



MODEL:
HYPER-ASL

**PICO-ITX SBC with Intel Atom® x7000E and N-Series
On-Board CPU, 8GB LPDDR5 Memory on Board, HDMI, LVDS,
M.2 M and A Key, USB 3.2, iSATA , COM, RoHS**

User Manual



Revision



Date	Version	Changes
March 18, 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: HYPER-ASL

The HYPER-ASL series is a single board computer in Pico-ITX form factor. It is powered by the Intel Atom® x7000E Processor Series and Intel® Processor N-Series on-board SoC. It supports on-board 8GB 4800 MHz LPDDR5 (system max. 16GB).

The HYPER-ASL series includes HDMI and LVDS for dual independent display. It provides two 2.5GbE RJ45 Ethernet interfaces through the Intel® I226V controllers. Expansion and I/O ports include two M.2 slots, one COM port, one iSATA 6Gb/s connector, two USB 3.2 Gen 2 and two USB 2.0 connectors.

1.2 Features

Some of the HYPER-ASL motherboard features are listed below:

- Support Intel Atom® x7000E Processor Series and Intel® Processor N-Series on-board SoC
- On-board 8GB 4800 MHz LPDDR5 (system max. 16GB)
- Two 2.5GbE RJ45 connectors via Intel® I226V controller
- Dual independent display by HDMI and LVDS
- One iSATA 6Gb/s connector
- Two USB 3.2 Gen 2 ports and two USB 2.0 connectors
- One M.2 M-key slot and one M.2 A-key slot
- One serial port

HYPER-ASL

- RoHS compliant

1.3 Connectors

The connectors on the HYPER-ASL are shown in the figure below.

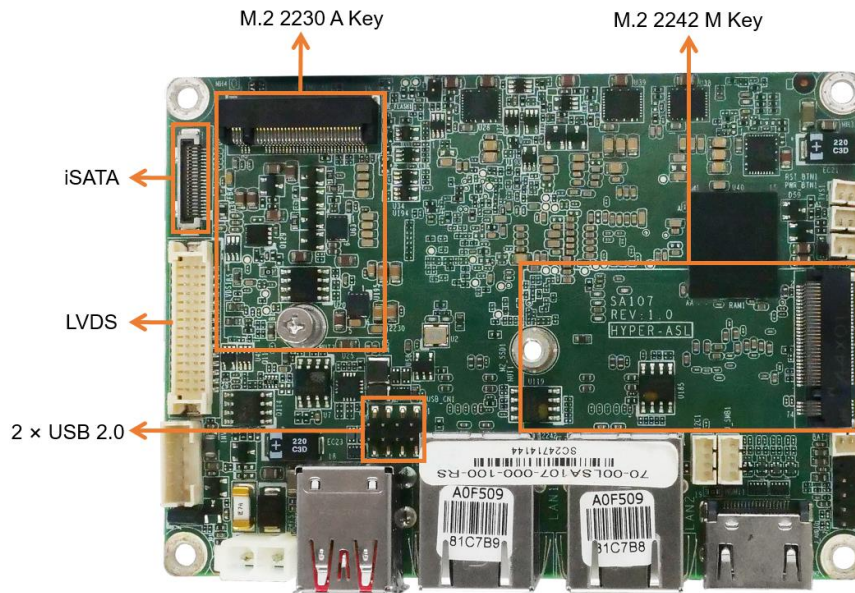


Figure 1-2: Connectors (1/3)

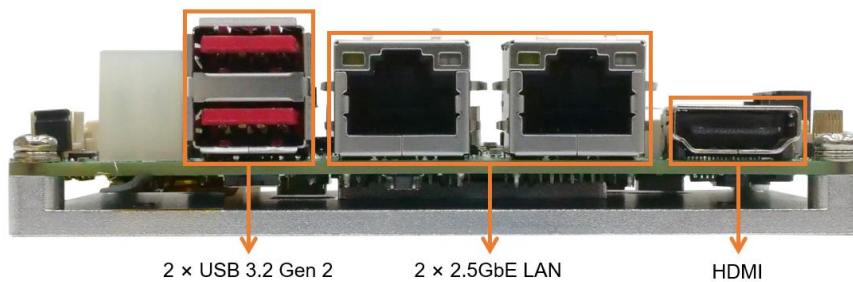


Figure 1-3: Connectors (2/3)



Figure 1-4: Connectors (3/3)

HYPER-ASL

1.4 Dimensions

The main dimensions of the HYPER-ASL are shown in the diagram below.

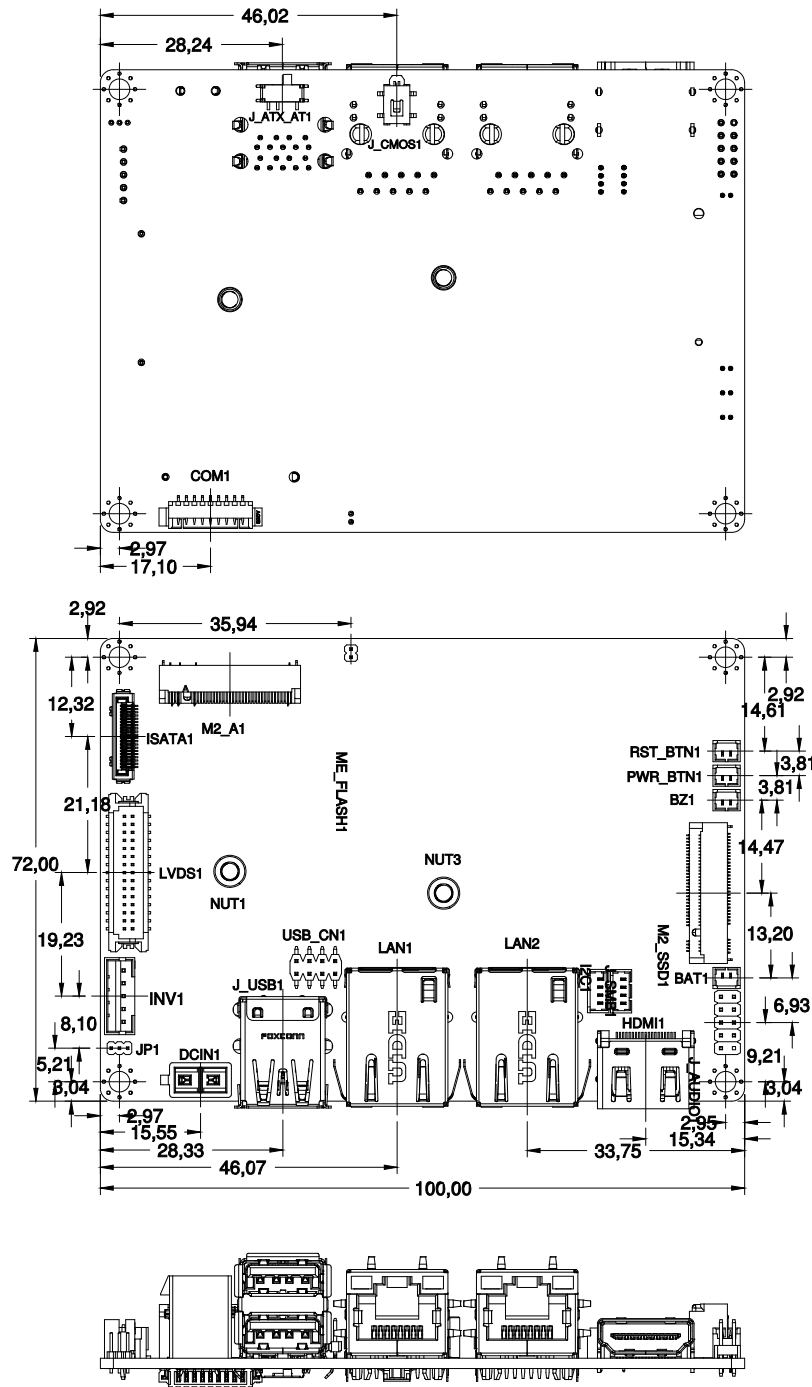


Figure 1-5: HYPER-ASL Dimensions (mm)

1.5 Data Flow

Figure 1-6 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.



Figure 1-6: Data Flow Diagram

HYPER-ASL

1.6 Technical Specifications

The HYPER-ASL technical specifications are listed below.

Model	HYPER-ASL
Form Factor	Pico-ITX
CPU Supported	Support Intel Atom® x7000E Processor Series and Intel® Processor N-Series Intel® N97 on-board SoC Intel Atom® x7433RE on-board SoC Intel Atom® x7835RE on-board SoC
Memory	Dual channel on-board LPDDR5 8GB pre-installed (system max.16GB)
Graphics Engine	Intel® UHD Graphics
Display Output	Dual independent display 1 x HDMI 1.4 (4K @ 30Hz) 1 x LVDS: 24-bit dual-channel, up to 1920 x 1200
Ethernet Controllers	2 x Intel® 2.5GbE I226-V controller
BIOS	AMI UEFI BIOS
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansions	1 x M.2 A Key 2230 (PCIe Gen3 x1 & USB2.0) 1 x M.2 M Key 2242 (PCIe Gen3 x2)
I/O Interface Connectors	
Ethernet	Two 2.5GbE RJ-45 ports
Front Panel	1 x Power button connector (1 x 2 pin, p=1.25 mm) 1 x Reset button connector (1 x 2 pin, p=1.25 mm)
I ² C/SMBus	1 x I ² C (1 x 4 pin) 1 x SMBus (1 x 4 pin)
Serial ATA	1 x iSATA 6Gb/s
Serial Ports	1 x RS-232/422/485 (1 x 9 pin, p=1.25 mm)

USB Ports	2 x USB 3.2 Gen 2x1 Type-A (10Gb/s) 2 x USB 2.0 (2 x 4 pin, p=2.0 mm)
Environmental and Power Specifications	
Power Supply	AT/ATX power supply
Power Consumption	12V@2.724A (Intel® N97 with 8 GB 4800 MHz LPDDR5 memory, max.loading, EuP mode disabled)
Operating Temperature	0°C ~ 60°C
Storage Temperature	-30°C ~ 70°C
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	100 mm x 72 mm
Weight (Gross/Net)	600g / 250g

Table 1-1: HYPER-ASL 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 HYPER-ASL 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.

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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 HYPER-ASL was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The HYPER-ASL is shipped with the following components:

Quantity	Item and Part Number	Image
1	HYPER-ASL single board computer	
1	iSATA cable	
1	Power cable	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable, 210mm, p=2.0 mm (P/N: 32001-008600-200-RS)	
RS-232/422/485 cable, 250mm, 1 x 9 pin, p=1.25 mm (P/N: 32205-008000-100-RS)	
Audio peripheral board, Realtek ALC888S 7.1 Channel (P/N: AC-KIT-888S-R10)	
Audio peripheral board, Realtek ALC888S 7.1 Channel (P/N: AC-KIT2-888S-R10)	
Cooler module for 2" HYPER series (P/N: 42306-0331E4-00-HF)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the peripheral interface connectors.

3.1.1 HYPER-ASL Peripheral Interface Connectors

The figures below shows all the peripheral interface connectors of the HYPER-ASL series.

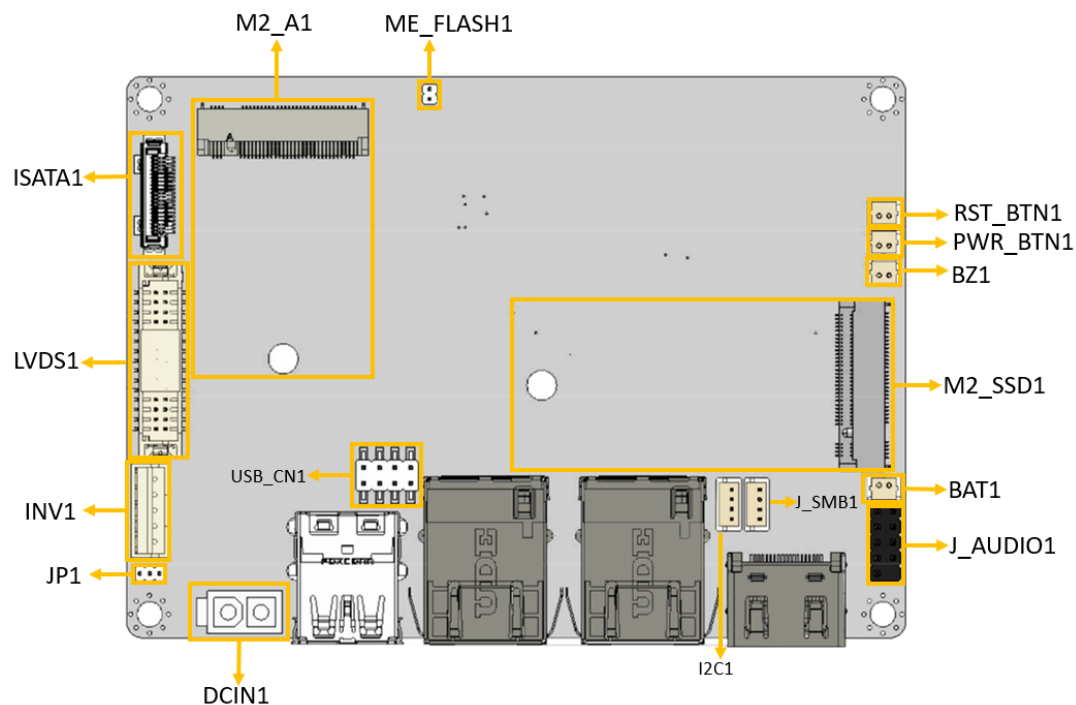


Figure 3-1: Peripheral Interface Connectors (Front Side)

HYPER-ASL

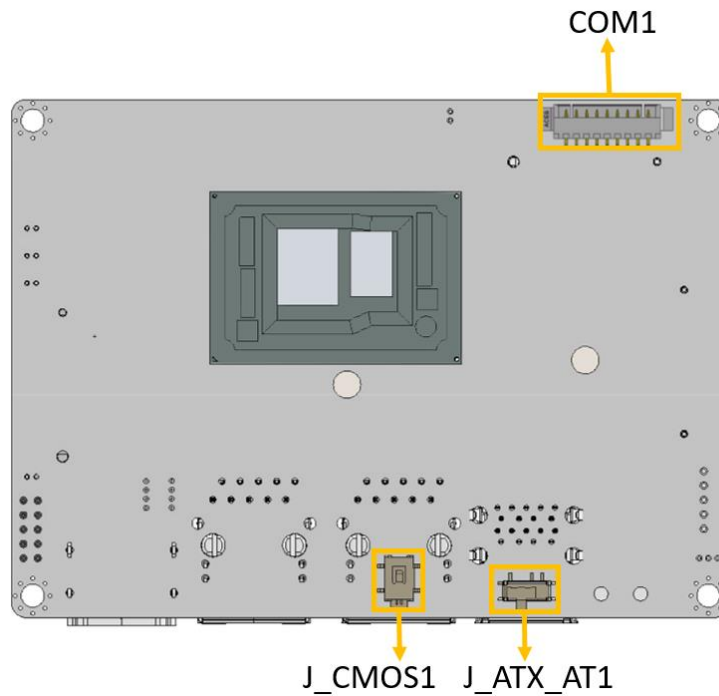


Figure 3-2: Peripheral Interface Connectors (Solder Side)

3.1.2 Internal Peripheral Connectors

The table below lists all the internal connectors on the board.

Connector	Type	Label
Battery Connector	2-pin wafer	BAT1
AT/ATX Power Mode Setting Switch	3-pin switch	J_ATX_AT1
Clear CMOS Button	Tact switch	J_CMOS1
I ² C Connector	4-pin wafer	I2C1
SMBUS Connector	4-pin wafer	J_SMB1
Internal USB 2.0 Connector	8-pin header	USB_CN1
M.2 M-key Slot	M.2 M-key slot	M2_SSD1
M.2 A-key Slot	M.2 A-key slot	M2_A1
Power Button Connector	2-pin wafer	PWR_BTN1
Reset Button Connector	2-pin wafer	RST_BTN1

Connector	Type	Label
iSATA 6Gb/s Connector	20-pin SATA connector	ISATA1
RS-232/422/485 Serial Port	9-pin wafer	COM1
Buzzer Connector	2-pin wafer	BZ1
LVDS Connector	30-pin connector	LVDS1
LVDS Panel Power	5-pin wafer	INV1
LCD Power Selection	3-pin mini jumper	JP1
Audio Connector	10-pin header	J_AUDIO1
Power Connector	2-pin connector	DCIN1
ME Flash Connector	2-pin header	ME_FLASH1

Table 3-1: Internal Peripheral Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
External 2.5GbE Connector	RJ45	LAN1, LAN2
External HDMI Connector	HDMI	HDMI1
External Dual USB 10Gb/s Connector	USB 3.2	J_USB1

Table 3-2: External Panel Connectors

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3.2 Internal Peripheral Connectors

The section describes all of the internal connectors on the HYPER-ASL.

3.2.1 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 HYPER-ASL is installed.

CN Label:	BAT1
CN Type:	2-pin wafer
CN Location:	See Figure 3-3
CN Pinouts:	See Table 3-3

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.

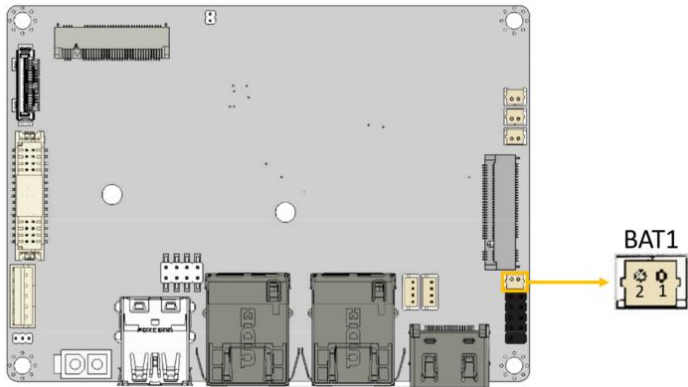


Figure 3-3: Battery Connector Location

Pin	Description	Pin	Description
1	VBATT	2	GND

Table 3-3: Battery Connector Pinouts

HYPER-ASL

3.2.2 AT/ATX Power Mode Setting

CN Label:	J_ATX_AT1
CN Type:	3-pin switch
CN Location:	See Figure 3-4
CN Pinouts:	See Table 3-4

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

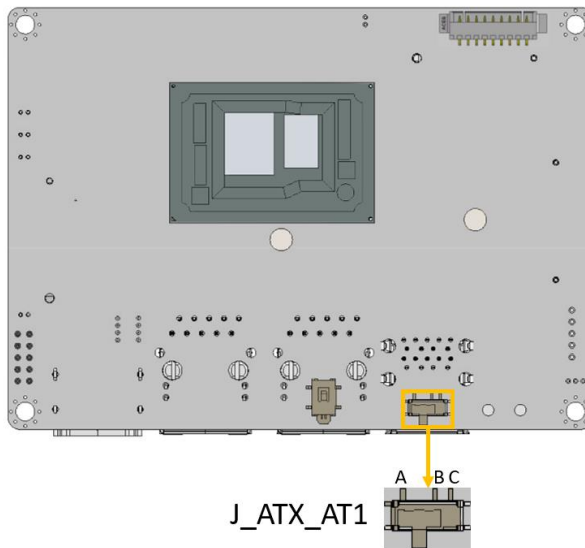


Figure 3-4: AT/ATX Power Mode Switch Location

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

Table 3-4: AT/ATX Power Mode Switch Settings

3.2.3 Clear CMOS Button

CN Label:	J_CMOS1
CN Type:	Tact switch
CN Location:	See Figure 3-5
CN Pinouts:	See Table 3-5

The J_CMOS1 is used to clear CMOS settings.

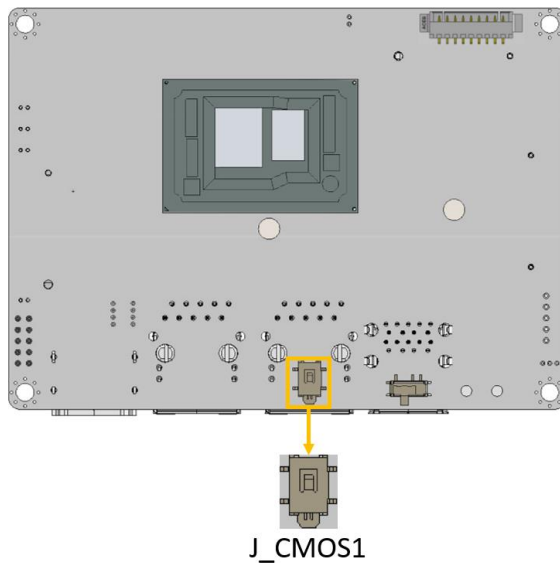


Figure 3-5: Clear CMOS Jumper Location

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

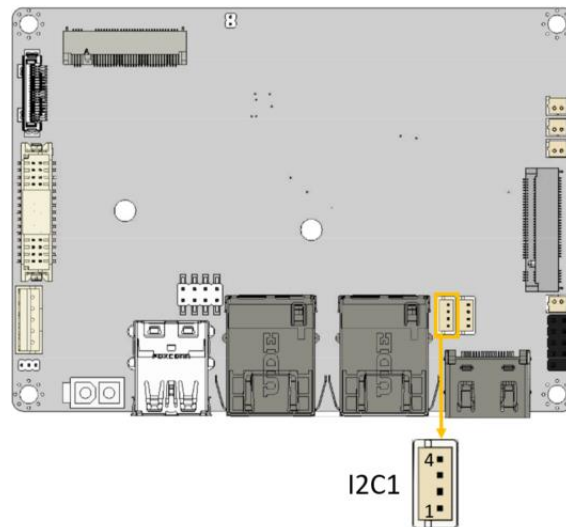
Table 3-5: Clear CMOS Jumper Pinouts

3.2.4 I²C Connector

- CN Label:** I2C1
- CN Type:** 4-pin wafer, p=1.25 mm
- CN Location:** See **Figure 3-6**
- CN Pinouts:** See **Table 3-6**

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

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Figure 3-6: I²C Connector Location

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

Table 3-6: I²C Connector Pinouts

3.2.5 SMBus Connector

CN Label: J_SMB1

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

CN Location: See Figure 3-7

CN Pinouts: See Table 3-7

The SMBus connector is used to connect SMBus devices to the mainboard.

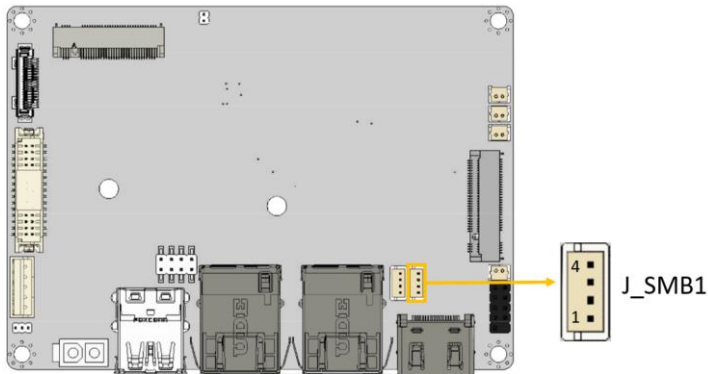


Figure 3-7: SMBus Connector Location

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

Table 3-7: SMBus Connector Pinouts

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3.2.6 Internal USB 2.0 Connectors

- CN Label:** USB_CN1
- CN Type:** 8-pin header, p=2.54 mm
- CN Location:** See Figure 3-8
- CN Pinouts:** See Table 3-8

The Internal USB 2.0 connectors connect to USB 2.0 devices.

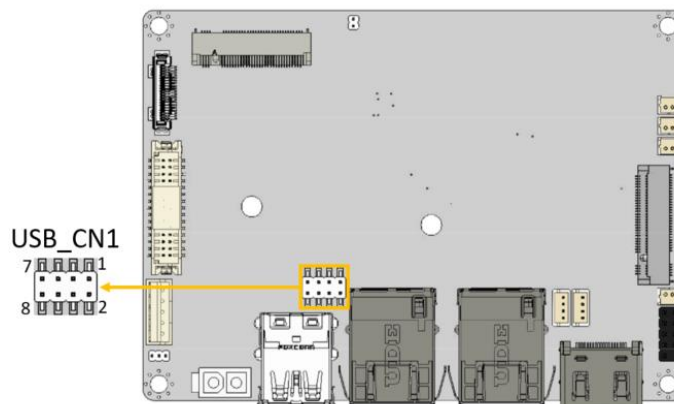


Figure 3-8: Internal USB 2.0 Connector Location

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

Table 3-8: Internal USB 2.0 Connector Pinouts

3.2.7 M.2 M-Key Slot

- CN Label:

M2_SSD1
- CN Type:

M.2 M-key slot
- CN Location:

See Figure 3-9
- CN Pinouts:

See Table 3-9

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

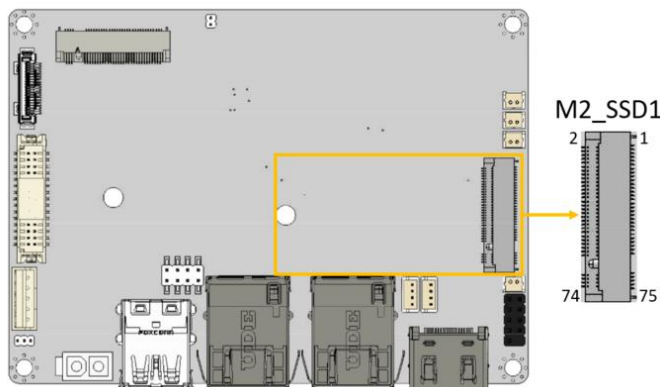


Figure 3-9: M.2 M-Key Slot Location

Pin	Description	Pin	Description
1	GND	2	+V3.3A
3	GND	4	+V3.3A
5	NC	6	NC
7	NC	8	NC
9	GND	10	+V3.3A
11	NC	12	+V3.3A
13	NC	14	+V3.3A
15	GND	16	+V3.3A
17	NC	18	+V3.3A
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC

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Pin	Description	Pin	Description
27	GND	28	NC
29	PCIE_RX7-	30	NC
31	PCIE_RX7+	32	NC
33	GND	34	USB+
35	PCIE_TX7-	36	USB-
37	PCIE_TX7+	38	MKEY_SSD_SLP
39	GND	40	M2_I2C_CLK
41	PCIE_RX6-	42	M2_I2C_DATA
43	PCIE_RX6+	44	NC
45	GND	46	NC
47	PCIE_TX6-	48	NC
49	PCIE_TX6+	50	BUF_PLT_RST
51	GND	52	NC
53	CLK_M2_B-	54	PCIE_WAKE#
55	CLK_M2_B+	56	NC
57	GND	58	NC
59	Module Key	60	Module Key
61	Module Key	62	Module Key
63	Module Key	64	Module Key
65	Module Key	66	Module Key
67	NC	68	NC
69	+V3.3A	70	+V3.3A
71	GND	72	+V3.3A
73	GND	74	+V3.3A
75	GND		

Table 3-9: M.2 M-Key Slot Pinouts

3.2.8 M.2 A-Key Slot

- CN Label:

M2_A1
- CN Type:

M.2 A-key slot
- CN Location:

See Figure 3-10
- CN Pinouts:

See Table 3-10

The M.2 A-key slot is used for Wi-Fi or Bluetooth modules.

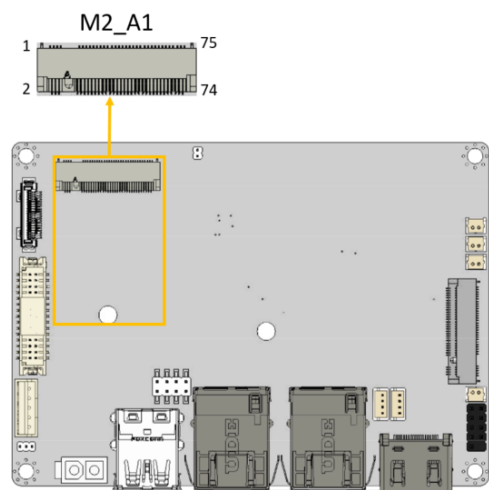


Figure 3-10: M.2 A-Key Slot Location

Pin	Description	Pin	Description
1	GND	2	+3.3V
3	USB2_P7_DP	4	+3.3V
5	USB2_P7_DN	6	N/C
7	NC	8	N/C
9	GND	10	N/C
11	NC	12	N/C
13	NC	14	N/C
15	GND	16	N/C
17	NC	18	GND
19	NC	20	N/C
21	GND	22	N/C

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Pin	Description	Pin	Description
23	NC	24	N/C
25	NC	26	N/C
27	GND	28	N/C
29	N/C	30	GND
31	N/C	32	N/C
33	GND	34	N/C
35	PCIE_P7_TX_DP	36	GND
37	PCIE_P7_TX_DN	38	GND
39	GND	40	N/C
41	PCIE_P7_RX_DP	42	N/C
43	PCIE_P7_RX_DN	44	N/C
45	GND	46	N/C
47	PCIE_CLKP0	48	N/C
49	PCIE_CLKN0	50	N/C
51	GND	52	BUF_PLT_RST_N
53	N/C	54	BT_RF_KILL_N
55	PCIE_WAKE_N	56	WIFI_RF_KILL_N
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	N/C
67	N/C	68	NC
69	N/C	70	NA
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

Table 3-10: M.2 A-Key Slot Pinouts

3.2.9 Power Button Connector

CN Label: PWR_BTN1
CN Type: 2-pin wafer, p=2.00 mm
CN Location: See **Figure 3-11**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.

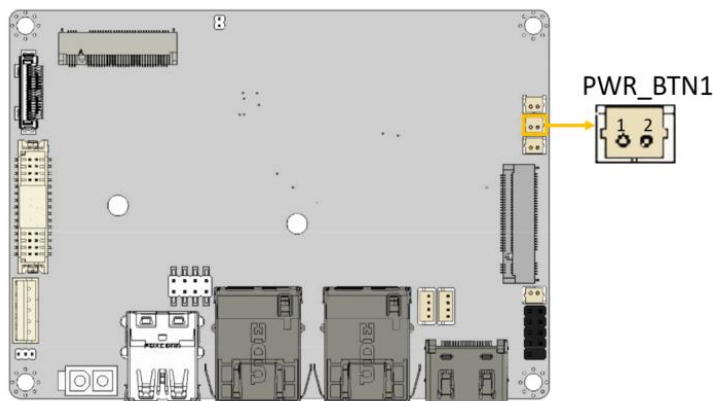


Figure 3-11: Power Button Connector Location

3.2.10 Reset Button Connector

CN Label: RST_BTN1
CN Type: 2-pin wafer, p=2.00 mm
CN Location: See **Figure 3-12**

The reset button connector is connected to a reset switch on the system chassis allows users to reboot the system when the system is turned on.

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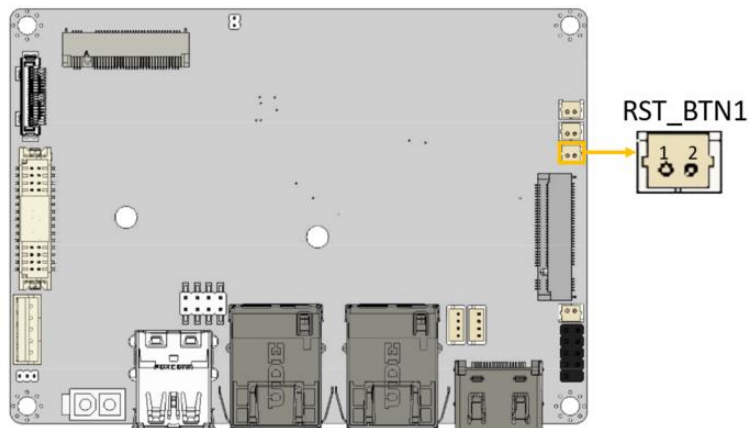


Figure 3-12: Reset Button Connector Location

3.2.11 iSATA 6Gb/s Connectors

CN Label:	ISATA1
CN Type:	20-pin SATA connector
CN Location:	See Figure 3-13
CN Pinouts:	See Table 3-11

The iSATA drive connector is connected to a SATA device via a cable defined by IEI. The iSATA drive transfers data at speeds as high as 6Gb/s.

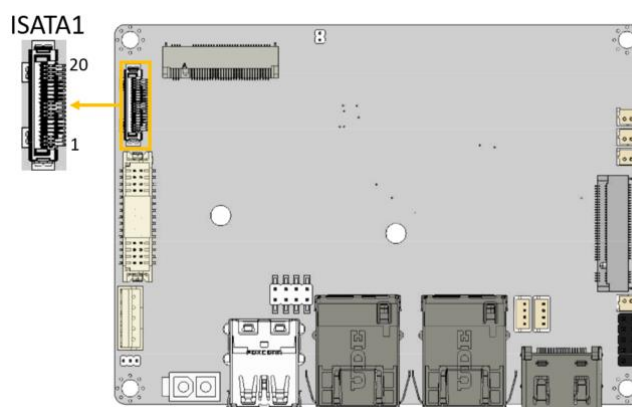


Figure 3-13: iSATA Connector Location

Pin	Description	Pin	Description
1	GND	11	+5V
2	GND	12	N/C
3	GND	13	N/C
4	GND	14	GND
5	GND	15	SATA RX+
6	GND	16	SATA_RX-
7	+5V	17	GND
8	+5V	18	SATA_TX-
9	+5V	19	SATA_TX+
10	+5V	20	GND

Table 3-11: iSATA Connector Pinouts

3.2.12 RS-232/422/485 Serial Port Connector

- CN Label:

COM1
- CN Type:

9-pin wafer, p=2.54 mm
- CN Location:

See Figure 3-14
- CN Pinouts:

See Table 3-12

The connector provides RS-232/422/485 communications.

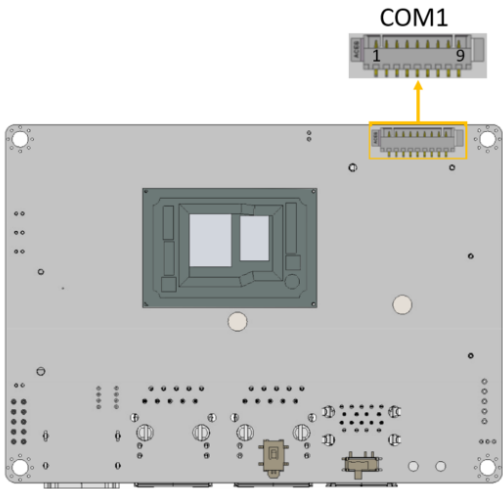


Figure 3-14: RS-232/422/485 Connector Location

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Pin	Description	Pin	Description
1	DCD	6	CTS
2	DSR	7	DTR
3	SIN	8	RI
4	RTS	9	GND
5	SOUT		

Table 3-12: RS-232/422/485 Connector Pinouts

3.2.13 Buzzer Connector

CN Label: **BZ1**

CN Type: 2-pin wafer, p=1.25 mm

CN Location: See **Figure 3-15**CN Pinouts: See **Table 3-13**

The buzzer connector is connected with the buzzer to give a beep warning when the motherboard goes wrong.

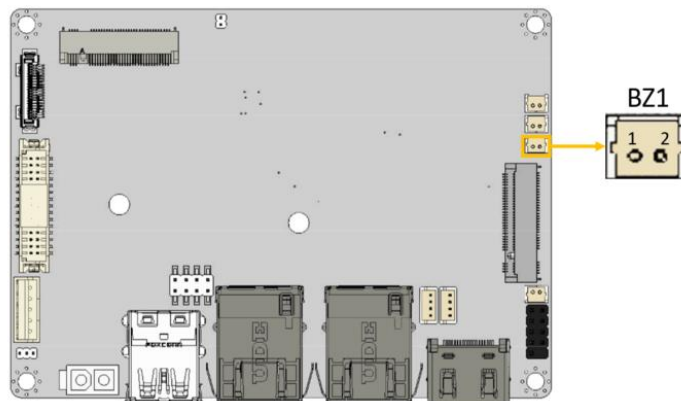


Figure 3-15: Buzzer Connector Location

Pin	Description	Pin	Description
1	+5V	2	PC_BEEP

Table 3-13: Buzzer Connector Pinouts

3.2.14 LVDS Connector

- CN Label:

LVDS1
- CN Type:

30-pin connector, p=1.25 mm
- CN Location:

See Figure 3-16
- CN Pinouts:

See Table 3-14

The LVDS connector is used to connect LVDS screens.

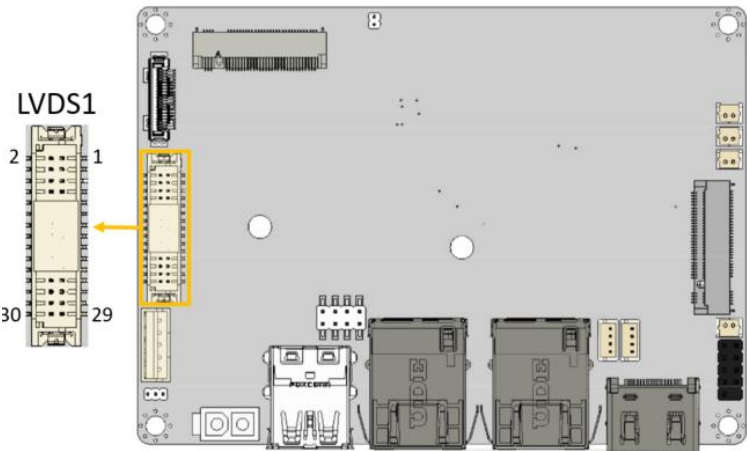


Figure 3-16: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	21	A5M_L
2	GND	22	A6M_L
3	A0M_L	23	A5P_L
4	A1M_L	24	A6P_L
5	A0P_L	25	GND
6	A1P_L	26	GND
7	GND	27	CLK2M_L
8	GND	28	A7M_L
9	A2M_L	29	CLK2P_L
10	CLK1M_L	30	A7P_L
11	A2P_L	31	GND
12	CLK1P_L	32	GND

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Pin	Description	Pin	Description
13	GND	33	LVDS_RESETB
14	GND	34	NC
15	A3M_L	35	+VCC_LCD
16	A4M_L	36	+VCC_LCD
17	A3P_L	37	+VCC_LCD
18	A4P_L	38	+VCC_LCD
19	GND	39	+VCC_LCD
20	GND	40	+VCC_LCD

Table 3-14: LVDS Pinouts

3.2.15 LVDS Panel Power

CN Label: INV1

CN Type: 5-pin wafer, p=2.0 mm

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

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

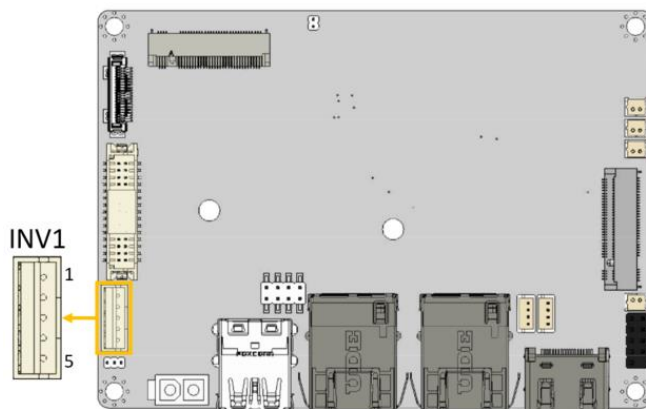


Figure 3-17: LVDS Panel Power Location

Pin	Description	Pin	Description
1	LVDS_BRIGHTNESS	4	GND
2	GND	5	LVDS_ENABKL

Pin	Description	Pin	Description
3	+V12_LCD_BKL		

Table 3-15: LVDS Panel Power Pinouts

3.2.16 LCD Power Selection

- CN Label:

JP1
- CN Type:

3-pin mini jumper, p=1.27 mm
- CN Location:

See Figure 3-18
- CN Pinouts:

See Table 3-16

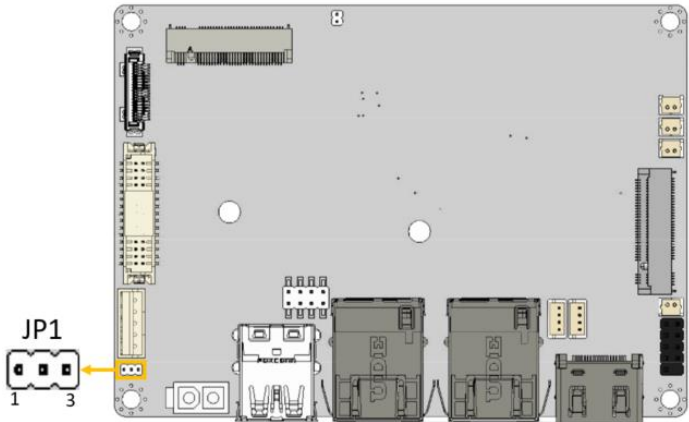


Figure 3-18: LCD Power Selection Location

Pin	Description
1-2	+3.3V(Default)
2-3	+5V

Table 3-16: LCD Power Selection Pinouts

3.2.17 Audio Connector

- CN Label:

J_AUDIO1
- CN Type:

10-pin header, p=2.0 mm
- CN Location:

See Figure 3-19

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CN Pinouts: See Table 3-17

The audio connector is connected to external audio devices (AC-KIT-888S-R10 or AC-KIT2-888S-R10) including speakers and microphones for the input and output of audio signals to and from the system.

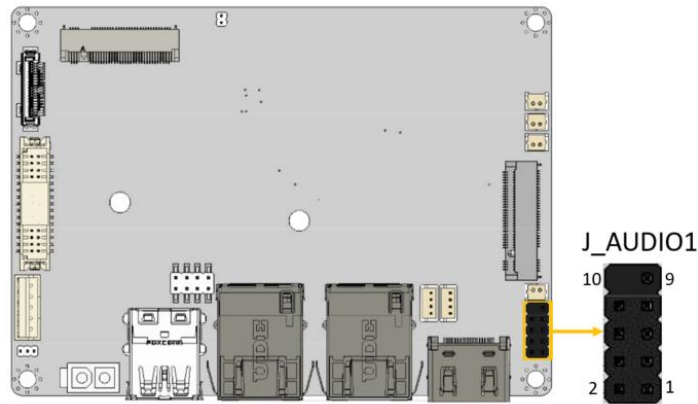


Figure 3-19: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC_R	2	HDA_BCLK_R
3	HDA_SDO_R	4	HDA_PCBEEPC
5	HDA_SDI_0_R	6	HDA_RST_R
7	+5V	8	GND
9	+12V	10	GND

Table 3-17: Audio Connector Pinouts

3.2.18 Power Connector

CN Label: DCIN1

CN Type: 2-pin connector, p=4.2 mm

CN Location: See Figure 3-20

CN Pinouts: See Table 3-18

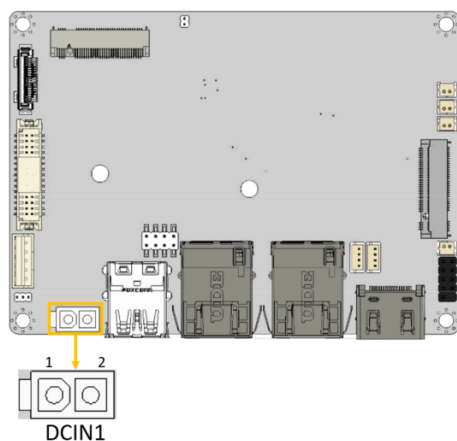


Figure 3-20: Power Connector Location

Pin	Description
1	+12VDC
2	GND

Table 3-18: Power Connector Pinouts

3.2.19 ME Flash Connector

CN Label: ME_FLASH1

CN Type: 2-pin header, p=1.27 mm

CN Location: See Figure 3-21

CN Pinouts: See Table 3-19

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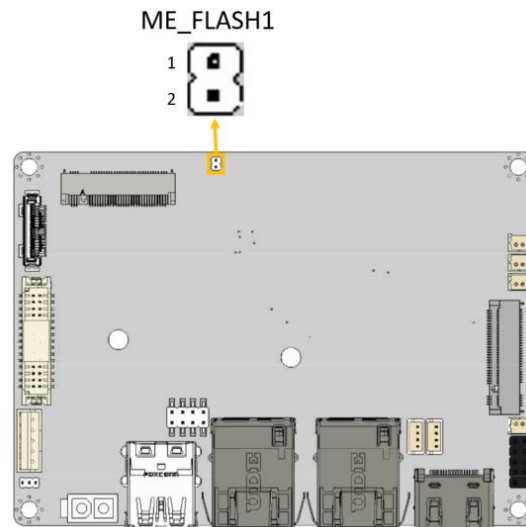


Figure 3-21: ME Flash Connector Location

Pin	Description
1	+VCCPGPPIR_3P3_1P8
2	HDA_SDO

Table 3-19: ME Flash Connector Pinouts

3.3 External Peripheral Interface Connector Panel

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

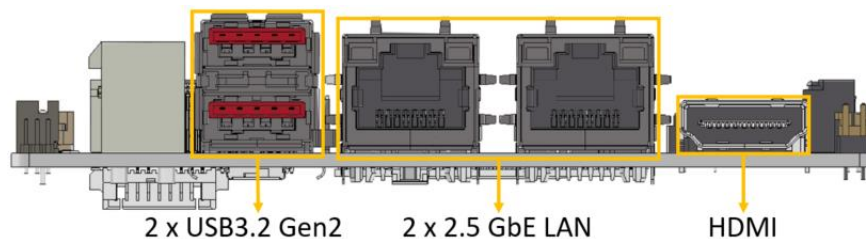


Figure 3-22: External Peripheral Interface Connector

3.3.1 External 2.5GbE RJ-45 Connectors

CN Label: LAN1, LAN2
CN Type: RJ45
CN Location: See Figure 3-23

CN Pinouts: See Table 3-20

The LAN connector connects to a local network.

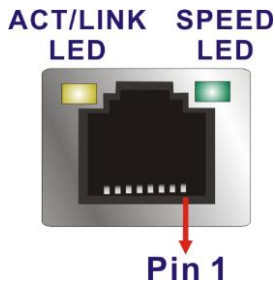


Figure 3-23: LAN Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LAN1_MDI0P	5	LAN1_MDI2P
2	LAN1_MDI0N	6	LAN1_MDI2N
3	LAN1_MDI1P	7	LAN1_MDI3P
4	LAN1_MDI1N	8	LAN1_MDI3N

Table 3-20: 2.5GbE RJ-45 Connector Pinouts

Activity/Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection
Yellow	Linked	orange	1000 Mbps connection
Blinking	TX/RX activity	Green	2.5 Gbps connection

Table 3-21: LAN LED Status

3.3.2 External HDMI Connector

- CN Label:

HDMI1
- CN Type:

HDMI
- CN Location:

See Figure 3-22
- CN Pinouts:

See Table 3-22

The external HDMI connector can connect to an HDMI device.

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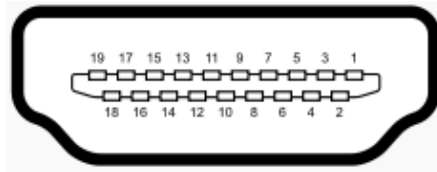


Figure 3-24: External HDMI Connector Location

Pin	Description	Pin	Description
1	HDMI2_DATA2	2	GND
3	HDMI2_DATA2#	4	HDMI2_DATA1
5	GND	6	HDMI2_DATA1#
7	HDMI2_DATA0	8	GND
9	HDMI2_DATA0#	10	HDMI2_CLK
11	GND	12	HDMI2_CLK#
13	N/C	14	N/C
15	HDMI2_SCL	16	HDMI2_SDA
17	GND	18	+5V
19	HDMI2_HPD		

Table 3-22: External HDMI Connector Pinouts

3.3.3 External Dual USB 3.2 Gen2 10Gb/s Connector

- CN Label:

J_USB1
- CN Type:

USB 3.2
- CN Location:

See Figure 3-22
- CN Pinouts:

See Table 3-23

The external dual USB 3.2 Gen 2 connector can be connected to USB 2.0 or USB 3.2 devices.

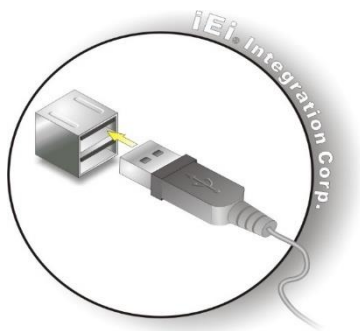


Figure 3-25: External dual USB 3.2 Gen2 Connectors Location

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

Table 3-23: External dual USB 3.2 Gen2 Connectors Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions



WARNING:

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

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the HYPER-ASL. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the HYPER-ASL 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 HYPER-ASL, place it on an anti-static pad. This reduces the possibility of ESD damaging the HYPER-ASL.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations



NOTE:

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

HYPER-ASL



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 HYPER-ASL 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 HYPER-ASL 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 HYPER-ASL off:
 - When working with the HYPER-ASL, 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 HYPER-ASL, **DO NOT:**

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

4.3 M.2 Module Installation

To install an M.2 module, please follow the steps below.

- 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 20° (**Figure 4-1**).

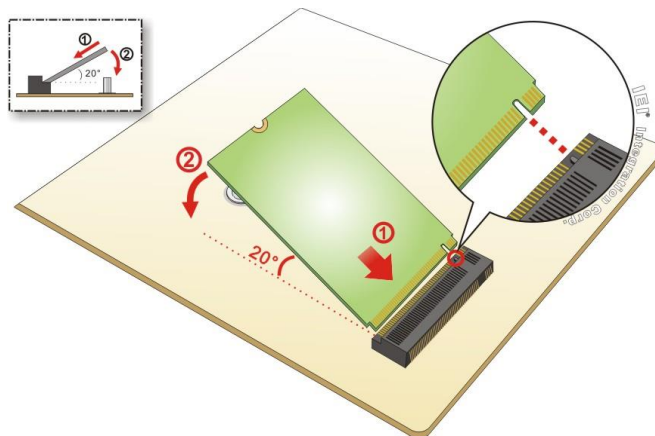


Figure 4-1: Inserting the M.2 Module into the Slot at an Angle

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

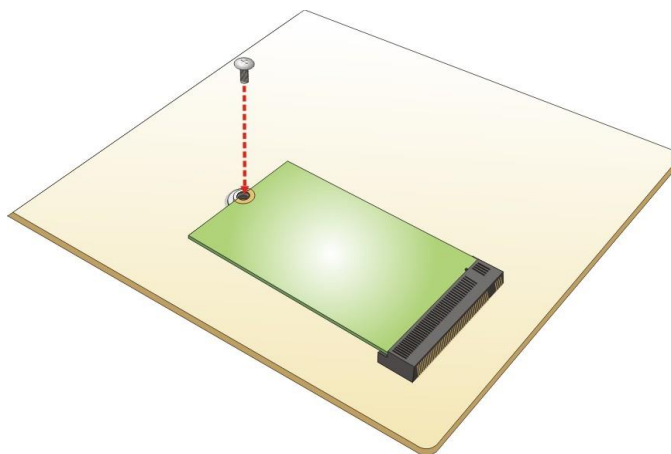


Figure 4-2: Securing the M.2 Module

HYPER-ASL

4.4 7.1 Channel Audio Kit Installation

**NOTE:**

This item must be ordered separately, and connects to the audio connector. For further information please contact the nearest distributor, reseller or vendor or contact an IEI sales representative directly.

The audio kit attaches to the audio connector. The audio kit provides 7.1 channel audio. To install the audio kit, please refer to the steps below:

Step 1: **Connect the cable to the audio kit.** Connect the included cable to the audio kit. Make sure pin 1 aligns with the marked pin.

Step 2: **Connect the cable to the board.** Connect the other end of the cable to the board. Make sure to line up the marked pin 1.

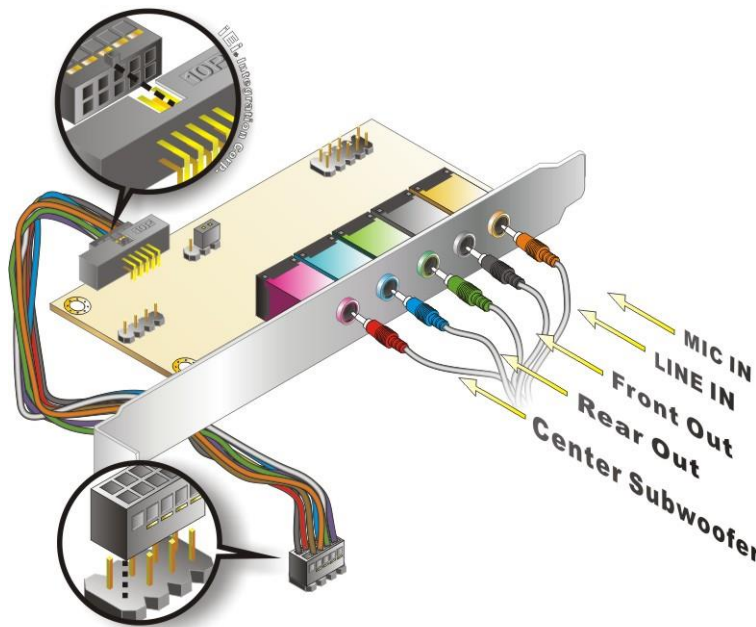


Figure 4-3: 7.1 Channel Audio Kit

Step 3: **Mount the audio kit onto the chassis.** Once the audio kit is connected to the board, secure the audio kit bracket to the system chassis.

Step 4: Connect the audio devices. Connect speakers and external audio sources to the audio jacks on the audio kit.

Step 5: Install the driver. Install the 7.1 channel audio driver included with the board.

4.5 Software Installation

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

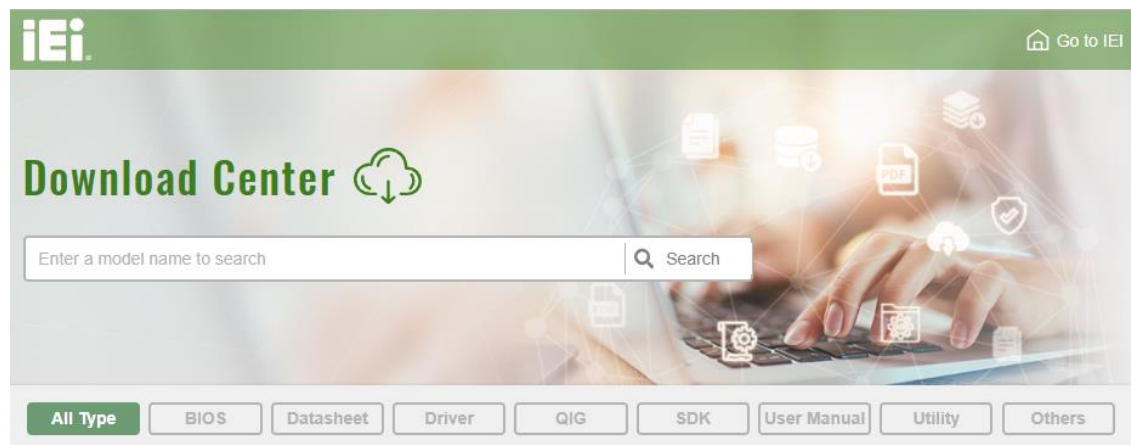


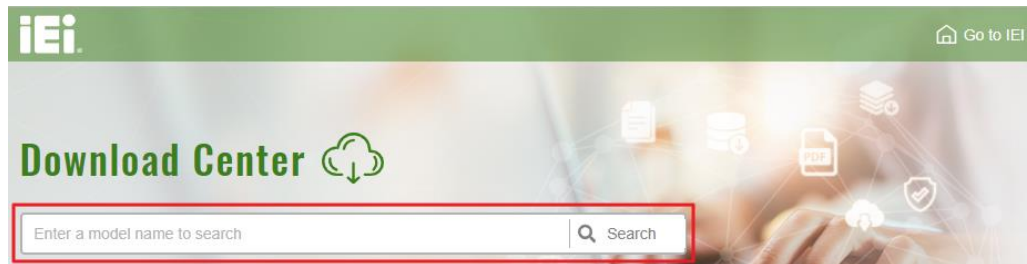
Figure 4-4: IEI Resource Download Center

HYPER-ASL

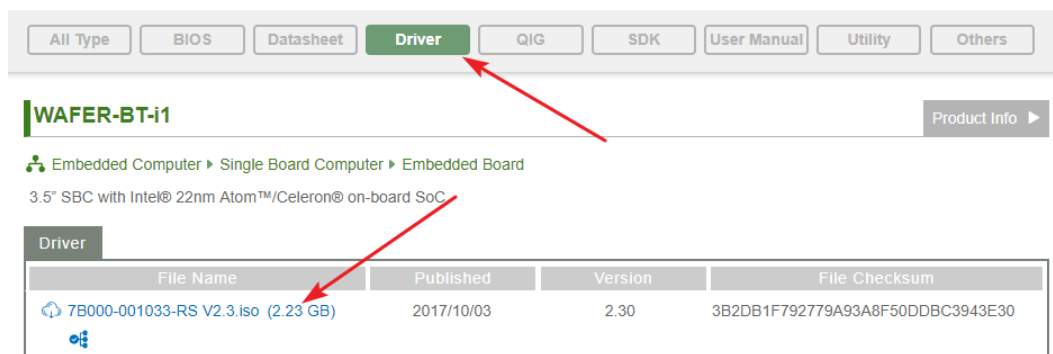
4.6 Driver Download

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

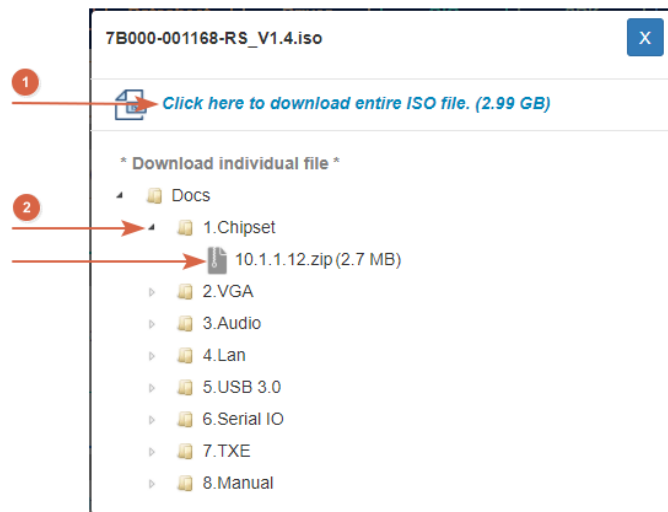
Step 1: Go to <https://download.ieiworld.com>. Type HYPER-ASL and press Enter.



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.

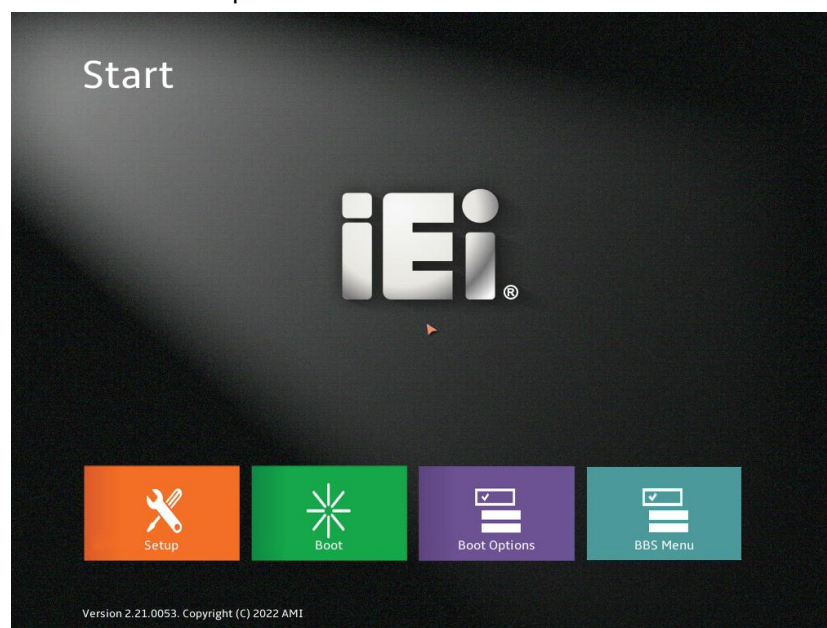


Figure 5-1: BIOS Starting Menu

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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

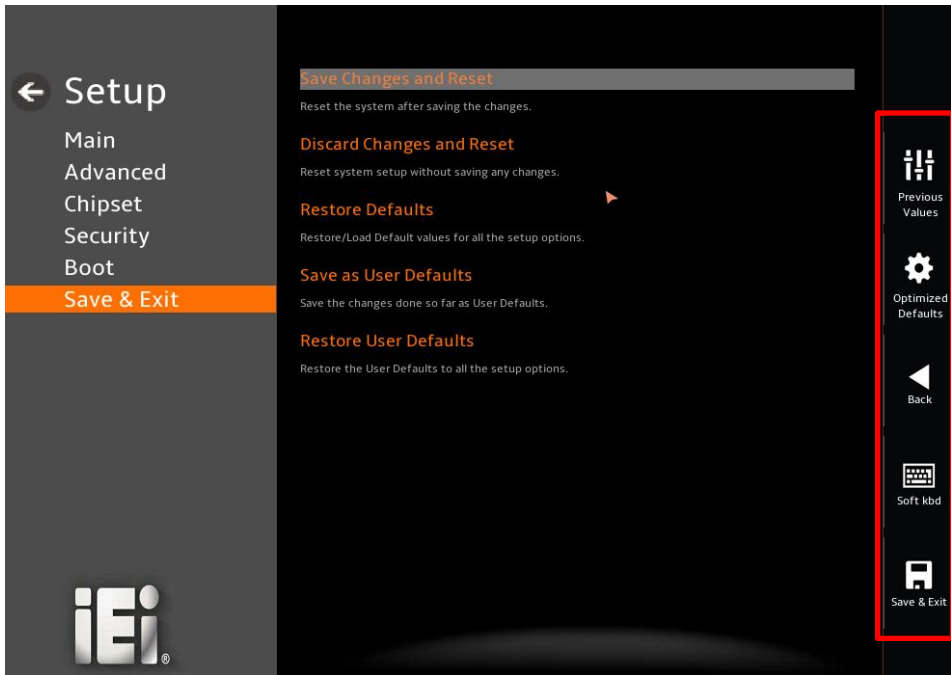
For keyboard navigation, use the navigation keys shown in **Table 5-1**.

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

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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

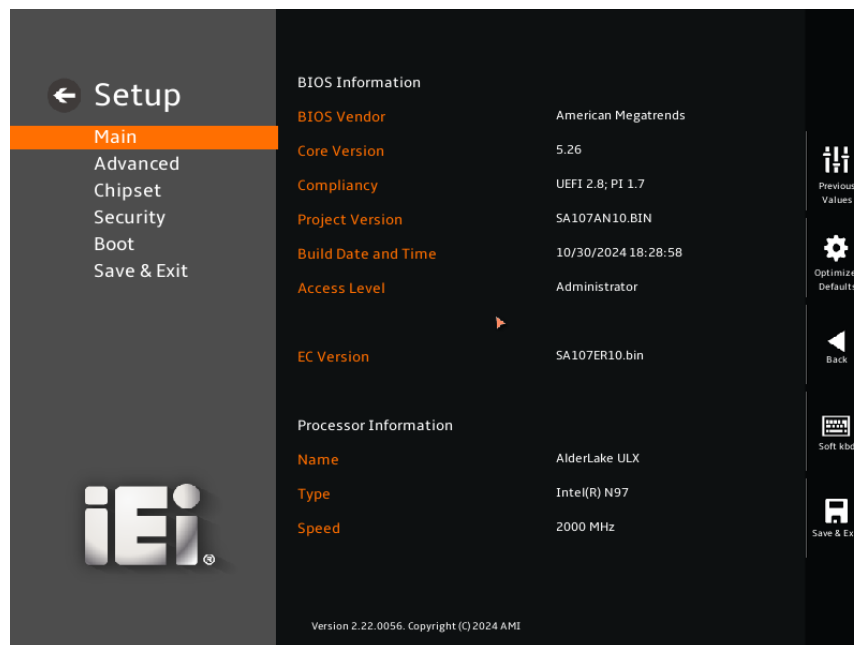
The **menu bar** on top of the BIOS screen has the following main items:

- 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

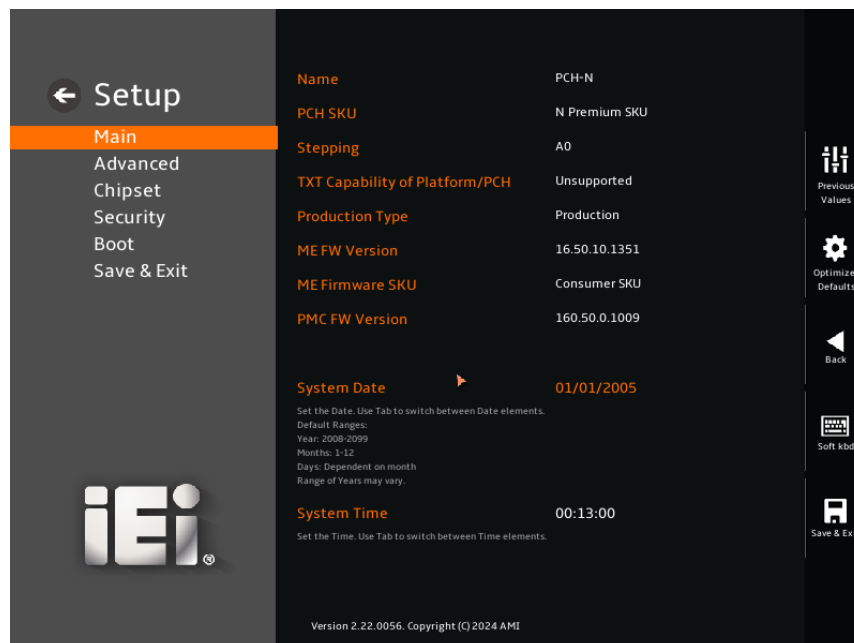
The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (错误!未找到引用源。 and **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 (1/2)



BIOS Menu 2: Main (2/2)

HYPER-ASL

➔ 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
- **Compliance:** Current UEFI & PI version
- **Project Version:** the board version
- **Build Date and Time:** Date the current BIOS version was made
- **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

➔ 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.

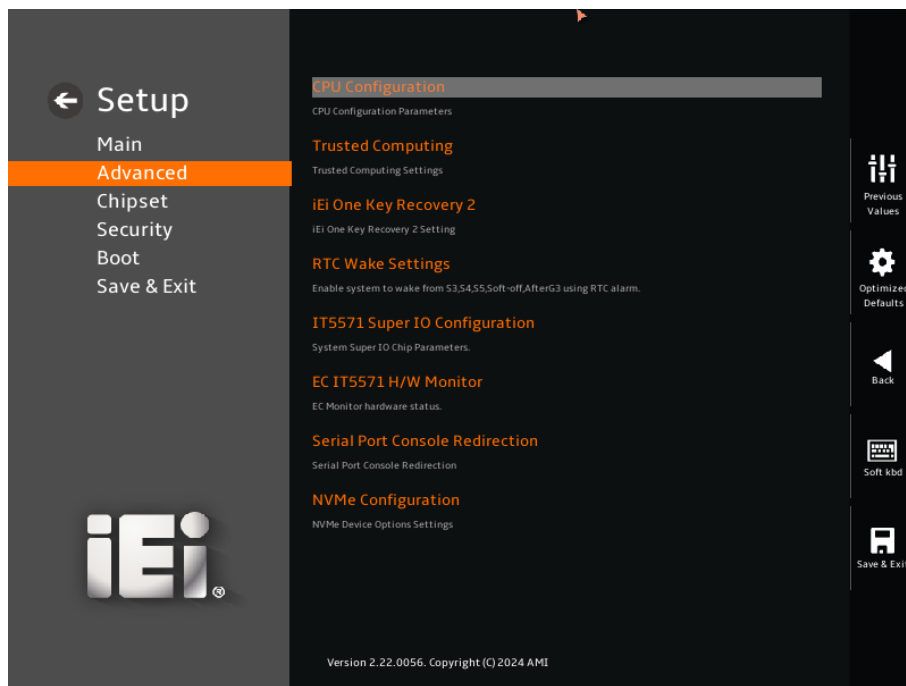
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5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 3**) 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.

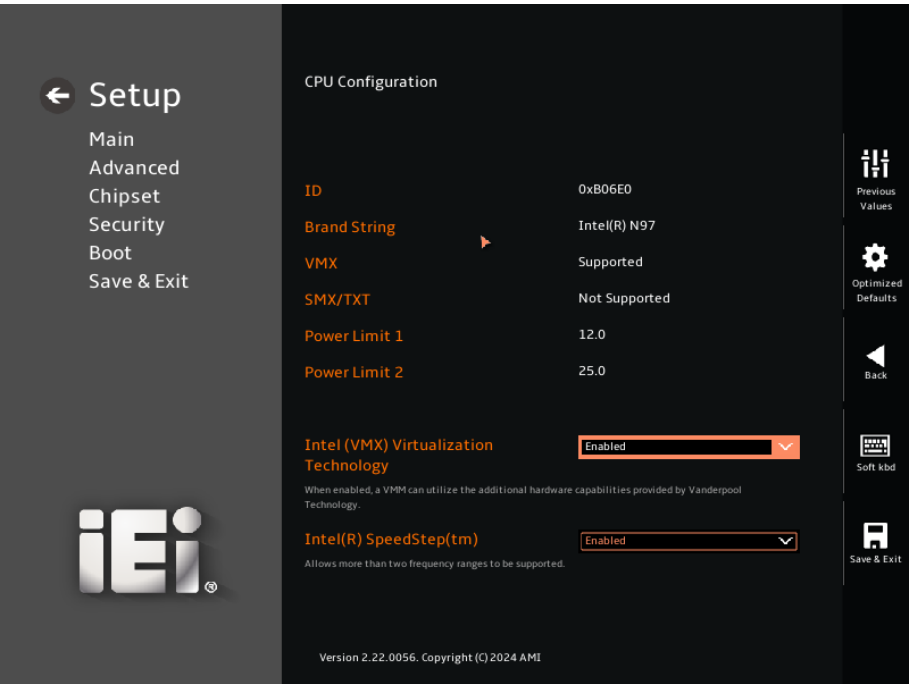


BIOS Menu 3: Advanced



5.3.1 CPU Configuration

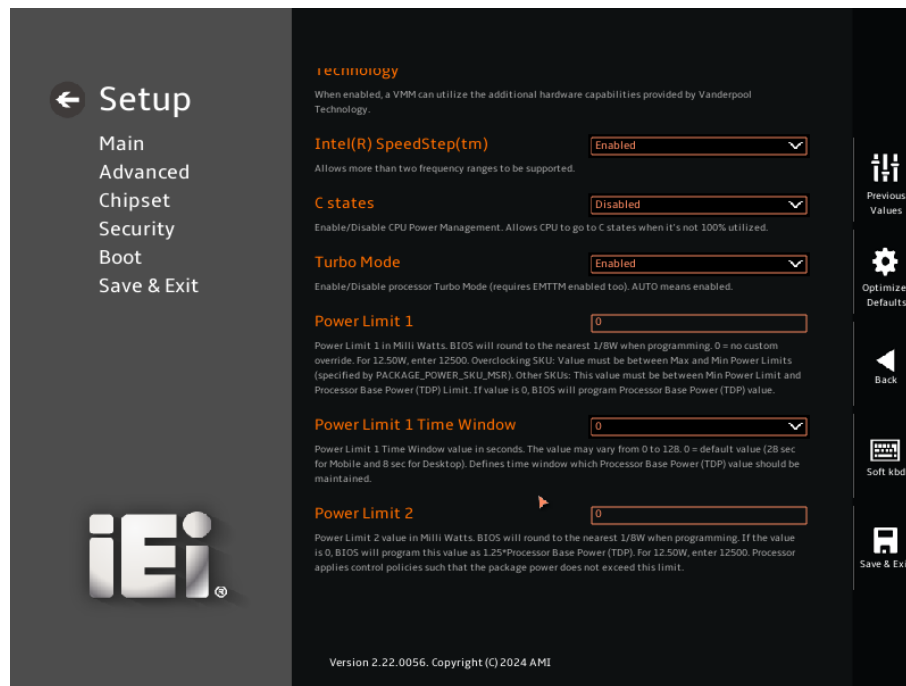
Use the **CPU Configuration** menu (**BIOS Menu 4**) to view detailed CPU specifications or enable the Intel Virtualization Technology.



BIOS Menu 4: CPU Configuration (1/2)



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BIOS Menu 5: CPU Configuration (2/2)

➔ 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. |

➔ 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 |

→ Power Limit 1 [0]

Use the + or – key to change the **Power Limit 1** value (unit: mW). 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. 0 is the default value.

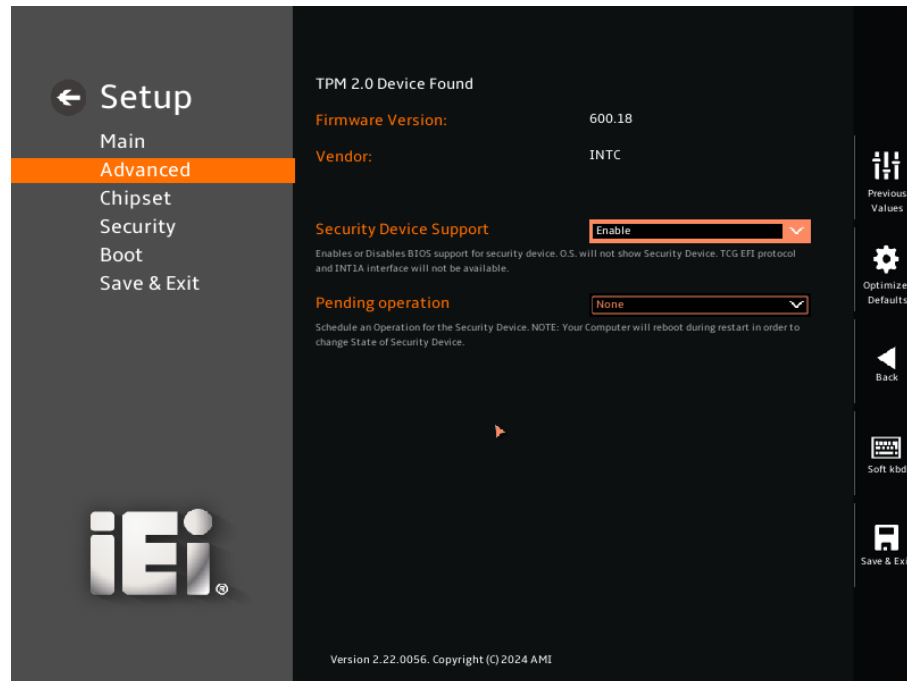
→ Power Limit 2 [0]

Use the + or – key to change the **Power Limit 2** value (unit: mW). BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500.

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5.3.2 Trusted Computing

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



BIOS Menu 6: PCH-FW Configuration

➔ Security Device Support [Enable]

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

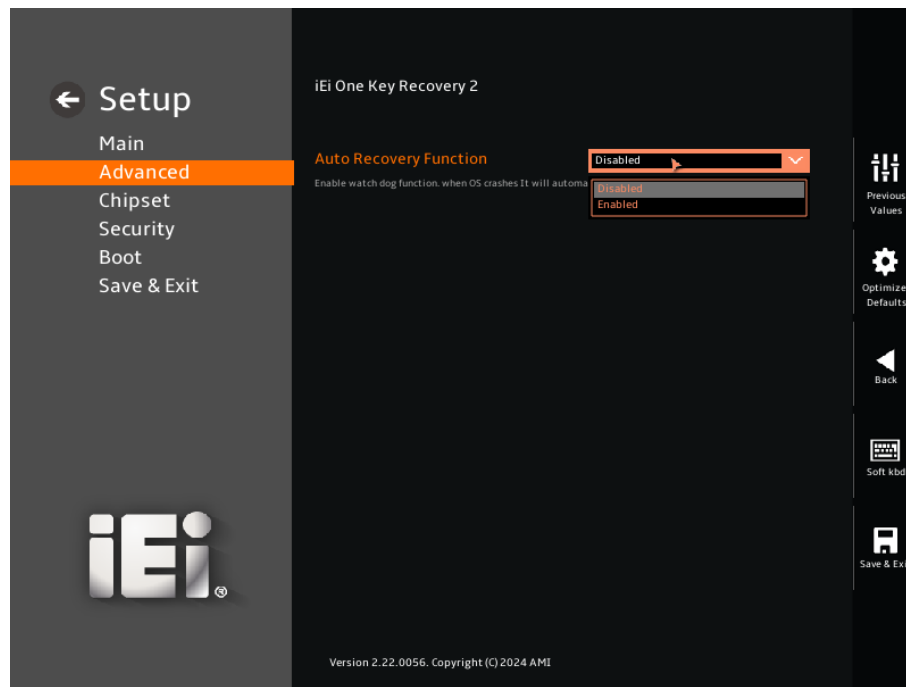
- | | | | |
|---|----------------|----------------|--------------------------|
| ➔ | Disable | | TPM support is disabled. |
| ➔ | Enable | DEFAULT | TPM support is enabled. |

➔ Pending Operation [None]

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

- | | | | |
|---|------------------|----------------|---|
| ➔ | None | DEFAULT | TPM information remains unchanged as the previous |
| ➔ | TPM Clear | | TPM information is cleared |

5.3.3 iEi One Key Recovery 2



BIOS Menu 7: iEi One Key Recovery2 Configuration

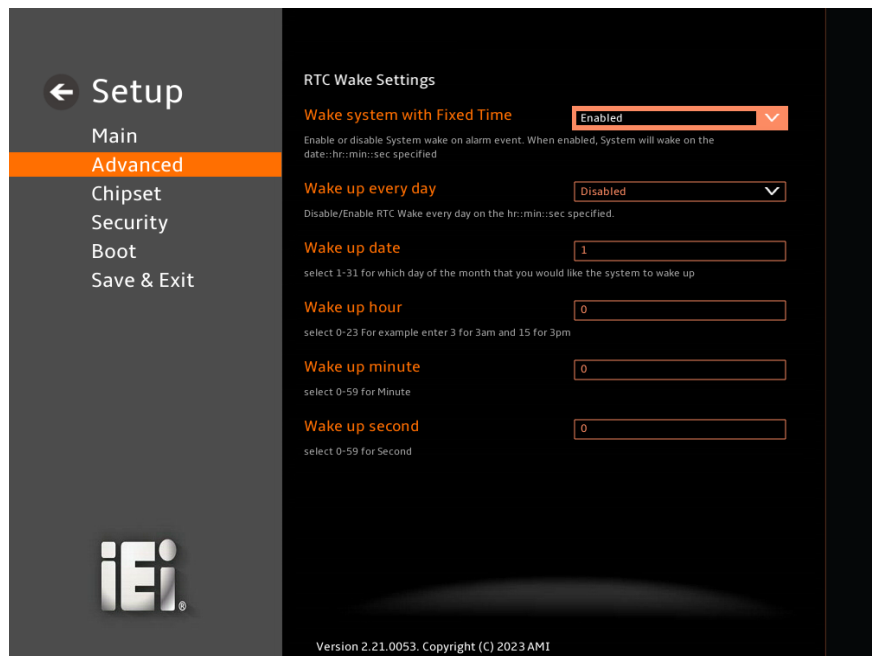
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5.3.4 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 8**) configures RTC wake events.



BIOS Menu 8: RTC Wake Settings (1/2)



BIOS Menu 9: 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 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

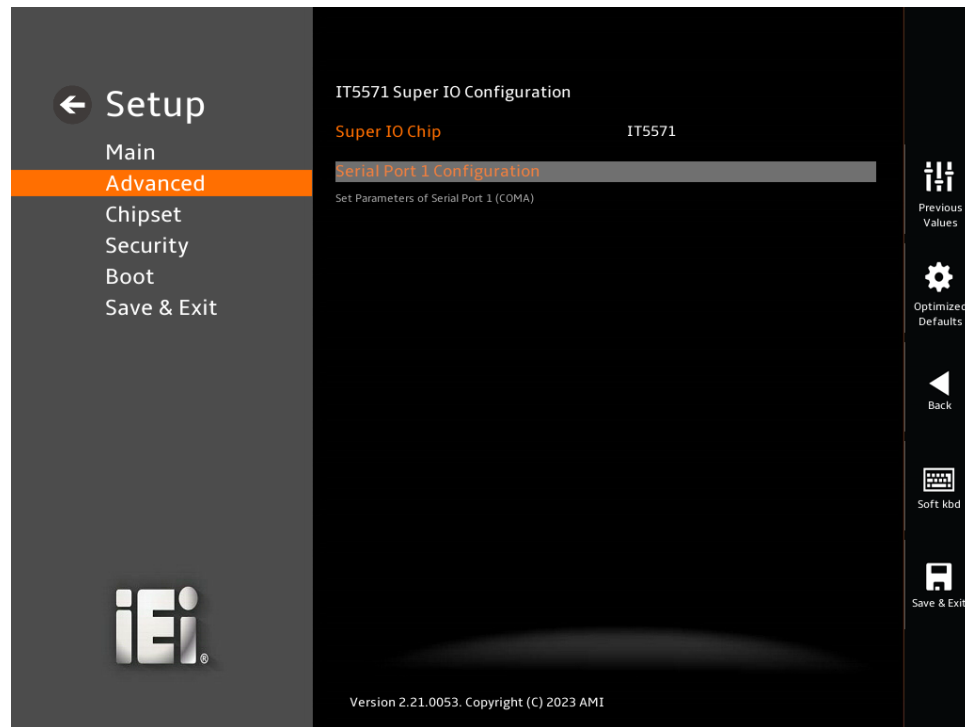
After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.



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5.3.5 IT5571 Super IO Configuration

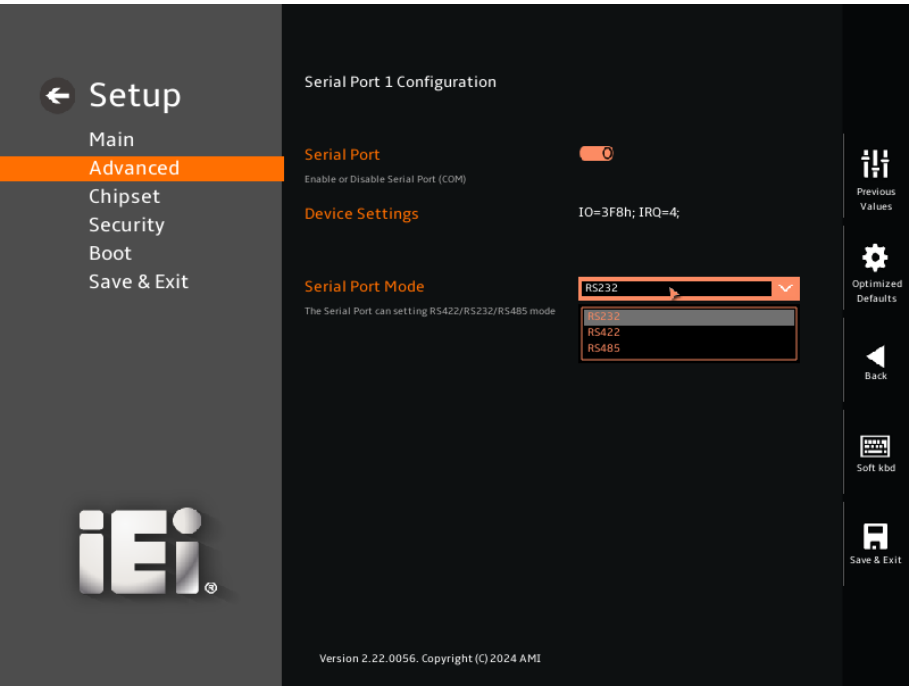
Use the **IT5571 Super IO Configuration** menu (**BIOS Menu 10**) to set or change the configurations for serial port.



BIOS Menu 10: IT5571 Super IO Configuration

5.3.5.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 11**) to configure the serial port.



BIOS Menu 11: Serial Port 1 Configuration Menu

➔ Serial Port [Enabled]

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

- ➔ DisabledDisable 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=4Serial I/O port address is 3F8h and the interrupt address is IRQ4

➔ Device Mode [RS232]

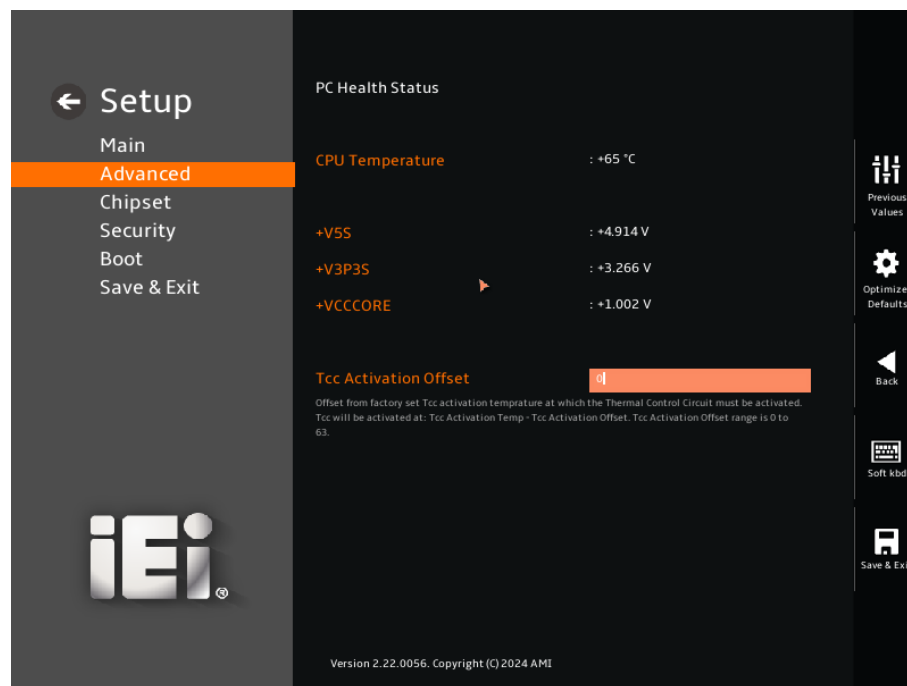
Use the **Device Mode** option to change the serial port mode.

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➔ 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

5.3.6 EC IT5571 H/W Monitor

The **IT5571 H/W Monitor** menu (**BIOS Menu 12**) shows the state of H/W real-time operating temperature and system voltages, and contains the system thermal control submenu.



BIOS Menu 12: IT5571 H/W Monitor

➔ PC Health Status

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

- System Temperatures:
 - CPU Temperature

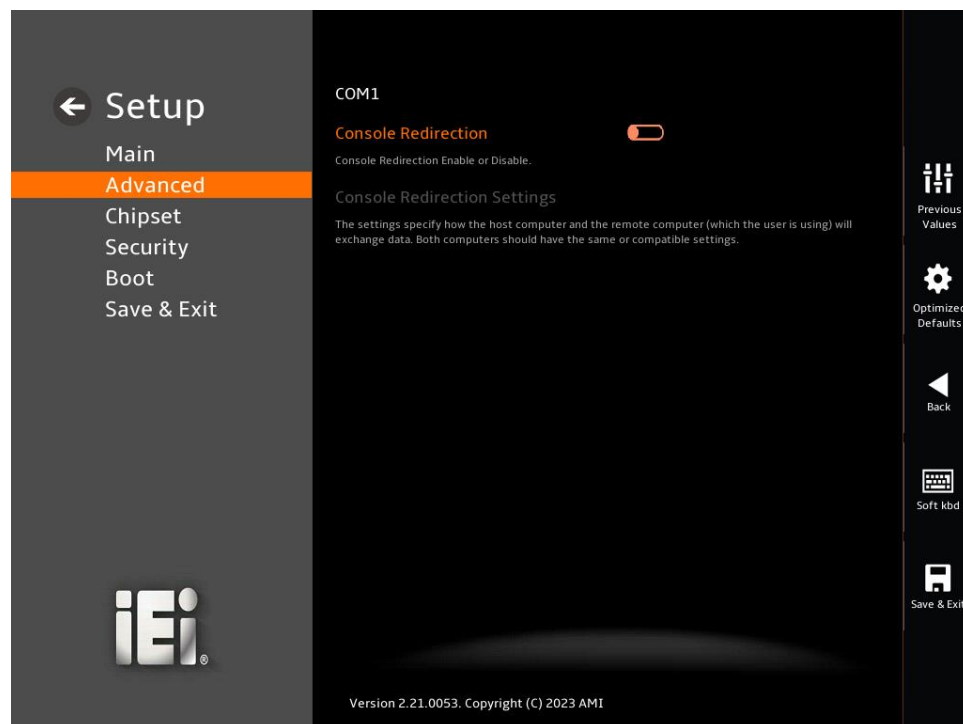
- Voltages:
 - +5VS
 - +V3P3S
 - +VCCCORE

→ Tcc Activation Offset

This setting adjusts the offset from the factory-defined Thermal Control Circuit (TCC) activation temperature, determining when the TCC should activate. The activation temperature is calculated as: $\text{TCC Activation Temperature} = \text{Factory Set Temperature} - \text{TCC Activation Offset}$. The offset range is 0 to 63.

5.3.7 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 13**) 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 13: Serial Port Console Redirection

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→ Console Redirection [Disabled]

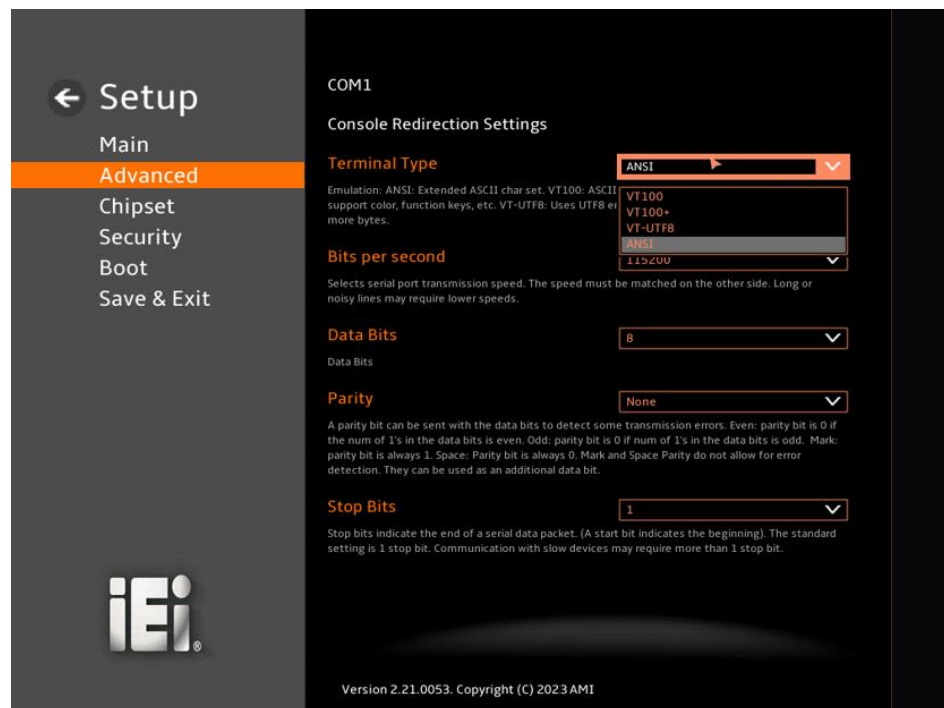
Use **Console Redirection** option to enable or disable the console redirection function.

- **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.

5.3.7.1 Console Redirection Settings

The following options are available in the **Console Redirection Settings** submenu (**BIOS Menu 14**) when the **COM Console Redirection** (for COM1) option is enabled.



BIOS Menu 14: 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 the value set in the remote terminal. 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. |

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- ➔ **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. This option does not allow for error detection.

➔ **Stop Bits [1]**

Use the **Stop Bits** option to specify the number of stop bits 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.

5.3.8 NVMe Configuration

Use the **NVMe Configuration (BIOS Menu 15)** menu to display the NVMe controller and device information.



BIOS Menu 15: NVMe Configuration

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5.4 Chipset

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

**WARNING!**

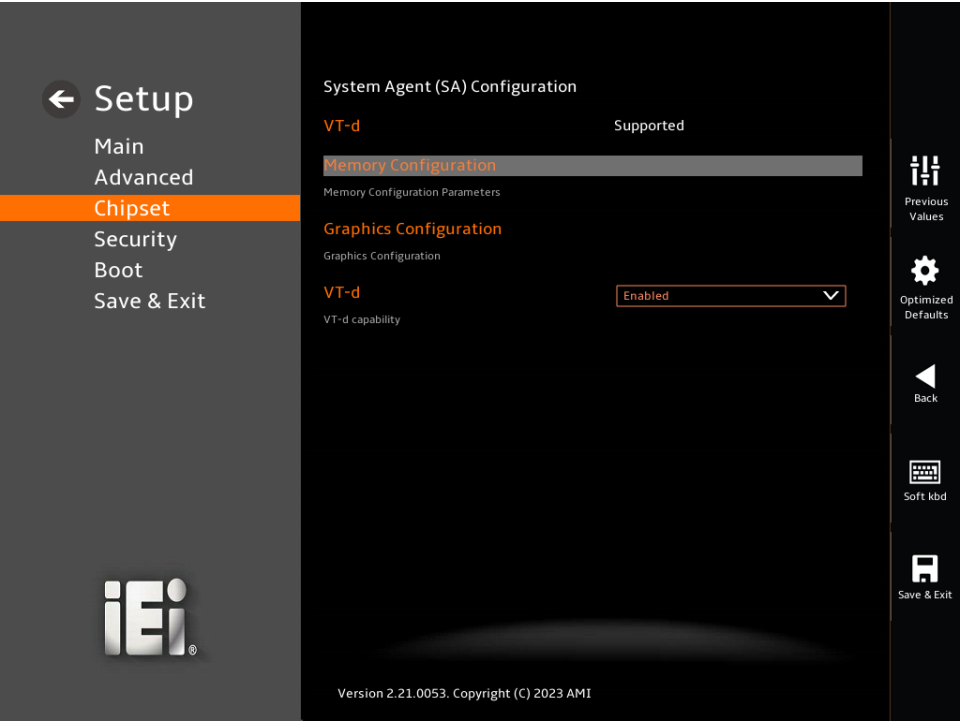
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 16: Chipset

5.4.1 System Agent (SA) Configuration

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



BIOS Menu 17: System Agent (SA) Configuration

➔ **VT-d [Enabled]**

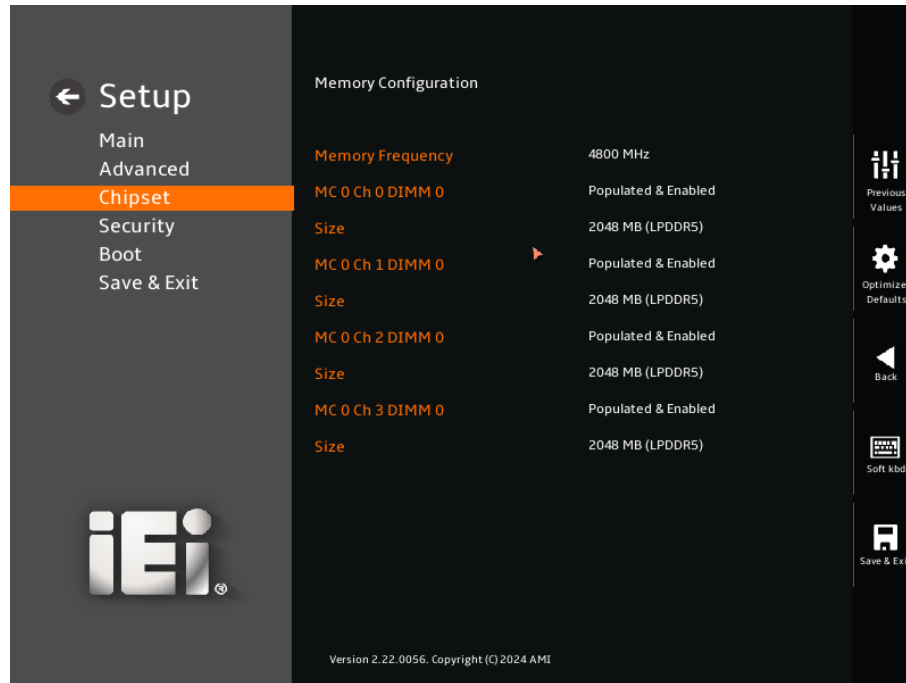
Use the **VT-d** option to enable or disable the VT-d capability.

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

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5.4.1.1 Memory Configuration

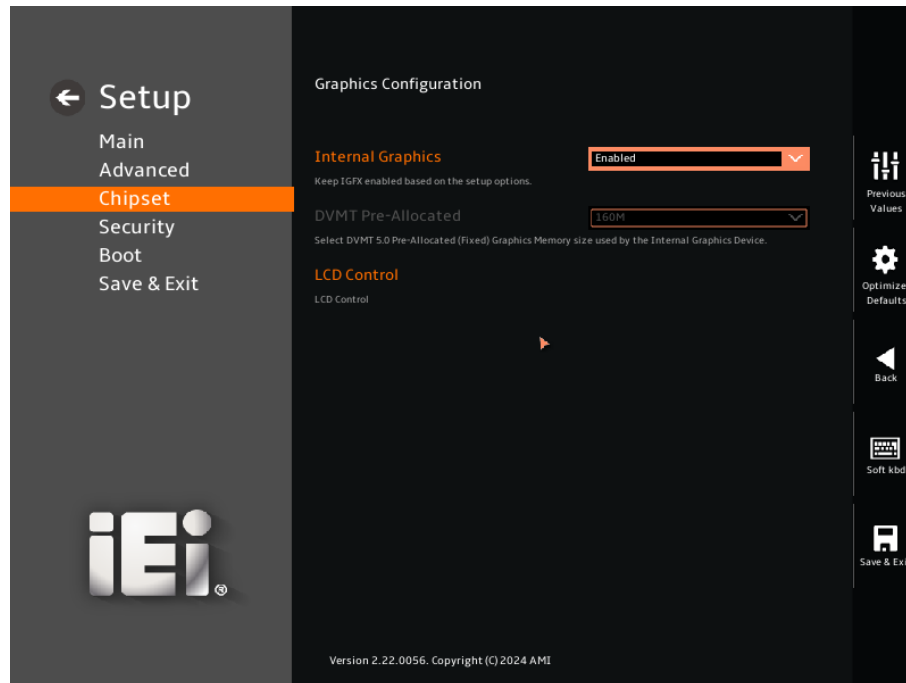
Use the **Memory Configuration** submenu (**BIOS Menu 18**) to view memory information.



BIOS Menu 18: Memory Configuration

5.4.1.2 Graphics Configuration

Use the **Graphics Configuration (BIOS Menu 19)** menu to configure the system's graphics.



BIOS Menu 19: Graphics Configuration

➔ 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]

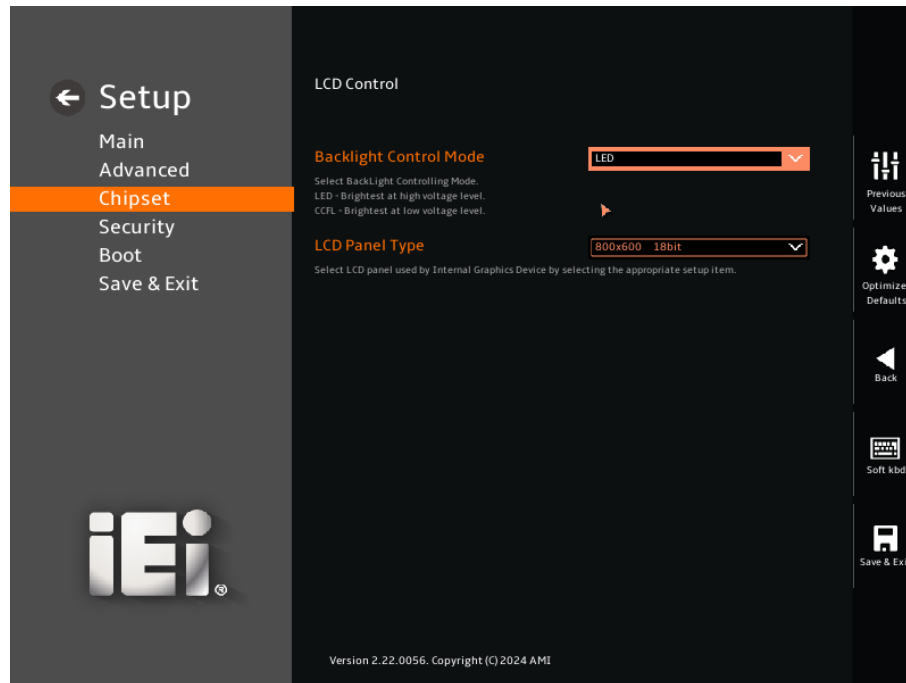
Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated

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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**

→ LCD Control



BIOS Menu 20: LCD Control

→ Backlight Control Mode [LED]

Use the **LVDS Backlight PWM mode** option to specify a PWM mode for LVDS backlight control.

- | | | | |
|---|-------------|----------------|----------------------------------|
| → | LED | Default | Brightest at high voltage level. |
| → | CCFL | | Brightest at low voltage level. |



LCD Panel Type [800x600 18bit]

Use the **LCD Panel Type** option to select the internal graphics device by selecting the appropriate setup item.

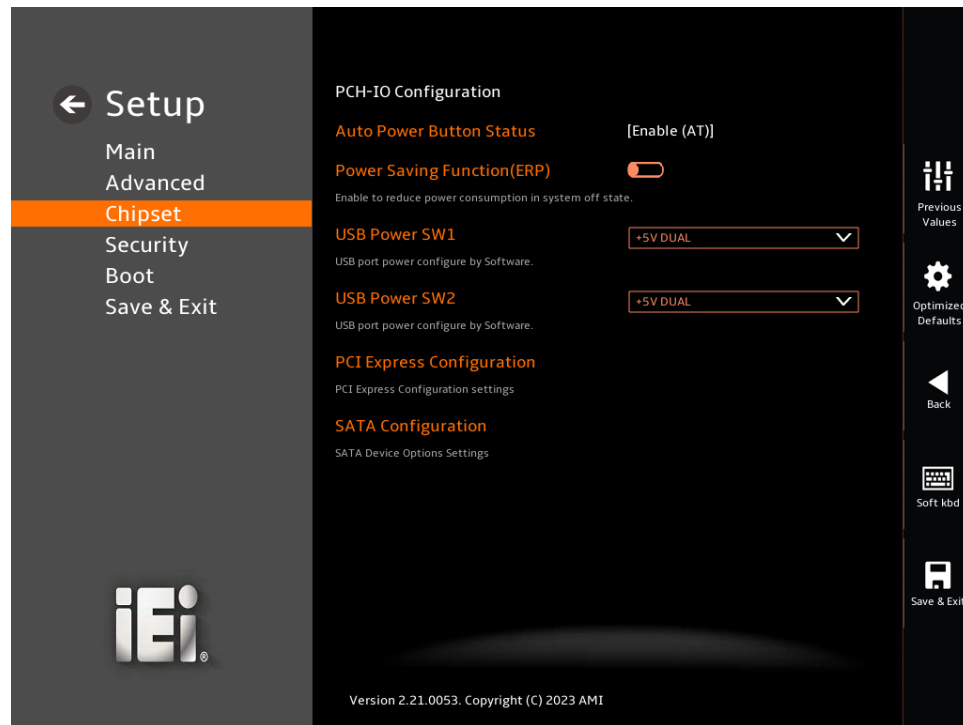
- | | | |
|---|-----------------|----------------|
| ➔ | 800x600 18bit | Default |
| | 1024x768 18bit | |
| | 1024x768 24bit | |
| | 1280x768 18bit | |
| | 1280x800 18bit | |
| | 1280x960 18bit | |
| | 1280x1024 48bit | |
| | 1366x768 18bit | |
| | 1366x768 24bit | |
| | 1440x900 48bit | |
| | 1024x768 18bit | |



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5.4.2 PCH-IO Configuration

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



BIOS Menu 21: PCH-IO Configuration

➔ **Auto Power Button Status [Disabled (ATX)]**

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

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

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

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

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



➔ Enabled

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

➔ USB Power state [+5VDUAL]

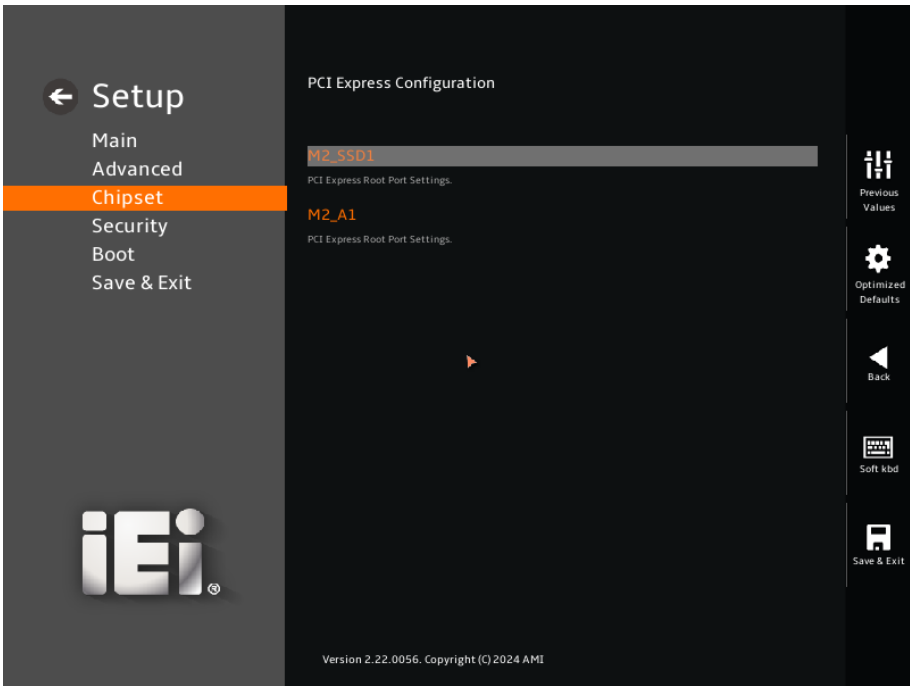
Use the **USB Power state** option to enable or disable the USB Power.

➔ +5VDUAL DEFAULT USB Power is on.

➔ +5 USB Power is off.

5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** submenu (**BIOS Menu 22**) to configure the PCI Express slots.



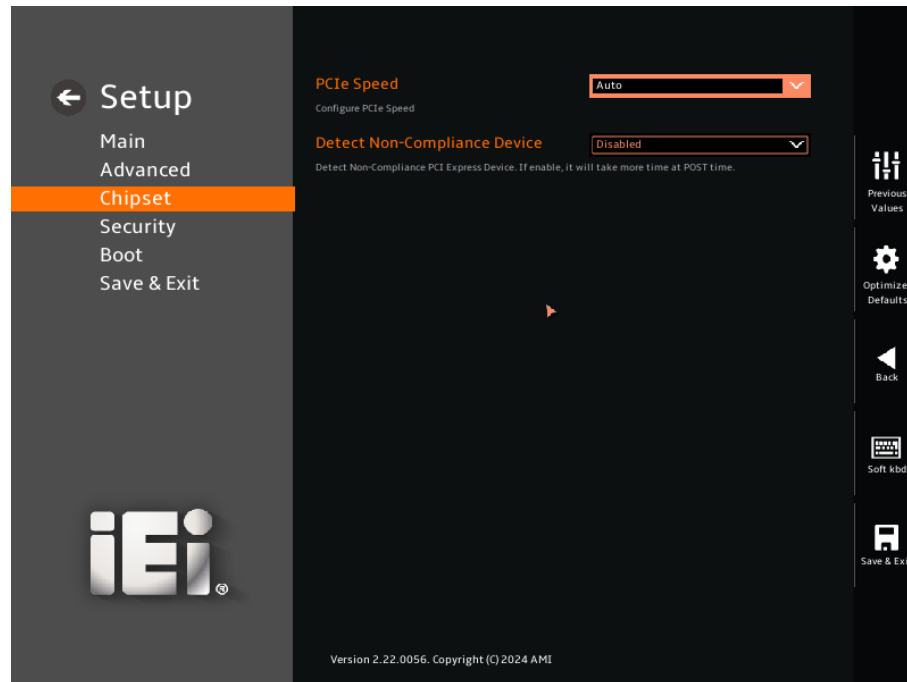
BIOS Menu 22: PCI Express Configuration



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5.4.2.1.1 PCIe Root Port Setting

Use the **M2_SSD1** and **M2_A1** submenus (**BIOS Menu 23**) to configure the PCIe Root Port Setting.



BIOS Menu 23: 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]

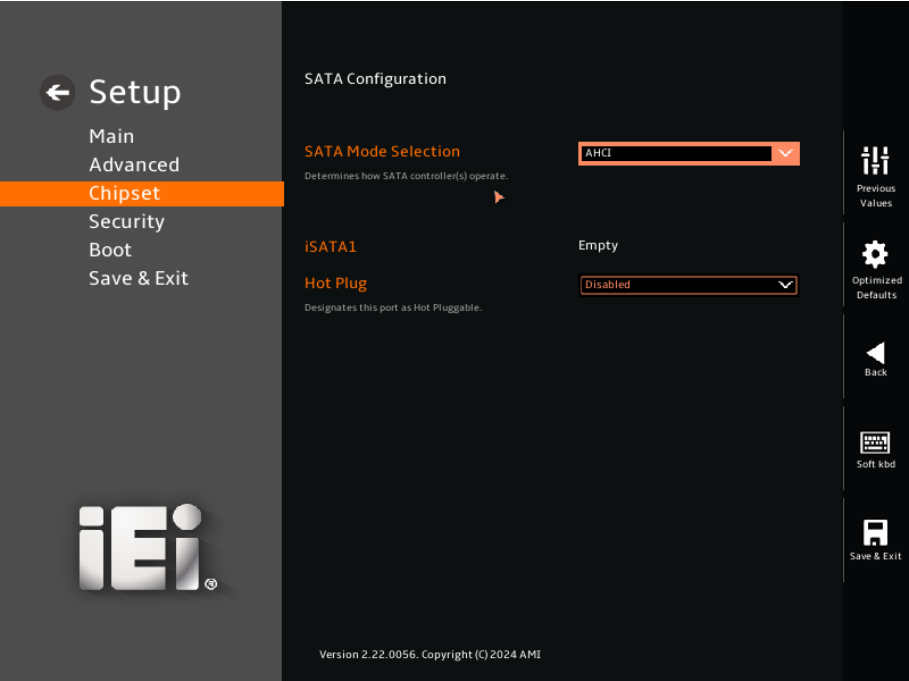
Use the **Detect Non-Compliance Device** option to configure whether to detect if a non-compliance PCI Express device is connected to the PCI Express port.



- | | | |
|------------|---------|--|
| ➔ 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. |

5.4.2.2 SATA Configuration

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



BIOS Menu 24: SATA Configuration

➔ **SATA Mode Selection [AHCI]**

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

- | | | |
|---|---------|--|
| ➔ AHCI | DEFAULT | Configures SATA devices as AHCI device. |
| ➔ Intel RST Premium With Intel Optane System Acceleration | | Configures SATA devices to the Intel RST Premium with the Intel Optane System Acceleration mode. |



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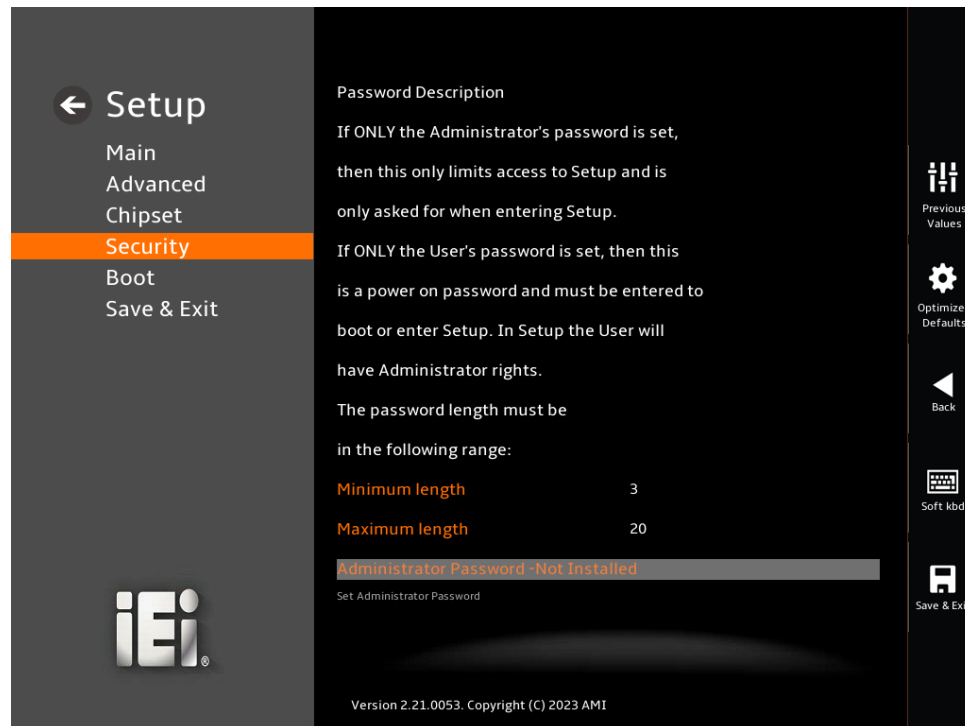
→ Hot Plug [Disabled]

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.

5.5 Security

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



BIOS Menu 25: Security (1/2)



BIOS Menu 26: Security (2/2)

→ Administrator Password

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

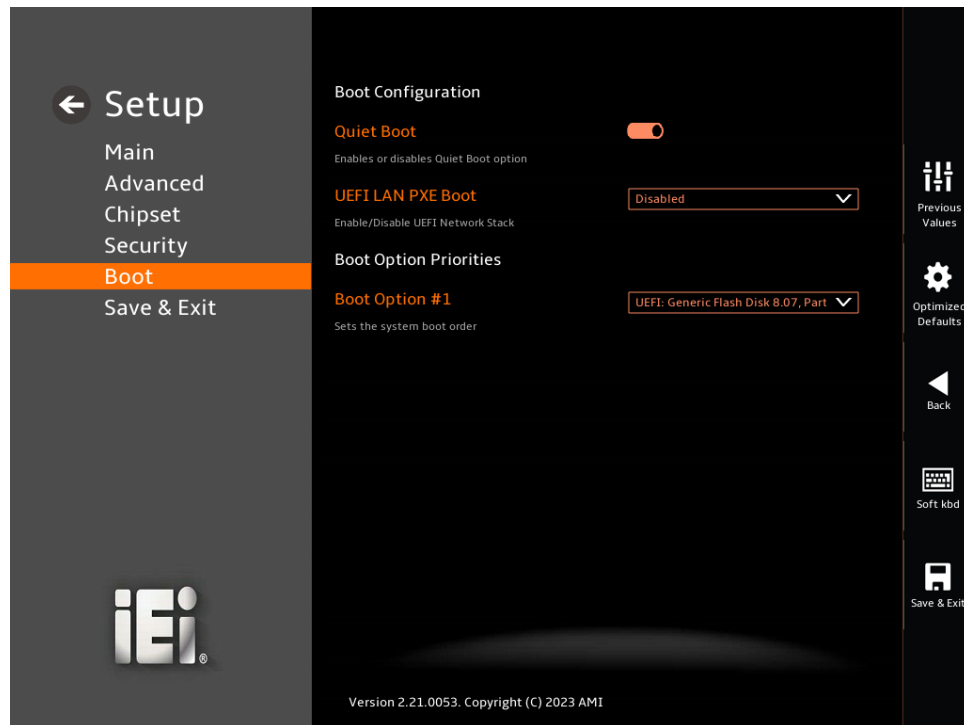
→ User Password

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

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5.6 Boot

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



BIOS Menu 27: Boot

5.6.1 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 |

→ UEFI LAN PXE Boot [Disabled]

Use the **UEFI LAN PXE Boot** option to enable or disable the UEFI Network stack

- | | | | |
|---|-----------------|----------------|-----------------------------|
| → | Disabled | DEFAULT | Disabled UEFI Network stack |
|---|-----------------|----------------|-----------------------------|

→ Enabled

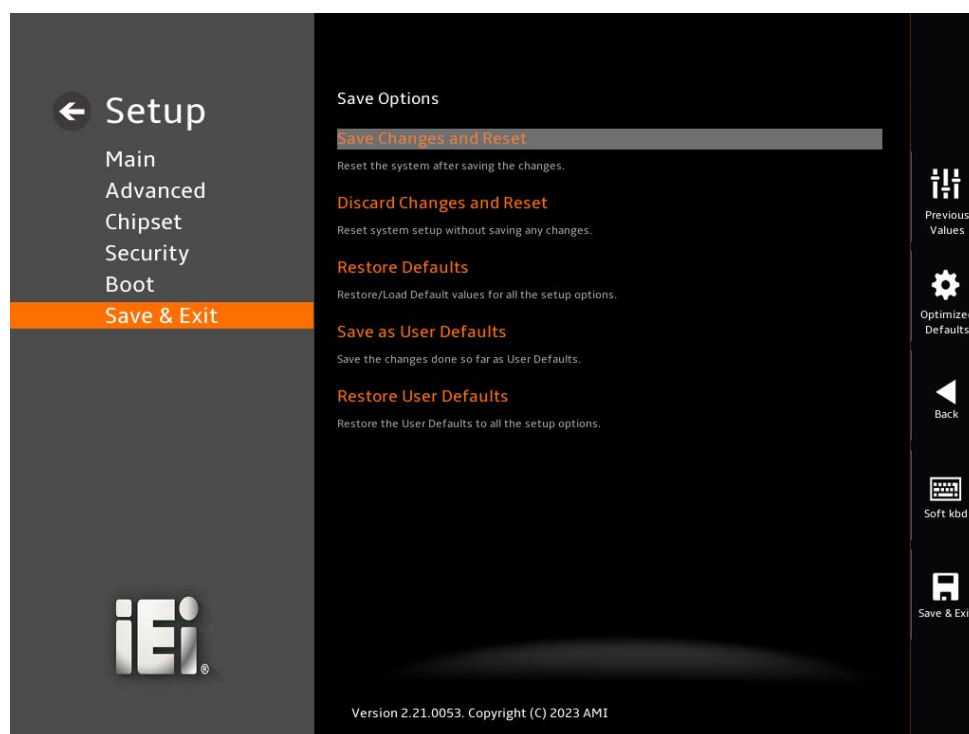
Enable UEFI Network stack

5.6.2 Boot Option Priorities

Use the Boot Option # N to choose the system boots from the peripherals you selected.

5.7 Save & Exit

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



BIOS Menu 28: Save & Exit

→ Save Changes and Reset

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

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➔ 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

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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

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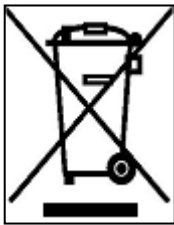


CAUTION:

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

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

➔ BIOS Information	55
➔ Processor Information.....	55
➔ PCH Information.....	55
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➔ System Time [xx:xx:xx]	56
➔ Intel (VMX) Virtualization Technology [Enabled]	59
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➔ Power Limit 2 [0]	60
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➔ Wake system with Fixed Time [Enabled].....	64
➔ Serial Port [Enabled].....	66
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➔ Device Mode [RS232].....	66
➔ PC Health Status	67
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➔ Data Bits [8]	70
➔ Parity [None].....	70
➔ Stop Bits [1]	71
➔ VT-d [Enabled].....	74
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➔ Backlight Control Mode [LED]	77
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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.

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**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

HYPER-ASL**E.1 PEI Beep Codes**

Number of Beeps	Description
4	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL 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

HYPER-ASL

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

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

