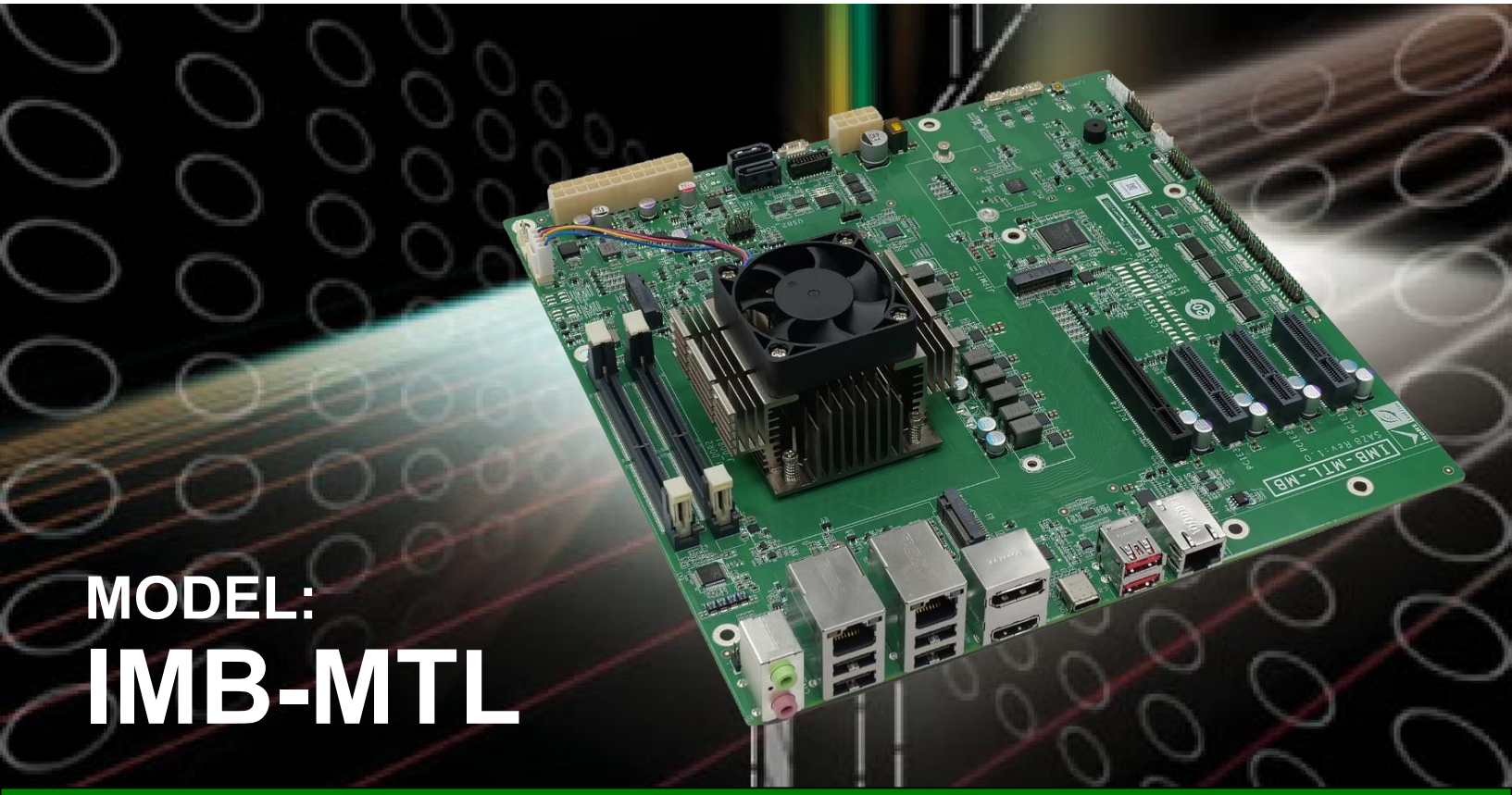
IEI Integration Corp.



MODEL:

IMB-MTL

micro-ATX motherboard supports 14th Gen. Intel® mobile Meteor Lake-H on-board processor, DDR5, 2.5GbE LAN, M.2, USB 3.2, SATA 6Gb/s, HD Audio and RoHS

User Manual

Rev. 1.00 – August 1, 2025

RoHS Lead Free

Revision

Date	Version	Changes
August 1, 2025	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.

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Chapter

1

Introduction

1.1 Introduction

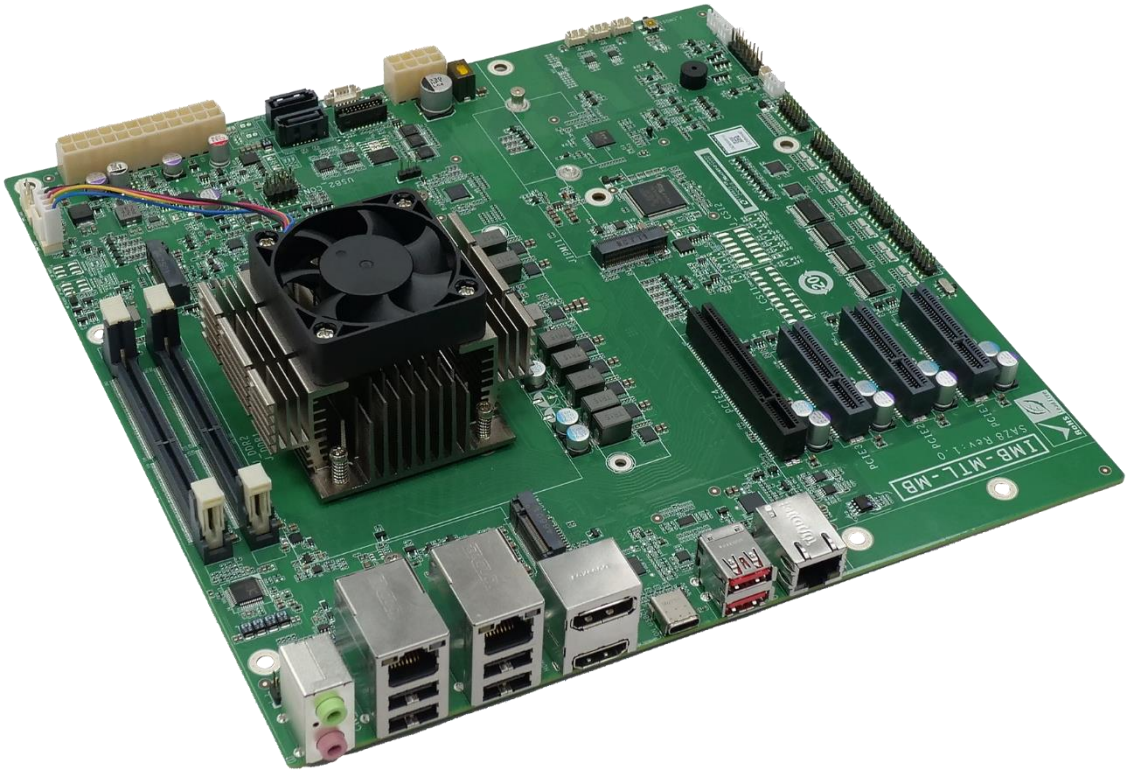


Figure 1-1: IMB-MTL

The IMB-MTL is a microATX motherboard. It accepts a 14th Gen. Intel® mobile Meteor Lake-H on-board processor and supports two 262-pin 5600MHz DDR5 SO-DIMM slots supporting up to 96 GB memory. It supports two SATA 6Gb/s drives. Moreover, the IMB-MTL includes DP, HDMI, USB4 and IEI iDPM for quad independent displays.

The IMB-MTL provides two 2.5GbE interfaces through the Intel® I225LM and I226V controllers. Expansion and I/O include three PCIe x4 slot, one PCIe x8 slots, two M.2 slots, four RS-232 ports, two RS-232/422/485, two USB 3.2 Gen 2, and six USB 2.0.

1.2 Feature

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

- 14th Gen. Intel® mobile Meteor Lake-H on-board processor
- Two 262-pin 5600 MHz DDR5 SO-DIMM, system up to 96G
- One 2.5GbE I226LM controller and one 2.5GbE I226V controller
- Quad independent display by HDMI, DP, USB4 and iDPM
- Two SATA 6Gb/s connectors support RAID 0, 1, 5, 10
- Two USB 3.2 Gen 2 ports and six USB 2.0
- One M.2 M-key slot for SSD; one M.2 B-key slot for IRIS2-2600
- 1 x PCIe Gen5 x8 slot
- 3 x PCIe Gen4 x4 slot
- 4 x RS-232 and 2 x RS-232/422/485
- TPM 2.0 security function supported by PTT
- RoHS compliant

1.3 Connectors

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

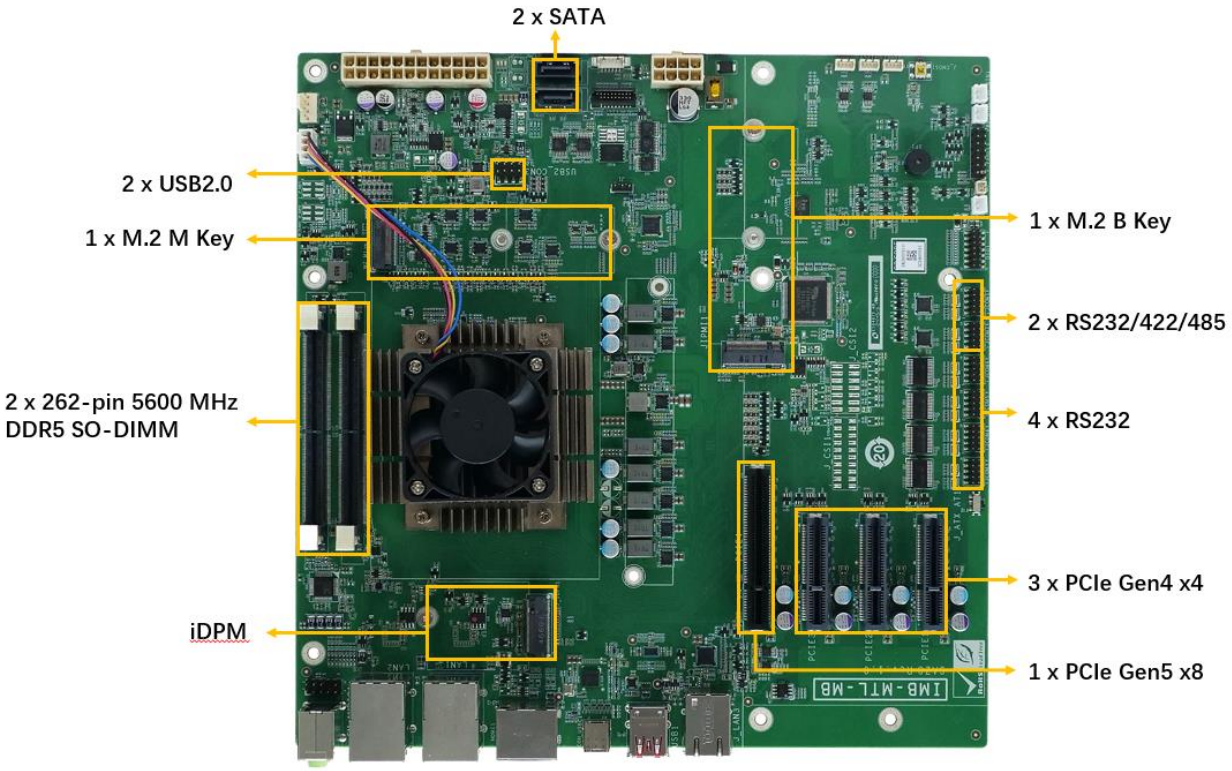


Figure 1-2: Connectors

1.4 Dimensions

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

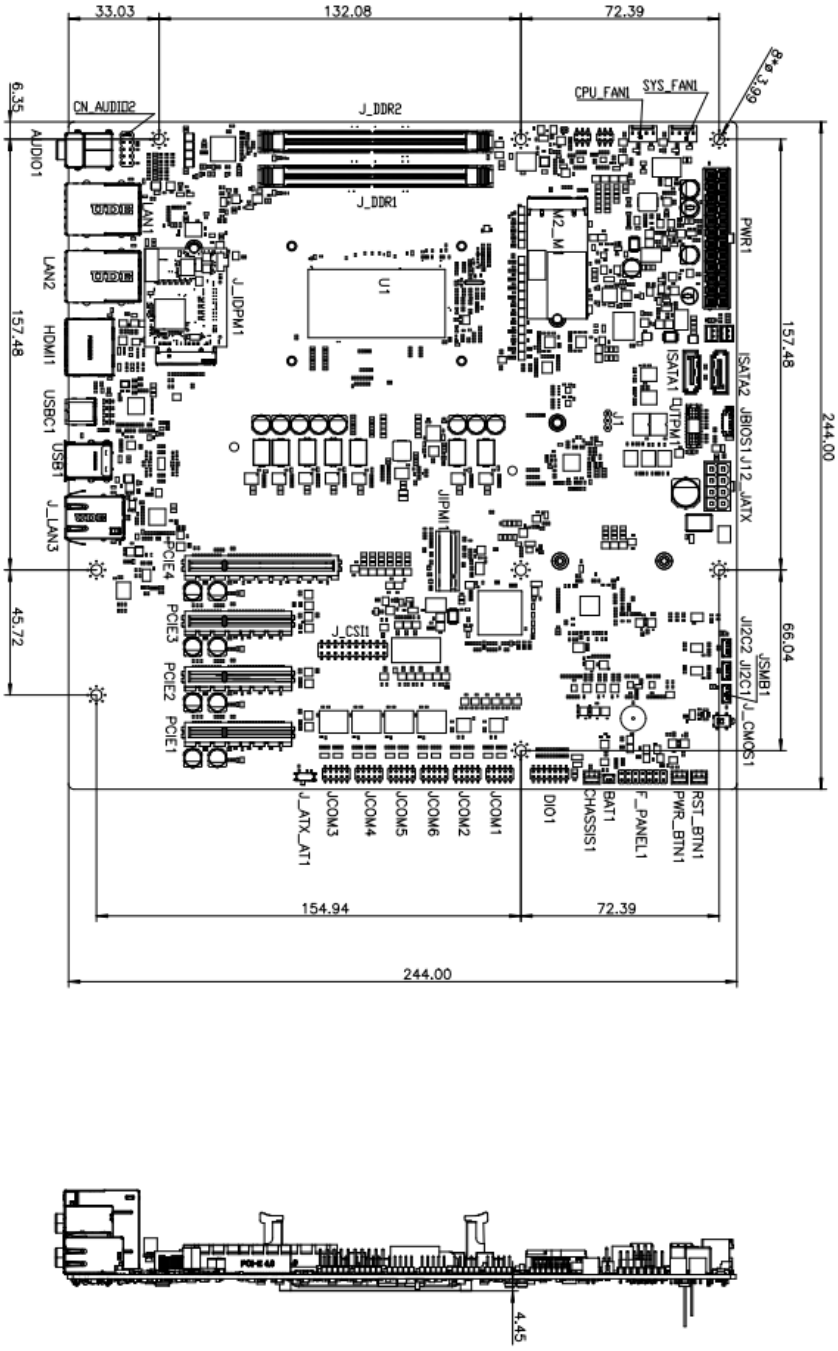


Figure 1-3: IMB-MTL Dimensions (mm)

1.5 Data Flow

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

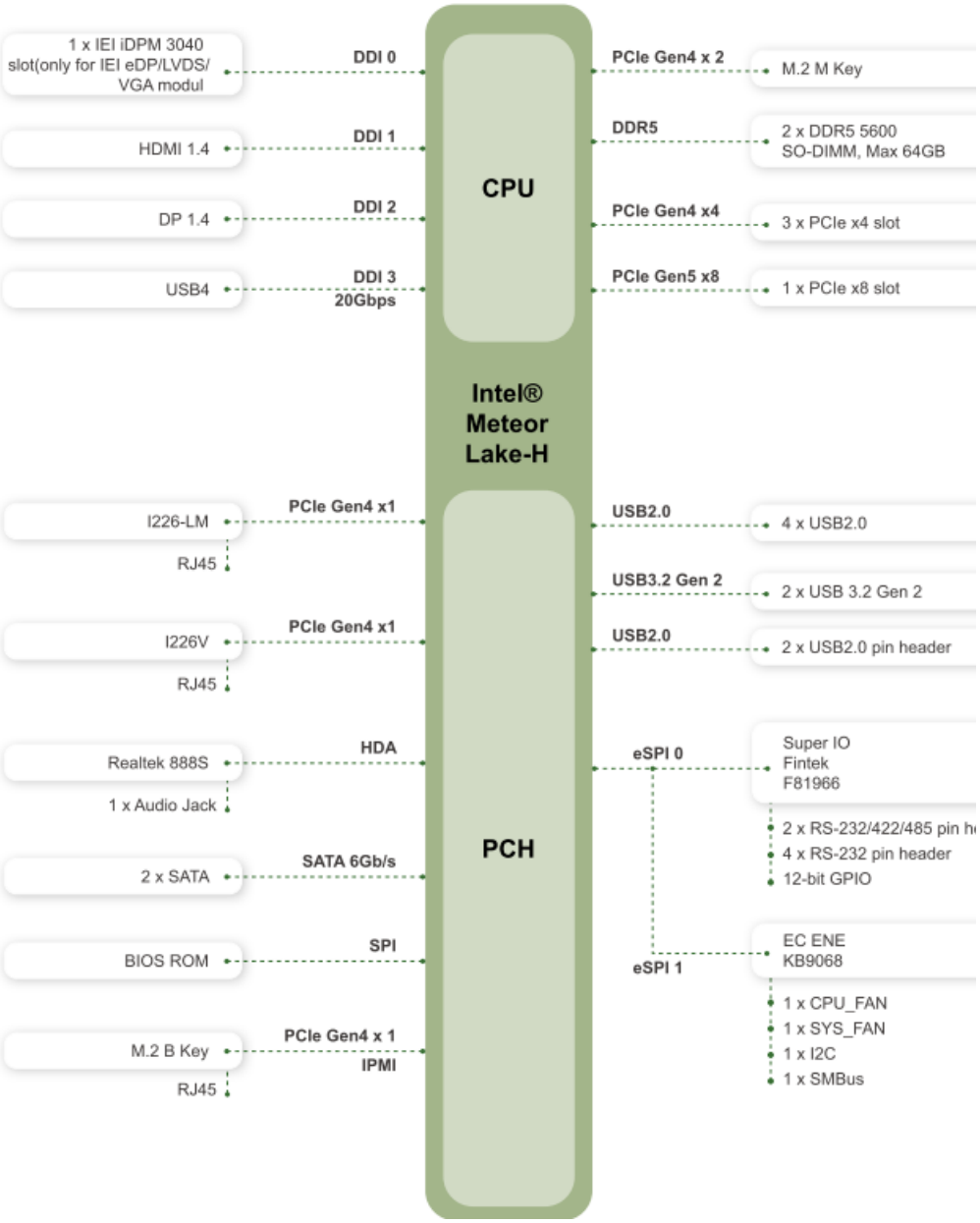


Figure 1-4: Data Flow Diagram

1.6 Technical Specifications

The IMB-MTL technical specifications are listed below.

Specification/Model	IMB-MTL
Form Factor	microATX
CPU Supported	14th Gen. Intel® mobile Meteor Lake-H on-board processor
Memory	2 x 262-pin 5600 MHz DDR5 SO-DIMM, system up to96G
Graphics Engine	Intel® New Xe LPG Graphics
Display Output	Quad independent display 1 x HDMI 1.4 (up to 4K @30Hz) 1 x DP1.4 (up to 4K @60Hz) 1 x USB4 (up to 4096 x 2160 @60Hz) 1 x IEI iDPM 3040 slot
Ethernet Controllers	LAN1: Intel® I226LM 2.5GbE controller LAN2: Intel® I226V 2.5GbE controller LAN3: For IPMI
Audio	Realtek ALC888S HD Audio codec 1 x Audio Jack (Line-out, Mic-in) 1 x Analog audio (2x5 pin)
BIOS	AMI UEFI BIOS
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansions	1 x PCIe Gen5 x8 Slot 3 x PCIe Gen4 x4 1 x M.2 B key 3080 (for IRIS2-2600) 1 x M.2 M key 2280 (PCIe Gen4 x2)
I/O Interface Connectors	
Audio Connectors	One internal audio connector (10-pin header)
Chassis Intrusion	One 2-pin header
Digital I/O	12-bit digital I/O

Specification/Model	IMB-MTL
Ethernet	Two RJ-45 GbE ports
Fan	1 x CPU fan connector (1x4 pin) 1 x System fan connector (1x4 pin)
Front Panel	One 14-pin header (power LED, HDD LED, speaker, power button, reset button)
I^2C	One 4-pin wafer connector
LAN LED	Two 2-pin headers for LAN1 LED and LAN2 LED
Serial ATA	Two SATA 6Gb/s connectors
Serial Ports	4 x RS-232 (2x5 pin, P=2.0) 2 x RS-232/422/485 (2x5 pin, P=2.0)
SMBus	One 4-pin wafer connector
USB Ports	2x USB 3.2 Gen 2 (10Gb/s) 4 x USB 2.0 2 x USB 2.0 (2x4 pin, P=2.54)
Environmental and Power Specifications	
Power Supply	AT/ATX power supply
Power Consumption	3.3V@1.19A, 5V@4.76A, 12V@5.76A, 5VSB@0.03A (Intel® Ultra 7 165H CPU with 32 GB 4800 MHz DDR5 memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-30ºC ~ 70ºC
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	244 mm x 244 mm
Weight (GW/NW)	1200g / 700g

Table 1-1: IMB-MTL Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the IMB-MTL 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 IMB-MTL was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The IMB-MTL is shipped with the following components:

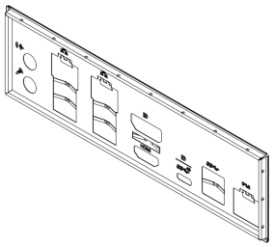
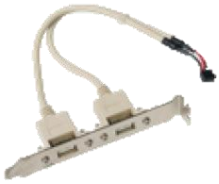
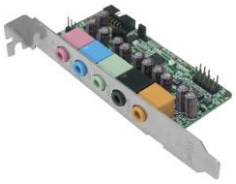
Quantity	Item and Part Number	Image
1	IMB-MTL single board computer	
2	SATA cable	
1	I/O shielding (45014-0112C0-00-HF)	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
RS-232/422/485 cable, 230mm, P=2.54 (**P/N**: 32205-000702-200-RS)	
Dual port USB cable with bracket, 300mm, P=2.54 (**P/N**: CB-USB02-RS)	
Realtek ALC888S 7.1 Channel HD Audio peripheral board (**P/N**: AC-KIT-888S-R10)	
IPMI 2.0 adapter card with AST2600 BMC chip with KVM function for iEi iRIS2 Connector IPMI 2.0 module (**P/N**: iRIS2-2600-R10)	
eDP to eDP DisplayPort converter board (for IEI iDPM connector) (**P/N**: iDPM-eDP-R10)	
eDP to LVDS DisplayPort converter board (for IEI iDPM connector) (**P/N**: iDPM-LVDS-R10)	
eDP to VGA Connetor converter board (For IEI Display Module) (**P/N**: iDPM-VGA-R10)	

Item and Part Number	Image
eDP to DP Connetor converter board (For IEI Display Module) (**P/N**: iDPM-DP-R10)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the peripheral interface connectors.

3.1.1 IMB-MTL Layout

The figures below show all the peripheral interface connectors.

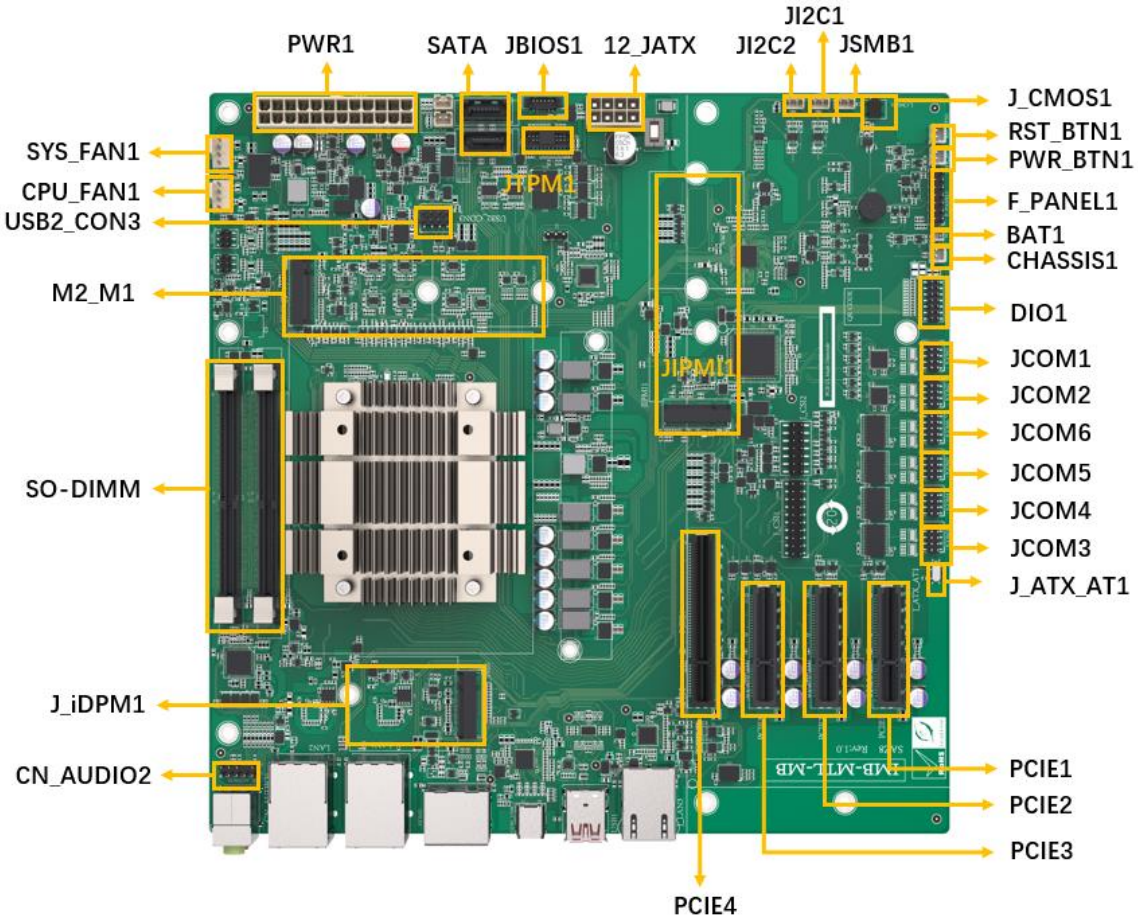


Figure 3-1: Peripheral Interface Connectors

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
AT/ATX power mode setting	3-pin switch	J_ATX_AT1
Clear CMOS jumper	Button	J_CMOS1
ATX power connector	24-pin connector	PWR1
Audio connector	10-pin header	CN_AUDIO2
ATX CPU 12V power connector	8-pin Molex power connector	12_JATX
RTC battery connector	2-pin header	BAT1
Chassis intrusion connector	2-pin header	CHASSIS1
DDR5 DIMM slots	262-pin socket	J_DDR1 J_DDR2
Digital I/O connector	14-pin header	DIO1
Fan connectors	4-pin header	CPU_FAN1, SYS_FAN1
Front panel connector	14-pin header	F_PANEL1
I2C connector	4-pin wafer	JI2C1, JI2C2
RS-232 serial port connectors	40-pin box header	JCOM3, JCOM6, JCOM4, JCOM5
RS-232/422/485 connectors	9-pin header	JCOM1, JCOM2
SATA 6Gb/s connectors	8-pin SATA connector	ISATA1, ISATA2,
SMBus connector	4-pin wafer	JSMB1
M.2 M key slots	M-key slot	M2_M1
PCIe x4 slots	PCIe Slot	PCIE1, PCIE2, PCIE3
PCIe x8 slot	PCIe Slot	PCIE4
Onboard power button	Push button	PWR_BTN1

Connector	Type	Label
Onboard Reset button	Push button	RST_BTN1
BIOS Update Connector	6-pin wafer	JBIOS1
IPMI connector	M.2 B key	JIPMI1
IEI iDPM Connector	iDPM	J_iDPM1
Internal USB 2.0 Connectors	8-pin header	USB2_CON3
TPM Connector	20-pin header	JTPM1

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
External audio jacks	Audio jacks	CN_AUDIO1
External RJ-45 connector	RJ45	J_LAN3
External 2.5GbE RJ-45 and dual USB combo connector	USB 2.0, RJ45	LAN1, LAN2
External USB 3.2 connector	USB 3.2	USB1
External USB4 connector	USB4	CON_USBC1
External HDMI and DP combo connector	HDMI, DP	HDMI1

Table 3-2: Rear Panel Connectors

3.3 Internal Peripheral Connectors

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

3.3.1 Power Source Connector

CN Label: **12_JATX**

CN Type: 8-pin Molex power connector, p=4.2mm

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

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

This connector provides power to the CPU.

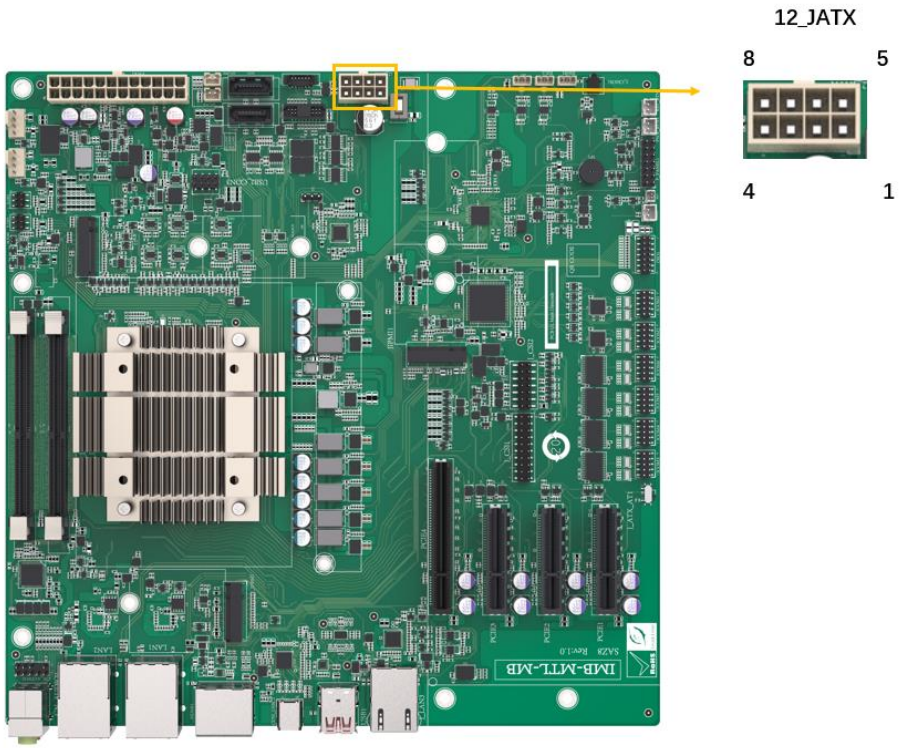


Figure 3-2: Power Source Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
4	GND	8	+12V

Table 3-3: Power Source Connector Pinouts

3.3.2 ATX Power Connector

CN Label: **PWR1**

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

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

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

The ATX power connector connects to an ATX power supply.

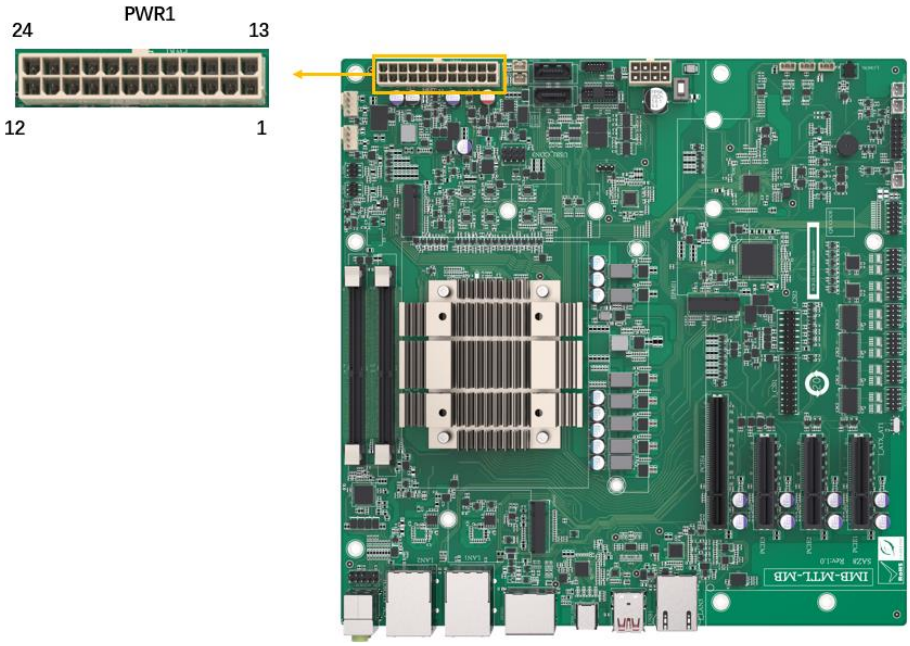


Figure 3-3: ATX Power Connector Location

Pin	Description	Pin	Description
1	+V3P3S	13	+V3P3S
2	+V3P3S	14	-12VS
3	GND	15	GND
4	+V5S	16	PS_ON

Pin	Description	Pin	Description
5	GND	17	GND
6	+V5S	18	GND
7	GND	19	GND
8	PWRGD_PS	20	
9	+5VDSW	21	+V5S
10	+12VS	22	+V5S
11	+12VS	23	+V5S
12	+V3P3S	24	GND

Table 3-4: ATX Power Connector Pinouts

3.3.3 Battery Connector

CAUTION:

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

Dispose of used batteries according to instructions and local regulations.

NOTE:

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

CN Label: **BAT1**

CN Type: 2-pin header

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

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

A system battery is placed in the battery holder. The battery provides power to the system clock to retain the time when power is turned off.

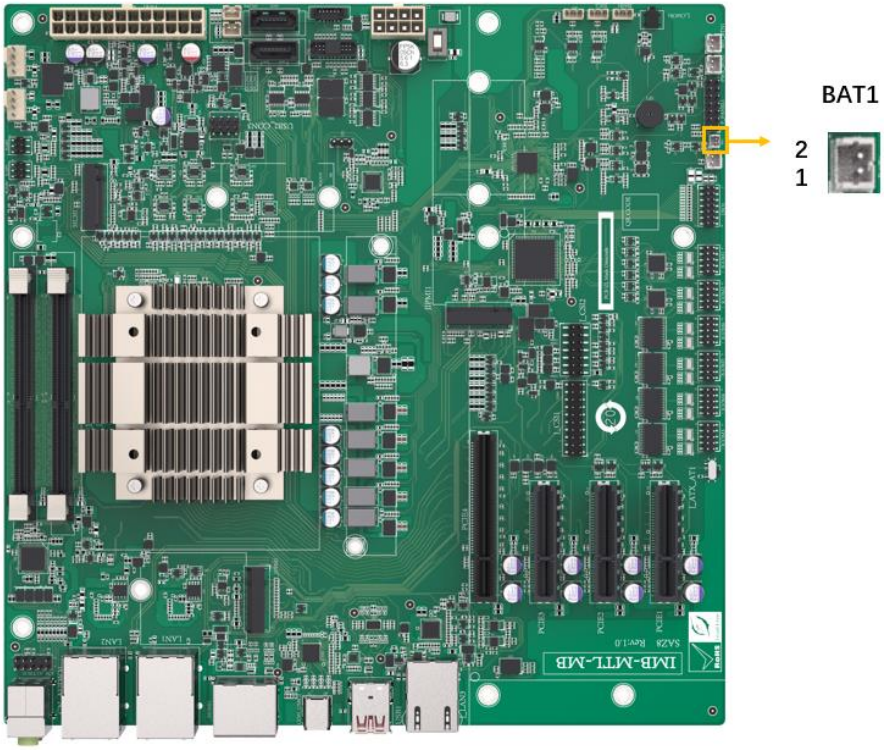


Figure 3-4: Battery Connector Location

Pin	Description	Pin	Description
1	VBATT	2	GND

Table 3-5: Battery Connector Pinouts

3.3.4 Chassis Intrusion Connector

CN Label: **CHASSIS1**

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

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

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

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

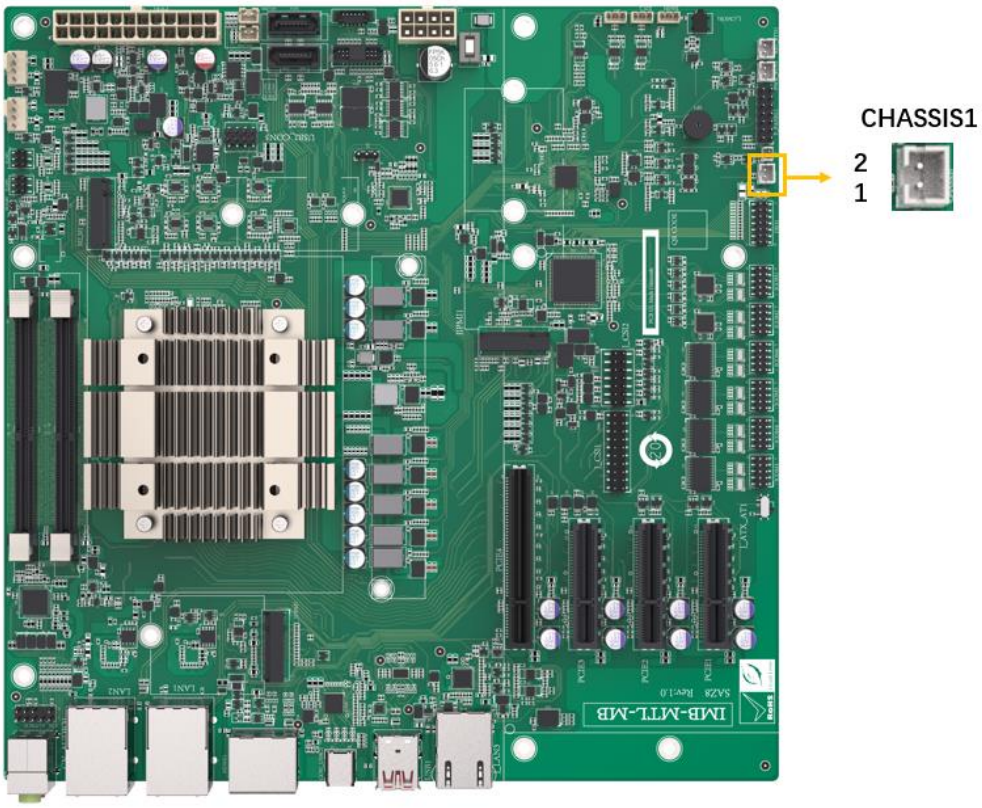


Figure 3-5: Chassis Intrusion Connector Location

Pin	Description	Pin	Description
1	CASEOPEN_N	2	GND

Table 3-6: Chassis Intrusion Connector Pinouts

3.3.5 AT/ATX Power Mode Setting

CN Label: **J_ATX_AT1**

CN Type: 3-pin switch

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

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

The AT/ATX power mode selection is made through the AT/ATX power mode switch.

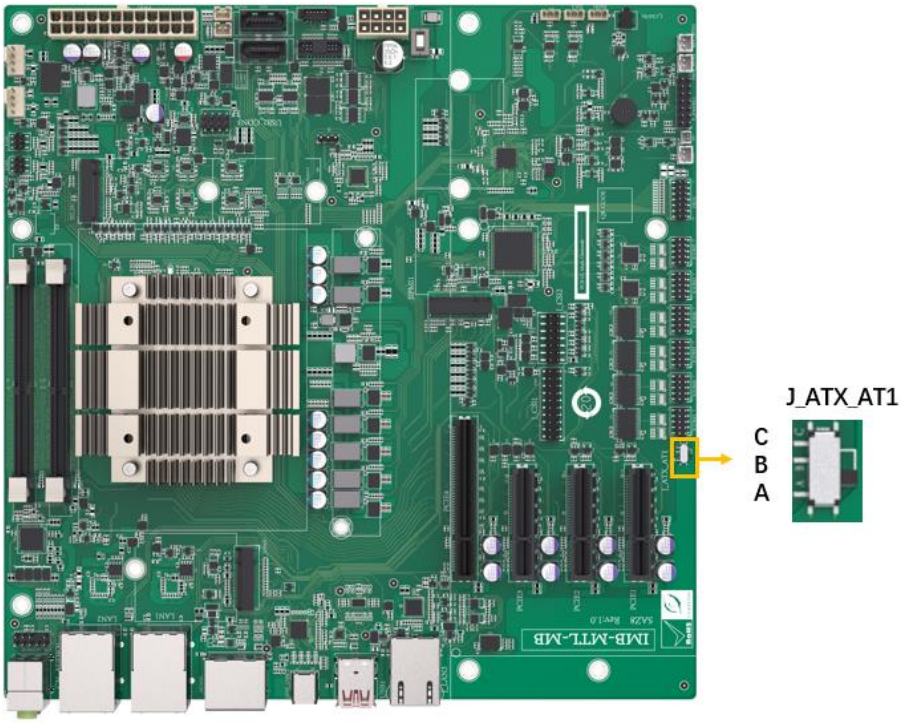


Figure 3-6: AT/ATX Power Mode Switch Locations

Pin	Description	Pin	Description
Short A - B	ATX Power Mode (default)	Short B - C	AT Power Mode

Table 3-7: AT/ATX Power Mode Switch Settings

3.3.6 Audio connector

CN Label: **CN_AUDIO2**

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

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

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

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

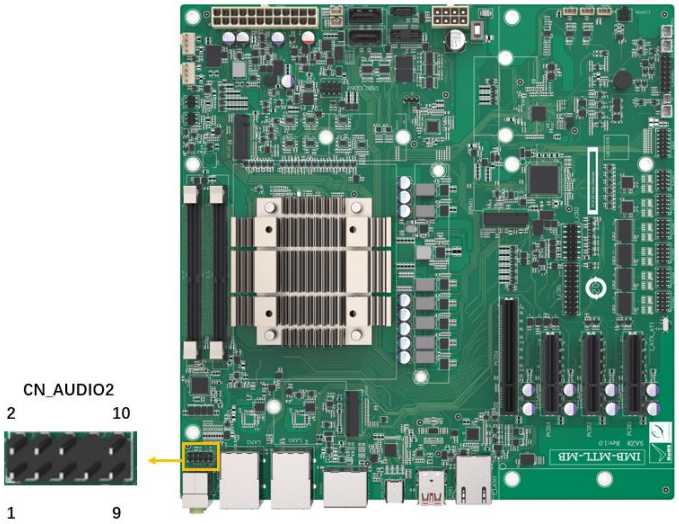


Figure 3-7: Audio connector Location

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	LLINE2-L	10	LINE2-JD

Table 3-8: Audio connector Pinouts

3.3.7 Digital I/O Connector

CN Label: **DIO1**

CN Type: 14-pin header, p=2.0 mm

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

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

The Digital I/O connector provides programmable input and output for external devices.

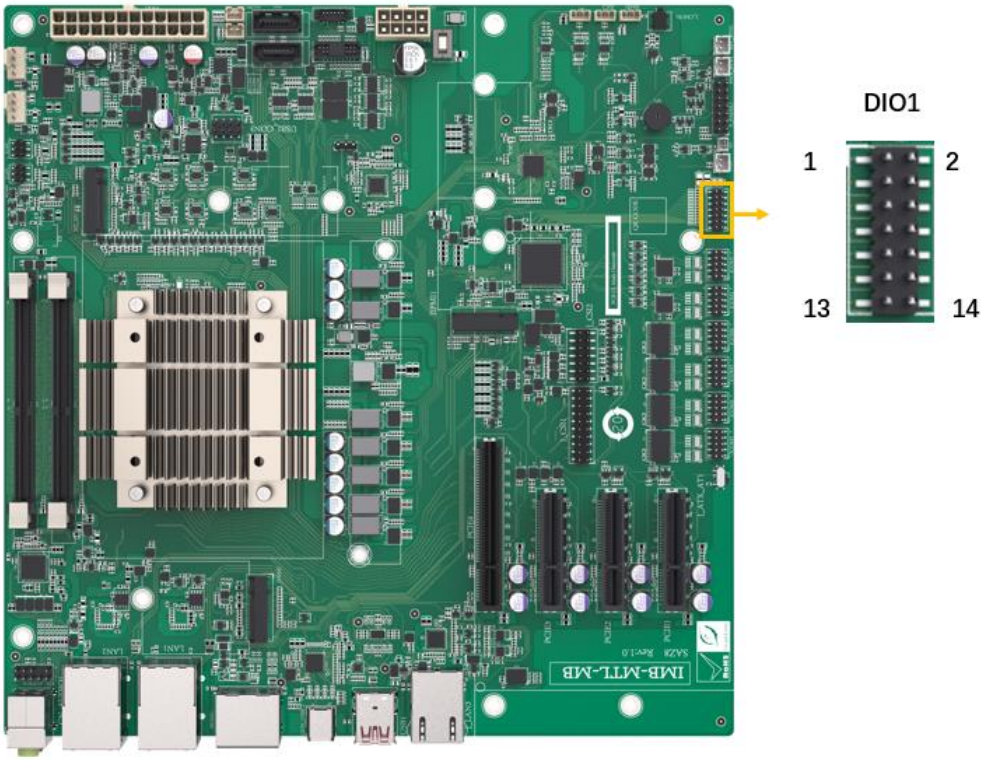


Figure 3-8: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+5V_RUN_DIO
3	Output 5	4	Output 4
5	Output 3	6	Output 2
7	Output 1	8	Output 0
9	Input 5	10	Input 4
11	Input 3	12	Input 2

Pin	Description	Pin	Description
13	Input 1	14	Input 0

Table 3-9: Digital I/O Connector Pinouts

3.3.8 Clear CMOS Button

CN Label: **J_CMOS1**

CN Type: Button

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

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

The J_CMOS1 is used to Clear CMOS Setup.

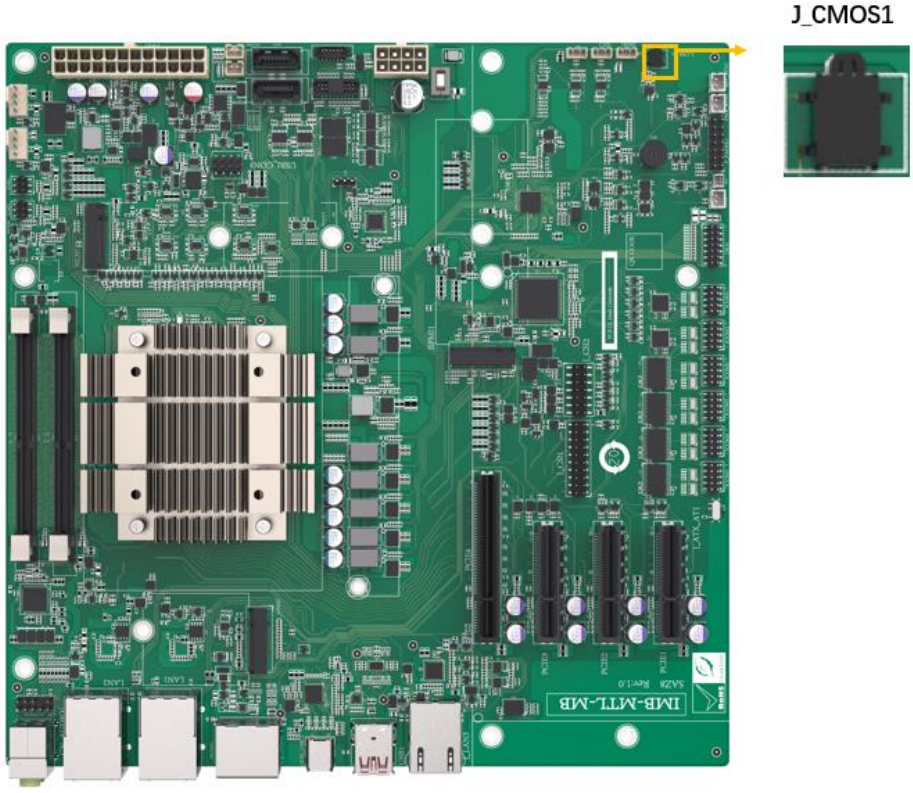


Figure 3-9: Clear CMOS Jumper Location

Pin	Description
NC	Keep CMOS Setup (Normal Operation)
Press	Clear CMOS Setup

Table 3-10: Clear CMOS Jumper Pinouts

3.3.9 Fan Connector (CPU)

CN Label: **CPU_FAN1**

CN Type: 4-pin header, p=2.54 mm

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

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

The fan connector attaches to a CPU cooling fan.

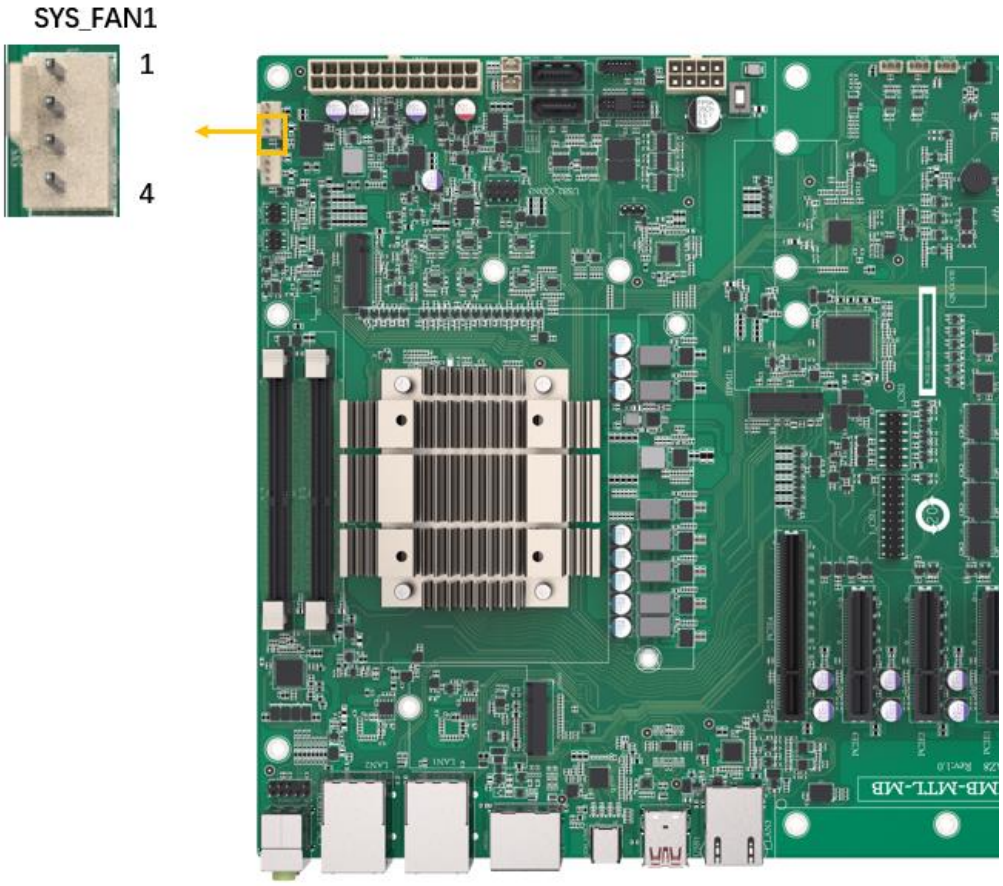


Figure 3-10: CPU Fan Connector Location

Pin	Description	Pin	Description
1	GND	2	+12V
3	FANIO	4	PWM (+5V)

Table 3-11: CPU Fan Connector Pinouts

3.3.10 Fan Connectors (System)

CN Label: **SYS_FAN1**

CN Type: 4-pin header, p=2.54 mm

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

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

Fan connector attaches to a system cooling fan. The fan connector provides smart fan function.

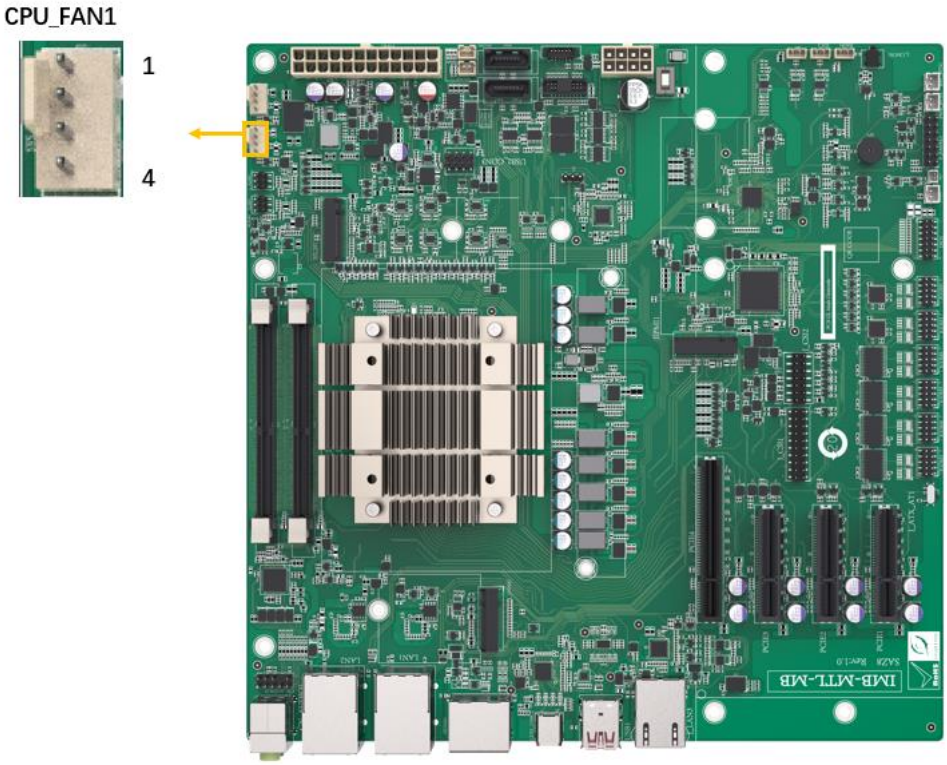


Figure 3-11: System Fan Connector Locations

Pin	Description	Pin	Description
1	GND	2	+12V
3	FANIO	4	PWM (+5V)

Table 3-12: System Fan Connector Pinouts

3.3.11 Front Panel Connector

CN Label: **F_PANEL1**

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

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

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

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

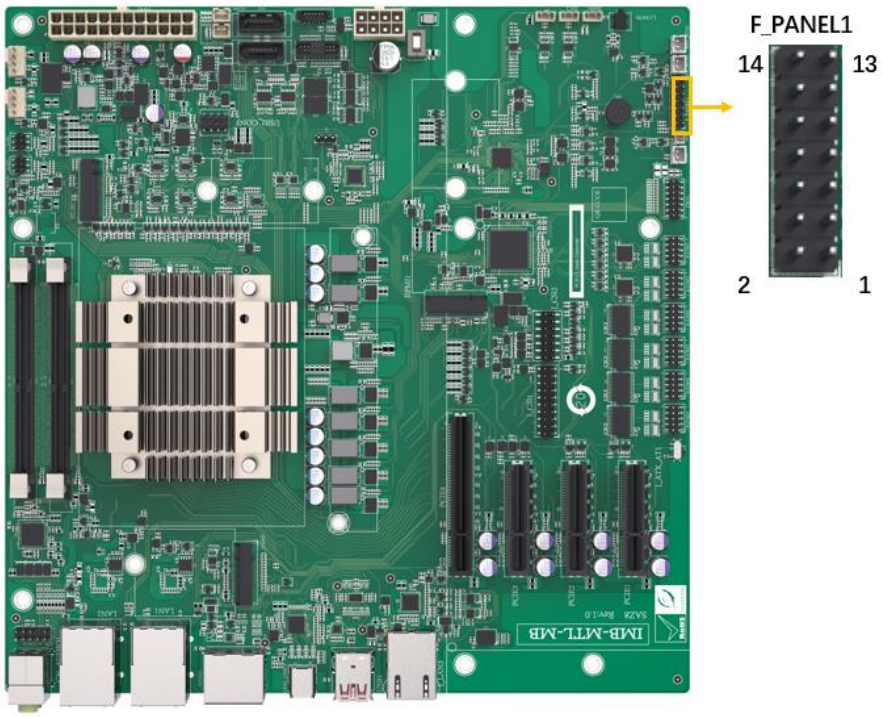


Figure 3-12: Front Panel Connector Location

Function	Pin	Description	Pin	Description	
PWR LED	1	PWR_LED+	2	SPKR+	SPKR
	3	NC	4	NC	
	5	PWR_LED-	6	NC	
PWR BTN	7	PWR_BTN+	8	SPKR-	
	9	PWR_BTN-	10	NC	

HDD LED	11	HDD_LED+	12	Reset+	RESET
	13	HDD_LED-	14	Reset-	

Table 3-13: Front Panel Connector Pinouts

3.3.12 I²C Connector

CN Label: **J_I2C1, JI2C2**

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

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

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

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

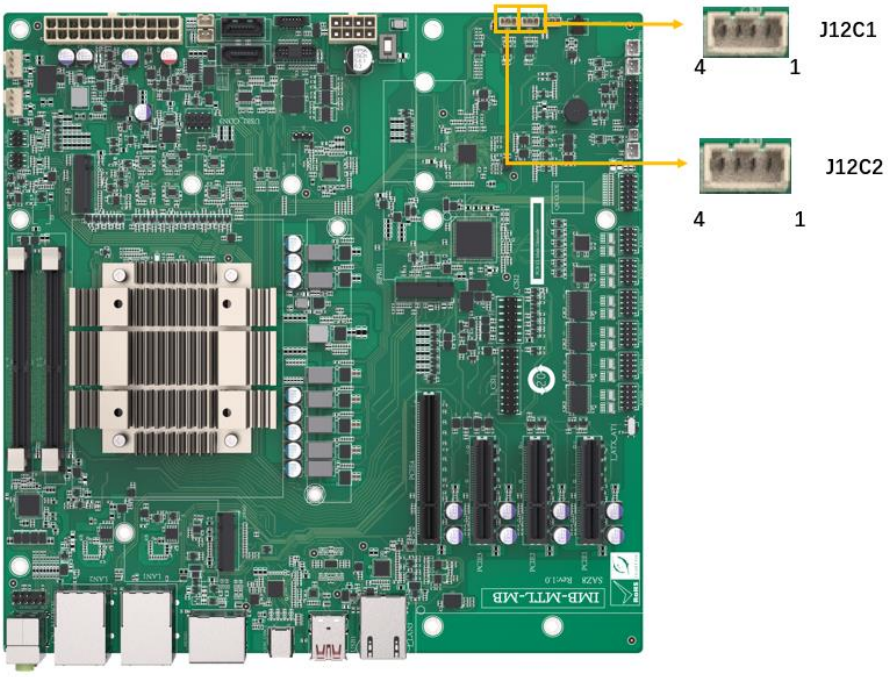


Figure 3-13: I²C Connector Location

Pin	Description	Pin	Description
1	GND	3	I2C_CLK
2	I2C_DATA	4	+5V

Table 3-14: I²C Connector Pinouts

3.3.13 SMBus Connector

CN Label: **J_SMB1**

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

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

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

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

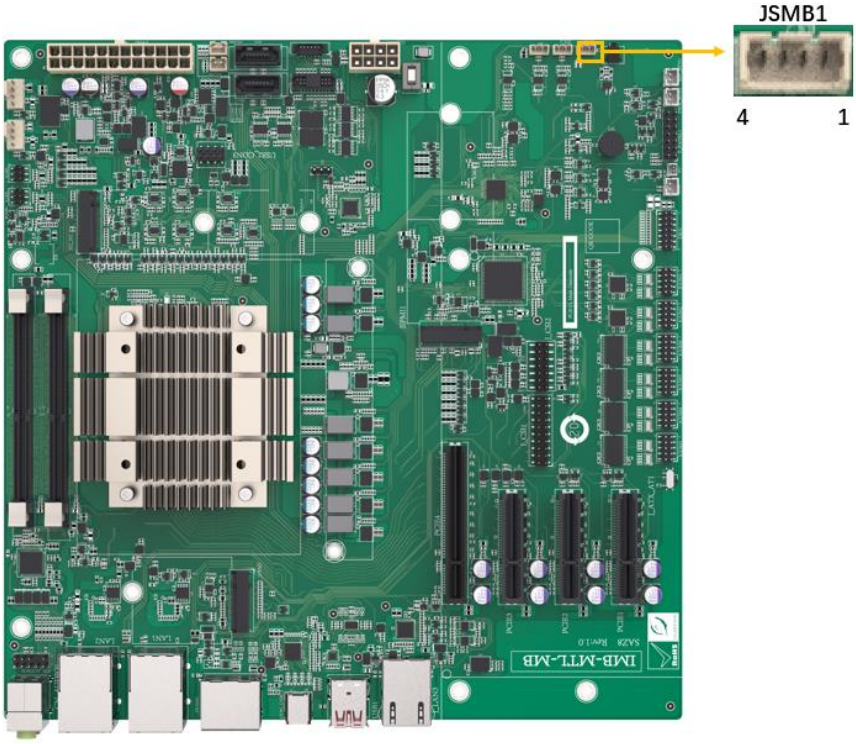


Figure 3-14: SMBus Connector Location

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

Table 3-15: SMBus Connector Pinouts

3.3.14 M.2 M-key Slot

CN Label: **M2_M1**

CN Type: M-key slot

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

The M.2 2242/2280 slot is keyed in the M position.

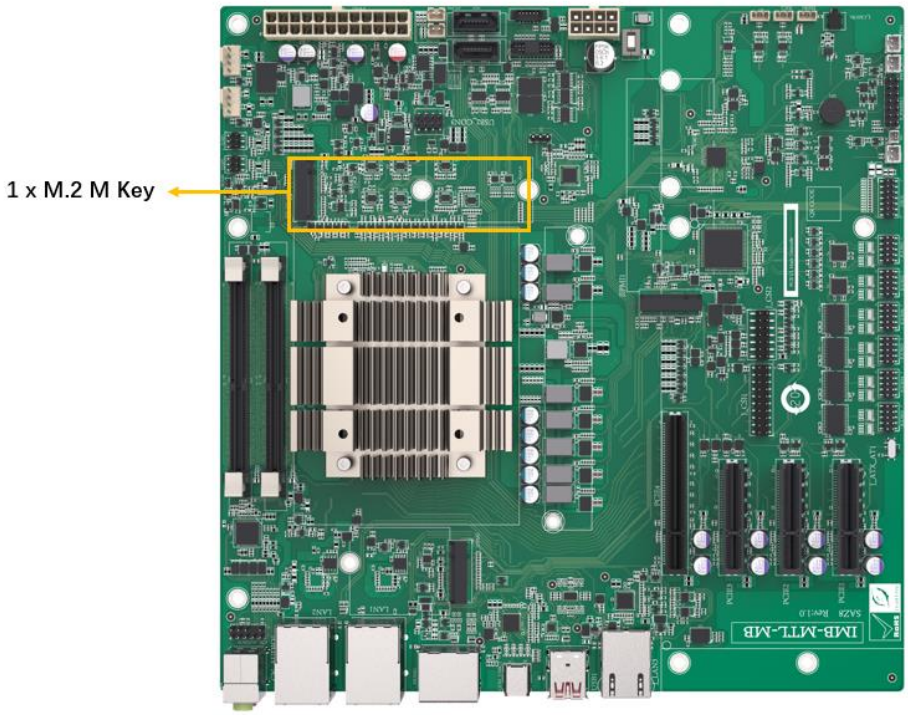


Figure 3-15: M.2 M-key Slot Location

3.3.15 IPMI (Intelligent Platform Management Interface) slot

CN Label: **JIPMI**

CN Type: M.2 B key

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

The iPMI slot is an Intelligent Platform Management Interface.

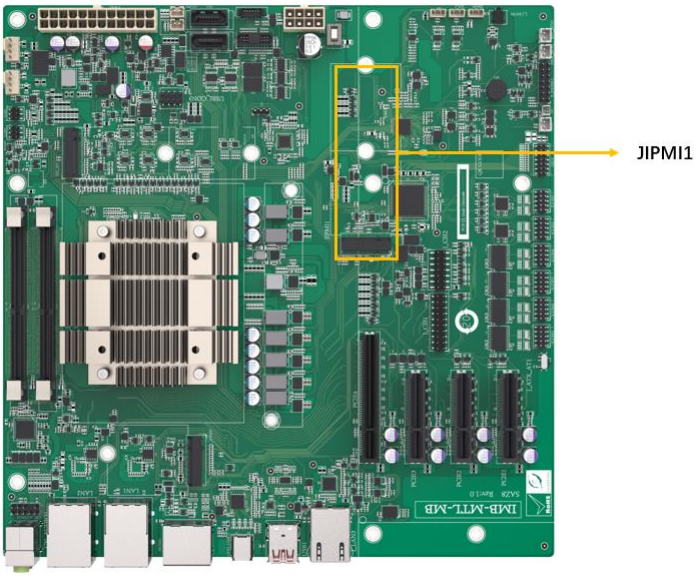


Figure 3-16: IPMI Slot Location

3.3.16 IEI iDPM Connector

CN Label: **J_iDPM1**

CN Type: iDPM

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

The product equipped with 1 x IEI iDPM 3040 slot

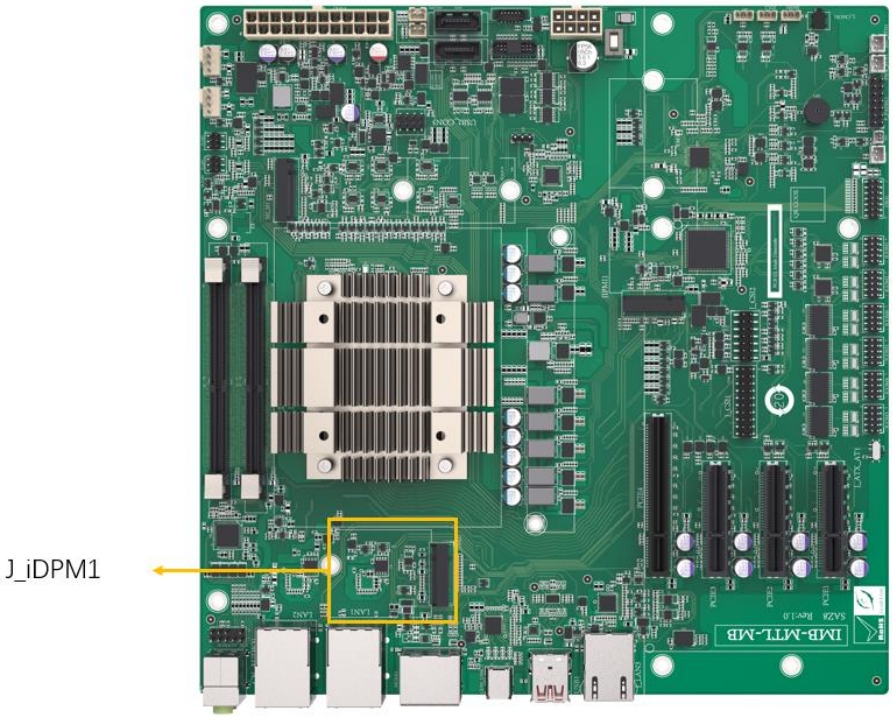


Figure 3-17: iDPM Slot Location

3.3.17 PCIe x8 Slots

CN Label: **PCIE4**

CN Type: PCIe x8 Slot

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

The PCIe x8 slot enables a PCIe x8 expansion module to be connected to the board.

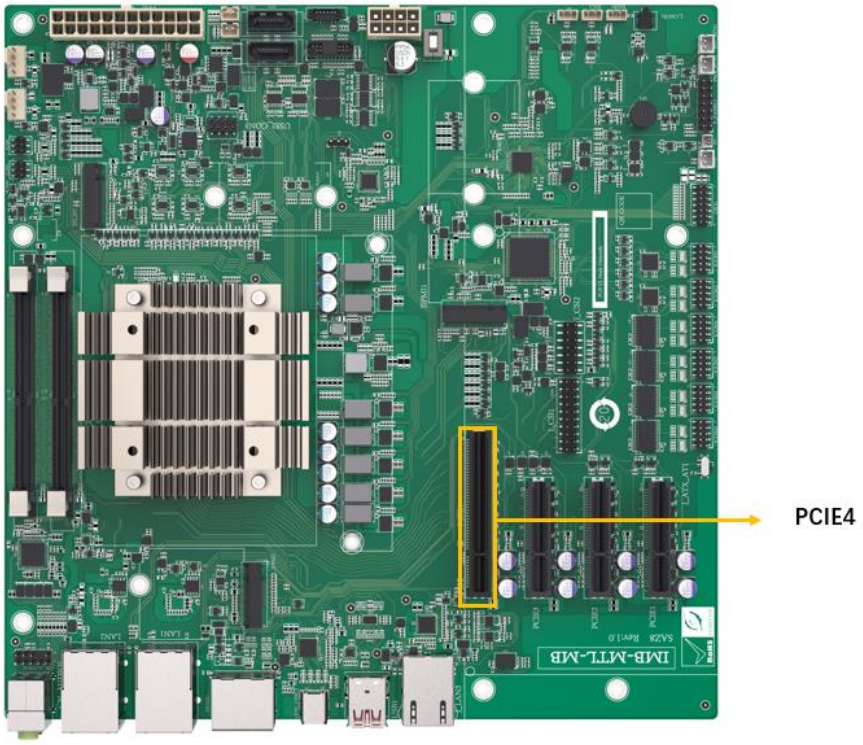


Figure 3-18: PCIe x8 Slot Locations

3.3.18 PCIe x4 Slots

CN Label: **PCIE1, PCIE2, PCIE3**

CN Type: PCIe x4 slot

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

The PCIe x4 expansion card slots are for PCIe x4 expansion cards.

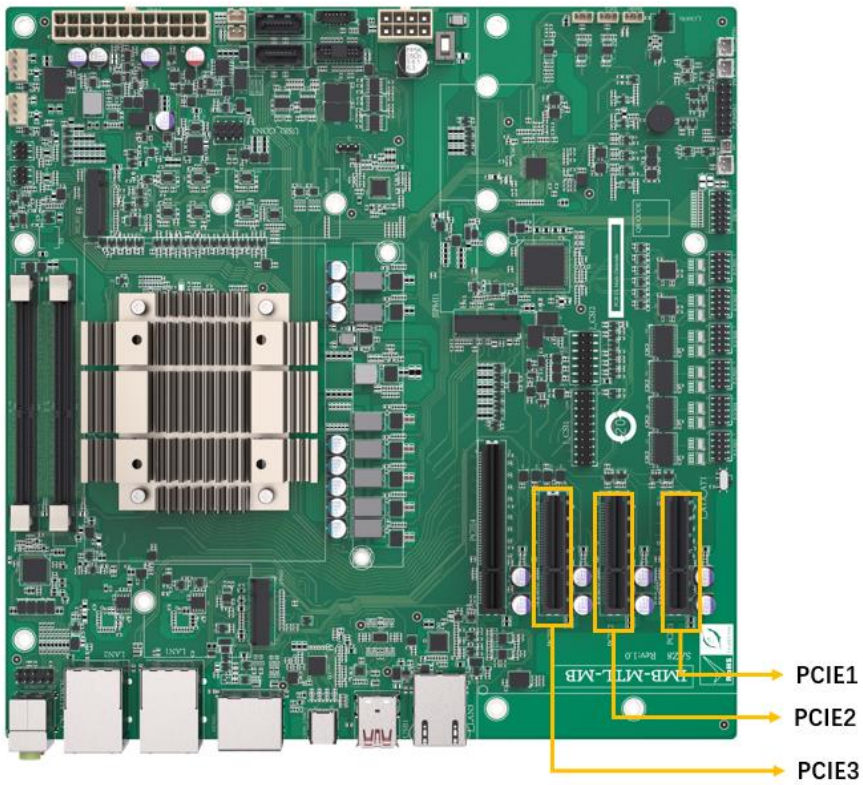


Figure 3-19: PCIe x4 Slot Locations

3.3.19 External Power Button Connector

CN Label: **PWR_BTN1**

CN Type: Push button

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

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

The connector provides connect for external power button use.

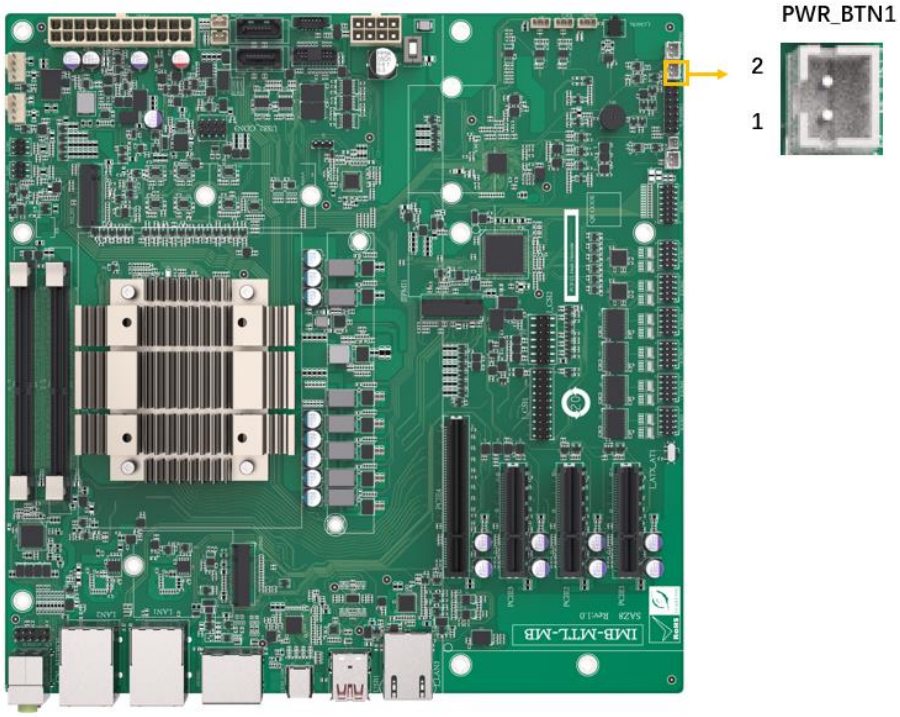


Figure 3-20: External Power Button Connector Location

Pin	Description	Pin	Description
1	PWRBTN_SW	3	GND

Table 3-16: External Power Button Connector Pinouts

3.3.20 External Reset Button Connector

CN Label: **RST_BTN1**

CN Type: Push button

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

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

The connector provides connect for external reset button use.

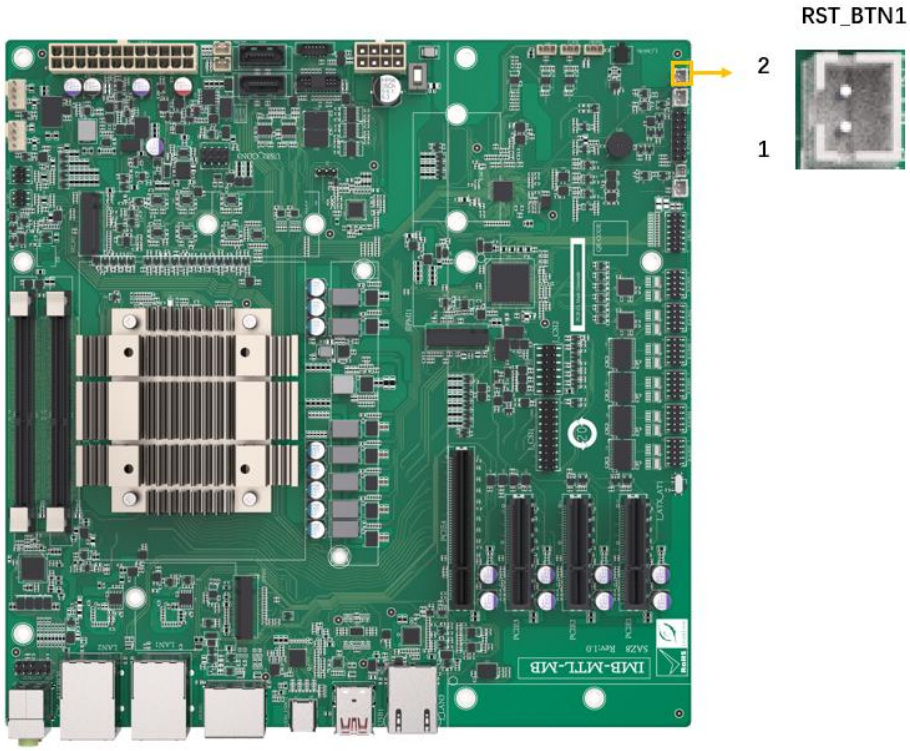


Figure 3-21: External Reset Button Connector Location

Pin	Description	Pin	Description
1	PM_SYSRST_R	3	GND

Table 3-17: External Reset Button Connector Pinouts

3.3.21 DDR5 SO-DIMM sockets

CN Label: **J_DDR1, J_DDR2**

CN Type: 262-pin socket

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

The DIMM slots are for DDR5 DIMM memory modules

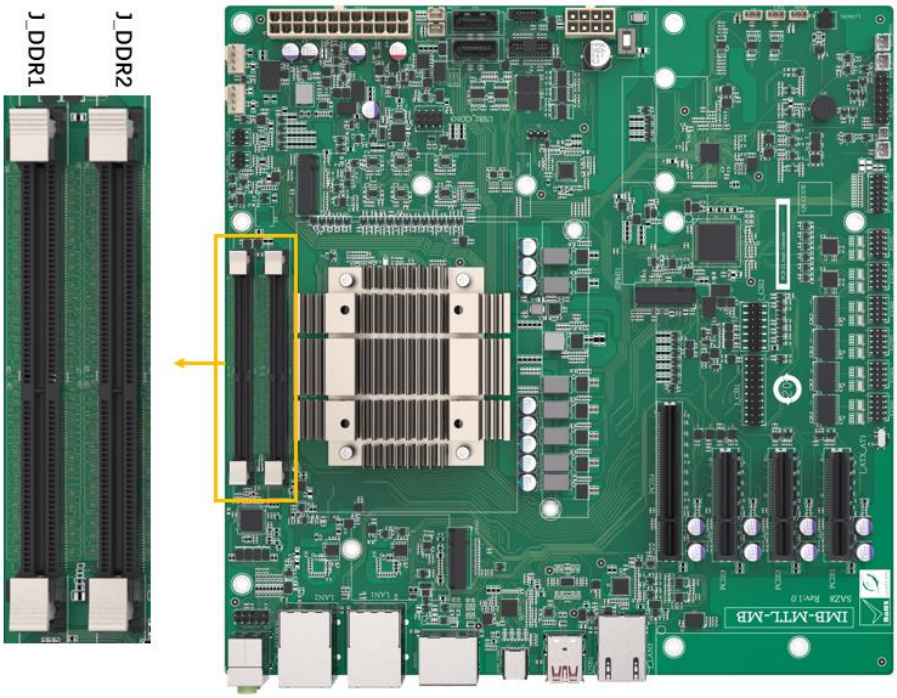


Figure 3-22: DDR5 DIMM Sockets Location

3.3.22 SATA 6Gb/s Connectors

CN Label: **ISATA1, ISATA2**

CN Type: 8-pin SATA connector

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

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

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

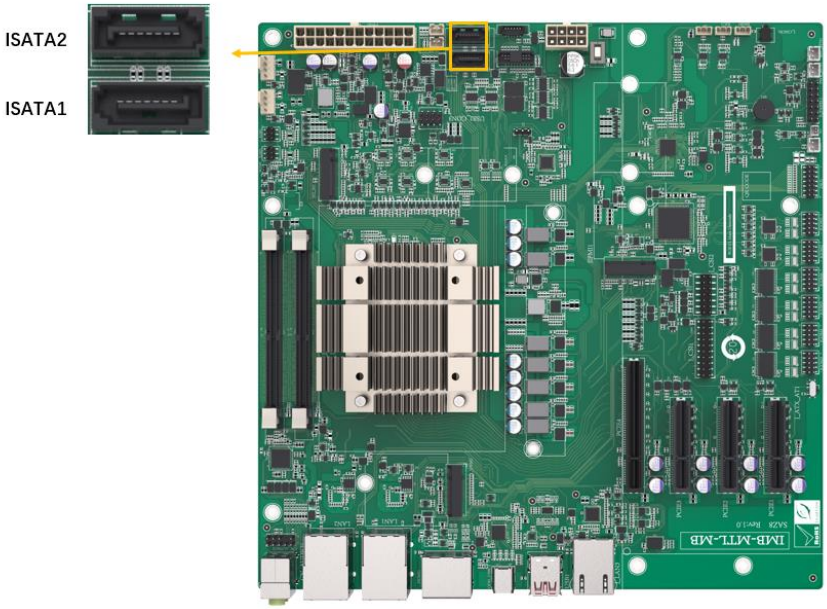


Figure 3-23: SATA 6Gb/s Connector Locations

Pin	Description	Pin	Description
1	GND	5	SATA_RX-
2	SATA_TX+	6	SATA RX+
3	SATA_TX-	7	GND
4	GND	8	N/C

Table 3-18: SATA 6Gb/s Connector Pinouts

3.3.23 RS-232 Serial Port Connectors

CN Label: **JCOM3, JCOM4, JCOM5, JCOM6**

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

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

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

Each of these connectors provides RS-232 communications.

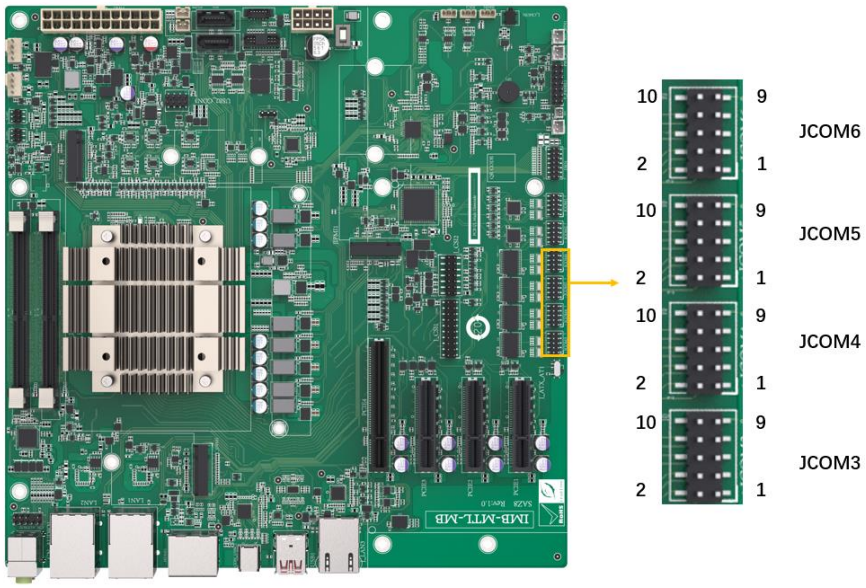


Figure 3-24: RS-232 Connector Location

Pin	Description	Pin	Description
1	DCD	2	DSR
3	NRX	4	NTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	

Table 3-19: RS-232 Connector Pinouts

3.3.24 RS-232/422/485 Serial Port Connectors

CN Label: **JCOM1, JCOM2**

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

CN Location: See **Figure 3-25**

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

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

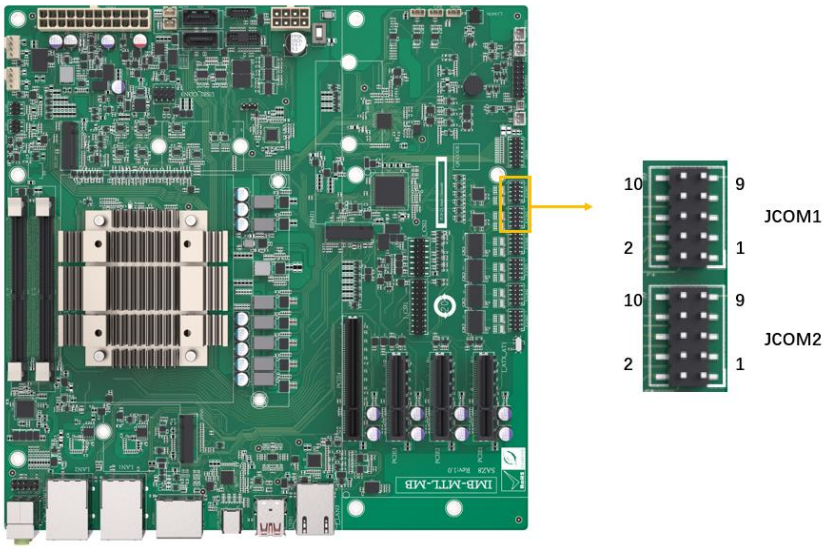


Figure 3-25: RS-232/422/485 Connector Location

Pin	Description	Pin	Description
1	DCD	6	CTS
2	DSR	7	DTR
3	RX	8	RI
4	RTS	9	GND
5	TX	--	--

Table 3-20: RS-232/422/485 Connector Pinouts

3.3.25 BIOS Update Connector

CN Label: **JBIOS1**

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

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

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

The BIOS Update Connector is used to update BIOS.

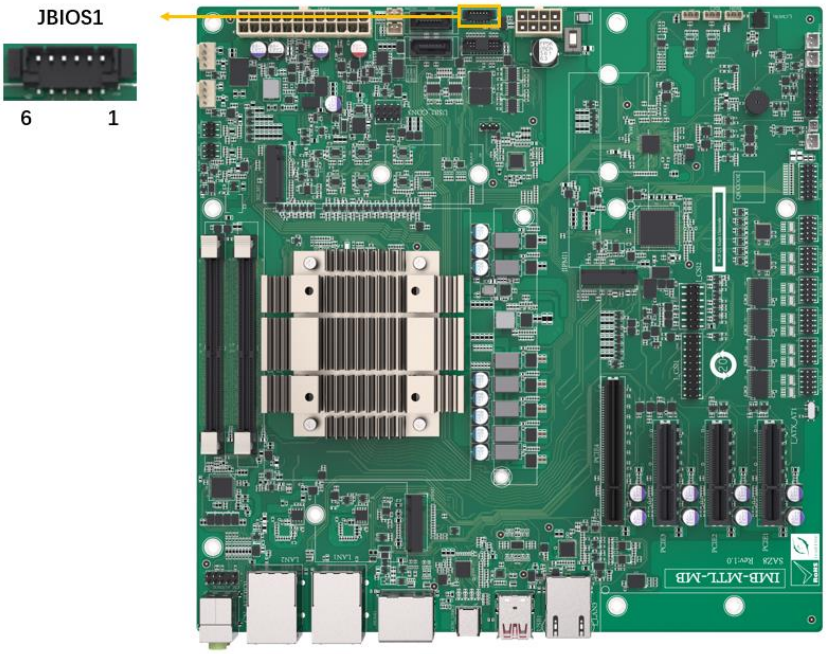


Figure 3-26: BIOS update Connectors Locations

Pin	Description	Pin	Description
1	+3.3V_SPI_CON	5	SPI_MOSI_SW
2	CS	6	GND
3	SPI_MISO_SW	G1	GND
4	SPI_CLK_SW	G2	GND

Table 3-21: BIOS update Connectors Pinouts

3.3.26 Internal USB 2.0 Connectors

CN Label: **USB2_CON3**

CN Type: 8-pin header, p=2.54 mm

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

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

The Internal USB 2.0 connectors connect to USB 2.0 devices. Each pin header provides two USB 2.0 ports.

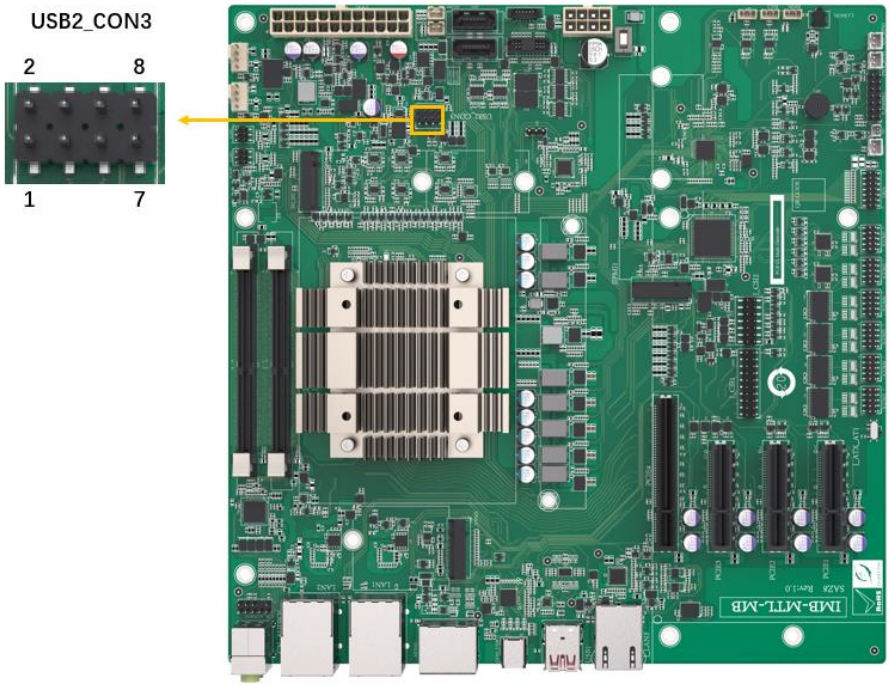


Figure 3-27: Internal USB 2.0 Connector Locations

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 3-22: Internal USB 2.0 Connector Pinouts

3.3.27 TPM Connector

CN Label: **JTPM1**

CN Type: 20-pin header, p=1.27 mm

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

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

The TPM Connector connect to a TPM module, which provides hardware-level security features.

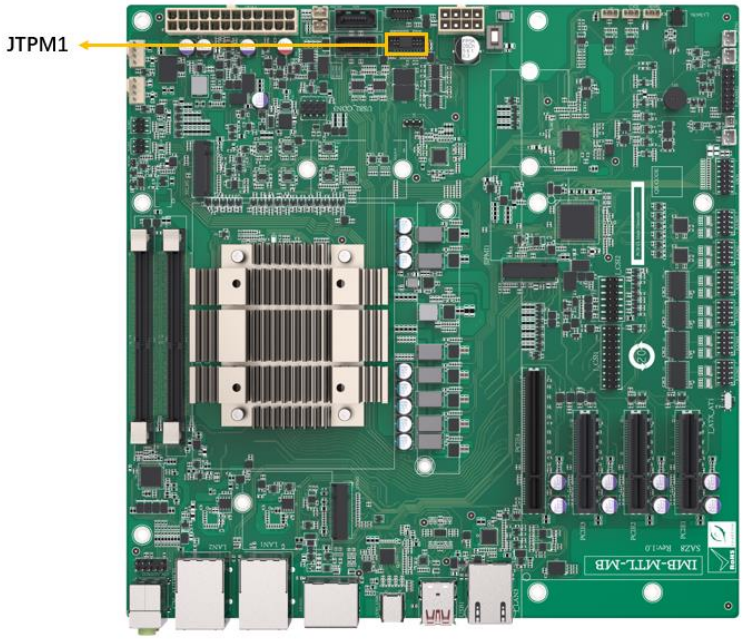


Figure 3-28: Internal USB 2.0 Connector Locations

Pin	Description	Pin	Description
2	SPI_CS0_SW_N_C	13	SPI_TPM_CS_R_N_C
3	SPI_TPM_GPIO_N_C	14	GND
4	SPI_CSI_SW_N_C	15	TPM_WP

Pin	Description	Pin	Description
5	GND	16	INT_SERIRQ_C
6	+V3P3A_TPM_PIN6	17	SPI_TPM_INT_C
7	SPI_CLK_TPM_C	18	+V3P3A_TPM_PIN18
8	SPI_DQ2_TPM_C	19	BUF_PLT_RST_TPM
9	SPI_DQ3_TPM_C	20	+V3P3A_TPM_PIN20
10	SPI_MISO_TPM_C	N1	
11	SPI_TPM_HOLD_R_N	N2	
12	SPI_MOSI_TPM_C		

Table 3-23: TPM Connector Pinouts

3.4 External Peripheral Interface Connector Panel

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

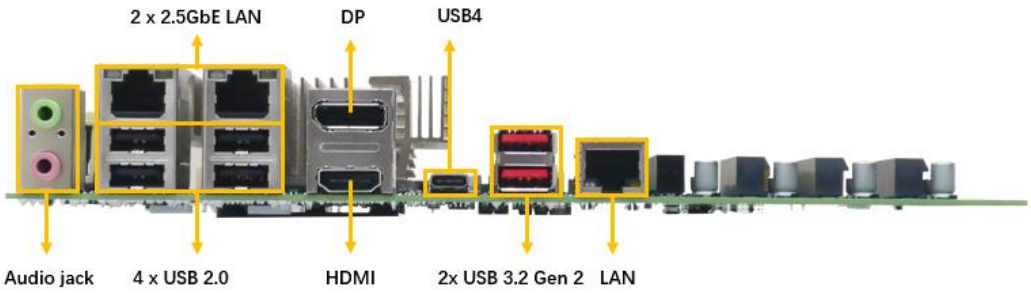


Figure 3-29: External Peripheral Interface Connector

3.4.1 External USB4 connector

CN Label: **CON_USBC1**

CN Type: USB4

CN Location: See **Figure 3-30**

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

The external USB4 connectors on the IMB-MTL.

Figure 3-30: USB4 Connector

Pin	Description	Pin	Description
A1	GND	B4	+VBUS_USBC0
A2	USBC0_CN_TX0_DP	B5	CC2_CN
A3	USBC0_CN_TX0_DN	B6	USBC0_CN_TX1_DP
A4	+VBUS_USBC0	B7	USBC0_CN_TX1_DN
A5	CC1_CN	B8	SUB2_CN

Pin	Description	Pin	Description
A6	USBC0_CN_P3_DP	B9	+VBUS_USBC0
A7	USBC0_CN_P3_DN	B10	USBC0_CN_TX1_DP
A8	SUB1_CN	B11	USBC0_CN_TX1_DN
A9	+VBUS_USBC0	B12	GND
A10	USBC0_CN_RX1_DP	G1	GND
A11	USBC0_CN_RX1_DN	G2	GND
A12	GND	G3	GND
B1	GND	G4	GND
B2	USBC0_CN_TX1_DP	N1	
B3	USBC0_CN_TX1_DN	N2	

Table 3-24: USB4 Port Pinouts

3.4.2 External USB 3.2 Gen 2 connector

CN Label: **USB1**

CN Type: USB 3.2

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

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

The external USB 3.2 Gen 2 connectors on the IMB-MTL.

Figure 3-31: USB 3.2 Gen 2 Connector

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-

Pin	Description	Pin	Description
6	USB3_RX+	15	USB3_ RX+
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+

Table 3-25: USB 3.2 Port Pinouts

3.4.3 External 2.5GbE RJ-45 and dual USB 2.0 combo connector

CN Label: **LAN1, LAN2**

CN Type: USB 2.0, RJ45

CN Location: See **Figure 3-32**

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

The LAN1 and LAN2 include dual USB 2.0 and one 2.5GbE RJ-45.

Figure 3-32: USB 2.0 and RJ45 Connector

Pin	Description	Pin	Description
G1	LAN1_GND	R4	I225_MDI1_P_1
G2	LAN1_GND	R5	I225_MDI1_N_1
G3	LAN1_GND	R6	I225_MDI2_P_1
G4	LAN1_GND	R7	I225_MDI2_N_1
G5	LAN1_GND	R8	I225_MDI3_P_1
G6	LAN1_GND	R9	I225_MDI3_N_1
G7	LAN1_GND	R10	N4245357
G8	LAN1_GND	U1	VCC_USB20_A
L1	I225_SPEED_2500_N_1	U2	USB3_TX+

Pin	Description	Pin	Description
L2	I225_SPEED_1000_N_1	U3	USB2_P7_DN_R
L3	I225_LINK_ACT_N_1	U4	GND
L4	N4245567	U5	VCC_USB20_A
R1	N4245423	U6	USB2_P8_DN_R
R2	I225_MDI0_P_1	U7	USB2_P8_DP_R
R3	I225_MDI0_N_1	U8	GND

Table 3-26: USB 2.0 Port Pinouts

3.4.4 External HD Audio Connector

CN Label: **CN_AUDIO1**

CN Type: Audio jack

CN Location: See **Figure 3-33**

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

The audio jacks connect to external audio devices.

Figure 3-33: HD Audio Connector Pinouts

Pin	Description
Line-out (Green)	Connect this port to headphone or speaker
Microphone (Pink)	Connect this port to microphone

Table 3-27: HD Audio connector Pinouts

3.4.5 External HDMI and DP combo connector

CN Label: **HDMI1**

CN Type: HDMI, DP

CN Location: See **Figure 3-34, Figure 3-35**

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

The external DP connector on the IMB-MTL.

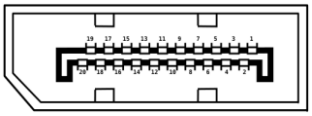


Figure 3-34: External DP Connector Pinouts

Pin	Description	Pin	Description
1	LANE0P	11	GND
2	GND	12	LANE3N
3	LANE0N	13	AUX_CTRL_DET_C
4	LANE1P	14	GND
5	GND	15	AUXP
6	LANE1N	16	GND
7	LANE2P	17	AUXN
8	GND	18	HPD
9	LANE2N	19	GND
10	LANE3P	20	+5V

Table 3-28: External DP Connector Pinouts

The external HDMI connector on the IMB-MTL.

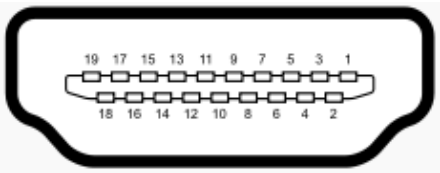


Figure 3-35: External HDMI Connector Location

Pin	Description	Pin	Description
21	HDMI_DATA2	31	GND
22	GND	32	HDMI_CLK#
23	HDMI_DATA2#	33	N/C
24	HDMI_DATA1	34	N/C
25	GND	35	HDMI_SCL
26	HDMI_DATA1#	36	HDMI_SDA
27	HDMI_DATA0	37	GND
28	GND	38	+5V
29	HDMI_DATA0#	39	HDMI_HPD
30	HDMI_CLK		

Table 3-29: External HDMI Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

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

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

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

4.2 Internal Peripheral Device Connections

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

4.2.1 SATA Drive Connection

The IMB-MTL 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 4-1**.

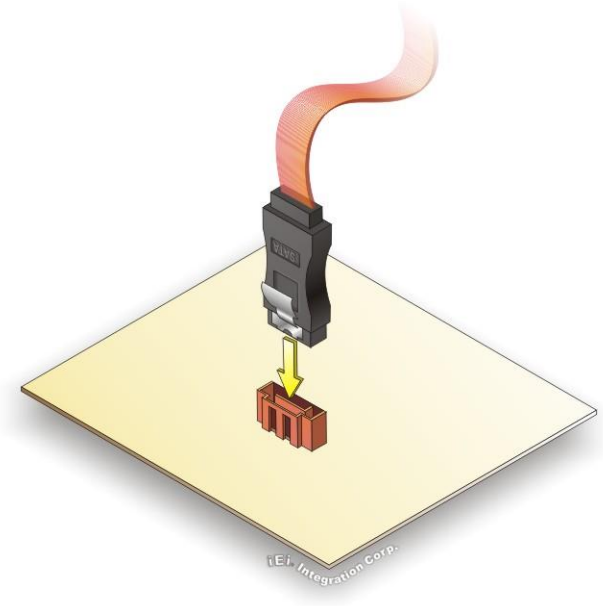


Figure 4-1: SATA Drive Cable Connection

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 4-2**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-2**.

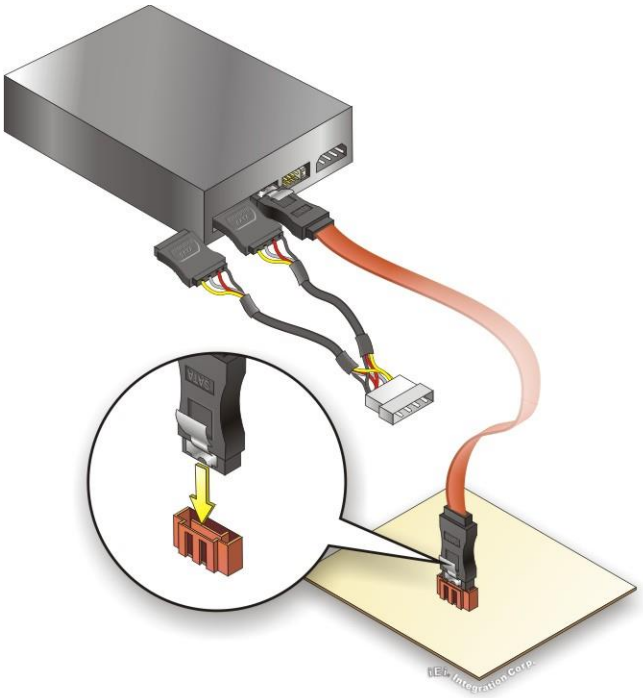


Figure 4-2: SATA Power Drive Connection

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

4.3 Installation Considerations

NOTE:

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

WARNING:

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

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

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

Before and during the installation of the IMB-MTL, **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.

4.4 DIMM Installation

To install a DIMM, please follow the steps below and refer to **Figure 4-3**.

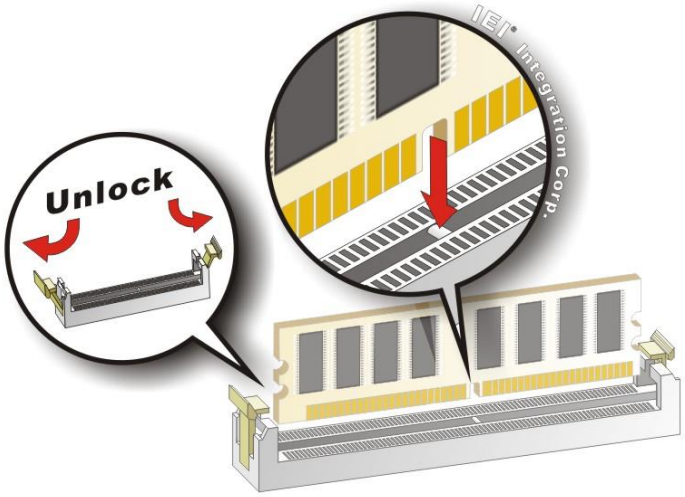


Figure 4-3: DIMM Installation

Step 1: **Open the DIMM socket handles**. Open the two handles outwards as far as they can. See **Figure 4-3**.

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 4-3**.

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

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

CAUTION:

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

4.5 M.2 Module Installation

The IMB-MTL provide two ways to install the M.2 expansion card. One is using screw, and the other is using the retainer. Please follow the steps below.

Mode One: Using screw

Step 1: Locate the M.2 module slot. See **Chapter 3**.

Step 2: Remove the retention screw secured on the motherboard.

Step 3: Line up the notch on the module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20º (**Figure 4-4)**.

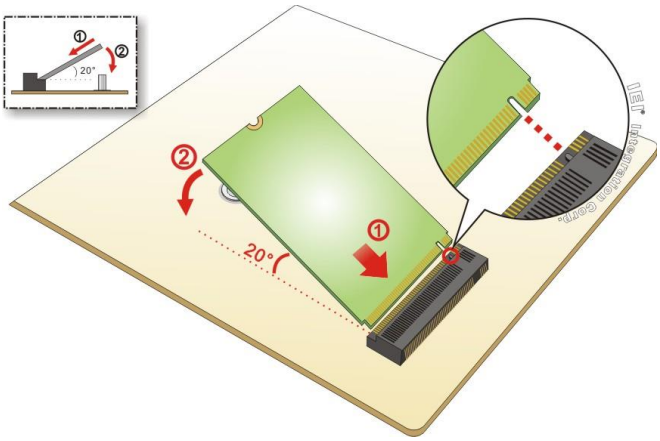


Figure 4-4: Inserting the M.2 Module into the Slot at an Angle

Step 4: Secure the M.2 module with the previously removed retention screw (**Figure 4-5**).

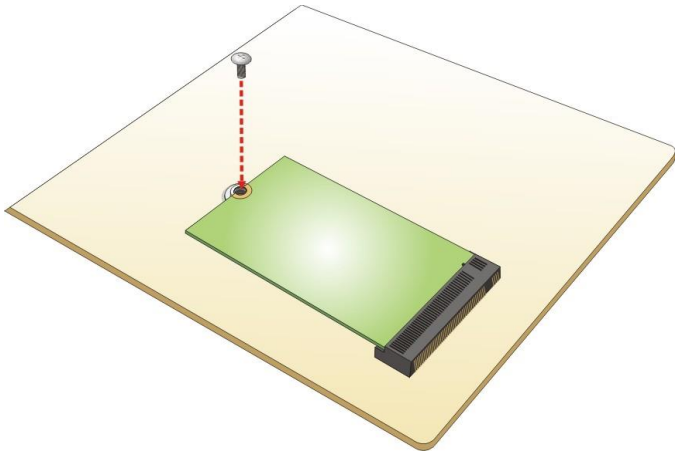


Figure 4-5: Securing the M.2 Module

Mode Two: Using the Retainer

Step 1: Press the retainer down as shown below. (See **Figure 4-6**)

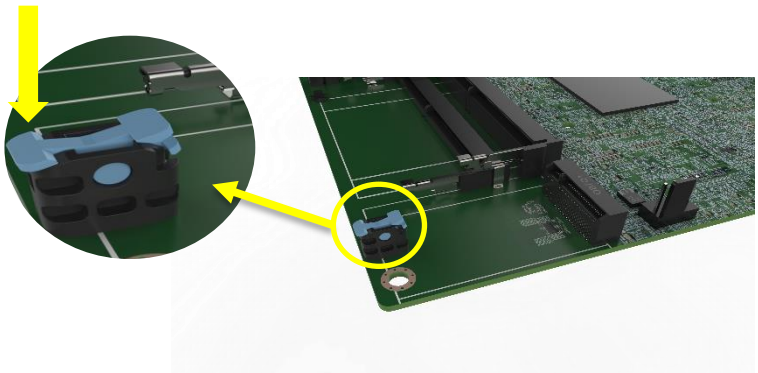


Figure 4-6: Press the Retainer

Step 2: Line up the notch on the M.2 module with the notch on the slot. Slide the M.2 module into the socket at an angle of about 20º. (See **Figure 4-4**)

Step 3: Align the notch on the end of the M.2 module with the clip of the retainer. (See **Figure 4-7**)

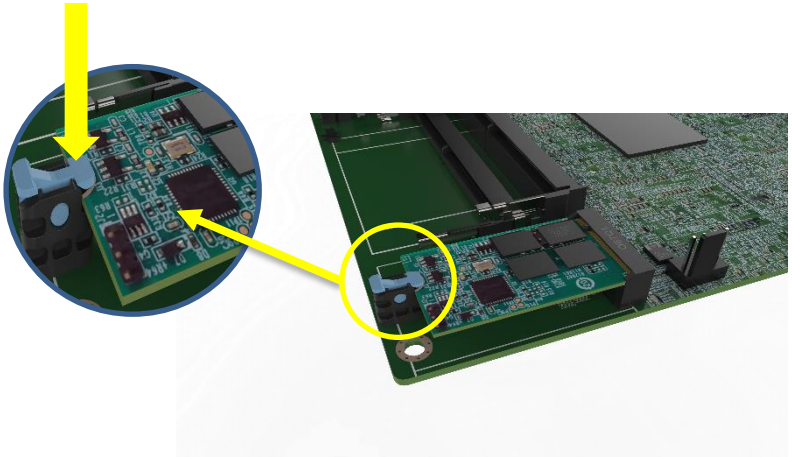


Figure 4-7: Aligning the M.2 Module with the Retainer

Step 4: Press the M.2 module down until it is secured into place by the retainer. (See **Figure 4-8**)

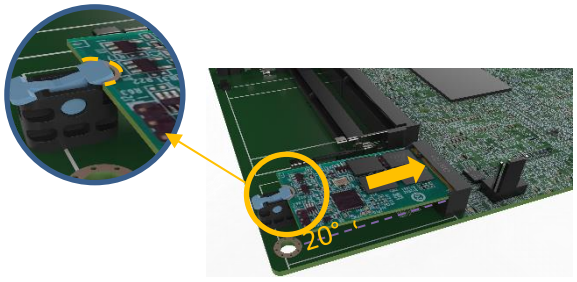


Figure 4-8: Securing the M.2 Module

Step 5: If you want to remove the M.2 module, you should press the retainer down as described in Step 1 to release the M.2 module. (See **Figure 4-6**)

4.6 Software Installation

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

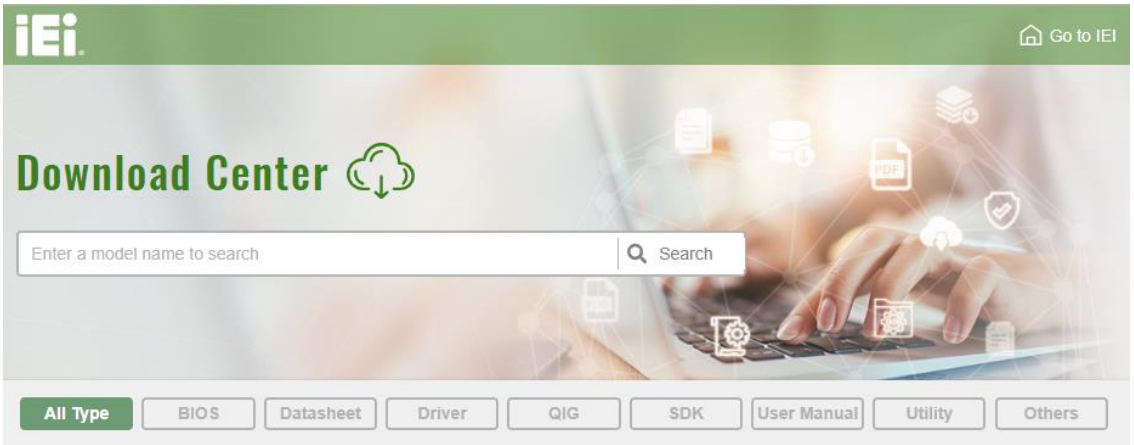
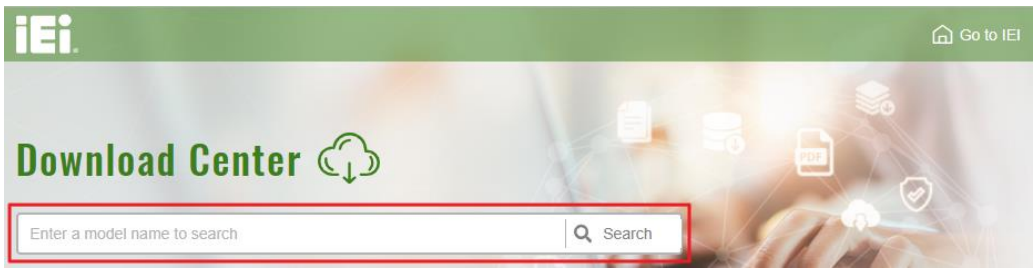


Figure 4-9: IEI Resource Download Center

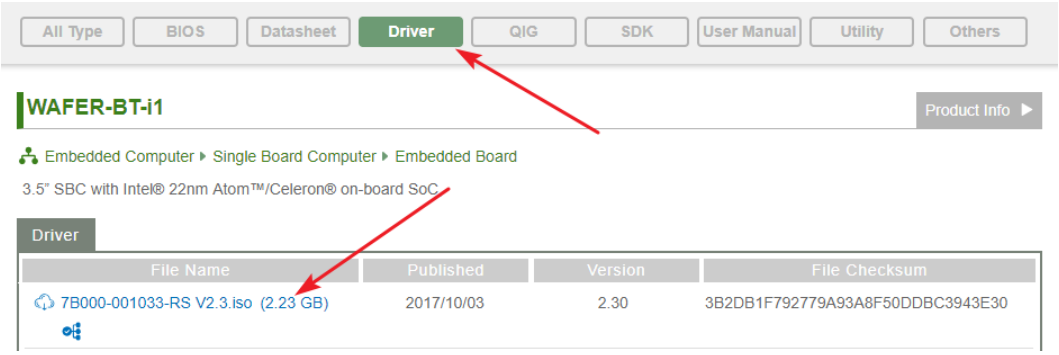
4.7 Driver Download

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

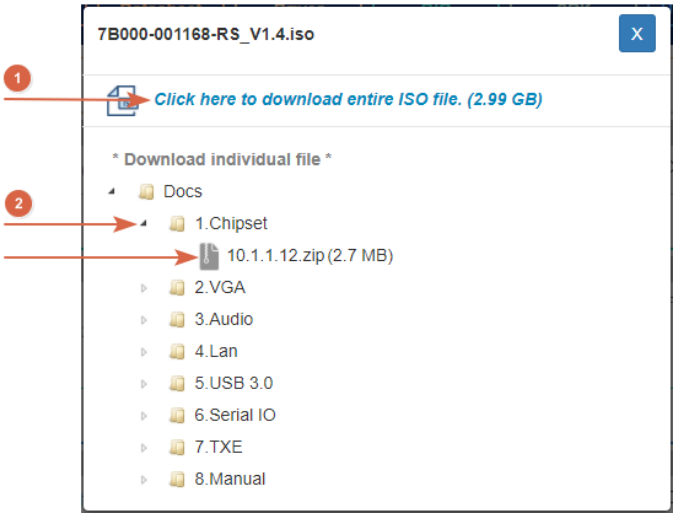
Step 1: Go to https://download.ieiworld.com. Type IMB-MTL and press Enter.



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. **Using keyboard**: Press the **DEL** or **F2** as soon as the system is turned on.
2. **Using touchscreen**: Press the **Setup** button on the upper right corner of the BIOS Starting Menu.

If the message disappears before the **DEL or F2** key is pressed, restart the computer and try again, then the BIOS Starting Menu will appear. Select "Setup" and press Enter to get into the BIOS Setup.

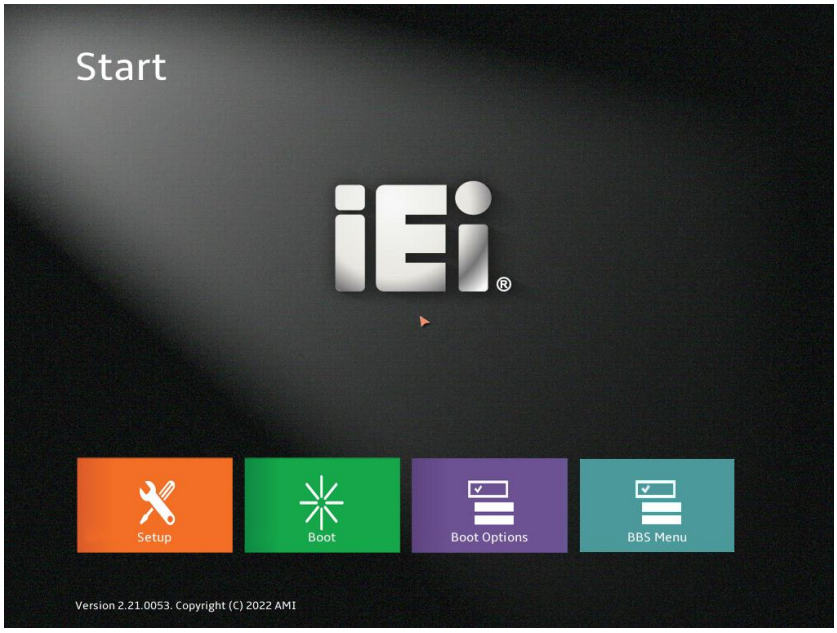


Figure 5-1: BIOS Starting Menu

5.1.2 Using Setup

The BIOS Setup menu can be navigated by using a keyboard or a touchscreen.

5.1.2.1 Keyboard Navigation

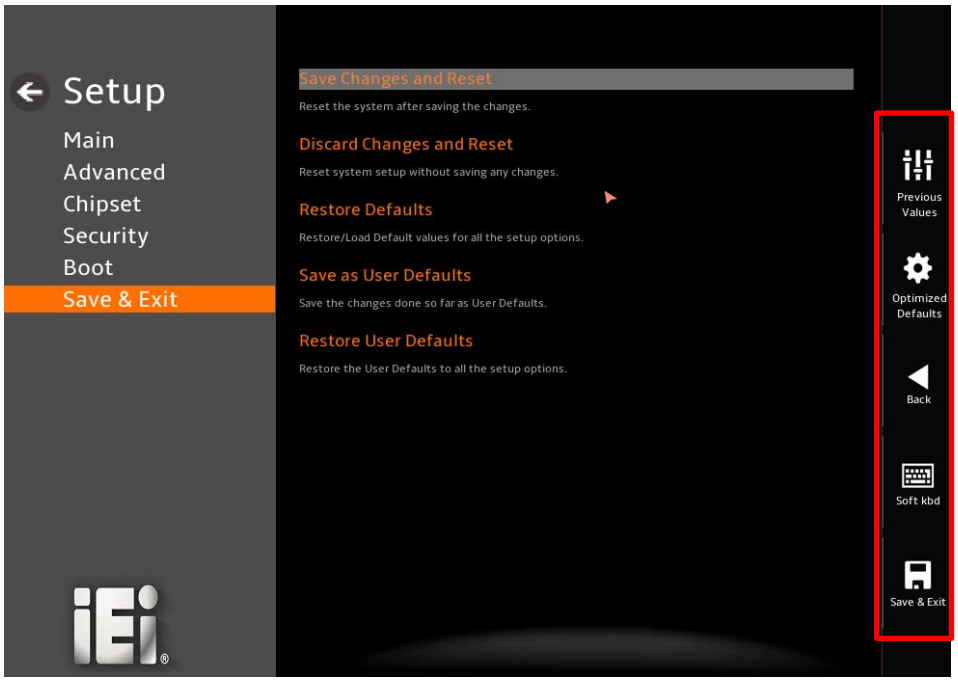
For keyboard navigation, use the navigation keys shown in **Table 5-1**.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page Up	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
<K>	Scroll help area upwards
<M>	Scroll help area downwards

Table 5-1: BIOS Navigation Keys

5.1.2.2 Touch Navigation

For touchscreen navigation, use the on-screen navigation keys shown below.



On-screen Button	Function
Previous Values	Load the last value you set.
Optimized Defaults	Load the factory default values in order to achieve the best performance.
Back	Return to the previous menu.
Soft kbd	Display the on-screen keyboard.
Save & Exit	Save the changes made to the BIOS options and reset the system.

Table 5-2: BIOS On-screen 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 the **Esc** key.

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

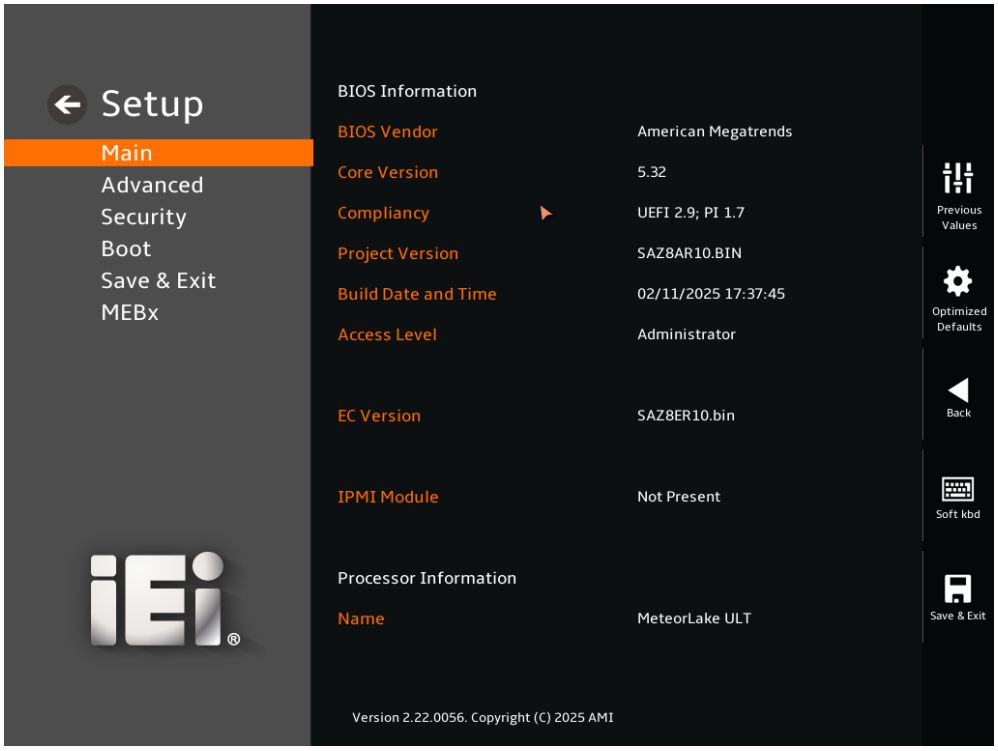
The **menu bar** on top of the BIOS screen has the following main items:

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

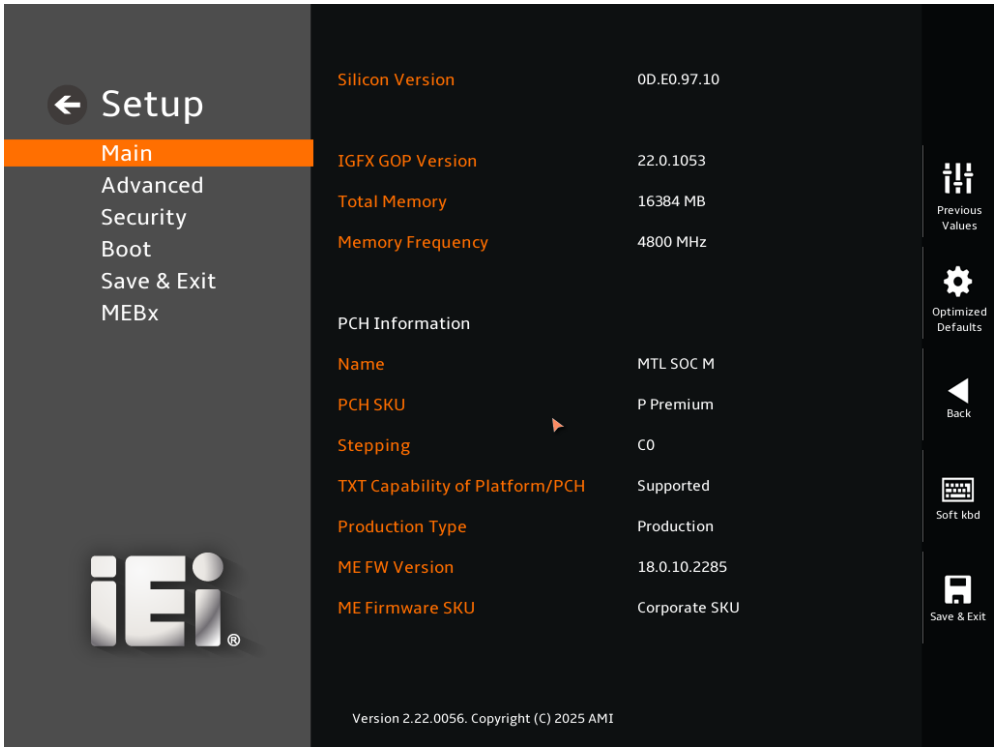
5.2 Main

The **Main** BIOS menu (**BIOS Menu 2**) appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.

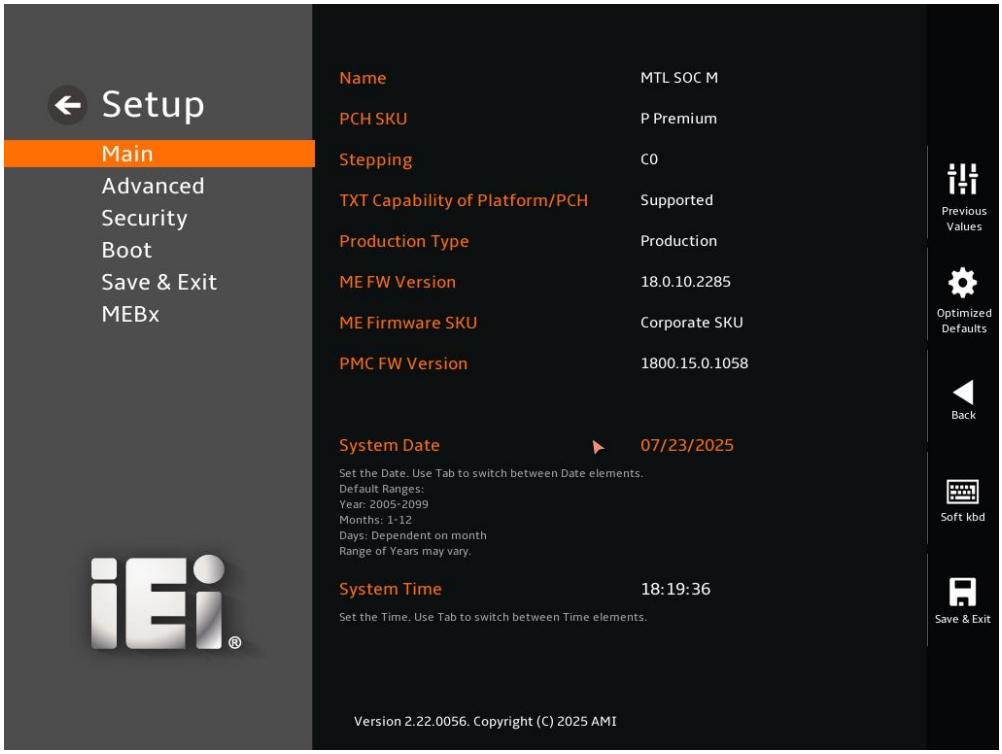


BIOS Menu 1: Main (1/4)

BIOS Menu 2: Main (2/4)



BIOS Menu 3: Main (3/4)



BIOS Menu 4: Main (4/4)

➔ BIOS Information

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

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Compliancy:** Current UEFI & PI version
- **Project Version:** the board version
- **Build Date and Time:** Date the current BIOS version was made
- **Access Level:** Administrator
- **EC Version:** Current EC version

➔ Processor Information

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

- **Name:** Displays the Processor Details
- **Type:** Displays the Processor Type
- **Speed:** Displays the Processor Speed
- **ID:** Displays the Processor ID
- **Stepping:** Displays the PCH Stepping
- **Number of Efficient-core(s):** 8Core(s) / 8Thread(s)
- **Number of Performance-core(s):** 6Core(s) /12Thread(s)
- **Number of Low Power E-core(s):** 2Core(s) / 2Thread(s)
- **Microcode Revision:** 1E

➔ **PCH Information**

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

- **Name:** Displays the PCH Name
- **PCH SKU:** Displays the PCH SKU
- **Stepping:** Displays the PCH Stepping
- **TXT Capability of Platform/PCH:** Displays the TXT Capability
- **Production Type:** Displays the Production Type
- **ME FW Version:** Displays the ME Firmware Version
- **ME Firmware SKU:** Displays the ME Firmware SKU
- **PMC FW Version:** Displays the PMC Firmware Version

➔ **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]**

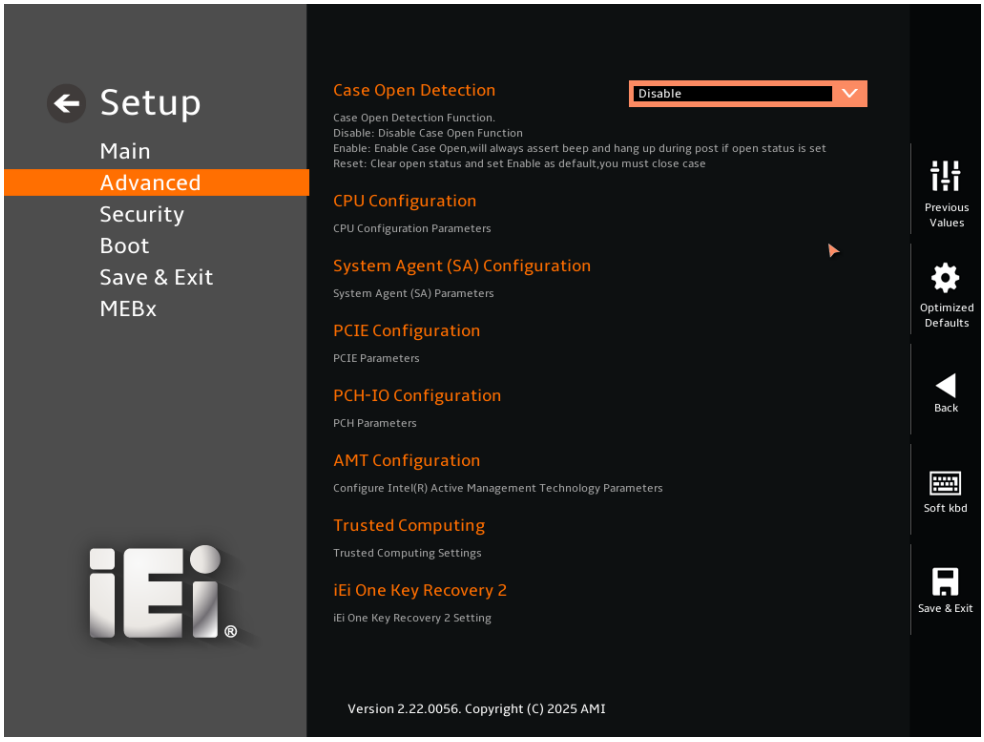
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

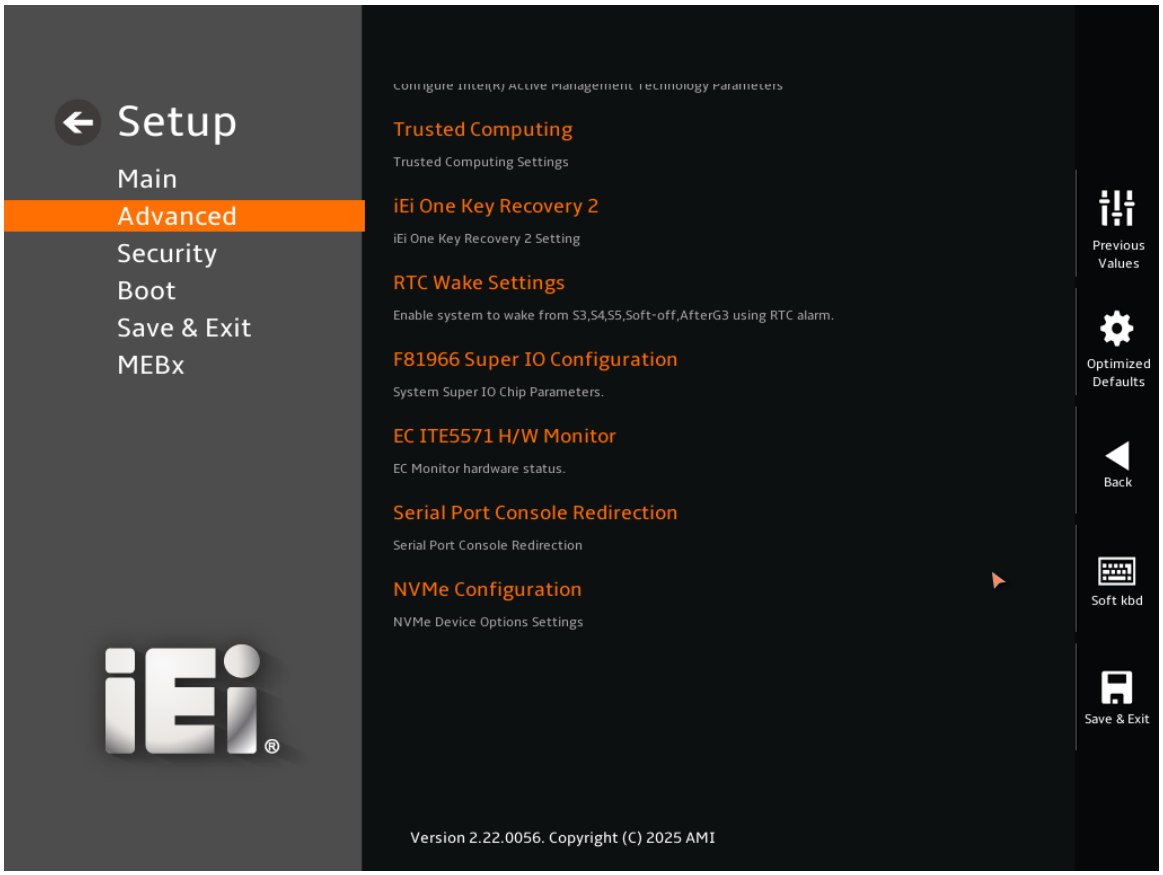
Use the **Advanced** menu (**BIOS Menu 5**) to configure the CPU and peripheral devices through the following sub-menus:

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.



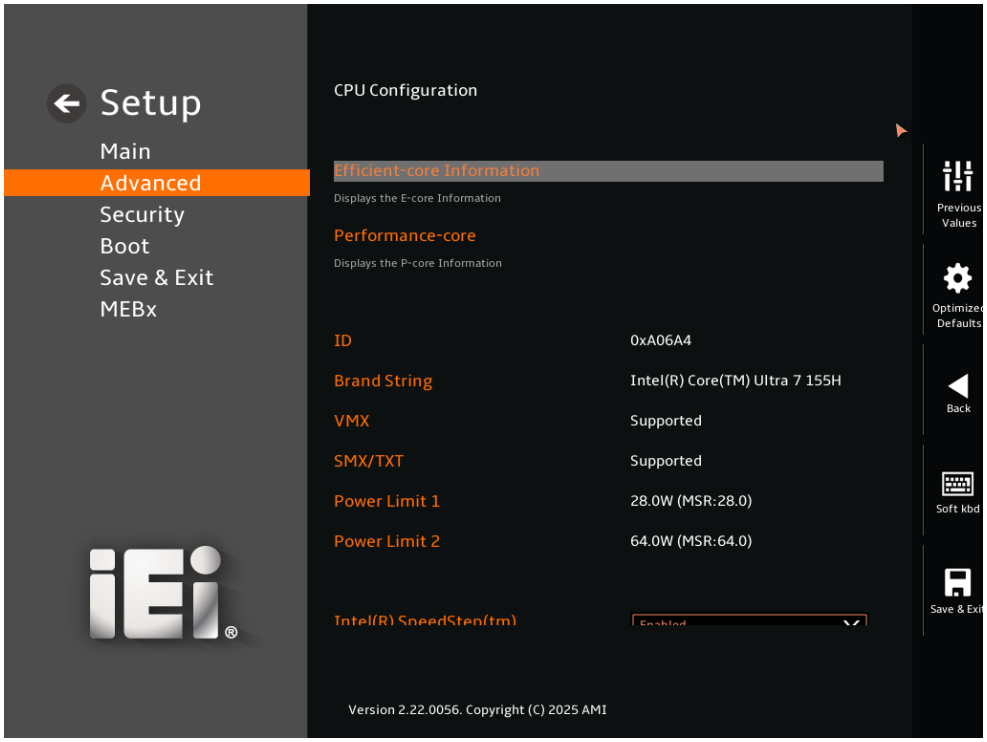
BIOS Menu 5: Advanced (1/2)



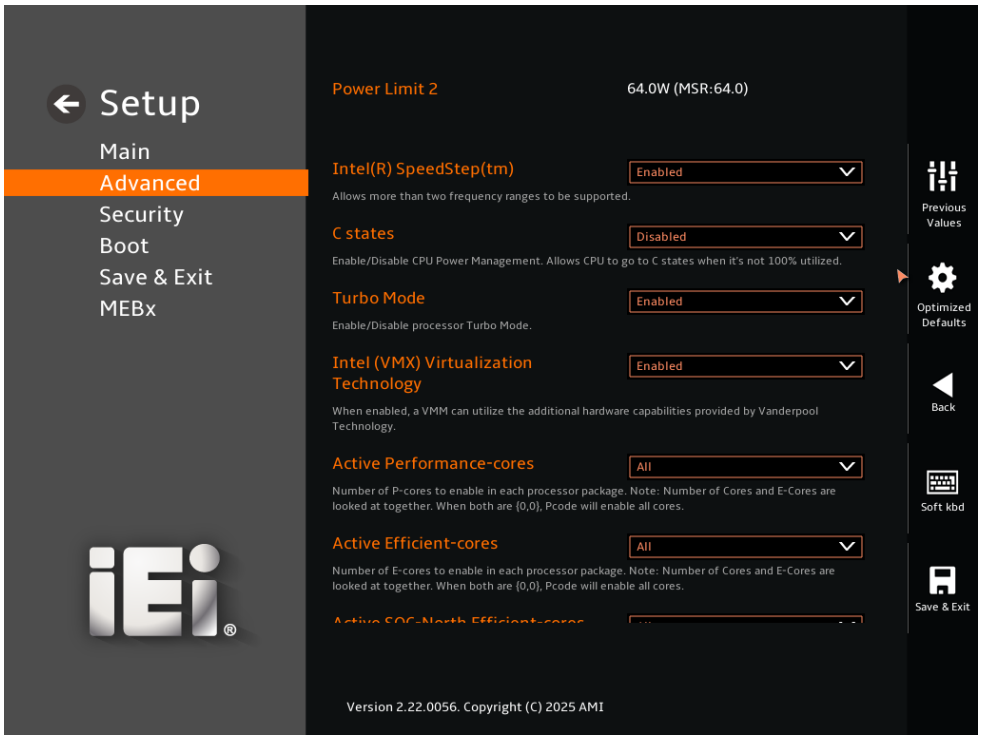
BIOS Menu 6: Advanced (2/2)

5.3.1 CPU Configuration

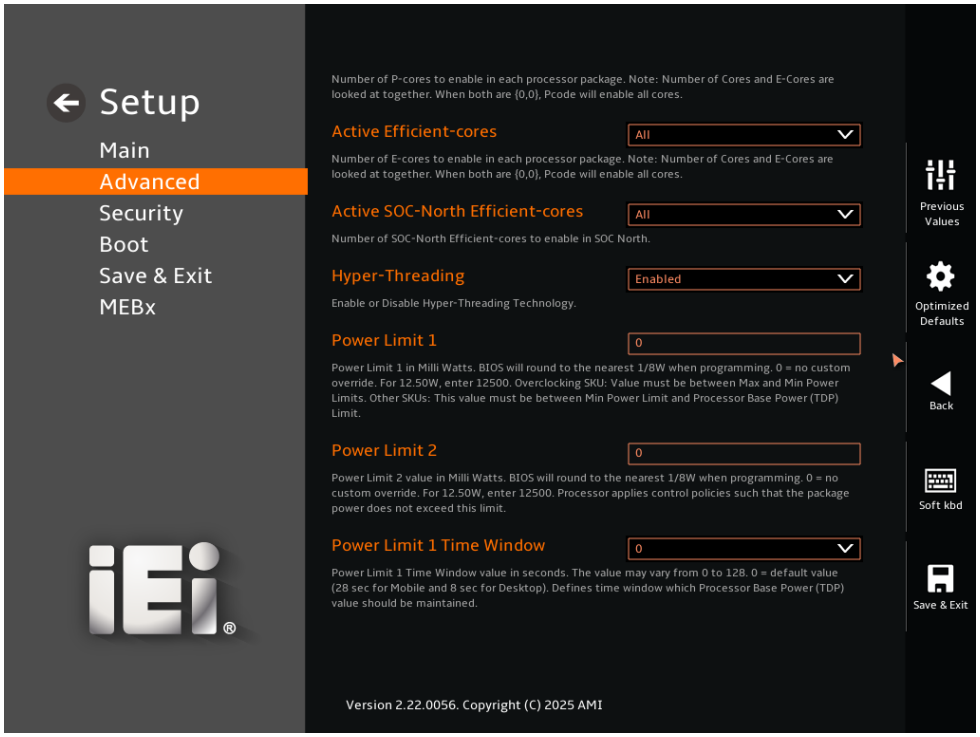
Use the **CPU Configuration** menu (**BIOS Menu 7**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 7: CPU Configuration (1/3)



BIOS Menu 8: CPU Configuration (2/3)



BIOS Menu 9: CPU Configuration (3/3)

➔ **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 CPU power management which allows CPU to go to C states when it is not 100% utilized.

➔ **Disabled**	**DEFAULT**	Disables CPU power management
➔ **Enabled**		Enables CPU power management

➔ **Turbo Mode [Enabled]**

Use the **Turbo Mode** option to enable or disable Turbo Mode which requires Intel Speed Step or Intel Speed Shift to be available and enabled.

➔ **Disabled**		Disables Turbo Mode Technology
➔ **Enabled**	**DEFAULT**	Enables Turbo Mode Technology

➔ **Intel (VMX) Virtualization Technology [Enabled]**

Use the **Intel (VMX) 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**		Disables Intel Virtualization Technology.
➔ **Enabled**	**DEFAULT**	Enables Intel Virtualization Technology.

➔ **Active Performance Cores [All]**

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

➔ **All**	**DEFAULT**	Enable all P-cores in the processor package.
➔ **1**		Enable one P-core in the processor package.

➔ **Active Efficient Cores [All]**

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

➔ **All**	**DEFAULT**	Enable all E-cores in the processor package.
➔ **0**		Enable zero E-core in the processor package.
➔ **1**		Enable one E-cores in the processor package.
➔ **2**		Enable two E-cores in the processor package.
➔ **3**		Enable three E-cores in the processor package.
➔ **4**		Enable four E-cores in the processor package.
➔ **5**		Enable five E-cores in the processor package.
➔ **6**		Enable six E-cores in the processor package.
➔ **7**		Enable seven E-cores in the processor package.

➔ **Active SOC-North Efficient-cores [All]**

Use the **Active SOC-North Efficient-cores** option to enable numbers of the SOC-North Efficient-cores.

➔ **All**	**DEFAULT**	Enable all SOC-North Efficient-cores.
➔ **1**		Enable one SOC-North Efficient-core.

➔ **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

➔ **Power Limit 1 [0]**

Use the + or – key to change the **Power Limit 1** value. BIOS will program the default values for Limit 1 and Power Limit 1 Time Window. For 12.50W, enter 12500.

➔ **Power Limit 2[0]**

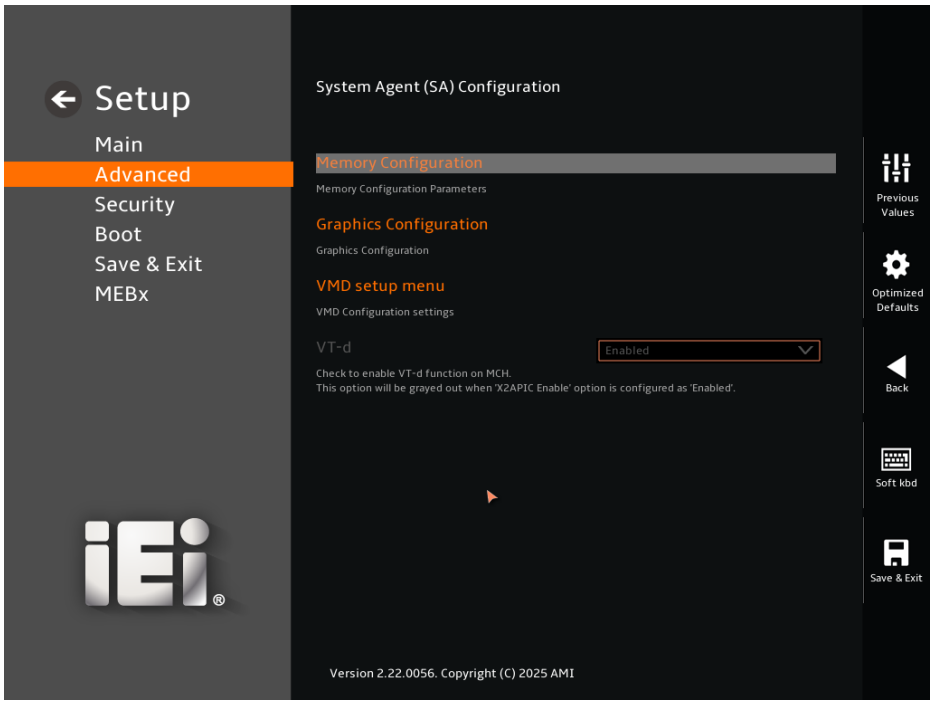
Use the + or – key to change the **Power Limit 2** value. BIOS will program the default values for Limit 1 and Power Limit 1 Time Window. For 12.50W, enter 12500.

➔ **Power Limit 1 Time Window [0]**

Use the **Power Limit 1 Time Window** option to select the PL1 time duration. The value may vary from 0 to 128. For 0 is the default value

5.3.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 10**) to configure the System Agent (SA) parameters.



BIOS Menu 10: System Agent (SA) Configuration

➔ **VT-d [Enabled]**

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

➔ **Enabled** **DEFAULT** Enable the VT-d capability

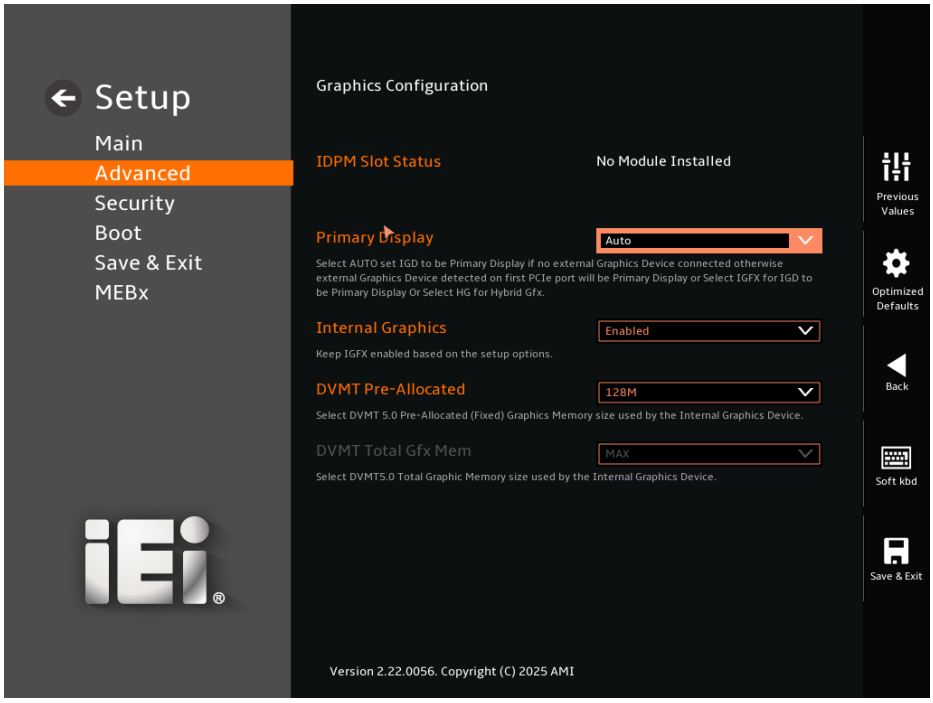
5.3.2.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 11**) to view memory information.

BIOS Menu 11: Memory Configuration

5.3.2.2 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 12**) menu to configure the video device connected to the system.



BIOS Menu 12: 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 configure whether to keep IGFX enabled. If user wants to support dual display by internal graphics and external graphics, this Internal Graphics

option should be set to Enabled and the above Primary Display option should be set to IGFX.

➔ **Auto**		Auto mode
➔ **Disabled**		Disables IGFX.
➔ **Enabled**	**Default**	Enables IGFX.

➔ **DVMT Pre-Allocated [160M]**

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:

- 80M
- 160M **Default**

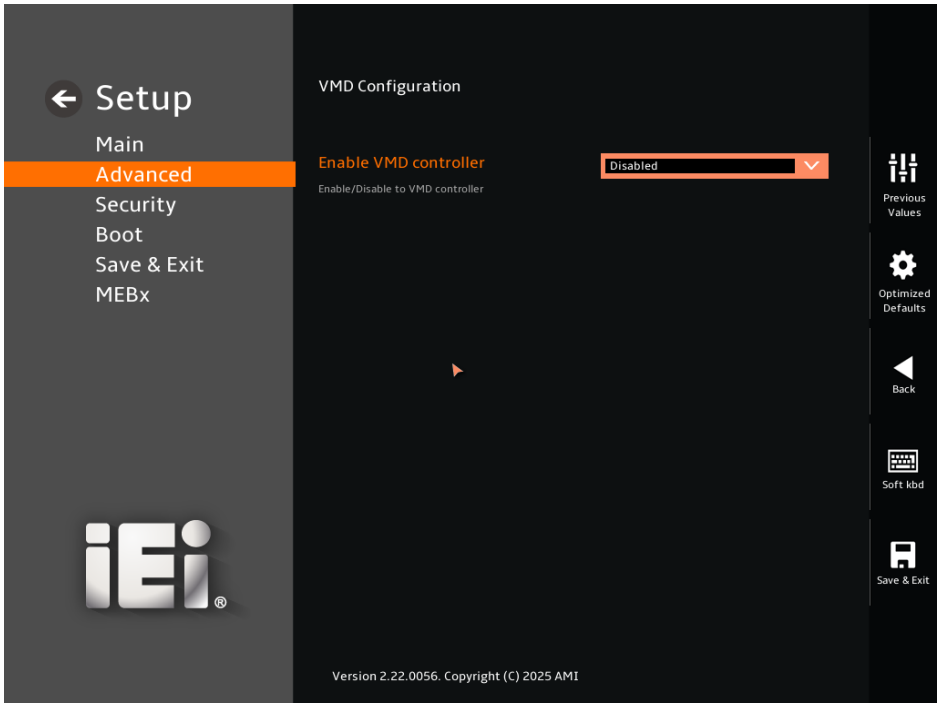
➔ **DVMT Total Gfx Mem [MAX]**

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

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

5.3.2.3 VMD Configuration

Use the **VMD Configuration** submenu (**BIOS Menu 13**) to enable VMD.



BIOS Menu 13: VMD Configuration

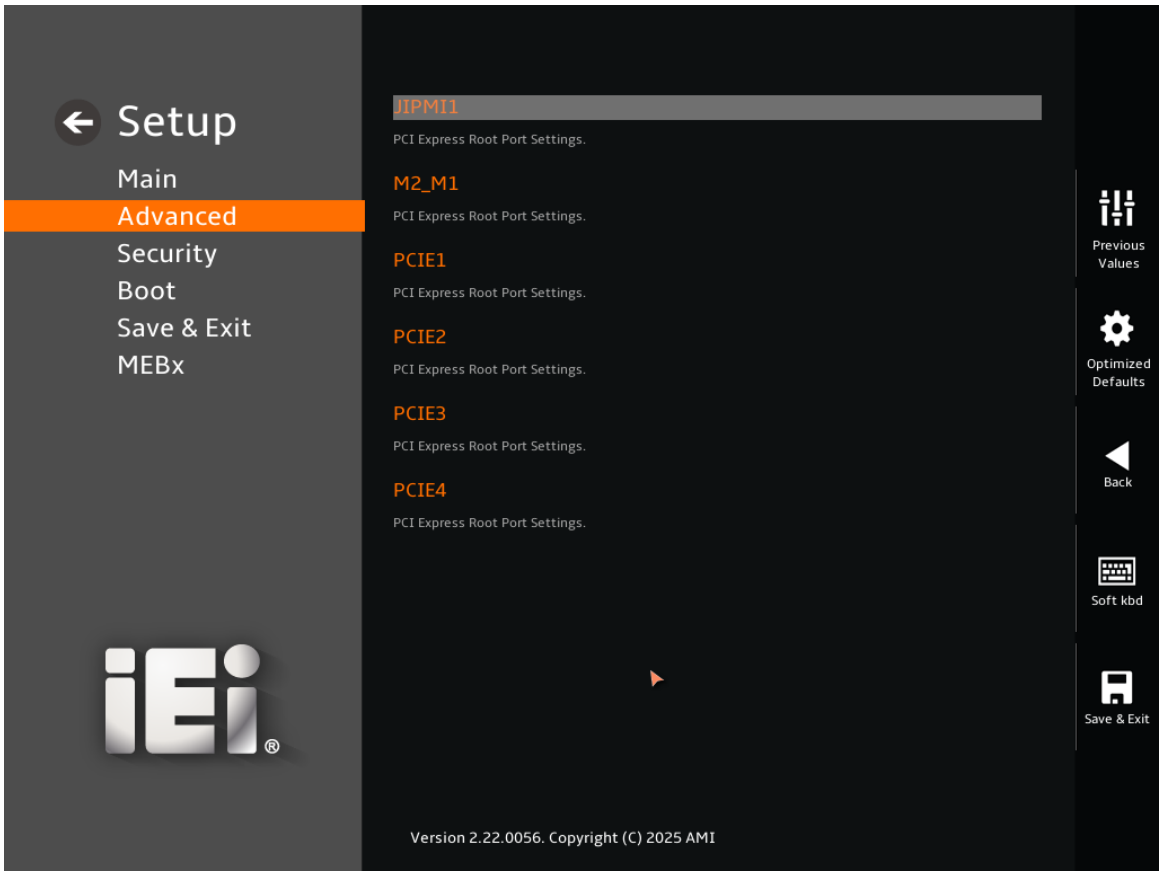
➔ **Enable VMD controller [Disabled]**

Use the **Enable VMD controller** option to enable or disable VMD controller.

➔ **Disabled**	**Default**	Disable VMD controller.
➔ **Enabled**		Enable VMD controller.

5.3.3 PCI Express Configuration

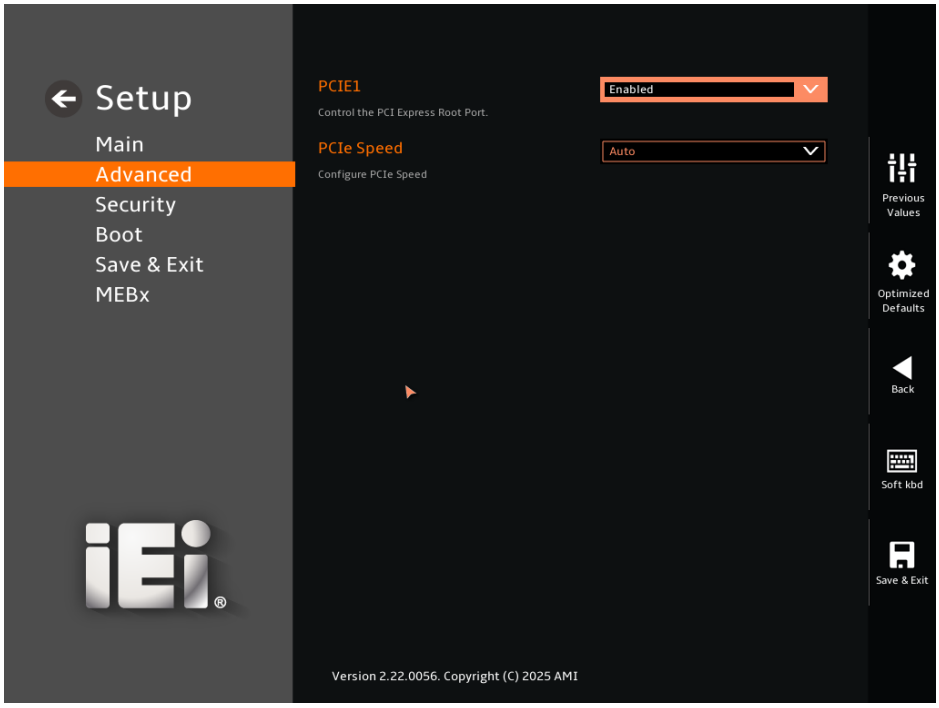
Use the **PCI Express Configuration** submenu (**BIOS Menu 14**) to configure the PCI Express slots.



BIOS Menu 14: PCI Express Configuration

5.3.3.1 PCIe Root Port Setting

Use the **JIPMI1, M2_M1, PCIE1, PCIE2, PCIE3, PCIE4** submenu (**BIOS Menu 15**) to configure the PCIe Root Port Setting.



BIOS Menu 15: PCIe Slot Configuration Submenu

➔ **PCIe Speed [Auto]**

Use the **PCIe Speed** option to specify the PCI Express port speed. Configuration options are listed below.

➔ **Auto**	**DEFAULT**	Auto mode.
➔ **Gen1**		Configure PCIe Speed to Gen1.
➔ **Gen2**		Configure PCIe Speed to Gen2.
➔ **Gen3**		Configure PCIe Speed to Gen3.

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

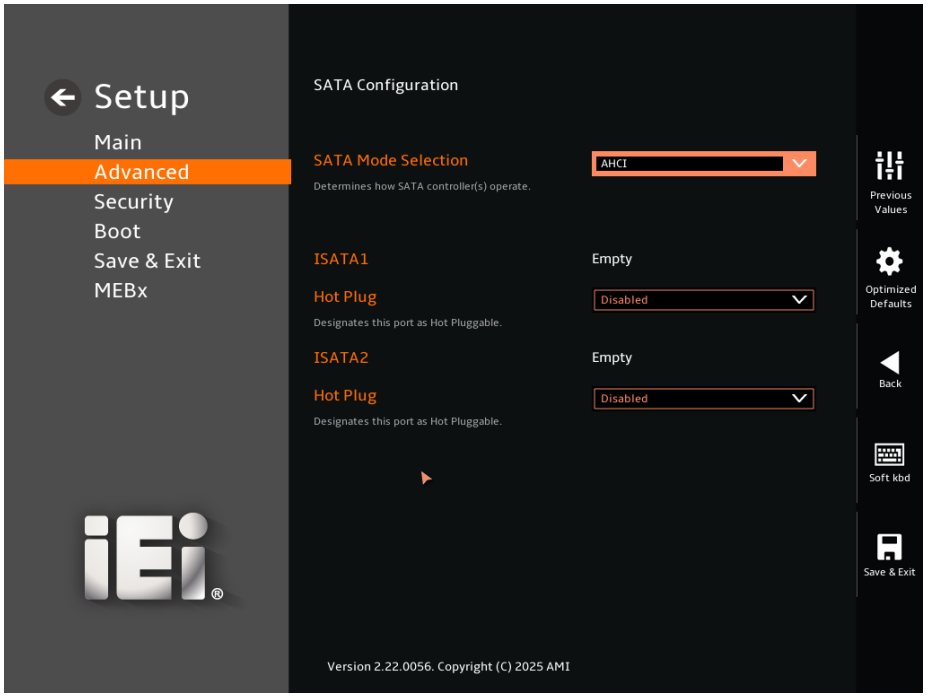
Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.

➔ **Disabled** **DEFAULT** Do not detect if a non-compliance PCI Express device is connected to the PCI Express port.

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

5.3.3.2 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 16**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 16: 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.

➔ **Intel RST Premium With Intel Optane System Acceleration** Configures SATA devices to the Intel RST Premium With Intel Optane System Acceleration mode.

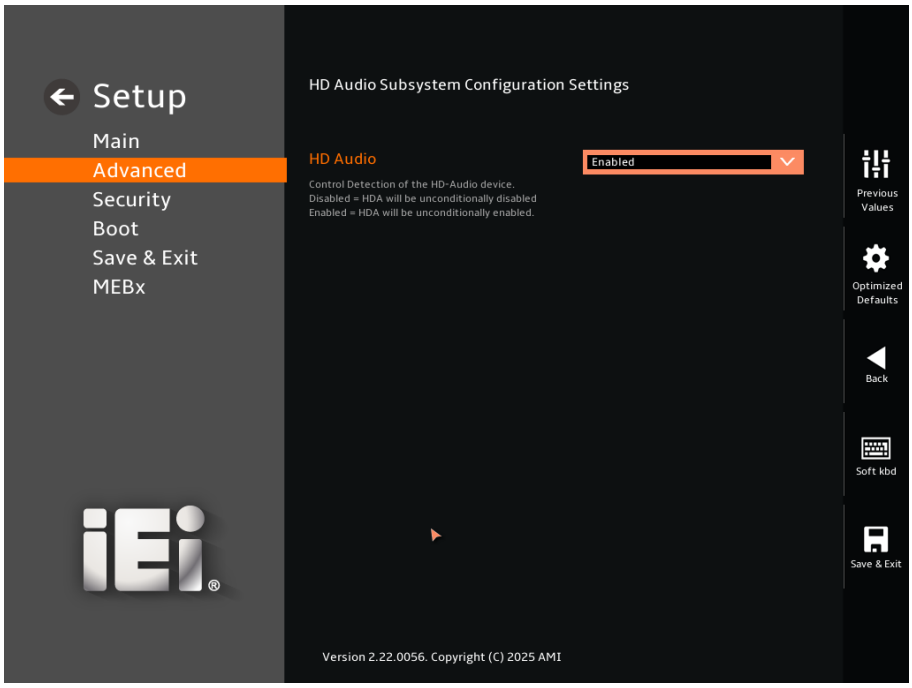
➔ **Hot Plug [Disabled]**

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

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

5.3.3.3 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 17**) to configure the PCH Azalia settings.



BIOS Menu 17: HD Audio Configuration

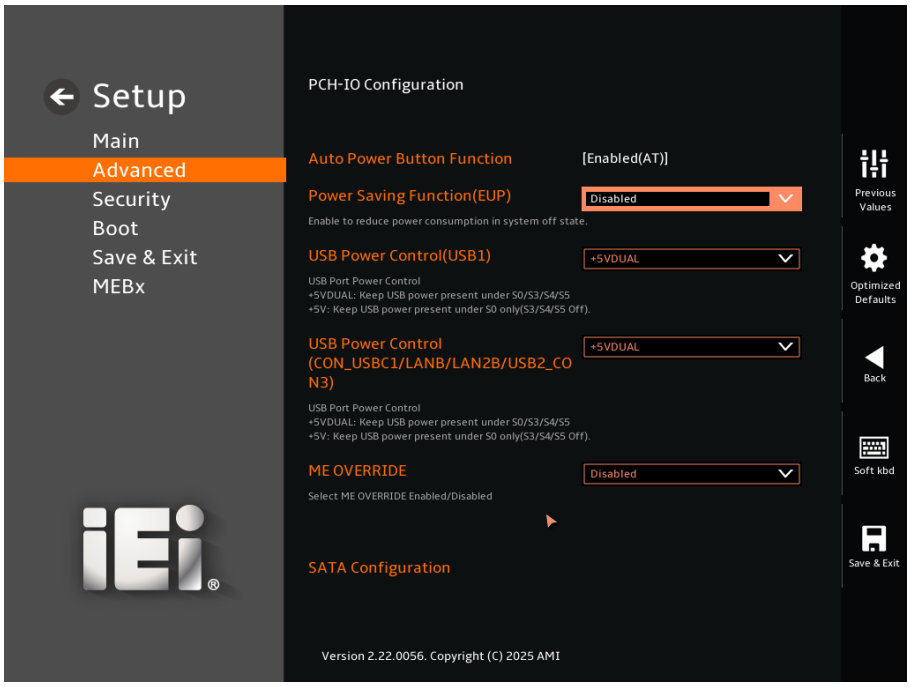
➔ **HD Audio [Enabled]**

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

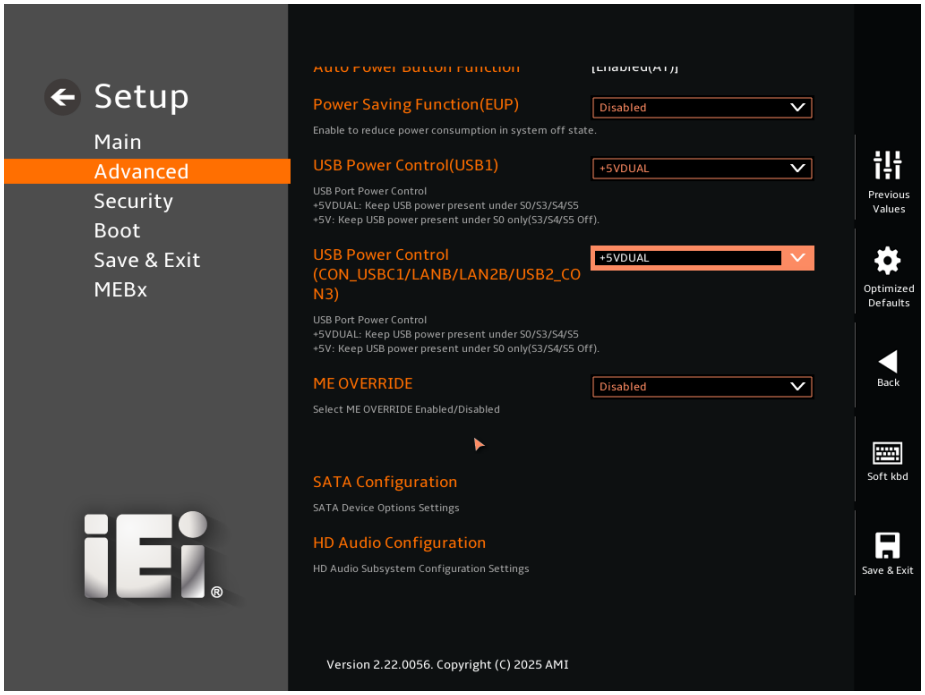
➔ **Disabled**		The onboard High Definition Audio controller is disabled.
➔ **Enabled**	**DEFAULT**	The onboard High Definition Audio controller is enabled.

5.3.4 PCH-IO Configuration

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



BIOS Menu 18: PCH-IO Configuration (1/2)



BIOS Menu 19: PCH-IO Configuration (2/2)

➔ Auto Power Button Function [Enabled (AT)]

Use the **Auto Power Button Function** BIOS option to show the power mode state. Use the **J_ATX_AT1** to switch the AT/ATX power mode.

➔ **Enabled (AT)**	**DEFAULT**	The system power mode is AT.
➔ **Disabled (ATX)**		The system power mode is ATX.

➔ Power Saving Function (EUP) [Disabled]

Use the **Power Saving Function (EUP)** 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 state [S0/S3/S4/S5 ON]**

Use the **USB Power state option** to enable or disable the USB Power.

➔ **S0/S3/S4/S5 ON**	**DEFAULT**	USB Power is on.
➔ **S3/S4/S5 OFF**		USB Power is off.

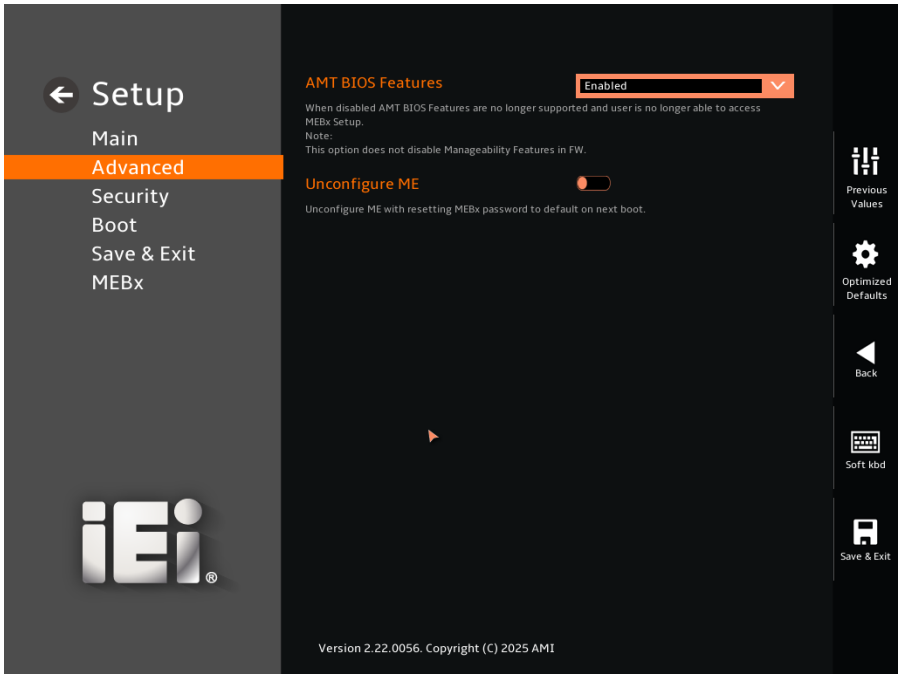
➔ **ME OVERRIDE [Disabled]**

Use the **ME OVERRIDE** to enable or disable the ME OVERRIDE.

➔ **Disabled**	**DEFAULT**	ME OVERRIDE is off.
➔ **Enabled**		ME OVERRIDE is on.

5.3.5 AMT Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 20**) to configure the PCH parameters.



BIOS Menu 20: AMT Configuration

➔ **AMI BIOS Features [Enabled]**

Use the **AMI BIOS Features** to enable or disable the AMT BIOS Features.

➔ **Enabled**	**DEFAULT**	AMT BIOS Features is on.
➔ **Disabled**		AMT BIOS Features is off.

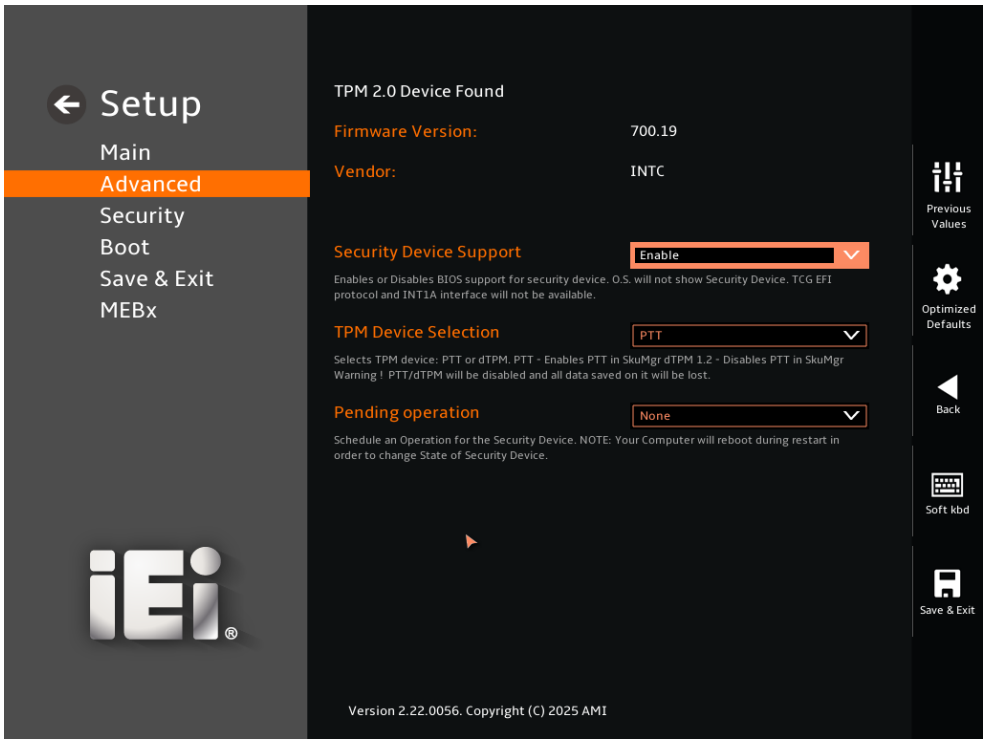
➔ **Unconfigure ME [Disabled]**

Configure ME with resetting MEBx password to default on next boot.

➔ **Disabled**	**DEFAULT**	Unconfigure ME with resetting MEBx password
➔ **Enabled**		Configure ME with resetting MEBx password

5.3.6 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 21**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 21: Trusted Computing Configuration

➔ **TPM Device Support [Enable]**

Use the **TPM Device Support** option to enable or disable BIOS support for security device.

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

➔ **TPM Device Selection [Enable]**

Use the **TPM Device Selection** option to select PTT or dTPM.PTT.

➔ **PTT**	**DEFAULT**	TPM Device is PTT.
➔ **dTPM.PTT**		TPM Device is dTPM.PTT.

➔ **Pending Operation [None]**

Use the **Pending Operation** option to schedule an operation for the security device.

➔ **None**	**DEFAULT**	TPM information is previous.S
➔ **TPM Clear**		TPM information is cleared

5.3.7 iEi One Key Recovery2

The **iEi One Key Recovery2** menu (**BIOS Menu 22**) enables watchdog function. When OS crashes, it will automatically recover system.

BIOS Menu 22: iEi One Key Recovery2

➔ **Auto Recovery Function [Disabled]**

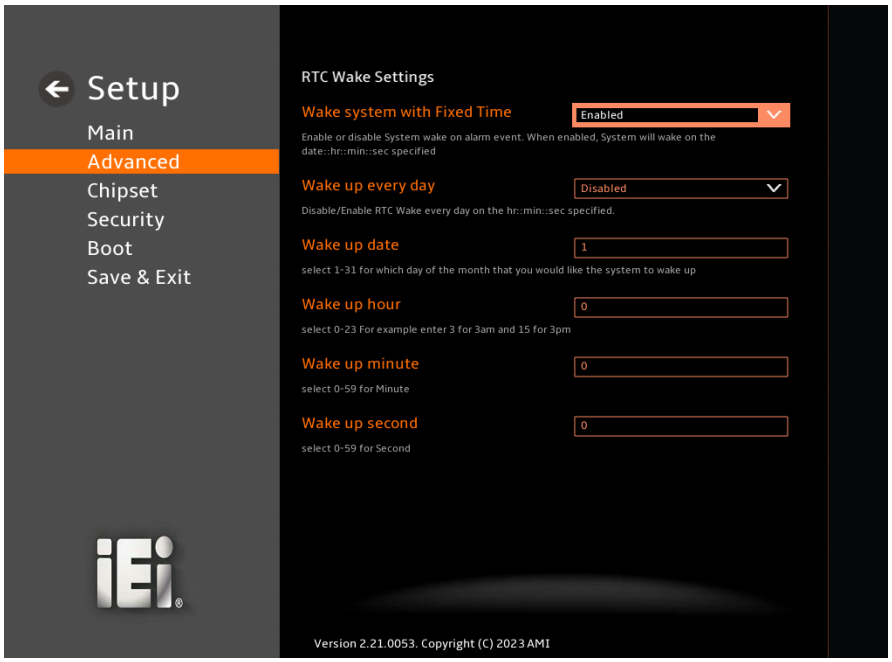
Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

➔ **Disabled**	**DEFAULT**	Disable watch dog function.
➔ **Enabled**		Enable watch dog function.

5.3.8 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 23**) configures RTC wake event.

BIOS Menu 23: RTC Wake Settings (1/2)



BIOS Menu 24: RTC Wake Settings (2/2)

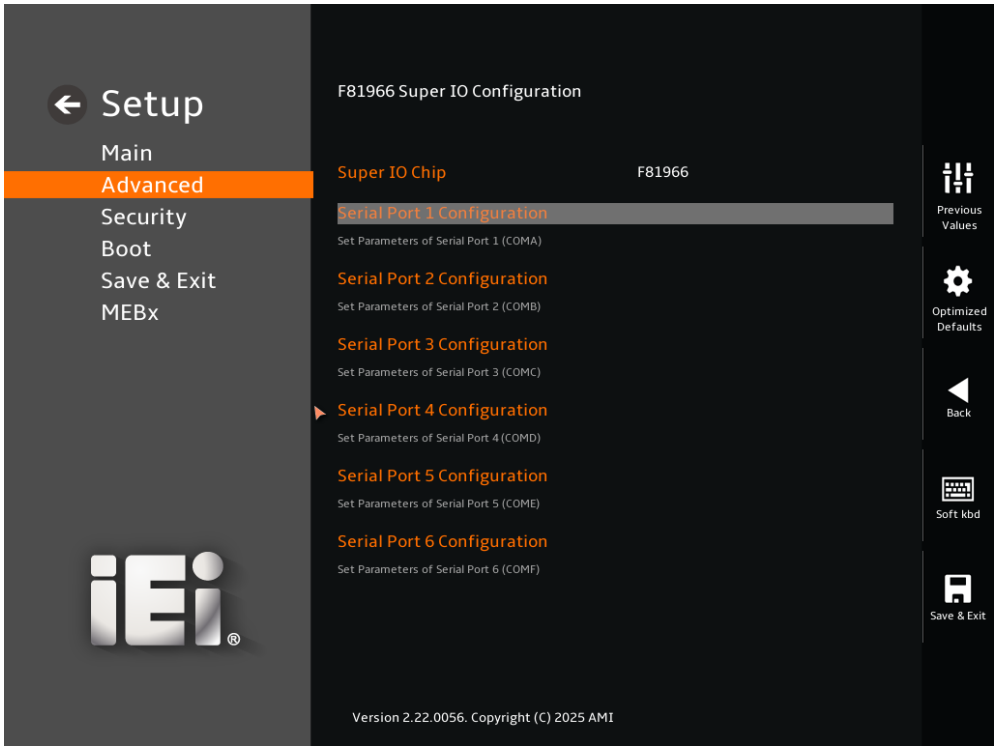
➔ **Wake system with Fixed Time [Enabled]**

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

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

5.3.9 F81966 Super IO Configuration

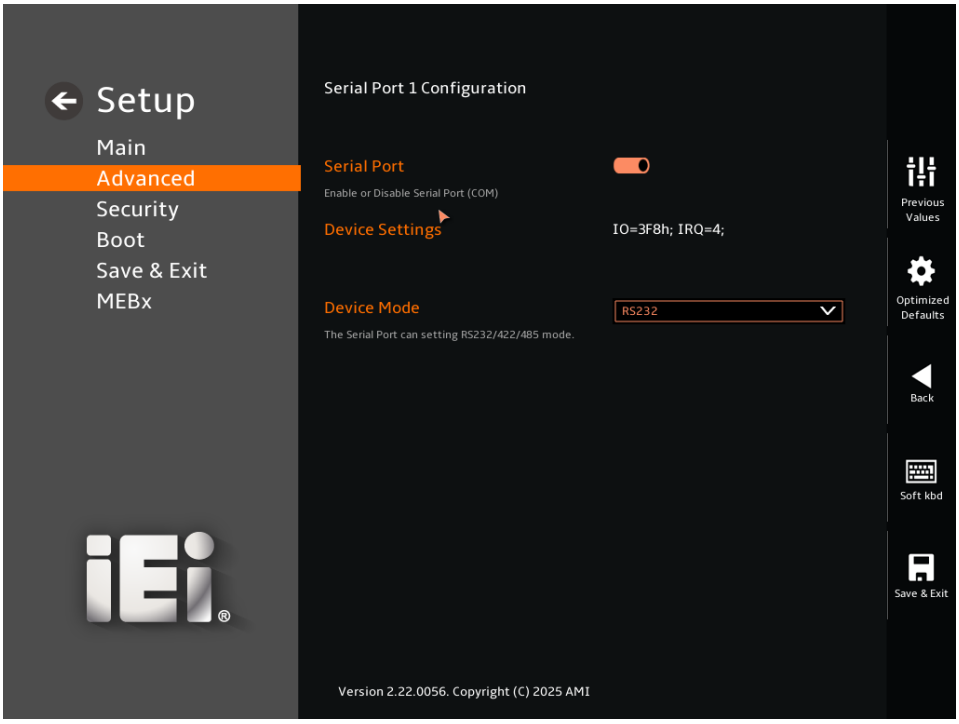
Use the **F81966 Super IO Configuration** menu (**BIOS Menu 25**) to set or change the configurations for serial ports.



BIOS Menu 25: F81966 Super IO Configuration

5.3.9.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 26**) to configure the serial port.



BIOS Menu 26: Serial Port 1 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

➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

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

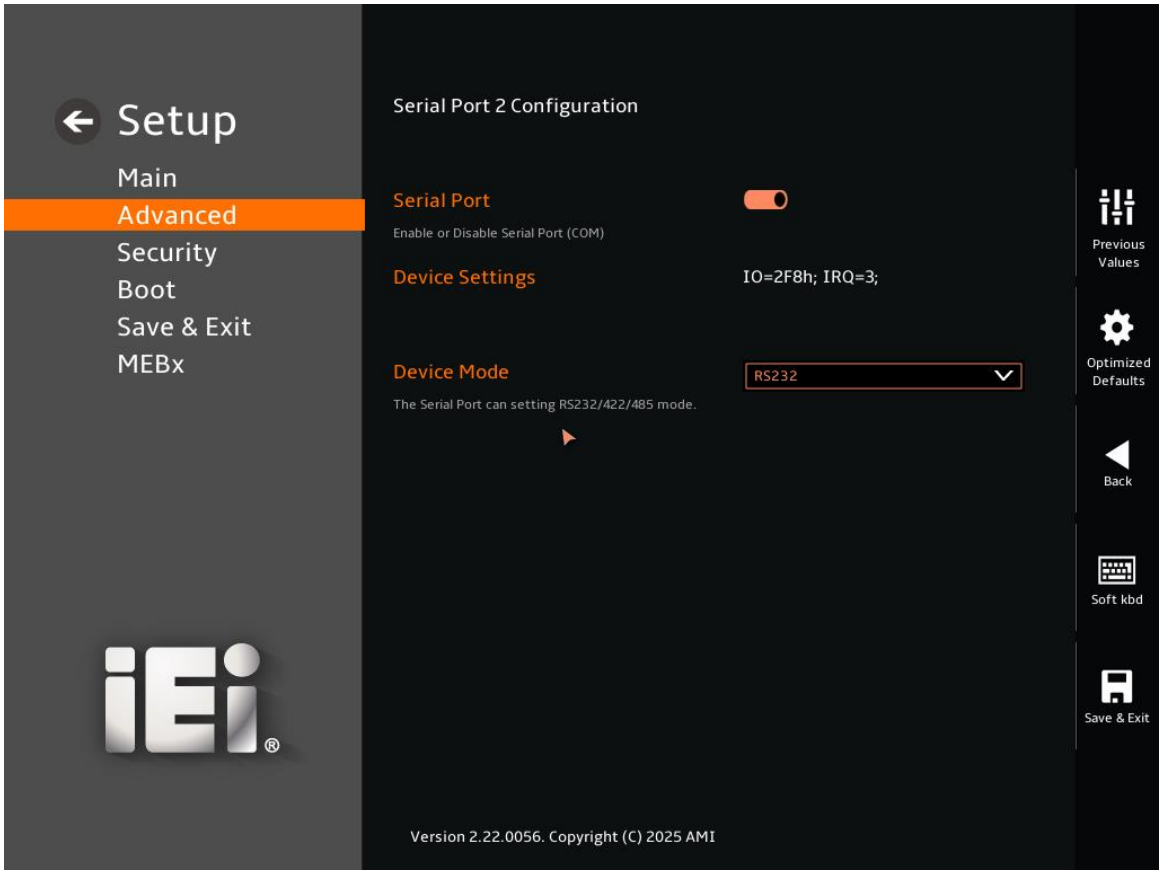
➔ **Device Mode [RS232]**

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

➔ **RS232**	**DEFAULT**	The serial port mode is RS-232
RS422 with Register		The serial port mode is RS-422
RS485 with Register		The serial port mode is RS-485

5.3.9.2 Serial Port 2 Configuration

Use the **Serial Port 2 Configuration** menu (**BIOS Menu 27**) to configure the serial port.



BIOS Menu 27: Serial Port 2 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

➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

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

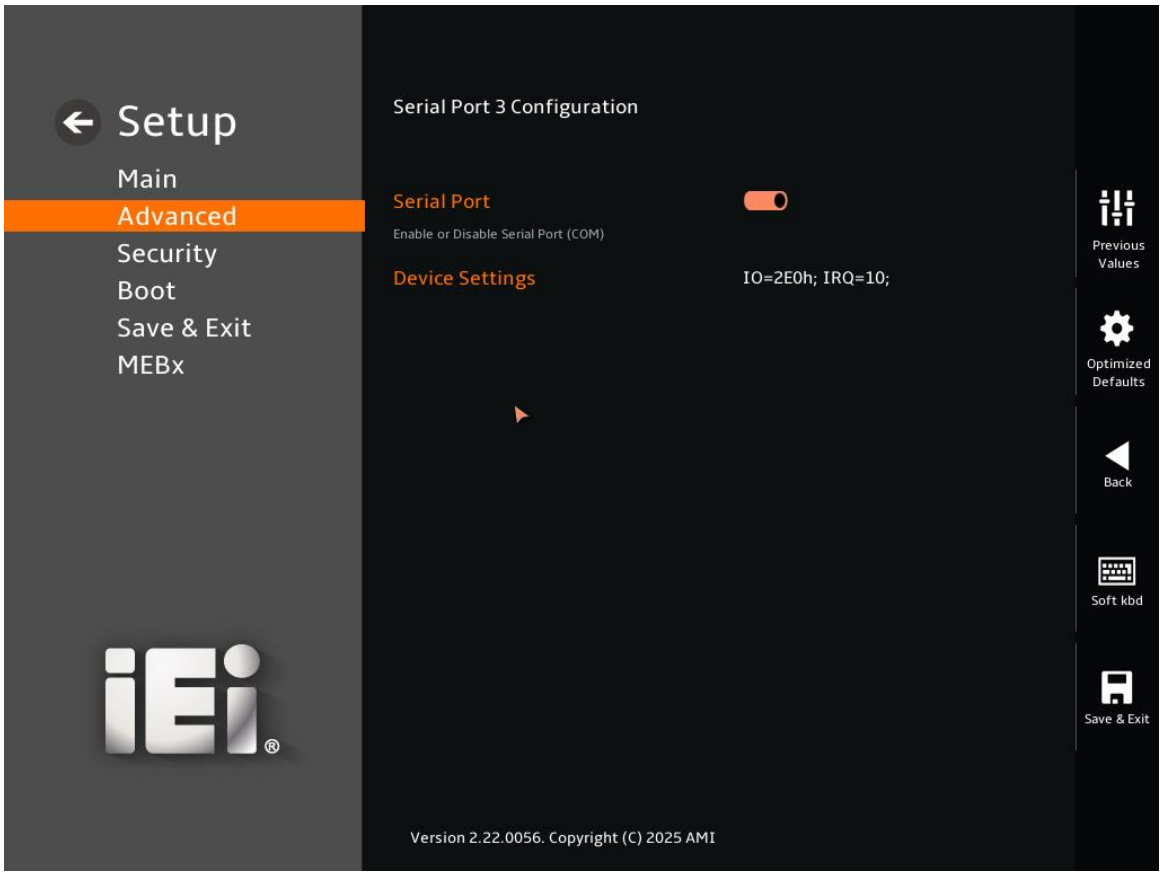
➔ **Device Mode [RS232]**

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

➔ **RS232**	**DEFAULT**	The serial port mode is RS-232
RS422 with Register		The serial port mode is RS-422
RS485 with Register		The serial port mode is RS-485

5.3.9.3 Serial Port 3 Configuration

Use the **Serial Port 3 Configuration** menu (**BIOS Menu 28**) to configure the serial port.



BIOS Menu 28: Serial Port 3 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

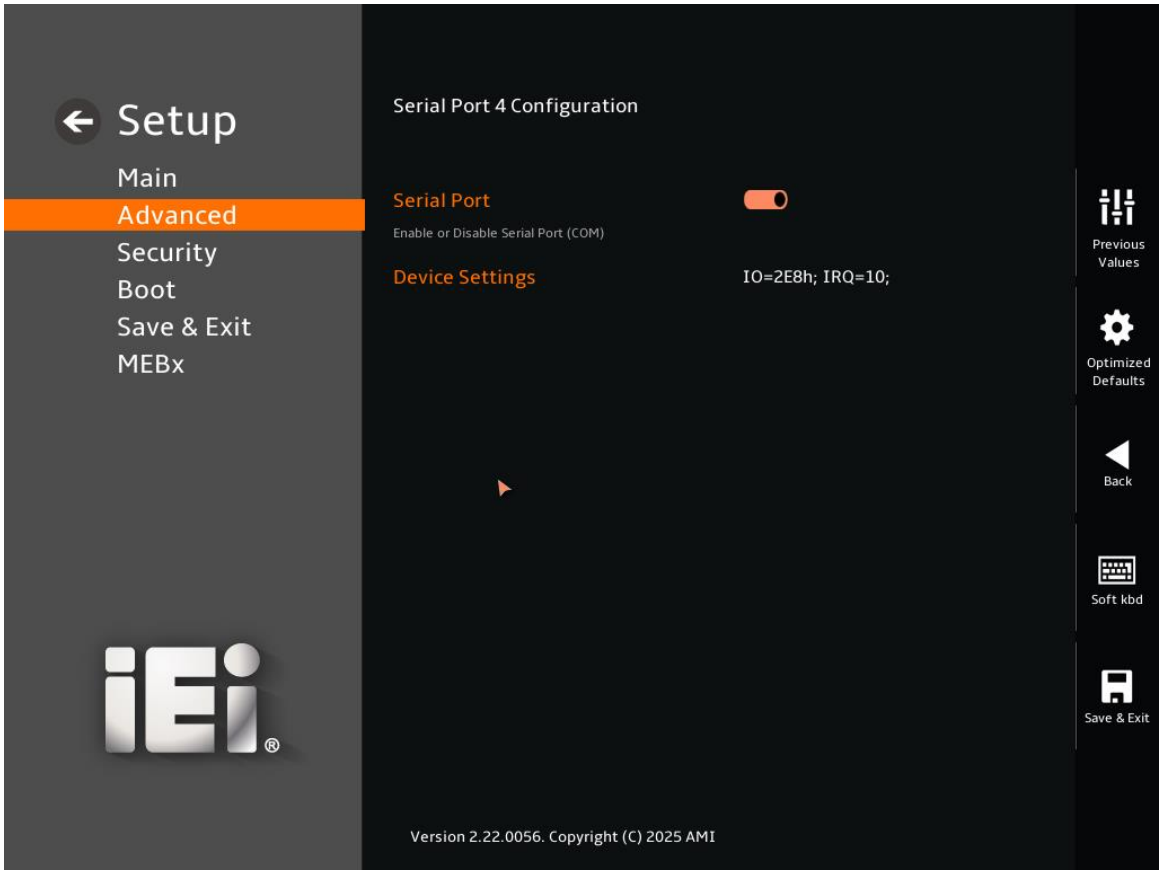
➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

➔ **IO=2E0h; IRQ=10** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ10

5.3.9.4 Serial Port 4 Configuration

Use the **Serial Port 4 Configuration** menu (**BIOS Menu 29**) to configure the serial port.



BIOS Menu 29: Serial Port 4 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

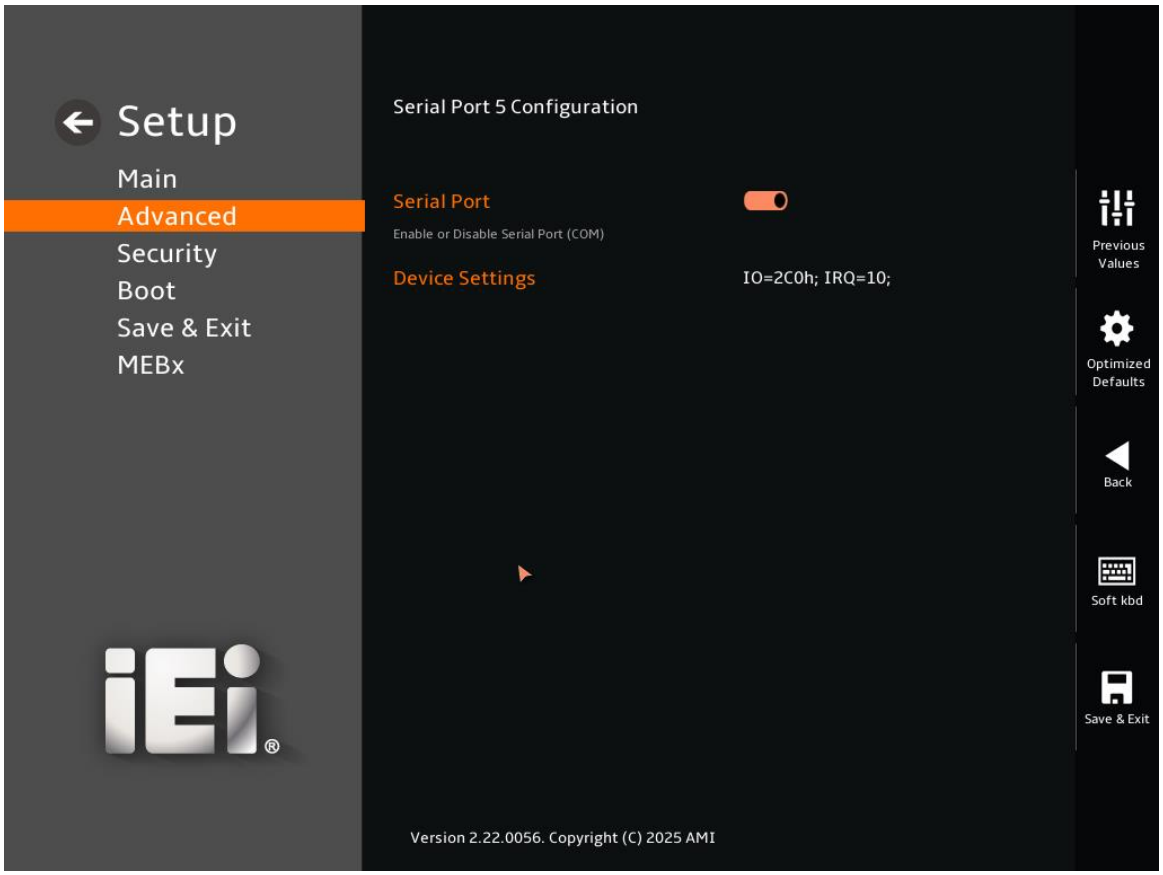
➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

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

5.3.9.5 Serial Port 5 Configuration

Use the **Serial Port 5 Configuration** menu (**BIOS Menu 30**) to configure the serial port.



BIOS Menu 30: Serial Port 5 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

➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

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

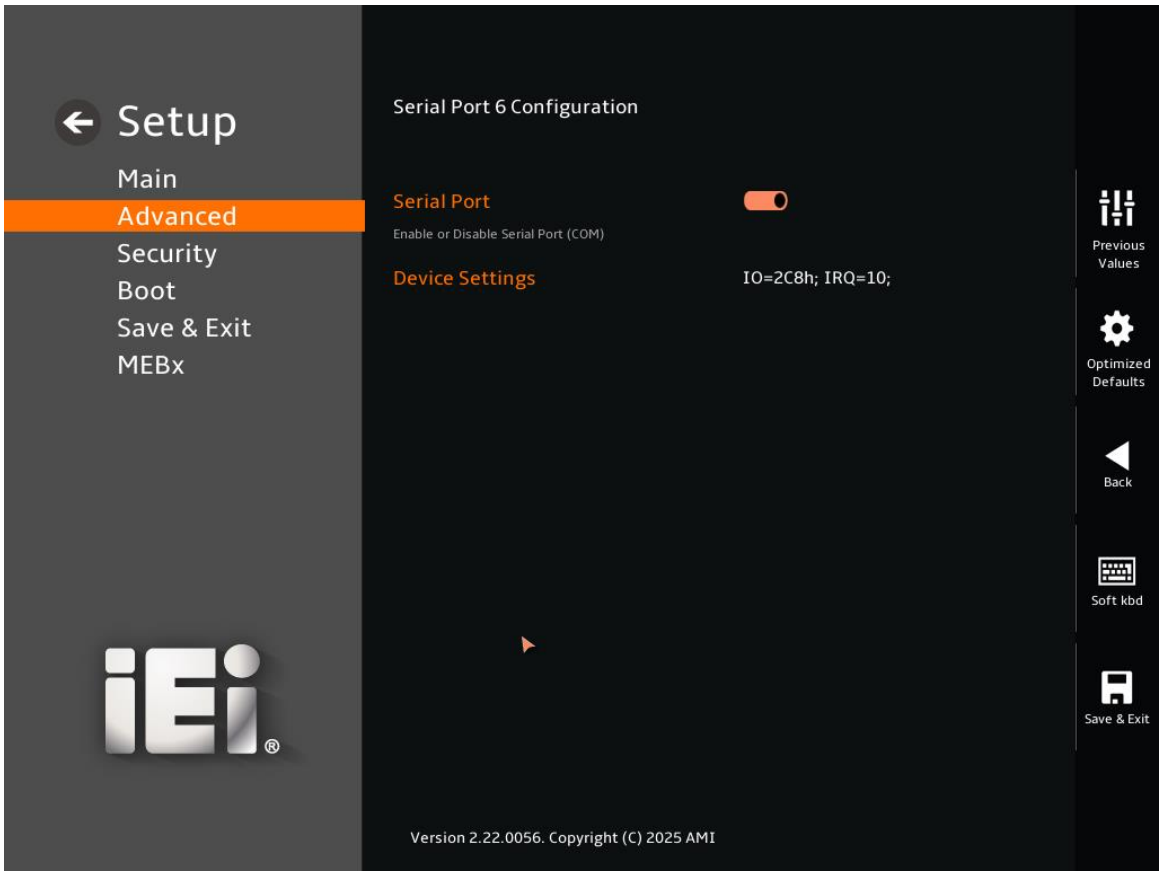
➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

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

5.3.9.6 Serial Port 6 Configuration

Use the **Serial Port 6 Configuration** menu (**BIOS Menu 31**) to configure the serial port.



BIOS Menu 31: Serial Port 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

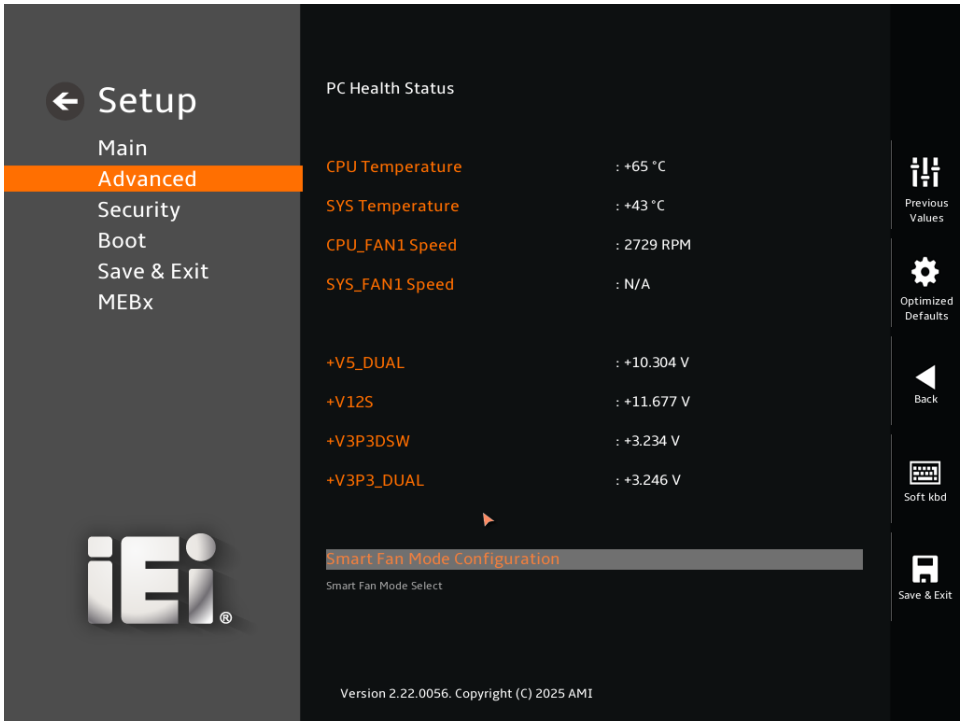
➔ **Device Settings**

The **Device Settings** option shows the serial port IO port address and interrupt address.

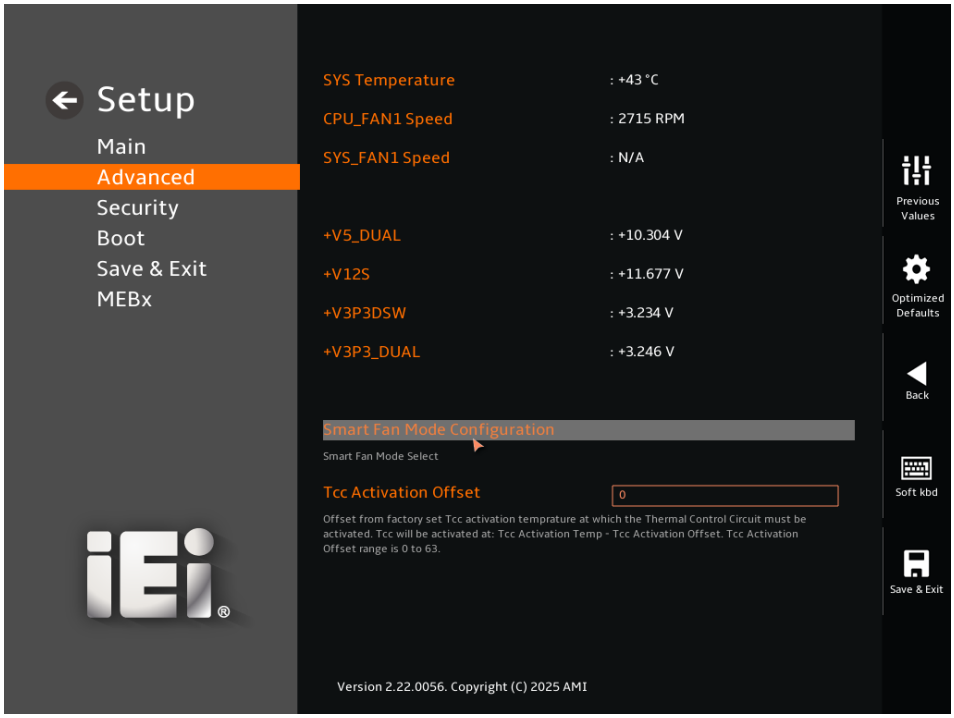
➔ **IO=2C8h; IRQ=10** — Serial Port I/O port address is 2C8h and the interrupt address is IRQ10

5.3.10 EC ITE5571 H-W Monitor

The **EC ITE5571 H-W Monitor** menu (**BIOS Menu 32**) contains the smart fan mode configuration submenu and shows the state of H/W real-time operating temperature, fan speeds and system voltages.



BIOS Menu 32: EC ITE5571 H-W Monitor (1/2)



BIOS Menu 33: EC ITE5571 H-W Monitor (2/2)

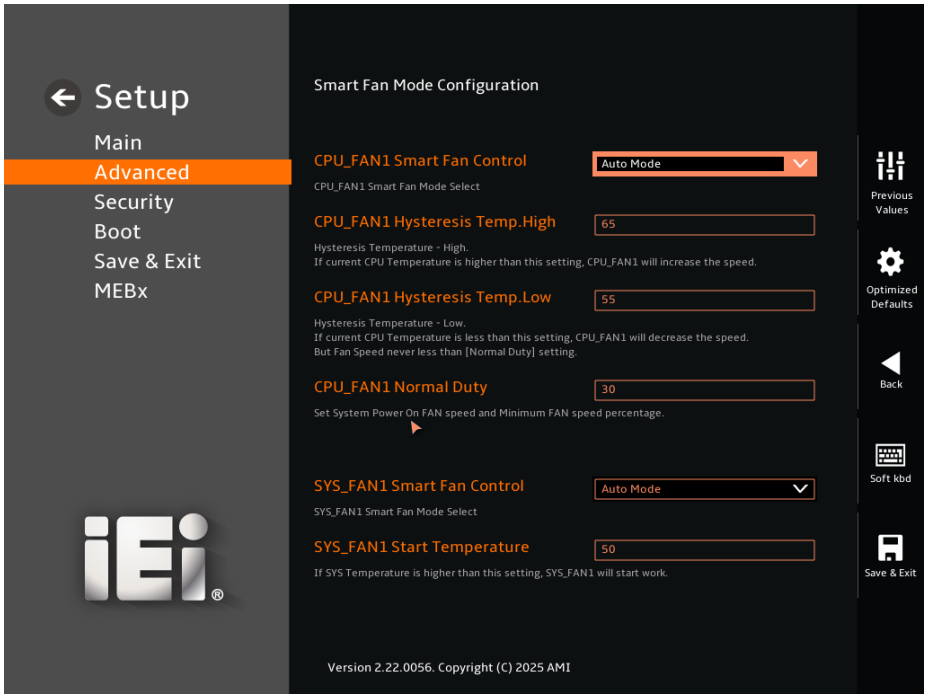
➔ PC Health Status

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

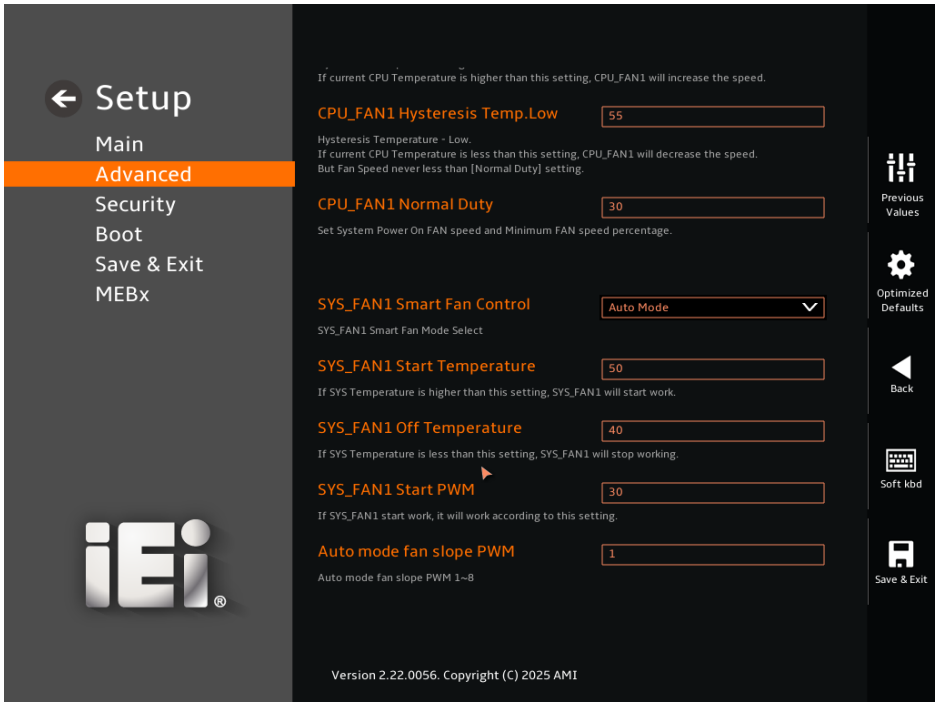
- System Temperatures:
  - CPU Temperature
  - System Temperature1
- Fan Speeds:
  - CPU_Fan1 Speed
  - SYS_Fan1 Speed
- Voltages:
  - +V5_DUAL
  - +12VS
  - +V3P3DSW
  - +V3P3_DUAL

5.3.10.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 34**) to configure the CPU/system fan start/off temperature and control mode.



BIOS Menu 34: Smart Fan Mode Configuration (1/2)



BIOS Menu 35: Smart Fan Mode Configuration (2/2)

➔ CPU_FAN1 Smart Fan Control [Auto Mode]

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

➔ **Manual Mode**		The fan spins at the speed set in Manual Mode settings.
➔ **Auto Mode**	**DEFAULT**	The fan adjusts its speed using Auto Mode settings.

➔ CPU_FAN1 Hysteresis Temp.High [65]

If current CPU temperature is higher than this setting, CPU_FAN1 will increase the speed. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ CPU_FAN1 Hysteresis Temp.Low [55]

If current CPU temperature is lower than this setting, CPU_FAN1 will decrease the speed. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **CPU_FAN1 Normal Duty [30]**

Set System Power On speed and minimum FAN speed percentage. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

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

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

➔ **Manual Mode**		The fan spins at the speed set in Manual Mode settings.
➔ **Auto Mode**	**DEFAULT**	The fan adjusts its speed using Auto Mode settings.

➔ **SYS_FAN1 Start Temperature [50]**

If the System temperature is between **fan off** and **fan start**, the fan speed change to **fan start PWM**. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **SYS_FAN1 Off Temperature [40]**

If the System temperature is lower than the value set this option, the fan speed change to be lowest. To set a value, Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **SYS_FAN1 Start PWM [30]**

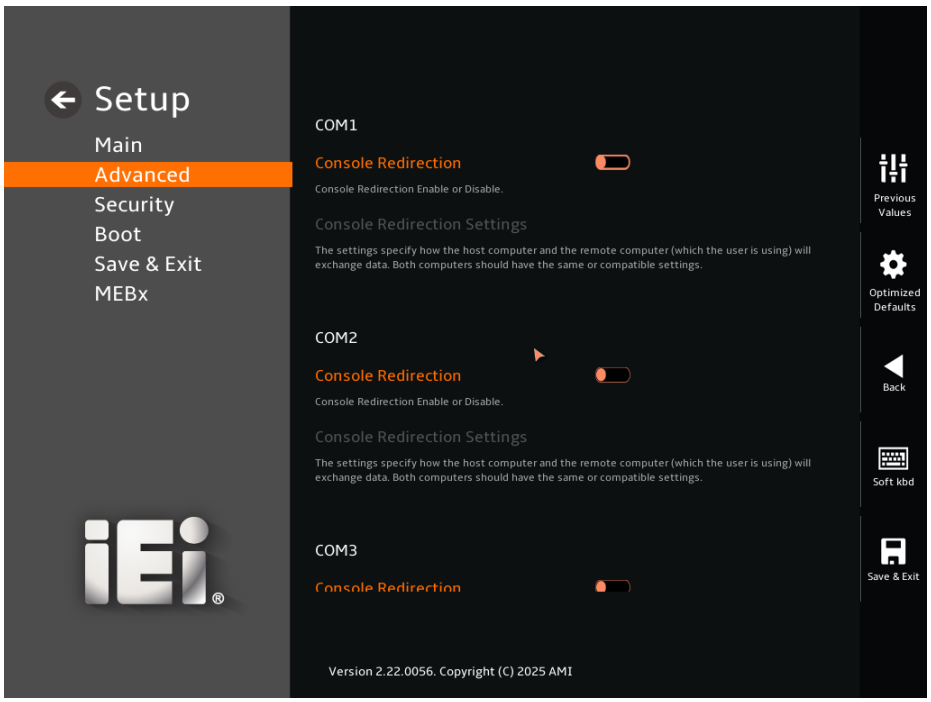
Use the **SYS_Fan1 Start PWM** option to set the PWM start value. Use the + or – key to change the value or enter a decimal number between 1 and 100.

➔ **Auto mode fan slope PWM [1]**

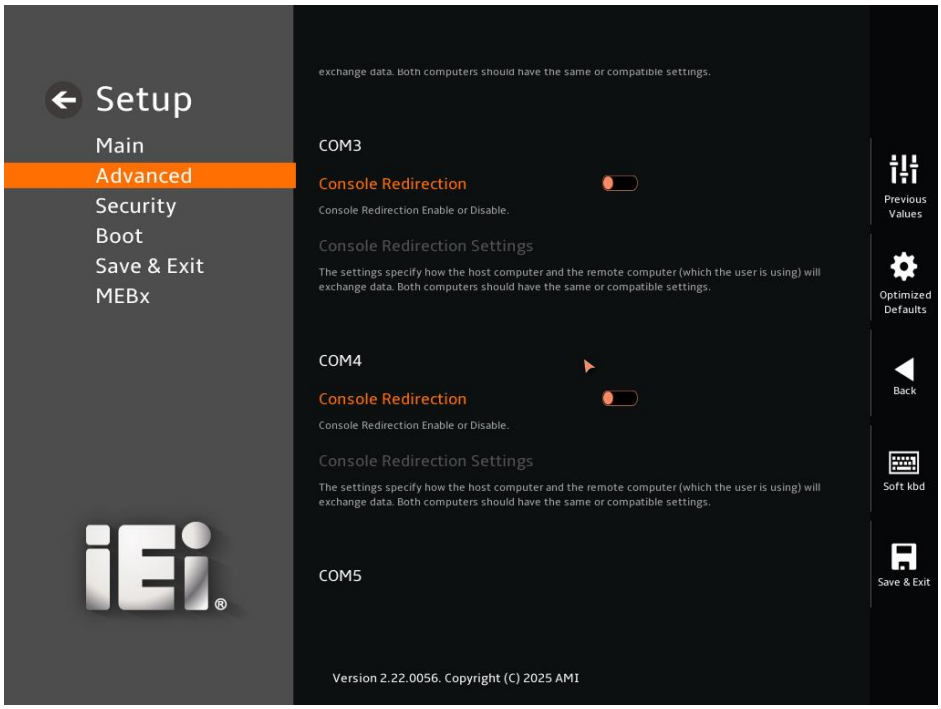
Use the **Auto mode fan slope PWM** option to set the fan slope PWM. Use the + or – key to change the value or enter a decimal number between 1 and 8.

5.3.11 Serial Port Console Redirection

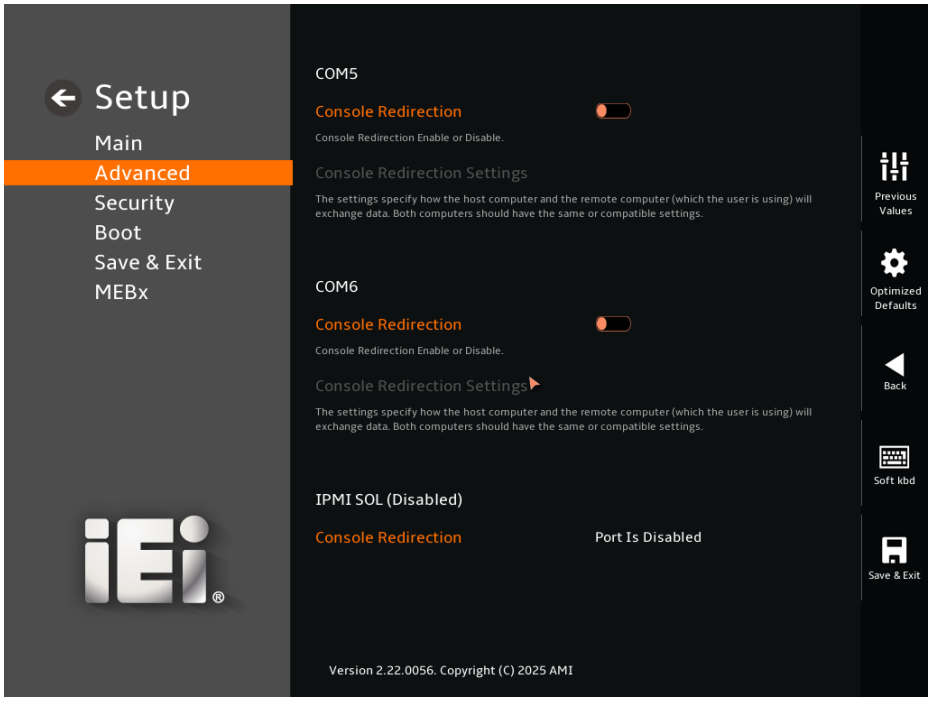
The **Serial Port Console Redirection** menu (**BIOS Menu 36**) allows the console redirection options to be configured. Console Redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



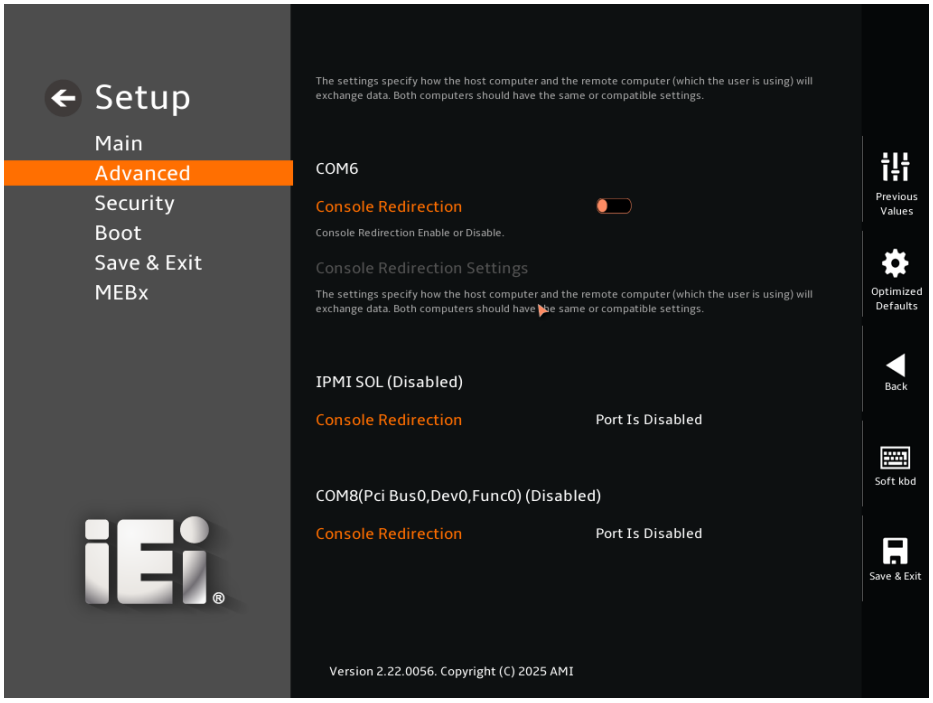
BIOS Menu 36: Serial Port Console Redirection (1/4)



BIOS Menu 37: Serial Port Console Redirection (2/4)



BIOS Menu 38: Serial Port Console Redirection (3/4)



BIOS Menu 39: Serial Port Console Redirection (4/4)

➔ **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 **Console Redirection Settings** submenu will be available when the **Console Redirection** option is enabled.

5.3.11.1 Console Redirection Settings

The following options are available in the **Console Redirection Settings** submenu (**BIOS Menu 40**) when the **COM Console Redirection** (for COM1 to COM6) option is enabled.

BIOS Menu 40: COM Console Redirection Settings

➔ **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 on the other side. Long or noisy lines may require lower speeds.

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

- **57600** — Sets the serial port transmission speed at 57600.
- **115200** **DEFAULT** — Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

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

- **7** — Sets the data bits at 7.
- **8** **DEFAULT** — Sets the data bits at 8.

➔ **Parity [None]**

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

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

➔ **Stop Bits [1]**

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

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

5.3.12 NVMe Configuration

Use the **NVMe Configuration** (**BIOS Menu 41**) menu to display the NVMe controller and device information.

BIOS Menu 41: NVMe Configuration

5.4 Security

Use the **Security** menu (**BIOS Menu 42**) to set system and user passwords.

BIOS Menu 42: Security (1/2)

BIOS Menu 43: Security (2/2)

➔ Administrator Password

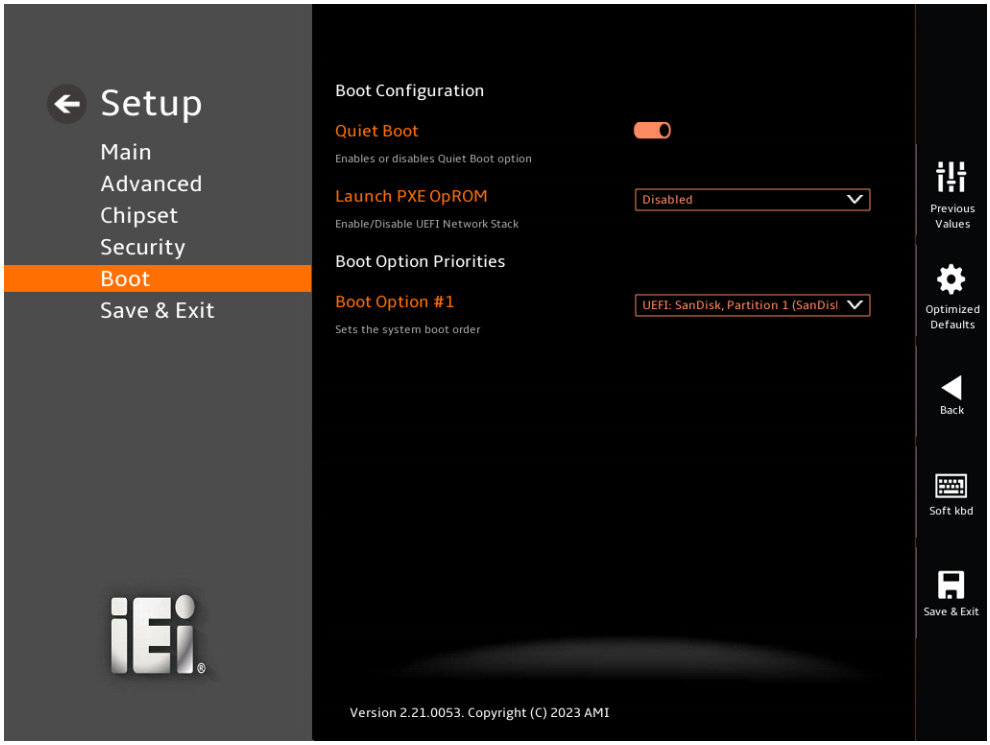
Use the **Administrator Password** to set or change an administrator password.

➔ User Password

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

5.5 Boot

Use the **Boot** menu (**BIOS Menu 44**) to configure system boot options.



BIOS Menu 44: Boot

5.5.1 Boot Configuration

➔ **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.

5.5.2 Boot Option Priorities

Use the Boot Option # N to choose the system boots from the peripherals you selected. The following Boot Options are listed as an example.

➔ **Boot Option #1**

Sets the system boot order **ADATA SP580** as the first priority.

- ➔ **Windows Boot Manager (P1: ADATA SSD SP580 240GB)**
- ➔ **Disabled**

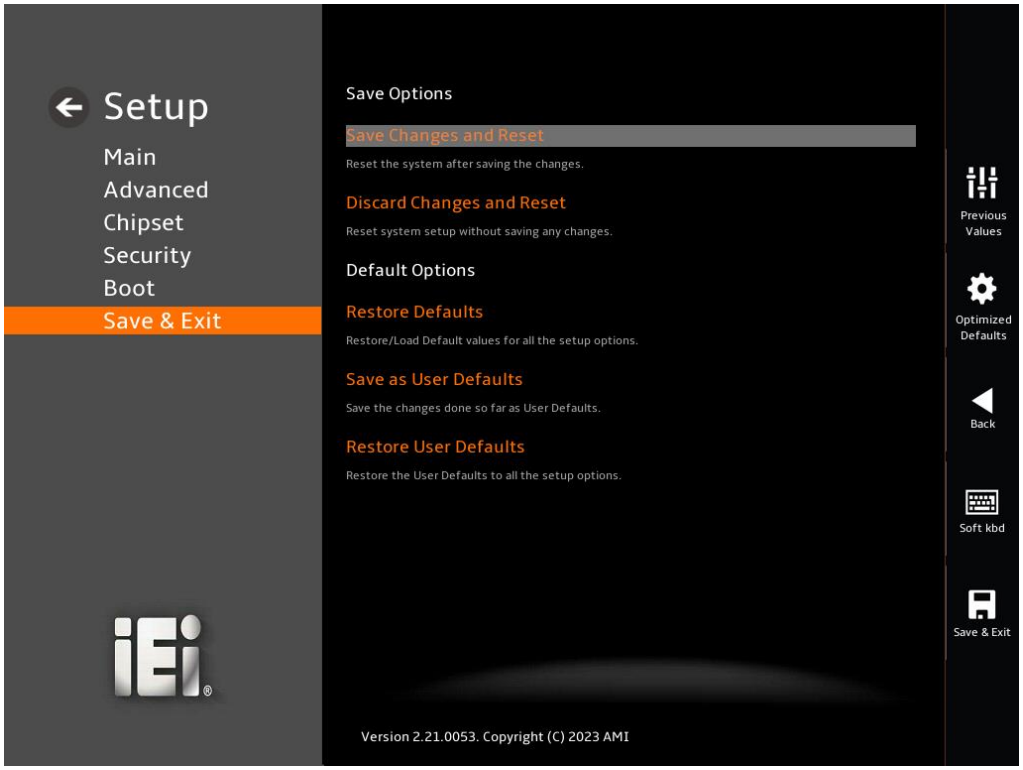
➔ **Boot Option #2**

Sets the system boot order **USB Partition 1** as the second priority.

- ➔ **UEFI: USB, Partition 1**
- ➔ **Disabled**

5.6 Save & Exit

Use the **Save & Exit** menu (**BIOS Menu 45**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 45: 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

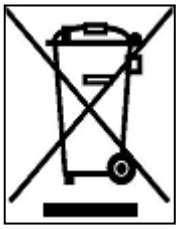
Product Disposal

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.

- ➔ **BIOS Information** **86**
- ➔ **Processor Information** **86**
- ➔ **PCH Information** **87**
- ➔ **System Date [xx/xx/xx]** **87**
- ➔ **System Time [xx:xx:xx]** **87**
- ➔ **Intel(R) SpeedStep(tm) [Enabled]** **92**
- ➔ **C states [Disabled]** **92**
- ➔ **Turbo Mode [Enabled]** **92**
- ➔ **Intel (VMX) Virtualization Technology [Enabled]** **92**
- ➔ **Active Performance Cores [All]** **93**
- ➔ **Active Efficient Cores [All]** **93**
- ➔ **Active SOC-North Efficient-cores [All]** **93**
- ➔ **Hyper-Threading [Enabled]** **94**
- ➔ **Power Limit 1 [0]** **94**
- ➔ **Power Limit 2[0]** **94**
- ➔ **Power Limit 1 Time Window [0]** **94**
- ➔ **VT-d [Enabled]** **95**
- ➔ **Primary Display [Auto]** **97**
- ➔ **Internal Graphics [Enabled]** **97**
- ➔ **DVMT Pre-Allocated [160M]** **98**
- ➔ **DVMT Total Gfx Mem [MAX]** **98**
- ➔ **Enable VMD controller [Disabled]** **99**
- ➔ **PCIe Speed [Auto]** **101**
- ➔ **Detect Non-Compliance Device [Disabled]** **101**
- ➔ **SATA Mode Selection [AHCI]** **102**
- ➔ **Hot Plug [Disabled]** **103**
- ➔ **HD Audio [Enabled]** **103**
- ➔ **Auto Power Button Function [Enabled (AT)]** **105**
- ➔ **Power Saving Function (EUP) [Disabled]** **105**
- ➔ **USB Power state [S0/S3/S4/S5 ON]** **106**
- ➔ **ME OVERRIDE [Disabled]** **106**
- ➔ **AMI BIOS Features [Enabled]** **107**
- ➔ **Unconfigure ME [Disabled]** **107**

- TPM Device Support [Enable] 108
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- CPU_FAN1 Normal Duty [30] 125
- SYS_FAN1 Smart Fan Control [Auto Mode] 125
- SYS_FAN1 Start Temperature [50] 125
- SYS_FAN1 Off Temperature [40] 125
- SYS_FAN1 Start PWM [30] 125
- Auto mode fan slope PWM [1] 125
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- Terminal Type [ANSI] 4
- Bits per second [115200] 4
- Data Bits [8] 5
- Parity [None] 5

- Stop Bits [1] 5
- Administrator Password 8
- User Password 8
- Quiet Boot [Enabled] 9
- Launch PXE OpROM [Disabled] 9
- Option ROM Messages [Force BIOS] 10
- Boot Option #1 10
- Boot Option #2 10
- Save Changes and Reset 11
- Discard Changes and Reset 11
- Restore Defaults 11
- Save as User Defaults 12
- Restore User Defaults 12

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))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) 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。