



# SCH-X403



**User's Manual**

Revision Date: Jan.16.2024

## Safety Information

### Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

### Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

### Statement

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- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

## Revision History

Revision	Date (yyyy/mm/dd)	Changes
V1.0	2024/01/16	First release

## Packing List

Item	Description	Q'ty
1	SCH-X403	1
2	Driver CD	1
3	SSD Tray Key	1
4	Rackmount Bracket + Screw	1 set

## Ordering information

### SCH-X403

Micro-Grid 10th CPU Fanless Computer with Intel. 10th Gen. Core i3/i5/i7/i9 up to 65W Processor, up to 64G SO-DIMM DDR4, 2 x RJ45 GbE, 4 x USB3.0, 2 x USB2.0, 2 x COM, 2 x DP, 1 x HDMI, 2 x SSD Tray, 1 x PCIe Gen3.0 x 16 expansion slot, DC-IN 12V, Operating Temperature -20~+60°C

## RoHS Compliance



### Perfectron RoHS Environmental Policy and Status Update

Perfectron is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with

European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

In order to meet the RoHS compliant directives, Perfectron has established an engineering and manufacturing task force to implement the introduction of green products. The task force will ensure that we follow the standard Perfectron development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which Perfectron are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant

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## Chapter 1 : Production Introduction

### 1.1 Specifications

#### System

CPU	Intel® 10 <sup>th</sup> Core™ i3/i5/i7/i9 up to 65W processor
Memory type	DDR4 SO-DIMM up to 64GB
Expansion Slot	1 PCI-E 3.0 x16 (Gen3, Support riser card x8 / x8, x8 / x4 / x4) 1 x M.2 (Key E, 2230) with PCIe x1, USB 2.0 and CNVi for Wireless 1 x M.2 (Key B, 3042 / 3052) with PCIe x1 / USB 3.0 / USB2.0 and SIM for 4G / 5G

#### Ethernet

Ethernet	LAN1: Intel® I225LM with 10/100/1000/2500 Mbps LAN2: Intel® I219LM with 10/100/1000 Mbps, support AMT / vPro
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#### Rear I/O

Power Button	1 x w/Indicator LED
Indicator	1 x HDD backlight
USB	2 x USB 2.0
Storage	2 x SSD Tray

#### Front I/O

Power Input	1 x 4P Terminal Block
LAN	2 x RJ45 GbE LAN
USB	4 x USB 3.0
DisplayPort	2 x DP
HDMI	1 x HDMI
AUDIO	1 x MIC-IN ; 1 x LINE OUT
COM	2 x COM (RS232/422/485)

#### Power

Power Input	DC-IN 12V
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#### OS support list

Windows	Windows 10 x64
Linux	Ubuntu16.04, Ubuntu18.04, Fedora 28

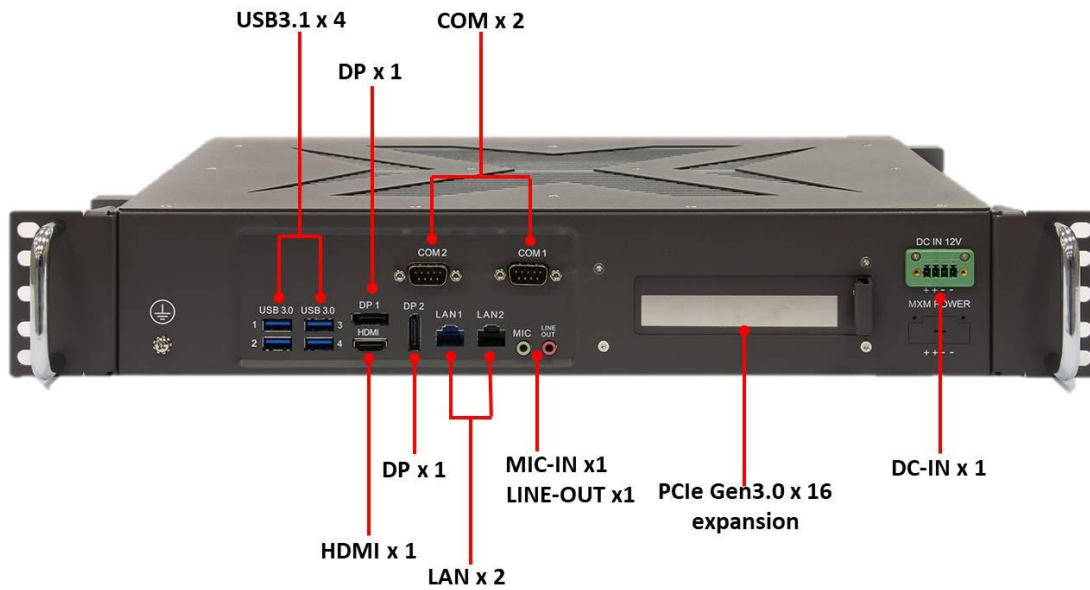
## Mechanical and Environmental

Dimension ( W x D x H )	430 x 300 x 74 mm
Operating Temp.	-20 to 60°C
Storage Temp.	-40°C to 85°C
Relative Humidity	5% to 95%, non-condensing
Certification	CE, FCC, MIL-STD 810G Compliance
Green Product	RoHS, WEEE compliance
System Design	Fanless
Mounting	2U Rackmount

### 1.2 Front Panel I/O Placement

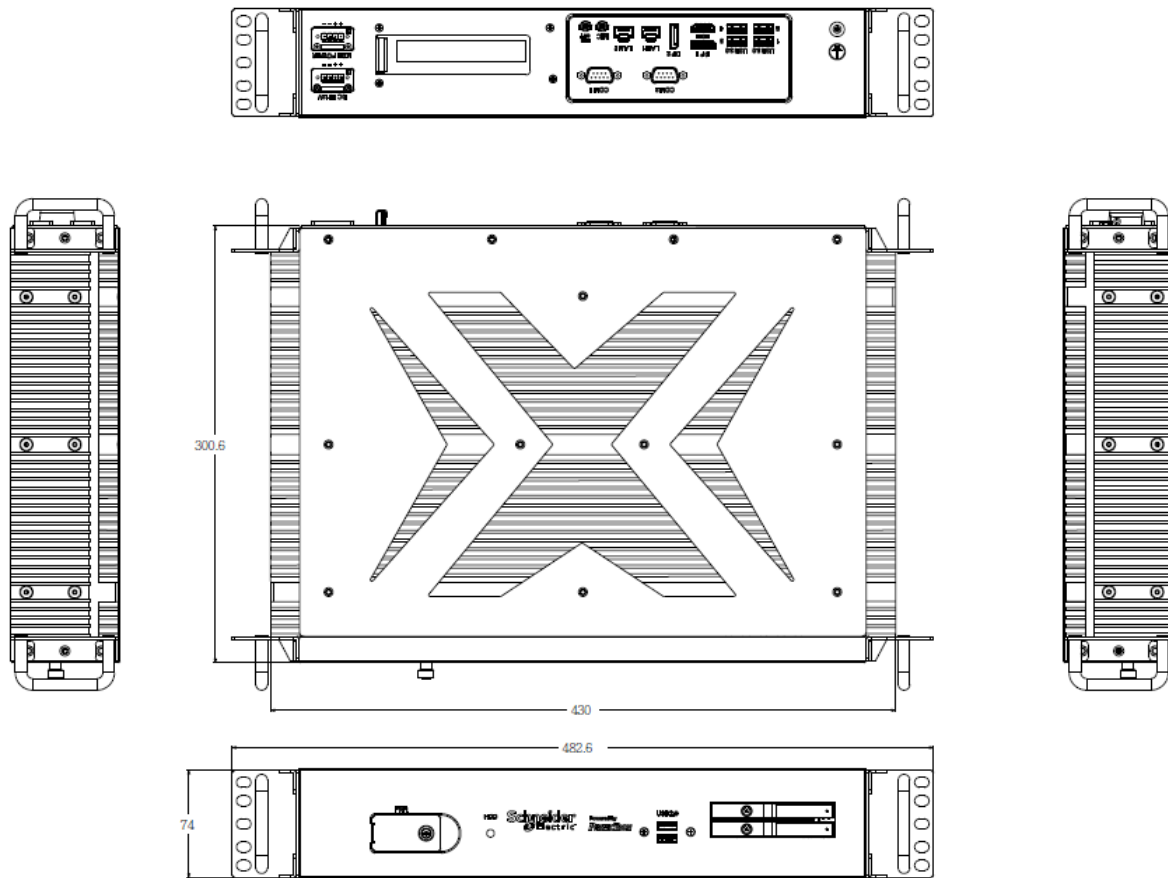


## 1.3 Rear Panel I/O Placement





## 1.4 Mechanical Dimensions

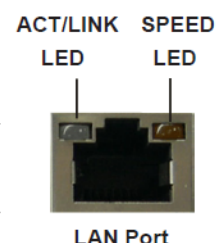


## Chapter 2 : Rear I/O Ports

### 2.1 LAN port LED Indications

#### LAN Port LED Indications

Activity/Link LED		SPEED LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps/1Gbps connection
On	Link	Green	2.5Gbps connection



## Chapter 3 : System Setup

This chapter provides more detailed information and let you know how to install components into the SCH-X403 series embedded system.



**Prior to removing the chassis cover, make sure the unit's power is off and disconnected from the power sources to prevent electric shock or system damage.**

### 3.1 2.5" Easy swap SSD installation

SCH-X403 series supports two 2.5" easy swap SSD

- Use Tri-angle security key to open keylock and pull out 2.5" SSD tray.
- Put 2.5"SSD on the tray and make sure SSD is fixed and push the tray back.
- Use Tri-angle security key to lock the tray door.





## Chapter 4: AMI BIOS UTILITY

This chapter provides users with detailed descriptions on how to set up a basic system configuration through the AMI BIOS setup utility.

### 4.1 Starting

To enter the setup screens, perform the following steps:

- Turn on the computer and press the <Del> key immediately.
- After the <Del> key is pressed, the main BIOS setup menu displays. Other setup screens can be accessed from the main BIOS setup menu, such as the Chipset and Power menus.

## 4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

Some of the hot keys are <F1>, <F10>, <Enter>, <ESC>, and <Arrow> keys.

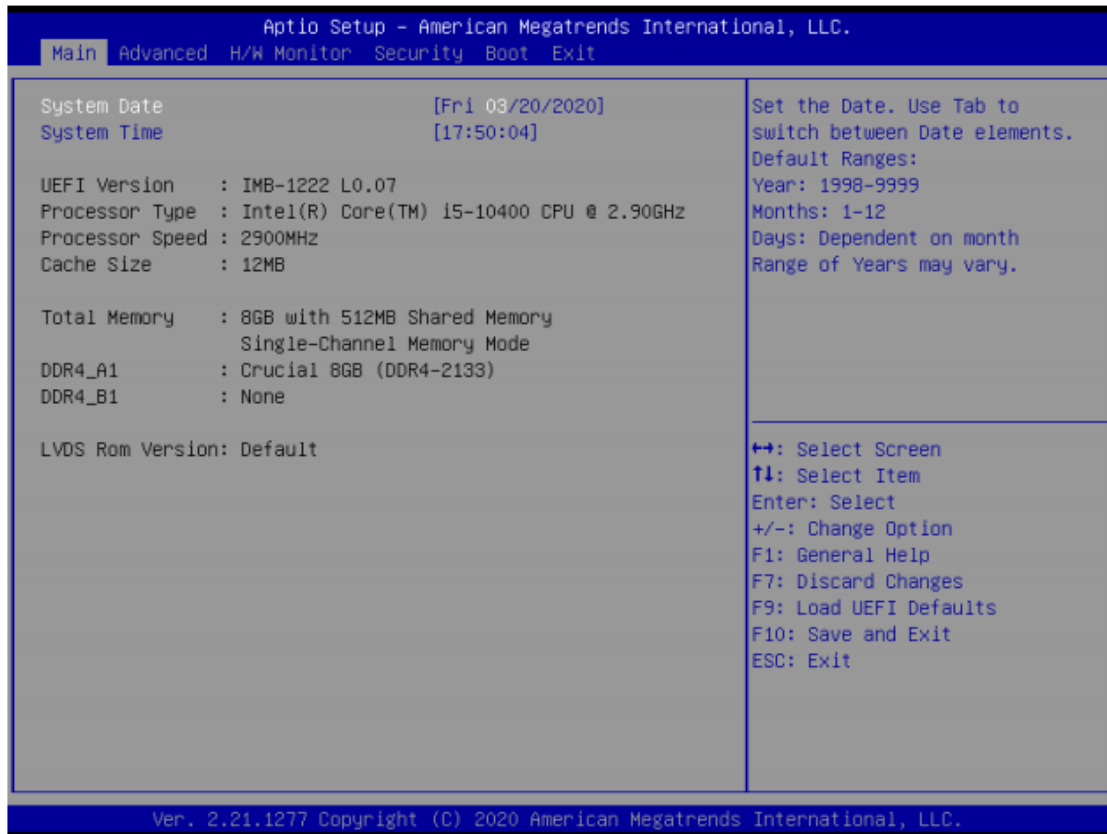


Some of the navigation keys may differ from one screen to another.

Left/Right	The Left and Right <Arrow> keys moves the cursor to select a menu.
Up/Down	The Up and Down <Arrow> keys moves the cursor to select a setup screen or sub-screen.
+ – Plus/Minus	The Plus and Minus <Arrow> keys changes the field value of a particular setup setting.
Tab	The <Tab> key selects the setup fields.
F1	The <F1> key displays the General Help screen.
F10	The <F10> key saves any changes made and exits the BIOS setup utility.
Esc	The <Esc> key discards any changes made and exits the BIOS setup utility.
Enter	The <Enter> key displays a sub-screen or changes a selected or highlighted option in each menu.

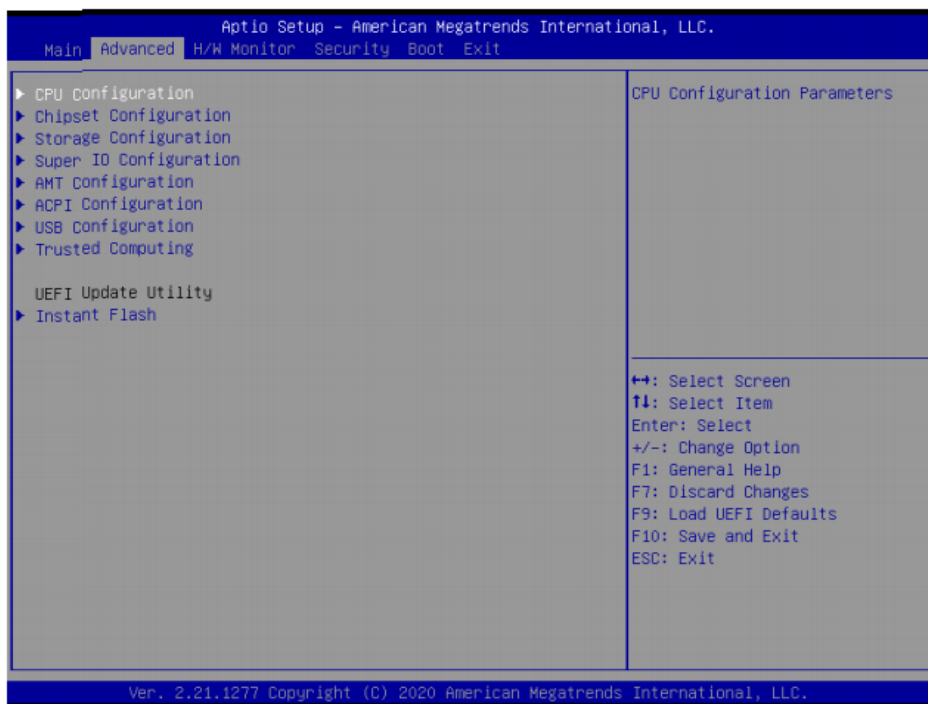
## 4.3 Main Screen

When you first enter the AMI BIOS setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS setup screen is shown below and the following items will be displayed:



## 4.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Storage Configuration, Super IO Configuration, AMT Configuration, ACPI Configuration, USB Configuration and Trusted Computing.



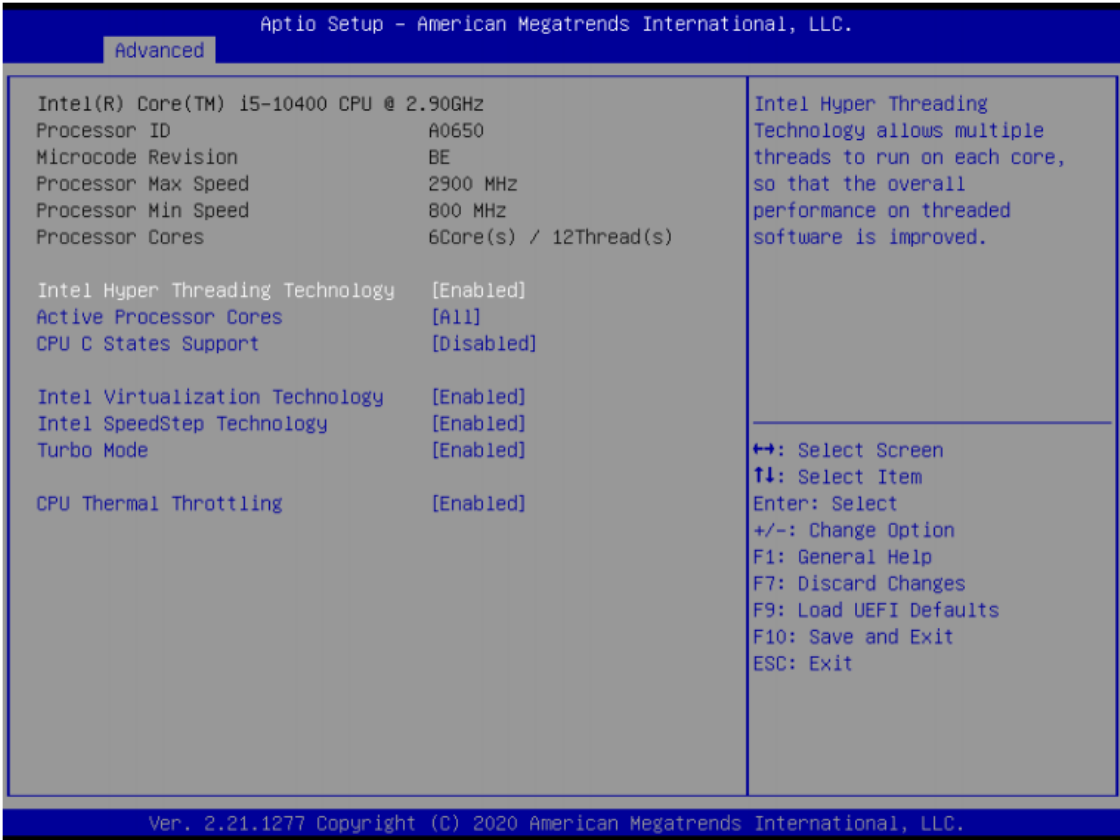
Setting wrong values in this section may cause the system to malfunction.

### Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after UEFI update process completes.



## 4.4.1 CPU Configuration



## Intel Hyper Threading Technology

Intel Hyper Threading Technology allows multiple threads to run on each core, so that the overall performance on threaded software is improved.

## Active Processor Cores

Select the number of cores to enable in each processor package.

## CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

## Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

## Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® OS and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.



Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

## Intel Turbo Boost Technology

Use this item to enable or disable Intel Turbo Boost Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is [Enabled].

## CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheating.





## 4.4.2 Chipset Configuration

Aptio Setup - American Megatrends International, LLC.

Advanced

ME Firmware Version	14.0.31.1120	Select a primary VGA.
VT-d Capability	Supported	
Primary Graphics Adapter	[PCI Express]	
Above 4G Decoding	[Disabled]	
VT-d	[Enabled]	
PCIe1 Link Speed	[Auto]	
Share Memory	[Auto]	
IGPU Multi-Monitor	[Disabled]	
Active LVDS	[Disabled]	
Primary IGFX Boot Display	[VBIOS Default]	
Onboard LAN1	[Enabled]	←→: Select Screen
Onboard LAN2	[Enabled]	↑↓: Select Item
		Enter: Select
		+/-: Change Option
Onboard HD Audio	[Enabled]	F1: General Help
Front Panel	[HD]	F7: Discard Changes
		F9: Load UEFI Defaults
Deep Sleep	[Disabled]	F10: Save and Exit
Restore on AC/Power Loss	[Power Off]	ESC: Exit

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## **Primary Graphics Adapter**

This allows you to select [Onboard] or [PCI Express] as the boot graphic adapter priority. The default value is [PCI Express].

## **Above 4G Decoding**

Enable or disable 64bit capable Devices to be decoded in Above 4G Address Space (only if the system supports 64 bit PCI decoding).

## **VT-d**

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

## **PCIE1 Link Speed**

Select the link speed for PCIE1.

## **Share Memory**

Configure the size of memory that is allocated to the integrated graphics processor when the system boots up.

## **IGPU Multi-Monitor**

Select disable to disable the integrated graphics when an external graphics card is installed. Select enable to keep the integrated graphics enabled at all times.

## **Active LVDS**

Use this to enable or disable the LVDS. The default value is [Disabled]. Set the item to [enable]. Then press <F10> to save the setting and restart the system. Now the default value of Active LVDS is changed to ENABLE (F9 load default is also set to ENABLE). Change the setting from [Enable] to [Disable], and then press <F10> to save the setting and restart the system. Likewise, the default value of Active LVDS is changed to DISABLE (F9 load default is also set to DISABLE)

## **Primary IGFX Boot Display**

Select the primary graphics boot display.

## **Onboard LAN1**

This allows you to enable or disable the Onboard LAN1 feature.

## **Onboard LAN2**

This allows you to enable or disable the Onboard LAN2 feature.

## **Onboard HD Audio**

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged.

## **Front Panel**

Enable/disable front panel HD audio.

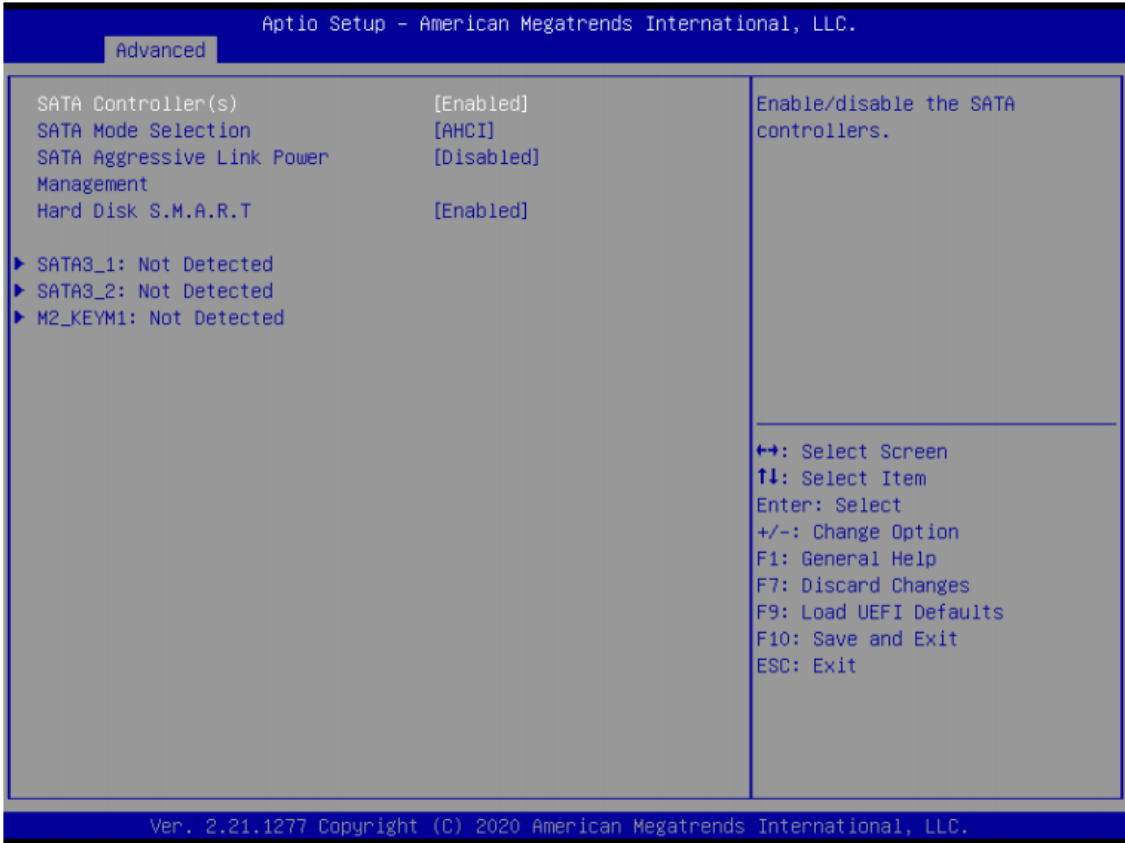
## **Deep Sleep**

Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. The default value is [Disabled].

## **Restore on AC/Power Loss**

Select the power state after a power failure. If [Power Off] is selected, the power will remain off when the power recovers. If [Power On] is selected, the system will start to boot up when the power recovers.

## 4.4.3 Storage Configuration



### SATA Controller(s)

Use this item to enable or disable the SATA Controller feature.

### SATA Mode Selection

Use this to select SATA mode. The default value is [AHCI Mode].



AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance.

### SATA Aggressive Link Power Management

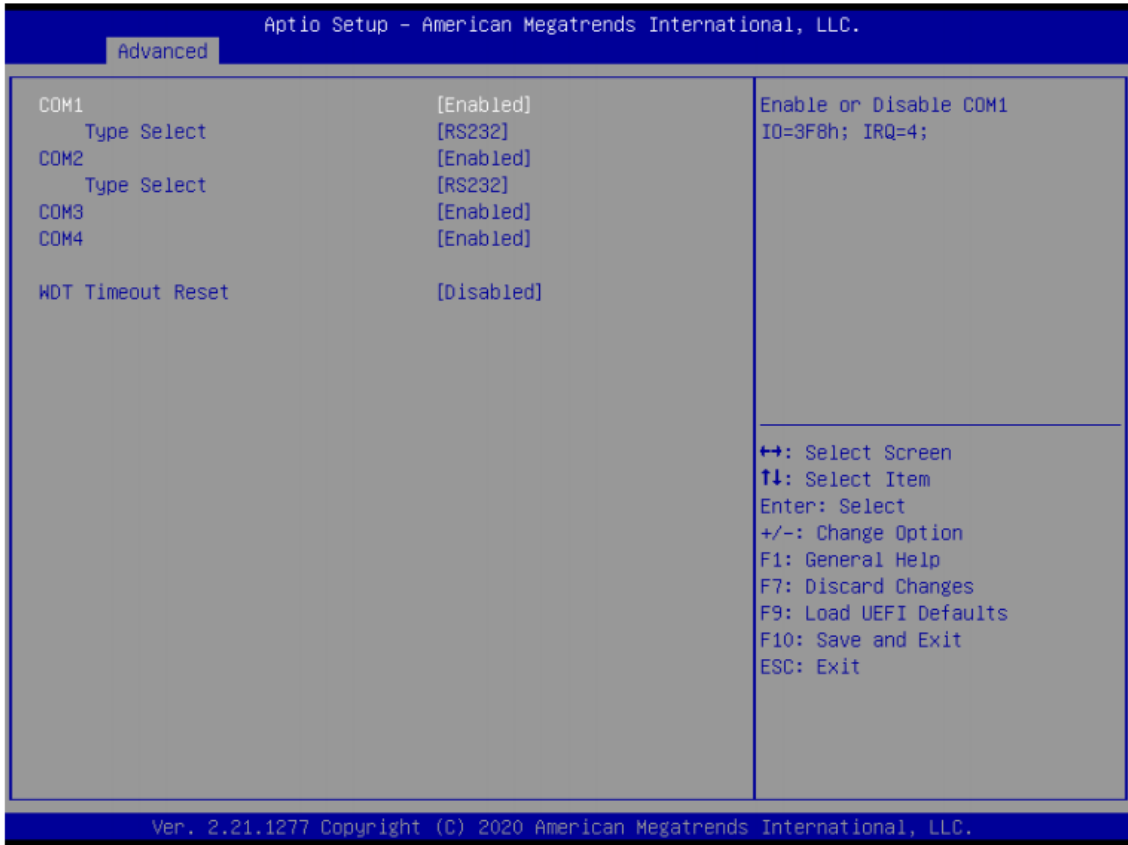
Use this item to configure SATA Aggressive Link Power Management.

### Hard Disk S.M.A.R.T.

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled] and [Enabled].



## 4.4.4 Super IO Configuration



## **COM1 Configuration**

Use this to set parameters of COM1.

### **Type Select**

Use this to select COM1 port type: [RS232], [RS422] or [RS485].

## **COM2 Configuration**

Use this to set parameters of COM2.

### **Type Select**

Use this to select COM2 port type: [RS232], [RS422] or [RS485].

## **COM3 Configuration**

Use this to set parameters of COM3.

## **COM4 Configuration**

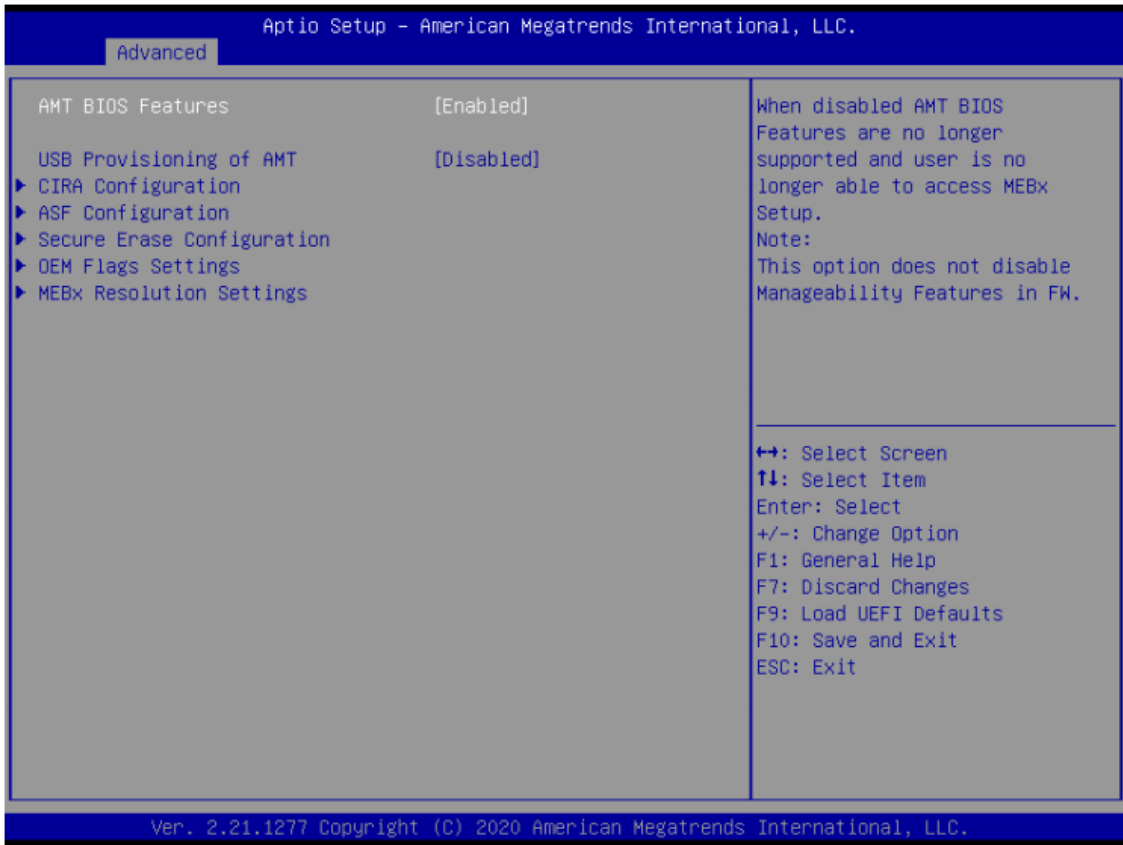
Use this to set parameters of COM4.

## **WDT Timeout Reset**

Use this to set the Watch Dog Timer.



## 4.4.5 AMT Configuration



## **AMT BIOS Features**

Use this to enable or disable Intel(R) Active Management Technology BIOS Extension. The default is [Enabled].

## **ASF support**

Use this to enable or disable Alert Specification Format. The default is [Enabled].

## **USB Provisioning of AMT**

Use this to enable or disable AMT USB Provisioning. The default is [Disabled].

## **Secure Erase mode**

Change Secure Erase module behavior: Simulated: Performs SE flow without erasing SSD. Real: Erase SSD.

## **Force Secure Erase**

Use this to enable or disable Force Secure Erase on next boot. The default is [Disabled].

## **MEBx hotkey Pressed**

Use this to enable or disable MEBx hotkey press. The default is [Disabled].

## **MEBx Selection Screen**

Use this to enable or disable MEBx Selection Screen. The default is [Disabled].

## **Hide Un-configure ME Confirmation Prompt**

Hide Un-Configure ME without password confirmation prompt. The default is [Disabled].

## **MEBx OEM Debug Menu Enable**

Use this to enable or disable MEBx OEM Debug Menu. The default is [Disabled].



## **Un-Configure ME**

Un-Configure ME without password. The default is [Disabled].

## **WatchDog**

Use this to enable or disable AMT WatchDog Timer. The default is [Disabled].

## **Activate Remote Assistance Process**

Trigger CIRA boot. The default is [Disabled].

## **PET Progress**

User can enable or disable PET Events progress to receive PET events or not. The default is [Enabled].

## **ASF Sensors Table**

Use this to enable or disable ASF Sensor Table. The default is [Disabled].

## **Non-UI Mode Resolution**

Use this to set resolution for non-UI text mode.

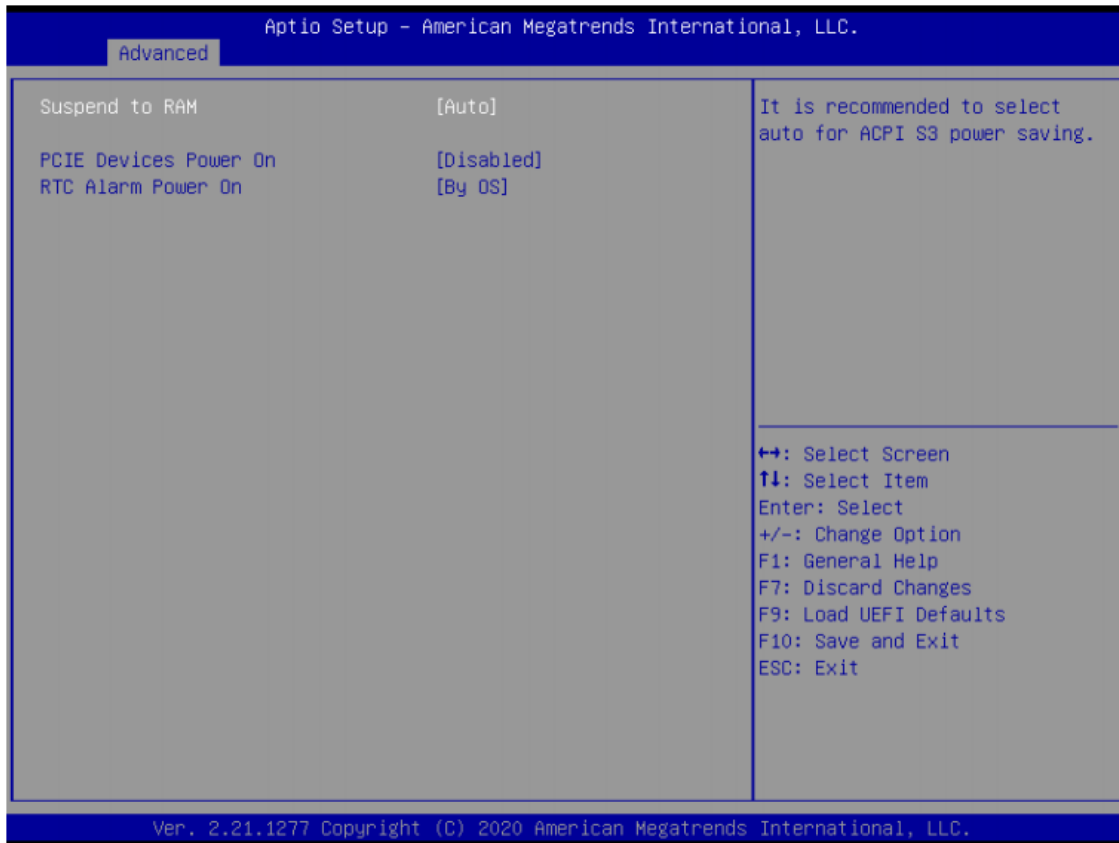
## **UI Mode Resolution**

Use this to set resolution for UI text mode.

## **Graphics Mode Resolution**

Use this to set resolution for graphics mode.

## 4.4.6 ACPI Configuration



### Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it.

### PCIE Devices Power On

Use this item to enable or disable PCIE devices to turn on the system from the power-soft-off mode.

### RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

## 4.4.7 USB Configuration



### Legacy USB Support

Use this option to select legacy support for USB devices. There are two configuration options: [Enabled], and [UEFI Setup Only]. The default value is [Enabled]. Please refer to below descriptions for the details of these four options:

[Enabled] - Enables support for legacy USB.

[UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS.

### USB Power Control

Use this item to control USB power.

## 4.4.8 Trusted Computing

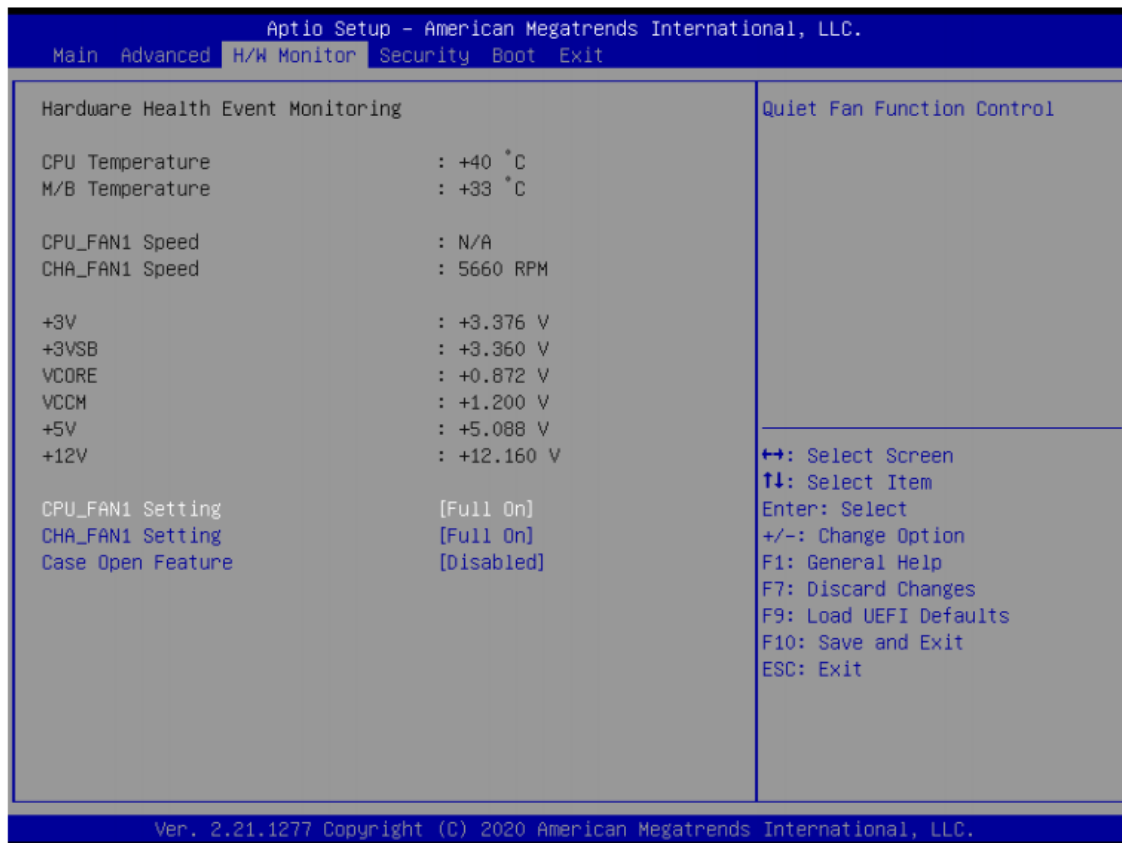


### Security Device Support

Enable or disable BIOS support for security device.

## 4.5 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



### CPU\_FAN1 Setting

This allows you to set CPU fan 1's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

### CHA\_FAN1 Setting

This allows you to set chassis fan 1's speed. Configuration options: [Full On] and [Automatic Mode]. The default value is [Full On].

### Case Open Feature

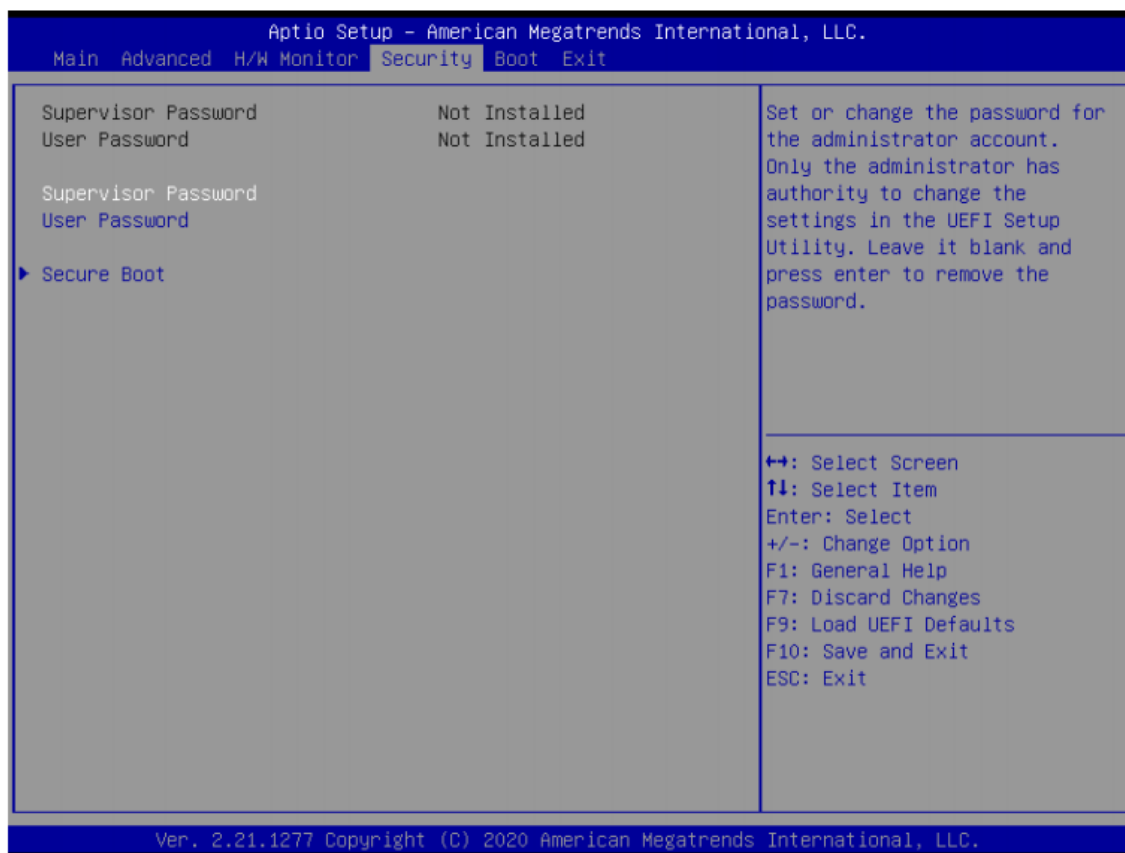
This allows you to enable or disable case open detection feature. The default is value [Disabled].

### Clear Status

This option appears only when the case open has been detected. Use this option to keep or clear the record of previous chassis intrusion status.

## 4.6 Security Screen

In this section, you may set, change or clear the supervisor/user password for the system.



### Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

### User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

### Secure Boot

Use this item to enable or disable support for Secure Boot.

## 4.7 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



### Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

### Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key. 65535(0XFFFF) means indefinite waiting.

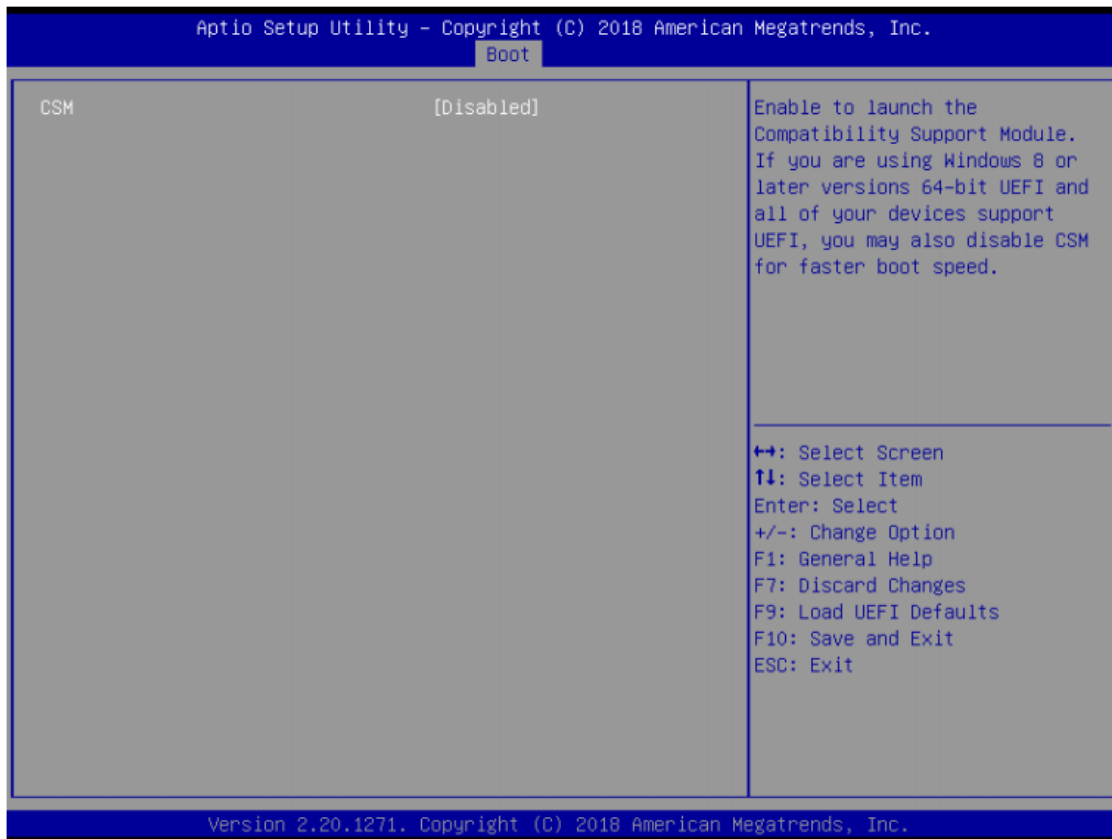
### Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

### Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Disabled].

## CSM (Compatibility Support Module)



### CSM

Use this to enable or disable Compatibility Support Module. The default value is [Disabled].

### Launch PXE OpROM Policy

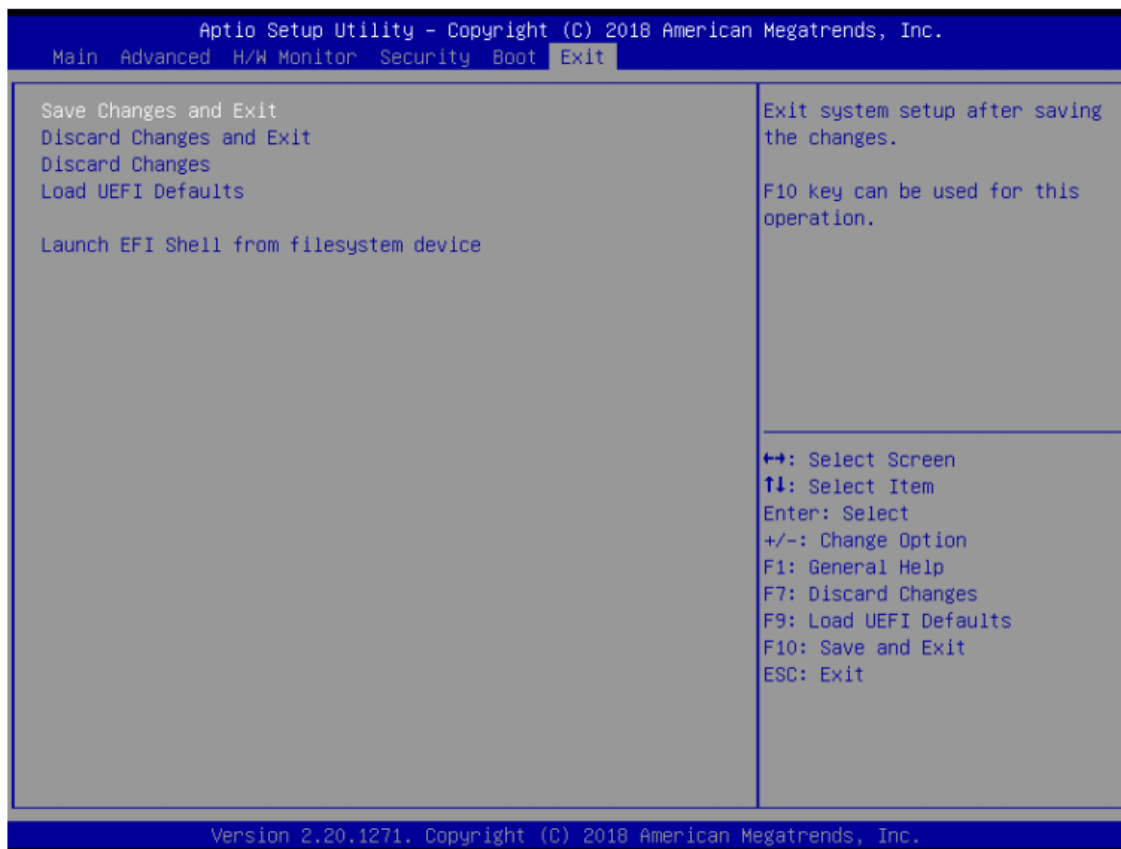
Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.

### Launch Storage OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.



## 4.8 Exit Screen



### Save Changes and Exit

When you select this option, it will pop-out the following message, “Save configuration changes and exit setup?” Select [OK] to save the changes and exit the UEFI SETUP UTILITY.

### Discard Changes and Exit

When you select this option, it will pop-out the following message, “Discard changes and exit setup?” Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

### Discard Changes

When you select this option, it will pop-out the following message, “Discard changes?” Select [OK] to discard all changes.

### Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

### Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.