

COM-RAPC6

COM Express Module

User's Manual 1st Ed

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Packing List

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

Item	Quantity
● COM-RAPC6	1

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

About this Document

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

Users may refer to the product page at AAEON.com for the latest version of this document.

Safety Precautions

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

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

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

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.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

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	X	X	○	○	○	○
外部信号 连接器及线材	X	X	○	○	○	○
<p>O: 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 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>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。</p>						

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	X	X	○	○	○	○
Wires & Connectors for External Connections	X	X	○	○	○	○
<p>O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.</p> <p>X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.</p> <p>Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only</p>						

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Chapter 1

Product Specifications

1.1 Specifications

System

Form Factor	COM Express, Type 6
CPU	13th Gen Intel® Core™ H/P/U Series Processors
Chipset	Integrated with Intel® SoC
Memory	DDR5 SODIMM Socket x 2, non-ECC Default: up to 4800 MT/s, 64GB Customized BIOS: up to 5200 MT/s with P/H series CPU
Onboard Storage	N/A
BIOS	UEFI
Wake on LAN	Yes
Watchdog Timer	255 Levels
Dimension (L x W)	3.75" x 3.75" (95mm x 95mm)
Security	TPM 2.0

Power

Power Requirement	+12V and +5VSB for ATX, +12V for AT
Power Type	AT/ATX (Default: AT Mode)
Power Consumption	Intel® Core™ i7-13800HE, DDR5 32GB x 2, 5.25A @+12V

Display

Graphics Controller	Intel® Iris® Xe Graphics eligible Intel® UHD Graphics for 13th Gen Intel® Processors
Video Output	4 Simultaneous Displays: DDI x 3, up to 3840 x 2160 @120Hz 18/24-bit Single/Dual Channel LVDS, up to 1920 x 1080, or eDP x 1, up to 3840 x 2160 @60Hz VGA x 1, up to 1920 x 1080

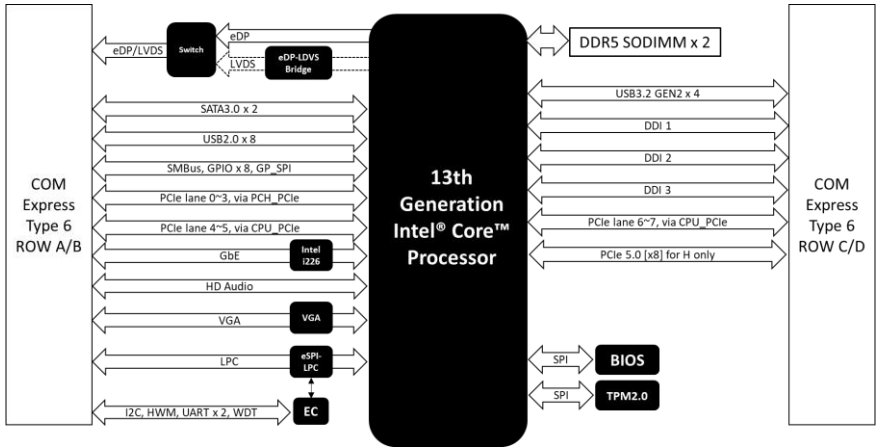
I/O

Ethernet	Intel® I226 x 1
Audio	High Definition Audio Interface
USB	USB 2.0 x 8 USB 3.2 Gen 2 x 4
Serial Port	2-Wire UART x 2 (Tx/Rx)
HDD Interface	SATA 6Gb/s x 2
Expansion	PCIe [x1] x 4 (Configurable by BIOS) PCIe [x8] x 1 + PCIe [x4] x 1 (PEG [x8] for H Series SKU only) Note: Cannot be split into smaller lanes
GPIO	8-bit
SMBus/I2C	I2C x 1 SMBus x 1

Environmental

Operating Temperature	32°F ~ 140°F (0°C ~ 60°C) WiTAS2: -40°F ~ 185°F (-40°C ~ 85°C) on selected CPU SKU
Storage Temperature	-40°F ~ 185°F (-40°C ~ 85°C)
Operating Humidity	0% ~ 90% relative humidity, non-condensing
EMC	CE/FCC Class A
OS Support	Windows® 10 (64-bit) Linux Ubuntu 23.10.1/Kernel 6.5
Weight	0.25 lb. (0.12Kg)

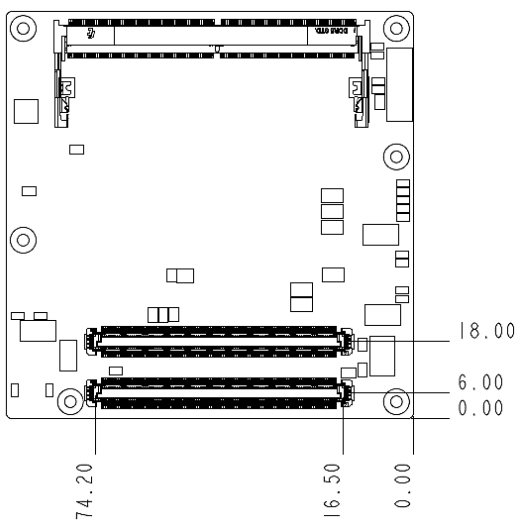
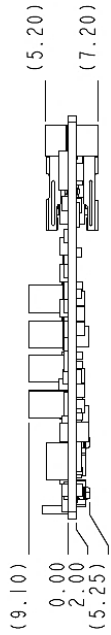
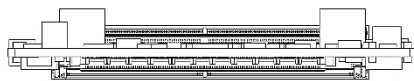
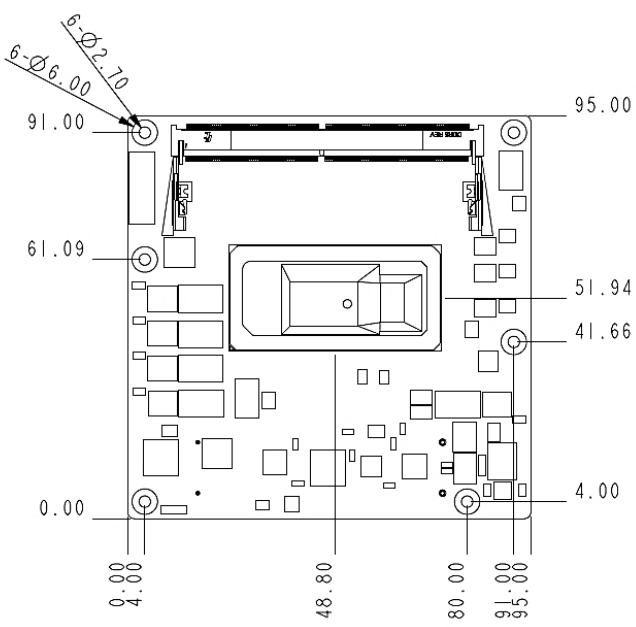
1.2 Block Diagram



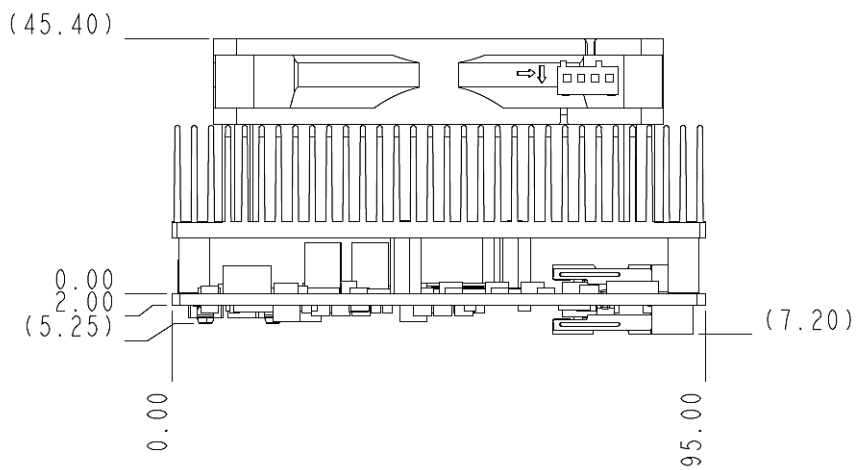
Chapter 2

Hardware Information

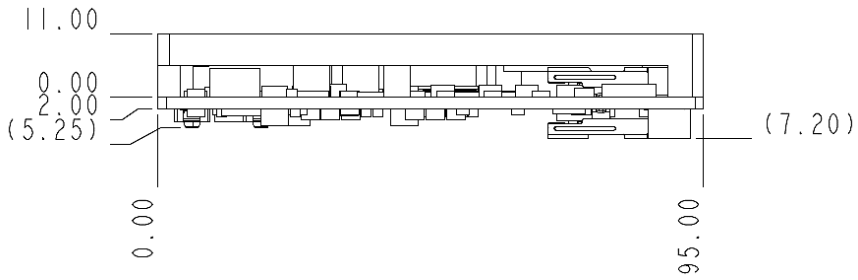
2.1 Dimensions



With Active Cooling (Part No: COM-RAPC6-FAN01)

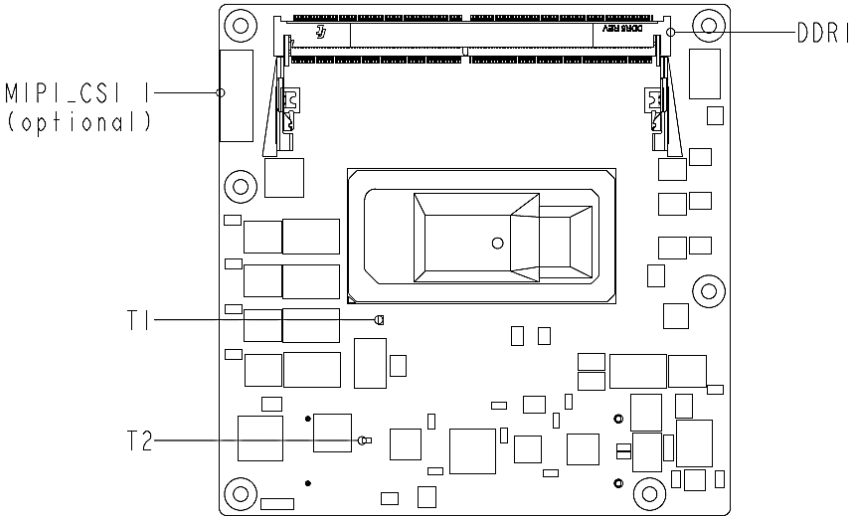


With Heatspreader (Part No: COM-RAPC6-HSP01)

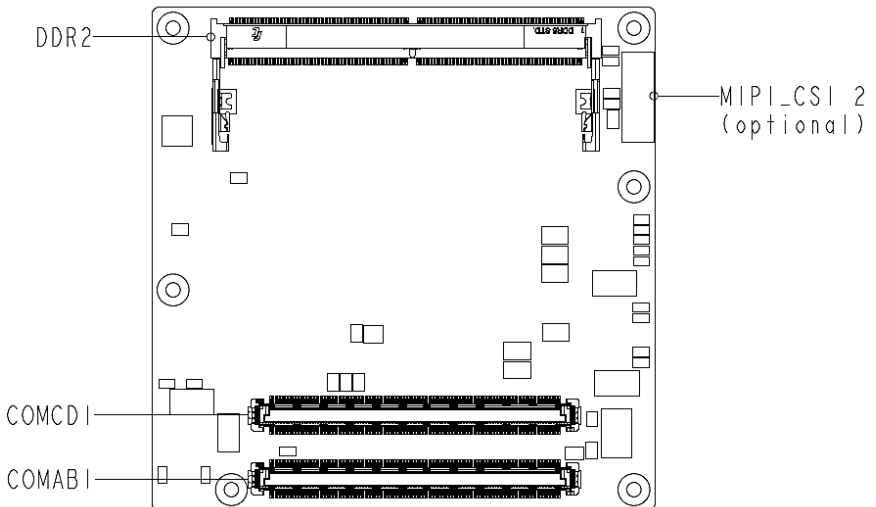


2.2 Jumpers and Connectors

Component Side



Solder Side

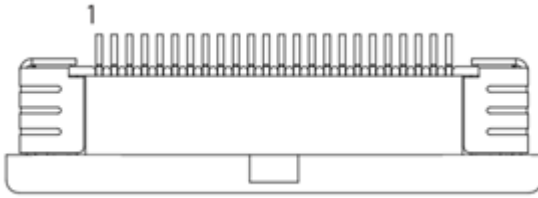


2.3 List of Connectors

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

Label	Function
CN3	MIPI CSI CH B
CN4	MIPI CSI CH C
COMAB1	Express Row A/B Connector
COMCD1	Express Row C/D Connector
DDR1	DDR5 SODIMM COM Connector
DDR2	DDR5 SODIMM COM Connector

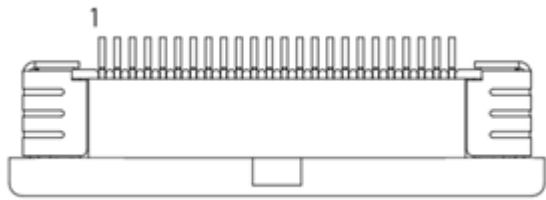
2.3.1 MIPI CSI CH B (CN3)



Pin	Signal
1	VCC_3.3V
2	VCC_3.3V
3	GND
4	CSI_DP_0
5	CSI_DN_0
6	GND
7	CSI_DP_1
8	CSI_DN_1
9	GND
10	CSI_DP_2
11	CSI_DN_2
12	CAM_RST#
13	CSI_DP_3
14	CSI_DN_3
15	GND
16	CSI_CLK_P
17	CSI_CLK_N
18	GND
19	I2C_CLK

Pin	Signal
20	I2C_DAT
21	CRD_PWREN
22	IMGCLKOUT

2.3.2 MIPI CSI CH C (CN4)



Pin	Signal
1	VCC_3.3V
2	VCC_3.3V
3	GND
4	CSI_DP_0
5	CSI_DN_0
6	GND
7	CSI_DP_1
8	CSI_DN_1
9	GND
10	CSI_DP_2
11	CSI_DN_2
12	CAM_RST#
13	CSI_DP_3
14	CSI_DN_3

Pin	Signal
15	GND
16	CSI_CLK_P
17	CSI_CLK_N
18	GND
19	I2C_CLK
20	I2C_DAT
21	CRD_PWREN
22	IMGCLKOUT

2.3.3 COM Express Row A/B Connector (COMA1)

Row A		Row B	
Pin	Signal	Pin	Signal
A1	GND (FIXED)	B1	GND (FIXED)
A2	GBE0_MDI3-	B2	GBE0_ACT#
A3	GBE0_MDI3+	B3	LPC_FRAME#
A4	GBE0_LINK1000#	B4	LPC_AD0
A5	GBE0_LINK2500#	B5	LPC_AD1
A6	GBE0_MDI2-	B6	LPC_AD2
A7	GBE0_MDI2+	B7	LPC_AD3
A8	GBE0_LINK	B8	N.C
A9	GBE0_MDI1-	B9	N.C
A10	GBE0_MDI1+	B10	LPC_CLK
A11	GND (FIXED)	B11	GND (FIXED)
A12	GBE0_MDI0-	B12	PWRBTN#
A13	GBE0_MDI0+	B13	SMB_CK
A14	N.C	B14	SMB_DAT

Row A		Row B	
Pin	Signal	Pin	Signal
A15	SUS_S3#	B15	SMB_ALERT#
A16	SATA0_TX+	B16	SATA1_TX+
A17	SATA0_TX-	B17	SATA1_TX-
A18	SUS_S4#	B18	SUS_STAT#
A19	SATA0_RX+	B19	SATA1_RX+
A20	SATA0_RX-	B20	SATA1_RX-
A21	GND (FIXED)	B21	GND (FIXED)
A22	N.C	B22	N.C
A23	N.C	B23	N.C
A24	SUS_S5#	B24	PWR_OK
A25	N.C	B25	N.C
A26	N.C	B26	N.C
A27	BATLOW#	B27	WDT
A28	SATA_ACT#	B28	N.C
A29	HDA_SYNC	B29	N.C
A30	HDA_RST#	B30	HDA_SDINO
A31	GND (FIXED)	B31	GND (FIXED)
A32	AC_BITCLK	B32	SPKR
A33	AC_SDOOUT	B33	I2C_CK
A34	BIOS_DIS0#	B34	I2C_DAT
A35	THRMTRIP#	B35	CB_THRM#
A36	USB6-	B36	USB7-
A37	USB6+	B37	USB7+
A38	USB_6_7_OC#	B38	USB_4_5_OC#
A39	USB4-	B39	USB5-
A40	USB4+	B40	USB5+

Row A		Row B	
Pin	Signal	Pin	Signal
A41	GND (FIXED)	B41	GND (FIXED)
A42	USB2-	B42	USB3-
A43	USB2+	B43	USB3+
A44	USB_2_3_OC#	B44	USB_0_1_OC#
A45	USB0-	B45	USB1-
A46	USB0+	B46	USB1+
A47	VCC_RTC	B47	PCIE_RST2_ESPI_EN#
A48	PCIE_RST1	B48	N.C
A49	N.C	B49	SYS_RESET#
A50	LPC_SERIRQ	B50	CB_RESET#
A51	GND (FIXED)	B51	GND (FIXED)
A52	PCIE_TX5+ (CPU)	B52	PCIE_RX5+ (CPU)
A53	PCIE_TX5- (CPU)	B53	PCIE_RX5- (CPU)
A54	GPIO	B54	GPO1
A55	PCIE_TX4+ (CPU)	B55	PCIE_RX4+ (CPU)
A56	PCIE_TX4- (CPU)	B56	PCIE_RX4- (CPU)
A57	GND	B57	GPO2
A58	PCIE_TX3+ (PCH)	B58	PCIE_RX3+ (PCH)
A59	PCIE_TX3- (PCH)	B59	PCIE_RX3- (PCH)
A60	GND (FIXED)	B60	GND (FIXED)
A61	PCIE_TX2+ (PCH)	B61	PCIE_RX2+ (PCH)
A62	PCIE_TX2- (PCH)	B62	PCIE_RX2- (PCH)
A63	GPIO	B63	GPO3
A64	PCIE_TX1+ (PCH)	B64	PCIE_RX1+ (PCH)
A65	PCIE_TX1- (PCH)	B65	PCIE_RX1- (PCH)
A66	GND	B66	WAKE0# (PCH)

Row A		Row B	
Pin	Signal	Pin	Signal
A67	GPI2	B67	WAKE1# (EC)
A68	PCIE_TX0+ (PCH)	B68	PCIE_RX0+ (PCH)
A69	PCIE_TX0- (PCH)	B69	PCIE_RX0- (PCH)
A70	GND (FIXED)	B70	GND (FIXED)
A71	LVDS_A0+ / eDP_PAIR2+	B71	LVDS_B0+
A72	LVDS_A0- / eDP_PAIR2-	B72	LVDS_B0-
A73	LVDS_A1+ / eDP_PAIR1+	B73	LVDS_B1+
A74	LVDS_A1- / eDP_PAIR1-	B74	LVDS_B1-
A75	LVDS_A2+ / eDP_PAIR0+	B75	LVDS_B2+
A76	LVDS_A2- / eDP_PAIR0-	B76	LVDS_B2-
A77	LVDS_VDD_EN	B77	LVDS_B3+
A78	LVDS_A3+	B78	LVDS_B3-
A79	LVDS_A3-	B79	LVDS_BKLT_EN / eDP_BKLT_EN
A80	GND (FIXED)	B80	GND (FIXED)
A81	LVDS_A_CK+ / eDP_PAIR0+	B81	LVDS_B_CK+
A82	LVDS_A_CK- / eDP_PAIR0-	B82	LVDS_B_CK-
A83	LVDS_I2C_CK / eDP_AUX_DN	B83	LVDS_BKLT_CTRL / eDP_BKLT_CTRL
A84	LVDS_I2C_DAT / eDP_AUX_DP	B84	VCC_5V_SBY
A85	GPI3	B85	VCC_5V_SBY
A86	KBRST#(option)	B86	VCC_5V_SBY
A87	EDP_HPDP	B87	VCC_5V_SBY
A88	PCIE0_CK_REF+	B88	BISO_DIS1#
A89	PCIE0_CK_REF-	B89	VGA_RED
A90	GND (FIXED)	B90	GND (FIXED)
A91	+V3.3S(option)	B91	VGA_GRN
A92	SPI_MISO	B92	VGA_BLU

Row A		Row B	
Pin	Signal	Pin	Signal
A93	GPO0	B93	VGA_HSYNC
A94	SPI_CLK	B94	VGA_VSYNC
A95	SPI_MOSI	B95	VGA_I2C_CK
A96	GND	B96	VGA_I2C_DAT
A97	N.C	B97	SPI_CS#
A98	CB_STXD1X	B98	SMI#
A99	CB_SRXD1X	B99	SCI#
A100	GND (FIXED)	B100	GND (FIXED)
A101	CB_STXD2X	B101	CB_FAN_PWM
A102	CB_SRXD2X	B102	CB_FAN_TACH
A103	PCH_LID#	B103	PCH_SLEEP#
A104	VCC_12V	B104	VCC_12V
A105	VCC_12V	B105	VCC_12V
A106	VCC_12V	B106	VCC_12V
A107	VCC_12V	B107	VCC_12V
A108	VCC_12V	B108	VCC_12V
A109	VCC_12V	B109	VCC_12V
A110	GND (FIXED)	B110	GND (FIXED)

2.3.4 COM Express Row C/D Connector (COMCD1)

Row C		Row D	
Pin	Signal	Pin	Signal
C1	GND (FIXED)	D1	GND (FIXED)
C2	GND (FIXED)	D2	GND (FIXED)
C3	USB_SSRX0-	D3	USB_SSTX0-
C4	USB_SSRX0+	D4	USB_SSTX0+
C5	GND (FIXED)	D5	GND (FIXED)
C6	USB_SSRX1-	D6	USB_SSTX1-
C7	USB_SSRX1+	D7	USB_SSTX1+
C8	GND (FIXED)	D8	GND (FIXED)
C9	USB_SSRX2-	D9	USB_SSTX2-
C10	USB_SSRX2+	D10	USB_SSTX2+
C11	GND (FIXED)	D11	GND (FIXED)
C12	USB_SSRX3-	D12	USB_SSTX3-
C13	USB_SSRX3+	D13	USB_SSTX3+
C14	GND (FIXED)	D14	GND (FIXED)
C15	N.C	D15	DDI1_CTRLCLK_AUX+
C16	N.C	D16	DDI1_CTRLDATA_AUX-
C17	RSVD	D17	RSVD
C18	RSVD	D18	RSVD
C19	PCIE_RX6+ (CPU)	D19	PCIE_TX6+ (CPU)
C20	PCIE_RX6- (CPU)	D20	PCIE_TX6- (CPU)
C21	GND (FIXED)	D21	GND (FIXED)
C22	PCIE_RX7+ (CPU)	D22	PCIE_TX7+ (CPU)
C23	PCIE_RX7- (CPU)	D23	PCIE_TX7- (CPU)
C24	DDI1_HPD	D24	RSVD

Row C		Row D	
Pin	Signal	Pin	Signal
C25	N.C	D25	RSVD
C26	N.C	D26	DDI1_PAIR0+
C27	RSVD	D27	DDI1_PAIR0-
C28	RSVD	D28	RSVD
C29	N.C	D29	DDI1_PAIR1+
C30	N.C	D30	DDI1_PAIR1-
C31	GND (FIXED)	D31	GND (FIXED)
C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+
C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2-
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL
C35	RSVD	D35	RSVD
C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+
C37	DDI3_CTRLDATA_AUX-	D37	DDI1_PAIR3-
C38	DDI3_DDC_AUX_SEL	D38	RSVD
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+
C40	DDI3_PAIR0-	D40	DDI2_PAIR0-
C41	GND (FIXED)	D41	GND (FIXED)
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-
C44	DDI3_HPD	D44	DDI1_HPD
C45	RSVD	D45	RSVD
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-
C48	RSVD	D48	RSVD
C49	DDI3_PAIR3+	D49	DDI2_PAIR3+
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-

Row C		Row D	
Pin	Signal	Pin	Signal
C51	GND (FIXED)	D51	GND (FIXED)
C52	PEG_RX0+ (CPU) *	D52	PEG_TX0+ (CPU) *
C53	PEG_RX0- (CPU) *	D53	PEG_TX0- (CPU) *
C54	N.C	D54	PEG_LANE_RV#
C55	PEG_RX1+ (CPU) *	D55	PEG_TX1+ (CPU) *
C56	PEG_RX1- (CPU) *	D56	PEG_TX1- (CPU) *
C57	N.C	D57	GND
C58	PEG_RX2+ (CPU) *	D58	PEG_TX2+ (CPU) *
C59	PEG_RX2- (CPU) *	D59	PEG_TX2- (CPU) *
C60	GND (FIXED)	D60	GND (FIXED)
C61	PEG_RX3+ (CPU) *	D61	PEG_TX3+ (CPU) *
C62	PEG_RX3- (CPU) *	D62	PEG_TX3- (CPU) *
C63	RSVD	D63	RSVD
C64	RSVD	D64	RSVD
C65	PEG_RX4+ (CPU) *	D65	PEG_TX4+ (CPU) *
C66	PEG_RX4- (CPU) *	D66	PEG_TX4- (CPU) *
C67	RSVD	D67	GND (FIXED)
C68	PEG_RX5+ (CPU) *	D68	PEG_TX5+ (CPU) *
C69	PEG_RX5- (CPU) *	D69	PEG_TX5- (CPU) *
C70	GND (FIXED)	D70	GND (FIXED)
C71	PEG_RX6+ (CPU) *	D71	PEG_TX6+ (CPU) *
C72	PEG_RX6- (CPU) *	D72	PEG_TX6- (CPU) *
C73	GND (FIXED)	D73	GND (FIXED)
C74	PEG_RX7+ (CPU) *	D74	PEG_TX7+ (CPU) *
C75	PEG_RX7- (CPU) *	D75	PEG_TX7- (CPU) *
C76	GND (FIXED)	D76	GND (FIXED)

Row C		Row D	
Pin	Signal	Pin	Signal
C77	RSVD	D77	RSVD
C78	N.C	D78	N.C
C79	N.C	D79	N.C
C80	GND (FIXED)	D80	GND (FIXED)
C81	N.C	D81	N.C
C82	N.C	D82	N.C
C83	RSVD	D83	RSVD
C84	GND (FIXED)	D84	GND (FIXED)
C85	N.C	D85	N.C
C86	N.C	D86	N.C
C87	GND (FIXED)	D87	GND (FIXED)
C88	N.C	D88	N.C
C89	N.C	D89	N.C
C90	GND (FIXED)	D90	GND (FIXED)
C91	N.C	D91	N.C
C92	N.C	D92	N.C
C93	GND	D93	GND
C94	N.C	D94	N.C
C95	N.C	D95	N.C
C96	GND (FIXED)	D96	GND (FIXED)
C97	RSVD	D97	RSVD
C98	N.C	D98	N.C
C99	N.C	D99	N.C
C100	GND (FIXED)	D100	GND (FIXED)
C101	N.C	D101	N.C
C102	N.C	D102	N.C

Row C		Row D	
Pin	Signal	Pin	Signal
C103	GND (FIXED)	D103	GND
C104	VCC_12V	D104	VCC_12V
C105	VCC_12V	D105	VCC_12V
C106	VCC_12V	D106	VCC_12V
C107	VCC_12V	D107	VCC_12V
C108	VCC_12V	D108	VCC_12V
C109	VCC_12V	D109	VCC_12V
C110	GND (FIXED)	D110	GND (FIXED)

Note: PEG [x8] (from Row C/D) is only supported by H series CPU (45W).

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The board uses certain routines to test and initialize board hardware. If the routines encounter an error during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors.

System configuration verification routines check the current system configuration stored in the CMOS memory and BIOS NVRAM. If a system configuration is not found or a system configuration data error is detected, the system will load the optimized default and re-boot with this default system configuration automatically.

There are four situations in which you will need to setup system configuration:

- You are starting your system for the first time.
- You have changed the hardware attached to your system.
- The system configuration is reset by Clear-CMOS jumper
- The CMOS memory has lost power and the configuration information has been erased.

The COM-RAPC6 CMOS memory has an integral lithium battery backup for data retention. However, you will need to replace the complete unit when it finally runs down.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in the battery-backed CMOS RAM and BIOS NVRAM so it retains the Setup information when the power is turned off.

To enter Setup, power on the computer and press immediately.

The function of each menu is as follows:

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

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

System I/O – System I/O information and configuration.

Security – Password for setup administrator can be set here.

Boot – Enable/disable Quiet Boot option.

Save & Exit – Save changes and exit Setup.

3.3 Setup Submenu: Main

Aptio Setup - AMI

Main Advanced System I/O Security Boot Save & Exit

== BIOS Information ==
CDM-RAPC6 R1.2 (CRAPAM12) (12/12/2023)

== EC Information ==
(ECoM_116) (11/10/2023)

== CPU Information ==
13th Gen Intel(R) Core(TM) i5-13600HE

== MEM Information ==
Total Memory 8192 MB
Memory Frequency 4800 MHz

== SATA Information ==
Serial ATA Port 0 Empty
Serial ATA Port 1 Empty
System Date [Thu 11/30/2023]
System Time [19:59:51]

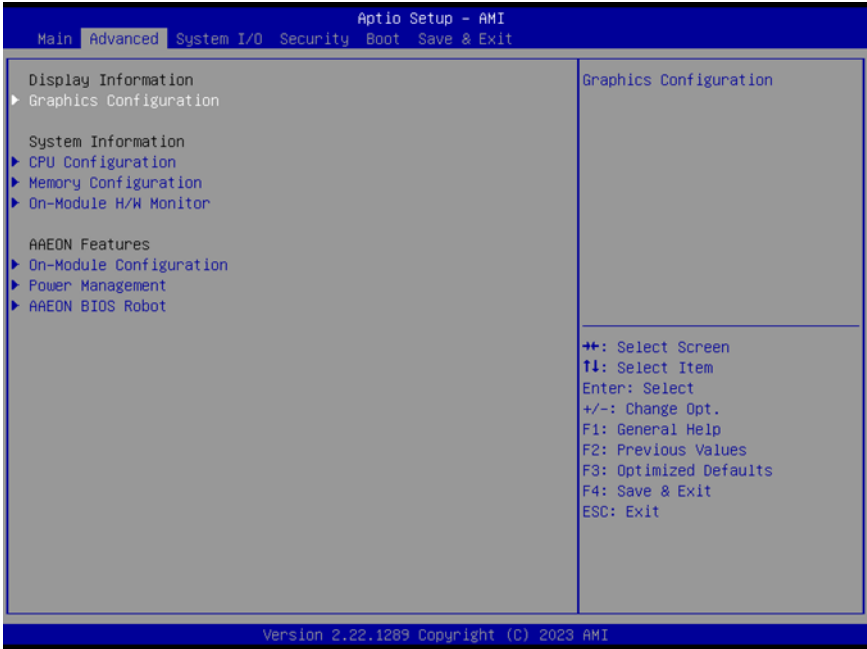
Access Level Administrator

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

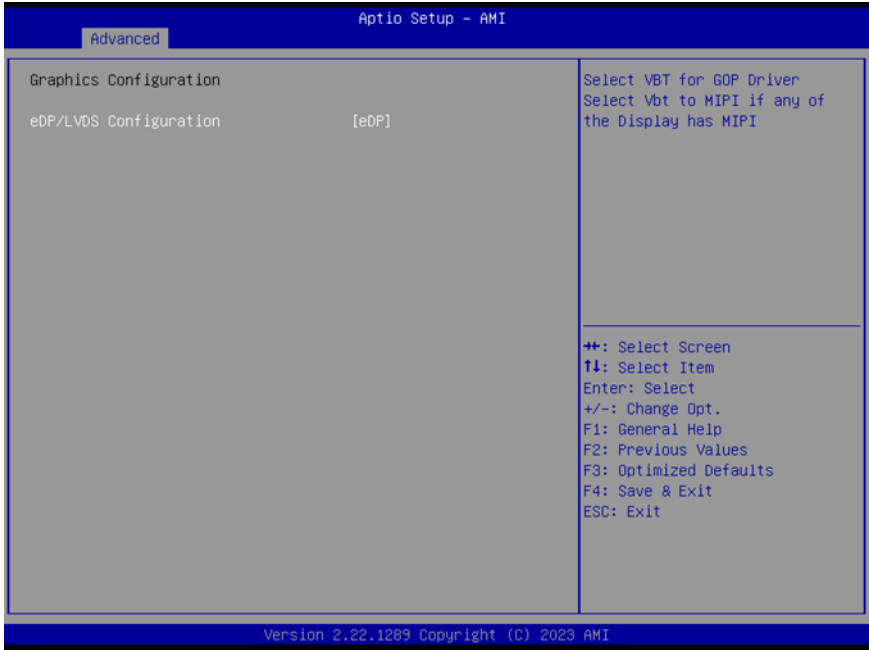
++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

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3.4 Setup Submenu: Advanced

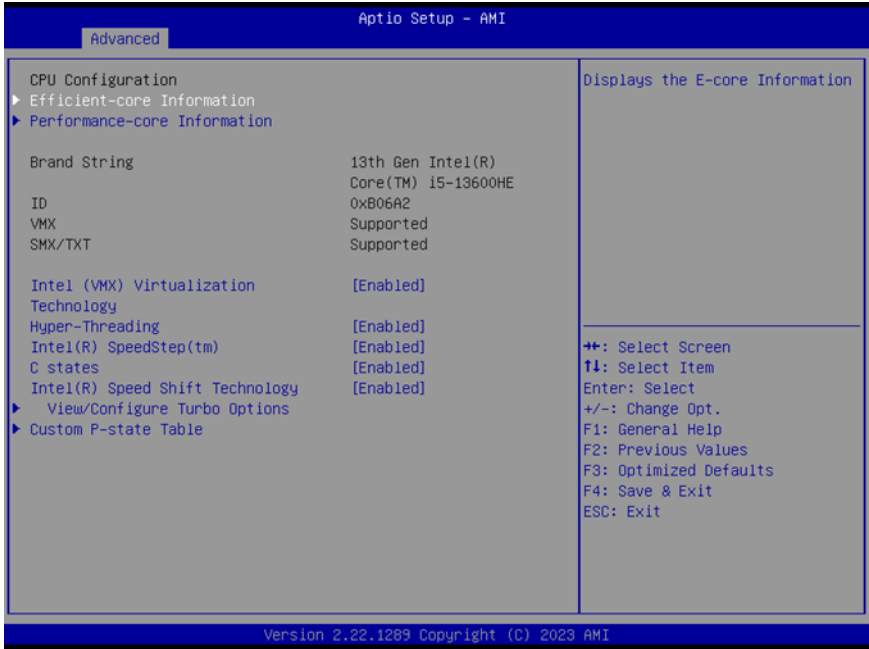


3.4.1 Graphics Configuration



Options Summary		
eDP/LVDS Configuration	eDP	Optimal Default, Failsafe Default
	LVDS	
	eDP/LVDS Off	
Select VBT for GOP Driver. Select Vbt to MIPI if any of the Display has MIPI.		

3.4.2 CPU Configuration



Options Summary		
Intel (VMX) Virtualization Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default
When enabled, a VMX 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(R) SpeedStep(tm)	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

Intel(R) Speed Shift Technology	Disabled	
	Enabled	Optimal Default, Failsafe Default

Enable/Disable Intel(R) Speed Shift Technology support.

Enabling will expose the CPPC v2 interface to allow for hardware-controlled P-states.

3.4.2.1 Efficient-Core Information

The screenshot shows the 'Advanced' menu of the Aptio Setup - AMI BIOS. The 'Efficient-core Information' section is expanded, displaying the following cache details:

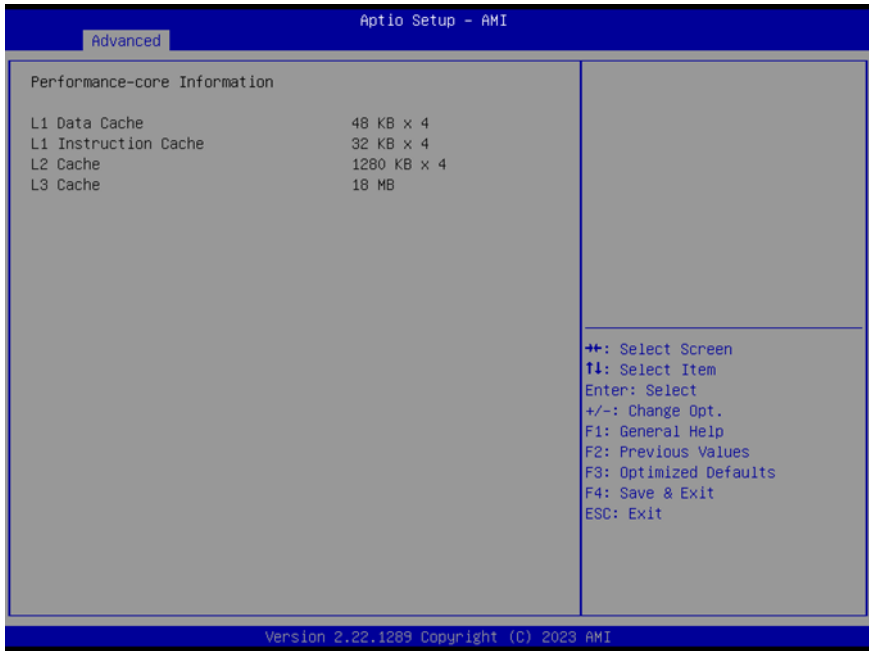
Cache Type	Size
L1 Data Cache	32 KB x 8
L1 Instruction Cache	64 KB x 8
L2 Cache	2048 KB x 2
L3 Cache	18 MB

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

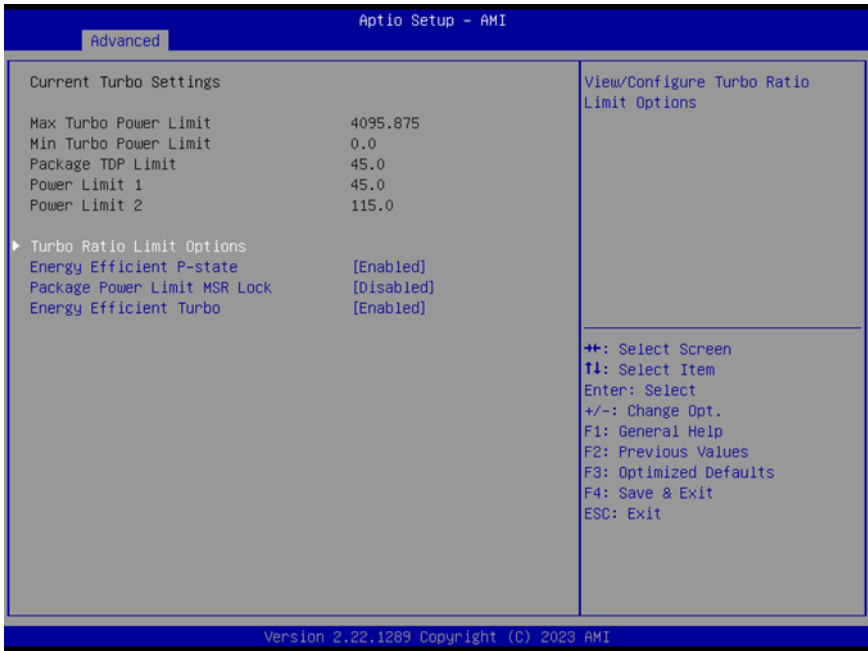
- ++: Select Screen
- ↑: Select Item
- Enter: Select
- +/-: Change Opt.
- F1: General Help
- F2: Previous Values
- F3: Optimized Defaults
- F4: Save & Exit
- ESC: Exit

At the bottom of the screen, the version and copyright information are displayed: Version 2.22.1289 Copyright (C) 2023 AMI.

3.4.2.2 Performance-Core Information



3.4.2.3 View/Configure Turbo Options



Options Summary		
Energy Efficient P-State	Disabled	
	Enabled	Optimal Default, Failsafe Default
<p>Enable/Disable Energy Efficient P-state feature.</p> <p>When set to 0, will disable access to ENERGY_PERFORMANCE_BIAS MSR and CPUID Function 6 ECX[3] will read 0 indicating no support for Energy Efficient policy setting.</p> <p>When set to 1 will enable access to ENERGY_PERFORMANCE_BIAS MSR 1B0h and CPUID Function 6 ECX[3] will read 1 indicating Energy Efficient policy setting is supported.</p>		
Package Power Limit MSR Lock	Disabled	Optimal Default, Failsafe Default
	Enabled	
<p>Enable/Disable locking of Package Power Limit settings.</p> <p>When enabled, PACKAGE_POWER_LIMIT MSR will be locked and a reset will be required to unlock the register.</p>		

Options Summary

Energy Efficient Turbo	Disabled	
	Enabled	Optimal Default, Failsafe Default

Enable/Disable Energy Efficient Turbo Feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled.

3.4.2.3.1 Turbo Ratio Limit Options

The screenshot shows the 'Advanced' menu in the Aptio Setup - AMI BIOS. The 'Current Turbo Ratio Limit Settings' section lists the following values:

Core	Processor	Limit Type	Value
P-core	Turbo Ratio Limit	Numcore0	1
P-core	Turbo Ratio Limit	Numcore1	2
P-core	Turbo Ratio Limit	Numcore2	3
P-core	Turbo Ratio Limit	Numcore3	4
P-core	Turbo Ratio Limit	Numcore4	5
P-core	Turbo Ratio Limit	Numcore5	6
P-core	Turbo Ratio Limit	Numcore6	7
P-core	Turbo Ratio Limit	Numcore7	8
P-core	Turbo Ratio Limit	Ratio0	48
P-core	Turbo Ratio Limit	Ratio1	48
P-core	Turbo Ratio Limit	Ratio2	47
P-core	Turbo Ratio Limit	Ratio3	47
P-core	Turbo Ratio Limit	Ratio4	47
P-core	Turbo Ratio Limit	Ratio5	47
P-core	Turbo Ratio Limit	Ratio6	47
P-core	Turbo Ratio Limit	Ratio7	47
E-core	Turbo Ratio Limit	Numcore0	1
E-core	Turbo Ratio Limit	Numcore1	2
E-core	Turbo Ratio Limit	Numcore2	3
E-core	Turbo Ratio Limit	Numcore3	4
E-core	Turbo Ratio Limit	Numcore4	5
E-core	Turbo Ratio Limit	Numcore5	6
E-core	Turbo Ratio Limit	Numcore6	7

Navigation keys 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

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Aptio Setup - AMI

Advanced

E-core Turbo Ratio Limit Numcore7	8
E-core Turbo Ratio Limit Ratio0	36
E-core Turbo Ratio Limit Ratio1	36
E-core Turbo Ratio Limit Ratio2	36
E-core Turbo Ratio Limit Ratio3	36
E-core Turbo Ratio Limit Ratio4	33
E-core Turbo Ratio Limit Ratio5	33
E-core Turbo Ratio Limit Ratio6	33
E-core Turbo Ratio Limit Ratio7	33
P-core Turbo Ratio Limit Numcore0	1
P-core Turbo Ratio Limit Numcore1	2
P-core Turbo Ratio Limit Numcore2	3
P-core Turbo Ratio Limit Numcore3	4
P-core Turbo Ratio Limit Numcore4	5
P-core Turbo Ratio Limit Numcore5	6
P-core Turbo Ratio Limit Numcore6	7
P-core Turbo Ratio Limit Numcore7	8
P-core Turbo Ratio Limit Ratio0	48
P-core Turbo Ratio Limit Ratio1	48
P-core Turbo Ratio Limit Ratio2	47
P-core Turbo Ratio Limit Ratio3	47
P-core Turbo Ratio Limit Ratio4	47
P-core Turbo Ratio Limit Ratio5	47
P-core Turbo Ratio Limit Ratio6	47

Performance-core Turbo Ratio Limit Ratio6 defines the turbo ratio (max is 85 in normal mode and 120 in core extension mode), the core range is defined in Turbo Ratio Limit Numcore6.

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

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Aptio Setup - AMI

Advanced

P-core Turbo Ratio Limit Numcore7	8
P-core Turbo Ratio Limit Ratio0	48
P-core Turbo Ratio Limit Ratio1	48
P-core Turbo Ratio Limit Ratio2	47
P-core Turbo Ratio Limit Ratio3	47
P-core Turbo Ratio Limit Ratio4	47
P-core Turbo Ratio Limit Ratio5	47
P-core Turbo Ratio Limit Ratio6	47
P-core Turbo Ratio Limit Ratio7	47
E-core Turbo Ratio Limit Numcore0	1
E-core Turbo Ratio Limit Numcore1	2
E-core Turbo Ratio Limit Numcore2	3
E-core Turbo Ratio Limit Numcore3	4
E-core Turbo Ratio Limit Numcore4	5
E-core Turbo Ratio Limit Numcore5	6
E-core Turbo Ratio Limit Numcore6	7
E-core Turbo Ratio Limit Numcore7	8
E-core Turbo Ratio Limit Ratio0	36
E-core Turbo Ratio Limit Ratio1	36
E-core Turbo Ratio Limit Ratio2	36
E-core Turbo Ratio Limit Ratio3	36
E-core Turbo Ratio Limit Ratio4	33
E-core Turbo Ratio Limit Ratio5	33
E-core Turbo Ratio Limit Ratio6	33
E-core Turbo Ratio Limit Ratio7	33

Efficient-core Turbo Ratio Limit Ratio7 defines the turbo ratio (max is 85 irrespective of the core extension mode), the core range is defined in E-core Turbo Ratio Limit Numcore7.

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

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Options Summary		
P-core Turbo Ratio Limit Numcore 0-7	1 – 8	Optimal Default, Failsafe Default
Performance-core Turbo Ratio Limit Numcore 0-7 defines the core range, the turbo ratio is defined in Turbo Ratio Limit Ratio 0-7. If value is zero, this entry is ignored		
P-core Turbo Ratio Limit Ratio 0-7	47, 48	Optimal Default, Failsafe Default
Performance-core Turbo Ratio Limit Ratio 0-7 defines the turbo ratio (max is 85 in normal mode and 120 in core extension mode), the core range is defined in Turbo Ratio Limit Numcore 0-7.		
E-core Turbo Ratio Limit Numcore 0-7	1 – 8	Optimal Default, Failsafe Default
Efficient-core Turbo Ratio Limit Numcore 0-7 defines the core range, the turbo ratio is defined in E-core Turbo Ratio Limit Ratio 0-7. If value is zero, this entry is ignored.		
E-core Turbo Ratio Limit Ratio 0-7	33, 36	Optimal Default, Failsafe Default
Efficient-core Turbo Ratio Limit Ratio 0-7 defines the turbo ratio (max is 85 irrespective of the core extension mode), the core range is defined in E-core Turbo Ratio Limit Numcore 0-7.		

3.4.2.4 Custom P-State Table



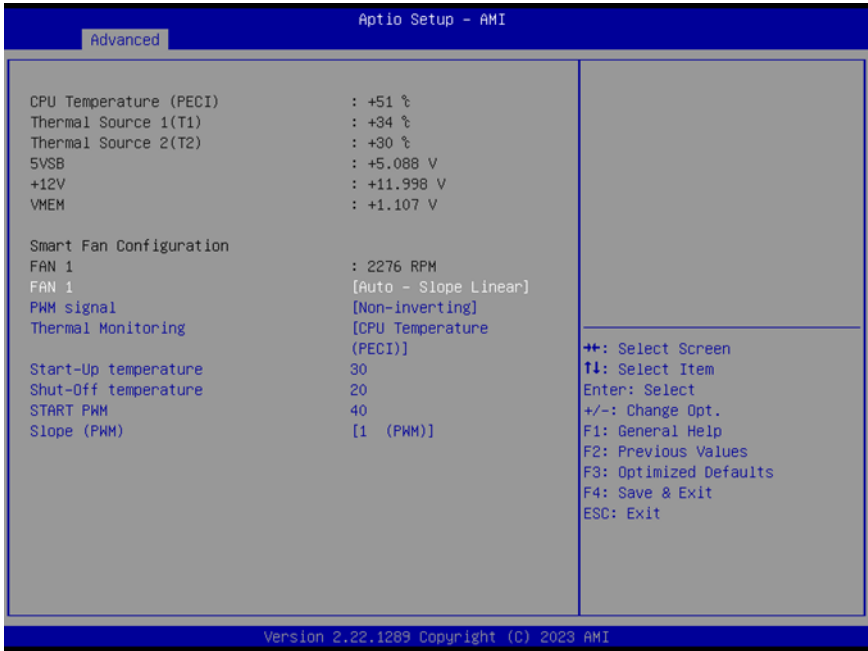
Options Summary		
Number of P states	0	Optimal Default, Failsafe Default
Sets the number of custom P-states. At least 2 states must be present.		

3.4.3 Memory Configuration



3.4.4 On-Module H/W Monitor

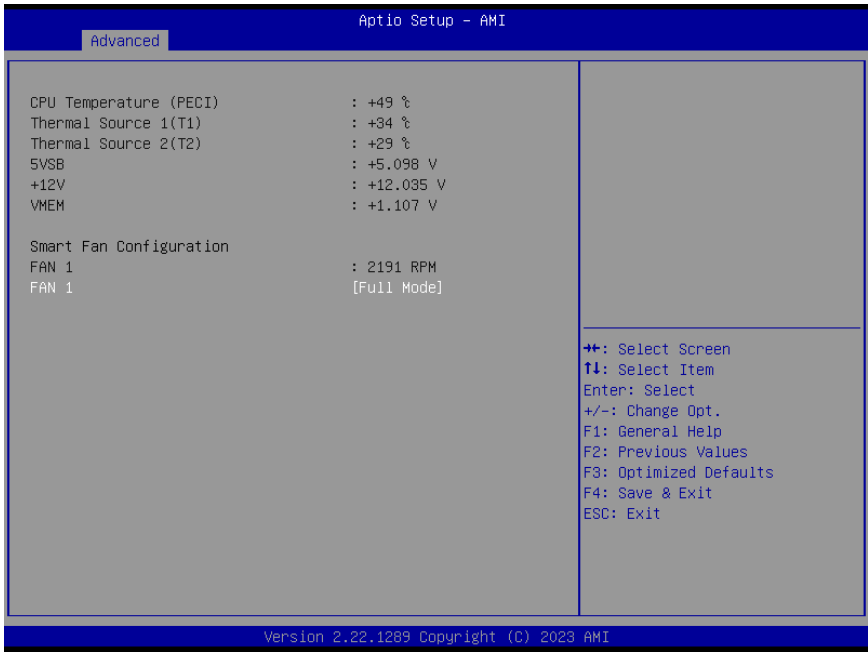
FAN1: Auto – Slope Linear



Options Summary		
FAN 1	Full Mode	
	Manual Mode	
	Auto – Slope Linear	Optimal Default, Failsafe Default
Smart 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	30	Optimal Default, Failsafe Default

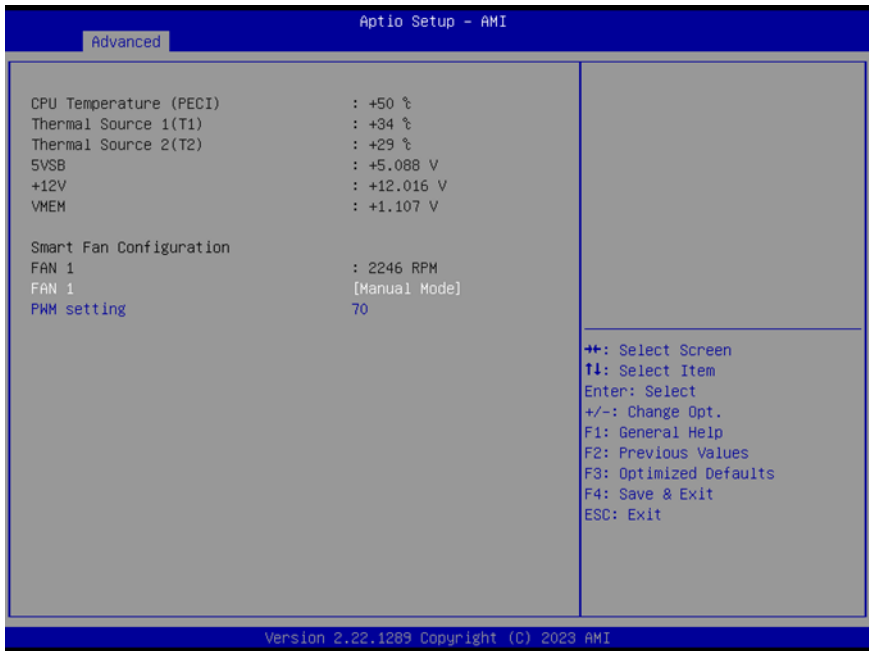
Options Summary		
PWM output when monitoring thermal sensor is exceeded. Range: 0 – 100.		
Shut-Off temperature	20	Optimal Default, Failsafe Default
PWM turns off when monitored thermal sensor is less or equal to. Range: 0 – 100.		
Start PWM	40	Optimal Default, Failsafe Default
The beginning PWM output value when Start-Up temperature is triggered.		
Slope (PWM)	0 (PWM)	
	1 (PWM)	Optimal Default, Failsafe Default
	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.		

FAN1: Full Mode



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

FAN1: Manual Mode



Options Summary		
FAN 1	Full Mode	
	Manual Mode	Optimal Default, Failsafe Default
	Auto – Slope Linear	
Smart Fan Mode Select.		
PWM setting	70	Optimal Default, Failsafe Default
The PWM value of manual mode. Range: 0 – 100.		

3.4.5 On-Module Configuration



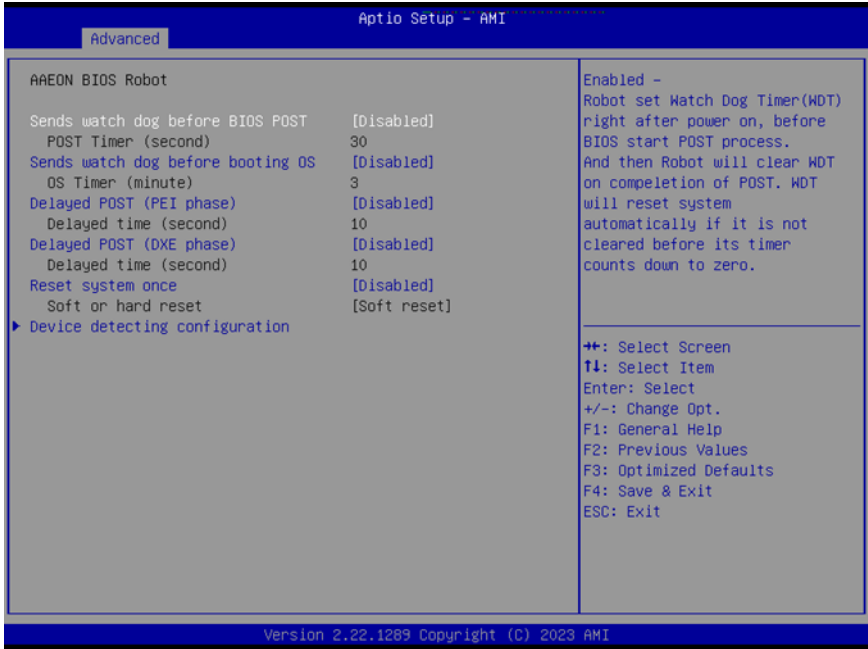
Options Summary		
Battery Management	Disabled	Optimal Default, Failsafe Default
	One Battery	
Enable to support battery in ACPI OS by I2C_CK, I2C_DAT (B33, B34).		

3.4.6 Power Management



Options Summary		
Power Mode	ATX Type	Optimal Default, Failsafe Default
	AT Type	
Select system power mode.		
Restore AC Power Loss	Last State	
	Always On	
	Always Off	Optimal Default, Failsafe Default
IO Restore AC power Loss.		
RTC wake system from S5	Disable	Optimal Default, Failsafe Default
	Fixed Time	
	Dynamic Time	
	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.		

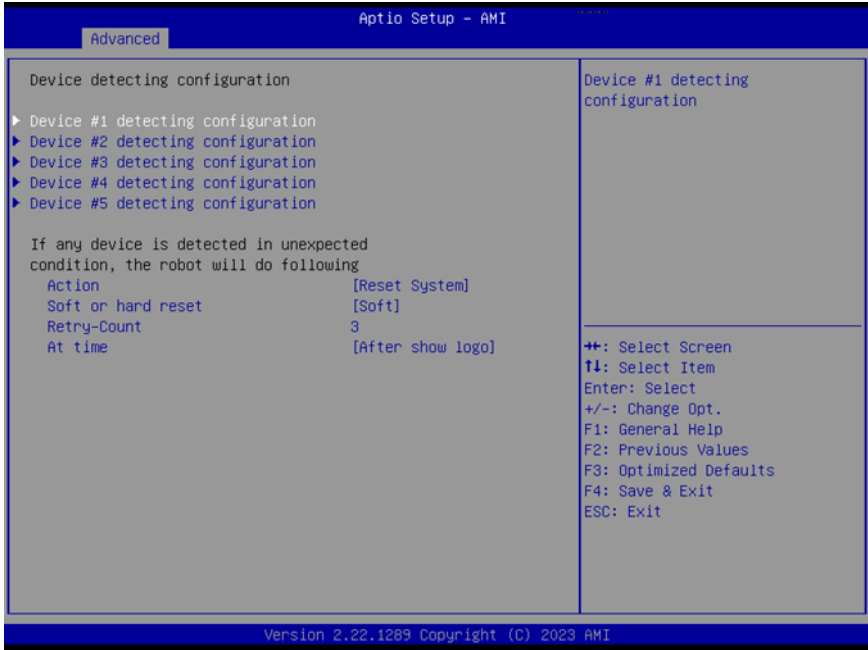
3.4.7 AAEON BIOS Robot



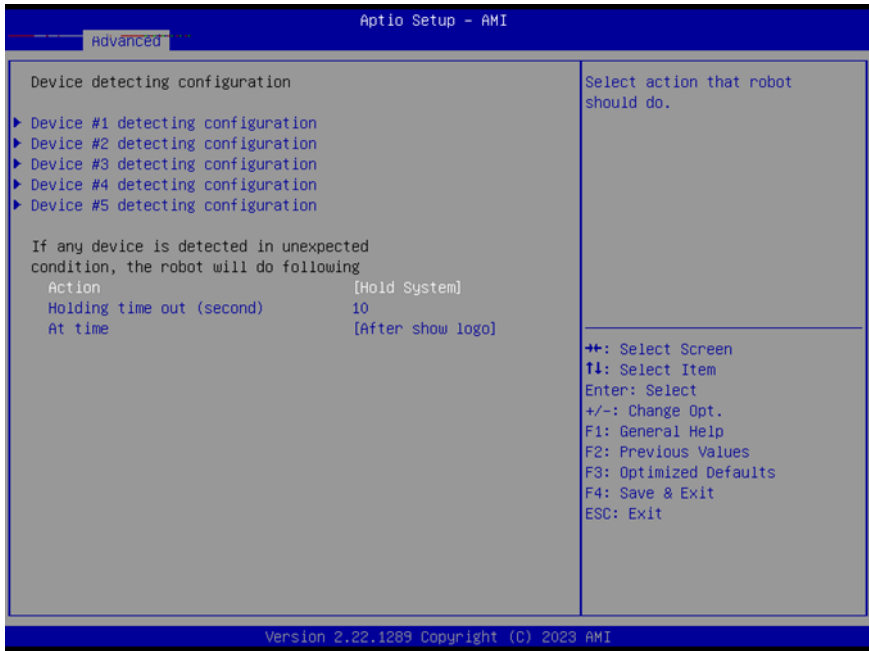
Options Summary		
Sends watch dog before BIOS POST	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot set Watch Dog Timer (WDT) right after power on, before BIOS start POST process. And then Robot will clear WDT on completion of POST. WDT will reset system automatically if it is not cleared before its timer counts down to zero.		
POST Timer (second)	30	Optimal Default, Failsafe Default
Timer count set to Watch Dog Timer for POST. WARNING: Do not set to a value equal or shorter than normal POST time, otherwise system may never complete POST unless clearing BIOS settings. More than 2 x normal POST time is suggested.		
Sends watch dog before booting OS	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot set Watch Dog Timer (WDT) after POST completion, before BIOS transfer control to OS. WARNING: Before enabling this function, a program in OS must be in responsible for clearing WDT. Also, this function should be disabled if OS is going to update itself.		

Options Summary		
OS Timer (minute)	3	Optimal Default, Failsafe Default
Timer count set to Watch Dog Timer for OS loading.		
Delayed POST (PEI phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot holds BIOS from starting POST, right after power on. This allows BIOS POST to start with stable power or start after system is physically warmed-up. Note: Robot does this before 'Sends watch dog'.		
Delayed time (second)	10	Optimal Default, Failsafe Default
Period of time for Robot to hold BIOS from POST.		
Delayed POST (DXE phase)	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed-up. Note: Robot does this after 'Sends watch dog before BIOS POST'.		
Delayed time (second)	10	Optimal Default, Failsafe Default
Period of time for Robot to hold BIOS from POST.		
Reset system once	Disabled	Optimal Default, Failsafe Default
	Enabled	
Enabled - Robot resets system for one time on each boot. This will send a soft or hard reset to onboard devices, thus puts devices to more stable state.		
Soft or hard reset	Soft reset	Optimal Default, Failsafe Default
	Hard reset"	
Select reset type robot should send on each boot.		

3.4.7.1 Device Detecting Configuration



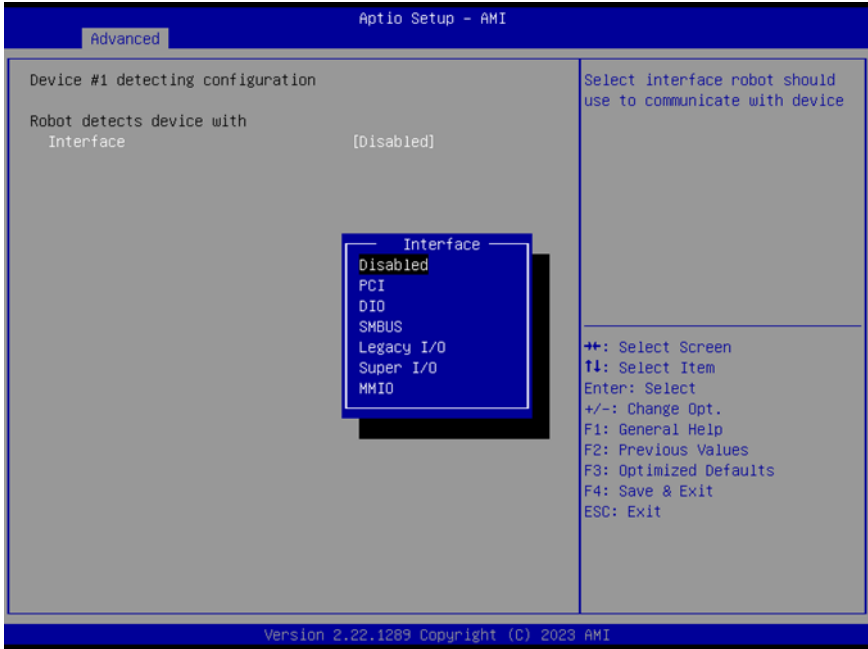
Options Summary		
Action	Reset System	Optimal Default, Failsafe Default
	Hold System	
Select action that robot should do.		
Soft or hard reset	Soft	Optimal Default, Failsafe Default
	Hard	
Select reset type robot should send on each boot.		
Retry-Count	3	Optimal Default, Failsafe Default
Fill retry counter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

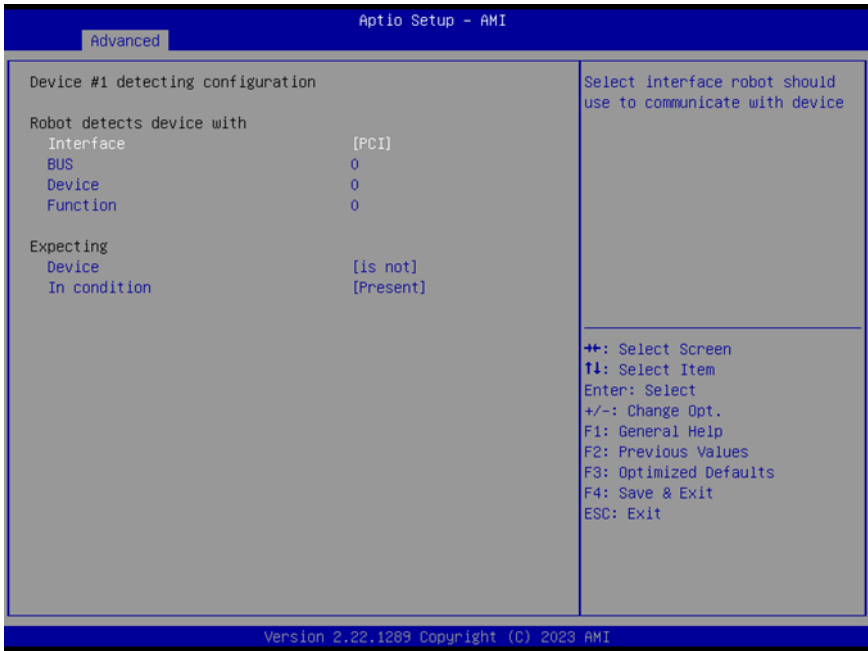
Action	Reset System	
	Hold System	Optimal Default, Failsafe Default
Select action that robot should do.		
Holding time out (second)	10	Optimal Default, Failsafe Default
Fill hold time out here. Robot will hold system no longer then time-out value, and then let system continue its POST.		
At time	After 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.		

3.4.8.1.1 Device #* Detecting Configuration – Interface



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

3.4.8.1.2 Device #* Detecting Configuration – PCI



Options Summary		
When interface item set to "PCI" will show below items		
BUS	0	Optimal Default, Failsafe Default
Fill BUS number to a PCI device, in hexadecimal. Range: 0 – FF.		
Device	0	Optimal Default, Failsafe Default
Fill DEVICE number to a PCI device, in hexadecimal. Range: 0 – FF.		
Function	0	Optimal Default, Failsafe Default
Fill FUNCTION number to a PCI device, in hexadecimal. Range: 0 – FF.		
Device	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action if condition met.		

Options Summary

In condition	Present	Optimal Default, Failsafe Default
	Specified register data	

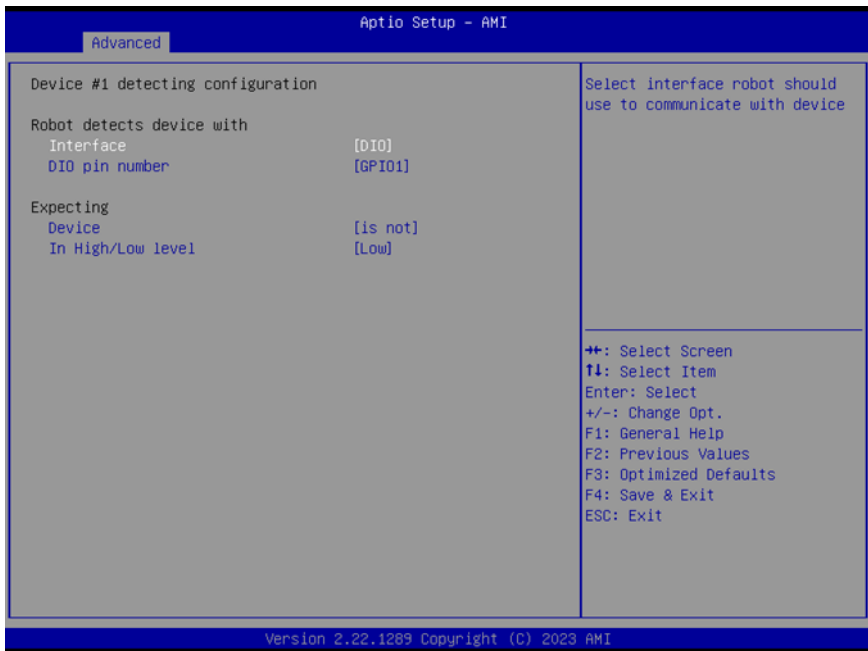
Select the condition that robot should check for device.

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.

3.4.8.1.3 Device #* Detecting Configuration – DIO



Options Summary

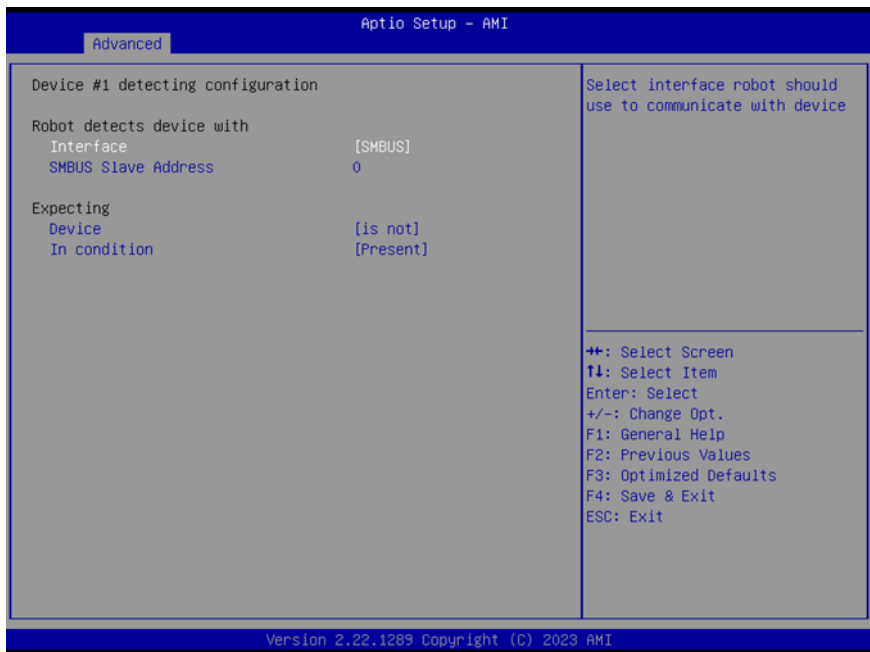
When interface item set to "DIO" will show below items

DIO pin number	GPIO 1	Optimal Default, Failsafe Default
	GPIO *	

Fill DIO pin number, DIO, DIO1, and so on. For COM express product: 0-3 - GPIO-3\
n4-7 - GPO0-3.

Options Summary		
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.		

3.4.8.1.4 Device #* Detecting Configuration – SMBUS



Options Summary		
When interface item set to "SMBUS" will show below items		
SMBUS Slave Address	0	Optimal Default, Failsafe Default
Fill slave address to a SMBUS device, in hexadecimal. Range: 0 - FF		
Device	is	
	Is not	Optimal Default, Failsafe Default

Options Summary

Select that robot should or should not do action if condition met.

In condition	Present	Optimal Default, Failsafe Default
	Specified register data	

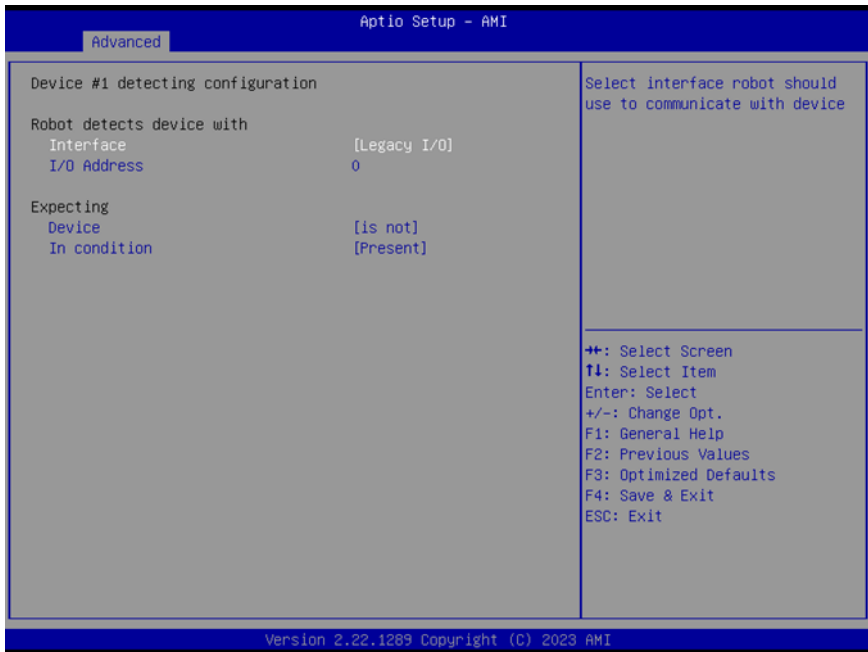
Select the condition that robot should check for device.

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.

3.4.8.1.5 Device #* Detecting Configuration – Legacy I/O



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.

Options Summary

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	

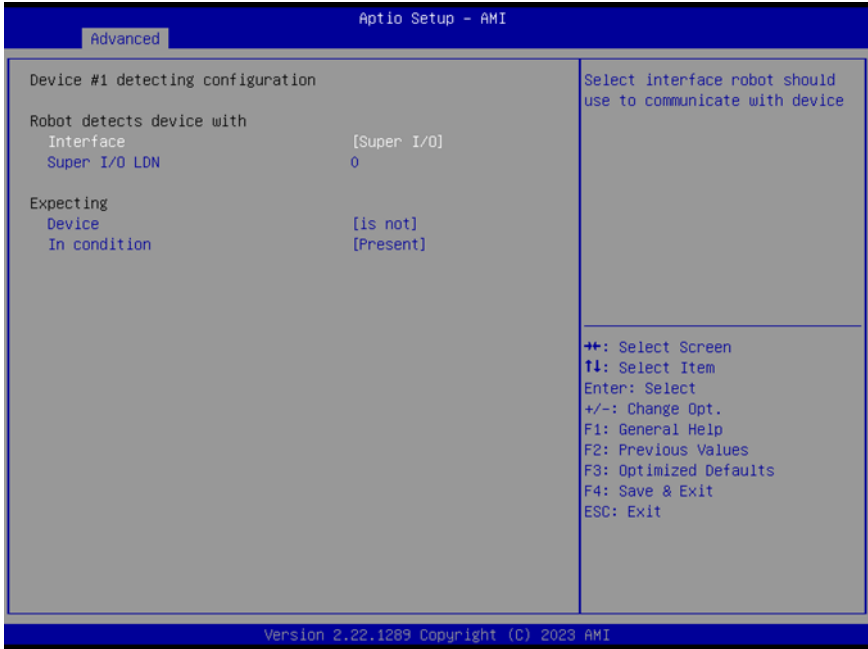
Select the condition that robot should check for device.

Present - device is detected.

According to register - Robot read register according to configuration.

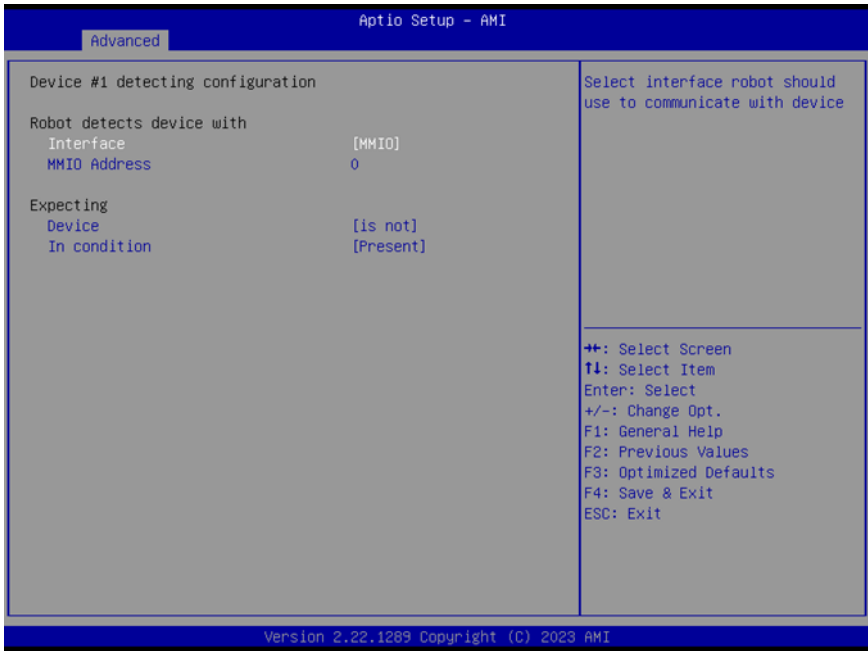
Note: Device will be considered 'Present' by Robot, when data read from device is not 0xFF.

3.4.8.1.6 Device #* Detecting Configuration – Super I/O



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.		

3.4.8.1.7 Device #* Detecting Configuration – MMIO

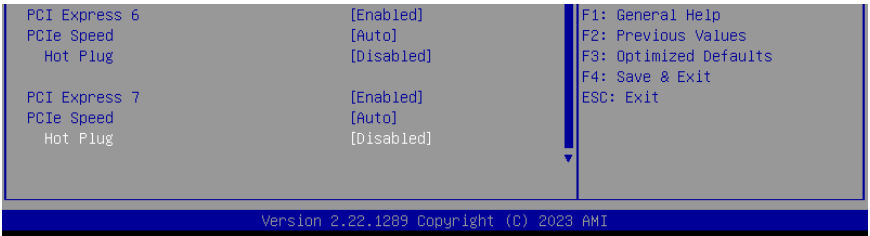
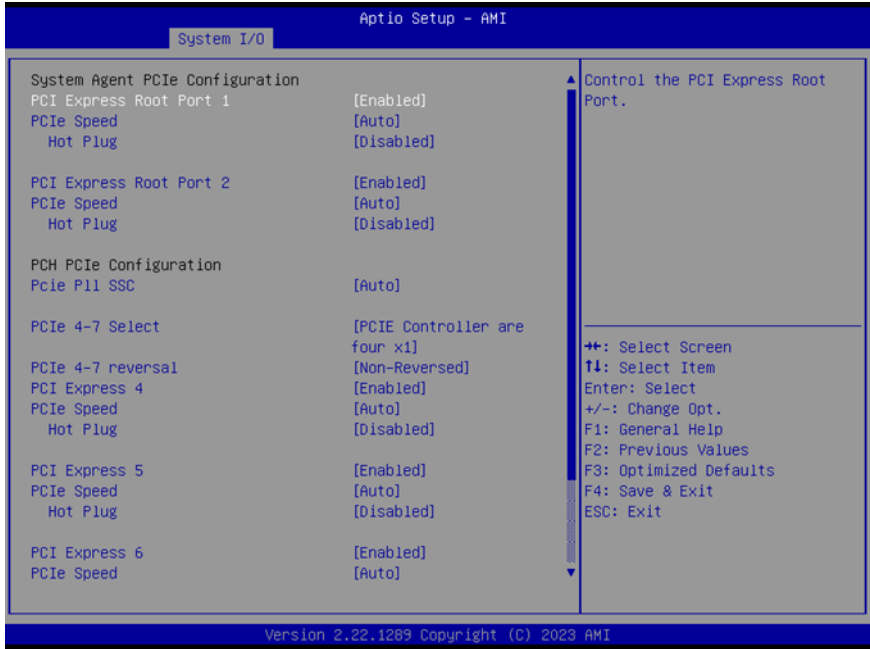


Options Summary		
When interface item set to "MMIO" will show below items		
MMIO Address	0	Optimal Default, Failsafe Default
Fill Memory Mapped I/O address device is responding to. Range: 0~FFFFFFFF.		
Device	is	
	Is not	Optimal Default, Failsafe Default
Select that robot should or should not do action 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.		

3.5 Setup Submenu: System I/O



3.5.1 PCI Express Configuration



Options Summary

PCI Express Root Port 1-2	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	

Options Summary		
	Gen4	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		
Pcie Pll SSC	Auto	Optimal Default, Failsafe Default
	0.0%	
	0.1%	
	0.2%	
	0.3%	
	0.4%	
	0.5%	
	0.6%	
	0.7%	
	0.8%	
	0.9%	
	1.0%	
	1.1%	
	1.2%	
	1.3%	
	1.4%	
	1.5%	
	1.6%	
1.7%		
1.8%		
1.9%		
2.0%		
Disable		
Pcie Pll SSC percentage. AUTO – Keep hw default, no BIOS override. Range is 0.0% - 2.0%.		
PCIe 4 - 7 Select	PCIe Controller are four x1	Optimal Default, Failsafe Default
	PCIe Controller are one x2 and two x1	
	PCIe Controller are two x2	
	PCIe Controller is one x4	

Options Summary		
PCIE Controller Setting.		
PCIe 4 - 7 reversal	Non-Reversed	Optimal Default, Failsafe Default
	Reversed	
PCIE LANE REVERSAL.		
PCI Express 4 - 7	Disabled	
	Enabled	Optimal Default, Failsafe Default
Control the PCI Express Root Port.		
PCIe Speed	Auto	Optimal Default, Failsafe Default
	Gen1	
	Gen2	
	Gen3	
Configure PCIe Speed.		
Hot Plug	Disabled	Optimal Default, Failsafe Default
	Enabled	
PCI Express Hot Plug Enable/Disable.		

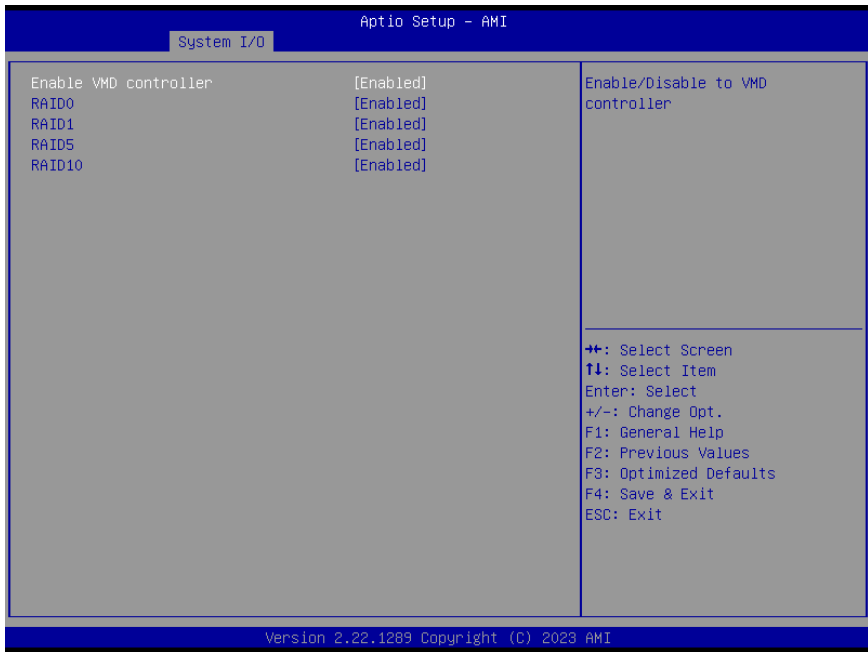
3.5.2 Storage Configuration



3.5.2.1 VMD Configuration



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

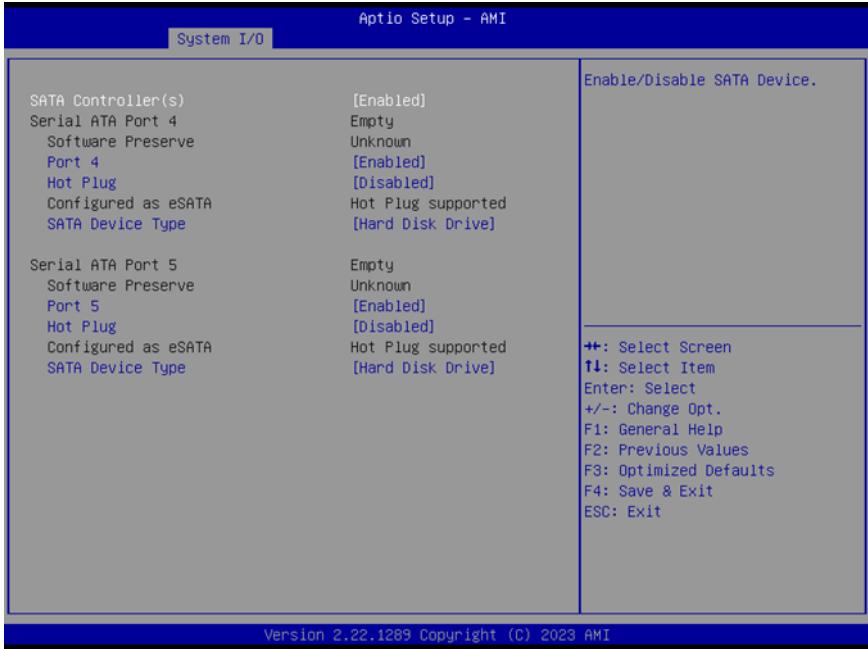


Options Summary		
RAID0	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable "RAID0 support".		
RAID1	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable "RAID1 support".		
RAID5	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable "RAID5 support".		
RAID10	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable "RAID10 support".		

3.5.2.2 NVMe Configuration



3.5.2.3 SATA Configuration



Options Summary		
SATA Controller(s)	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable/Disable SATA Device.		
Port 4 - 5	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.		

3.5.3 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

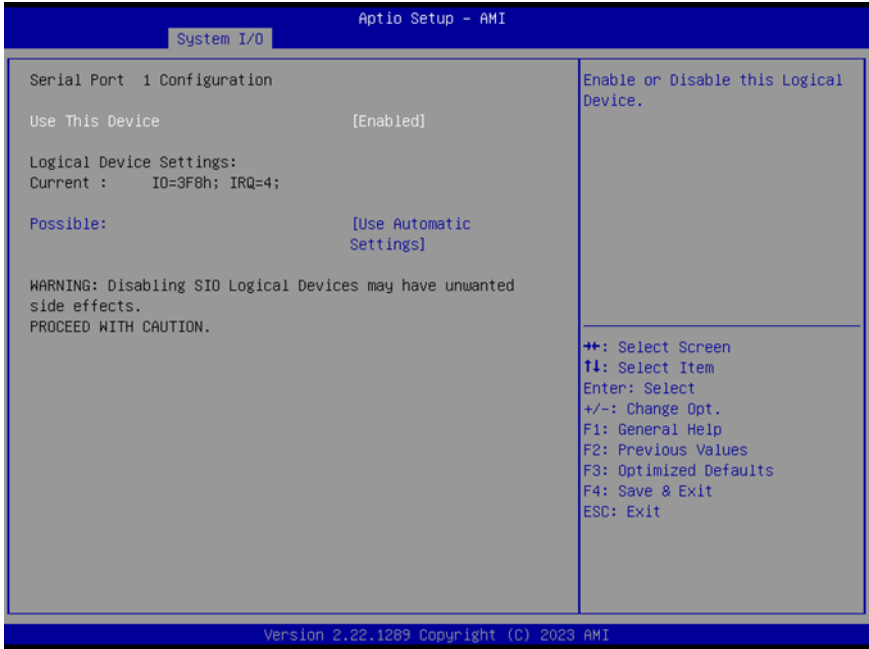


Options Summary		
GPIO 1 - 4	Output	
	Input	Optimal Default, Failsafe Default
Set DIO as Input or Output.		
GPIO 5 - 8	Output	Optimal Default, Failsafe Default
	Input	
Set DIO as Input or Output.		
Output Level	High	Optimal Default, Failsafe Default
	Low	
Set output level when DIO pin is output.		

3.5.5 Legacy Logical Devices Configuration

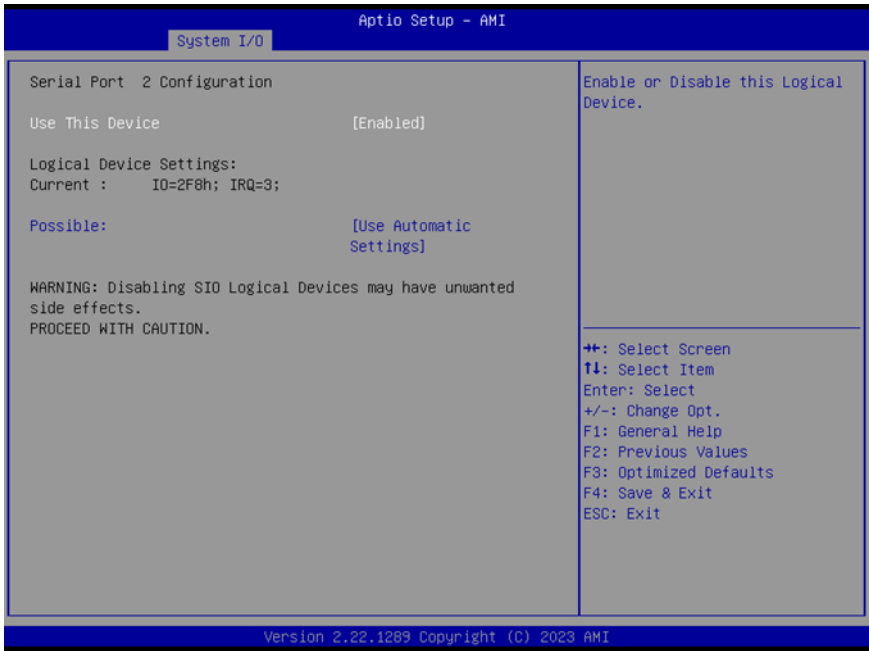


3.5.5.1 Serial Port 1 Configuration



Options Summary		
Use This Device	Disable	
	Enable	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 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



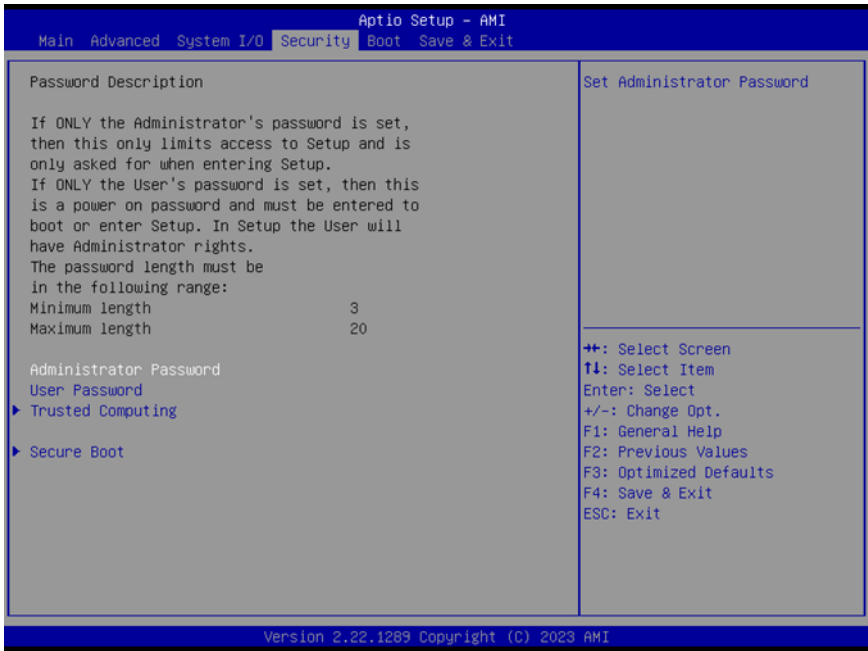
Options Summary		
Use This Device	Disable	
	Enable	Optimal Default, Failsafe Default
Enable or Disable this Logical Device.		
Possible:	Use Automatic Settings	Optimal Default, Failsafe Default
	IO=2F8h; IRQ=3; DMA;	
	IO=2D8h; IRQ=10; DMA;	
Allows user to change the device resource settings. New settings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

3.5.6 Serial Port Console Redirection



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

3.6 Setup Submenu: Security



Change Administrator/User Password

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

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

Remove Password

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

3.6.1 Trusted Computing



Options Summary		
Security Device Support	Disable	
	Enable	Optimal Default, Failsafe Default
Enables or Disables BIOS support for security device. O.S. will not show Security Device. 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.		

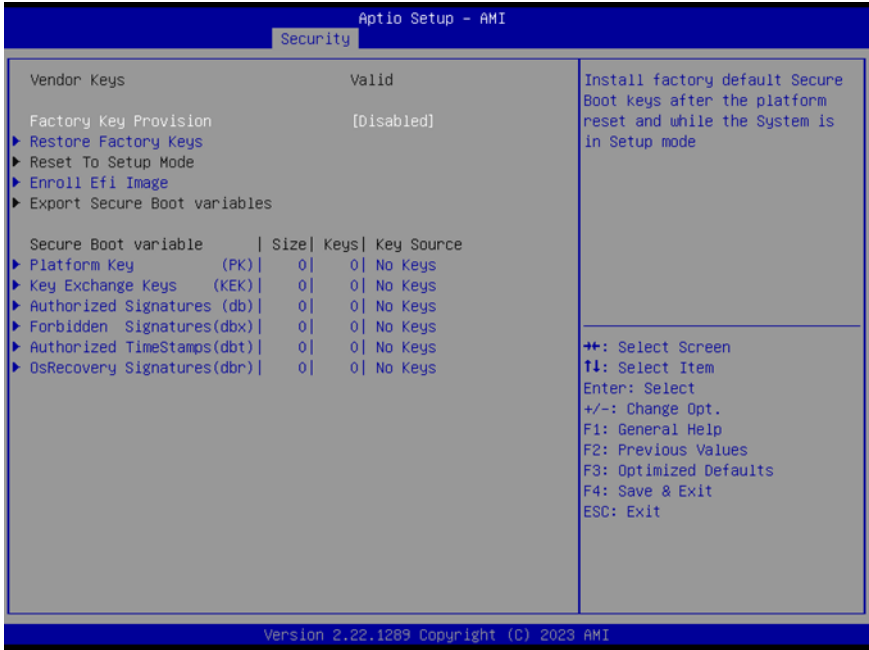
Options Summary		
Platform Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or disable Platform Hierarchy.		
Storage Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe Default
Enable or Disable Storage Hierarchy.		
Endorsement Hierarchy	Disabled	
	Enabled	Optimal Default, Failsafe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

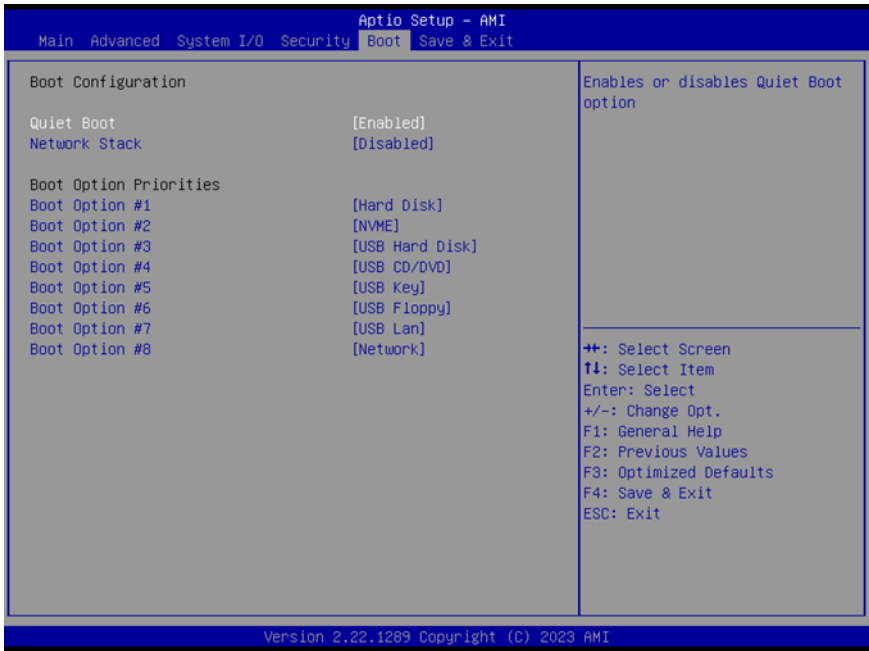
3.6.2.1 Key Management



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

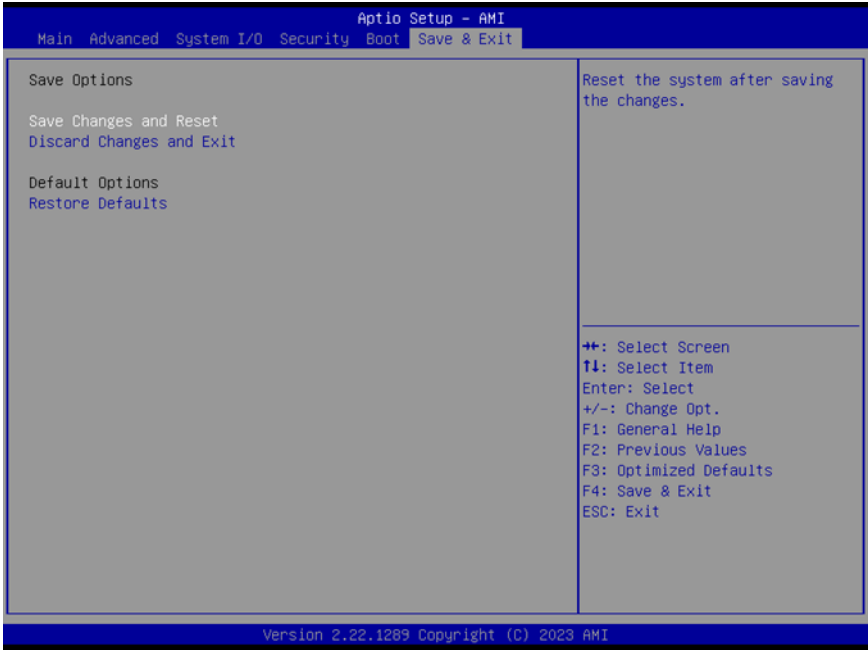
Options Summary	
Platform Key (PK)	Update
	Delete
Key Exchange Keys (KEK)	Details
	Export
	Update
	Append
	Delete
Authorized Signatures (db)	Details
	Export
	Update
	Append
	Delete
Forbidden Signatures (dbx)	Details
	Export
	Update
	Append
	Delete
Authorized TimeStamps (dbt)	Update
	Append
OsRecovery 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 Quite Boot option.		
Network Stack	Disabled	Optimal Default, Failsafe Default
	Enabled	

3.8 Setup Submenu: Save & Exit



Chapter 4

Drivers Installation

4.1 Drivers Download and Installation

Drivers for the COM-RAPC6 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. Run the **Autorun.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Install Audio Drivers

Note: Ensure Intel Smart Sound Driver (10.29.00.8102) is installed before the Realtek Audio driver (Realtek Audio 6.0.9034.2)

Install Intel Smart Sound Driver

1. Open the **Audio** folder
2. Open the **10.29.00.8102** subfolder
3. Follow the setup information within the file to manually install driver.

Install Realtek Audio Driver

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

Install ME Driver

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

Install Serial IO Driver

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

Appendix A

I/O Information

A.1 I/O Address Map

Address Range	Device Name
[0000000000000000 - 000000000000CF7]	PCI Express Root Complex
[0000000000000020 - 000000000000021]	Programmable interrupt controller
[0000000000000024 - 000000000000025]	Programmable interrupt controller
[0000000000000028 - 000000000000029]	Programmable interrupt controller
[000000000000002C - 00000000000002D]	Programmable interrupt controller
[000000000000002E - 00000000000002F]	Motherboard resources
[0000000000000030 - 000000000000031]	Programmable interrupt controller
[0000000000000034 - 000000000000035]	Programmable interrupt controller
[0000000000000038 - 000000000000039]	Programmable interrupt controller
[000000000000003C - 00000000000003D]	Programmable interrupt controller
[0000000000000040 - 000000000000043]	System timer
[000000000000004E - 00000000000004F]	Motherboard resources
[0000000000000050 - 000000000000053]	System timer
[0000000000000061 - 000000000000061]	Motherboard resources
[0000000000000063 - 000000000000063]	Motherboard resources
[0000000000000065 - 000000000000065]	Motherboard resources
[0000000000000067 - 000000000000067]	Motherboard resources
[0000000000000068 - 000000000000068]	Microsoft ACPI-Compliant Embedded Controller
[000000000000006C - 00000000000006C]	Microsoft ACPI-Compliant Embedded Controller
[0000000000000070 - 000000000000070]	Motherboard resources
[0000000000000080 - 000000000000080]	Motherboard resources
[0000000000000092 - 000000000000092]	Motherboard resources
[00000000000000A0 - 0000000000000A1]	Programmable interrupt controller
[00000000000000A4 - 0000000000000A5]	Programmable interrupt controller
[00000000000000A8 - 0000000000000A9]	Programmable interrupt controller
[00000000000000AC - 0000000000000AD]	Programmable interrupt controller
[00000000000000B0 - 0000000000000B1]	Programmable interrupt controller
[00000000000000B2 - 0000000000000B3]	Motherboard resources
[00000000000000B4 - 0000000000000B5]	Programmable interrupt controller
[00000000000000B8 - 0000000000000B9]	Programmable interrupt controller
[00000000000000BC - 0000000000000BD]	Programmable interrupt controller
[00000000000002F8 - 00000000000002FF]	Communications Port (COM2)
[00000000000003F8 - 00000000000003FF]	Communications Port (COM1)
[00000000000004D0 - 00000000000004D1]	Programmable interrupt controller
[0000000000000680 - 000000000000069F]	Motherboard resources
[0000000000000D00 - 000000000000FFFF]	PCI Express Root Complex
[000000000000164E - 000000000000164F]	Motherboard resources
[0000000000001854 - 0000000000001857]	Motherboard resources
[0000000000002000 - 00000000000020FE]	Motherboard resources
[0000000000003000 - 000000000000303F]	Intel(R) UHD Graphics
[0000000000003060 - 000000000000307F]	Standard SATA AHCI Controller
[0000000000003080 - 0000000000003083]	Standard SATA AHCI Controller
[0000000000003090 - 0000000000003097]	Standard SATA AHCI Controller
[000000000000EFA0 - 000000000000EFBF]	Intel(R) SMBus - 51A3

A.2 Memory Address Map

COM Express Module

COM-RAPC6





















































Memory	
[00000000000A0000 - 00000000000BFFFF]	PCI Express Root Complex
[0000000050400000 - 00000000504FFFFFF]	Intel(R) Ethernet Controller I226-IT
[0000000050400000 - 00000000505FFFFFF]	Intel(R) PCI Express Root Port #9 - 51B0
[0000000050400000 - 00000000BFFFFFFF]	PCI Express Root Complex
[0000000050500000 - 0000000050503FFF]	Intel(R) Ethernet Controller I226-IT
[0000000050600000 - 0000000050601FFF]	Standard SATA AHCI Controller
[0000000050602000 - 00000000506027FF]	Standard SATA AHCI Controller
[0000000050603000 - 00000000506030FF]	Standard SATA AHCI Controller
[00000000C0000000 - 00000000CFFFFFFF]	Motherboard resources
[00000000FD690000 - 00000000FD69FFFF]	Intel(R) Serial IO GPIO Host Controller - INTC1055
[00000000FD6A0000 - 00000000FD6AFFFF]	Intel(R) Serial IO GPIO Host Controller - INTC1055
[00000000FD6D0000 - 00000000FD6DFFFF]	Intel(R) Serial IO GPIO Host Controller - INTC1055
[00000000FD6E0000 - 00000000FD6EFFFF]	Intel(R) Serial IO GPIO Host Controller - INTC1055
[00000000FE010000 - 00000000FE010FFF]	Intel(R) SPI (flash) Controller - 51A4
[00000000FED00000 - 00000000FED003FF]	High precision event timer
[00000000FED20000 - 00000000FED7FFFF]	Motherboard resources
[00000000FED40000 - 00000000FED44FFF]	Trusted Platform Module 2.0
[00000000FED45000 - 00000000FED8FFFF]	Motherboard resources
[00000000FED90000 - 00000000FED93FFF]	Motherboard resources
[00000000FEDA0000 - 00000000FEDA0FFF]	Motherboard resources
[00000000FEDA1000 - 00000000FEDA1FFF]	Motherboard resources
[00000000FEDC0000 - 00000000FEDC7FFF]	Motherboard resources
[00000000FEE00000 - 00000000FEEFFFFFFF]	Motherboard resources
[0000004000000000 - 0000004000FFFFFF]	Intel(R) UHD Graphics
[0000006000000000 - 0000006000FFFFFF]	Intel(R) UHD Graphics
[0000006001100000 - 000000600110FFFF]	Intel(R) USB 3.1o eXtensible Host Controller - 1.20 (Microsoft)
[0000006001118000 - 00000060011180FF]	Intel(R) SMBus - 51A3
[0000007FFFEF9000 - 0000007FFFEF9FFF]	Intel(R) Serial IO UART Host Controller - 51A8
[0000007FFFEFA000 - 0000007FFFEFAFFF]	Intel(R) Management Engine Interface #1
[0000007FFFEFB000 - 0000007FFFEFBFFF]	Intel(R) Serial IO SPI Host Controller - 51AB
[0000007FFFEFC000 - 0000007FFFEFCFFF]	High Definition Audio Controller
[0000007FFFEF0000 - 0000007FFFEF7FFF]	High Definition Audio Controller





















































A.3 Large Memory Address Map





















































- ▼  Large Memory
 -  [0000004000000000 - 0000007FFFFFFFFF] PCI Express Root Complex





















































A.4 IRQ Mapping Chart





















































▼	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 - INTC1055
	(ISA) 0x00000029 (41)	Trusted Platform Module 2.0
	(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
	(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) 0x0000065 (101)	Microsoft ACPI-Compliant System
 (ISA) 0x0000066 (102)	Microsoft ACPI-Compliant System
 (ISA) 0x0000067 (103)	Microsoft ACPI-Compliant System
 (ISA) 0x0000068 (104)	Microsoft ACPI-Compliant System
 (ISA) 0x0000069 (105)	Microsoft ACPI-Compliant System
 (ISA) 0x000006A (106)	Microsoft ACPI-Compliant System
 (ISA) 0x000006B (107)	Microsoft ACPI-Compliant System
 (ISA) 0x000006C (108)	Microsoft ACPI-Compliant System
 (ISA) 0x000006D (109)	Microsoft ACPI-Compliant System
 (ISA) 0x000006E (110)	Microsoft ACPI-Compliant System
 (ISA) 0x000006F (111)	Microsoft ACPI-Compliant System
 (ISA) 0x0000070 (112)	Microsoft ACPI-Compliant System
 (ISA) 0x0000071 (113)	Microsoft ACPI-Compliant System
 (ISA) 0x0000072 (114)	Microsoft ACPI-Compliant System
 (ISA) 0x0000073 (115)	Microsoft ACPI-Compliant System
 (ISA) 0x0000074 (116)	Microsoft ACPI-Compliant System
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 (ISA) 0x0000079 (121)	Microsoft ACPI-Compliant System
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 (ISA) 0x000007C (124)	Microsoft ACPI-Compliant System
 (ISA) 0x000007D (125)	Microsoft ACPI-Compliant System
 (ISA) 0x000007E (126)	Microsoft ACPI-Compliant System
 (ISA) 0x000007F (127)	Microsoft ACPI-Compliant System
 (ISA) 0x0000080 (128)	Microsoft ACPI-Compliant System
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 (ISA) 0x000008F (143)	Microsoft ACPI-Compliant System
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 (ISA) 0x0000096 (150)	Microsoft ACPI-Compliant System
 (ISA) 0x0000097 (151)	Microsoft ACPI-Compliant System
 (ISA) 0x0000098 (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
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 (ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
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 (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

















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 (ISA) 0x0000017F (383)	Microsoft ACPI-Compliant System
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 (ISA) 0x0000019F (415)	Microsoft ACPI-Compliant System
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 (ISA) 0x000001A4 (420)	Microsoft ACPI-Compliant System
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 (ISA) 0x000001A8 (424)	Microsoft ACPI-Compliant System
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 (ISA) 0x000001CC (460)	Microsoft ACPI-Compliant System
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 (ISA) 0x000001CE (462)	Microsoft ACPI-Compliant System
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	(PCI) 0x00000010 (16)	High Definition Audio Controller
	(PCI) 0x00000010 (16)	Intel(R) Serial IO UART Host Controller - 51A8
	(PCI) 0x00000025 (37)	Intel(R) Serial IO SPI Host Controller - 51AB
	(PCI) 0xFFFFFEE (-18)	Intel(R) Management Engine Interface #1

	(PCI) 0xFFFFFEF (-17)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE0 (-16)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE1 (-15)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE2 (-14)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE3 (-13)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE4 (-12)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE5 (-11)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE6 (-10)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE7 (-9)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE8 (-8)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFE9 (-7)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFEA (-6)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFEB (-5)	Intel(R) Ethernet Controller I226-IT
	(PCI) 0xFFFFFEC (-4)	Intel(R) UHD Graphics
	(PCI) 0xFFFFFED (-3)	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
	(PCI) 0xFFFFFEE (-2)	Standard SATA AHCI Controller