EPC-WHL

8th Gen Intel® Whiskey Lake-U 4 Core UTL coreProcessor i7/i5/i3/Celeron Fanless Tiny System

Quick Reference Guide

5th Ed – 17 January 2023

Part No. E2017CAM0A4R

FCC Statement

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTATLLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

A Message to the Customer

Avalue Customer Services

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:

http://www.avalue.com.tw/

Content

1. Getting Started 5
1.1 Safety Precautions 5
1.2 Packing List 5
1.3 System Specifications 6
1.4 System Overview 8
1.4.1 Front View 8
1.4.2 Rear View 8
1.5 System Dimensions 10
1.5.1 Front & Top View 10
2. Hardware Configuration 11
2.1 Installing Hard Disk & Memory (EPC-WHL) 12
2.2 Installing M.2 B-Key card (EPC-WHL) 15
2.3 Installing Mounting Brackets (EPC-WHL) 16
2.4 Installing Din Rail Mounting and Remove (EPC-WHL) 17
2.5 Installing Stand (EPC-WHL) 20
3.BIOS Setup 21
3.1 Introduction 22
3.2 Starting Setup 22
3.3 Using Setup 23
3.4 Getting Help 24
3.5 In Case of Problems 24
3.6 BIOS setup 25
3.6.1 Main Menu 25
3.6.1.1 System Language 26
3.6.1.2 System Date 26
3.6.1.3 System Time 26
3.6.2 Advanced Menu 26
3.6.2.1 Connectivity Configuration 27
3.6.2.1.1 WWAN Configuration 28
3.6.2.2 CPU Configuration 28
3.6.2.3 Power & Performance 29
3.6.2.3.1 CPU – Power Management Control 30
3.6.2.3.1.1 Config TDP Configurations 31
3.6.2.3.2 GT – Power Management Control 32
3.6.2.4 PCH-FW Configuration 33

3.6.2.4.1 Firmware Update Configuration 33
3.6.2.5 Trusted Computing 34
3.6.2.6 APCI Settings 35
3.6.2.7 IT8528 Super IO Configuration 36
3.6.2.7.1 Serial Port 1 Configuration 36
3.6.2.8 HW Monitor 37
3.6.2.9 S5 RTC Wake Settings 37
3.6.2.10 Serial Port Console Redirection 38
3.6.2.10.1 Legacy Console Redirection Settings 38
3.6.2.11 USB Configuration 39
3.6.2.12 Network Stack Configuration 40
3.6.3 Chipset 40
3.6.3.1 System Agent (SA) Configuration 41
3.6.3.1.1 Memory Configuration 41
3.6.3.1.2 Graphics Configuration 42
3.6.3.2 PCH-IO Configuration 43
3.6.3.2.1 PCI Express Configuration 43
3.6.3.2.1.1 PCI Express Root Port 8(LAN2-I211) 44
3.6.3.2.1.2 PCI Express Root Port 12(M.2 KeyB) 45
3.6.3.2.1.3 PCI Express Root Port 13(M.2 KeyE) 46
3.6.3.2.2 SATA And RST Configuration 47
3.6.3.2.3 HD Audio Configuration 55
3.6.3.3 Board & Panel Configuration 56
3.6.4 Security 57
3.6.4.1 Secure Boot 58
3.6.4.1.1 Key Management 59
3.6.5 Boot 60
3.6.6 Save and exit 61
3.6.6.1 Save Changes and Reset 61
3.6.6.2 Discard Changes and Reset 61
3.6.6.3 Restore Defaults 62
3.6.6.4 Launch EFI Shell from filesystem device 62

1. Getting Started

1.1 Safety Precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

1.2 Packing List

- 1 x EPC-WHL Intel® Core® SoC Processor Fanless Box PC
- Other major components include the followings:
  - EPC-WHL Stand
  - Screw Kit
  - Adapter

If any of the above items is damaged or missing, contact your retailer.

1.3 System Specifications

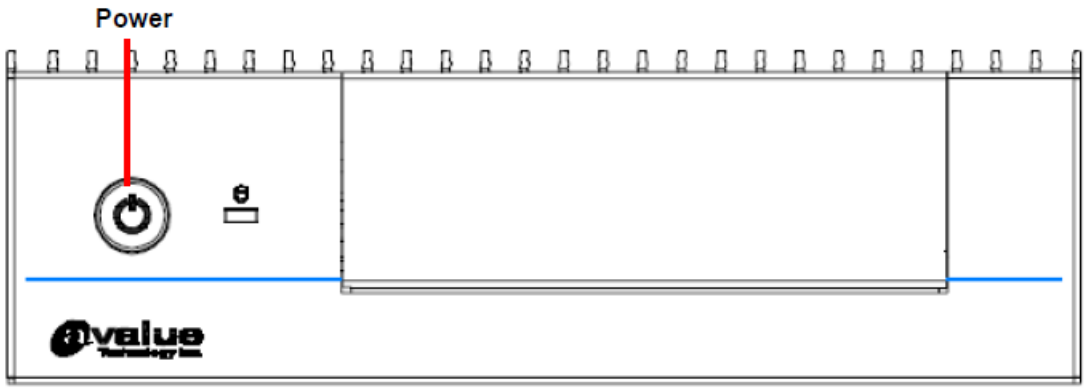
System	
SBC	• ECM-WHL
CPU	• Intel® Core™ i7-8665UE Processor (8M Cache, up to 4.40 GHz) • Intel® Core™ i5-8365UE Processor (6M Cache, up to 4.10 GHz) • Intel® Core™ i3-8145UE Processor (4M Cache, up to 3.9GHz) • Intel® Celeron® Processor 4305UE (2M Cache, 2.00 GHz)
BIOS	• AMI BIOS, 128Mbit SPI Flash ROM
Adapter	• +12V/10A
System Memory	• 2 x 260-pin SODIMM Socket, max up to 64GB 2400Mhz
Watchdog Timer	• H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
H/W Status Monitor	• Monitoring CPU Temperature, Voltage with Auto Throttling Control
Storage	
Solid State Drive	• 1 x 2.5" Drive Bay (7mm)
M.2	• 1 x M.2 B-Key (2242)
Others	• Support TPM2.0(Optional), RAID 0/1
Expansion	
Expansion	• 1 x M.2 (Key-B, 2242/3042, PCIe, SATA, USB 3.0, USB 2.0, SIM Slot) • 1 x M.2 (Key-E, 2230, PCIe, USB2.0, CNVi)
Front I/O	
Button	• 1 x Power On/Off Button w/LED
LED	• 1 x LED for Storage Access
Rear I/O	
USB Port	• 4 x USB 3.1 (Gen 2, 10 Gbps)
LAN Port	• 2 x RJ45
Display Port	• 2 x HDMI
DC Input	• 1 x DC Jack (Lockable DC Jack)
LED	• 2 x LED for Power On/Off & Storage Access
Others	• 2 x Antenna Mounting with Dust Cover
Display	
Chipset Chipset	• Intel® UHD Graphics 620 (i7-8665UE, i5-8365UE, i3-8145UE) • Intel® UHD Graphics 610 (4305UE)
Resolution	• 2 x HDMI (1.4b) : 4096x2160@24Hz
Ethernet	
Chipset	• 1 x Intel i210AT, 1 x Intel i219LM
Ethernet Interface	• 10/100/1000 Base-Tx Gigabit Ethernet Compatible

Lan Port	• 2 x RJ45 w/LED
Audio	
Chipset	• Realtek ALC888S
Audio Interface	• Mic-In, Line-out
Mechanical	
Power Type	• AT/ATX (ATX is default)
Power Requirement	• Power Input: Typical 12V DC-IN
Dimension	• 177mm x 123mm x 55mm
Weight	• 2.65lbs(1.2KG)
Color	• Black & Blue
Mounting Kit	• Stand (Default) • VESA Mount Kit (Factory Option)
Reliability	
Vibration Test	• With SSD: 5Grms, IEC 60068-2-64, Random, 10~ 500Hz, 30min/Axis, 3 Axis
Mechanical Shock Test	• With SDD : 10G, IEC 60068-2-27, Half Sine, 11ms, Z Axis
Drop Test	• ISTA 2A, IEC-60068-2-32 Test : Ed, 1corner, 3 Edges, 6 Faces
Operating Temperature	• With extended temperature peripherals: -10°C ~ 40°C (14°F ~ 104°F) with 0.2m/s air flow • With extended temperature peripherals: -10°C ~ 50°C (14°F ~ 122°F) with 0.5m/s air flow • With 2.5” hard drive: 0°C ~ 40°C (32°F ~ 113°F) with 0.5m/s air flow
Operating Humidity	• 40 °C @ 90% Relative Humidity, Non-condensing
Storage Temperature	• -20°C ~ 60°C (-4°F ~ 140°F)
Certification	• CE, FCC Class B
OS Supported	• Win 10, Linux

Note: Specifications are subject to change without notice.

1.4 System Overview

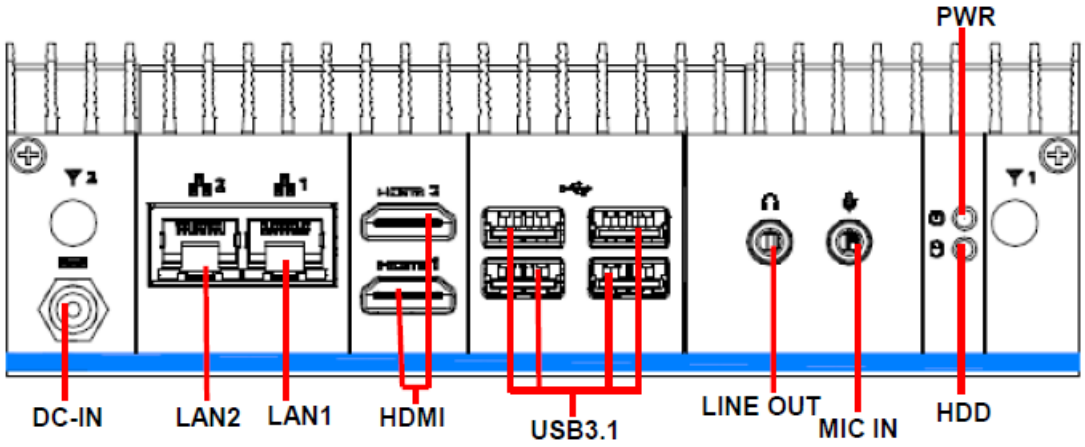
1.4.1 Front View



Connectors

Label	Function	Note
Power	Power on button	

1.4.2 Rear View



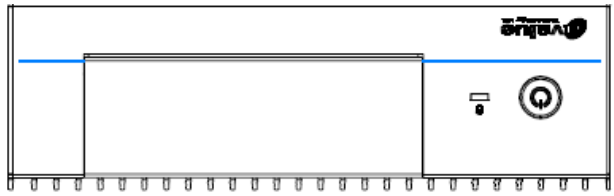
Connectors

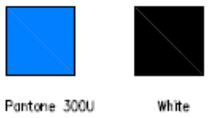
Label	Function	Note
HDD	HDD indicator	
PWR	System power indicator	
LAN1/2	RJ-45 Ethernet x 2	
USB3.1	USB 3.1 connector x 4	
HDMI	HDMI connector x 2	

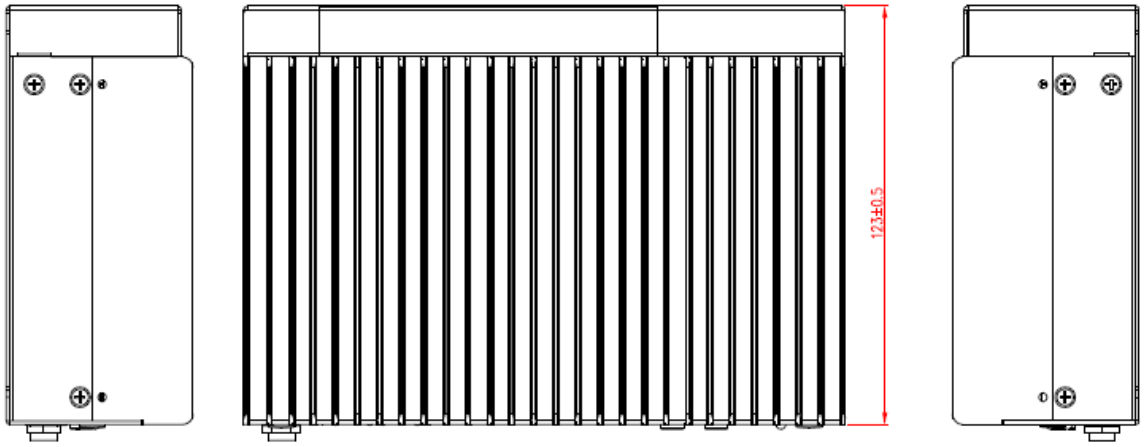
DC-IN	DC Power-in connector
LINE OUT	Line-out audio jack
MIC IN	Mic-in audio jack

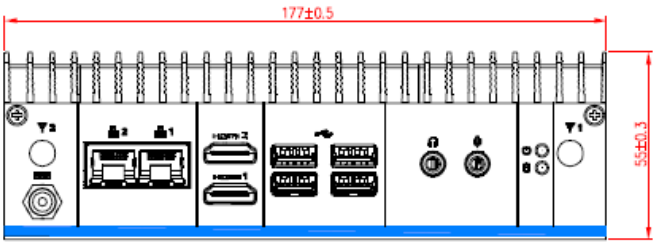
1.5 System Dimensions

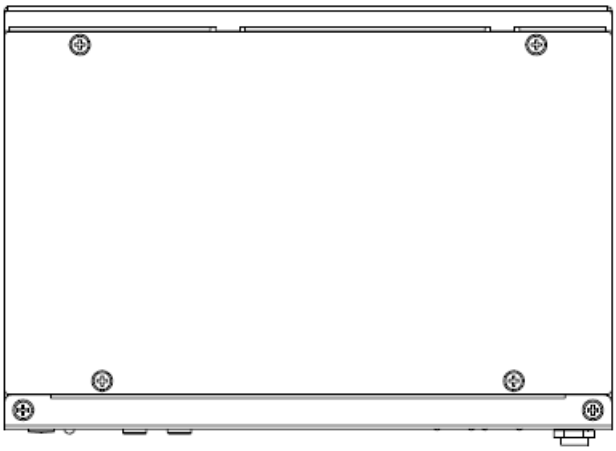
1.5.1 Front & Top View











(Unit: mm)

2. Hardware Configuration

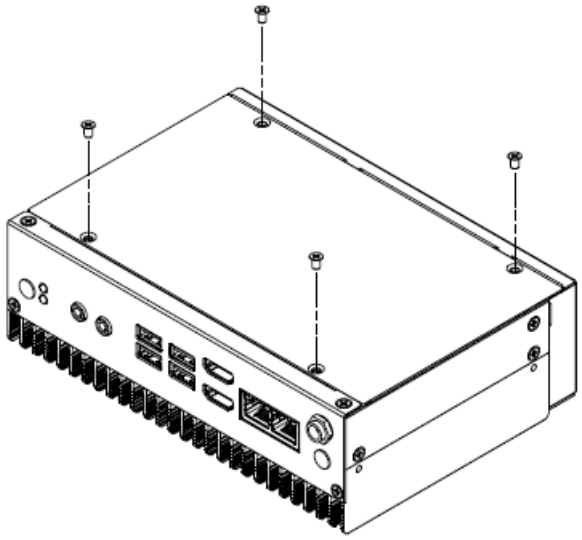
For advanced information, please refer to:

1- ECM-WHL User's Manual

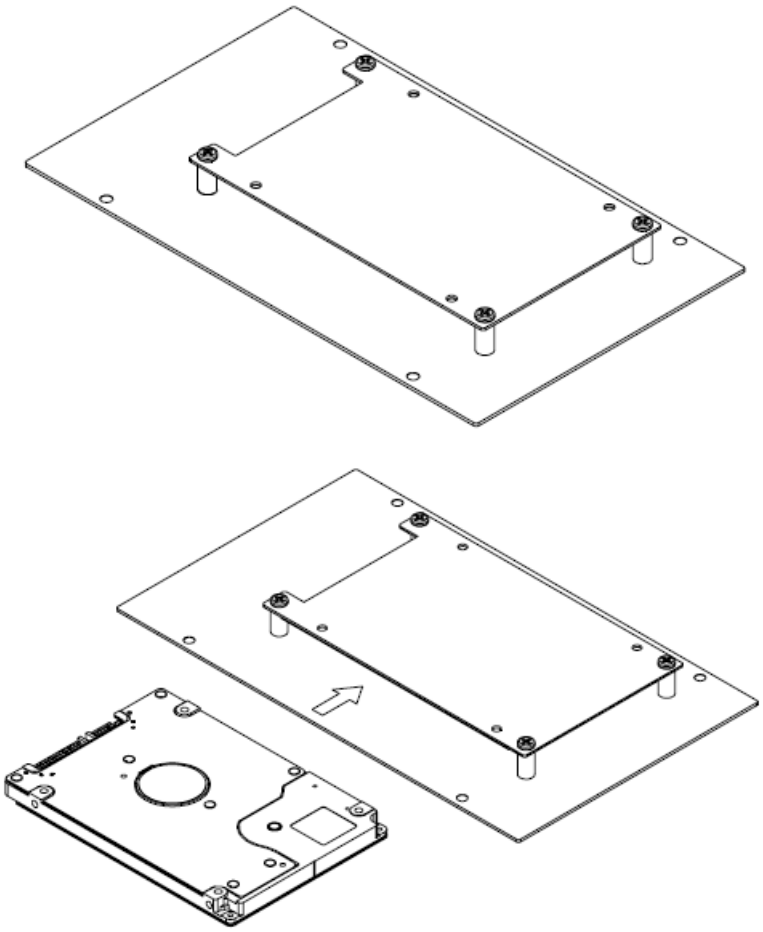
Note: If you need more information, please visit our website:

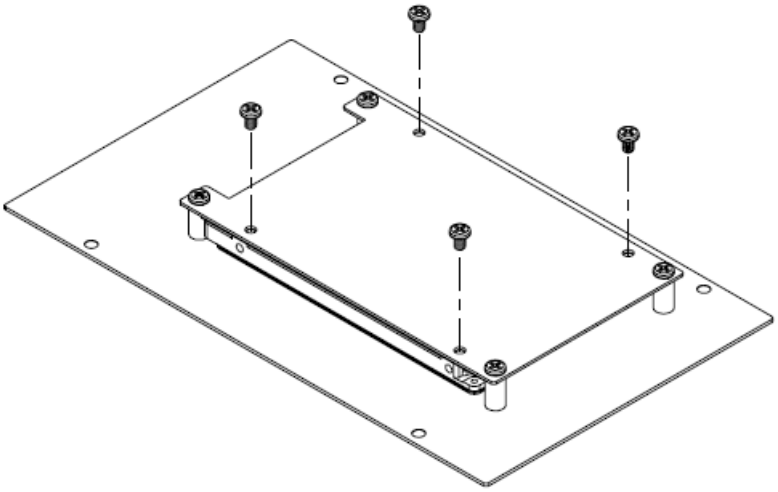
http://www.avalue.com.tw

2.1 Installing Hard Disk & Memory (EPC-WHL)

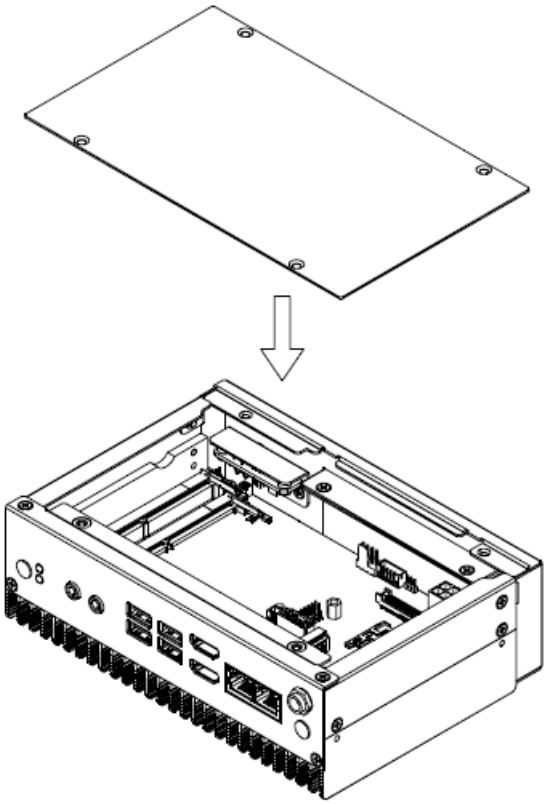


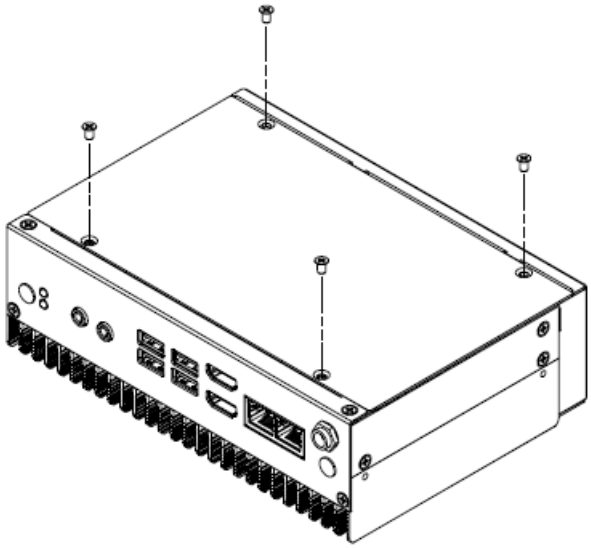
Step1. Remove 4 screws from the bottom of your system and take it off.



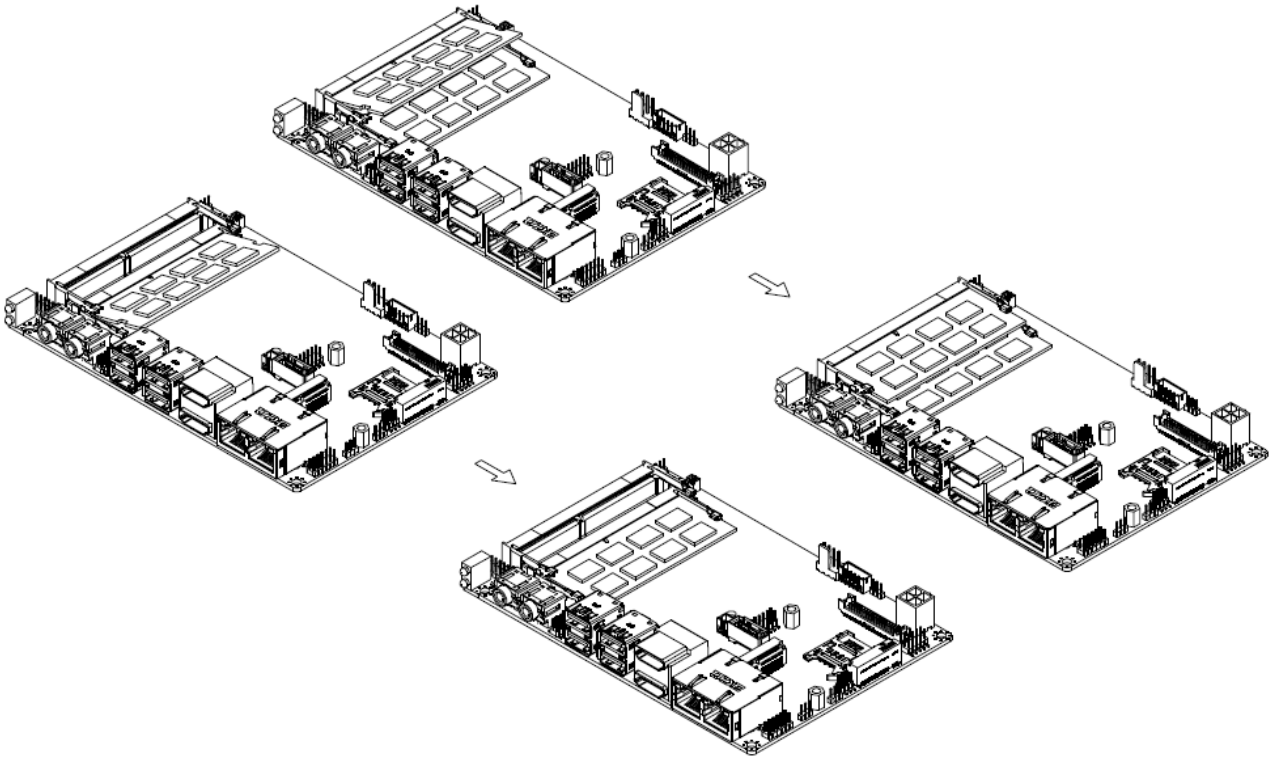


Step2. Fix HDD using the 4 screws in the Accessory Kit.



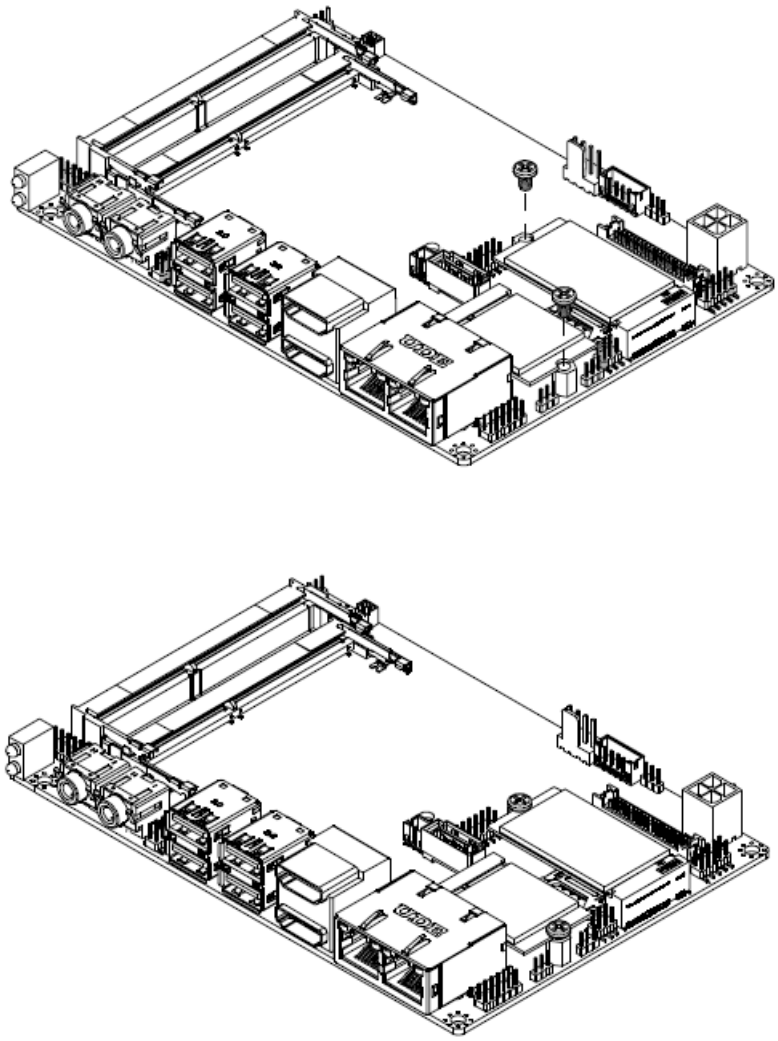


Step3. Place back the cover and fasten 4 screws back to complete



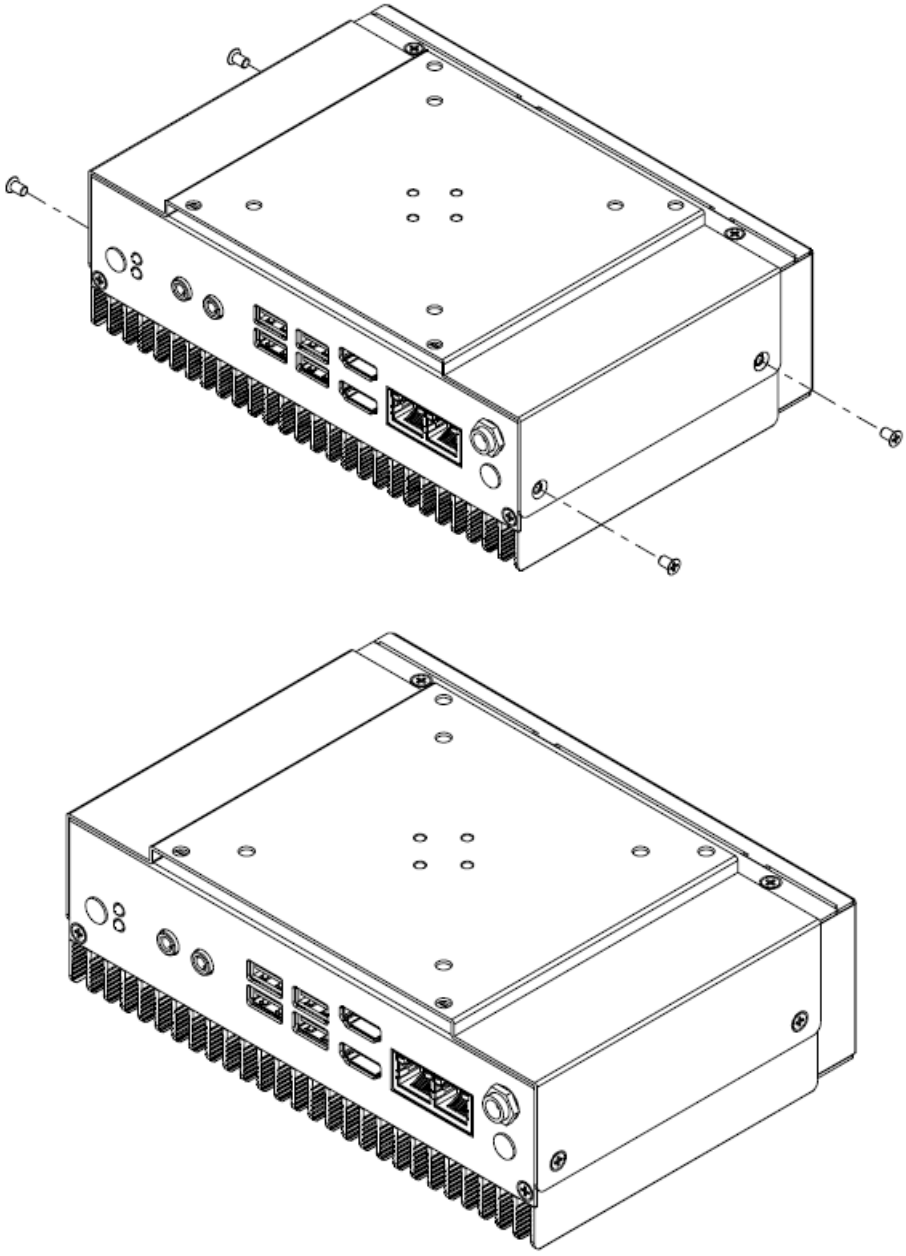
Step4. Properly install the memory modules and press until properly seated.

2.2 Installing M.2 B-Key card (EPC-WHL)



Step1. Insert M.2 B-Key card into designated locations and fasten with the screws to complete installation.

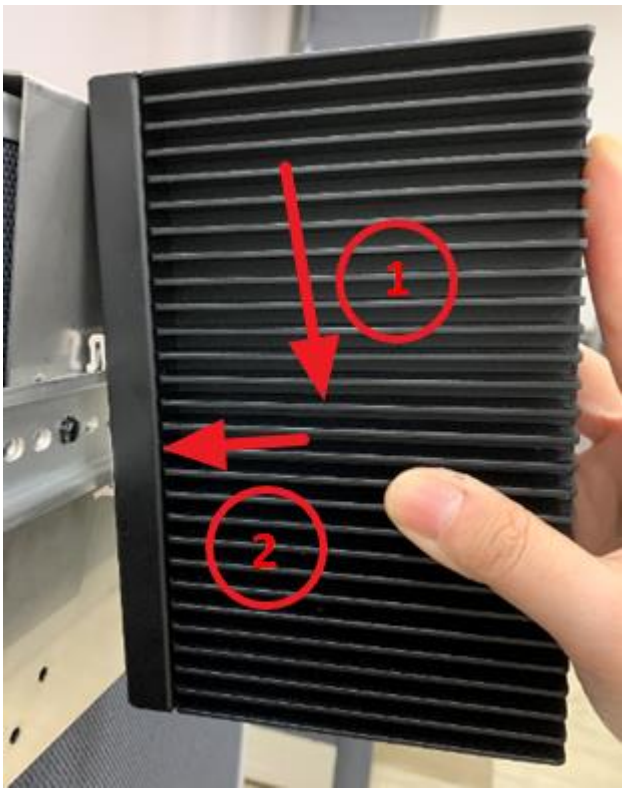
2.3 Installing Mounting Brackets (EPC-WHL)



Step1. Remove 4 screws from the side.

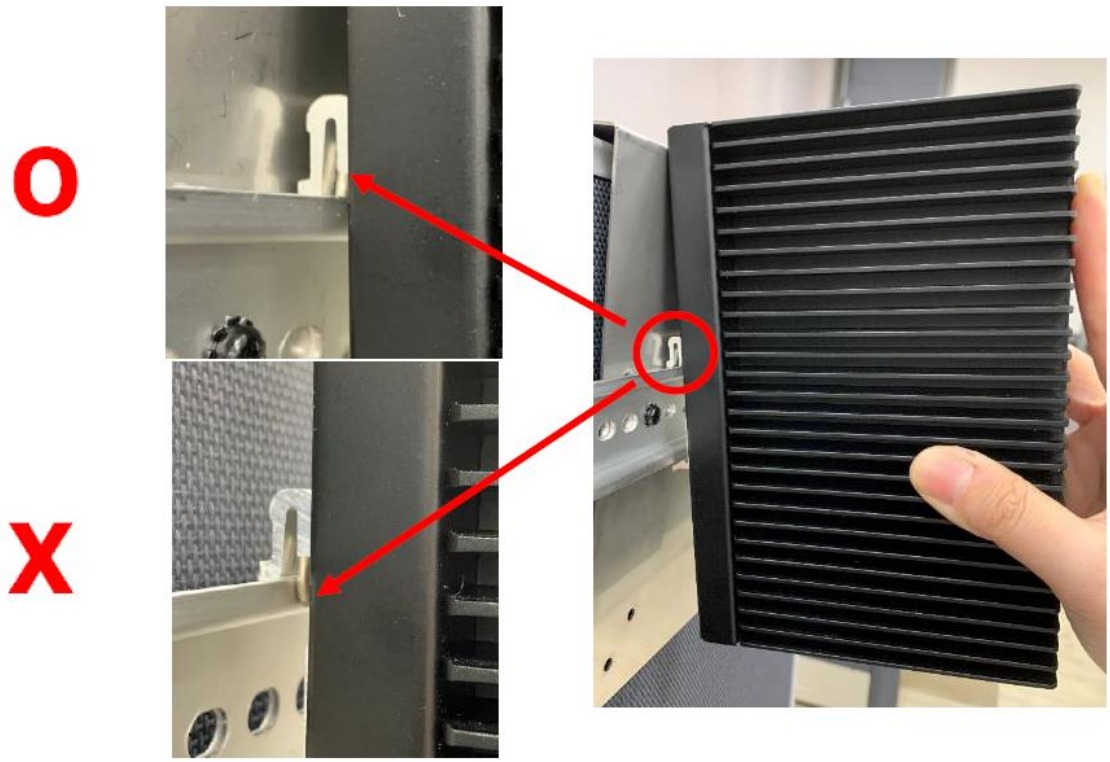
Step2. Insert and fasten screw on each side of the system to secure Mounting brackets.

2.4 Installing Din Rail Mounting and Remove (EPC-WHL)

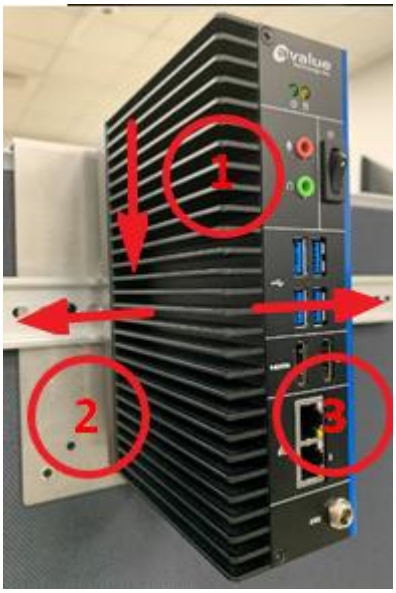


Step1. Slide the Din-rail into the track.

- **Note:** Please ensure the grommet is inside the track as below.



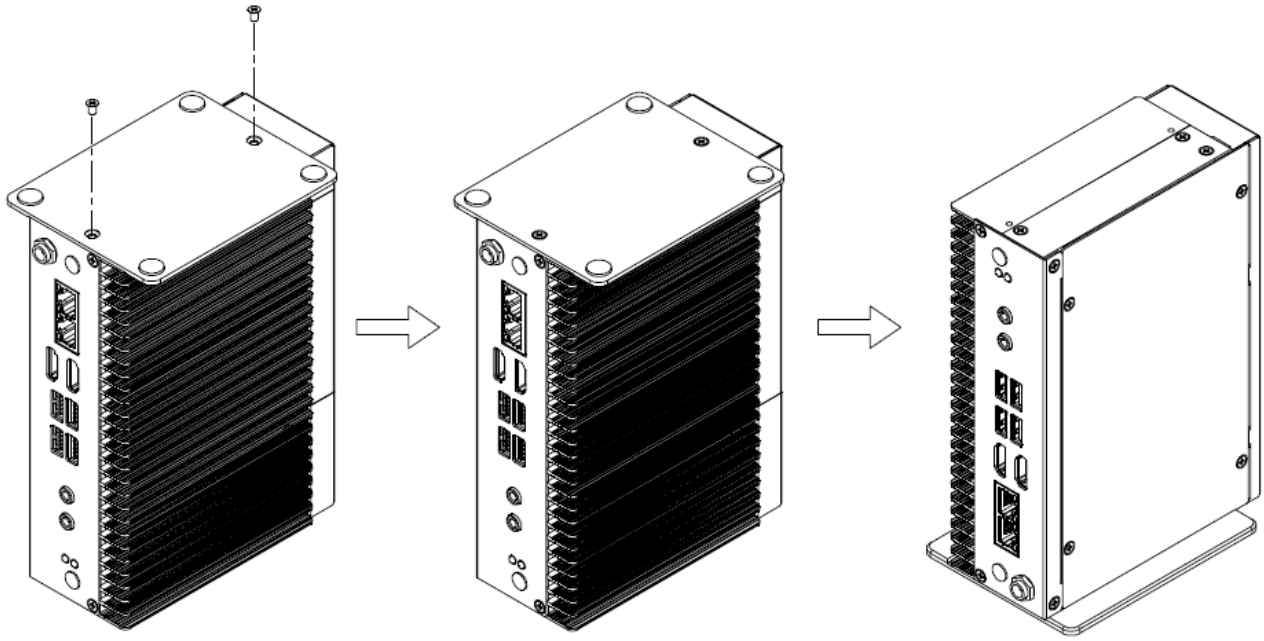
Step2. Check whether the Din-Rail is tightly on the track.



Step3. Push down the system (Press the Din-Rail) then move it right and left.

Step4. Push down the system (Press the Din-Rail) then remove the Din-Rail from the track.

2.5 Installing Stand (EPC-WHL)



Step1. Fasten 2 screws on the side of the system to secure Stand.

3.BIOS Setup

3.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

3.2 Starting Setup

AMI BIOS™ is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:
By pressing <ESC> or <Del> immediately after switching the system on, or
By pressing the < ESC> or <Del> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <ESC> or <Del> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

3.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Button	Description
↑	Move to previous item
↓	Move to next item
←	Move to the item in the left hand
→	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into NVRAM Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Previous Values
F3 key	Optimized defaults
F4 key	Save & Exit Setup

- **Navigating Through The Menu Bar**

  Use the left and right arrow keys to choose the menu you want to be in.

Note: Some of the navigation keys differ from one screen to another.

- **To Display a Sub Menu**

  Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A "➢" pointer marks all sub menus.

3.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the <Enter> key again.

3.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

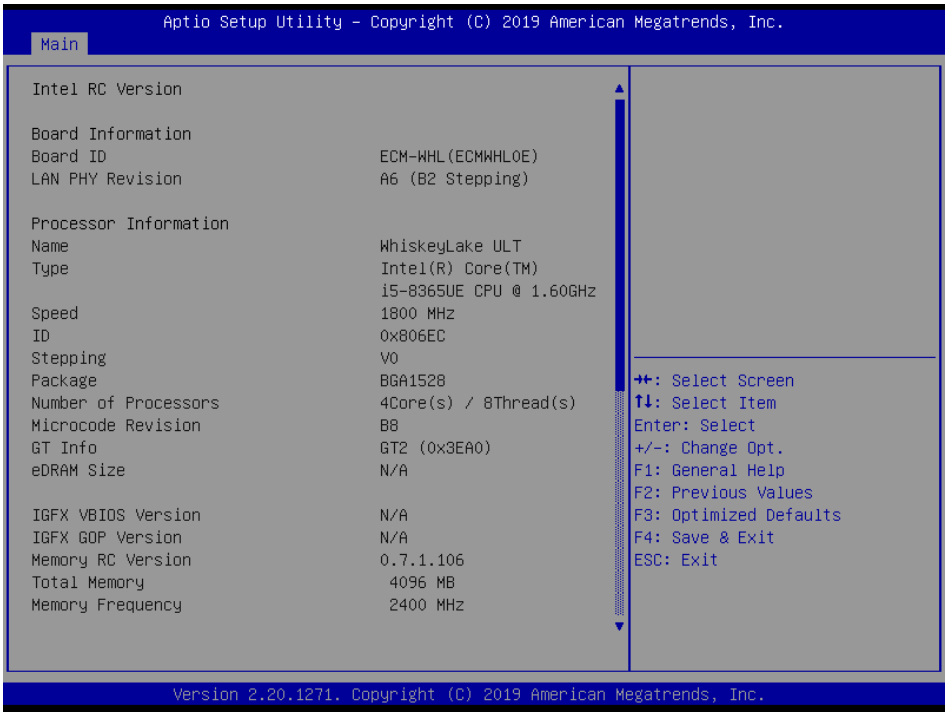
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

3.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

3.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.



3.6.1.1 System Language

This option allows choosing the system default language.

3.6.1.2 System Date

Use the system date option to set the system date. Manually enter the day, month and year.

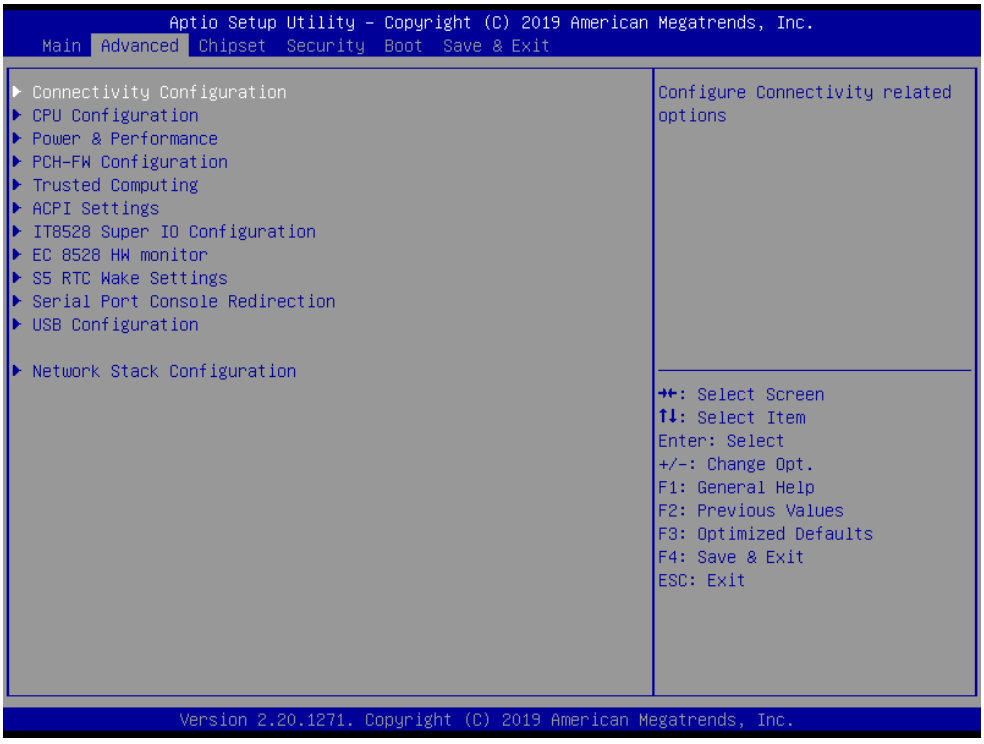
3.6.1.3 System Time

Use the system time option to set the system time. Manually enter the hours, minutes and seconds.

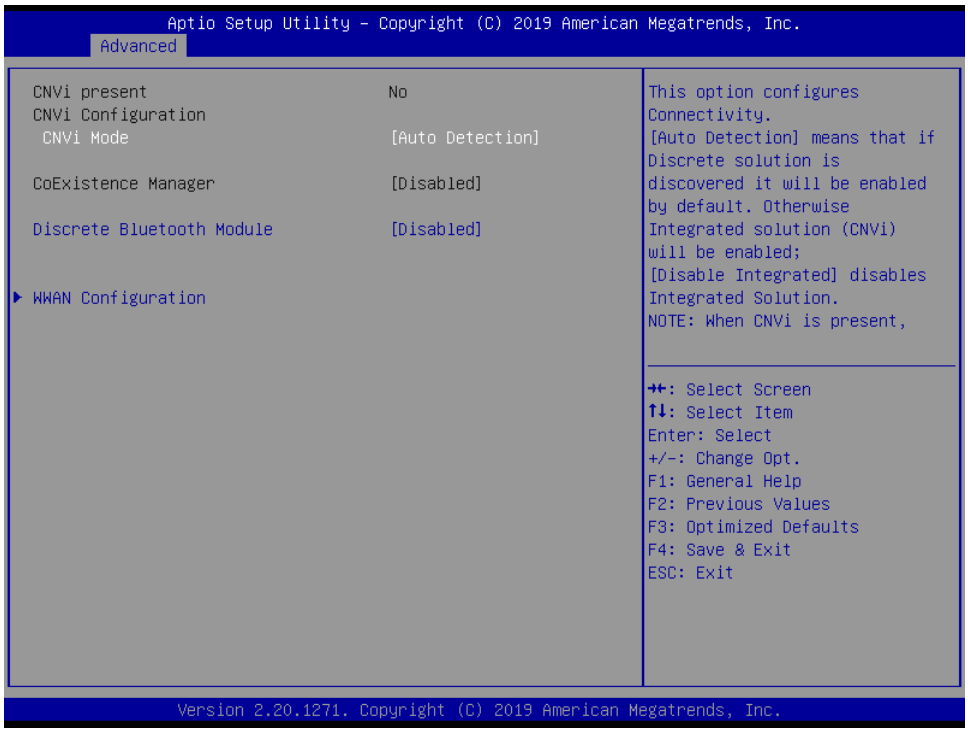
Note: The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.
Visit the Avalue website (www.avalue.com.tw) to download the latest product and BIOS information.

3.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.

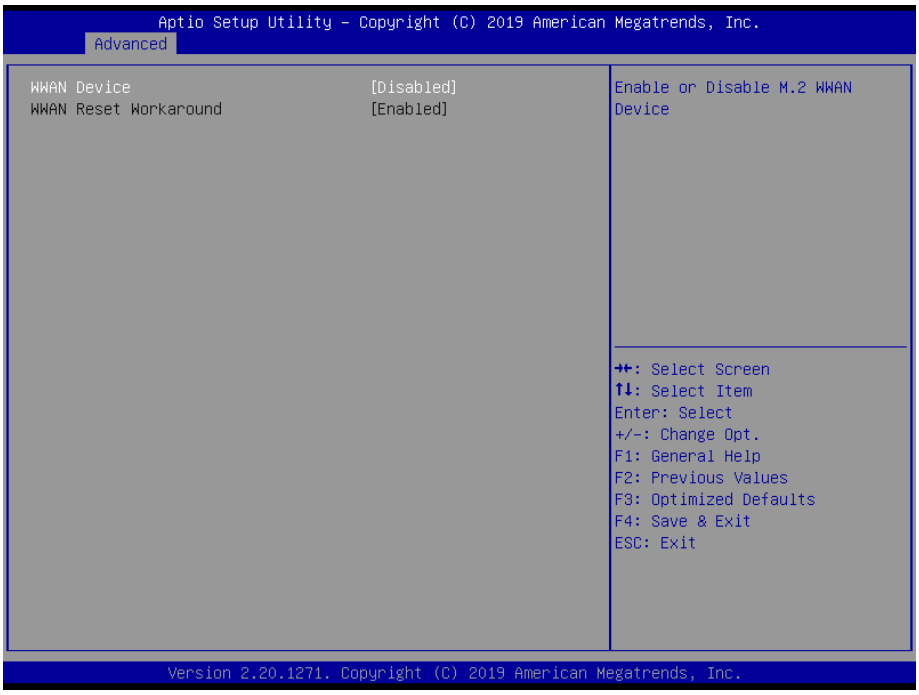


3.6.2.1 Connectivity Configuration



Item	Options	Description
CNVi Mode	Disable Integrated Auto Detection**[Default]**	This option configures Connectivity. [Auto Detection] means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; [Disable Integrated] disables Integrated Solution. NOTE: When CNVi is present, the GPIO pins that are used for radio.
Discrete Bluetooth Module	Disabled**[Default]** Thunder Peak	Seriallo UART0 needs to be enabled to select BT Module.

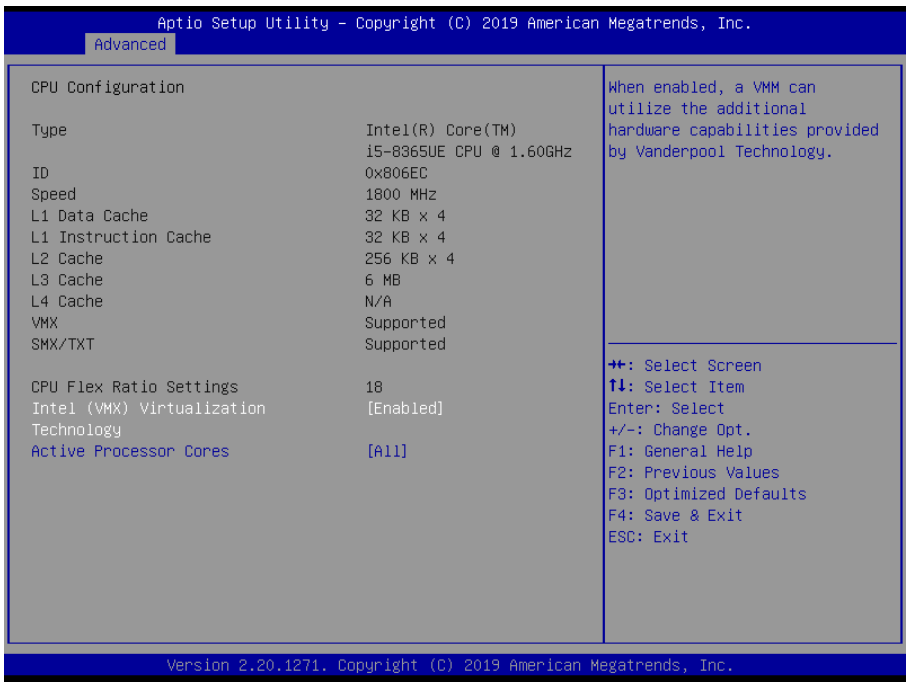
3.6.2.1.1 WWAN Configuration



Item	Option	Description
WWAN Device	Enabled Disabled**[Default]**	Enable or Disable M.2 WWAN Device.

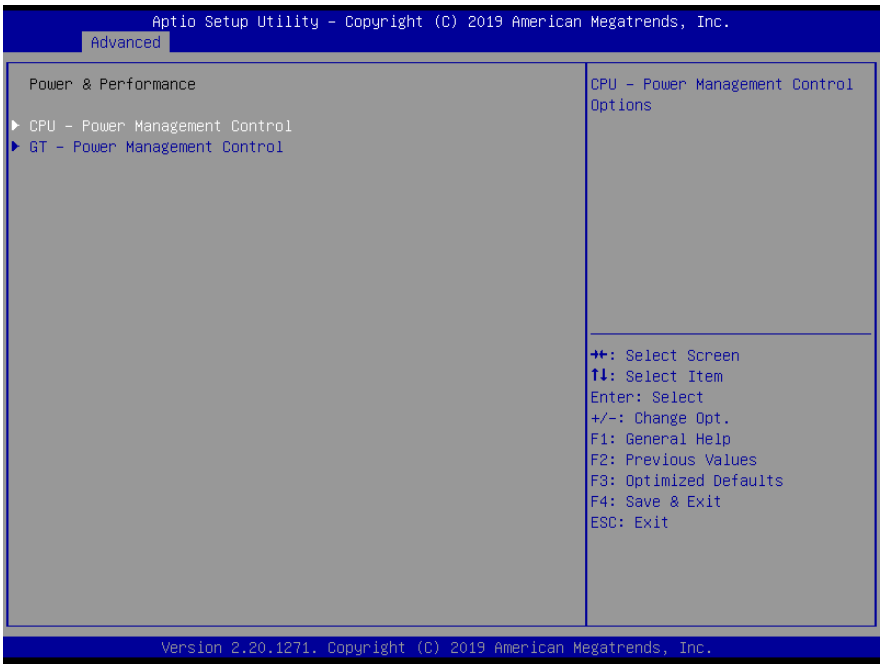
3.6.2.2 CPU Configuration

Use the CPU configuration menu to view detailed CPU specification and configure the CPU.

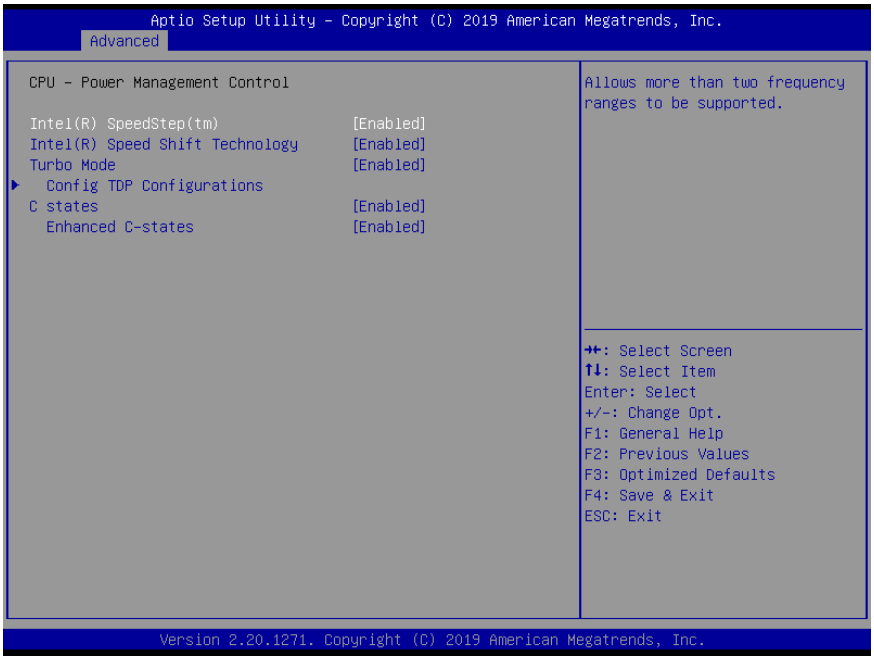


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All**[Default]** 1 2 3 4 5 6 7 8	Number of cores to enable in each processor package.

3.6.2.3 Power & Performance

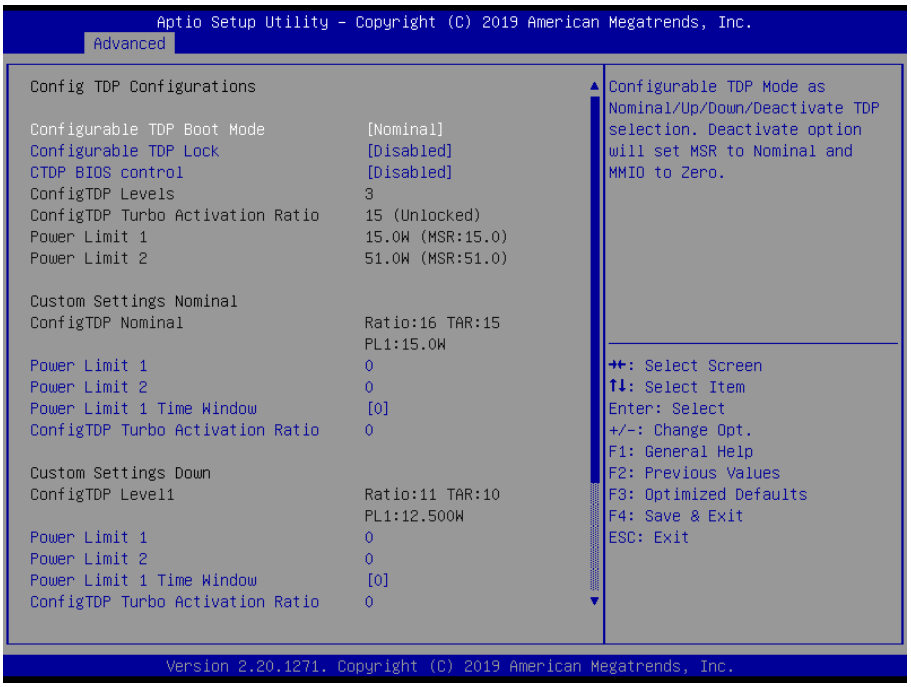


3.6.2.3.1 CPU – Power Management Control



Item	Option	Description
Intel® SpeedStep™	Enabled**[Default]**, Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled**[Default]**, Disabled	Eanble/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enabled**[Default]**, Disabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
C States	Enabled**[Default]**, Disabled	Enable/Disable CPU Power Management.
Enhanced C-States	Enabled**[Default]**, Disabled	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

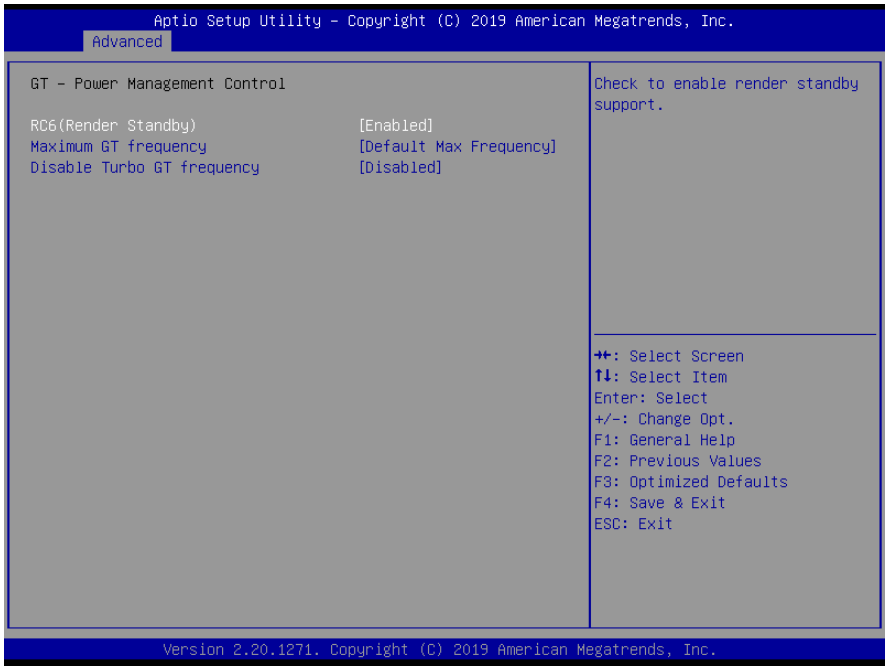
3.6.2.3.1.1 Config TDP Configurations



Item	Option	Description
Configurable TDP Boot Mode	Nominal**[Default]**, Down Up Deactivate	Configurable TDP Mode as Nominal/Up/Down/Deactivate TDP selection. Deactivate option will set MSR to Nominal and MMIO to Zero.
Configurable TDP Lock	Disabled**[Default]** Enabled	Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.
CTDP BIOS control	Disabled**[Default]** Enabled	Enable CTDP control via runtime ACPI BIOS methods. This “BIOS only “feature does not require EC or driver support.
Power Limit 1	0	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0= no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power.
Power Limit 2	0	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0= no custom override. For 12.50W, enter 12500. Processor applies

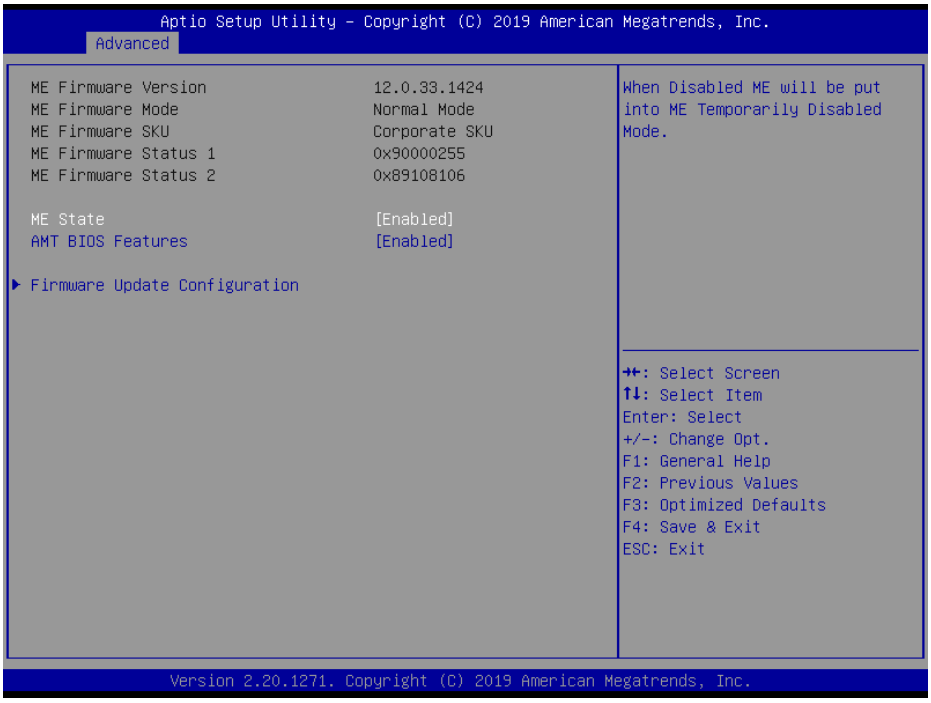
		control policies such that the package power does not exceed this limit.
Power Limit 1 Time Window	0**[Default]**/1/2/3/4/5/6/7/8/10/12/14/16/20/24/28/32/40/48/56/64/80/96/112/128	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128.0 = use default value (28 sec). Defines time window which TDP value should be maintained.
ConfigTDP Turbo Activation Rtaio	0	Custom value for Turbo Activation Ratio. Needs to be configured with valid values from LFM to Max Turbo. 0 means don't use custom value.

3.6.2.3.2 GT – Power Management Control



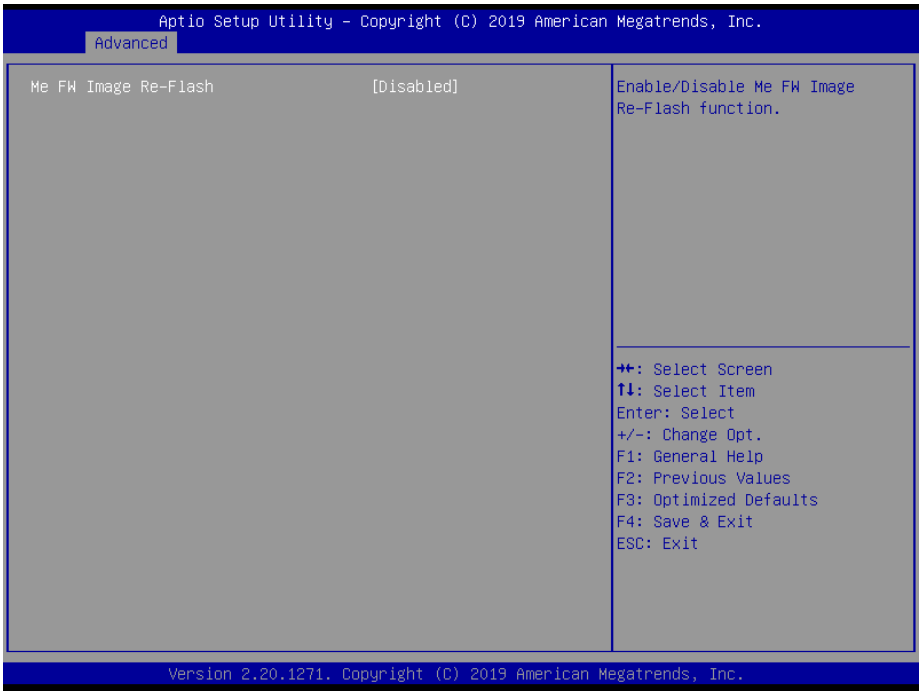
Item	Option	Description
RC6(Render Standby)	Enabled**[Default]**, Disabled	Check to enable render standby support.
Maximum GT frequency	Default Max Frequency**[Default]** 100Mhz/150Mhz/200Mhz/250Mhz/300Mhz/350Mhz/400Mhz/450Mhz/500Mhz/550Mhz/600Mhz/650Mhz/700Mhz/750Mhz/800Mhz/850Mhz/900Mhz/950Mhz/1000Mhz/1050Mhz/1100Mhz/1150Mhz/1200Mhz	Auto Updated.
Disable Turbo GT frequency	Enabled Disabled**[Default]**	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited.

3.6.2.4 PCH-FW Configuration



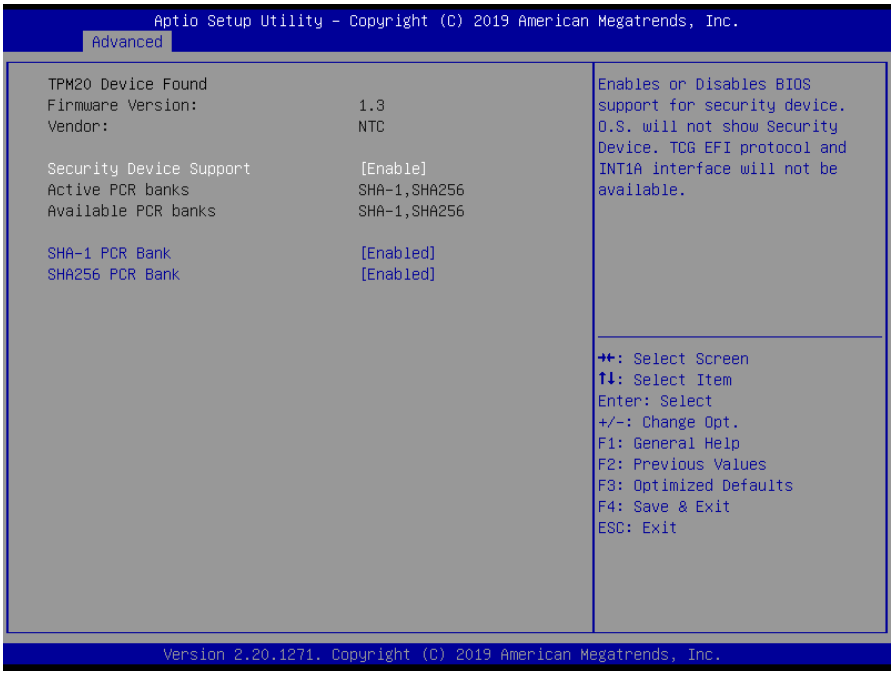
Item	Options	Description
ME State	Disabled, Enabled**[Default]**	When Disabled ME will be put into ME Temporarily Disabled Mode.
AMT BIOS Features	Disabled, Enabled**[Default]**	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup. Note: This option does not disable Manageability Features in FW.

3.6.2.4.1 Firmware Update Configuration



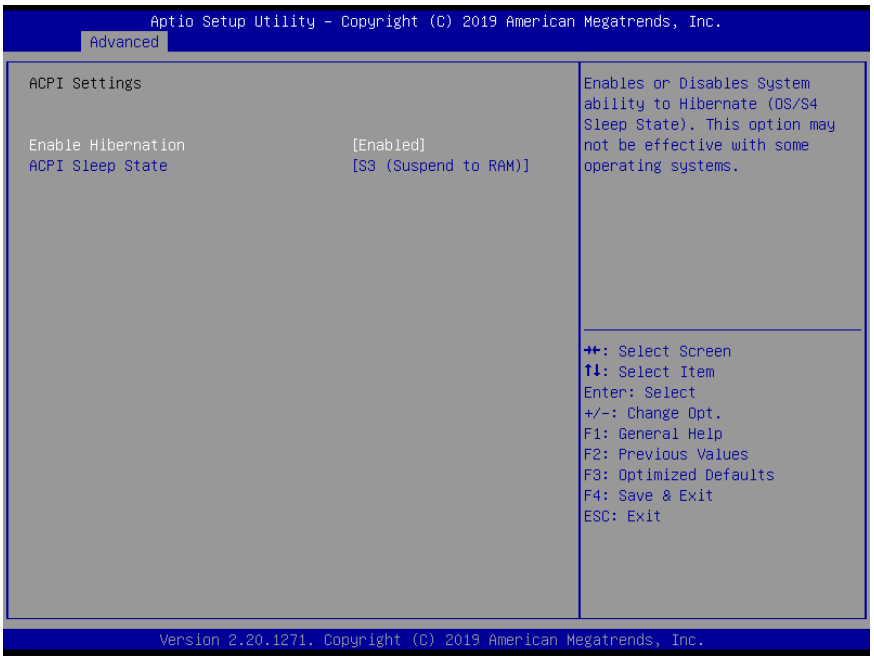
Item	Option	Description
ME FW Image Re-Flash	Disabled **[Default]**, Enabled	Enable/Disable Me FW Image Re-Flash function.

3.6.2.5 Trusted Computing



Item	Options	Description
Security Device Support	Disable, Enable**[Default]**	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.
SHA-1 PCR Bank	Disable, Enable**[Default]**	Enables or Disables SHA-1 PCR Bank.
SHA256 PCR Bank	Disable, Enable**[Default]**	Enables or Disables SHA256 PCR Bank.

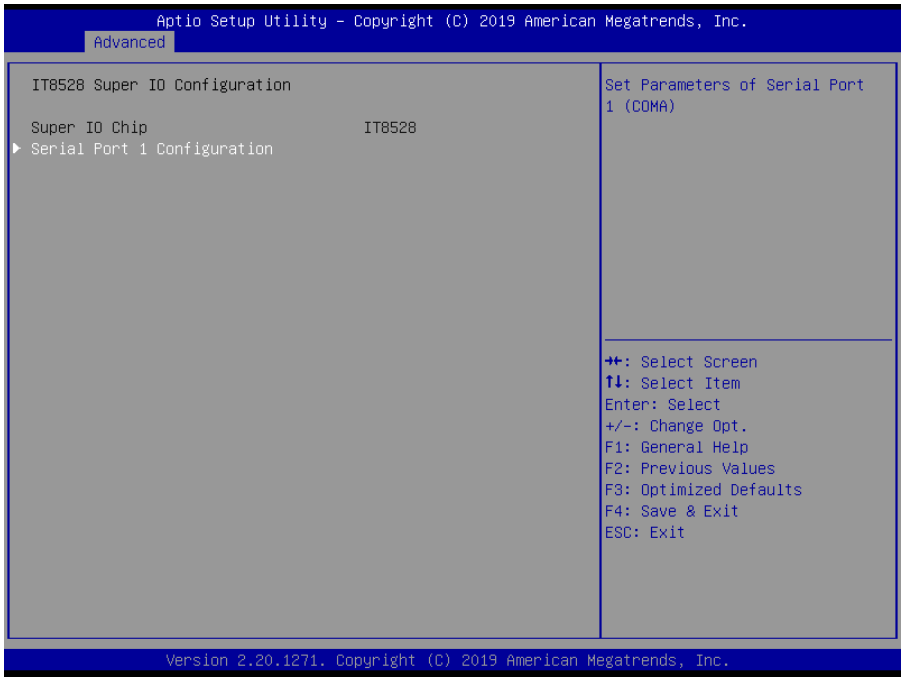
3.6.2.6 APCI Settings



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

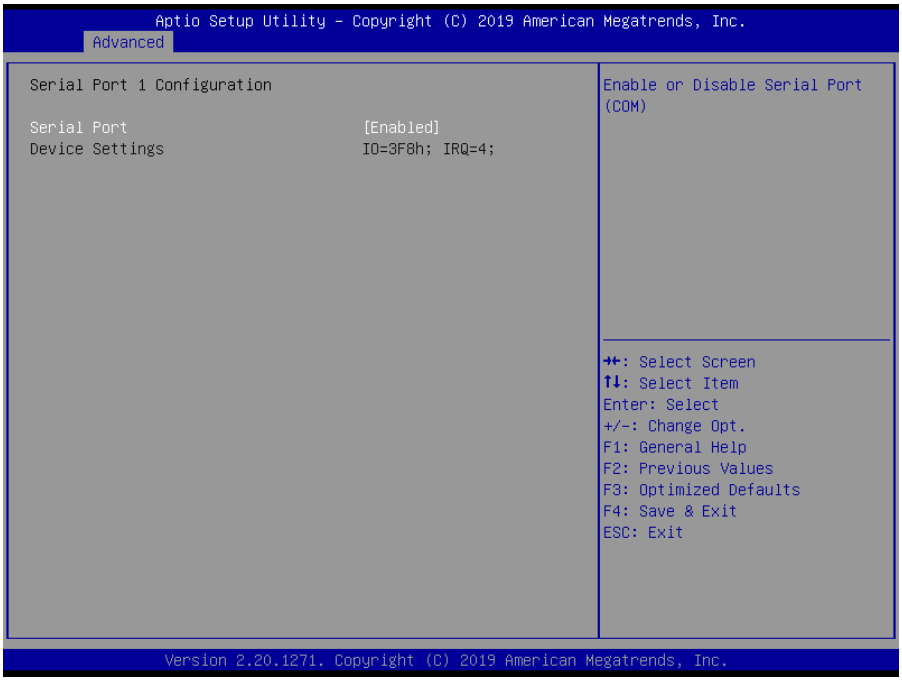
3.6.2.7 IT8528 Super IO Configuration

You can use this item to set up or change the IT8528 Super IO configuration for serial ports. Please refer to 3.6.2.7.1 for more information.



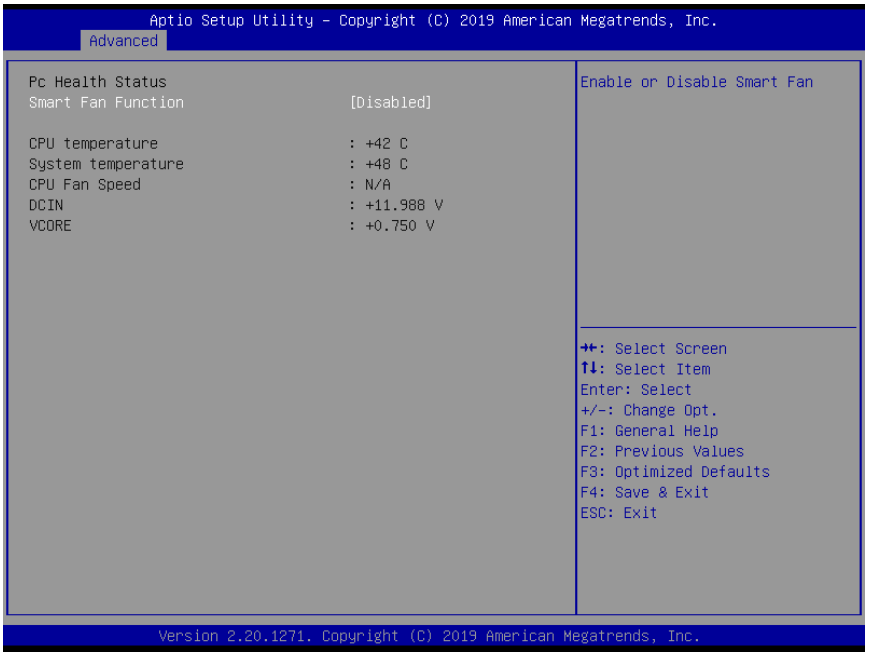
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).

3.6.2.7.1 Serial Port 1 Configuration



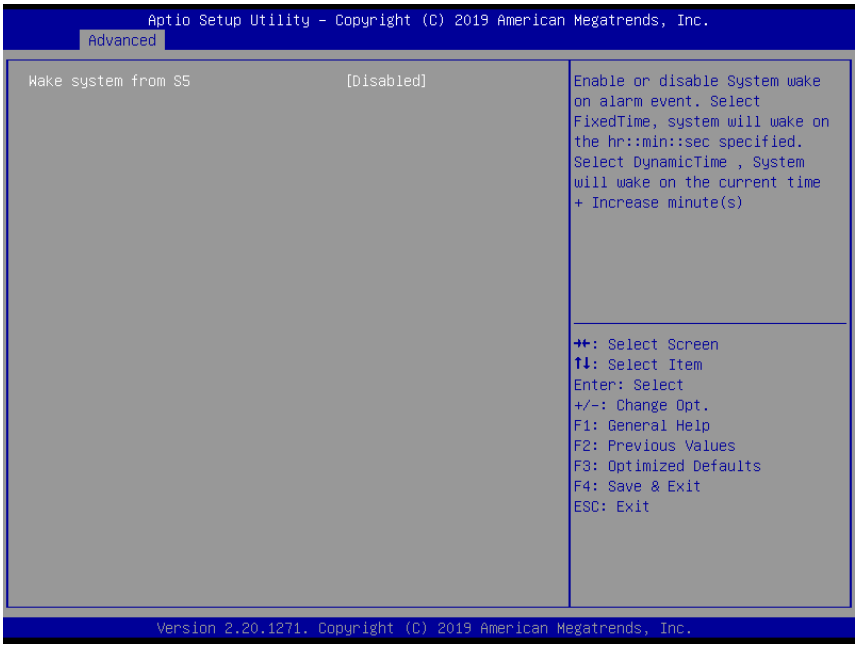
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).

3.6.2.8 HW Monitor



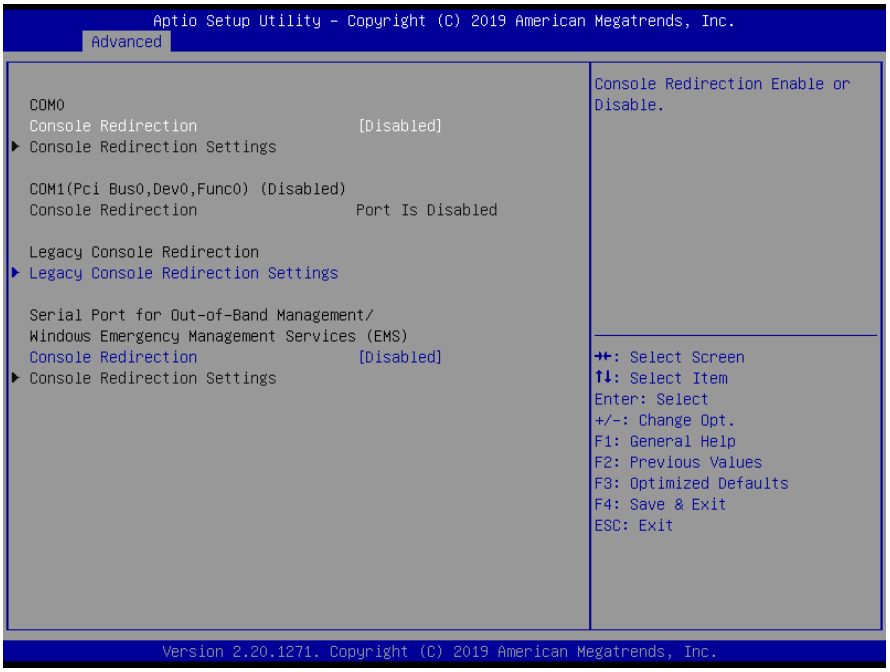
Item	Options	Description
Smart Fan Function	Enabled, Disabled**[Default]**	Enables or Disables Smart Fan.

3.6.2.9 S5 RTC Wake Settings



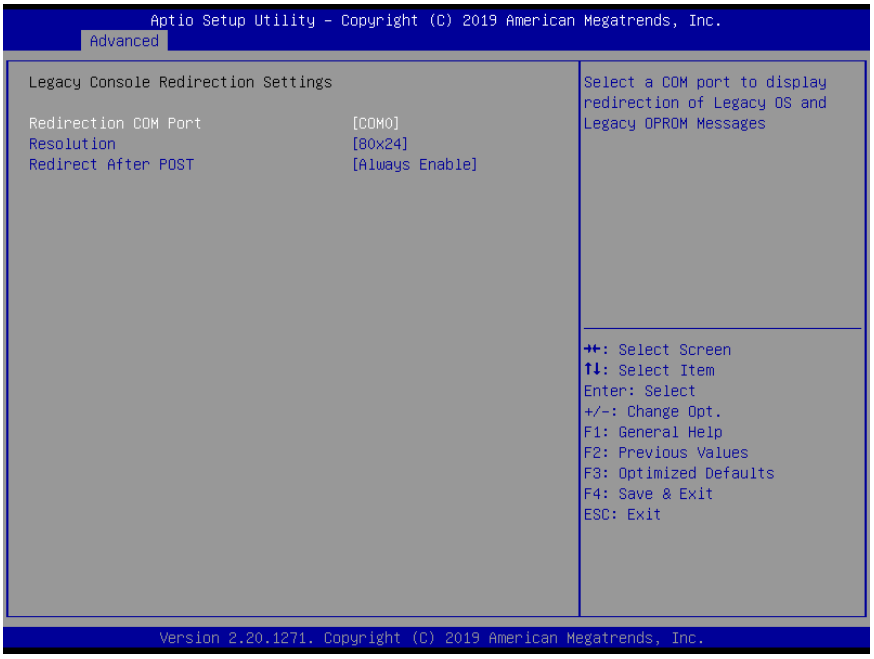
Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

3.6.2.10 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

3.6.2.10.1 Legacy Console Redirection Settings

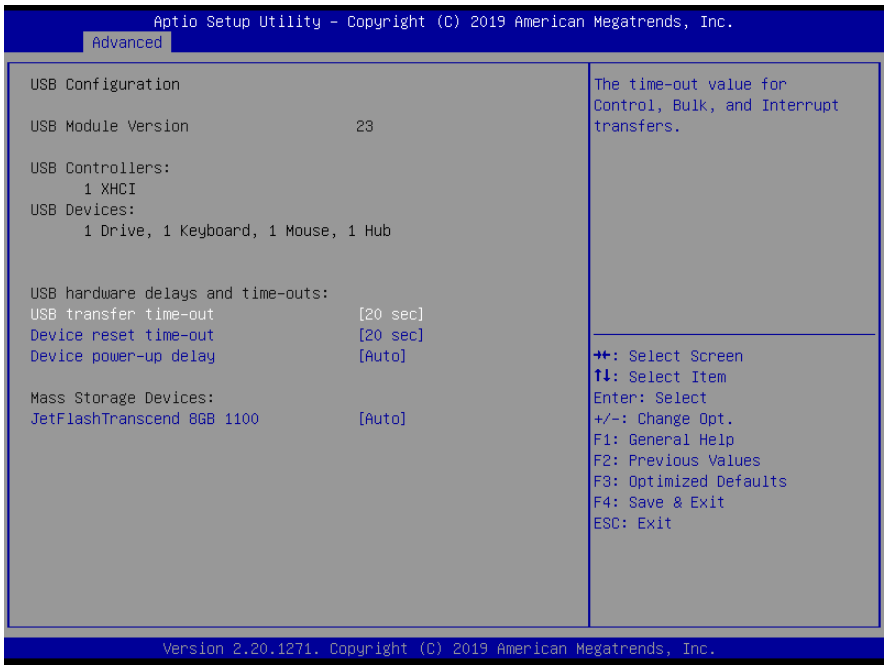


Item	Option	Description
Redirection COM Port	COM0**[Default]**	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	80x24**[Default]** 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.

Redirect After POST	Always Enable**[Default]** BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

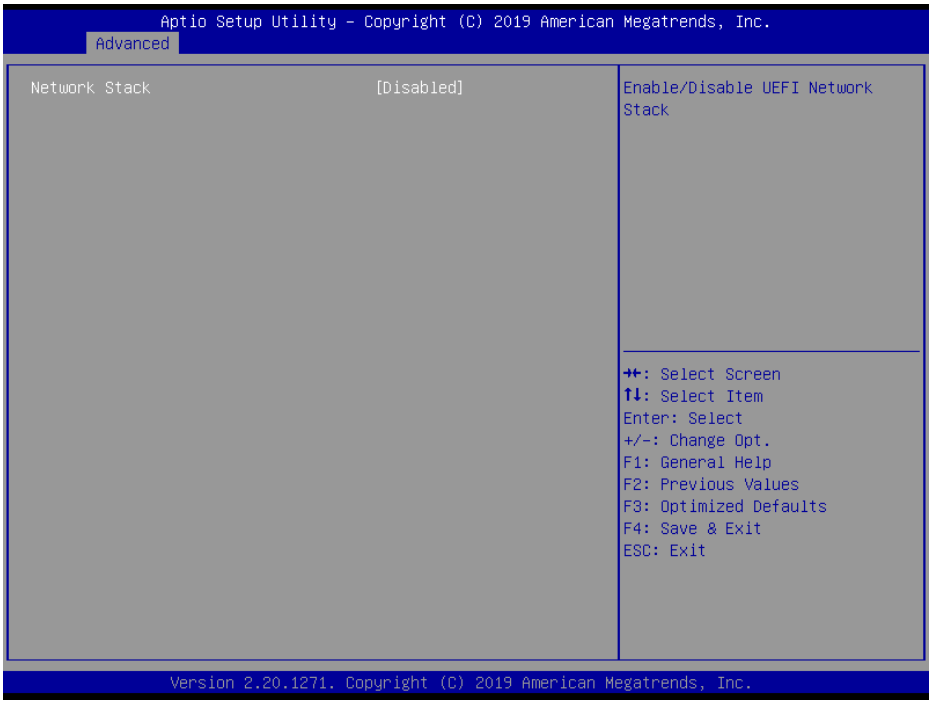
3.6.2.11 USB Configuration

The USB Configuration menu helps read USB information and configures USB settings.



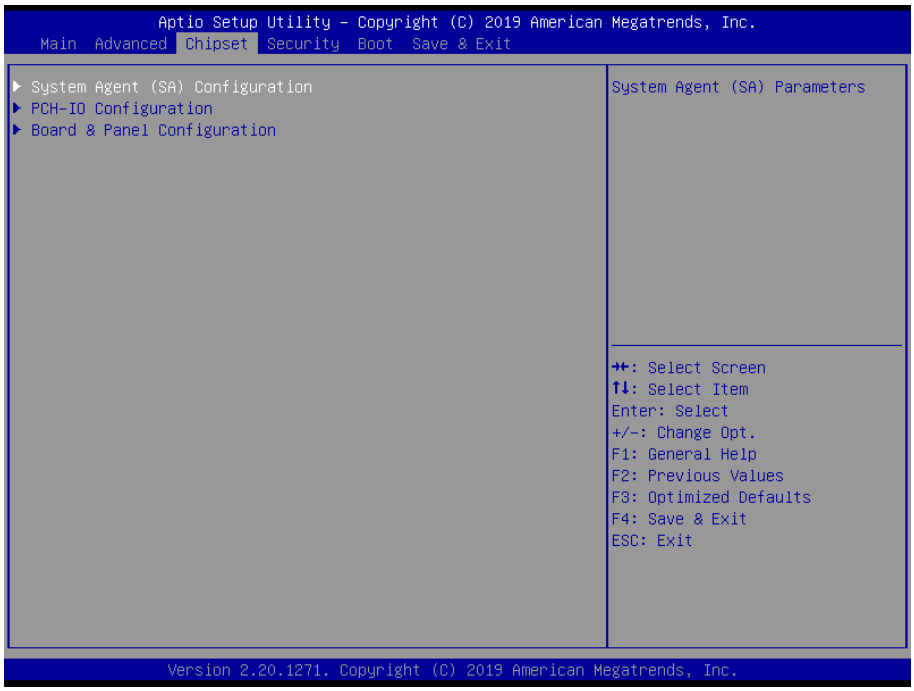
Item	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	Auto**[Default]** Manual	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 form Hub descriptor.
Mass Storage Devices	Auto**[Default]** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.6.2.12 Network Stack Configuration

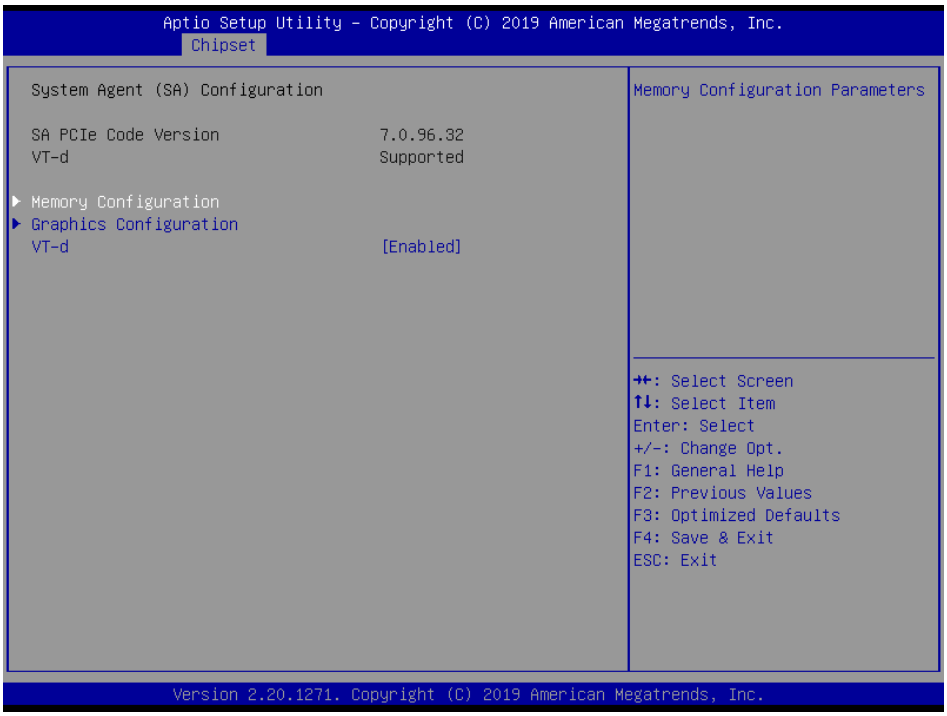


Item	Options	Description
Network Stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

3.6.3 Chipset

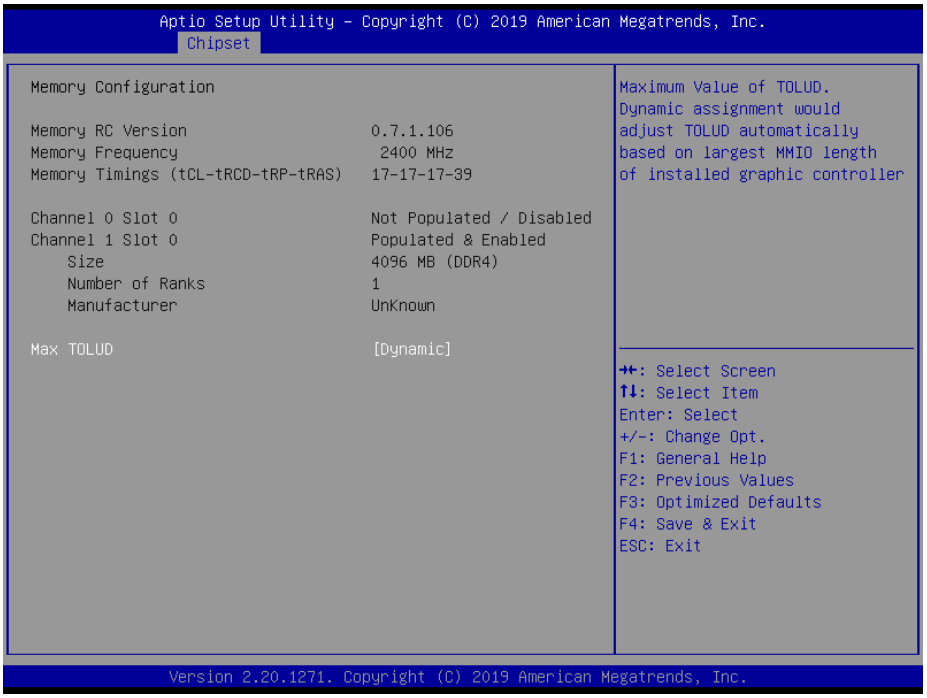


3.6.3.1 System Agent (SA) Configuration



Item	Option	Description
VT-d	Enabled**[Default]** Disabled	VT-d capability.

3.6.3.1.1 Memory Configuration

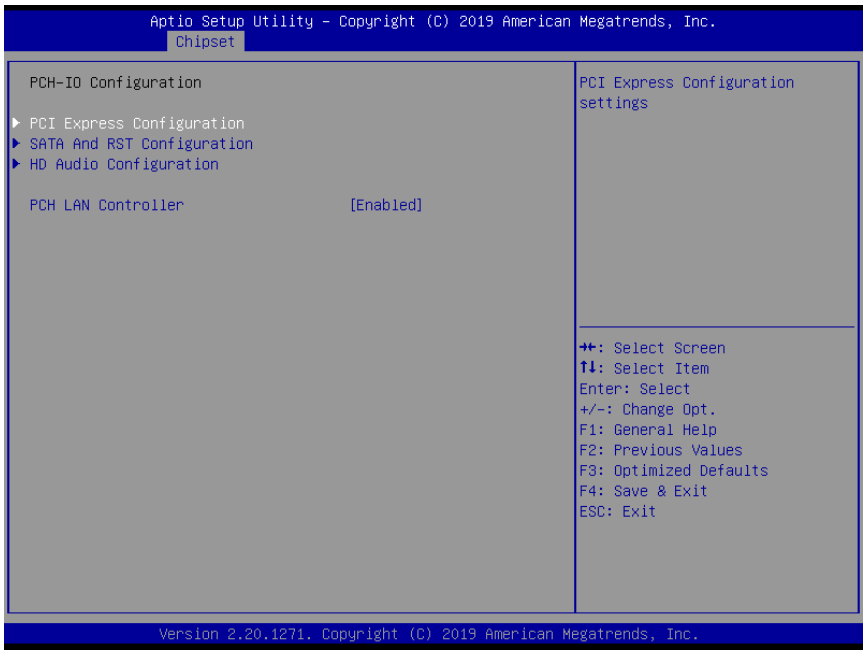


Item	Option	Description
Max TOLUD	Dynamic**[Default]** 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.

3.6.3.1.2 Graphics Configuration

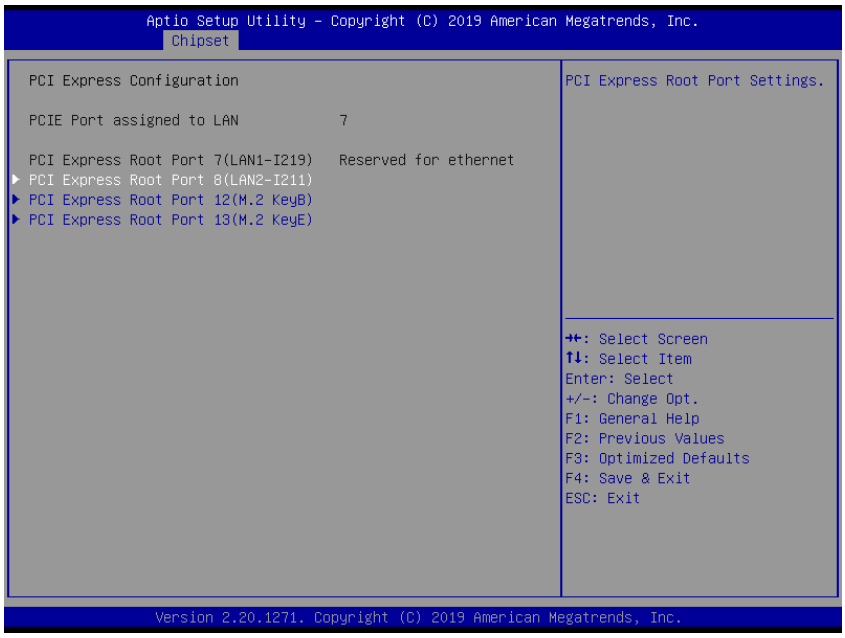
Item	Option	Description
Primary Display	Auto**[Default]** IGFX PEG PCI SG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Select PCIE Card	Auto**[Default]** Elk Creek 4 PEG Eval	Select the card used on the platform Auto: Skip GPIO based Power Enable to dGPU Elk Creek 4: DGPU Power Enable = ActiveLow PEG Eval : DGPU Power Enable= ActiveHigh.

3.6.3.2 PCH-IO Configuration

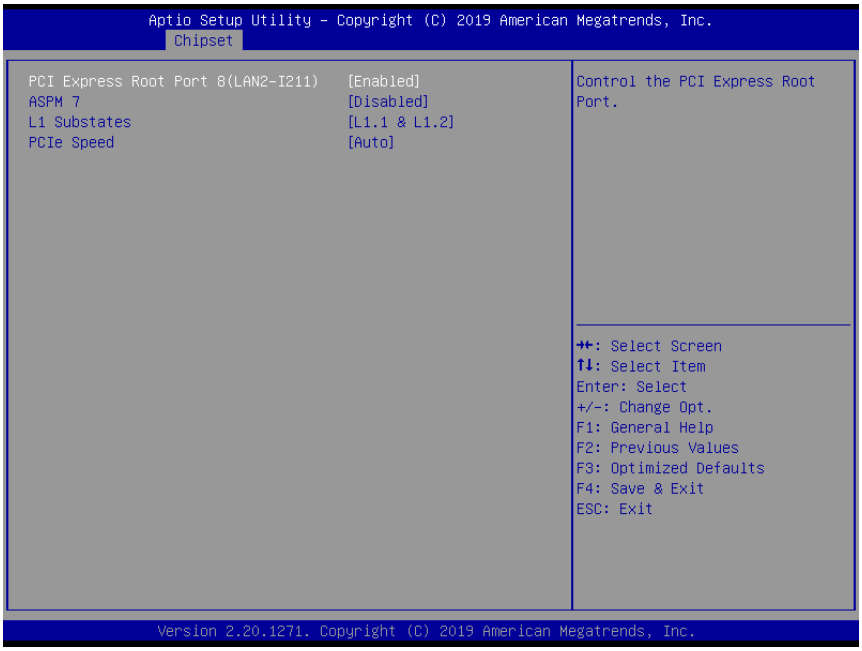


Item	Option	Description
PCH LAN Controller	Disabled Enabled**[Default]**	Enable/Disable onboard NIC.

3.6.3.2.1 PCI Express Configuration



3.6.3.2.1.1 PCI Express Root Port 8(LAN2-I211)

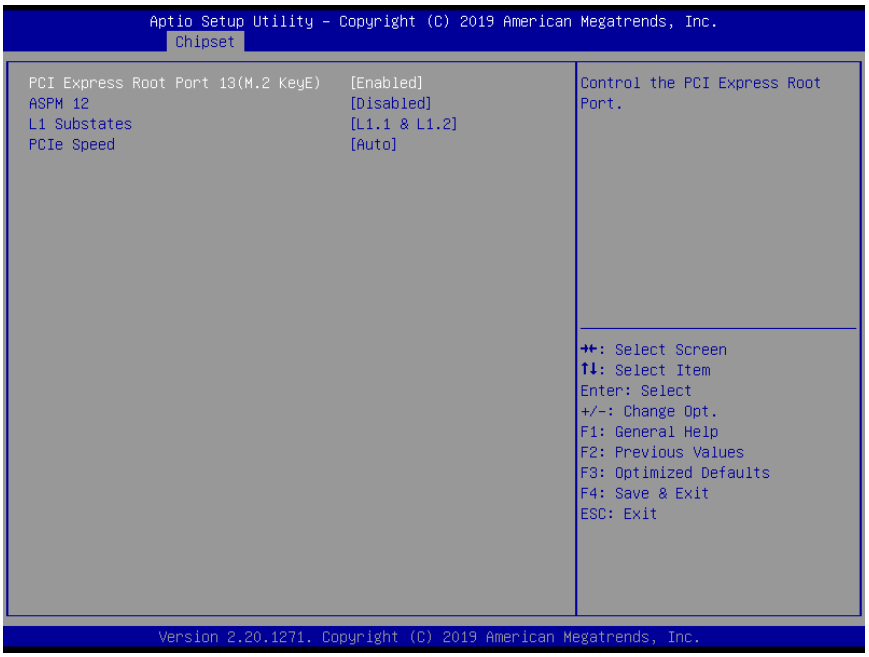


Item	Option	Description
PCI Express Root Port 8(LAN2-I211)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM7	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.2 PCI Express Root Port 12(M.2 KeyB)

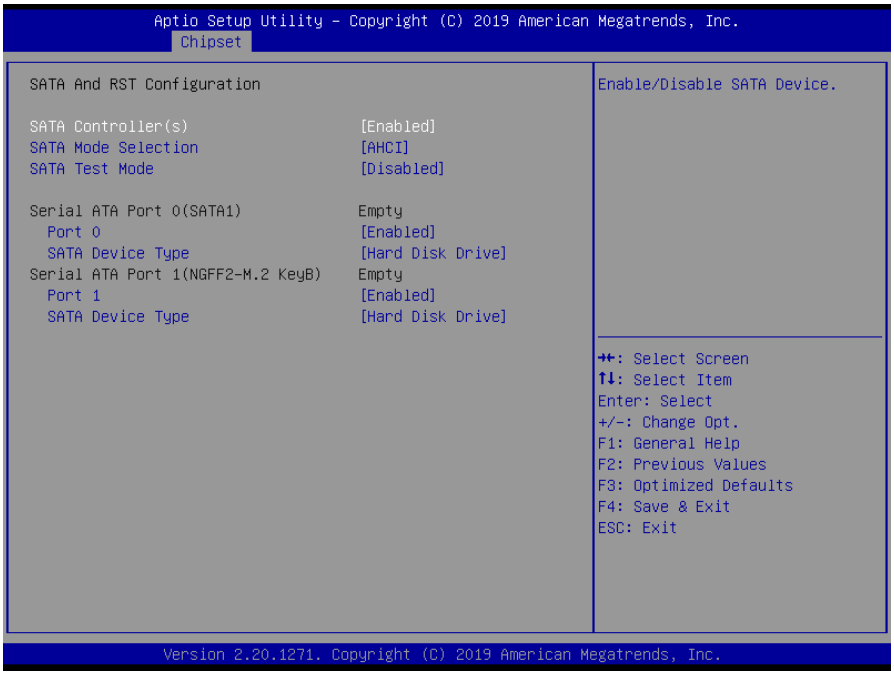
Item	Option	Description
PCI Express Root Port 12(M.2 KeyB)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM11	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.1.3 PCI Express Root Port 13(M.2 KeyE)



Item	Option	Description
PCI Express Root Port 13(M.2 KeyE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM12	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled, L1.1 L1.1 & L1.2**[Default]**	PCI Express L1 Substates settings.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

3.6.3.2.2 SATA And RST Configuration



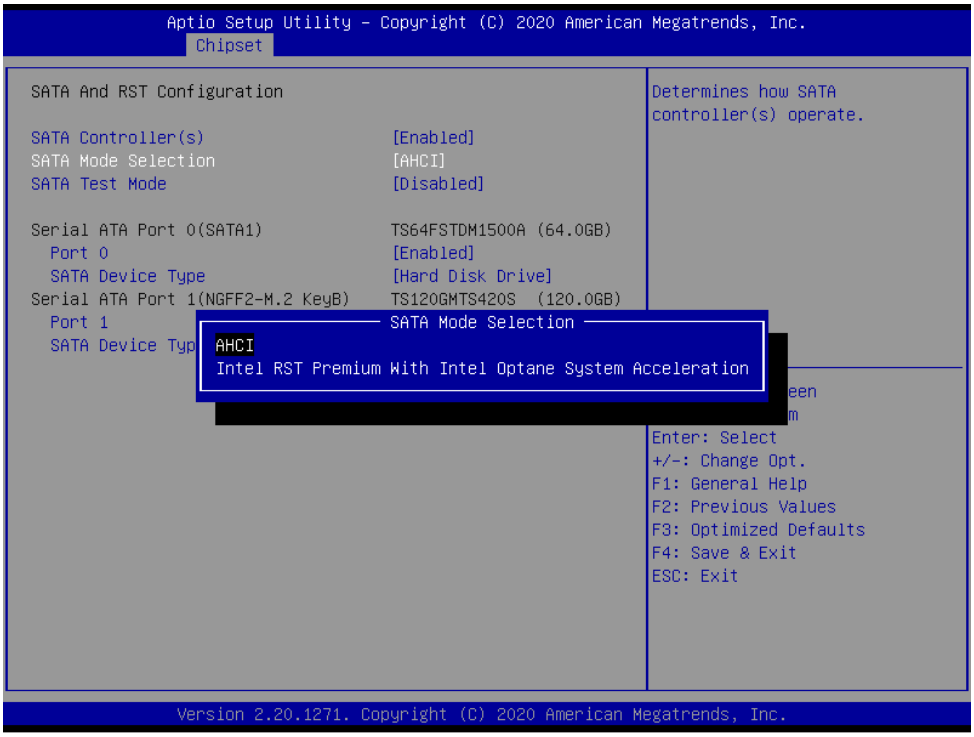
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable/Disable SATA Device.
SATA Mode Selection	AHCI**[Default]**, RAID	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled Disabled**[Default]**	Test Mode Enable/Disable (Loop Back).
Port 0	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Port 1	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive**[Default]** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

Note: RAID/RST Mode support RAID 0 & RAID 1.
To set RAID configuration, please follow the instruction below.

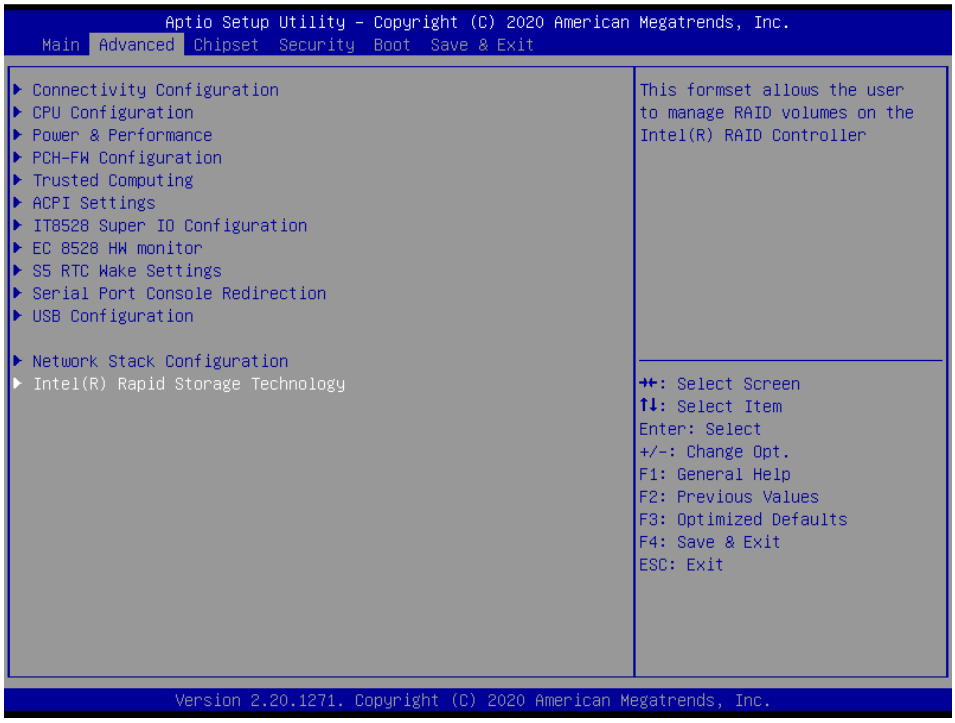
- **Set RAID 0 (DATA Striping)**

Step 1:

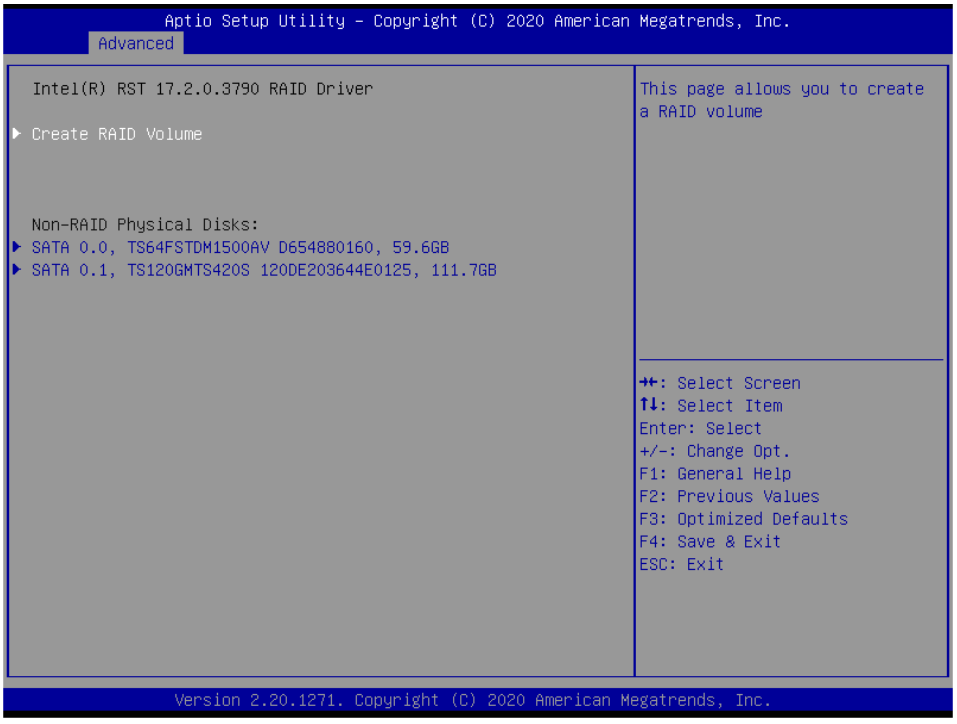
- Select “SATA mode selection” as “Intel RST Premium with Intel Optane System Acceleration”
- Save and Reset system



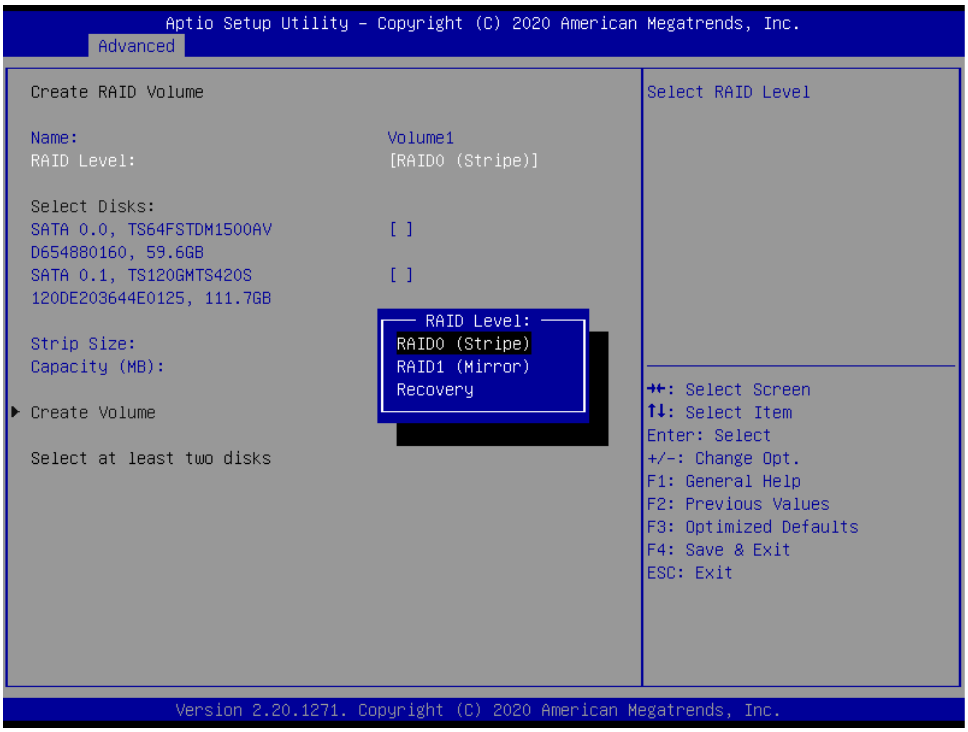
Step 2: Enter “Intel® Rapid Storage Technology”



Step 3: Enter “Create RAID Volume”

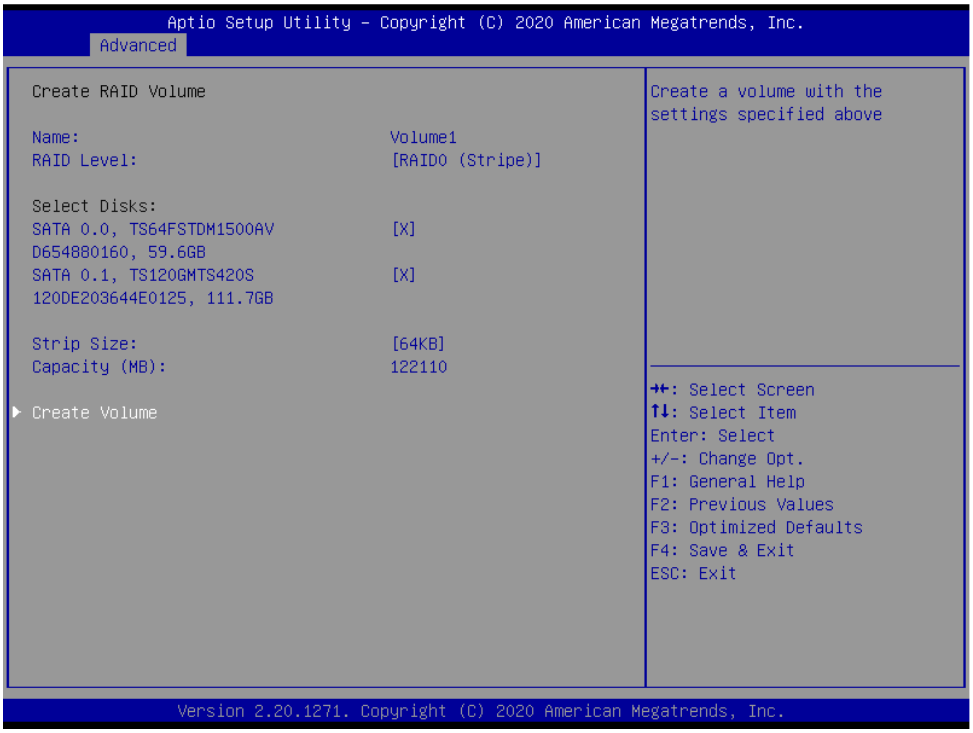


Step 4: Enter “Name “as “name of raid “and Set “RAID Level” as “RAID0”

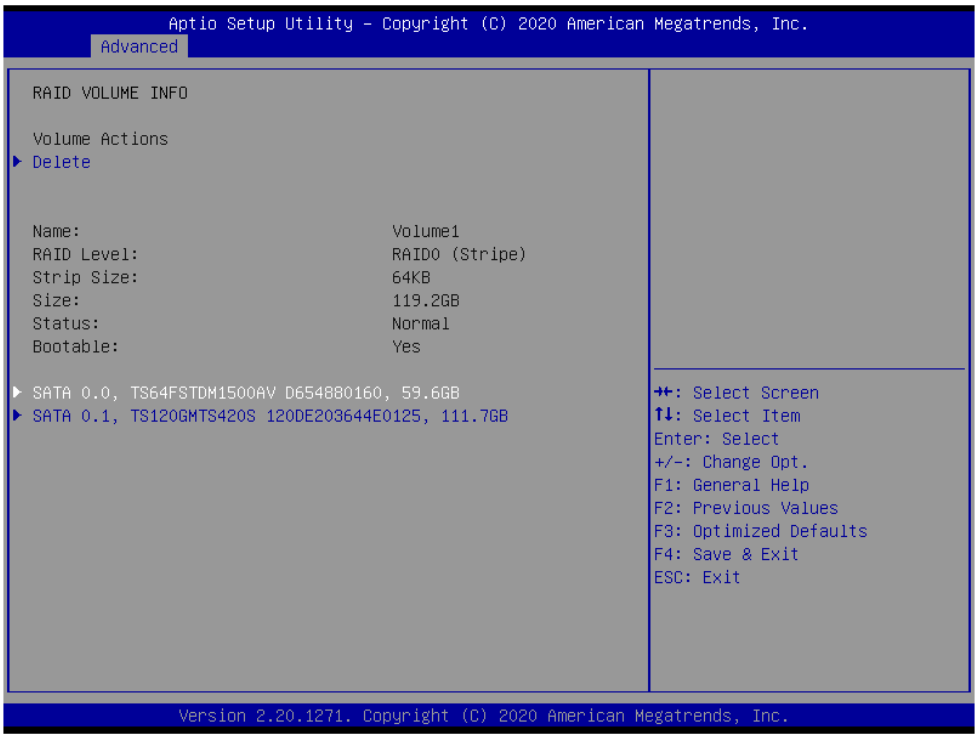


Step 5:

- Select disk SATA 0.0 and SATA 0.1
- Select “Strip Size”
- Select “Capacity”
- Enter “Create Volume”

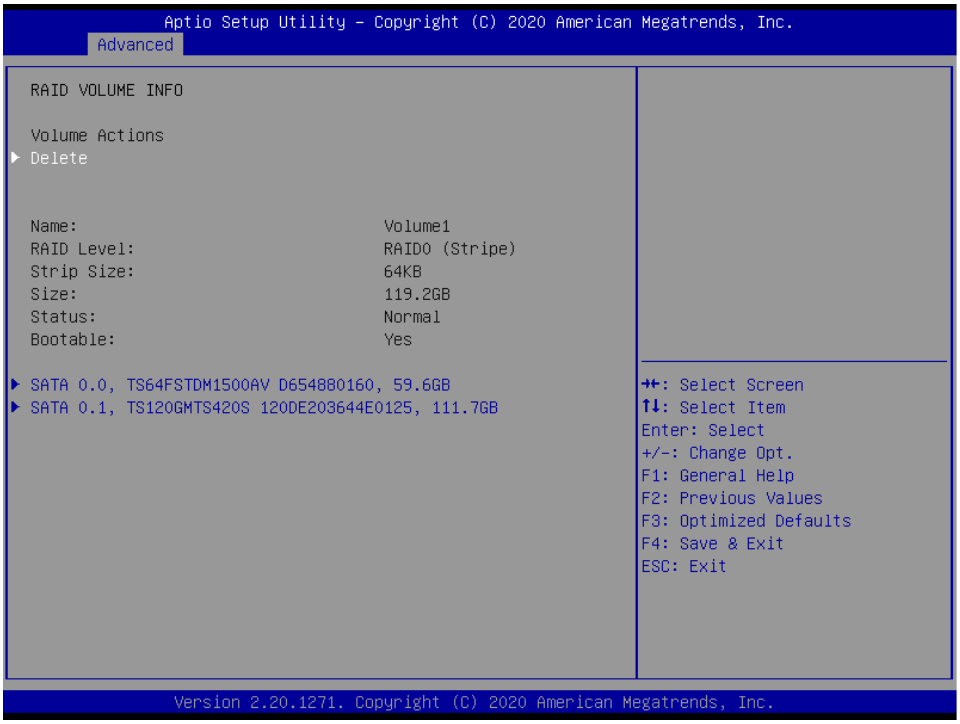


Step 6: Completed. This page show the information of raid created by user

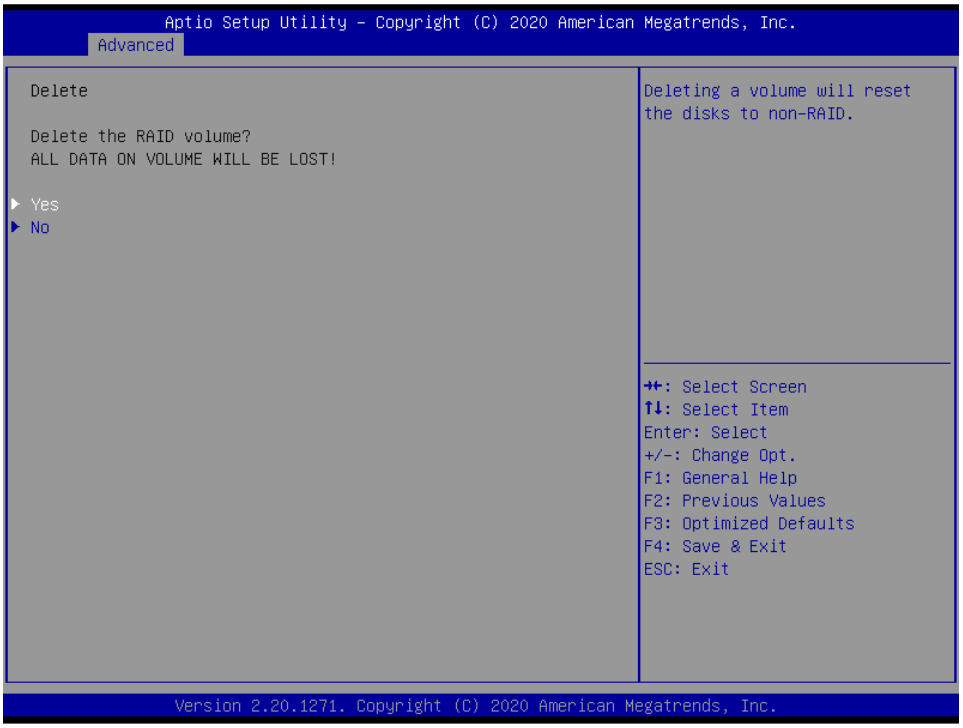


➢ **Delete Raid 0:**

Step1: Enter “Delete”

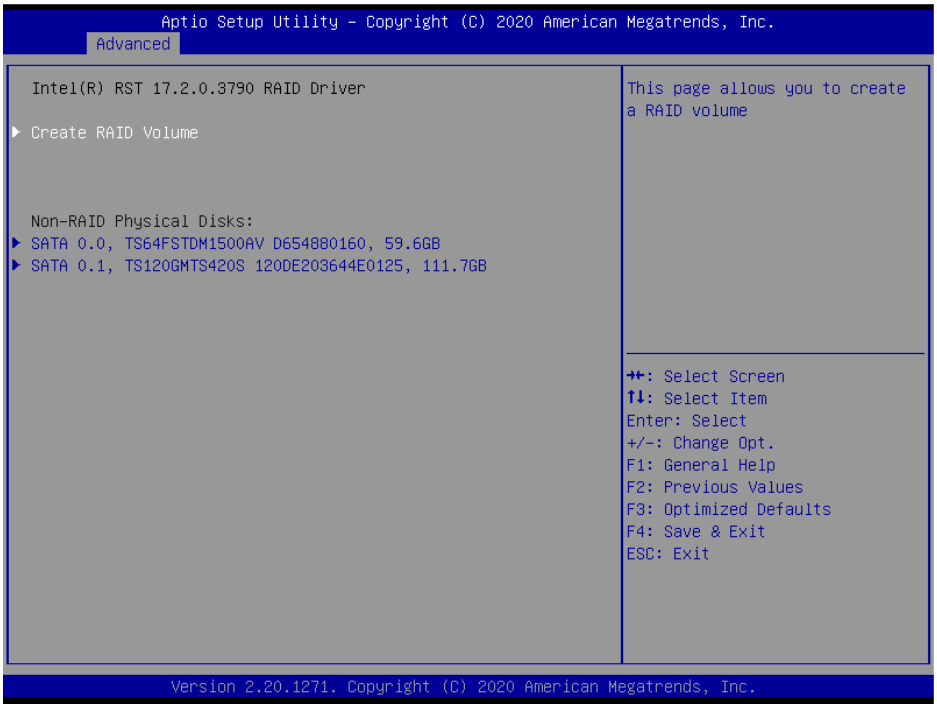


Step 2: Select “Yes “to delete RAID



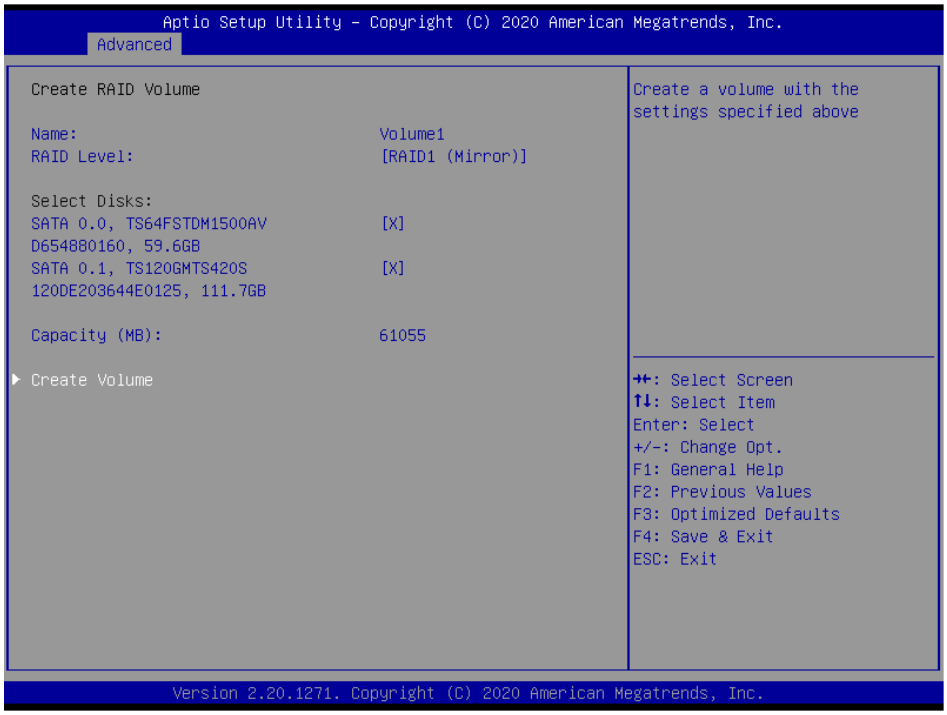
- **Set RAID 1 (DATA Mirroring)**

Step1: Enter “Create RAID Volume”

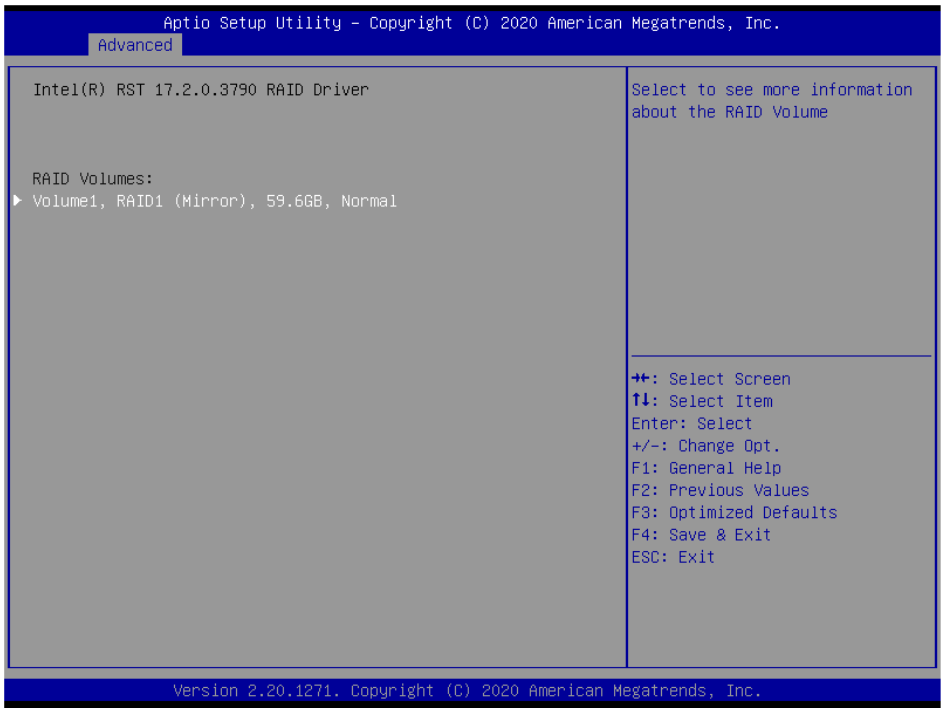


Step2:

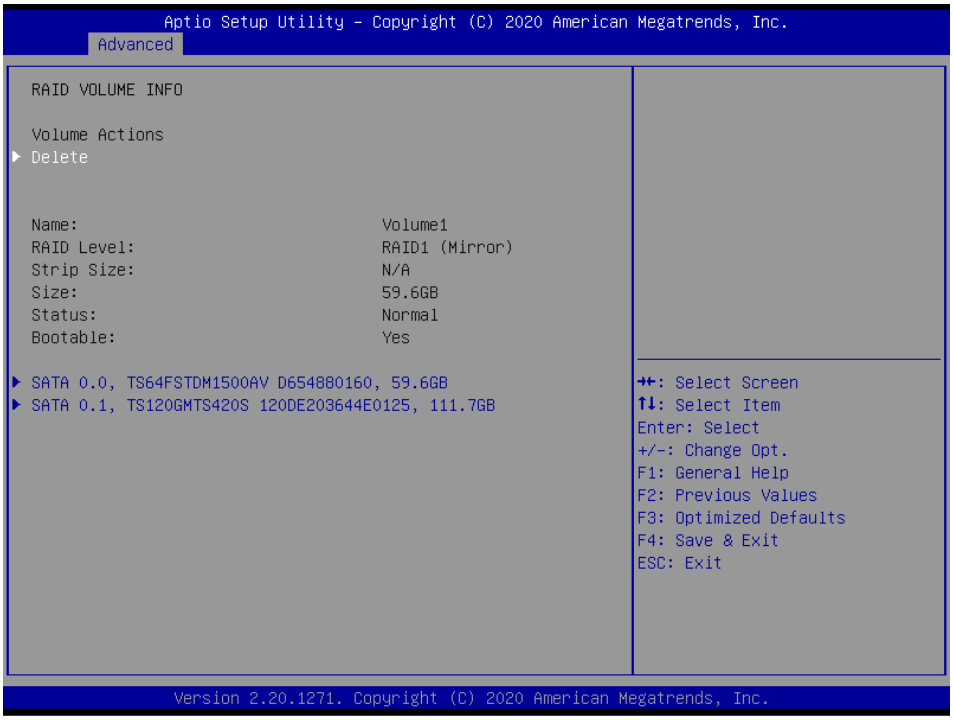
- Enter “Name ” as “name of raid”
- Set “RAID Level “ as “RAID1”
- Select disk “SATA 0.0” and ”SATA 0.1”
- Select “Strip Size”
- Select “Capacity”
- Enter “Create Volume”



Step 3: Raid 1 be created. Select”Volume1” to see detail.

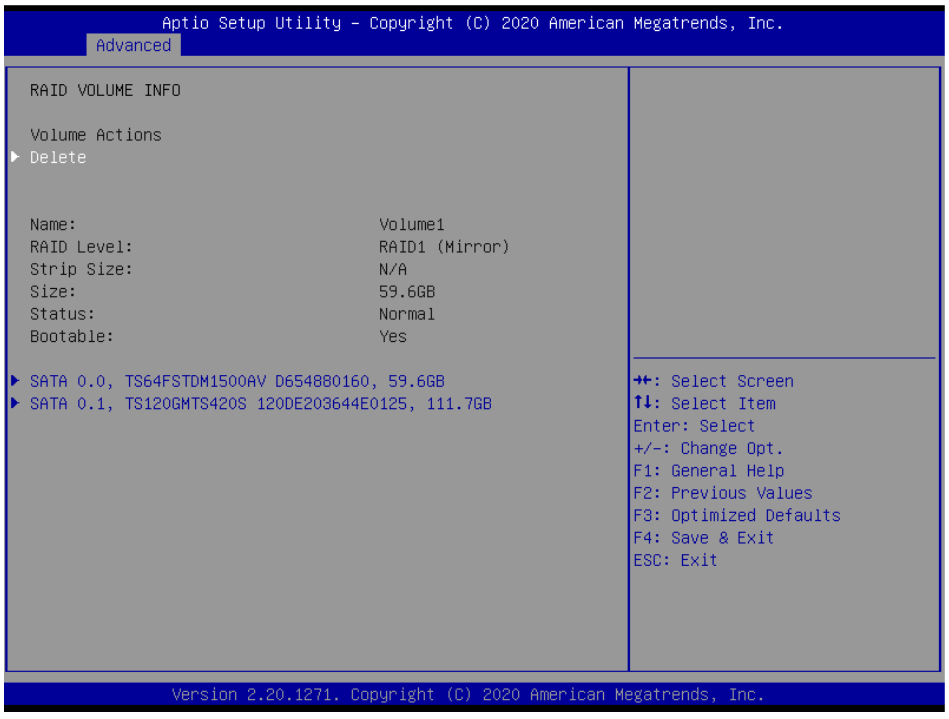


Step 4: Completed. This page show the information of raid created by user.



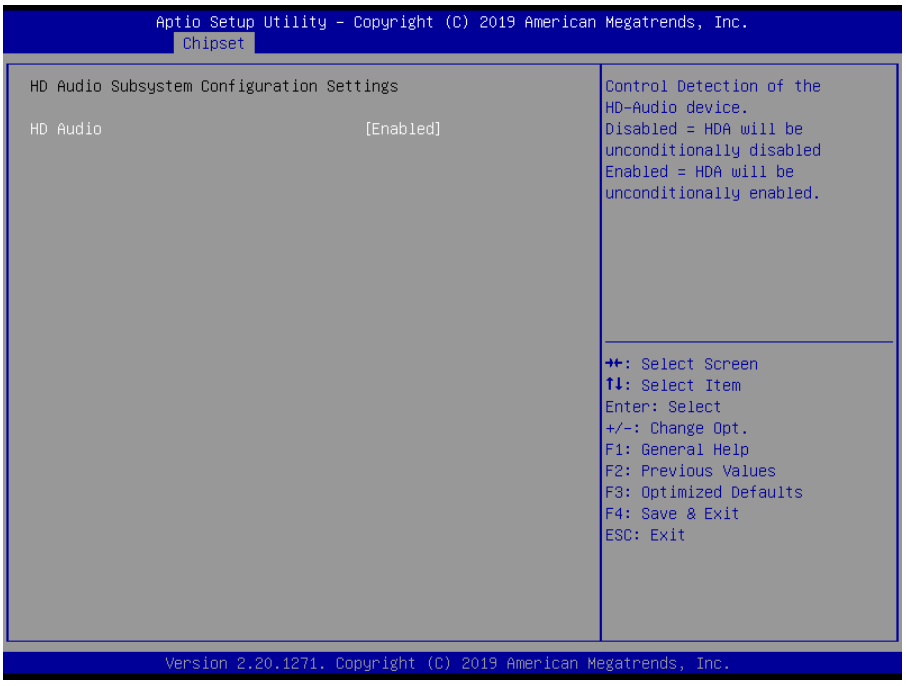
- **Delete Raid 1**

Step1: Enter “Delete”



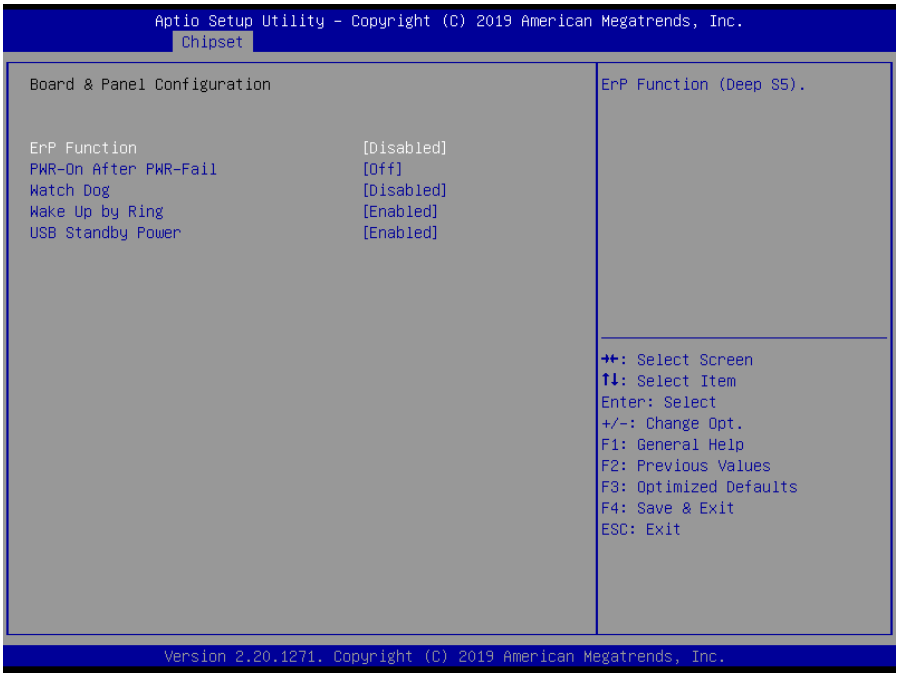
Step2: Select “Yes” to delete RAID

3.6.3.2.3 HD Audio Configuration



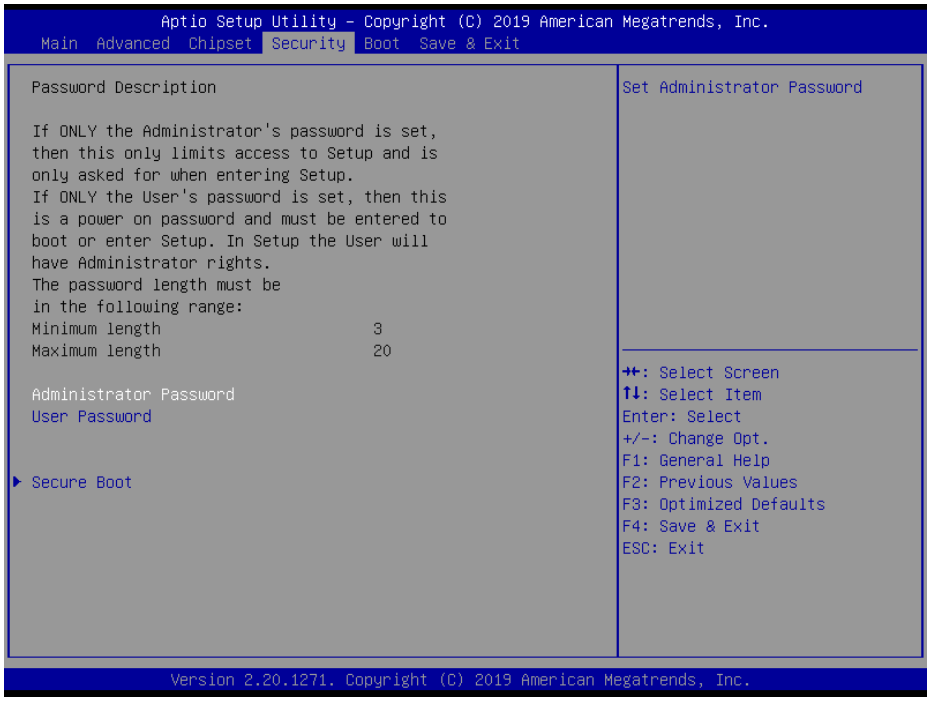
Item	Option	Description
HD Audio	Disabled Enabled**[Default]**	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

3.6.3.3 Board & Panel Configuration



Item	Option	Description
ErP Function	Disabled**[Default]** Enabled	ErP Function (Deep S5).
PWR-On After PWR-Fail	Off**[Default]** On Last state	AC loss resume.
Watch Dog	Disabled**[Default]** 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
Wake Up by Ring	Disabled Enabled**[Default]**	Wake Up by Ring from S3/S4/S5.
USB Standby Power	Disabled Enabled**[Default]**	Enable/Disabled USB Standby Power during S3/S4/S5.

3.6.4 Security



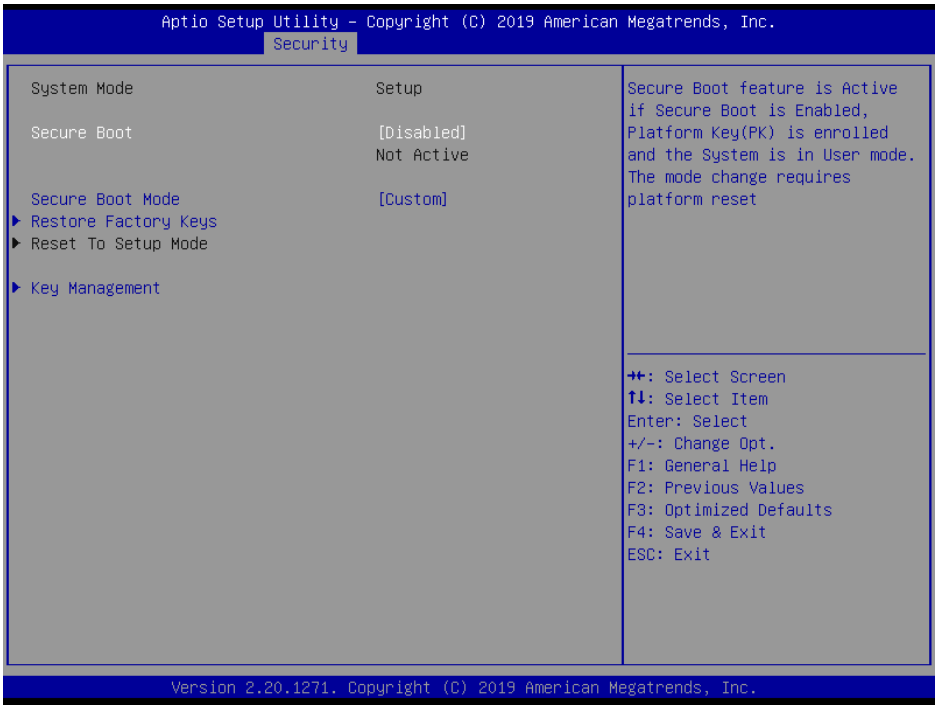
- **Administrator Password**

Set setup Administrator Password

- **User Password**

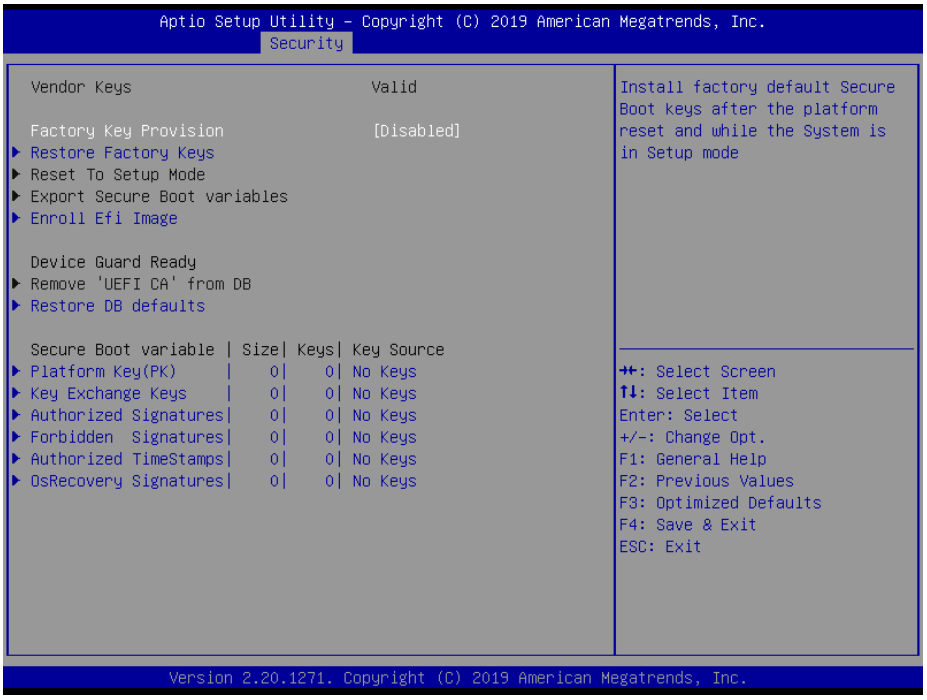
Set User Password

3.6.4.1 Secure Boot



Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot feature is Active if Secure Boot is Enable, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard Custom**[Default]**	Secure Boot mode selector: Standard/Custom. In Custom mode Secure Boot Variables can be configured without authentication.

3.6.4.1.1 Key Management

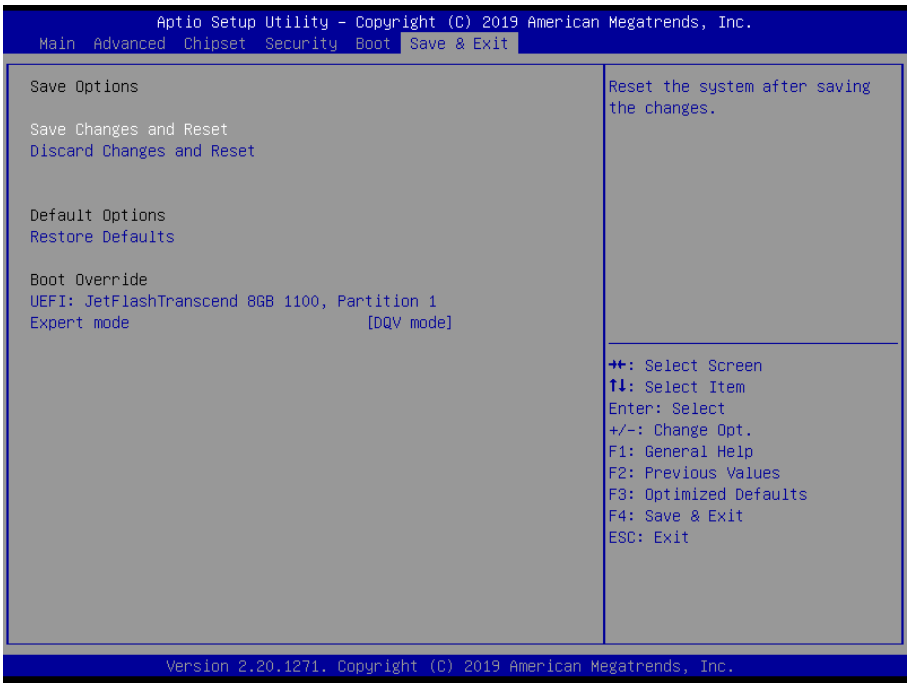


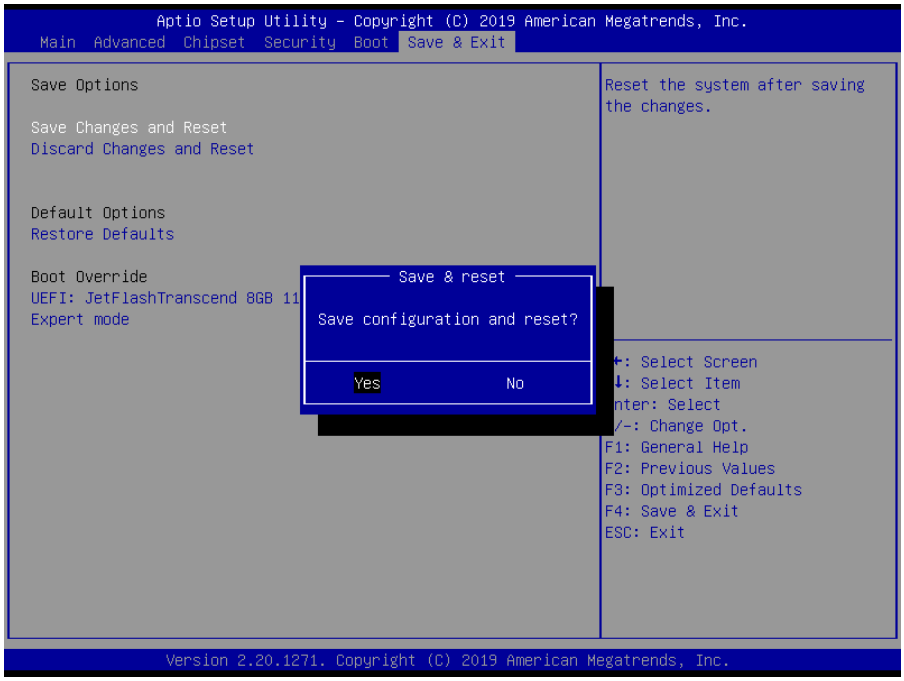
Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

3.6.5 Boot

Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off**[Default]**	Select the keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	Set the system boot order.	

3.6.6 Save and exit





3.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

3.6.6.2 Discard Changes and Reset

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

3.6.6.3 Restore Defaults

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

3.6.6.4 Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.