



# NanoCOM-ARH

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COM Express Module

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

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## Packing List

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

Item	Quantity
● NanoCOM-ARH	1

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

## About this Document

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

Users may refer to the [AAEON.com](http://AAEON.com) for the latest version of this document.

## Safety Precautions

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

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any 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 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.**

### **Warning!**



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

### **Caution:**

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

### **Attention:**

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

## 产品中有毒有害物质或元素名称及含量

AAEON 主板/子板/背板

QQ04-381 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

QQ4-381 Rev.A2

Part Name	Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
PCB Assemblies	×	○	○	○	○	○
Connector and Cable	×	○	○	○	○	○

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

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

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

EFUP (Environment Friendly Use Period) value: 10 years

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

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# Chapter 1

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Product Specifications

## 1.1 Specifications

### System

Form Factor	COM Express Mini Size, Type 10
CPU	Intel® Core™ Ultra Processors (Series 2): Intel® Core™ Ultra 7 Processor 255H (16C/16T, up to 5.1 GHz, 28W) Intel® Core™ Ultra 5 Processor 225H (14C/14T, up to 4.9 GHz, 28W)
Chipset	Integrated with Intel® SoC
Memory	Onboard LPDDR5(X), up to 8400MHz, 32GB
Onboard Storage	NVMe, up to 256GB
BIOS	AMI UEFI
Wake on LAN	Yes
Watchdog Timer	255 Levels
Dimension (L x W)	3.31" x 2.17" (84mm x 55mm)
Security	fTPM/dTPM (Default)

### Power

Power Requirement	+9V – 19V and +5VSB (± 10%) for ATX, +9V – 19V for AT <b>Note:</b> +8.5V will trigger UVP & +20V will trigger OVP.
Power Type	AT/ATX, switch by BIOS
Power Consumption (Typical)	Intel® Core™ Ultra 7 Processor 255H, 1.67A @+19V

## Display

Graphics Controller	Intel® Arc™ Graphics
Video Output	Dual Display: DDI x 1, up to 3840 x 2160 eDP x 1, up to 3840 x 2160 @60Hz

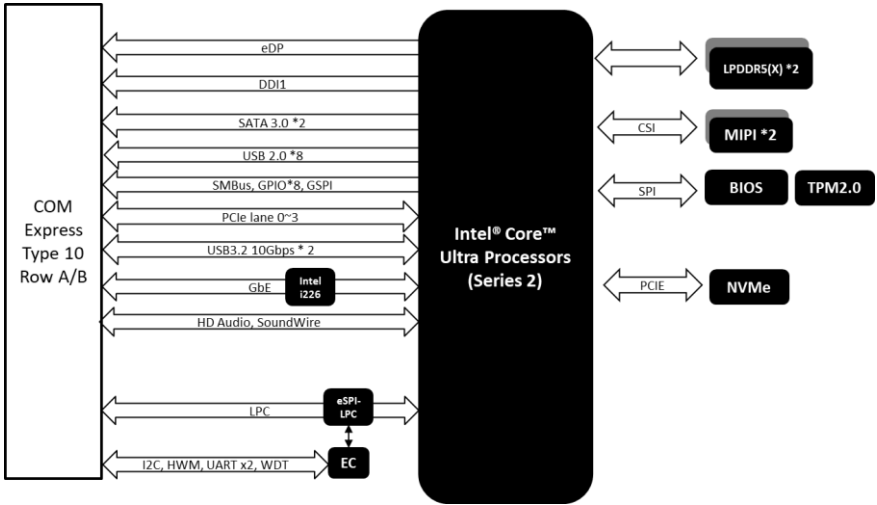
## I/O

Ethernet	Intel® Ethernet Controller I226, 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 4.0 [x1] x 4 LPC x 1
GPIO	8-bit
SMBus/I2C	I2C x 1, from EC (default) or CPU, switch by BIOS SMBus x 1, from CPU

## 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® 11 (64-bit) Linux Ubuntu 24.04/Kernel 6.11
Weight	0.15 lb (0.07 Kg)

## 1.2 Block Diagram



Note: CSI camera support available by request.

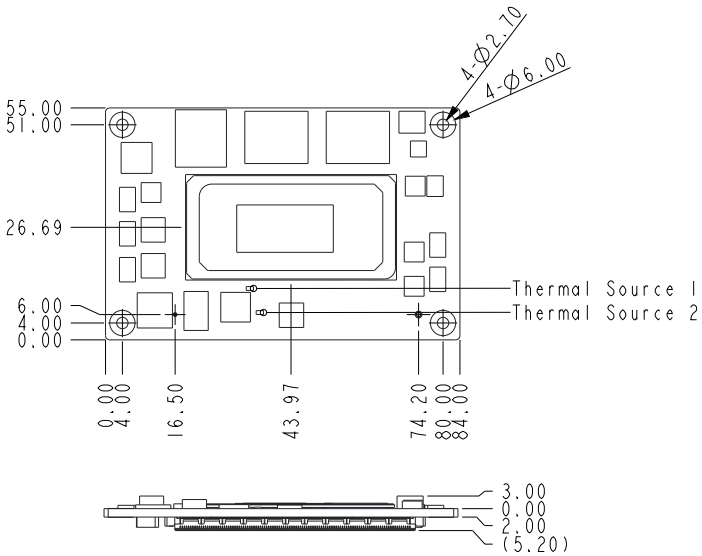
# Chapter 2

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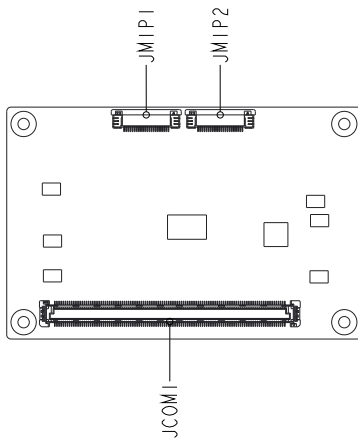
Hardware Information

## 2.1 Dimensions, Jumpers and Connectors

### Top Side

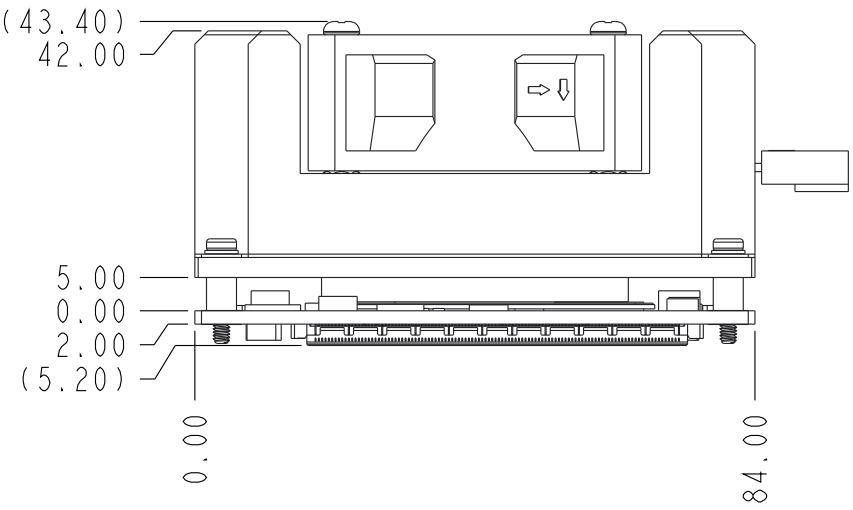


### Bottom Side

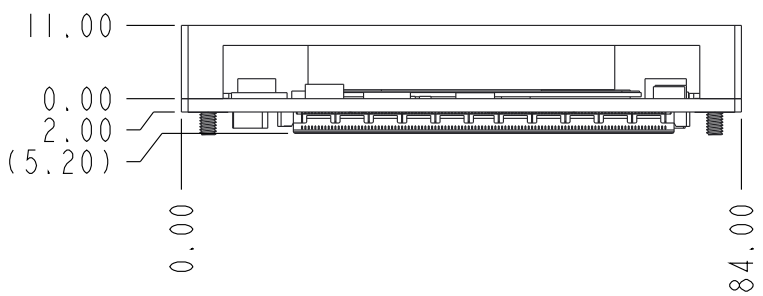


Thermal Solutions

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



With Heatspreader (P/N: NANOCOM-MTU-HSP01)

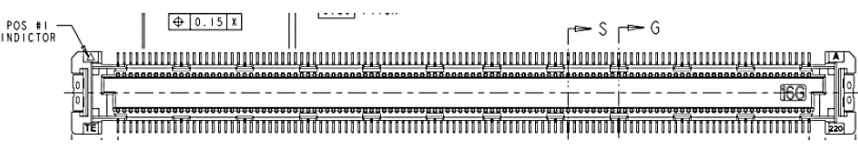
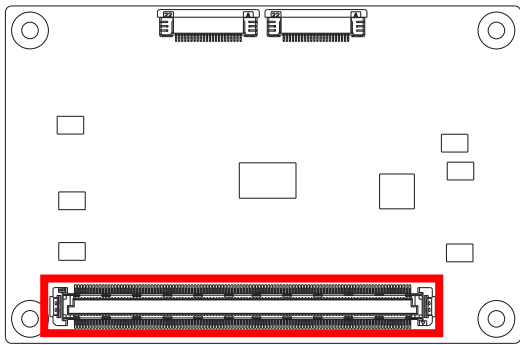


## 2.2 List of Jumpers and Connectors

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

Label	Function
JCOM1	COM Express Type 10 Connector
JMIP1	MIPI
JMIP2	MIPI

### 2.2.1 COM Express Type 10 Connector (JCOM1)



Pin	Pin Name	Signal Type	Signal level
A1	GND(FIXED)		
A2	GBE0_MDI3-		
A3	GBE0_MDI3+		
A4	GBE0_LINK_MID#		
A5	GBE0_LINK_MAX#		
A6	GBE0_MDI2-		
A7	GBE0_MDI2+		
A8	GBE0_LINK#		

Pin	Pin Name	Signal Type	Signal level
A9	GBE0_MDI1-		
A10	GBE0_MDI1+		
A11	GND(FIXED)		
A12	GBE0_MDIO-		
A13	GBE0_MDIO+		
A14	GBE0_CTREF		
A15	SUS_S3#		
A16	SATA0_TX+		
A17	SATA0_TX-		
A18	SUS_S4#		
A19	SATA0_RX+		
A20	SATA0_RX-		
A21	GND(FIXED)		
A22	USB_SSRX0-		
A23	USB_SSRX0+		
A24	SUS_S5#		
A25	USB_SSRX1-		
A26	USB_SSRX1+		
A27	BATLOW#		
A28	(S)ATA_ACT#		
A29	HDA_SYNC		
A30	HDA_RST#		
A31	GND(FIXED)		
A32	HDA_BITCLK		
A33	HDA_SDOOUT		
A34	BIOS_DIS0#		
A35	THRMTRIP#		
A36	USB6-		
A37	USB6+		
A38	USB_6_7_OC#		
A39	USB4-		
A40	USB4+		
A41	GND(FIXED)		
A42	USB2-		
A43	USB2+		
A44	USB_2_3_OC#		
A45	USB0-		
A46	USB0+		
A47	VCC_RTC		

Pin	Pin Name	Signal Type	Signal level
A48	RSMRST_OUT#		
A49	GBE0_SDP		
A50	LPC_SERIRQ		
A51	GND(FIXED)		
A52	NC		
A53	NC		
A54	GPIO		
A55	GP_SPI_CS#		
A56	GP_SPI_CK		
A57	GND		
A58	PCIE_TX3+		
A59	PCIE_TX3-		
A60	GND(FIXED)		
A61	PCIE_TX2+		
A62	PCIE_TX2-		
A63	GPIO		
A64	PCIE_TX1+		
A65	PCIE_TX1-		
A66	GND		
A67	GPIO		
A68	PCIE_TX0+		
A69	PCIE_TX0-		
A70	GND(FIXED)		
A71	eDP_TX2+		
A72	eDP_TX2-		
A73	eDP_TX1+		
A74	eDP_TX1-		
A75	eDP_TX0+		
A76	eDP_TX0-		
A77	eDP_VDD_EN		
A78	NC		
A79	NC		
A80	GND(FIXED)		
A81	eDP_TX3+		
A82	eDP_TX3-		
A83	eDP_AUX+		
A84	eDP_AUX-		
A85	GPIO		
A86	NC		

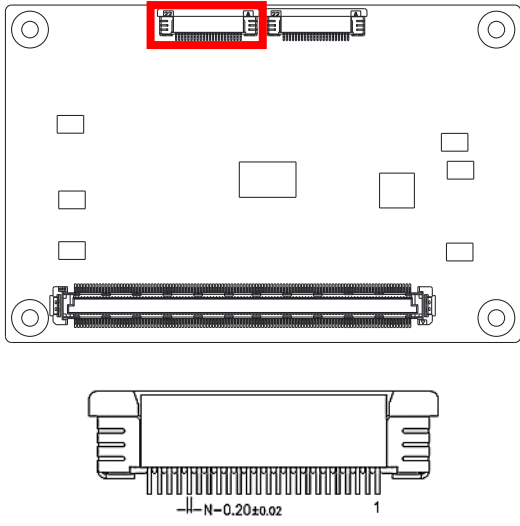
Pin	Pin Name	Signal Type	Signal level
A87	eDP_HPD		
A88	PCIE_CLK_REF+		
A89	PCIE_CLK_REF-		
A90	GND(FIXED)		
A91	SPI_POWER		
A92	SPI_MISO		
A93	GPO0		
A94	SPI_CLK		
A95	SPI_MOSI		
A96	TPM_PP		
A97	TYPE10#		
A98	SER0_TX		
A99	SER0_RX		
A100	GND(FIXED)		
A101	SER1_TX		
A102	SER1_RX		
A103	LID#		
A104	VCC_12V		
A105	VCC_12V		
A106	VCC_12V		
A107	VCC_12V		
A108	VCC_12V		
A109	VCC_12V		
A110	GND(FIXED)		
B1	GND(FIXED)		
B2	GBE0_ACT#		
B3	LPC_FRAME#		
B4	LPC_AD0		
B5	LPC_AD1		
B6	LPC_AD2		
B7	LPC_AD3		
B8	NC		
B9	NC		
B10	LPC_CLK		
B11	GND(FIXED)		
B12	PWRBTN#		
B13	SMB_CK		
B14	SMB_DAT		
B15	SMB_ALERT#		

Pin	Pin Name	Signal Type	Signal level
B16	SATA1_TX+		
B17	SATA1_TX-		
B18	SUS_STAT#		
B19	SATA1_RX+		
B20	SATA1_RX-		
B21	GND(FIXED)		
B22	USB_SSTX0-		
B23	USB_SSTX0+		
B24	PWR_OK		
B25	USB_SSTX1-		
B26	USB_SSTX1+		
B27	WDT		
B28	SNDW0_CLK		
B29	SNDW0_DAT		
B30	HDA_SDIN0		
B31	GND(FIXED)		
B32	SPKR		
B33	I2C_CK		
B34	I2C_DAT		
B35	THRM#		
B36	USB7-		
B37	USB7+		
B38	USB_4_5_OC#		
B39	USB5-		
B40	USB5+		
B41	GND(FIXED)		
B42	USB3-		
B43	USB3+		
B44	USB_0_1_OC#		
B45	USB1-		
B46	USB1+		
B47	NC		
B48	NC		
B49	SYS_RESET#		
B50	CB_RESET#		
B51	GND(FIXED)		
B52	NC		
B53	NC		
B54	GPO1		

Pin	Pin Name	Signal Type	Signal level
B55	GP_SPI_MISO		
B56	GP_SPI_MOSI		
B57	GPO2		
B58	PCIE_RX3+		
B59	PCIE_RX3-		
B60	GND(FIXED)		
B61	PCIE_RX2+		
B62	PCIE_RX2-		
B63	GPO3		
B64	PCIE_RX1+		
B65	PCIE_RX1-		
B66	WAKE0#		
B67	WAKE1#		
B68	PCIE_RX0+		
B69	PCIE_RX0-		
B70	GND(FIXED)		
B71	DDIO_PAIR0+		
B72	DDIO_PAIR0-		
B73	DDIO_PAIR1+		
B74	DDIO_PAIR1-		
B75	DDIO_PAIR2+		
B76	DDIO_PAIR2-		
B77	NC		
B78	NC		
B79	eDP_BKLT_EN		
B80	GND(FIXED)		
B81	DDIO_PAIR3+		
B82	DDIO_PAIR3-		
B83	eDP_BKLT_CTRL		
B84	VCC_5V_SBY		
B85	VCC_5V_SBY		
B86	VCC_5V_SBY		
B87	VCC_5V_SBY		
B88	BIOS_DIS1#		
B89	DDIO_HPD		
B90	GND(FIXED)		
B91	NC		
B92	NC		
B93	NC		

Pin	Pin Name	Signal Type	Signal level
B94	NC		
B95	DDIO_DDC_AUX_SEL		
B96	NC		
B97	SPI_CS#		
B98	DDIO_CTRLCLK_AUX+		
B99	DDIO_CTRLDATA_AUX-		
B100	GND(FIXED)		
B101	FAN_PWMOUT		
B102	FAN_TACHIN		
B103	SLEEP#		
B104	VCC_12V		
B105	VCC_12V		
B106	VCC_12V		
B107	VCC_12V		
B108	VCC_12V		
B109	VCC_12V		
B110	GND(FIXED)		

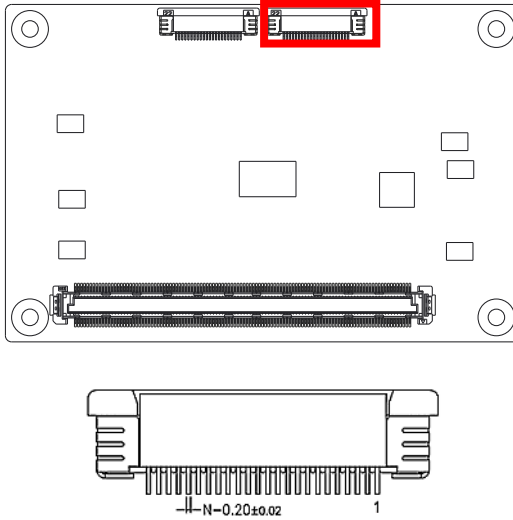
## 2.2.2 MIPI (JMIP1)



Pin	Pin Name	Signal Type	Signal level
1	CAM1_VCC	POWER	3.3V
2	CAM1_VCC	POWER	3.3V
3	GND		
4	CSI1_RX0+		
5	CSI1_RX0-		
6	GND		
7	CSI1_RX1+		
8	CSI1_RX1-		
9	GND		
10	CSI1_RX2+		
11	CSI1_RX2-		
12	CAM1_RST#		
13	CSI1_RX3+		
14	CSI1_RX3-		
15	GND		
16	CSI1_CK+		
17	CSI1_CK-		
18	GND		
19	I2C_CAM1_CK		

Pin	Pin Name	Signal Type	Signal level
20	I2C_CAM1_DAT		
21	CAM1_PWR#		
22	CAM1_MC		

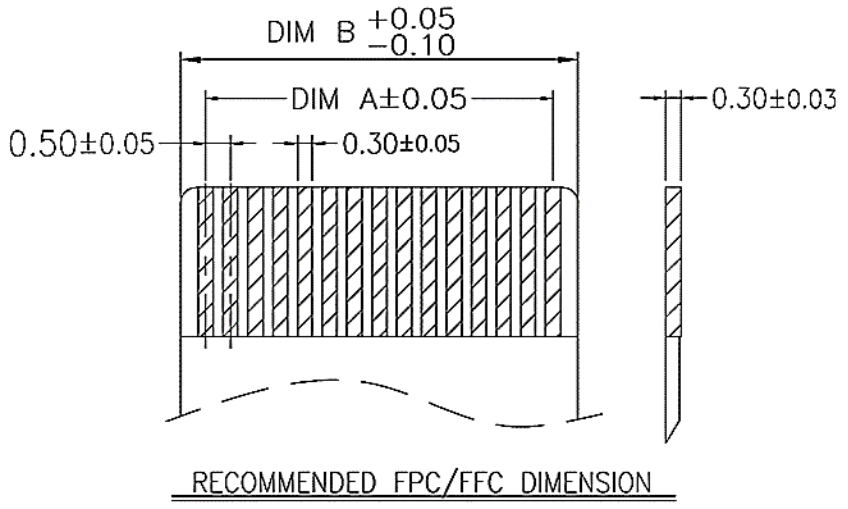
### 2.2.3 MIPI (JMIP2)



Pin	Pin Name	Signal Type	Signal level
1	CAM2_VCC	POWER	3.3V
2	CAM2_VCC	POWER	3.3V
3	GND		
4	CSI2_RX0+		
5	CSI2_RX0-		
6	GND		
7	CSI2_RX1+		
8	CSI2_RX1-		
9	GND		
10	CSI2_RX2+		
11	CSI2_RX2-		
12	CAM2_RST#		
13	CSI2_RX3+		
14	CSI2_RX3-		

Pin	Pin Name	Signal Type	Signal level
15	GND		
16	CSI2_CK+		
17	CSI2_CK-		
18	GND		
19	I2C_CAM2_CK		
20	I2C_CAM2_DAT		
21	CAM2_PWR#		
22	CAM2_MC		

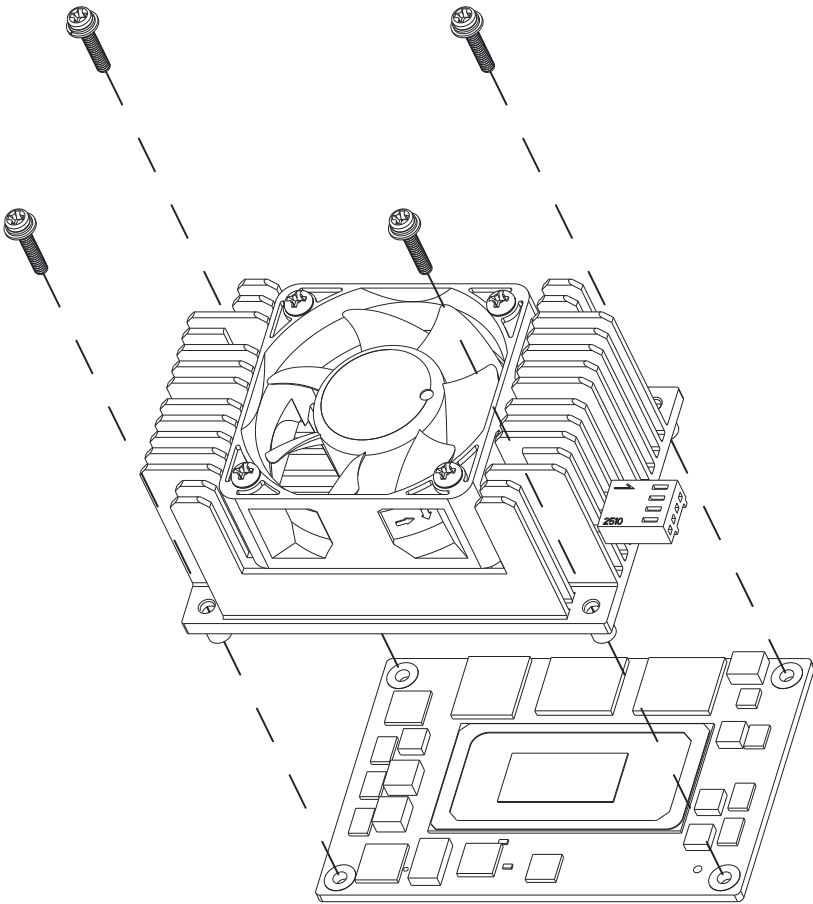
Recommended FPC/FFC cable dimensions:



## 2.3 Thermal Solution Installation

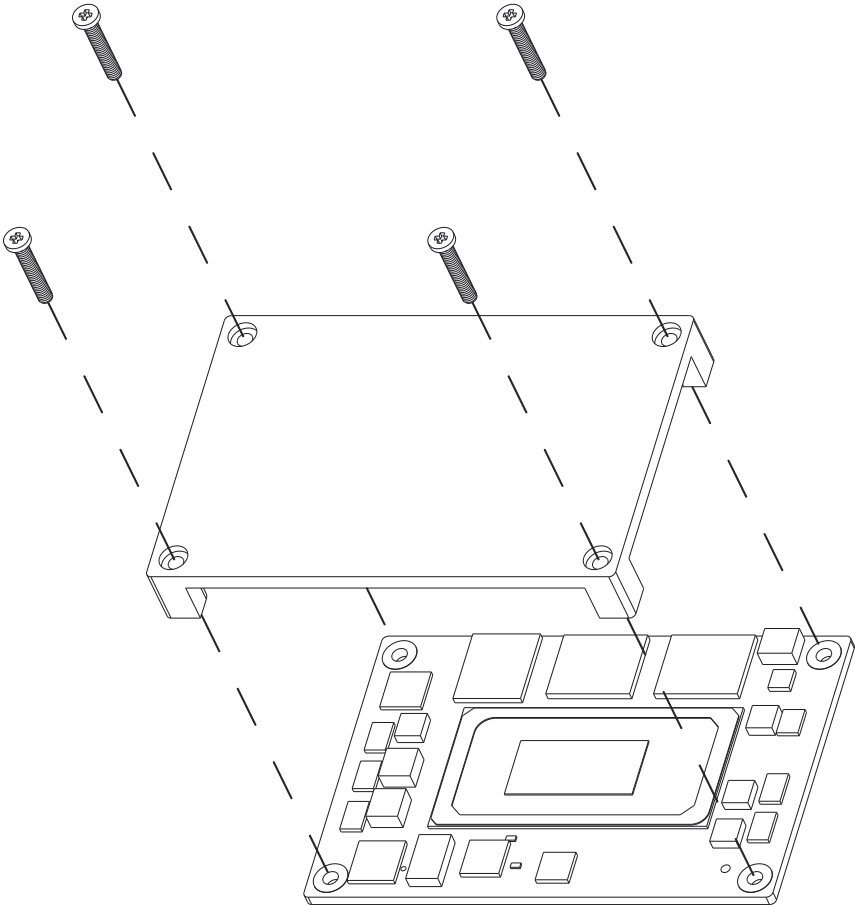
### 2.3.1 Fan Assembly

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



## 2.3.2 Heatspreader Assembly

Tighten all four screws following the alignment shown below in order to affix the heatspreader to the NANOCOM-ARH.



# Chapter 3

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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 and BIOS NVRAM. If system configuration is not found or system configuration data error is detected, system will load optimized default and re-boot with this default system configuration automatically.

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 <ESC> immediately while your computer is powering up.

The function for each interface can be found below.

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

**Advanced** – Enable/disable boot option for legacy network devices.

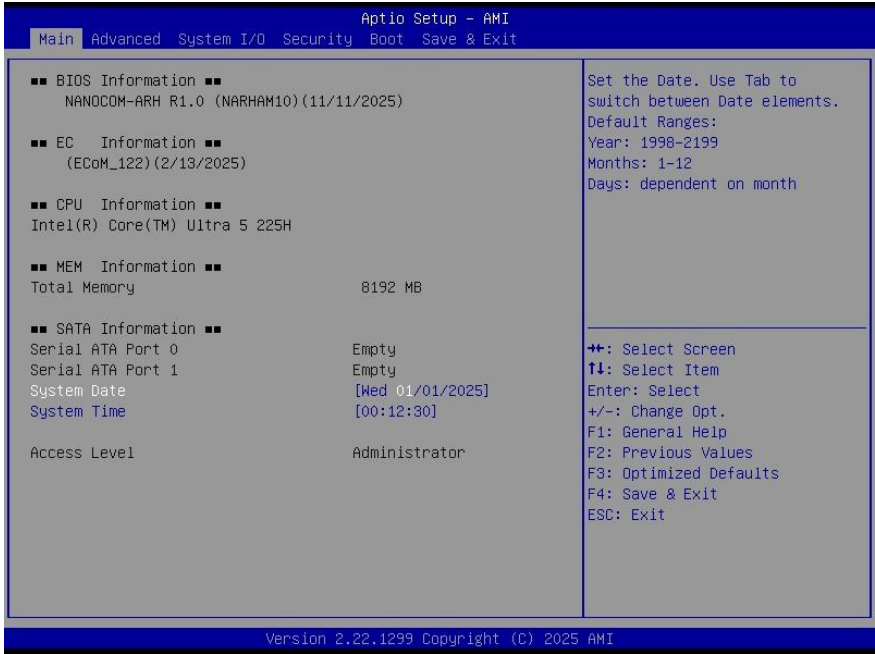
**System I/O** – Host bridge parameters.

**Security** – Set setup administrator password.

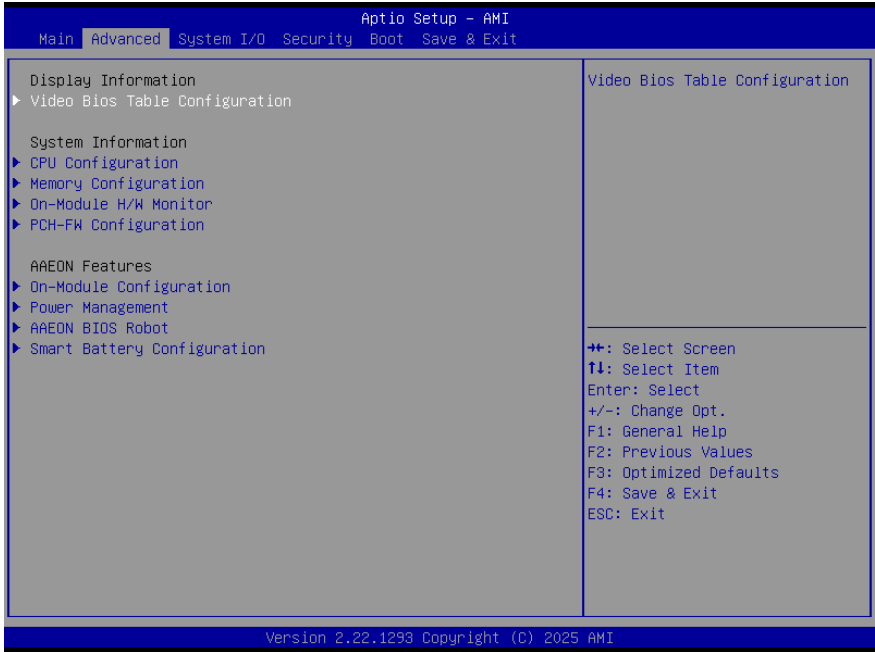
**Boot** – Enable/disable quiet boot option

**Save & Exit** – Save your changes and exit the program

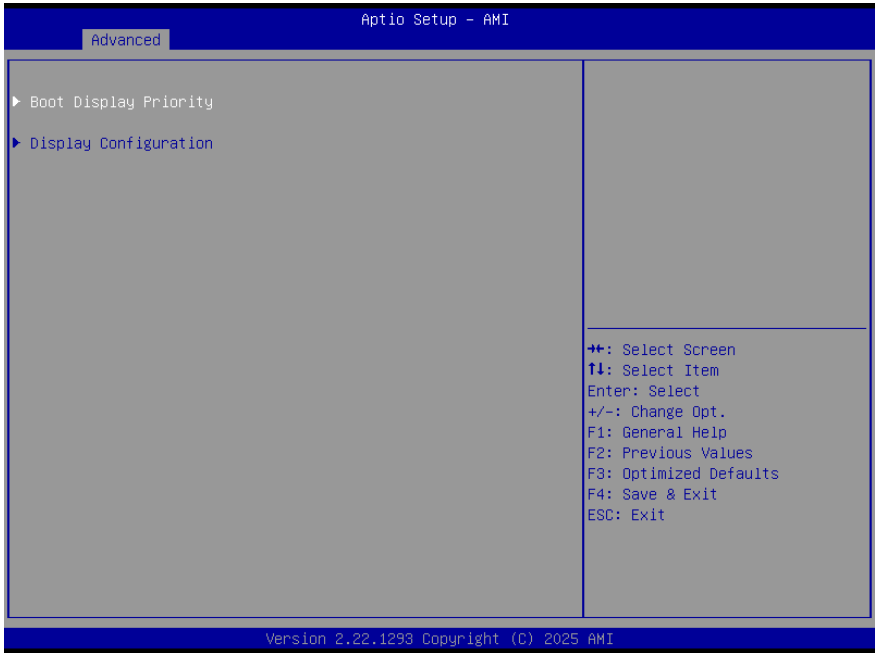
### 3.3 Setup Submenu: Main



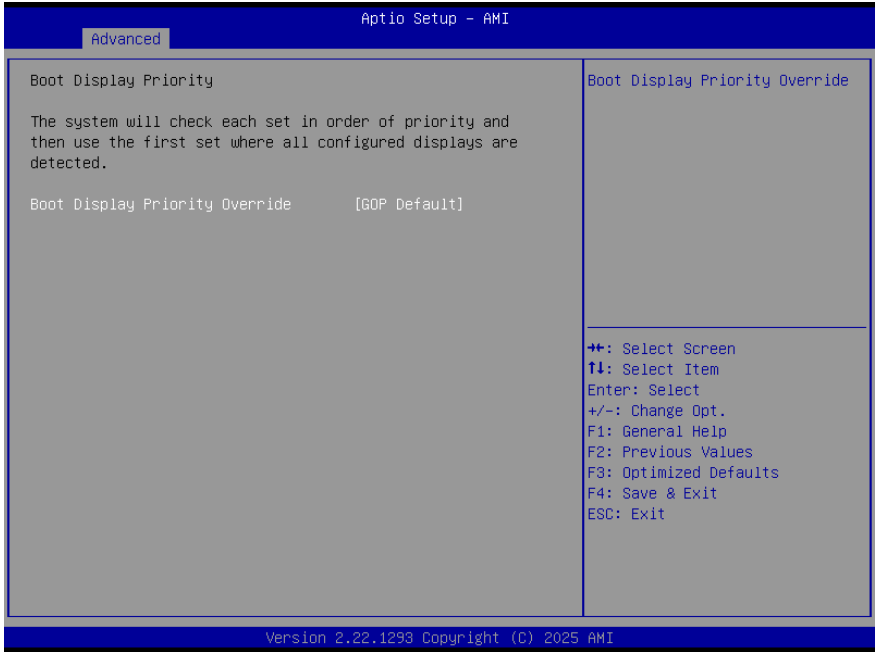
### 3.4 Setup Submenu: Advanced



### 3.4.1 Video Bios Table Configuration

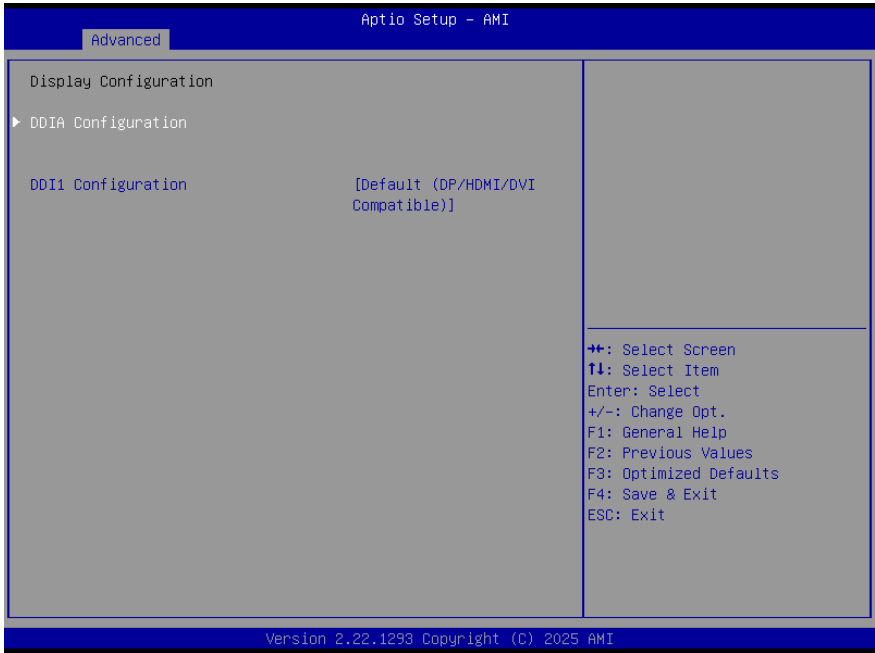


### 3.4.1.1 Boot Display Priority



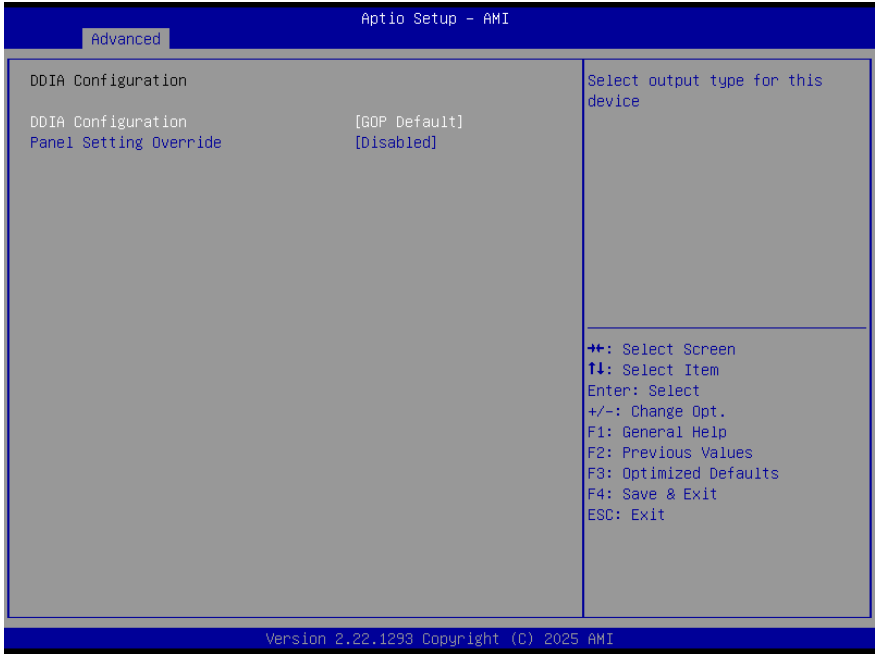
Options Summary		
Boot Display Priority	Enabled	
Override	GOP Default	Optimal Default, Failsafe Default
Boot Display Priority Override.		

### 3.4.1.2 Display Configuration



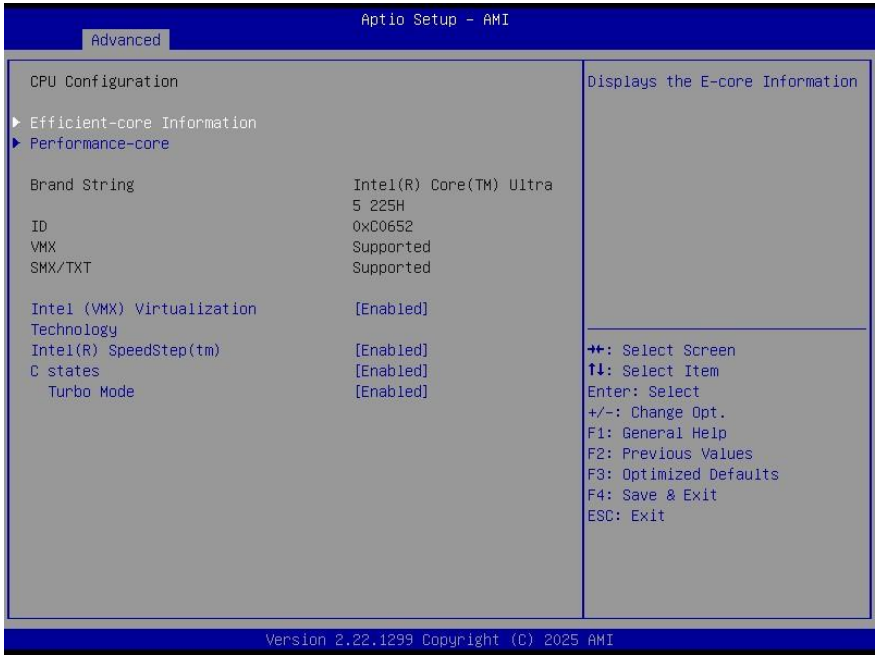
Options Summary		
DDI1 Configuration	No Device	
	DP	
	DP/HDMI/DVI Compatible	
	HDMI/DVI	
	Default (DP/HDMI/DVI Compatible)	Optimal Default, Failsafe Default
Select output type for this device.		

### 3.4.1.3 DDIA Configuration



Options Summary		
DDIA Configuration	No Device	
	DDIA	
	GOP Default	Optimal Default, Failsafe Default
Select output type for this device.		
Panel Setting Override	Enabled	
	Disabled	Optimal Default, Failsafe Default
Panel Setting Override.		

### 3.4.2 CPU Configuration



Options Summary		
Intel (VMX) Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.		
Hyper-Threading	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Hyper-Threading Technology.		
Intel® SpeedStep™	Disabled	
	Enabled	Optimal Default, Failsafe Default
Allows more than two frequency ranges to be supported.		
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.		

## Options Summary

Turbo Mode	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable processor Turbo Mode.		

## 3.4.2.1 Efficient-core Information

The screenshot shows the 'Advanced' menu of the Aptio Setup - AMI BIOS. The 'Efficient-core Information' section displays the following cache sizes:

L1 Data Cache	320 KB
L1 Instruction Cache	640 KB
L2 Cache	10240 KB
L3 Cache	18 MB

Below the cache information, a list of navigation keys is provided:

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

At the bottom of the screen, the text reads: Version 2.22.1299 Copyright (C) 2025 AMI

### 3.4.2.2 Performance-core Information

The screenshot displays the 'Advanced' menu of the Aptio Setup - AMI BIOS. The 'Performance-core' section is expanded, showing the following cache information:

Cache Type	Size
L1 Data Cache	192 KB
L1 Instruction Cache	256 KB
L2 Cache	12288 KB
L3 Cache	18 MB

Navigation instructions are listed on the right side of the screen:

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

At the bottom of the screen, the text reads: 'Version 2.22.1299 Copyright (C) 2025 AMI'.

### 3.4.3 Memory Configuration

Aptio Setup - AMI

Advanced

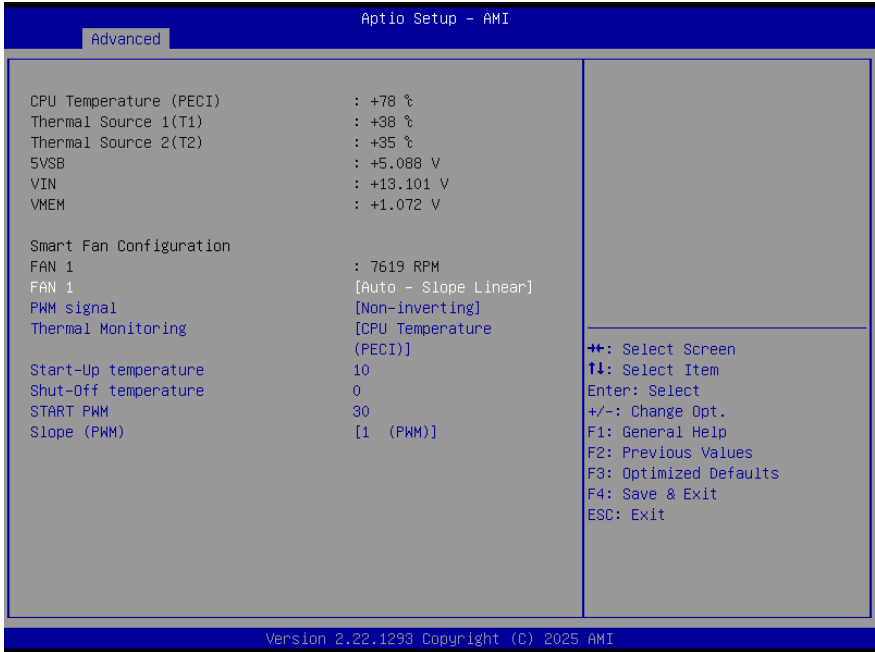
Memory Configuration	
Memory RC Version	2.10.2.0
Total Memory	8192 MB
Memory Frequency	6400 MHz
tCL-tRCD-tRP-tRAS	17-15-15-34
MC 0 Ch 0 DIMM 0	Populated & Enabled
Size	2048 MB (LPDDR5)
Number of Ranks	1
Manufacturer	Samsung
MC 0 Ch 1 DIMM 0	Populated & Enabled
Size	2048 MB (LPDDR5)
Number of Ranks	1
Manufacturer	Samsung
MC 0 Ch 2 DIMM 0	Populated & Enabled
Size	2048 MB (LPDDR5)
Number of Ranks	1
Manufacturer	Samsung
MC 0 Ch 3 DIMM 0	Populated & Enabled
Size	2048 MB (LPDDR5)
Number of Ranks	1
Manufacturer	Samsung

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

Version 2.22.1299 Copyright (C) 2025 AMI

### 3.4.4 On-Module H/W Monitor

Fan Mode: Auto – Slope Linear



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

Options Summary		
PWM output when monitoring thermal sensor is exceeded. Range: 0 – 100		
<b>Start-Off temperature</b>	0	
PWM turns off when monitored thermal sensor is less or equal to. Range: 0- 100		
<b>START PWM</b>	30	
The beginning PWM output value when Start-Up temperature is triggered.		
<b>Slope (PWM)</b>	0 (PWM)	
	1 (PWM)	Optimal Default, Failsafe Default
	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



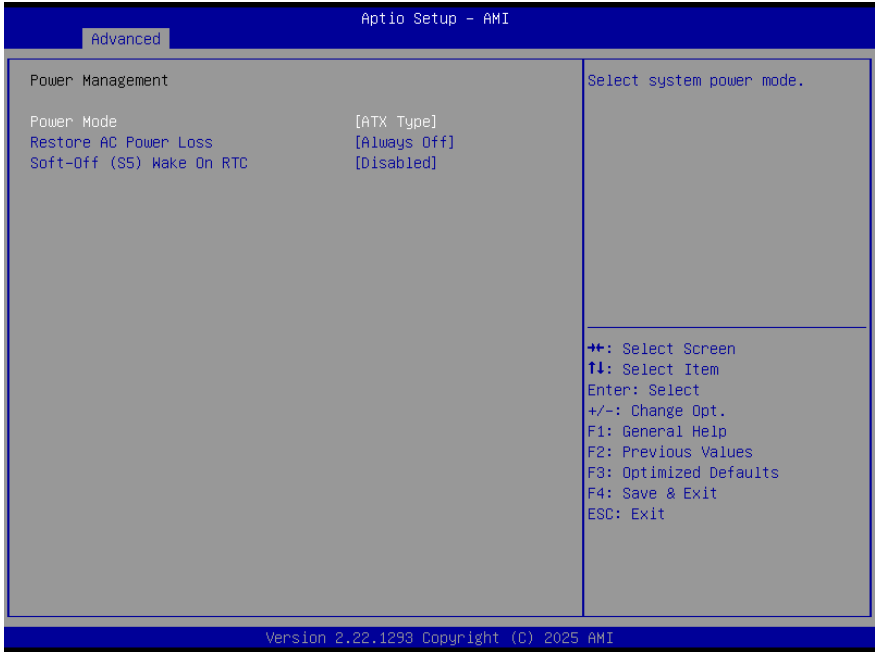
Options Summary		
TPM Device Section	dTPM	Optimal Default, Failsafe Default
	PTT	
<p>Selects TPM device: PTT or dTPM.</p> <p>PTT - Enables PTT in SkuMgr.                      dTPM 1.2 - Disables PTT in SkuMgr.</p> <p>Warning!                      PTT/dTPM will be disabled and all data saved on it will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

### 3.4.6 On-Module Configuration



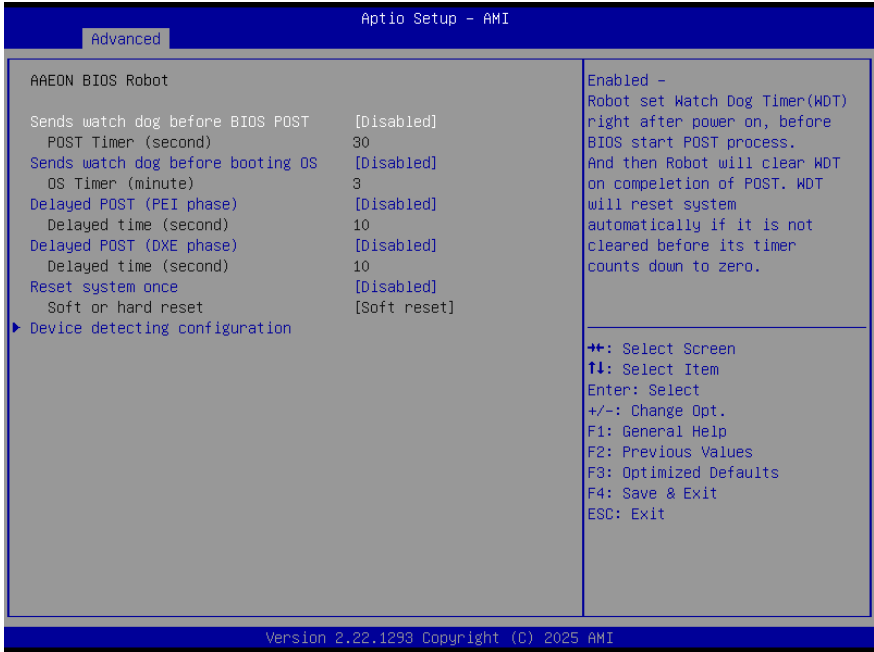
Options Summary		
Battery Management	Disabled	Optimal Default, Failsafe Default
	One Battery	
Enable to support battery in ACPI OS by I2C_CK, I2C_DAT (B33, B34).		

### 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
Restore AC Power Loss.		
Soft-Off (S5) Wake On RTC	Disable	Optimal Default, Failsafe Default
	By Date	
	By Weekday	
	Bypass	
By Date: System will wake on the day with hr::min::sec specified.		
By Weekday: System will wake on the enabled weekday with hr::min::sec specified.		
Bypass: BIOS will not control RTC wake function.		

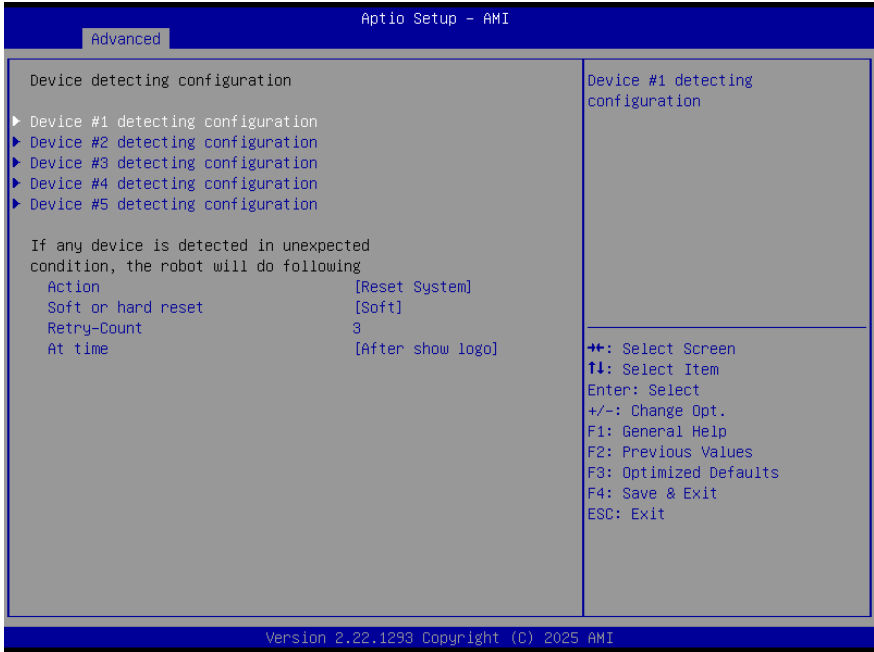
### 3.4.8 AAEON BIOS Robot



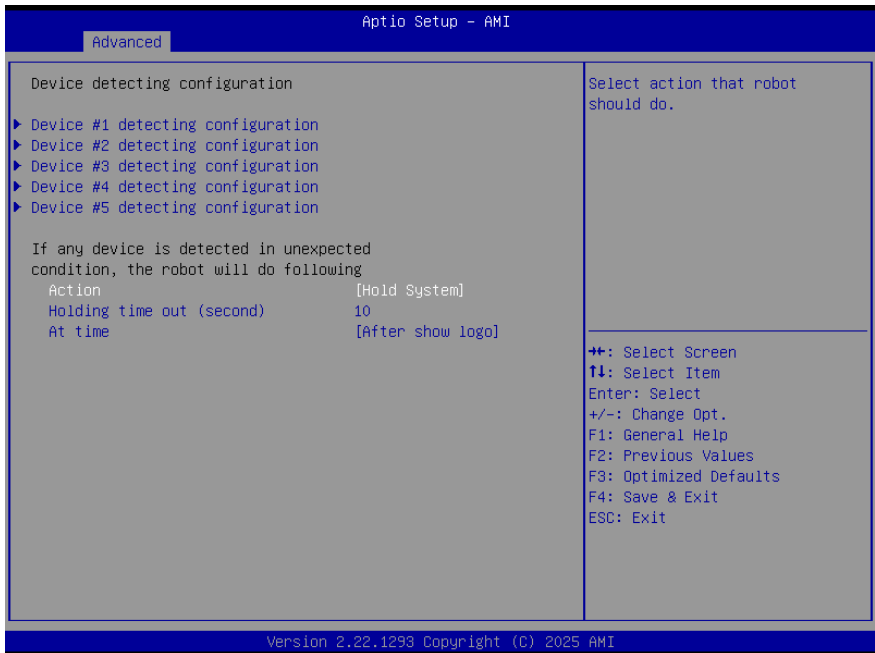
Options Summary		
Send watch dog before BIOS POST	Disabled	Optimal Default, Failsafe Default
	Enabled	
<p>Enabled - Robot set Watch Dog Timer (WDT) right after power on, before BIOS start POST process.                      And then Robot will clear WDT on completion of POST.</p> <p>WDT will reset system automatically if it is not cleared before its timer counts down to zero.</p>		
POST Timer (second)	30	Optimal Default, Failsafe Default
<p>Timer count set to Watch Dog Timer for POST.</p> <p>WARNING: Do not set to a value equal or shorter than normal POST time, otherwise system may never complete POST unless clearing BIOS settings.</p> <p>More than 2 x normal POST time is suggested.</p>		

Options Summary		
<b>Send watch dog before booting OS</b>	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot set Watch Dog Timer (WDT) after POST completion, before BIOS transfer control to OS. WARNING: Before enabling this function, a program in OS must be responsible for clearing WDT. Also, this function should be disabled if OS is going to update itself.		
<b>OS Timer (minute)</b>	3	Optimal Default, Failsafe Default
Timer count set to Watch Dog Timer for OS loading.		
<b>Delayed POST (PEI phase)</b>	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. Note: Robot does this before 'Sends watch dog'.		
<b>Delayed time (second)</b>	10	Optimal Default, Failsafe Default
Period of time for Robot to hold BIOS from POST.		
<b>Delayed POST (DXE phase)</b>	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'.		
<b>Delayed time (second)</b>	10	Optimal Default, Failsafe Default
Period of time for Robot to hold BIOS from POST.		
<b>Reset system once</b>	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot resets system for one time on each boot. This will send a soft or hard reset to onboard devices, thus putting devices into a more stable state.		
<b>Soft or hard reset</b>	Soft reset	Optimal Default, Failsafe Default
	Hard reset	
Select reset type robot should send on each boot.		

### 3.4.8.1 Device Detecting Configuration

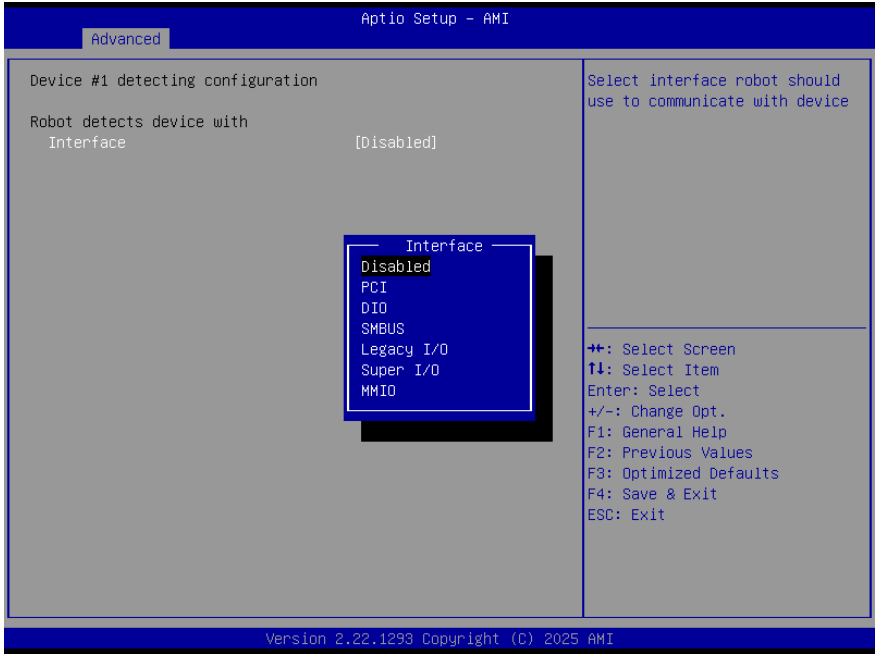


Options Summary		
Action	Reset System	Optimal Default, Failsafe Default
	Hold System	
Select action that robot should do.		
Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	
Select reset type robot should send on each boot.		
Retry-Count	3	Optimal Default, Failsafe Default
Fill retry counter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

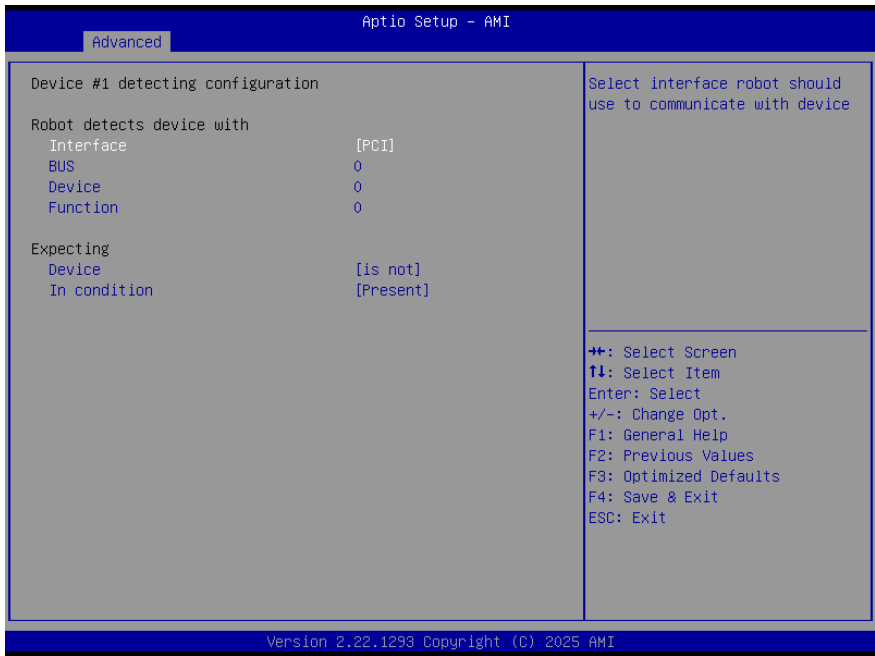


Options Summary		
Action	Reset System	
	Hold System	Optimal Default, Failsafe Default
Select action that robot should do.		
Holding time out (second)	10	Optimal Default, Failsafe Default
Fill hold time out here. Robot will hold system no longer than time-out value, and then let system continue its POST.		
At time	After show logo	Optimal Default, Failsafe Default
	Before show logo	
Select robot action time: After show logo - Robot will do action after logo is displayed. System devices are almost ready. Before show logo - Robot will do action earlier before logo, but some devices may not be ready.		

### 3.4.8.2 Device # Detecting Configuration



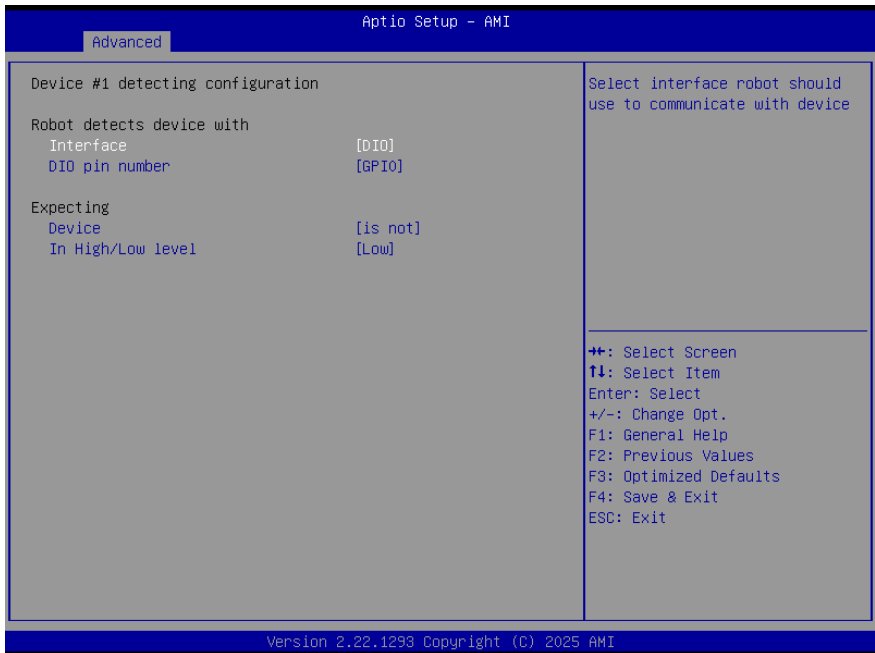
Options Summary		
Interface	Disabled	Optimal Default, Failsafe Default
	PCI	
	DIO	
	SMBUS	
	Legacy I/O	
	Super I/O	
	MMIO	
Select interface robot should use to communicate with device.		



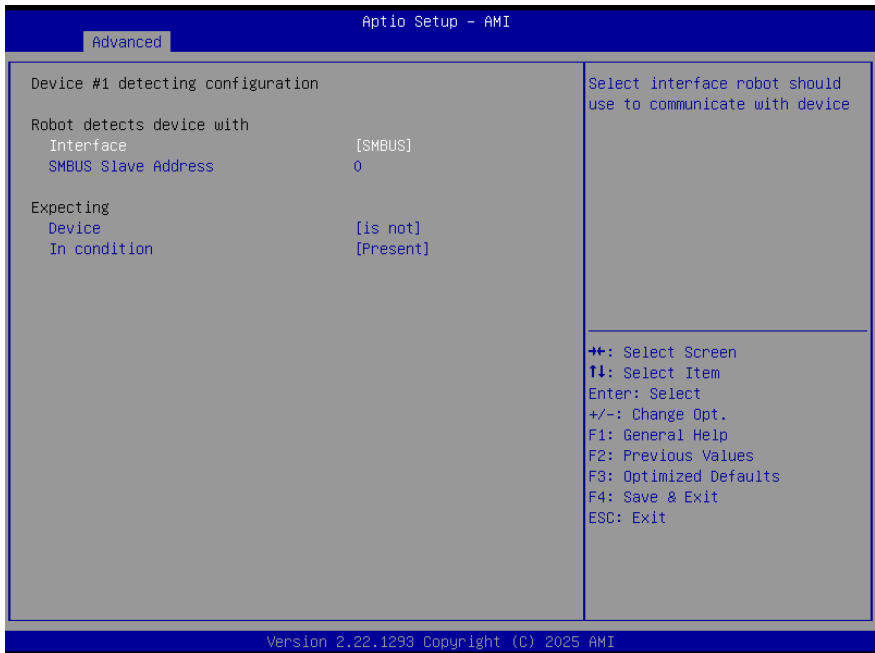
## Options Summary

When interface item set to "PCI" will show below items

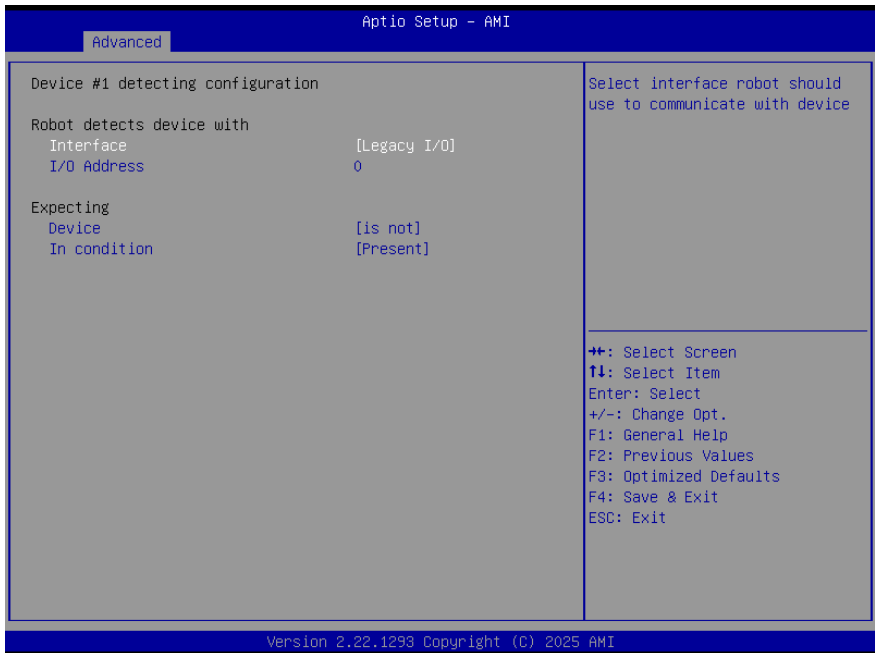
<b>BUS</b>	0	Optimal Default, Failsafe Default
Fill BUS number to a PCI device, in hexadecimal. Range: 0 – FF.		
<b>Device</b>	0	Optimal Default, Failsafe Default
Fill DEVICE number to a PCI device, in hexadecimal. Range: 0 – FF.		
<b>Function</b>	0	Optimal Default, Failsafe Default
Fill FUNCTION number to a PCI device, in hexadecimal. Range: 0 – FF.		
<b>Device</b>	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
<b>In condition</b>	Present	Optimal Default, Failsafe Default
	Specified register data	
Select the condition that robot should check for device. Present - device is detected. According to register - Robot read register according to configuration. Note: Device will be considered 'Present' by Robot, when data read from device is not 0xFF.		



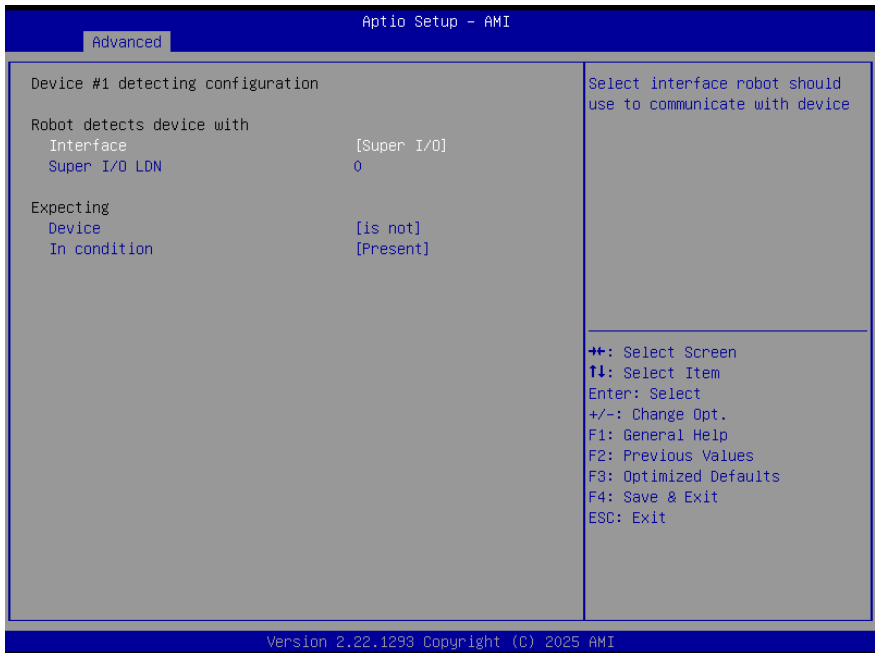
Options Summary		
When interface item set to "DIO" will show below items		
DIO pin number	GPIO 0	Optimal Default, Failsafe Default
	GPIO *	
Fill DIO pin number, 0 - DIO, 1 - DIO1, and so on. For COM express product: 0-3 - GPIO-3 4-7 - GPO0-3		
Device	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
In High/Low level	Low	Optimal Default, Failsafe Default
	High	
Select High/Low level of the DIO pin that robot should do action.		



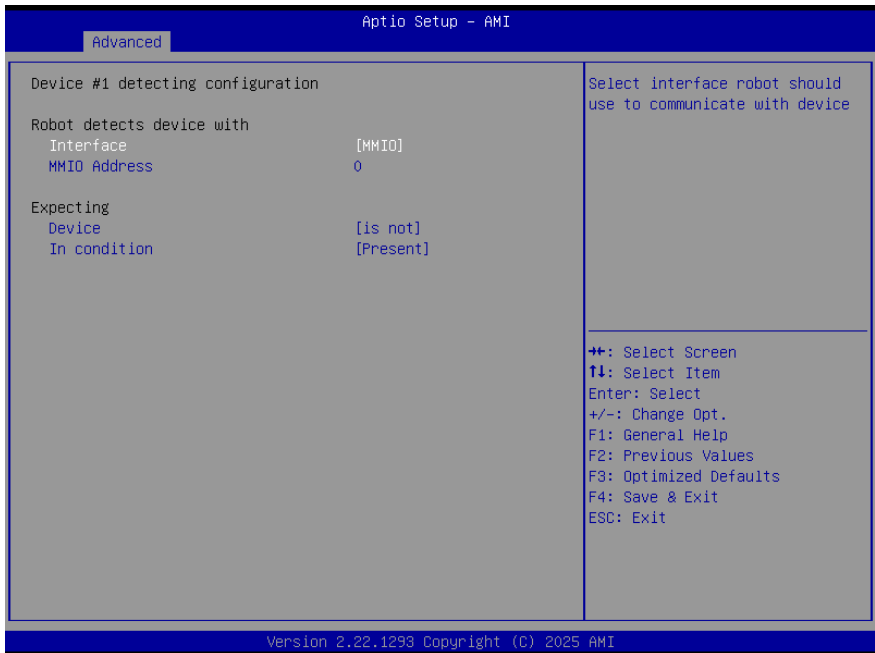
Options Summary		
When interface item set to "SMBUS" will show below items		
<b>SMBUS Slave Address</b>	0	Optimal Default, Failsafe Default
Fill slave address to a SMBUS device, in hexadecimal. Range: 0 - FF		
<b>Device</b>	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
<b>In condition</b>	Present	Optimal Default, Failsafe Default
	Specified register data	
Select the condition that robot should check for device. Present - device is detected According to register - Robot read register according to configuration. Note: Device will be considered 'Present' by Robot, when data read from device is not 0xFF.		



Options Summary		
When interface item set to "Legacy I/O" will show below items		
I/O Address	0	Optimal Default, Failsafe Default
Fill I/O address device is responding to. Range: 0~FFFF.		
Device	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
In condition	Present	Optimal Default, Failsafe Default
	Specified register data	
Select the condition that robot should check for device. Present - device is detected. According to register - Robot read register according to configuration. Note: Device will be considered 'Present' by Robot when data read from device is not 0xFF.		

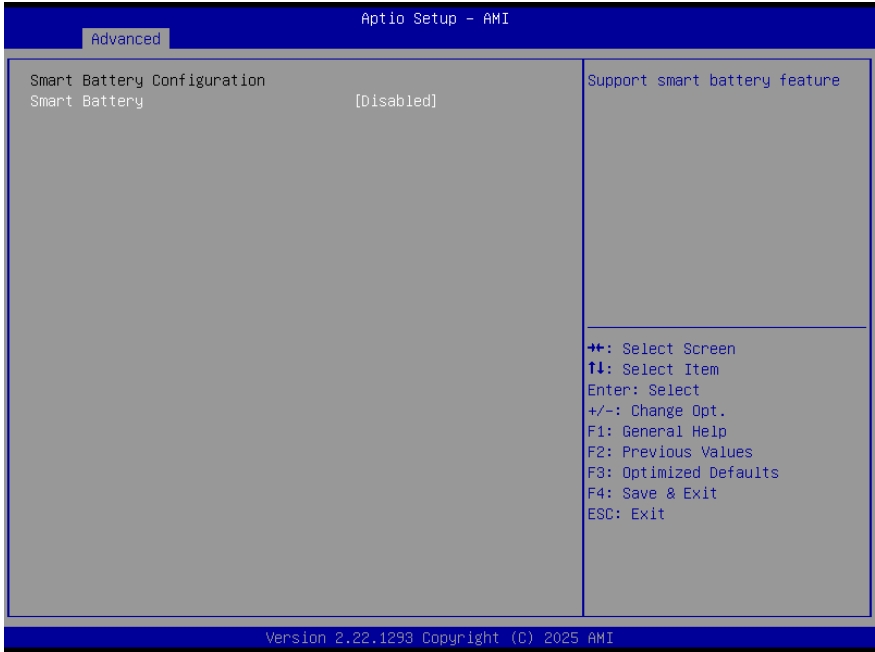


Options Summary		
When interface item set to "Super I/O" will show below items		
Super I/O LDN	0	Optimal Default, Failsafe Default
Fill LDN number to a Super I/O device. Range: 0~FF.		
Device	Is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
In condition	Present	Optimal Default, Failsafe Default
	Specified register data	
Select the condition that robot should check for device. Present - device is detected. According to register - Robot read register according to configuration. Note: Device will be considered 'Present' by Robot when data read from device is not 0xFF.		



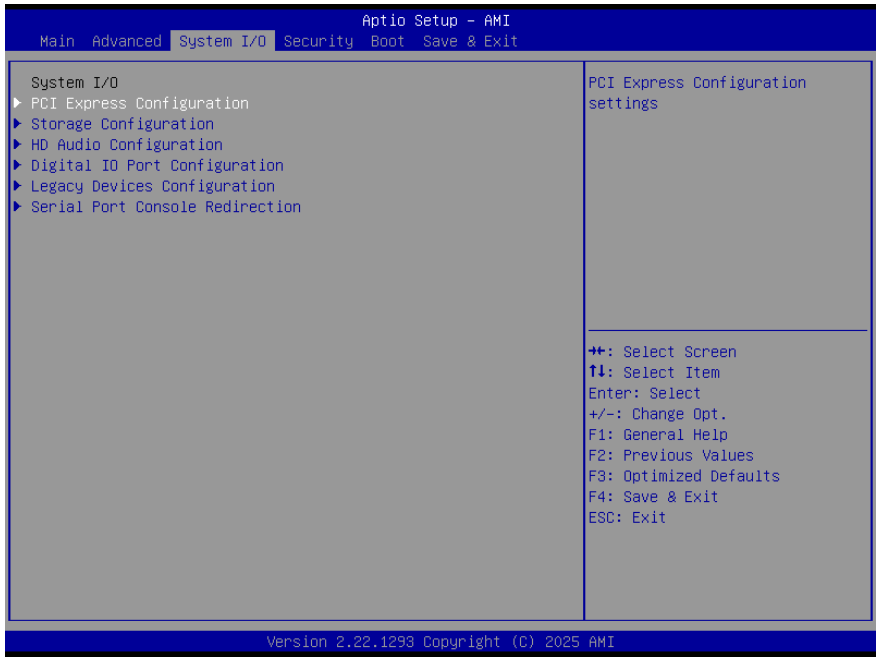
Options Summary		
When interface item set to "MMIO" will show below items		
MMIO Address	0	Optimal Default, Failsafe Default
Fill Memory Mapped I/O address device is responding to. Range: 0~FFFFFFFF.		
Device	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		
In condition	Present	Optimal Default, Failsafe Default
	Specified register data	
Select the condition that robot should check for device. Present - device is detected. According to register - Robot read register according to configuration. Note: Device will be considered 'Present' by Robot when data read from device is not 0xFF.		

### 3.4.9 Smart Battery Configuration

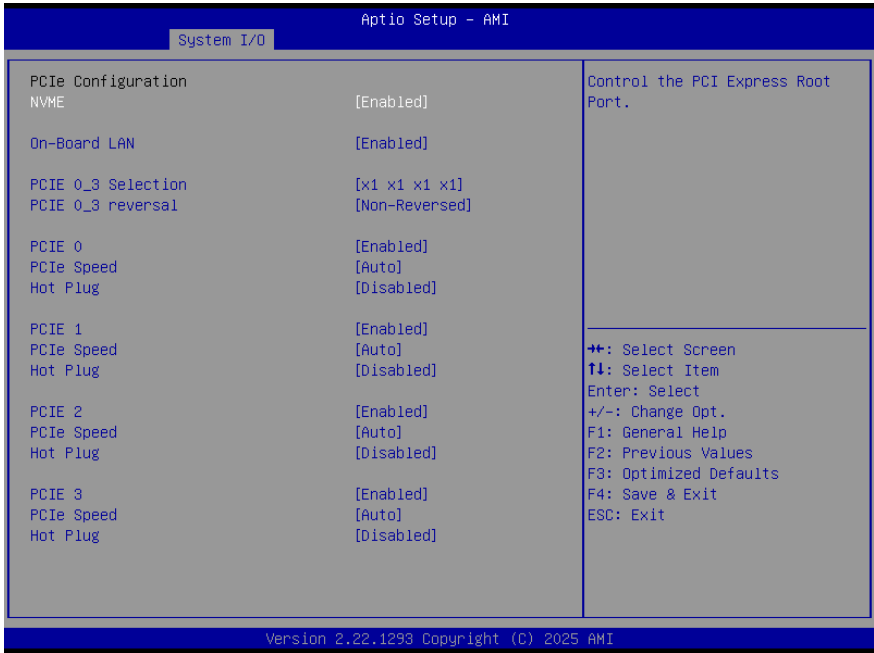


Options Summary		
Smart Battery	Disable	Optimal Default, Failsafe Default
	Enable	
Support smart battery feature.		

### 3.5 Setup Submenu: System I/O



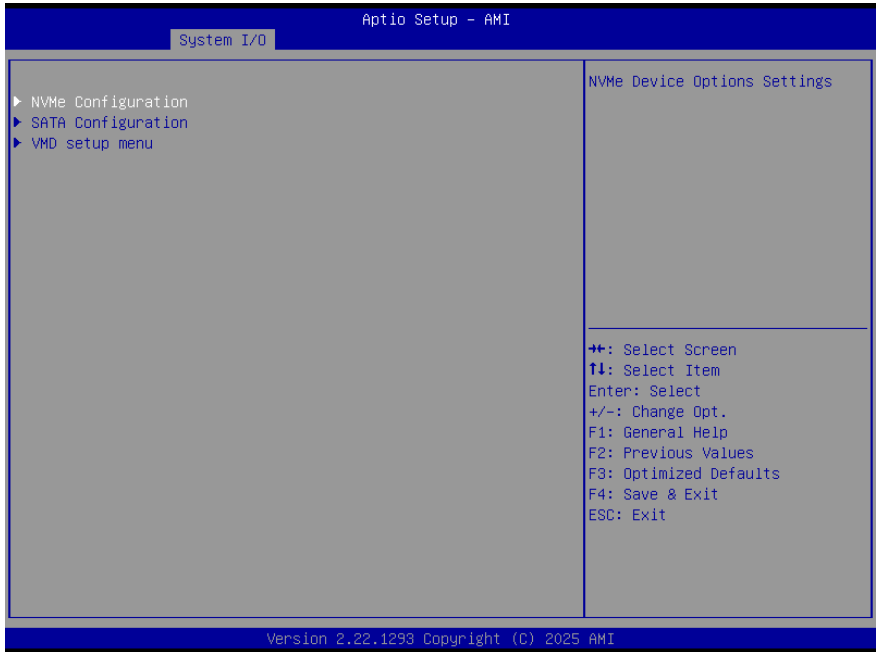
### 3.5.1 PCI Express Configuration



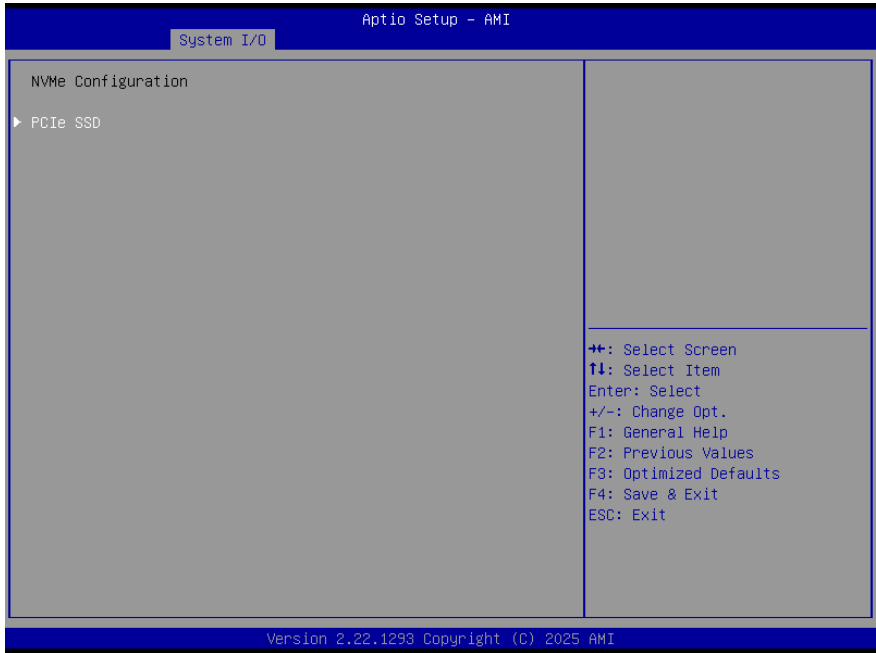
Options Summary		
NVME	Disable	
	Enable	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
On-Board LAN	Disable	
	Enable	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe 0_3 Selection	x1 x1 x1 x1	Optimal Default, Failsafe Default
	x2 x1 x1	
	x2 x2	
	x4	
PCIe Controller Setting.		
PCIe 0_3 reversal	Non-Reversed	Optimal Default, Failsafe Default
	Reversed	
PCIe LANE REVERSAL.		

Options Summary		
PCIe 0 ~ 3	Disable	
	Enable	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
	Gen4	
Configure PCIe Speed.		
Hot Plug	Disable	Optimal Default, Failsafe Default
	Enable	
PCI Express Hot Plug Enable/Disable.		

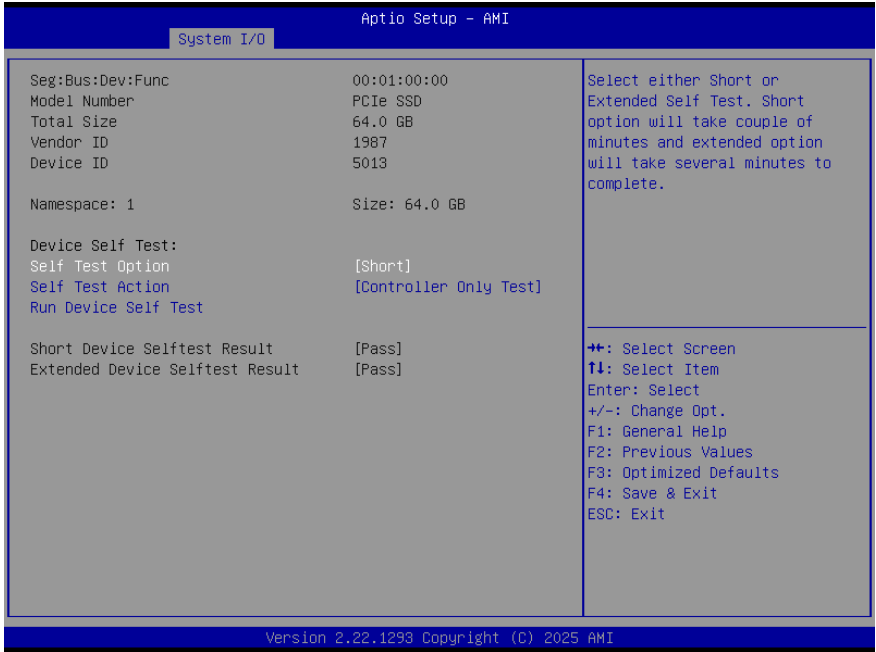
### 3.5.2 Storage Configuration



### 3.5.2.1 NVMe Configuration

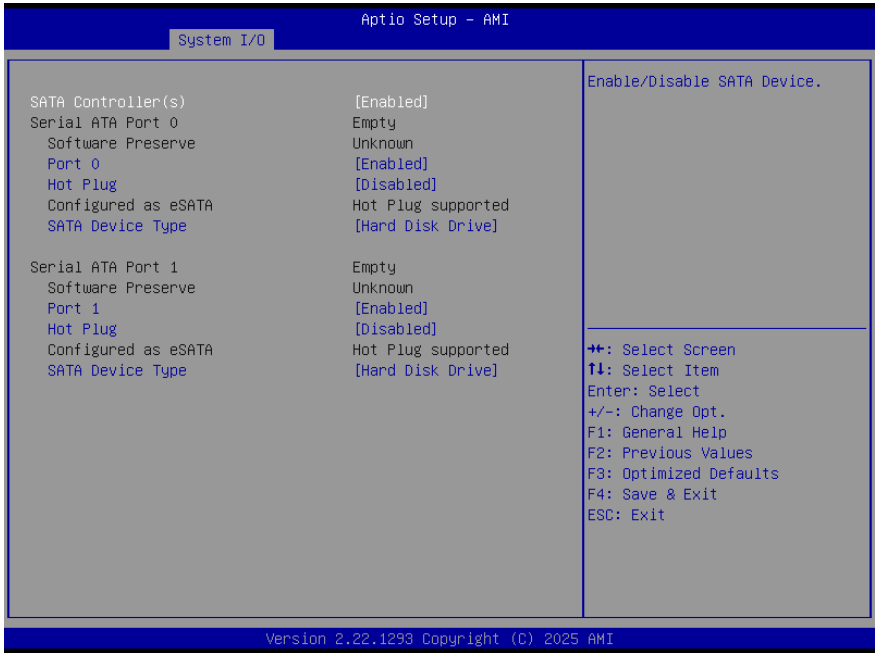


### 3.5.2.2 PCIe SSD



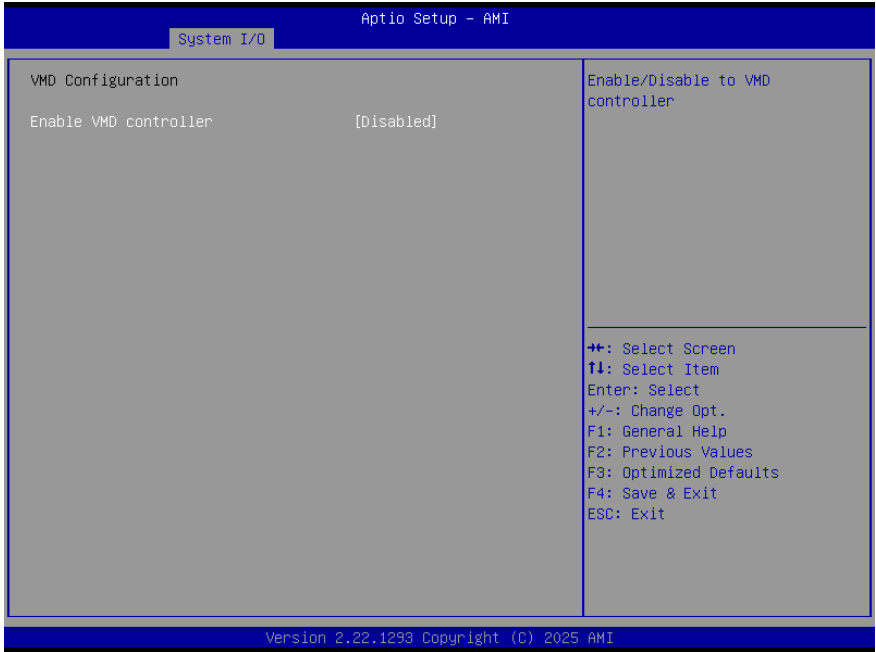
Options Summary		
Self Test Option	Short	Optimal Default, Failsafe Default
	Extended	
Select either Short or Extended Self Test Option. Short option will take a couple of minutes and extended option will take several minutes to complete.		
Self Test Action	Controller only test	Optimal Default, Failsafe Default
	Controller and NameSpace test	
Select either to test Controller alone or Controller and NameSpace. Select Controller and NameSpace option will take a lot longer to complete the test.		

### 3.5.2.3 SATA Configuration



Options Summary		
SATA Controller(s)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable SATA Device.		
Port 0 ~ 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.		

### 3.5.2.3 VMD Setup Menu



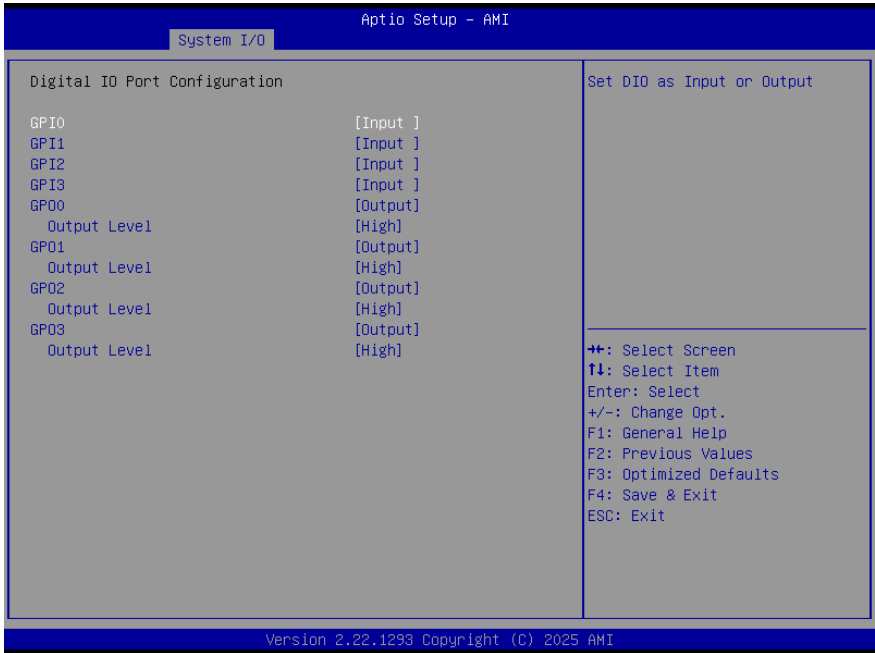
Options Summary		
Enable VMD controller	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable to VMD controller.		

### 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 Digital IO Port Configuration

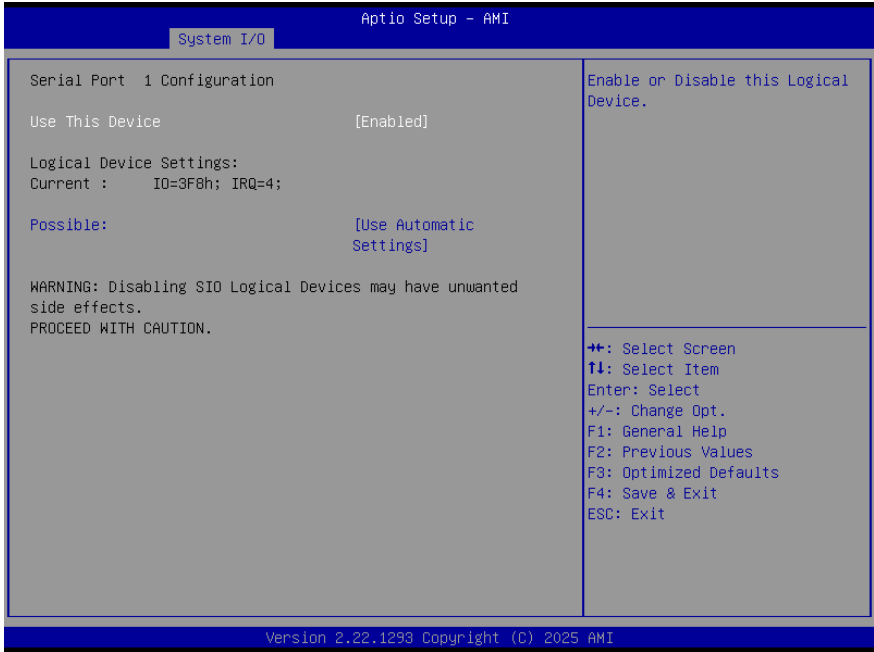


Options Summary		
GPI 0 - 3	Input	Optimal Default, Failsafe Default
	Output	
Set DIO as Input or Output.		
GPO 0 - 3	Input	
	Output	Optimal Default, Failsafe Default
Set DIO as Input or Output.		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output.		

### 3.5.5 Legacy Logical Devices Configuration

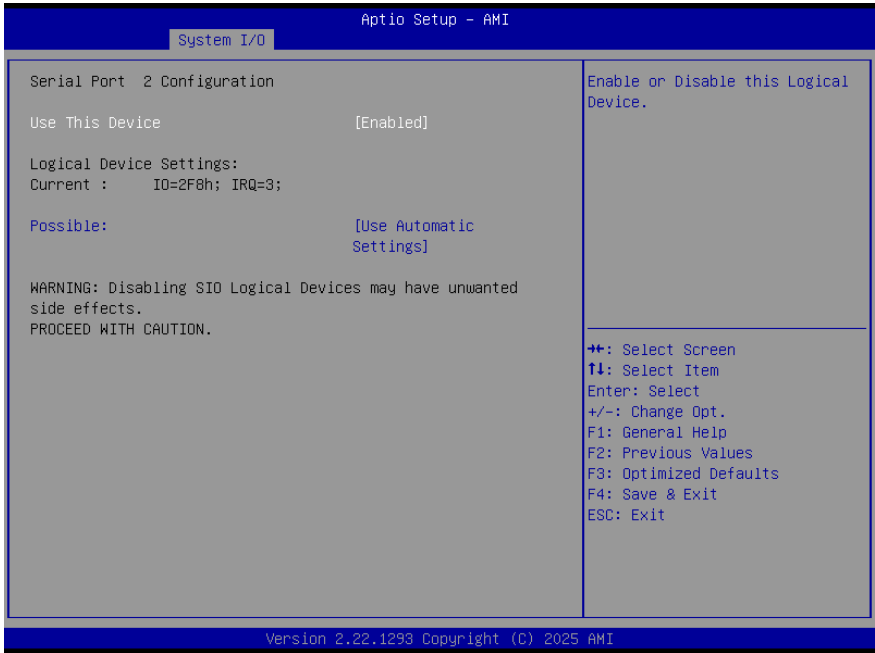


### 3.5.5.1 Serial Port 1 Configuration



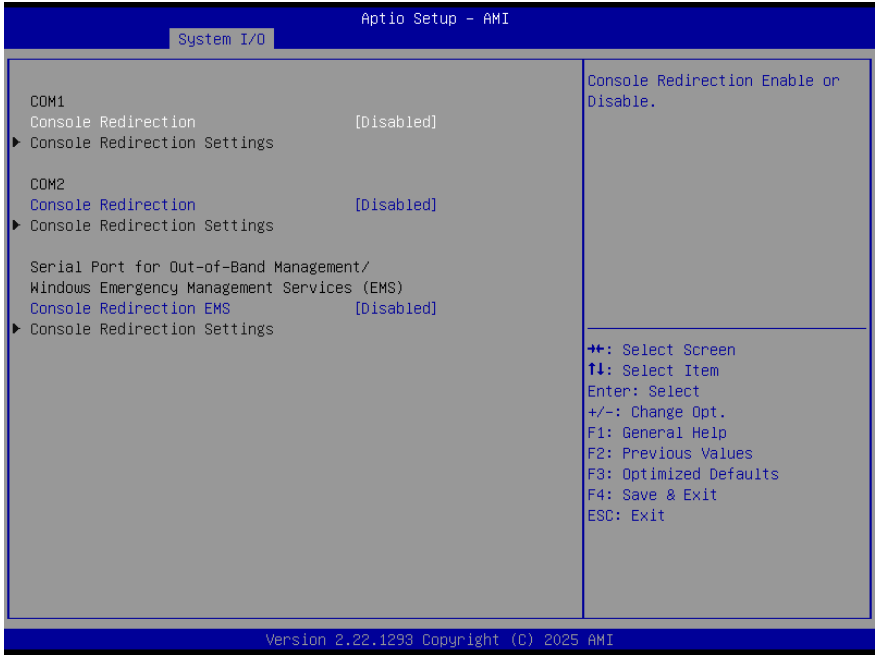
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=3F8h; IRQ=4; DMA;	
	IO=2C8h; IRQ=11; DMA;	
Allows the user to change the device resource settings. New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

### 3.5.5.2 Serial Port 2 Configuration



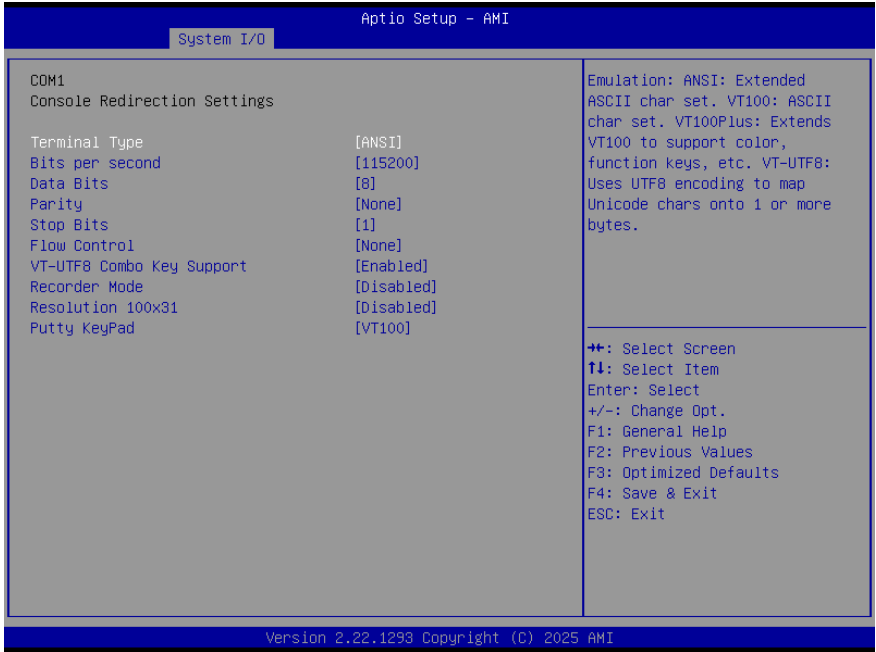
Options Summary		
Use This Device	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3; DMA;	
	IO=2d8h; IRQ=10; DMA;	
Allows the user to change the device resource settings. New settings will be reflected on this setup page after system restarts.		

### 3.5.6 Serial Port Console Configuration



Options Summary		
COM1 Console Redirection	Disabled	Optimal Default, Failsafe Default
	Enabled	
Console Redirection Enable or Disable.		
COM2 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 COM1 Console Redirection Settings

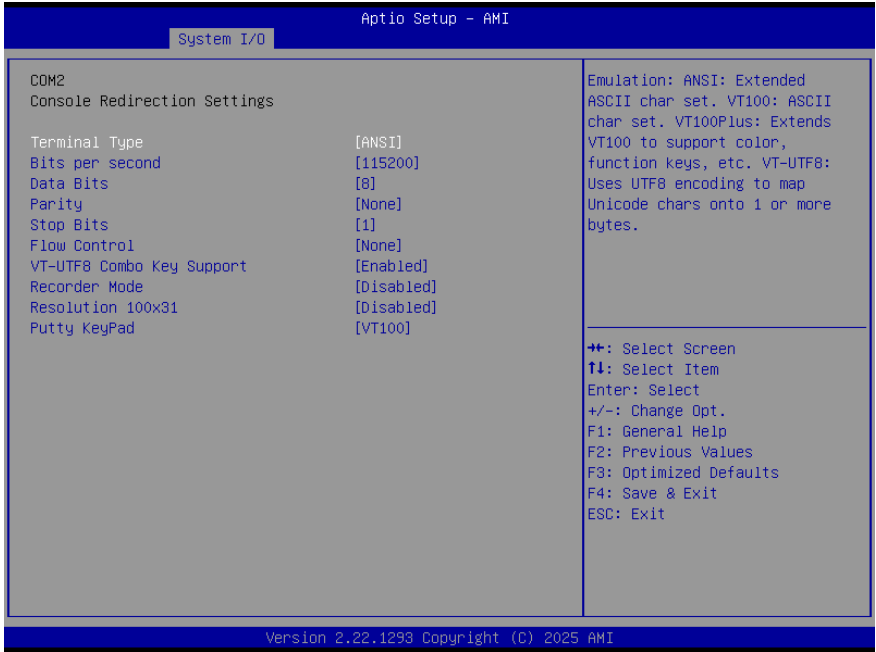


Options Summary		
Terminal Type	VT100	
	VT100Plus	
	VT-UTF8	
	ANSI	Optimal Default, Failsafe Default
Emulation:  ANSI: Extended ASCII char set.  VT100: ASCII char set.  VT100Plus: Extends VT100 to support color, function keys.  VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.		

Options Summary		
Bits per second	9600	
	19200	
	38400	
	57600	
	115200	Optimal Default, Failsafe Default
	230400	
	460800	
	921600	
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.		
Data Bits	7	
	8	Optimal Default, Failsafe Default
Data Bits		
Parity	None	Optimal Default, Failsafe Default
	Even	
	Odd	
	Mark	
	Space	
<p>A parity bit can be sent with the data bits to detect some transmission errors.</p> <p>Even: parity bit is 0 if the num of 1's in the data bits is even.</p> <p>Odd: parity bit is 0 if num of 1's in the data bits is odd.</p> <p>Mark: parity bit is always 1.</p> <p>Space: Parity bit is always 0.</p> <p>Mark and Space Parity do not allow for error detection.</p> <p>They can be used as an additional data bit.</p>		
Stop Bits	1	Optimal Default, Failsafe Default
	2	
<p>Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning).</p> <p>The standard setting is 1 stop bit.</p> <p>Communication with slow devices may require more than 1 stop bit.</p>		
Flow Control	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
<p>Flow control can prevent data loss from buffer overflow.</p> <p>When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow.</p> <p>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.</p>		
VT-UTF8 Combo Key Support	Disabled	
	Enabled	Optimal Default, Failsafe Default

Options Summary		
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals		
Recorder Mode	Disabled	Optimal Default, Failsafe Default
	Enabled	
With this mode enabled only text will be sent. This is to capture Terminal data.		
Resolution 100x31	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables or disables extended terminal resolution.		
Putty KeyPad	VT100	Optimal Default, Failsafe Default
	LINUX	
	XTERMR6	
	SCO	
	ESCN	
	VT400	
Select FunctionKey and KeyPad on Putty		

### 3.5.6.2 COM2 Console Redirection Settings

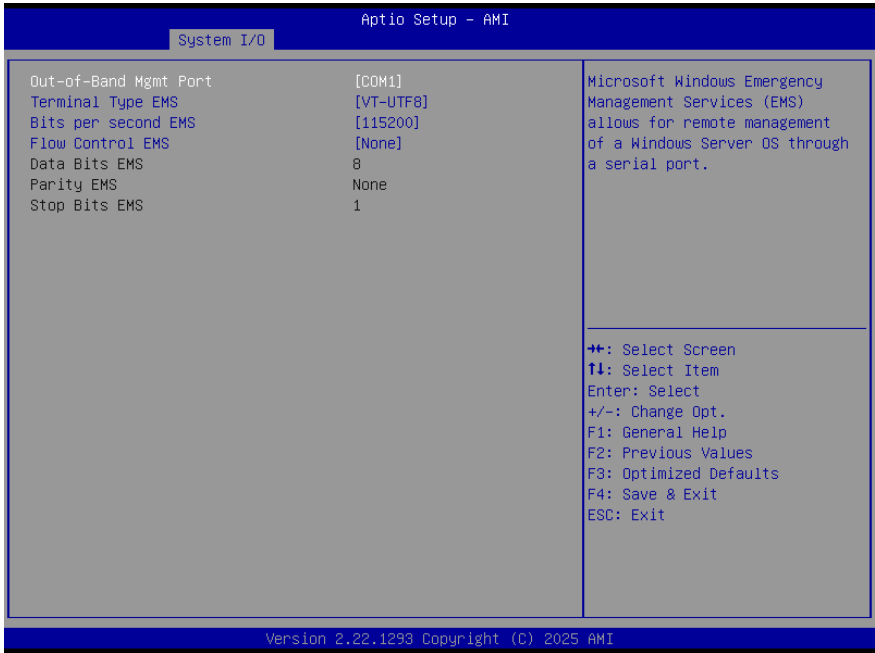


Options Summary		
Terminal Type	VT100	
	VT100Plus	
	VT-UTF8	
	ANSI	Optimal Default, Failsafe Default
Emulation:  ANSI: Extended ASCII char set.  VT100: ASCII char set.  VT100Plus: Extends VT100 to support color, function keys.  VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.		

Options Summary		
Bits per second	9600	
	19200	
	38400	
	57600	
	115200	Optimal Default, Failsafe Default
	230400	
	460800	
	921600	
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.		
Data Bits	7	
	8	Optimal Default, Failsafe Default
Data Bits		
Parity	None	Optimal Default, Failsafe Default
	Even	
	Odd	
	Mark	
	Space	
<p>A parity bit can be sent with the data bits to detect some transmission errors.</p> <p>Even: parity bit is 0 if the num of 1's in the data bits is even.</p> <p>Odd: parity bit is 0 if num of 1's in the data bits is odd.</p> <p>Mark: parity bit is always 1.</p> <p>Space: Parity bit is always 0.</p> <p>Mark and Space Parity do not allow for error detection.</p> <p>They can be used as an additional data bit.</p>		
Stop Bits	1	Optimal Default, Failsafe Default
	2	
<p>Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning).</p> <p>The standard setting is 1 stop bit.</p> <p>Communication with slow devices may require more than 1 stop bit.</p>		
Flow Control	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
<p>Flow control can prevent data loss from buffer overflow.</p> <p>When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow.</p> <p>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.</p>		
VT-UTF8 Combo Key Support	Disabled	
	Enabled	Optimal Default, Failsafe Default

Options Summary		
Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals		
Recorder Mode	Disabled	Optimal Default, Failsafe Default
	Enabled	
With this mode enabled only text will be sent. This is to capture Terminal data.		
Resolution 100x31	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enables or disables extended terminal resolution.		
Putty KeyPad	VT100	Optimal Default, Failsafe Default
	LINUX	
	XTERMR6	
	SCO	
	ESCN	
	VT400	
Select FunctionKey and KeyPad on Putty		

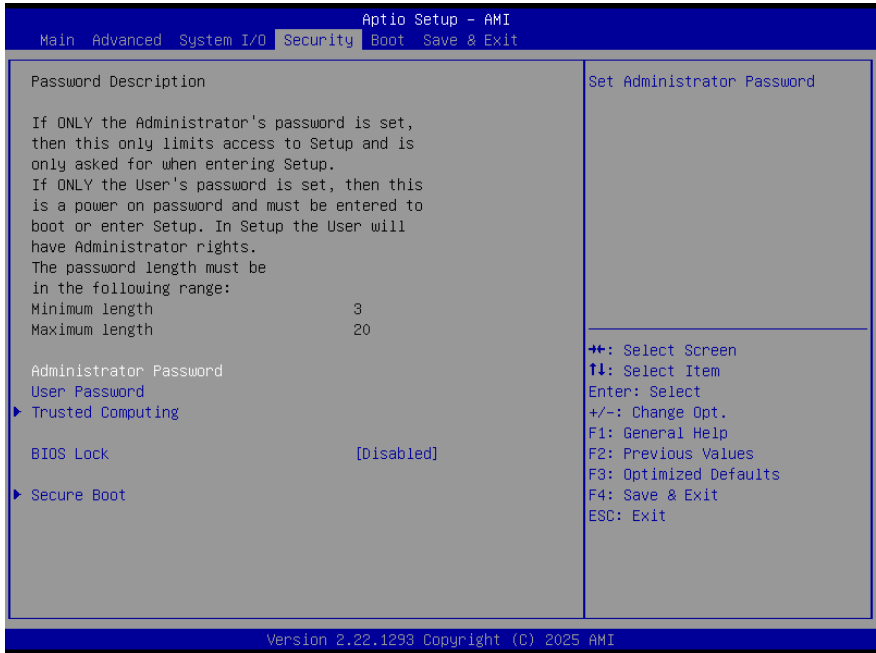
### 3.5.6.3 Console Redirection Settings



Options Summary		
Out-of-Band Mgmt Port	COM1	
	COM2	Optimal Default, Failsafe Default
Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port		
Terminal Type EMS	VT100	
	VT100Plus	
	VT-UTF8	Optimal Default, Failsafe Default
	ANSI	
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.		
Bits per second EMS	9600	
	19200	
	57600	
	115200	Optimal Default, Failsafe Default

Options Summary		
Bits per second EMS (cont.)	230400	
	460800	
	921600	
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.		
Flow Control EMS	None	Optimal Default, Failsafe Default
	Hardware RTS/CTS	
	Software Xon/Xoff	
<p>Flow control can prevent data loss from buffer overflow.</p> <p>When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow.</p> <p>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.</p>		

## 3.6 Setup Submenu: Security



### Change User/Administrator Password

You can set a User Password once an Administrator Password is set. The password will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility. Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your password for a final confirmation. Press Enter again after you have retyped it correctly.

## Removing the Password

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

Options Summary		
BIOS Lock	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.		

### 3.6.1 Trusted Computing

Aptio Setup - AMI

Security

TPM 2.0 Device Found		Enables or Disables BIOS support for security device. U.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version:	7.2	
Vendor:	NTC	
Security Device Support	[Enable]	
Active PCR banks	SHA256	
Available PCR banks	SHA256,SHA384	
SHA256 PCR Bank	[Enabled]	
SHA384 PCR Bank	[Disabled]	
Pending operation	[None]	
Platform Hierarchy	[Enabled]	
Storage Hierarchy	[Enabled]	
Endorsement Hierarchy	[Enabled]	
Physical Presence Spec Version	[1.3]	
TPM 2.0 InterfaceType	[TIS]	
Device Select	[Auto]	

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

Version 2.22.1293 Copyright (C) 2025 AMI

Options Summary		
Security Device Support	Disable	
	Enable	Optimal Default, Failsafe Default

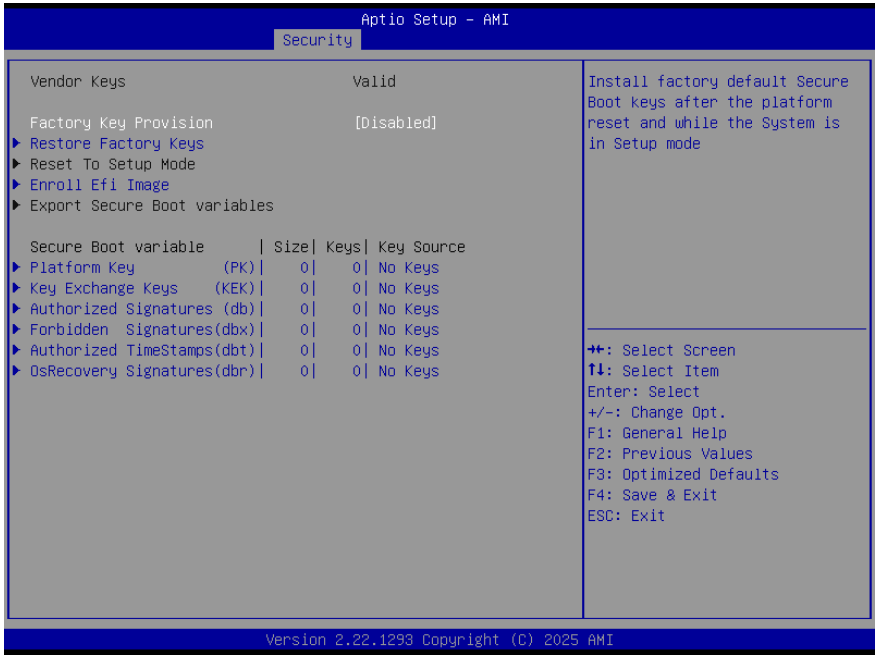
Options Summary		
Enables or Disables BIOS support for the security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.		
SHA256 PCR Bank	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable SHA256 PCR Bank.		
SHA384 PCR Bank	Disable	Optimal Default, Failsafe Default
	Enable	
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.		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or disable Platform Hierarchy.		
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storage Hierarchy.		
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Endorsement Hierarchy.		
Physical Presence Spec Version	1.2	
	1.3	Optimal Default, Failsafe Default
Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.		
Device Select	TPM 1.2	
	TPM 2.0	
	Auto	Optimal Default, Failsafe Default
TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.		

### 3.6.2 Secure Boot



Options Summary		
Secure Boot	Disabled	Optimal Default, Failsafe Default
	Enabled	
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset.		
Secure Boot Mode	Custom	Optimal Default, Failsafe Default
	Standard	
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		
Force System to User Mode. Install factory default Secure Boot key databases.		
Restore To Setup Mode		
Force System Delete all Secure Boot key databases from NVRAM.		

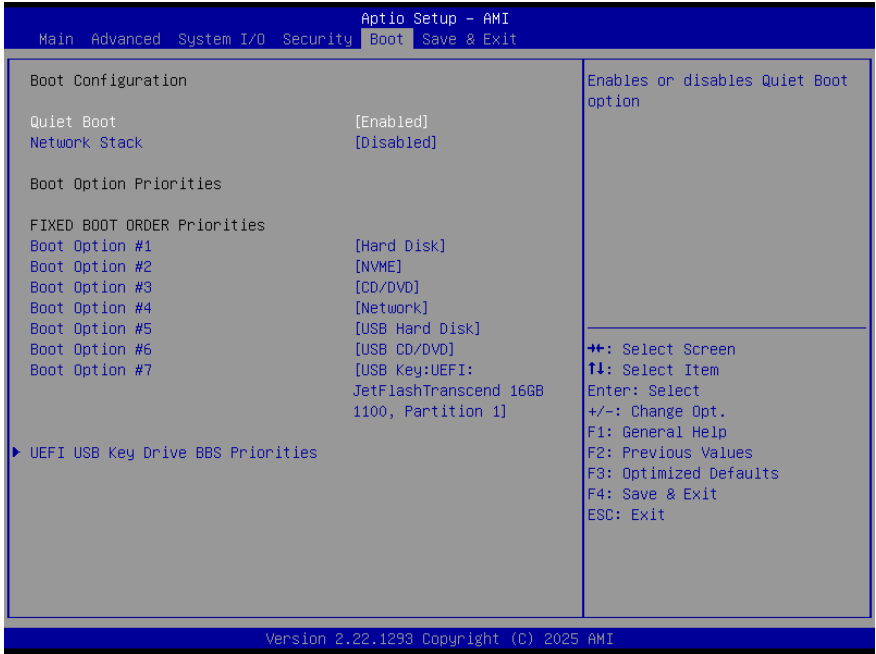
### 3.6.2.1 Expert Key Management



Options Summary		
<b>Factory Key Provision</b>	Disabled	Optimal Default, Failsafe Default
	Enabled	
Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.		
<b>Restore Factory Keys</b>		
Force System to User Mode. Install factory default Secure Boot key databases.		
<b>Reset to Setup Mode</b>		
Delete all Secure Boot key databases from NVRAM.		
<b>Export Secure Boot variables</b>		
Save NVRAM content of Secure Boot variable to a file.		
<b>Enroll Efi Image</b>		
Allow the image to run in Secure Boot mode.		
Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).		

Options Summary	
Platform Key (PK)	Details
	Export
	Update
	Delete
Key Exchange Keys (KEK)	Details
	Export
	Update
	Append
	Delete
Authorized Signatures (db)	Details
	Export
	Update
	Append
	Delete
Forbidden Signatures (dbx)	Details
	Export
	Update
	Append
	Delete
Authorized TimeStamps (dbt)	Update
	Append
OsRecovery Signatures (dbr)	Update
	Append
Enroll Factory Defaults or load certificates from a file: Public Key Certificate: a)EFI_SIGNATURE_LIST b)EFI_CERT_X509 (DER) c)EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX Authenticated UEFI Variable EFI PE/COFF Image (SHA256) Key Source: Factory, Modified, Mixed	

### 3.7 Setup Submenu: Boot



Options Summary		
Quiet Boot	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enables or disables Quiet Boot option.		
Network Stack	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enable/Disable UEFI Network Stack.		

### 3.8 Setup Submenu: Save & Exit



# Chapter 4

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Drivers Installation

## 4.1 Driver Download and Installation

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

<https://www.aaeon.com/en/>

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. Read the readme file before proceeding. Caution: Some drivers may require firmware updates first.
3. Identify the subfolder that matches your hardware: choose one of **PRO40GB**, **PRO1000**, **PRO2500**, **PROAVF**, **PROCGB**, **PROXGB**, **RDMA**.
4. Open the appropriate folder for your device, then run the executable file in that folder (e.g., setup.exe or [driver\_name].exe).
5. Follow the instructions, drivers will be installed automatically.
6. If your device supports management or additional applications, optionally install software from the **APPS** folder.
7. To update firmware, open the **NVMUpdatePackage** folder and follow the instructions in its readme.

## ME & TXE Drivers

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

## Serial I/O Drivers

1. Open the folder where you unzipped the **Serial I/O Drivers**
2. Identify the drivers you need based on your system hardware:
  - i. **iaLPSS2\_GPIO2\_MTL**
  - ii. **iaLPSS2\_I2C\_MTL**
  - iii. **iaLPSS2\_13C\_MTL**
  - iv. **iaLPSS2\_SPI\_MTL**
  - v. **iaLPSS2\_UART2\_MTL**
3. Open the folder for the driver you want to install.
4. Run the corresponding setup file (e.g., iaLPSS2\_GPIO2\_MTL.sys or setup.exe if provided), then follow the on-screen instructions; the driver will be installed automatically.
5. Repeat steps 4–6 for each additional driver required by your system.
6. After all drivers are installed, restart to complete the installation.

## Intel® NPU Drivers

1. Open the folder where you unzipped the **Peripheral Drivers**
2. Identify the drivers you need based on your system hardware:
  - i. **npu\_driver\_compiler.dll**
  - ii. **npu\_extension.dll**
  - iii. **npu\_level\_zero\_umd.dll**
  - iv. **tbb12.dll**
  - v. **tbbmalloc.dll**
  - vi. **ze\_loader.dll**
  - vii. **ze\_tracing\_layer.dll**
  - viii. **ze\_validation\_layer.dll**
3. Run the setup program if provided, or manually install the .sys and .dll files according to the instructions in the readme.
4. Follow the on-screen instructions; drivers and supporting libraries will be installed automatically.

## Intel® Platform Monitoring Technology Driver

1. Open the folder where you unzipped the **Peripheral Drivers**
2. Locate the **IntcPMT.sys** file.
3. Run the setup program if provided, or manually install the .sys file according to the instructions in the readme.
4. Follow the on-screen instructions; the driver will be installed automatically.

## Audio Drivers

### Intel® SST Driver

1. **Open Device Manager**  
Press Windows + X, then select **Device Manager**.
2. **Locate the Target Device**  
Expand categories like **Sound, video and game controllers**, **System devices**, **Audio inputs and outputs**, or **Other devices**.  
Devices may appear as unknown (e.g., "Audio DSP" or "Multimedia Controller").
3. **Update the Driver** - Right-click the device → **Update driver**.
4. Choose **Browse my computer for drivers**.
5. Click **Browse**, and navigate to the folder for the correct driver component.
6. Click **Next** to install the driver.
7. **Repeat for All Components**

Install each component in the suggested order. Restart the system after completing all installations.

## Recommended Installation Order:

IntcAudioBus  
IntcSDW / IntcSdwBus  
IntcSST  
IntcDMic  
IntcOED  
IntcUSB  
IntcBTAu  
IntcBtLE  
IntcAudioSensors  
IntcStreaming  
WoV (Wake-on-Voice)  
DetectionVerificationDrv

If any driver fails to install, verify that the .inf file is in the folder and that your hardware supports the feature.

## Realtek Audio Driver

1. Open the folder where you unzipped the **Realtek Audio Driver**.
2. Run the **Setup.exe** file in the folder.
3. Follow the instructions.
4. Drivers will be installed automatically.

## RAID Driver

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

## Intel Camera Driver

1. Open the folder where you unzipped the **Intel Camera Driver**.
2. Extract the driver package to a folder such as: C:\Intel\_Camera\_Driver\
3. **Open Device Manager**
  - i. Press Windows + X → **Device Manager**.
  - ii. Expand **Imaging Devices, Cameras, or Other devices**.
  - iii. Look for:
  - iv. "Intel AVStream Camera"
  - v. "Unknown Device"
  - vi. "OV01A1S" / "OV13858" (depending on camera module)
4. Manually Install Drivers.

**Right-click → Update driver**

**Select "Browse my computer for drivers"**

**Browse to the extracted folder, and let Windows search subfolders**

**Click Next to install**

Repeat for:

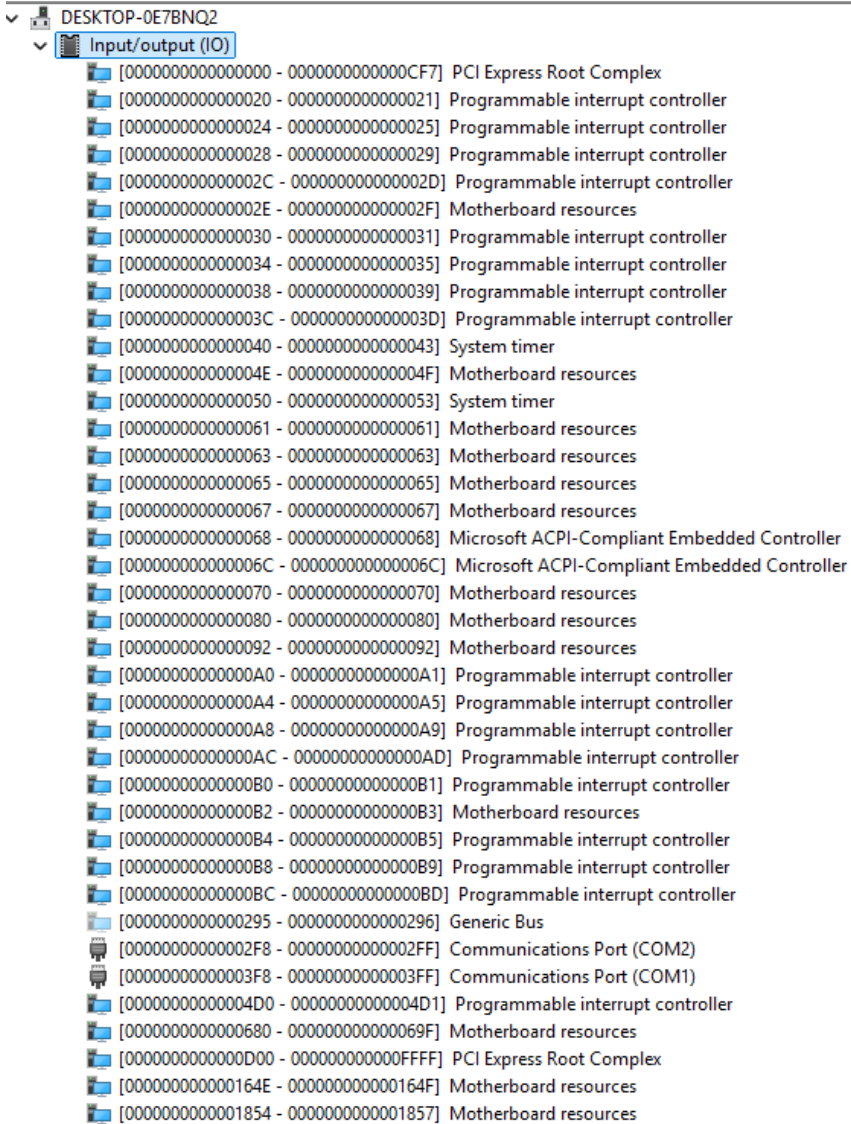
- Main camera (iacamera64.sys)
- Sensor modules (e.g., ov01a1s.sys, ov13858.sys)
- ISP driver (iaisp64.sys)
- Control logic (iactrllogic64.sys)
- Sub-drivers like IntcOED, Im3643, It6911uxc, etc.

# Appendix A








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I/O Information

## A.1 I/O Address Map



Address Range	Device Name
[0000000000000000 - 0000000000000CF7]	PCI Express Root Complex
[0000000000000020 - 0000000000000021]	Programmable interrupt controller
[0000000000000024 - 0000000000000025]	Programmable interrupt controller
[0000000000000028 - 0000000000000029]	Programmable interrupt controller
[000000000000002C - 000000000000002D]	Programmable interrupt controller
[000000000000002E - 000000000000002F]	Motherboard resources
[0000000000000030 - 0000000000000031]	Programmable interrupt controller
[0000000000000034 - 0000000000000035]	Programmable interrupt controller
[0000000000000038 - 0000000000000039]	Programmable interrupt controller
[000000000000003C - 000000000000003D]	Programmable interrupt controller
[0000000000000040 - 0000000000000043]	System timer
[000000000000004E - 000000000000004F]	Motherboard resources
[0000000000000050 - 0000000000000053]	System timer
[0000000000000061 - 0000000000000061]	Motherboard resources
[0000000000000063 - 0000000000000063]	Motherboard resources
[0000000000000065 - 0000000000000065]	Motherboard resources
[0000000000000067 - 0000000000000067]	Motherboard resources
[0000000000000068 - 0000000000000068]	Microsoft ACPI-Compliant Embedded Controller
[000000000000006C - 000000000000006C]	Microsoft ACPI-Compliant Embedded Controller
[0000000000000070 - 0000000000000070]	Motherboard resources
[0000000000000080 - 0000000000000080]	Motherboard resources
[0000000000000092 - 0000000000000092]	Motherboard resources
[0000000000000A0 - 00000000000000A1]	Programmable interrupt controller
[0000000000000A4 - 00000000000000A5]	Programmable interrupt controller
[0000000000000A8 - 00000000000000A9]	Programmable interrupt controller
[00000000000000AC - 00000000000000AD]	Programmable interrupt controller
[00000000000000B0 - 00000000000000B1]	Programmable interrupt controller
[00000000000000B2 - 00000000000000B3]	Motherboard resources
[00000000000000B4 - 00000000000000B5]	Programmable interrupt controller
[00000000000000B8 - 00000000000000B9]	Programmable interrupt controller
[00000000000000BC - 00000000000000BD]	Programmable interrupt controller
[0000000000000295 - 0000000000000296]	Generic Bus
[00000000000002F8 - 00000000000002FF]	Communications Port (COM2)
[00000000000003F8 - 00000000000003FF]	Communications Port (COM1)
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000680 - 000000000000069F]	Motherboard resources
[0000000000000D00 - 0000000000000FFF]	PCI Express Root Complex
[000000000000164E - 000000000000164F]	Motherboard resources
[0000000000001854 - 0000000000001857]	Motherboard resources



	[0000000000002000 - 00000000000020FE] Motherboard resources
	[0000000000003000 - 0000000000003FFF] PCI Express Root Port
	[0000000000003020 - 000000000000303F] Standard SATA AHCI Controller
	[0000000000003040 - 0000000000003043] Standard SATA AHCI Controller
	[0000000000003050 - 0000000000003057] Standard SATA AHCI Controller
	[0000000000004000 - 0000000000004FFF] PCI Express Root Port
	[000000000000EFA0 - 000000000000EFBF] Intel (R) SMBus - 7722
	[000000000000FFFF - 0000000000010006] Communications Port (COM1)

## A.2 Memory Address Map










































Memory	
[0000000000000000 - 000000000000FFFF]	Motherboard resources
[0000000000000000 - 000000000000FFFF]	Motherboard resources
[00000000000A0000 - 00000000000BFFFF]	PCI Express Root Complex
[0000000080000000 - 000000008000FFFF]	Intel(R) Ethernet Controller I226-IT
[0000000080000000 - 000000008010FFFF]	PCI Express Root Port
[0000000080000000 - 00000000BFFFFFFF]	PCI Express Root Complex
[0000000080100000 - 0000000080103FFF]	Intel(R) Ethernet Controller I226-IT
[0000000080200000 - 0000000080203FFF]	Standard NVM Express Controller
[0000000080200000 - 000000008020FFFF]	PCI Express Root Port
[0000000080200000 - 000000008020FFFF]	PCI Express Root Port
[0000000080300000 - 0000000080301FFF]	Standard SATA AHCI Controller
[0000000080300000 - 000000008030FFFF]	PCI Express Root Port
[0000000080302000 - 00000000803027FF]	Standard SATA AHCI Controller
[0000000080303000 - 00000000803030FF]	Standard SATA AHCI Controller
[00000000C0000000 - 00000000CFFFFFFF]	Motherboard resources
[00000000E0D10000 - 00000000E0D1FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC105E
[00000000E0D20000 - 00000000E0D2FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC105E
[00000000E0D30000 - 00000000E0D3FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC105E
[00000000E0D40000 - 00000000E0D4FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC105E
[00000000E0D50000 - 00000000E0D5FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC105E
[00000000FC800000 - 00000000FC81FFFF]	Motherboard resources
[00000000FE010000 - 00000000FE010FFF]	Intel (R) SPI (flash) controller - 7723
[00000000FED00000 - 00000000FED003FF]	High precision event timer
[00000000FED20000 - 00000000FED7FFFF]	Motherboard resources
[00000000FED40000 - 00000000FED44FFF]	Trusted Platform Module 2.0
[00000000FED45000 - 00000000FED8FFFF]	Motherboard resources
[00000000FEDC0000 - 00000000FEDC7FFF]	Motherboard resources
[00000000FEE00000 - 00000000FEEFFFFF]	Motherboard resources
[0000004000000000 - 000000400000FFFF]	Intel(R) Graphics
[0000004017000000 - 000000401700FFFF]	Intel(R) Graphics
[0000004018000000 - 000000401800FFFF]	PCI Express Root Port
[0000004020240000 - 000000402024FFFF]	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
[0000004020250000 - 000000402025FFFF]	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
[0000004020268000 - 00000040202680FF]	Intel (R) SMBus - 7722
[0000004020269000 - 0000004020269FFF]	Intel(R) Management Engine Interface #1
[000000402026A000 - 000000402026AFFF]	Intel(R) Serial IO I2C Host Controller - 7779
[000000402026B000 - 000000402026BFFF]	Intel(R) Serial IO I2C Host Controller - 7778
[0000003FFB000000 - 0000003FFB70FFFF]	Intel(R) AI Boost
[0000003FFBFC0000 - 0000003FFBFDFFFF]	Intel® Smart Sound Technology BUS
[0000003FFBFFB000 - 0000003FFBFFBFFF]	Intel(R) AI Boost
[0000003FFBFFBC000 - 0000003FFBFFBFFF]	Intel® Smart Sound Technology BUS
[0000003FFBFFC0000 - 0000003FFBFFCFFF]	Intel(R) Platform Monitoring Technology (PMT) Driver

## A.3 Large Memory Address Map










































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- ▼  Large Memory
  -  [0000004000000000 - 000003FFBFFFFFFF] PCI Express Root Complex










































## A.4 IRQ Mapping Chart










































- ▼  DESKTOP-0E7BNQ2
  - >  Input/output (IO)
    - ▼  Interrupt request (IRQ)
      -  (ISA) 0x00000000 (00) System timer
      -  (ISA) 0x00000003 (03) Communications Port (COM2)
      -  (ISA) 0x00000004 (04) Communications Port (COM1)
      -  (ISA) 0x0000000E (14) Intel(R) Serial IO GPIO Host Controller - INTC105E
      -  (ISA) 0x0000000F (15) Communications Port (COM1)
      -  (ISA) 0x00000037 (55) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000038 (56) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000039 (57) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003A (58) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003B (59) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003C (60) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003D (61) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003E (62) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000003F (63) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000040 (64) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000041 (65) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000042 (66) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000043 (67) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000044 (68) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000045 (69) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000046 (70) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000047 (71) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000048 (72) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000049 (73) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004A (74) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004B (75) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004C (76) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004D (77) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004E (78) Microsoft ACPI-Compliant System
      -  (ISA) 0x0000004F (79) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000050 (80) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000051 (81) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000052 (82) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000053 (83) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000054 (84) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000055 (85) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000056 (86) Microsoft ACPI-Compliant System
      -  (ISA) 0x00000057 (87) Microsoft ACPI-Compliant System










































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	(ISA) 0x00000058 (88)	Microsoft ACPI-Compliant System
	(ISA) 0x00000059 (89)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005A (90)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005B (91)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005C (92)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005D (93)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005E (94)	Microsoft ACPI-Compliant System
	(ISA) 0x0000005F (95)	Microsoft ACPI-Compliant System
	(ISA) 0x00000060 (96)	Microsoft ACPI-Compliant System
	(ISA) 0x00000061 (97)	Microsoft ACPI-Compliant System
	(ISA) 0x00000062 (98)	Microsoft ACPI-Compliant System
	(ISA) 0x00000063 (99)	Microsoft ACPI-Compliant System
	(ISA) 0x00000064 (100)	Microsoft ACPI-Compliant System
	(ISA) 0x00000065 (101)	Microsoft ACPI-Compliant System
	(ISA) 0x00000066 (102)	Microsoft ACPI-Compliant System
	(ISA) 0x00000067 (103)	Microsoft ACPI-Compliant System
	(ISA) 0x00000068 (104)	Microsoft ACPI-Compliant System
	(ISA) 0x00000069 (105)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006A (106)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006B (107)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006C (108)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006D (109)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006E (110)	Microsoft ACPI-Compliant System
	(ISA) 0x0000006F (111)	Microsoft ACPI-Compliant System
	(ISA) 0x00000070 (112)	Microsoft ACPI-Compliant System
	(ISA) 0x00000071 (113)	Microsoft ACPI-Compliant System
	(ISA) 0x00000072 (114)	Microsoft ACPI-Compliant System
	(ISA) 0x00000073 (115)	Microsoft ACPI-Compliant System
	(ISA) 0x00000074 (116)	Microsoft ACPI-Compliant System
	(ISA) 0x00000075 (117)	Microsoft ACPI-Compliant System
	(ISA) 0x00000076 (118)	Microsoft ACPI-Compliant System
	(ISA) 0x00000077 (119)	Microsoft ACPI-Compliant System
	(ISA) 0x00000078 (120)	Microsoft ACPI-Compliant System
	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System










































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 (ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
 (ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
 (ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
 (ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
 (ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
 (ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
 (ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
 (ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
 (ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
 (ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
 (ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
 (ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
 (ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
 (ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
 (ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
 (ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
 (ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
 (ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
 (ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
 (ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
 (ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
 (ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
 (ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System










































 (ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AB (171)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
 (ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
 (ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
 (ISA) 0x000000BF (191)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C0 (192)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C1 (193)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C2 (194)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C3 (195)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C4 (196)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C5 (197)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C6 (198)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C7 (199)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C8 (200)	Microsoft ACPI-Compliant System
 (ISA) 0x000000C9 (201)	Microsoft ACPI-Compliant System
 (ISA) 0x000000CA (202)	Microsoft ACPI-Compliant System
 (ISA) 0x000000CB (203)	Microsoft ACPI-Compliant System
 (ISA) 0x000000CC (204)	Microsoft ACPI-Compliant System
 (ISA) 0x00000100 (256)	Microsoft ACPI-Compliant System
 (ISA) 0x00000101 (257)	Microsoft ACPI-Compliant System
 (ISA) 0x00000102 (258)	Microsoft ACPI-Compliant System
 (ISA) 0x00000103 (259)	Microsoft ACPI-Compliant System
 (ISA) 0x00000104 (260)	Microsoft ACPI-Compliant System

 (ISA) 0x00000105 (261)	Microsoft ACPI-Compliant System
 (ISA) 0x00000106 (262)	Microsoft ACPI-Compliant System
 (ISA) 0x00000107 (263)	Microsoft ACPI-Compliant System
 (ISA) 0x00000108 (264)	Microsoft ACPI-Compliant System
 (ISA) 0x00000109 (265)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010A (266)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010B (267)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010C (268)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010D (269)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010E (270)	Microsoft ACPI-Compliant System
 (ISA) 0x0000010F (271)	Microsoft ACPI-Compliant System
 (ISA) 0x00000110 (272)	Microsoft ACPI-Compliant System
 (ISA) 0x00000111 (273)	Microsoft ACPI-Compliant System
 (ISA) 0x00000112 (274)	Microsoft ACPI-Compliant System
 (ISA) 0x00000113 (275)	Microsoft ACPI-Compliant System
 (ISA) 0x00000114 (276)	Microsoft ACPI-Compliant System
 (ISA) 0x00000115 (277)	Microsoft ACPI-Compliant System
 (ISA) 0x00000116 (278)	Microsoft ACPI-Compliant System
 (ISA) 0x00000117 (279)	Microsoft ACPI-Compliant System
 (ISA) 0x00000118 (280)	Microsoft ACPI-Compliant System
 (ISA) 0x00000119 (281)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011A (282)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011B (283)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011C (284)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011D (285)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011E (286)	Microsoft ACPI-Compliant System
 (ISA) 0x0000011F (287)	Microsoft ACPI-Compliant System
 (ISA) 0x00000120 (288)	Microsoft ACPI-Compliant System
 (ISA) 0x00000121 (289)	Microsoft ACPI-Compliant System
 (ISA) 0x00000122 (290)	Microsoft ACPI-Compliant System
 (ISA) 0x00000123 (291)	Microsoft ACPI-Compliant System
 (ISA) 0x00000124 (292)	Microsoft ACPI-Compliant System
 (ISA) 0x00000125 (293)	Microsoft ACPI-Compliant System
 (ISA) 0x00000126 (294)	Microsoft ACPI-Compliant System
 (ISA) 0x00000127 (295)	Microsoft ACPI-Compliant System
 (ISA) 0x00000128 (296)	Microsoft ACPI-Compliant System
 (ISA) 0x00000129 (297)	Microsoft ACPI-Compliant System
 (ISA) 0x0000012A (298)	Microsoft ACPI-Compliant System
 (ISA) 0x0000012B (299)	Microsoft ACPI-Compliant System
 (ISA) 0x0000012C (300)	Microsoft ACPI-Compliant System
 (ISA) 0x0000012D (301)	Microsoft ACPI-Compliant System










































 (ISA) 0x0000012E (302)	Microsoft ACPI-Compliant System
 (ISA) 0x0000012F (303)	Microsoft ACPI-Compliant System
 (ISA) 0x00000130 (304)	Microsoft ACPI-Compliant System
 (ISA) 0x00000131 (305)	Microsoft ACPI-Compliant System
 (ISA) 0x00000132 (306)	Microsoft ACPI-Compliant System
 (ISA) 0x00000133 (307)	Microsoft ACPI-Compliant System
 (ISA) 0x00000134 (308)	Microsoft ACPI-Compliant System
 (ISA) 0x00000135 (309)	Microsoft ACPI-Compliant System
 (ISA) 0x00000136 (310)	Microsoft ACPI-Compliant System
 (ISA) 0x00000137 (311)	Microsoft ACPI-Compliant System
 (ISA) 0x00000138 (312)	Microsoft ACPI-Compliant System
 (ISA) 0x00000139 (313)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013A (314)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013B (315)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013C (316)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013D (317)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013E (318)	Microsoft ACPI-Compliant System
 (ISA) 0x0000013F (319)	Microsoft ACPI-Compliant System
 (ISA) 0x00000140 (320)	Microsoft ACPI-Compliant System
 (ISA) 0x00000141 (321)	Microsoft ACPI-Compliant System
 (ISA) 0x00000142 (322)	Microsoft ACPI-Compliant System
 (ISA) 0x00000143 (323)	Microsoft ACPI-Compliant System
 (ISA) 0x00000144 (324)	Microsoft ACPI-Compliant System
 (ISA) 0x00000145 (325)	Microsoft ACPI-Compliant System
 (ISA) 0x00000146 (326)	Microsoft ACPI-Compliant System
 (ISA) 0x00000147 (327)	Microsoft ACPI-Compliant System
 (ISA) 0x00000148 (328)	Microsoft ACPI-Compliant System
 (ISA) 0x00000149 (329)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014A (330)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014B (331)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014C (332)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014D (333)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014E (334)	Microsoft ACPI-Compliant System
 (ISA) 0x0000014F (335)	Microsoft ACPI-Compliant System
 (ISA) 0x00000150 (336)	Microsoft ACPI-Compliant System
 (ISA) 0x00000151 (337)	Microsoft ACPI-Compliant System
 (ISA) 0x00000152 (338)	Microsoft ACPI-Compliant System
 (ISA) 0x00000153 (339)	Microsoft ACPI-Compliant System
 (ISA) 0x00000154 (340)	Microsoft ACPI-Compliant System
 (ISA) 0x00000155 (341)	Microsoft ACPI-Compliant System
 (ISA) 0x00000156 (342)	Microsoft ACPI-Compliant System































	(ISA) 0x00000157 (343)	Microsoft ACPI-Compliant System
	(ISA) 0x00000158 (344)	Microsoft ACPI-Compliant System
	(ISA) 0x00000159 (345)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015A (346)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015B (347)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015C (348)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015D (349)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015E (350)	Microsoft ACPI-Compliant System
	(ISA) 0x0000015F (351)	Microsoft ACPI-Compliant System
	(ISA) 0x00000160 (352)	Microsoft ACPI-Compliant System
	(ISA) 0x00000161 (353)	Microsoft ACPI-Compliant System
	(ISA) 0x00000162 (354)	Microsoft ACPI-Compliant System
	(ISA) 0x00000163 (355)	Microsoft ACPI-Compliant System
	(ISA) 0x00000164 (356)	Microsoft ACPI-Compliant System
	(ISA) 0x00000165 (357)	Microsoft ACPI-Compliant System
	(ISA) 0x00000166 (358)	Microsoft ACPI-Compliant System
	(ISA) 0x00000167 (359)	Microsoft ACPI-Compliant System
	(ISA) 0x00000168 (360)	Microsoft ACPI-Compliant System
	(ISA) 0x00000169 (361)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016A (362)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016B (363)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016C (364)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016D (365)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016E (366)	Microsoft ACPI-Compliant System
	(ISA) 0x0000016F (367)	Microsoft ACPI-Compliant System
	(ISA) 0x00000170 (368)	Microsoft ACPI-Compliant System
	(ISA) 0x00000171 (369)	Microsoft ACPI-Compliant System
	(ISA) 0x00000172 (370)	Microsoft ACPI-Compliant System
	(ISA) 0x00000173 (371)	Microsoft ACPI-Compliant System
	(ISA) 0x00000174 (372)	Microsoft ACPI-Compliant System
	(ISA) 0x00000175 (373)	Microsoft ACPI-Compliant System
	(ISA) 0x00000176 (374)	Microsoft ACPI-Compliant System
	(ISA) 0x00000177 (375)	Microsoft ACPI-Compliant System
	(ISA) 0x00000178 (376)	Microsoft ACPI-Compliant System
	(ISA) 0x00000179 (377)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017A (378)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017B (379)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017C (380)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017D (381)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017E (382)	Microsoft ACPI-Compliant System
	(ISA) 0x0000017F (383)	Microsoft ACPI-Compliant System

 (ISA) 0x00000180 (384)	Microsoft ACPI-Compliant System
 (ISA) 0x00000181 (385)	Microsoft ACPI-Compliant System
 (ISA) 0x00000182 (386)	Microsoft ACPI-Compliant System
 (ISA) 0x00000183 (387)	Microsoft ACPI-Compliant System
 (ISA) 0x00000184 (388)	Microsoft ACPI-Compliant System
 (ISA) 0x00000185 (389)	Microsoft ACPI-Compliant System
 (ISA) 0x00000186 (390)	Microsoft ACPI-Compliant System
 (ISA) 0x00000187 (391)	Microsoft ACPI-Compliant System
 (ISA) 0x00000188 (392)	Microsoft ACPI-Compliant System
 (ISA) 0x00000189 (393)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018A (394)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018B (395)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018C (396)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018D (397)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018E (398)	Microsoft ACPI-Compliant System
 (ISA) 0x0000018F (399)	Microsoft ACPI-Compliant System
 (ISA) 0x00000190 (400)	Microsoft ACPI-Compliant System
 (ISA) 0x00000191 (401)	Microsoft ACPI-Compliant System
 (ISA) 0x00000192 (402)	Microsoft ACPI-Compliant System
 (ISA) 0x00000193 (403)	Microsoft ACPI-Compliant System
 (ISA) 0x00000194 (404)	Microsoft ACPI-Compliant System
 (ISA) 0x00000195 (405)	Microsoft ACPI-Compliant System
 (ISA) 0x00000196 (406)	Microsoft ACPI-Compliant System
 (ISA) 0x00000197 (407)	Microsoft ACPI-Compliant System
 (ISA) 0x00000198 (408)	Microsoft ACPI-Compliant System
 (ISA) 0x00000199 (409)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019A (410)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019B (411)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019C (412)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019D (413)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019E (414)	Microsoft ACPI-Compliant System
 (ISA) 0x0000019F (415)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A0 (416)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A1 (417)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A2 (418)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A3 (419)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A4 (420)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A5 (421)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A6 (422)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A7 (423)	Microsoft ACPI-Compliant System
 (ISA) 0x000001A8 (424)	Microsoft ACPI-Compliant System

 (ISA) 0x000001A9 (425)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AA (426)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AB (427)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AC (428)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AD (429)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AE (430)	Microsoft ACPI-Compliant System
 (ISA) 0x000001AF (431)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B0 (432)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B1 (433)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B2 (434)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B3 (435)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B4 (436)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B5 (437)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B6 (438)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B7 (439)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B8 (440)	Microsoft ACPI-Compliant System
 (ISA) 0x000001B9 (441)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BA (442)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BB (443)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BC (444)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BD (445)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BE (446)	Microsoft ACPI-Compliant System
 (ISA) 0x000001BF (447)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C0 (448)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C1 (449)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C2 (450)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C3 (451)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C4 (452)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C5 (453)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C6 (454)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C7 (455)	Microsoft ACPI-Compliant System
 (ISA) 0x000001C8 (456)	Microsoft ACPI-Compliant System
 (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

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 (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) 0x00000020 (32)	Intel(R) Serial IO I2C Host Controller - 7778
	(PCI) 0x00000021 (33)	Intel(R) Serial IO I2C Host Controller - 7779
	(PCI) 0xFFFFFEE8 (-24)	Intel® Smart Sound Technology BUS
	(PCI) 0xFFFFFEE9 (-23)	Intel(R) AI Boost
	(PCI) 0xFFFFFEEA (-22)	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
	(PCI) 0xFFFFFEEB (-21)	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
	(PCI) 0xFFFFFEEC (-20)	Intel(R) Graphics
	(PCI) 0xFFFFFEED (-19)	Intel(R) Management Engine Interface #1
	(PCI) 0xFFFFFEEE (-18)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFEEF (-17)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFFF0 (-16)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFFF1 (-15)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFFF2 (-14)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFFF3 (-13)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF4 (-12)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF5 (-11)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF6 (-10)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF7 (-9)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF8 (-8)	Standard NVM Express Controller
	(PCI) 0xFFFFFFF9 (-7)	Standard NVM Express Controller
	(PCI) 0xFFFFFFFA (-6)	Standard NVM Express Controller
	(PCI) 0xFFFFFFFB (-5)	Standard NVM Express Controller
	(PCI) 0xFFFFFFFC (-4)	Standard SATA AHCI Controller
	(PCI) 0xFFFFFFFDD (-3)	PCI Express Root Port
	(PCI) 0xFFFFFFFDE (-2)	PCI Express Root Port