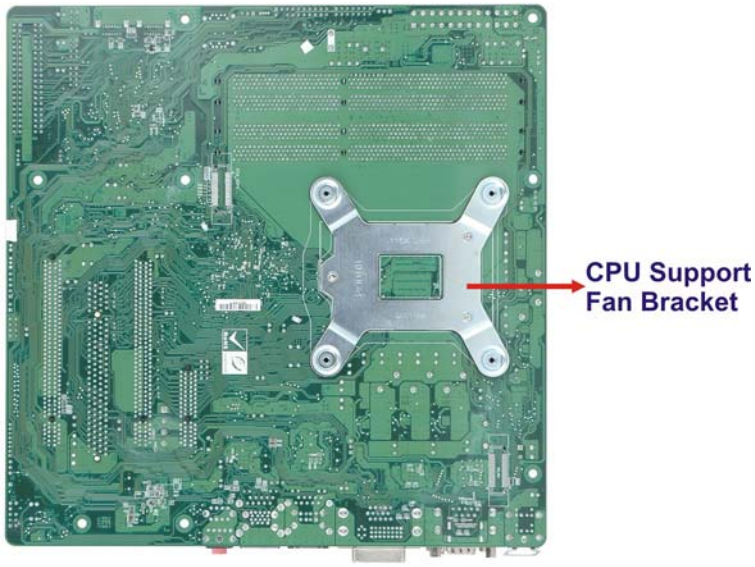


Figure 4-6: Cooling Kit Support Bracket

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

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

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

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMB-C2060. Carefully route the cable and avoid heat generating chips and fan blades.

4.2.3 DIMM Installation

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

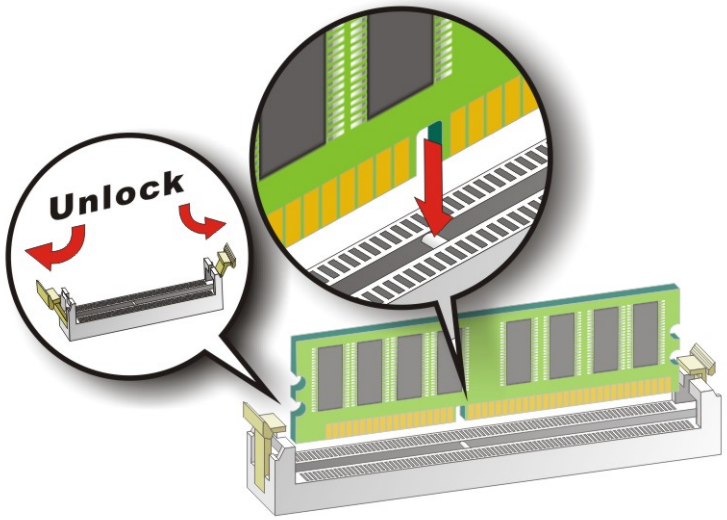


Figure 4-7: DIMM Installation

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

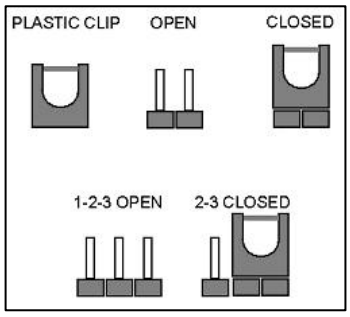
Step 2: **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-7**.

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

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

4.3 Jumper Settings

NOTE:



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

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

Description	Label	Type
AT/ATX mode select jumper	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

Jumper Label: **JATX_AT1**

Jumper Type: 2-pin header

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

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

The AT 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

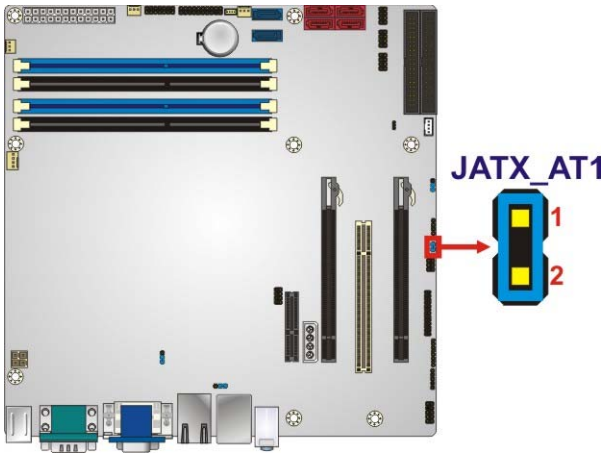


Figure 4-8: AT/ATX Power Mode Jumper Location

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 4-9**

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

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

Table 4-3: Clear BIOS Jumper Settings

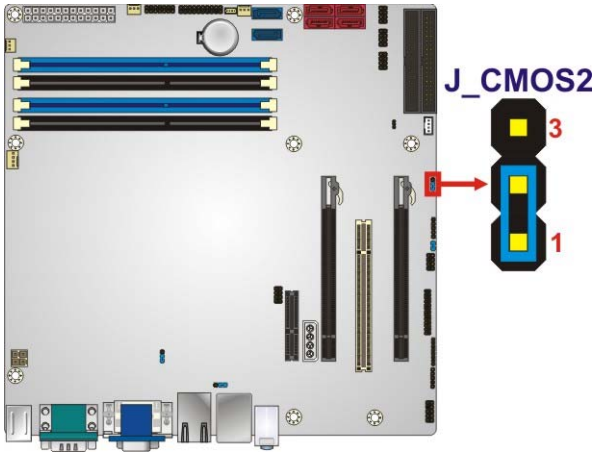


Figure 4-9: Clear BIOS Jumper Location

4.3.3 ME Debug Jumper

CN Label:	**J_FLASH1**
CN Type:	3-pin header
CN Location:	See **Figure 4-10**
CN Pinouts:	See **Table 4-4**

The ME Debug connector allows ME firmware overwrite protection.

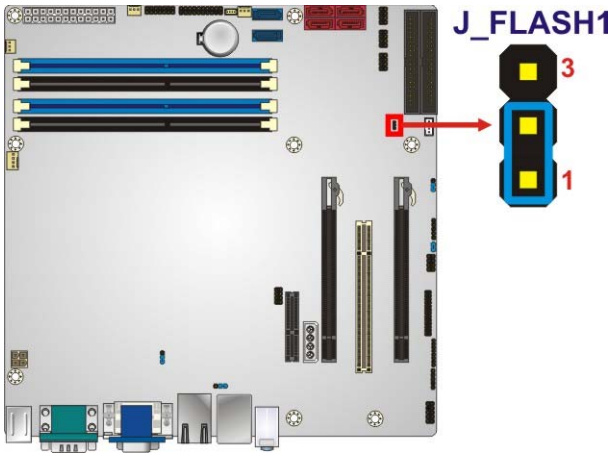


Figure 4-10: ME Debug Jumper Location

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

Table 4-4: ME Debug Jumper Settings

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 4-11**

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

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

Table 4-5: USB Power Select Jumper Settings

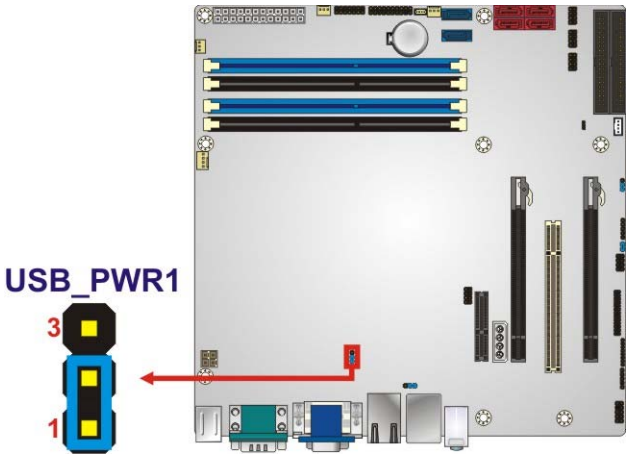


Figure 4-11: USB Power Select Jumper Location

4.3.5 Wake-on LAN Jumper

CN Label:	**WOL_SEL1**
CN Type:	3-pin header
CN Location:	See **Figure 4-12**
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 4-12: Wake-on LAN Jumper Location

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

Table 4-6: Wake-on LAN Jumper Settings

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-C2060 is shipped with four SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

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

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector. See **Figure 4-13**.

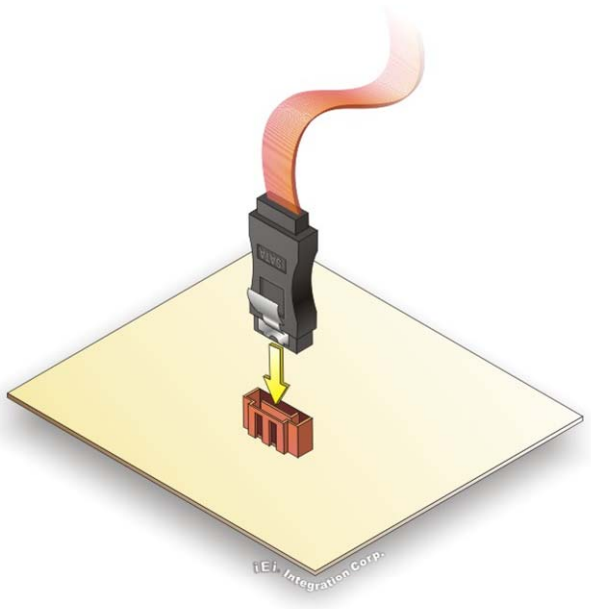


Figure 4-13: SATA Drive Cable Connection

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 4-14**.

Step 4: **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-14**.

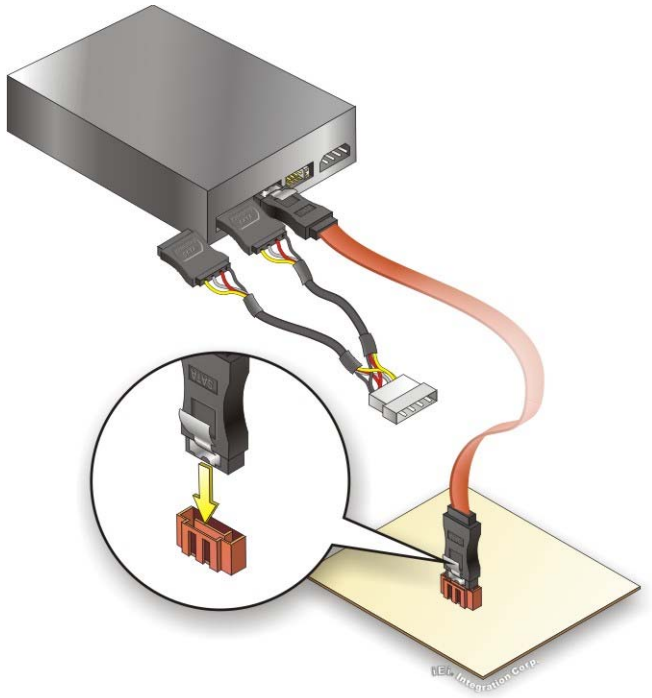


Figure 4-14: SATA Power Drive Connection

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-C2060.

4.5.1 Audio Connector

The audio jacks on the external audio connector enable the IMB-C2060 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.

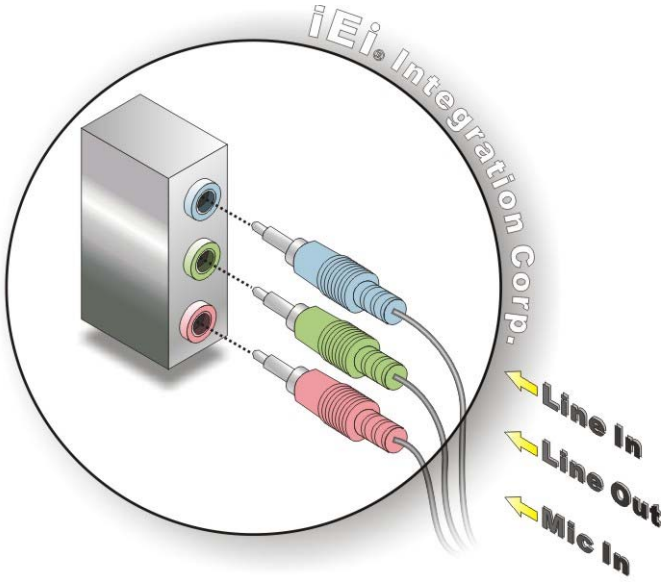


Figure 4-15: Audio Connector

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-C2060. See **Figure 4-16**.

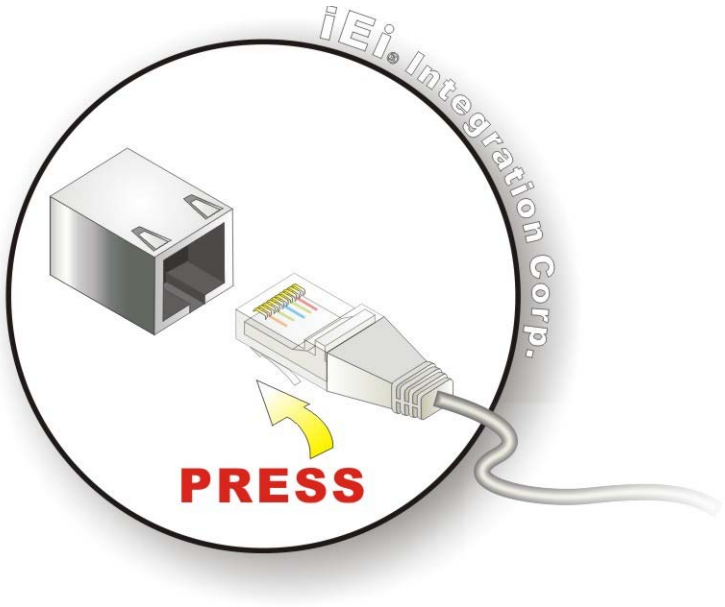


Figure 4-16: LAN Connection

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

4.5.3 Parallel Device Connection

The IMB-C2060 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-C2060.

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 4-17**.

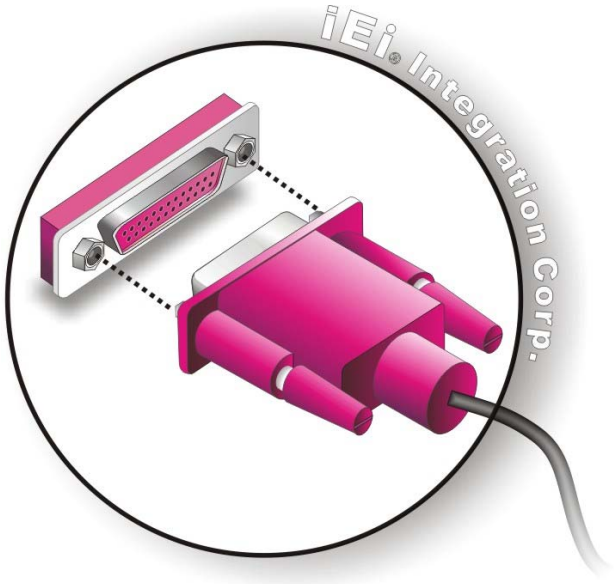


Figure 4-17: Parallel Device Connector

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-C2060 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-C2060.

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 4-18**.

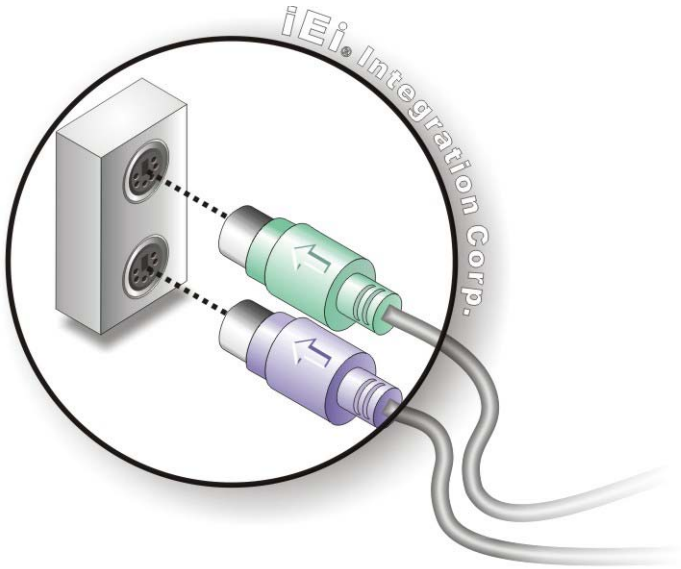


Figure 4-18: PS/2 Keyboard/Mouse Connector

4.5.5 Serial Device Connection

The IMB-C2060 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-C2060.

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 4-19**.

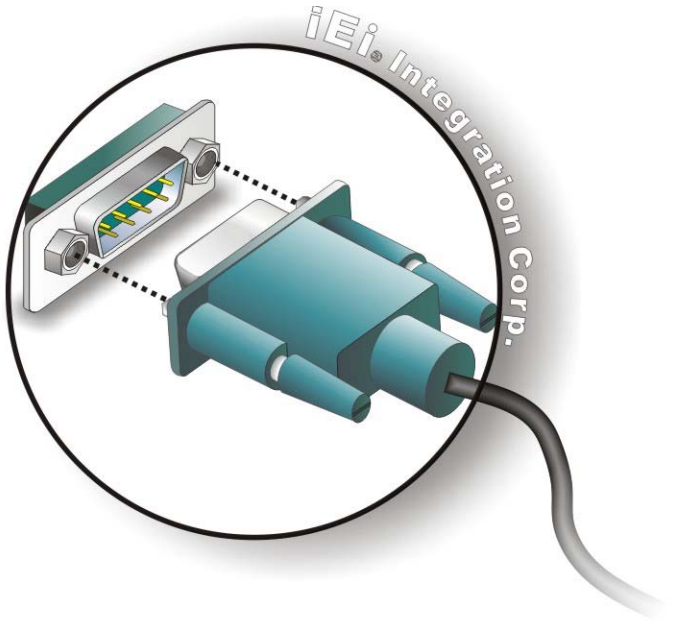


Figure 4-19: Serial Device Connector

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-C2060.

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 4-20**.

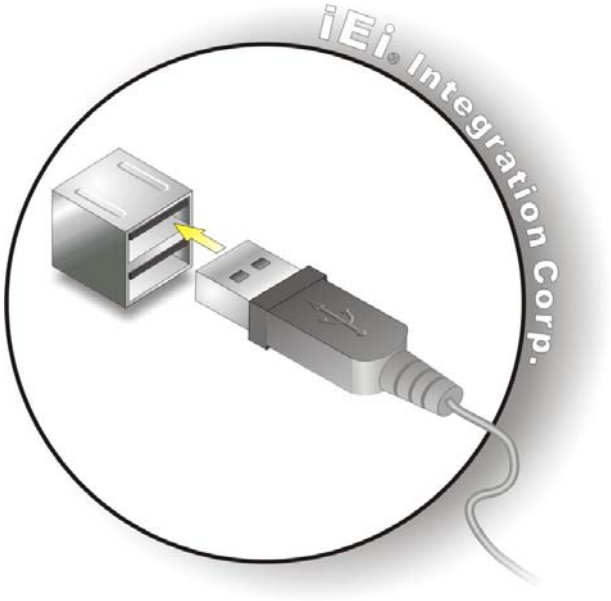


Figure 4-20: USB Connector

4.5.7 VGA Monitor Connection

The IMB-C2060 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-C2060, 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-C2060. See **Figure 4-21**.

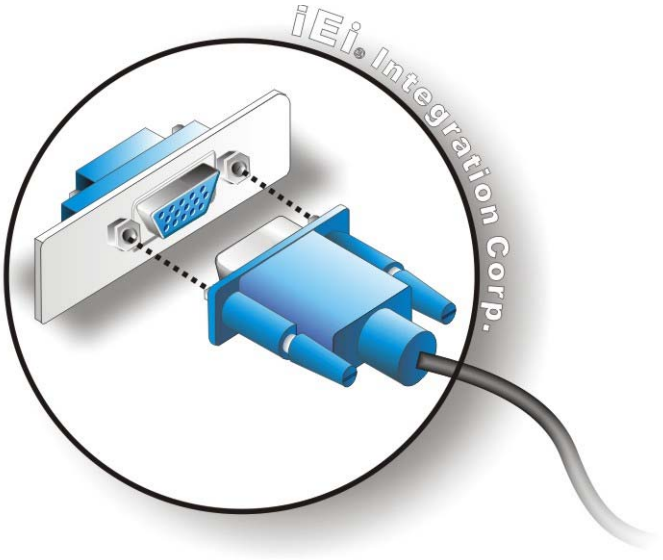


Figure 4-21: VGA Connector

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-C2060 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.

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

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

5.1.5 BIOS Menu Bar

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

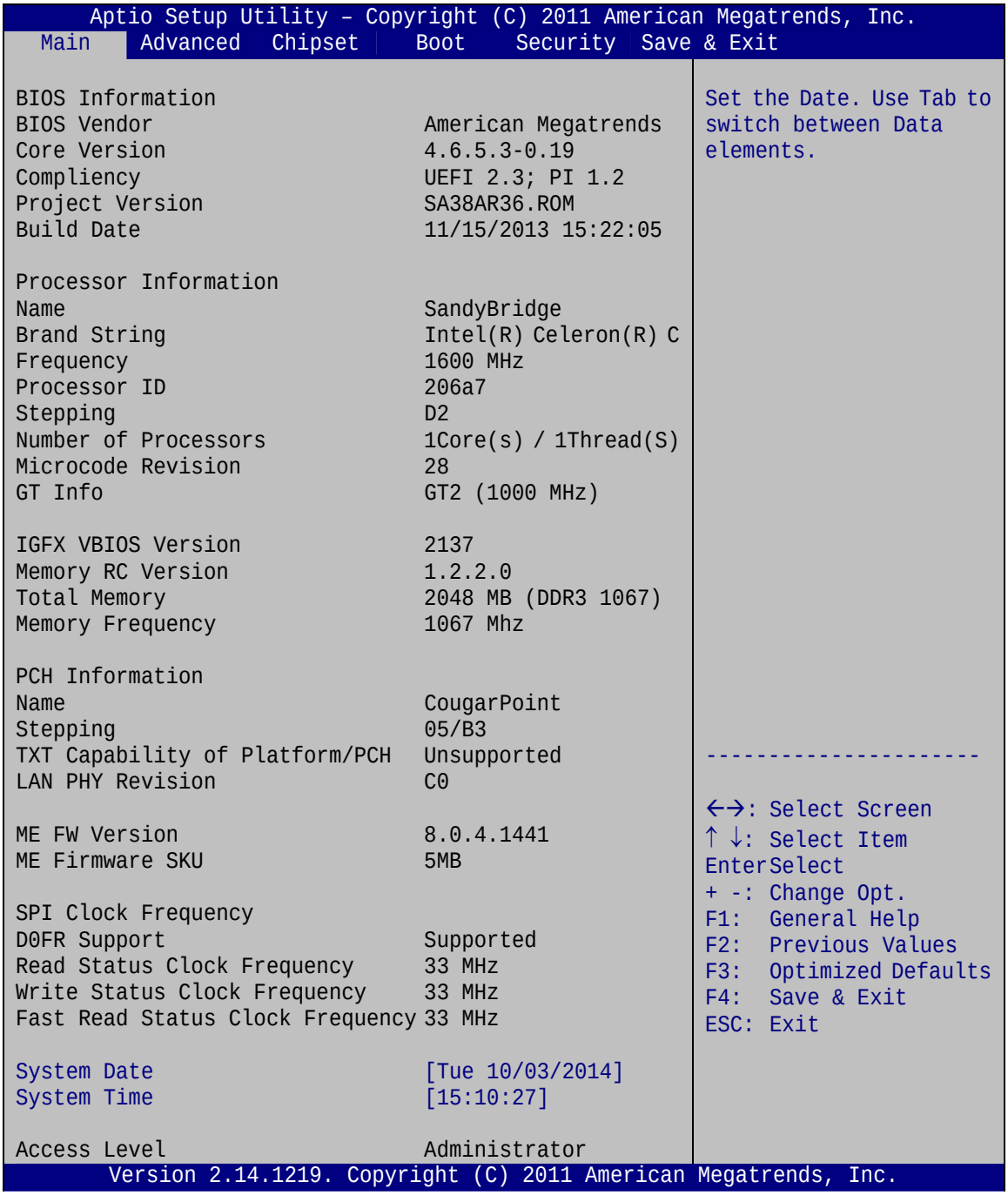
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

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

5.2 Main

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

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



BIOS Menu 1: Main

The 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]**

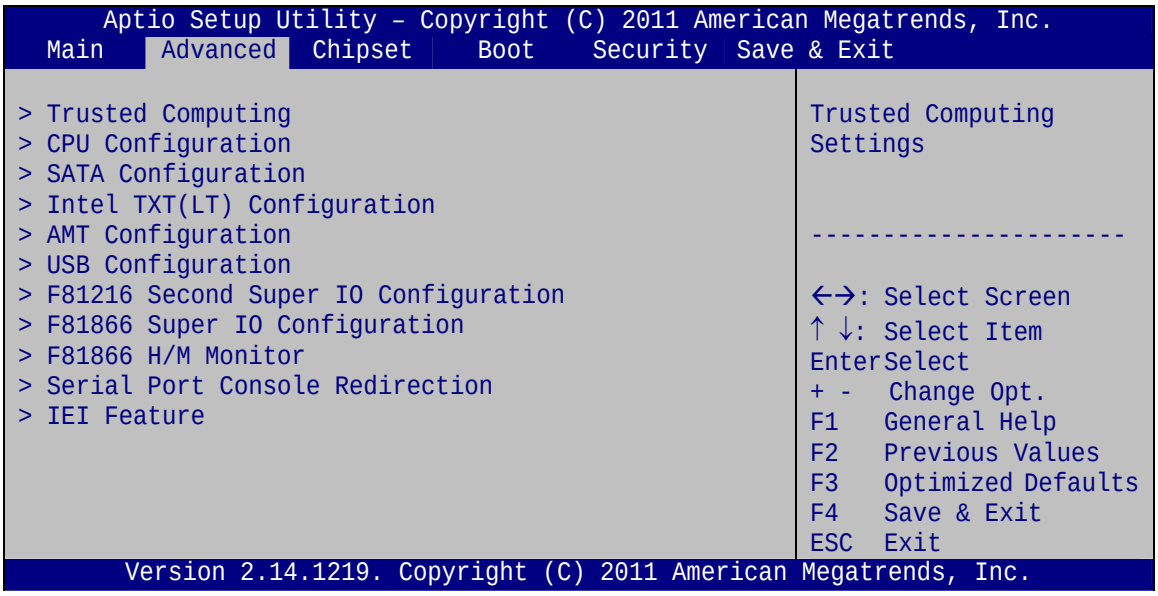
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING!

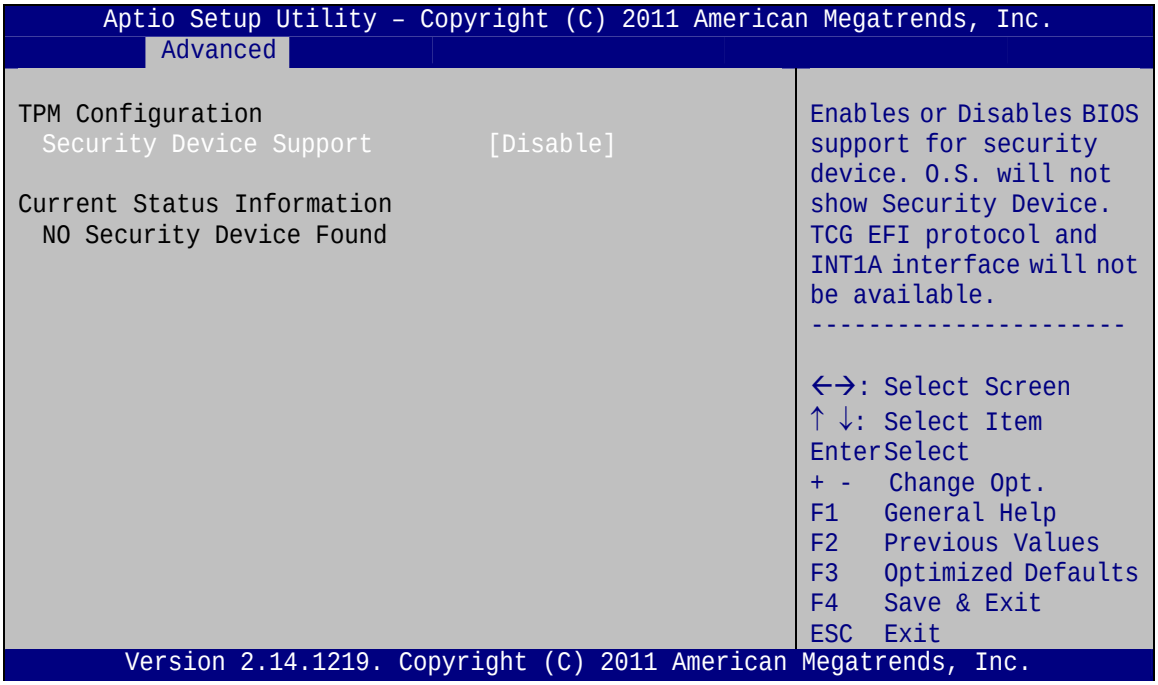
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 3**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 3: Trusted Computing

➔ **Security Device Support [Disable]**

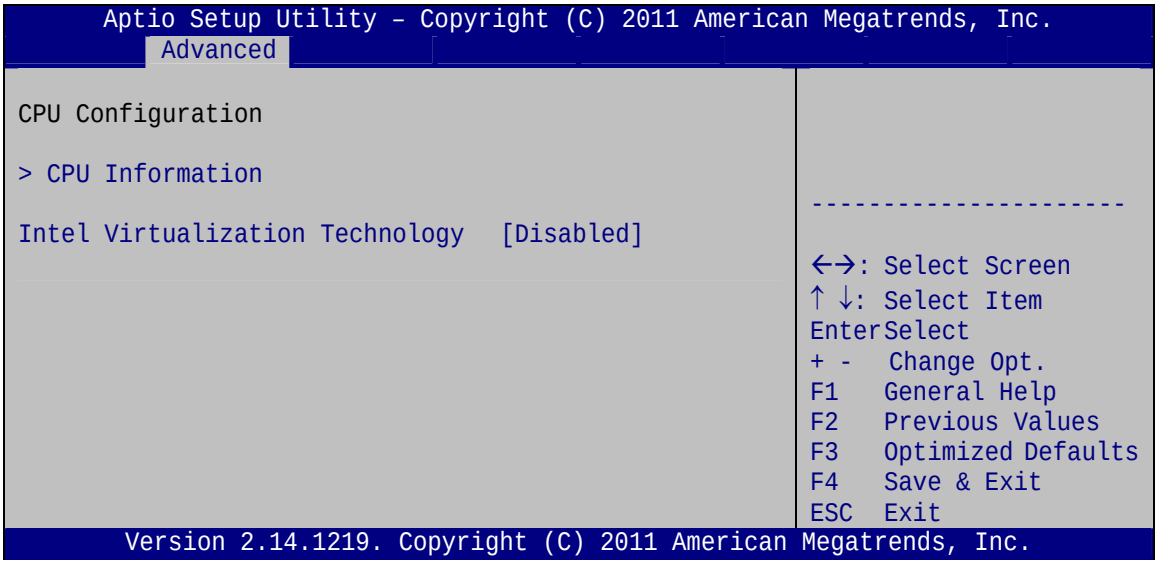
Use the **Security Device Support** option to configure support for the security device.

➔ **Disable** **DEFAULT** Security device support is disabled.

➔ **Enable** Security device support is enabled.

5.3.2 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 4**) to enter the **CPU Information** submenu or enable Intel Virtualization Technology.



BIOS Menu 4: CPU Configuration

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

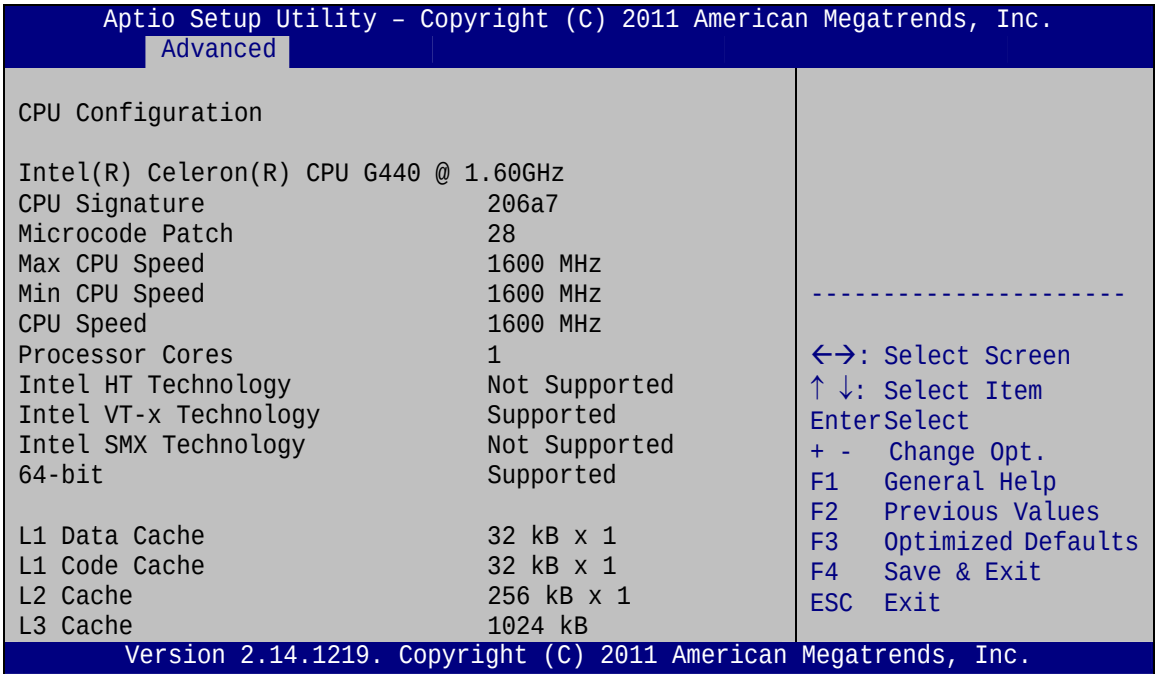
Use the **Intel® Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel Virtualization technology allows several OSs to run on the same system at the same time.

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

➔ **Enabled** Enables Intel Virtualization Technology.

5.3.2.1 CPU Information

Use the **CPU Information** submenu (**BIOS Menu 5**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 5: CPU Information

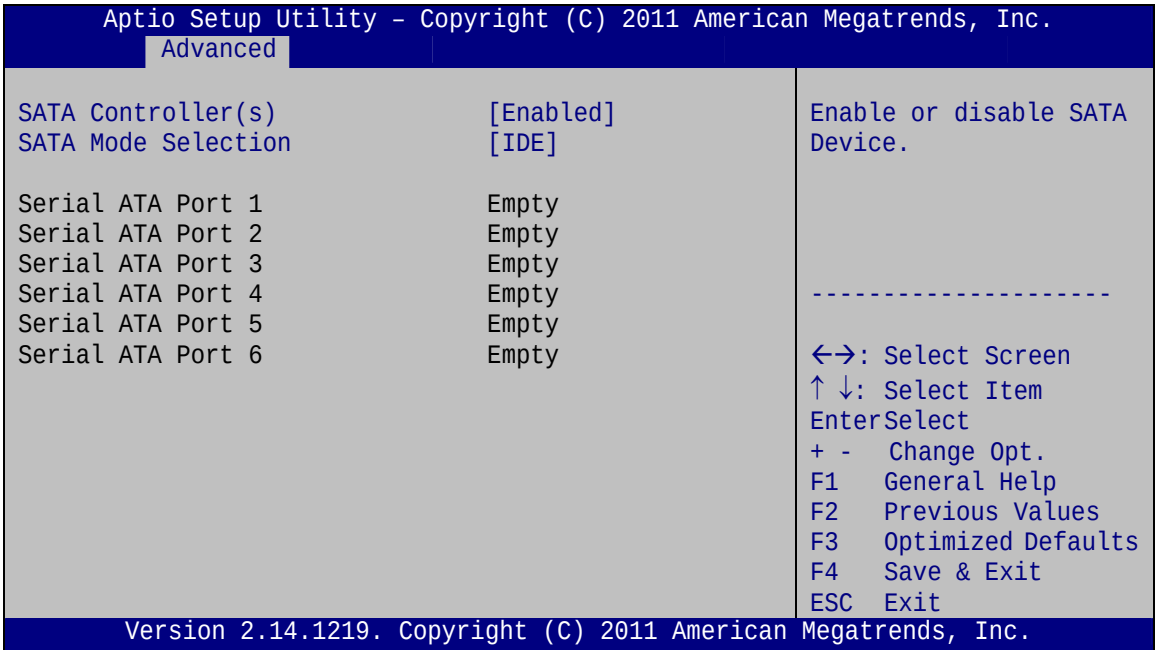
The CPU Configuration menu (**BIOS Menu 5**) lists the following CPU details:

- 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.

- 64-bit: Indicates if 64-bit OS 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.

5.3.3 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 6**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 6: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

Use the **SATA Controller(s)** option to enable or disable the serial ATA controller.

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

➔ **Disabled** Disables the on-board SATA controller.

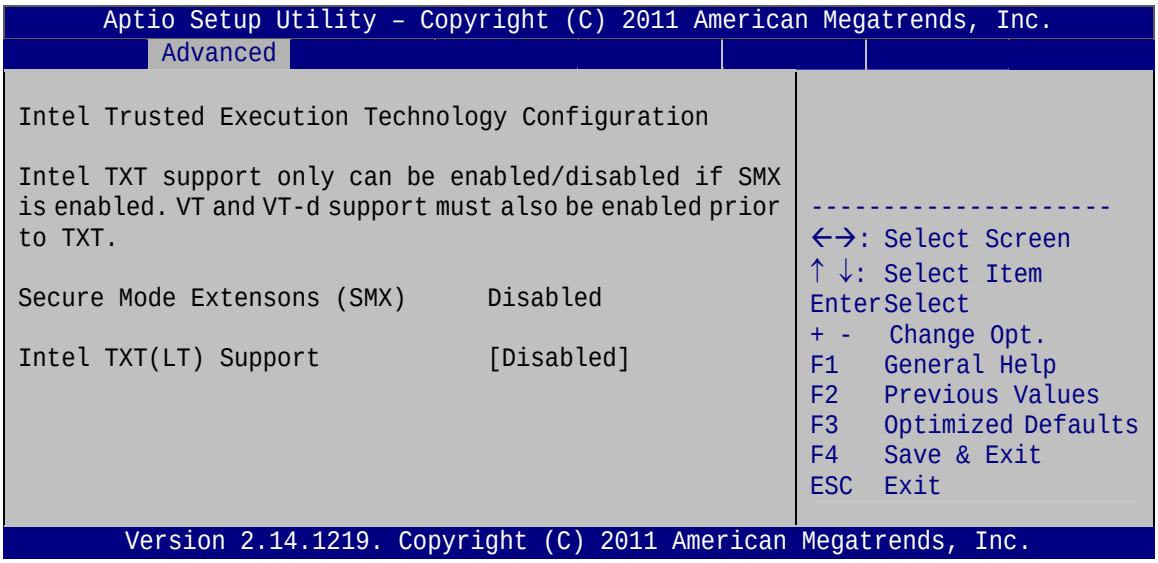
➔ **SATA Mode Selection [IDE]**

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

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

5.3.4 Intel TXT(LT) Configuration

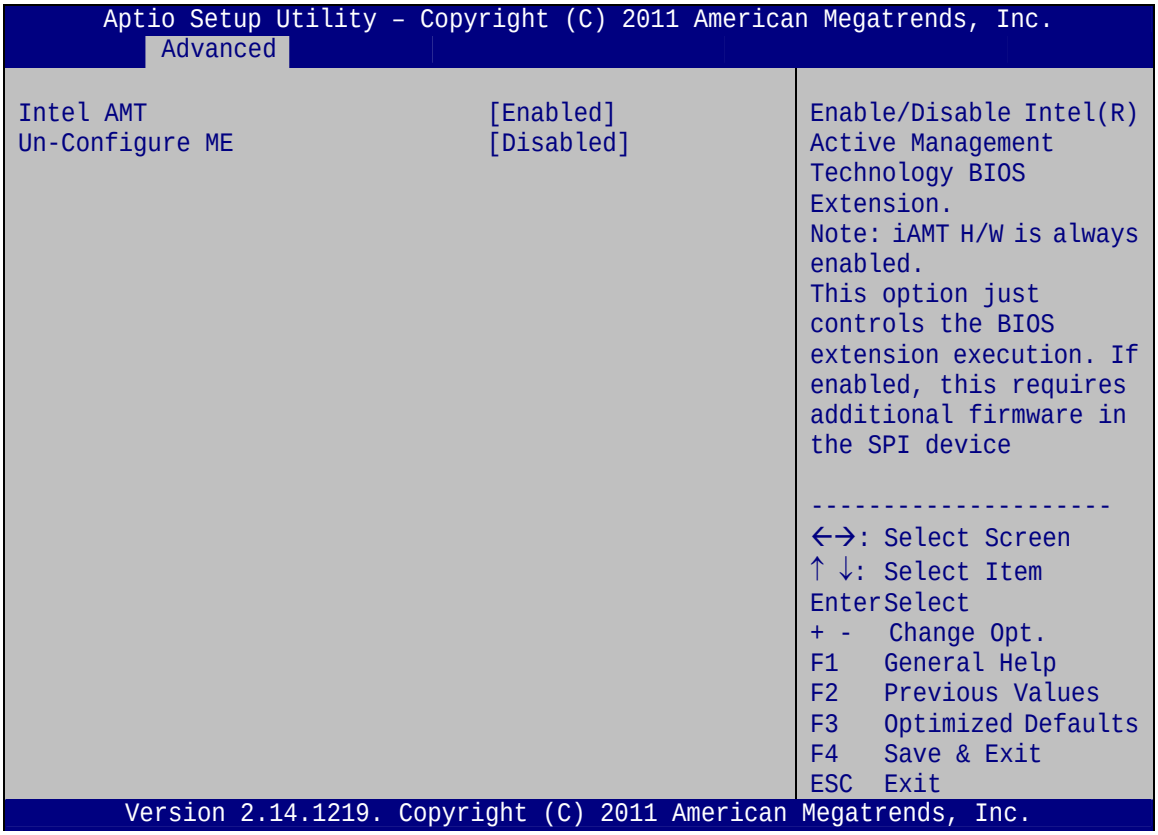
Use the **Intel TXT(LT) Configuration** menu to configure Intel Trusted Execution Technology support.



BIOS Menu 7: Intel TXT(LT) Configuration

5.3.5 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 8**) allows Intel® AMT options to be configured.



BIOS Menu 8: AMT Configuration

➔ **Intel AMT [Enabled]**

Use **Intel AMT** option to enable or disable the Intel® AMT function. Please note that Intel® AMT hardware support is always enabled. This option is to control the BIOS extension execution. If enabled, it requires additional firmware in the SPI device.

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

➔ **Un-Configure ME [Disabled]**

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

➔ **Disabled** **DEFAULT** Disable ME unconfigure

➔ **Enabled** Enable ME unconfigure

5.3.6 USB Configuration

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

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

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

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

BIOS Menu 9: USB Configuration

➔ **USB Devices**

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

➔ **Legacy USB Support [Enabled]**

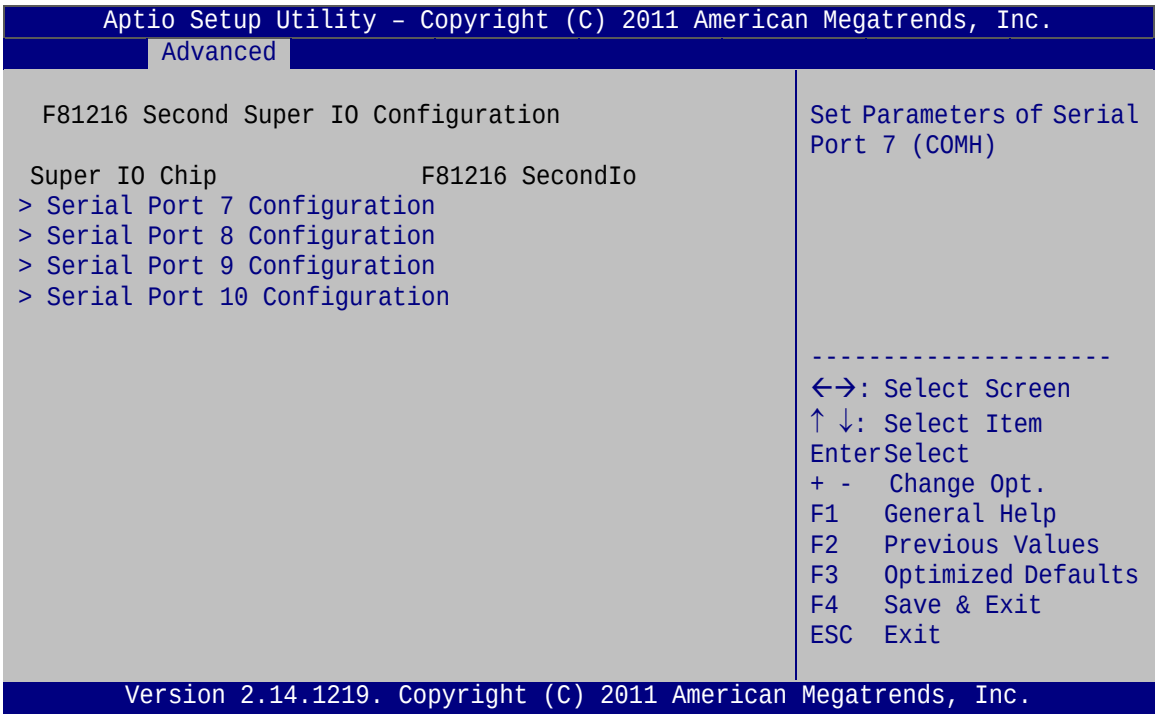
Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled,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

keyboard can control the system even when there is no USB driver loaded onto the system.

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

5.3.7 F81216 Second Super IO Configuration

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



BIOS Menu 10: F81216 Second Super IO Configuration

5.3.7.1 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=11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ11
➔	**IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔	**IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11

➔ **Device Mode [Serial Port Function Mode (RS232)]**

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

- Serial Port Function Mode (RS232) **DEFAULT**
- IR Mode, Pusle 1.6us, Full Duplex
- IR Mode, Pusle 1.6us, Half Duplex
- IR Mode, Pusle 3/16 Bit Time, Full Duplex
- IR Mode, Pusle 3/16 Bit Time, Half Duplex

5.3.7.2 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=11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ11
➔ **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

5.3.7.3 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=11**	Serial Port I/O port address is 2B0h and the interrupt address is IRQ11
➔	**IO=2B0h; IRQ=10, 11**	Serial Port I/O port address is 2B0h and the interrupt address is IRQ10, 11
➔	**IO=2B8h; IRQ=10, 11**	Serial Port I/O port address is 2B8h and the interrupt address is IRQ10, 11

5.3.7.4 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

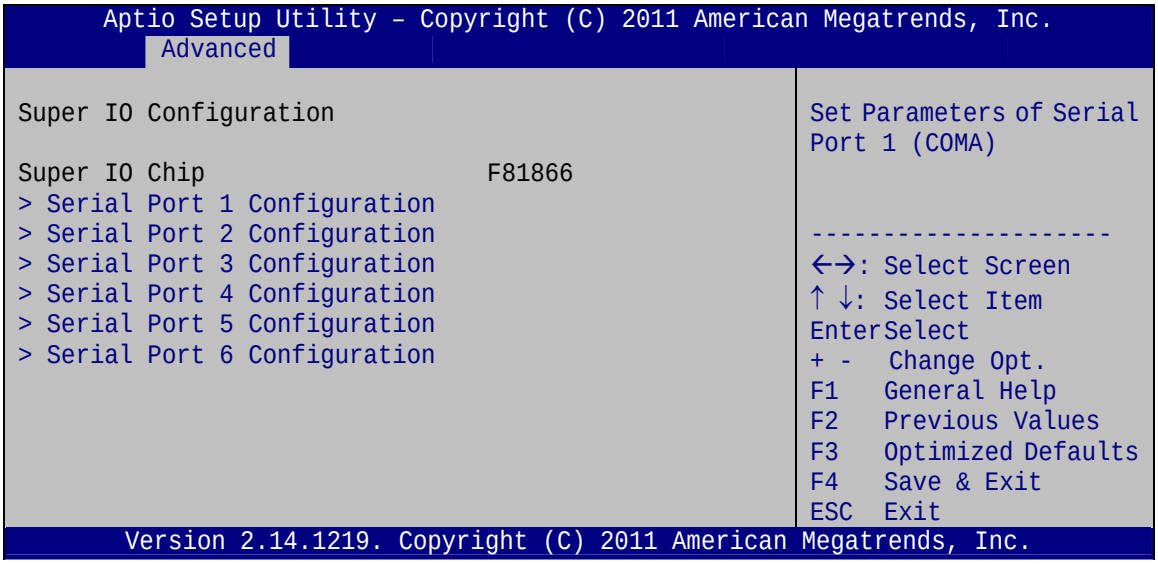
➔ **Change Settings [Auto]**

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

5.3.8 F81866 Super IO Configuration

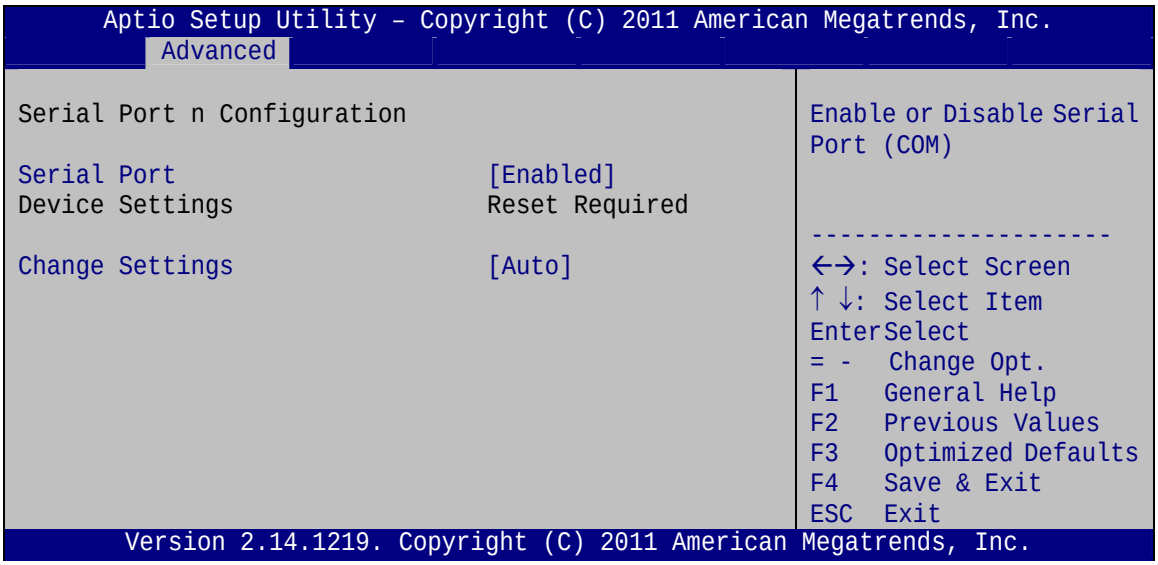
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 11**) to displays IO chip type and the submenus for configuring the external serial port 1 ~ 6.



BIOS Menu 11: F81866 Super IO Configuration

5.3.8.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 12**) to configure the serial port n.



BIOS Menu 12: Serial Port n Configuration Menu

5.3.8.1.1 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

5.3.8.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

5.3.8.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.8.1.4 Serial Port 4 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

5.3.8.1.5 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=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

5.3.8.1.6 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]**

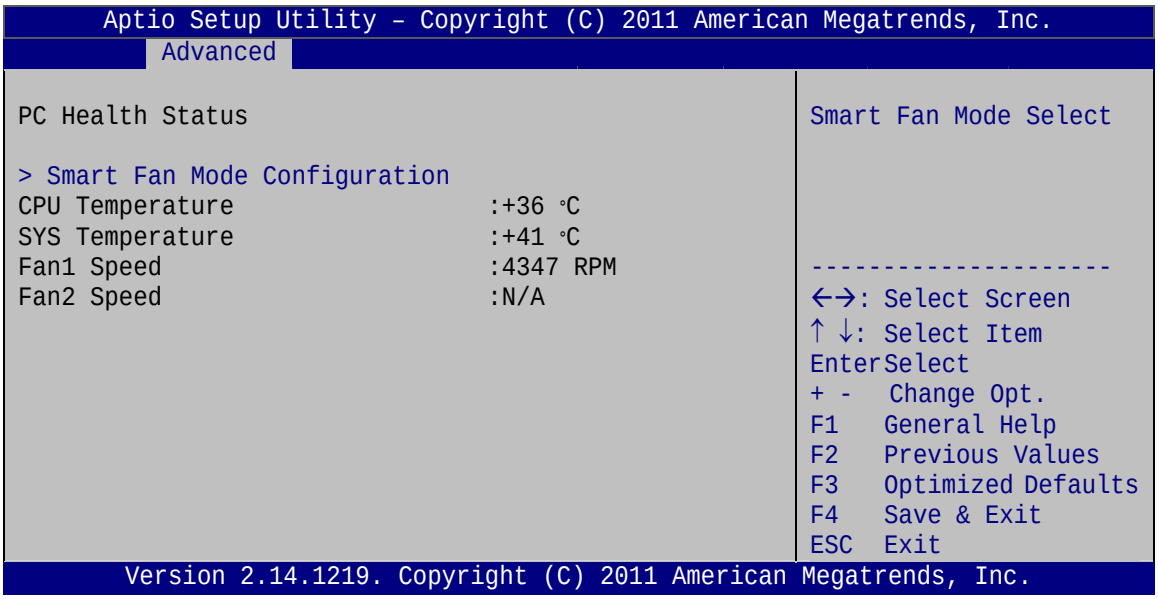
Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **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=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

5.3.9 F81866 H/W Monitor

The **F81866 H/W Monitor** menu (**BIOS Menu 13**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.



BIOS Menu 13: F81866 H/W Monitor

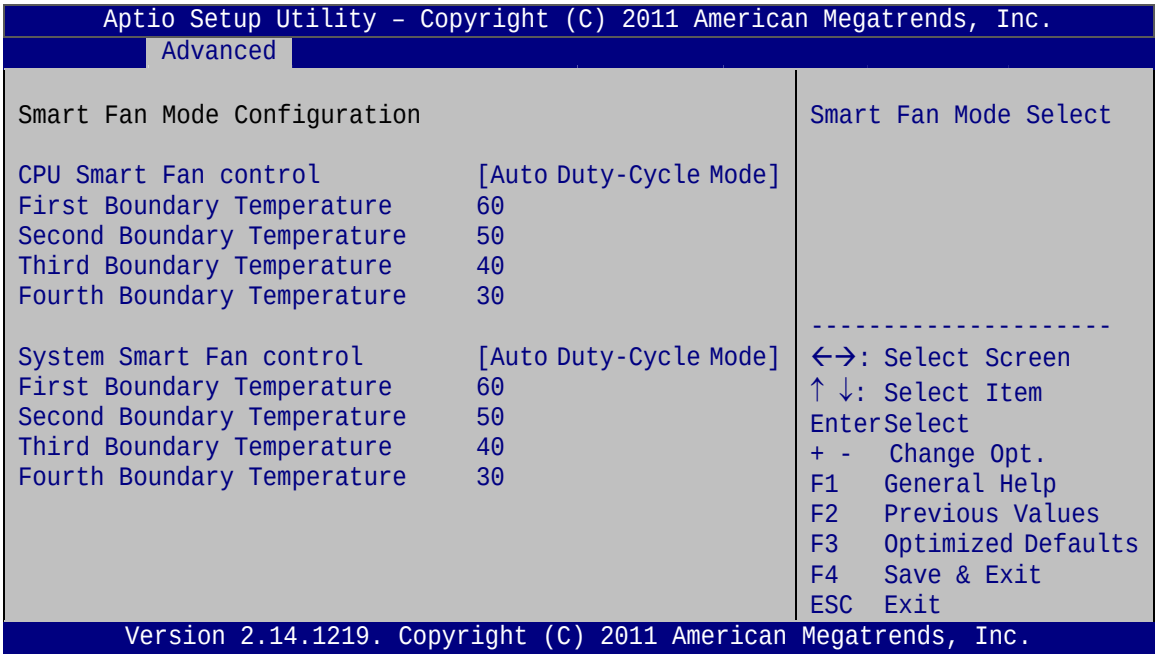
➔ **PC Health Status**

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - Fan1 Speed
  - Fan2 Speed

5.3.9.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 14**) to configure smart fan temperature and speed settings.



BIOS Menu 14: Smart Fane Mode Configuration

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

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

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

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

➔ **System Smart Fan control [Auto Duty-Cycle Mode]**

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

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

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

➔ **Boundary Temperature**

Use the + or – key to change the fan **Boundary Temperature** value. Enter a decimal number between 0 and 100.

5.3.10 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 15**) 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 15: 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

The following options are available in the **Console Redirection Settings** submenu when the Console Redirection option is enabled.

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

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

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

➔ **Data Bits [8]**

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

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

➔ **Parity [None]**

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

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

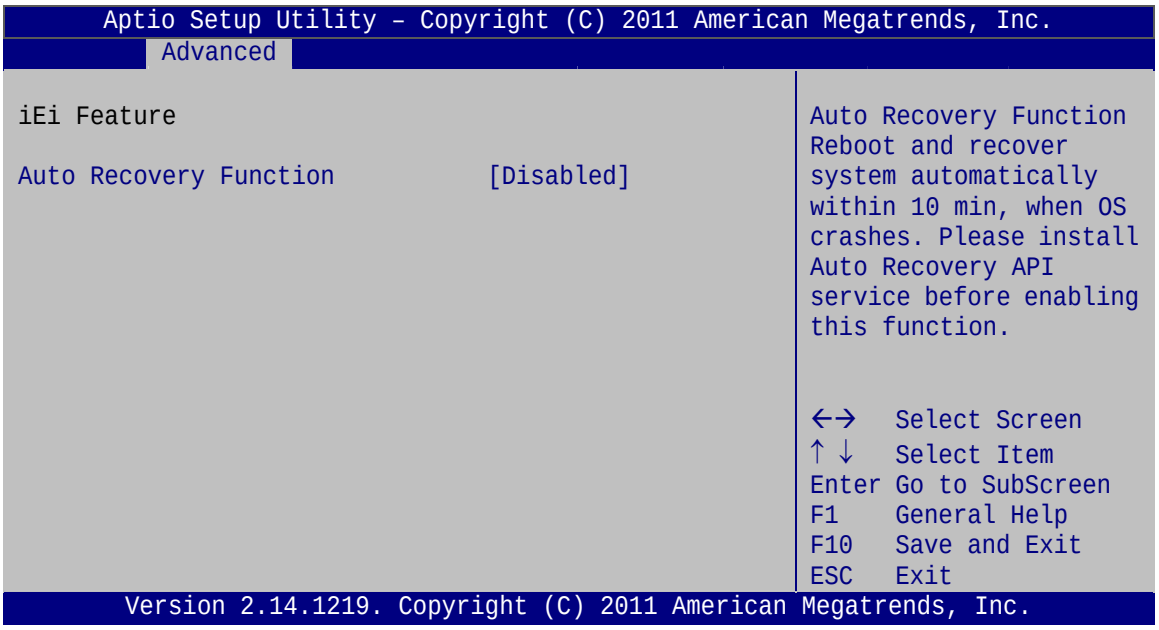
➔ **Stop Bits [1]**

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

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

5.3.11 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 16**) to configure One Key Recovery function.



BIOS Menu 16: 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 17**) to access the Northbridge, Southbridge, Integrated Graphics, and ME Subsystem configuration menus.

WARNING!

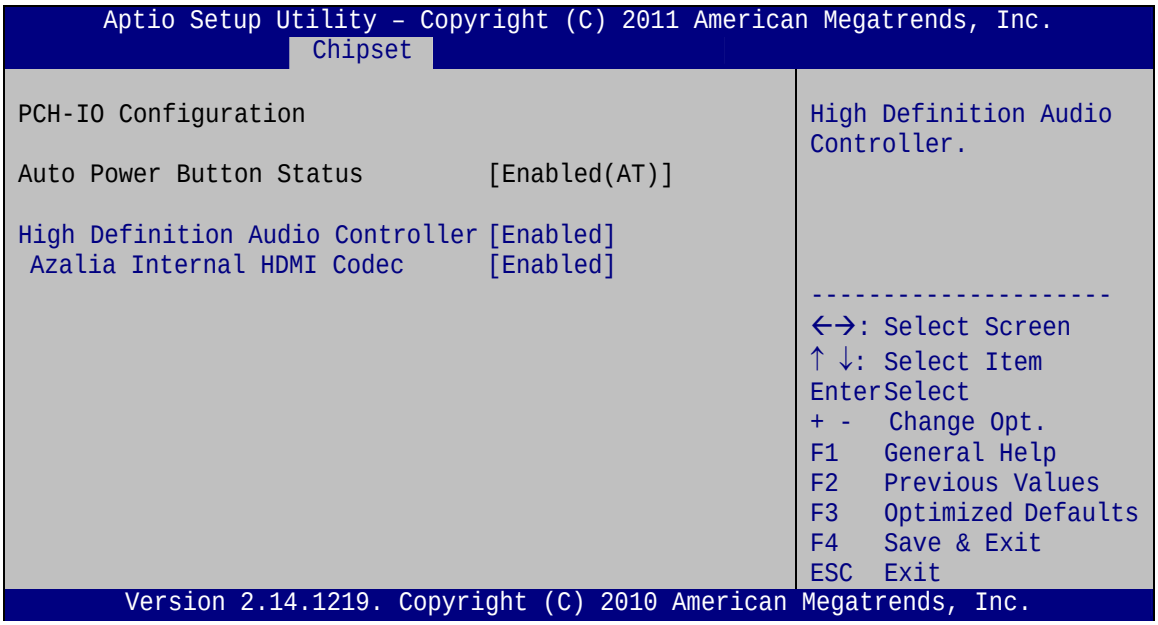
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

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

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


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

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

BIOS Menu 17: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 18**) to configure the PCH chipset.



BIOS Menu 18: PCH-IO Configuration

➔ **High Definition Audio Controller [Enabled]**

Use the **High Definition Audio Controller** 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 [Enabled]**

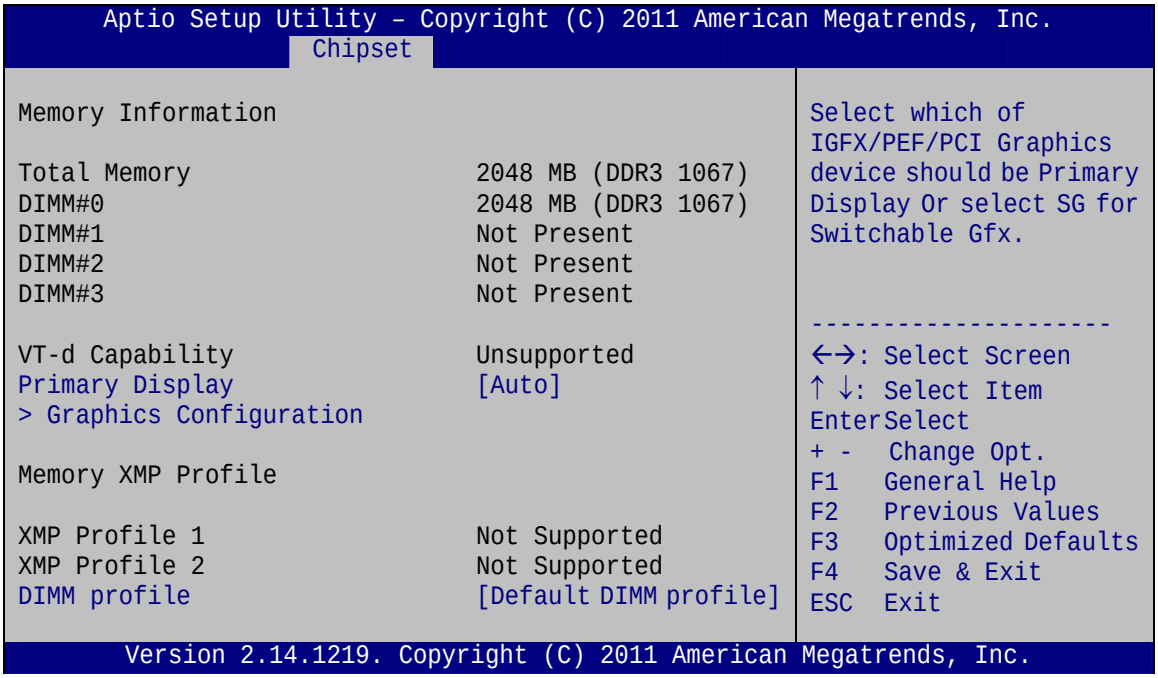
Use the **Azalia internal HDMI codec** option to enable or disable the internal HDMI codec for High Definition Audio.

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

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

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 19**) to configure the System Agent (SA) chipset.



BIOS Menu 19: System Agent (SA) Configuration

➔ **Primary Display [Auto]**

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

- Auto **DEFAULT**
- IGFX
- PEG
- PCI
- SG

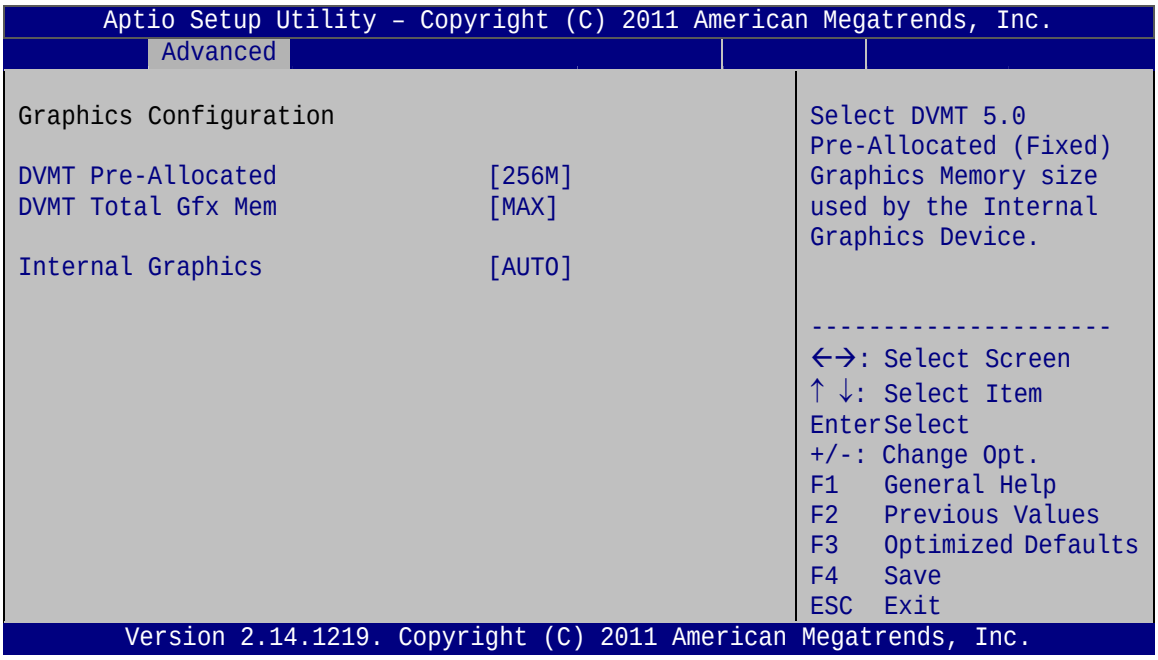
➔ **DIMM Profile [Default DIMM profile]**

Use the **DIMM Profile** option to select DIMM timing profile. Configuration options are listed below.

- Default DIMM profile **DEFAULT**
- XMP Profile 1
- XMP Profile 2

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** menu (**BIOS Menu 20**) to configure the video device connected to the system.



BIOS Menu 20: Graphics Configuration

➔ **DVMT Pre-Allocated [128M]**

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

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

➔ **DVMT Total Gfx Mem [MAX]**

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

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

➔ **Internal Graphics [Auto]**

Use the **Internal Graphics** option to enable or disable Integrated Graphics Device (IGD).

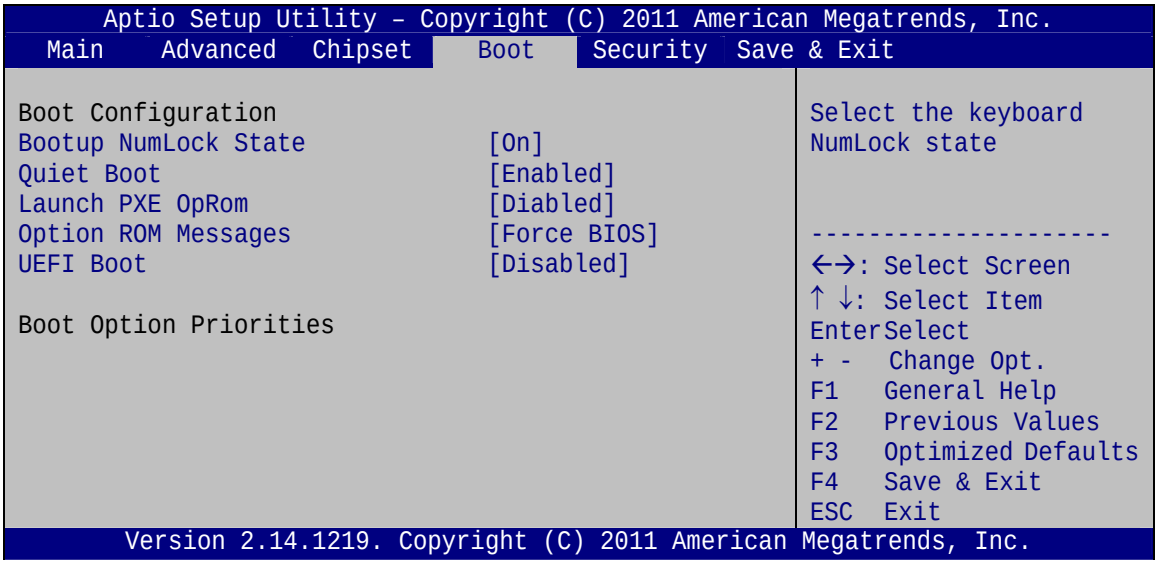
➔ **Auto** **DEFAULT** Integrated Graphics Device is automatically detected and enabled.

➔ **Disabled** Integrated Graphics Device is disabled.

➔ **Enabled** Integrated Graphics Device is enabled.

5.5 Boot

Use the **Boot** menu (**BIOS Menu 21**) to configure system boot options.



BIOS Menu 21: 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

➔ **Launch PXE OpROM [Disabled]**

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

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

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

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

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

➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** BIOS option to allow the system to boot from the UEFI devices.

➔ **Enabled**		Enables to boot from the UEFI devices.
➔ **Disabled**	**DEFAULT**	Disables to boot from the UEFI devices.

5.6 Security

Use the **Security** menu (**BIOS Menu 22**) to set system and user passwords.

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

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

BIOS Menu 22: Security

➔ **Administrator Password**

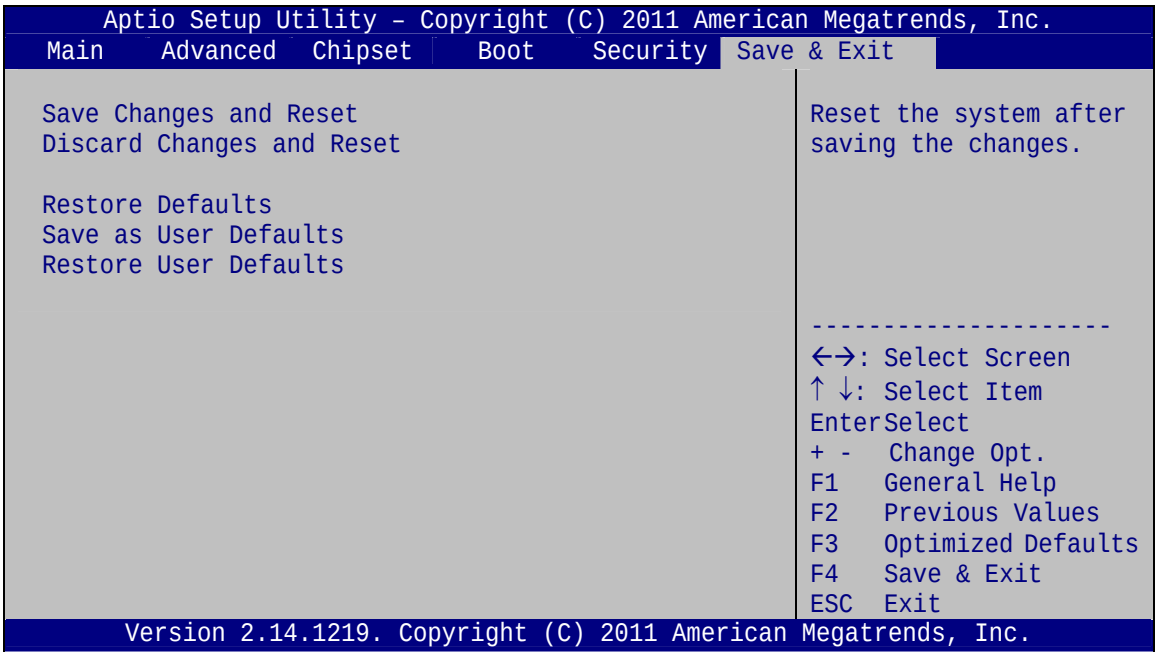
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 23**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 23: 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
- Graphic
- 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-C2060 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-C2060.

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.

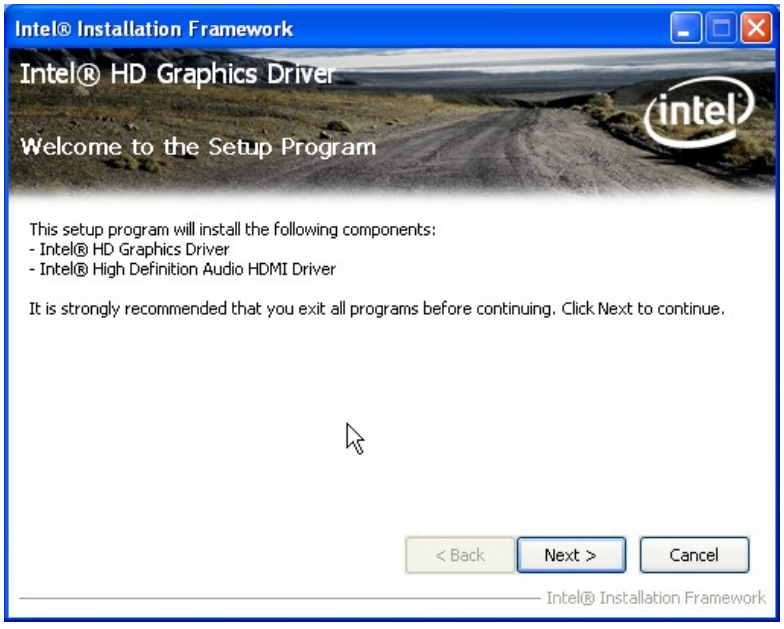


Figure 6-9: Graphics Driver Welcome Screen

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

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

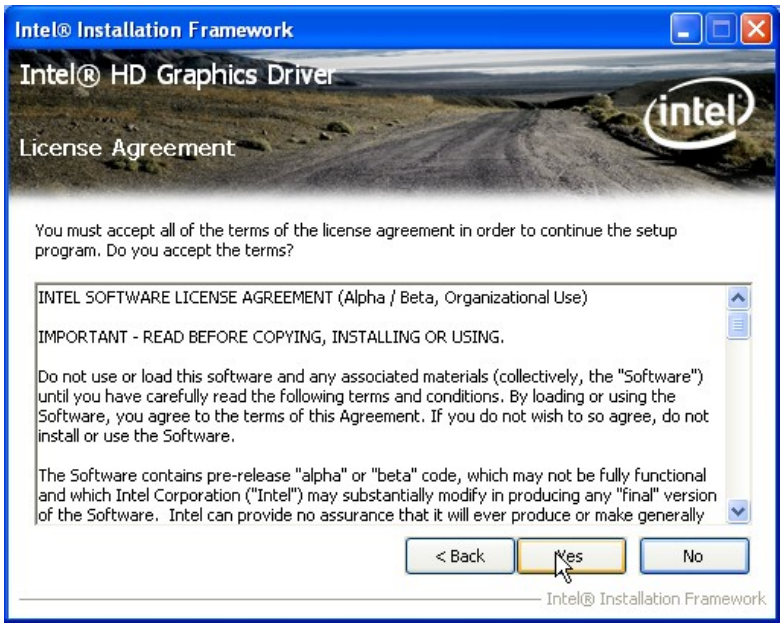


Figure 6-10: Graphics Driver License Agreement

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

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

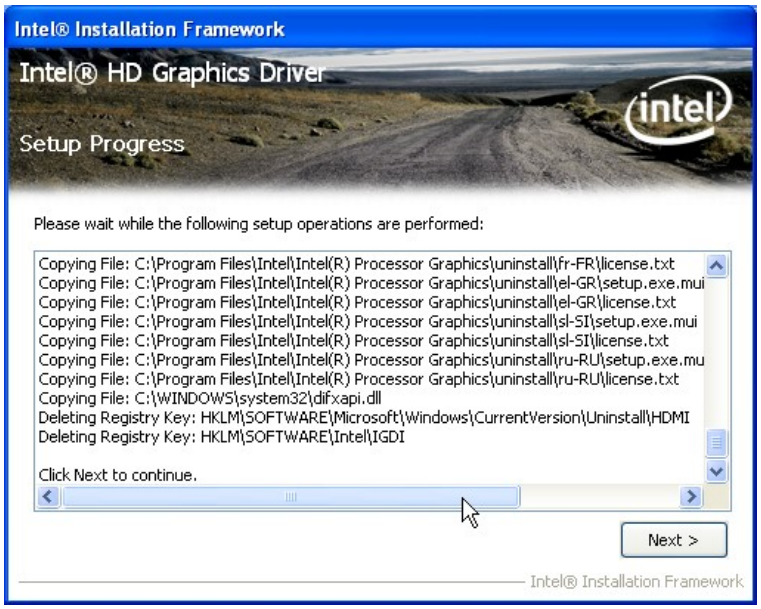


Figure 6-11: Graphics Driver Setup Operations

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

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

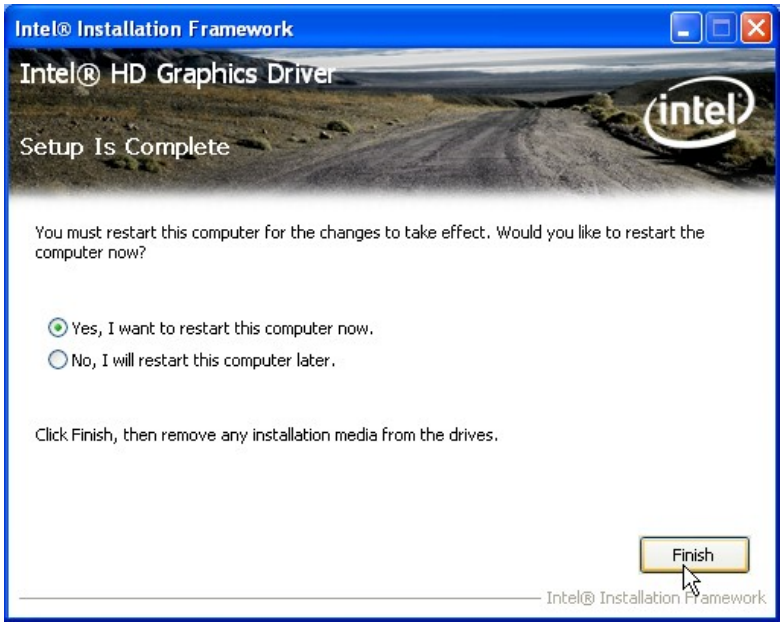


Figure 6-12: Graphics Driver Installation Finish Screen

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**.

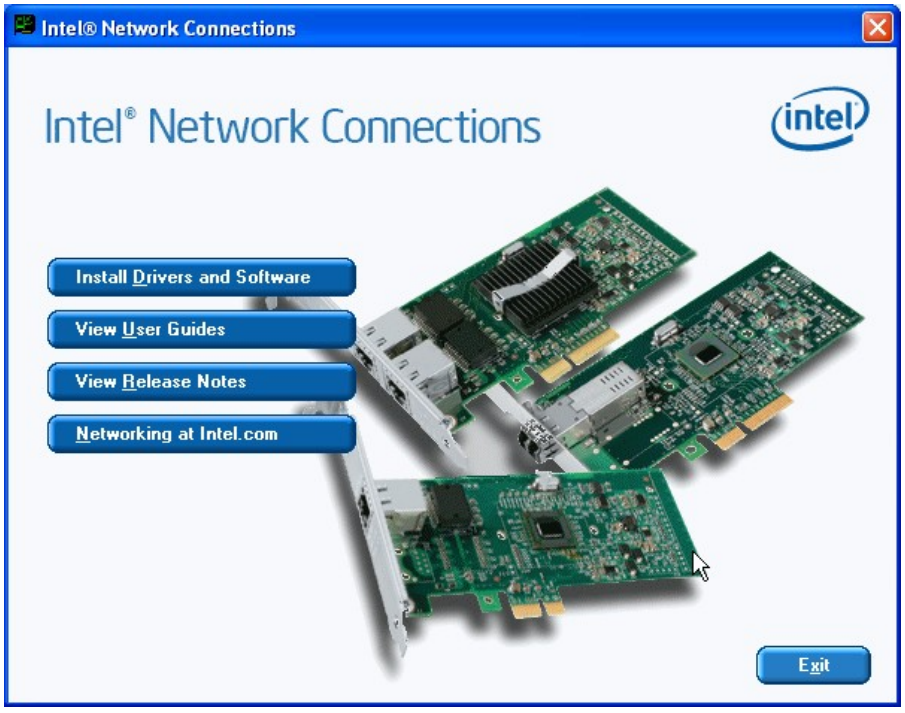


Figure 6-13: Intel® Network Connection Menu

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.

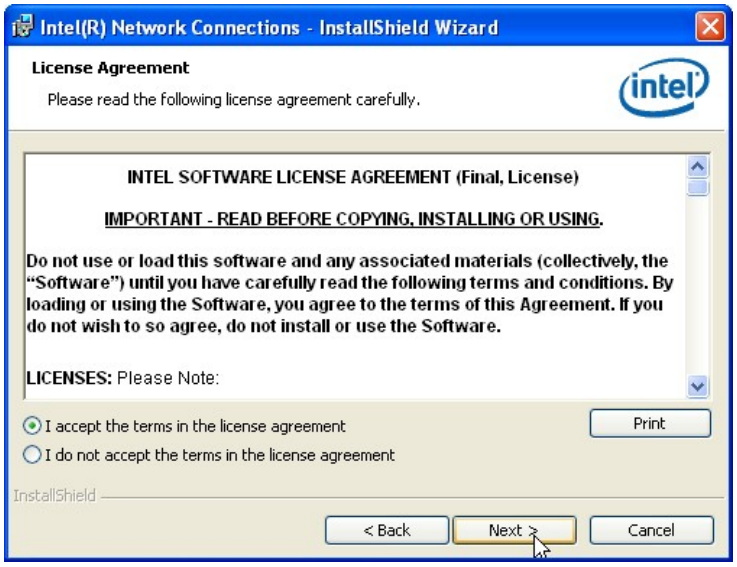


Figure 6-15: LAN Driver License Agreement

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

Step 12: Select program features to install.

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

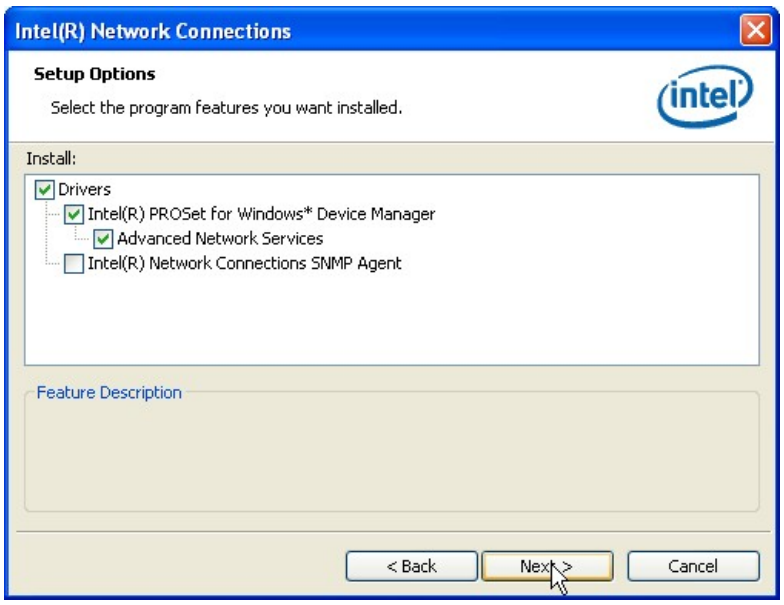


Figure 6-16: LAN Driver Setup Options

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

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

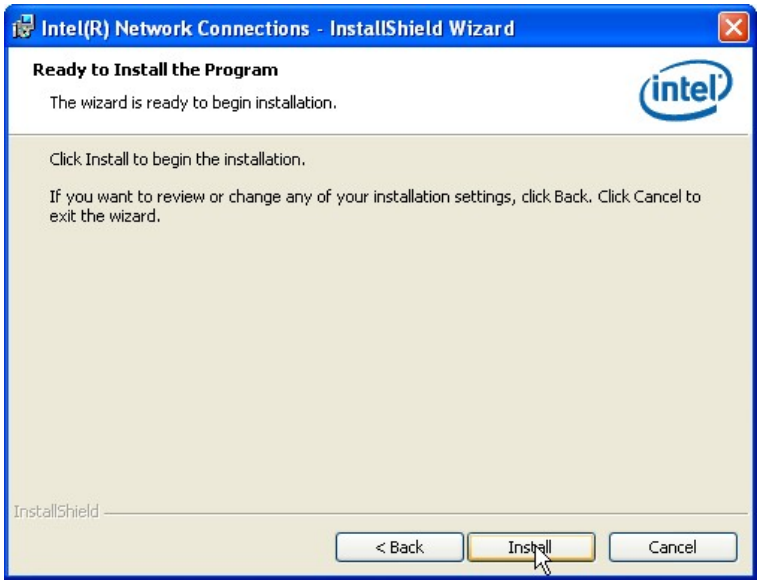


Figure 6-17: LAN Driver Installation

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.

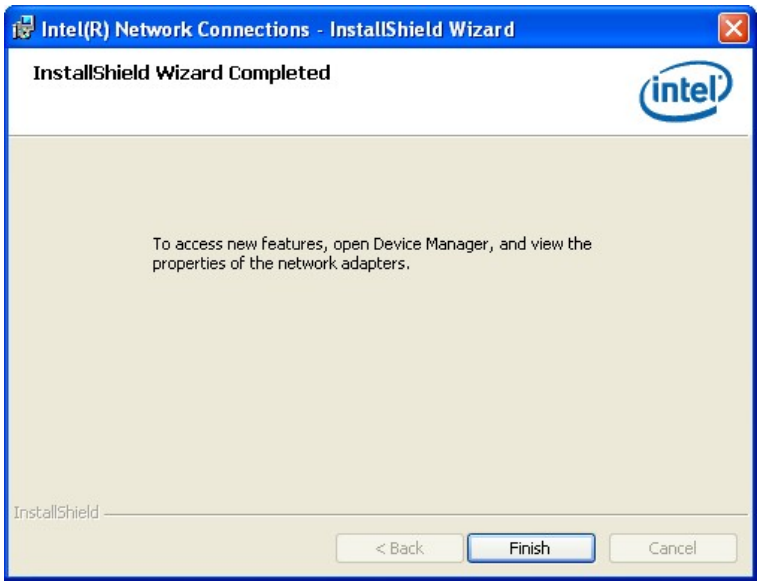


Figure 6-18: LAN Driver Installation Complete

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**).

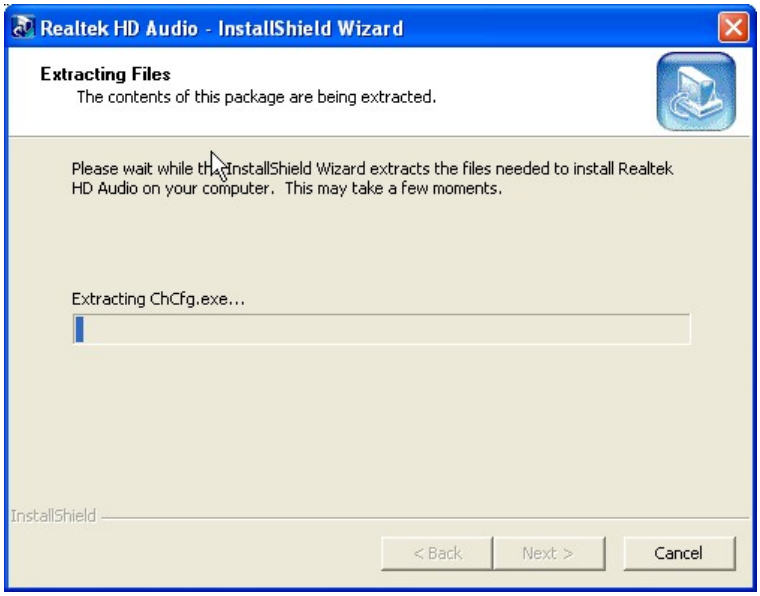


Figure 6-19: Audio Driver – Extracting Files

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 touch panel software driver, please follow the steps below.

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

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

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

Step 4: A **Welcome Screen** appears (**Figure 6-23**).

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: Click "**I accept the terms in the license agreement**" to accept and continue.

Figure 6-24: USB 3.0 Driver License Agreement

Step 8: The **Install** screen appears and displays the progress of the installation (**Figure 6-25**).

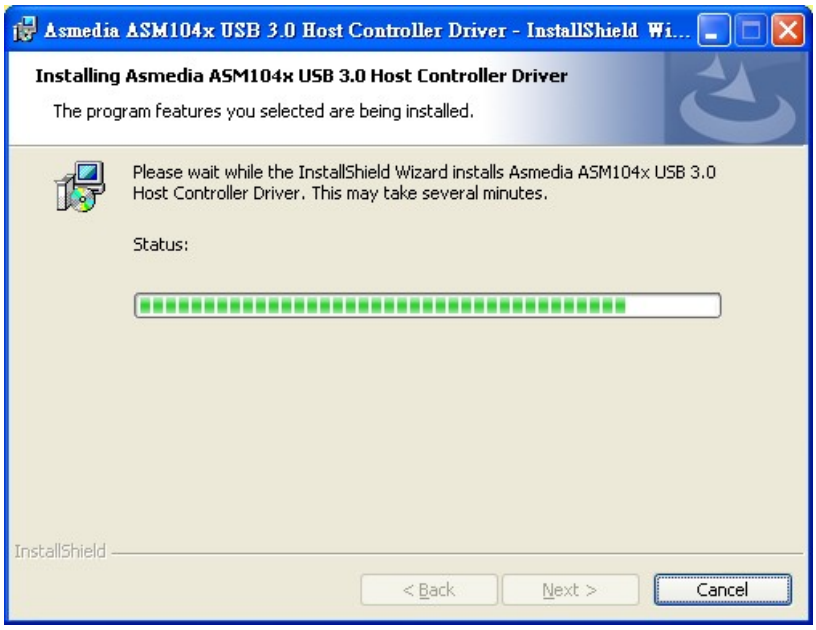


Figure 6-25: USB 3.0 Driver Installation Screen

Step 9: 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.

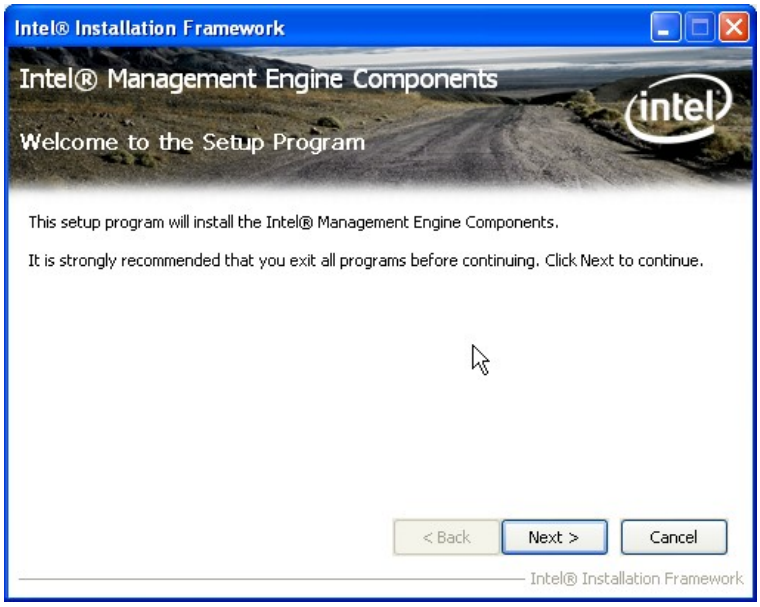


Figure 6-27: Intel® ME Driver Welcome Screen

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

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

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

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

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

Figure 6-28: Intel® ME Driver License Agreement

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

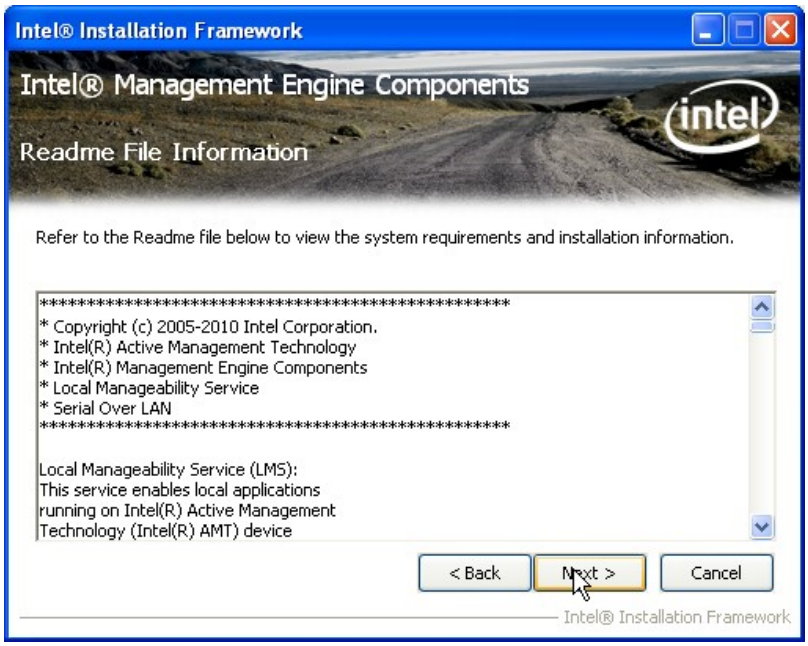


Figure 6-29: Intel® ME Driver Read Me File

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

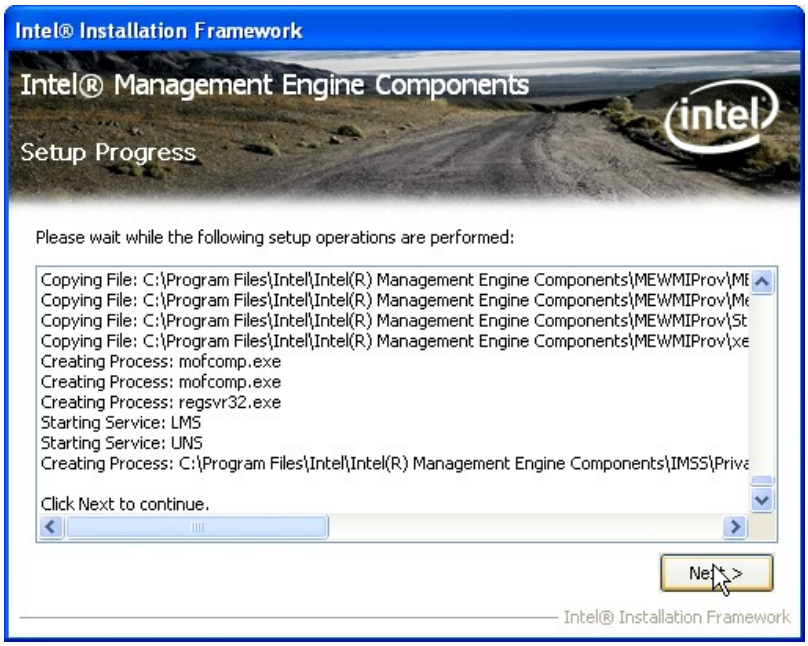


Figure 6-30: Intel® ME Driver Setup Operations

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

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.

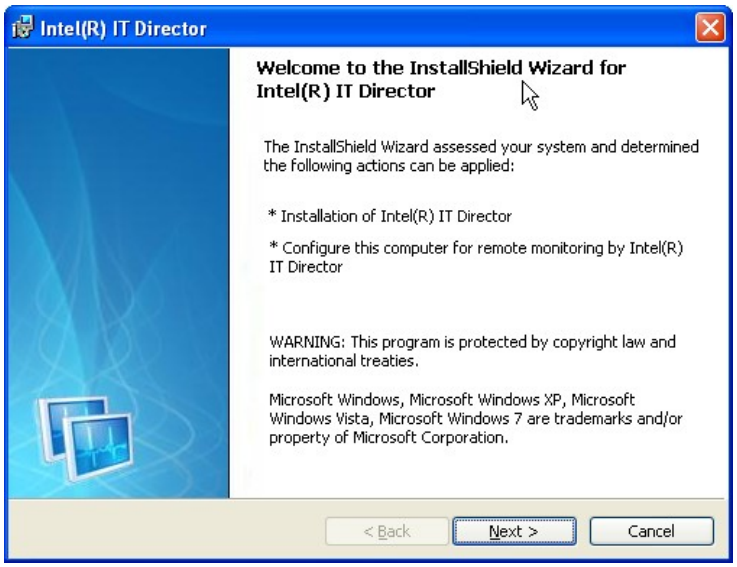


Figure 6-32: IT Director Welcome Screen

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.

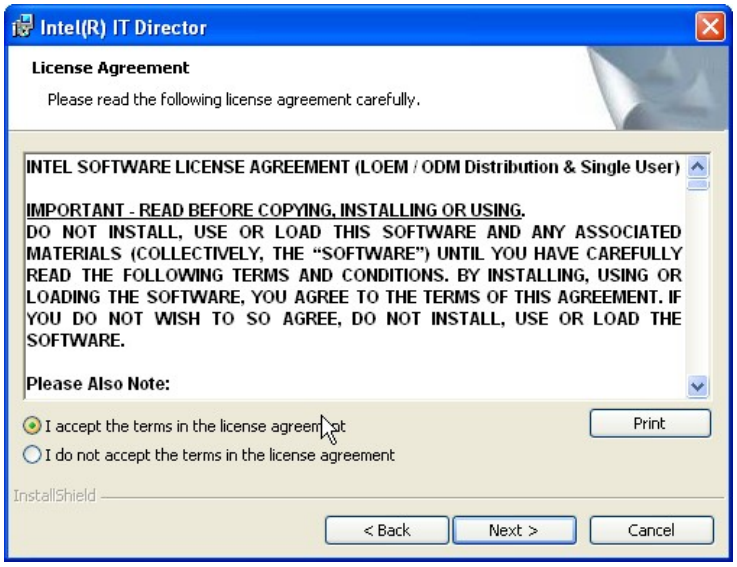


Figure 6-33: IT Director License Agreement

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.

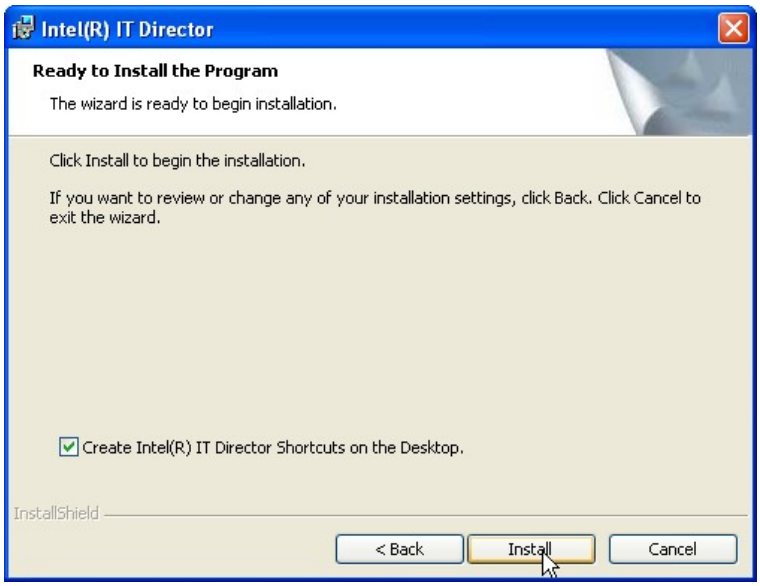


Figure 6-34: IT Director Installation

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.

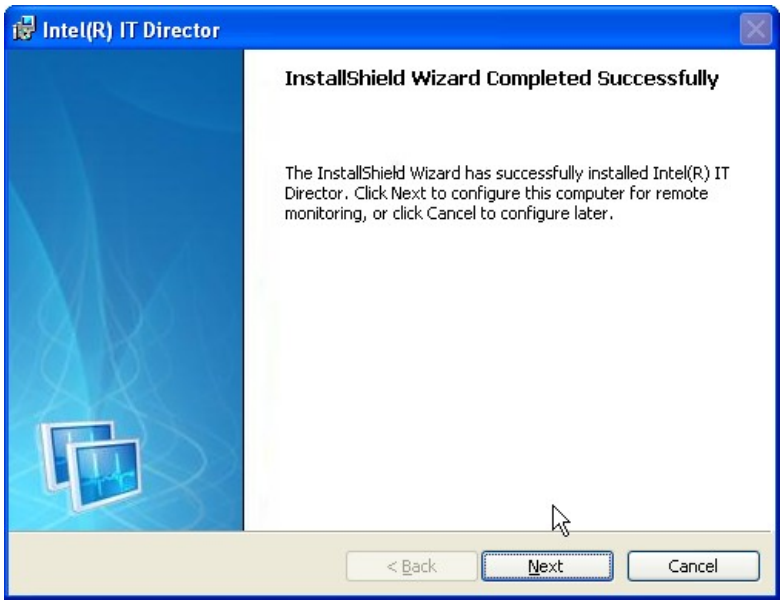


Figure 6-35: IT Director Installation Complete

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

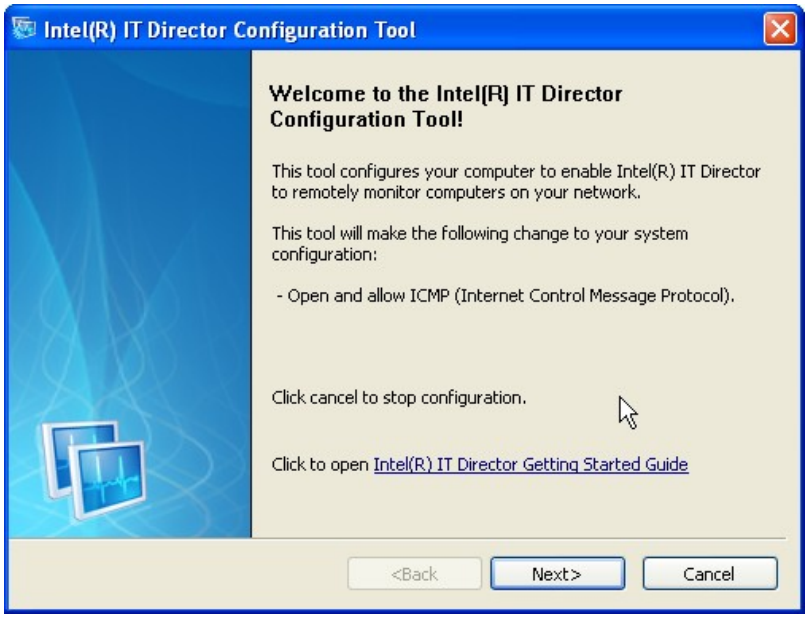


Figure 6-36: IT Director Configuration Tool Welcome Screen

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**).

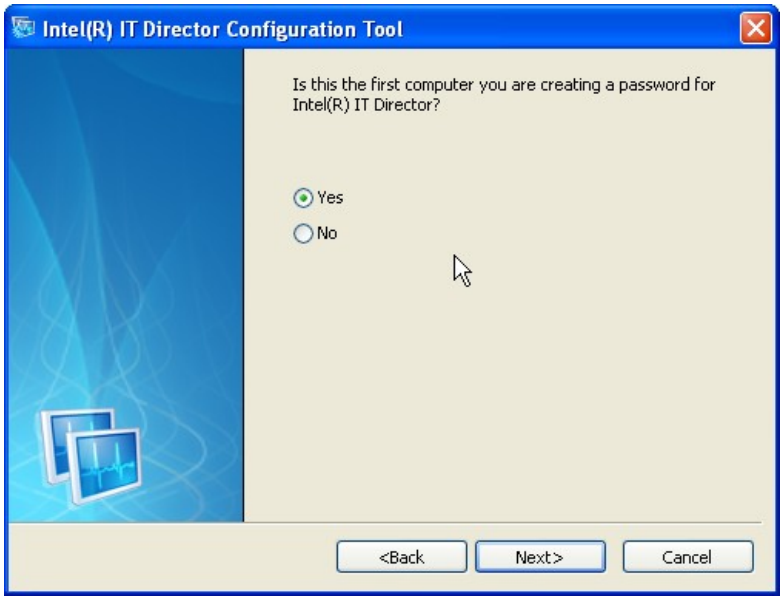


Figure 6-37: IT Director – Creating Password

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.

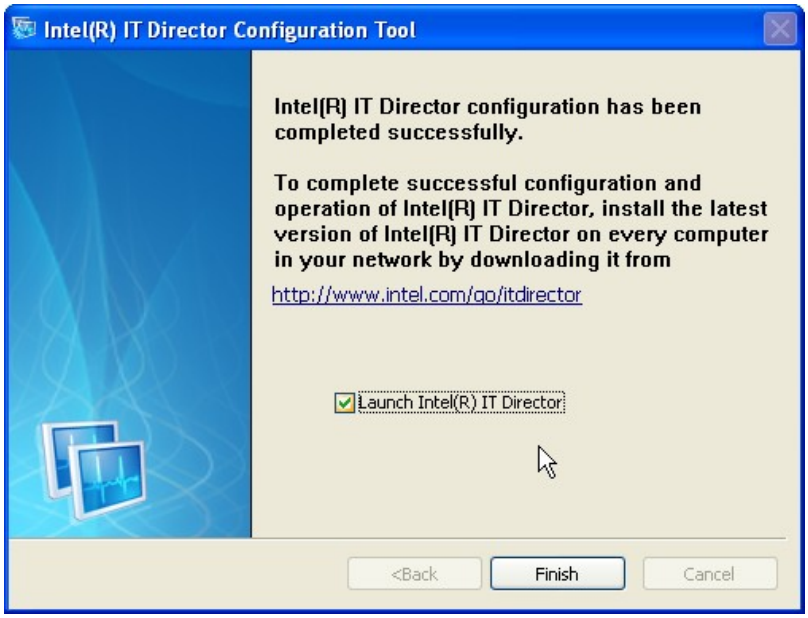


Figure 6-38: IT Director Configuration Complete

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-C2060 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 6-1: Digital I/O Connector Pinouts

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH
Sub-function:
AL – 8 :Set the digital port as INPUT
AL :Digital I/O input value

C.3 Assembly Language Sample 1

```
MOV     AX, 6F08H       ;setting the digital port as input
INT     15H             ;
```

AL low byte = value

AH – 6FH
Sub-function:
AL – 9 :Set the digital port as OUTPUT
BL :Digital I/O input value

C.4 Assembly Language Sample 2

```
MOV     AX, 6F09H       ;setting the digital port as output
MOV     BL, 09H         ;digital value is 09H
INT     15H             ;
```

Digital Output is 1001b

Appendix

D

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

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

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

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

NOTE:

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

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

;
; ADD THE APPLICATION PROGRAM HERE
;

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

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

;
; EXIT ;
```

Appendix

E

Intel® Matrix Storage Manager

E.1 Introduction

The IMB-C2060 can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

CAUTION!

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

E.1.1 Precautions

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

WARNING!

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

CAUTION!

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

E.2 Features and Benefits

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

E.3 Accessing the Intel® Matrix Storage Manager

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

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

NOTE:

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

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

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

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

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

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

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

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

E.4 Installing the Operating System to the RAID Array

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

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

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

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

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

Appendix

F

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMB-C2060

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMB-C2060.

- MS-DOS 6.22
- Microsoft Windows XP (32-bit)
- Microsoft Windows 2000
- Red Hat 9.0

F.2 Compatible Processors

The following Intel® Socket 478 processors have been successfully tested on the IMB-C2060

CPU	Model
Intel® Xeon™ E3 series	i3-2120

Table F-1: Compatible Processors

Appendix

G

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

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