

User Manual

FP-610 Mini ITX Motherboard



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FP610 Motherboard

User Manual

(Version 0.5)

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Chapter 1 Product Introduction

1.1 Brief Introduction

The FP610 Mini-ITX motherboard is based on AMD Ryzen™ embedded/mobile series processor, built on the groundbreaking “Zen 2” and “Zen 3” core architecture with innovative technology and optimized high performance.

1.2 Parameters

AMD Ryzen V2000 Series Embedded Processor:

- Ryzen V2516 --- 6 Cores/12 Threads, Base Freq. 2.1 GHz, Max Freq. 3.95GHz, TDP10-25W

AMD Ryzen Mobile Processors Processor:

- Ryzen 5 5600H --- 6 Cores/12 Threads, Base Freq. 3.3 GHz, Max Freq. 4.2GHz, TDP35-54W
- Ryzen 7 5800H --- 8 Cores/16 Threads, Base Freq. 3.2 GHz, Max Freq. 4.4GHz, TDP35-54W

Memory: Dual Channel SO-DIMM DDR4-3200MHz up to 64GB

GPU: Integrated graphics based on CPU, supports a maximum of four displays through 4xDP1.4 standard interfaces and 1xLVDs/eDP. Please note the DP1 and LVDs/eDP cannot be used simultaneously.

Storage: 1 x M.2 Key B for 2242/2280 SATA SSD or 4G, 1 x M.2 Key M for 2280 NVMe/SATA SSD, 1x SATA3.0

USB: 2x USB3.2 rear standard ports; 2xUSB2.0 rear stand ports; 4xUSB2.0 onboard pin.

Ethernet: 2x Onboard Gigabit Network Controller (Realtek RTL8111H)

Audio: High-Definition Audio Codec, supports Line-out, Mic-in (rear ports); Line-out, Mic-in onboard pin (front) and power amplifier.

COM Ports: 6xRS232, COM2 RS485 optional.

Expansion: 1xM.2 Key E 2230 for Wi-Fi & Bluetooth.

Other I/O: 1xPCIe4X, GPIO 8-bit, 1xLPT, 1xLPC, 1xLAN_LED

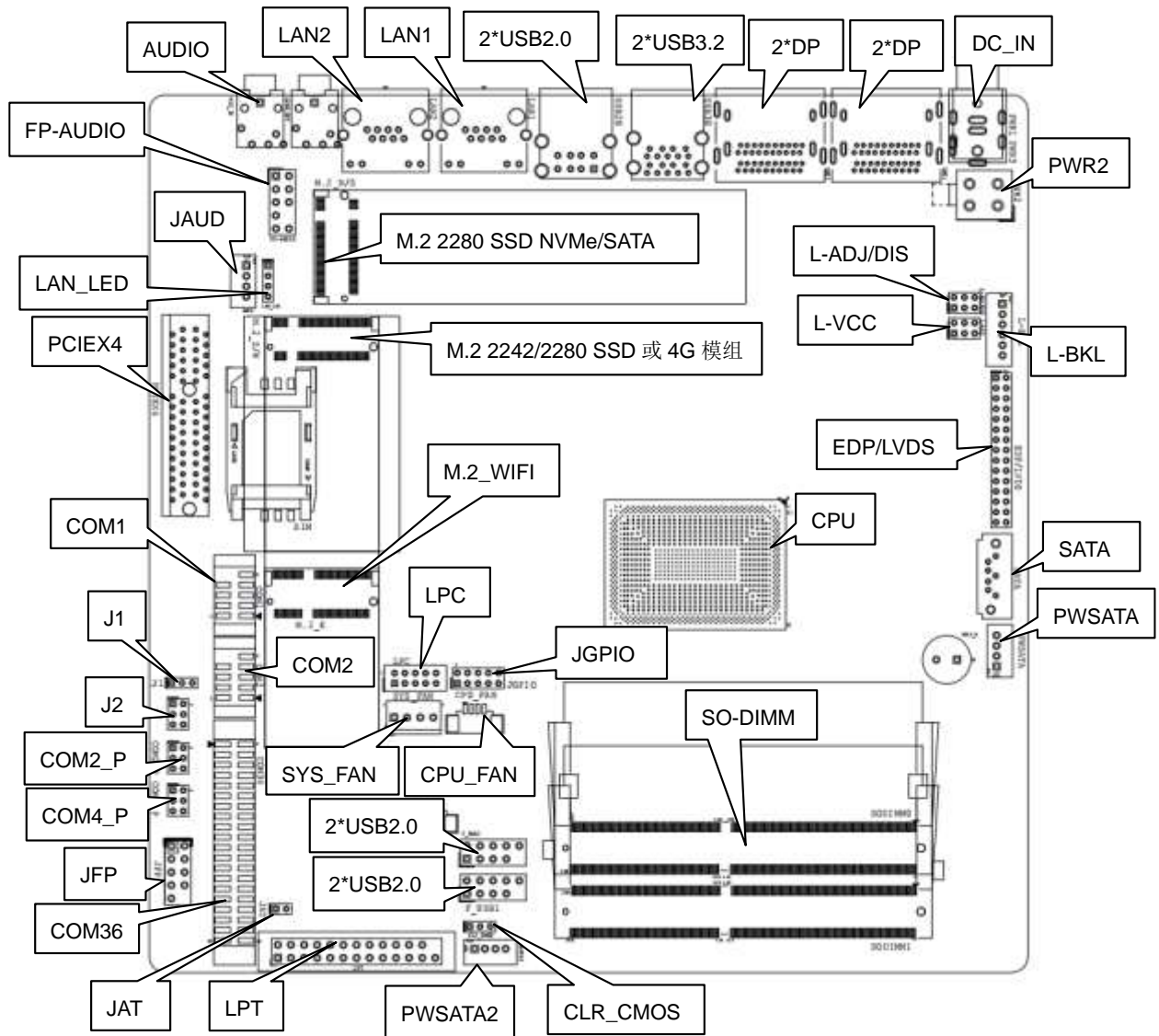
Other Function: Optional TPM Security.

Dimension: 170mm x 170mm

Power: 19V DC-in

Working temperature: -20°C~60°C

1.3 Connector Diagram



Chapter 2 Hardware

2.1 Installations

Please refer to the following steps for installations:

1. Read the user manual carefully to make sure all the adjustments on the FP610 are correct.
2. Installing the Memory:
 - Press the ejector tab of the memory slot outwards with your fingertips.
 - Hold the memory module and align the key to the module with that on the memory slot.
 - Gently push the module into the slot until the ejector levers return completely to the closed position, holding the module in place when the module touches the bottom of the slot. To remove the module, press the ejector levers outwards to unseat the module.
3. Installing the expansion cards:
 - Locate the expansion slots and remove the screw, insert the cards into the slot at a 45-degree angle then attach the screw to the expansion cards, gently press down on it then install the screw back.
4. Connect all signal wires, cables, panel control wiring, and power supplies.
5. Start the computer and complete the setup of the BIOS program.

The board's components are integrated circuits and can easily be damaged by Electrostatic Discharge or ESD; therefore, please follow the instructions:

- Hold the board's edge when handing, and do not touch onboard pins, components, or plug sockets.
- When touching integrated circuit components (such as CPU, RAM, etc.), please wear an anti-static wrist strap/glove to avoid electrostatic discharge damage to the board or other sensitive components.
- Before installing the integrated circuits/sensitive components, place the sensitive components in anti-static bags to keep them safe from ESD.
- Please make sure the power switch is OFF before plugging the power plug.

2.2 Jumper Setting

Please configure the jumpers according to your requirements before installing the hardware.

How to identify the first header of jumpers and pins: Observe the mark beside the jumper or pins and find the header marked by "1" or bold line or triangular symbol. Or observe the rear panel and the header with a square solder pad is the first header.

2.3 Memory Slots

2 x SO-DIMM DDR4-3200 MHz, supporting dual channels, maximum capacity 64GB.

2.4 Display

The board is equipped with four standard DP1.4 interfaces, 1xLVDS/eDP, and supports 4 x simultaneous displays.

The DP1 rear port cannot be used with LVDS/eDP at the same time, while using the LVDS/EDP headers the DP1 port will be disabled.

2.4.1 LVDS (screen printing: EDP/LVDS, L-ADJ/DIS, L-BKL, L-VCC)

A dual channel 24-bit LVDS interface, the LVDS screen power is controlled by the L-VCC jumper. The L-BKL controls the LVDS backlight power, and L-ADJ/DIS controls the LVDS on/off and screen backlight polarity adjustment.

LVDS Data Pin (Screen printing: EDP/LVDS)

Signal	Pin		Signal
VCC	1	2	VCC
VCC	3	4	GND
GND	5	6	GND
A_DATA0_DN	7	8	A_DATA0_DP
A_DATA1_DN	9	10	A_DATA1_DP
A_DATA2_DN	11	12	A_DATA2_DP
GND	13	14	GND
A_CLK_DN	15	16	A_CLK_DP
A_DATA3_DN	17	18	A_DATA3_DP
B_DATA0_DN	19	20	B_DATA0_DP
B_DATA1_DN	21	22	B_DATA1_DP
B_DATA2_DN	23	24	B_DATA2_DP
GND	25	26	GND
B_CLK_DN	27	28	B_CLK_DP
B_DATA3_DN	29	30	B_DATA3_DP

Screen backlight brightness adjustment pin (screen printing: L_BKL)

Pin	Signal
1	GND
2	GND
3	LCD_BKL_ADJ
4	LCD_BKL_ON
5	VSY (The output voltage is consistent with the DC power supply.)
6	VSY (The output voltage is consistent with the DC power supply.)

LVDS Backlight Inverter ON/OFF Control (screen printing: L-ADJ_DIS)

Pin	Setting	Function
1-3	Close	LVDS OFF
3-5	Close	LVDS ON
2-4	Close	Backlight Control Reversed
4-6	Close	Backlight Control Standard

LVDS Display Power Supply Jumper (screen printing: L-VCC)

Interface	Setting	Function
1-2	Close	+3.3V
3-4	Close	+5V
5-6	Close	VSY (The output voltage is consistent with the DC power supply.)

Note: When the LVDS display power supply is set by the jumpers the voltage can be adjusted between 12V, 5V, and 3.3V. It is strictly prohibited to use jumper caps to short-circuit two or more ports at the same time.

2.4.2 eDP (screen printing: EDP/LVDS, L-ADJ/DIS, L-BKL, L-VCC)

The board supports a two LANE eDP(1.3) as an optional function. When it is selected as eDP the LVDS functions will be disabled. The display power is controlled by the L-VCC jumper, and the screen backlight power is controlled by the L_BKL jumper. The L-ADJ/DIS is the EDP backlight inverter ON/OFF control.

eDP Data Pin (Screen Printing: EDP/LVDS)

Signal	Pin	Signal
--------	-----	--------

VCC	1	2	VCC
VCC	3	4	EDP_HPDP
GND	5	6	GND
EDP_AUXN	7	8	EDP_AUXP
N/A	9	10	N/A
EDP_DATA0_P	11	12	EDP_DATA0_N
GND	13	14	GND
N/A	15	16	N/A
EDP_DATA1_P	17	18	EDP_DATA1_N
N/A	19	20	N/A
N/A	21	22	N/A
N/A	23	24	N/A
GND	25	26	GND
N/A	27	28	N/A
N/A	29	30	N/A

eDP Display backlight brightness adjustment pin (screen printing: LVDS_ADJ)

Pin	Signal
1	GND
2	GND
3	LCD_BKL_ADJ
4	LCD_BKL_ON
5	VSY (The output voltage is consistent with the DC power supply.)
6	VSY (The output voltage is consistent with the DC power supply.)

eDP Backlight Inverter ON/OFF Control (screen printing: L-ADJ_DIS)

Pin	Setting	Function
1-3	Close	NULL
3-5	Close	NULL
2-4	Close	Backlight Control Reversed
4-6	Close	Backlight Control Standard

eDP Display Power Supply Jumper (screen printing: L-VCC)

Interface	Setting	Function
-----------	---------	----------

1-2	Close	+3.3V
3-4	Close	+5V
5-6	Close	VSY (The output voltage is consistent with the DC power supply.)

Note: When the LVDS display power supply is set by the jumpers the voltage can be adjusted between 12V, 5V, and 3.3V. It is strictly prohibited to use jumper caps to short-circuit two or more ports at the same time.

2.5 Expansion (Screen Printing: M.2_N/S, M.2_S/W, M.2_E, PCIEX4)

Screen Printing M.2_N/S: M.2 slot Key M, support 2280 NVMe / SATA SSD

Screen Printing M.2_S/W: M.2 slot Key B, support NGFF 2242/2280SSD or 4G module, with standard SIM card slot.

Screen Printing M.2_E: M.2 slot Key E, support NGFF WIFI card.

Screen Printing PCIEX4: It is a PCIe3.0/4X slot, which can be used to expand PCIe devices such as network cards and graphics cards.

2.6 Storage (Screen Printing: SATA, PWSATA)

Supports 1 standard SATA3.0 interface with a transmission rate of 6GB/s, and one disk power supply socket (Spacing 2.0mm).

Disk Power Supply (Screen Printing: PWSATA)

Pin	Signal
1	5V
2	GND
3	GND
4	VSY (The output voltage is consistent with the DC power supply.)

2.7 USB

Features 2xUSB3.2 and 2x USB2.0 rear ports, 4xUSB2.0 onboard header.

USB headers (Screen Printing: F_USB1, F_USB2)

Signal	Pin		Signal
VCC 5V	1	2	VCC 5V

USB DATA-	3	4	USB DATA-
USB DATA+	5	6	USB DATA+
GND	7	8	GND
(NC)	9	10	N/A

2.7 LAN (Screen Printing: LAN1, LAN2, LAN_LED)

Build with high-performance RTL8111H Gigabit Network Controllers 2xRJ45 interfaces, supports Magic packet wake-up functions and the LAN2 supports PXE network boot.

It also provides a set of LAN_LED Network light indicator pins.

LED Status Indicators:

LINK LED(Green)	Function	ACTIVE LED(Orange)	Function
Always on	Network Connected	Blinking	Data Transfer

LAN_LED (Screen printing: LAN_LED)

Pin	Signal
1	LAN1_D+
2	LAN1_D-
3	LAN2_D-
4	LAN2_D+

2.8 Audio

The board features High-Definition Audio Codec ALC662, the audio interface colored green is the Line-out, and the audio interface colored pink is the Mic-in. The JAUD pin is for the power amplifier.

FP_AUDIO (screen printing: FP_AUDIO)

Signal	Pin		Signal
MIC2-L	1	2	AGND
MIC2-R	3	4	AVCC
FRO-R	5	6	MIC2-JD
F-IO-SEN(AGNG)	7	8	(NC)
FRO-L	9	10	LIN2-JD

JAUD (screen printing: JAUD)

Pin	Signal
1	L+
2	L-
3	R-
4	R+

2.10 COM (screen printing: COM1, COM2, COM36, COM2_P, COM4_P, J1, J2)

It is equipped with 6COM (2.0mm spacing of built-in pins). The COM1 and COM2 slots are defined as industrial control; COM3 to COM6 are RS232 definition; COM2_P and COM4_P provide optional 5V or consistent voltage with the DC power supply.

COM1 (Screen printing: COM1)

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

COM2(Screen printing: COM2)

Signal	RS232	RS485
1	DCD#	DATA-
2	DSR#	(NC)
3	RXD	DATA+
4	RTS#	(NC)
5	TXD	(NC)
6	CTS#	(NC)
7	DTR#	(NC)
8	RI#	(NC)
9	GND	GND

COM2_P, COM4_P (Screen printing: COM2_P, COM4_P)

Interface	Setting	Function
1-2	Close	5V
3-4	Close	RI

5-6	Close	VSY (The output voltage is consistent with the DC power supply.)
-----	-------	---

COM2 Setting Mode (Screen printing: J1, J2)

COM2	
RS232	RS485
J1(1-2) J2(1-3, 2-4)	J1(2-3) J2(3-5, 4-6)

COM36 (Screen printing: COM36)

Signal	Pin		Signal
DCD#	1	2	RXD
TXD	3	4	DTR#
GND	5	6	DSR#
RTS#	7	8	CTS#
RI#	9	10	N/A
DCD#	11	12	RXD
TXD	13	14	DTR#
GND	15	16	DSR#
RTS#	17	18	CTS#
RI#	19	20	N/A
DCD#	21	22	RXD
TXD	23	24	DTR#
GND	25	26	DSR#
RTS#	27	28	CTS#
RI#	29	30	N/A
DCD#	31	32	RXD
TXD	33	34	DTR#
GND	35	36	DSR#
RTS#	37	38	CTS#
RI#	39	40	N/A

2.11 LPT (screen printing: LPT)

The board provides a set of 2X13Pin LPT interface. A convert cable is needed to transfer the LPT to the standard interface for use. Users can connect it to various equipment like printers according to their needs.

LPT (screen printing: LPT)

Signal	Pin		Signal
STB	1	2	AFD
LPT_PPD0	3	4	ERROR
LPT_PPD1	5	6	INIT
LPT_PPD2	7	8	SLIN
LPT_PPD3	9	10	GND
LPT_PPD4	11	12	GND
LPT_PPD5	13	14	GND
LPT_PPD6	15	16	GND
LPT_PPD7	17	18	GND
ACK	19	20	GND
BUSY	21	22	GND
PE	23	24	GND
SLCT	25	26	(NC)

2.12 System Fan (Screen Printing: SYS_FAN)

The board provides a system fan socket with a default voltage of 5V, 12V optional.

SYSFAN (Screen Printing: SYS_FAN)

Pin	Signal
1	GND
2	VCC
3	TAC
4	CTL

2.13 CPU FAN (Screen Printing: CPU_FAN)

The board provides a CPU fan socket with a default voltage of 5V, 12V optional.

CPU_FAN (Screen Printing: CPU_FAN)

Pin	Signal
1	VCC
2	GND
3	TAC
4	CTL

2.14 GPIO (screen printing: JGPIO)

The board is equipped with a set of 2 x 5pin as JGPIO pin (2.0mm spacing), supporting 8 programmable I/O lanes in total.

GPIO (screen printing: JGPIO)

Signal	Pin		Signal
GPIO3	1	2	3.3VA
GPIO4	3	4	GPIO69
GPIO9	5	6	GPIO86
GPIO40	7	8	GPIO89
GND	9	10	GPIO90

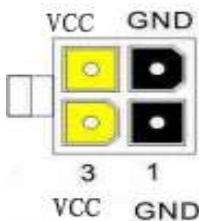
2.15 Board Power Supply (Screen Printing: PWR1, PWR2)

It supports 19V DC-in power adapter or ATX supplementary power (2 x 2pin).

PWR1: 19V DC-in power supply socket



PWR2: ATX supplementary power supply socket (2x2PIN)



2.16 Switch Panel Pin (Screen Printing: JFP)

The front control panel interface is supposed to connect to the function button and the light indicator on the front panel of the chassis.

JFP (Screen Printing: JFP)

Signal	Pin		Signal
HDD_LED+	1	2	PWR_LED+
HDD_LED-	3	4	PWR_LED-
RSTBTN-	5	6	PWR_ON+
RSTBTN+	7	8	PWR_ON-
N/A	9	10	(NC)

2.17 LPC (Screen Printing: LPC)

LPC (Screen Printing: LPC)

Signal	Pin		Signal
L_FRAME_N	1	2	LPC_AD3
LPC_AD2	3	4	LPC_AD1
LPC_AD0	5	6	GND
PLTRST#	7	8	CLK_LPC_PORT80
+3.3V	9	10	SERIRQ

2.18 Hardware Auto Start (Screen Printing: JAT)

JAT (screen printing: JAT)

Settings	JAT
Close	Hardware Auto Start

Please note the jumper function is similar to the " AC Power Loss Options " function in BIOS. When the latter is set to **Always on**, the device will also start automatically after power is connected.

2.19 CMOS Clearance/Retention (Screen Printing: CLR_CMOS)


The CMOS is powered by the button battery on the board. Clearing CMOS will permanently erase the previous system settings and set them to the original (factory settings) system settings.

Steps:

- (1) Turn off the computer and disconnect the power supply.
- (2) Use a jumper cap to short the first and second pins of CLR_CMOS for about 10 seconds, and then disconnect.
- (3) Insert the jumper back into the 2nd and 3rd pins of CLR_CMOS (note that closing 1 and 2 pins are: CLR_CMOS, closing 2 and 3 pins is: normal power on).
- (4) When starting the computer, press the key to enter the BIOS, load the optimal default values, save, and exit the settings.

COMS (Screen Printing: CLR_CMOS)

Pin	Settings	Function
1-2	Close	Clear COMS
2-3	Close	Normal Boot

 Please do not clear the CMOS when the PC is powered on, in case of board damages. After clearing the CMOS, the jumper cap must be set back to the 2nd and 3rd pins for normal boot.

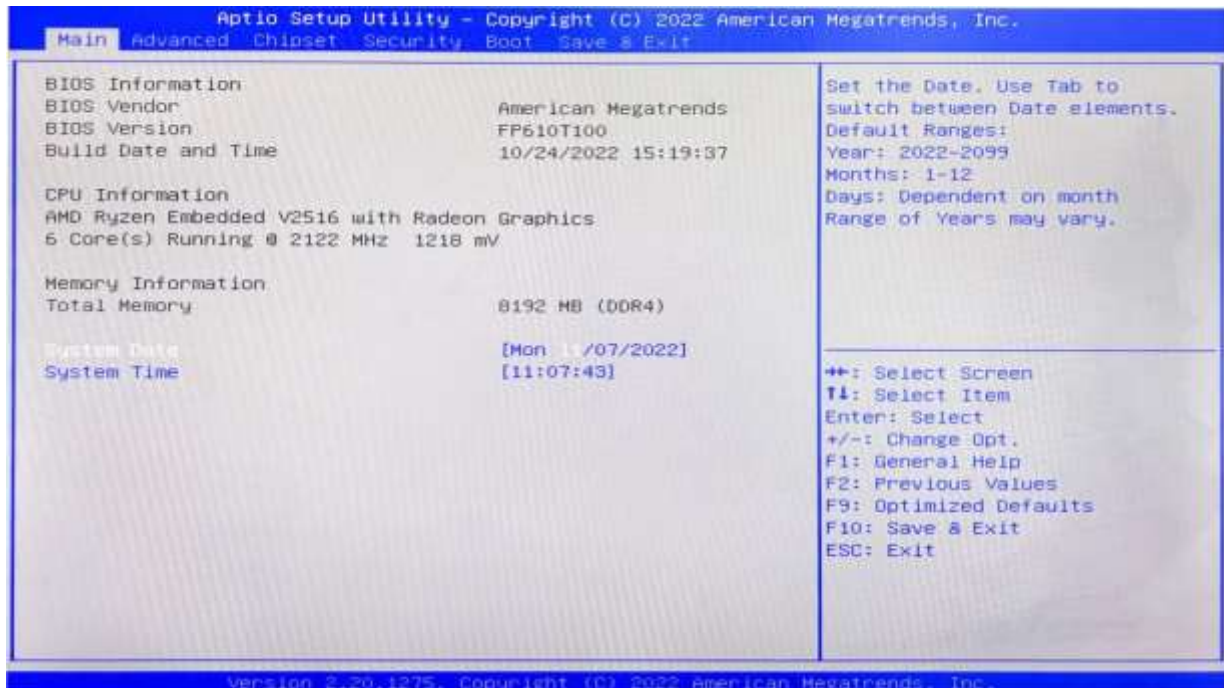
Chapter 3 BIOS Setup

3.1 Entering the BIOS

1. Turn on the computer and press <Delete> entering the BIOS
2. After the computer is turned on, keep pressing F11, select enter Setup
3. BIOS Hotkeys:
 - F9: Restore to Factory setting.
 - F10: Save and Exit.
 - ESC: Exit

3.2 Main Setup (BIOS info, Date, Time)

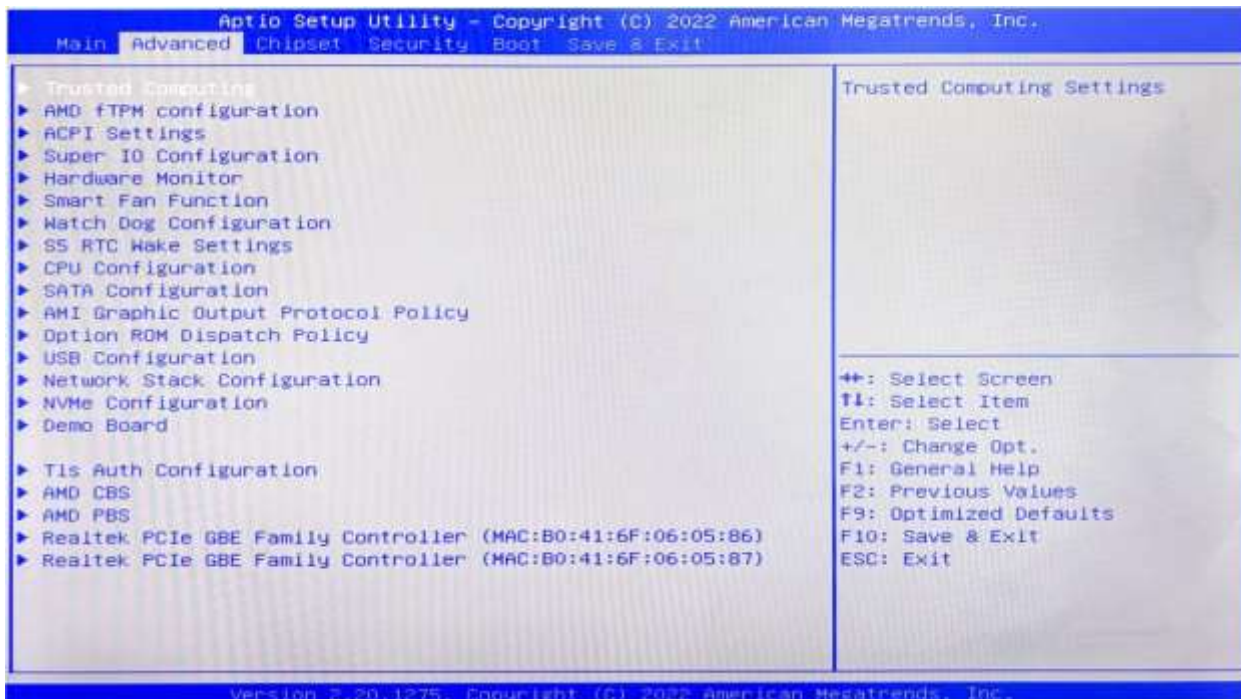
When you enter the BIOS Setup utility the first things you will encounter is the Main Setup screen. Shown below is the Main BIOS Setup screen. You can always return to the Main setup by selecting the Main tab.



System Date: Set the date. MM/DD/YY format.

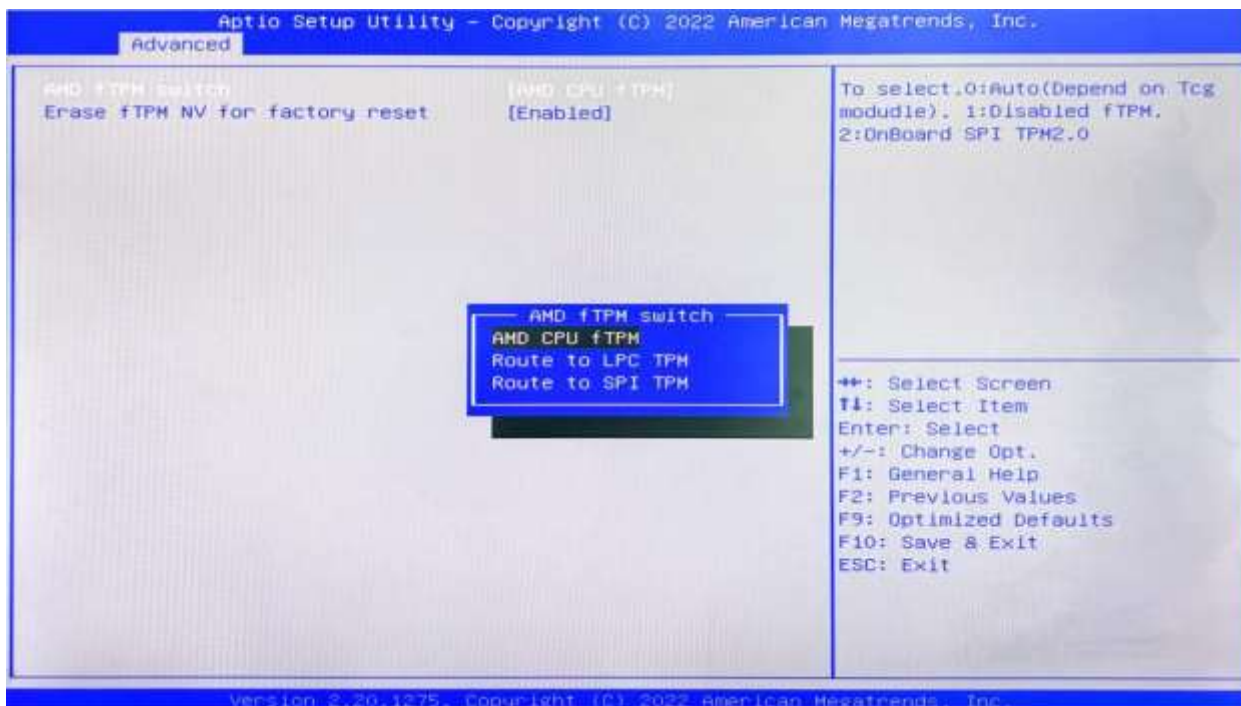
System Time: Set the time. HH:MM: SS format.

3.3 Advanced Settings



Select any of the items in the left frame of the screen. The advanced sections allow you to configure, improve and set up system features according to the preference of the CPU Configuration. All Advanced BIOS Setup options are described as follows.

3.3.1 AMD fTPM Configuration

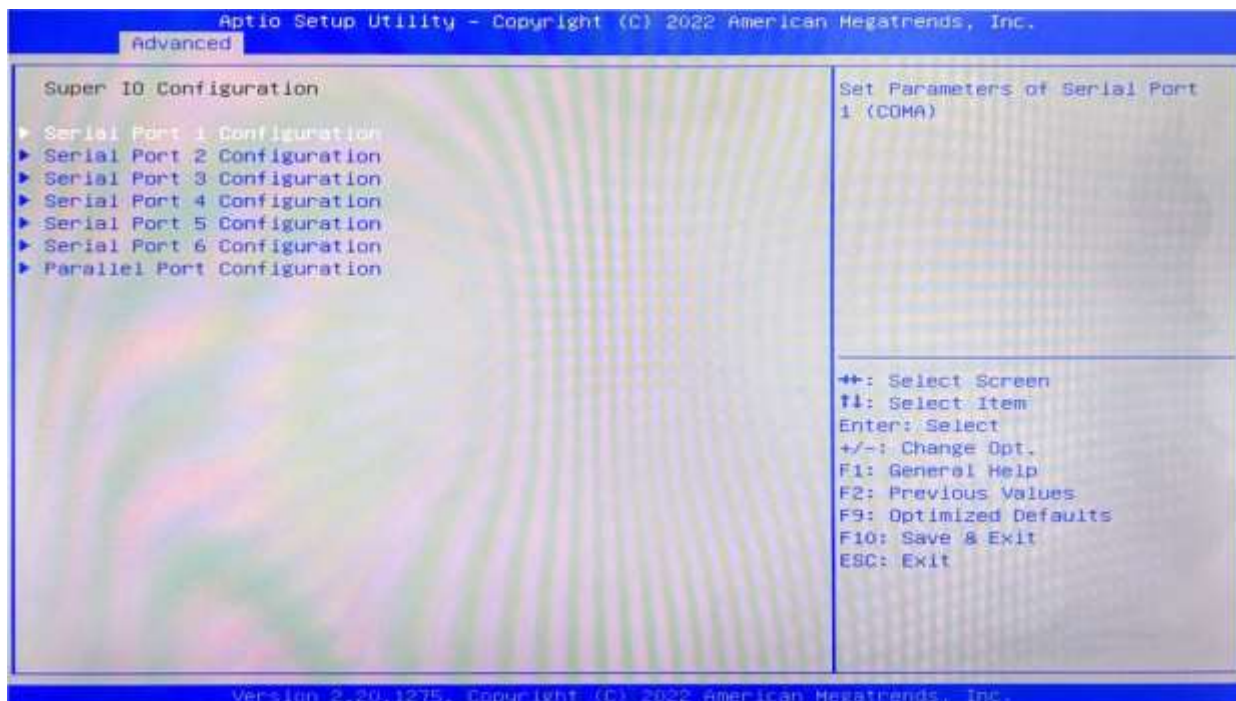


AMD fTPM Switch:

The TPM (Trusted Plat-form Module) is a secure key generator and key cache management component that enables protected storage of encryption keys and authentication credentials for enhanced security.

This option allows you to choose from internal CPU TPM or external TPM. Select AMD CPU fTPM for CPU internal TPM, and select Route to LPC TPM for external TPM2.0.

3.3.2 Super IO Configuration



Serial Port 1~6 Configuration

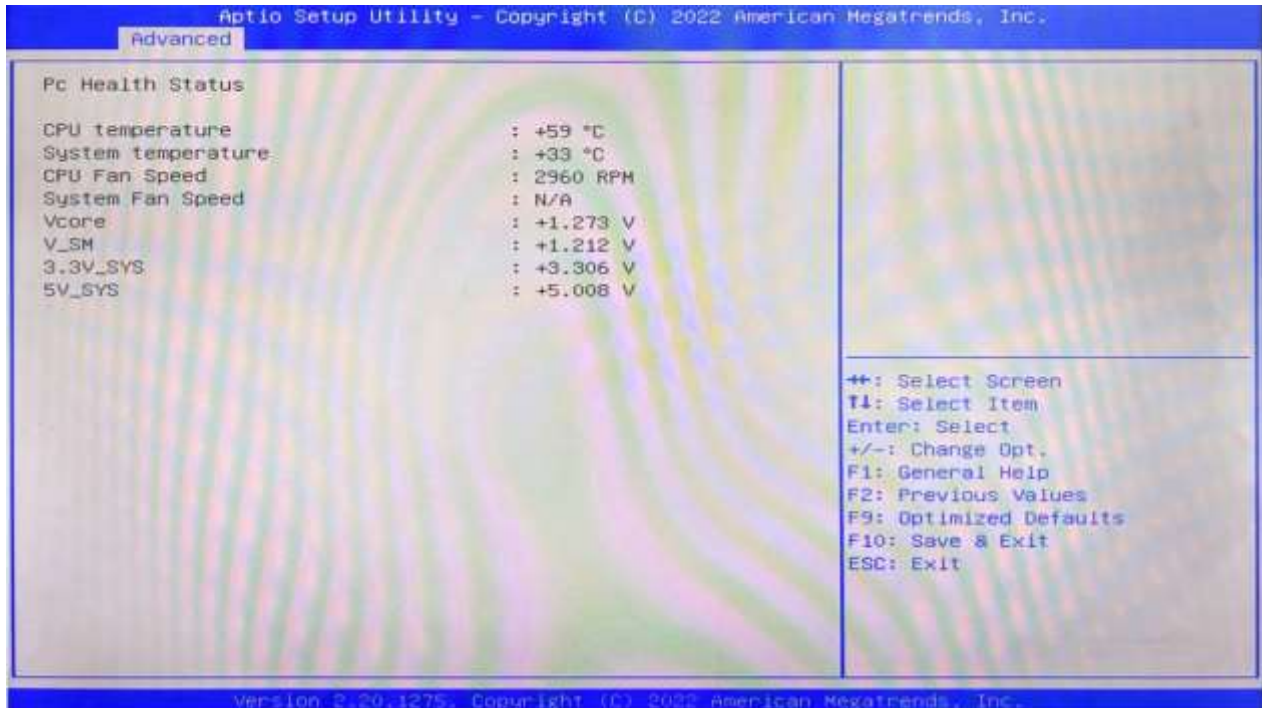
Serial Port: Enable or disable serial port (COM).

Device Setting (Read-only): Displays serial ports' interrupt and location.

Change Setting: Change serial port settings and suggest setting "Auto" as default.

Parallel Port Configuration

3.3.3 Hardware Monitor

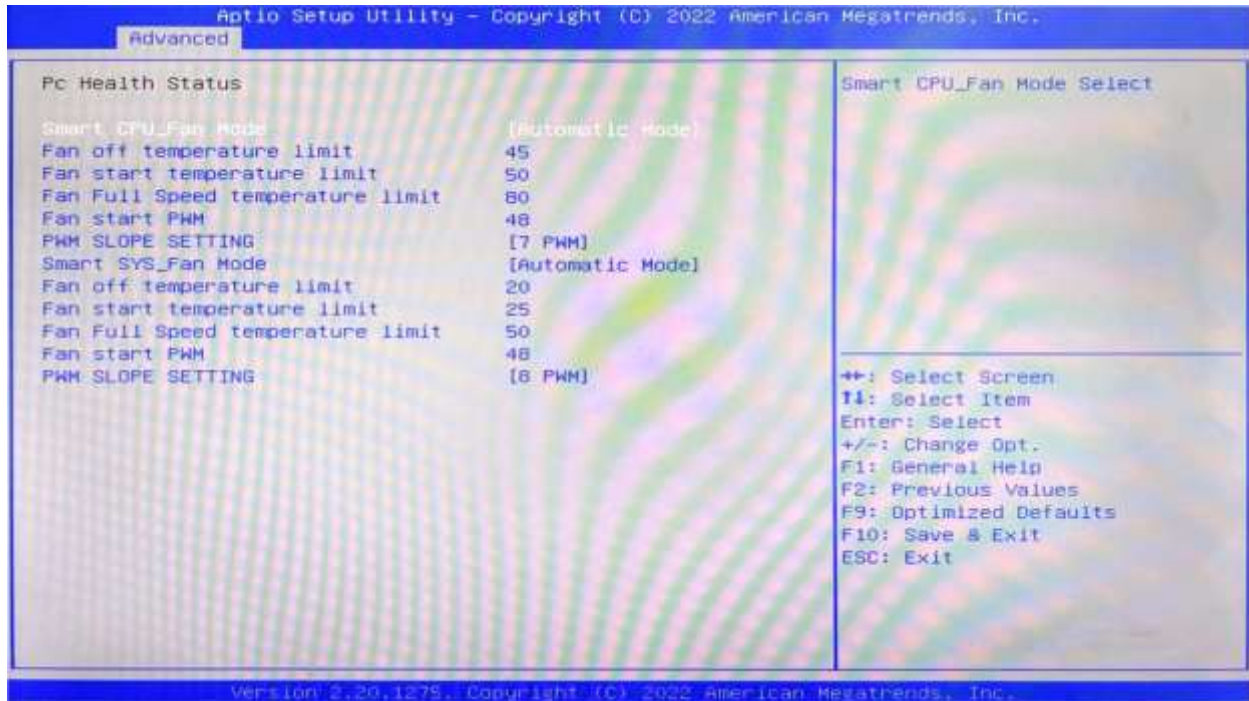


PC Health Status

The PC health status displays CPU temperature, system temperature, fan speed, and other relevant voltage values. The above parameters have a certain range, and the system cannot run beyond these ranges.

1. CPU Temperature
2. System Temperature
3. CPU Fan Speed
4. System Fan2 Speed
5. VCore: Core Voltage
6. V_SM
7. +3.3V_SYS: 3.3V
8. +5V_SYS: 5V

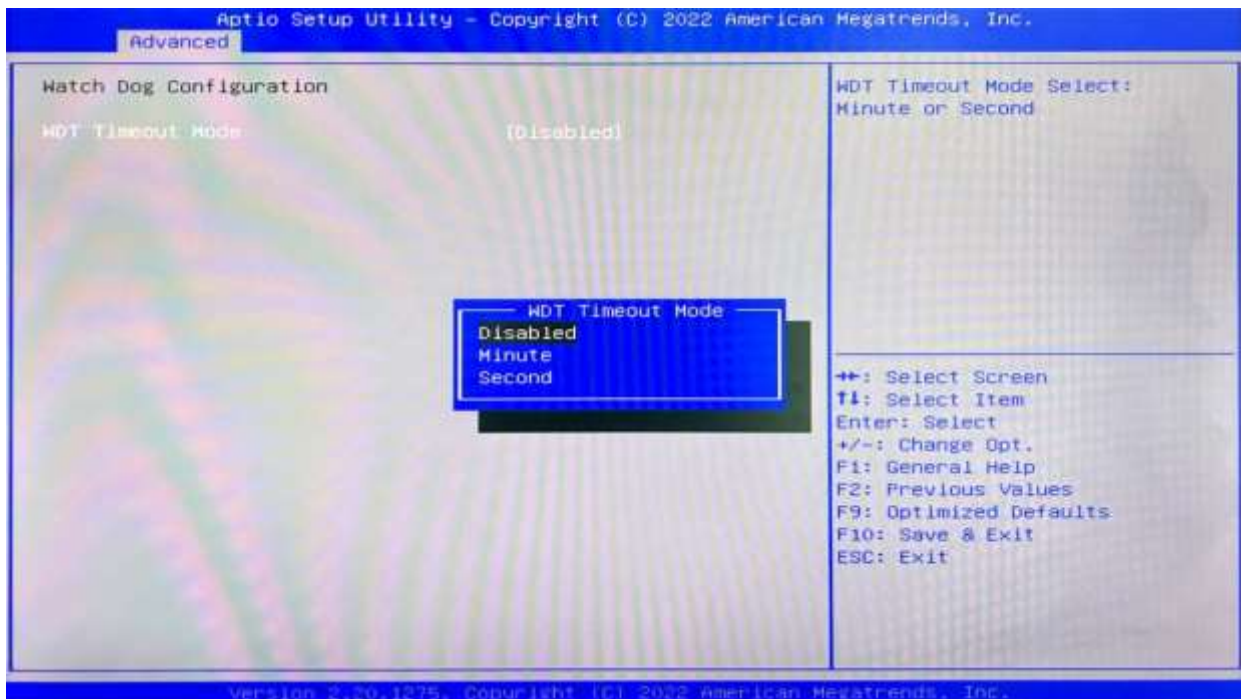
3.3.4 Smart Fan Function



The Smart Fan Function allows you to set three different modes for the CPU fan speed and system fan speed, according to your needs.

1. Automatic Mode
2. Full on Mode
3. Manual Mode

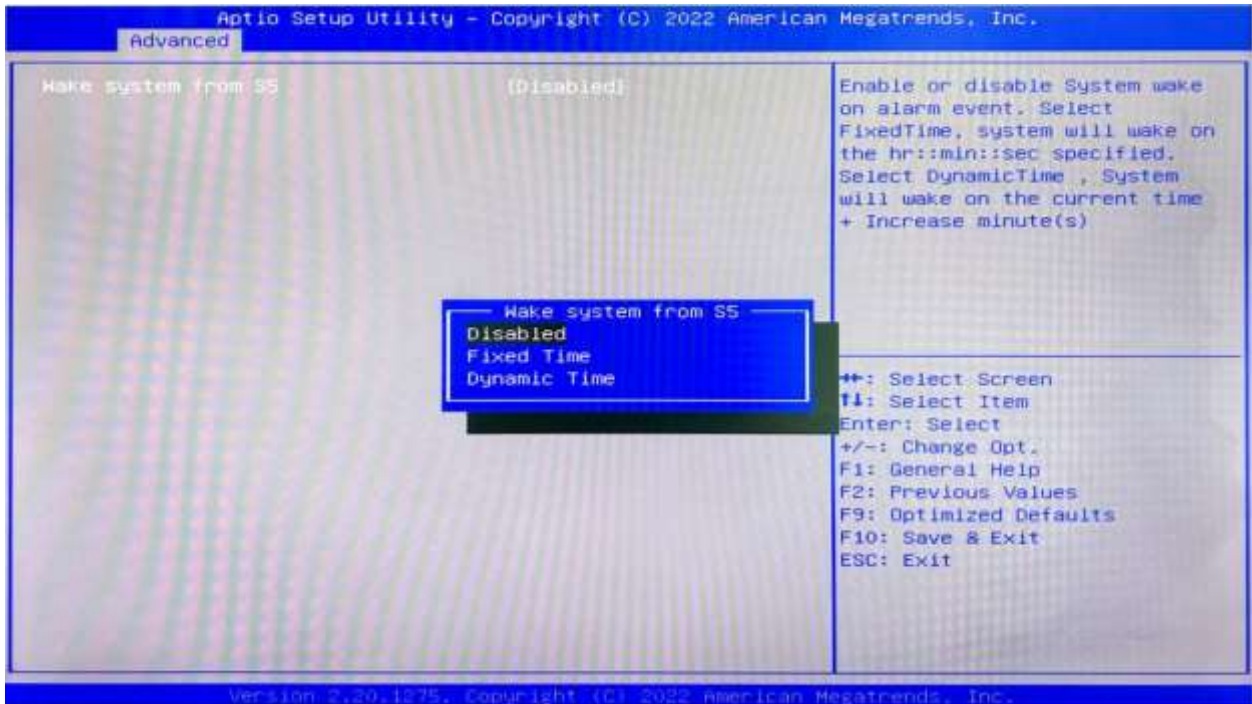
3.3.5 Watchdog Configuration



Watchdog Configuration

WDT Timeout Mode select: Minute or Second

3.3.6 S5 RTC Wake Settings

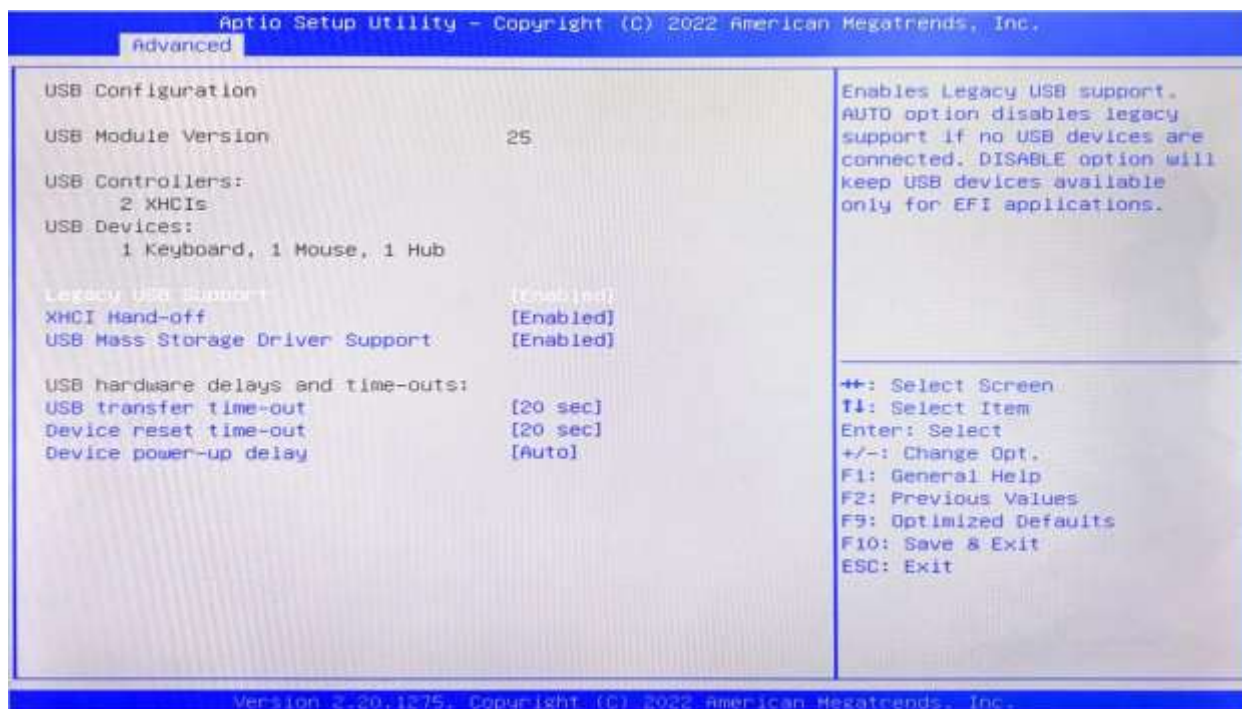


Wake system From S5: timing boot settings, disabled by default.

Fixed Time: Select Fixed Time and the system will wake on the Hr: Min: Sec specified.

Dynamic Time: Select Dynamic Time and the system will wake on a dynamic time.

3.3.7 USB Configuration



1. Legacy USB Support

Enable Legacy USB support. Disables legacy support if no USB devices are connected. Select enable will keep USB devices available under UEFI's support.

2. XHCI Hand-off

Whether to enable the USB XCHI transfer protocol. A workaround for OS without XHCI hand-off support. The XHCI ownership change should be claimed by the USB XCHI driver.

3. USB Mass Storage Driver Support

Enable(default) or disable USB Mass Storage Driver Support.

4. USB transfer time-out

Time-out value for control, bulk, and interrupt transfers, default time:20 second.

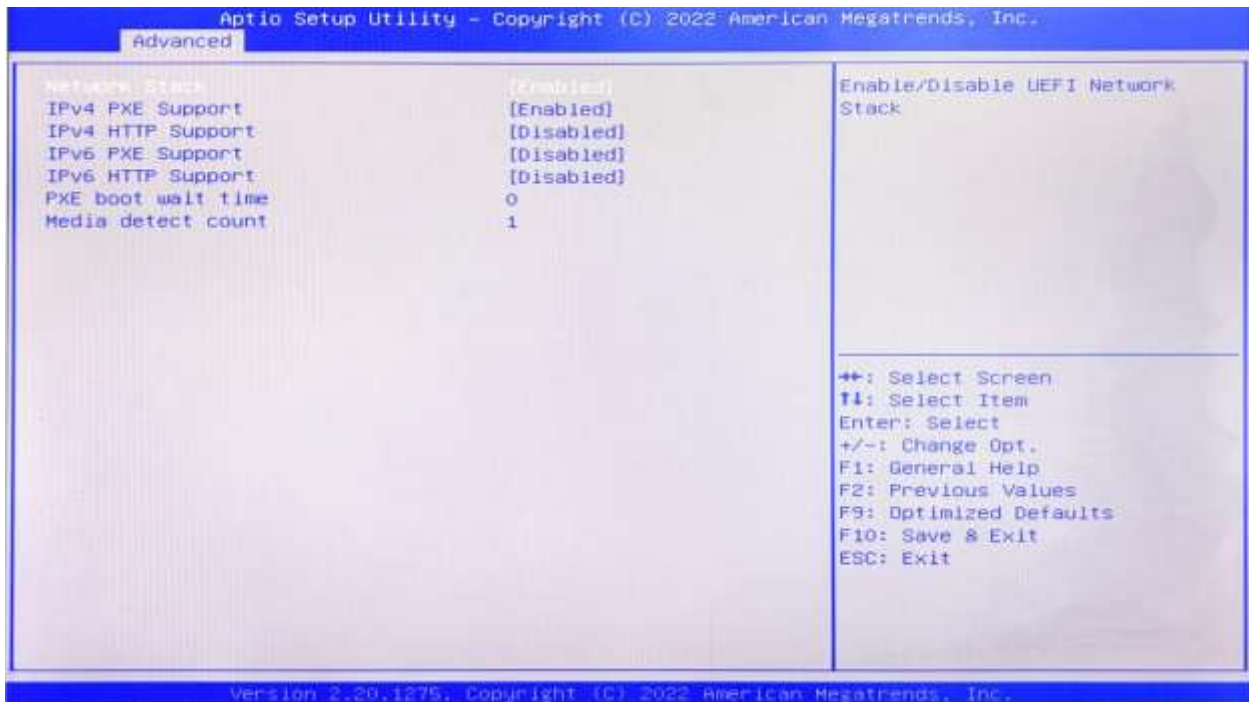
5. Device reset time-out

USB mass storage device start unit command time-out, default time:20 second.

6. Device Power-up Delay

Maximum time the device will take before it properly reports itself to the host controller.

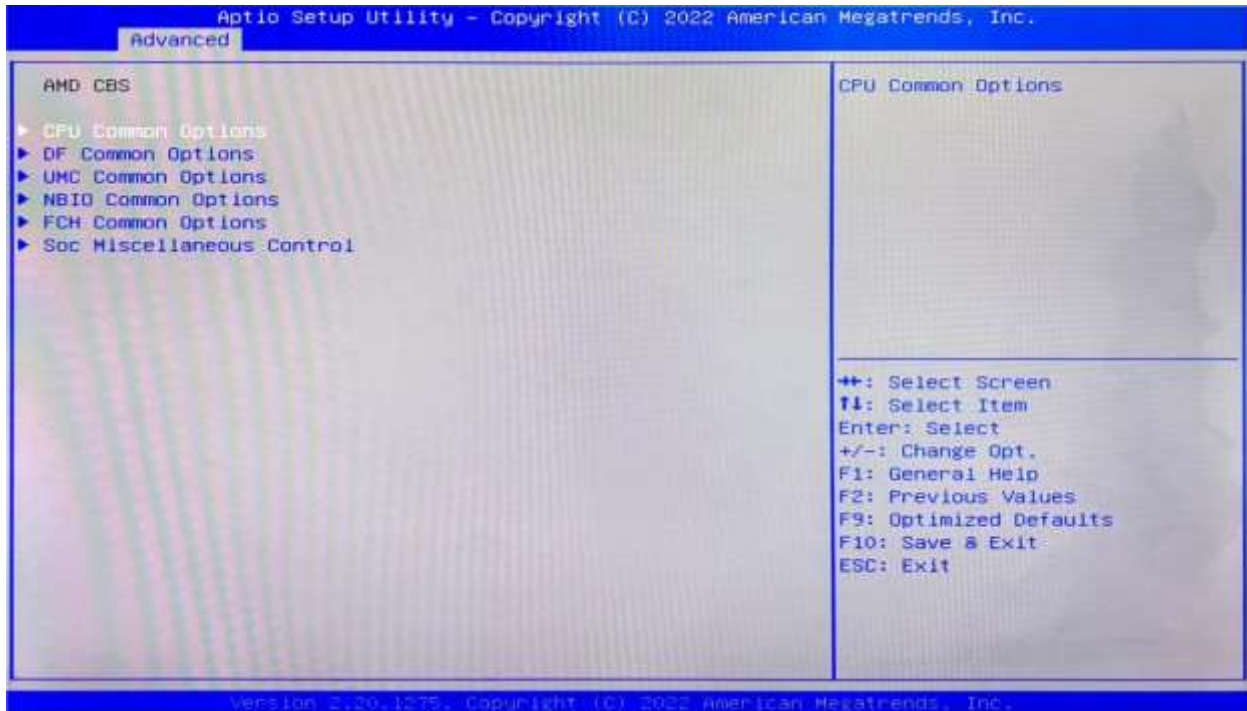
3.3.8 Network Stack Configuration



Network Stack

PXE Network boot setting, disabled by default.

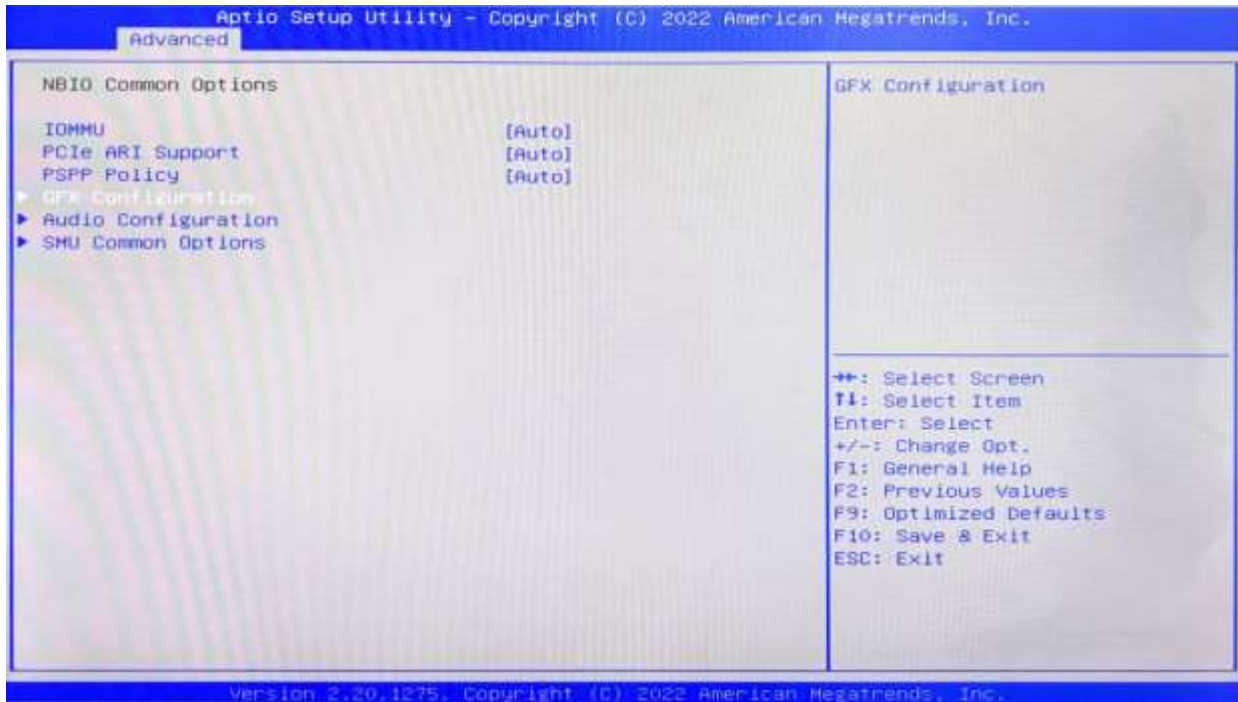
3.3.9 AMD CBS



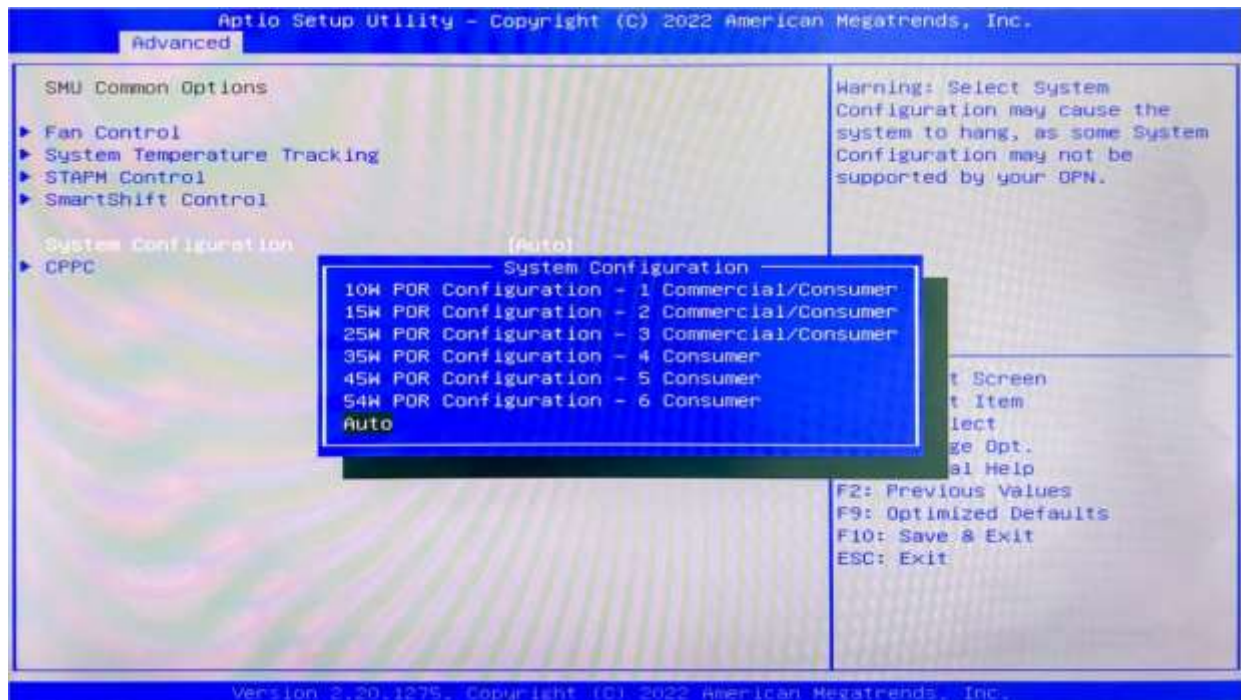
AMD CBS: Custom BIOS Settings

1. CPU Common Options
2. DF Common Options
3. UMC Common Options
4. NBIO Common Options
5. FCH Common Options
6. SOC Miscellaneous Control

3.3.9.1 NBIO Common Options

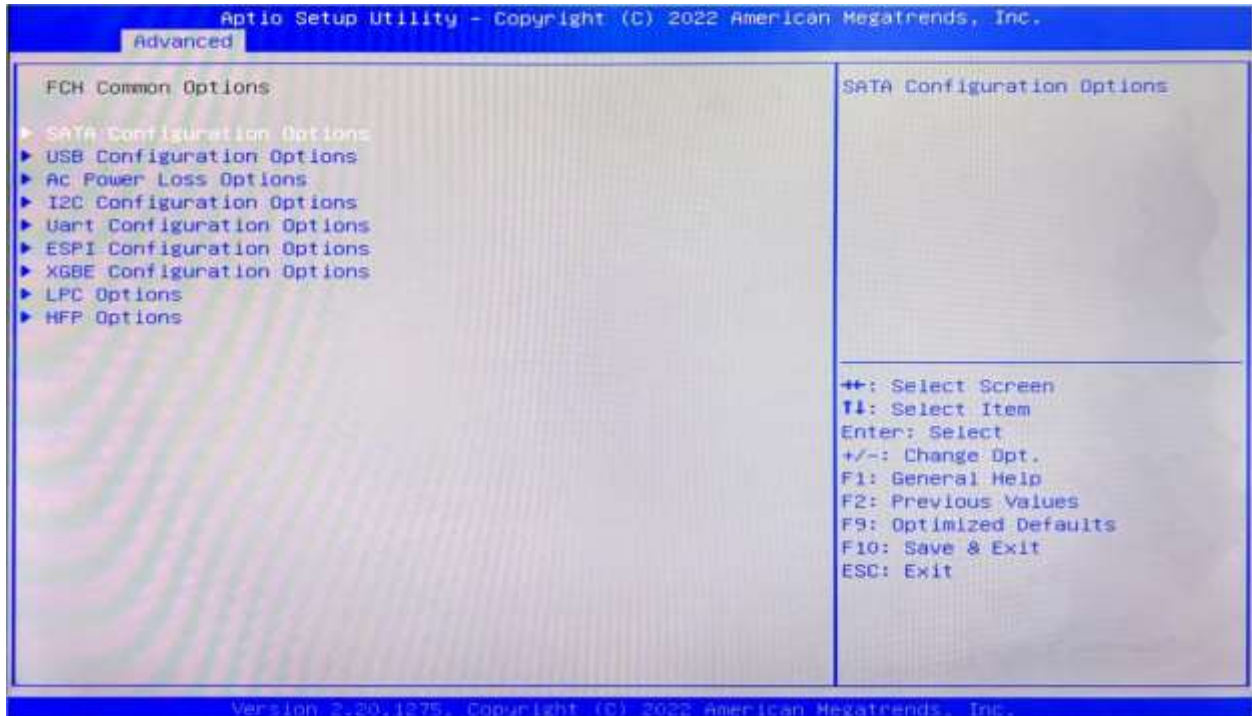


1. Select CFX configuration and go to the next screen.



2. Select System configuration to enter the selection, according to the CPU properties to set maximum and minimum power 10W ~ 54W. Auto for the default setting.

3.3.9.2 FCH Common Options



SATA Configuration Option

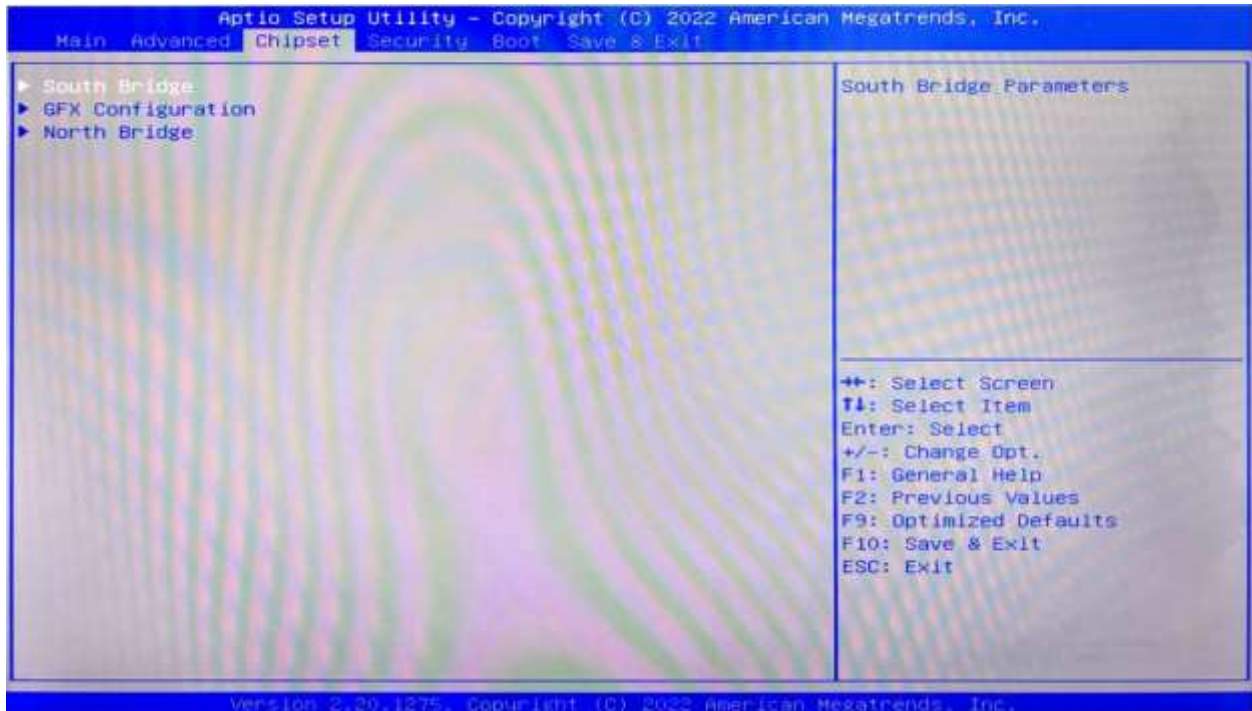
Option to check whether the SATA hard drive is recognized

AC Power Loss Options

"AC Power Loss Options" is a setting that determines the behavior of a computer when power is lost and then restored. There are two options available in this setting:

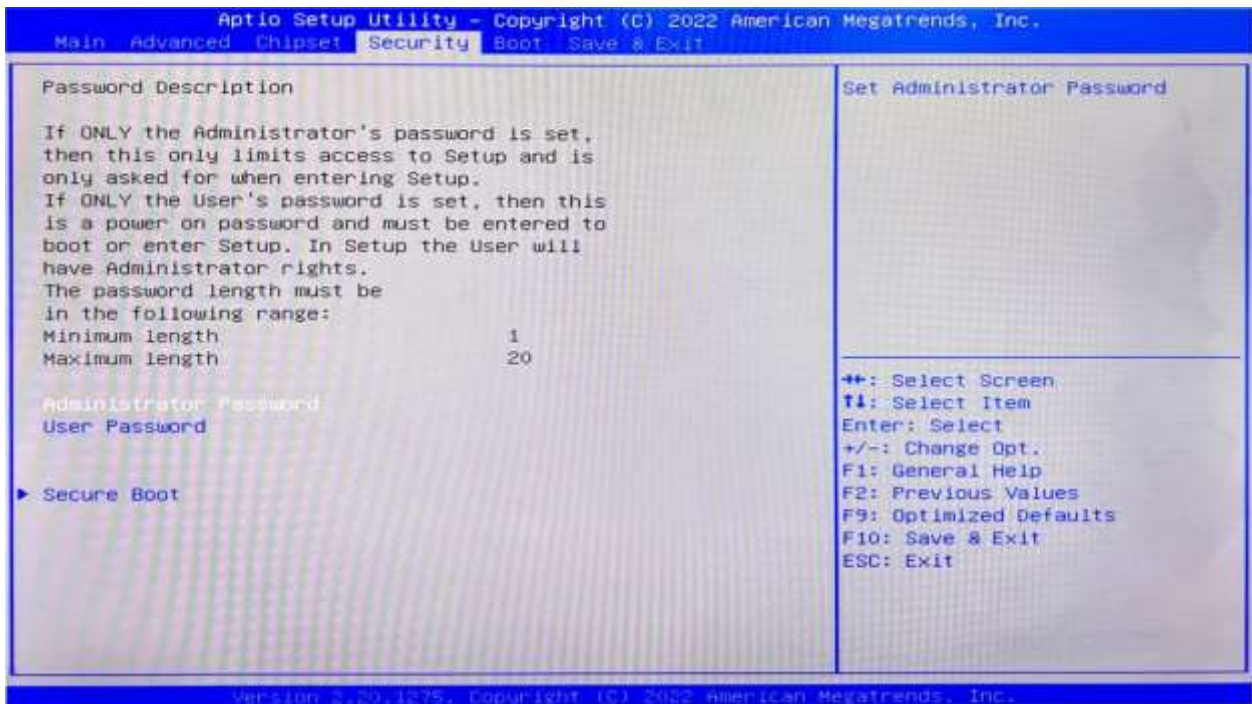
1. "Always off" (the default setting) means that the computer will remain off when power is restored, and you will need to manually press the power button to turn it on again.
2. "Always on" means that the computer will automatically turn on when power is restored. However, it is recommended that you wait for at least 15 seconds after a power loss before turning the computer back on.

3.4 Chipset



- **South Bridge**
Allows users to configure the South Bridge settings.
- **CFX configuration**
Allows users to view details of the display items.
- **North Bridge**
Allows users to configure the North Bridge settings.

3.5 Security

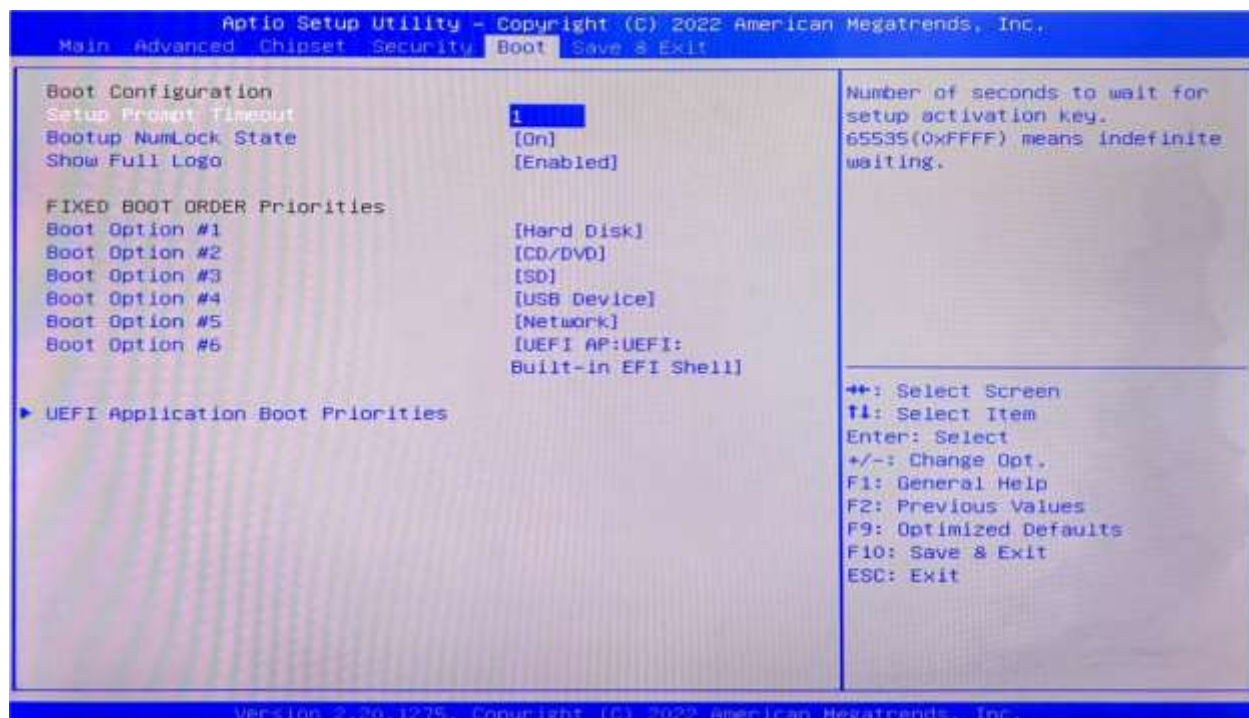


Administrator Password: Set the Administrator Password.

User Password: Set User Password.

Secure Boot: Secure boot

3.6 BOOT



Setup Prompt Timeout:

Number of seconds that the firmware will wait before initiating the original default boot selection. A value of 0 indicates that the default boot selection is to be initiated immediately on boot. A value of 65535(0xFFFF) indicates that firmware will wait for user input before booting. This means the default boot selection is not automatically started by the firmware.

Bootup NumLock State:

Select the keyboard NumLock state. The Bootup NumLock State allows activation of the Keypad number lock function after the system is powered on to the DOS system. When the default is set to ON, the NumLock is on when the system starts. When it is set to OFF, the keypad is in the cursor control state when starting.

Show Full Logo:

Enabled/Disabled Displays customized boot logo.

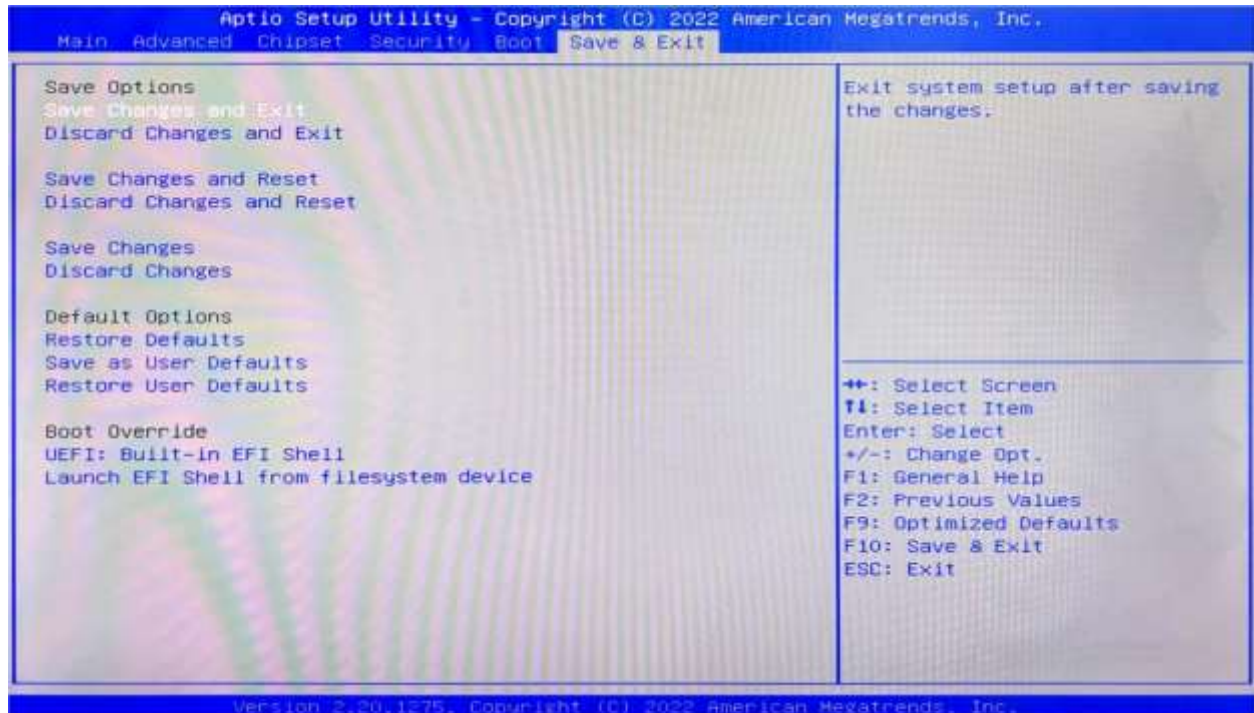
Boot Option #1~#6:

Set the system boot order from Number 1 to Number 6.

UEFI Application boot Priorities:

UEFI application boot priority.

3.7 Save & Exit

**Save Changes and Exit:**

Exit the system setup after saving the changes and continue to start the computer.

Discard Changes and Exit:

Exit the system setup without saving any changes and continue to start the computer.

Save Changes and Reset:

Reset the system after saving the changes.

Discard changes and Reset:

Reset the system without saving any changes.

Save Changes:

Save changes done so far to any of the options.

Discard Changes:

Discard changes done so far to any of the options.

Restore Defaults:

Restore/load default values for all the options.

Save as User Defaults:

Save the changes done so far as the user defaults.

Restore User Defaults:

Restore the user defaults to all the options.

Boot Override:

Boot device selection can override your boot priority. Select the specified boot device such as SATA, USB Flash Disk, EFI Shell, PXE, etc., and boot directly. Or press F11 boot by selecting the specified boot device.