iEi

® IEI Integration Corp.

MODEL:

PICOe-B650

Half-size PCIe CPU Card with LGA1155 32nm Intel® Core™ i7/i5/i3 CPU and Intel® B65 Chipset, DDR3, VGA, USB 2.0, Dual PCIe GbE, SATA 6Gb/s, HD Audio, RoHS Compliant

User Manual

Rev. 1.02 – October 7, 2014

RoHS Lead Free

Revision

Date	Version	Changes
October 7, 2014	1.02	Modified Table 3-9: Front Panel Connector Pinouts
November 20, 2013	1.01	Updated Section 5.3.4: SATA Configuration
February 3, 2012	1.00	Initial release

Copyright

Table of Contents

List of Figures

List of Tables

BIOS Menus

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: PICOe-B650 Half-size CPU Card

The PICOe-B650 half-size PCIe CPU card is an embedded LGA1155 Intel® Core™ processor i3, i5 or i7 platform. The PICOe-B650 supports one 204-pin 1066/1333 MHz 8.0 GB (max.) DDR3 SDRAM SO-DIMM. The board includes one VGA connector, and supports a dual-display configuration.

The PICOe-B650 also comes with two Gigabit Ethernet (GbE) connectors, one SATA 6Gb/s connector, one SATA 3Gb/s connector and four USB 2.0 connector. Serial device connectivity is provided by two internal RS-232 connectors.

The PICOe-B650 supports an optional Trusted Platform Module (TPM) to provide a trusted and secure base for various applications.

1.2 Connectors

The connectors on the PICOe-B650 are shown in the figure below.
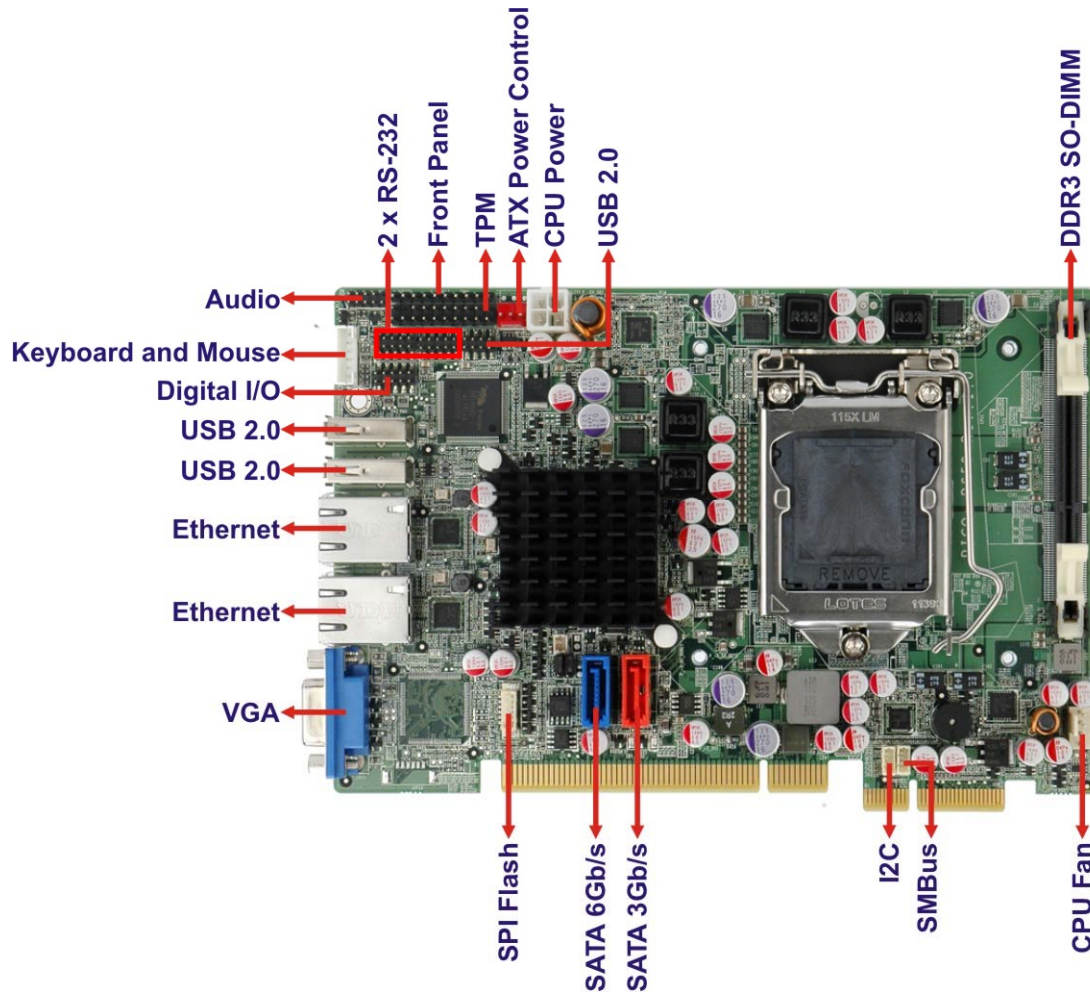
Figure 1-2: Connectors

1.3 Dimensions

The dimensions of the board are listed below:

- **Length**: 185 mm
- **Width**: 122 mm
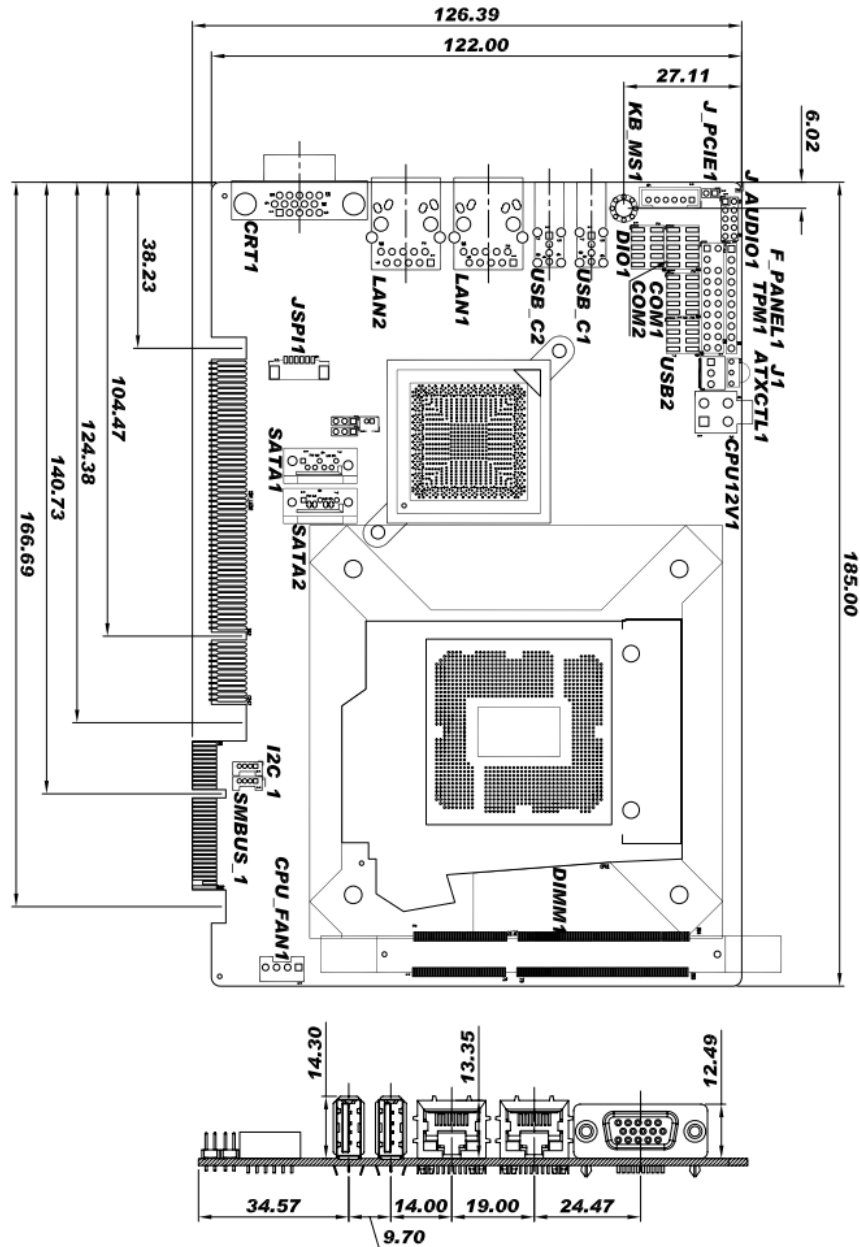
Figure 1-3: PICOe-B650 Dimensions (mm)

1.4 Data Flow

Figure 1-4 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.
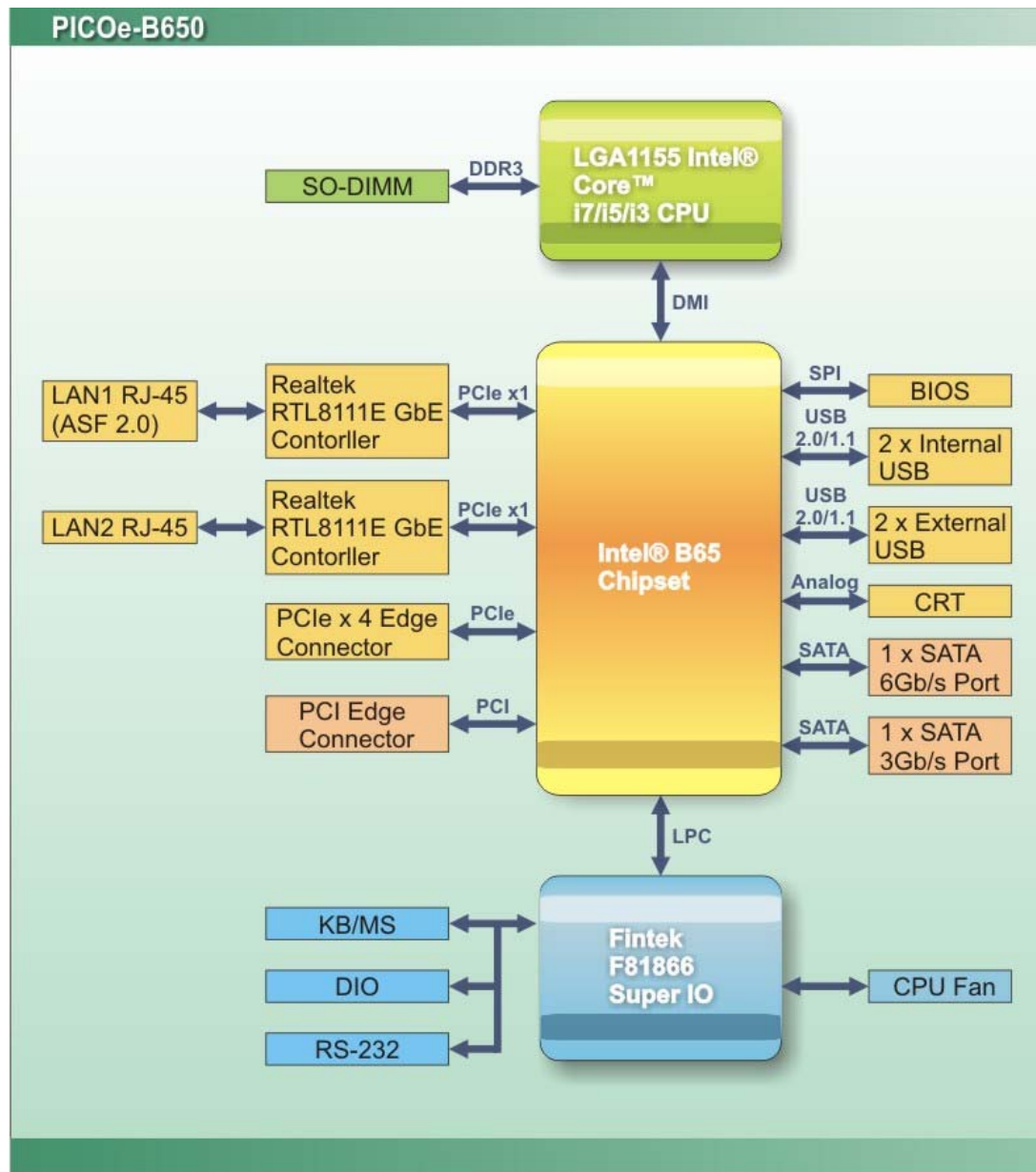
Figure 1-4: Data Flow Block Diagram

1.5 Technical Specifications

PICOe-B650 technical specifications are listed in table below.

Specification	PICOe-B650
Form Factor	Half-size PCIe CPU Card
CPU Socket	LGA1155 socket
CPU Options	Intel® Core™ i7/i5/i3 quad-core/dual-core processor Intel® Pentium®/Celeron® processor
System Chipset	Intel® B65
Graphics Engine	Intel® HD Graphics Gen 6 support for DX10.1 and OpenGL 3.0 Full MPEG2, VC1, AVC Decode
Memory	One 204-pin SO-DIMM socket supports one 1333/1066 MHz DDR3 SDRAM SO-DIMM (system max. 8 GB)
LAN	Dual Realtek RTL8111E PCIe GbE controllers, LAN1 supports ASF 2.0
BIOS	UEFI BIOS
Super I/O	Fintek F81866
Ethernet Controller	Two Realtek RTL8111E PCIe GbE controllers (LAN1 with ASF2.0 support)
Digital I/O	8-bit digital I/O (4-bit input, 4-bit output)
Watchdog Timer	Software programmable supports 1~255 sec. system reset
SMBus	One 4-pin wafer connector
I²C	One 4-pin wafer connector
TPM	One 20-pin header supports optional Infineon TPM module
Expansion	
PCI	PCI signal via golden finger
PCIe	Four PCIe x1 via golden finger
I/O Interface Connectors	
Display	One VGA port (VGA integrated in Intel® B65)

Specification	PICOe-B650
Ethernet	Two RJ-45 GbE ports
Audio	Supports 7.1 channel HD audio via optional IEI AC-KIT-888HD kit
Keyboard/Mouse	One keyboard and mouse connector via internal 6-pin header
Serial Ports	Two RS-232 serial ports via internal pin header
USB 2.0 ports	Two external USB ports Two USB ports via internal pin headers
Storage	
Serial ATA	One SATA 6Gb/s port One SATA 3Gb/s port
Environmental and Power Specifications	
Power Supply	5 V / 12 V, AT/ATX power support
Power Consumption	5V@3.17A, 12V@0.46A, Vcore_12V@7.26A, 5VSB@0.18A (3.4GHz Intel® Core™ i7-2600K with two 2GB 1333MHz DDR3 memory)
Operating Temperature	-10°C~60°C
Storage Temperature	-20°C~70°C
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	185 mm x 122 mm
Weight GW/NW	1000g/260g

Table 1-1: Technical Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

![WARNING icon] **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 PICOe-B650 is unpacked, please do the following:

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

2.3 Unpacking Checklist

> ![NOTE icon] **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 PICOe-B650 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

2.3.1 Package Contents

The PICOe-B650 is shipped with the following components:

Quantity	Item and Part Number	Image
1	PICOe-B650 CPU card	
2	SATA cable (**P/N**: 32801-000703-200-RS)	
1	Dual RS-232 cable (**P/N**: 19800-000112-RS)	
1	Dual USB cable (w bracket) (**P/N**: 19800-003000-200-RS)	
1	Mini jumper pack (**P/N**: 33101-000657-RS)	
1	Utility CD	

1	One Key Recovery CD	
1	Quick Installation Guide	

2.3.2 Optional Items

The PICOe-B650 is shipped with the following components:

Item and Part Number	Image
SATA power cable (**P/N**: 32102-000100-200-RS)	
KB/MS cable (with bracket) (**P/N**: 19800-000075-RS)	
7.1 Channel HD Audio kit with Realtek ALC888 (**P/N**: AC-KIT-888HD-R10)	
SATA to IDE/CompactFlash® converter board (**P/N**: SAIDE-KIT01-R10)	
Infineon TPM module (**P/N**: TPM-IN01-R11)	
LGA1155/LGA1156 Cooler kit (1U Chassis compatible, 73W) (**P/N**: CF-1156A-RS)	

LGA1155/LGA1156 Cooler kit (95W) (**P/N**: CF-1156B-RS)	
LGA1155/LGA1156 Cooler kit (45W) (**P/N**: CF-1156C-RS)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. Section 3.2 lists all the peripheral interface connectors seen in Section 3.1.1.

3.1.1 PICOe-B650 Layout

Figure 3-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
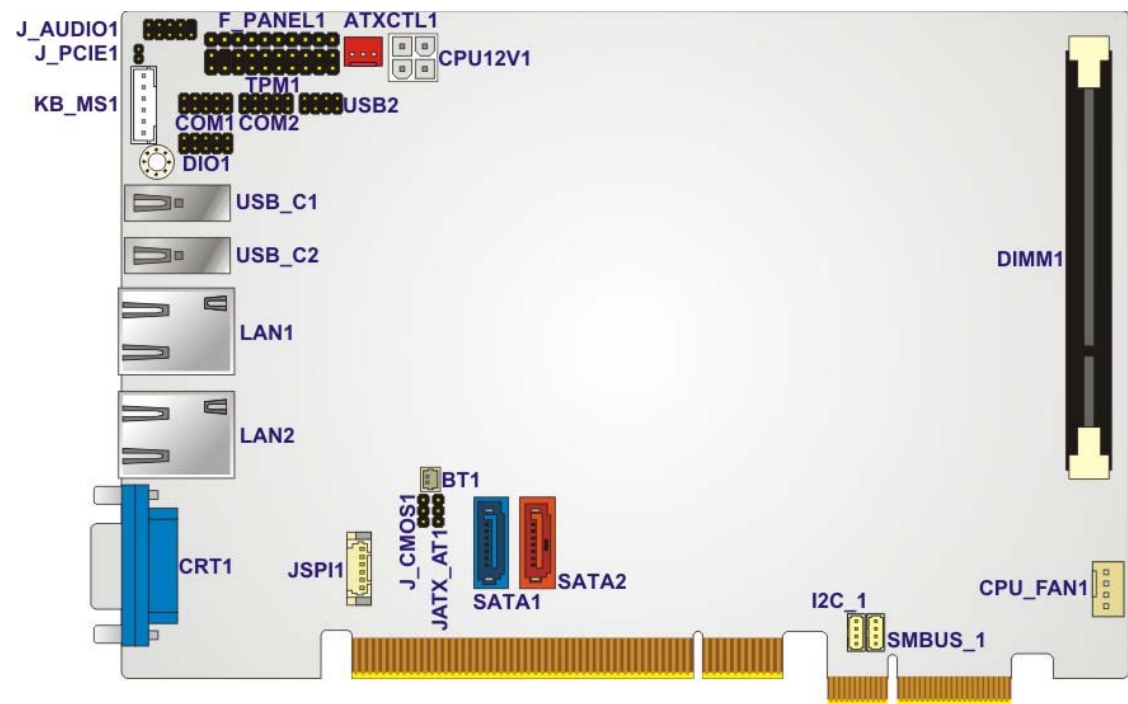
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the PICOe-B650. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power control connector	3-pin wafer	ATXCTL1
Audio connector	9-pin header	J_AUDIO1
Battery connector	2-pin wafer	BT1

Connector	Type	Label
CPU fan connector	4-pin wafer	CPU_FAN1
CPU power connector	4-pin connector	CPU12V1
DDR3 SO-DIMM	204-pin SO-DIMM	DIMM1
Digital input/output (DIO) connector	10-pin header	DIO1
Front panel connector	10-pin header	F_PANEL1
I^2C connector	4-pin wafer	I2C_1
Keyboard and mouse connector	6-pin wafer	KB_MS1
SATA 6Gb/s connector	7-pin SATA	SATA1
SATA 3Gb/s connector	7-pin SATA	SATA2
Serial port connectors (RS-232)	10-pin header	COM1, COM2
SMBus connector	4-pin wafer	SMBUS_1
SPI flash connector	6-pin wafer	JSPI1
TPM connector	20-pin header	TPM1
USB 2.0 connector	8-pin header	USB2

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

Table 3-2 lists the rear panel connectors on the PICOe-B650. Detailed descriptions of these connectors can be found in **Section 3.3** on **page 31**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
USB 2.0 port	USB port	USB_C1
USB 2.0 port	USB port	USB_C2
VGA port connector	15-pin female	CRT1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU card is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the PICOe-B650.

3.2.1 ATX Power Supply Enable Connector

CN Label:	**ATXCTL1**
CN Type:	3-pin wafer (1x3)
CN Location:	See **Figure 3-2**
CN Pinouts:	See **Table 3-3**

The ATX power supply enable connector enables the PICOe-B650 to be connected to an ATX power supply. In default mode, the PICOe-B650 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to **Section 4.4.1** for more details.
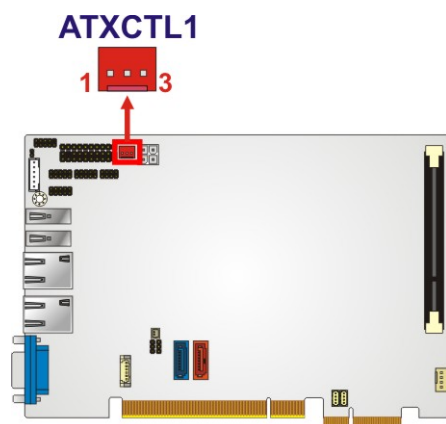
Figure 3-2: ATX Power Supply Enable Connector Location

Pin	Description
1	GND
2	PS-ON
3	+5 Standby

Table 3-3: ATX Power Supply Enable Connector Pinouts

3.2.2 Audio Connector

CN Label:	**J_AUDIO1**
CN Type:	9-pin header (2x5)
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

The 9-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.
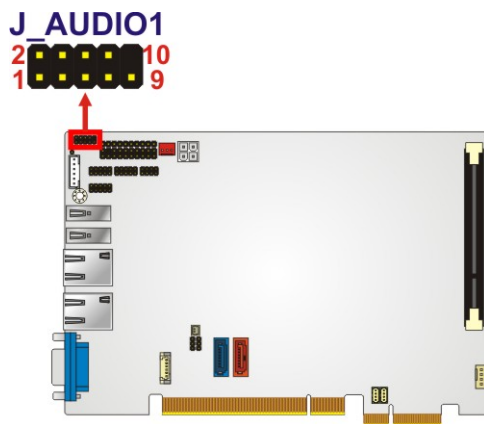
Figure 3-3: Audio Connector Location

Pin	Description	Pin	Description
1	HDA_SYNC	2	HDA_BITCLK
3	HDA_SDOUT	4	PC_BEEP
5	HDA_SDIN0	6	HDA_RST#
7	+5V	8	GND
9	+12V	10	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:	**BT1**
CN Type:	2-pin wafer (1x2)
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.
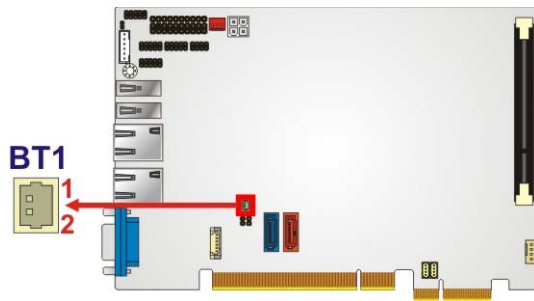
Figure 3-4: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-5: Battery Connector Pinouts

3.2.4 CPU Fan Connector

CN Label:	**CPU_FAN1**
CN Type:	4-pin wafer (1x4)
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

The cooling fan connector provides a 12V, 500mA current to the cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
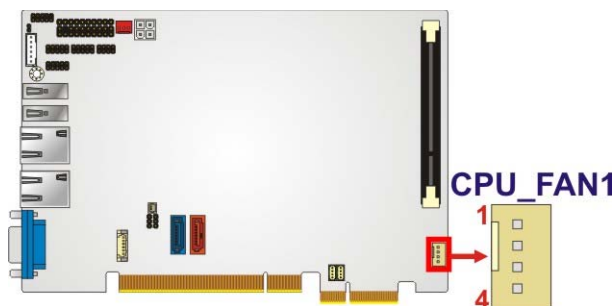
Figure 3-5: +12V Fan Connector Location

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

Table 3-6: +12V Fan Connector Pinouts

3.2.5 CPU 12 V Power Connector

CN Label:	**CPU12 V1**
CN Type:	4-pin connector
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-7**

This connector accepts 12 V of power for the processor.
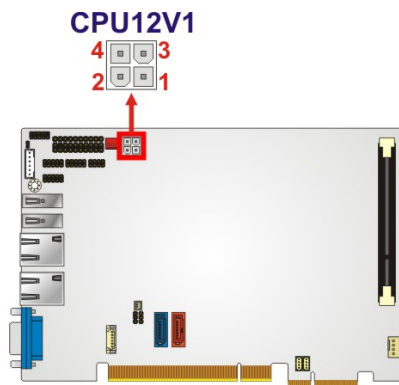
Figure 3-6: CPU Power Connector Location

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

Table 3-7: CPU Power Connector Pinouts

3.2.6 Digital Input/Output (DIO) Connector

CN Label: DIO1

CN Type: 10-pin header (2x5)

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

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

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.
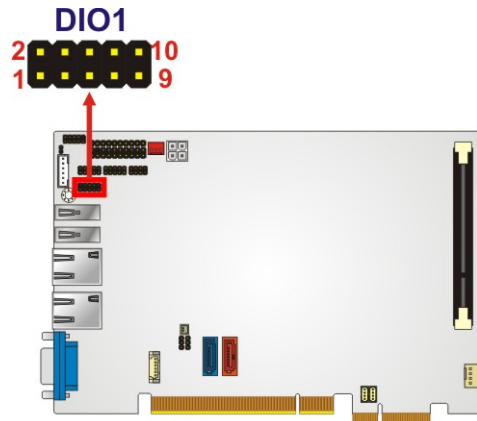
Figure 3-7: DIO Connector Location

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

Table 3-8: DIO Connector Connector Pinouts

3.2.7 Front Panel Connector

CN Label: F_PANEL1

CN Type: 10-pin header (1x10)

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

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

The front panel connector connects to external switches and indicators to monitor and controls the CPU card. These indicators and switches include:

- HDD LED
- Power button
- Power LED
- Reset
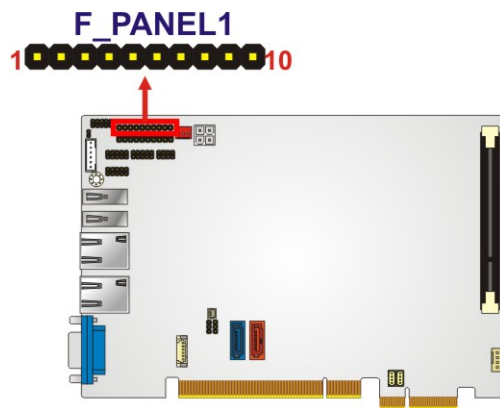
Figure 3-8: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
	1	N/A	Power LED	6	PWR_LED+
Power Button	2	PWR_BTN		7	PWR_LED+
	3	GND		8	GND
HDD LED	4	HDD_LED+	Reset	9	RESET
	5	HDD_LED-		10	GND

Table 3-9: Front Panel Connector Pinouts

3.2.8 I2C Connector

CN Label: **I2C_1**

CN Type: 4-pin wafer (1x4)

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

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

The I2C connector is used to connect I^2C-bus devices to the mainboard.
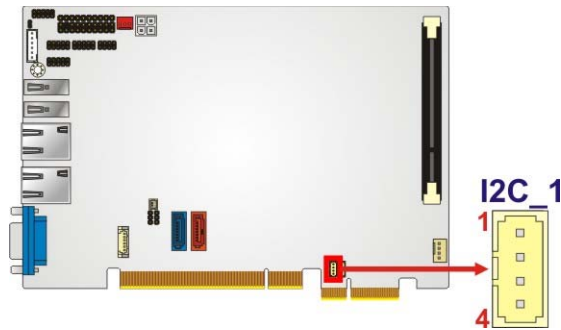
Figure 3-9: I2C Connector Location

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

Table 3-10: I2C Connector Pinouts

3.2.9 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin header (1x6)
CN Location:	See **Figure 3-10**
CN Pinouts:	See **Table 3-11**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.
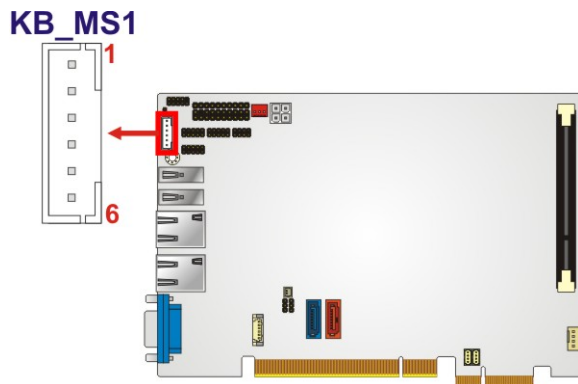
Figure 3-10: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 3-11: Keyboard/Mouse Connector Pinouts

3.2.10 SATA 6Gb/s Connector

CN Label: **SATA1**

CN Type: 7-pin SATA drive connector

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

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

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 6Gb/s.
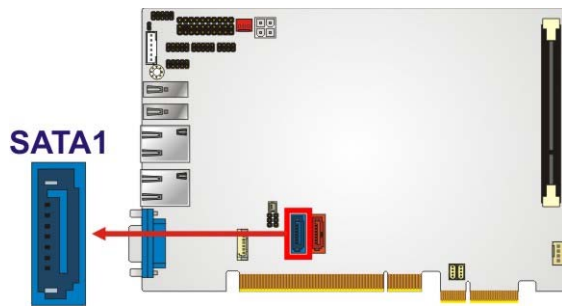
Figure 3-11: SATA Drive Connector Location

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

Table 3-12: SATA Drive Connector Pinouts

3.2.11 SATA 3Gb/s Connector

CN Label: **SATA2**

CN Type: 7-pin SATA drive connector

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

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

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 3Gb/s.
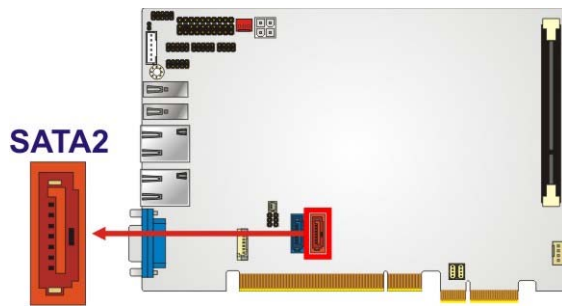
Figure 3-12: SATA Drive Connector Location

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

Table 3-13: SATA Drive Connector Pinouts

3.2.12 Serial Port Connectors (COM 1 and COM 2)

CN Label: **COM1, COM2**

CN Type: 10-pin header (2x5)

CN Location: See Figure 3-13

CN Pinouts: See Table 3-14

The 10-pin serial port connectors provide three RS-232 serial communications channels.

The COM serial port connectors can be connected to external RS-232 serial port devices.
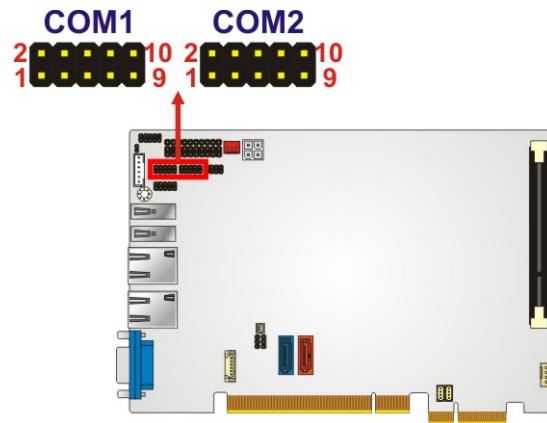
Figure 3-13: COM Connector Locations

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

Table 3-14: COM Connector Pinouts

3.2.13 SMBus Connector

CN Label: **SMBUS_1**

CN Type: 4-pin wafer (1x4)

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

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

The SMBus Connector provides a connection to a SMBus (System Management Bus) device.
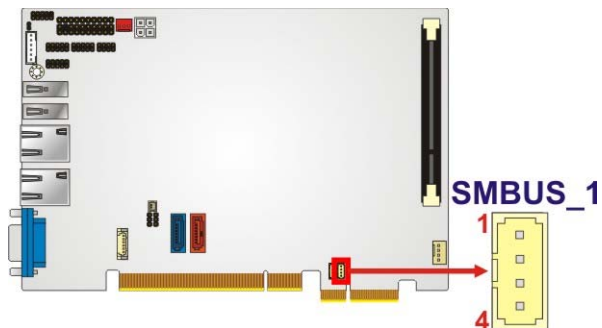
Figure 3-14: SMBus Connector Location

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

Table 3-15: SMBus Connector Pinouts

3.2.14 SPI Flash Connector

CN Label: **JSPI1**

CN Type: 6-pin header (1x6)

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

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

The SPI Flash connector is used to flash the BIOS.
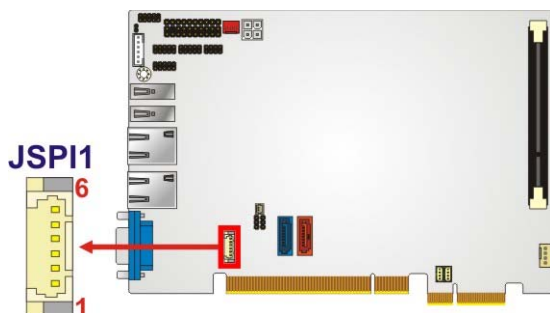
Figure 3-15: SPI Flash Connector Location

Pin	Description
1	SPI_VCC
2	SPI_CS#
3	SPI_MISO
4	SPI_CLK
5	SPI_MOSI
6	GND

Table 3-16: SPI Flash Connector

3.2.15 TPM Connector

CN Label: TPM1

CN Type: 20-pin header (2x10)

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

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

The Trusted Platform Module (TPM) connector secures the system on bootup.
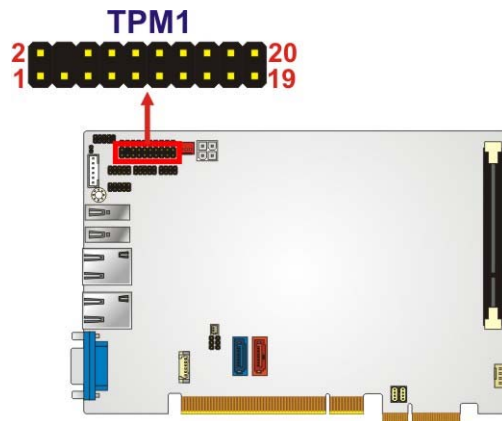
Figure 3-16: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND2
3	LFRAME#	4	KEY
5	LRESET#	6	+5V

Pin	Description	Pin	Description
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND3
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND1	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-17: TPM Connector Pinouts

3.2.16 USB Connectors (Internal)

CN Label:	**USB2**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-17**
CN Pinouts:	See **Table 3-18**

The internal USB connector provides connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.
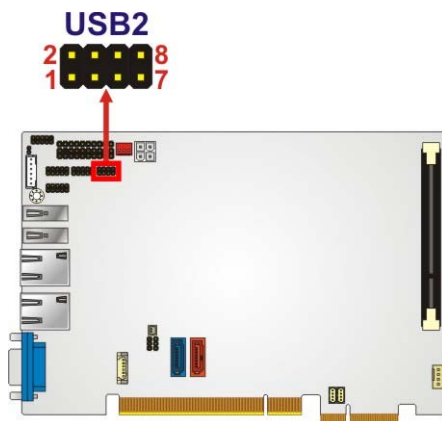
Figure 3-17: USB Connector Location

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

Table 3-18: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-18 shows the PICOe-B650 external peripheral interface connector (EPIC) panel. The PICOe-B650 EPIC panel consists of the following:

- 2 x RJ-45 LAN connectors
- 2 x USB connectors
- 1 x VGA connector
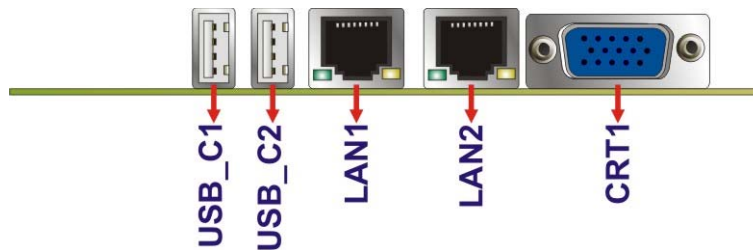
Figure 3-18: PICOe-B650 External Peripheral Interface Connector

3.3.1 LAN Connectors

CN Label:	**LAN1 and LAN2**
CN Type:	RJ-45
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-19**

The PICOe-B650 is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

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

Table 3-19: LAN Pinouts
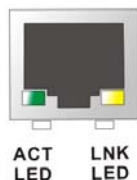
Figure 3-19: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one yellow (activity/link) and one green/orange (speed). The yellow LED indicates activity/link on the port and the green/orange LED indicates the connection speed. See **Table 3-20**.

ACT/LINK LED		SPEED LED	
STATUS	DESCRIPTION	STATUS	DESCRIPTION
OFF	No Link	OFF	10 Mbps connection
YELLOW	Link	GREEN	100 Mbps connection
BLINKING	Data activity	ORANGE	1000 Mbps connection

Table 3-20: RJ-45 Ethernet Connector LEDs

3.3.2 USB Connectors

> **CN Label:**   **USB_C1, USB_C2**
>
> **CN Type:**   USB port
>
> **CN Location:**   See **Figure 3-18**
>
> **CN Pinouts:**   See **Table 3-21**

The PICOe-B650 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-
3	DATA+
4	GND

Table 3-21: USB Port Pinouts

3.3.3 VGA Connector

CN Label:	**VGA1**
CN Type:	15-pin Female
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Figure 3-20** and **Table 3-22**

The PICOe-B650 has a single 15-pin female connector for connectivity to standard display devices.
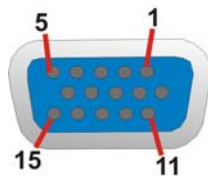
Figure 3-20: VGA Connector

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

Table 3-22: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

> **WARNING:**
>
> Failure to take ESD precautions during the installation of the PICOe-B650 may result in permanent damage to the PICOe-B650 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PICOe-B650. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PICOe-B650 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 PICOe-B650, place it on an anti-static pad. This reduces the possibility of ESD damaging the PICOe-B650.
- *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 the PICOe-B650 is installed. All installation notices pertaining to the installation of the PICOe-B650 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the PICOe-B650 and injury to the person installing the CPU card.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the PICOe-B650, PICOe-B650 components and injury to the user.

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

- **Read the user manual**:
  o The user manual provides a complete description of the PICOe-B650 installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD)**:
  o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place the PICOe-B650 on an antistatic pad**:
  o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power to the PICOe-B650 off**:
  o When working with the PICOe-B650, 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 PICOe-B650 **DO NOT:**

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

4.3 CPU and Memory Installation

 WARNING:

Do not run the CPU without a heatsink and fan. Without the heatsink and fan, the high temperatures can destroy the CPU and other components. CPUs marked as fanless don't need the fan, but still need adequate ventilation.

The CPU, CPU cooling kit and DIMM are the most critical components of the PICOe-B650. If one of these component is not installed the PICOe-B650 cannot run.

4.3.1 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**.
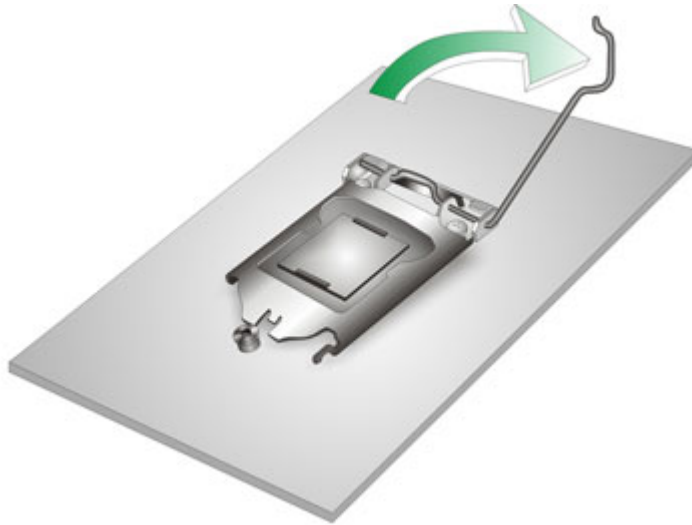
Figure 4-1: Disengage the CPU Socket Load Lever

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**.
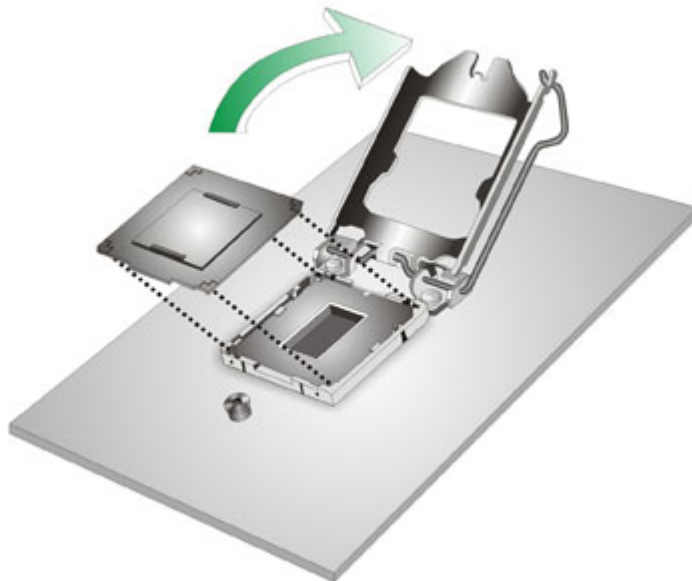
Figure 4-2: Remove Protective Cover

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.
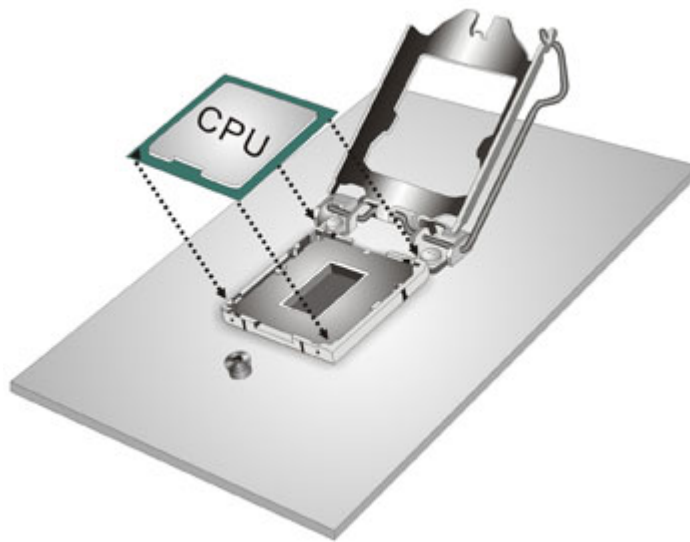
Figure 4-3: Insert the Socket LGA1155 CPU

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.
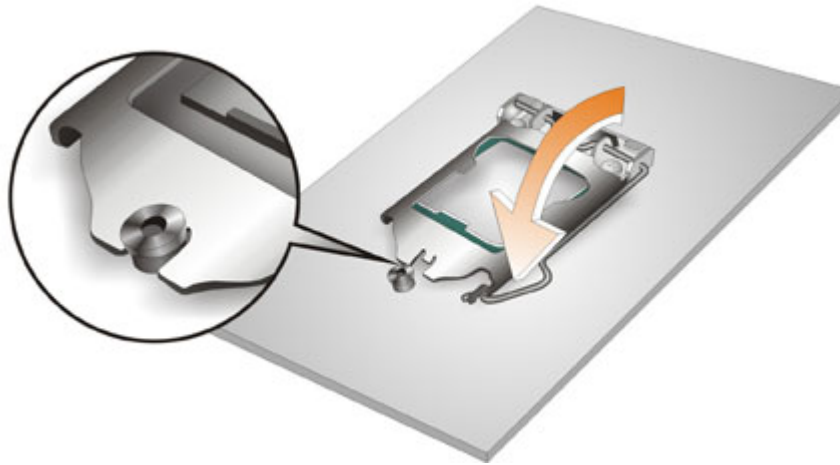
Figure 4-4: Close the Socket LGA1155

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

supply to the board.

4.3.2 Socket LGA1155 Cooling Kit Installation

⚠️ **WARNING:**

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

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

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

![WARNING 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 CPU card. See **Figure 4-5.**
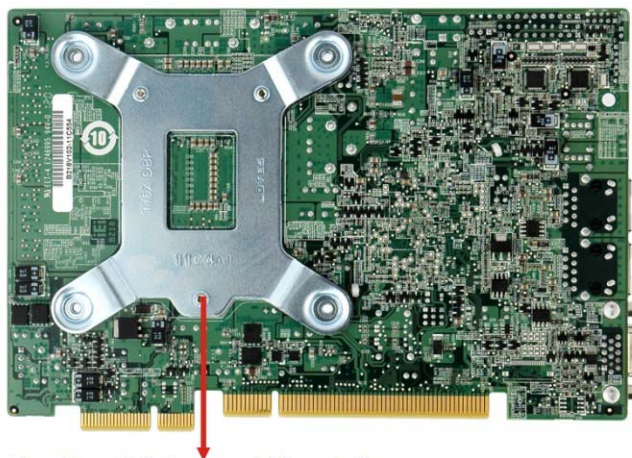
Figure 4-5: Cooling Kit Support Bracket

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 PICOe-B650. Carefully route the cable and avoid heat generating chips and fan blades.

4.3.3 SO-DIMM Installation

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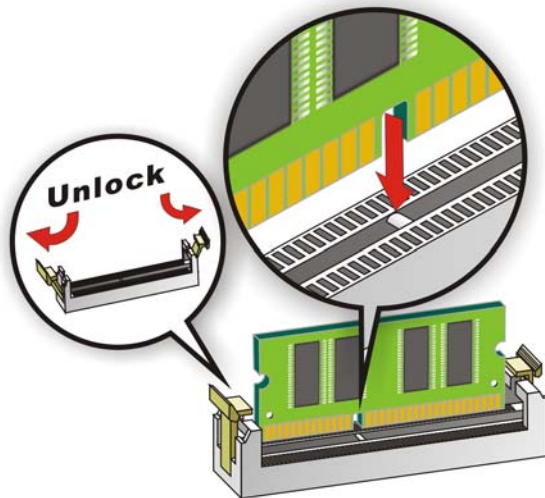
Figure 4-6: SO-DIMM Installation

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

Step 2: **Align the SO-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 SO-DIMM**. Once aligned, press down until the SO-DIMM is properly seated. Clip the two handles into place. See **Figure 4-6**.

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

4.4 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
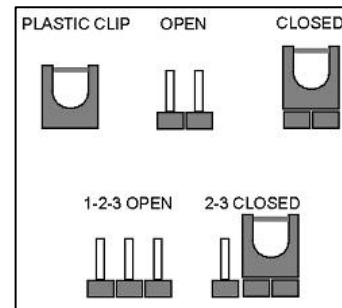
Before the PICOe-B650 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the PICOe-B650 are listed in **Table 4-1**.

Description	Label	Type
AT/ATX power mode select	JATX_AT1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
PCIe status select	J_PCIE1	2-pin header

Table 4-1: Jumpers

4.4.1 AT/ATX Power Mode Select Jumper

Jumper Label:	**JATX_AT1**
Jumper Type:	3-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
Short 1-2	Use ATX power (Default)
Short 2-3	Use AT power

Table 4-2: AT/ATX Power Mode Jumper Settings
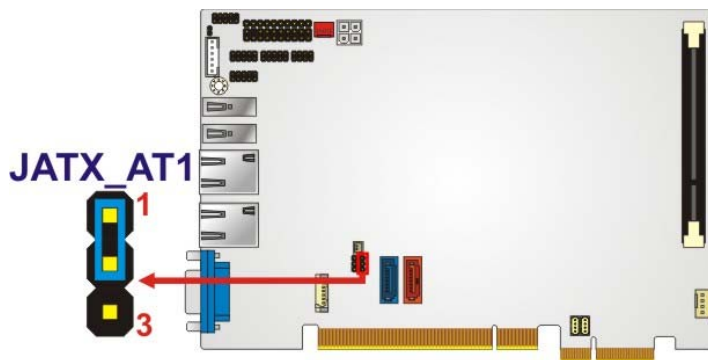
Figure 4-7: AT/ATX Power Mode Jumper Location

4.4.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

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

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

If the PICOe-B650 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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

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

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

The clear CMOS jumper settings are shown in **Table 4-3**.

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

Table 4-3: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 4-8** below.
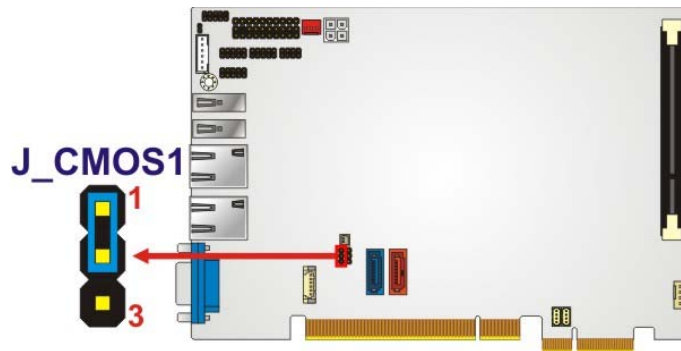
Figure 4-8: Clear CMOS Jumper

4.4.3 PCIe Status Select Jumper

Jumper Label: **J_PCIE1**

Jumper Type: 2-pin header

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

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

The **PCIe Status Select** jumper allows the PCIe status to be configured. The **PCIe Status Select** jumper settings are shown in Table 4-4.

Setting	Description
Open	One PCIe x4
Short	Four PCIe x1 (Default)

Table 4-4: PCIe Status Select Jumper Settings

The PCIe Status Select jumper location is shown in Figure 4-9.
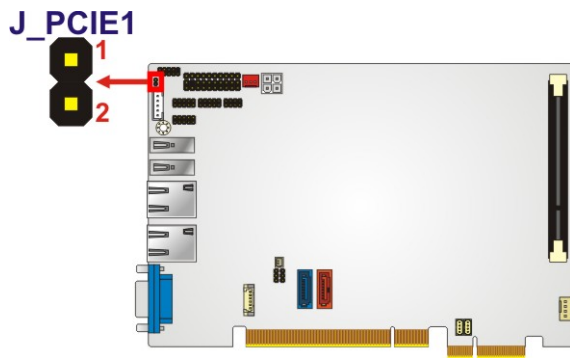
Figure 4-9: PCIe Status Select Jumper Pinout Locations

4.5 Chassis Installation

4.5.1 Airflow

> **WARNING:**
>
> Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the PICOe-B650 must have air vents to allow cool air to move into the system and hot air to move out.

The PICOe-B650 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.

4.5.2 Backplane Installation

Before the PICOe-B650 can be installed into the chassis, a backplane must first be installed. Please refer to the installation instructions that came with the backplane and the chassis to see how to install the backplane into the chassis.

![NOTE icon] **NOTE:**

IEI has a wide range of backplanes available. Please contact your PICOe-B650 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

4.5.3 CPU Card Installation

To install the PICOe-B650 CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding 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.

4.6 Internal Peripheral Device Connections

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

4.6.1 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 pin headers. See **Figure 4-10**.
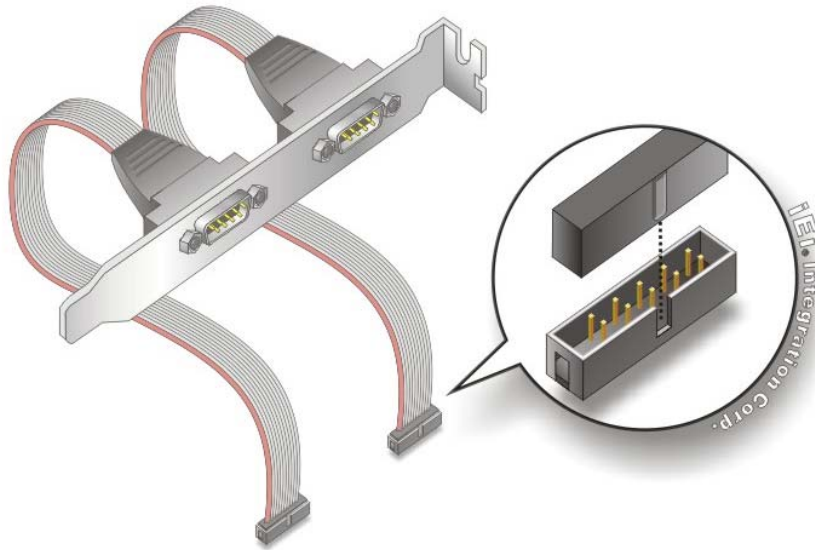
Figure 4-10: Dual RS-232 Cable Installation

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

4.6.2 SATA Drive Connection

The PICOe-B650 is shipped with two SATA drive cables. To connect the SATA drives to
the connectors, please follow the steps below.

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

in **Chapter 3**.

Step 2:   **Insert the cable connector**. Insert the cable connector into the on-board SATA

drive connector until it clips into place. See **Figure 4-11**.
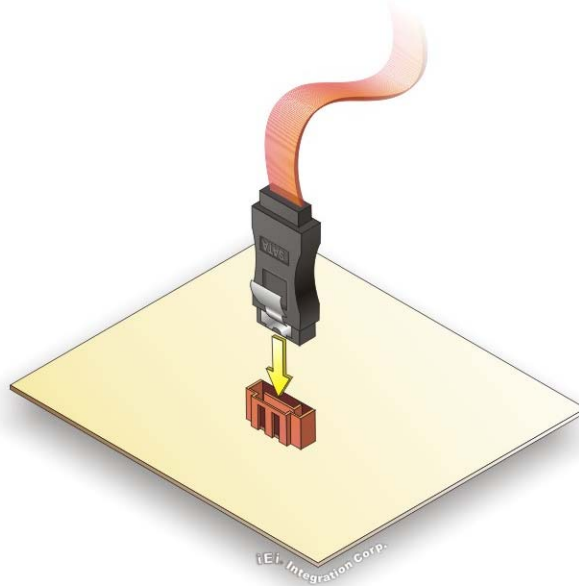
Figure 4-11: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-12**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-12**.
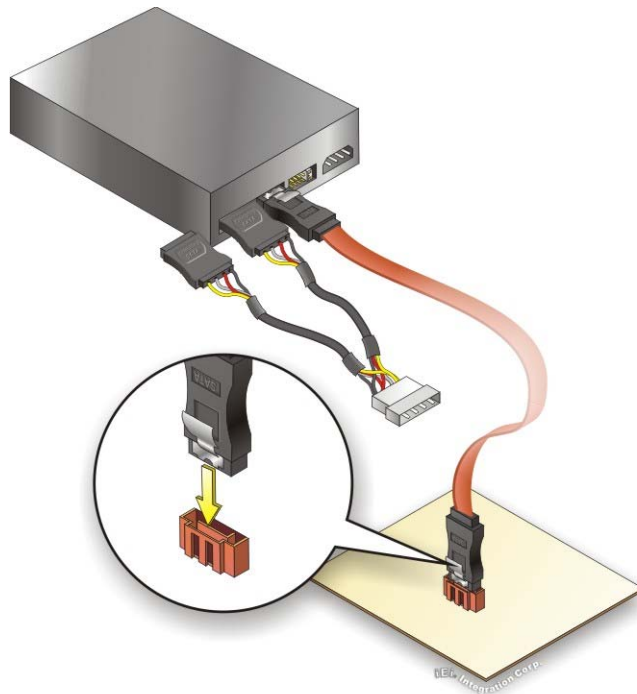
Figure 4-12: SATA Power Drive Connection

4.6.3 USB Cable (Dual Port) with Slot Bracket

The PICOe-B650 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 PICOe-B650 USB connector.

Step 3: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the PICOe-B650, connect the cable connectors to

the on-board connectors. See **Figure 4-13**.
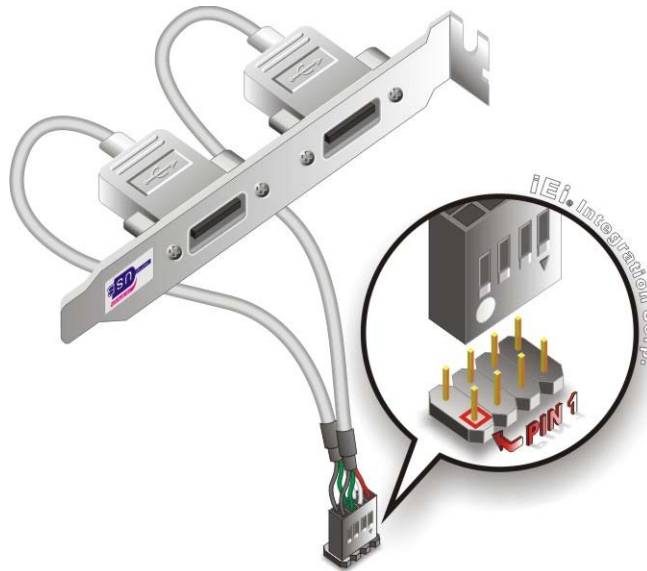
Figure 4-13: Dual USB Cable Connection

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.

4.7 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding PICOe-B650 external peripheral interface connector making sure the pins are properly aligned.

4.7.1 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 PICOe-B650. See **Figure 4-14**.
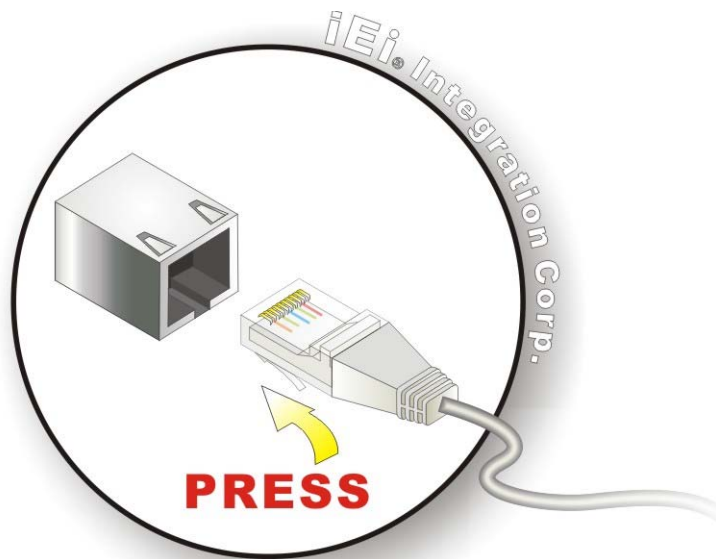
Figure 4-14: LAN Connection

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

4.7.2 USB Connection

The external USB Series "A" receptacle connector provides easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the PICOe-B650.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB

Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 4-15**.
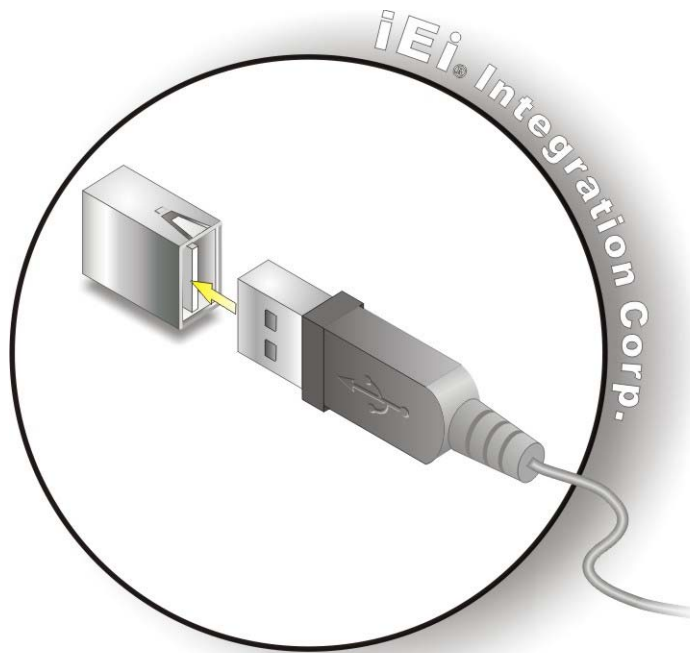
Figure 4-15: USB Connector

4.7.3 VGA Monitor Connection

The PICOe-B650 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 PICOe-B650, 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

PICOe-B650. See **Figure 4-16**.
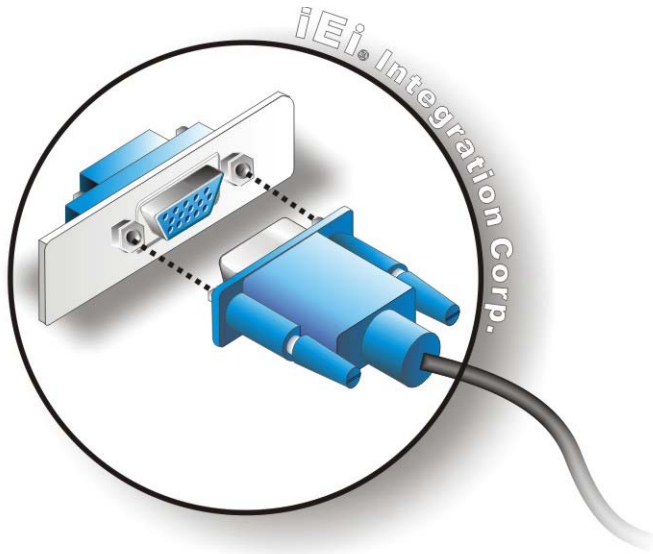
Figure 4-16: VGA Connector

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.

4.8 Software Installation

All the drivers for the PICOe-B650 are on the CD that came with the system. To install the

drivers, please follow the steps below.

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

NOTE:

If the installation program doesn't start automatically:

Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 4-17**).
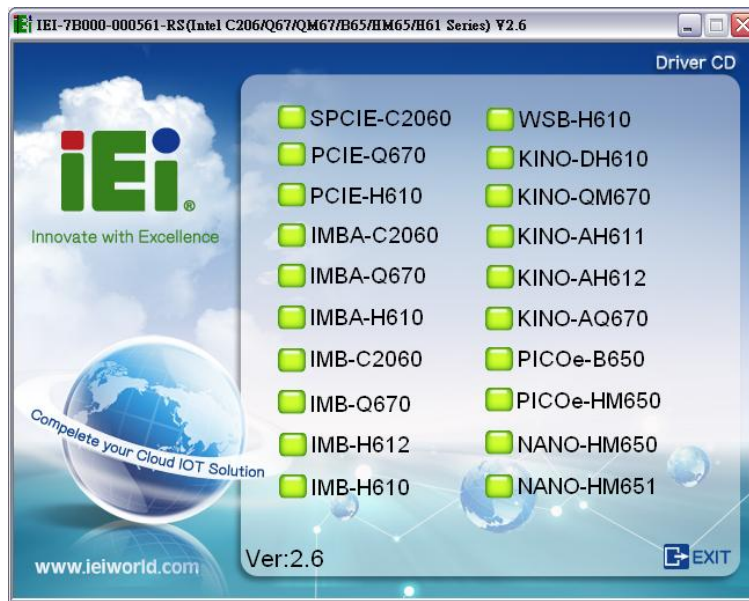
Figure 4-17: Introduction Screen

Step 3: Click **PICOe-B650**.

Step 4: A new screen with a list of available drivers appears (**Figure 4-18**).

Figure 4-18: Available Drivers

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

Chapter

5

BIOS Screens

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 icon] **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 AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

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

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

5.1.2 Using Setup

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

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side

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

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                  4.6.4.0 0.03              elements.
  Compliency                    UEFI 2.0
  Project Version               B218AR09.ROM
  Build Date                    12/29/2011 17:06:33       ---------------------

  Memory Information                                       ←→: Select Screen
  Total Memory                  2048 MB (DDR3 1333)        ↑ ↓: Select Item
                                                           Enter Select
  System Date                   [Tue 03/04/2011]           + -  Change Opt.
  System Time                   [15:10:27]                 F1   General Help
                                                           F2   Previous Values
  Access Level                  Administrator              F3   Optimized Defaults
                                                           F4   Save & Exit
                                                           ESC  Exit
          Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 1: Main

➔ **System Overview**

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

- ▪ **BIOS Vendor:** Installed BIOS vendor
- ▪ **Core Version:** Current BIOS version
- ▪ **Project Version:** the board version
- ▪ **Build Date:** Date the current BIOS version was made

➔ **Memory Information**

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

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

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

5.3 Advanced

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

⚠ **WARNING!**

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

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

 > ACPI Settings                                     System ACPI Parameters
 > Trusted Computing
 > CPU Configuration
 > SATA Configuration
 > Intel TXT(LT) Configuration                       ----------------------
 > USB Configuration
 > Super IO Configuration                            ←→: Select Screen
 > H/M Monitor                                       ↑↓: Select Item
 > Serial Port Console Redirection                   Enter Select
 > iEi Feature                                       + -   Change Opt.
                                                     F1    General Help
                                                     F2    Previous Values
                                                     F3    Optimized Defaults
                                                     F4    Save & Exit
                                                     ESC   Exit
         Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 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 the highest ACPI
                                                      sleep state the system
ACPI Sleep State                 [S1 (CPU Stop Clock)]  will enter 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 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 3: ACPI Configuration

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

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

➔ **Suspend Disabled**

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

5.3.2 Trusted Computing

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

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

 TPM Configuration                                         Enables or Disables TPM
   TPM SUPPORT                      [Disable]              support. O.S. will not
                                                           show TPM. Reset of
 Current TPM Status Information                            platform is required.
   NO TPM Hardware

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

                                                           ←→: Select Screen
                                                           ↑ ↓: Select Item
                                                           Enter Select
                                                           + -  Change Opt.
                                                           F1   General Help
                                                           F2   Previous Values
                                                           F3   Optimized Defaults
                                                           F4   Save & Exit
                                                           ESC  Exit
          Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 4: TPM Configuration

➔ **TPM Support [Disable]**

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

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

➔ **Enable**   TPM support is enabled.

5.3.3 CPU Configuration

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

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

CPU Configuration                                   Socket specific CPU
                                                    Information
> CPU Information

Intel Virtualization Technology   [Disabled]        ---------------------

                                                    ←→: Select Screen
                                                    ↑↓: Select Item
                                                    Enter Select
                                                    + -   Change Opt.
                                                    F1    General Help
                                                    F2    Previous Values
                                                    F3    Optimized Defaults
                                                    F4    Save & Exit
                                                    ESC   Exit
         Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
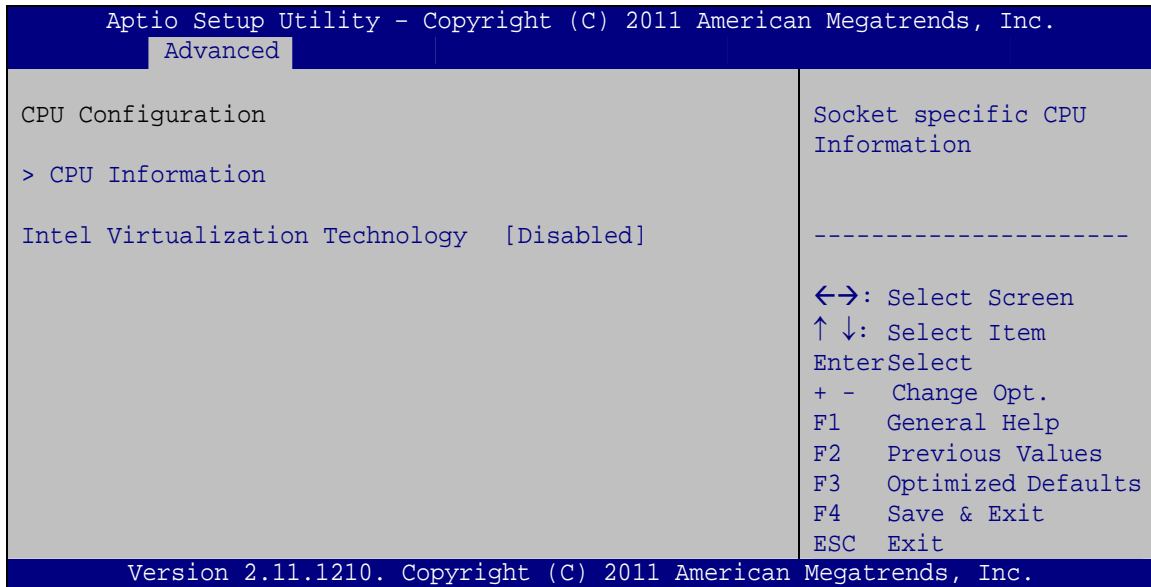
BIOS Menu 5: CPU Configuration

➔   **Intel Virtualization Technology [Disabled]**

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

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

➔   **Enabled**   Enables Intel Virtualization Technology.

5.3.3.1 CPU Information

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

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

CPU Configuration

Intel(R) Pentium(R) CPU G850 @ 2.90GHz
CPU Signature                    206a7                  ---------------------
Microcode Patch                  14
Max CPU Speed                    2900 MHz               ←→: Select Screen
Min CPU Speed                    1600 MHz               ↑ ↓: Select Item
Processor Cores                  2                      EnterSelect
Intel HT Technology              Not Supported          + -  Change Opt.
Intel VT-x Technology            Supported              F1   General Help
Intel SMX Technology             Not Supported          F2   Previous Values
                                                        F3   Optimized Defaults
L1 Data Cache                    32 kB x 2              F4   Save & Exit
L1 Code Cache                    32 kB x 2              ESC  Exit
L2 Cache                         256 kB x 2
L3 Cache                         3072 kB
          Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 6: CPU Configuration

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

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

5.3.4 SATA Configuration

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

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

 SATA Configuration                                      (1) IDE Mode. (2) AHCI
                                                         Mode.
 SATA Mode                      [IDE Mode]
 Serial-ATA Controller 0        [Compatible]
 Serial-ATA Controller 1        [Enhanced]

 SATA Port0                     Not Present

 SATA Port1                     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 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 7: SATA Configuration

➔ **SATA Mode [IDE Mode]**

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

→ **Disable**   Disables SATA devices.

→ **IDE Mode**   DEFAULT   Configures SATA devices as normal IDE device.

→ **AHCI Mode**   Configures SATA devices as AHCI device.

→ **Serial-ATA Controller n**

Use the **Serial-ATA Controller** option to configure the SATA controller.

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

→ **Enhanced**   Configures the on-board SATA controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated.

→ **Compatible**   Configures the on-board SATA controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 6 storage devices.

5.3.5 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 Extensons (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 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
BIOS Menu 8: Intel TXT(LT) Configuration

5.3.6 USB Configuration

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

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

USB Configuration                                        USB Support Parameters

USB Devices:                                             --------------------
       1 Keyboard, 2 Hubs                                ←→: Select Screen
                                                         ↑ ↓: Select Item
USB Support                         [Enabled]            Enter Select
Legacy USB Support                  [Enabled]            + -  Change Opt.
                                                         F1   General Help
                                                         F2   Previous Values
                                                         F3   Optimized Defaults
                                                         F4   Save & Exit
                                                         ESC  Exit


         Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
    BIOS Menu 9: USB Configuration

➔ **USB Devices**

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

➔ **USB Support [Enabled]**

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

➔ **Disabled**   USB support disabled

➔ **Enabled**   DEFAULT   USB support enabled

➔ **Legacy USB Support [Enabled]**

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

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

➔ **Enabled**   DEFAULT   Legacy USB support enabled

➔ **Disabled**   Legacy USB support disabled

5.3.7 Super IO Configuration

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

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

 Super IO Configuration                              Set Parameters of Serial
                                                     Port 1 (COMA)
 Super IO Chip                 Fintek F81866
 > Serial Port 1 Configuration
 > Serial Port 2 Configuration                       --------------------
                                                     ←→: Select Screen
 Power Saving Function        [Disabled]             ↑ ↓: Select Item
                                                     Enter Select
                                                     + -  Change Opt.
                                                     F1   General Help
                                                     F2   Previous Values
                                                     F3   Optimized Defaults
                                                     F4   Save & Exit
                                                     ESC  Exit
        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 10: Super IO Configuration

➔ **Power Saving Function [Disabled]**

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

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

➔ **Enabled**   Power Saving Function support enabled

5.3.7.1 Serial Port n Configuration

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

```
        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 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 11: Serial Port n Configuration Menu

5.3.7.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**   Disable the serial port

➔ **Enabled**   DEFAULT   Enable the serial port

➔ **Change Settings [Auto]**

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

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

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

5.3.7.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled**

Disable the serial port

➔ **Enabled** DEFAULT

Enable the serial port

➔ **Change Settings [Auto]**

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

➔ **Auto** DEFAULT

The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2F8h;**
IRQ=3

Serial Port I/O port address is 2F8h and the interrupt address is IRQ3

➔ **IO=3F8h;**
IRQ=3, 4

Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4

➔ **IO=2F8h;**
IRQ=3, 4

Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4

➔ **IO=2C0h;**
IRQ=3, 4

Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4

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

IRQ=3, 4   address is IRQ3, 4

5.3.8 H/W Monitor

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

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

PC Health Status                                        Smart FAN Configuration

CPU Temperature                     :+44 C
SYS Temperature                     :+32 C
CPU FAN Speed                       :1950 RPM
VCC3V                               :+3.328 V
V_core                              :+1.112 V
+1.05V                              :+1.040 V         --------------------
VDDR                                :+1.632 V         ←→: Select Screen
VSB3V                               :+3.424 V         ↑ ↓: Select Item
VBAT                                :+3.232 V         Enter Select
5VSB                                :+4.992 V         + -   Change Opt.
                                                      F1    General Help
> FAN 1 Configuration                                 F2    Previous Values
                                                      F3    Optimized Defaults
                                                      F4    Save & Exit
                                                      ESC   Exit
       Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

   BIOS Menu 12: H/W Monitor

➔ **PC Health Status**

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

- System Temperatures:
  o CPU Temperature
  o System Temperature
- Fan Speed:
  o CPU Fan Speed
- Voltages:

o   VCC3V

o   Vcore

o   Vcc

o   +1.05V

o   VDDR

o   VSB3V

o   VBAT

o   5VSB

5.3.8.1 FAN 1 Configuration

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

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

 PC Health Status

 CPU Smart Fan control            [Auto by RPM]
 Target Temp Sensor               [CPU Temperature]
 Temperature Bound 1              60
 Temperature Bound 2              50
 Temperature Bound 3              40
 Temperature Bound 4              30              --------------------
 Segment 1 Speed (%)              100             ←→: Select Screen
 Segment 2 Speed (%)              85              ↑ ↓: Select Item
 Segment 3 Speed (%)              70              Enter Select
 Segment 4 Speed (%)              60              + -   Change Opt.
 Segment 5 Speed (%)              50              F1   General Help
 Full Speed Count                 3000            F2   Previous Values
                                                  F3   Optimized Defaults
                                                  F4   Save & Exit
                                                  ESC  Exit

        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 13: FAN 1 Configuration

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

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

➔   **Auto by RPM**   DEFAULT   The fan adjusts its speed using Auto by RPM settings

➔ **Auto by Duty-Cycle**

The fan adjusts its speed using Auto by Duty-Cycle settings

➔ **Manual by RPM**

The fan spins at the speed set in Manual by RPM settings

➔ **Manual by Duty-Cycle**

The fan spins at the speed set in Manual by Duty Cycle settings

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

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

➔ **CPU Temperature** DEFAULT

Sets the target temperature sensor to the CPU temperature.

➔ **System Temperature1**

Sets the target temperature sensor to the System Temperature1 setting.

➔ **System Temperature2**

Sets the target temperature sensor to the System Temperature2 setting.

➔ **Temperature Bound n**

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

➔ **Segment n Speed (%)**

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

➔ **Full Speed Count**

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

5.3.9 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 14**) 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
                                                   +/-: Change Opt.
                                                   F1   General Help
                                                   F2   Previous Values
                                                   F3   Optimized Defaults
                                                   F4   Save & Exit
                                                   ESC  Exit
        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 14: 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

5.3.10 IEI Feature

Use the **IEI Feature** menu (**Error! Reference source not found.**) to configure One Key
Recovery function.

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


                                                    ----------------------
                                                    ←→   Select Screen
                                                    ↑↓   Select Item
                                                    Enter Go to SubScreen
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit
        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
   BIOS Menu 15: 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 16**) to access the Northbridge, Southbridge,
Integrated Graphics, and ME Subsystem configuration menus.

⚠ **WARNING!**

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

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

> North Bridge                                  North Bridge Parameters
> South Bridge
> Integrated Graphics
                                                --------------------
                                                ←→: Select Screen
                                                ↑↓: Select Item
                                                Enter Select
                                                + -   Change Opt.
                                                F1    General Help
                                                F2    Previous Values
                                                F3    Optimized Defaults
                                                F4    Save & Exit
                                                ESC   Exit

      Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
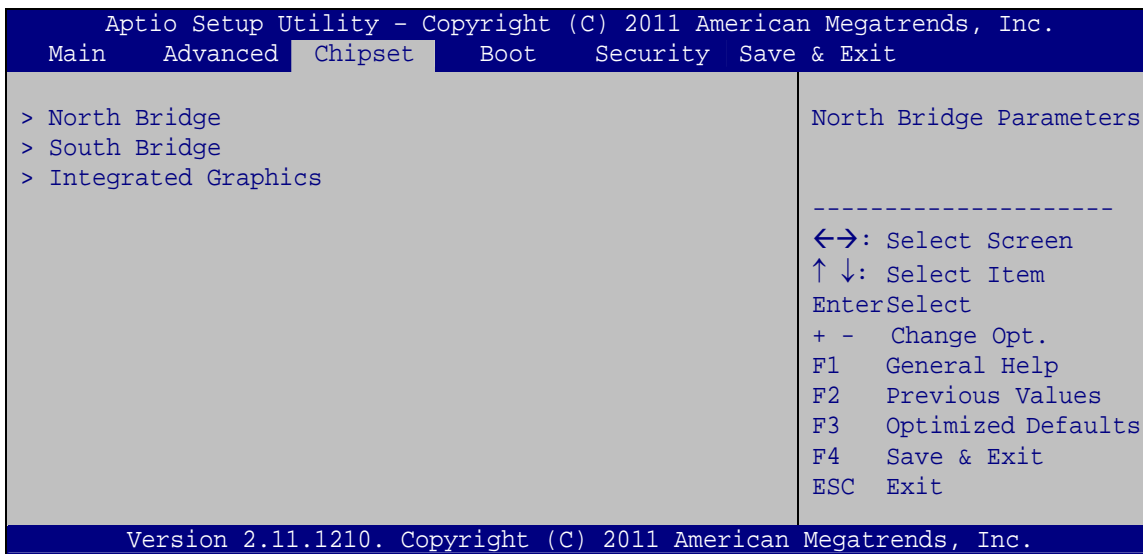
BIOS Menu 16: Chipset

5.4.1 Northbridge Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 17**) to configure the Northbridge chipset.

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

 Memory Information                                  Select which graphics
                                                     controller to use as the
 Total Memory                 2048 MB (DDR3 1333)    primary boot device.

 Memory Slot0                 2048 MB (DDR3 1333)

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

BIOS Menu 17:Northbridge Chipset Configuration

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

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

   ▪   IGD
   ▪   PCI/IGD
   ▪   PCI/PEG
   ▪   PEG/IGD   DEFAULT
   ▪   PEG/PCI

➔ **IGD Memory [64M]**

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

➔ **Disable**

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

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

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

➔ **VT-d [Disabled]**

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

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

➔ **Enabled**   Enables VT-d support.

5.4.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 18**) to configure the Southbridge chipset.

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

Auto Power Button Status        [OFF]              Specify what state to go
Restore AC Power Loss           [Power Off]        to when power is
                                                   re-applied after a power
Audio Configuration                                failure (G3 state).
Azalia HD Audio                 [Enabled]


                                                   --------------------
                                                   ←→: Select Screen
                                                   ↑↓: Select Item
                                                   Enter Select
                                                   + -  Change Opt.
                                                   F1   General Help
                                                   F2   Previous Values
                                                   F3   Optimized Defaults
                                                   F4   Save & Exit
                                                   ESC  Exit
          Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 18: Southbridge Chipset Configuration

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

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

➔ **Power Off**   D<small>EFAULT</small>   The system remains turned off

➔ **Power On**   The system turns on

➔ **Azalia HD Audio [Enabled]**

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

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

➔ **Enabled**   D<small>EFAULT</small>   The onboard High Definition Audio controller is detected automatically and enabled

5.4.3 Integrated Graphics

Use the **Integrated Graphics** menu (**BIOS Menu 19**) to configure the video device connected to the system.

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

Intel IGD SWSCI OpRegion Configuration                    Select DVMT Mode used by
                                                          Internal Graphics
DVMT Mode Select                      [DVMT Mode]         Device. If Fixed Mode
DVMT/FIXED Memory                     [Maximum]           selected, IGD Memory
                                                          might need to be changed
                                                          to a larger value, for
                                                          IGD to have sufficient
                                                          memory.


                                                          --------------------
                                                          ←→: Select Screen
                                                          ↑ ↓: Select Item
                                                          Enter Select
                                                          +/-: Change Opt.
                                                          F1   General Help
                                                          F2   Previous Values
                                                          F3   Optimized Defaults
                                                          F4   Save
                                                          ESC  Exit
        Version 2.11.1211. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 19: Integrated Graphics

➔ **DVMT Mode Select [DVMT Mode]**

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

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

➔ **DVMT Mode**   DEFAULT   Graphics memory is dynamically allocated according to the system and graphics needs.
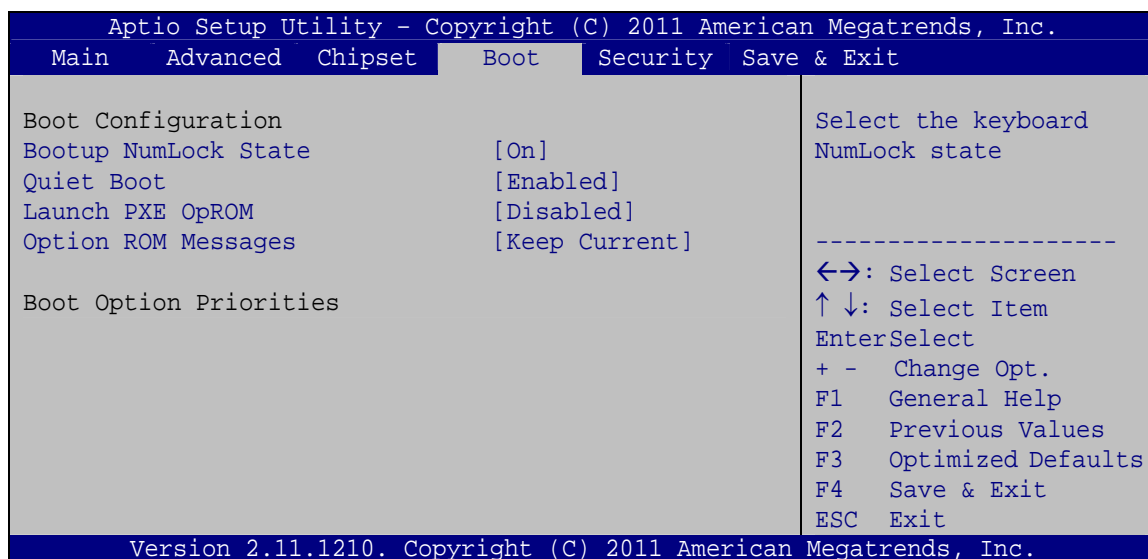
➔ **DVMT/FIXED Memory [Maximum]**

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

- 128 MB
- 256 MB
- Maximum   DEFAULT

5.5 Boot

Use the **Boot** menu (**BIOS Menu 20**) 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]
 Launch PXE OpROM               [Disabled]
 Option ROM Messages            [Keep Current]           ---------------------
                                                         ←→: Select Screen
 Boot Option Priorities                                  ↑ ↓: Select Item
                                                         Enter Select
                                                         + -   Change Opt.
                                                         F1   General Help
                                                         F2   Previous Values
                                                         F3   Optimized Defaults
                                                         F4   Save & Exit
                                                         ESC  Exit
        Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 20: Boot

➔ **Bootup NumLock State [On]**

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

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

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

➔ **Quiet Boot [Enabled]**

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

➔ **Disabled**   Normal POST messages displayed

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

➔ **Launch PXE OpROM [Disabled]**

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

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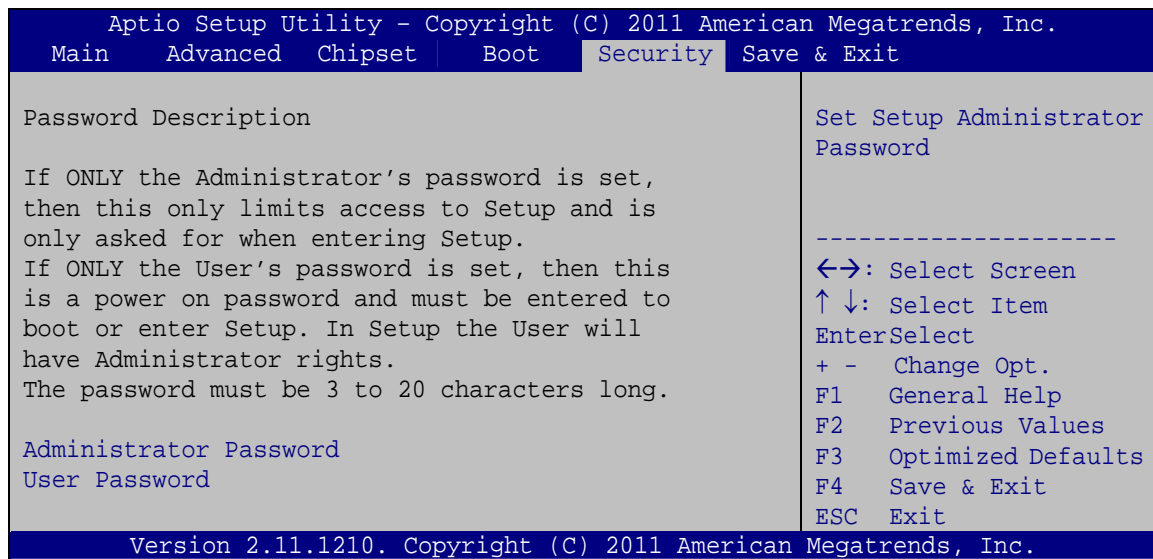
➔ **Enabled**   Load PXE Option ROMs

➔ **Option ROM Messages [Keep Current]**

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

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

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

5.6 Security

Use the **Security** menu (**BIOS Menu 21**) 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 Setup Administrator
                                                 Password
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup.             --------------------
 If ONLY the User's password is set, then this   ←→: Select Screen
 is a power on password and must be entered to   ↑ ↓: Select Item
 boot or enter Setup. In Setup the User will     Enter Select
 have Administrator rights.                      + -   Change Opt.
 The password must be 3 to 20 characters long.   F1   General Help
                                                 F2   Previous Values
                                                 F3   Optimized Defaults
 Administrator Password                          F4   Save & Exit
 User Password                                   ESC  Exit

         Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```
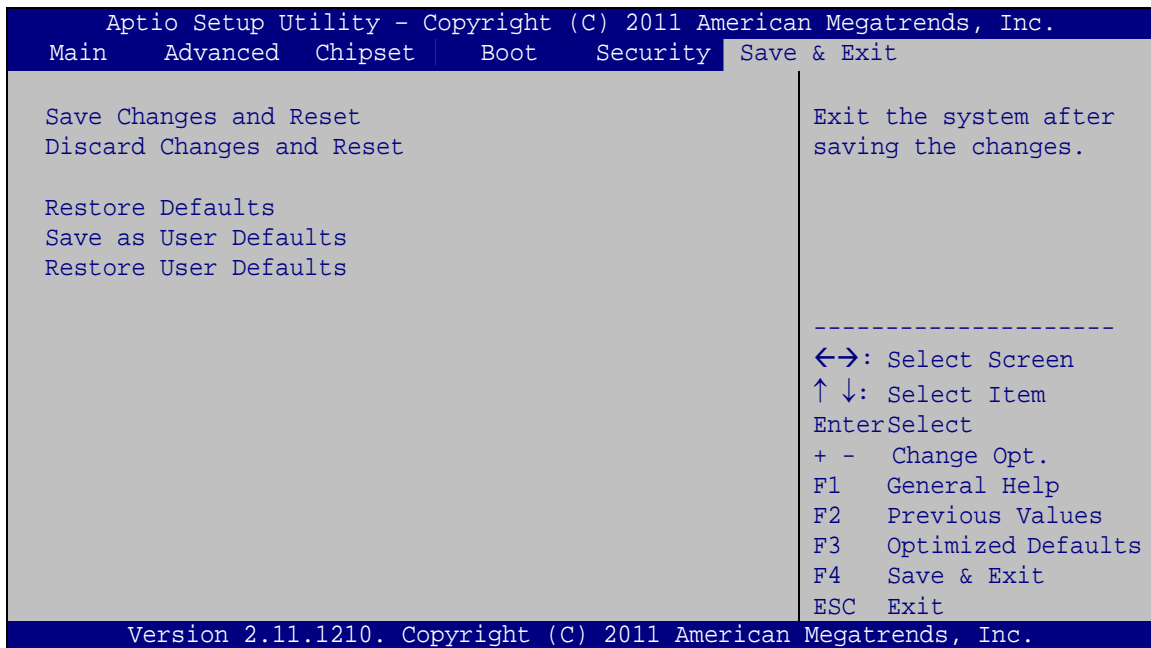**BIOS Menu 21: Security**

➔ **Administrator Password**

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

➔ **User Password**

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 22**) 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 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
```

BIOS Menu 22: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.

Appendix

A

BIOS Options

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

Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
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/Ouput Controll Hub (ICH) is an Intel® Southbridge chipset.

IrDA Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.

L1 Cache The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.

L2 Cache The Level 2 Cache (L2 Cache) is an external processor memory cache.

LCD   Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.

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

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

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

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

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

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

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

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

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

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the PICOe-B650 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

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

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

INT 15H:

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

C.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

C.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

D

Watchdog Timer

NOTE:

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

The Watchdog Timer is a hardware-based timer that attempts to restart the system when it stops working. The system may stop working because of external EMI or software bugs. The Watchdog Timer ensures that standalone systems like ATMs will automatically attempt to restart in the case of system problems.

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

INT 15H:

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

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

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

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

 NOTE:

> The Watchdog Timer is activated through software. The software application that activates the Watchdog Timer must also deactivate it when closed. If the Watchdog Timer is not deactivated, the system will automatically restart after the Timer has finished its countdown.

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

;
; ADD THE APPLICATION PROGRAM HERE
;

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

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

;
; EXIT ;

Appendix
E

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O
O:　This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 X:　This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006						

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

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

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