BOXER-6407-TWL

Fanless Embedded Box PC

User's Manual 1st Ed

Last Updated: April 27, 2026

Copyright Notice

Acknowledgement

Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
● BOXER-6407-TWL	1
● DC Jack Power Adapter	1
● Wall Mount Bracket	2
● Screw Package	1

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the product page at AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any power supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls.
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
18. Do not leave this device in an uncontrolled environment with temperatures beyond the device's permitted storage temperatures (see chapter 1) to prevent damage.
19. Do NOT disassemble the motherboard so as not to damage the system or void your warranty.
20. If the thermal pad had been damaged, please contact AAEON's salesperson to purchase a new one. Do NOT use those of other brands.
21. The Hex Cylinder Coppers on the front panel are not removable.
22. Repeatedly assemble and disassemble the system may cause damages to the exterior paint and surface and screw holes.
23. Use the right size screwdriver.
24. Use the screwdriver correctly to remove screws from the system.

FCC Statement

This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON System QO4-381 Rev.A2

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)
印刷电路板及其电子组件	×	○	○	○	○	○
外部信号连接器及线材	×	○	○	○	○	○
外壳	○	○	○	○	○	○
中央处理器与内存	×	○	○	○	○	○
硬盘	×	○	○	○	○	○
液晶模块	×	○	○	○	○	○
光驱	×	○	○	○	○	○
触控模块	×	○	○	○	○	○
电源	×	○	○	○	○	○
电池	×	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

○: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。

×: 表示该有害物质的某一均质材料超出了 GB/T 26572 的限量要求，然而该部件仍符合欧盟指令 2011/65/EU 的规范。

环保使用期限(EFUP (Environmental Friendly Use Period)) : 10 年

备注:

一、此产品所标示之环保使用期限，系指在一般正常使用状况下。

二、上述部件物质中央处理器、内存、硬盘、光驱、电源为选购品。

三、上述部件物质液晶模块、触控模块仅一体机产品适用。

China RoHS Requirement (EN)

Name and content of hazardous substances in product

AAEON System QO4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB Assemblies	×	○	○	○	○	○
Connector and Cable	×	○	○	○	○	○
Chassis	○	○	○	○	○	○
CPU and Memory	×	○	○	○	○	○
Hard Disk	×	○	○	○	○	○
LCD Modules	×	○	○	○	○	○
CD-ROM/DVD-ROM	×	○	○	○	○	○
Touch Modules	×	○	○	○	○	○
Power	×	○	○	○	○	○
Battery	×	○	○	○	○	○

The table is prepared in accordance with the provisions of SJ/T 11364.

○：Indicates that said hazardous substance contained in all of the homogenous materials for this product is below the limit requirement of GB/T 26572.

×：Indicates that said hazardous substance contained in at least one of the homogenous materials used for this part is above the limit requirement of GB/T 26572. But this product still be compliance with 2011/65/EU Directive (allowed with 2011/65/EU Annex III of RoHS exemption with number 6(c),7(a),7(c)-1).

EFUP (Environment Friendly Use Period) value: 10 years.

Notes：

1. This product defined period of use is under normal condition.
2. In above part, CPU/Memory/ Hard Disk/CD-ROM/DVD-ROM/ Power are optional.
3. In above part, LCD Modules/ Touch Modules are for all-in-one product model.

Table of Contents

Chapter 1

Product Specifications

1.1 Specifications

System	
CPU	Intel® Processor N series:
	Intel® Processor N250 (4C/4T, 6W)
	Intel® Processor N150 (4C/4T, 6W)
Chipset	Intel® SoC
System Memory	DDR5 4800MHz SODIMM x 1, up to 32GB
Display Interface	HDMI x 1, up to 4K @60Hz
	VGA x 1
Storage Device	M.2 2280 M-Key x 1 (PCIe Gen 3 [x2])
Ethernet	RJ-45 x 2 for GbE LAN (Intel® Ethernet Controller I210-AT)
I/O	USB 3.2 Gen 2 x 1
	USB 2.0 x 3
	DB-9 x 2 for RS-232/422/485
	Power Button with Power LED x 1
	Antenna Opening x 4
Expansion	M.2 2230 E-Key x1 (PCIe [x1])
	M.2 3052 B-Key x 1 (USB 3 + PCIe)
	SIM Slot x 1
	Onboard TPM 2.0
Indicator	Power Button with LED
OS Support	Windows® 11 Pro/IoT
	Linux Ubuntu 24.04 and above

Power Supply

Power Requirement	Lockable DC Jack x 1 for 12V DC-in

Mechanical

Mounting	Wall Mount
Dimensions (W x H x D)	6.02" x 3.98" x 1.18" (153mm x 101mm x 30mm) w/o brackets
Gross Weight	2.95 lb (1.34 kg)
Net Weight	1.21 lb (0.55 kg)

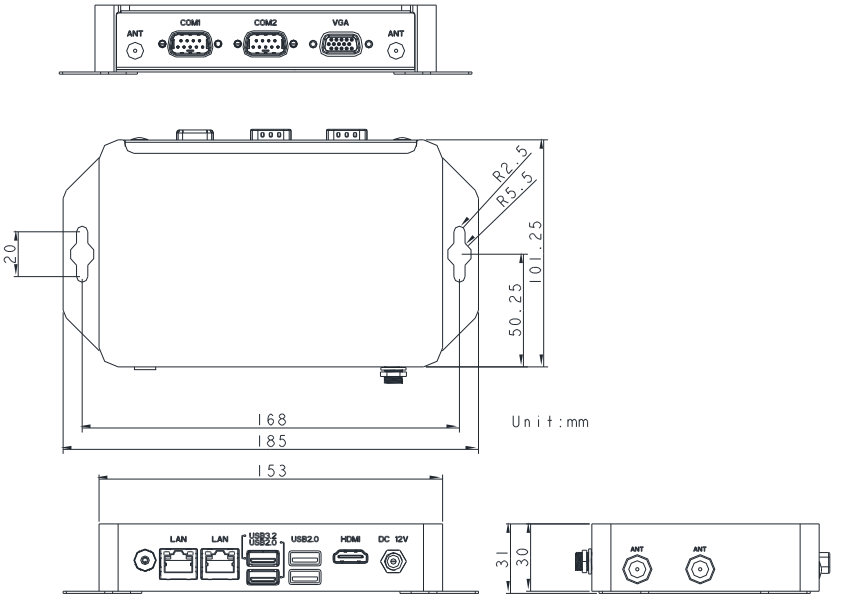
Environmental

Operating Temperature	-4°F – 140°F (-20°C – 60°C), IEC60068-2 with 0.7 m/s Airflow, with wide temp. memory/storage
Storage Temperature	-40°F – 176°F (-40°C – 80°C)
Storage Humidity	5 – 95% @ 40°C, non-condensing
Anti-Vibration	Random, 3 Grms, 5~500Hz, with SSD
Anti-Shock	With SSD: 50 G, IEC 60068-2-27, half sine, 11 ms duration
Certification	CE / FCC Class A

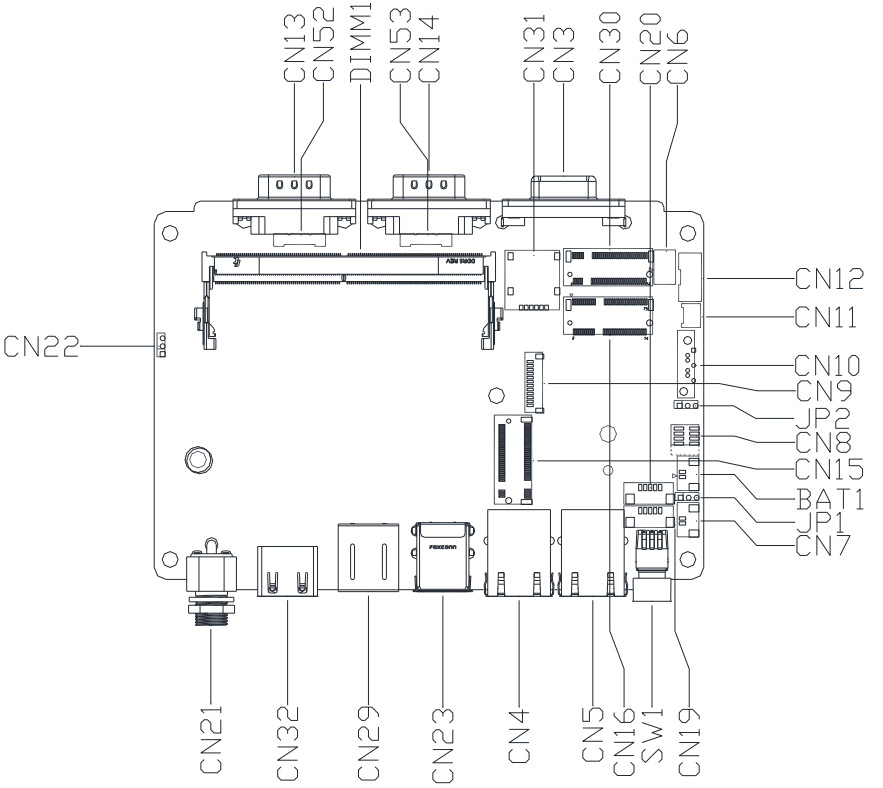
Chapter 2

Hardware Information

2.1 Dimensions



2.2 Jumpers and Connectors



Board dimensions: 138mm x 97.7mm x 1.8mm.

2.3 List of Jumpers

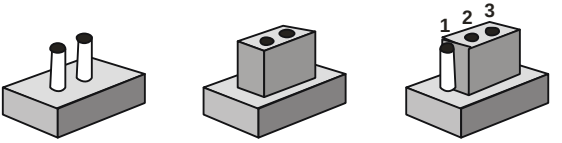
The board has a number of jumpers that allow you to configure your system to suit your application.

The table below shows the function of each of the board's jumpers.

Label	Function
JP1	CMOS Control Selection
JP2	ATX/AT Mode Selection

2.3.1 Setting Jumpers

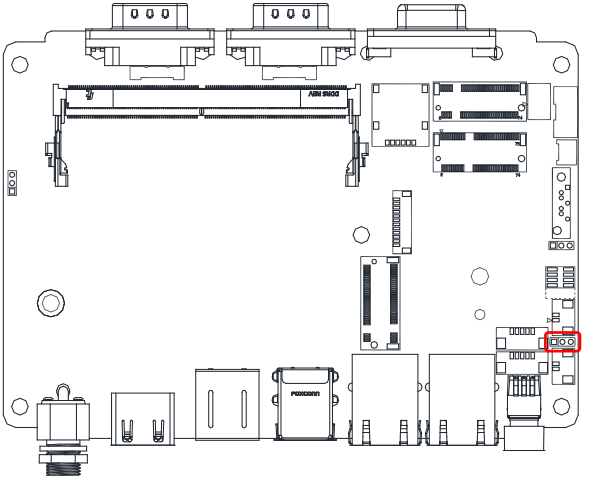
You can configure your system to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip.
To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.

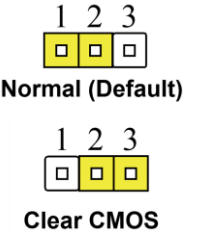


Open **Closed** **Closed 2-3**

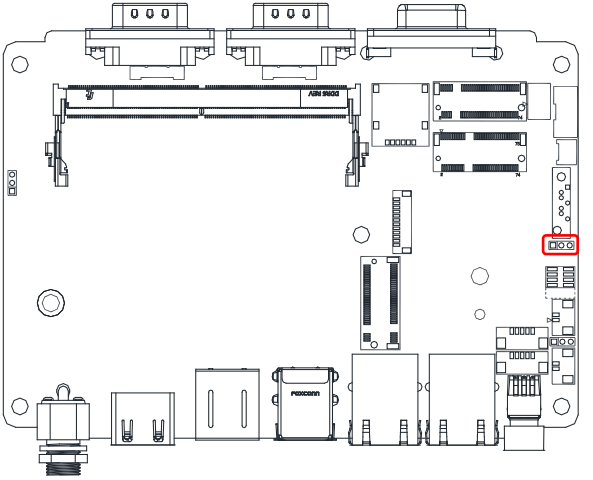
A pair of needle-nose pliers may be helpful when working with jumpers.
If you have any questions about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

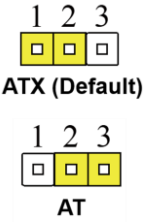
2.3.2 Clear CMOS Jumper (JP1)





2.3.3 AT/ATX Mode Selection (JP2)





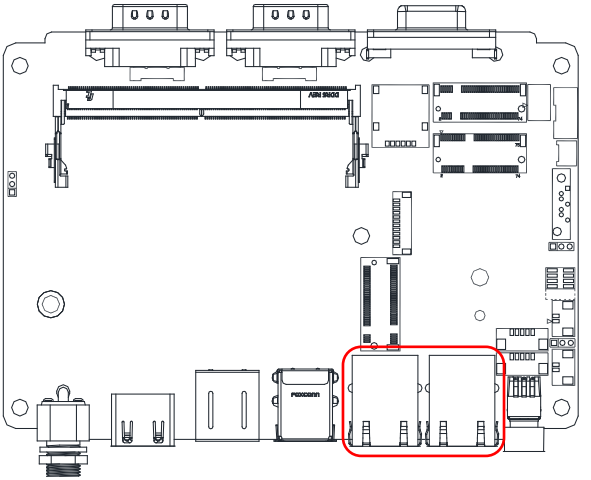
2.4 List of Connectors

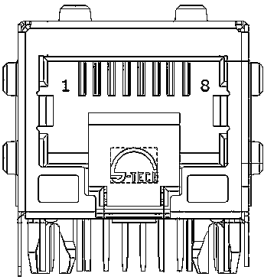
The board has a number of connectors that allow you to configure your system to suit your application.

The table below shows the function of each of the board's connectors.

Label	Function
CN4 / CN5	GbE LAN RJ-45 Port
CN13 / CN14	COM 1/COM 2 Port (RS-232/422/485)
CN52 / CN53	COM 1/COM 2 Wafer Box (RS-232/422/485)
CN32	HDMI Port
CN6	Reset Switch Wafer Box (by request)
CN3	VGA Single Port
CN21	DC Jack Connector Power Source Input
CN12	DIO Wafer Box
CN10	SATA HDD Connector
CN11	SATA HDD Power Connector
CN16	M.2 2230 E-Key Slot
CN30	M.2 3052 B-Key Slot
CN15	M.2 2280 M-Key Slot
CN1	RTC Battery
SW1	Power Button
CN7	Remote Button Connector (by request)
CN20 / CN19	USB 2.0 x 2 Wafer Box (by request)
CN2	USB 3.2 / USB 2.0 Stack Port
CN29	Dual USB 2.0 Port
CN31	Nano SIM Slot
DIMM1	DDR5 SODIMM Slot

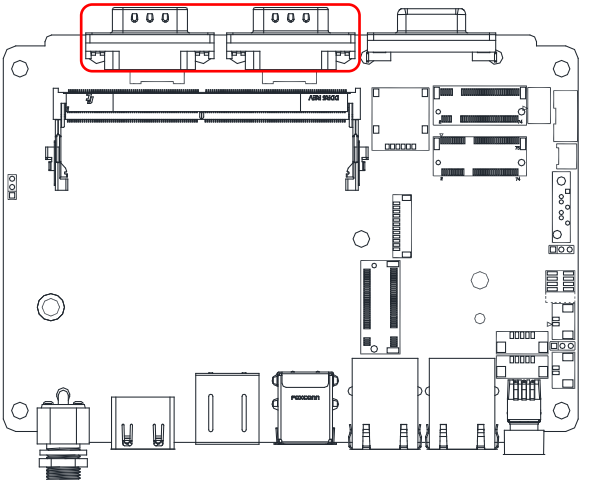
2.4.1 RJ-45 LAN Port (CN4/CN5)

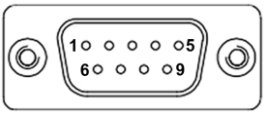




Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

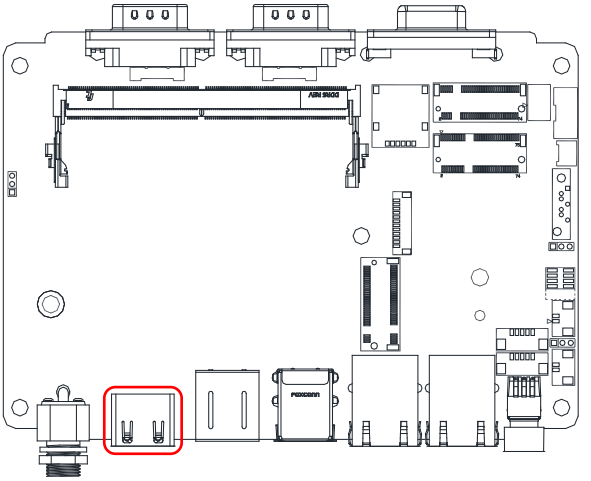
2.4.2 COM 1/COM 2 Port (RS-232/422/485) (CN13/CN14)

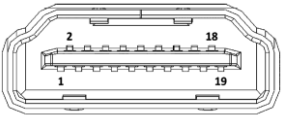




Pin	RS-232	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	RX	IN	RS422_TX+	RS485_D+
3	TX	OUT	RS422_RX+	
4	DTR	OUT	RS422_RX-	
5	GND	GND		
6	DSR	IN		
7	RTS	OUT		
8	CTS	IN		
9	RI (Default: Disable)	OUT		

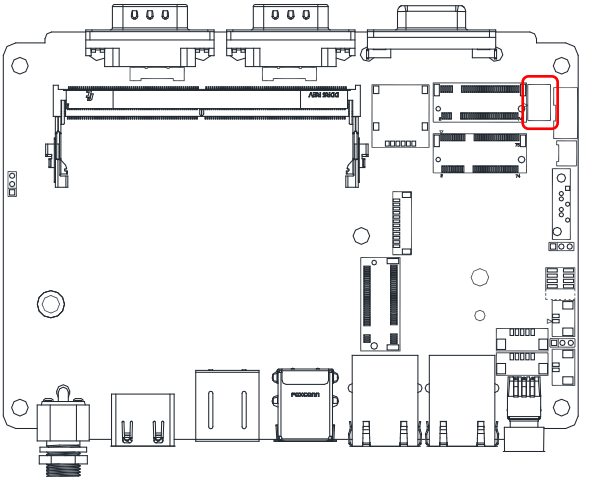
2.4.3 HDMI Port (CN29)

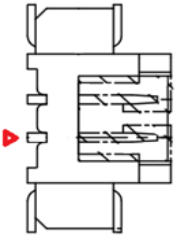




Pin	Pin Name	Signal Type	Signal Level
P1	HDMI_DATA2_P	DIFF	
P2	GND	GND	
P3	HDMI_DATA2_N	DIFF	
P4	HDMI_DATA1_P	DIFF	
P5	GND	GND	
P6	HDMI_DATA1_N	DIFF	
P7	HDMI_DATA0_P		
P8	GND	GND	
P9	HDMI_DATA0_n		
P10	HDMI_CLK_P	DIFF	
P11	GND	GND	
P12	HDMI_CLK_N	DIFF	
P13	CEC		3.3V
P14	NC		
P15	HDMI_SCL		
P16	HDMI_SDA		
P17	GND	GND	
P18	+V5S_HDMI	PWR	5V
P19	HDMI_HPD		5V

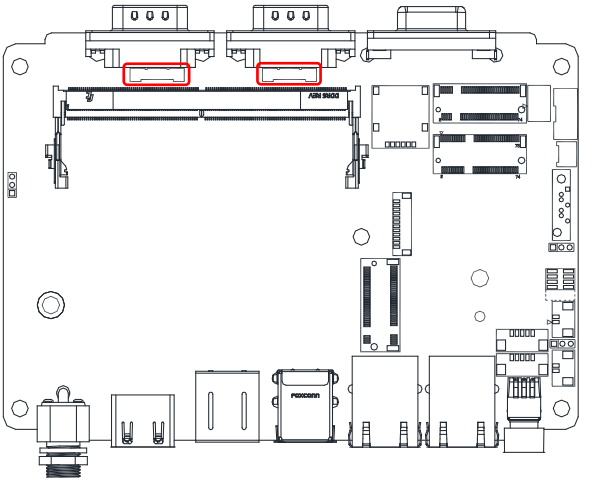
2.4.4 Reset Switch Wafer Box (by request) (CN6)

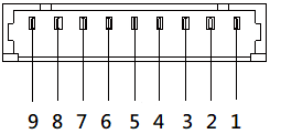




Pin	Pin Name	Signal Type	Signal Level
1	HWRST#	IN	
2	GND		

2.4.5 COM 1/COM 2 Wafer Box (RS-232/422/485) (CN52/CN53)

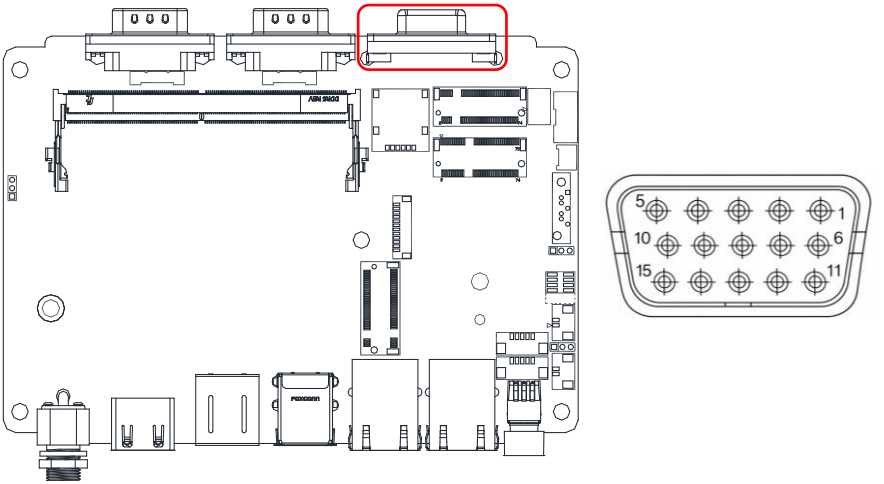




Pin	RS-232	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-

Pin	RS-232	Signal Type	RS-422	RS-485
2	DSR	IN		
3	RX	IN	RS422_TX+	RS485_D+
4	RTS	OUT		
5	TX	OUT	RS422_RX+	
6	CTS	IN		
7	DTR	OUT	RS422_RX-	
8	RI (Default: Disable)	IN		
9	GND	GND		

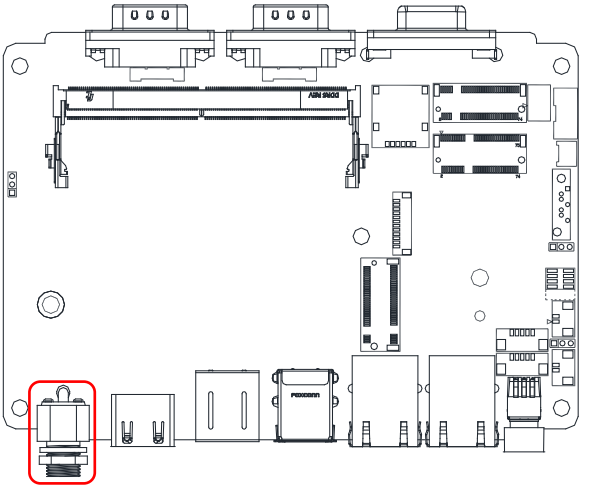
2.4.6 VGA Single Port (CN3)

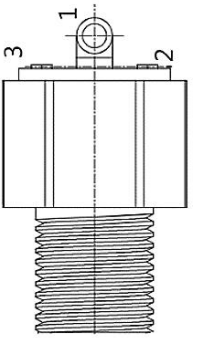


Pin	Pin Name	Signal Type	Signal Level
1	RED	IN	
2	GREEN	IN	
3	BLUE	IN	
4	NA		
5	GND_CRT	GND	
6	GND_CRT	GND	
7	GND_CRT	GND	
8	GND_CRT	GND	
9	+V5S_DISP	PWR	+5V
10	GND_CRT	GND	
11	NA		
12	DDC_DAT	IN	

Pin	Pin Name	Signal Type	Signal Level
13	HSYNC	IN	
14	VSYNC	IN	
15	DDC_CLK	IN	

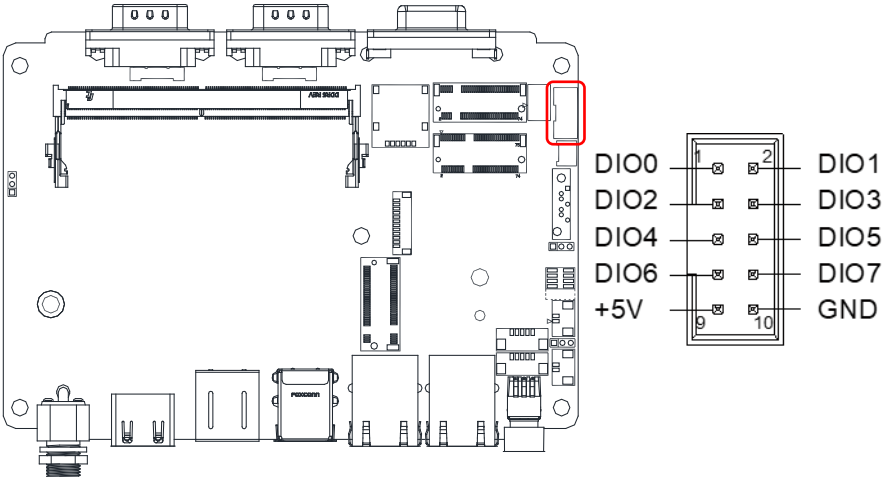
2.4.7 DC Jack Connector Power Source Input (CN21)





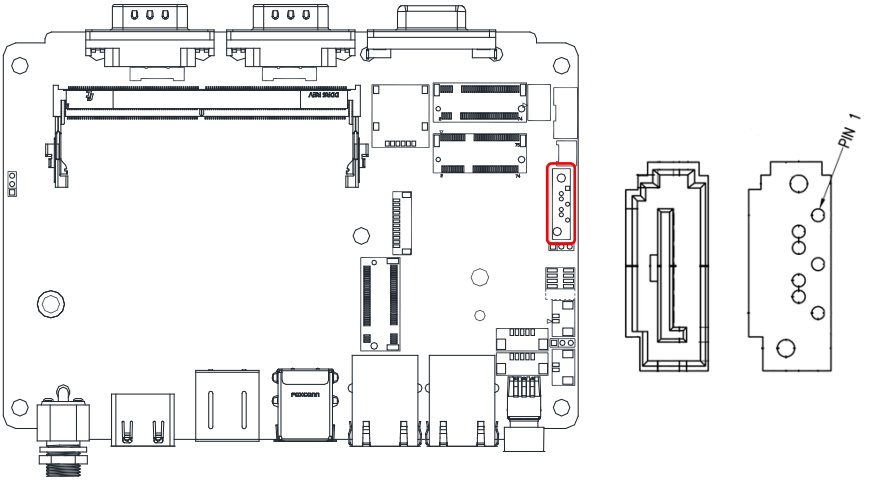
Pin	Pin Name	Signal Type	Signal Level
1	VIN	PWR	+12V
2	GND	GND	
3	GND	GND	

2.4.8 DIO Wafer Box (CN12)



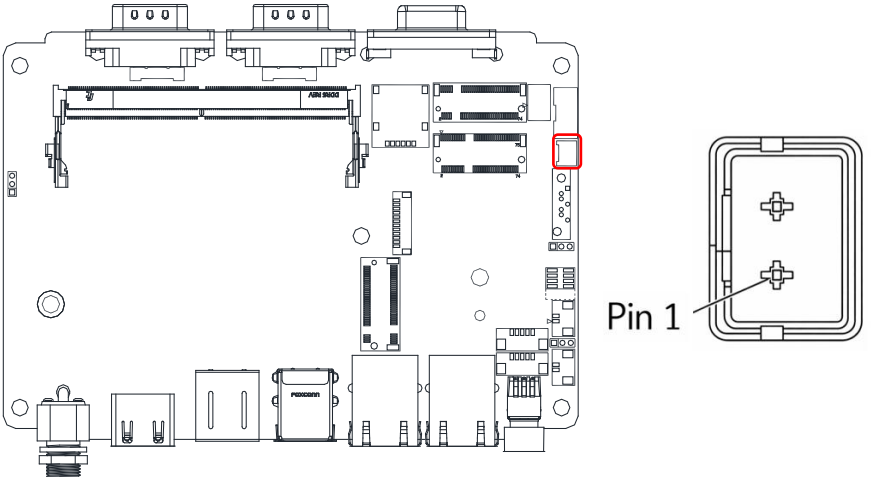
Pin	Pin Name	Signal Type	Signal Level
1	DIO0	I/O	+5V/ 12mA
2	DIO1	I/O	+5V/ 12mA
3	DIO2	I/O	+5V/ 12mA
4	DIO3	I/O	+5V/ 12mA
5	DIO4	I/O	+5V/ 12mA
6	DIO5	I/O	+5V/ 12mA
7	DIO6	I/O	+5V/ 12mA
8	DIO7	I/O	+5V/ 12mA
9	+5V	PWR	+5V/ 650mA
10	GND	GND	

2.4.9 SATA Connector (CN10)



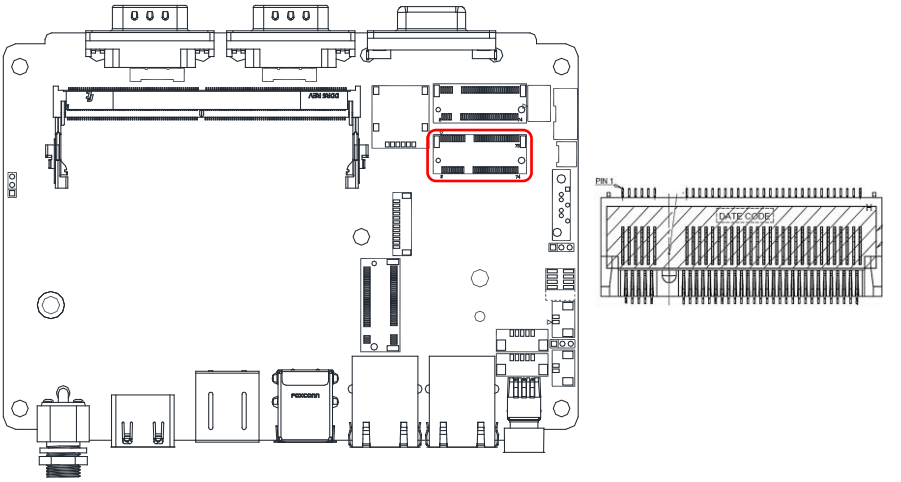
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TXP	DIFF	
3	SATA_TXN	DIFF	
4	GND	GND	
5	SATA_RXN	DIFF	
6	SATA_RXP	DIFF	
7	GND	GND	

2.4.10 SATA Power Connector (CN11)



Pin	Pin Name	Signal Type	Signal Level
1	+V5S	PWR	+5V
2	GND	GND	

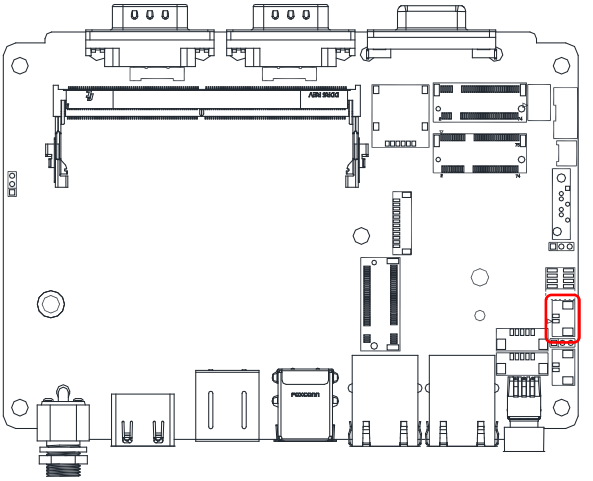
2.4.11 M.2 2230 E-Key Slot (CN16)

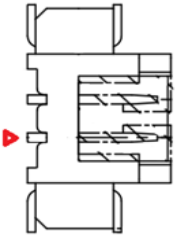


Pin	Pin Name	Signal	Pin	Pin Name	Signal	Level
1	GND	GND	2	+3.3V	PWR	+3.3V

Pin	Pin Name	Signal	Pin	Pin Name	Signal	Level
3	USB2.0	DIFF	4	+3.3V	PWR	+3.3V
5	USB2.0	DIFF	6	NC		
7	GND	GND	8	NC		
9	NC		10	NC		
11	NC		12	NC		
13	NC		14	NC		
15	NC		16	NC		
17	NC		18	GND	GND	
19	NC		20	NC		
21	NC		22	NC		
23	NC					
			32	NC		
33	GND	GND	34	NC		
35	PCIE_TXP	DIFF	36	NC		
37	PCIE_TXN	DIFF	38	NC		
39	GND	GND	40	NC		
41	PCIE_RXP	DIFF	42	NC		
43	PCIE_RXN	DIFF	44	NC		
45	GND	GND	46	NC		
47	CLKOUT_PCIE	DIFF	48	NC		
49	CLKOUT_PCIE	DIFF	50	SUSCLK	IN	+3.3V
51	GND	GND	52	BUF_PLT_RST#	IN	+3.3V
53	PCIE_CLKREQ#	OUT	54	BT_DIS#	IN	+3.3V
55	KEYE_WAKE#	OUT	56	WLAN_DIS#	IN	+3.3V
57	GND	GND	58	SMB_DATA		
59	NC		60	SMB_CLK	IN	
61	NC		62	SMB_ALERT	IN	
63	GND	GND	64	NC		
65	NC		66	NC		
67	NC		68	NC		
69	GND	GND	70	NC		
71	NC		72	+3.3V	PWR	+3.3V
73	NC		74	+3.3V	PWR	+3.3V
75	GND	GND				

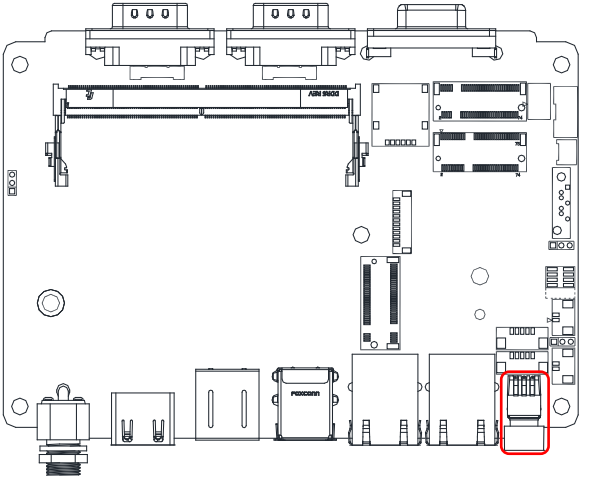
2.4.12 RTC Battery (CN1)

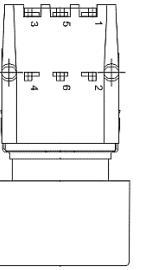




Pin	Pin Name	Signal Type	Signal Level
1	+V3P3A_RTC	PWR	+3.3V
2	GND	GND	

2.4.13 Power Button (SW1)

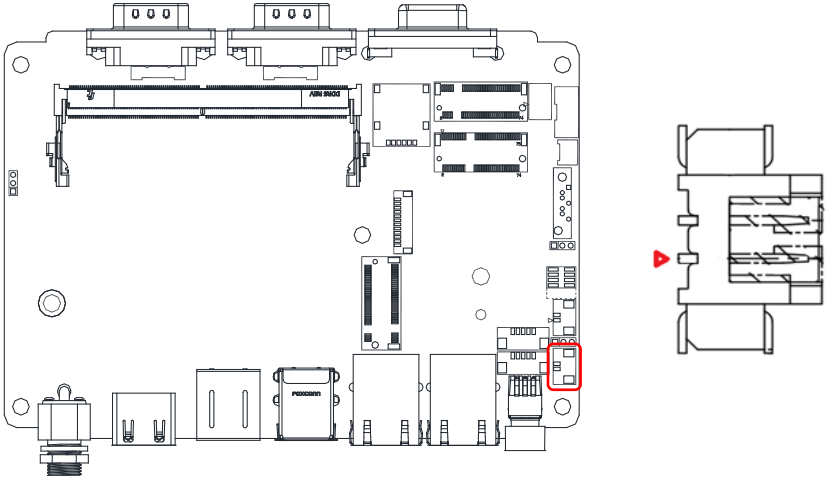




Pin	Pin Name	Signal Type	Signal Level
1	NC		

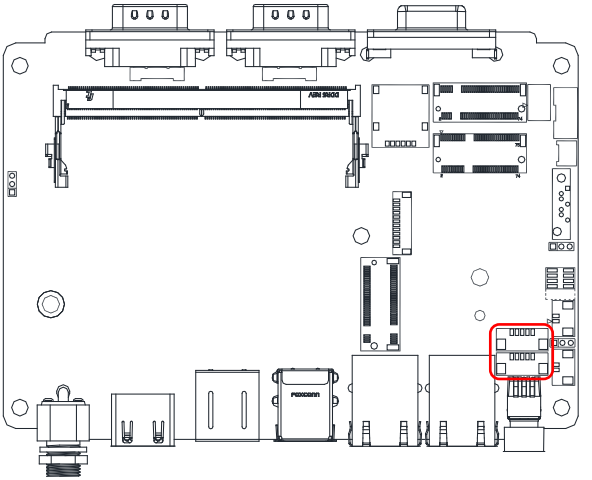
Pin	Pin Name	Signal Type	Signal Level
2	GND	GND	
3	PANSWH#	OUT	
4	PANSWH#	OUT	
5	PWB_LED_G		+5V
6	PWB_LED_B		+5V

2.4.14 Remote Button Connector (by request) (CN7)



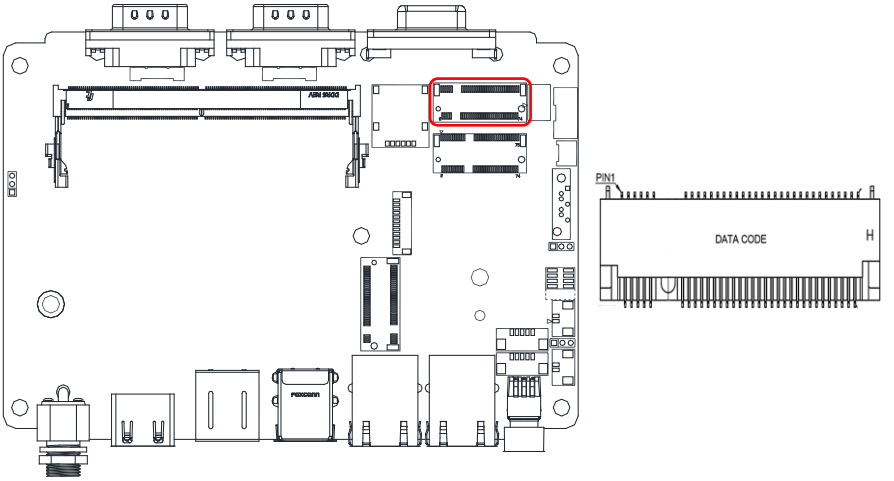
Pin	Pin Name	Signal Type	Signal Level
1	PWR_BUTTON#	IN	
2	GND		

2.4.15 USB 2.0 x 2 Wafer Box (CN20/CN19)



Pin	Pin Name	Signal Type	Signal Level
1	+5V	GND	+5V/0.5A
2	USBD-	DIFF	
3	USBD+	DIFF	
4	GND	GND	
5	GND	GND	

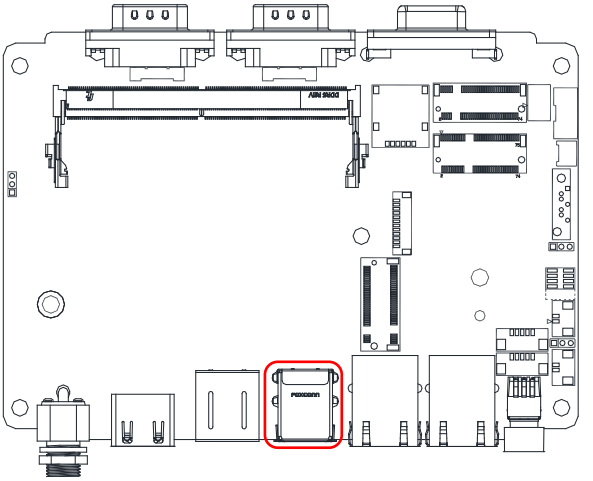
2.4.16 M.2 3052 B-Key Slot (CN30)

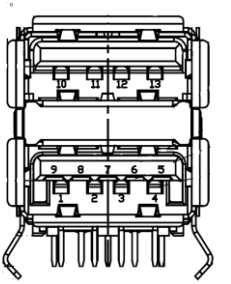


Pin	Pin Name	Signal	Pin	Pin Name	Signal	Level
1	NC		2	+3.3V	PWR	+3.3V
3	GND	GND	4	+3.3V	PWR	+3.3V
5	GND	GND	6	FULL_CARD_POWER	OUT	+3.3V
7	USB2.0		8	3GPW_EN	IN	+3.3V
9	USB2.0		10	NC		
11	GND	GND	12			
			20	NC		
21	NC		22	NC		
23	NC		24	NC		
25	NC		26	NC		
27	GND	GND	28	NC		
29	USB3_RX_N		30	UIM_RESET		
31	USB3_RX_P		32	UIM_CLK		
33	GND	GND	34	UIM_DATA		
35	USB3_TX_N		36	UIM_PWR		
37	USB3_TX_P		38	NC		
39	GND	GND	40	NC		
41	PCIE_RXN		42	NC		

Pin	Pin Name	Signal	Pin	Pin Name	Signal	Level
43	PCIE_RXP		44	NC		
45	GND	GND	46	NC		
47	PCIE_TXN		48	NC		
49	PCIE_TXP		50	BUF_PLT_RST#	IN	+3.3V
51	GND	GND	52	NC		
53	CLKOUT_PCIE_N		54	M2_WAKE#	OUT	+3.3V
55	CLKOUT_PCIE_P		56	NC		
57	GND	GND	58	NC		
59	NC		60	NC		
61	NC		62	NC		
63	NC		64	NC		
65	NC		66	NC		
67	M2_3052_RST_N		68	SUSCLK		
69	NC		70	+3.3V	PWR	+3.3V
71	GND	GND	72	+3.3V	PWR	+3.3V
73	GND	GND	74	+3.3V	PWR	+3.3V
75	GND	GND				

2.4.17 USB 3.2 / USB 2.0 Stack Port (CN2)

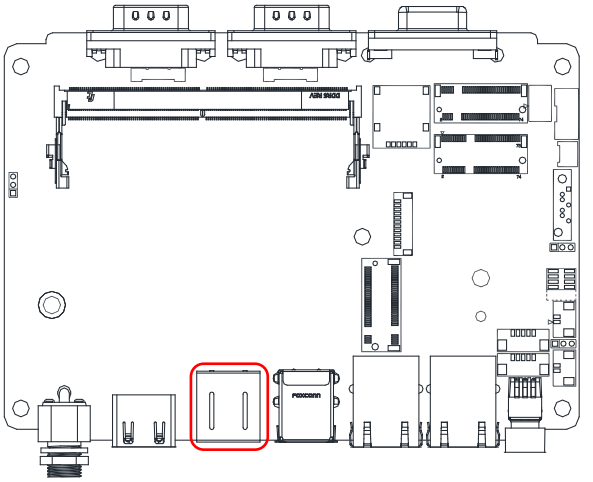


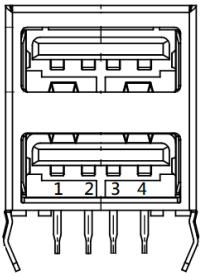


Pin	Pin Name	Signal Type	Signal Level
1	VCC_USB1	PWR	+5V/0.9A
2	USB1-	DIFF	
3	USB1+	DIFF	

Pin	Pin Name	Signal Type	Signal Level
4	GND	GND	
5	USB3_RX1_N_C	DIFF	
6	USB3_RX1_P_C	DIFF	
7	GND	GND	
8	USB3_TX1_N_C	DIFF	
9	USB3_TX1_P_C	DIFF	
10	VCC_USB2	PWR	+5V/0.9A
11	USB2-	DIFF	
12	USB2+	DIFF	
13	GND	GND	

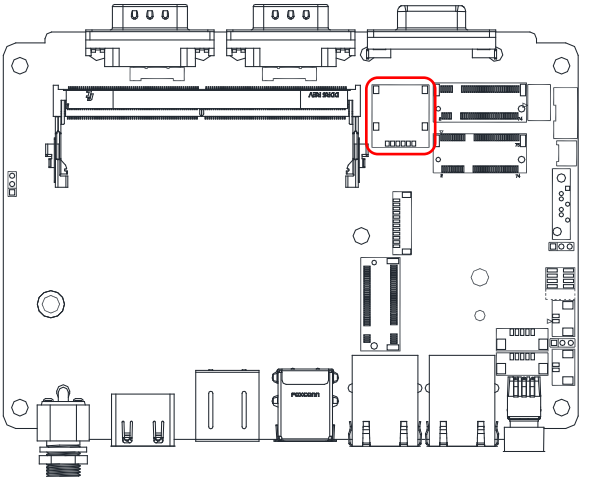
2.4.18 Dual USB 2.0 Port (CN29)

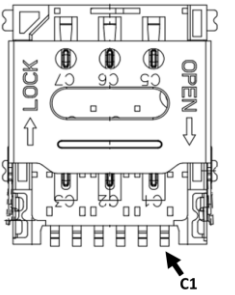




Pin	Pin Name	Signal Type	Signal Level
1	VCC_USB	PWR	+5V/0.5A
2	USB-	DIFF	
3	USB+	DIFF	
4	GND	GND	GND
5	VCC_USB	PWR	+5V/0.5A
6	USB-	DIFF	
7	USB+	DIFF	
8	GND	GND	GND

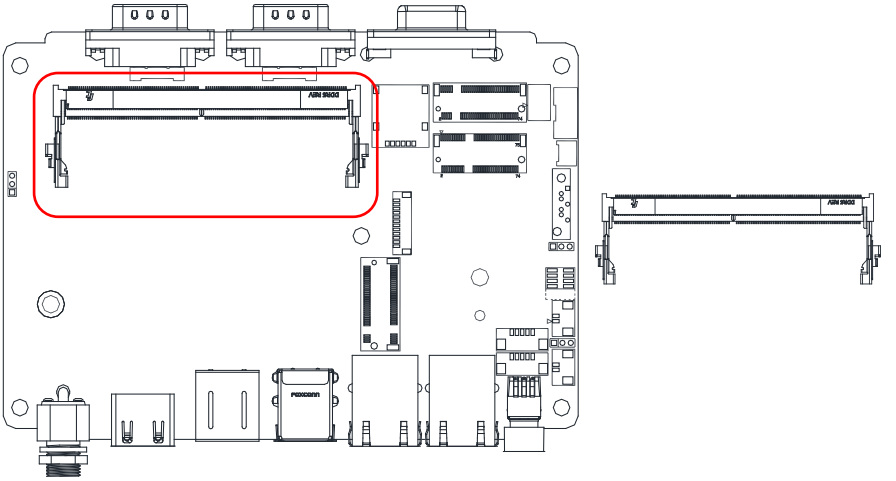
2.4.19 Micro SIM Slot (CN31)





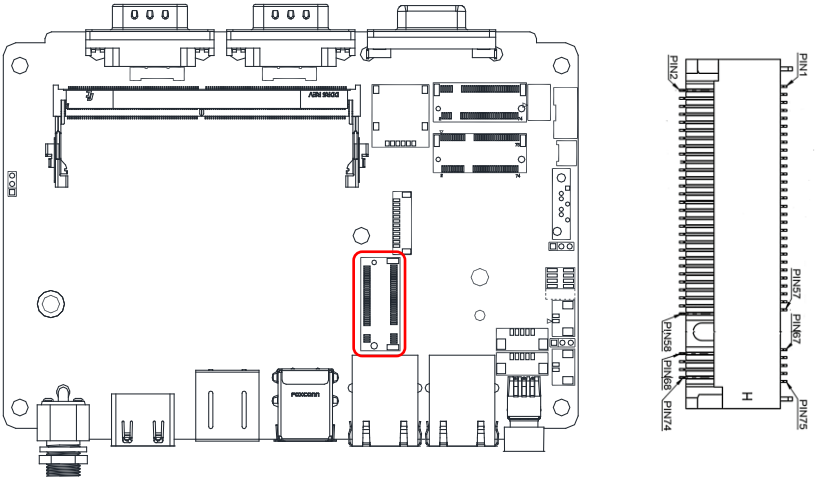
Pin	Pin Name	Signal Type	Signal Level
C1	UIM_PWR	PWR	
C2	UIM_RESET	IN	
C3	UIM_CLK	IN	
C5	GND	GND	
C6	NA	NA	
C7	UIM_DATA	I/O	

2.4.20 DDR5 SODIMM Slot (DIMM1)



Standard specification.

2.4.21 M.2 2280 M-Key Slot (CN15)



Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type
1	GND	GND	2	+3.3V	PWR
3	GND	GND	4	+3.3V	PWR

Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type
5	NC		6	CARD_PWR_OFF_N	OUT
7	NC		8	NC	
9	GND	GND	10	NC	
11	NC		12	+3.3V	PWR
13	NC		14	+3.3V	PWR
15	GND	PWR	16	+3.3V	PWR
17	NC		18	+3.3V	PWR
19	NC		20	NC	
21	GND	PWR	22	NC	
23	NC		24	NC	
25	NC		26	NC	
27	GND	PWR	28	NC	
29	PCIE_RXN2	IN	30	NC	
31	PCIE_RXP2	IN	32	NC	
33	GND	GND	34	NC	
35	PCIE_TXN2	OUT	36	NC	
37	PCIE_TXP2	OUT	38	DEVSLP	IN
39	GND	GND	40	SMB_CLK_M2	
41	PCIE_RXP3	IN	42	SMB_DATA_M2	
43	PCIE_RXN3	IN	44	NC	
45	GND	GND	46	NC	
47	PCIE_TXN3	OUT	48	NC	
49	PCIE_TXP3	OUT	50	RESET#	IN
51	GND	PWR	52	CLKREQ#	OUT
53	PCIE_M.2_CLK#	OUT	54	WAKE#	OUT
55	PCIE_M.2_CLK	OUT	56	NC	
57	GND	GND	58	NC	
67	NC		68	NC	
69	NC		70	+3.3V	PWR
71	GND	GND	72	+3.3V	PWR
73	GND	GND	74	+3.3V	PWR
75	GND	GND			

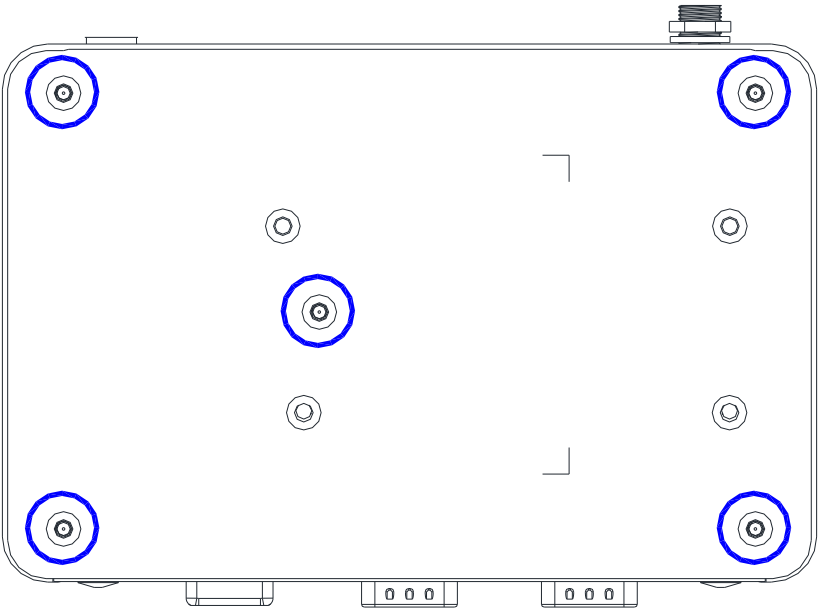
2.5 Hardware Assembly

This section details the hardware assembly steps for the BOXER-6407-TWL. Please read this section thoroughly before beginning installation and ensure you have all necessary peripheral hardware ready.

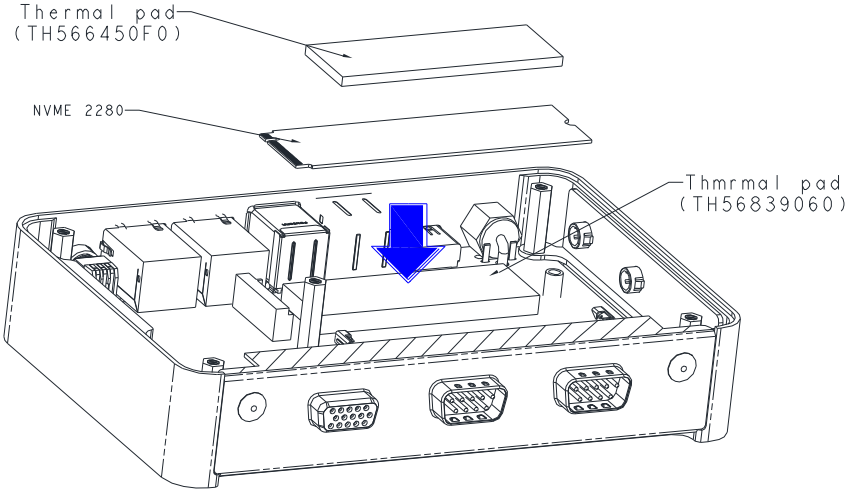
2.5.1 NVMe Installation

Before installing the NVMe module, ensure the system is powered down and disconnect the power cord from the system.

Step 1: Remove the five (5) screws from the bottom of the chassis to remove the bottom panel from the system.



Step 2: Prior to installation, please place a thermal pad between the mainboard and the module, then follow standard procedures for NVMe card installation, aligning the notch on the module with its respective key slot. Once the module is secured, place a second thermal pad on top of it prior to reassembling the system, as shown.

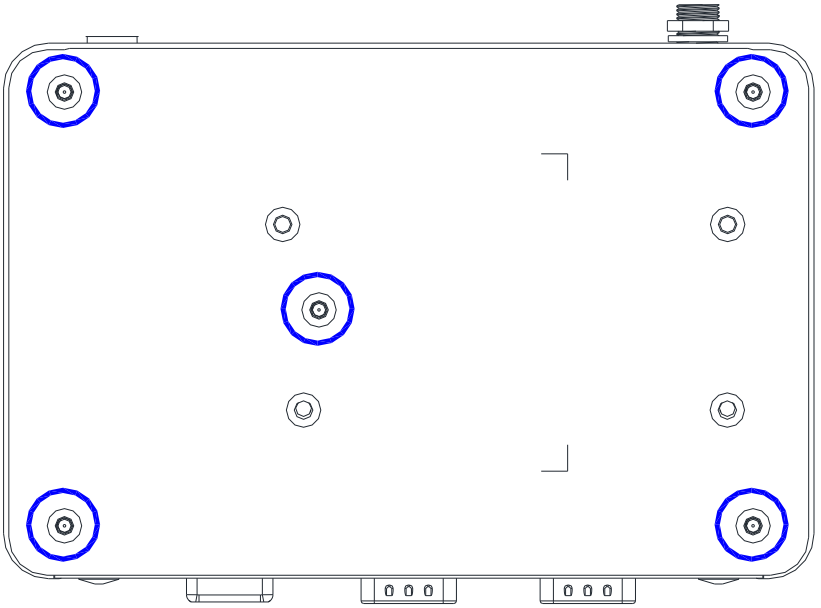


Note: For guidance on locating the appropriate M.2 expansion slot, please see section 2.4.21.

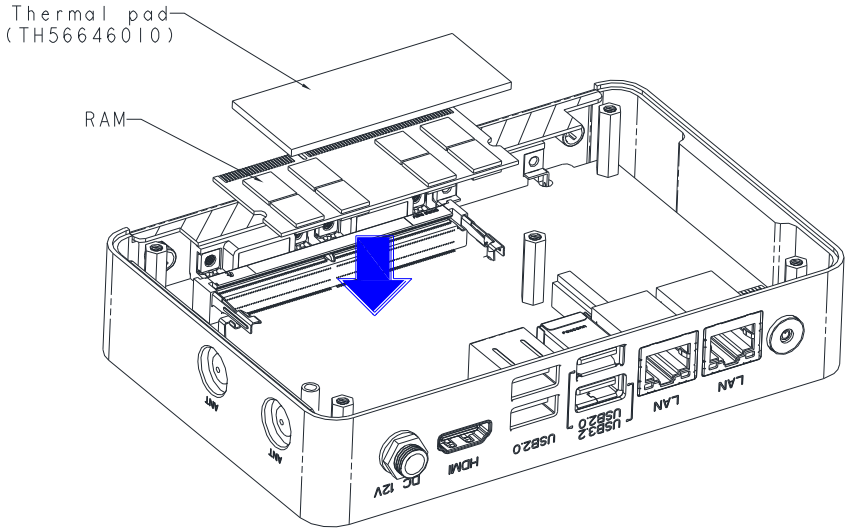
2.5.2 RAM Installation

Before installing the RAM module, ensure the system is powered down and disconnect the power cord from the system.

Step 1: Remove the five (5) screws from the bottom of the chassis to remove the bottom panel from the system.



Step 2: Insert the DDR5 module into the slot at a 45-degree angle until the connectors are fully seated and the metal clips on each side snap into place. Once the module is secured, place a thermal pad on top of it prior to reassembling the system, as shown.



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The system uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press <Del> or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/Disable boot option for legacy network devices

System I/O – Enable/Disable system I/O device

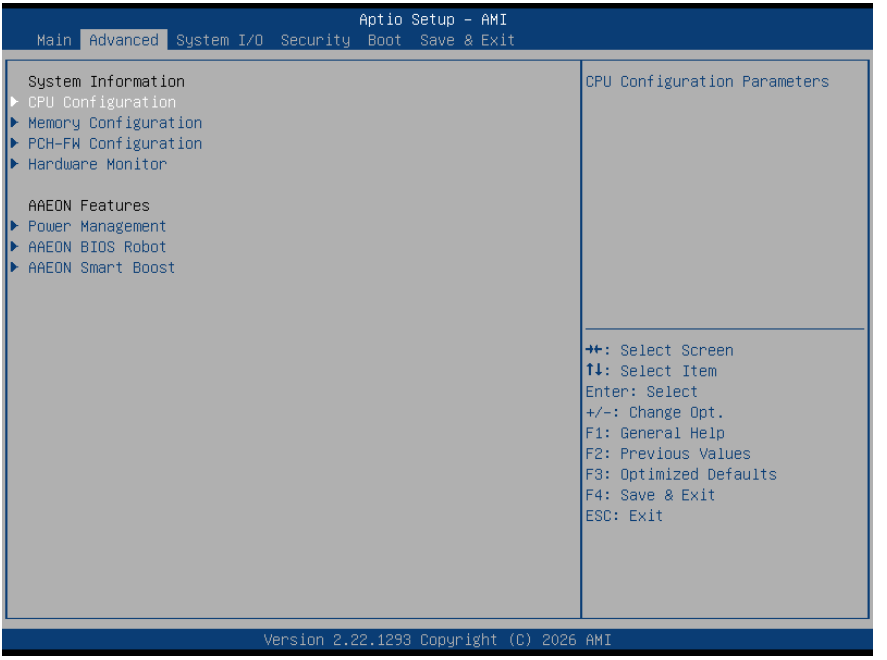
Security – The setup administrator password can be set here

Boot – Enable/Disable quiet Boot Option

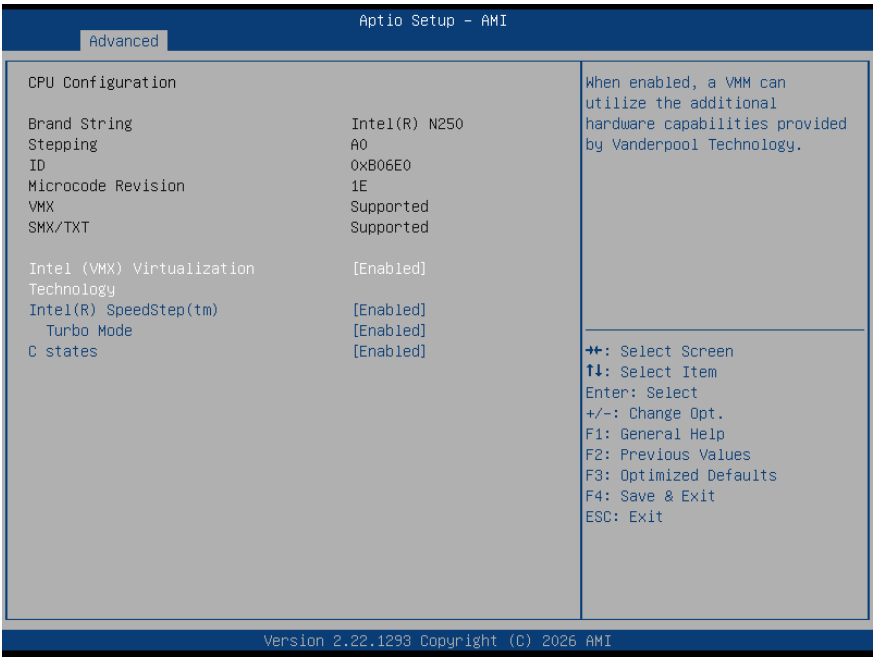
Save & Exit –Save your changes and exit the program

3.3 Setup Submenu: Main

3.4 Setup Submenu: Advanced

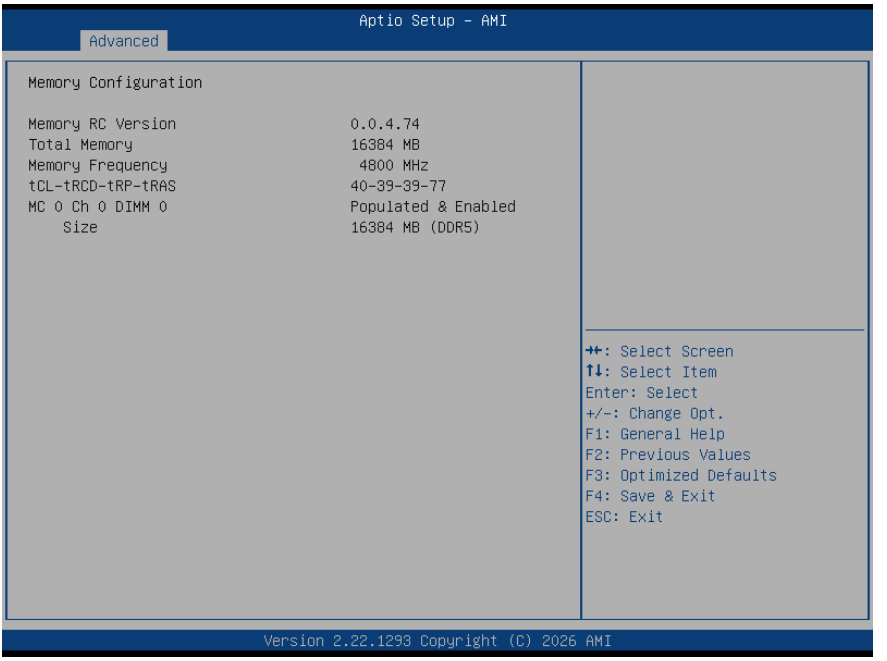


3.4.1 CPU Configuration

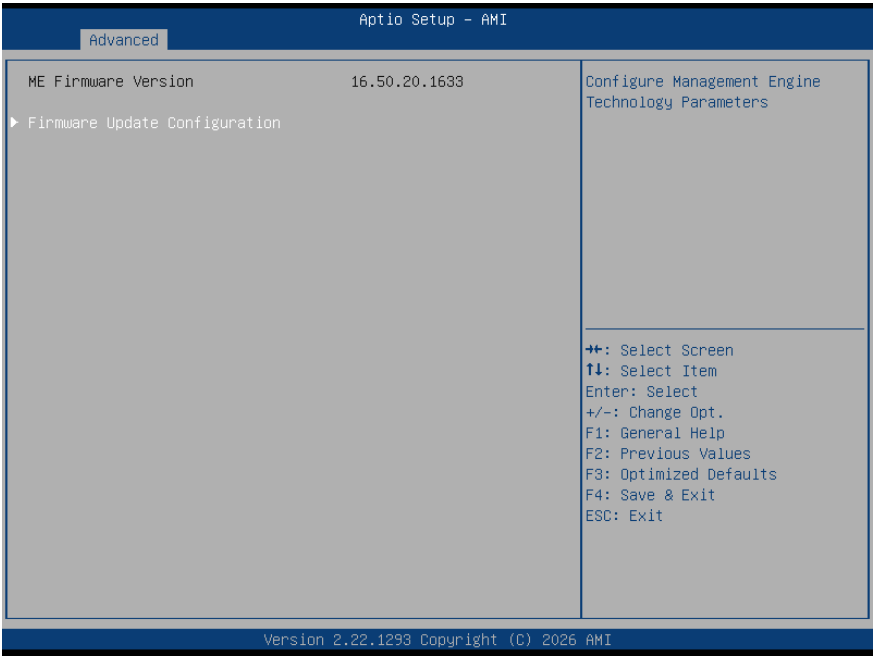


Options Summary		
Intel (VMX)Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
Intel® SpeedStep™	Disabled	
	Enabled	Optimal Default, Failsafe Default
Allows more than two frequency ranges to be supported.		
Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enabled/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.		
C states	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enabled/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized		

3.4.2 Memory Configuration



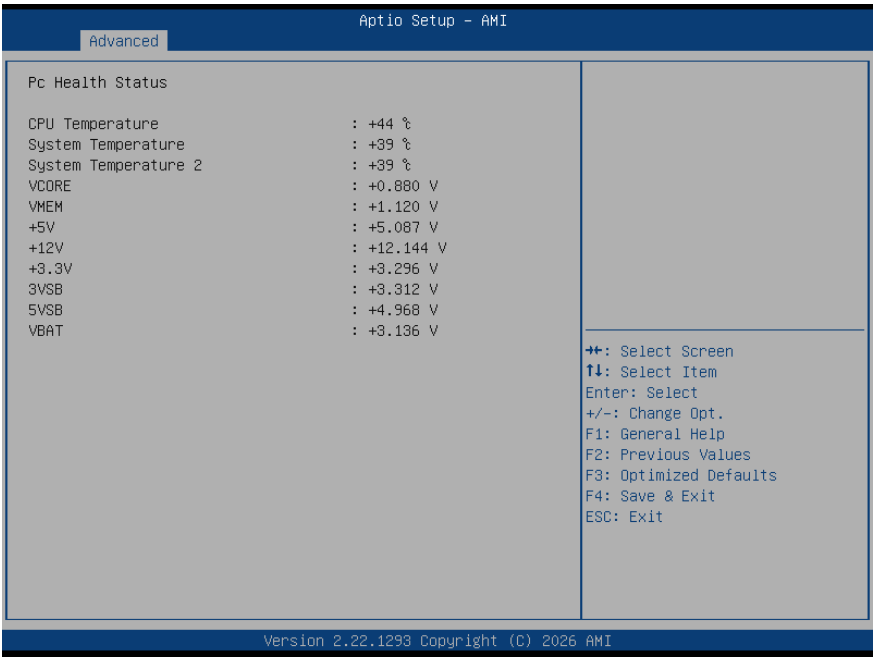
3.4.3 PCH-FW Configuration



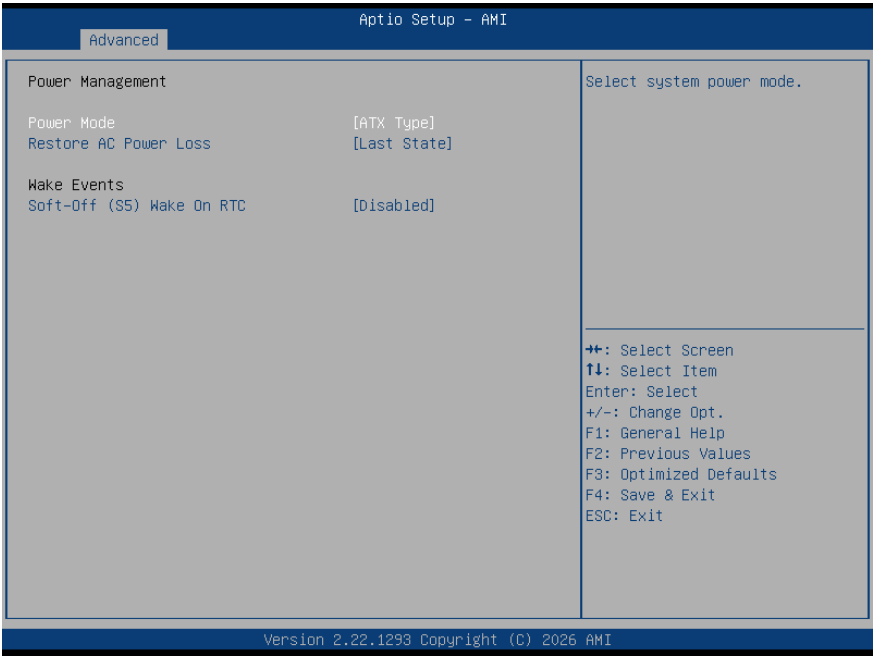
3.4.3.1 Firmware Update Configuration

Options Summary		
Me FW Image Re-Flash	Enabled	
	Disabled	Optimal Default, Failsafe Default
Enable/Disable Me FW Image Re-Flash function.		
FW Update	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable Me FW Update function.		

3.4.4 Hardware Monitor



3.4.5 Power Management



Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select system power mode.		
Restore AC Power Loss	Last State	Optimal Default, Failsafe Default
	Always On	
	Always Off	
System Wake On RTC	Disabled	Optimal Default, Failsafe Default
	By Date	
	By Weekday	
	Bypass	
By Date: System will wake on the day with hr::min::sec specified. **By Weekday:** System will wake on the enabled weekday with hr::min::sec specified. **Bypass:** BIOS will not control RTC wake function.		

3.4.6 AAEON BIOS Robot

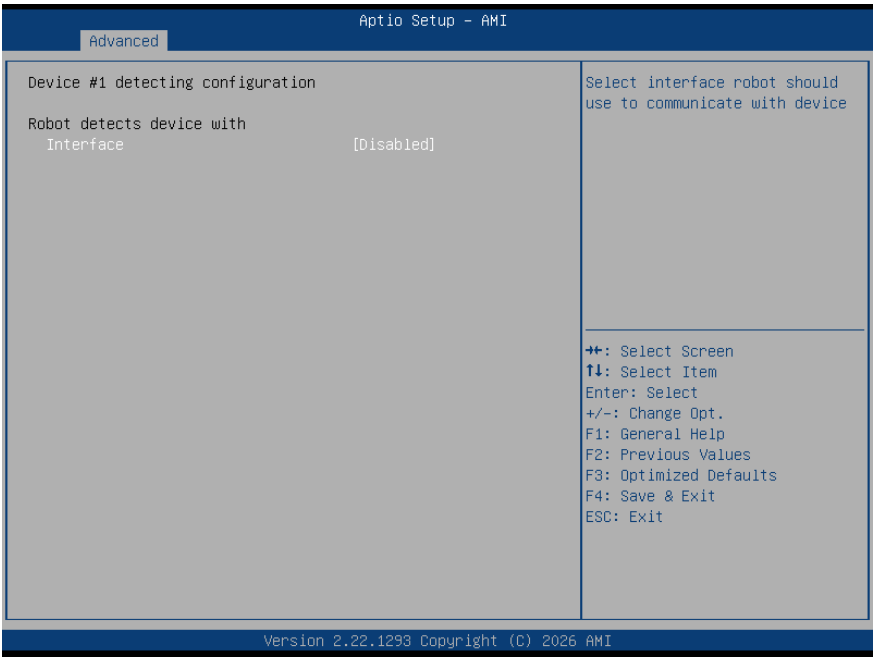
Options Summary		
Sends watch dog before BIOS POST	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – Robot set Watch Dog Timer (WDT) right after power on, before BIOS start POST process. And then Robot will clear WDT on completion of POST. WDT on completion of POST. WDT. WDT will reset system automatically if it is not cleared before its timer counts down to zero.		
Sends watch dog before booting OS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – Robot set Watch Dog Timer (WDT) after POST completion, before BIOS transfer control to OS. WARNING: Before enabling this function, a program in OS must be in responsible for clearing WDT. Also, this function should be disabled if OS I going to update itself.		
Delayed POST (PEI phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	

Options Summary		
Enabled -Robot holds BIOS from starting POST, right after power on. This allows BIOS POST to start with stable power or start after system is physically warmed-up. **Note:** Robot does this before 'Sends watch dog'.		
Delayed POST (DXE phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled -Robot holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed-up. **Note**: Robot does this after 'Sends watch dog before BIOS POST'.		
Reset system once	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – The robot performs a single system reset on each boot. This sends a soft or hard reset to onboard devices, helping to place them in a more stable state.		

3.4.6.1 Device Detecting Configuration

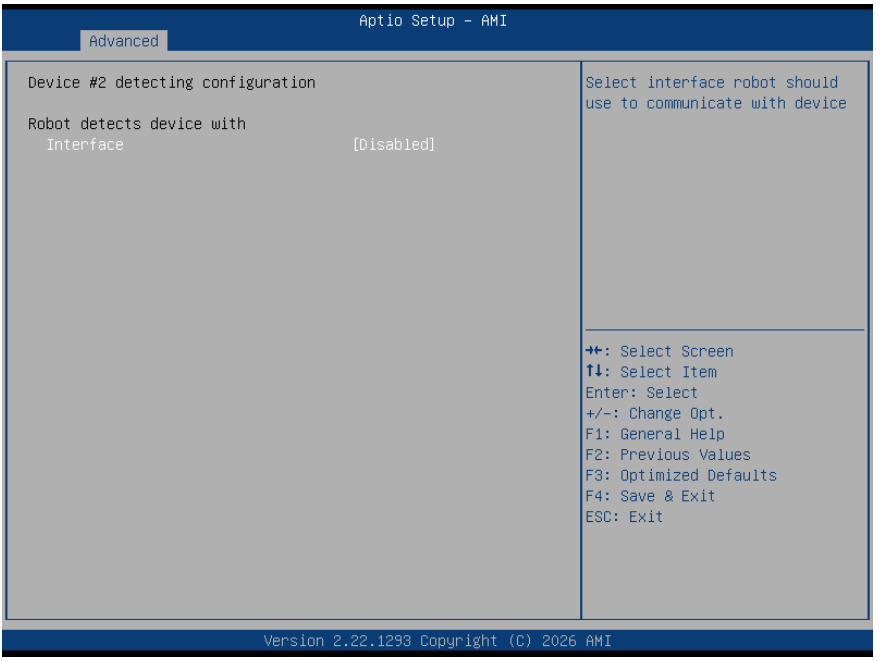
Options Summary		
Action	Reset System	Optimal Default, Failsafe Default
	Hold System	
Select action that robot should do.		
Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	
Select reset type robot should send on each boot.		
Retry-Count	3	Optimal Default, Failsafe Default
Fill retry counter here. Robot will reset system at most counter times, and then let system continue its POST.		
At time	After show logo	Optimal Default, Failsafe Default
	Before show logo	
Select robot action time: After show logo -Robot will do action after logo is displayed. System devices are almost ready. Before show logo - Robot will do action earlier before logo, but some devices may not be ready.		

3.4.6.1.1 Device #1 Detecting Configuration



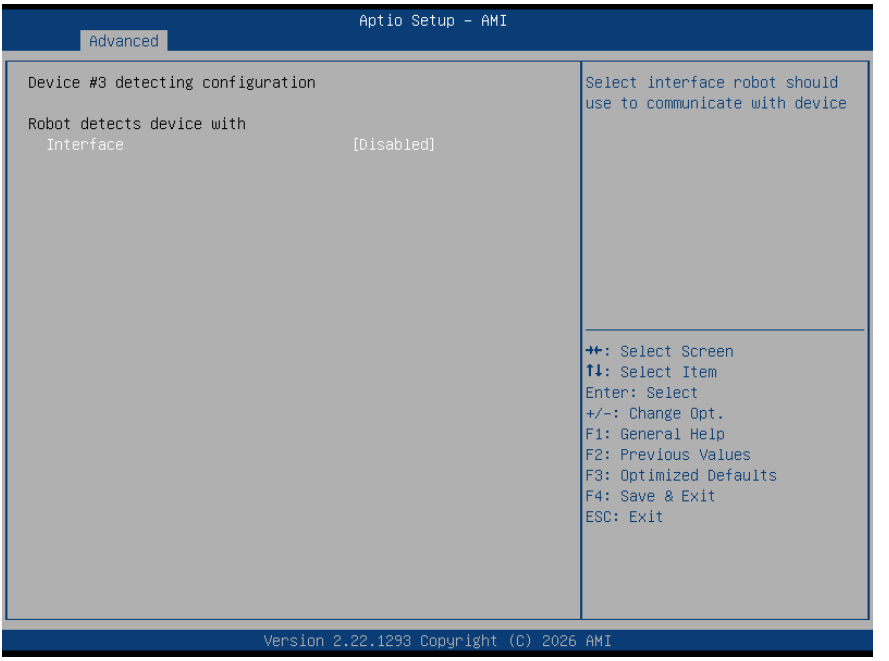
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.2 Device #2 Detecting Configuration



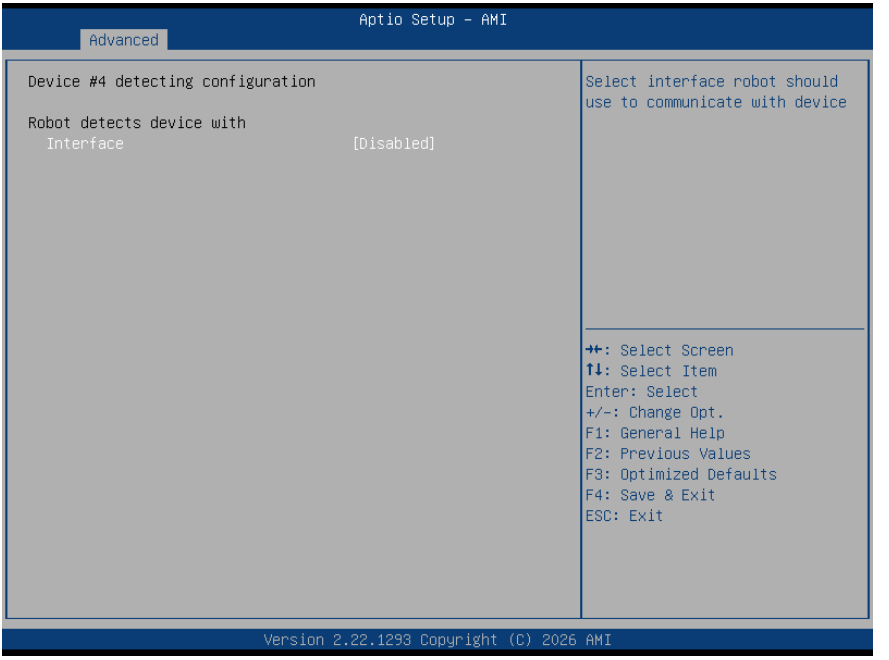
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.3 Device #3 Detecting Configuration



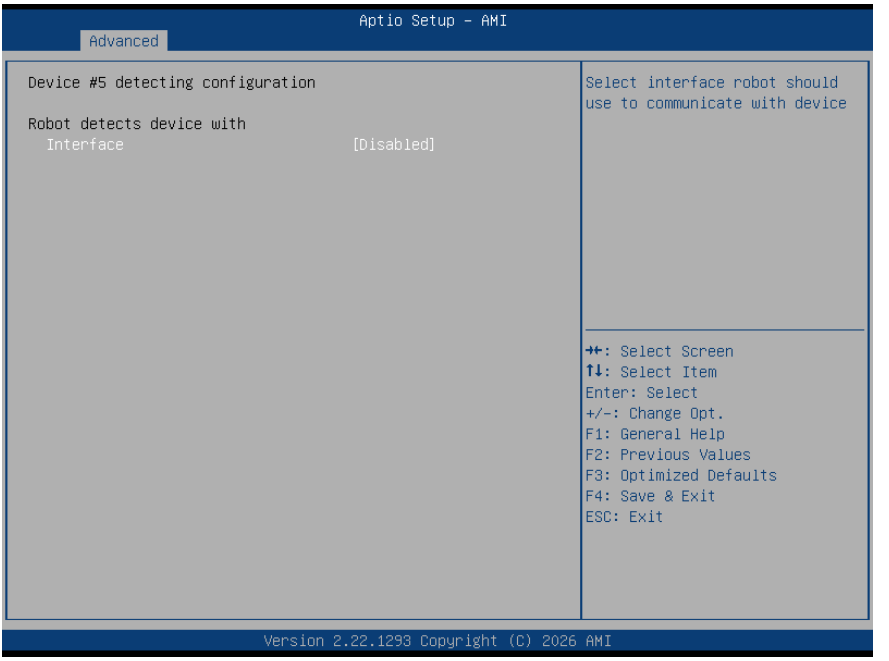
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.4 Device #4 Detecting Configuration



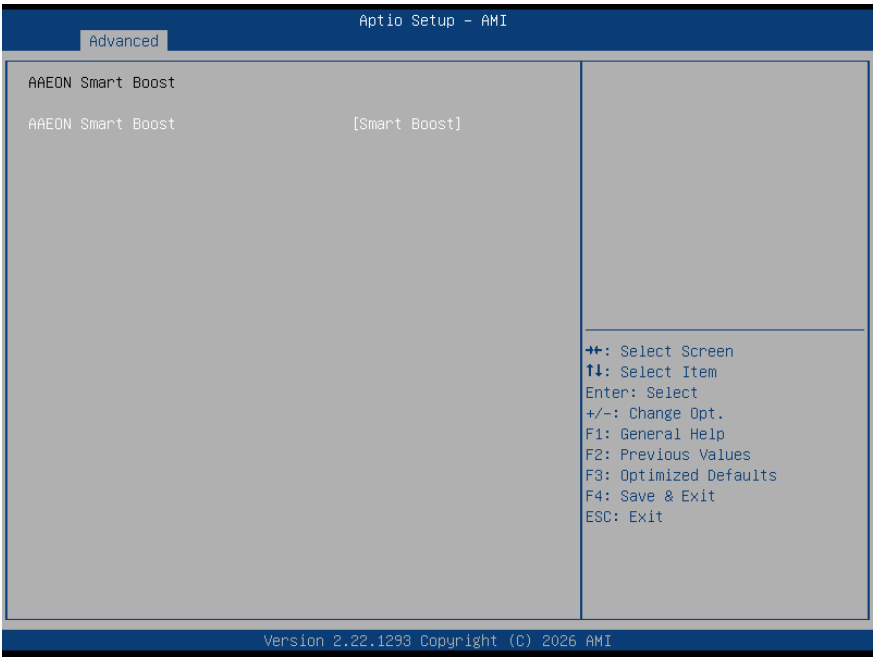
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.5 Device #5 Detecting Configuration



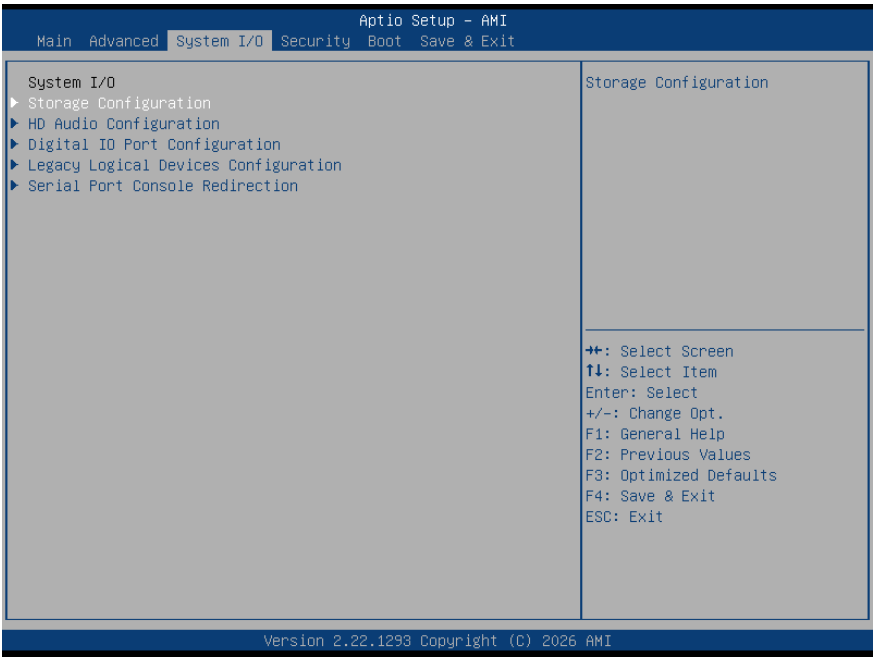
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.7 AAEON Smart Boost

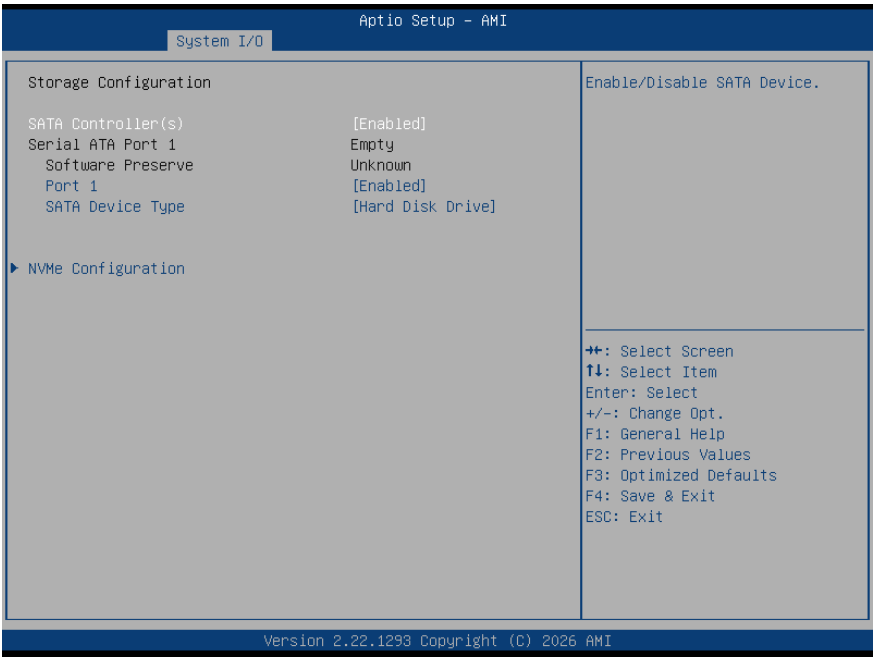


Options Summary		
AAEON Smart Boost	Smart Boost	Optimal Default, Failsafe Default
	Maximum Performance	
	Good Stability	
	Disable	

3.5 Setup Submenu: System I/O



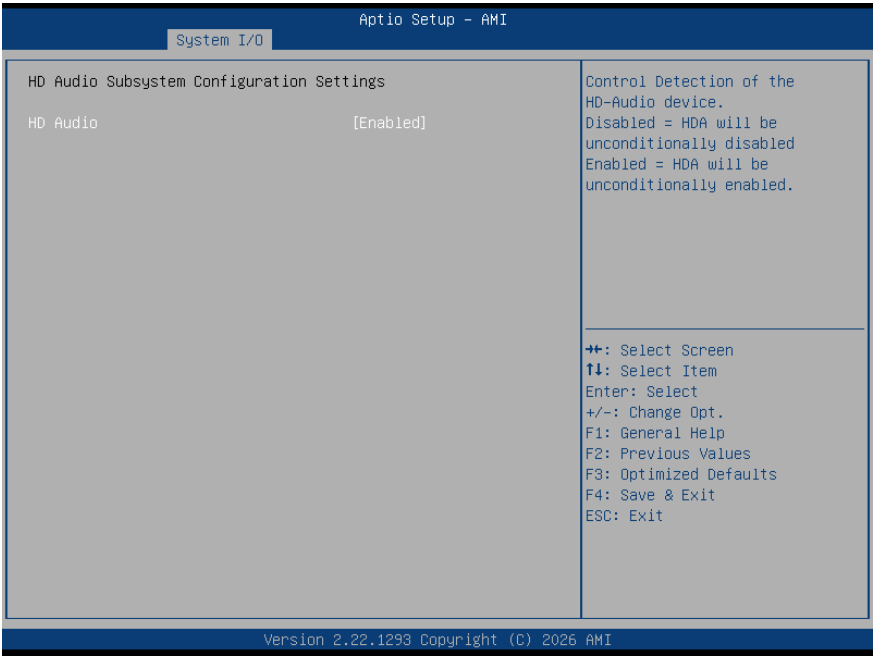
3.5.1 Storage Configuration



Options Summary		
SATA Controller(s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable to SATA Device.		
Port 1	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable to SATA Port.		
SATA Device Type	Hard Disk Drive	Optimal Default, Failsafe Default
	Solid State Drive	
Identify whether the SATA port is connected to a Solid State Drive or Hard Disk Drive.		

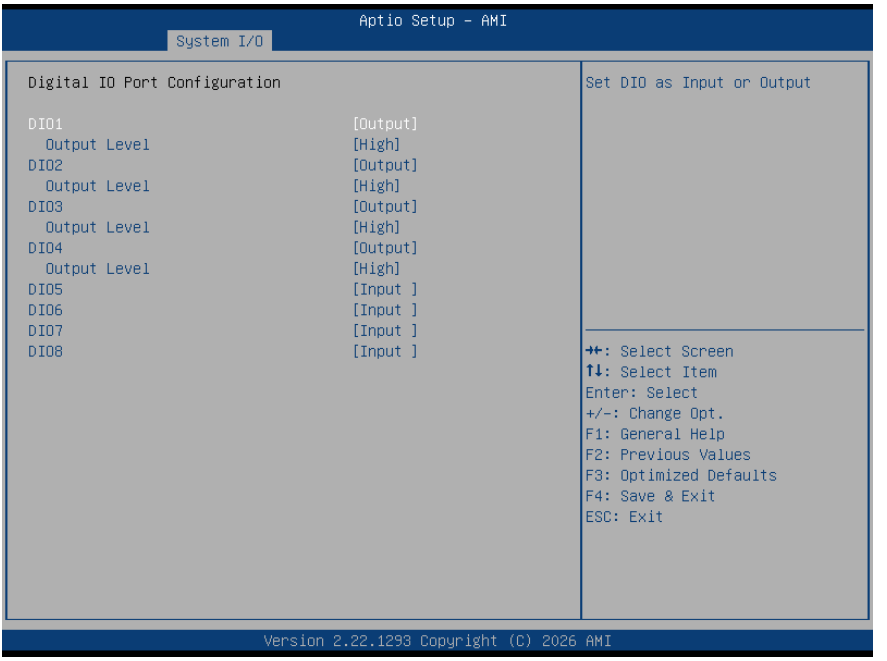
3.5.1.1 NVMe Configuration

3.5.2 HD Audio Configuration



Options Summary		
HD Audio	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.		

3.5.3 Digital IO Port Configuration



Options Summary		
DIO1	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		
DIO2	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		
DIO3	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default

Options Summary		
Set output level when DIO pin is output		
DIO4	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		
DIO5	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output		
DIO6	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output		
DIO7	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output		
DIO8	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output		

3.5.4 Legacy Logical Devices Configuration

3.5.4.1 Serial Port 1

Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8; IRQ=4;	
	IO=2F8; IRQ=3;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		
Mode	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485, selection.		

3.5.4.2 Serial Port 2

Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8; IRQ=3;	
	IO=3F8; IRQ=4;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		
Mode	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485, selection.		

3.5.5 Serial Port Console Redirection

Options Summary		
Console Redirection	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Console Redirection.		
Console Redirection EMS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable Console Redirection.		

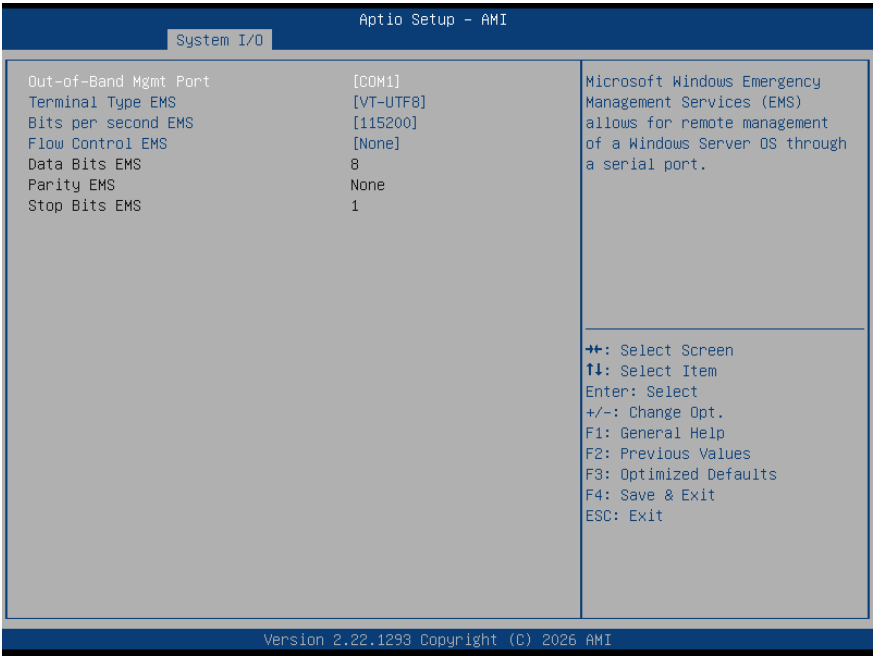
3.5.5.1 Console Redirection Settings (COM1)

Options Summary		
Terminal Type	VT100	
	VT100Plus	
	VT-UTF8	
	ANSI	Optimal Default, Failsafe Default
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.		
Bits per second	9600	
	19200	
	38400	
	57600	
	115200	Optimal Default, Failsafe Default

Options Summary		
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.		
Data Bits	7	
	8	Optimal Default, Failsafe Default
Data Bits		
Parity	None	Optimal Default, Failsafe Default
	Even	
	Odd	
	Mark	
	Space	
A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.		
Stop Bits	1	Optimal Default, Failsafe Default
	2	
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.		
Flow Control	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.		
VT-UTF8 Combo Key Support	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals		

Options Summary		
Recorder Mode	Disabled	Optimal Default, Failsafe Default
	Enabled	
With this mode enabled only text will be sent. This is to capture Terminal data.		
Resolution 100x31	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables or disables extended terminal resolution		
Putty KeyPad	VT100	Optimal Default, Failsafe Default
	LINUX	
	XTERMR6	
	SCO	
	ESCN	
	VT400	
Select FunctionKey and KeyPad on Putty.		

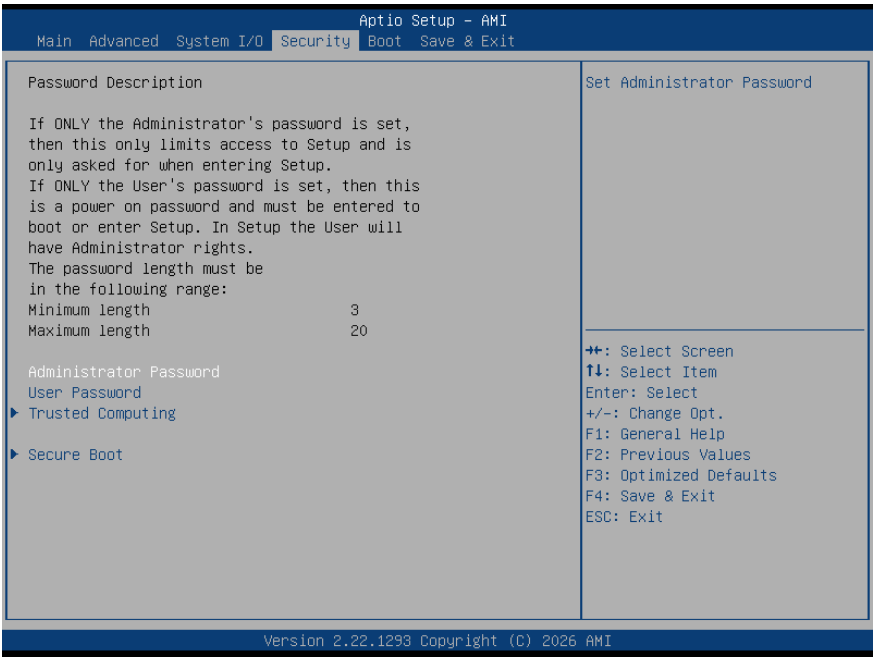
3.5.5.2 Console Redirection Settings (Out-of-Band Mgmt Port)



Options Summary		
Out-of-Band Mgmt Port	COM1	Optimal Default, Failsafe Default
	COM1(Pci Bus0, Dev0, Func0) (Disabled)	
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.		
Terminal Type EMS	VT100	
	VT100Plus	
	VT-UTF8	Optimal Default, Failsafe Default
	ANSI	
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.		
Bits per second EMS	9600	
	19200	
	57600	
	115200	Optimal Default, Failsafe Default

Options Summary		
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.		
Flow Control EMS	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
	Software Xon/Xoff	
Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.		

3.6 Setup Submenu: Security



Change User/Administrator Password

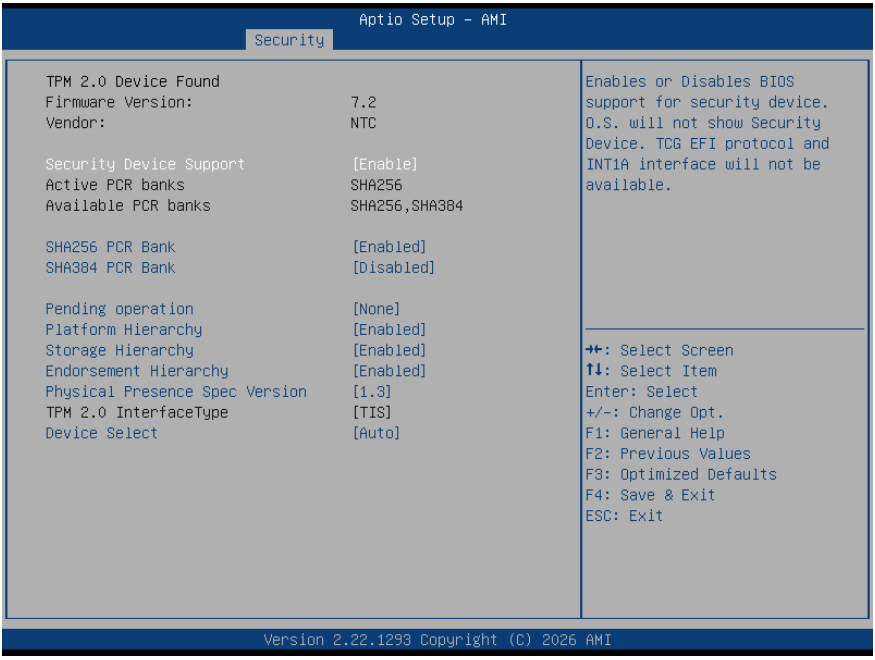
You can set a User Password once an Administrator Password. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

3.6.1 Trusted Computing



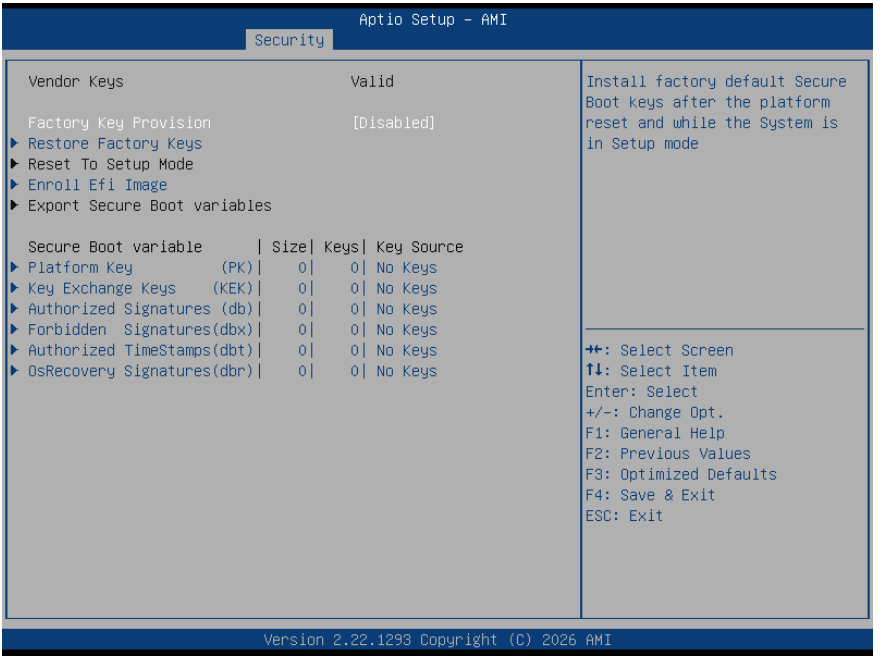
Options Summary		
Security Device Support	Enable	Optimal Default, Failsafe Default
	Disable	
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.		
SHA256 PCR Bank	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SHA256 PCR Bank		
SHA384 PCR Bank	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable SHA384 PCR Bank		
Pending operation	None	Optimal Default, Failsafe Default
	TPM Clear	
Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.		

Options Summary		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Platform Hierarchy		
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storage Hierarchy		
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Endorsement Hierarchy		
Physical Presence Spec Version	1.2	
	1.3	Optimal Default, Failsafe Default
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.		
Device Select	TPM 1.2	
	TPM 2.0	
	Auto	Optimal Default, Failsafe Default
TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found. TPM 1.2 devices will be enumerated.		

3.6.2 Secure Boot

Options Summary		
Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.		
Secure Boot Mode	Standard	
	Custom	Optimal Default, Failsafe Default
Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.		
Restore Factory Keys	Yes	
	No	
Force System to User Mode. Install factory default Secure Boot key databases.		

3.6.2.1 Expert Key Management



Options Summary		
Factory Key Provision	Disabled	Optimal Default, Failsafe Default
	Enabled	
Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.		
Restore Factory Keys	Yes	
	No	
Force System to User Mode. Install factory default Secure Boot key databases.		
Enroll Efi Image		
Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).		
Platform Key (PK)	Update	
Key Exchange Keys (KEK)	Update	
	Append	
Authorized Signatures (db)	Update	
	Append	

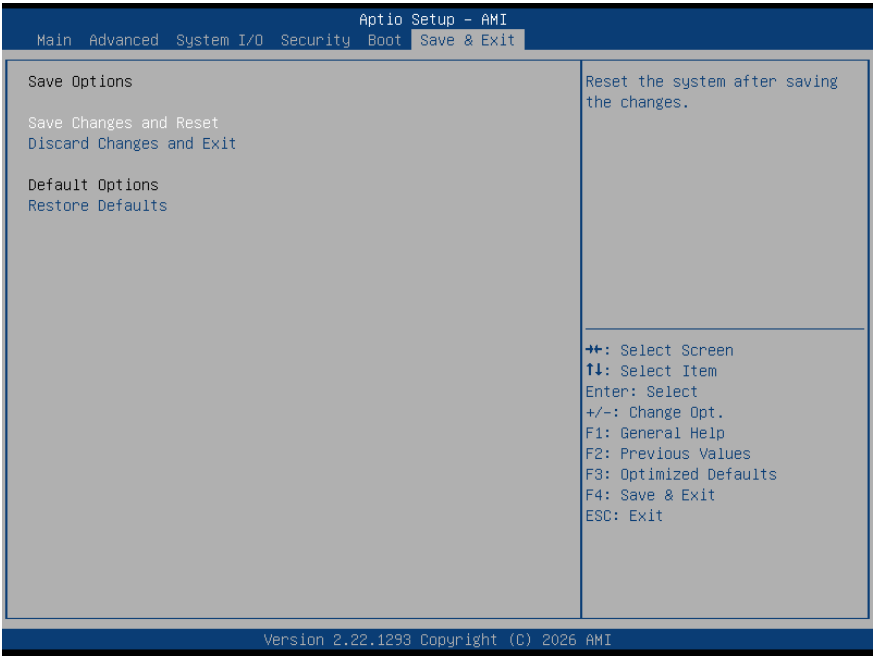
Options Summary	
Forbidden Signatures (dbx)	Update
	Append
Authorized TimeStamps (dbt)	Update
	Append
OsRecovery Signatures (dbr)	Update
	Append
Enroll Factory Defaults or load certificates from a file: 1. Public Key Certificate: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF Image (SHA256) Key Source: Factory, External, Mixed	

3.7 Setup Submenu: Boot

Options Summary		
Quiet Boot	Disabled	
	Enabled	Default
Enables/disables Quiet Boot option.		
Network Stack	Disabled	Default
	Enabled	
Enable/Disable UEFI Network Stack.		
Boot Option #1	Hard Disk	
Boot Option #2	NVME	
Boot Option #3	USB Device	
Boot Option #4	Network	
Sets the system boot order.		

3.7.1 UEFI USB Drive BBS Priorities

3.8 Setup Submenu: Save & Exit



Chapter 4

Drivers Installation

4.1 Drivers Download and Installation

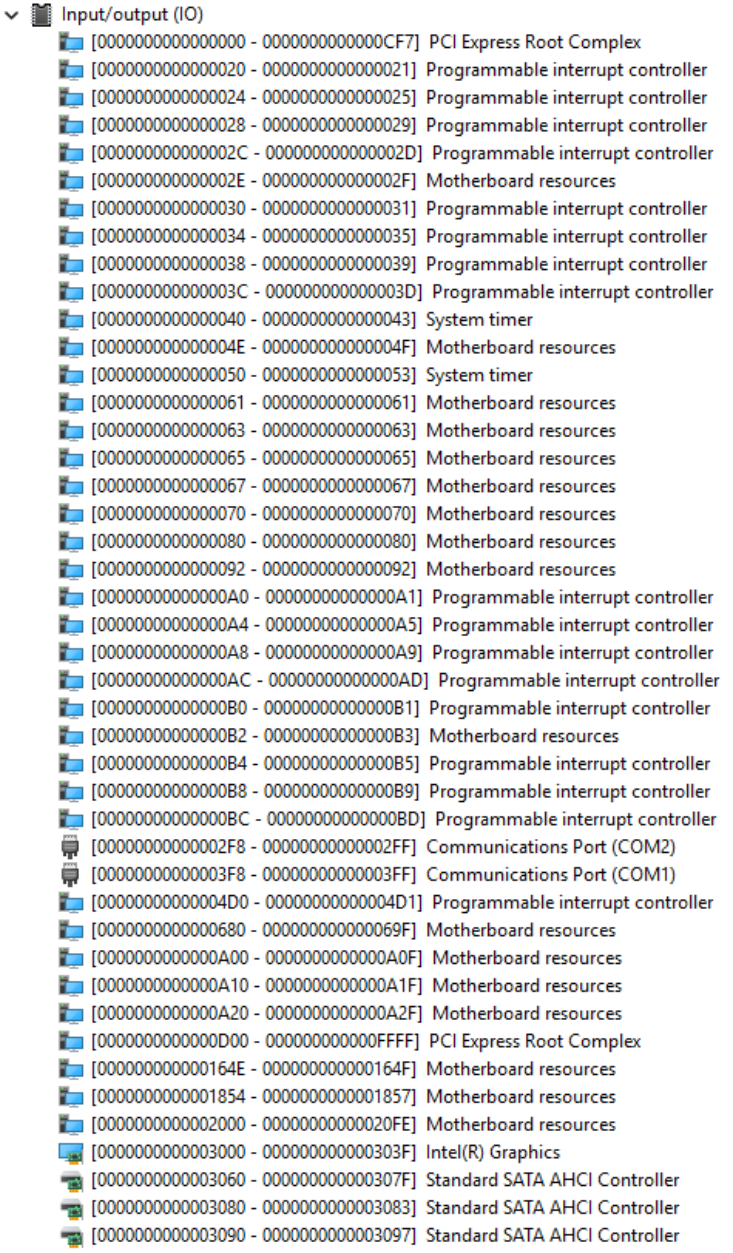
Drivers for the BOXER-6407-TWL can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/product/detail/ultra-slim-fanless-box-pc-solutions-boxer-6407-twl/download

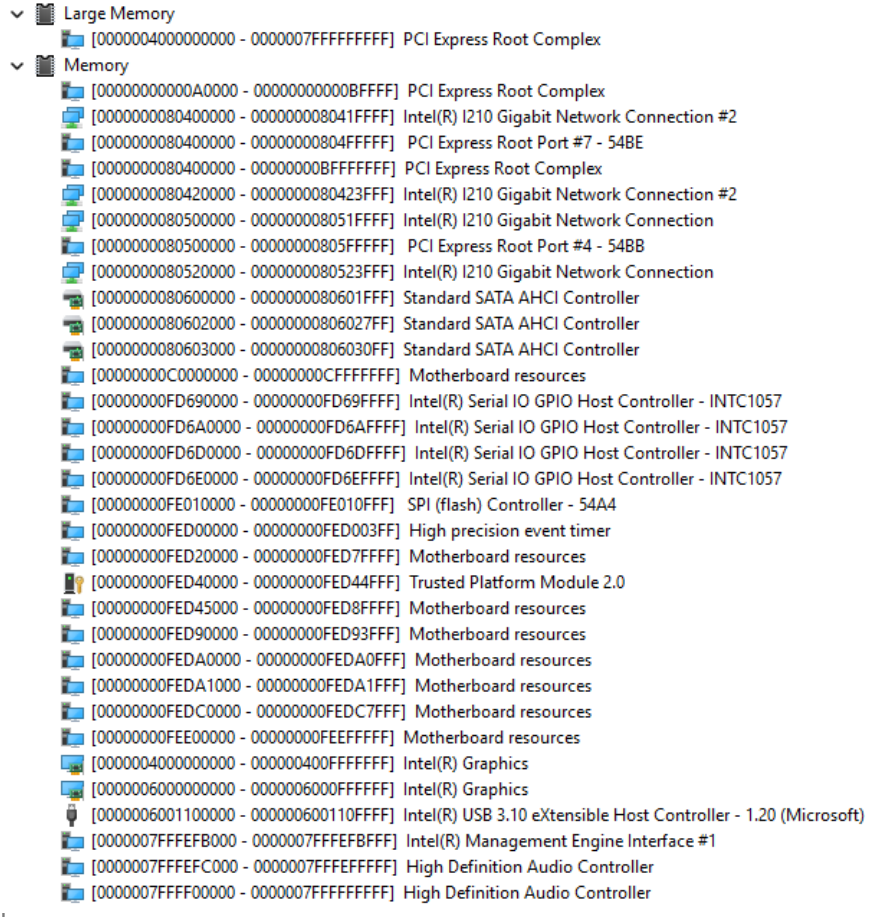
Appendix A

I/O Information

A.1 I/O Address Map



A.2 Memory Address Map



A.3 IRQ Mapping Chart