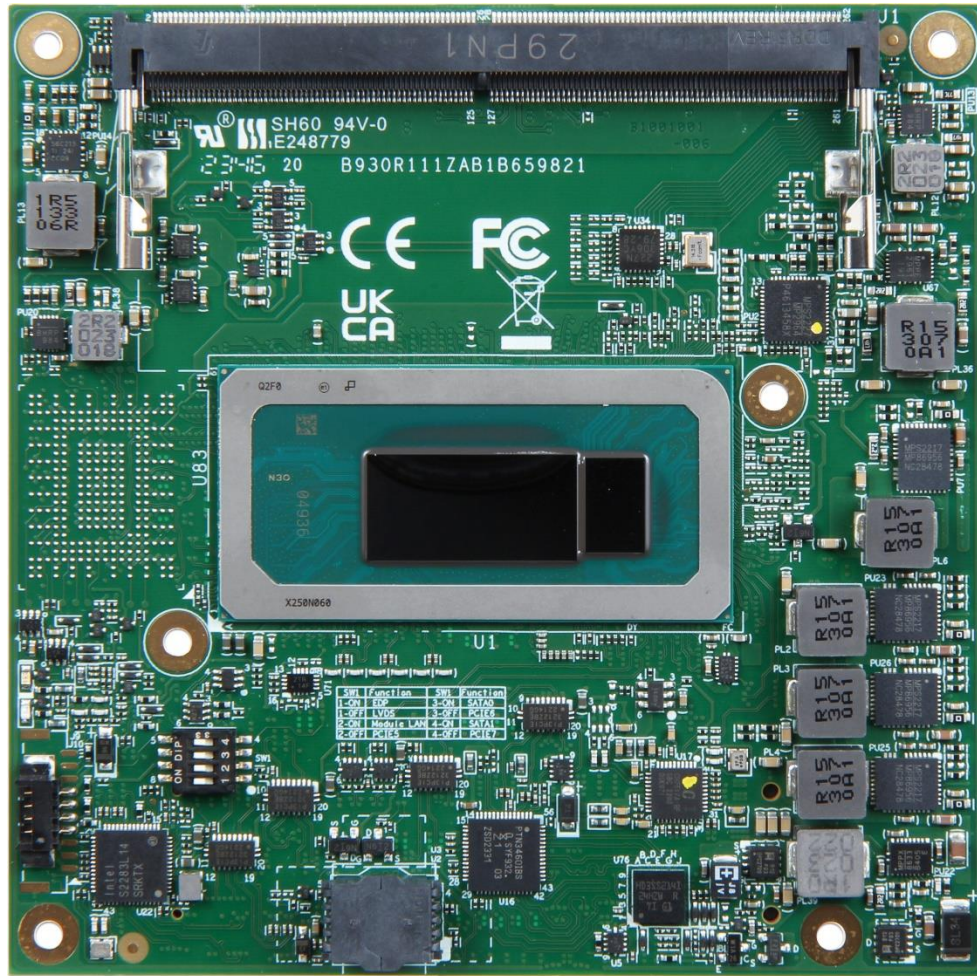




COM Express™

PCOM-B659

User's Guide R0.6

Revision History

Rev.	Note	Date
R0.1	Preliminary release	2024 / 03 / 28
R0.2	1. Update copyright information 2. Update heatspreader dimension diagram 3. Add onboard SSD cooling instruction 4. Update packaging pictures	2024 / 05 / 10
R0.3	1. Add section 7 BIOS setup items	2024 / 11 / 21
R0.4	1. Update Function Switching to R1 Rev 2. Modify Pinout description	2025 / 01 / 03
R0.5	1. Revise Pin Out Table Description for A44, A77, B79, B83	2025 / 07 / 07
R0.6	1. Correct 2D Drawing for Module and Thermal Solution	2025 / 10 / 13

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1 Introduction

PCOM-B659 is COM Express module based on Intel® 13th Gen P/U platform. It is compatible with COM Express Rev3.1 standard. The platform adopts Intel 7 lithography and VNNI instruction set, offers advance computing power with 15~28W thermal and embedded use condition for wide range application. PCOM-B659 supports PCIe Gen4 lanes, and 2x Non-ECC DDR5 SO-DIMM, which is suit for mission critical use conditions and AI edge computing. This module also provides (up to) 8x PCIe Gen3 x1 lanes, 2x optional USB4(alternative with DDI), 4x USB 3.2 Gen 2, and 2x SATA. The complete and flexible I/O capacity also mapped to wide range of embedded/industrial applications.

1.1 PCOM-B659 SKU List

Series	PCOM-B659						
Ordering P/N	AB1-3R62	AB1-3S45	AB1-3S46	AB1-3S47	AB1-3S55	AB1-3S54	AB1-3S12
	CPU Specifications						
Processor	i7-1370PE	i5-1340PE	i3-1320PE	i7-1365UE	i5-1335UE	i3-1315URE	U300E
# of Cores	6P + 8E	4P + 8E	4P + 4E	2P + 8E	2P + 8E	2P + 4E	1P + 4E
# of Threads	20	16	12	12	12	8	6
Cache	24 MB	12 MB	12 MB	12 MB	12 MB	10 MB	8 MB
Base Frequency	1.9 GHz	1.8 GHz	1.7 GHz	1.7 GHz	1.3 GHz	1.2 GHz	1.1 GHz
Turbo Frequency	4.8 GHz	4.5 GHz	4.5 GHz	4.9 GHz	4.5 GHz	4.5 GHz	4.3 GHz
TDP	28 W	28 W	28 W	15 W	15 W	15 W	15 W
Temperature Range	0 °C ~ 60 °C	0 °C ~ 60 °C	0 °C ~ 60 °C	0 °C ~ 60 °C	0 °C ~ 60 °C	0 °C ~ 60 °C	0 °C ~ 60 °C
	DDR5 Memory Specifications						
Capacity	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)
Speed	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s
ECC	No	No	No	No	No	No	No
	I/O Specifications						
PCIe	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0
USB 3.2 Gen2 /2.0	4x / 8x	4x / 8x	4x / 8x	4x / 8x	4x / 8x	4x / 8x	4x / 8x
SATA	2x	2x	2x	2x	2x	2x	2x
Ethernet	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE

Table 1 PCOM-B659 P & U Series Embedded SKU

Series	PCOM-B659					
Ordering P/N	AB1-3S53	AB1-3S52	AB1-3S51	AB1-3S50	AB1-3S49	AB1-3S48
	CPU Specifications					
Processor	i7-1370PRE	i5-1350PRE	i3-1320PRE	i7-1365URE	i5-1345URE	i3-1315URE
# of Cores	6P + 8E	4P + 8E	4P + 4E	2P + 8E	2P + 8E	2P + 4E
# of Threads	20	16	12	12	12	8
Cache	24 MB	12 MB	12 MB	12 MB	12 MB	10 MB
Base Frequency	1.9 GHz	1.8 GHz	1.7 GHz	1.7 GHz	1.4 GHz	1.2 GHz
Turbo Frequency	4.8 GHz	4.6 GHz	4.5 GHz	4.9 GHz	4.6 GHz	4.5 GHz
TDP	28 W	28 W	28 W	15 W	15 W	15 W
Temperature Range	-40 °C ~ 85 °C	-40 °C ~ 85 °C	-40 °C ~ 85 °C	-40 °C ~ 85 °C	-40 °C ~ 85 °C	-40 °C ~ 85 °C
	Memory Specifications					
Capacity	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)	2x SO-DIMM (96GB)
Speed	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s	5200 MT/s
ECC	No	No	No	No	No	No
	I/O Specifications					
PCIe	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0	PEG (2x PCIe 4.0 x4) 8x PCIe 3.0
USB 3.2 Gen2 /2.0	4x / 8x	4x / 8x	4x / 8x	4x / 8x	4x / 8x	4x / 8x
SATA	2x	2x	2x	2x	2x	2x
Ethernet	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE	1x 2.5 GbE

Table 2 PCOM-B659 P & U Series Industrial SKU

2 Block Diagram

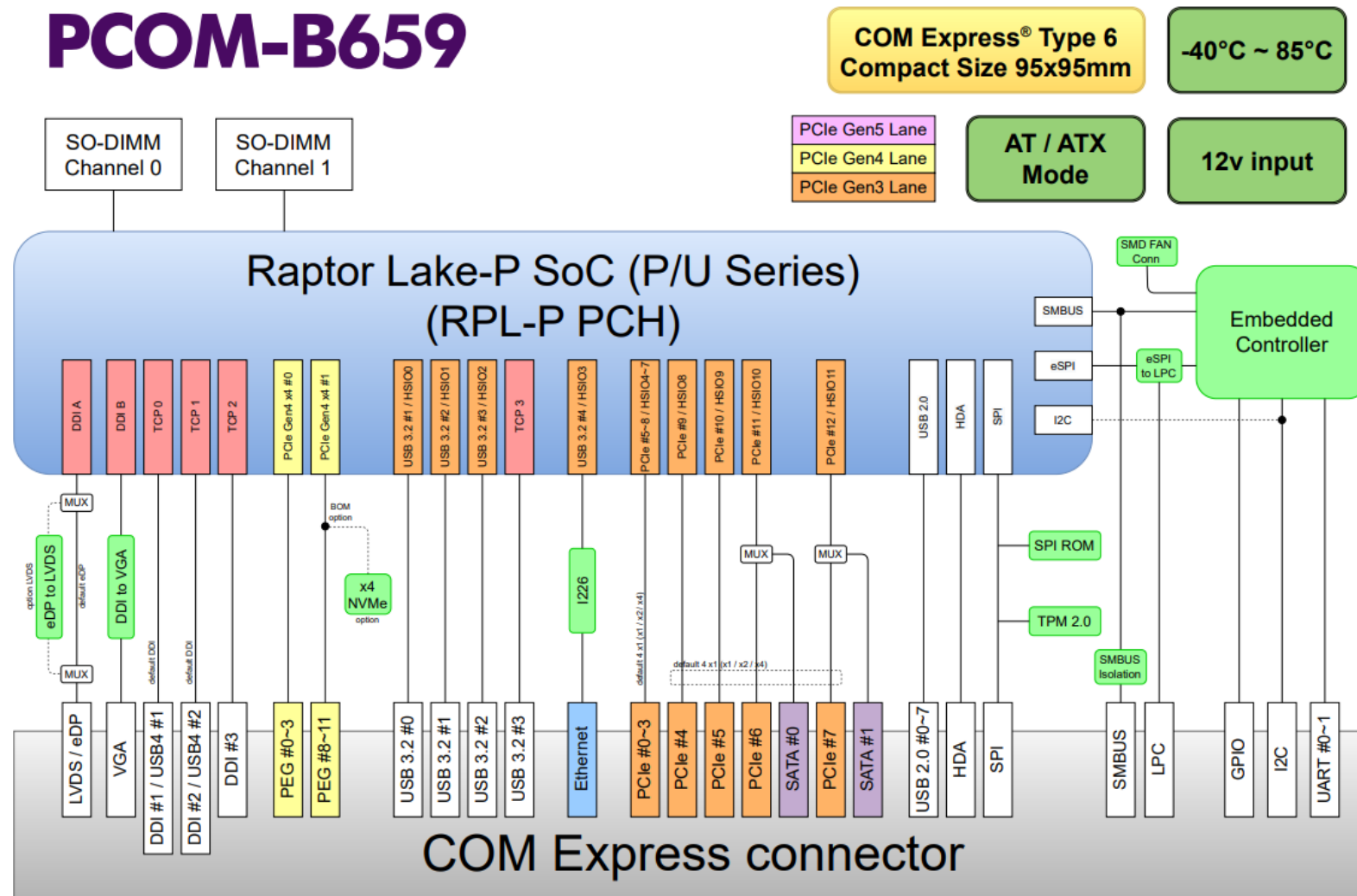


Figure 1 Block Diagram

3 Specifications

Product	➤ PCOM-B659
Form Factor	➤ COM Express® Type 6, Compact Size (95 X 95mm)
Processor	<ul style="list-style-type: none">➤ Intel® Core™ i7-1370PE➤ Intel® Core™ i5-1340PE➤ Intel® Core™ i3-1320PE➤ Intel® Core™ i7-1365UE➤ Intel® Core™ i5-1335UE➤ Intel® Core™ i3-1315UE➤ Intel® Processor U300E➤ Intel® Core™ i7-1370PRE➤ Intel® Core™ i5-1350PRE➤ Intel® Core™ i3-1320PRE➤ Intel® Core™ i7-1365URE➤ Intel® Core™ i5-1345URE➤ Intel® Core™ i3-1315URE
BIOS	➤ AMI BIOS
Memory	<ul style="list-style-type: none">➤ 2x non-ECC DDR5 SO-DIMM➤ Up to 96GB 5200MT/s
Graphic	➤ Intel® Iris® Xe Graphics eligible
Display (4 independent displays simultaneously)	<ul style="list-style-type: none">➤ 3x DDI➤ 1x eDP / 1x LVDS (switchable)➤ 1x VGA

Ethernet	➤ 1x 2.5 GbE (via Intel® i226 series) Share signal with PCIe #5 lane
Audio	➤ HDA
PCI Express	➤ PEG 2x Gen4 x4 (All series) ➤ 8x PCIe 3.0 (1 lane share with LAN, 2 lanes share with SATA)
I/O	➤ 4x USB 3.2 Gen2 ➤ 8x USB 2.0 ➤ 2x SATA ➤ 8 bit GPIO (default 4 in / 4 out) ➤ I2C / SMBus ➤ 2x UART
Hardware Monitors	➤ ITE series Embedded Controller, Voltage, Fan and Temperature
Security	➤ TPM 2.0
Power Management	➤ ACPI
Environment	➤ Operating Temperature Standard: 0 °C ~ 60 °C Extended: -40 °C ~ 85 °C (Selected industrial SKU) ➤ Storage Temperature -40 °C ~ 85°C ➤ Relative Humidity 5% ~ 95%

Table 3 PCOM-B659 SPEC

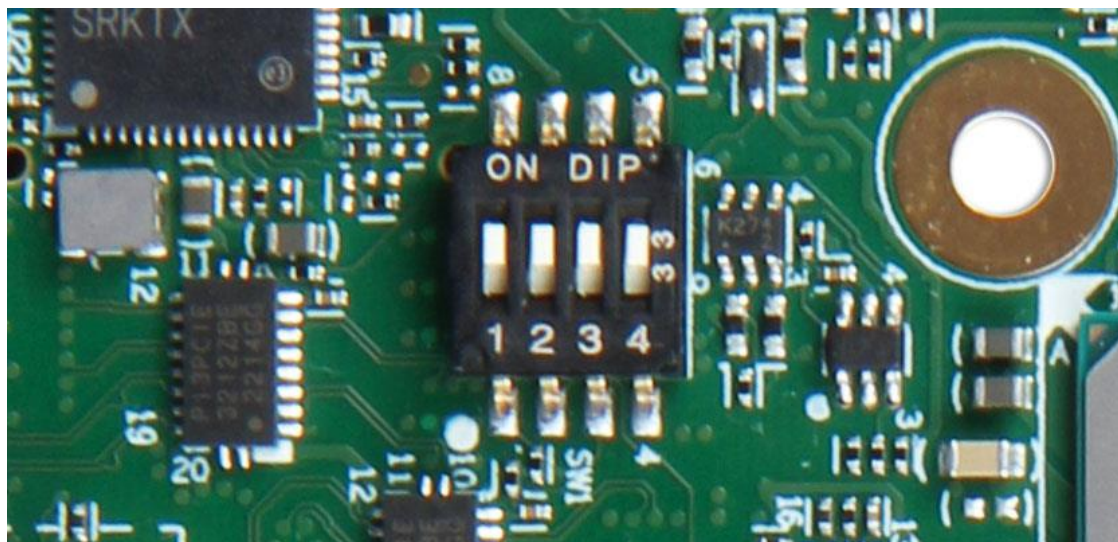
3.1 Function switching

An onboard physical switch is used for the following function switching.

- R0 Revision → support eDP / LVDS switching, onboard LAN / PCIe #5 switching, and 2x SATA / PCIe #6 #7 switching
- R1 Revision → support eDP / LVDS and 2x SATA / PCIe #6 #7 switching, support onboard LAN + PCIe #5 simultaneously

SW1	Option	SW1	Option
1 - ON	eDP	3 - ON	SATA1
1 - OFF	LVDS	3 - OFF	PCIe #7
2 - ON	LAN (R0 only)	4 - ON	SATA0
2 - OFF	PCIe #5 (R0 only)	4 - OFF	PCIe #6

SW1	Option	SW1	Option
1 - ON	eDP	3 - ON	SATA1
1 - OFF	LVDS	3 - OFF	PCIe #7
2 - ON	NA (R1 later)	4 - ON	SATA0
2 - OFF	NA (R1 later)	4 - OFF	PCIe #6



3.2 Supported Operating Systems

The PCOM-B659 supports the following operating systems.

Vendor	Operating System	Supported
Microsoft	Windows 10 IoT Enterprise RS5 LTSC	
	Windows 11	
Linux	Linux LTS kernel v5.4.x & v5.10.x	
	Ubuntu 22.04	

Table 4 OS Support list

Note. Portwell does not endorse/validate/support any specific Linux distribution or entity mentioned on this list.

Note. Portwell recommends customers to work with Linux vendors/open source communities to find feature list and support model.

3.3 Windows OS Driver

Please download the drivers from Portwell download center website.

<https://download.portwell.tw/pcom-b659>

3.4 Electrical Characteristics

Input voltage	+12V $\pm$ 5%
RTC Battery	From Carrier
Power on mode	ATX Mode & AT Mode

Table 5 Electrical characteristics

Power Distribution

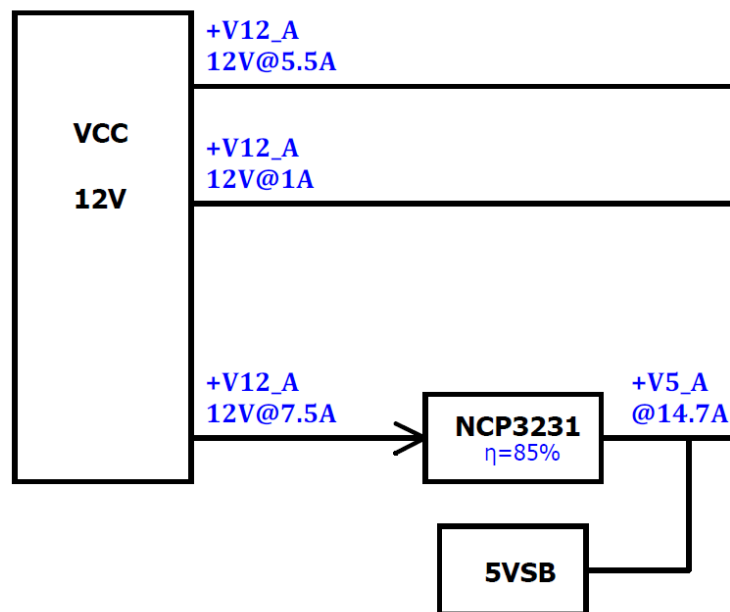


Figure 2 PCOM-B659 Power on sequence

- ATX Power Sequence

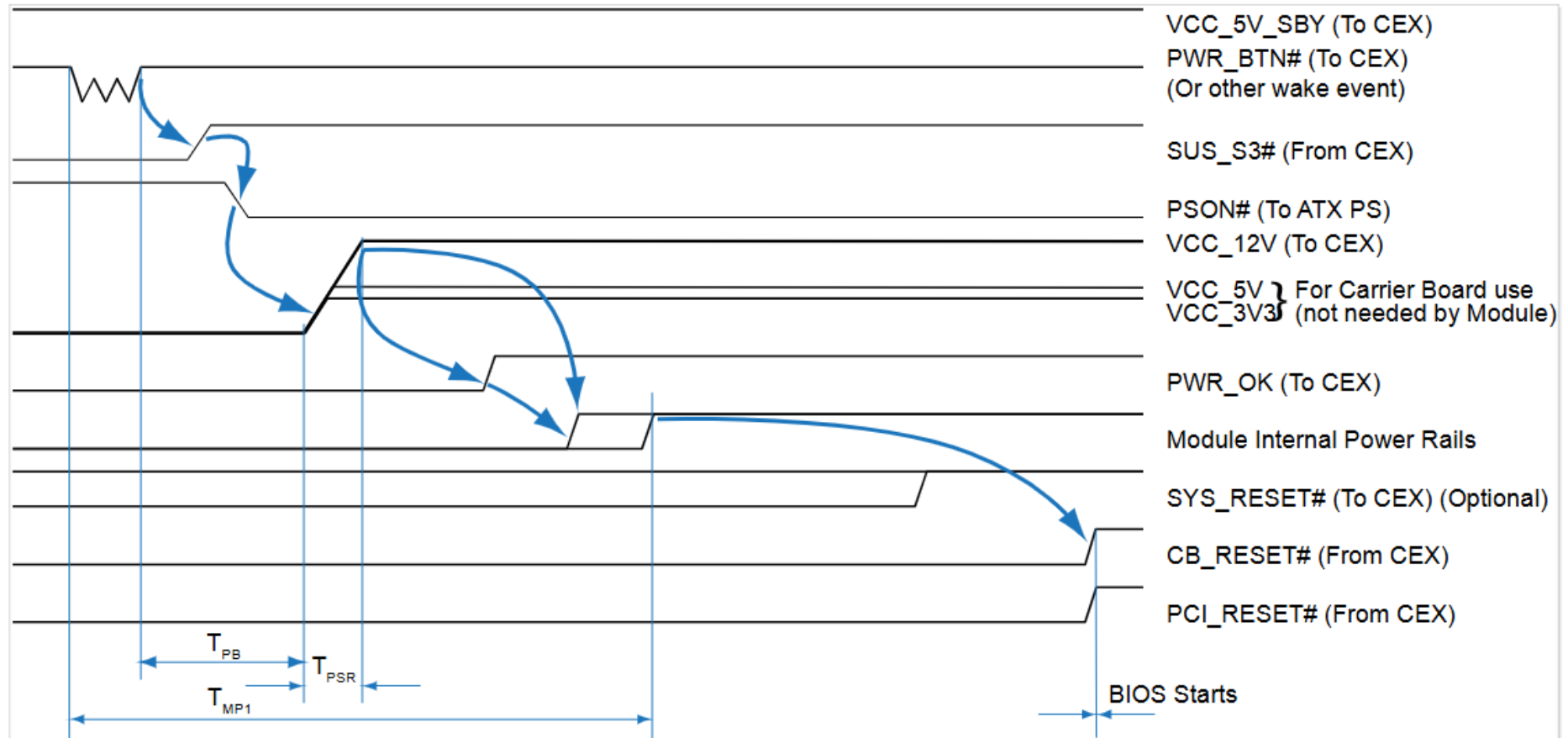


Figure 3 ATX style boot
(Reference from COM Express® Carrier Design Guide)

- AT Power Sequence

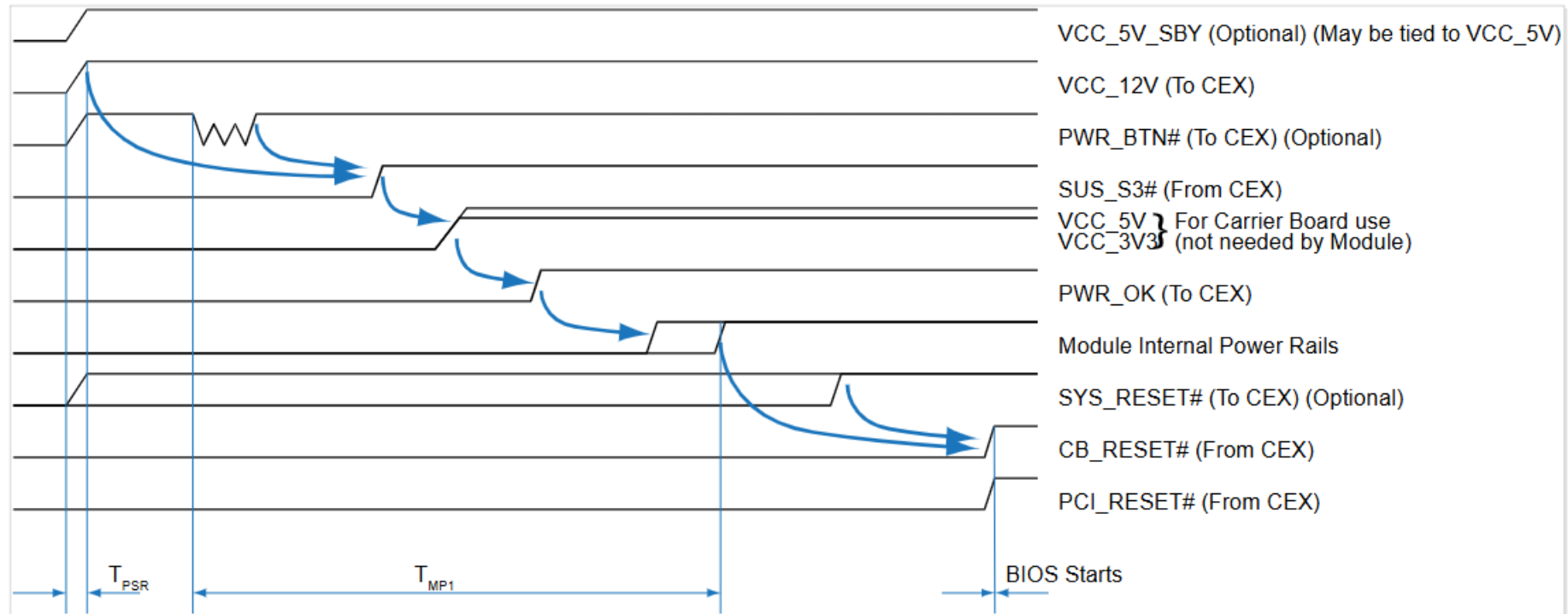


Figure 4 AT style boot
(Reference from COM Express® Carrier Design Guide)

- PWR_OK signal

Carrier board hardware must keep this signal low until all power rails and clocks are stable. Releasing PWR_OK too early or not driving it low at all may cause boot up abnormal symptom. It is a good design implementation to delay the PWR_OK signal a little (at least 100ms) after all carrier board power rails are up, to ensure a stable system.

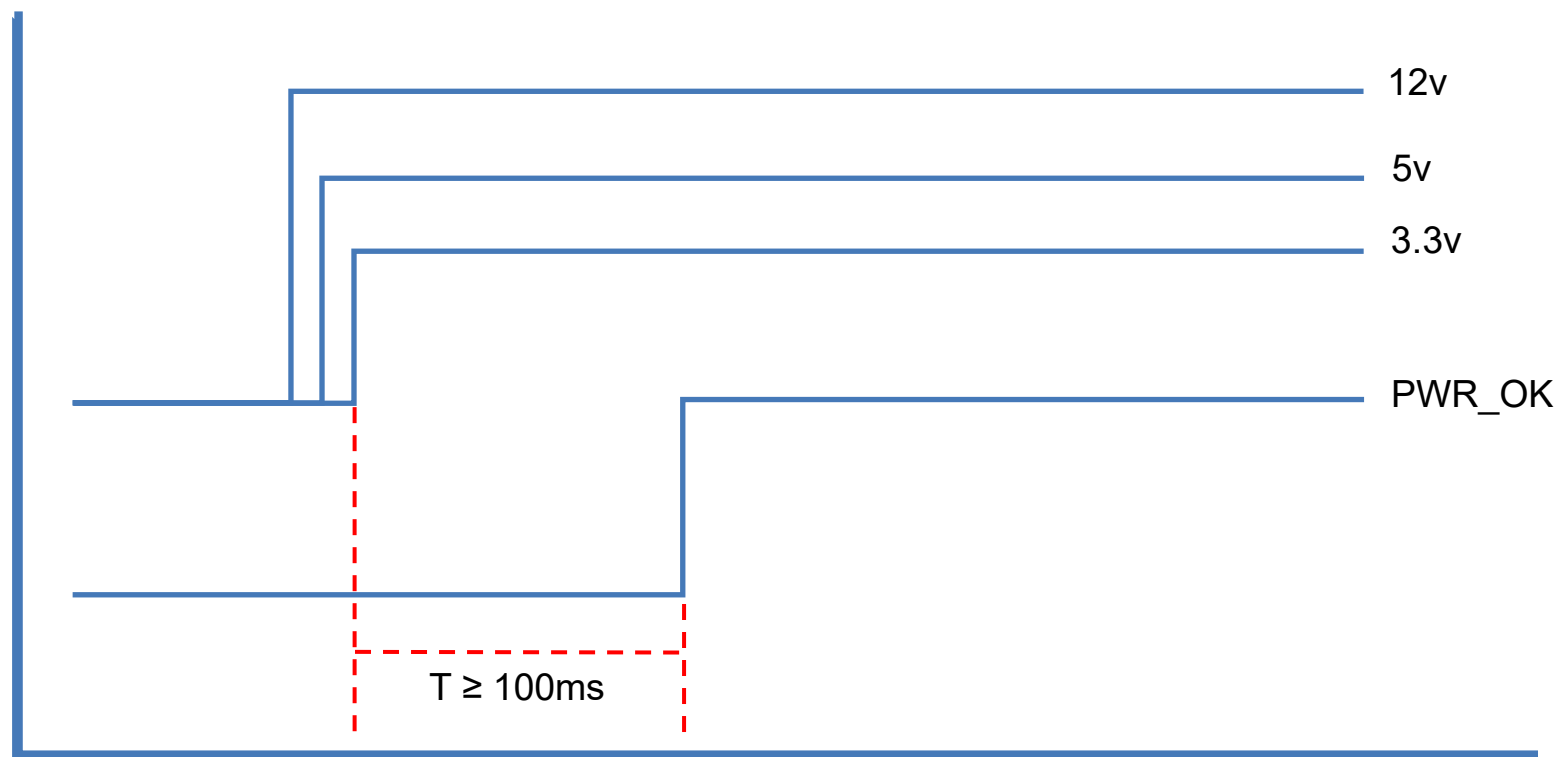


Figure 5 PWR_OK signal brief diagram

3.5 Power Consumption

The power consumption values were measured with the following condition:

- ATX power supply
- PCOM-B659 module
- PCOM-C60B carrier (modified module 12v input)
- PCOM-B659 standard cooler
- Windows 11 23H2

The power consumption values were recorded during the following methods:

- S0 Idle: 12v current, boot into Windows desktop and idle for 5 min
- 100% Workload with turbo: The average 12v current during 100% workload
- Peak Current: The maximum 12v current during the beginning of turbo mode running
- S3: 5v standby current, wait 5 min later after system into sleeping status
- S5: 5v standby current, wait 5 min later after system into shutdown status

Note. Power consumption results are measured at Portwell laboratory and are for reference only

- P / U Series Embedded SKU

Series	PCOM-B659						
Ordering P/N	AB1-3R62	AB1-3S45	AB1-3S46	AB1-3S47	AB1-3S55	AB1-3S54	AB1-3S12
Processor	i7-1370PE	i5-1340PE	i3-1320PE	i7-1365UE	i5-1335UE	i3-1315UE	U300E
Cores / Threads	6P+8E / 20	4P+8E / 16	4P+4E / 12	2P+8E / 12	2P+8E / 12	2P+4E / 8	1P+4E / 6
TDP	28W	28W	28W	15W	15W	15W	15W
<u>Power Consumption</u>							
S0 Idle	TBD	TBD	TBD	TBD	TBD	TBD	TBD
100% Workload with turbo mode	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Peak Current	TBD	TBD	TBD	TBD	TBD	TBD	TBD
S3	TBD	TBD	TBD	TBD	TBD	TBD	TBD
S5	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Table 6 PCOM-B659 Power Consumption (Embedded SKU)

- P / U Series Industrial SKU

Series	PCOM-B659					
Ordering P/N	AB1-3S53	AB1-3S52	AB1-3S51	AB1-3S50	AB1-3S49	AB1-3S48
Processor	i7-1370PRE	i5-1350PRE	i3-1320PRE	i7-1365URE	i5-1345URE	i3-1315URE
Cores / Threads	6P+8E / 20	4P+8E / 16	4P+4E / 12	2P+8E / 12	2P+8E / 12	2P+4E / 8
TDP	28W	28W	28W	15W	15W	15W
S0 Idle	TBD	TBD	TBD	TBD	TBD	TBD
100% Workload with turbo mode	TBD	TBD	TBD	TBD	TBD	TBD
Peak Current	TBD	TBD	TBD	TBD	TBD	TBD
S3	TBD	TBD	TBD	TBD	TBD	TBD
S5	TBD	TBD	TBD	TBD	TBD	TBD

Table 7 PCOM-B659 Power Consumption (Industrial SKU)

3.6 Mechanical Dimensions

- Top Side Dimension

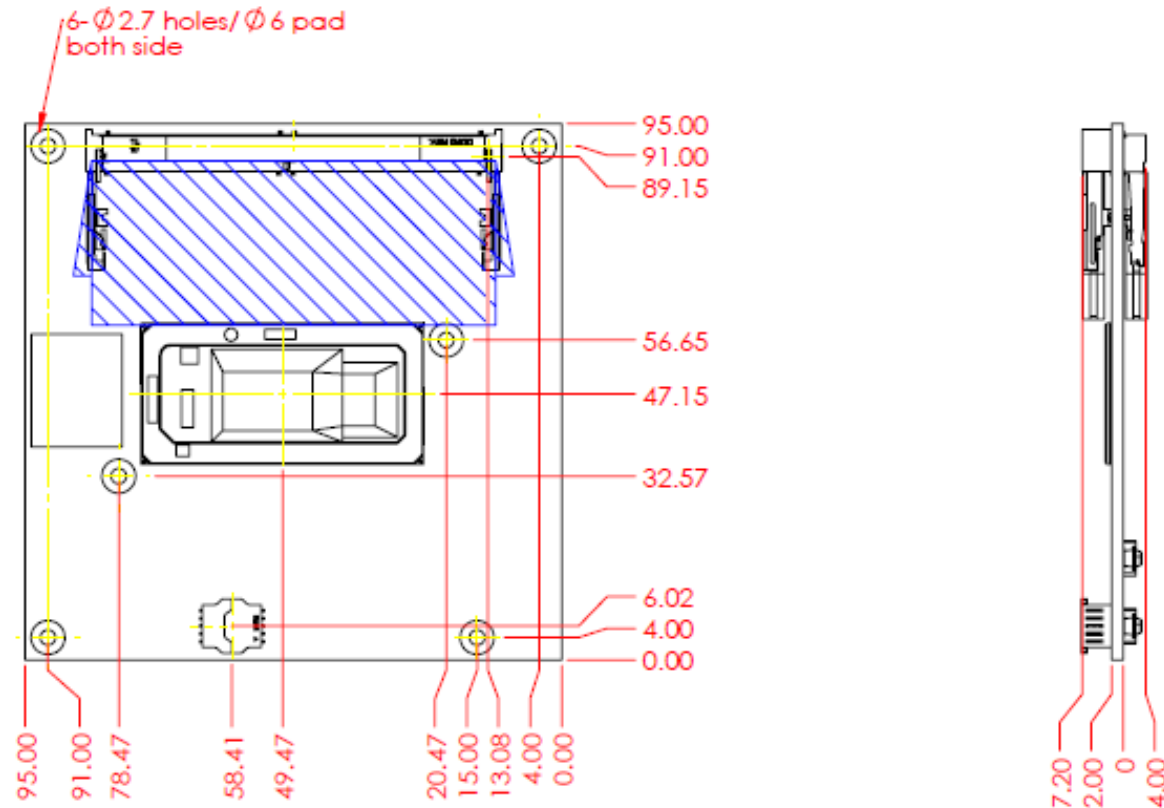


Figure 6 Mechanical Dimension - Top

- Bottom Side Dimension

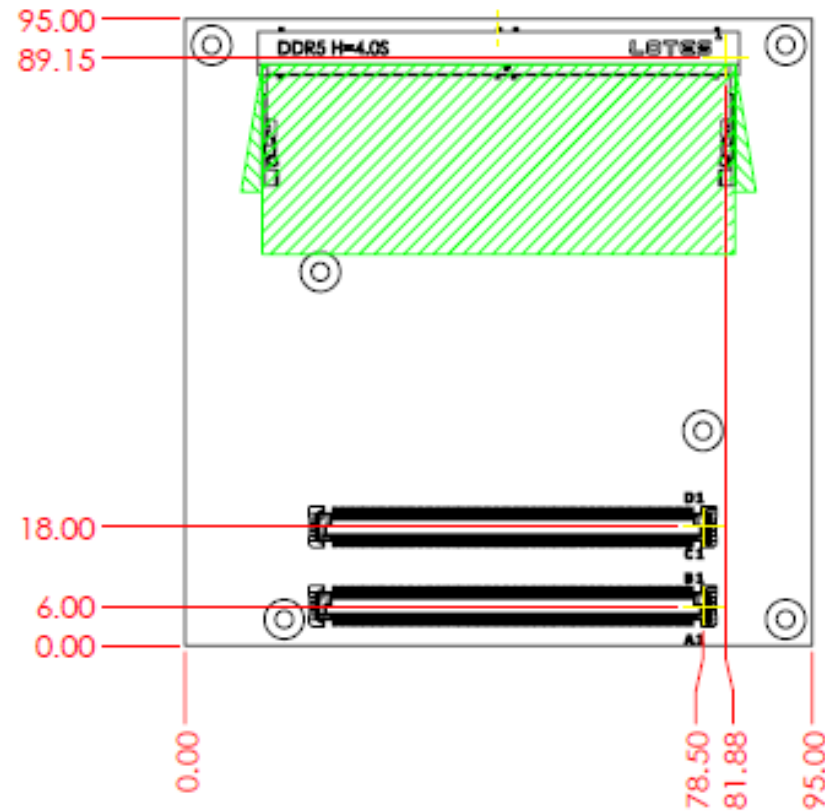


Figure 7 Mechanical Dimension - Bottom

3.7 Environmental Specifications

Storage Temperature	-40°C ~ 85°C
Operation Temperature	Standard: 0°C ~ 60°C Extended: -40°C ~ 85°C (Selected industrial SKU)
Storage Humidity	0% ~ 95%
Operation Humidity	0% ~ 95%

Table 8 Environmental Specifications

3.8 Ordering Guide

♦ Module (Embedded SKU)

Product	Ordering P/N
PCOM-B659-1370PE	AB1-3R62
PCOM-B659-1340PE	AB1-3S45
PCOM-B659-1320PE	AB1-3S46
PCOM-B659-1365UE	AB1-3S47
PCOM-B659-1335UE	AB1-3S55
PCOM-B659-1315UE	AB1-3S54
PCOM-B659-U300E	AB1-3S12

Table 9 Ordering Guide - PCOM-B659 (Embedded SKU)

♦ Module (Industrial SKU)

Product	Ordering P/N
PCOM-B659-1370PRE	AB1-3S53
PCOM-B659-1350PRE	AB1-3S52
PCOM-B659-1320PRE	AB1-3S51
PCOM-B659-1365URE	AB1-3S50
PCOM-B659-1345URE	AB1-3S49
PCOM-B659-1315URE	AB1-3S48

Table 10 Ordering Guide - PCOM-B659 (Industrial SKU)

♦ **Accessory**

Accessory	Ordering P/N	Remark
Cooler (copper elastic pad)	B9972210	Available
Cooler (aluminum)	B9972240	Available
Heat Sink (copper elastic pad)	B830C220	Available
Heat Sink (aluminum)	B830C210	Available
Heat Spreader (Heatpipe)	B830C190	Available
Heat Spreader (aluminum)	B830C200	Available
Carrier (Mini-ITX) PCOM-C605R	AB1-3P78	Available
Evaluation Carrier (ATX) PCOM-C60B	AB1-3G22	Available
FAN Cable	B786Z150	Available*

Table 11 Ordering Guide - Accessory

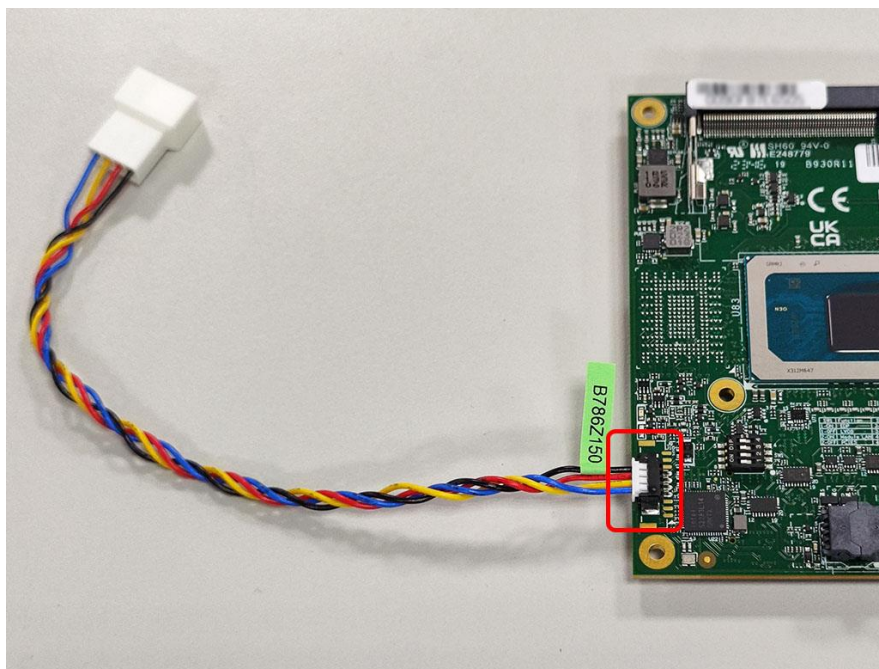
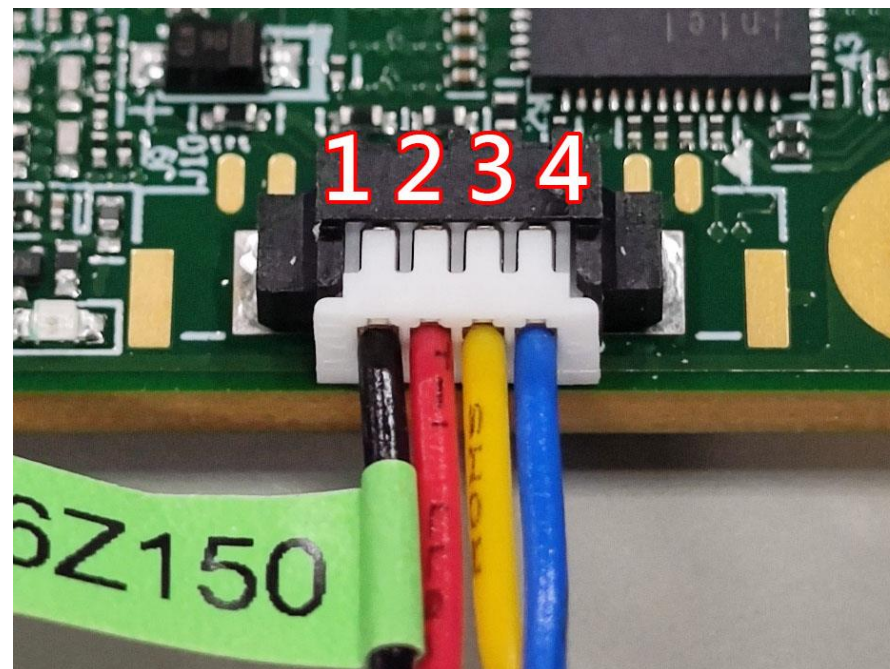
Note. FAN Cable already bundled in the standard module package.

♦ FAN Cable Instructions

PCOM-B659 provides signals for a primary (onboard) and secondary (carrier) FAN, here is the picture indicate the location of onboard FAN connector.

This FAN cable transforms the 4 pin standard FAN connector to a SMD type onboard connector.

J10	FAN
1	GND
2	+12V
3	FAN_TACHIN
4	FAN_PWMOUT



4 Thermal Solution

● Cooler Dimension

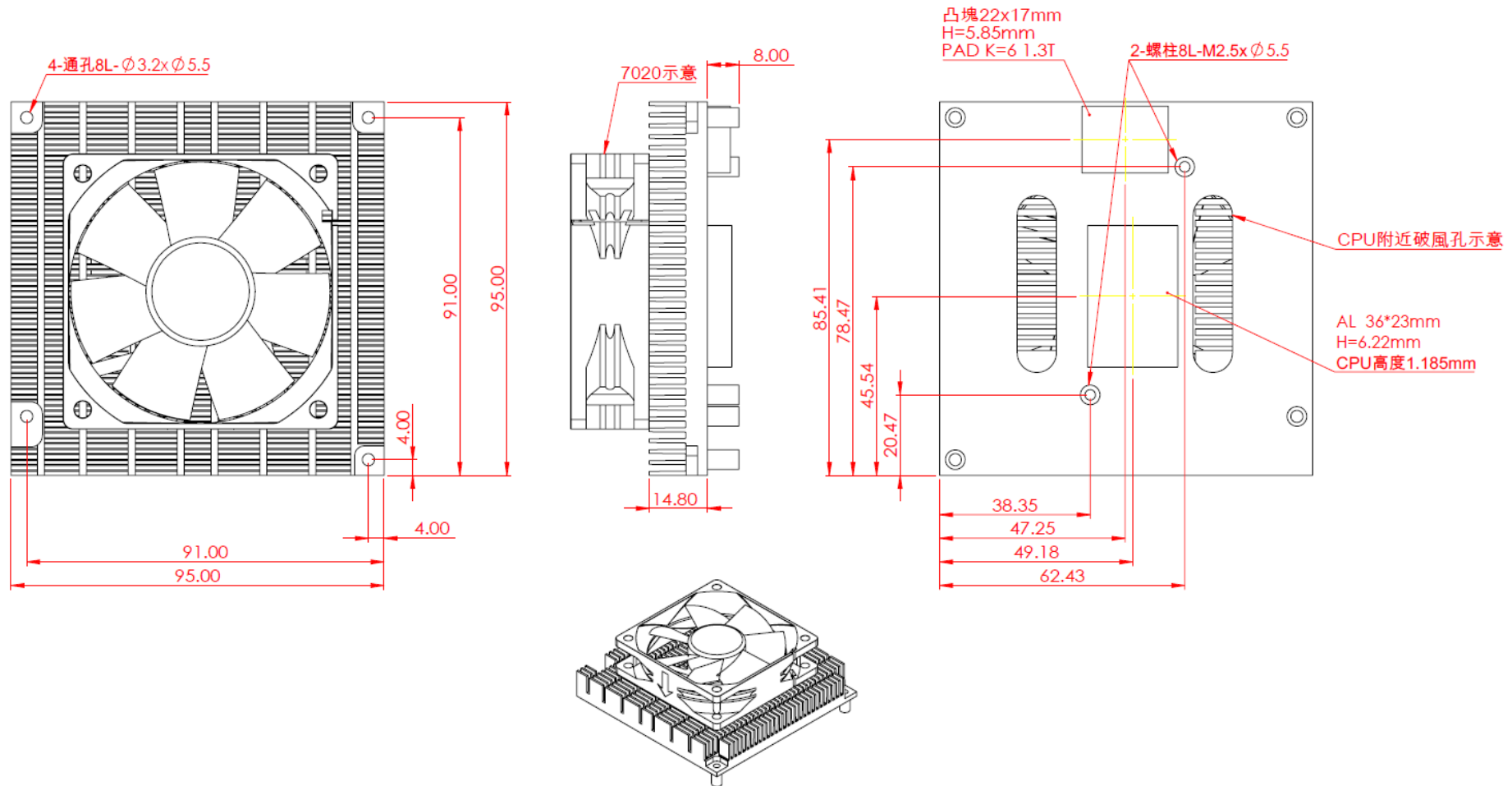


Figure 8 Cooler mechanical dimension

- Heatsink Dimension

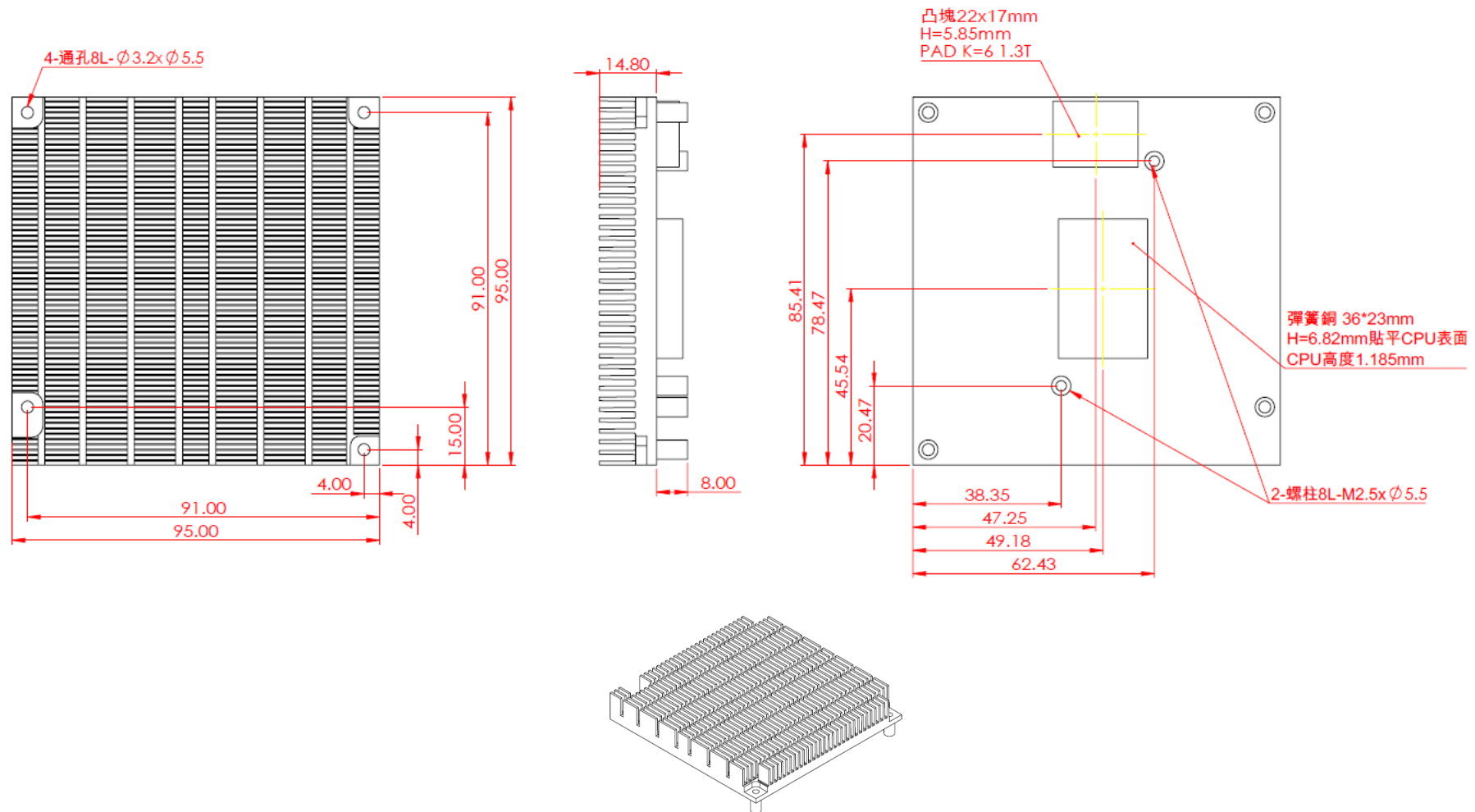


Figure 9 Heatsink mechanical dimension

- Heatspreader Dimension

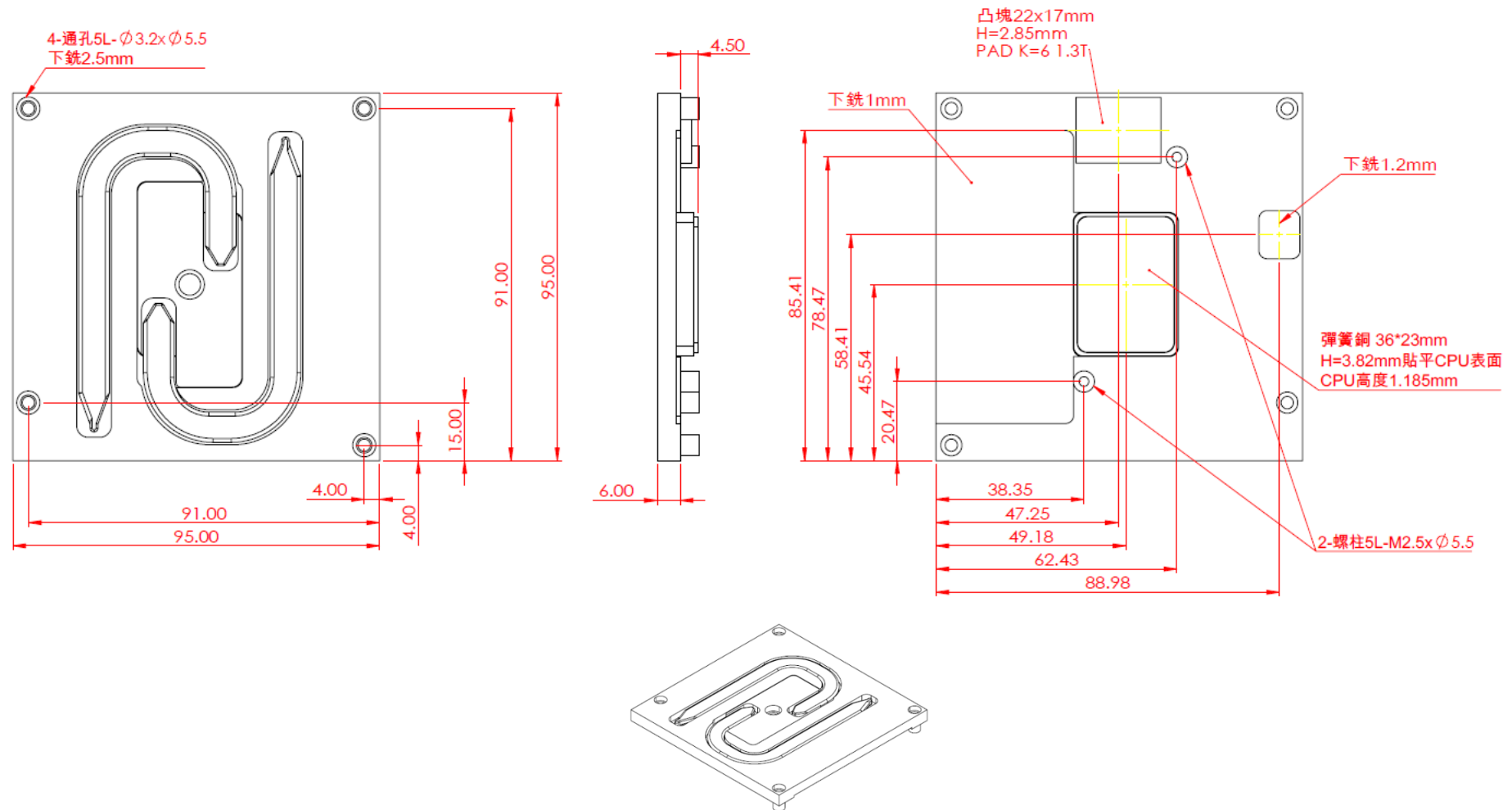


Figure 10 Heatspreader mechanical dimension

4.1 Onboard SSD cooling

The B659 heatsink is equipped with metal protrusions for conducting heat from the onboard SSD, along with a 1.3mm thick thermal pad. If the B659 used does not have an onboard SSD, there is no need to remove the cover film on the thermal pad.

For systems employing passive cooling solutions without fan assistance, it's important to note that the CPU heat source may potentially affect the onboard SSD. If high SSD temperatures result in performance degradation, it is recommended to remove the SSD thermal pad from the metal protrusions on the heatsink.

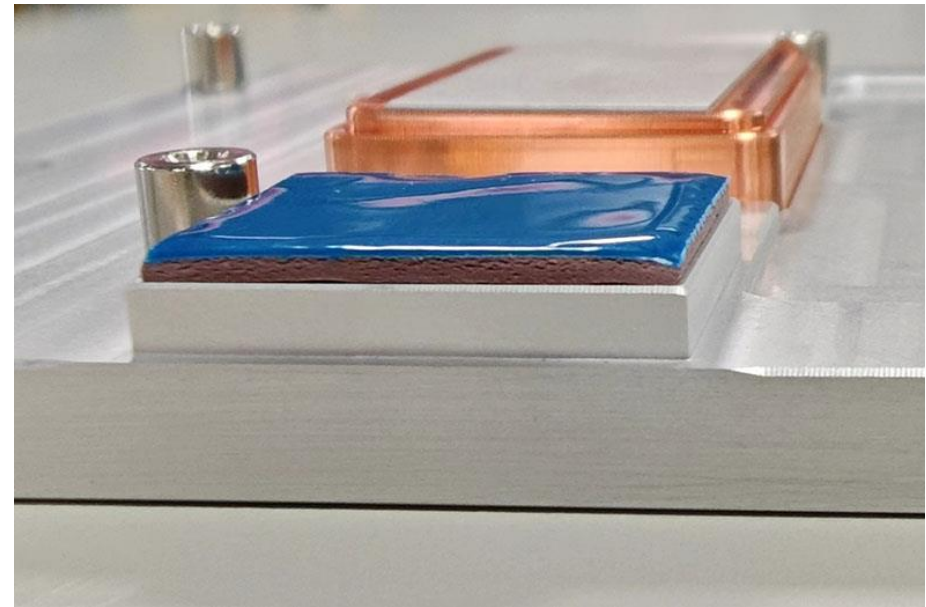


Figure 11 Onboard SSD thermal pad

5 Pin out Tables

Pin	Row A	Pin	Row B	Pin	Row C	Pin	Row D
A1	GND	B1	GND	C1	GND	D1	GND
A2	LAN_MDI3N	B2	LAN_LED_LNK_ACT_N	C2	GND	D2	GND
A3	LAN_MDI3P	B3	LFRAME#_CB	C3	USB3_RN1	D3	USB3_TN1
A4	LAN_LED_1000_N	B4	LAD0	C4	USB3_RP1	D4	USB3_TP1
A5	LAN_LED_2500_N	B5	LAD1	C5	GND	D5	GND
A6	LAN_MDI2N	B6	LAD2	C6	USB3_RN2	D6	USB3_TN2
A7	LAN_MDI2P	B7	LAD3	C7	USB3_RP2	D7	USB3_TP2
A8	LAN_LED_LINK_N	B8	NC	C8	GND	D8	GND
A9	LAN_MDI1N	B9	NC	C9	USB3_RN3	D9	USB3_TN3
A10	LAN_MDI1P	B10	PCICLK	C10	USB3_RP3	D10	USB3_TP3
A11	GND	B11	GND	C11	GND	D11	GND
A12	LAN_MDI0N	B12	PWRBTN#_D	C12	USB3_RN4	D12	USB3_TN4
A13	LAN_MDI0P	B13	SMB_CLK	C13	USB3_RP4	D13	USB3_TP4
A14	NC	B14	SMB_DATA	C14	GND	D14	GND
A15	KBC_SLP_S3#	B15	COME_SMB_ALERT#_R	C15	TBT_LSX0_TXD	D15	DDI1_CTRLCLK_AUX_P
A16	SATA_TXP0	B16	SATA_TXP1	C16	TBT_LSX0_RXD	D16	DDI1_CTRLDATA_AUX_N
A17	SATA_TXN0	B17	SATA_TXN1	C17	TC_RETIMER_FORCE_PWR	D17	USB4_PD_I2C_ALERT#
A18	KBC_SLP_S4#	B18	ICH_SUS_STAT_N	C18	GND	D18	PMC_ALERT_N
A19	SATA_RXP0	B19	SATA_RXP1	C19	PCIE_RXP6	D19	PCIE_TXP6
A20	SATA_RXN0	B20	SATA_RXN1	C20	PCIE_RXN6-	D20	PCIE_TXN6
A21	GND	B21	GND	C21	GND	D21	GND

A22	NC	B22	NC	C22	PCIE_RXP7	D22	PCIE_TXP7
A23	NC	B23	NC	C23	PCIE_RXN7	D23	PCIE_TXN7
A24	KBC_SLP_S5#	B24	CB_PWROK	C24	DDI1_HPD	D24	GND
A25	NC	B25	NC	C25	SML0CLK	D25	GND
A26	NC	B26	NC	C26	SML0DATA	D26	DDI1_PAIR0_P
A27	BATLOW#	B27	WDTO	C27	SML1CLK	D27	DDI1_PAIR0_N
A28	SATA_LED#	B28	HDA_SDI2_CN	C28	SML1DATA	D28	GND
A29	PCH_HDA_SYNC	B29	HDA_SDI1_CN	C29	USB4_PD_I2C_CLK	D29	DDI1_PAIR1_P
A30	PCH_HDA_RST#	B30	PCH_HDA_SDI0	C30	USB4_PD_I2C_DAT	D30	DDI1_PAIR1_N
A31	GND	B31	GND	C31	GND	D31	GND
A32	PCH_HDA_BIT_CLK	B32	SPKR	C32	DDI2_CTRLCLK_AUX_P	D32	DDI1_PAIR2_P
A33	PCH_HDA_SDO	B33	I2C_CLK	C33	DDI2_CTRLDATA_AUX_N	D33	DDI1_PAIR2_N
A34	BIOS_DIS0#	B34	I2C_DAT	C34	DDI2_AUX_SEL	D34	DDI1_AUX_SEL
A35	THERMTRIP#_3V_C	B35	CB_OVT#	C35	TBT_LSX1_TXD	D35	TBT_LSX1_RXD
A36	USB_PN6	B36	USB_PN7	C36	DDI3_CTRLCLK_AUX_P	D36	DDI1_PAIR3_P
A37	USB_PP6	B37	USB_PP7	C37	DDI3_CTRLDATA_AUX_N	D37	DDI1_PAIR3_N
A38	USB2_OC3	B38	USB_OC2	C38	DDI3_AUX_SEL	D38	GND
A39	USB_PN4	B39	USB_PN5	C39	DDI3_PAIR0_P	D39	DDI2_PAIR0_P
A40	USB_PP4	B40	USB_PP5	C40	DDI3_PAIR0_N	D40	DDI2_PAIR0_N
A41	GND	B41	GND	C41	GND	D41	GND
A42	USB_PN2	B42	USB_PN3	C42	DDI3_PAIR1_P	D42	DDI2_PAIR1_P
A43	USB_PP2	B43	USB_PP3	C43	DDI3_PAIR1_N	D43	DDI2_PAIR1_N
A44	USB_OC23	B44	USB2_OC0	C44	DDI3_HPD	D44	DDI2_HPD
A45	USB_PN0	B45	USB_PN1	C45	NC	D45	GND
A46	USB_PP0	B46	USB_PP1	C46	DDI3_PAIR2_P	D46	DDI2_PAIR2_P
A47	VCC3P3_RTC	B47	CB_ESPI_EN#	C47	DDI3_PAIR2_N	D47	DDI2_PAIR2_N

A48	RSMRST_OUT#	B48	USB0_HOST_PRSENT	C48	NC	D48	GND
A49	LAN_SDP0	B49	RSTBTN#	C49	DDI3_PAIR3_P	D49	DDI2_PAIR3_P
A50	SERIRQ	B50	CB_PLTRST#	C50	DDI3_PAIR3_N	D50	DDI2_PAIR3_N
A51	GND	B51	GND	C51	GND	D51	GND
A52	PCIE_TXP5	B52	PCIE_RXP5	C52	PEG0_RX_DP	D52	PEG0_TX_DP
A53	PCIE_TXN5	B53	PCIE_RXN5	C53	PEG0_RX_DN	D53	PEG0_TX_DN
A54	GPI0	B54	GPO1	C54	TYPE0	D54	PEG_LAN__R_RV#
A55	PCIE_TXP4	B55	PCIE_RXP4	C55	PEG1_RX_DP	D55	PEG1_TX_DP
A56	PCIE_TXN4	B56	PCIE_RXN4	C56	PEG1_RX_DN	D56	PEG1_TX_DN
A57	GND	B57	GPO2	C57	TYPE1	D57	TYPE2
A58	PCIE_TXP3	B58	PCIE_RXP3	C58	PEG2_RX_DP	D58	PEG2_TX_DP
A59	PCIE_TXN3	B59	PCIE_RXN3	C59	PEG2_RX_DN	D59	PEG2_TX_DN
A60	GND	B60	GND	C60	GND	D60	GND
A61	PCIE_TXP2	B61	PCIE_RXP2	C61	PEG3_RX_DP	D61	PEG3_TX_DP
A62	PCIE_TXN2	B62	PCIE_RXN2	C62	PEG3_RX_DN	D62	PEG3_TX_DN
A63	GPI1	B63	GPO3	C63	GND	D63	GND
A64	PCIE_TXP1	B64	PCIE_RXP1	C64	GND	D64	GND
A65	PCIE_TXN1	B65	PCIE_RXN1	C65	NC	D65	NC
A66	GND	B66	PCIE_WAKE#	C66	NC	D66	NC
A67	GPI2	B67	WAKE1#_R	C67	RAPID_SHUT	D67	GND
A68	PCIE_TXP0	B68	PCIE_RXP0	C68	NC	D68	NC
A69	PCIE_TXN0	B69	PCIE_RXN0	C69	NC	D69	NC
A70	GND	B70	GND	C70	GND	D70	GND
A71	LVDS0_EDP2_P	B71	LVDS0_CHB_TXP0	C71	NC	D71	NC
A72	LVDS0_EDP2_N	B72	LVDS0_CHB_TXN0	C72	NC	D72	NC
A73	LVDS1_EDP1_P	B73	LVDS0_CHB_TXP1	C73	GND	D73	GND

A74	LVDS1_EDP1_N	B74	LVDS0_CHB_TXN1	C74	NC	D74	NC
A75	LVDS2_EDP0_P	B75	LVDS0_CHB_TXP2	C75	NC	D75	NC
A76	LVDS2_EDP0_N	B76	LVDS0_CHB_TXN2	C76	GND	D76	GND
A77	LVDS/EDP_VDDEN	B77	LVDS0_CHB_TXP3	C77	GND	D77	GND
A78	LVDS0_CHA_TXP3	B78	LVDS0_CHB_TXN3	C78	PEG8_RX_DP_CONN	D78	PEG8_TX_DP_CONN
A79	LVDS0_CHA_TXN3	B79	LVDS/EDP_BKLT_EN	C79	PEG8_RX_DN_CONN	D79	PEG8_TX_DN_CONN
A80	GND	B80	GND	C80	GND	D80	GND
A81	LVDSCK_DP3_P	B81	LVDS0_CHB_CLKP	C81	PEG9_RX_DP_CONN	D81	PEG9_TX_DP_CONN
A82	LVDSCK_DP3_N	B82	LVDS0_CHB_CLKN	C82	PEG9_RX_DN_CONN	D82	PEG9_TX_DN_CONN
A83	LVSDCK_EDPAUX_P	B83	LVDS/EDP_BKLTCTRL	C83	GND	D83	GND
A84	LVSDDA_EDPAUX_N	B84	5VSB	C84	GND	D84	GND
A85	GPI3	B85	5VSB	C85	PEG10_RX_DP_CONN	D85	PEG10_TX_DP_CONN
A86	NC	B86	5VSB	C86	PEG10_RX_DN_CONN	D86	PEG10_TX_DN_CONN
A87	EDP_HPD	B87	5VSB	C87	GND	D87	GND
A88	PCIE_CLK_REF+	B88	BIOS_DIS1#	C88	PEG11_RX_DP_CONN	D88	PEG11_TX_DP_CONN
A89	PCIE_CLK_REF-	B89	VGA_R	C89	PEG11_RX_DN_CONN	D89	PEG11_TX_DN_CONN
A90	GND	B90	GND	C90	GND	D90	GND
A91	SPI_POWER	B91	VGA_G	C91	NC	D91	NC
A92	SPIO_MISO_R	B92	VGA_B	C92	NC	D92	NC
A93	GPO0	B93	VGA_HSY	C93	GND	D93	GND
A94	SPI0_CLK_R	B94	VGA_VSY	C94	NC	D94	NC
A95	SPIO_MOSI_R	B95	VGA_SCL	C95	NC	D95	NC
A96	TPM_PP	B96	VGA_SDA	C96	GND	D96	GND
A97	TYPE10#	B97	CB_FSPI_CS0#_R	C97	GND	D97	GND
A98	SER0_TX	B98	NC	C98	NC	D98	NC
A99	SER0_RX	B99	NC	C99	NC	D99	NC

A100	GND	B100	GND	C100	GND	D100	GND
A101	SER1_TX	B101	FAN_PWMOUT_R	C101	NC	D101	NC
A102	SER1_RX	B102	FAN_TACHIN_R	C102	NC	D102	NC
A103	LID#_R	B103	SLEEP#	C103	GND	D103	GND
A104	VCC_12V	B104	VCC_12V	C104	VCC_12V	D104	VCC_12V
A105	VCC_12V	B105	VCC_12V	C105	VCC_12V	D105	VCC_12V
A106	VCC_12V	B106	VCC_12V	C106	VCC_12V	D106	VCC_12V
A107	VCC_12V	B107	VCC_12V	C107	VCC_12V	D107	VCC_12V
A108	VCC_12V	B108	VCC_12V	C108	VCC_12V	D108	VCC_12V
A109	VCC_12V	B109	VCC_12V	C109	VCC_12V	D109	VCC_12V
A110	GND	B110	GND	C110	GND	D110	GND

Table 12 Pin out description

6 System Resources

LPC

Device	I/O Address	Note
Embedded Controller	0x6E / 0x6F	EC Address
	0x62 / 0x66	EC ACPI CMD Port
	0x200 / 0x201	EC BRAM Port for I2C function
	0x300~0x3FF	EC LPC IO Space
	0x3F8~0x3FF	EC UART1
	0x3E8~0x3EF	EC UART2
Carrier SIO	N/A	

SMBUS

SMBUS Address	Information
0x44	SMBus ARP
0x6C	PCIe Clock Buffer
0x10 / 0x12 / 0x16 / 0x48	Reserved

Table 13 System Resources

7 BIOS Setup Items

7.1 Introduction

The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

7.2 BIOS Setup

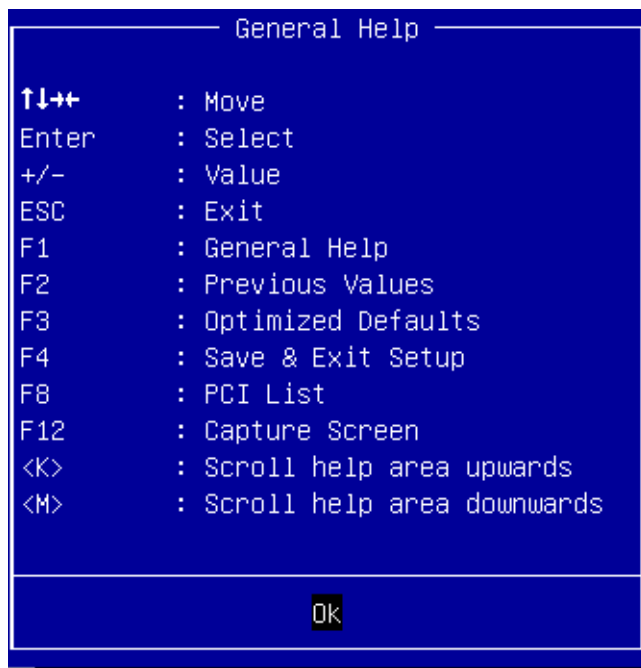
Power on the computer and the system will start POST (Power on Self Test) process. When the message below appears on the screen, press <Delete> or <ESC> key will enter BIOS setup screen.

Press <ESC > or <Delete> to enter SETUP

If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

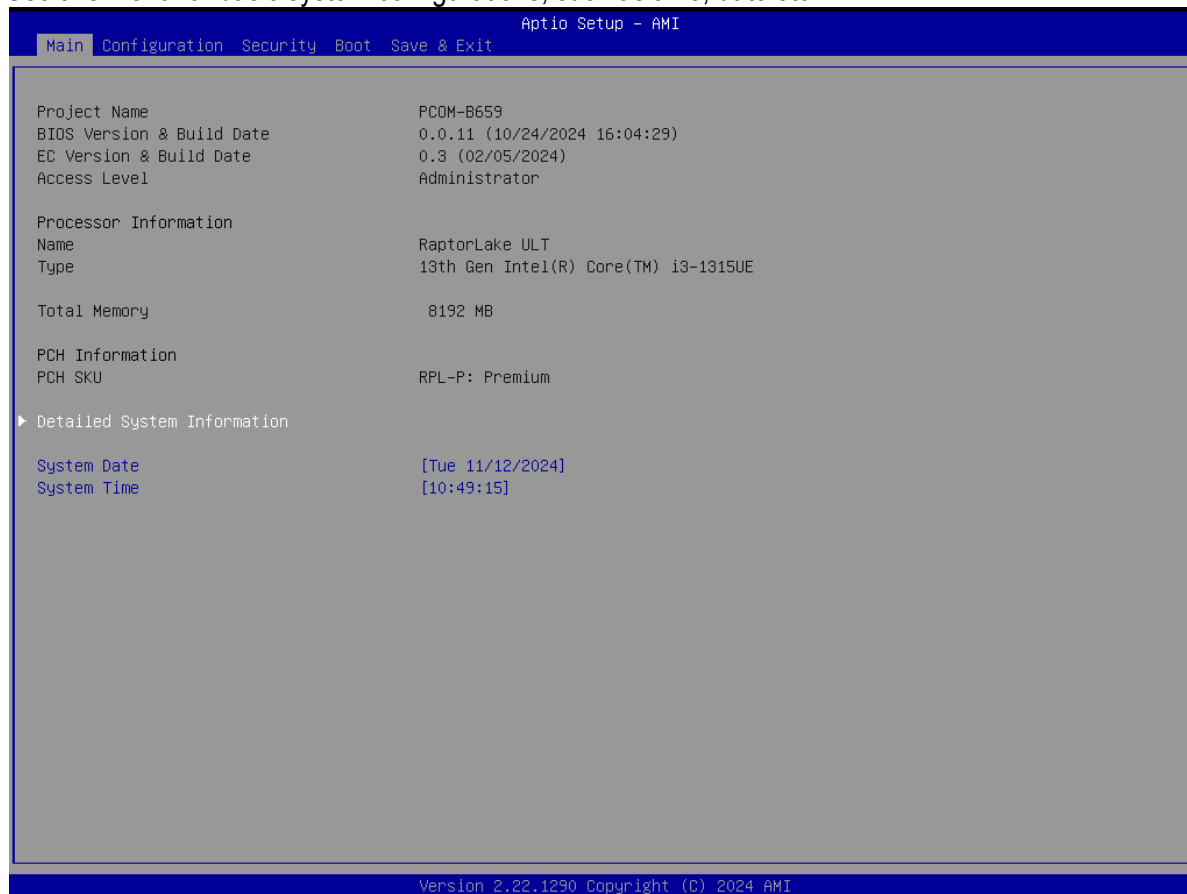
Press <F1> to Run General Help or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help Screen.

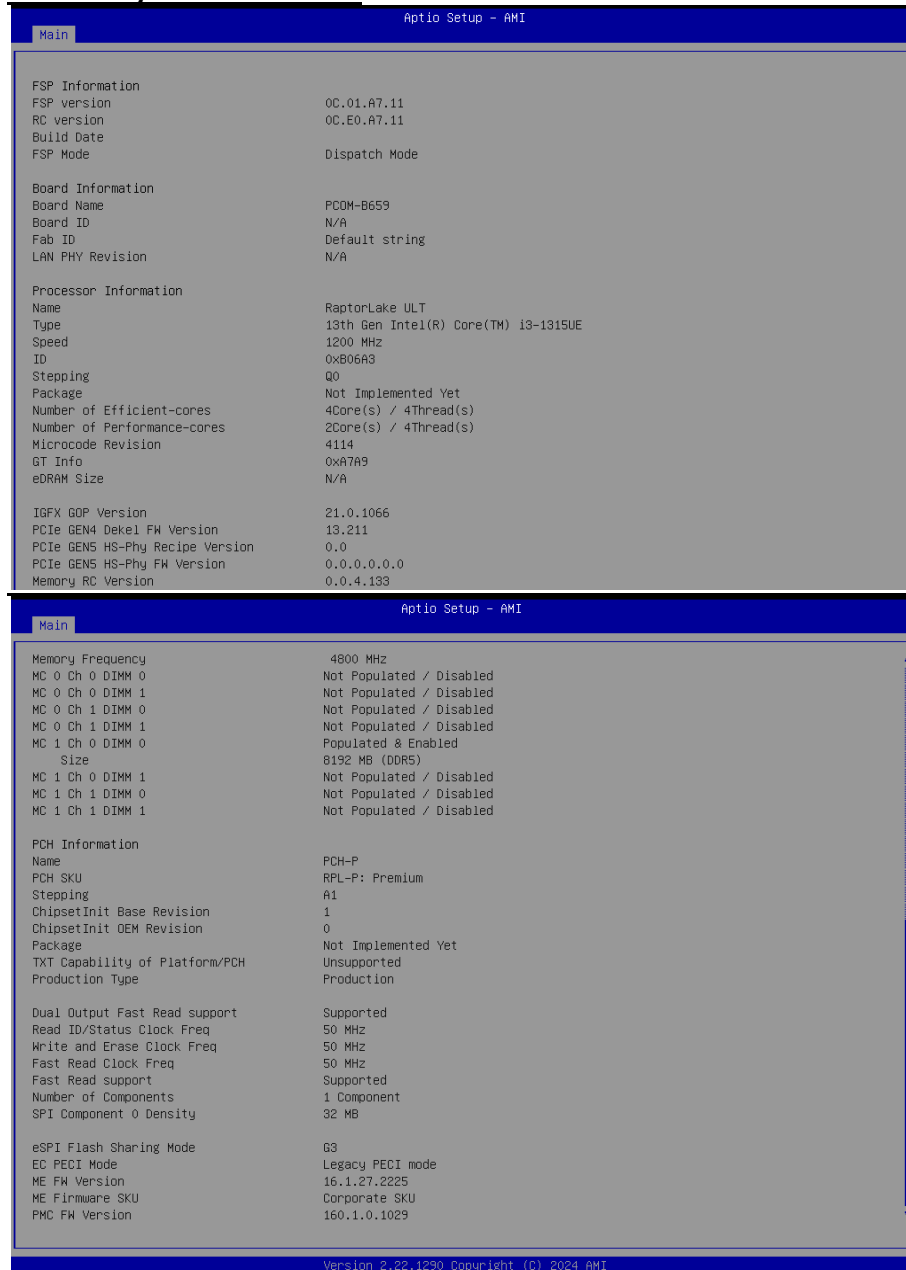


7.2.1 Main

Use this menu for basic system configurations, such as time, date etc.

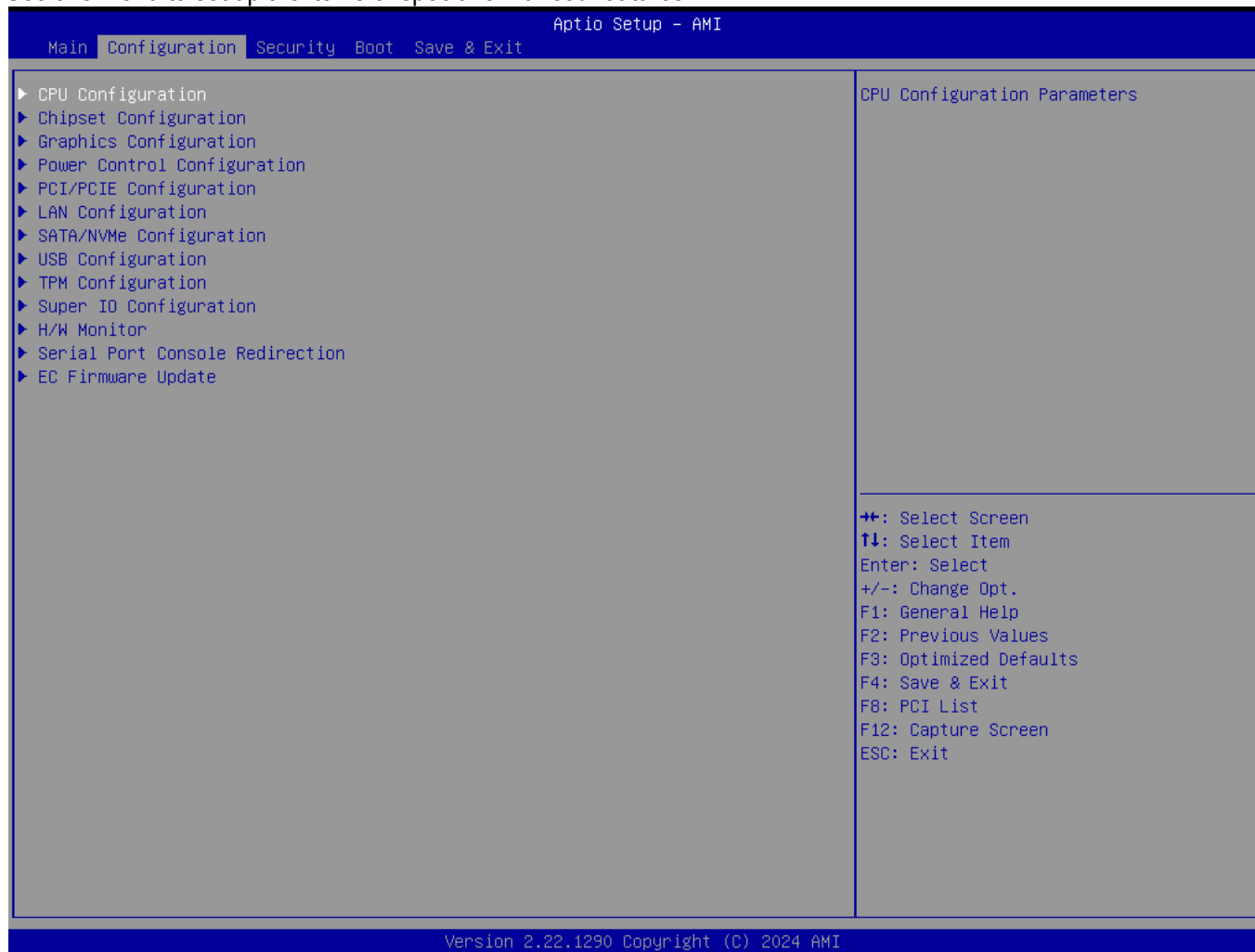


Feature	Description	Options
System Date	The date format is <Day>, <Month> <Date> <Year>. Use [+] or [-] to configure system Date.	
System Time	The time format is <Hour> <Minute> <Second>. Use [+] or [-] to configure system Time.	

Detailed System Information

7.2.2 Configuration

Use this menu to set up the items of special enhanced features



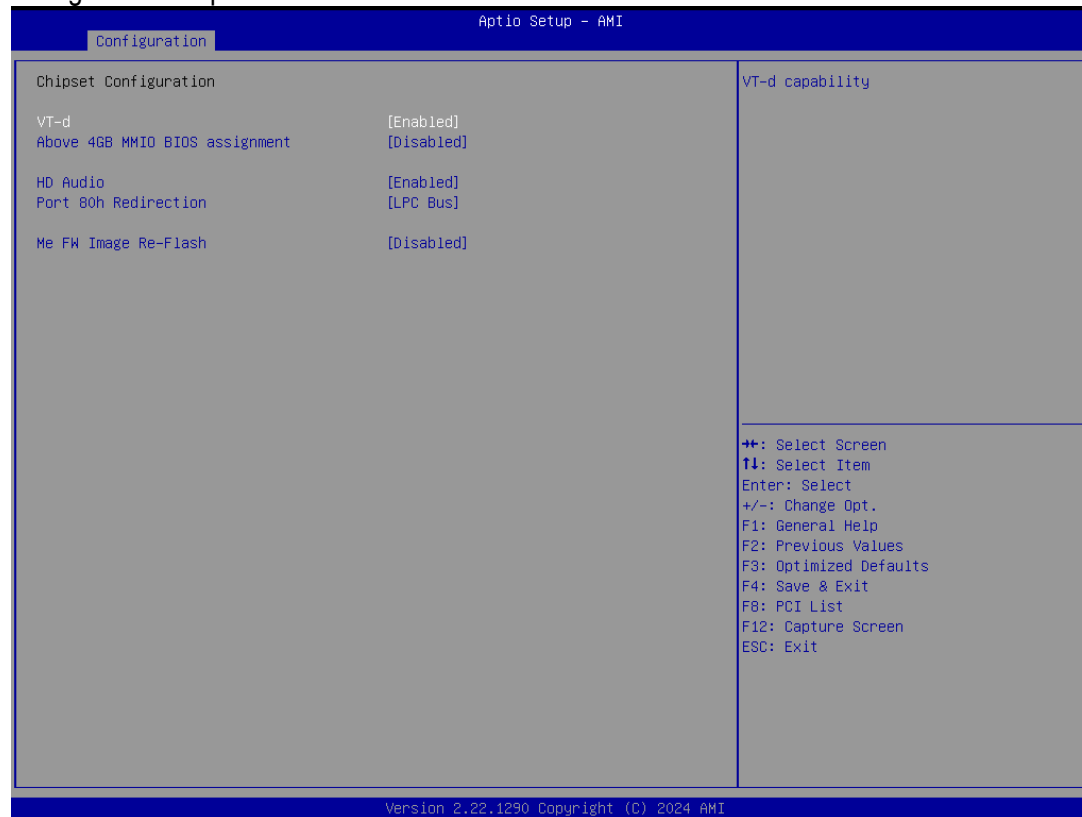
CPU Configuration

CPU Configuration Parameters

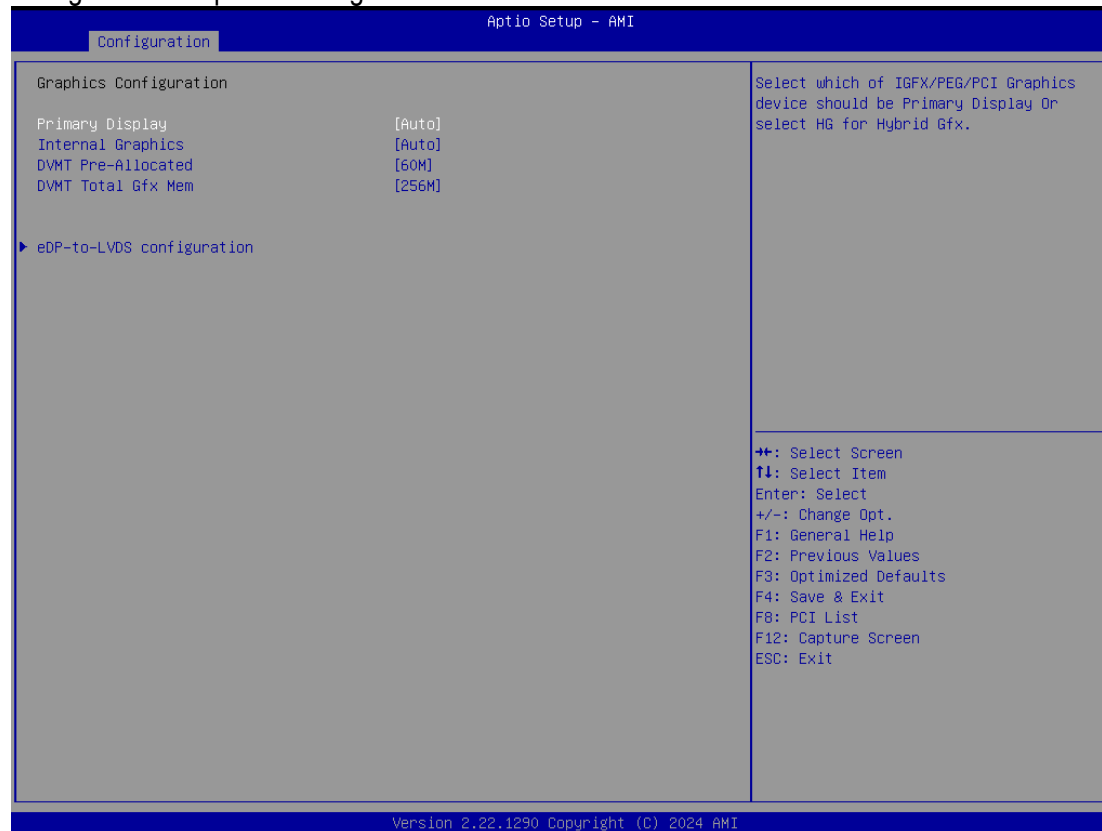
Aptio Setup - AMI		
Configuration		
CPU Configuration		Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.
Type	13th Gen Intel(R) Core(TM) i3-1315UE	
ID	0XB06A3	
Speed	1200 MHz	
L1 Data Cache	48 KB x 2	
L1 Instruction Cache	32 KB x 2	
L2 Cache	1280 KB x 2	
L3 Cache	10 MB	
VMX	Supported	
SMX/TXT	Not Supported	
Active Performance-cores	[All]	
Active Efficient-cores	[All]	
Hyper-Threading	[Enabled]	
Boot performance mode	[Turbo Performance]	
Intel (VMX) Virtualization Technology	[Enabled]	
Intel(R) SpeedStep(tm)	[Enabled]	
Intel(R) Speed Shift Technology	[Enabled]	
Turbo Mode	[Enabled]	
C states	[Enabled]	
Enhanced C-states	[Enabled]	
C-State Auto Demotion	[C1]	
C-State Un-demotion	[C1]	
Package C-State Demotion	[Enabled]	
Package C-State Un-demotion	[Enabled]	
CState Pre-Wake	[Enabled]	
IO MWAIT Redirection	[Disabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit

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Feature	Description	Options
Active Performance-cores	Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.	★All, 1
Active Efficient-cores	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores	★All, 3, 2, 1, 0
Hyper-Threading	Enabled or Disabled Hyper-Threading Technology.	Disabled, ★Enabled
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector	Max Battery, Max Non-Turbo Performance ★Turbo Performance
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vander pool Technology.	Disabled, ★Enabled
Intel® Speed Step™	Allows more than two frequency ranges to be supported.	Disabled, ★Enabled
Intel® Speed Shift Technology	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states	Disabled, ★Enabled
Turbo Mode	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.	Disabled, ★Enabled
C states	Enable/Disable CPU Power Management. Allows CPU to go to C states when It's not 100% utilized	Disabled, ★Enabled
Enhanced C-States	Enable/disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.	Disabled, ★Enabled
C-State Auto Demotion	Configure C-State Auto Demotion	Disable, ★C1
C-State Un-demotion	Configure C-State Un-demotion	Disable, ★C1
Package C State Demotion	Package C-State Demotion	Disabled, ★Enabled
Package C State Un-demotion	Package C-State Un-demotion	Disabled, ★Enabled
CState Pre-Wake	Disable – Sets bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the Cstate Pre-Wake	Disabled, ★Enabled
IO MWAIT Redirection	When set, will map IO_read instructions sent to IO registers PMG_IO_BASE_ADDRBASE+offset to MWAIT(offset)	★Disabled, Enabled

Chipset Configuration**Configuration Chipset feature**

Feature	Description	Options
VT-d	VT-d Capability	Disabled, ★Enabled
Above 4GB MMIO BIOS assignment	Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB	Enabled, ★Disabled
HD Audio	Control Detection of the HD-Audio device. Disabled= HAD will be unconditionally disabled Enabled= HAD will be unconditionally enabled.	Disabled, ★Enabled
Port 80h Redirection	Control where the Port 80h cycles are sent	★LPC Bus, PCIE Bus
Me FW Image Re-Flash	Enable/Disable Me FW Image Re-Flash function	★Disabled, Enabled

Graphics Configuration**Configuration Graphics Settings**

Feature	Description	Options
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.	★Auto, IGFX, PEG Slot, PCH PCI
Internal Graphics	Keep IGFX enable based on the setup options.	★Auto, Disable, Enable
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.	32M,64M,96M,128M,160M,12M,16M,20M,24M,28M,32M/F7,36M,40M,44M,48M,52M,56M,★60M
DVMT Total Gfx Mem	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device	128M,★256M, MAX

eDP-to-LVDS configuration

eDP-to-LVDS(PTN3460)



Feature	Description	Options
Panel Profile	Select Panel Profile for current use.	640x480,800x480,800x600,★1024x768,1280x800 1280x1024,1366x768,1440x900,1920x1080,OEM Profile
Color depth and data format	Select Color depth and data format	★VESA 24 bpp, JEIDA 24 bpp ,VESA and JEIDA 18 bpp
Channel Mode	Select LVDS Channel Mode	Dual Channel,★Single Channel
Clock Mode	Select clock output for LVDS.	★Even Bus, Odd Bus, Both Buses

OEM Profile**PANEL 1 Configuration**

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Configuration

PANEL 1 Configuration

Profile Name :	empty	
Rename Profile		
Color depth and data format	[VESA and JEIDA 18 bpp]	
Channel Mode	[Single Channel]	
Clock Mode	[Even Bus]	
Pixel Clock	0.000 Mhz	2500
H Active Pixels	0	640
H Blank Pixels	0	160
H Offset Pixels	0	16
H Width Pixels	0	96
V Active Lines	0	480
V Blank Lines	0	45
V Offset Lines	0	10
V Width Lines	0	2
H & V sync Signal Polarity	[Postive]	

⇐+: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit

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Feature	Description	Options
Color depth and data format	Select Color depth and data format	VESA 24 bpp, JEIDA 24 bpp, ★VESA and JEIDA 18 bpp
Channel Mode	Select LVDS Channel Mode	★Single Channel, Dual Channel
Clock Mode	Select clock output for LVDS.	★Even Bus, Odd Bus, Both Buses
Pixel Clock	Pixel Clock(10Khz)	★2500
H Active Pixels	H Active Pixels (Pixel)	★640
H Blank Pixels	H Blank Pixels (Pixel)	★160
H Offset Pixels	H Offset Pixels (Pixel)	★16
H Width Pixels	H Width Pixels (Pixel)	★96
V Active Lines	V Active Lines (Line)	★480
V Blank Lines	V Blank Lines (Line)	★45
V Offset Lines	V Offset Lines (Line)	★10
V Width Lines	V Width Lines (Line)	★2
H&V sync Signal Polarity	Flag: 0x1E Signal Polarity is Postive 0x18 Signal Polarity is Non-Postive	★Postive, Non-Postive

Power Control Configuration**System Power Control Configuration Parameters**

Aptio Setup - AMI

Configuration

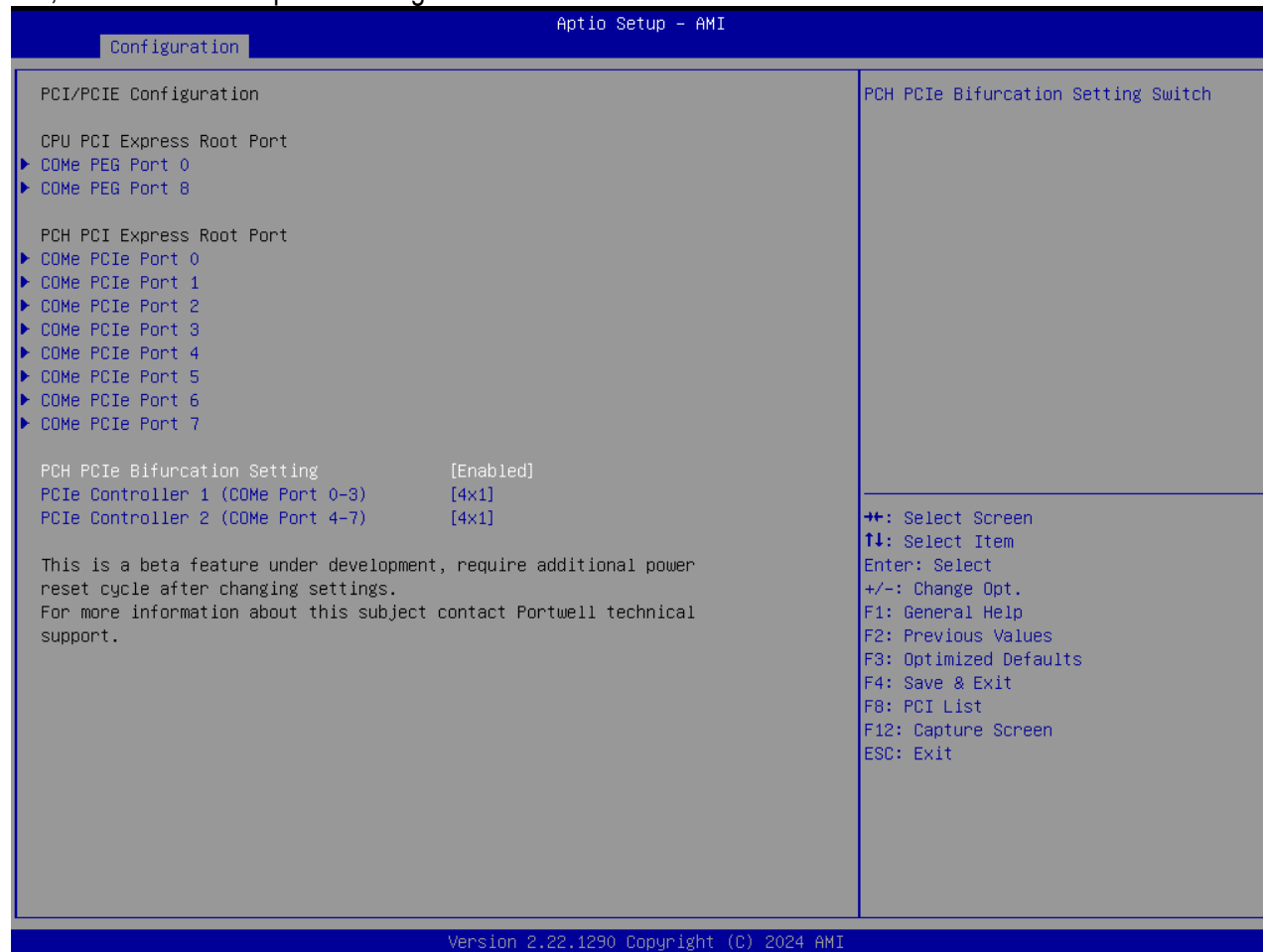
Power Control Configuration

Enable Hibernation	[Enabled]	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	[S3 (Suspend to RAM)]	
Restore AC Power Loss	[Power Off]	

++: Select Screen
 ↑↓: Select Item
 Enter: Select
 +/-: Change Opt.
 F1: General Help
 F2: Previous Values
 F3: Optimized Defaults
 F4: Save & Exit
 F8: PCI List
 F12: Capture Screen
 ESC: Exit

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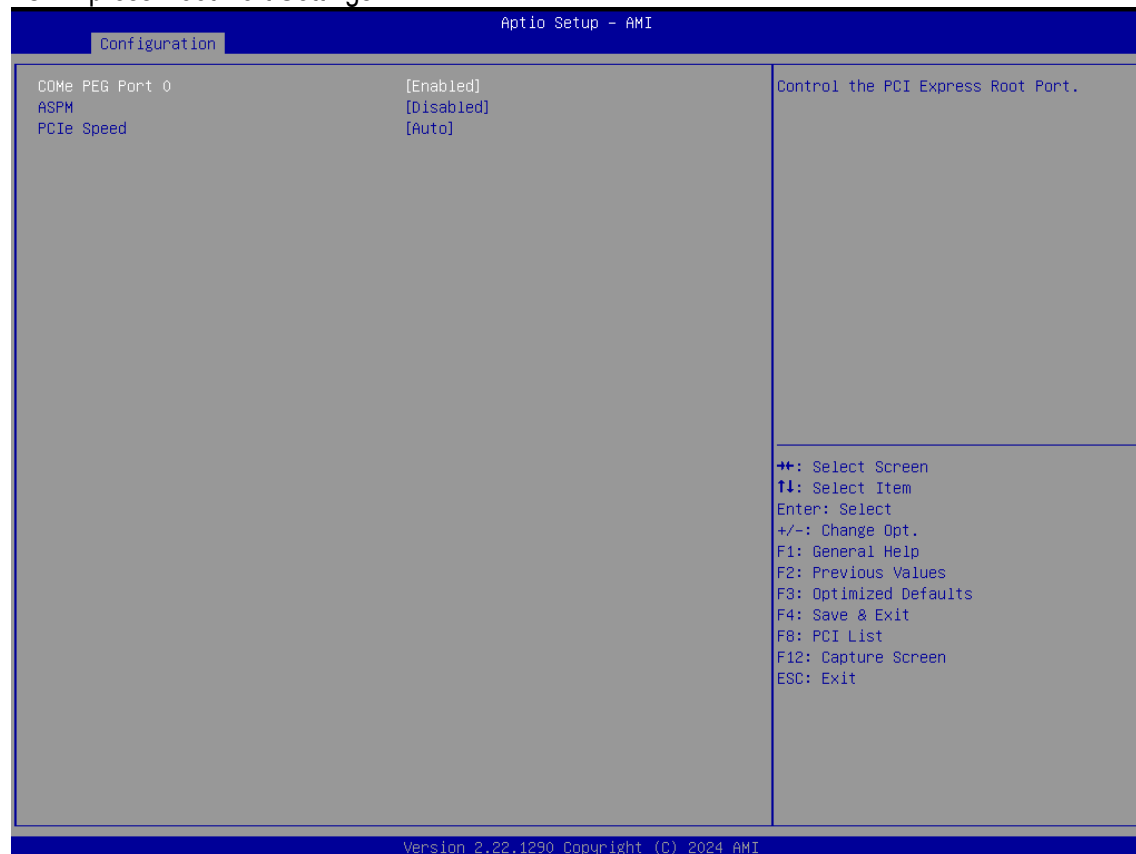
Feature	Description	Options
Enable Hibernation	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not be effective with some operating systems	Disabled, ★Enabled
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	Suspend Disabled , ★S3 (Suspend to RAM)
Restore AC Power Loss	Specify what state to go to when power is re-applied after a power failure (G3 state).	Power On, ★Power Off, Last State

PCI/PCIE Configuration**PCI, PCI-X and PCI Express Settings**

Feature	Description	Options
PCH PCIe Bifurcation Setting	PCH PCIe Bifurcation Setting Switch	★ Disabled, Enabled
PCH PCIe Bifurcation Setting [Enabled]		
PCIe Controller 1 (COMe Port 0-3)	Control PCH PCIe lane width.	★ 4x1,1x2 、 2x1,2x2,1x4
PCIe Controller 2 (COMe Port 4-7)	Control PCH PCIe lane width.	★ 4x1,1x2 、 2x1,2x2,1x4

COMe PEG Port 0,8

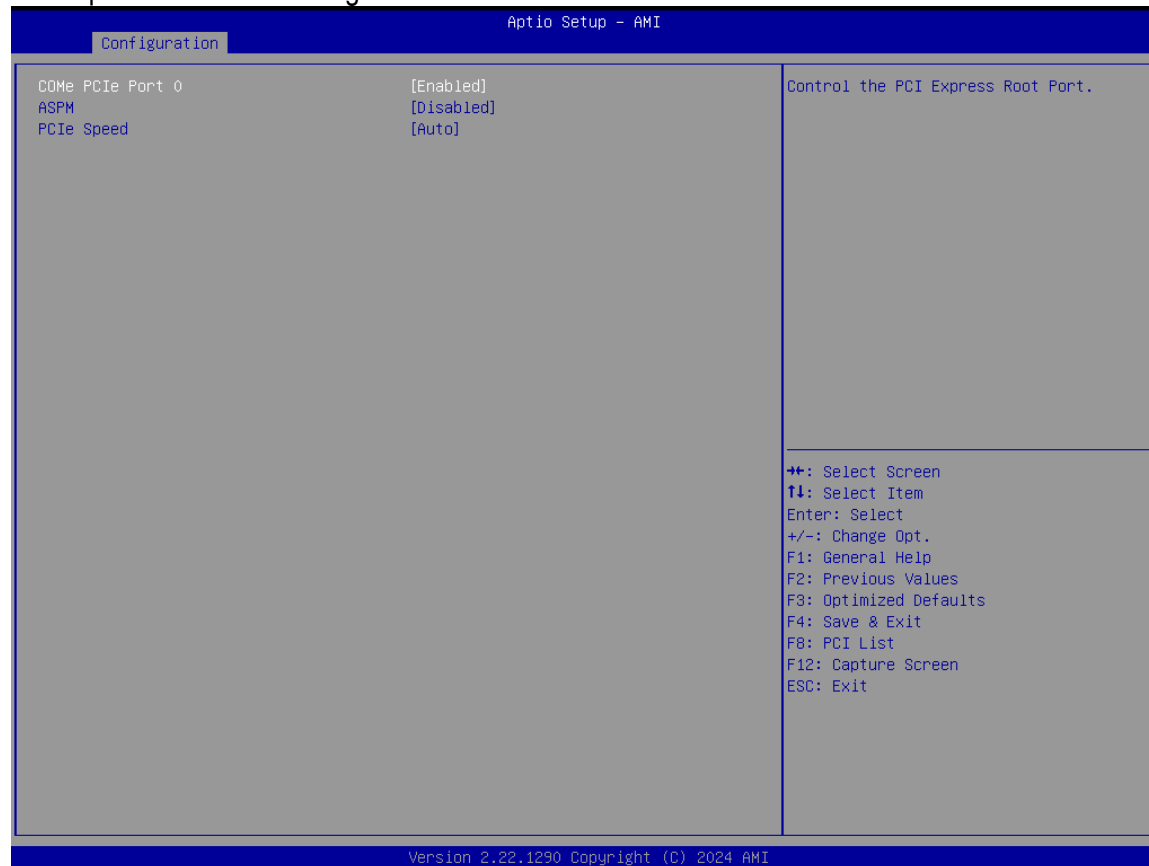
PCI Express Root Port Settings



Feature	Description	Options
COMe PEG Port 0,8	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO - BIOS auto configure DISABLE – Disables ASPM	★Disabled, L0s, L1, L0sL1
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3, Gen4

COMe PCIe Root Port 0~7

PCI Express Root Port Settings



Feature	Description	Options
COMe PCIe Port 0~7	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO - BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

LAN Configuration

Configuration On Board LAN Device

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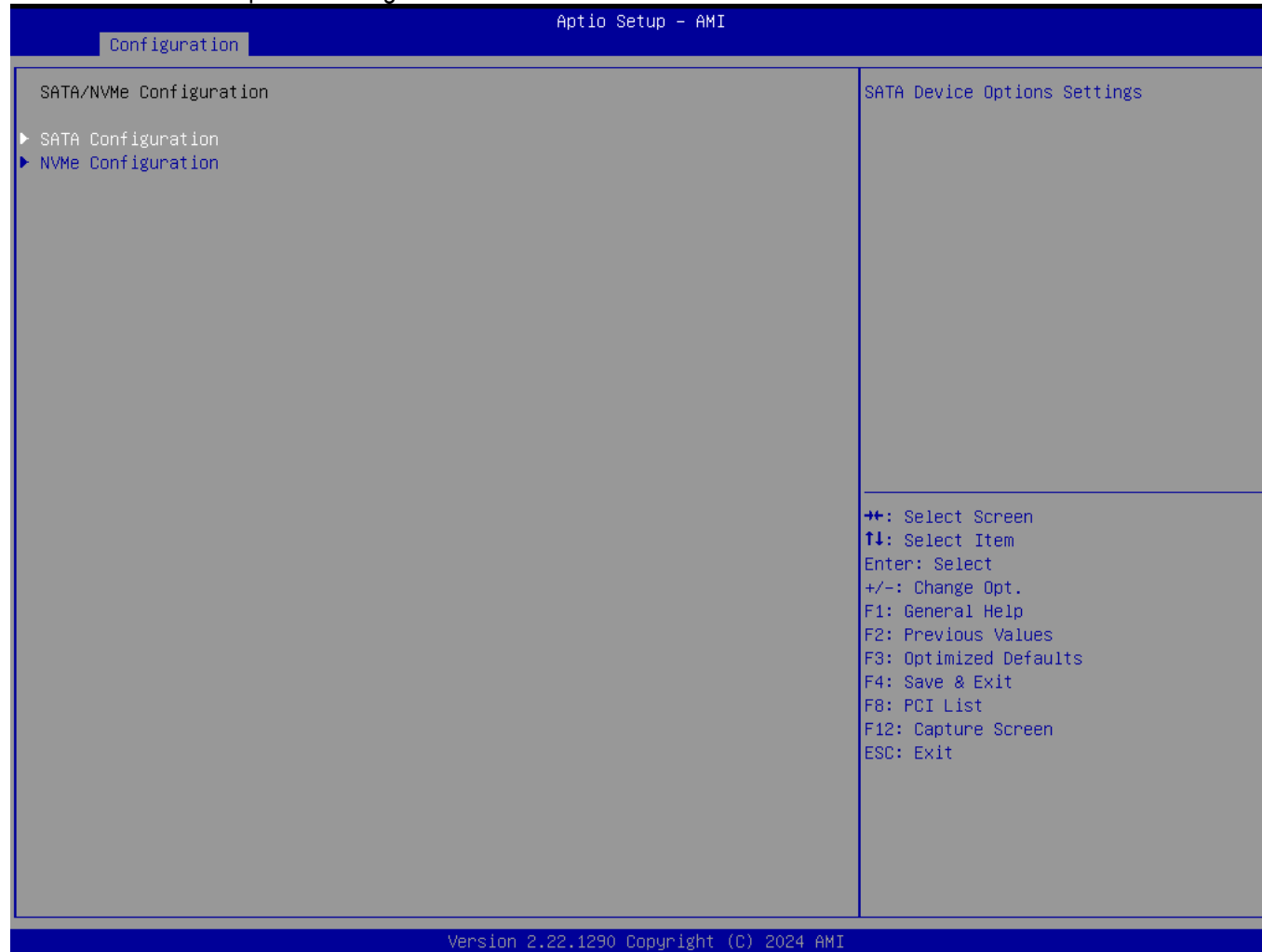
Configuration

LAN Configuration		Control the PCI Express Root Port.
Intel Ethernet Controller I226LM		
LAN MAC Address	00-90-FB-7F-FF-EF	
OnBoard LAN Controller#1	[Enabled]	
PCIE_WAKE(Wake On Lan)	[Enabled]	
Launch UEFI PXE ROM	[Enabled]	
IPv4 PXE Support	[Enabled]	
IPv4 HTTP Support	[Enabled]	
IPv6 PXE Support	[Enabled]	
IPv6 HTTP Support	[Enabled]	
PXE boot wait time	0	
Media detect count	1	

++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit

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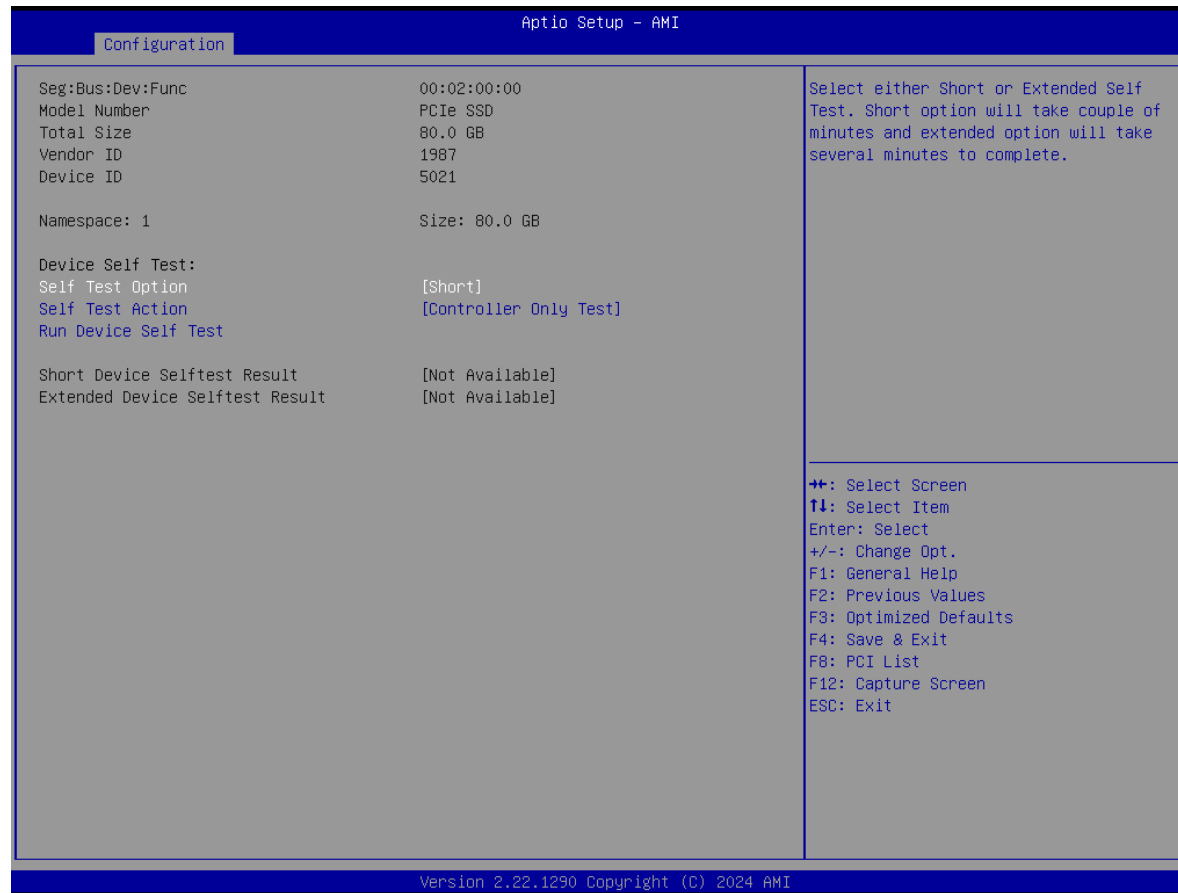
Feature	Description	Options
OnBoard LAN Controller #1	Control the PCI Express Root Port.	Disabled, ★Enabled
PCIE_WAKE (Wake on LAN)	Control PCIE Wake# pin for Wake On Lan function	★Enabled , Disabled
Launch UEFI PXE ROM	Enable/Disable UEFI Network Stack	★Disabled, Enabled
Launch UEFI PXE ROM[Enable]		
IPv4 PXE Support	Enable/Disable Ipv4 PXE boot support. If disable, IPv4 PXE boot support will not be available.	Disabled, ★Enabled
IPv4 HTTP Support	Enable/Disable Ipv4 HTTP boot support. If disable, IPv4 HTTP boot support will not be available.	Disabled, ★Enabled
IPv6 PXE Support	Enable/Disable Ipv6 PXE boot support. If disable, IPv6 PXE boot support will not be available.	Disabled, ★Enabled
IPv6 HTTP Support	Enable/Disable Ipv6 HTTP boot support. If disable, IPv6 HTTP boot support will not be available.	Disabled, ★Enabled
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.	★0
Media detect count	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.	★1

SATA /NVME Configuration**SATA/NVMe Device Options Settings**

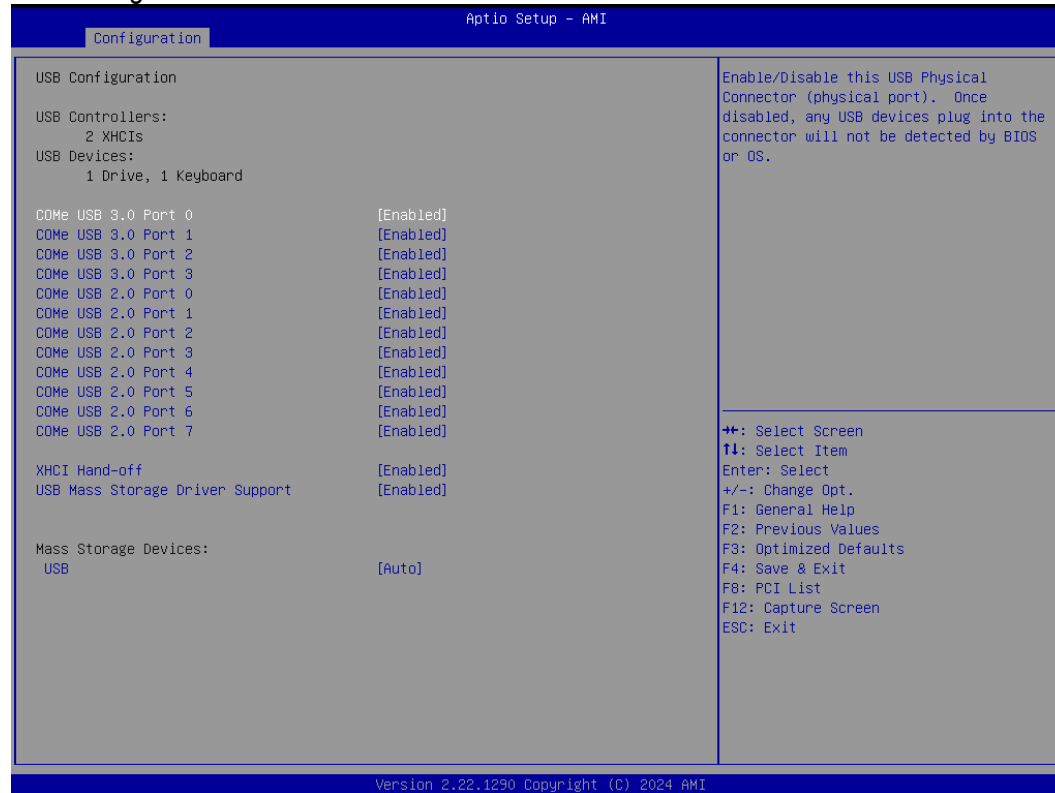
Feature	Description	Options
SATA Configuration	SATA Device Options Settings	
NVMe Configuration	NVMe Device Options Settings	

SATA Configuration

Feature	Description	Options
SATA Controller(s)	Enable/Disable the SATA Device.	★Enabled , Disabled
Enable VMD controller(RAID Mode)	Enable/Disable to VMD controller	★Disabled, Enabled
COMe SATA Port 0~1		
Port 0~1	Enable or Disable SATA Port	Disabled, ★Enabled
Hot Plug	Designates this port as Hot Pluggable	★Disabled, Enabled
SATA Device Type	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive	★Hard Disk Drive, Solid State Drive

NVME Configuration**PCIe SSD**

Feature	Description	Options
Self Test Option	Select either Short or Extended Self Test, Short option will take couple of minutes and extended option will take several minutes to complete,	★Short, Extended
Self Test Action	Select either to test Controller alone or Controller and Namespace option will take lot longer to complete the test.	★Controller Only Test, Controller and Namespace Test
Run Device Self Test	Perform device self test for the corresponding Option and Action selected by user, Pressing 'ESC' key will abort the test. Result shown below is the recent result logged in the device.	

USB Configuration**USB Configuration Parameters**

Feature	Description	Options
COMe USB 3.0 Port #0~3	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
COMe USB 2.0 Port #0~7	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver	★Enabled ,Disabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support	Disabled, ★Enabled
USB	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type	★Auto, Floppy, Forced FDD, Hard Disk, CD-ROM

TPM Configuration**Trust Computing Settings**

Aptio Setup - AMI

Configuration

TPM 2.0 Device Found		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.
Firmware Version:	7.85	
Vendor:	IFX	
Security Device Support	[Enable]	
Active PCR banks	SHA256	
Available PCR banks	SHA256	
SHA256 PCR Bank	[Enabled]	
Pending operation	[None]	
Platform Hierarchy	[Enabled]	
Storage Hierarchy	[Enabled]	
Endorsement Hierarchy	[Enabled]	
TPM 2.0 UEFI Spec Version	[TCG_2]	
Physical Presence Spec Version	[1.3]	
TPM 2.0 InterfaceType	[TIS]	
Device Select	[Auto]	

Version 2.22.1290 Copyright (C) 2024 AMI

←+: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit

Feature	Description	Options
Security Device Support	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.	Disabled, ★Enabled
SHA256 PCR Bank	Enables or Disables SHA256 PCR Bank	Disabled, ★Enabled
Pending operation	Schedule an Operation for the Security Device. Note: Your Computer will reboot during restart in order to change State of Security Device	★None, TPM Clear
Platform Hierarchy	Enables or Disables Platform Hierarchy	Disabled, ★Enabled
Storage Hierarchy	Enables or Disables Storage Hierarchy	Disabled, ★Enabled
Endorsement Hierarchy	Enables or Disables Endorsement Hierarchy	Disabled, ★Enabled
TPM 2.0 UEFI Spec Version	Select the TCG2 Spec Version Support, TCG_1_2: the Compatible mode for Win8/Win10 TCG_2: Support new TCG2 protocol and event format for Win10 or later	TCG_1_2, ★TCG_2
Physical Presence Spec Version	Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.	1.2, ★1.3
Device Select	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 TPM2.0 devices if not found, TPM 1.2 devices will be enumerated	TPM1.2, TPM2.0, ★Auto

Super IO Configuration**System Super IO Chip Parameters**

Feature	Description	Options
Watch Dog Timer	Enable/Disable Watch Dog Timer	★ Disabled, Enabled
Watch Dog Timer[Enable]		
Timer Unit	Select Timer count unit of WDT	★ Second, Minute
Timer value	Set WDT Timer value seconds/minutes	★ 20

Serial Port 1 Configuration

Set Parameters of Serial Port 1(COMA)

Aptio Setup - AMI

Configuration

Serial Port 1 Configuration

Module Serial Port 1 [Enabled]

Device Settings IO=3F8h; IRQ=4;

Enable or Disable Serial Port (COM)

+/-: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit

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Feature	Description	Options
Module Serial Port 1	Enable or Disable Serial Port (COM)	Disabled, ★ Enabled

Serial Port 2 Configuration

Set Parameters of Serial Port 2(COMB)



Feature	Description	Options
Module Serial Port 2	Enable or Disable Serial Port (COM)	Disabled, ★ Enabled

H/W Monitor

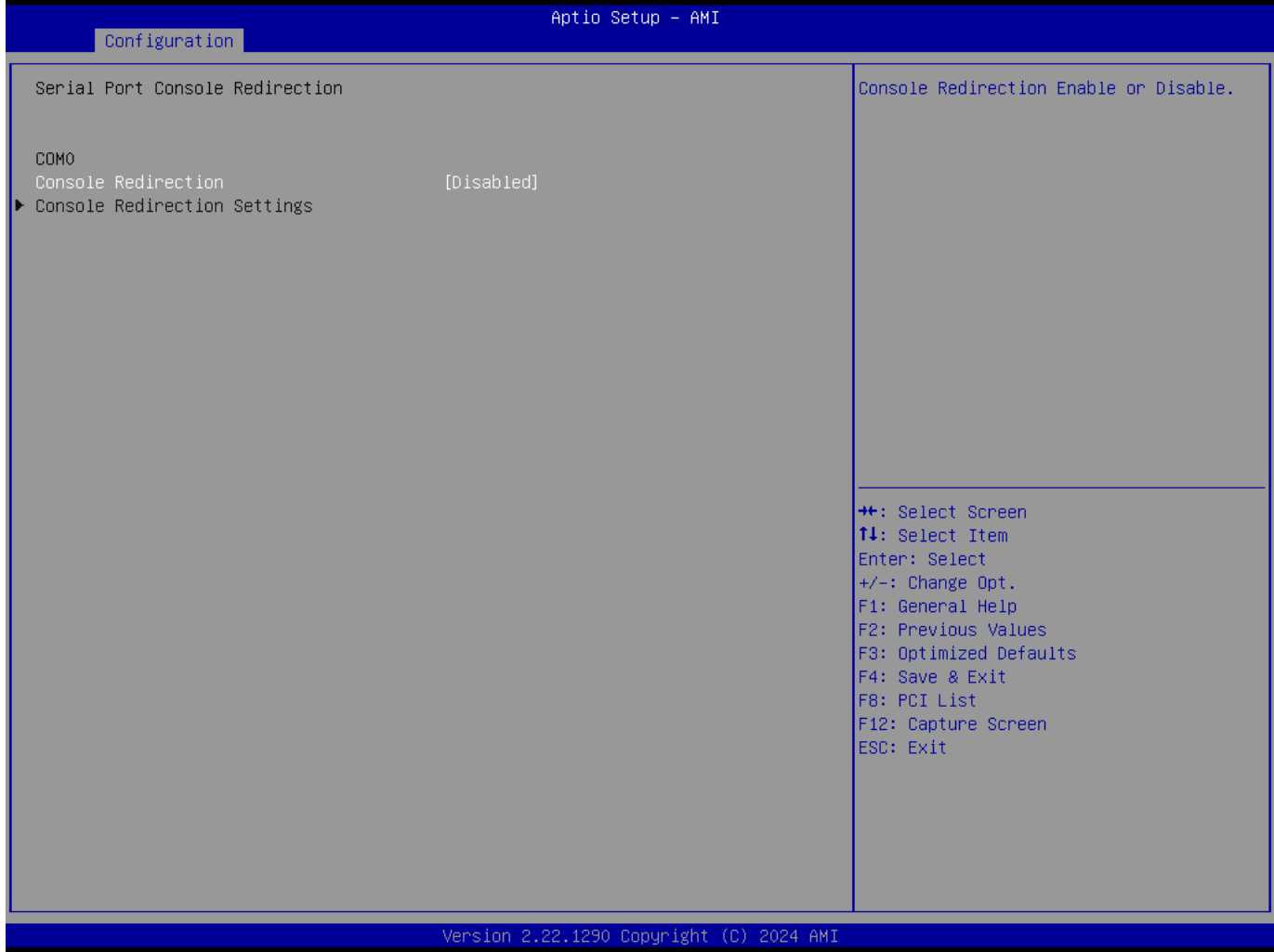
Monitor hardware status

Aptio Setup - AMI		
Configuration		
Module Fan Function	[Enabled]	Disable / Enable the smart fan control.
Module Fan Control Mode	[Thermal Cruise Mode]	
Module Fan Tolerance Temp	5	
Module Fan Start Target Temp	40	
Module Fan Full Target Temp	60	
Module Fan Low End	5	
Carrier Fan Function	[Enabled]	
Carrier Fan Control Mode	[Thermal Cruise Mode]	
Carrier Fan Tolerance Temp	5	
Carrier Fan Start Target Temp	30	
Carrier Fan Full Target Temp	80	
Carrier Fan Low End	5	
CPU Temperature	: +34 °C	
Module Fan Speed	: N/A	
Carrier Fan Speed	: 1583 RPM	
Vcore	: +0.702 V	
+3.3V	: +3.336 V	
+5V	: +5.078 V	
+12V	: +12.474 V	
VDIMM	: +1.107 V	
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit		
Version 2.22.1290 Copyright (C) 2024 AMI		

Feature	Description	Options
Module Fan Function	Enable/Disable the smart fan control	★Disabled, Enabled
Module Fan Function [Enable]		
Module Fan Control Mode	Smart Fan Mode Select	★Thermal Cruise Mode, Fan Control Mode
Module Fan Tolerance Temp	In Thermal Cruise Mode: tolerance of target temperature	★5
Module Fan Start Target Temp	In Thermal Cruise Mode: start temperature	★40
Module Fan Full Target Temp	In Thermal Cruise Mode: full speed temperature	★60
Module Fan Low End	In Thermal Cruise Mode: low end of fan speed (0~100%)	★5
Carrier Fan Function	Enable/Disable the smart fan control	★Disabled, Enabled
Carrier Fan Function [Enable]		
Carrier Fan Control Mode	Smart Fan Mode Select	★Thermal Cruise Mode, Fan Control Mode
Carrier Fan Tolerance Temp	In Thermal Cruise Mode: tolerance of target temperature	★5
Carrier Fan Start Target Temp	In Thermal Cruise Mode: start temperature	★40
Carrier Fan Full Target Temp	In Thermal Cruise Mode: full speed temperature	★60
Carrier Fan Low End	In Thermal Cruise Mode: low end of fan speed (0~100%)	★5

Serial Port Console Redirection

Serial Port Console Redirection



Feature	Description	Options
Console Redirection	Console Redirection Enable or Disable	★Disabled, Enabled

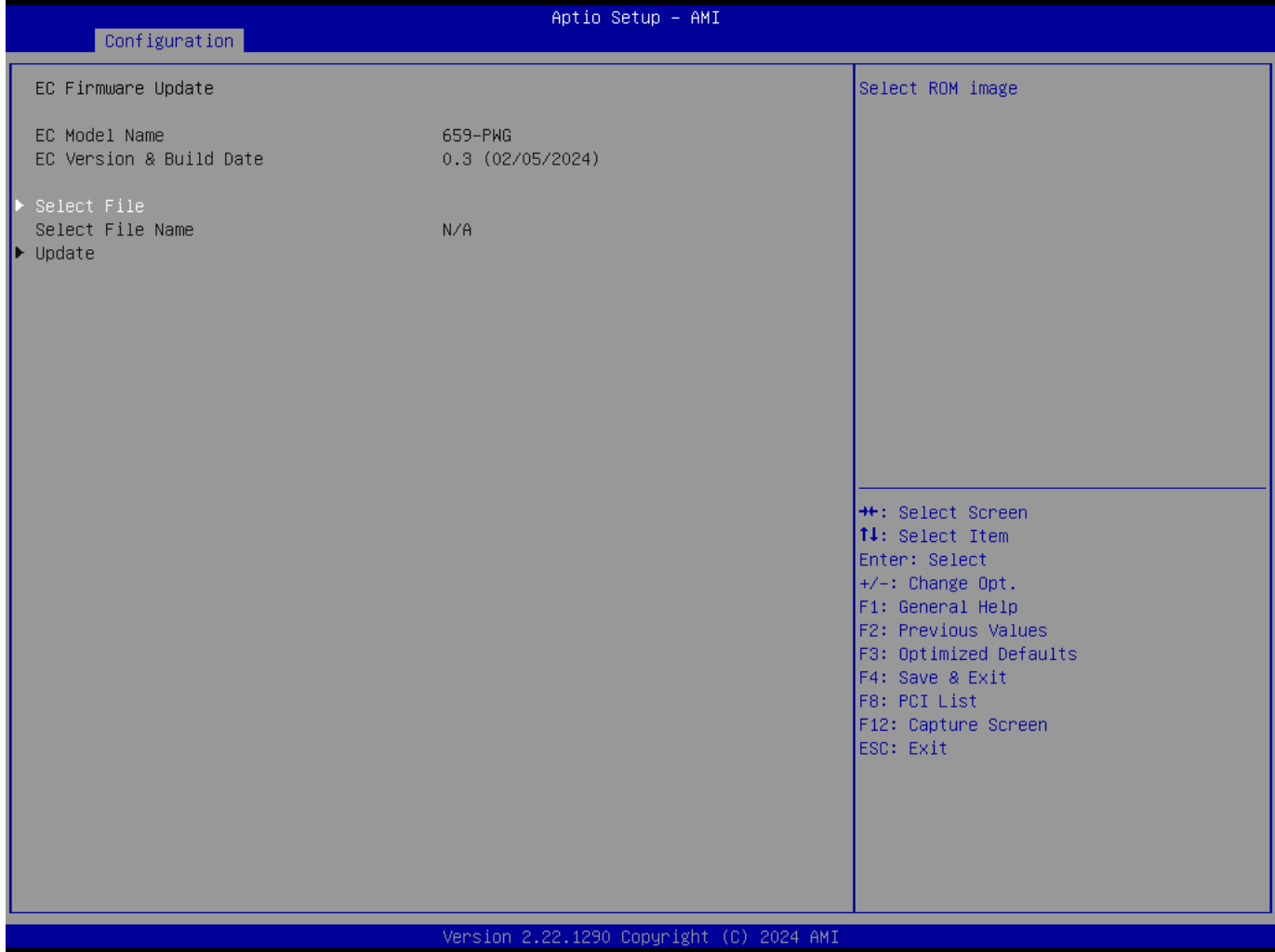
COM0**Console Redirection Settings**

Aptio Setup - AMI		
Configuration		
COM0 Console Redirection Settings		Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Terminal Type	[VT100Plus]	
Bits per second	[115200]	
Data Bits	[8]	
Parity	[None]	
Stop Bits	[1]	
Flow Control	[None]	
VT-UTF8 Combo Key Support	[Enabled]	
Recorder Mode	[Disabled]	
Resolution 100x31	[Disabled]	
Putty KeyPad	[VT100]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F8: PCI List F12: Capture Screen ESC: Exit
Version 2.22.1290 Copyright (C) 2024 AMI		

Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color , function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	VT100,★VT100Plus, VT-UTF8, ANSI
Bits per second	Select Serial port transmission speed. The speed must be matched on other side. Long or noisy lines may require lower speeds.	9600, 19200, 38400, 57600,★115200
Data bits	Data Bits	7,★8
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.	★None, Even, Odd, Mark, Space
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.	★1,2
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.	★None, Hardware RTS/CTS
VT-UTFB Combo Key Support	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals	Disabled,★Enabled
Recorder Mode	With this mode enabled only text will be sent. This is to capture Terminal data.	★Disabled, Enabled
Resolution 100x31	Enables or disables extended terminal resolution	★Disabled, Enabled
Putty KeyPad	Select FunctionKey and KeyPad on Putty	★VT100, LINUX,XTERMR6, SCO,ESCN,VT400

EC Firmware Update

EC Firmware Update



Feature	Description	Options
Select File	Select ROM image	

7.2.3 Security



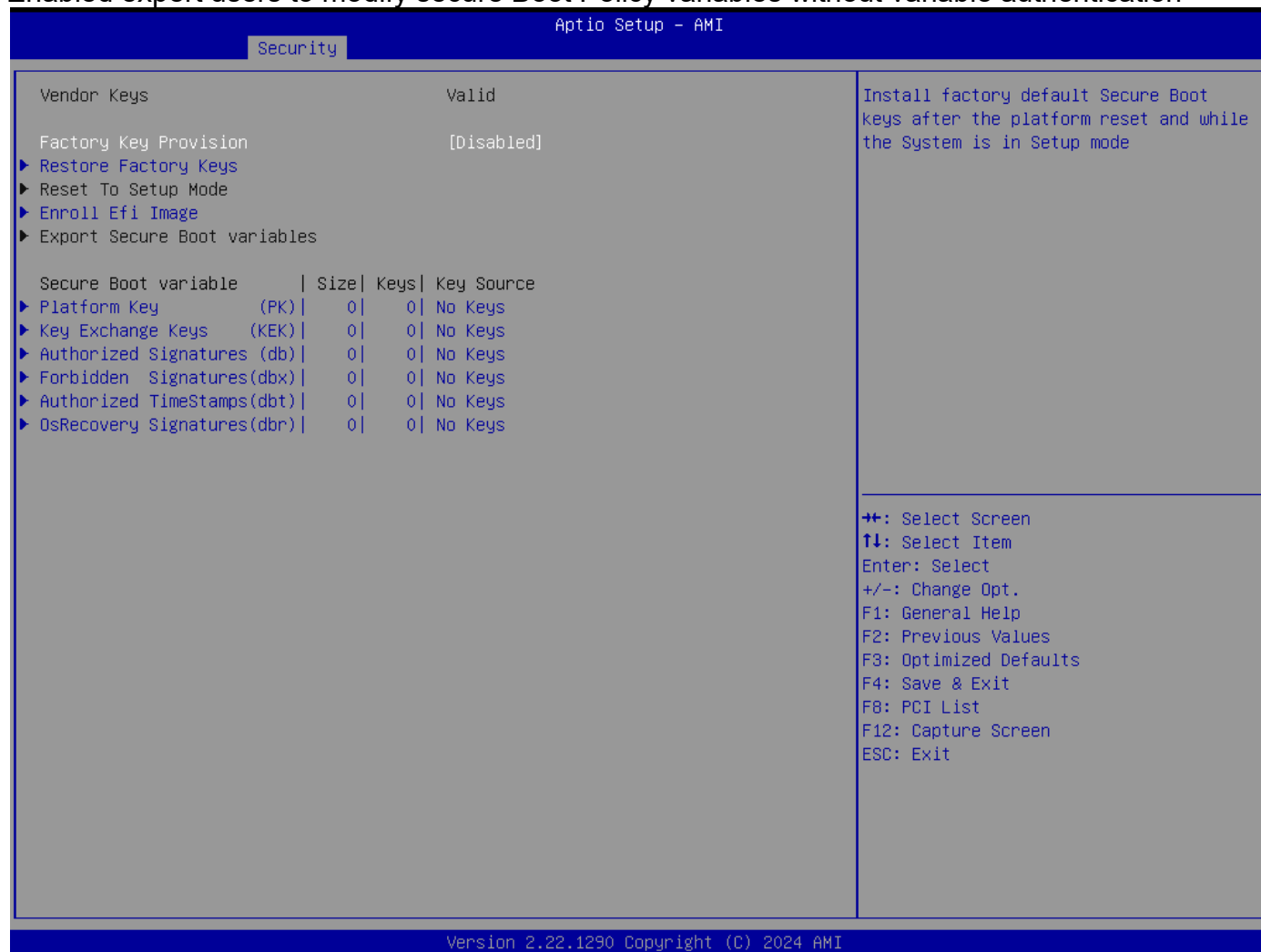
Feature	Description	Options
Disable Block Sid	Override to allow SID authentication of TCG Storage device. Modified value will be applicable only for next boot.	★ Disabled, Enabled
Password Check Mode	[Setup] check password when enter setup screen. [Power on] check password on every time system power on.	★ Setup, Power on
Administrator Password	Set Administrator Password	

Secure Boot**Secure Boot configuration**

Feature	Description	Options
Secure Boot	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.	★Disabled, Enabled
Secure Boot Mode	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	Standard, ★Custom
Restore Factory keys	Force System to User Mode. Install factory default Secure Boot key databases	

Key Management

Enabled expert users to modify secure Boot Policy variables without variable authentication

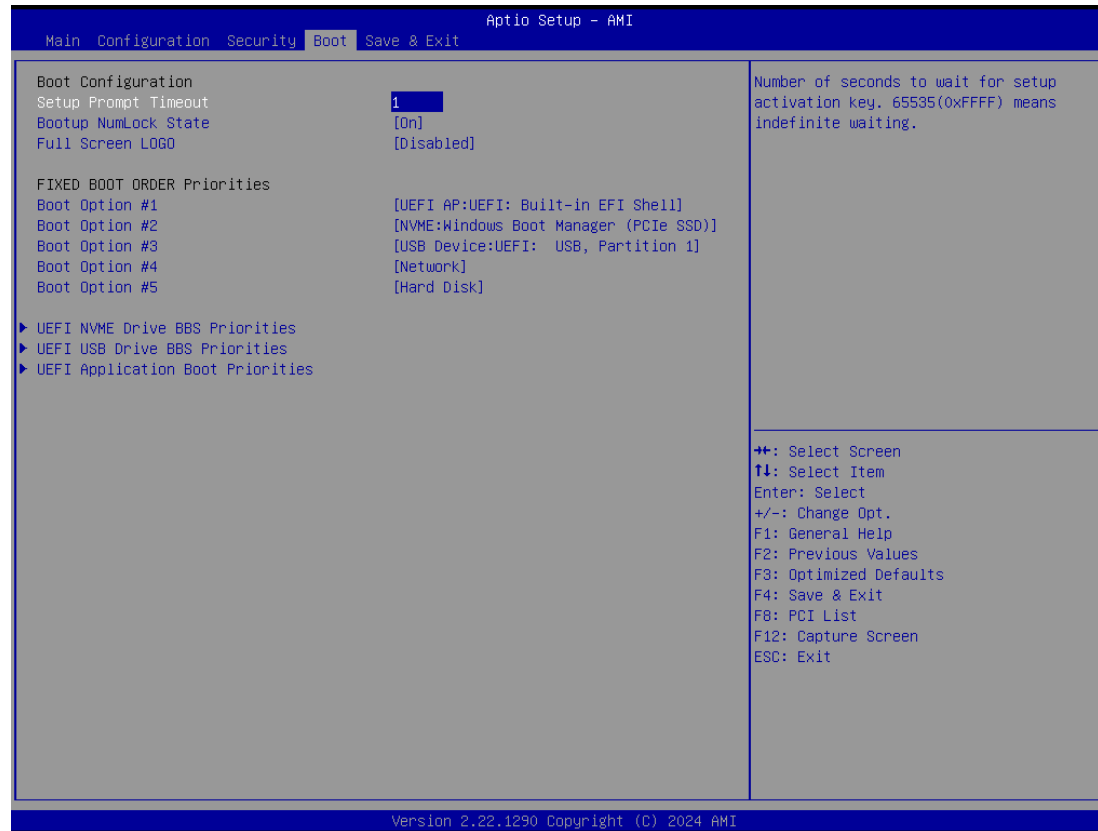


Feature	Description	Options
Factory keys Provision	Install factory default Secure Boot key after the platform reset and while the System is in Setup mode.	★ Disabled, Enabled
Restore Factory keys	Force System to User Mode. Install factory default Secure Boot key databases	
Enroll Efi Image	Allow Efi image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)	
Platform Key (PK)	Enroll Factory Defaults or load certificates from a file:	
Key Exchange Keys (KEK)	1.Public Key Certificate:	
Authorized Signatures (db)	a)EFI_SIGNATURE_LIST	
Forbidden Signatures (dbx)	b) EFI_CERT_X509 (DER)	
Authorized TimeStamps(dbt)	c) EFI_CERT_RSA2048 (bin)	
OsRecovery Signatures (dbr)	d)EFI_CERT_SHAXXX	
	2.Authenticated UEFI Variable	
	3.EFI PE/COFF Image(SHA256)	
	Key Source: Factory, External, Mixed	

PCIe SSD**TCG Store device Security Configuration**

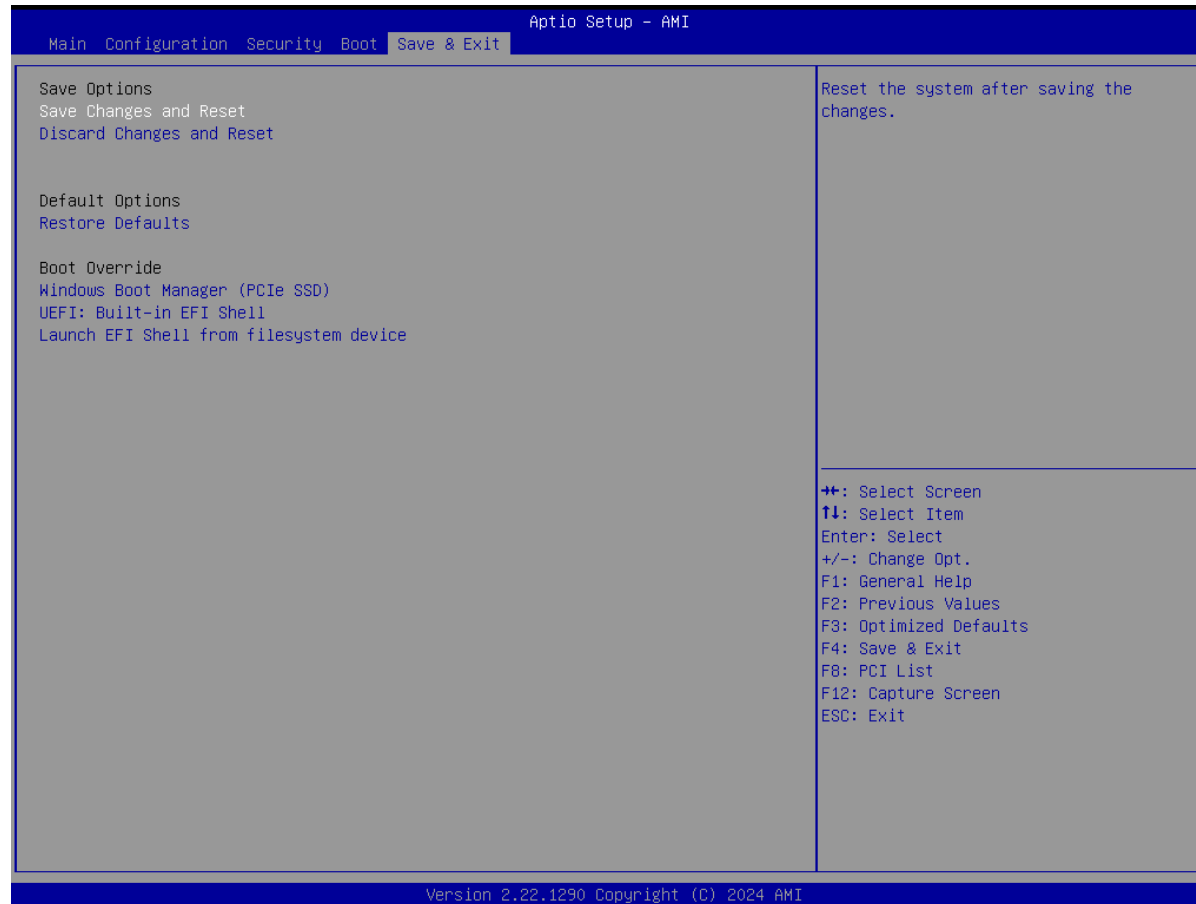
Feature	Description	Options
Set Admin Password	Sets Admin Password. Once installed enables device security and locks device immediately. Advisable to Power Cycle System after Password Set/Clear. Discard or Save changes option in setup does not have any impact on PASSWORD controls.	
Device Reset	Resets the device using 32 bytes PSID (Physical Security Identification) value of the device. PSID revert resets the device to Original Factory State and it will completely erases the user data from drive. It is case sensitive	

7.2.4 Boot



Feature	Description	Options
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	★1
Bootup NumLock State	Select the keyboard NumLock state	★On, Off
Full Screen LOGO	Enables or disables Quiet Boot option and Full screen LOGO.	★Disabled, Enabled
Boot Option #1~5	Sets the system boot order	★Hard Disk, NVME(PCIe SSD), USB Device, Network, UEFI AP: UEFI: Built-in EFI Shell, Disabled
UEFI Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

7.2.5 Save & Exit



Feature	Description	Options
Save Changes and Reset	Reset the system after saving the changes.	
Discard Changes and Reset	Reset system setup without saving any changes.	
Restore Defaults	Restore/Load Default values for all the setup options.	
UEFI: Built-in EFI Shell	Reset the system after saving the changes. (Boot option filter: UEFI only)	
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.	

8 BIOS / EC Update

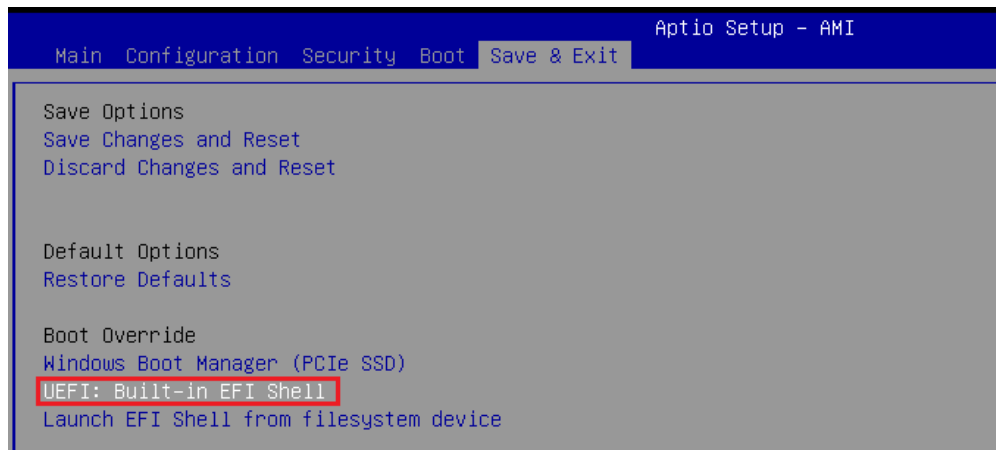
PCOM-B659 only support BIOS/EC update under UEFI shell environment, refer the following step, please.

● BIOS update

Step 1. Unzip update file to the USB DOK (USB DOK must be FAT or FAT32 format)

Step 2. Plug the USB DOK on the target system and select “Built-in EFI Shell” in the BIOS “Save&Exit” page

Shown as below picture



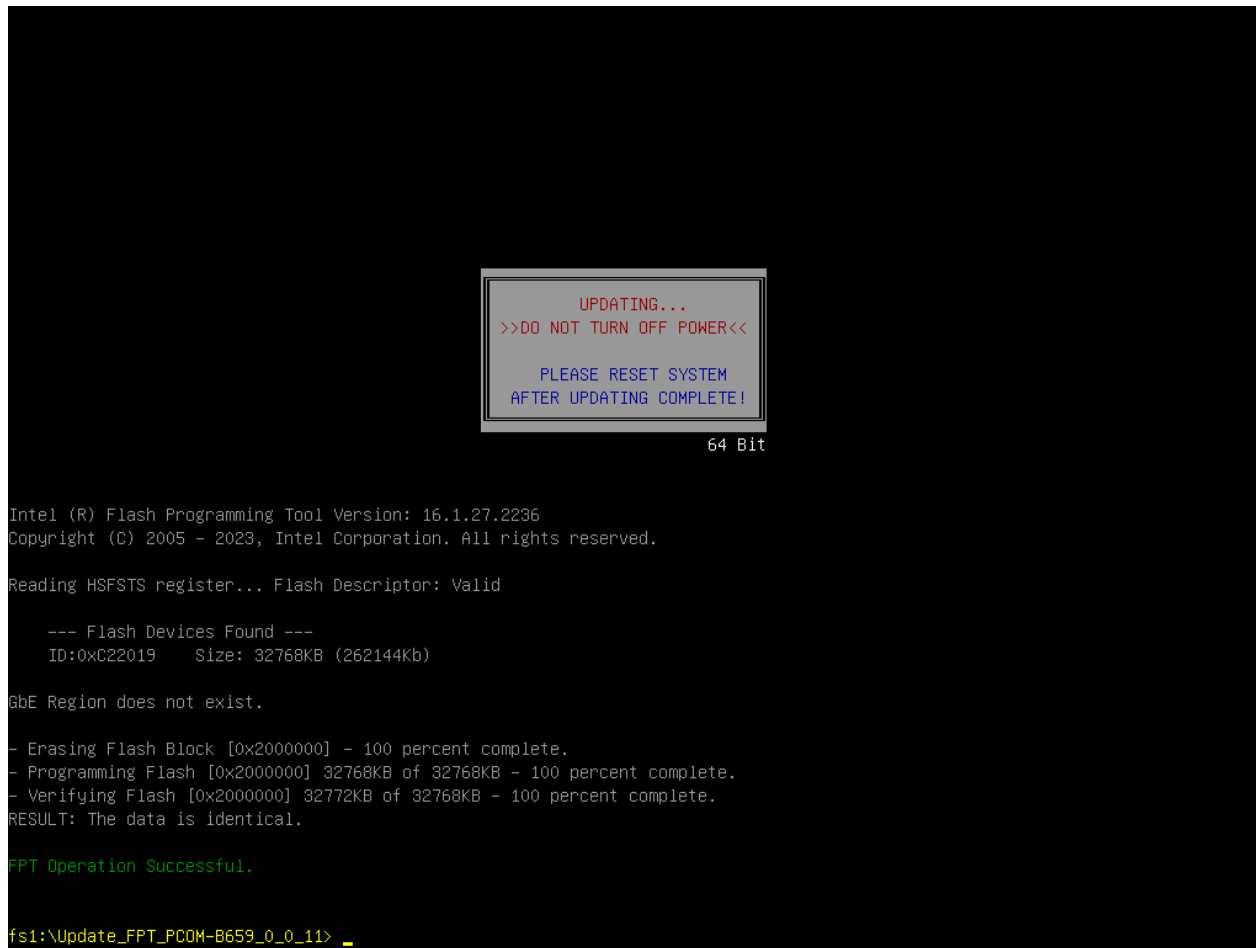
Step 3. Under the UEFI shell, change prompt to your USB DOK, the below example is “fs1: “

Step 4. Then change the folder with updated file and use command: “update “ and press enter

```
fs1:\>
fs1:\> cd Update_FPT_PCOM-B659_0_0_11
fs1:\Update_FPT_PCOM-B659_0_0_11> Update.efi_
```

Step 5. The updating process will start and show the updating progress

Step 6. Please power off and restart the system once updating finished



```
UPDATING...
>>DO NOT TURN OFF POWER<<

PLEASE RESET SYSTEM
AFTER UPDATING COMPLETE!

64 Bit

Intel (R) Flash Programming Tool Version: 16.1.27.2236
Copyright (C) 2005 - 2023, Intel Corporation. All rights reserved.

Reading HSFSTS register... Flash Descriptor: Valid

--- Flash Devices Found ---
ID:0xC22019 Size: 32768KB (262144Kb)

GbE Region does not exist.

- Erasing Flash Block [0x20000000] - 100 percent complete.
- Programming Flash [0x20000000] 32768KB of 32768KB - 100 percent complete.
- Verifying Flash [0x20000000] 32772KB of 32768KB - 100 percent complete.
RESULT: The data is identical.

FPT Operation Successful.

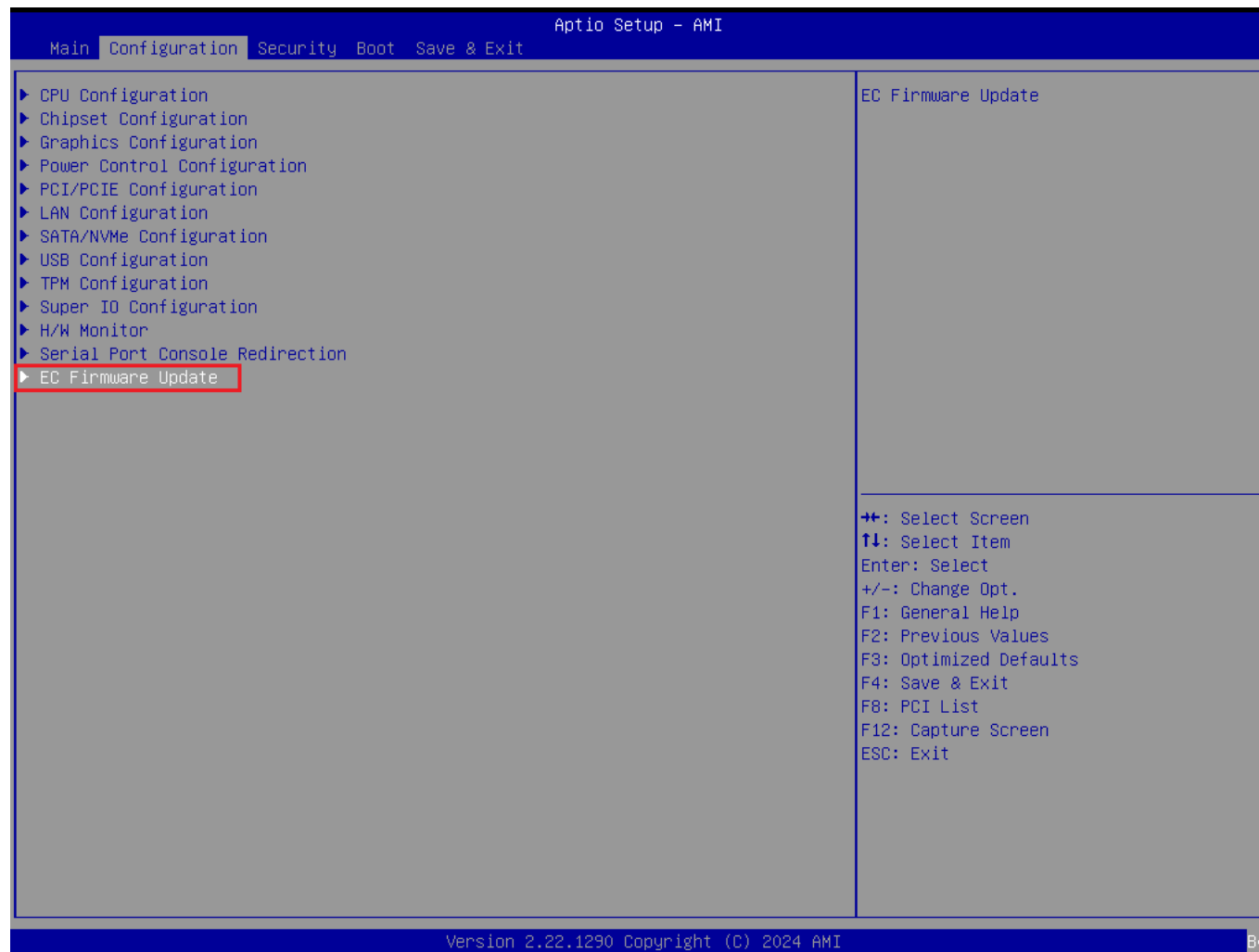
fs1:\Update_FPT_PCOM-B659_0_0_11> _
```

(BIOS updating finished)

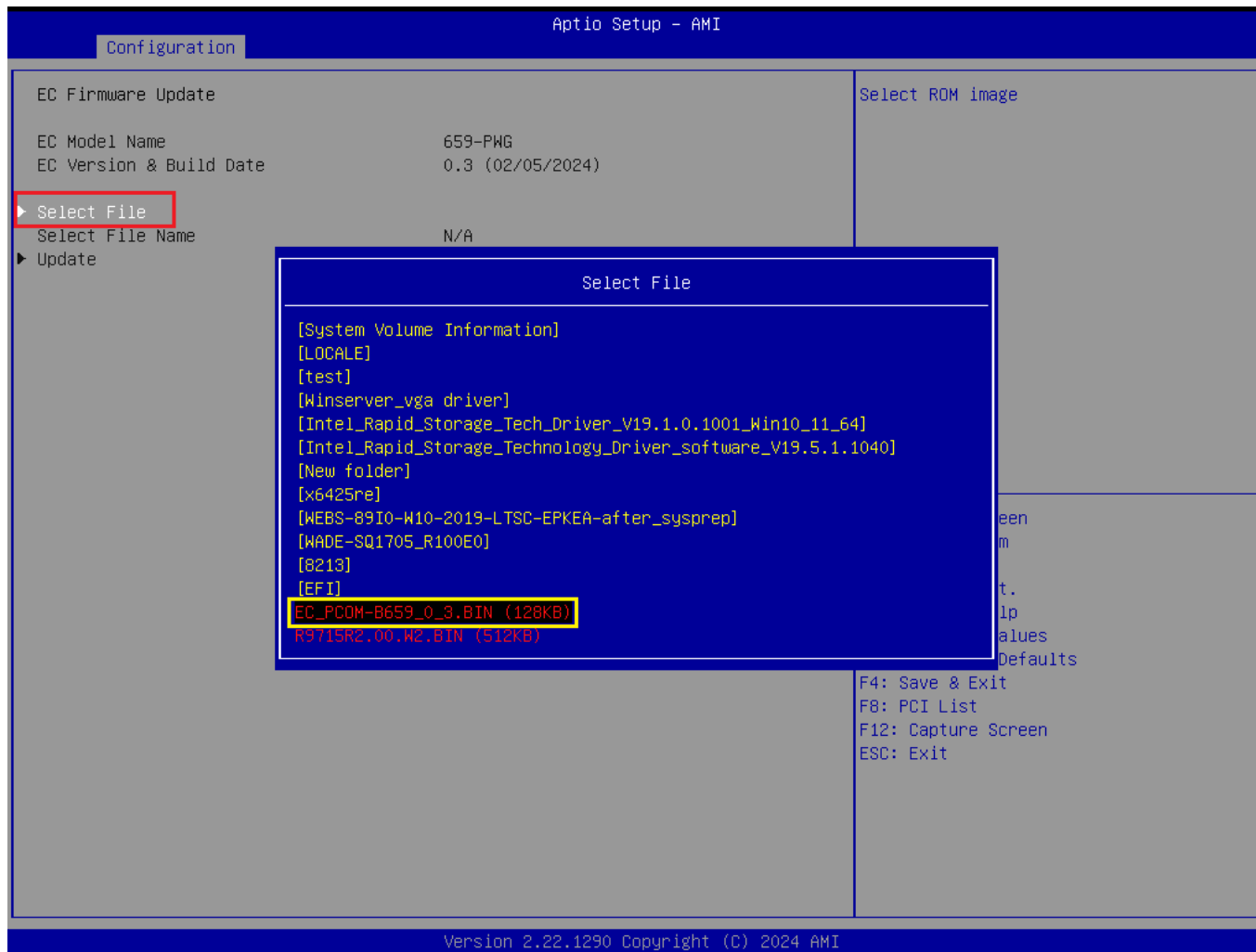
● EC update

Step 1. Unzip EC binary file to the USB DOK (USB DOK must be FAT or FAT32 format)

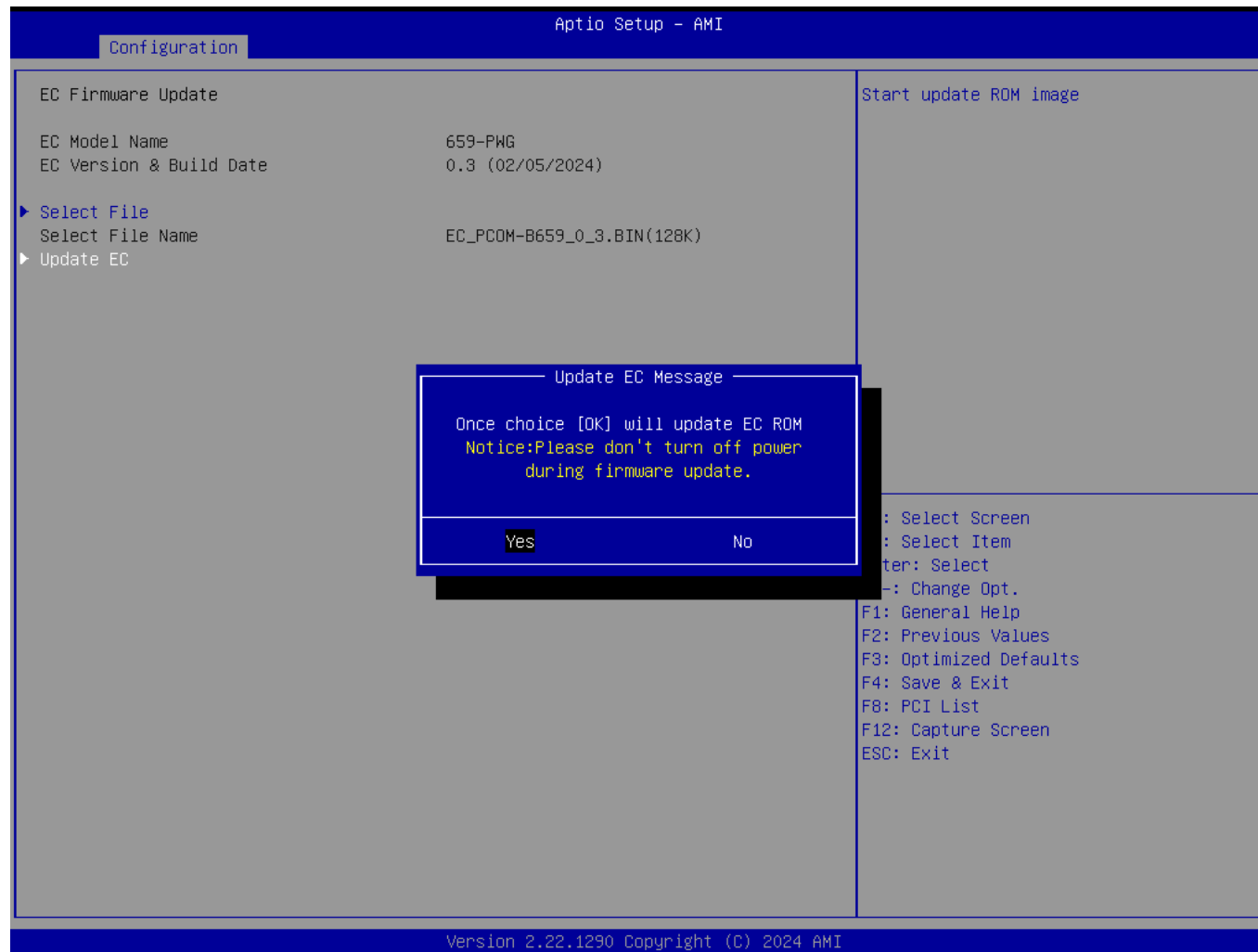
Step 2. Select “EC Firmware Update” item in BIOS setup menu



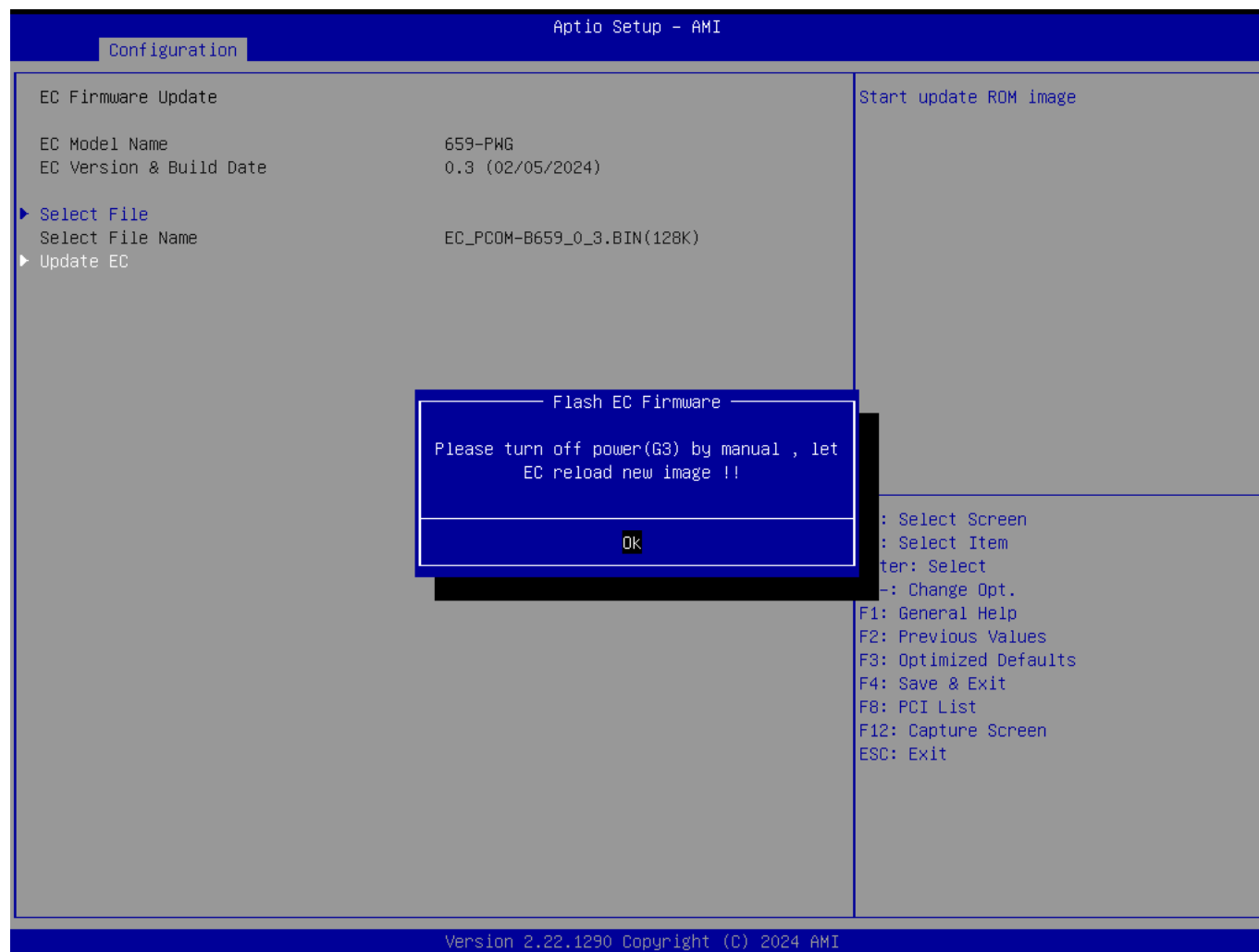
Step 3. Select EC binary file by option item shown as below



Step 4. Select “Yes” to start EC update (Please don’t turn off power during firmware update)



Step 5. Turn off power to make system into G3 status once updating finished, then power on the system



9 PORTWELL Software Tool

The Portwell Evaluation Tool (PET) is an API which users can access the GPIO, I2C, SMBus, etc under Windows and Linux OS. For more information, contact Portwell technical support or your local Portwell sales representative.

10 Packaging Information

PCOM-B659 packaging specification will follow the Portwell standard style.

Package	Appearance	Size
Anti-Static bubble bag		180x130mm
White Paper Box		210x150x40mm
Shipping Box (10 pcs White paper box)		595x300x185mm

Table 14 Packaging information

11 Industry Specifications

The list below provides links to industry specifications that apply to PORTWELL modules.

Low Pin Count Interface Specification, Revision 1.0 (LPC) <http://www.intel.com/design/chipsets/industry/lpc.htm>

Universal Serial Bus (USB) Specification, Revision 2.0 <http://www.usb.org/home>

PCI Specification, Revision 2.3 <https://www.pcisig.com/specifications>

Serial ATA Specification, Revision 3.0 <http://www.serialata.org/>

PICMG® COM Express Module™ Base Specification <http://www.picmg.org/>

PCI Express Base Specification, Revision 2.0 <https://www.pcisig.com/specifications>