BOXER-6648-ARS

Fanless Compact Embedded Computer

User's Manual 1st Ed

Last Updated: November 17, 2025

Copyright Notice

Acknowledgement

Packing List

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

Item	Quantity
● BOXER-6648-ARS	1
● Wall Mount Kit	1
● 4 Pin Terminal Block Connector (for DC Input)	1
● Screw Pack	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® Core™ Ultra 9 Processor 285/285T
	Intel® Core™ Ultra 7 Processor 265/265T
	Intel® Core™ Ultra 5 Processor 225/225T
Chipset	A1 SKU: Intel® H810 Chipset
	A2 SKU: Intel® Q870 Chipset
System Memory	DDR5 SODIMM Slot x 2, up to 96GB
Display Interface	HDMI 2.0 x 2
Storage Device	Internal 2.5" SATA Drive Bay x 2
	(RAID 0/1 supported on A2 SKU)
	M.2 2280 M-Key x 1 (PCIe Gen 4 [x4]) for NVMe
Ethernet	Intel® Ethernet Controller I226-LM, 2.5GbE LAN x 2
	Intel® Ethernet Connection I219-LM, 1GbE LAN x 1
	(Intel® Active Management Technology on 2.5GbE
	LAN on A2 Model SKU only)
I/O	A1 SKU:
	USB 3.2 Gen 1 (5Gbps) Type-A x 4
	USB 2.0 x 4
	A2 SKU:
	USB 3.2 Gen 2 (10Gbps) Type-A x 6
	USB 2.0 x 2
	DB-9 x 6 for RS-232/422/485
	Mic-in / Line-out
	10-pin Terminal Block for 8-bit DIO
	Power Button with LED Indicator x 1
	2-pin Remote Power On/Off Connector x 1

System

Expansion	M.2 2230 E-Key x 1 (PCIe)
	M.2 2280 M-Key x 1 (PCIe Gen 4 [x4])
Indicator	System Power / Storage LED
OS Support	Windows® 11 Pro
	Windows® 11 IoT Enterprise LTSC 2024
	Ubuntu 24.04 or later

Power Supply

Power Requirement	10V ~ 35V DC-in via 4-pin Terminal Block Connector

Mechanical

Mounting	Wall Mount
	DIN Rail (optional)
Dimensions (W x H x D)	10.39" x 3.2" x 6.1" (264mm x 81mm x 156mm)
Gross Weight	10.8 lb (4.9 kg)
Net Weight	8.6 lb (3.9 kg)

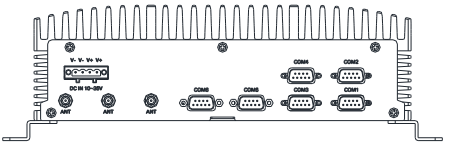
Environmental

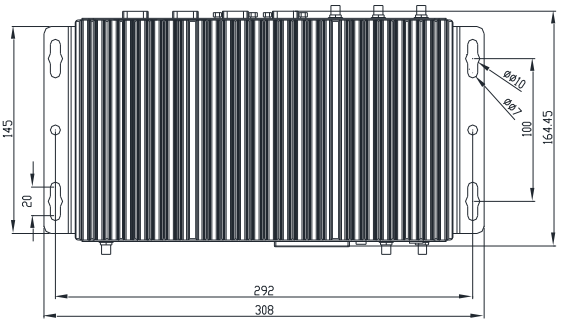
Operating Temperature	-13°F – 122°F (-25°C – 50°C) with 65W TDP CPU, IEC60068-2 with 0.7 m/s AirFlow, with wide temp. memory/storage
Storage Temperature	-40˚F – 176˚F (-40˚C – 80˚C)
Storage Humidity	5 – 95% @ 40˚C, non-condensing
Anti-Vibration	SSD: Random, 3Grms, 5~500Hz
Anti-Shock	SSD: 50G w/ Wall Mount, Half-sine, 11ms
Certification	CE/FCC class A

Chapter 2

Hardware Information

2.1 Dimensions





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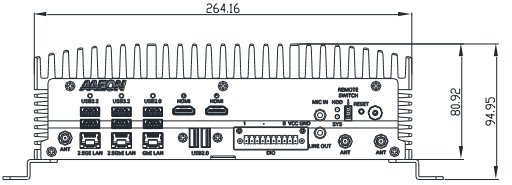
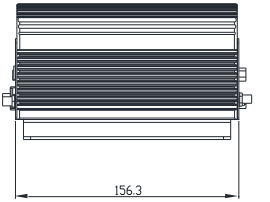
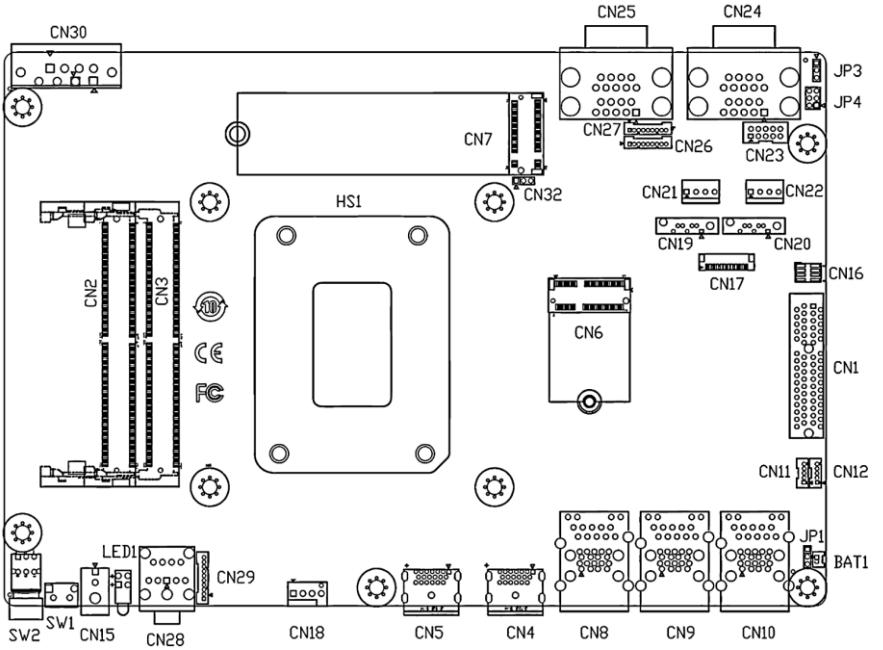




2.2 Jumpers and Connectors



2.3 List of Jumpers

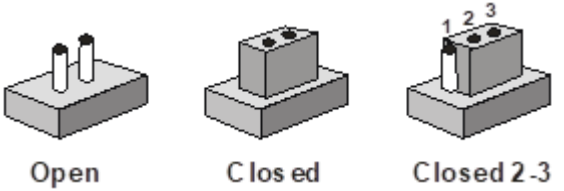
Please refer to the table below for all of the system's jumpers that you can configure for your application.

Label	Function
JP1	CMOS Control Selection
JP3	ATX/AT Mode Selection

2.3.1 Setting Jumpers

The BOXER-6648-ARS comes with several jumpers which allow you to configure the system by either setting the jumper to "open" or "closed"; or by selecting certain pins. A closed jumper has two pins connected with a jumper clip, while an open jumper has no pins connected.

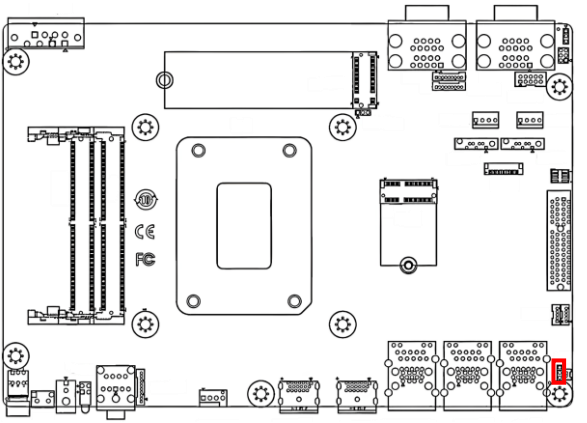
For jumpers with multiple pins, this guide uses "pins A-B" to notate which pins should be connected by a jumper clip. For example, "pins 1-2" means you should connect pins 1 and 2, while "pins 2-3" means you should connect pins 2 and 3.



A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any questions about how best to configure the system for your application, contact your AAEON representative or visit our website to talk with our support team.

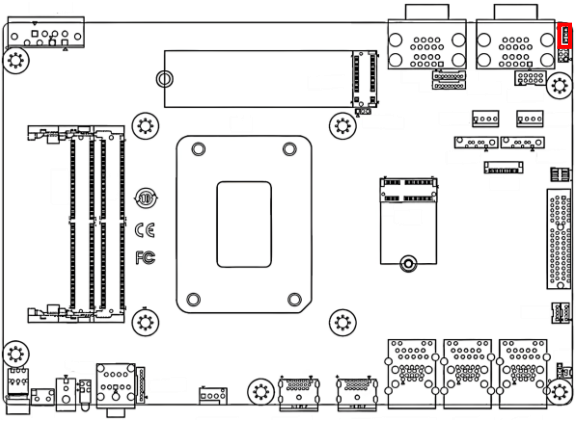
2.3.2 Clear CMOS Jumper (JP1)



Normal (Default)

Clear CMOS

2.3.3 ATX/AT Mode Selection (JP3)



ATX (Default)

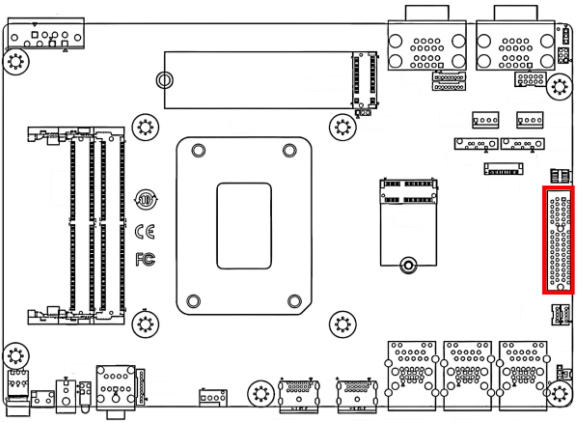
AT

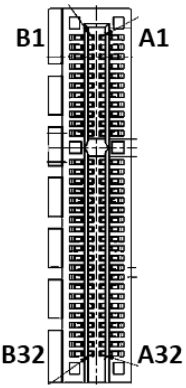
2.4 List of Connectors

Please refer to the table below for all of the system's connectors that you can configure for your application

Label	Function
CN1	PCIe [x4] Slot
CN2	SODIMM Slot
CN3	SODIMM Slot
CN4	HDMI Port
CN5	HDMI Port
CN6	M.2 2230 E-Key Slot
CN7	M.2 2280 M-Key Slot
CN8	1GbE LAN + Dual USB 3.2 Port
CN9	2.5GbE LAN + Dual USB 3.2 Port
CN10	2.5GbE LAN + Dual USB 3.2 Port
CN11	USB 2.0 Wafer
CN12	USB 2.0 Wafer
CN15	Remote Button
CN17	eSPI Connector
CN18	Fan Connector
CN19	SATA Port
CN20	SATA Port
CN21	SATA Power Connector
CN22	SATA Power Connector
CN23	Digital IO Port
CN24	COM 1 + COM 2
CN25	COM 3 + COM 4
CN26	COM 5 (Internal Wafer)
CN27	COM 6 (Internal Wafer)
CN28	Audio Connector
CN29	Audio Internal Wafer
CN30	DC-In Connector

2.4.1 PCIe [x4] Slot (CN1)



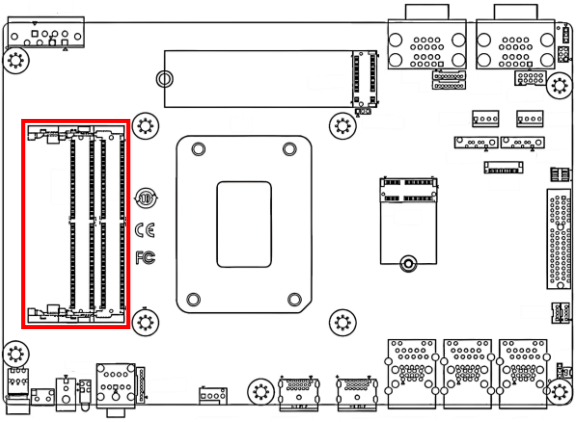


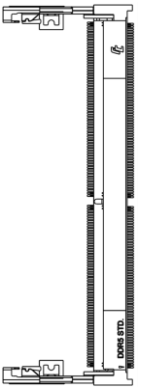
Pin	Pin Name	Signal Type	Signal level
A1	PRSNT1#	I/O	
A2	+12V	PWR	+V12S
A3	+12V	PWR	+V12S
A4	GND	GND	
A5	PCIE_TXN5	DIFF	
A6	PCIE_TXP5	DIFF	
A7	PCIE_RXN5	DIFF	
A8	PCIE_RXP5	DIFF	
A9	+3.3V	PWR	+V3.3S
A10	+3.3V	PWR	+V3.3S
A11	PERST#	I/O	
A12	GND	GND	
A13	PCIE_x4SLOT_CLK	DIFF	
A14	PCIE_x4SLOT_CLK#	DIFF	
A15	GND	GND	
A16	PCIE_RXP24	DIFF	
A17	PCIE_RXN24	DIFF	
A18	GND	GND	
A19	NC		
A20	GND	GND	
A21	PCIE_RXP23	DIFF	
A22	PCIE_RXN23	DIFF	
A23	GND	GND	
A24	GND	GND	

Pin	Pin Name	Signal Type	Signal level
A25	PCIE_RXP22	DIFF	
A26	PCIE_RXP22	DIFF	
A27	GND	GND	
A28	GND	GND	
A29	PCIE_RXP21	DIFF	
A30	PCIE_RXN21	DIFF	
A31	GND	GND	
A32	NC		
B1	+12V	PWR	+V12S
B2	+12V	PWR	+V12S
B3	+12V	PWR	+V12S
B4	GND	GND	
B5	SMB_CLK	I/O	
B6	SMB_DATA	I/O	
B7	GND	GND	
B8	+V3.3S	PWR	+V3.3S
B9	NC		
B10	3.3Vaux	PWR	+V3.3A
B11	WAKE#	I/O	
B12	NC		
B13	GND	GND	
B14	PCIE_TXP24	DIFF	
B15	PCIE_TXN24	DIFF	
B16	GND	GND	
B17	PRSNT	I/O	
B18	GND	GND	
B19	PCIE_TXP23	DIFF	
B20	PCIE_TXN23	DIFF	
B21	GND	GND	
B22	GND	GND	
B23	PCIE_TXP22	DIFF	
B24	PCIE_TXN22	DIFF	
B25	GND	GND	
B26	GND	GND	
B27	PCIE_TXP21	DIFF	
B28	PCIE_TXN21	DIFF	
B29	GND	GND	
B30	NC		
B31	PRSNT	I/O	

Pin	Pin Name	Signal Type	Signal level
B32	GND	GND	

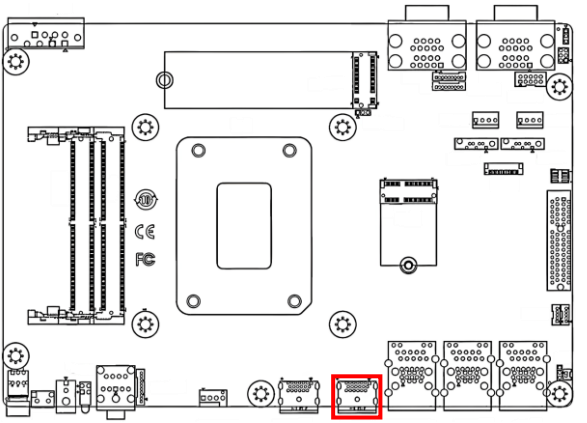
2.4.2 SODIMM Slot (CN2/CN3)

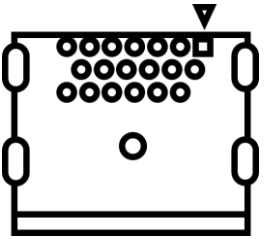




Standard configuration.

2.4.3 HDMI Port (CN4)

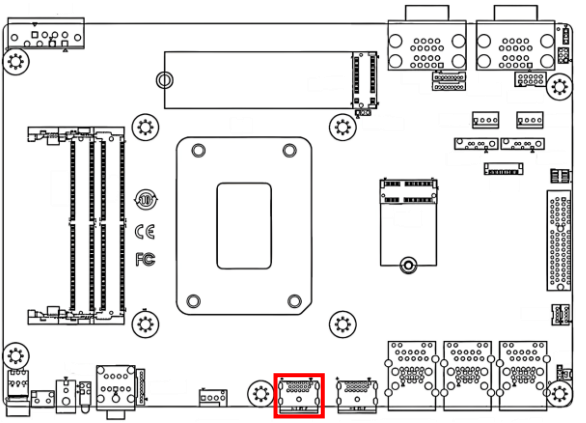


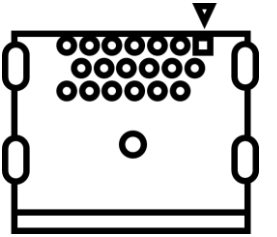


Pin	Pin Name	Signal Type	Signal level
P1	HDMI1_DATA2_P	DIFF	
P2	GND	GND	

Pin	Pin Name	Signal Type	Signal level
P3	HDMI1_DATA2_N	DIFF	
P4	HDMI1_DATA1_P	DIFF	
P5	GND	GND	
P6	HDMI1_DATA1_N	DIFF	
P7	HDMI1_DATA0_P		
P8	GND	GND	
P9	HDMI1_DATA0_n		
P10	HDMI1_CLK_P	DIFF	
P11	GND	GND	
P12	HDMI1_CLK_N	DIFF	
P13	CEC		3.3V
P14	NC		
P15	HDMI1_SCL		
P16	HDMI1_SDA		
P17	GND	GND	
P18	+V5S_HDMI_CON	PWR	5V
P19	HDMI1_HPD		5V
P20	HDMI2_DATA2_P		
P21	GND	GND	
P22	HDMI2_DATA2_N		
P23	HDMI2_DATA1_P		
P24	GND	GND	
P25	HDMI2_DATA1_N		
P26	HDMI2_DATA0_P		
P27	GND	GND	
P28	HDMI2_DATA0_N		
P29	HDMI2_CLK_P		
P30	GND	GND	
P31	HDMI2_CLK_N		
P32	CEC		3.3V
P33	NC		
P34	HDMI2_SCL		
P35	HDMI2_SDA		
P36	GND	GND	
P37	+V5S_HDMI_CON		5V
P38	HDMI2_HPD		5V

2.4.4 HDMI Port (CN5)

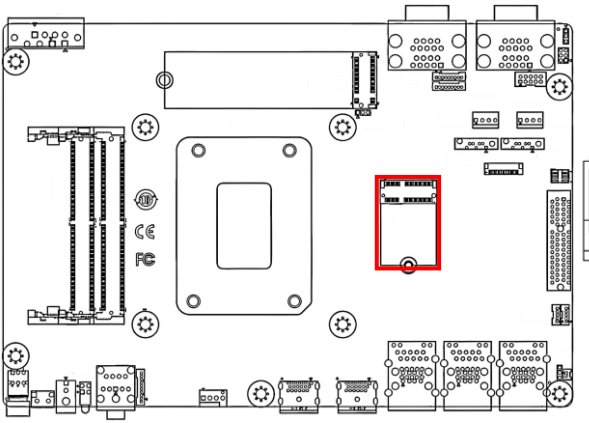


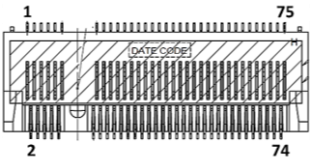


Pin	Pin Name	Signal Type	Signal level
P1	HDMI1_DATA2_P	DIFF	
P2	GND	GND	
P3	HDMI1_DATA2_N	DIFF	
P4	HDMI1_DATA1_P	DIFF	
P5	GND	GND	
P6	HDMI1_DATA1_N	DIFF	
P7	HDMI1_DATA0_P		
P8	GND	GND	
P9	HDMI1_DATA0_n		
P10	HDMI1_CLK_P	DIFF	
P11	GND	GND	
P12	HDMI1_CLK_N	DIFF	
P13	CEC		3.3V
P14	NC		
P15	HDMI1_SCL		
P16	HDMI1_SDA		
P17	GND	GND	
P18	+V5S_HDMI_CON	PWR	5V
P19	HDMI1_HPD		5V
P20	HDMI2_DATA2_P		
P21	GND	GND	
P22	HDMI2_DATA2_N		
P23	HDMI2_DATA1_P		
P24	GND	GND	

Pin	Pin Name	Signal Type	Signal level
P25	HDMI2_DATA1_N		
P26	HDMI2_DATA0_P		
P27	GND	GND	
P28	HDMI2_DATA0_N		
P29	HDMI2_CLK_P		
P30	GND	GND	
P31	HDMI2_CLK_N		
P32	CEC		3.3V
P33	NC		
P34	HDMI2_SCL		
P35	HDMI2_SDA		
P36	GND	GND	
P37	+V5S_HDMI_CON		5V
P38	HDMI2_HPD		5V

2.4.5 M.2 2230 E-Key Slot (CN6)

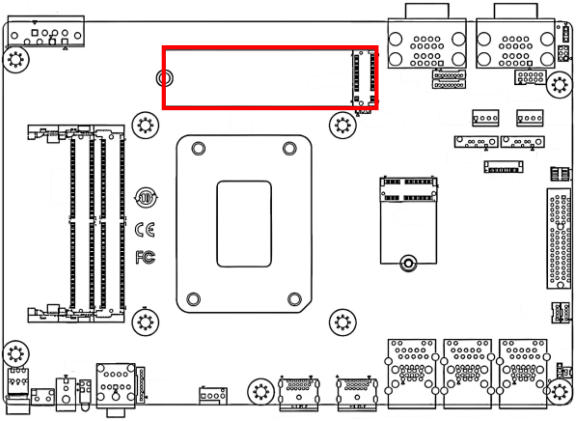


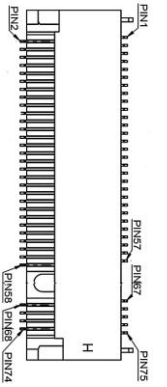


Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	2	+V3P3_NGFF_E	PWR	+3.3V
3	USB_PP4	DIFF	4	+V3P3_NGFF_E	PWR	+3.3V
5	USB_PN4	DIFF	6	NC		
7	GND	GND	8	NC		
9	NC		10	NC		
11	NC		12	NC		

Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
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	PCIE4_TXP	DIFF	36	NC		
37	PCIE4_TXN	DIFF	38	NC		
39	GND	GND	40	NC		
41	PCIE4_RXP	DIFF	42	NC		
43	PCIE4_RXN	DIFF	44	NC		
45	GND	GND	46	NC		
47	PCIE_M2E_P	DIFF	48	NC		
49	PCIE_M2E_N	DIFF	50	SUSCLK	IN	+3.3V
51	GND	GND	52	WIFI_RST#	IN	+3.3V
53	PCIE_M2E_CLKREQ#	OUT	54	BT_EN	IN	+3.3V
55	M2E_WAKE#	OUT	56	WIFI_EN	IN	+3.3V
57	GND	GND	58	NC		
59	NC		60	NC		
61	NC		62	NC		
63	GND	GND	64	NC		
65	NC		66	NC		
67	NC		68	NC		
69	GND	GND	70	NC		
71	NC		72	+V3P3_NGFF_E	PWR	+3.3V
73	NC		74	+V3P3_NGFF_E	PWR	+3.3V
75	GND	GND				

2.4.6 M.2 2280 M-Key Slot (CN7)

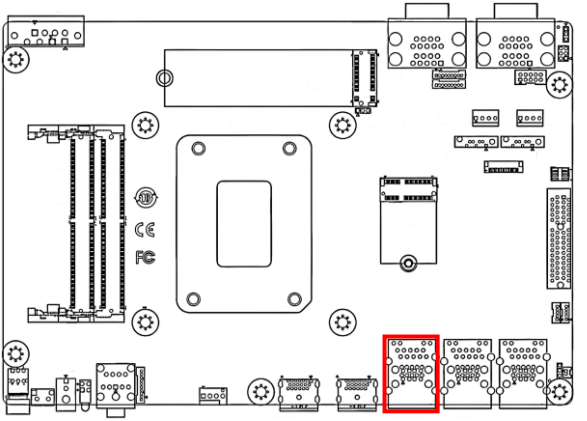


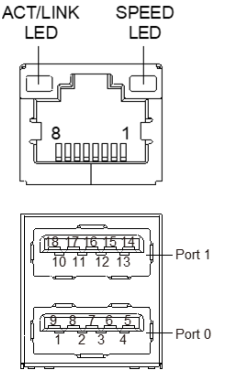


Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	2	+3.3V	PWR	+3.3V
3	GND	GND	4	+3.3V	PWR	+3.3V
5	PCIE_RXN8	IN	6	CARD_PWR_OFF_N	OUT	+3.3V
7	PCIE_RXP8	IN	8	NC		
9	GND	GND	10	NC		
11	PCIE_TXN8	OUT	12	+3.3V	PWR	+3.3V
13	PCIE_TXP8	OUT	14	+3.3V	PWR	+3.3V
15	GND	PWR	16	+3.3V	PWR	+3.3V
17	PCIE_RXN7	IN	18	+3.3V	PWR	+3.3V
19	PCIE_RXP7	IN	20	NC		
21	GND	PWR	22	NC		
23	PCIE_TXN7	OUT	24	NC		
25	PCIE_TXP7	OUT	26	NC		
27	GND	PWR	28	NC		
29	PCIE_RXN6	IN	30	NC		
31	PCIE_RXP6	IN	32	NC		
33	GND	GND	34	NC		
35	PCIE_TXN6	OUT	36	NC		
37	PCIE_TXP6	OUT	38	DEVSLP	IN	+3.3V
39	GND	GND	40	NC		
41	PCIE_RXP5	IN	42	NC		
43	PCIE_RXN5	IN	44	NC		
45	GND	GND	46	NC		

Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
47	PCIE_TXN5	OUT	48	NC		
49	PCIE_TXP5	OUT	50	RESET#	IN	+3.3V
51	GND	PWR	52	CLKREQ#	OUT	+3.3V
53	PCIE_M.2_CLK#	OUT	54	WAKE#	OUT	+3.3V
55	PCIE_M.2_CLK	OUT	56	NC		
57	GND	GND	58	NC		
67	NC		68	NC		
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				

2.4.7 1GbE LAN + Dual USB 3.2 Port (CN8)



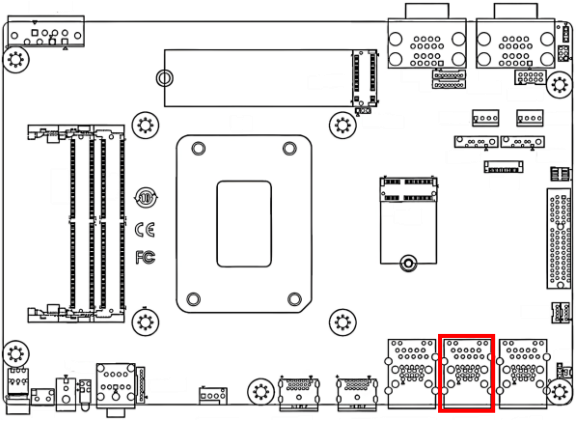


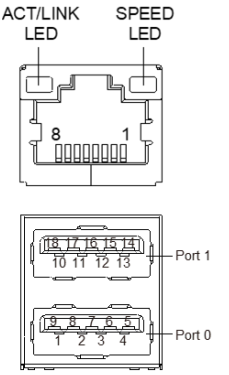
LAN			
Pin	Pin Name	Signal Type	Signal level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	

LAN			
Pin	Pin Name	Signal Type	Signal level
8	MDI3-	DIFF	

USB			
Pin	Pin Name	Signal Type	Signal level
1	+5VSB	PWR	+5V
2	USB5_D-	DIFF	
3	USB5_D+	DIFF	
4	GND	GND	
5	USB5_SSRX−	DIFF	
6	USB5_SSRX+	DIFF	
7	GND	GND	
8	USB5_SSTX−	DIFF	
9	USB5_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB6_D-	DIFF	
12	USB6_D+	DIFF	
13	GND	GND	
14	USB6_SSRX−	DIFF	
15	USB6_SSRX+	DIFF	
16	GND	GND	
17	USB6_SSTX−	DIFF	
18	USB6_SSTX+	DIFF	

2.4.8 2.5GbE LAN + Dual USB 3.2 Port (CN9)

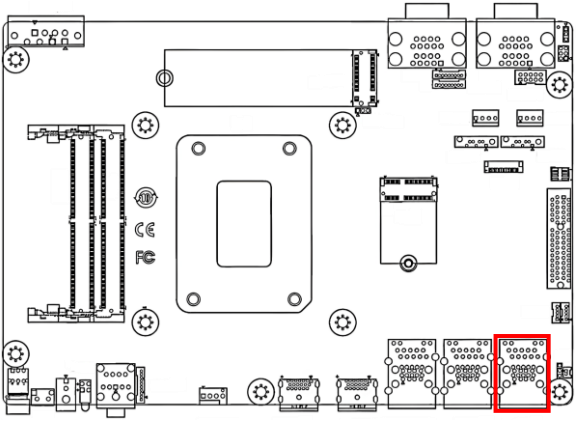


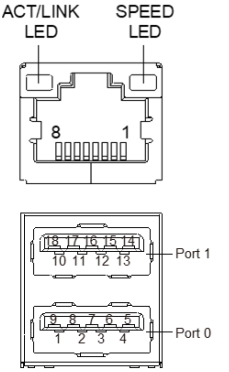


LAN			
Pin	Pin Name	Signal Type	Signal level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

USB			
Pin	Pin Name	Signal Type	Signal level
1	+5VSB	PWR	+5V
2	USB5_D-	DIFF	
3	USB5_D+	DIFF	
4	GND	GND	
5	USB5_SSRX−	DIFF	
6	USB5_SSRX+	DIFF	
7	GND	GND	
8	USB5_SSTX−	DIFF	
9	USB5_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB6_D-	DIFF	
12	USB6_D+	DIFF	
13	GND	GND	
14	USB6_SSRX−	DIFF	
15	USB6_SSRX+	DIFF	
16	GND	GND	
17	USB6_SSTX−	DIFF	
18	USB6_SSTX+	DIFF	

2.4.9 2.5GbE LAN + Dual USB 3.2 Port (CN10)



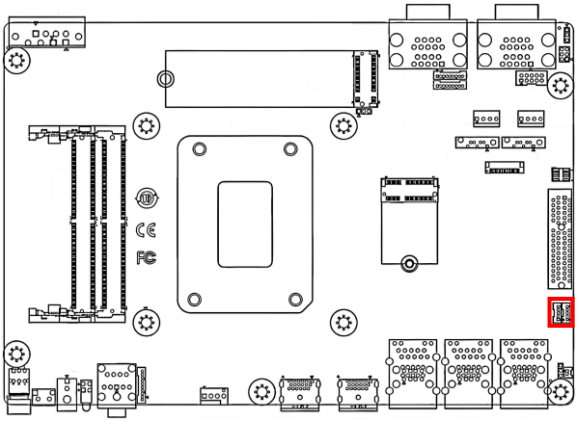


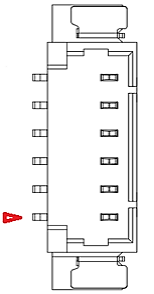
LAN			
Pin	Pin Name	Signal Type	Signal level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

USB			
Pin	Pin Name	Signal Type	Signal level
1	+5VSB	PWR	+5V
2	USB5_D-	DIFF	
3	USB5_D+	DIFF	
4	GND	GND	
5	USB5_SSRX−	DIFF	
6	USB5_SSRX+	DIFF	
7	GND	GND	
8	USB5_SSTX−	DIFF	
9	USB5_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB6_D-	DIFF	
12	USB6_D+	DIFF	

USB			
Pin	Pin Name	Signal Type	Signal level
13	GND	GND	
14	USB6_SSRX−	DIFF	
15	USB6_SSRX+	DIFF	
16	GND	GND	
17	USB6_SSTX−	DIFF	
18	USB6_SSTX+	DIFF	

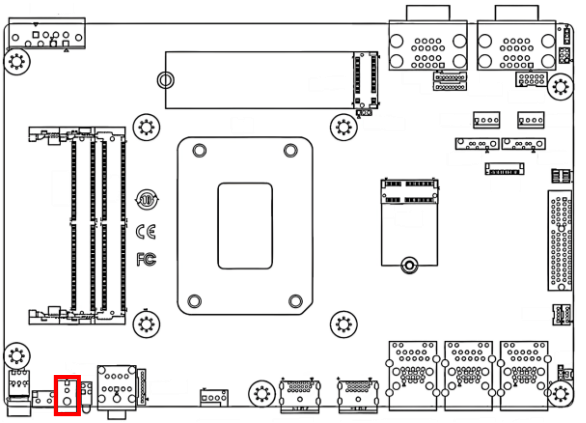
2.4.10 USB 2.0 Wafer (CN11/CN12)

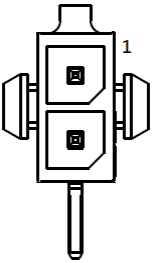




Pin	Pin Name	Signal Type	Signal level
1	+5V	GND	+5V
2	USBD-	DIFF	
3	USBD+	DIFF	
4	GND	GND	
5	GND	GND	

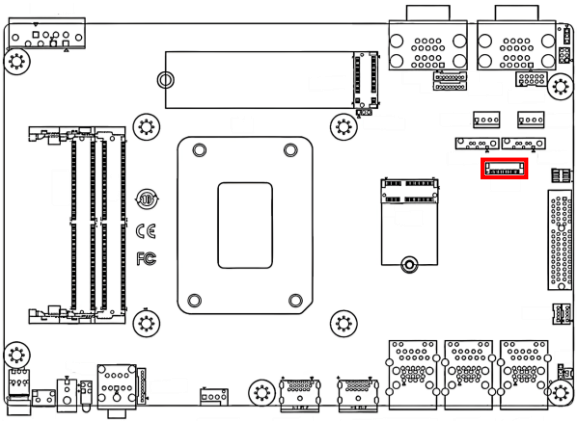
2.4.11 Remote Button Connector (CN15)

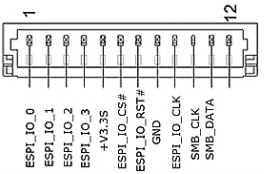




Pin	Pin Name	Signal Type	Signal level
1	PWR_BUTTON	IN	
2	GND	GND	

2.4.12 eSPI Connector (CN17)

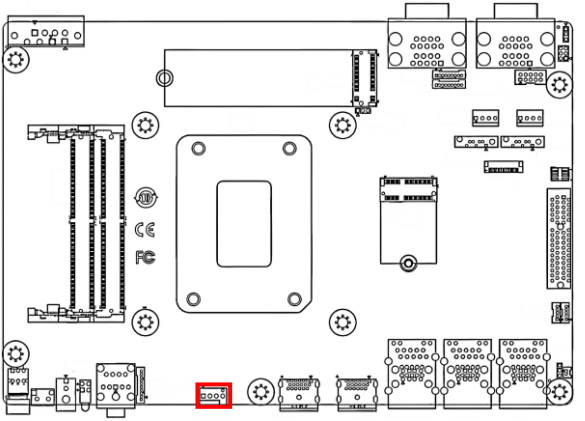


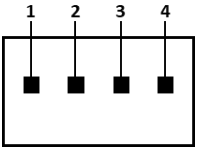


Pin	Pin Name	Signal Type	Signal Level
1	ESPI_IO_0	I/O	+1.8V
2	ESPI_IO_1	I/O	+1.8V
3	ESPI_IO_2	I/O	+1.8V
4	ESPI_IO_3	I/O	+1.8V

Pin	Pin Name	Signal Type	Signal Level
5	+3.3V	PWR	+3.3V
6	ESPI_IO_CS#	IN	
7	ESPI_IO_RST#	IN	
8	GND	GND	
9	EPSI_IO_LCLK	IN	
10	SMCLK	IN	
11	SMDAT	I/O	
12	NC		

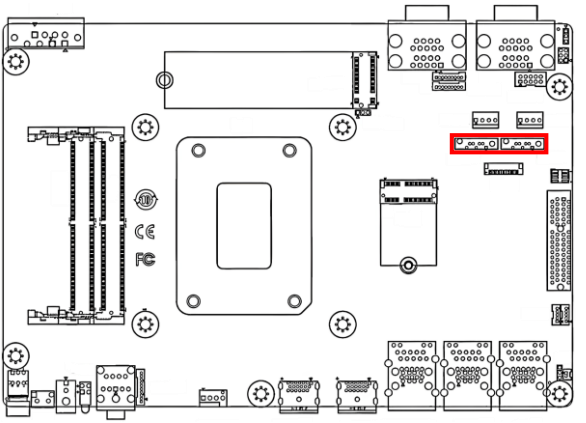
2.4.13 Fan Connector (CN18)

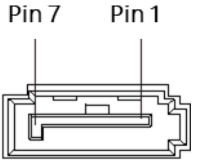




Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+V12S	PWR	+12V
3	FAN_PWM	OUT	
4	FAN_CTL	OUT	

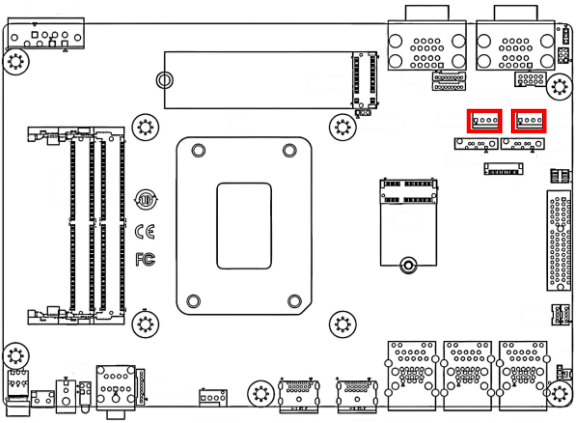
2.4.14 SATA Port (CN19/CN20)

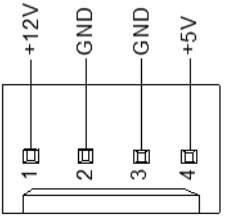




Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX+	DIFF	
3	SATA_TX-	DIFF	
4	GND	GND	
5	SATA_RX-	DIFF	
6	SATA_RX+	DIFF	
7	GND	GND	

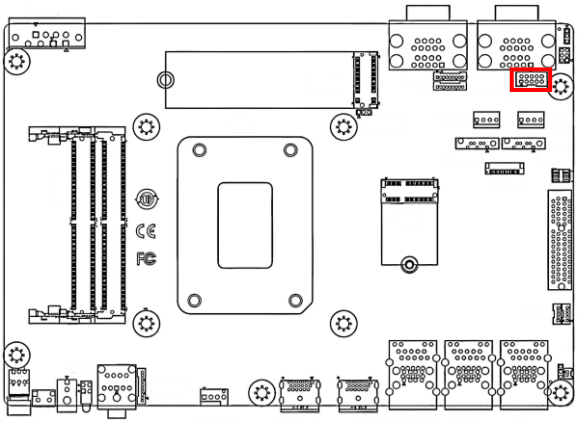
2.4.15 SATA Power Connector (CN21/CN22)

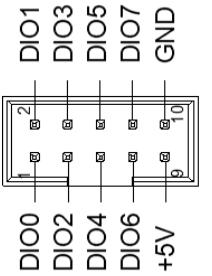


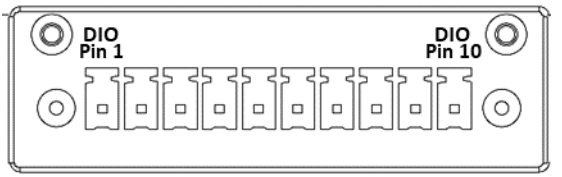


Pin	Pin Name	Signal Type	Signal Level
1	+12V	PWR	+12V
2	GND	GND	
3	GND	GND	
4	+5V	PWR	+5V

2.4.16 Digital IO Port (CN23)

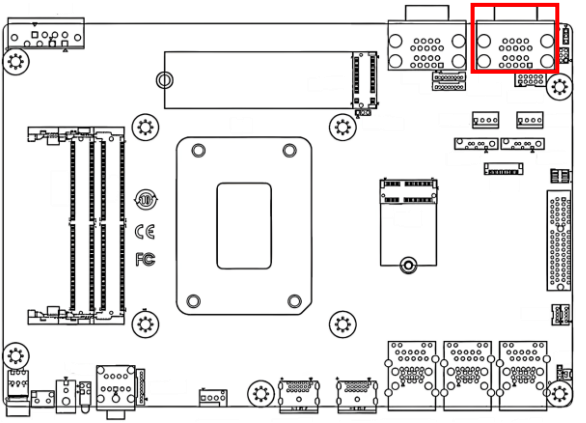


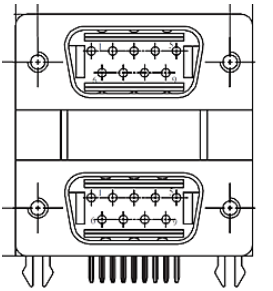




Pin	Pin Name	Signal Type	Signal Level
1	DIO0	I/O	+5V / 12mA
2	DIO1	I/O	+5V / 12mA
3	DIO2	I/O	+5V / 12mA
4	DIO3	I/O	+5V / 12mA
5	DIO4	I/O	+5V / 12mA
6	DIO5	I/O	+5V / 12mA
7	DIO6	I/O	+5V / 12mA
8	DIO7	I/O	+5V / 12mA
9	+5V	PWR	+5V / 650mA
10	GND	GND	

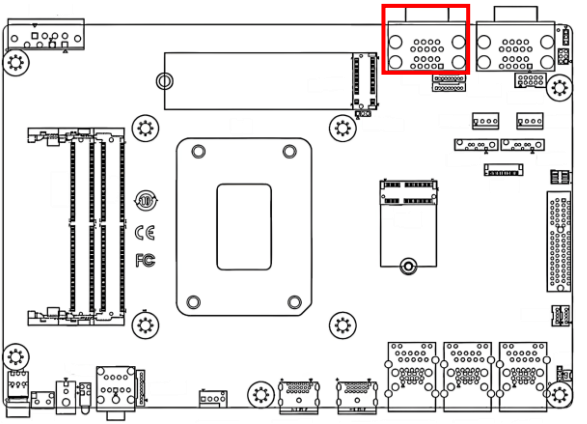
2.4.17 COM 1 + COM 2 (CN24)

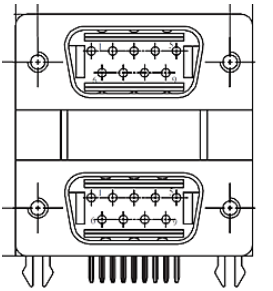




Pin	Pin Name	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	RX	IN	RS422_TX+	RS485_D+
3	TX	OUT	RS422_RX+	
4	DTR	OUT	RS422_RX-	
5	GND	GND		
6	DSR	IN		
7	RTS	OUT		
8	CTS	IN		
9	RI1	IN		

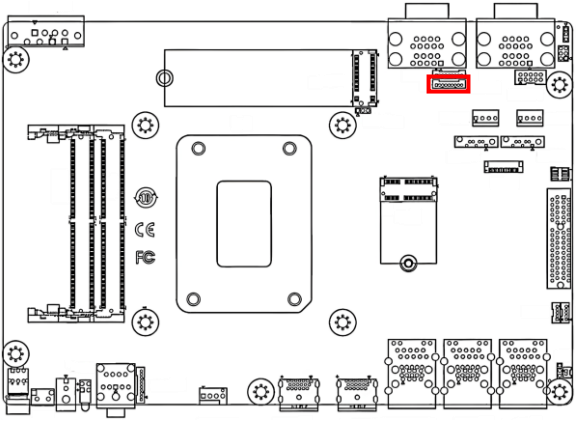
2.4.18 COM 3 + COM 4 (CN25)

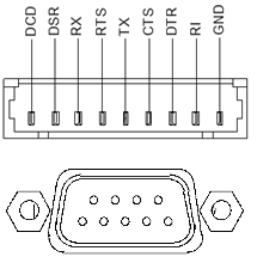




Pin	Pin Name	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	RX	IN	RS422_TX+	RS485_D+
3	TX	OUT	RS422_RX+	
4	DTR	OUT	RS422_RX-	
5	GND	GND		
6	DSR	IN		
7	RTS	OUT		
8	CTS	IN		
9	RI1	IN		

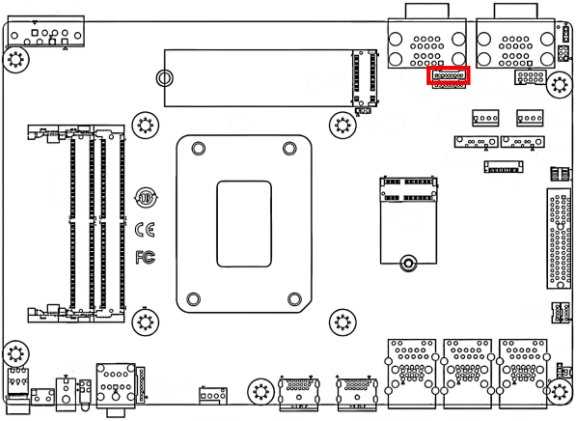
2.4.19 COM 5 (Internal Wafer) (CN26)

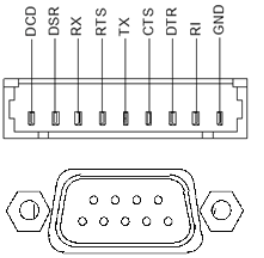




Pin	Pin Name	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	DSR	IN		
3	RX	IN	RS422_TX+	RS485_D+
4	RTS	OUT		
5	TX	OUT	RS422_RX+	
6	CTS	IN		
7	DTR	OUT	RS422_RX-	
8	RI	IN		
9	GND	GND		

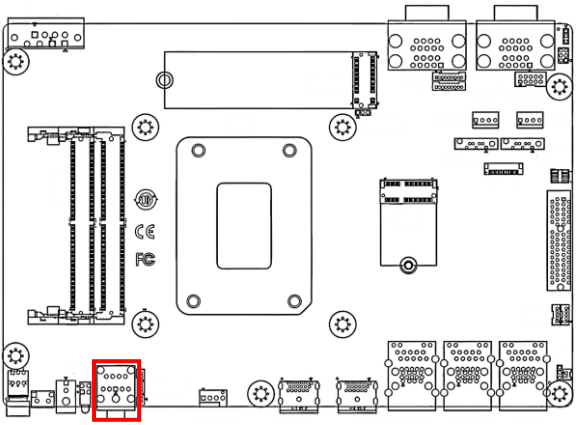
2.4.20 COM 6 (Internal Wafer) (CN27)

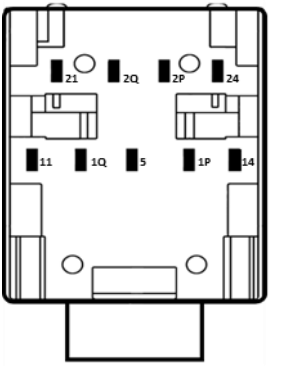




Pin	Pin Name	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	DSR	IN		
3	RX	IN	RS422_TX+	RS485_D+
4	RTS	OUT		
5	TX	OUT	RS422_RX+	
6	CTS	IN		
7	DTR	OUT	RS422_RX-	
8	RI	IN		
9	GND	GND		

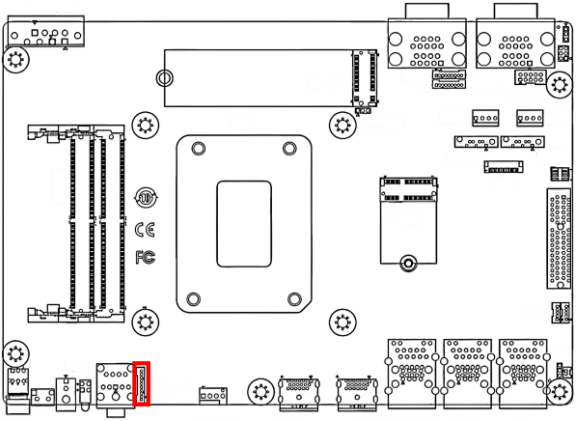
2.4.21 Audio Connector (CN28)

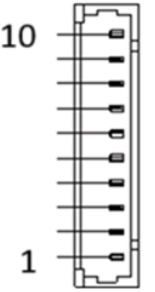




Pin	Signal	Signal Type	Signal Level
5	AUD_GND	GND	
24	LOUT_L	OUT	
21	LOUT_R	OUT	
2P	HP_DET_3	IN	
2Q	HP_DET_4	IN	
14	MIC_L	IN	
11	MIC_R	IN	
1P	HP_DET_1	IN	
1Q	HP_DET2	IN	

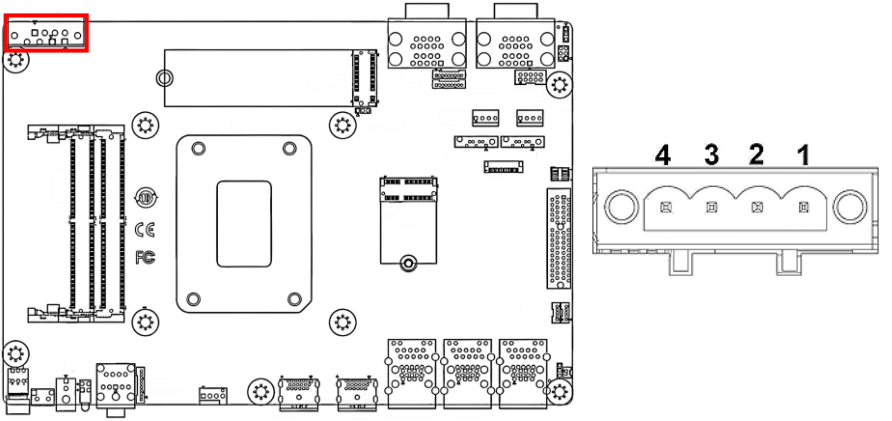
2.4.22 Audio Internal Wafer (10P Pitch: 1.25mm) (CN29)





Pin	Signal	Signal Type	Signal Level
1	MIC_L	IN	
2	MIC_R	IN	
3	GND_AUDIO	GND	
4	LINE_L_IN	IN	
5	LINE_R_IN	IN	
6	GND_AUDIO	GND	
7	LEFT_OUT	OUT	
8	GND_AUDIO	GND	
9	RIGHT_OUT	OUT	
10	+5V_AUDIO	PWR	+5V

2.4.23 DC-In Connector (CN30)



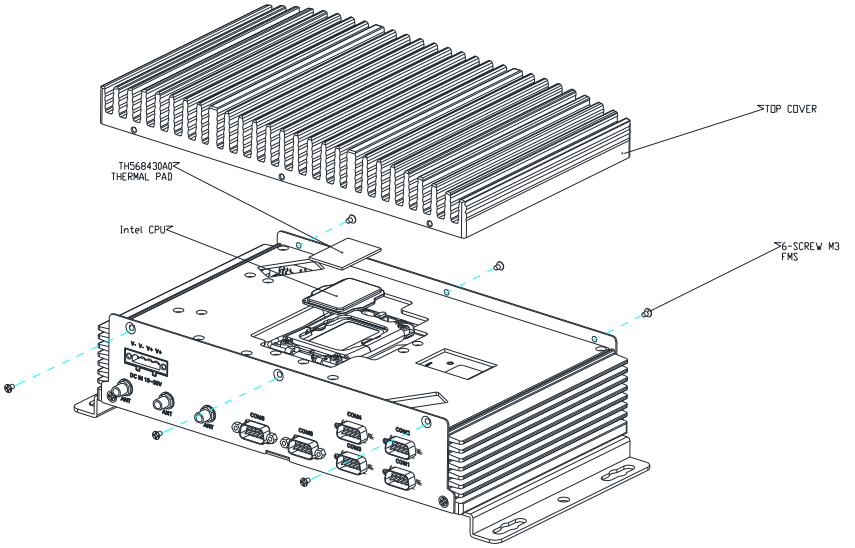
Pin	Signal	Signal Type	Signal Level
1	V+	PWR	10~35V
2	V+	PWR	10~35V
3	GND	GND	
4	GND	GND	

2.5 Hardware Installation

2.5.1 CPU Installation

Step 1: Access the chassis interior to expose the CPU socket by unscrewing the six (6) M3 screws located on the front and rear panels of the system and removing the top cover of the system.

Step 2: Release the metal retention arm and open the CPU socket cover, then match the gold triangle on the CPU corner with the triangle mark on the socket.

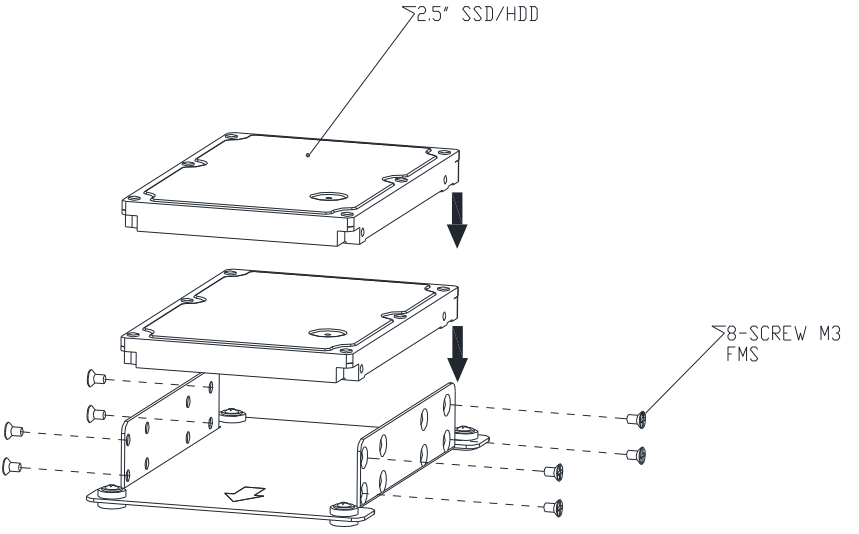


Step 3: Gently place the CPU into the socket without applying force, then close the socket cover and secure the metal retention arm. Prior to reassembling the chassis, ensure a thermal pad is affixed on top of the CPU.

Step 4: Reassemble the system by reattaching the top cover and securing it to the chassis body using the six (6) screws removed in step 1.

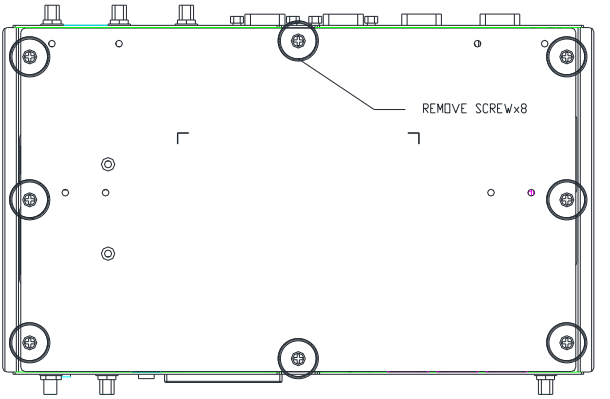
2.5.2 2.5" HDD Installation

Step 1: Align the drive(s) with the drive mounting bracket as shown, then Secure each drive to the bracket using eight (8) M3 flat-head screws with four on each side (two per side per drive).

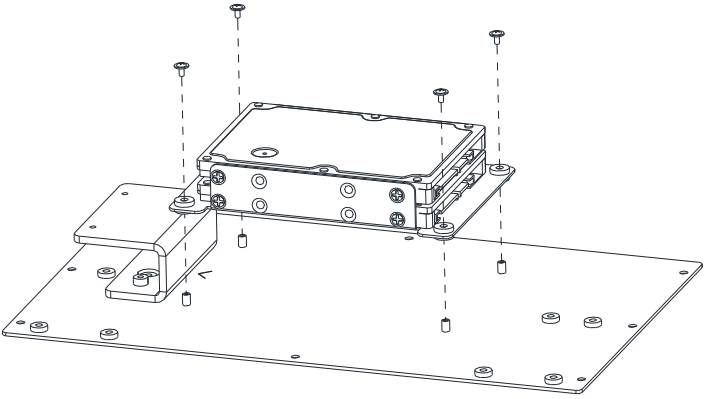


Note: Ensure the SATA connectors face outward for easy cable access later.

Step 2: Remove eight (8) screws from the bottom cover of the system, as located in the below diagram (circled). Carefully lift and set aside the cover to expose the internal mounting area.



Step 3: Position the HDD/SSD bracket (with drives attached) onto the mounting holes inside the chassis. **Note**: The arrow in the diagram indicates the correct orientation.

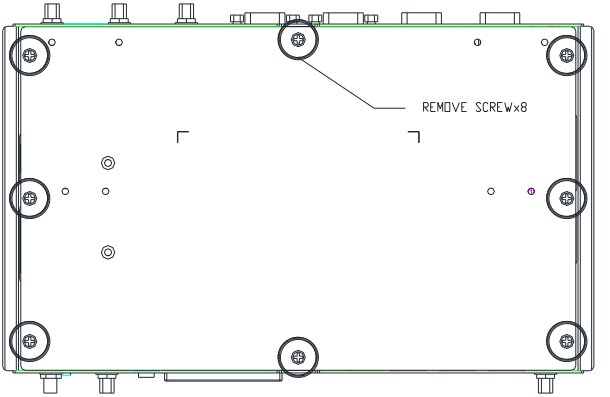


Step 4: Secure the bracket using four (4) screws through the base of the bracket into the standoffs on the chassis.

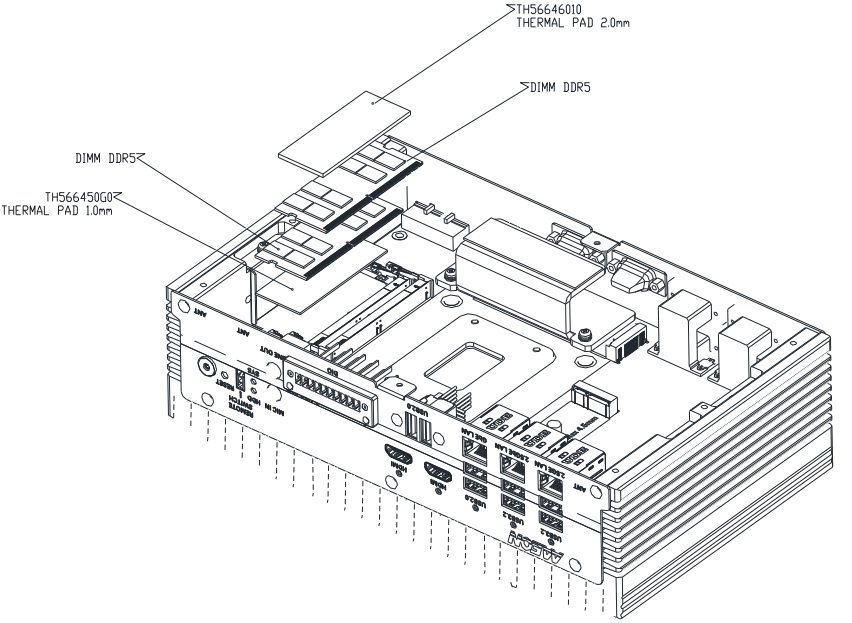
Step 5: Attach the SATA data cable and power cable to each SSD/HDD, and ensure cables are routed neatly to avoid interference with other components or airflow paths.

2.5.3 DDR5 SODIMM Installation

Step 1: If not already disassembled, remove the eight (8) screws from the bottom cover of the system, as located in the below diagram (circled).

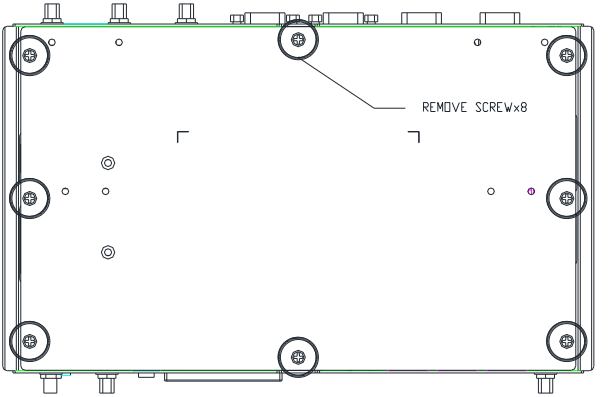


Step 2: Insert two (2) thermal pads and two (2) DDR5 SODIMM(s) in the following order: **Thermal Pad (1.0mm) > SODIMM 1 > SODIMM 2 > Thermal Pad 2.0mm**

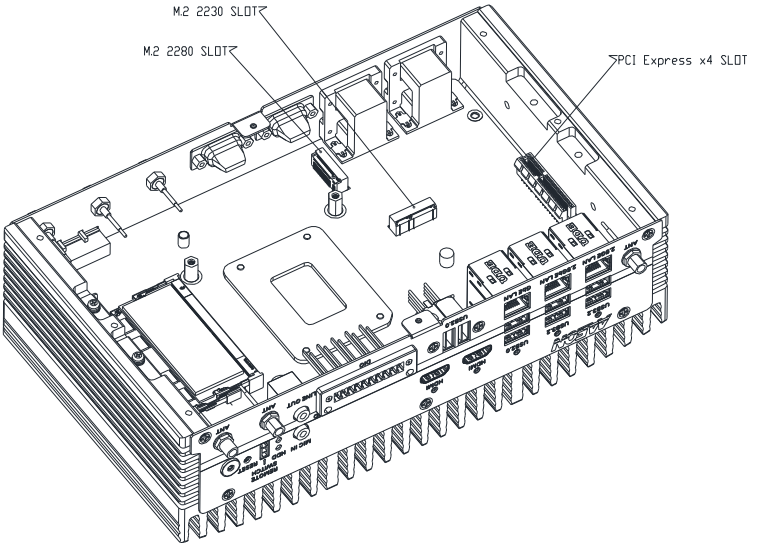


2.5.4 M.2 Card Installation

Step 1: If not already disassembled, remove the eight (8) screws from the bottom cover of the system, as located in the below diagram (circled).



Step 2: Note the location of the M.2 and PCIe slots as labelled in the following diagram.



.

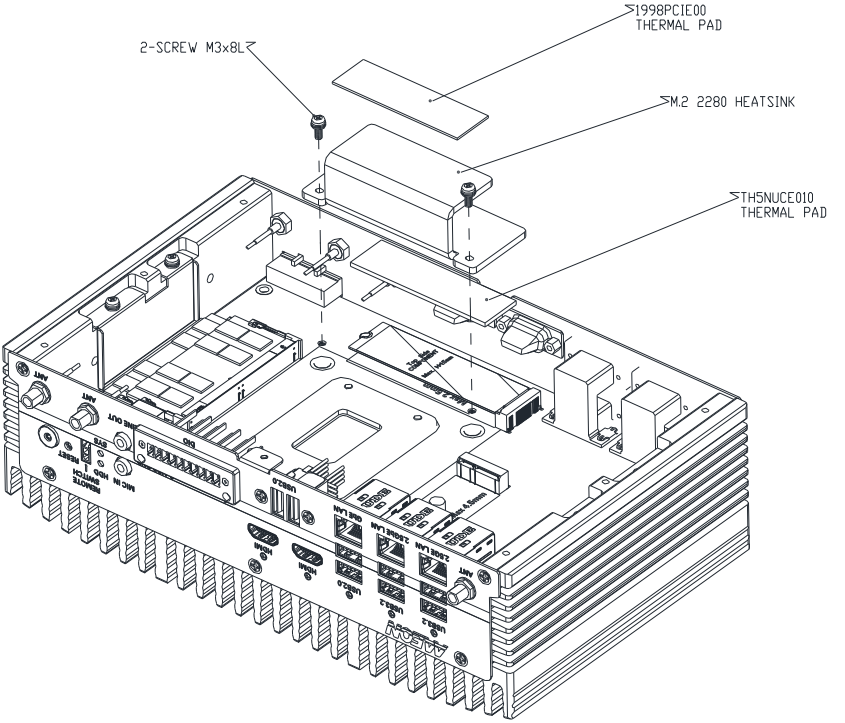
Step 3: For M.2 2230 and PCIe cards, follow standard installation procedures of inserting each card at a slight angle (~30°) and gently pressing down until fully seated. Secure the free end of the card(s) with their respective retaining screws.

M.2 2280 Card Installation

Step 1: Insert the card at a slight angle (~30°) and gently press down until fully seated.

Step 2: Place a thermal pad atop the card, followed by the M.2 2280 Heatsink.

Step 3: Secure the M.2 2280 Heatsink to the system motherboard using the two (2) M3 screws.



Step 4: Prior to reassembling the system bottom cover, ensure a second thermal pad is placed on top of the M.2 2280 Heatsink.

Step 5: Reattach the system bottom cover using the eight (8) screws provided.

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

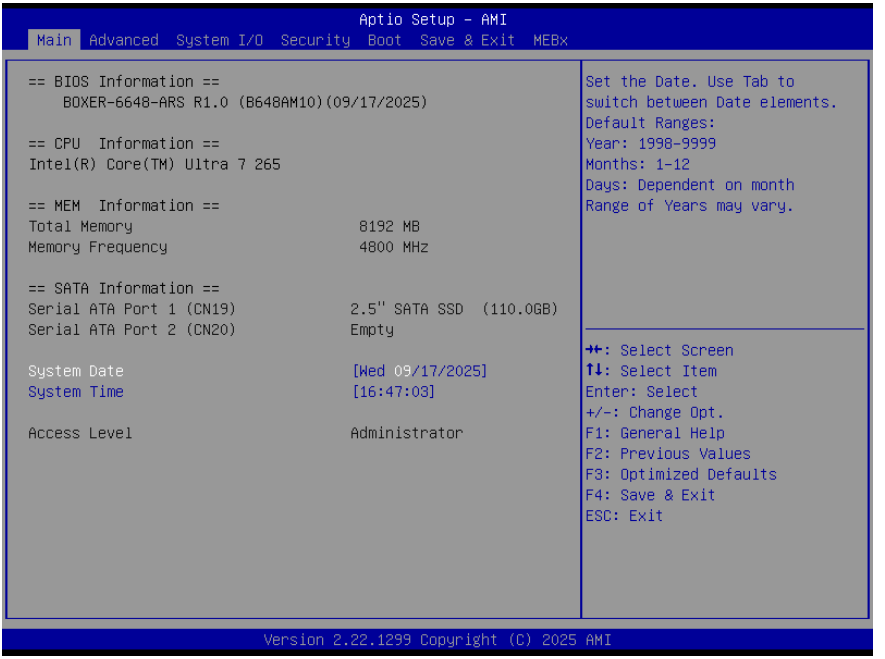
Boot – Enable/ Disable quiet Boot Option

Security – The setup administrator password can be set here

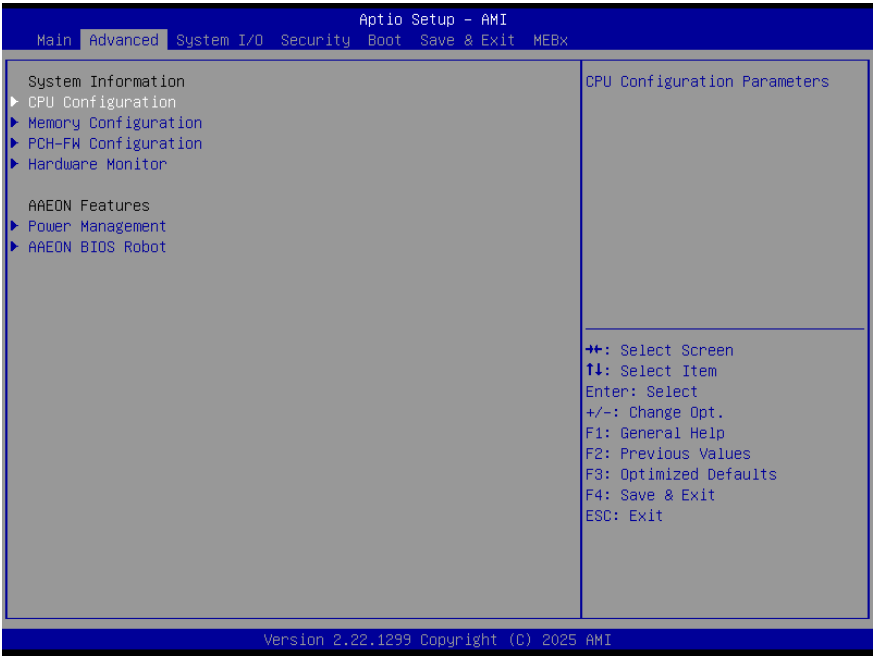
Save & Exit –Save your changes and exit the program

MEBx – Intel® Management Engine BIOS Extension

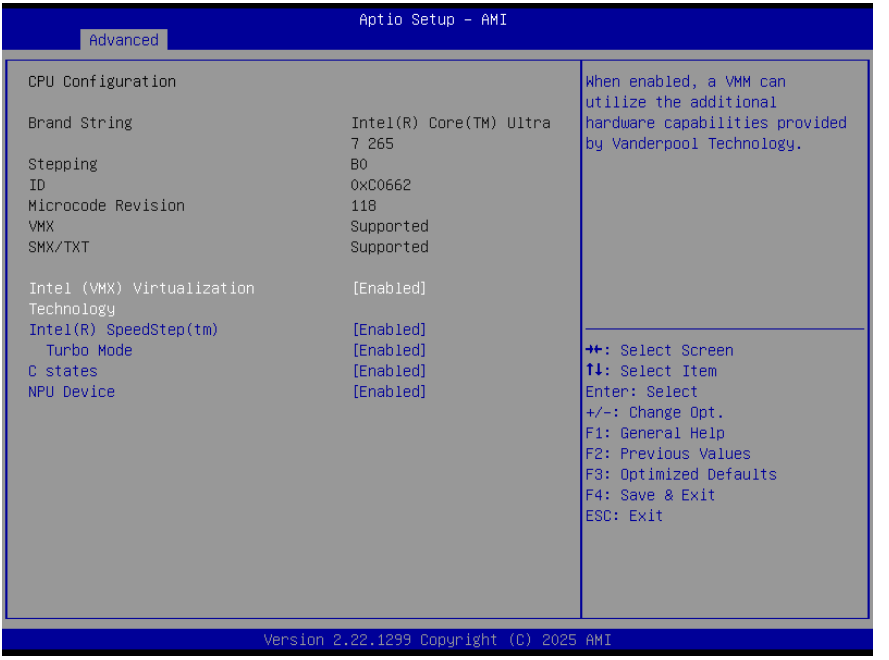
3.3 Setup Submenu: Main



3.4 Setup Submenu: Advanced



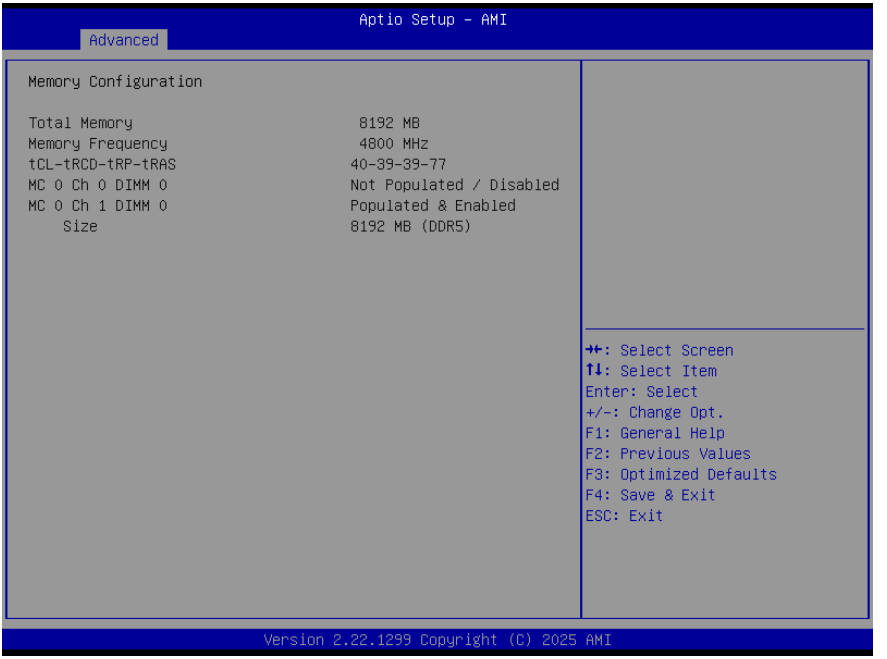
3.4.1 CPU Configuration



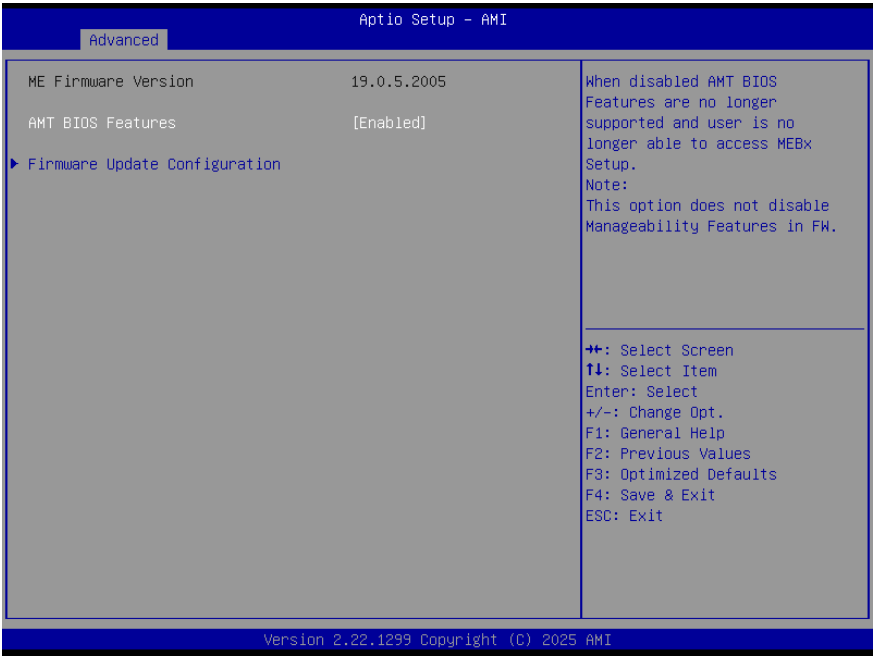
Options Summary		
Intel (VMX) Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
Hyper-Threading	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Hyper-Threading 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
Enable or disable the processor's Turbo Mode (requires EMTTM to be enabled). AUTO means Turbo Mode is enabled.		
C states	Disabled	
	Enabled	Optimal Default, Failsafe Default

Options Summary
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

3.4.2 Memory Configuration

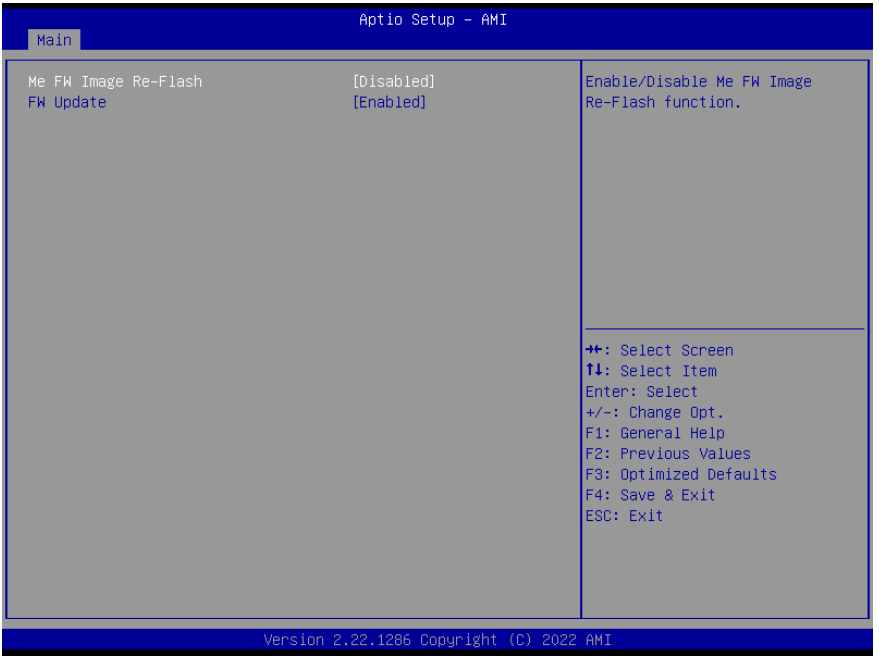


3.4.3 PCH-FW Configuration



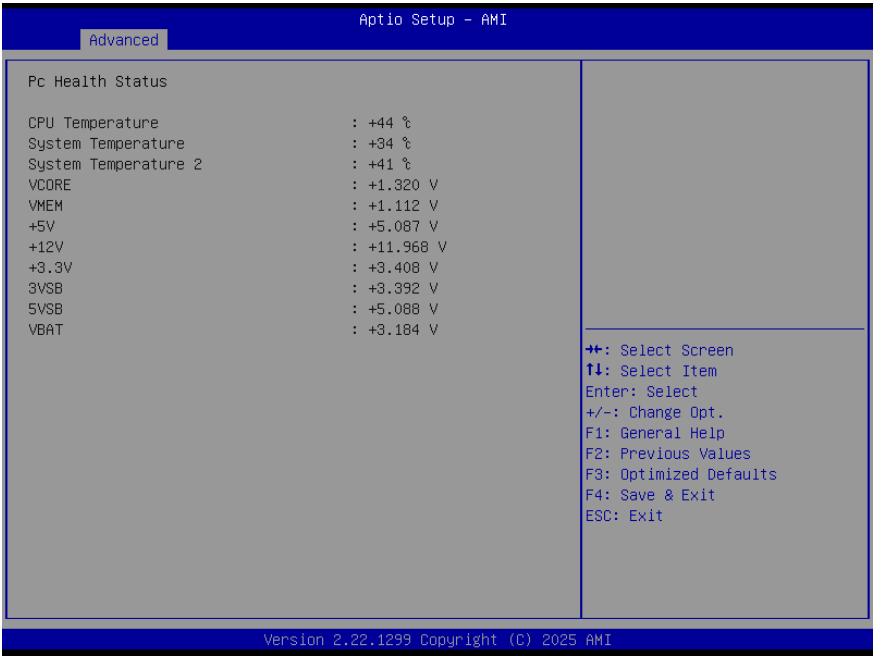
Options Summary		
AMT BIOS Features	Enabled	Optimal Default, Failsafe Default
	Disabled	
When disabled, AMT BIOS features are no longer supported, and the user cannot access the MEBx setup. **Note:** This option does not disable manageability features in the firmware.		

3.4.3.1 Firmware Update Configuration



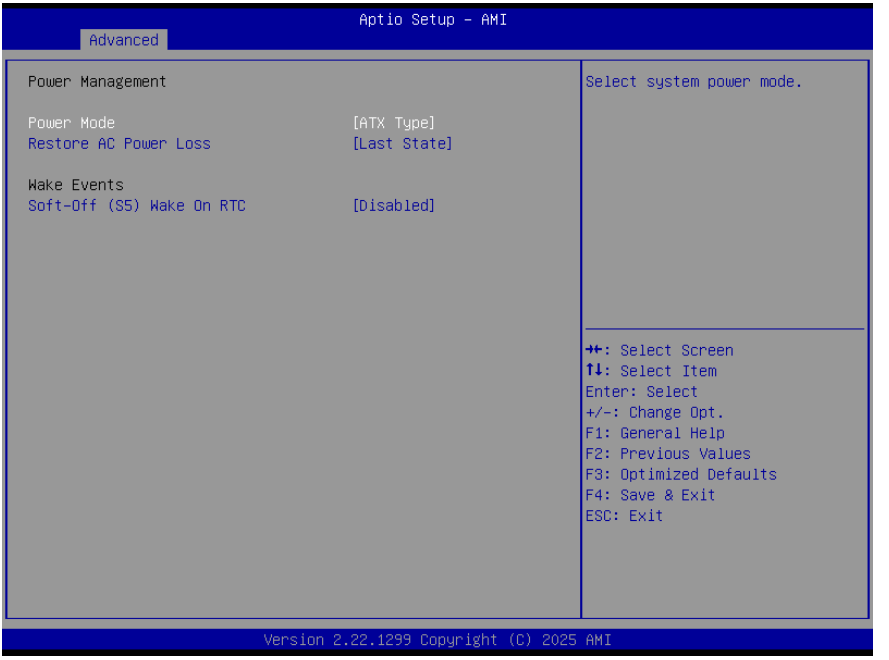
Options Summary		
Me FW Image Re-Flash	Enabled	
	Disabled	Optimal Default, Failsafe Default
Enable/Disable Me FW Image Re-Flash function.		
FW Update	Enabled	
	Disabled	Optimal Default, Failsafe Default
Enable/Disable Me FW Update function.		

3.4.4 Hardware Monitor



Options Summary		
Smart Fan	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable or Disable Smart Fan.		

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	
SIO Restore AC Power Loss: Determines the system's behavior after power is lost and then restored. **Note:** A CMOS battery must be installed for this function to operate correctly.		
System Wake On RTC	Disabled	Optimal Default, Failsafe Default
	By Date	
	By Weekday	
	Bypass	

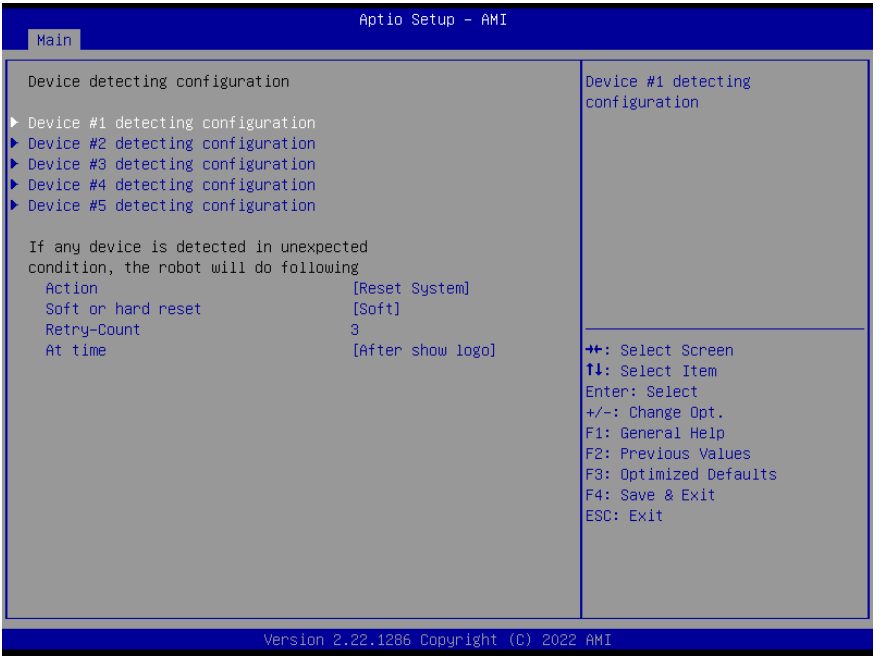
Options Summary
By Date: The system will wake on the specified day at the defined hour, minute, and second. **By Weekday:** The system will wake on the selected weekdays at the defined hour, minute, and second. **Bypass:** The BIOS will not control the RTC wake function.

3.4.6 AAEON BIOS Robot

Options Summary		
Sends watch dog before BIOS POST	Disabled	Optimal Default, Failsafe Default
	Enabled	

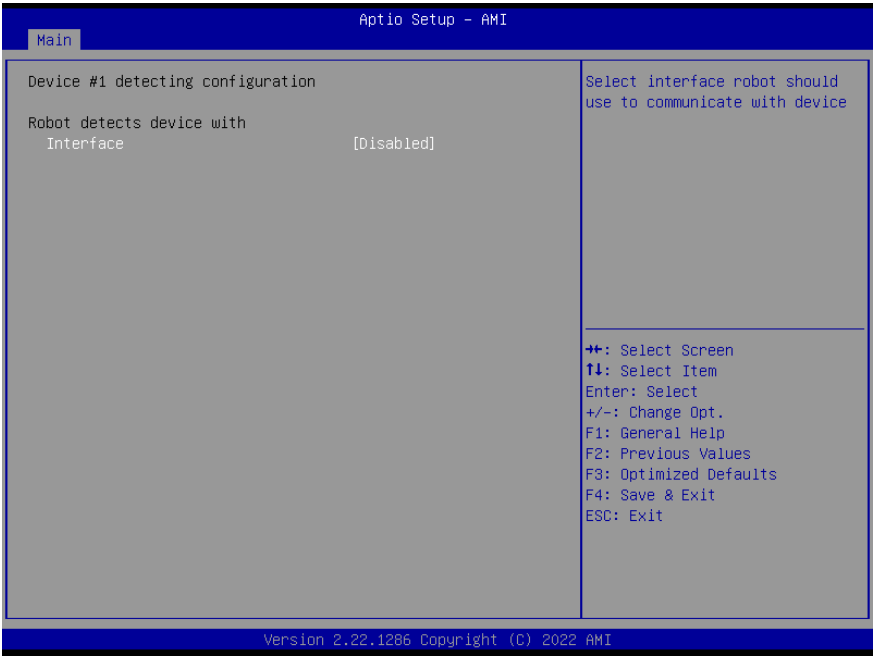
Options Summary		
Enabled – The robot sets the Watch Dog Timer (WDT) immediately after power-on, before the BIOS starts the POST process. The robot then clears the WDT upon completion of POST. If the WDT is not cleared before the timer expires, it will automatically reset the system.		
Sends watch dog before booting OS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – The robot sets the Watch Dog Timer (WDT) after POST completion, before the BIOS transfers control to the operating system. **Warning:** Before enabling this function, an OS program must be responsible for clearing the WDT. This function should be disabled if the operating system is going to perform updates.		
Delayed POST (PEI phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – The robot delays the BIOS from starting POST immediately after power-on. This allows the POST process to begin once power is stable or after the system has physically warmed up. **Note:** This action occurs before the "Send Watch Dog" operation.		
Delayed POST (DXE phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled – The robot delays the BIOS before POST completion. This allows the POST process to continue only after power is stable or the system has physically warmed up. **Note:** This action occurs after the "Send Watch Dog before BIOS POST" operation.		

3.4.6.1 Device Detecting Configuration



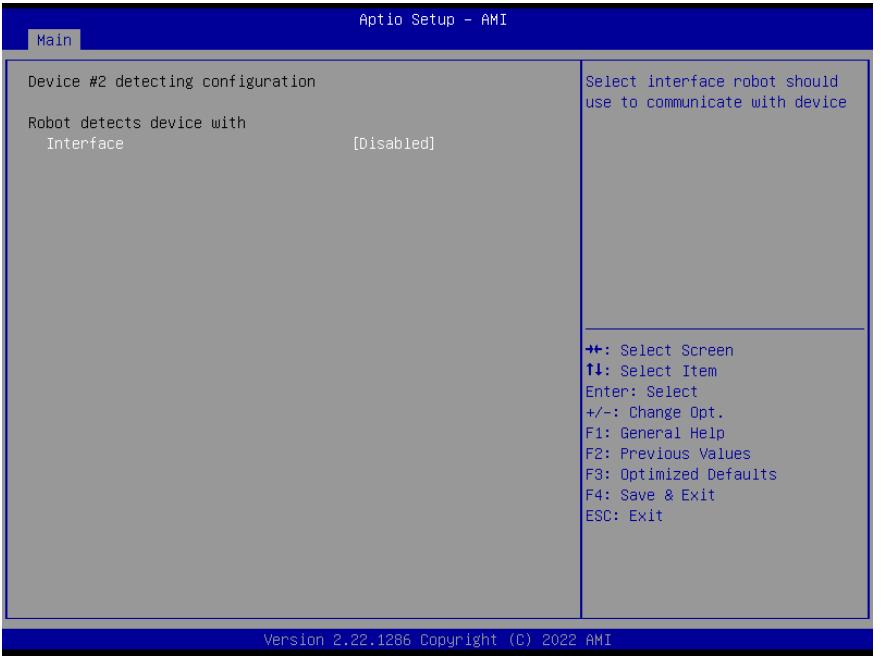
Options Summary		
Action	Reset System	Optimal Default, Failsafe Default
	Hold System	
Select action that robot should do.		
Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	
Select the type of reset the robot should perform on each boot.		
Retry-Count	3	Optimal Default, Failsafe Default
Enter the retry count. The robot will reset the system up to the specified number of times, then allow the system to continue POST.		
At time	After show logo	Optimal Default, Failsafe Default
	Before show logo	
Select the robot action time: **After show logo** – The robot performs the action after the logo is displayed, when system devices are nearly ready. **Before show logo** – The robot performs the action before the logo is displayed, but some devices may not yet be ready.		

3.4.6.1.1 Device #1 Detecting Configuration



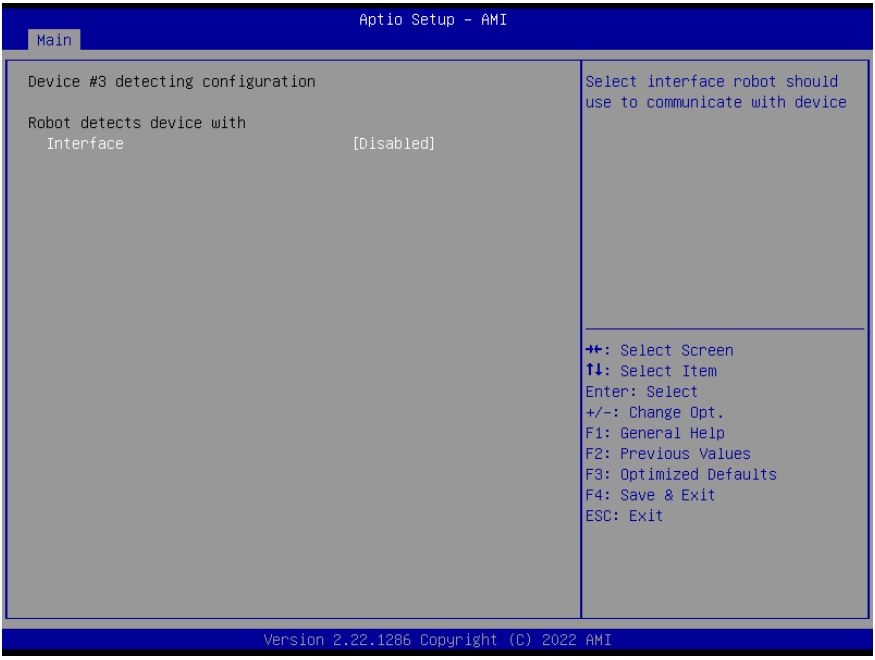
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.2 Device #2 Detecting Configuration



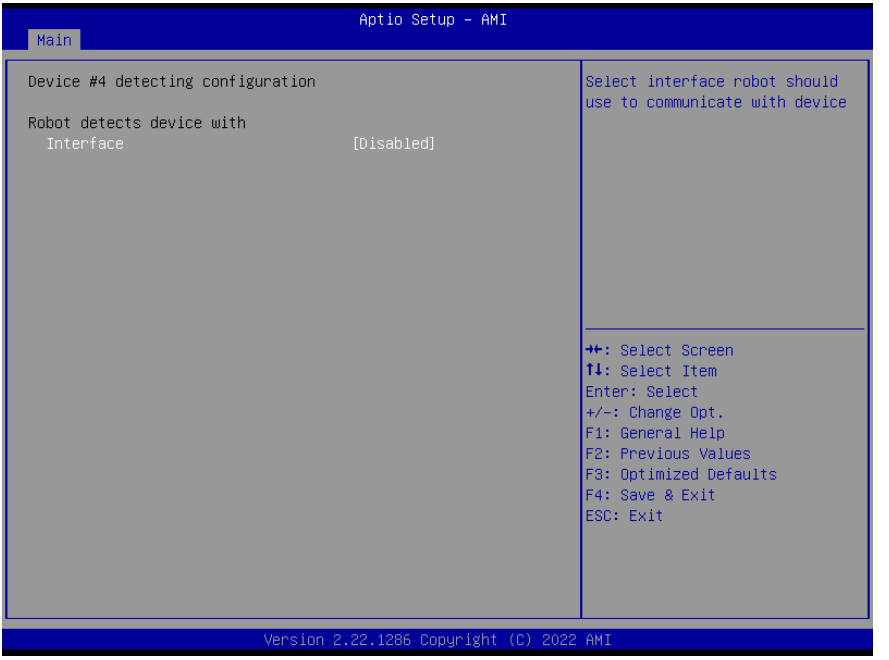
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.3 Device #3 Detecting Configuration



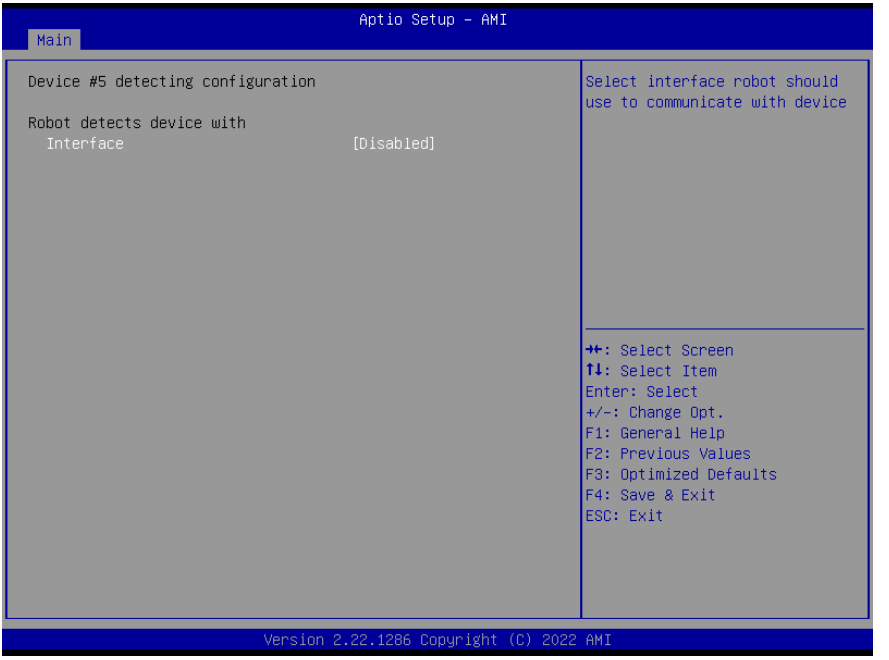
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.4 Device #4 Detecting Configuration



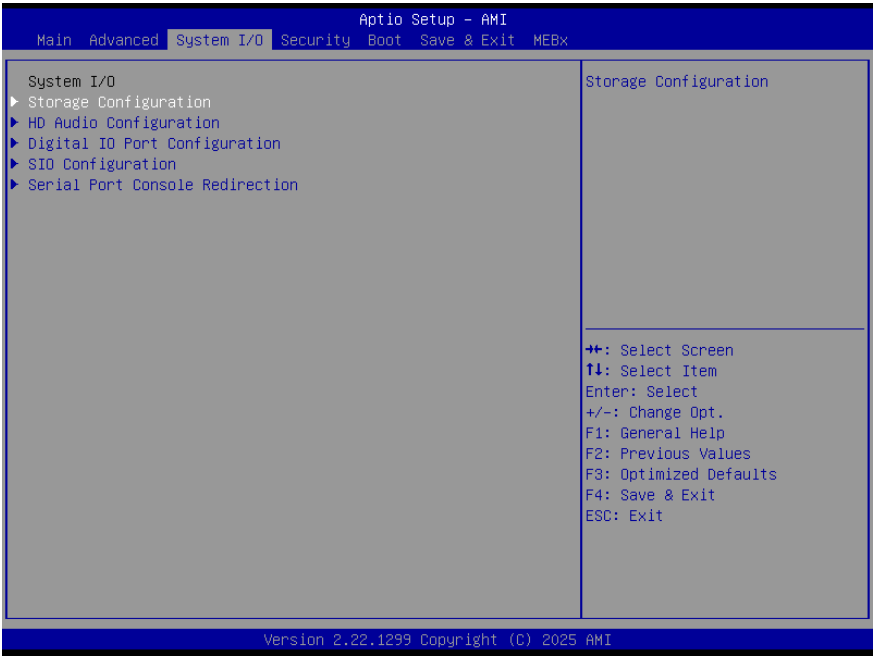
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.4.6.1.5 Device #5 Detecting Configuration

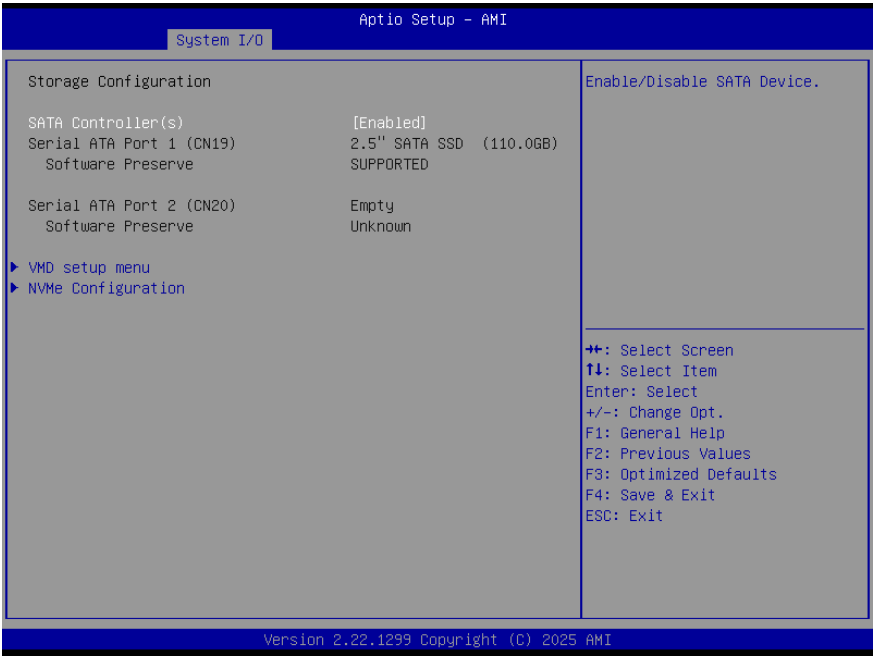


Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		

3.5 Setup Submenu: System I/O

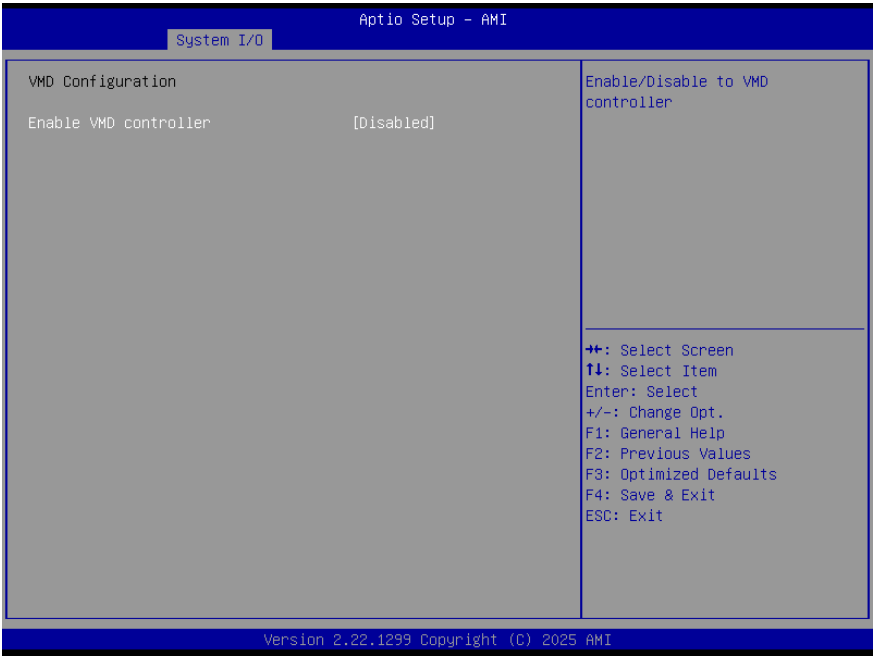


3.5.1 Storage Configuration



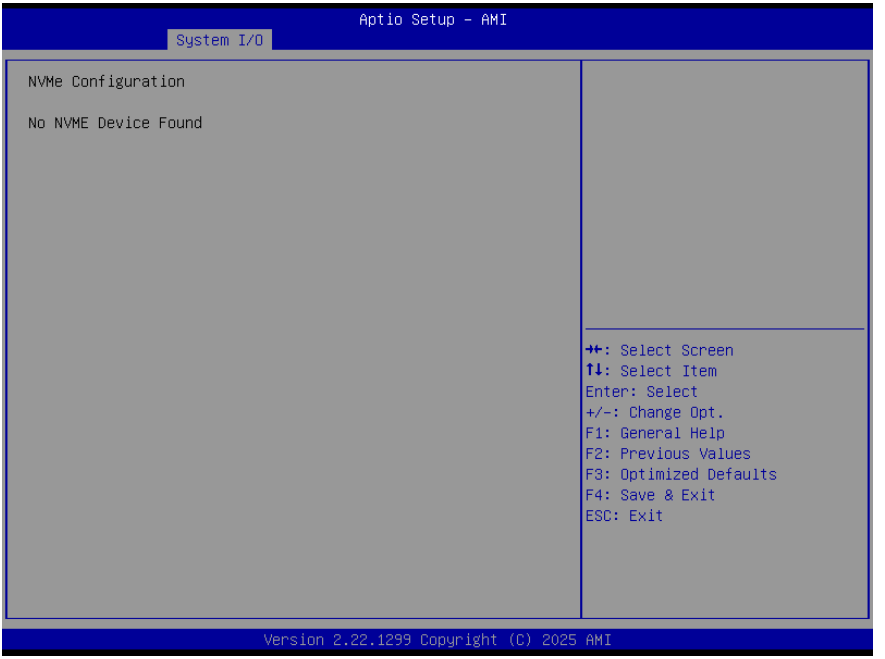
Options Summary		
SATA Controller(s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable SATA Device.		

3.5.1.1 VMD Configuration

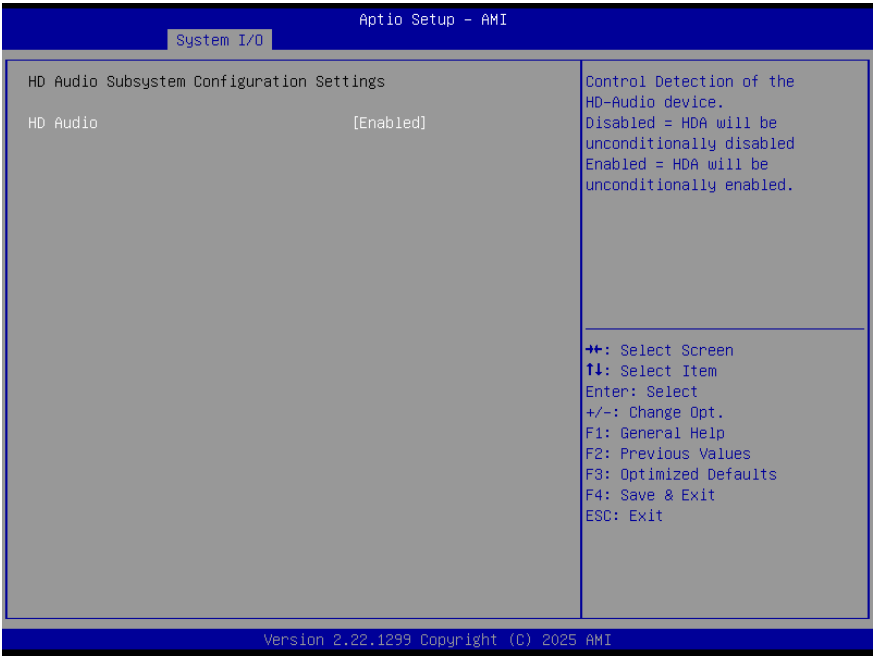


Options Summary		
Enable VMD controller	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable VMD controller.		

3.5.1.2 NVMe Configuration

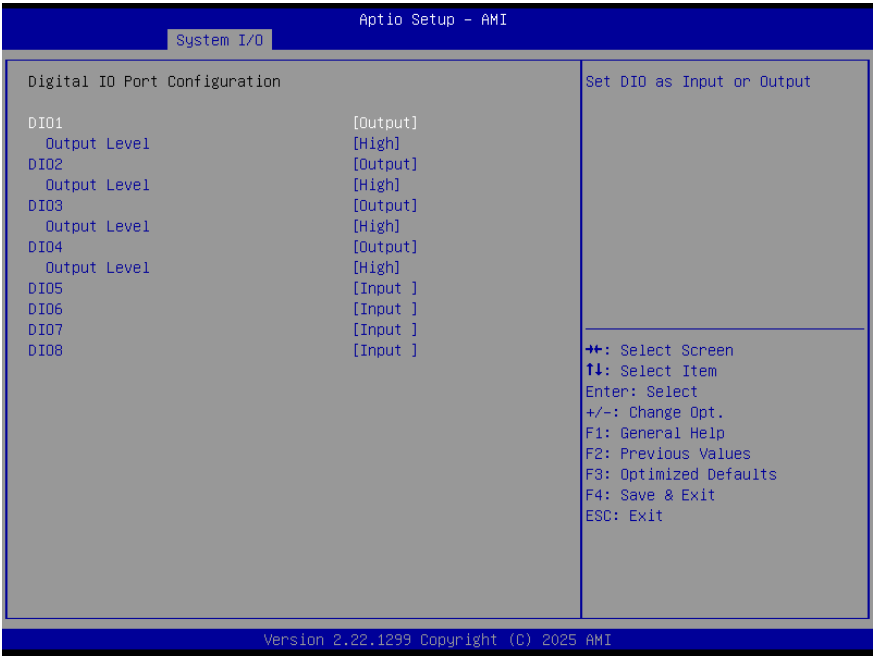


3.5.2 HD Audio Configuration



Options Summary		
HD Audio	Disabled	
	Enabled	Optimal Default, Failsafe Default
Controls detection of the HD-Audio device: **Disabled** – HD-Audio (HDA) is always disabled. **Enabled** – HD-Audio (HDA) is always enabled.		

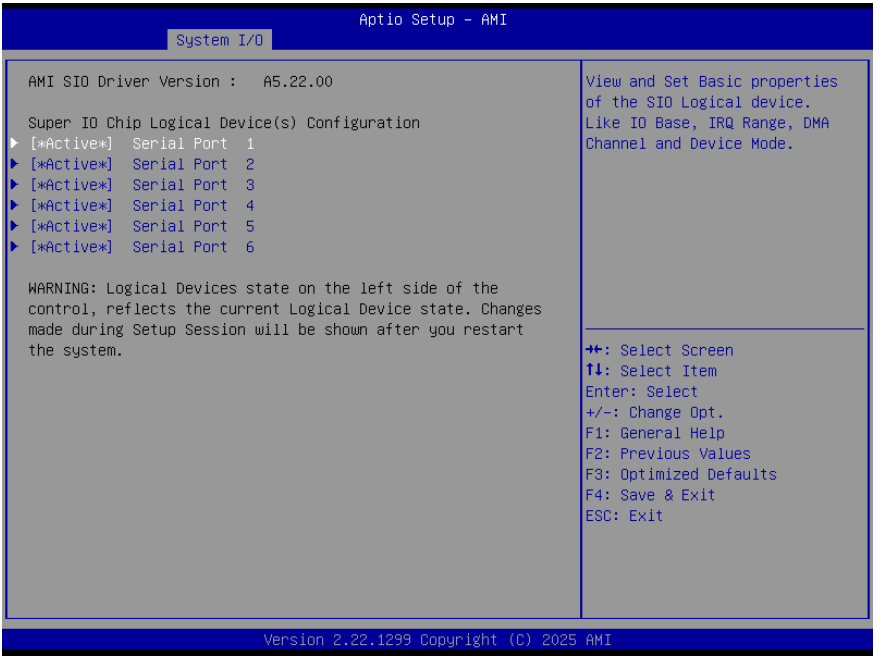
3.5.3 Digital IO Port Configuration



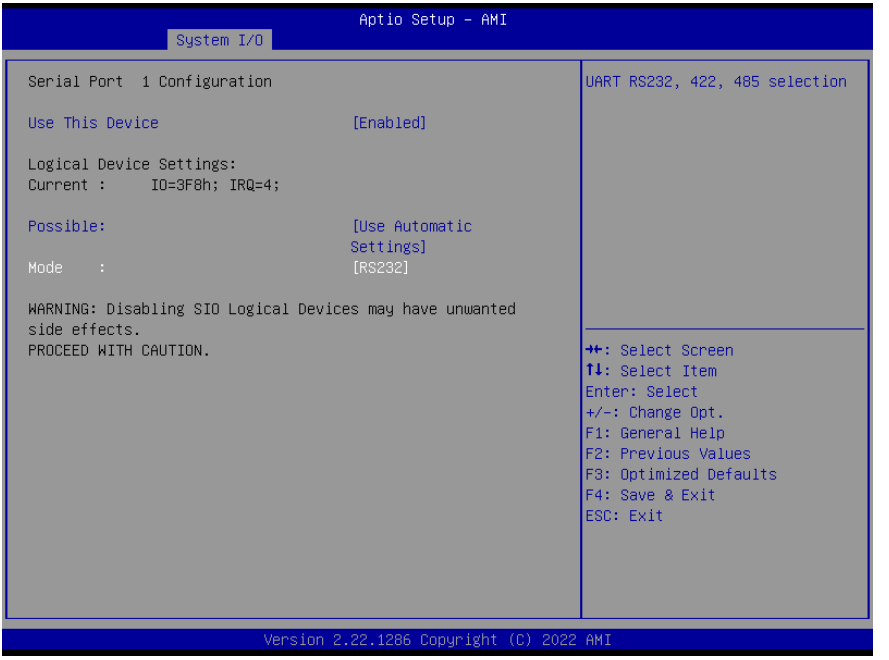
Options Summary		
DIO1	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output.		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output.		
DIO2	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output.		
Output Level	Low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

Options Summary		
Output Level	Low	
	High	Optimal Default, Failsafe Default
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

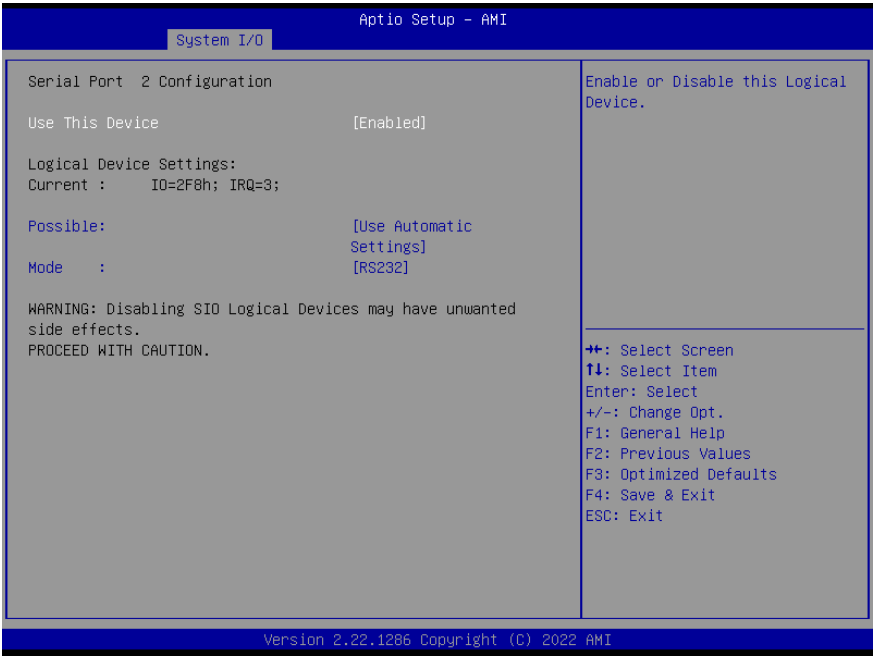


3.5.4.1 Serial Port 1



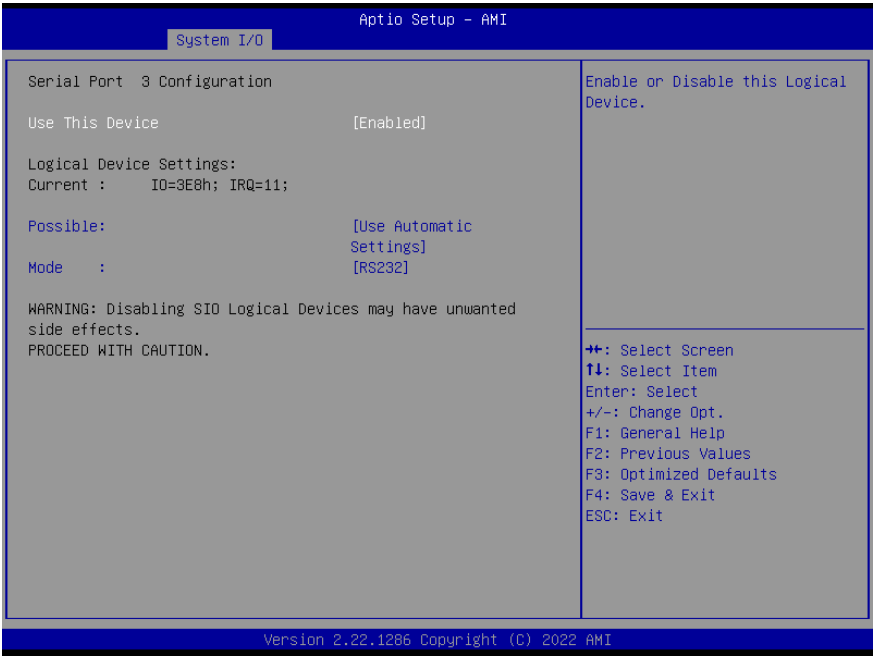
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8; IRQ=4;	
	IO=2F8; IRQ=3;	
Allows the user to change the device resource settings. New settings will 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



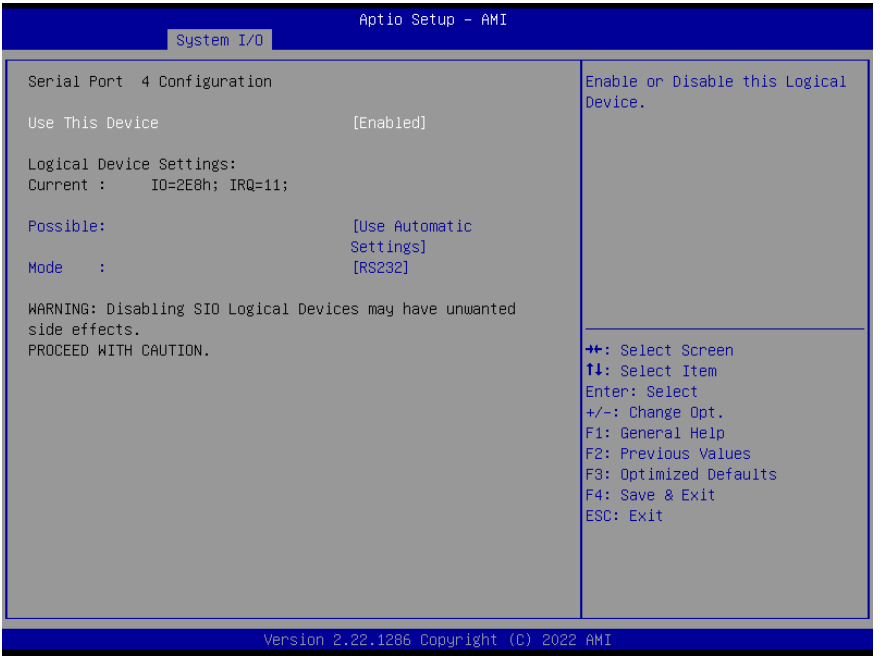
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8; IRQ=3;	
	IO=3F8; IRQ=4;	
Allows the user to change the device resource settings. New settings will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

3.5.4.3 Serial Port 3



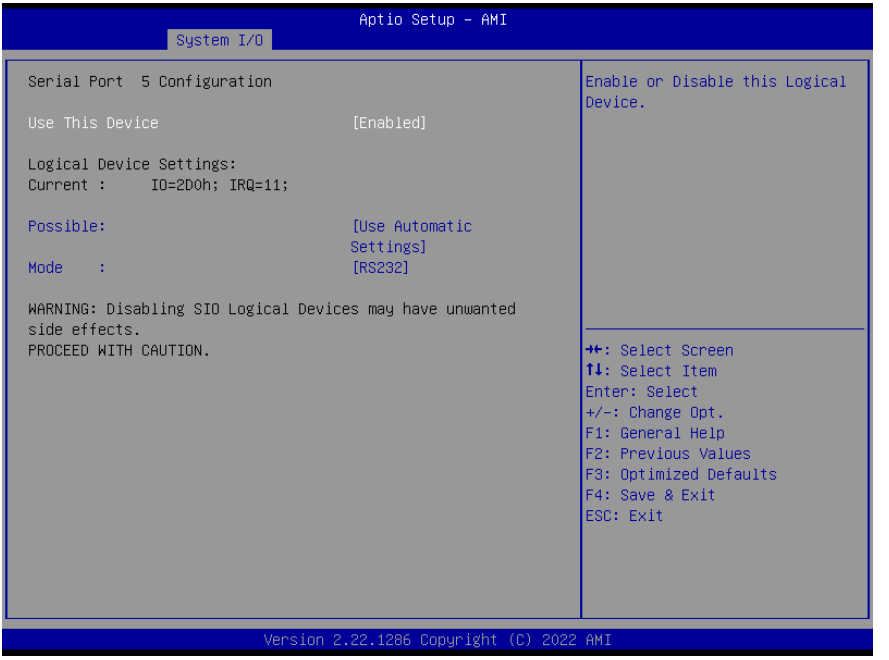
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3E8; IRQ=11;	
	IO=2E8; IRQ=11;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		
Mode	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485, selection.		

3.5.4.4 Serial Port 4



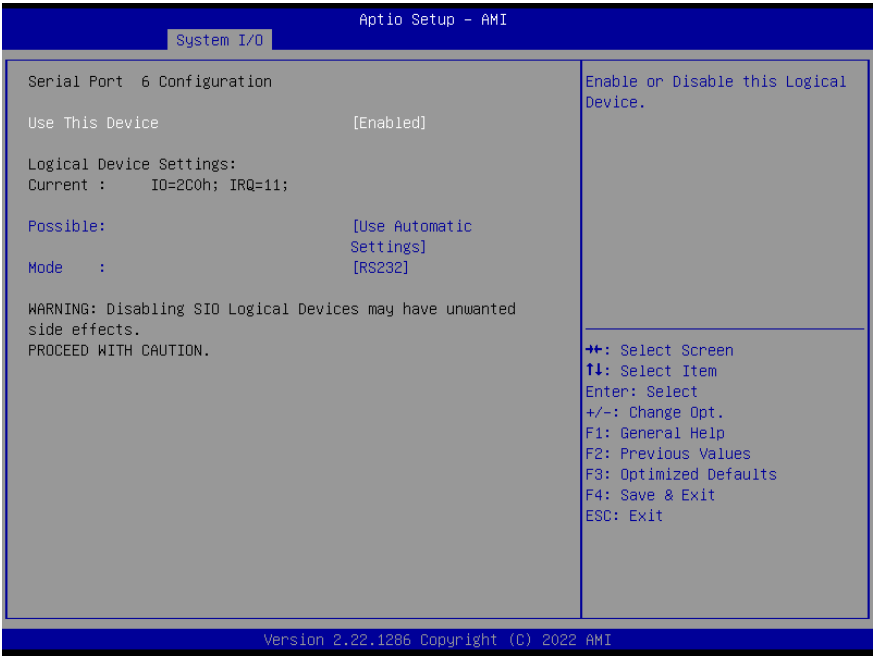
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2E8; IRQ=11;	
	IO=3E8; IRQ=11;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		
Mode	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485, selection.		

3.5.4.5 Serial Port 5



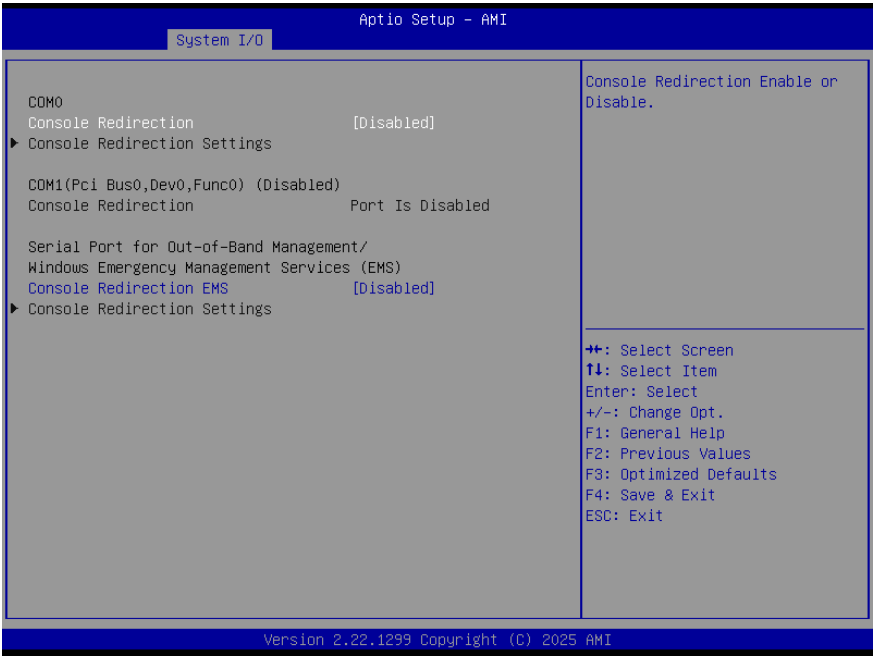
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2D0; IRQ=11;	
	IO=2C0; IRQ=11;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		
Mode	RS232	Optimal Default, Failsafe Default
	RS422	
	RS485	
UART RS232, 422, 485, selection.		

3.5.4.6 Serial Port 6



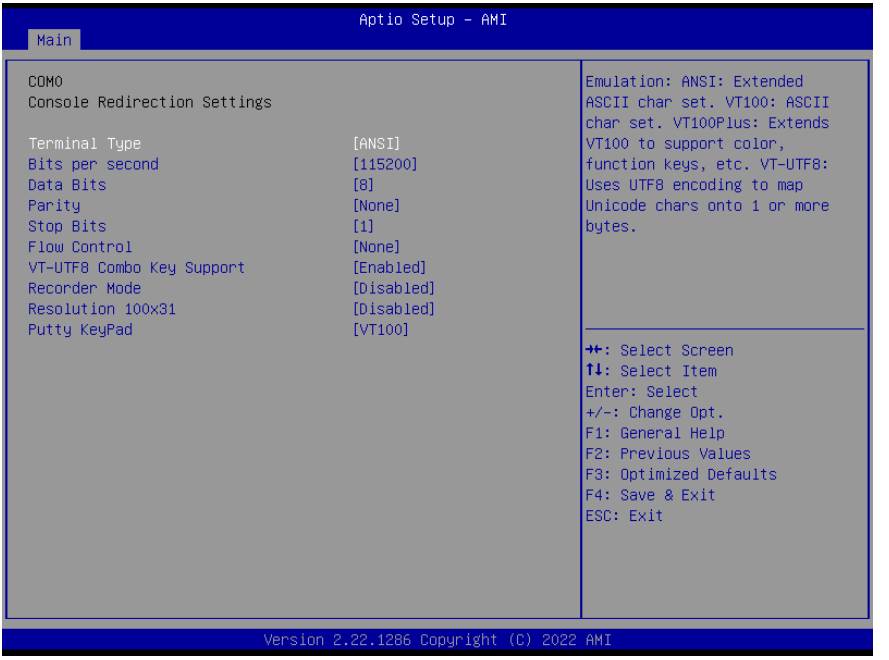
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2C0; IRQ=11;	
	IO=2D0; IRQ=11;	
Allows the user to change the device resource settings. New settings will 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 (COM0)

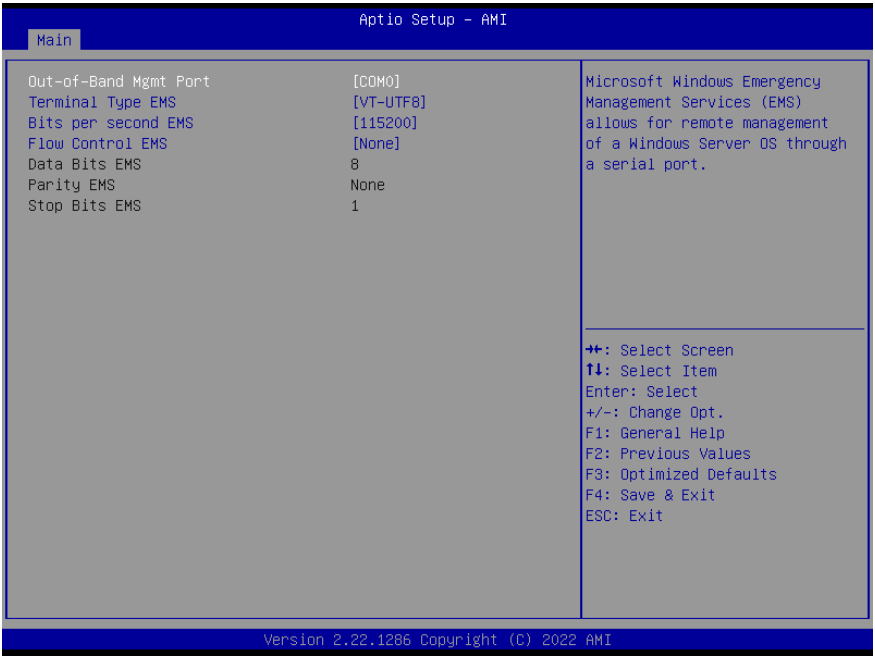


Options Summary		
Terminal Type	VT100	
	VT100Plus	
	VT-UTF8	
	ANSI	Optimal Default, Failsafe Default
Emulation Options: **ANSI** – Uses the extended ASCII character set. **VT100** – Uses the standard ASCII character set. **VT100Plus** – Extends VT100 to support color, function keys, and additional features. **VT-UTF8** – Uses UTF-8 encoding to map Unicode characters to one or more bytes.		
Bits per second	9600	
	19200	
	38400	
	57600	
	115200	Optimal Default, Failsafe Default
Select the serial port transmission speed. The speed must match the setting on the connected device. Longer or noisy lines may require a lower speed.		

Options Summary		
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 transmitted with the data bits to help detect certain transmission errors: **Even** – The parity bit is 0 if the number of 1s in the data bits is even. **Odd** – The parity bit is 0 if the number of 1s in the data bits is odd. **Mark** – The parity bit is always 1. **Space** – The parity bit is always 0. **Note:** Mark and Space parity do not provide 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 slower devices may require more than one stop bit.		
Flow Control	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
Flow control helps prevent data loss due to buffer overflow. When sending data, if the receiving buffers are full, a stop signal is sent to pause the data flow. Once the buffers have space, a start signal resumes the flow. Hardware flow control uses two dedicated wires to transmit the start and stop signals.		
VT-UTF8 Combo Key Support	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals		
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		

Options Summary		
Putty KeyPad	VT100	Optimal Default, Failsafe Default
	LINUX	
	XTERMR6	
	SCO	
	ESCN	
	VT400	
Select FunctionKey and KeyPad on Putty.		

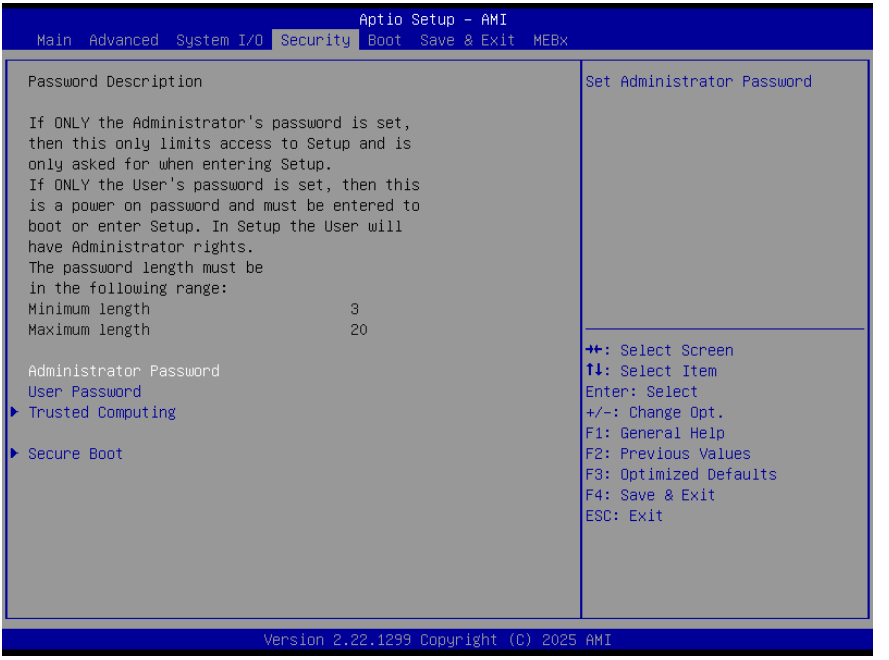
3.5.5.2 Console Redirection Settings (Out-of-Band Mgmt Port)



Options Summary		
Out-of-Band Mgmt Port	COM0	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 options are VT100+ and then VT100. For more information, see the Console Redirection Settings page for help with Terminal Type/Emulation.		

Options Summary		
Bits per second EMS	9600	
	19200	
	57600	
	115200	Optimal Default, Failsafe Default
Select the serial port transmission speed. The speed must match the setting on the connected device. Longer or noisy lines may require a lower speed.		
Flow Control EMS	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
	Software Xon/Xoff	
Flow control prevents data loss due to buffer overflow. When sending data, if the receiving buffers are full, a stop signal is sent to pause transmission. Once the buffers are available, a start signal resumes data flow. Hardware flow control uses two dedicated wires to transmit the start and stop signals.		

3.6 Setup Submenu: Security



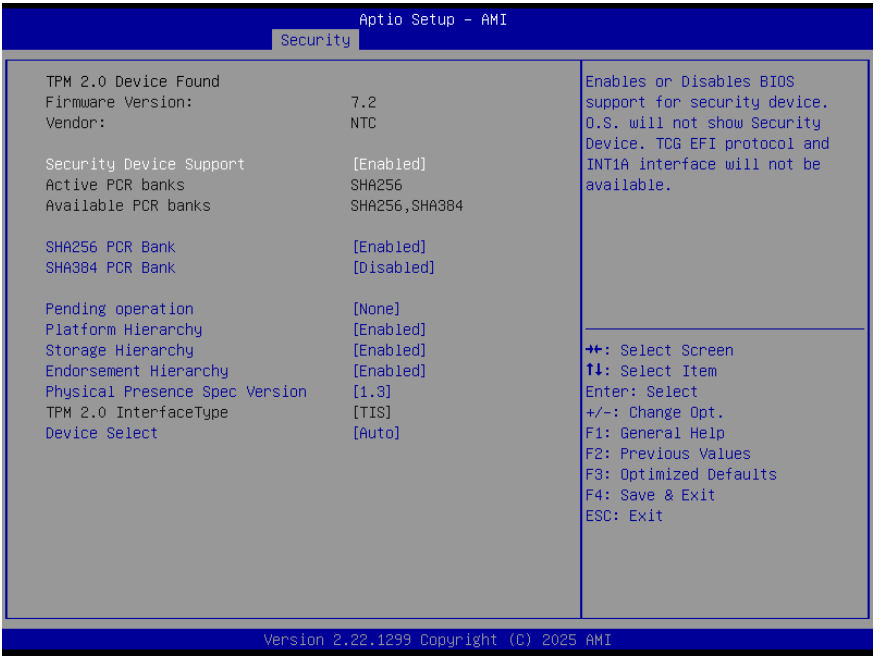
Change User/Administrator Password

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.

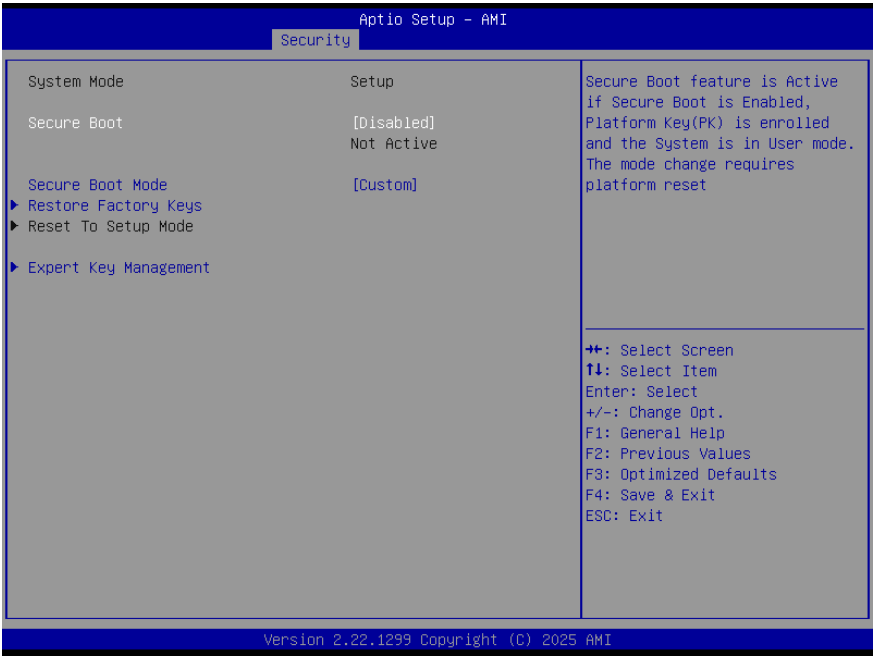
3.6.1 Trusted Computing



Options Summary		
Security Device Support	Enable	Optimal Default, Failsafe Default
	Disable	
Enable or disable BIOS support for the security device. When disabled, the operating system will not detect the security device, and the TCG EFI protocol and INT1A interface will be unavailable.		
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	

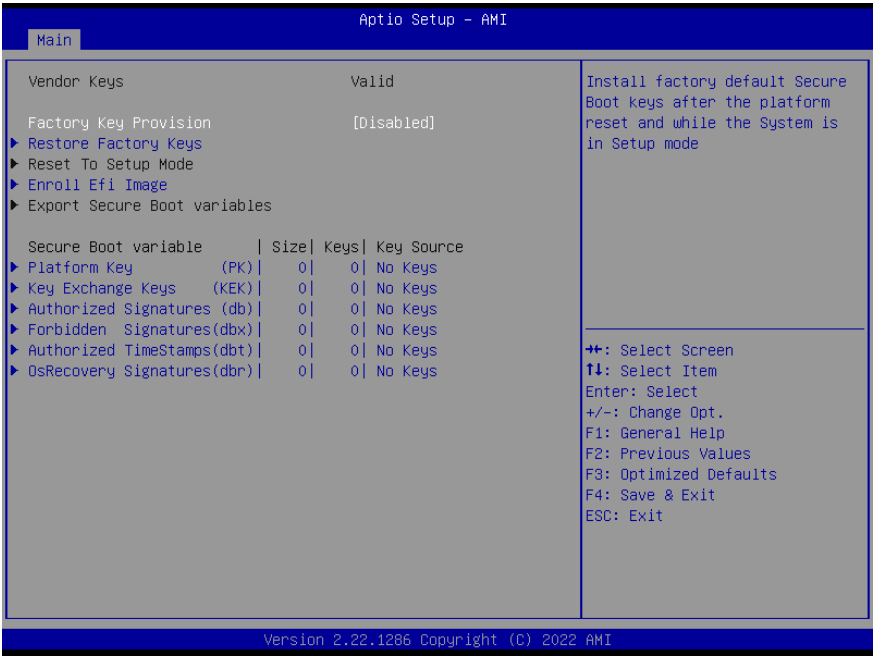
Options Summary		
Schedule an operation for the security device. **Note:** The computer will automatically reboot to apply the security device state change.		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Platform Hierarchy.		
Storage Hierarchy	Disabled	
	Enabled	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 whether to inform the operating system to support PPI Specification version 1.2 or 1.3. **Note:** Some HCK tests may not be compatible with version 1.3.		
Device Select	TPM 1.2	
	TPM 2.0	
	Auto	Optimal Default, Failsafe Default
TPM 1.2 – Supports only TPM 1.2 devices. **TPM 2.0** – Supports only TPM 2.0 devices. **Auto** – Supports both TPM 1.2 and TPM 2.0 devices. If no TPM is detected, the system defaults to TPM 2.0. TPM 1.2 devices will still be enumerated when present.		

3.6.2 Secure Boot



Options Summary		
Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
The Secure Boot feature is active when Secure Boot is enabled, the Platform Key (PK) is enrolled, and the system is in User mode. Changing the mode requires a 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 requiring full authentication.		
Restore Factory Keys	Yes	
	No	
Force the system into User mode and install the factory default Secure Boot key databases.		

3.6.2.1 Key Management



Options Summary		
Factory Key Provision	Disabled	Optimal Default, Failsafe Default
	Enabled	
Install the factory default Secure Boot keys after a platform reset, while the system is in Setup mode.		
Restore Factory Keys	Yes	
	No	
Force the system into User mode and install the factory default Secure Boot key databases.		
Enroll Efi Image		
Allow the EFI image to run in Secure Boot mode by enrolling its SHA256 hash certificate into the 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	

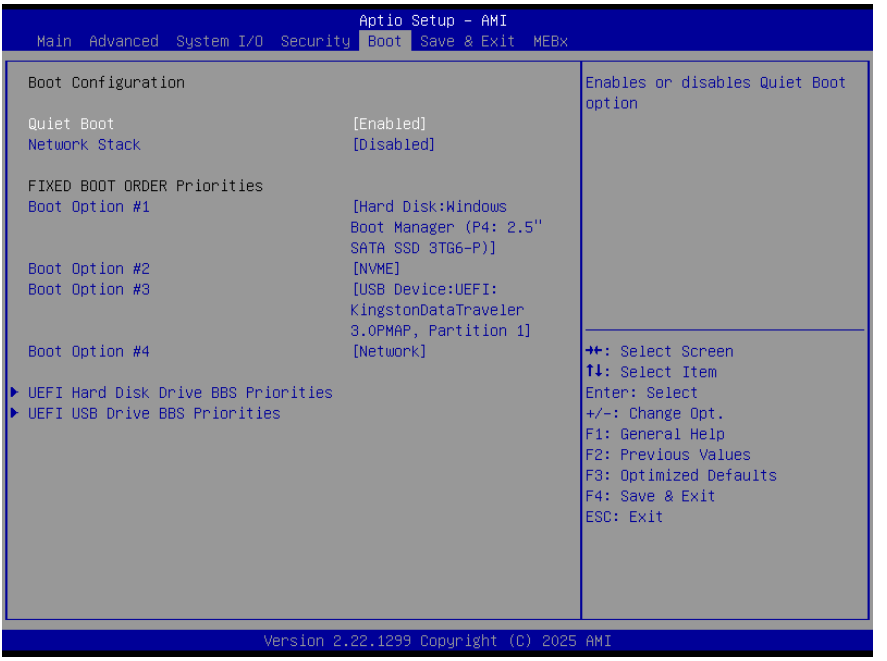
Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:

a) EFI_SIGNATURE_LIST
b) EFI_CERT_X509 (DER)
c) EFI_CERT_RSA2048 (bin)
d) EFI_CERT_SHAXXX

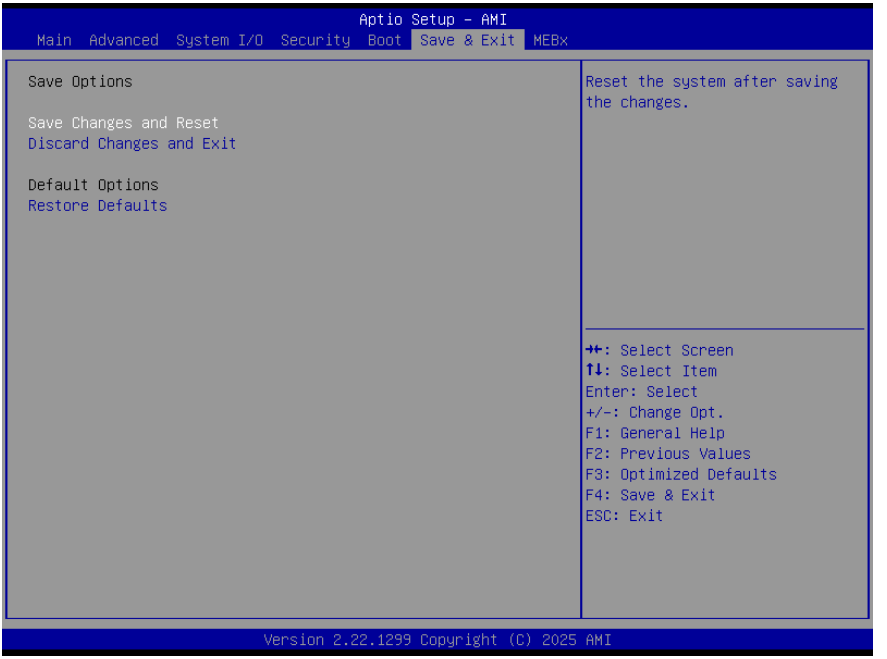
2.Authenticated UEFI Variable
3.EFI PE/COFF Image (SHA256)
Key Source: Factory, External, Mixed

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		

3.8 Setup Submenu: Save & Exit



3.9 Setup Submenu: MEBx

Chapter 4

Drivers Installation

4.1 Drivers Download and Installation

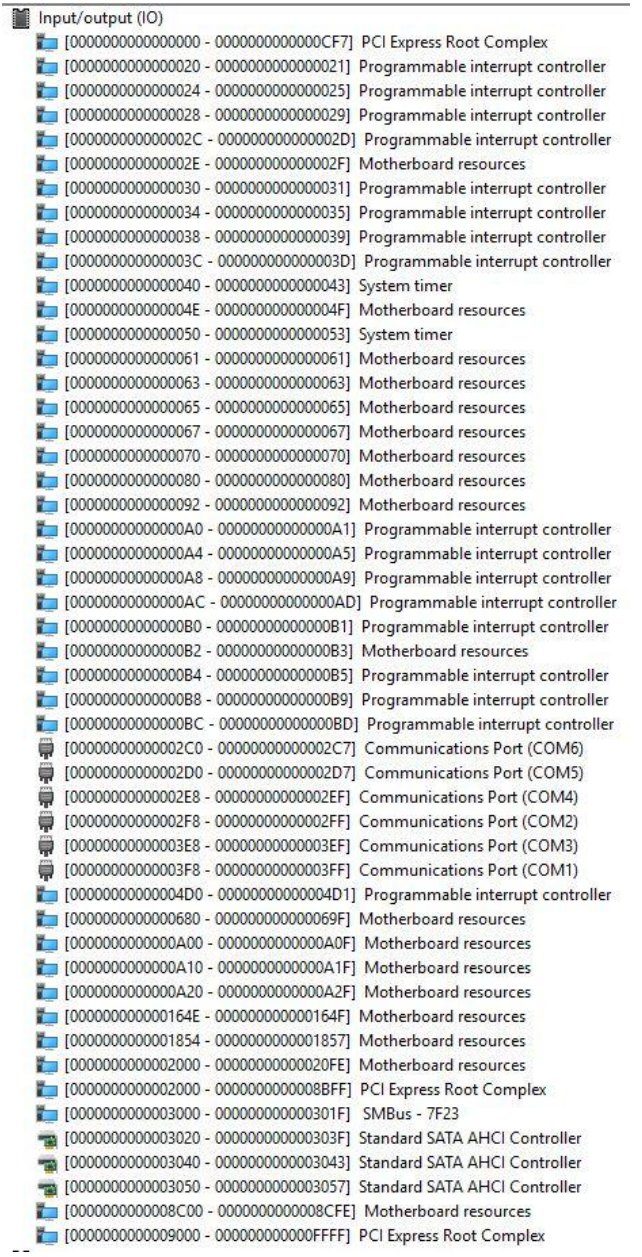
Drivers for the BOXER-6648-ARS can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/product/detail/compact-fanless-box-pc-solutions-boxer-6648-ars/download

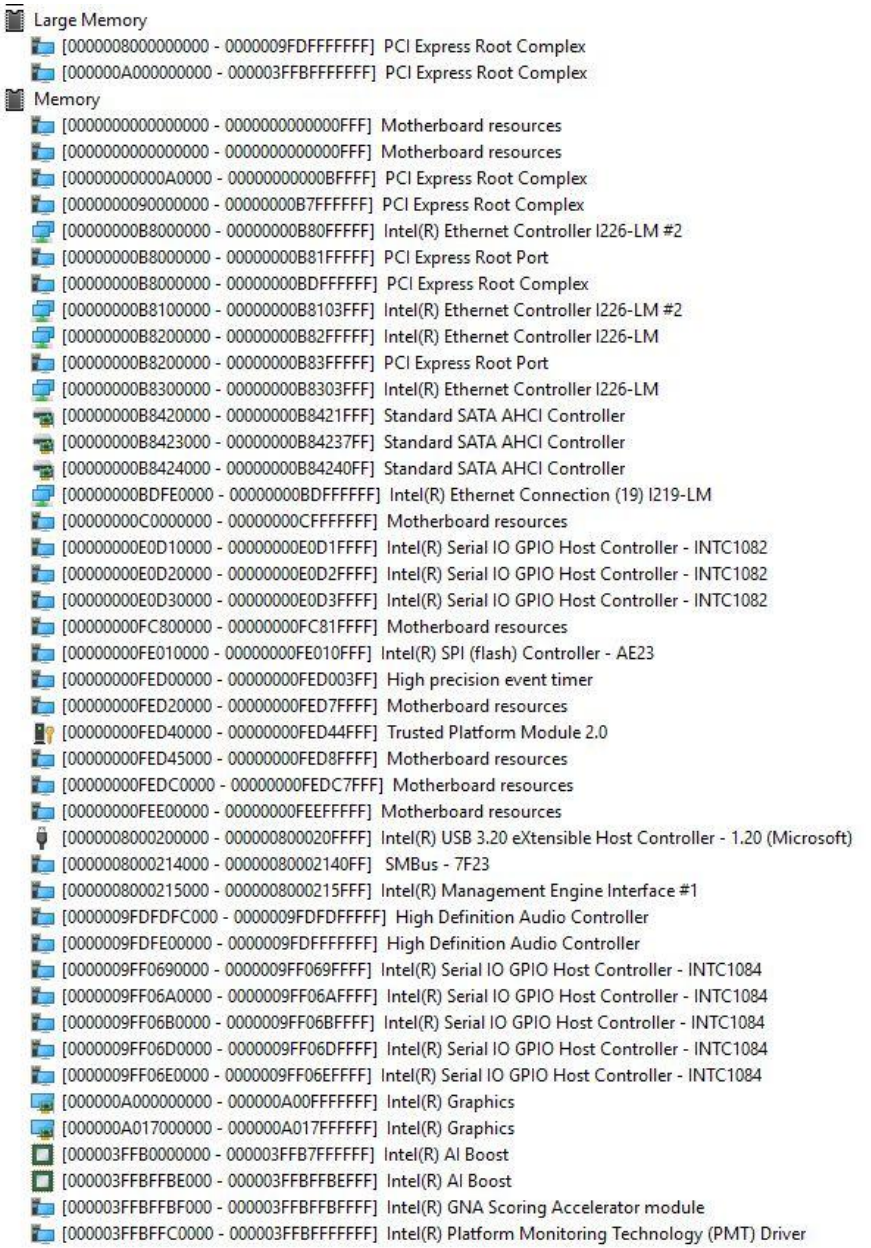
Appendix A

I/O Information

A.1 I/O Address Map



A.2 Memory Address Map



A.3 IRQ Mapping Chart