NanoCOM-ADN

COM Express Module

User's Manual 2nd Ed

Last Updated: February 10, 2025

Copyright Notice

Acknowledgements

Packing List

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

Item	Quantity
● NanoCOM-ADN	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 AAEON.com for the latest version of this document.

Safety Precautions

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

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

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
18. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

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 主板/子板/背板 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	×	○	○	○	○	○

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：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。

China RoHS Requirement (EN)

Name and content of hazardous substances in product

AAEON Main Board/Daughter Board/Backplane 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

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: This product defined period of use is under normal condition.

Table of Contents

Chapter 1

Product Specifications

1.1 Specifications

System	
Form Factor	COM Express Mini Size, Type 10
CPU	Intel Atom® x7000E Series: Intel Atom® x7425E (4C, 1.50 GHz, 12W) Intel® Processor N-series: Intel® Core™ i3-N305 (8C, up to 3.8 GHz, 15W) Intel® Processor N97 (4C, 2.00 GHz, 12W) Intel® Processor N50 (2C, 1.00 GHz, 6W)
Chipset	Integrated with Intel® SoC
Memory	Onboard LPDDR5x 4000MHz, 4-Channel, up to 16GB
Onboard Storage	eMMC, up to 64GB
BIOS	AMI UEFI
Wake on LAN	Yes
Watchdog Timer	255 Levels
Dimension	3.31" x 2.17" (84mm x 55mm)
Security	TPM 2.0

Power	
Power Requirement	+12V and +5VSB for ATX, +12V for AT
Power Type	AT/ATX, switch by BIOS
Power Consumption (Typical)	Intel® Core™ i3-N305, 2.32A @+12V

Display	
Graphics Controller	Intel® UHD Graphics
Video Output	Dual Display: DDI x 1, up to 3840 x 2160 18/24-bit Single-Channel LVDS x 1, up to 1024 x 768

I/O

Ethernet	Intel® Ethernet Controller I226-V, 2.5GbE x 1
Audio	High Definition Audio Interface
USB Port	USB 2.0 x 8
	USB 3.2 Gen 2 x 2
Serial Port	2-Wire UART x 2 (Tx/Rx)
HDD Interface	SATA 6Gb/s x 2
Expansion	PCIe 3.0 [x1] x 4
	LPC x 1
GPIO	8-bit
SMBus/I2C	I2C x 1
	SMBus x 1

Environmental

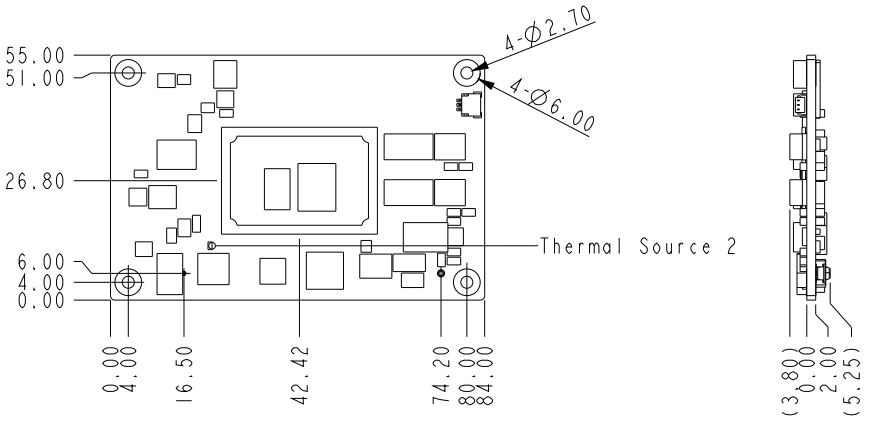
Operating Temperature	-4°F ~ 158°F (-20°C ~ 70°C)
Storage Temperature	-40°F ~ 185°F (-40°C ~ 85°C)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
EMC	CE/FCC Class A
OS Support	Windows® 10/11 (64-bit)
	Linux Ubuntu 22.04.4/Kernel 6.5
Weight	0.15 lb. (0.07Kg)

Chapter 2

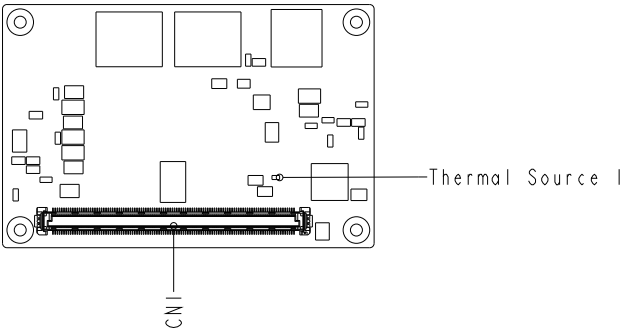
Hardware Information

2.1 Dimensions, Jumpers and Connectors

Top Side

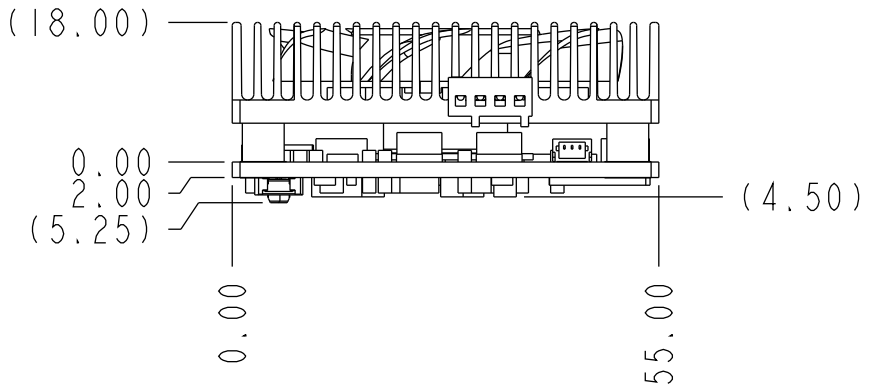


Bottom Side

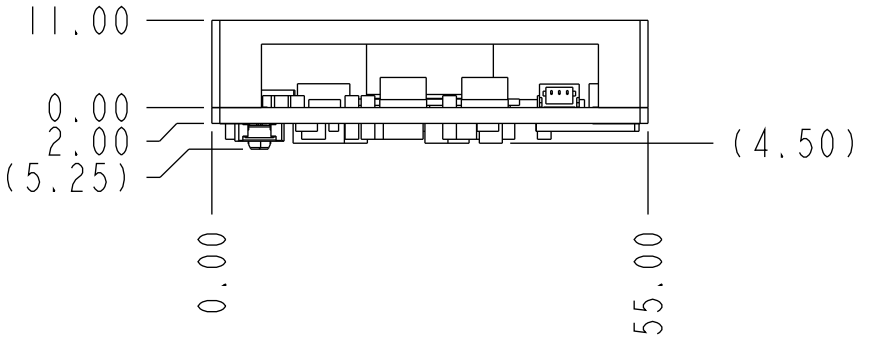


Thermal Solutions

With Active Cooler (P/N: NANOCOM-ADN-FAN01)



With Heat Spreader (P/N: NANOCOM-ADN-HSP01)



2.2 List of Jumpers and Connectors

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

Label	Function
CN1	Row A/B

2.2.1 ROW A/B Connector (CN1)

Row A		Row B	
Pin	Name	Pin	Name
A1	GND_0	B1	GND_15
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#/ESPI_CS0#
A4	GBE0_LINK100#	B4	LPC_AD0/ESPI_IO_0
A5	GBE0_LINK1000#	B5	LPC_AD1/ESPI_IO_1
A6	GBE0_MDI2-	B6	LPC_AD2/ESPI_IO_2
A7	GBE0_MDI2+	B7	LPC_AD3/ESPI_IO_3
A8	GBE0_LINK#	B8	LPC_DRQ0#/ESPI_ALERT0# (NC)
A9	GBE0_MDI1-	B9	LPC_DRQ1#/ESPI_ALERT1# (NC)
A10	GBE0_MDI1+	B10	LPC_CLK/ESPI_CK
A11	GND_1	B11	GND_16
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CLK
A14	GBE0_CTREF (NC)	B14	SMB_DAT
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#/ESPI_RESET#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-

Row A		Row B	
Pin	Name	Pin	Name
A21	GND_2	B21	GND_17
A22	USB_SSRX0-	B22	USB_SSTX0-
A23	USB_SSRX0+	B23	USB_SSTX0+
A24	SUS_S5#	B24	PWR_OK
A25	USB_SSRX1-	B25	USB_SSTX1-
A26	USB_SSRX1+	B26	USB_SSTX1+
A27	BATLOW#	B27	WDT
A28	(S)ATA_ACT#	B28	HDA_SDIN2/SNDW0_CLK (NC)
A29	HDA_SYNC	B29	HDA_SDIN1/SNDW0_DAT
A30	HDA_RST#	B30	HDA_SDIN0
A31	GND_3	B31	GND_18
A32	HDA_BITCLK	B32	SPKR
A33	HDA_SDOUT	B33	I2C_CK
A34	BIOS_DIS0#/ESPI_SAFS	B34	I2C_DAT
A35	THRMTRIP#	B35	THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+
A41	GND_4	B41	GND_19
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	ESPI_EN#
A48	RSMRST_OUT#	B48	USB0_HOST_PRSNT (NC)
A49	GBE0_SDP	B49	SYS_RESET#
A50	LPC_SERIRQ/ESPI_CS1#	B50	CB_RESET#
A51	GND_5	B51	GND_20

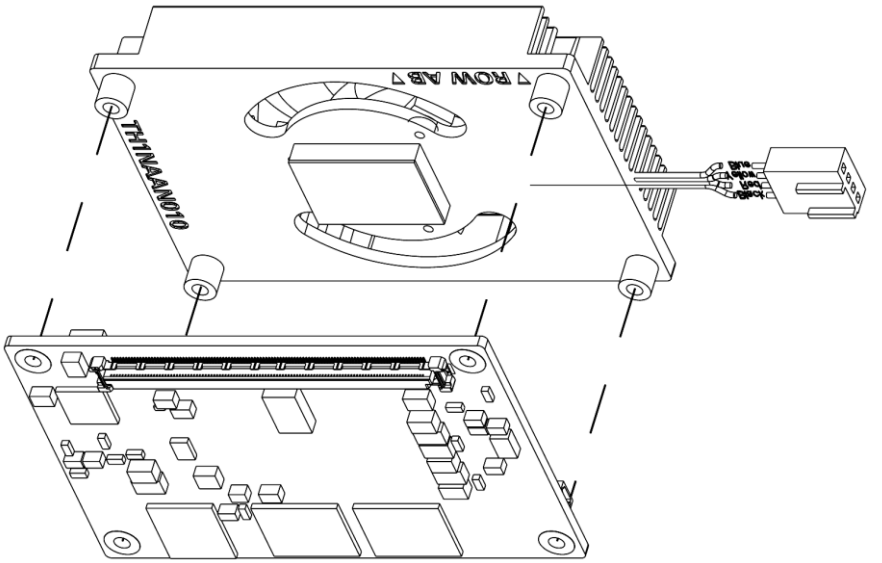
Row A		Row B	
Pin	Name	Pin	Name
A52	RSVD_13 (NC)	B52	RSVD_11 (NC)
A53	RSVD_14 (NC)	B53	RSVD_12 (NC)
A54	GPI0	B54	GPO1
A55	GP_SPI_CS#	B55	GP_SPI_MISO
A56	GP_SPI_CK	B56	GP_SPI_MOSI
A57	GND_6	B57	GPO2
A58	PCIE_TX3+	B58	PCIE_RX3+
A59	PCIE_TX3-	B59	PCIE_RX3-
A60	GND_7	B60	GND_21
A61	PCIE_TX2+	B61	PCIE_RX2+
A62	PCIE_TX2-	B62	PCIE_RX2-
A63	GPI1	B63	GPO3
A64	PCIE_TX1+	B64	PCIE_RX1+
A65	PCIE_TX1-	B65	PCIE_RX1-
A66	GND_8	B66	WAKE0#
A67	GPI2	B67	WAKE1#
A68	PCIE_TX0+	B68	PCIE_RX0+
A69	PCIE_TX0-	B69	PCIE_RX0-
A70	GND_9	B70	GND_22
A71	LVDS_A0+	B71	DDI0_PAIR0+
A72	LVDS_A0-	B72	DDI0_PAIR0-
A73	LVDS_A1+	B73	DDI0_PAIR1+
A74	LVDS_A1-	B74	DDI0_PAIR1-
A75	LVDS_A2+	B75	DDI0_PAIR2+
A76	LVDS_A2-	B76	DDI0_PAIR2-
A77	LVDS_VDD_EN	B77	DDI0_PAIR4+ (NC)
A78	LVDS_A3+	B78	DDI0_PAIR4- (NC)
A79	LVDS_A3-	B79	LVDS_BKLD_EN
A80	GND_10	B80	GND_23
A81	LVDS_A_CK+	B81	DDI0_PAIR3+
A82	LVDS_A_CK-	B82	DDI0_PAIR3-

Row A		Row B	
Pin	Name	Pin	Name
A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTLR
A84	LVDS_I2C_DAT	B84	VCC_5V_SBY_0
A85	GPI3	B85	VCC_5V_SBY_1
A86	RSVD_0	B86	VCC_5V_SBY_2
A87	eDP_HPD	B87	VCC_5V_SBY_3
A88	PCIE0_CK_REF+	B88	BIOS_DIS1#
A89	PCIE0_CK_REF-	B89	DDI0_HPD
A90	GND_12	B90	GND_24
A91	SPI_POWER	B91	DDI0_PAIR5+ (NC)
A92	SPI_MISO	B92	DDI0_PAIR5- (NC)
A93	GPO0	B93	DDI0_PAIR6+ (NC)
A94	SPI_CLK	B94	DDI0_PAIR6- (NC)
A95	SPI_MOSI	B95	DDI0_DDC_AUX_SEL
A96	TPM_PP	B96	USB7_HOST_PRSNT (NC)
A97	TYPE10#	B97	SPI_CS#
A98	RS1_TX	B98	DDI0_CTRLCLK_AUX+
A99	RS1_RX	B99	DDI0_CTRLDATA_AUX-
A100	GND_13	B100	GND_25
A101	RS2_TX	B101	FAN_PWMOUT
A102	RS2_RX	B102	FAN_TACHIN
A103	LID#	B103	SLEEP#
A104	VCC_12V_0	B104	VCC_12V_6
A105	VCC_12V_1	B105	VCC_12V_7
A106	VCC_12V_2	B106	VCC_12V_8
A107	VCC_12V_3	B107	VCC_12V_9
A108	VCC_12V_4	B108	VCC_12V_10
A109	VCC_12V_5	B109	VCC_12V_11
A110	GND_14	B110	GND_26

2.3 Thermal Solution Installation

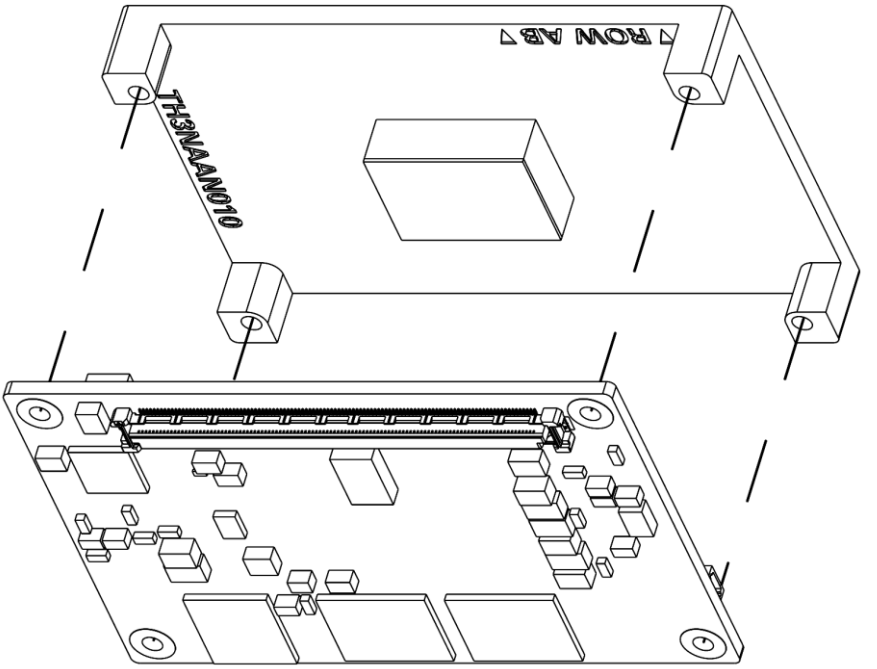
2.3.1 Fan Assembly

Tighten all four screws following the alignment shown below in order to affix the fan to the NanoCOM-ADN.



2.3.2 Heat Spreader Assembly

Tighten all four screws following the alignment shown below in order to affix the heat spreader to the NanoCOM-ADN.



Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The board 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 – For BIOS standard features

System I/O – For hosting bridge parameters

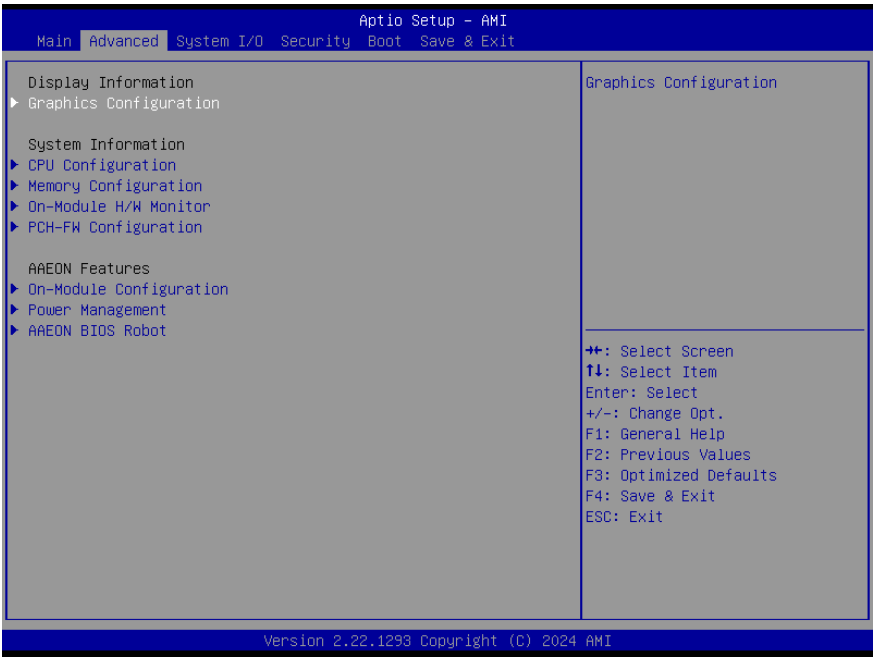
Security – The setup administrator password can be set here

Boot – Enable/ Disable Boot Option

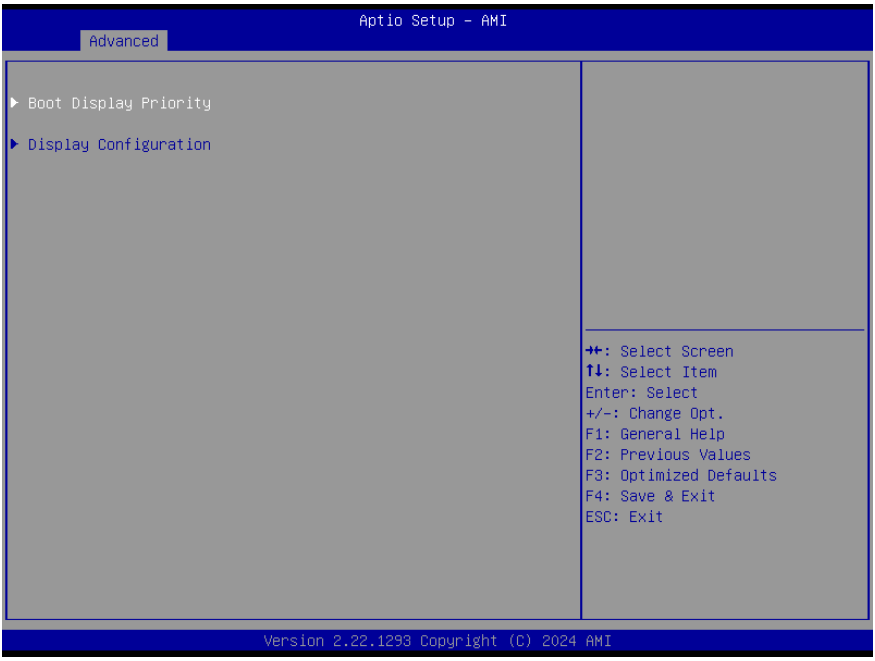
Save & Exit –Save your changes and exit the program

3.3 Setup Submenu: Main

3.4 Setup Submenu: Advanced

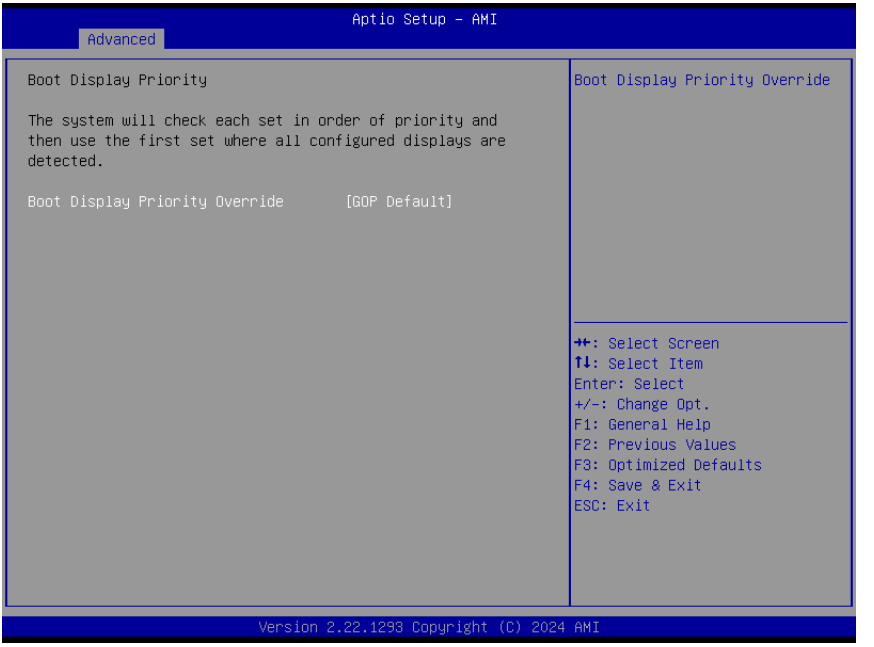


3.4.1 Graphics Configuration



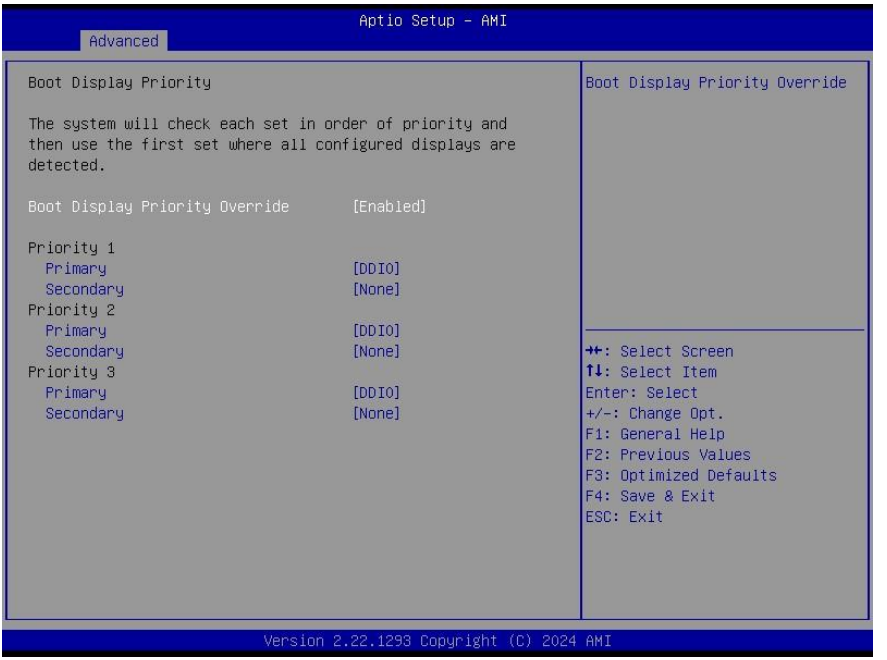
3.4.1.1 Boot Display Priority Override

Mode 1: GOP Default



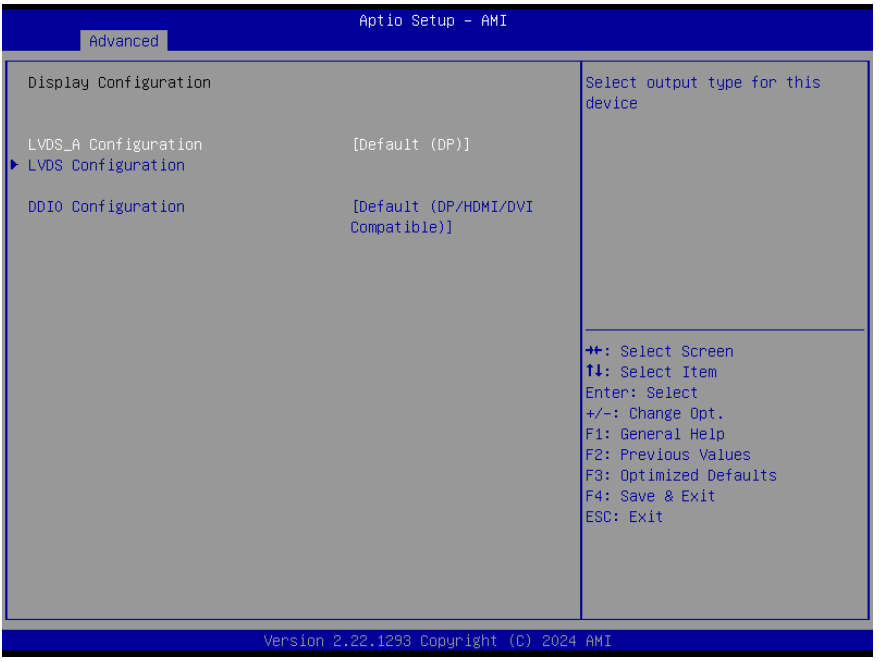
Options Summary		
Boot Display Priority Override	Enabled	
	GOP Default	Optimal Default, Failsafe Default
Boot Display Priority Override		

Mode 2: Enabled



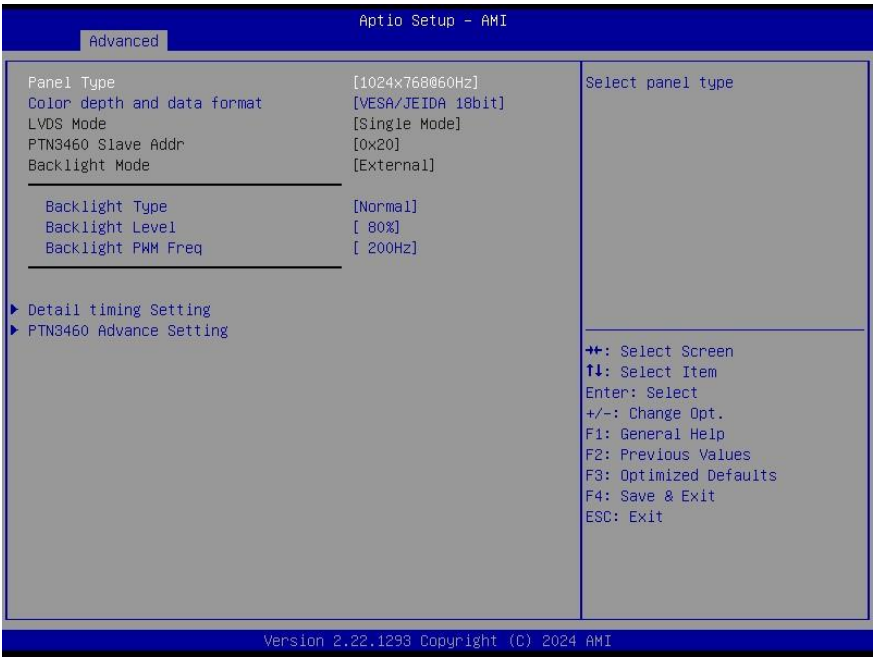
Options Summary		
Primary	None	
	LVDS_A	
	DDI0	Optimal Default, Failsafe Default
Secondary	None	Optimal Default, Failsafe Default
	LVDS_A	
	DDI0	
Boot Display Priority Override.		

3.4.1.2 Display Configuration



Options Summary		
LVDS_A Configuration	No Device (Disable)	
	Default (DP)	Optimal Default, Failsafe Default
Select output type for this device		
DDI0 Configuration	DP	
	HDMI/DVI	
	Default (DP/HDMI/DVI Compatible)	Optimal Default, Failsafe Default
Select output type for this device		

3.4.1.2.1 LVDS Configuration

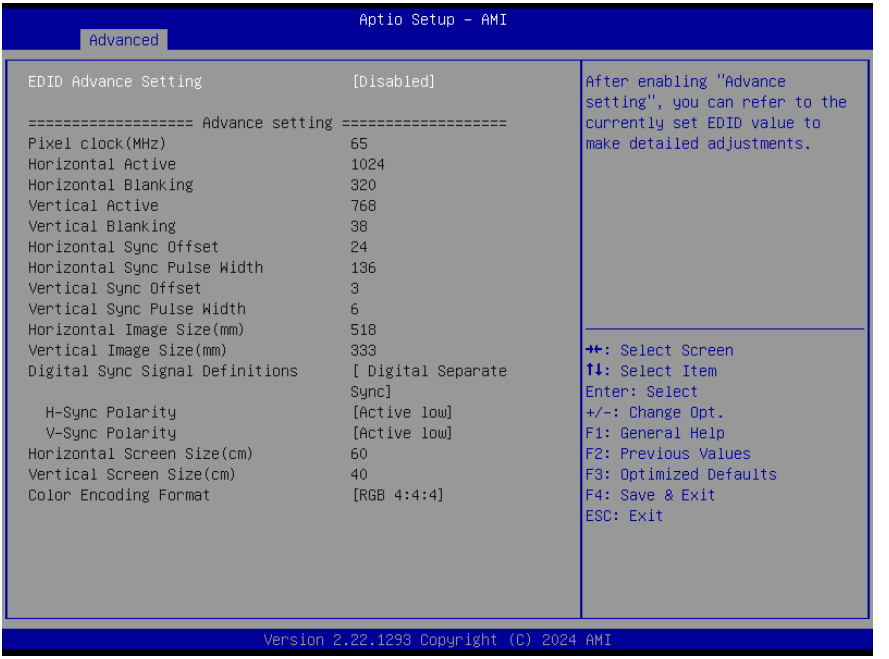


Options Summary		
Panel Type	640x480@60Hz	
	800x480@60Hz	
	800x600@60Hz	
	1024x600@60Hz	
	1024x768@60Hz	Optimal Default, Failsafe Default
	1280x768@60Hz	
	1280x800@60Hz	
	1280x1024@60Hz	
	1366x768@60Hz	
	1440x900@60Hz	
	1600x1200@60Hz	
	1920x1080@60Hz	
	1920x1200@60Hz	
Select panel type.		

Options Summary		
Color Depth	VESA 24bit	
	JEIDA 24bit	
	VESA/JEDIA 18bit	Optimal Default, Failsafe Default
Color depth and data packing format. If need to set it to 36/48 bit mode, please also set "LVDS Mode" to "Dual Mode"		
LVDS Mode	Single Mode	Optimal Default, Failsafe Default
Single / Dual Mode.		
Backlight Type	Normal	Optimal Default, Failsafe Default
	Inverted	
Select backlight control signal type.		
Backlight Level	0%	
	10%	
	20%	
	30%	
	40%	
	50%	
	60%	
	70%	
	80%	Optimal Default, Failsafe Default
	90%	
	100%	
Select backlight control level		
Backlight PWM Freq	100Hz	
	200Hz	Optimal Default, Failsafe Default
	220Hz	
	500Hz	
	1KHz	
	2.2KHz	
	6.5KHz	
Select PWM frequency of backlight control signal		

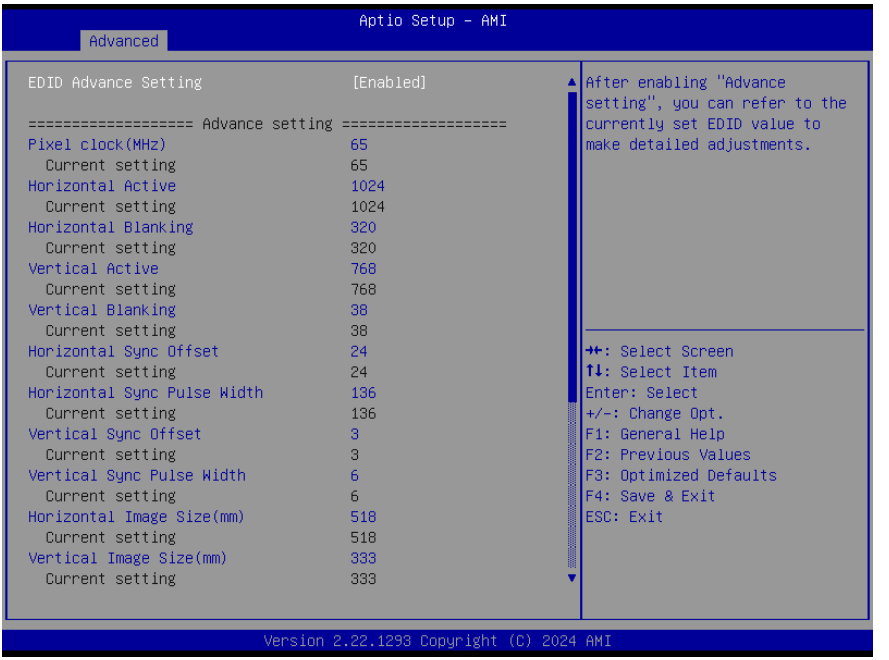
3.4.1.2.2 EDID Advance Setting

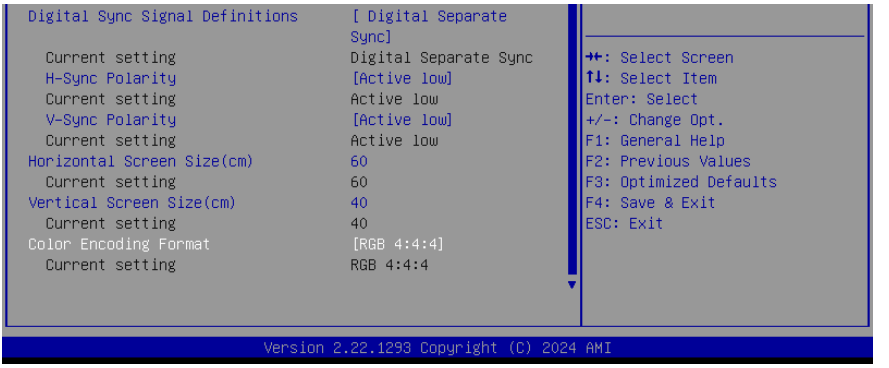
Mode 1: Disabled



Options Summary		
EDID Advance Setting	Disabled	Optimal Default, Failsafe Default
	Enabled	
After enabling "Advance setting", you can refer to the currently set EDID value to make detailed adjustments.		

Mode 2: Enabled

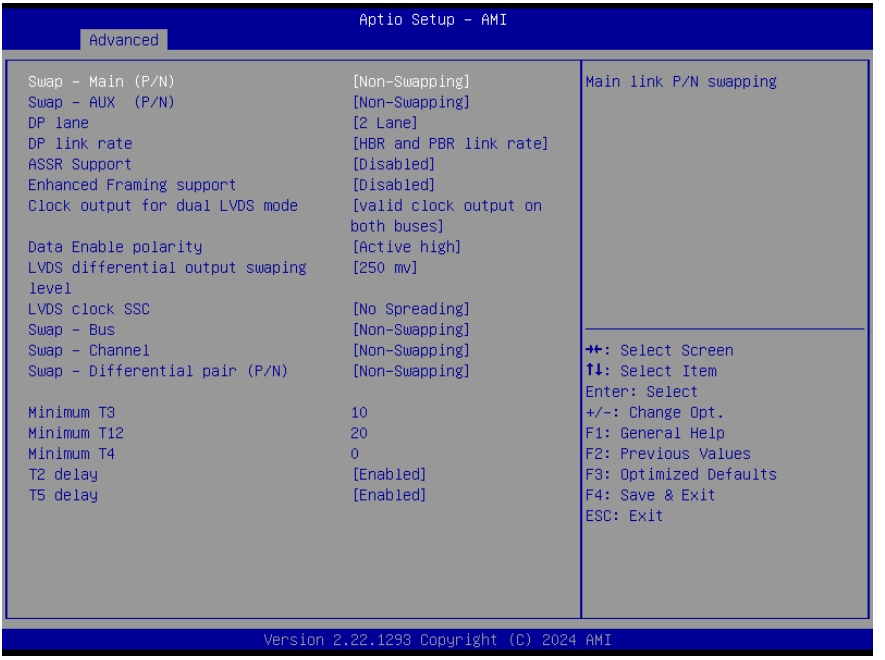




Options Summary		
Pixel clock (MHz)	65	Optimal Default, Failsafe Default
Pixel clock setting in MHz		
Horizontal Active	1024	Optimal Default, Failsafe Default

Options Summary		
Horizontal Addressable Video in pixels		
Horizontal Blanking	320	Optimal Default, Failsafe Default
Horizontal Blanking in pixels		
Vertical Active	768	Optimal Default, Failsafe Default
Vertical Addressable Video in lines		
Vertical Blanking	38	Optimal Default, Failsafe Default
Vertical Blanking in lines		
Horizontal Sync Offset	24	Optimal Default, Failsafe Default
Horizontal Front Porch in pixels		
Horizontal Sync Pulse Width	136	Optimal Default, Failsafe Default
Horizontal Sync Pulse Width in pixels		
Vertical Sync Offset	3	Optimal Default, Failsafe Default
Vertical Front Porch in Lines		
Vertical Sync Pulse Width	6	Optimal Default, Failsafe Default
Vertical Sync Pulse Width in Lines		
Horizontal Image Size (mm)	518	Optimal Default, Failsafe Default
The horizontal and vertical addressable video image size, define the addressable video size of the displayed image (derived from the incoming video signal).		
Vertical Image Size (mm)	333	Optimal Default, Failsafe Default
The horizontal and vertical addressable video image size, define the addressable video size of the displayed image (derived from the incoming video signal).		
Digital Sync Signal Definitions	Digital Separate Sync	Optimal Default, Failsafe Default
Digital Sync Signal Definitions		
H-Sync Polarity	Active low	Optimal Default, Failsafe Default
H-Sync Polarity		
V-Sync Polarity	Active low	Optimal Default, Failsafe Default
V-Sync Polarity		
Horizontal Screen Size (cm)	60	Optimal Default, Failsafe Default
The active physical screen size of the display device		
Vertical Screen Size (cm)	40	Optimal Default, Failsafe Default
The active physical screen size of the display device		
Color Encoding Format	RGB 4:4:4	Optimal Default, Failsafe Default
Color Encoding Format		

3.4.1.2.3 PTN3460 Advance Setting



Options Summary		
Swap – Main (P/N)	Non-Swapping	Optimal Default, Failsafe Default
	Swapped	
Main link P/N swapping		
Swap – AUX (P/N)	Non-Swapping	Optimal Default, Failsafe Default
	Swapped	
AUX P/N swapping		
DP lane	2 Lane	Optimal Default, Failsafe Default
	1 Lane	
DP lan configuration		
DP link rate	HBR and PBR link rate	Optimal Default, Failsafe Default
	RBR link rate only DP lane	
DP link configuration		
ASSR Support	Disabled	Optimal Default, Failsafe Default
	Enabled	
Alternative Scrambler Seed Reset		

Options Summary		
Enhanced Framing support	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enhanced Framing support		
Clock output for dual LVDS mode	Valid clock output on both buses	Optimal Default, Failsafe Default
	Valid clock output on even bus only	
	Valid clock output on odd bus only	
Clock output for dual LVDS mode		
Data Enable polarity	Active high	Optimal Default, Failsafe Default
	Active low	
Data enable polarity		
LVDS differential output swapping level	250 mv	Optimal Default, Failsafe Default
	150 mv	
	200 mv	
	300 mv	
	350 mv	
	400 mv	
	450 mv	
LVDS differential output swapping level		
LVDS clock SSC	No Spreading	Optimal Default, Failsafe Default
	0.5% Spreading	
	1.0% Spreading	
	1.5% Spreading	
	2.0% Spreading	
	2.5% Spreading	
LVDS clock frequency center spreading depth		
Swap -Bus	Non-Swapping	Optimal Default, Failsafe Default
	Swapped	
Odd bus <-> Even bus		
Swap - Channel	Non-Swapping	Optimal Default, Failsafe Default
	Swapped	
(A <-> D, B<-> CLK, C <-> C)		
Swap – Differential pair (P/N)	Non-Swapping	Optimal Default, Failsafe Default
	Swapped	
Differential pair (P/N) swapping		
Minimum T3	10	Optimal Default, Failsafe Default
Minimum T3 timing of panel power sequence to enforce (expressed in units of 50ms)		

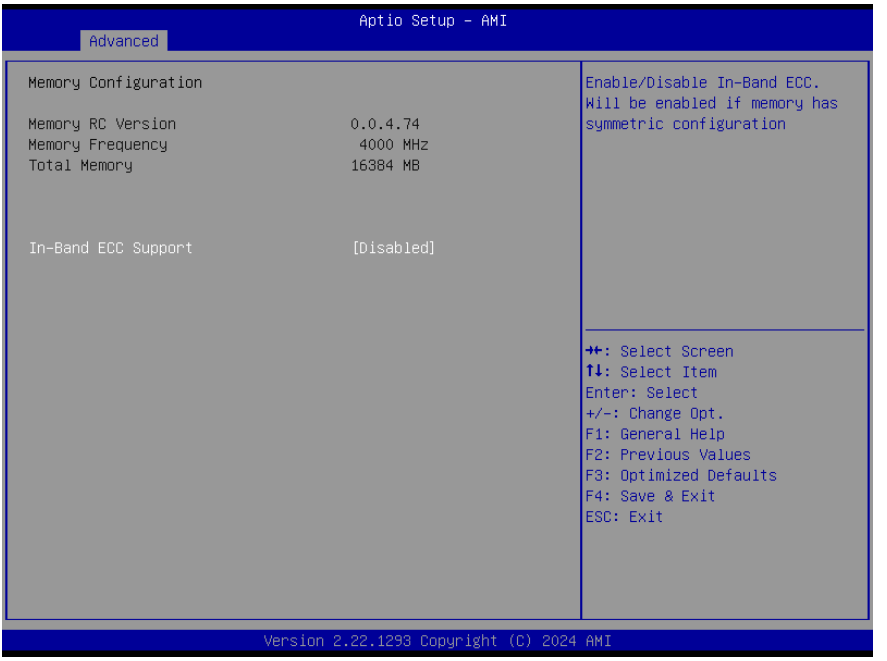
Options Summary		
Minimum T2	20	Optimal Default, Failsafe Default
Minimum T2 timing of panel power sequence to enforce (expressed in units of 50ms)		
Minimum T4	0	Optimal Default, Failsafe Default
Minimum T4 timing of panel power sequence to enforce (expressed in units of 50ms)		
T2 delay	Disabled	
	Enabled	Optimal Default, Failsafe Default
T2 is delayed by 20ms		
T5 delay	Disabled	
	Enabled	Optimal Default, Failsafe Default
T5 is delayed by 20ms		

3.4.2 CPU Configuration

Options Summary		
Intel (VMX) Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default

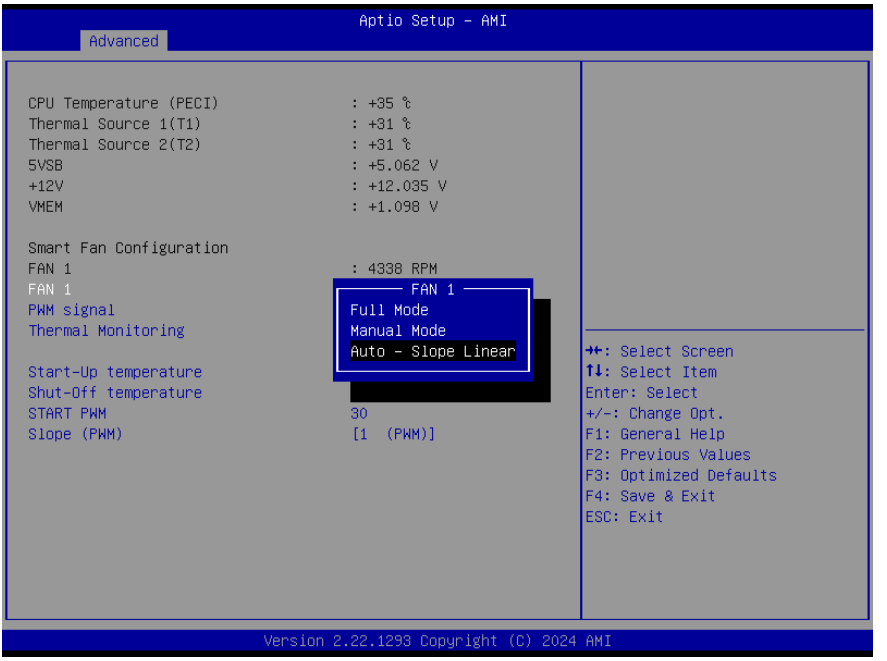
Options Summary		
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
Intel(R) SpeedStep(tm)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Allows more than two frequency ranges to be supported.		
Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.		
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.		

3.4.3 Memory Configuration



Options Summary		
In-Band ECC Support	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable In-Band ECC. Will be enabled if memory has symmetric configuration		

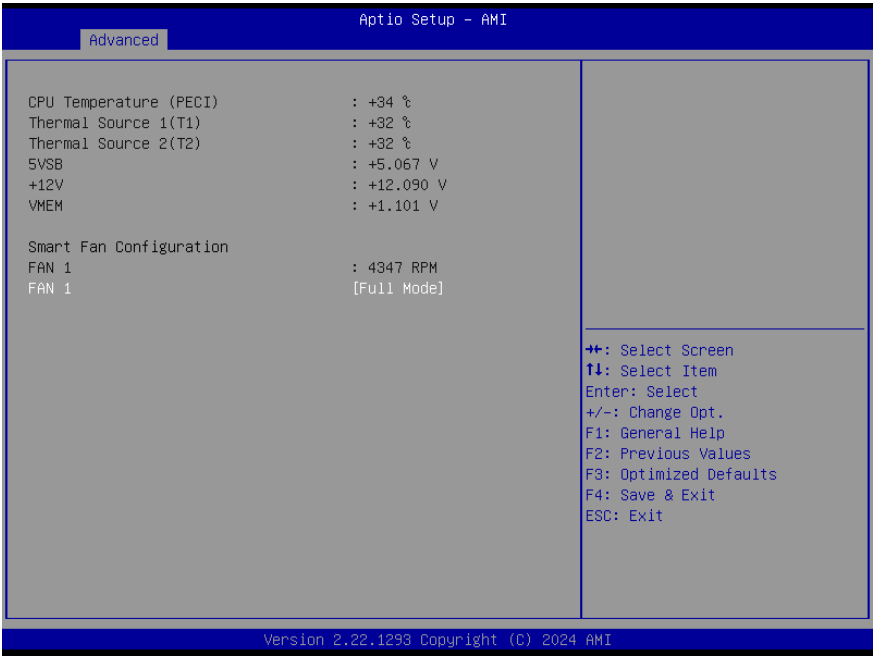
3.4.4 On-Module Hardware Monitor



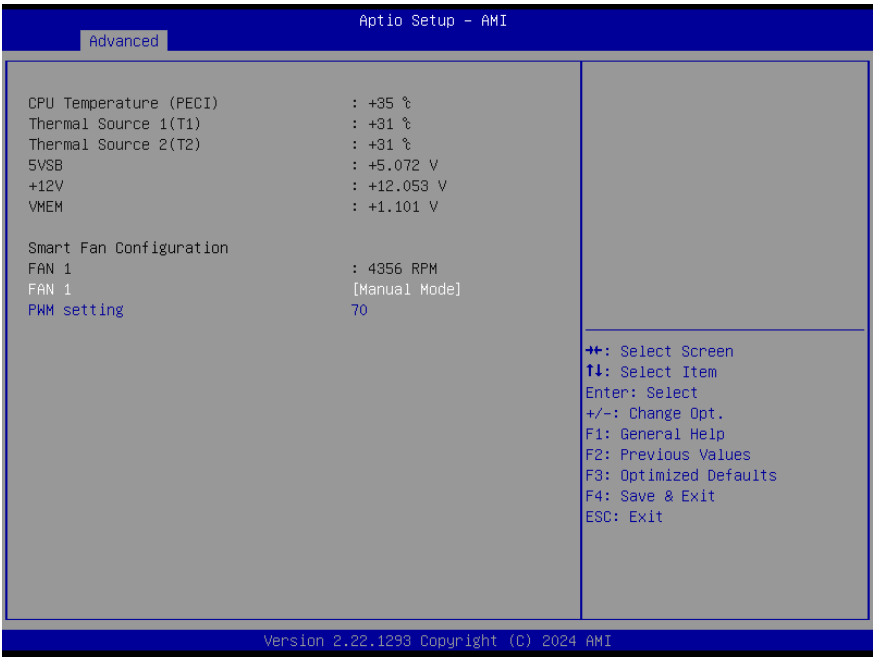
Options Summary		
FAN 1	Full Mode	
	Manual Mode	
	Auto – Slope Linear	Optimal Default, Failsafe Default
Smart Fan Mode Select.		

3.4.4.1 Smart Fan Mode Configuration

FAN 1: Full Mode

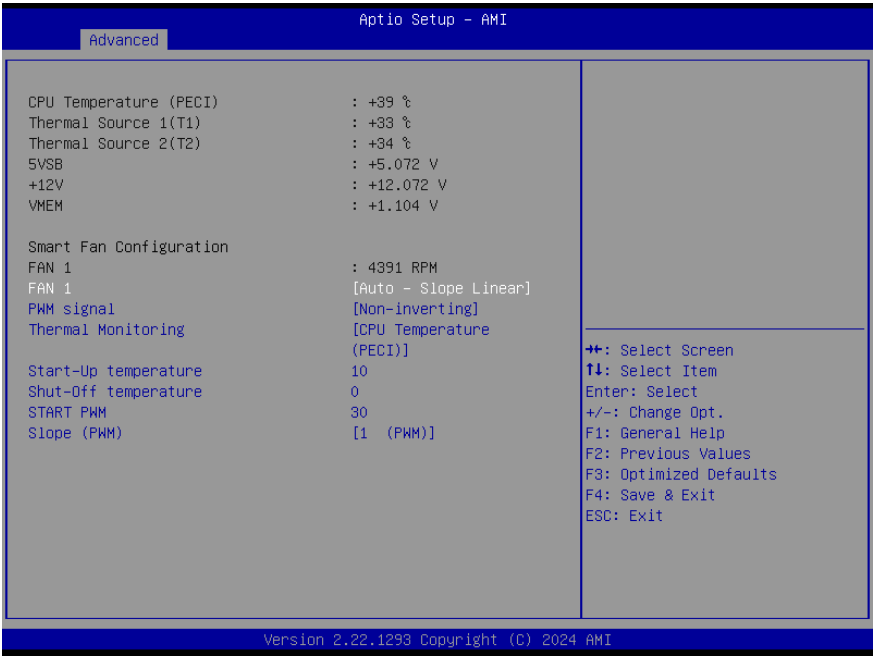


FAN 1: Manual Mode



Options Summary		
PWM Setting	70	Optimal Default, Failsafe Default
The PWM value of manual mode. Range: 0 – 100.		

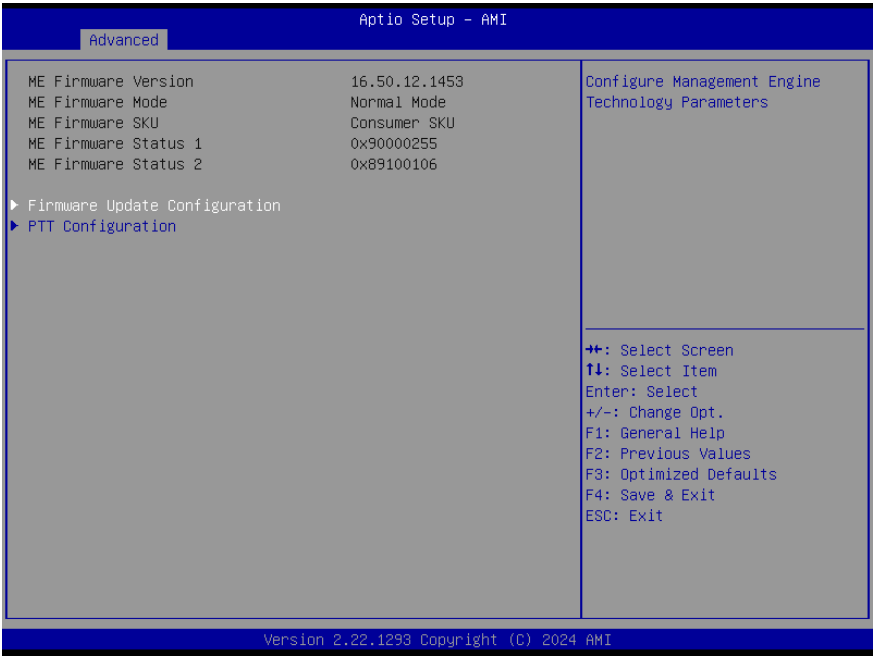
FAN 1: Auto – Slope Linear



Options Summary		
PWM signal	Non-inverting	Optimal Default, Failsafe Default
	Inverting	
Select output PWM of inverting or non-inverting signal.		
Thermal Monitoring	CPU Temperature (PECI)	Optimal Default, Failsafe Default
	Thermal Source 1 (T1)	
	Thermal Source 2 (T2)	
Monitoring thermal sensor select.		
Start – Up temperature	10	Optimal Default, Failsafe Default
PWM output when monitoring thermal sensor is exceeded. Range: 0 – 100.		
Shut – Off temperature	0	Optimal Default, Failsafe Default
PWM turns off when monitored thermal sensor is less or equal to. Range: 0 – 100.		
START PWM	30	Optimal Default, Failsafe Default
The beginning PWM output value when Start-Up temperature is triggered.		
Slope (PWM)	0 (PWM)	
	1 (PWM)	Optimal Default, Failsafe Default

Options Summary		
Slope (PWM) Cont.	2 (PWM)	
	4 (PWM)	
	8 (PWM)	
	16 (PWM)	
	32 (PWM)	
	64 (PWM)	
When the monitored temperature is higher than the Start-Up temperature, the PWM output increases per degree.		

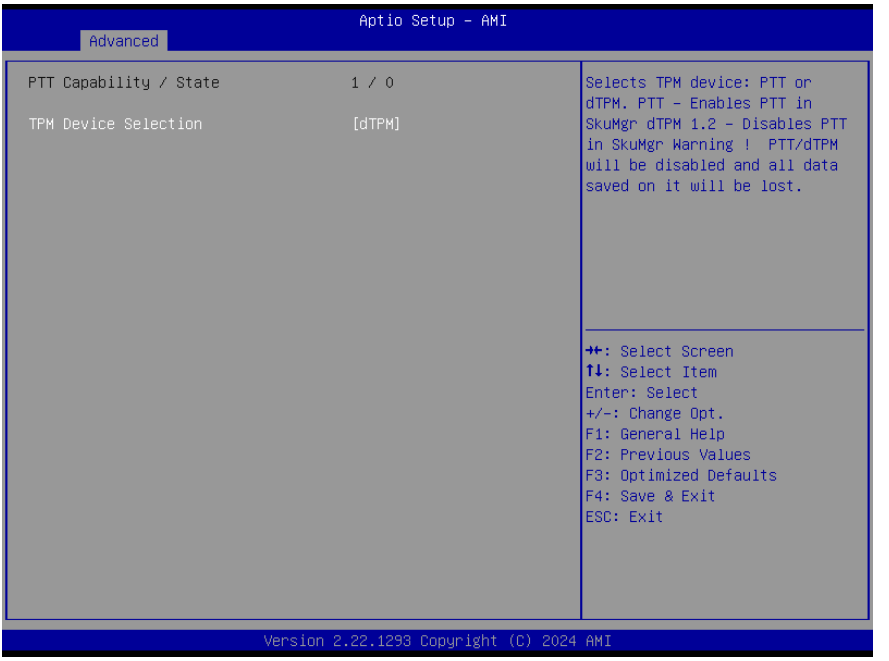
3.4.5 PCH-FW Configuration



3.4.5.1 Firmware Update Configuration

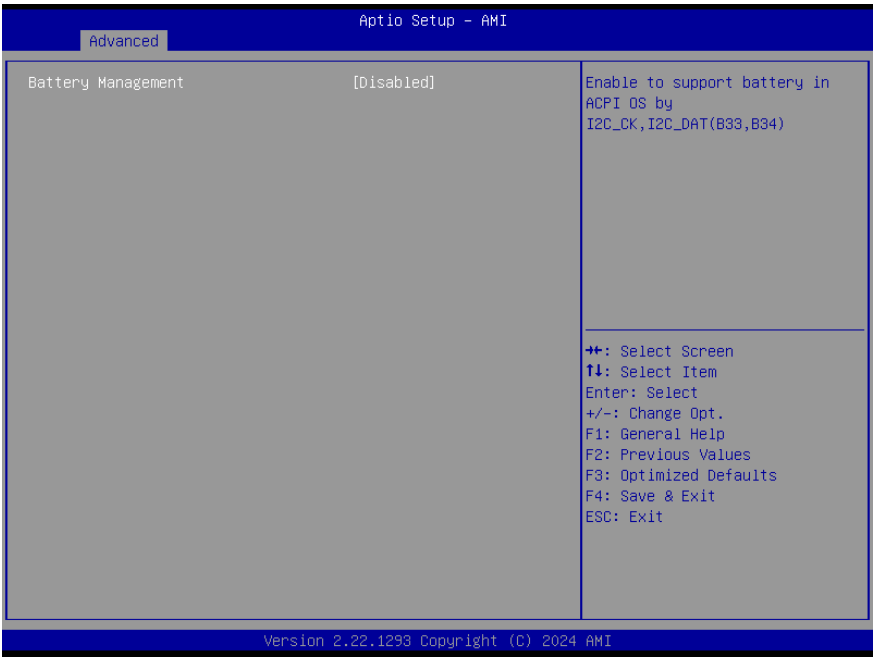
Options Summary		
ME FW Image Re-Flash	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable Me FW Image Re-Flash function.		
FW Update	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable ME FW Update function.		

3.4.5.2 PTT Configuration



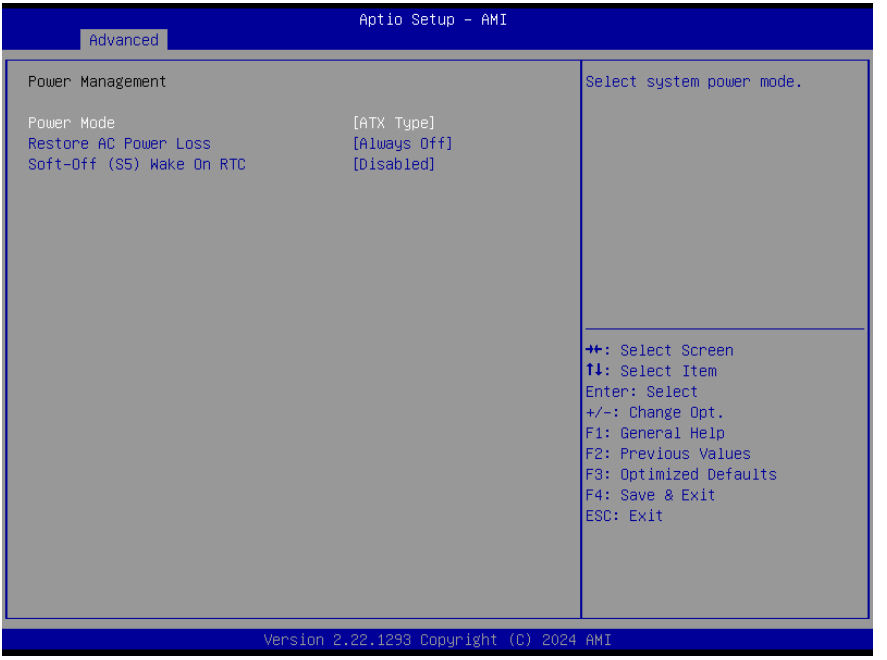
Options Summary		
TPM Device Selection	dTPM	Optimal Default, Failsafe Default
	PTT	
Selects TPM device: PTT or dTPM. PTT – Enables PTT in SkuMgr dTPM 1.2 – Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.		

3.4.6 On-Module Configuration



Options Summary		
Battery Management	Disabled	Optimal Default, Failsafe Default
	One Battery	
Enable to support battery in ACPI OS by I2C_CK, I2C_DAT (B33, B34)		

3.4.7 Power Management



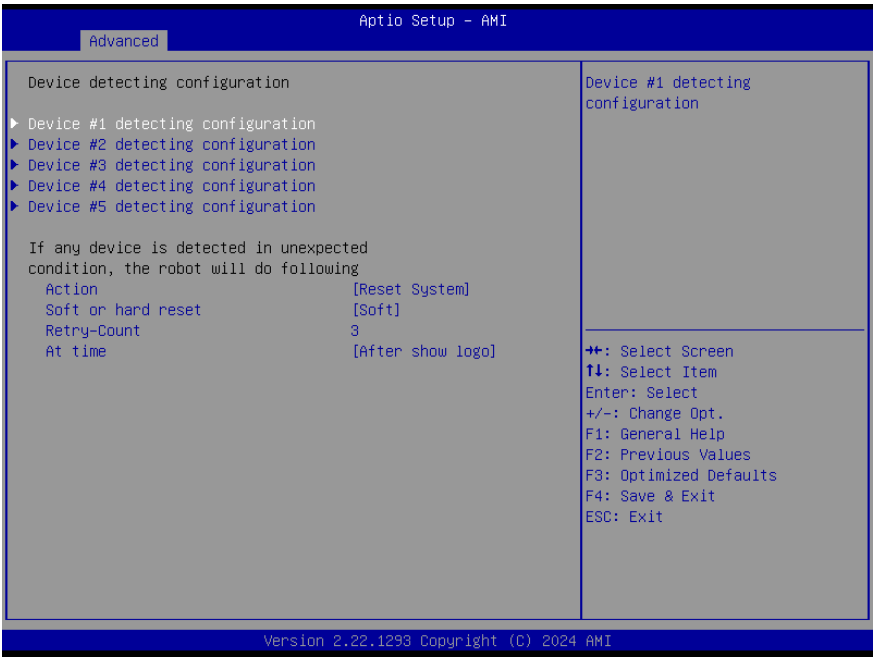
Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select system power mode.		
Restore AC Power Loss	Last State	
	Always On	
	Always Off	Optimal Default, Failsafe Default
SIO Restore AC Power Loss: To decide the behavior after system power cut then resupply. Note: The CMOS battery must be present.		
Soft-Off (S5) Wake On RTC	Disabled	Optimal Default, Failsafe Default
	By Date	
	By Weekday	
	Bypass	
By Date: System will wake on the day with hr::min::sec Specified. By Weekday: System will wake on the enabled weekday with hr::min::sec Specified. Dynamic Time: System will wake on the current time + Increase minute(s) Bypass: BIOS will not control RTC wake function.		

3.4.8 AAEON BIOS Robot

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

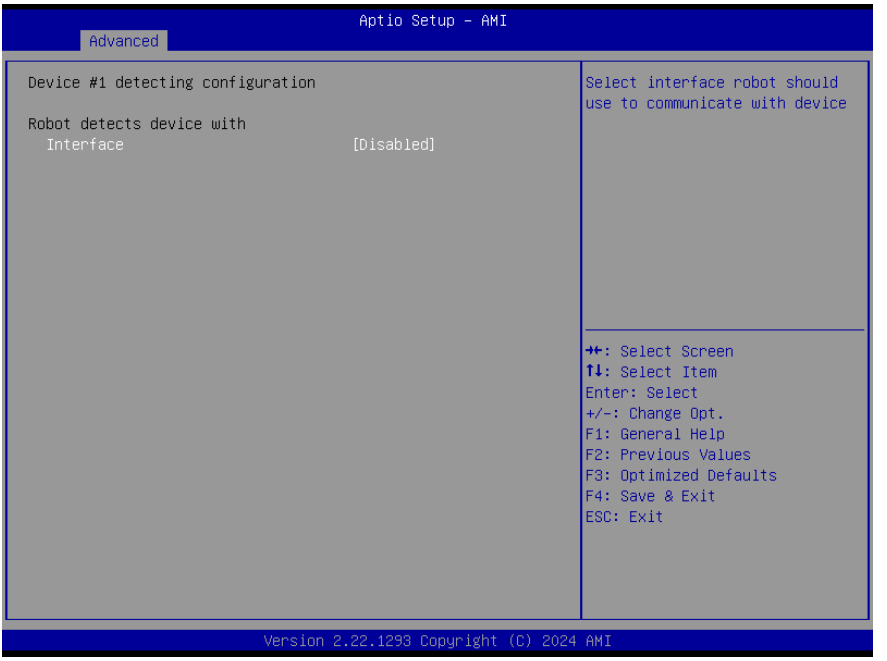
Options Summary		
Note: Robot does this before 'Sends watch dog'.		
Delayed POST (DXE phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed-up. Note: Robot does this after 'Sends watch dog before BIOS POST'.		
Reset system once	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot resets system for one time on each boot. This will send a soft or hand reset to onboard devices, thus puts devices to more stable state.		

3.4.8.1 Device Detecting Configuration



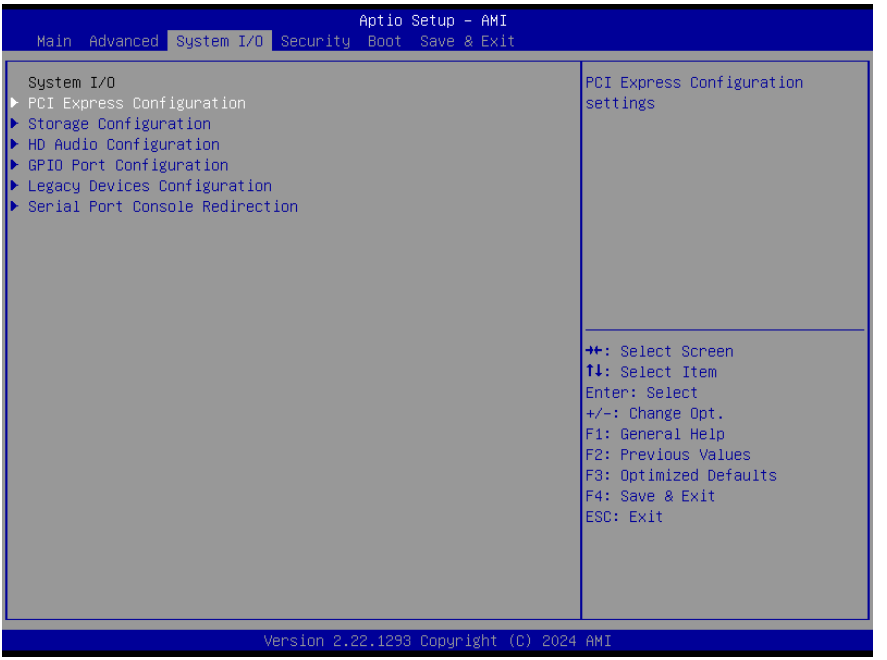
Options Summary		
Action	Reset System	Optimal Default, Failsafe Default
	Hold System	
Select action that robot should do.		
Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	
Select reset type robot should send on each boot.		
Retry - Count	3	Optimal Default, Failsafe Default
At time	After 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.		

3.4.8.1.1 Device Detecting Configuration

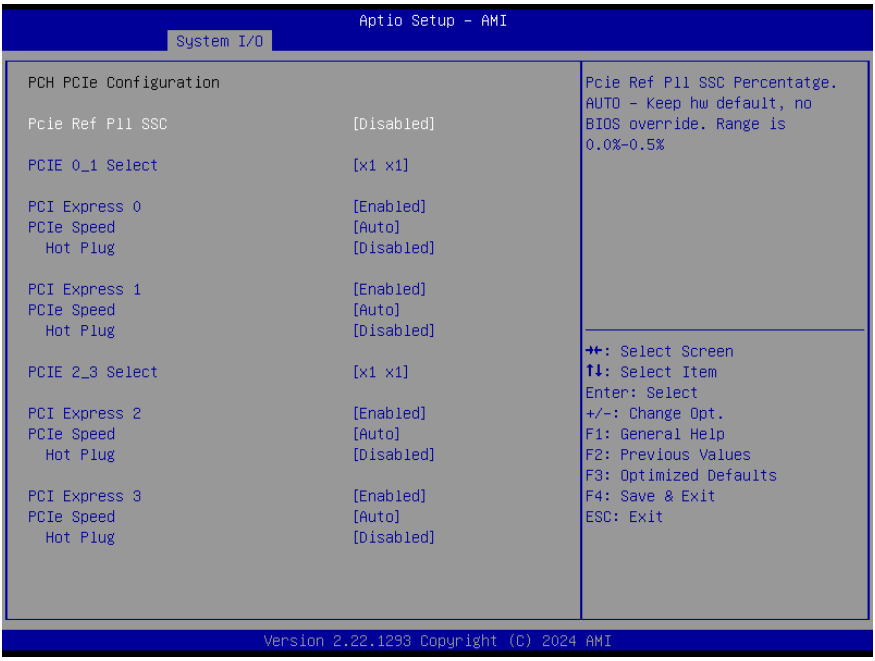


Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device		

3.5 Setup Submenu: System I/O



3.5.1 PCI Express Configuration

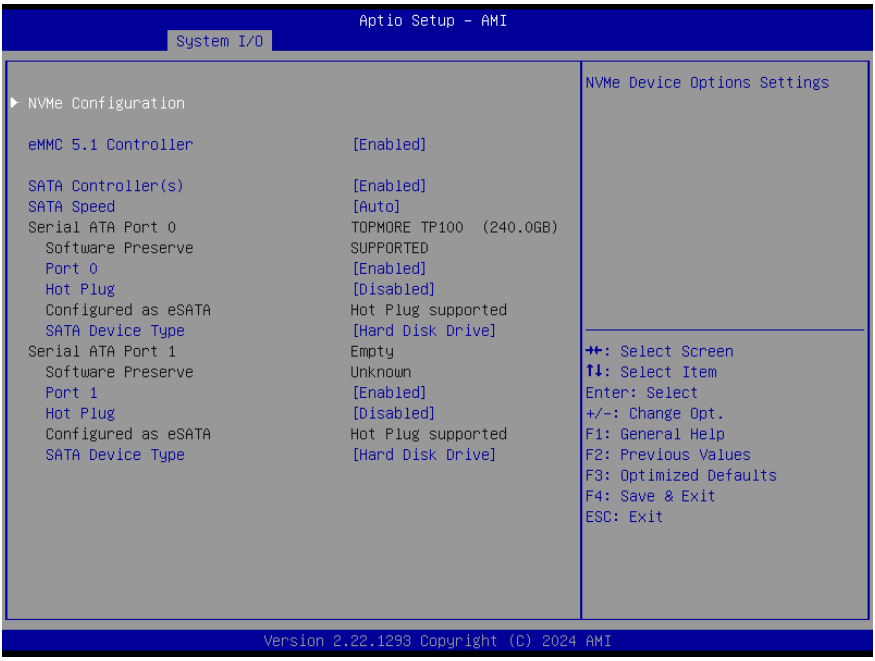


Options Summary		
Pcie Ref Pll SSC	Disabled	Optimal Default, Failsafe Default
	Auto	
	0.0%	
	0.1%	
	0.2%	
	0.3%	
	0.4%	
	0.5%	
Pcie Ref Pll SSC Percentage. AUTO – Keep hw default, no BIOS override. Range is 0.0% - 0.5%.		
PCIE 0_1 Select	×1 x1	Optimal Default, Failsafe Default
	×2	
PCIE Controller Setting.		

Options Summary		
PCI Express 0	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		
PCI Express 1	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		
PCIE 2_3 Select	×1 x1	Optimal Default, Failsafe Default
	×2	
PCIE Controller Setting.		
PCI Express 2	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		
PCI Express 3	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		

Options Summary		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		

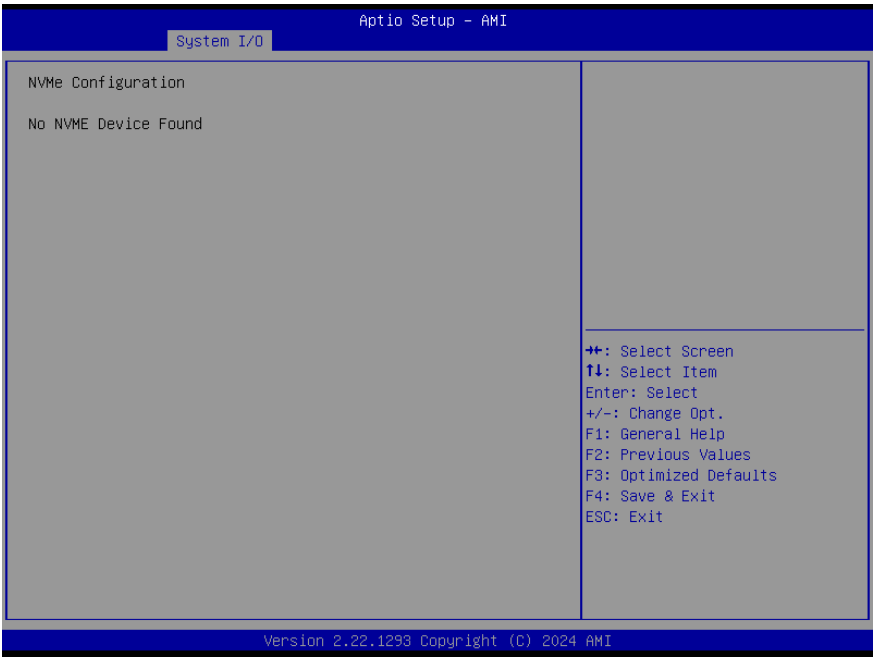
3.5.2 Storage Configuration



Options Summary		
eMMC 5.1 Controller	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SCS eMMC 5.1 Controller		
SATA Controller (s)	Enabled	Optimal Default, Failsafe Default
	Disabled	
Enable/Disable SATA Device.		
SATA Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure for the max speed support Gen1:1.5Gb/s, Gen2:3.0Gb/s and Gen3:6.0Gb/s.		
Port 0	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SATA Port.		

Options Summary		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
Designates this port as Hot Pluggable.		
SATA Device Type	Hard Disk Drive	Optimal Default, Failsafe Default
	Solid State Drive	
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.		
Port 1	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SATA Port.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
Designates this port as Hot Pluggable.		
SATA Device Type	Hard Disk Drive	Optimal Default, Failsafe Default
	Solid State Drive	
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.		

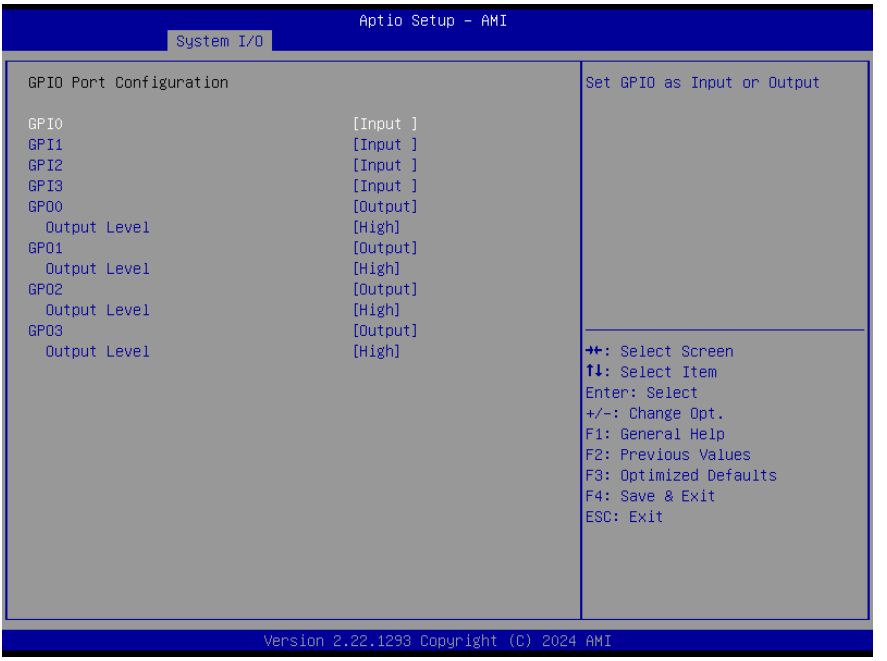
3.5.2.1 NVMe Configuration



3.5.3 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.		

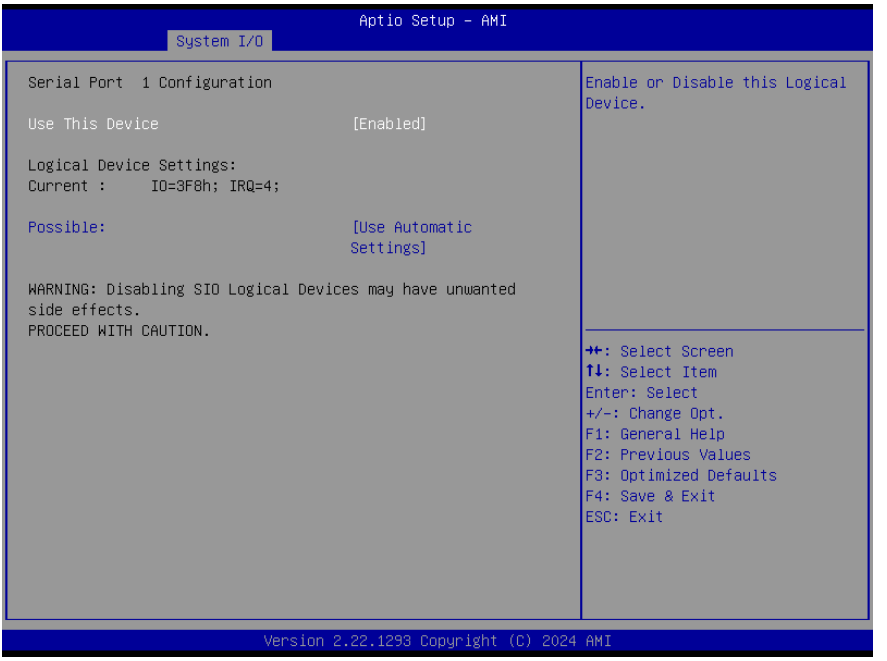
3.5.4 GPIO Port Configuration



Options Summary		
GPI 0 ~ 3	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output.		
GPO 0 ~ 3	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.		

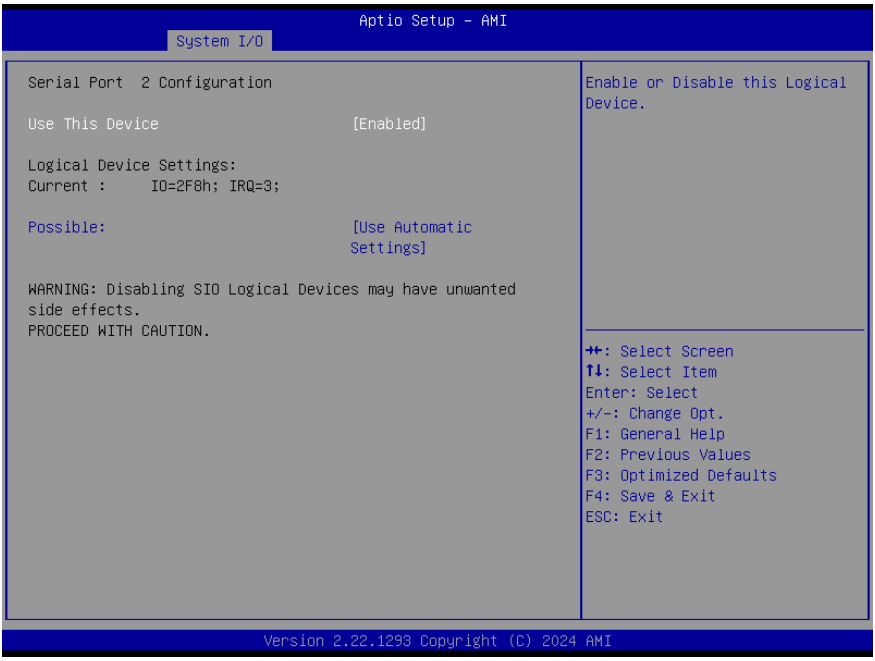
3.5.5 Legacy Devices Configuration

3.5.5.1 Serial Port 1 Configuration



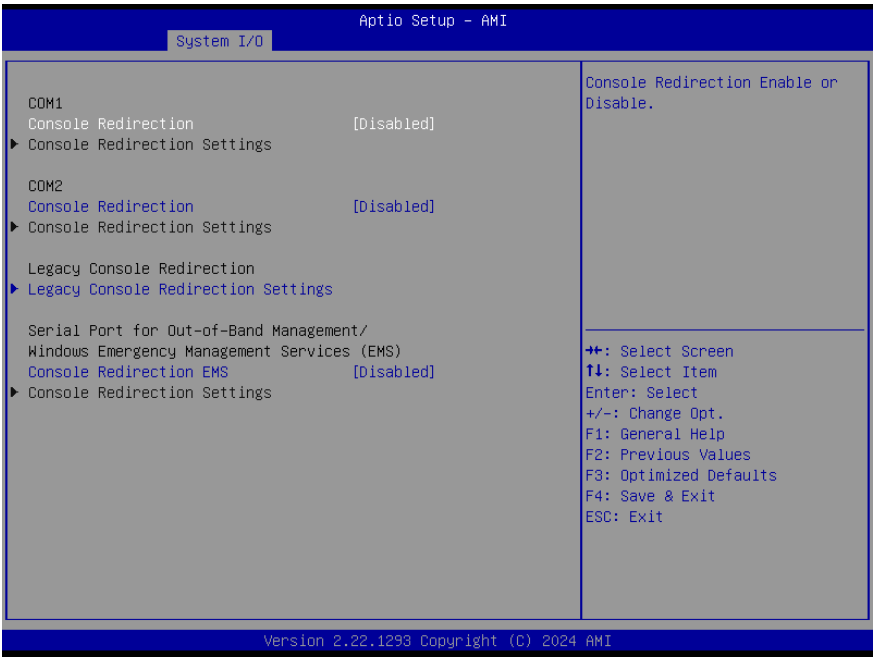
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=4; DMA;	
	IO=2C8h; IRQ=11; DMA;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		

3.5.5.2 Serial Port 2 Configuration



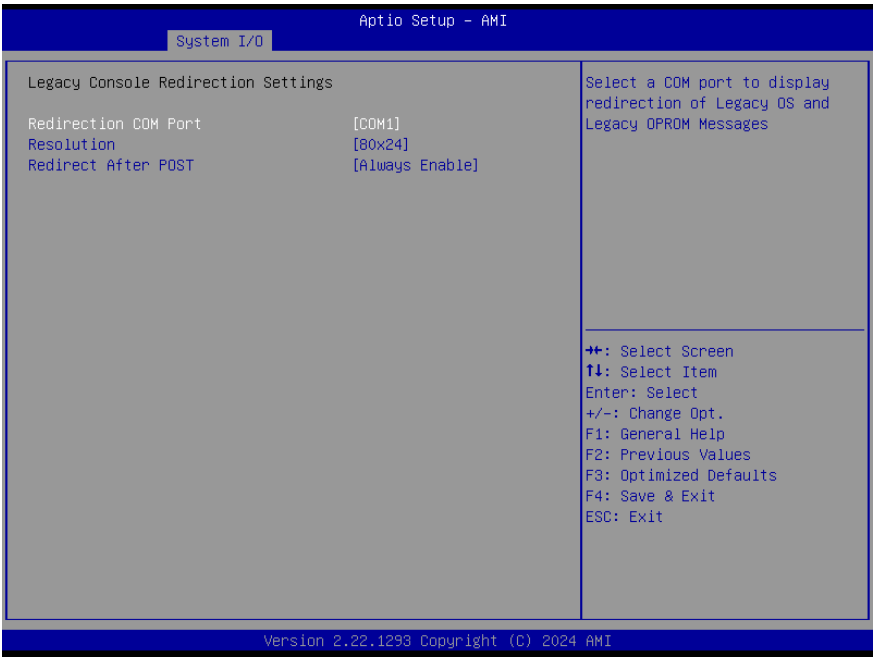
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3 DMA;	
	IO=2D8h; IRQ=10; DMA;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		

3.5.6 Serial Port Console Redirection



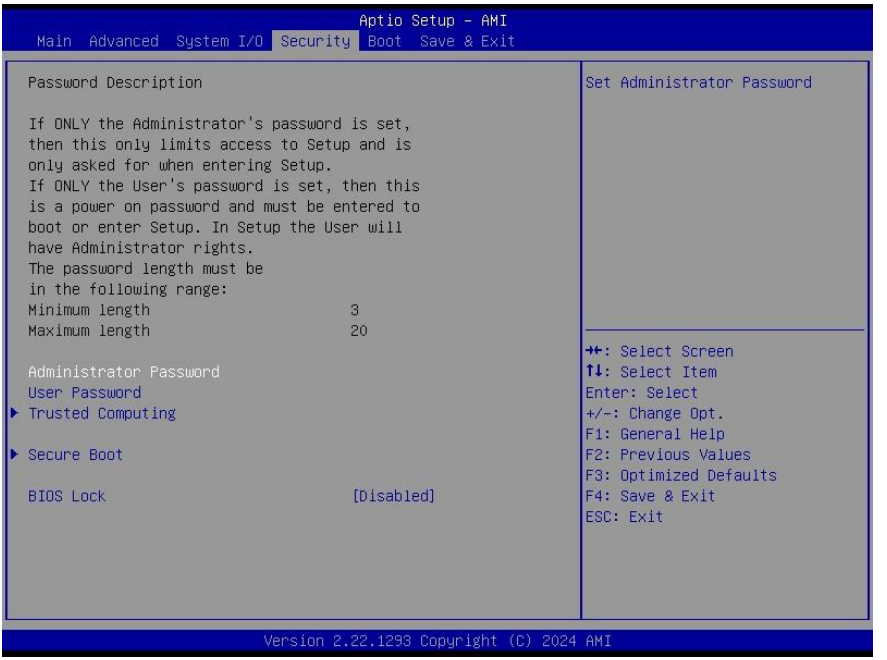
Options Summary		
Console Redirection	Disabled	Optimal Default, Failsafe Default
	Enabled	
Console Redirection Enable or Disable.		
Console Redirection EMS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Console Redirection Enable or Disable.		

3.5.6.1 Legacy Console Redirection Settings



Options Summary		
Redirection COM Port	COM1	Optimal Default, Failsafe Default
	COM2	
Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages		
Resolution	80x24	Optimal Default, Failsafe Default
	80x25	
On Legacy OS, the Number of Rows and Columns supported redirection		
Redirect After POST	Always Enable	Optimal Default, Failsafe Default
	BootLoader	
When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.		

3.6 Setup Submenu: Security



Change User/Administrator Password

You can set an Administrator password. If you set an Administrator password, you can then set a User password. User passwords do not have access to many of the features in the Setup utility.

Select the password you want to set and press <Enter>. A dialog box will appear which lets you set the password. Passwords must be between 3 and 20 letters or numbers. Press <Enter> and re-enter the password into the next dialog box that appears. Press <Enter> after you have retyped it correctly. The password is required at boot time, or when the user enters the Setup utility.

Removing the Password

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

3.6.1 Trusted Computing

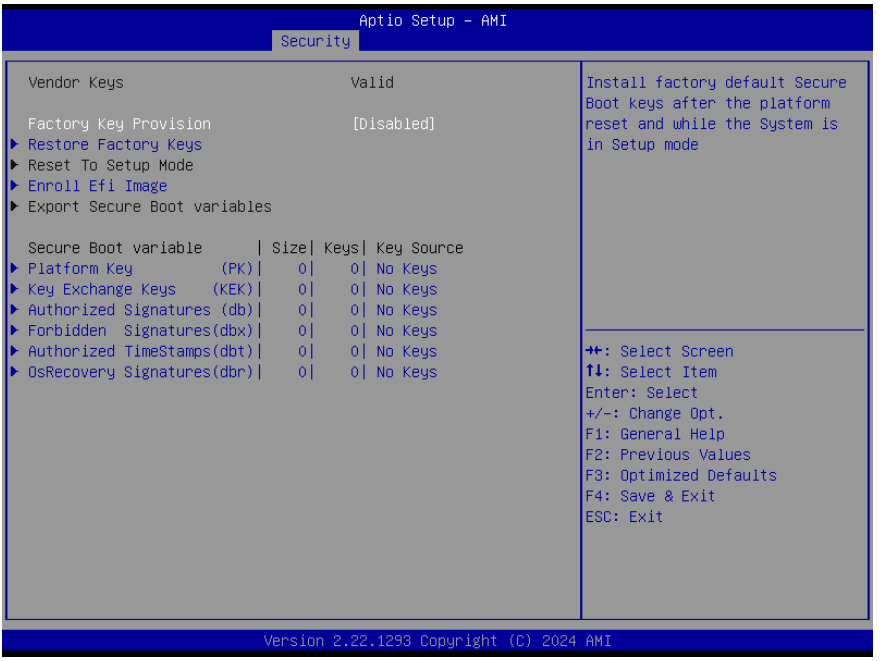
Options Summary		
Security Device Support	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TGU EFI protocol and INT1A interface will not be available.		
SHA 256 PCR Bank	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable SHA256 PCR Bank.		
SHA 384 PCR Bank	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable or Disable SHA384 PCR Bank.		
Pending operation	None	Optimal Default, Failsafe Default
	TPM Clear	
Schedule an Operation for the Security Device. Note: Your Computer will reboot during restart in order to change State of Security Device.		

Options Summary		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Platform Hierarchy.		
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storage Hierarchy.		
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Endorsement Hierarchy.		
Physical Presence Spec Version	1.2	
	1.3	Optimal Default, Failsafe Default
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.		
Device Select	TPM 1.2	
	TPM 2.0	Optimal Default, Failsafe Default
	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

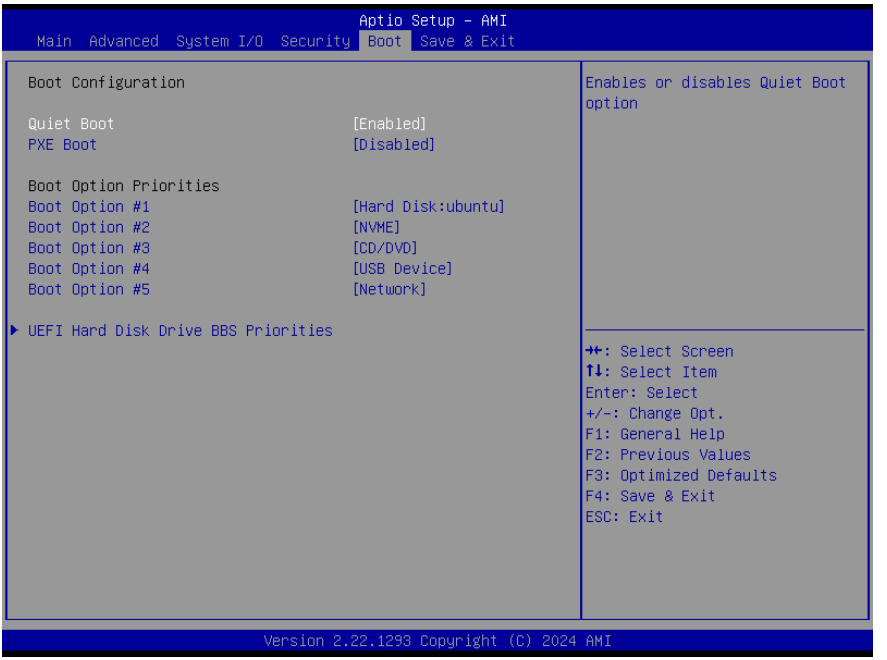
Options Summary		
Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.		
Secure Boot Mode	Standard	
	Custom	Optimal Default, Failsafe Default
Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.		

3.6.2.1 Key Management



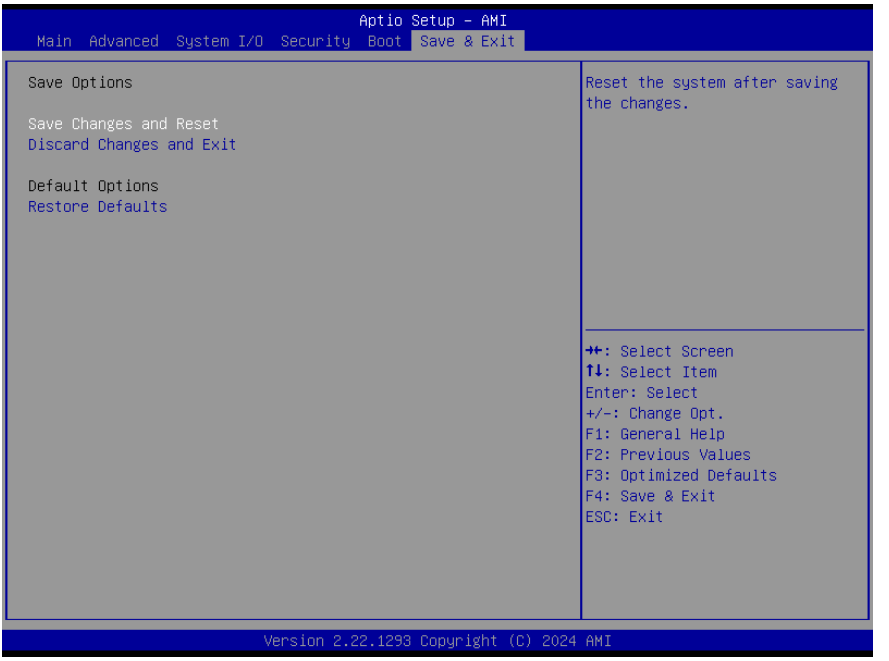
Options Summary		
Factory Key Provision	Disabled	Optimal Default, Failsafe Default
	Enabled	
Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.		

3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enables or disables Quiet Boot option.		
PXE Boot	Disabled	Optimal Default, Failsafe Default
	UEFI	
Controls the execution of UEFI and Legacy Network OpROM		

3.8 Setup Submenu: Save & Exit



Chapter 4

Drivers Installation

4.1 Driver Download and Installation

Drivers for the NanoCOM-ADN can be downloaded from the product page on the AAEON website by following this link:

https://www.aaeon.com/en/p/com-express-cpu-modules-nanocom-adn

Download the driver(s) you need and follow the steps below to install them.

Chipset Driver

1. Open the folder where you unzipped the **Chipset Drivers**
2. Run the **SetupChipset.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Graphics Driver

1. Open the folder where you unzipped the **Graphics Drivers**
2. Run the **Installer.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

LAN Drivers

1. Open the folder where you unzipped the **LAN Drivers**
2. Follow the instructions contained in the Setup Information file to manually install drivers.

Install Audio Drivers

Note: Ensure Intel Smart Sound Driver (**Intel_SST_ADL_v10.29.00.8467**) is installed before the Realtek Audio driver (**Realtek Audio 6.0.9034.2**)

Install Intel Smart Sound Driver

1. Open the **Audio** folder
2. Open the **Intel(R)_SST_ADL_v10.29.00.8467** subfolder
3. Follow the setup information within the file to manually install driver.

Install Realtek Audio Driver

1. Open the **Audio** folder
2. Open the **Realtek Audio 6.0.9034.2** folder
3. Run the **Setup.exe** file in the folder
4. Follow the instructions
5. Driver will be installed automatically

Install Serial IO Driver

1. Open the **Peripheral Driver** folder
2. Run the **SetupSerialIO.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

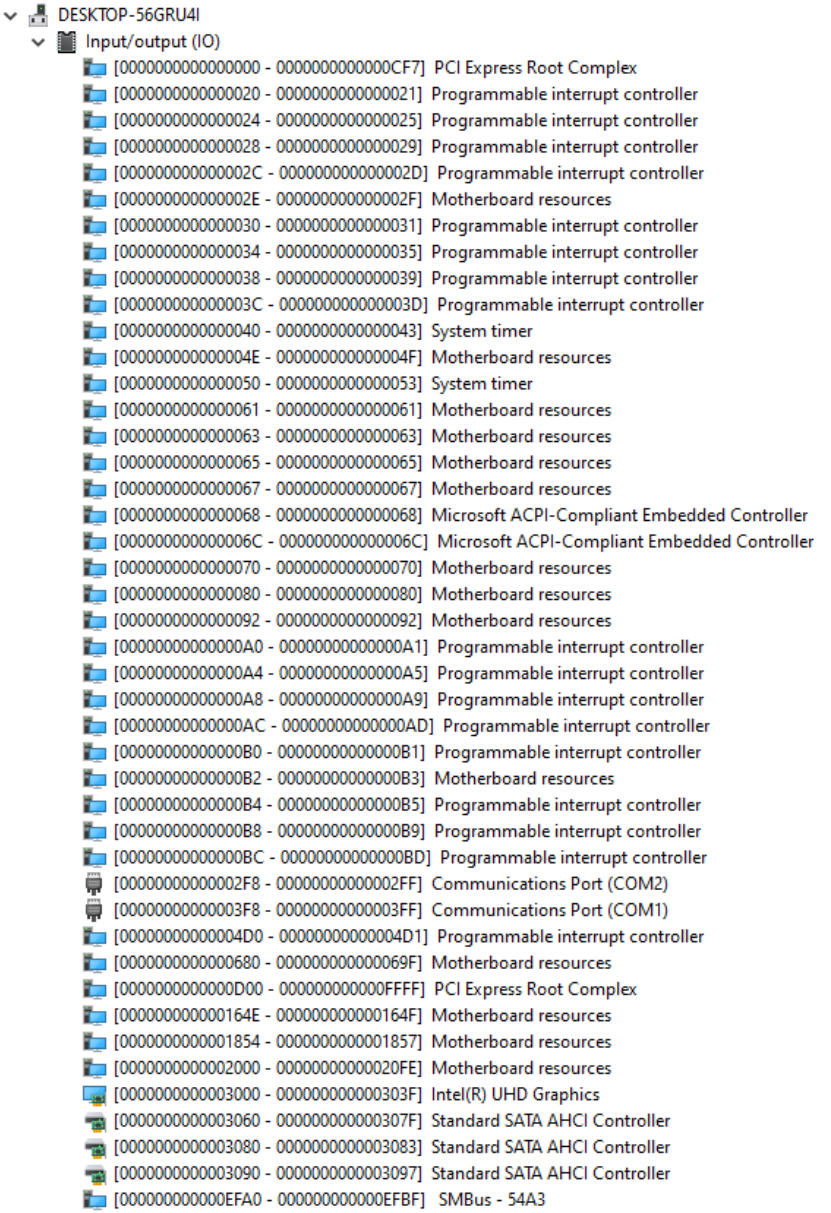
Install ME & TXE Driver

1. Open the **ME & TXE** folder
2. Run the **SetupME.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

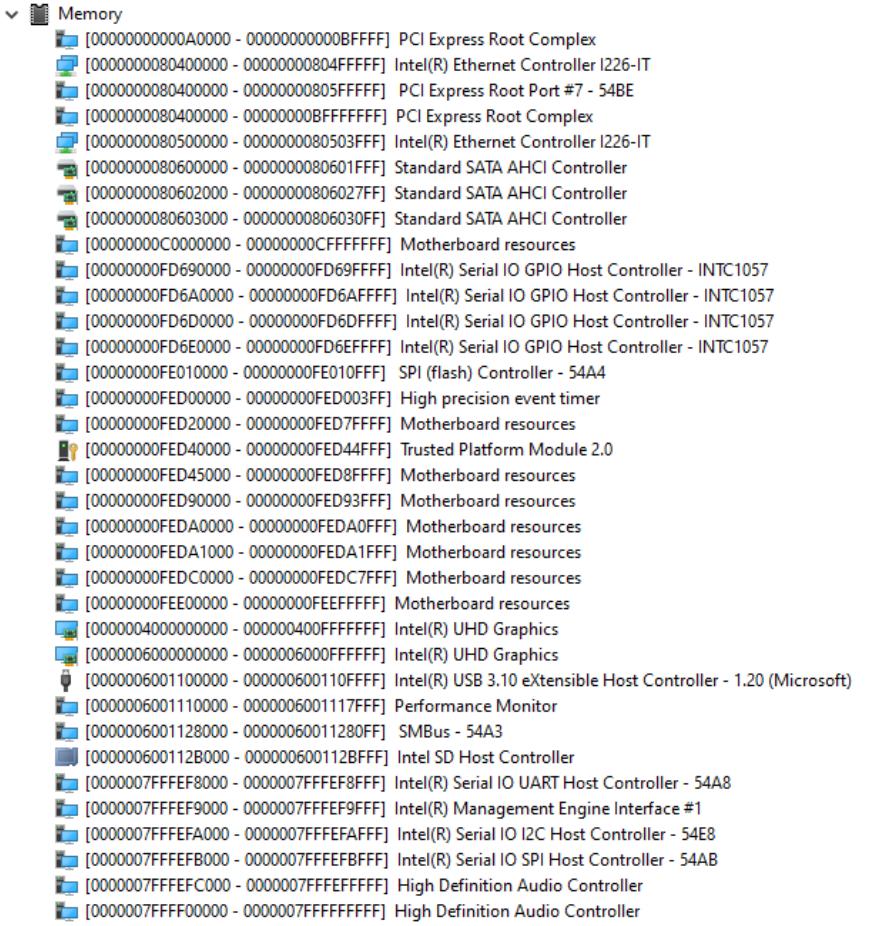
Appendix A

I/O Information

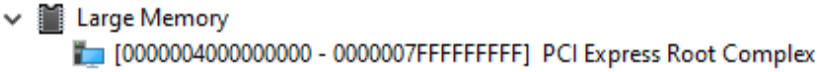
A.1 I/O Address Map



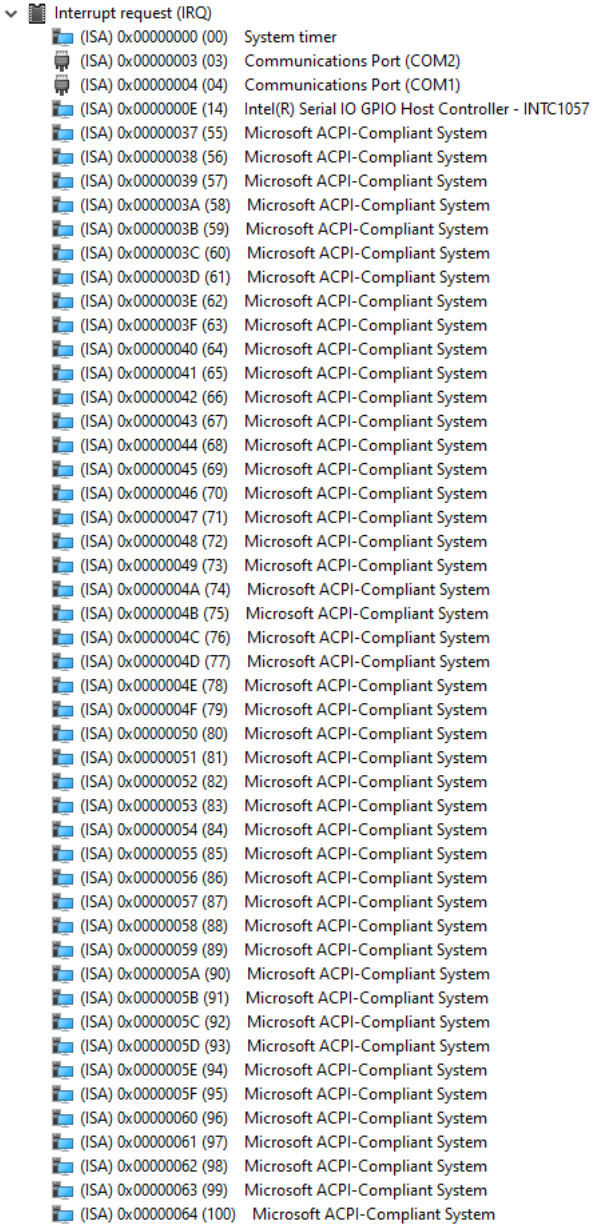
A.2 Memory Address Map



A.3 Large Memory Address Map



A.4 IRQ Mapping Chart



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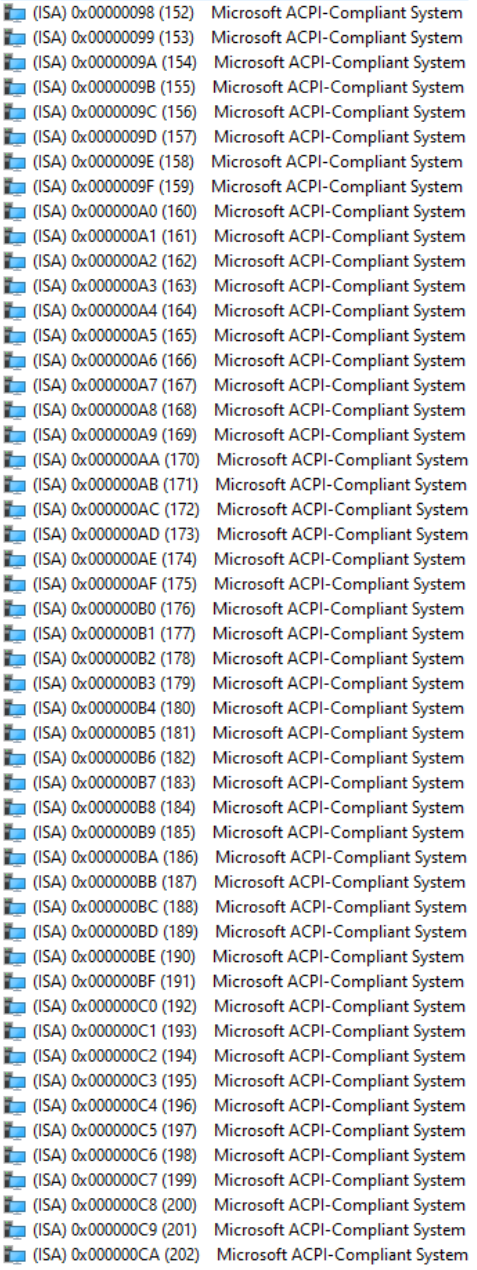
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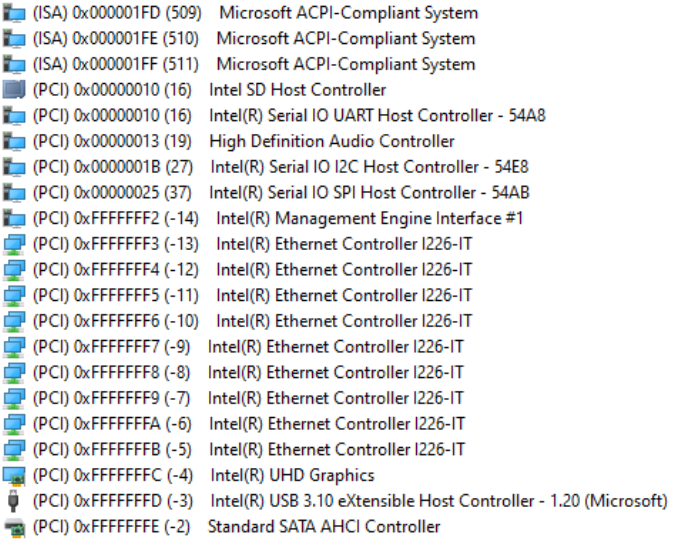
(ISA) 0x000001C9 (457) Microsoft ACPI-Compliant System

(ISA) 0x000001CA (458) Microsoft ACPI-Compliant System
(ISA) 0x000001CB (459) Microsoft ACPI-Compliant System
(ISA) 0x000001CC (460) Microsoft ACPI-Compliant System
(ISA) 0x000001CD (461) Microsoft ACPI-Compliant System
(ISA) 0x000001CE (462) Microsoft ACPI-Compliant System
(ISA) 0x000001CF (463) Microsoft ACPI-Compliant System
(ISA) 0x000001D0 (464) Microsoft ACPI-Compliant System
(ISA) 0x000001D1 (465) Microsoft ACPI-Compliant System
(ISA) 0x000001D2 (466) Microsoft ACPI-Compliant System
(ISA) 0x000001D3 (467) Microsoft ACPI-Compliant System
(ISA) 0x000001D4 (468) Microsoft ACPI-Compliant System
(ISA) 0x000001D5 (469) Microsoft ACPI-Compliant System
(ISA) 0x000001D6 (470) Microsoft ACPI-Compliant System
(ISA) 0x000001D7 (471) Microsoft ACPI-Compliant System
(ISA) 0x000001D8 (472) Microsoft ACPI-Compliant System
(ISA) 0x000001D9 (473) Microsoft ACPI-Compliant System
(ISA) 0x000001DA (474) Microsoft ACPI-Compliant System
(ISA) 0x000001DB (475) Microsoft ACPI-Compliant System
(ISA) 0x000001DC (476) Microsoft ACPI-Compliant System
(ISA) 0x000001DD (477) Microsoft ACPI-Compliant System
(ISA) 0x000001DE (478) Microsoft ACPI-Compliant System
(ISA) 0x000001DF (479) Microsoft ACPI-Compliant System
(ISA) 0x000001E0 (480) Microsoft ACPI-Compliant System
(ISA) 0x000001E1 (481) Microsoft ACPI-Compliant System
(ISA) 0x000001E2 (482) Microsoft ACPI-Compliant System
(ISA) 0x000001E3 (483) Microsoft ACPI-Compliant System
(ISA) 0x000001E4 (484) Microsoft ACPI-Compliant System
(ISA) 0x000001E5 (485) Microsoft ACPI-Compliant System
(ISA) 0x000001E6 (486) Microsoft ACPI-Compliant System
(ISA) 0x000001E7 (487) Microsoft ACPI-Compliant System
(ISA) 0x000001E8 (488) Microsoft ACPI-Compliant System
(ISA) 0x000001E9 (489) Microsoft ACPI-Compliant System
(ISA) 0x000001EA (490) Microsoft ACPI-Compliant System
(ISA) 0x000001EB (491) Microsoft ACPI-Compliant System
(ISA) 0x000001EC (492) Microsoft ACPI-Compliant System
(ISA) 0x000001ED (493) Microsoft ACPI-Compliant System
(ISA) 0x000001EE (494) Microsoft ACPI-Compliant System
(ISA) 0x000001EF (495) Microsoft ACPI-Compliant System
(ISA) 0x000001F0 (496) Microsoft ACPI-Compliant System
(ISA) 0x000001F1 (497) Microsoft ACPI-Compliant System
(ISA) 0x000001F2 (498) Microsoft ACPI-Compliant System
(ISA) 0x000001F3 (499) Microsoft ACPI-Compliant System
(ISA) 0x000001F4 (500) Microsoft ACPI-Compliant System
(ISA) 0x000001F5 (501) Microsoft ACPI-Compliant System
(ISA) 0x000001F6 (502) Microsoft ACPI-Compliant System
(ISA) 0x000001F7 (503) Microsoft ACPI-Compliant System
(ISA) 0x000001F8 (504) Microsoft ACPI-Compliant System
(ISA) 0x000001F9 (505) Microsoft ACPI-Compliant System
(ISA) 0x000001FA (506) Microsoft ACPI-Compliant System
(ISA) 0x000001FB (507) Microsoft ACPI-Compliant System
(ISA) 0x000001FC (508) Microsoft ACPI-Compliant System


(ISA) 0x000001FD (509) Microsoft ACPI-Compliant System
(ISA) 0x000001FE (510) Microsoft ACPI-Compliant System
(ISA) 0x000001FF (511) Microsoft ACPI-Compliant System
(PCI) 0x00000010 (16) Intel SD Host Controller
(PCI) 0x00000010 (16) Intel(R) Serial IO UART Host Controller - 54A8
(PCI) 0x00000013 (19) High Definition Audio Controller
(PCI) 0x0000001B (27) Intel(R) Serial IO I2C Host Controller - 54E8
(PCI) 0x00000025 (37) Intel(R) Serial IO SPI Host Controller - 54AB
(PCI) 0xFFFFFFF2 (-14) Intel(R) Management Engine Interface #1
(PCI) 0xFFFFFFF3 (-13) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF4 (-12) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF5 (-11) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF6 (-10) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF7 (-9) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF8 (-8) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFF9 (-7) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFFA (-6) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFFB (-5) Intel(R) Ethernet Controller I226-IT
(PCI) 0xFFFFFFFC (-4) Intel(R) UHD Graphics
(PCI) 0xFFFFFFFD (-3) Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
(PCI) 0xFFFFFFFE (-2) Standard SATA AHCI Controller