# SCH-401

IEC-61850-3, IEEE-1613 2U Fanless System

# 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

## Revision History

| Revision | Date (yyyy/mm/dd) | Changes |
|---|---|---|
| V1.0 | 2021/06/09 | First release |

## Packing list

| Item | Description | Q'ty |
|---|---|---|
| 1 | SCH-401 IEC-61850-3,IEEE-1613 Substation 2U Server | 1 |
| 2 | Driver CD | 1 |

## Ordering information

| Model | Description |
|---|---|
| SCH-401 | 2U 19" Power Automation Fanless Server Computer with Intel 10th Core™i3/i5/i7/i9 Processor up to 65W, U-DIMM 128GB, 2TB SSD Easy Swap, 125V DC-IN Redundant Power Supply, TPM/FTDI Support, Operating Temperature -20°C~+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.

# Chapter 1 : Production Introduction

## 1.1 Specifications

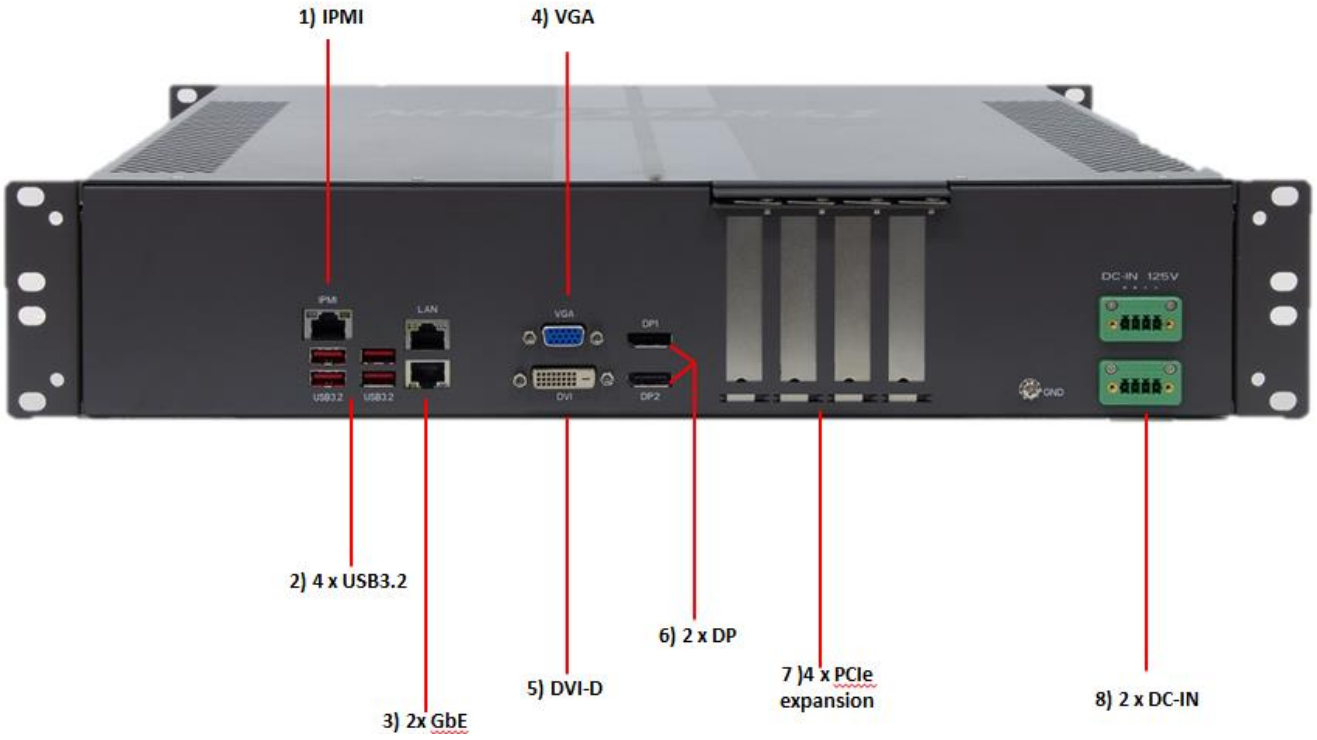
| | |
|---|---|
| **System** | |
| CPU | Intel 10th Gen Core® i3/i5/i7/i9 Processor up to 65W |
| Memory type | 4 x DDR4 UDIMM up to 128GB |
| Expansion Slot | 1 PCI-E 3.0 x16<br>2 PCI-E 3.0 x4 |
| Storage Device | 4 x 2.5" Easy swap HDD/SSD Tray (Support RAID 0,1,5,10) |
| **Rear I/O** | |
| Power Button | 1 x w/Indicator LED |
| USB | 2 x USB 2.0 |
| **Front I/O** | |
| Power Input | 2 x 125V DC-IN |
| LAN | 2 x RJ45 GbE LAN ; 1 x IPMI |
| USB | 4 x USB 3.2 |
| DisplayPort | 2 x DP |
| DVI | 1 x DVI-D |
| VGA | 1 |
| **Power** | |
| Power Input | 125V DC-IN, 2 x 200W DC/DC Redundant Power Supply(INRUSH CURRENT : 45A/110VDC) |
| **Security** | |
| TPM | 1 |
| **Management** | |
| FTDI | 1 |
| **OS support list** | |
| Windows | Windows 10 x64 |
| Linux | Ubuntu, Red Hat |
| **Mechanical and Evvironmental** | |
| Dimension | 430 x 450 x 88 mm ( W x D x H ) |
| Operating Temp. | -20°C to 60°C |

| | |
|---|---|
| Storage Temp. | -40°C to 85°C |
| Relative Humidity | 5% to 95%, non-condensing |
| Standards | CE, FCC Compliance |
| System Design | Fanless |
| Mounting | 2U Rackmount |
| EMC | CE, FCC compliant |
| Green Product | RoHS, WEEE compliance |

## 1.2 Front Panel I/O Placement

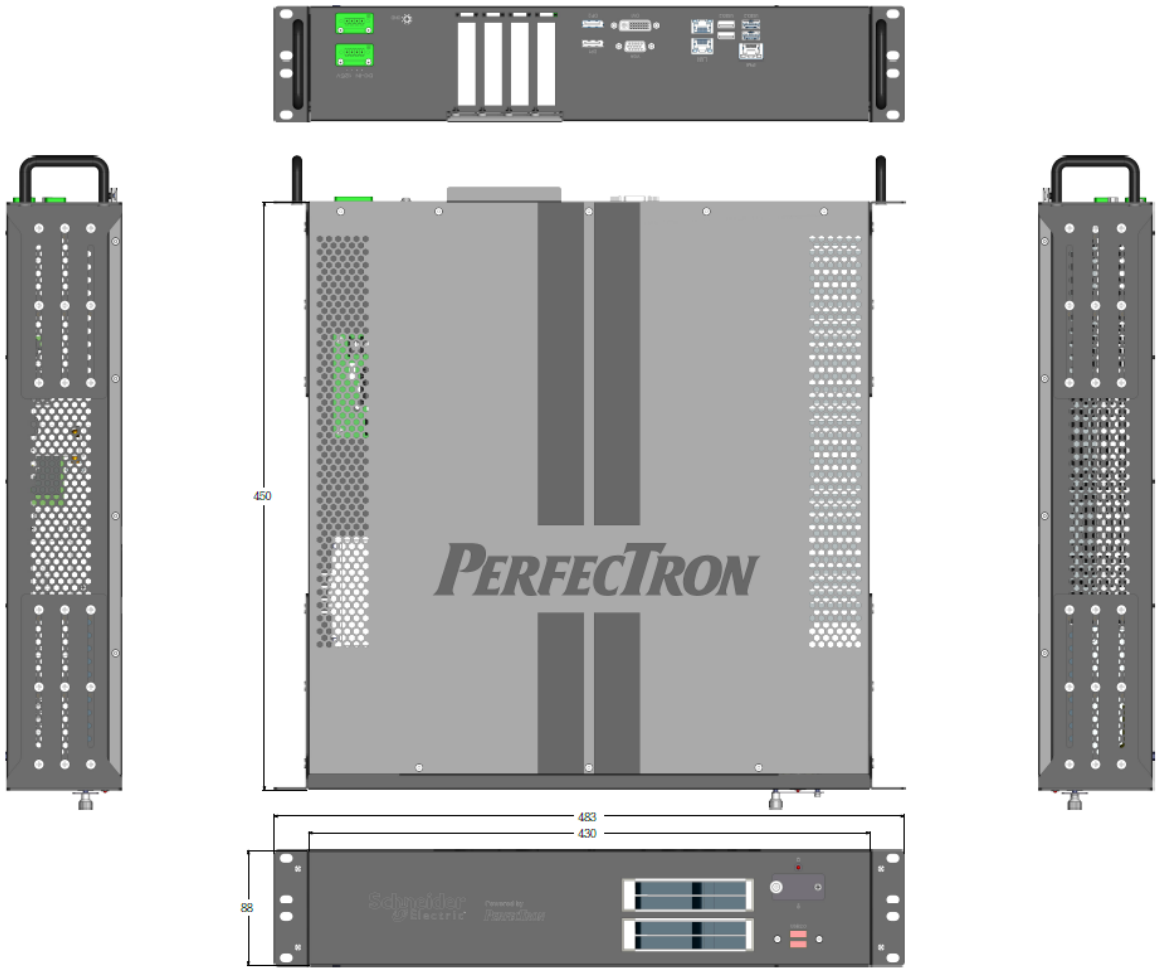

| | |
|---|---|
| 1 | 4 x HDD Tray |
| 2 | 2 x USB2.0 |
| 3 | Power Button |

## 1.3 Rear Panel I/O Placement




| | |
|---|---|
| 1 | IPMI |
| 2 | 4 x USB3.2 |
| 3 | 2 x GbE |
| 4 | VGA |
| 5 | DVI-D |
| 6 | 2 x DP |
| 7 | 4 x PCIe expansion |
| 8 | 2 x DC-IN |

## 1.4 Mechanical Dimensions



# Chapter 2 : Rear I/O Ports

## 2.1 LAN/IPMI port

| LAN Port Pin Definition | | | |
|---|---|---|---|
| Pin# | Definition | Pin# | Definition |
| 1 | TRCT2 | 13 | IETCT |
| 2 | TRD2+ | 14 | IET+ |
| 3 | TRD2- | 15 | IET- |
| 4 | TRD3+ | 16 | |
| 5 | TRD3- | 17 | L1-GRE- |
| 6 | TRCT3 | 18 | L1-GRE+ |
| 7 | TRCT1 | 19 | L2-YEL- |
| 8 | TRD1+ | 20 | COMMON |
| 9 | TRD1- | 21 | L2-GRE- |
| 10 | TRD4+ | 22 | CG1 |
| 11 | TRD4- | 23 | CG2 |
| 12 | TRCT4 | | |

| IPMI LAN Pin Definition | | | |
|---|---|---|---|
| Pin# | Definition | Pin# | Definition |
| 9 | VCC | 19 | YEL- |
| 10 | TX1+ | 20 | YEL+ |
| 11 | TX1- | 21 | ORG+/GRN- |
| 12 | TX2+ | 22 | ORG-/GRN+ |
| 13 | TX2- | 23 | SGND |
| 14 | TX3+ | 24 | SGND |
| 15 | TX3- | 25 | SGND |
| 16 | TX4+ | 26 | SGND |
| 17 | TX4- | | |
| 18 | GND | | |

## 2.2 VGA/DVI-D/DP port

A VGA port and a DVI-D port are located next to Display Ports 1/2 on the I/O back panel. Use these connections for VGA and DVI displays. The VGA connector is on top and the DVI-D is on the bottom.

There are two Display Ports located on the rear I/O back panel. Display Port, developed by the VESA consortium, delivers digital display and fast refresh rate. It can connect to virtually any display using a Display Port adaptor for devices such as VGA, DVI, or HDMI.

## 2.3 USB3.2 port

| Pin# | Definition | Pin# | Definition |
|---|---|---|---|
| A1 | VBUS | B1 | Power |
| A2 | USB_N | B2 | USB_N |
| A3 | USB_P | B3 | USB_P |
| A4 | GND | B4 | GND |
| A5 | SS_RX_N3_CON | B5 | SS_RX_N4_CON |
| A6 | SS_RX_P3_CON | B6 | SS_RX_P4_CON |
| A7 | GND | B7 | GND |
| A8 | SS_TX_N3_CON | B8 | SS_TX_N4_CON |
| A9 | SS_TX_P3_CON | B9 | SS_TX_P4_CON |

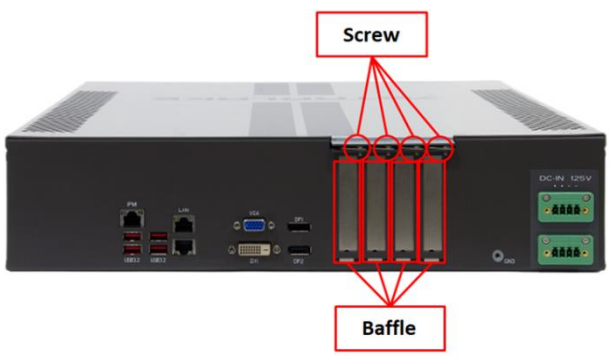
# Chapter 3 : System Setup

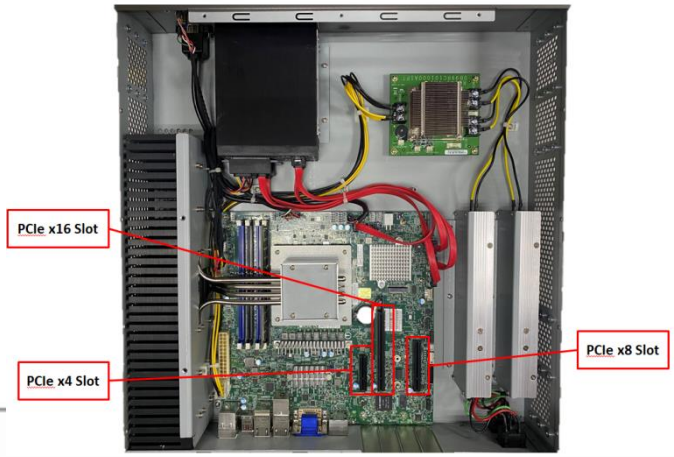
## 3.1 Removing the Top Cover from the Chassis

The sixteen screws on the top and side are used to secure the cover to the chassis. Remove these screws and put them in a safe place for later use.


## 3.2 Installing PCIe Card

First, you need to remove the baffle and screws. There is PCIe x4 / 8/16 slot on the motherboard, insert the corresponding PCIe Card and lock the screw.



## 3.3 Install the screws on the upper cover

Attach the screws at sixten locations to complete the installation.


## 3.4 2.5" Easy Swap SSD installation

SCH-401 support four 2.5" Easy Swap SSD

- Use Tri-angle security key to open keylock and pull out the 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 tray door.

**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.**

# 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

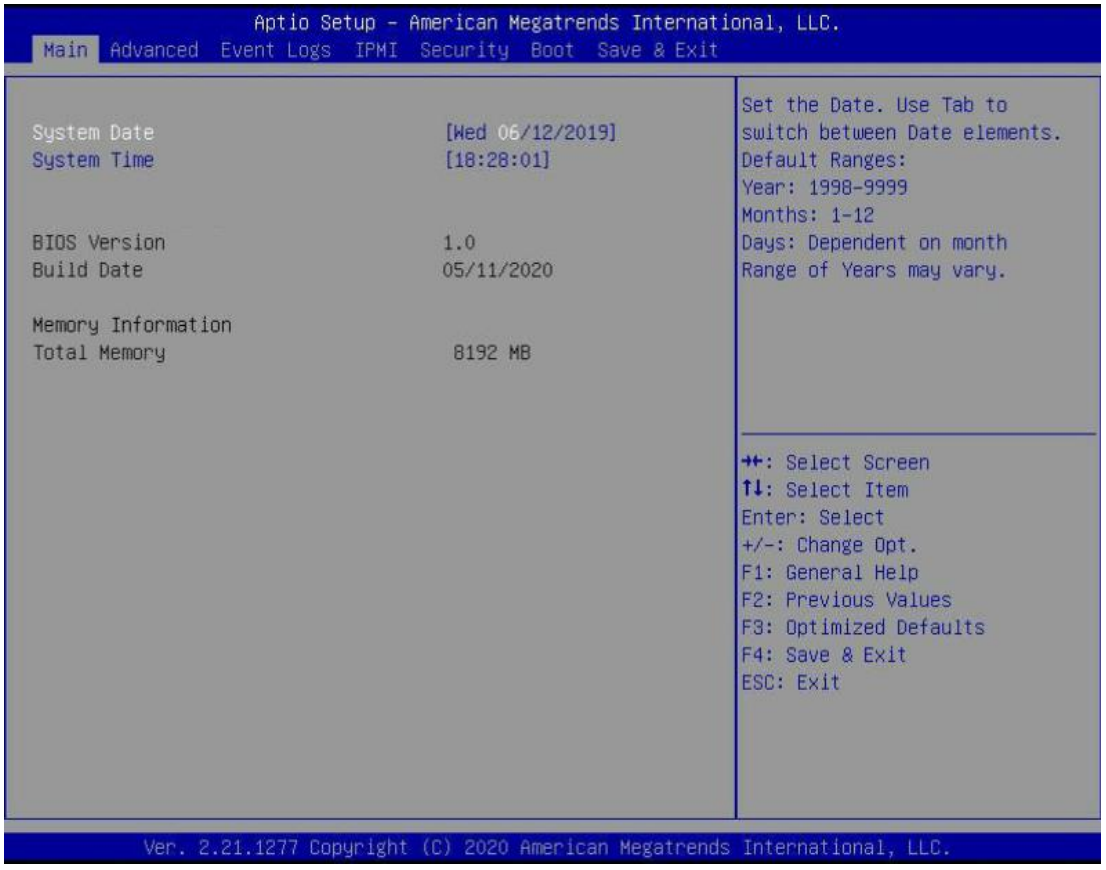
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.
Some of the hot keys are <F1>, <F10>, <Enter>, <ESC>, and <Arrow> keys.

**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 Setup

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:




The Main BIOS setup screen has two main frames. The left frame displays all the options that c an be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System Date**

  Use this function to change the system date.

  Select System Date using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.

  The date setting must be entered in MM/DD/YY format.

- **System Time**

  Use this function to change the system time.

  Select System Time using the Up and Down <Arrow> keys. Enter the new values through the keyboard. Press the Left and Right <Arrow> keys to move between fields.

The time setting is entered in HH:MM:SS format.

**Note:** The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

- **BIOS Version**

This item displays the version of the BIOS ROM used in the system.

- **Build Date**

This item displays the date when the version of the BIOS ROM used in the system was built.

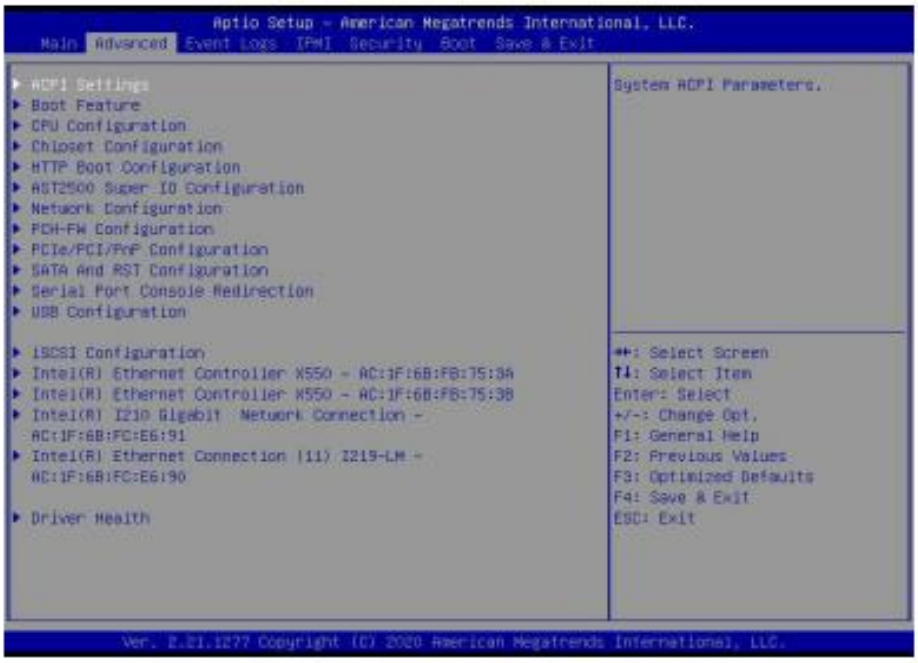
- **Memory Information**

**Total Memory**

This item displays the total size of memory available in the system.

## 4.4 Advanced Setup Configurations

Use the arrow keys to select the Advanced menu and press <Enter> to access the menu items:




**Warning**: Take caution when changing the Advanced settings. An incorrect value, a very high DRAM frequency, or an incorrect DRAM timing setting may make the system unstable. When this occurs, revert to default manufacturer settings.

### ▶ACPI Settings

**ACPI Sleep State**

Use this feature to select the ACPI Sleep State that the system will enter into when the suspend button is activated. The options are Suspend Disabled and **S3 (Suspend to RAM)**.

**WHEA Support**

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are Disabled and **Enabled**.

**High Precision Event Timer**

Select Enabled to activate the High Precision Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are Disabled and **Enabled**.

**Native PCIE Enable**

Enable this feature to grant control of PCI Express Native hot plug, PCI Express Power Management Events, and PCI Express Capability Structure Control. The options are Disabled and **Enabled**.

**Native ASPM**

Select Enabled for the operating system to control the ASPM, or Disabled for the BIOS to control the ASPM. The options are Auto, Enabled, and **Disabled**.

## ▶Boot Feature

**Fast Boot**

Enable this feature to reduce the time the computer takes to boot up. The computer will boot with a minimal set of required devices. This feature does not have an effect on BBS boot options in the Boot tab. The options are **Disabled** and Enabled.

**Quiet Boot**

Use this feature to select the screen display between the POST messages and the OEM logo upon bootup. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are Disabled and **Enabled**.

**Option ROM Messages**

Use this feature to set the display mode for the Option ROM. Select Keep Current to display the current AddOn ROM setting. Select Force BIOS to use the Option ROM display set by the system BIOS. The options are **Force BIOS** and Keep Current.

**Bootup NumLock State**

Use this feature to set the Power-on state for the <Numlock> key. The options are **On** and Off.

**Wait For "F1" If Error**

Use this feature to force the system to wait until the "F1" key is pressed if an error occurs. The options are Disabled and **Enabled**.

**Re-try Boot**

If this feature is enabled, the BIOS will automatically reboot the system from a specified boot device after its initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

**Power Configuration**

**Watch Dog Function**

If enabled, the Watch Dog Timer will allow the system to reset or generate NMI based on jumper settings when it is expired for more than five minutes. The options are **Disabled** and Enabled.

**Restore on AC Power Loss**

Use this feature to set the power state after a power outage. Select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. The options are Stay Off, Power On, and **Last State**.

**Power Button Function**

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for the user to power off the system after pressing and holding the power button for four seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are **Instant Off** and 4 Seconds Override.

## ▶Connectivity Configuration

This submenu becomes configurable when a CNVi device is plugged into the motherboard.

**CNVi present**

This feature displays the status of wireless connections.

**CNVi Configuration**

**CNVi WiFi&BT**

Use this feature to enable CNVi WiFi and Bluetooth support. The options are Disabled and **Enabled**.

## ▶CPU Configuration

The following CPU information will display:

- CPU Signature
- Microcode Patch

- Max CPU Speed
- Min CPU Speed
- CPU Speed
- Processor Cores
- Hyper Threading Technology
- VMX
- SMX/TXT
- 64-bit
- EIST Technology
- CPU C3 state
- CPU C6 state
- CPU C7 state
- CPU C8 state
- CPU C9 state
- CPU C10 state
- L1 Data Cache
- L1 Instruction Cache
- L2 Cache
- L3 Cache
- L4 Cache

**C6DRAM (Available when supported by the CPU)**

This feature enables moving DRAM contents to PRM memory when the CPU is in a C6 state. The options are Disabled and **Enabled**.

**Hardware Prefetcher**

If set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disable and **Enable**.

**Adjacent Cache Prefetch**

The CPU prefetches the cache line for 64 bytes if this feature is set to Disabled. The CPU prefetches both cache lines for 128 bytes as comprised if this feature is set to Enable. The options are **Enable** and Disable.

**Intel (VMX) Virtualization Technology (Available when supported by the CPU)**

Use this feature to enable the Vanderpool Technology. This technology allows the system to run several operating systems simultaneously. The options are Disabled and **Enabled**.

**Active Processor Cores**

This feature determines how many CPU cores will be activated for each CPU. When all is selected, all cores in the CPU will be activated. The options are **All** and 1, 2, 3, 4, and 5.

**Hyper-Threading (Available when supported by the CPU)**

Select Enable to support Intel Hyper-threading Technology to enhance CPU performance. The options are Disable and **Enable**.

**AES (Available when supported by the CPU)**

Select Enabled for Intel CPU Advanced Encryption Standard (AES) instructions support to enhance data integrity. The options are Disabled and **Enabled**.

**Boot Performance Mode**

This feature allows the user to select the performance state that the BIOS will set before the operating system handoff. The options are Power Saving, **Max Non-Turbo Performance**, and Turbo Performance.

**Intel® SpeedStep™C (Available when supported by the CPU)**

Intel SpeedStep Technology allows the system to automatically adjust processor voltage and core frequency to reduce power consumption and heat dissipation. The options are Disabled and **Enabled**.

**Intel® Speed Shift Technology**

Use this feature to enable or disable Intel Speed Shift Technology support. When this feature is enabled, the Collaborative Processor Performance Control (CPPC) version 2 interface will be available to control CPU P-States. The options are Disabled and **Enabled**.

**Turbo Mode (Available when supported by the CPU)**

Select Enable for processor cores to run faster than the frequency specified by the manufacturer. The options are Disable and **Enable**.

**Power Limit 1 Override (Available when supported by the CPU)**

Use this feature to enable or disable Power Limit 1 override. The options are **Disabled** and Enabled.

**Power Limit 1**

Use this feature to set the power limit 1, in milliwatts. When the limit is exceeded, the CPU ratio is lowered after a period of time (see Power Limit 1 Time Window below). A lower limit can save power and protect the CPU, while a higher limit improves performance. This value must be between Min Power Limit TDP limit. Use the number keys on your keyboard to enter the value. The default setting is **0**.

**Power Limit 1 Time Window**

This feature determines how long the time window over which the TDP value is maintained. Use the number keys on your keyboard to enter the value. The default setting is **0**. This value may vary between 0 and 128.

**Power Limit 2 Override (Available when supported by the CPU)**

Use this feature to enable or disable Power Limit 2 override. The options are Disabled and **Enabled**.

**Power Limit 2**

Use this feature to set the power limit 2. Use the number keys on your keyboard to enter the value. The default setting is **0**.

**C-States**

Use this feature to enable the C-State of the CPU. The options are Disabled and **Enabled**.

**Enhanced C-states**

Use this feature to enable the enhanced C-State of the CPU. The options are Disabled and **Enabled**.

**C-State Auto Demotion**

Use this feature to prevent unnecessary excursions into the C-states to improve latency. The options are Disabled, C1, C3, and **C1 and C3**.

**C-State Un-Demotion**

This feature allows the user to enable or disable the un-demotion of C-State. The options are Disabled, C1, C3, and **C1 and C3**

**Package C-State Demotion**

Use this feature to enable or disable the Package C-State demotion. The options are **Disabled** and Enabled.

**Package C-State Un-Demotion**

Use this feature to enable or disable the Package C-State un-demotion. The options are **Disabled** and Enabled.

**CState Pre-Wake**

This feature allows the user to enable or disable the C-State Pre-Wake. The options are Disabled and **Enabled**.

**Package C State Limit**

Use this feature to set the Package C-State limit. The options are C0/C1, C2, C3, C6, C7, C7s, C8, C9, Cpu Default, and **Auto**.

## ▶Chipset Configuration

**Warning:** Setting the wrong values in the following features may cause the system to malfunction.

### ▶System Agent (SA) Configuration

The following information will display:

- SA PCIe Code Version: 7.0.53.66
- VT-d: Supported

### ▶Memory Configuration

**Memory Configuration**

- Memory RC Version
- Memory Frequency
- Memory Timing (tCL-tRCD-tRP-tRAS)
- DIMMA1
- DIMMA2
- DIMMB1
- DIMMB2

**Maximum Memory Frequency**

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1067, 1200, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, 2400, 2600, 2667, 2800, 2933.

**Max TOLUD**

This feature sets the maximum TOLUD value, which specifies the "Top of Low Usable DRAM" memory space to be used by internal graphics devices, GTT Stolen Memory, and TSEG, respectively, if these devices are enabled. The options are **Dynamic**, 1 GB, 1.25 GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB, 3.25 GB, and 3.5 GB.

**Memory Scrambler**

Use this feature to enable or disable memory scrambler support. The options are Disabled and **Enabled**.

**Force ColdReset**

Use this feature to enable or disable a cold boot during a MRC execution. The options are Enabled and **Disabled**.

**Force Single Rank**

Select enabled to use only Rank 0 in each DIMM. The options are **Disabled** and Enabled.

**Memory Remap**

Use this feature to enable or disable memory remap above 4GB. The options are **Enabled** and Disabled.

**MRC Fast Boot**

Use this feature to enable or disable fast path through the memory reference code. The options are Disabled and **Enabled**.

## ▶Graphics Configuration

**Graphics Configuration**

- IGFX VBIOS Version
- IGFX GOP Version

**Graphics Turbo IMON Current**

Use this feature to set the graphics turbo IMON value. The default is **31**.

**Skip Scanning of External Gfx Card**

If set to enabled, the system will not scan for an external graphics card on PEG and PCIE slots. The options are **Disabled** and Enabled.

**Primary Display**

Use this feature to select the primary video display. The options are **Auto,** IGFX, PEG, and PCI.

**Internal Graphics**

Select Auto to keep an internal graphics device installed on an expansion slot supported by the CPU to be automatically enabled. The options are **Auto**, Disable, and Enable.

**GTT Size**

Use this feature to set the memory size to be used by the graphics translation table (GTT). The options are 2MB, 4MB, and **8MB**.

**Aperture Size**

Use this feature to set the Aperture size, which is the size of system memory reserved by the BIOS for graphics device use. The options are 128MB, **256MB,** 512MB, 1024MB, and 2048MB.

**DVMT Pre-Allocated**

Dynamic Video Memory Technology (DVMT) allows dynamic allocation of system memory to be used for video devices to ensure best use of available system memory based on the DVMT 5.0 platform. The options are 0M, **32M**, 64M, 4M, 8M, 12M, 16M, 20M, 24M, 28M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M, and 60M.

**DVMT Total Gfx Mem**

Use this feature to set the total memory size to be used by internal graphics devices based on the DVMT 5.0 platform. The options are 128MB, **256MB,** and MAX.

**PM Support**

Enable this feature to activate Power Management BIOS support. The options are **Enable** and Disable.

**PAVP Enable**

Protected Audio Video Path (PAVP) decodes Intel integrated graphics encrypted video. The options are Disable and **Enable**.

**Cdynmax Clamping Enable**

Enable this feature to activate Cdynmax Clamping. The options are **Enable** and Disable.

**Graphics Clock Frequency**

**Skip CD Clock Init in S3 resume**

Use this feature to enable skipping of the full CD initialization. If set to Disabled, the full CD clock will initialize. The options are Enabled and **Disabled**.

## ▶DMI/OPI Configuration

The following DMI information will display:

DMI: X4 Gen3

**DMI Link ASPM Control**

Use this feature to set the ASPM (Active State Power Management) state on the SA (System Agent) side of the DMI Link. The options are Disable, L0s, L1, and **L0sL1**.

**DMI Extended Sync Control**

Use this feature to enable or disable the DMI extended synchronization. The options are Enable and **Disable**.

## ▶PEG Configuration

**CPU SLOT6 PCI-E 3.0 X16**

**Enable Root Port**

Use this feature to enable or disable the PCI Express Graphics (PEG) device in the port specified by the user. The options are Disable, Enable, and **Auto**.

**Max Link Speed**

Use this feature to select PCIe support for the device installed on SLOT7. The options are **Auto**, Gen 1, Gen 2, and Gen 3.

## ▶GT - Power Management Control

**RC6 (Render Standby)**

Use this feature to enable render standby support. The options are Disabled and **Enabled**.

**Maximum GT frequency**

Use this feature to define the Maximum GT frequency. Choose between 33MHz (RPN) and 1200Mhz (RP0). Any value beyond this range will be clipped to its min/max sup-

**Disable Turbo GT frequency**

Use this feature to disable Turbo GT frequency. If set to Enabled, Turbo GT frequency becomes disabled. If set to Disabled, GT frequency limiters will be removed. The options are Enabled and **Disabled**.

**VT-d**

Select Enabled to activate Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The options are Disabled and **Enabled**.

**SW Guard Extensions (SGX)**

Select Enabled to activate the Software Guard Extensions (SGX). The options are Disabled, Enabled, and **Software Controlled**.

**GNA Device (B0:D8:F0)**

Use this feature to enable SA GNA device. The options are **Enabled** and Disabled.

***If the feature SGX is set to Enabled, the following features below will be available for configuration:***

**Select Owner EPOCH Input Type**

There are three Owner EPOCH modes (each EPOCH is 64 bit). The options are **No Change in Owner EPOCHs**, Change to New Random Owner EPOCH, and Manual User Defined Owner EPOCHs.

***If the feature Select Owner EPOCH Input Type is set to Manual User Defined Owner EPOCHs, the following features below will be available for configuration:***

**Software Guard Extensions Epoch 0**

Enter a numeric value for this feature. The default is **0**.

**Software Guard Extensions Epoch 1**

Enter a numeric value for this feature. The default is **0**.

**PRMRR Size**

The BIOS must reserve a contiguous region of Processor Reserved Memory (PRM) in the Processor Reserved Memory Range Register (PRMRR). The options are 32MB, 64MB, and **128MB**.

## ▶PCH-IO Configuration

**PCH-IO Configuration**

- PCH SKU Name
- Stepping

### ▶PCI Express Configuration

**DMI Link ASPM Control**

Use this feature to set the ASPM (Active State Power Management) state on the SA (System Agent) side of the DMI Link. The options are Disabled, L0s, L1, L0sL1, and **Auto**.

**Peer Memory Write Enable**

Use this feature to enable or disable peer memory write. The options are **Disabled** and Enabled.

▶PCH SLOT4 PCI-E 3.0 X4 (IN X8)
▶PCI-E M.2-E1
▶PCH SLOT7 PCI-E 3.0 X4
▶PCI-E M.2-M1

**ASPM**

Use this feature to activate the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are Disabled, L0s, L1, L0sL1, and **Auto**.

**L1 Substates**

Use this feature to set the PCI Express L1 Substates. The options are Disabled, L1.1, and **L1.1 & L1.2.**

**PCIe Speed**

Use this feature to select the PCI Express port speed. The options are **Auto,** Gen1, Gen2, and Gen3.

**PCIe PLL SSC**

## ▶HDD Security Configuration

**HDD Security Configuration**

The following HDD information will display:

**P0**

**Security Supported**

**Security Enabled**

**Security Locked**

**Security Frozen**

**HDD User Pwd Status**

**HDD Master Pwd Status**

**Set User Password**

Press Enter to create a new, or change an existing HDD password.

## ▶HTTP Boot Configuration

**HTTP BOOT Configuration**

**HTTP Boot One Time**

Use this feature to create the HTTP boot option. The options are **Disabled** and Enabled.

**Input The Description**

Highlight the feature and press enter to create a description.

**Boot URI**

Highlight the feature and press enter to create a boot URI.

## ▶AST2500 Super IO Configuration

The following Super IO information will display:

- Super IO Chip AST2500

## ▶Serial Port 1 Configuration

**Device Settings**

This feature displays the status of a serial port specified by the user.

**Change Settings**

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by the user. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options are **Auto**, (IO=3F8h; IRQ=4;), (IO=2F8h; IRQ=4;), (IO=3E8h; IRQ=4;), and (IO=2E8h; IRQ=4;).

## ▶Serial Port 2 Configuration

**Serial Port 2**

Select Enabled to enable the selected onboard serial port. The options are Disabled and **Enabled**.

**Device Settings**

This feature displays the status of a serial port specified by the user.

**Change Settings**

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by the user. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options are **Auto**, (IO=3F8h; IRQ=3;), (IO=2F8h; IRQ=3;), (IO=3E8h; IRQ=3;), and (IO=2E8h; IRQ=3;).

**Serial Port 2 Attribute (Available for Serial Port 2 only)**

Select SOL to use COM Port 2 as a Serial Over LAN (SOL) port for console redirection. The options are **SOL** and COM.

## ▶Network Configuration

## ▶MAC:XXXXXXXXXXXX-IPv4 Network Configuration

**Configured**

This feature indicates whether a network address is configured successfully or not. The default is **Unchecked**.

***If the feature above is set to Checked, the following features below will be available for configuration:***

***If the feature above is set to Unchecked, the following features below will be available for configuration:***

**Local IP Address**

Enter an IP address in dotted decimal notation.

**Local Netmask**

Enter a NetMask address in dotted decimal notation.

**Local Gateway**

Enter a Gateway in dotted decimal notation.

**Local DNS Servers**

Enter a DNS server in dotted decimal notation.

**Save Changes and Exit**

Select this feature to save changes you have made and return to the upper configuration page.

### ▶MAC:XXXXXXXXXXXX-HTTP Boot Configuration

This submenu is available for configuration when IPv4 HTTP Support and IPv6 HTTP Support are set to Enabled.

**Input the description**

This feature is an input field that, when the HTTP boot option is created, can be used to enter text to describe or identify the HTTP connection.

**Internet Protocol**

Select the version of Internet Protocol. The options are subject to change depending on the features you enabled in IPv4 HTTP Support and IPv6 HTTP Support.

**Boot URI**

This feature is an input field used to enter a web or network address to point to the HTTP boot files. This supports the HTTP or HTTPS protocols only.

### ▶MAC:XXXXXXXXXXXX-IPv6 Network Configuration

The following information is displayed:

**Host Addresses**

**Route Table**

**Gateway addresses**

**DNS addresses**

**Interface ID**

Enter an ID for the device.

**DAD Transmit Count**

Enter a value for DAD (Duplicate Address Detection) Transmit Count. A value of zero indicates the DAD is not performed. The default is **1**.

**Policy**

Use this feature to set the Policy. The options are **Automatic** and Manual.

***If the feature above is set to Manual, the following features below will be available for configuration:***

**Advanced Configuration**

**New IPv6 Addresses**

Enter a new IPv6 Gateway address.

**New DNS Addresses**

Enter a new DNS address.

**Commit Changes and Exit**

Select this feature to save the changes you have made and return to the upper configuration page.

**Saves Changes and Exit**

Select this feature to save the changes you have made and return to the upper configuration page.

### ▶Enter Configuration Menu

**Interface Name**

**Interface Type**

**Route Table**

**Gateway addresses**

**DNS addresses**

**Interface ID**

This feature shows the interface ID for the specified network device.

**DAD Transmit Count**

This feature sends Neighbor Solicitation messages while performing a Duplicate Address Detection (DAD) to make sure there is no IP address duplication. A value of zero means a DAD has not been performed.

**Policy**

Use this feature to select an automatic or manual policy. The options are **Automatic** and Manual.

**Save Changes And Exit**

When you have completed the changes for this section, select this option to save all changes made and exit.

## ▶PCH-FW Configuration

**ME Firmware Version: 14.**

**ME Firmware Mode: Normal Mode**

**ME Firmware SKU: Corporate SKU**

**ME FW Image Re-Flash**

Use this feature to update the Management Engine firmware. The options are **Disabled** and Enabled.

## ▶AMT Configuration

**USB Provisioning of AMT**

Use this feature to enable or disable USB provisioning. The options are **Disabled** and

## ▶CIRCA Configuration

**Activate Remote Assistance Process**

Use this feature to activate Remote Assistance. Enabling this feature will also trigger the CIRCA boot. The options are **Disabled** and Enabled.

***If the feature above is set to Enabled, the feature below will be available for configuration:***

**CIRCA Timeout**

Use this feature to set the timeout value for MPS connection. Use 0 for the default timeout value of 60 seconds.

## ▶ASF Configuration

**PET Progress**

Use this feature to enable or disable PET Events Progress to receive PET Events alerts. The options are Disabled and **Enabled**.

**WatchDog**

Select Enabled to allow AMT to reset or power down the system if the operating system or BIOS hangs or crashes. The options are **Disabled** and Enabled.

**OS Timer / BIOS Timer**

These options appear if Watch Dog (above) is enabled. This is a timed delay in seconds, before a system power down or reset after a BIOS or operating system failure is detected. Enter the value in seconds.

**ASF Sensors Table**

Enable this feature for the ASF Sensor Table to be added into the ASF! ACPI table. The options are **Disabled** and Enabled.

## ▶Secure Erase Configuration

**Secure Erase mode**

Select Real to securely erase a solid state drive. The options are **Simulated** and Real.

## ▶OEM Flags Settings

**MEBx hotkey Pressed**

Use this feature to specify whether the MEBx hotkey should be enabled during the system boot. The options are **Disabled** and Enabled.

**MEBx Selection Screen**

Use this feature to select the type of MEBx selection screen. Press 1 to enter the ME Configuration screen and 2 to initiate a remote connection. Network access must be activated for a remote connection. The options are **Disabled** and Enabled.

**Hide Unconfigure ME Confirmation Prompt**

Use this feature to hide the unconfigure ME confirmation prompt. The options are **Disabled** and Enabled.

**MEBx OEM Debug Menu Enable**

Use this feature to enable or disable the OEM debug menu in MEBx. The options are **Disabled** and Enabled.

**Unconfigure ME**

Use this feature to reset the MEBx password to default. The options are **Disabled** and Enabled.

## ▶MEBx Resolution Settings

**Non-UI Mode Resolution**

Use this feature to specify the resolution for the non-UI text mode. The options are **Auto**, 80x25, and 100x31.

**UI Mode Resolution**

Use this feature to specify the resolution for the UI text mode. The options are **Auto**, 80x25, and 100x31.

**Graphics Mode Resolution**

Use this feature to specify the resolution for the graphics mode. The options are **Auto**

## ▶PCIe/PCI/PnP Configuration

**Option ROM execution**

**Video**

Use this feature to select the execution of the video OpROM. The options are Do not launch and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**PCI PERR/SERR Support**

Use this feature to enable or disable the runtime event for PCI errors. The options are **Disabled** and Enabled.

**Above 4GB MMIO BIOS Assignment**

Select Enable for remapping of BIOS above 4GB. The options are Enabled and **Disabled**.

**SR-IOV Support**

Use this feature to enable or disable Single Root IO Virtualization Support. The options are **Disabled** and Enabled.

**BME DMA Mitigation**

Enable this feature to help block DMA attacks. The options are Enabled and **Disabled**.

**Onboard Video Option ROM**

Use this feature to select which firmware function to be loaded for LAN1 used for system boot. The options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**NVMe Firmware Source**

The feature determines which type of NVMe firmware should be used in your system. The options are **Vendor Defined Firmware** and AMI Native Support.

**Consistent Device Name Support**

This feature controls the device naming for network devices and slots. The options are **Disabled** and Enabled.

**CPU SLOT6 PCI-E 3.0 X16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. he options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**PCH SLOT7 PCI-E 3.0 X4 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. he options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**PCI-E M.2-M1 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. he options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**PCI-E M.2-E1 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. he options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**Onboard LAN1 Option ROM**

Use this feature to select which firmware function to be loaded for LAN1 used for system boot. The options are Disabled, Legacy and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

***These options are subject to change depending on the feature of Boot Mode Select.***

**Onboard LAN2 Option ROM**

Use this feature to select a desired firmware function to be loaded for onboard LAN1. The options are Disabled, Legacy, and **EFI**. The Legacy option is hidden when the Boot mode is EFI. The EFI option is hidden when the Boot mode is Legacy.

**Network Stack**

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible

**IPv6 HTTP Support**

Select Enabled to enable IPv6 HTTP boot support. The options are **Disabled** and Enabled.

**PXE Boot Wait Time**

Use this option to specify the wait time to press the ESC key to abort the PXE boot. Press "+" or "-" on your keyboard to change the value. The default setting is **0**.

**Media Detect Count**

Use this option to specify the number of times media will be checked. Press "+" or "-" on your keyboard to change the value. The default setting is **1**.

## ▶SATA And RST Configuration

**SATA Controller(s)**

This feature enables or disables the onboard SATA controller supported by the Intel PCH chip. The options are **Enabled** and Disabled.

**SATA Mode Selection**

Use this feature to select the SATA mode. The options are **AHCI** and Intel RST Premium With Intel Optane System Acceleration.

***If the feature above is set to Intel RST Premium With Intel Optane System Acceleration, the next four features will be available for configuration:***

**SATA Interrupt Selection**

Use this feature to select the SATA interrupt. The options are Msix, **Msi**, and Legacy.

**PCI-E M.2-M1**

The feature shown here is dependent on the M.2 device plugged into the motherboard. This feature appears if an M.2 device is plugged in and RAID is selected in the SATA Mode Selection feature. Use this feature to enable or disable RST PCIe storage remapping. The options are RST Controlled and **Not RST Controlled**.

**Aggressive LPM Support**

When this feature is set to Enable, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link in a low power mode during extended periods of I/O inactivity, and will return the link to an active state when I/O activity resumes. The options are Disabled and **Enabled**.

**Serial ATA Port 0-3**

This feature displays the information detected on the installed SATA drive on the particular SATA port.

- Software Preserve Support

**SATA Port 0-3 Hot Plug**

Set this feature to Enable for hot plug support, which will allow the user to replace a SATA drive without shutting down the system. The options are Disabled and **Enabled**.

**SATA Port 0-3 Spin Up Device**

Set this feature to enable or disable the PCH to initialize the device. The options are **Disabled** and Enabled.

**SATA Port 0-3 SATA Device Type**

Use this feature to specify if the SATA port specified by the user should be connected to a Solid State Drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

## ▶Serial Port Console Redirection

**COM1 Console Redirection**

Select Enabled to enable console redirection support for a serial port specified by the user. The options are Enabled and **Disabled**.

***If the feature above is set to Enabled, the following features will be available for***

**COM1 Bits Per Second**

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

**COM1 Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 Bits and **8 Bits**.

**COM1 Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

**COM1 Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

**COM1 Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**COM1 VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals.

**COM1 Legacy OS Redirection Resolution**

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

**COM1 Redirection After BIOS POST**

Use this feature to enable or disable legacy console redirection after BIOS POST. When set to Bootloader, legacy console redirection is disabled before booting the OS. When set to Always Enable, legacy console redirection remains enabled when booting the OS. The options are **Always Enable** and Bootloader.

**SOL/COM2 Console Redirection**

Select Enabled to use the SOL port for Console Redirection. The options are Disabled and **Enabled.**

***If the feature above is set to Enabled, the following features will become available for configuration:***

## ▶SOL/COM2 Console Redirection Settings

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

**SOL/COM2 Terminal Type**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

**SOL/COM2 Bits per second**

**SOL/COM2 Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

**SOL/COM2 Stop Bits**

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

**SOL/COM2 Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

**SOL/COM2 VT-UTF8 Combo Key Support**

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are Disabled and **Enabled.**

**SOL/COM2 Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**SOL/COM2 Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and

## ▶AMT SOL Console Redirection Settings

**AMT SOL Terminal Type**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

**AMT SOL Bits per second**

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

**AMT SOL Data Bits**

Use this feature to set the data transmission size for Console Redirection. The options are 7 Bits and **8 Bits**.

**AMT SOL Parity**

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

**AMT SOL Recorder Mode**

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

**AMT SOL Resolution 100x31**

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

**AMT SOL Putty KeyPad**

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

**AMT SOL Legacy OS Redirection Resolution**

Use this feature to select the number of rows and columns used in Console Redirection for legacy OS support. The options are 80x24 and **80x25**.

**AMT SOL Redirection After BIOS POST**

Use this feature to enable or disable legacy Console Redirection after BIOS POST. When set to Bootloader, legacy Console Redirection is disabled before booting the OS. When set to Always Enable, legacy Console Redirection remains enabled when booting the OS. The options are **Always Enable** and Bootloader.

## ▶Legacy Console Redirection Settings



**Redirection COM Port**

Use this feature to select a COM port to display redirection of Legacy OS and Legacy

**Out-of-Band Mgmt Port**

The feature selects a serial port in a client server to be used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1,** SOL/COM2, and AMT SOL.

**Terminal Type**

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are VT100, VT100+, **VT-UTF8**, and ANSI.

**Bits Per Second**

This feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

**Flow Control**

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

**Data Bits, Parity, Stop Bits**



## ▶Trusted Computing

- SHA256 PCR Bank

***If the feature above is set to Enable, "SHA-1 PCR Bank" and "SHA256 PCR Bank" will become available for configuration:***

**SHA-1 PCR Bank**

Use this feature to disable or enable the SHA-1 Platform Configuration Register (PCR) bank for the installed TPM device. The options are Disabled and **Enabled**.

**SHA256 PCR Bank**

Use this feature to disable or enable the SHA256 Platform Configuration Register (PCR) bank for the installed TPM device. The options are Disabled and **Enabled**.

**Pending Operation**

Use this feature to schedule a TPM-related operation to be performed by a security device for system data integrity. Your system will reboot to carry out a pending TPM operation. The options are **None** and TPM Clear.

**Platform Hierarchy**

Use this feature to disable or enable platform hierarchy for platform protection. The options are Disabled and **Enabled**.

**Storage Hierarchy**

Use this feature to disable or enable storage hierarchy for cryptographic protection. The options are Disabled and **Enabled**.

**Endorsement Hierarchy**

**Intel Trusted Execution Support**

Intel Trusted Execution Technology (TXT) helps protect against software-based attacks and ensures protection, confidentiality, and integrity of data stored or created on the system. Use this feature to enable or disable TXT Support. The options are **Disabled** and Enabled.

**Current Status Information**

The following information will be displayed:

**TPM Enabled Status**

**TPM Active Status**

**TPM Owner Status**

## ▶USB Configuration

**USB Configuration**

**USB Module Version: 21**

**USB Controllers: 2 XHCIs**

**USB Devices:**

**Legacy USB Support**

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there are no legacy USB devices present. Select Disable to have all USB devices available for EFI applications only. The options are **Enabled**, Disabled, and Auto.

**Commit Changes and Exit**

Select this item to save the changes and exit.

## ▶Host iSCSI Configuration

**iSCSI Initiator Name**

This feature allows the user to enter the unique name of the iSCSI Initiator in IQN format. Once the name of the iSCSI Initiator is entered into the system, configure the proper settings for the following items.

**▶Add an Attempt**

**▶Delete Attempts**

**▶Change Attempt Order**

## ▶Intel(R) Ethernet Controller X550 - AC:1F:6B:FB:75:3A
## ▶Intel(R) Ethernet Controller X550 - AC:1F:6B:FB:75:3B
## ▶Intel(R) I210 Gigabit Network Connection - AC:1F:6B:FC:E6:91
## ▶NIC Configuration



**Link Speed**

Use this feature to specify the port speed used for the selected boot protocol. The options

**MAC Address**

**Virtual MAC Address**

## ▶Intel(R) Ethernet Connection (11) I219-LM - AC:1F:6B:FC:E6:90

**PORT CONFIGURATION INFORMATION**

**UEFI Driver**

**Adapter PBA**

**PCI Device ID**

**PCI Address**

**MAC Address**

## ▶Intel(R) Rapid Storage Technology

This submenu will only appear if the following requirements are met when entering the BIOS: Set the Boot Mode Select to **DUAL** or **UEFI**. Set the SATA Mode Selection to **Intel RST Premium With Intel Optane System Acceleration**. Set the Storage Option ROM/UEFI Driver to **EFI**.

Information for installed storage drives will be viewable in this submenu when the settings

▶Intel(R) 10GbE Driver 6.9.04 x64

Controller 97d46a18 Child 0

Intel(R) Ethernet Controller X550

## 4.5 Event Logs

Use this menu to configure Event Log settings.


▶Change SMBIOS Event Log Settings

**SMBIOS Event Log Standard Settings**

**Log System Boot Event**

This option toggles the System Boot Event logging to enabled or disabled. The options are **Disabled** and Enabled.

**MECI**

The Multiple Event Count Increment (MECI) counter counts the number of occurrences that a duplicate event must happen before the MECI counter is incremented. This is a numeric value. The default value is **1**.

**METW**

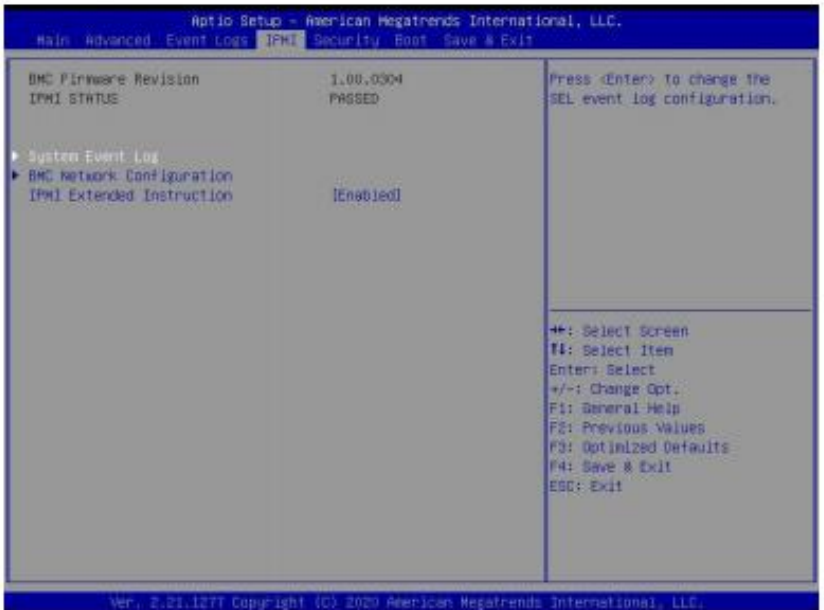
The Multiple Event Time Window (METW) defines the number of minutes that must pass between duplicate log events before MECI is incremented. This is in minutes, from 0 to 99. The default value is **60**.

**Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

## ▶View SMBIOS Event Log

## 4.6 IPMI

Use this menu to configure Intelligent Platform Management Interface (IPMI) settings.



**When SEL is Full**

This feature allows the user to decide what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

**Note**: After making changes on a setting, be sure to reboot the system for the changes to take effect.

## ▶BMC Network Configuration

**BMC Network Configuration**

**Update IPMI LAN Configuration**

Select Yes for the BIOS to implement all IP/MAC address changes at the next system boot. The options are **No** and Yes.

***If the feature above is set to Yes, Configuration Address Source, VLAN, and IPv6 Support available for configuration:***

**Configure IPv4 Support**

**Gateway IP Address**

This feature displays the Gateway IP address for this computer. The address can be manually entered. This should be in decimal and in dotted quad form (i.e., 172.31.0.1).

**VLAN**

This feature displays the virtual LAN settings. The options are Disabled and Enabled.

**VLAN ID**

This feature is enabled if VLAN is enabled.

**Configure IPv6 Support**

**IPv6 Address Status**

**IPv6 Support**

Use this feature to enable IPv6 support. The options are **Enabled** and Disabled.

**Configuration Address Source**

## 4.7 Security

Use this menu to configure the following security settings for the system.

**Hard Drive Security Frozen**

Use this feature to enable or disable the BIOS security frozen command for SATA and NVMe devices. The options are Enabled and **Disabled**.

**Password Check**

Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password at bootup or upon entering the BIOS Setup utility. The options are **Setup** and Always.

**Lockdown Mode**

This feature is grayed out when the DCMS Key is not installed.

## ▶Secure Boot

This section displays the contents of the following secure boot features:

- System Mode

### ▶Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

### ▶Reset to Setup Mode

This feature deletes all Secure Boot key databases from NVRAM.

### ▶Export Secure Boot variables

This feature allows the user to copy NVRAM content of Secure boot variables to files in a root folder on a file system device.



### ▶Enroll EFI Image

### ▶Key Exchange Key

**Details**

Review details on current settings of the Key Exchange Keys.

**Export**

This feature allows the user to export Key Exchange Keys to an available file system.

**Update**

Select Yes to load the KEK from the manufacturer's defaults. Select No to load the Key Exchange Keys from a file.

**Append**

## ▶Forbidden Signatures

**Details**

Review details on current settings of the Forbidden Signatures.

**Export**

This feature allows the user to export Forbidden Signatures to an available file system.

**Update**

Select Yes to load the DBX from the manufacturer's defaults. Select No to load the DBX from a file.

**Append**

### ▶OsRecovery Signature

**Details**

Review details on current settings of the OsRecovery Signatures.

**Export**

This feature allows the user to export OsRecovery Signatures to an available file system.

**Update**

Select Yes to load the DBR from the manufacturer's defaults. Select No to load the DBR from a file.

**Set Admin Password**

Press <Enter> to create a new admin password.

**Set User Password**

Press <Enter> to create a new user password.

***The next feature is available when the Admin Password has been activated.***

**Device Reset**

Reset the device using a 32 byte PSID (Physical Security Identification) value of the device.

## 4.8 Boot

Use this menu to configure Boot settings.

- Boot Option #9
- Boot Option #10
- Boot Option #11
- Boot Option #12
- Boot Option #13
- Boot Option #14

▶UEFI NETWORK Drive BBS Priorities
▶Hard Disk Drive BBS Priorities
▶CD/DVD Drive BBS Priorities
▶USB Hard Disk Drive BBS Priorities
▶USB CD/DVD Drive BBS Priorities
▶USB Key Drive BBS Priorities
▶USB Floppy Drive BBS Priorities
▶USB LAN Drive BBS Priorities
▶NETWORK Drive BBS Priorities

These submenus are subject to change depending on the feature of Boot Mode Select and

## 4.9 Save & Exit

Use this menu to save settings and exit from the BIOS.

**Default Options**

**Load Optimized Defaults**

To set this feature, select Restore Defaults from the Save & Exit menu and press <Enter>. These are factory settings designed for maximum system stability, but not for maximum performance.

**Save As User Defaults**