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ACS-330

Intel®Alder Lake-N Embedded Edge Controller

User Manual

Release Date	Revision
Nov. 2025	V1.1

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Revision History

Reversion	Date	Description
1.0	2025/10/27	First Release
1.1	2025/11/24	Add SecurBoot Key information in Ch3.6

Warning!_____

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

Disclaimer

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Packing List

Model	Description	Qty
Plug Conn	DINKLE,ESC250V-02P,1X2P,2.5mm,Green,4A,2P	1
CONNECTOR	PHOENIX CONN/PH 5.08 3P/2ESDVM-03P(F)	1
Plug Conn	DINKLE,0221-2005,1X5P,3.5mm,Green,5P	2

Option List

Model	Description	Qty
ADAPTER	ADAPTER/AC100~240V IN/24V5A OUT/120W EA11011M-2400	1
POWER CORD	AC power cord	1

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Chapter 1 System Product

1.1 Features

- Intel® Alder Lake-N processors (12th Gen) with DDR5 memory, up to 32GB.
- Supports 2 x M.2 slots (1x M.2 B-Key 3042/3052 4G/5G system with nano SIM card slot, 1x M.2 B+M Key 2242 SATA storage).
- Supports 1x Mini PCIe 3027/3051 Wi-Fi system.
- Dual 2500 BASE-T Ethernet supports Time-Sensitive Network (TSN) technology.
- Dual display (1x HDMI, 1x DP).
- 8x GPIOs.
- 2x RS232/422/485 ports.
- Modular design for optional UARTs extension.
- Modular design for optional two PSE LAN ports and four USB2.0 ports.
- Modular design for optional AI acceleration card.
- Support Windows 11 IoT Enterprise LTSC

1.2 Specifications

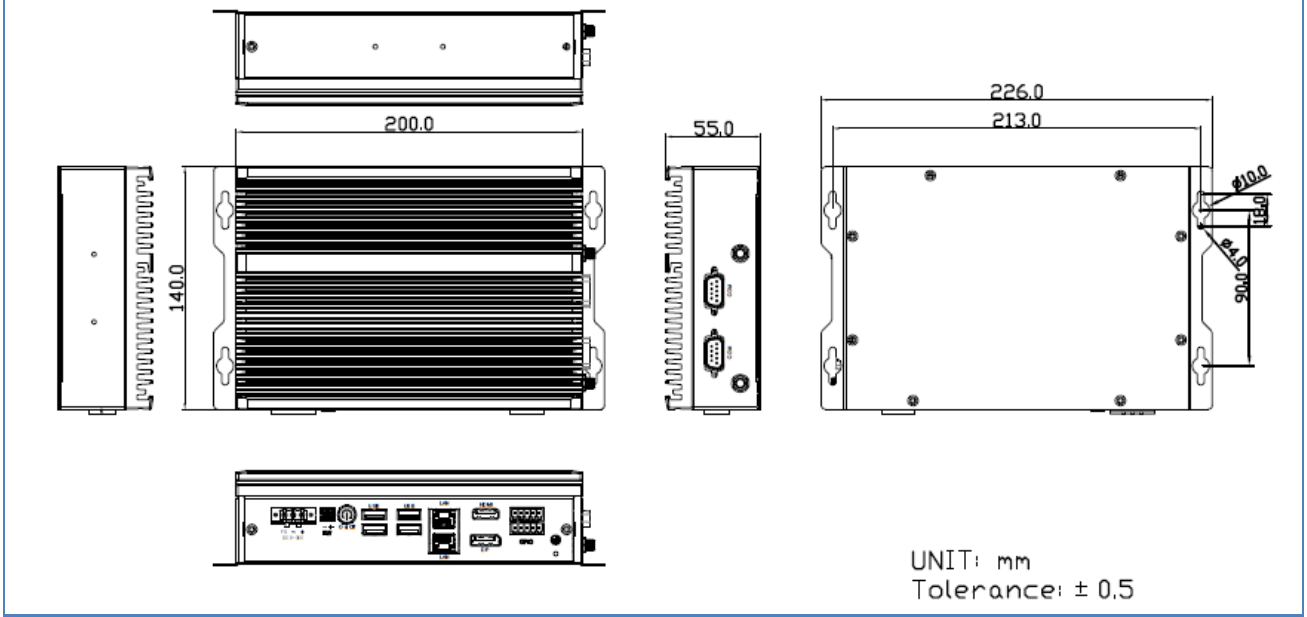
	ACS-330
System	
CPU	Intel® Alder Lake Processor N97 (4-core, 6MB Cache, 12W TDP)
Security	Support Onboard TPM 2.0
Memory	1 x DDR5 NON-ECC SO-DIMM slot, support up to 32GB capacity at 4800MT/S.
Multiple Display	Dual display(1 x HDMI, 1 x DP)
HDMI	1 x HDMI 2.0b (up to 4K @60Hz, HDCP 2.2)
DP	1 x Display Port 1.4 (up to 4K @60Hz, VDSC 1.1, HDCP 2.2, MST)
MISC. Function	1 x SMBus Wafer Header 1 x I2C Interface (M.2 Connector)
Outside IO Port	
USB	4 x USB2.0 Type-A at Front Side
LAN	2 x 2500 BASE-T Ethernet Ports(RJ-45)
Serial Port	2 x RS-232/422/485 select via BIOS
GPIO	8 x GPIO (4xIN, 4xOUT, 3.3V/5V hardware selectable)
Audio	1 x Line-out, 1 x Mic-in, 1 x Line-in
Button	1 x Power Button 1 x Switch Connector
Storage Space	
Storage	1 x M.2 B+M-Key 2242 (SATA Interface)
Power	

Power Input	9-36V DC(Auto Power on)
Power Consumtion	Max: 26.99W
Expansion	
Expansion Slot	1 x Mini PCIe 3027/3051 for Wi-Fi module (PCIe/USB2.0 Signal) 1 x M.2 B-Key 3042/3052 for 4G/5G module (PCIe/USB2.0/USB3.2 signal)
Others	
Other Expansion Card	UART-4 x RS-232/422/485 (BIOS Selectable) GPIO- 8 x GPIO (4xIN/4xOUT, 3.3V/5V, hardware -selectable)
Others	1 x Power LED indicator
Environmental	
Operating temperature	-20~60°C (-4 ~ 140 °F) **(-30~70°C for option)**
Storage temperature	-40~85°C (-40 ~ 185 °F)
Humidity	95% RH @ 40°C/104 °F
Vibration	7.7 Grms, IEC60068-2-64, Random, 5Hz to 2KHz, 10min / Axis (Operating)
Shock	20G, half sine shock pulse, 11ms duration, 3 tgimes per face
Drop	90cm (1 corner, 3 edges, 6 surfaces, Full packing)
Certification	CE / FCC Class A, UKCA, LVD, RoHS, UL
RoHS	RoHS Compliant
Ingress Protection	IP20
Operating System Support	
OS Support	Windows 11 IoT Enterprise LTSC/LINUX/Ubuntu 20.04 / 22.04
Mechanical	
Mounting	Wall Mount Din Rail
Dimension (mm)	200 x 140 x 55 (WxDxH)
Net Weight(Kg)	2.2

1.3 Dimensions

ACS-330 Wall Mount

Wall Mount



Wall Mount (With Extension Card)

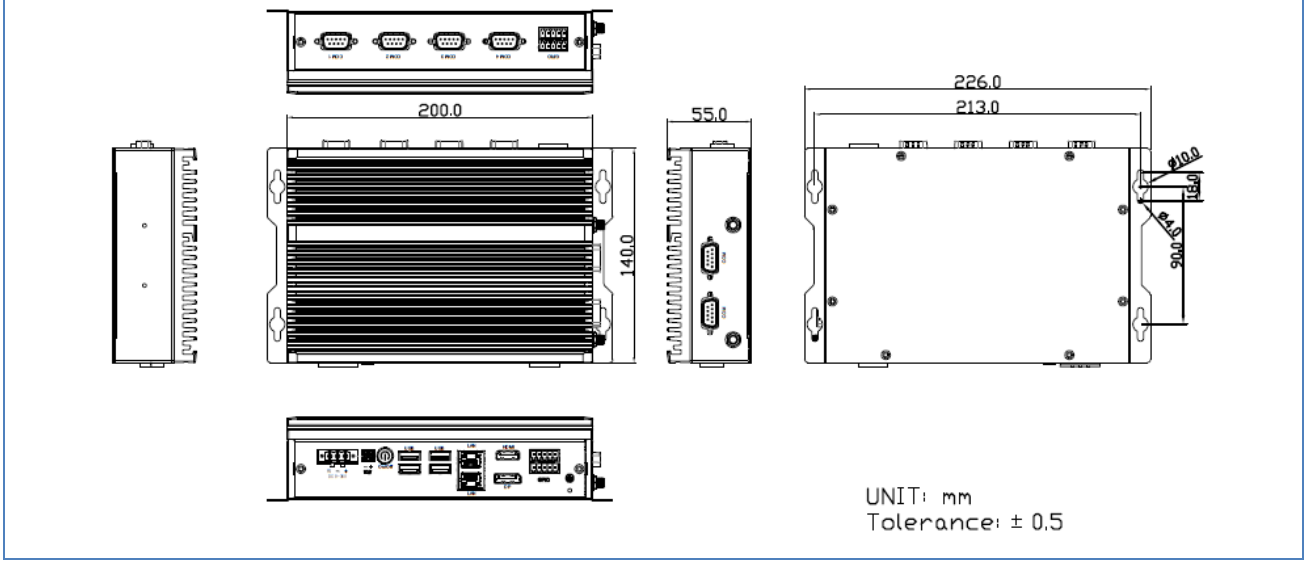
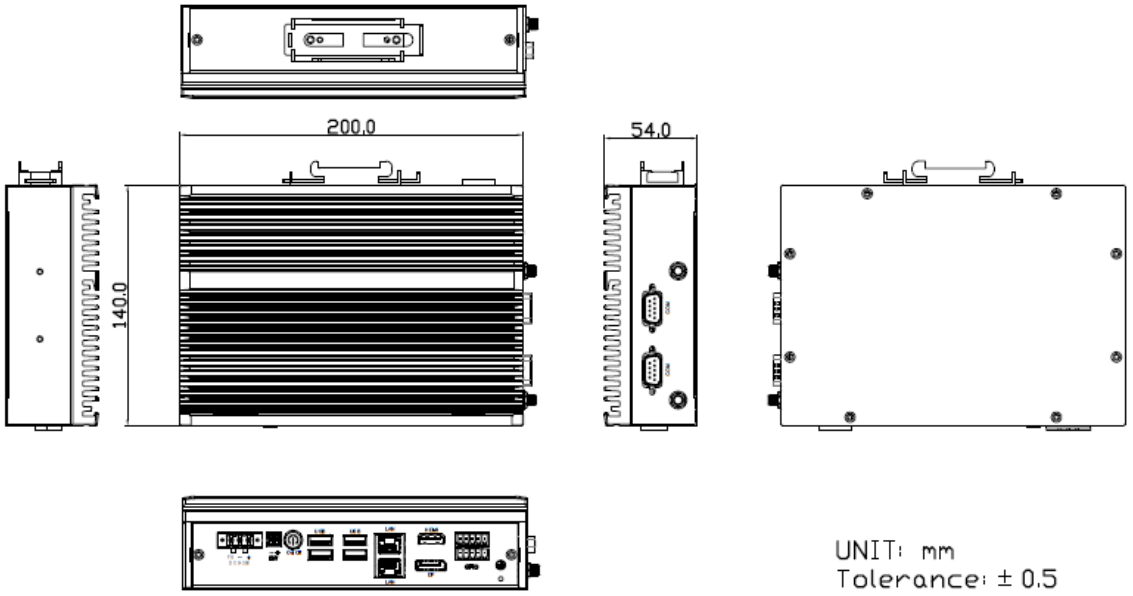


Figure 1: Dimensions of ACS-330 (Wall Mount)

Din-Rail



Din-Rail (With Extension Card)

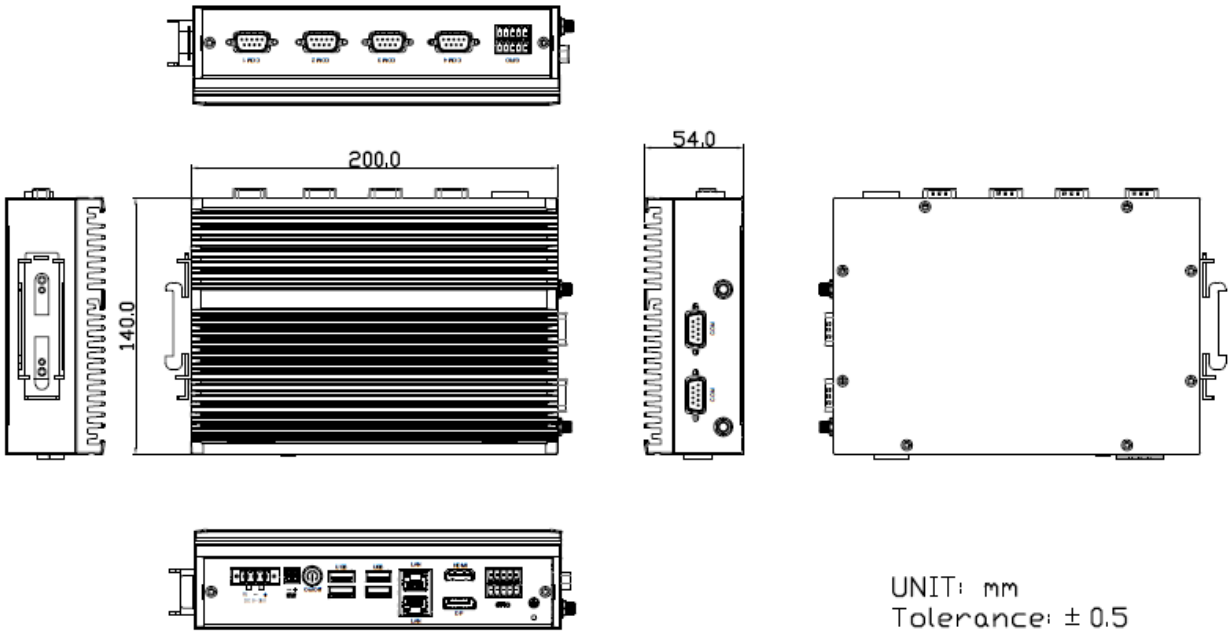


Figure 2: Dimensions of ACS-330 (Din Rail)

1.4 Brief Description of ACS-330

APLEX's ACS-330 embedded edge controllers deliver high performance and flexibility, supporting PCIe, SATA, and optional UART for Wi-Fi, 5G, and storage with cableless.

ACS-330 provide reliable edge solutions, bridging the gap between OT and IT. By installing the ACS-330 series, your system gains video output capabilities that enable information visualization on dashboards and monitors.

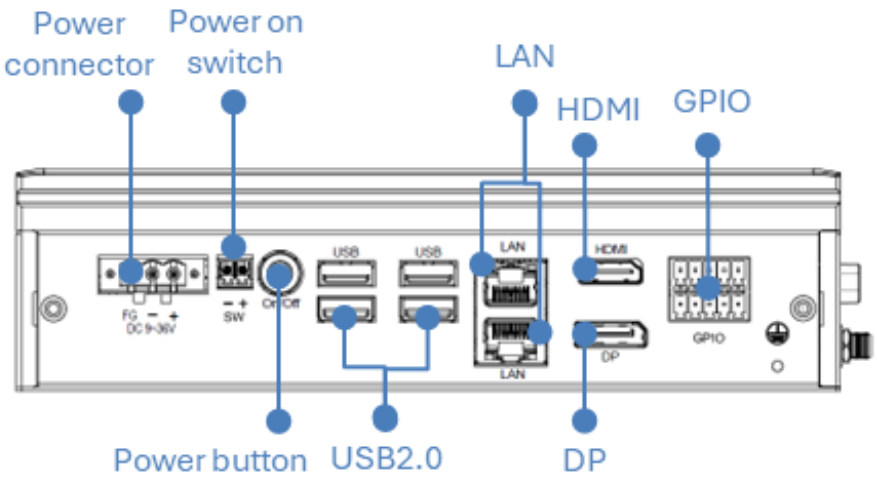
Front I/O

Side I/O

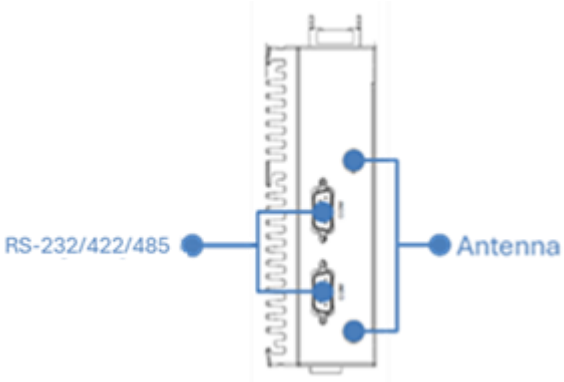
Figure 2: Overall Appearance of ACS-330

1.5 Chassis Specifications & I/O Connector Function

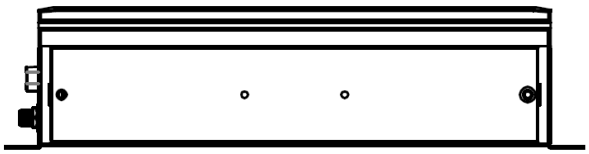
Front I/O



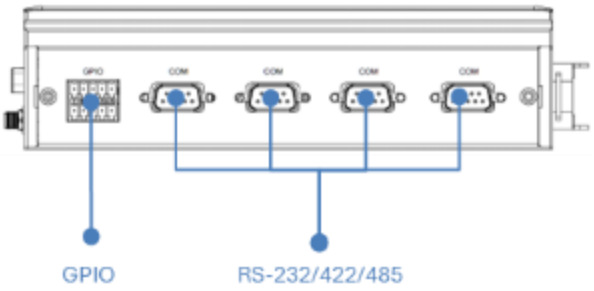
Side I/O



Rear I/O



Rear I/O (With Extension Card)



1.6 DIN-rail Mounting (optional)

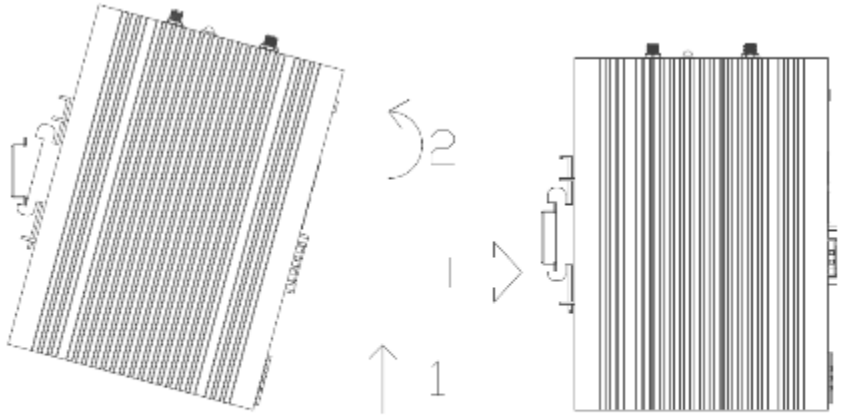
Suggested Installation Method

STEP 1:

Hold the DIN rail lower lip kit on the mounting rail.

STEP 2:

Press the device against the upper mounting rail until it snaps into place



Assembly instructions

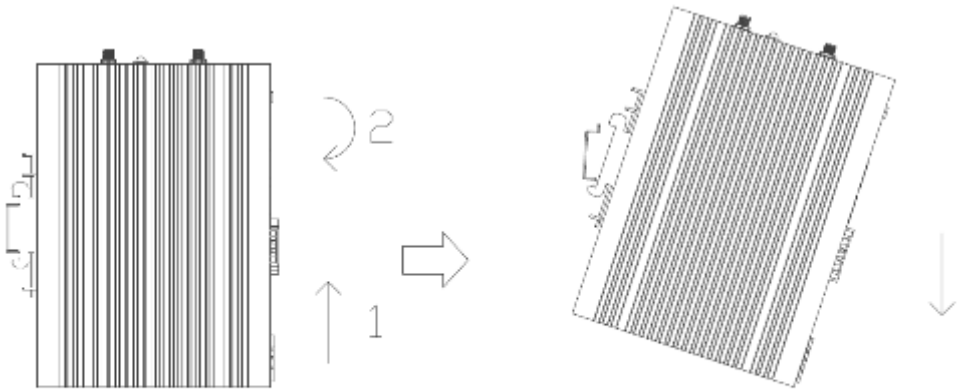
Suggested Removal Method

STEP 1:

Pull the device up and off the DIN rail with the upper lip off the rail.

STEP 2:

Gently pull the device back at a 45° angle away from the rails, and then pull the device down to remove.



Disassembly instructions

Chapter 2 Hardware

2.1 Motherboard Introduction

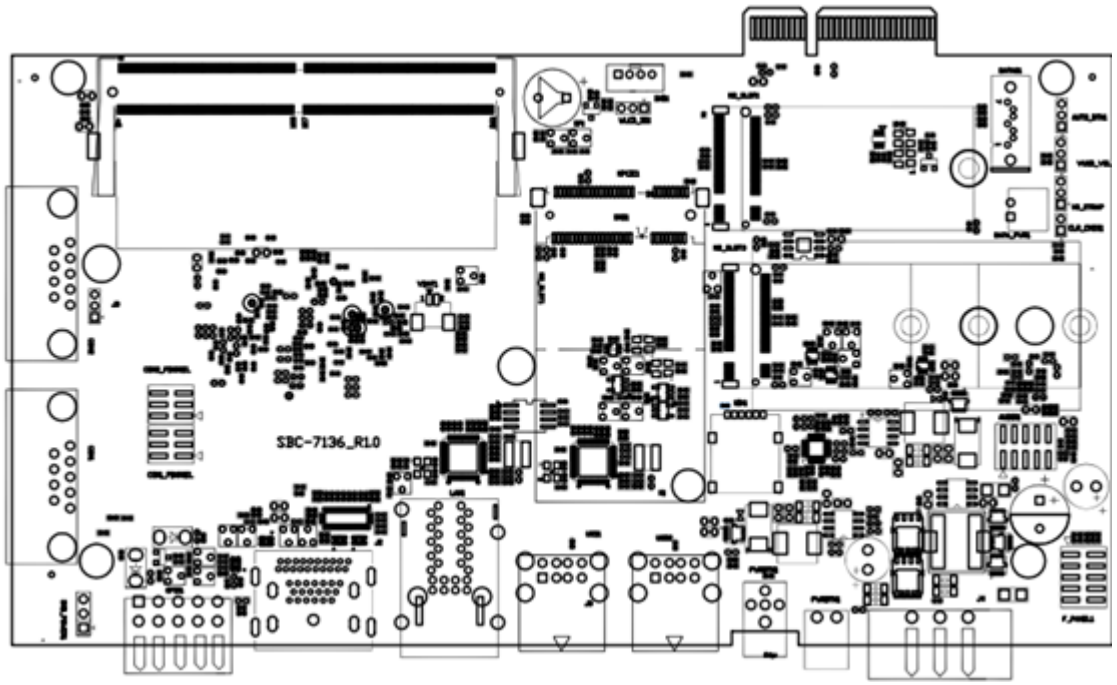
SBC-7136 is an industrial motherboard developed on the basis of Intel Alder Lake, which provides abundant peripheral interfaces to meet the needs of different customers.

2.2 Motherboard Specifications & Dimensions

Specifications	
Board Size	196mm x 114mm
CPU Support	Intel N97, 4C4T, up to 3.6GHz, 24EU iGPU, TDP:12W
Chipset	SOC
Memory Support	1 x SO-DIMM (262pins), up to 32GB DDR5 4800MT/s
Graphics	Integrated Intel UHD Graphics
Display Mode	1 x HDMI 2.0b via HDMI Port 1 x DP 1.4 via DP Port
Support Resolution	HDMI: support up to 4096x2160@60Hz DP: support up to 4096x2160@60Hz
Super I/O	Extra ITE IT8786E-I/HX are optional
BIOS	AMI/UEFI BIOS
Storage	1 x SATAIII via 7pin SATA connector 1 x M.2 B+M Key(SATA) 2242 for Storage
Ethernet	1 x 2.5G LAN via Intel® I226V/IT controller (PXE/WOL) 1 x 2.5G LAN via Intel® I226V/IT controller (PXE/WOL)
USB	4 x USB2.0, Type-A stack ports 1 x USB2.0 for M.2 B+M Key 1 x USB2.0 for Mini PCIE 1x USB2.0 & USB3.2 Gen1 for M.2 B-Key
Serial	2 x RS-232(default)/422/485, signals select via BIOS, pin9 RI(default)/5V/12V, select via jumper on BOARD. 4 x RS-232(default)/422/485 via Extra card are optional
GPIO	8-bit digital I/O connector
Audio	Support Audio via Realtek ALC887-VA2-CG HD audio codec Support Line-in,Line-out,MIC by 2.0mm 2x5pin header
Expansion Slots	1 x M.2 B-Key(PCIex1, USB3.0, USB2.0),3042/3052 for 4G/5G module with Nano SIM slot 1 x MiniPCIE (PCIex1, USB2.0) for WiFi/BT module

FAN	1x 2pin fan connector
Watchdog Timer	Software programmable 1–255 level
TPM	Onboard TPM, Support fTPM, select via BIOS
Switches and LED Indicators	1 x Power button 1 x Switch connector
Battery	Support 3V RTC Li-battery via 2pin wafer (VBAT1)
Power Management	Wide range DC 9~36V±10% power input via 3pin connector
Temperature	Operating: -20℃ to 60℃ Storage: -40℃ to 85℃
Humidity	5% - 95%, non-condensing, operating
Certifications	Meet CE/FCC class A UL RoHS2.0

2.3 Board Dimensions



Dimensions: 196 x 114 (units :mm)

Figure 3: Motherboard Dimensions

2.4 Jumpers and Connectors Location

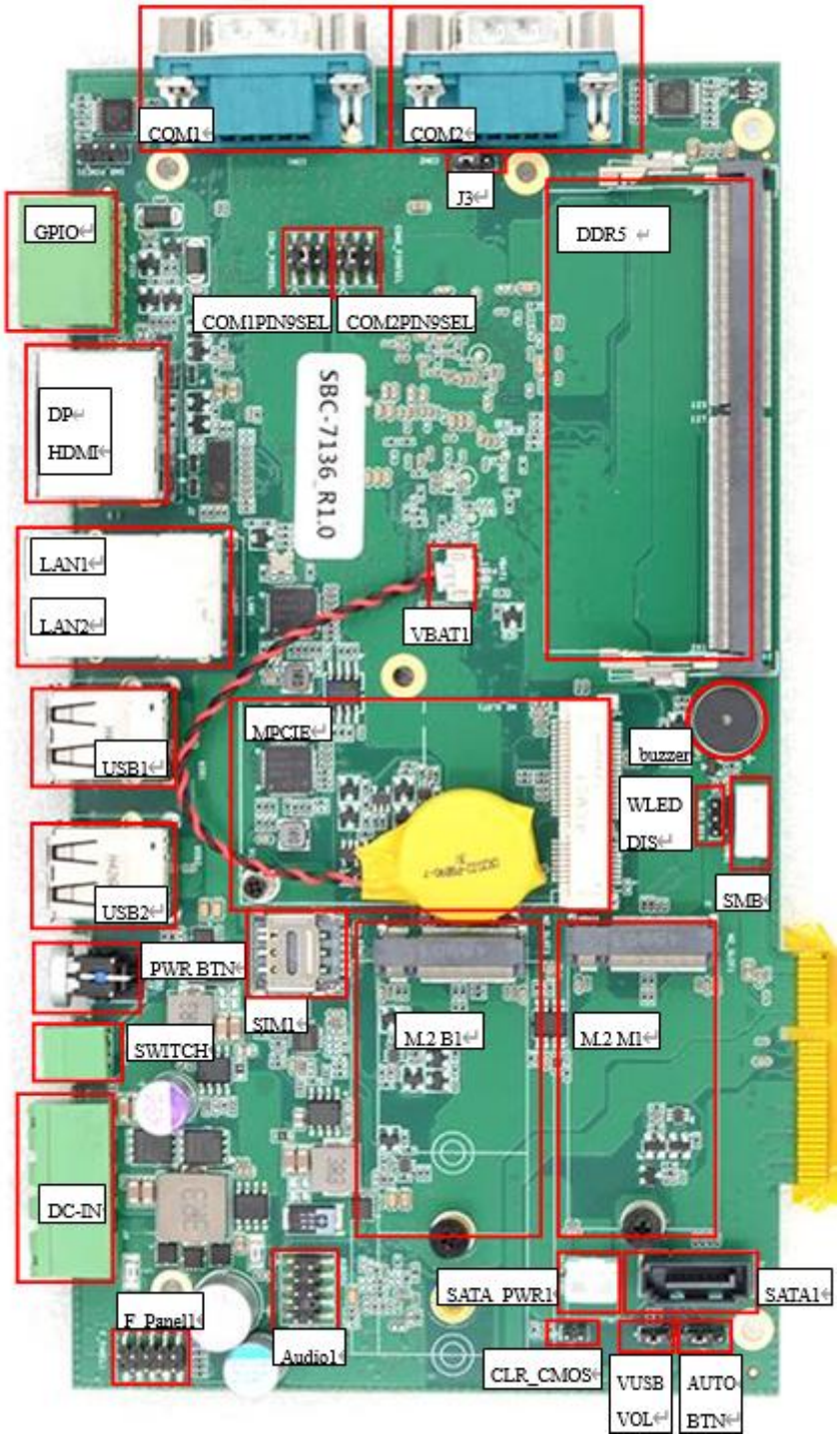


Figure 3: Jumpers and Connectors Location- Board Top

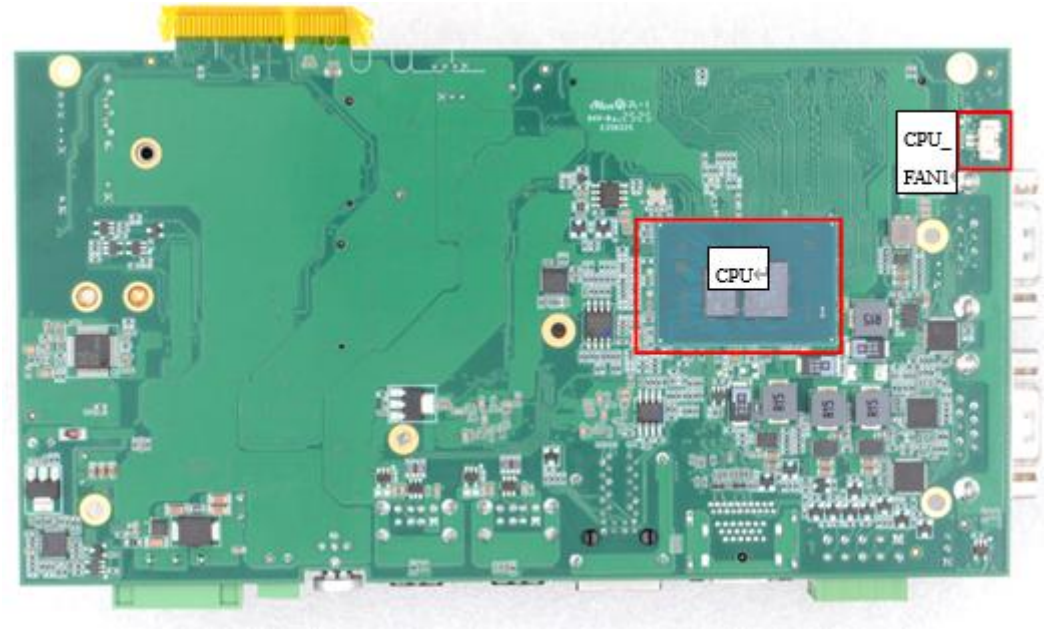


Figure 4: Jumpers and Connectors Location- Board Bottom

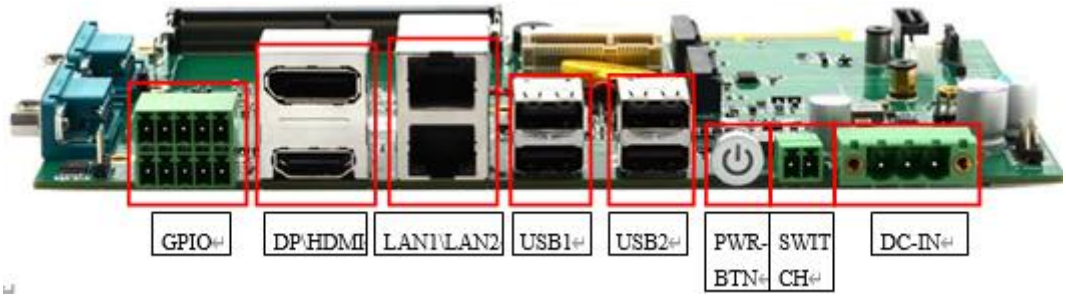


Figure 5: Jumpers and Connectors Location- External I/O

2.5 Jumpers Setting and Connectors

1. CPU1:

(FCBGA1264) Onboard Intel Alder Lake SoC

Model	SoC				
	Number	PBF	Cores/ Threads	TDP	Remarks
SBC-7136-N97	N97	Up to 3.6GHz	4C/4T	12W	Default

2. DDR5:

(SO-DIMM 262Pin slot) DDR5 memory socket, the socket is located at the top of the board and supports 262Pin 1.1V DDR5 SO-DIMM memory module up to 16GB.

Max Memory Size (dependent on memory type).

3. VBAT1:

(1.25mm Pitch 1x2 wafer Pin Header) 3.0V Li battery is embedded to provide power for CMOS.

Pin#	Signal Name
Pin1	VCC_RTC
Pin2	GND

4. CLR_CMOS1:

CMOS clear switch, CMOS clear operation will permanently reset old BIOS settings to factory defaults.

Procedures of CMOS clear:

a) Turn off the system and unplug the power cord from the power outlet.

b) To clear the CMOS settings, close CLR_CMOS1 for 1 second

c) Power on the system again.

d) When entering the POST screen, press the <DEL> key to enter CMOS Setup Utility to load optimal defaults.

e) After the above operations, save changes and exit BIOS Setup.

5. CPU_FAN1:

(1.25mm Pitch 1x2 wafer Pin Header) Fan connector, cooling fans can be connected directly for use.

Pin#	Signal Name
1	GND
2	VCC(5V_S0)

Note:

Output power of cooling fan must be limited under 3W.

6. DC_IN1:

(5.08mm Pitch 1x3 Pin Connector) DC9~36V System power input connector.

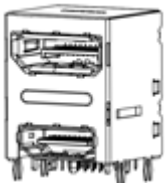
Pin#	Power Input
Pin1	DC_IN+ (DC+9V~36V)
Pin2	DC_IN- (Ground)
Pin3	GND (Earth)

7. SMB:

(2.00mm Pitch 1x4 Pin Header) For SMBUS interface Device.

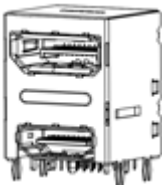
Pin#	Signals
1	GND
2	Data
3	Clock
4	Vcc 3.3V

8. Display Port:



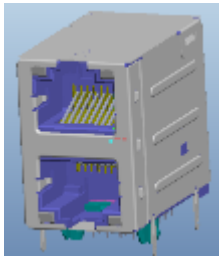
Integrated DP and HDMI connecotrs (upper layer interface), support DP1.4 and maximum resolution 4096x2304@60Hz.

9. HDMI1:



Integrated DP and HDMI connecotrs (lower level interface), support HDMI2.0b and maximum resolution 4096x2304@60Hz.

10. LAN1, LAN2:



(Integrated RJ45 Connector) Provide 2.5GbE LAN via Intel® I226V/IT

Status	Description
Green ACT, Yellow Link	100Mbps
Green ACT, Yellow Link	1G/2.5Gbps

11. WLED_DIS:

(2.0mm Pitch 1x3 Pin Header) For Mini PCIE signals

JP1 Pin#	Function
1	For MiniPCIE Pin20 signals:W_DISABLE
2	For MiniPCIE Pin42 signals:LED_WWAN
3	For MiniPCIE Pin44 signals:LED_WLAN

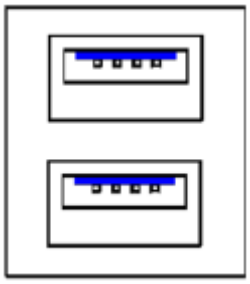
12. AUDIO:

(2.0mm Pitch 2x5Pin header) Provide line-in/line-out/mic-in via onboard Realtek ALC897 codec.

Signal Name	Pin#	Pin#	Signal Name
LINE-OUT-R	1	2	LINE-OUT-L
GND	3	4	GND
MIC-IN-R	5	6	MIC-IN-L
GND	7	8	GND
LINE-IN-R	9	10	LINE-IN-L

13. USB1, USB2:

(Double stack USB typeA) Rear USB2.0 connector, provides up to 4 USB2.0 ports.



Each USB Type A Receptacle (2 Ports) Current limited value is 1A.

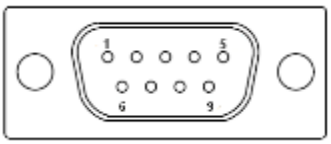
14. VUSB_VOL:

(2.0mm Pitch 1x3 Pin Header) Set USB power status when the system is turned off..

JP1 Pin#	Function
Close 1-2	**USB interface provides power after the system is turned off (Default)**
Close 2-3	The USB interface does not provide power after the system is turned off

15. COM1, COM2:

(DB9 connector) Provide serial RS232/422/485 via standard DB9 male connector. Default is set to RS232, RS422/485 can be selected via BIOS. Pin 9 RI/5V/12V select via COM1_PIN9SEL, COM2_PIN9SEL.



RS232 (Default):	
Pin#	Signal Name
1	NC
2	RXD (Received Data)
3	TXD (Transmit Data)
4	NC
5	GND
6	NC
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	NC
BIOS Setup：Serial Port 1 Configuration【RS-232】	

RS422 (option):	
Pin#	Signal Name
1	422_TX-
2	422_TX+
3	422_RX+
4	422_RX-
5	GND
6	NC
7	NC
8	NC
9	NC

BIOS Setup：Serial Port 1 Configuration【RS-422】

RS485 (option):	
Pin#	Signal Name
1	485-
2	485+
3	NC
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC
BIOS Setup：Serial Port 1 Configuration【RS-485】	

16. COM1_PIN9SEL, COM2_PIN9SEL:

(2.0mm Pitch 2x3 Pin Header) For COM1, COM2 pin9 signal setting.

JP1 Pin#	Function
Close 1-2	COM1/2 Pin9 = +12V
Close 3-4	**COM1 Pin9 RI (Ring Indicator, Default)**
Close 5-6	COM1/2 Pin9 = +5V

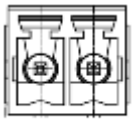
17. J3: GPIO POWER Select:

Set GPIO connector voltage through J3 jumper.

JP1 Pin#	Function
Close 1-2	GPIO connector voltage= +5V
Close 2-3	**GPIO connector voltage=+3.3V (Default)**

18. SWITCH:

(3.5mm pitch 2x5 pin connector) Connect external switch.



JP1 Pin#	Function
1	GND
2	Power Button

19. GPIO1:

(3.5mm 2x5pin connector) Provide 8Xgpio with 3.3V or 5V.

Signal Name	Pin#	Pin#	Signal Name
GPIO_VCC	1	2	GND
GPIO0	3	4	GPIO1
GPIO2	5	6	GPIO3
GPIO4	7	8	GPIO5
GPIO6	9	10	GPIO7

20. F_Panel1:

(2.0mm 2x5pin header) Provide power button/reset button/power LED/HDD LED.

Signal Name	Pin#	Pin#	Signal Name
HDD LED+	1	2	Power LED+
HDD LED-	3	4	Power LED-
Reset Button-	5	6	Power Button+
Reset Button+	7	8	Power Button-
NC	9	10	NC

21. SIM1:

(Nano-SIM Slot) Support Nano SIM card for M.2 B Key.

Pin#	Signal Name
1	SIM_VCC
2	SIM_RST
3	SIM_CLK
4	GND
5	NC
6	SIM_DAT

22. M2_B1:

(M.2 B-Key Socket) Support 3042/3052 4G/5G module with Nano SIM slot,and Support 2242 Nvme interface SSD.

23. M2_M1:

(M.2 B+M Key Socket) Provide SATA PCIex4, support M-key 2242 SATA interface SSD.

24. MPCIE:

(MPCIE) Provide USB2.0/PCIex1, support Mini PCIE WiFi/BT expansion cards.

25. SATA1:

(SATA 7Pin) SATA connector provide SATA III signal for storages.

26. SATA_PWR1:

(2.0mm Pitch 1x2 Wafer Pin Header) 5V power supply for SATA1 port device.

Pin#	Signal Name
1	5V_S0
2	GND

Note:

Output current of the connector must not be above 1A.

27. AUTO_BTN:

The AUTO_BTN button allows you to select automatic power on after the motherboard is powered on.

Status	Function
Pin1-2 short circuit	Forced AT Mode(Default, auto power ON)
Pin2-3 short circuit	ATX Mode(Manual Power ON), but Auto power ON select via BIOS

Chapter 3 BIOS Setup Description

3.1 Operations after POST Screen

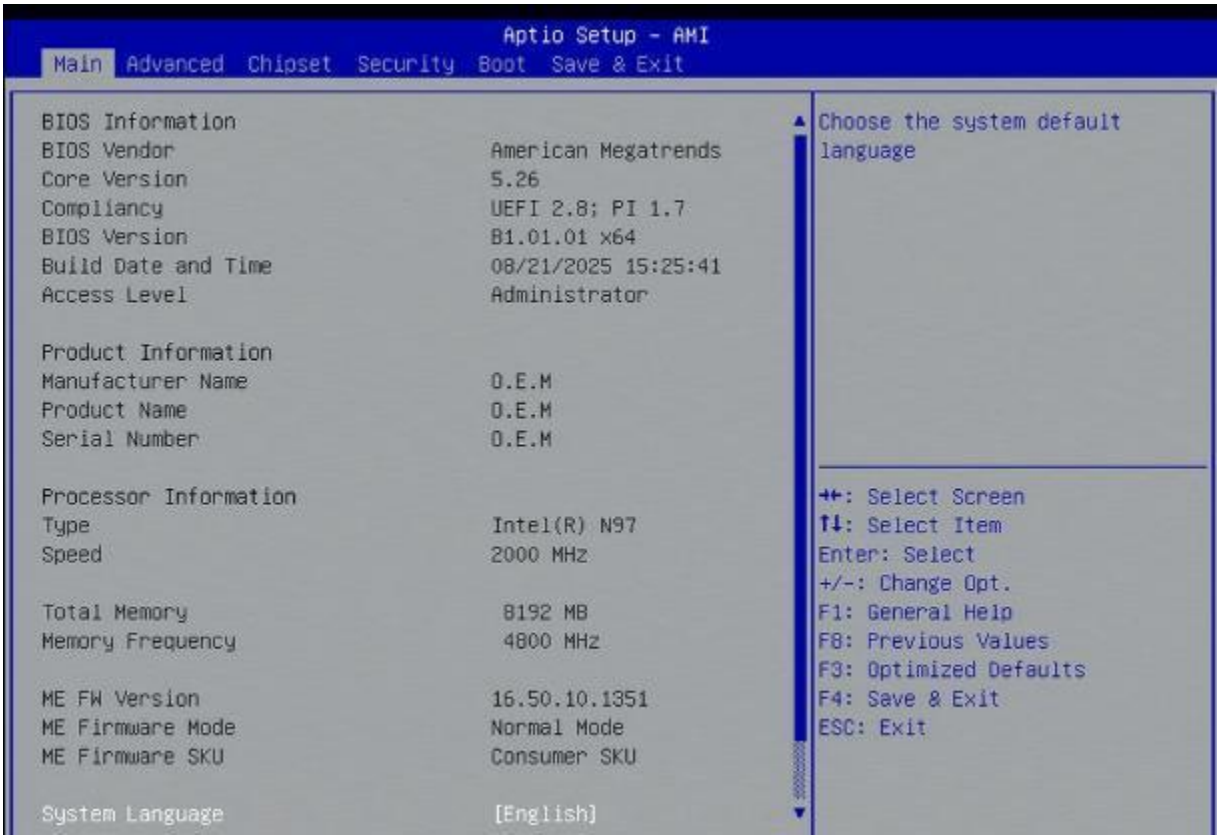
After CMOS discharge or BIOS flashing operation. Press [Delete] key to enter CMOS Setup.

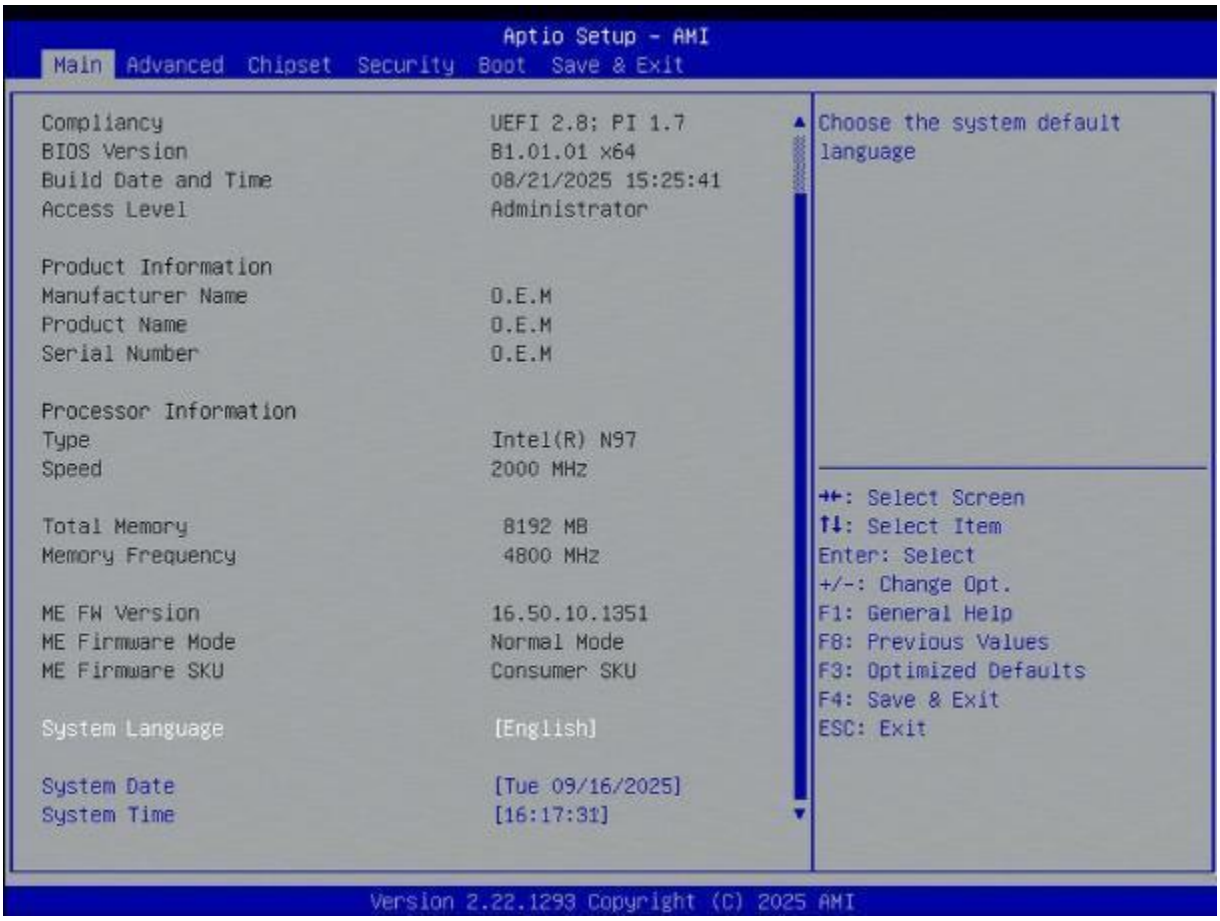
After optimizing and exiting CMOS Setup

3.2 BIOS SETUP UTILITY

Press [Delete] key to enter BIOS Setup utility during POST, and then a main menu containing system summary information will appear.

3.3 Main Settings





System Time:

Set the system time, the time format is:

Hour : 0 to 23

Minute : 0 to 59

Second : 0 to 59

System Date:

Set the system date, the date format is:

Day: Note that the 'Day' automatically changes when you set the date.

Month: 01 to 12

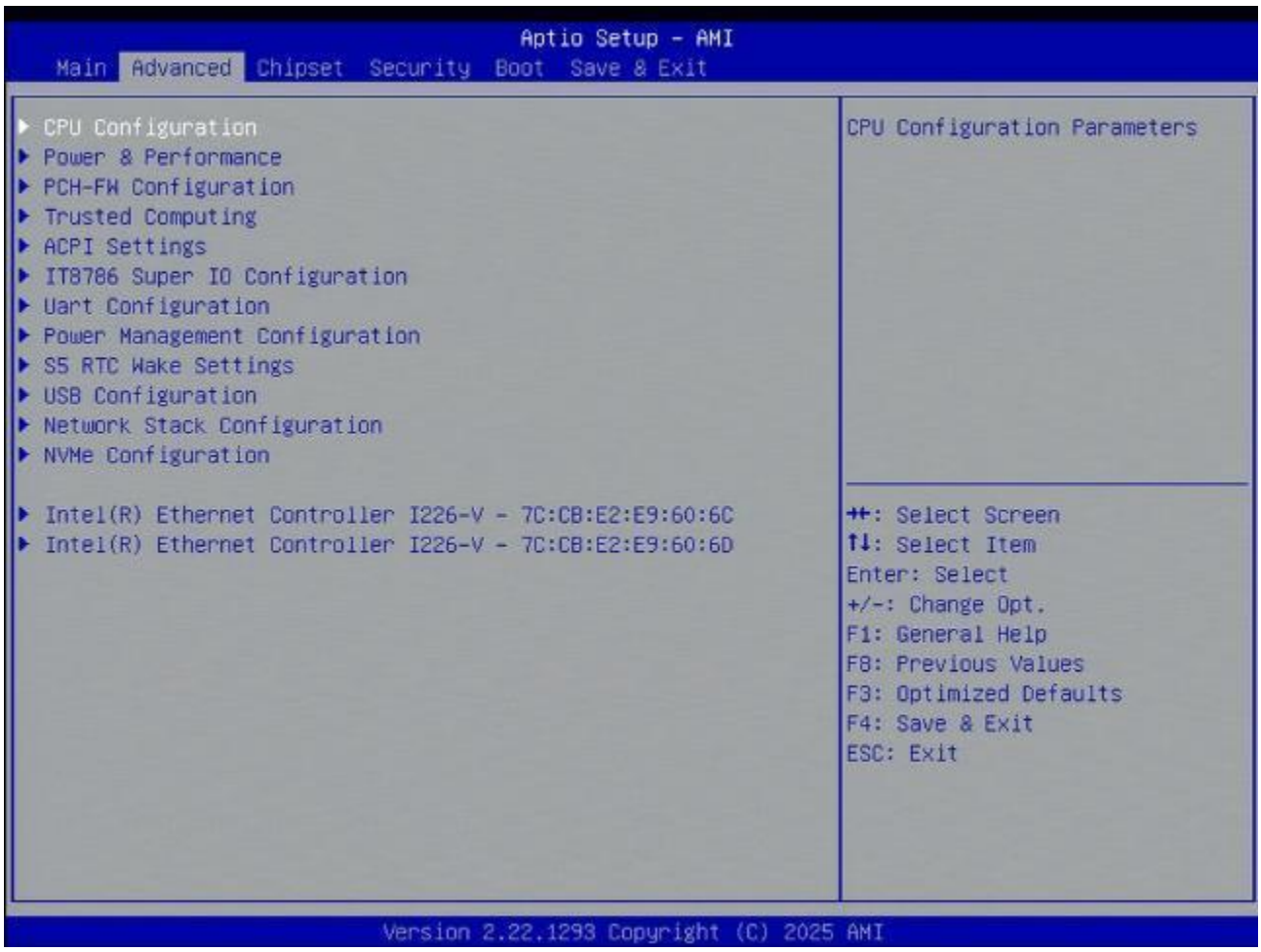
Date: 01 to 31

Year: 1998 to 2099

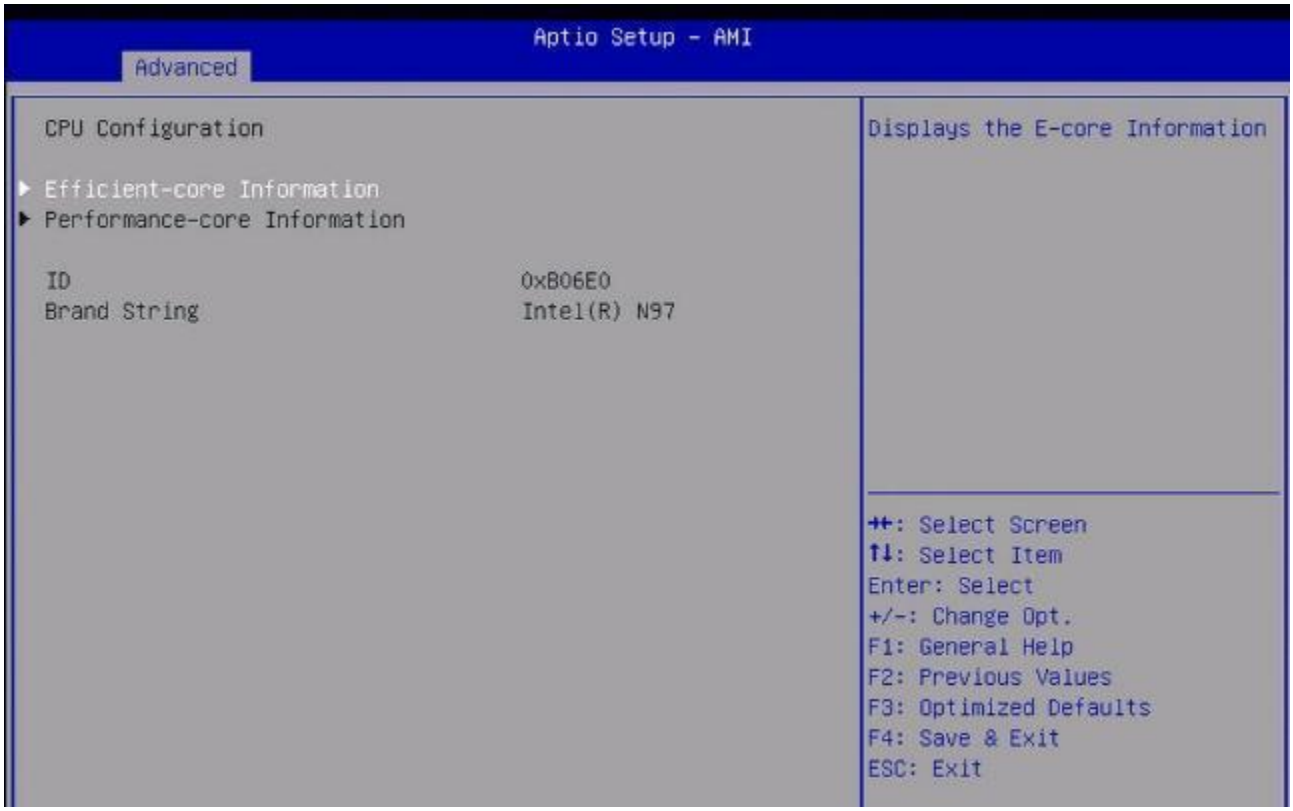
NOTE:

When all selectable items are not listed in the BIOS, it only has two options to "Enabled" or "Disabled".

3.4 Advanced Settings

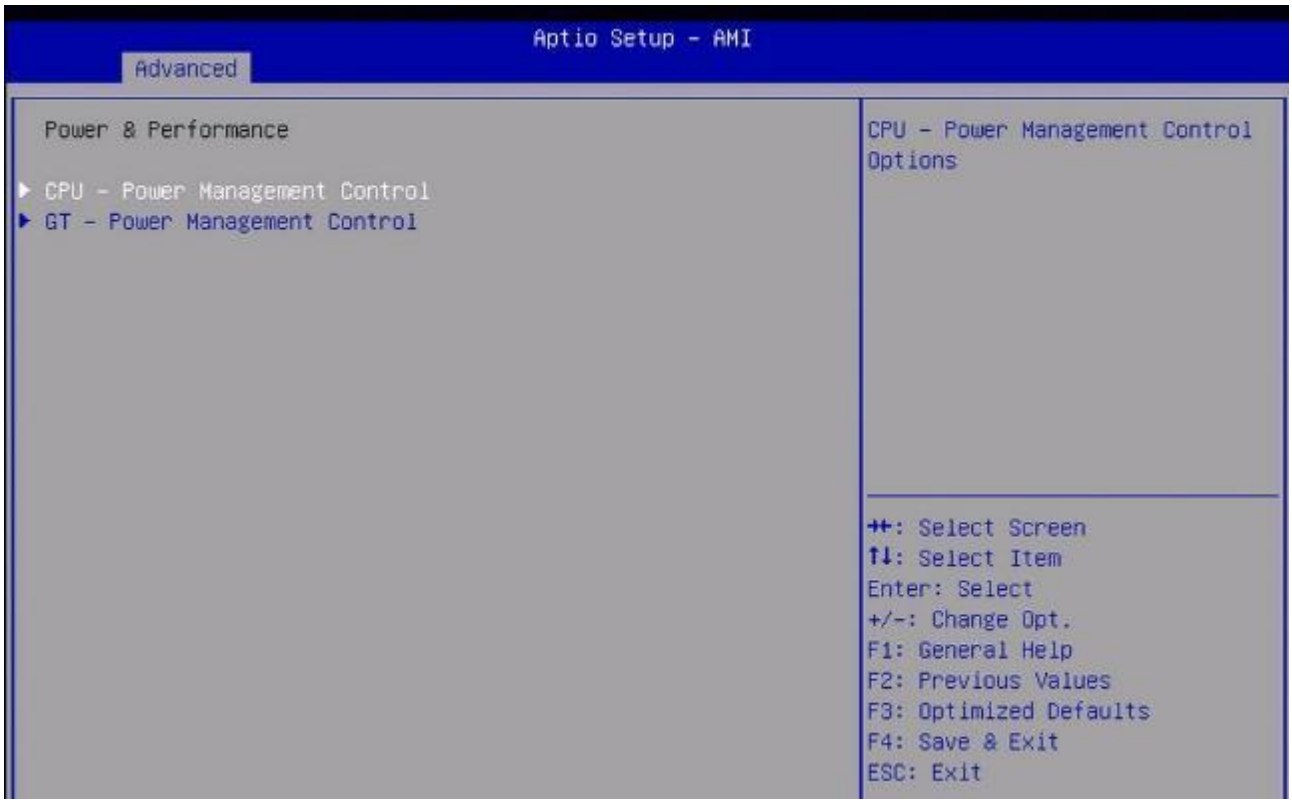


3.4.1 CPU Configuration

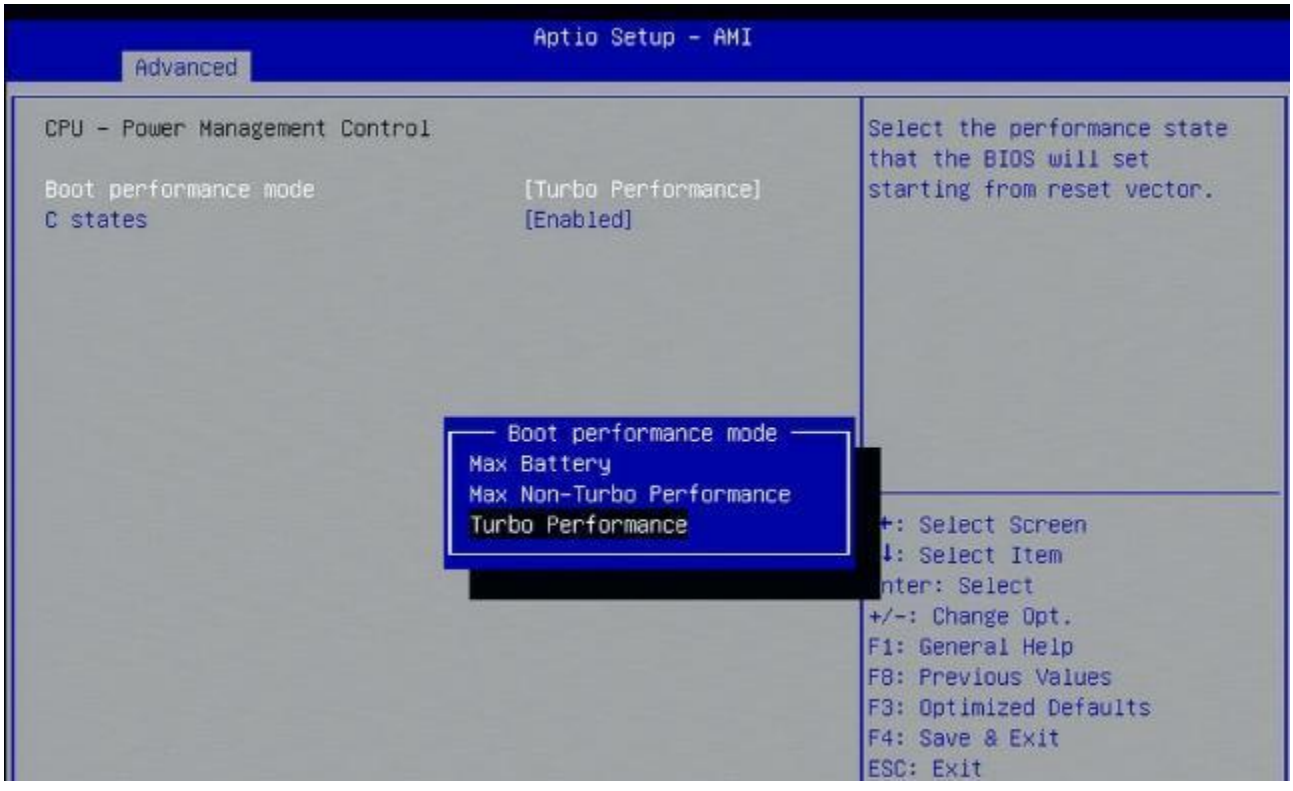


3.4.1.1 Efficient-core Information

3.4.2 Power & Performance



3.4.2.1 CPU-Power Management Control



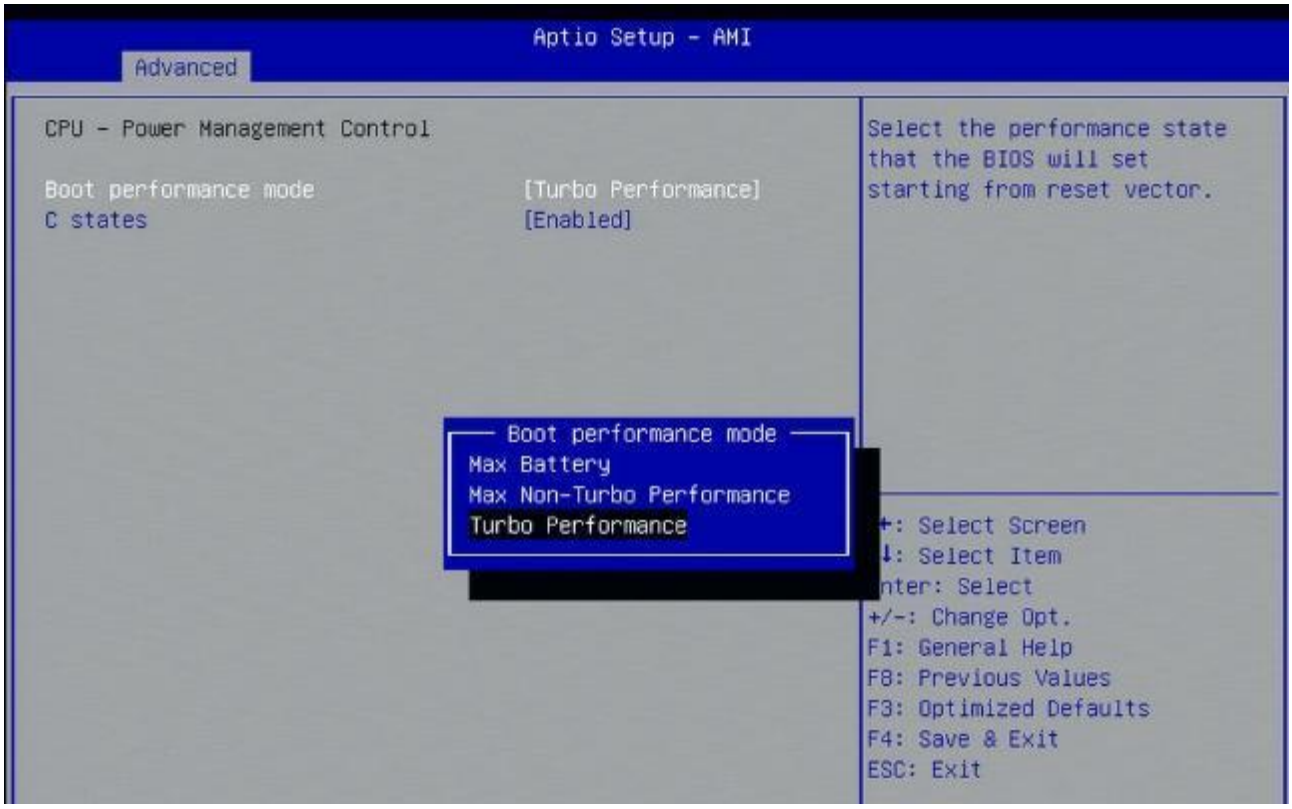
Boot performance mode:

Select the performance state that the BIOS will set starting from reset vector.

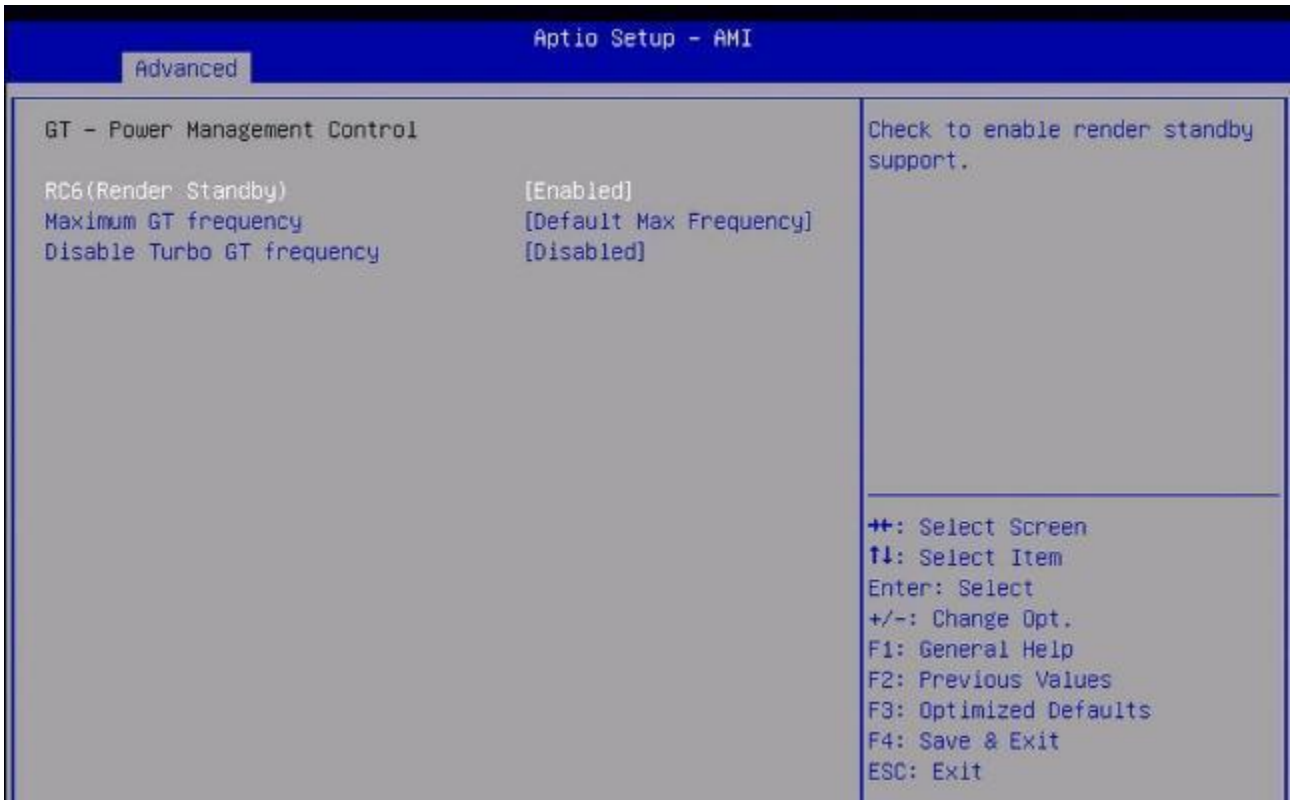
Turbo Mode:

Enable/Disable processor Turbo Mode (requires EMTTM enabled too).AUTO means enabled.

3.4.2.1.1 Boot performance mode



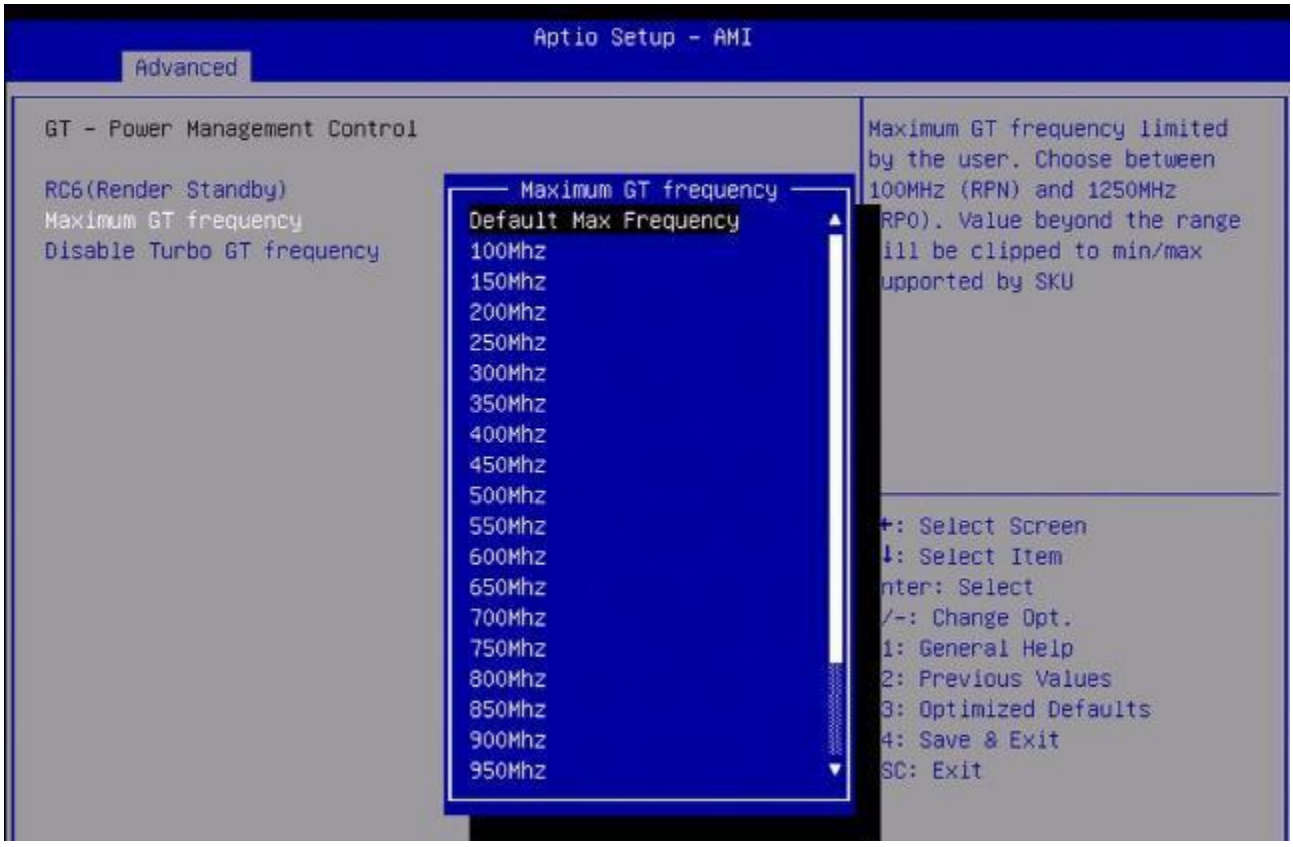
3.4.2.2 GT- Power Management Control

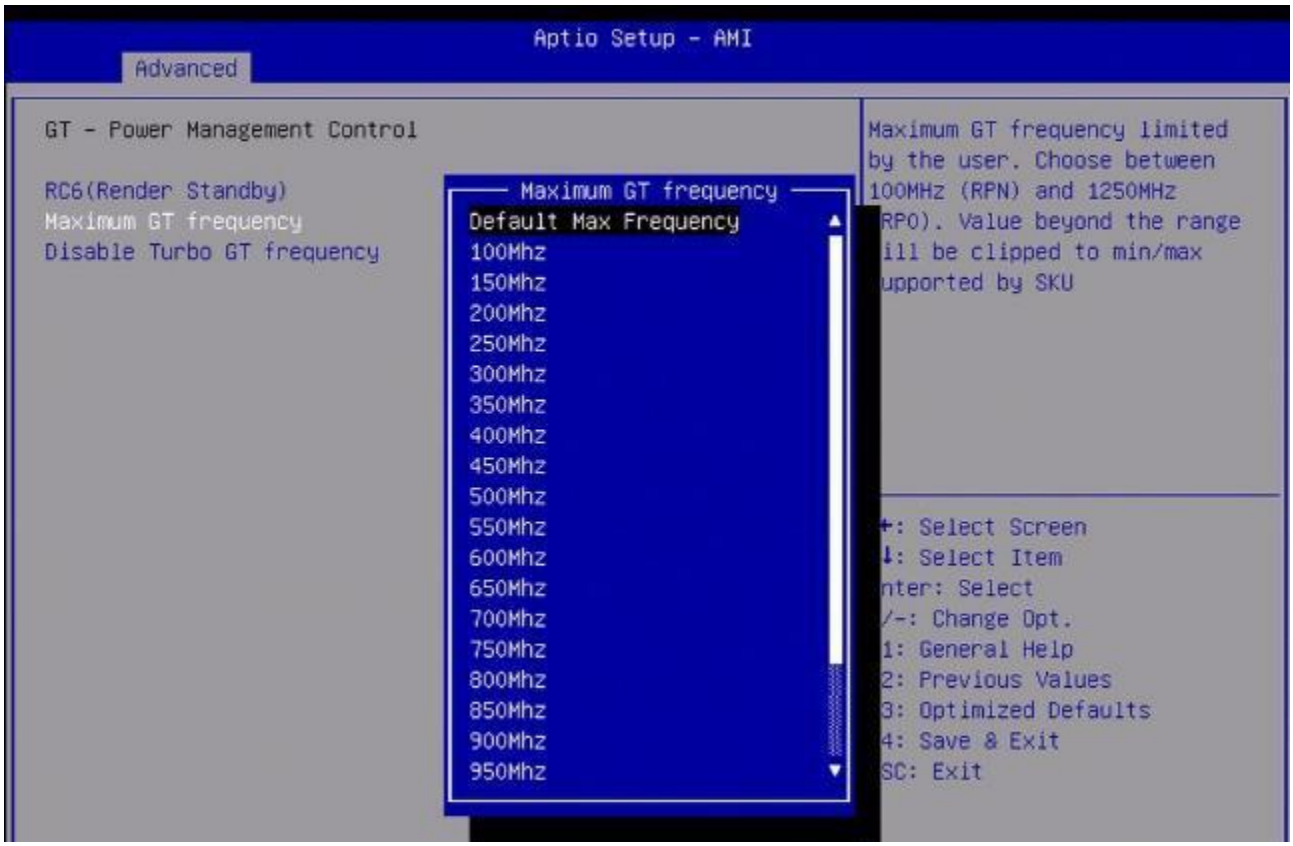


RC6(Render Standby):

Check to enable render standby support.

Maximum GT frequency

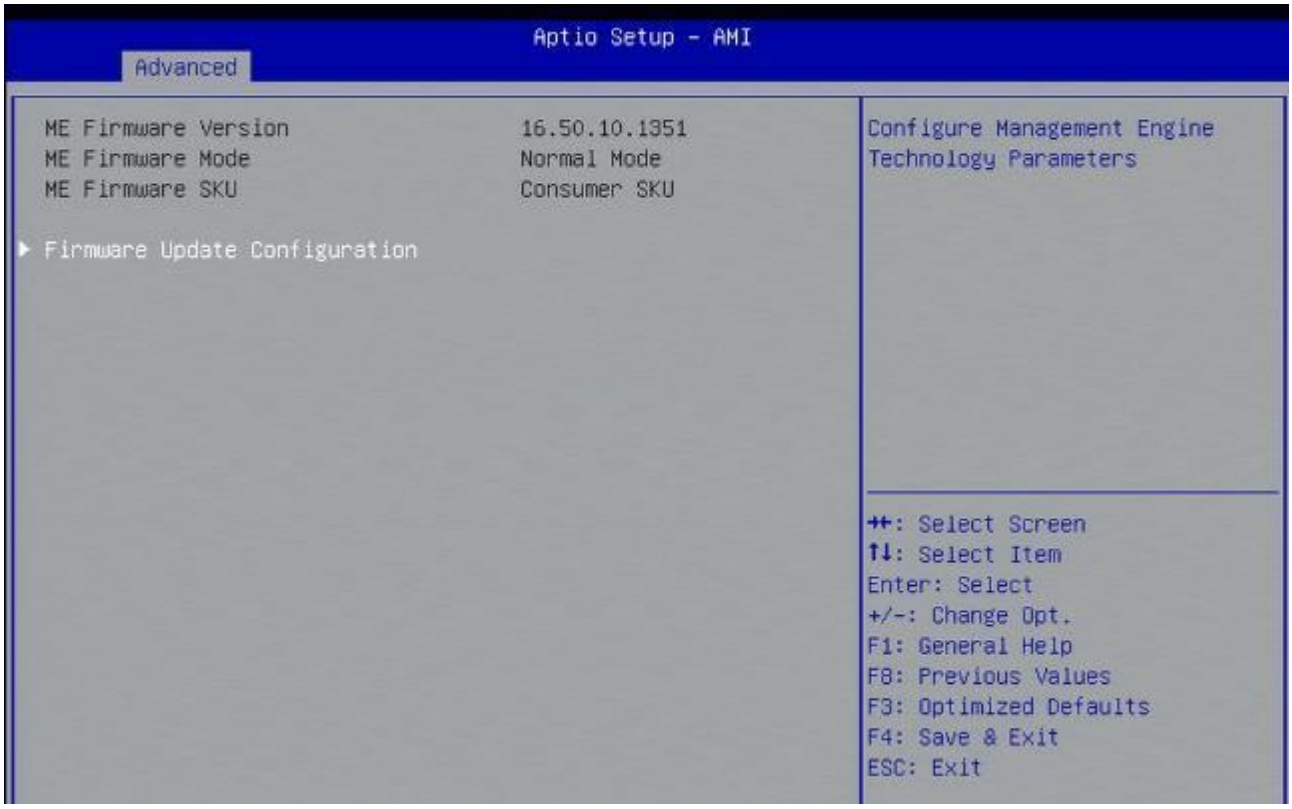




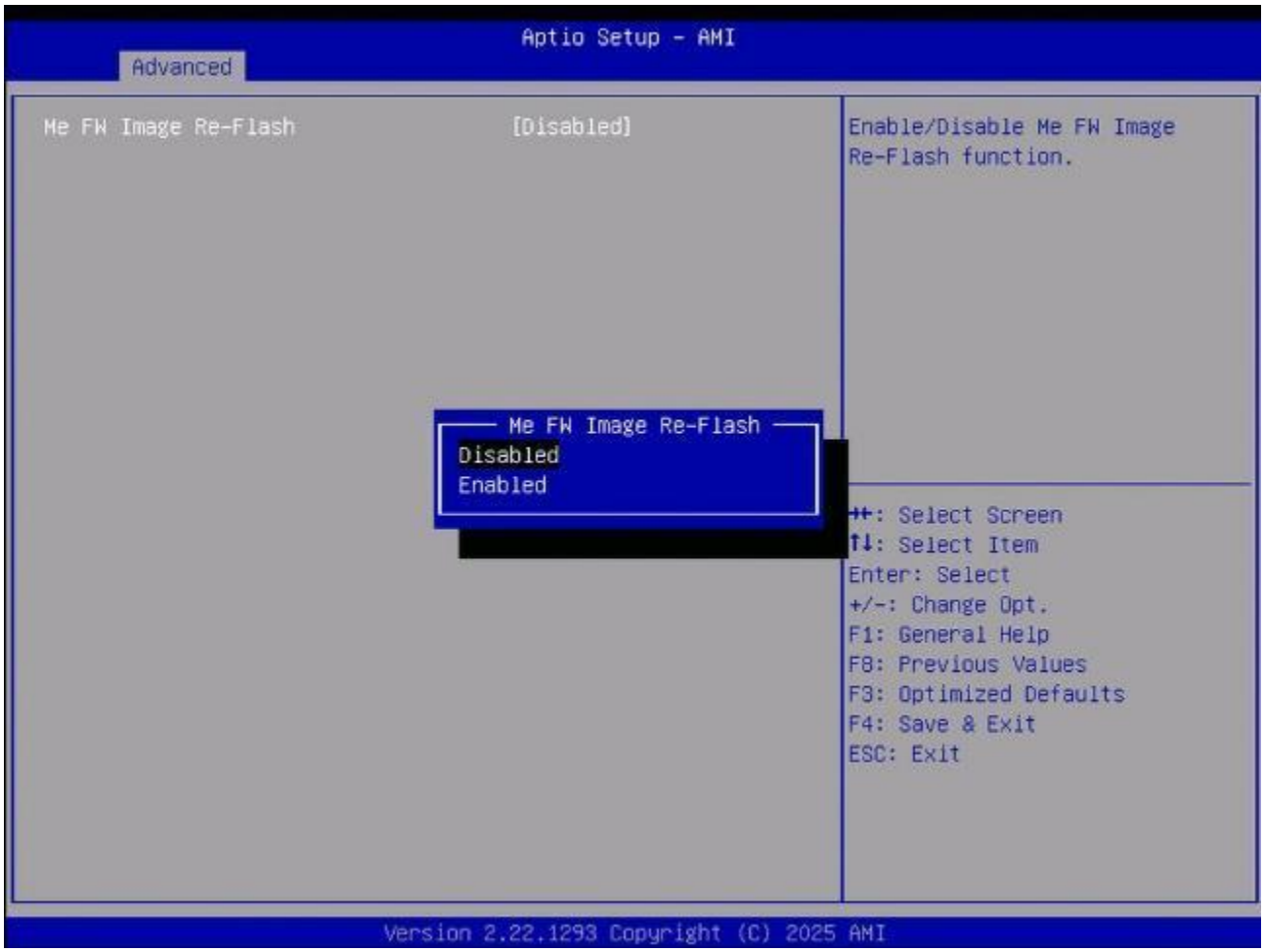
Disable Turbo GT frequency:

Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

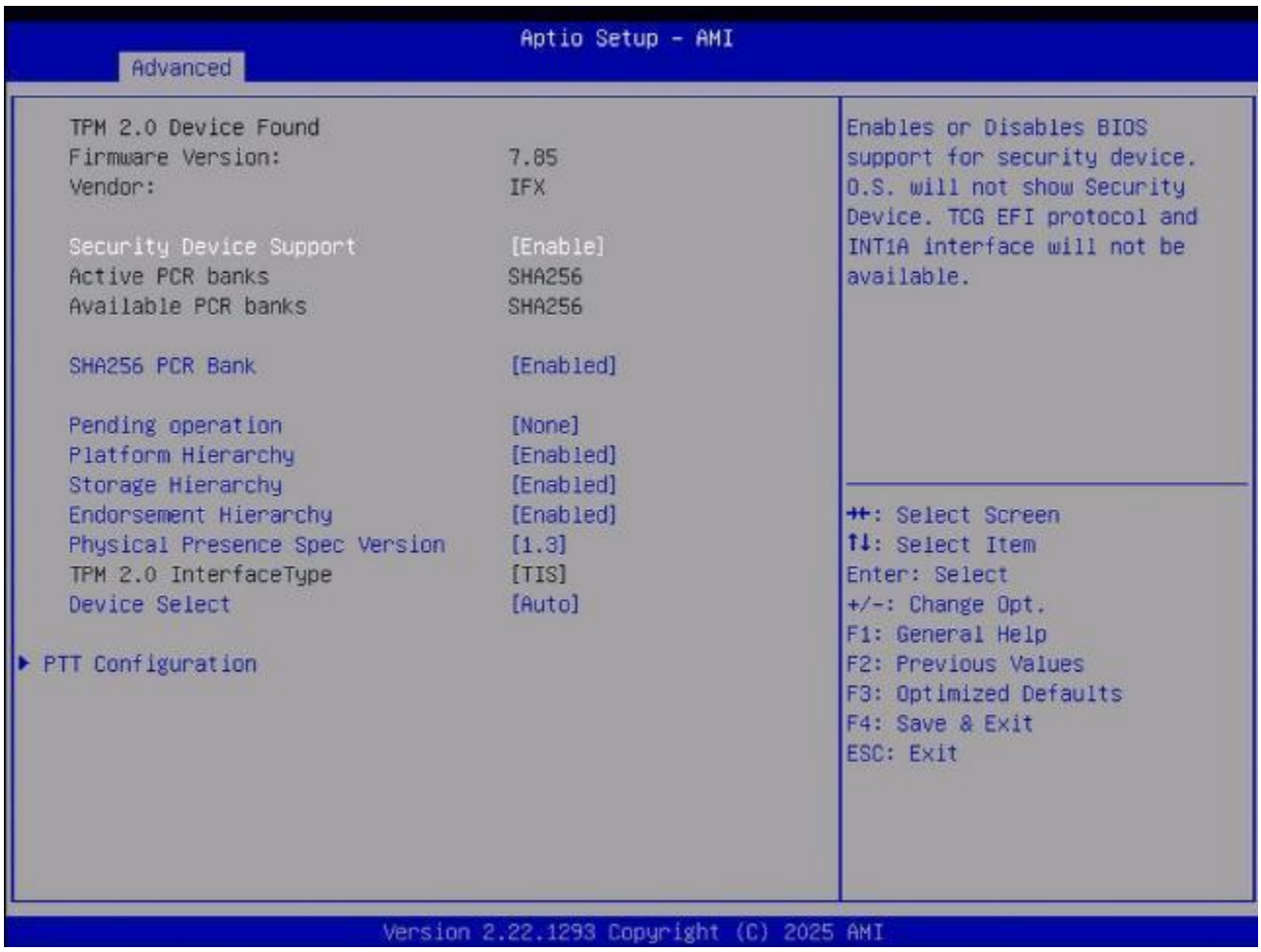
3.4.3 PCH-FW Configuration



3.4.3.1 Firmware Update Configuration



3.4.4 Trusted Computing



Security Device support:

Enables or Disables BlOS support for security device. o.S. wll not show Security Device. TCG EFl protocol and INT1A interface will not be available.

SHA256 PCR Bank:

Enable or Disable SHA256 PCR Bank

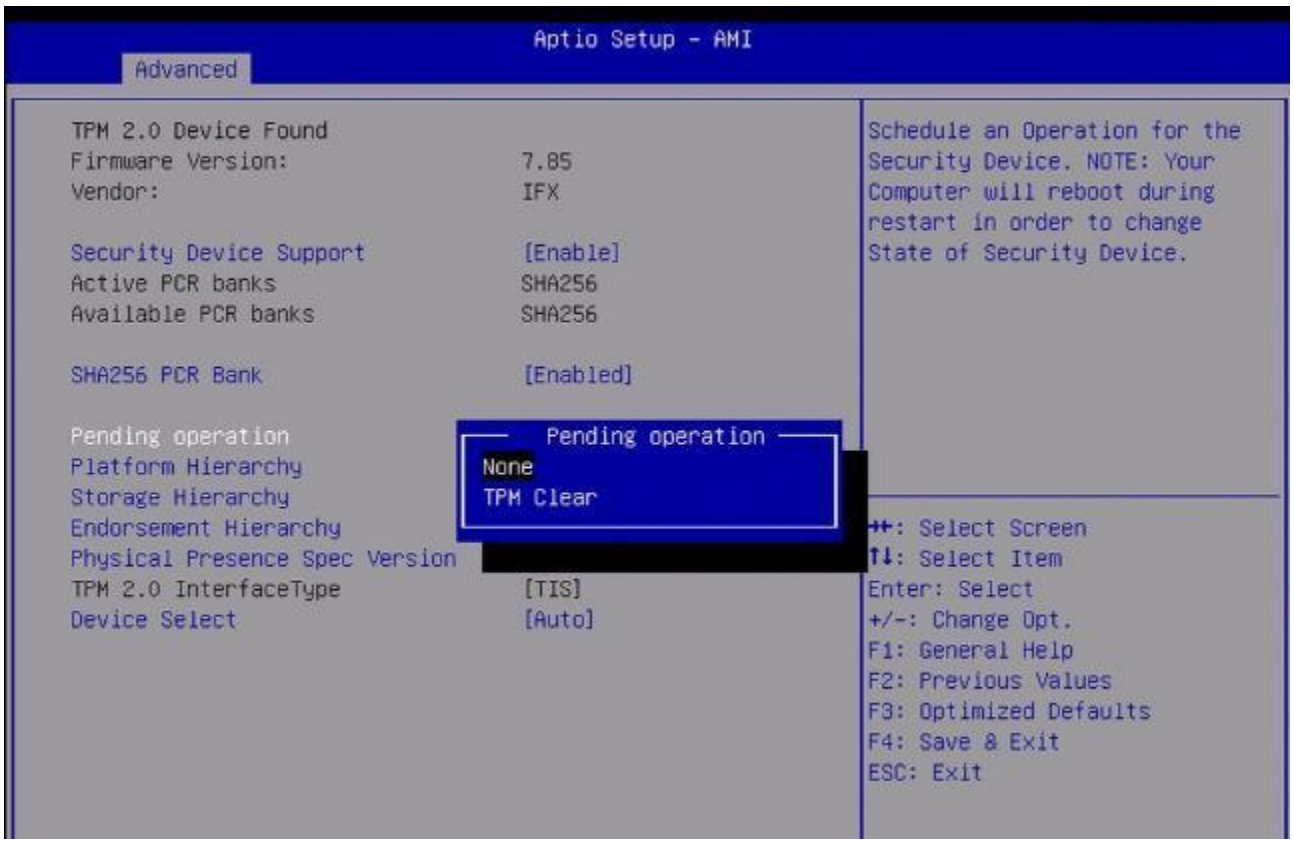
Pending operation:

Schedule an Operation for the Security Device.NOTE:Your Computer will reboot during restart in order to change State of Security Device.

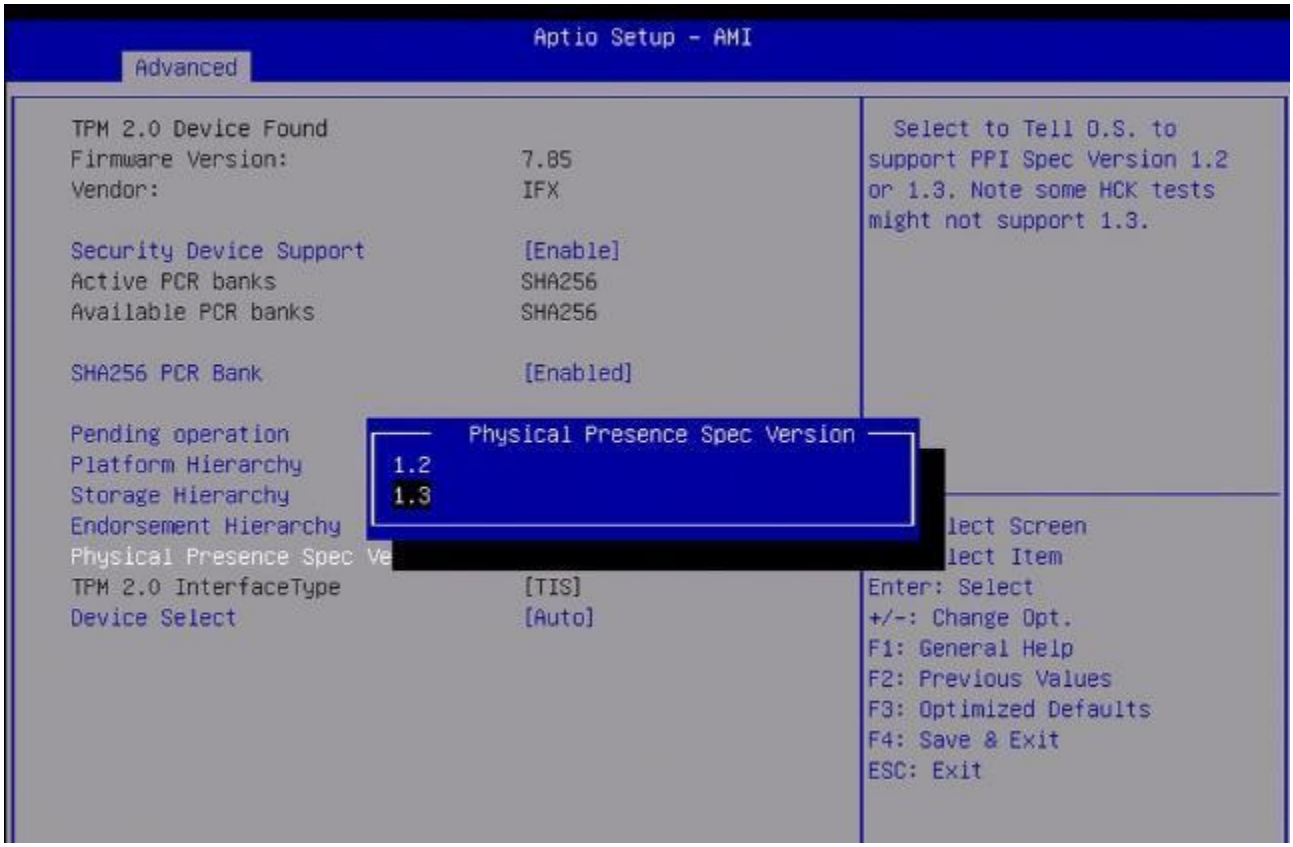
Device Select:

TPM1.2 will restict support to TPM 1.2 devices, TPM 2.0 will restict support to TPM 2.0 devices, Auto wll upport both with the default set toTPM 2.0 devices if not found,TPM 1.2 devices will be enumerated

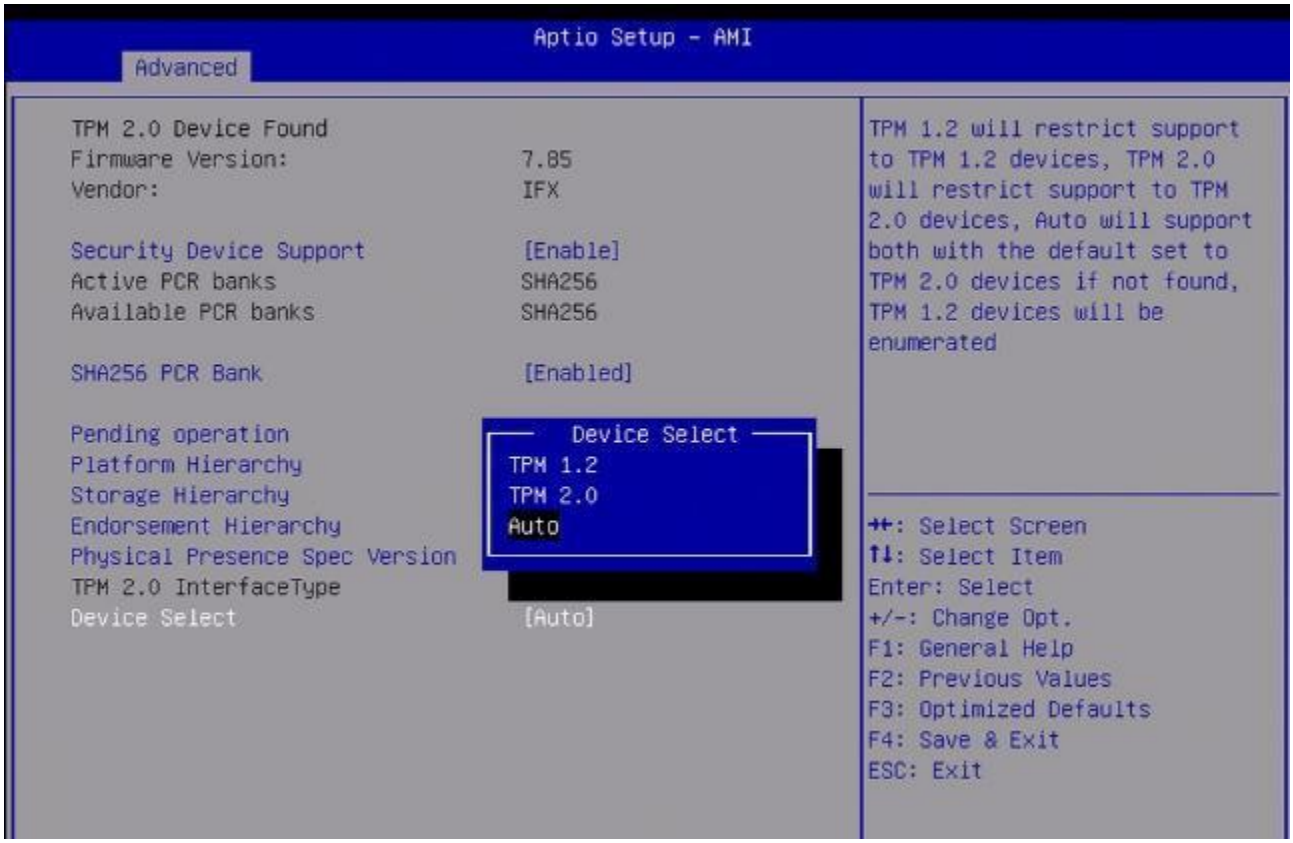
3.4.4.1 Pending operation



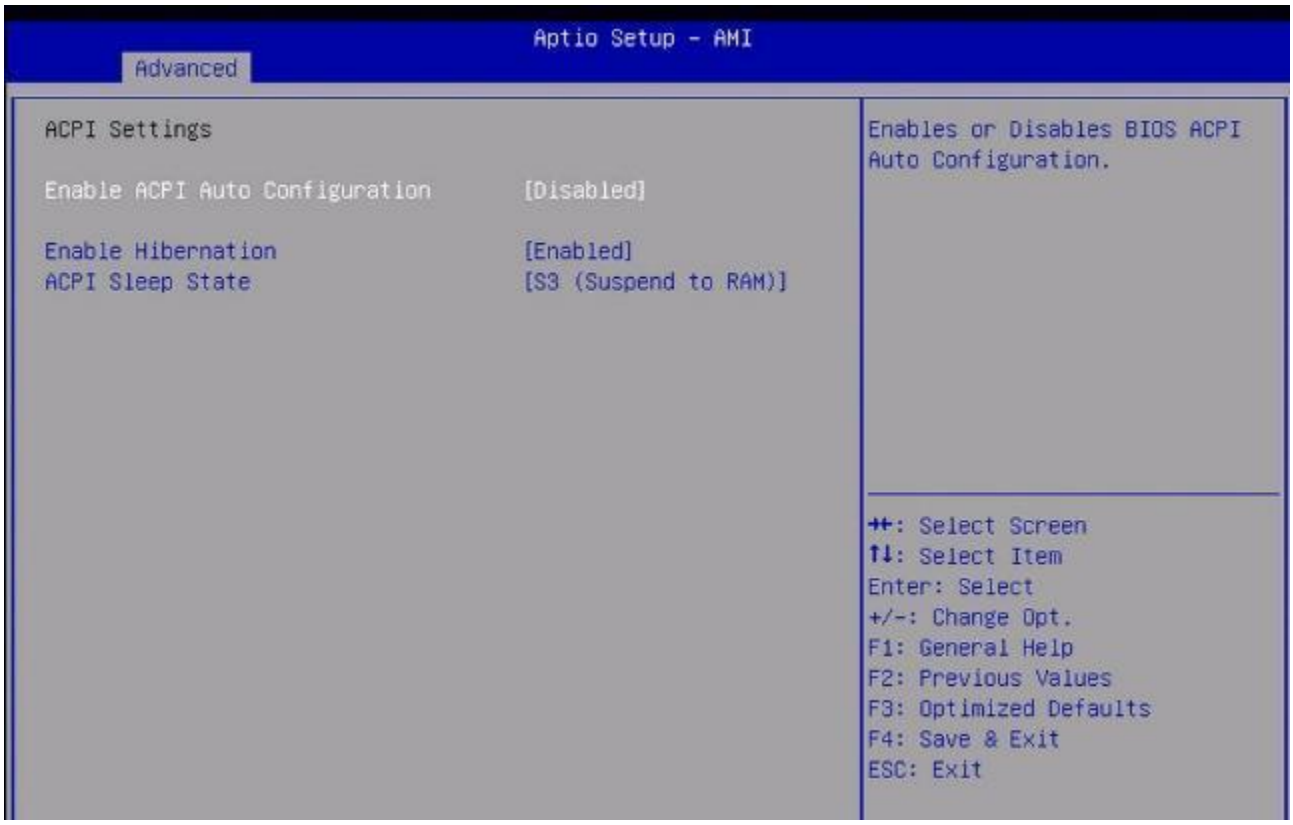
3.4.4.2 Physical Presence Spec Version



3.4.4.3 Device Select



3.4.5 ACPI Settings



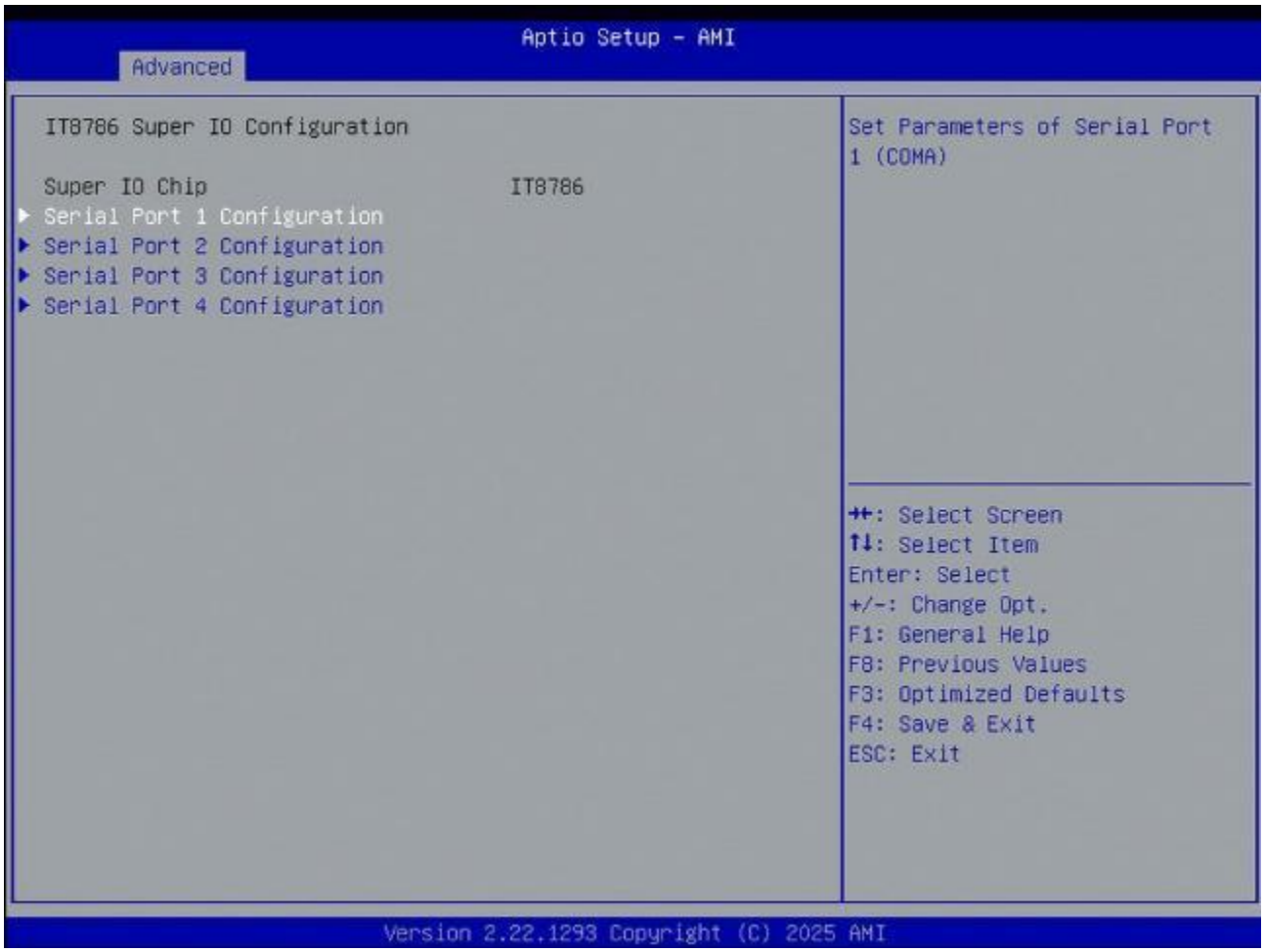
Enable Hibernation:

Enables or Disables System ability to Hibernate(OS/S4 Ssleep State). This option may not be effective with some operating systems.

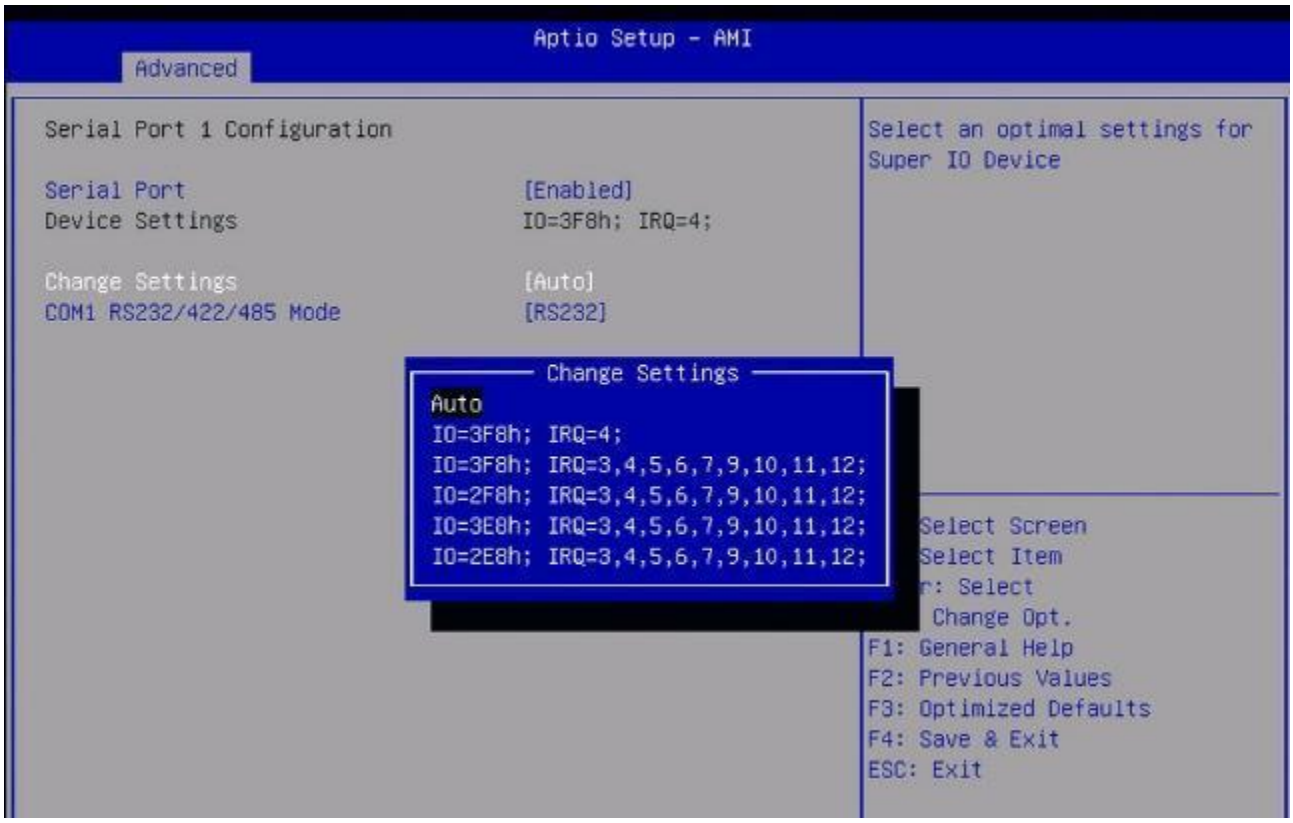
ACPI Sleep State:

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

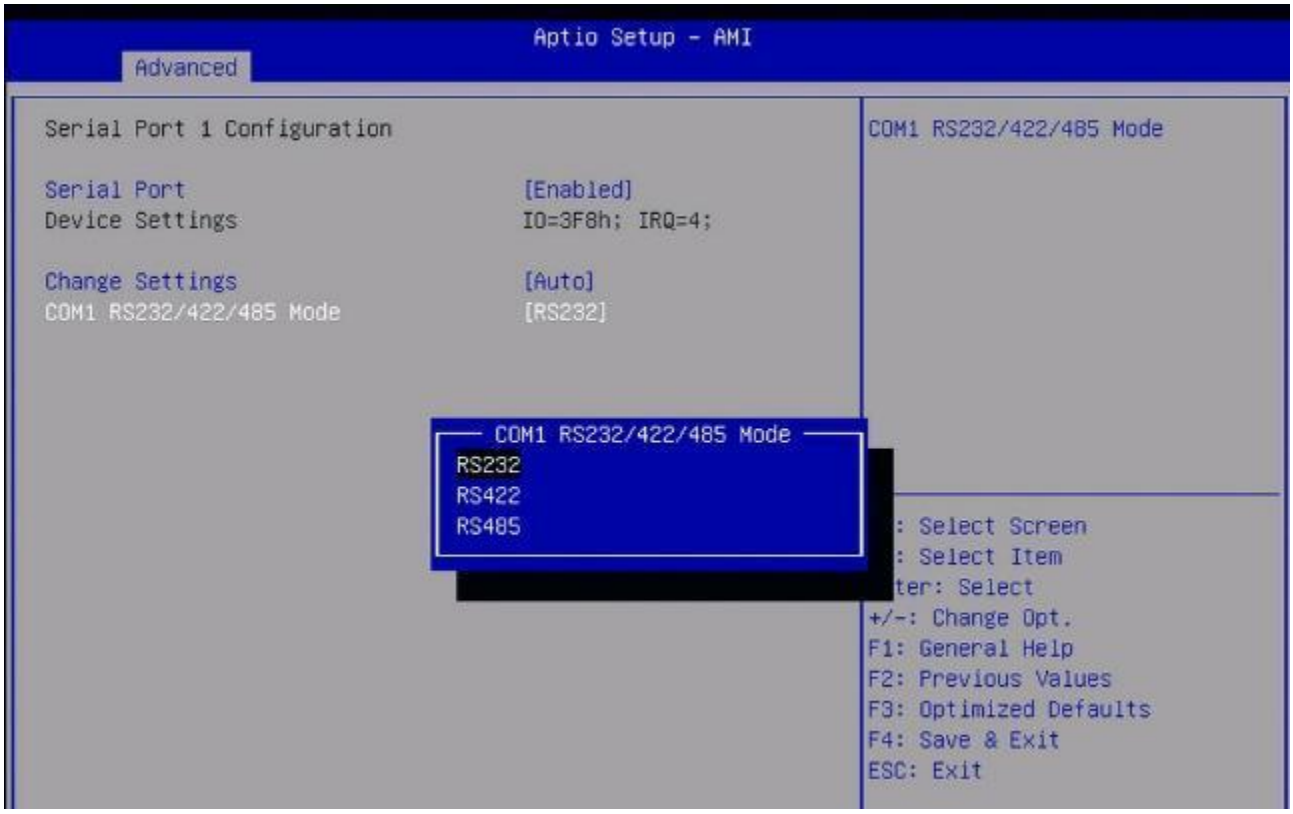
3.4.6 IT8786 Super IO Configuration



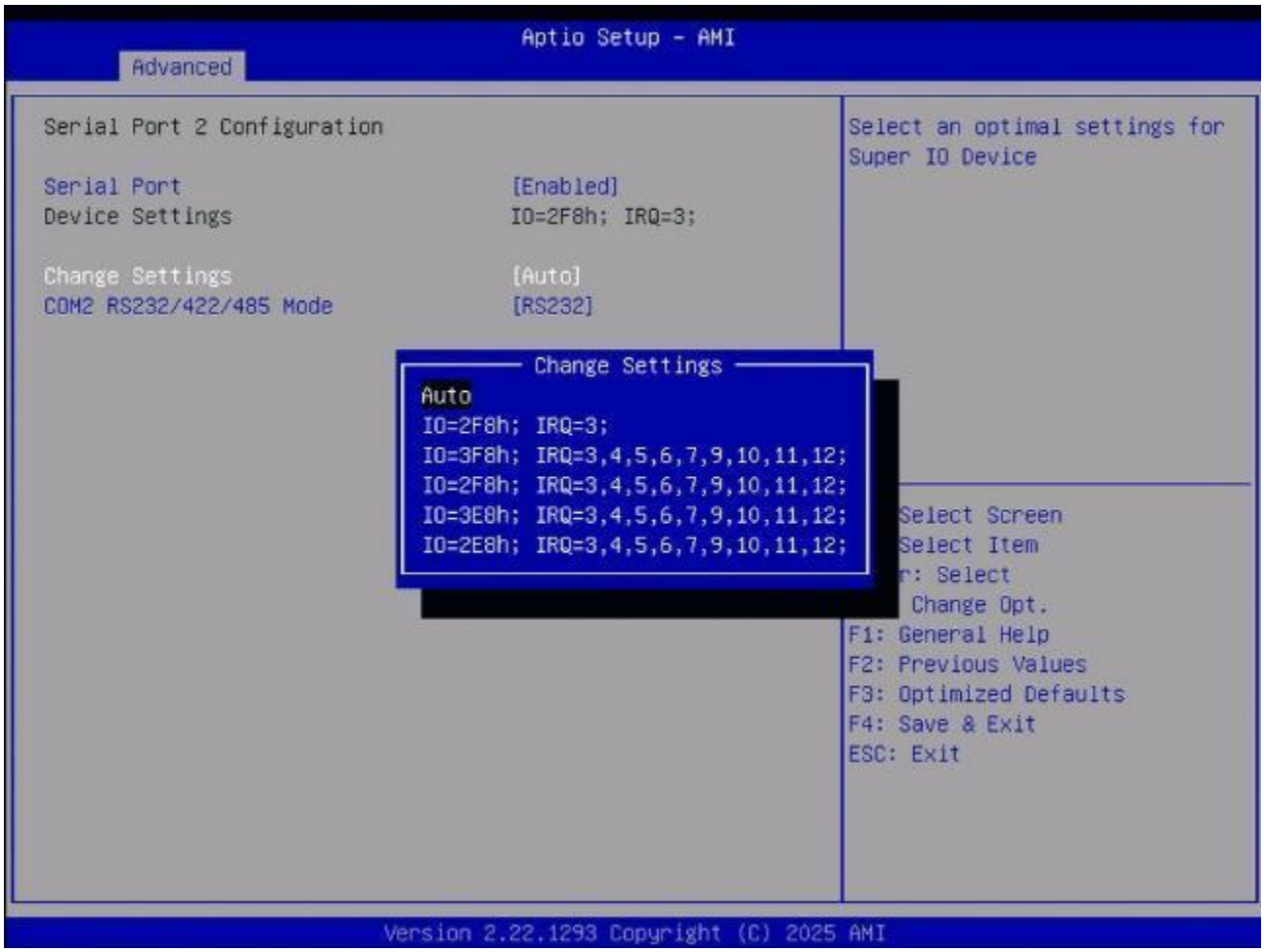
3.4.6.1 Serial Port 1 Configuration



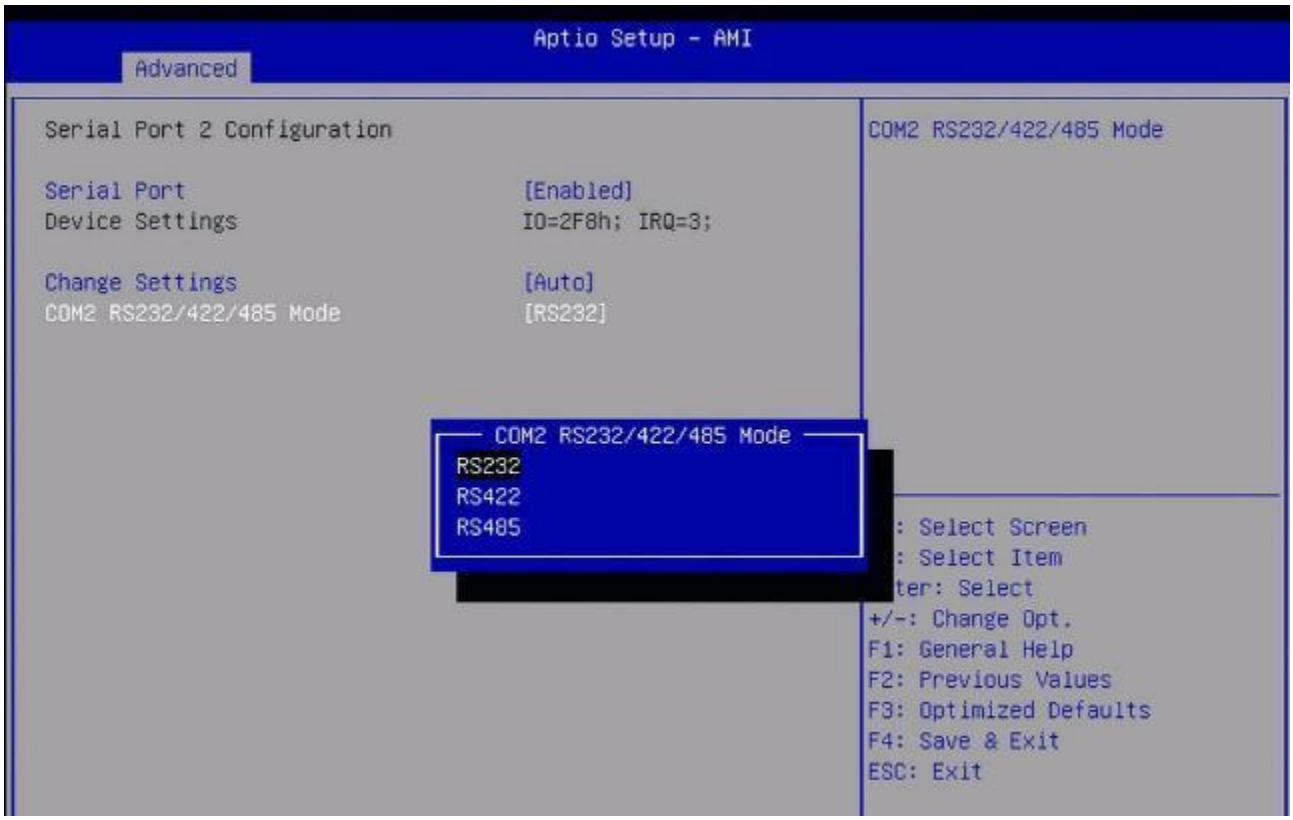
COM1 RS232/422/485 Mode



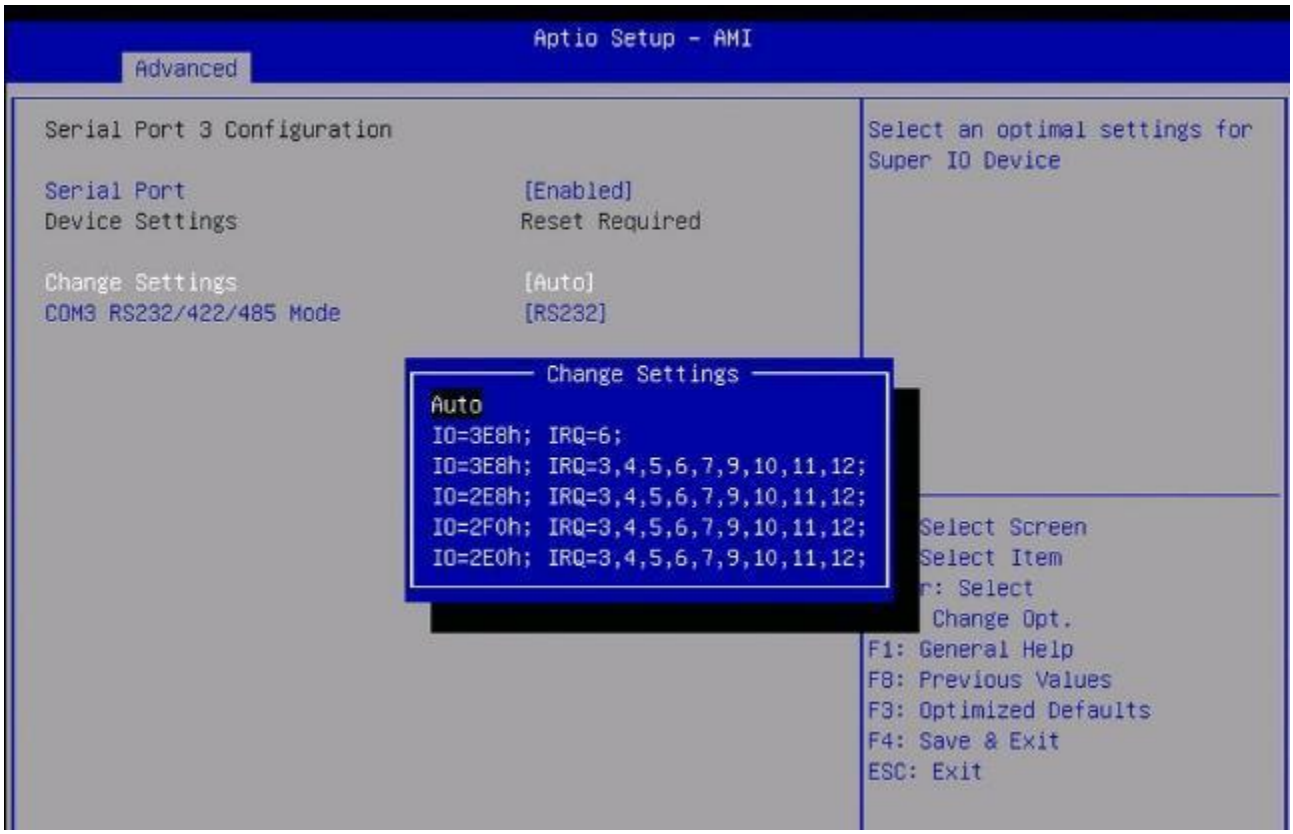
3.4.6.2 Serial Port 2 Configuration



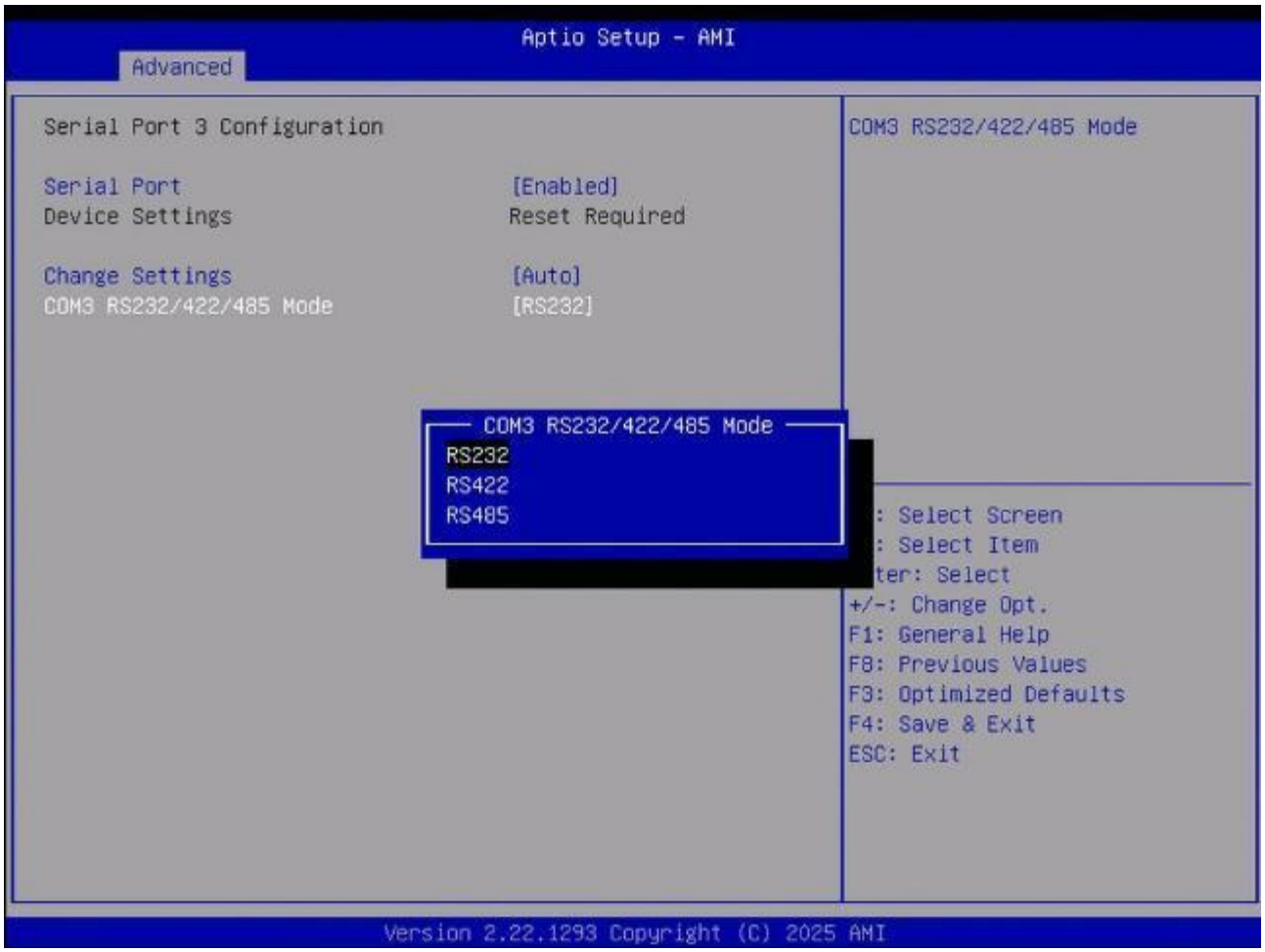
COM2 RS232/422/485 Mode



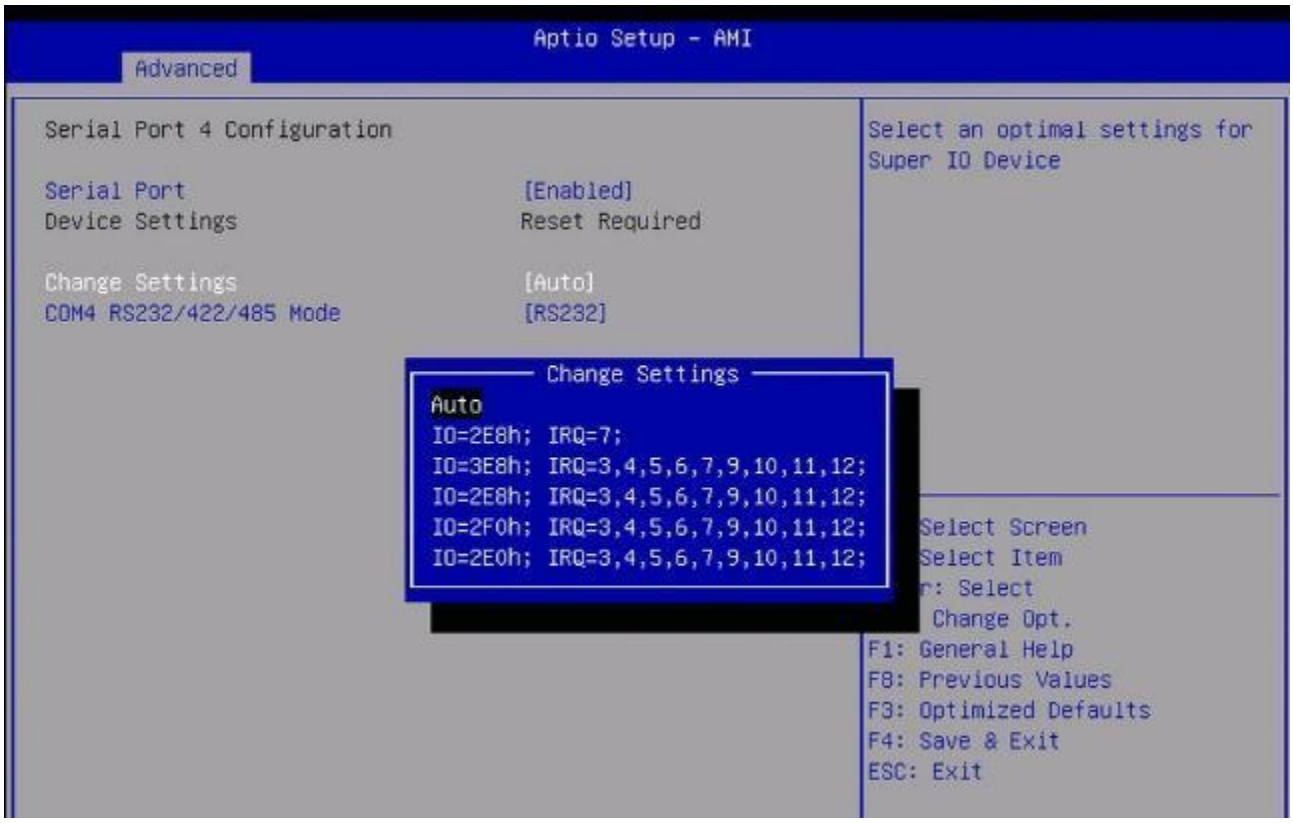
3.4.6.3 Serial Port 3 Configuration



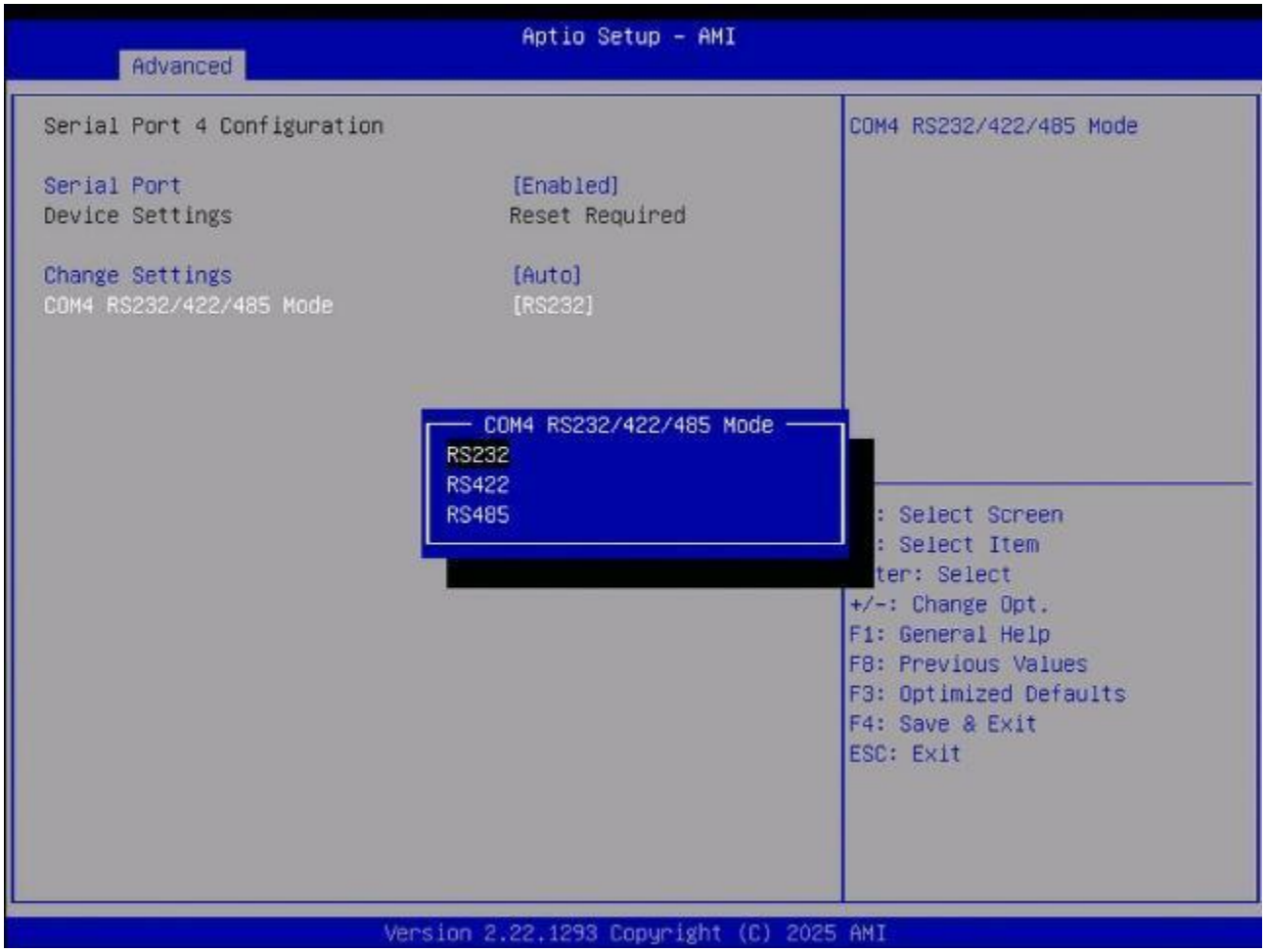
COM3 RS232/422/485 Mode



3.4.6.4 Serial Port4 Configuration

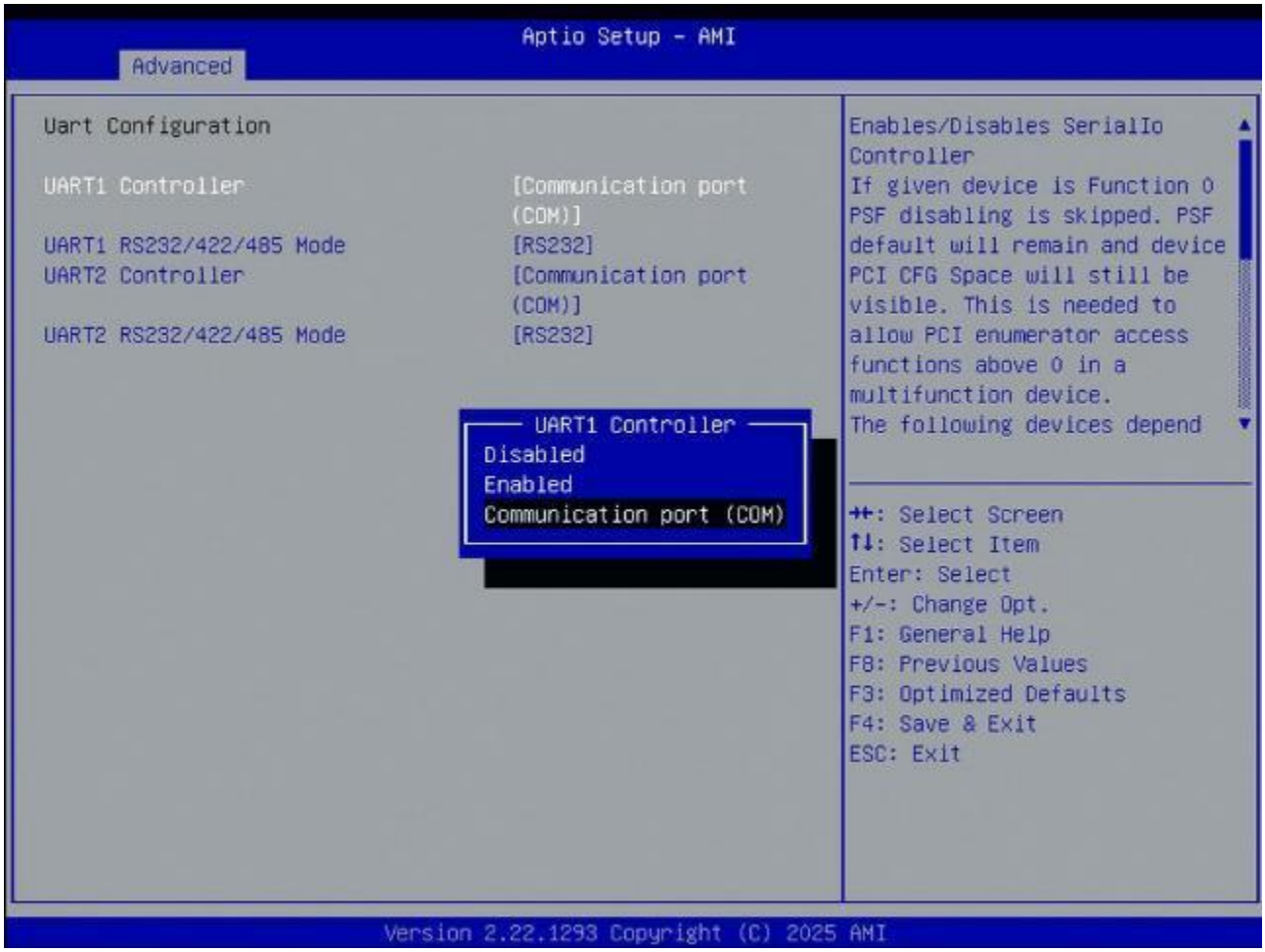


COM4 RS232/422/485 Mode

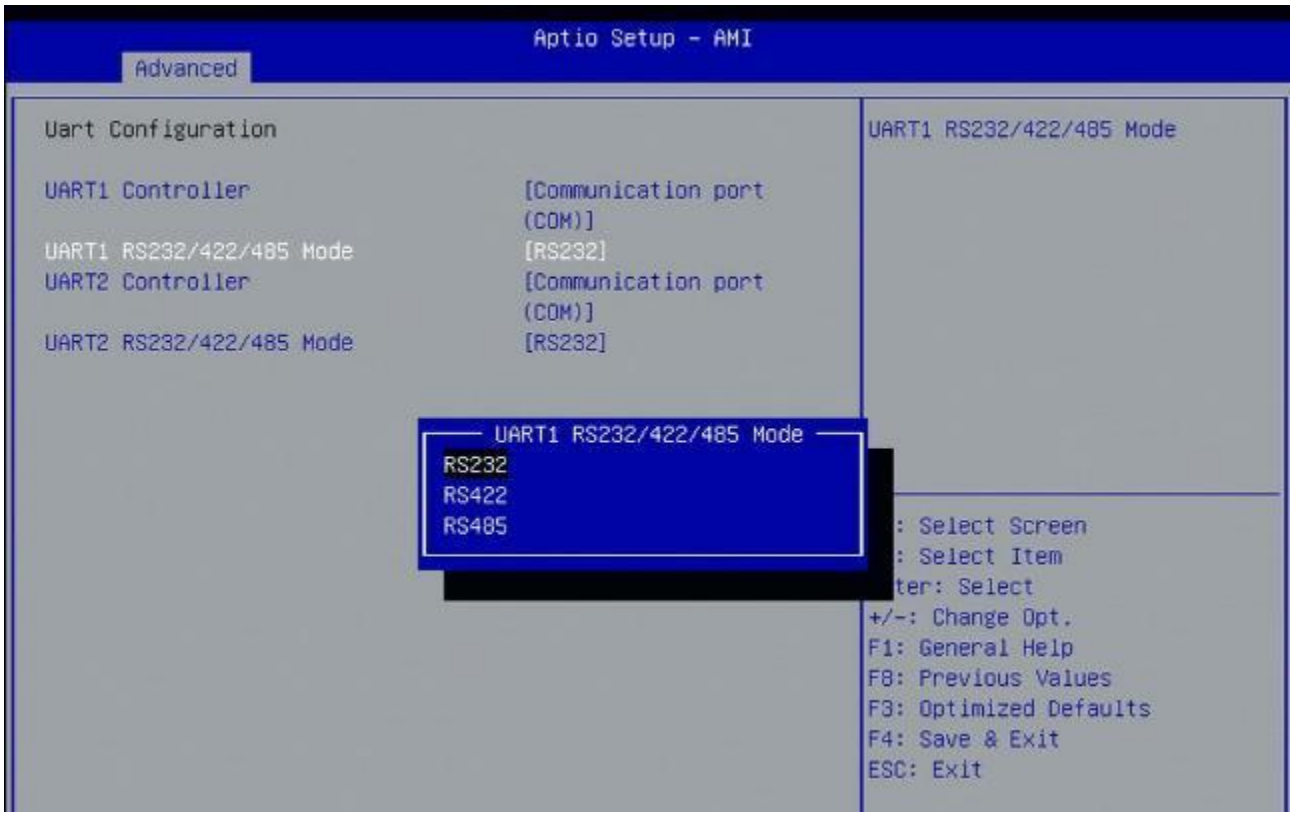


3.4.7 UART Configuration

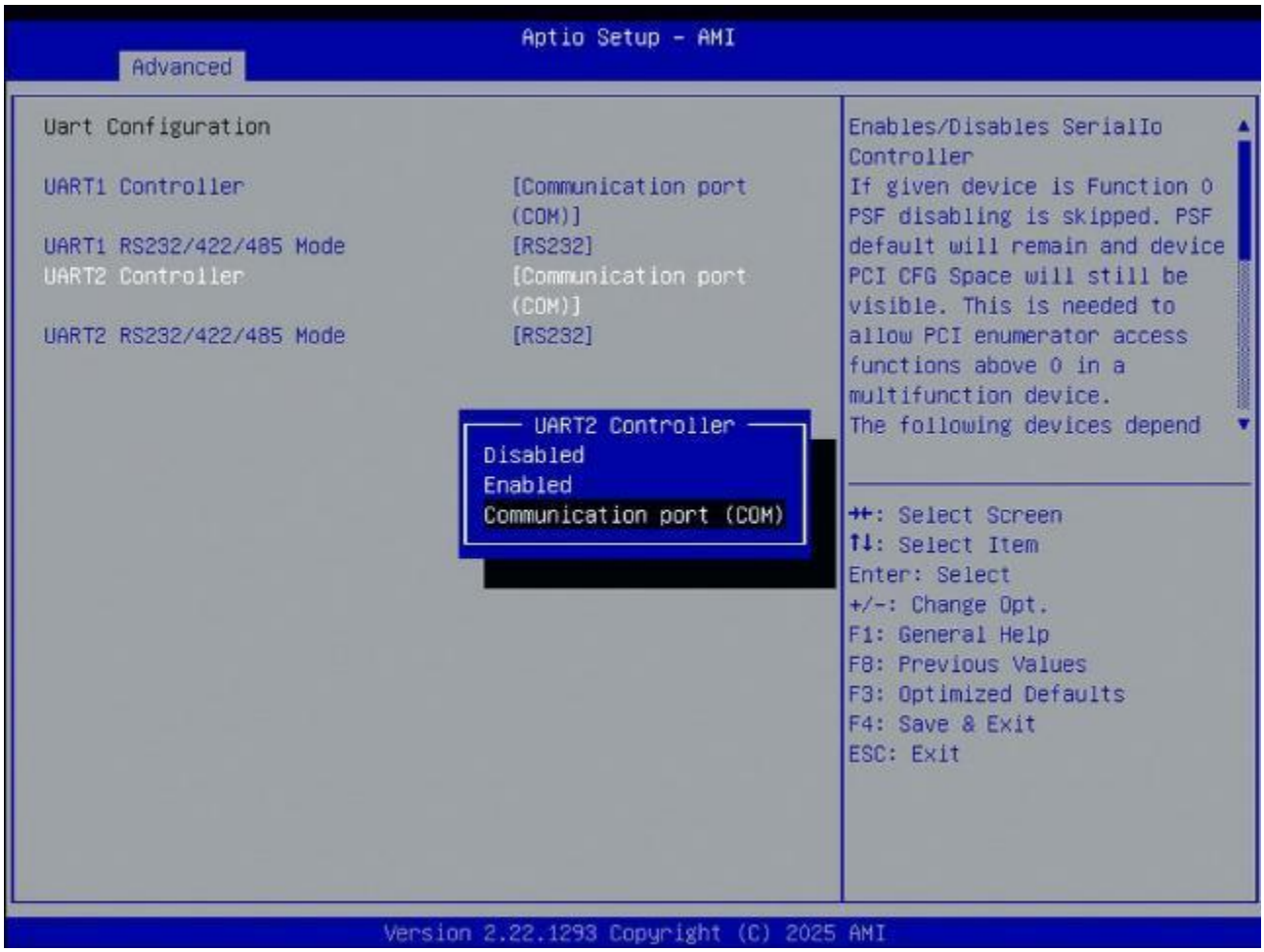
3.4.7.1 UART1 Controller



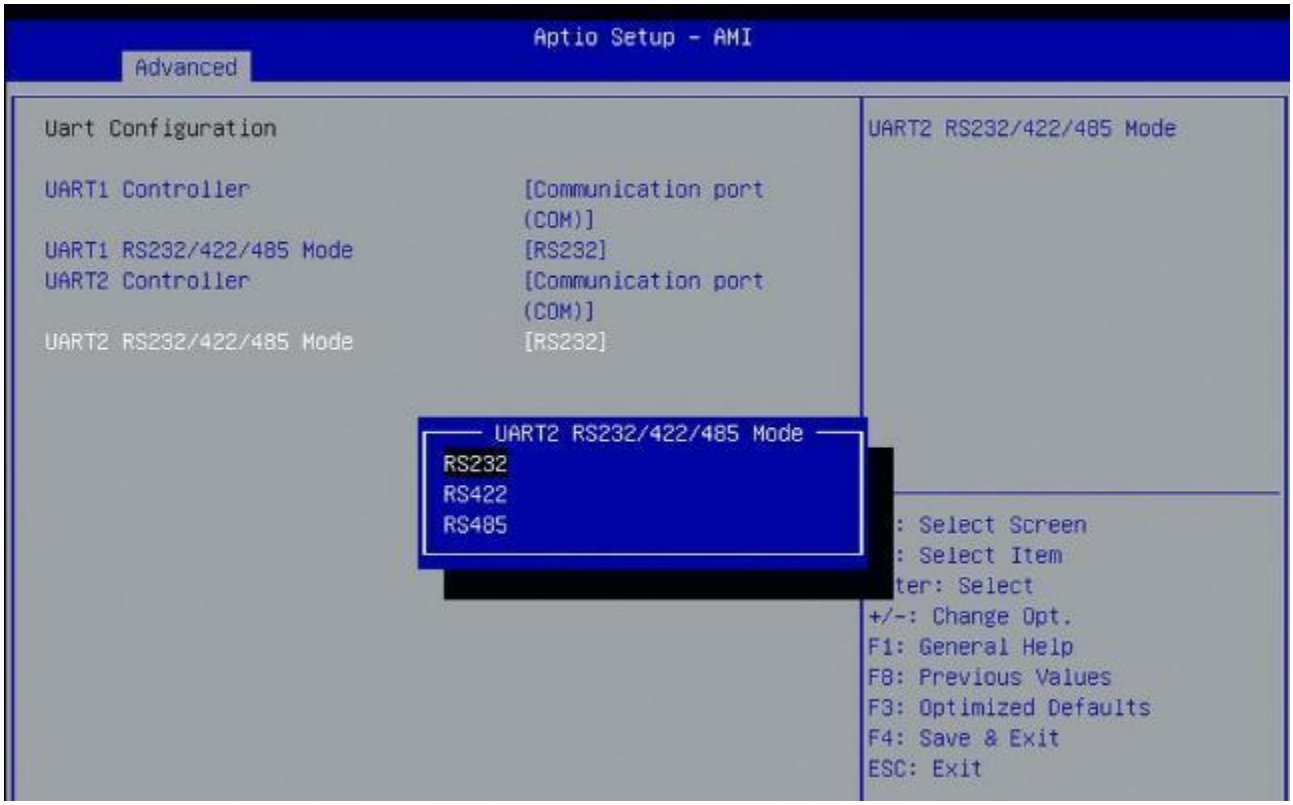
UART1 RS232/422/485 Mode



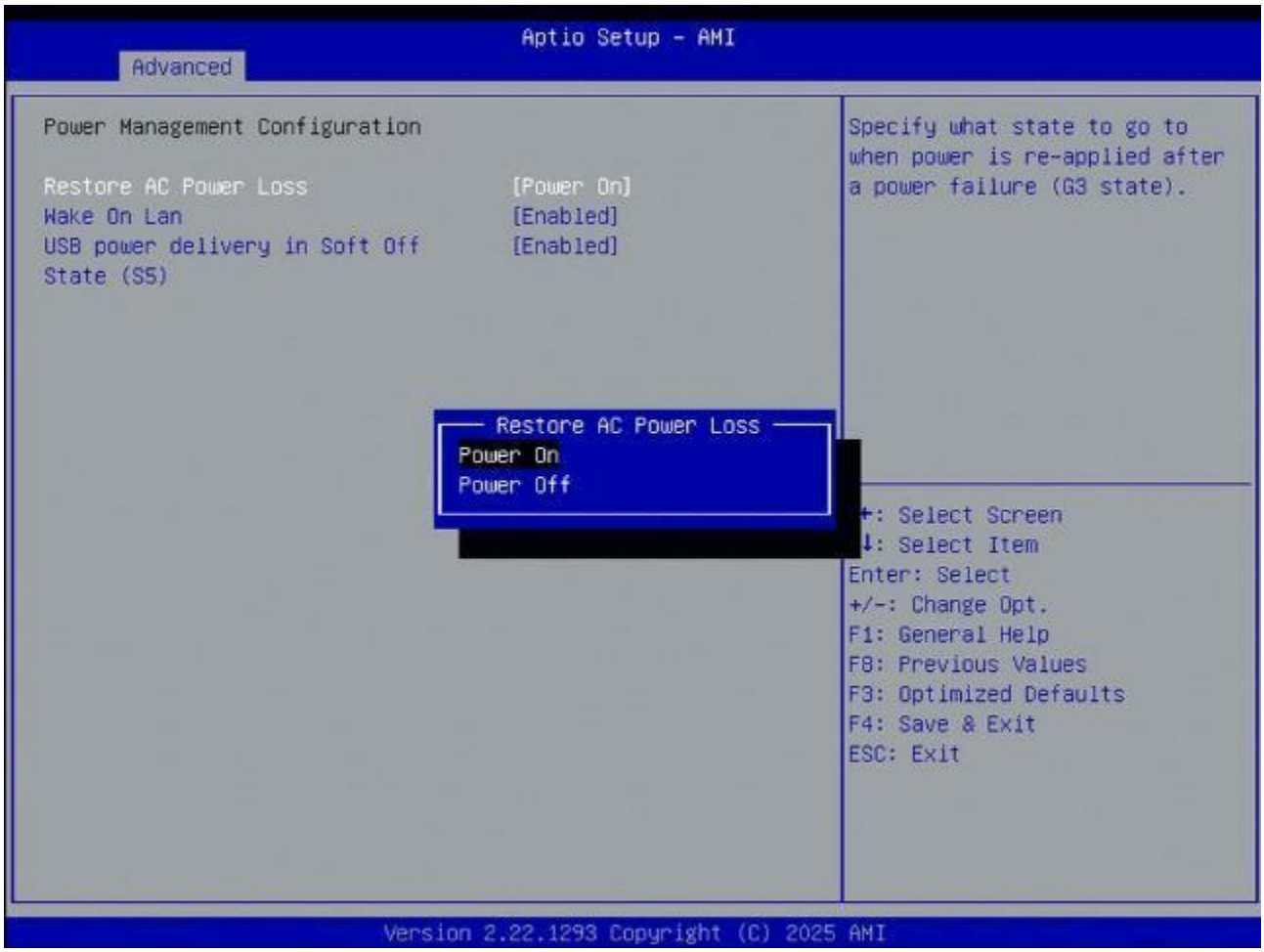
3.4.7.2 UART2 Controller



UART2 RS232/422/485 Mode



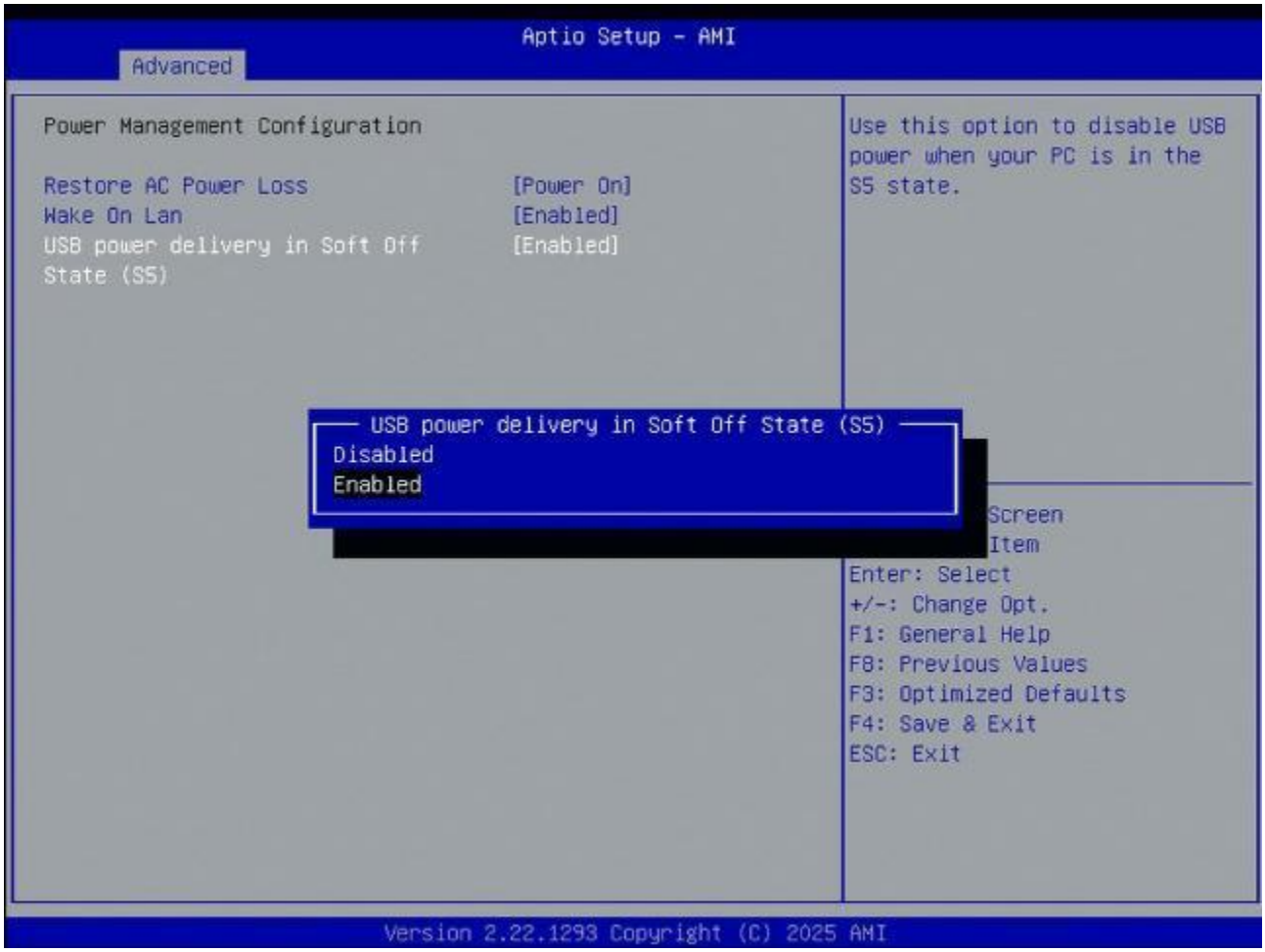
3.4.8 Power Management Configuration



Note:

Restore AC Power Loss: Power ON (Default)

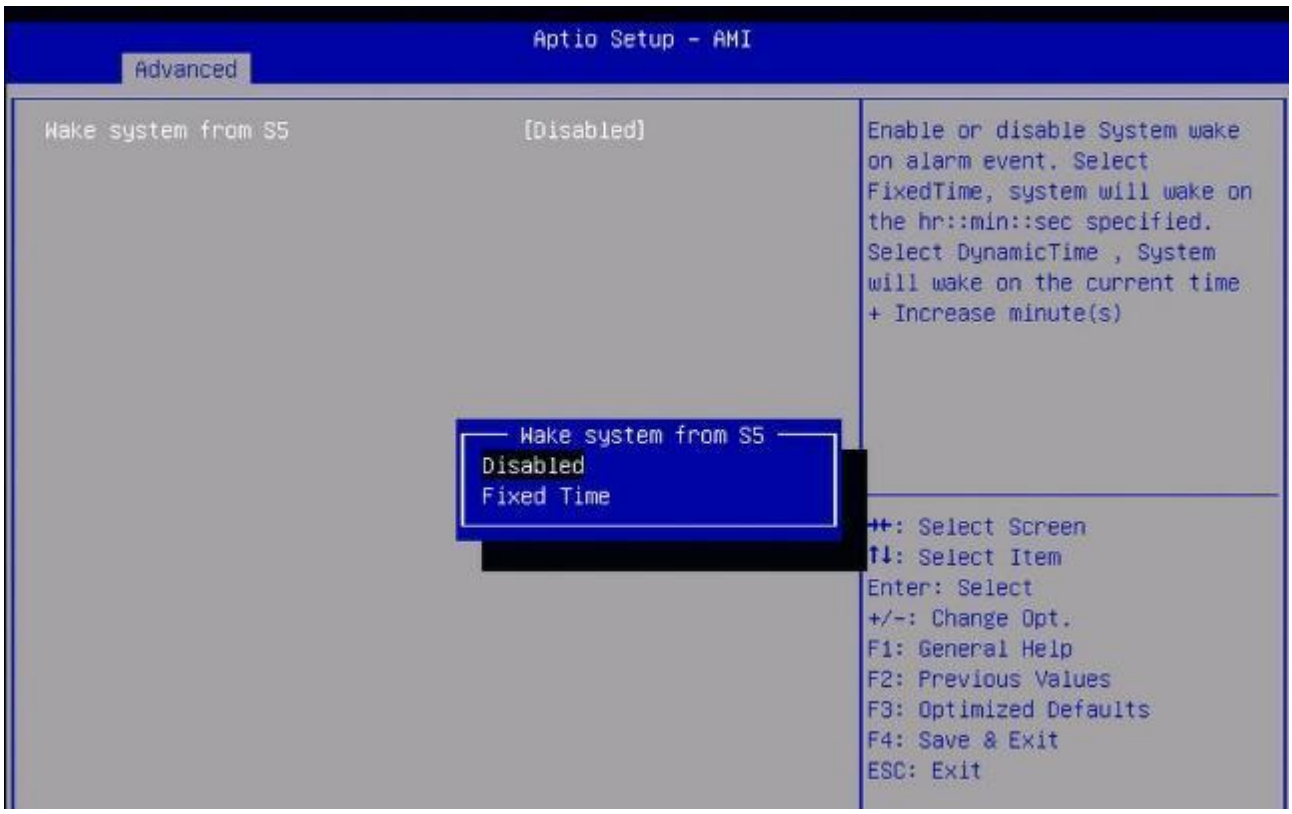
USB Power delivery in Soft off



Note:

USB Power delivery in Soft off: After enabling this setting, the USB will remain powered on when the system is turned off.

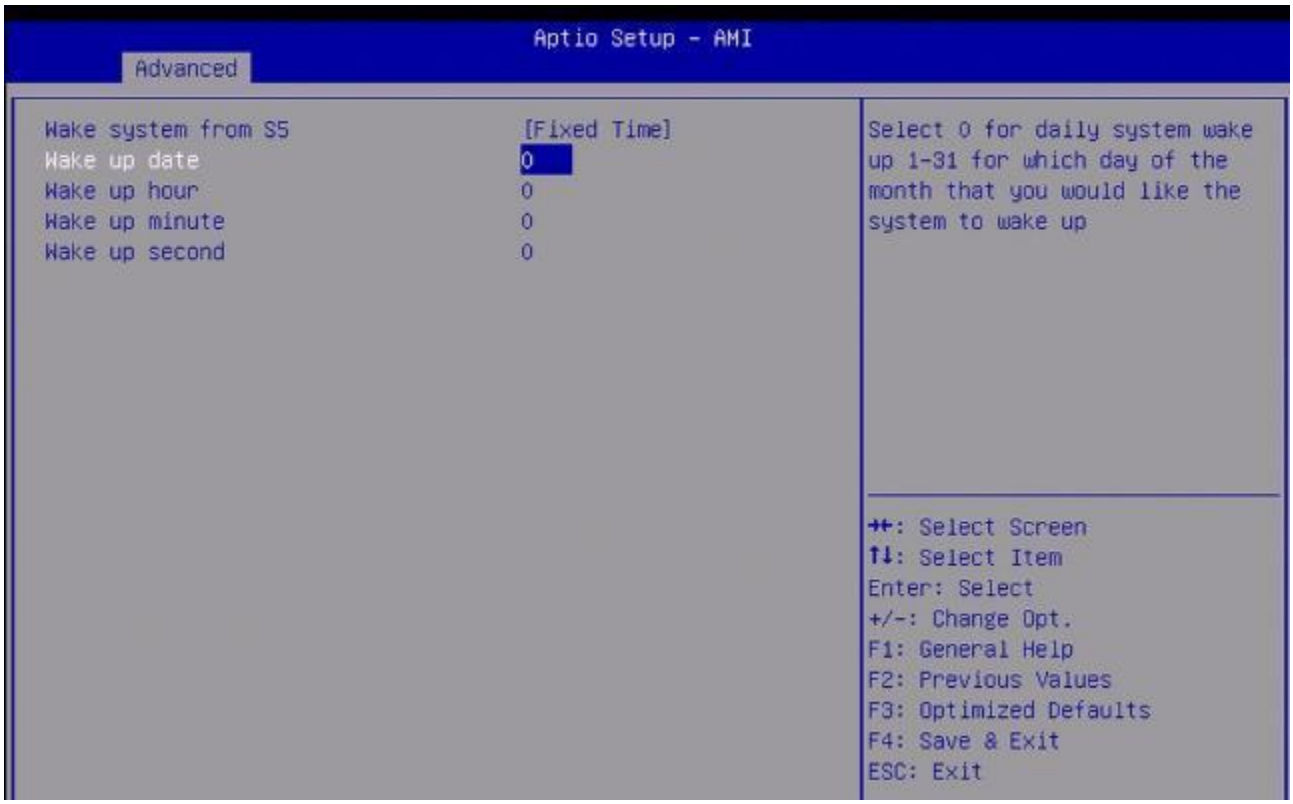
3.4.9 S5 RTC Wake Settings



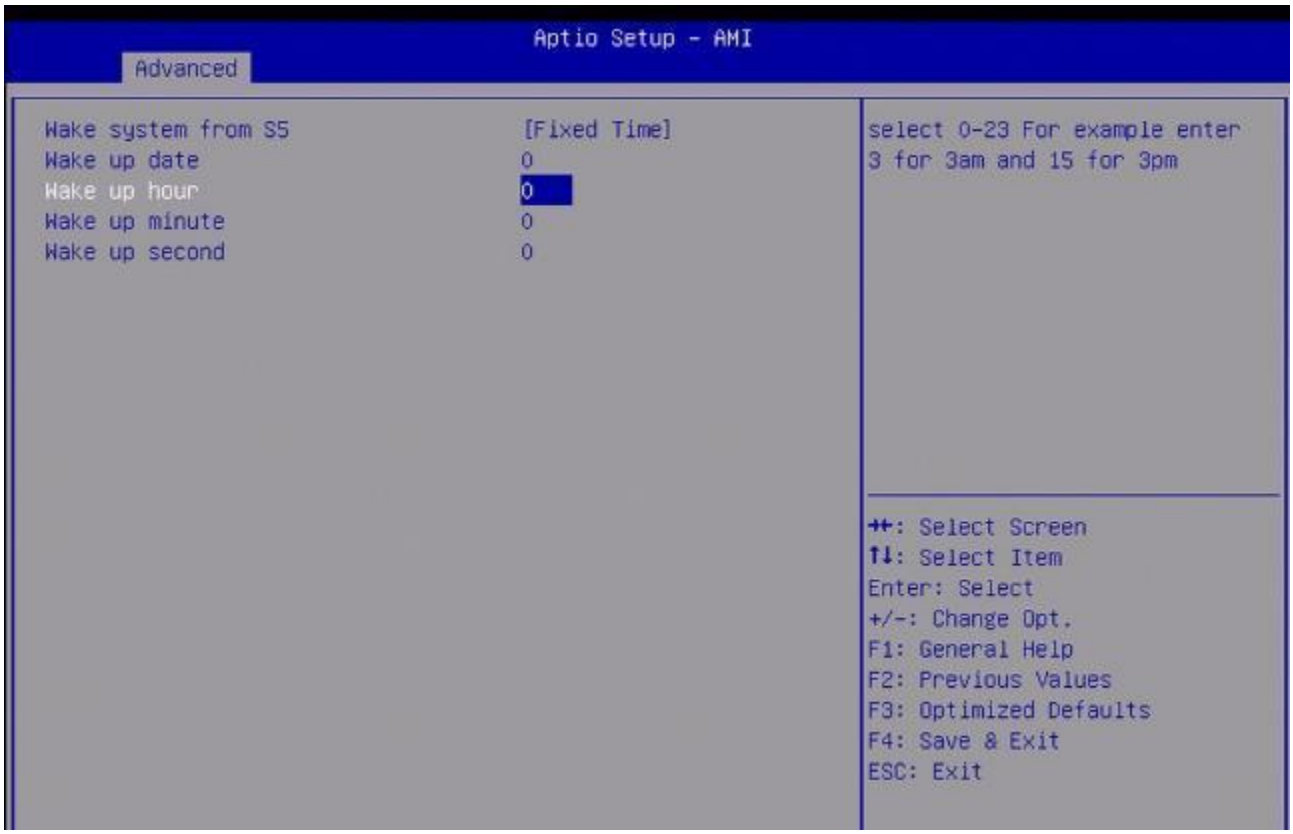
Wake system from S5:

Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr:min:sec specified. Select Dynamic Time , System will wake on the current time + Increase minute(s)

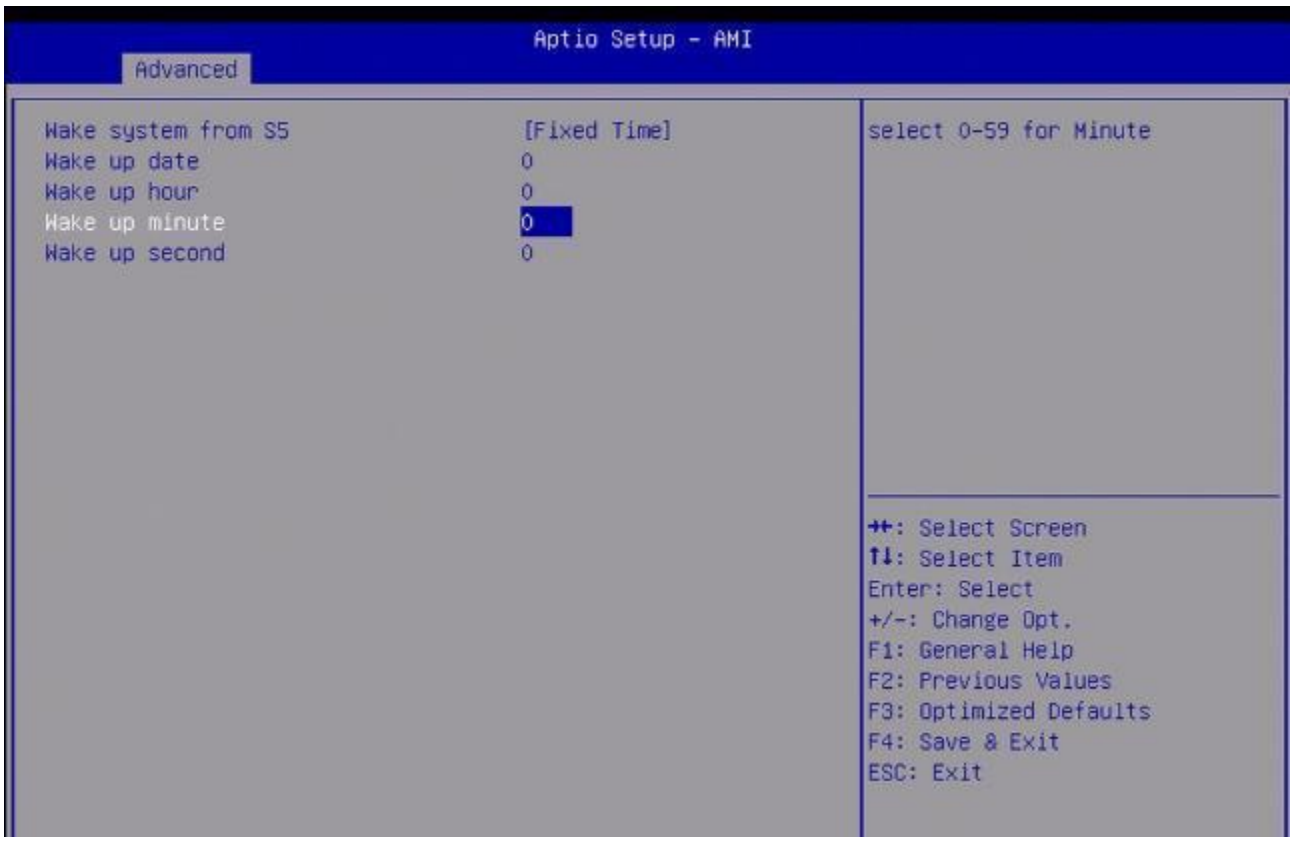
Wake up date: Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up



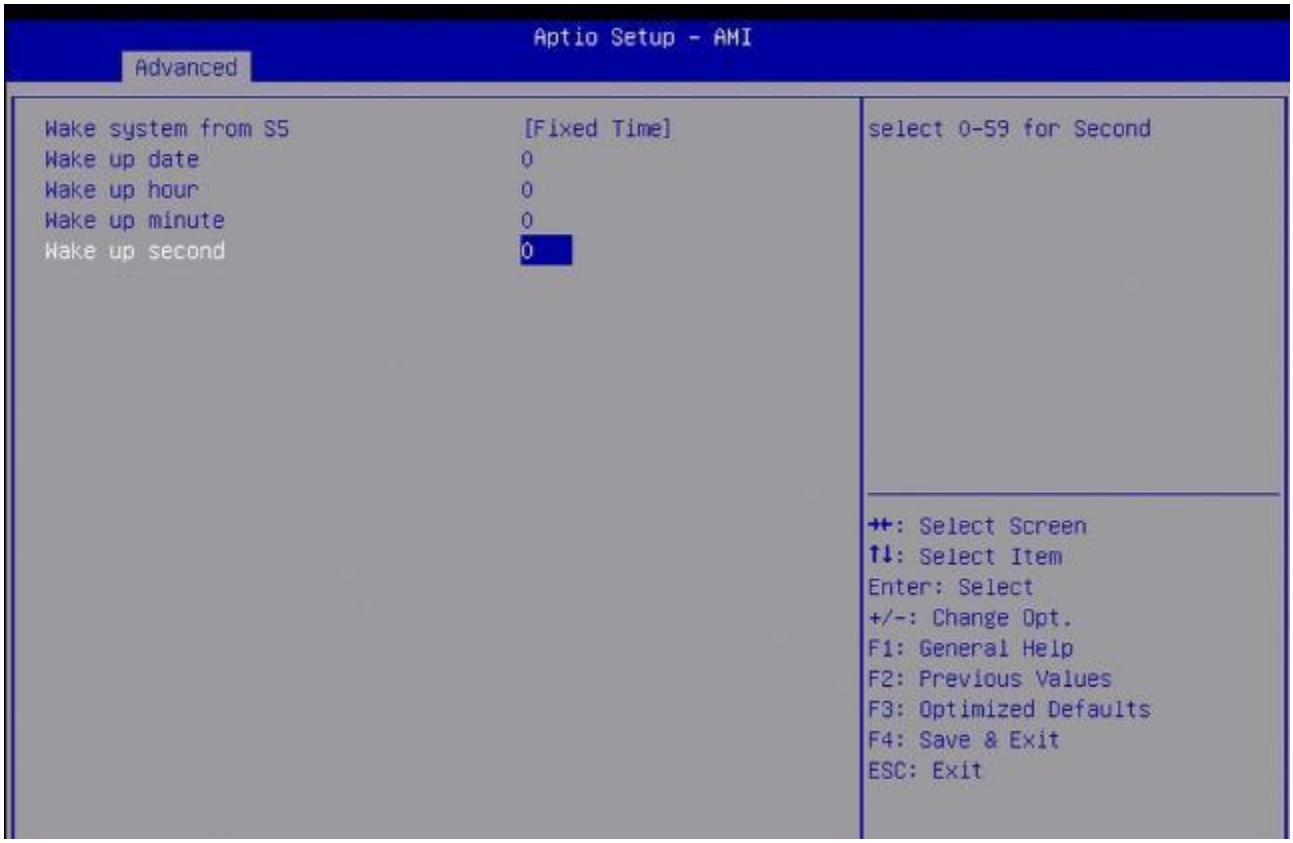
Select 0-23 For time, for example enter 3 for 3am and 15 for 3pm



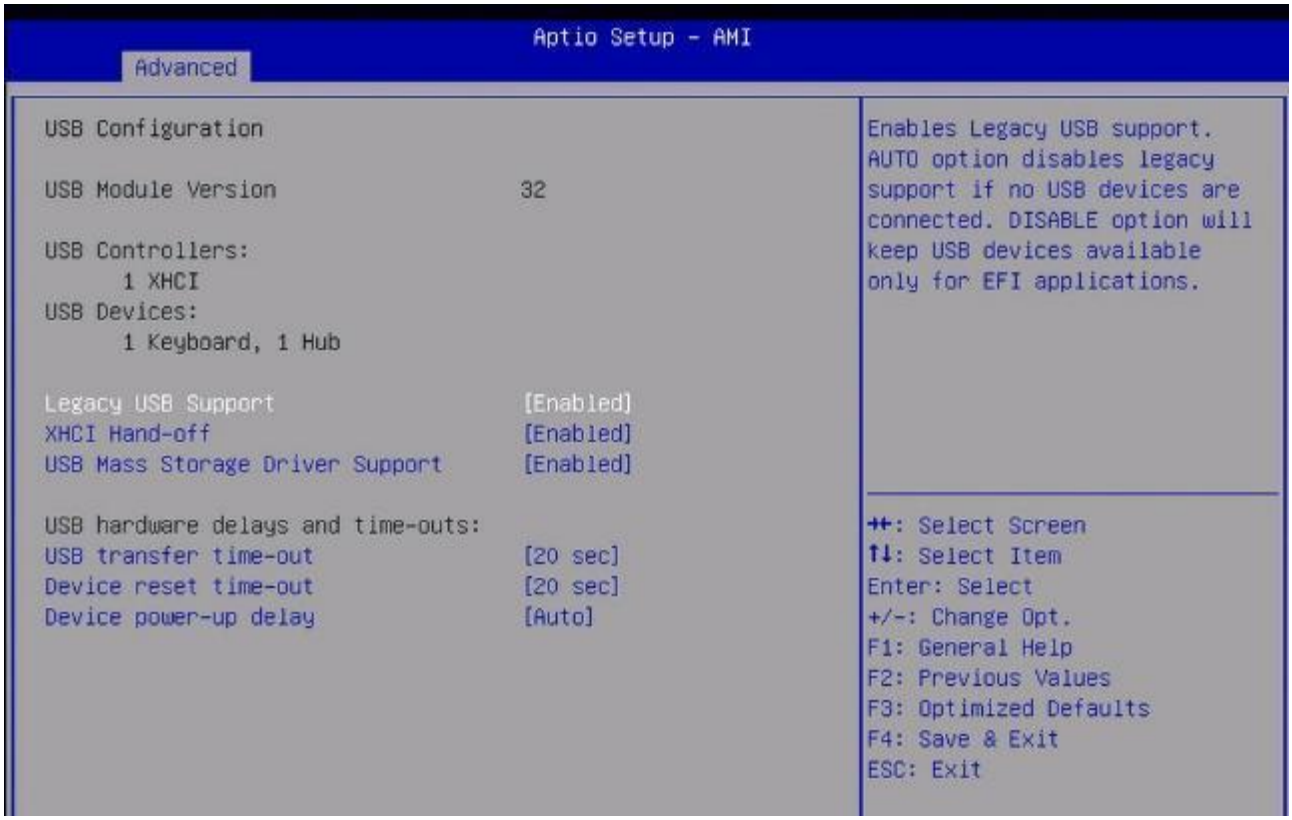
Select 0-59 for minute



Select 0-59 for second



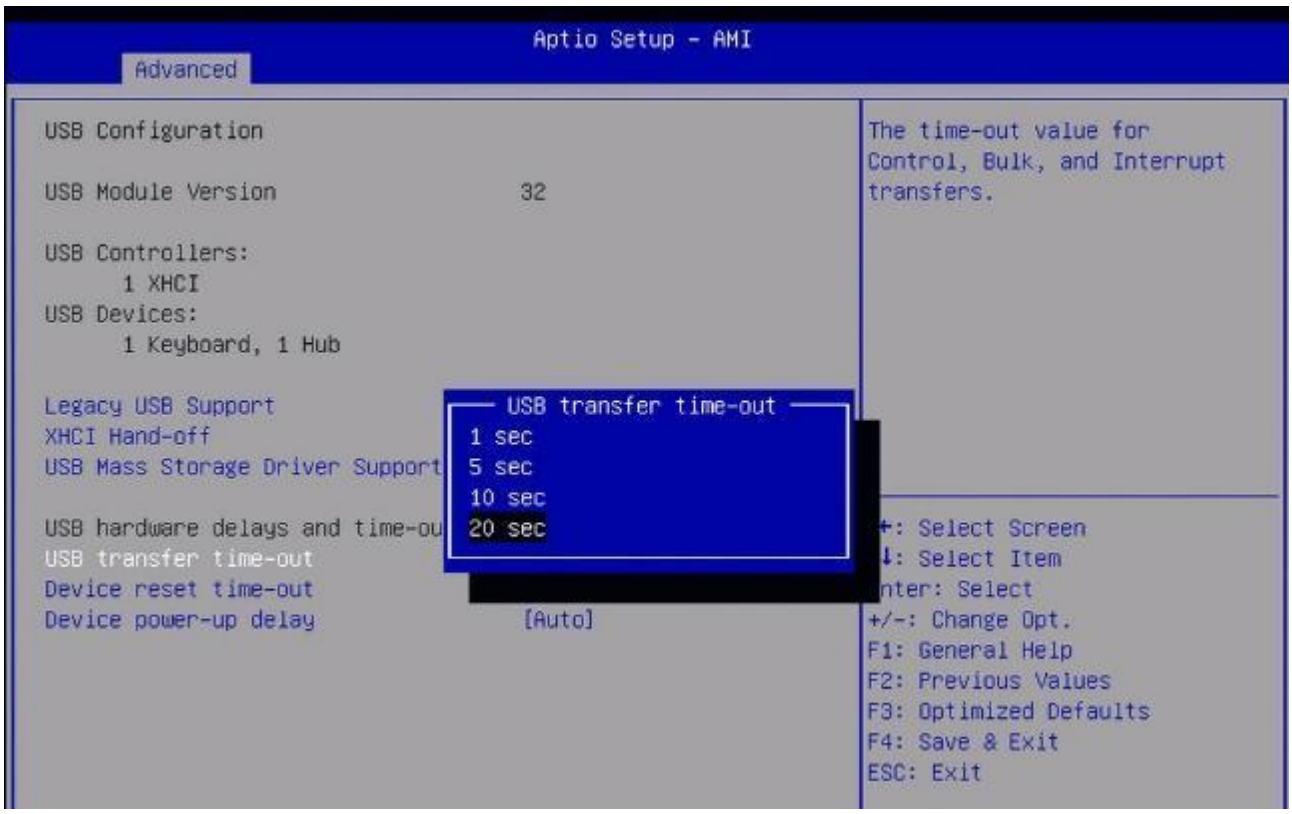
3.4.10 USB Configuration



Legacy USB Support:

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected.DISABLE option will keep USB devicesavailable only for EFl applications.

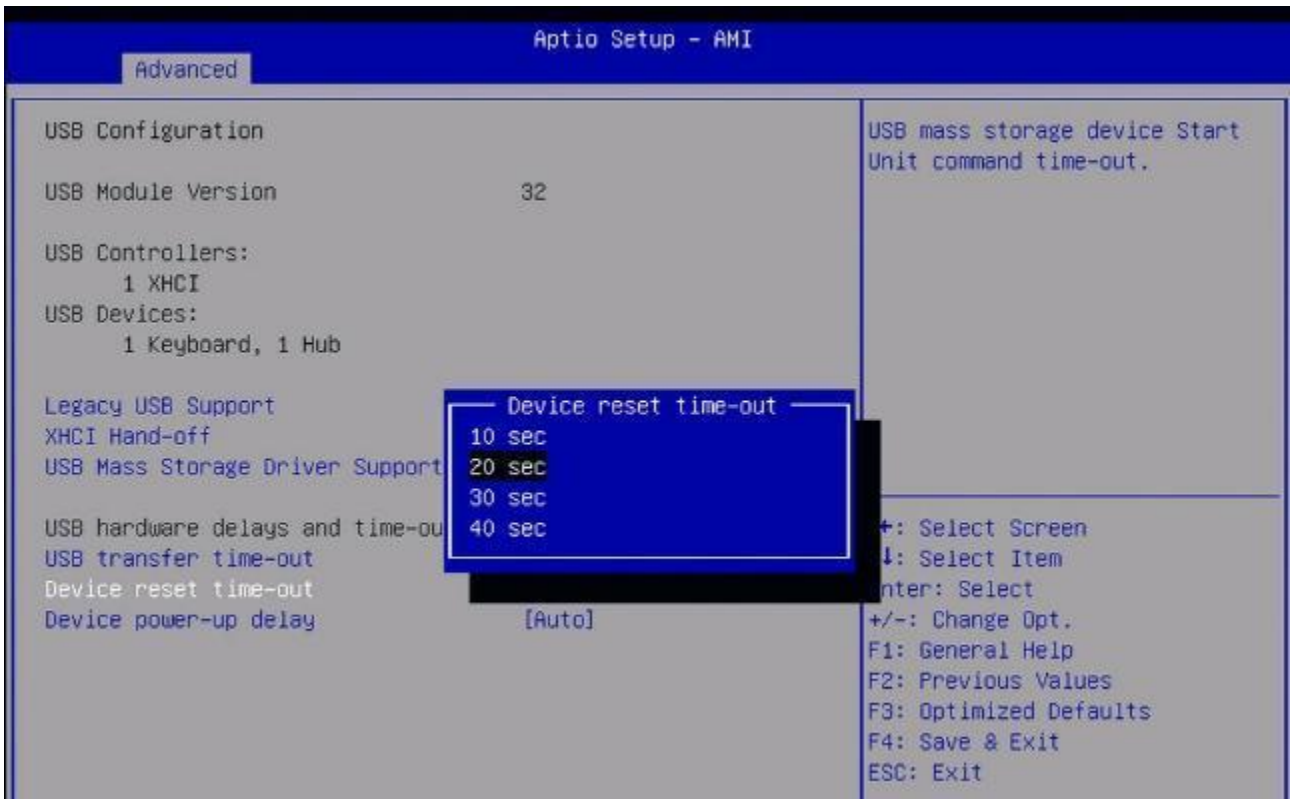
3.4.10.1 USB Transfer time-out



USB Transfer time-out:

The time-out value for Control, Bulk, and Interrupt transfers.

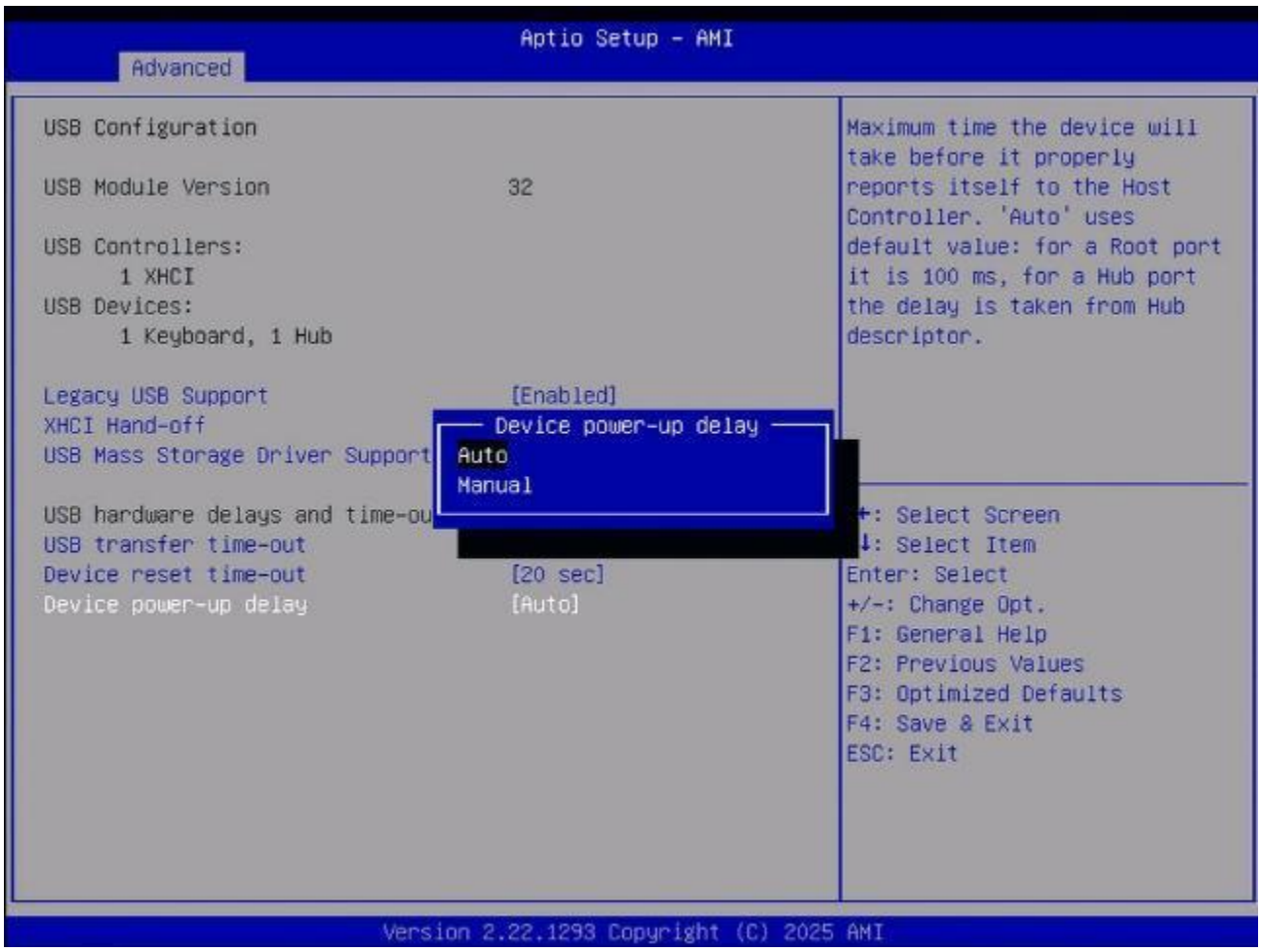
3.4.10.2 Device reset time-out



Device reset time-out:

USB mass storage device Start Unit command time-out.

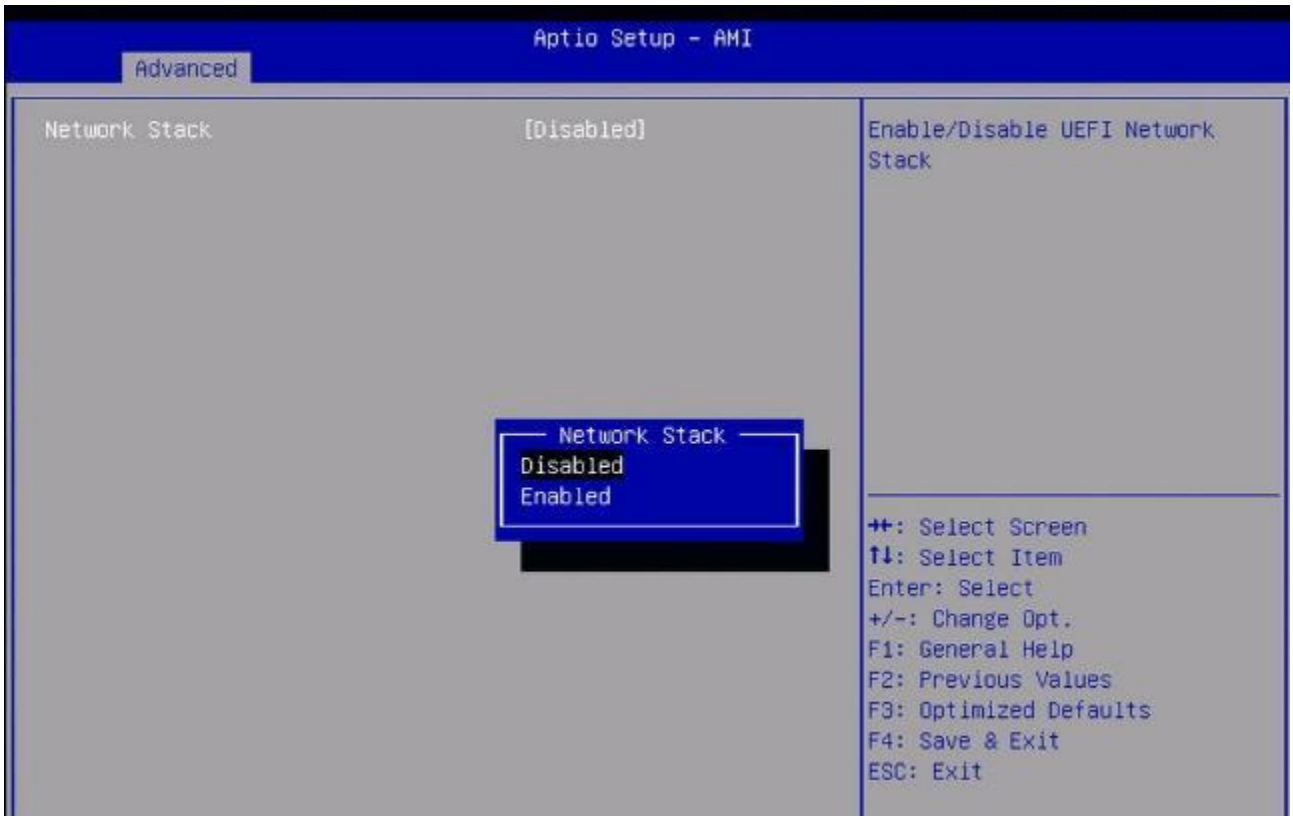
3.4.10.3 Device power-up delay



Device power-up delay:

Maximum time the device will take before it properly reports itself to the Host Controller. ‘Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

3.4.11 Network Stack Configuration



3.4.11.1 PXE boot wait time

IPV4 PXE Support:

Enable/Disable lPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPV4 HTTP Support:

Enable/Disable lPv4 HTTP boot support. lf disabled, IPv4 HTTP boot support will not be available.

IPV6 PXE Support:

Enable/Disable lPv6 PXE boot support. lf disabled, IPv6 PXE boot support will not be available.

IPV6 HTTP Support:

Enable/Disable lPv6 HTTP boot support. If disabled,IPv6 HTTP boot support will not be available.

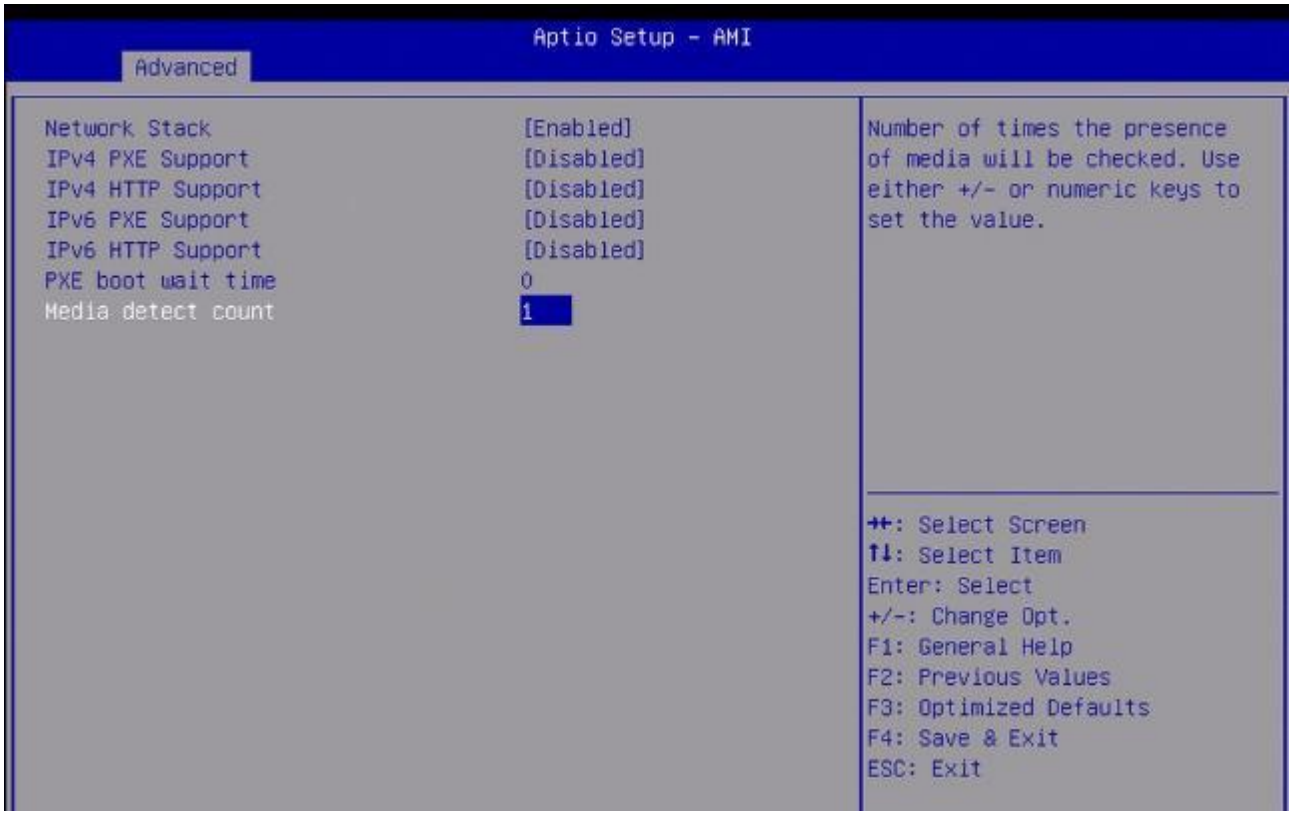
PXE Boot Wait Time:

Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value,

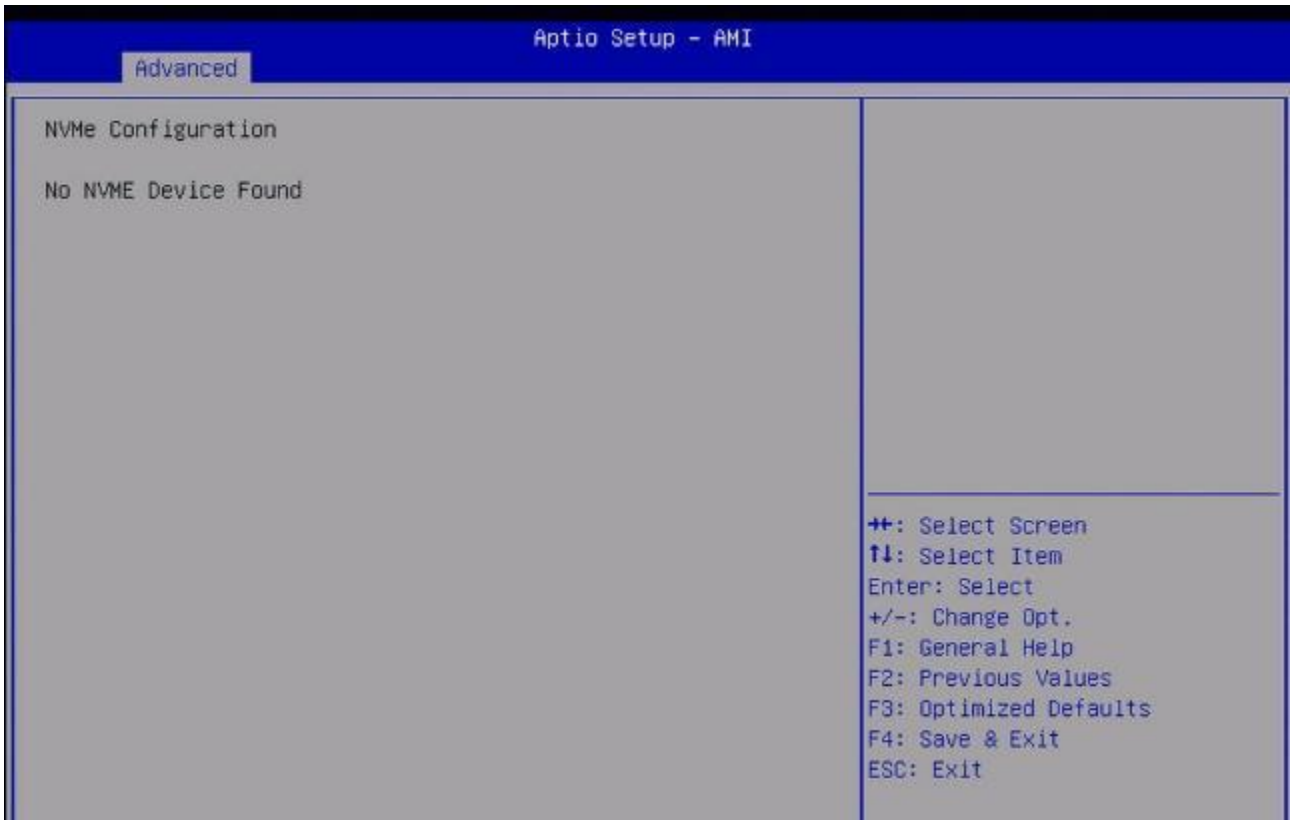
Media detect count:

Number of times the presence of media will be checked.Use either +/- or numeric keys to set the value.

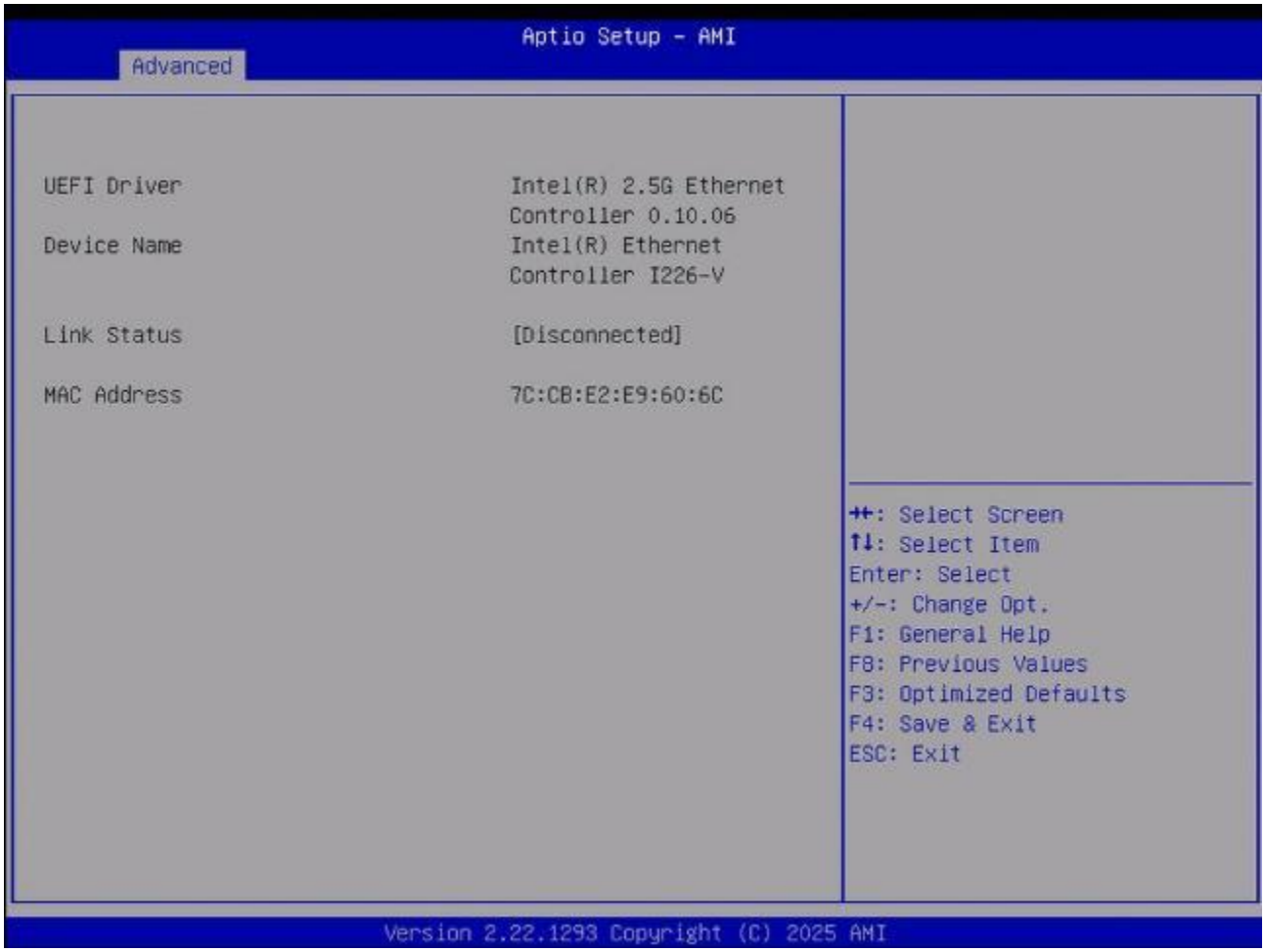
3.4.11.2 Media detect count



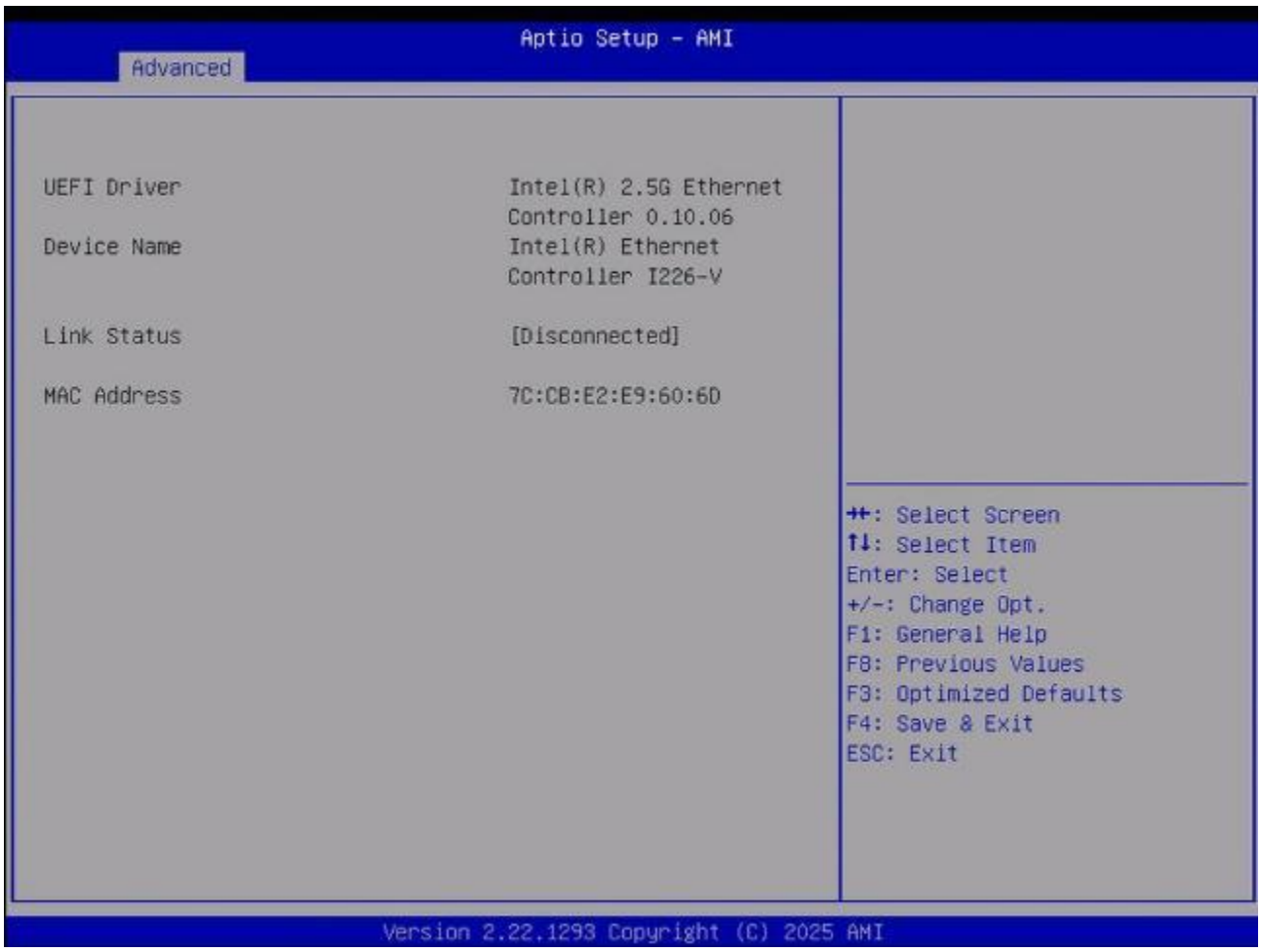
3.4.12 NVMe Configuration



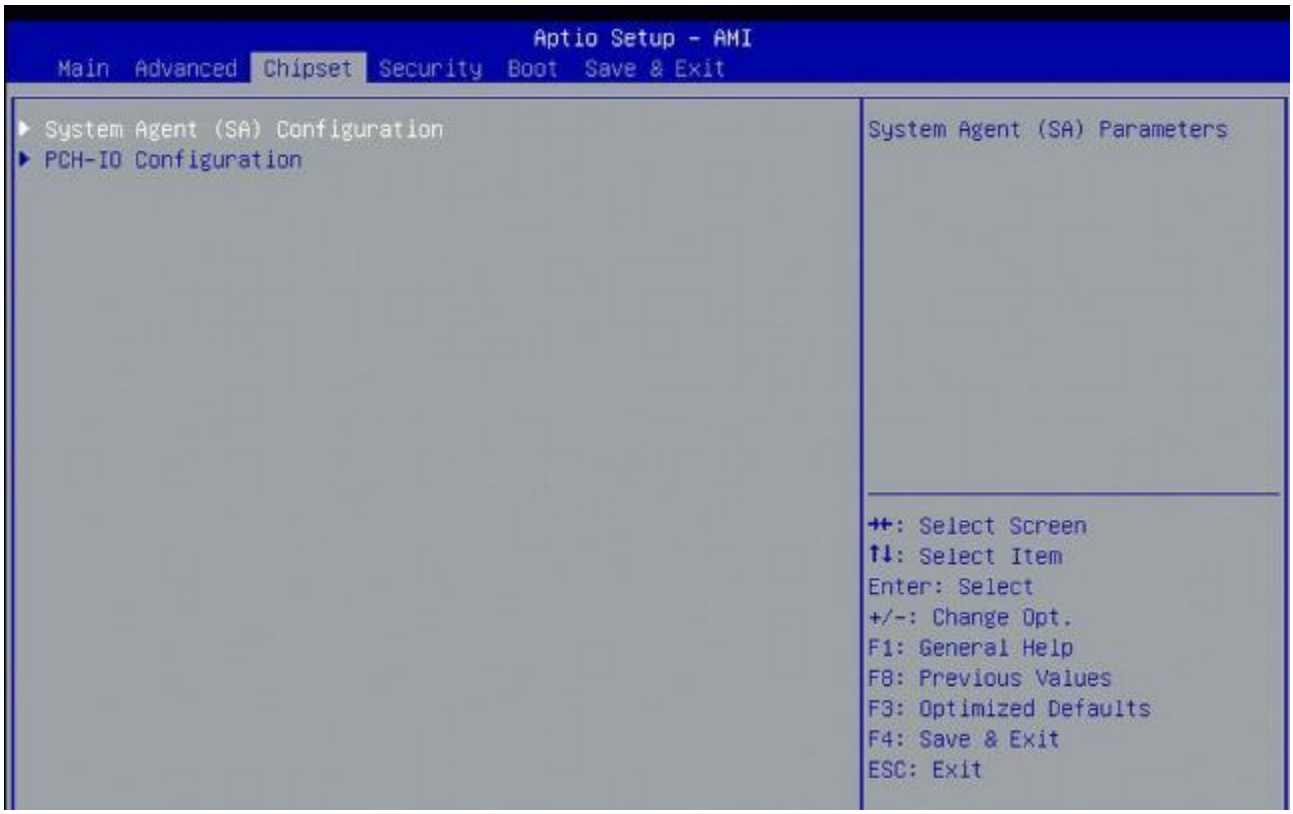
3.4.13 Intel® Ethernet Controller I226-V



3.4.14 Intel® Ethernet Controller I226-V

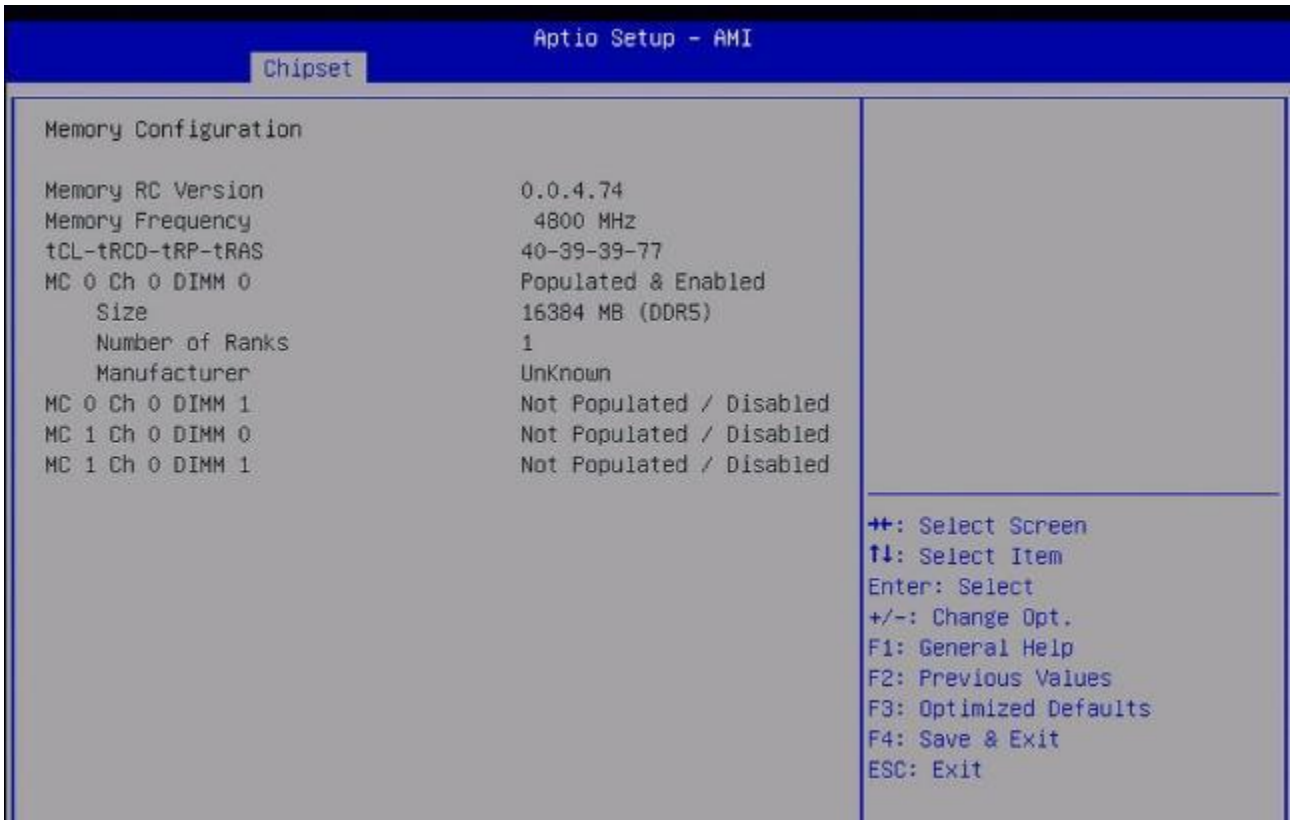


3.5 Chipset Settings



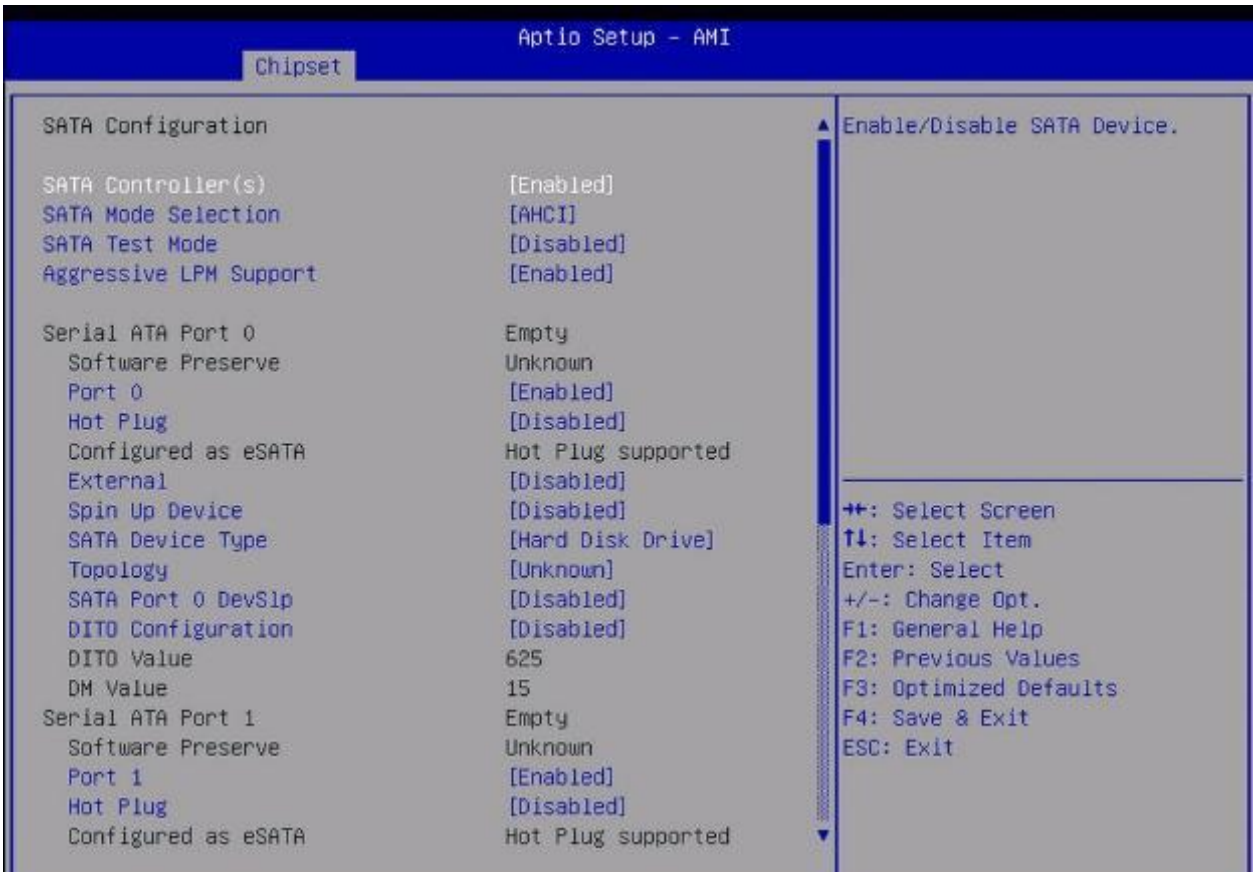
3.5.1 System Agent (SA) Configuration

3.5.1.1 Memory Configuration



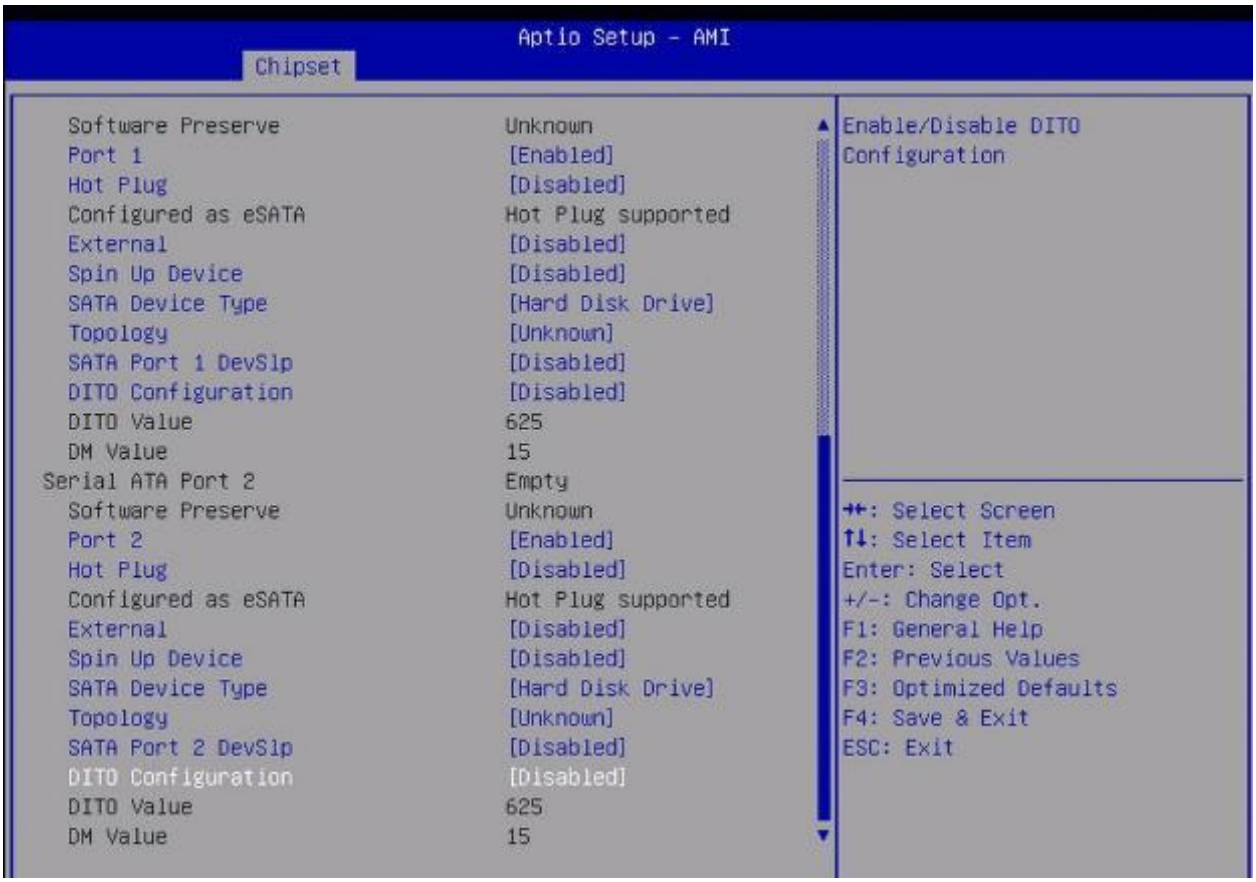
3.5.2 PCH-IO Configuration

3.5.2.1 SATA Configuration



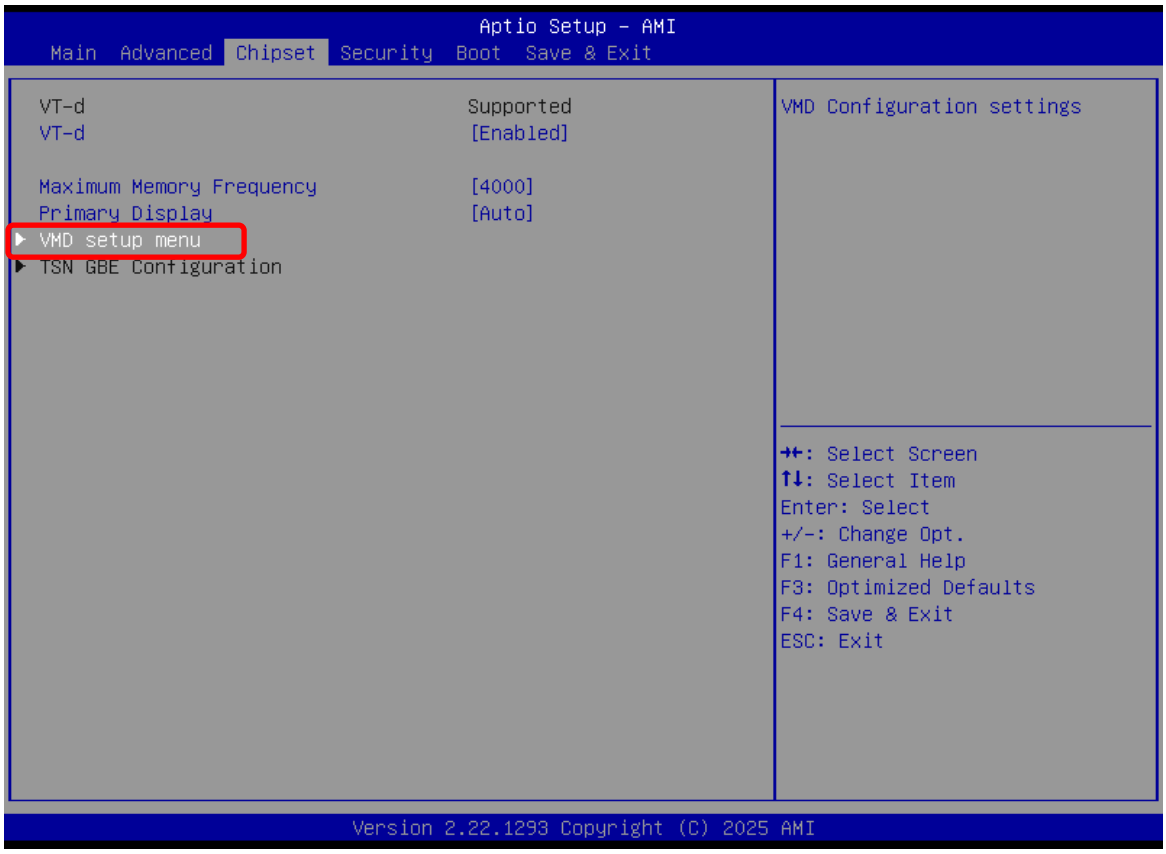
SATA Device Type:

Identify the SATA port is connected to Solid State Drive or Hard Disk Drive



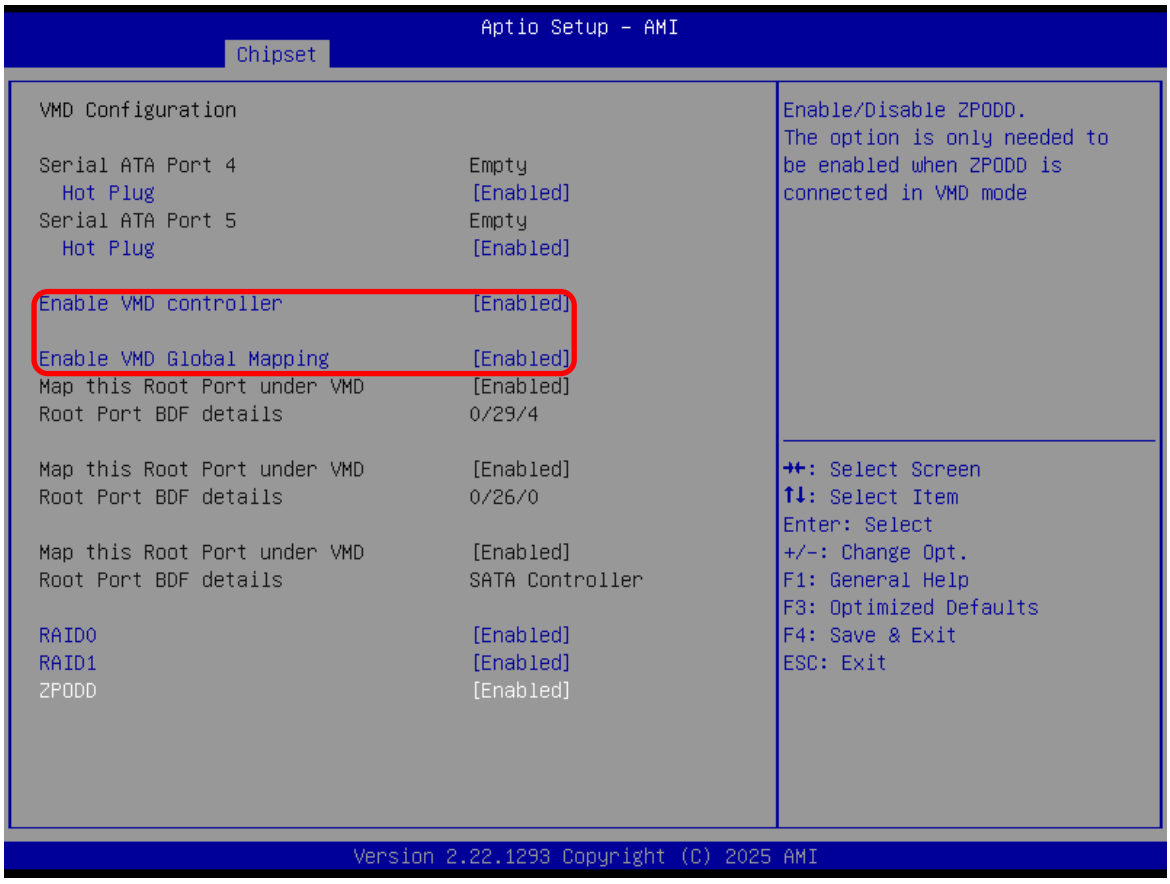
BIOS RAID Setting

BIOS Menu => Chipset => VMD setup menu

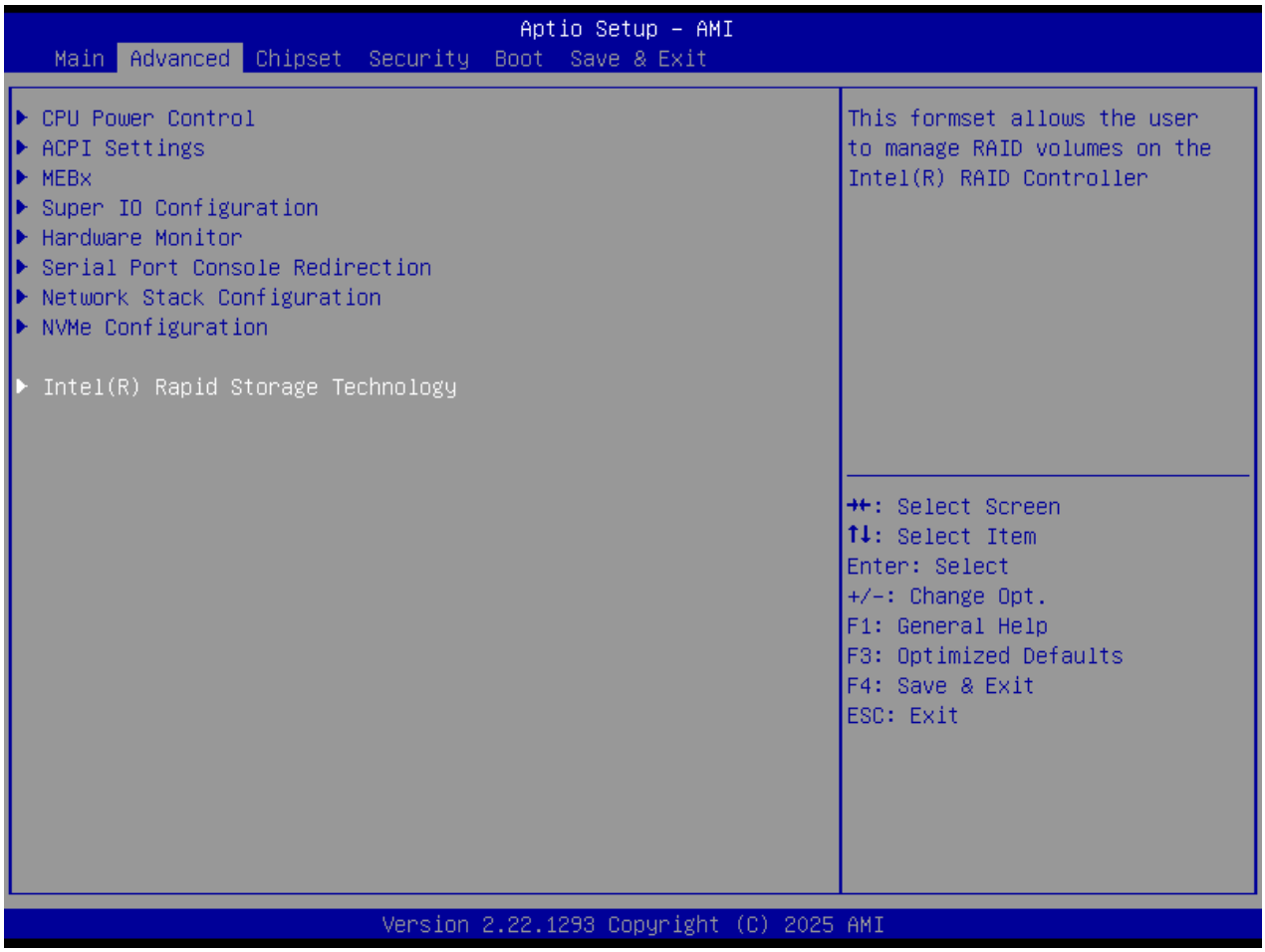


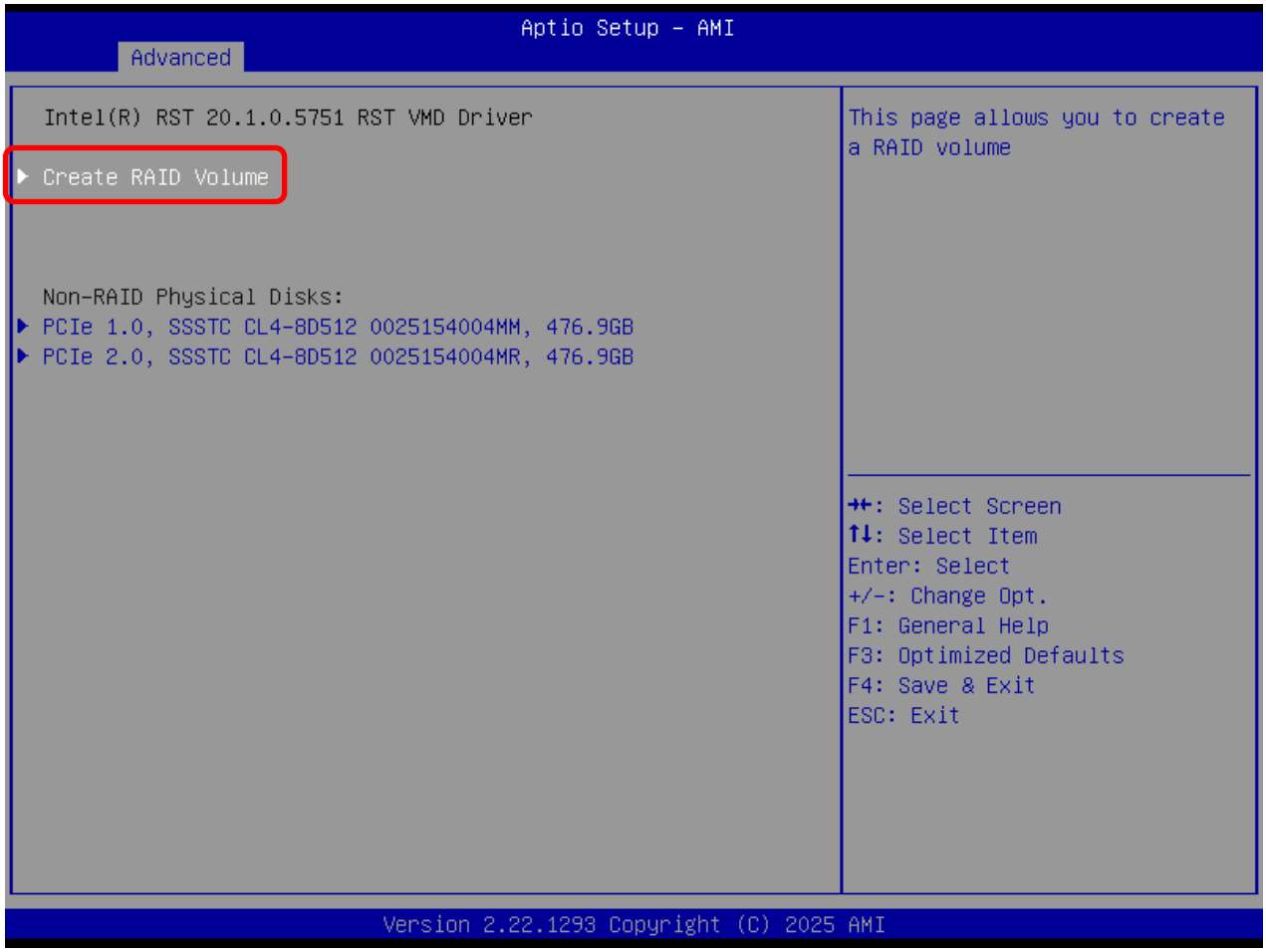
Enable VMD controller =>Enable

Enabled VMD Global Mapping=>Enabled and press [F10]

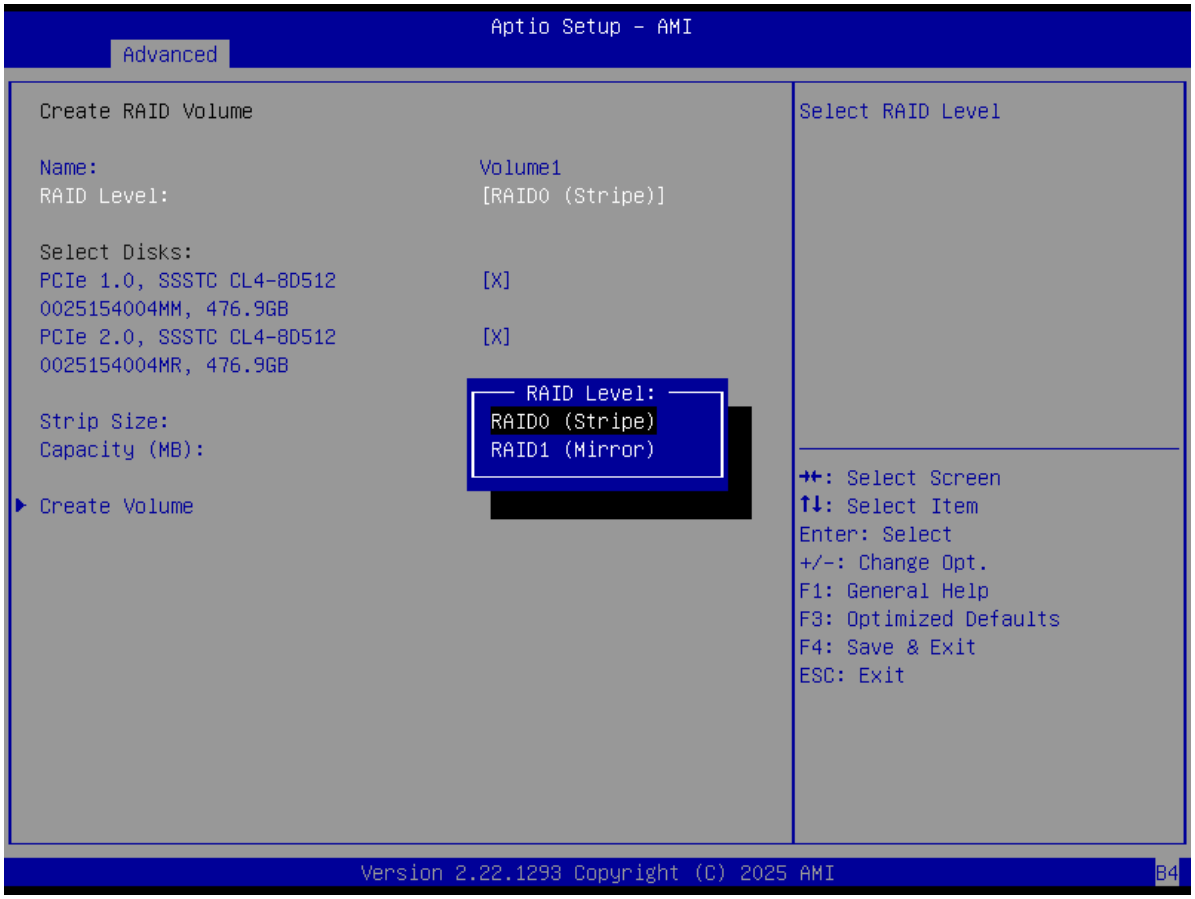


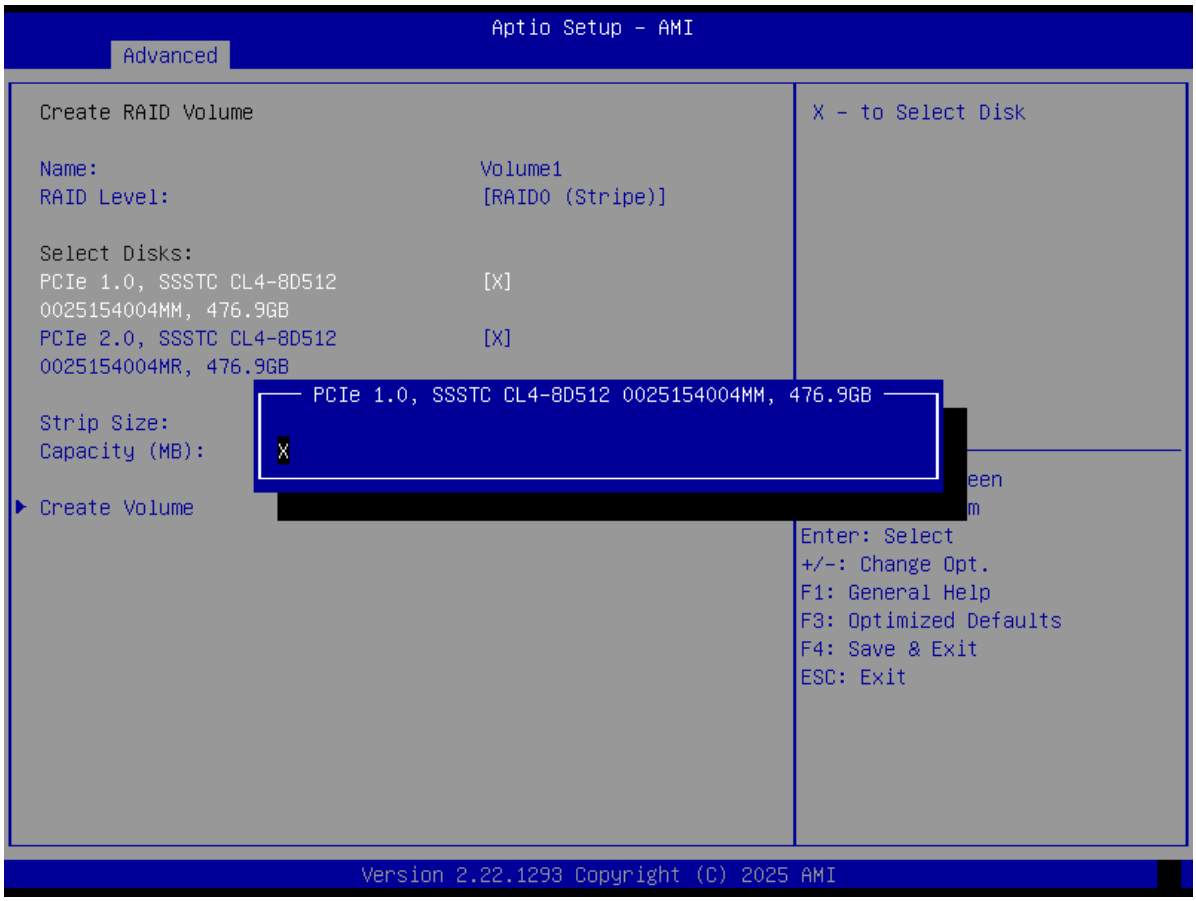
Reset machine and select Intel(R)Rapid Storage Technology to create RAID volume

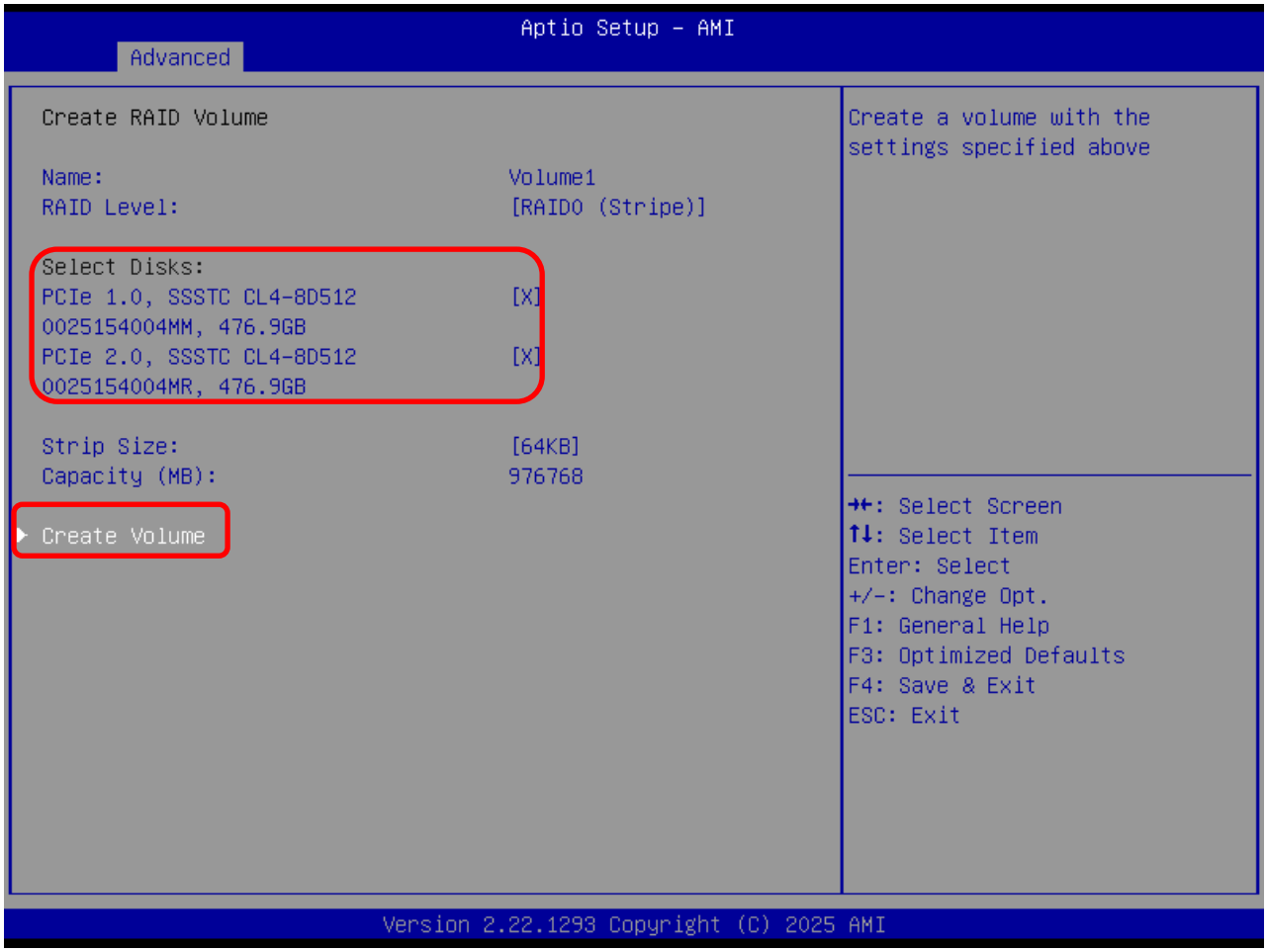




RAID 0 & 1 setting menu to select storages to create RAID volume, then press [F10] to complete RAID configuration






Aptio Setup – AMI
Advanced
Create RAID Volume
Name: Volume1
RAID Level: [RAID0 (Stripe)]
Select Disks:
PCIe 1.0, SSSTC CL4-8D512 [X]
0025154004MM, 476.9GB
PCIe 2.0, SSSTC CL4-8D512 [X]
0025154004MR, 476.9GB
Strip Size: [64KB]
Capacity (MB): 976768
Create Volume
Create a volume with the settings specified above
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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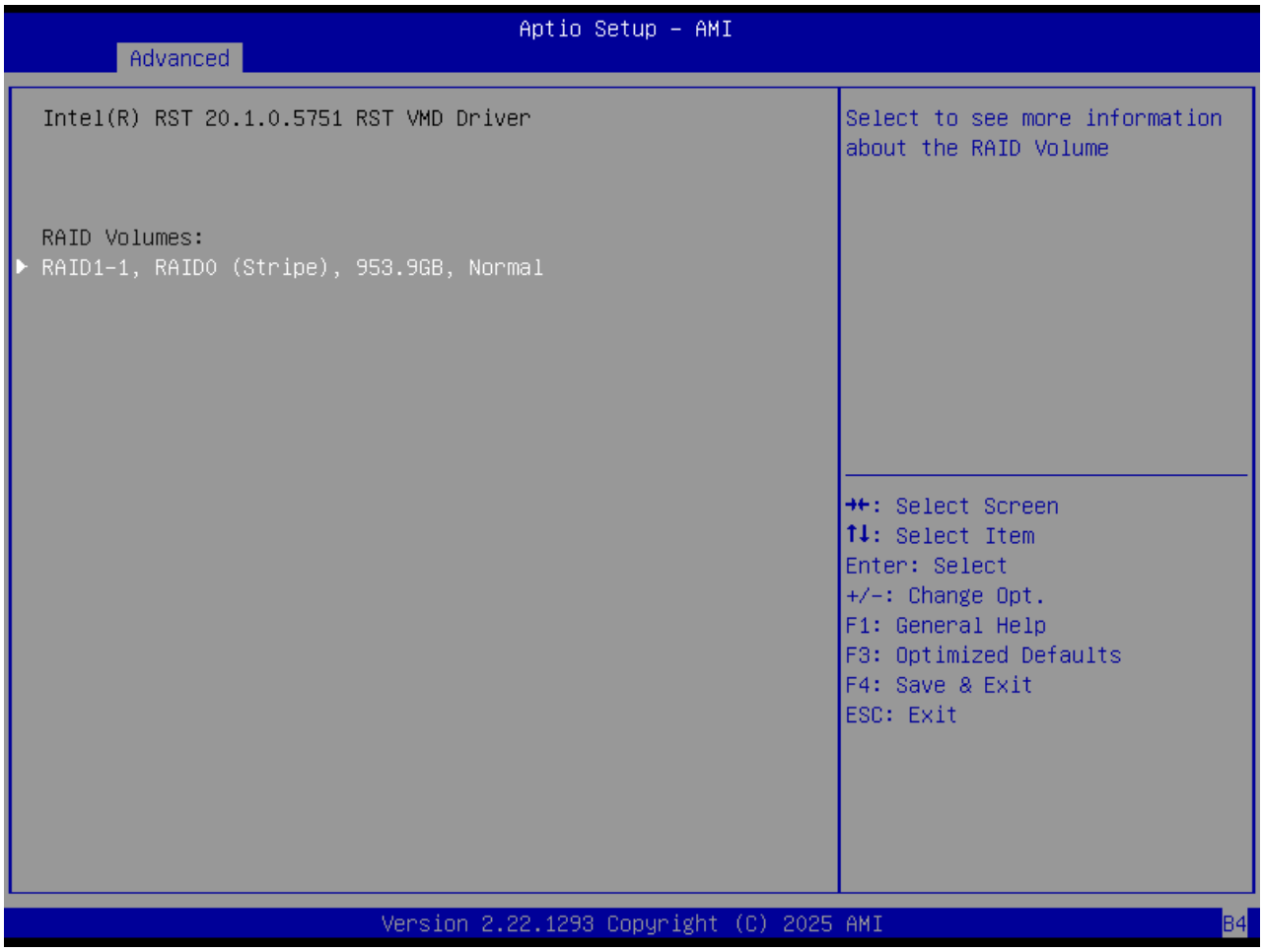
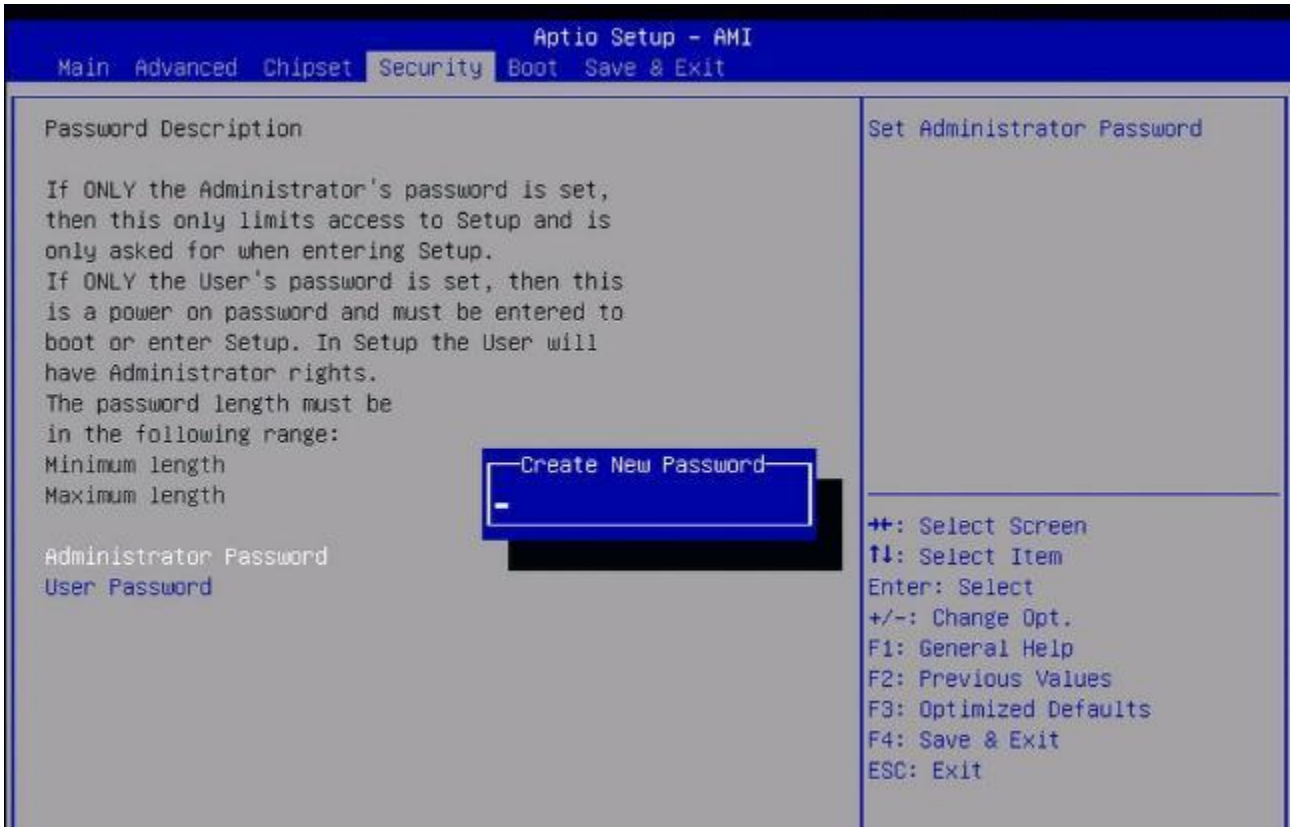
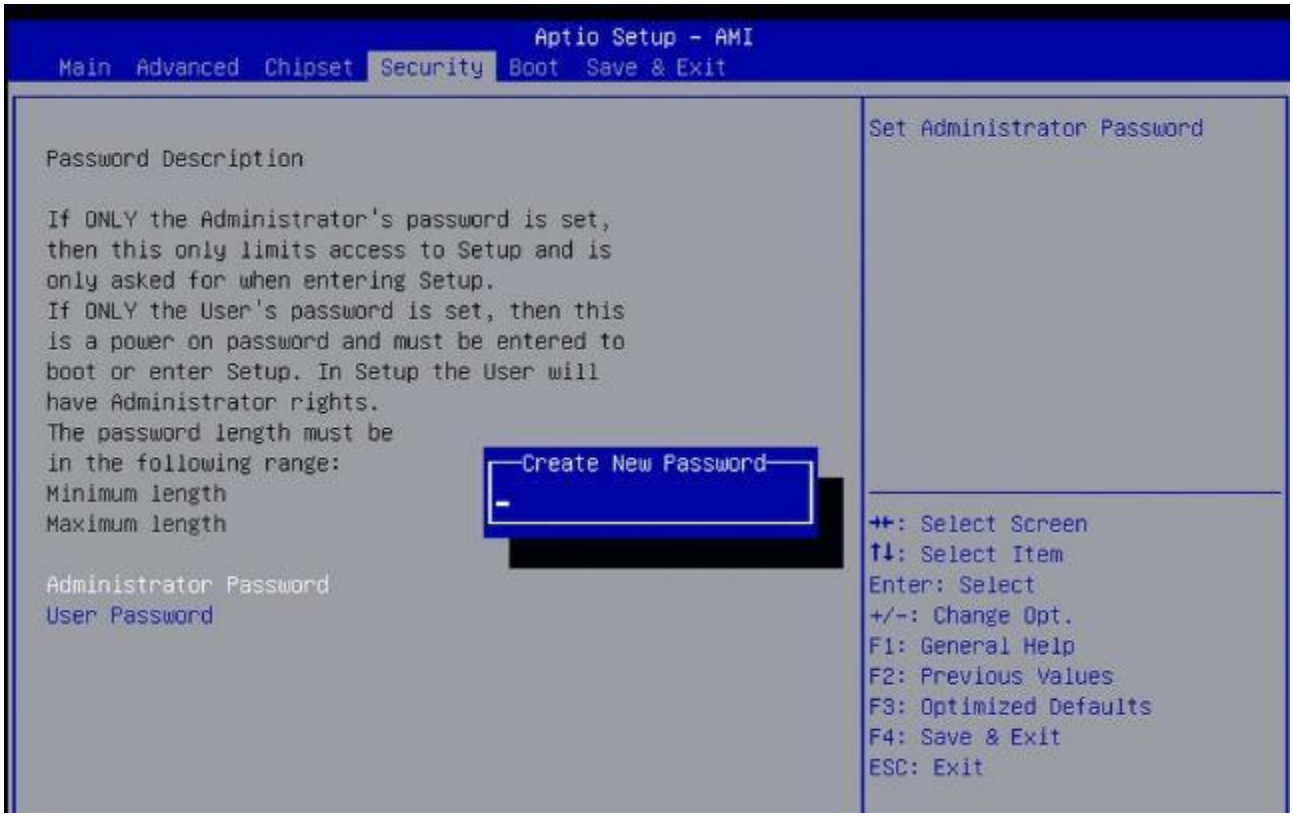

Aptio Setup – AMI
Advanced
Intel(R) RST 20.1.0.5751 RST VMD Driver
RAID Volumes:
RAID1-1, RAID0 (Stripe), 953.9GB, Normal
Select to see more information about the RAID Volume
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI
B4

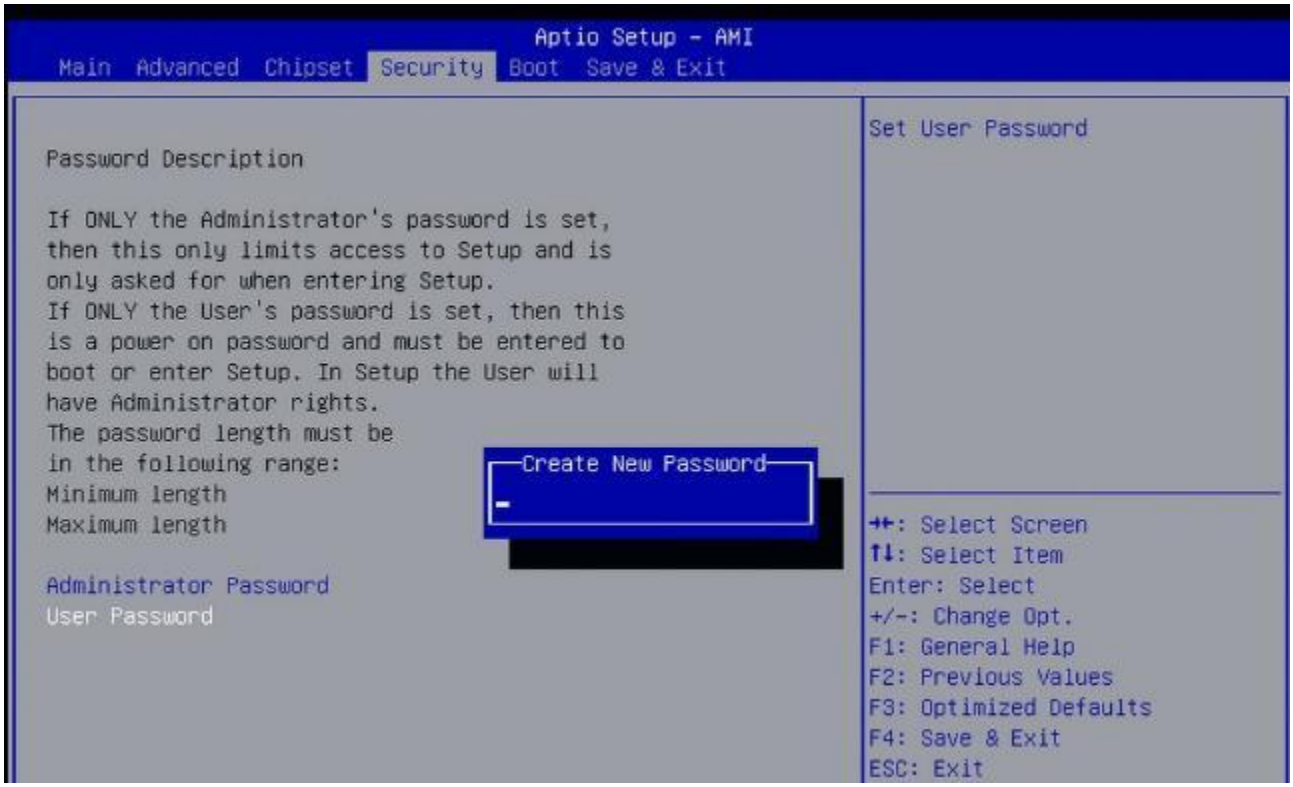
3.6 Security Settings



3.6.1 Administrator Password



3.6.2 User Password

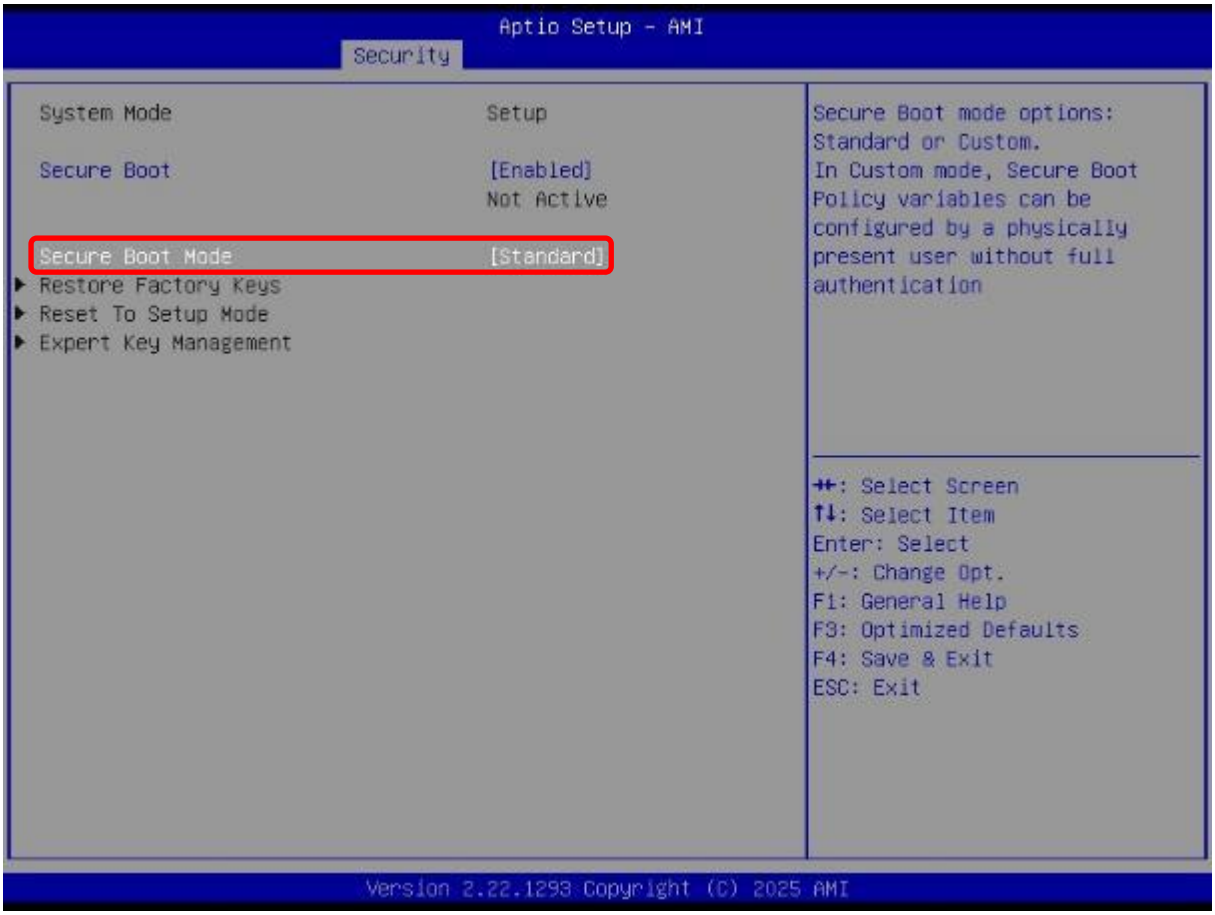


How to Enroll Secure Boot Keys (PK, KEK, db) in BIOS/UEFI.

This document explains how to import Secure Boot keys into a UEFI firmware (BIOS). Procedures may vary slightly depending on the motherboard vendor, but the overall process is the same across platforms supporting UEFI Secure Boot.

0. You must first obtain the secure keys (PK, KEK, db) from Microsoft. After that, prepare a FAT32-formatted USB drive, UEFI firmware typically only reads key files from FAT32 file systems. Copy your secure keys (PK, KEK, db) to the root directly to the USB drive.
1. When boot up the unit, press DEL on the keyboard. Enter the BIOS menu and select the option shown in the image below.

   Path: Security/Secure Boot Mode, and select “Custom”


Aptio Setup - AMI
Security
System Mode
Setup
Secure Boot
[Enabled]
Not Active
Secure Boot Mode
[Standard]
Restore Factory Keys
Reset To Setup Mode
Expert Key Management
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
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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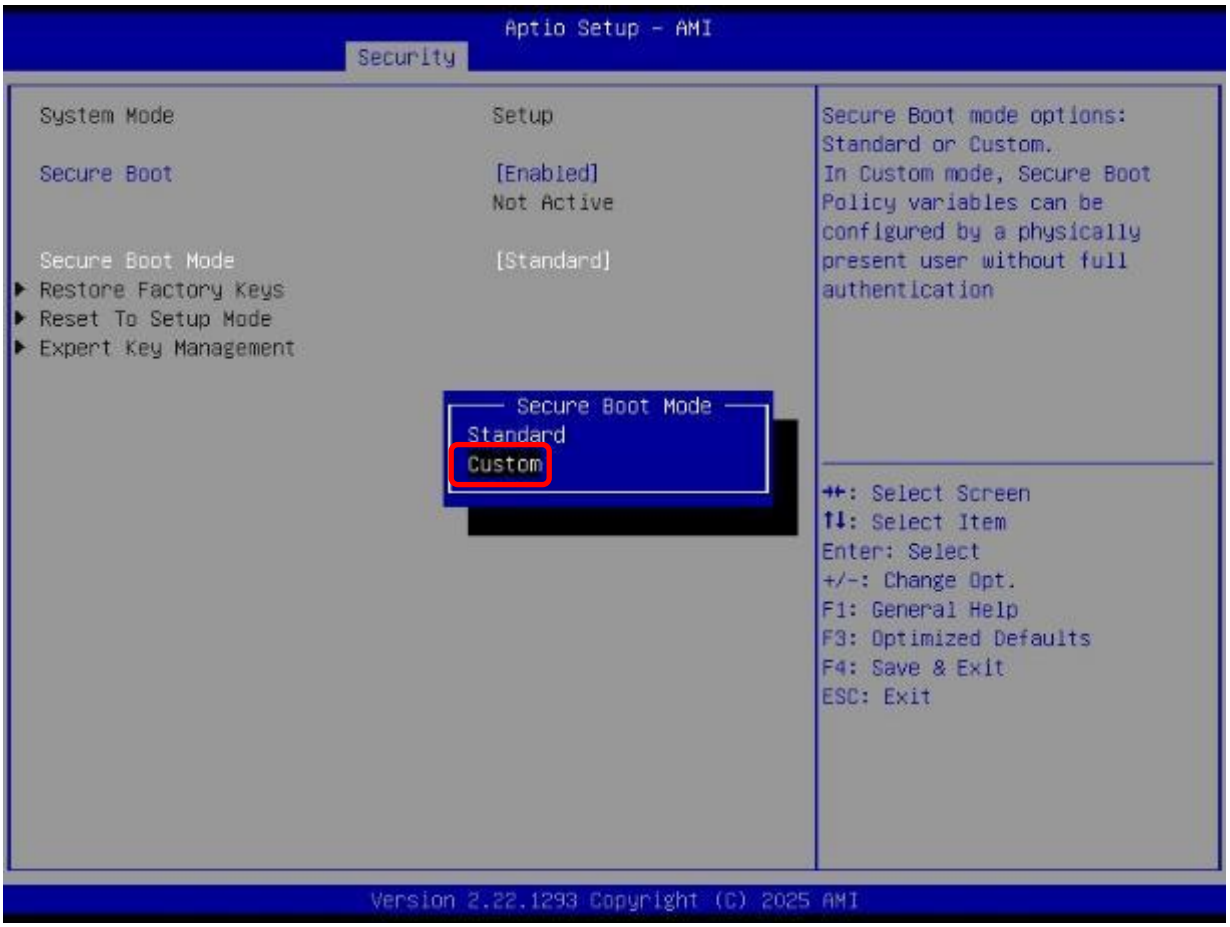
Aptio Setup - AMI
Security
System Mode
Setup
Secure Boot
[Enabled]
Not Active
Secure Boot Mode
[Standard]
Restore Factory Keys
Reset To Setup Mode
Expert Key Management
Secure Boot Mode
Standard
Custom
Secure Boot mode options:
Standard or Custom.
In Custom mode, Secure Boot
Policy variables can be
configured by a physically
present user without full
authentication
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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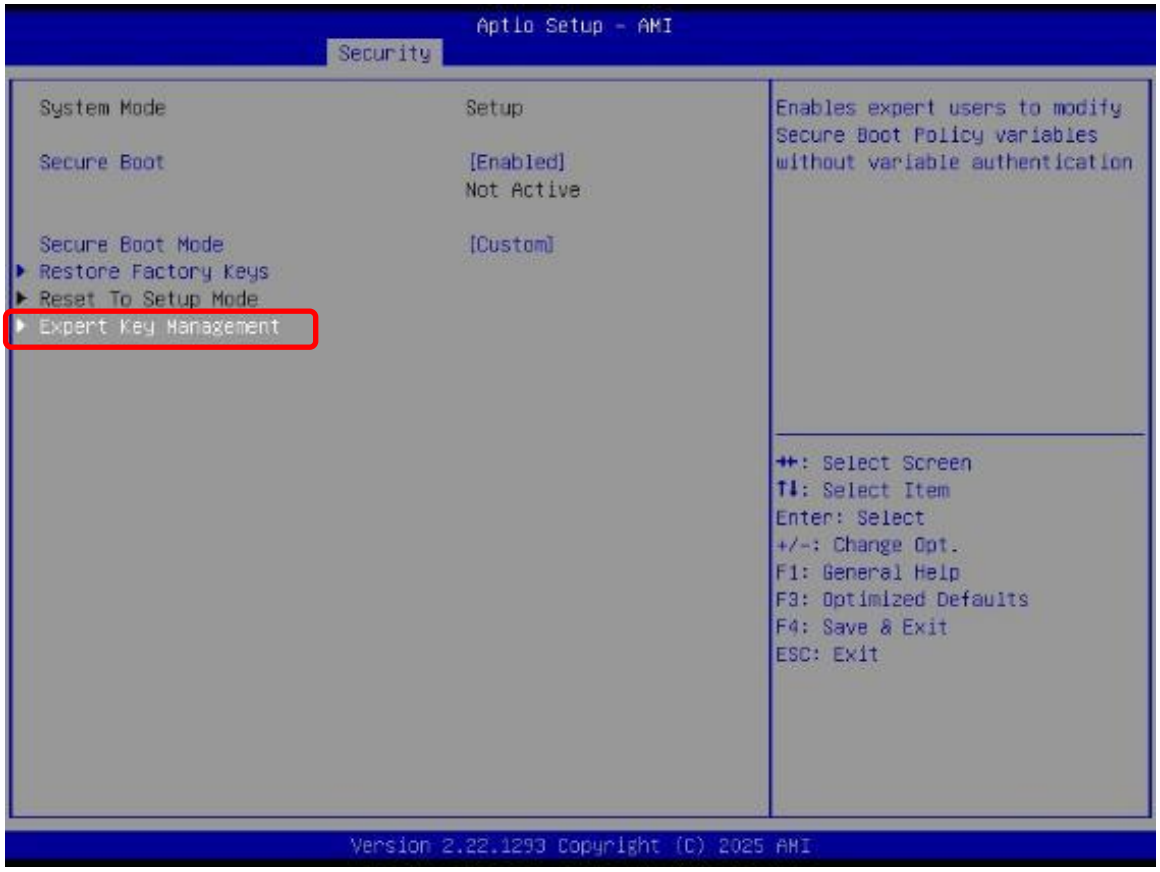
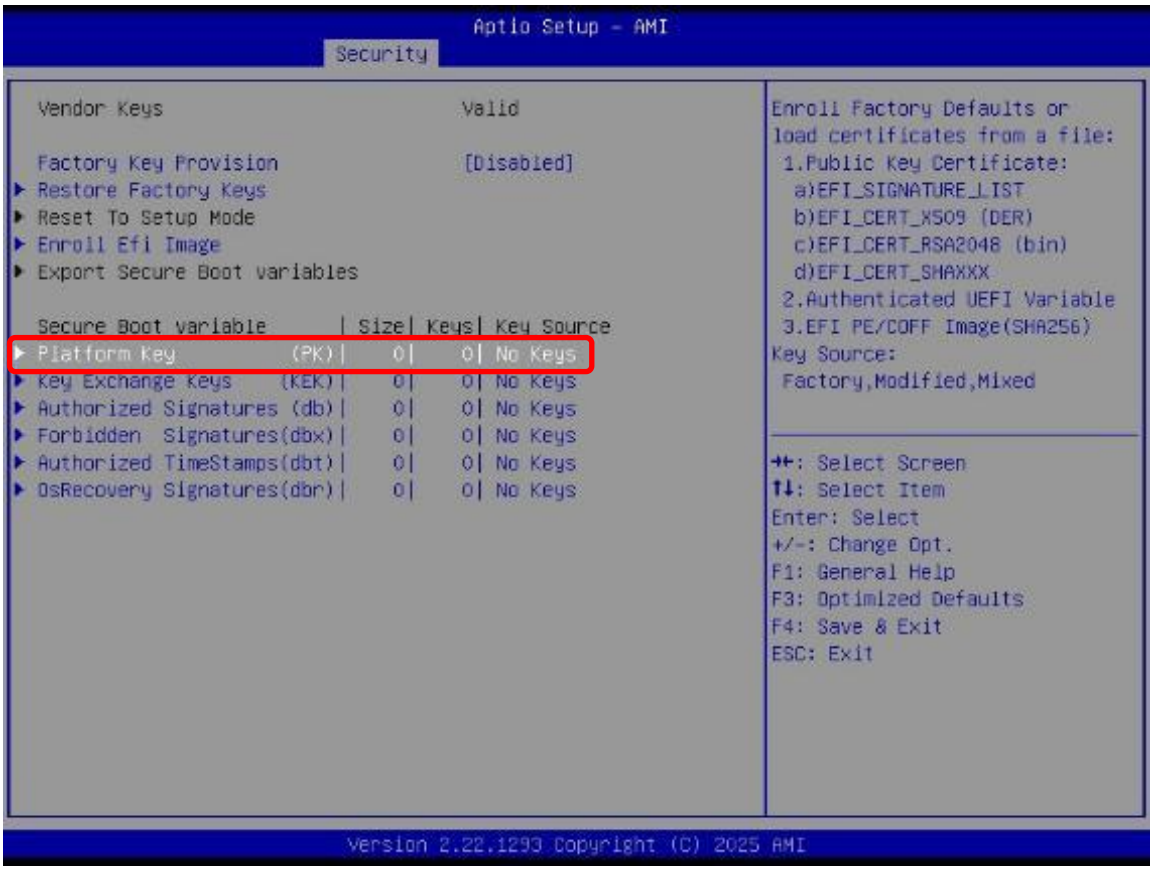
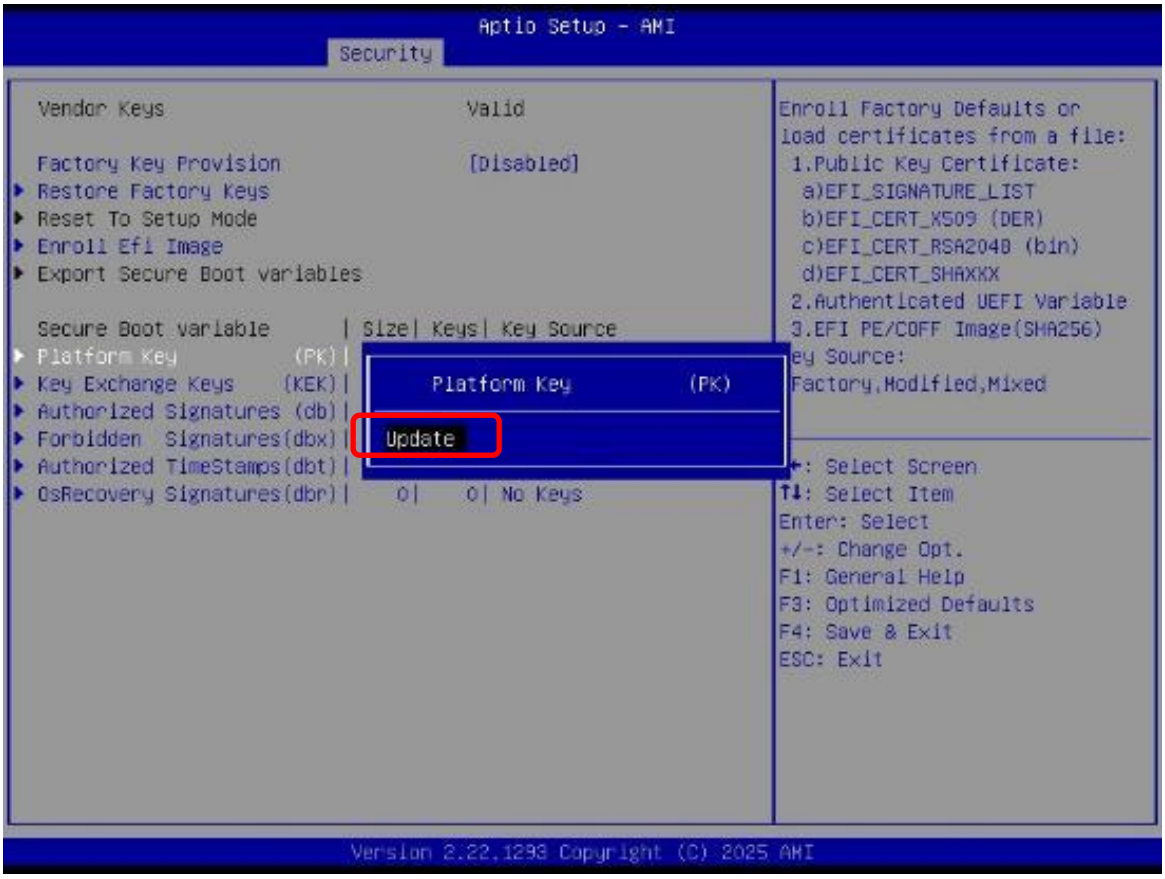
2. Then select “Expert Key Management”



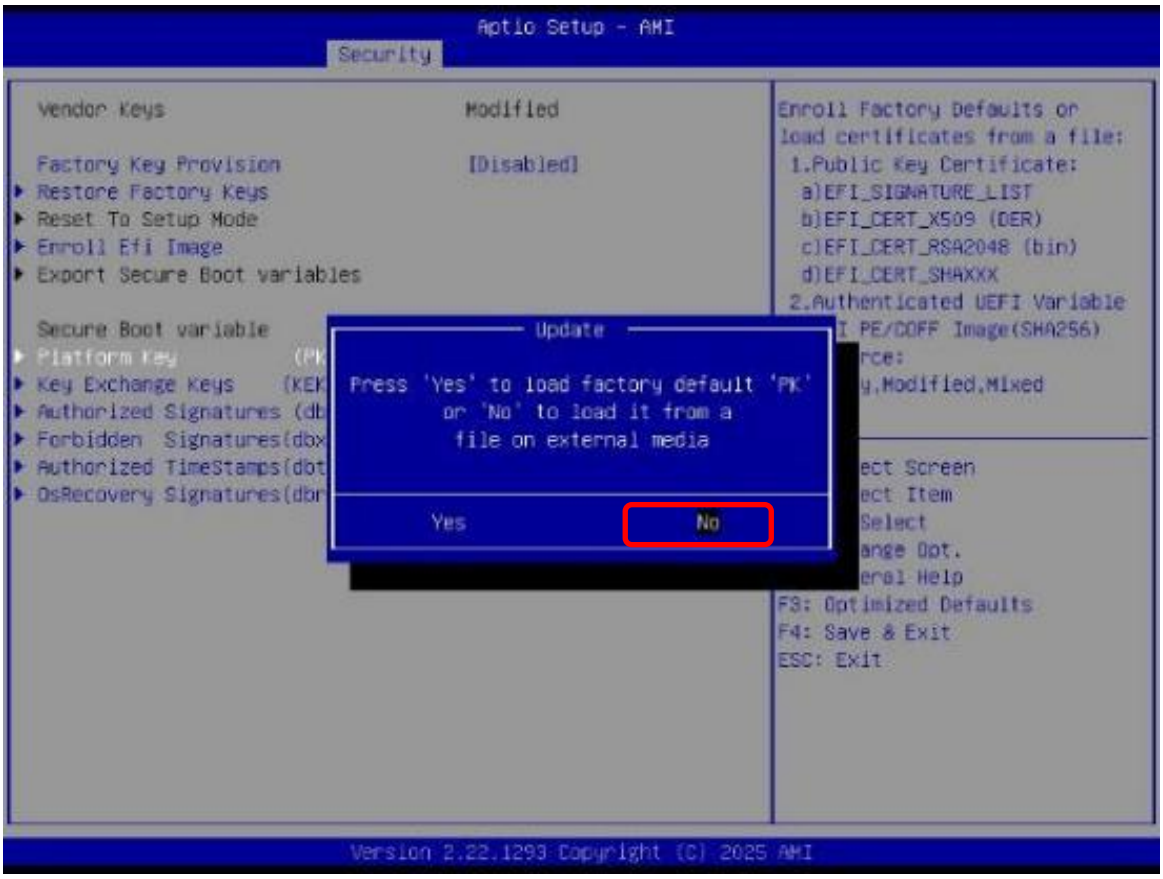
3. Select “Platform Key” (PK), enter



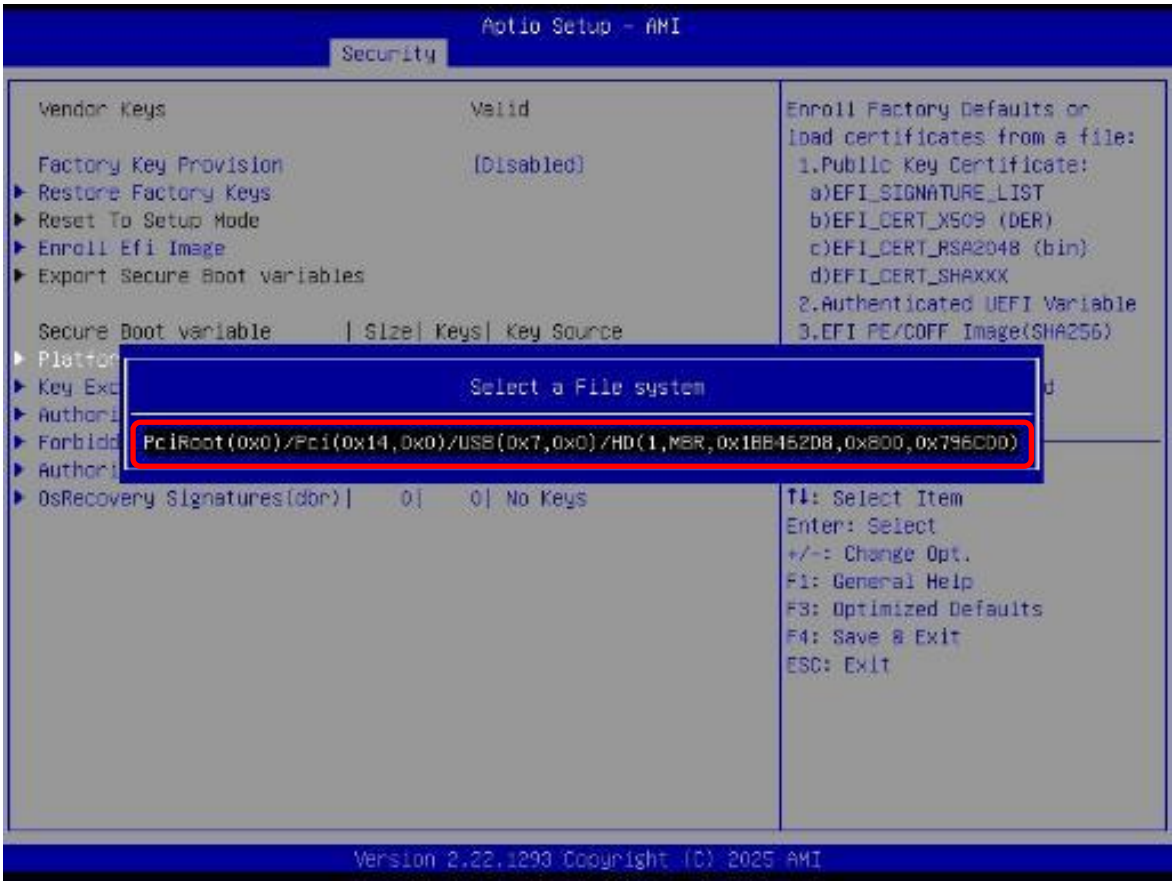
Select “Update”

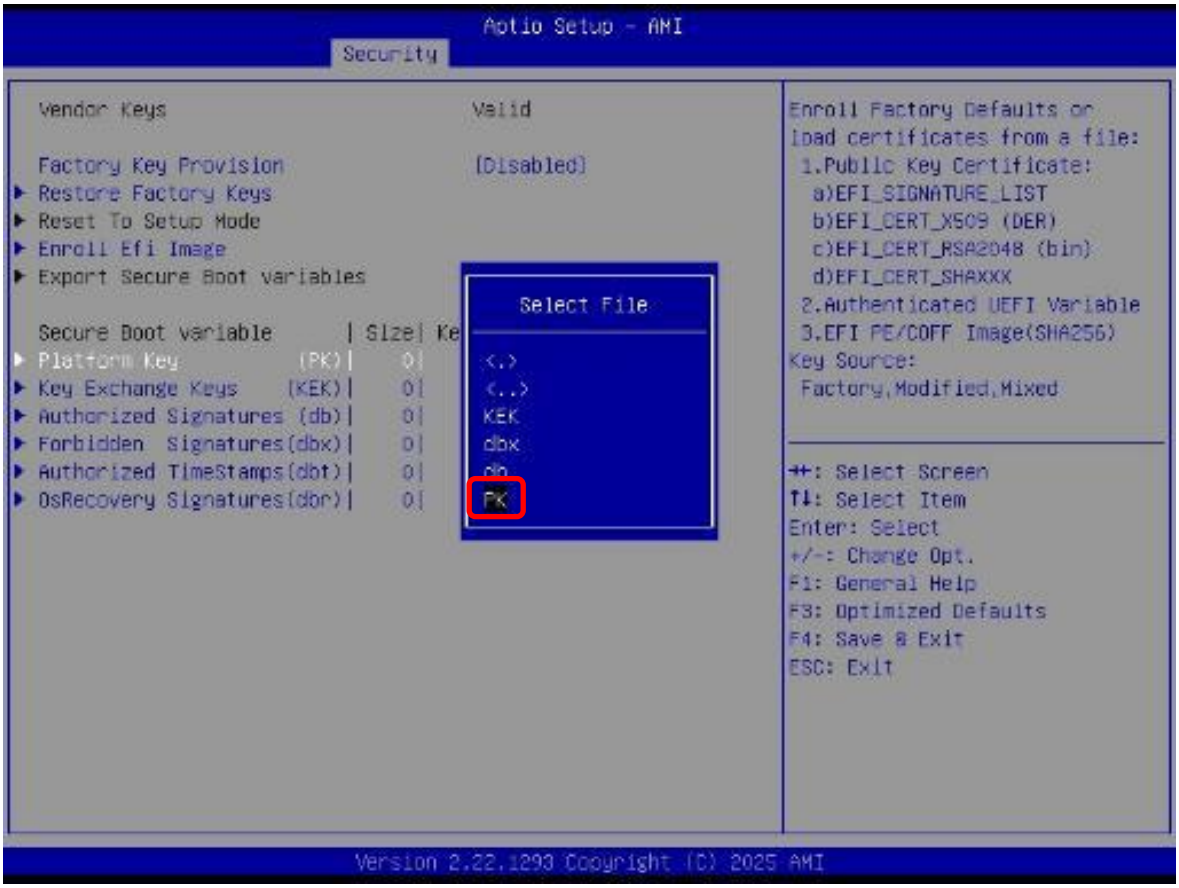


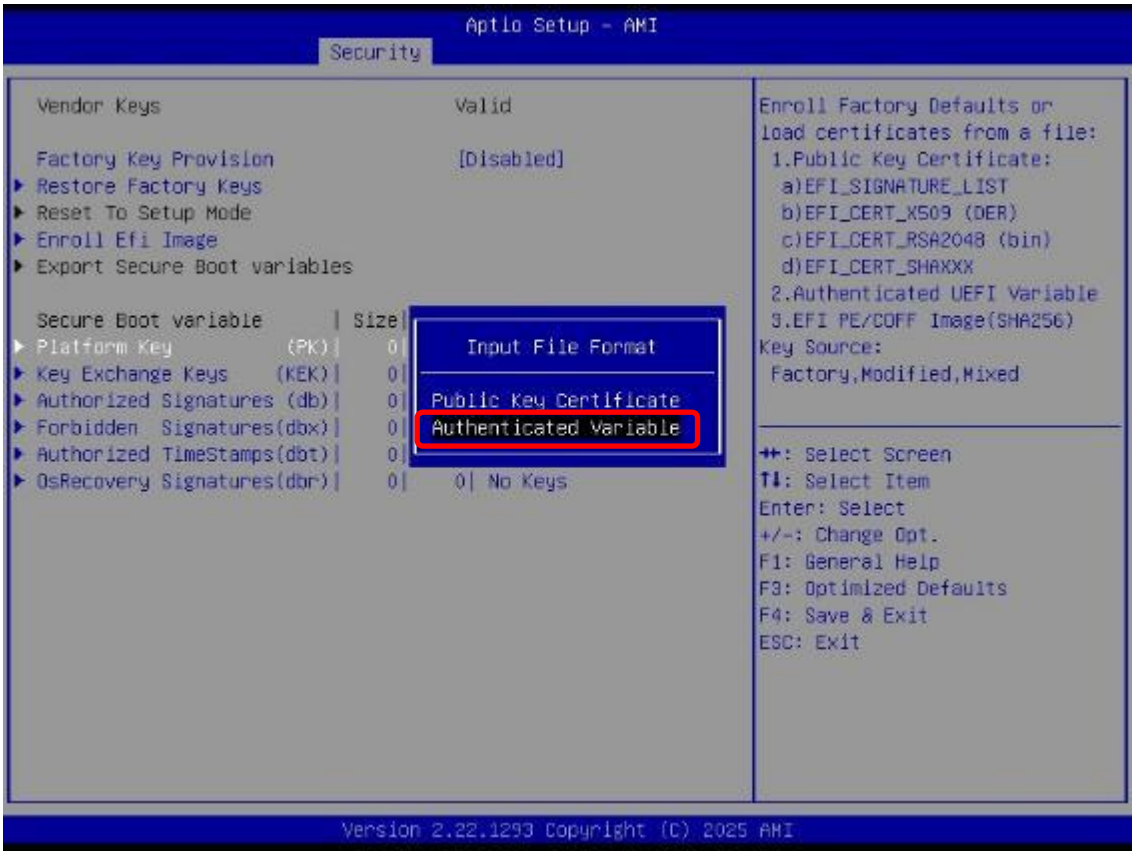
Select “No”



Find your USB drive to select your Keys (PK)






Aptio Setup - AMI
Security
Vendor Keys
Valid
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Size
Platform Key (PK)
Key Exchange Keys (KEK)
Authorized Signatures (db)
Forbidden Signatures(dbx)
Authorized TimeStamps(dbt)
OsRecovery Signatures(dbr)
0
0
0
0
0
0
Input File Format
Public Key Certificate
Authenticated Variable
No Keys
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
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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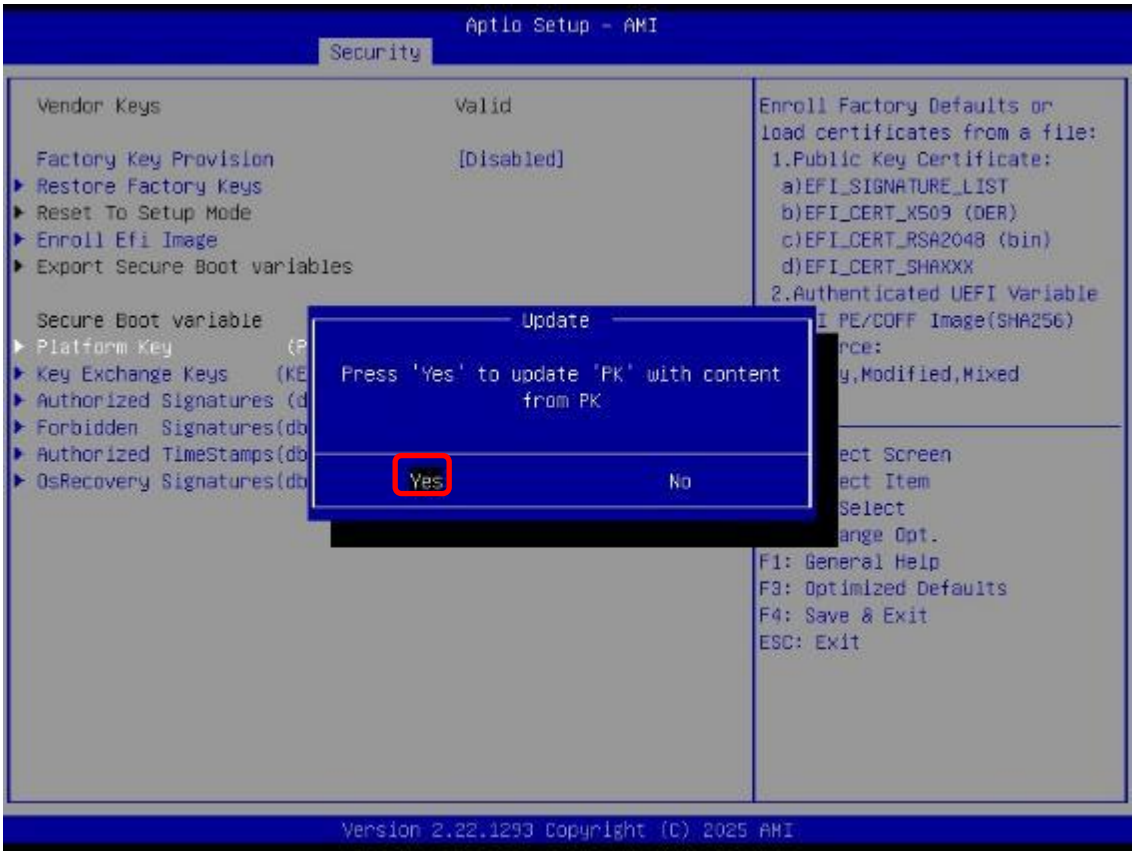
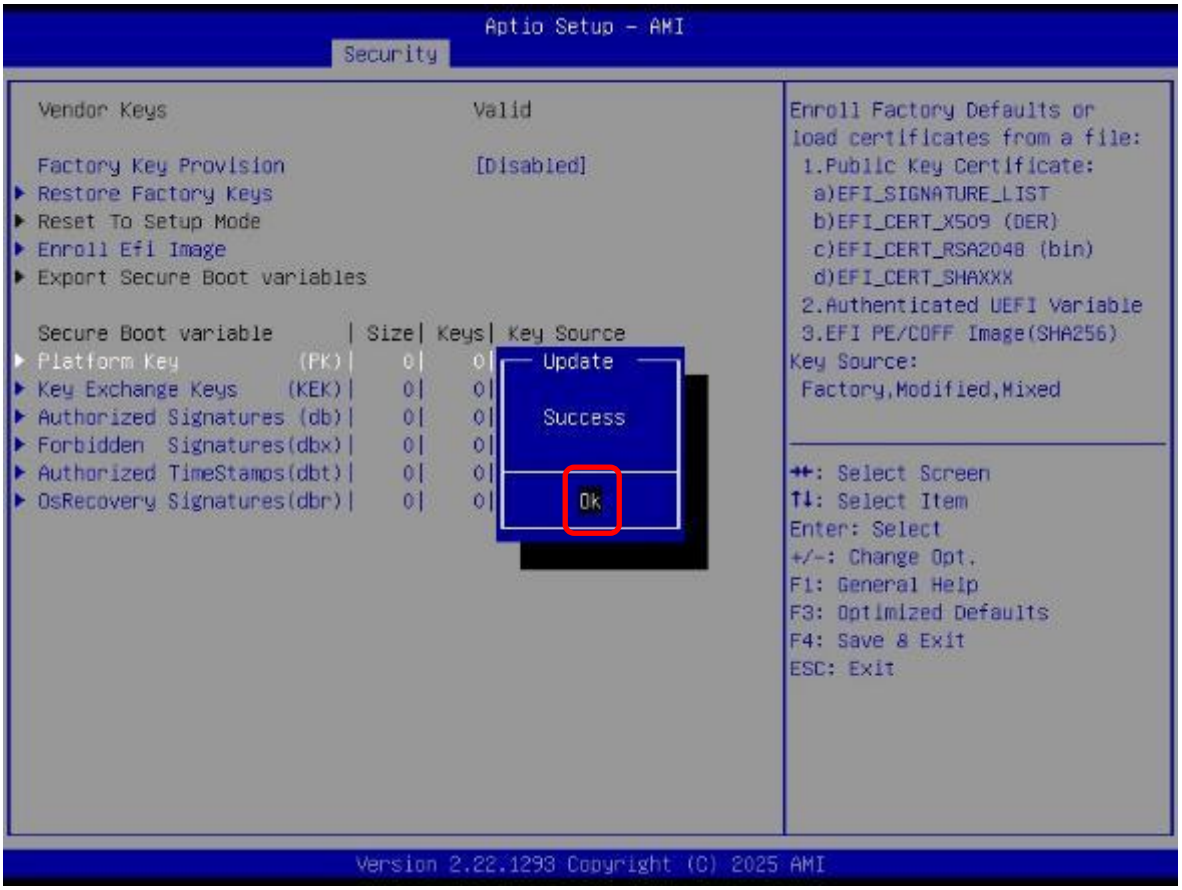
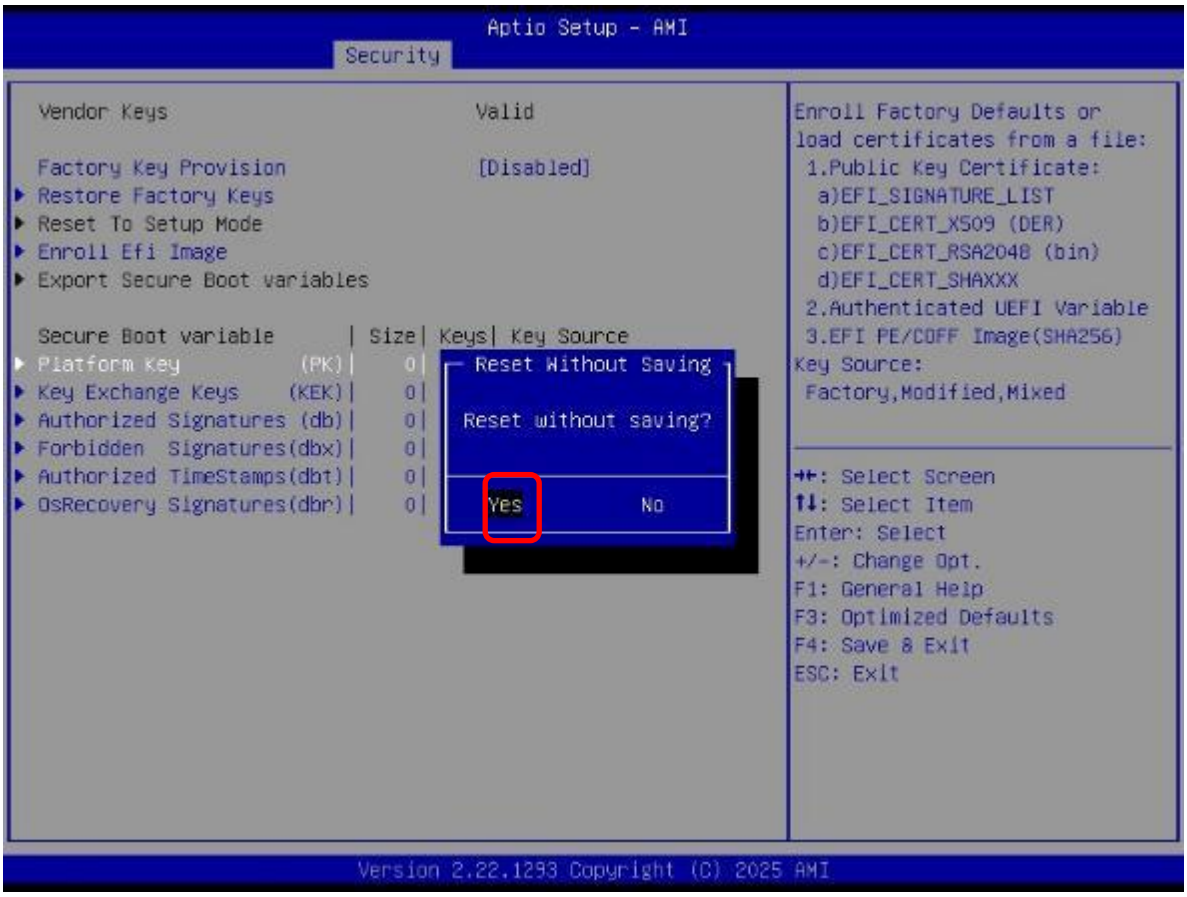

Aptio Setup - AMI
Security
Vendor Keys
Valid
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Update
Press 'Yes' to update 'PK' with content from PK
Yes
No
Enroll Factory Defaults or
load certificates from a file:
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
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI


Aptio Setup – AMI
Security
Vendor Keys Valid
Factory Key Provision [Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable | Size| Keys| Key Source
Platform Key (PK)| 0| 0|
Key Exchange Keys (KEK)| 0| 0|
Authorized Signatures (db)| 0| 0|
Forbidden Signatures(dbx)| 0| 0|
Authorized TimeStamps(dbt)| 0| 0|
OsRecovery Signatures(dbr)| 0| 0|
Update
Success
Ok
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
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI


Aptio Setup – AMI
Security
Vendor Keys Valid
Factory Key Provision [Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable | Size| Keys| Key Source
Platform Key (PK)| 0|
Key Exchange Keys (KEK)| 0|
Authorized Signatures (db)| 0|
Forbidden Signatures(dbx)| 0|
Authorized TimeStamps(dbt)| 0|
OsRecovery Signatures(dbr)| 0|
Reset Without Saving
Reset without saving?
Yes
No
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
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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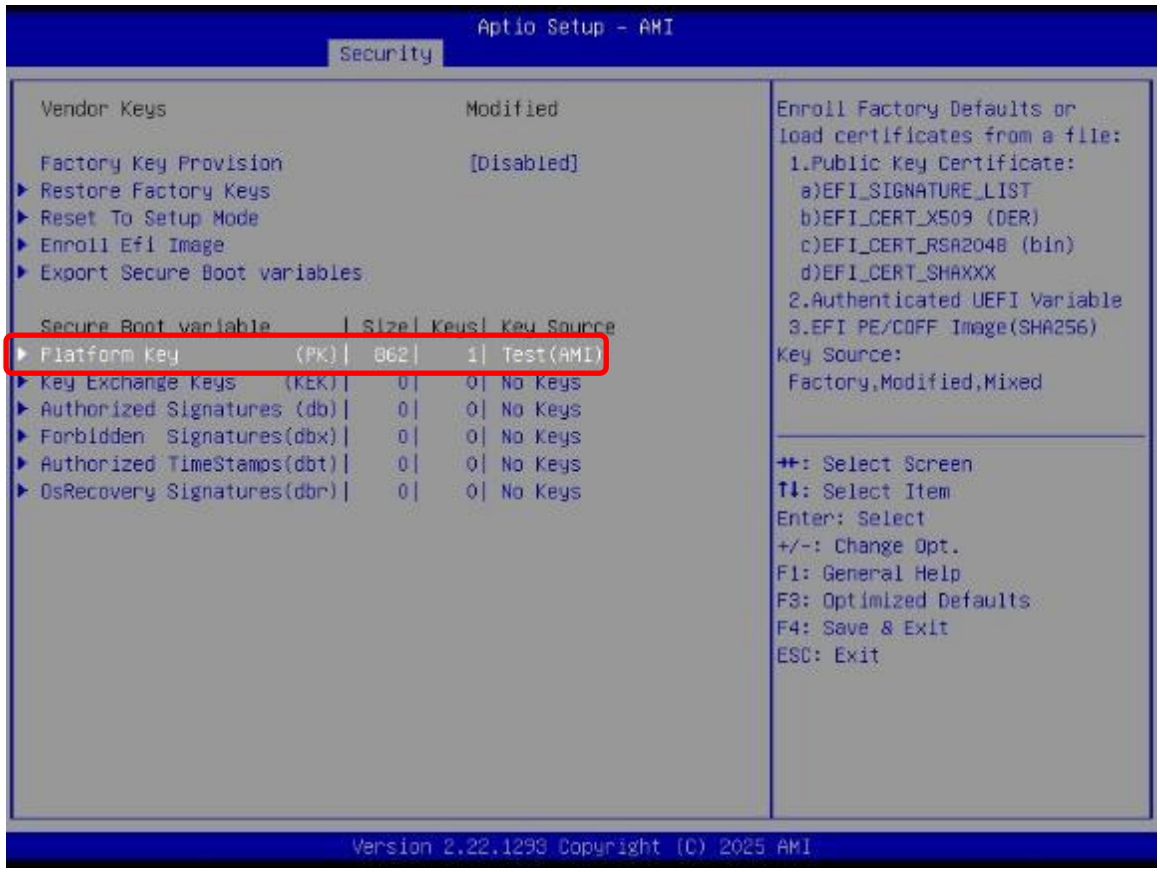
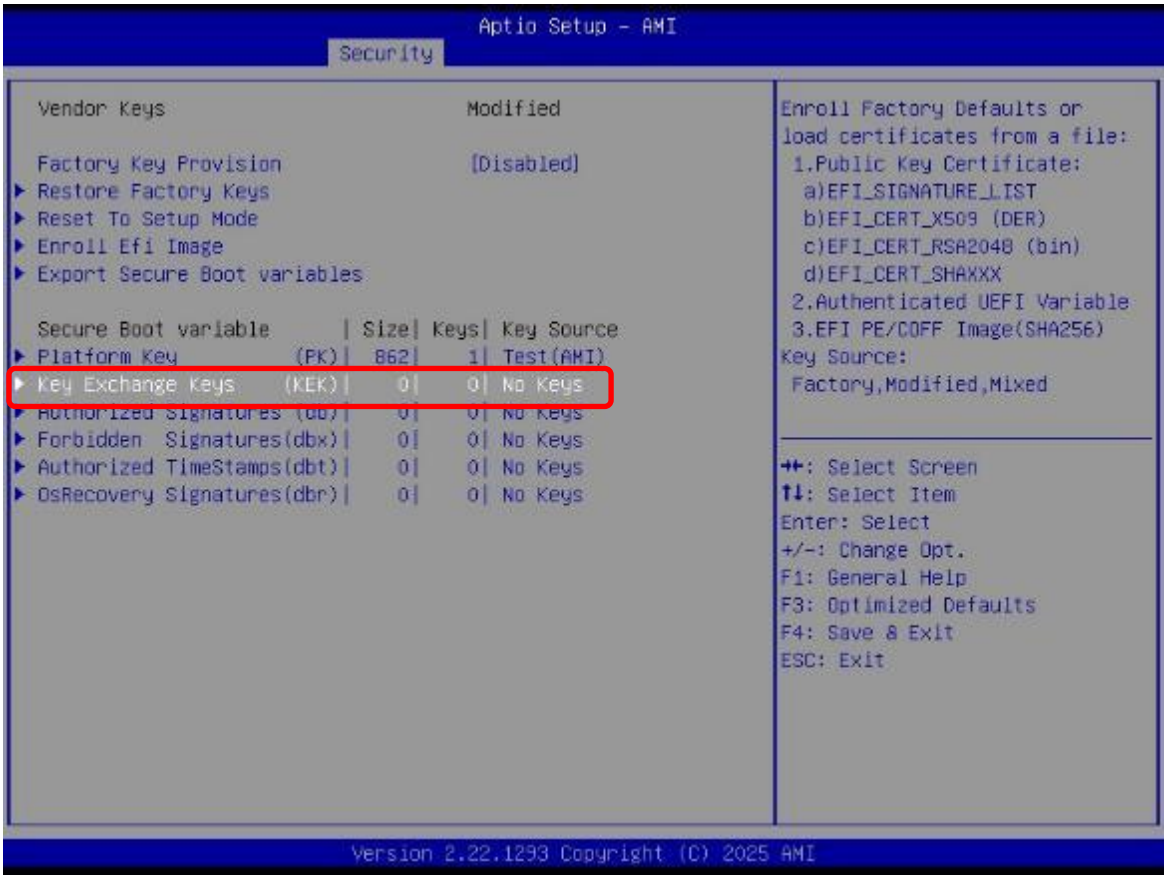
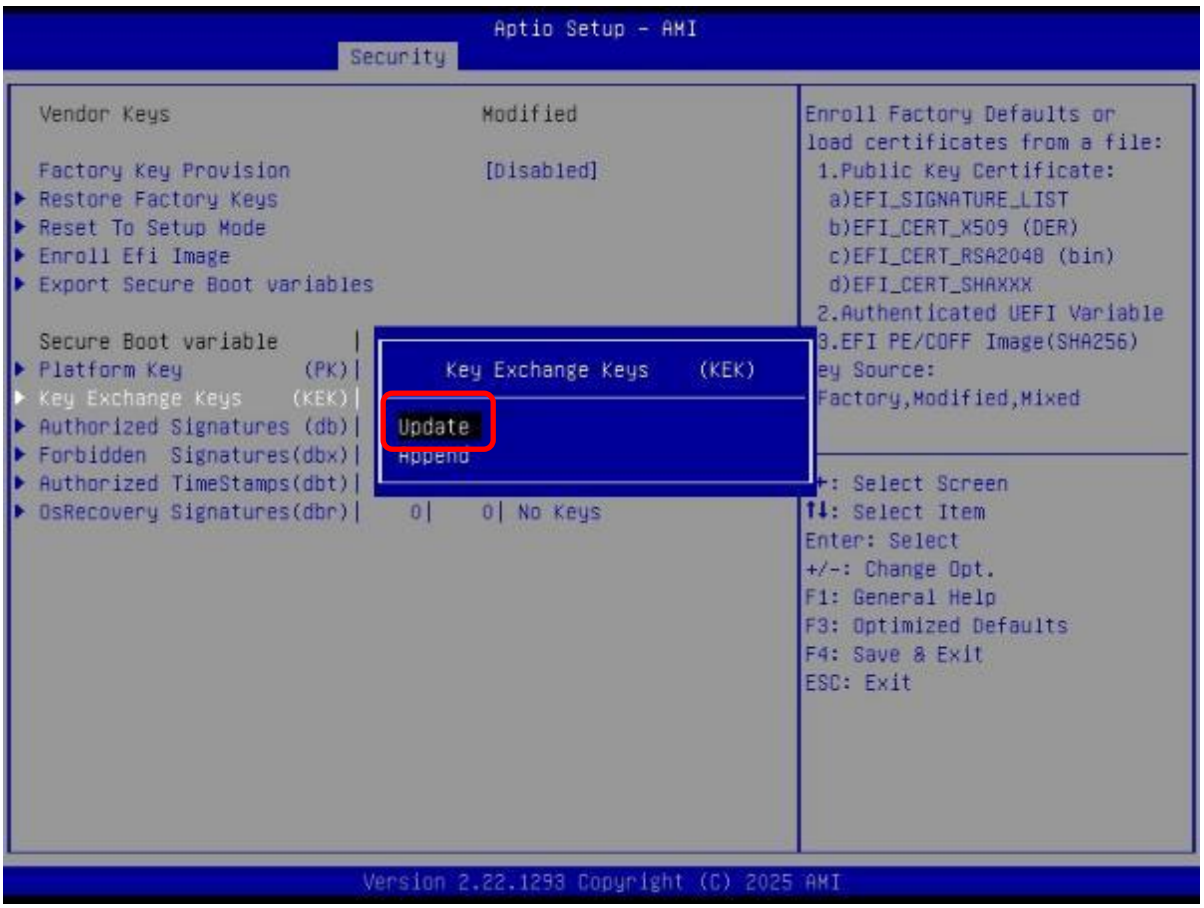
The image below shows that the Platform Key (PK) has already been successfully enrolled.



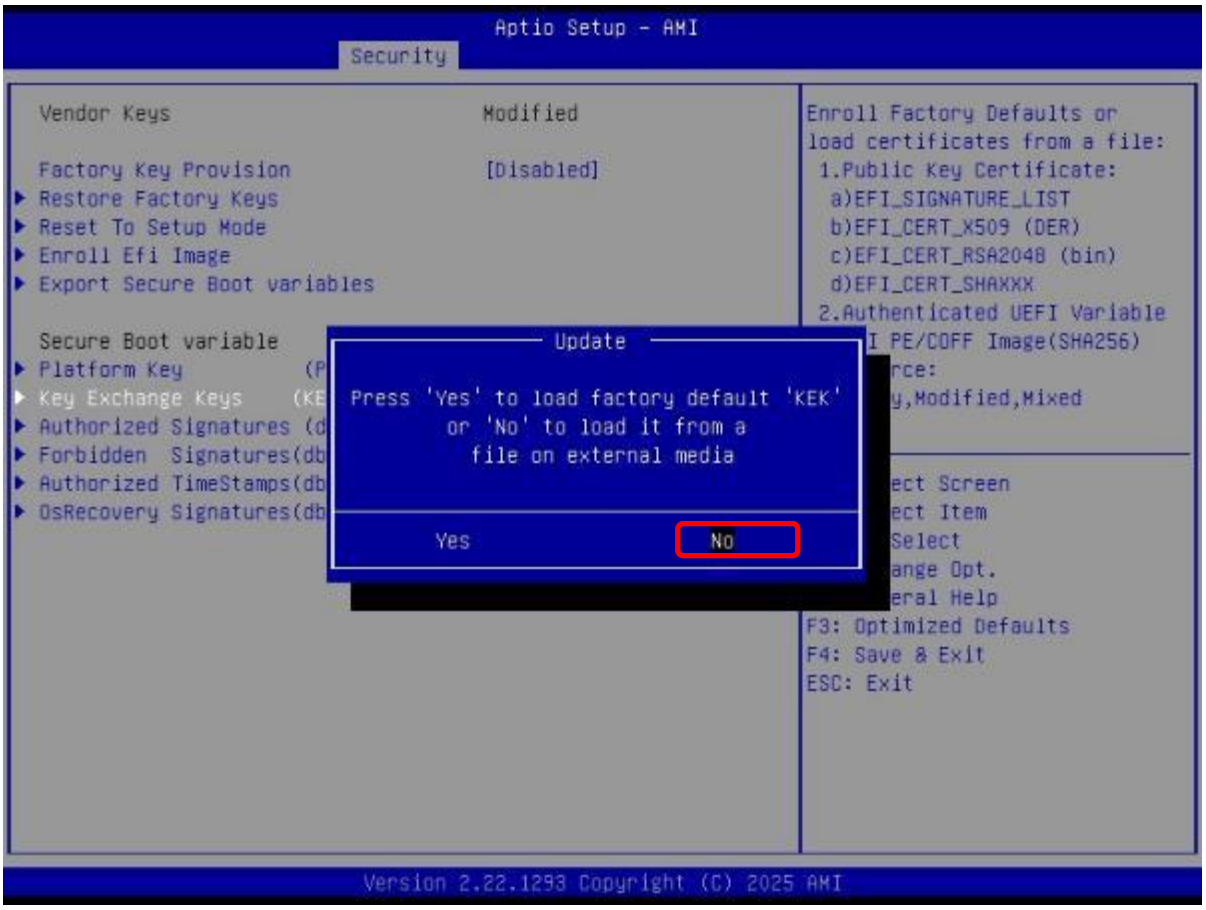
4. Select “Key Exchange Keys” (KEK), enter



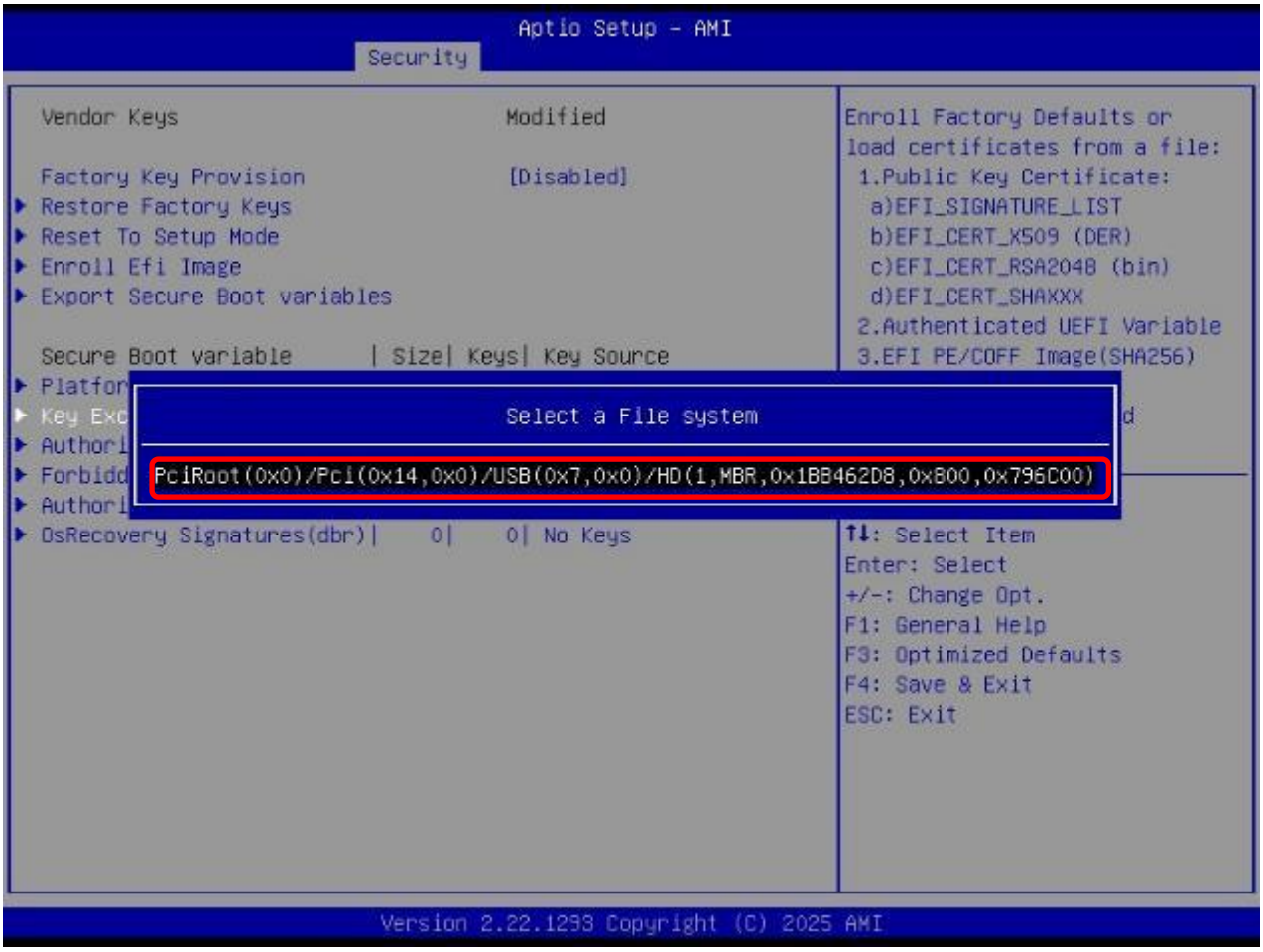
Select “Update”

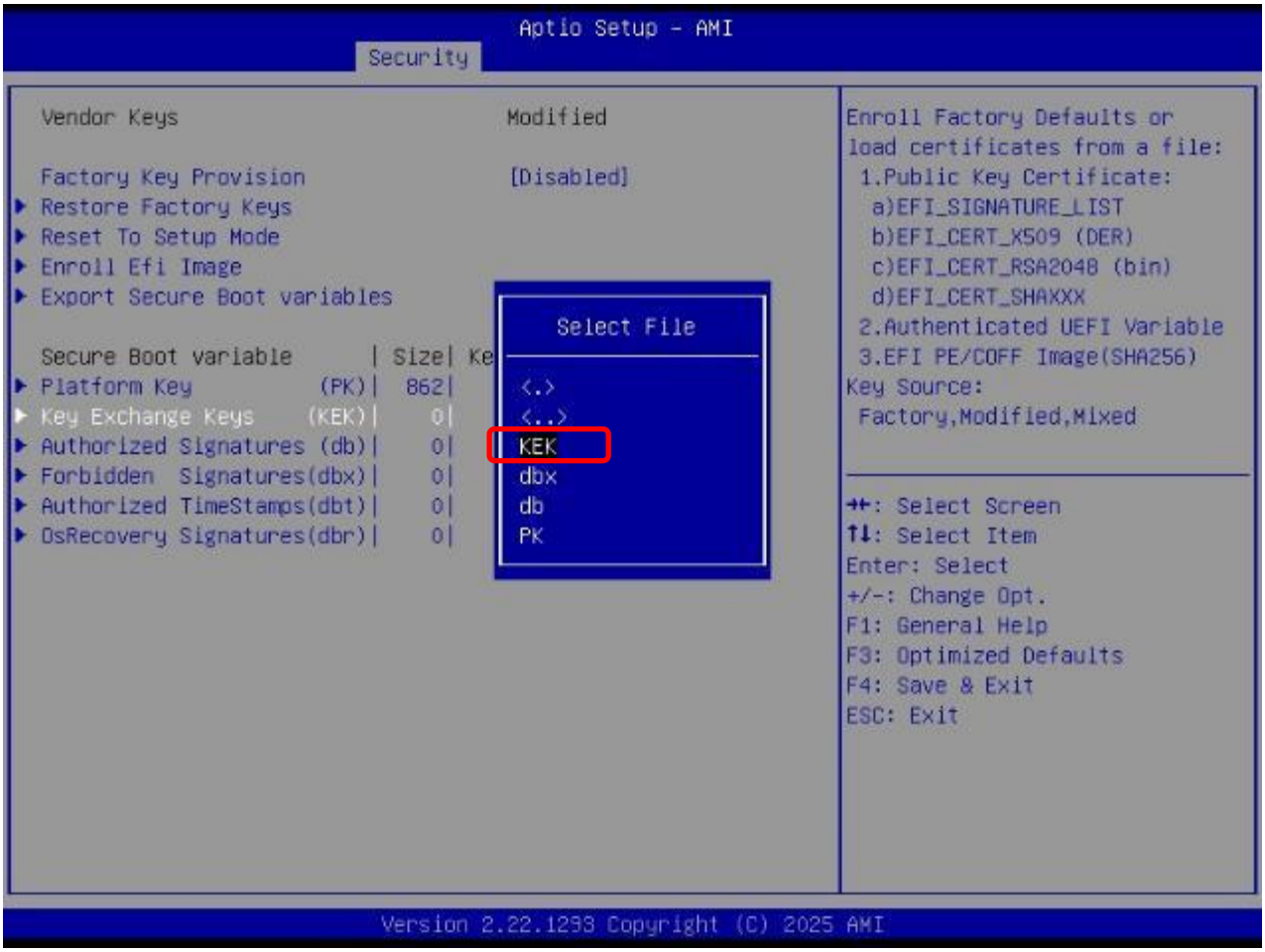


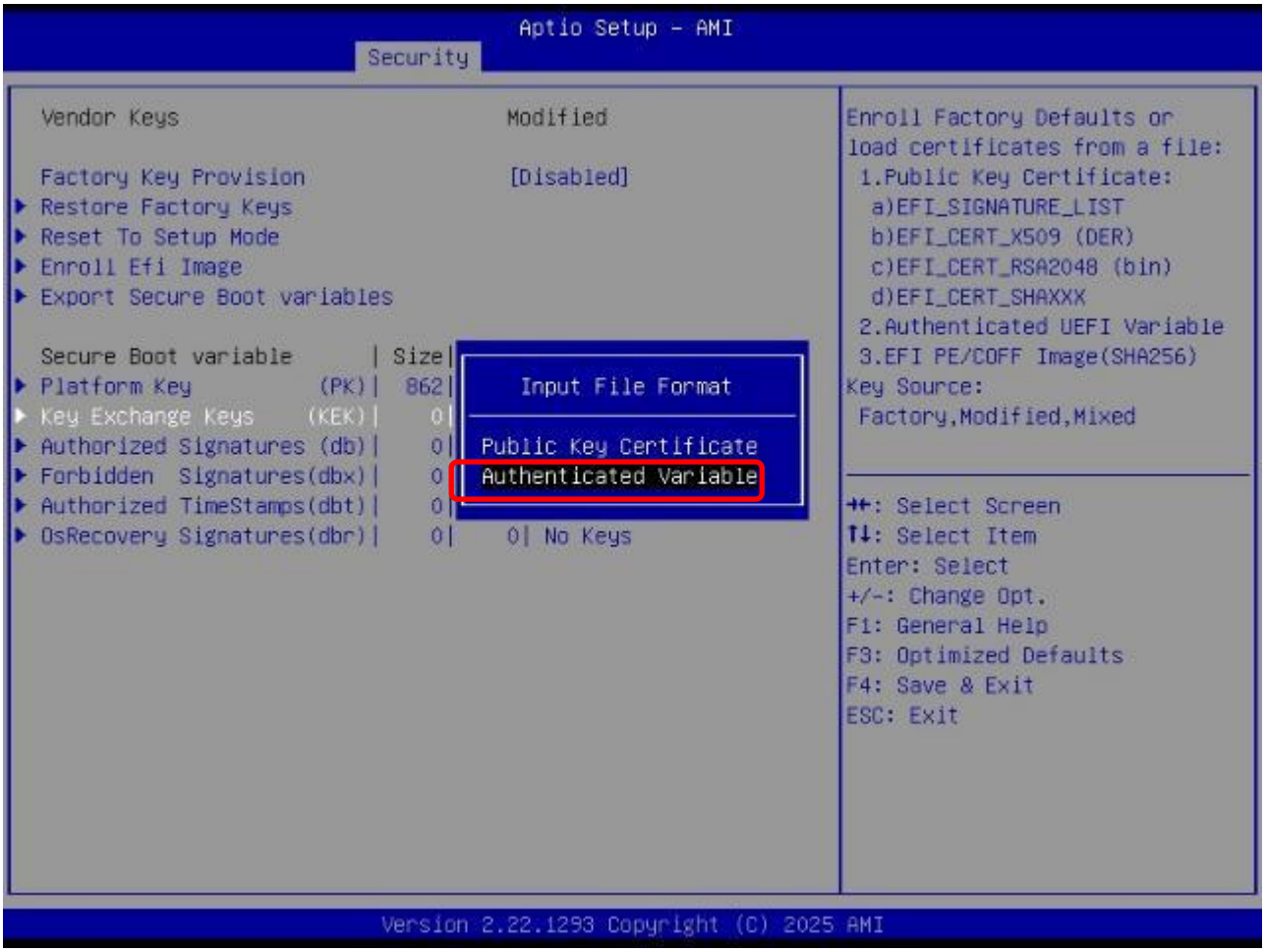
Select “No”

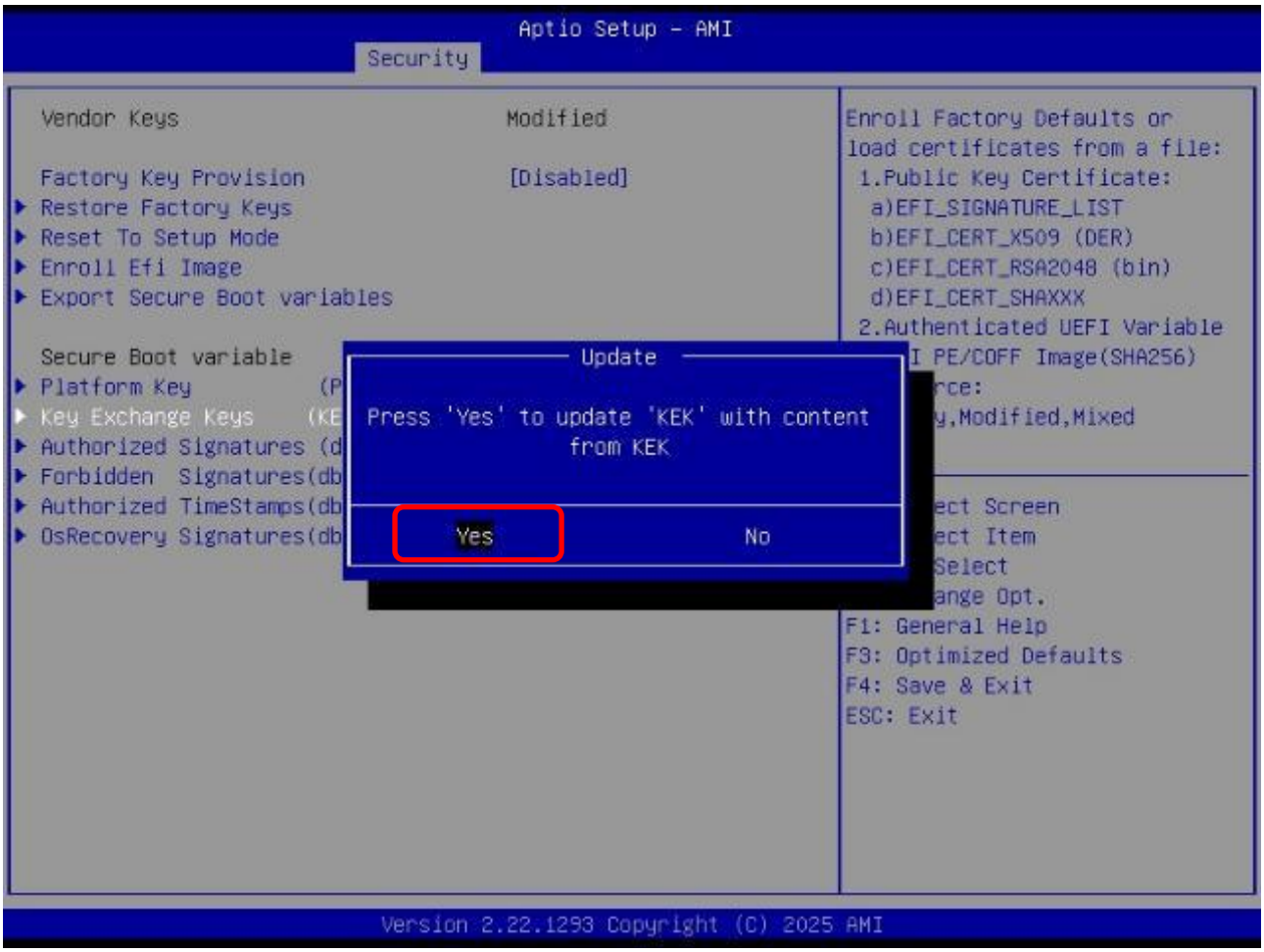


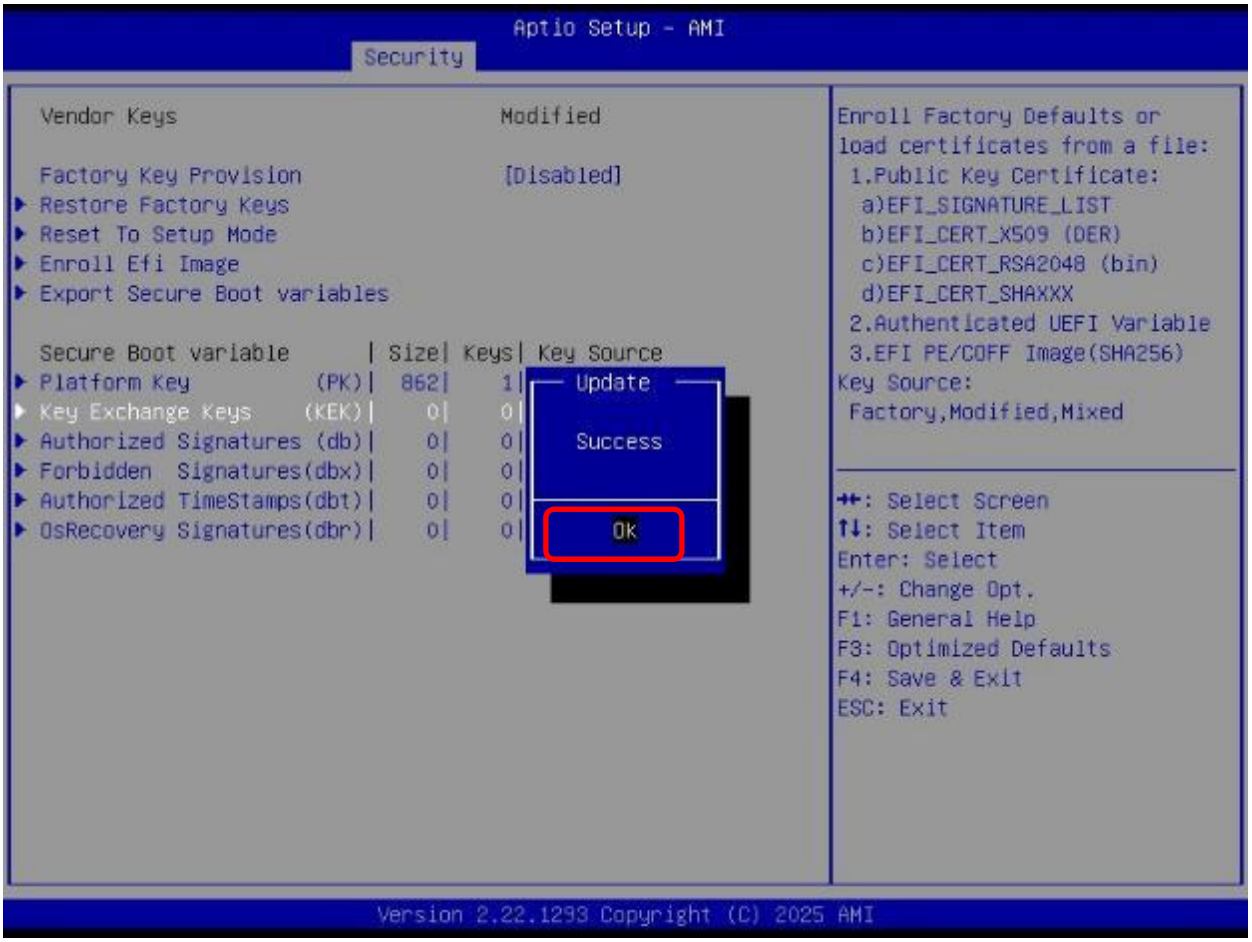
Find your USB drive to select your “Key Exchange Keys” (KEK)



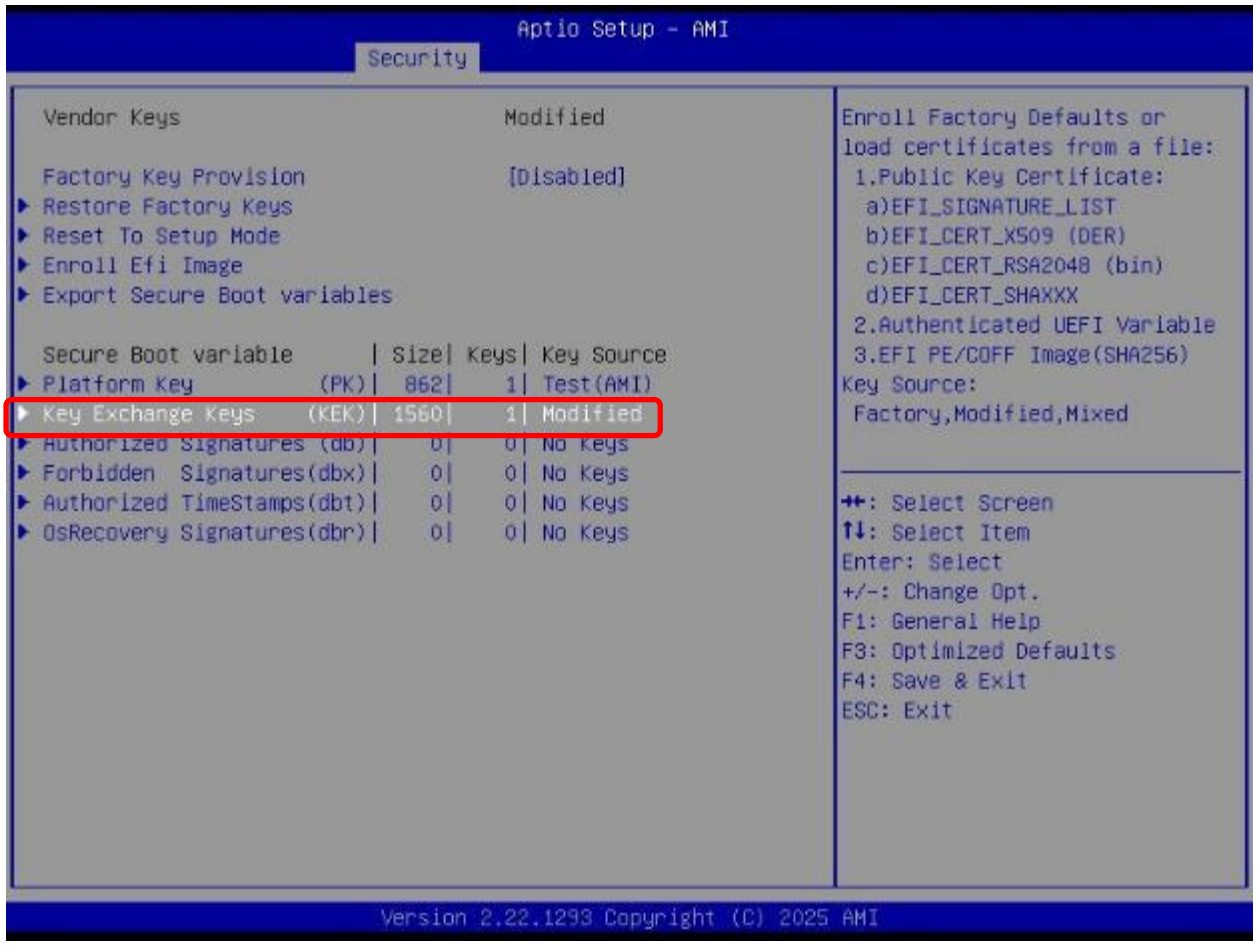



Aptio Setup – AMI
Security
Vendor Keys
Modified
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Size
Platform Key (PK)
862
Key Exchange Keys (KEK)
0
Authorized Signatures (db)
0
Forbidden Signatures(dbx)
0
Authorized TimeStamps(dbt)
0
OsRecovery Signatures(dbr)
0
0 No Keys
Input File Format
Public Key Certificate
Authenticated Variable
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
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI

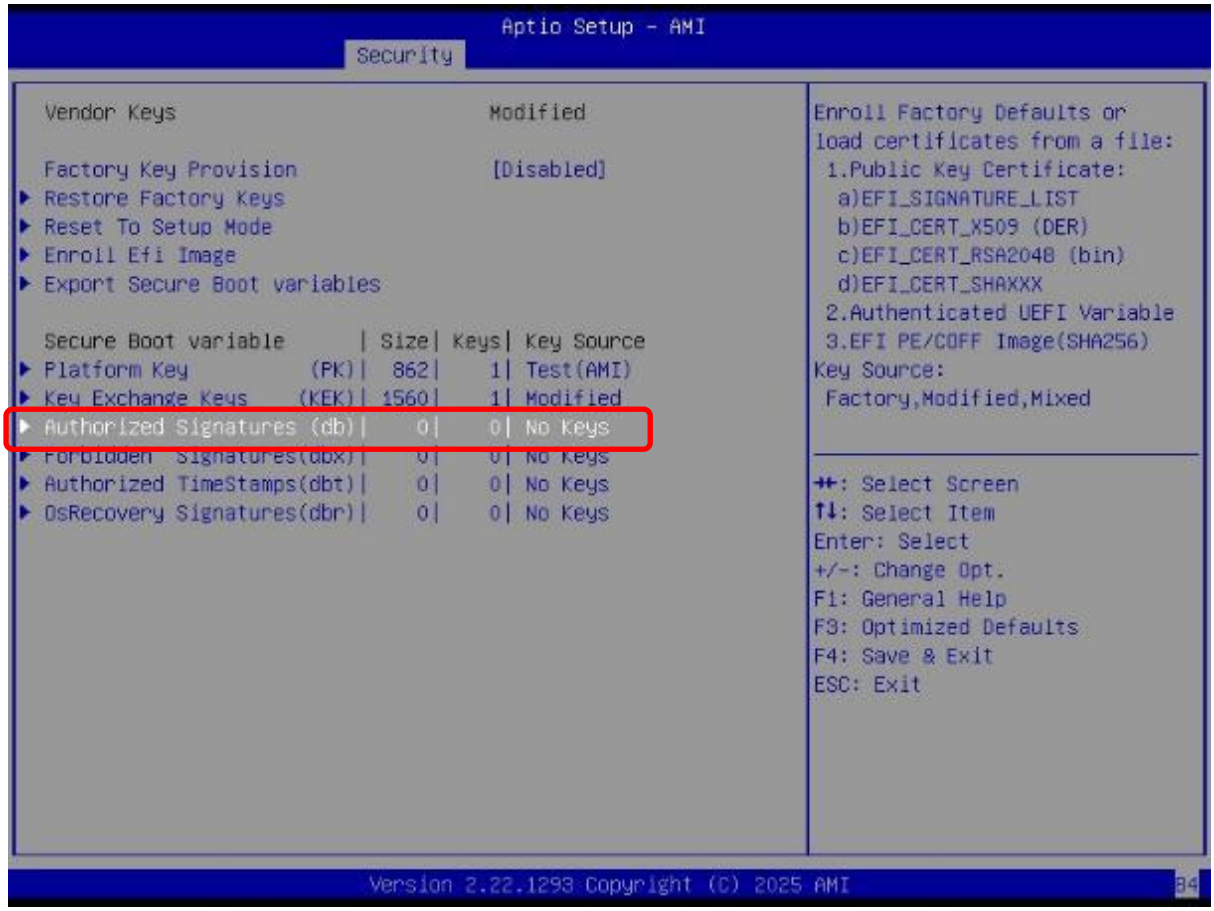

Aptio Setup – AMI
Security
Vendor Keys
Modified
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Update
Press 'Yes' to update 'KEK' with content from KEK
Yes
No
Enroll Factory Defaults or
load certificates from 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
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI



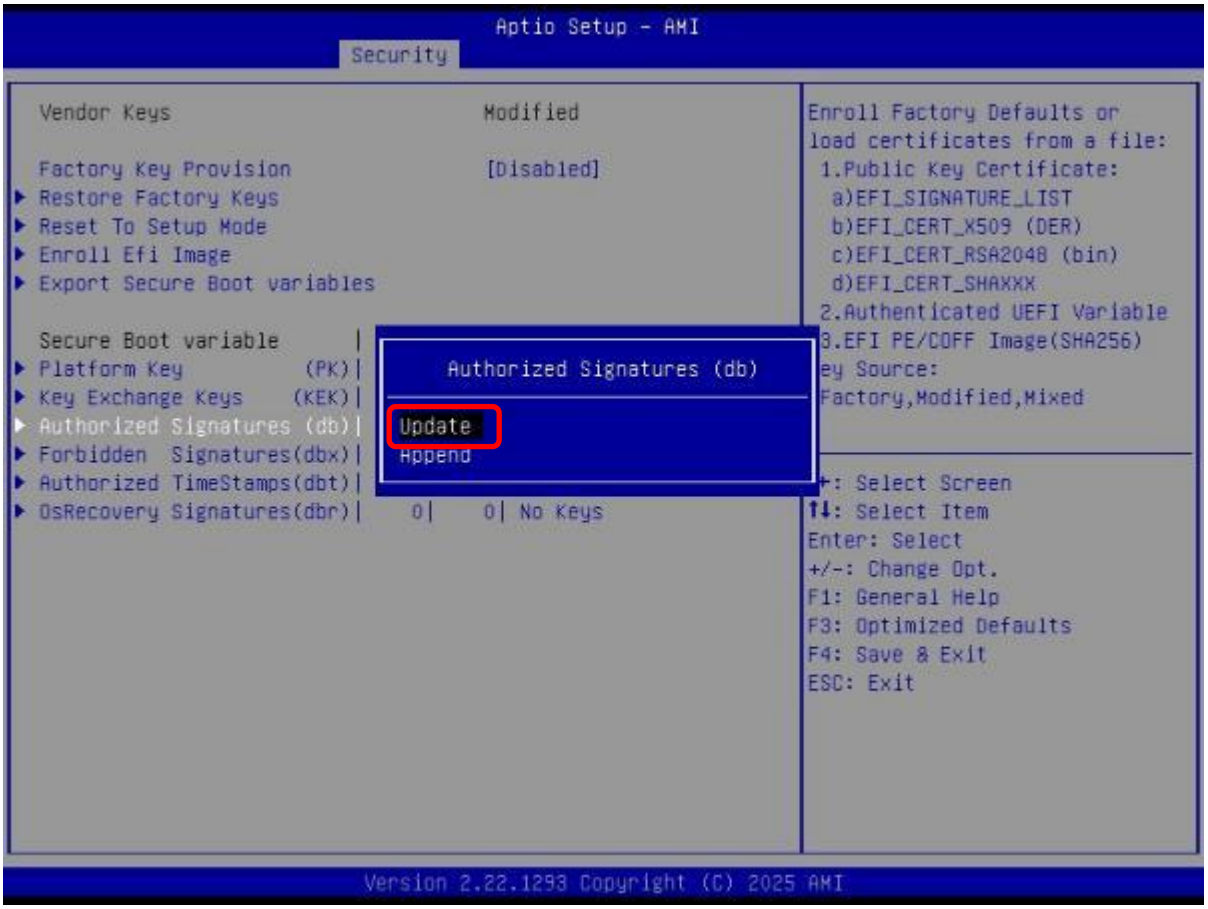
The image below shows that the Key Exchange Keys (KEK) has already been successfully enrolled.



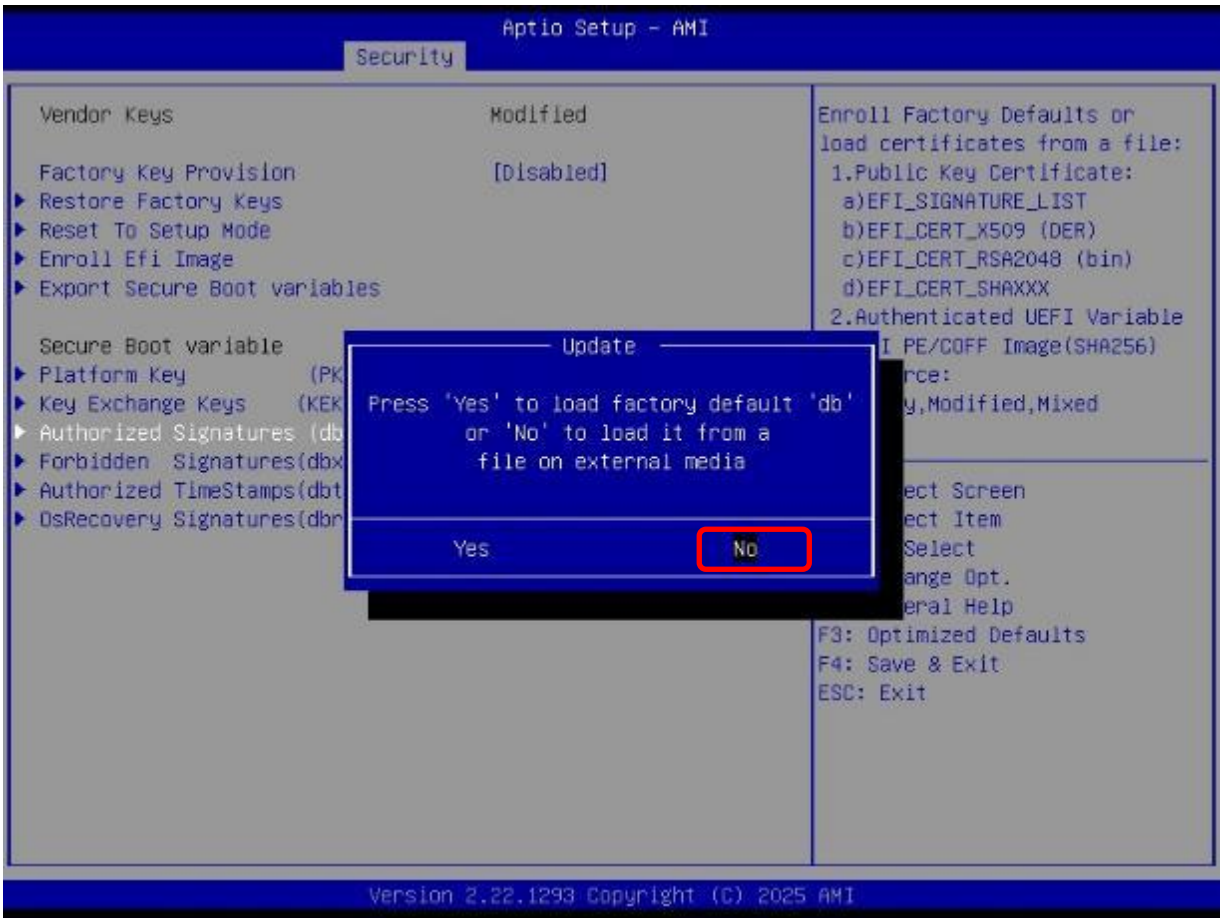
5. Select “Authorized Signature (db)”, enter

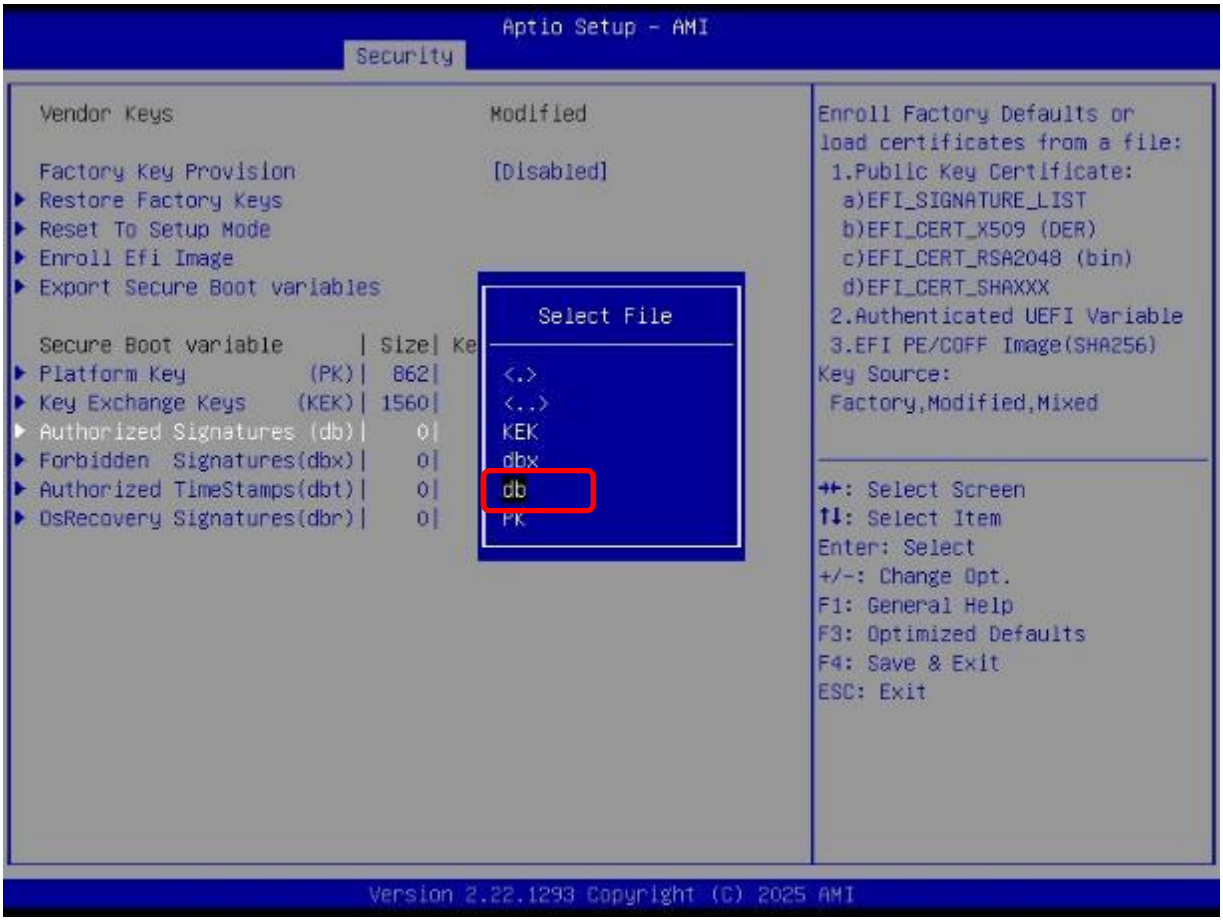


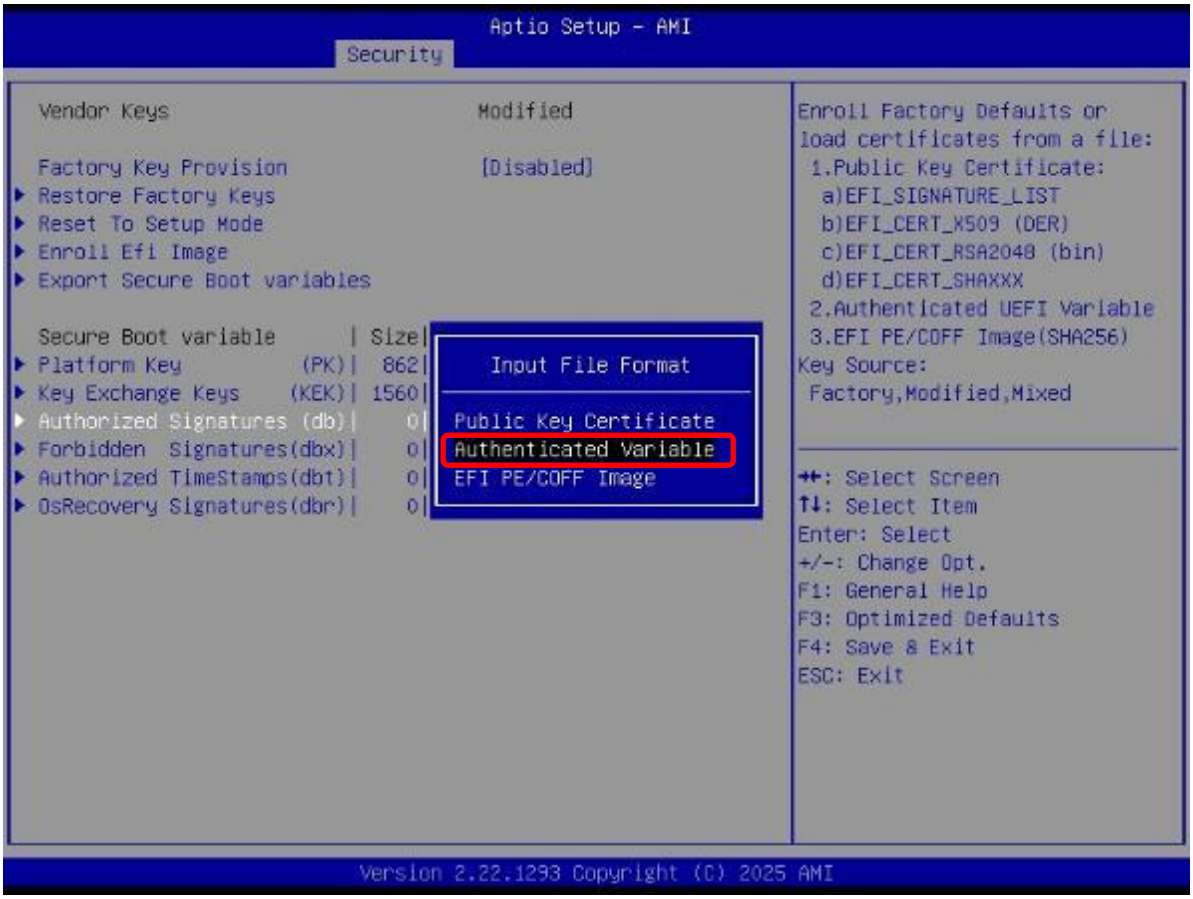
Select “Update”



Select “No”


Aptio Setup – AMI
Security
Vendor Keys
Modified
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Platform Key
Key Exchange Keys
Authorized Signatures (db
Forbidden Signatures(dbx
Authorized TimeStamps(dbt
OsRecovery Signatures(dbr
Update
Press 'Yes' to load factory default 'db'
or 'No' to load it from a
file on external media
Yes
No
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
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI


Aptio Setup – AMI
Security
Vendor Keys
Modified
Factory Key Provision
[Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Size
Platform Key (PK) 862
Key Exchange Keys (KEK) 1560
Authorized Signatures (db) 0
Forbidden Signatures(dbx) 0
Authorized TimeStamps(dbt) 0
OsRecovery Signatures(dbr) 0
Select File
<.>
<..>
KEK
dbx
db
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
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1293 Copyright (C) 2025 AMI


Aptio Setup – AMI
Security
Vendor Keys Modified
Factory Key Provision [Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable | Size|
Platform Key (PK)| 862|
Key Exchange Keys (KEK)| 1560|
Authorized Signatures (db)| 0|
Forbidden Signatures(dbx)| 0|
Authorized TimeStamps(dbt)| 0|
OsRecovery Signatures(dbr)| 0|
Input File Format
Public Key Certificate
Authenticated Variable
EFI PE/COFF Image
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
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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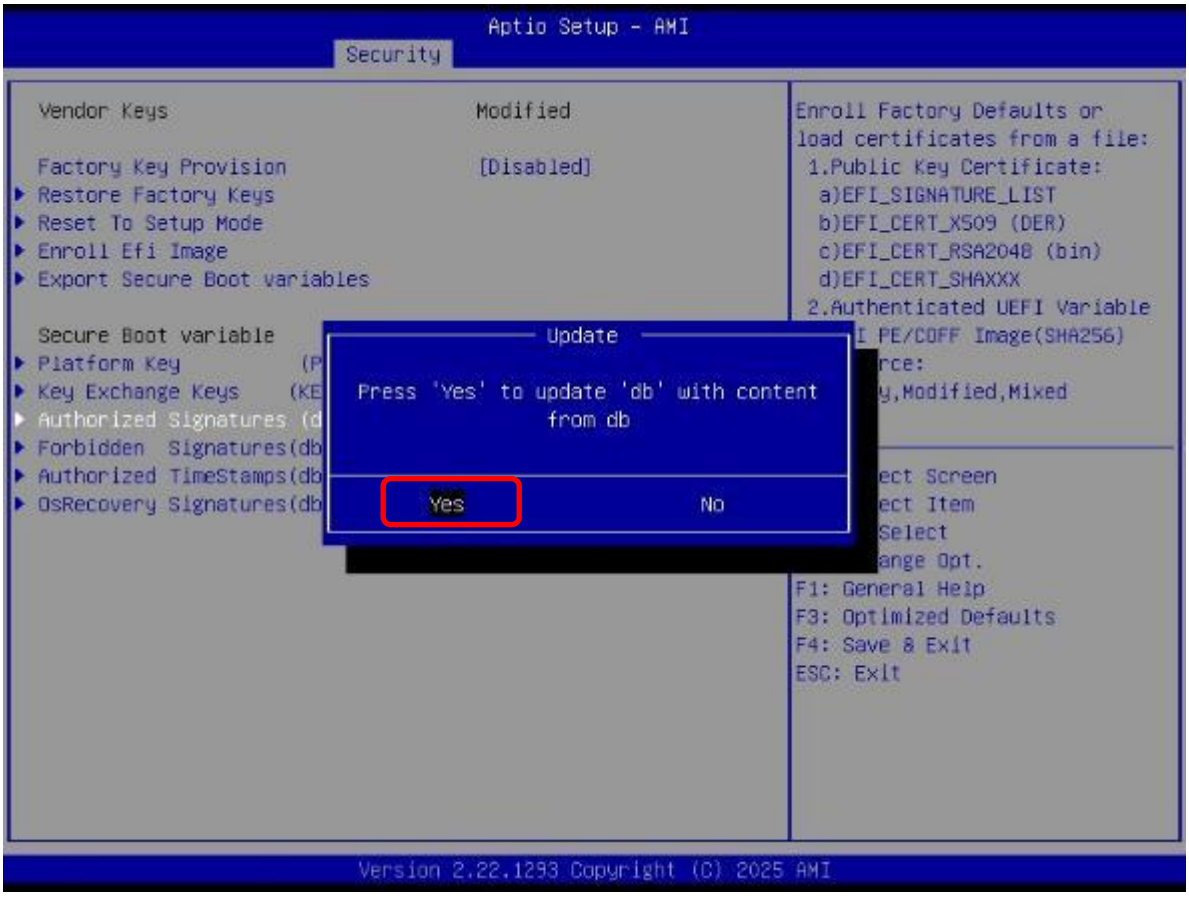
Aptio Setup – AMI
Security
Vendor Keys Modified
Factory Key Provision [Disabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Platform Key (P
Key Exchange Keys (KE
Authorized Signatures (d
Forbidden Signatures(db
Authorized TimeStamps(db
OsRecovery Signatures(db
Update
Press 'Yes' to update 'db' with content from db
Yes
No
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
I PE/COFF Image(SHA256)
rce:
y,Modified,Mixed
ect Screen
ect Item
Select
ange Opt.
F1: General Help
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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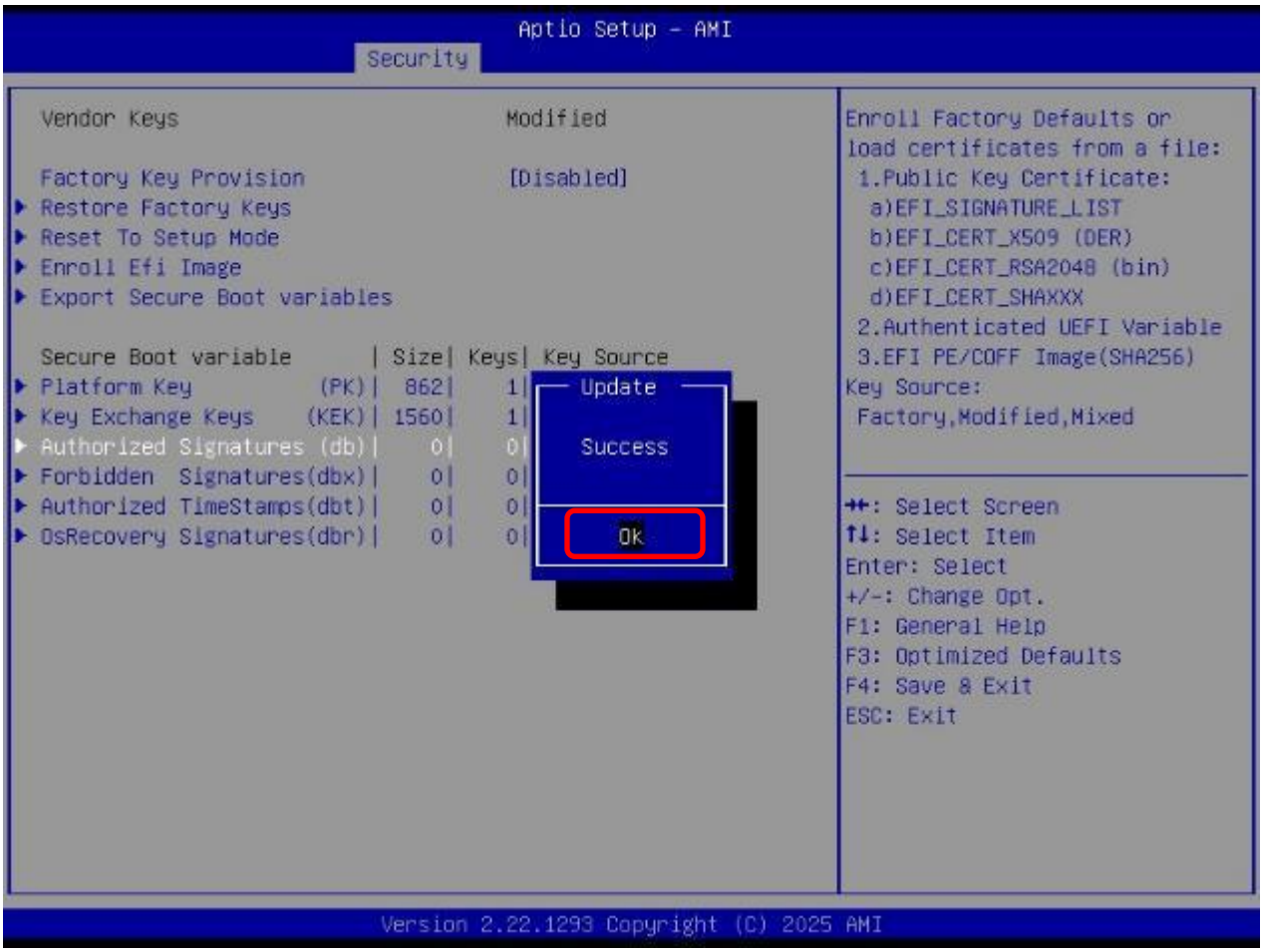
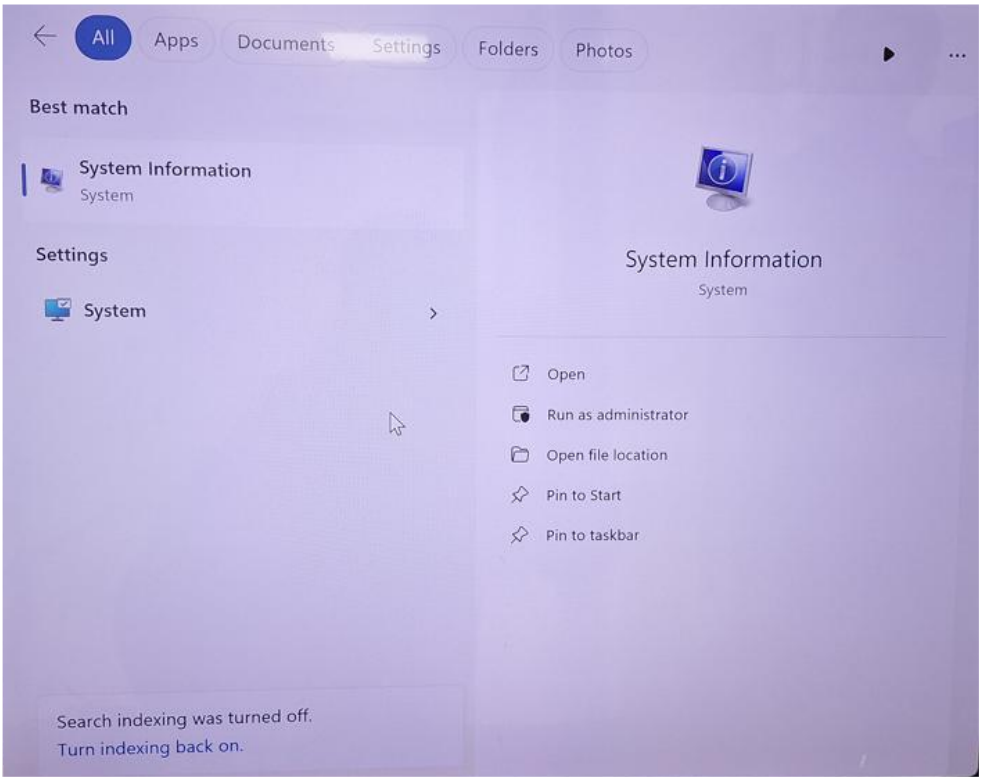
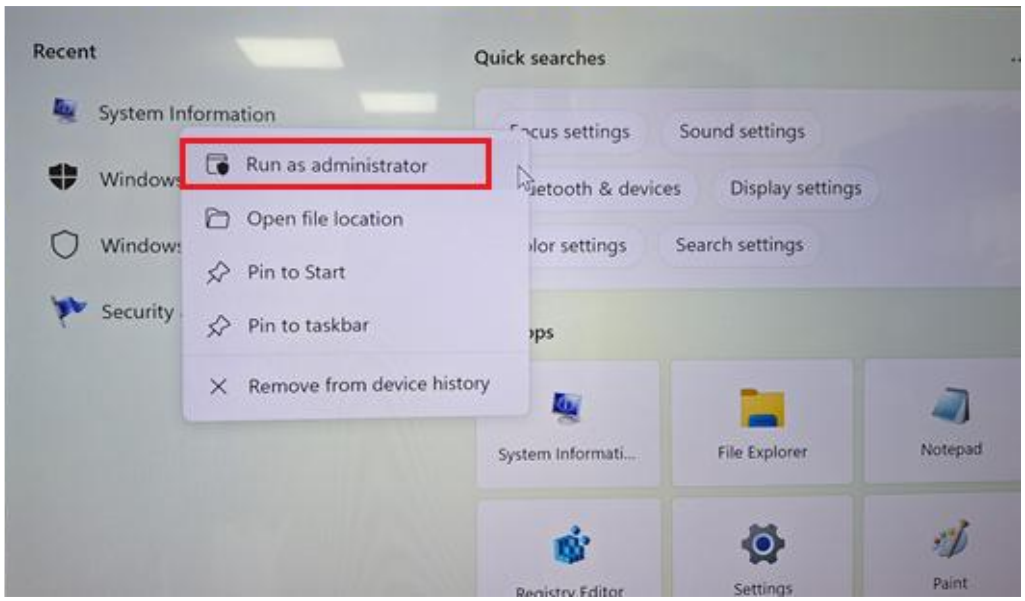


Once the above steps are completed, the key enrollment process is finished.

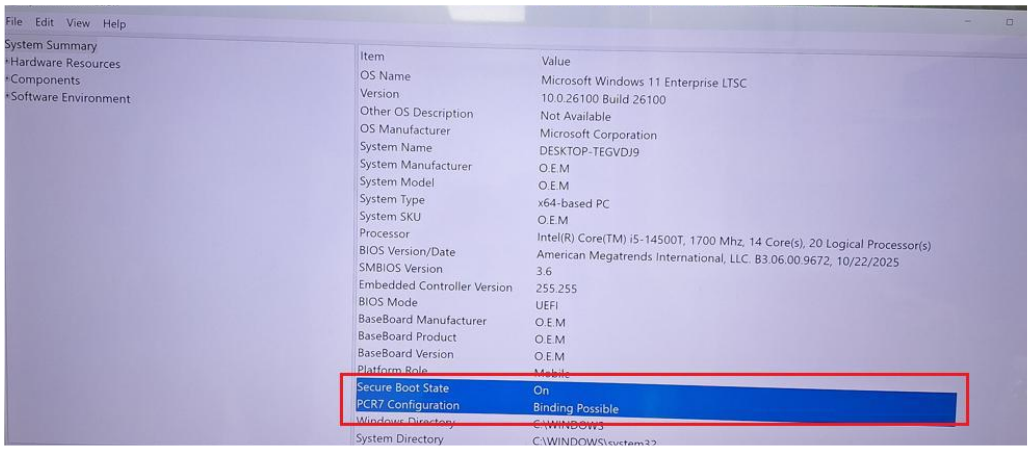
6. To verify that Secure Boot is functioning properly in the Windows environment, search “System information” in Windows.



Right click, and then select “Run as administrator”

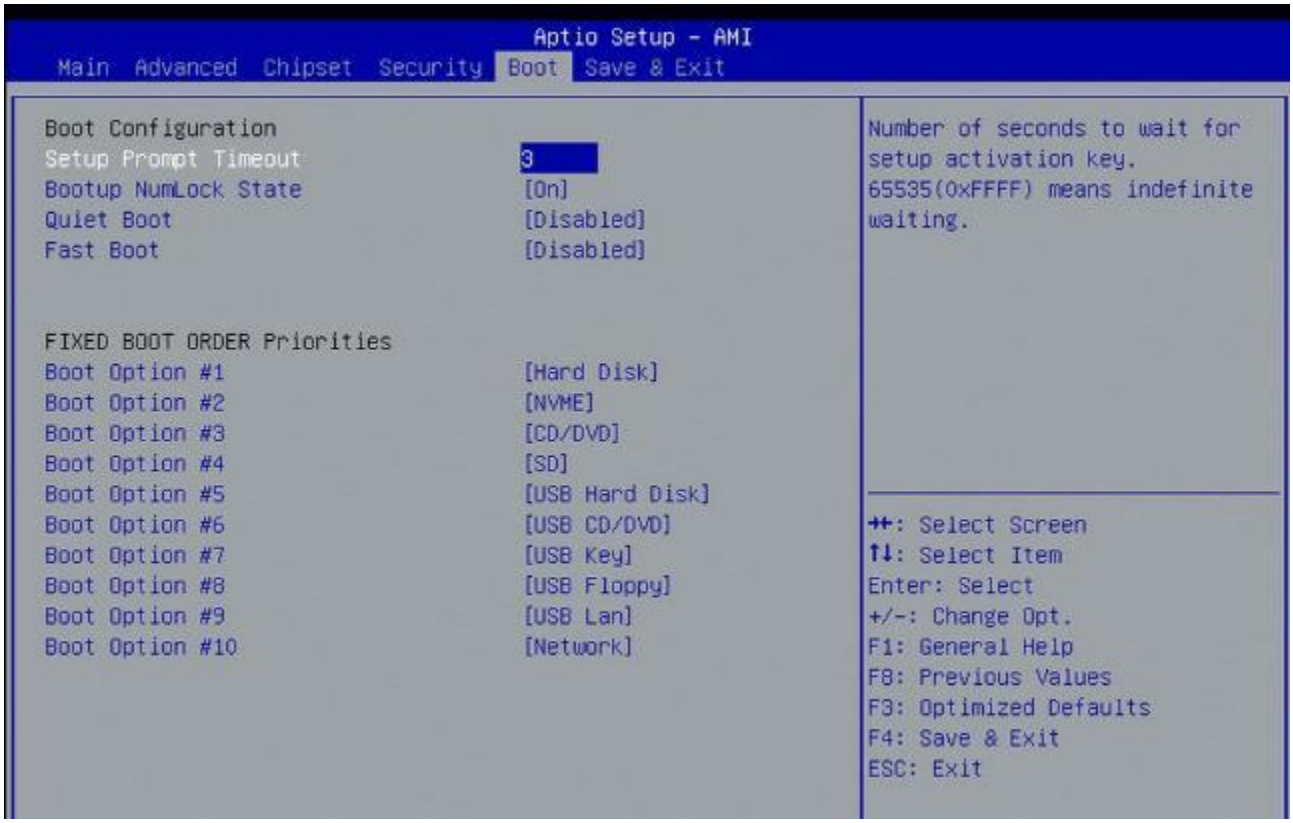


Verify that Secure Boot State is shown as On, and PCR7 Configuration is listed as Biding Possible.



Thank you for going through this instruction. Following it will help you complete the setup smoothly.

3.7 Boot Settings



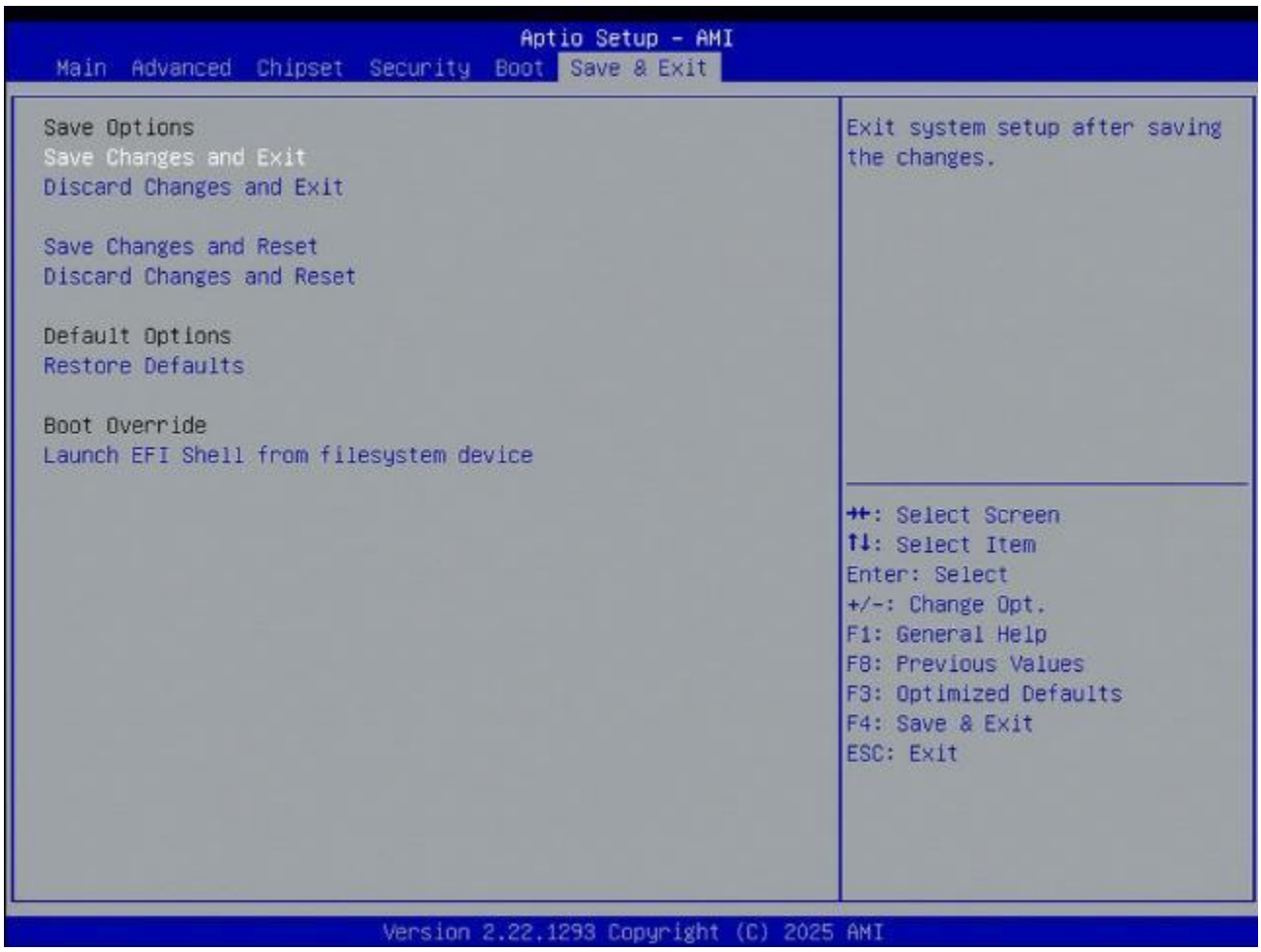
Setup Prompt Timeout:

Number of seconds to wait for setup activation key.65535(OxFFFF) means indefinite waiting.

Fast Boot:

Enables or disables boot with initiaization of a minimal set of devices required to launch active boot option.Has no effect for BBS boot options.

3.8 Save & Exit Settings



Restore Defaults:

Restore/Load Default values for all the setup options.
