Portwell

FUDA4- S1X23 Series

Multi-Touch Panel PC Series

User Manual

Version 0.3

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Revision History

0.1	Official Release
0.2	Model Name correction for typo
0.3	Mechanism size details updated

Table of Contents

CHAPTER 1 PRODUCT OVERVIEW 4

1.1 INTRODUCTION 5

1.2 PRODUCT SPECIFICATIONS 6

1.3 ORDERING GUIDE 8

1.4 DIMENSION 9

CHAPTER 2 SYSTEM OVERVIEW 14

2.1 REAR VIEW 15

2.2 JUMPER SETTING 17

CHAPTER 3 SYSTEM INSTALLATION 54

3.1 OPENING THE CHASSIS 55

3.2 MEMORY INSTALLATION 57

3.4 WIFI MODULE INSTALLATION 60

3.5 PANEL MOUNT INSTALLATION 61

3.6 VESA MOUNT INSTALLATION 62

CHAPTER 4 BIOS SETUP ITEMS 63

4.1 ENTERING SETUP -- LAUNCH SYSTEM SETUP 64

4.2 HOW TO UPDATE THE BIOS/EC FILE 113

CHAPTER 5 IMPORTANT INSTRUCTIONS 116

5.1 NOTE ON THE WARRANTY 117

5.2 EXCLUSION OF ACCIDENT LIABILITY OBLIGATION 117

5.3 LIABILITY LIMITATIONS / EXEMPTION FROM THE WARRANTY OBLIGATION 117

5.4 DECLARATION OF CONFORMITY 117

CHAPTER 6 PORTWELL SOFTWARE SERVICE 118

6.1 PET TOOL 119

Chapter 1

System Overview

1.1 Introduction
1.2 Product Specifications
1.3 Ordering Guide
1.4 Dimension

1.1 Introduction

FUDA4: Rugged, Flexible, and Optimized for Industrial Integration

The FUDA4 is a robust and versatile industrial computing solution designed for seamless deployment across diverse environments. With onboard storage and support for M.2 2242/2280 M-Key slot, FUDA4 balances system stability with high-speed data transmission—making it ideal for applications requiring both performance and reliability.

To meet modern connectivity needs, FUDA4 features an M.2 2230 E-Key slot for Wi-Fi and Bluetooth modules, enabling faster edge connectivity, minimizing cabling complexity, and supporting flexible installation in space-constrained settings.

Built to withstand harsh operating conditions, FUDA4 supports a wide temperature range from -25° C to 65° C. This makes it perfectly suited for outdoor, semi-outdoor, and high-heat environments, where consistent performance is critical.

Security is also at the core of FUDA4's design. It supports encryption and authentication mechanisms to ensure data integrity and secure system boot—essential for security-critical industrial and enterprise applications.

The fanless architecture enhances reliability by reducing mechanical failure points, extending the product lifecycle, and allowing for silent operation—especially beneficial in noise-sensitive or compact installations.

FUDA4 is engineered for adaptability, offering both capacitive and resistive touch options to accommodate various usage scenarios. Coupled with multiple screen size options, the system can be tailored for embedded systems, machine control interfaces, or real-time on-site monitoring.

Furthermore, its modular design enables rapid I/O customization, reducing deployment lead time and minimizing maintenance costs. This makes FUDA4 an excellent choice for dynamic projects and a wide range of vertical markets.

1.2 Product Specifications

Model Name	FUDA4-S1023	FUDA4-S1223	FUDA4-S1523	FUDA4-S1623
LCD Size	10.4”	12.1”	15”	15.6”
Resolution	1024 x 768	1024 x 768	1024 x 768	1366 x 768
Brightness (cd/m²)	450 cd/m²	600 cd/m²	450 cd/m²	400 cd/m²
Contrast Ratio	3000:1	3000:1	3000:1	800:1
Backlight	LED Type			
Touch Screen	Projected Capacitive Multi-Touch Screen (10 points)			
SoC	Intel Atom® X7433RE processor (6M Cache, up to 3.40 GHz) (TDP: 9 watt)			
Memory	DDR5 4800 MT/s SDRAM on one 262 pin SO-DIMM socket up to 32GB			
BIOS	AMI			
Graphics	Intel® UHD Graphics			
Panel Interface	LVDS			
LAN Chipset	Intel I226IT			
TPM	TPM 2.0			
Watchdog Timer	Programmable 1~255 sec			
Storage Device	Onboard eMMC 5.1 Flash up to 256GB (default:128GB) M.2 2242/2260/2280 M key socket			
Operating System	Windows 10/Windows 11/ Linux			
Serial Port	2x RS-232/ RS-422/ RS-485	Extension I/O board selection - 2x RS-232/RS-422/RS-485 + 2x USB 2.0 - 2x RS-232/RS-422/RS-485 + 1x RS-232		

		- 2x RS-232/RS-422/RS-485 + 1x 2ch DIDO		
Display	1x HDMI® 2.0b 1x USB Type C with DP ALT mode			
USB	2x USB 3.2 Gen2 (10Gbps) 1x USB Type C (DisplayPort/USB 10Gbps support)			
Ethernet	2x Intel® I226IT 2.5GbE Ethernet			
Others	1x 3 pin Terminal Block Connector 1x Power Button, Reset Button 1x Power LED, 1x Storage LED			
Expansion	1x M.2 2230 E key socket Extension I/O board selections			
Dimension (mm) (L) x (W) x (H)	282 x 238 x 57.3	306 x 260 x 58.2	384 x 310 x 56.6	415 x 265 x 56.6
Mounting	VESA Mount 75x75, 100x100, Panel Mount			
Power Supply	12V~24V DC			
Consumption (Max)	33.5W (12V); 33.6W (24V)	40.9W (12V); 39.4W (24V)	40.5W (12V); 40.2W (24V)	48.8W (12V); 48.1W (24V)
Consumption (Min)	11.8W (12V); 14W (24V)	12W (12V); 12.3W (24V)	11.2W (12V); 12W (24V)	17.2W (12V); 18.1W (24V)
OP Temp	-25 ~ 65° C degree			
Vibration	1.0G Random Operation, 10~500Hz (eMMC, SSD) Packaged vibration test 2.16G, 10~500Hz			
Shock	15G peak acceleration (11m sec. duration) / operation			
Drop	Package with Carton from 96.5 cm (1-Corner, 3-Axis, 6-Face), ISTA 2A Standard			
IP Protection	Front Bezel: IP65 Whole enclosure: IP20 (IEC 60529 Edition 2.1 Standard)			
Certificate	FCC/CE/UKCA Class A/Heavy Industry IEC 61000-6-2, IEC 61000-6-4, CE LVD Safety (EN 62368-1)			

1.3 Ordering Guide

P/N	Description
AL6-3321	(R).ATO.FUDA4-S1623-0000-00.15.6" Intel Amston Lake X7433RE 9W P-CAP Touch Panel PC with Black Aluminum Bezel and Black Chassis
AL6-3319	(R).ATO.FUDA4-S1523-0000-00.15" Intel Amston Lake X7433RE 9W P-CAP Touch Panel PC with Black Aluminum Bezel and Black Chassis
AL6-3320	(R).ATO.FUDA4-S1223-0000-00.12.1" Intel Amston Lake X7433RE 9W P-CAP Touch Panel PC with Black Aluminum Bezel and Black Chassis
AL6-3318	(R).ATO.FUDA4-S1023-0000-00.10.4" Intel Amston Lake X7433RE 9W P-CAP Touch Panel PC with Black Aluminum Bezel and Black Chassis

1.4 Dimension

In this section, we present the dimensions of two models: FUDA4-S1X23

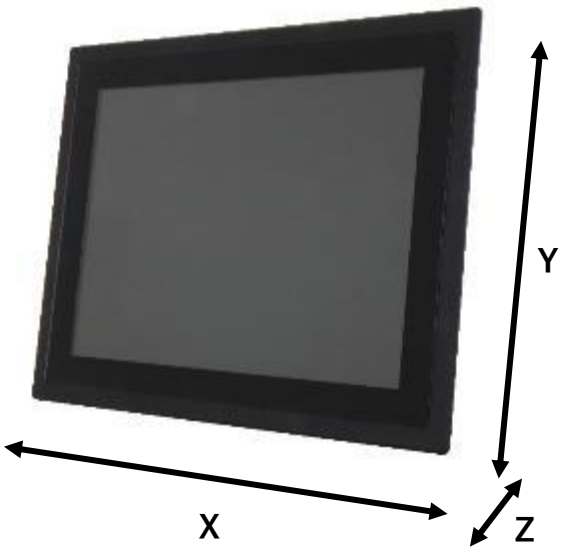


Figure 1 FUDA4-S1X23 Mechanical Dimension

Model	X	Y	Z
FUDA4-S1023	282	238	57.3
FUDA4-S1223	306	260	58.2
FUDA4-S1523	384	310	56.6
FUDA4-S1623	415	265	56.6

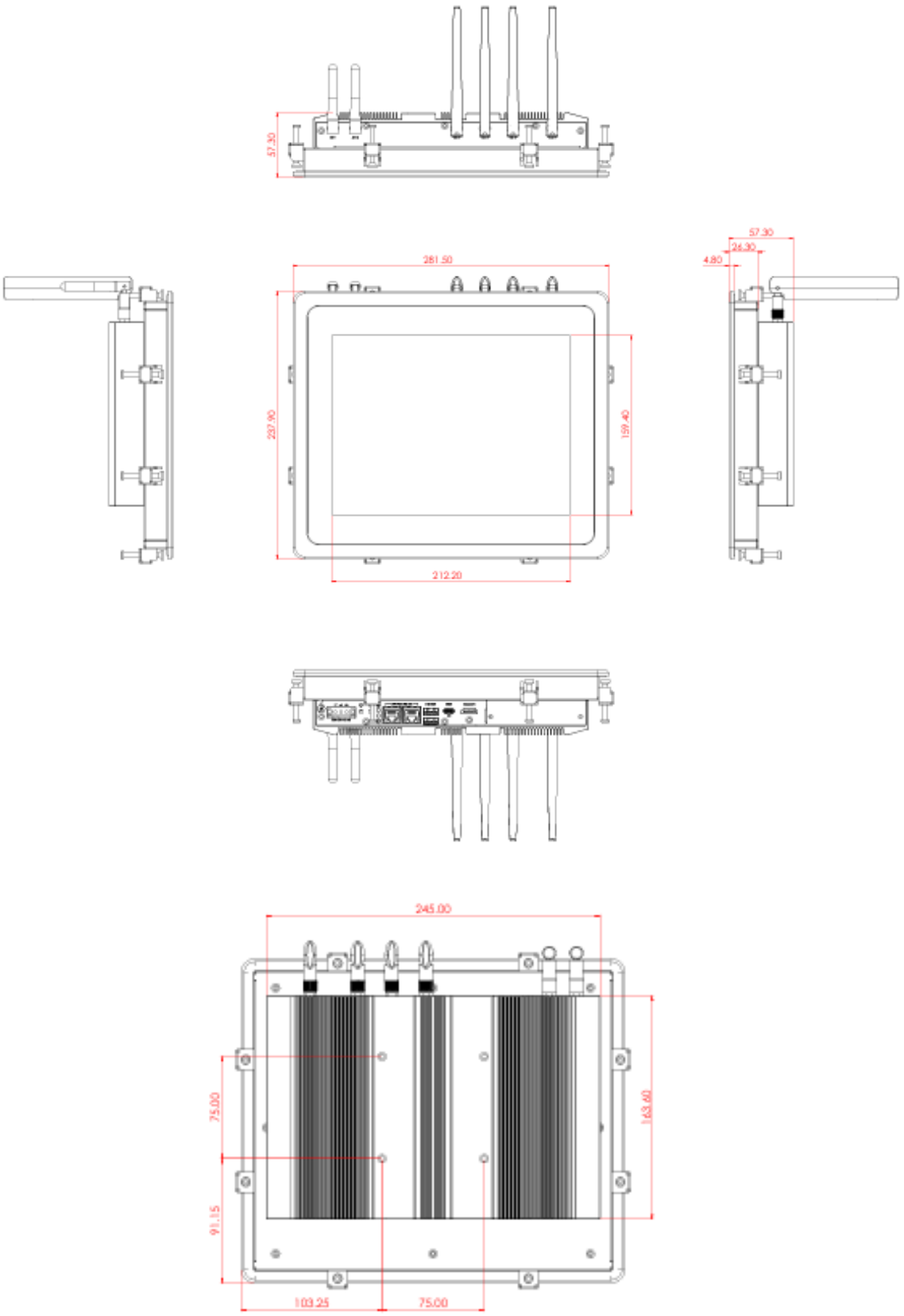


Figure 2 FUDA4-S1023 Mechanical Dimension and VESA(75*75)

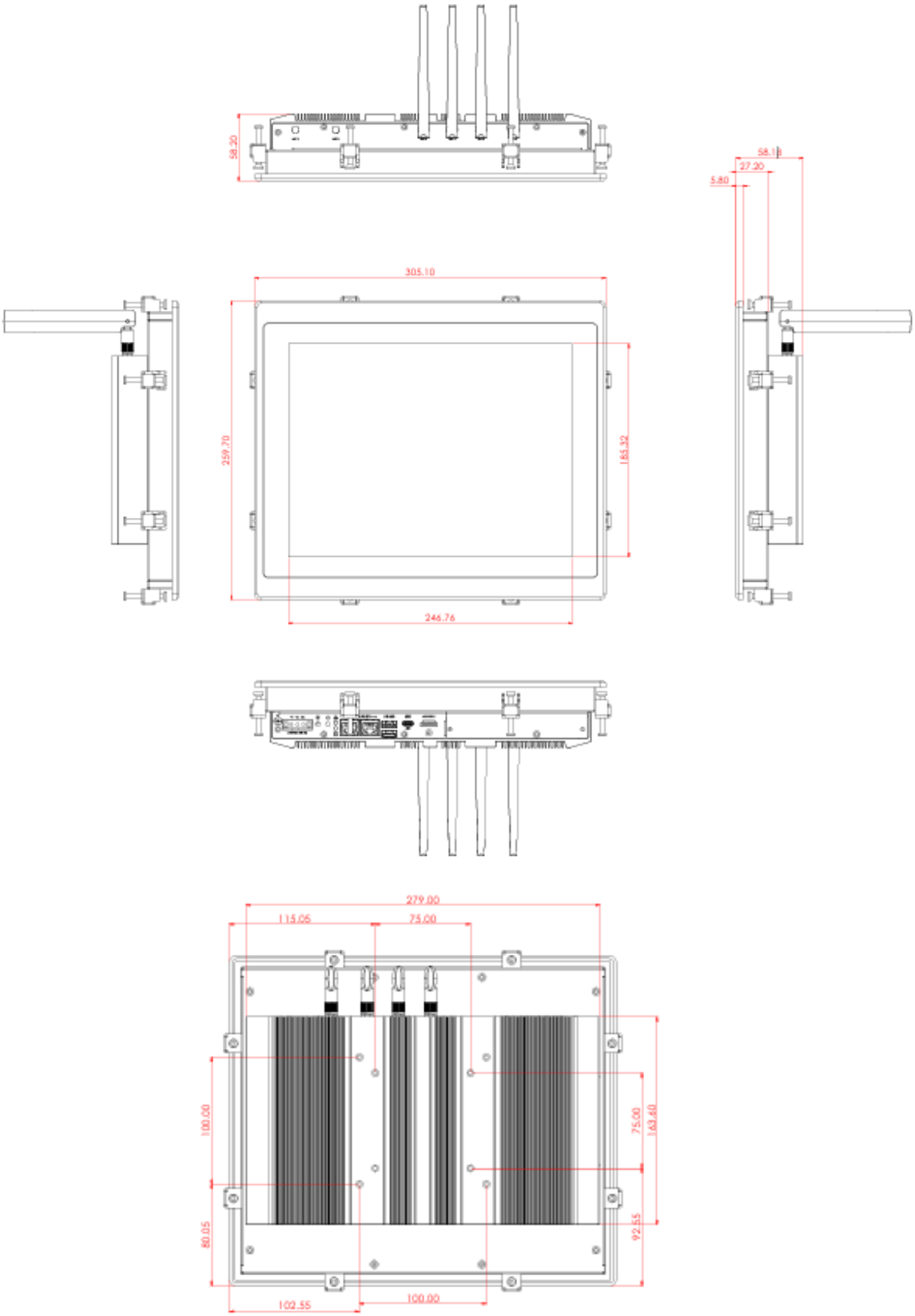


Figure 3 FUDA4-S1223 Mechanical Dimension and VESA(75*75)

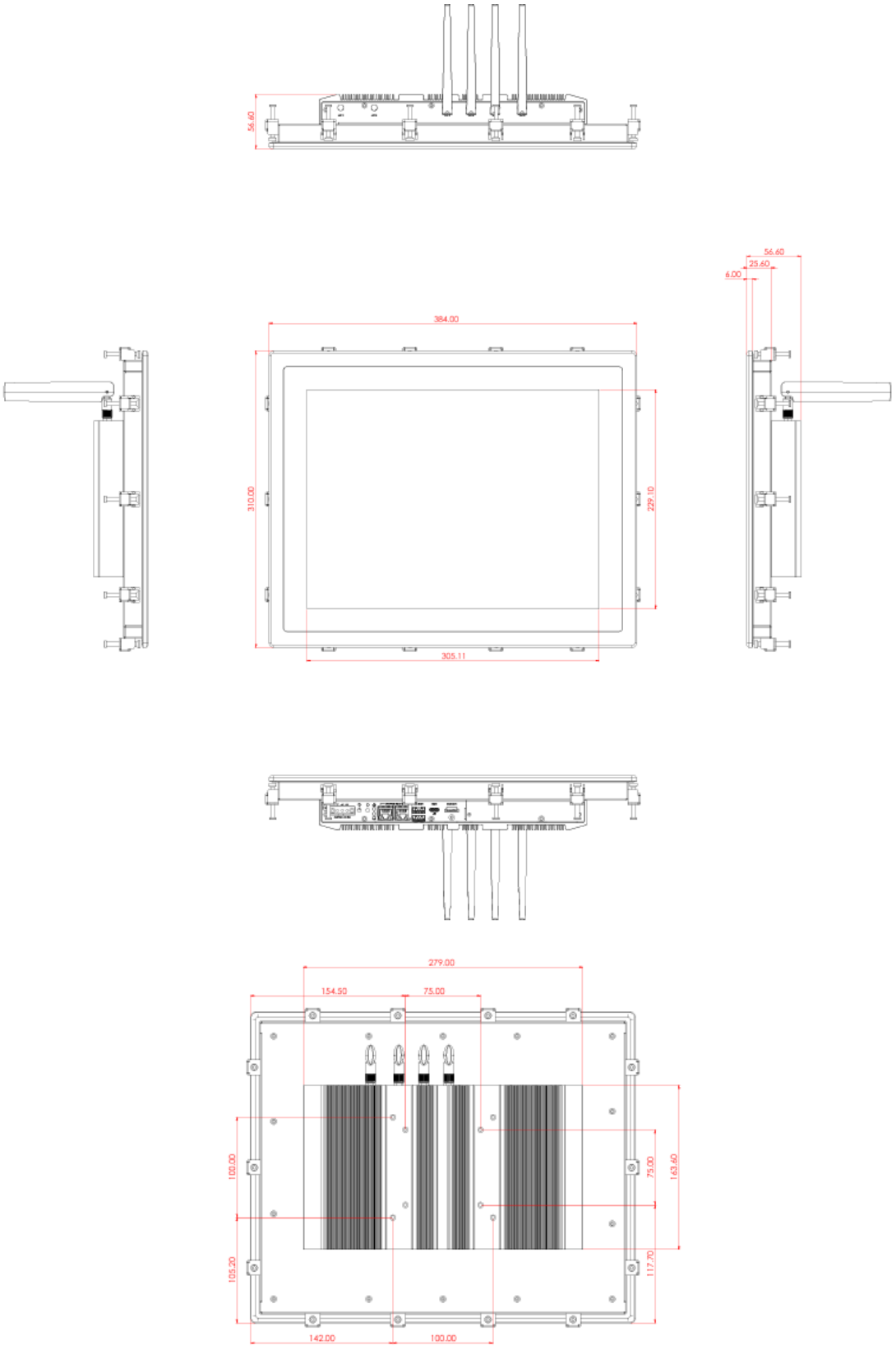


Figure 4 FUDA4-S1523 Mechanical Dimension and VESA(75*75)

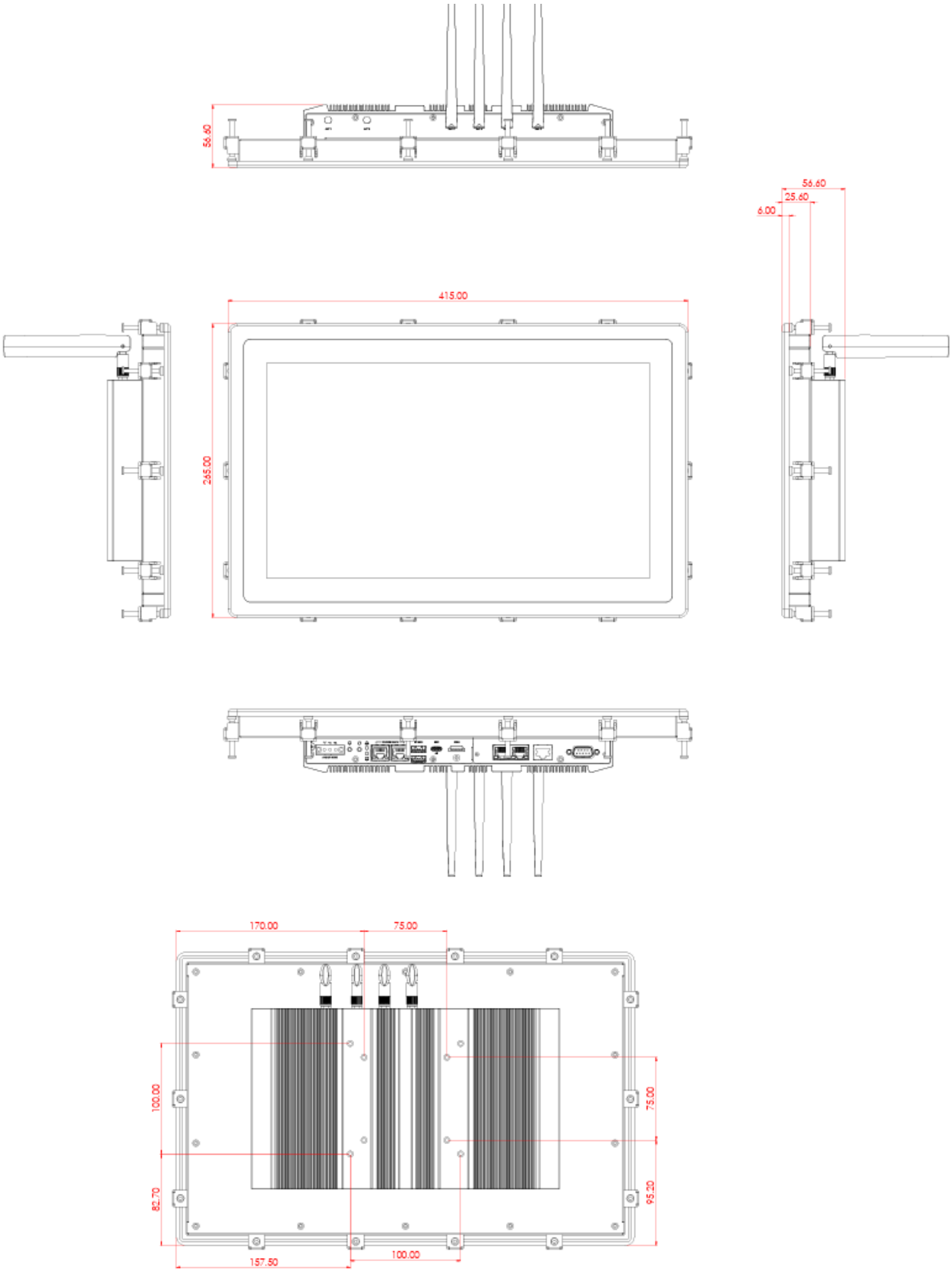


Figure 5 FUDA4-S1623 Mechanical Dimension and VESA(75*75)

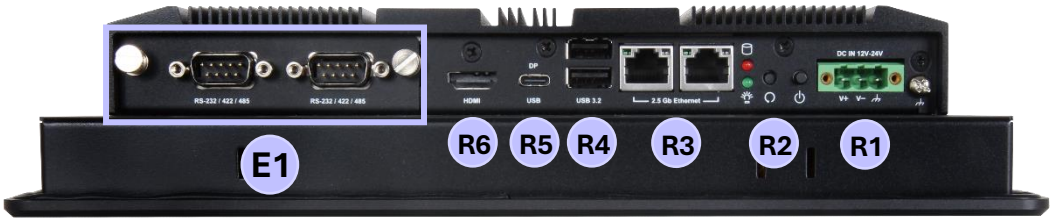
Chapter 2

System Overview

2.1 Rear view
2.2 Jumper setting

2.1 Rear view

- FUDA4-S1023 System



No.	Description
E1	(opt.) Extension I/O board: 2x RS-232/RS-422/RS-485 or N/A
R1	DC 12V-24V 1x 3 pin Terminal Block
R2	1x Power Button, Reset Button 1x Power LED, 1x Storage LED
R3	2x 2.5GbE Ethernet
R4	2x USB 3.2 Gen2
R5	1x USB Type C (DisplayPort/USB 10Gbps support)
R6	1x HDMI® 2.0b

- FUDA4-S1X23 System (X:2、5、6)

No.	Description
E1	(opt.) Extension I/O board:

	- 2x RS-232/RS-422/RS-485 + 2x USB 2.0 - 2x RS-232/RS-422/RS-485 + 1x RS-232 - 2x RS-232/RS-422/RS-485 + 1x 2ch DIDO or N/A
R1	DC 12V-24V 1x 3 pin Terminal Block
R2	1x Power Button, Reset Button 1x Power LED, 1x Storage LED
R3	2x 2.5GbE Ethernet
R4	2x USB 3.2 Gen2
R5	1x USB Type C (DisplayPort/USB 10Gbps support)
R6	1x HDMI® 2.0b

2.2Jumper setting

This chapter indicates jumpers', headers and connectors' locations. Users may find useful information related to hardware settings in this chapter.

Jumper Setting

In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 and Figure 2 for the Jumper allocations.

- **Main Board Drawing Overview**

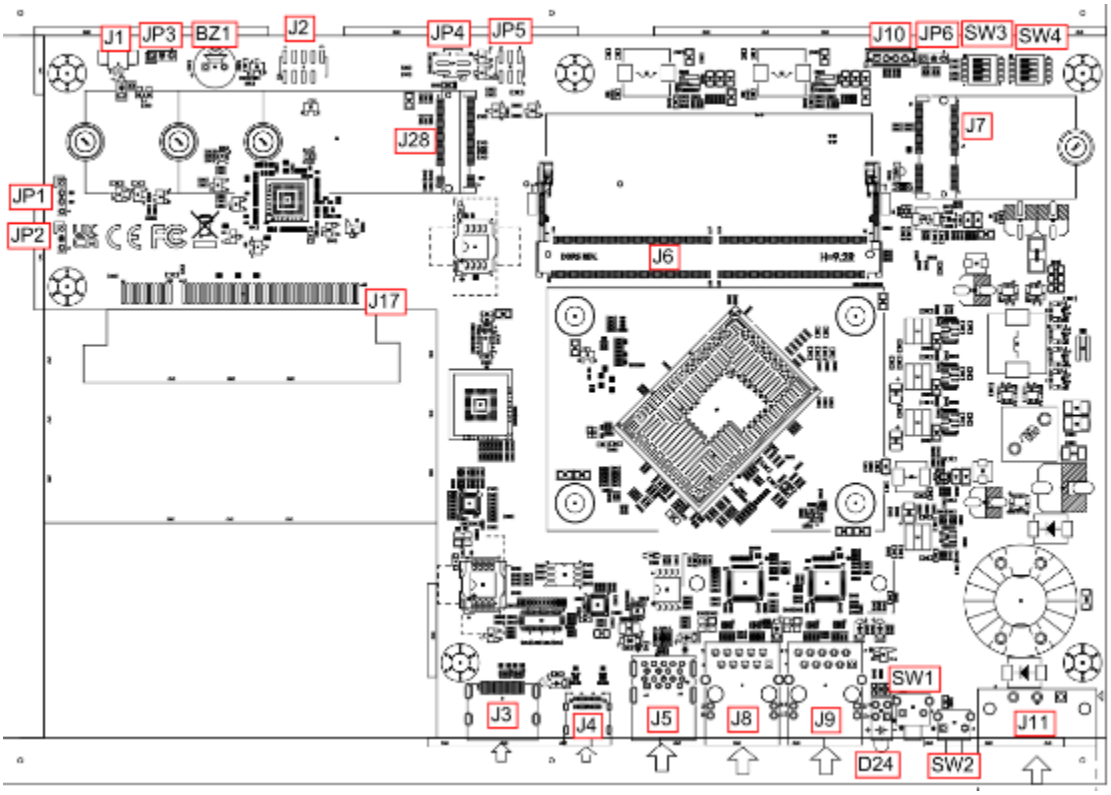


Figure 6 Top View

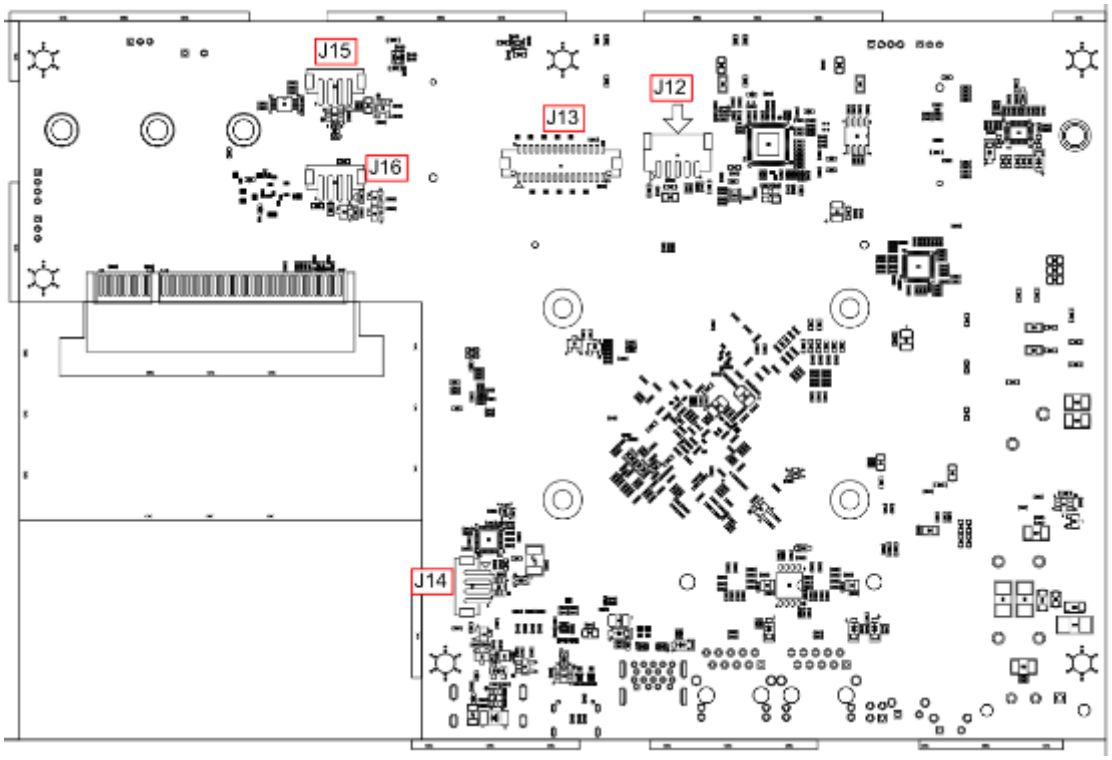


Figure 7 Bottom View

Connector:

J1	Battery Connector
J2	LPC Debug Port
J3	HDMI®
J4	DP ALT mode Type C
J5	USB3.2 Dual
J6	DDR5 SO-DIMM
J7	M.2 Key E_Wi-Fi
J8	2.5G Gigabit Ethernet
J9	2.5G Gigabit Ethernet
J10	CHRONTE IC FW update
J11	DC input Jack
J12	LVDS/eDP backlight
J13	LVDS/eDP signal
J14	Touch Connector
J15	Bezel Connector
J16	Front Panel Connector
J17	PCIe x8 Slot
J28	M.2 Key M_SATA SSD

Jumper (Button):

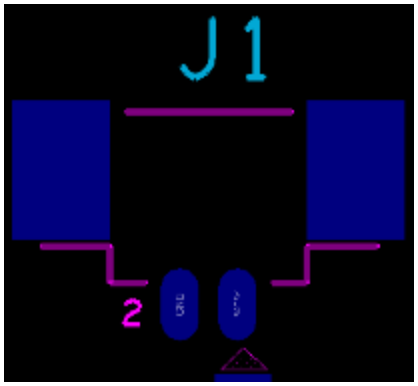
JP1 I2C Debug Port
JP2 AT / ATX Mode Select
JP3 Clear CMOS
JP4 Backlight Enable Pin voltage Select
JP5 Panel VDD voltage Select
JP6 Reserve Vcore IC Debug

SW1 Reset button
SW2 Power button
SW3 Panel Resolution Select
SW4 eDP / LVDS Panel Select

D24 LED

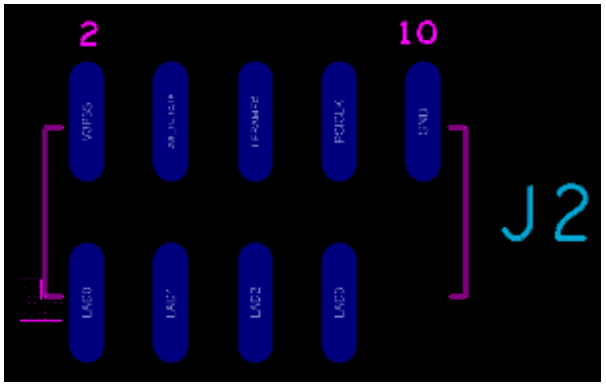
Connector:

J1: Battery Connector



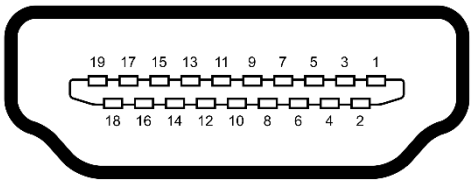
PIN No.	Signal Description
1	BAT3V
2	GND

J2: LPC Debug Port



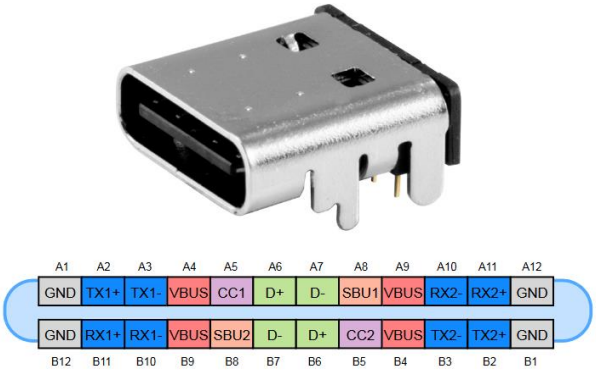
PIN No.	Signal Description	PIN No.	Signal Description
1	**LAD0**	**2**	**V3P3S**
3	LAD1	4	BUF_PLTRST#
5	LAD2	6	LFRAME#
7	LAD3	8	PCICLK
		10	GND

J3: HDMI®



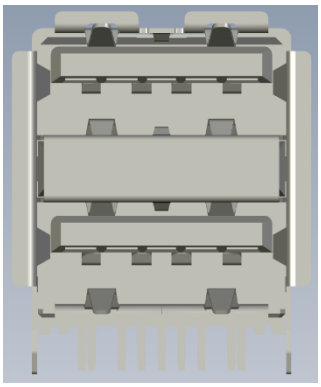
PIN No.	Signal Description	PIN No.	Signal Description
1	D2+	2	D2 shield
3	D2-	4	D1+
5	D1 shield	6	D1-
7	D0+	8	D0 shield
9	D0-	10	CLK+
11	CLK shield	12	CLK-
13	CEC	14	HEC Data / Reserved
15	SCL	16	SDA
17	DDC/CEC/HEC GND	18	5V
19	HPD		

J4: DP ALT mode Type C



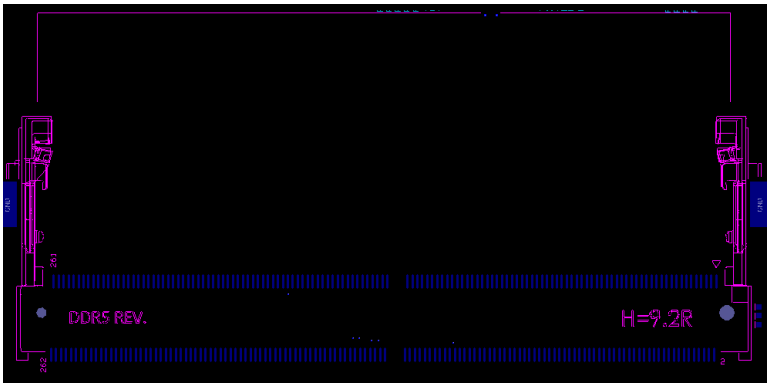
PIN No.	Signal Description	PIN No.	Signal Description
A1	GND	B12	GND
A2	SSTXp1 ("TX1+")	B11	SSRXp1 ("RX1+")
A3	SSTXn1 ("TX1-")	B10	SSRXn1 ("RX1-")
A4	V_{BUS}	B9	V_{BUS}
A5	CC1	B8	SBU2
A6	D+	B7	D-
A7	D-	B6	D+
A8	SBU1	B5	CC2
A9	V_{BUS}	B4	V_{BUS}
A10	SSRXn2 ("RX2-")	B3	SSTXn2 ("TX2-")
A11	SSRXp2 ("RX2+")	B2	SSTXp2 ("TX2+")
A12	GND	B1	GND

J5: USB3.2 Dual



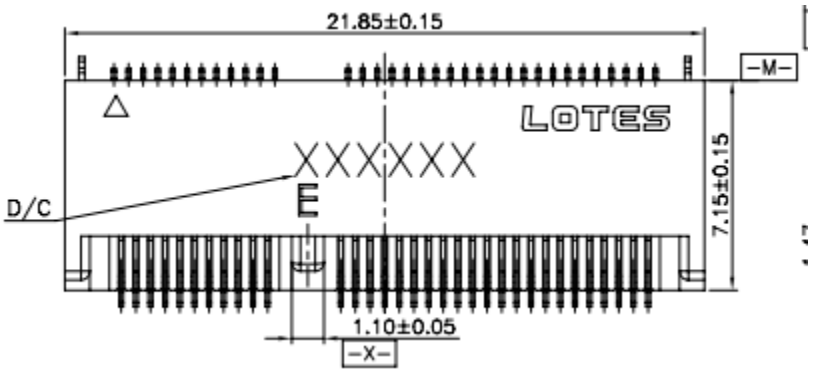
PIN No.	Signal Description	PIN No.	Signal Description
A1	5V	B1	GND
A2	D1-	B2	D0-
A3	D1+	B3	D0+
A4	GND	B4	GND
A5	SSRX1-	B5	SSRX0-
A6	SSRX1+	B6	SSRX0+
A7	GND	B7	GND
A8	SSTX1-	B8	SSTX0-
A9	SSTX1+	B9	SSTX0+

J6: DDR5 SO-DIMM



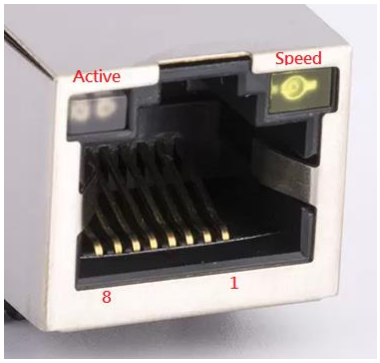
Follow DDR5 Specification

J7: M.2 Key E_Wi-Fi



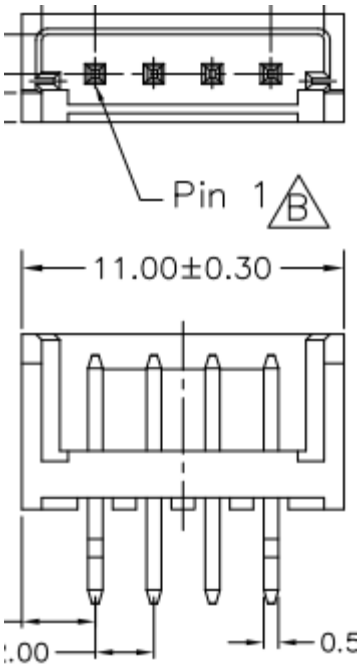
Follow PCI Express M.2 Specification Ver5.1

J8、J9: 2.5G Gigabit Ethernet



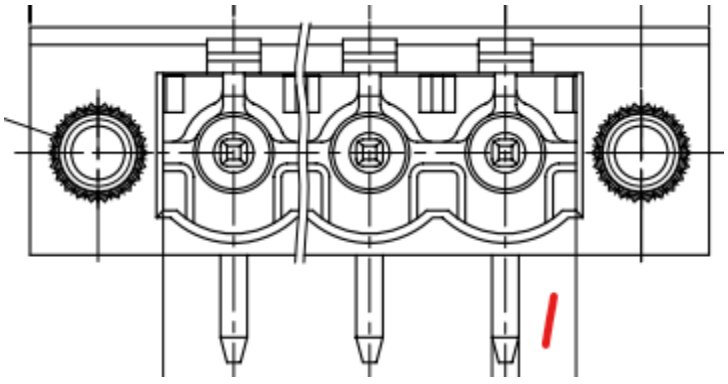
PIN No.	Signal Description
1	TRxP0
2	TRxN0
3	TRxP1
4	TRxP2
5	TRxN2
6	TRxN1
7	TRxP3
8	TRxN3

J10: CHRONTE IC FW update



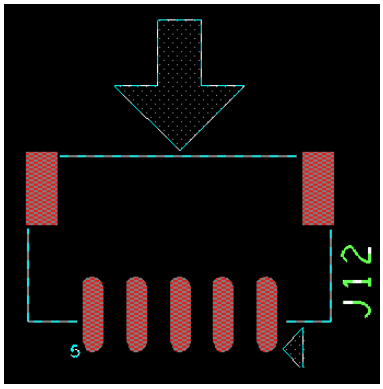
PIN No.	Signal Description
1	3.3V
2	SMB_DATA
3	SMB_CLK
4	GND

J11 DC input Jack



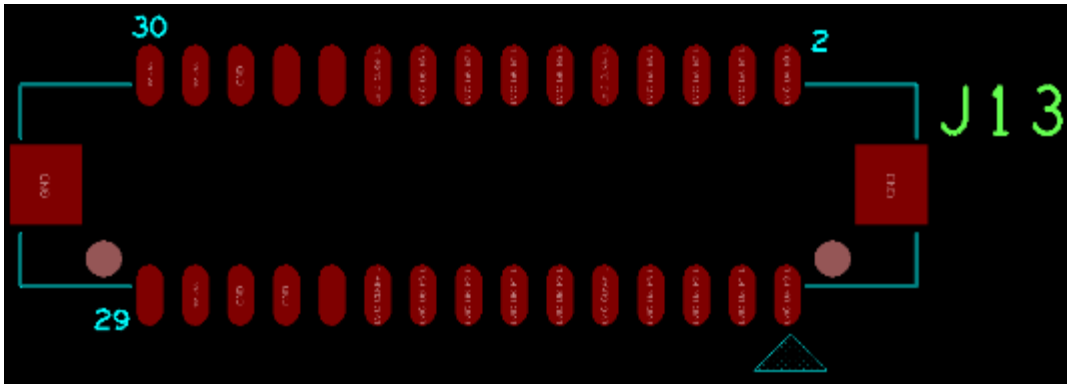
PIN No.	Signal Description
1	GND_EARTH
2	GND
3	Vin

J12: LVDS/eDP backlight



PIN No.	Signal Description
1	BL_ENABLE
2	GND
3	12V
4	BL_PWM
5	5V

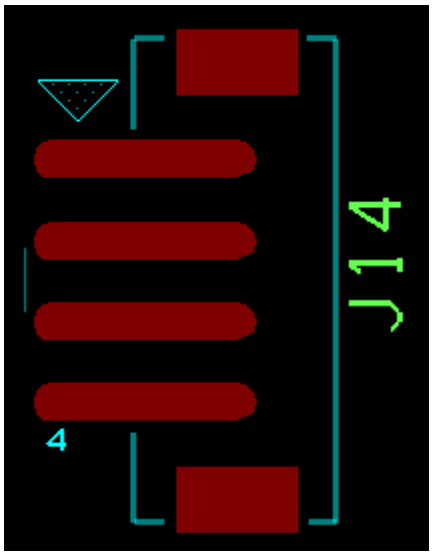
J13: LVDS/eDP signal



PIN No.	Signal Description	PIN No.	Signal Description
1	LVIC_DA_P0_L	2	LVIC_DA_N0_L
3	LVIC_DA_P1_L / eDP_TX1_P	4	LVIC_DA_N1_L / eDP_TX1_N
5	LVIC_DA_P2_L / eDP_TX0_P	6	LVIC_DA_N2_L / eDP_TX0_N

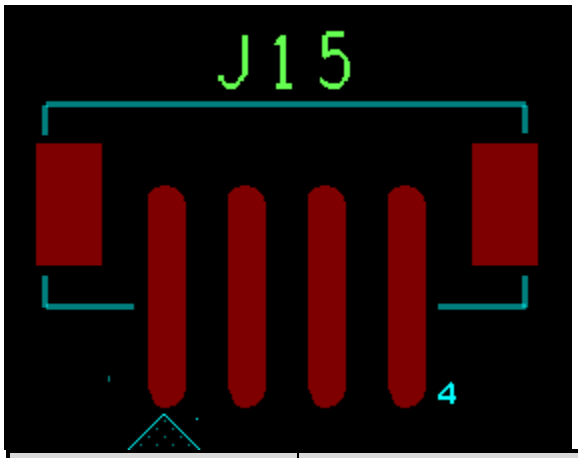
7	LVIC_DA_P3_L	8	LVIC_DA_N3_L
9	LVIC_CLKA+_L / eDP_AUX_P	10	LVIC_CLKA-_L / eDP_AUX_N
11	LVIC_DB_P0_L	12	LVIC_DB_N0_L
13	LVIC_DB_P1_L	14	LVIC_DB_N1_L
15	LVIC_DB_P2_L	16	LVIC_DB_N2_L
17	LVIC_DB_P3_L	18	LVIC_DB_N3_L
19	LVIC_CLKB+_L	20	LVIC_CLKB-_L
21	LVDS0_DDC_CLK	22	LVDS0_DDC_DATA
23	GND	24	EDP_HPD_Panel
25	GND	26	GND
27	VDD_LVDS	28	VDD_LVDS
29	NC	30	VDD_LVDS

J14: Touch Connector



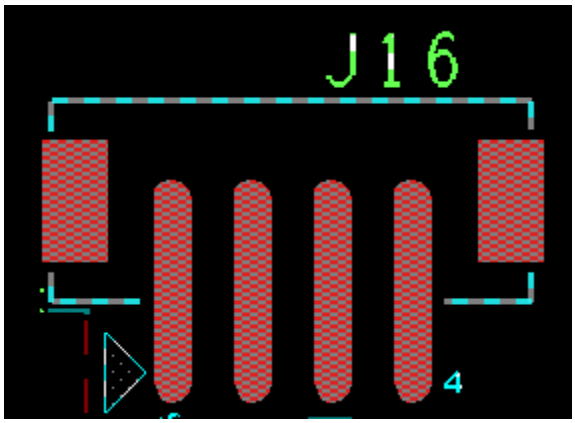
PIN No.	Signal Description
1	5V
2	USB_D-
3	USB_D+
4	GND

J15: Bezel Connector



PIN No.	Signal Description
1	5V
2	USB_D-
3	USB_D+
4	GND

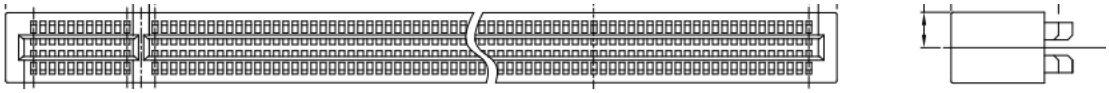
J16: Front Panel Connector



PIN No.	Signal Description
1	GND
2	Power Button
3	PHONT_LED1
4	PHONT_LED2

PHONT_LED1	PHONT_LED2
S0：L	S0：H
S5：H	S5：L

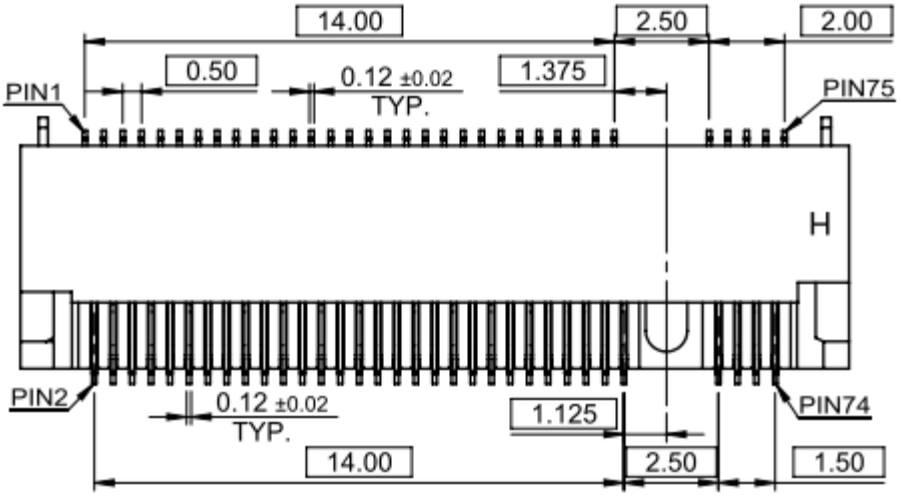
J17: PCIe x8 Slot



PIN No.	Signal Description	PIN No.	Signal Description
A1	V3P3A	B1	V3P3S
A2	V3P3A	B2	V3P3S
A3	V3P3A	B3	V3P3S
A4	GND	B4	GND
A5	GPI0	B5	GPO0
A6	GPI1	B6	GPO1
A7	GPI2	B7	GPO2
A8	GPI3	B8	GPO3
A9	V12P0A	B9	V5P0A
A10	V12P0A	B10	V5P0A
A11	PCIE_RST#	B11	PCIE_WAKE#
A12	NC	B12	GND
A13	PCIE_CLKREQ4_N	B13	PCIECLK_DIFF_N4
A14	PCIE_CLKREQ3_N	B14	PCIECLK_DIFF_P4
A15	NC	B15	GND
A16	NC	B16	PCIECLK_DIFF_N3
A17	KBC_SLP_S3#	B17	PCIECLK_DIFF_P3
A18	GND	B18	GND
A19	PCIE_TXN12_C	B19	PWRBTN#_D
A20	PCIE_TXP12_C	B20	GND
A21	GND	B21	PCIE_RXN12
A22	GND	B22	PCIE_RXP12
A23	PCIE_TXN4_C	B23	GND
A24	PCIE_TXP4_C	B24	GND
A25	GND	B25	PCIE_RXN4
A26	GND	B26	PCIE_RXP4
A27	PCIE_TXN3_C	B27	GND

A28	PCIE_TXP3_C	B28	GND
A29	GND	B29	PCIE_RXN3
A30	USB_PN3	B30	PCIE_RXP3
A31	USB_PP3	B31	GND
A32	USB2_OC3	B32	LAD0
A33	USB_PN2	B33	LAD1
A34	USB_PP2	B34	LAD2
A35	NC	B35	LAD3
A36	HDA_BCLK	B36	LRESET#
A37	HDA_SYNC	B37	PCICLK
A38	HDA_SDO	B38	LFRAME#
A39	HDA_SDI0	B39	SERIRQ
A40	HDA_RST	B40	GPIO1_R / Reserved
A41	SP339_COM1_Mode0	B41	GPIO2_R / Reserved
A42	SP339_COM1_Mode1	B42	GPIO3_R / Reserved
A43	SP339_COM1_Mode2	B43	GPIO4_R / Reserved
A44	NC	B44	SMB_CLK
A45	SP339_COM2_Mode0	B45	SMB_DAT
A46	SP339_COM2_Mode1	B46	SMB_ALT#
A47	SP339_COM2_Mode2	B47	NC
A48	NC	B48	RSTBTN#
A49	NC	B49	BUF_PLTRST#

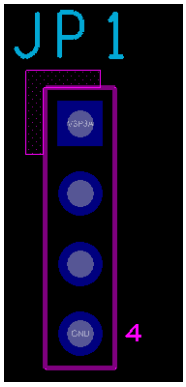
J28: M.2 Key M_SATA SSD



Follow PCI Express M.2 Specification Ver5.1

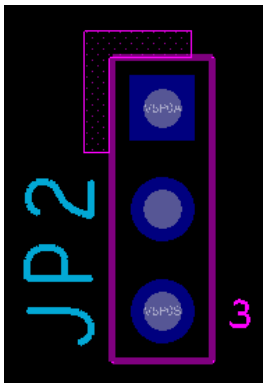
Jumper:

JP1: I2C Debug Port



PIN No.	Signal Description
1	3.3V
2	CLK
3	DATA
4	GND

JP2: AT / ATX Mode Select

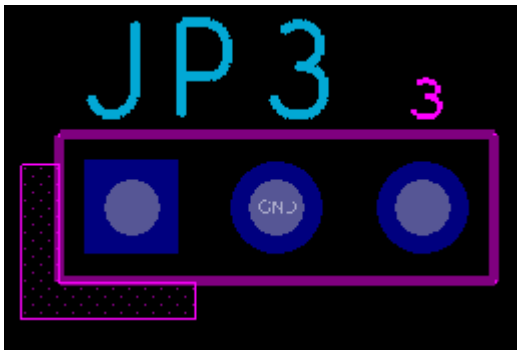


PIN No.	Signal Description
1	V5P0A
2	V5S_EC
3	V5P0S

1-2 AT MODE

2-3 ATX MODE(DEFAULT)

JP3: Clear CMOS

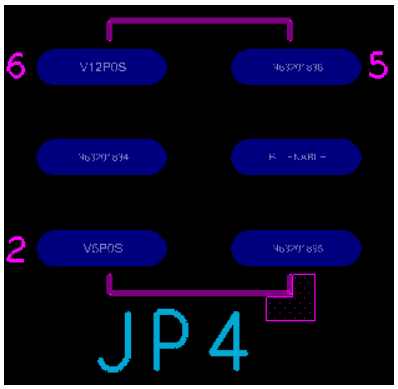


1-2 CLR CMOS

2-3 CLR ME RTC

Floating(DEFAULT)

JP4: Backlight Enable Pin voltage Select



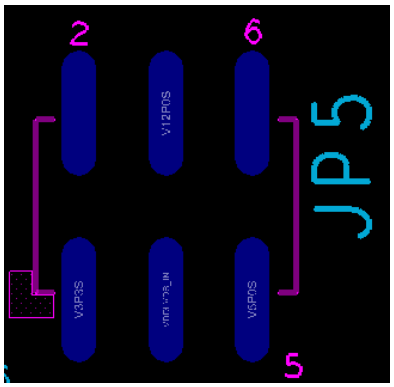
1-3, 2-4 5V, Active High (DEFAULT)

1-3, 4-6 12V, Active High

3-5,2-4 5V, Active Low

3-5,4-6 12V, Active Low

JP5: Panel VDD voltage Select

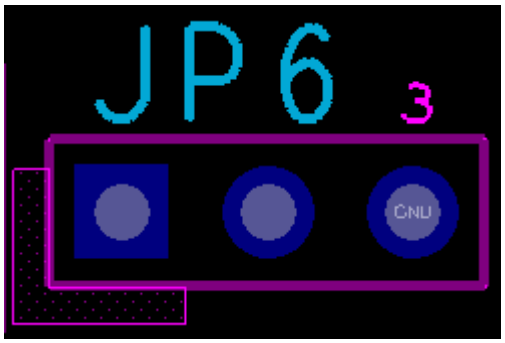


1-3 VDD_LVDS = 3.3V

3-4 VDD_LVDS = 12V

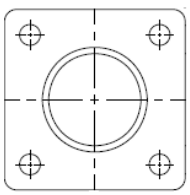
3-5 VDD_LVDS = 5V

JP6: Reserve Vcore IC Debug



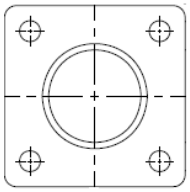
PIN No.	Signal Description
1	SDA
2	SCL
3	GND

SW1: Reset button



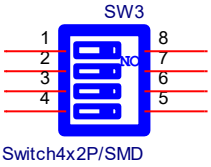
MODE	Jumper Setting
Release	Normal
Push	Reset system

SW2: Power button



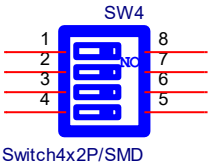
MODE	Jumper Setting
Release	Normal
Push	Recover

SW3: Panel Resolution Select



	SW3	GP0 Pin 1	GP1 Pin 2	GP2 Pin 3	GP3 Pin 4	Resolution		
00		ON	ON	ON	ON	800 x 600	24 bit	Single Channel
01		OFF	ON	ON	ON	1024 x 768	18 bit	Single Channel
02	default	ON	OFF	ON	ON	1024 x 768	24 bit	Single Channel
03		OFF	OFF	ON	ON	1280 x 768	18 bit	Single Channel
04		ON	ON	OFF	ON	1280 x 800	18 bit	Single Channel
05		OFF	ON	OFF	ON	1280 x 960	18 bit	Single Channel
06		ON	OFF	OFF	ON	1280 x 1024	24 bit	Dual Channel
07		OFF	OFF	OFF	ON	1366 x 768	18 bit	Single Channel
08		ON	ON	ON	OFF	1366 x 768	24 bit	Single Channel
09		OFF	ON	ON	OFF	1440 x 900	24 bit	Dual Channel
10		ON	OFF	ON	OFF	1400 x 1050	24 bit	Dual Channel
11		OFF	OFF	ON	OFF	1600 x 900	24 bit	Dual Channel
12		ON	ON	OFF	OFF	1680 x 1050	24 bit	Dual Channel
13		OFF	ON	OFF	OFF	1600 x 1200	24 bit	Dual Channel
14		ON	OFF	OFF	OFF	1920 x 1080	24 bit	Dual Channel
15	eDP bypass	OFF	OFF	OFF	OFF	1920 x 1200	24 bit	Dual Channel

SW4: eDP / LVDS Panel Select



FOR LVDS PANEL(Default)

1-8、3-6 ON

2-7、4-5 OFF

FOR eDP PANEL

1-8、3-6 OFF

2-7、4-5 ON

D24: LED

R：SATA

G：Power LED

- **Extension I/O Board(2x RS-232/RS-422/RS-485) Drawing**

  Overview

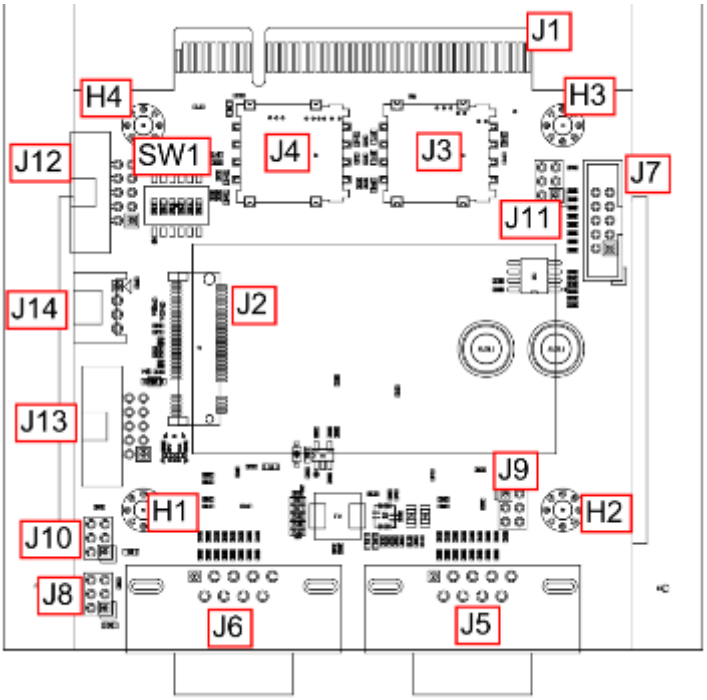


Figure 8 Top View

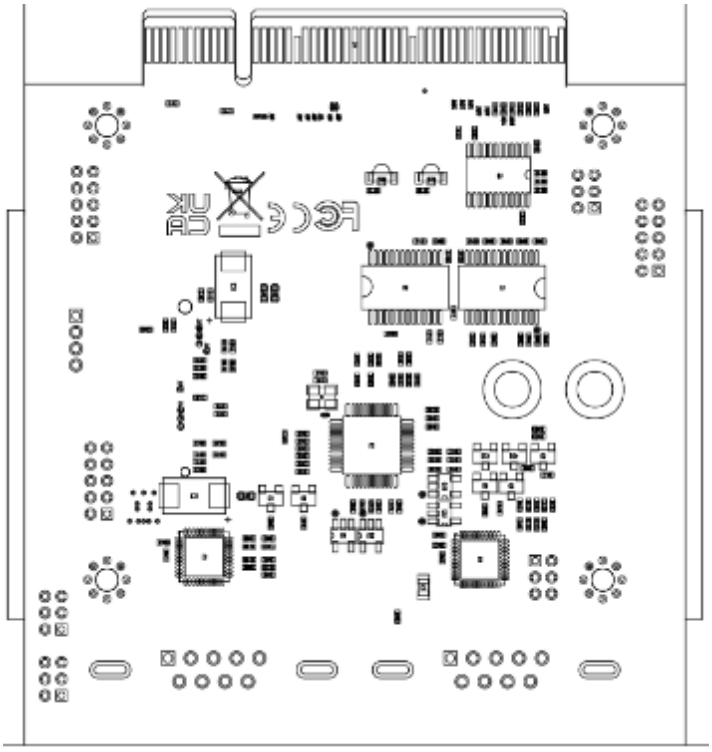


Figure 9 Bottom View

Specification

Connector:

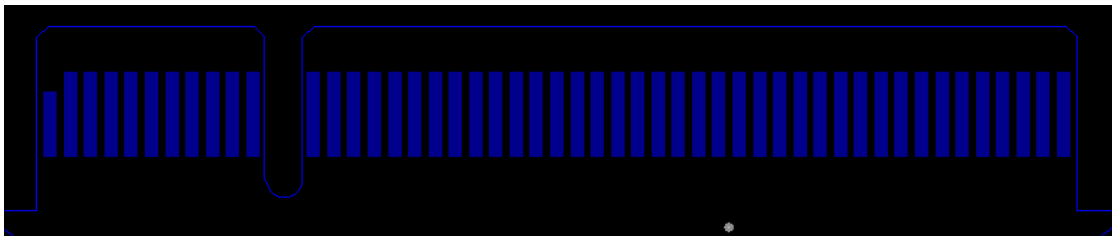
J1	PCIex8 Golden Finger
J2	M.2 Key B_WWAN
J3	Micro SIM
J4	Micro SIM
J5	DB9：RS232、422、485
J6	DB9：RS232、422、485
J7	Box Header：RS232
J12	Box Header：GPIO
J13	Box Header：RS232
J14	Wafer：USB2.0

Jumper (DIP Switch):

J8	COM 1's RI Select
J9	COM 2's RI Select
J10	COM 3's RI Select
J11	COM 4's RI Select
SW1	M.2 Key B module Select

Connector:

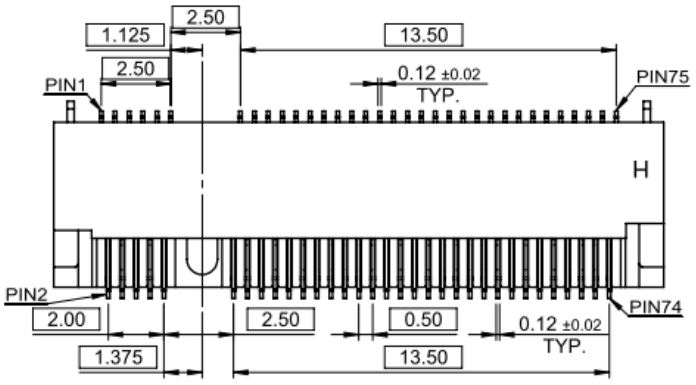
J1: PCIex8 Golden Finger



PIN No.	Signal Description	PIN No.	Signal Description
A1	V3P3A	B1	V3P3S
A2	V3P3A	B2	V3P3S
A3	V3P3A	B3	V3P3S
A4	GND	B4	GND
A5	GPI0	B5	GPO0
A6	GPI1	B6	GPO1
A7	GPI2	B7	GPO2
A8	GPI3	B8	GPO3
A9	V12P0A	B9	V5P0A
A10	V12P0A	B10	V5P0A
A11	PCIE_RST#	B11	PCIE_WAKE#
A12	NC	B12	GND
A13	PCIE_CLKREQ4_N	B13	PCIECLK_DIFF_N4
A14	PCIE_CLKREQ3_N	B14	PCIECLK_DIFF_P4
A15	NC	B15	GND
A16	NC	B16	PCIECLK_DIFF_N3
A17	KBC_SLP_S3#	B17	PCIECLK_DIFF_P3
A18	GND	B18	GND
A19	PCIE_TXN12_C	B19	PWRBTN#_D
A20	PCIE_TXP12_C	B20	GND
A21	GND	B21	PCIE_RXN12

A22	GND	B22	PCIE_RXP12
A23	PCIE_TXN4_C	B23	GND
A24	PCIE_TXP4_C	B24	GND
A25	GND	B25	PCIE_RXN4
A26	GND	B26	PCIE_RXP4
A27	PCIE_TXN3_C	B27	GND
A28	PCIE_TXP3_C	B28	GND
A29	GND	B29	PCIE_RXN3
A30	USB_PN3	B30	PCIE_RXP3
A31	USB_PP3	B31	GND
A32	USB2_OC3	B32	LAD0
A33	USB_PN2	B33	LAD1
A34	USB_PP2	B34	LAD2
A35	NC	B35	LAD3
A36	HDA_BCLK	B36	LRESET#
A37	HDA_SYNC	B37	PCICLK
A38	HDA_SDO	B38	LFRAME#
A39	HDA_SDI0	B39	SERIRQ
A40	HDA_RST	B40	GPIO1_R / Reserved
A41	SP339_COM1_Mode0	B41	GPIO2_R / Reserved
A42	SP339_COM1_Mode1	B42	GPIO3_R / Reserved
A43	SP339_COM1_Mode2	B43	GPIO4_R / Reserved
A44	NC	B44	SMB_CLK
A45	SP339_COM2_Mode0	B45	SMB_DAT
A46	SP339_COM2_Mode1	B46	SMB_ALT#
A47	SP339_COM2_Mode2	B47	NC
A48	NC	B48	RSTBTN#
A49	NC	B49	BUF_PLTRST#

J2: M.2 Key B_WWAN



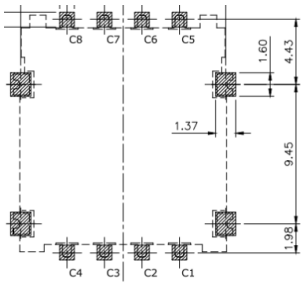
PIN No.	Signal Description	PIN No.	Signal Description
1	M2_CONFIG_3	2	+V3P3A_LTE
3	GND	4	+V3P3A_LTE
5	GND	6	M1_Power_OFF_N
7	M2_USB_DP	8	M1_W_DISABLE1_N
9	M2_USB_DN	10	M1_WWAN_LED_N
11	GND	12 ~ 19	M.2 B key
21	M2_CONFIG_0	20	NC
23	PCIE_WAKE#	22	NC
25	NC	24	NC
27	GND	26	M1_Sierra_GPS_DIS#
29	USB3_SSRXN_P0 / PCIE_RXN4	28	NC
31	USB3_SSRXP_P0 / PCIE_RXP4	30	M1_UIM1_REST
33	GND	32	M1_UIM1_CLK
35	USB3_SSTXN_P0 / PCIE_TXN4	34	M1_UIM1_DAT
37	USB3_SSTXP_P0 / PCIE_TXP4	36	M1_UIM1_PWR
39	GND	38	NC
41	PCIE_RXN3	40	M1_UIM2_DETK
43	PCIE_RXP3	42	M1_UIM2_DAT

45	GND	44	M1_UIM2_CLK
47	PCIE_TXN3	46	M1_UIM2_REST
49	PCIE_TXP3	48	M1_UIM2_PWR
51	GND	50	PCIE_RST_N
53	PCIECLK_DIFF_N3	52	PCIE_CLKREQ3_N
55	PCIECLK_DIFF_P3	54	PCIE_WAKE#
57	GND	56	NC
59	NC	58	NC
61	NC	60	NC
63	NC	62	NC
65	NC	64	NC
67	NC	66	M1_UIM1_DETK
69	M2_CONFIG_1	68	NC
71	GND	70	+V3P3A_LTE
73	GND	72	+V3P3A_LTE
75	M2_CONFIG_2	74	+V3P3A_LTE

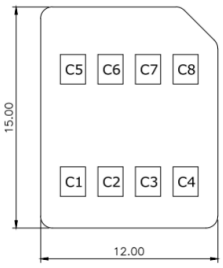
J3、J4 : Micro SIM

J3 SIM1

J4 SIM2



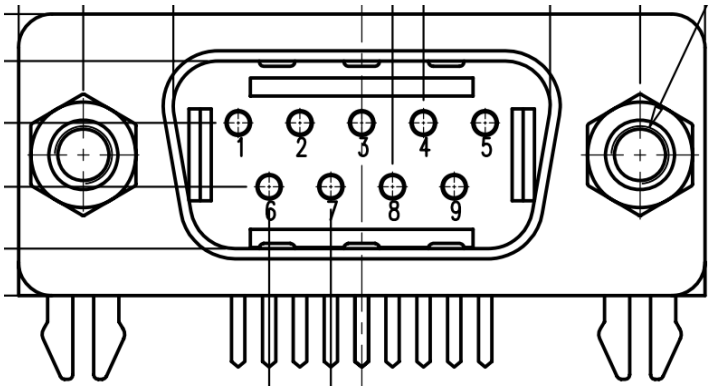
RECOMMEND LAYOUT (TOP VIEW)
GENERAL TOLERANCE ±0.05mm



MICRO SIM CARD
PAD LAYOUT

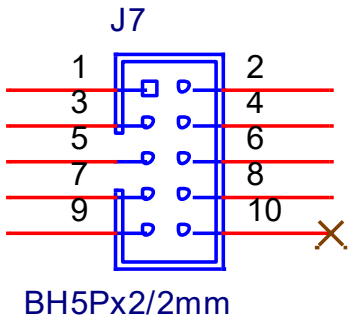
PIN No.	Signal Description	PIN No.	Signal Description
1	VCC	2	RST
3	CLK	4	NC
5	GND	6	NC
7	DAT	8	NC

J5、J6 : DB9 : RS232、422、485



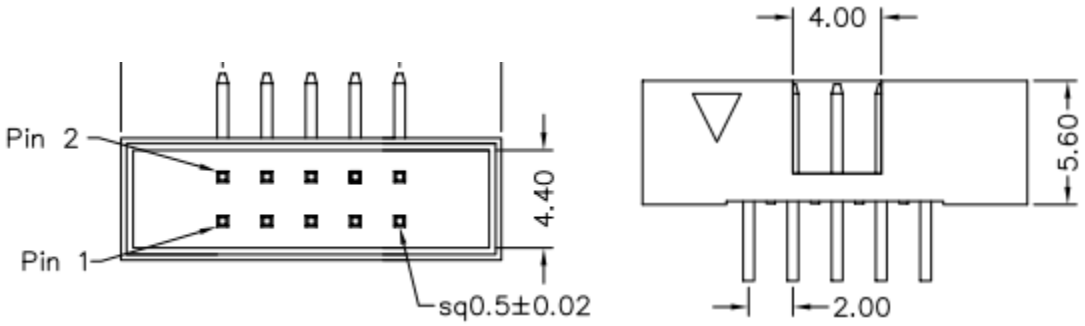
PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#/DT-	2	RXD#/DT+
3	TXD#/422R+	4	DTR#/422R-
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#/5V/12V		

J7 : Box Header : RS232



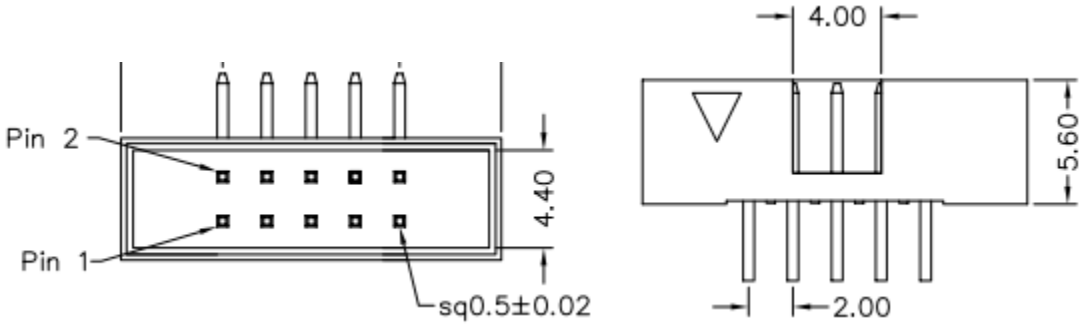
PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#	2	RXD#
3	TXD#	4	DTR#
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#/5V/12V	10	NC

J12 : Box Header：GPIO



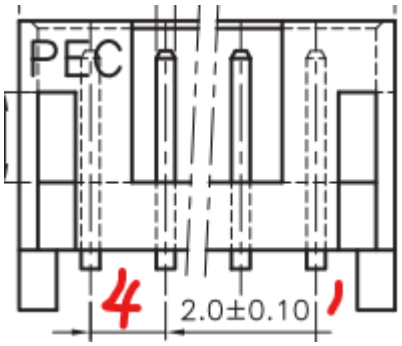
PIN No.	Signal Description	PIN No.	Signal Description
1	GPO0	2	GPI0
3	GPO1	4	GPI1
5	GPO2	6	GPI2
7	GPO3	8	GPI3
9	GND	10	3.3V

J13 : Box Header：RS232



PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#	2	RXD#
3	TXD#	4	DTR#
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#/5V/12V	10	NC

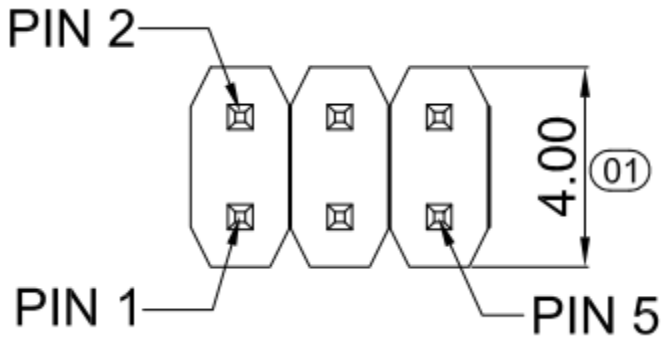
J14 : Wafer：USB2.0



PIN No.	**Signal Description**
1	5V
2	USB_D-
3	USB_D+
4	GND

Jumper:

J8、J9、J10、J11 : COM Port's RI Select

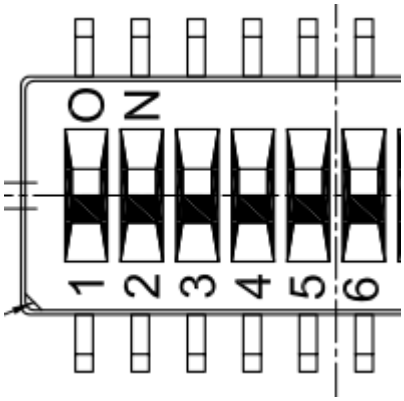


1-2 COM Port's RI Pin is 12V

3-4 COM Port's RI Pin is RI# (DEFAULT)

5-6 COM Port's RI Pin is 5V

SW1: M.2 Key B module Select



	Module \ SW1	Pin1	Pin2	Pin3	Pin4	Pin5	Pin6
Default	4G、5G SIM 1	ON	ON	OFF	OFF	ON	OFF
	4G、5G SIM 2	ON	ON	OFF	OFF	OFF	ON
	Hailo-8 (AI)	ON	OFF	ON	ON	OFF	OFF

- **Extension I/O Board(1x 2ch DIDO) Drawing Overview**

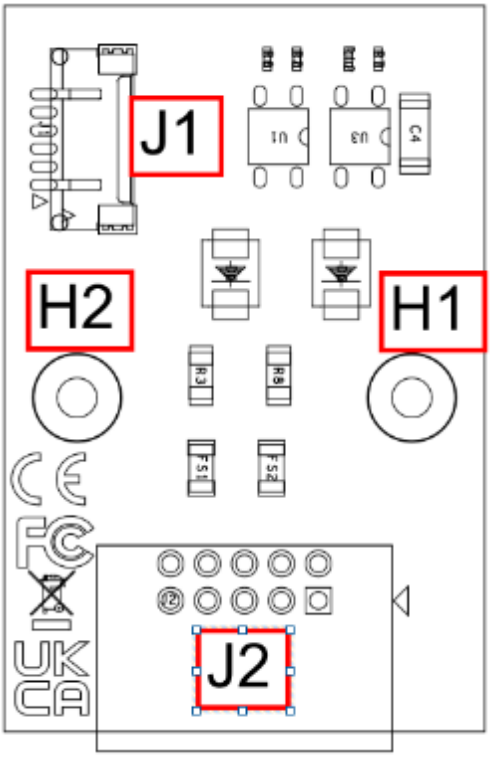


Figure 10 Top View

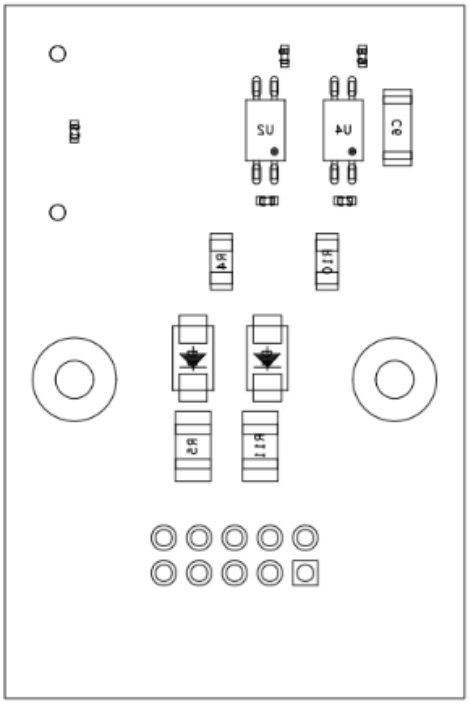


Figure 11 Bottom View

Specification

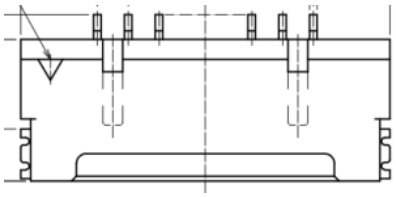
Connector:

J1　Wafer：GPIO (input)

J2　Isolated GPIO (output)

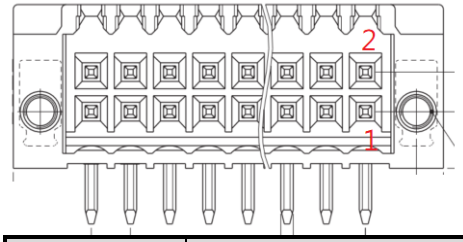
Connector:

J1 : Wafer：GPIO (input)



PIN No.	**Signal Description**
1	GND
2	GPI0
3	GPI1
4	3.3V
5	GPO0
6	GPO1

J2 : Isolated GPIO (output)



PIN No.	**Signal Description**	PIN No.	**Signal Description**
1	GPI_GND	2	GPO_GND
3	NC	4	GPO_1
5	NC	6	GPO_0
7	NC	8	GPI_1
9	NC	10	GPI_0

- **Extension I/O Board(1x RS-232) Drawing Overview**

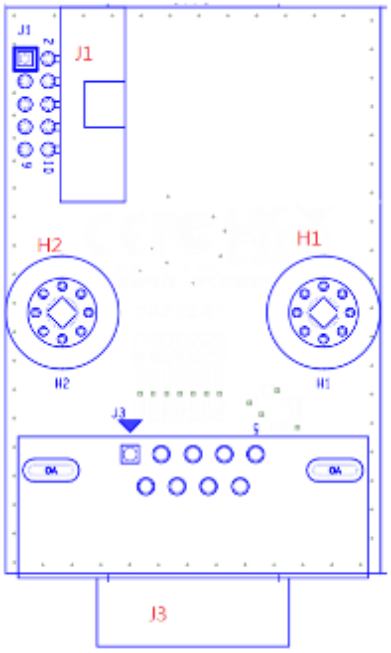


Figure 12 Top View

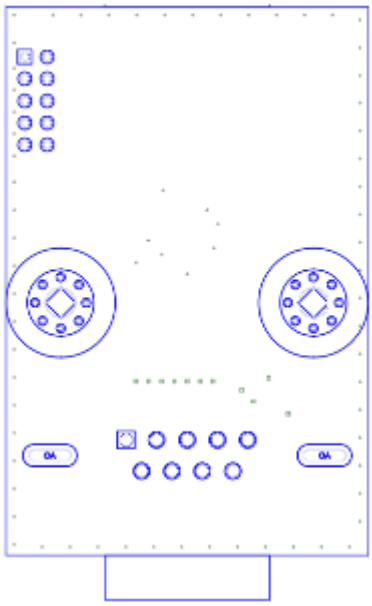


Figure 13 Bottom View

Specification

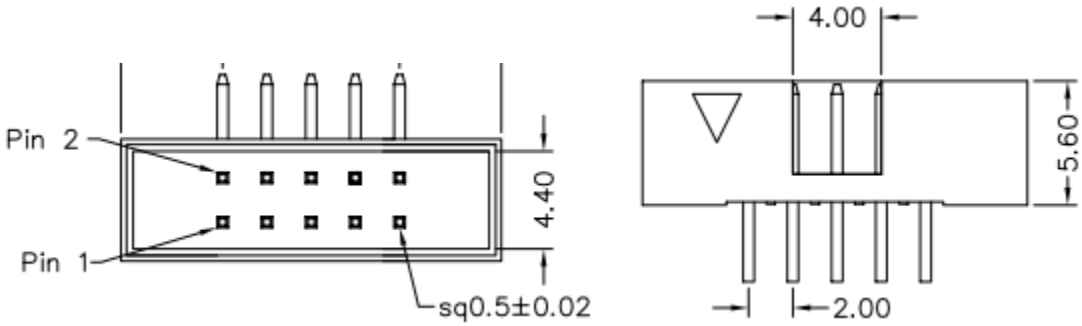
Connector:

J1　Box Header：RS232 (input)

J3　　DB9：RS232 (output)

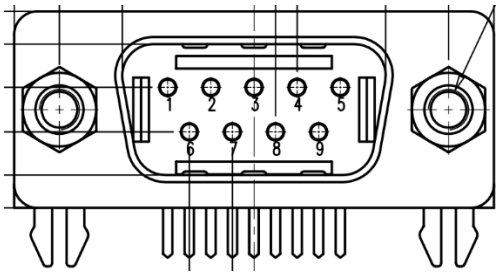
Connector:

J1 : Box Header：RS232



PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#	2	RXD#
3	TXD#	4	DTR#
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#	10	NC

J3: DB9：RS232



PIN No.	Signal Description	PIN No.	Signal Description
1	DCD#/DT-	2	RXD#/DT+
3	TXD#/422R+	4	DTR#/422R-
5	GND	6	DSR#
7	RTS#	8	CTS#
9	RI#/5V/12V		

- **Extension I/O Board(2x USB 2.0) Drawing Overview**

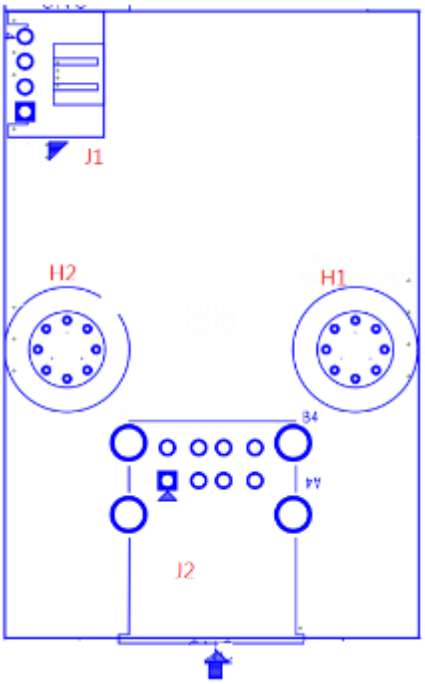


Figure 14 Top View

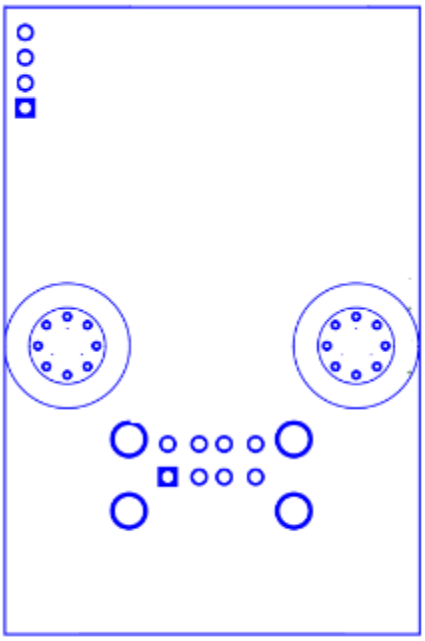


Figure 15 Bottom View

Specification

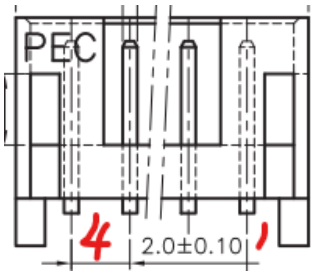
Connector:

J1 Wafer：USB2.0 (input)

J2 USB 2.0 Dual (output)

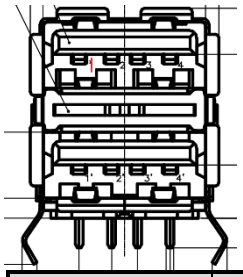
Connector:

J1 : Wafer：USB2.0



PIN No.	**Signal Description**
1	5V
2	USB_D-
3	USB_D+
4	GND

J2 : USB 2.0 Dual



PIN No.	**Signal Description**
up	
1	5V
2	USB_D-
3	USB_D+
4	GND
down	
1	5V
2	USB_D-
3	USB_D+
4	GND

Chapter 3

System Installation

3.1 Opening the Chassis
3.2 Memory installation
3.3 5G module installation
3.4 WIFI module installation
3.5 Panel mount installation
3.6 VESA mount installation

3.1 Opening the Chassis

➢ Steps to Remove the Aluminum Extruded Back Cover

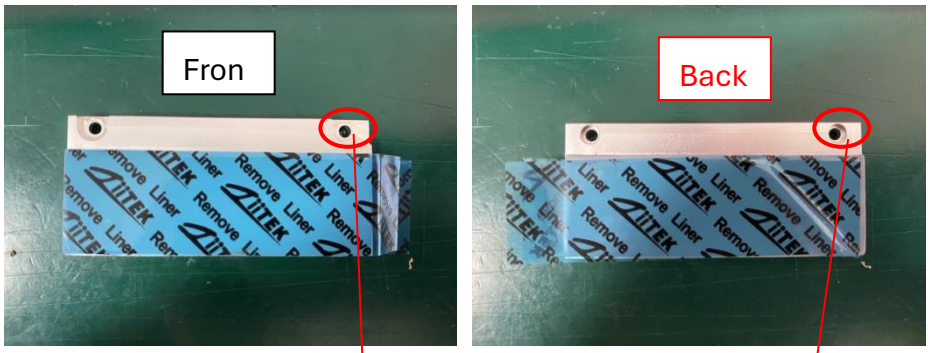
Unscrew and remove the screws on the rear panel.

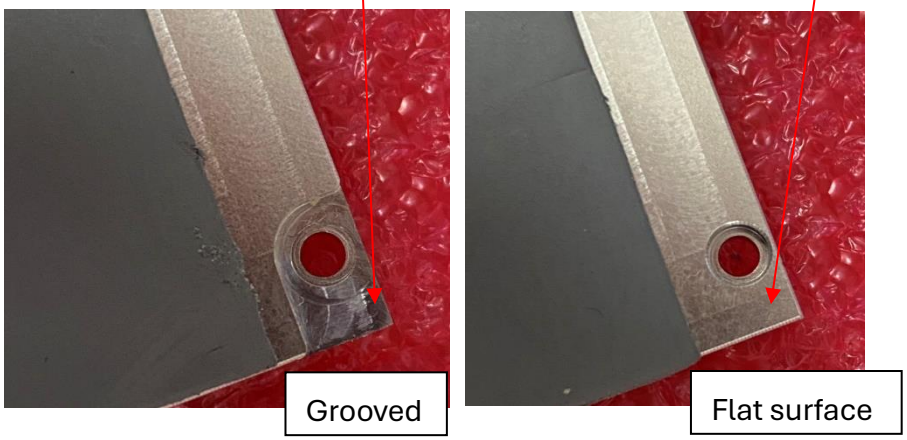
Unscrew and remove the screws on the front panel.

Once all screws have been removed, you can detach the aluminum and rear cover.

3.2 Memory installation

(1.) When installing 32G memory, the thermal pad must be replaced
Remove the thermal pad from the “back side”, and apply a new thermal pad.

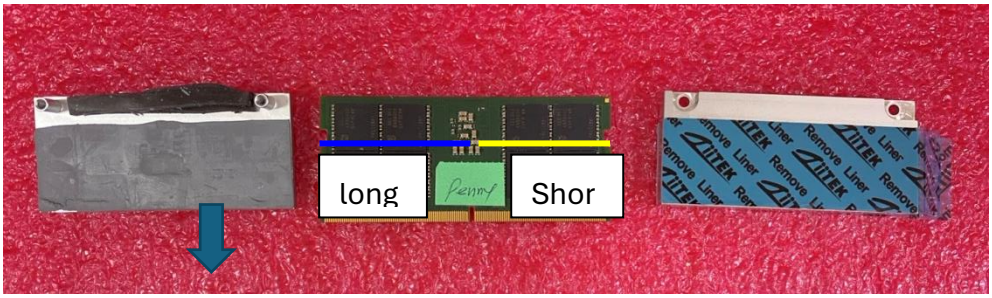


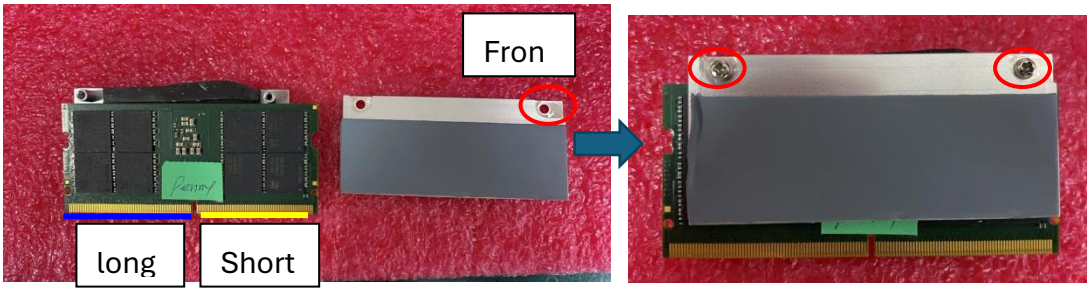


(2.) 8G/16G/32G Memory Installation

As shown in the diagram, place the memory module between the heat spreaders, then fasten the screws.

Ensure that the release liner on the thermal pad is removed prior to installation.

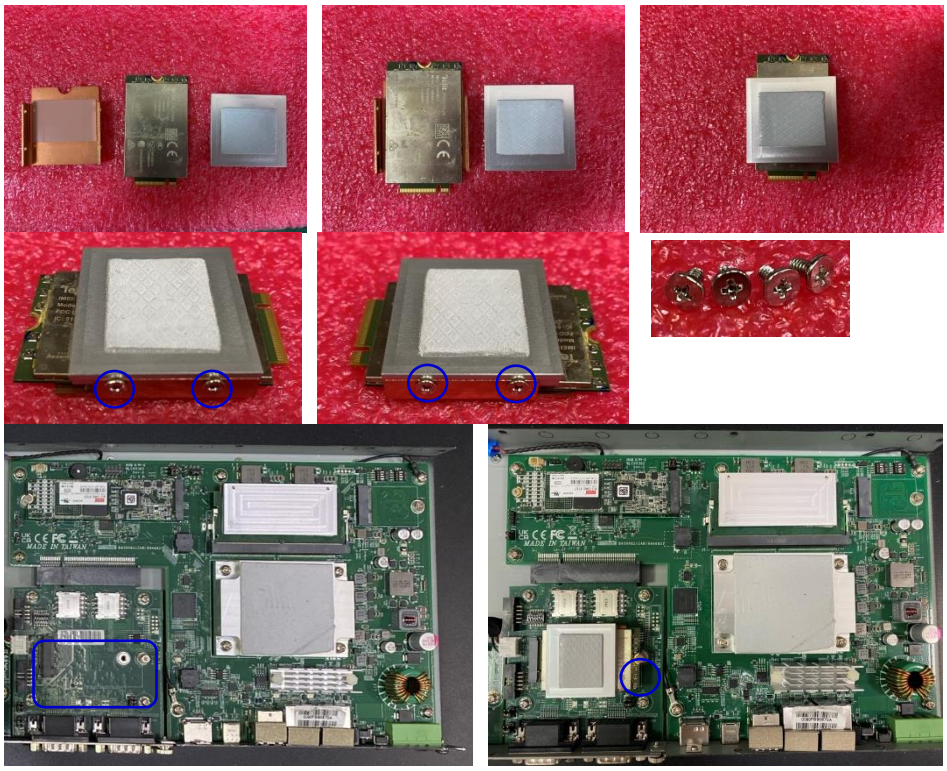




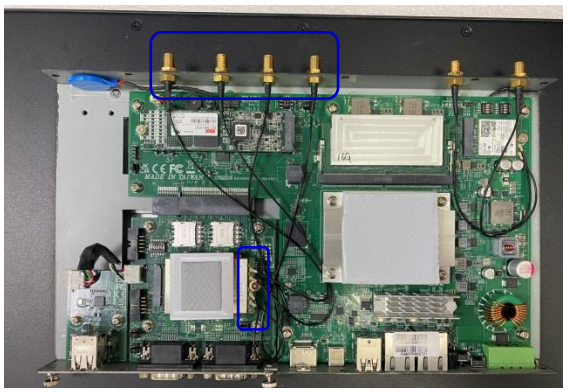
Align the memory with the slot, insert it, then press down to secure it in place.

3.3 5G module installation

As shown in the diagram, place the 5G module between the heat spreaders, then fasten the screws.(Ensure that the release liner on the thermal pad is removed before installation.)



According to the diagram, secure the antenna cables to the chassis. Then, connect the MHF4 connectors to the corresponding ports on the module.



3.4 WIFI module installation

Install the Wi-Fi module into the designated slot on the motherboard. Ensure it is securely inserted, then fasten it with a screw.

According to the diagram, secure the antenna cables to the chassis. Then, connect the MHF4 connectors to the corresponding ports on the module.

3.5 Panel mount installation

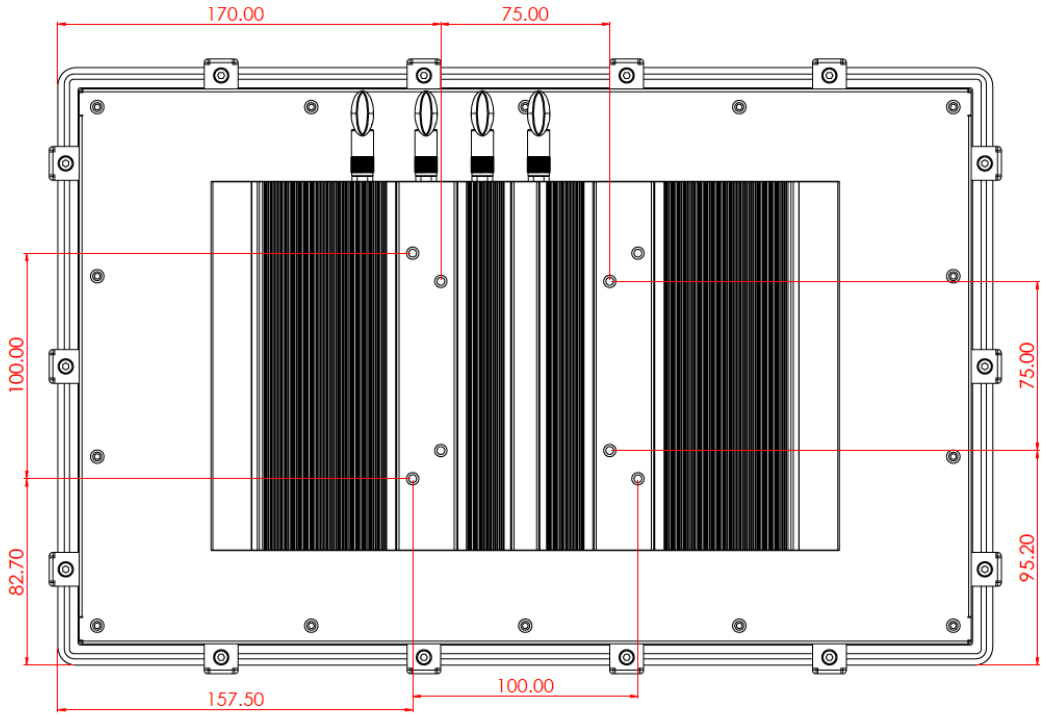
After assembling the panel mount clip, install it onto the system.

Secure the clip with an average torque of 5 kgf·cm.

After securing, ensure the assembly matches the illustration.

3.6 VESA mount installation

The rear cover of the FUDA4-S1X23 supports both 75 x 75 mm and 100 x 100 mm VESA mounting holes. It is compatible with standard VESA stands, wall mounts, and arm mounts. Please select screws that are suitable for your chosen installation method.



Portwell

Chapter 4

BIOS setup items

4.1 Entering Setup -- Launch System Setup
4.2 How to update the BIOS/EC file

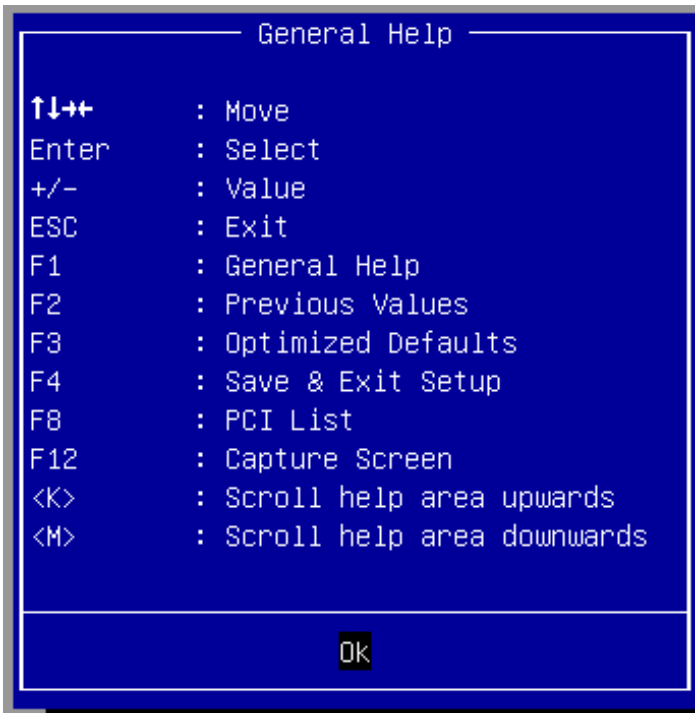
FUDA4 system adopts PEB-99A6 mother board. The following section describes the BIOS setup program. The BIOS setup program can be used to view and change the BIOS settings for the module. Only experienced users should change the default BIOS settings.

4.1 Entering Setup -- Launch System Setup

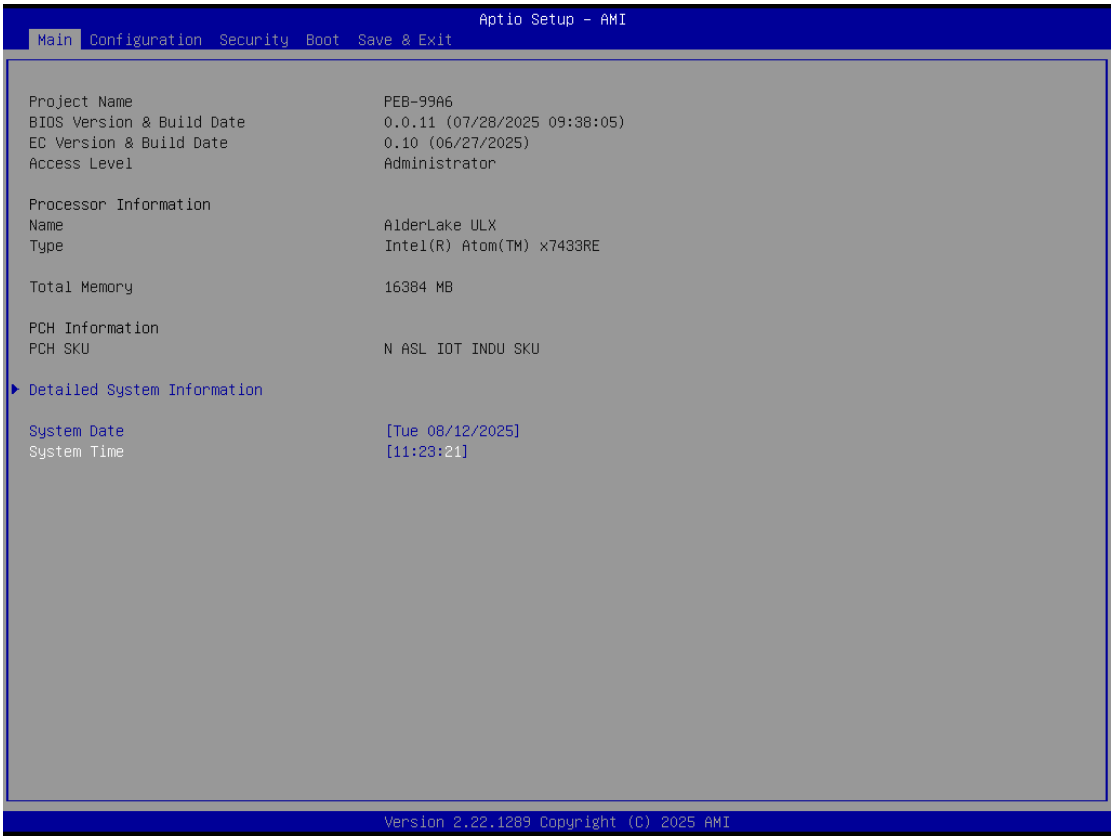
Power on the computer and the system will start POST (Power On Self-Test) process. When the message below appears on the screen, press <Del> key will enter BIOS setup screen.

Press <Del> 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.

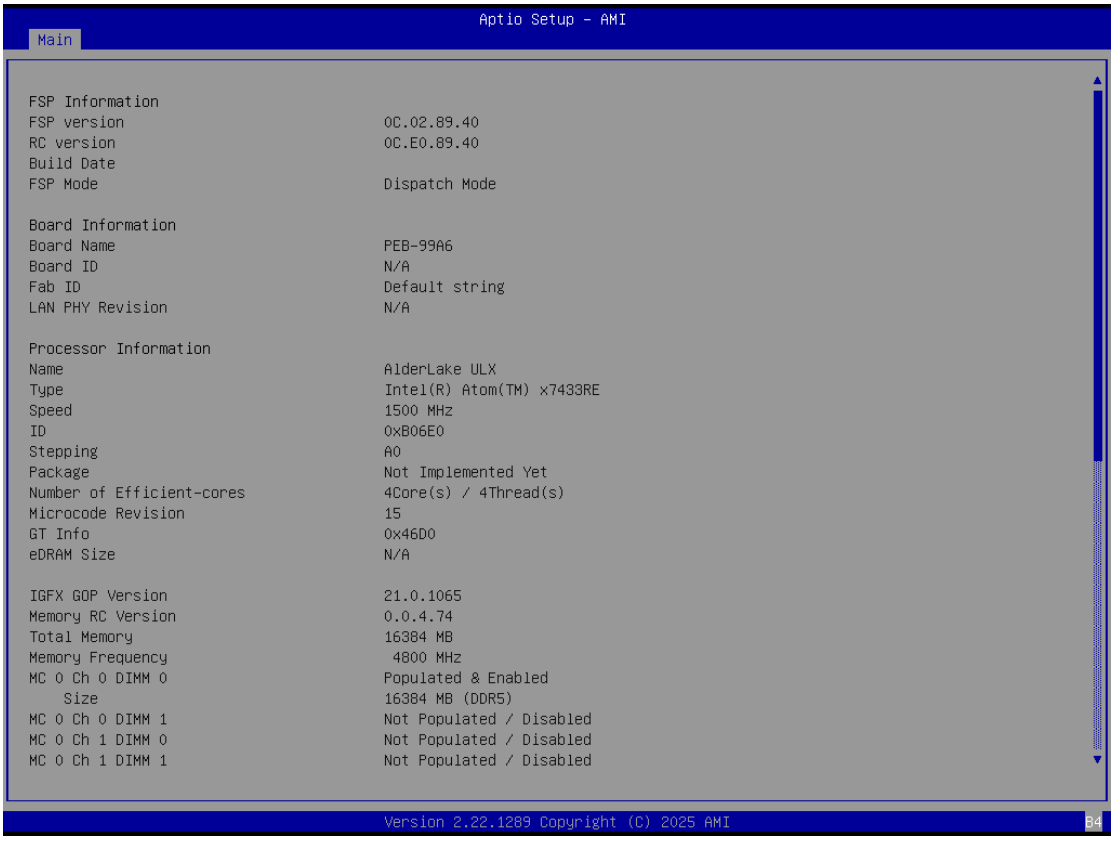

General Help
↑↓→← : Move
Enter : Select
+/- : Value
ESC : Exit
F1 : General Help
F2 : Previous Values
F3 : Optimized Defaults
F4 : Save & Exit Setup
F8 : PCI List
F12 : Capture Screen
<K> : Scroll help area upwards
<M> : Scroll help area downwards
Ok

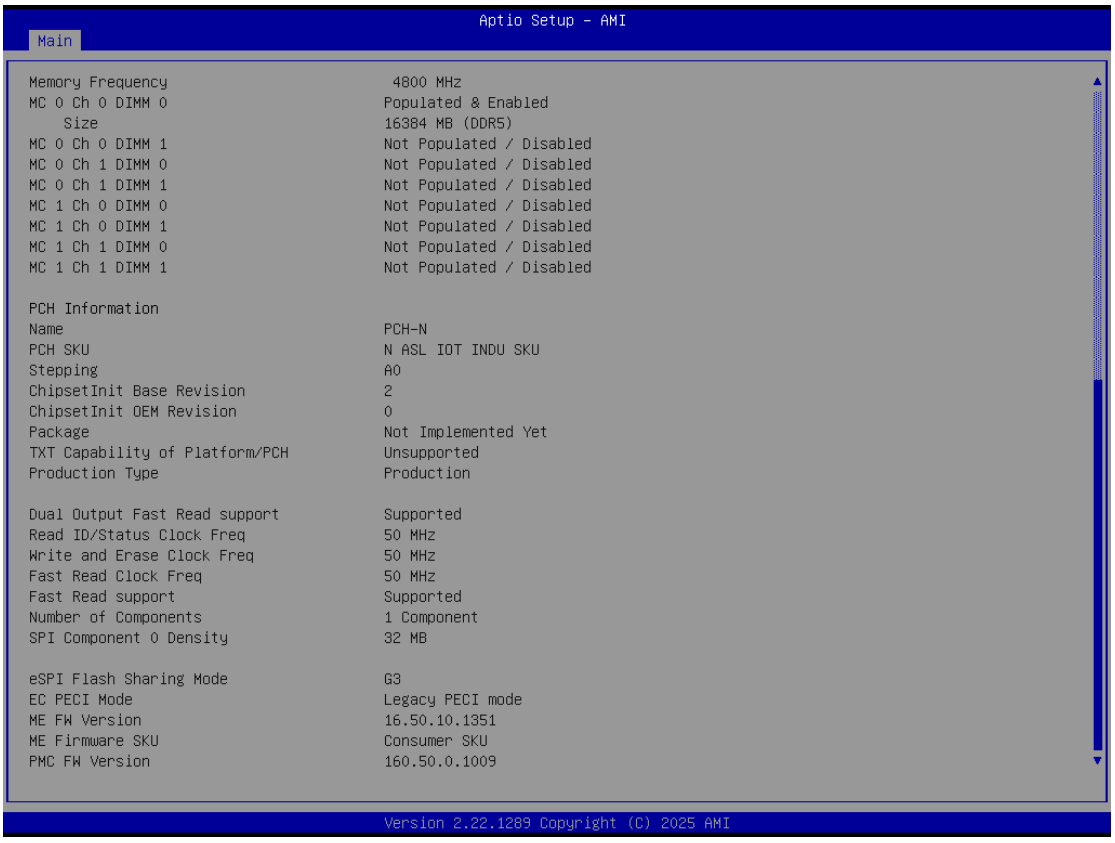
4.1.1 Main


Aptio Setup – AMI
Main Configuration Security Boot Save & Exit
Project Name PEB-99A6
BIOS Version & Build Date 0.0.11 (07/28/2025 09:38:05)
EC Version & Build Date 0.10 (06/27/2025)
Access Level Administrator
Processor Information
Name AlderLake ULX
Type Intel(R) Atom(TM) x7433RE
Total Memory 16384 MB
PCH Information
PCH SKU N ASL IOT INDU SKU
Detailed System Information
System Date [Tue 08/12/2025]
System Time [11:23:21]
Version 2.22.1289 Copyright (C) 2025 AMI

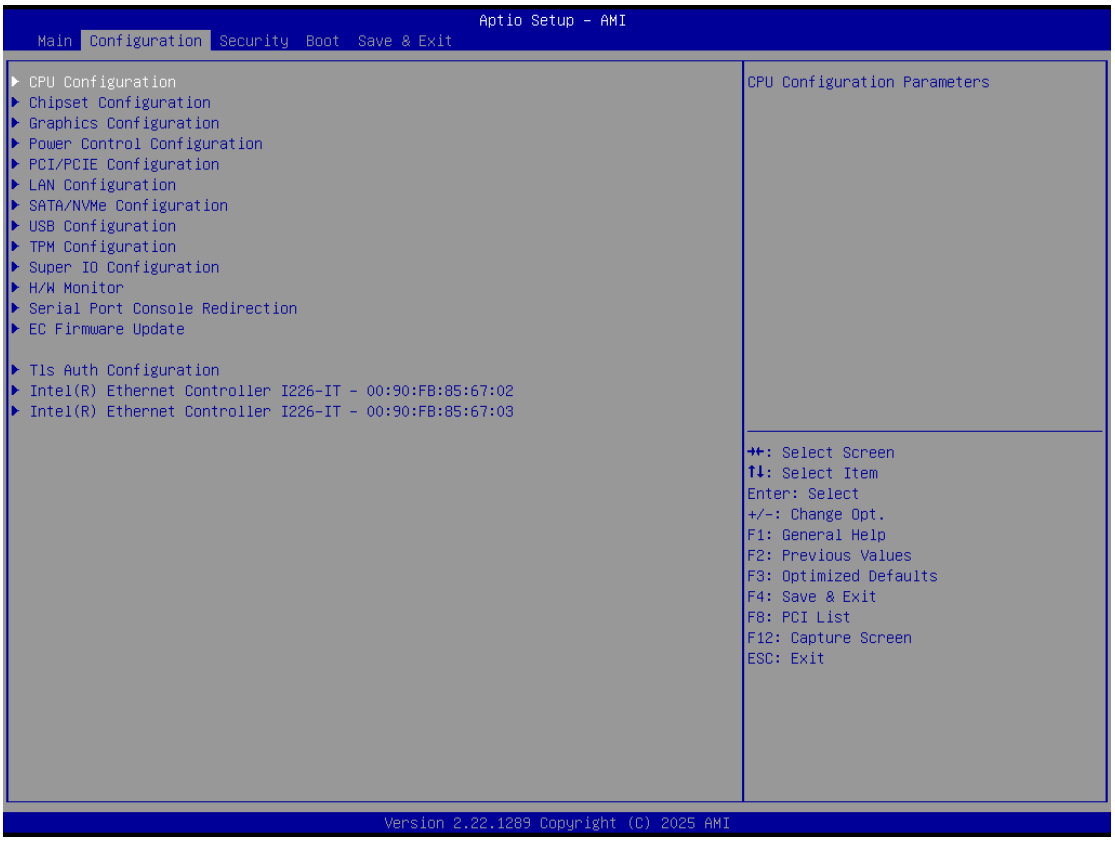
Feature	Description	Options
System Date	The date format is <Day>, <Month><Date><Year>. Use [+] or [−] to configure system Date.	
System Time	The time format is <Hour><Minute><Second>. Use [+] or [−] to configure system Time.	

Detailed System Information

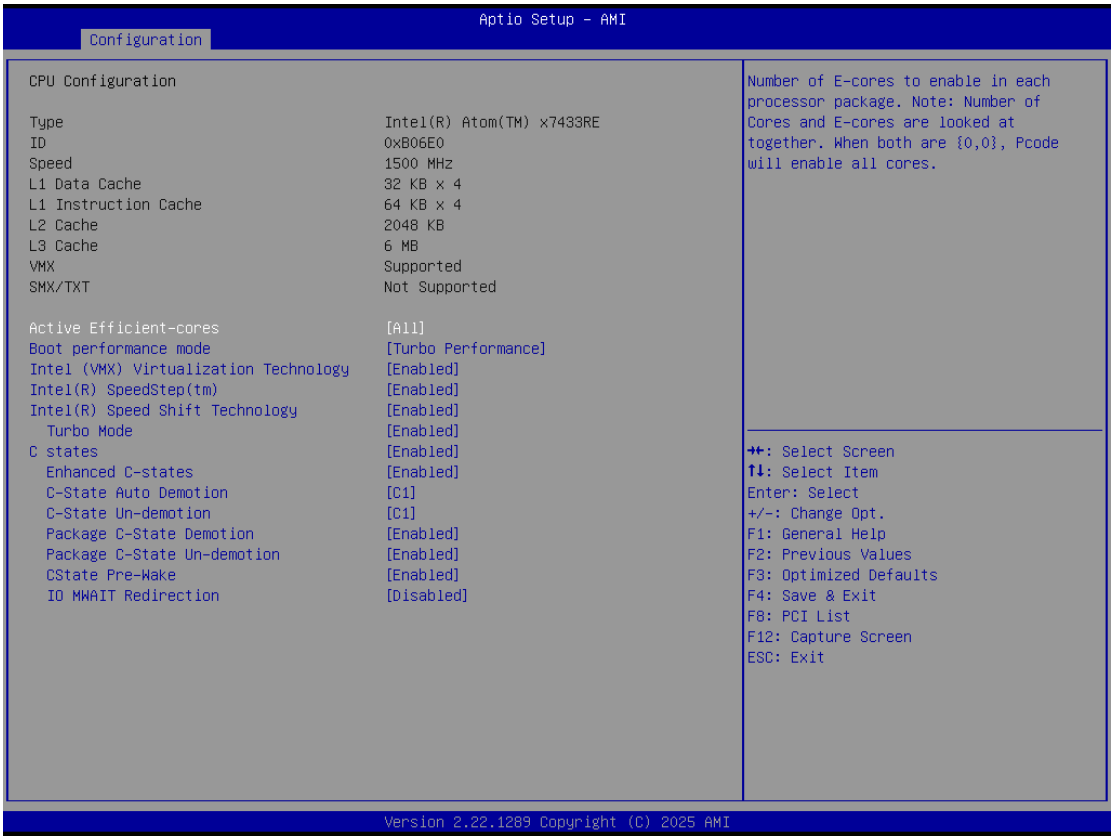




4.1.2 Configuration



CPU Configuration

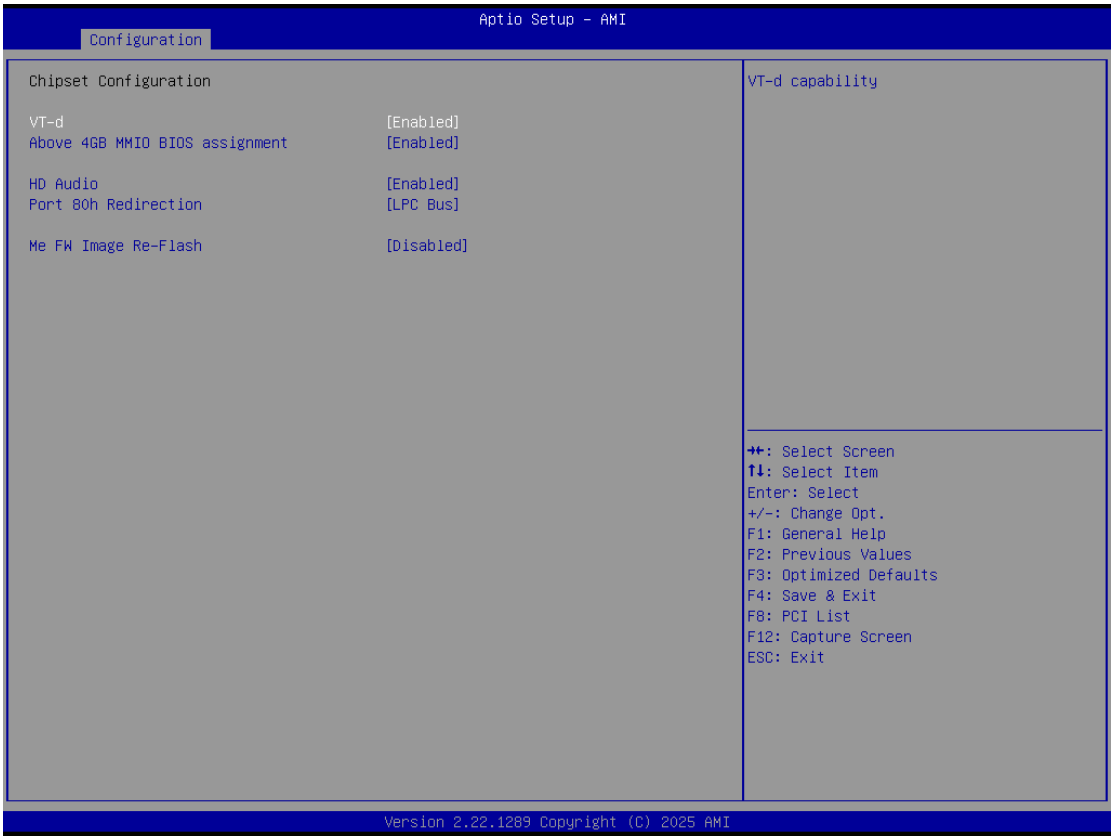


Feature	Description	Options
Active Efficient-Cores	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together, When both are {0,0}, Pcode will enable all cores.	★All, 3, 2, 1
Boot performance mode	Select the performance state that the BIOS will set starting from reset vector	★Turbo Performance , Max Battery, Max Non-
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

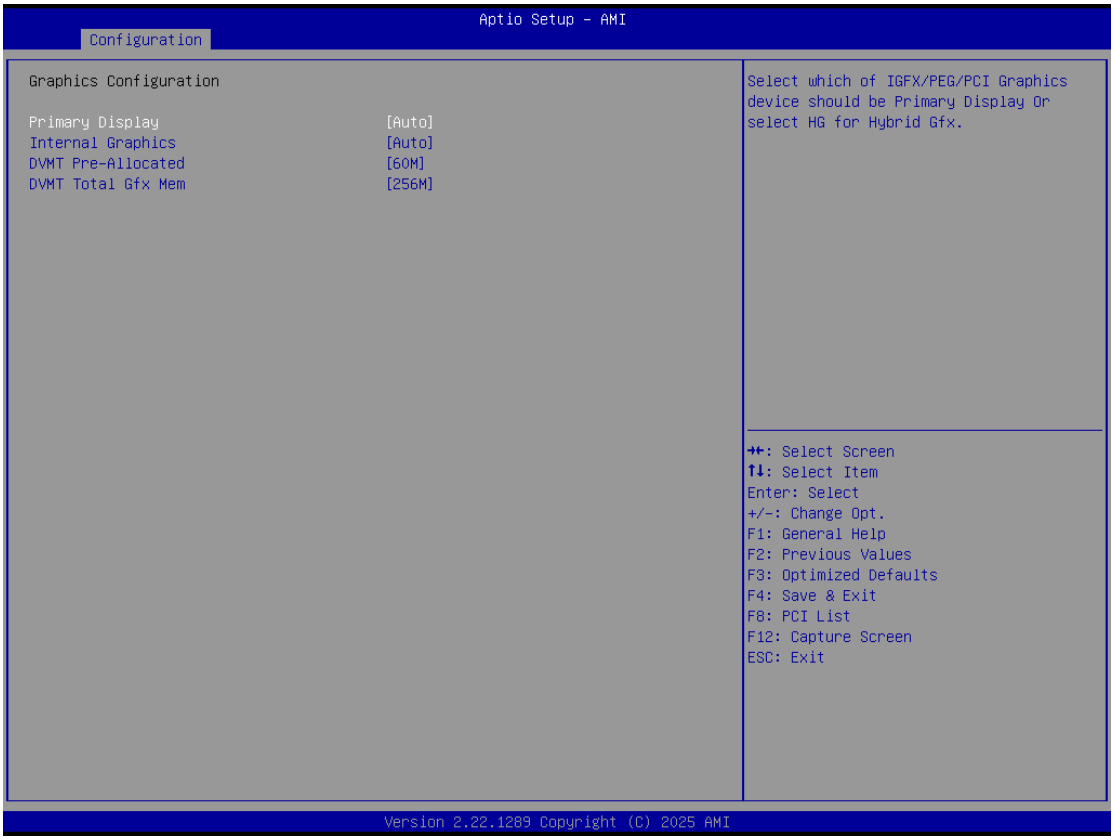
Feature	Description	Options
Intel® Speed Shift Technology	Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states	Disabled, ★Enabled
Turbo Mode	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means 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	Disabled, ★C1
C-State Un-demotion	Configure C-State Un-demotion	Disabled, ★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



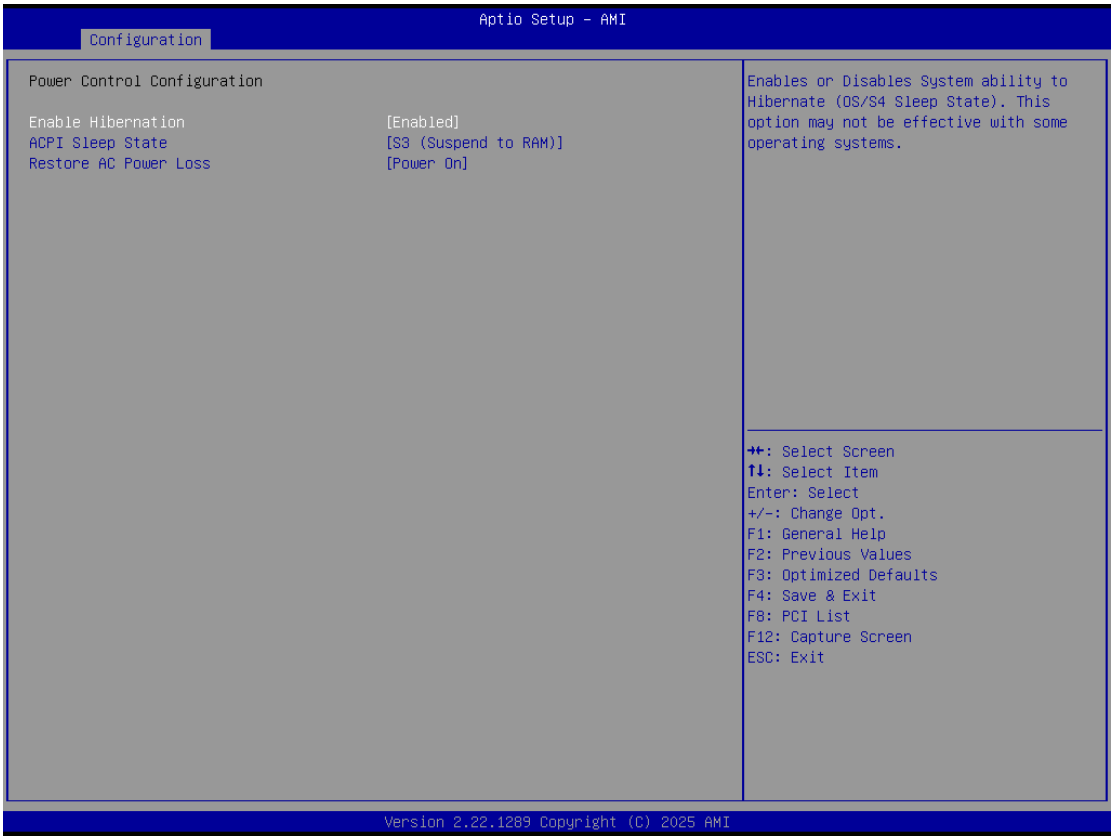
Feature	Description	Options
VT-d	VT-d Capability.	Disabled, ★Enabled
Above 4GB MMIO BIOS assignment	Enable/Disable above 4GB Memory Mapped IO BIOS assignment, This is enabled automatically when Aperture Size is set to 2048MB.	Disabled, ★Enabled
HD Audio	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled. Enabled = HDA will be unconditionally enabled.	Disabled, ★Enabled
Port 80h Redirection	Control when 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



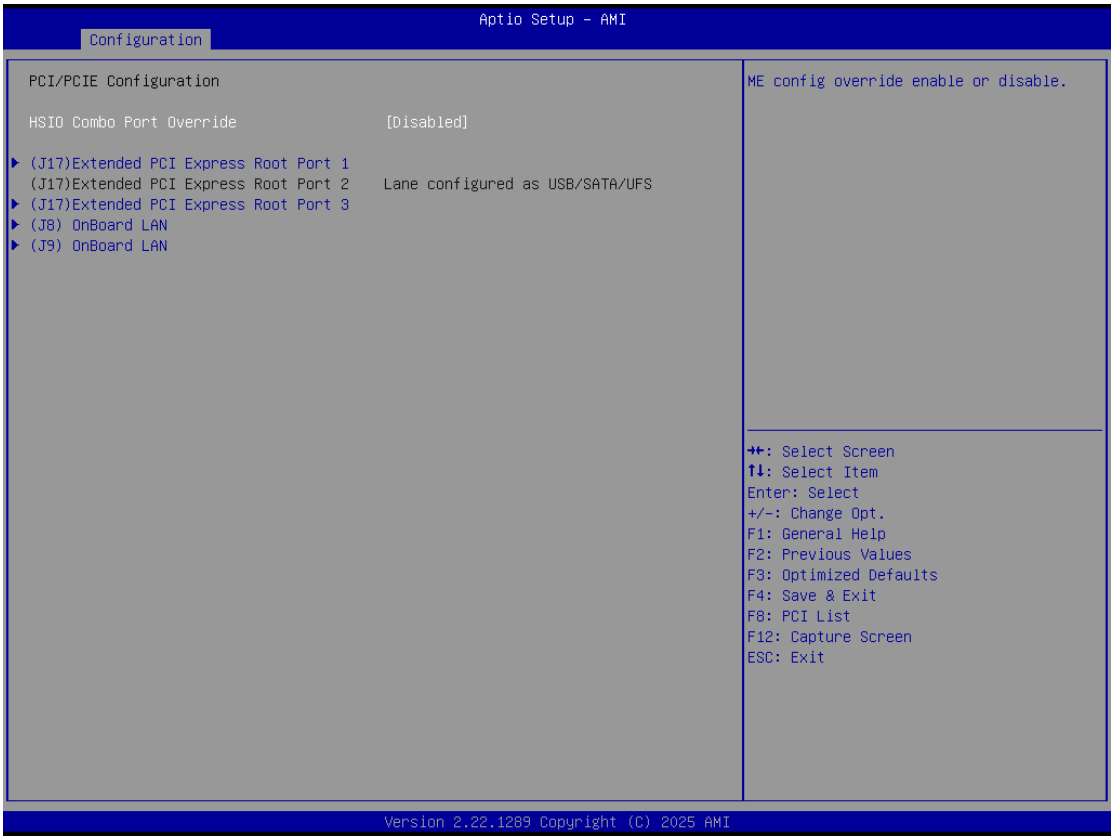
Feature	Description	Options
Primary Display	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or Select HG for Hybrid Gfx.	★Auto, IGFX
Internal Graphics	Keep IGFX enable based on the setup options.	★Auto, Disabled, Enabled
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) 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	★256M, 128M, MAX

Power Control Configuration



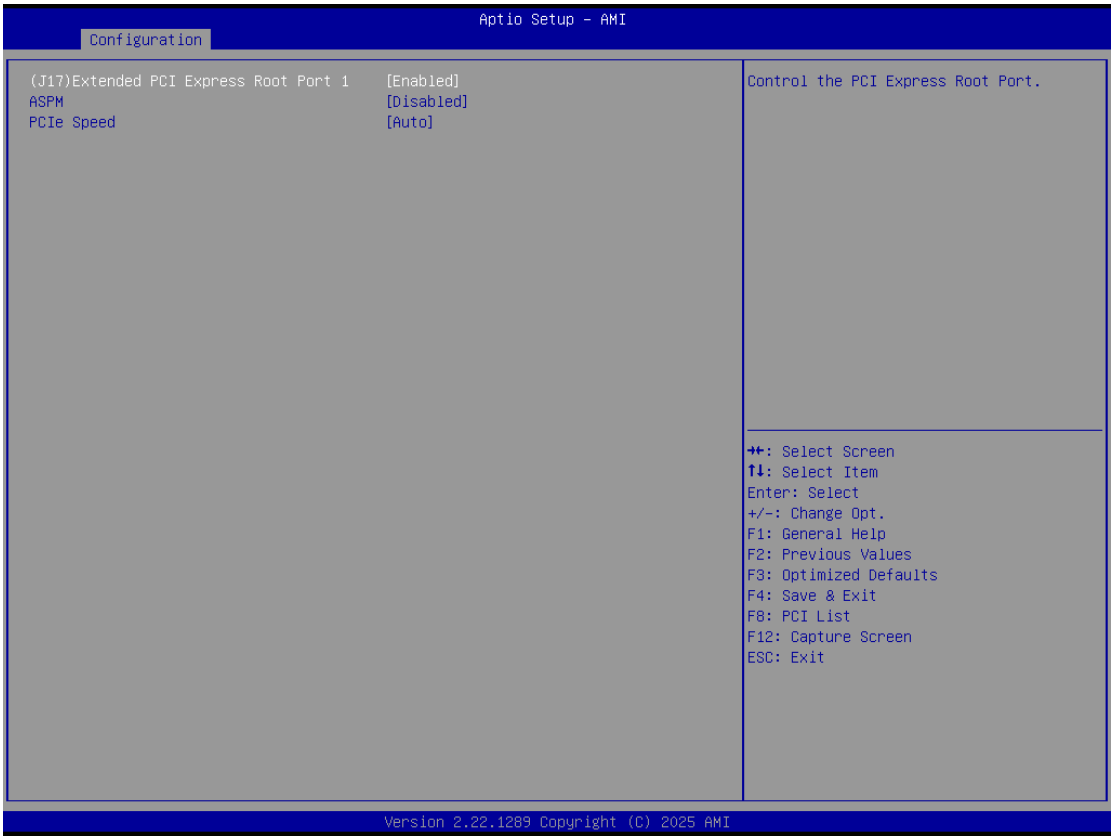
Feature	Description	Options
Enable Hibernation	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.	Disabled, ★Enabled
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.	★S3 (Suspend to RAM), Suspend Disabled
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



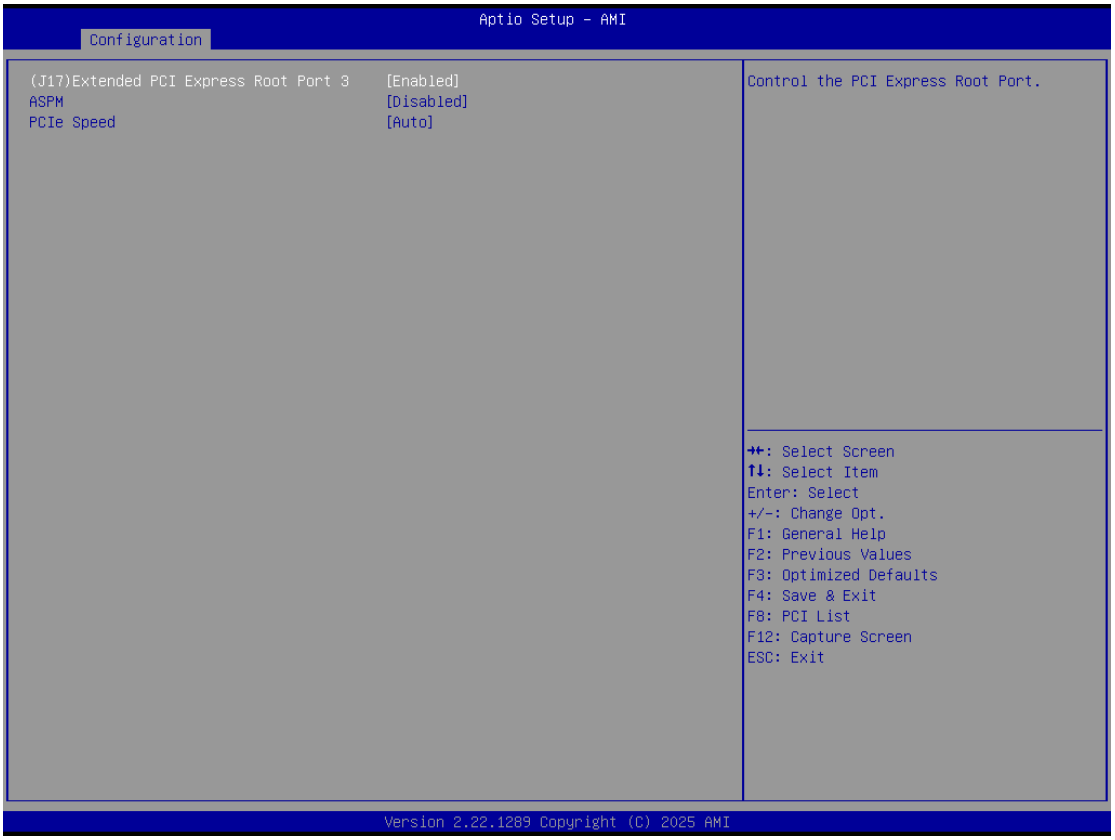
Feature	Description	Options
HSIO Combo Port Override	ME config override enabled or disabled.	★Disabled, Enabled
HSIO Combo Port Override [Enabled]		
(J17) Extended IO PCIe 1/2 Bifurcation	Control PCH PCIe lane width.	★2x1, 1x2
(J17) Extended IO 1 Type	Control USB/PCIe combo port.	USB, ★PCIe
(J17) Extended IO 2 Type	Control USB/PCIe combo port.	★USB, PCIe

(J17) Extended PCI Express Root Port 1



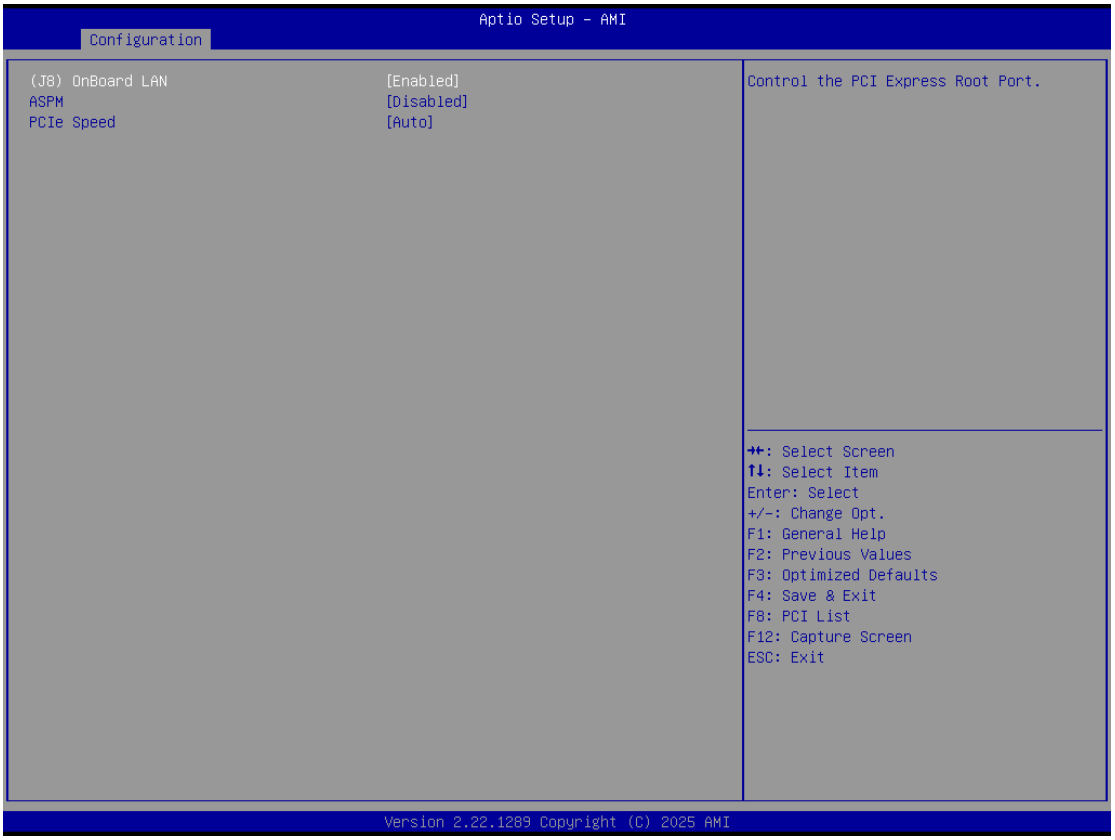
Feature	Description	Options
(J17) Extended PCI Express Root Port 1	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

(J17) Extended PCI Express Root Port 3



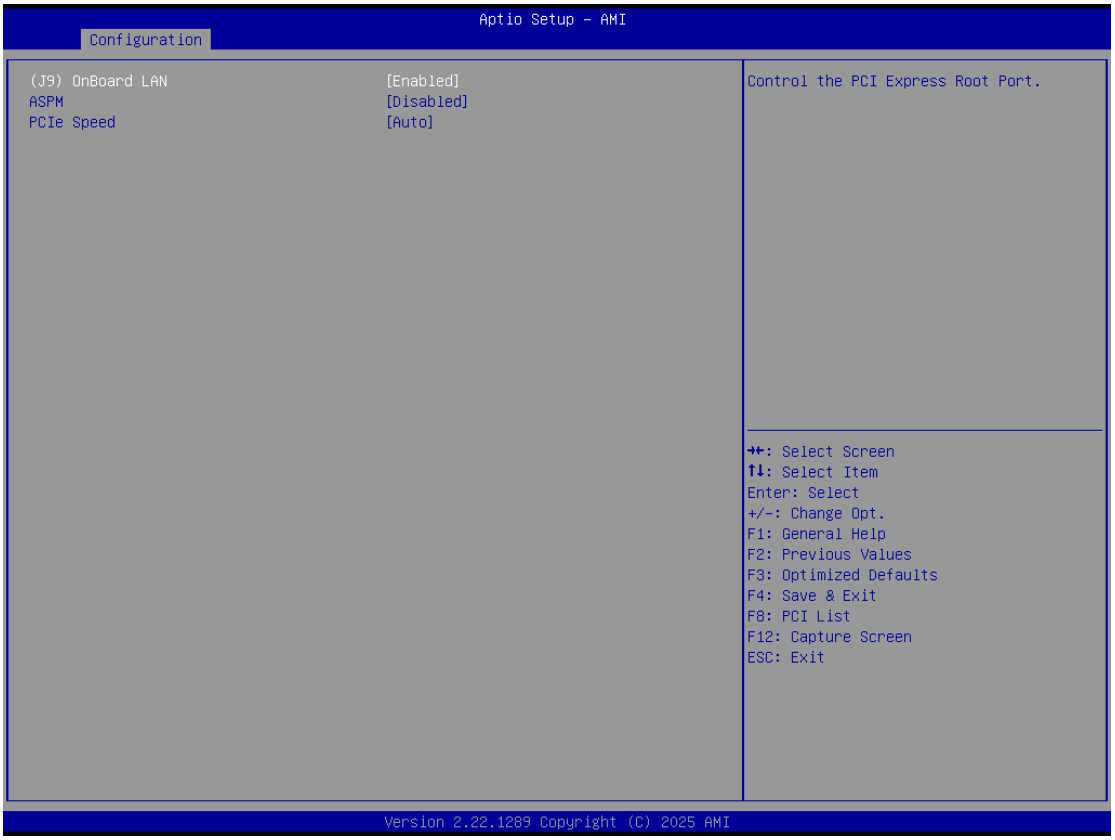
Feature	Description	Options
(J17) Extended PCI Express Root Port 3	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

(J8) Onboard LAN



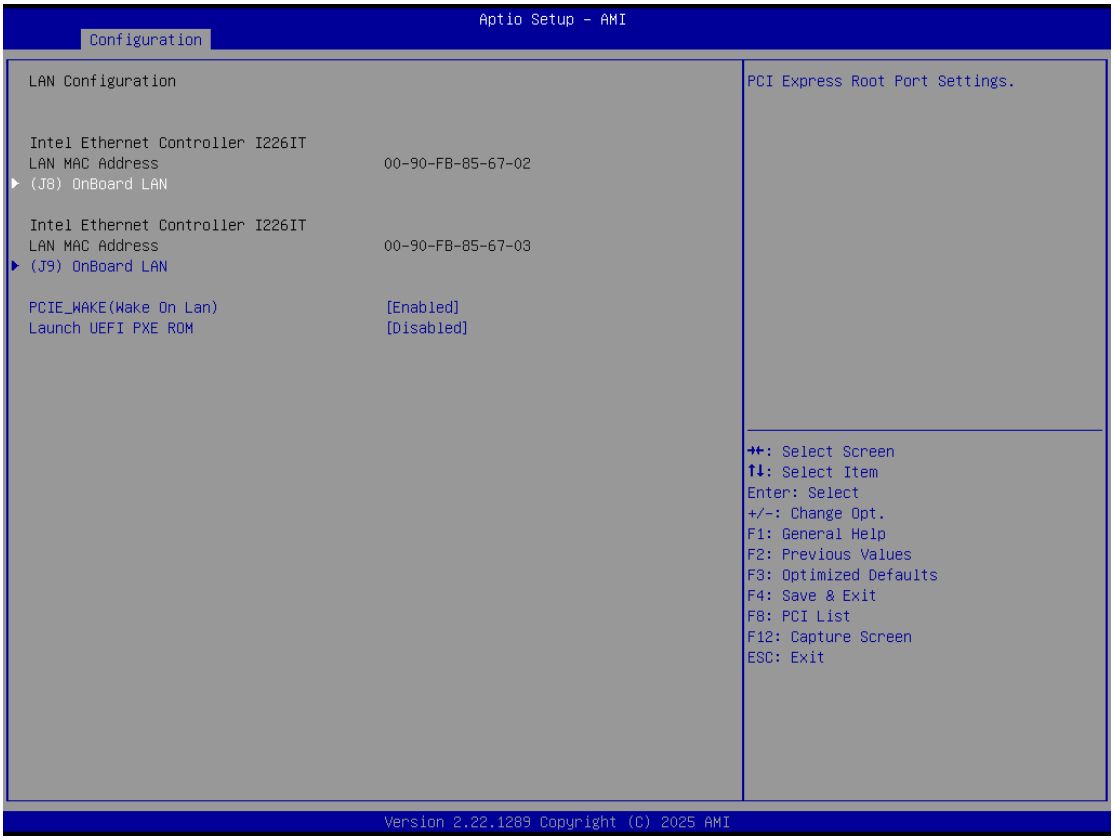
Feature	Description	Options
(J8) Onboard LAN	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

(J9) Onboard LAN



Feature	Description	Options
(J9) Onboard LAN	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

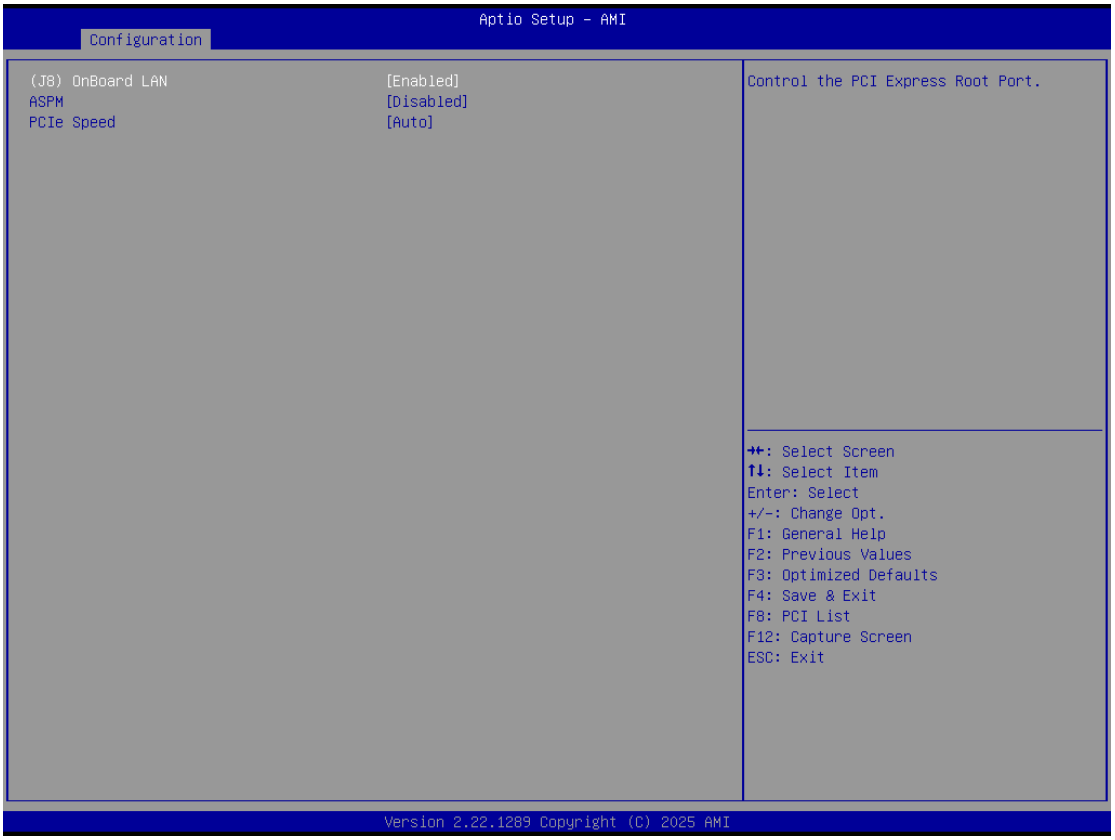
LAN Configuration



Feature	Description	Options
(J8) Onboard LAN	Control the PCI Express Root Port.	
(J9) Onboard LAN	Control the PCI Express Root Port.	
PCIE_WAKE (Wake On Lan)	Control the PCIE Wake# pin for Wake On Lan function.	Disabled, ★Enabled
Launch UEFI PXE ROM	Enable/Disable UEFI Network Stack	★Disabled, Enabled
Launch UEFI PXE ROM (Enabled)		
IPv4 PXE Support	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.	Disabled, ★Enabled

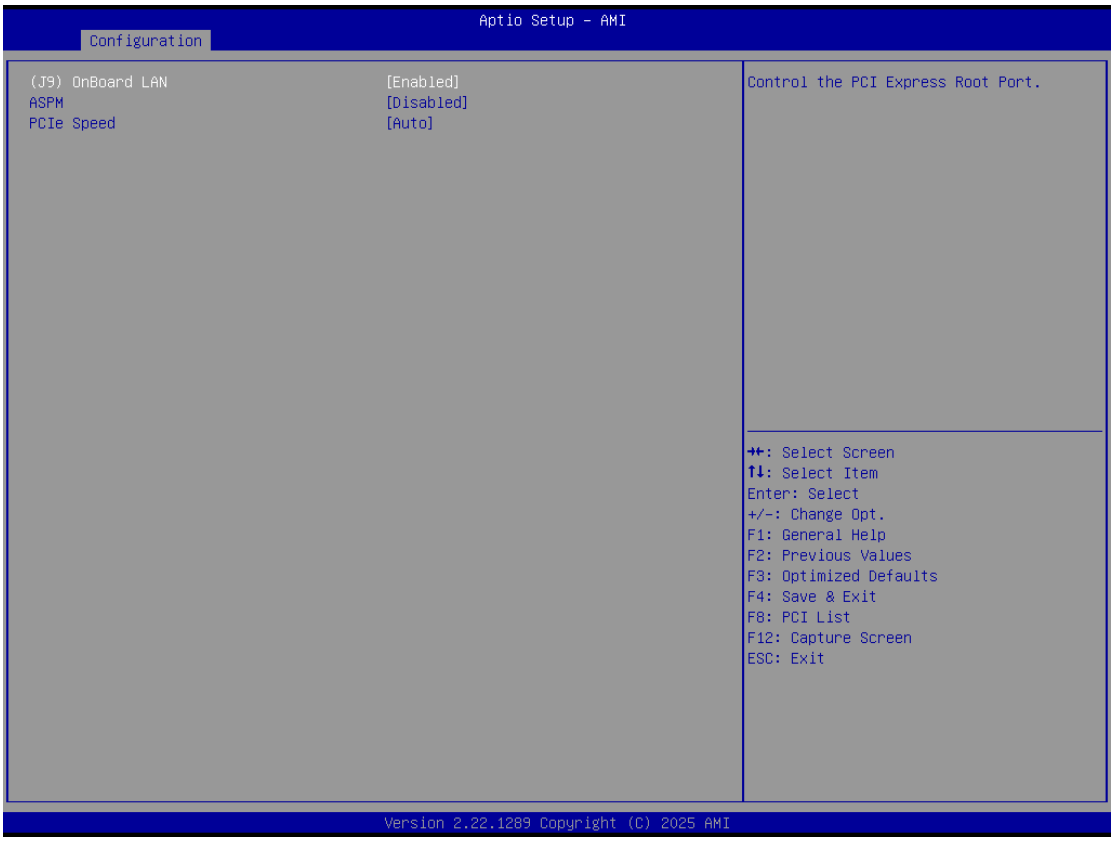
IPv4 HTTP Support	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.	Disabled, ★Enabled
IPv6 PXE Support	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.	Disabled, ★Enabled
IPv6 HTTP Support	Enable/Disable IPv6 HTTP boot support. If disabled, 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

(J8) Onboard LAN



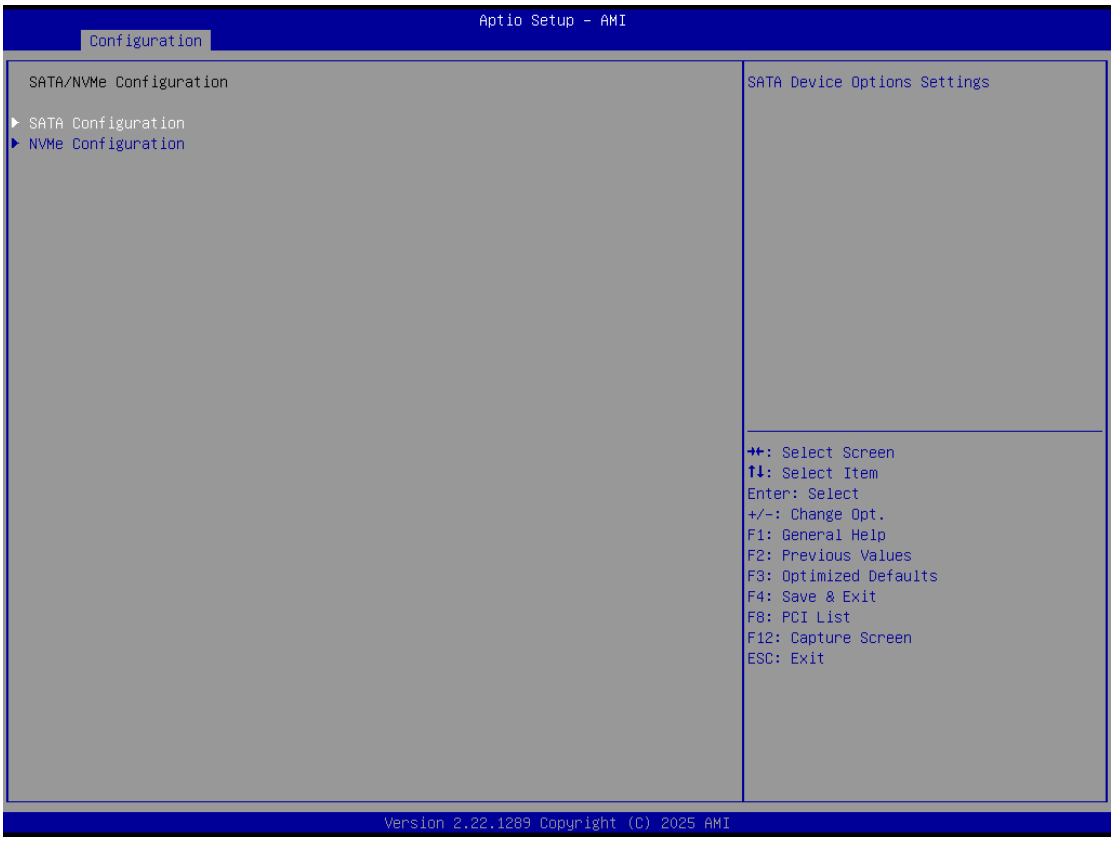
Feature	Description	Options
(J8) Onboard LAN	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

(J9) Onboard LAN

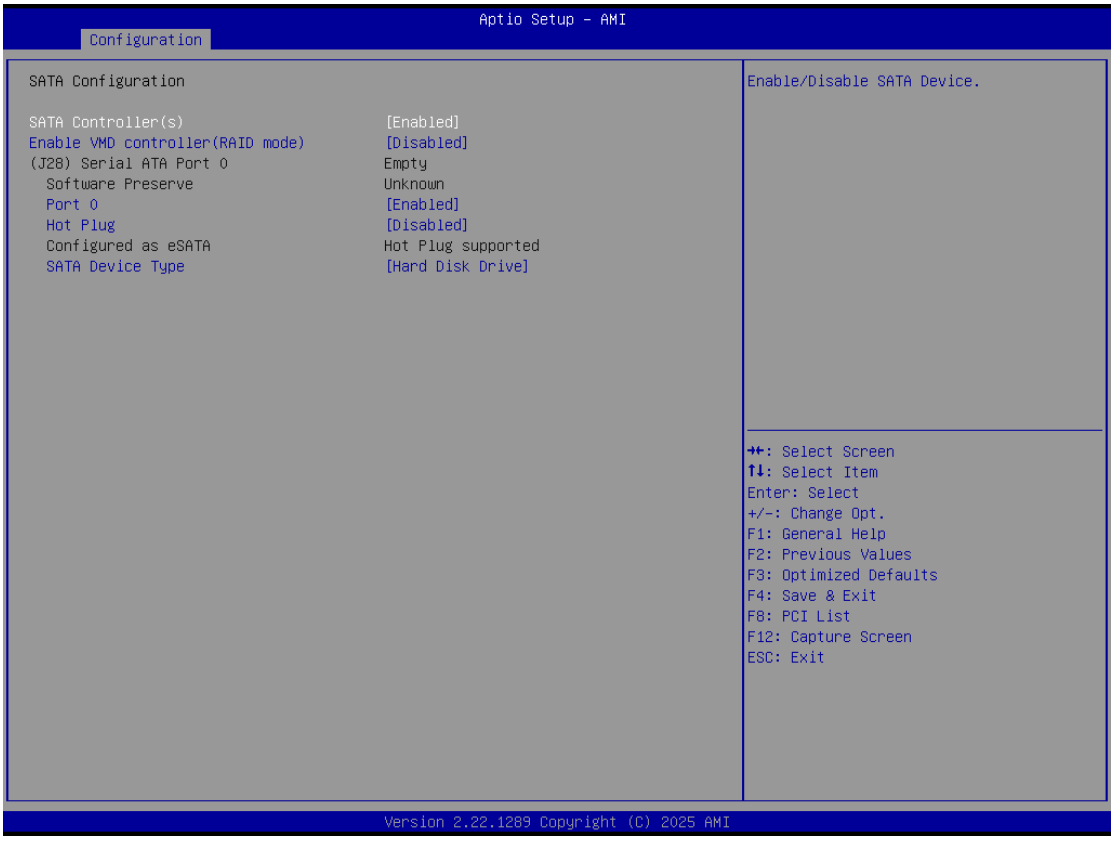


Feature	Description	Options
(J9) Onboard LAN	Control the PCI Express Root Port.	Disabled, ★Enabled
ASPM	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO-BIOS auto configure DISABLE – Disables ASPM	★Disabled, L1, Auto
PCIe Speed	Configure PCIe Speed	★Auto, Gen1, Gen2, Gen3

SATA /NVMe Configuration

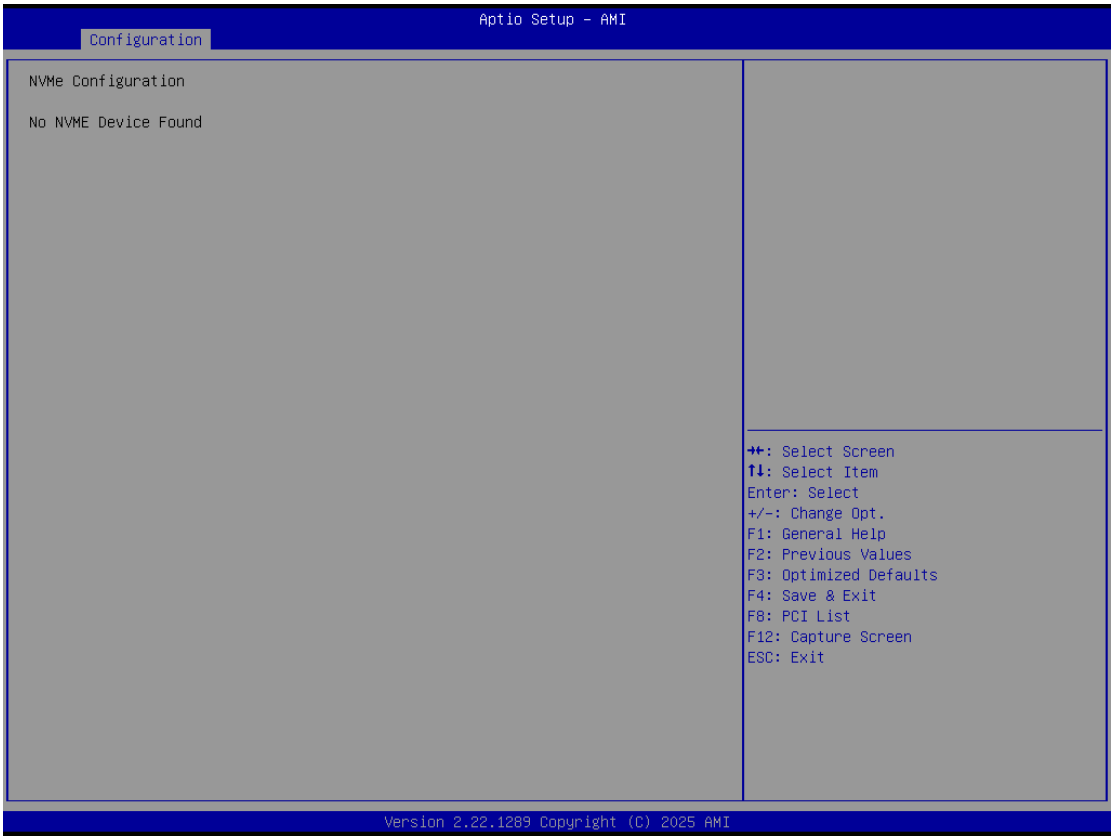


SATA Configuration

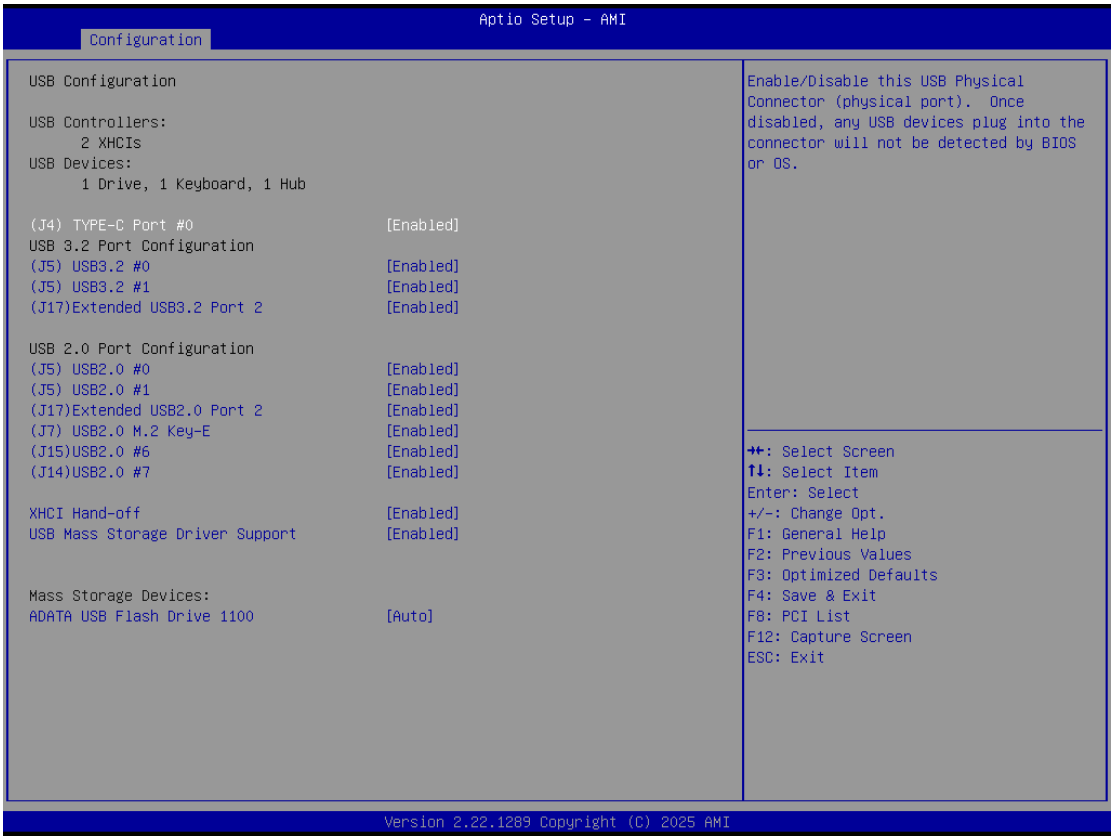


Feature	Description	Options
SATA Controller(s)	Enable/Disable SATA Device	Disabled, ★Enabled
Enable VMD controller (RAID mode)	**Enable/Disable to VMD controller.**	**★Disabled, Enabled**
(J28) Serial ATA Port 0		
Port 0	Enabled or Disabled SATA Port	Disabled, ★Enabled
Hot plug	Designates this port as 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



USB Configuration



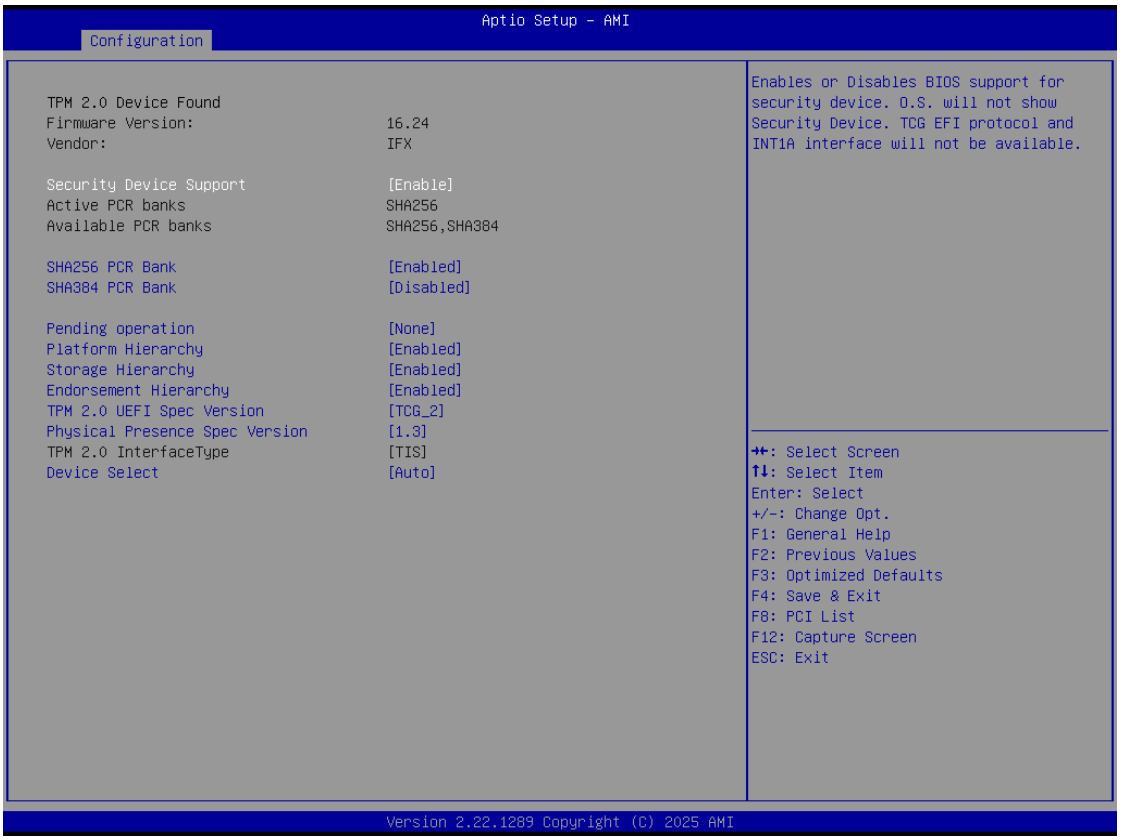
Feature	Description	Options
(J4) TYPE-C Port #0	Enabled/Disabled this USB Physical connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
USB 3.2 Port Configuration		
(J5) USB3.2 #0	Enabled/Disabled this USB Physical connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.	Disabled, ★Enabled
(J5) USB3.2 #1	Enabled/Disabled 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

(J17) Extended USB3.2 Port 2	Enabled/Disabled 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
USB 2.0 Port Configuration		
(J5) USB2.0 #0	Enabled/Disabled 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
(J5) USB2.0 #1	Enabled/Disabled 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
(J17) Extended USB2.0 Port 2	Enabled/Disabled 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
Feature	**Description**	**Options**
(J7) USB2.0 M.2 key-E	Enabled/Disabled 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
(J15) USB2.0 #6	Enabled/Disabled 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
(J14) USB2.0 #7	Enabled/Disabled 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	Disabled, ★Enabled
USB Mass Storage Driver Support	Enable/Disable USB Mass Storage Driver Support	Disabled, ★Enabled

Mass storage Devices:		
ADATA USB Flash Drive 1100	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

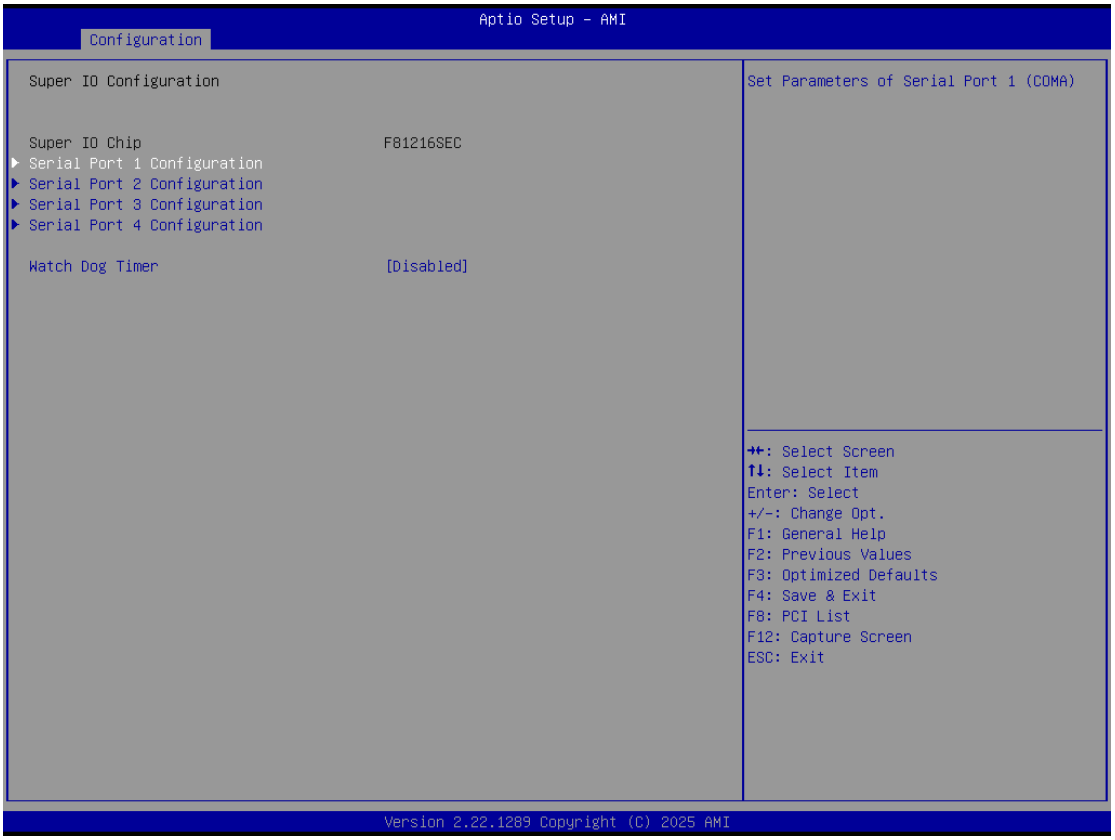
TPM 2.0 Device Found



Feature	Description	Options

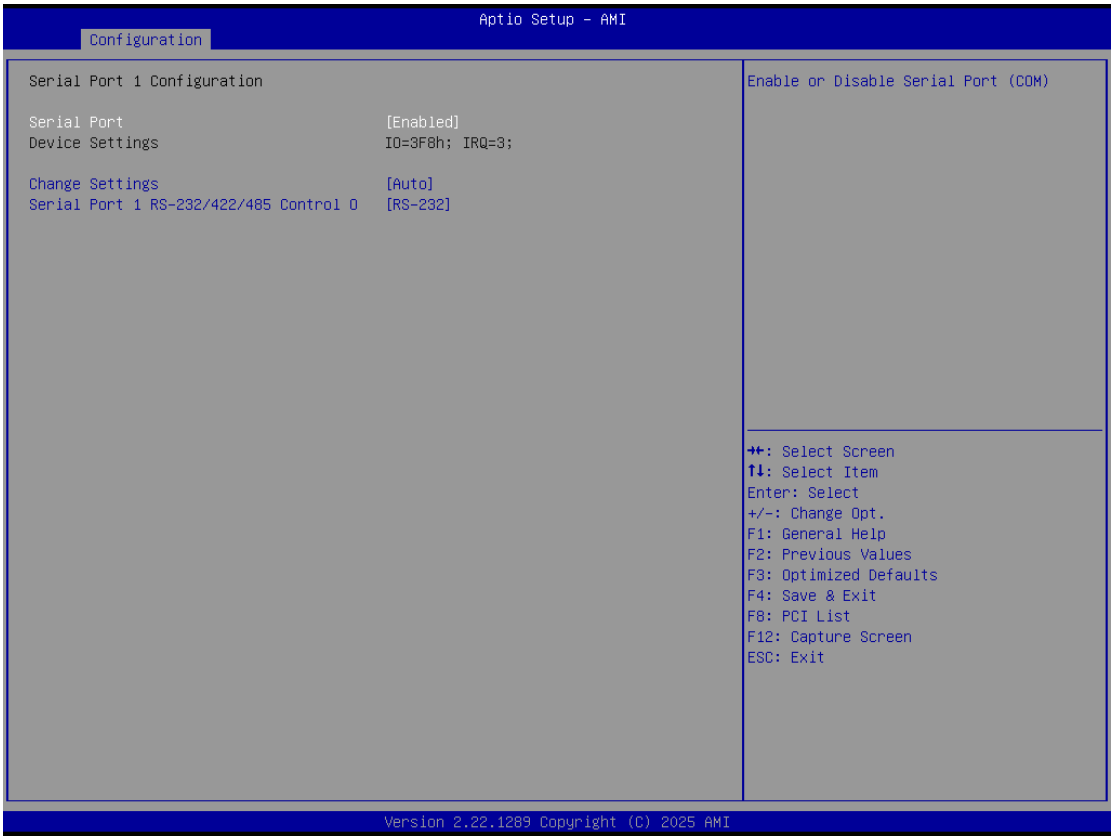
Security Device Support	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A Interface will not be available.	Disabled, ★Enabled
SHA256 PCR Bank	Enables or Disables SHA256 PCR Bank.	Disabled, ★Enabled
SHA384 PCR Bank	Enables or Disables SHA384 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
TPM2.0 UEFI Spec Version	Select the TCG2 Spec Version Support. CG_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 TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.	★Auto, TPM 1.2, TPM 2.0

Super IO Configuration



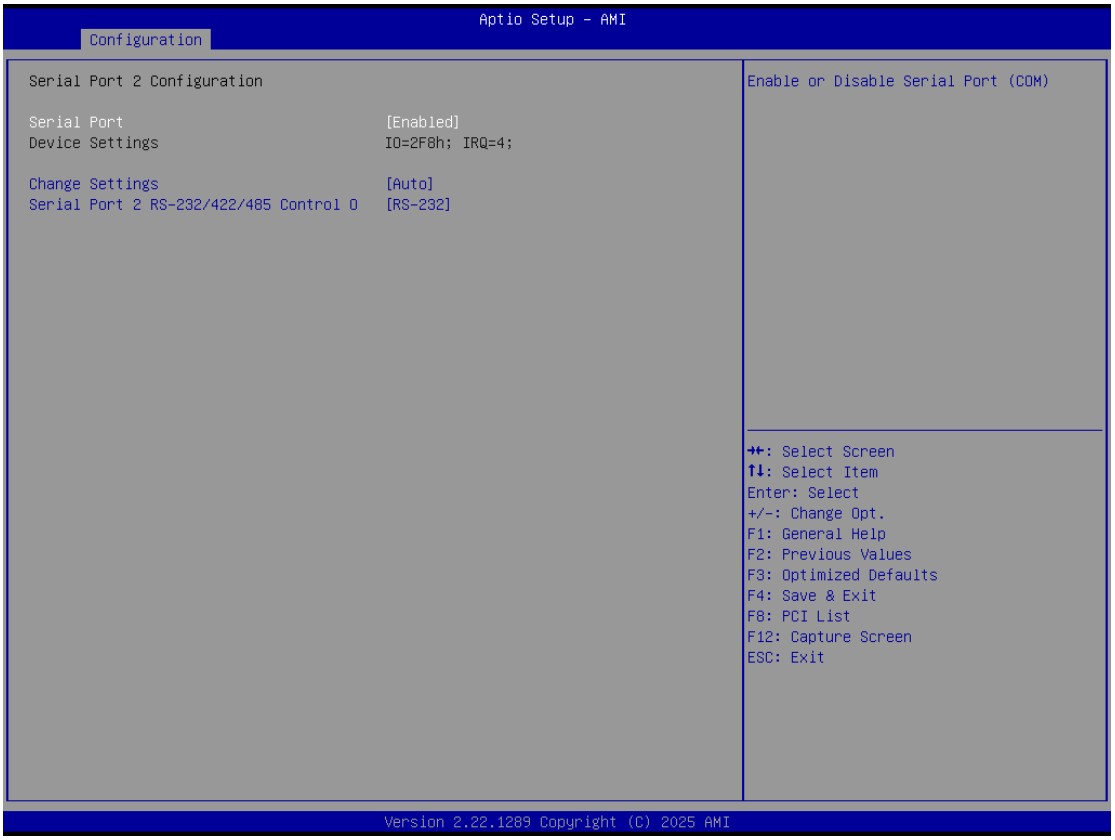
Feature	Description	Options
Serial Port 1 Configuration		
Serial Port 2 Configuration		
Serial Port 3 Configuration		
Serial Port 4 Configuration		
Watch Dog Timer	Enable/Disable Watch Dog Timer	★Disabled, Enabled
Watch Dog Timer [Enabled]		
Timer Unit	Select Timer count unit of WDT	★Second, Minute
Timer value	Set WDT Timer value seconds / minutes	★20

Serial Port 1 Configuration



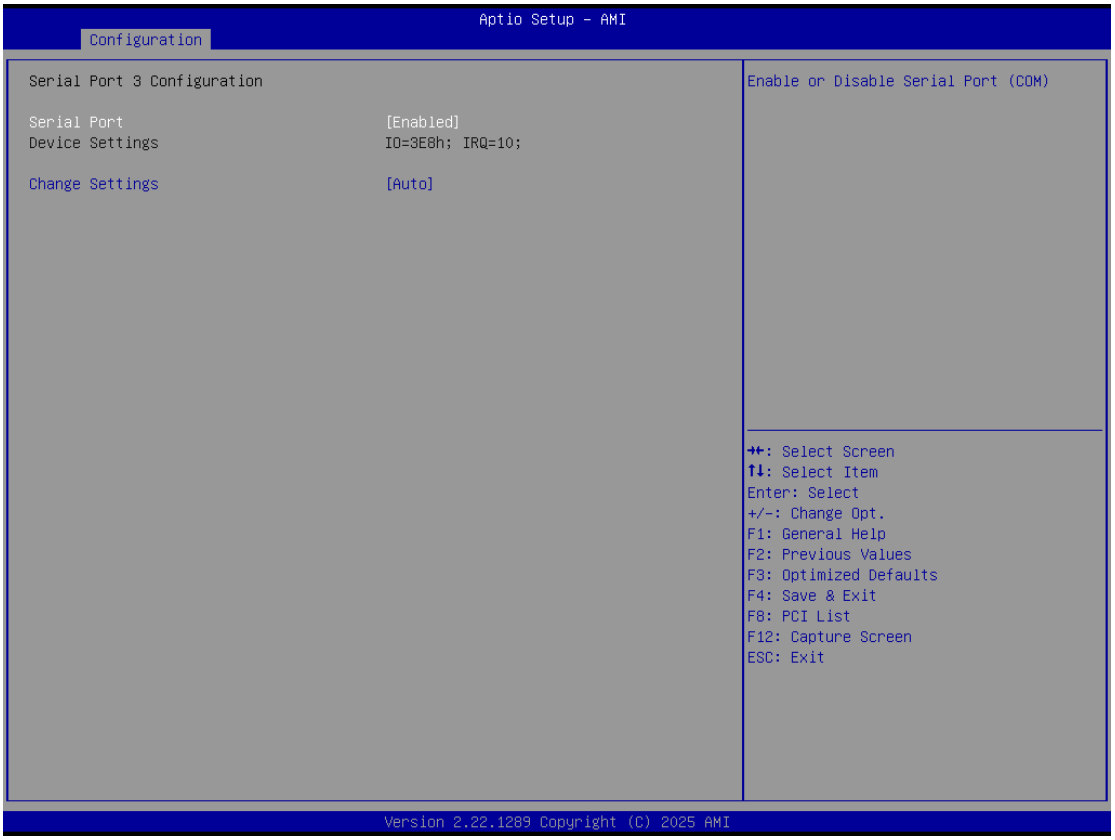
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
Change Settings	Select an optimal setting for Super IO Device.	★Auto, IO=3F8h; IRQ=3; IO=3F8h; IRQ=3,4,10,11
Serial Port 1 RS-232/422 /485 Control Option	Serial Port 1 RS-232/422/485 Control Option	★RS-232, RS-485 HALF DUPLEX

Serial Port 2 Configuration



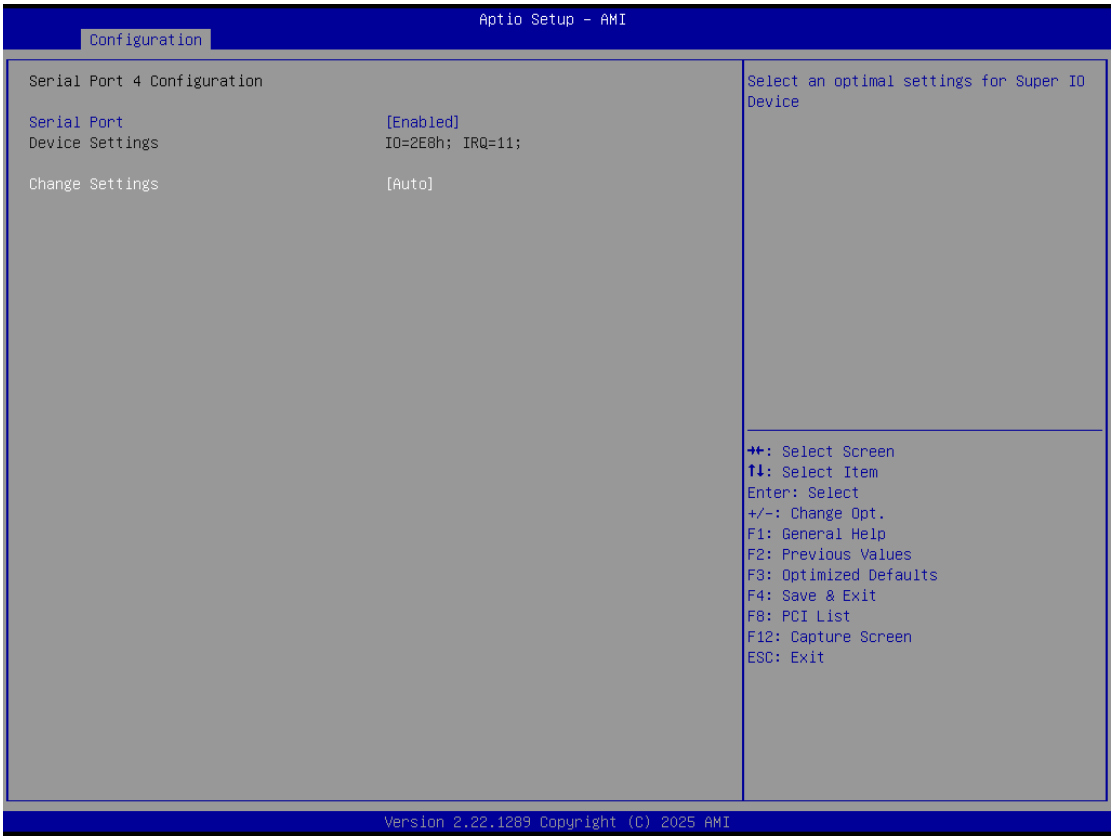
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
Change Settings	Select an optimal setting for Super IO Device.	★Auto, IO=3F8h; IRQ=3; IO=3F8h; IRQ=3,4,10,11
Serial Port 2 RS-232/422 /485 Control Option	Serial Port 2 RS-232/422/485 Control Option	★RS-232, RS-485 HALF DUPLEX

Serial Port 3 Configuration



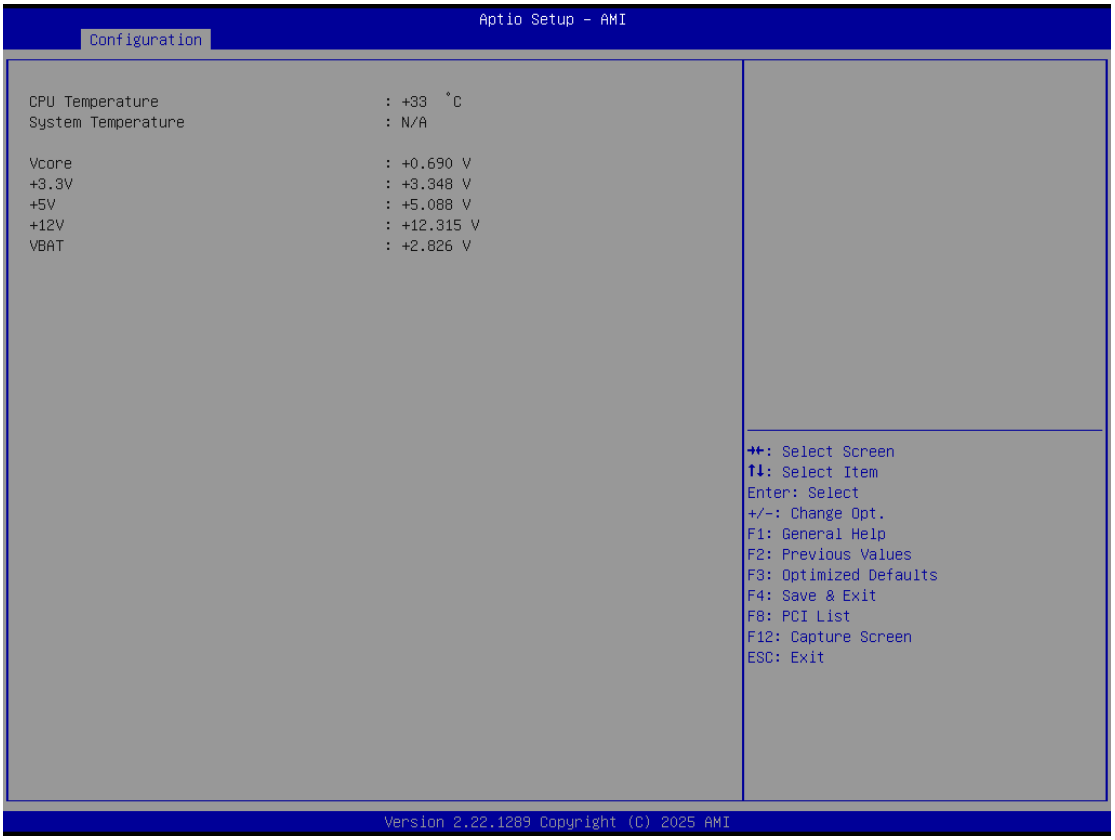
Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
Change Settings	Select an optimal setting for Super IO Device.	★Auto, IO=3F8h; IRQ=3; IO=3F8h; IRQ=3,4,10,11

Serial Port 4 Configuration

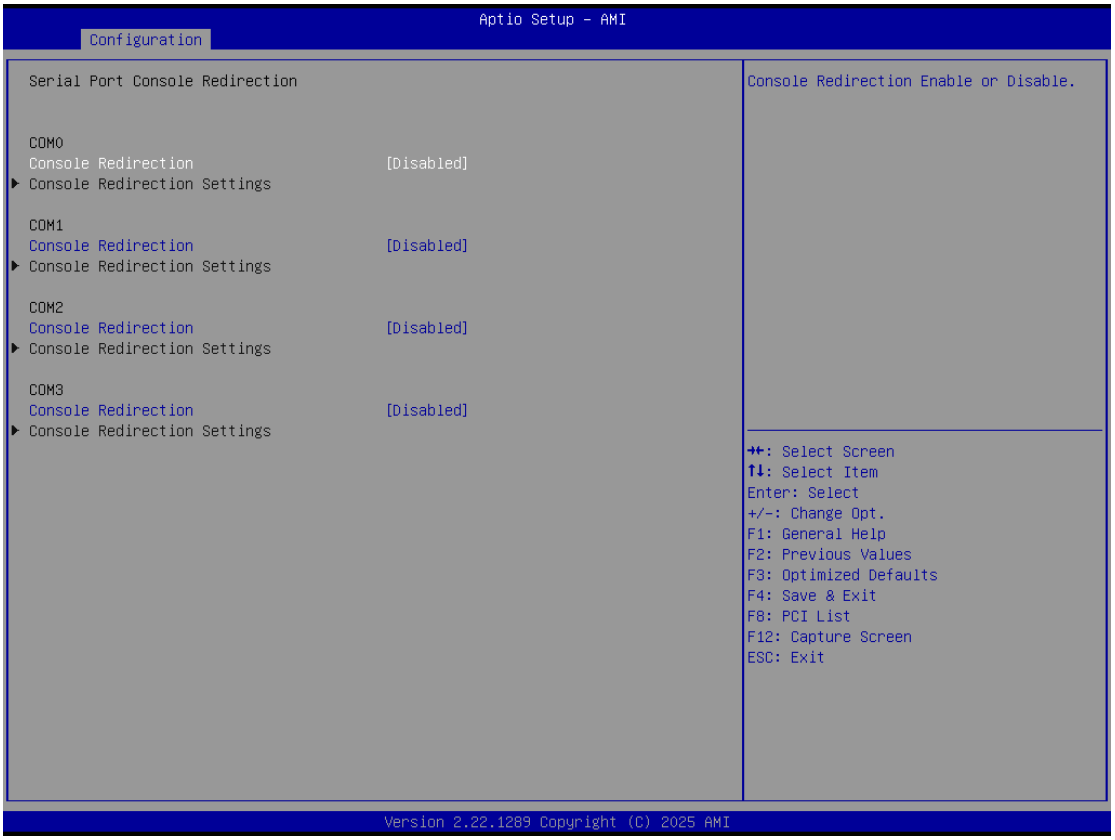


Feature	Description	Options
Serial Port	Enable or Disable Serial Port (COM)	Disabled, ★Enabled
Change Settings	Select an optimal setting for Super IO Device.	★Auto, IO=3F8h; IRQ=3; IO=3F8h; IRQ=3,4,10,11

HW Monitor


Aptio Setup – AMI
Configuration
CPU Temperature : +33 °C
System Temperature : N/A
Vcore : +0.690 V
+3.3V : +3.348 V
+5V : +5.088 V
+12V : +12.315 V
VBAT : +2.826 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 2.22.1289 Copyright (C) 2025 AMI

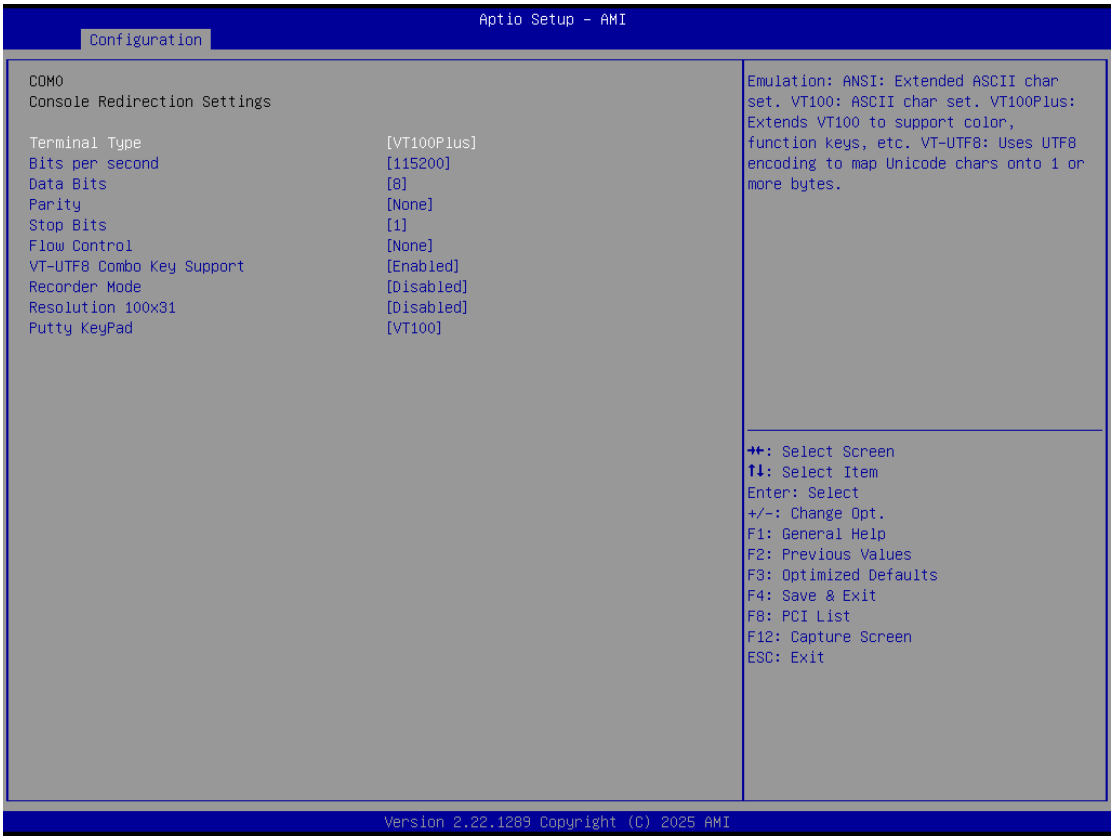
Serial Port Console Redirection



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

COM0 ~ COM3 Console Redirection Settings:

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

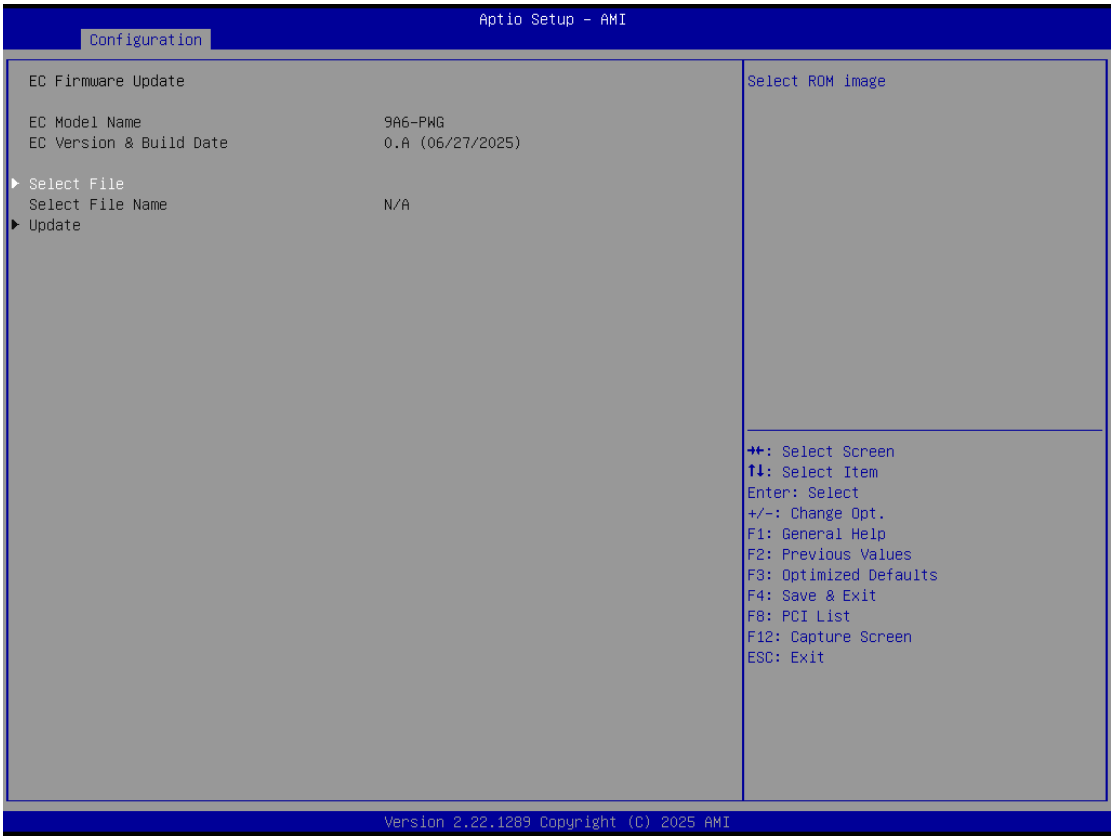


Feature	Description	Options
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.	★VT100Plus, ANSI, VT100, VT-UTF8

Bits per second	Select Serial port transmission speed. The speed must be matched on other side. Long or noisy lines may require lower speeds.	★115200, 9600, 19200, 38400, 57600
Data bits	Data bits	★8, 7
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

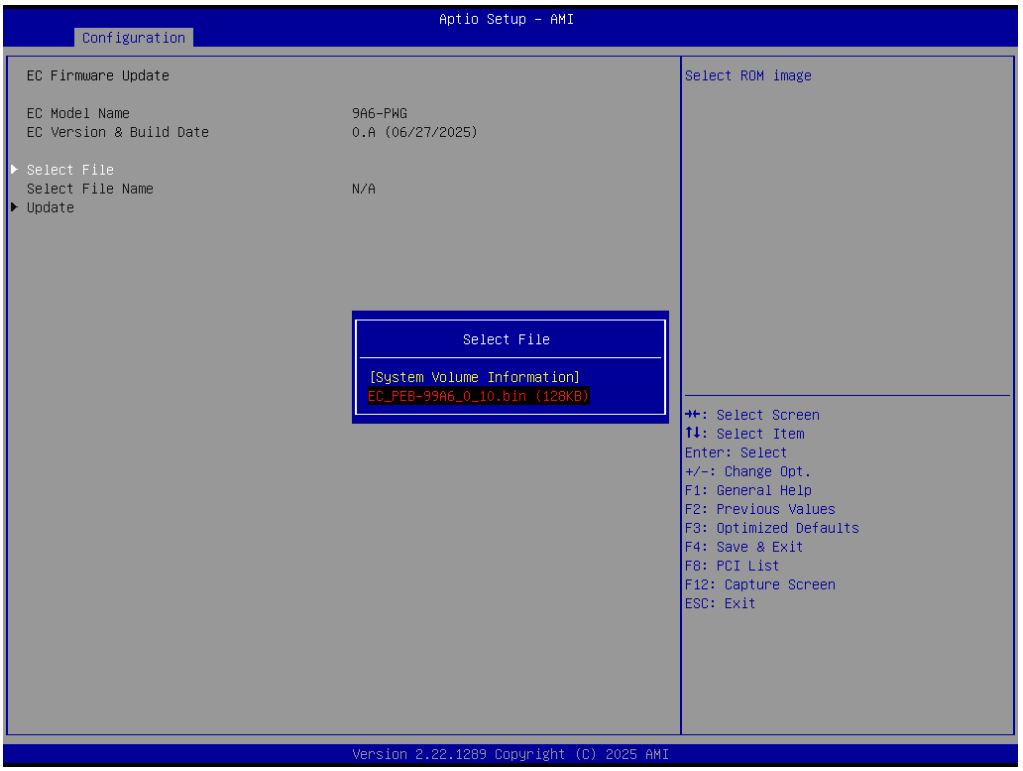
Feature	Description	Options
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.	★1,2
Flow Control	Flow control can prevent data loss from buffer overflow. 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 signal.	★None, Hardware RTS/CTS
VT-UTF8 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

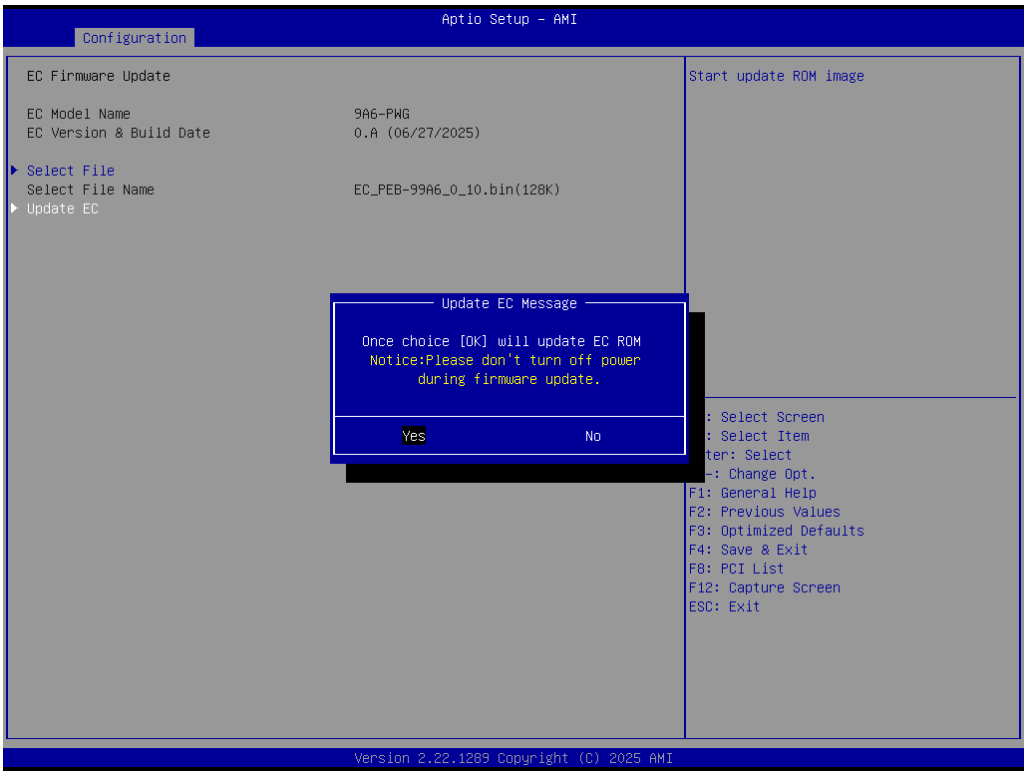


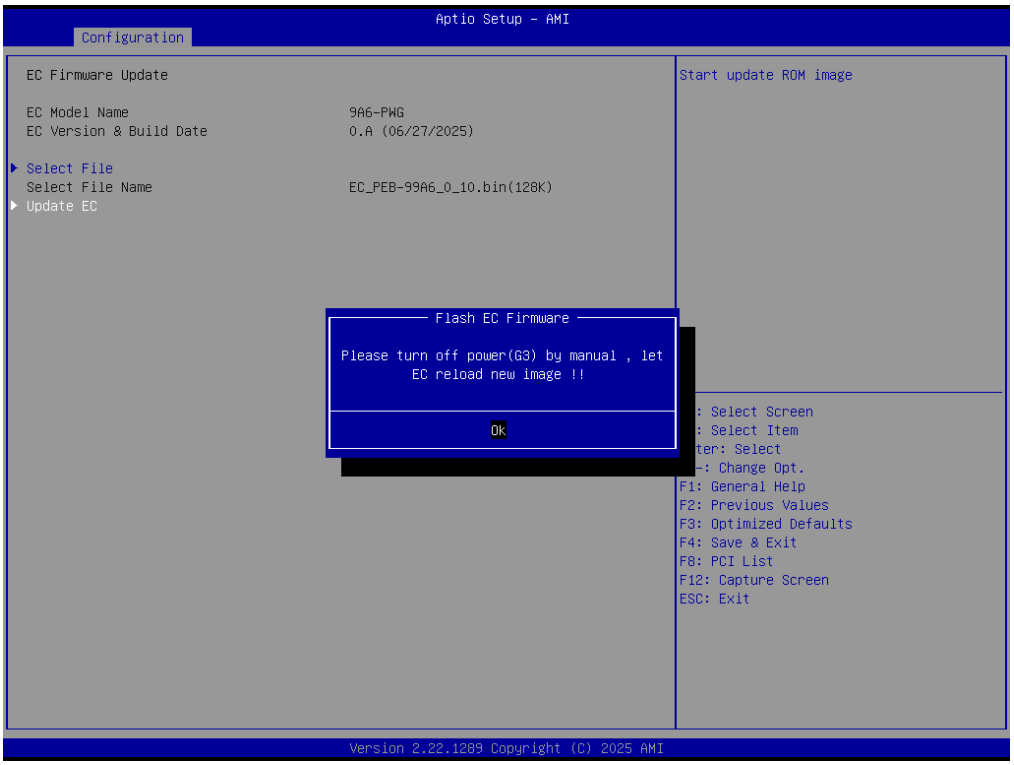
Feature	Description	Options
Select File	Select BIOS BIN file in (USB) drive to update	
Update	Start update ROM image	

Select file



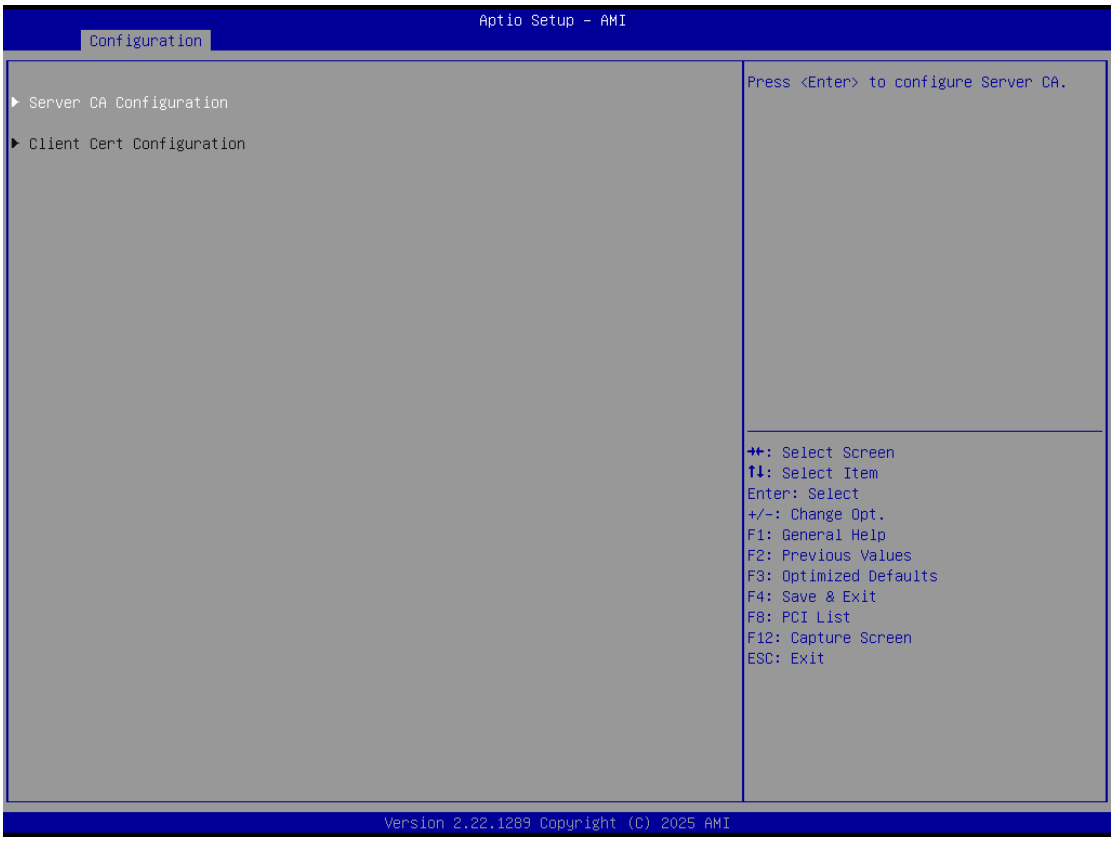
Update EC




Aptio Setup - AMI
Configuration
EC Firmware Update
EC Model Name 9A6-PWG
EC Version & Build Date 0.A (06/27/2025)
Select File
Select File Name EC_PEB-99A6_0_10.bin(128K)
Update EC
Start update ROM image
Flash EC Firmware
Please turn off power(G3) by manual , let EC reload new image !!
Ok
: Select Screen
: Select Item
ter: Select
-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
F8: PCI List
F12: Capture Screen
ESC: Exit
Version 2.22.1289 Copyright (C) 2025 AMI

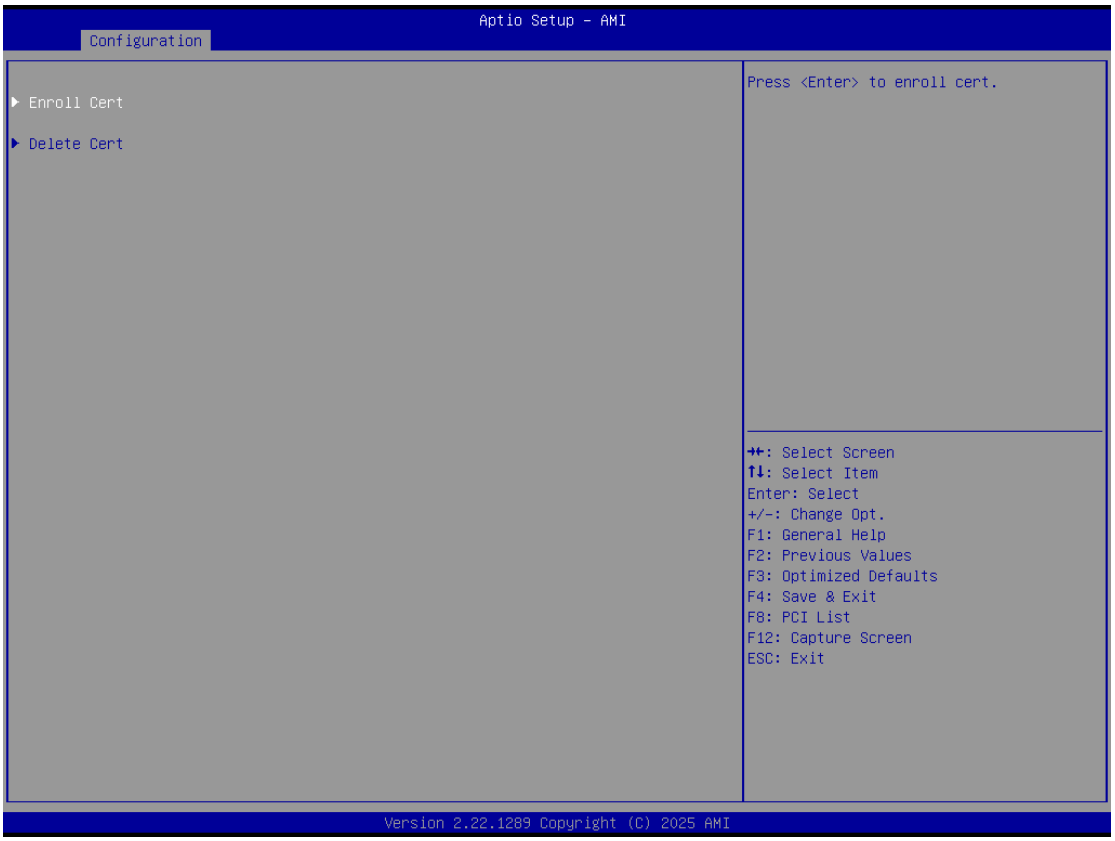
Server CA Configuration

Press <Enter> to configure Server CA.



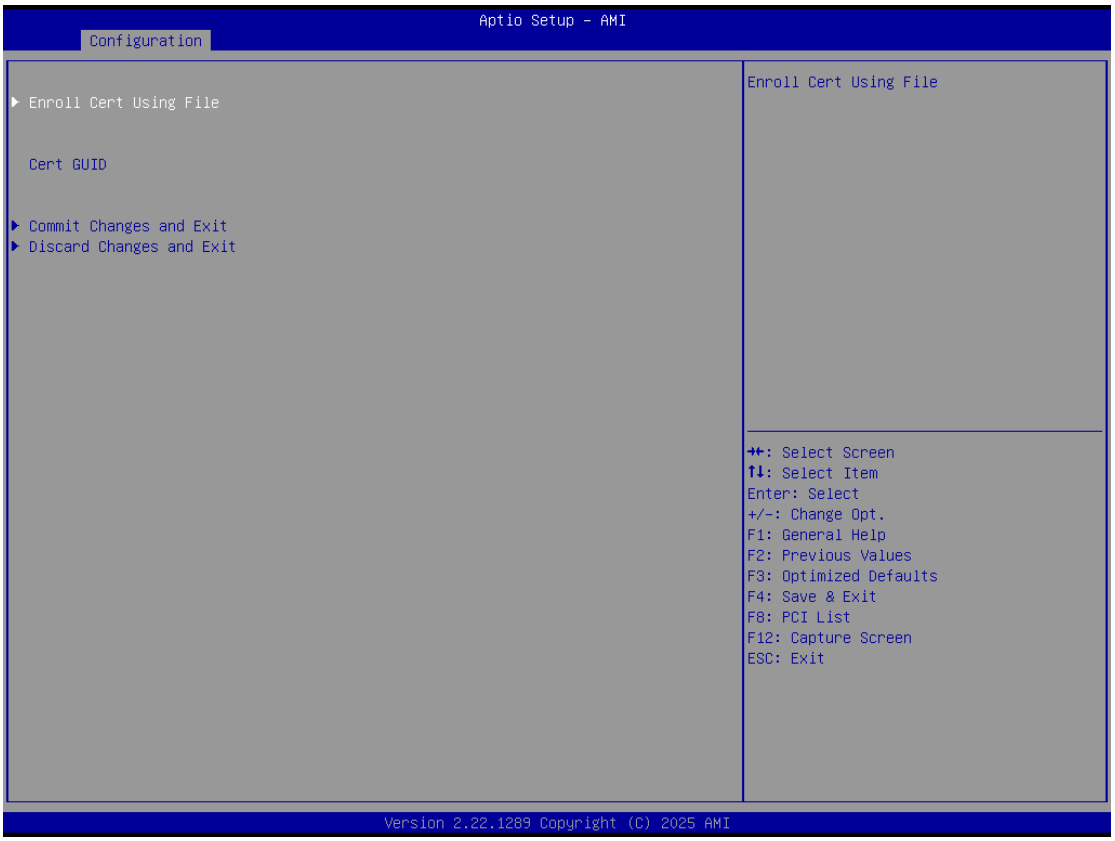
Enroll Cert

Press <Enter> to enroll cert.



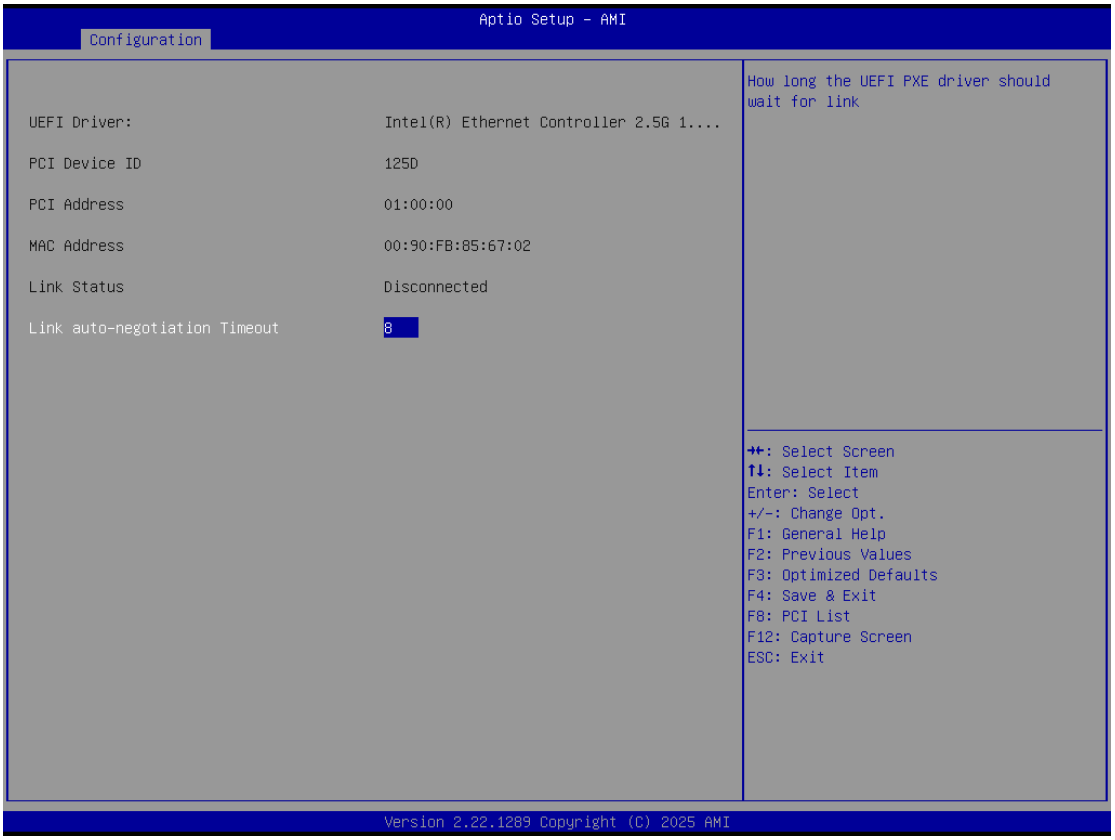
Enroll Cert Using File

Enroll Cert Using File.



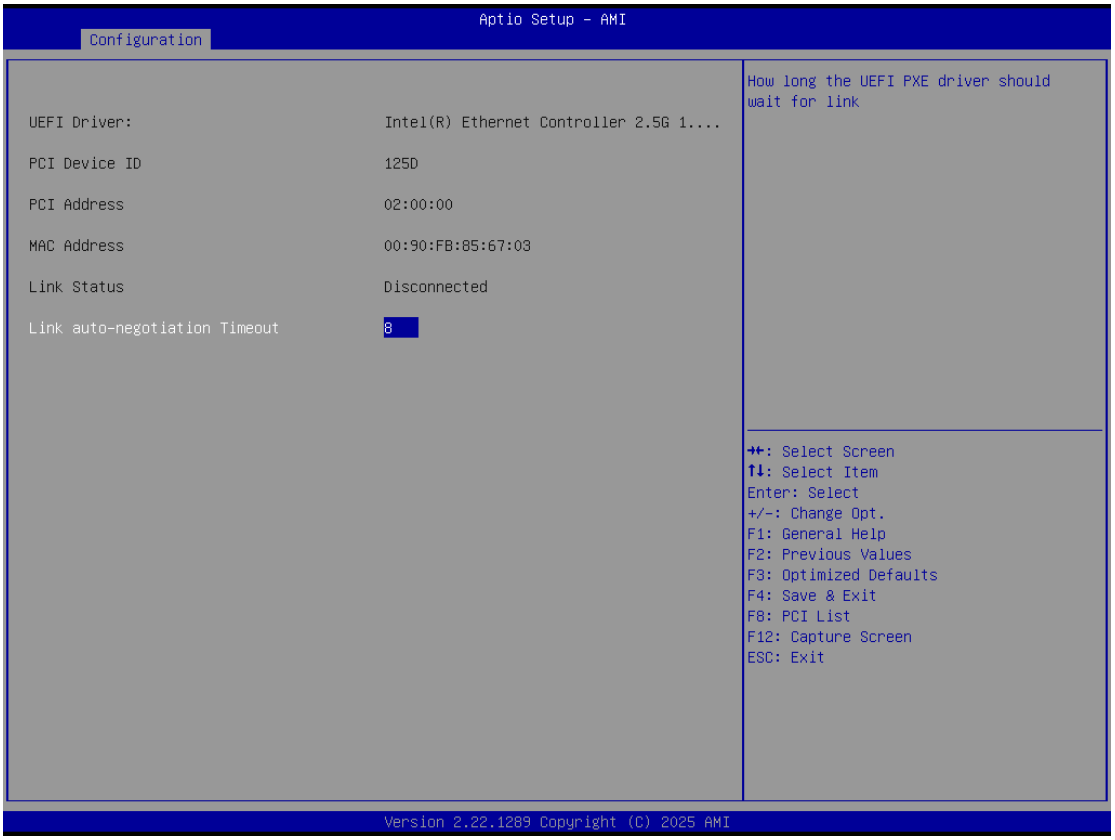
Feature	Description	Options
Enroll Cert Using File	Enroll Cert Using File.	
Cert GUID	Input digit character in 11111111-2222-3333-4444-1234567890ab format.	
Commit Changes and Exit	Commit Changes and Exit	
Discard Changes and Exit	Discard Changes and Exit	

Intel (R) Ethernet Controller I226-IT – 00:90:FB:85:67:02



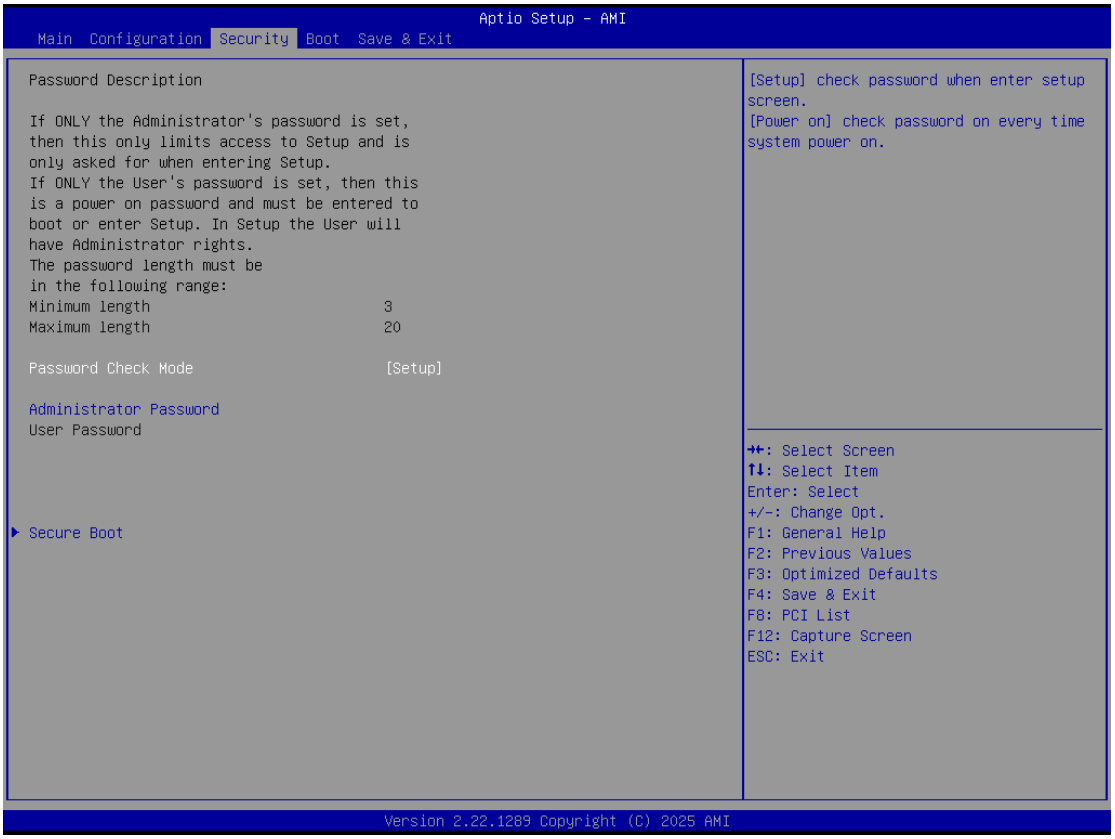
Feature	Description	Options
Link auto-negotiation Timeout	How long the UEFI PXE driver should wait for link.	★8

Intel (R) Ethernet Controller I226-IT – 00:90:FB:85:67:03



Feature	Description	Options
Link auto-negotiation Timeout	How long the UEFI PXE driver should wait for link.	★8

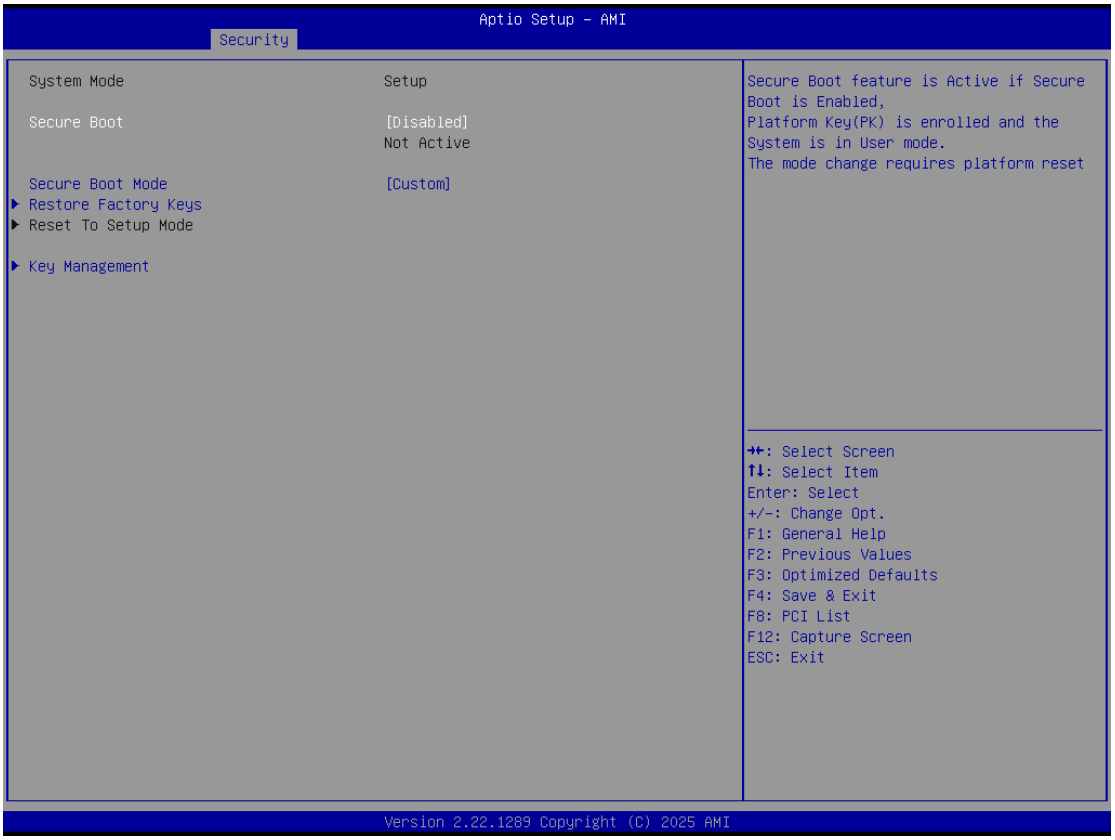
4.1.3 Security



Feature	Description	Options
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	

Secure Boot

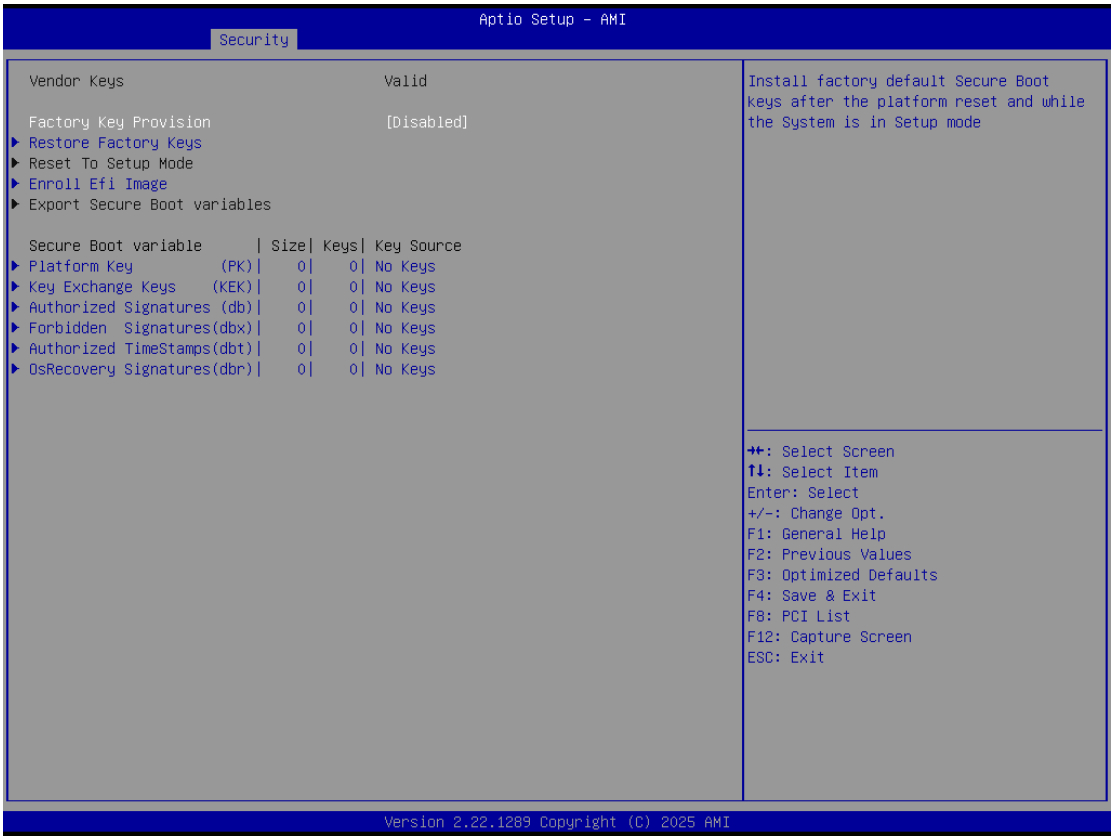
Secure Boot configuration



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	★Custom, Standard
Restore Factory keys	Force System to User Mode. Install factory default Secure Boot key databases	Yes, No
Key Management	Enables expert users to modify Secure Boot Policy variables without variable authentication	

Key Management

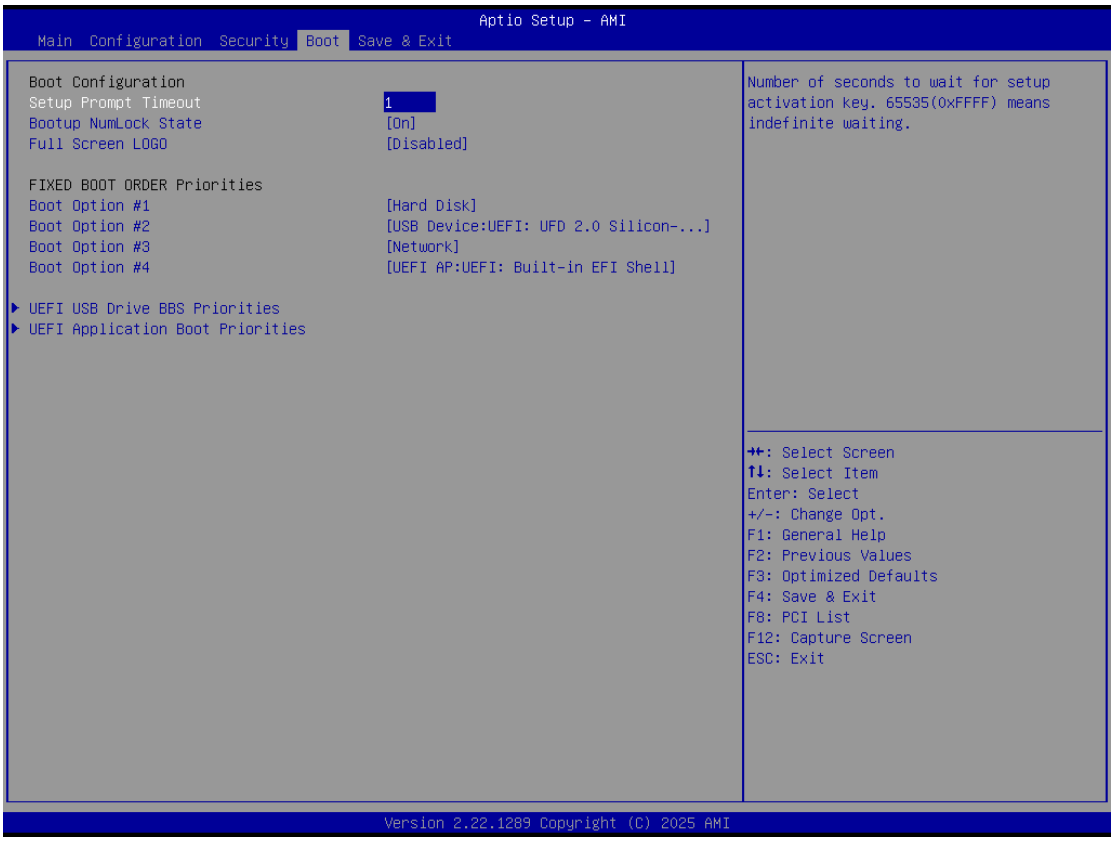
Enables expert users to modify Secure Boot Policy variables without variable authentication



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	Yes, No
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)	

Feature	Description	Options
Platform Key(PK)	Enroll Factory Defaults or load certificates from a file: 1.Public Key Certificate: a)EFI_SIGNATURE_LIST b) EFI_CERT_X509 (DER) c) EFI_CERT_RSA2048 (bin) d)EFI_CERT_SHAXXX 2.Authenticated UEFI Variable 3.EFI PE/COFF Image(SHA256) Key Source: Factory, Modified, Mixed	
Key Exchange Keys(KEK)		
Authorized Signatures (db)		
Forbidden Signatures (dbx)		
Authorized TimeStamps (dbt)		
OsRecovery Signatures (dbr)		

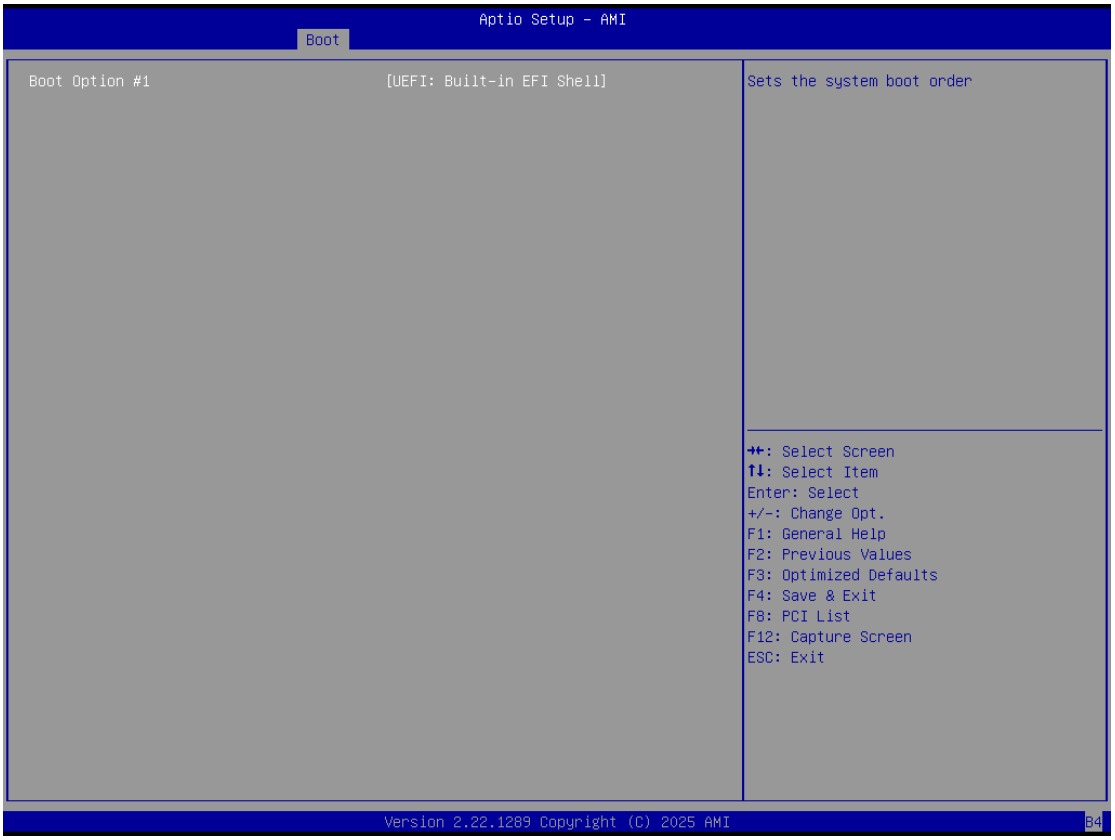
4.1.4 Boot



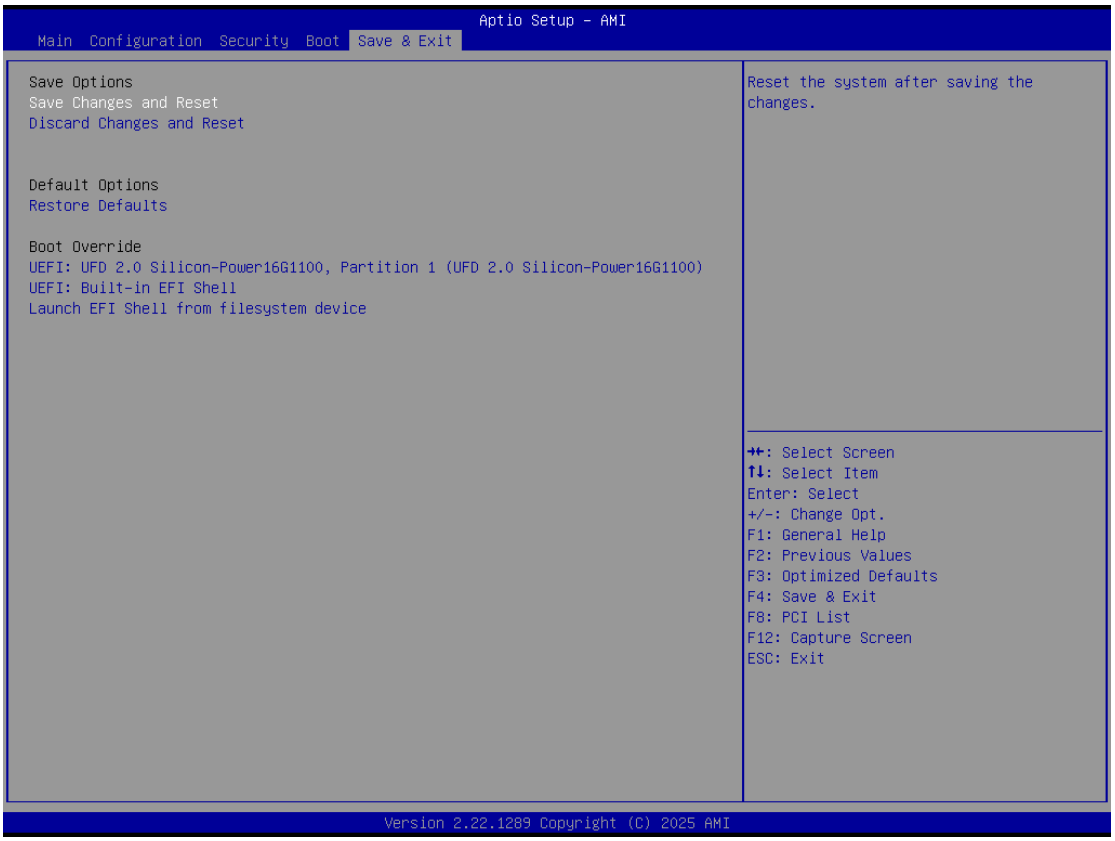
Feature	Description	Options
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	★1
Bootup NumLock State	Select the keyboard NumLock state.	★On, Off
Full Screen LOGO	Enables or disables Quiet Boot option and Full screen Logo.	★Disabled, Enabled
Boot Option #1 ~ #4	Sets the system boot order	Hard Disk,, UEFI AP: UEFI: Built-in EFI Shell, USB Device; Network, Disabled
UEFI Application Boot Priorities	Specifies the Boot Device Priority sequence from available UEFI Application	

UEFI Application Boot Priorities:

Sets the system boot order.



4.1.5 Save & Exit



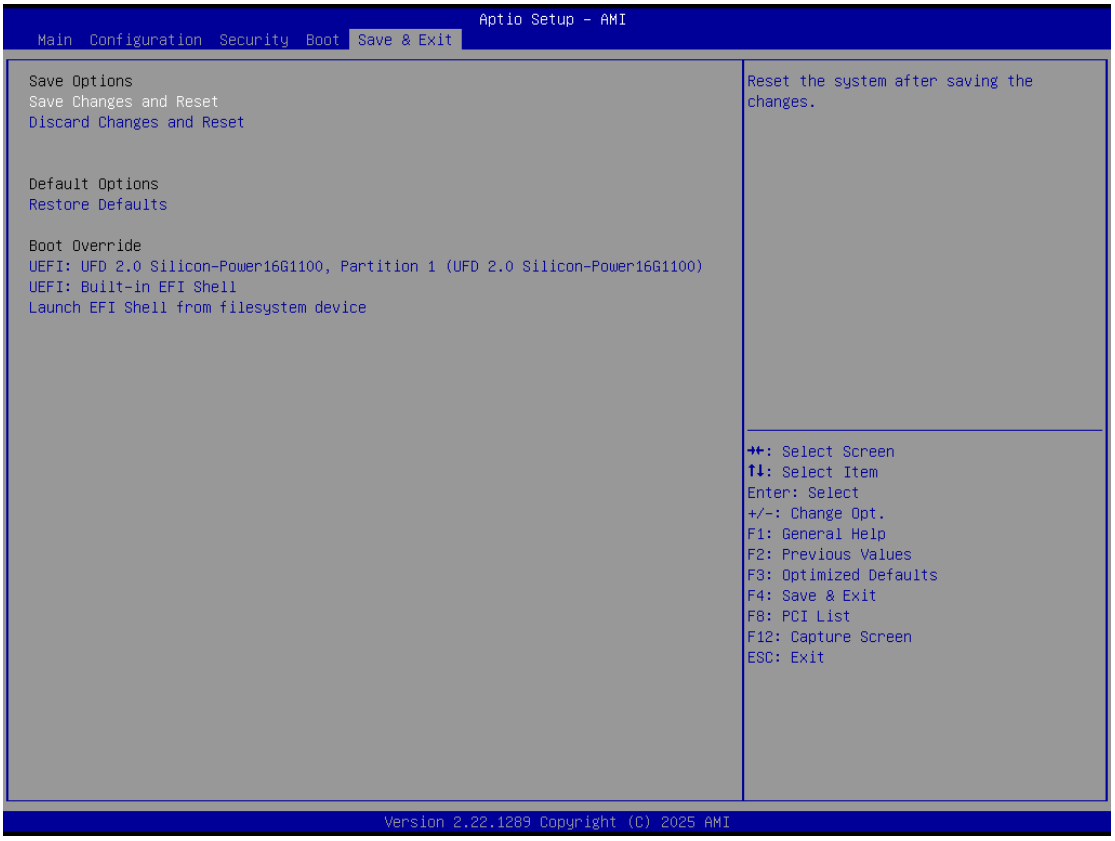
Feature	Description	Options
Save Changes and Reset	Reset the system after saving the changes.	
Discard Changes and Reset	Reset system setup without saving any changes.	
Restore Defaults	Restore/Load Default values for all the setup options.	
UEFI: Built-in EFI Shell		
Launch EFI Shell from filesystem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

4.2 How to update the BIOS/EC file

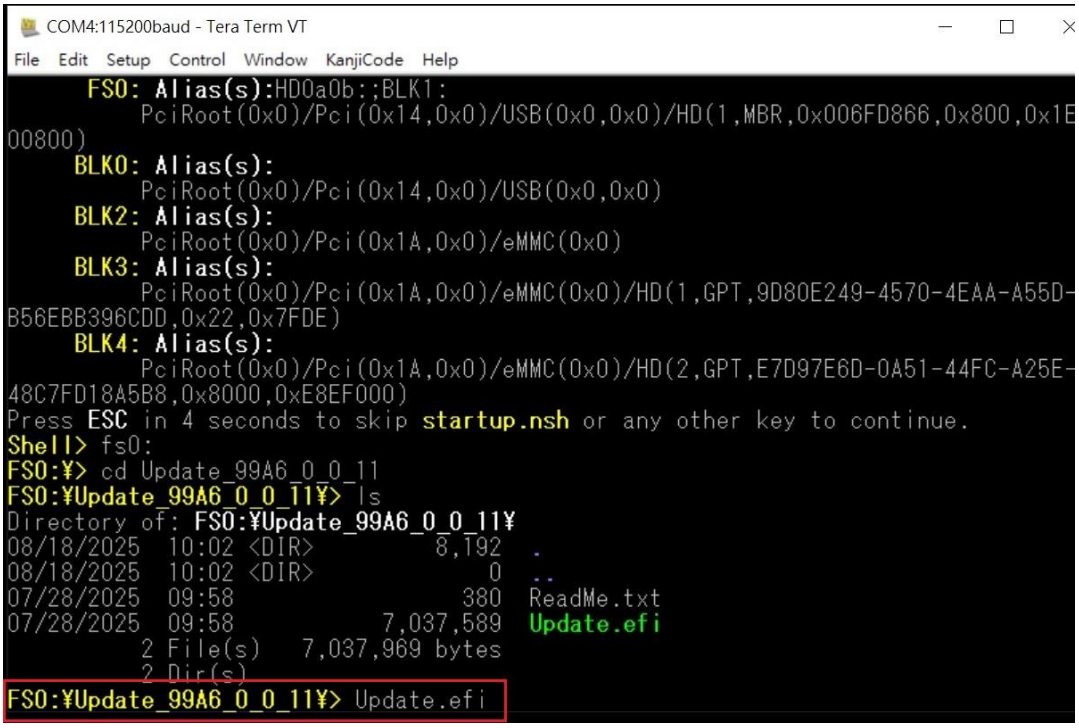
Step 1. Prepare a USB DOK.

Step 2. Unzip BIOS update file to the USB DOK.

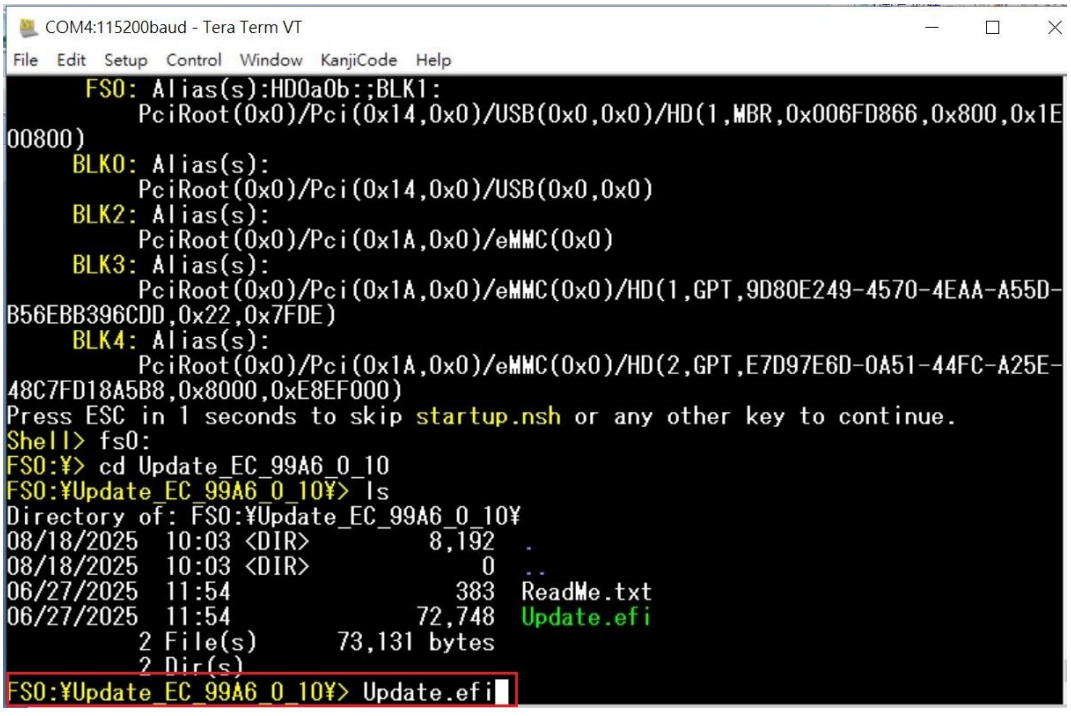
Step 3. Plug the USB DOK into the target system and then boot in UEFI Shell by selecting UEFI: Built-in EFI Shell in the BIOS Save & Exit page.



Step 4. Under the UEFI shell, direct to your USB DOK, below picture is an example using fs0. Then direct to the folder with BIOS updated file and then enter command: "Update.efi" to start updating BIOS or EC.



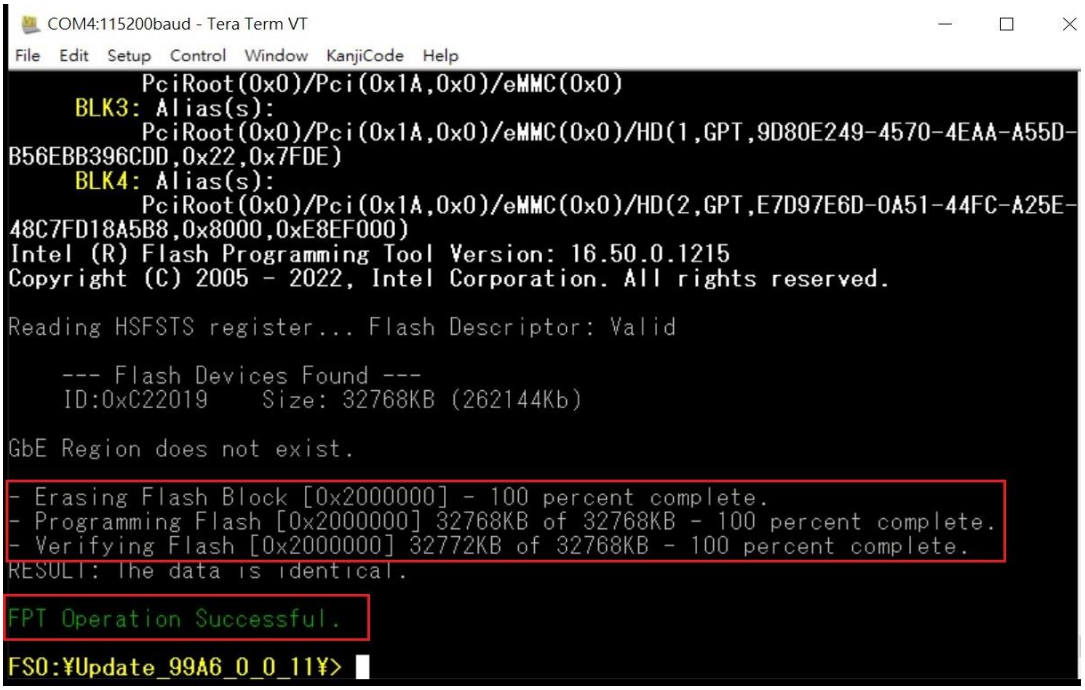
(BIOS File Update)



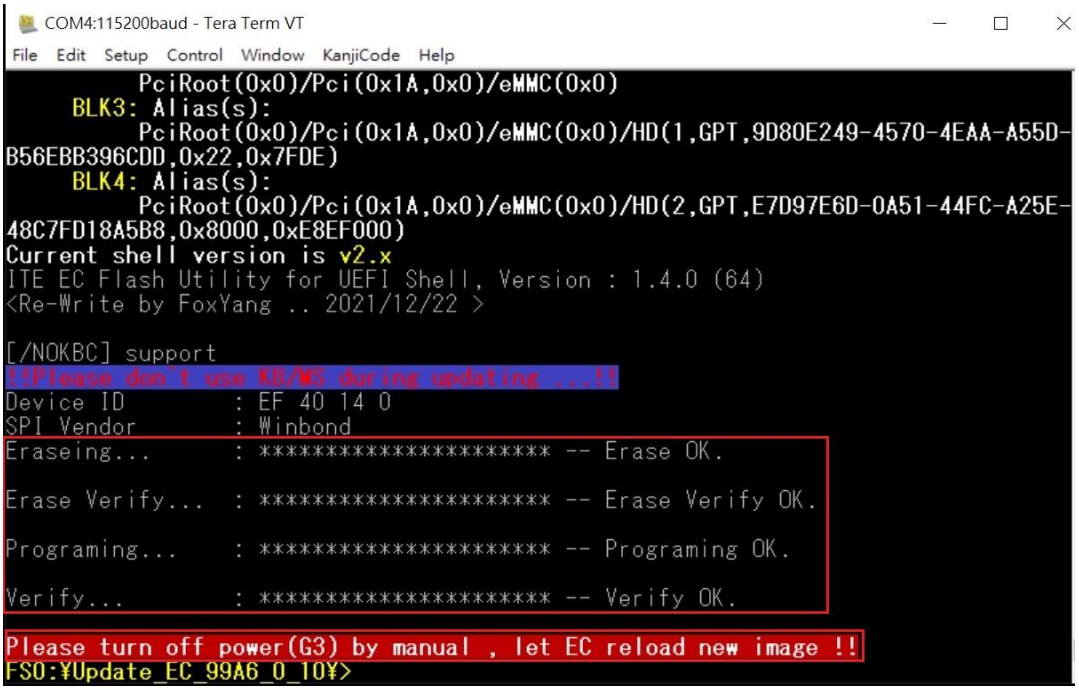
(EC File Update)

Step 5. The updating process will start and you can see the updating progress. When you see the following pictures, which means the BIOS update processes finished.

Please cut the AC power off and wait for 10 seconds before powering on.



(BIOS update finished)



(EC update finished)

Chapter 5

Important instructions

5.1 Note on the Warranty
5.2 Exclusion of Accident Liability Obligation
5.3 Liability limitations / Exemption from the Warranty Obligation
5.4 Declaration of Conformity

This chapter includes instructions which must be carefully followed when the embedded system/Touch Panel PC is used.

5.1 Note on the Warranty

Due to their limited-service life, parts which, by their nature, are especially subject to wear are not included in the guarantee beyond the legal stipulations.

5.2 Exclusion of Accident Liability Obligation

Portwell, Inc. shall be exempt from the statutory accident liability obligation if users fail to abide by the safety instructions.

5.3 Liability Limitations / Exemption from the Warranty Obligation

In the event of damage to the system unit caused by failure to abide by the hints in this manual and on the unit (especially the safety instructions), Portwell, Inc. shall not be required to respect the warranty even during the warranty period and shall be free from the statutory accident liability obligation.

5.4 Declaration of Conformity

EMC

CE/FCC Class A

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This equipment may not cause harmful interference.
2. This equipment must accept any interference that may cause undesired operation.

Chapter 6

6.1 PET tool

6.1 PET tool

Portwell Evaluation Tool (PET)
The Portwell Evaluation Tool (PET) is an API which Portwell's customers can access the GPIO, I2C, SMBus, etc under Windows and Linux OS. For more information, please contact Portwell.

Please visit our Download Center to obtain the necessary documents and files, such as the catalog, user manual, PET, BIOS, and driver.
https://www.portwell.com.tw/support-center/download-center/

If you have other additional technical information or request which is not covered in this manual, please fill in the technical request form as below hyperlink.
https://www.portwell.com.tw/support-center/technical-request/
We will do our best to provide a suggestion or solution for you.

Portwell

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