

AiTRON-8XXC

7"/10.1"/12.1"/15"/15.6"/21.5"

Intel Alder Lake-N

Fanless Industrial Narrow Edge Touch Panel PC

User Manual

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Revision

V1.0

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Revision History

Reversion	Date	Description
1.0	2025/12/1	Initiation

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.

Caution

Risk of explosion if the battery is replaced with an incorrect type.

Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

Disclaimer

This information in this document is subject to change without notice. In no event shall Apex Technology Inc. be liable for damages of any kind, whether incidental or consequential, arising from either the use or misuse of information in this document or in any related materials.

Safety Precautions

Follow the messages below to prevent your systems from damage:

- ◆ Avoid your system from static electricity on all occasions.
- ◆ Prevent electric shock. Don't touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- ◆ Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

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1.1 Features

- 7" to 21.5" Industrial Narrow Edge Touch Panel PC
- Intel® Alder Lake-N Processor
- Support 1 x 262-pin SO-DIMM slot, DDR5-4800MHz (non-ECC) up to 32GB
- Power Input: DC 9-36V
- IP66 Compliant Aluminum Front Bezel
- Support Projected Capacitive Multi-touch screen
- Support High Brightness LCD Version (for option)
- Support Auto-Dimming (for option)
- Fanless Design

1.2 Specifications

	AiTRON-8XXC Series
System	
CPU	Intel® Processor N97 Quad Core 2.0GHz, 6MB cache, 12W TDP Intel Atom™ x7425E, 4C, 6MB cache, up to 3.4GHz, 12W TDP (option)
Chipset	Integrated with SoC
BIOS	AMI UEFI BIOS
Memory	1 x 262-pin SO-DIMM slot, DDR5-4800MHz (non-ECC) up to 32GB
Graphic	Integrated Intel® UHD Graphics, 1.20 GHz
IO Port (7")	
USB	2 x USB 3.2 Gen1 and 2 x USB 2.0 with Type-A Connectors
Serial	1 x DB9, supports RS-232/422/485(COM1, BIOS selection, RS-232 is default)
LAN	2 x RJ-45, support Intel® I226V/IT 2.5GbE LAN
Display	1 x HDMI1.4 via HDMI Connector, resolution up to 3840 x 2160@30Hz
Power	1 x 3-Pin Terminal Block Type, DC 9-36V Power input
IO Port (10.1" ~ 21.5")	
USB	2x USB 3.2 Gen1 Type-A, 2 x USB 2.0 Type-A ; 2 x optional USB 2.0 Type-A (By cable via pin header)
Serial	1 x DB9, supports RS-232/422/485(COM1, BIOS selection, RS-232 is default) 1 x DB9, supports RS-232/422/485 (COM2, BIOS selection, RS-232 is default) (By cable via pin header COM 2), optional 1 x DB9, supports RS-232(COM3) (By cable via pin header), optional
LAN	2 x RJ-45, support Intel® I226V/IT 2.5GbE LAN
Display	1 x HDMI1.4 via HDMI Connector, resolution up to 3840 x 2160@30Hz

Power	1 x 3-Pin Terminal Block Type, DC 9-36V Power input
Storage Space	
Storage	1 x M.2 M-Key 2280 for SSD (PCIe x1 and SATA-III), default is SATA type with SSD heatsink (APLEX P/N: 0920760024000601)
Expansion	
Expansion Slot	1 x M.2 2230 E-Key (USB2.0 + PCIe x1) for optional Wi-Fi/BT module 1 x M.2 3042/3052 B-Key (USB3.2 Gen1, PCIe x1) for optional LTE/5G module
Others	
TPM	Onboard TPM2.0 SPI I/F TPM IC
Watchdog Timer	1 ~ 255 sec (system)
Wake on LAN	Support WOL
Antenna	
Antenna	2 x SMA-female connectors' holes for external antenna (2 for Wi-Fi 6e+BT5.3/LTE/5G)
Power	
Power Input	1 x Terminal Block Type, DC 9-36V Power input, Power on AT/ATX supported, default is AT mode
Mechanical	
Mechanical Construction	Aluminum die-casting chassis
Mounting	Panel Mount VESA 75 x 75 mm (7") VESA 100 x 100 mm (10.1" ~21.5")
IP Rating	IP66 Front Bezel Design
Operating System Support	
OS Support	Windows 10 IoT Enterprise 2021 LTSC or later Windows 11 IoT Enterprise 2024 LTSC or later Linux 24.04 or later
Environmental	
Operating Temperature	7" ~15.6" LCD : Standard: -20~60°C ; High Brightness: 0~50°C 21.5" LCD : 0°C to 50°C
Storage Temperature	-30~70°C
Humidity	10 to 95% @ 40°C, non-condensing
Certification	CE / FCC Class A

1.3 Display

1.3.1 Standard LCD

	AiTRON-807CP	AiTRON-810CP	AiTRON-812CP	AiTRON-815CP	AiTRON-816CP
Display Type	7" TFT LCD	10" TFT LCD	12" TFT LCD	15" TFT LCD	15.6W" TFT LCD
Max. Resolution	1024 x 600	1280 x 800	1024 x 768	1024 x 768	1920x1080
Max. Color	262K	262K	16.7M	16.2M	16.7M
Luminance(cd/m ²)	1000	350	500	350	500
Contrast Ratio	1000 : 1	800:1	1000:1	1000:1	1000:1
Viewing angle(H/V)	85/85	170/170	178 /178	178/178	178 /178
MTBF(Hrs)	50,000	30,000	30,000	50,000	50,000

	AiTRON-821CP
Display Type	21.5" TFT LCD
Max. Resolution	1920x1080
Max. Color	16.7M
Luminance(cd/m ²)	300
Contrast Ratio	1000:1
Viewing angle(H/V)	178 /178
MTBF(Hrs)	50,000

1.3.2 High Brightness LCD

	AiTRON-807CPH	AiTRON-810CPH	AiTRON-812CPH	AiTRON-815CPH	AiTRON-816CPH
Display Type	7" TFT LCD	10" TFT LCD	12" TFT LCD	15" TFT LCD	15.6W" TFT LCD
Max. Resolution	1024 x 600	1280 x 800	1024 x 768	1024 x 768	1920x1080
Max. Color	16.7M	16.7M	16.2M	16.7M	16.7M
Luminance(cd/m ²)	1000	1200	1000	1000	1000
Contrast Ratio	1000 : 1	800: 1	1000:1	3000:1	1000:1
Viewing angle(H/V)	85/85	178/178	178/178	176/176	85/85
MTBF(Hrs)	40,000	50,000	50,000	70,000	50,000

	AiTRON-821CPH
Display Type	21.5" TFT LCD
Max. Resolution	1920 x 1080
Max. Color	16.7M
Luminance(cd/m ²)	1000
Contrast Ratio	1000:1
Viewing angle(H/V)	89/89
MTBF(Hrs)	50,000

All product specifications are subject to change without notice, * identify as optional function

1.4 Mechanical

	AiTRON-807CP(H)	AiTRON-810CP(H)	AiTRON-812CP(H)	AiTRON-815CP(H)	AiTRON-816CP(H)
Mounting	VESA Mount 75 x 75 mm	VESA Mount 100 x 100 mm			
Dimensions(mm)	197x135x48	270x184.9x57	291x230x55	359.6x283.6x56.6	396.3x246.7x55
Net Weight (Kg)	TBD	1.86	2.31	3.42	3.85

	AiTRON-821CP(H)
Mounting	VESA Mount 100 x 100 mm
Dimensions	529.6x321.3x56.5
Net Weight(kg)	5.14

1.5 Power Consumption

Max power consumption of each model under Window 10

Model	Max Power Consumption
AiTRON-807C	TBD
AiTRON-810C	36.67
AiTRON-812C	38.41
AiTRON-815C	51.62
AiTRON-816C	52.97
AiTRON-821C	47.52

* To record power consumed when system has full loading with external devices attached.

* Power consumption may have 10% tolerance difference due to different MB, parts, test instrument, and so on.

* We suggest to use the adapter that APLEX approved. If you would like to adopt your own power supply or adapter, please add another 20-30% from the above power consumption to make sure the system can work stable.

1.6 Dimensions

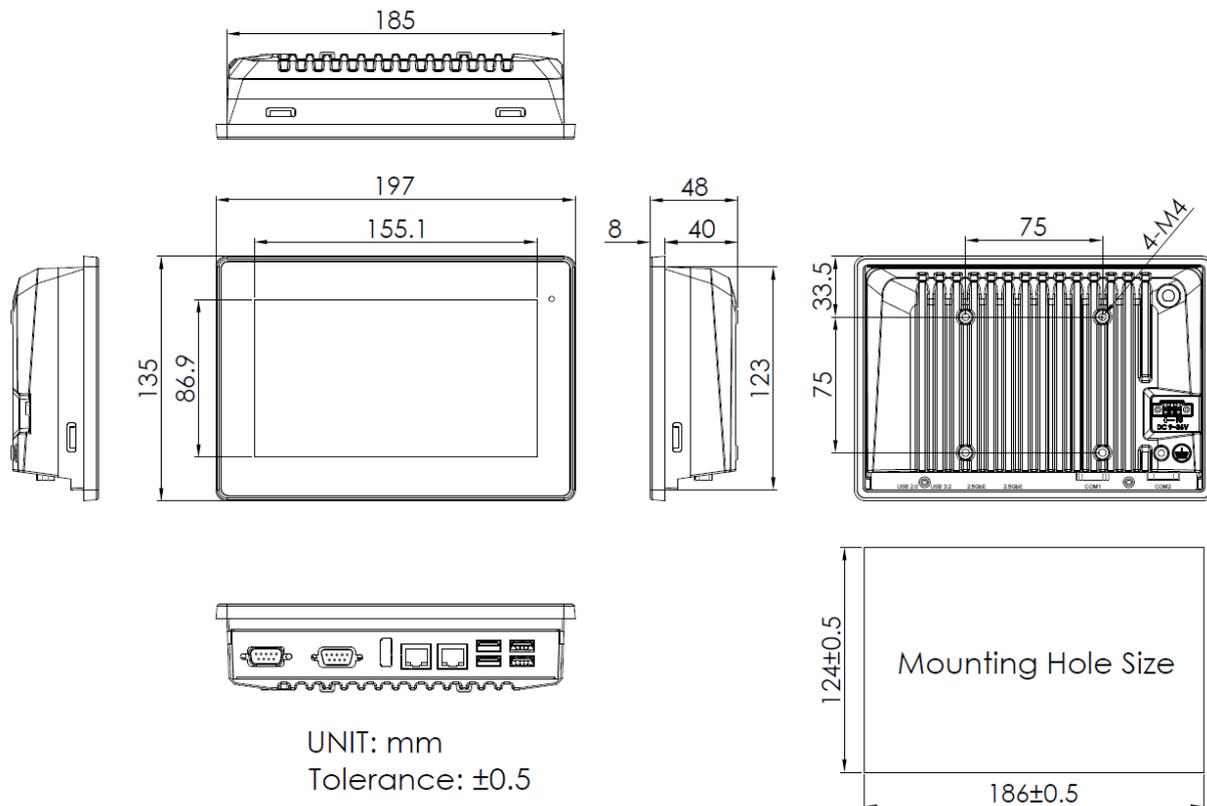


Figure 1 Dimensions of AiTRON-807CP(H)

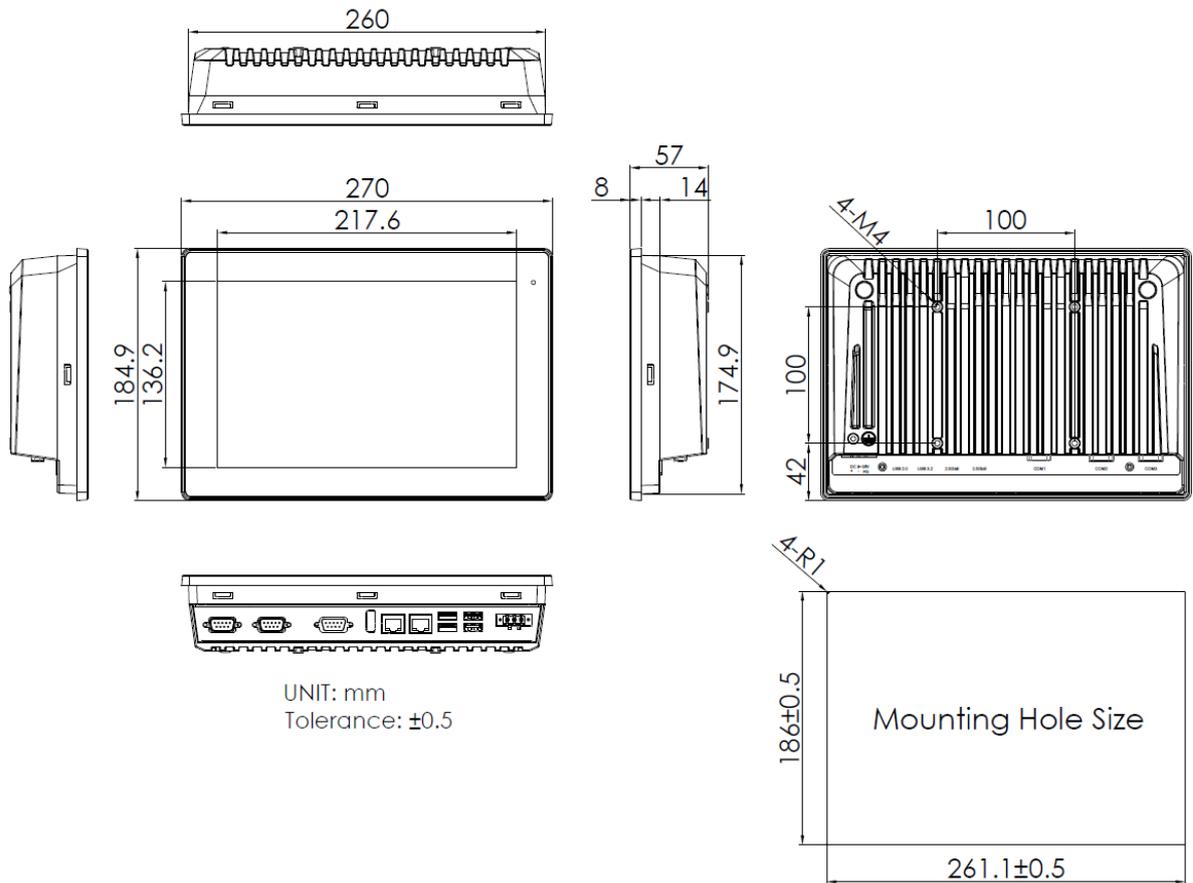


Figure 2 Dimensions of AiTRON-810CP(H)

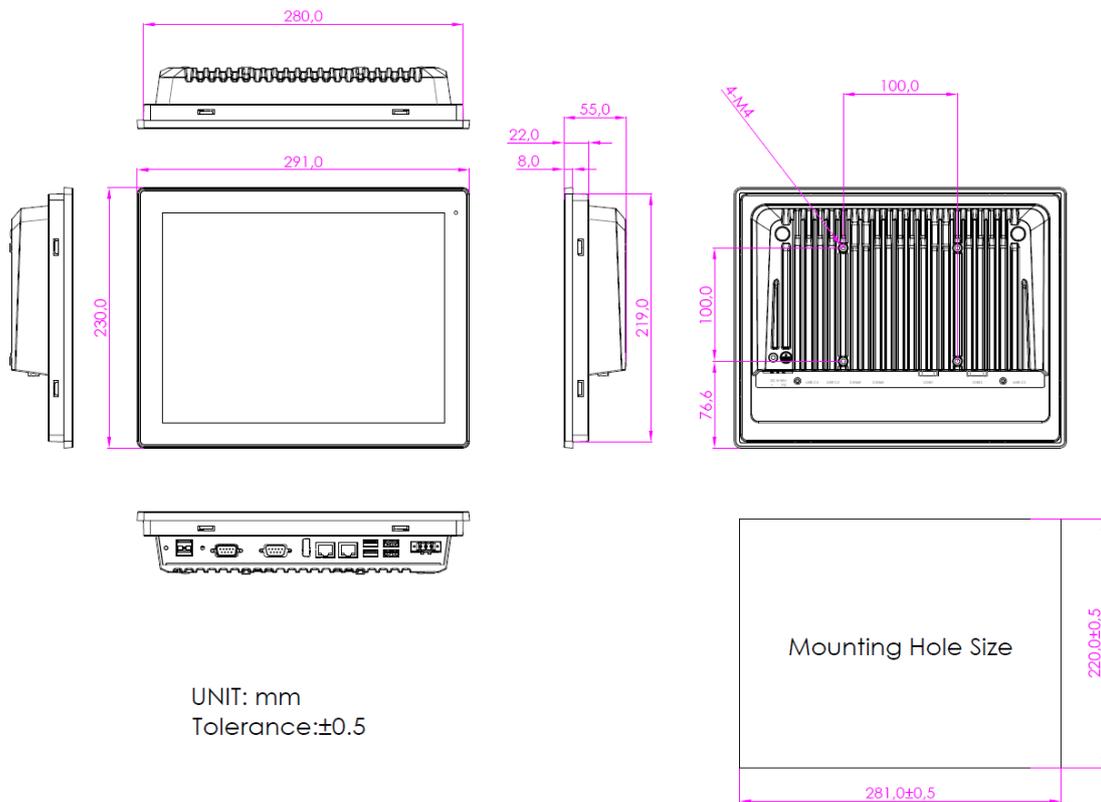


Figure 3 Dimensions of AiTRON-812CP(H)

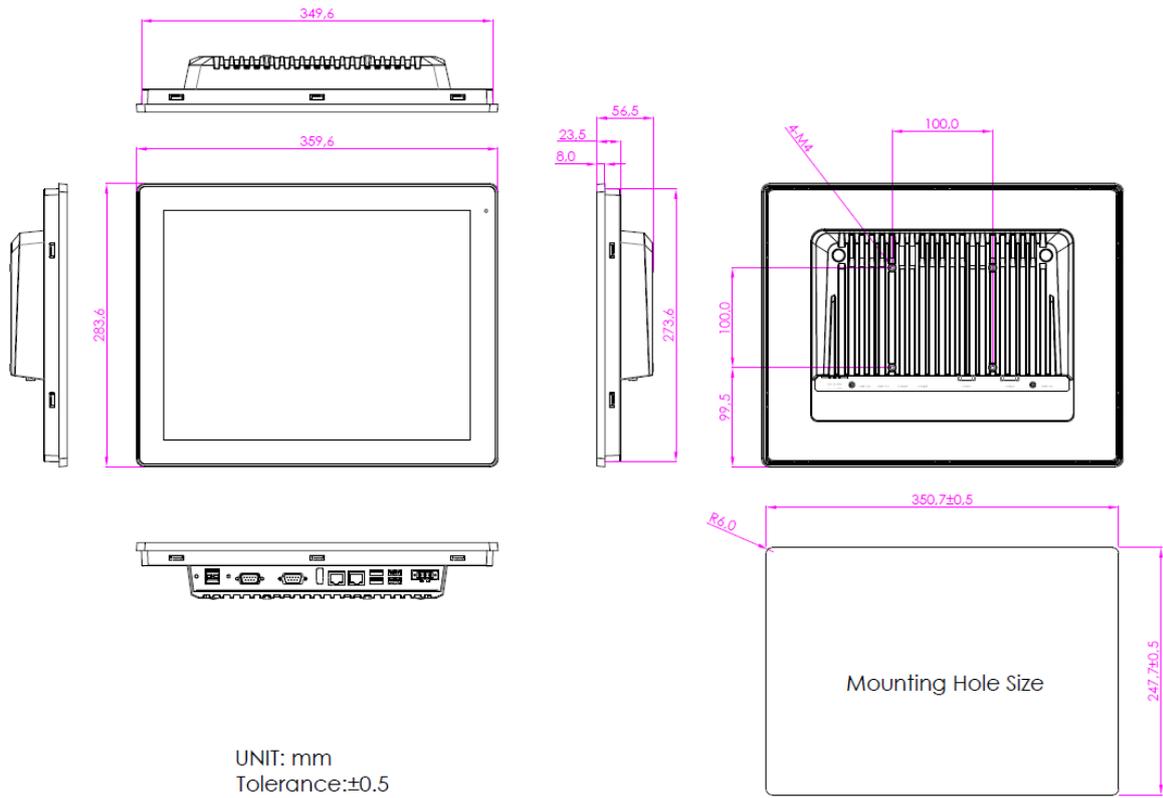


Figure 4 Dimensions of AiTRON-815CP(H)

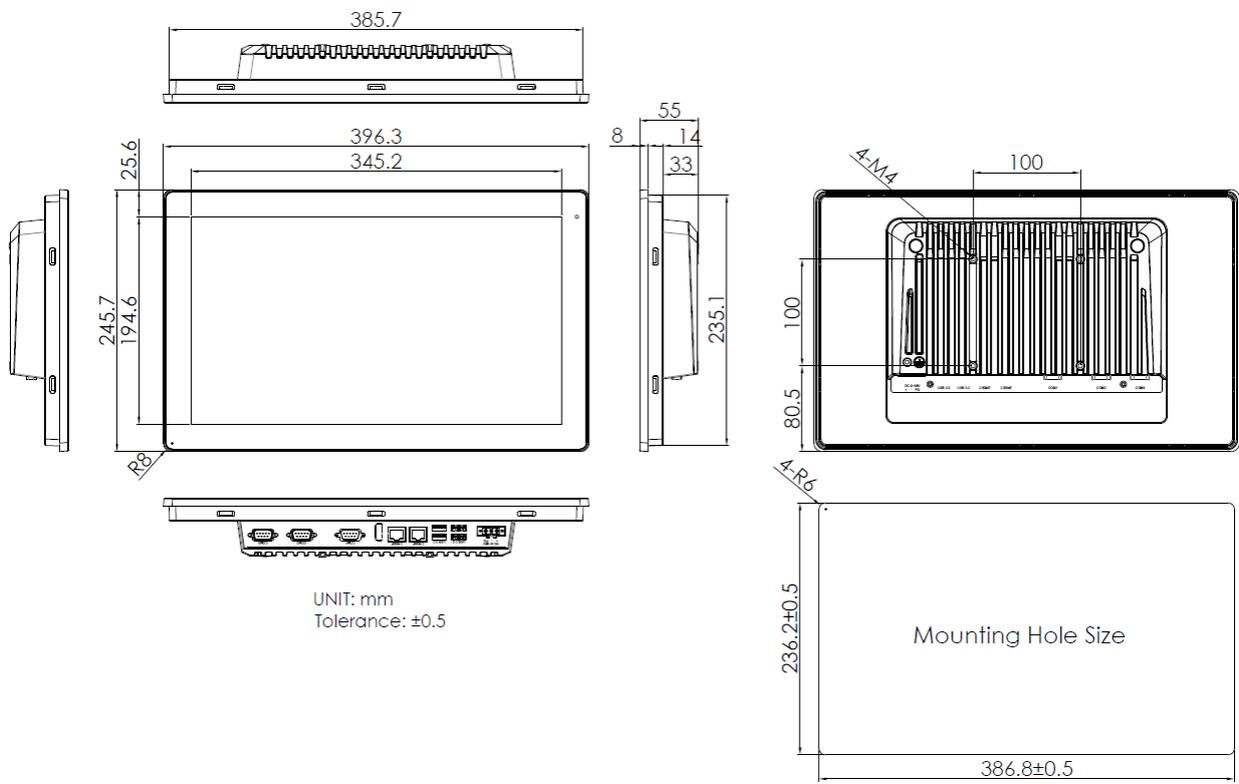


Figure 5 Dimensions of AiTRON-816CP(H)

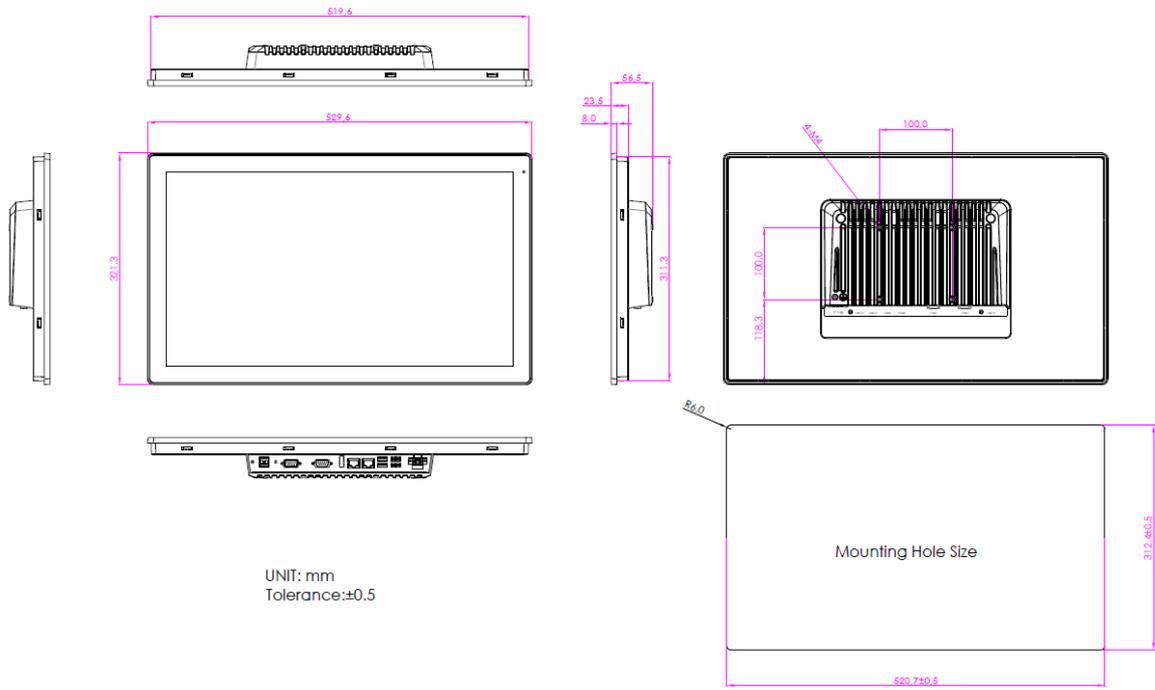


Figure 6 Dimensions of AiTRON-821CP(H)

1.7 Brief Description of AiTRON-8XXC Series

AiTRON-8XXC series products are a newly launched product line, ranging in size from 7" to 21.5". They feature a fanless, low-power, and compact design, making them suitable for use as HMI and control panels in smart production lines and self-service kiosks. With a protective aluminum enclosure, full-plane projected capacitive multi-touchscreen technology, wireless capabilities, and multiple I/O options, the high-performance AiTRON-8XXC series devices can also be integrated with a wide range of optional peripherals and accessories according to specific application requirements.

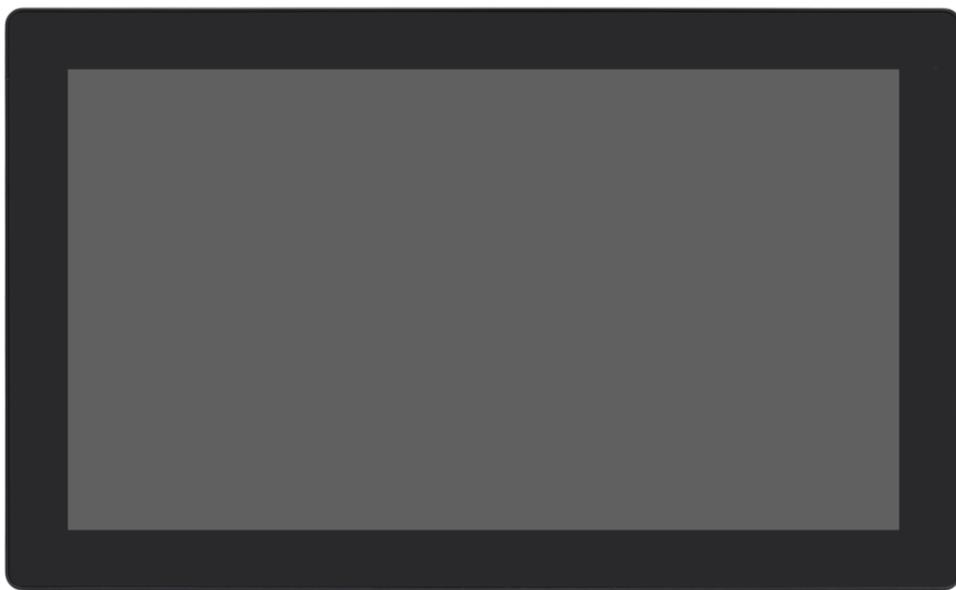


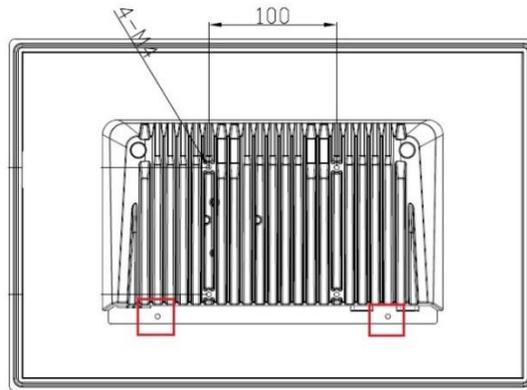
Figure 7 Front View of AiTRON-816C



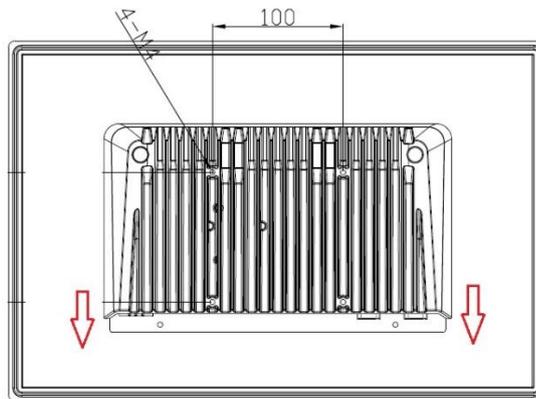
Figure 8 Rear View of AiTRON-816C

1.8 Installation of Memory and Storage

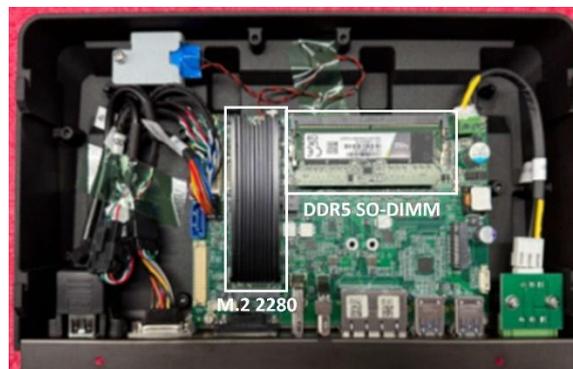
Step 1: Loosen and remove two screws on bottom side of the back cover.



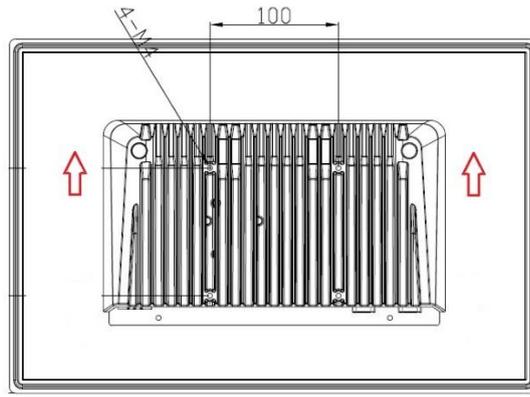
Step 2: Push down back cover from the rear chassis of Panel PC to open the back cover.



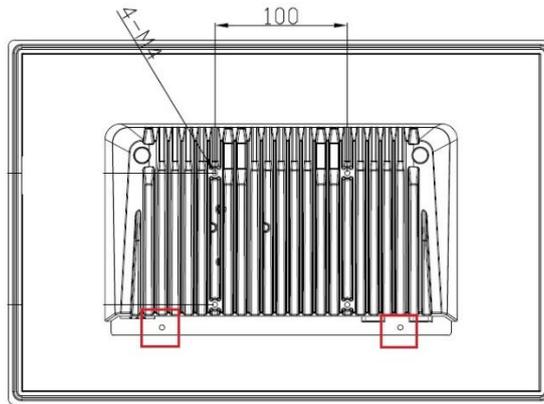
Step 3: After opening back cover, you can see the motherboard. You can install memory module(DDR5 SO-DIMM) and M.2 M-Key 2280 for SSD (SATAIII) onto motherboard while you buy barebone. Please refer to 1.12 for the assembly steps to attach the heatsink to the M.2 2280 SSD.



Step 4 : Push the back cover latch into the sliding rail of rear chassis.



Step 5 : Tighten two screws of back cover to fix onto rear chassis .



1.9 VESA Mounting

AiTRON-8XXC series support VESA 75/100 mount.

AiTRON-807C : VESA 75, M3x4L screw x 4 PCs

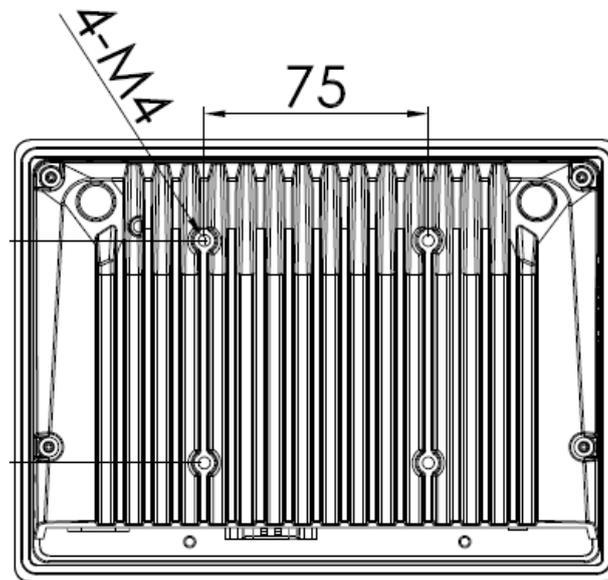


Figure 9 AiTRON-807C VESA Mounting

AiTRON-810C/812C/815C/816C/821C : VESA 100, M3x4L screw x 4 PCs

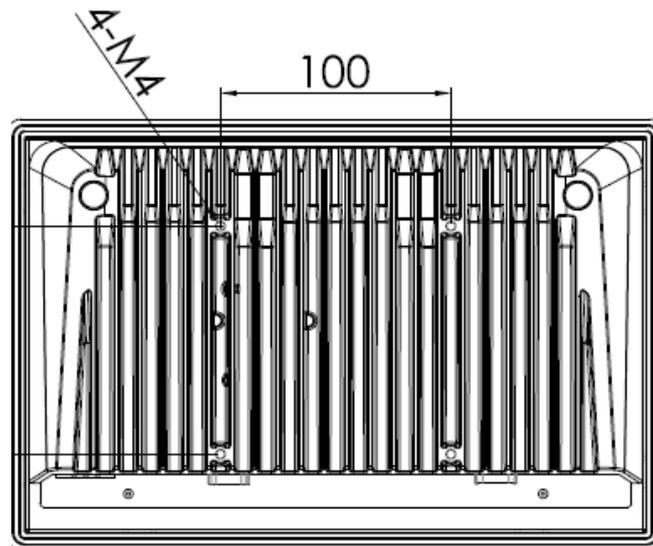


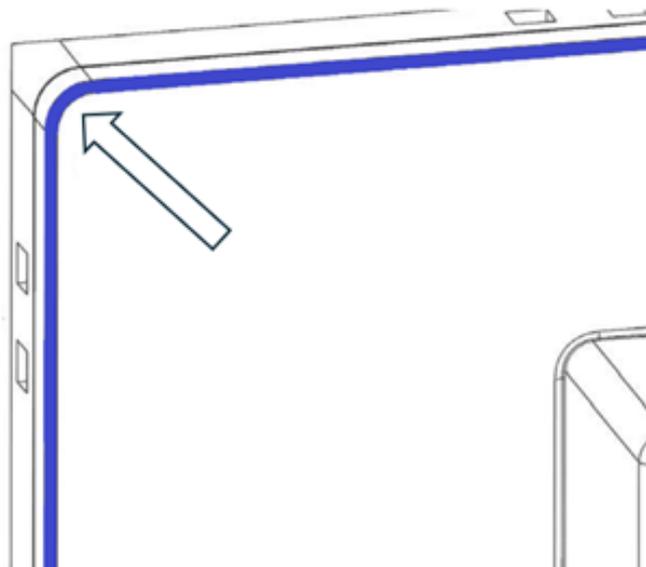
Figure 10 AiTRON-810C/812C/815C/816C/821C VESA Mounting

1.10 Panel Mounting

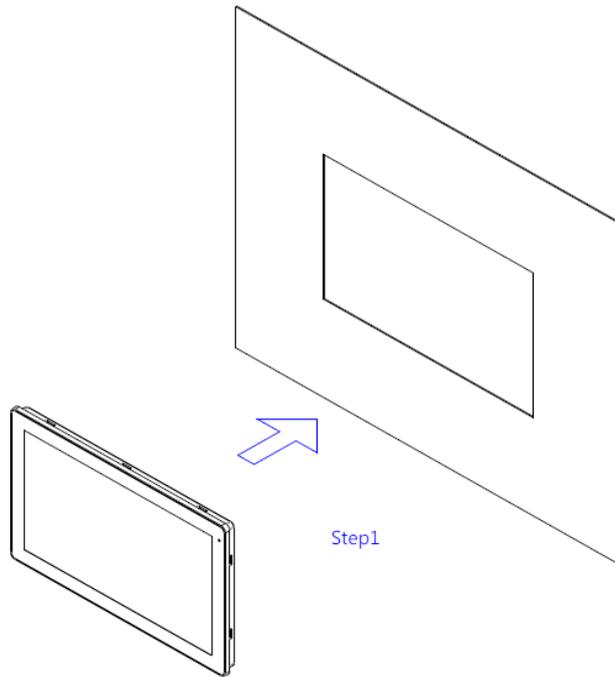
There are mounting holes located along the four sides of the HMI. Position the AiTRON panel pc against the panel mount and insert the mounting kit from the four sides and tighten them with screws.

Description	Qty	Unit
Panel mounting kit for 7"	4	PCS
Panel mounting kit for 10.1", 12.1"	8	PCS
Panel mounting kit for 15", 15.6"	10	PCS
Panel mounting kit for 21.5"	12	PCS

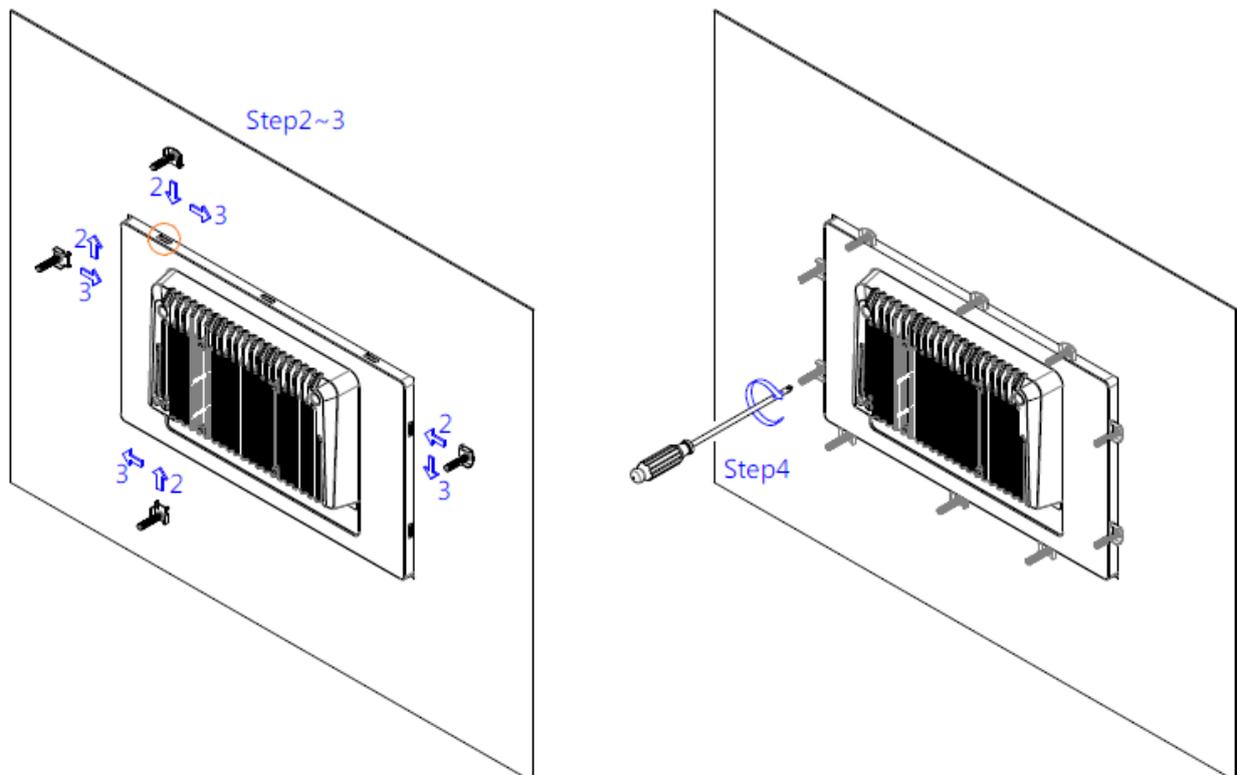
1. The front panel is equipped with a waterproof gasket strip with adhesive on it. Before installing the AiTRON-8XXC into the panel opening cover, please make sure that the waterproof gasket is fixed correctly.



2. Place the AiTRON-8XXC into the panel opening cover.



3. Take out the panel mounting kits from the accessory partition and then attach them to the fixed holes around the rear chassis of AiTRON-8XXC. Tighten the screws of each fastening hook into position to clamp and secure the panel.



1.11 Optional Panel Mount Dustproof Covers

If the Panel PC is mounted using a VESA bracket and dust protection is required, dustproof covers can be installed over the rear panel mounting holes to protect the system.

Description	Qty	Unit
Panel Mount Dustproof Covers for 7"	4	PCS
Panel Mount Dustproof Covers for 10.1", 12.1"	8	PCS
Panel Mount Dustproof Covers for 15", 15.6"	10	PCS
Panel Mount Dustproof Covers for 21.5"	12	PCS

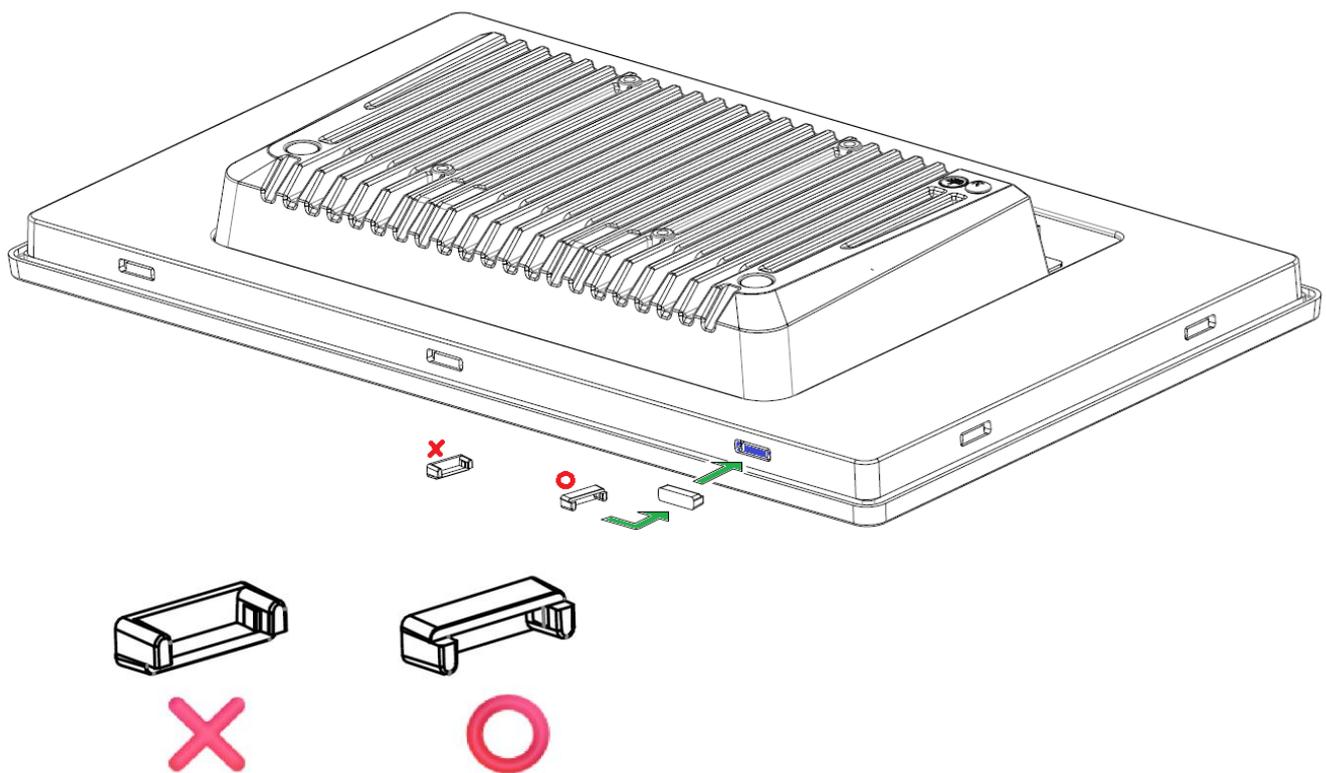


Figure 11 AiTRON-8XXC PANEL Mount Dustproof Cover

1.12 SSD heatsink kit installation guide

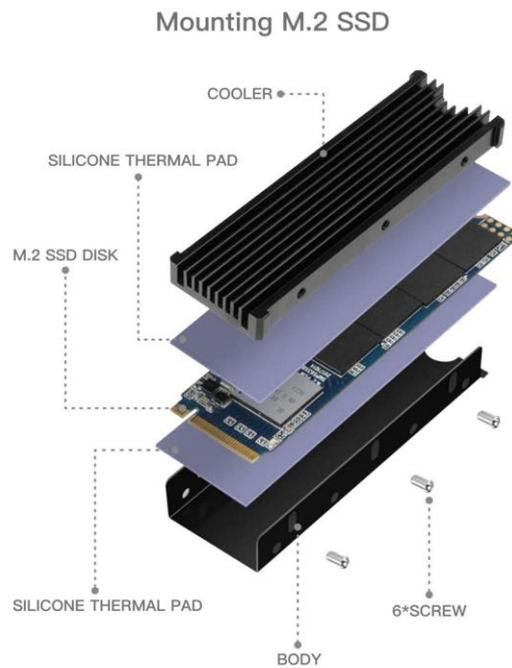
M.2 2280 heatsink dimension: 76 x 24 x 6.3mm

Notice:

It is recommended to install an SSD heatsink to prevent the M.2 SSD from overheating during high-speed operations, which could lead to reduced performance or instability.

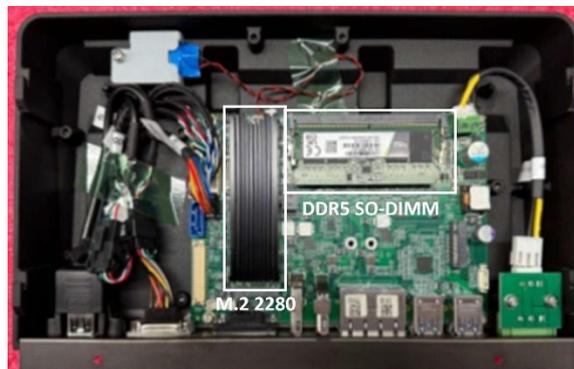
Step 1 :

Disassemble the SSD heatsink kit, then apply the thermal pad to both the top and bottom sides of the SSD. Secure the SSD to the thermal kit and tighten the screws.



Step 2 :

Install the SSD with the thermal kit into the M.2 2280 slot on the motherboard.



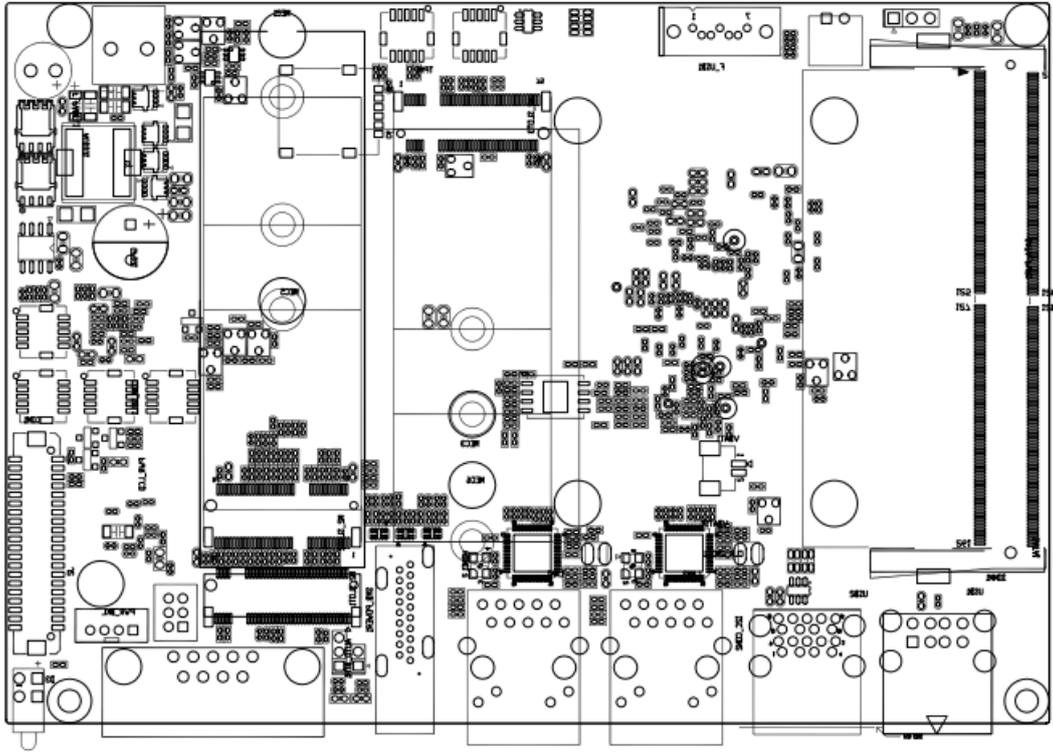
SBC-7135 is a 3.5" industrial motherboard developed on the basis of Intel Alder Lake, which provides abundant peripheral interfaces to meet the needs of different customers..

2.1 Motherboard Specifications

Specifications	
Board Size	146mm x 101.6mm
CPU Support	Intel N95,4C4T ,up to 3.4GHz, 16EU iGPU TDP:15W Intel N97,4C4T, up to 3.6 GHz , 24EU iGPU , TDP:12W Intel N100,4C4T,up to 3.4GHz, 24EU iGPU,TDP:6W Intel N200,4C4T,up to 3.7GHz, 32EU iGPU,TDP:6W Intel Core™ i3-N300,8C8T,up to 3.8GHz, 32EU iGPU,TDP:7W Intel Core™ i3-N305,8C8T,up to 3.8GHz, 32EU iGPU,TDP:15W Intel Atom® X7425E,4C4T, up to 3.4GHz, 24EU iGPU , TDP:12W
Chipset	SOC
Memory Support	SO-DIMM (262pins), up to 32GB DDR5 4800MT/s
Graphics	Integrated Intel UHD Graphics
Display Mode	1 x HDMI1.4b via HDMI Port 1 x LVDS (18/24-bit dual LVDS)/eDP(option by BOM)
Support Resolution	HDMI: support up to 3840x2160@30Hz LVDS: support up to 1920x1200@60Hz eDP: support up to 3840x2160@60Hz
Super I/O	ITE IT8786E-I/HX
BIOS	AMI/UEFI BIOS
Storage	1 x SATAIII via 7pin SATA connector 1 x M.2 M-Key (PCIe 3.0 x1/SATA-III) 2280 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	2 x USB3.2 Gen1/USB2.0, Type-A stack ports (USB1) 2 x USB2.0, Type-A stack ports (USB2) 2 x USB2.0 via SHD 1.25mm 2x5pin header (F_USB1) 1x USB2.0 for M.2 B-Key 1x USB2.0 for M.2 E-Key
Serial	1 x RS-232(default)/422/485, signals select via BIOS (COM1), pin9 RI(default)/5V/12V, select via COM1_PIN9SEL. (DB9, COM1) 1 x RS-232(default)/422/485 via SHD 1.25mm 2x5pin header, signals select via BIOS (COM2) 4 x 2wired RS232 via SHD 1.25mm 2x5pin header (COM3-6)

GPIO	8-bit digital I/O by SHD 1.25mm 2x5pin header (GPIO1)
Audio	Support Audio via Realtek ALC887-VA2-CG HD audio codec Support Line-in,Line-out,MIC by SHD 1.25mm 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 (SIM1) 1 x M.2 E-Key(PCIex1,USB2.0,CNVi),2230 for WIFI/BT module
FAN	1x 2pin fan connector
Watchdog Timer	Software programmable 1–255 level
TPM	Onboard TPM IC Infineon_SLB9670AQ2.0
Switches and LED Indicators	Power button/reset button/power LED/HDD LED via SHD 1.25mm 2x5pin header (F_Panel1)
Battery	Support 3V RTC Li-battery via 2pin wafer (VBAT1)
Power Management	Wide range DC 9~36V power input via 2pin terminal block
Temperature	Operating: -30°C to 70°C Storage: -40°C to 85°C
Humidity	10% - 90%, non-condensing, operating
Certifications	Meet CE/FCC class A UL RoHS2.0

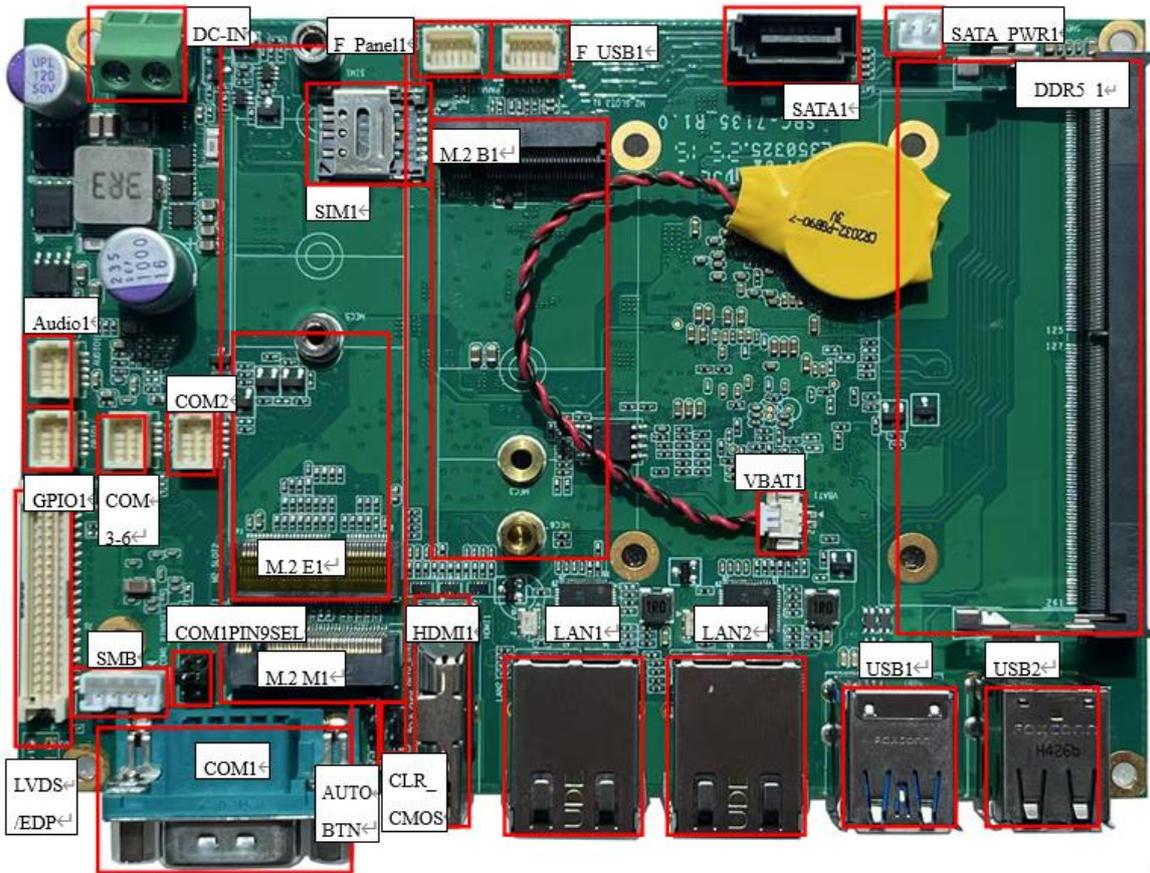
2.2 Board Dimensions



Dimensions: 146 x 101.6 (units :mm)

2.3 Jumpers and Connectors Location

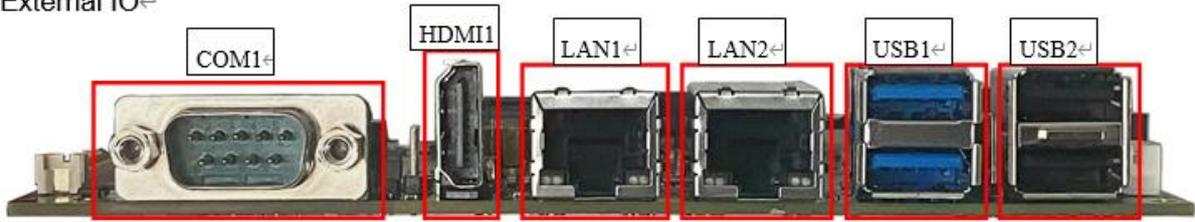
Board Top



Board Bottom



External IO



2.4 Jumpers Setting and Connectors

1. CPU1:

(FCBGA1264) Onboard Intel Alder Lake SoC

Model	SoC				
	Number	PBF	Cores/ Threads	TDP	Remarks
SBC-7135-N95	N95	Up to 4.4GHz(P-Core)	4C / 4T	15W	Option
SBC-7135-N97	N97	Up to 4.4GHz(P-Core)	4C / 4T	12W	Default
SBC-7135-N100	N100	Up to 4.4GHz(P-Core)	4C / 4T	6W	Option
SBC-7135-N200	N200	Up to 4.4GHz(P-Core)	4C / 4T	6W	Option
SBC-7135-N300	N300	Up to 4.5GHz(P-Core)	8C / 8T	7W	Option
SBC-7135-N305	N305	Up to 4.5GHz(P-Core)	8C / 8T	15W	Option
SBC-7135-X7425E	X7425E	Up to 4.5GHz(P-Core)	4C / 4T	12W	Option

2. DDR5_1:

(SO-DIMM 260Pin slot) DDR5 memory socket, the socket is located at the top of the board and supports 260Pin 1.1V DDR5 SO-DIMM memory module up to 32GB.

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 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 1x2 Pin Connector) DC9~36V System power input connector.

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

7. SMB:

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

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

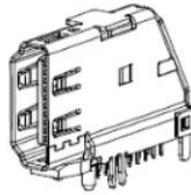
8. LVDS/eDP:

(1.25mm Pitch 2x20 Connector, DF13-40P) Support 18/24-bit LVDS interface LCM with USB2.0 signal for touch screen.

Function	Signal Name	Pin#		Signal Name	Function
DC12V	12V_S0	1	2	12V_S0	DC12V
LVDS/eDP Signals	BKLT_PWM_OUT	3	4	BKLT_EN	LVDS/eDP Signals
	GND	5	6	GND	
	LVDS_VDD5	7	8	LVDS_VDD5	
	LVDS_VDD3.3	9	10	LVDS_VDD3.3	
	GND	11	12	GND	
	LA_D0-/eDP D0-	13	14	LA_D0+/eDP D0+	
	LA_D1-/eDP D1-	15	16	LA_D1+/eDP D1+	
LA_D2-/eDP D2-	17	18	LA_D2+/eDP D2+		

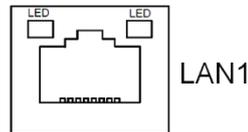
	LA_D3-/ eDP D3-	19	20	LA_D3+/ eDP D3+	
	LA_CLK-/ eDP AUX-	21	22	LA_CLK+/ eDP AUX+	
	LB_D0-	23	24	LB_D0+	
	LB_D1-	25	26	LB_D1+	
	LB_D2-	27	28	LB_D2+	
	LB_D3-	29	30	LB_D3+	
	LB_CLK-	31	32	LB_CLK+	
USB3	GND	33	34	GND	USB3
	USB2 9D-	35	36	USB2 9D+	
SMBus	SMBus DAT	37	38	5V_S5	Power LED
	SMBus CLK	39	40	Power LED+	

9. HDMI1:



(Vertical HDMI Connector) HDMI Interface connector.
HDMI 1.4, Support resolution up to 3840x2160@30Hz.

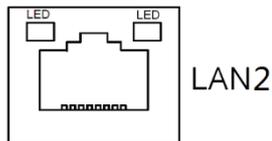
10. LAN1:



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

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

11. LAN2:



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

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

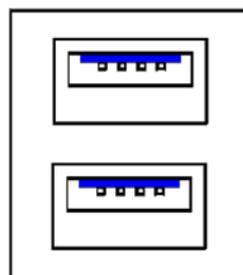
12. F_AUDIO1:

(SHD 1.25mm 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 Type-A) Rear USB3.2 Gen1 connector, provides up to 2 USB3.2 Gen1/USB2.0 ports, USB3.2 Gen1 allows data transfers up to 5.0Gbps.



Each USB Type A Receptacle (2 Ports) Current limited value is [2A](#).

If the external USB device current exceeds 2.0A, please separate connectors into different Receptacle.

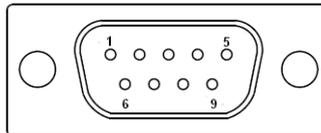
14. F_USB1:

(SHD 1.25mm 2x5pin header) Provide 2xUSB2.0 signals.

Signal Name	Pin#	Pin#	Signal Name
5V_USB23	1	2	5V_USB23
USB2_N	3	4	USB3_N
USB2_P	5	6	USB3_P
GND	7	8	GND
GND	9	10	GND

15. COM1:

(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.



RS232 (Default):	
Pin#	Signal Name
1	DCD# (Data Carrier Detect)
2	RXD (Received Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	JP1 select Setting (RI/5V/12V)
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:

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

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

17. COM2:

(SHD 1.25mm 2x5pin header) Provide RS232 RS422/485, Default is set to RS232, RS422/485 can be selected via BIOS.

Signal Name	Pin#	Pin#	Signal Name
DCD	1	2	RXD
TXD	3	4	DTR
GND	5	6	DSR
RTS	7	8	CTS
RI	9	10	NC

18. COM3-6:

(SHD 1.25mm 2x5pin header) Provide 4x2wired RS232(COM3/4/5/6).

Signal Name	Pin#	Pin#	Signal Name
COM3_RX	1	2	COM3_TX
COM4_RX	3	4	COM4_TX
COM5_RX	5	6	COM5_TX
COM6_RX	7	8	COM6_TX
GND	9	10	GND

19. GPIO1:

(SHD 1.25mm 2x5pin header) Provide 8Xgpio with 3.3V VCC.

Signal Name	Pin#	Pin#	Signal Name
3.3V_GPIO	1	2	GND
GPIO0	3	4	GPIO1
GPIO2	5	6	GPIO3
GPIO4	7	8	GPIO5
GPIO6	9	10	GPIO7

20. F_Panel1:

(SHD 1.25mm 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 M-Key Socket) Provide PCIe1, support M-key 2280 Nvme interface SSD.

24. M2_E1:

(M.2 E-Key Socket) Provide USB2.0/PCIe1/CNVi, support E-key 2230 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:

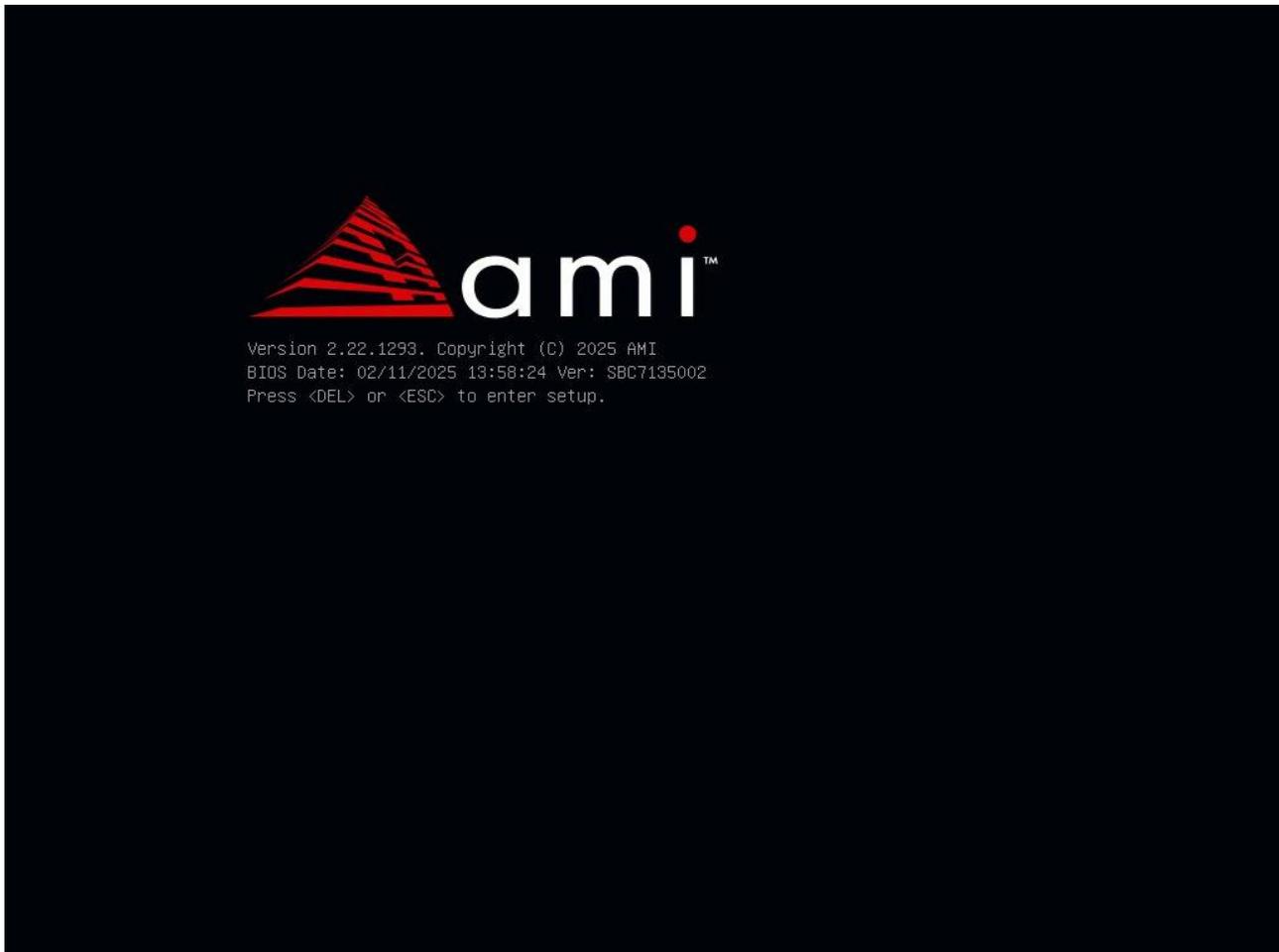
The AUTO_BTN button allows you to select automatic power on after the motherboard is powered on.

(Default)

Status	Function
Pin1-2 short circuit	Forced AT mode(Auto power ON)
Pin2-3 short circuit	AT(Auto power ON)/ATX(Manual Power ON) mode select via BIOS (Default AT mode)
*Note: Compatible with BIOS version 002	

3.1 Operations after POST Screen

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

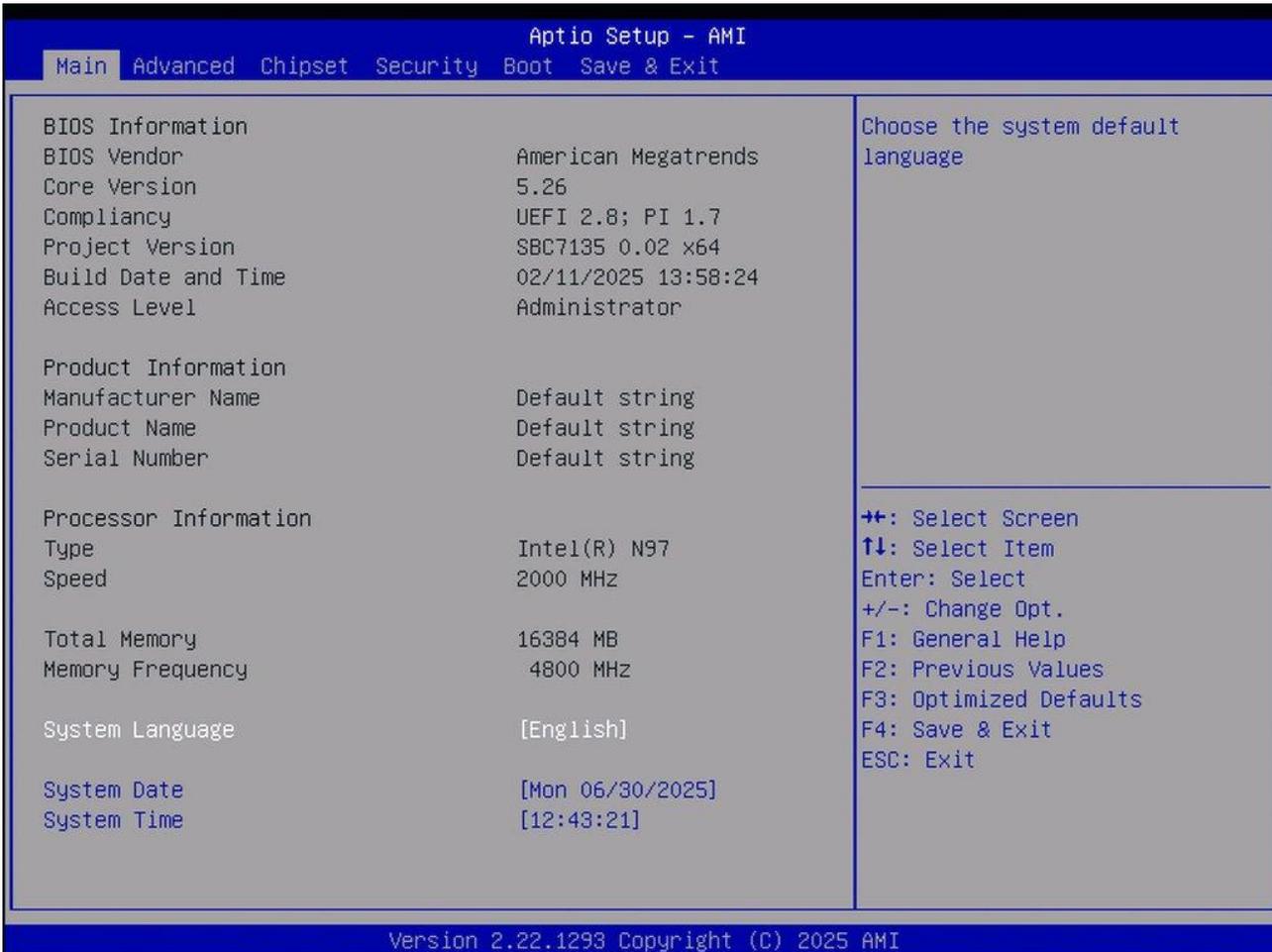


After optimizing and exiting CMOS Setup

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".

3.4.1.1 Efficient-core Information

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

L1 Data Cache	32 KB x 4
L1 Instruction Cache	64 KB x 4
L2 Cache	2048 KB
L3 Cache	6 MB

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

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

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3.4.2 Power & Performance

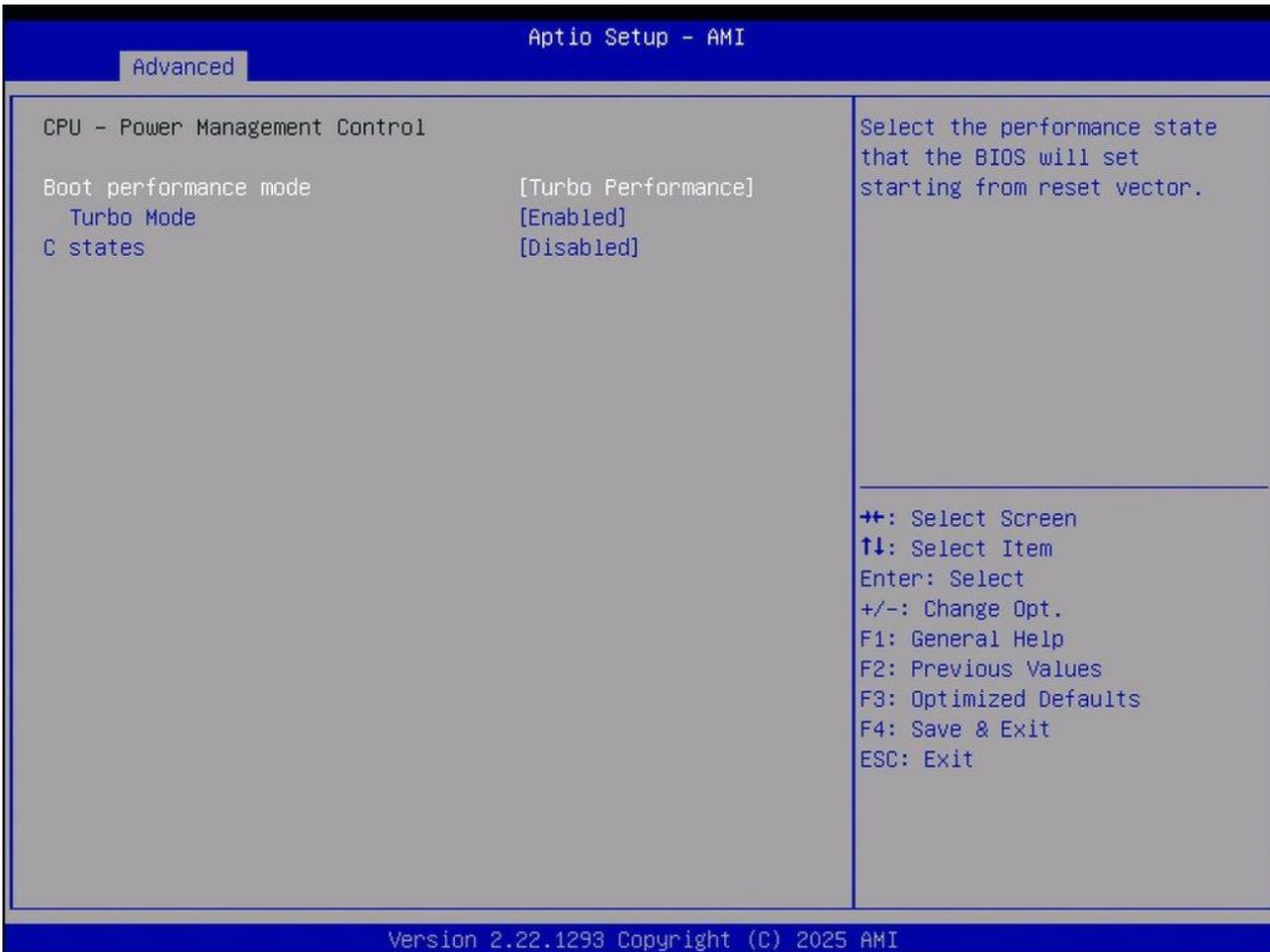
The screenshot shows the 'Advanced' menu of the Aptio Setup - AMI. The 'Power & Performance' section is selected, displaying the following options:

- ▶ CPU - Power Management Control
- ▶ GT - Power Management Control

The 'CPU - Power Management Control Options' section is currently empty. Navigation instructions are listed on the right side of the screen:

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

3.4.2.1 CPU-Power Management Control



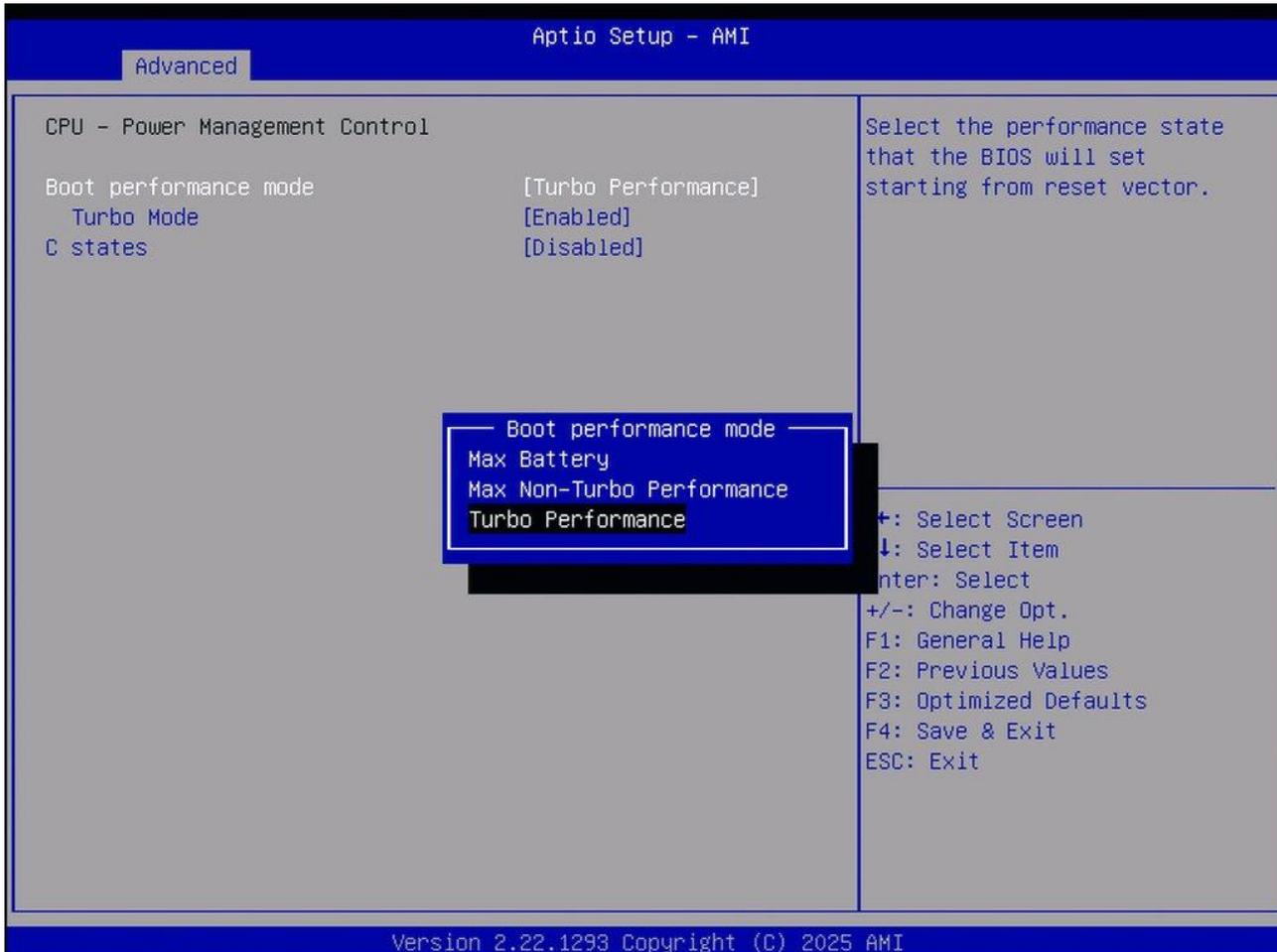
Boot performance mode:

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

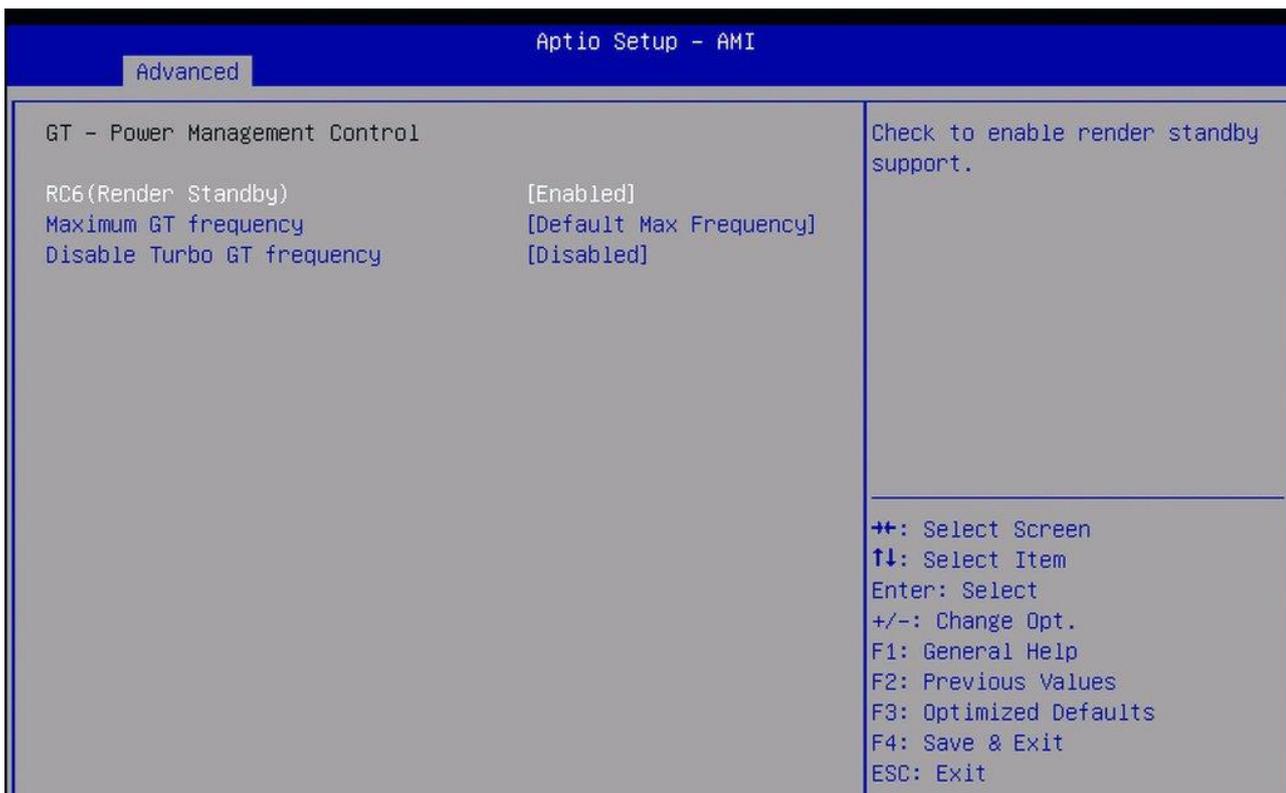
Turbo Mode:

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

2.4.2.1.1 Boot performance mode



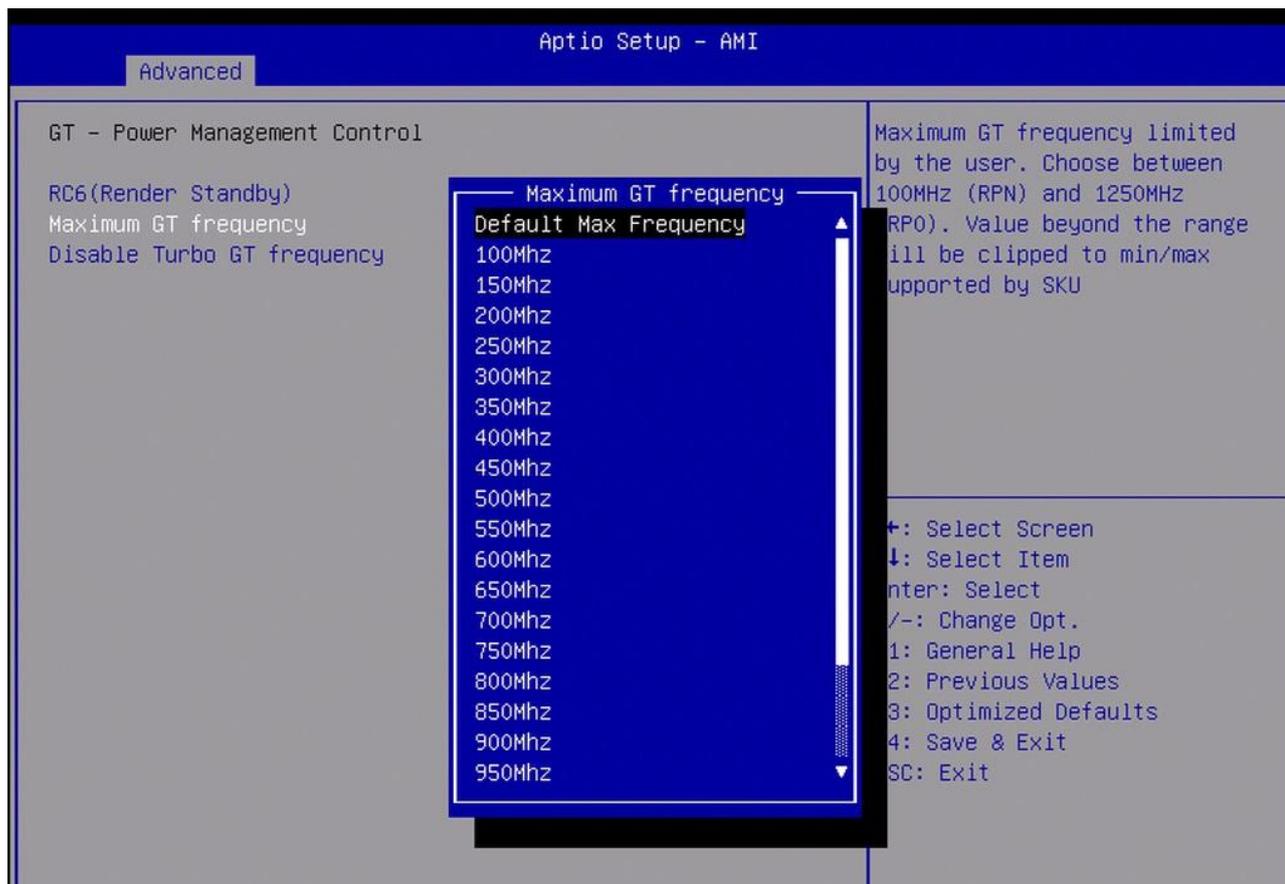
3.4.2.2 GT- Power Management Control



RC6(Render Standby):

Check to enable render standby support.

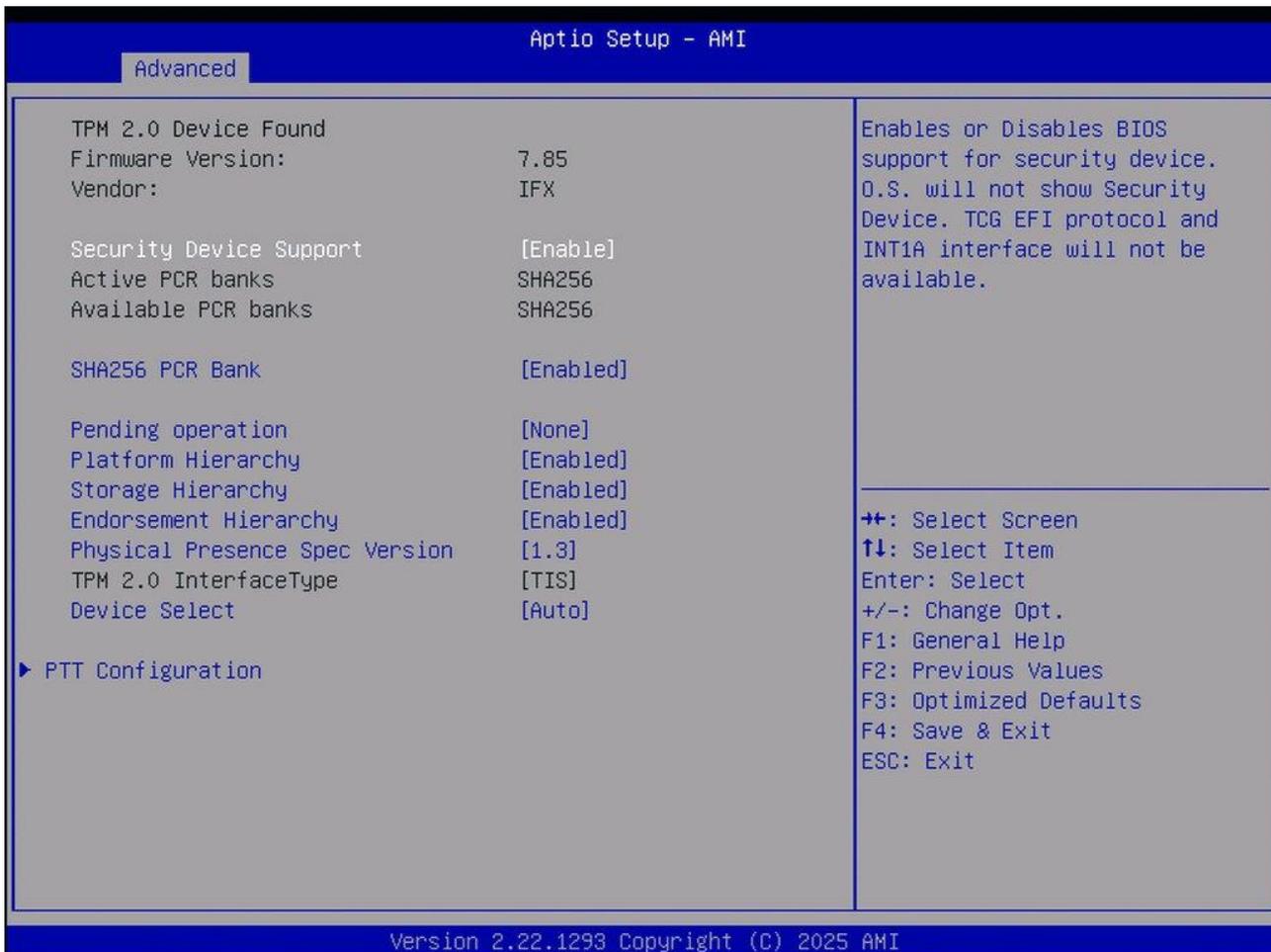
Maximum GT frequency:



Disable Turbo GT frequency:

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

3.4.3 Trusted Computing



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.

SHA256 PCR Bank:

Enable or Disable SHA256 PCR Bank

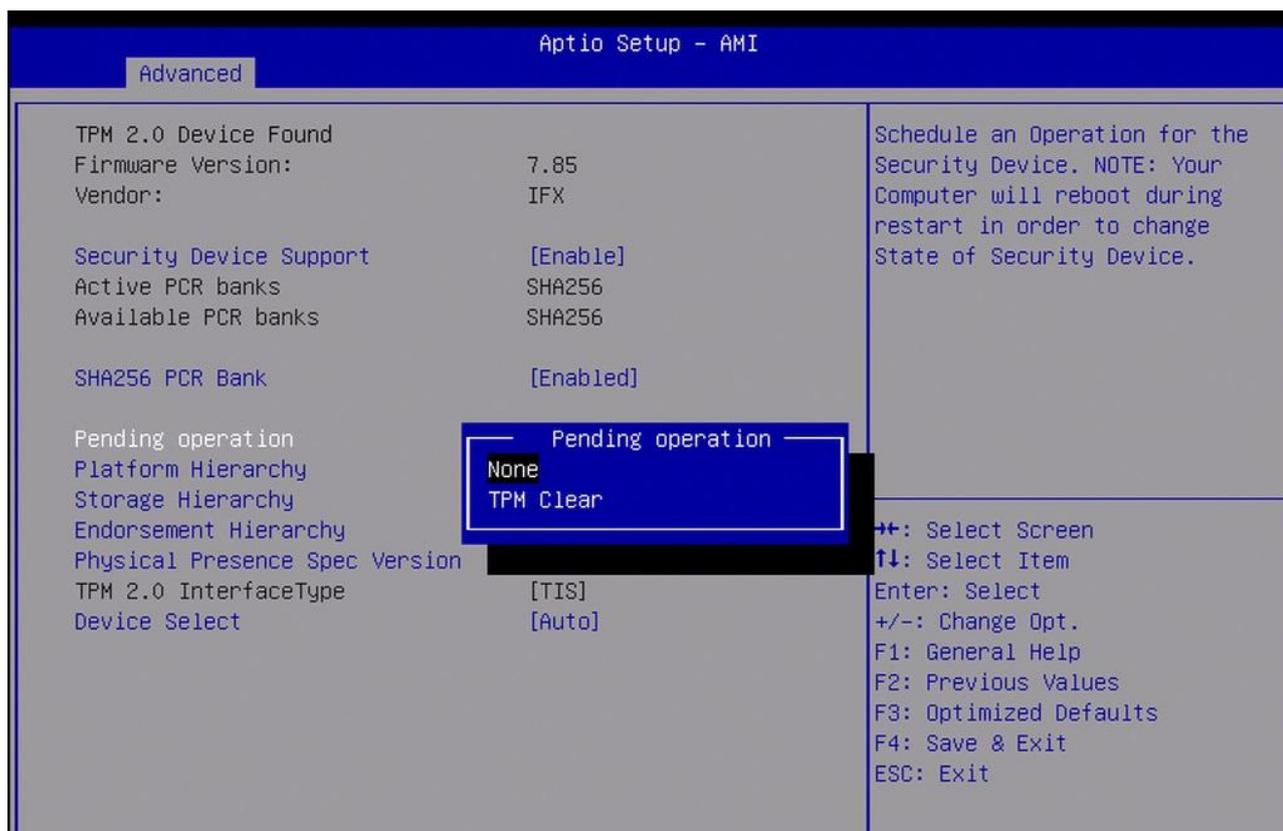
Pending operation:

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

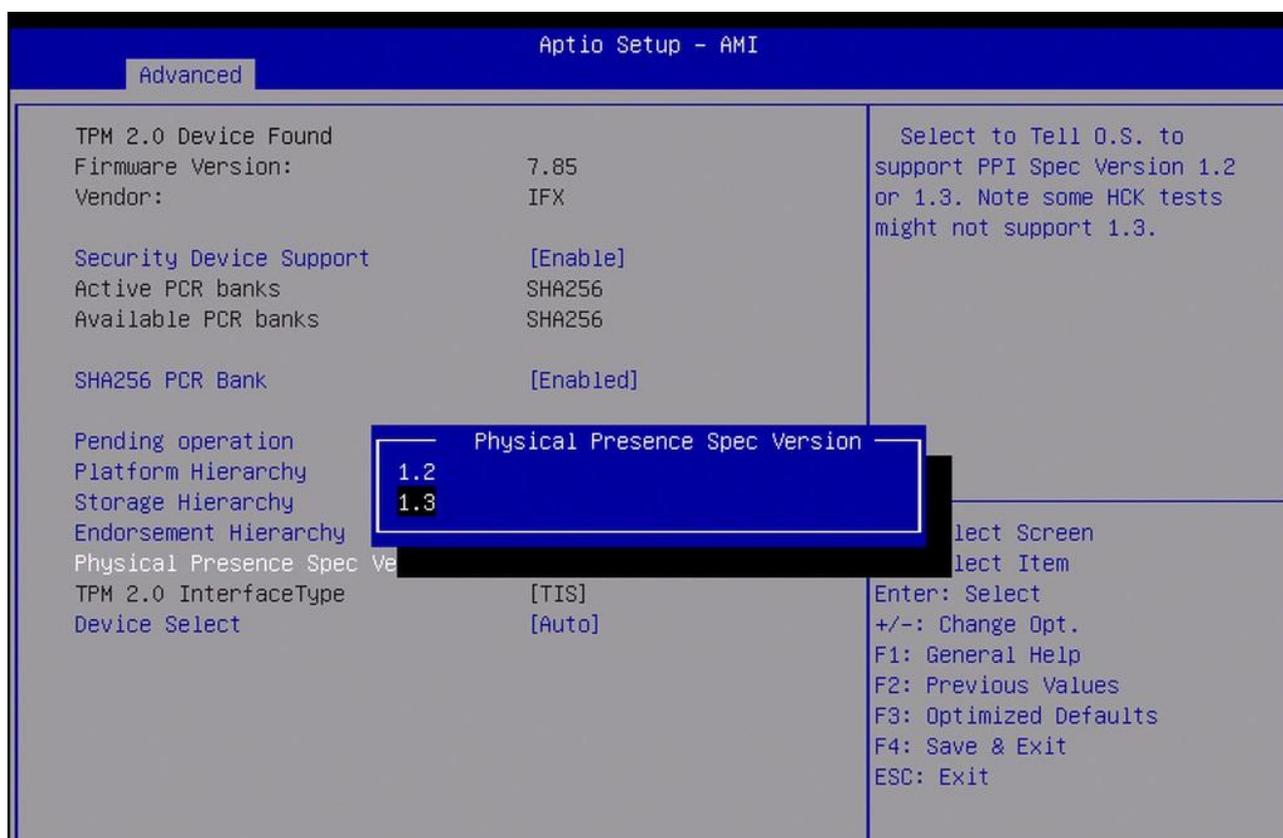
Device Select:

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

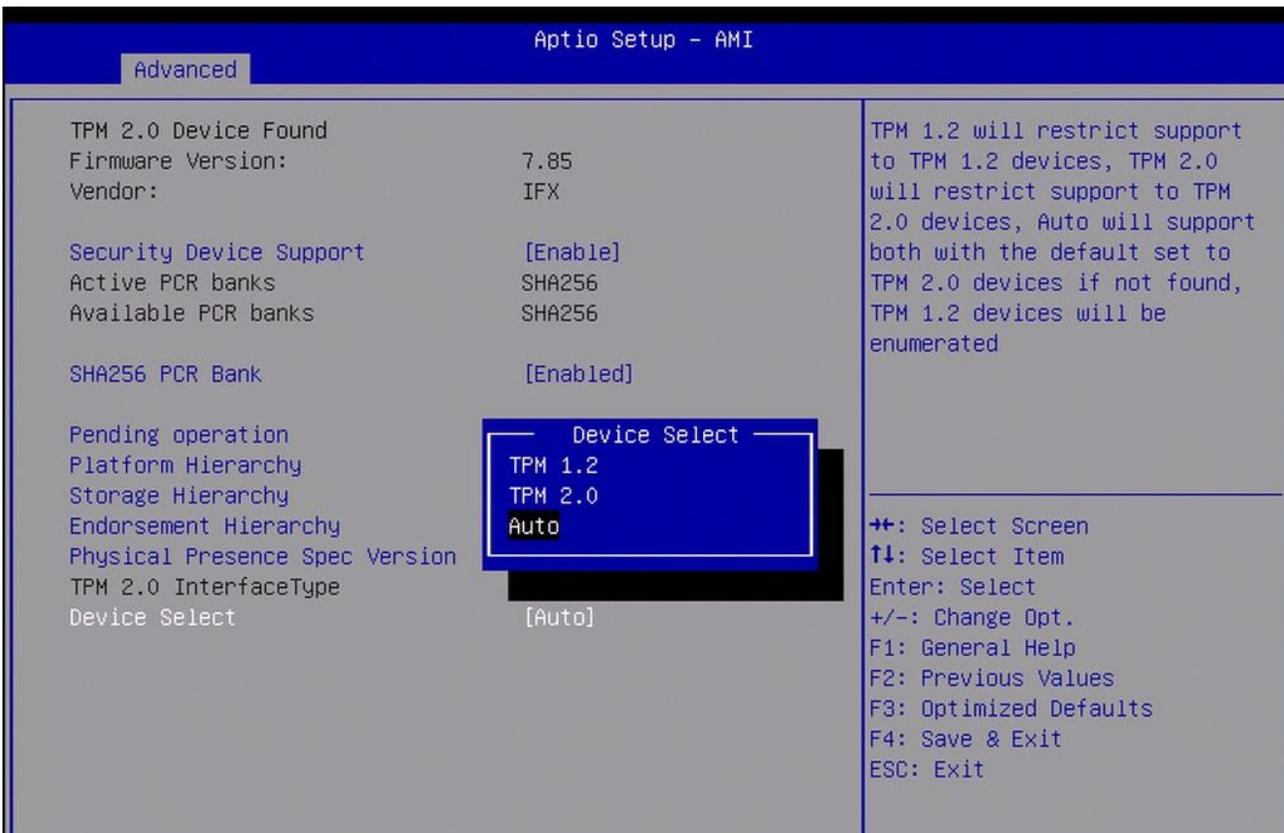
3.4.3.1 Pending operation



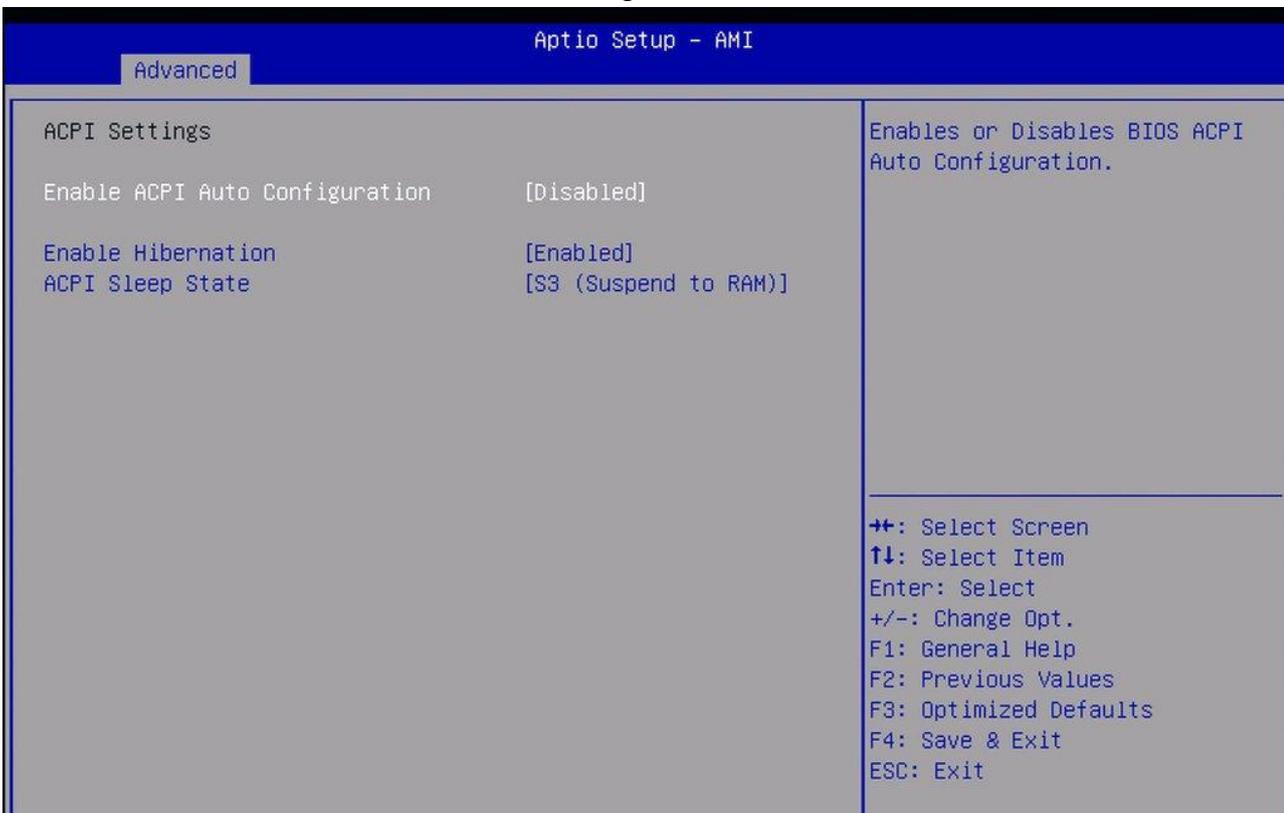
3.4.3.2 Physical Presence Spec Version



3.4.3.3 Device Select



3.4.4 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.

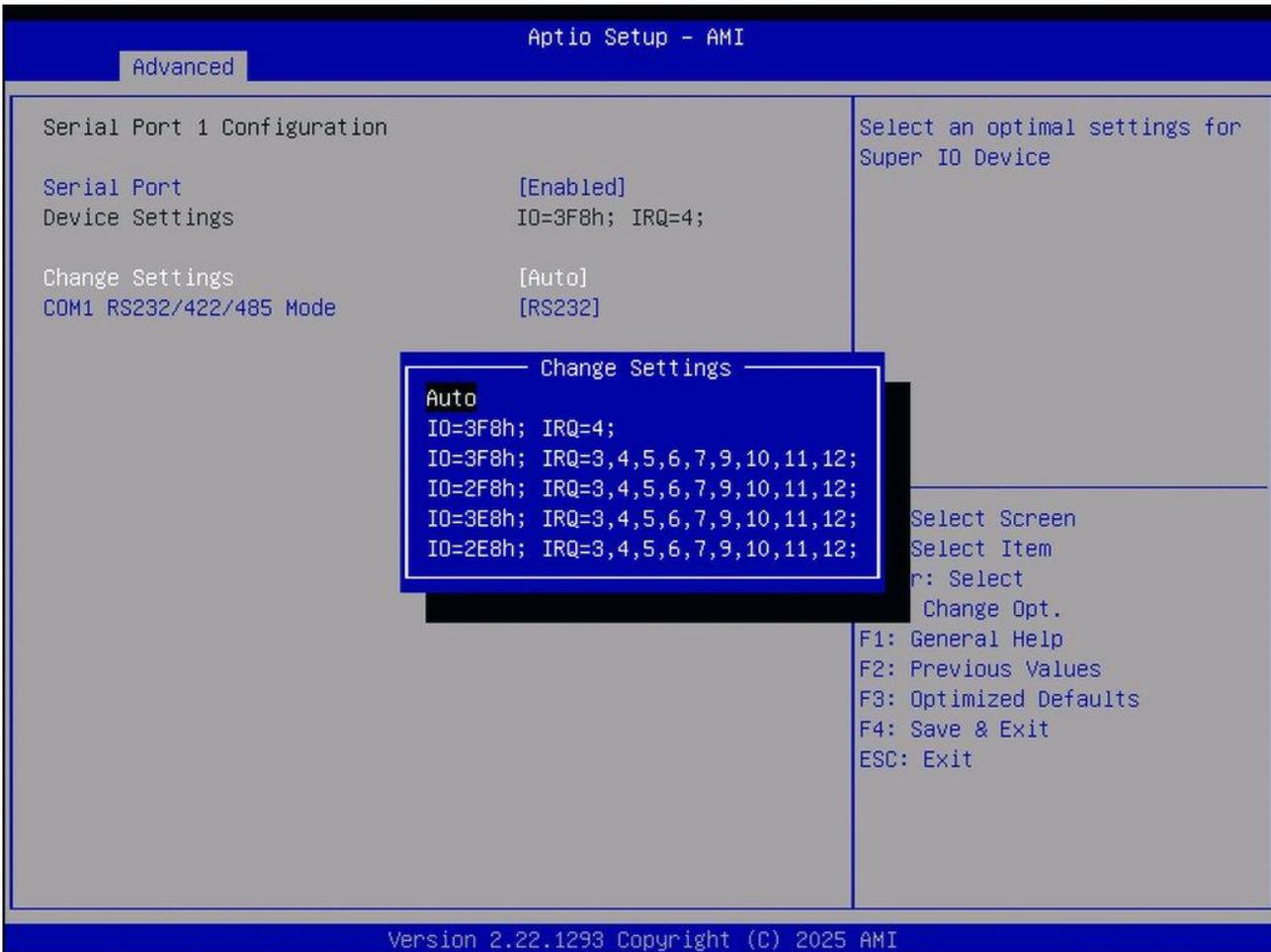
ACPI Sleep State:

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

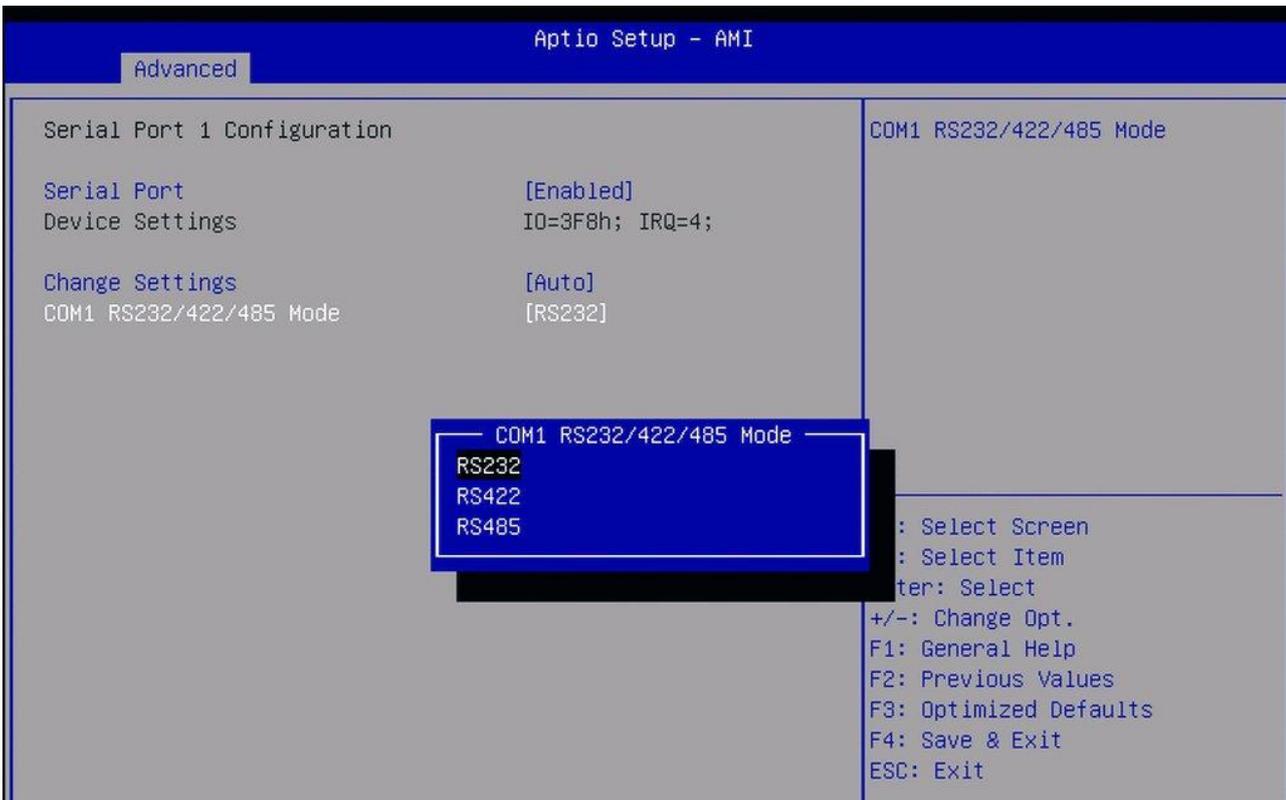
3.4.5 IT8786 Super IO Configuration



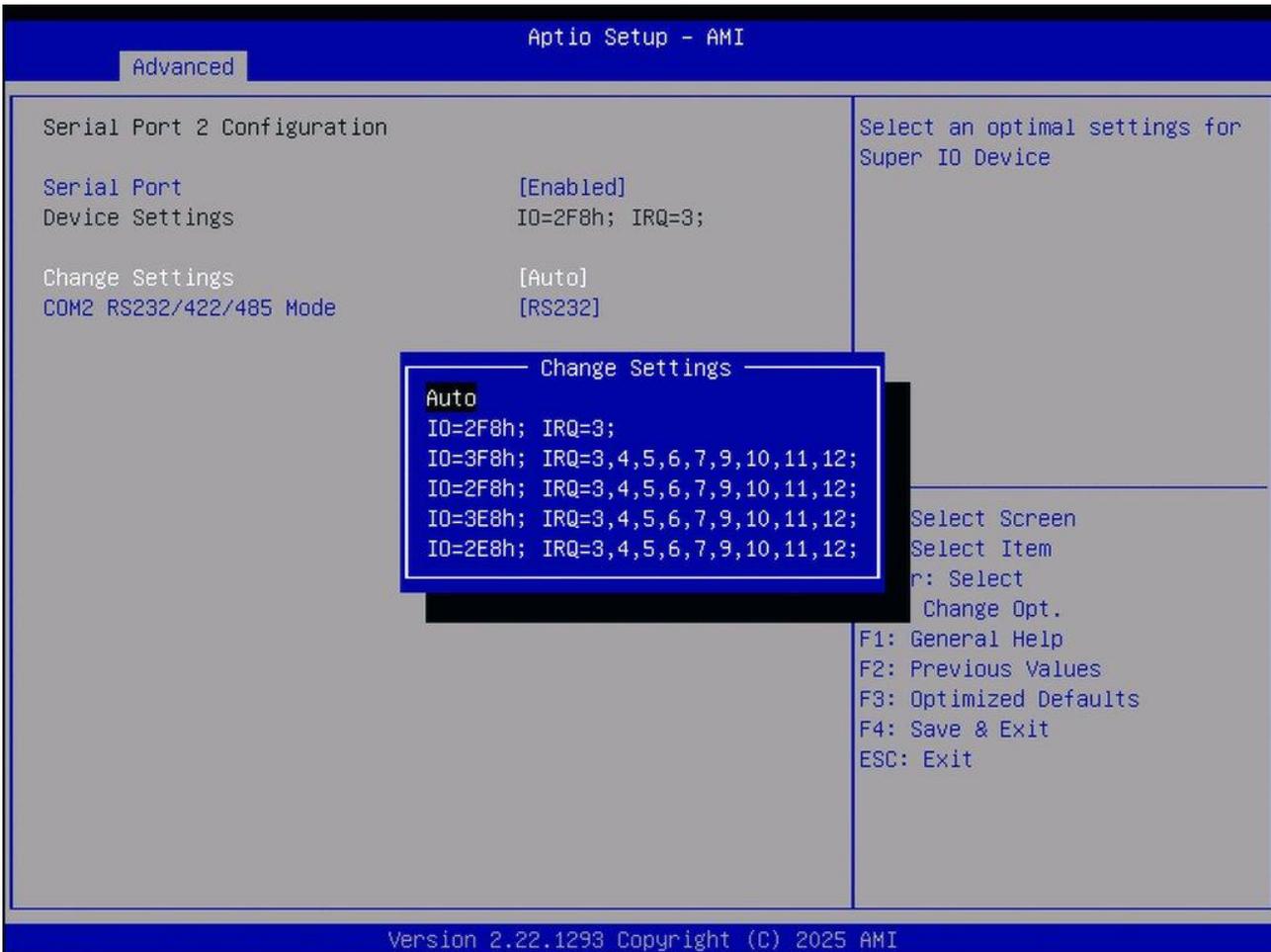
3.4.5.1 Serial Port 1 Configuration



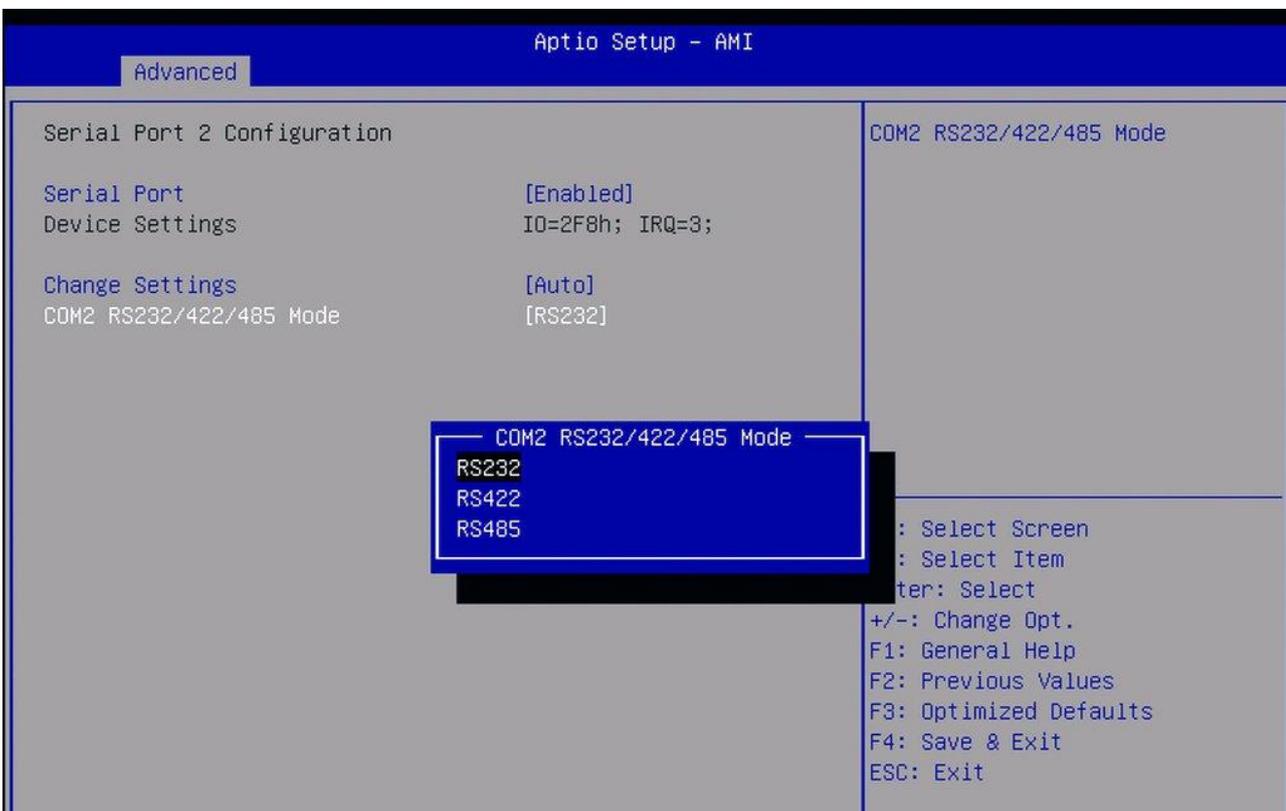
Com1 RS232/422/485 Mode



3.4.5.2 Serial Port 2 Configuration



Com2 RS232/422/485 Mode



3.4.5.3 Serial Port 3 Configuration

Aptio Setup - AMI

Advanced

Serial Port 3 Configuration

Serial Port [Enabled]

Device Settings IO=3E8h; IRQ=6;

Change Settings [Auto]

Select an optimal settings for Super IO Device

Change Settings

Auto

IO=3E8h; IRQ=6;

IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;

Select Screen

Select Item

r: Select

Change Opt.

F1: General Help

F2: Previous Values

F3: Optimized Defaults

F4: Save & Exit

ESC: Exit

3.4.5.4 Serial Port 4 Configuration

Aptio Setup - AMI

Advanced

Serial Port 4 Configuration

Serial Port [Enabled]

Device Settings IO=2E8h; IRQ=7;

Change Settings [Auto]

Select an optimal settings for Super IO Device

Change Settings

Auto

IO=2E8h; IRQ=7;

IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;

IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;

Select Screen

Select Item

r: Select

Change Opt.

F1: General Help

F2: Previous Values

F3: Optimized Defaults

F4: Save & Exit

ESC: Exit

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3.4.5.5 Serial Port 5 Configuration

Aptio Setup - AMI

Advanced

Serial Port 5 Configuration

Select an optimal settings for Super IO Device

Serial Port [Enabled]
Device Settings IO=3E0h; IRQ=11;
Change Settings [Auto]

Change Settings

Auto
IO=2E0h; IRQ=10;
IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;

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

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3.4.5.6 Serial Port 6 Configuration

Aptio Setup - AMI

Advanced

Serial Port 6 Configuration

Select an optimal settings for Super IO Device

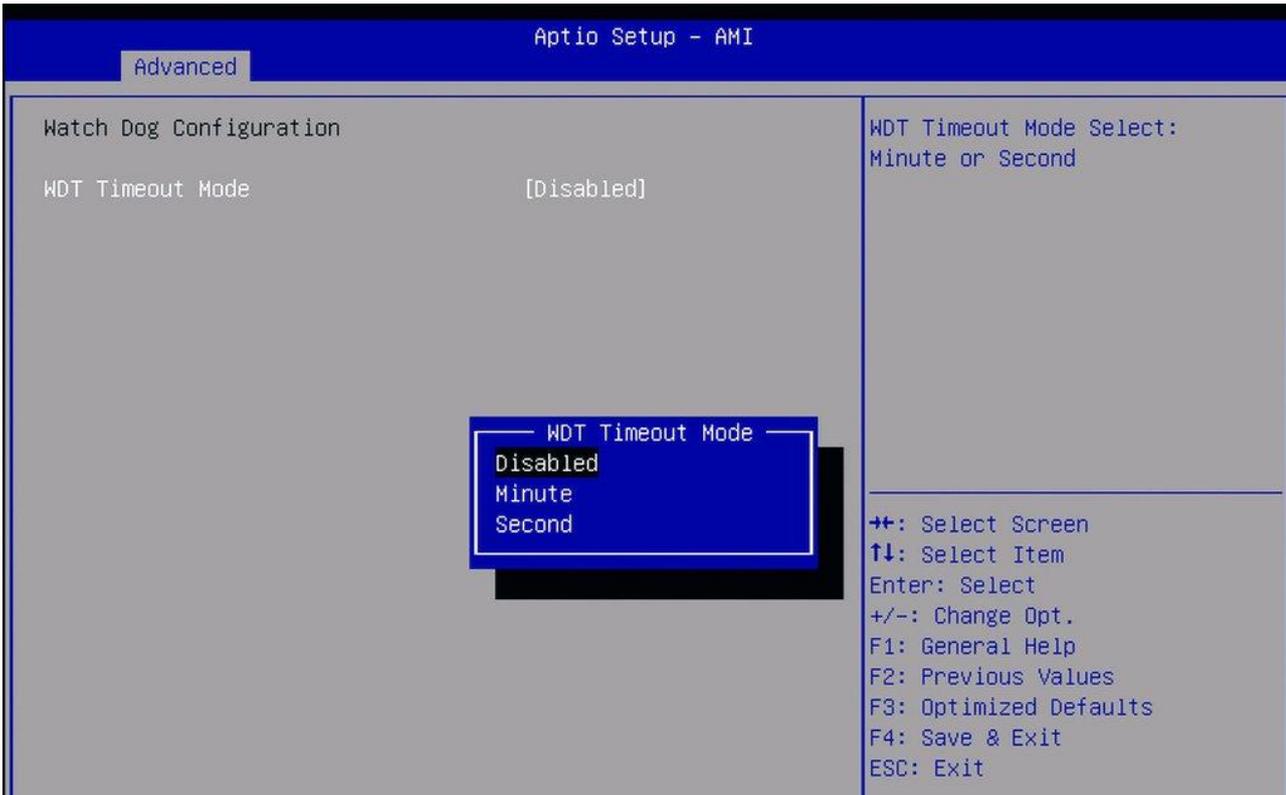
Serial Port [Enabled]
Device Settings IO=2E0h; IRQ=10;
Change Settings [Auto]

Change Settings

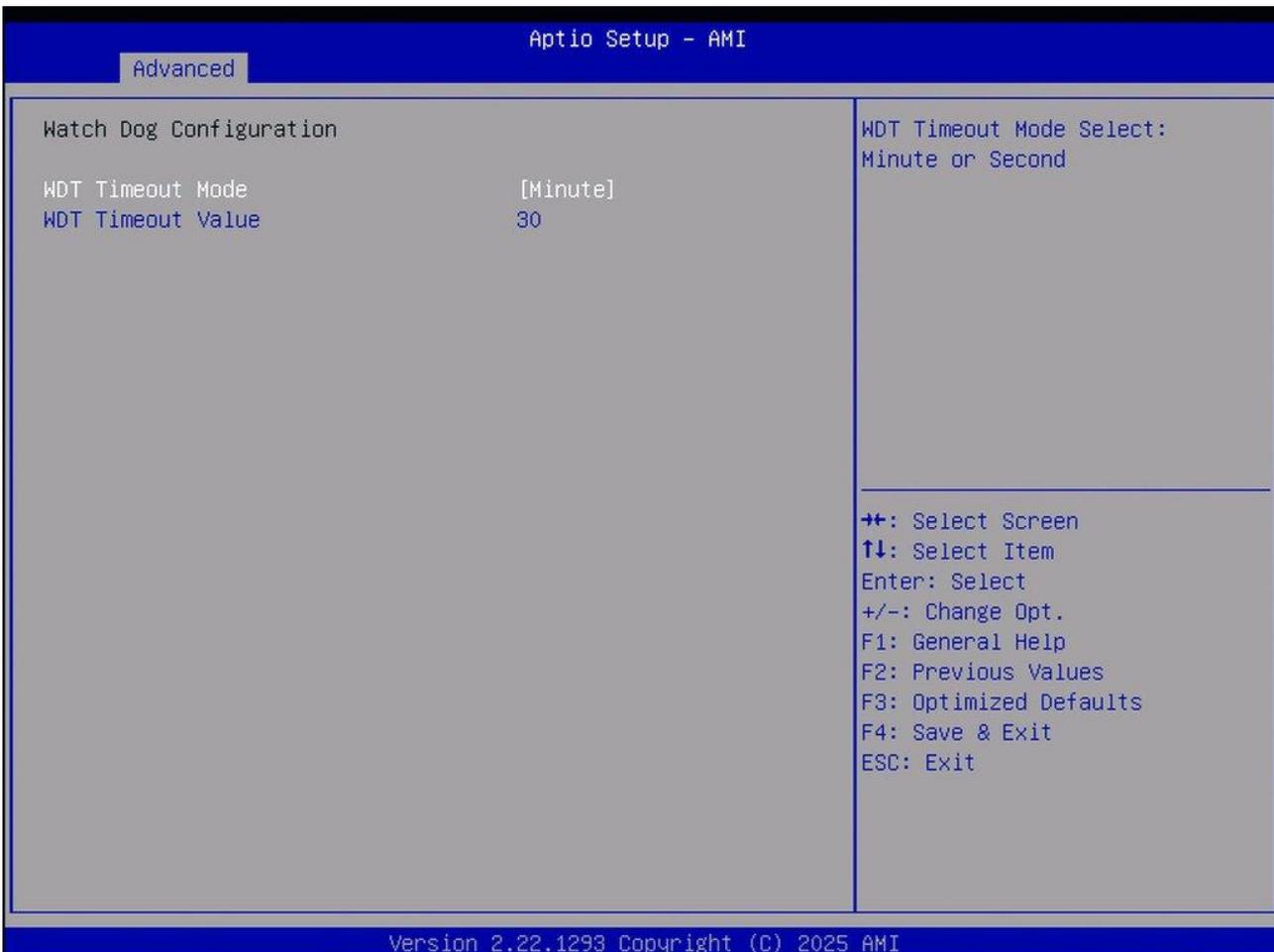
Auto
IO=3E0h; IRQ=11;
IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12;
IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;

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

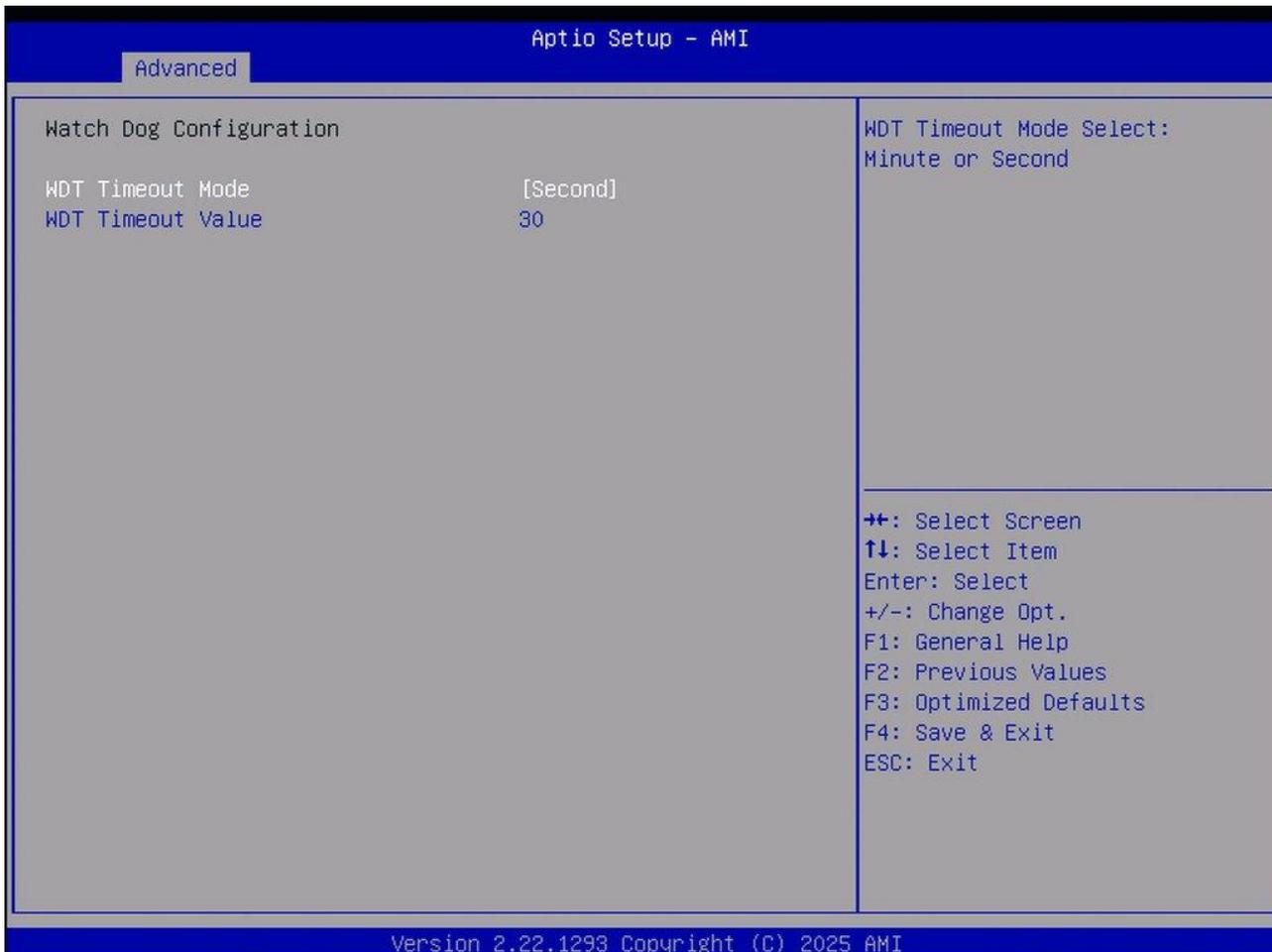
3.4.5.7 Watch Dog Configuration



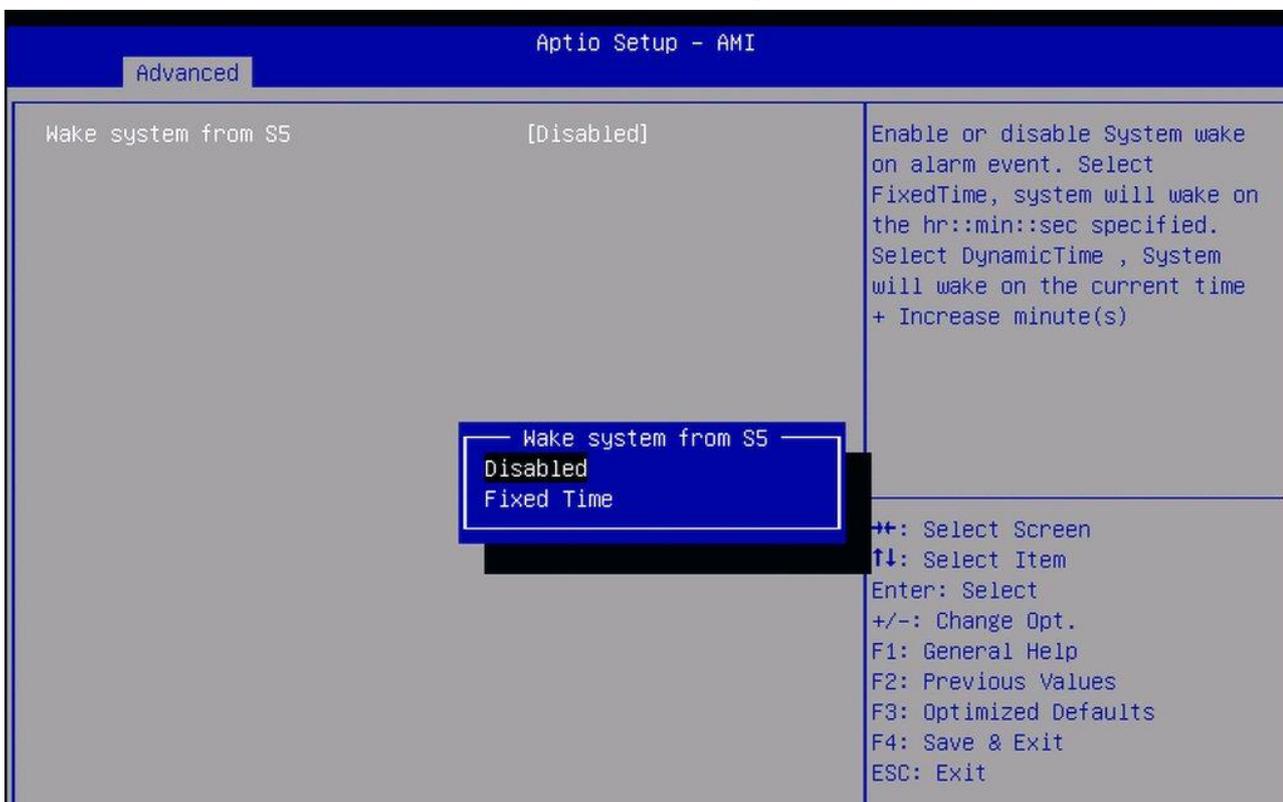
WDT Timeout Value:0~255 Minute



WDT Timeout Value:0~255 Second.



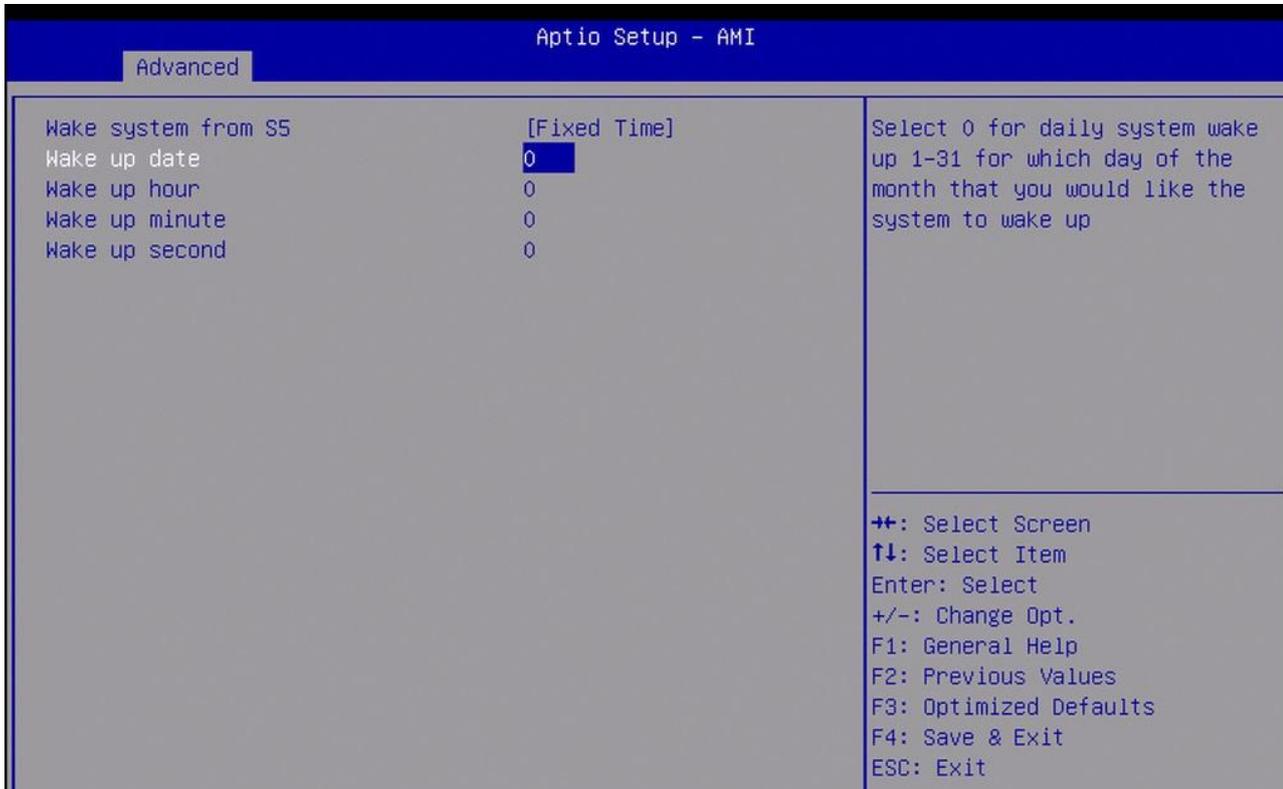
3.4.6 S5 RTC Wake Settings



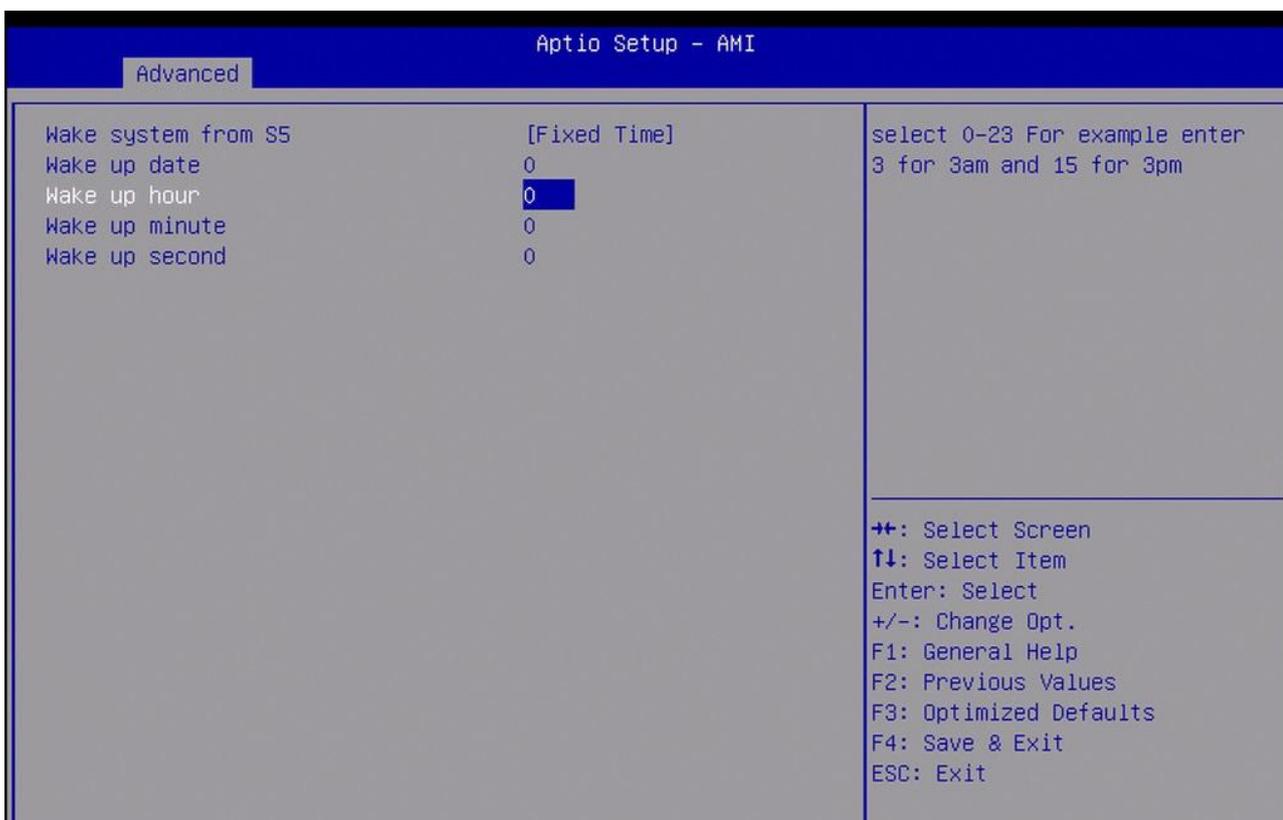
Wake system from S5:

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)

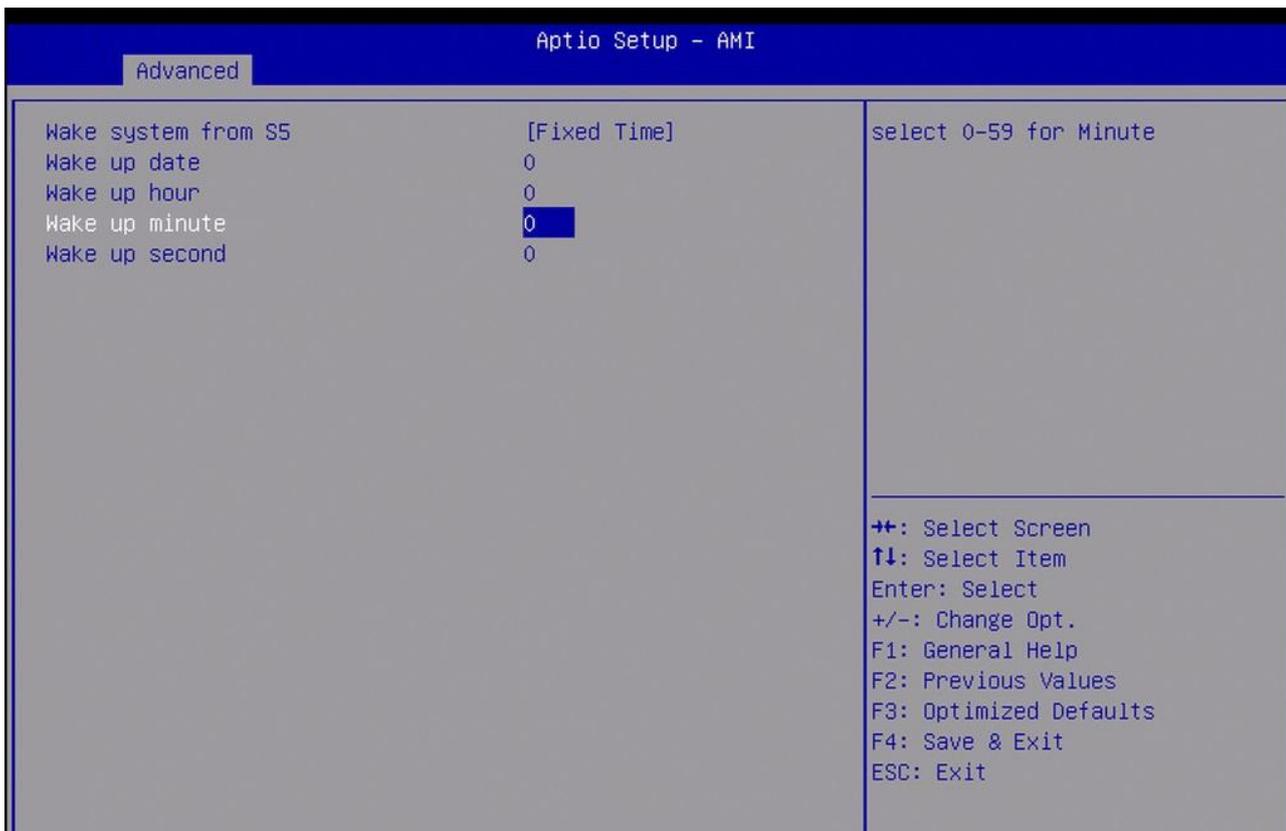
Wake up date: Select 0 for daily system wake up 1-31 for which day of the month that you would like the system to wake up



select 0-23 For example enter 3 for 3am and 15 for 3pm



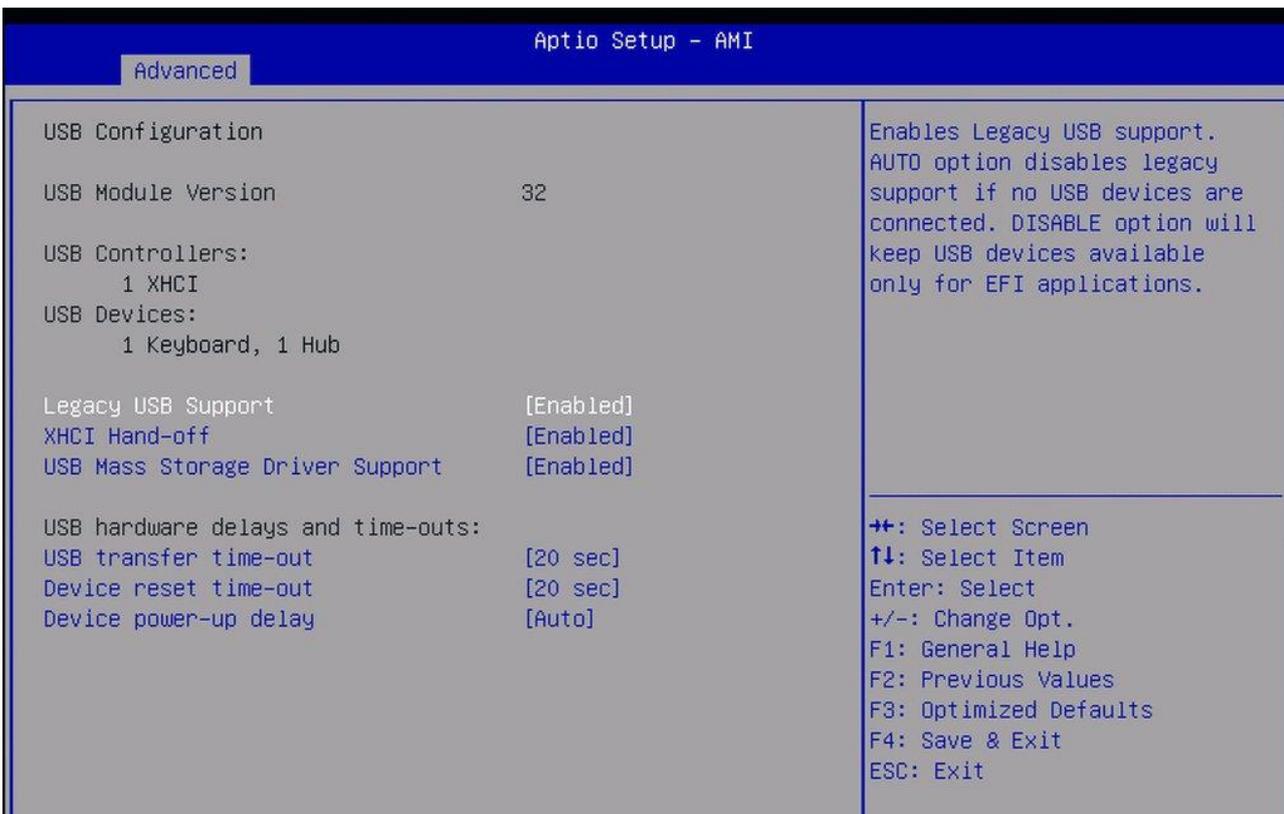
select 0-59 for Minute



select 0-59 for Second



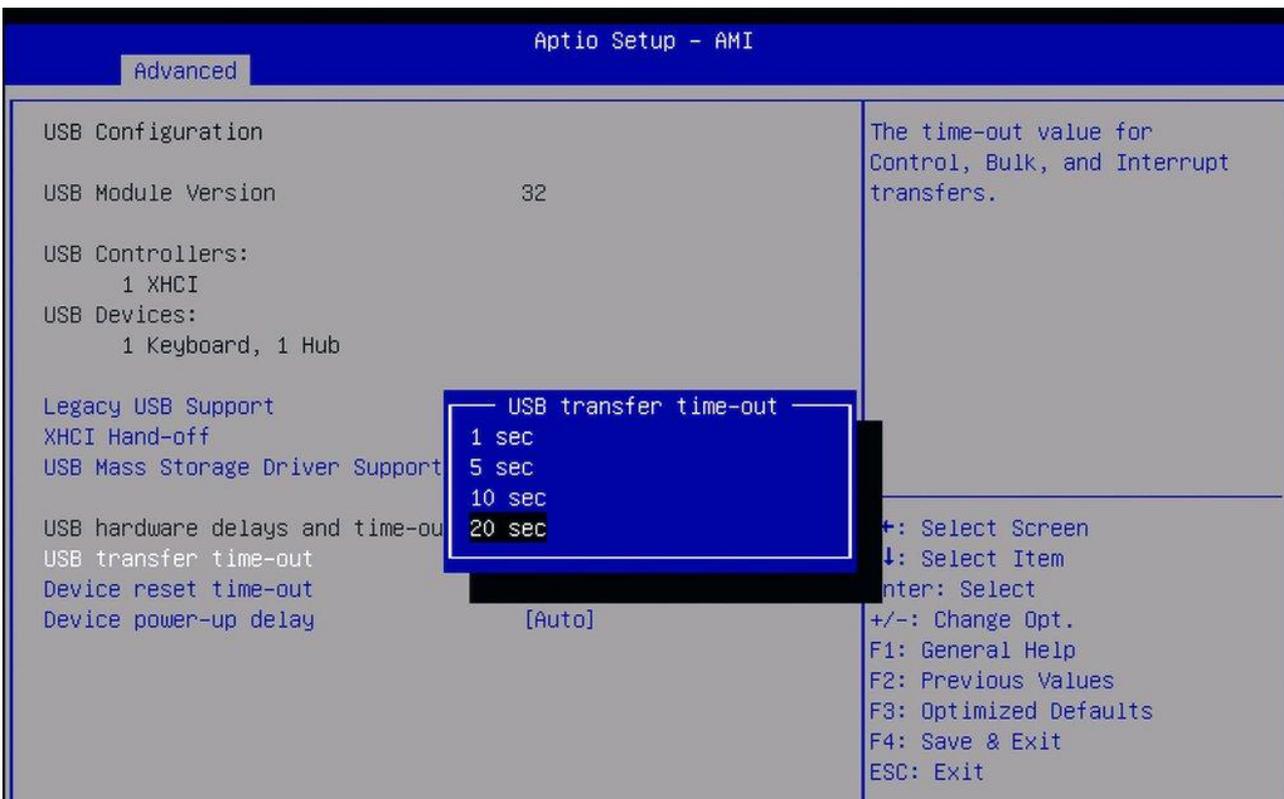
3.4.7 USB Configuration



Legacy USB Support:

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

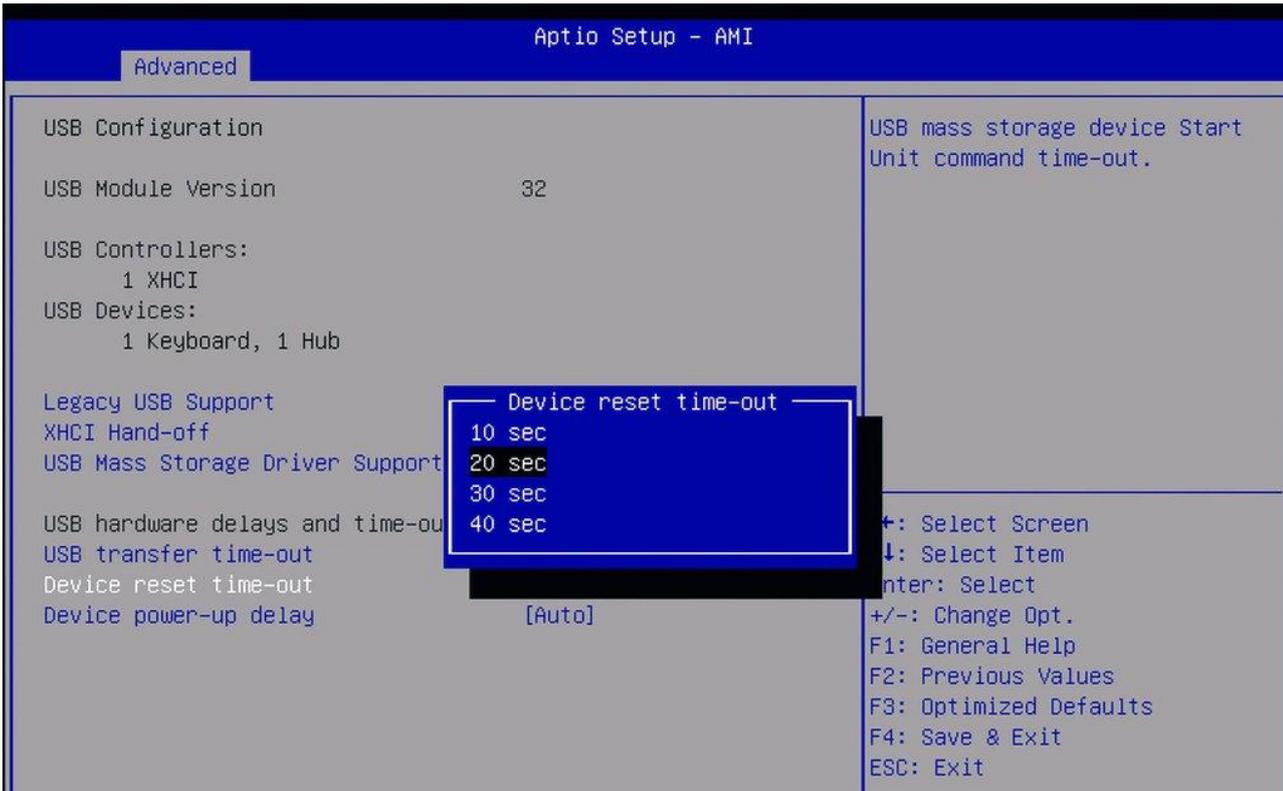
3.4.7.1 USB transfer time-out



USB transfer time-out:

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

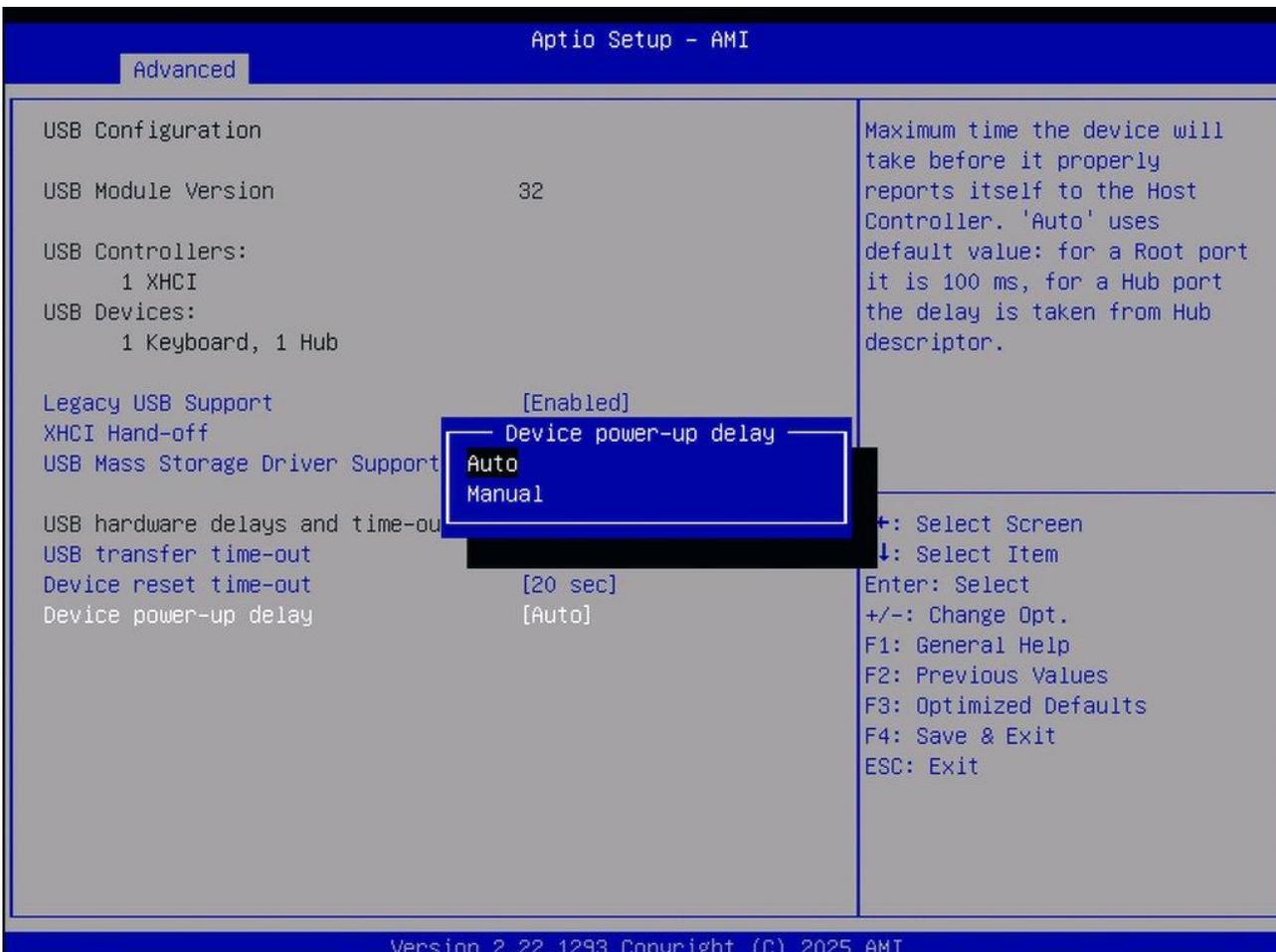
3.4.7.2 Device reset time-out



Device reset time-out:

USB mass storage device Start Unit command time-out.

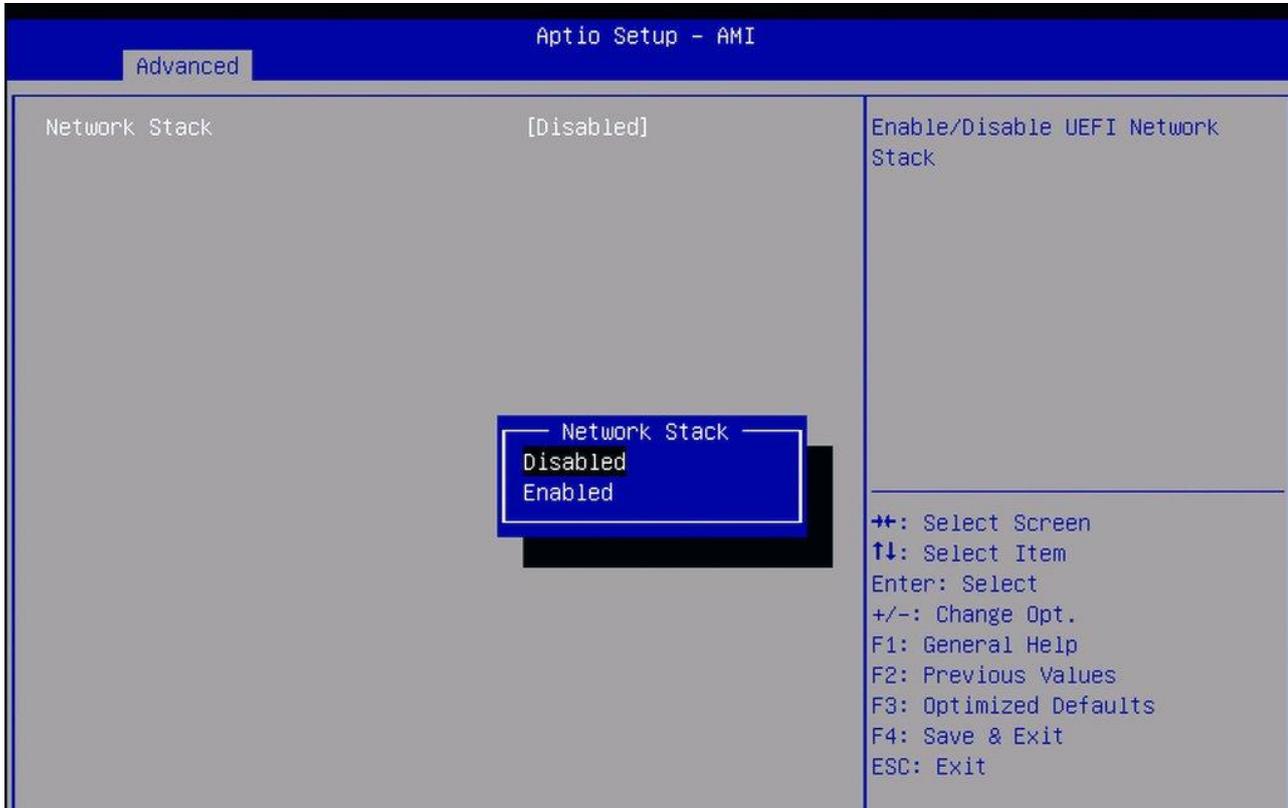
3.4.7.3 Device power-up delay



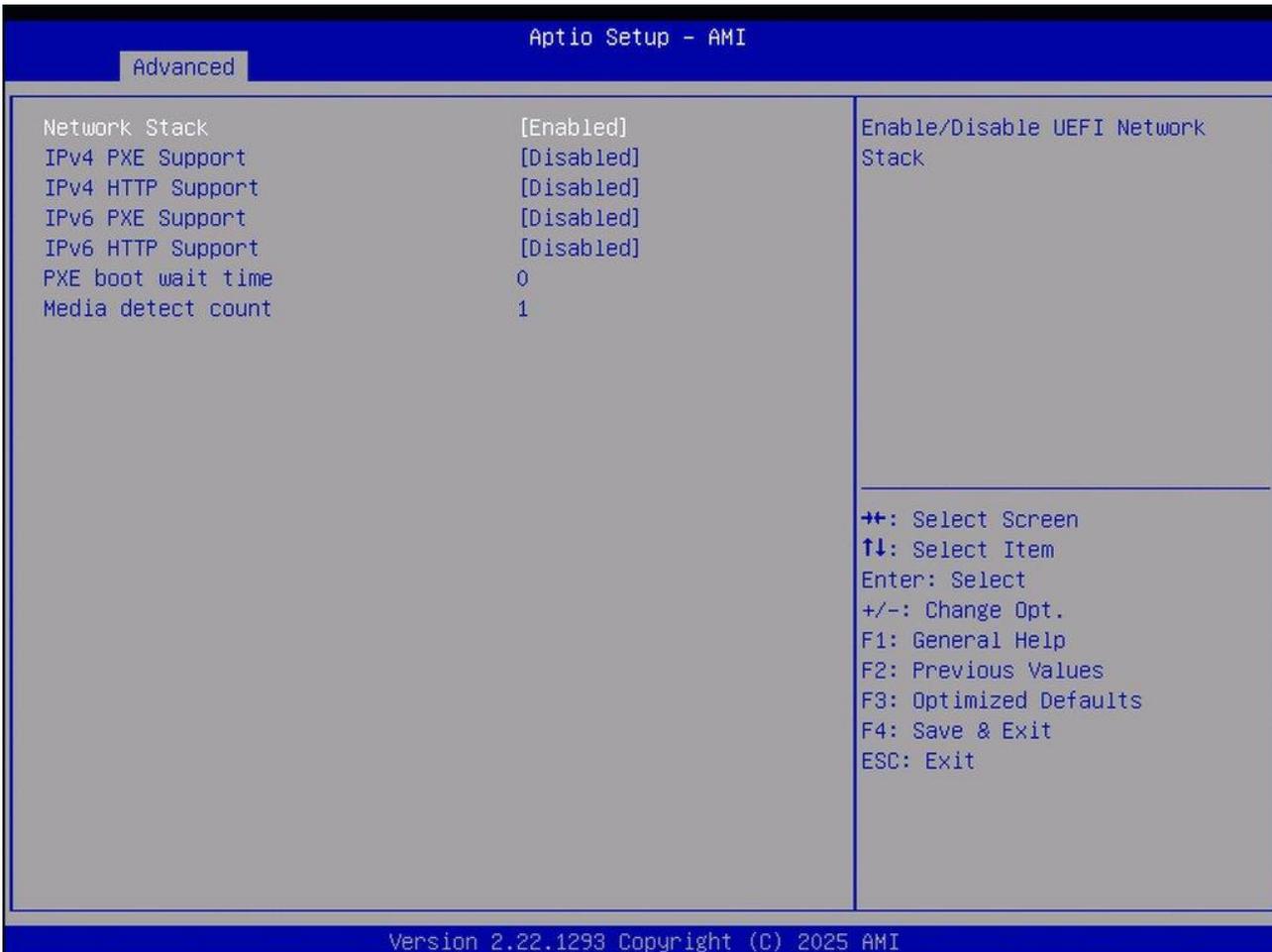
Device power-up delay:

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.

3.4.8 Network Stack Configuration



3.4.8.1 PXE boot wait time



IPV4 PXE Support:

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

IPV4 HTTP Support:

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

IPV6 PXE Support:

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

IPV6 HTTP Support:

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

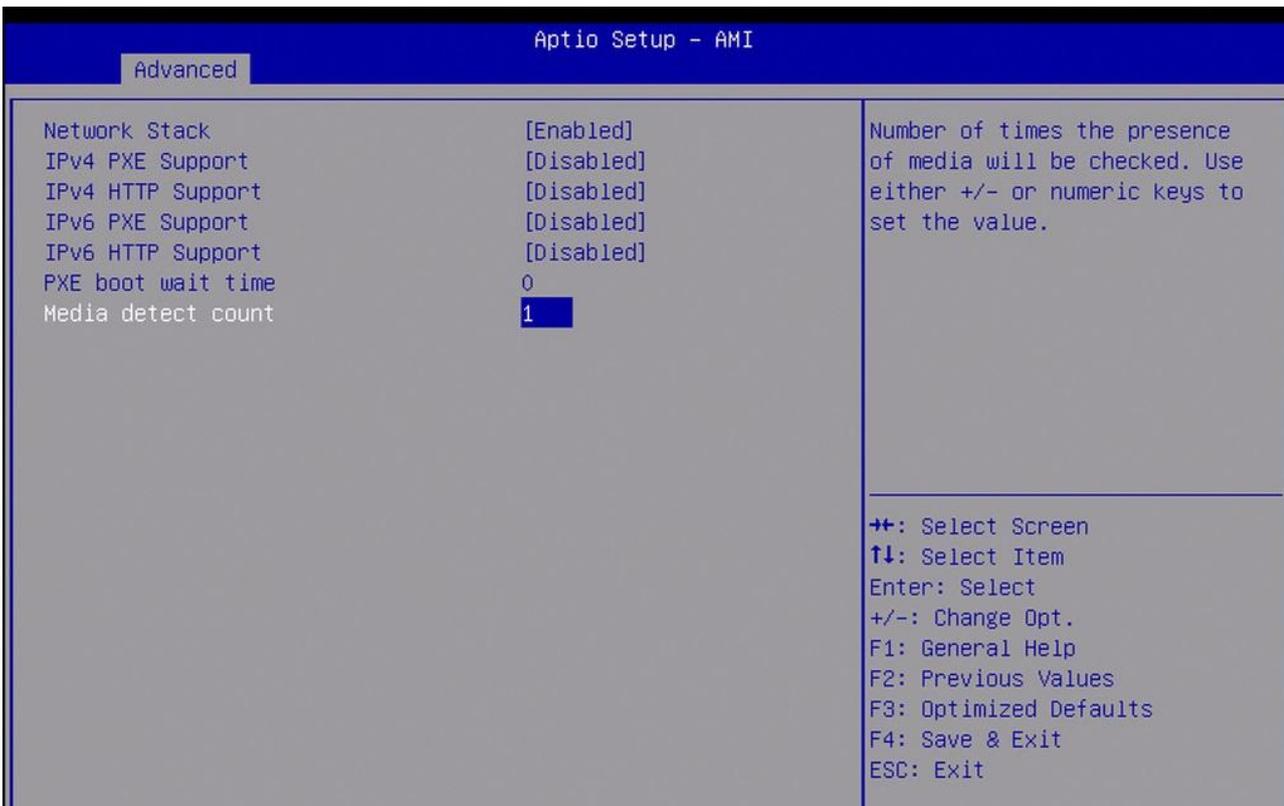
PXE Boot Wait Time:

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

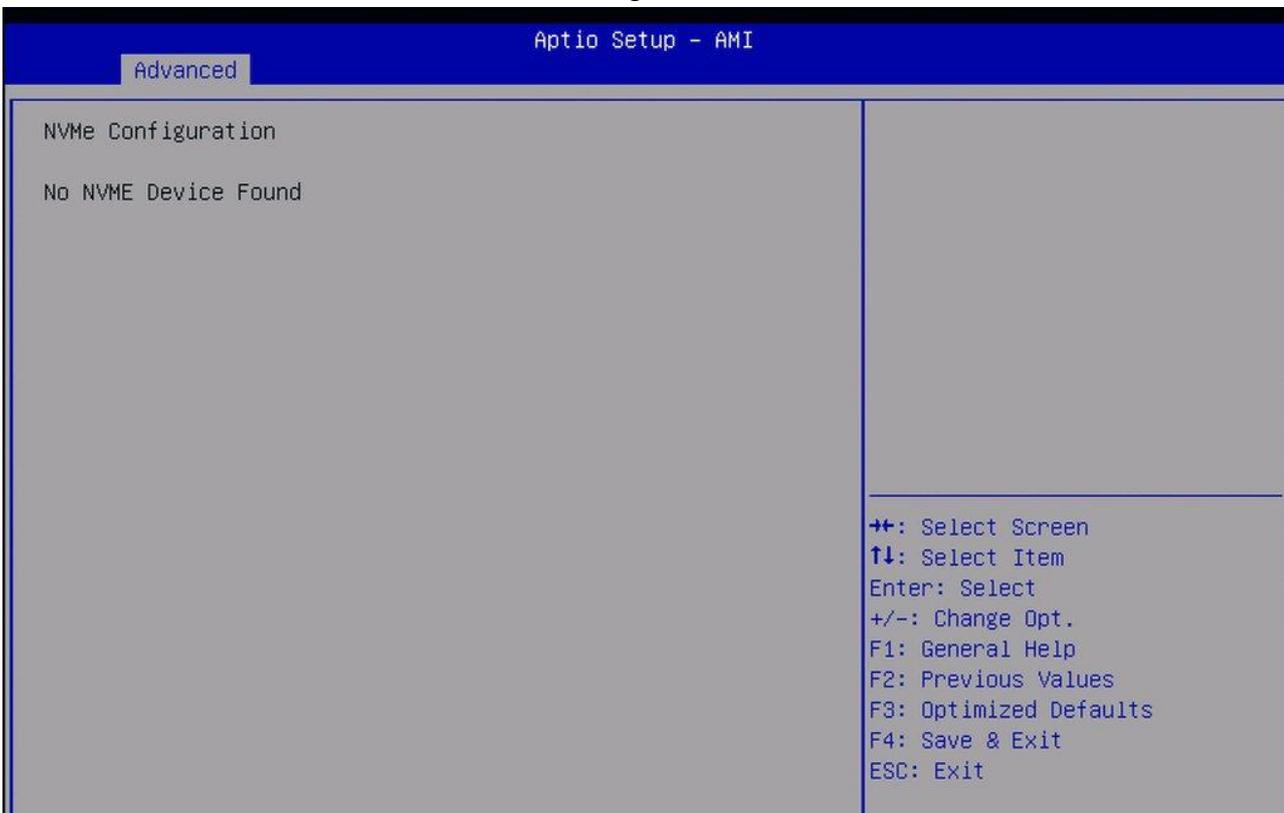
Media detect count:

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

3.4.8.2 Media detect count



3.4.9 NVMe Configuration



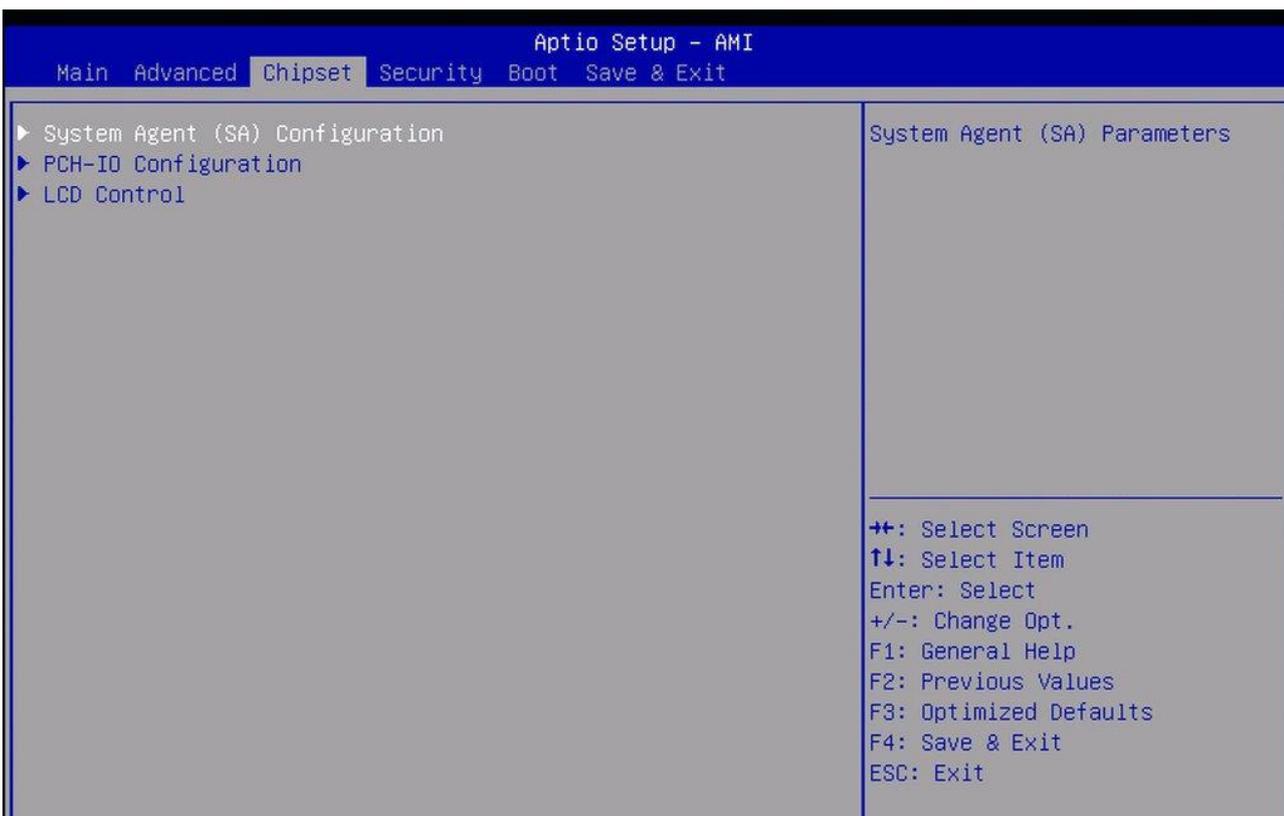
3.4.10 Intel(R) Ethernet Controller I226-V



3.4.11 Intel(R) Ethernet Controller I226-V



3.5 Chipset Settings



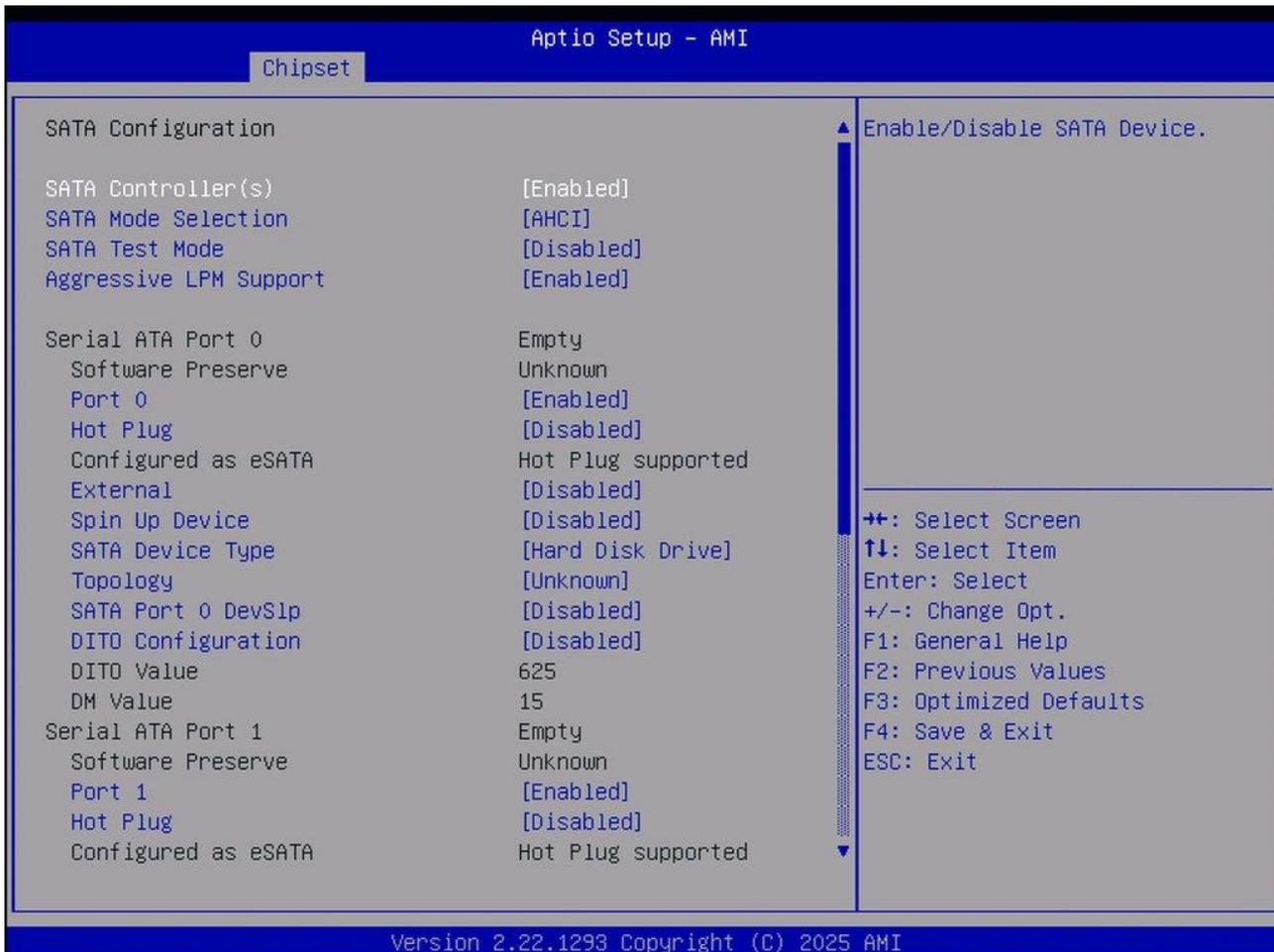
3.5.2 PCH-IO Configuration



Note:

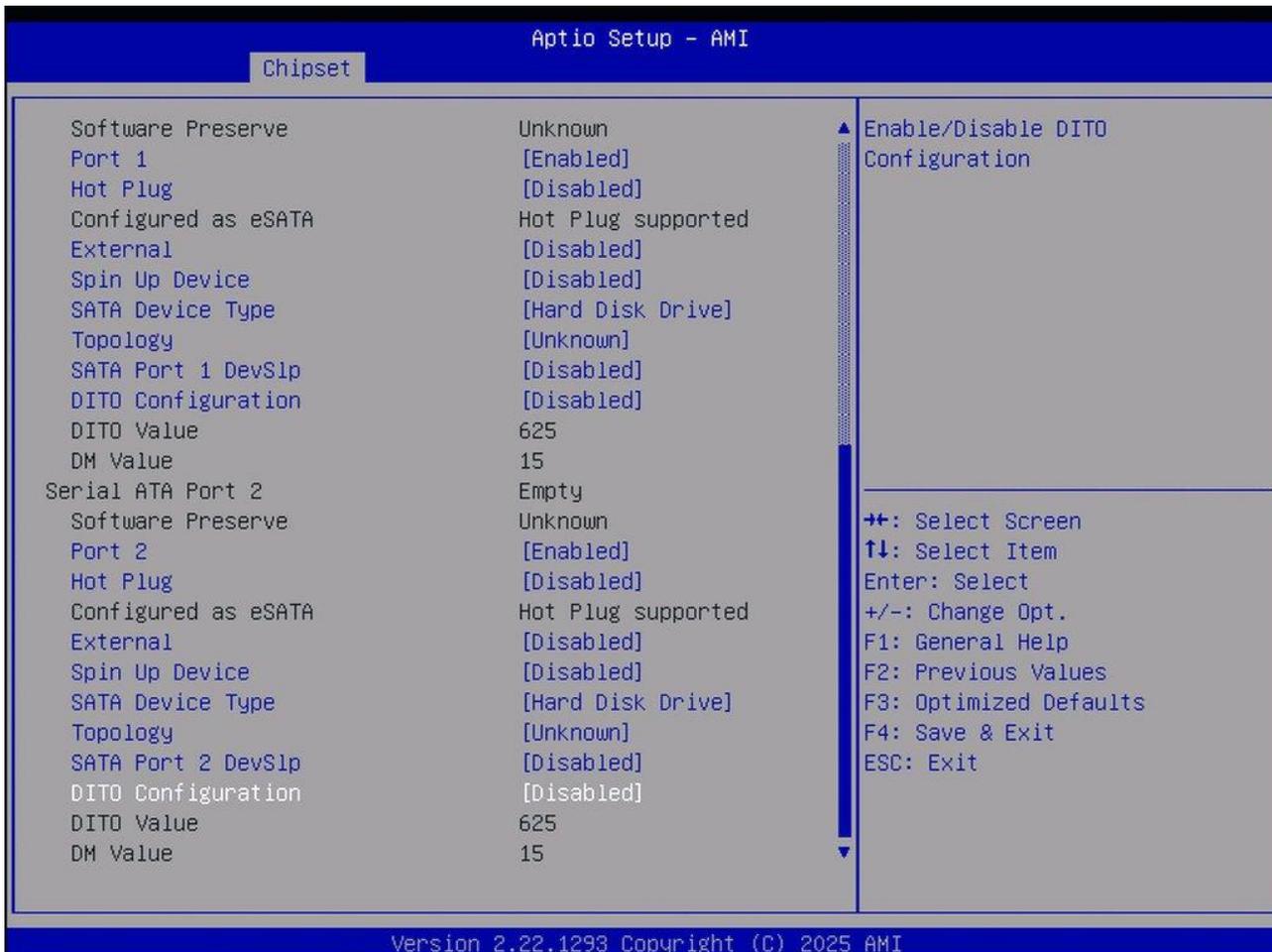
Restore AC Power Loss: Power ON(Default)

3.5.2.1 SATA Configuration

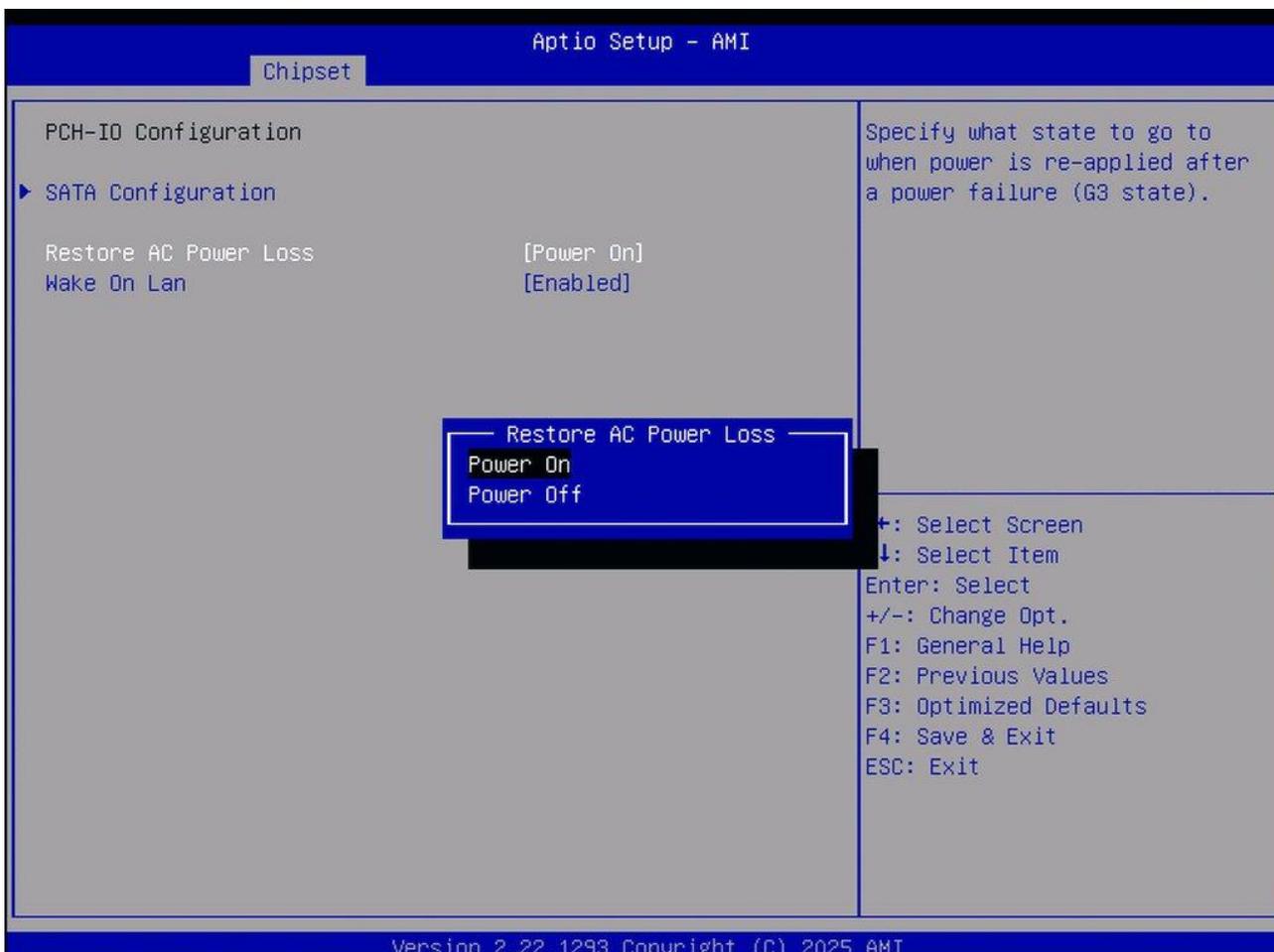


SATA Device Type:

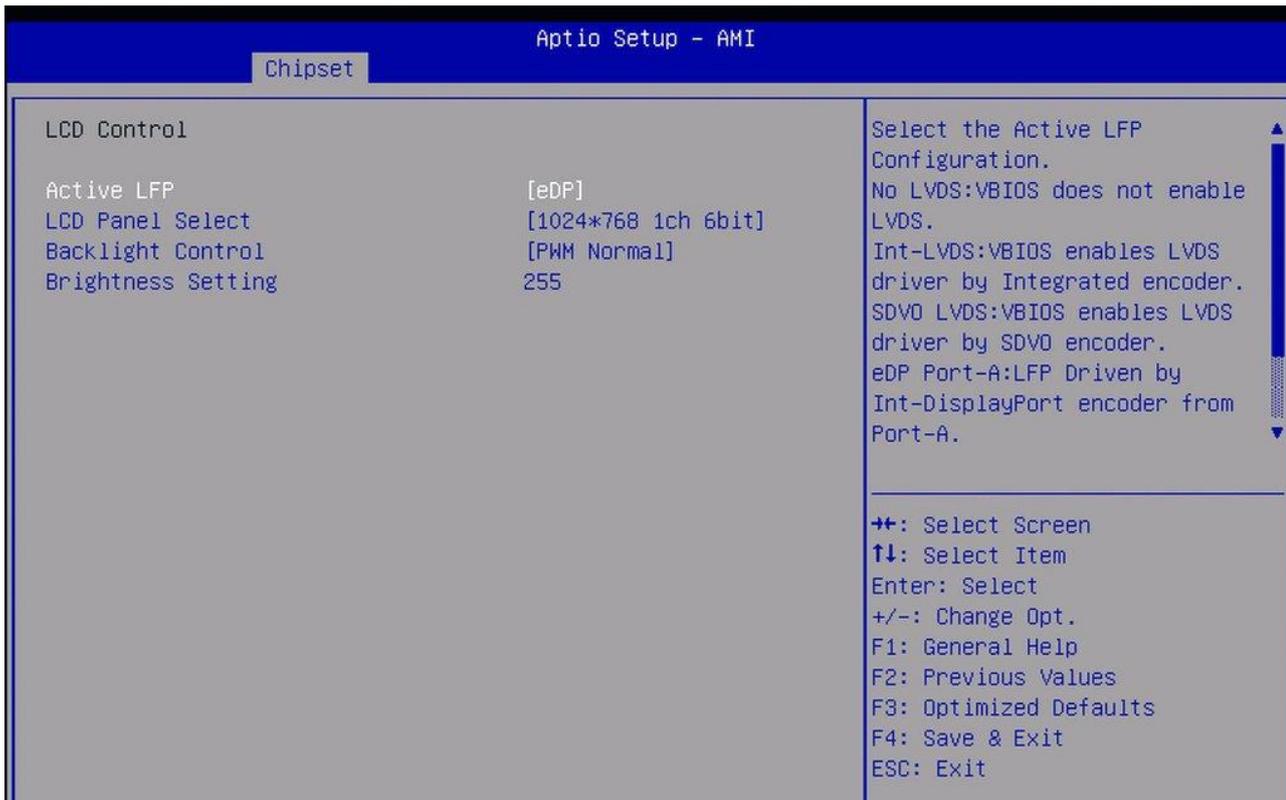
Identify the SATA port is connected to Solid State Drive or Hard Disk Drive



3.5.2.2 Restore AC Power Loss



3.5.3 LCD Control



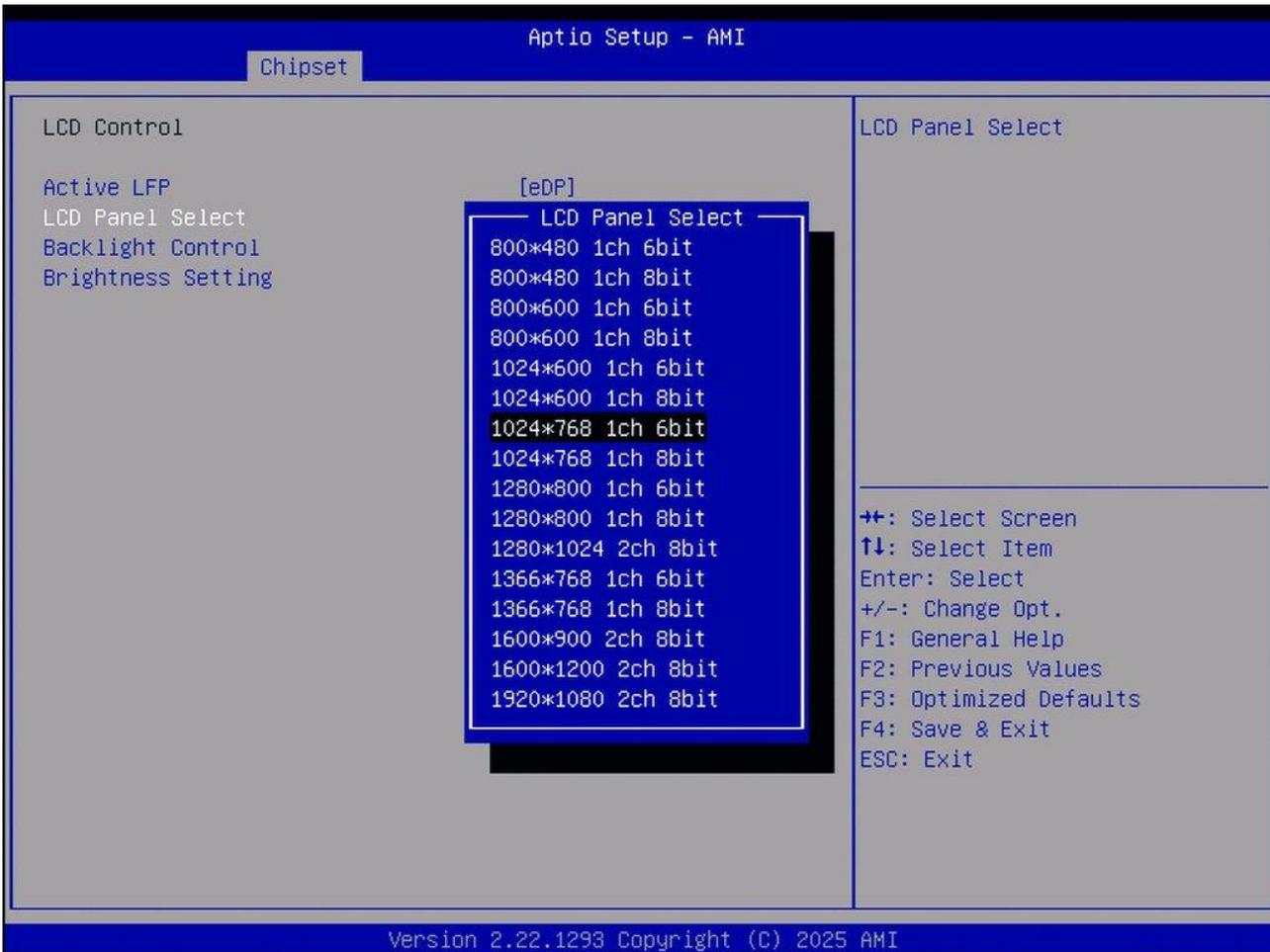
Active LFP:

Select the Active LFP Configuration. No edp: vBIOS does not enable LVDS.
edp: VBIOS enables LVDS driver by integrated encoder. .

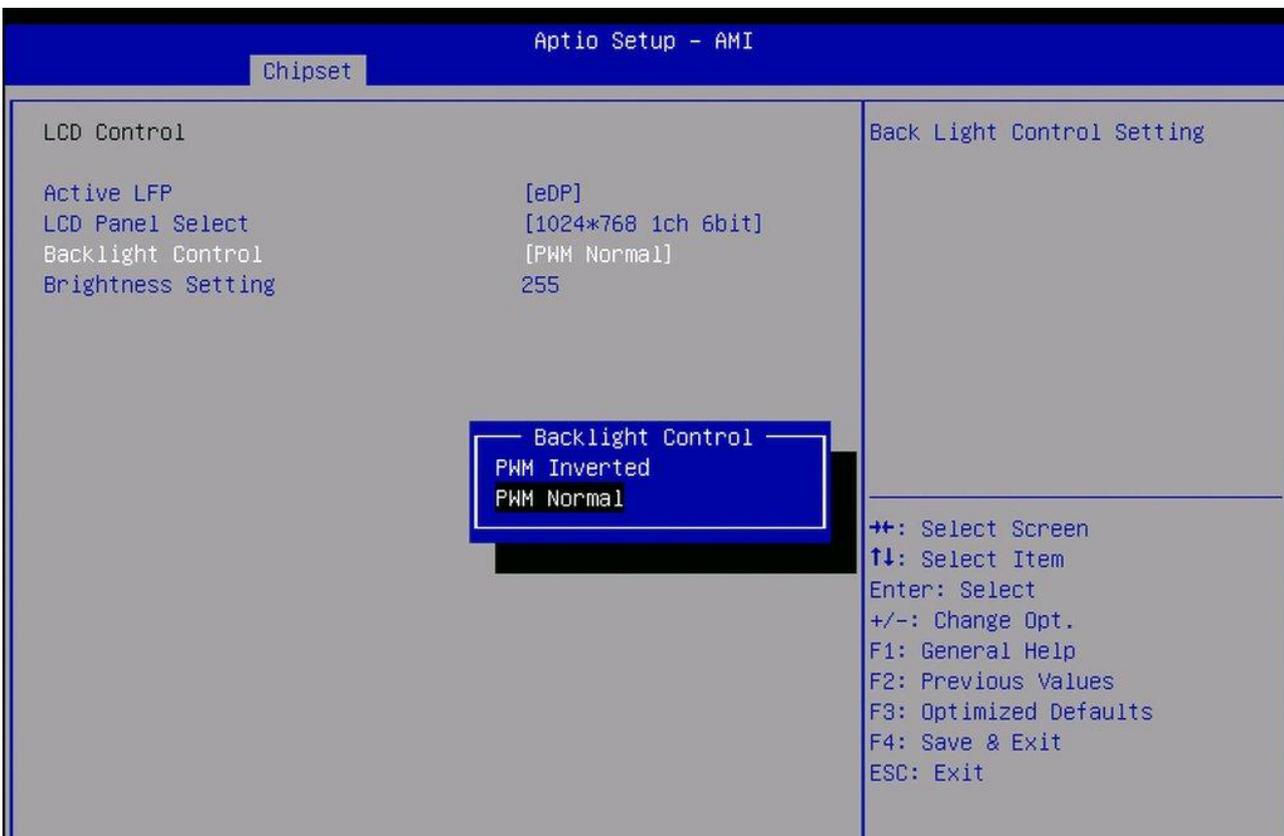
3.5.3.1 Active LFP



3.5.3.2 LCD Panel Select



3.5.3.3 Backlight Control



3.5.3.4 Brightness Setting



3.6 Security Settings

Aptio Setup - AMI

Main Advanced Chipset **Security** Boot Save & Exit

Password Description

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length
Maximum length

Administrator Password
User Password

Create New Password

Set Administrator Password

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

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3.6.1 Administrator Password

Aptio Setup - AMI

Main Advanced Chipset **Security** Boot Save & Exit

Password Description

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length
Maximum length

Administrator Password
User Password

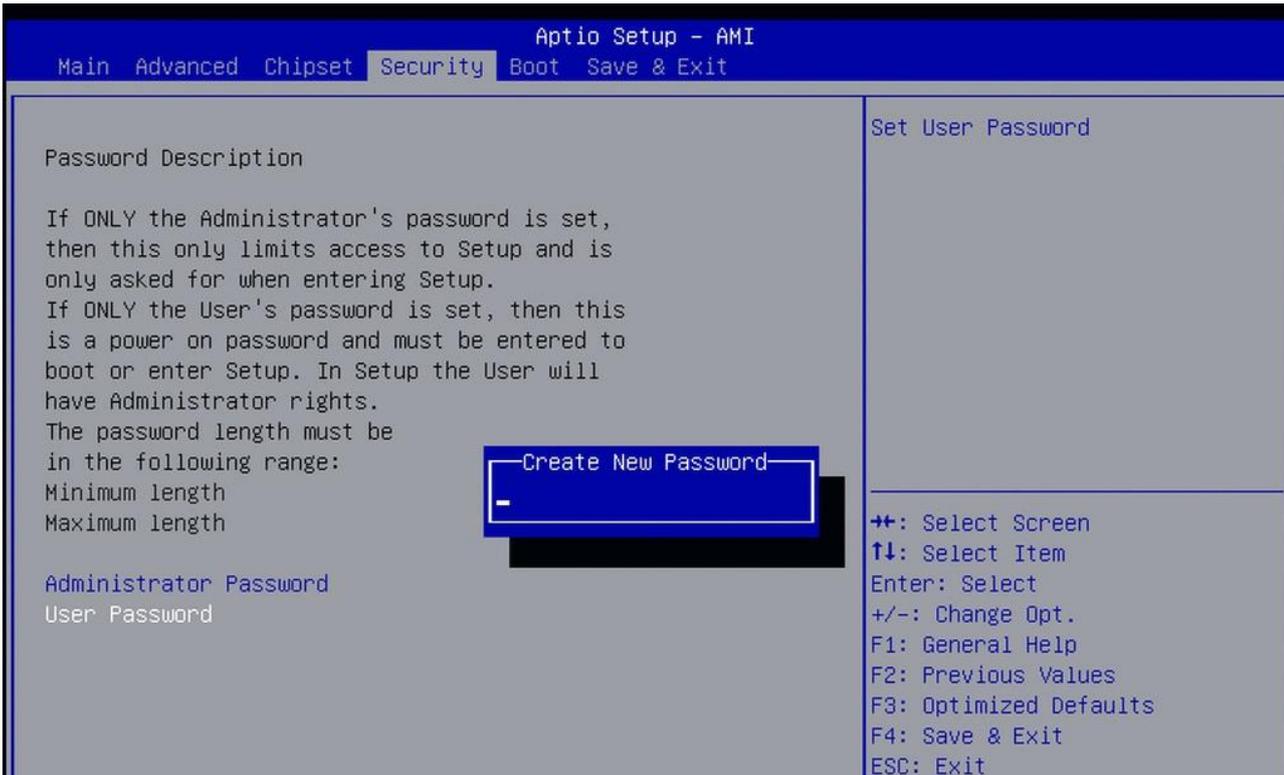
Create New Password

Set Administrator Password

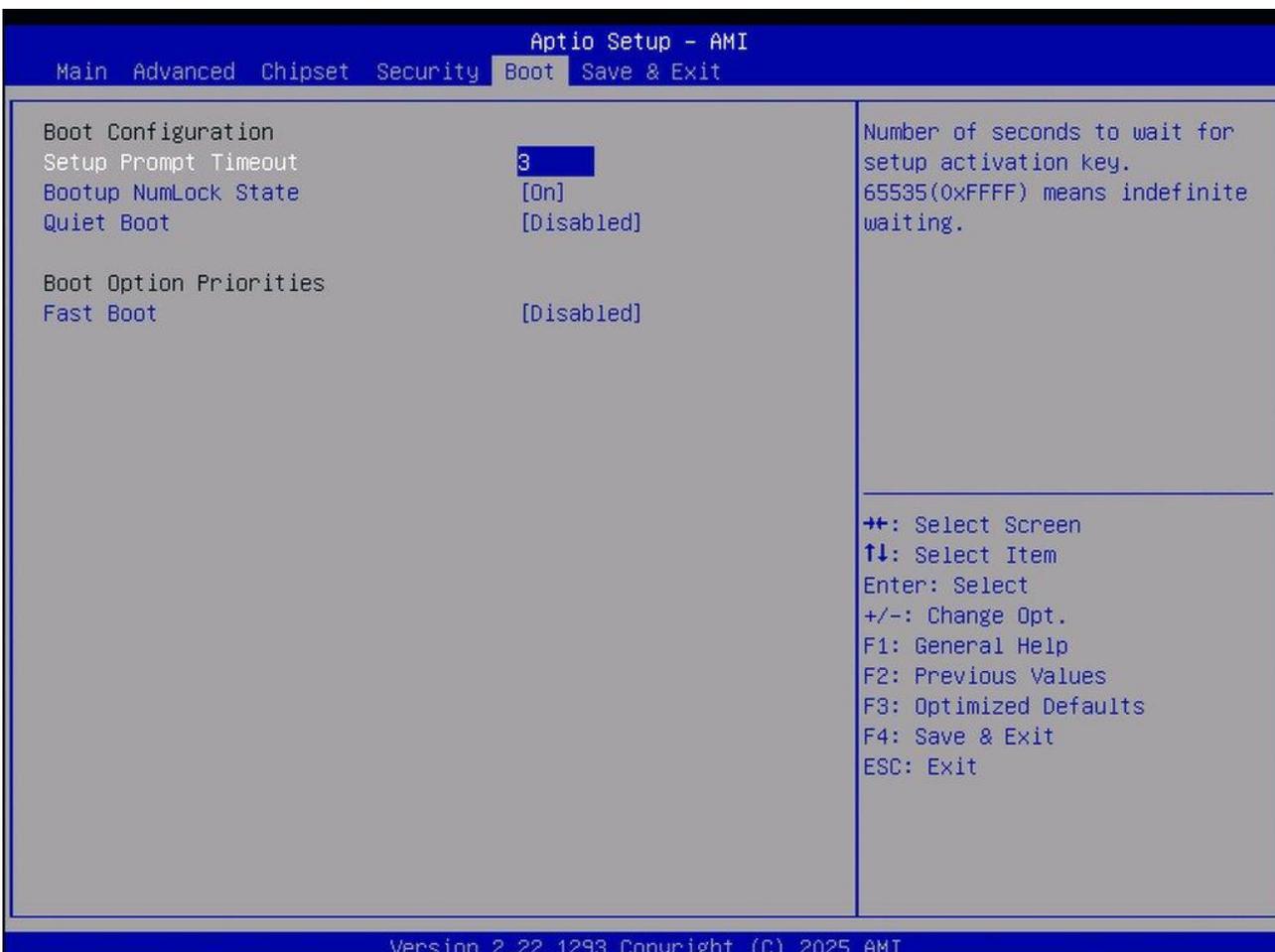
++: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.22.1293 Copyright (C) 2025 AMI

3.6.2 User Password



3.7 Boot Settings



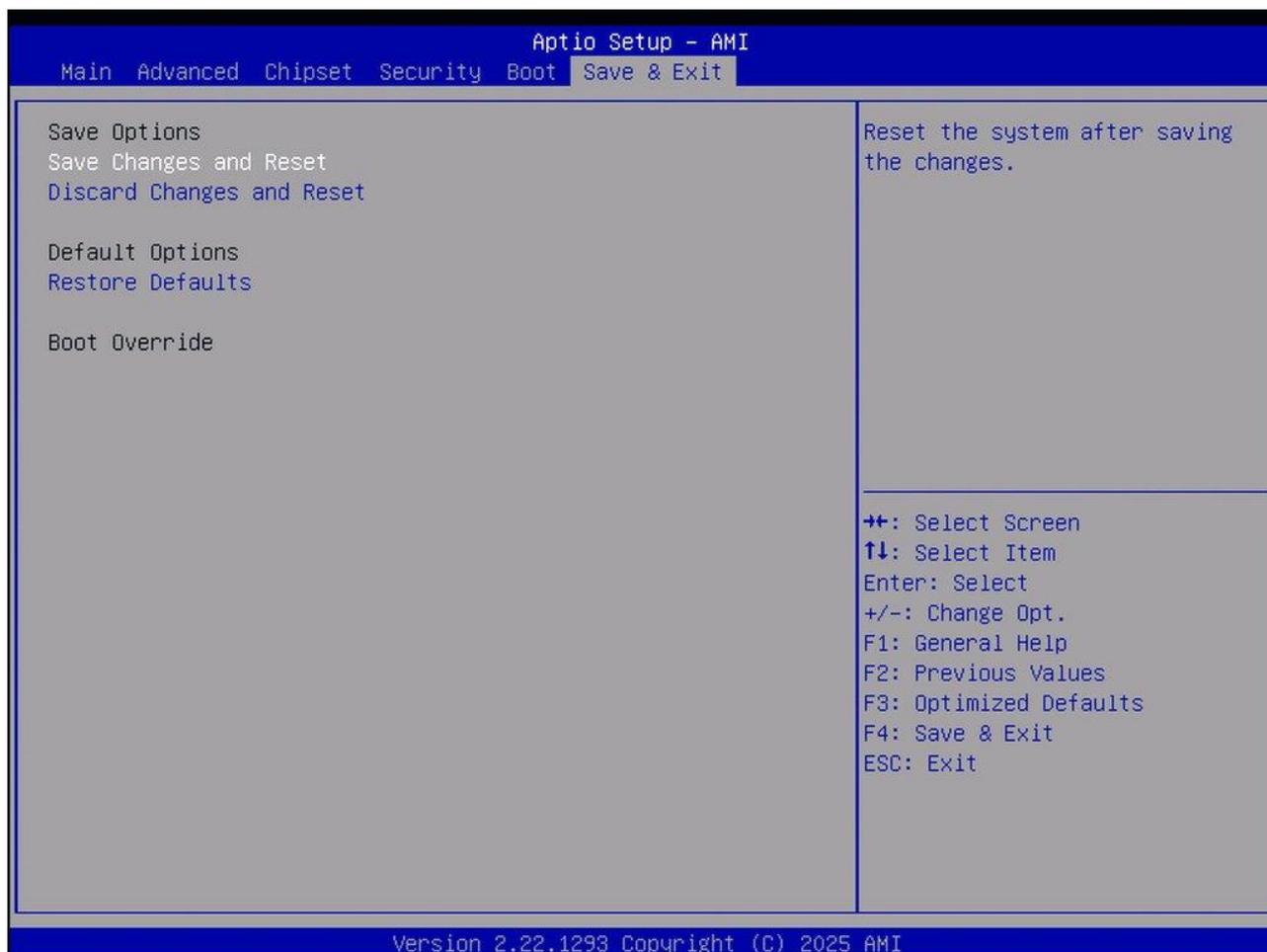
Setup Prompt Timeout:

Number of seconds to wait for setup activation key.65535(0xFFFF) means indefinite waiting.

Fast Boot:

Enables or disables boot with initialization 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.

3.9 Secure Boot Keys

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

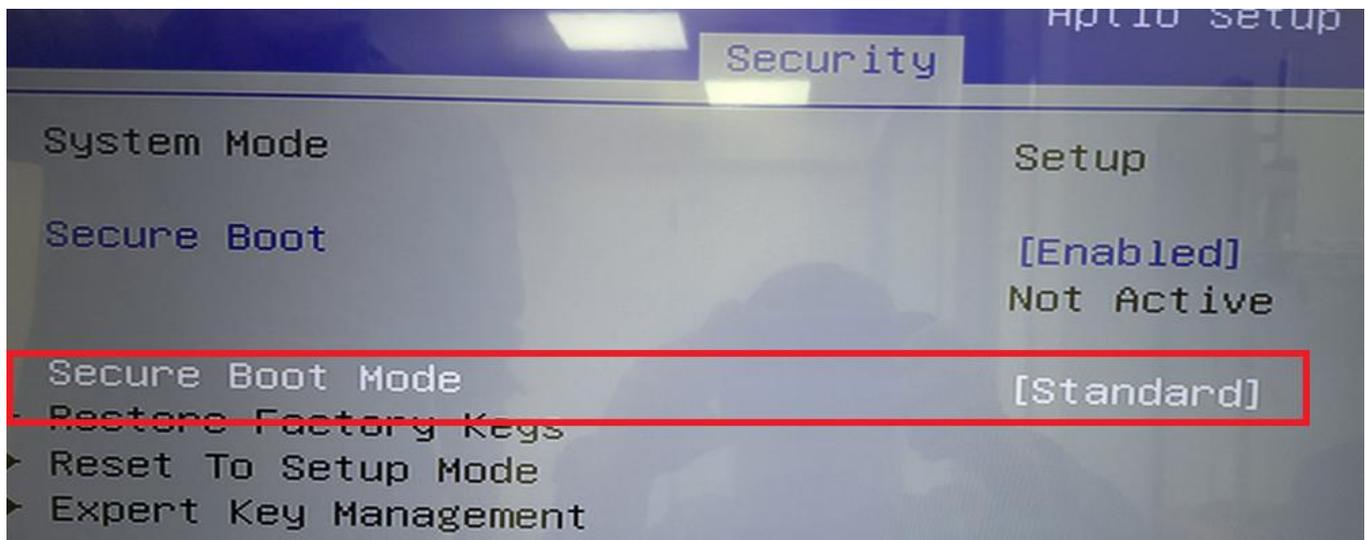
This document explains how to import Secure Boot keys into a UEFI firmware (BIOS). Procedures may vary slightly depending on the motherboard vendor, but the overall process is the same across most platforms supporting UEFI Secure Boot.

1. You must first obtain the Secure Keys (PK, KEK, db) from Microsoft.

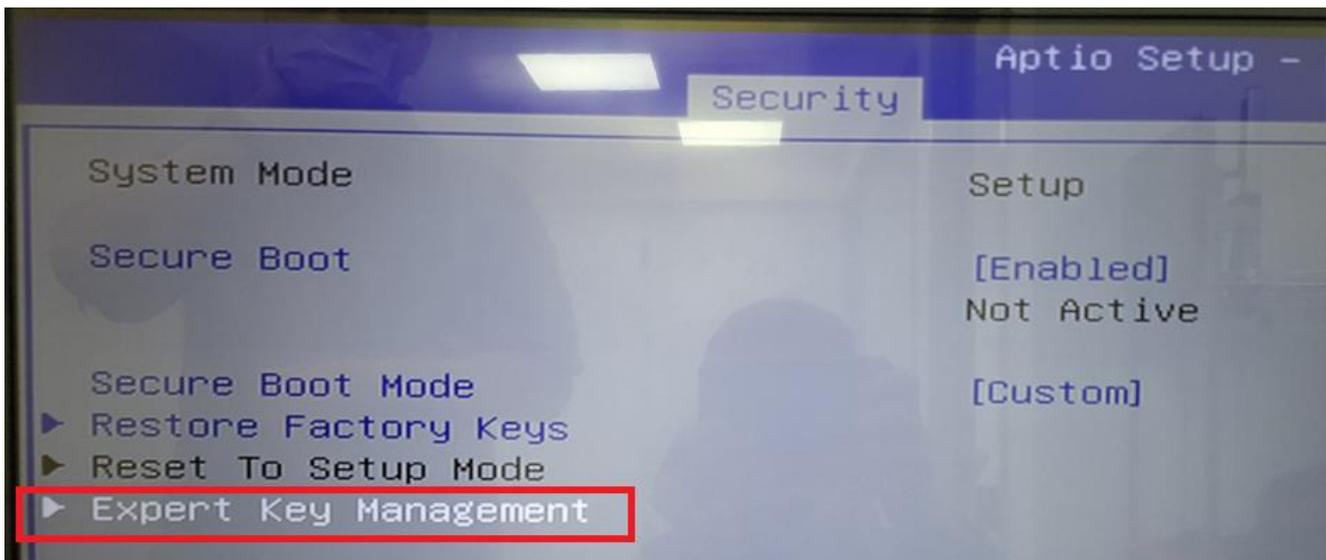
After that, prepare a FAT32-formatted USB drive, UEFI firmware typically only reads key files from FAT32 file systems. Copy your secure keys (PK, KEK, db) to the root directory of the USB drive.

2. When boot up the unit, press DEL on the keyboard. Enter the BIOS menu and select the option shown in the image below.

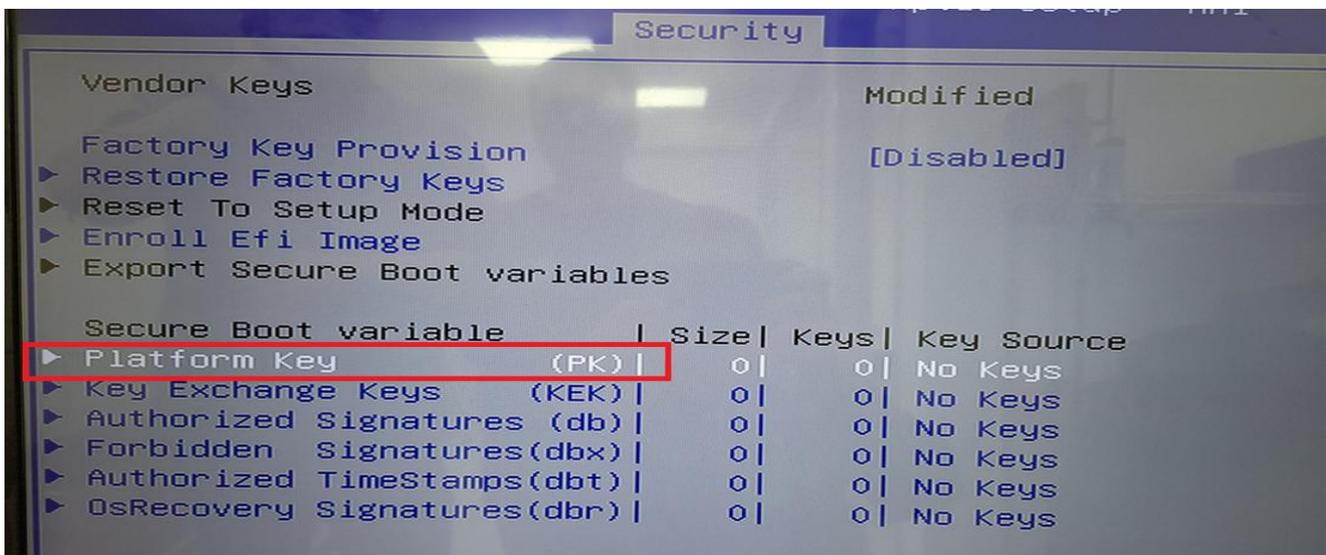
Path: Security/Secure Boot Mode, and select "Custom"



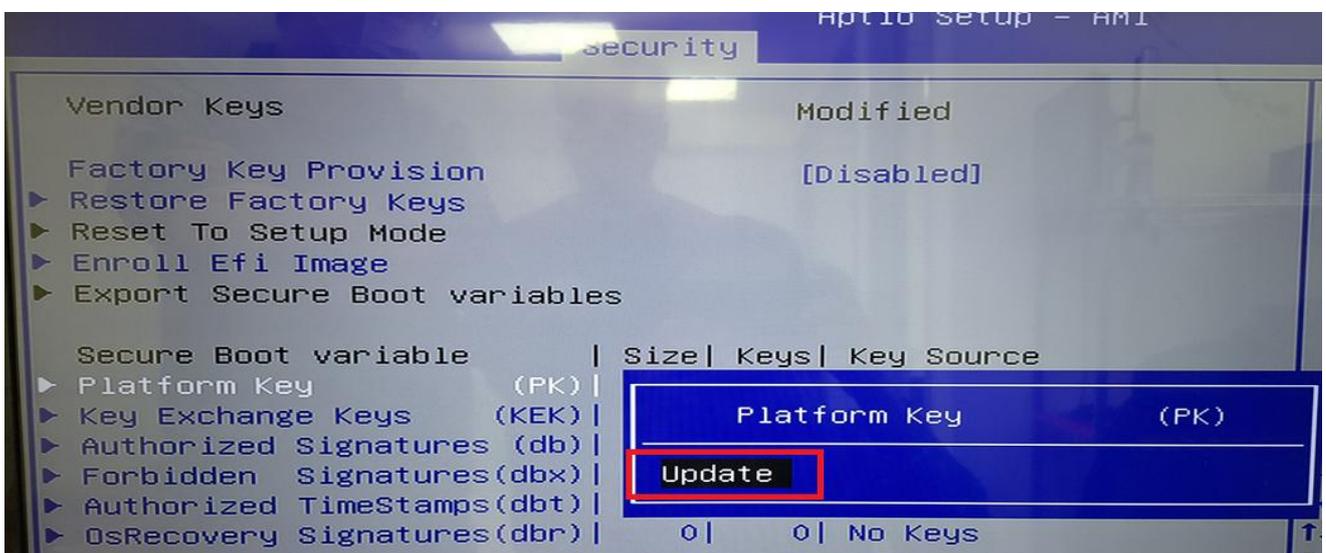
3. Then select "Expert Key Management"



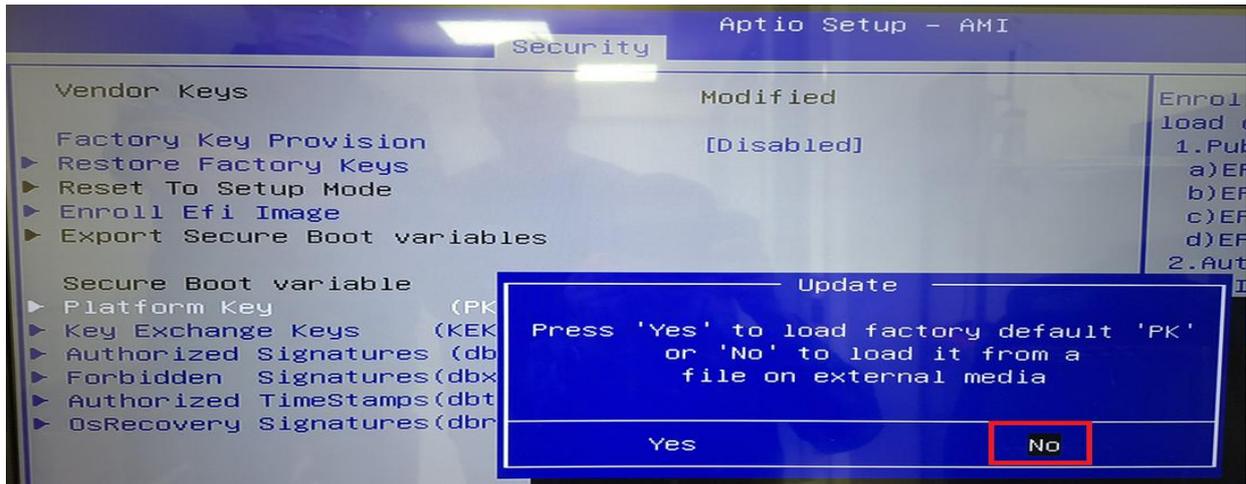
4. Select "Platform Key (PK)", enter



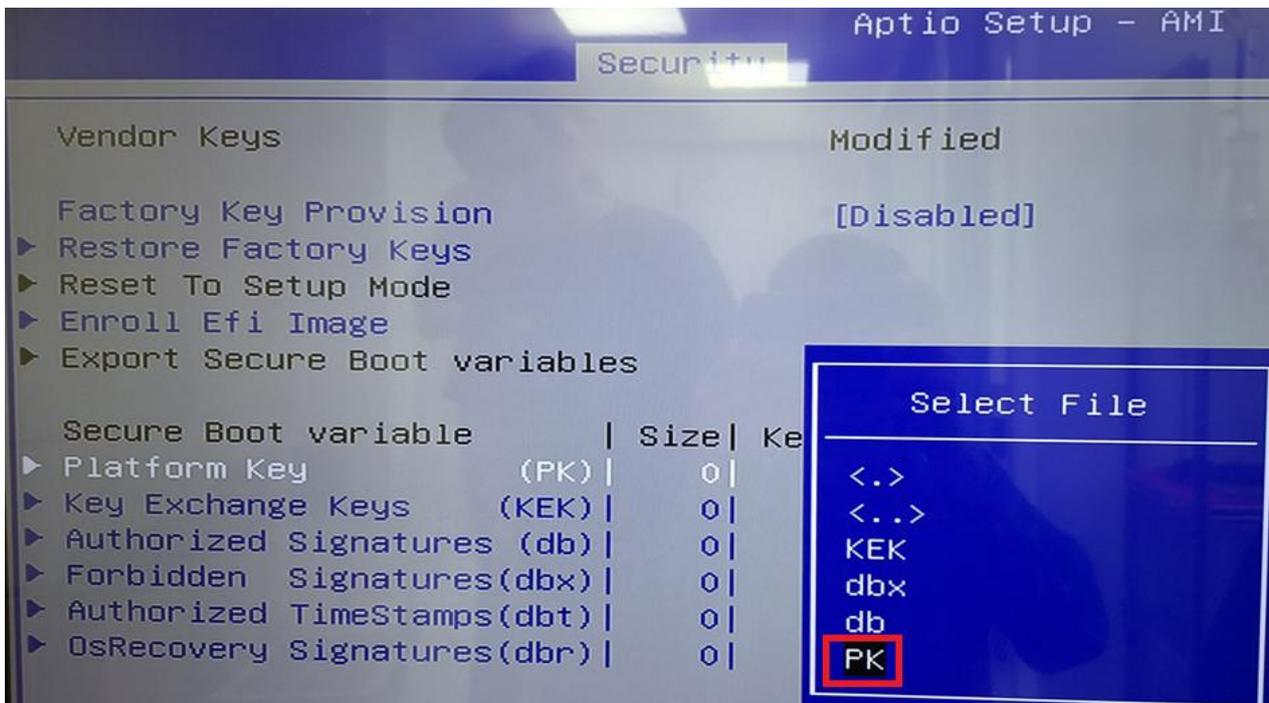
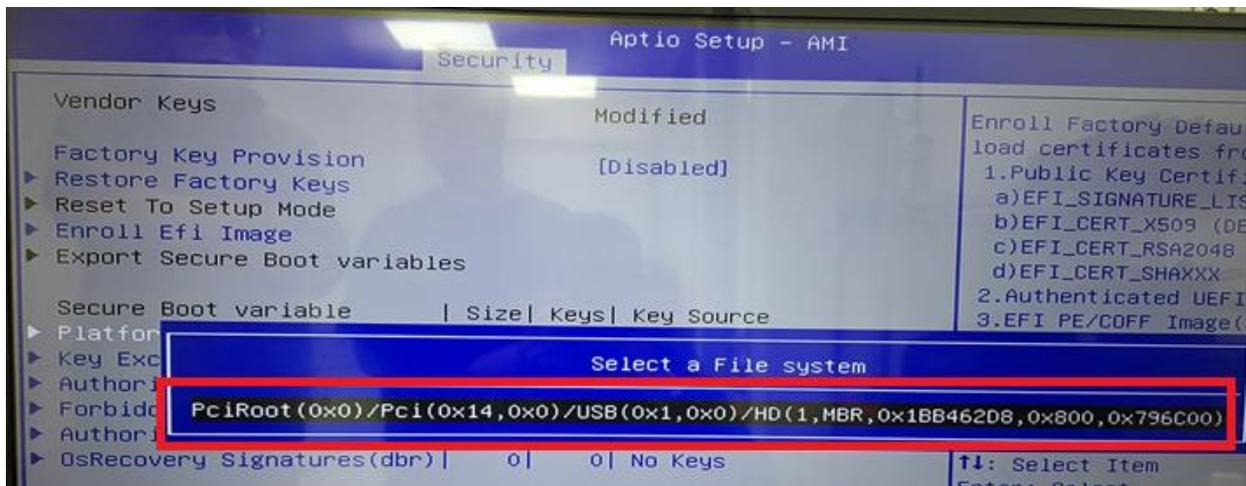
3.9.1 Select "Update"

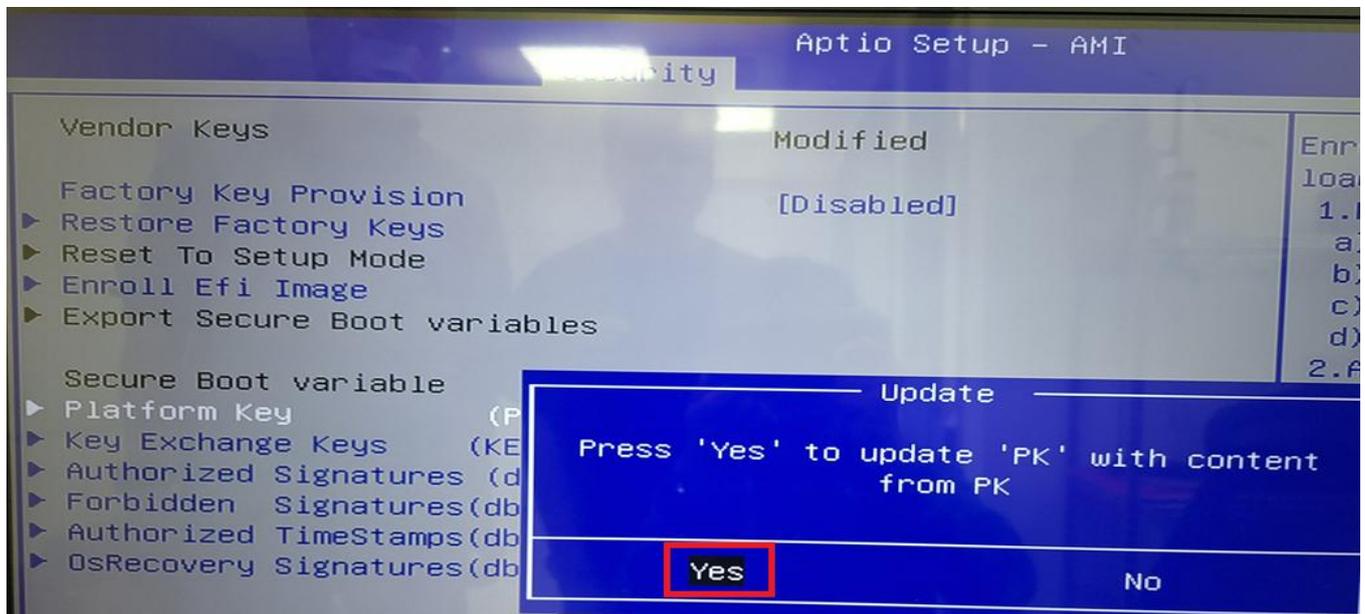
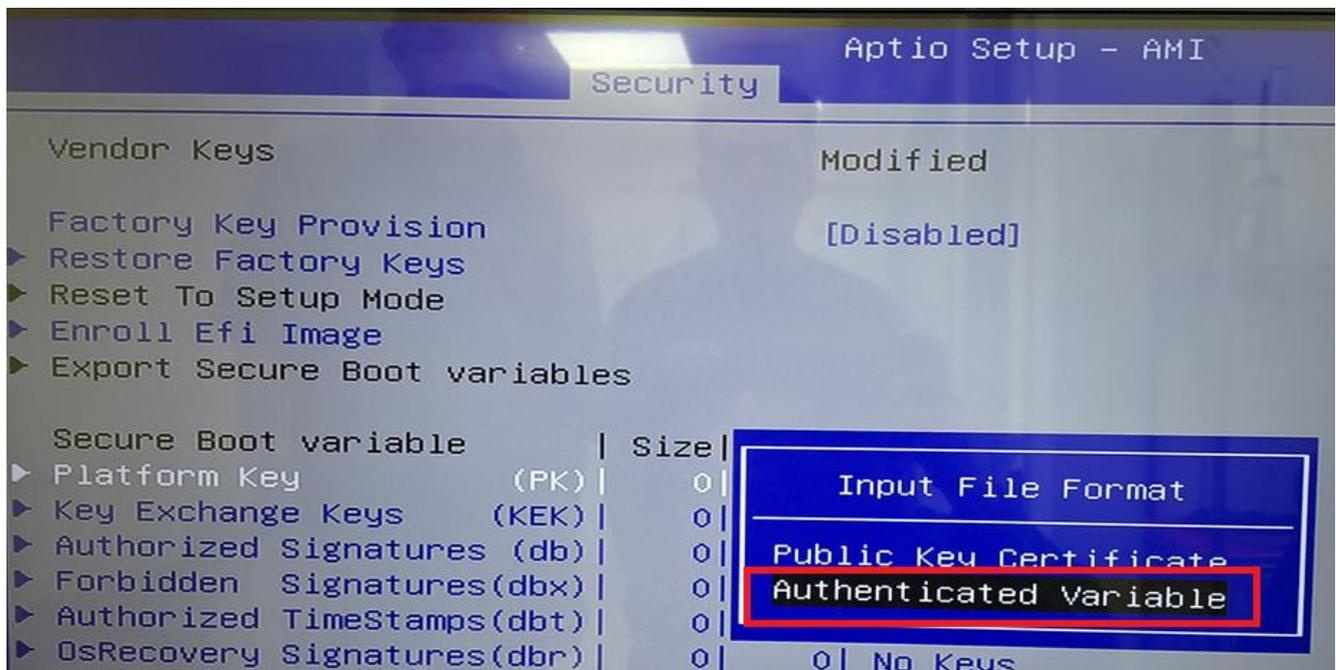


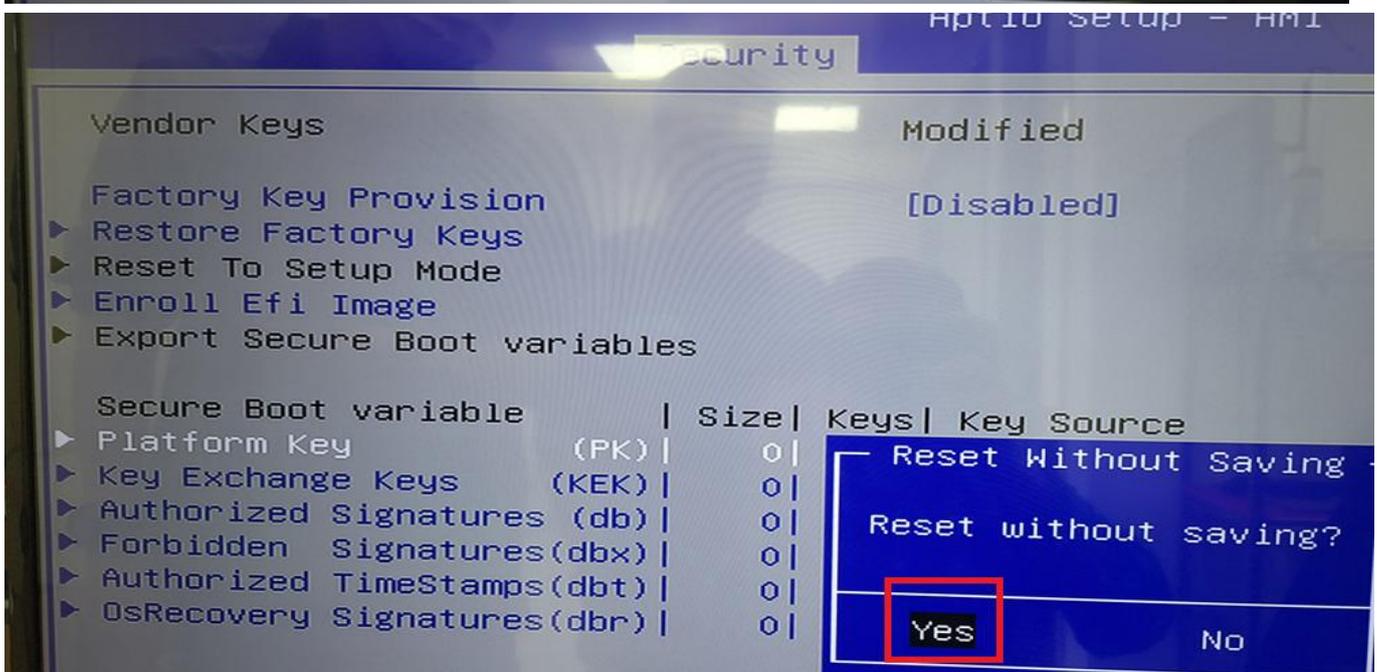
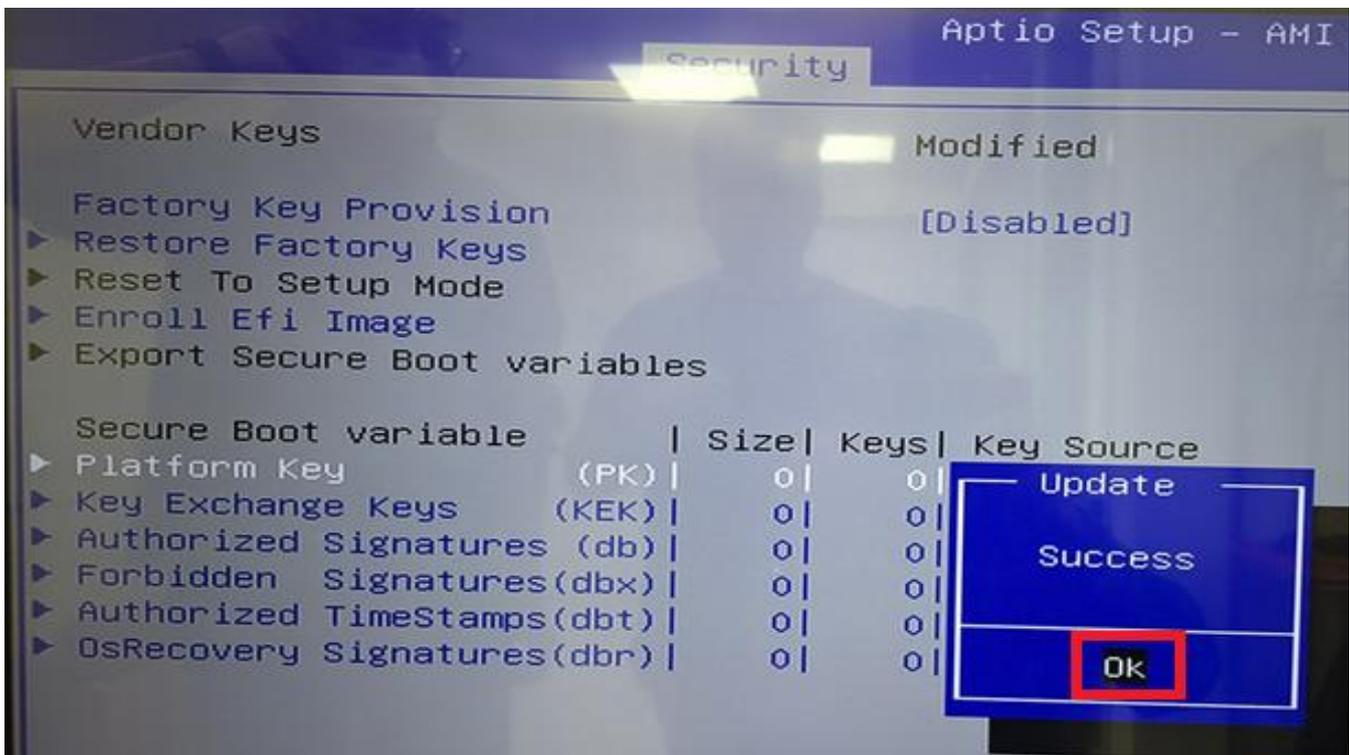
3.9.2 Select "No"



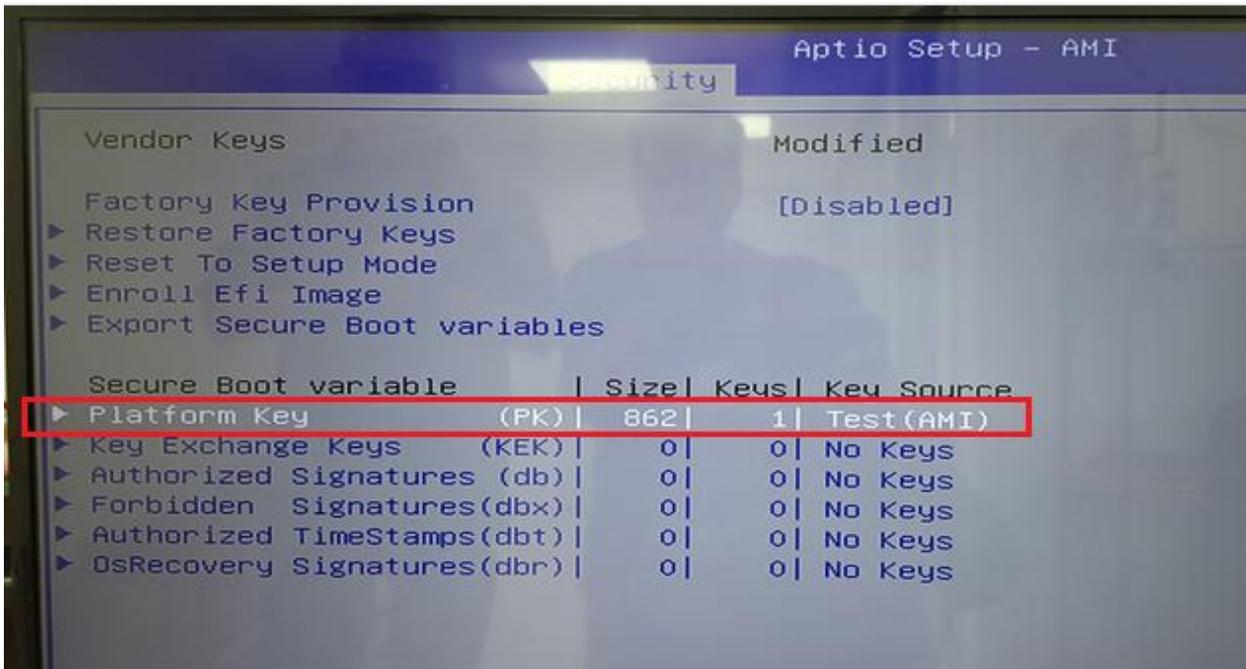
3.9.3 Find your USB drive to select your Keys (PK).



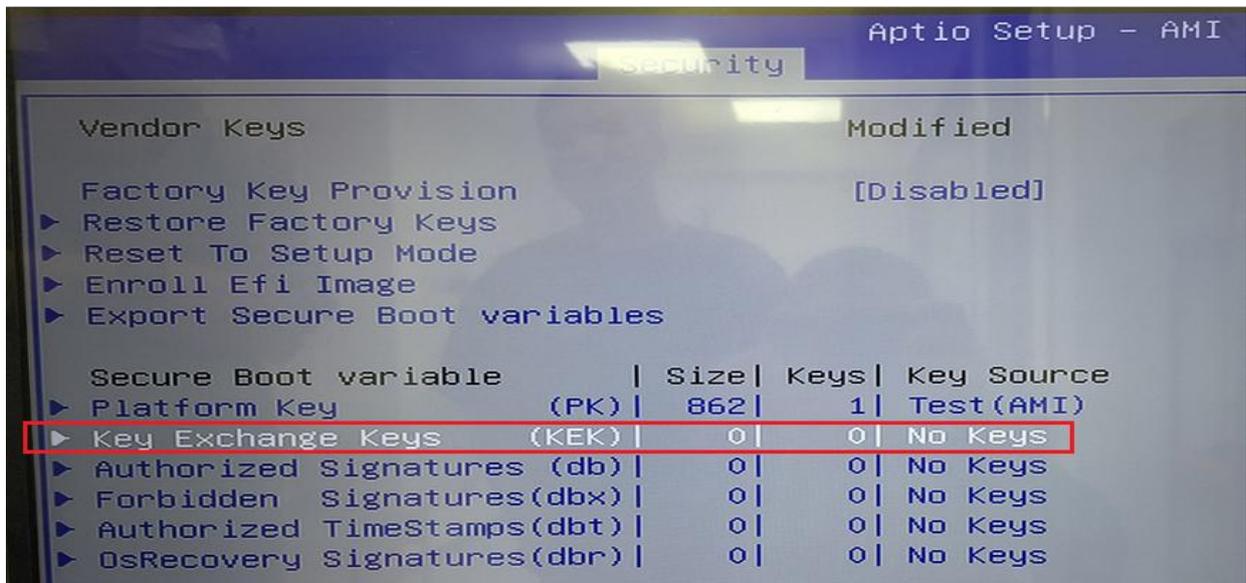




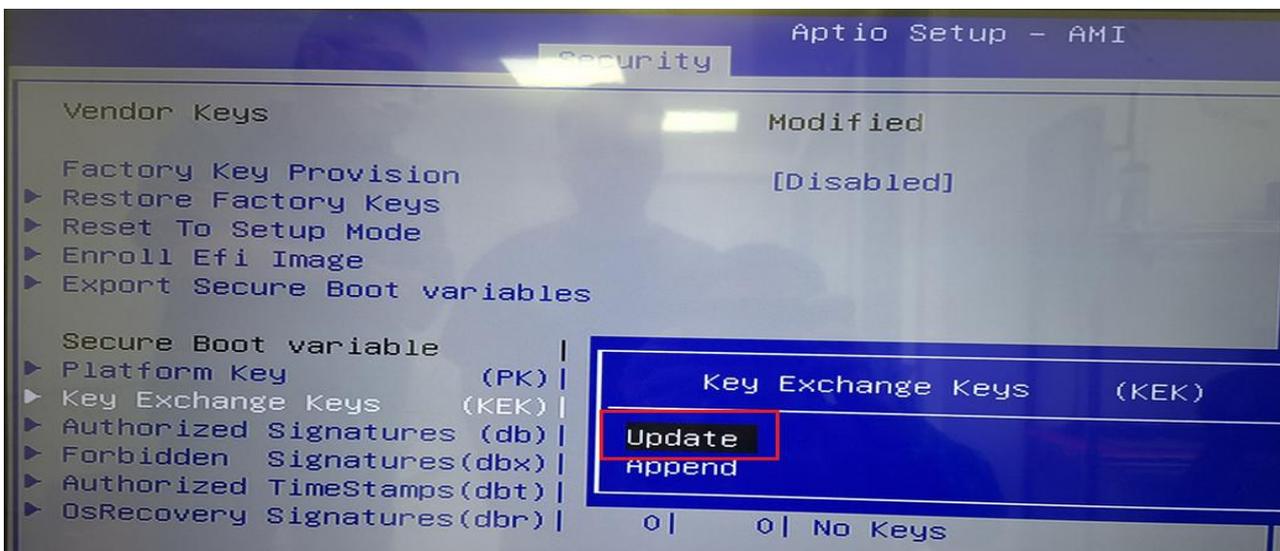
3.9.4 The image below shows that the Platform Key (PK) has already been successfully enrolled.



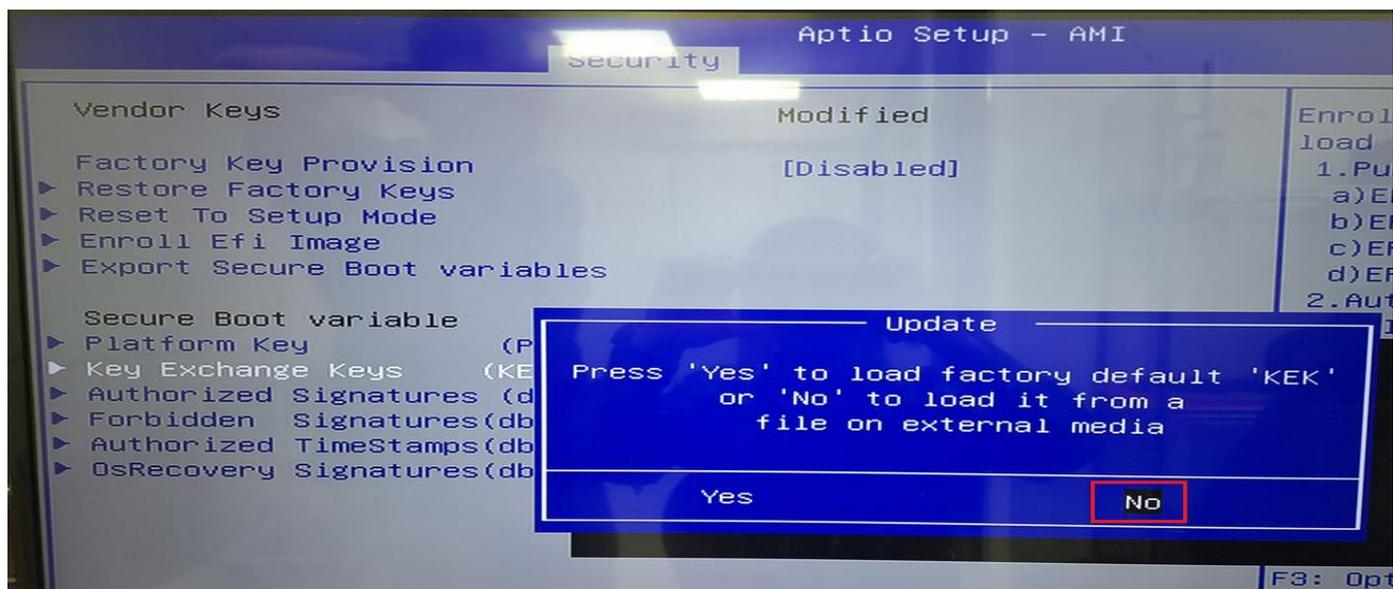
5. Select "Key Exchange Keys (KEK)", enter



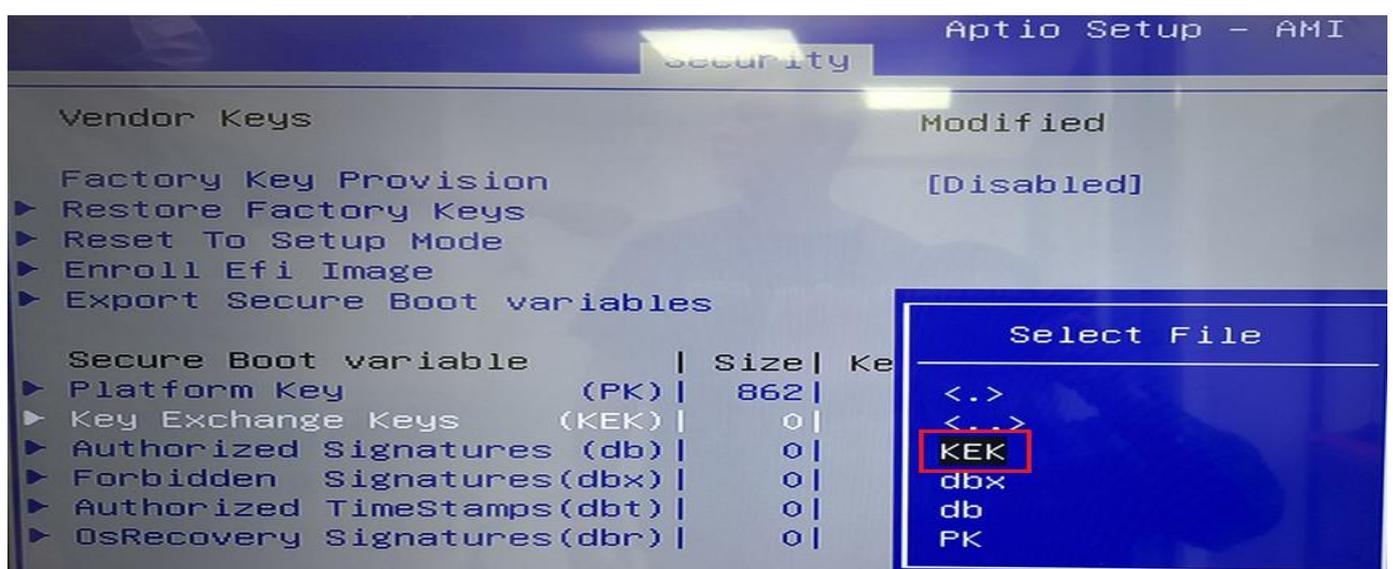
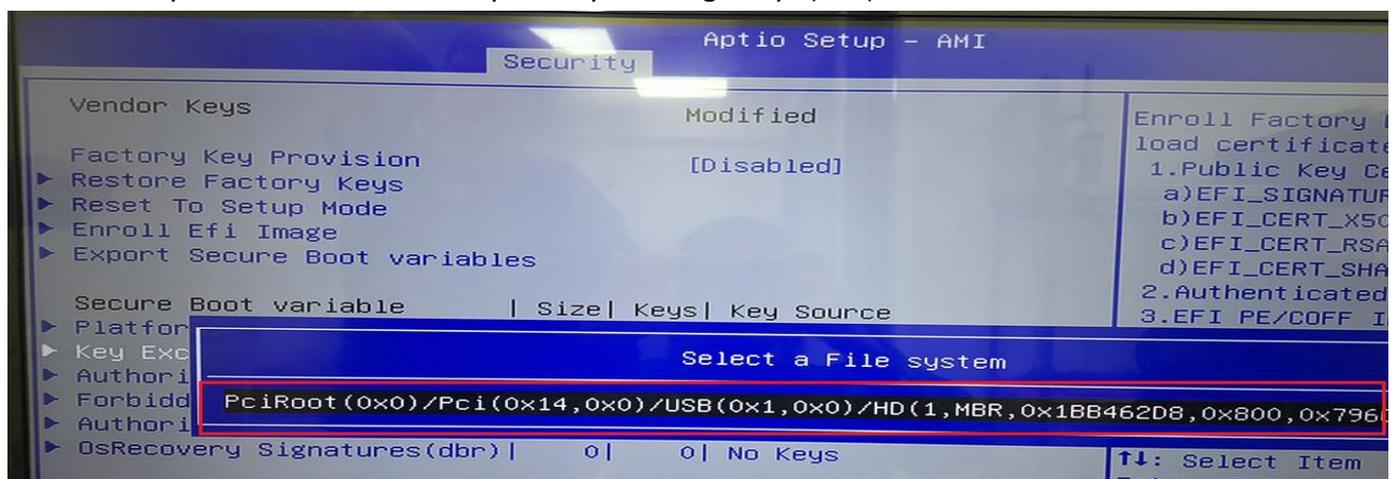
- 3.9.5 Select "Update"

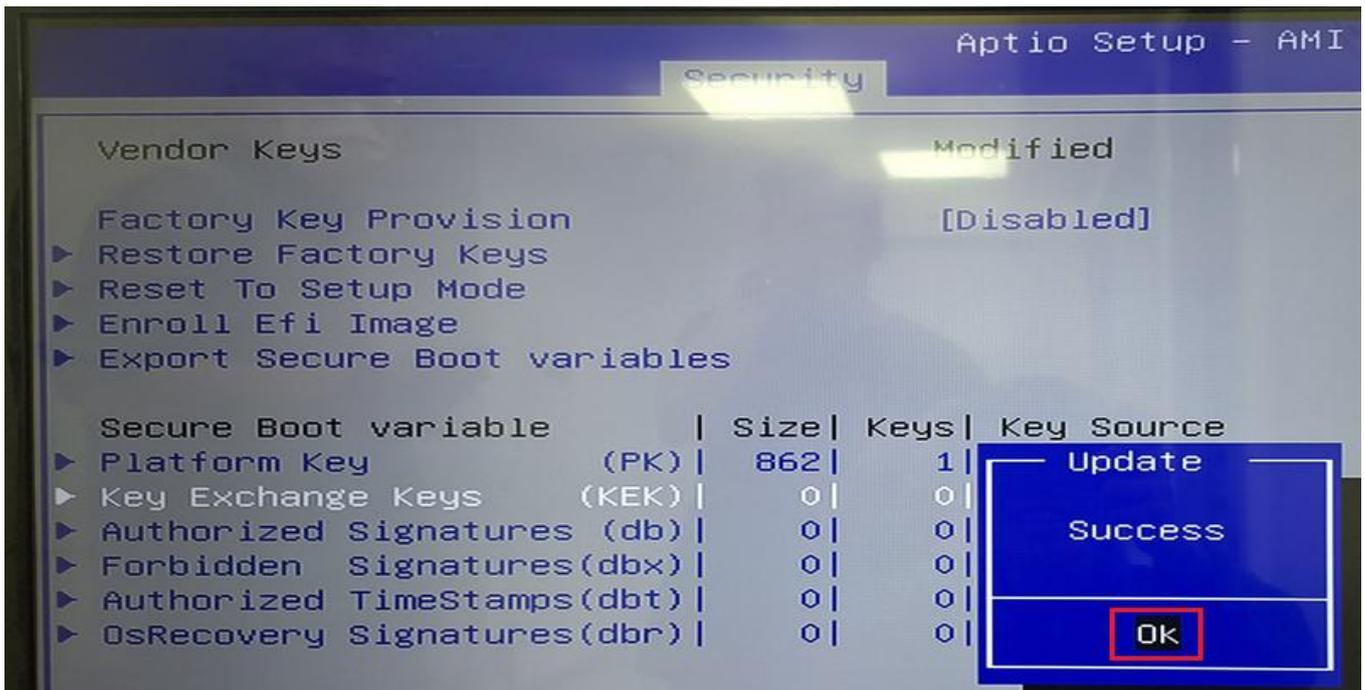
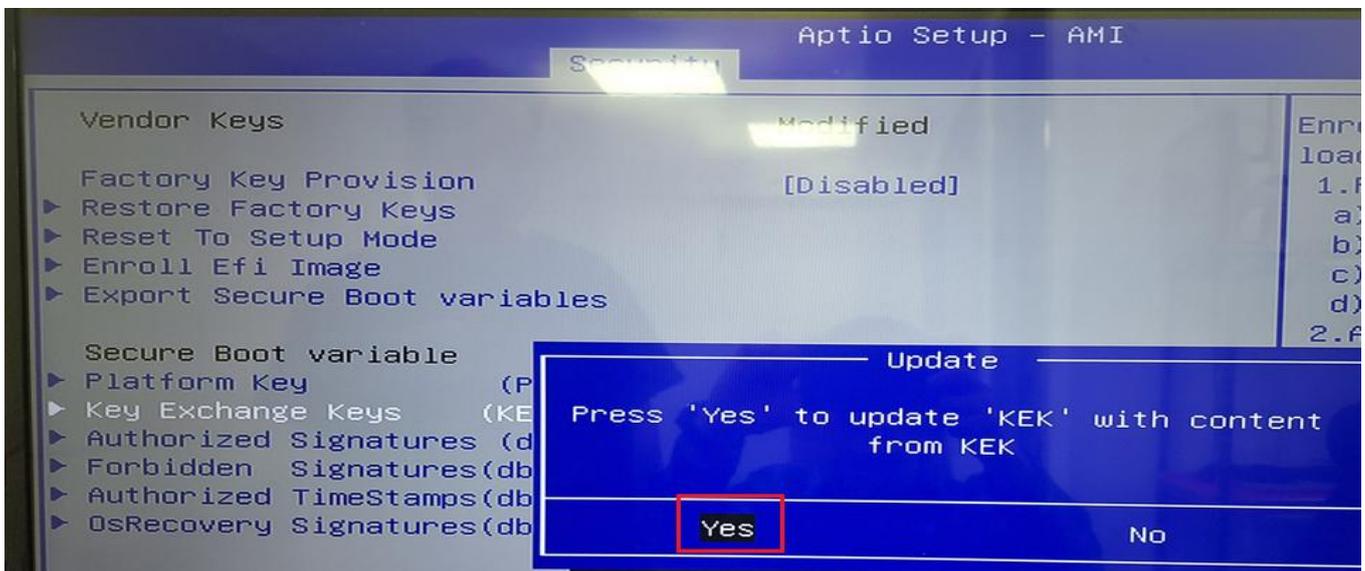
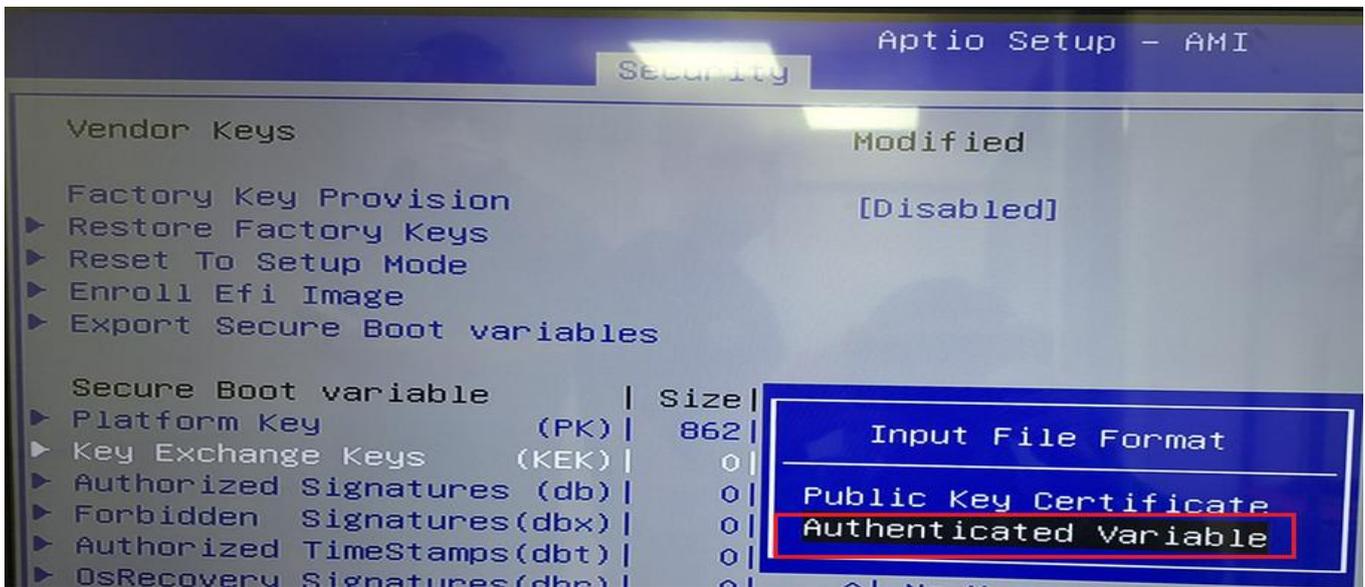


3.9.6 Select "No"

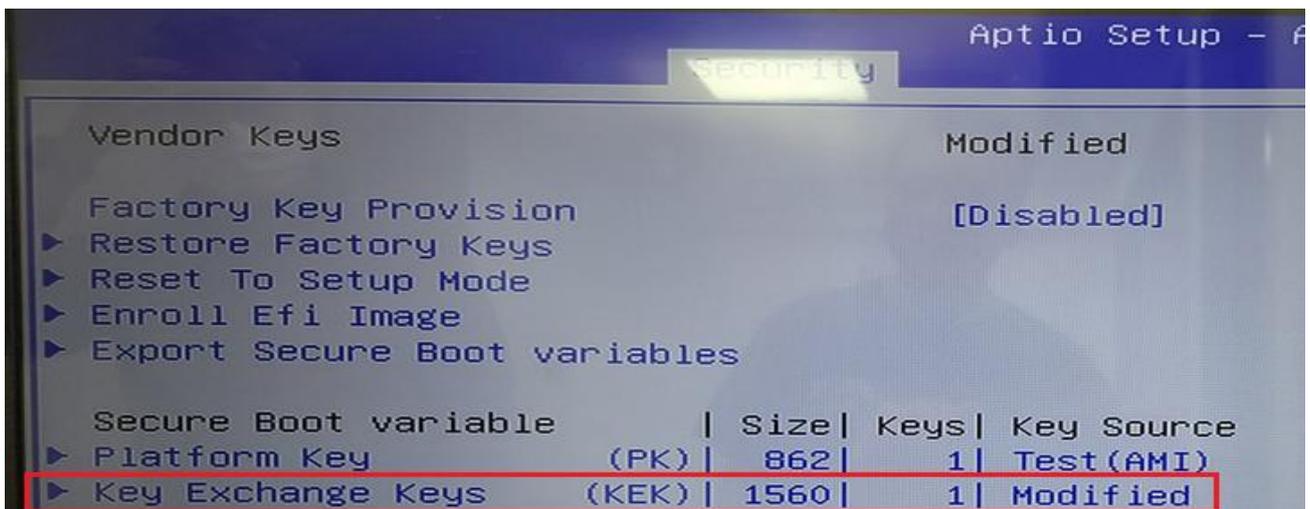


3.9.7 Find your USB drive to select your Key Exchange Keys (KEK).

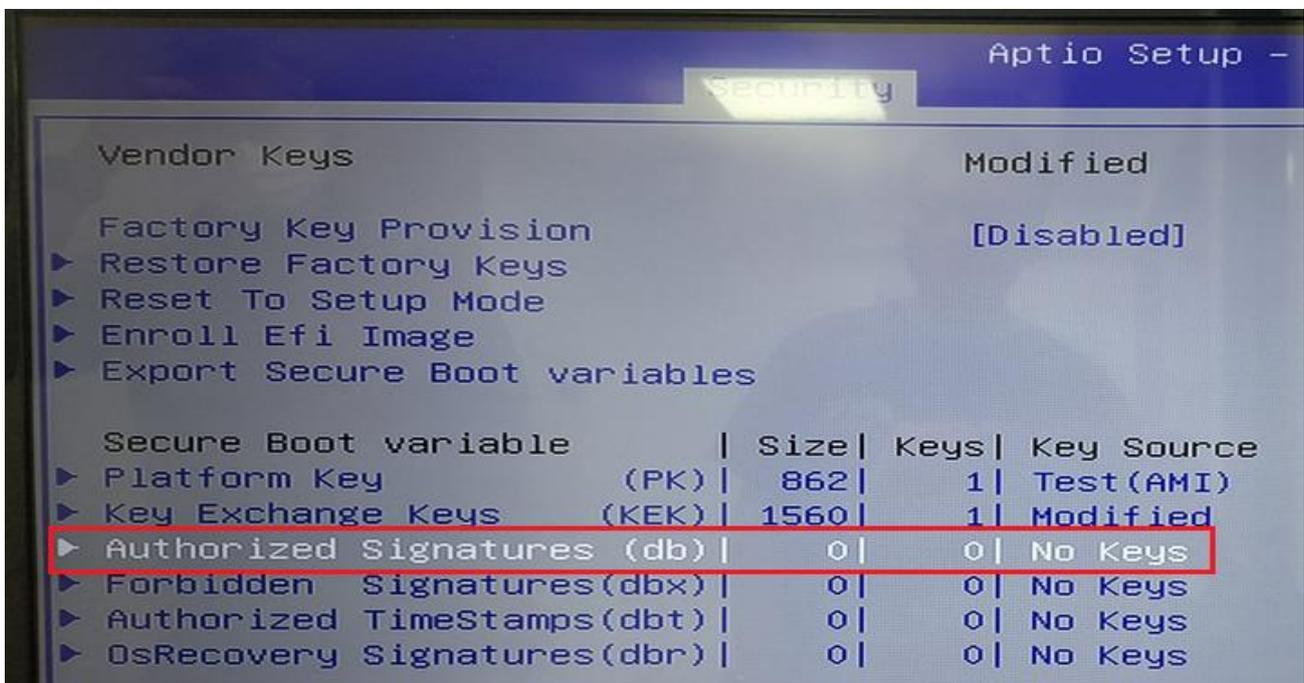




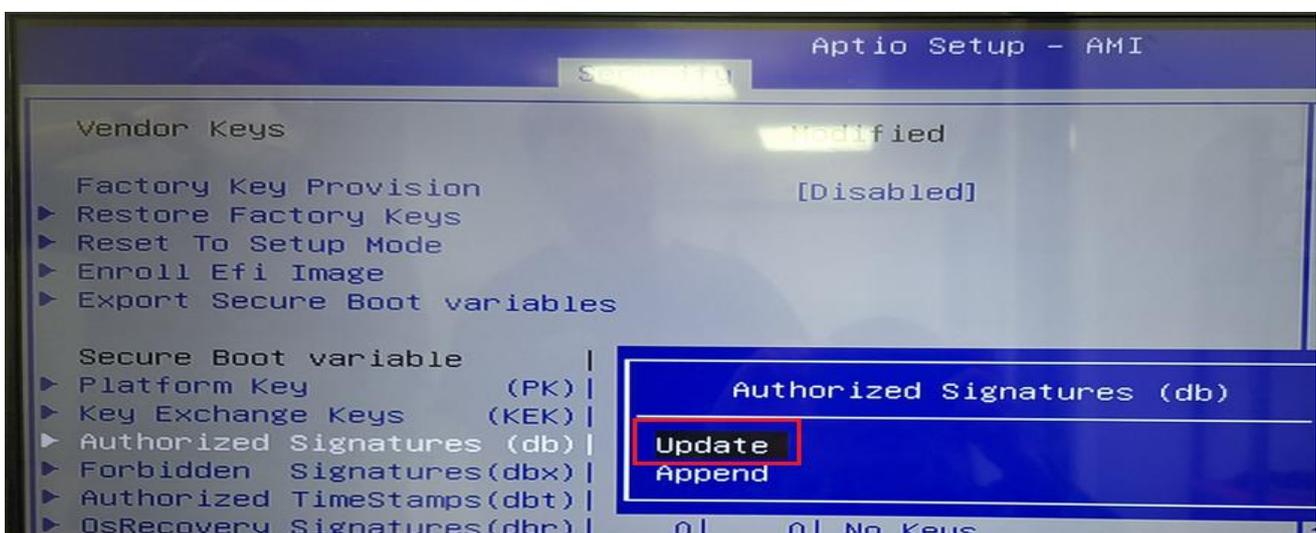
3.9.8 The image below shows that the **Key Exchange Keys (KEK)** has already been successfully enrolled.



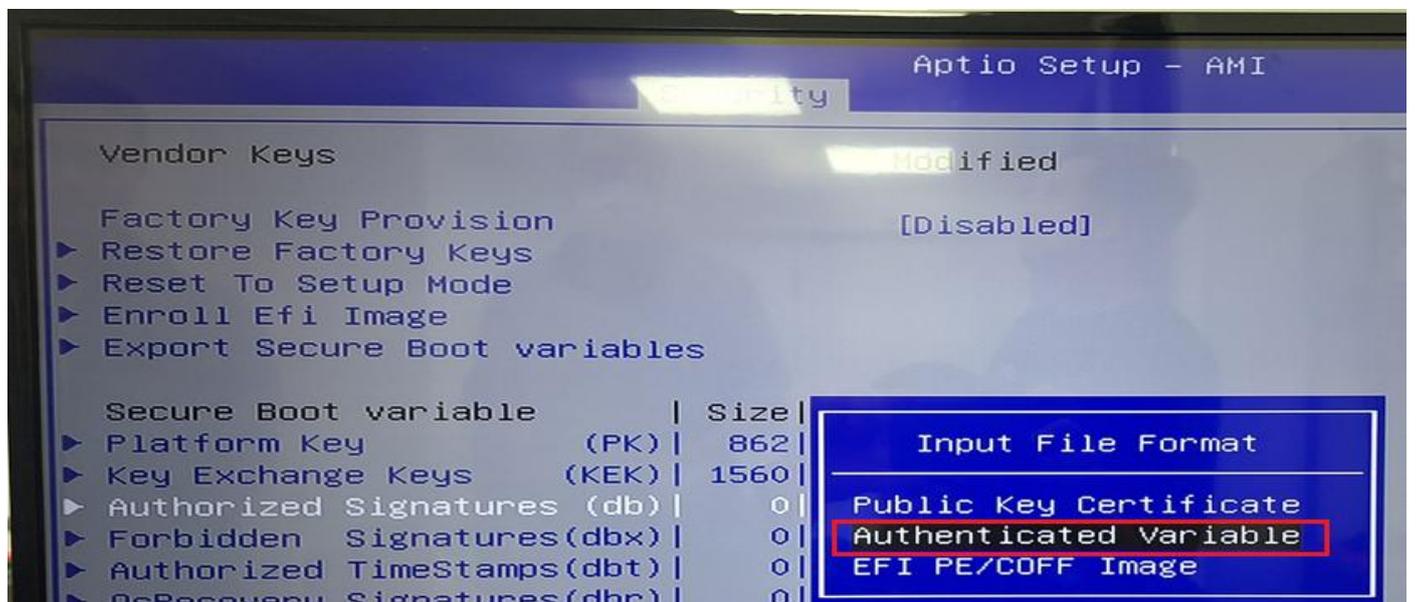
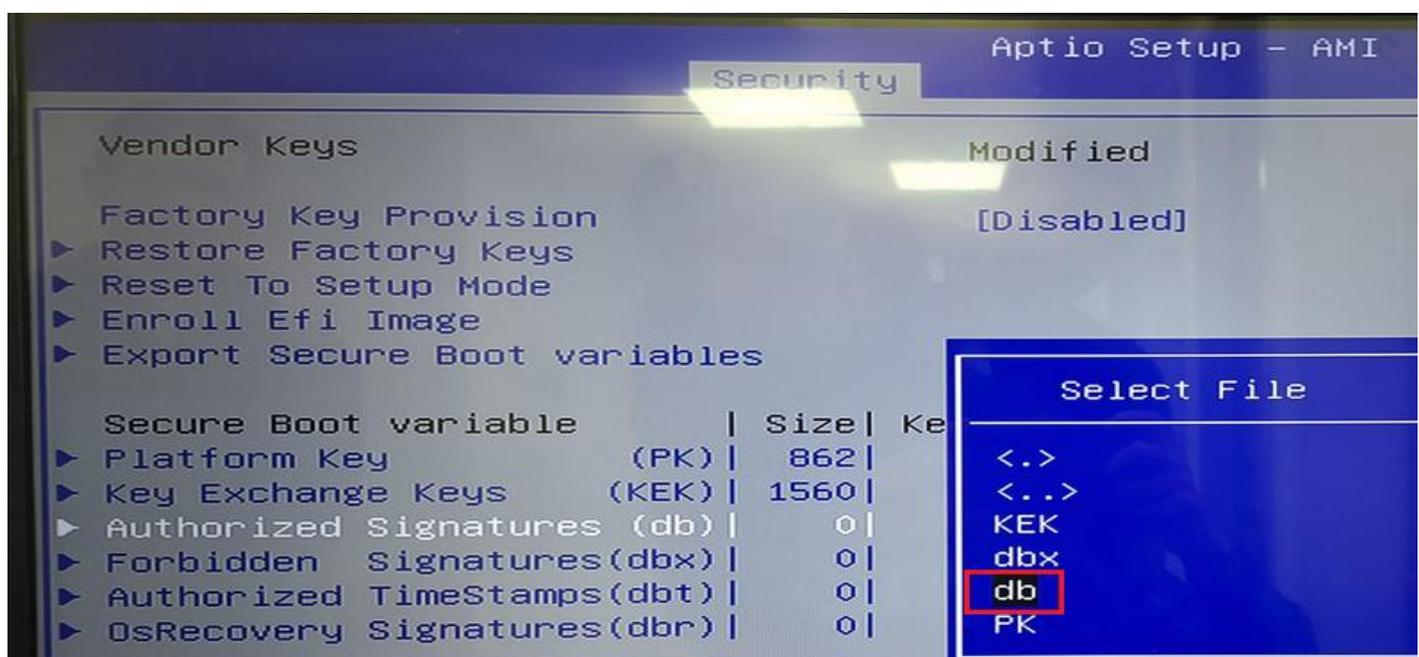
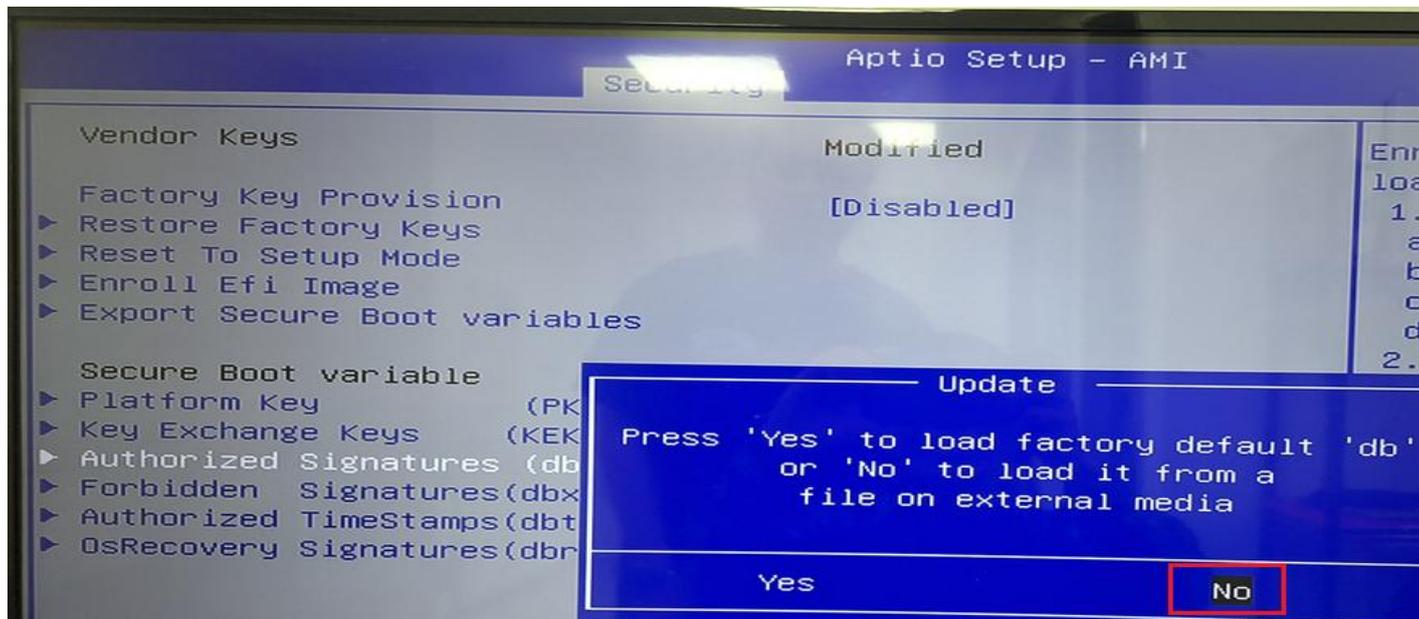
6. Select "Authorized Signatures (db)", enter

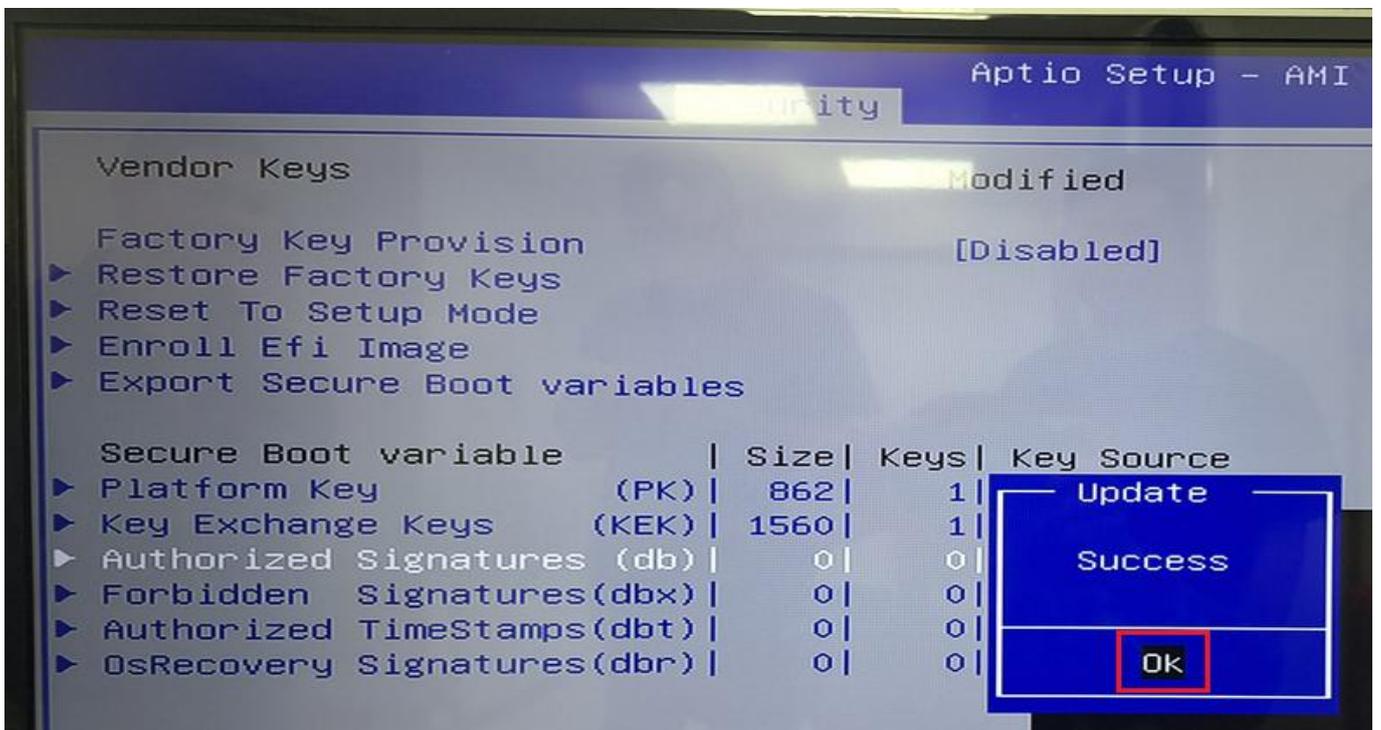
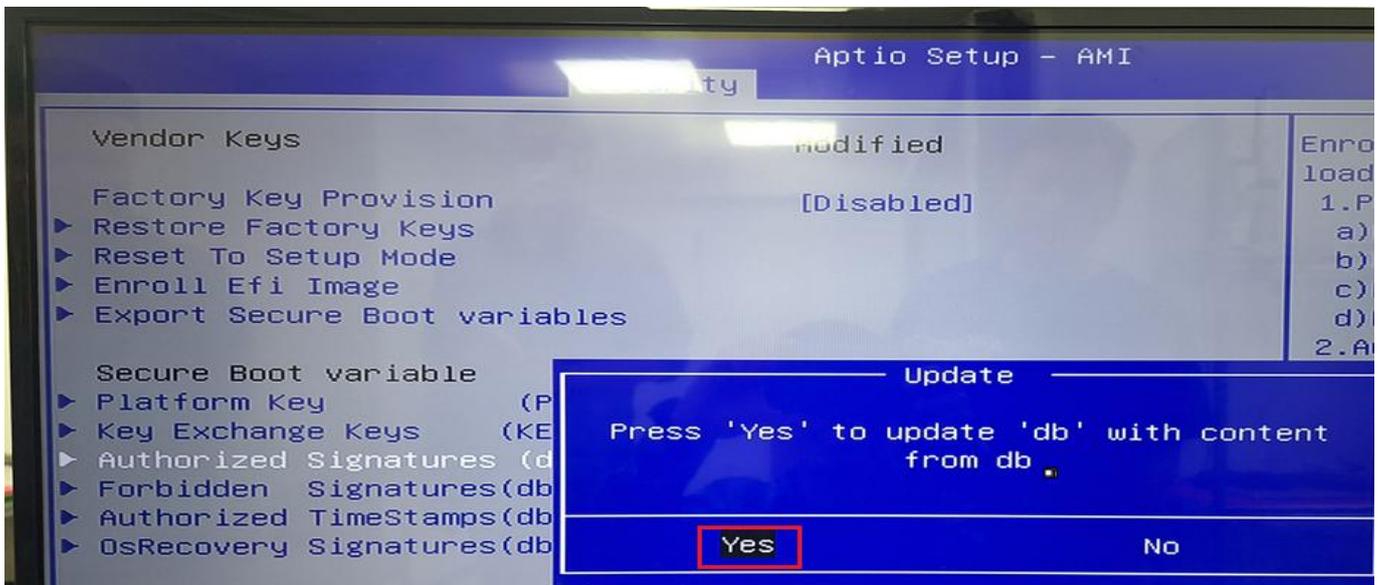


3.9.9 Select "Update"



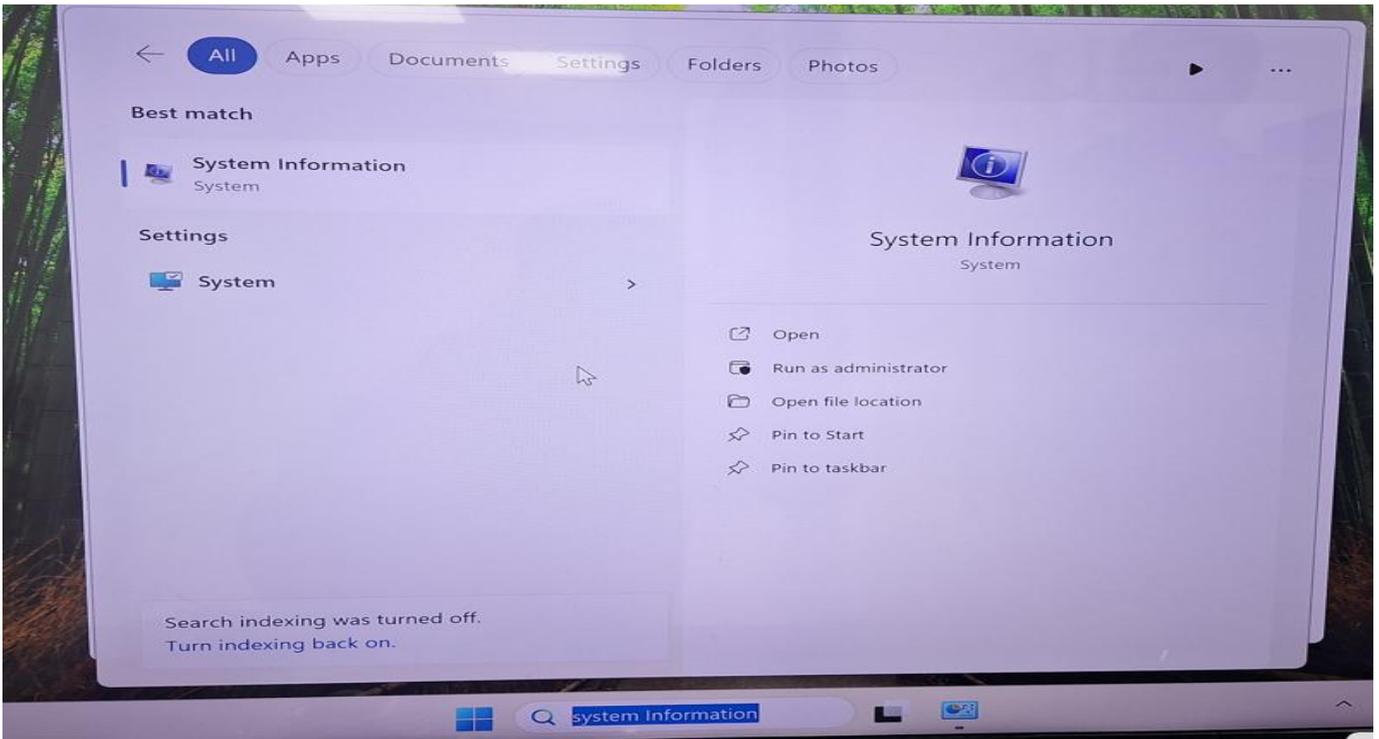
3.9.10 Select "No"



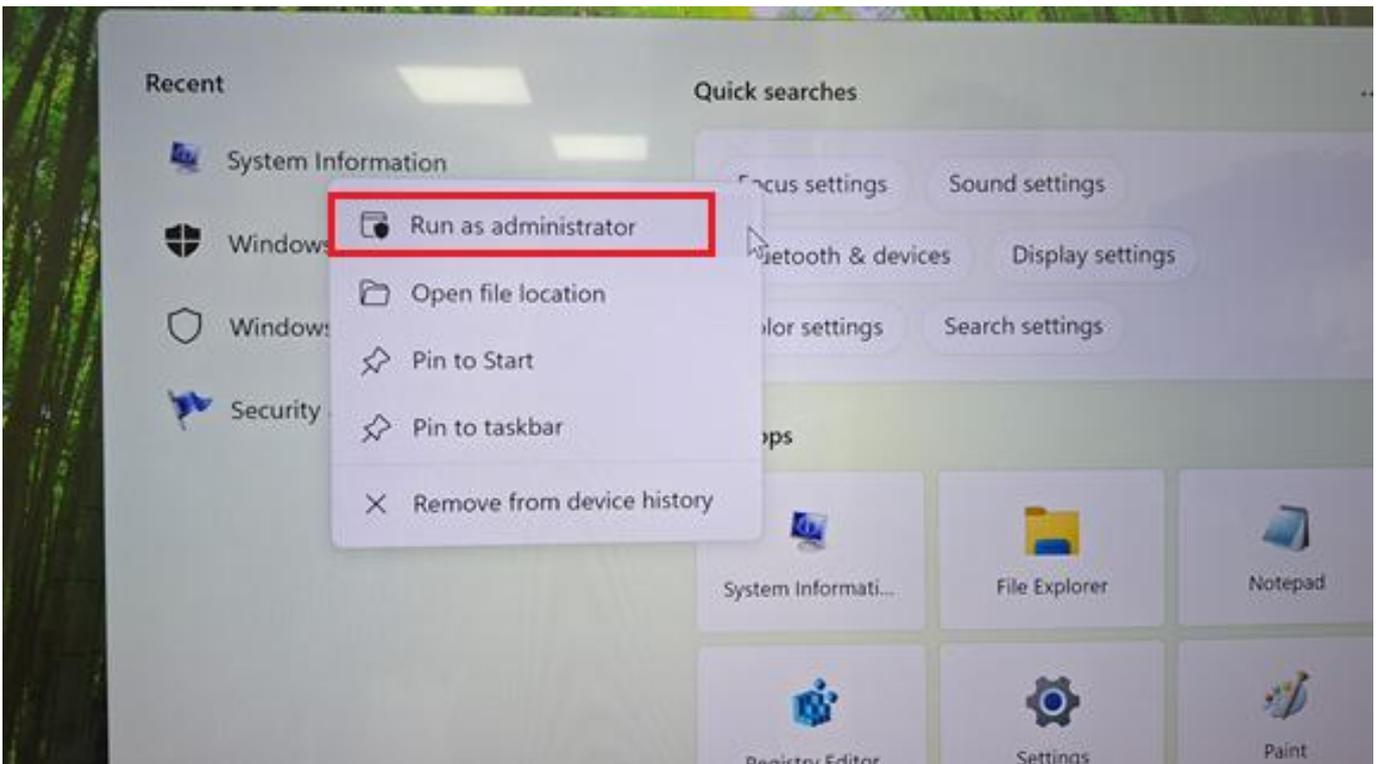


3.9.11 Once the above steps are completed, the key enrollment process is finished.

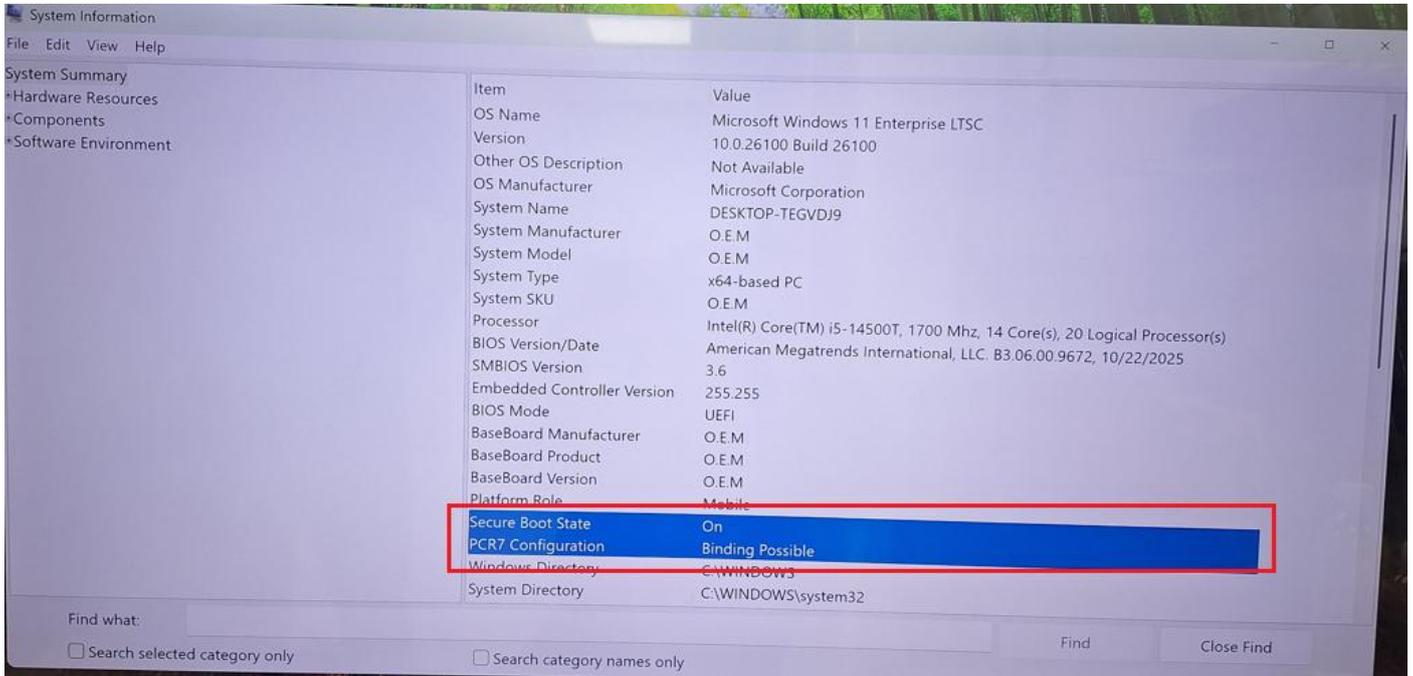
7. To verify that Secure Boot is functioning properly in the Windows environment.
Search “System information” in Windows.



3.9.12 Right-click, and then select “Run as administrator”



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



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

This chapter describes the installation procedures for software and drivers under the windows 10. The software and drivers are included with the motherboard. The contents include Intel Chipset, Graphics chipset driver, Audio driver, LAN driver and Intel® management engine interface. The instructions are as below.

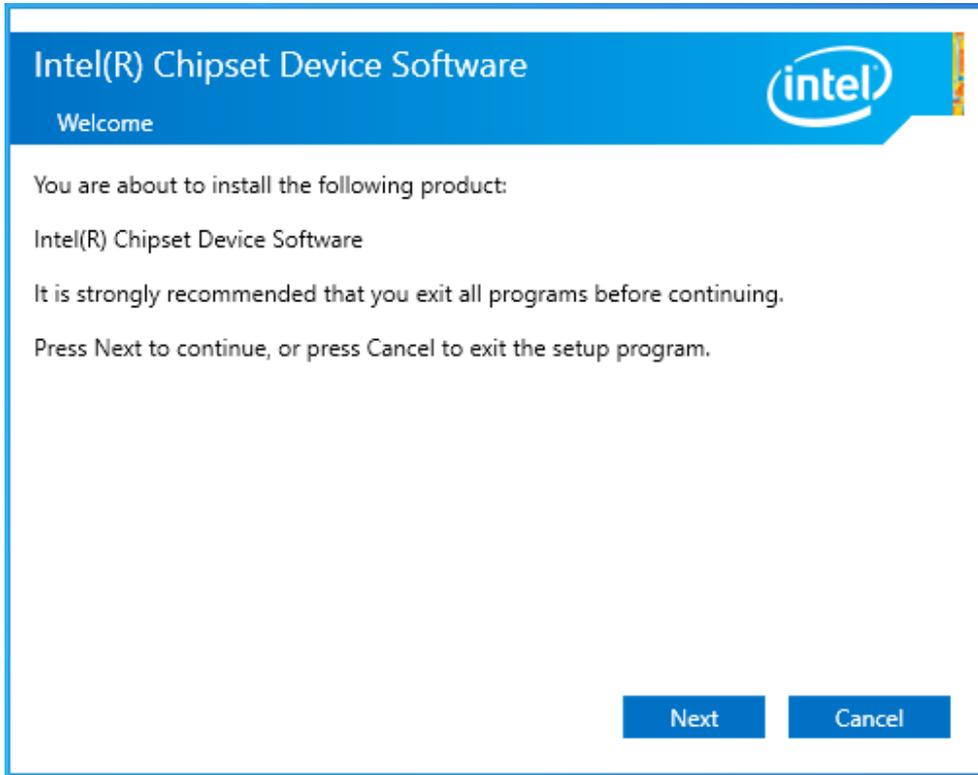
Important Note:

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the installation of drivers.

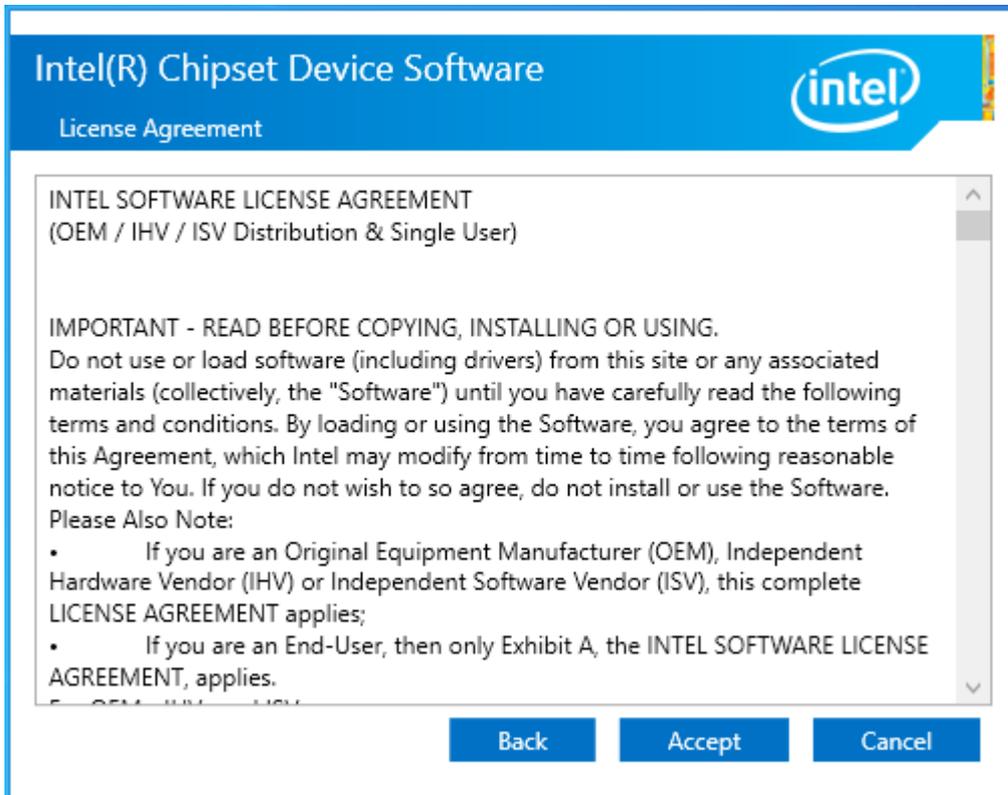
4.1 Intel Chipset

To install the Intel chipset driver, please follow the steps below.

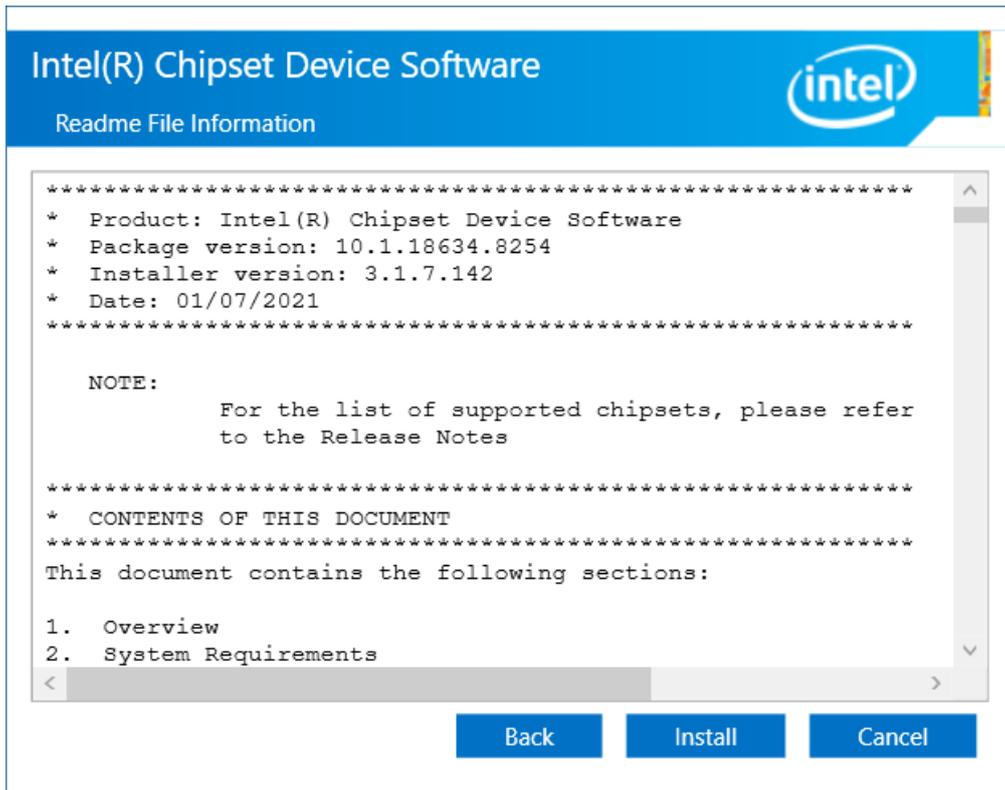
Step 1. Here is welcome page. Please make sure you save and exit all programs before install. Click **Next**.



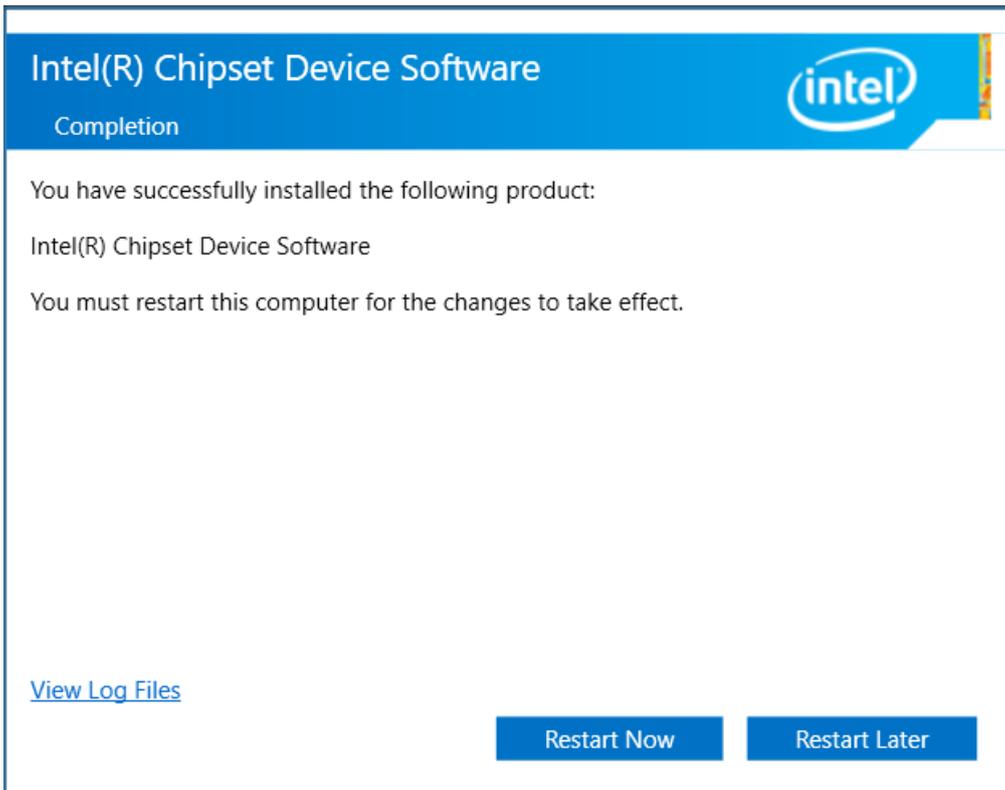
Step 2. Read the license agreement. Click **Accept** to accept all of the terms of the license agreement.



Step 3. Click **Install** to begin the installation.



Step 4. Select **Restart Now** to reboot your computer for the changes to take effect.



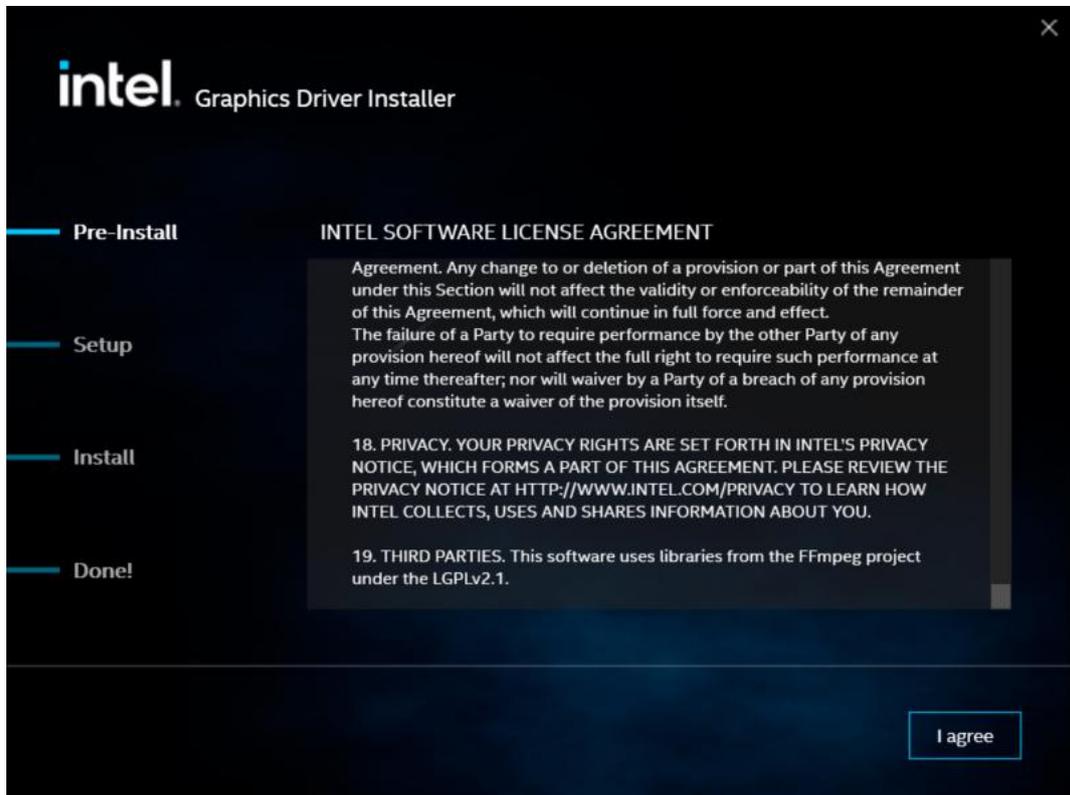
4.2 Intel® HD Graphics Chipset

To install the Intel® HD Graphics Chipset, please follow the steps below.

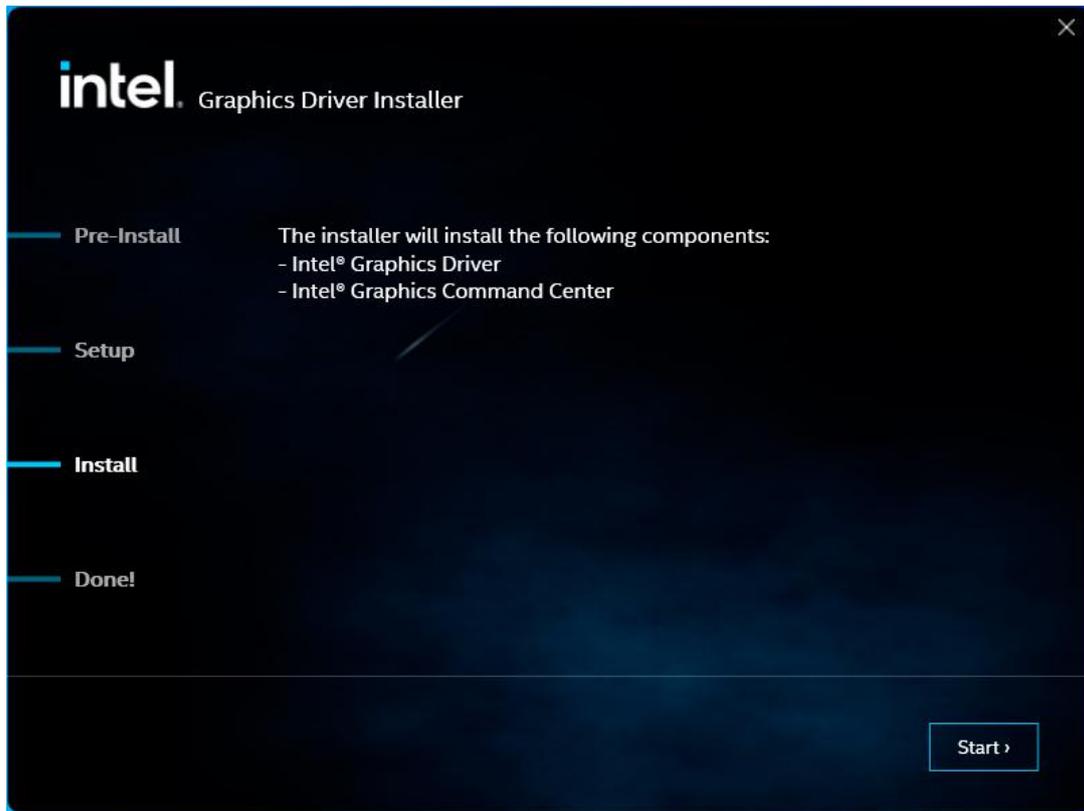
Step 1. Click **Begin installation**.



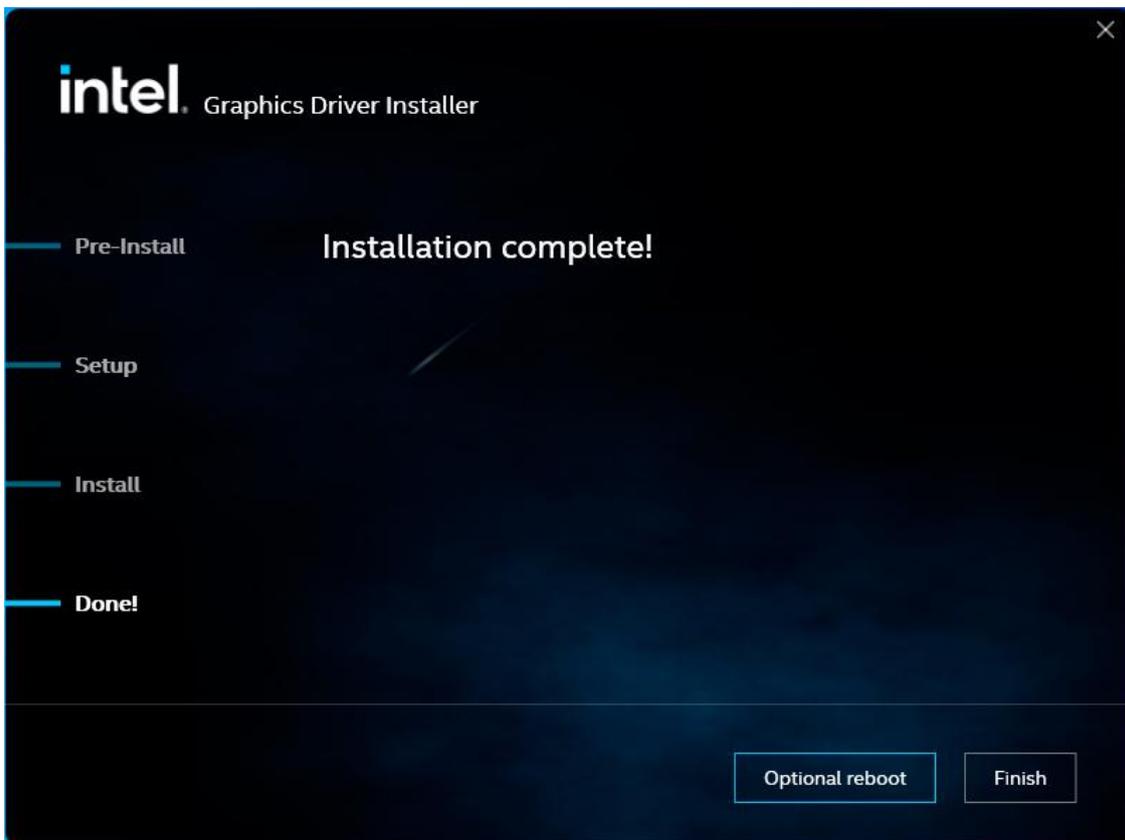
Step 2. Read the license agreement. Click **I agree** to accept all the terms of the license agreement.



Step 3. Choose **Install** function and Click **Start** to setup program.



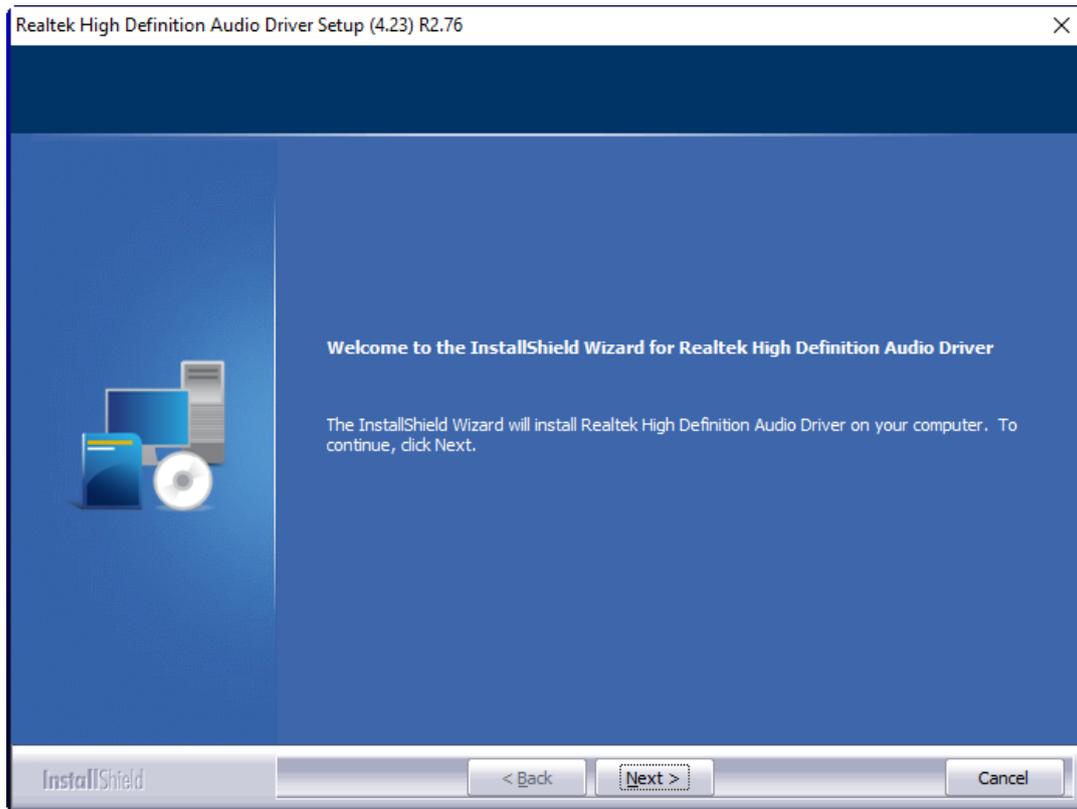
Step 4. Click **Finish** to complete installation.



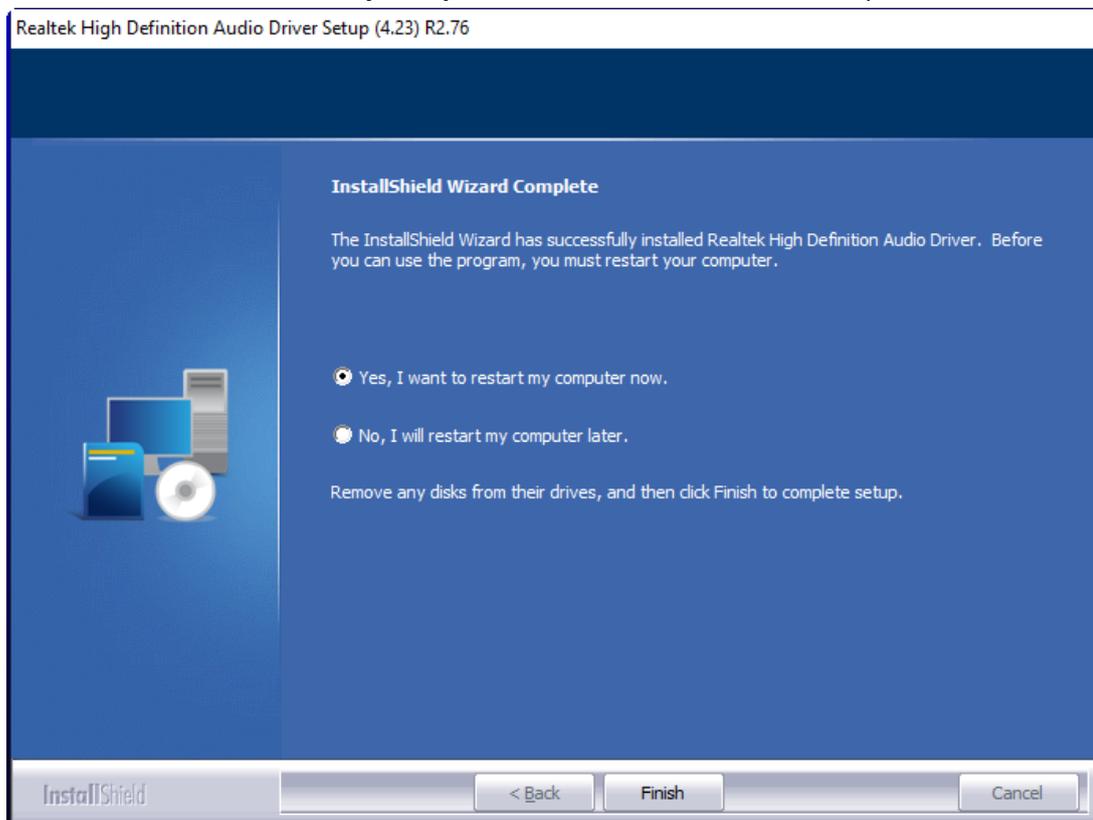
4.3 Intel® HD Graphics Chipset

To install the Realtek HD Audio Driver, please follow the steps below.

Step 1. Click **Next** to continue.



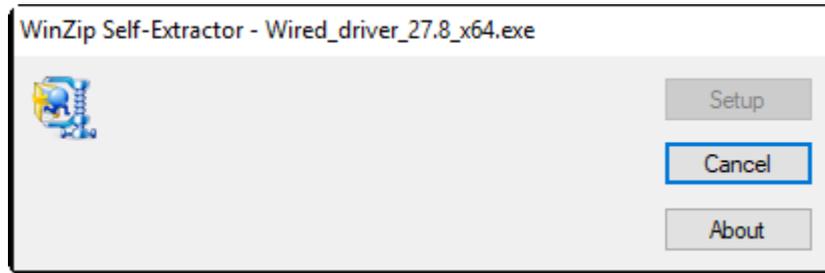
Step 2. Click **Yes, I want to restart my computer now.** Click **Finish** to complete the installation.



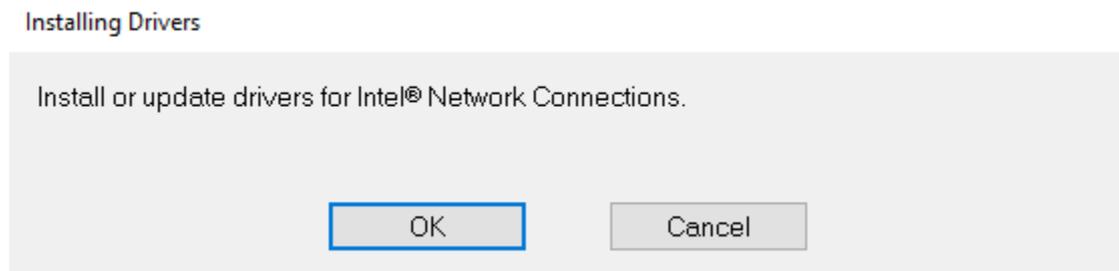
4.4 | LAN Driver

To install the LAN driver, please follow the steps below.

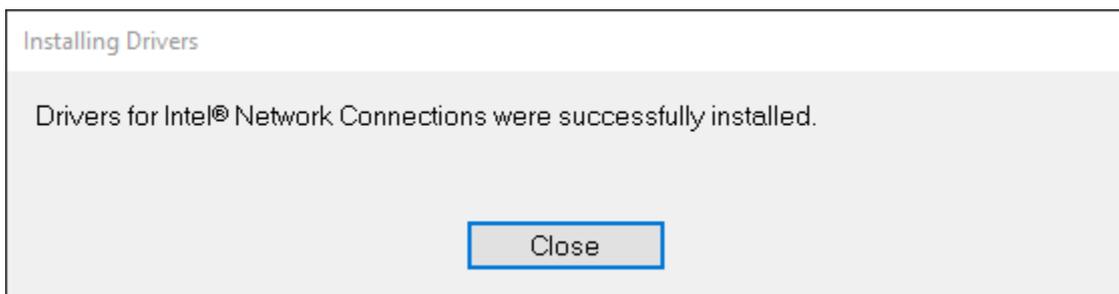
Step 1. Click **Zip File** to continue.



Step 3. Click **OK** to begin the installation.



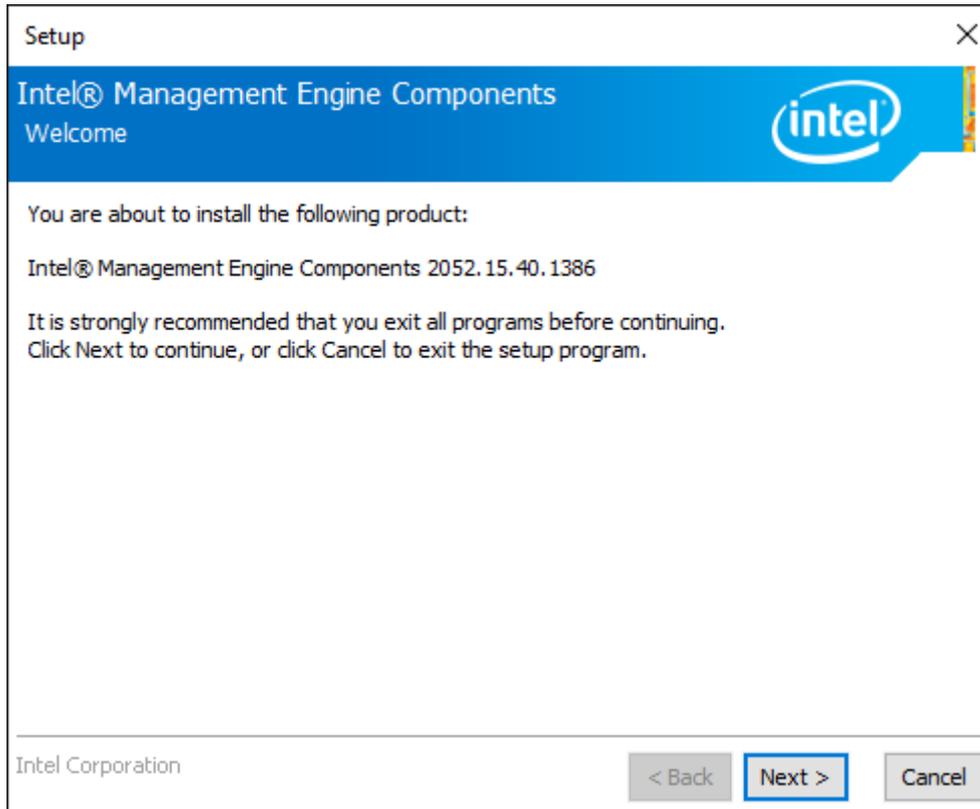
Step 4. Click **Close** to finish installation.



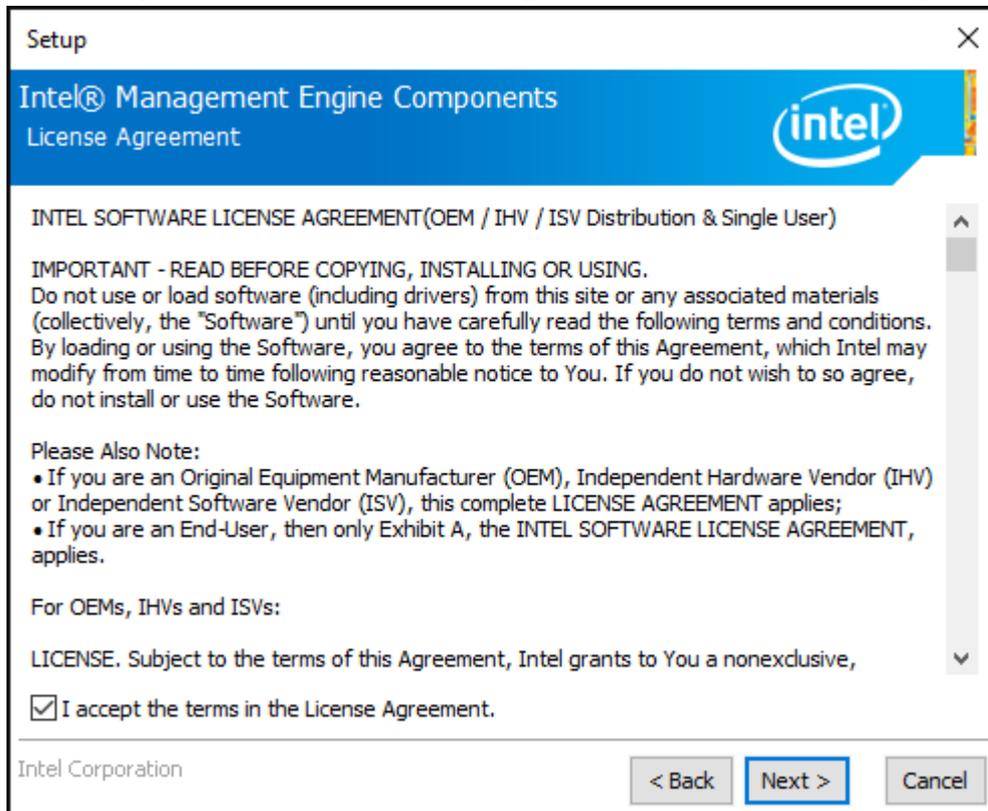
4.5 Intel® Management Engine Interface

To install the Intel® Management Engine Interface, please follow the steps below.

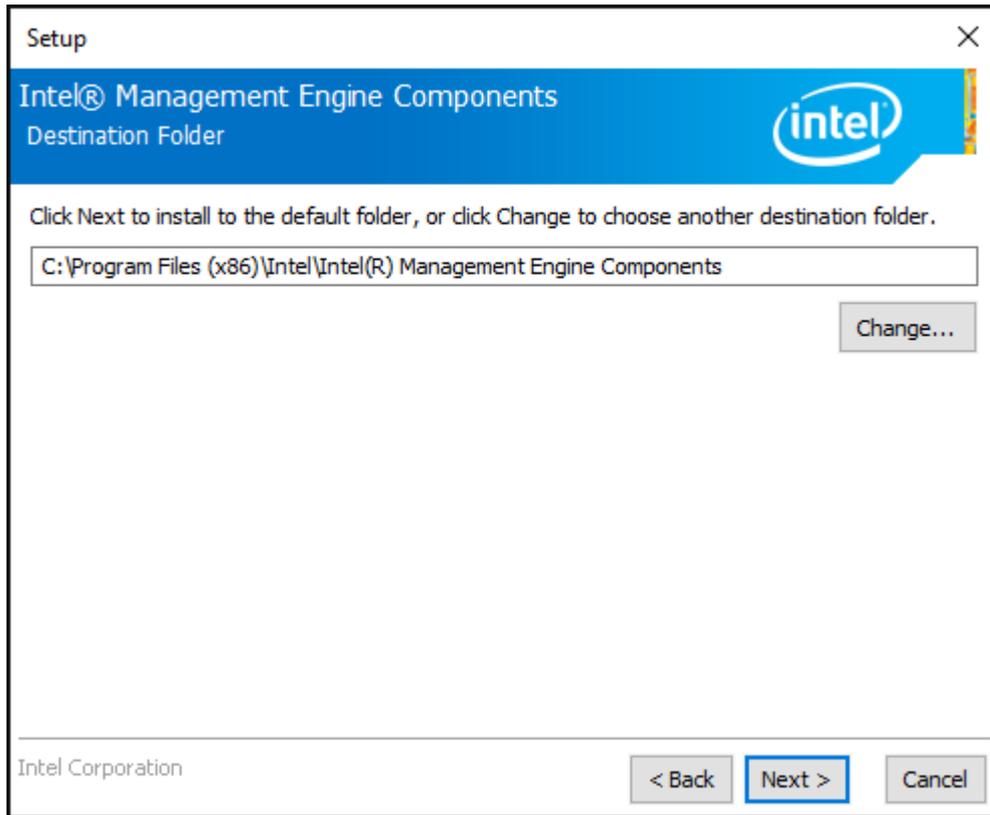
Step 1. Select setup language you need. Click **Next** to continue.



Step 2. Choose **I accept the terms in the License Agreement** and click **Next** to begin the installation.



Step 3. Click **Next** to continue.



Step 4. Click **Finish** to complete the installation.

