FWS-2291

Desktop Network Appliance

User Manual 1st Ed

Last Updated: June 6, 2025

Copyright Notice

Acknowledgement

Packing List

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

Item	Quantity
● FWS-2291	1
● Power Adapter	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. All cables and adapters supplied by AAEON are certified and in accordance with the material safety laws and regulations of the country of sale. Do not use any cables or adapters not supplied by AAEON to prevent system malfunction or fires.
3. Make sure the power source matches the power rating of the device.
4. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
5. Always completely disconnect the power before working on the system's hardware.
6. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
7. 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.
8. Always disconnect this device from any AC supply before cleaning.
9. While cleaning, use a damp cloth instead of liquid or spray detergents.
10. Make sure the device is installed near a power outlet and is easily accessible.
11. Keep this device away from humidity.
12. Place the device on a solid surface during installation to prevent falls
13. Do not cover the openings on the device to ensure optimal heat dissipation.
14. Watch out for high temperatures when the system is running.
15. Do not touch the heat sink or heat spreader when the system is running
16. Never pour any liquid into the openings. This could cause fire or electric shock.

17. 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.

18. 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

19. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

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	×	O	O	O	O	O
Connector and Cable	×	O	O	O	O	O
Chassis	O	O	O	O	O	O
CPU and Memory	×	O	O	O	O	O
Hard Disk	×	O	O	O	O	O
LCD Modules	×	O	O	O	O	O
CD-ROM/DVD-ROM	×	O	O	O	O	O
Touch Modules	×	O	O	O	O	O
Power	×	O	O	O	O	O
Battery	×	O	O	O	O	O

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

O：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	
Form Factor	Desktop Network Appliance
Processor	Intel® Processor N-series SoC
Chipset	SoC
System Memory	DDR5 SODIMM x 1, up to 16GB (32GB for Intel Atom® x7000RE/C Series CPU SKUs)

Network	
Ethernet	Intel® Ethernet Controller I226-V, 2.5GbE x 4 Intel® Ethernet Controller I210-IS, SFP x 2 (co-lay with Intel® Ethernet Controller I210-AT Copper x 2) by PCIe Bridge
Bypass	2 Pairs Bypass

Display	
Graphics Controller	Intel® UHD Graphics
Connector	HDMI x 1 (Optional)

Storage	
HDD	2.5" HDD Bay x 1 M.2 2242 M-Key x 1
CF/CFast/mSATA	Onboard eMMC (Default 32GB, up to 128GB)

Expansion

PCIe Slot	-
Mini-PCIe Slot	M.2 3052 B-Key (5G, Colay Mini Card with Push pin SIM for 4G LTE/Wi-Fi) M.2 2230 E-Key (Colay Mini Card slot for Wi-Fi)
USB	USB 3.2 Gen 1 (Type-A) x 2, 4.5W per port, max. 5W total

Miscellaneous

RTC	Internal RTC
Watchdog Timer	1~255 step by software programmable
Software Button	Software Programmable Switch x 1 (Colay HW Reset Button)
TPM	SPI TPM v2.0 (optional)
GPIO	Reserve internal Pin Header (8-bit Digital I/O Interface, 4-in/4-out)
Fan	Fanless/Fan (default: Fan)
MTBF (Hours)	TBD
Color	Black

Environmental

Power Requirement	Dual 12V DC Lockable Power Input Connector, 40/60W Power Adapter (Redundant) Reserve 2.54 pin header for power button
Operating Temperature	32°F ~ 122°F (0°C ~ 40°C)
Storage Temperature	-4°F ~ 158°F (-20°C ~ 70°C)
Operating Humidity	10%~90% relative humidity, non-condensing

Environmental

Storage Humidity	10 ~ 80% @ 40C, non-condensing
Vibration	0.5G / 5 ~ 500Hz / operation
	1.5G / 5 ~ 500Hz / non-operation
Shock	10G peak acceleration (11 m sec. duration), operation
	20G peak acceleration (11 m sec. duration), non-operation
Dimension (W x D x H)	4.7" x 4.1" x 1.7" (220mm x 105mm x 44mm)

I/O

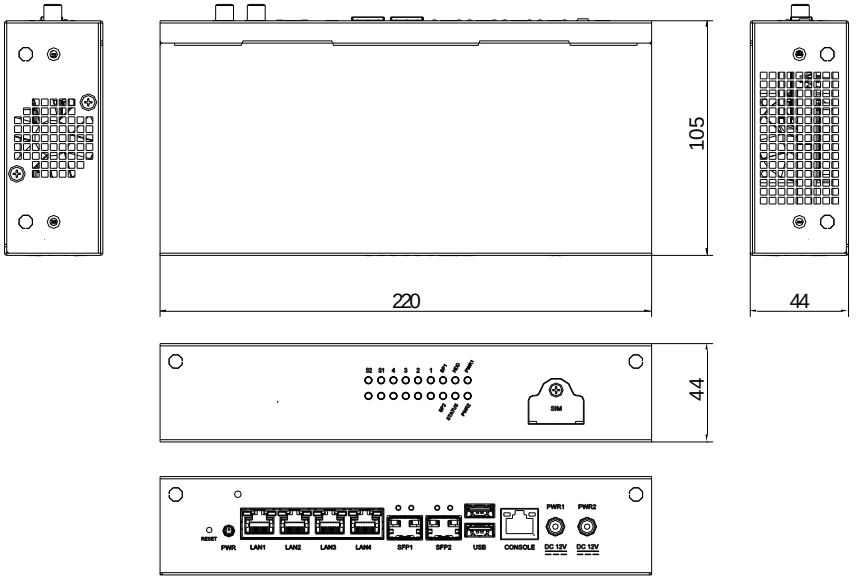
Rear Panel	Lockable DC Power Input Connector x 2
	Power Button x 1
	USB 3.2 Gen 1 x 2
	RJ-45 x 4
	Fiber x 2
	RJ45 Console x 1
	Antenna Hole x 2
	Software Programmable Switch x 1
Front Panel	Power LED x 2
	Status LED x 1
	Bypass LED x 2
	Storage Active LED x 1
	Ethernet LED x 12
	Antenna Hole x 2
	Antenna Hole x 1 (Right Panel)
	Antenna Hole x 1 (Left Panel)
	Accessible SIM Slot x 1

Chapter 2

Hardware Information

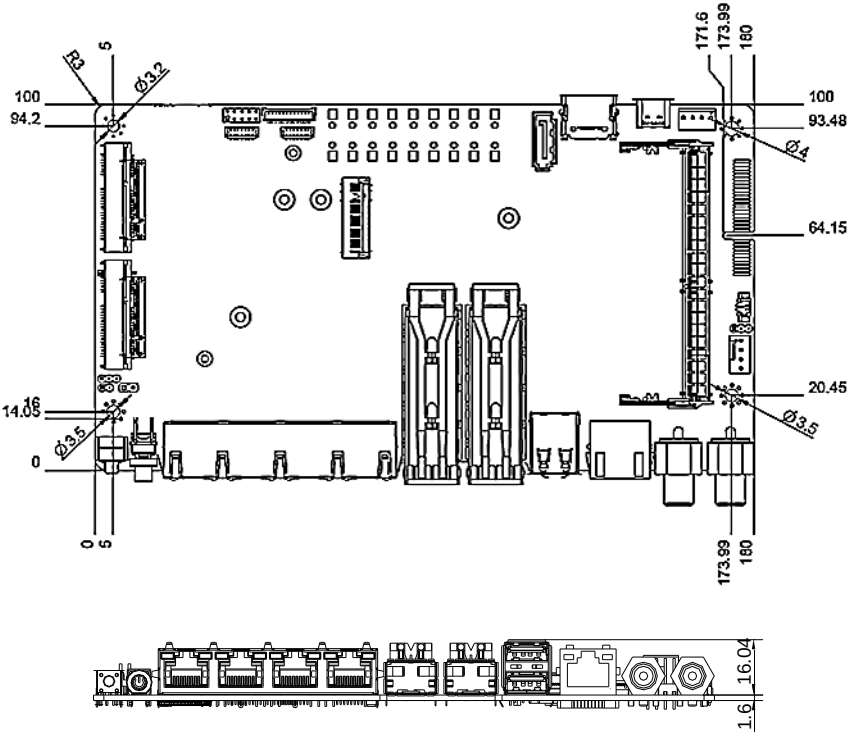
2.1 Dimensions

System

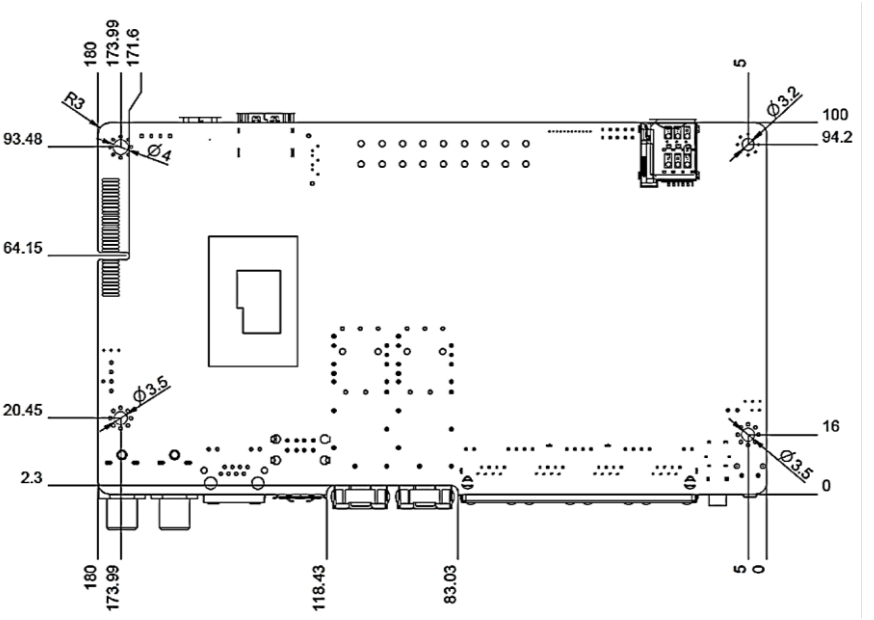


Board

Top


R3
5
Ø3.2
100
94.2
171.6
173.99
180
100
93.48
Ø4
64.15
20.45
Ø3.5
16
14.05
Ø3.5
0
0
5
173.99
180
16.04
1.6

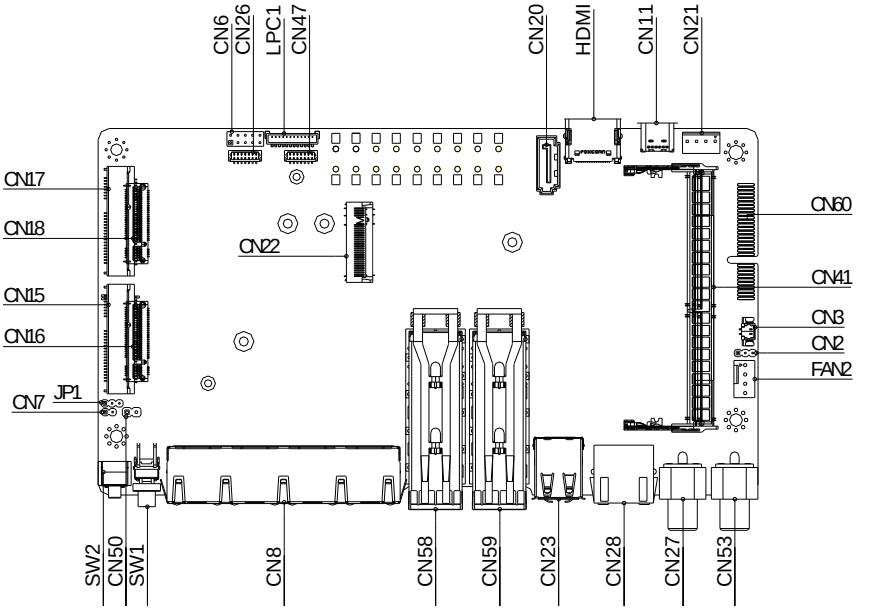
Bottom


180
173.99
171.6
R3
Ø4
93.48
64.15
20.45
Ø3.5
2.3
180
173.99
118.43
83.03
5
Ø3.2
100
94.2
16
Ø3.5
0
5
0

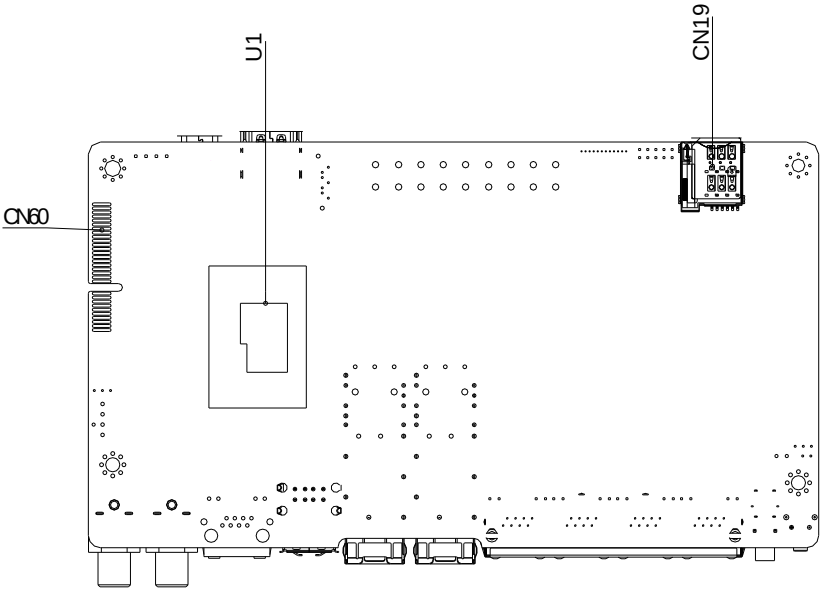
2.2 Jumpers and Connectors

Note: Components and their locations may vary depending upon which configuration was purchased. If you have questions about your FWS-2291, visit our website to contact an AAEON support representative.

Component Side



Solder Side

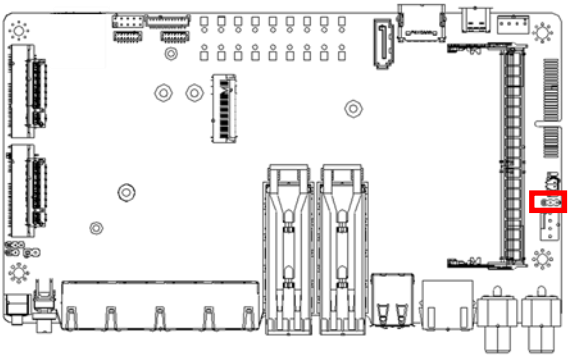


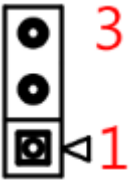
2.3 List of Jumpers

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

Label	Function
CN2	Clear CMOS
JP1	Manual/Auto Power On Option Header

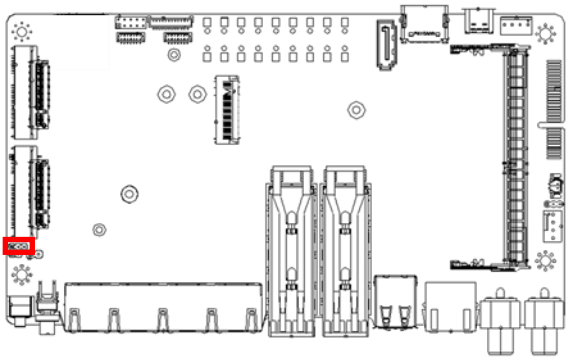
2.3.1 Clear CMOS (CN2)

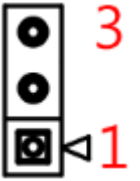




Clear CMOS	
Normal (Default)	1-2
Clear CMOS	2-3

2.3.2 Manual/Auto Power On (JP1)





Manual/Auto Power On	
Manual (Default)	1-2
Auto	2-3

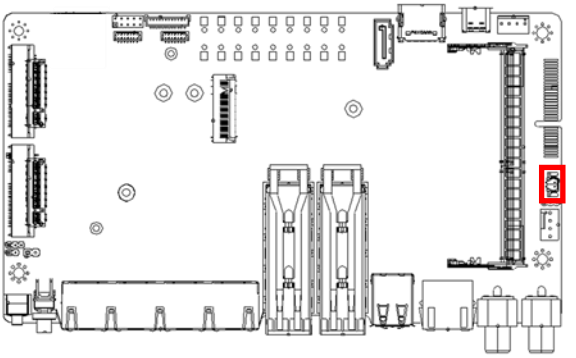
2.4 List of Connectors

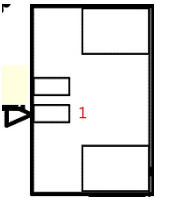
Please refer to the table below for all of the board's connectors that you can configure for your application. (Optional) denotes a component that is not included on the standard configuration. Some optional components may replace standard components. Contact AAEON support if you have any questions about the configuration of your FWS-2291 system.

Label	Function
SW2	Reset Switch
CN23	USB 3.2 Type-A Port
CN8	2.5GbE RJ-45 Port
CN20	SATA Connector
LED50	DC_Jack_12VIN_2
LED49	DC_Jack_12VIN_1
LED51	Status LED
LED30	SATA LED
LED32	Bypass2 LED
LED31	Bypass1 LED
LED37	LAN0 Speed LED
LED25	LAN0 Act/Link LED
LED38	LAN1 Speed LED
LED26	LAN1 Act/Link LED
LED39	LAN2 Speed LED
LED27	LAN2 Act/Link LED
LED40	LAN3 Speed LED
LED28	LAN3 Act/Link LED
LED43	LAN4 Speed LED
LED46	LAN4 Act/Link LED
LED45	LAN5 Speed LED
LED44	LAN5 Act/Link LED
CN16	M.2 2230 E-Key (PCIe only)
CN15	Mini Card (PCIe/Half-size only)
CN22	M.2 2242 M-Key (SATA only)
CN26	BIOS Flash Connector
CN18	M.2 3052 B-Key (USB 3.0 & USB 2.0 only)
CN17	Mini Card (PCIe/Half-size only)
CN3	CMOS Battery Connector
LPC1	Port 80 Connector

Label	Function
CPU_FAN2	Fan Connector
CN47	MCU FW Programming Connector
CN7	Case Open Header
CN6	Digital IO Header
CN21	SATA Power Connector
HDMI1	HDMI Connector (Optional)
CN19	SIM Card Connector
CN11	Type-C Connector Console Port
CN28	Console Connector
CN27	DC_Jack (12V_1 IN)
CN53	DC_Jack (12V_2 IN)
SW1	Power Button
CN58	LAN4 Fiber Connector
CN59	LAN5 Fiber Connector
CN57	Dual GbE RJ-45 Port
CN7	Case Open Header
CN50	Power Button Header
CN41	DDR5 SODIMM

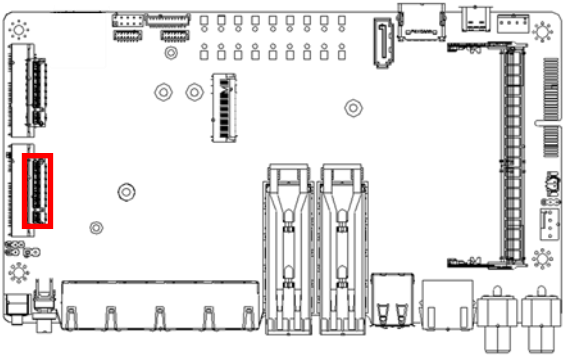
2.4.1 CMOS Battery Connector (CN3)

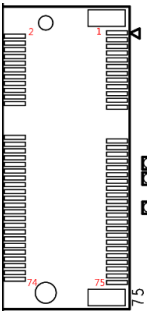




Pin	Signal	Pin	Signal
1	3V	2	GND

2.4.2 M.2 2230 E-Key (CN16)

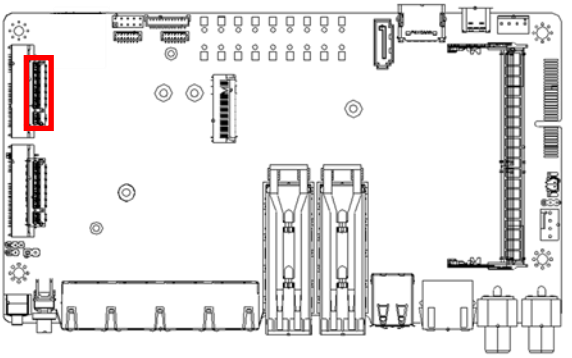


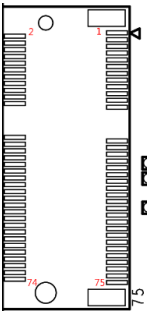


Pin	Signal	Pin	Signal
1	GND	42	
2	+V3.3A_WLAN	43	M.2E1_RXN
3	USB_R2_DP4	44	
4	+V3.3A_WLAN	45	GND
5	USB_R2_DN4	46	
6		47	M.2E1_CLKP_B
7	GND	48	
8		49	M.2E1_CLKN_B
9		50	PCH_SUSCLK
10		51	GND

Pin	Signal	Pin	Signal
11		52	M.2_WLAN_PERST_R_N
12		53	MC1_CLKREQ#
13		54	BT1_RF_KILL_N
14		55	M.2_WLAN_PE_WAKE#
15		56	WIFI1_RF_KILL_N
16		57	GND
17		58	M.2B_SMBDATA
18	GND	59	
19		60	M.2B_SMBCLK
20		61	
21		62	
22		63	GND
23		64	
32		65	
33	GND	66	
34		67	
35	M.2E1_TXP	68	
36		69	GND
37	M.2E1_TXN	70	
38		71	
39	GND	72	+V3.3A_WLAN
40		73	
41	M.2E1_RXP	74	+V3.3A_WLAN
		75	GND

2.4.3 M.2 3052 B-Key (CN18)

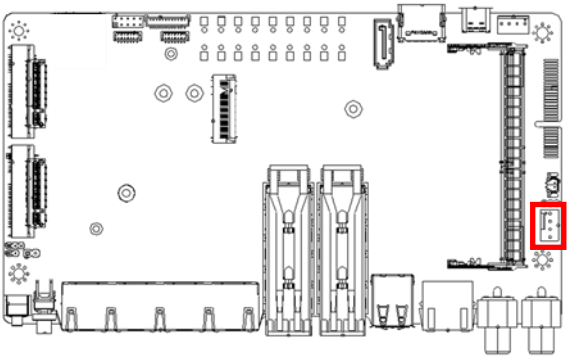


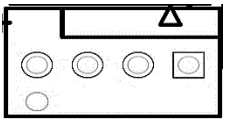


Pin	Signal	Pin	Signal
1	M.2C_CFG3	44	
2	+V3.3A_WLAN	45	GND
3	GND	46	
4	+V3.3A_WLAN	47	DPE_M2_C_TXN14
5	GND	48	
6	M.2C_POFF#	49	DPE_M2_C_TXP14
7	USB2_CONA3_P	50	DPE_R1_RSTN
8	M.2C_DIS#	51	GND
9	USB2_CONA3_N	52	
10		53	CLK_M2B_DN
11	GND	54	PMC_WAKE#
21	M.2C_CFG0	55	CLK_M2B_DP
22		56	
23		57	GND
24		58	
25		59	
26		60	
27	GND	61	
28		62	
29	USB3_M2B_RXN0	63	
30	UIM1_RST	64	
31	USB3_M2B_RXP0	65	
32	UIM1_CLK	66	M.2C_SIMDET#
33	GND	67	M2_RST_N
34	UIM1_DAT	68	PCH_SUSCLK
35	USB3_M2B_TXN0	69	M.2C_CFG1

Pin	Signal	Pin	Signal
36	UIM1_PWR	70	+V3.3_WWAN
37	USB3_M2B_TXP0	71	GND
38	M.2C_DEVSLP	72	+V3.3_WWAN
39	GND	73	GND
40		74	+V3.3A_WLAN
41	DPE_M2_C_RXN14	75	M.2C_CFG2
42			
43	DPE_M2_C_RXP14		

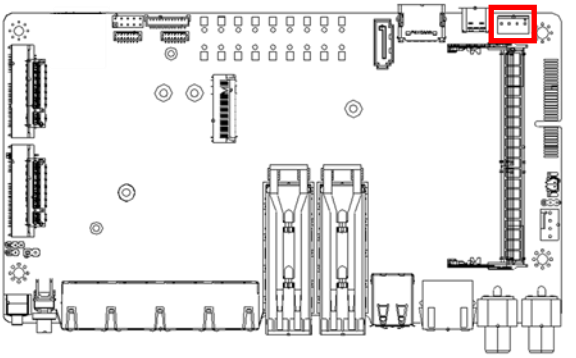
2.4.4 Fan Connector (CPU_FAN2)

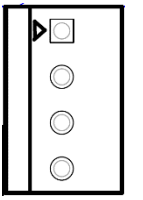




Pin	Signal	Pin	Signal
1	GND	2	+12S
3	FANTAC1	4	FANCTL1

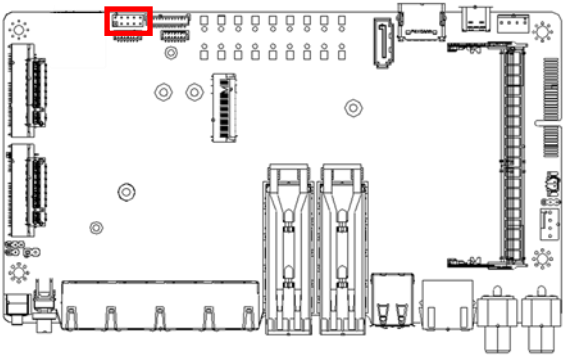
2.4.5 SATA Power Connector (CN21)

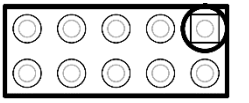




Pin	Signal	Pin	Signal
1		2	GND
3	GND	4	+5VS

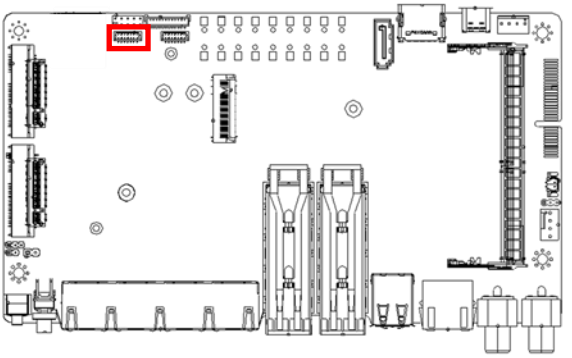
2.4.6 Digital IO Header (CN6)

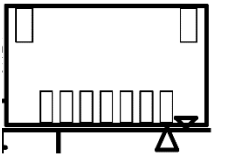




Pin	Signal	Pin	Signal
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	DIO5	6	DIO6
7	DIO7	8	DIO8
9	+V5S	10	GND

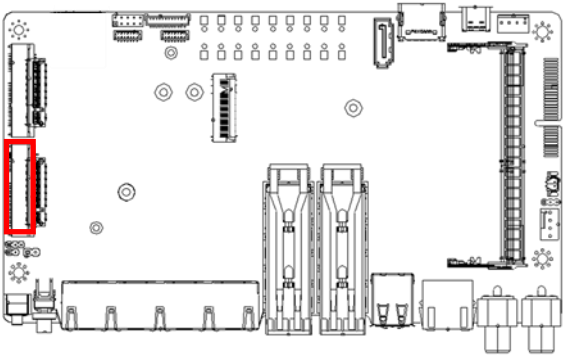
2.4.7 BIOS Flash Connector (CN26)

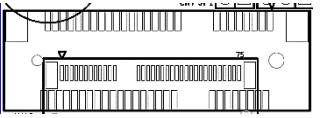




Pin	Signal
1	FLASH_MISO
2	GND
3	FLASH_CLK
4	+VDD_FLASH
5	FLASH_MOSI
6	FLASH_CS0#
7	NC

2.4.8 Mini Card (CN15)

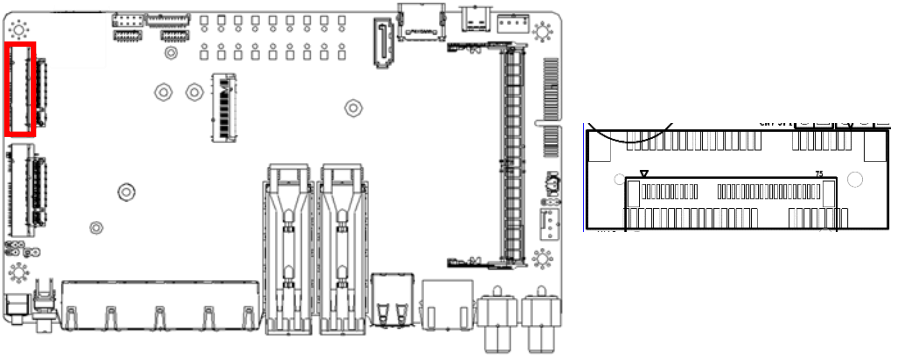




Pin	Signal	Pin	Signal
1	PMC_WAKE#	2	+V3P3A
3	NC	4	GND
5	NC	6	MC1_1P5V
7	MC1_CLKREQ#	8	UIM2_PWR

Pin	Signal	Pin	Signal
9	GND	10	UIM2_DAT
11	MiniCE1_CLKN	12	UIM2_CLK
13	MiniCE1_CLKP	14	UIM2_RST
15	GND	16	UIM2_VPP
17	NC	18	GND
19	NC	20	MC1_DIS#
21	GND	22	BUF_PLTRST#
23	MiniCE1_RXN	24	MC1_3.3AUX
25	MiniCE1_RXP	26	GND
27	GND	28	MC1_1P5V
29	GND	30	SMB_CLK_S
31	MiniCE1_TXN	32	SMB_DATA_S
33	MiniCE1_TXP	34	GND
35	GND	36	USB_DN4
37	GND	38	USB_DP4
39	+V3P3A	40	GND
41	+V3P3A	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	MC1_1P5V
49	NC	50	GND
51	NC	52	+V3P3A

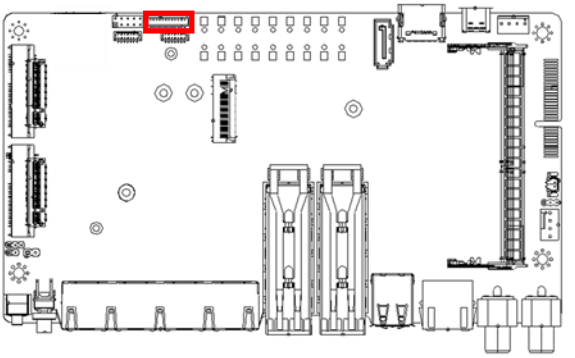
2.4.9 Mini Card (CN17)

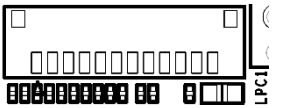


Pin	Signal	Pin	Signal
1	PMC_WAKE#	2	+V3P3A

Pin	Signal	Pin	Signal
3	NC	4	GND
5	NC	6	MC2_1P5V
7	MC1_CLKREQ#	8	UIM1_PWR
9	GND	10	UIM1_DAT
11	CLK_MINIC2_DN	12	UIM1_CLK
13	CLK_MINIC2_DP	14	UIM1_RST
15	GND	16	UIM1_VPP
17	NC	18	GND
19	NC	20	MC3_DIS#
21	GND	22	DPE_RR_STN
23	USB3_R1_RX1_N	24	MC3_3.3AUX
25	USB3_R1_RX1_P	26	GND
27	GND	28	MC2_1P5V
29	GND	30	SMB_CLK_S
31	USB3_R1_TX1_N	32	SMB_DATA_S
33	USB3_R1_TX1_P	34	GND
35	GND	36	USB2_CONB3_N
37	GND	38	USB2_CONB3_P
39	+V3P3A	40	GND
41	+V3P3A	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	MC2_1P5V
49	NC	50	GND
51	NC	52	+V3P3A

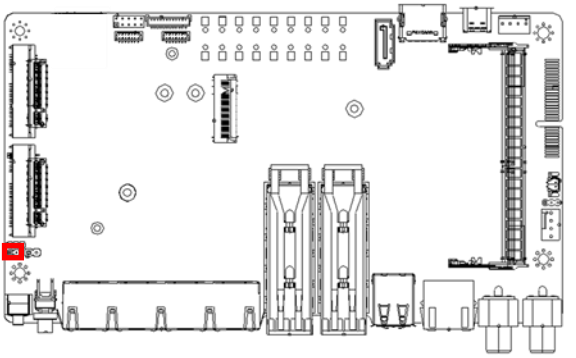
2.4.10 Port 80 Connector (LPC1)

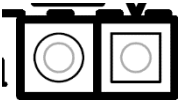




Pin	Signal
1	SIO_ESPIIO0_R2
2	SIO_ESPIIO1_R2
3	SIO_ESPIIO2_R2
4	SIO_ESPIIO3_R2
5	+V3P3S
6	SIO_R2__ESPICS#
7	SIO_R2_ESPIRST#
8	GND
9	SIO_ESPICLK_R2
10	+V3P3A
11	NC
12	NC

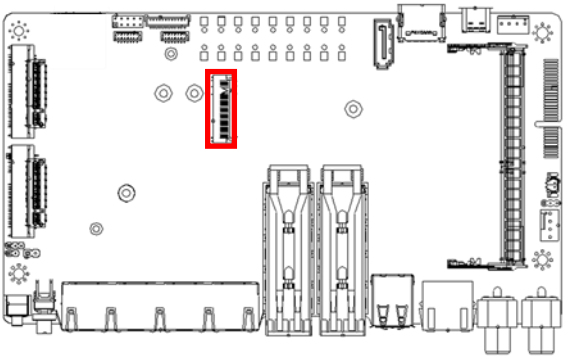
2.4.11 Case Open Header (CN7)

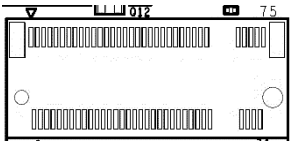




Pin	Signal	Pin	Signal
1	COPEN#	2	GND

2.4.12 M.2 2242 M-Key (CN22)

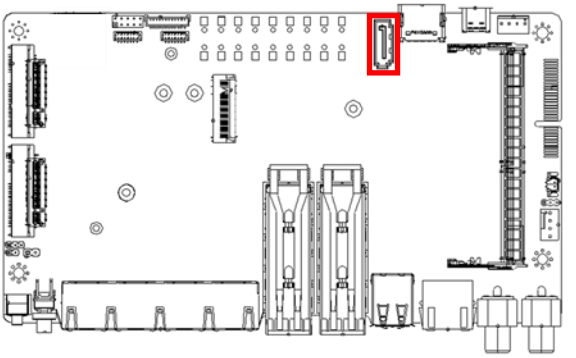


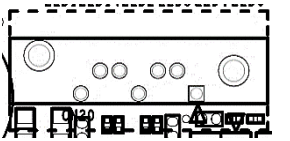


Pin	Signal	Pin	Signal
1	GND	2	+V3P3S
3	GND	4	+V3P3S
5	NC	6	NC
7	NC	8	NC
9	GND	10	M2_SATA_LED#
11	NC	12	+V3P3S
13	NC	14	+V3P3S
15	GND	16	+V3P3S

Pin	Signal	Pin	Signal
17	NC	18	+V3P3S
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC D
35	NC	36	NC
37	NC	38	M.2_R_DEVSLP
39	GND	40	NC
41	SATA_CRXP1	42	NC
43	SATA_CRXN1	44	NC
45	GND	46	NC
47	SATA_CTXN1	48	NC
49	SATA_CTXP1	50	BUF_R_PLTRST#
51	GND	52	PU_M2_CLKREQ_N
53	NC	54	PMC_R_WAKE#
55	NC	56	NC
57	GND	58	NC
67	NC	68	PCH_SUSCLK
69	M2_R1_SATA_DET	70	+V3P3S
71	GND	72	+V3P3S
73	GND	74	+V3P3S
75	GND		

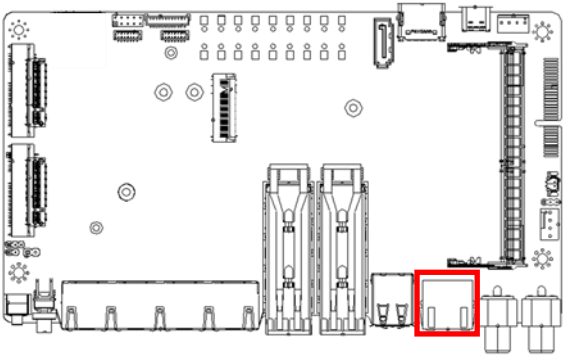
2.4.13 SATA Connector (CN20)

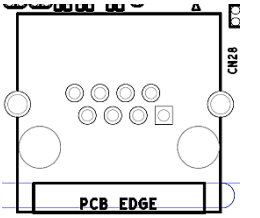




Pin	Signal
1	GND
2	SATA_CTXP0
3	SATA_CTXN0
4	GND
5	SATA_CRXN0
6	SATA_CRXP0
7	GND

2.4.14 Console Connector (CN28)

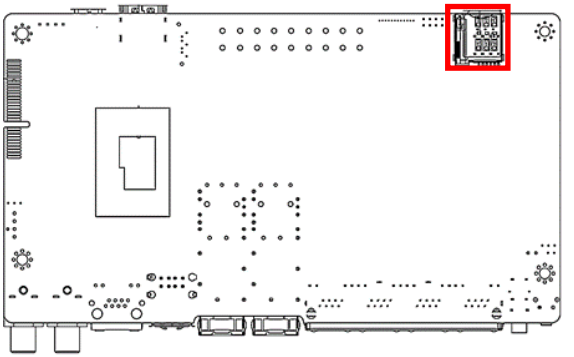


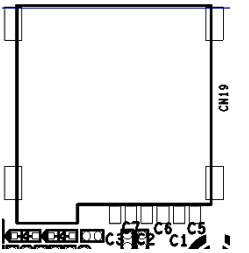


Pin	Signal
1	RTS1
2	DTR1
3	TXD1
4	GND

Pin	Signal
5	CRJ5
6	RXD1
7	DSR1
8	CTS1

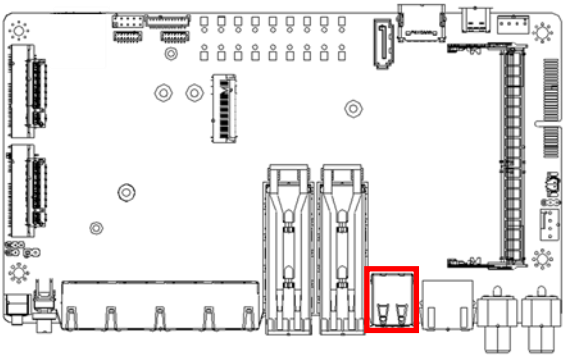
2.4.15 SIM Card (CN19)

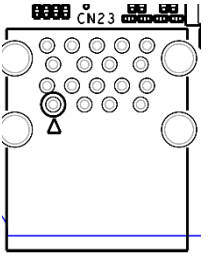




Pin	Signal
C1	UIM1_PWR
C2	UIM1_R_RST
C3	UIM1_R_CLK
C5	GND
C6	UIM1_R_VPP
C7	UIM1_R_DAT

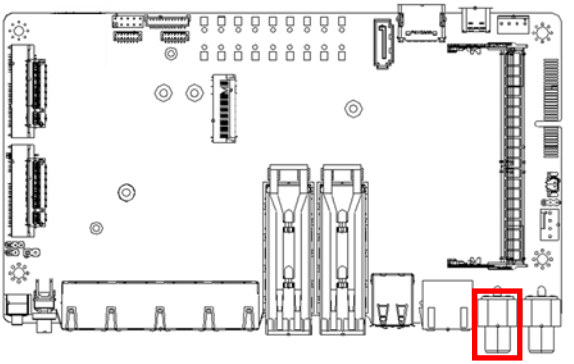
2.4.16 USB 3.2 Type-A Port (CN23)

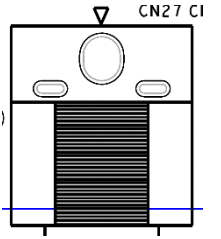




Pin	Signal
1	USB3VCC
2	USB1-
3	USB1+
4	GND
5	USB3_RXN1
6	USB3_RXP1
7	GND
8	USB3_TXN1
9	USB3_TXP1
10	USB3VCC
11	USB2-
12	USB2+
13	GND
14	USB3_RXN2
15	USB3_RXP2
16	GND
17	USB3_TXN2
18	USB3_TXP2

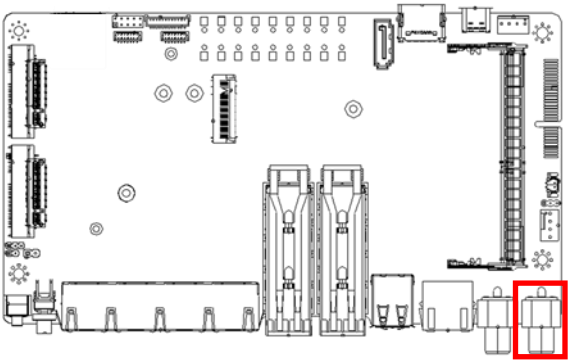
2.4.17 DC_Jack (12V_1 IN) (CN27)

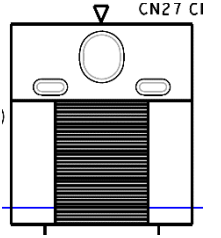




Pin	Signal
1	VIN_+12V1
2	GND
3	GND

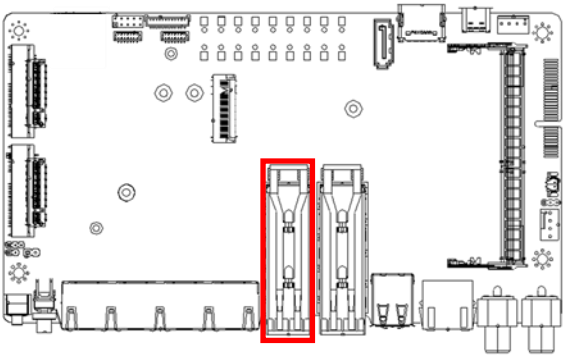
2.4.18 DC_Jack (12V_2 IN) (CN53)

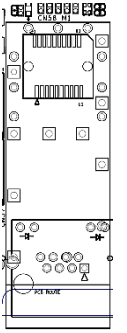




Pin	Signal
1	VIN_+12V1
2	GND
3	GND

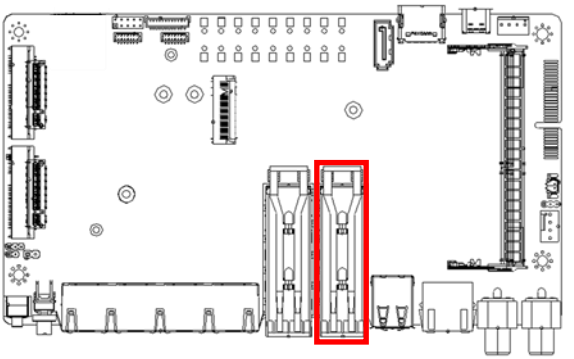
2.4.19 LAN4 Fiber Connector (CN58)

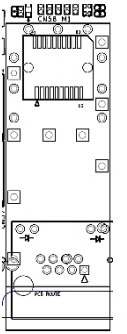




Pin	Signal	Pin	Signal
1	GND	2	SDP0_1_TX_FAULT
3	TX_DIS0	4	MDIO0_SDA0
5	MDC0_SCL0	6	SDP0_2_MOD_ABS
7	SDP0_3_RS0	8	SDP0_0_RX_LOSS
9	SDP0_3_RS1	10	GND
11	GND	12	RX_L0_N
13	RX_L0_P	14	GND
15	+3P3V_SFP_RX0	16	+3P3V_SFP_TX0
17	GND	18	TX_L0_P
19	TX_L0_N	20	GND
H1	GND	H2	M2_SATA_LED#

2.4.20 LAN5 Fiber Connector (CN59)

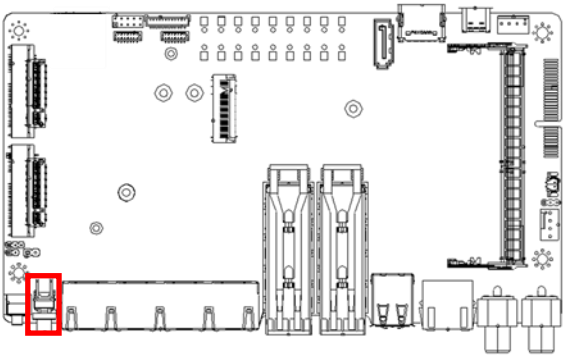


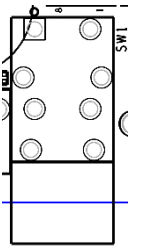


Pin	Signal	Pin	Signal

Pin	Signal	Pin	Signal
1	GND	2	SDP1_1_TX_FAULT
3	TX_DIS1	4	MDIO1_SDA0
5	MDC1_SCL0	6	SDP1_2_MOD_ABS
7	SDP1_3_RS0	8	SDP1_0_RX_LOSS
9	SDP1_3_RS1	10	GND
11	GND	12	RX_L1_N
13	RX_L1_P	14	GND
15	+3P3V_SFP_RX1	16	+3P3V_SFP_TX1
17	GND	18	TX_L1_P
19	TX_L1_N	20	GND
H1	GND	H2	M2_SATA_LED#

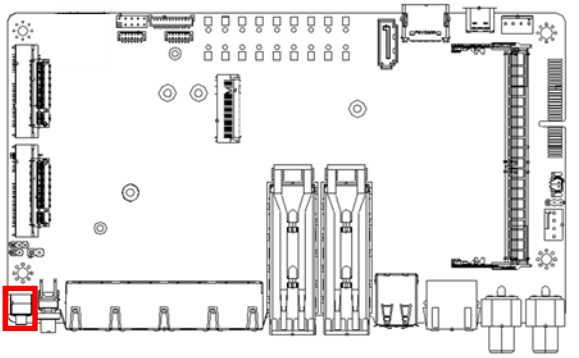
2.4.21 Power Button (SW1)

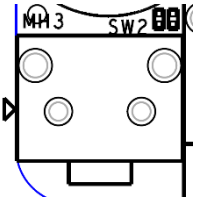




Pin	Signal	Pin	Signal
1	FB_PWSIN#	3	GND
2	NC	4	MNC
L1	L_BLUE	L2	L_RED
5	GND	6	GND

2.4.22 Reset Button (SW2)





Pin	Signal	Pin	Signal
1	GND	3	GND
2	RSTSW#	4	GND

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The system uses certain routines to perform testing and initialization during the boot up sequence. If an error, fatal or non-fatal, is encountered, the system will output a few short beeps or display an error message. The system 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 and BIOS NVRAM. If a system configuration is not found or an error is detected, the system will load the default configuration and reboot automatically.

There are three situations in which the CMOS settings will need to be set or changed:

- Starting the system for the first time
- The system hardware has been changed
- The system configuration was reset by the Clear CMOS jumper
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention. The battery must be replaced when it runs down.

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 <Esc> immediately while your computer is powering up.

The function for each interface can be found below.

Main

Basic information and set Date & Time.

Advanced

Major feature configuration (e.g.: CPU, Hardware Monitor, AAEON features, etc.).

System I/O

Configuration for system I/O devices.

Security

Set BIOS Administrator/User password.

Boot

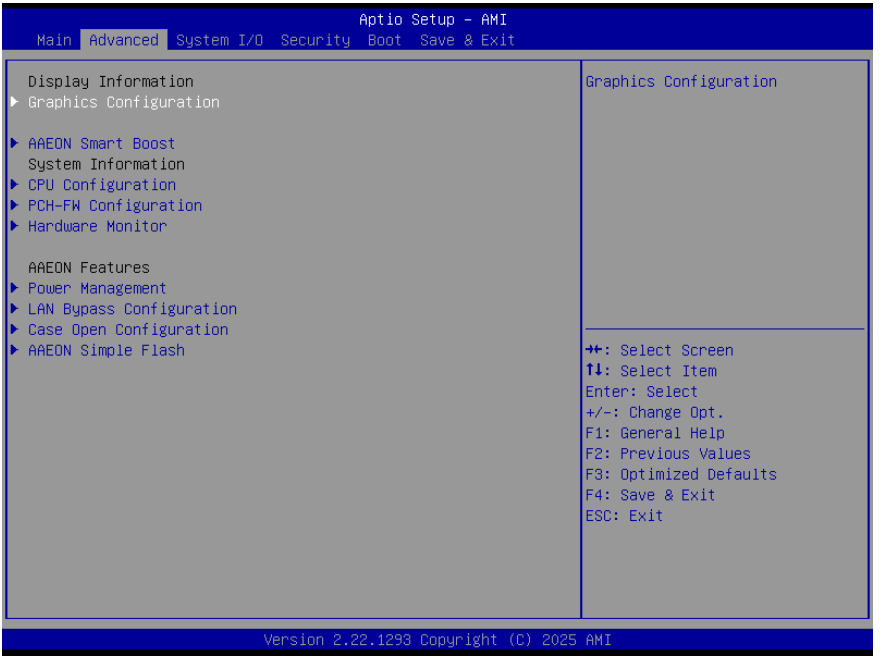
Adjust Boot configuration/priorities.

Save& Exit

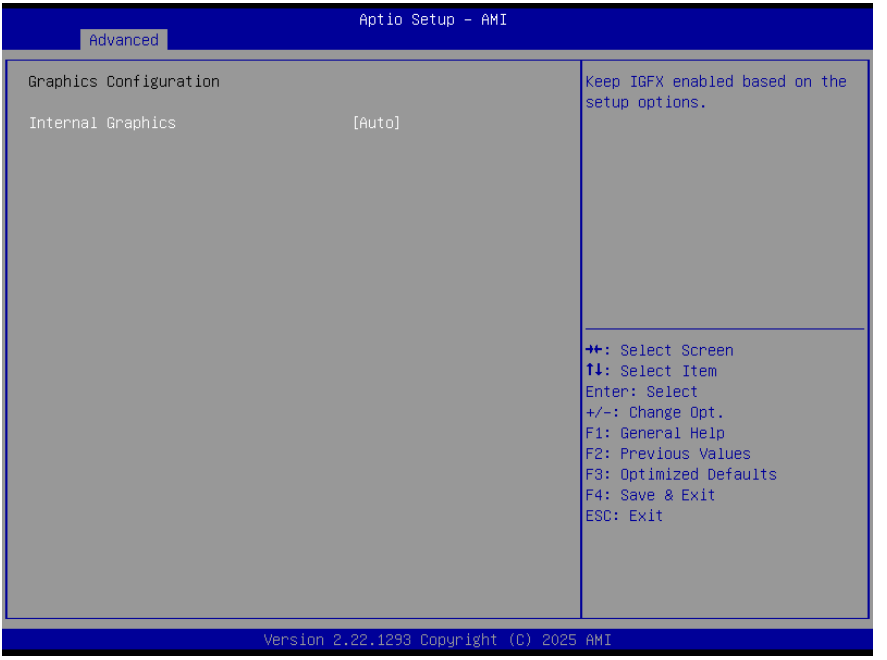
Save changes/restore defaults and exit system setup.

3.3 Setup Submenu: Main

3.4 Setup Submenu: Advanced

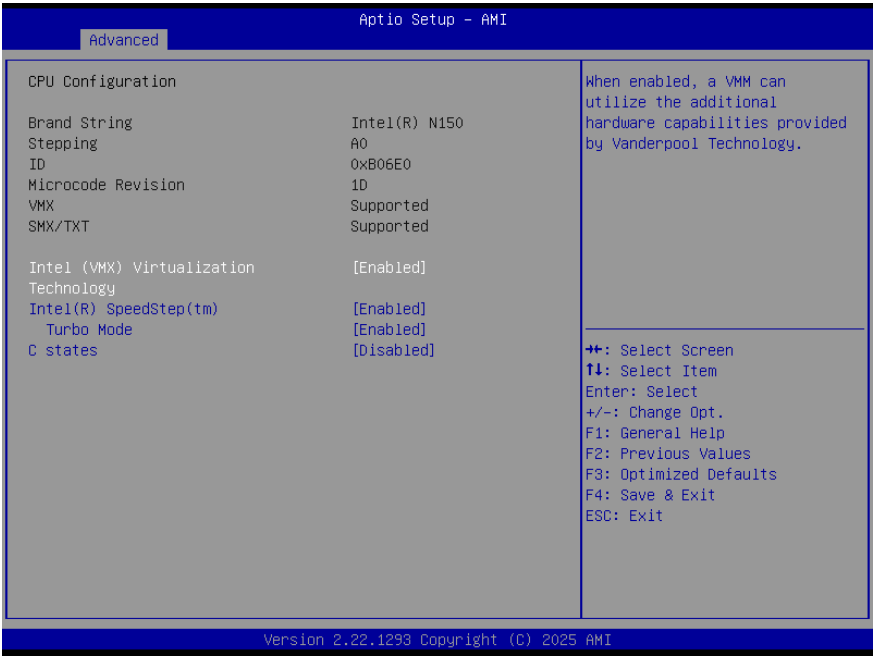


3.4.1 Graphics Configuration



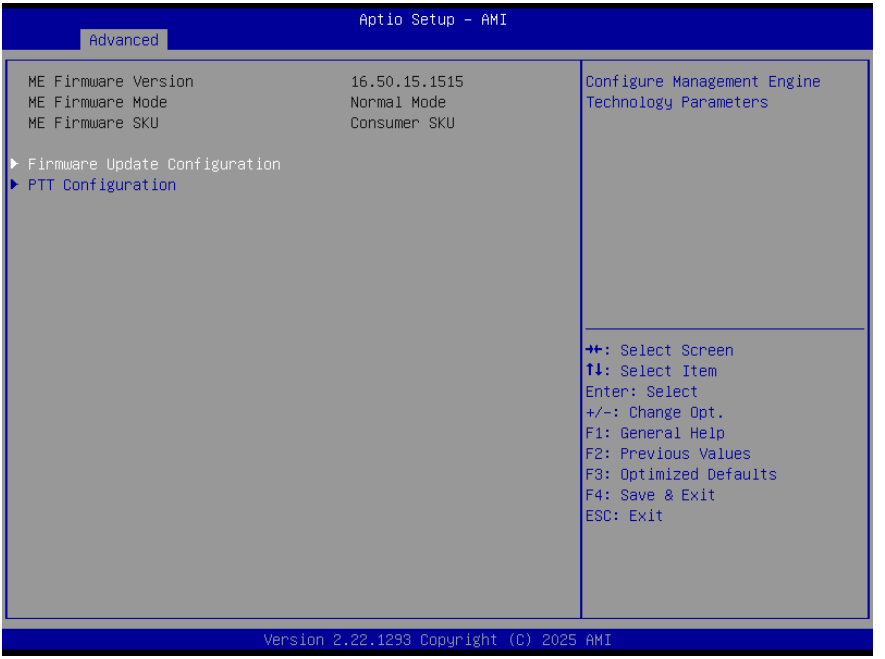
Options Summary		
Internal Graphics	Auto	Optimal Default, Failsafe Default
	Disabled	
	Enabled	
Keep IGFX enabled based on the setup options.		

3.4.2 CPU Configuration

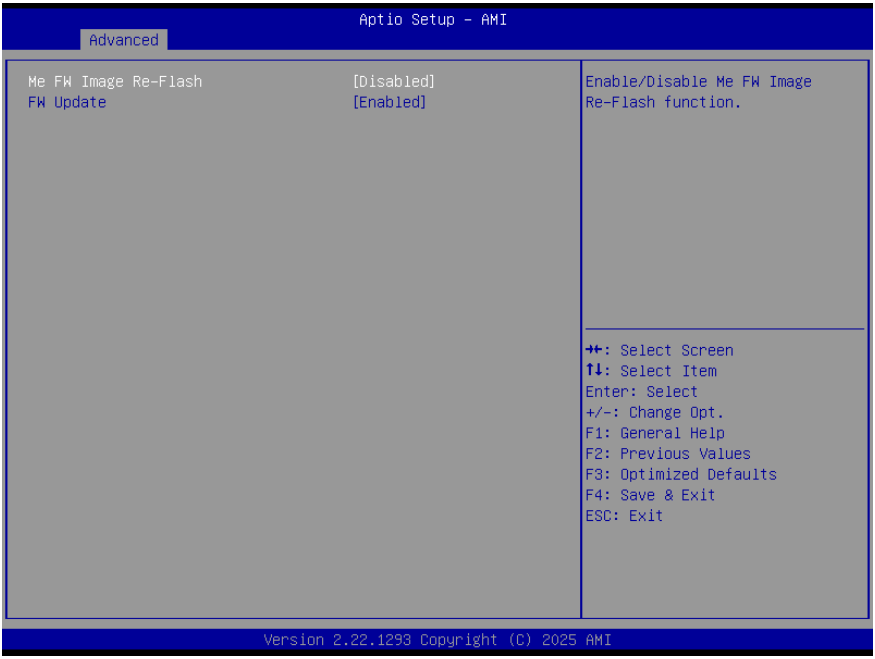


Options Summary	
Intel (VMX) Virtualization Technology	Disabled
	Enabled
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.	
Intel® SpeedStep™	Disabled
	Enabled
Allows more than two frequency ranges to be supported.	
Turbo Mode	Disabled
	Enabled
Enable/Disable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

3.4.3 PCH-FW Configuration

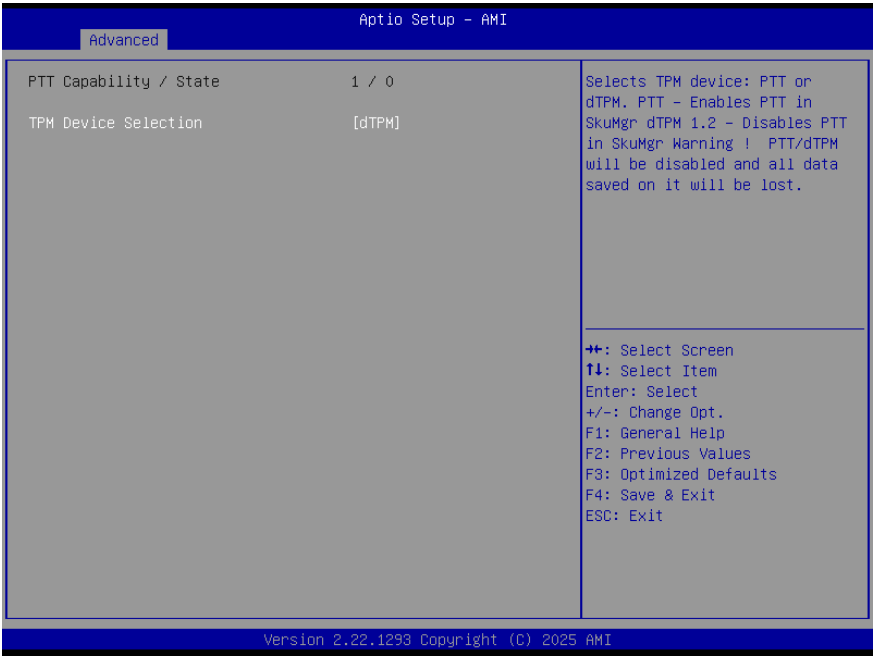


3.4.4 Firmware Update Configuration



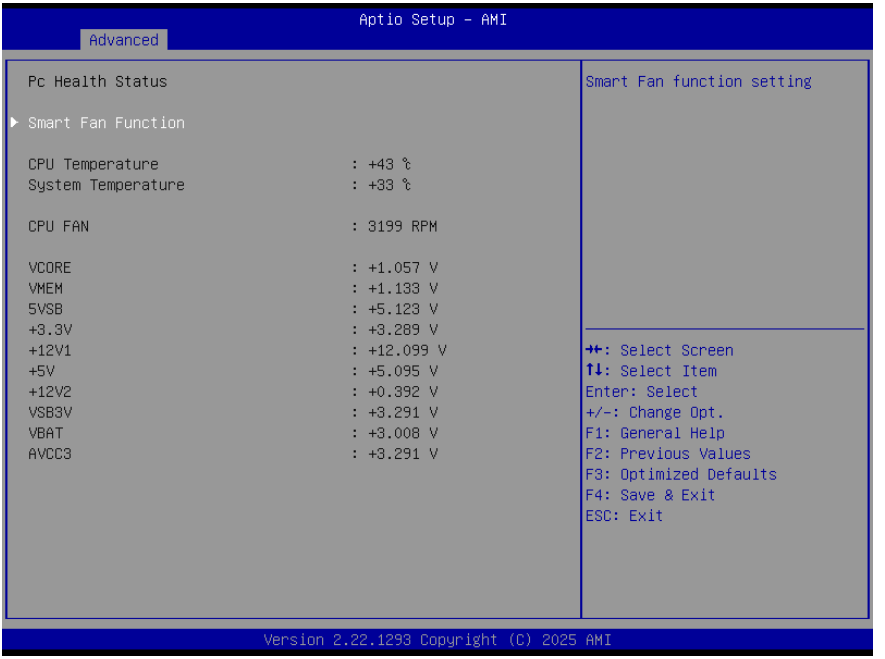
Options Summary	
Me FW Image Re-Flash	Disabled
	Enabled
Enable/Disable Me FW Image Re-Flash function.	
FW Update	Disabled
	Enabled
Enable/Disable ME FW update function.	

3.4.5 PTT Configuration

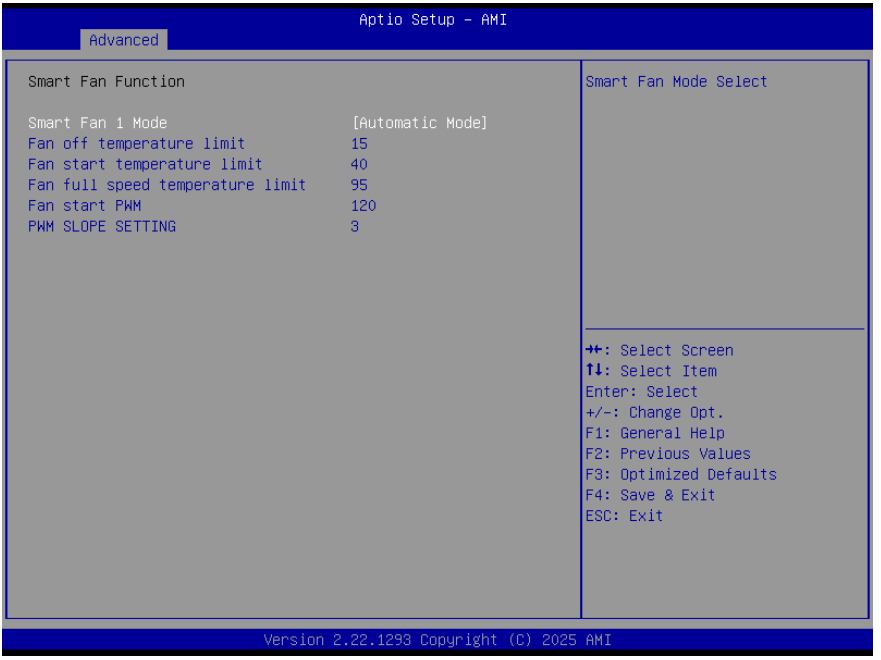


Options Summary	
TPM Device Selection	dTPM
	PTT
Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.	

3.4.6 Hardware Monitor



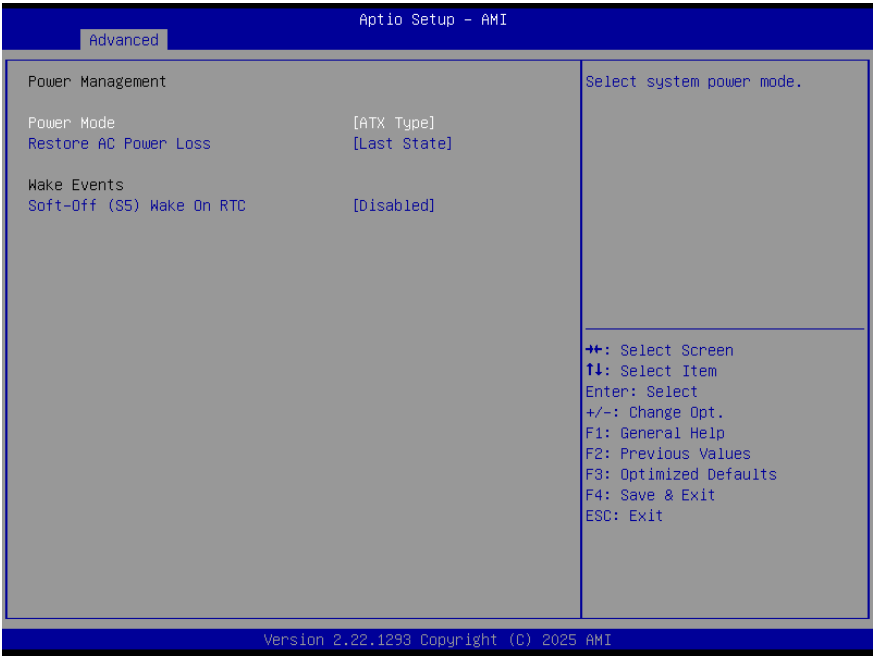
3.4.6.1 Smart Fan Function



Options Summary		
CPU Fan 1 Mode	Software Mode	
	Automatic Mode	Optimal Default, Failsafe Default
Smart Fan Mode Select		
Manual PWM Setting	127	Optimal Default, Failsafe Default
	0~255	
Manual Mode: Fan will work with this Manual PWM Value		
Fan off temperature limit	15	Optimal Default, Failsafe Default
Fan will off when temperature lower than this limit		
Fan start temperature limit	40	Optimal Default, Failsafe Default
Fan will work when temperature higher than this limit		
Fan full Speed Temperature limit	95	Optimal Default, Failsafe Default
Fan will full speed when temperature higher than this limit		
Fan start PWM	120	Optimal Default, Failsafe Default
Fan will start with this PWM value		
PWM SLOPE SETTING	3	Optimal Default, Failsafe Default

Options Summary
PWM SLOPE Selection Slope = PWM value/℃

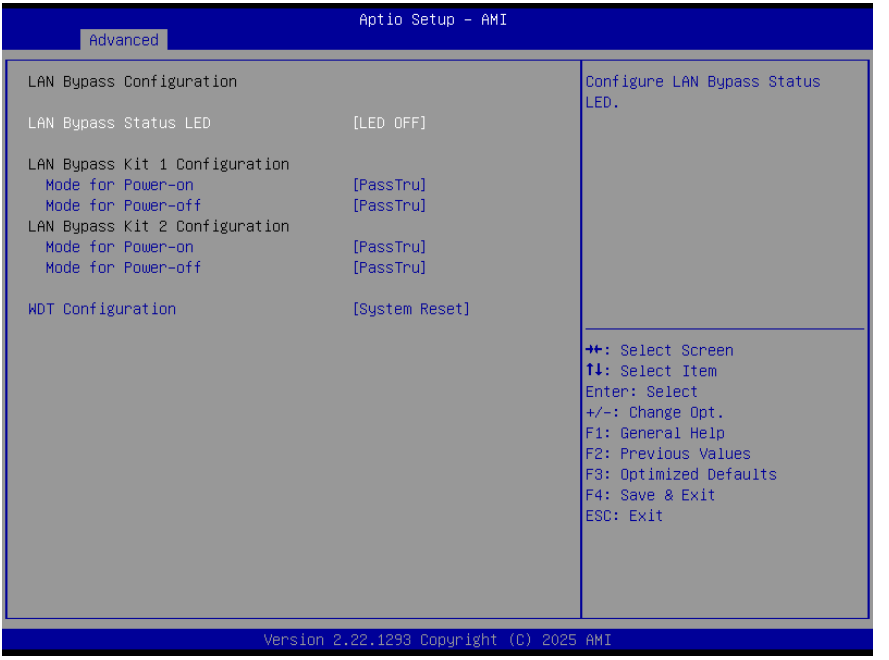
3.4.7 Power Management



Options Summary	
Power Mode	**ATX Type**
	AT Type
Select Power Supply Mode.	
Restore AC Power Loss	Power Off
	Power On
	Last State
Select AC power state when power is re-applied after a power failure.	
Soft-Off (S5) Wake On RTC	**Disabled**
	By Date
	By Weekday
	Bypass

Options Summary
By Date: System will wake on the day with hr::min::sec specified. By Weekday: System will wake on the enabled weekday with hr::min::sec specified. Bypass: BIOS will not control RTC wake function

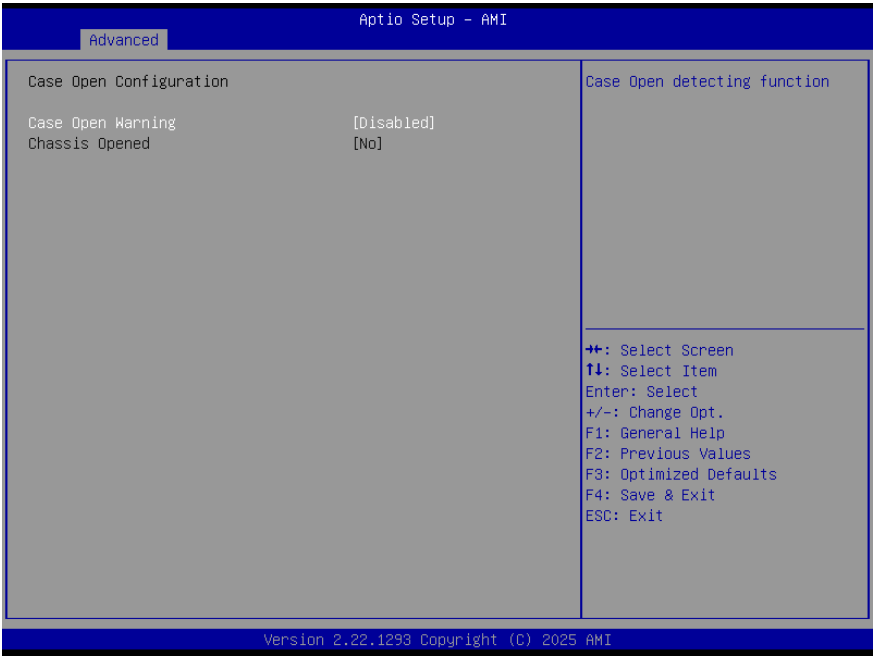
3.4.8 LAN Bypass Configuration



Options Summary		
Configure LAN Bypass Status LED	LED OFF	Optimal Default, Failsafe Default
	RED LED ON	
	RED LED BLINK	
	RED LED FAST BLINK	
	GREEN LED ON	
	GREEN LED BLINK	
	GREEN LED FAST BLINK	
Configure LAN Bypass Status LED.		

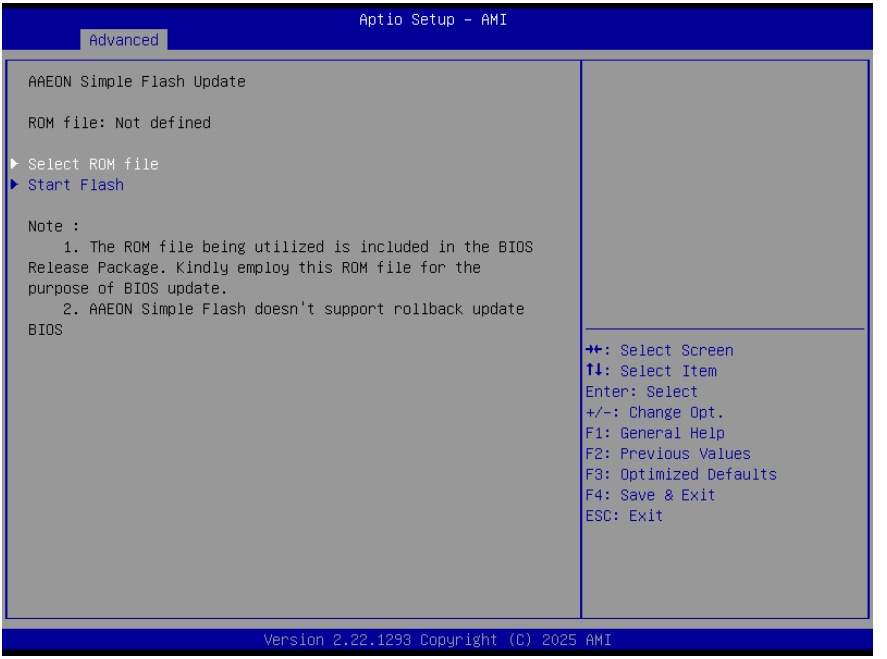
Options Summary		
Mode for Power-on	ByPass	
	PassTru	Optimal Default, Failsafe Default
Configure LAN kit behavior when system in power-on state. (Bypass/Pass Through)		
Mode for Power-off	ByPass	
	PassTru	Optimal Default, Failsafe Default
Configure LAN kit behavior when system in power-off state. (Bypass/Pass Through)		
WDT Configuration	System Reset	Optimal Default, Failsafe Default
	Force ByPass	
Configure WDT behavior, System Reset or Force Bypass		

3.4.9 Case Open Configuration



Options Summary		
Case Open Warning	Disabled	Optimal Default, Failsafe Default
	Enabled	
	Clear	
Case Open detecting function.		

3.4.10 AAEON Simple Flash



Select ROM file

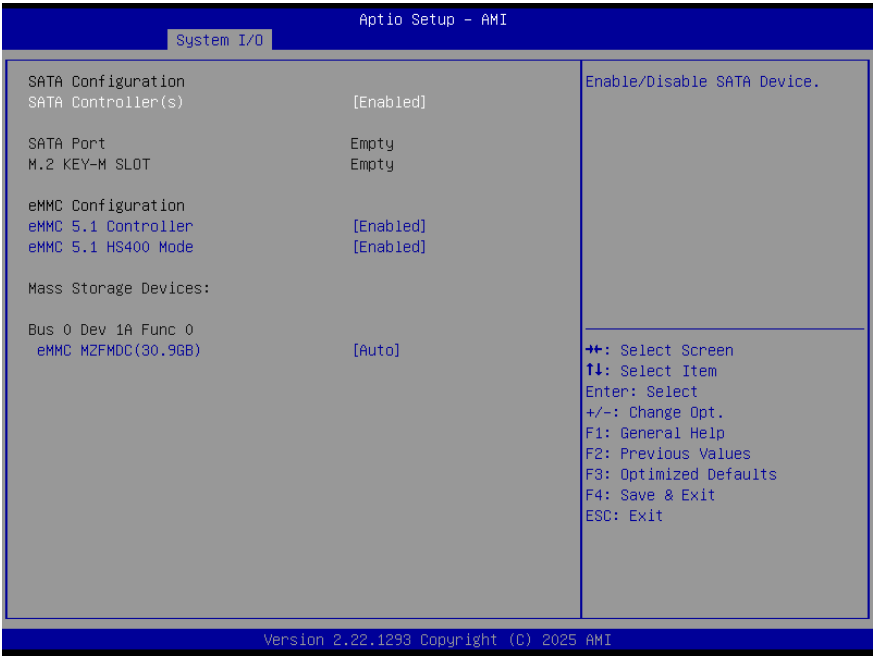
Select the BIOS ROM file to update.

Start Flash

To start the BIOS ROM update process.

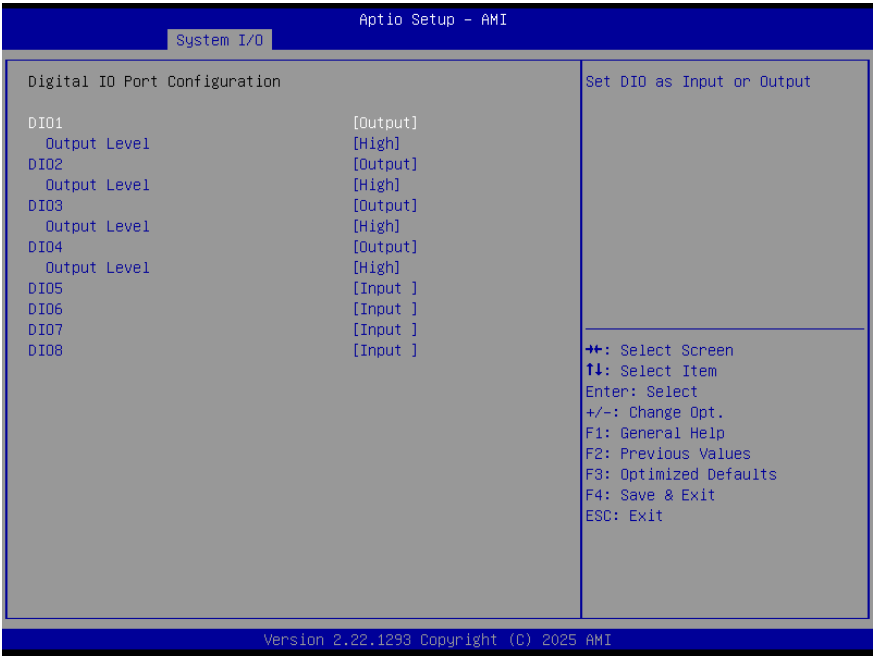
3.5 Setup Submenu: System I/O

3.5.1 Storage Configuration



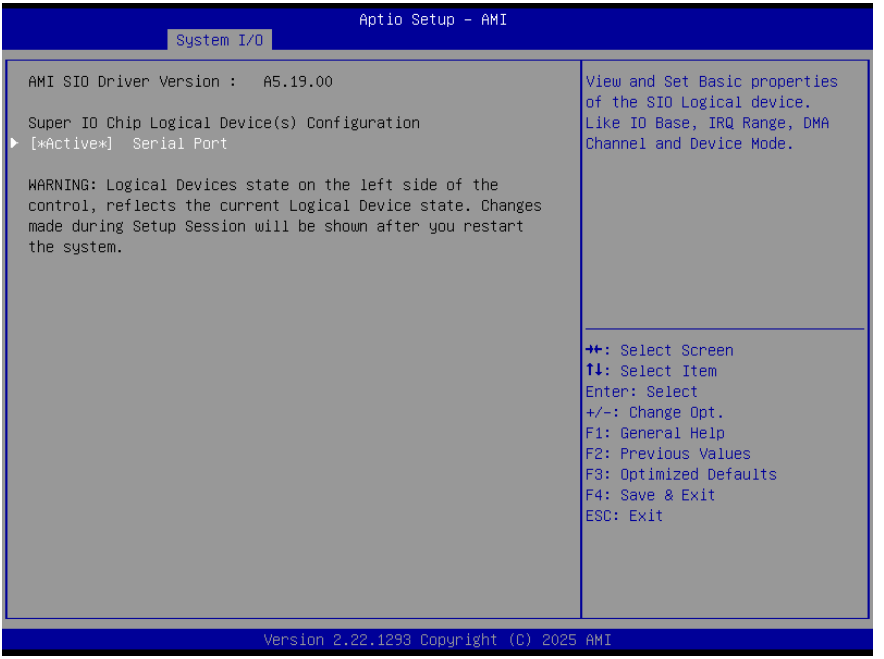
Options Summary		
SATA Controller(s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable SATA Device.		
eMMC 5.1 Controller	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SCS eMMC 5.1 Controller.		
eMMC 5.1 HS400 Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SCS eMMC 5.1 HS400 Mode.		

3.5.2 Digital IO Port Configuration

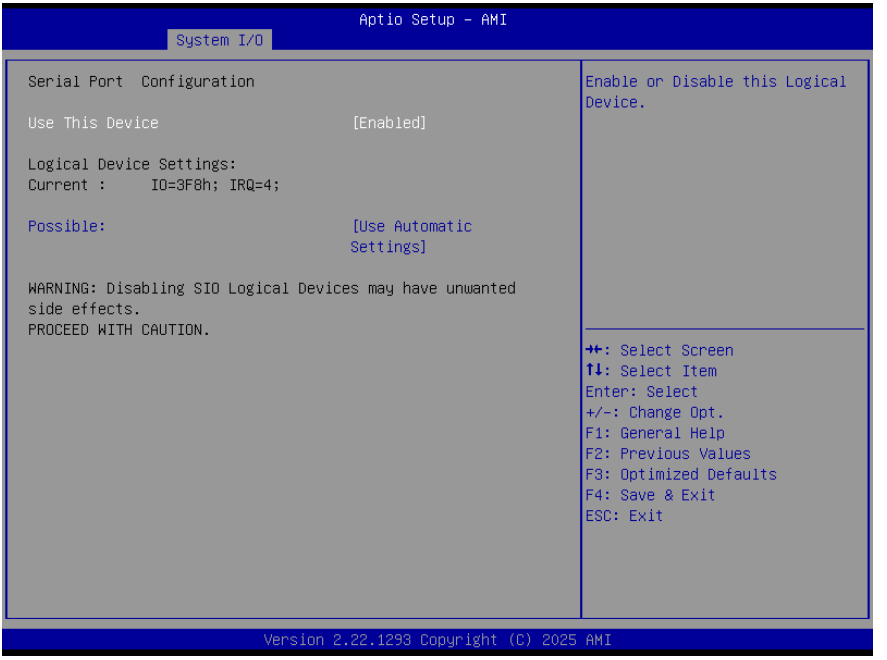


Options Summary		
DIO Port1~4	Output	Optimal Default, Failsafe Default
	Input	
Set DIO as Input or Output		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output		
DIO Port5~8	Output	
	Input	Optimal Default, Failsafe Default
Set DIO as Input or Output		

3.5.3 Legacy Logical Devices Configuration

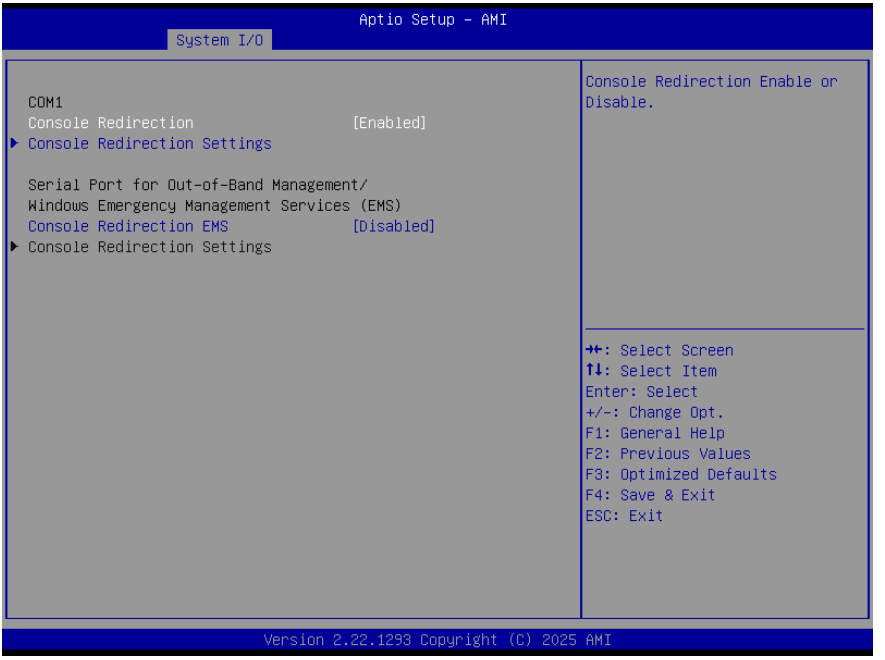


3.5.4 Serial Port Configuration



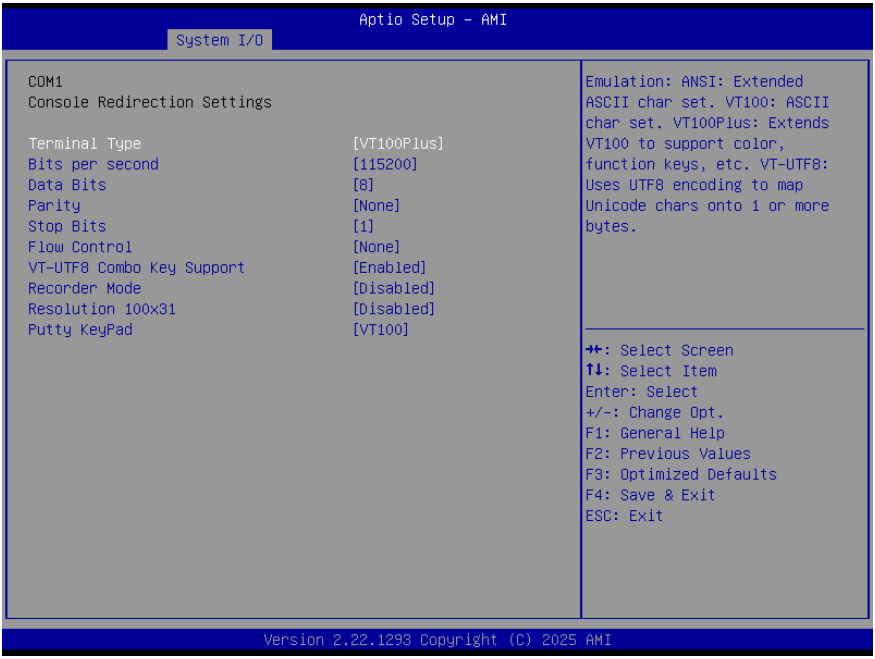
Options Summary	
Use This Device	Disabled
	Enabled
Enable or Disable this Logical Device.	
Possible:	**Use Automatic Settings**
	IO=3F8h; IRQ=4;
	IO=2F8h; IRQ=3;
Allows user to change Device's Resource settings. New settings will be reflected on This Setup Page after System restarts.	

3.5.5 Serial Port Console Redirection



Options Summary		
Console Redirection	Enabled	Optimal Default, Failsafe Default
	Disabled	
Console Redirection Enable or Disable.		
Console Redirection Settings		
The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.		
Console Redirection EMS	Enabled	
	Disabled	Optimal Default, Failsafe Default
Console Redirection Enable or Disable.		

3.5.5.1 COM1 Console Redirection Settings

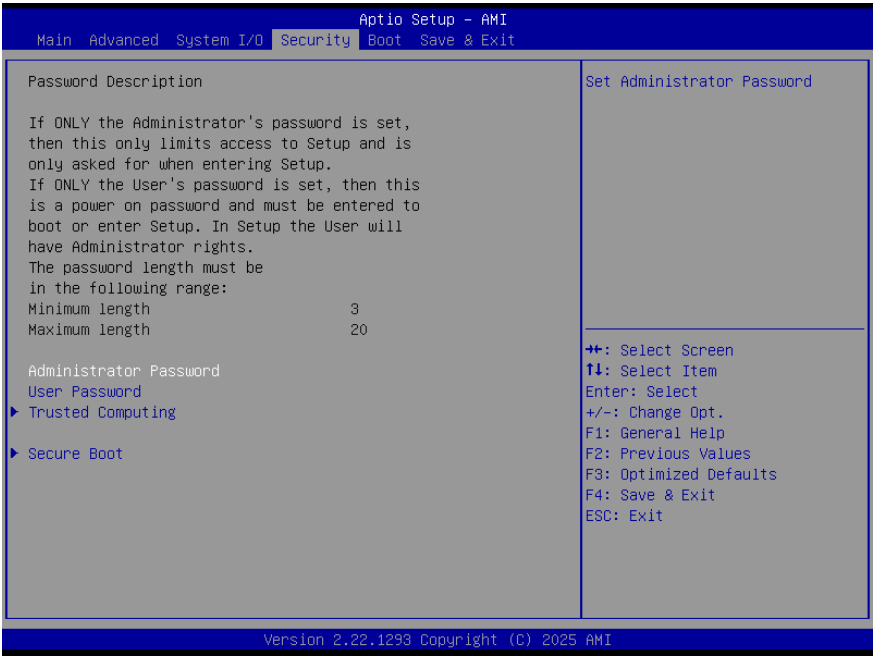


Options Summary		
Terminal Type	VT100	
	VT100Plus	Optimal Default, Failsafe Default
	VT-UTF8	
	ANSI	
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode.		
Bits per second	9600	
	19200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

Options Summary		
Data bit	7	
	8	Optimal Default, Failsafe Default
Data Bits		
Parity	None	Optimal Default, Failsafe Default
	Even	
	Odd	
	Mark	
	Space	
A Parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if the 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.		
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	Enabled	Optimal Default, Failsafe Default
	Disabled	
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	

Options Summary		
Enables or disables extended terminal resolution.		
Putty KeyPad	VT100	Optimal Default, Failsafe Default
	LINUX	
	XTERMR6	
	SCO	
	ESCN	
	VT400	
Select FunctionKey and KeyPad on Putty.		

3.6 Setup Submenu: Security



Change User/Administrator Password

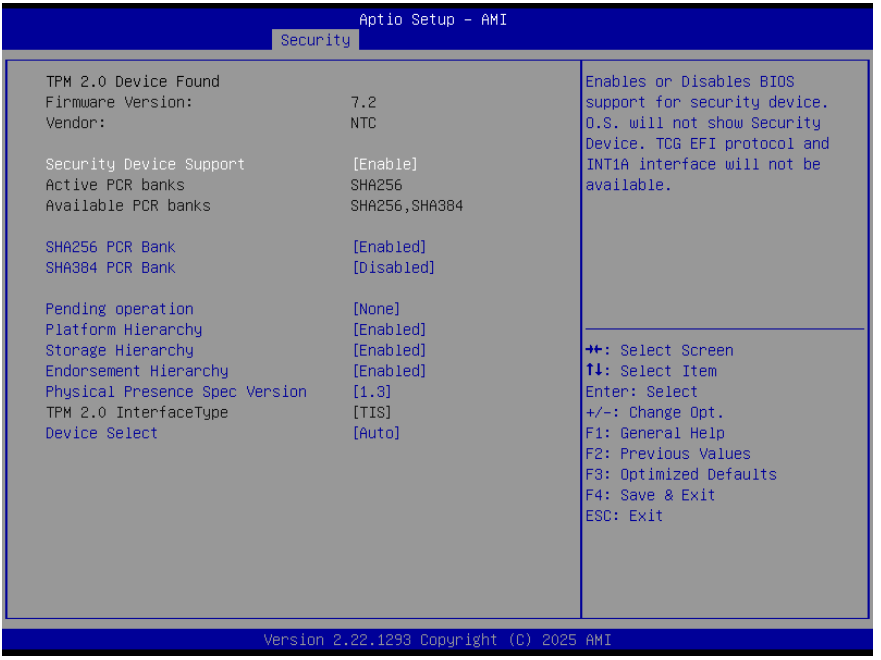
You can set an Administrator Password or User Password. An Administrator Password must be set before you can set a User Password. The password will be required during boot up, or when the user enters the Setup utility. A User Password does not provide access to many of the features in the Setup utility.

Select the password you wish to set, and press Enter. In the dialog box, enter your password (must be between 3 and 20 letters or numbers). Press Enter and retype your password to confirm. Press Enter again to set the password.

Removing the Password

Select the password you want to remove and enter the current password. At the next dialog box press Enter to disable password protection.

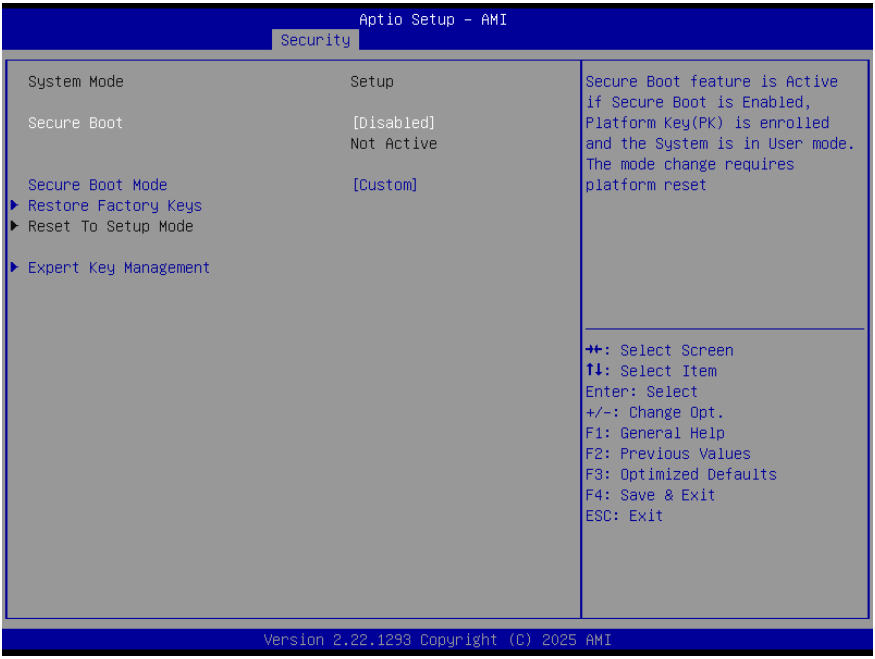
3.6.1 Trusted Computing



Options Summary	
Security Device Support	Disabled
	Enabled
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.	
SHA256 PCR Bank	Disabled
	Enabled
Enable or Disable SHA256 PCR Bank	
SHA384 PCR Bank	**Disabled**
	Enabled
Enable or Disable SHA384 PCR Bank.	
Pending operation	**None**
	TPM Clear
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.	

Options Summary	
Platform Hierarchy	Disabled
	Enabled
Enable or Disable Platform Hierarchy	
Storage Hierarchy	Disabled
	Enabled
Enable or Disable Storage Hierarchy	
Endorsement Hierarchy	Disabled
	Enabled
Enable or Disable Endorsement Hierarchy	
Physical Presence Spec Version	1.2
	1.3
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3	
TPM 2.0 InterfaceType	CRB
	TIS
Select the Communication Interface to TPM 20 Device.	
Device Select	TPM 1.2
	TPM 2.0
	Auto
TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found. TPM 1.2 devices will be enumerated.	

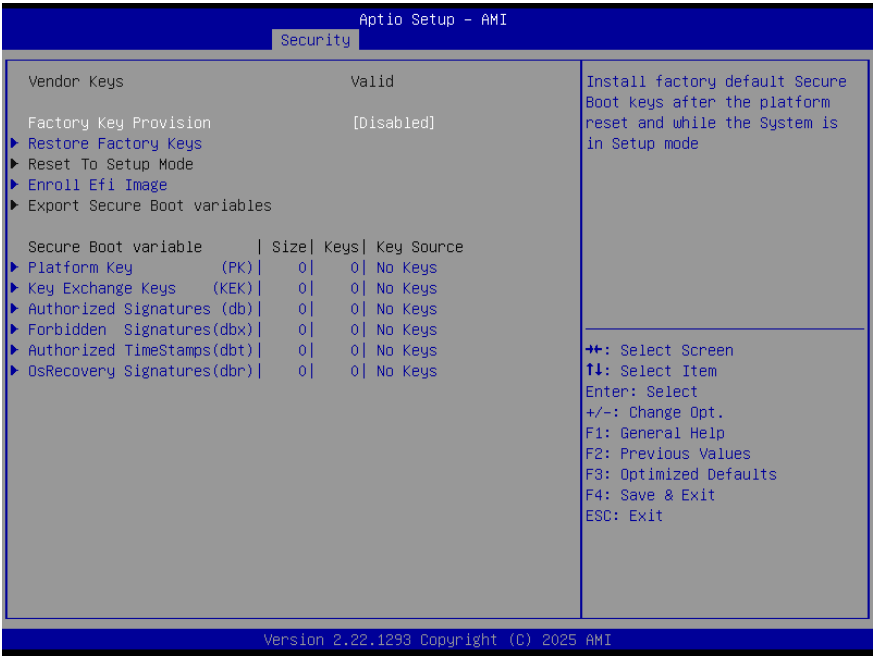
3.6.2 Secure Boot



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

Options Summary	
Reset To Setup Mode	Yes
	No
Delete all Secure Boot key databases from NVRAM	

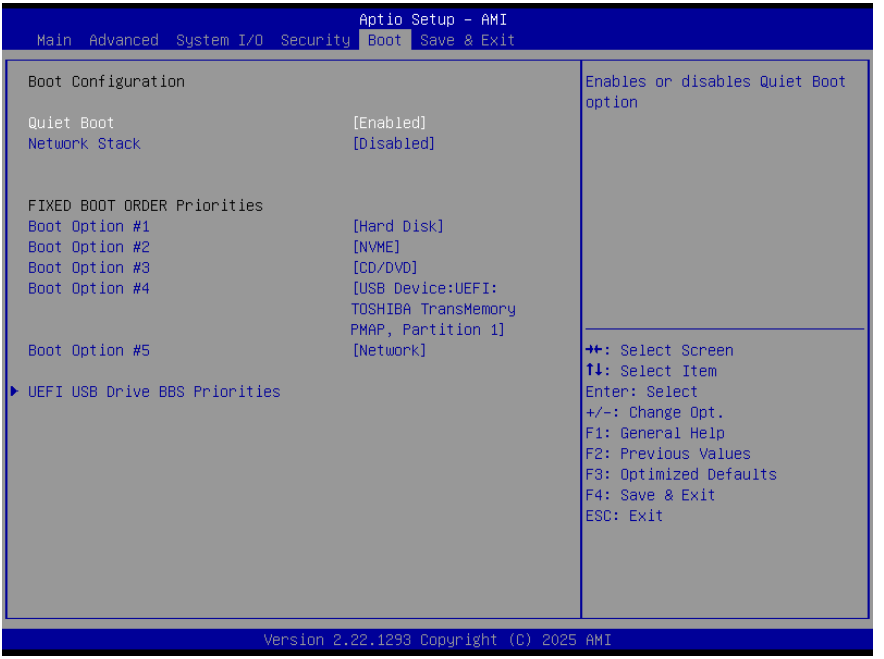
3.6.2.1 Key Management



Options Summary	
Factory Key Provision	Disabled
	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	
Reset To Setup Mode	Yes
	No
Delete all Secure Boot key databases from NVRAM	

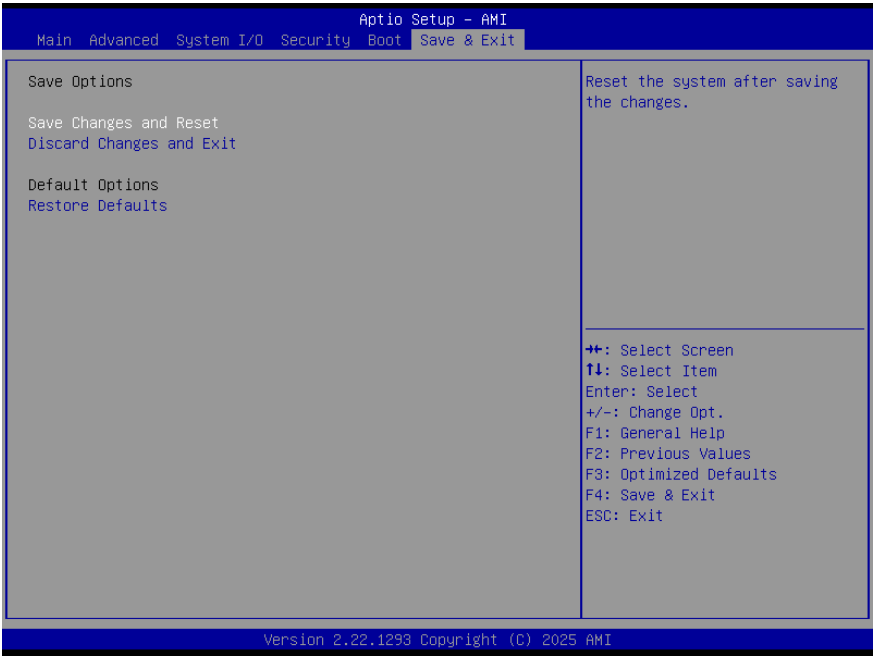
Options Summary	
Enroll Efi Image	OK
Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)	
Export Secure Boot variables	OK
Save NVRAM content of Secure Boot variable to a file	
Secure Boot Variables	
Enroll Factory Defaults or load certificates from a file: 1. Public Key Certificate in: a) EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER encoded) c) EFI_CERT_RSA2048 (bin) d) EFI_CERT_SHAXXX 2. Authenticated UEFI Variable 3. EFI PE/COFF Image (SHA256) Key Source: Default, External, Mixed	

3.7 Setup Submenu: Boot



Options Summary	
Quiet Boot	Disabled
	Enabled
Enables or disables Quiet Boot option.	
Network Stack	**Disabled**
	Enabled
Enable/Disable UEFI Network Stack	
FIXED BOOT ORDER Priorities	Sets the system boot order

3.8 Setup Submenu: Save & Exit



Options Summary	
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Exit	Exit system setup without saving any changes.
Restore Defaults	Restore/Load Default values for all the setup options.

Appendix A

Software Development Kit Information

A.1 Software Development Kit Support List

The FWS-2291 is available with a software development kit (SDK) supporting a range of additional functions and interfaces.

Function	SDK Support
Watchdog Timer	Yes
Software Programming Button	Yes
Status LED	Yes
LAN Bypass	Yes
DIO	Yes
HW Monitor	Yes
Case Open Function	Yes

For more information regarding the above SDK support list, please contact your AAEON or visit https://www.aaeon.com/en/contacts/ for more information.

Appendix B

Glue Removal Procedure

B.1 Removing Glue from Your System

To protect components from damage and ensure proper operation out of the box, glue may have been applied to some cables or connectors to keep them in place during shipping. This glue must be removed before attempting to swap components or perform maintenance. This section details the steps needed to remove the glue.

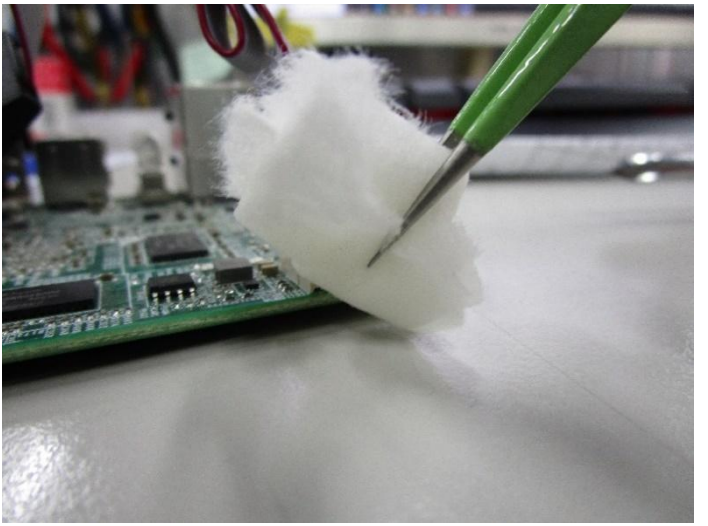
Before performing any kind of system maintenance, ensure the system is shut down (not in sleep or hibernate mode) and the power cable has been removed. Follow steps in Chapter 2 to access the components inside.

You will need the following items for this step:

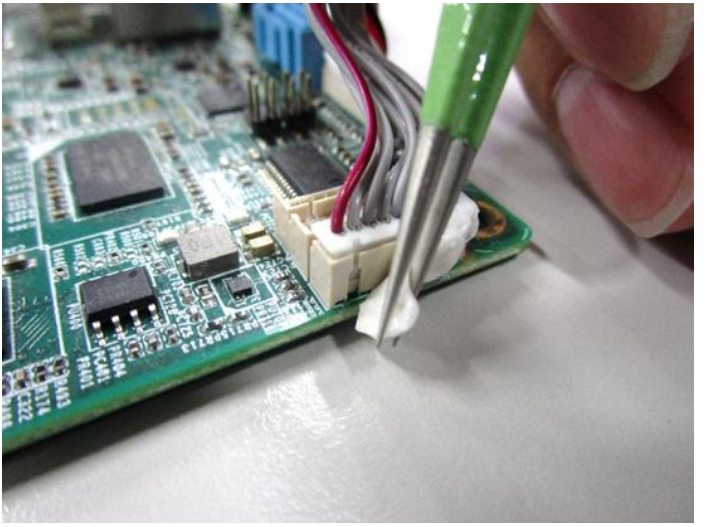
- Cotton or cotton swab
- Anti-static tweezers
- An alcohol solution that is at least 99.5% alcohol (ethanol solution or denatured alcohol). AAEON recommends using an eye dropper or a bottle with a nozzle as in the picture below:

Step 1: Using an eyedropper or bottle as shown above, apply a few drops of alcohol to the glue.

Step 2: Allow the alcohol to soak for 10 seconds, then use a cotton swab or cotton with anti-static tweezers to evenly rub the alcohol over the glue.



Step 3: Let soak for 10 more seconds, then use anti-static tweezers to remove the glue.



If you encounter any issues or need support, please contact your AAEON representative or visit our Support Page at AAEON.com