

# BOXER-6646-ADP

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Fanless Compact Embedded Computer with  
12<sup>th</sup> Generation Intel<sup>®</sup> Core<sup>™</sup> i7/i5/i3 Processor

User's Manual 1<sup>st</sup> Ed

## Copyright Notice

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## Packing List

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

Item	Quantity
● BOXER-6646-ADP	1
● Wallmount Kit	1
● 3 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

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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](http://AAEON.com) for the latest version of this document.

## Safety Precautions

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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 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

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### **Warning!**



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.*



## 产品中有毒有害物质或元素名称及含量

AAEON System

QO4-381 Rev.A0

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。

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。

**Hazardous and Toxic Materials List**

AAEON System

QO4-381 Rev.A0

Component Name	Hazardous or Toxic Materials or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBBS)	Polybrominated diphenyl ethers (PBDES)
PCB and Components	X	O	O	O	O	O
Wires & Connectors for Ext.Connections	X	O	O	O	O	O
Chassis	O	O	O	O	O	O
CPU & RAM	X	O	O	O	O	O
HDD Drive	X	O	O	O	O	O
LCD Module	X	X	O	O	O	O
Optical Drive	X	O	O	O	O	O
Touch Control Module	X	O	O	O	O	O
PSU	X	O	O	O	O	O
Battery	X	O	O	O	O	O

This form is prepared in compliance with the provisions of SJ/T 11364.

O: The level of toxic or hazardous materials present in this component and its parts is below the limit specified by GB/T 26572.

X: The level of toxic of hazardous materials present in the component exceed the limits specified by GB/T 26572, but is still in compliance with EU Directive 2011/65/EU (RoHS 2).

Notes:

1. The Environment Friendly Use Period indicated by labelling on this product is applicable only to use under normal conditions.
2. Individual components including the CPU, RAM/memory, HDD, optical drive, and PSU are optional.
3. LCD Module and Touch Control Module only applies to certain products which feature these components.

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# Chapter 1

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Product Specifications

## 1.1 Specifications

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### System

CPU	Intel® Core™ i7-1270PE
	Intel® Core™ i5-1250PE
	Intel® Core™ i3-1220PE
Chipset	Intel® System on Chip
System Memory	DDR5 SODIMM Slot x 2
Display Interface	HDMI x 2
	Display Port x 2
Storage Device	Removable 2.5" SATA Drive Bay x 1
	M.2 2280 NVMe Slot x 1
Ethernet	RJ-45 x 2 for 2.5GbE LAN i226-LM x 2
	RJ-45 x 1 for GbE LAN i219-LM x 1
I/O	USB Type-A x 3 for USB 3.2 Gen 2 (10Gbps)
	USB Type-A x 3 for USB 2.0
	DB-9 x 4 for RS-232/422/485
	Line-out
	SMA Antenna Holes x 4
	DB-15 for DIO 8-bit x 1
	Power Button with LED indicator x 1
Remote Power On/Off 2-pin Connector x 1	
Expansion	M.2 2230 E-Key x 1
	M.2 3052 B-Key x 1 (for 5G Module)
Indicator	System Power LED x 1
OS support	Windows® 10 IoT Ent LTSC, Windows® 11 PRO, Ubuntu 22.04



## Power Supply

**Power Requirement** 10~35V DC-In via 3-pin Terminal block Connector

## Mechanical

**Mounting** Wallmount

**Dimensions (W x H x D)** 8.66" x 6.06" x 2.42" (220mm x 15 mm x 61.6mm)

**Gross Weight** 6.6 lb. (3.0 Kg)

**Net Weight** 4.9 lb. (2.2 Kg)

## Environmental

**Operating Temperature** -4°F ~140°F (-20°C ~ 60°C), IEC68-2 with 0.5 m/s AirFlow, with Wide Temperature 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 @ Wallmount, Half-Sine, 11ms

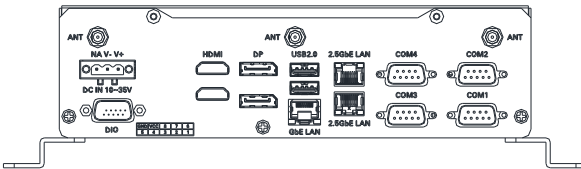
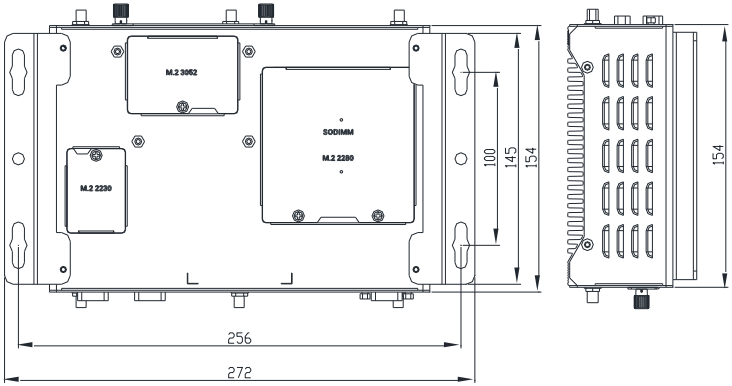
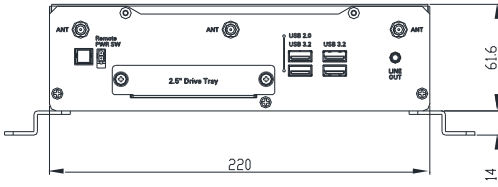
**Certification** CE/FCC Class A

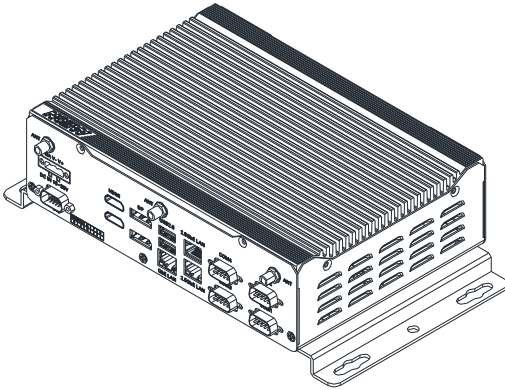
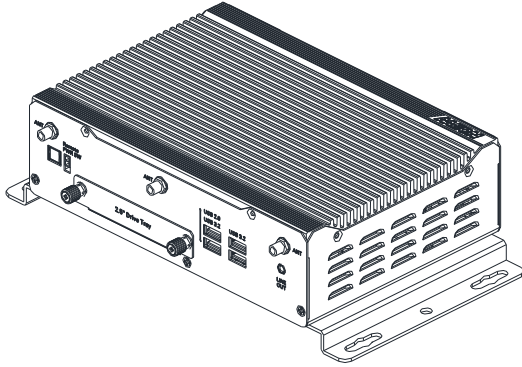
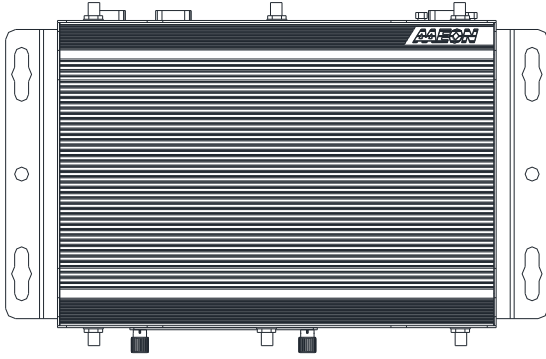
# Chapter 2

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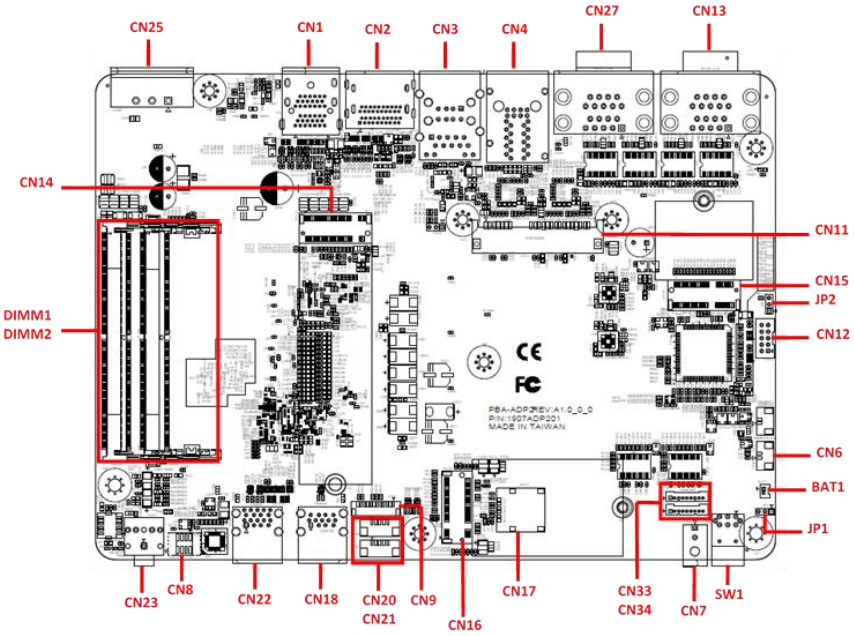
Hardware Information

## 2.1 Dimensions





## 2.2 Jumpers and Connectors



## 2.3 List of Jumpers

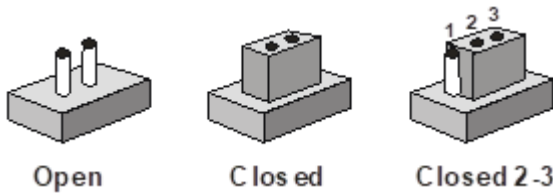
Please refer to the table below for all of the system's jumpers that you can configure for your application.

Label	Function
JP1	CMOS Control Selection
JP2	Auto-Power Button Selection

### 2.3.1 Setting Jumpers

The BOXER-6646-ADP 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.

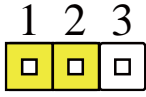


A pair of needle-nose pliers may be helpful when working with jumpers.

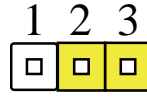
If you have any questions about how best to configure the system for your application, contact your AAEON representative or visit our website to talk with our support team.

### 2.3.2 Clear CMOS Jumper (JP1)

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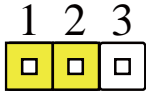
Normal (Default)



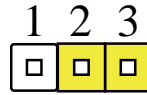
Clear CMOS

### 2.3.3 Auto Power Button Selection (JP3)

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ATX (Default)



AT

## 2.4 List of Connectors

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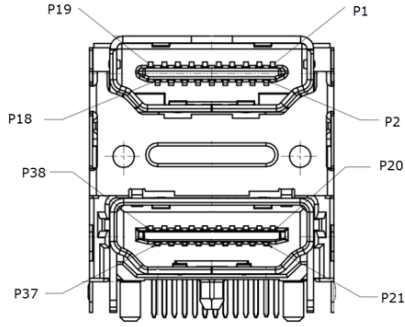
Please refer to the table below for all of the system's connectors that you can configure for your application

Label	Function
CN1	HDMI Dual Port
CN2	DP Dual Port
CN3	LAN 1G + USB 2.0 x 2 Connector
CN4	LAN 2.5G x 2 Connector
CN6	Reset Switch Wafer Box
CN7	Remote Button
CN8	SPI Flash Header
CN9	eSPI Wafer Box (Debug Port)
CN11	2.5" SATA HDD Connector
CN12	DIO Wafer Box
CN13	COM 1+COM 2 Connector RS232/RS422/RS485
CN14	M2.2280 M-Key Slot
CN15	M2.2230 E-Key Slot
CN16	M2.3052 B-Key Slot
CN17	SIM Slot
CN18	USB 3.2+USB 2.0 Connector
CN20	USB 2.0 Wafer Box
CN21	USB 2.0 Wafer Box
CN22	USB 3.2 x 2 Connector
CN23	Audio Connector
CN25	Phoenix Connector Power Input
CN27	COM 3+COM 4 Connector RS232/RS422/RS485
CN33	COM 5 Wafer Box RS232/RS422/RS485



Label	Function
CN34	COM 6 Wafer Box RS232/RS422/RS485
BAT1	RTC Battery
SW1	Power Button
DIMM1	DDR5 SO-DIMM Slot
DIMM2	DDR5 SO-DIMM Slot

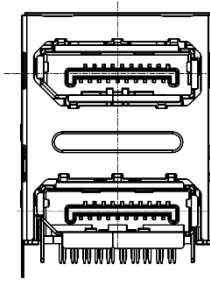
## 2.4.1 HDMI Dual Port (CN1)



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		

Pin	Pin Name	Signal Type	Signal level
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

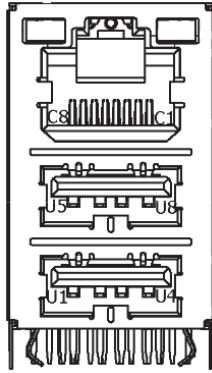
## 2.4.2 DP Dual Port (CN2)



Pin	Signal	Signal Type	Signal Level
P1	DP1_DATA0_P	DIFF	
P2	GND	GND	
P3	DP1_DATA0_N	DIFF	
P4	DP1_DATA1_P	DIFF	
P5	GND	GND	
P6	DP1_DATA1_N	DIFF	
P7	DP1_DATA2_P	DIFF	
P8	GND	GND	
P9	DP1_DATA1_N	DIFF	
P10	DP1_DATA3_P	DIFF	
P11	GND	GND	
P12	DP1_DATA3_N	DIFF	
P13	CONFIG1		3.3V
P14	CONFIG2		
P15	DP1_AUX_P	DIFF	
P16	GND	GND	
P17	DP1_AUX_N	DIFF	
P18	DP1_HPD		

Pin	Signal	Signal Type	Signal Level
P19	RETURN		
P20	DP1_PWR	PWR	+3.3V
P21	DP2_DATA0_P	DIFF	
P22	GND	GND	
P23	DP2_DATA0_N	DIFF	
P24	DP2_DATA1_P	DIFF	
P25	GND	GND	
P26	DP2_DATA1_N	DIFF	
P27	DP2_DATA2_P	DIFF	
P28	GND	GND	
P29	DP2_DATA1_N	DIFF	
P30	DP2_DATA3_P	DIFF	
P31	GND	GND	
P32	DP2_DATA3_N	DIFF	
P33	CONFIG1		3.3V
P34	CONFIG2		
P35	DP2_AUX_P	DIFF	
P36	GND	GND	
P37	DP2_AUX_N	DIFF	
P38	DP2_HPD		
P39	RETURN		
P40	DP2_PWR	PWR	+3.3V

### 2.4.3 RJ-45 (2.5GbE LAN) & USB 2.0 Connector (CN3)

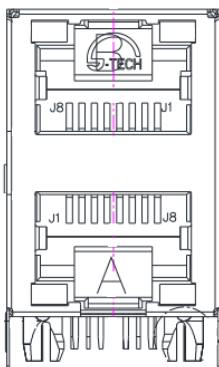


Pin	Signal	Signal Type
C1	LAN1_MDI0P	DIFF
C2	LAN1_MDI0N	DIFF
C3	LAN1_MDI1P	DIFF
C4	LAN1_MDI1N	DIFF
C5	LAN1_MDI2P	DIFF
C6	LAN1_MDI2N	DIFF
C7	LAN1_MDI3P	DIFF
C8	LAN1_MDI3N	DIFF

Pin	Signal	Signal Type	Signal Level
U1	VCC_USB5	PWR	+5V
U2	USB5-	DIFF	
U3	USB5+	DIFF	
U4	GND	GND	
U5	VCC_USB5	PWR	+5V
U6	USB6-	DIFF	

Pin	Signal	Signal Type	Signal Level
U7	USB6+	DIFF	
U8	GND	GND	

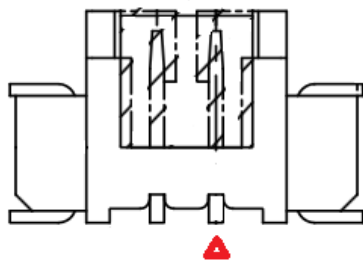
## 2.4.4 RJ-45 (2.5GbE LAN) Connector (CN4)



Pin	Signal	Signal Type
J1	LAN2_MDI0P	DIFF
J2	LAN2_MDI0N	DIFF
J3	LAN2_MDI1P	DIFF
J4	LAN2_MDI1N	DIFF
J5	LAN2_MDI2P	DIFF
J6	LAN2_MDI2N	DIFF
J7	LAN2_MDI3P	DIFF
J8	LAN2_MDI3N	DIFF

Pin	Signal	Signal Type
J1	LAN3_MDI0P	DIFF
J2	LAN3_MDI0N	DIFF
J3	LAN3_MDI1P	DIFF
J4	LAN3_MDI1N	DIFF
J5	LAN3_MDI2P	DIFF
J6	LAN3_MDI2N	DIFF
J7	LAN3_MDI3P	DIFF
J8	LAN3_MDI3N	DIFF

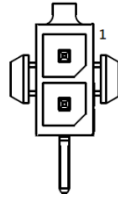
### 2.4.5 Reset Switch Wafer Box (CN6)



Pin	Signal	Signal Type
1	HWRST#	IN
2	GND	

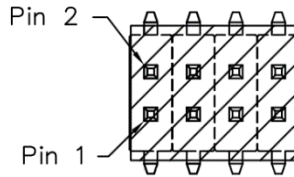


### 2.4.6 Remote Button (CN7)



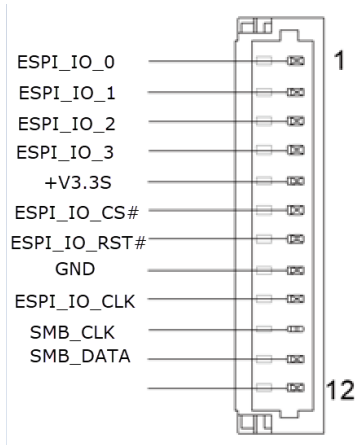
Pin	Signal	Signal Type
1	PWR_BUTTON#	IN
2	GND	

### 2.4.7 SPI Flash Header (CN8)



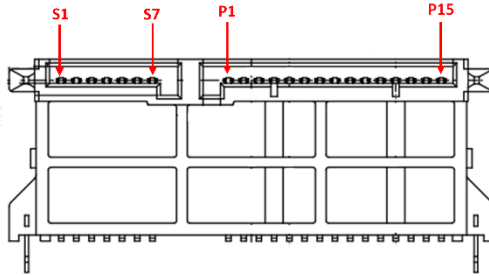
Pin	Signal	Signal Type	Signal Level
1	+V3P3M_SPI	PWR	+3.3V
2	GND	GND	
3	SPI_CE0#_F	IN	
4	SPI_CLK_F	IN	
5	SPI_SO_F	IN	
6	SPI_SI_F	IN	
7	NC		
8	NC		

## 2.4.8 eSPI Wafer Box (Debug Port) (CN9)



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

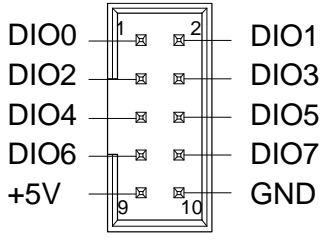
## 2.4.9 2.5" SATA HDD Connector (CN11)



Pin	Signal	Signal Type	Signal Level
S1	GND	GND	
S2	SATA0_TXP	DIFF	
S3	SATA0_TXN	DIFF	
S4	GND	GND	
S5	SATA0_RXN	DIFF	
S6	SATA0_RXP	DIFF	
S7	GND	GND	
P1	+V3P3S	PWR	+3.3V
P2	+V3P3S	PWR	+3.3V
P3	+V3P3S	PWR	+3.3V
P4	GND	GND	
P5	GND	GND	
P6	GND	GND	
P7	+V5S	PWR	+5V
P8	+V5S	PWR	+5V
P9	+V5S	PWR	+5V
P10	GND	GND	

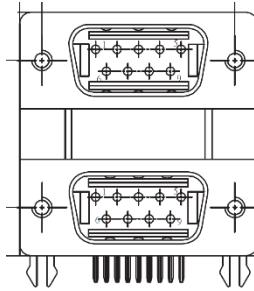
Pin	Signal	Signal Type	Signal Level
P11	NA	NA	
P12	GND	GND	
P13	+V12S	PWR	+12V
P14	+V12S	PWR	+12V
P15	+V12S	PWR	+12V

### 2.4.10 DIO Wafer Box (CN12)



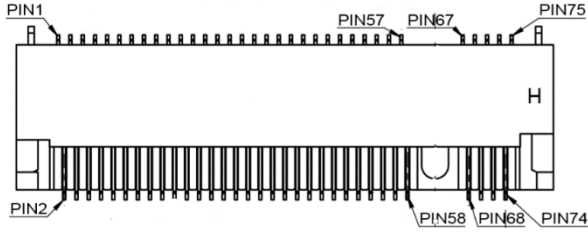
Pin	Signal	Signal Type	Signal Level
1	DIO0	I/O	+5V
2	DIO1	I/O	+5V
3	DIO2	I/O	+5V
4	DIO3	I/O	+5V
5	DIO4	I/O	+5V
6	DIO5	I/O	+5V
7	DIO6	I/O	+5V
8	DIO7	I/O	+5V
9	+5V	PWR	+5V
10	GND	GND	

## 2.4.11 Dual COM Connector RS232/RS422/RS485 (CN13, CN27)



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		

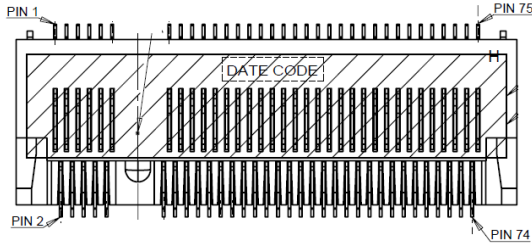
## 2.4.12 M.2 2280 M-Key Slot (CN14)



Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	2	+V3P3_NGFF	PWR	+3.3V
3	GND	GND	4	+V3P3_NGFF	PWR	+3.3V
5	PCIE4_3_RXN	IN	6	CARD_PWR_OFF_N	OUT	+3.3V
7	PCIE4_3_RXP	IN	8	NC		
9	GND	GND	10	NC		
11	PCIE4_3_TXN	OUT	12	+V3P3_NGFF	PWR	+3.3V
13	PCIE4_3_TXP	OUT	14	+V3P3_NGFF	PWR	+3.3V
15	GND	PWR	16	+V3P3_NGFF	PWR	+3.3V
17	PCIE4_2_RXN	IN	18	+V3P3_NGFF	PWR	+3.3V
19	PCIE4_2_RXP	IN	20	NC		
21	GND	PWR	22	NC		
23	PCIE4_2_TXN	OUT	24	NC		
25	PCIE4_2_TXP	OUT	26	NC		
27	GND	PWR	28	NC		
29	PCIE4_1_RXN	IN	30	NC		
31	PCIE4_1_RXP	IN	32	NC		
33	GND	GND	34	NC		

Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal Level
35	PCIE4_1_TXN	OUT	36	NC		
37	PCIE4_1_TXP	OUT	38	DEV_SLP	IN	+3.3V
39	GND	GND	40	SMB_CLK_M2		+1.8V
41	PCIE4_0_RXP	IN	42	SMB_DATA_M2		+1.8V
43	PCIE4_0_RXN	IN	44	NC		
45	GND	GND	46	NC		
47	PCIE4_0_TXN	OUT	48	NC		
49	PCIE4_0_TXP	OUT	50	BUF_PLT_RST_R	IN	+3.3V
51	GND	PWR	52	PCIE_CLKREQ#0	OUT	+3.3V
53	CLKOUT_PCIE_N0	OUT	54	M2_WAKE#	OUT	+3.3V
55	CLKOUT_PCIE_P0	OUT	56	NC		
57	GND	GND	58	NC		
67	NC		68	NC		
69	NC		70	+V3P3_NGFF	PWR	+3.3V
71	GND	GND	72	+V3P3_NGFF	PWR	+3.3V
73	GND	GND	74	+V3P3_NGFF	PWR	+3.3V
75	GND	GND				

## 2.4.13 M.2 2230 E-Key Slot (CN15)

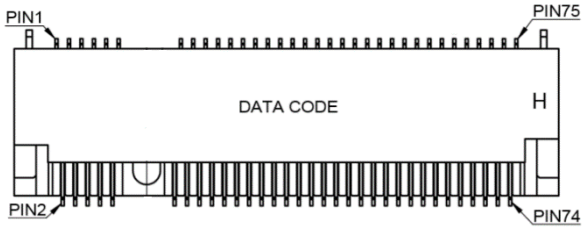


Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal level
1	GND	GND	2	+V3P3_NGFF_E	PWR	+3.3V
3	USB_PP9	DIFF	4	+V3P3_NGFF_E	PWR	+3.3V
5	USB_PN9	DIFF	6	NC		
7	GND	GND	8	M.2_BT_PCMCLK_C	IN	+3.3V
9	NC		10	M.2_BT_PCMFRM_C	IN	+3.3V
11	NC		12	M.2_BT_PCMMIN_C	OUT	+3.3V
13	NC		14	M.2_BT_PCMOUT_C	IN	+3.3V
15	NC		16	NC		
17	NC		18	GND	GND	
19	NC		20	KEYE_UART_WAKE_N	OUT	+3.3V
21	NC		22	NC		
23	NC					
			32	NC		
33	GND	GND	34	NC		
35	PCIE5_TXP	DIFF	36	NC		



Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal level
37	PCIE5_TXN	DIFF	38	CL_RST#	IN	+3.3V
39	GND	GND	40	CL_DATA		+3.3V
41	PCIE5_RXP	DIFF	42	CL_CLK	IN	+3.3V
43	PCIE5_RXN	DIFF	44	GPPC_F6_CNV_PA_BLANKING	OUT	+3.3V
45	GND	GND	46	CNV_MFUART2_TXD	IN	+3.3V
47	CLKOUT_PCIE_P4	DIFF	48	CNV_MFUART2_RXD	OUT	+3.3V
49	CLKOUT_PCIE_N4	DIFF	50	SUSCLK	IN	+3.3V
51	GND	GND	52	BUF_PLT_RST#	IN	+3.3V
53	PCIE_CLKREQ#4	OUT	54	GPP_A13_PMC_I2C_SCL	IN	+3.3V
55	KEYE_WAKE_N	OUT	56	GPPC_E3_CPU_GP_0	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	+V3P3_NGFF_E	PWR	+3.3V
73	NC		74	+V3P3_NGFF_E	PWR	+3.3V
75	GND	GND				

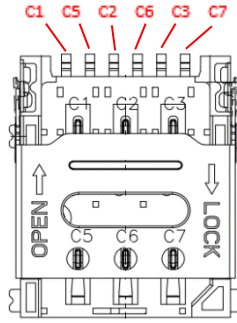
## 2.4.14 M.2 3052 B-Key Slot (CN16)



Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal level
1	NC		2	+3P3V_NGFF_3052	PWR	+3.3V
3	GND	GND	4	+3P3V_NGFF_3052	PWR	+3.3V
5	GND	GND	6	FULL_CARD_POWER	OUT	+3.3V
7	USB_PP10		8	3GPW_EN	IN	+3.3V
9	USB_PN10		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_RX4_N		30	UIM_RESET		
31	USB3_RX4_P		32	UIM_CLK		
33	GND	GND	34	UIM_DATA		

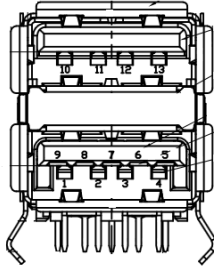
Pin	Pin Name	Signal Type	Pin	Pin Name	Signal Type	Signal level
35	USB3_TX4_N		36	UIM_PWR1		
37	USB3_TX4_P		38	NC		
39	GND	GND	40	NC		
41	PCIE12_R-_SATA_R-		42	NC		
43	PCIE12_R+_SATA_R-		44	NC		
45	GND	GND	46	NC		
47	PCIE12_T-_SATA_T-		48	NC		
49	PCIE12_T+_SATA_T+		50	BUF_PLT_3052_RST#	IN	+3.3V
51	GND	GND	52	PCIE_CLKREQ#3	OUT	+3.3V
53	CLK_PCIE_N3	OUT	54	M2_3052_WAKE#	OUT	+3.3V
55	CLK_PCIE_P3	OUT	56	NC		
57	GND	GND	58	NC		
59	NC		60	NC		
61	NC		62	NC		
63	NC		64	NC		
65	NC		66	NC		
67	BUF_PLT_3052_RST:		68	SUSCLK_3052		
69	NC		70	+3P3V_NGFF_3052	PWR	+3.3V
71	GND	GND	72	+3P3V_NGFF_3052	PWR	+3.3V
73	GND	GND	74	+3P3V_NGFF_3052	PWR	+3.3V
75	GND	GND				

## 2.4.15 SIM Slot (CN17)



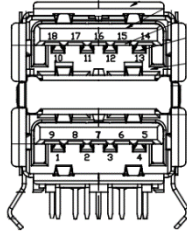
Pin	Signal	Signal Type
C1	UIM_PWR	PWR
C2	UIM_RESET	IN
C3	UIM_CLK	IN
C5	GND	GND
C6	UIM_VPP	PWR
C7	UIM_DATA	I/O

## 2.4.16 USB 3.2 + USB 2.0 Connector (CN18)



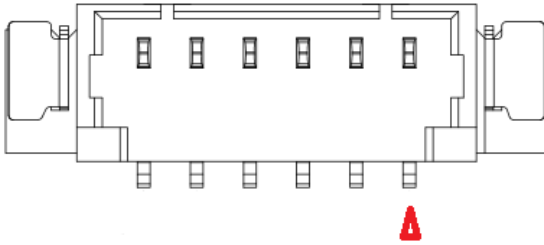
Pin	Signal	Signal Type	Signal Level
1	VCC_USB	PWR	+5V
2	USB3-	DIFF	
3	USB3+	DIFF	
4	GND	GND	
5	USB3_RX3_N_C	DIFF	
6	USB3_RX3_P_C	DIFF	
7	GND	GND	
8	USB3_TX3_N_C	DIFF	
9	USB3_TX3_P_C	DIFF	
10	VCC_USB	PWR	+5V
11	USB4-	DIFF	
12	USB4+	DIFF	
13	GND	GND	

## 2.4.17 USB 3.2 x 2 Connector (CN22)



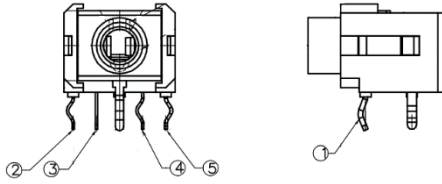
Pin	Signal	Signal Type	Signal Level
1	VCC_USB	PWR	+5V
2	USB1-	DIFF	
3	USB1+	DIFF	
4	GND	GND	
5	USB3_RX1_N_C	DIFF	
6	USB3_RX1_P_C	DIFF	
7	GND	GND	
8	USB3_TX1_N_C	DIFF	
9	USB3_TX1_P_C	DIFF	
10	VCC_USB	PWR	+5V
11	USB2-	DIFF	
12	USB2+	DIFF	
13	GND	GND	
14	USB3_RX2_N_C	DIFF	
15	USB3_RX2_P_C	DIFF	
16	GND	GND	
17	USB3_TX2_N_C	DIFF	
18	USB3_TX2_P_C	DIFF	

## 2.4.18 USB 2.0 Wafer Box (CN20, CN21)



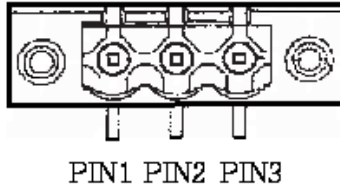
Pin	Signal	Signal Type	Signal Level
1	+5V	GND	+5V
2	USBD-	DIFF	
3	USBD+	DIFF	
4	GND	GND	
5	GND	GND	

### 2.4.19 Audio Connector (CN23)



Pin	Signal	Signal Type	Signal Level
1	AUD_GND	GND	
2	LOUT_R	OUT	
3	+VDD_AUD	PWR	+5V
4	HP_DET_3	IN	
5	LOUT_L	OUT	

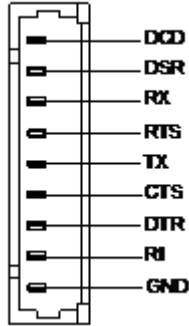
### 2.4.20 Phoenix Connector Power Input (CN25)



Pin	Signal	Signal Type	Signal Level
1	VIN	PWR	+9V ~ +36V
2	GND	GND	
3	NC		

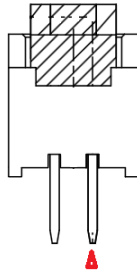


## 2.4.21 COM5/COM6 Wafer Box (Optional) (CN33, CN34)



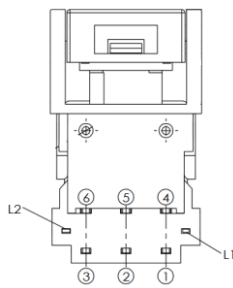
Pin	Pin Name	Signal Type	RS-422	RS-485
1	DCD	IN	RS422_TX-	RS485_D-
2	DSR	IN		
3	RX	IN	RS422_TX+	RS485_D+
4	RTS	OUT		
5	TX	OUT	RS422_RX+	
6	CTS	IN		
7	DTR	OUT	RS422_RX-	
8	RI	IN		
9	GND	GND		

### 2.4.22 RTC Battery (BAT1)



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

### 2.4.23 Power Button (SW1)



Pin	Signal	Signal Type	Signal Level
1	NC		
2	GND	GND	
3	PWR_BUTTON#	OUT	
4	NC		
5	GND	GND	

Pin	Signal	Signal Type	Signal Level
6	PWR_BUTTON#	OUT	
L1	+V5S	PWR	+5V
L2	GND	GND	

## 2.5 Hardware Installation

### 2.5.1 2.5" HDD Installation

For this process you will need a Phillips head screwdriver.

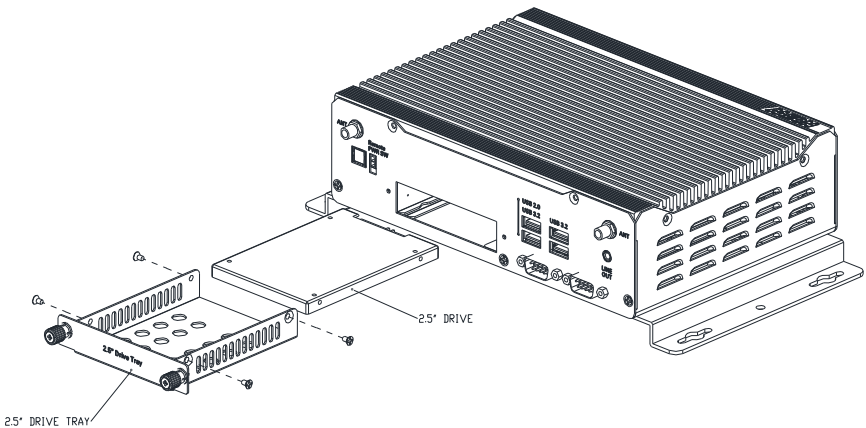
**Step 1:** Locate the removable 2.5" SATA Drive Bay on the front I/O side of the chassis.

**Step 2:** Unscrew the outer pins and remove the 2.5" SATA Drive Bay from the chassis.

**Step 3:** Unscrew the four (4) screws at each corner of the 2.5" SATA Drive Bay, and insert the 2.5" HDD into the 2.5" SATA Drive Bay.

**Step 4:** Secure the HDD by reassembling the four (4) screws as shown.

**Step 5:** Reinsert the 2.5" SATA Drive Bay into the chassis, securing the outer pins once inserted.





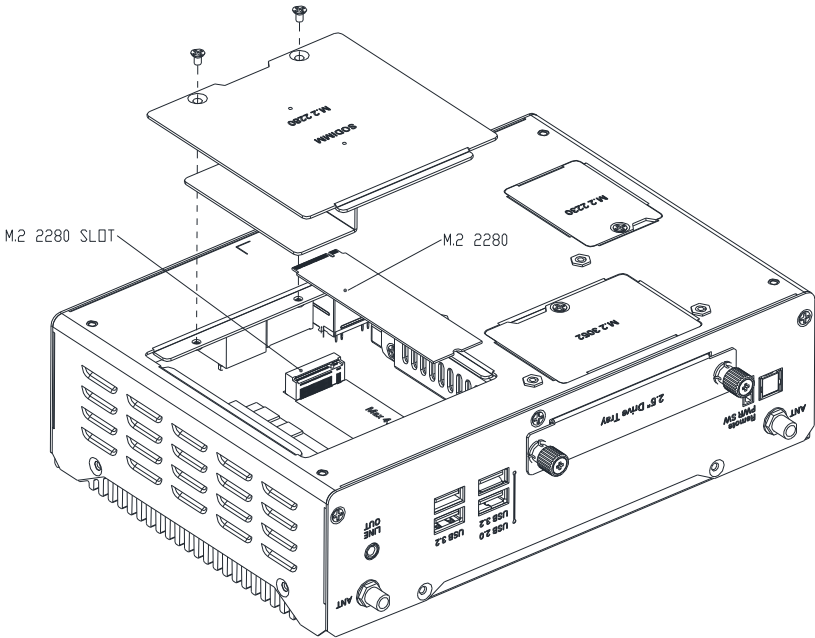
## 2.5.3 NVMe Storage Module (M.2 2280 M-Key) Installation

For this process you will need a Phillips head screwdriver.

**Step 1:** Access the M.2 2280 M-Key slot by removing the two (2) screws on the panel marked 'SODIMM/M.2 2280' on the bottom-side of the chassis as shown below.

**Step 2:** Insert NVMe Storage Module.

**Step 3:** Reaffix the two (2) screws removed during step 1.



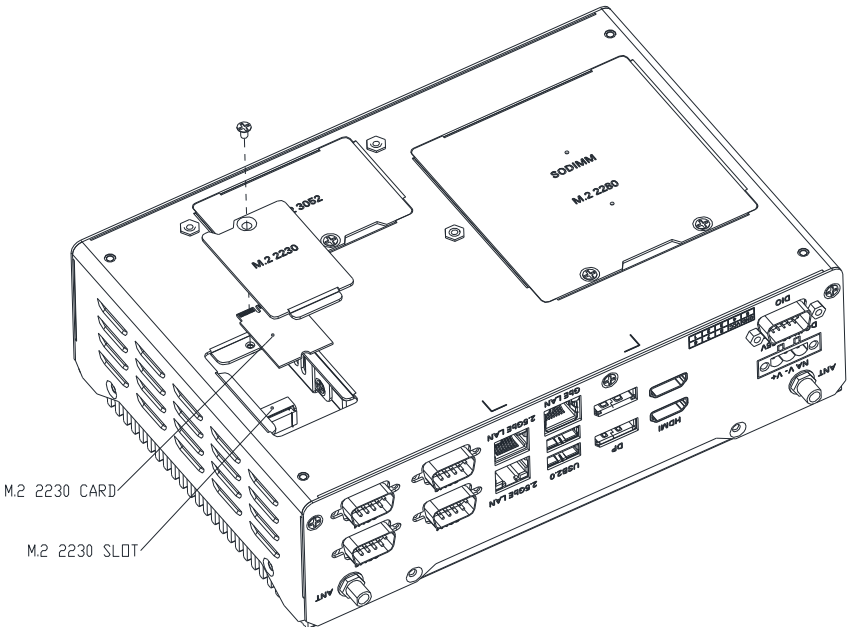
## 2.5.4 Wi Fi Module (M.2 2230 E-Key Slot) Installation

For this process you will need a Phillips head screwdriver.

**Step 1:** Access the M.2 2230 E-Key slot by removing the screw on the panel marked 'M.2 2230' on the bottom-side of the chassis as shown below.

**Step 2:** Insert Wi-Fi Module.

**Step 3:** Reaffix the screw removed during step 1.



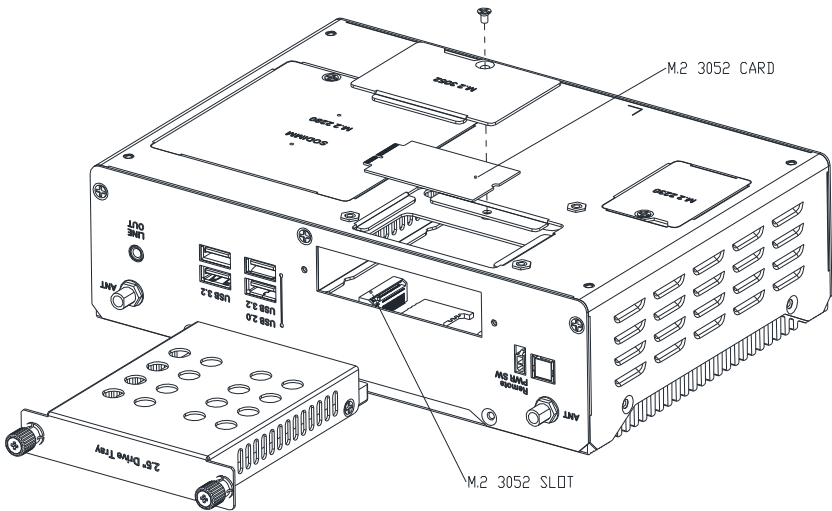
## 2.5.5 5G Module (M.2 3052 B-Key Slot) Installation

For this process you will need a Phillips head screwdriver.

**Step 1:** Access the M.2 3052 B-Key slot by removing the 2.5" drive bay, then remove the screw on the panel marked 'M.2 3052' on the bottom-side of the chassis as shown below.

**Step 2:** Insert 5G Module.

**Step 3:** Reaffix the screw removed during step 1, then reinsert the drive bay.



S



# Chapter 3

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AMI BIOS Setup

### 3.1 System Test and Initialization

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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

**MEBx** – Intel® Management Engine BIOS Extension

### 3.3 Setup Submenu: Main

**Aptio Setup - AMI**

Main Advanced System I/O Security Boot Save & Exit MEBx

== BIOS Information ==  
BOXER-6646-ADP R1.0 (B646AM10)(10/07/2022)

== CPU Information ==  
12th Gen Intel(R) Core(TM) i5-1250PE

== MEM Information ==  
Total Memory 16384 MB  
Memory Frequency 4800 MHz

== SATA Information ==  
Serial ATA Port 1 Empty  
mSATA Empty

System Date [Fri 01/01/2021]  
System Time [00:04:44]

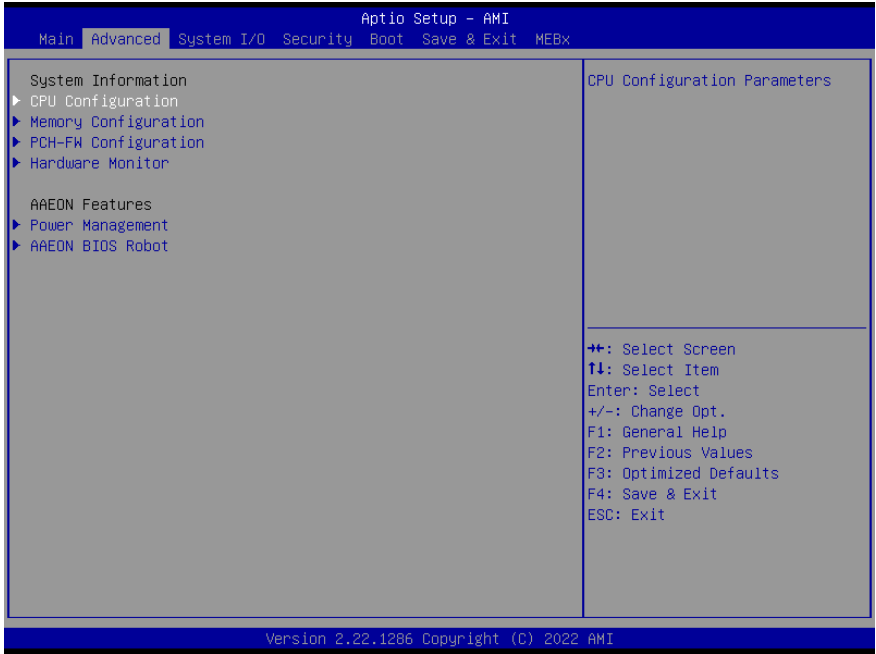
Access Level Administrator

Set the Date. Use Tab to switch between Date elements.  
Default Ranges:  
Year: 1998-2199  
Months: 1-12  
Days: dependent on month

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

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### 3.4 Setup Submenu: Advanced



### 3.4.1 CPU Configuration

Aptio Setup - AMI

Advanced

CPU Configuration		When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.  ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Brand String	12th Gen Intel(R) Core(TM) i5-1250PE	
Stepping ID	L0 0x906A3	
Microcode Revision	421	
VMX	Supported	
SMX/TXT	Supported	
Intel (VMX) Virtualization Technology	[Enabled]	
Hyper-Threading	[Enabled]	
Intel(R) SpeedStep(tm)	[Enabled]	
Turbo Mode	[Enabled]	
C states	[Enabled]	

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Options Summary		
<b>Intel (VMX) Virtualization Technology</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
<b>Hyper-Threading</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Hyper-Threading Technology		
<b>Intel® SpeedStep™</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default
Allows more than two frequency ranges to be supported		
<b>Turbo Mode</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.		

Options Summary		
C states	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.		

### 3.4.2 Memory Configuration

Aptio Setup - AMI

Advanced

Memory Configuration

Total Memory	16384 MB
Memory Frequency	4800 MHz
tCL-tRCD-tRP-tRAS	40-39-39-77
MC 0 Ch 0 DIMM 0	Populated & Enabled
Size	16384 MB (DDR5)
MC 1 Ch 0 DIMM 0	Not Populated / Disabled

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

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### 3.4.3 PCH-FW Configuration



Options Summary		
AMT BIOS Features	Enabled	Optimal Default, Failsafe Default
	Disabled	
<p>When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.            Note: This option does not disable Manageability Features in FW.</p>		



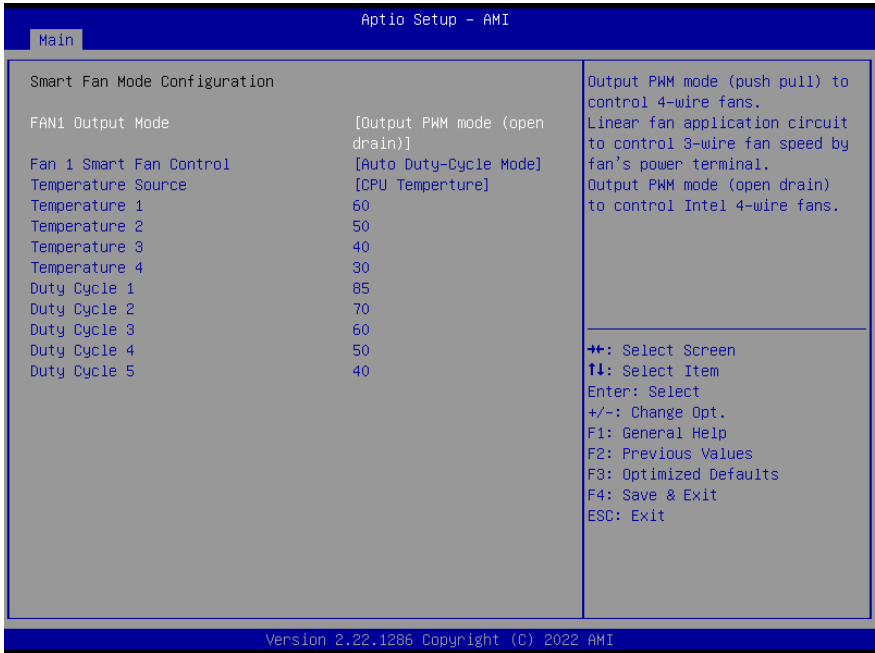
### 3.4.3.1 Firmware Update Configuration



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.		



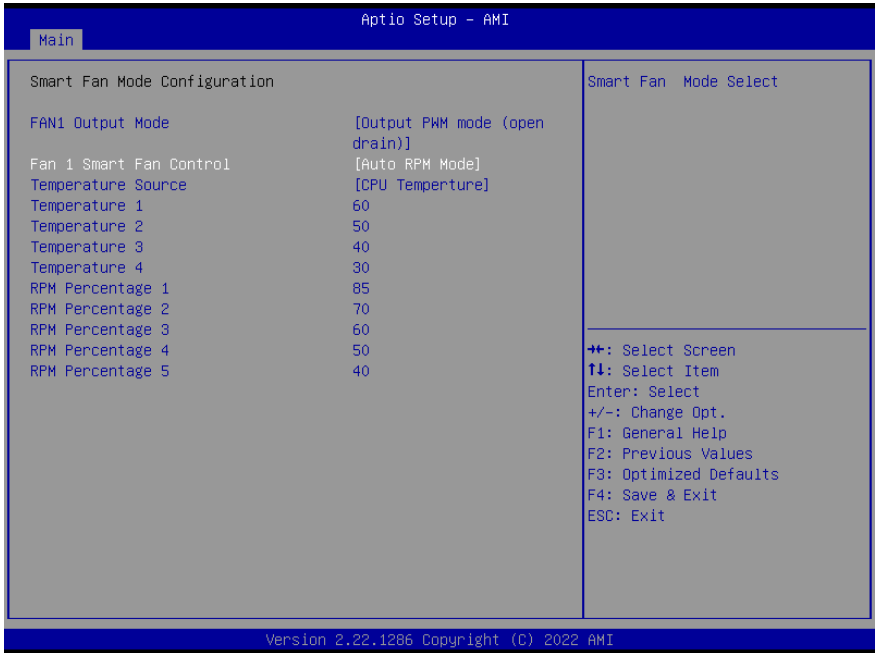
### 3.4.5 Smart Fan Mode Configuration



Options Summary		
FAN1 Output Mode	Output PWM mode (open drain)	Optimal Default, Failsafe Default
	Linear Fan Application	
	Output PWM mode (push pull)	
Output PWM mode (push pull) to control 4-wire fans. Linear fan application circuit to control 3-wire fan speed by fan's power terminal. Output PWM mode (open drain) to control Intel 4-wire fans.		
Fan 1 Smart Fan Control	Manual RPM Mode	
	Manual Duty Mode	
	Auto RPM Mode	
	Auto Duty-Cycle Mode	Optimal Default, Failsafe Default
Smart Fan Mode Select.		
Temperature Source	CPU Temperature	Optimal Default, Failsafe Default
	System Temperature	
	System Temperature 2	
Select the monitored temperature source for this fan.		

Options Summary		
Temperature 1	60	Optimal Default, Failsafe Default
Temperature 2	50	Optimal Default, Failsafe Default
Temperature 3	40	Optimal Default, Failsafe Default
Temperature 4	30	Optimal Default, Failsafe Default
Temperature 5	20	Optimal Default, Failsafe Default
Duty Cycle 1	85	Optimal Default, Failsafe Default
Duty Cycle 2	70	Optimal Default, Failsafe Default
Duty Cycle 3	60	Optimal Default, Failsafe Default
Duty Cycle 4	50	Optimal Default, Failsafe Default
Duty Cycle 5	40	Optimal Default, Failsafe Default
Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100		

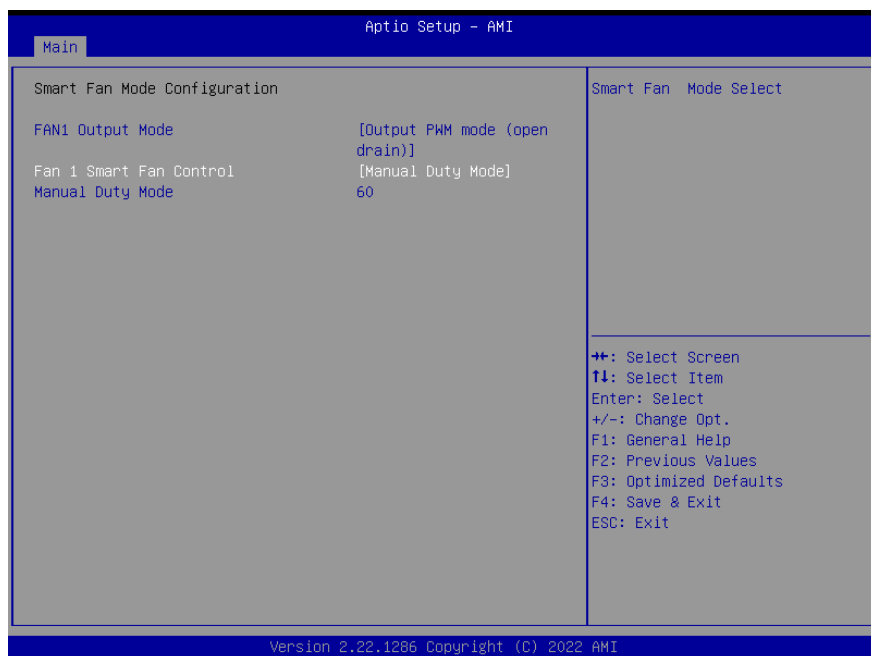
### 3.4.5.1 Fan 1 Smart Fan Control (Auto RPM Mode)



Options Summary		
Fan 1 Smart Fan Control	Auto RPM Mode	
Smart Fan Mode Select.		
Temperature Source	CPU Temperature	Optimal Default, Failsafe Default
	System Temperature	
	System Temperature 2	
Select the monitored temperature source for this fan.		
Temperature 1	60	Optimal Default, Failsafe Default
Temperature 2	50	Optimal Default, Failsafe Default
Temperature 3	40	Optimal Default, Failsafe Default
Temperature 4	30	Optimal Default, Failsafe Default
Temperature 5	20	Optimal Default, Failsafe Default
RPM Percentage 1	85	Optimal Default, Failsafe Default
RPM Percentage 2	70	Optimal Default, Failsafe Default
RPM Percentage 3	60	Optimal Default, Failsafe Default
RPM Percentage 4	50	Optimal Default, Failsafe Default

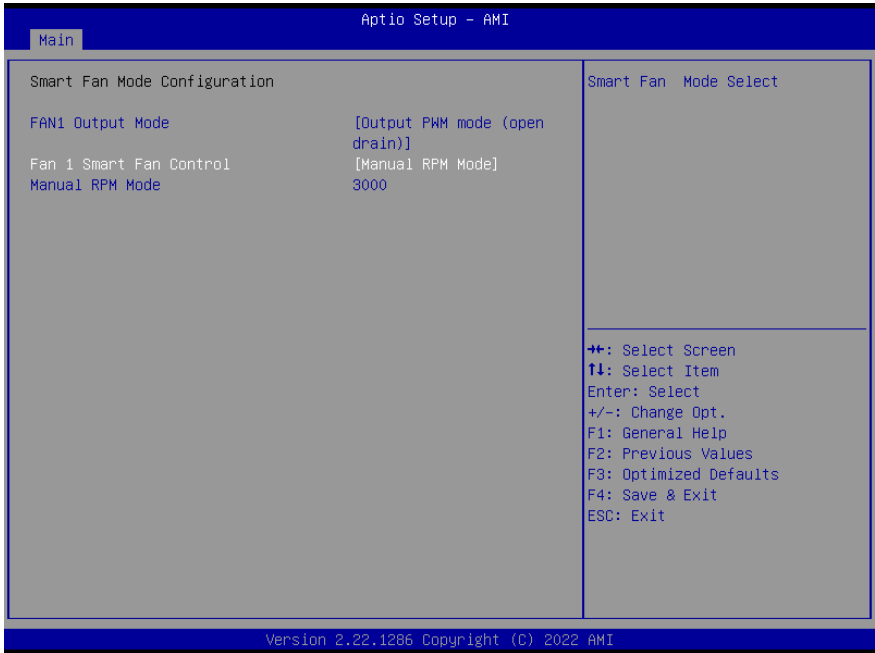
Options Summary		
RPM Percentage	5   40	Optimal Default, Failsafe Default
Auto fan speed control. Fan speed will follow different temperature by different RPM 1-100		

### 3.4.5.2 Fan 1 Smart Fan Control (Manual Duty Mode)



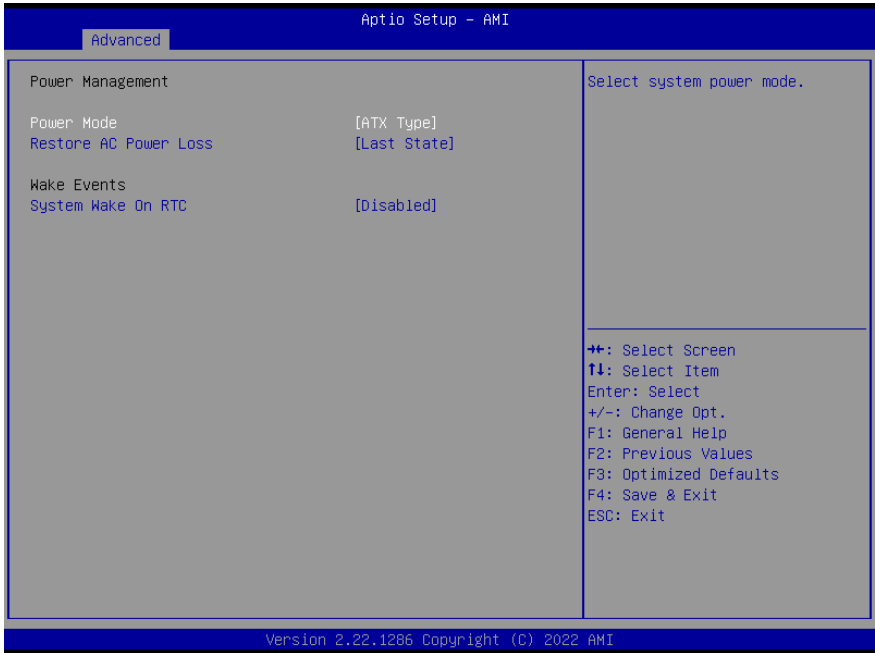
Options Summary		
Fan 1 Smart Fan Control	Manual Duty Mode	
Smart Fan Mode Select.		
Temperature Source	CPU Temperature	Optimal Default, Failsafe Default
	System Temperature	
	System Temperature 2	
Select the monitored temperature source for this fan.		
Manual Duty Mode	60	Optimal Default, Failsafe Default
Manual mode fan control, user can write expected duty cycle (PWM fan type) 1-100		

### 3.4.5.3 Fan 1 Smart Fan Control (Manual RPM Mode)



Options Summary		
Fan 1 Smart Fan Control	Manual RPM Mode	
Smart Fan Mode Select.		
Temperature Source	CPU Temperature	Optimal Default, Failsafe Default
	System Temperature	
	System Temperature 2	
Select the monitored temperature source for this fan.		
Manual RPM Mode	3000	Optimal Default, Failsafe Default
Manual mode fan control, user can write expected RPM count 500-10000		

### 3.4.6 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	
Set GPI [3:0] Output as Hi or Low		
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./n By Weekday: System will wake on the enabled weekday with hr::min::sec specified./n Bypass: BIOS will not control RTC wake function		



### 3.4.7 AAEON BIOS Robot



Options Summary		
<b>Sends watch dog before BIOS POST</b>	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.		
<b>Sends watch dog before booting OS</b>	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.		
<b>Delayed POST (PEI phase)</b>	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.

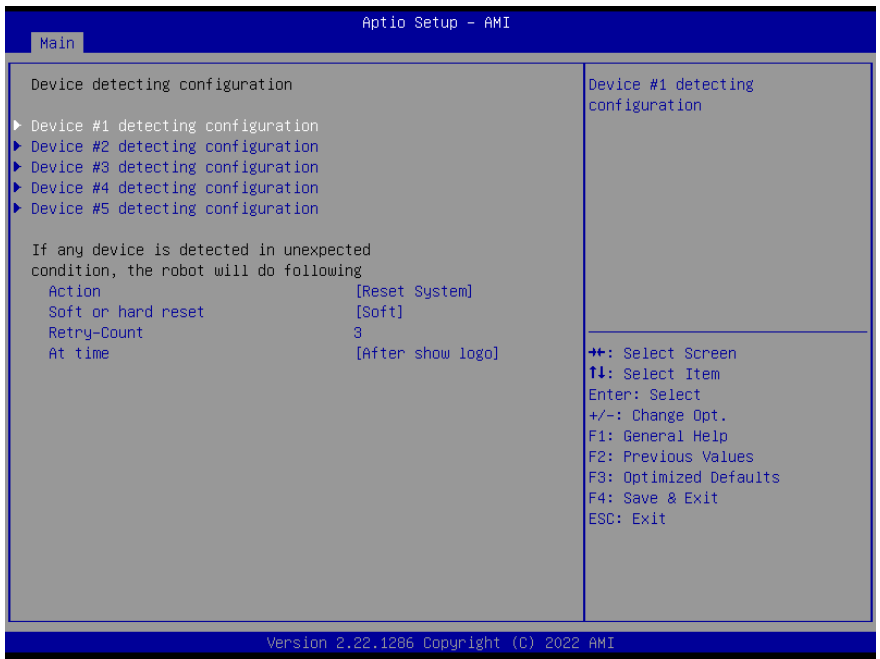
Note: Robot does this before 'Sends watch dog'.

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'.

### 3.4.7.1 Device Detecting Configuration



### Options Summary

Action	Reset System	Optimal Default, Failsafe Default
	Hold System	

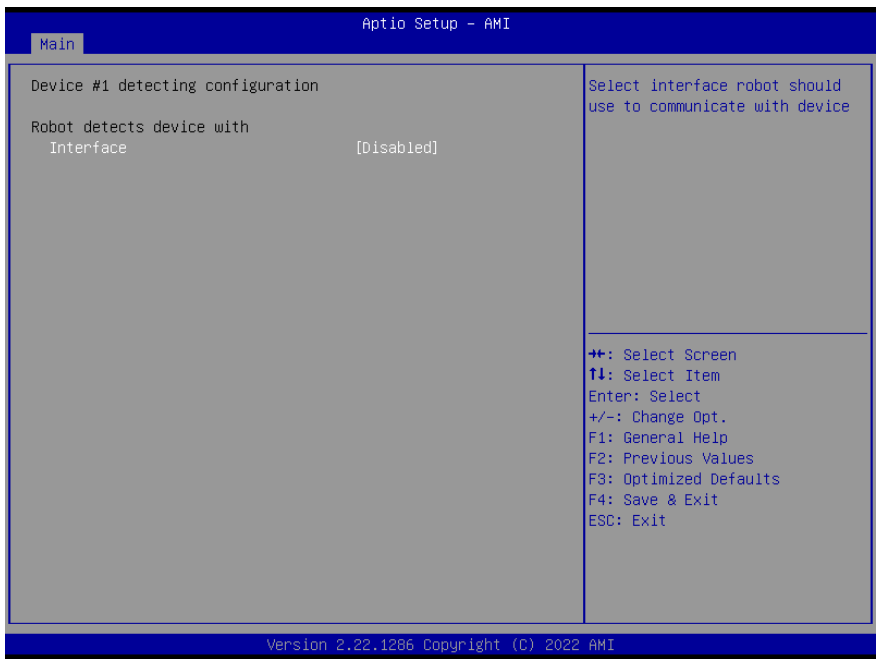
Select action that robot should do.

Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	

Select reset type robot should send on each boot.

Options Summary		
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.		

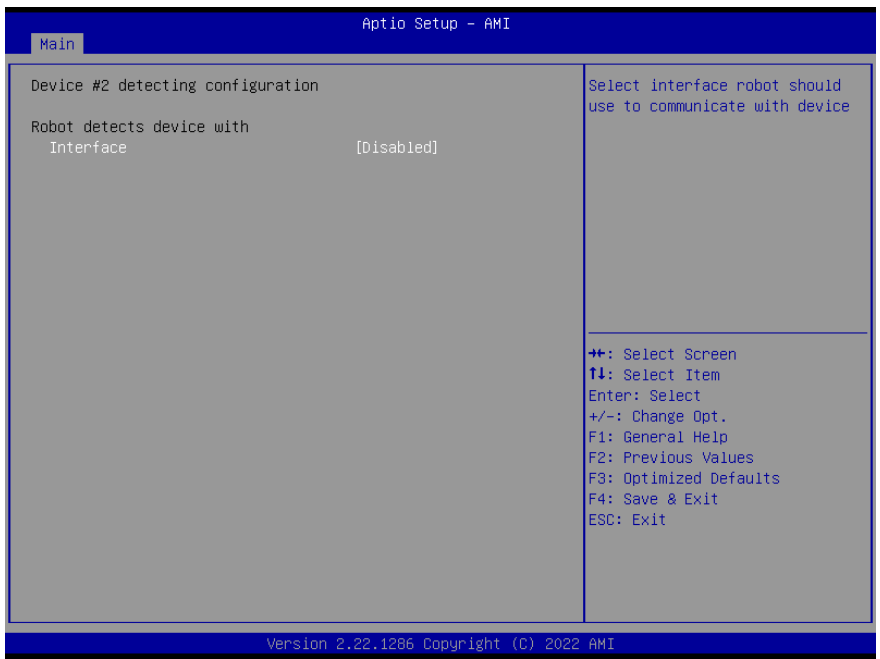
### 3.4.7.1.1 Device #1 Detecting Configuration



Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	

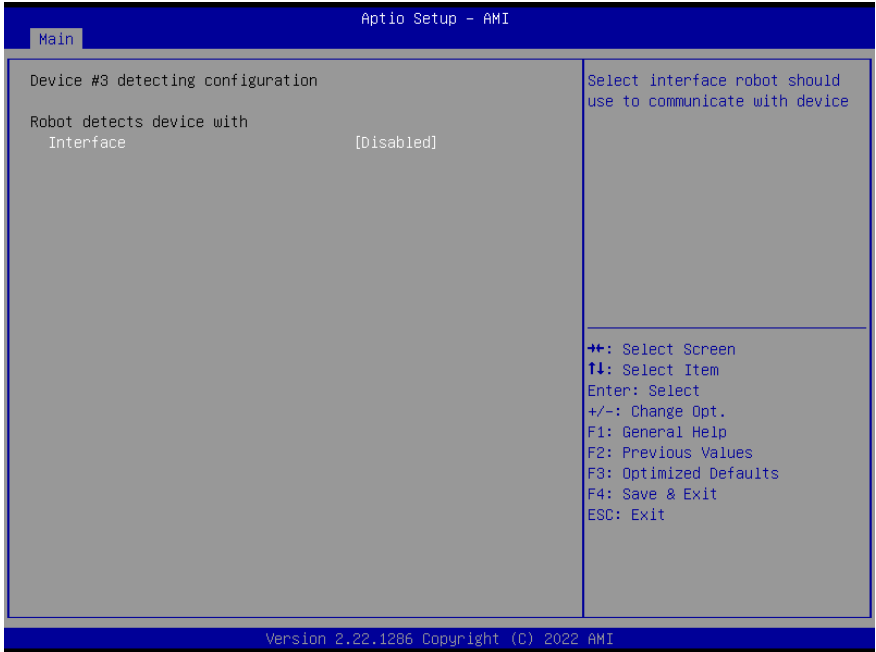
Options Summary	
	MMIO
Select interface robot should use to communicate with device	

### 3.4.7.1.2 Device #2 Detecting Configuration



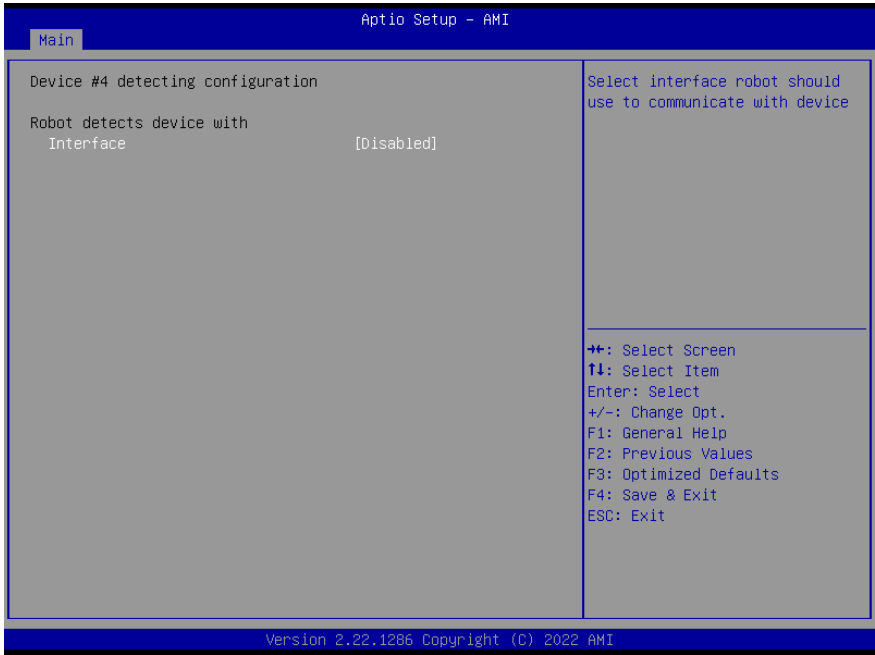
Options Summary		
<b>Interface</b>	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device		

### 3.4.7.1.3 Device #3 Detecting Configuration



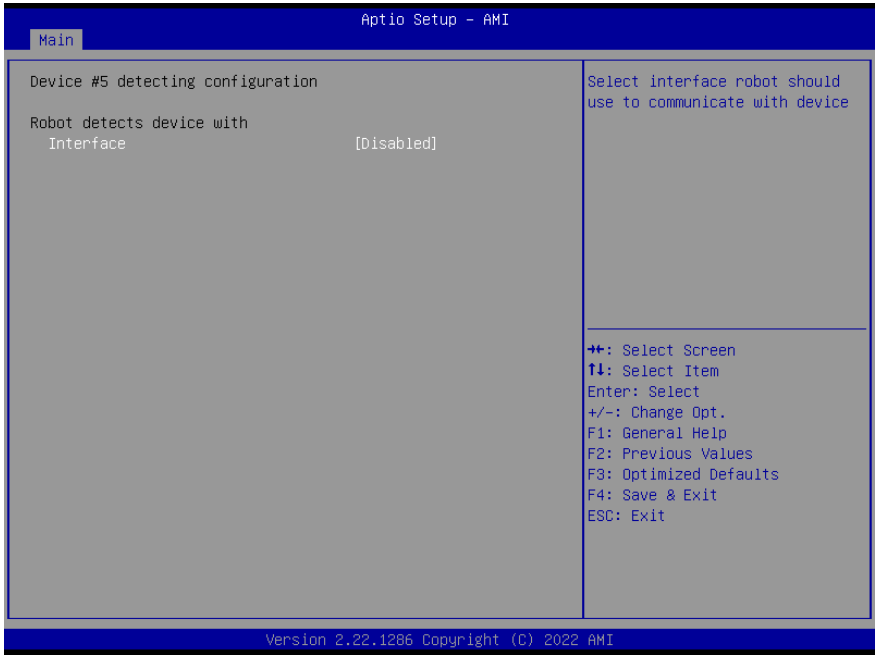
Options Summary		
<b>Interface</b>	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device		

### 3.4.7.1.4 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		

### 3.4.7.1.5 Device #5 Detecting Configuration



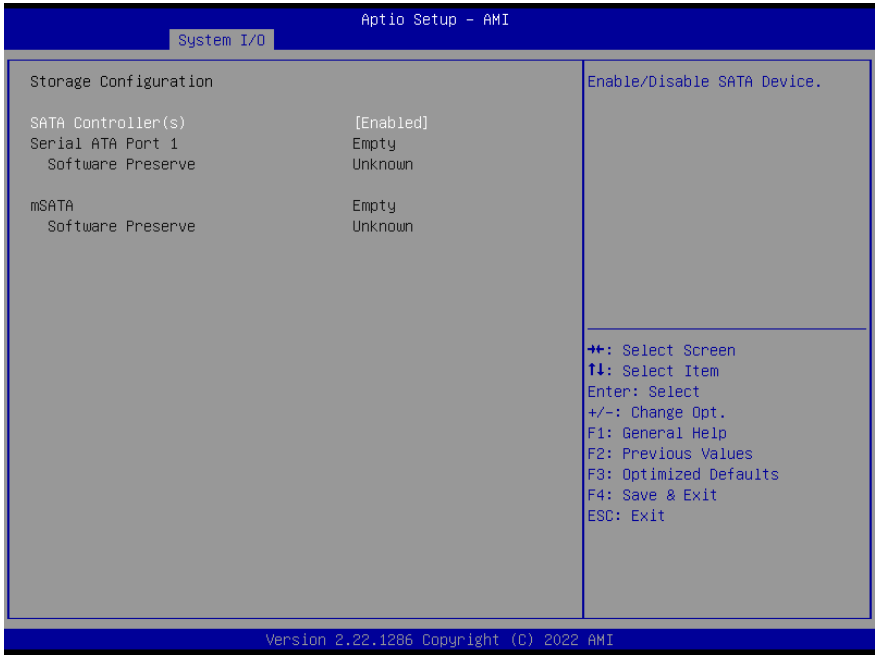
Options Summary		
<b>Interface</b>	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device		

### 3.5 Setup Submenu: System I/O





### 3.5.1 Storage Configuration



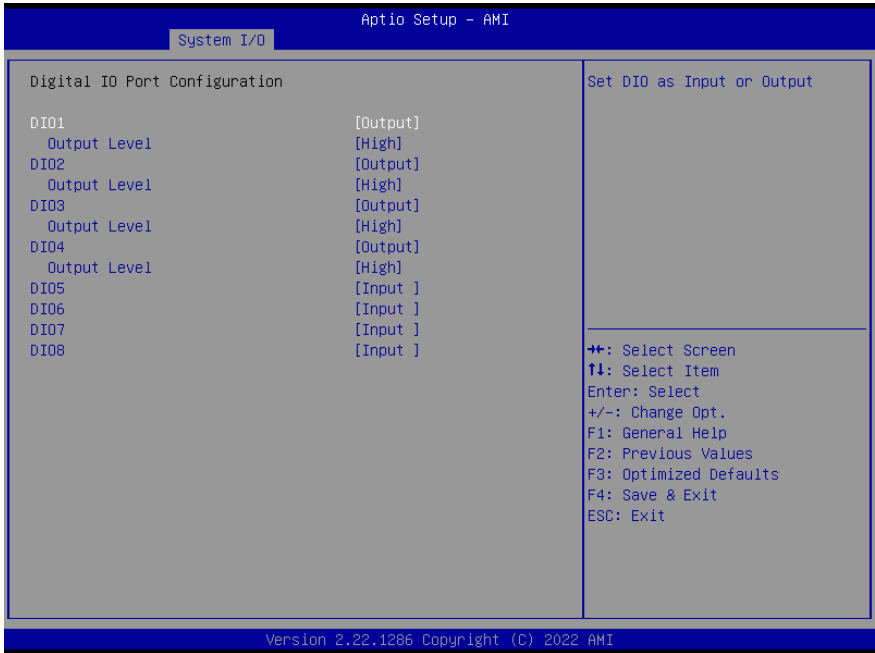
Options Summary		
SATA Controller(s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable to SATA Device		

### 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.		

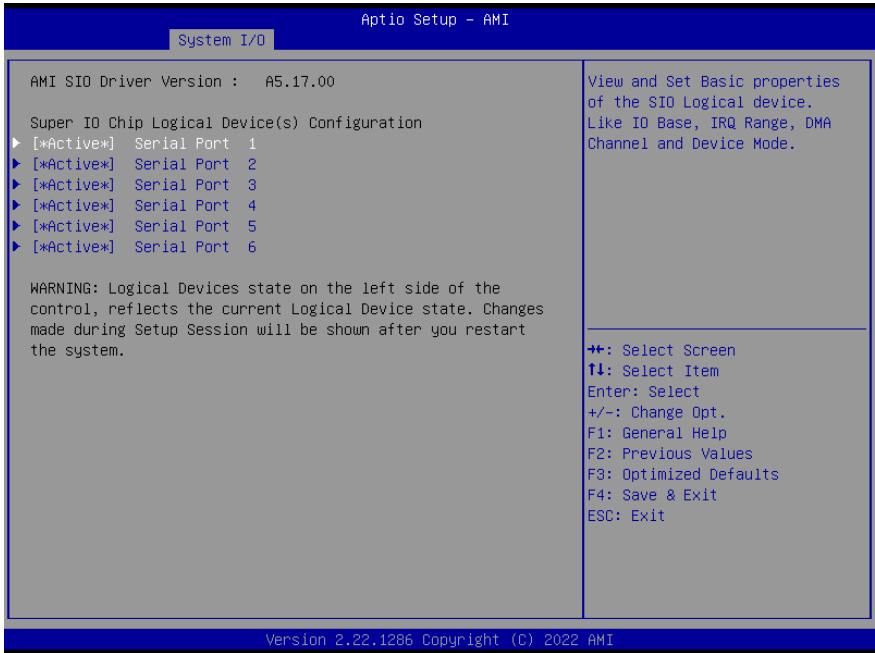
### 3.5.3 Digital IO Port Configuration



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		

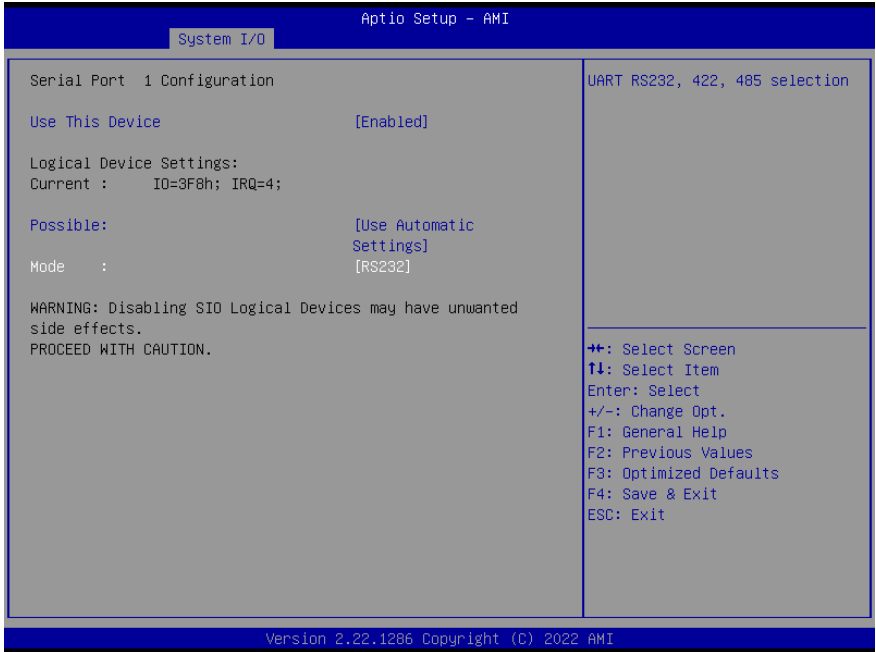
Options Summary		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		
DIO4	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		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



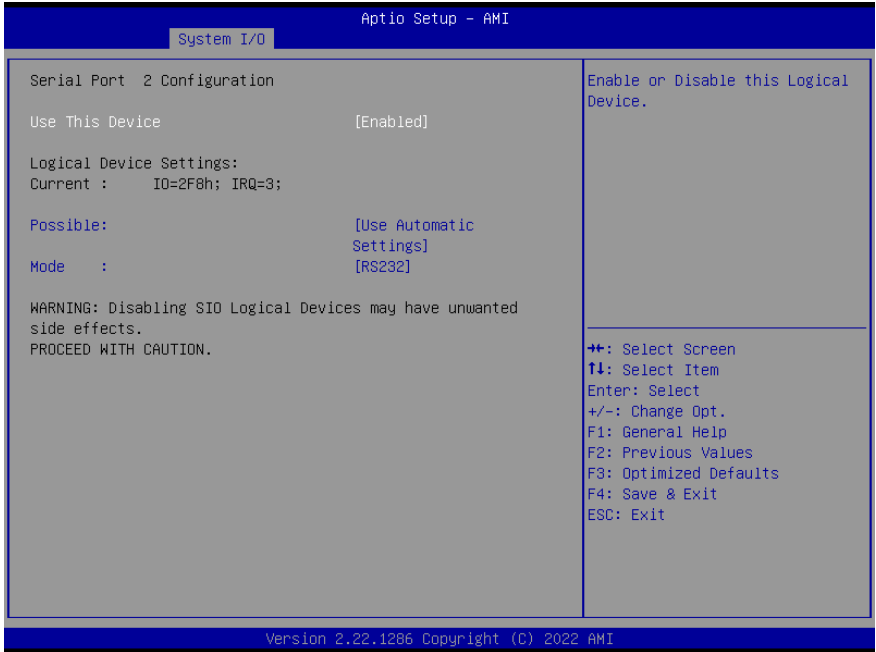
Options Summary		
DIO1	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output		
Output Level	Low	
	High	Optimal Default, Failsafe Default
Set output level when DIO pin is output		
DIO2	Input	
	Output	Optimal Default, Failsafe Default

### 3.5.4.1 Serial Port 1



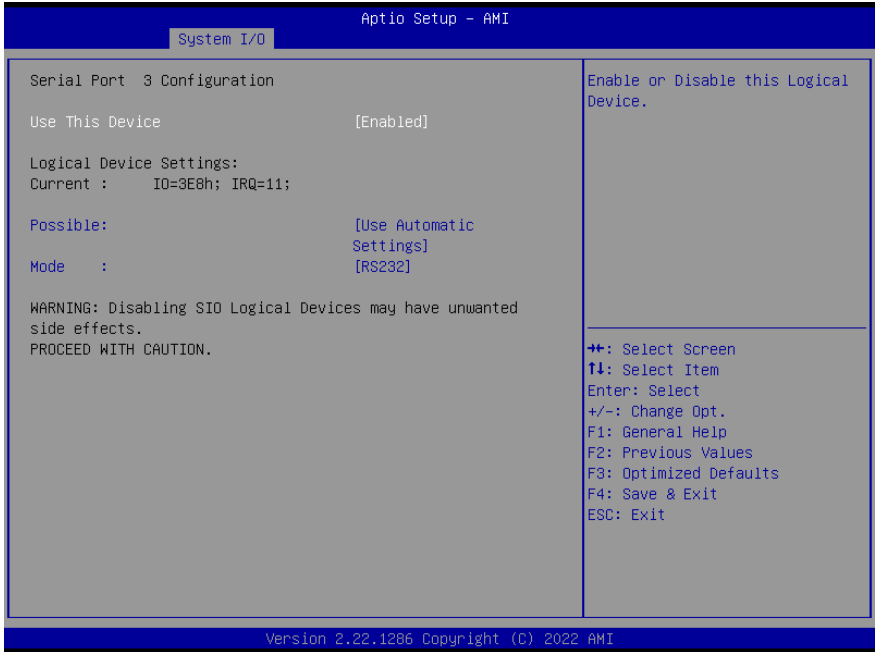
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8; IRQ=4;	
	IO=2F8; IRQ=3;	
Allows the user to change the device resource settings. New settings will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



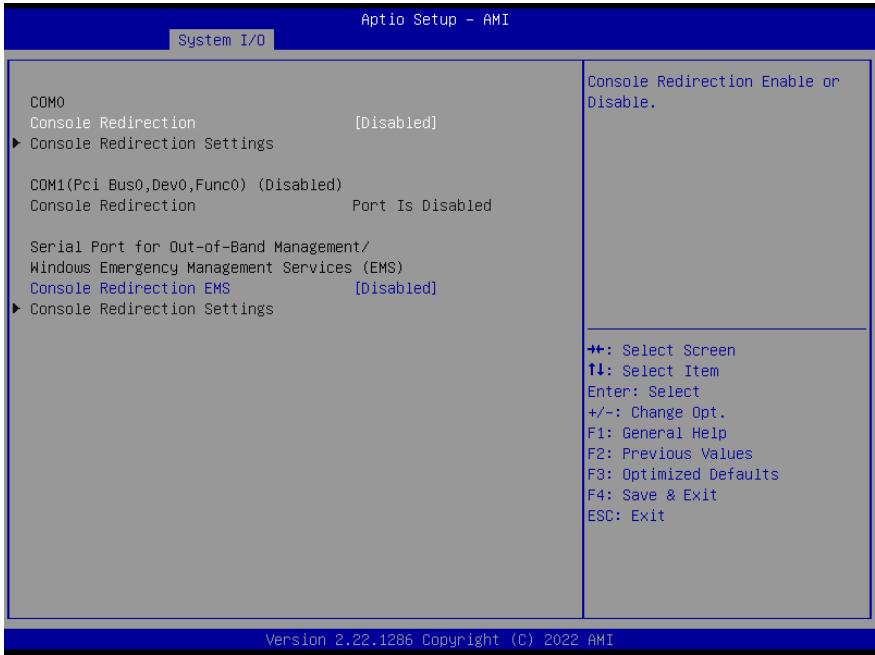
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2D0; IRQ=11;	
	IO=2C0; IRQ=11;	
Allows the user to change the device resource settings. New settings will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

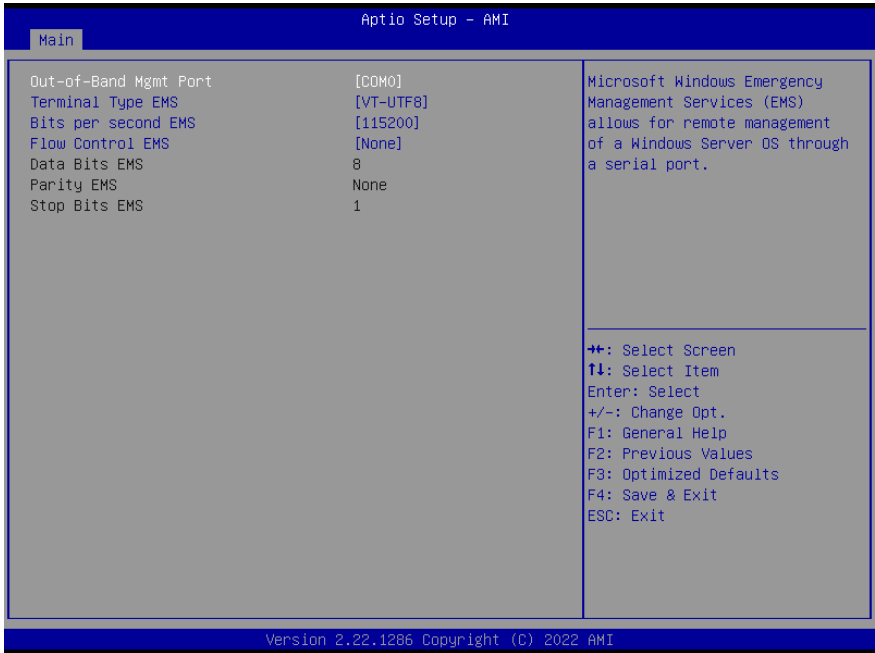
### 3.5.5.1 Console Redirection Settings (COM0)



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
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

Options Summary		
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		
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)

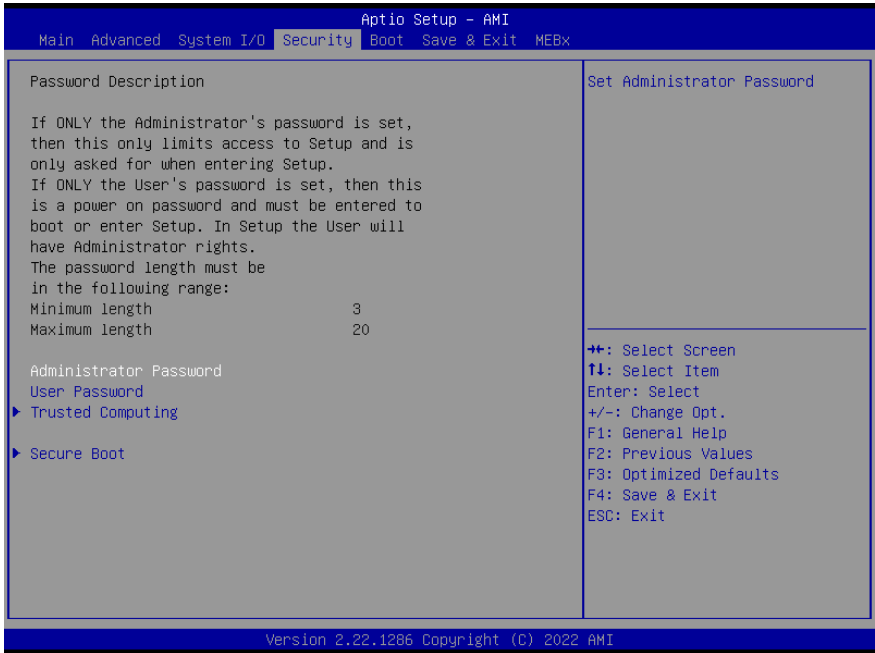


Options Summary		
Out-of-Band Mgmt Port	COM0	Optimal Default, Failsafe Default
	COM1(Pci Bus0, Dev0, Func0) (Disabled)	
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.		
Terminal Type EMS	VT100	Optimal Default, Failsafe Default
	VT100Plus	
	VT-UTF8	
	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	Optimal Default, Failsafe Default
	19200	
	57600	
	115200	

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

Aptio Setup - AMI

Security

TPM 2.0 Device Found Firmware Version: 7.2 Vendor: NTC	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.
Security Device Support [Enabled] Active PCR banks SHA256 Available PCR banks SHA256,SHA384	+*: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
SHA256 PCR Bank [Enabled] SHA384 PCR Bank [Disabled]	
Pending operation [None] Platform Hierarchy [Enabled] Storage Hierarchy [Enabled] Endorsement Hierarchy [Enabled] Physical Presence Spec Version [1.3] TPM 2.0 InterfaceType [TIS] Device Select [Auto]	

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Options Summary		
<b>Security Device Support</b>	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.		
<b>SHA256 PCR Bank</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SHA256 PCR Bank		
<b>SHA384 PCR Bank</b>	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable SHA384 PCR Bank		
<b>Pending operation</b>	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.		
<b>Platform Hierarchy</b>	Disabled	
	Enabled	Optimal Default, Failsafe Default

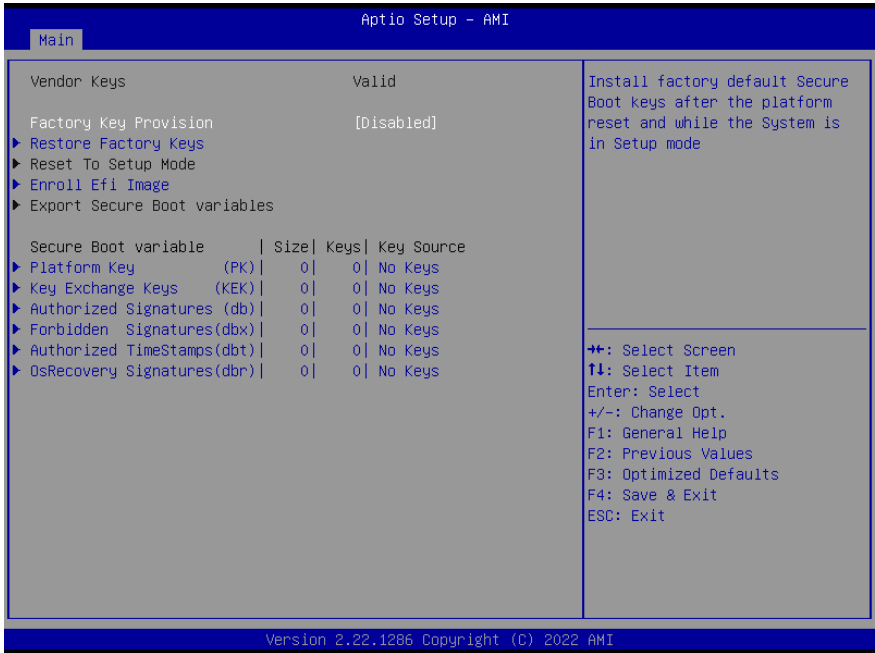
Options Summary		
Enable or Disable Platform Hierarchy		
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storage Hierarchy		
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Endorsement Hierarchy		
Physical Presence 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		
<b>Secure Boot</b>	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		
<b>Secure Boot Mode</b>	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		
<b>Restore Factory Keys</b>	Yes	
	No	
Force System to User Mode. Install factory default Secure Boot key databases		

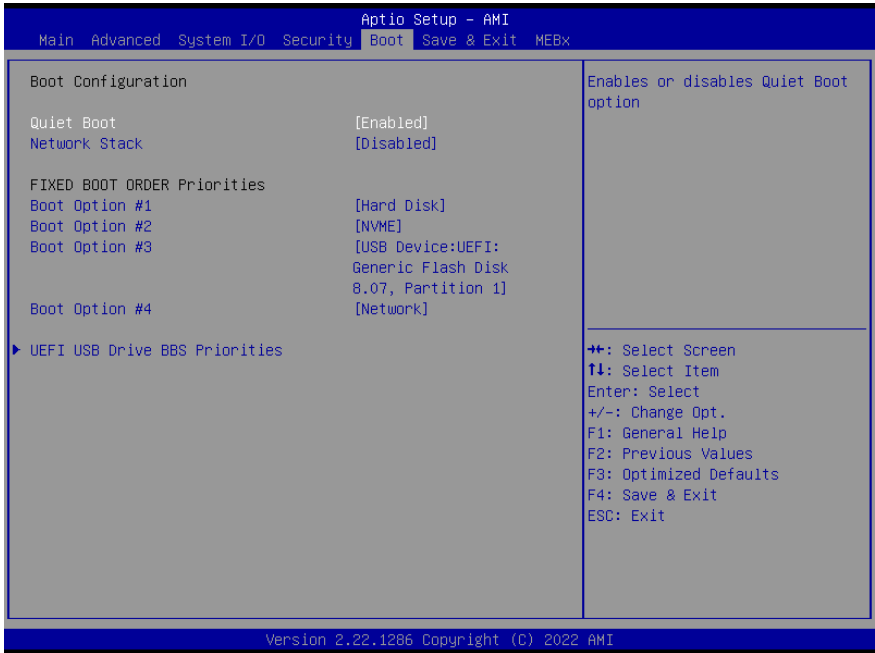
### 3.6.2.1 Key Management



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 BBS Priorities



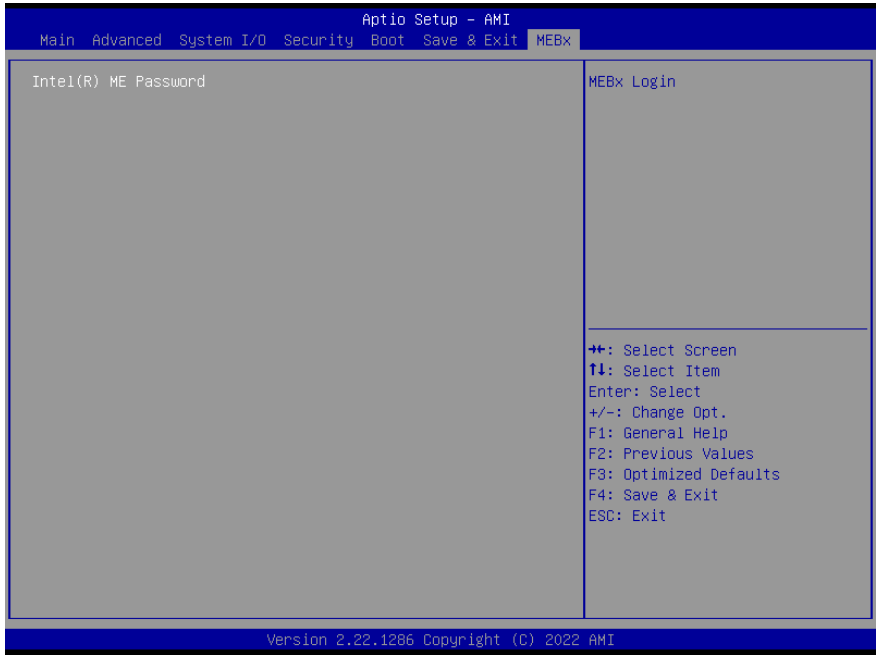
Options Summary		
Quiet Boot	Disabled	
	Enabled	Default
Enables/disables Quiet Boot option.		
Network Stack	Disabled	Default
	Enabled	
Enable/Disable UEFI Network Stack.		
Boot Option #1	Hard Disk	
Boot Option #2	NVME	
Boot Option #3	USB Device	
Boot Option #4	Network	
Sets the system boot order		



### 3.8 Setup Submenu: Save & Exit



### 3.9 Setup Submenu: MEBx



# Chapter 4

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Drivers Installation

## 4.1 Drivers Download and Installation

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Drivers for the BOXER-6646-ADP can be downloaded from the product page on the AAEON website by following this link:

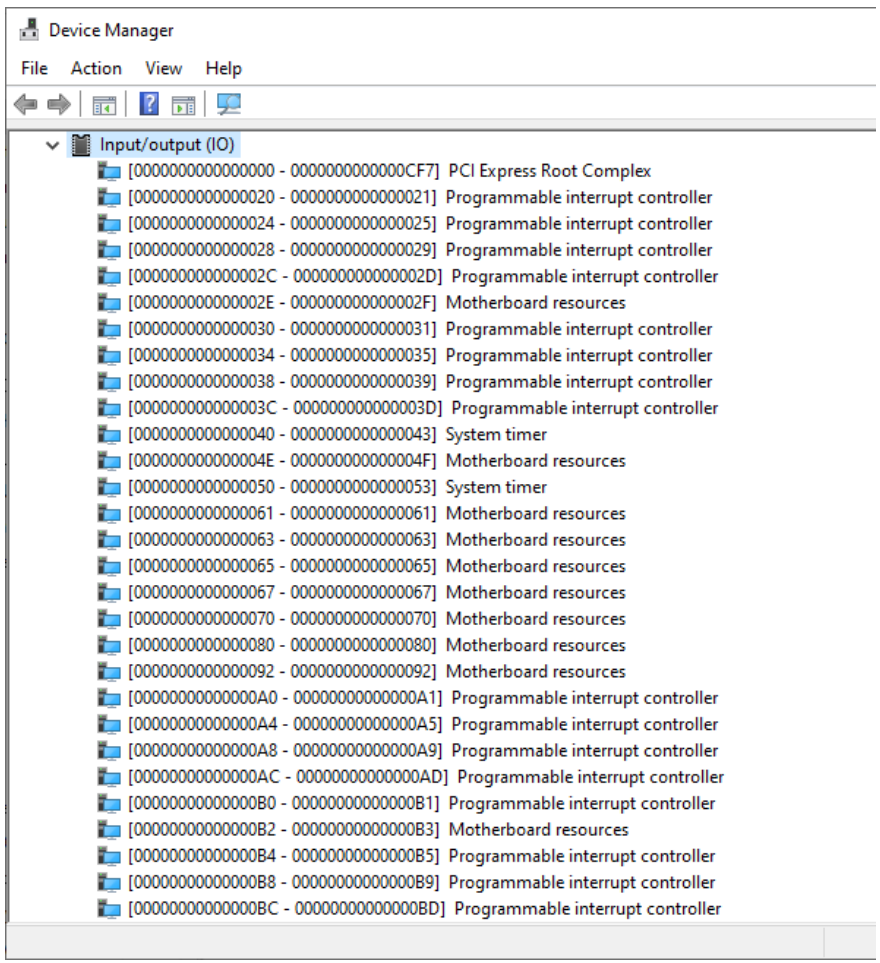
<https://www.aaeon.com/en/p/compact-fanless-box-pc-solutions-boxer-6646-adp>

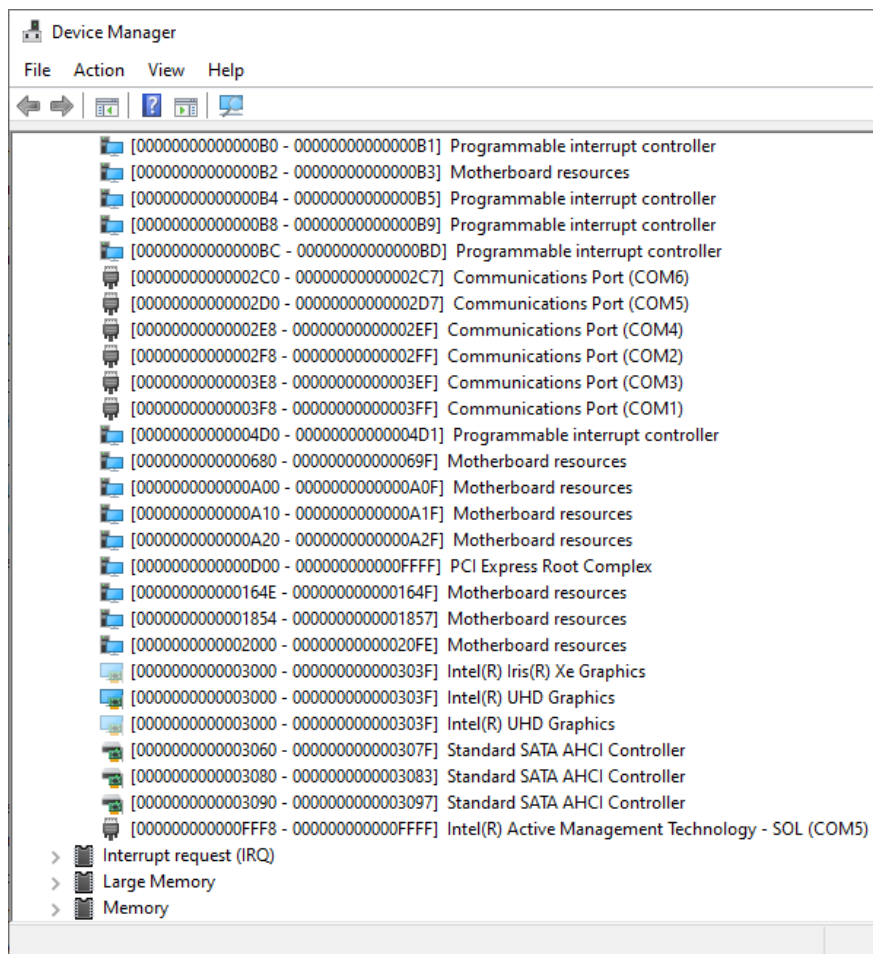
# Appendix A

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I/O Information

## A.1 I/O Address Map





## A.2 Memory Address Map

The screenshot displays the Windows Device Manager interface for a system named 'DESKTOP-P7FBSHL'. The 'Memory' category is expanded, showing a list of hardware devices with their memory addresses and names. The devices listed include:

- [000000000000A0000 - 000000000000BFFFFF] PCI Express Root Complex
- [0000000080400000 - 00000000805FFFFF] Intel(R) PCI Express Root Port #10 - 51B1
- [0000000080400000 - 00000000BFFFFFFF] PCI Express Root Complex
- [00000000804FC000 - 00000000804FFFFF] Intel(R) Ethernet Controller I226-LM #2
- [0000000080500000 - 00000000805FFFFF] Intel(R) Ethernet Controller I226-LM #2
- [0000000080600000 - 00000000807FFFFF] Intel(R) PCI Express Root Port #9 - 51B0
- [00000000806FC000 - 00000000806FFFFF] Intel(R) Ethernet Controller I226-LM #3
- [0000000080700000 - 00000000807FFFFF] Intel(R) Ethernet Controller I226-LM #3
- [0000000080820000 - 0000000080821FFF] Standard SATA AHCI Controller
- [0000000080822000 - 00000000808227FF] Standard SATA AHCI Controller
- [0000000080823000 - 00000000808230FF] Standard SATA AHCI Controller
- [00000000BFFDF000 - 00000000BFFDFFFF] Intel(R) Active Management Technology - SOL (COM5)
- [00000000BFFE0000 - 00000000BFFFFFFF] Intel(R) Ethernet Connection (16) I219-LM
- [00000000C0000000 - 00000000CFFFFFFF] Motherboard resources
- [00000000FE010000 - 00000000FE010FFF] Intel(R) SPI (flash) Controller - 51A4
- [00000000FED00000 - 00000000FED003FF] High precision event timer
- [00000000FED20000 - 00000000FED27FFF] Motherboard resources
- [00000000FED40000 - 00000000FED44FFF] Trusted Platform Module 2.0
- [00000000FED45000 - 00000000FED48FFF] Motherboard resources
- [00000000FED90000 - 00000000FED93FFF] Motherboard resources
- [00000000FEDA0000 - 00000000FEDA0FFF] Motherboard resources
- [00000000FEDA1000 - 00000000FEDA1FFF] Motherboard resources
- [00000000FEDC0000 - 00000000FEDC7FFF] Motherboard resources
- [00000000FEE00000 - 00000000FEEFFFFF] Motherboard resources
- [0000004000000000 - 000000400FFFFFFF] Intel(R) UHD Graphics
- [0000006000000000 - 0000006000FFFFFFF] Intel(R) UHD Graphics
- [0000006001100000 - 000000600110FFFFF] Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
- [0000007FFFEFB000 - 0000007FFFEFBFFF] Intel(R) Management Engine Interface #1
- [0000007FFFEFC000 - 0000007FFFEFFFFF] High Definition Audio Controller
- [0000007FFFEF0000 - 0000007FFFEFFFFF] High Definition Audio Controller



### A.3 IRQ Mapping Chart

