# IEi

## IEI Integration Corp.

**MODEL:**

# SPCIE-C2160

**Full-Size PICMG 1.3 CPU Card Supports LGA1155 Intel® Xeon® E3/Core™ i3/Pentium®/Celeron® CPU, Intel® C216 Chipset, DDR3, VGA, DVI-D, Dual Intel® PCIe GbE, Two SATA 6Gb/s Ports, PCIe Mini, HD Audio and RoHS**

# User Manual

**Rev. 1.02 – November 16, 2015**

RoHS Lead Free

# Revision

| Date | Version | Changes |
|------|---------|---------|
| November 16, 2015 | 1.02 | Updated Section 1.7: Technical Specifications |
| April 24, 2014 | 1.01 | Modified LAN pinouts<br>Updated Chapter 2: Packing List |
| May 7, 2013 | 1.00 | Initial release |

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# Manual Conventions

**WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

**CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

**NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

**HOT SURFACE**

This symbol indicates a hot surface that should not be touched without taking care.

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**Chapter**

**1**

# Introduction

## 1.1 Introduction
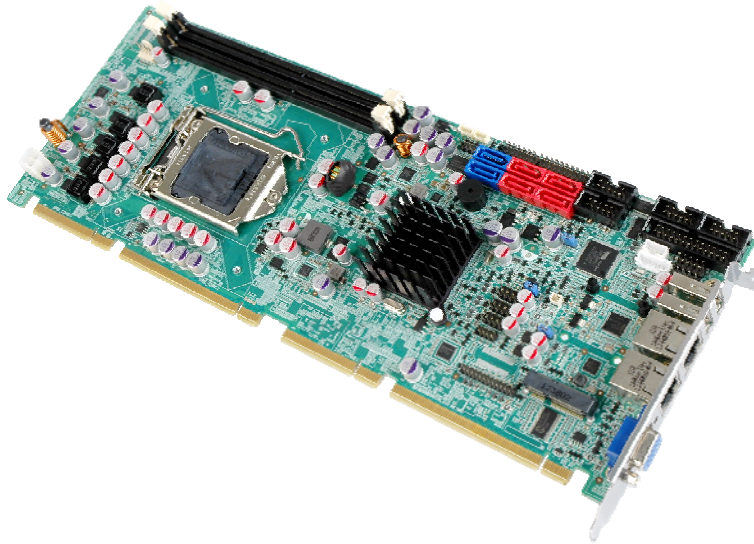


**Figure 1-1: SPCIE-C2160**

The SPCIE-C2160 is a PICMG 1.3 CPU card. It accepts a Socket LGA1155 Intel® Xeon® E3/Core™ i3/Pentium®/Celeron® processor and supports two 240-pin 1600/1333 MHz dual-channel DDR3 DIMM modules up to 16.0 GB.

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

The integrated Intel® C216 chipset supports two SATA 6Gb/s and four SATA 3Gb/s drives. Two USB 2.0 on the rear panel, six USB 2.0 by pin header and one PCIe Mini interface provide flexible expansion options. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the SPCIE-C2160.

## 1.2 Model Variations

The model variations of the SPCIE-C2160 are listed below.

| Model No. | CPU Supported | DVI-D by 26-pin header |
|-----------|---------------|------------------------|
| SPCIE-C2160-DVI-R10 | LGA1155 Intel® Xeon® E3/ Core™ i3/Pentium®/Celeron® | Yes |
| SPCIE-C2160-R10 | LGA1155 Intel® Xeon® E3/ Core™ i3/Pentium®/Celeron® | No |

**Table 1-1: SPCIE-C2160 Model Variations**

## 1.3 Features

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

- PICMG 1.3 full-size graphics grade solution
- LGA1155 CPU socket
- Intel® C216 chipset
- Dual-channel DDR3 DIMMs support up to 16.0 GB
- Dual independent display by VGA and DVI-D (DVI model only)
- One PCIe Mini expansion slot
- Two Intel® PCIe Gigabit Ethernet connectors (LAN2 with Intel® AMT 8.0 support)
- Two SATA 6Gb/s connectors with RAID function
- Four SATA 3Gb/s connectors with RAID function
- TPM V1.2 hardware security function supported by the TPM module
- High Definition Audio
- RoHS compliant

## 1.4 Connectors

The connectors on the SPCIE-C2160 are shown in the figure below.
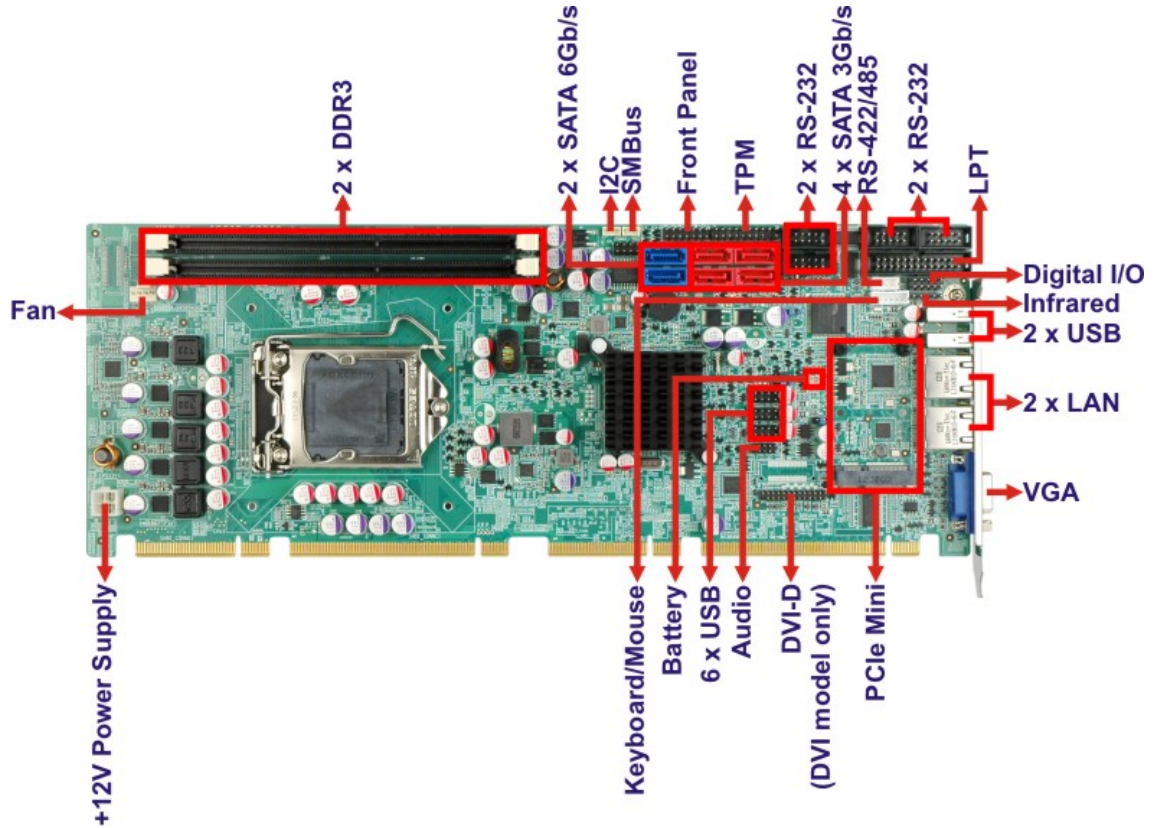
**Figure 1-2: Connectors**

## 1.5 Dimensions

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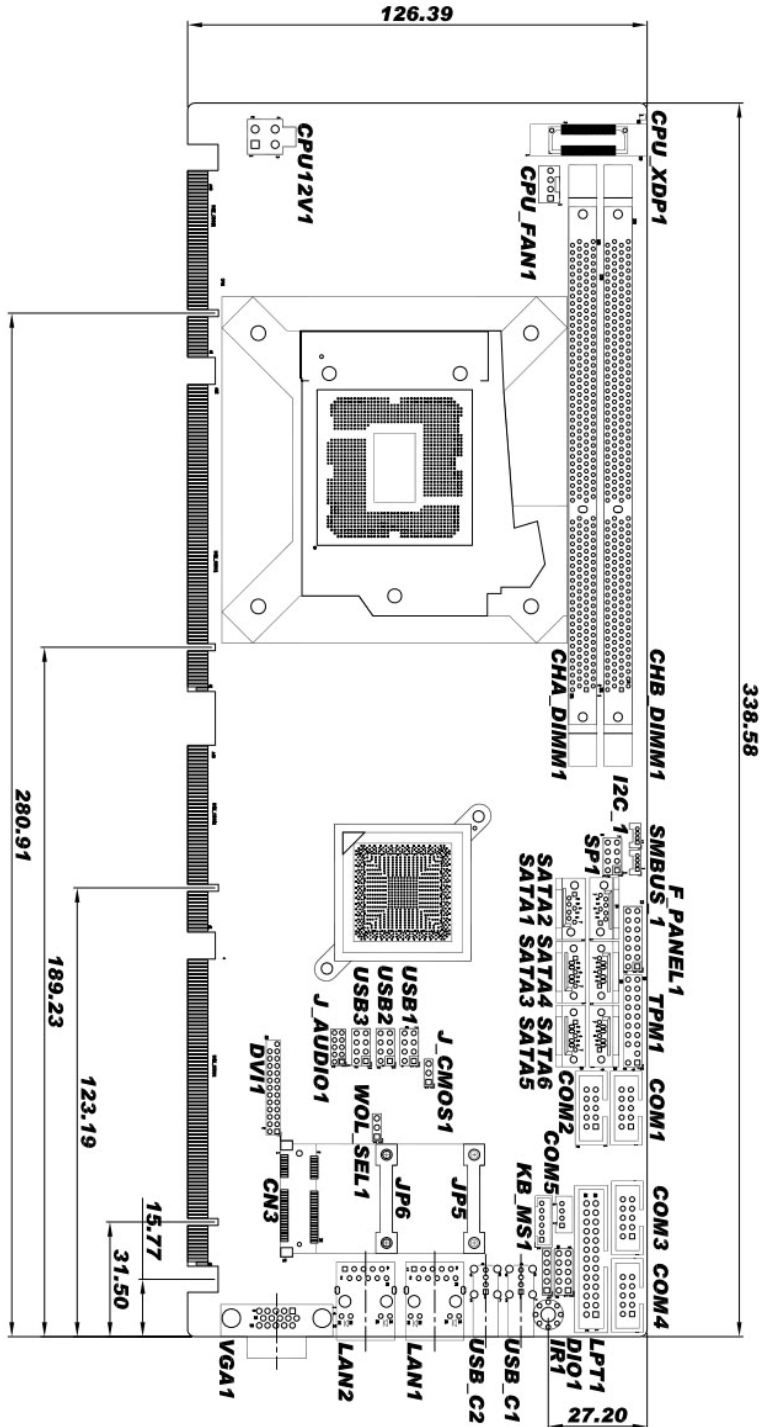


**Figure 1-3: SPCIE-C2160 Dimensions (mm)**
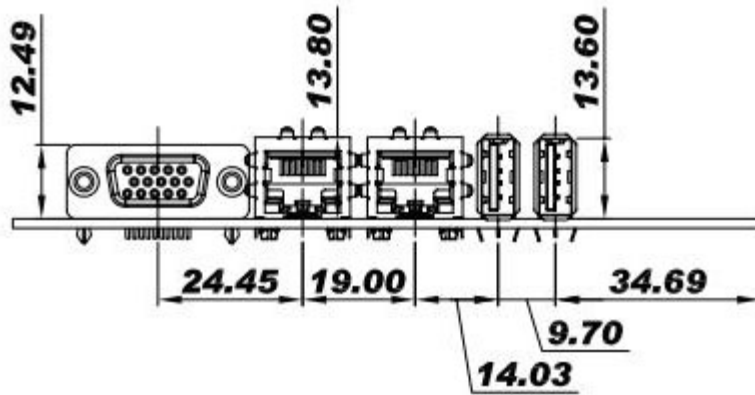
**Figure 1-4: External Interface Panel Dimensions (mm)**

## 1.6 Data Flow

**Figure 1-5** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.
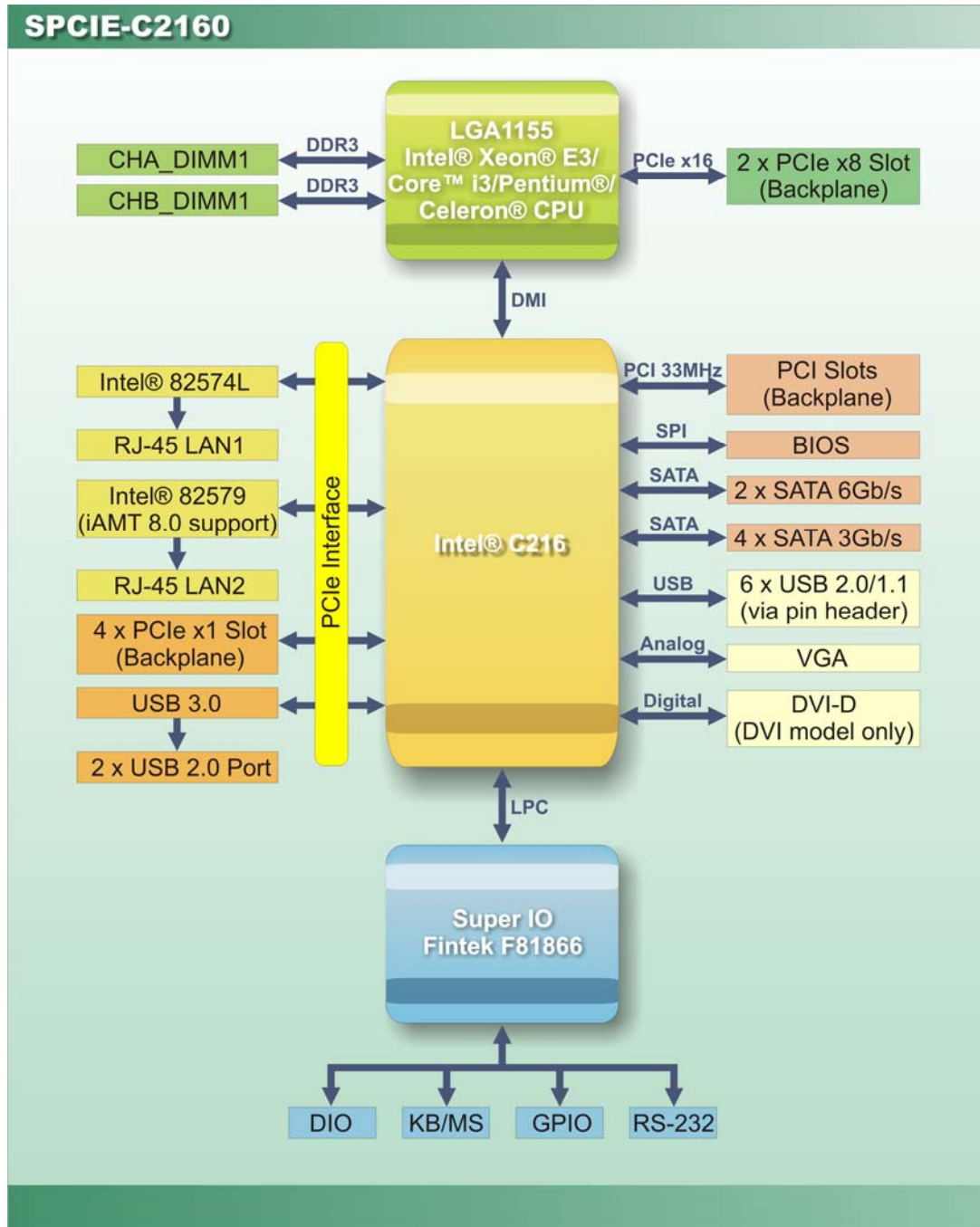


**Figure 1-5: Data Flow Diagram**

## 1.7 Technical Specifications

The SPCIE-C2160 technical specifications are listed below.

| Specification/Model | SPCIE-C2160 |
|---|---|
| Form Factor | PICMG 1.3 |
| CPU Supported | LGA1155 Intel® Xeon® E3/Core™ i3/Pentium®/Celeron® CPU |
| Chipset | Intel® C216 |
| Memory | Two 240-pin 1600/1333 MHz dual-channel ECC/non-ECC unbuffered DDR3 SDRAM DIMMs support (system max. 16.0 GB) |
| Graphics Engine | Intel® HD Graphics Gen 7 supports DirectX 11 and OpenCL 1.1<br>Full MPEG2, VC1, AVC Decode |
| Audio | Supports IEI AC-KIT-892HD-R10 audio kit |
| BIOS | UEFI BIOS<br>B285ARxx supports one PCIe x4 slot (default)<br>B285APxx supports four PCIe x1 slots |
| Ethernet Controllers | Intel® 82574L PCIe Ethernet controller (LAN1)<br>Intel® 82579 PHY with Intel® AMT 8.0 support (LAN2) |
| Super I/O Controller | Fintek F81866 |
| Watchdog Timer | Software programmable supports 1~255 sec. system reset |
| Expansions | One PCIe Mini slot (with USB 2.0/1.1 signal)<br>4 x PCI link via golden finger<br>**16-lane PCIe link from CPU via golden finger:**<br>Support either one PCIe x16 slot, two PCIe x8 slots or two PCIe x4 plus one PCIe x8 slots on the backplane (selected by BIOS)<br>**4-lane PCIe link from PCH via golden finger:**<br>Support either one PCIe x4 slot or four PCIe x1 slots on the backplane<br>For installing PCIe x1 devices on the backplane, the user must update BIOS to the version which supports four PCIe x1 slots |

| I/O Interface Connectors | |
|---|---|
| **Audio Connector** | One internal audio connector (10-pin header) |
| **Digital I/O** | 8-bit digital I/O |
| **Display Output** | One VGA<br>One DVI-D (via 26-pin header to<br>IO-KIT-001-R20 DVI-D/USB module) (DVI model only) |
| **Ethernet** | Two RJ-45 GbE ports |
| **Fan** | One 4-pin wafer connector |
| **Front Panel** | One 14-pin header (power LED, HDD LED, speaker, power button,<br>reset button) |
| **I2C** | One 4-pin wafer connector |
| **Infrared** | One via 5-pin header |
| **Keyboard/Mouse** | One 6-pin wafer connector |
| **Parallel Port** | One parallel port via internal 26-pin box header |
| **Serial ATA** | Four SATA 3Gb/s connectors (support RAID 0, 1, 5, 10)<br>Two SATA 6Gb/s connectors (support RAID 0, 1, 5, 10) |
| **Serial Ports** | Four RS-232 via internal box headers<br>One RS-422/485 via internal 4-pin wafer connector |
| **SMBus** | One 4-pin wafer connector |
| **TPM** | One via 20-pin header |
| **USB Ports** | Two external USB 2.0 ports on rear IO<br>Six internal USB 2.0 ports by three pin headers |
| Environmental and Power Specifications | |
| **Power Supply** | AT/ATX power supported |
| **Power Consumption** | 5V@3.98A , 12V@0.38A, Vcore_12V@7.81A, 3.3V@1.61A,<br>5VSB@0.15A (3.4 GHz Intel® Xeon® E3 CPU with two 2GB 1333 MHz<br>DDR3 memory) |
| **Operating Temperature** | -10ºC ~ 60ºC |

| Storage Temperature | -20ºC ~ 70ºC |
|---|---|
| Humidity | 5% ~ 95% (non-condensing) |
| Physical Specifications | |
| Dimensions | 338 mm x 126 mm |
| Weight (GW/NW) | 1200 g / 420 g |

Table 1-2: SPCIE-C2160 Specifications

**Chapter**

# 2

# Packing List

## 2.1 Anti-static Precautions

⚠️ **WARNING!**

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

Make sure to adhere to the following guidelines:

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

## 2.2 Unpacking Precautions

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

- Follow the anti-static 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 SPCIE-C2160 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The SPCIE-C2160 is shipped with the following components:

| Quantity | Item and Part Number | Image |
|---|---|---|
| 1 | SPCIE-C2160 CPU card | |
| 4 | SATA cable<br>(**P/N**: 32000-062800-RS) | |
| 1 | Dual RS-232 cable<br>(**P/N**: 19800-000051-RS) | |
| 1 | Dual-port USB cable with bracket<br>(**P/N**: 19800-003100-300-RS) | |
| 1 | Mini jumper pack | |

| Quantity | Item and Part Number | Image |
|---|---|---|
| 1 | DVI-D/USB kit (DVI model only) (**P/N**: IO-KIT-001-R20) | |
| 1 | One Key Recovery CD | |
| 1 | Utility CD | |
| 1 | Quick Installation Guide | |

**Table 2-1: Packing List**

## 2.4 Optional Items

The following are optional components which may be separately purchased:

| Item and Part Number | Image |
|---|---|
| RS-422/485 cable, 200 mm (**P/N**: 32205-003800-300-RS) | |
| KB/MS cable with bracket (**P/N**: 19800-000075-RS) | |
| SATA to IDE/CF converter board (**P/N**: SAIDE-KIT01-R10) | |
| SATA power cable (**P/N**: 32102-000100-200-RS) | |

| Item and Part Number | Image |
|---|---|
| LPT cable<br>(**P/N**: 19800-000049-RS) | |
| 7.1-channel HD audio kit with Realtek ALC892 audio codec supporting dual audio stream<br>(**P/N**: AC-KIT-892HD-R10) | |
| LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W)<br>(**P/N**: CF-1156A-RS-R11) | |
| LGA1155/LGA1156 cooler kit (1U chassis compatible, 45W)<br>(**P/N**: CF-1156C-RS) | |
| LGA1155/LGA1156 cooler kit (1U chassis compatible, 65W)<br>(**P/N**: CF-1156D-RS) | |
| LGA1155/LGA1156 cooler kit (95W)<br>(**P/N**: CF-1156E-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 SPCIE-C2160 Layout

The figures below show all the connectors and jumpers.
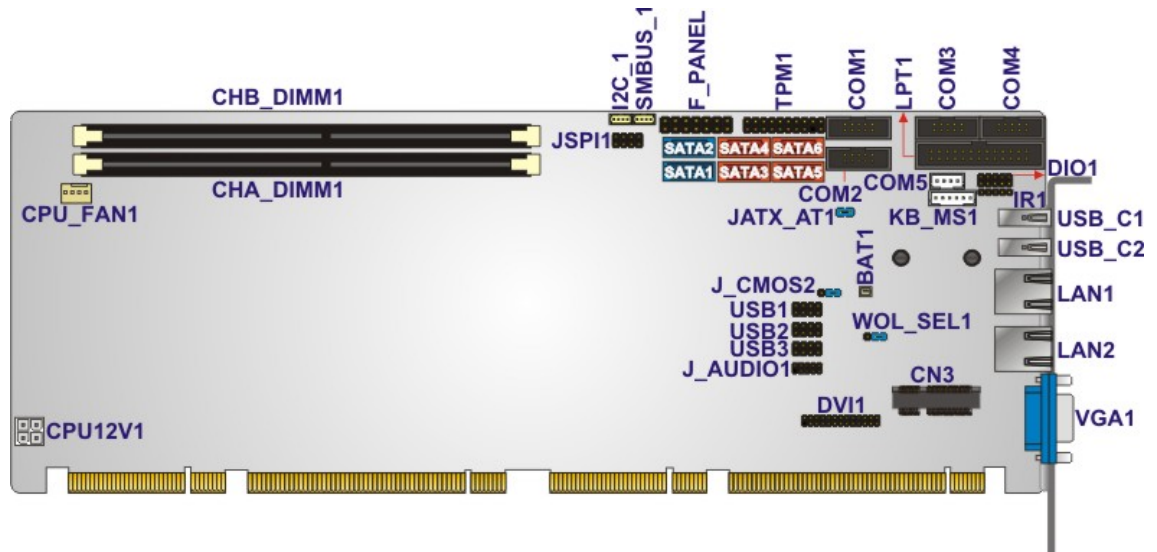


**Figure 3-1: Connectors and Jumpers**

### 3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

| Connector | Type | Label |
|---|---|---|
| +12V ATX power supply connector | 4-pin Molex power connector | CPU12V1 |
| Audio kit connector | 10-pin header | J_AUDIO1 |
| Battery connector | 2-pin wafer | BT2 |
| DDR3 DIMM sockets | 240-pin socket | CHA_DIMM1 CHB_DIMM1 |
| Digital I/O connector | 10-pin header | DIO1 |
| DVI-D connector (DVI model only) | 26-pin header | DVI1 |

| Connector | Type | Label |
|---|---|---|
| Fan connector (CPU) | 4-pin wafer | CPU_FAN1 |
| Front panel connector | 14-pin header | F_PANEL1 |
| I2C connector | 4-pin wafer | I2C_1 |
| Infrared connector | 5-pin header | IR1 |
| Keyboard and mouse connector | 6-pin wafer | KB_MS1 |
| Parallel port connector | 26-pin box header | LPT1 |
| PCIe Mini slot | PCIe Mini | CN3 |
| SATA 3Gb/s drive connector | 7-pin SATA connector | SATA3, SATA4, SATA5, SATA6 |
| SATA 6Gb/s drive connector | 7-pin SATA connector | SATA1, SATA2 |
| Serial port, RS-422/485 | 4-pin wafer | COM5 |
| Serial port, RS-232 | 10-pin box header | COM1, COM2, COM3, COM4 |
| SMBus connector | 4-pin wafer | SMBUS_1 |
| SPI ROM connector | 8-pin header | JSPI1 |
| TPM connector | 20-pin header | TPM1 |
| USB connectors | 8-pin header | USB1, USB2, USB3 |

**Table 3-1: Peripheral Interface Connectors**

### 3.1.3 External Interface Panel Connectors

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

| Connector | Type | Label |
|---|---|---|
| Ethernet connector | RJ-45 | LAN1 |
| Ethernet connector | RJ-45 | LAN2 |
| USB port | USB | USB_C1 |
| USB port | USB | USB_C2 |

| Connector | Type | Label |
|---|---|---|
| VGA connector | 15-pin female | VGA1 |

**Table 3-2: Rear Panel Connectors**

## 3.2 Internal Peripheral Connectors

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

### 3.2.1 12V Power Connector

| | |
|---|---|
| **CN Label:** | **CPU12V1** |
| **CN Type:** | 4-pin Molex power connector |
| **CN Location:** | See **Figure 3-2** |
| **CN Pinouts:** | See **Table 3-3** |

The connector supports the 12V power supply.
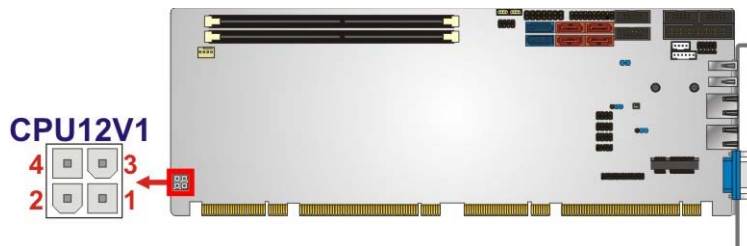


**Figure 3-2: ATX Power Connector Pinout Location**

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | GND | 2 | GND |
| 3 | +12V | 4 | +12V |

**Table 3-3: ATX Power Connector Pinouts**

### 3.2.2 Audio Kit Connector

| | |
|---|---|
| **CN Label:** | **J_AUDIO1** |
| **CN Type:** | 10-pin header |
| **CN Location:** | See **Figure 3-3** |

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

This connector connects to an external audio kit.
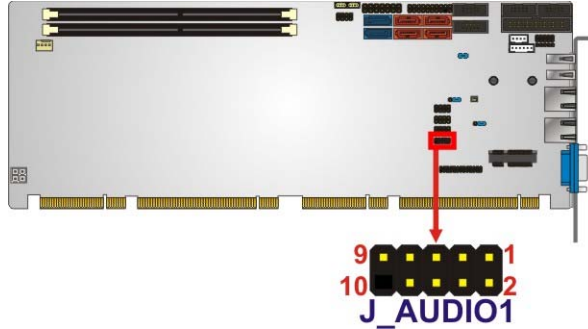


**Figure 3-3: Audio Connector Location**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | ACZ_SYNC | 2 | ACZ_BITCLK |
| 3 | ACZ_SDOUT | 4 | ACZ_PCBEEP |
| 5 | ACZ_SDIN | 6 | ACZ_RST# |
| 7 | ACZ_VCC | 8 | ACZ_GND |
| 9 | ACZ_12V | 10 | ACZ_GND |

**Table 3-4: Audio Connector Pinouts**

## 3.2.3 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:** 2-pin wafer

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

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

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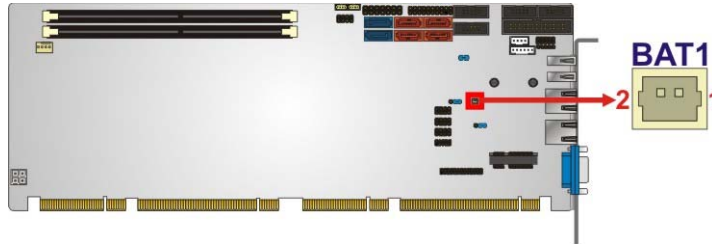


**Figure 3-4: Battery Connector Location**

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | Battery+ |

**Table 3-5: Battery Connector (BT2) Pinouts**

## 3.2.4 DDR3 DIMM Slots

**CN Label:** **CHA_DIMM1, CHB_DIMM1**

**CN Type:** DDR3 DIMM slot

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

The DIMM slots are for DDR3 DIMM memory modules.
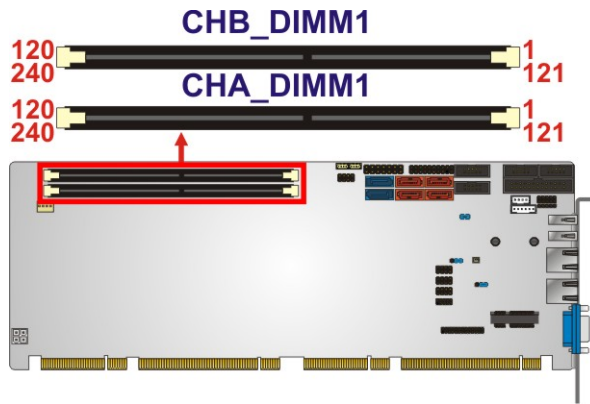
**Figure 3-5: DDR3 DIMM Slot Locations**

## 3.2.5 Digital I/O Connector

**CN Label:** DIO1

**CN Type:** 10-pin header

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

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

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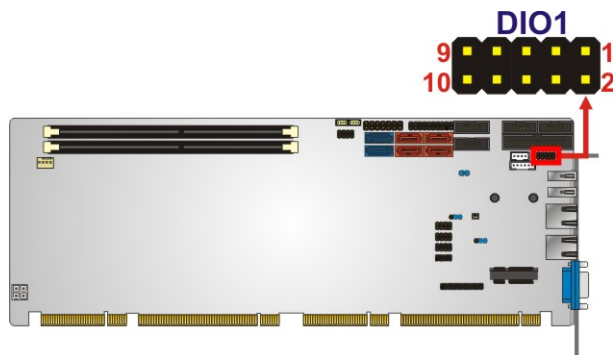


**Figure 3-6: Digital I/O Connector Location**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---|---|---|---|
| 1 | GND | 2 | VCC |
| 3 | Output 3 | 4 | Output 2 |
| 5 | Output 1 | 6 | Output 0 |

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 7 | Input 3 | 8 | Input 2 |
| 9 | Input 1 | 10 | Input 0 |

**Table 3-6: Digital I/O Connector Pinouts**

## 3.2.6 DVI-D Connector (DVI Model Only)

**CN Label:**      DVI1

**CN Type:**      26-pin header

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

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

The DVI-D connector connects to a monitor that supports DVI video input via the DVI-D/USB kit.
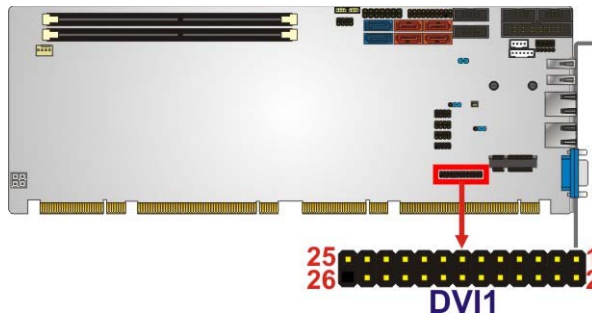


**Figure 3-7: DVI-D Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Data 2- | 2 | Data 2+ |
| 3 | GND | 4 | NC |
| 5 | NC | 6 | DDC Clock |
| 7 | DDC Data | 8 | NC |
| 9 | Data 1- | 10 | Data 1+ |
| 11 | GND | 12 | NC |
| 13 | NC | 14 | VCC |
| 15 | GND | 16 | Hot Plug Detect |
| 17 | Data 0- | 18 | Data 0+ |

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 19 | GND | 20 | NC |
| 21 | NC | 22 | GND |
| 23 | Clock + | 24 | Clock - |
| 25 | GND | 26 | NC |

**Table 3-7: DVI-D Connector Pinouts**

### 3.2.7 Fan Connector (CPU)

**CN Label:** **CPU_FAN1**

**CN Type:** 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.
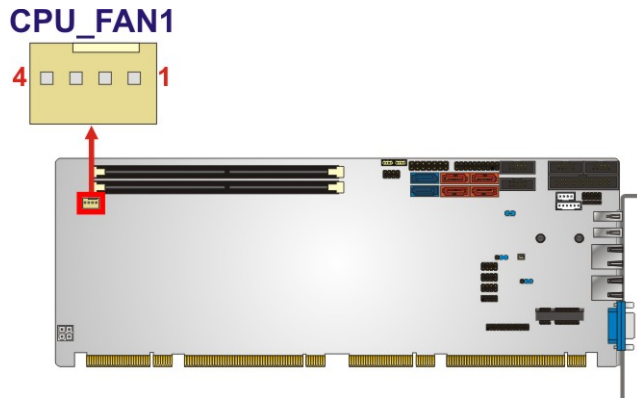


**Figure 3-8: CPU Fan Connector Location**

| PIN NO. | DESCRIPTION |
|---------|-------------|
| 1 | GND |
| 2 | +12 V |
| 3 | Rotation Signal |
| 4 | PWM Control Signal |

**Table 3-8: CPU Fan Connector Pinouts**

### 3.2.8 Front Panel Connector

| | |
|---|---|
| **CN Label:** | **F_PANEL1** |
| **CN Type:** | 14-pin header |
| **CN Location:** | See **Figure 3-9** |
| **CN Pinouts:** | See **Table 3-9** |

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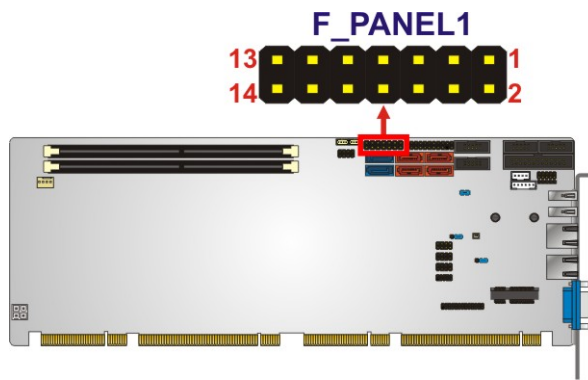


**Figure 3-9: Front Panel Connector Location**

| FUNCTION | PIN | DESCRIPTION | FUNCTION | PIN | DESCRIPTION |
|---|---|---|---|---|---|
| Power LED | 1 | +5V | Speaker | 2 | +5V |
| | 3 | N/C | | 4 | N/C |
| | 5 | GROUND | | 6 | N/C |
| Power Button | 7 | PWR_BTN+ | | 8 | Speaker |
| | 9 | PWR_BTN- | Reset | 10 | N/C |
| HDD LED | 11 | +5V | | 12 | RESET- |
| | 13 | HDD_LED- | | 14 | GROUND |

**Table 3-9: Front Panel Connector Pinouts**

### 3.2.9 I2C Connector

**CN Label:**      **I2C_1**

**CN Type:**      4-pin wafer

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

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

The I2C connector is for system debug.
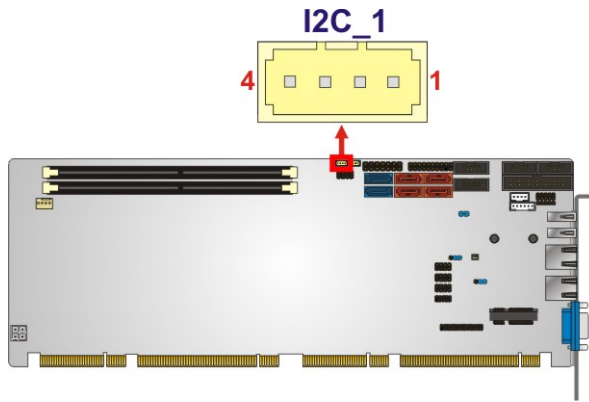
**Figure 3-10: I2C Connector Location**

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | PCH_GP38_PU |
| 3 | PCH_GP39_PU |
| 4 | +5VS |

**Table 3-10: I2C Connector Pinouts**

### 3.2.10 Infrared Interface Connector

**CN Label:**      **IR1**

**CN Type:**      5-pin header

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

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

The infrared connector attaches to an infrared receiver for use with remote controls.
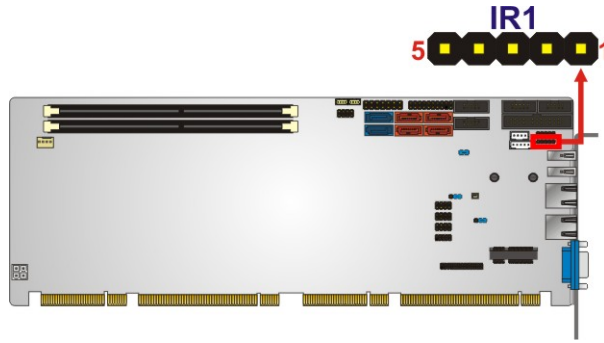
**Figure 3-11: Infrared Connector Location**

| Pin | Description |
|-----|-------------|
| 1 | VCC |
| 2 | NC |
| 3 | IR-RX |
| 4 | GND |
| 5 | IR-TX |

**Table 3-11: Infrared Connector Pinouts**

## 3.2.11 Keyboard/Mouse Connector

| | |
|---|---|
| **CN Label:** | **KB_MS1** |
| **CN Type:** | 6-pin wafer |
| **CN Location:** | See **Figure 3-12** |
| **CN Pinouts:** | See **Table 3-12** |

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.
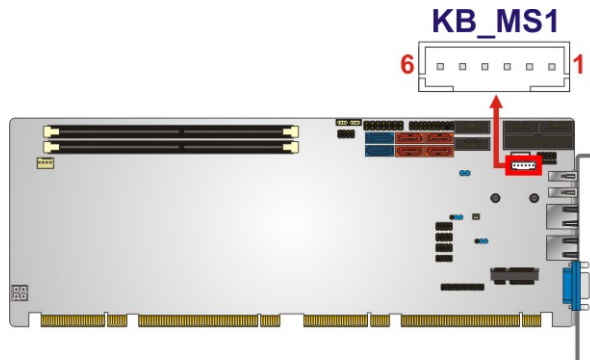
**Figure 3-12: Keyboard/Mouse Connector Location**

| Pin | Description |
| --- | --- |
| 1 | +5 VCC |
| 2 | Mouse Data |
| 3 | Mouse Clock |
| 4 | Keyboard Data |
| 5 | Keyboard Clock |
| 6 | GROUND |

**Table 3-12: Keyboard/Mouse Connector Pinouts**

## 3.2.12 Parallel Port Connector

**CN Label:**      **LPT1**

**CN Type:**       26-pin box header

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

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

The parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.
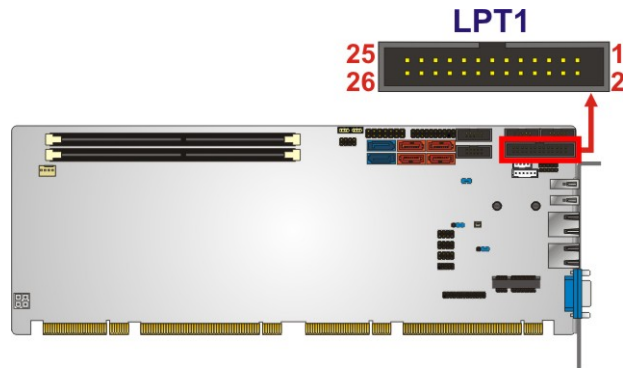
**Figure 3-13: Parallel Port Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | STROBE# | 2 | DATA0 |
| 3 | DATA1 | 4 | DATA2 |
| 5 | DATA3 | 6 | DATA4 |
| 7 | DATA5 | 8 | DATA6 |
| 9 | DATA7 | 10 | ACKNOWLEDGE# |
| 11 | BUSY | 12 | PAPER EMPTY |
| 13 | PRINTER SELECT | 14 | AUTO FORM FEED # |
| 15 | ERROR# | 16 | INITIALIZE# |
| 17 | PRINTER SELECT LN# | 18 | GND |
| 19 | GND | 20 | GND |
| 21 | GND | 22 | GND |
| 23 | GND | 24 | GND |
| 25 | GND | | |

**Table 3-13: Parallel Port Connector Pinouts**

## 3.2.13 PCIe Mini Card Slot

> **CN Label:**      **CN3**
>
> **CN Type:**       PCIe Mini card slot
>
> **CN Location:**   See **Figure 3-14**
>
> **CN Pinouts:**    See **Table 3-14**

The PCIe Mini card slot is for installing a PCIe Mini expansion card.
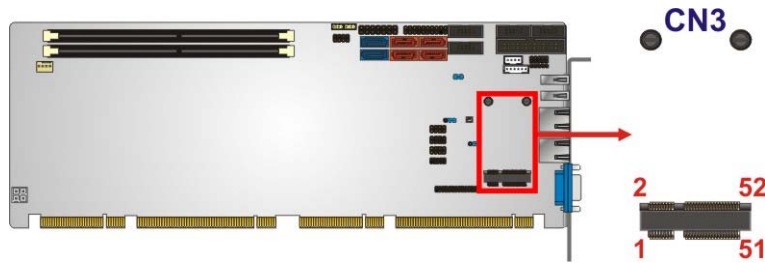


**Figure 3-14: PCIe Mini Card Slot Location**

| Pin | Description | Pin | Description |
| --- | --- | --- | --- |
| 1 | PCIE_WAKE# | 2 | VCC3 |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | 1.5V |
| 7 | CLKREQ# | 8 | LFRAME# |
| 9 | GND | 10 | LAD3 |
| 11 | CLK- | 12 | LAD2 |
| 13 | CLK+ | 14 | LAD1 |
| 15 | GND | 16 | LAD0 |
| 17 | PCIRST# | 18 | GND |
| 19 | LPC | 20 | VCC3 |
| 21 | GND | 22 | PCIRST# |
| 23 | PERN2 | 24 | 3VDual |
| 25 | PERP2 | 26 | GND |
| 27 | GND | 28 | 1.5V |
| 29 | GND | 30 | SMBCLK |
| 31 | PETN2 | 32 | SMBDATA |
| 33 | PETP2 | 34 | GND |
| 35 | GND | 36 | USBD- |
| 37 | NC | 38 | USBD+ |
| 39 | NC | 40 | GND |
| 41 | NC | 42 | NC |
| 43 | NC | 44 | RF_LINK# |
| 45 | NC | 46 | BLUELED# |

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 47 | NC | 48 | 1.5V |
| 49 | NC | 50 | GND |
| 51 | NC | 52 | VCC3 |

**Table 3-14: PCIe Mini Card Slot Pinouts**

### 3.2.14 SATA 3Gb/s Drive Connector

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

**CN Type:**        7-pin SATA drive connector

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

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

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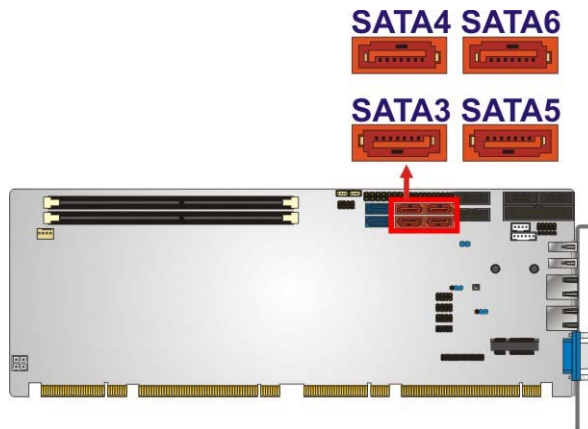


**Figure 3-15: SATA 3Gb/s Drive Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | GND | 2 | TX+ |
| 3 | TX- | 4 | GND |
| 5 | RX- | 6 | RX+ |
| 7 | GND | | |

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

### 3.2.15 SATA 6Gb/s Drive Connector

**CN Label:** SATA1, SATA2

**CN Type:** 7-pin SATA drive connector

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

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

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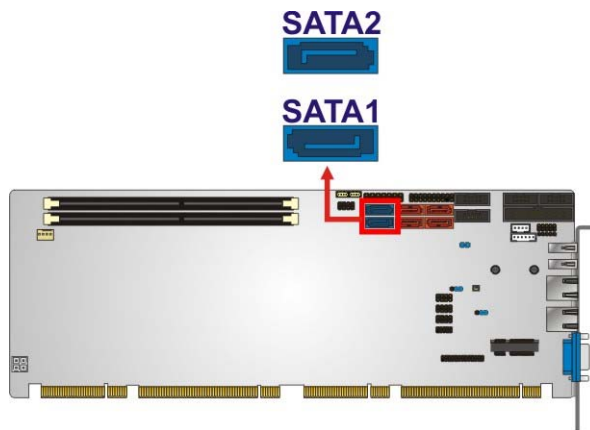


**Figure 3-16: SATA 6Gb/s Drive Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | GND | 2 | TX+ |
| 3 | TX- | 4 | GND |
| 5 | RX- | 6 | RX+ |
| 7 | GND | | |

**Table 3-16: SATA 6Gb/s Drive Connector Pinouts**

### 3.2.16 Serial Port Connectors, RS-232

**CN Label:** COM1, COM2, COM3, COM4

**CN Type:** 10-pin box header

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

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

Each of these connectors provides RS-232 connections.
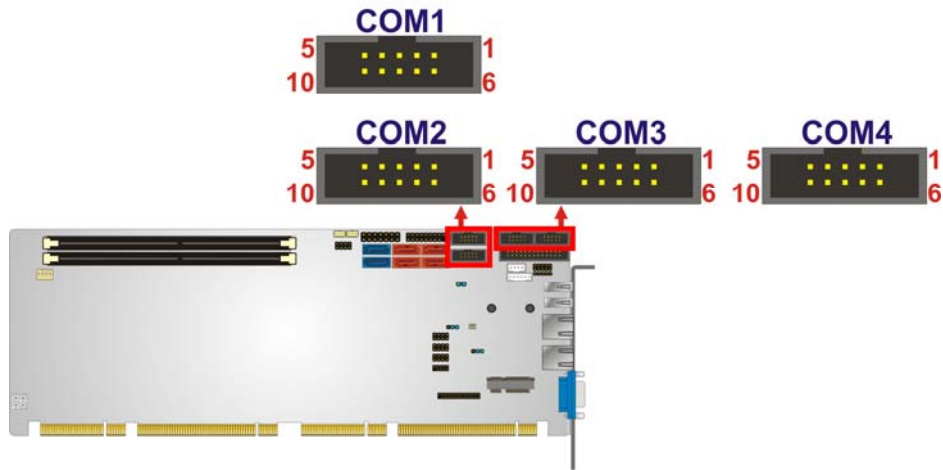


**Figure 3-17: Serial Port Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1 | Data Carrier Direct (DCD) | 2 | Receive Data (RXD) |
| 3 | Transmit Data (TXD) | 4 | Data Terminal Ready (DTR) |
| 5 | Ground (GND) | 6 | Data Set Ready (DSR) |
| 7 | Request To Send (RTS) | 8 | Clear To Send (CTS) |
| 9 | Ring Indicator (RI) | 10 | N/C |

**Table 3-17: Serial Port Connector Pinouts**

### 3.2.17 Serial Port Connector, RS-422/485

**CN Label:** COM5

**CN Type:** 4-pin wafer

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

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

This connector provides RS-422 or RS-485 communications.
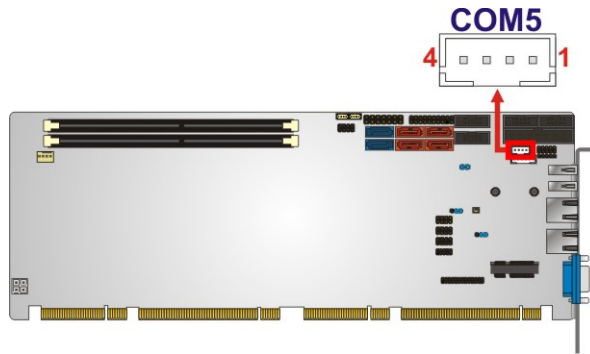
**Figure 3-18: RS-422/485 Connector Location**

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

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

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



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

## 3.2.18 SMBus Connector

CN Label:        **SMBUS_1**

CN Type:        4-pin wafer

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

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

The SMBus (System Management Bus) connector provides low-speed system management communications.
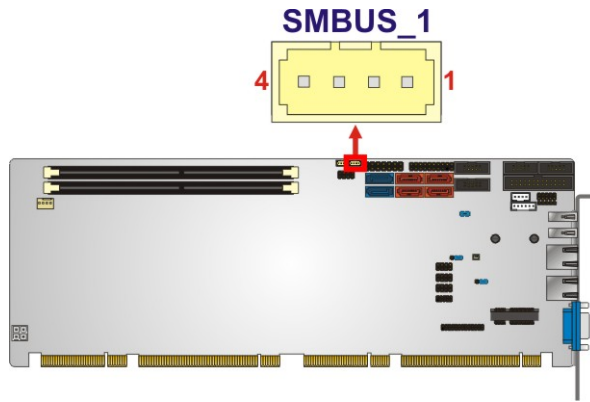
**Figure 3-19: SMBus Connector Location**

| Pin | Description |
|-----|-------------|
| 1 | GND |
| 2 | SMB_DATA |
| 3 | SMB_CLK |
| 4 | +V5S |

**Table 3-20: SMBus Connector Pinouts**

## 3.2.19 SPI ROM Connector

| | |
|---|---|
| **CN Label:** | JSPI1 |
| **CN Type:** | 8-pin header |
| **CN Location:** | See **Figure 3-20** |
| **CN Pinouts:** | See **Table 3-21** |

The SPI connector is used to flash the BIOS.
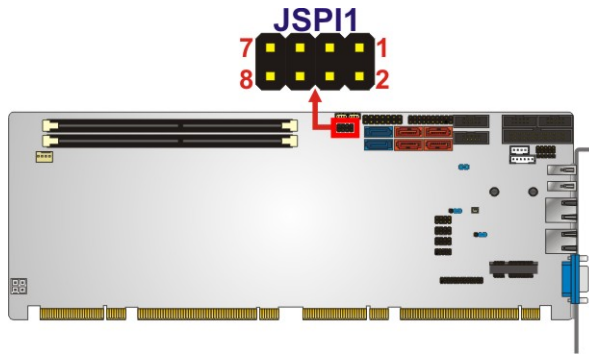
**Figure 3-20: SPI Connector Location**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | +3.3V | 2 | GND |
| 3 | SPI_CS0 | 4 | SPI_CLK |
| 5 | SPI_SO0 | 6 | SPI_SI |
| 7 | NC | 8 | NC |

**Table 3-21: SPI Connector Pinouts**

## 3.2.20 TPM Connector

**CN Label:**     **TPM1**

**CN Type:**     20-pin header

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

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

The TPM connector connects to a TPM module.
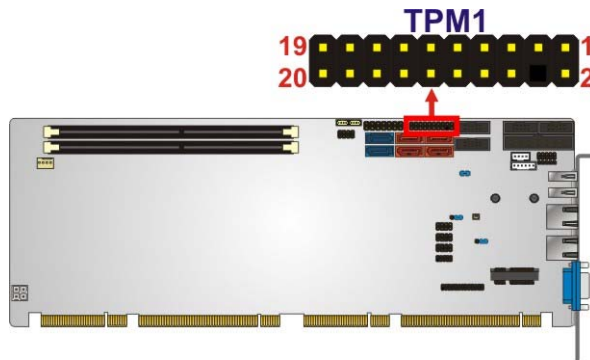
**Figure 3-21: TPM Connector Location**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | CLK | 2 | GND |
| 3 | ERAME# | 4 | NC |
| 5 | RESRT# | 6 | +5V |
| 7 | AD3 | 8 | AD2 |
| 9 | +3V | 10 | AD1 |
| 11 | AD0 | 12 | GND |
| 13 | SMB_CLK | 14 | SMB_DATA |
| 15 | SB3V | 16 | SERIRQ |
| 17 | GND | 18 | CLKRUN# |
| 19 | PM_SUS_STAT# | 20 | DRQ# |

**Table 3-22: TPM Connector Pinouts**

## 3.2.21 USB Connectors

**CN Label:**　　USB1, USB2, USB3

**CN Type:**　　8-pin header

**CN Location:**　See **Figure 3-22**

**CN Pinouts:**　See **Table 3-23**

The USB connectors connect to USB devices. Each pin header provides two USB ports.
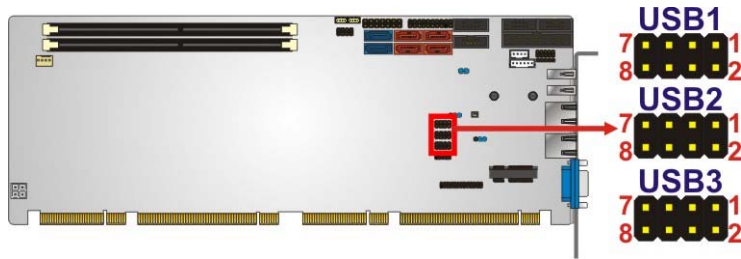
**Figure 3-22: USB Connector Pinout Locations**

| PIN NO. | DESCRIPTION | PIN NO. | DESCRIPTION |
|---------|-------------|---------|-------------|
| 1 | VCC | 2 | GND |
| 3 | DATA- | 4 | DATA+ |
| 5 | DATA+ | 6 | DATA- |
| 7 | GND | 8 | VCC |

**Table 3-23: USB Port Connector Pinouts**

## 3.3 External Peripheral Interface Connector Panel

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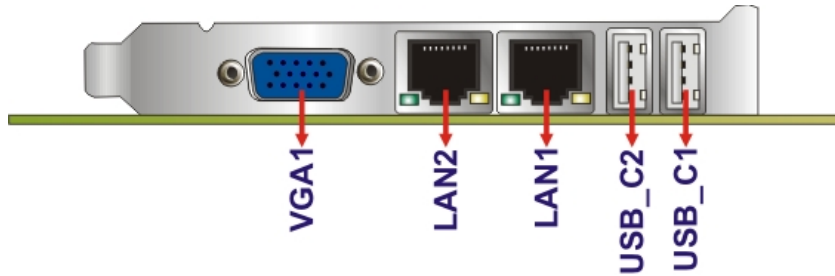


**Figure 3-23: External Peripheral Interface Connector**

### 3.3.1 Ethernet Connectors

**CN Label:**      **LAN1** and **LAN2**

**CN Type:**      RJ-45

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

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

The SPCIE-C2160 is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

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

**Table 3-24: LAN Pinouts**
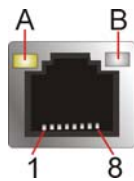


**Figure 3-24: Ethernet Connector**

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

**Table 3-25: Connector LEDs**

### 3.3.2 USB Connectors

| | |
|---|---|
| **CN Label:** | **USB_C1 and USB_C2** |
| **CN Type:** | USB port |
| **CN Location:** | See **Figure 3-23** |
| **CN Pinouts:** | See **Table 3-26** |

The SPCIE-C2160 has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

| Pin | Description |
|-----|-------------|
| 1 | VCC |
| 2 | DATA- |

| Pin | Description |
| --- | --- |
| 3 | DATA+ |
| 4 | GROUND |

**Table 3-26: USB Port Pinouts**

### 3.3.3 VGA Connector

| | | |
| --- | --- | --- |
| **CN Label:** | **VGA1** | |
| **CN Type:** | 15-pin Female | |
| **CN Location:** | See **Figure 3-23** | |
| **CN Pinouts:** | See **Figure 3-25** and **Table 3-27** | |

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

| Pin | Description | Pin | Description |
| --- | --- | --- | --- |
| 1 | RED | 2 | GREEN |
| 3 | BLUE | 4 | NC |
| 5 | GND | 6 | GND |
| 7 | GND | 8 | GND |
| 9 | VGAVCC | 10 | GND |
| 11 | NC | 12 | DDCDAT |
| 13 | HSYNC | 14 | VSYNC |
| 15 | DDCCLK | | |

**Table 3-27: VGA Connector Pinouts**
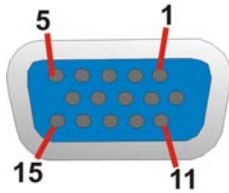


**Figure 3-25: VGA Connector**

**Chapter**

**4**

# Installation

## 4.1 Anti-static Precautions

**WARNING:**

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

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

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

## 4.2 Installation Considerations

**NOTE:**

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

⚠️ **WARNING:**

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

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

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

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

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

### 4.2.1 Socket LGA1155 CPU Installation

---

**WARNING:**

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

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

---

To install the CPU, follow the steps below.

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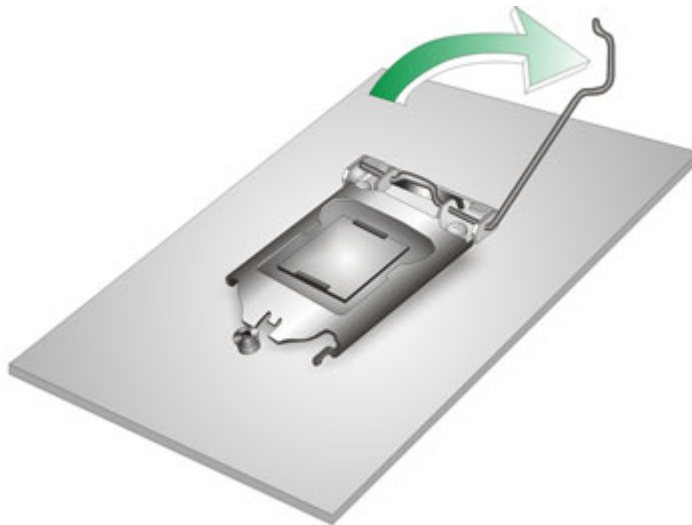


**Figure 4-1: Disengage the CPU Socket Load Lever**

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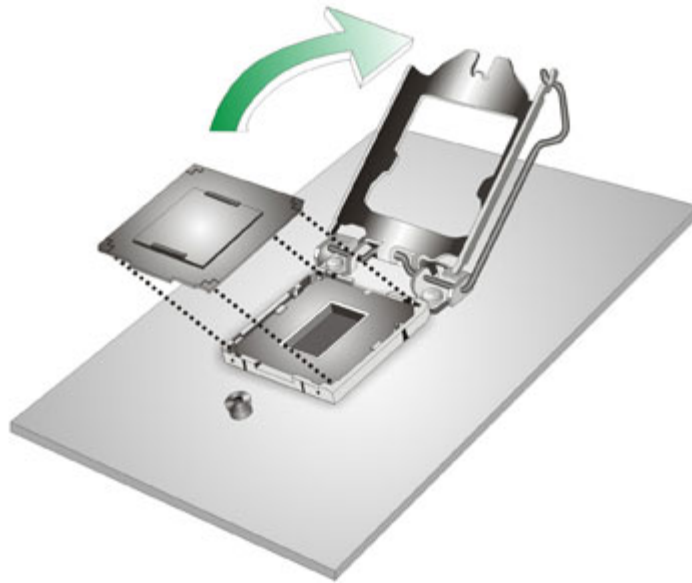
**Figure 4-2: Remove Protective Cover**

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

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

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

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

**Step 7:** **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-3**.
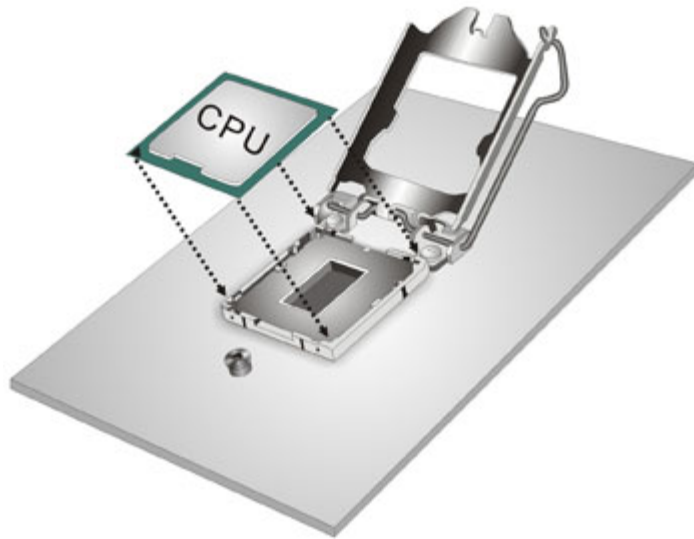
**Figure 4-3: Insert the Socket LGA1155 CPU**

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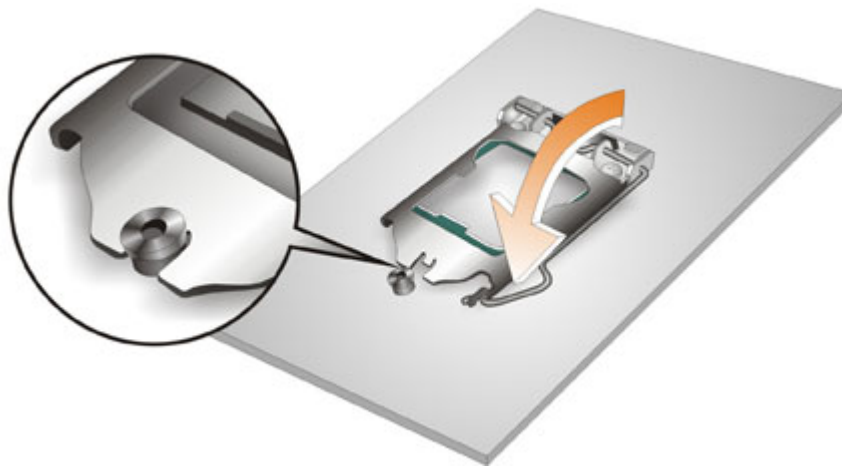


**Figure 4-4: Close the Socket LGA1155**

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

### 4.2.2 Socket LGA1155 Cooling Kit Installation

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

![WARNING icon] **WARNING:**

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

To install the cooling kit, follow the instructions below.

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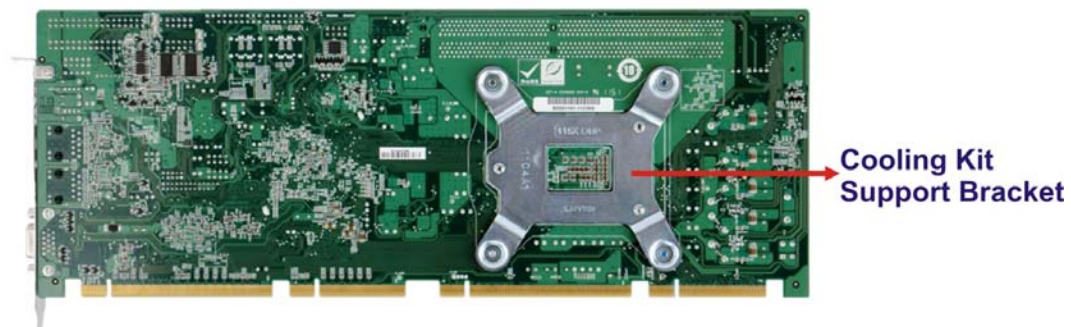


**Figure 4-5: Cooling Kit Support Bracket**

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

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

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

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

## 4.2.3 DIMM Installation

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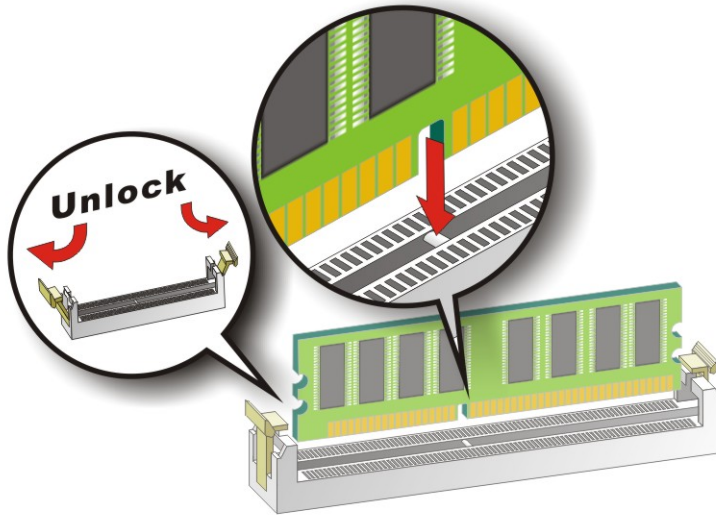


**Figure 4-6: DIMM Installation**

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

**Step 2:** **Align the DIMM with the socket**. Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-6**.

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

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

## 4.3 Jumper Settings

**NOTE:**

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
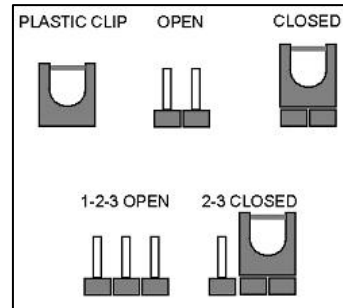
The hardware jumpers must be set before installation. Jumpers are shown in **Table 4-1**.

| Description | Label | Type |
|---|---|---|
| AT/ATX power select | JATX_AT1 | 2-pin header |
| Clear CMOS jumper | J_CMOS1 | 3-pin header |
| Wake-on LAN | WOL_SEL1 | 3-pin header |

**Table 4-1: Jumpers**

### 4.3.1 AT/ATX Power Select Jumper

| | |
|---|---|
| **Jumper Label:** | JATX_AT1 |
| **Jumper Type:** | 2-pin header |
| **Jumper Settings:** | See **Table 4-2** |
| **Jumper Location:** | See **Figure 4-7** |

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

| Setting | Description |
|---------|-------------|
| Closed | ATX power (Default) |
| Open | AT power |

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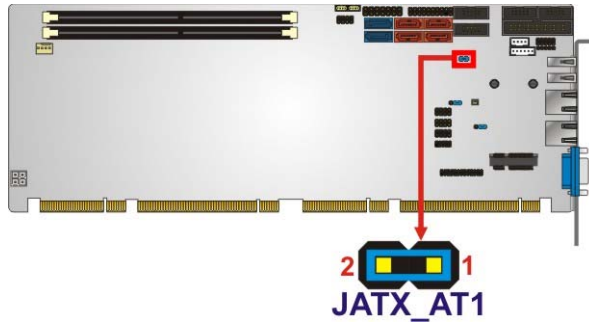


**Figure 4-7: AT/ATX Power Mode Jumper Location**

## 4.3.2 Clear CMOS Jumper

**Jumper Label:**        **J_CMOS1**

**Jumper Type:**        3-pin header

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

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

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

| Setting | Description |
|---------|-------------|
| Short 1-2 | Normal |
| Short 2-3 | Clear BIOS |

**Table 4-3: Clear BIOS Jumper Settings**
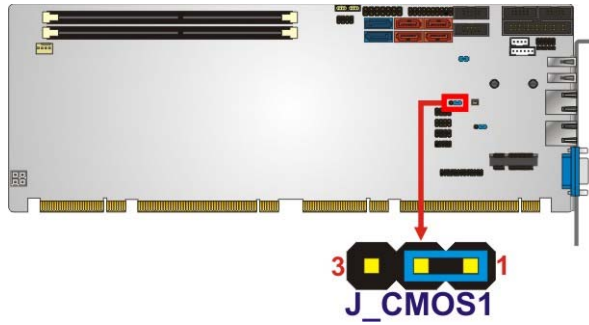
**Figure 4-8: Clear BIOS Jumper Location**

### 4.3.3 Wake-on LAN Jumper

| | |
|---|---|
| **CN Label:** | **WOL_SEL1** |
| **CN Type:** | 3-pin header |
| **CN Location:** | See **Figure 4-9** |
| **CN Pinouts:** | See **Table 4-4** |

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

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

**Table 4-4: Wake-on LAN Connector Pinouts**
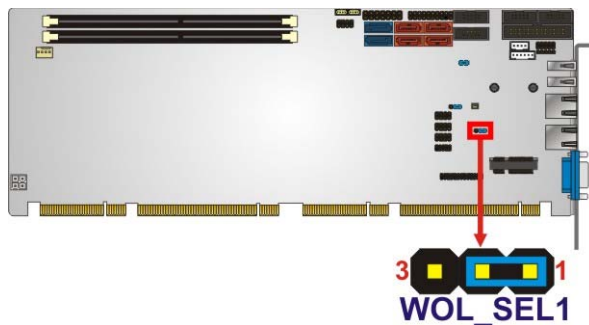


**Figure 4-9: Wake-on LAN Connector Pinout Locations**

## 4.4 Chassis Installation

### 4.4.1 Airflow



**WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the SPCIE-C2160 must have air vents to allow cool air to move into the system and hot air to move out.

The SPCIE-C2160 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

### 4.4.2 CPU Card Installation

To install the CPU card onto the backplane, carefully align the CPU card edge connector with the CPU card socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, please refer to the reference material that came with the chassis.

## 4.5 Internal Peripheral Device Connections

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

### 4.5.1 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

Step 1:   **Locate the connectors**. The locations of the RS-232 connectors are shown in

Chapter 3.

**Step 2:** **Insert the cable connectors**. Insert one connector into each serial port box

headers (**Figure 4-10**). A key on the front of the cable connectors ensures the

connector can only be installed in one direction.
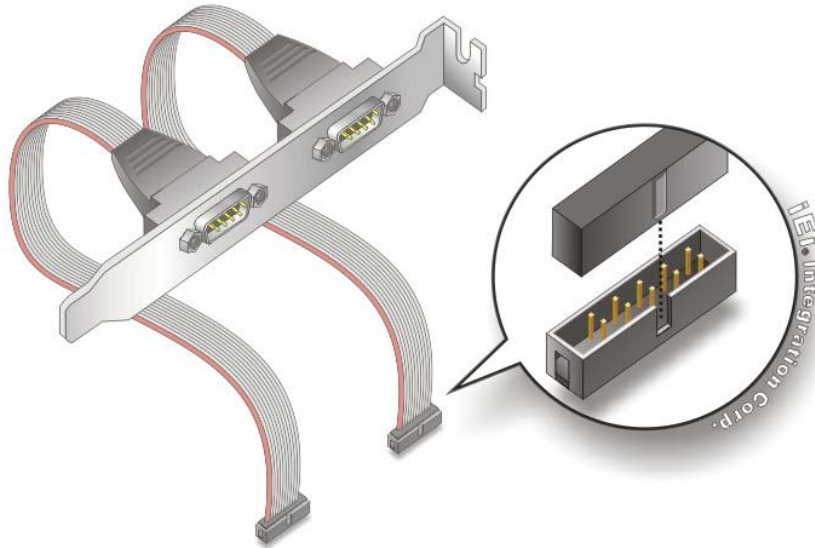


**Figure 4-10: Dual RS-232 Cable Installation**

**Step 3:** **Secure the bracket**. The dual RS-232 connector has two D-sub 9 male

connectors secured on a bracket. To secure the bracket to the chassis please

refer to the reference material that came with the chassis.

## 4.5.2 DVI-D/USB Kit Installation (DVI Model Only)

The DVI-D/USB kit, consisting of one DVI-D and four USB ports, connects to the DVI-D
and USB connectors on the SPCIE-C2160. To install the DVI-D/USB kit, please follow the
steps below.

**Step 1:** **Connect the cables to the DVI-D/USB kit**. Connect the included cables to the

DVI-D/USB kit.

**Step 2:** **Connect the cables to the board**. Connect the other ends of the included

cables to the board.
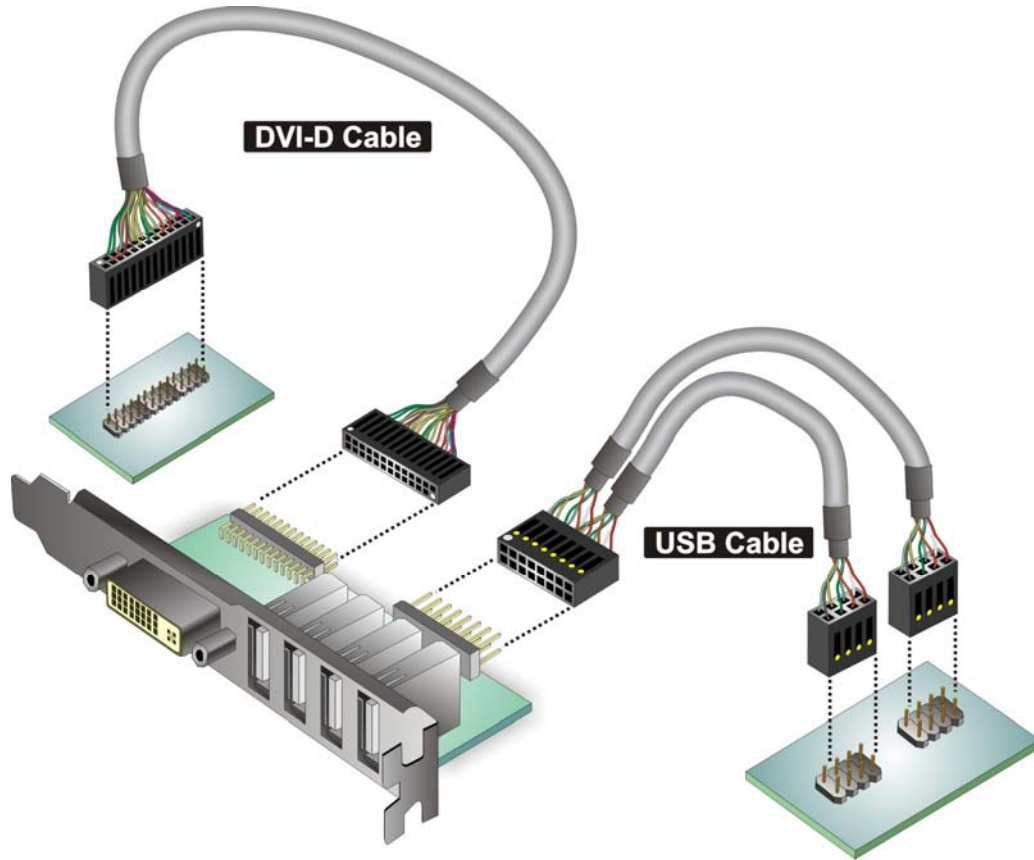
**Figure 4-11: DVI-D/USB Kit Installation**

**Step 3:** **Mount the DVI-D/USB kit onto the chassis**. Once the DVI-D/USB kit is connected to the board, secure the DVI-D/USB kit bracket to the system chassis.

## 4.5.3 SATA Drive Connection

The SPCIE-C2160 is shipped with four SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

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

**Step 2:** **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 4-12**.
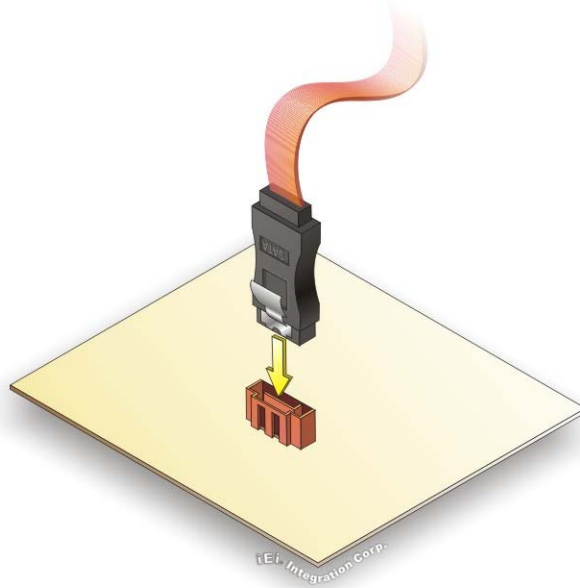
**Figure 4-12: SATA Drive Cable Connection**

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

**Step 4:** **Connect the SATA power cable (optional)**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-13**.
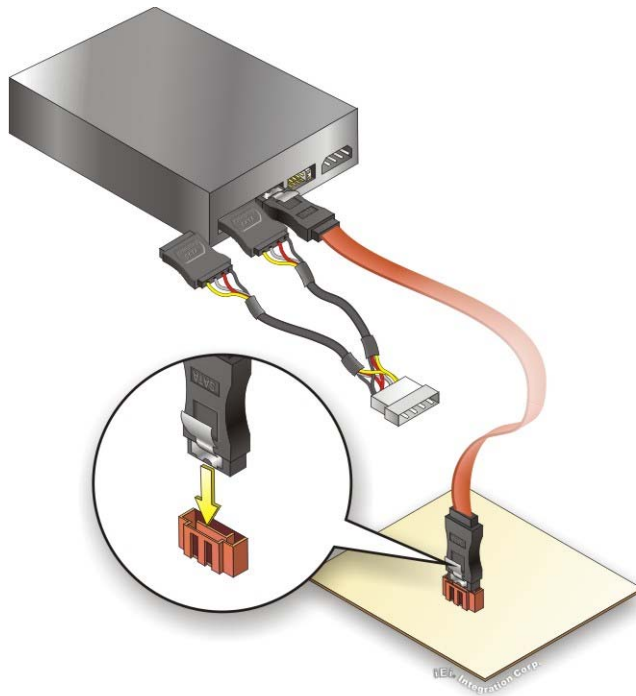
**Figure 4-13: SATA Power Drive Connection**

## 4.5.4 USB Cable (Dual Port) with Slot Bracket

The SPCIE-C2160 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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

⚠ **WARNING:**

If the USB pins are not properly aligned, the USB device can burn out.

**Step 2:** **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the SPCIE-C2160 USB connector.

**Step 3:** **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the SPCIE-C2160, connect the cable connectors to the on-board connectors. See **Figure 4-14**.
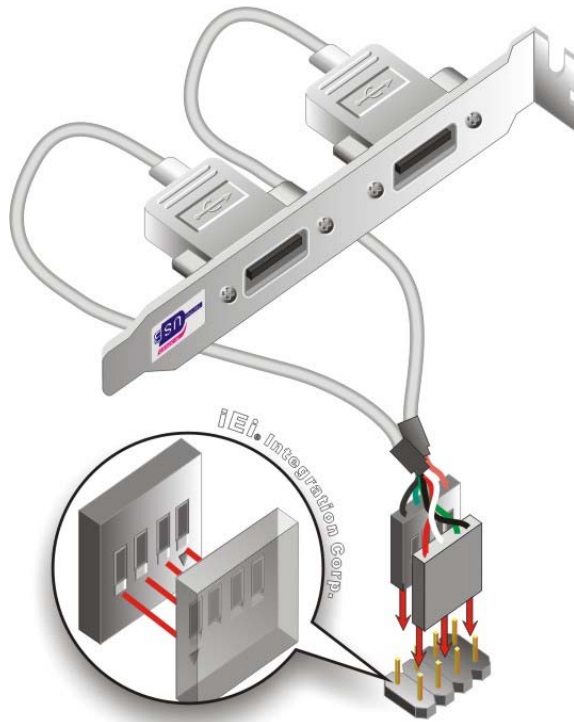


**Figure 4-14: Dual USB Cable Connection**

**Step 4:** **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

## 4.5.5 PCIe Mini Card Installation

To install the PCIe Mini card, please refer to the diagram and instructions below.
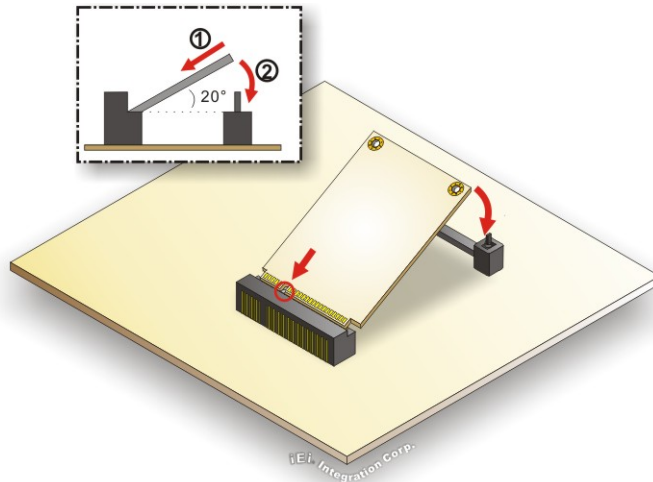
**Figure 4-15: PCIe Mini Card Installation**

**Step 1:** **Insert into the socket at an angle**. Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20º.

**Step 2:** **Push down until the card clips into place**. Push the other end of the card down until it clips into place on the plastic connector.

## 4.6 External Peripheral Interface Connection

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

### 4.6.1 LAN Connection

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

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

**Step 2:** **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the SPCIE-C2160. See **Figure 4-16**.
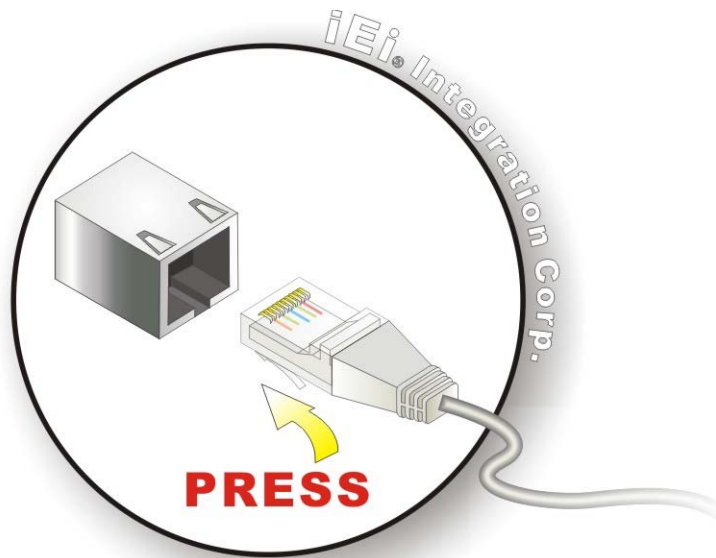
**Figure 4-16: LAN Connection**

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

cable RJ-45 connector into the on-board RJ-45 connector.

## 4.6.2 USB Device Connection (Single Connector)

There are two external USB 2.0 connectors. Both connectors are perpendicular to the SPCIE-C2160. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

**Step 1:** **Located the USB connectors.** The locations of the USB connectors are shown

in Chapter 3.

**Step 2:** **Align the connectors.** Align the USB device connector with one of the

connectors on the SPCIE-C2160. See **Figure 4-17**.
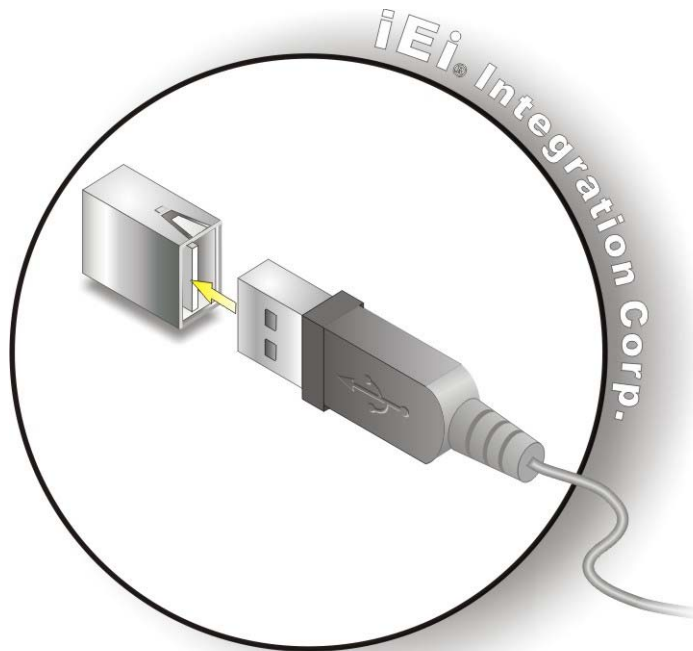
**Figure 4-17: USB Device Connection**

**Step 3:** **Insert the device connector.** Once aligned, gently insert the USB device

connector into the on-board connector.

## 4.6.3 VGA Monitor Connection

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

**Step 1:** **Locate the female DB-15 connector**. The location of the female DB-15

connector is shown in **Chapter 3**.

**Step 2:** **Align the VGA connector**. Align the male DB-15 connector on the VGA screen

cable with the female DB-15 connector on the external peripheral interface.

**Step 3:** **Insert the VGA connector**  Once the connectors are properly aligned with the

insert the male connector from the VGA screen into the female connector on the

SPCIE-C2160. See **Figure 4-18**.
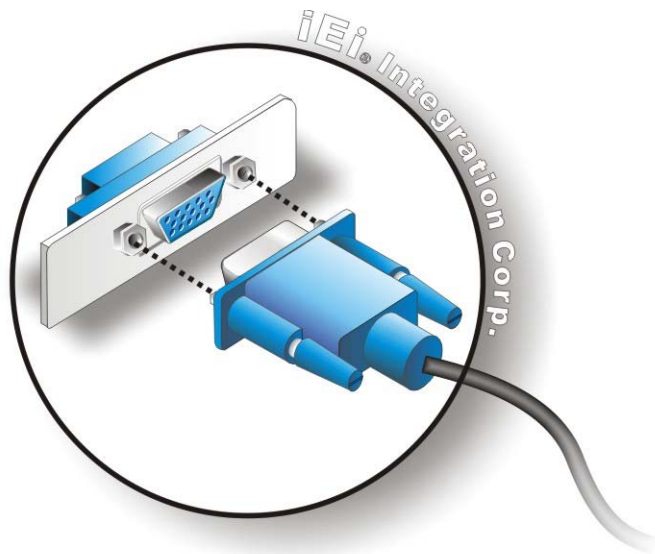
**Figure 4-18: VGA Connector**

**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.

# 4.7 Intel® AMT Setup Procedure

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

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

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

**Step 3:** The 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 icon] **NOTE:**

To change the password, enter a new password following the strong

password rule (containing at least one upper case letter, one lower

case letter, one digit and one special character, and be at least eight

characters).

**Chapter**

**5**

# BIOS

## 5.1 Introduction

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

 **NOTE:**

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

### 5.1.1 Starting Setup

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

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

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

### 5.1.2 Using Setup

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

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

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

**Table 5-1: BIOS Navigation Keys**

### 5.1.3 Getting Help

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

### 5.1.4 Unable to Reboot after Configuration Changes

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

### 5.1.5 BIOS Menu Bar

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

- ▪ Main – Changes the basic system configuration.
- ▪ Advanced – Changes the advanced system settings.
- ▪ Chipset – Changes the chipset settings.
- ▪ Boot – Changes the system boot configuration.
- ▪ Security – Sets User and Supervisor Passwords.

▪ Save & Exit – Selects exit options and loads default settings

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

## 5.2 Main

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

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

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

BIOS Information                                            Set the Date. Use Tab to
BIOS Vendor                      American Megatrends        switch between Data
Core Version                     4.6.5.3                    elements.
Compliancy                       UEFI 2.3; PI 1.2
Project Version                  VOWDAR11.ROM
Build Date and Time              03/27/2013 11:53:40

Processor Information
Name                             SandyBridge
Brand String                     Intel(R) Xeon(R) CPU
Frequency                        3100 MHz
Processor ID                     206a7
Stepping                         D2
Number of Processors             4Core(s) / 4Thread(s)
Microcode Revision               28
GT Info                          GT2 (1350 MHz)            ----------------------

IGFX VBIOS Version               2137
Memory RC Version                1.2.2.0
Total Memory                     2048 MB (DDR3)
Memory Frequency                 1333 MHz

PCH Information
Name                             PantherPoint
Stepping                         04/C1
TXT Capability of Platform/PCH   Supported
LAN PHY Revision                 C0

ME FW Version                    8.0.0.1351                →←: Select Screen
ME Firmware SKU                  5MB                       ↑↓: Select Item
                                                           Enter: Select
SPI Clock Frequency                                        +/-: Change Opt.
DOFR Support                     Unsupported               F1:  General Help
Read Status Clock Frequnecy      33 MHz                    F2:  Previous Values
Write Status Clock Frequnecy     33 MHz                    F3:  Optimized Defaults
Fast Read Status Clock Frequnecy 33 MHz                    F4:  Save & Exit
                                                           ESC: Exit
System Date                      [Mon 04/01/2013]
System Time                      [15:10:27]

Access Level                     Administrator

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

**BIOS Menu 1: Main**

➔ **System Overview**

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

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

The **Main** menu has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

## 5.3 Advanced

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

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

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

> ACPI Settings                                      System ACPI Parameters
> RTC Wake Settings
> Trusted Computing
> CPU Configuration                                  ---------------------
> SATA Configuration
> Intel TXT(LT) Configuration
> AMT Configuration                                  →←: Select Screen
> USB Configuration                                  ↑ ↓: Select Item
> F81866 Super IO Configuration                      Enter: Select
> F81866 H/M Monitor                                 +/-:  Change Opt.
> Serial Port Console Redirection                    F1:   General Help
> iEi Feature                                        F2:   Previous Values
                                                     F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC:  Exit
      Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
 **BIOS Menu 2: Advanced**

### 5.3.1 ACPI Settings

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

```
      Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
      Advanced

ACPI Settings                                        Select ACPI sleep state
                                                     the system will enter
ACPI Sleep State               [S1 only(CPU Stop C…] when the SUSPEND button
                                                     is pressed.


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

                                                     →←: Select Screen
                                                     ↑ ↓: Select Item
                                                     Enter: Select
                                                     +/-:  Change Opt.
                                                     F1:   General Help
                                                     F2:   Previous Values
                                                     F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC:  Exit
      Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
 **BIOS Menu 3: ACPI Configuration**

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

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

➔ **Suspend Disabled**

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

## 5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) enables the system to wake at the specified time.

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

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

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

                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-:  Change Opt.
                                                         F1:   General Help
                                                         F2:   Previous Values
                                                         F3:   Optimized Defaults
                                                         F4:   Save & Exit
                                                         ESC:  Exit
     Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
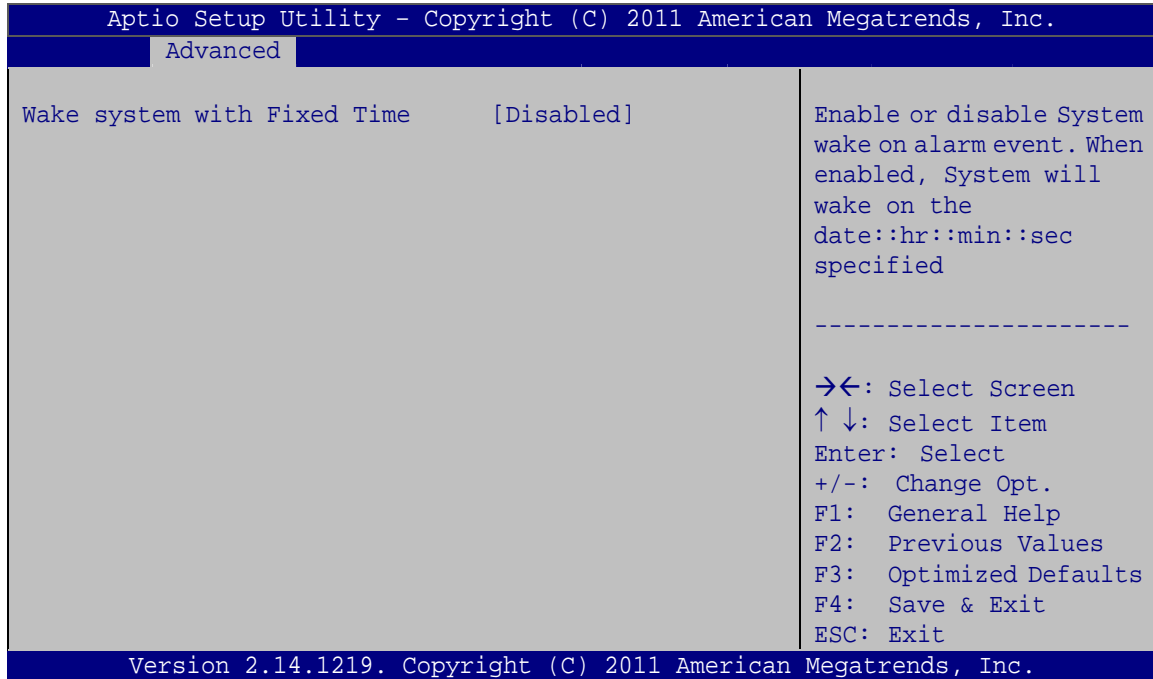
**BIOS Menu 4: RTC Wake Settings**

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

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled**   DEFAULT   The real time clock (RTC) cannot generate a wake event

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

Wake up date

Wake up hour

Wake up minute

Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

### 5.3.3 Trusted Computing

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

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

Configuration                                      Enables or Disables BIOS
  Security Device Support          [Disable]       support for security
                                                   device. O.S. will not
Current Status Information                         show Security Device.
  NO Security Device Found                         TCG EFI protocol and
                                                   INT1A interface will not
                                                   be available.

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

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

**BIOS Menu 5: Trusted Computing**

➔ **Security Device Support [Disable]**

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

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

➔ **Enable**             TPM support is enabled.

### 5.3.4 CPU Configuration

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

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

CPU Configuration                                              When enabled, a VMM can
                                                              utilize the additional
Intel(R) Xeon(R) CPU E31225 @ 3.10GHz                         hardware capabilities
CPU Signature                    206a7                        provided by Vanderpool
Microcode Patch                  28                           Technology
Max CPU Speed                    3100 MHz
Min CPU Speed                    1600 MHz
CPU Speed                        3100 MHz                     ---------------------
Processor Cores                  4
Intel HT Technology              Not Supported
Intel VT-x Technology            Supported                    →←: Select Screen
Intel SMX Technology             Supported                    ↑ ↓: Select Item
64-bit                           Supported                    Enter: Select
                                                              +/-:  Change Opt.
L1 Data Cache                    32 kB x 4                    F1:  General Help
L1 Code Cache                    32 kB x 4                    F2:  Previous Values
L2 Cache                         256 kB x 4                   F3:  Optimized Defaults
L3 Cache                         6144 kB                      F4:  Save & Exit
                                                              ESC: Exit
Intel Virtualization Technology  [Disabled]

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

**BIOS Menu 6: CPU Configuration**

➔ **Intel Virtualization Technology [Disabled]**

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

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

➔ **Enabled**               Enables Intel Virtualization Technology.

**5.3.5 SATA Configuration**

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

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

 SATA Controller(s)                [Enabled]            Enable or disable SATA
 SATA Mode Selection               [IDE]                Device.

 SATA1 Port                        Empty
    Hot Plug                       [Disabled]           --------------------
 SATA2 Port                        Empty
    Hot Plug                       [Disabled]           →←: Select Screen
 SATA3 Port                        Empty                ↑ ↓: Select Item
    Hot Plug                       [Disabled]           Enter: Select
 SATA4 Port                        Empty                +/-:  Change Opt.
    Hot Plug                       [Disabled]           F1:   General Help
 SATA5 Port                        Empty                F2:   Previous Values
    Hot Plug                       [Disabled]           F3:   Optimized Defaults
 SATA6 Port                        Empty                F4:   Save & Exit
    Hot Plug                       [Disabled]           ESC: Exit

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

**BIOS Menu 7: SATA Configuration**

➔ **SATA Controller(s) [Enabled]**

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

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

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

➔ **SATA Mode Selection [IDE]**

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

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

➔ **AHCI**   Configures SATA devices as AHCI device.

➔ **RAID**   Configures SATA devices as RAID device.

➔ **Hot Plug [Disabled]**

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

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

➔ **Enabled**                  Enables the hot plug function.

## 5.3.6 Intel TXT(LT) Configuration

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

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

 Intel Trusted Execution Technology Configuration

 Intel TXT support only can be enabled/disabled if SMX
 is enabled. VT and VT-d support must also be enabled prior    --------------------
 to TXT.                                                        ➔←: Select Screen
                                                               ↑ ↓: Select Item
 Secure Mode Extensions (SMX)       Enabled                    Enter: Select
                                                               +/-:  Change Opt.
 Intel TXT(LT) Support              [Disabled]                 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 8: Intel TXT(LT) Configuration**

### 5.3.7 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 9**) allows the advanced power management options to be configured.

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

Intel AMT                          [Enabled]              Enable/Disable Intel (R)
Un-Configure ME                    [Disabled]             Active Management
                                                          Technology BIOS
                                                          Extension. Note: iAMT H/W
                                                          is always enabled.
                                                          This option just controls
                                                          the BIOS extension
                                                          execution.
                                                          If enabled, this requires
                                                          additional firmware in the
                                                          SPI device.
                                                          --------------------
                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:  General Help
                                                          F2:  Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC:  Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
**BIOS Menu 9: AMT Configuration**

➔ **Intel AMT [Enabled]**

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

➔ **Disabled**                Intel® AMT is disabled

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

➔ **Un-Configure ME [Disabled]**

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

➔ **Disabled**    DEFAULT      Not perform ME unconfigure

➔ **Enabled**                 To perform ME unconfigure

### 5.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 10**) 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
        1 Keyboard, 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
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1:  General Help
                                                       F2:  Previous Values
                                                       F3:  Optimized Defaults
                                                       F4:  Save & Exit
                                                       ESC: Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
   **BIOS Menu 10: USB Configuration**

➔ **USB Devices**

The **USB Devices** 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

### 5.3.9 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 11**) to set or change the configurations for the parallel ports and serial ports.

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

 F81866 Super IO Configuration                      Set Parameters of Floppy
                                                    Disk Controller (FDC)
 F81866 Super IO Chip            F81866
 > Floppy Disk Controller Configuration
 > Serial Port 1 Configuration                      ---------------------
 > Serial Port 2 Configuration                      →←: Select Screen
 > Serial Port 4 Configuration                      ↑ ↓: Select Item
 > IrDA Configuration                               Enter: Select
 > Parallel Port Configuration                      +/-:  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 11: F81866 Super IO Configuration**

### 5.3.9.1 Floppy Disk Controller Configuration

Use the **Floppy Disk Controller Configuration** menu (**BIOS Menu 12**) to set the parameters of the floppy disk controller.

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

Floppy Disk Controller Configuration                      Enable or Disable Floppy
                                                          Disk Controller
Floppy Disk Controller            [Enabled]
Device Settings                   IO=3F0h; IRQ=6; DMA=2
                                                          ---------------------
Change Settings                   [Auto]                  →←: Select Screen
Device Mode                       [Read Writer]           ↑ ↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
      Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 12: Floppy Disk Controller Configuration Menu**

➔ **Floppy Disk Controller [Enabled]**

Use the **Floppy Disk Controller** option to enable or disable the floppy disk controller.

➔ **Disabled**　　　　　　　　Floppy disk controller disabled

➔ **Enabled**　　**DEFAULT**　　Floppy disk controller enabled

➔ **Change Settings [Auto]**

Use the **Change Settings** option to select an optimal setting for the super IO device.

➔ **Auto**　　**DEFAULT**　　The super IO device settings are automatically
　　　　　　　　　　　　　detected.

➔ **IO=3F0h;**　　　　　　The I/O port address is 3F0h, the interrupt address is
　**IRQ=6;**　　　　　　　IRQ6 and the DMA is 2.
　**DMA=2**

➔ **Device Mode [Read Write]**

Use the **Device Mode** option to select the floppy disk controller mode.

➔ **Read Write**　**DEFAULT**　　Select this option for normal operation.

➔ **Write**                              Select this option for read only operation.

     **Protect**

### 5.3.9.2 Serial Port n Configuration

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

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

 Serial Port n Configuration                        Enable or Disable Serial
                                                    Port (COM)
 Serial Port                    [Enabled]
 Device Settings                IO=3F8h; IRQ=4
                                                    --------------------
 Change Settings                [Auto]              ➔←: Select Screen
                                                    ↑ ↓: Select Item
                                                    Enter:  Select
                                                    +/-:  Change Opt.
                                                    F1:   General Help
                                                    F2:   Previous Values
                                                    F3:   Optimized Defaults
                                                    F4:   Save & Exit
                                                    ESC: Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 13: Serial Port n Configuration Menu**

### 5.3.9.2.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**                Disable the serial port

➔ **Enabled**     DEFAULT     Enable the serial port

➔ **Change Settings [Auto]**

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

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

➔ **IO=3F8h; IRQ=4** Serial Port I/O port address is 3F8h and the interrupt address is IRQ4

➔ **IO=3F8h; IRQ=3, 4** Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4

➔ **IO=2F8h; IRQ=3, 4** Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4

➔ **IO=2C0h; IRQ=3, 4** Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4

➔ **IO=2C8h; IRQ=3, 4** Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

### 5.3.9.2.2 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;**             Serial Port I/O port address is 2F8h and the interrupt
   **IRQ=3, 4**            address is IRQ3, 4

➔ **IO=2C0h;**             Serial Port I/O port address is 2C0h and the interrupt
   **IRQ=3, 4**            address is IRQ3, 4

➔ **IO=2C8h;**             Serial Port I/O port address is 2C8h and the interrupt
   **IRQ=3, 4**            address is IRQ3, 4

### 5.3.9.2.3 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;**             Serial Port I/O port address is 2E8h and the interrupt
   **IRQ=10**             address is IRQ10

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

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

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

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

#### 5.3.9.3 IrDA Configuration

Use the **IrDA Configuration** menu (**BIOS Menu 14**) to set the parameters of the floppy disk controller.

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

IrDA Configuration                                          Enable or Disable IrDA

IrDA                                  [Enabled]
Device Settings                       IO=2D8h; IRQ=10        ---------------------
                                                            →←: Select Screen
Change Settings                       [Auto]                 ↑ ↓: Select Item
                                                            Enter: Select
                                                            +/-:  Change Opt.
                                                            F1:   General Help
                                                            F2:   Previous Values
                                                            F3:   Optimized Defaults
                                                            F4:   Save & Exit
                                                            ESC: Exit

        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
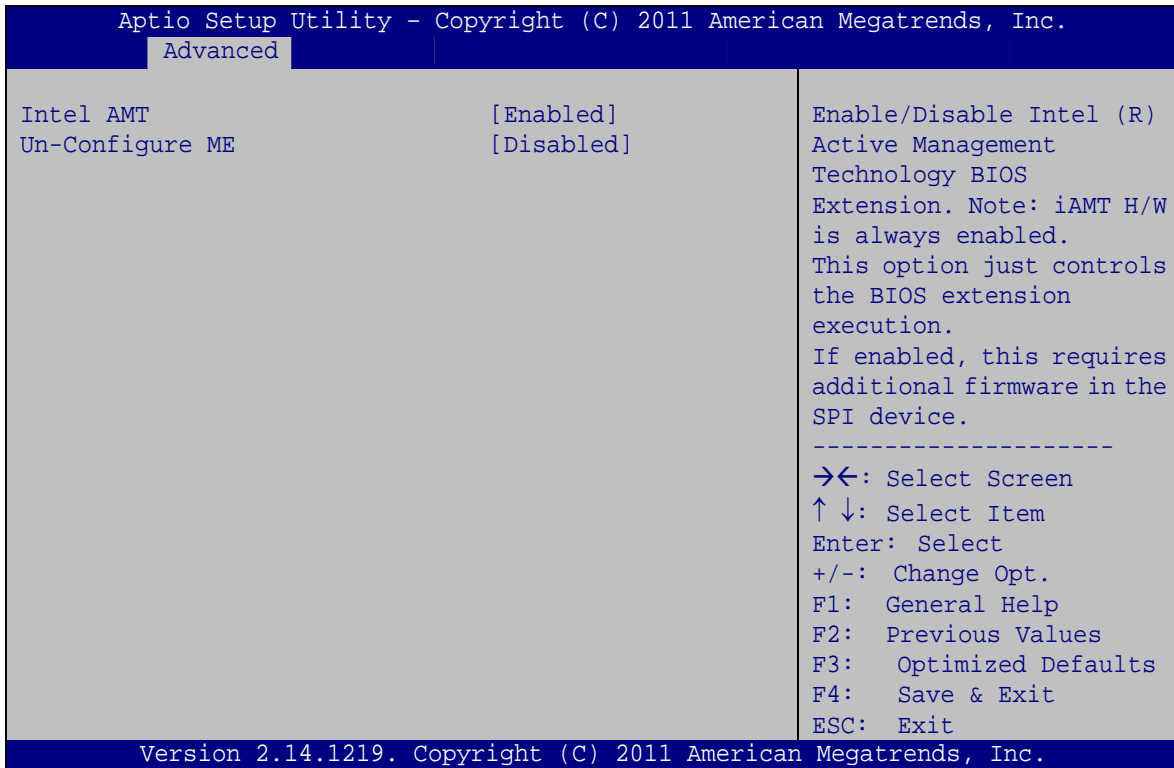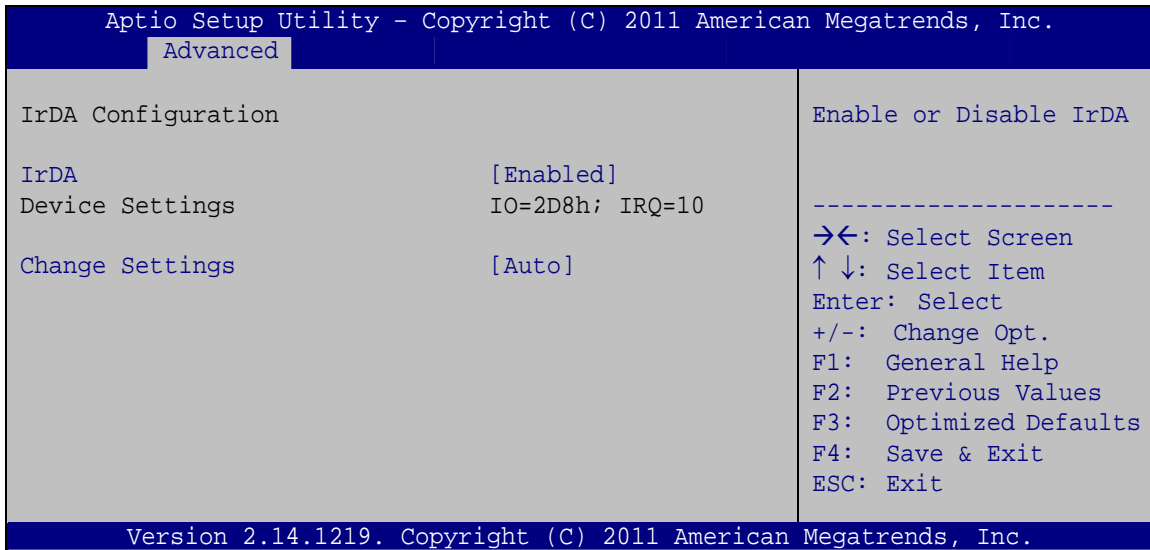
**BIOS Menu 14: IrDA Configuration Menu**

➔  **IrDA [Enabled]**

Use the **IrDA** option to enable or disable the IrDA function.

➔  **Disabled**              Disable the IrDA function

➔  **Enabled**    DEFAULT    Enable the IrDA function

➔  **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;**              Serial Port I/O port address is 2D8h and the interrupt
    **IRQ=10**                address is IRQ10

➔ **IO=2C0h;**         Serial Port I/O port address is 2C0h and the interrupt

    **IRQ=10, 11**         address is IRQ10, 11

➔ **IO=2C8h;**         Serial Port I/O port address is 2C8h and the interrupt

    **IRQ=10, 11**         address is IRQ10, 11

➔ **IO=2D0h;**         Serial Port I/O port address is 2D0h and the interrupt

    **IRQ=10, 11**         address is IRQ10, 11

➔ **IO=2D8h;**         Serial Port I/O port address is 2D8h and the interrupt

    **IRQ=10, 11**         address is IRQ10, 11

➔ **IO=2E0h;**         Serial Port I/O port address is 2E0h and the interrupt

    **IRQ=10, 11**         address is IRQ10, 11

## 5.3.9.4 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 15**) to configure the serial port n.

```
         Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
           Advanced

Parallel Port Configuration                                    Enable or Disable
                                                               Parallel Port (LPT/LPTE)
Parallel Port                      [Enabled]
Device Settings                    IO=378h; IRQ=5
                                                               --------------------
Change Settings                    [Auto]                      ➔←: Select Screen
Device Mode                        [STD Printer Mode]          ↑↓: Select Item
                                                               Enter: Select
                                                               +/-:  Change Opt.
                                                               F1:  General Help
                                                               F2:  Previous Values
                                                               F3:  Optimized Defaults
                                                               F4:  Save & Exit
                                                               ESC: Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 15: Parallel Port Configuration Menu**

➔ **Parallel Port [Enabled]**

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

➔ **Disabled**             Disable the parallel port

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

➔ **Change Settings [Auto]**

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

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

➔ **IO=378h;** **IRQ=5** Parallel Port I/O port address is 378h and the interrupt address is IRQ5

➔ **IO=378h;** **IRQ=5, 7** Parallel Port I/O port address is 378h and the interrupt address is IRQ5, 7

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

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

➔ **Device Mode [STD Printer Mode]**

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

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

## 5.3.10 F81866 H/W Monitor

The **F81866 H/W Monitor** menu (**BIOS Menu 16**) contains the fan configuration submenu, and displays the system temperature and CPU fan speed.

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

PC Health Status                                        Smart Fan Mode Select

> Smart Fan Mode Configuration
CPU Temperature                      :+27 C             --------------------
System Temperature                   :+36 C             →←: Select Screen
CPU_FAN1 Speed                       :2362 RPM          ↑ ↓: Select Item
                                                        Enter: Select
                                                        +/-:  Change Opt.
                                                        F1:   General Help
                                                        F2:   Previous Values
                                                        F3:   Optimized Defaults
                                                        F4:   Save & Exit
                                                        ESC: Exit

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

**BIOS Menu 16: F81866 H/W Monitor**

➔ **PC Health Status**

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

- CPU Temperature
- System Temperature
- CPU Fan Speed

## 5.3.10.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration submenu** (**BIOS Menu 17**) to configure fan 1 temperature and speed settings.

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

Smart Fan Mode Configuration                              Smart Fan Mode Select

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

**BIOS Menu 17: Smart Fan Mode Configuration**

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

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

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

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

➔ **CPU Temperature n**

Use the **+/–** key or enter a decimal number to change the **CPU Temperature n** value.

## 5.3.11 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 18**) 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.

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

   COM1                                              Console Redirection
   Console Redirection           [Disabled]          Enable or Disable
 > Console Redirection Settings

   COM2
   Console Redirection           [Disabled]          --------------------
 > Console Redirection Settings                      →←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
   iAMT SOL                                          +/-:  Change Opt.
                                                     F1:   General Help
   COM3(Pci Bus0,Dev0,Func0) (Disabled)             F2:   Previous Values
   Console Redirection           Port Is Disabled    F3:   Optimized Defaults
                                                     F4:   Save & Exit
                                                     ESC:  Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 18: Serial Port Console Redirection**

➔ **Console Redirection [Disabled]**

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

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

➔ **Enabled**                 Enabled the console redirection function

➔ **Terminal Type [ANSI]**

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

➔ **VT100**                   The target terminal type is VT100

➔ **VT100+**                  The target terminal type is VT100+

➔ **VT-UTF8**                 The target terminal type is VT-UTF8

➔ **ANSI**        DEFAULT      The target terminal type is ANSI

➔ **Bits per second [115200]**

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

➔ **9600**                        Sets the serial port transmission speed at 9600.

➔ **19200**                       Sets the serial port transmission speed at 19200.

➔ **38400**                       Sets the serial port transmission speed at 38400.

➔ **57600**                       Sets the serial port transmission speed at 57600.

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

➔ **Data Bits [8]**

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

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

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

➔ **Parity [None]**

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

➔ **None**       DEFAULT          No parity bit is sent with the data bits.

➔ **Even**                        The parity bit is 0 if the number of ones in the data bits is even.

➔ **Odd**                         The parity bit is 0 if the number of ones in the data bits is odd.

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

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

➔ **Stop Bits [1]**

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

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

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

### 5.3.12 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 19**) to configure One Key Recovery function.

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

 iEi Feature                                          Auto Recovery Function
                                                      Reboot and recover
 Auto Recovery Function            [Disabled]         system automatically
                                                      within 10 min, when OS
                                                      crashes. Please install
                                                      Auto Recovery API
                                                      service before enabling
                                                      this function.


                                                      ---------------------
                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-:  Change Opt.
                                                      F1:   General Help
                                                      F2:   Previous Values
                                                      F3:   Optimized Defaults
                                                      F4:   Save & Exit
                                                      ESC: Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
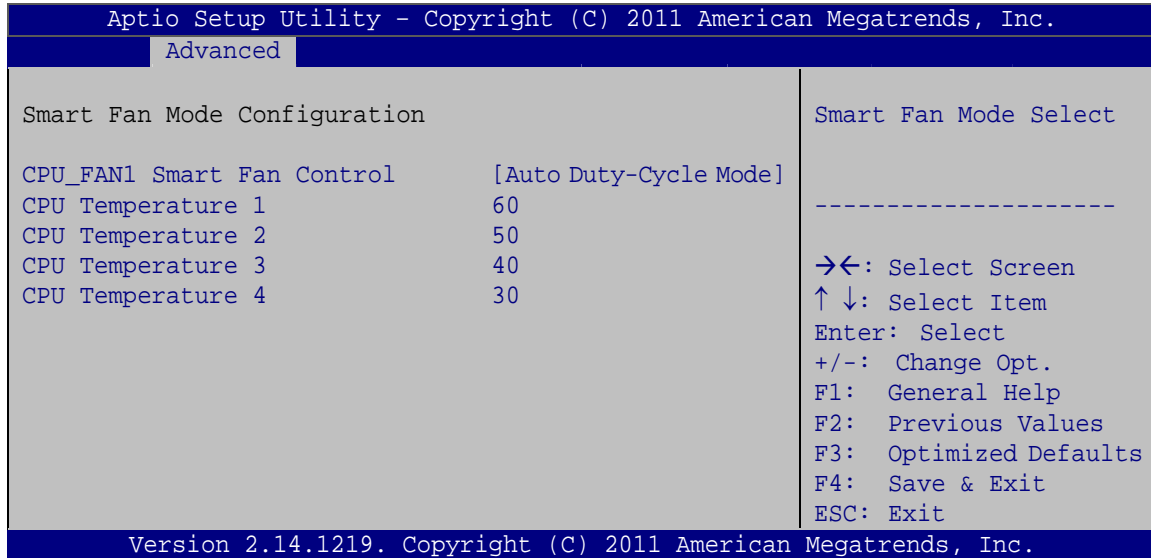
       **BIOS Menu 19: iEi Feature**

➔ **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 20**) to access the PCH IO and System Agent (SA) configuration menus.

---

![WARNING icon] **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

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


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

**BIOS Menu 20: Chipset**

## 5.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 21**) to configure the System Agent (SA) parameters.

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

VT-d                             [Disabled]          Check to enable VT-d
                                                     function on MCH.
> Graphics Configuration
> NB PCIe Configuration
> Memory Configuration                               --------------------
                                                     →←: Select Screen
                                                     ↑ ↓: Select Item
                                                     Enter: Select
                                                     +/-:  Change Opt.
                                                     F1:  General Help
                                                     F2:  Previous Values
                                                     F3:  Optimized Defaults
                                                     F4:  Save & Exit
                                                     ESC: Exit
           Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 21: System Agent (SA) Configuration**

➔ **VT-d [Disabled]**

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

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

➔ **Enabled**               Enables VT-d support.

## 5.4.1.1 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 22**) menu to configure the video device connected to the system.

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

Graphics Configuration                                    Select which of
                                                          IGFX/PEG/PCI Graphics
Primary Display                 [Auto]                    device should be Primary
DVMT Pre-Allocated              [256M]                    Display Or select SG for
DVMT Total Gfx Mem              [MAX]                     Switchable Gfx.
> LCD Control
                                                          ----------------------
                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
       Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
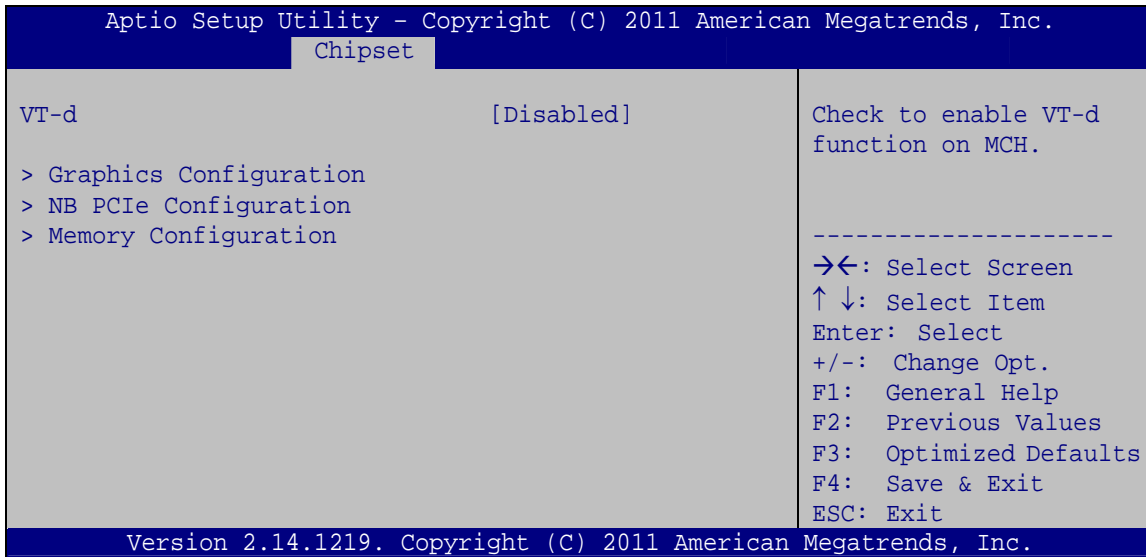
**BIOS Menu 22: Graphics Configuration**

➔ **Primary Display [Auto]**

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

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

➔ **DVMT Pre-Allocated [256M]**

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
- 256M           **Default**
- 512M

➔ **DVMT Total Gfx Mem [MAX]**

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

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

### 5.4.1.1.1 LCD Control
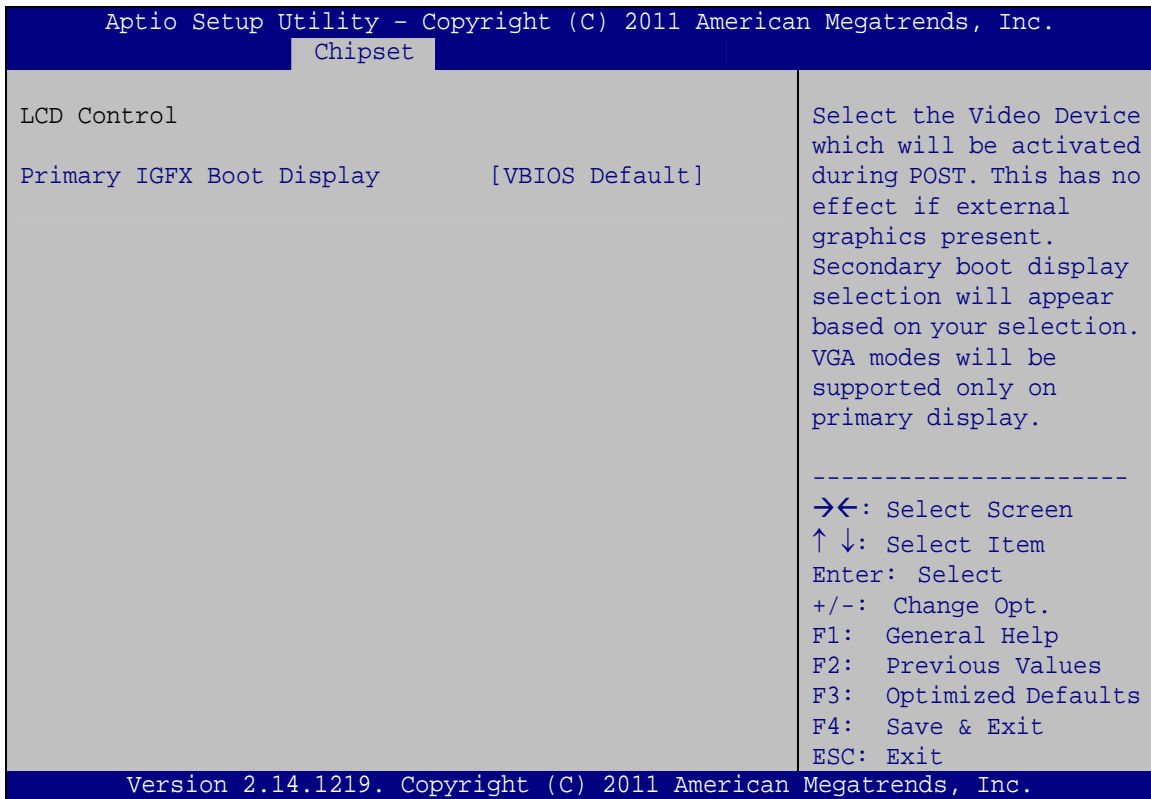
```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                             Chipset

LCD Control                                           Select the Video Device
                                                      which will be activated
Primary IGFX Boot Display         [VBIOS Default]     during POST. This has no
                                                      effect if external
                                                      graphics present.
                                                      Secondary boot display
                                                      selection will appear
                                                      based on your selection.
                                                      VGA modes will be
                                                      supported only on
                                                      primary display.

                                                      ----------------------
                                                      →←: Select Screen
                                                      ↑ ↓: Select Item
                                                      Enter: Select
                                                      +/-:  Change Opt.
                                                      F1:  General Help
                                                      F2:  Previous Values
                                                      F3:  Optimized Defaults
                                                      F4:  Save & Exit
                                                      ESC: Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
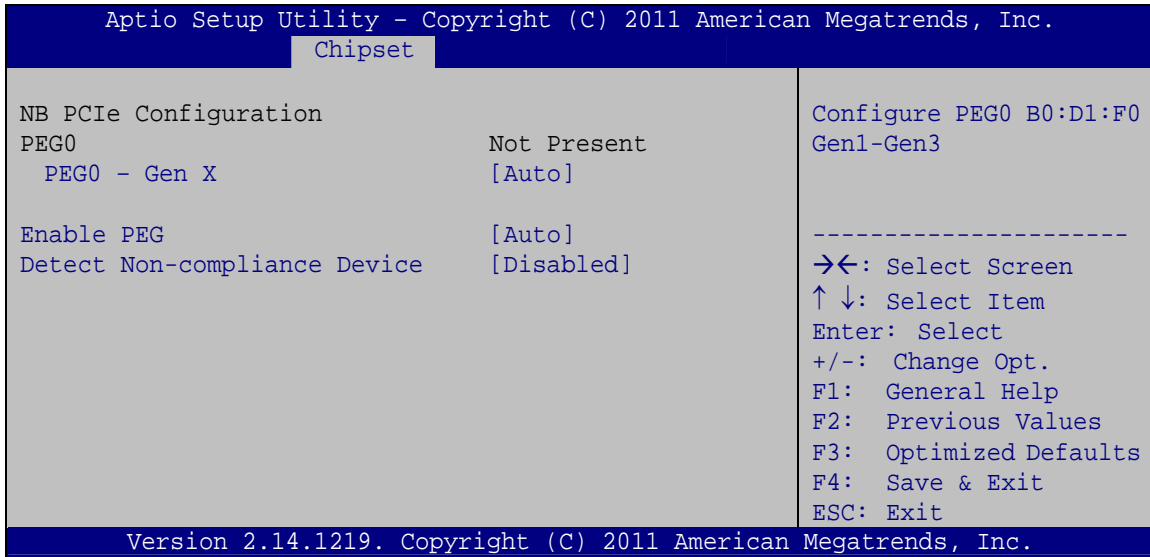
**BIOS Menu 23: LCD Control**

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

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

- VBIOS            **DEFAULT**
- CRT
- DVI

### 5.4.1.2 NB PCIe Configuration

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

NB PCIe Configuration                                    Configure PEG0 B0:D1:F0
PEG0                           Not Present               Gen1-Gen3
  PEG0 - Gen X                 [Auto]

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

**BIOS Menu 24: NB PCIe Configuration**

➔ **PEG0 – Gen X [Auto]**

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

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

➔ **Enable PEG [Auto]**

Use the **Enable PEG** option to enable or disable the PCI Express (PEG) controller.

➔ **Disabled**                    Disables the PCI Express (PEG) controller.

➔ **Enabled**                     Enables the PCI Express (PEG) controller.

➔ **Auto**          DEFAULT    The PCI Express (PEG) controller is disabled if no PCI Express devices are connected.
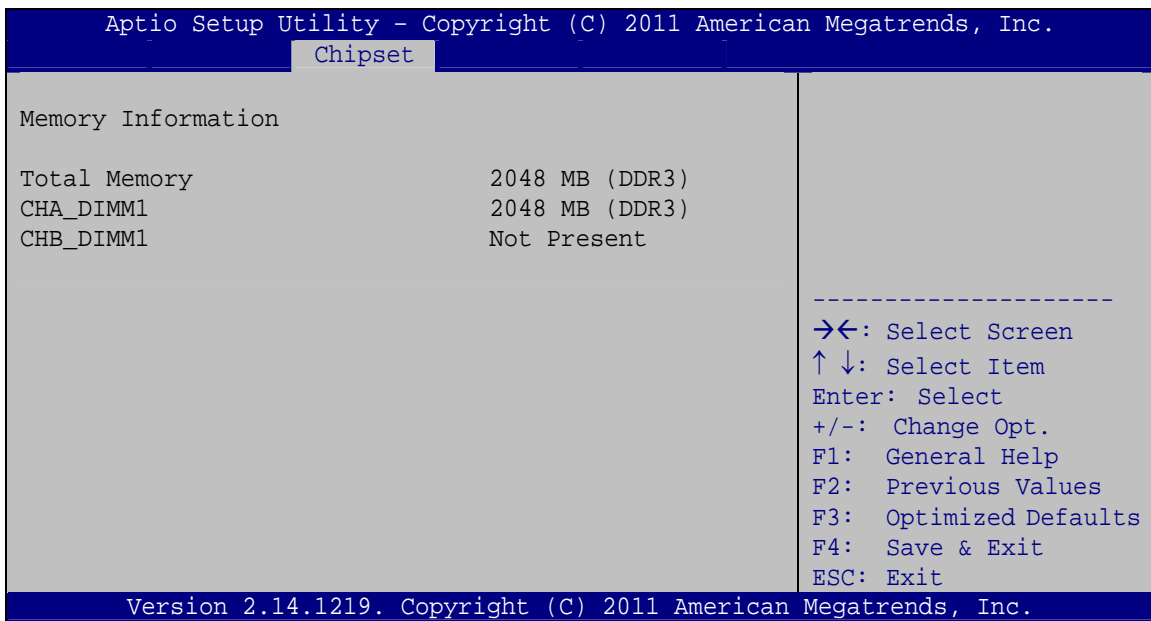
➔ **Detect Non-Compliance Device [Disabled]**

Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled**  DEFAULT  Disables to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Enabled**  Enables to detect if a non-compliance PCI Express device is connected to the PCI Express port.

### 5.4.1.3 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 25**) to view memory information.

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

Memory Information

Total Memory                       2048 MB (DDR3)
CHA_DIMM1                          2048 MB (DDR3)
CHB_DIMM1                         Not Present

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

**BIOS Menu 25: Memory Configuration**

### 5.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 26**) to configure the PCH parameters.

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

Auto Power Button Status          [Disabled (ATX)]        Select AC power state
                                                          when power is re-applied
Restore AC Power Loss             [Last State]            after a power failure.
                                                          When Auto Power Button
> PCI Express Configuration                               Function select Enabled
> PCH Azalia Configuration                                the AC power loss will
                                                          always power on.
Power Saving Function(ERP)        [Disabled]
                                                          ---------------------
                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-:  Change Opt.
                                                          F1:   General Help
                                                          F2:   Previous Values
                                                          F3:   Optimized Defaults
                                                          F4:   Save & Exit
                                                          ESC: Exit
         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 26: PCH-IO Configuration**

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

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

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

➔ **Power On**           The system turns on

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

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

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

➔ **Disabled**     DEFAULT   Power saving function is disabled.

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

### 5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 24**) to select the support type of the PCI Express or PCIe Mini slots.

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

PCI Express Configuration                          PCI Express Root Port 1
                                                   <PCIEX1_1> Settings.
> PCIEX1_1
> PCIEX1_2
> PCIEX1_3                                          ----------------------
> PCIEX1_4                                          →←: Select Screen
> Mini PCIE                                         ↑↓: Select Item
                                                   Enter: Select
                                                   +/-:  Change Opt.
                                                   F1:   General Help
                                                   F2:   Previous Values
                                                   F3:   Optimized Defaults
                                                   F4:   Save & Exit
                                                   ESC:  Exit
          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
**BIOS Menu 27: PCI Express Configuration**

➔ **PCIEX1_1/ PCIEX1_2/ PCIEX1_3/ PCIEX1_4/Mini PCIE**

Use this option to select the support type of the PCI Express or PCIe Mini slots. The following options are available:

- Auto **Default**
- Gen1
- Gen2

### 5.4.2.2 PCH Azalia Configuration

Use the **PCH Azalia Configuration** menu (**BIOS Menu 28**) to configure the PCH Azalia settings.

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

    PCH Azalia Configuration                              Control Detection of the
                                                          Azalia device.
      Azalia                          [Enabled]           Disabled = Azalia will be
                                                          unconditionally
                                                          disabled
                                                          Enabled = Azalia will be
                                                          unconditionally Enabled

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

**BIOS Menu 28: PCH Azalia Configuration Menu**

➔ **Azalia [Enabled]**

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

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

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

## 5.5 Boot

Use the **Boot** menu (**BIOS Menu 29**) to configure system boot options.

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

 Boot Configuration                                         Select the keyboard
 Bootup NumLock State              [On]                     NumLock state
 Quiet Boot                        [Enabled]
 Option ROM Messages               [Force BIOS]
 Launch PXE OpROM                  [Disabled]               --------------------
 UEFI Boot                         [Disabled]               →←: Select Screen
                                                            ↑ ↓: Select Item
 Boot Option Priorities                                     Enter: Select
                                                            +/-:  Change Opt.
                                                            F1:   General Help
                                                            F2:   Previous Values
                                                            F3:   Optimized Defaults
                                                            F4:   Save & Exit
                                                            ESC: Exit
        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

**BIOS Menu 29: Boot**

➔ **Bootup NumLock State [On]**

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

➔ **On**          DEFAULT          Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **Off**          Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

➔ **Quiet Boot [Enabled]**

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

➔ **Disabled**                              Normal POST messages displayed

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

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

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

➔ **Force        DEFAULT        Sets display mode to force BIOS.
   BIOS**

➔ **Keep                               Sets display mode to current.
   Current**

➔ **Launch PXE OpROM [Disabled]**

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

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

➔ **Enabled**                              Load PXE Option ROMs.

➔ **UEFI Boot [Disabled]**

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

➔ **Enabled**                              Boot from UEFI devices is enabled.

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

## 5.6 Security

Use the **Security** menu (**BIOS Menu 30**) to set system and user passwords.

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

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

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

**BIOS Menu 30: Security**

➔ **Administrator Password**

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

➔ **User Password**

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

## 5.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 31**) to load default BIOS values, optimal failsafe values and to save configuration changes.

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

   Save Changes and Reset                          Exit the system after
   Discard Changes and Reset                       saving the changes.

   Restore Defaults
   Save as User Defaults
   Restore User Defaults

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

**BIOS Menu 31: Save & Exit**

➔   **Save Changes and Reset**

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

➔   **Discard Changes and Reset**

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

➔   **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

**Chapter**

**6**

# Software Drivers

## 6.1 Available Software Drivers

![NOTE icon] **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
- VGA
- LAN
- Audio
- SATA (Intel® Rapid Storage Technology)
- Intel® AMT

Installation instructions are given below.

## 6.2 Software Installation

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

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

![NOTE icon] **NOTE:**

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

**Step 2:** The driver main menu appears. Click SPCIE-C2160.

**Step 3:** A new screen with a list of available drivers appears (**Figure 6-1**).
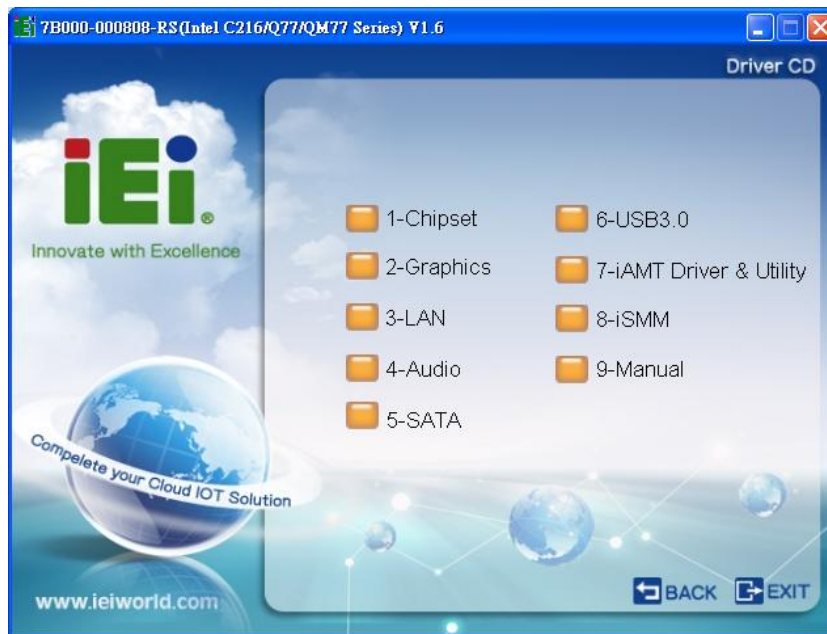
**Figure 6-1: Available Drivers**

**Step 4:** 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 "**1-Chipset**".

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

**Step 4:** When the setup files are completely extracted, the **Welcome Screen** in **Figure 6-2** appears.

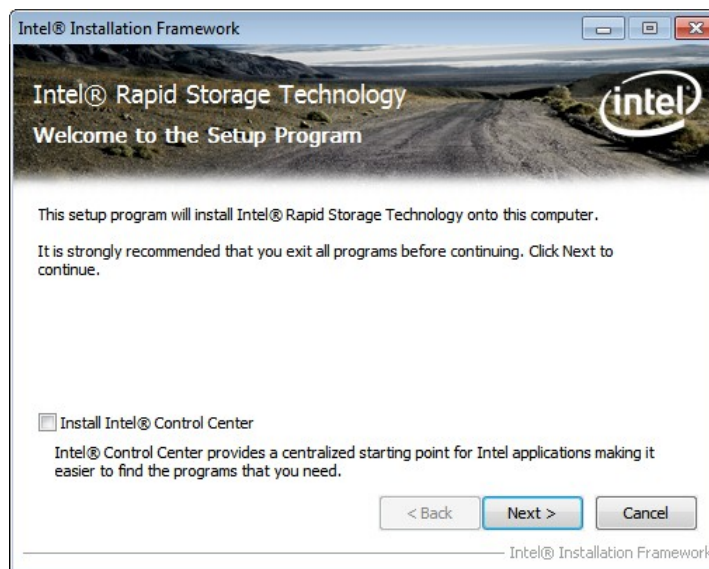**Step 5:** Click **Next** to continue.

**Figure 6-2: Chipset Driver Welcome Screen**

**Step 6:** The license agreement in **Figure 6-3** appears.

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

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



**Figure 6-3: Chipset Driver License Agreement**

**Step 9:** The **Read Me** file in **Figure 6-4** appears.

**Step 10:** Click **Next** to continue.
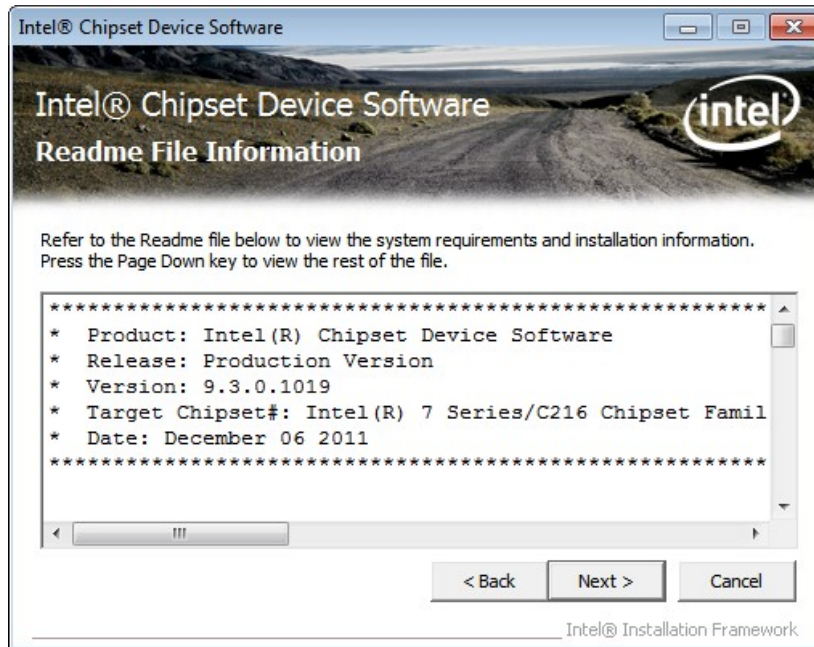
**Figure 6-4: Chipset Driver Read Me File**

**Step 11:** **Setup Operations** are performed as shown in **Figure 6-5**.

**Step 12:** Once the **Setup Operations** are complete, click **Next** to continue.
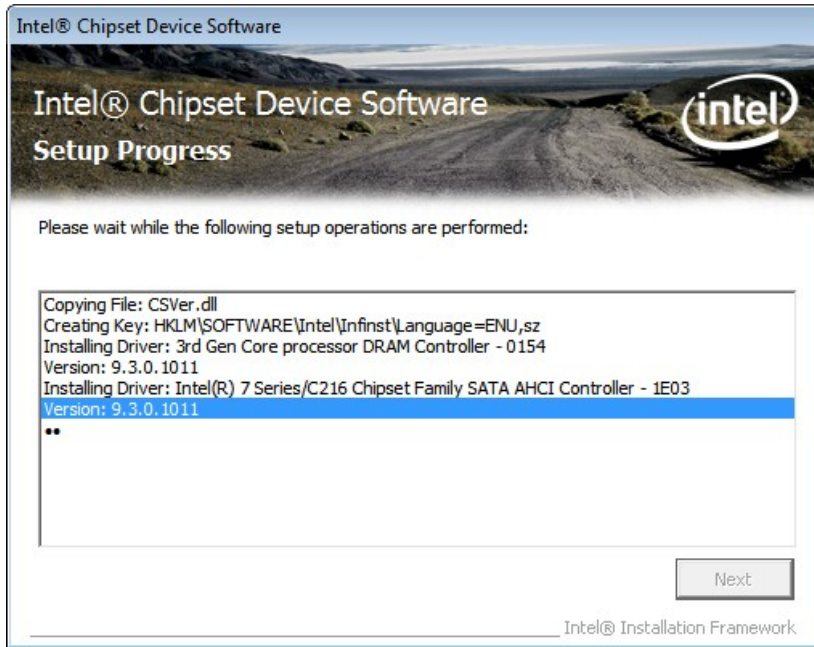
**Figure 6-5: Chipset Driver Setup Operations**

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

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



**Figure 6-6: 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 "**2-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 6-7** appears.

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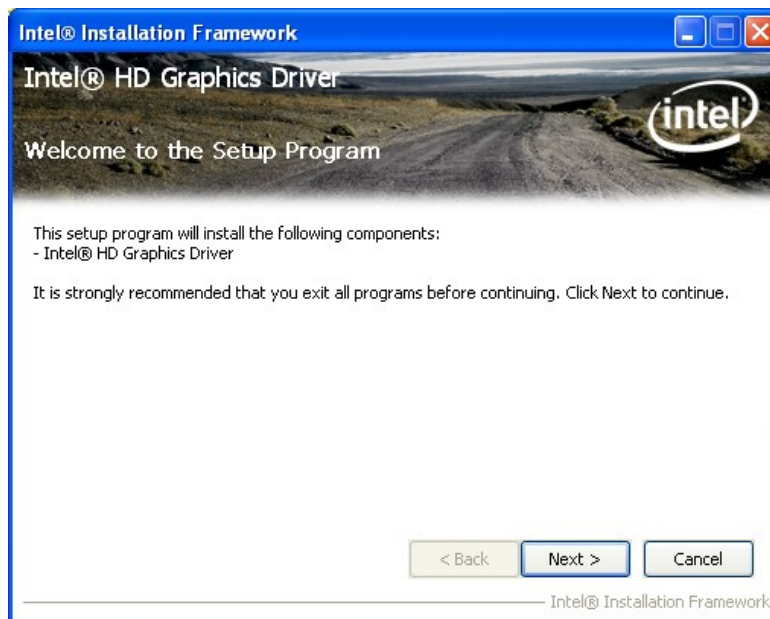


**Figure 6-7: Graphics Driver Welcome Screen**

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

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

**Figure 6-8: Graphics Driver License Agreement**

**Step 8:** The **Read Me** file in **Figure 6-9** appears. Click **Next** to continue.
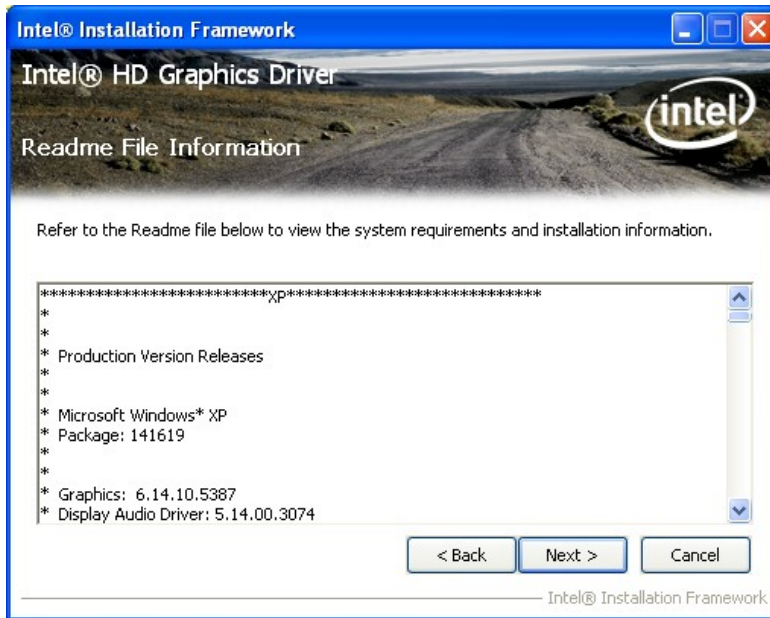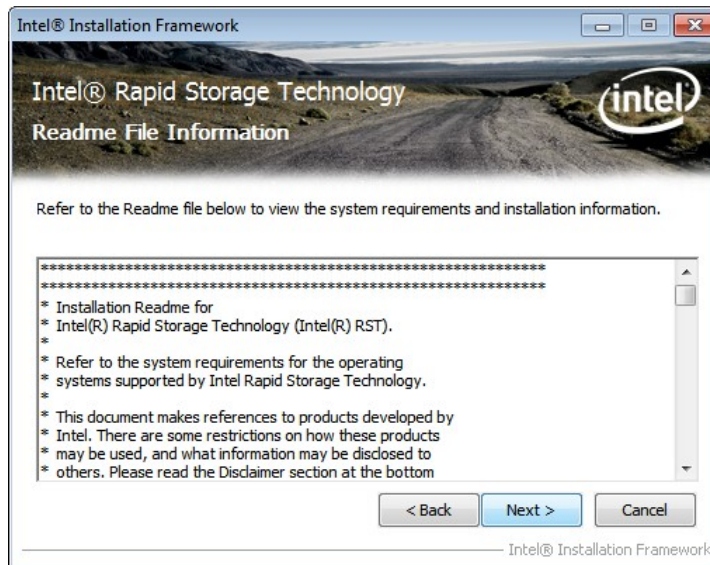


**Figure 6-9: Graphics Driver Read Me File**

**Step 9:** **Setup Operations** are performed as shown in **Figure 6-10**.

**Step 10:** Once the **Setup Operations** are complete, click **Next** to continue.
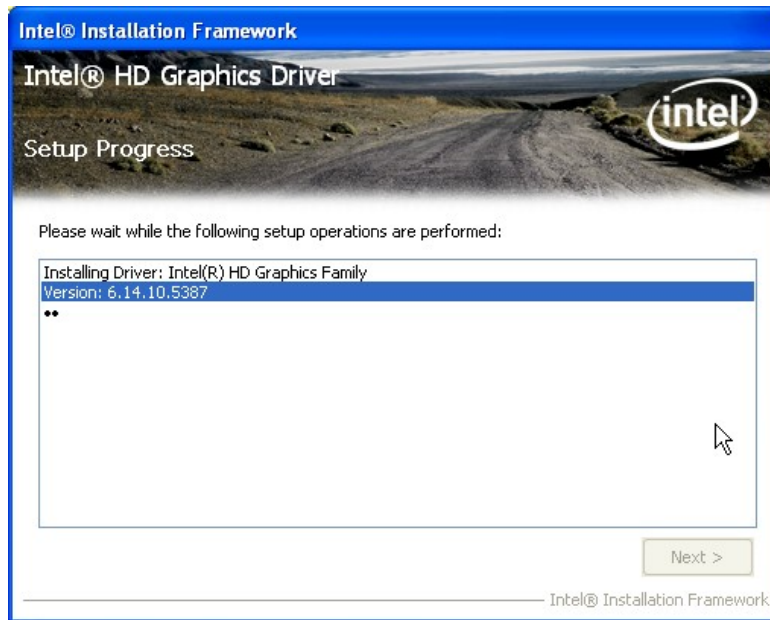
**Figure 6-10: Graphics Driver Setup Operations**

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

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



**Figure 6-11: Graphics Driver Installation Finish Screen**

## 6.5 LAN Driver Installation

To install the LAN driver, please do the following.

**Step 1:** Right-click the Computer button from the start menu and select **Properties**.

(**Figure 6-12**).
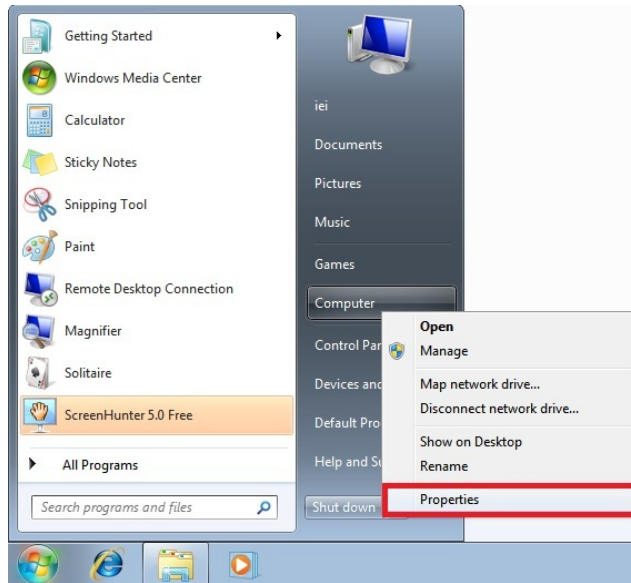


**Figure 6-12: Windows Control Panel**

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

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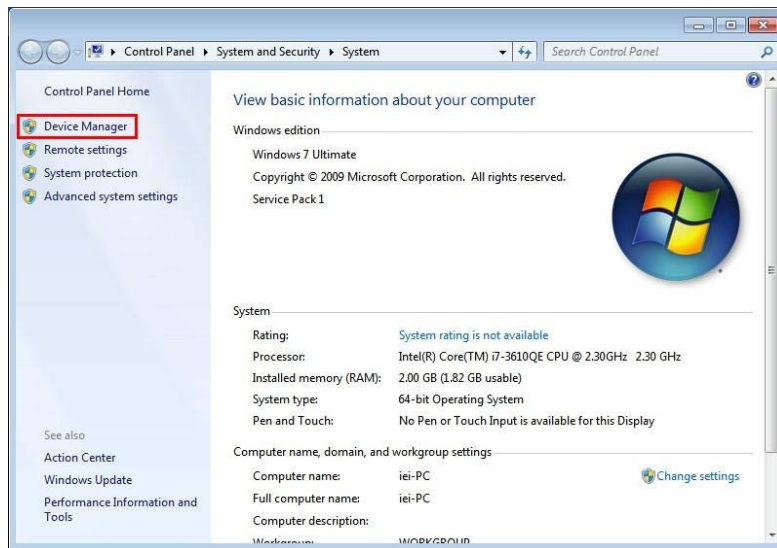
**Figure 6-13: System Control Panel**

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

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

**Step 6:** Select **Update Driver Software**.
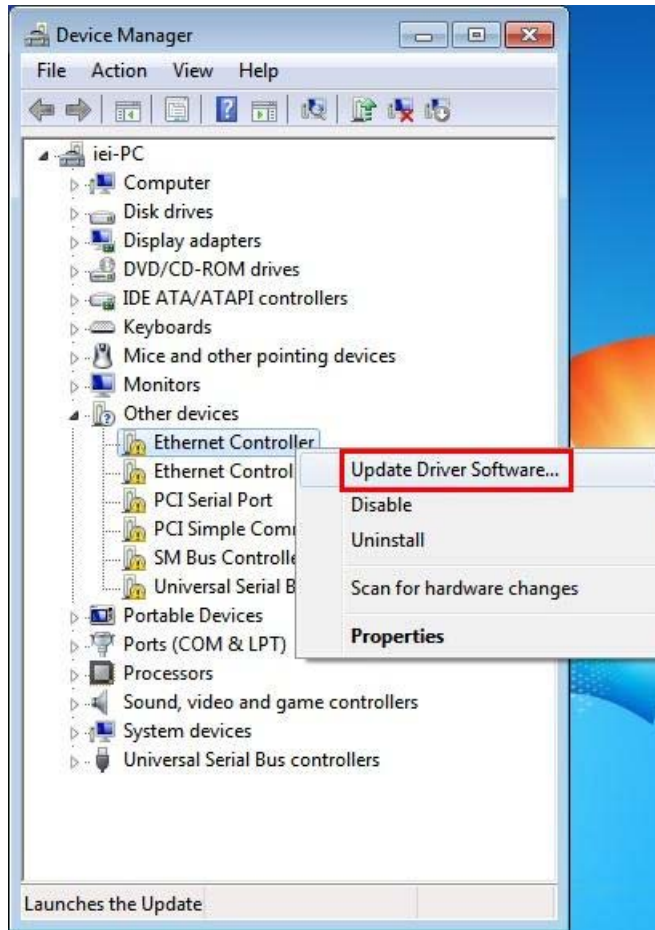
**Figure 6-14: Device Manager List**

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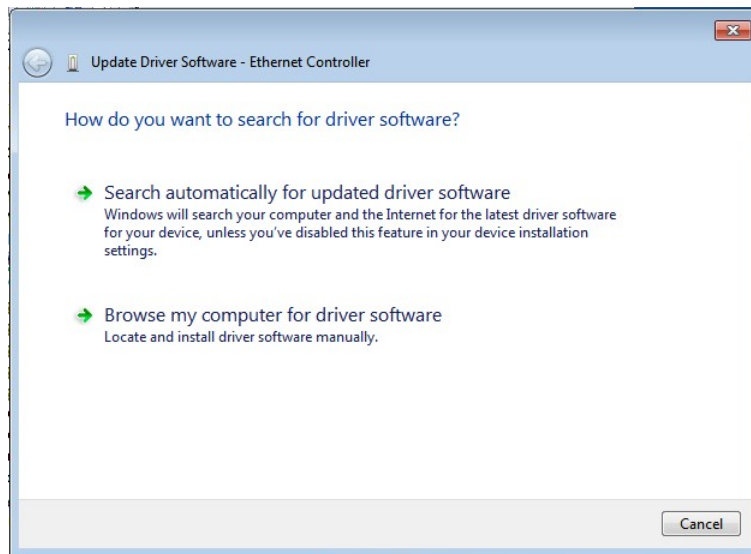
**Figure 6-15: Update Driver Software Window**

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

**Step 9:** Click Browse to select "**X:\3-LAN**" directory in the **Locate File** window, where

"**X:\**" is the system CD drive. (**Figure 6-16**).
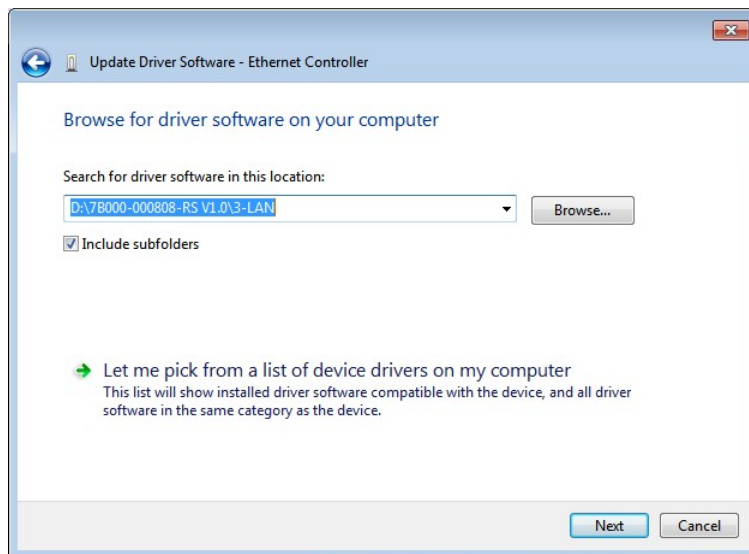


**Figure 6-16: Locate Driver Files**

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

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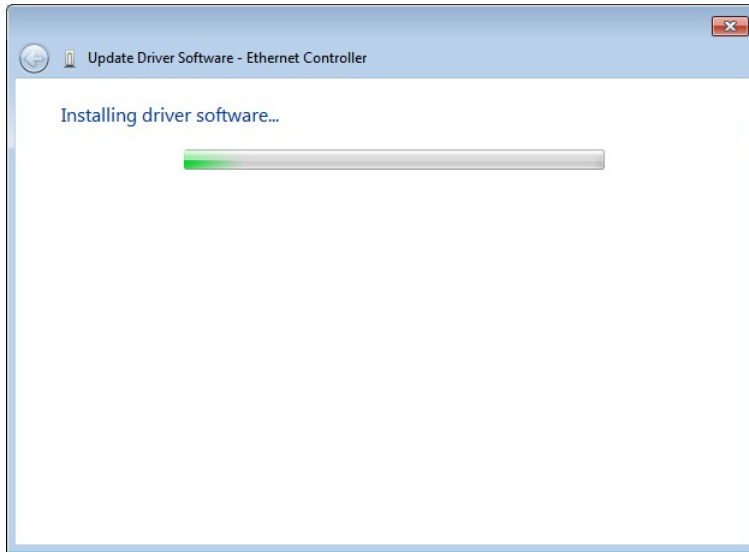
**Figure 6-17: LAN Driver Installation**

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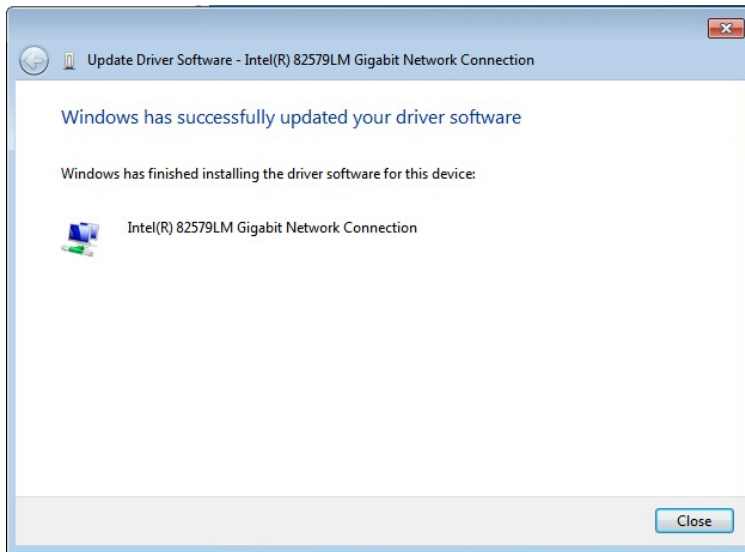


**Figure 6-18: LAN Driver Installation Complete**

## 6.6 Audio Driver Installation

To install the audio driver, please do the following.

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

**Step 2:**   Click "**4-Audio**" and select the folder which corresponds to the operating

system.

**Step 3:**   Double click the setup file.

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

process.

**Step 5:**   Once initialized, the **InstallShield Wizard** welcome screen appears

(**Figure 6-19**).
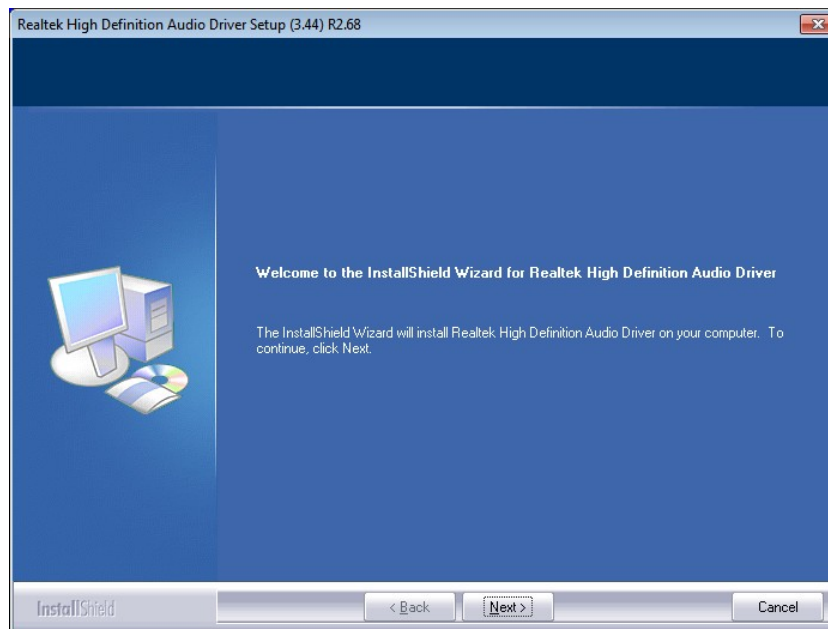


*Figure 6-19: InstallShield Wizard Welcome Screen*

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

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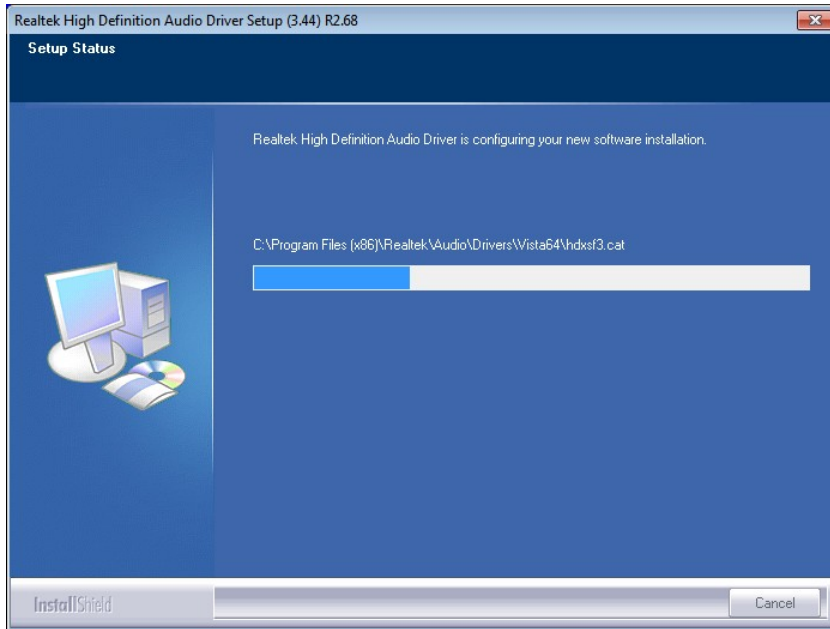
**Figure 6-20: Audio Driver Software Configuration**

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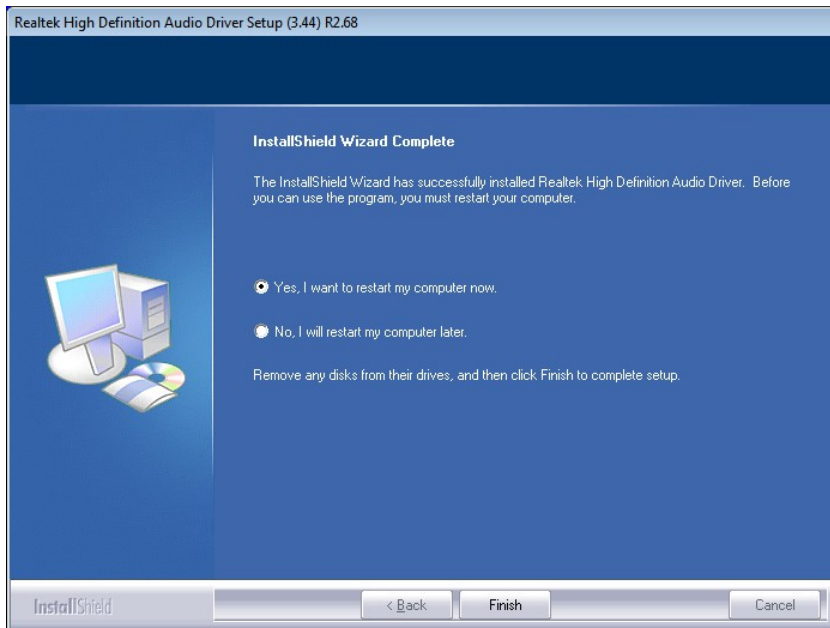


**Figure 6-21: Restart the Computer**

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

# 6.7 Intel® Rapid Storage Technology Driver Installation

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

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

**Step 2:** Click "**5-SATA**".

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

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

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



**Figure 6-22: SATA RAID Driver Welcome Screen**

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

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

**Step 8:** Click **Yes** to continue.
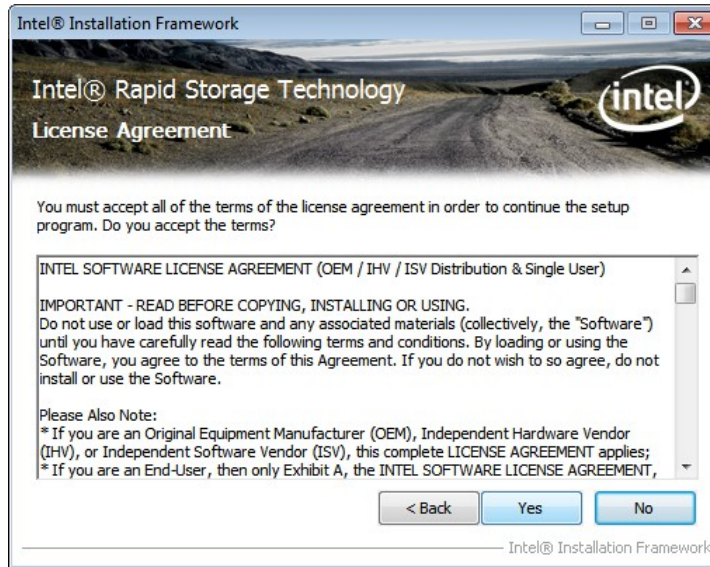
**Figure 6-23: SATA RAID Driver License Agreement**

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

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



**Figure 6-24: SATA RAID Driver Read Me File**

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

**Step 12:** Once the **Setup Operations** are complete, click **Next** to continue.
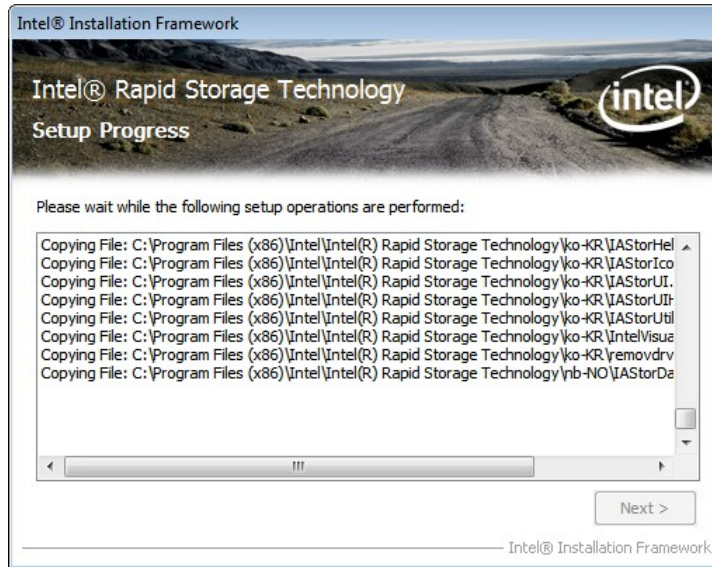
**Figure 6-25: SATA RAID Driver Setup Operations**

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

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



**Figure 6-26: SATA RAID Driver Installation Finish Screen**

## 6.8 Intel® AMT Driver 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 "**7-iAMT**".

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

**Step 4:** When the setup files are completely extracted the **Welcome Screen** in **Figure 6-27** appears.

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

**Figure 6-27: Intel® ME Driver Welcome Screen**

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

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

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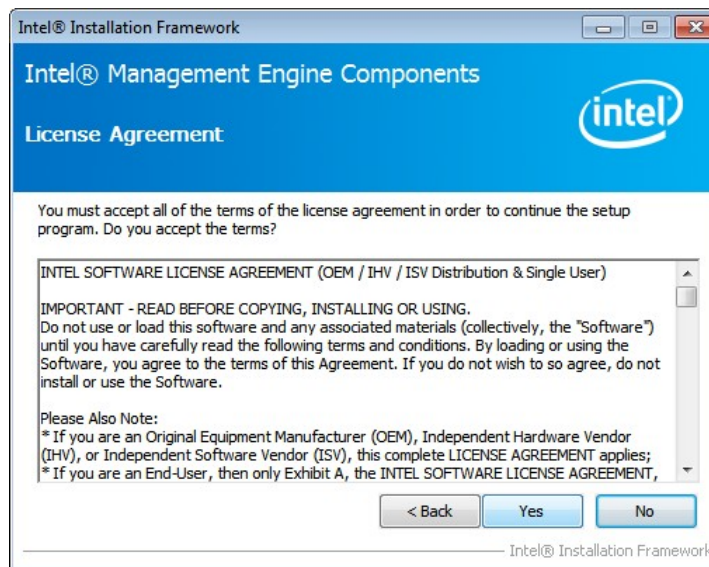


**Figure 6-28: Intel® ME Driver License Agreement**

**Step 9:** **Setup Operations** are performed as shown in **Figure 6-29**.

**Step 10:** Once the **Setup Operations** are complete, click **Next** to continue.
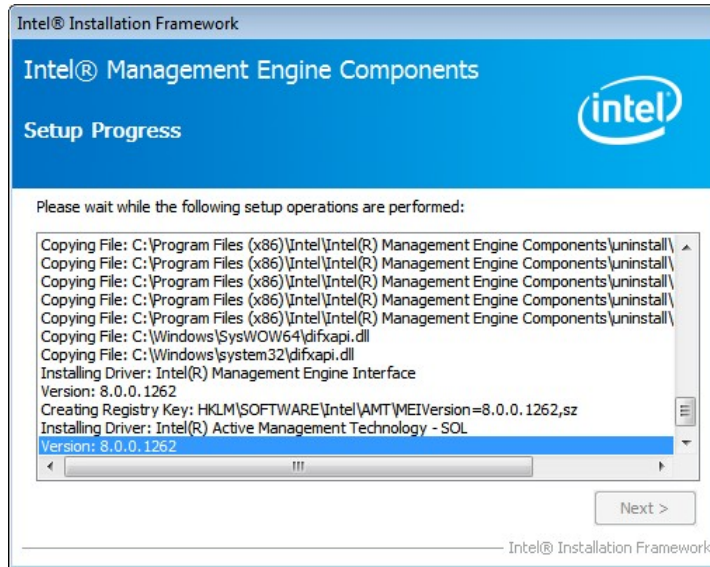
**Figure 6-29: Intel® ME Driver Setup Operations**

**Step 11:** The **Finish** screen in **Figure 6-30** appears.

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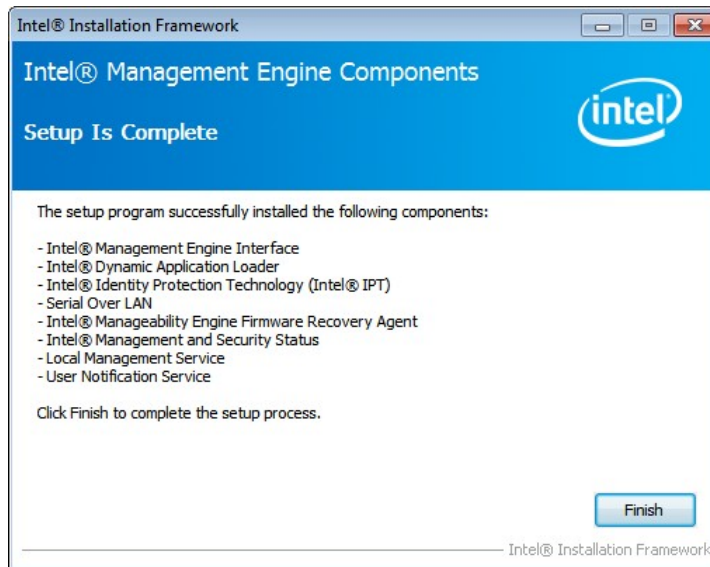


**Figure 6-30: Intel® ME Driver Installation Finish Screen**

**Appendix**

**A**

# Regulatory Compliance

**DECLARATION OF CONFORMITY**

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

**FCC WARNING**

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

■ This device may not cause harmful interference, and
■ This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Appendix**

**B**

# BIOS Options

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

# Appendix

# C

# Terminology

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

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

**LVDS**          Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.

**POST**          The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.

**RAM**           Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.

**SATA**          Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.

**S.M.A.R.T**     Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.

**UART**          Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.

**UHCI**          The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.

**USB**           The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.

**VGA**           The Video Graphics Array (VGA) is a graphics display system developed by IBM.

<div style="text-align: right;">

**Appendix**

# D

</div>

# Digital I/O Interface

## D.1 Introduction

The DIO connector on the SPCIE-C2160 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

> ![NOTE icon] **NOTE:**
>
> For further information, please refer to the datasheet for the Super I/O chipset.

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 |

## D.2 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 |

## D.3 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**

**E**

# Watchdog Timer

 **NOTE:**

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

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external 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 E-1: AH-6FH Sub-function**

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

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

 **NOTE:**

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

**EXAMPLE PROGRAM:**

**; INITIAL TIMER PERIOD COUNTER**

**;**
**W_LOOP:**
**;**

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

**;**
**; ADD THE APPLICATION PROGRAM HERE**
**;**

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

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

**;**
**; EXIT ;**

**Appendix**

# F

# Intel® Matrix Storage Manager

## F.1 Introduction

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

## ⚠️ CAUTION!

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

### F.1.1 Precautions

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

## ⚡ WARNING!

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

⚠️ **CAUTION!**

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

## F.2 Features and Benefits

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

## F.3 Accessing the Intel® Matrix Storage Manager

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

**Step 13:** **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 14:** **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 15:** **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 16: Save and Exit BIOS**. After the SATA support option is enabled, save and exit the BIOS.

**Step 17: Reboot the system**. Reboot the system after saving and exiting the BIOS.

**Step 18: Press Ctrl+I. during the system boot process**. Press Ctrl+I when prompted to enter the RAID configuration software.

**Step 19: Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

# F.4 Installing the Operating System to the RAID Array

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

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

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

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

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

# 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<br><br>(Pb) | 汞<br><br>(Hg) | 镉<br><br>(Cd) | 六价铬<br><br>(CR(VI)) | 多溴联苯<br><br>(PBB) | 多溴二苯醚<br><br>(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。<br>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。 | | | | | | |