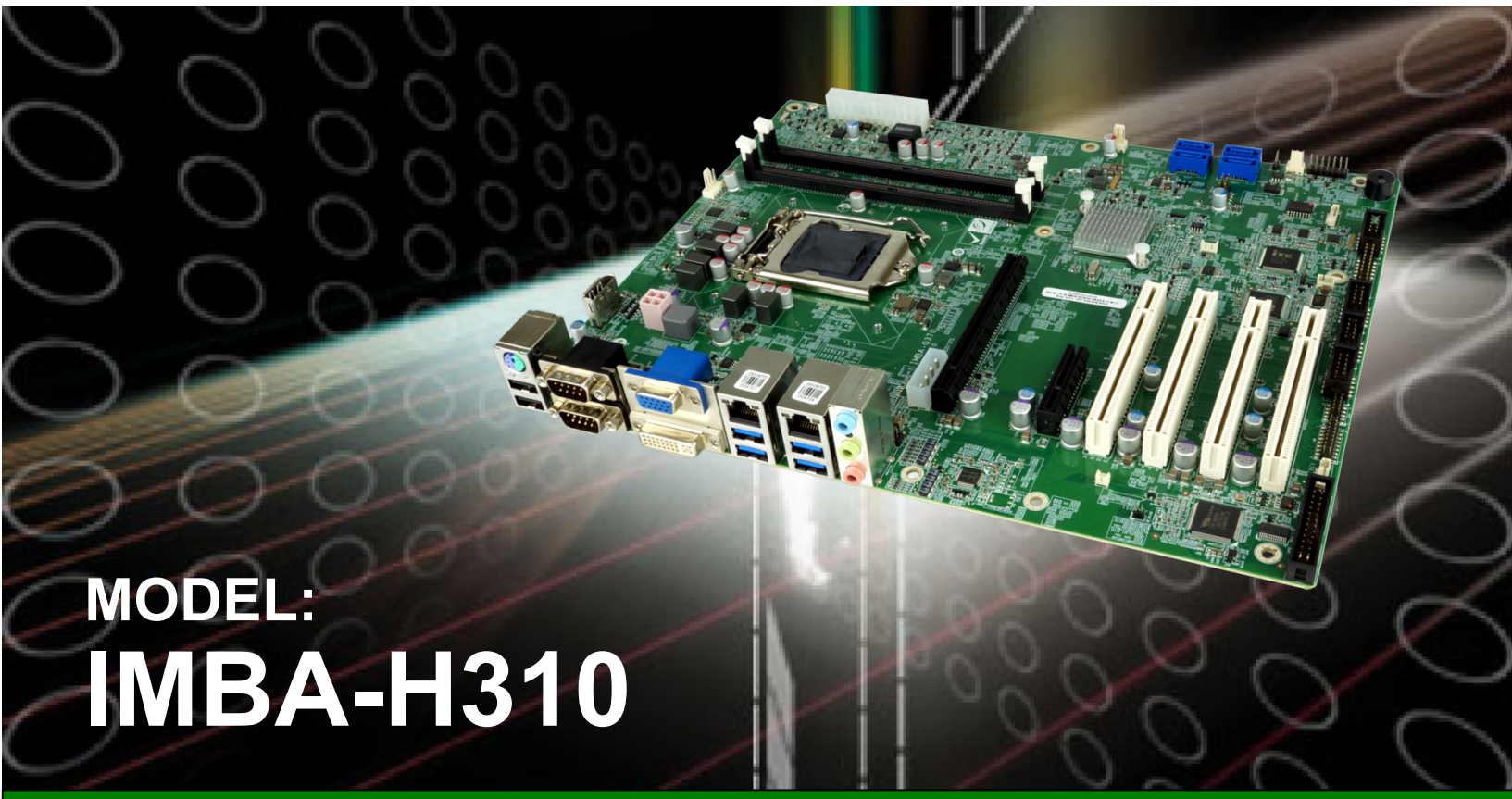
IEI Integration Corp.



MODEL:

IMBA-H310

ATX Motherboard Supports 8th/9th Generation LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® CPU, Intel® H310 Chipset, DDR4, DVI-D, VGA, DP, SATA 6Gb/s, USB 3.2 Gen 1, Dual Intel® GbE LAN, HD Audio and RoHS

User Manual

Rev. 1.00 – September 16, 2020

RoHS Lead Free

Revision

Date	Version	Changes
September 16, 2020	1.00	Initial release

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Manual Conventions

WARNING

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

CAUTION

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

NOTE

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

HOT SURFACE

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

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Chapter

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Introduction

1.1 Introduction

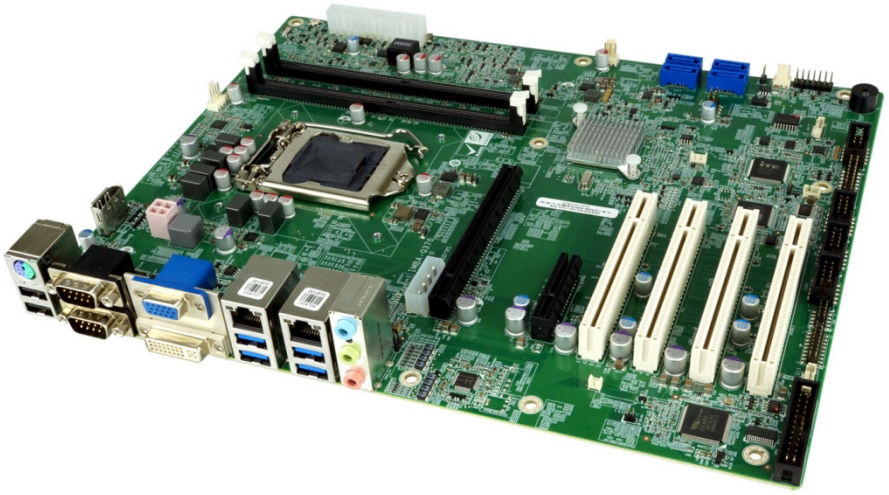


Figure 1-1: IMBA-H310

The IMBA-H310 is an ATX motherboard. It accepts a Socket LGA1151 8th/9th Gen. Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® processor and supports two 288-pin 2666/2400 MHz dual-channel DDR4 DIMMs up to 64 GB.

The IMBA-H310 provides two GbE interfaces through the Intel® I219LM PHY and the Intel® I211AT PCIe controllers. The integrated Intel® H310 chipset supports four SATA 6Gb/s drives. In addition, the IMBA-H310 includes DVI-D, VGA and internal DisplayPort interfaces for triple independent display.

Expansion and I/O include four PCI slots, one PCIe x16 slot, one PCIe x4 slot, four USB 3.2 Gen 1 (5Gb/s) and two USB 2.0 on the rear panel, two USB 2.0 by pin headers, five RS-232 and one RS-232/422/485. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the IMBA-H310.

1.2 Model Variations

The model variations of the IMBA-H310 are listed below.

	Packing List	Packaging Type
IMBA-H310	I/O shielding SATA cable QIG	Standard
IMBA-H310-ECO	I/O shielding QIG	Eco packaging

Table 1-1: Model Variations

1.3 Features

Some of the IMBA-H310 motherboard features are listed below:

- ATX form factor
- 8th/9th generation LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® processor supported
- Intel® H310 chipset
- Two 288-pin 2666/2400 MHz dual-channel unbuffered DDR4 DIMMs support up to 64 GB
- Two Intel® PCIe GbE connectors
- Triple independent display by DVI-D, VGA or internal DisplayPort interfaces
- SATA 6Gb/s and USB 3.2 Gen 1 (5Gb/s) supported
- One PCIe x16 slot and one PCIe x4 slot
- Four PCI slots
- Six COM ports (five RS-232 and one RS-232/422/485)
- High Definition Audio
- RoHS compliant

1.4 Connectors

The connectors on the IMBA-H310 are shown in the figure below.

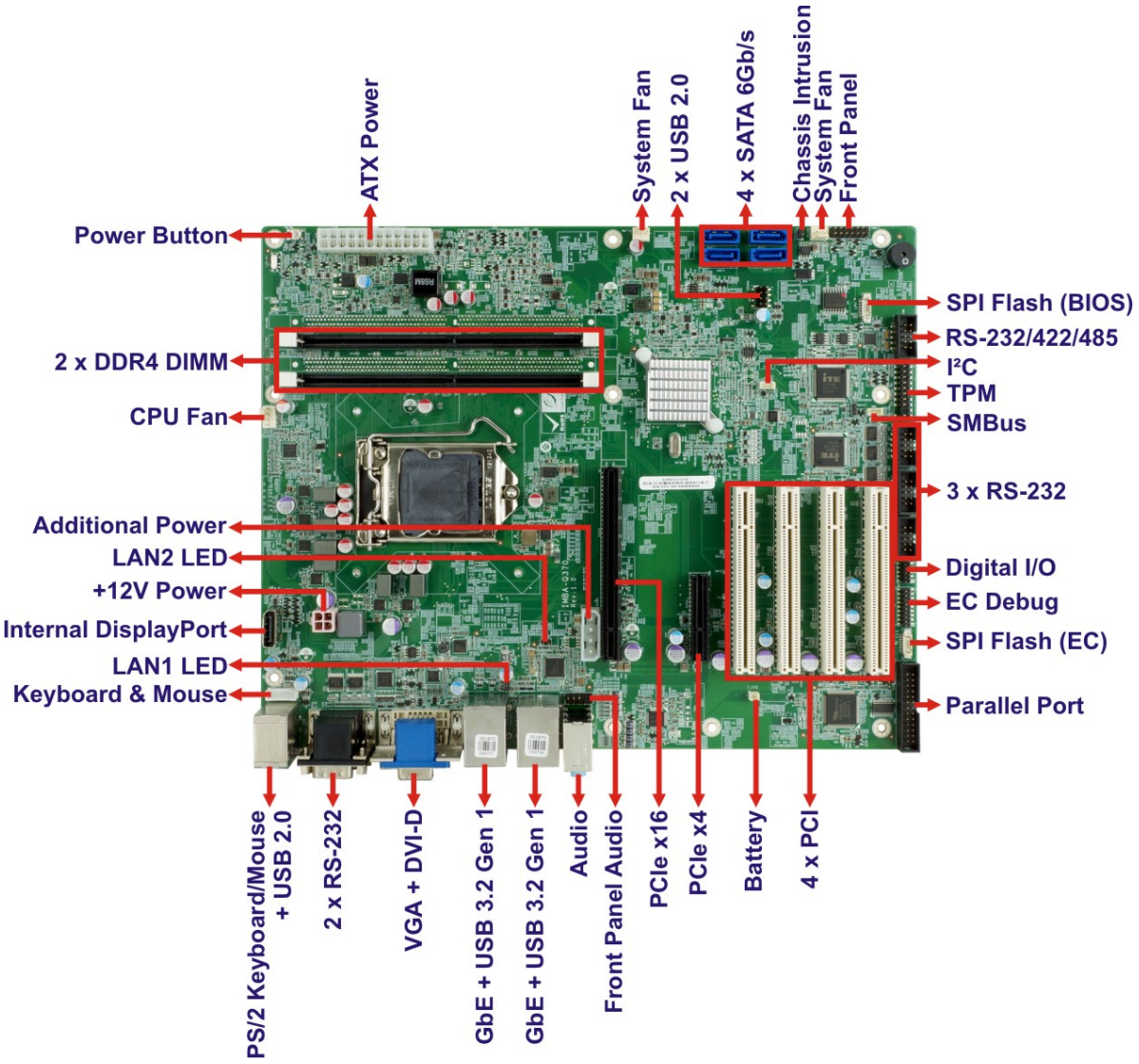


Figure 1-2: Connectors

1.5 Dimensions

The main dimensions of the IMBA-H310 are shown in the diagram below.

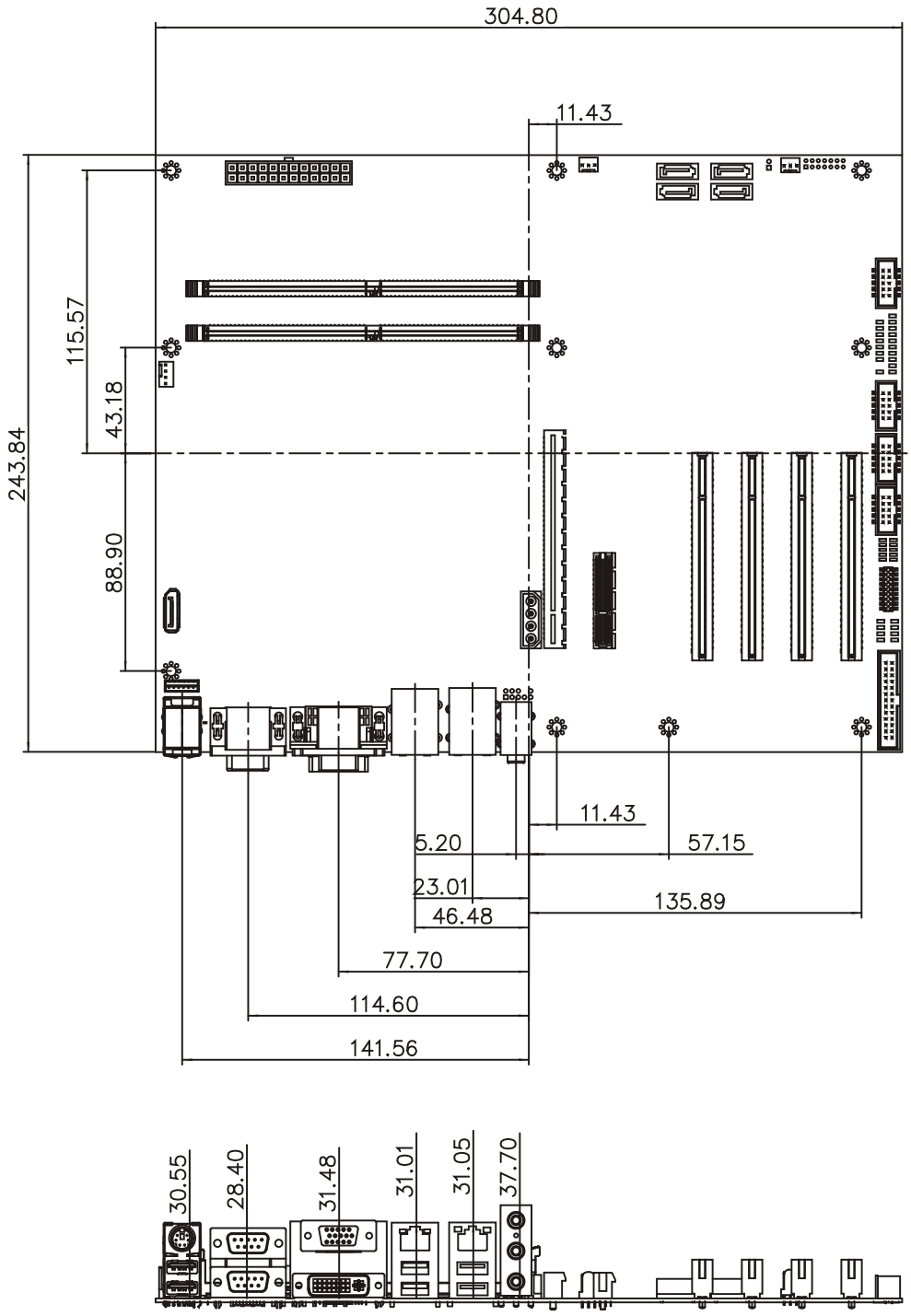


Figure 1-3: Dimensions (mm)

1.6 Data Flow

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

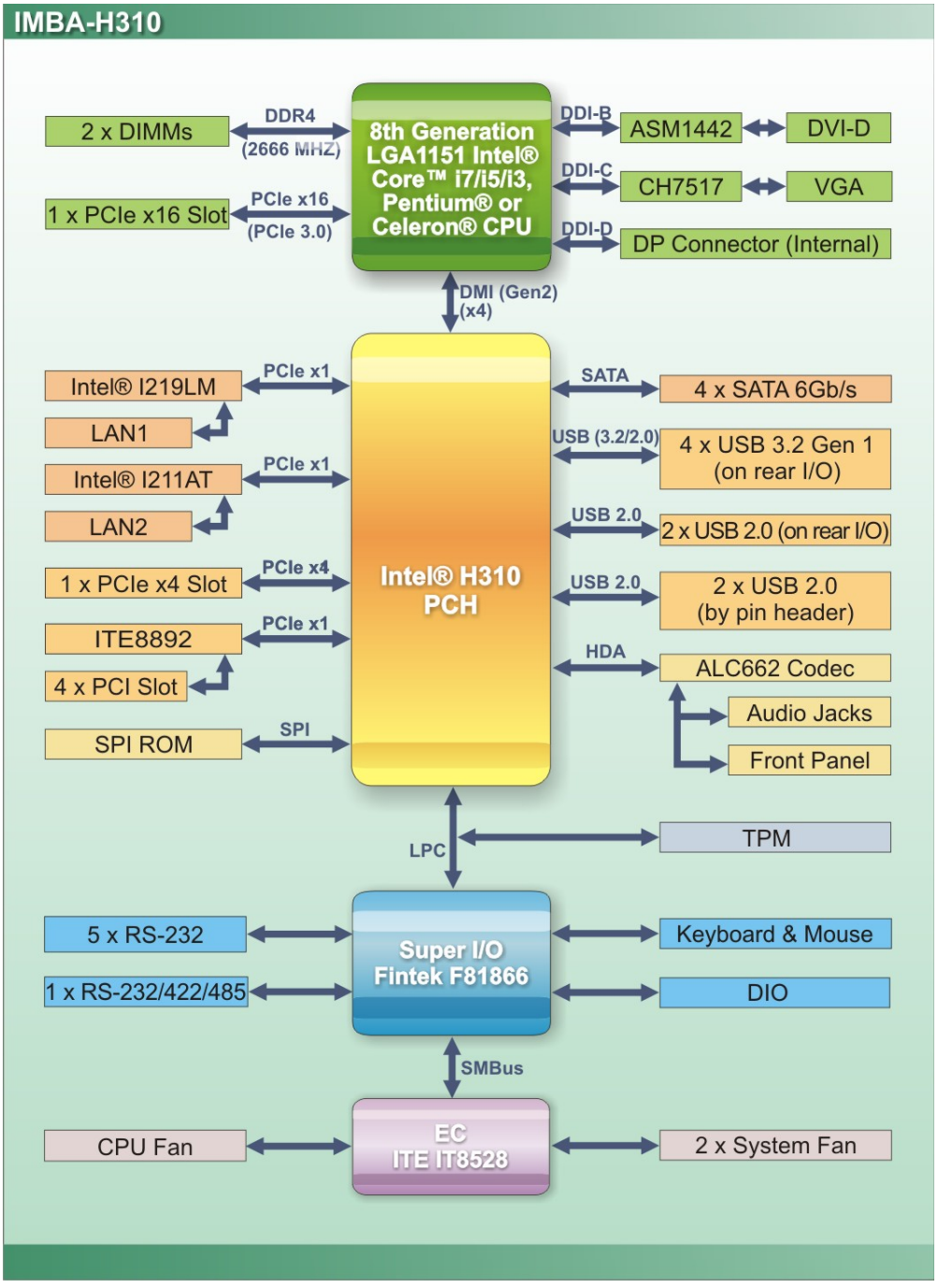


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

The IMBA-H310 technical specifications are listed below.

Specification/Model	IMBA-H310
Form Factor	ATX
CPU Supported	8th/9th generation LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® CPU
PCH	Intel® H310
Memory	Two 288-pin 2666/2400 MHz dual-channel unbuffered DDR4 SDRAM DIMMs supported (system max. 64 GB)
Graphics Engine	Intel® HD Graphics Gen9 engine with 16 low-power execution units, supporting DX2015, OpenGL 5.x, OpenCL 2.x and ES 2.0
Display Output	Triple independent display One DVI-D (up to 2560x1600@60Hz) One VGA (up to 1920x1200@60Hz) One internal DisplayPort (up to 4096x2304@60Hz)
Audio	Realtek ALC662 HD Audio codec supports 5.1 channels
BIOS	AMI UEFI BIOS
Ethernet Controllers	**LAN1_USB1**: Intel® I219LM PHY **LAN2_USB2**: Intel® I211AT PCIe Ethernet controller
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansions	One PCIe 3.0 x16 slot One PCIe 2.0 x4 slot Four PCI slots
I/O Interface Connectors	
Audio Connectors	Line-in, line-out and mic-in audio jacks on rear panel One internal front panel audio connector (10-pin header)
Chassis Intrusion	One 2-pin header
Ethernet	Two RJ-45 GbE ports

Fan	One 4-pin CPU smart fan connector Two 3-pin system fan connectors
Front Panel	One 14-pin header (power LED, HDD LED, speaker, power button, reset button)
I²C	One 4-pin wafer connector
Keyboard and Mouse	One PS/2 keyboard/mouse connector One internal keyboard and mouse connector (6-pin wafer)
LAN LEDs	Two 2-pin headers
Parallel Port	One parallel port via internal 26-pin box header
Serial ATA	Four SATA 6Gb/s connectors (no RAID)
Serial Ports	Two external RS-232 serial port Three RS-232 via internal box headers One RS-232/422/485 via internal box header
SMBus	One 4-pin wafer connector
USB 2.0	Two USB 2.0 ports on rear panel Two USB 2.0 ports via internal pin header
USB 3.2	Four USB 3.2 Gen 1 (5Gb/s) ports on rear panel
Environmental and Power Specifications	
Power Supply	AT/ATX power supply
Power Consumption	3.3V@0.39A, 5V@2.99A, 12V@3.08A, 5VSB@0.2A (Intel® Core™ i5-8500 up to 3.00 GHz CPU with 20 GB 2400/2133 MHz DDR4 memory)
Operating Temperature	-20ºC ~ 60ºC
Storage Temperature	-30ºC ~ 70ºC
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 305 mm
Weight (GW/NW)	1200 g/700 g

Table 1-2: IMBA-H310 Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMBA-H310 is unpacked, please do the following:

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

2.3 Packing List

NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMBA-H310 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The IMBA-H310 is shipped with the following components:

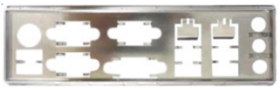
Quantity	Item and Part Number	Image
1	IMBA-H310 single board computer	
1	I/O shielding	
2	SATA cable	
1	Quick installation guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual USB cable (w bracket), 300 mm, p=2.54 (**P/N:** 19800-003100-100-RS)	
Dual RS-232 cable, 230 mm, p=2.54 (**P/N**: 32205-000702-100-RS)	
PS/2 KB/MS Y-cable with bracket, 220 mm (**P/N**: 19800-000075-RS)	
SATA power cable (**P/N**: 32102-000100-200-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 73W) (**P/N**: CF-1156A-RS-R11)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 45W) (**P/N**: CF-115XC-RS)	
LGA1155/LGA1156 cooler kit (1U chassis compatible, 65W) (**P/N**: CF-115XD-RS)	
LGA1155/LGA1156 cooler kit (95W) (**P/N**: CF-115XE-R10)	

Item and Part Number	Image
20-pin Infineon TPM 2.0 module, software management tool, firmware v5.5 (**P/N**: TPM-IN02-R20)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the peripheral interface connectors.

3.1.1 IMBA-H310 Layout

The figure below shows all the peripheral interface connectors.

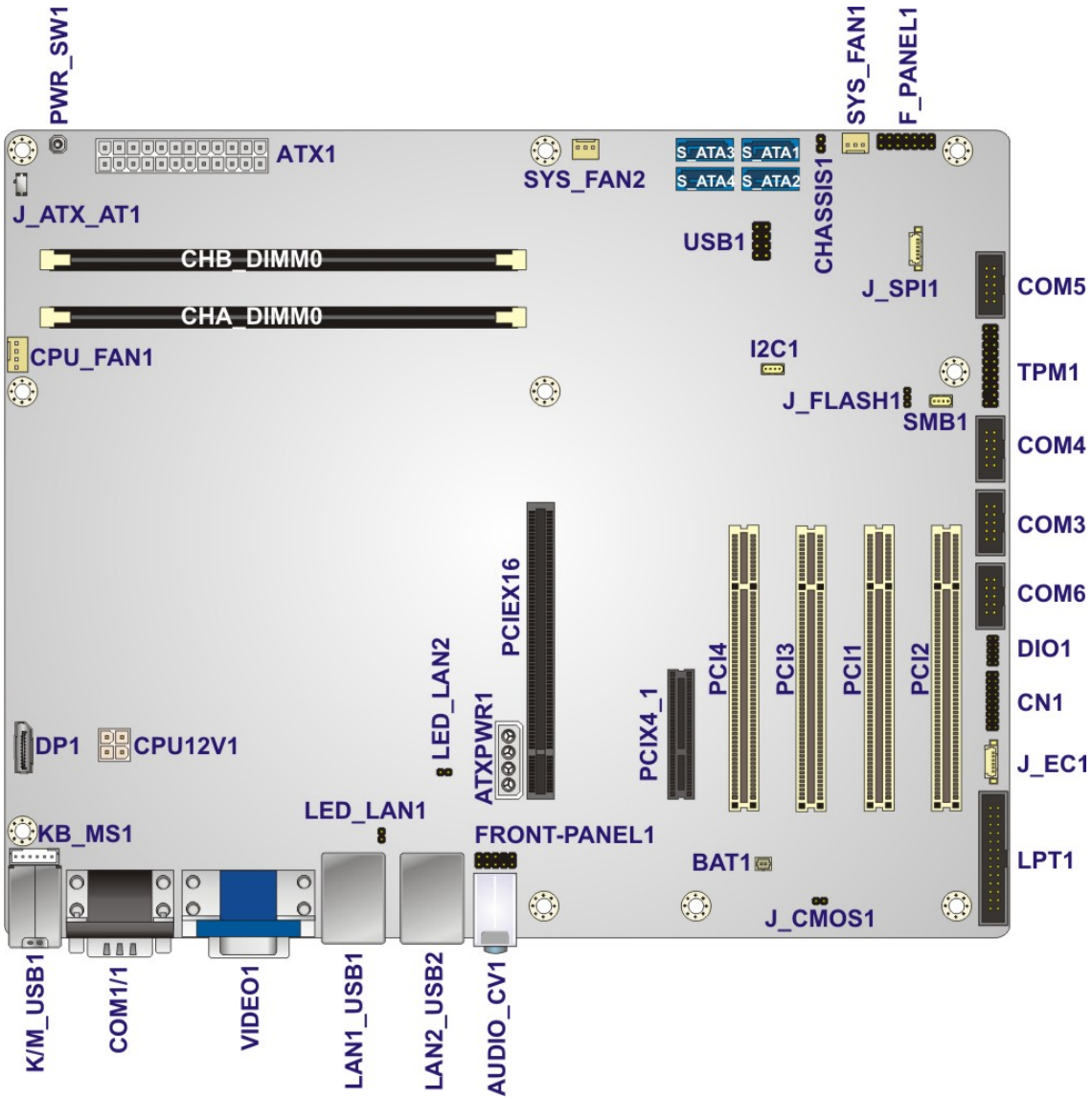


Figure 3-1: Peripheral Interface Connectors

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
+12V power connector	4-pin Molex power connector	CPU12V1
Additional power connector	4-pin connector	ATXPWR1
ATX power connector	24-pin connector	ATX1
Battery connector	2-pin wafer	BAT1
Chassis intrusion connector	2-pin header	CHASSIS1
DDR4 DIMM sockets	288-pin socket	CHA_DIMM0, CHB_DIMM0
Digital I/O connector	10-pin header	DIO1
EC debug connector	18-pin header	CN1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connectors (system)	3-pin wafer	SYS_FAN1, SYS_FAN2
Front panel audio connector	10-pin header	FRONT-PANEL1
Front panel connector	14-pin header	F_PANEL1
I^2C connector	4-pin wafer	I2C1
Internal DisplayPort connector	DisplayPort	DP1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN LED connectors	2-pin header	LED_LAN1, LED_LAN2
Parallel port connector	26-pin box header	LPT1
PCI slots	PCI slot	PCI1, PCI2, PCI3, PCI4
PCIe x16 slot	PCIe x16 slot	PCIEX16
PCIe x4 slot	PCIe x4 slot	PCIEX4_1

Connector	Type	Label
Power button	Push button	PWR_SW1
RS-232 serial ports	10-pin box header	COM3, COM4, COM6
RS-232/422/485 serial port	10-pin box header	COM5
SATA 6Gb/s drive connector	7-pin SATA connector	S_ATA1, S_ATA2, S_ATA3, S_ATA4
SMBus connector	4-pin wafer	SMB1
SPI flash connector	6-pin wafer	J_SPI1
SPI flash connector, EC	6-pin wafer	J_EC1
TPM connector	20-pin header	TPM1
USB 2.0 connector	8-pin header	USB1

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Audio connector	Audio jacks	AUDIO_CV1
Ethernet and USB 3.2 Gen 1 connectors	RJ-45 & USB 3.2 Gen 1 combo	LAN1_USB1, LAN2_USB2
Keyboard/mouse and USB 2.0 connectors	PS/2 & USB 2.0 combo	K/M_USB1
Serial port connector	Dual DB-9 male	COM1/1
VGA and DVI-D connector	DB-15 & DVI-D combo	VIDEO1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the IMBA-H310.

3.2.1 +12V Power Connector

CN Label: **CPU12V1**

CN Type: 4-pin Molex power connector, p=4.2 mm

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

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

This connector provides power to the CPU.

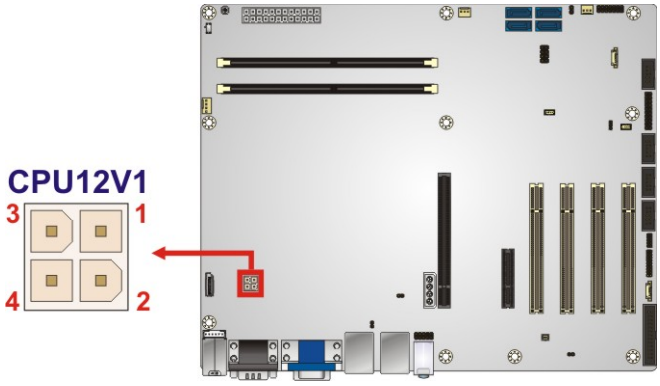


Figure 3-2: +12V Power Connector Pinout Location

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

Table 3-3: +12V Power Connector Pinouts

3.2.2 Additional Power Connector

CN Label: **ATXPWR1**

CN Type: 4-pin connector, p=5.08 mm

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

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

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

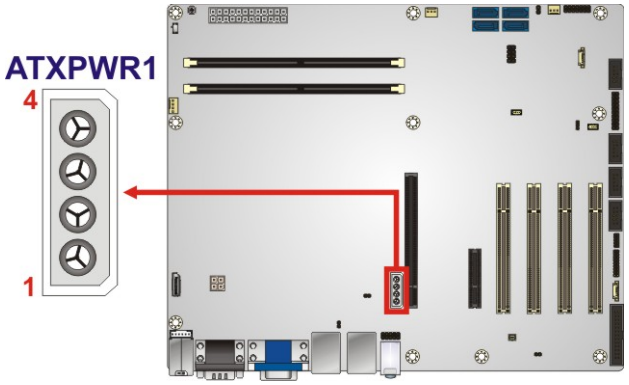


Figure 3-3: Additional Power Connector Location

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

Table 3-4: Additional Power Connector Pinouts

3.2.3 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin connector, p=4.2 mm

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

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

The ATX power connector connects to an ATX power supply.

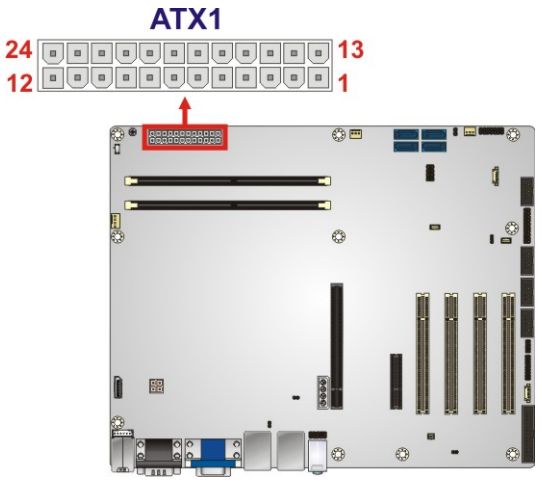


Figure 3-4: ATX Power Connector Location

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

Table 3-5: ATX Power Connector Pinouts

3.2.4 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.

NOTE:

It is recommended to attach the RTC battery onto the system chassis in which the IMBA-H310 is installed.

CN Label:	**BAT1**
CN Type:	2-pin wafer, p=1.25 mm
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

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

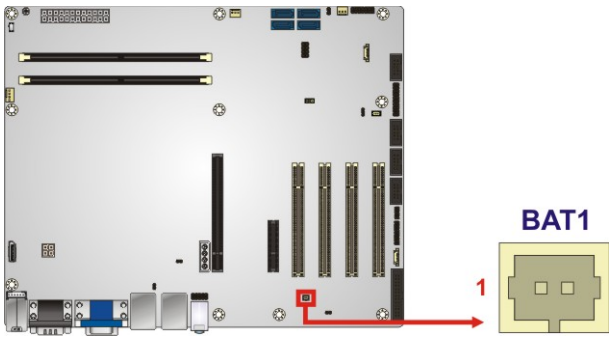


Figure 3-5: Battery Connector Location

Pin	Description
1	RTC Battery+
2	GND

Table 3-6: Battery Connector Pinouts

3.2.5 Chassis Intrusion Connector

CN Label: **CHASSIS1**

CN Type: 2-pin header, p=2.54 mm

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

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

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.

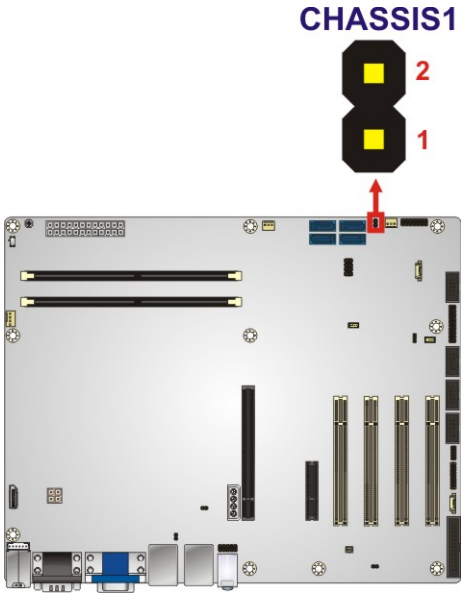


Figure 3-6: Chassis Intrusion Connector Location

Pin	Description
1	+3.3VSB
2	CHASSIS OPEN

Table 3-7: Chassis Intrusion Connector Pinouts

3.2.6 DDR4 DIMM Slots

CN Label: **CHA_DIMM0, CHB_DIMM0**

CN Type: 288-pin DDR4 DIMM slot

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

The DIMM slots are for DDR4 DIMM memory modules.

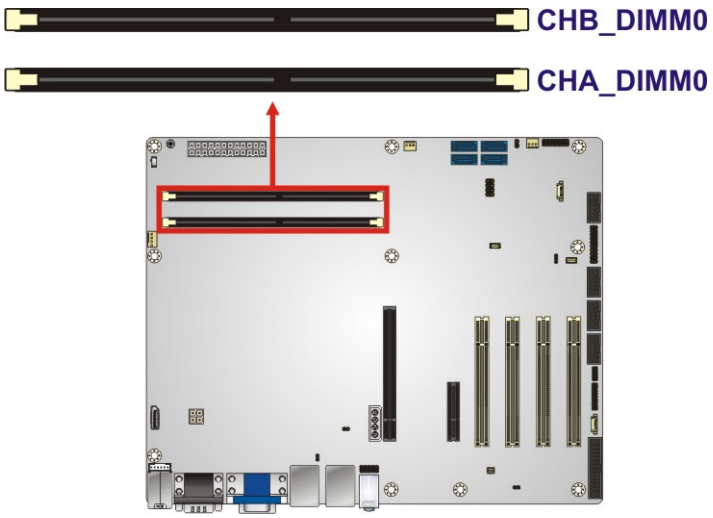


Figure 3-7: DDR4 DIMM Slot Locations

3.2.7 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header, p=2.00 mm

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

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

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

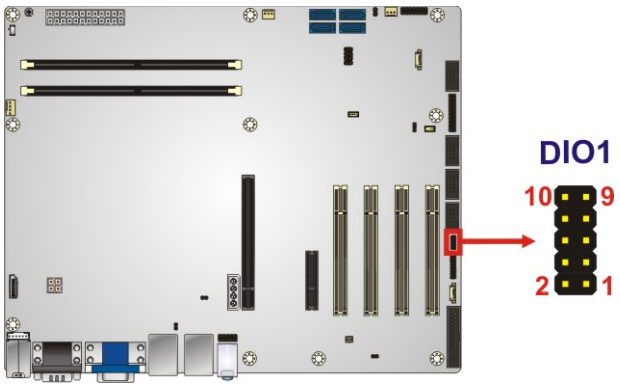


Figure 3-8: Digital I/O Connector Location

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

Table 3-8: Digital I/O Connector Pinouts

3.2.8 EC Debug Connector

CN Label: **CN1**

CN Type: 18-pin header, p=2.00 mm

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

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

The EC debug connector is used for EC debug.

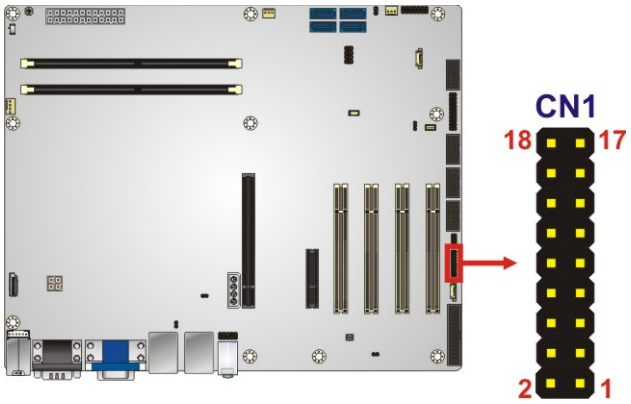


Figure 3-9: EC Debug Connector Location

Pin	Description	Pin	Description
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

Table 3-9: EC Debug Connector Pinouts

3.2.9 Fan Connector (CPU)

CN Label:	**CPU_FAN1**
CN Type:	4-pin wafer, p=2.54 mm
CN Location:	See **Figure 3-10**
CN Pinouts:	See **Table 3-10**

The fan connector attaches to a CPU cooling fan.

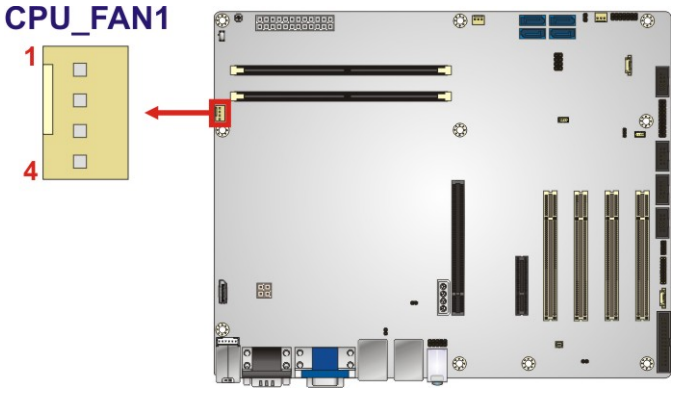


Figure 3-10: CPU Fan Connector Location

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

Table 3-10: CPU Fan Connector Pinouts

3.2.10 Fan Connectors (System)

CN Label:	**SYS_FAN1, SYS_FAN2**
CN Type:	3-pin wafer, p=2.54 mm
CN Location:	See **Figure 3-11**
CN Pinouts:	See **Table 3-11**

Each fan connector attaches to a system cooling fan.

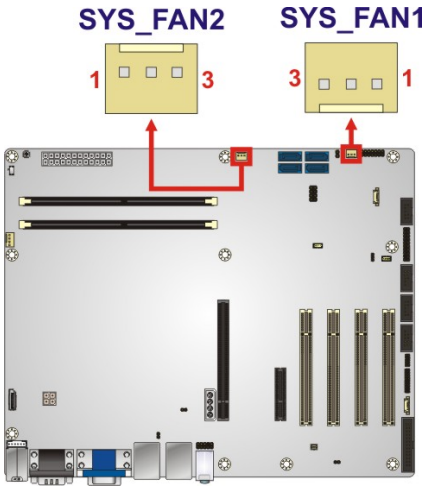


Figure 3-11: System Fan Connector Locations

Pin	Description
1	FANIO
2	+12V
3	GND

Table 3-11: System Fan Connector Pinouts (SYS_FAN1)

Pin	Description
1	N/C
2	+12V
3	GND

Table 3-12: System Fan Connector Pinouts (SYS_FAN2)

3.2.11 Front Panel Audio Connector

CN Label: **FRONT-PANEL1**

CN Type: 10-pin header, p=2.54 mm

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

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

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

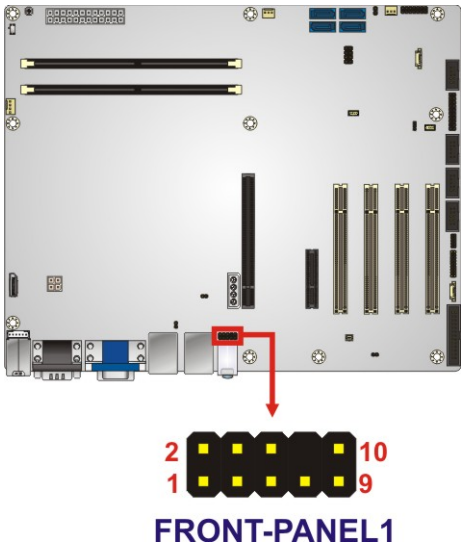


Figure 3-12: Front Panel Audio Connector Location

Pin	Description	Pin	Description
1	MIC2-L	2	GND
3	MIC2-R	4	Presence#
5	LINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LINE2-L	10	LINE2-JD

Table 3-13: Front Panel Audio Connector Pinouts

3.2.12 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header, p=2.54 mm

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

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

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

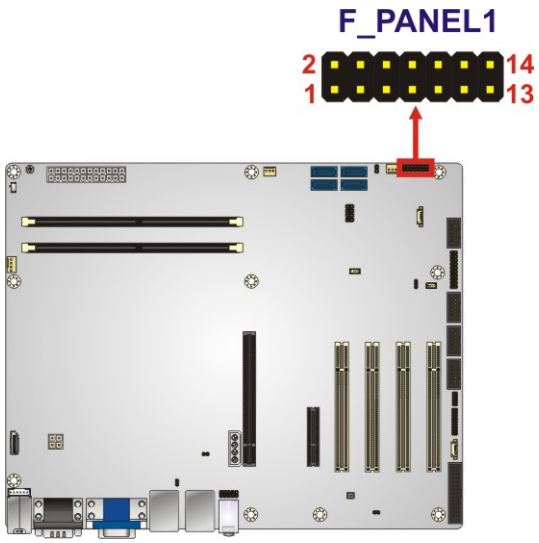


Figure 3-13: Front Panel Connector Location

Function	Pin	Description	Function	Pin	Description
Power LED	1	PWR_LED+	Speaker	2	Speaker+
	3	NC		4	NC
	5	PWR_LED-		6	NC
Power Button	7	PWR_BTN+		8	Speaker-
	9	PWR_BTN-		10	NC
HDD LED	11	HDD_LED+	Reset	12	Reset+
	13	HDD_LED-		14	Reset-

Table 3-14: Front Panel Connector Pinouts

3.2.13 I²C Connector

CN Label:	**I2C1**
CN Type:	4-pin wafer, p=1.25 mm
CN Location:	See **Figure 3-14**
CN Pinouts:	See **Table 3-15**

The I²C connector is used to connect I²C-bus devices to the mainboard.

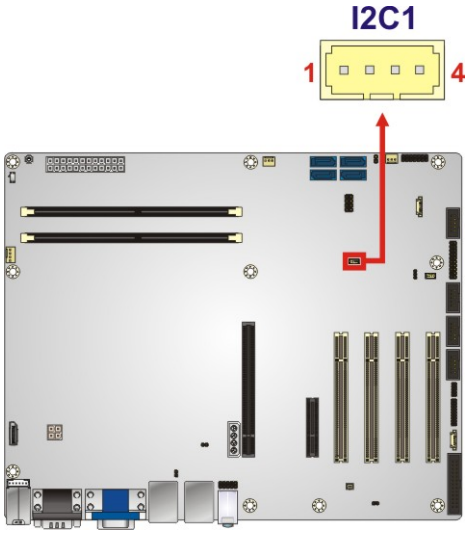


Figure 3-14: I²C Connector Location

Pin	Description
1	GND
2	I2C_DAT
3	I2C_CLK
4	+5V

Table 3-15: I²C Connector Pinouts

3.2.14 Internal DisplayPort Connector

CN Label: **DP1**

CN Type: DisplayPort

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

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

The internal DisplayPort connector supports DisplayPort devices.

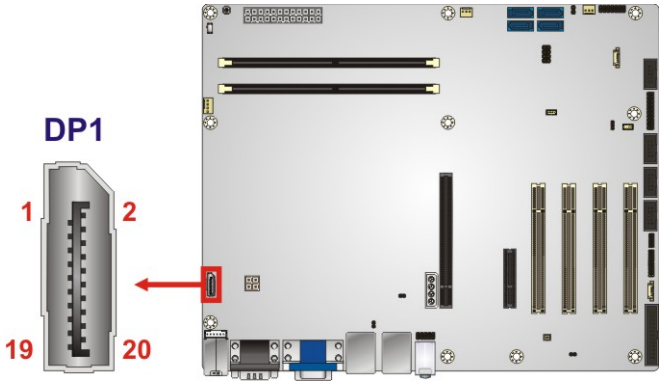


Figure 3-15: Internal DisplayPort Connector Location

Pin	Description	Pin	Description
1	DATA_0P	11	GND
2	GND	12	DATA_3N
3	DATA_0N	13	CONFIG1
4	DATA_1P	14	CONFIG2
5	GND	15	AUX_P
6	DATA_1N	16	GND
7	DATA_2P	17	AUX_N
8	GND	18	DP_HPD
9	DATA_2N	19	GND
10	DATA_3P	20	DP_PWR

Table 3-16: Internal DisplayPort Connector Pinouts

3.2.15 Keyboard and Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-16**
CN Pinouts:	See **Table 3-17**

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

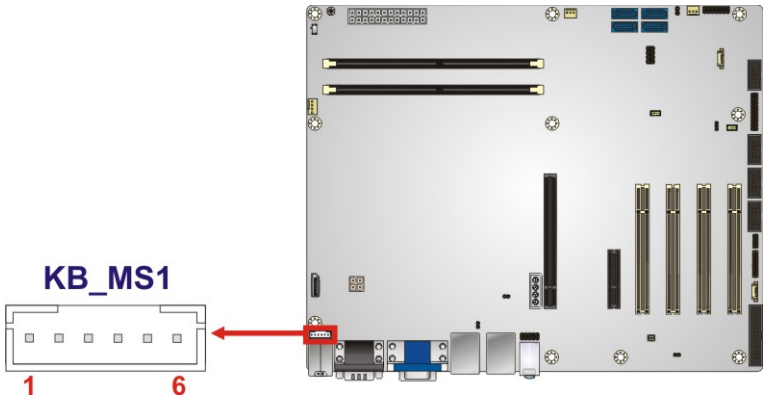


Figure 3-16: Keyboard and Mouse Connector Location

Pin	Description
1	VCC
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-17: Keyboard and Mouse Connector Pinouts

3.2.16 LAN LED Connectors

CN Label:	**LED_LAN1, LED_LAN2**
CN Type:	2-pin header, p=2.54 mm
CN Location:	See **Figure 3-17**
CN Pinouts:	See **Table 3-18**

The LAN LED connectors are used to connect to the LAN LED indicators on the chassis to indicate users the link activities of the two LAN ports.

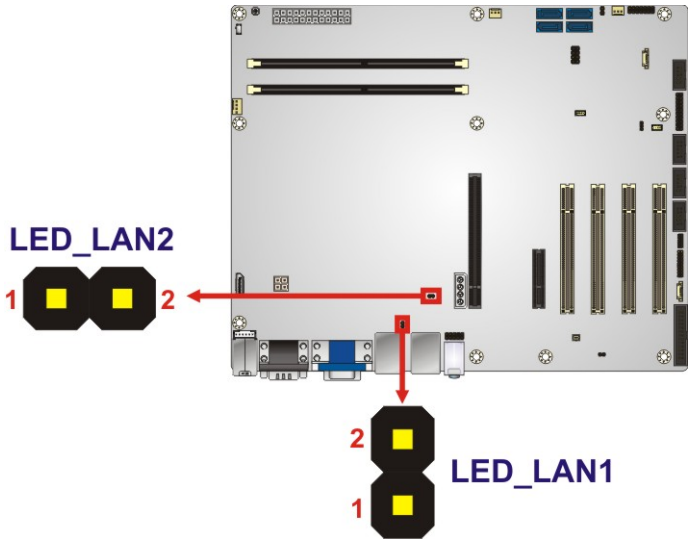


Figure 3-17: LAN LED Connector Locations

Pin	Description
1	+3.3V
2	LAN_LED_LINK#_ACT

Table 3-18: LAN LED Connector Pinouts

3.2.17 Parallel Port Connector

CN Label: **LPT1**

CN Type: 26-pin box header, p=2.54 mm

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

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

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

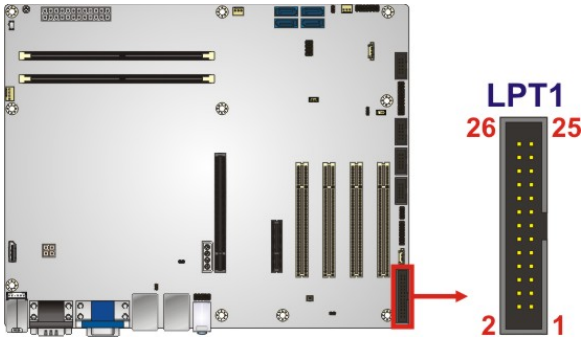


Figure 3-18: Parallel Port Connector Location

Pin	Description	Pin	Description
1	RSTROBE#	2	SIO_AFD#
3	RPD0	4	SIO_ERR#
5	RPD1	6	SIO_INIT#
7	RPD2	8	SIO_SLIN#
9	RPD3	10	GND
11	RPD4	12	GND
13	RPD5	14	GND
15	RPD6	16	GND
17	RPD7	18	GND
19	SIO_ACK#	20	GND
21	SIO_BUSY	22	GND
23	SIO_PE	24	GND
25	SIO_SLCT	26	N/C

Table 3-19: Parallel Port Connector Pinouts

3.2.18 PCI Slots

CN Label: **PCI1, PCI2, PCI3, PCI4**

CN Type: PCI slot

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

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

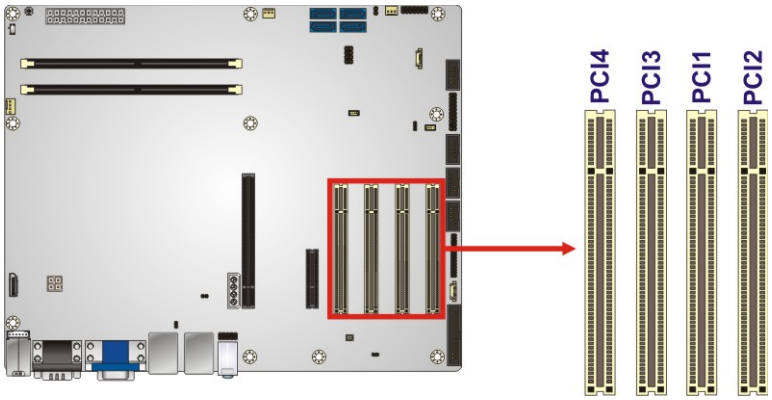


Figure 3-19: PCI Slot Locations

3.2.19 PCI Express x16 Slot

CN Label: **PCIEX16**

CN Type: PCIe x16 slot

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

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

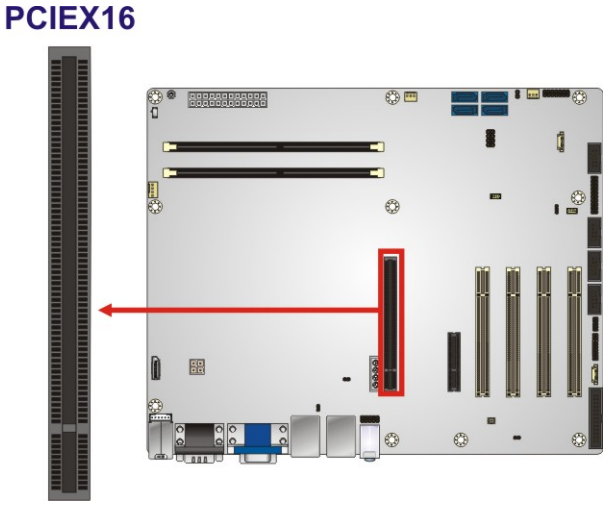


Figure 3-20: PCIe x16 Slot Location

3.2.20 PCI Express x4 Slot

CN Label: **PCIEX4_1**

CN Type: PCIe x4 slot

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

The PCIe x4 expansion card slot is for PCIe x4 expansion card.

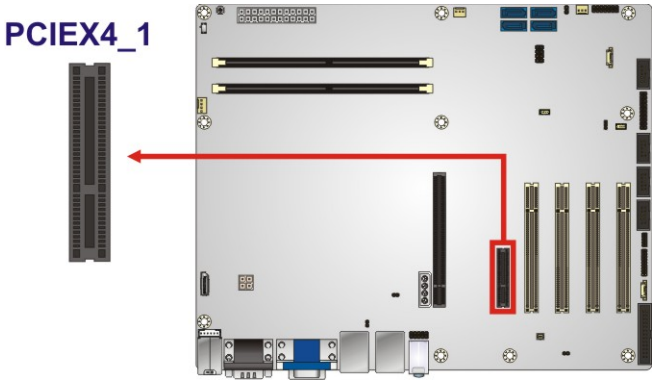


Figure 3-21: PCIe x4 Slot Location

3.2.21 Power Button

CN Label:	**PWR_SW1**
CN Type:	Push button
CN Location:	See **Figure 3-22**

The on-board power button controls system power.

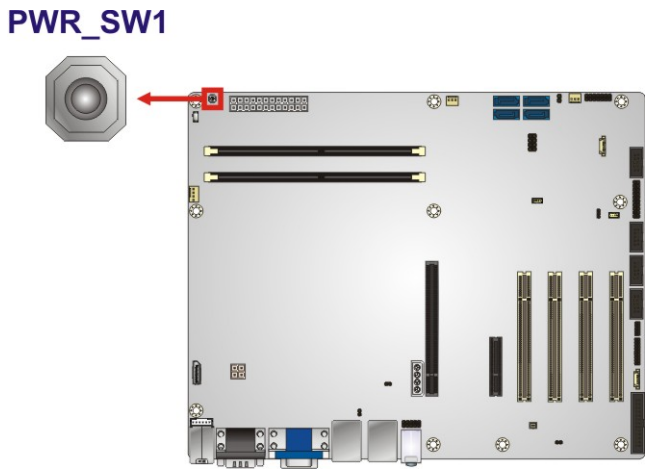


Figure 3-22: Power Button Location

3.2.22 RS-232 Serial Port Connector

CN Label:	**COM3, COM4, COM6**
CN Type:	10-pin box header, p=2.54 mm
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-20**

Each of these connectors provides RS-232 connections.

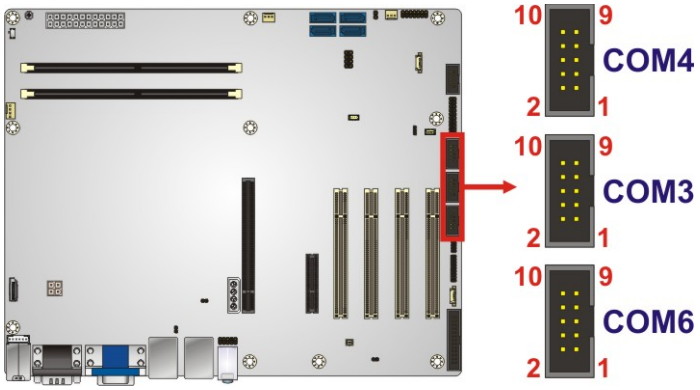


Figure 3-23: RS-232 Serial Port Connector Locations

Pin	Description	Pin	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

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

3.2.23 RS-232/422/485 Serial Port Connector

CN Label:	**COM5**
CN Type:	10-pin box header, p=2.54 mm
CN Location:	See **Figure 3-24**
CN Pinouts:	See **Table 3-21**

Each of these connectors provides RS-232, RS-422 or RS-485 communications.

NOTE:

The communication protocol of the serial port is set through the BIOS menu in “Advanced → Super IO Configuration → Serial Port 5 Configuration”. Use the **Transfer Mode** BIOS option to configure the correspondent serial ports (refer to **Sections 5.3.6.1.1** for detailed information).

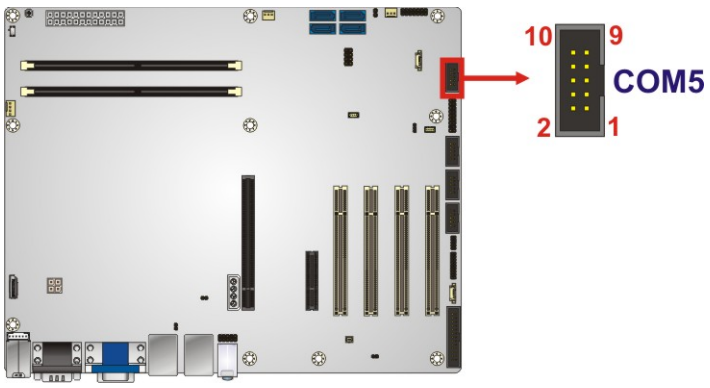


Figure 3-24: RS-232/422/485 Connector Location

Pin	Description	Pin	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

Table 3-21: RS-232/422/485 Connector Pinouts

Use an RS-232/422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

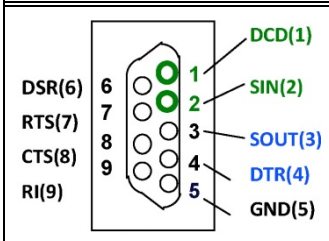
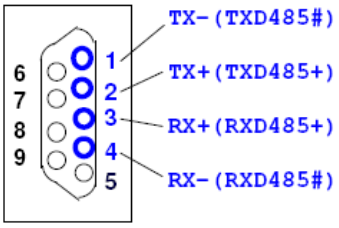
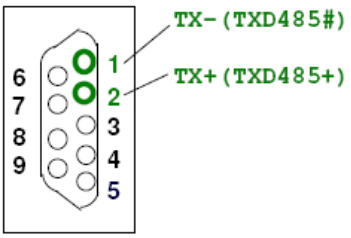
RS-232 Pinouts	RS-422 Pinouts	RS-485 Pinouts
		

Table 3-22: DB-9 RS-232/422/485 Pinouts

3.2.24 SATA 6Gb/s Drive Connector

CN Label:	**S_ATA1, S_ATA2, S_ATA3, S_ATA4**
CN Type:	7-pin SATA drive connector
CN Location:	See **Figure 3-25**
CN Pinouts:	See **Table 3-23**

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

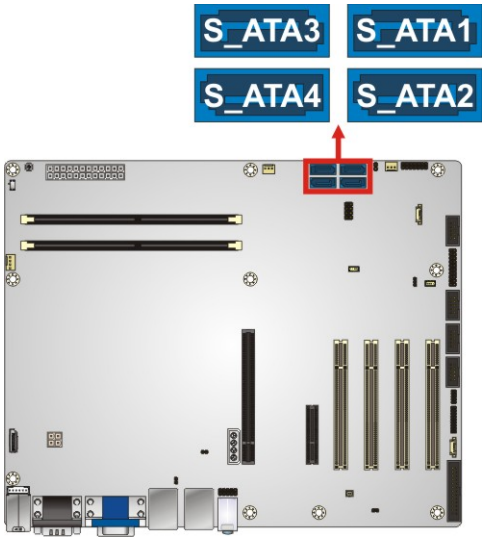


Figure 3-25: SATA 6Gb/s Drive Connector Locations

Pin	Description
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA RX+
7	GND

Table 3-23: SATA 6Gb/s Drive Connector Pinouts

3.2.25 SMBus Connector

CN Label: **SMB1**

CN Type: 4-pin wafer, p=1.25 mm

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

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

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

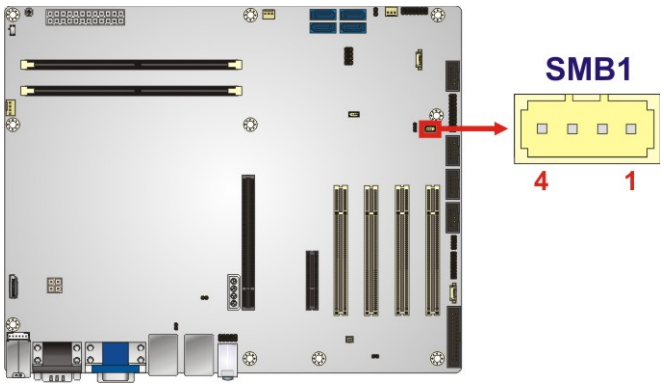


Figure 3-26: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+5V

Table 3-24: SMBus Connector Pinouts

3.2.26 SPI Flash Connector

CN Label: **J_SPI1**

CN Type: 6-pin wafer, p=1.25 mm

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

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

The SPI flash connector is used to flash the SPI ROM.

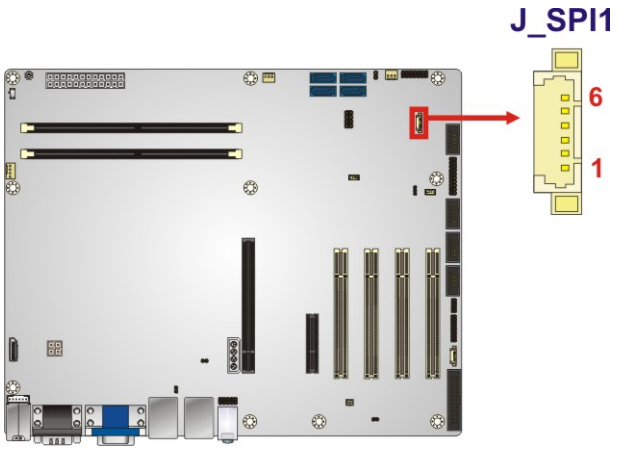


Figure 3-27: SPI Flash Connector Location

Pin	Description	Pin	Description
1	+3.3V	4	SPI_CLK
2	SPI_CS#	5	SPI_SI
3	SPI_SO	6	GND

Table 3-25: SPI Flash Connector Pinouts

3.2.27 SPI Flash Connector, EC

CN Label: **J_EC1**

CN Type: 6-pin wafer, p=1.25 mm

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

CN Pinouts: See **Table 3-26**

The SPI flash connector is used to flash the EC ROM.

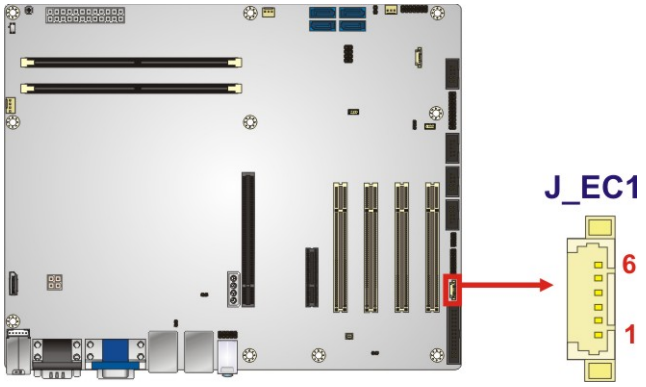


Figure 3-28: SPI EC Flash Connector Location

Pin	Description	Pin	Description
1	+3.3V_EC	4	SPI_CLK_EC
2	SPI_CS#_EC	5	SPI_SI_EC
3	SPI_SO_EC	6	GND

Table 3-26: SPI EC Flash Connector Pinouts

3.2.28 TPM Connector

CN Label: **TPM1**

CN Type: 20-pin header, p=2.54 mm

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

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

The Trusted Platform Module (TPM) connector secures the system on bootup.

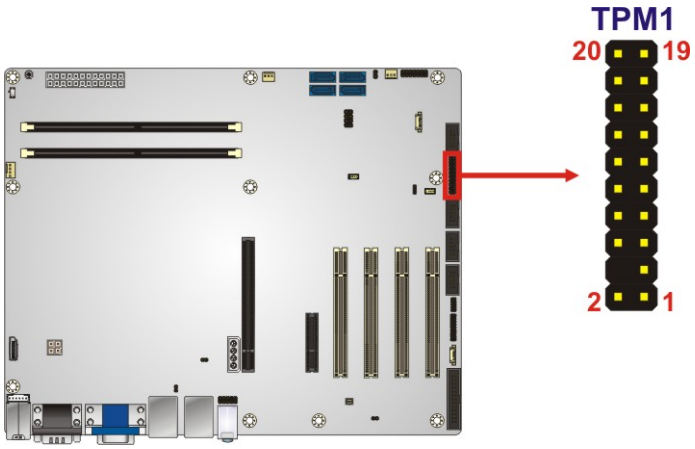


Figure 3-29: TPM Connector Pinout Location

Pin	Description	Pin	Description
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRESET#	6	+5 V
7	LAD3	8	LAD2
9	+3.3 V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3 V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-27: TPM Connector Pinouts

3.2.29 USB 2.0 Connector

CN Label:	**USB1**
CN Type:	8-pin header, p=2.54 mm
CN Location:	See **Figure 3-30**
CN Pinouts:	See **Table 3-28**

The USB 2.0 connector connects to USB 2.0 devices. Each pin header provides two USB 2.0 ports.

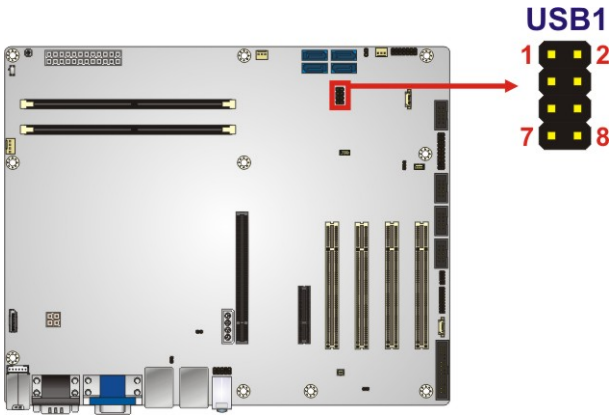


Figure 3-30: USB 2.0 Connector Pinout Location

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

Table 3-28: USB 2.0 Connector Pinouts

3.3 External Peripheral Interface Connector Panel

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

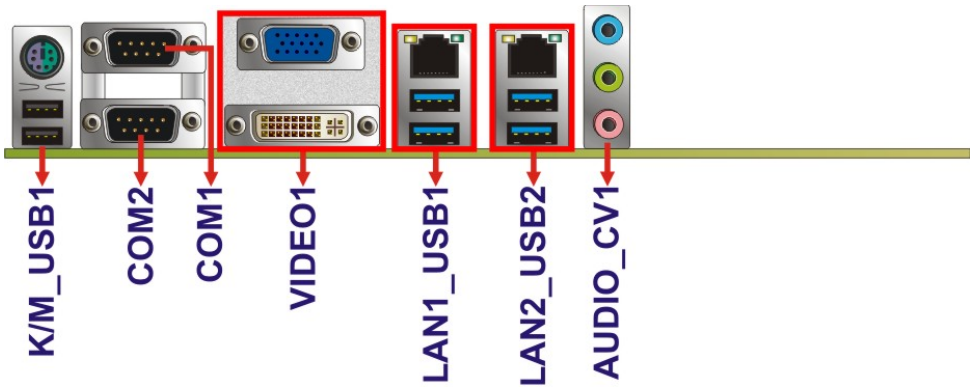


Figure 3-31: External Peripheral Interface Connectors

3.3.1 Audio Connector

CN Label: **AUDIO_CV1**

CN Type: Audio jack

CN Location: See **Figure 3-31**

The audio jacks connect to external audio devices.

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

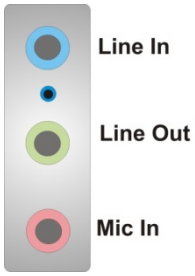


Figure 3-32: Audio Connector

3.3.2 Ethernet and USB 3.2 Gen 1 Connectors

CN Label: **LAN1_USB1, LAN2_USB2**

CN Type: RJ-45 & USB 3.2 Gen 1 Type A combo

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-29** and **Table 3-30**

There are four external USB 3.2 Gen 1 (5Gb/s) connectors on the IMBA-H310.

Pin	Description	Pin	Description
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_ DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_ RX+
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+

Table 3-29: USB 3.2 Gen 1 Port Pinouts

Each LAN connector connects to a local network

Pin	Description	Pin	Description
1	LAN_MDI0P	5	LAN_MDI2P
2	LAN_MDI0N	6	LAN_MDI2N
3	LAN_MDI1P	7	LAN_MDI3P
4	LAN_MDI1N	8	LAN_MDI3N

Table 3-30: LAN Pinouts

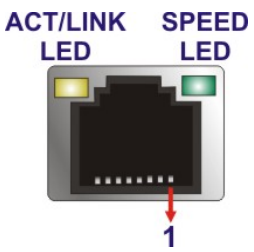


Figure 3-33: LAN Connector

3.3.3 Keyboard/Mouse and USB 2.0 Connectors

CN Label: **K/M_USB1**

CN Type: PS/2 & USB 2.0 combo

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-31** and **Table 3-32**

The USB 2.0 connector can be connected to a USB 2.0/1.1 device.

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

Table 3-31: USB 2.0 Port Pinouts

The PS/2 port is for connecting a PS/2 mouse or keyboard.

Pin	Description
9	GND
10	Keyboard Data
11	Mouse Data
12	VCC
13	Keyboard Clock
14	Mouse Clock

Table 3-32: PS/2 Connector Pinouts

3.3.4 Serial Port Connectors

CN Label: **COM1/1**

CN Type: Dual DB-9 male

CN Location: See **Figure 3-31**

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

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

Pin	Description	Pin	Description
1	DATA CARRIER DETECT	6	DATA SET READY
2	RECEIVE DATA	7	REQUEST TO SEND
3	TRANSMIT DATA	8	CLEAR TO SEND
4	DATA TERMINAL READY	9	RING INDICATOR
5	GND		

Table 3-33: Serial Port Connector Pinouts

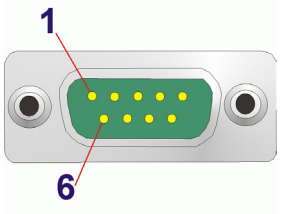


Figure 3-34: Serial Port Connector Pinouts

3.3.5 VGA and DVI-D Connectors

CN Label: **VIDEO1**

CN Type: DB-15 female & DVI-D female combo

CN Location: See **Figure 3-31**

CN Pinouts: See **Table 3-34** and **Table 3-35**

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

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

Table 3-34: VGA Connector Pinouts

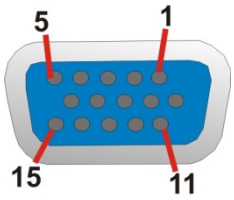


Figure 3-35: VGA Connector

The 24-pin Digital Visual Interface (DVI) connector connects to high-speed, high-resolution digital displays. The DVI-D connector supports digital signals.

Pin	Description	Pin	Description
1	DATA2-	13	NC
2	DATA2+	14	VCC +5V
3	SHIELD24	15	GND
4	NC	16	HPD
5	NC	17	DATA0-
6	DDCCLK	18	DATA0+
7	DDCDATA	19	SHIELD05
8	NC	20	NC
9	DATA-	21	NC
10	DATA1+	22	SHIELDCLK
11	SHIELD13	23	CLK2+
12	NC	24	CLK2-
C1	NC	C4	NC
C2	NC	C5	AGND
C3	NC	C6	NC

Table 3-35: DVI-D Connector Pinouts

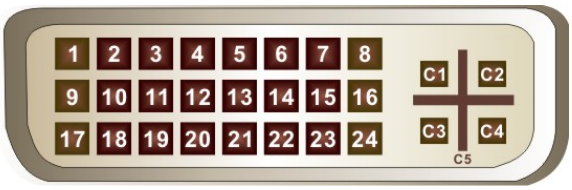


Figure 3-36: DVI-D Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IMBA-H310 may result in permanent damage to the IMBA-H310 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-H310. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-H310 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding***:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring the IMBA-H310, place it on an anti-static pad. This reduces the possibility of ESD damaging the IMBA-H310.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

WARNING:

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

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

- Read the user manual:
  - The user manual provides a complete description of the IMBA-H310 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the IMBA-H310 on an anti-static pad:
  - When installing or configuring the motherboard, place it on an anti-static pad. This helps to prevent potential ESD damage.
- Turn all power to the IMBA-H310 off:
  - When working with the IMBA-H310, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the IMBA-H310, **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 Socket LGA1151 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**.

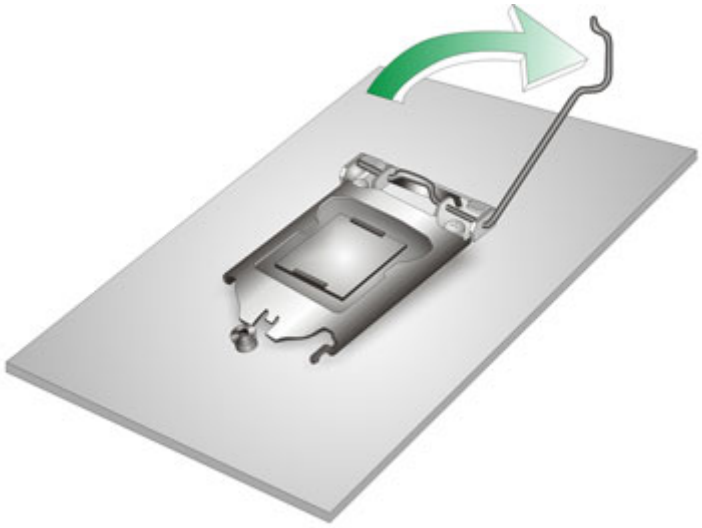


Figure 4-1: Disengage the CPU Socket Load Lever

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**.

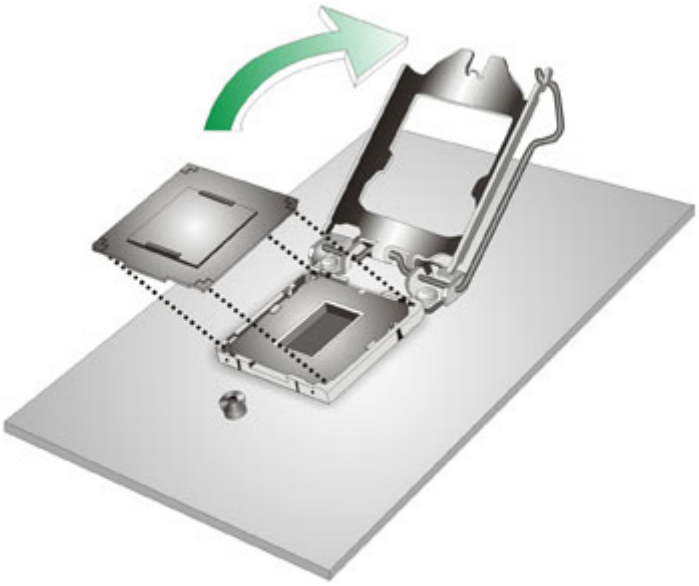


Figure 4-2: Remove Protective Cover

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.

WARNING:

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

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**.

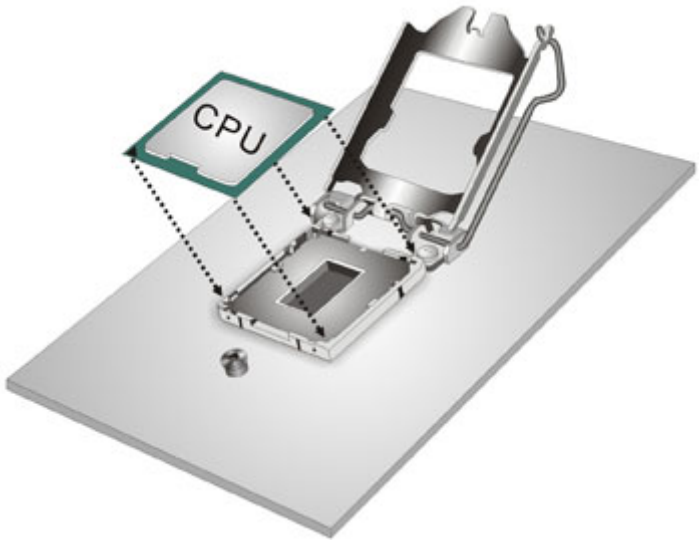


Figure 4-3: Insert the Socket LGA1151 CPU

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 LGA1151

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

4.4 Socket LGA1151 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 heat sink and fan.

WARNING:

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

To install the cooling kit, follow the instructions below.

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

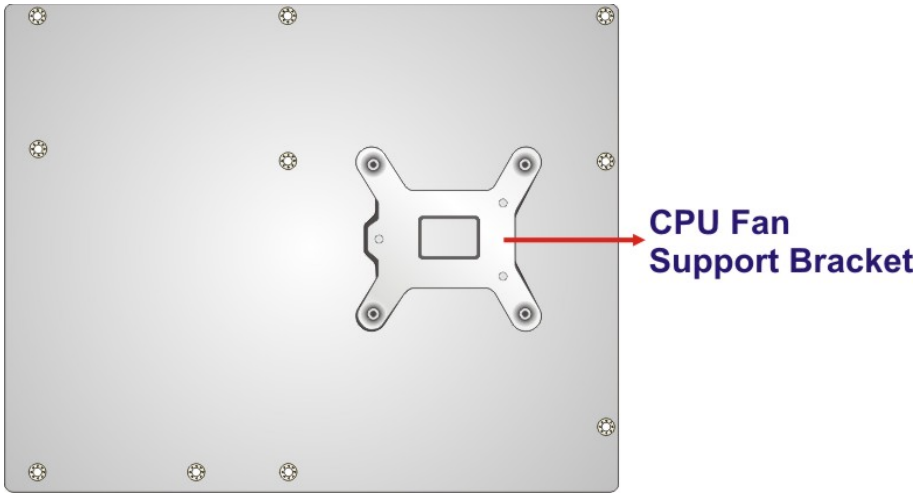


Figure 4-5: Cooling Kit Support Bracket

Step 2: **Place the cooling kit onto the socket LGA1151 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: **Tighten the screws**. Use a screwdriver to tighten the four screws. In a diagonal pattern, tighten each screw a few turns then move to the next one, until they are all secured. Do not overtighten the screws.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the CPU fan connector on the IMBA-H310. Carefully route the cable and avoid heat generating chips and fan blades.

4.5 DIMM Installation

CAUTION:

For dual channel configuration, always install two identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

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

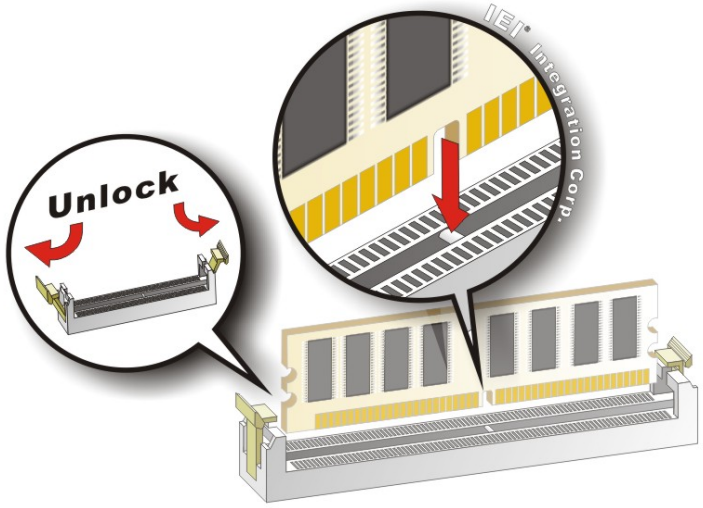


Figure 4-6: DIMM Installation

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

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

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

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

4.6 System Configuration

The system configuration should be performed before installation.

4.6.1 AT/ATX Power Mode Setting

The AT and ATX power mode selection is made through the AT/ATX power mode switch which is shown in **Figure 4-7**.

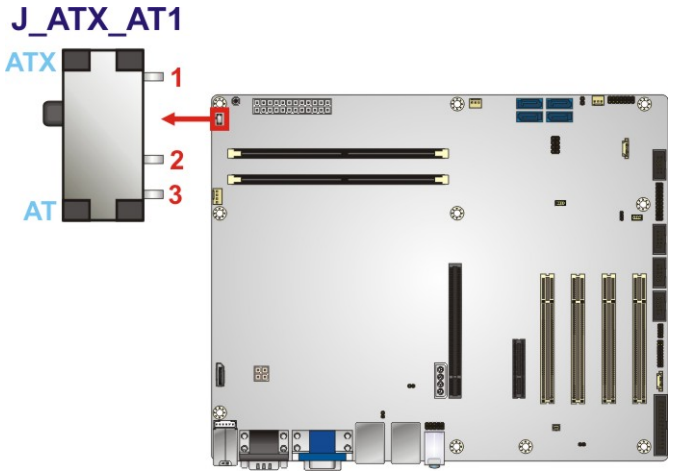


Figure 4-7: AT/ATX Power Mode Switch Location

Setting	Description
1-2	ATX power mode (default)
2-3	AT power mode

Table 4-1: AT/ATX Power Mode Switch Settings

4.6.2 Clear CMOS

To reset the BIOS, short the jumper for 3 seconds or more, then remove the jumper clip.

Setting	Description
Open	Keep current BIOS setup
Short	Clear BIOS

Table 4-2: Clear BIOS Jumper Settings

The location of the clear CMOS button (J_CMOS1) is shown in **Figure 4-8**.

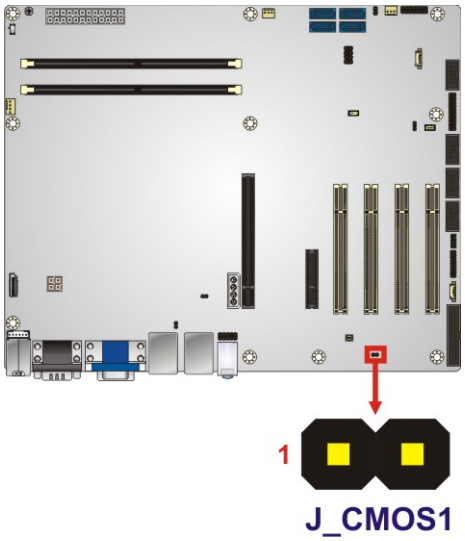


Figure 4-8: Clear CMOS Jumper Location

4.6.3 Flash Descriptor Security Override

The Flash Descriptor Security Override jumper (J_FLASH1) allows to enable or disable the ME firmware update. Refer to **Figure 4-9** and **Table 4-3** for the jumper location and settings.

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

Table 4-3: Flash Descriptor Security Override Jumper Settings

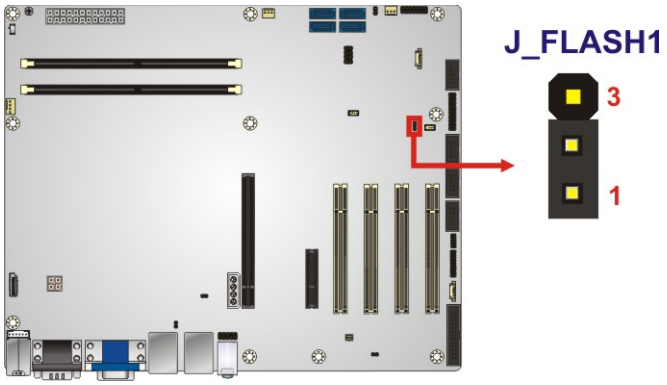


Figure 4-9: Flash Descriptor Security Override Jumper Location

To update the ME firmware, please follow the steps below.

Step 1: Before turning on the system power, short pin 2-3 of the Flash Descriptor Security Override jumper.

Step 2: Update the BIOS and ME firmware, and then turn off the system power.

Step 3: Remove the metal clip on the Flash Descriptor Security Override jumper or return to its default setting (short pin 1-2).

Step 4: Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

4.6.4 USB Power Selection

The USB power selection is made through the BIOS menu in “Chipset → PCH-IO Configuration”. Use the **USB Power SW1** and the **USB Power SW2** BIOS options to configure the correspondent USB ports (see **Table 4-4**) and refer to **Table 4-5** to select the USB power source.

BIOS Options	Configured USB Ports
USB Power SW1	LAN1_USB1 (external USB 3.2 Gen 1 ports) LAN2_USB2 (external USB 3.2 Gen 1 ports) K/M_USB1 (external USB 2.0 ports)
USB Power SW2	USB1 (internal USB 2.0 ports)

Table 4-4: BIOS Options and Configured USB Ports

Options	Description
+5V DUAL	+5V dual (default)
+5V	+5V

Table 4-5: USB Power Source Setup

Please refer to **Section 5.4.2** for detailed information.

4.7 Internal Peripheral Device Connections

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

4.7.1 SATA Drive Connection

The IMBA-H310 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 4-10**.

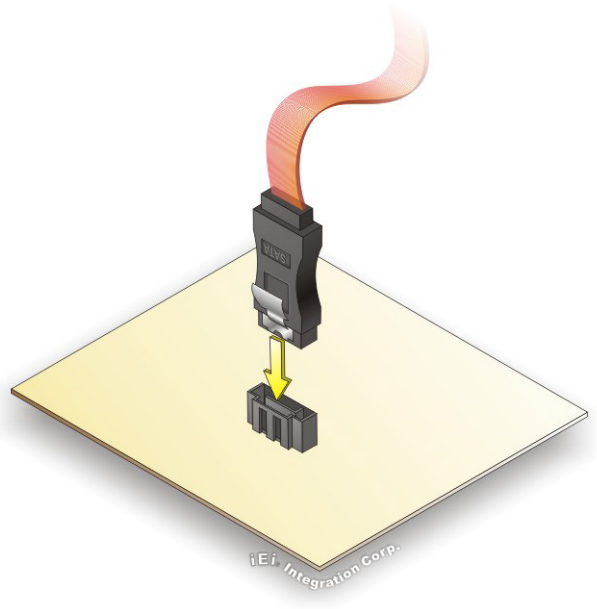


Figure 4-10: SATA Drive Cable Connection

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 4-11**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-11**.

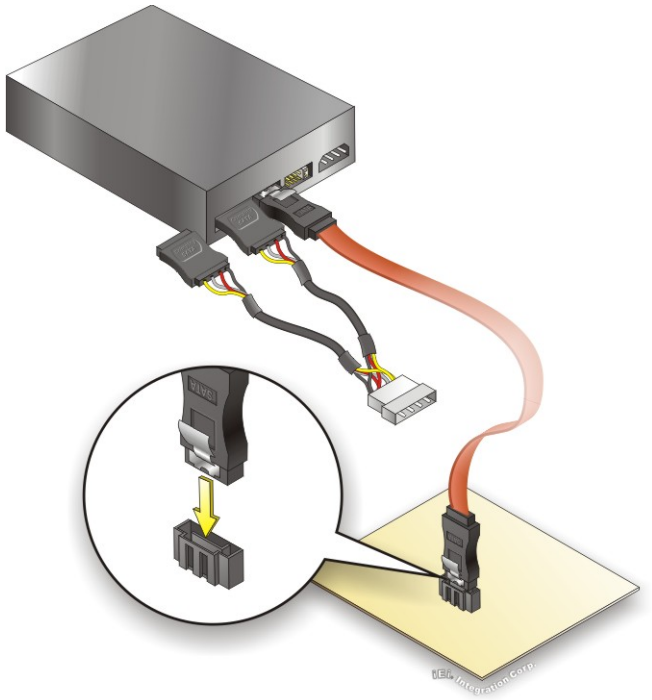


Figure 4-11: SATA Power Drive Connection

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

4.8 Driver Installation

All the drivers for the IMBA-H310 are available on IEI Resource Download Center (https://download.ieiworld.com). Type IMBA-H310 and press Enter to find all the relevant software, utilities, and documentation.

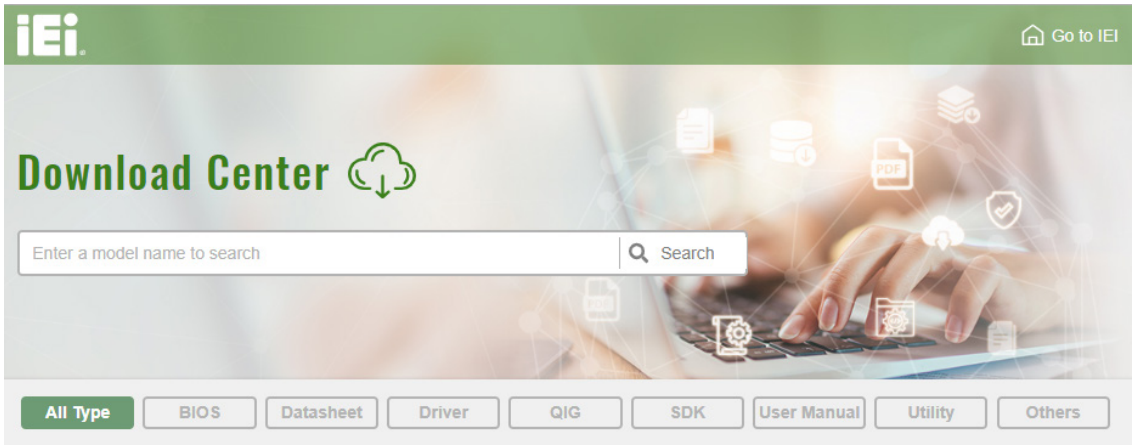
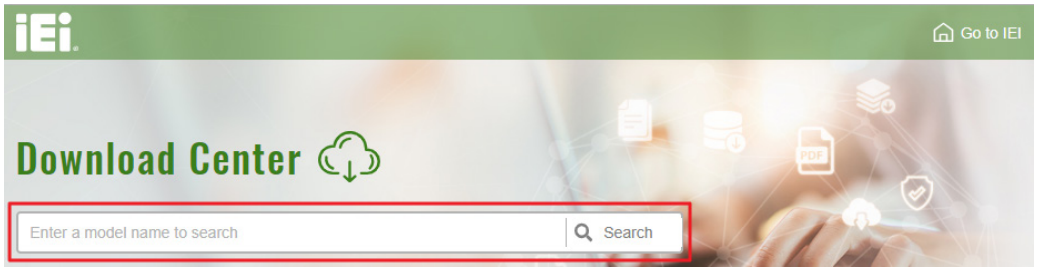


Figure 4-12: IEI Resource Download Center

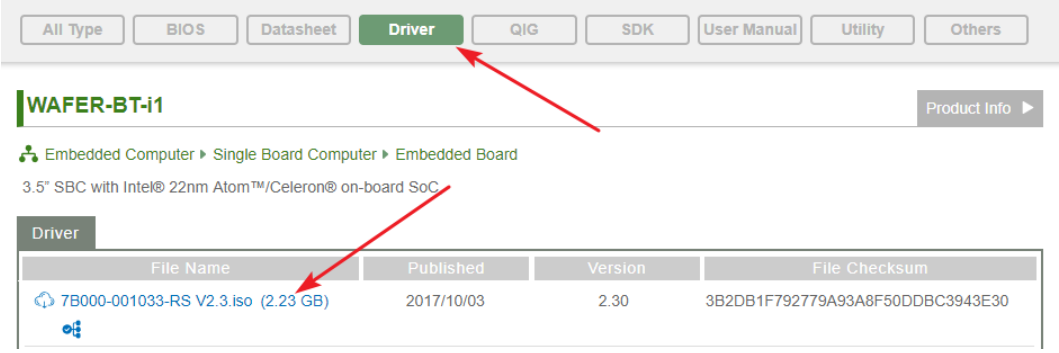
4.8.1 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

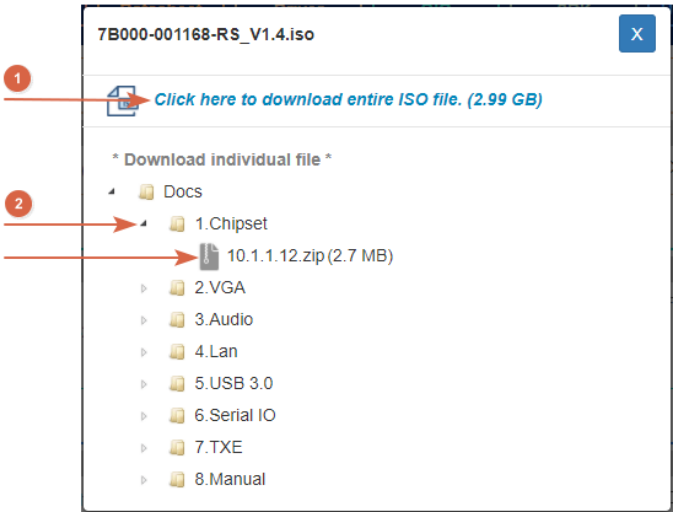
Step 1: Go to https://download.ieiworld.com. Type IMBA-H310 and press Enter.



Step 2: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



Step 3: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or click the small arrow to find an individual driver and click the file name to download (❷).



NOTE:

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content. On Windows 7 system, an additional tool (such as Virtual CD-ROM Control Panel from Microsoft) is needed to mount the file.

Chapter

5

BIOS

5.1 Introduction

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

NOTE:

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

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

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

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 clear CMOS button described in **Chapter 4**.

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.

BIOS Menu 1: Main

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

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

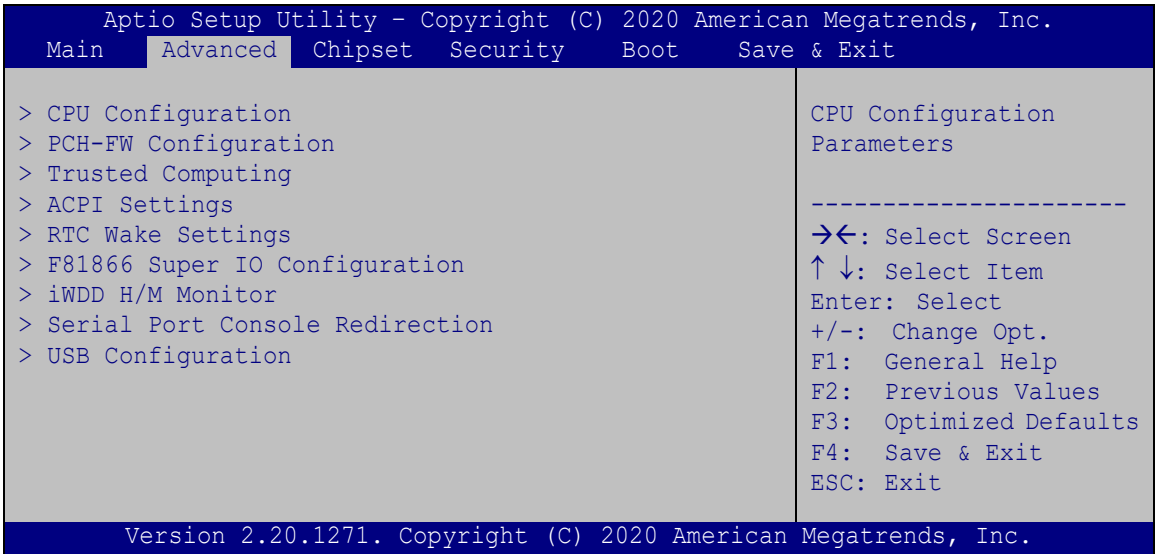
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING!

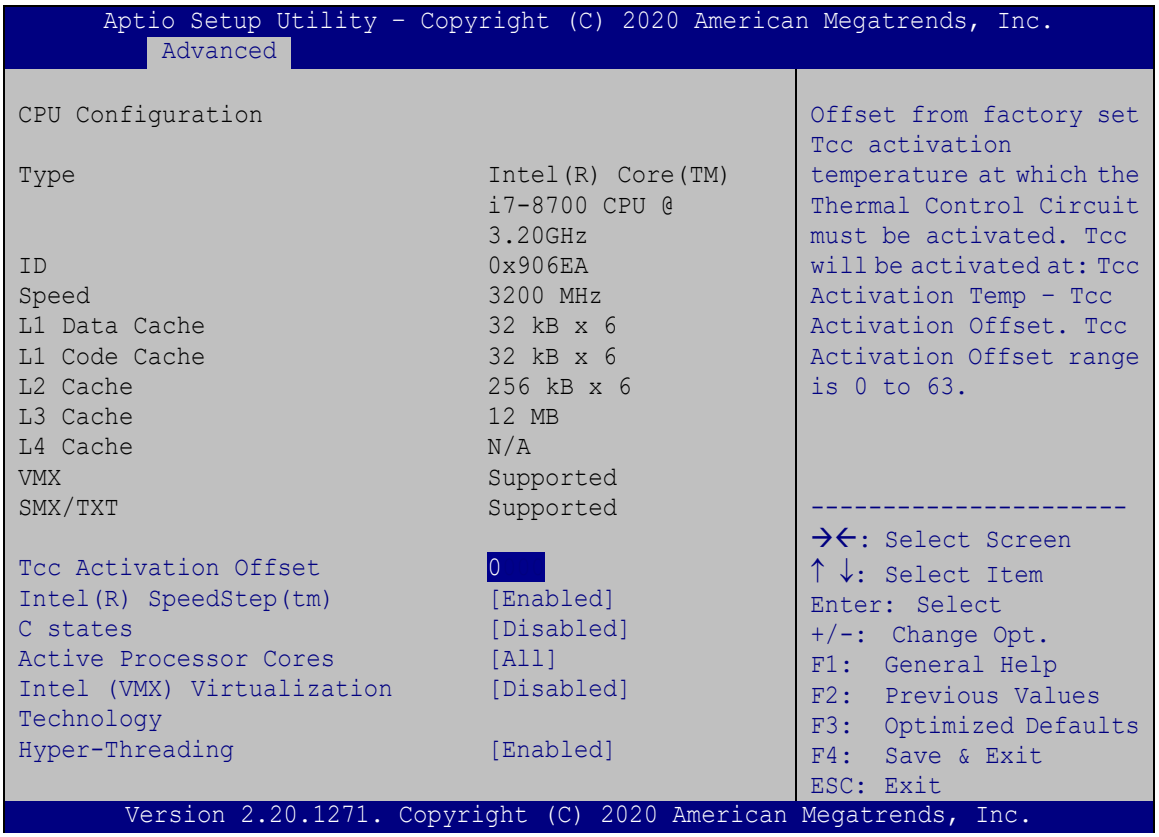
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 3: CPU Configuration

➔ **Tcc Activation Offset**

Offset from default value of Thermal Control Circuit (TCC) activation temperature at which the TCC must be activated. TCC Activation Offset range is 0 to 63.

➔ **Intel(R) SpeedStep(tm) [Enabled]**

Use the **Intel(R) SpeedStep(tm)** option to enable or disable the Intel® SpeedStep Technology which allows more than two frequency ranges to be supported.

➔	**Disabled**		Disables Intel® SpeedStep Technology
➔	**Enabled**	**DEFAULT**	Enables Intel® SpeedStep Technology

➔ **C states [Disabled]**

Use the **C states** option to enable or disable the CPU C states.

➔ **Disabled**	**DEFAULT**	Disables the CPU C states.
➔ **Enabled**		Enables the CPU C states.

➔ **Active Processor Cores [All]**

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

➔ **All**	**DEFAULT**	Enable all cores in the processor package.
➔ **1**		Enable one core in the processor package.
➔ **2**		Enable two cores in the processor package.
➔ **3**		Enable three cores in the processor package.
➔ **4**		Enable four cores in the processor package.
➔ **5**		Enable five cores in the processor package.

➔ **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.

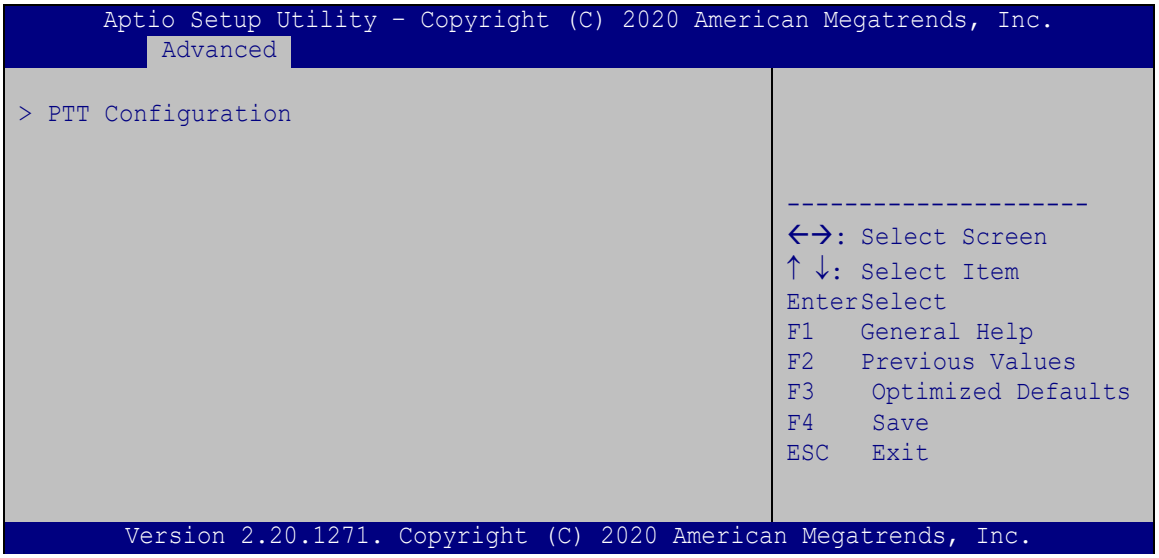
➔ **Hyper-Threading [Enabled]**

Use the **Hyper-Threading** option to enable or disable the Hyper-Threading Technology.

➔ **Disabled**		Disables Hyper-Threading Technology
➔ **Enabled**	**DEFAULT**	Enables Hyper-Threading Technology

5.3.2 PCH-FW Configuration

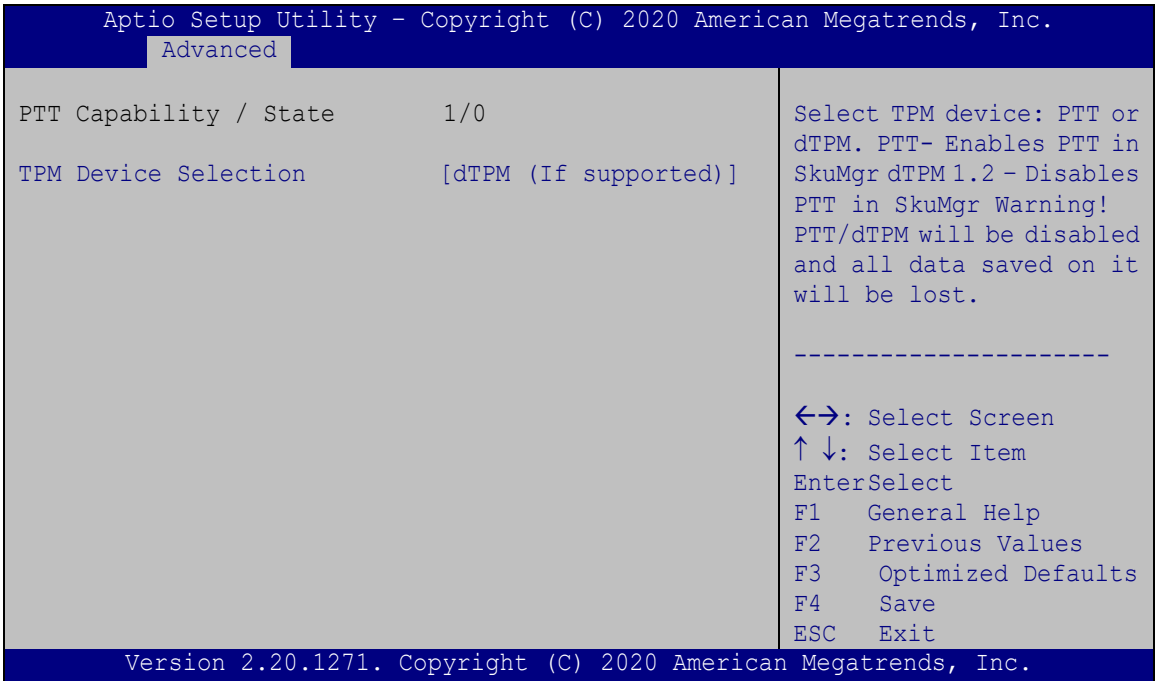
The **PCH-FW Configuration** menu (**BIOS Menu 4**) allows Intel® Active Management Technology (AMT) options to be configured.



BIOS Menu 4: PCH-FW Configuration

5.3.2.1 PTT Configuration

Use the **PTT Configuration** menu (**BIOS Menu 5**) to configure settings related to the Trusted Platform Module (TPM).



BIOS Menu 5: PTT Configuration

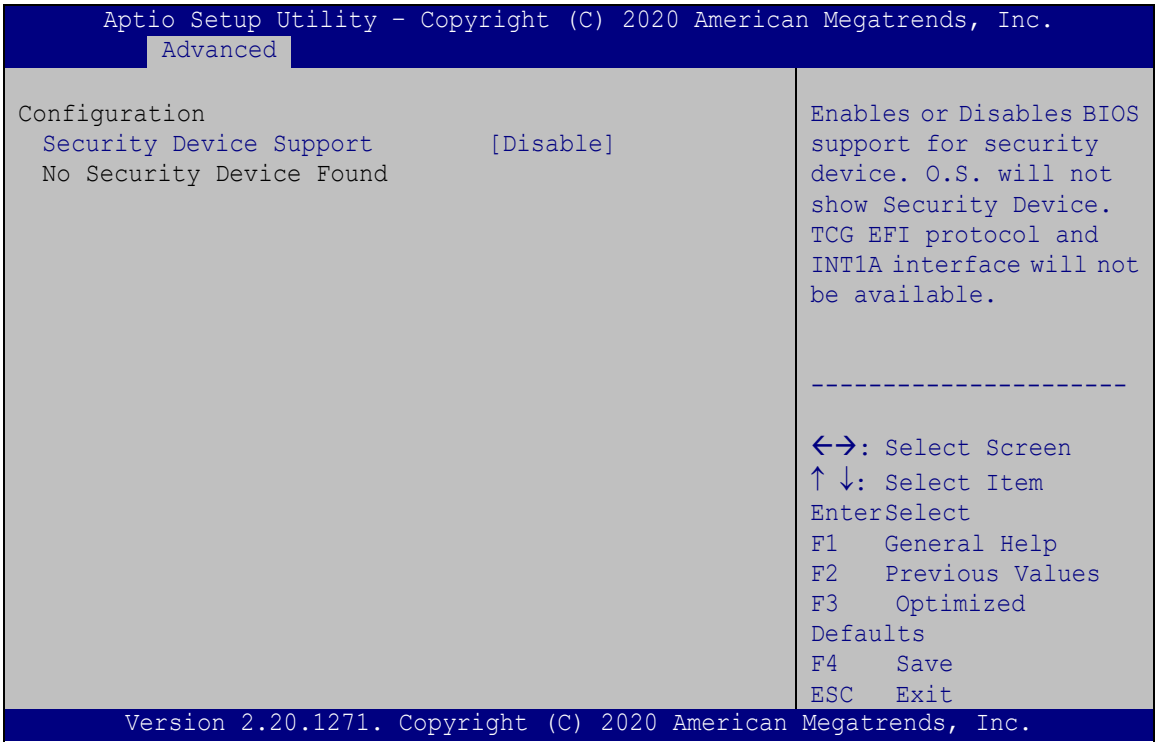
➔ **TPM Device Selection [dTPM (If supported)]**

Use the **TPM Device Selection** option to configure support for the TPM.

- ➔ **dTPM (If supported)** **DEFAULT** Disable PTT in SkuMgr.
- ➔ **PTT** Enable PTT in SkuMgr

5.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 6**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 6: Trusted Computing

➔ **Security Device Support [Disable]**

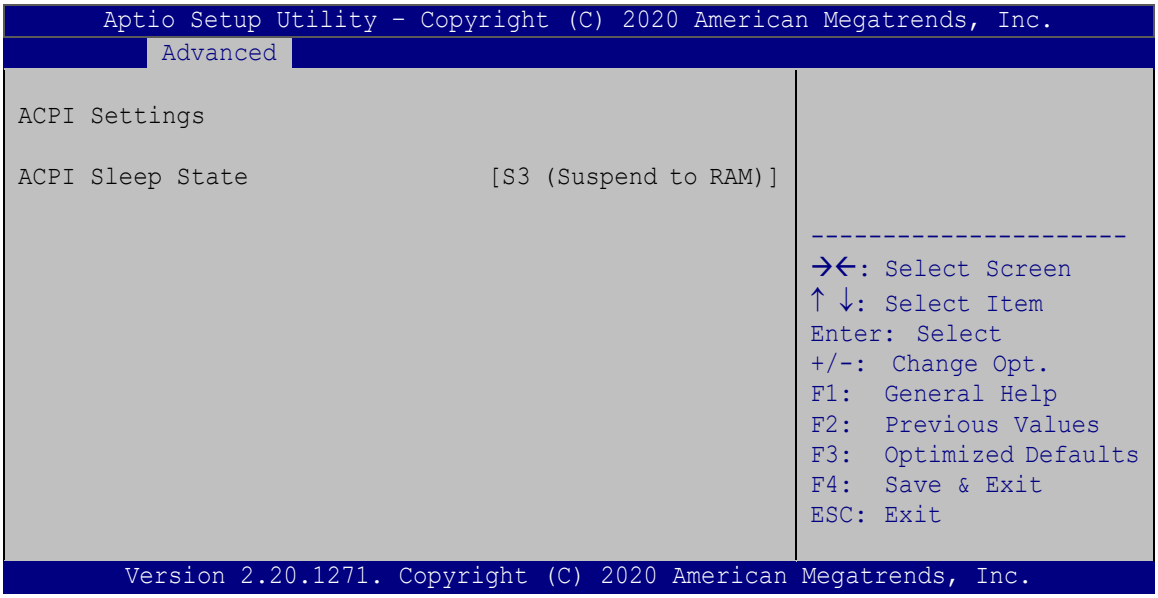
Use the **Security Device Support** option to configure support for the security device.

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

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

5.3.4 ACPI Settings

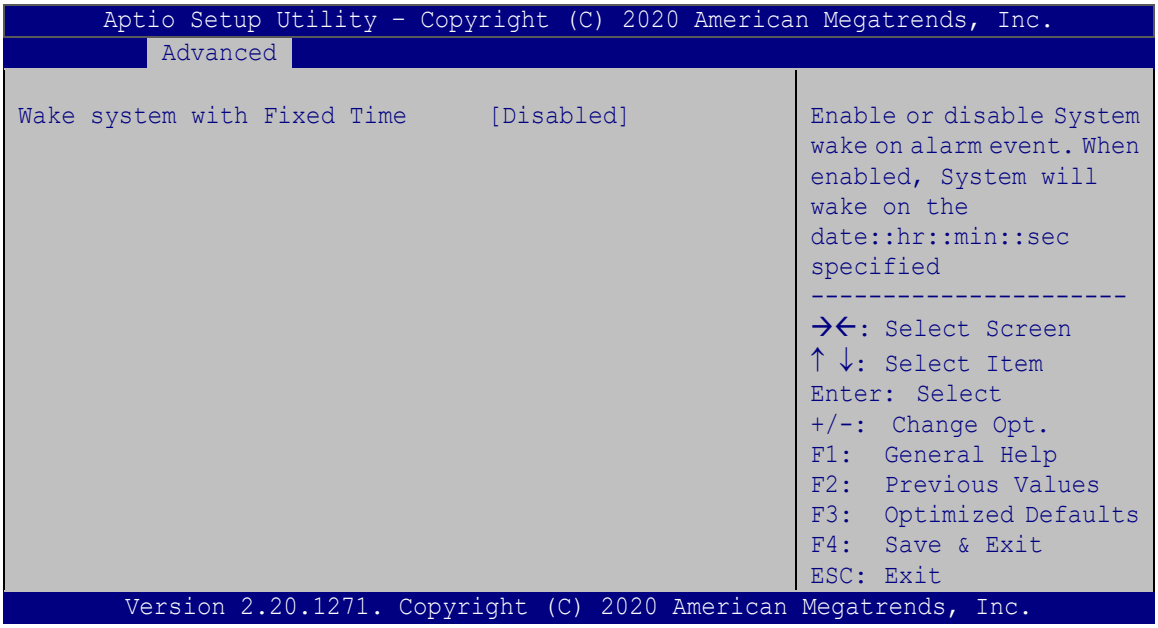
The **ACPI Settings** menu (**BIOS Menu 7**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 7: ACPI Configuration

5.3.5 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 8**) enables the system to wake at the specified time.



BIOS Menu 8: RTC Wake Settings

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

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

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

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

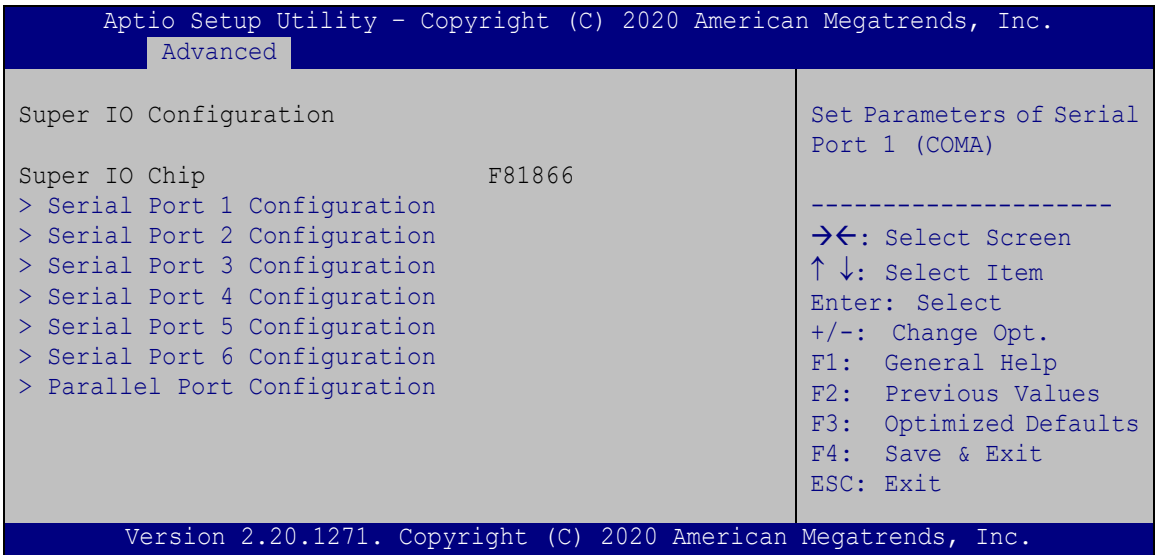
- Wake up date
- Wake up hour
- Wake up minute

Wake up second

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

5.3.6 F81866 Super IO Configuration

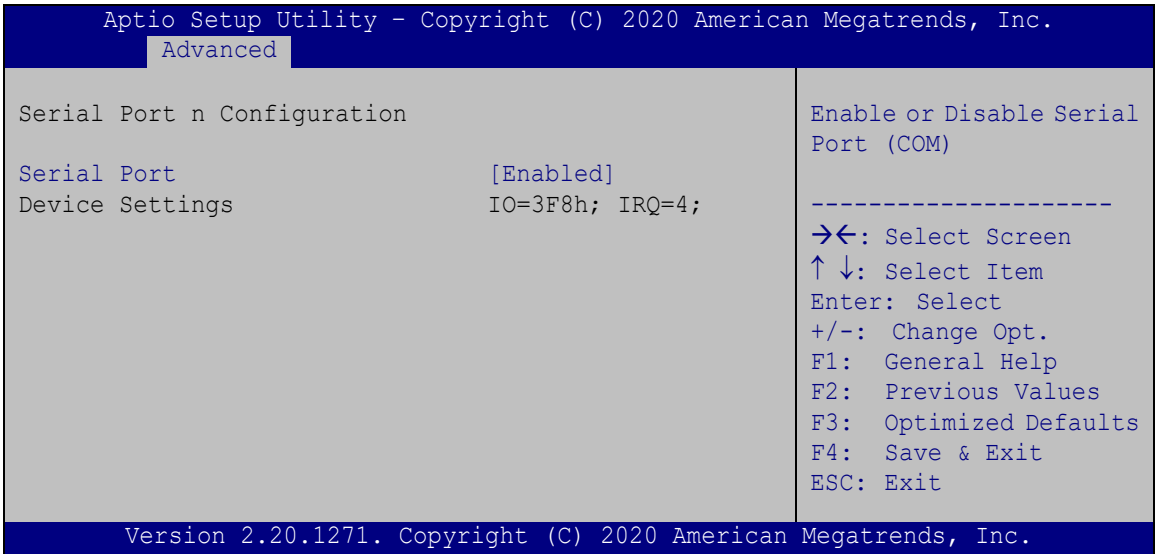
Use the **F81866 Super IO Configuration** menu (**BIOS Menu 9**) to set or change the configurations for the parallel ports and serial ports.



BIOS Menu 9: F81866 Super IO Configuration

5.3.6.1 Serial Port 1 ~ 6 Configuration

Use the **Serial Port 1 ~ 6 Configuration** menu (**BIOS Menu 10**) to configure the serial ports.



BIOS Menu 10: Serial Port 1 ~ 6 Configuration Menu

➔ **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

5.3.6.1.1 Serial Port 5 Configuration

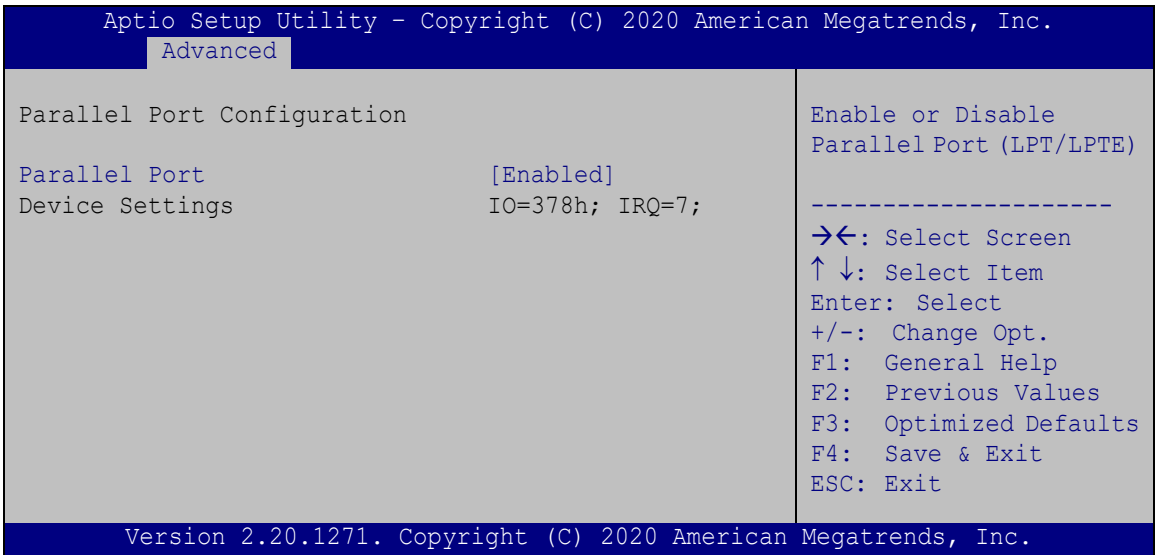
➔ **Transfer Mode [RS232]**

Use the **Transfer Mode** option to configure the data transfer mode for COM5.

➔	**RS422**		Set COM5 transfer mode to RS-422
➔	**RS485**		Set COM5 transfer mode to RS-485
➔	**RS232**	**DEFAULT**	Set COM5 transfer mode to RS-232

5.3.6.2 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 11**) to configure the parallel port.



BIOS Menu 11: Parallel Port Configuration

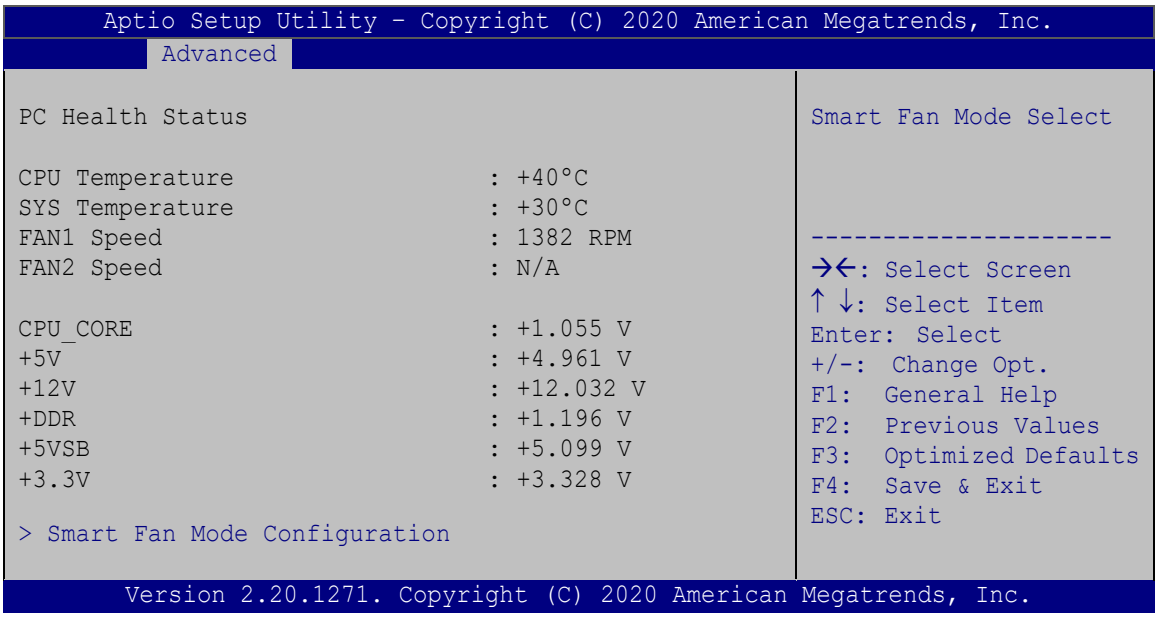
➔ **Parallel Port [Enabled]**

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

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

5.3.7 iWDD H/W Monitor

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



BIOS Menu 12: iWDD H/W Monitor

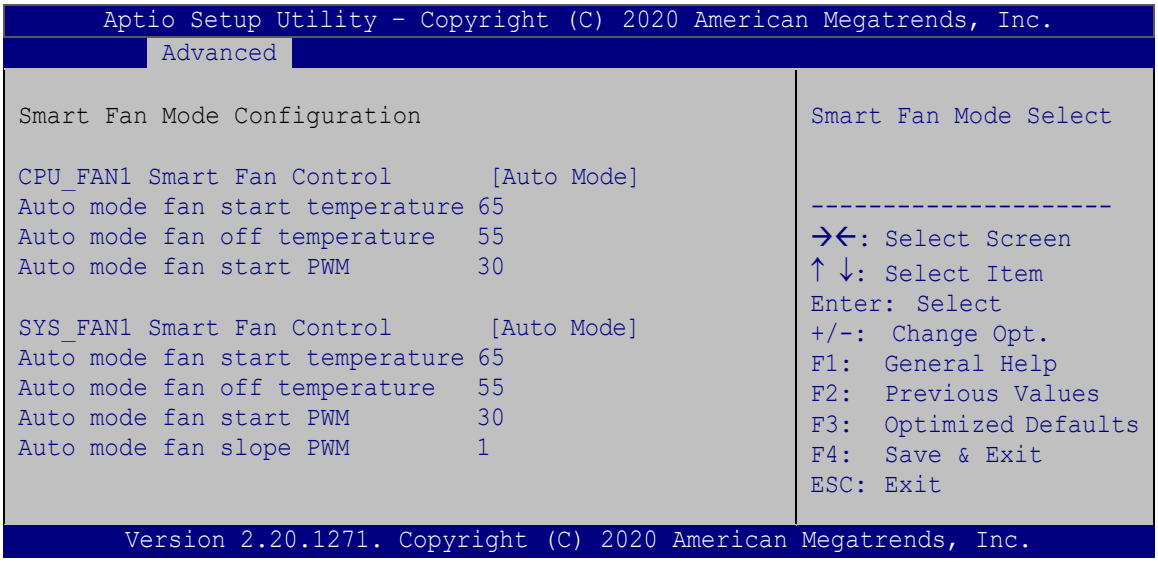
➔ **PC Health Status**

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speed:
  - Fan1 Speed (CPU_FAN1)
  - Fan2 Speed (SYS_FAN1)
- Voltages:
  - CPU_CORE
  - +5V
  - +12V
  - +DDR
  - +5VSB
  - +3.3V

5.3.7.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 13**) to configure the CPU/system fan temperature and speed settings.



BIOS Menu 13: Smart Fan Mode Configuration

➔ **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode]**

Use the **CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control** option to configure the CPU/System Smart Fan.

➔ **Auto Mode** **DEFAULT** The fan adjusts its speed using Auto Mode settings.

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

➔ **Auto mode fan start/off temperature**

Use the + or – key to change the **Auto mode fan start/off temperature** value. Enter a decimal number between 1 and 100.

➔ **Auto mode fan start PWM**

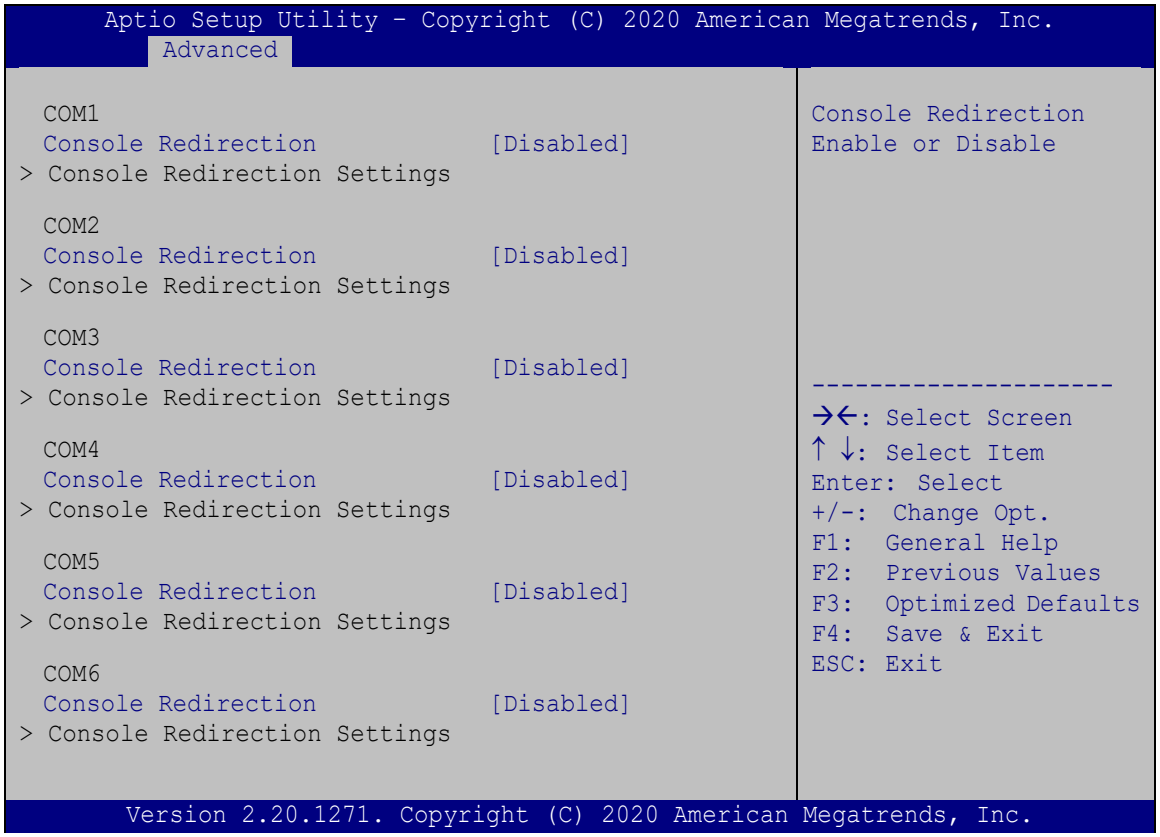
Use the + or – key to change the **Auto mode fan start PWM** value. Enter a decimal number between 1 and 100.

➔ **Auto mode fan slope PWM**

Use the + or – key to change the **Auto mode fan slope PWM** value. Enter a decimal number between 1 and 8.

5.3.8 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.



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

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

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

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

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

➔ **Data Bits [8]**

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

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

➔ **Parity [None]**

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

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

- ➔ **Even** — The parity bit is 0 if the number of ones in the data bits is even.
- ➔ **Odd** — The parity bit is 0 if the number of ones in the data bits is odd.
- ➔ **Mark** — The parity bit is always 1. This option does not provide error detection.
- ➔ **Space** — The parity bit is always 0. This option does not provide error detection.

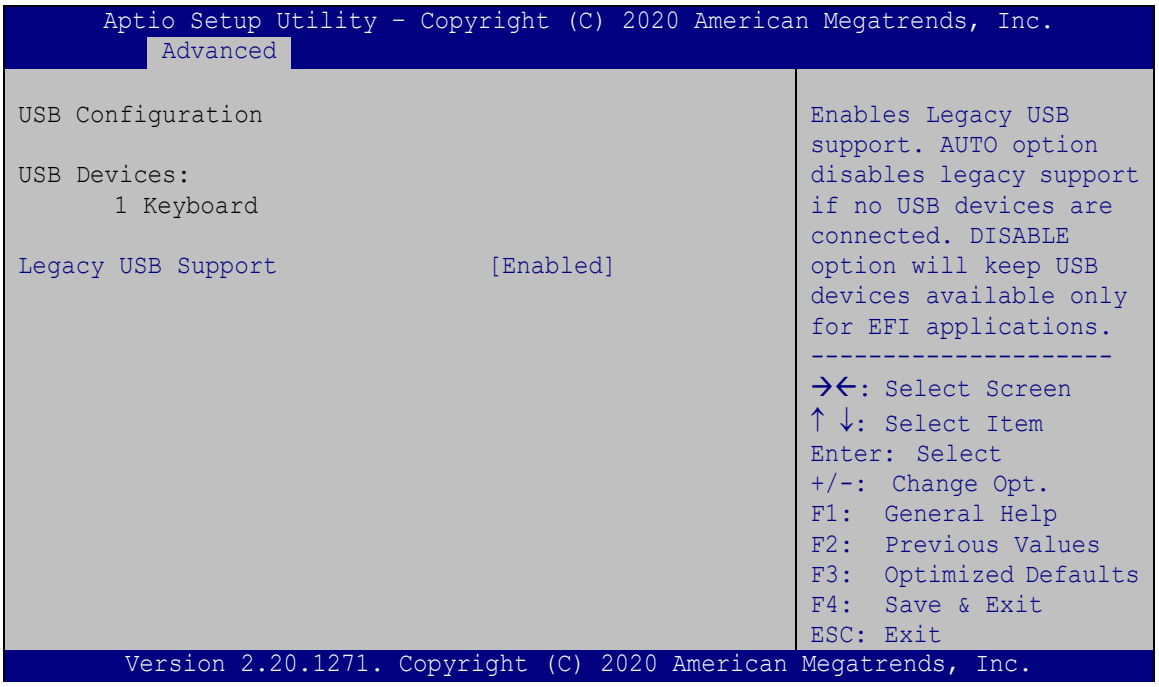
➔ **Stop Bits [1]**

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

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

5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 15**) to read USB configuration information and configure the USB settings.



BIOS Menu 15: USB Configuration

➔ **Legacy USB Support [Enabled]**

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

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

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 16**) to access the PCH IO and System Agent (SA) configuration menus.

WARNING!

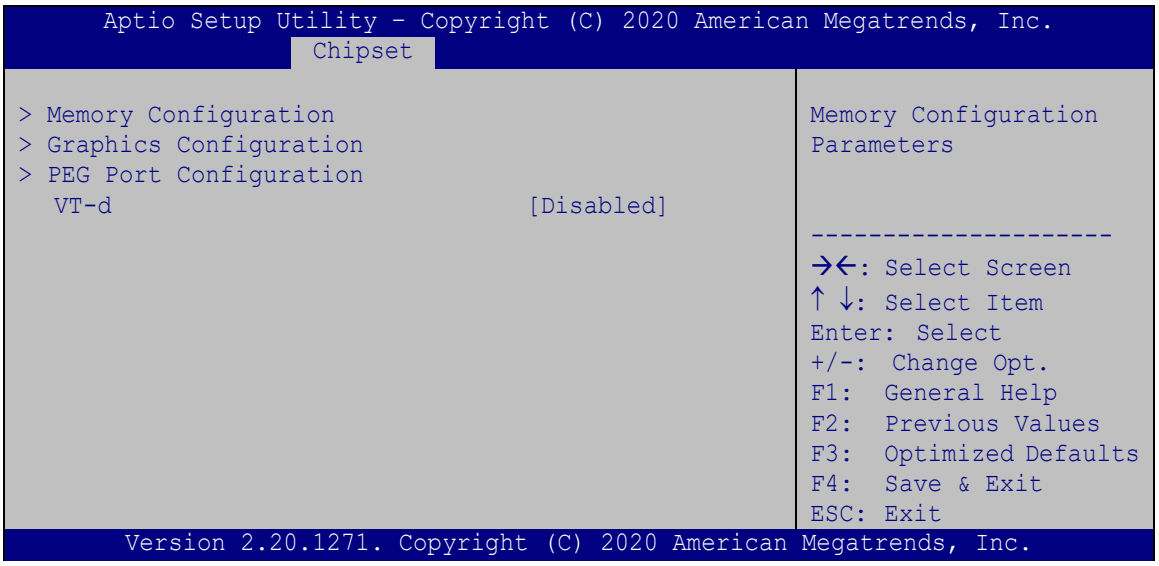
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

```
      Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
  Main    Advanced   Chipset   Security    Boot    Save & Exit

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

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

       Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 16: Chipset

5.4.1 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 17**) to configure the System Agent (SA) parameters.



BIOS Menu 17: System Agent (SA) Configuration

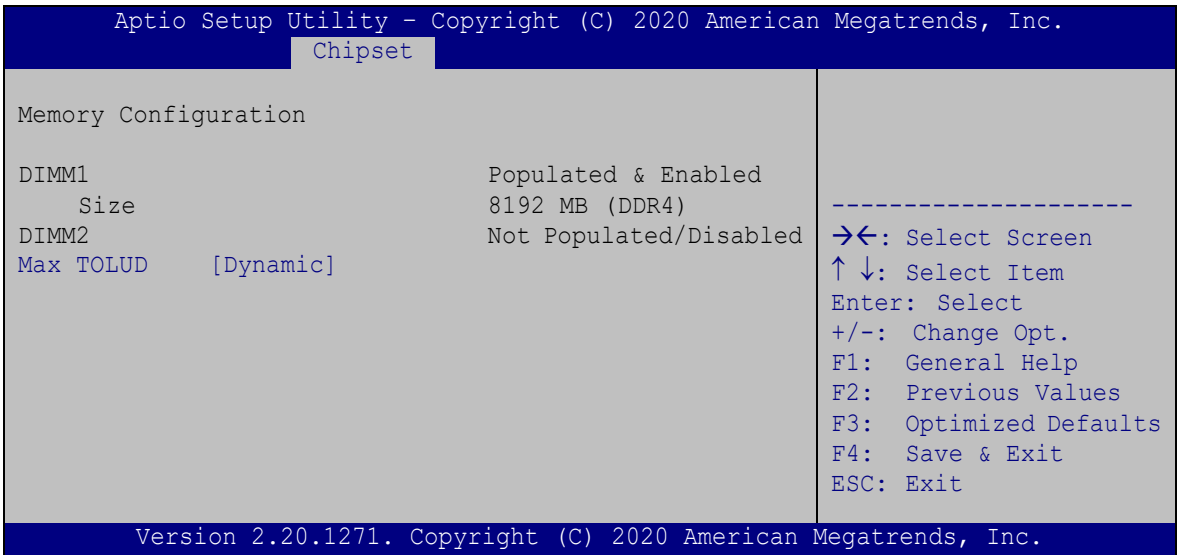
➔ **VT-d [Disabled]**

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

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

5.4.1.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 18**) to view memory information.



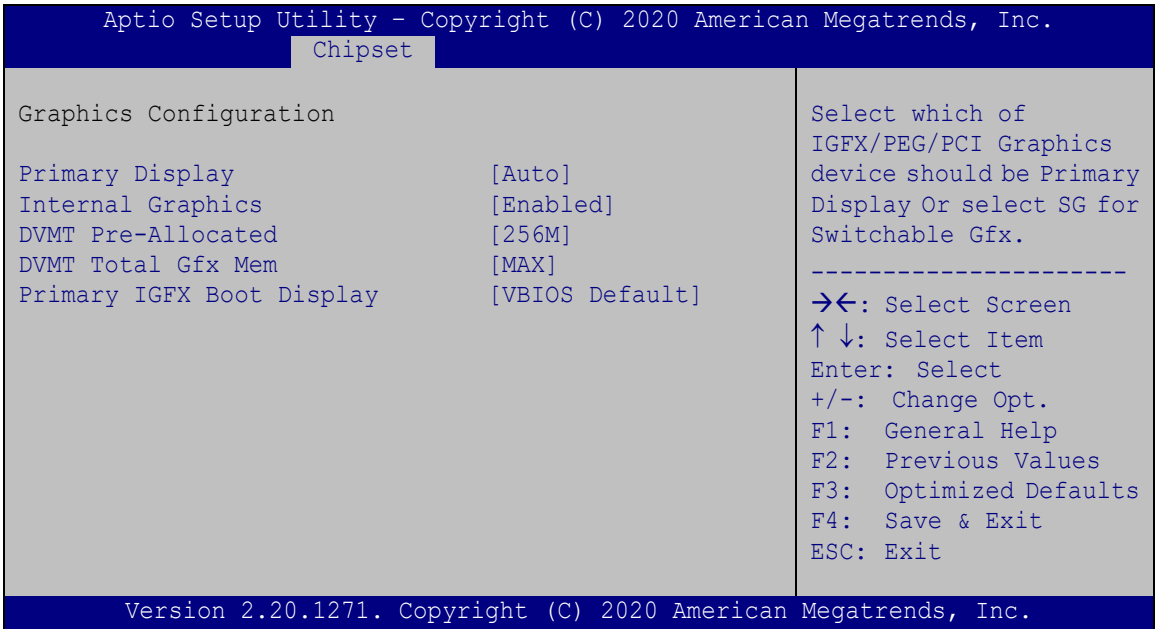
BIOS Menu 18: Memory Configuration

➔ **Max TOLUD [Dynamic]**

Use the **Max TOLUD** option to select the Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

5.4.1.2 Graphics Configuration

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



BIOS Menu 19: Graphics Configuration

➔ **Primary Display [Auto]**

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

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

➔ **Internal Graphics [Enabled]**

Use the **Internal Graphics** option to keep IGFX enabled basing on the setup options. The following options are available:

- Auto
- Disabled
- Enabled **Default**

➔ **DVMT Pre-Allocated [256M]**

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

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

➔ **DVMT Total Gfx Mem [MAX]**

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

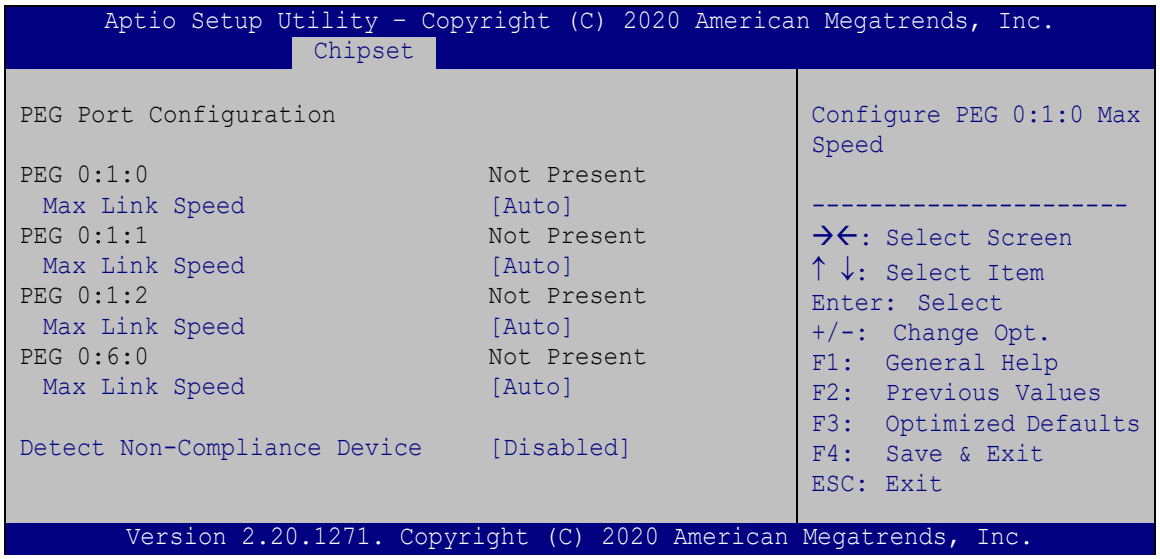
- 128M
- 256M
- MAX **Default**

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

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

- VBIOS Default **Default**
- DVI
- CRT
- DP1

5.4.1.3 PEG Port Configuration



BIOS Menu 20: PEG Port Configuration

➔ **Max Link Speed [Auto]**

Use the **Max Link Speed** option to select the maximum link speed of the PCI Express slot. The following options are available:

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

➔ **Detect Non-Compliance Device [Disabled]**

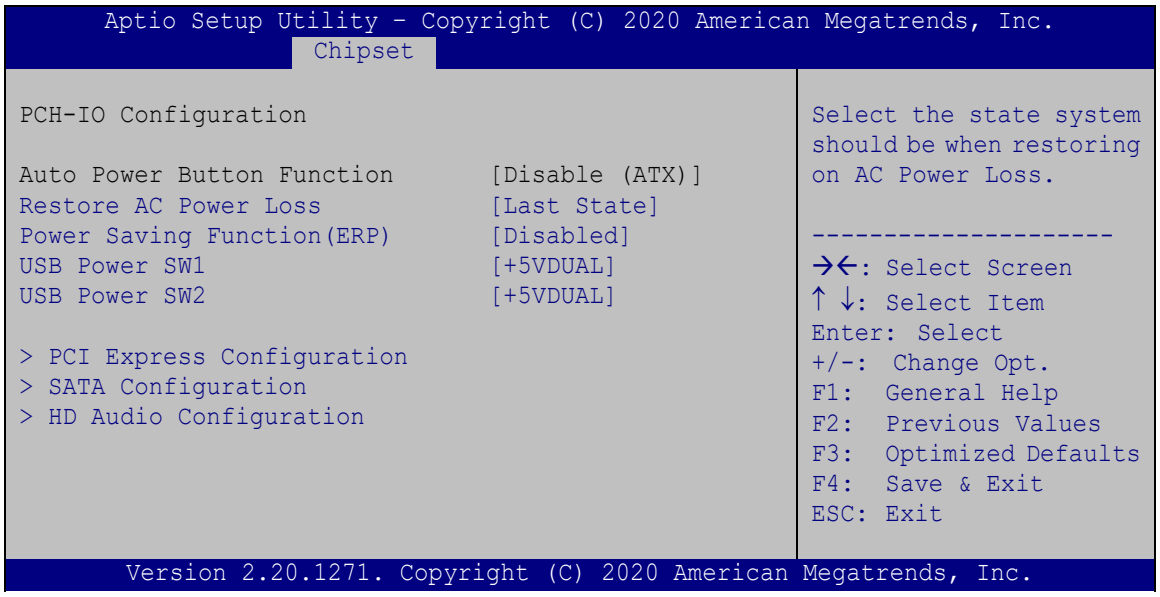
Use the **Detect Non-Compliance Device** option to enable or disable detecting if a non-compliance PCI Express device is connected to the PCI Express slot.

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

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

5.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 21**) to configure the PCH parameters.



BIOS Menu 21: PCH-IO Configuration

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

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

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

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

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

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

➔ **USB Power SW1 [+5V DUAL]**

Use the **USB Power SW1** BIOS option to configure whether to provide power to the corresponding USB connectors (**Table 5-2**) when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

➔ **+5V** Power is not provided to the external USB connectors when the system is in S3/S4 sleep state

➔ **+5VDUAL** **DEFAULT** Power is provided to the external USB connectors when the system is in S3/S4 sleep state

➔ **USB Power SW2 [+5V DUAL]**

Use the **USB Power SW2** BIOS option to configure whether to provide power to the corresponding USB connectors (**Table 5-2**) when the system is in S3/S4 sleep state. This option is valid only when the above **Power Saving Function (ERP)** BIOS option is disabled.

➔ **+5V** Power is not provided to the internal USB connectors when the system is in S3/S4 sleep state

➔ **+5VDUAL** **DEFAULT** Power is provided to the internal USB connectors when the system is in S3/S4 sleep state

BIOS Options	Configured USB Ports
USB Power SW1	LAN1_USB1 (external USB 3.2 Gen 1 ports) LAN2_USB2 (external USB 3.2 Gen 1 ports) K/M_USB1 (external USB 2.0 ports)
USB Power SW2	USB1 (internal USB 2.0 ports)

Table 5-2: BIOS Options and Configured USB Ports

5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** submenu (**BIOS Menu 22**) to configure the PCIe Mini slot.

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
                    Chipset
PCI Express Configuration                  | PCI Express Root Port
                                           | Settings.
> PCIEX4_1 slot                            |
                                           | ----------------------
                                           | →←: Select Screen
                                           | ↑ ↓: Select Item
                                           | Enter: Select
                                           | +/-: Change Opt.
                                           | F1: General Help
                                           | F2: Previous Values
                                           | F3: Optimized Defaults
                                           | F4: Save & Exit
                                           | ESC: Exit
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 22: PCI Express Configuration

5.4.2.1.1 PCIEX4_1 Slot

```
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
                    Chipset
PCIEX4_1 slot                  [Enabled]   | Control the PCI Express
PCIe Speed                     [Auto]      | Root Port.
Detect Non-Compliance Device   [Disabled]  |
                                           | ----------------------
                                           | →←: Select Screen
                                           | ↑ ↓: Select Item
                                           | Enter: Select
                                           | +/-: Change Opt.
                                           | F1: General Help
                                           | F2: Previous Values
                                           | F3: Optimized Defaults
                                           | F4: Save & Exit
                                           | ESC: Exit
Version 2.20.1271. Copyright (C) 2020 American Megatrends, Inc.
```

BIOS Menu 23: PCIEX14_1 Slot

➔ **PCIEX4_1 Slot [Enabled]**

Use the **PCIEX4_1 Slot** option to enable or disable the PCIe x4 slot (PCIEX4_1).

➔ **Disabled**		Disables the PCIe x4 slot.
➔ **Enabled**	**DEFAULT**	Enables the PCIe x4 slot.

➔ **PCIe Speed [Auto]**

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

- Auto **Default**
- Gen1
- Gen2

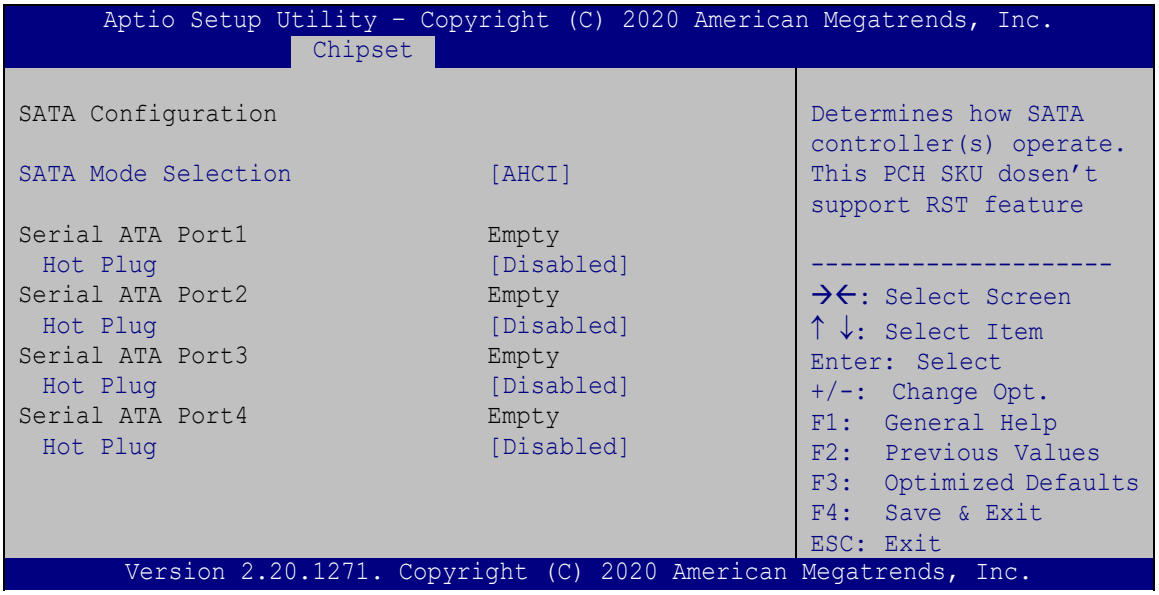
➔ **Detect Non-Compliance Device [Disabled]**

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

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

5.4.2.2 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 24**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 24: SATA Configuration

➔ **SATA Mode Selection [AHCI]**

Use the **SATA Mode Selection** option to determine how the SATA devices operate.

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

➔ **Hot Plug [Disabled]**

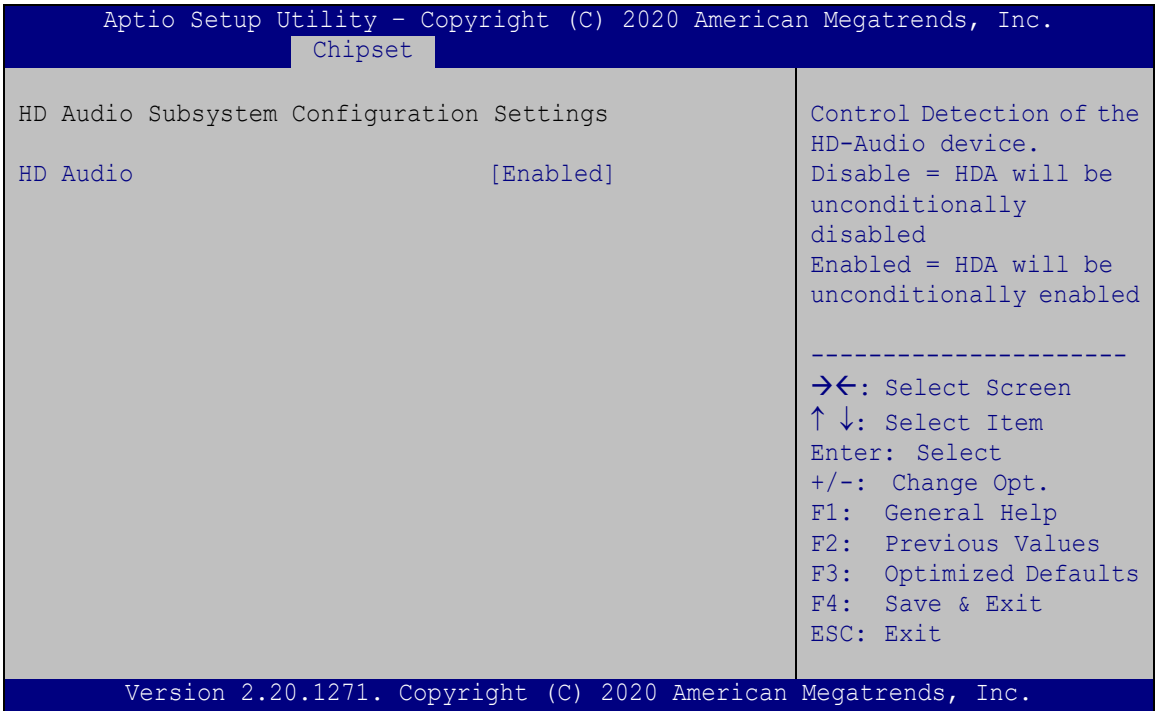
Use the **Hot Plug** option to designate the correspondent SATA port as hot-pluggable.

➔ **Disabled** **DEFAULT** Disables the hot-pluggable function of the SATA port.

➔ **Enabled** Designates the SATA port as hot-pluggable.

5.4.2.3 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 25**) to configure the PCH Azalia settings.



BIOS Menu 25: HD Audio Configuration

➔ **HD Audio [Enabled]**

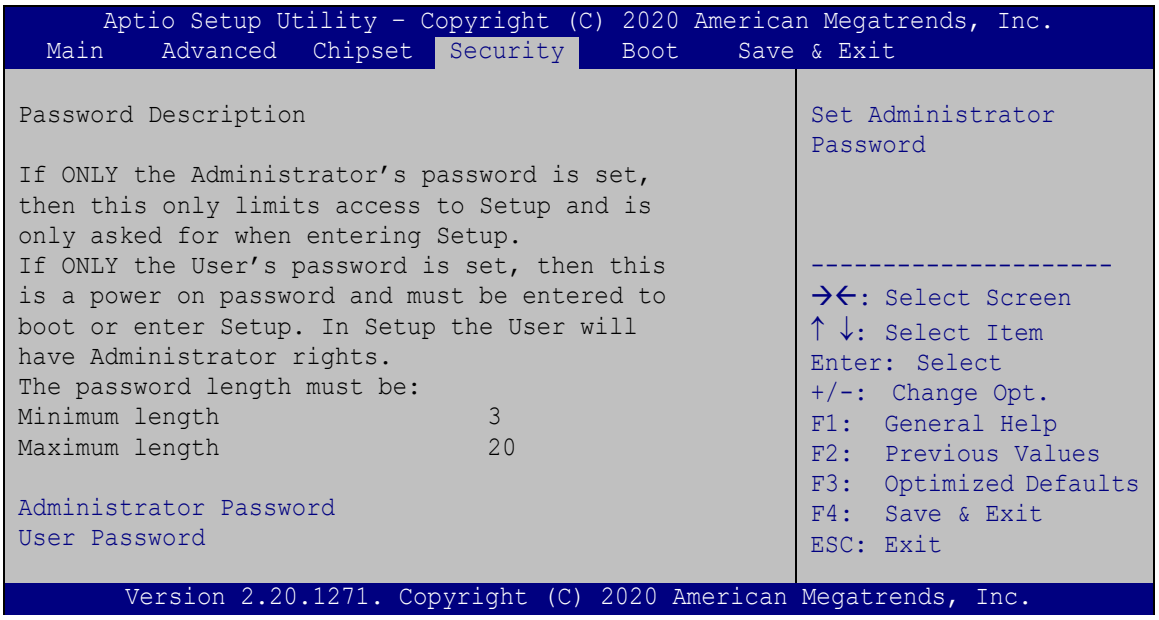
Use the **HD Audio** option to enable or disable the High Definition Audio controller.

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

➔ **Enabled** **DEFAULT** The onboard High Definition Audio controller is enabled.

5.5 Security

Use the **Security** menu (**BIOS Menu 26**) to set system and user passwords.



BIOS Menu 26: Security

➔ **Administrator Password**

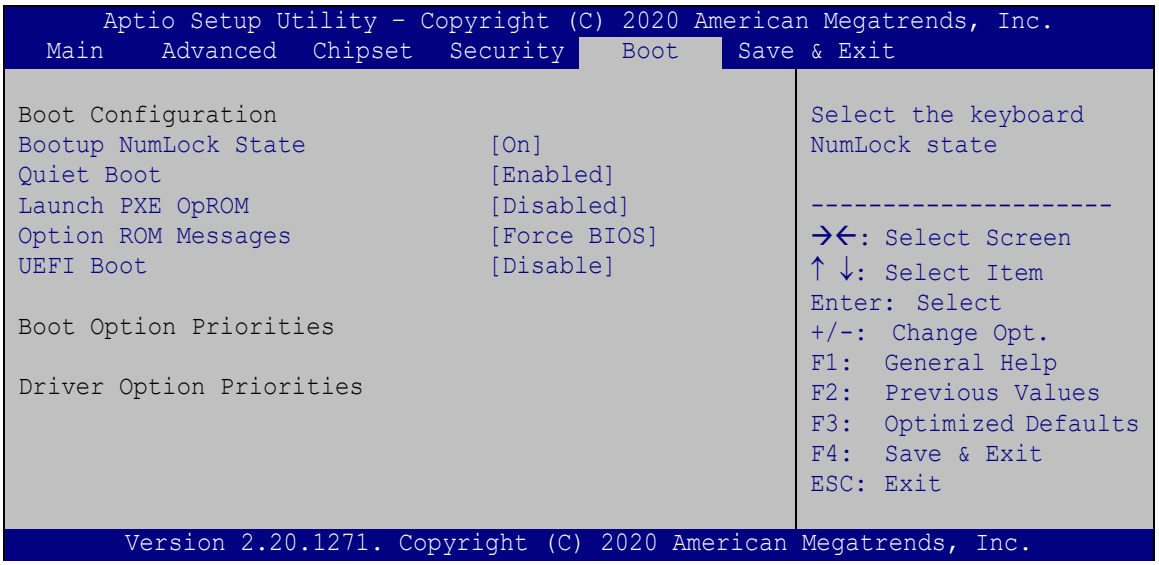
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.6 Boot

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



BIOS Menu 27: Boot

➔ **Bootup NumLock State [On]**

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

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

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

➔ **Quiet Boot [Enabled]**

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

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

➔ **Launch PXE OpROM [Disabled]**

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

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

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

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

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

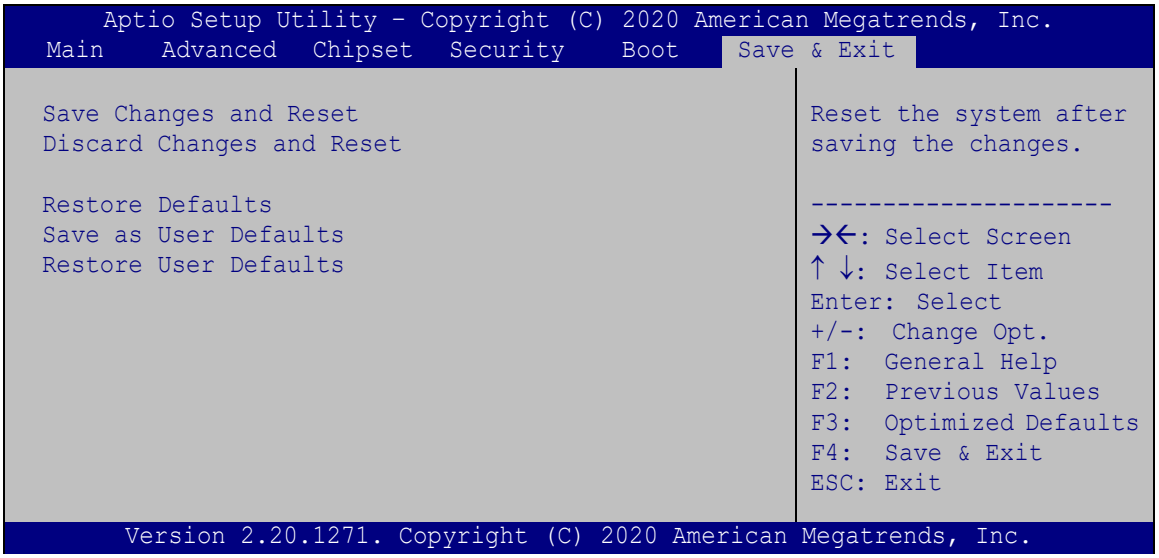
➔ **UEFI Boot [Disable]**

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

➔ **Enable**		Boot from UEFI devices is enabled.
➔ **Disable**	**DEFAULT**	Boot from UEFI devices is disabled.

5.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 28**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 28: Save & Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

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

FCC WARNING

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

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

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

Appendix

B

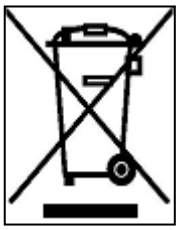
Product Disposal

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.

- Outside the European Union–If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union–The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

BIOS Options

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

Appendix

D

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

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

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

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

NOTE:

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

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

;
; ADD THE APPLICATION PROGRAM HERE
;

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

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

;
; EXIT ;
```

Appendix

E

Error Beep Code

E.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

E.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

NOTE:

If you have any question, please contact IEI for further assistance.

Appendix

F

Hazardous Materials Disclosure

F.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybromminated Biphenyls (PBB)	Polybromminated Diphenyl Ethers (PBDE)	Bis(2-etnyln exyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	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 Directive (EU) 2015/863.

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 Directive (EU) 2015/863.

F.2 China RoHS

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
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/T11364-2014與GB/T26572-2011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/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。