



X12DPG-U6

USER'S MANUAL

Revision 1.0a

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# Preface

## About This Manual

This manual is written for system integrators, IT technicians and knowledgeable end users. It provides information for the installation and use of the X12DPG-U6 motherboard.

## About This Motherboard

The Supermicro X12DPG-U6 supports dual 3rd Generation Intel® Xeon® Scalable Processors (in Socket P+/FCLGA4189-4 socket) with up to 40 CPU cores and a thermal design power (TDP) of up to 270W. Built with the Intel C621A chipset, the X12DPG-U6 supports up to 8TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 ECC memory with speeds of 3200/2933/2666MHz in 32 DIMMs and up to 8TB of Intel Optane™ PMem 200 series with speeds of up to 3200MHz. (See the notes below). This motherboard features superior IO expandability, which includes four PCIe 4.0 x16 connections, eight PCIe 4.0 x8 NVMe SlimSAS ports (with sixteen connections), ten SATA 3.0 ports, two PCIe 4.0 x4/SATA3 M.2 slots, and four USB ports (See the notes below). It also offers the most advanced data protection capabilities that encompasses silicon Root of Trust (RoT) and support of Trust Platform Module (TPM). The X12DPG-U6 is optimized for high-performance, high-end computing platforms and is ideal for big data, enterprise applications. Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at <http://www.supermicro.com/products/>.



**Notes:** 1. The Intel Optane Persistent Memory (PMem) 200 series are supported by the 3rd Gen. Intel Xeon Scalable (83xx/63xx/53xx/4314) processors. 2. Memory speed and capacity support depends on the processors used in the system. 3. Some I/O ports mentioned above are designed for the system configuration only. Please refer to the Supermicro system user's manual for more details.

## Conventions Used in the Manual

Special attention should be given to the following symbols for proper installation and to prevent damage done to the components or injury to yourself:



**Important:** Important information given to ensure proper system installation or to relay safety precautions.



**Warning!** Indicates important information given to prevent equipment/property damage or personal injury.



**Warning!** Indicates high voltage may be encountered while performing a procedure.



**Note:** Additional Information given to differentiate various models or to provide information for proper system setup.

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# Chapter 1

## Introduction

Congratulations on purchasing your computer motherboard from an industry leader. Supermicro motherboards are designed to provide you with the highest standards in quality and performance.

This motherboard was designed to be used in a Supermicro-proprietary chassis only as a part of an integrated, complete system solution. It is not intended to be sold as an independent, stand-alone product; therefore, no shipping package will be included in the shipment.

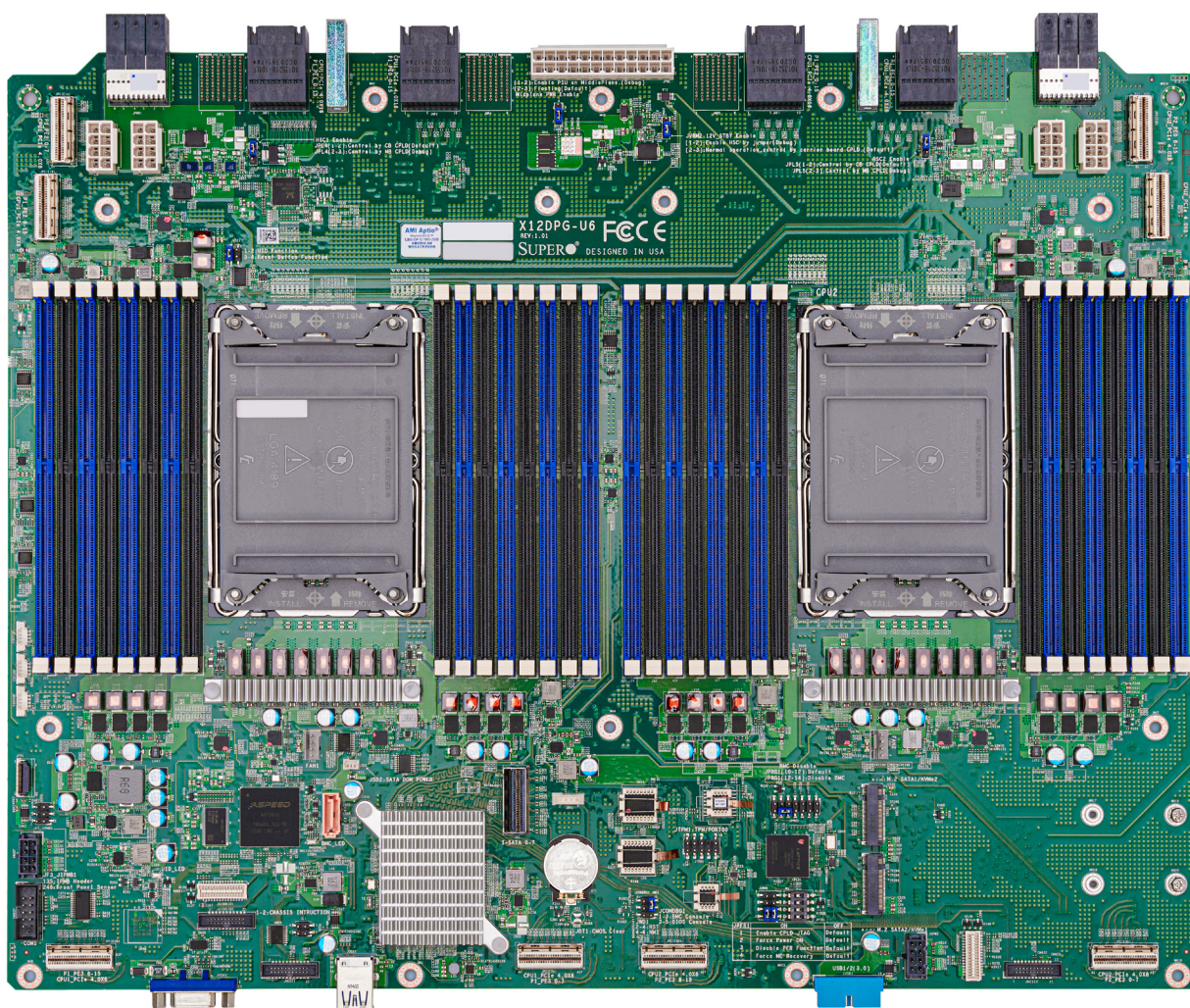
### 1.1 Important Links

For your motherboard to work properly, please follow the links below to download all necessary drivers/utilities and the user's manual for your server.

- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <https://www.supermicro.com/wdl/driver/>
- Product safety info: [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://www.supermicro.com/about/policies/safety_information.cfm)
- A secure data deletion tool designed to fully erase all data from storage devices can be found at our website: [https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9\\_Secure\\_Data\\_Deletion\\_Utility/](https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/)
- If you have any questions, please contact our support team at: [support@supermicro.com](mailto:support@supermicro.com)

This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

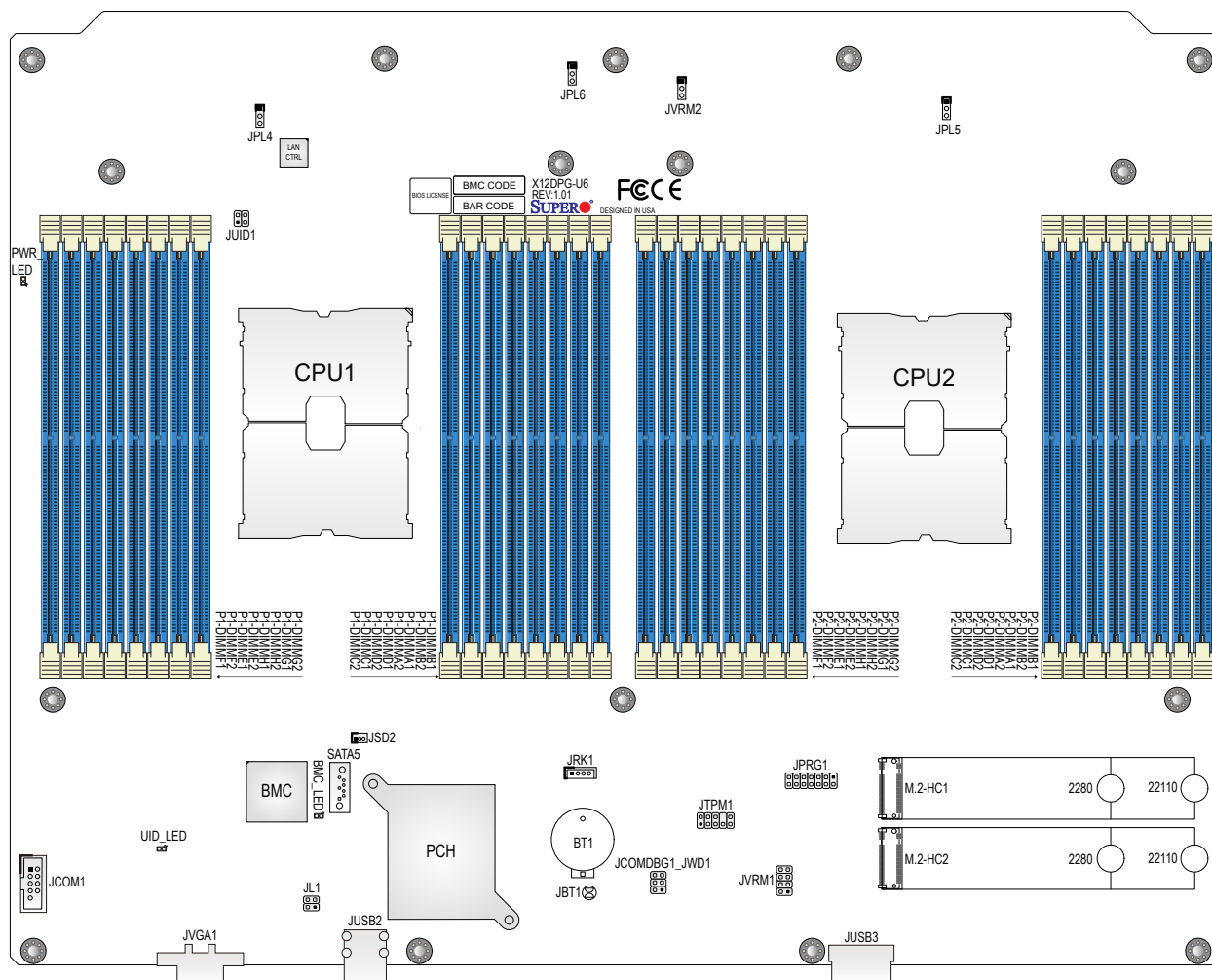
## X12DPG-U6 Motherboard Image



 **Note:** All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

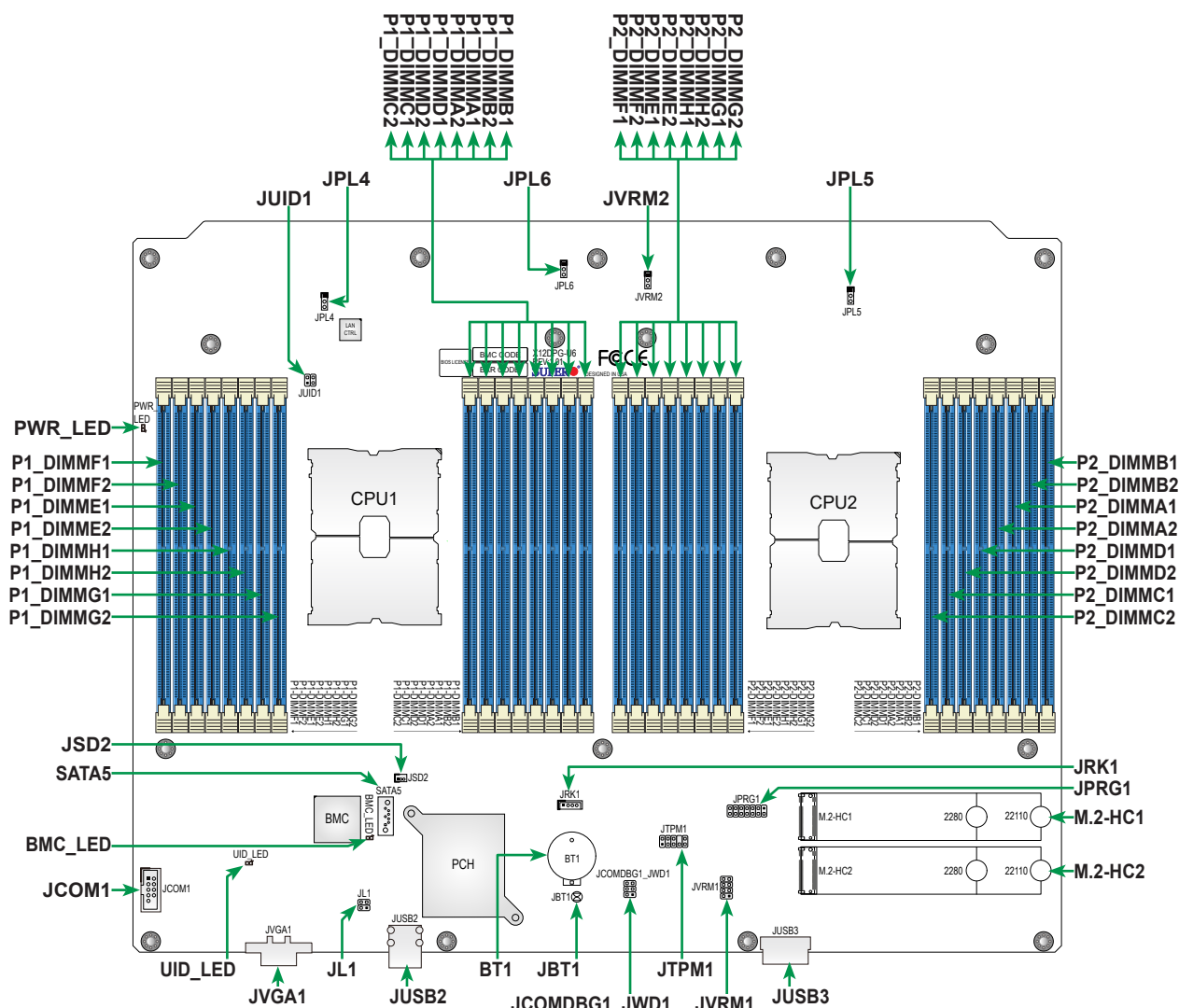
## X12DPG-U6 Motherboard Layout

(not drawn to scale)



**Note:** Components not documented are for internal testing only.

## Quick Reference



### Notes:

- See [Chapter 2](#) for detailed information on jumpers and I/O ports.
- " ■ " indicates the location of Pin 1.
- Jumpers/LED indicators not indicated are used for testing only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid possible explosion.
- Some I/O ports not shown on the illustration above are designed for the system configuration only. Please refer to the Supermicro system user's manual for more details.

## Quick Reference Table

| Jumper        | Description                  | Default Setting                                                                                                                                                                                  |
|---------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JBT1          | Clear CMOS                   | Short pads to clear CMOS                                                                                                                                                                         |
| JCOMDBG1_JWD1 | BMC console                  | Pins 1-3 BMC console<br>Pins 3-5 BIOS console                                                                                                                                                    |
| JCOMDBG1_JWD1 | Watchdog                     | Pins 2-4 RST<br>Pins 4-6 NMI                                                                                                                                                                     |
| JPL4          | Hot-swap jumper 1            | Pins 1-2 Controlled by carrier board CPLD* (default)<br>Pins 2-3 Controlled by motherboard CPLD* (debug)                                                                                         |
| JPL5          | Hot-swap jumper 2            | Pins 1-2 Controlled by carrier board CPLD* (default)<br>Pins 2-3 Controlled by motherboard CPLD* (debug)                                                                                         |
| JPL6          | System power enable          | Pins 1-2 Without carrier board connection (debug)<br>Pins 2-3 With carrier board connection (default)                                                                                            |
| JPRG1         | BMC disable                  | Pins 10-12 Enabled BMC (default)<br>Pins 12-14 Disabled BMC                                                                                                                                      |
| JUID1         | Unit Identifier (UID) switch | Pins 1-2 UID function<br>Pins 3-4 Reset function                                                                                                                                                 |
| JVRM1         | SMBus clock/Data to VRM      | Pins 1-3 BMC I <sup>2</sup> C/SDA to VRM (default)<br>Pins 3-5 PCH I <sup>2</sup> C/SDA to VRM<br>Pins 2-4 BMC I <sup>2</sup> C/SCL to VRM (default)<br>Pins 4-6 PCH I <sup>2</sup> C/SCL to VRM |
| JVRM2         | 12V_STBY enable              | Pins 1-2 Enabled 12V standby power (debug)<br>Pins 2-3 Normal operation, controlled by carrier board CPLD* (default)                                                                             |



**Note:** CPLD stands for Complex Programmable Logic Device.

| LED     | Description               | Status                      |
|---------|---------------------------|-----------------------------|
| BMC_LED | BMC heartbeat LED         | Blinking green: BMC normal  |
| PWR_LED | Onboard power LED         | Green on: Power on          |
| UID_LED | Unit identifier (UID) LED | Solid blue: Unit identified |

| Connector        | Description                                                                          |
|------------------|--------------------------------------------------------------------------------------|
| BT1              | Onboard battery                                                                      |
| JCOM1            | Front accessible COM header                                                          |
| JL1              | Chassis intrusion header                                                             |
| JRK1 (VROC)      | Intel VROC RAID Key header for NVMe SSD                                              |
| JSD2             | SATA DOM power connector                                                             |
| JTPM1            | Trusted Platform Module (TPM)/Port 80 header                                         |
| JUSB2            | USB 3.2 Gen 1 Type A ports (refer to <a href="#">page 44</a> for more details)       |
| JUSB3            | USB 3.2 Gen 1 header (connects to the USB Type A ports on the chassis using a cable) |
| JVGA1            | VGA Port                                                                             |
| M.2-HC1, M.2-HC2 | PCIe 4.0 x4/SATA 3.0 hybrid M.2 slots (support M-Key 2280 and 22110)                 |
| SATA5            | Intel PCH powered S-SATA 3.0 port with supports for SuperDOM (Disk on Module) device |

## Motherboard Features

| Motherboard Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CPU</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Supports dual 3rd Gen. Intel Xeon Scalable Processors (in Socket P+/FCLGA4189-4 socket) with up to 40 cores and a thermal design power (TDP) of up to 270W</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                     |
| <b>Memory</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Supports up to 8 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 (288-pin) ECC memory with speeds of 3200/2933/2666 MHz in 32 memory slots and up to 8 TB of Intel Optane PMem 200 Series with speeds of up to 3200 MHz</li> </ul> <p> <b>Note 1:</b> The Intel Optane Persistent Memory (PMem) 200 series are supported by the 3rd Gen. Intel Xeon Scalable (83xx/63xx/53xx/4314) processors.</p> <p><b>Note 2:</b> Memory speed and capacity support depends on the processors used in the system.</p>                   |                                                                                                                                                                                                                     |
| <b>DIMM Size</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Up to 256GB at 1.2V</li> </ul> <p> <b>Note:</b> For the latest CPU/memory updates, please refer to our website at <a href="http://www.supermicro.com/products/motherboard">http://www.supermicro.com/products/motherboard</a>.</p>                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                     |
| <b>Chipset</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Intel PCH C621A</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                     |
| <b>Expansion Slots</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Two Examax 4x10 PCIe 4.0x16 connectors supported by CPU1 (for midplane to carrier board connection)</li> <li>Two Examax 4x10 PCIe 4.0x16 connectors supported by CPU2 (for midplane to carrier board connection)</li> <li>Four Slimline SAS PCIe 4.0 x8 connectors supported by CPU1 (for PCIe or AIOM expansion slot)</li> <li>Four Slimline SAS PCIe 4.0 x8 connectors supported by CPU2 (for PCIe or AIOM expansion slot)</li> <li>Two sideband connectors for OCP AIOM cards (for system configuration)</li> <li>Two PCIe 4.0 x4/SATA 3.0 hybrid M.2 Slots (support M-Key 2280 and 22110)</li> </ul> |                                                                                                                                                                                                                     |
| <b>Network</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>OCP 3.0 NIC slots with NCSI interface via AIOM slots</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                     |
| <b>Baseboard Management Controller (BMC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>ASPEED AST2600 BMC</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                     |
| <b>Graphics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Graphics controller &amp; VGA support via ASPEED AST2600 BMC</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                     |
| <b>I/O Devices</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                     |
| <ul style="list-style-type: none"> <li>Serial (COM) Port</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>One front accessible serial port header (JCOM1)</li> </ul>                                                                                                                   |
| <ul style="list-style-type: none"> <li>SATA 3.0</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Eight I-SATA ports via a SlimlineSAS connector (for system configuration)</li> <li>One S-SATA 3.0 port with power-pins built-in with supports of SuperDOM (SATA5)</li> </ul> |
| <ul style="list-style-type: none"> <li>Video (VGA) Connection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>One VGA port on the rear I/O panel (JVGA1)</li> </ul>                                                                                                                        |

 **Note:** Some I/O ports described in the table above are designed for the system configuration only. Please refer to the Supermicro system user's manual for more details.

|                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Peripheral Devices</b>                                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>Two USB 3.2 Gen 1 Type A ports (JUSB2, for debug)</li> <li>One USB 3.2 Gen 1 header with two USB connections (JUSB3)</li> </ul>                                                                                                                                                                                         |
| <b>BIOS</b>                                                                                                                                                                                                                                                                                                                                                    |
| <ul style="list-style-type: none"> <li>AMI BIOS</li> <li>ACPI 3.0 or later, PCI firmware 4.0 support, BIOS rescue hot-key, SPI dual/quad speed support, Real Time Clock (RTC) wakeup, and SMBIOS 3.0 or later</li> </ul>                                                                                                                                       |
| <b>Power Management</b>                                                                                                                                                                                                                                                                                                                                        |
| <ul style="list-style-type: none"> <li>ACPI power management</li> <li>Power button override mechanism</li> <li>Power-on mode for AC power recovery</li> <li>Wake-on-LAN</li> <li>Power supply monitoring</li> </ul>                                                                                                                                            |
| <b>System Health Monitoring</b>                                                                                                                                                                                                                                                                                                                                |
| <ul style="list-style-type: none"> <li>Onboard voltage monitoring for +/-12V, +5V/+5V standby, +3.3V, and +3.3V standby</li> <li>Onboard temperature monitoring for CPU, VRM, LAN, PCH, system, and memory</li> <li>7+1 CPU switch phase voltage regulator</li> <li>CPU thermal trip support</li> <li>Platform Environment Control Interface (PECI)</li> </ul> |
| <b>Fan Control</b>                                                                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>Fan status monitoring via BMC connection</li> <li>Single cooling zone</li> <li>Low-noise fan speed control</li> </ul>                                                                                                                                                                                                   |
| <b>System Management</b>                                                                                                                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"> <li>SuperDoctor® 5</li> <li>Chassis intrusion header and detection</li> <li>Server platform service</li> </ul>                                                                                                                                                                                                              |
| <b>Firmware Integrity/System Security</b>                                                                                                                                                                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>Trusted Platform Module (TPM) support</li> <li>Silicon Root of Trust (RoT) support to protect firmware security by detecting critical data corruption, and restoring platform integrity</li> </ul>                                                                                                                      |
| <b>LED Indicators</b>                                                                                                                                                                                                                                                                                                                                          |
| <ul style="list-style-type: none"> <li>BMC LED</li> <li>Power LED</li> <li>UID LED</li> </ul>                                                                                                                                                                                                                                                                  |
| <b>Dimensions</b>                                                                                                                                                                                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li>13.98" (W) x 11.81" (L) (355.09 mm x 299.97 mm)</li> </ul>                                                                                                                                                                                                                                                              |



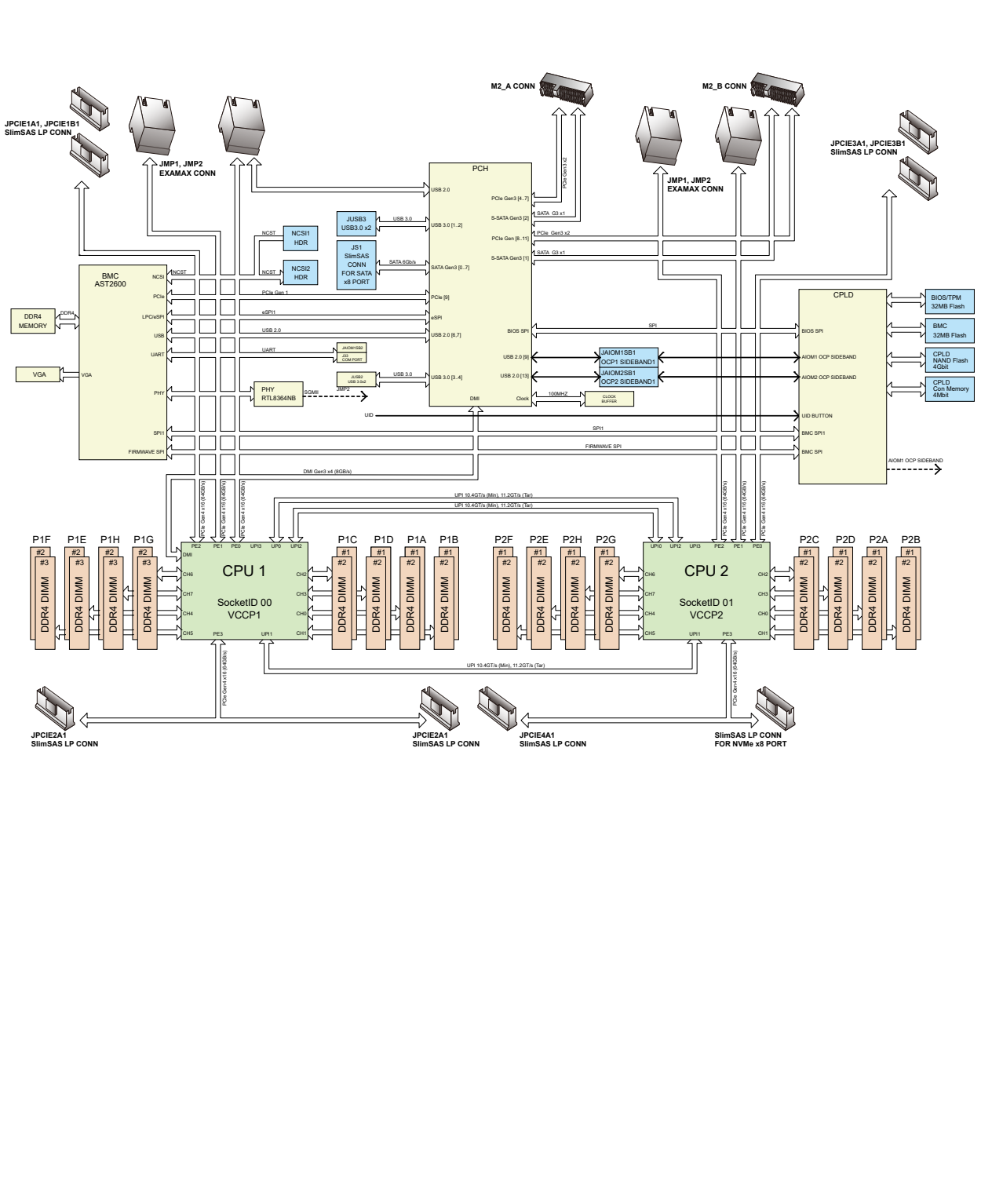
**Note:** Some I/O ports described in the table above are designed for the system configuration only. Please refer to the Supermicro system user's manual for more details.

 **Note 1:** The CPU maximum thermal design power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications.

**Note 2:** For BMC configuration instructions, please refer to the Embedded BMC Configuration User's Guide available at <http://www.supermicro.com/support/manuals/>.

**Note 3:** For proper BMC configuration, please refer to [https://www.supermicro.com/products/nfo/files/IPMI/Best\\_Practices\\_BMC\\_Security.pdf](https://www.supermicro.com/products/nfo/files/IPMI/Best_Practices_BMC_Security.pdf).

**Note 4:** If you purchase a Supermicro Out of Band (OOB) software license key (Supermicro P/N: SFT-OOB-LIC), please DO NOT change the IPMI MAC address.



 **Note:** This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard.

## 1.2 Processor and Chipset Support

Built upon the functionality and capability of the 3rd Gen. Intel Xeon Scalable Processors (Socket P+/FCLGA4189-4 socket) and the Intel PCH C621A chipset, the X12DPG-U6 motherboard increases energy efficiency, and system performance for a multitude of applications such as high performance computing, artificial intelligence (AI), deep learning (DL), big data, and enterprise applications.

### Features Supported by the Intel Xeon

- Performance improvements with higher core counts, up to 3 UPIs/socket at 11.2 GT/s
- Vector Neural Network Instructions (VNNI) support to accelerate training
- New hardware-enhanced security features help protect platform & data without compromising performance
- High PCIe performance (PCIe 4.0) with double the bandwidth of PCIe 3.0

## 1.3 Special Features

### Recovery from AC Power Loss

The Basic I/O System (BIOS) provides a setting that determines how the system will respond when AC power is lost and then restored to the system. You can choose for the system to remain powered off (in which case you must press the power switch to turn it back on), or for it to automatically return to the power-on state. See the Advanced BIOS Setup section for this setting. The default setting is **Last State**.

## 1.4 System Health Monitoring

### Onboard Voltage Monitors

An onboard voltage monitor will scan the voltages of the onboard chipset, memory, and CPU continuously. Once a voltage becomes unstable, a warning is given, or an error message is sent to the screen.

### Fan Status Monitor with Firmware Control

The system health monitor embedded in the BMC chip can check the RPM status of the cooling fans. The CPU and chassis fans are controlled via BMC.

## Environmental Temperature Control

System Health sensors monitor temperatures and voltage settings of onboard processors and the system in real time via the BMC interface. Whenever the temperature of the CPU or the system exceeds a pre-defined threshold, system and CPU cooling fans will be turned on to prevent the CPU or the system from overheating.



**Note:** To avoid possible system overheating, please be sure to provide adequate air-flow to your system.

## System Resource Alert

This feature is available when used with SuperDoctor 5 in the Windows OS or in the Linux environment. SuperDoctor is used to notify you of certain system events. For example, you can configure SuperDoctor to provide you with warnings when the system temperature, CPU temperatures, voltages and fan speeds go beyond a predefined range.

## 1.5 ACPI Features

ACPI stands for Advanced Configuration and Power Interface. The ACPI specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a computer system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as network cards, hard disk drives and printers.

In addition to enabling operating system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with appropriate Windows operating systems. For detailed information regarding OS support, please refer to the Supermicro website.

## 1.6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates. In areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

## 1.7 Serial Port

The X12DPG-U6 motherboard supports one serial communication connection. COM header (JCOM1) can be used for input/output. The UART provides legacy speeds with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support high-speed serial communication devices.

## 1.8 Intel Optane Persistent Memory (PMem) 200 Series Overview

The 3rd Gen. Intel Xeon Scalable Processors support Intel Optane PMem 200 Series memory. Intel Optane PMem offers higher capacities than the traditional DDR4 modules. It also provides increased storage capabilities due to data persistence in a DDR4 form factor for higher performance computing platforms with flexible configuration options.

 **Note:** The Intel Optane Persistent Memory (PMem) 200 series are supported by the 3rd Gen. Intel Xeon Scalable (83xx/63xx/53xx/4314) processors.

# Chapter 2

## Installation

### 2.1 Static-Sensitive Devices

Electrostatic Discharge (ESD) can damage electronic components. To avoid damaging your motherboard, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

#### Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the motherboard from the antistatic bag.
- Handle the motherboard by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the motherboard and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure that your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.
- Use only the correct type of onboard CMOS battery. Do not install the onboard battery upside down to avoid possible explosion.

#### Unpacking

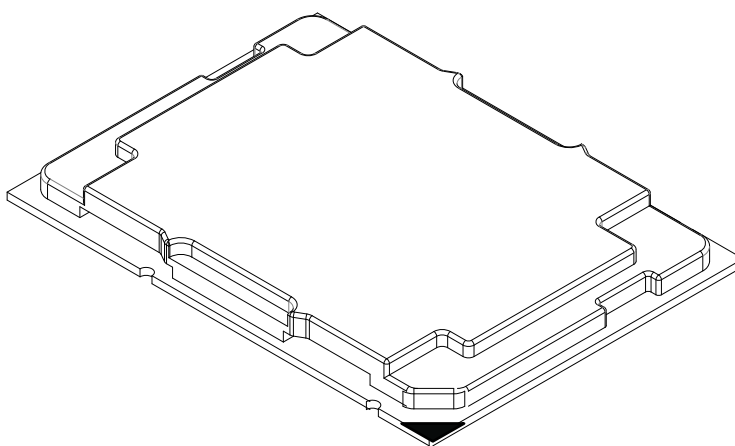
The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the motherboard, make sure that the person handling it is static protected.

## 2.2 Processor and Heatsink Installation

The processor (CPU) and processor carrier should be assembled together first to form the processor carrier assembly. This will be attached to the heatsink to form the processor heatsink module (PHM) before being installed into the CPU socket. Before installation, be sure to perform the following steps below:

- Please carefully follow the instructions given on the previous page to avoid ESD-related damages.
- Unplug the AC power cords from all power supplies after shutting down the system.
- Check that the plastic protective cover is on the CPU socket and none of the socket pins are bent. If they are, contact your retailer.
- When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or CPU socket, which may require manufacturer repairs.
- Thermal grease is pre-applied on a new heatsink. No additional thermal grease is needed.
- Refer to the Supermicro website for updates on processor and memory support.
- All graphics in this manual are for illustrations only. Your components may look different.

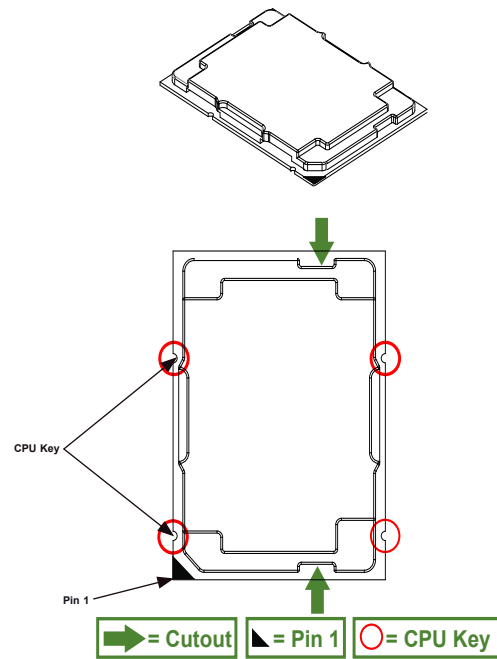
### The 3rd Gen Intel Xeon Scalable Processor



Processor Top View

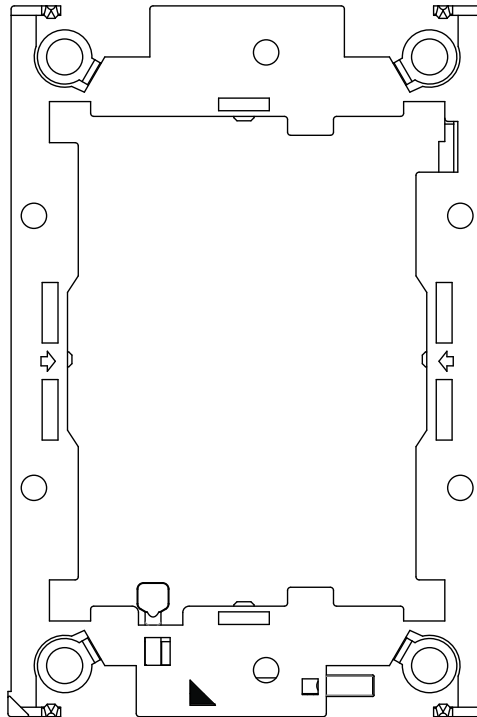
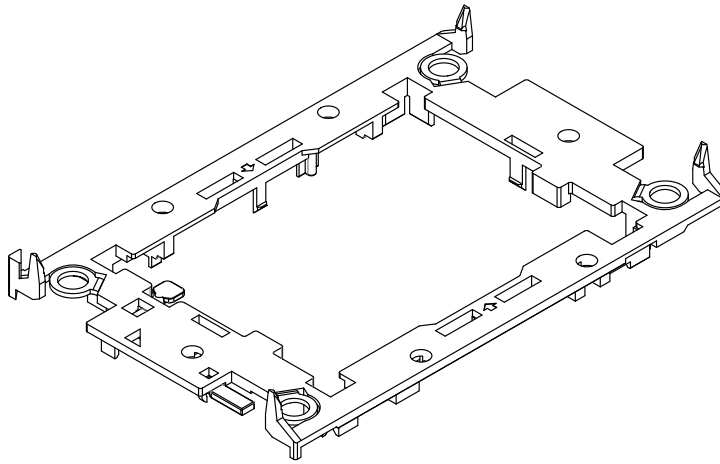
## 1. The 3rd Gen Intel Xeon Scalable Processor

Processor Top View (3D)



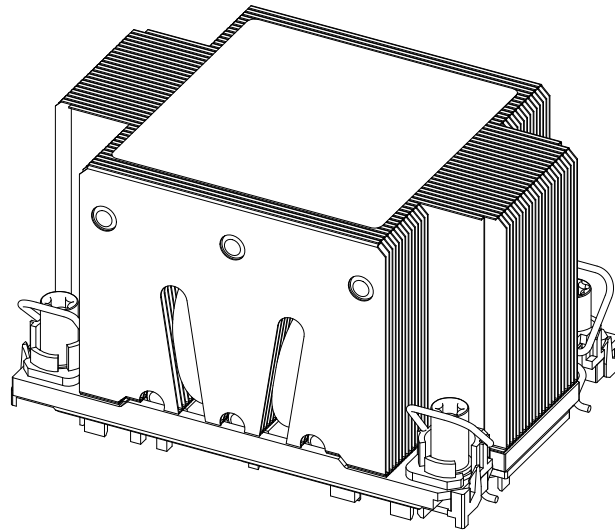
Processor Top View

## 2. The Processor Carrier



Carrier Bottom View

### 3. Heatsink

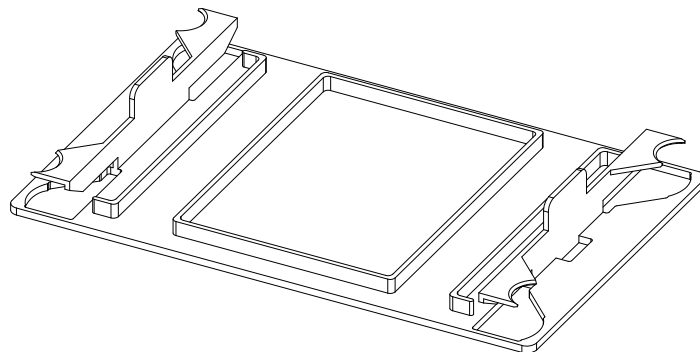


 **Note:** Exercise extreme care when handling the heatsink. Pay attention to the edges of heatsink fins which can be sharp! To avoid damaging the heatsink, please do not apply excessive force on the fins when handling the heatsink.

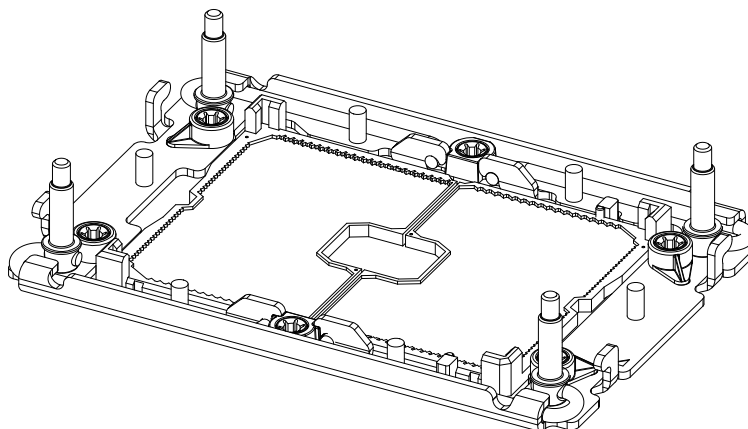
## Overview of the CPU Socket

The CPU socket is protected by a plastic protective cover.

Plastic Protective Cover



CPU Socket

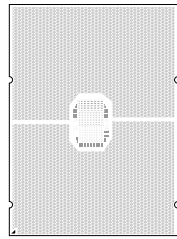


## Overview of the Processor Carrier Assembly

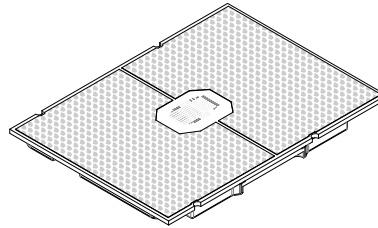
The processor carrier assembly contains a 3rd Gen Intel Xeon Scalable processor and a processor carrier. Carefully follow the instructions given in the installation section to place a processor into the carrier to create a processor carrier.

### 1. The 3rd Gen Intel Xeon Scalable Processor

Intel Processor (Bottom View)



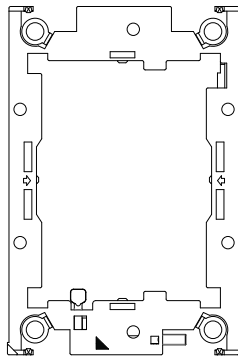
Processor (2D)



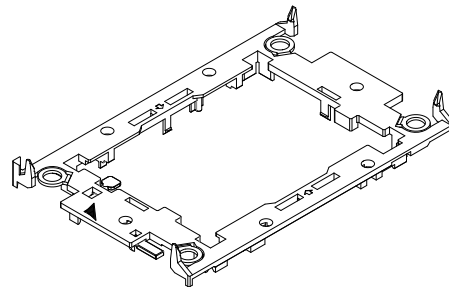
Processor (3D)

### 2. Processor Carrier

Intel Processor Carrier (Top View)



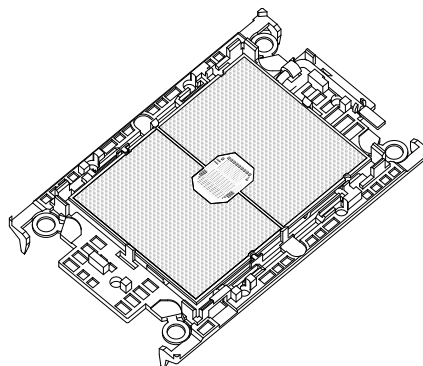
Processor Carrier (2D)



Processor Carrier (3D)



### 3. Processor Carrier Assembly

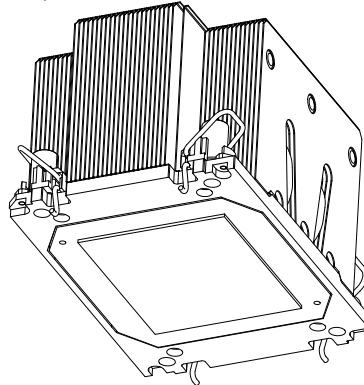


(with Processor Seated inside the Carrier)

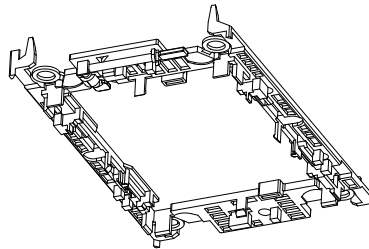
## Overview of the Processor Heatsink Module

The Processor Heatsink Module (PHM) contains a heatsink, a processor carrier, and a 3rd Gen Intel Xeon Scalable processor.

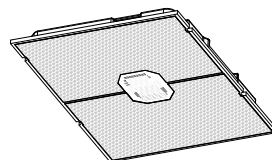
### 1. Heatsink (with Thermal Grease)



### 2. Processor Carrier



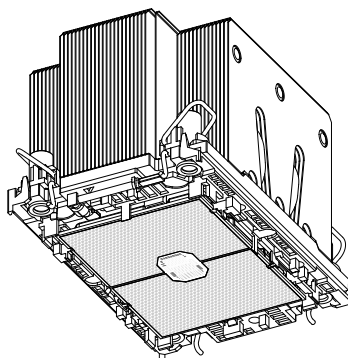
### 3. The 3rd Gen Intel Xeon Scalable Processor



Bottom View



### 4. Processor Heatsink Module (PHM)



Bottom View

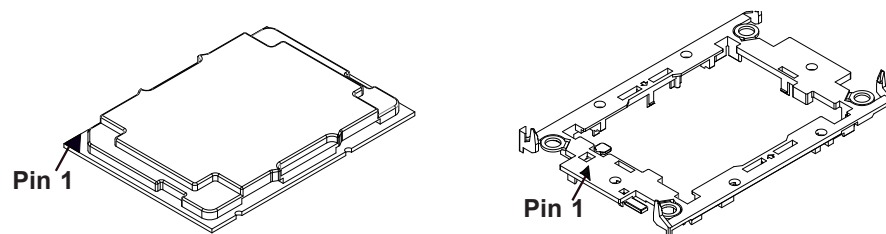
## Creating the Processor Carrier Assembly

The processor carrier assembly contains a 3rd Gen Intel Xeon Scalable processor and a processor carrier.

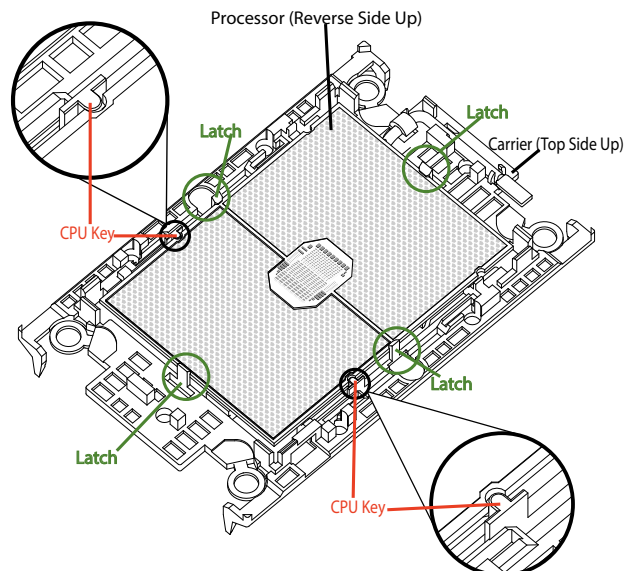
To create the processor carrier assembly, please follow the steps below:

 **Note:** Before installation, be sure to follow the instructions given on [Page 1](#) & [Page 2](#) of this chapter to properly prepare yourself for installation.

1. Hold the processor with the LGA lands (with Gold CPU contacts) facing down. Locate the small, gold triangle at the corner of the processor and the corresponding hollowed triangle on the processor carrier as shown in the graphics below. Please note that the triangle indicates Pin 1 location.

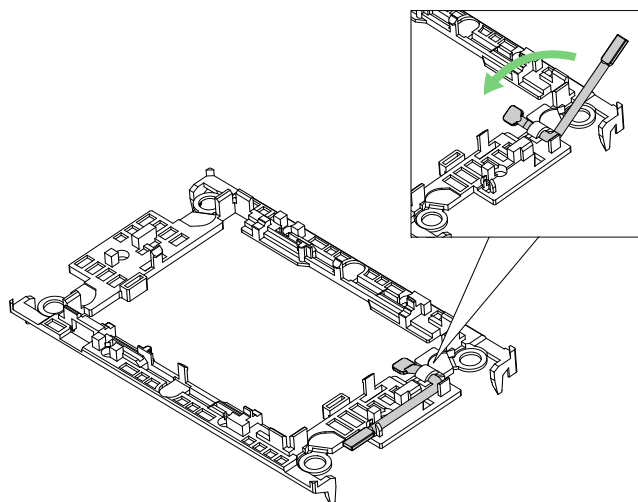


2. First, turn over the processor carrier and locate Pin 1 on the CPU and Pin 1 on the carrier. Then, turn the processor over with the processor reverse side (gold contacts) facing up and locate CPU keys on the processor. Finally, locate the CPU keys and four latches on the carrier as shown below.

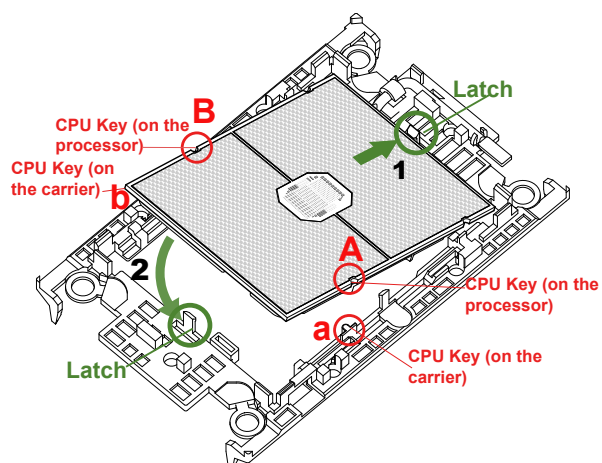


Carrier with the Processor Installed

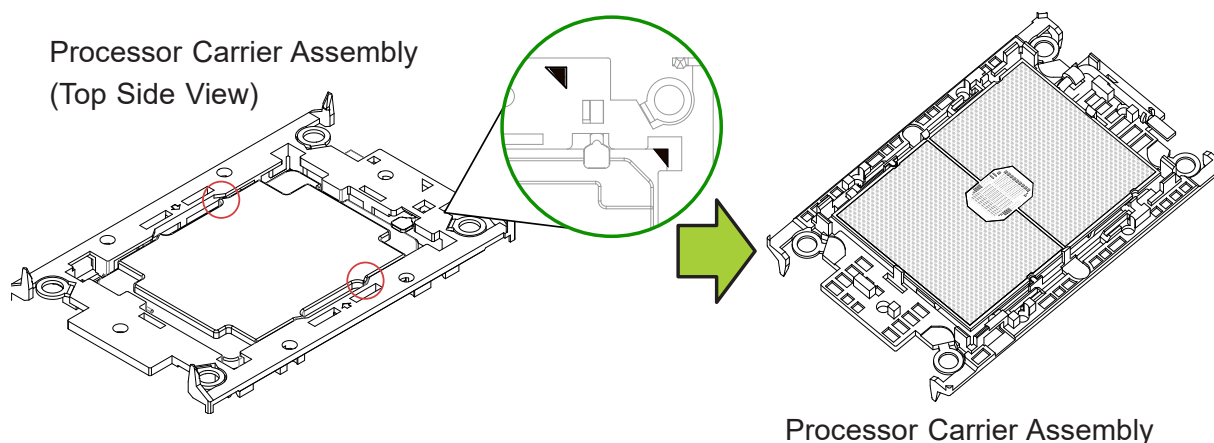
3. Locate the lever on the CPU socket and press the lever down as shown below.



4. Using Pin 1 as a guide, carefully align the CPU keys (A & B) on the processor against the CPU keys on the carrier (a & b) as shown in the drawing below.
5. Once they are properly aligned, carefully place one end of the processor into the latch marked 1 on the carrier, and place the other end of processor into the latch marked 2.



6. After the processor is placed inside the carrier, examine the four sides of the processor, making sure that the processor is properly seated on the carrier.

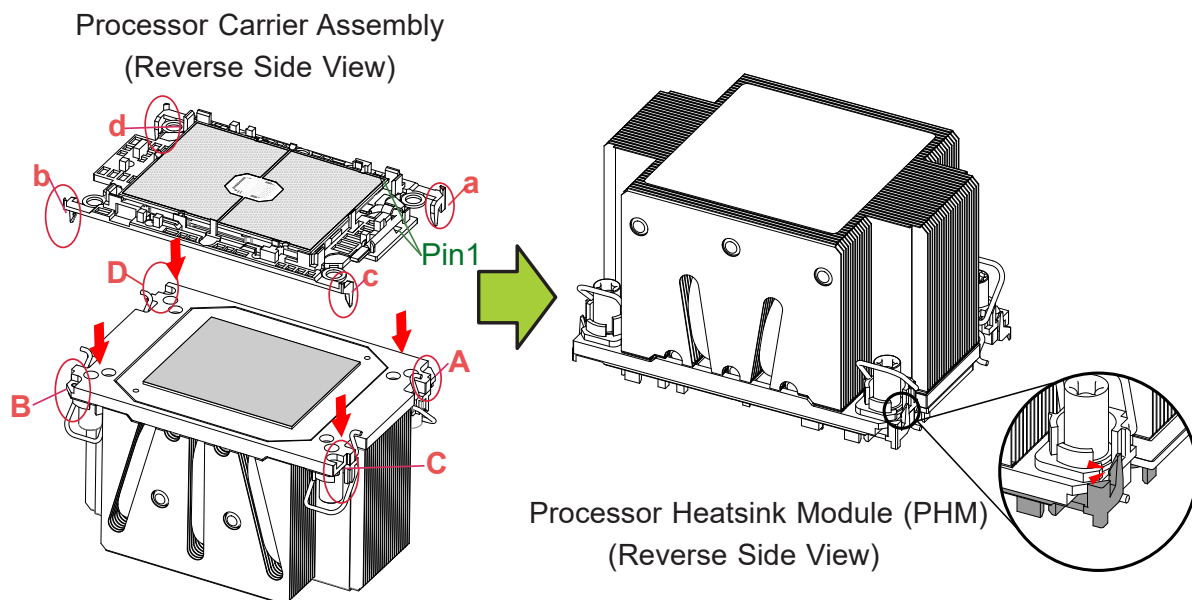


## Creating the Processor Heatsink Module (PHM)

After creating the processor carrier assembly, please follow the instructions below to mount the processor carrier into the heatsink to form the processor heatsink module (PHM).

 **Note:** If this is a new heatsink, the thermal grease has been pre-applied on the underside. Otherwise, apply the proper amount of thermal grease.

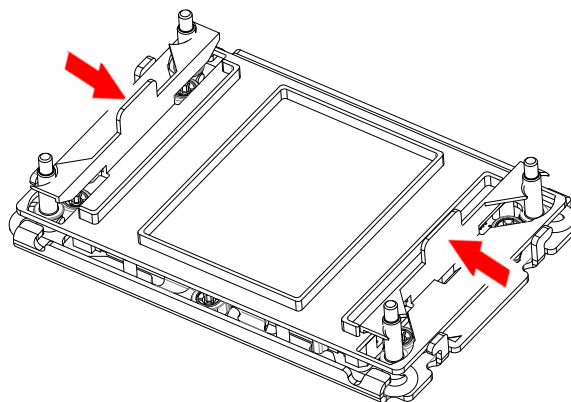
1. Turn the heatsink over with the thermal grease, which is on the reverse side of the heatsink, facing up. Pay attention to the two triangle cutouts (A, B) located at the diagonal corners of the heatsink as shown in the drawing below.
2. Hold the processor carrier assembly top side (with thermal grease) facing up, and locate the triangle on the CPU and the triangle on the carrier. (Triangle indicates Pin 1.)
3. Using Pin 1 as a guide, turn the processor carrier assembly over with the gold contacts facing up. Locate Pin 1 (A) on the processor and Pin 1 (a) on the processor carrier assembly "a".
4. Align the corner marked "a" on the processor carrier assembly against the triangle cutout "A" on the heatsink, and align the corners marked "b", "c", "d" on processor assembly against the corners marked "B", "C", "D" on the heatsinks
5. Once they are properly aligned, place the corner marked "a" on the processor carrier assembly into the corner of the heatsink marked "A". Repeat the same step to place the corners marked "b", "c", "d" on the processor carrier assembly into the corners of the heatsink marked "B", "C", "D" making sure that all plastic clips are properly attached to the heatsink.



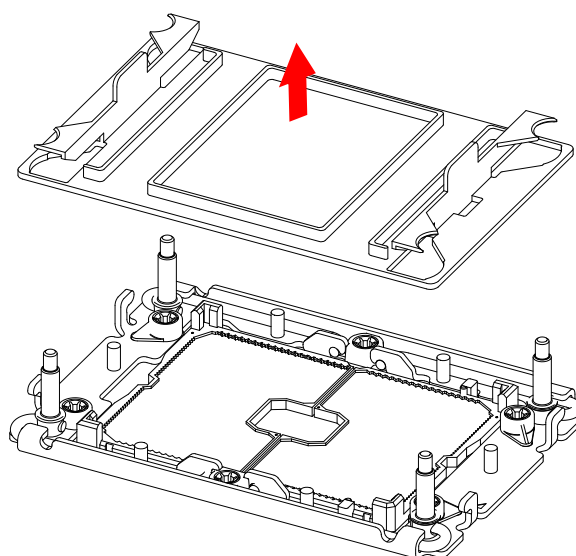
## Preparing the CPU Socket for Installation

This motherboard comes with a plastic protective cover installed on the CPU socket. Remove it from the socket by following the instructions given in the drawings below.

Removing the Plastic Protective Cover from the Socket



1. Press the tabs inward.

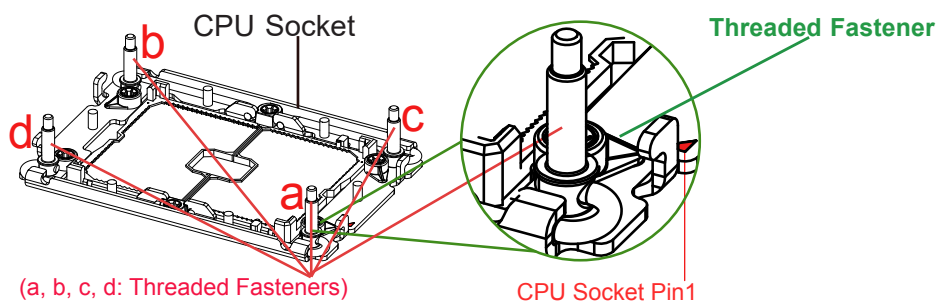


2. Pull up the protective cover from the socket.

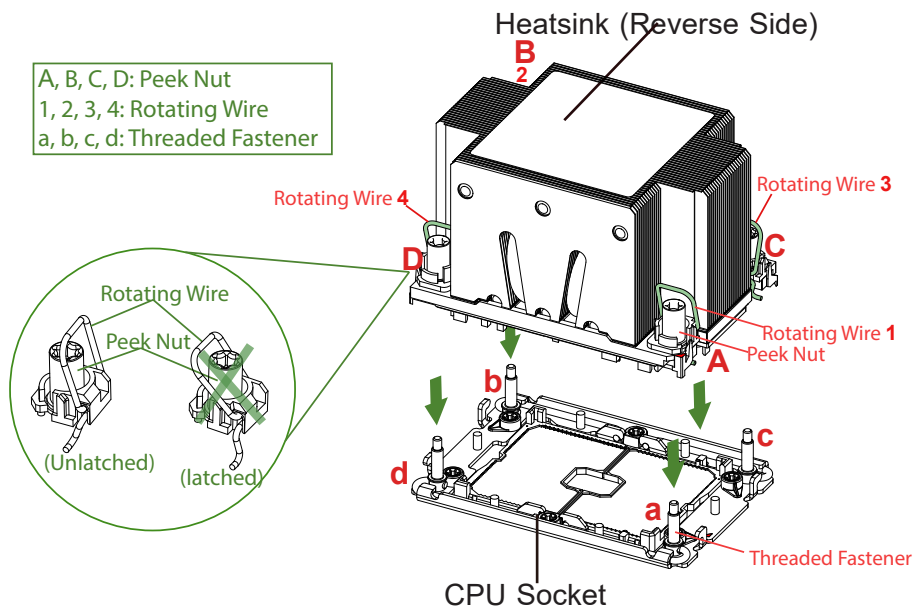
## Preparing to Install the Processor Heatsink Module (PHM) into the CPU Socket

After assembling the Processor Heatsink Module (PHM), you are ready to install it into the CPU socket. To ensure the proper installation, please follow the procedures below:

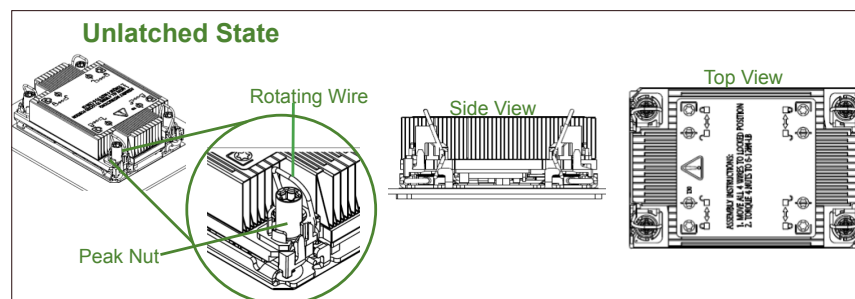
1. Locate four threaded fasteners (a, b, c, d) on the CPU socket.



2. Locate four peek nuts (A, B, C, D) and four rotating wires (1, 2, 3, 4) on the heatsink as shown in the graphics below.

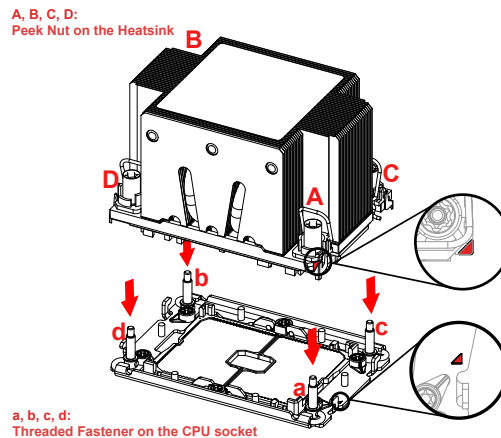


3. Check the rotating wires (1, 2, 3, 4) to make sure that they are at unlatched positions as shown in the drawing below before installing the PHM into the CPU socket.

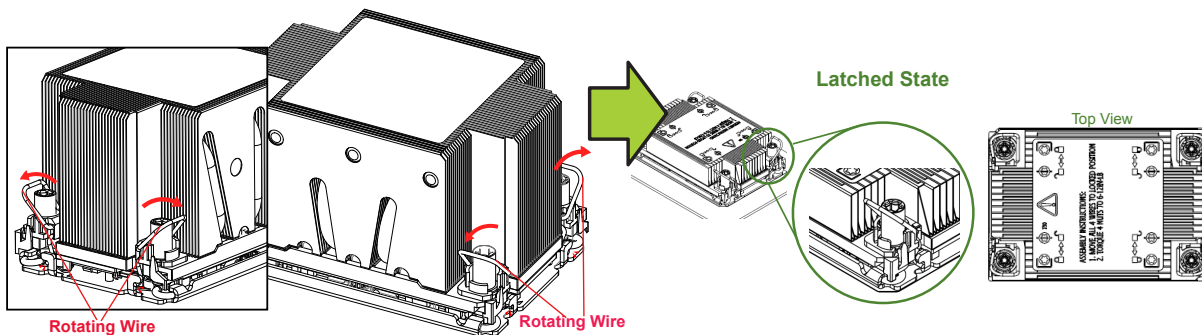


## Installing the Processor Heatsink Module (PHM)

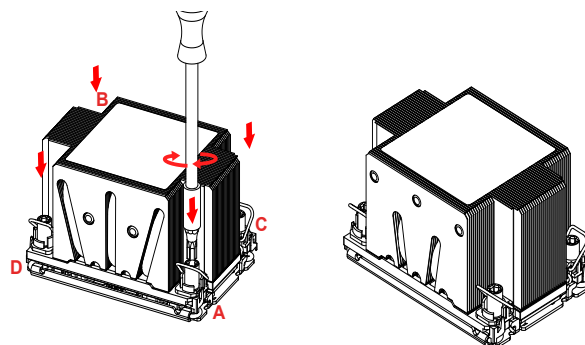
1. Align peek nut "A", which is next to the triangle (Pin 1) on the heatsink, against threaded fastener "a" on the CPU socket. Then align peek nuts "B", "C", "D" on the heatsink against threaded fasteners "b", "c", "d" on the CPU socket, making sure that all peek nuts on the heatsink are properly aligned with the correspondent threaded fasteners on the CPU socket.
2. Once they are aligned, gently place the heatsink on top the CPU socket, making sure that each peek nut is properly attached to its corresponding threaded fastener.



3. Press all four rotating wires outwards and make sure that the heatsink is securely latched onto the CPU socket.



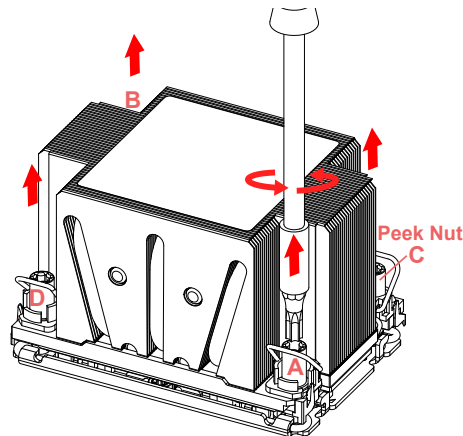
4. With a T30-bit screwdriver, tighten all peek nuts in the sequence of "A", "B", "C", and "D" with even pressure. To avoid damaging the processor or socket, do not use a force greater than 12 lbf-in when tightening the screws.
5. Examine all corners heatsink to ensure that the PHM is firmly attached to the CPU socket.



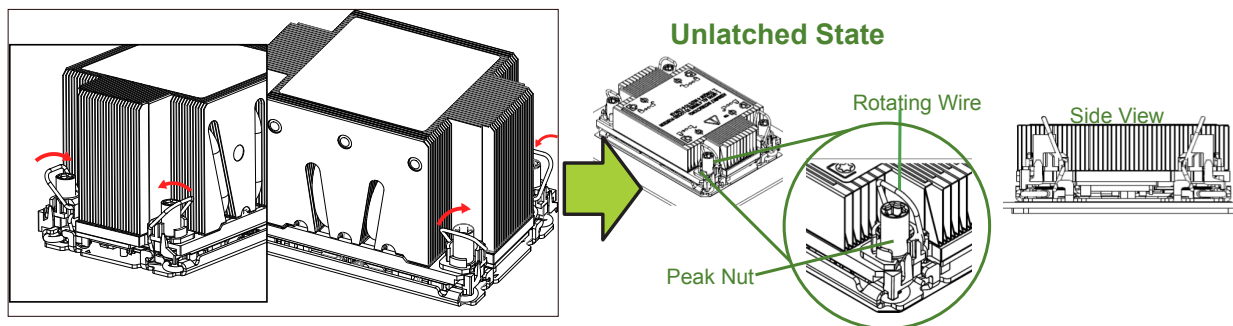
## Removing the Processor Heatsink Module from the CPU Socket

Before removing the processor heatsink module (PHM) from the motherboard, unplug the AC power cord from all power supplies after shutting down the system. Then follow the steps below:

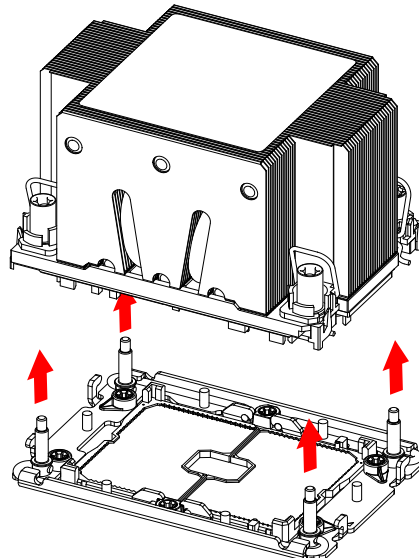
1. Use a T30-bit screwdriver to loosen the four peek nuts on the heatsink in the sequence of #A, #B, #C, and #D.



2. Once the peek nuts are loosened from the CPU socket, press the rotating wires inwards to unlatch the PHM from the socket as shown in the drawings below.



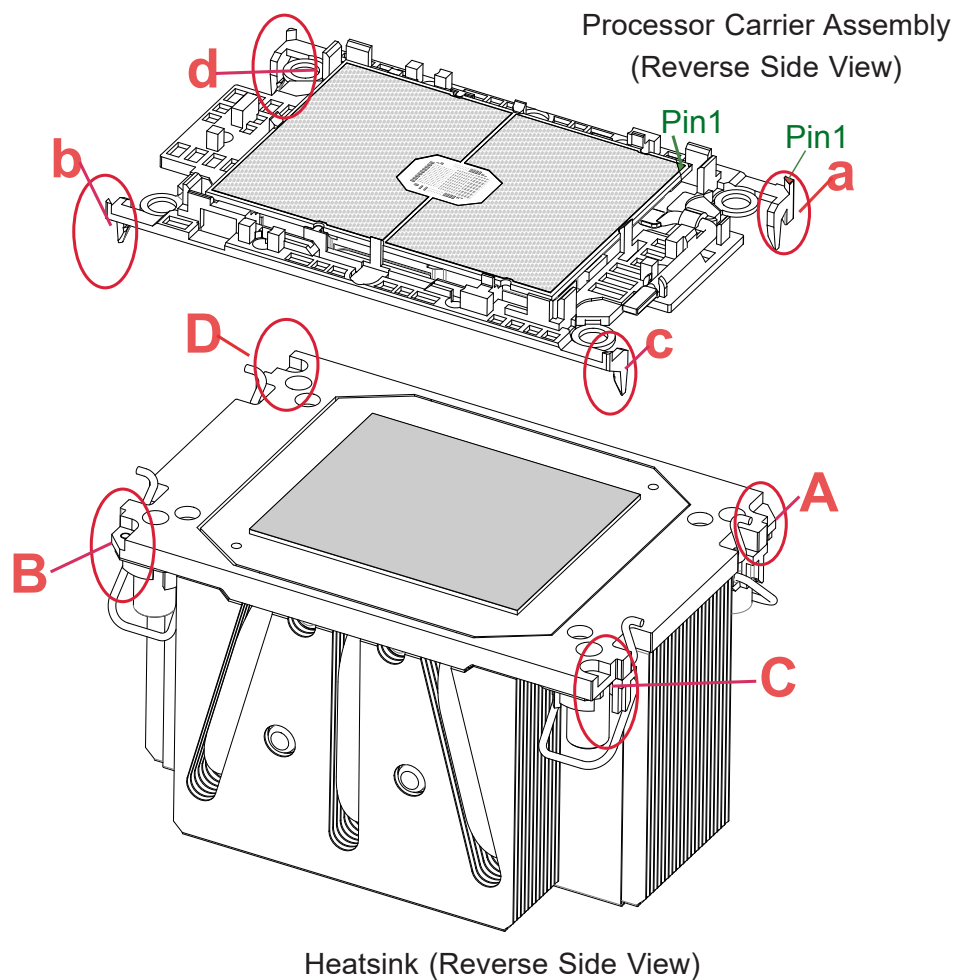
3. Gently lift the PHM upwards to remove it from the CPU socket.



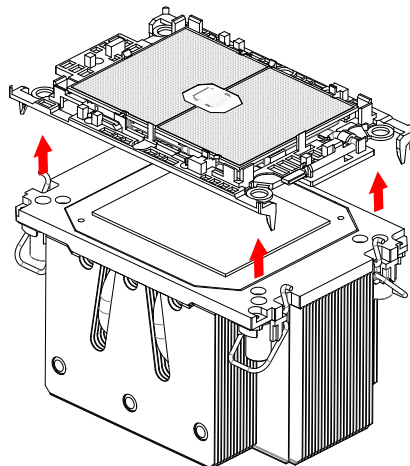
## Removing the Processor Carrier Assembly from the Processor Heatsink Module (PHM)

To remove the processor carrier assembly from the PHM, please follow the steps below:

1. Detach four plastic clips (marked a, b, c, d) on the processor carrier assembly from the four corners of heatsink (marked A, B, C, D) in the drawings below.



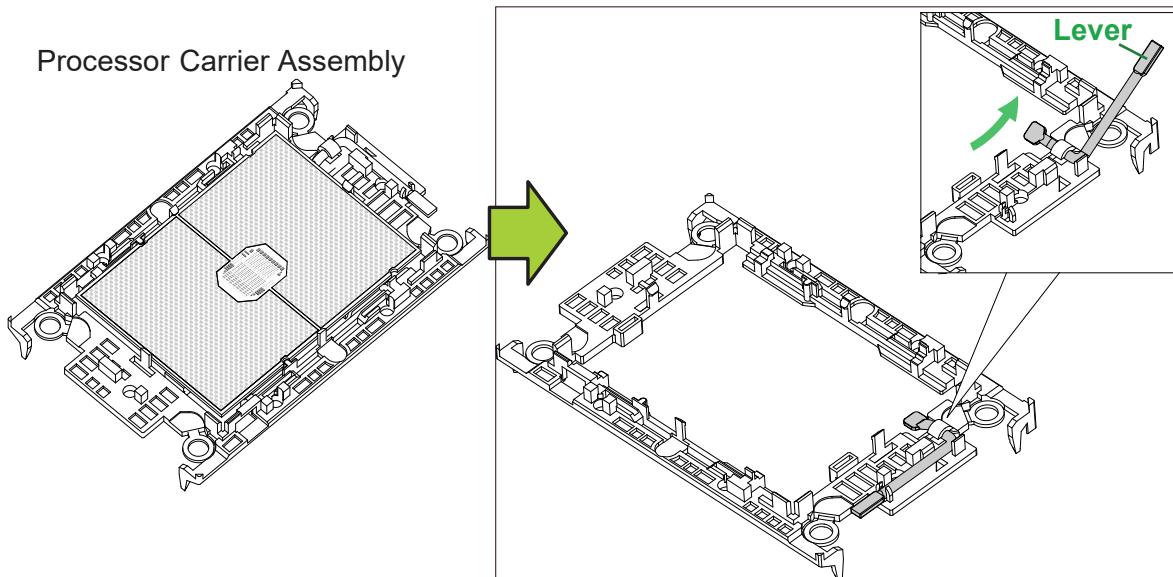
2. When all plastic clips are detached from the heatsink, remove the processor carrier assembly from the heatsink



## Removing the Processor from the Processor Carrier Assembly

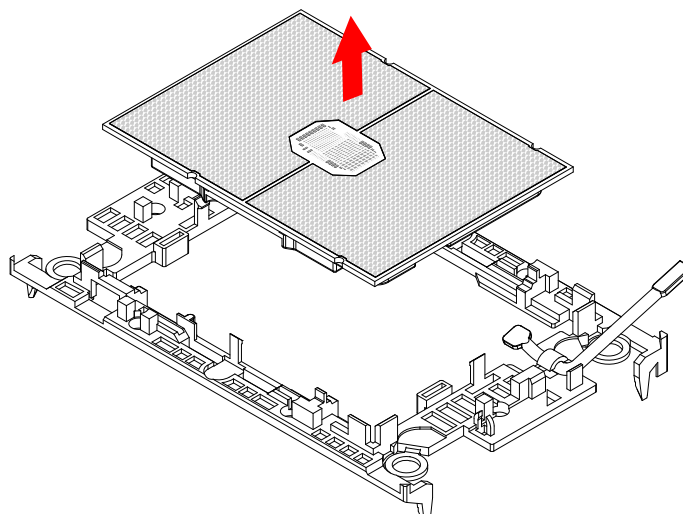
Once you have removed the processor carrier assembly from the PHM, you are ready to remove the processor from the processor carrier by following the steps below.

1. Unlock the lever from its locking position and push the lever upwards to disengage the processor from the processor carrier as shown in the right drawing below.



2. Once the processor is loosened from the carrier, carefully remove the processor from the processor carrier.

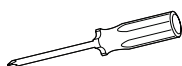
 **Note:** To avoid damaging the processor and its pins, please handle the processor with care.



## 2.3 Motherboard Installation

All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they ground the motherboard to the chassis. Make sure that the metal standoffs click in or are screwed in tightly.

### Tools Needed



Phillips Screwdriver (1)

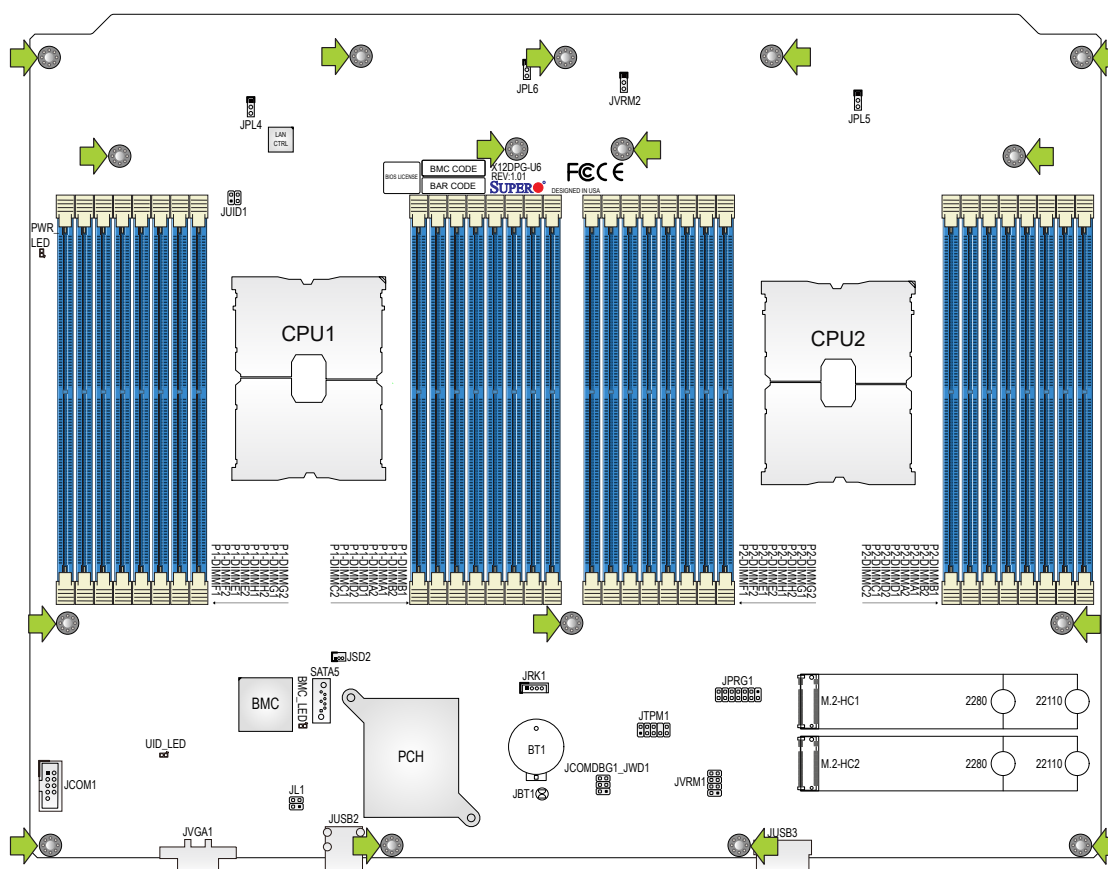


Phillips Screws (16)



Standoffs (16)  
(Only if Needed)

### Location of Mounting Holes

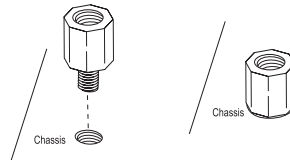


**Note 1:** To avoid damaging the motherboard and its components, please do not use a force greater than 8 lbf-in on each mounting screw during motherboard installation.

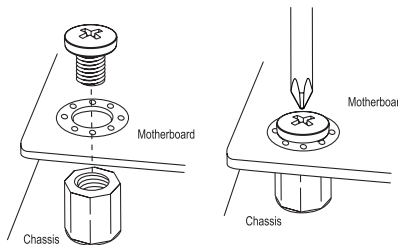
**Note 2:** Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

## Installing the Motherboard

1. Install the I/O shield into the back of the chassis, if applicable.
2. Locate the mounting holes on the motherboard. See the previous page for the location.



3. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.



4. Install standoffs in the chassis as needed.
5. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.
6. Using the Phillips screwdriver, insert a pan head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.
7. Repeat Step 6 to insert #6 screws into all mounting holes.
8. Make sure that the motherboard is securely placed in the chassis.

 **Note:** Images displayed are for illustration only. Your chassis or components might look different from those shown in this manual.

## 2.4 Memory Support and Installation



**Note:** Check the Supermicro website for recommended memory modules.



**Important:** Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

### Memory Support

The X12DPG-U6 supports up to 8TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 (288-pin) ECC memory with speeds of 3200/2933/2666MHz in 32 memory slots and up to 8TB of Intel Optane PMem 200 series with speeds of up to 3200MHz. (See the notes below.)



**Note 1:** The Intel Optane Persistent Memory (PMem) 200 series are supported by the 3rd Gen. Intel Xeon Scalable (83xx/63xx/53xx/4314) processors.

**Note 2:** Memory speed and capacity support depends on the processors used in the system.

**Note 3:** To enable the function of [Software Guard Extension \(SGX\)](#), make sure the DIMMs are populated with one DIMM per channel (1DPC).

### DDR4 Memory Support for the 3rd Gen Intel Xeon Scalable Processors

| Memory Support for the 3rd Gen Intel Xeon Scalable Processors |                             |                        |                         |                                                                                |                              |
|---------------------------------------------------------------|-----------------------------|------------------------|-------------------------|--------------------------------------------------------------------------------|------------------------------|
| Type                                                          | Ranks Per DIMM & Data Width | DIMM Capacity (GB)     |                         | Speed (MT/s); Voltage (V); Slots Per Channel (SPC) and DIMMs Per Channel (DPC) |                              |
|                                                               |                             |                        |                         | 1DPC<br>(1-DIMM Per Channel)                                                   | 2DPC<br>(2-DIMM Per Channel) |
|                                                               |                             | 8Gb                    | 16Gb                    | 1.2 V                                                                          | 1.2 V                        |
| RDIMM                                                         | SRx8                        | 8GB                    | 16GB                    | 3200                                                                           | 3200                         |
|                                                               | SRx4                        | 16GB                   | 32GB                    |                                                                                |                              |
|                                                               | DRx8                        | 16GB                   | 32GB                    |                                                                                |                              |
|                                                               | DRx4                        | 32GB                   | 64GB                    |                                                                                |                              |
| RDIMM 3Ds                                                     | (4R/8R) X4                  | 2H- 64 GB<br>4H-128 GB | 2H- 128 GB<br>4H-256 GB |                                                                                |                              |
| LRDIMM                                                        | QRx4                        | 64GB                   | 128GB                   | 3200                                                                           | 3200                         |
| LRDIMM - 3Ds                                                  | (4R/8R) X4                  | 4H-128 GB              | 2H- 128 GB<br>4H-256 GB | 3200                                                                           | 3200                         |

### Memory Population Table for the 3rd Gen Intel Xeon Scalable Processors

| DDR4 Memory Population Table for X12DP 32-DIMM Motherboards |                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>When 1 CPU is used:</b>                                  | <b>Memory Population Sequence</b>                                                                                                                                                                                                                                                                                                                      |
| 1 CPU & 1 DIMM                                              | CPU1: P1-DIMMA1                                                                                                                                                                                                                                                                                                                                        |
| 1 CPU & 2 DIMMs<br>(Note)                                   | CPU1: P1-DIMMA1/P1-DIMME1                                                                                                                                                                                                                                                                                                                              |
| 1 CPU & 4 DIMMs<br>(Note)                                   | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1                                                                                                                                                                                                                                                                                                          |
| 1 CPU & 6 DIMM                                              | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1                                                                                                                                                                                                                                                                                      |
| 1 CPU & 8 DIMMs<br>(Note)                                   | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1                                                                                                                                                                                                                                                                  |
| 1 CPU & 12 DIMMs<br>(Note)                                  | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/<br>P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2                                                                                                                                                                                                                      |
| 1 CPU & 16 DIMMs<br>(Note)                                  | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/<br>P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2                                                                                                                                                                              |
| <b>When 2 CPUs are used</b>                                 | <b>Memory Population Sequence</b>                                                                                                                                                                                                                                                                                                                      |
| 2 CPUs & 2 DIMMs<br>(Note)                                  | CPU1: P1-DIMMA1<br>CPU2: P2-DIMMA1                                                                                                                                                                                                                                                                                                                     |
| 2 CPUs & 4 DIMMs<br>(Note)                                  | CPU1: P1-DIMMA1/P1-DIMME1<br>CPU2: P2-DIMMA1/P2-DIMME1                                                                                                                                                                                                                                                                                                 |
| 2 CPUs & 6 DIMMs                                            | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1<br>CPU2: P2-DIMMA1/P2-DIMME1                                                                                                                                                                                                                                                                             |
| 2 CPUs & 8 DIMMs<br>(Note)                                  | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1                                                                                                                                                                                                                                                         |
| 2 CPUs & 10 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1                                                                                                                                                                                                                                     |
| 2 CPUs & 12 DIMMs<br>(Note)                                 | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1                                                                                                                                                                                                                 |
| 2 CPUs & 14 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1                                                                                                                                                                                             |
| 2 CPUs & 16 DIMMs<br>(Note)                                 | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1                                                                                                                                                                         |
| 2 CPUs & 18 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/<br>P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1                                                                                                                                                 |
| 2 CPUs & 20 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMA2/P1-DIMME2/<br>P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1                                                                                                                             |
| 2 CPUs & 22 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/<br>P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1                                                                                                         |
| 2 CPUs & 24 DIMMs<br>(Note)                                 | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/<br>P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1                                                                                     |
| 2 CPUs & 28 DIMMs                                           | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/<br>P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1/<br>P2-DIMMA2/P2-DIMME2/P2-DIMMC2/P2-DIMMG2                                         |
| 2 CPUs & 32 DIMMs<br>(Note)                                 | CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1/<br>P1-DIMMA2/P1-DIMME2/P1-DIMMC2/P1-DIMMG2/P1-DIMMB2/P1-DIMMF2/P1-DIMMD2/P1-DIMMH2<br>CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1/<br>P2-DIMMA2/P2-DIMME2/P2-DIMMC2/P2-DIMMG2/P2-DIMMB2/P2-DIMMF2/P2-DIMMD2/P2-DIMMH2 |

 **Note:** This memory configuration is recommended by Supermicro for optimal memory performance. Please use this configuration to maximize your memory performance.

### PMem 200 Series Population table for X12DP Motherboards (with 32 Slots)

 **Note:** The Intel Optane Persistent Memory (PMem) 200 Series are supported by the 3rd Gen Intel Xeon Scalable (83xx/63xx/53xx/4314) Processors.

| PMem 200 Series Population Table for X12DP 32-DIMM Motherboards (within 1 CPU socket) |         |               |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |      |
|---------------------------------------------------------------------------------------|---------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| DDR4+ PMem                                                                            | Mode    | AD Interleave | P1-DIMMF1 | P1-DIMMF2 | P1-DIMME1 | P1-DIMME2 | P1-DIMMH1 | P1-DIMMH2 | P1-DIMMG1 | P1-DIMMG2 | P1-DIMMC2 | P1-DIMMC1 | P1-DIMMD2 | P1-DIMMD1 | P1-DIMMA2 | P1-DIMMA1 | P1-DIMMB2 | P1-DIMMB1 |      |
| 4+4                                                                                   | AD MM   | One - x4      | PMem      | -         | DDR4      | -         | PMem      | -         | DDR4      | -         | -         | DDR4      | -         | PMem      | -         | DDR4      | -         | PMem      |      |
|                                                                                       |         | One - x4      | DDR4      | -         | PMem      | -         | DDR4      | -         | PMem      | -         | -         | PMem      | -         | DDR4      | -         | PMem      | -         | DDR4      |      |
| 6+1                                                                                   | AD      | One - x1      | DDR4      | -         | DDR4      | -         | -         | -         | DDR4      | -         | -         | DDR4      | -         | PMem      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | PMem      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | PMem      | -         | DDR4      | -         | -         | DDR4      | -         | -         | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | PMem      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | -         | -         | PMem      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | -         | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | PMem      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | PMem      | -         | -         | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | PMem      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | -         | -         | DDR4      |      |
| 8+1                                                                                   | AD      | One - x1      | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | PMem      | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      | PMem      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | PMem      | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | PMem      | DDR4      |      |
|                                                                                       |         |               | DDR4      | PMem      | DDR4      | -         | DDR4      | -         | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
|                                                                                       |         |               | DDR4      | -         | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | -         | DDR4      | -         | DDR4      | -         | DDR4      | -         | DDR4      |      |
| 8+4                                                                                   | AD MM   | One - x4      | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | DDR4      | PMem      | PMem      | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | DDR4      |      |
|                                                                                       |         | Two - x2      | DDR4      | -         | DDR4      | PMem      | DDR4      | PMem      | DDR4      | -         | -         | DDR4      | PMem      | DDR4      | PMem      | DDR4      | -         | DDR4      |      |
|                                                                                       |         | Two - x2      | DDR4      | PMem      | DDR4      |           | DDR4      | -         | DDR4      | PMem      | PMem      | DDR4      | -         | DDR4      | -         | DDR4      | PMem      | DDR4      |      |
|                                                                                       |         | One - x4      | DDR4      | PMem      | DDR4      | -         | DDR4      | PMem      | DDR4      | -         | -         | DDR4      | PMem      | DDR4      | -         | DDR4      | PMem      | DDR4      |      |
| 8+8                                                                                   | AD, MM, | One - x8      | DDR4      | PMem      | DDR4      | PMem      | DDR4      | PMem      | DDR4      | PMem      | PMem      | DDR4      | PMem      | DDR4      | PMem      | DDR4      | PMem      | DDR4      |      |
| 12+2                                                                                  | AD      | One - x2      | PMem      | -         | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | -         | PMem      |      |
|                                                                                       |         |               | DDR4      | DDR4      | DDR4      | DDR4      | PMem      | -         | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | -         | PMem      | DDR4      | DDR4      | DDR4      | DDR4 |
|                                                                                       |         |               | DDR4      | DDR4      | PMem      | -         | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | -         | PMem      | DDR4      | DDR4      | DDR4 |
|                                                                                       |         |               | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | PMem      | -         | -         | PMem      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4      | DDR4 |

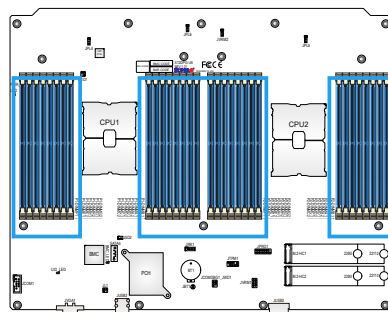
| Legend (for the table above) |                                                                     |
|------------------------------|---------------------------------------------------------------------|
| DDR4 Type and Capacity       |                                                                     |
| DDR4                         | See Validation Matrix (DDR4 DIMMs validated with PMem)              |
| Capacity                     |                                                                     |
| PMem                         | Any Capacity (Uniformly for all channels for a given configuration) |

- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual population, different PMem rearrangements among channels are permitted so long as the configuration doesn't break X12DP Memory population rules.
- Ensure the same DDR4 DIMM type and capacity are used for each DDR4 + PMem population.
- If the system detects an unvalidated configuration, then the system issues a BIOS warning. The CLI functionality is limited in non-POR configurations, and select commands will not be supported.

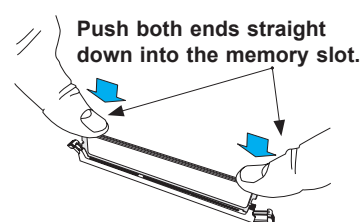
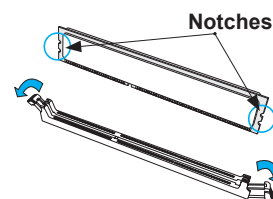
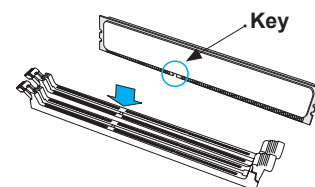
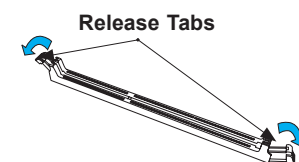
| Validation Matrix (DDR4 DIMMS with PMem 200 Series) |                                           |                    |       |
|-----------------------------------------------------|-------------------------------------------|--------------------|-------|
| DIMM Type                                           | Ranks Per DIMM<br>& Data Width<br>(Stack) | DIMM Capacity (GB) |       |
|                                                     |                                           | DRAM Density       |       |
|                                                     |                                           | 8Gb                | 16Gb  |
| RDIMM<br>(up to 3200)                               | 1Rx8                                      | N/A                | N/A   |
|                                                     | 1Rx4                                      | 16GB               | 32GB  |
|                                                     | 1Rx8                                      | 16GB               | 32GB  |
|                                                     | 1Rx4                                      | 32GB               | 64GB  |
| RDIMM 3DS<br>(up to 3200)                           | 4Rx4 (2H)                                 | N/A                | 128GB |
|                                                     | 8Rx4 (4H)                                 | NA                 | 256GB |
| LRDIMM (up to 3200)                                 | 4Rx4                                      | 64GB               | 128GB |
| LRDIMM 3DS<br>(up to 3200)                          | 4Rx4 (2H)                                 | N/A                | N/A   |
|                                                     | 8Rx4 (4H)                                 | 128GB              | 256GB |

## DIMM Installation

1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population tables in the previous section. Locate DIMM memory slots on the motherboard as shown on the right.

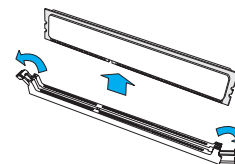


2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Push both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



## DIMM Removal

Press both release tabs on the ends of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.

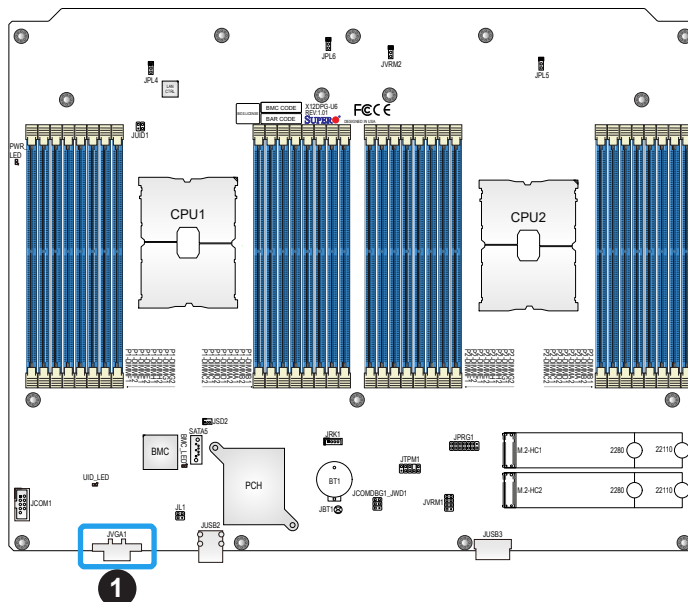


**Warning!** Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the DIMM module or the DIMM socket. Please handle DIMM modules with care. Carefully follow all the instructions given on Page 1 of this chapter to avoid ESD-related damages done to your memory modules or components.

## 2.5 Rear I/O Ports

### VGA Connection

The onboard VAG connection provides an analog interface support between the system and the video display. Connect the onboard VGA port to the VAG port on the chassis using the VGA cable. Refer to the layout below for the location of VGA port.



### 1. VGA Port

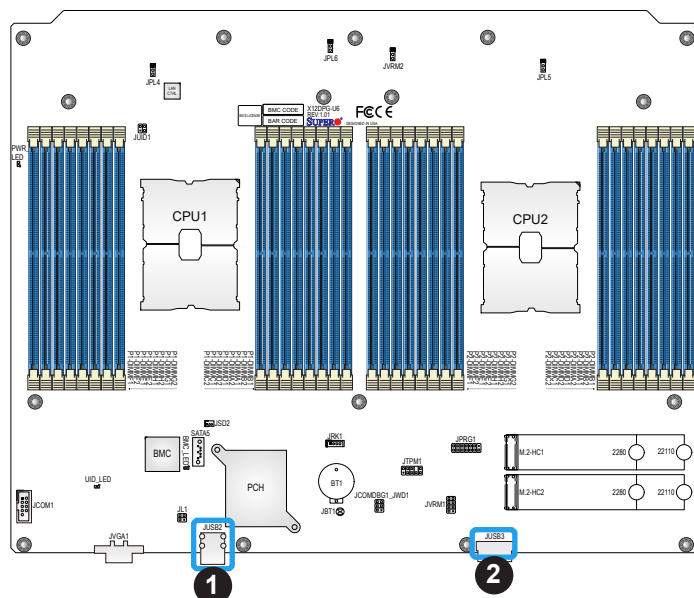


## Universal Serial Bus (USB) Ports and Header

There are two built-in USB Type A ports (JUSB2) and one USB header (JUSB3) on this motherboard. JUSB2 contains two USB Type A ports, and both can be used individually. Note that JUSB2 is reserved for configuring the motherboard only by the technician. JUSB3 is a header with 2 USB connections. Connect to the USB Type A ports on the chassis using the cable. Refer to the tables below for the JUSB2 port and JUSB3 header pin definitions.

| JUSB2 port (USB 3.2 Gen 1)<br>Pin Definitions |              |      |              |
|-----------------------------------------------|--------------|------|--------------|
| Pin#                                          | Definition   | Pin# | Definition   |
| A1                                            | VBUS         | B1   | VBUS         |
| A2                                            | D1-N         | B2   | D2-N         |
| A3                                            | D1-P         | B3   | D2-P         |
| A4                                            | GND          | B4   | GND          |
| A5                                            | Stda_SSRX1-N | B5   | Stda_SSRX2-N |
| A6                                            | Stda_SSRX1-P | B6   | Stda_SSRX2-P |
| A7                                            | GND_DRAIN    | B7   | GND_DRAIN    |
| A8                                            | Stda_SSTX1-N | B8   | Stda_SSTX2-N |
| A9                                            | Stda_SSTX1-P | B9   | Stda_SSTX2-P |
| G1                                            | Chassis GND  | G3   | Chassis GND  |
| G2                                            | Chassis GND  | G4   | Chassis GND  |

| JUSB3 Header (USB 3.2 Gen 1)<br>Pin Definitions |              |      |              |
|-------------------------------------------------|--------------|------|--------------|
| Pin#                                            | Definition   | Pin# | Definition   |
| 1                                               | VBUS         | 19   | VBUS         |
| 2                                               | Stda-SSRX1-N | 18   | Stda-SSRX2-N |
| 3                                               | Stda_SSRX1-P | 17   | Stda_SSRX2-P |
| 4                                               | GND          | 16   | GND          |
| 5                                               | Stda-SSRX1-N | 15   | Stda-SSRX2-N |
| 6                                               | Stda_SSRX1-P | 14   | Stda_SSRX2-P |
| 7                                               | GND          | 13   | GND          |
| 8                                               | D1-N         | 12   | D2-N         |
| 9                                               | D1-P         | 11   | D2-P         |
| 10                                              |              | x    |              |



1. JUSB2 (USB 3.2 Gen 1 Ports)
2. JUSB3 (USB 3.2 Gen 1 Header)

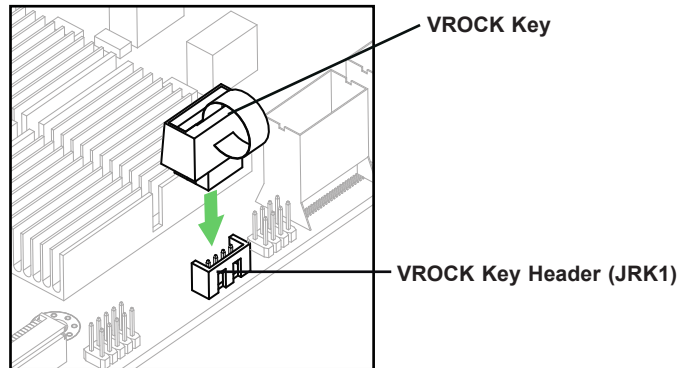


## 2.6 Headers

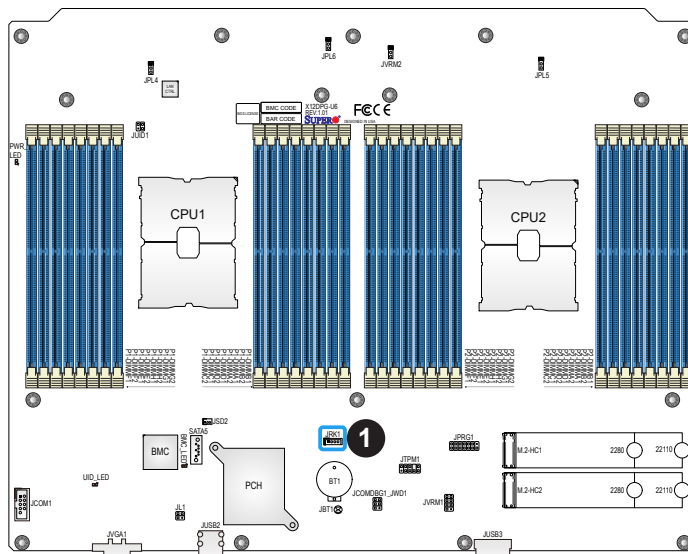
### VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support as shown in the illustration below. Please refer to the layout below for the location of JRK1.

| Intel VROC Key Pin Definitions |              |
|--------------------------------|--------------|
| Pin#                           | Definition   |
| 1                              | Ground       |
| 2                              | 3.3V Standby |
| 3                              | Ground       |
| 4                              | PCH RAID Key |



**Note:** The graphics contained in this user's manual are for illustration only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

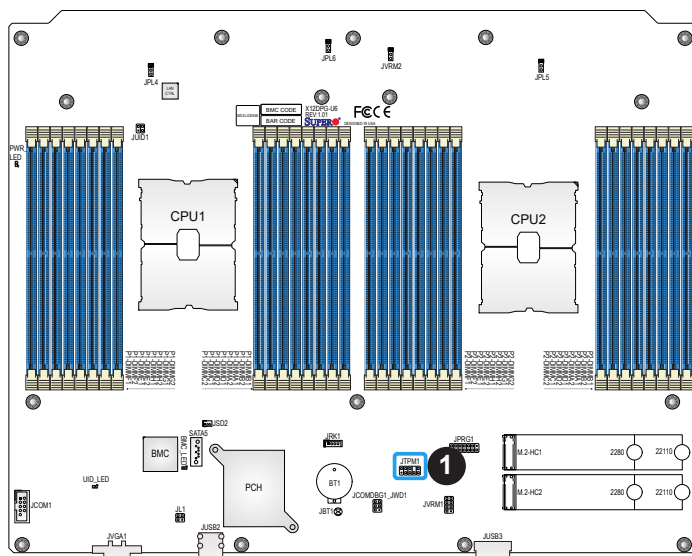


#### 1. VROC RAID Key Header

## TPM/Port 80 Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro (optional). A TPM/Port 80 connector is a security device that supports encryption and authentication in hard drives. It allows the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. See the layout below for the location of the TPM header and the table for pin definitions. Please go to the following link for more information on the TPM: <http://www.supermicro.com/manuals/other/TPM.pdf>.

| Trusted Platform Module Header<br>Pin Definitions |              |      |            |
|---------------------------------------------------|--------------|------|------------|
| Pin#                                              | Definition   | Pin# | Definition |
| 1                                                 | +3.3V        | 2    | SPI_CS#    |
| 3                                                 | RESET#       | 4    | SPI_MISO   |
| 5                                                 | SPI_CLK      | 6    | GND        |
| 7                                                 | SPI_MOSI     | 8    | NC         |
| 9                                                 | +3.3V Stdbby | 10   | SPI_IRQ#   |



1. TPM/Port 80 Header

## Chassis Intrusion

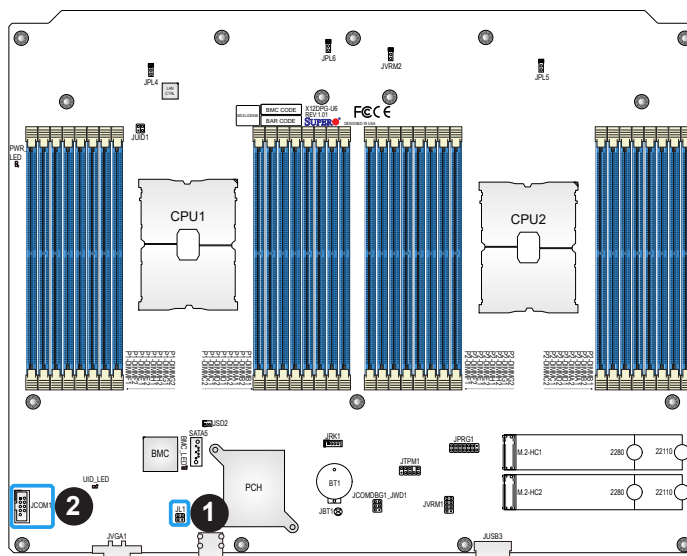
A Chassis Intrusion header is located at JL1 on the motherboard. Attach the appropriate cable from the chassis to inform you when the chassis is opened. Refer to the table below for pin definitions.

| Chassis Intrusion Pin Definitions |                 |
|-----------------------------------|-----------------|
| Pin#                              | Definition      |
| 1                                 | Intrusion Input |
| 2                                 | Ground          |
| 3                                 | Intrusion Input |
| 4                                 | Ground          |

## Serial Port

One COM header (JCOM1) is located on the motherboard. The COM connector provides a serial communication support. Refer to the table below for pin definitions.

| Serial Port Header Pin Definitions |            |      |            |
|------------------------------------|------------|------|------------|
| Pin#                               | Definition | Pin# | Definition |
| 1                                  | DCD        | 6    | DSR        |
| 2                                  | RXD        | 7    | RTS        |
| 3                                  | TXD        | 8    | CTS        |
| 4                                  | DTR        | 9    | RI         |
| 5                                  | Ground     | 10   | N/A        |



1. Chassis Intrusion
2. Serial Port

## S-SATA 3.0 Port

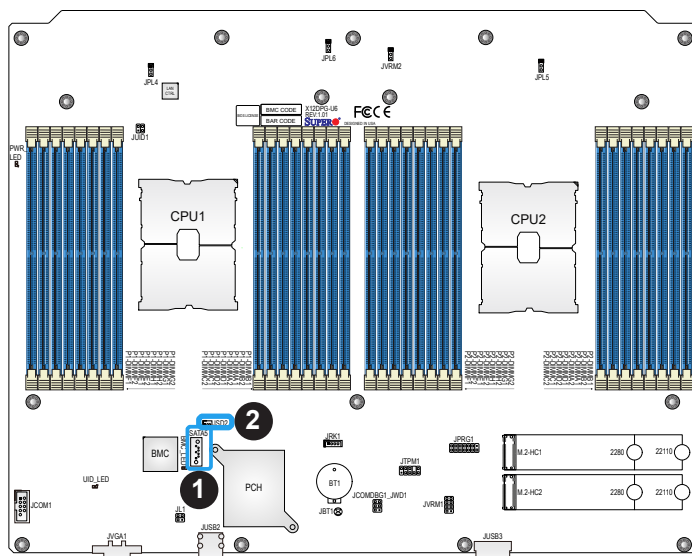
There is one S-SATA port located at SATA5 on this motherboard. The SATA5 port can be used with Supermicro SuperDOM which is an orange SATA DOM connector with power pins built in, and do not require external power cables. SATA5 port is also compatible with regular SATA HDDs or SATA DOMs that need external power cables. Refer to the table below for pin definitions.

| S-SATA Port<br>Pin Definitions |            |
|--------------------------------|------------|
| Pin#                           | Definition |
| 1                              | Ground     |
| 2                              | SATA_TXP   |
| 3                              | SATA_TXN   |
| 4                              | Ground     |
| 5                              | 5 SATA_RXN |
| 6                              | SATA_RXP   |
| 7                              | Ground     |

## Disk-On-Module Power Connector

The Disk-On-Module (DOM) power connector at JSD2 provides 5V power to a solid-state DOM storage device connected to a SATA port. Refer to the table below for pin definitions.

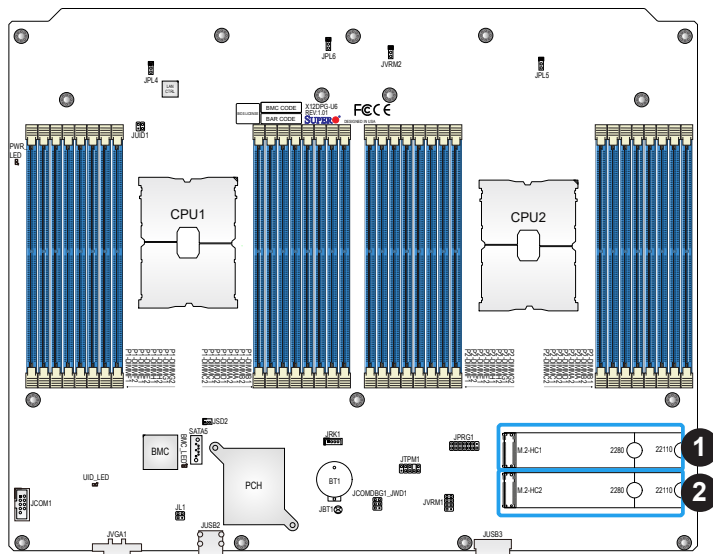
| DOM Power<br>Pin Definitions |            |
|------------------------------|------------|
| Pin#                         | Definition |
| 1                            | 5V         |
| 2                            | Ground     |
| 3                            | Ground     |



1. SATA5 (SuperDOM)
2. DOM PWR

## PCIe/SATA Hybrid M.2 Slots

This motherboard has two PCIe/SATA hybrid M.2 slots (M.2-HC1 and M.2-HC2). M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slots on the motherboard support PCIe 4.0 x4 M.2 NVMe SSDs in the 2280 and 22110 form factors.



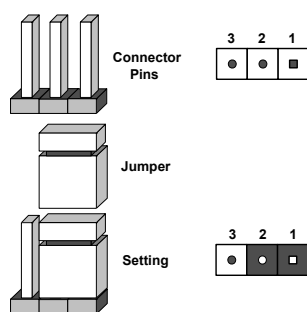
1. M.2-HC1 Slot
2. M.2-HC2 Slot

## 2.7 Jumper Settings

### How Jumpers Work

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram below for an example of jumping pins 1 and 2. Refer to the motherboard layout page for jumper locations.

 **Note:** On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.



## CMOS Clear

JBT1 is used to clear CMOS, which will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

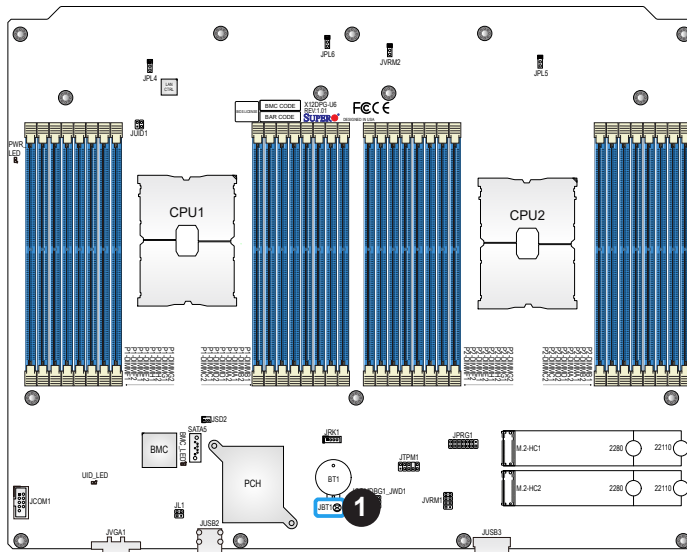


### To Clear CMOS

1. First power down the system and unplug the power cord(s).
2. Remove the cover of the chassis to access the motherboard and remove the battery from the motherboard.
3. Short the CMOS pads with a metal object such as a small screwdriver for at least four seconds.
4. Remove the screwdriver (or shorting device).
5. Replace the cover, reconnect the power cord(s), and power on the system.



**Note:** Clearing CMOS will also clear all passwords.



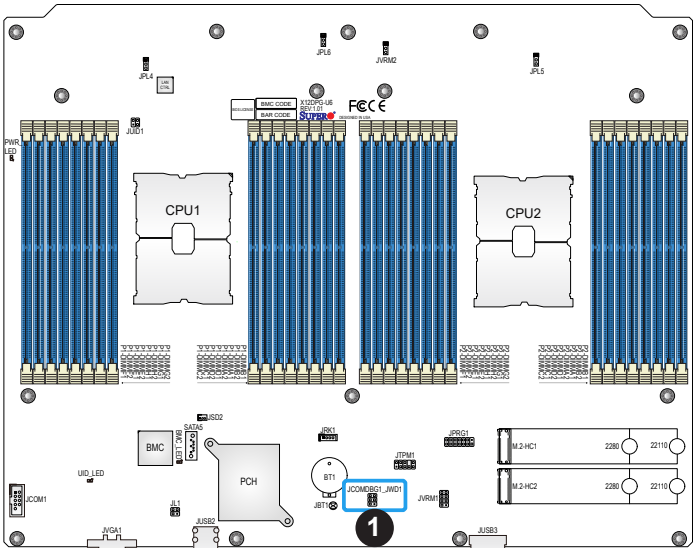
### 1. CMOS Clear

JCOMDBG1\_JWD1

JCOMDBG1\_JWD1 allows you to switch the console selection or watchdog. Close pins 1-3 to enable the console by BMC, or close pins 3-5 to enable the console by BIOS. Watchdog is a system monitor that can reboot the system when a software application hangs. Close pins 2-4 to reset the system if an application hangs. Close pins 4-6 to generate a non-maskable interrupt (NMI) signal for the application that hangs. For this function to work properly, please also enable the Watchdog setting in the BIOS. Refer to the tables below for pin definitions.

| Console Selection Jumper Settings |              |
|-----------------------------------|--------------|
| Jumper Setting                    | Definition   |
| Pins 1-3                          | BMC console  |
| Pins 3-5                          | BIOS console |

| Watch Dog Jumper Settings |            |
|---------------------------|------------|
| Jumper Setting            | Definition |
| Pins 2-4                  | Reset      |
| Pins 4-6                  | NMI        |



## BMC Enable

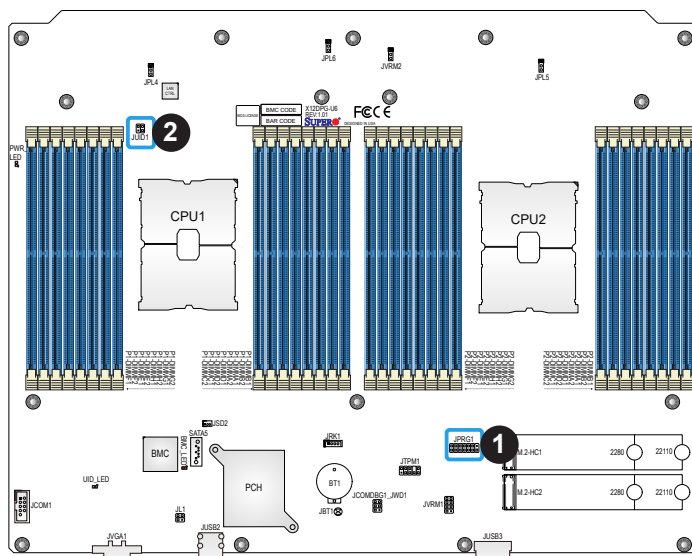
JPRG1 allows you to enable the embedded Baseboard Management Controller (BMC) to provide BMC 2.0/KVM support on the motherboard. By default, the BMC is enabled. Refer to the table below for pin definitions.

| BMC Enable Jumper Settings |                       |
|----------------------------|-----------------------|
| Jumper Setting             | Definition            |
| Pins 10-12                 | BMC enabled (default) |
| Pins 12-14                 | Disabled              |

## Unit Identifier (UID)/System Reset

JUID1 allows you to switch between UID and system reset when the motherboard is assembled into the system. The UID LED will light up to identify the system when closing pins 1-2. Close pins 3-4 to reset the system when pressing the system reset button. Refer to the table below for pin definitions.

| UID/System Reset Jumper Settings |              |
|----------------------------------|--------------|
| Jumper Setting                   | Definition   |
| Pins 1-2                         | UID          |
| Pins 3-4                         | Reset system |

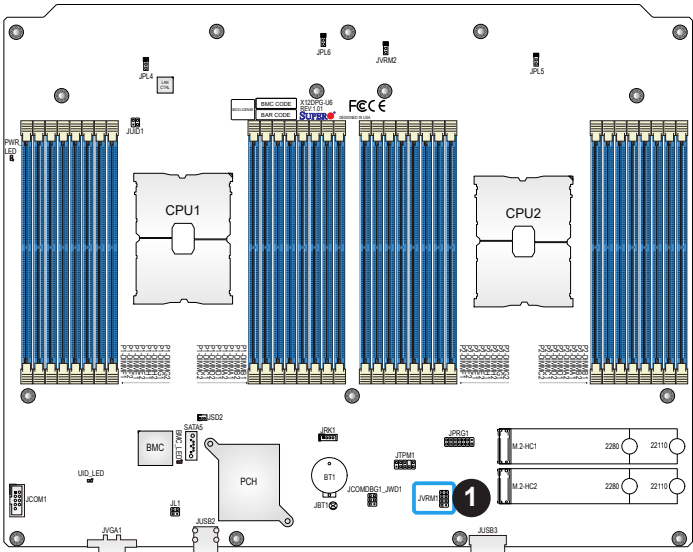


1. BMC Enable
2. UID/System Reset

I<sup>2</sup>C Bus for VRM

JVRM1 allows the BMC or the PCH to access CPU and memory VRM controllers. Refer to the table below for pin definitions.

| VRM<br>Jumper Settings |                                    |
|------------------------|------------------------------------|
| Jumper Setting         | Definition                         |
| Pins 1-3               | BMC I <sup>2</sup> C/SDA (default) |
| Pins 3-5               | PCH I <sup>2</sup> C/SDA           |
| Pins 2-4               | BMC I <sup>2</sup> C/SCL (default) |
| Pins 4-6               | PCH I <sup>2</sup> C/SCL           |



1. I<sup>2</sup>C Bus

## 2.8 Motherboard Power

This system is composed of the motherboard, midplane, carrier board, and powered by the specific power supply unit for the whole system. This motherboard can be powered individually by using an ATX power supply unit for the technician to debug. Refer to the table below to set the jumpers depending on the assembly of the system.

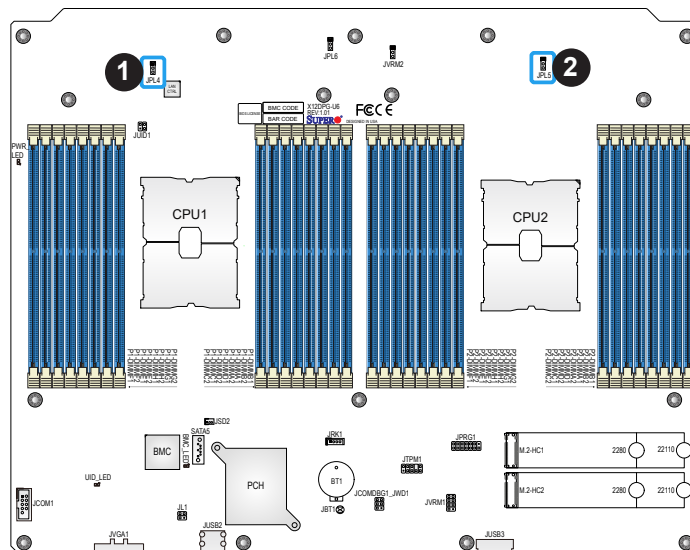
| Assembled Status                                 | Jumper Settings                          | Function                                                                |
|--------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------|
| Motherboard only                                 | JPL4, JPL5, and JVRM2 set to debug       | For motherboard debug or validation                                     |
| Motherboard with midplane connection             | JPL4, JPL5, JPL6, and JVRM2 set to debug | For higher power requirements or validation the motherboard on the rack |
| System (motherboard, midplane and carrier board) | All jumpers above set to default         | For system operation                                                    |

### JPL4 and JPL5

JPL4 and JPL5 allow you to enable the Complex Programmable Logic Device (CPLD) control on the motherboard or carrier board. Refer to the tables below for pin definitions.

| JPL4 Jumper Settings |                                       |
|----------------------|---------------------------------------|
| Jumper Setting       | Definition                            |
| Pins 1-2             | Controlled by carrier board (default) |
| Pins 2-3             | Controlled by motherboard (debug)     |

| JPL5 Jumper Settings |                                       |
|----------------------|---------------------------------------|
| Jumper Setting       | Definition                            |
| Pins 1-2             | Controlled by carrier board (default) |
| Pins 2-3             | Controlled by motherboard (debug)     |



JPL6

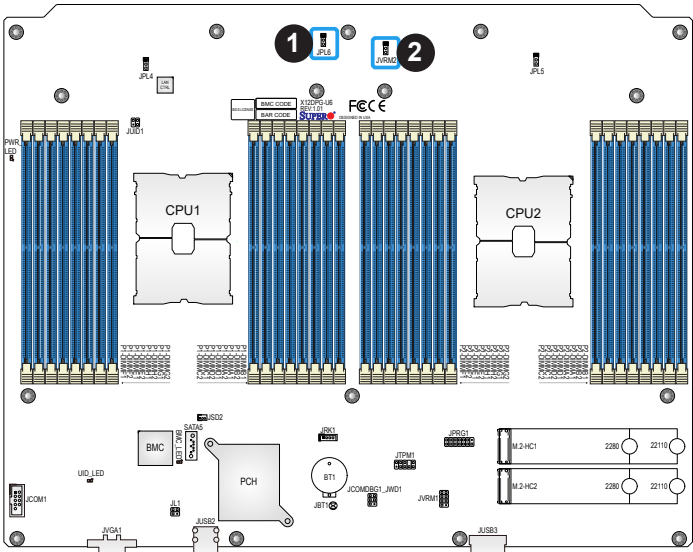
JPL6 allows you to set the position of the jumper depending on the connection of the carrier board. Refer to the table below for pin definitions.

| JPL6<br>Jumper Settings |                                          |
|-------------------------|------------------------------------------|
| Jumper Setting          | Definition                               |
| Pins 1-2                | Without carrier board connection (debug) |
| Pins 2-3                | With carrier board connection (default)  |

12V Standby Power

JVRM2 allows you to enable the 12V standby power for debugging this motherboard. Refer to the table below for pin definitions.

| 12V Standby Power<br>Jumper Settings |                                       |
|--------------------------------------|---------------------------------------|
| Jumper Setting                       | Definition                            |
| Pins 1-2                             | Enabled (Debug)                       |
| Pins 2-3                             | Controlled by carrier board (default) |



- 1. JPL6
- 2. 12V Standby Power

## 2.9 LED Indicators

### Onboard Power LED

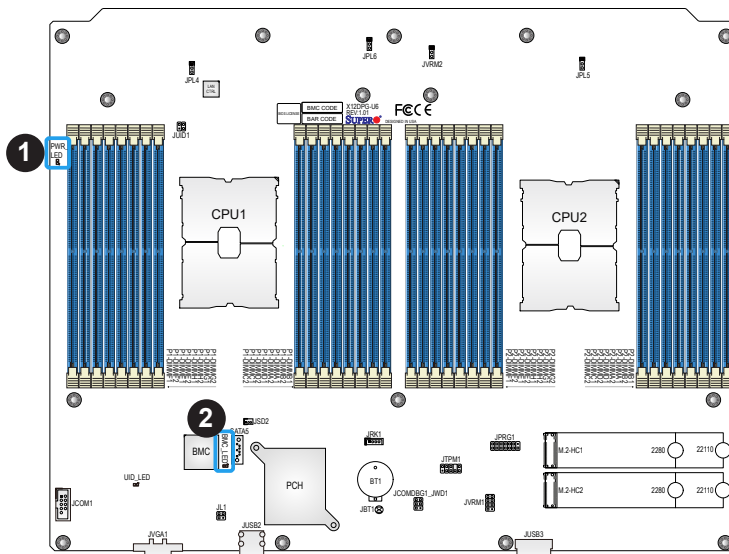
The Onboard Power LED is located at PWR\_LED on the motherboard. When this LED is on, the system power is on. Be sure to turn off the system power and unplug the power cord before removing or installing components. Refer to the table below for more detailed information.

| Onboard Power LED<br>LED Status |                  |
|---------------------------------|------------------|
| Status                          | Definition       |
| Off                             | System power off |
| Solid Green                     | System power on  |

### BMC LED

BMC\_LED is the BMC heartbeat LED. When the LED is blinking green, BMC is functioning normally. Refer to the table below for more detailed information.

| BMC Heartbeat LED<br>LED Status |                                                 |
|---------------------------------|-------------------------------------------------|
| Status                          | Definition                                      |
| Off                             | System power off<br>(power cable not connected) |
| Blinking Green                  | BMC normal                                      |



1. Onboard Power LED
2. BMC LED

The UID Indicator provides easy identification of a system unit that may be in need of service. Refer to the table below for more detailed information.

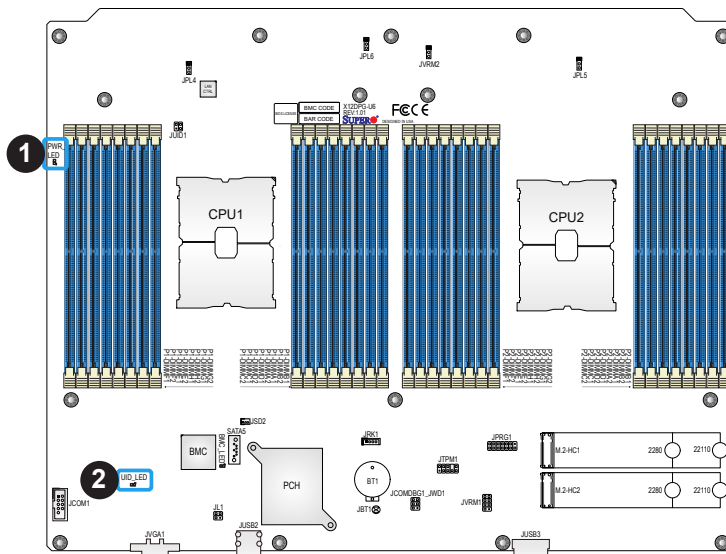
| Unit ID LED<br>LED Status |                 |
|---------------------------|-----------------|
| Status                    | Definition      |
| Solid Blue                | Unit identified |



## RoT LED Indicators

RoT is a trusted computing module embedded in the system. It consists of the computing hardware and software with a cryptographic system that provides fundamental security services such as reboot the computer system. Refer to the table below for the detailed behavior of RoT LED.

| Root of Trust (RoT)<br>LED Status                                 |                                               |                       |
|-------------------------------------------------------------------|-----------------------------------------------|-----------------------|
| Behavior                                                          | Power LED                                     | UID LED               |
| BIOS/BMC checking                                                 | Blinking Green at 4Hz                         | Off                   |
| BIOS recovering/updating                                          | Blinking Green at 4Hz                         | Blinking Blue at 10Hz |
| BMC recovering/updating                                           | Blinking Green at hotspare<br>(on-on-off-off) | Blinking Blue at 10Hz |
| BIOS/BMC flash is not detected or<br>golden image checking failed | Blinking Green at 1Hz                         | Off                   |
| CPLD recovery mode                                                | Off                                           | Blinking Blue at 10Hz |



## Chapter 3

# Troubleshooting

### 3.1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/or 'Returning Merchandise for Service' section(s) in this chapter. Always disconnect the AC power cord before adding, changing or installing any non hot-swap hardware components.

#### Before Power On

1. Make sure that there are no short circuits between the motherboard and chassis.
2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.
3. Remove all add-on cards.
4. Install the CPU (making sure it is fully seated) and connect the front panel connectors to the motherboard.

#### No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.
2. Make sure that the power connectors are properly connected.
3. Check that the 115V/230V switch, if available, on the power supply is properly set.
4. Turn the power switch on and off to test the system, if applicable.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

## No Video

1. Make sure that your peripherals or devices function normally.
2. If you see no any video in power on mode, please turn off the system, then remove all add-on cards and cables. Check if the system can be powered on

## System Boot Failure

If the system does not display Power-On-Self-Test (POST) or does not respond after the power is turned on, check the following:

1. Remove all components from the motherboard, especially the DIMM modules.
2. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this chapter.

## Memory Errors

1. Make sure that the memory modules are compatible with the system and are properly installed. See [Chapter 2](#) for installation instructions. (For memory compatibility, refer to the "Tested Memory List" link on the motherboard's product webpage to see a list of supported memory.)
2. Check if all memory modules are populated with same type and speed.
3. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.

## Losing the System's Setup Configuration

- The coin battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

## When the System Becomes Unstable

**A. If the system becomes unstable during or after OS installation, check the following:**

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.
2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.



**Note:** Click on the "Tested Memory List" link on the motherboard's product webpage to see a list of supported memory.

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.
4. System cooling: Check the system cooling to make sure that all heatsink fans and CPU/system fans, etc., work properly. Check the hardware monitoring settings in the BMC to make sure that the CPU and system temperatures are within the normal range. Also check the front panel Overheat LED and make sure that it is not on.
5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.
6. Proper software support: Make sure that the correct drivers are used.

***B. If the system becomes unstable before or during OS installation, check the following:***

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as SATA DOM or SSD.
2. Cable connection: Check to make sure that all cables are connected and working properly.
3. Use the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with the CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.
4. Identify bad components by isolating them: If necessary, remove a component in question from the chassis, and test it in isolation to make sure that it works properly. Replace a bad component with a good one.
5. Check and change one component at a time instead of changing several items at the same time. This will help isolate and identify the problem.
6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

## 3.2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, please note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problems with the specific system configuration that was sold to you.

1. Please go through the [Troubleshooting Procedures](#) and [Frequently Asked Questions](#) (FAQ) sections in this chapter or see the FAQs on our website (<http://www.supermicro.com/FAQ/index.php>) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website ([http://www.supermicro.com/ResourceApps/BIOS\\_IPMI\\_Intel.html](http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html)).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
  - Motherboard model and PCB revision number
  - BIOS release date/version (This can be seen on the initial display when your system first boots up.)
  - System configuration
4. An example of a Technical Support form is on our website at <http://www.supermicro.com/RmaForm/>.
5. Distributors: For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at [support@supermicro.com](mailto:support@supermicro.com).

### 3.3 Frequently Asked Questions

**Question: What type of memory does my motherboard support?**

**Answer:** This motherboard supports up to 8TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 (288-pin) ECC memory with speeds of 3200/2933/2666MHz in 32 slots and up to 8TB of Intel Optane PMem 200 Series with speeds of up to 3200MHz. (See the note below). To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given on [Section 2.4](#) in Chapter 2.

 **Note:** The Intel Optane Persistent Memory (PMem) 200 series are supported by the 3rd Gen. Intel Xeon Scalable (83xx/63xx/53xx/4314) processors.

**Question: How do I update my BIOS?**

**Answer:** It is recommended that you do not upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at [http://www.supermicro.com/ResourceApps/BIOS\\_IPMI\\_Intel.html](http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html). Please check our BIOS warning message and the information on how to update your BIOS on our website. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading.

 **Note:** The SPI BIOS chip used on this motherboard cannot be removed. Send your motherboard back to our RMA Department at Supermicro for repair. For BIOS Recovery instructions, please refer to the AMI BIOS Recovery Instructions posted at <http://www.supermicro.com/support/manuals/>.

***To update your BIOS under UEFI Shell***

 **Note:** We do not recommend that you update your BIOS if you are not experiencing a BIOS-related problem. If you need to update your BIOS, please follow the steps below to properly update your BIOS under UEFI Shell.

1. Download and save the BIOS update package to your computer.
2. Extract the files from the UEFI folder of the BIOS package to a USB flash drive.

 **Note:** The USB flash drive doesn't have to be bootable; however, it has to be formatted with the FAT/FAT32 file system.

3. Insert the USB flash drive into a USB port, boot to the Build-In UEFI Shell, and enter the following commands to start the BIOS update:

```
Shell> fs0:
```

```
fs0:\> cd UEFI
```

```
fs0:\UEFI> flash.nsh BIOSname#.###
```

4. The FLASH.NSH script will compare the Flash Descriptor Table (FDT) code in the new BIOS with the existing one in the motherboard:

***a. If a different FDT is found***

- A new file, STARTUP.NSH, will be created, and the system will automatically reboot in 10 seconds without you pressing any key. BIOS will be updated after the system reboots.
- You can also press <Y> to force an immediate system reboot to shorten the process. During system reboot, press the <F11> key to invoke the boot menu and boot into the build-in UEFI Shell. Your BIOS will be updated automatically.

***b. If the FDT is the same***

- BIOS update will be immediately performed without a system reboot initiated.

**Warning:** Do not shut down or reset the system while updating the BIOS to prevent possible boot failure!

5. Perform an A/C power cycle after the message indicating the BIOS update has completed.
6. Go to the BIOS setup utility, and restore the BIOS settings.

## 3.4 Battery Removal and Installation

### Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below.
3. Use a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.
4. Remove the battery.

### Proper Battery Disposal

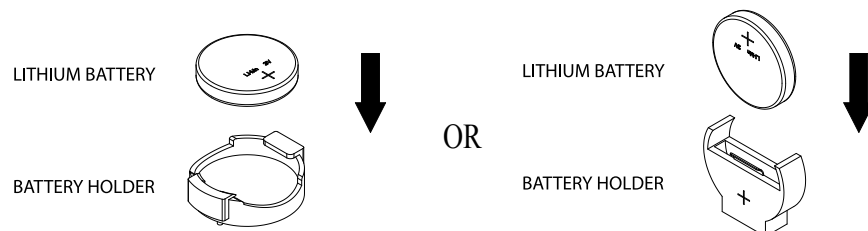
**Warning:** Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

### Battery Installation

To install an onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below
3. Identify the battery's polarity. The positive (+) side should be facing up.
4. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

**Warning:** When replacing a battery, be sure to only replace it with the same type.



## 3.5 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning the motherboard to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and the shipping package is mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete. For faster service, you can also request a RMA authorization online (<http://www.supermicro.com/RmaForm/>).

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.

## Chapter 4

# UEFI BIOS

### 4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.



**Noe:** Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. Please refer to the Manual Download area of our website for any changes to the BIOS that may not be reflected in this manual.

#### Starting the Setup Utility

To enter the BIOS Setup Utility, hit the <Delete> key while the system is booting-up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.) Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. 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. (Note that the BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.

A " ►" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F2>, <F3>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

## 4.2 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:



### System Date/System Time

Use this option to change the system date and time. Highlight *System Date* or *System Time* using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in MM/DD/YYYY format. The time is entered in HH:MM:SS format.

 **Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is the BIOS build date after RTC reset.

### Supermicro X12DPG-U6

#### 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.

#### CPLD Version

This item displays the Complex Programmable Logic Device version.

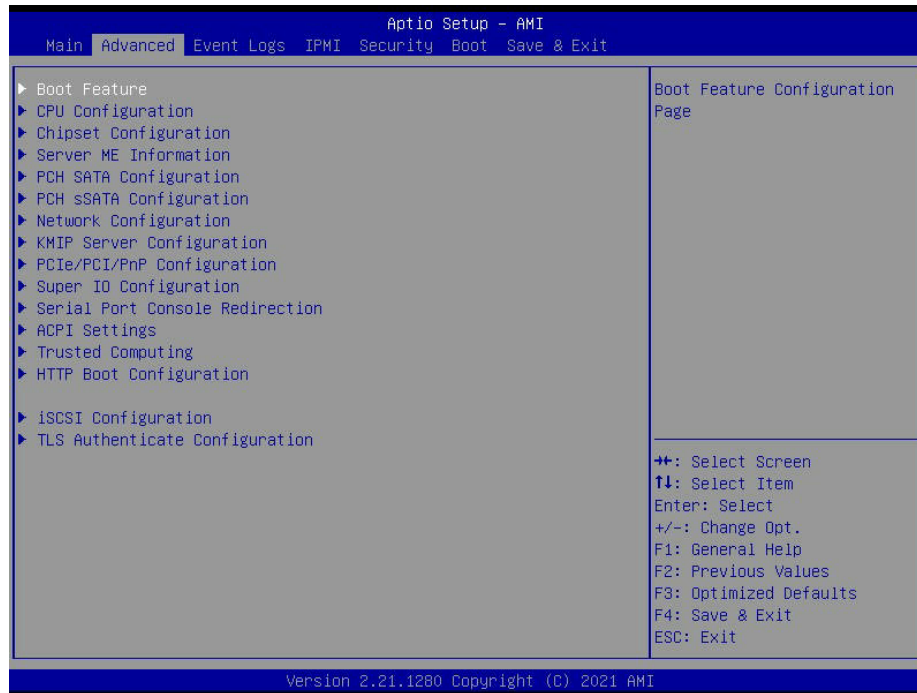
## **Memory Information**

### **Total Memory**

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

## 4.3 Advanced Setup Configurations

Use the arrow keys to select the Advanced menu and press <Enter> to access the submenu 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.

### ► Boot Feature

#### 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.

**INT19 (Interrupt 19) Trap Response**

Interrupt 19 is the software interrupt that handles the boot disk function. When this feature is set to Immediate, the ROM BIOS of the host adapters will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adapters to function as bootable disks. If this feature is set to Postponed, the ROM BIOS of the host adapters will not capture Interrupt 19 immediately and allow the drives attached to these adapters to function as bootable devices at bootup. The options are **Immediate** and Postponed.

**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 you 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 you presses the power button. The options are **Instant Off** and 4 Seconds Override.

## ► CPU Configuration

The following CPU information will display:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM (Per Core)
- L2 Cache RAM (Per Core)
- L3 Cache RAM (Per Core)
- Processor 0 Version
- Processor 1 Version

## ► CPU1 Core Disable Bitmap/CPU2 Core Disable Bitmap

### CPU1 Core Disable Bitmap/CPU2 Core Disable Bitmap

#### Available Bitmap:

#### Core Disable Bitmap (Hex)

Use this feature to enable or disable CPU cores in the processor specified by you. Enter 0 to enable all cores available in the processor. Disable all cores is an invalid configuration, at least one core per CPU must be enabled. The default setting is **0**.

#### Hyper-Threading (ALL)

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

#### 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 **Enable** and Disable.

### 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.

### DCU Streamer Prefetcher

Select Enable to enable the Data Cache Unit (DCU) Streamer Prefetcher which will stream and prefetch data and send it to the Level 1 data cache to improve data processing and system performance. The options are **Enable** and Disable.

### DCU IP Prefetcher

Select Enable for Data Cache Unit (DCU) IP Prefetcher support, which will prefetch IP addresses to improve network connectivity and system performance. The options are **Disable** and Enable.

### LLC Prefetch

If set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L3 cache to improve CPU performance. The options are **Disable** and Enable.

### Extended APIC

Select Enable to activate Advanced Programmable Interrupt Controller (APIC) support. The options are **Disable** and Enable.

### VMX

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**.



**Note:** Be sure to reboot the system for the change to take effect.

### Enable SMX

Use this feature to enable the Safer Mode Extensions (SMX). The options are **Disable** and Enable.

### PPIN Control

Select Unlock/Enable to use the Protected Processor Inventory Number (PPIN) in the system. The options are Unlock/Disable and **Unlock/Enable**.

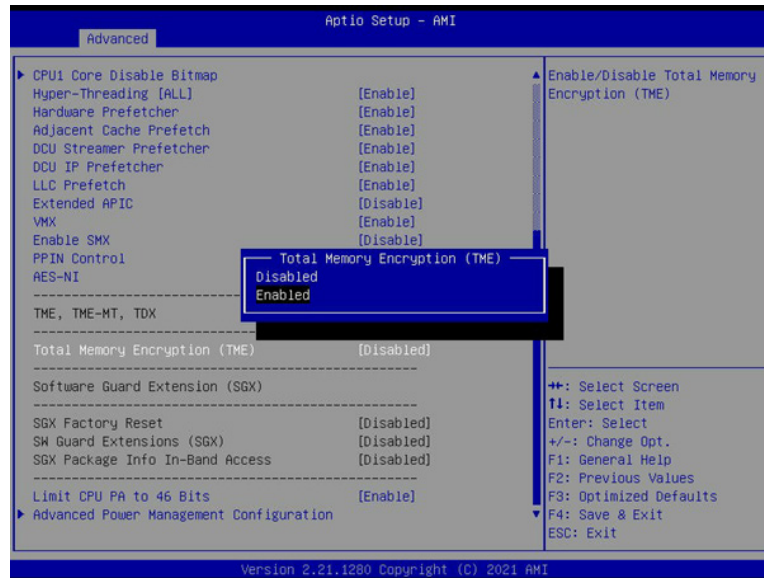
### AES-NI

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are Disable and **Enable**.

## TME, TME-MT, TDX

### Total Memory Encryption (TME) (Available when CPU supports TME capability)

Use this feature to enable the Total Memory Encryption (TME) function for physical memory protection. The options are **Disabled** and **Enabled**.



### Total Memory Encryption Multi-Tenant (TME-MT) (Available when **Total Memory Encryption (TME)** is set to **Enabled** and **Limit CPU PA to 46 bits** is set to **Disabled**)

Use this feature to support tenant-provided (SW-provided) keys. The options are **Disabled** and **Enabled**.

### MAX TME-MT Keys (Available when "**Total Memory Encryption Multi-Tenant (TME-MT)**" is set to **Enabled**)

This feature displays the maximum TME-MT keys.

*\*The following Software Guard Extension (SGX) features are available when "**Total Memory Encryption (TME)**" is set to **Enabled** and CPU is supported with Intel Software Guard Extensions (SGX).*



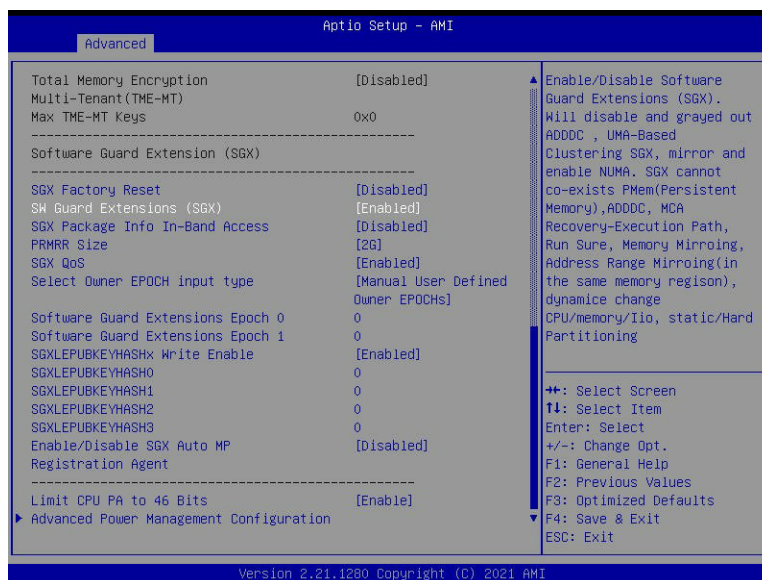
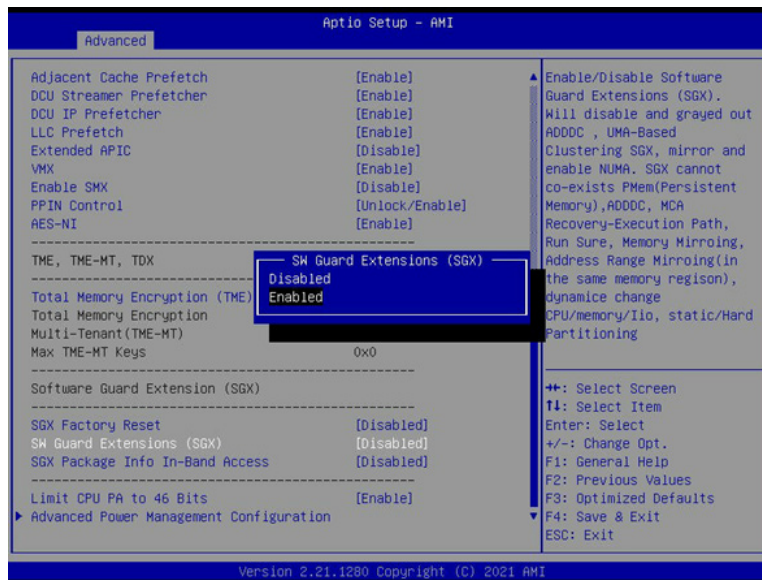
**Note:** Make sure the DIMMs are populated with one DIMM per channel.

### SGX Factory Reset

Use this feature to perform an SGX factory reset to delete all registration data and force an Initial Platform Establishment flow. Reboot the system for the change to take effect. The options are **Disabled** and **Enabled**.

## SW Guard Extensions (SGX)

Use this feature to enable Intel Software Guard Extensions (SGX) support. Intel SGX is a set of extensions that increases the security of application code and data by using enclaves in memory to protect sensitive information. The options are **Disabled** and Enabled.



## SGX Package Info In-Band Access

Setting this feature to Enabled is required before BIOS provides software with the key blobs, which are generated for each CPU package. The options are **Disabled** and Enabled.

## PRMRR Size

Use this feature to set the Processor Reserved Memory Range Register (PRMRR) size. The options are No valid PRMRR size, 1G, **2G**, 4G, 8G, 16G, 32G, 64G, 128G, 256G, and 512G.

## SGX QoS

Use this feature to enable Intel SGX Quality of Service (QoS) support. QoS can make better network performance by prioritizing network traffic. The options are Disabled and **Enabled**.

### Select Owner EPOCH input type

Owner EPOCH is used as a parameter to allow the owner to add entropy to the keys during the derivation. Use this feature to select the two Owner EPOCH modes. One is New Random Owner EPOCH , the other is manually entered by you. Each EPOCH is 64-bit. The options are Change to New Random Owner EPOCHs and **Manual User Defined Owner EPOCHs**.



**Note:** Changing the Owner EPOCH value will lose the data in enclaves.

### Software Guard Extensions Epoch 0 (Available when "[Select Owner EPOCH input type](#)" is set to Manual User Defined Owner EPOCHs)

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

### Software Guard Extensions Epoch 1 (Available when "[Select Owner EPOCH input type](#)" is set to Manual User Defined Owner EPOCHs)

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

### SGXLEPUBKEYHASHx Write Enable

Use this feature to write SGX LE Public Key Hash 0-3 from OS/SW. The options are Disabled and **Enabled**.

### SGXLEPUBKEYHASH0 (Available when "[SGXLEPUBKEYHASHx Write Enable](#)" is set to Enabled)

Use this feature to enter the bytes 0-7 of SGX Launch Enclave Public Key Hash. The default is **0**.

### SGXLEPUBKEYHASH1 (Available when "[SGXLEPUBKEYHASHx Write Enable](#)" is set to Enabled)

Use this feature to enter the bytes 8-15 of SGX Launch Enclave Public Key Hash. The default is **0**.

### SGXLEPUBKEYHASH2 (Available when "[SGXLEPUBKEYHASHx Write Enable](#)" is set to Enabled)

Use this feature to enter the bytes 16-23 of SGX Launch Enclave Public Key Hash. The default is **0**.

### SGXLEPUBKEYHASH3 (Available when "[SGXLEPUBKEYHASHx Write Enable](#)" is set to Enabled)

Use this feature to enter the bytes 24-31 of SGX Launch Enclave Public Key Hash. The default is **0**.

**Enable/Disable SGX Auto MP Registration Agent**

Use this feature to enable/disable SGX Auto Multi-Package Registration Agent (MPA) running automatically at boot time. The options are **Disabled** and **Enabled**.

**Limit CPU PA to 46 Bits**

Select Enable to limit CPU physical address to 46 bits to support the older Hyper-v CPU platform. The options are **Disable** and **Enable**.

**► Advanced Power Management Configuration****Advanced Power Management Configuration****Power Technology**

Select Energy Efficiency to support power-saving mode. Select Custom to customize system power settings. Select Disable to disable power-saving settings. The options are **Disable**, **Energy Efficient**, and **Custom**.

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

**Power Performance Tuning**

This feature allows you to select whether the BIOS or Operating System chooses energy performance bias tuning. The options are **OS Controls EPB** or **BIOS Controls EPB**.

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

**ENERGY\_PERF\_BIAS CFG mode**

The Energy Performance BIAS (EPB) feature allows you to configure CPU power and Performance settings. Select Maximum Performance to set the highest performance. Select Performance to optimize performance over energy efficiency. Select Balanced Performance to prioritize Performance optimization while conserving energy. Select Balanced Power to prioritize energy conservation while maintaining good performance. Select Power to optimize energy efficiency over performance. The options are **Maximum Performance**, **Performance**, **Balanced Performance**, **Balanced Power**, and **Power**.

## ► CPU P State Control

This feature allows you to configure the following CPU power settings:

### CPU P State Control

#### SpeedStep (P-states)

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

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

#### AVX P1

Use this feature to select the AVX P1 level. The options are **Normal**, Level1, and Level 2.

#### Dynamic SST-PP

Use this feature to enable the Dynamic SST-PP. The options are **Disable** and **Enable**.

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

#### Intel SST-PP

Use this feature to set the Intel SST-PP up to two additional base frequency conditions. The options are **Base**, Config 3, and, Config 4.

#### Activate SST-BF

Use this feature to enable the Activate SST-BF. The options are **Disable** and **Enable**.

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

#### Configure SST-BF

Use this feature to set SST-BF high priority cores. The options are **Disable** and **Enable**.

#### EIST PSD Function

This feature allows you to choose between Hardware and Software to control the processor's frequency and performance (P-state). In HW\_ALL mode, the processor hardware is responsible for coordinating the P-state, and the OS is responsible for keeping the P-state request up to date on all Logical Processors. In SW\_ALL mode, the OS Power Manager is responsible for coordinating the P-state, and must initiate the transition on all Logical Processors. In SW\_ANY mode, the OS Power Manager is responsible for coordinating the P-state and may initiate the transition on any Logical Processors. The options are **HW\_ALL** and **SW\_ALL**.

### **Turbo Mode**

This feature will enable dynamic control of the processor, allowing it to run above stock frequency. The options are Disable and **Enable**.

### **CPU Flex Ratio Override**

Select Enable to activate CPU Flex Ratio programming. The flex ratio should be under the CPU's max ratio. The options are **Disable** and Enabled.

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

### **CPU Flex Ratio Settings**

When CPU Flex Ratio override is enabled, this feature sets the value for the CPU Flex Ratio. The value must be between the maximum efficiency ratio and maximum non-turbo ratio. The default value is dependent on the CPU.

## **► Hardware PM State Control**

### **Hardware PM State Control**

#### **Hardware P-States**

This feature allows you to select between OS and hardware-controlled P-states. Selecting Native Mode allows the OS to choose a P-state. Selecting Out of Band Mode allows the hardware to autonomously choose a P-state without OS guidance. Selecting Native Mode with No Legacy Support functions as Native Mode with no support for older hardware. The options are **Disable**, Native Mode, Out of Band Mode, and Native Mode with No Legacy Support.

## **► Frequency Prioritization**

### **Frequency Prioritization**

#### **RAPL Prioritization**

Use this feature to activate per core power budgeting. The options are Enable and **Disable**.

## ► CPU C State Control

### CPU C State Control

#### Enable Monitor MWAIT

Select Enable to support Monitor and Mwait, which are two instructions in Streaming SIMD Extension 3 (SSE3), to improve synchronization between multiple threads for CPU performance enhancement. The options are Disable and **Enable**.

#### CPU C6 Report

Select Enable to allow the BIOS to report the CPU C6 State (ACPI C3) to the operating system. During the CPU C6 State, the power to all cache is turned off. The options are Disable, Enable, and **Auto**.

#### Enhanced Halt State (C1E)

Select Enable to use Enhanced Halt State technology, which will significantly reduce the CPU's power consumption by reducing its clock cycle and voltage during a Halt-state. The options are Disable and **Enable**.

## ► Package C State Control

### Package C State Control

#### Package C State

This feature allows you to set the limit on the C State package register. The options are C0/C1 State, C2 State, C6 (Non Retention) State, C6 (Retention) State, and **Auto**.

## ► CPU T State Control

### CPU T State Control

#### Software Controlled T-States

Use this feature to enable Software Controlled T-States. The options are **Disable** and Enable.

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

#### T-State Throttle Level

Use this feature to select the On-Die thermal throttling. The options are **disable**, 6.25%, 12.5%, 18.75%, 25.0%, 31.25%, 37.5%, 43.75%, 50.0%, 56.25%, 62.5%, 68.75%, 75.0%, 81.25%, 87.5%, and 93.75%.

## ► Chipset Configuration

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

### ► North Bridge

This feature allows you to configure the following North Bridge settings.

#### ► Uncore Configuration

##### Uncore Configuration

The following information will display:

- Number of CPU
- Number of IIO
- Current UPI Link Speed
- Current UPI Link Frequency
- Global MMIO Low Base / Limit
- Global MMIO High Base / Limit
- Pci-e Configuration Base / Size

##### Degrade Precedence

Use this feature to set degrade precedence when system settings are in conflict. Select Topology Precedence to degrade Features. Select Feature Precedence to degrade Topology. The options are **Topology Precedence** and Feature Precedence.

##### Link L0p Enable

Select Enable for the QPI to enter the L0p state for power saving. The options are **Disable**, Enable, and Auto.

##### Link L1 Enable

Select Enable for the QPI to enter the L1 state for power saving. The options are **Disable**, Enable, and Auto.

##### XPT Remote Prefetch

Use this feature to set the XPT Remote Prefetch. The options are Disable, Enable, and **Auto**.

**KTI Prefetch**

KTI Prefetch enables memory read to start early on a DDR bus. The options are Disable, Enable, and **Auto**.

**Local/Remote Threshold**

This feature allows you to set the threshold for the Interrupt Request (IRQ) signal. The options are Disable, **Auto**, Low, Medium, and High.

**IO Directory Cache (IODC)**

IO Directory Cache is an 8-entry cache that stores the directory state of remote IIO writes and memory lookups, and saves directory updates. Use this feature to lower cache to cache (C2C) transfer latencies. The options are Disable, **Auto**, Enable for Remote Invltom Hybrid Push, Invltom AllocFlow, Enable for Remote Invltom Hybrid AllocNonAlloc, and Enable for Remote Invltom and Remote WViLF.

**SNC (Sub NUMA)**

Sub NUMA Clustering (SNC) is a feature that breaks up the Last Level Cache (LLC) into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enable this feature to improve average latency and reduce memory access congestion for higher performance. The options are **Disable**, Enable SNC2 (2-clusters).

**XPT Prefetch**

This feature makes a copy to the memory controller of a read request being sent to LLC. The options are Disable, Enable, and **Auto**.

**Snoop Throttle Configuration**

This feature allows you to set the level of snoop throttle setting for CHA. The options are Disable, **Auto**, Low, Medium, and High.

**PCIe Remote P2P Relaxed Ordering**

Select Enable to enforce the P2P write ordering. The options are **Disable** and Enable.

**Stale AtoS**

Use this feature to optimize the A to S directory. The options are Disable, Enable, and **Auto**.

**LLC Dead Line Alloc**

Select Enable to optimally fill dead lines in LLC. The options are Disable, **Enable**, and Auto.

## ► Memory Configuration

### Integrated Memory Controller (iMC)

#### STEP DRAM Test

Use this feature to enable Samsung TestBIOS & Enhanced PPR (STEP). The options are **Disable** and **Enable**.

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

#### Operation Mode

Use this feature to set an operation mode for STEP DRAM Test. The options are **Test Only** and **Test and Repair**.

#### Enforce POR

Select the Plan of Record (POR) to enforce POR restrictions on DDR4 frequency and voltage programming. The options are **POR** and **Disable**.

#### PPR Type

Use this feature to set the Post Package Repair (PPR) type. The options are **PPR Disable**, **Hard PPR**, and **Soft PPR**.

#### Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 2133, 2200, 2400, 2600, 2666, 2800, 2933, 3000, and 3200.

#### Data Scrambling for DDR4

Use this feature to enable or disable data scrambling for DDR4 memory. The options are **Disable** and **Enable**.

#### 2x Refresh Enable

Select **Enable** for memory 2X refresh support to enhance memory performance. The options are **Auto**, **Disable**, and **Enable**.

## ► Memory Topology

This feature displays the information of onboard memory modules as detected by the BIOS.

## ► Memory RAS Configuration

### Memory RAS Configuration Setup

#### Enable Pcode WA for SAI PG

Use this feature to enable the Pcode Work Around for SAI Policy Group. The options are **Disable** and **Enable**.

#### Mirror Mode

This feature allows memory to be mirrored between two channels, providing 100% redundancy. The options are **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM.

#### UEFI ARM Mirror

This options allows the system to imitate the behavior of the UEFI based Address Range Mirror with setup option. The options are **Disable** and **Enable**.

#### Correctable Error Threshold

Use this feature to specify the threshold value for correctable memory-error logging, which sets a limit on the maximum number of events that can be logged in the memory error log at a given time. The default setting is **512**.

#### Partial Cache Line Sparing PCLS

Use this feature to enable Partial Cache Line Sparing (PCLS). The options are **Disable** and **Enable**.

#### ADDDC Sparing

Adaptive Double Device Data Correction (ADDDC) Sparing detects when the predetermined threshold for correctable errors is reached, copying the contents of the failing DIMM to spare memory. The failing DIMM or memory rank will then be disabled. The options are **Disable** and **Enable**.

#### Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this feature is set to **Enable**, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Disable**, **Enable**, and **Enable at End of POST**.

## ► I/O Configuration

### I/O Configuration

#### ► CPU1 Configuration/CPU2 Configuration

##### **IOU0 (I/O PCIe Port1)**

This feature configures the PCIe port Bifurcation setting for a PCIe port specified by you. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

##### **IOU1 (I/O PCIe Port2)**

This feature configures the PCIe port Bifurcation setting for a PCIe port specified by you. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

##### **IOU3 (I/O PCIe Port4)**

This feature configures the PCIe port Bifurcation setting for a PCIe port specified by you. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

##### **IOU4 (I/O PCIe Port5)**

This feature configures the PCIe port Bifurcation setting for a PCIe port specified by you. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

#### ► P1-JAIOM1/P2-JAIOM1

##### **P1-JAIOM1/P2-JAIOM1**

###### **Link Speed**

Use this feature to select the link speed for the PCI-E port specified by you. The options are Auto, Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), and Gen 4 (16GT/s).

###### **PCI-E Port Link Status**

###### **PCI-E Port Link Max**

###### **PCI-E Port Link Speed**

###### **PCI-E Port Max Payload Size**

Selecting Auto for this feature will enable the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCI-E device, allowing for maximum I/O efficiency. Selecting 128B or 256B will designate maximum packet size of 128 or 256. If possible, select max payload size to 256B. The options are 128B, 256B, 512B, and **Auto**.

## ► IOAT Configuration

### Disable TPH

Transparent Huge Pages (TPH) is a Linux memory management system that enables communication in larger blocks (pages). Enabling this feature will increase performance. The options are **No** and **Yes**.

### Prioritize TPH

Use this feature to enable Prioritize TPH support. The options are **Enable** and **Disable**.

### Relaxed Ordering

Select **Enable** to enable Relaxed Ordering support, which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to other transactions that have already been enqueued. The options are **No** and **Yes**.

## ► Intel® VT for Directed I/O (VT-d)

### Intel® VT for Directed I/O (VT-d)

Select **Enable** to use Intel Virtualization Technology for Direct I/O VT-d support by reporting the I/O device assignments to the Virtual Machine Monitor (VMM) through the DMAR ACPI tables. This feature offers fully-protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and **Disable**.

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

### ACS Control (Available if Intel VT for Directed I/O (VT-d) is enabled)

Use this feature to program Access Control Services (ACS) to the PCI-e Root Port Bridges. The options are **Enable** and **Disable**.

### Interrupt Remapping

Use this feature to enable Interrupt Remapping support, which detects and controls external interrupt requests. The options are **Auto**, **Enable**, and **Disable**.

## ► Intel® VMD Technology

This section describes the configuration settings for the Intel VMD Technology.

 **Note 1:** After you've enabled VMD in the BIOS on a PCIe slot, this PCIe slot will be dedicated for VMD use only, and it will no longer support any PCIe device. To re-activate this slot for PCIe use, please disable VMD in the BIOS.

**Note 2:** PCIe slots and naming can differ depending on the PCIe devices installed on your motherboard.

### Intel® VMD Technology

#### NVMe Mode Switch

Use this feature to select NVMe mode or enable VMD when a VROC key is presence. The options are Manual, VMD, and **Auto**.

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

## ► Intel® VMD for Volume Management Device on CPU1

### VMD Config for PCH ports

#### Enable/Disable VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

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

#### M.2-HC2 VMD/M.2-HC1 VMD

Use this feature to enable Intel Volume Management Device Technology support for the PCH root port. The options are **Disable** and Enable.

### VMD Config for IOU 3

#### Enable/Disable VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

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

#### Hot Plug Capable

Select Enable to enable Hot Plug support for the root ports specified by you, which will allow you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

### VMD Config for IOU 4

#### Enable/Disable VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

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

#### P1-JAIOM1 VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

#### Hot Plug Capable

Select Enable to enable Hot Plug support for the root ports specified by you, which will allow you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

### ►Intel® VMD for Volume Management Device on CPU2

### VMD Config for IOU 0

#### Enable/Disable VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

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

#### P2-JAIOM1 VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

#### Hot Plug Capable

Select Enable to enable Hot Plug support for the root ports specified by you, which will allow you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

### VMD Config for IOU 4

#### Enable/Disable VMD

Select Enable to enable Intel Volume Management Device Technology support for the root port specified by you. The options are **Disable** and Enable.

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

**Hot Plug Capable**

Select Enable to enable Hot Plug support for the root ports specified by you, which will allow you to change the devices on those root ports without shutting down the system. The options are **Disable** and Enable.

**PCI-E ASPM Support (Global)**

Use this feature to enable the ASPM support for all downstream devices. The options are **Disable** and Auto.

**IIO eDPC Support**

Use this feature to enable the IIO eDPC support. The options are **Disable**, On Fatal Error, and, On Fatal and Non-Fatal Errors.

**►South Bridge**

The following USB information will display:

- USB Module Version
- USB Devices

**Legacy USB Support**

This feature enables support for USB 2.0 and older. The options are **Enabled**, Disabled, and Auto.

**XHCI Hand-off**

When this feature is disabled, the motherboard will not support USB 3.0. The options are **Enabled** and Disabled.

**Port 60/64 Emulation**

This feature allows legacy I/O support for USB devices like mice and keyboards. The options are **Disabled** and Enabled.

**PCIe PLL SCC**

Select Enable for PCH PCI-E Spread Spectrum Clocking support, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

**Port 61h Bit-4 Emulation**

Select Enabled to enable the emulation of Port 61h bit-4 toggling in System Management Mode (SMM). The options are **Disabled** and Enabled.

## ► Server ME Configuration

The following General ME Configuration will display:

- General ME Configuration
- Oper. Firmware Version
- Backup Firmware Version
- Recovery Firmware Version
- ME Firmware Status #1
- ME Firmware Status #2
- Current State
- Error Code

## ► PCH SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA devices that are supported by the Intel PCH chip and displays the following features:

### PCH SATA Configuration

#### SATA Controller

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

#### Configure SATA as

Select AHCI to configure a SATA drive specified by you as an AHCI drive. Select RAID to configure a SATA drive specified by you as a RAID drive. The options are **AHCI** and RAID.

#### Support Aggressive Link Power Management

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 **Disable** and Enable.

***\*If the feature "[Configure SATA as](#)" above is set to RAID, the following features will become available for configuration:***

#### SATA RSTe Boot Info

Select Enable to provide full int13h support for the devices attached to SATA controller. The options are Disable and **Enable**.

### SATA RAID Option ROM/UEFI Driver

Select UEFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, **EFI**, and Legacy.

### SATA Port 0 ~ Port 7

#### Port 0 ~ Port 7 Hot Plug

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

#### Port 0 ~ Port 7 Spin Up Device

On an edge detect from 0 to 1, set this feature to allow the PCH to initialize the device. The options are **Disable** and Enable.

#### Port 0 ~ Port 7 SATA Device Type

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

## ►PCH sSATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA devices that are supported by the Intel PCH chip and displays the following features:

### PCH sSATA Configuration

#### sSATA Controller

This feature enables or disables the onboard sSATA controller supported by the Intel PCH chip. The options are **Enable** and Disable.

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

#### Configure sSATA as

Select AHCI to configure an sSATA drive specified by you as an AHCI drive. Select RAID to configure an sSATA drive specified by you as a RAID drive. The options are **AHCI** and RAID.

#### Support Aggressive Link Power Management

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 **Disable** and Enable.

***\*If the feature of **Configure sSATA as** is set to RAID, the following feature will become available for configuration:***

**sSATA RSTe Boot Info**

Select Enable to provide full int13h support for the devices attached to SATA controller. The options are Disable and **Enable**.

**sSATA RAID Option ROM/UEFI Driver**

Select UEFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, **EFI**, and Legacy.

**M.2-HC1/M.2-HC1****M.2-HC1/M.2-HC2/SATA5 Spin Up Device**

On an edge detect from 0 to 1, set this feature to allow the PCH to initialize the device. The options are **Disable** and Enable.

**M.2-HC1/M.2-HC2/SATA5 sSATA Device Type**

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

**SATA5 Hot Plug**

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

**► Network Stack Configuration****Network Stack**

Select Enabled to enable Preboot Execution Environment (PXE) or Unified Extensible Firmware Interface (UEFI) for network stack support. The options are Disabled and **Enabled**.

**IPv4 PXE Support**

Select Enabled to enable IPv4 PXE boot support. The options are Disabled and **Enabled**.

**IPv4 HTTP Support**

Select Enabled to enable IPv4 HTTP boot support. The options are **Disabled** and Enabled.

**IPv6 PXE Support**

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

**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**.

## **►KMIP Server Configuration**

### **KMIP Server IP address**

Use this feature to enter IP4 address in dotted-decimal notation.

### **KMIP TCP Port number**

Use this feature to enter KMIP TCP Port number between 100 to 9999. The default value is **5696**.

### **TimeZone**

Use this feature to enter current timezone GMT+?. The default value is GMT+8 Taiwan time.

### **TCG Nvme KMS Policy**

Use this feature to select TCG Nvme KMS Key Policy. The options are Normal Unlock, **Do Nothing**, Reset All Devices, and Delete Key Id List.

### **TCG Nvme KMS Status Retry Time**

Use this feature to test connection to Key Manage Server between 0 to 300. The default value is **60**.

### **Client UserName**

Use this feature to enter Client identity: user name, name length is 0 to 63 characters.

### **Client Password**

Use this feature to enter Client identity: password, password length is 0 to 31 characters.

### **KMS TLS Certificate/Size**

## **►CA Certificate**

The options include Update, Delete, and Export.

## **►Client Certificate**

The options include Update, Delete, and Export.

## **►Client Private Key**

The options include Update, Delete, and Export.

## ► PCIe/PCI/PnP Configuration

The following information will display:

- PCI Bus Driver Version
- PCI Devices Common Settings:

### **Above 4G Decoding (Available if the system supports 64-bit PCI decoding)**

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are Disabled and **Enabled**.

### **SR-IOV Support**

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

### **ARI Support**

Select Enabled for the Alternative Routing ID Interpretation (ARI) support. The options are **Disabled** and Enabled.

### **Bus Master Enable**

This feature enables a device connected to the bus to initiate Direct Memory Access (DMA) transactions. When Disabled is selected, the PCI Bus Driver disables Bus Master Attribute for Pre-Boot DMA Protection. When Enabled is selected, the PCI Bus Driver enables BUS Master Attribute for DMA transactions. Some devices request Bus master to be enabled for operations. The options are **Disabled** and Enabled.

### **Consistent Device Name Support**

Select enabled for the BIOS to consistently name network devices. The options are **Disabled** and Enabled.

### **MMIO High Base**

Use this feature to select the base memory size according to memory-address mapping for the IO hub. The options are 56T, 40T, **32T**, 24T, 16T, 4T, 2T, 1T, and 512G.

### **MMIO High Granularity Size**

Use this feature to select the high memory size according to memory-address mapping for the IO hub. The options are 1G, 4G, 16G, **64G**, 256G, and 1024G.

### **Maximum Read Request**

Use this feature to select the Maximum Read Request size of the PCI-Express device, or select Auto to allow the System BIOS to determine the value. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

**MMCFG Base**

Use this feature to select the low base address for PCIE adapters to increase base memory. The options are 1G, 1.5G, 1.75G, 2G, 2.25G. and 3G, and **Auto**.

**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.

**VGA Priority**

Use this feature to select VGA priority when multiple VGA devices are detected. Select Onboard to give priority to your onboard video device. Select Offboard to give priority to your graphics card. The options are **Onboard** and Offboard.

**Onboard Video Option ROM**

Use this feature to select the Onboard Video Option ROM type. The options are Disabled and **EFI**.

**M.2-HC1 OPROM/M.2-HC2 OPROM/P1-JAIOM1 OPROM/P2-JAIOM1 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **EFI**.

**RSC-H2-68G4 Slot1 PCIe Gen4 x16 OPROM**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **EFI**.

**NVMe/SAS #0 Option ROM/NVMe/SAS #1 Option ROM/NVMe/SAS #2 Option ROM/  
NVMe/SAS #3 Option ROM/**

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **EFI**.

**► Super IO Configuration****Super IO Configuration**

The following Super IO information will display:

- Super IO Chip AST2600

**► Serial Port 1 Configuration****Serial Port 1 Configuration**

This submenu allows you to configure the settings of Serial Port 1.

### Serial Port 1

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

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

#### Device Settings

This feature displays the status of a serial part specified by you.

#### Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by you. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options for Serial Port 1 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 Configuration

This submenu allows you to configure the settings of Serial Port 2.

#### Serial Port 2

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

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

#### Device Settings

This feature displays the status of a serial part specified by you.

#### Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of a serial port specified by you. Select Auto to allow the BIOS to automatically assign the base I/O and IRQ address. The options for Serial Port 2 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.

## ► Serial Port Console Redirection

### COM1

#### Console Redirection

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

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

## ► Console Redirection Settings

### COM1

#### Console Redirection Settings

##### Terminal Type

This feature allows you 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

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).

##### Data Bits

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

##### 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.

### 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**.

### 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.

### VT-UTF8 Combo Key Support

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

### 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.

### Resolution 100x31

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

### 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**.

### Putty KeyPad

This feature selects the settings for Function Keys and KeyPad used for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

### 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

### 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:***

### ► Console Redirection Settings

## SOL

### Console Redirection Settings

#### Terminal Type

This feature allows you 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

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).

#### Data Bits

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

#### 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.

### 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**.

### 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.

### VT-UTF8 Combo Key Support

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

### 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.

### Resolution 100x31

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

### 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**.

### Putty KeyPad

This feature selects the settings for Function Keys and KeyPad used for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SC0, ESCN, and VT400.

### 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

### Legacy Serial Redirection Port

Use this feature to select a COM port to display redirection of Legacy OS and Legacy OPRM messages. The options are **COM1** and SOL.

### Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

#### Console Redirection EMS

Select Enabled to use a COM port selected by you for EMS Console Redirection. The options are Enabled and **Disabled**.

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

## ► Console Redirection Settings

### 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** and 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 EMS

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 EMS**

**Parity EMS**

**Stop Bits EMS**

## ► **ACPI Settings**

### **ACPI Settings**

#### **NUMA**

Use this feature to enable Non-Uniform Memory Access (NUMA). The options are Disabled and **Enabled**.

#### **NUMA-Based Clustering**

Use this feature to set the NUMA-Based Clustering. The options are Disabled (ALL2ALL) and **Hemisphere (2-clusters)**.



**Note:** This feature is available only when SNC is disabled. If SNC is enabled, NUMA-Based Clustering is automatically disabled by BIOS.

#### **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**.

## ► **Trusted Computing**

The following Trusted Platform Module (TPM) information will be displayed if a TPM 2.0 module is detected.

- TPM 2.0 Device Found
- Firmware Version
- Vendor

### Security Device Support

If this feature and the TPM jumper on the motherboard are both set to Enabled, onboard security devices will be enabled for Trusted Platform Module (TPM) support to enhance data integrity and network security. Please reboot the system for a change on this setting to take effect. The options are Disable and **Enable**.

- Active PCR Bank
- Available PCR banks

***\*If the feature of [Security Device Support](#) is set to Enable, the following features 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

Use this feature to disable or enable endorsement hierarchy for privacy control. The options are Disabled and **Enabled**.

#### PH Randomization

Use this feature to disable or enable Platform Hierarchy (PH) Randomization. The options are **Disabled** and Enabled.

#### SMCI BIOS-Based TPM Provision Support

Use feature to enable the Supermicro TPM Provision support. The options are Disabled and **Enabled**.

### **TXT 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**.

## **► HTTP Boot Configuration**

### **HTTP Boot Configuration**

#### **Http Boot policy**

Use this feature to set the HTTP boot policy. The options are **Apply to all LANs**, **Apply to each LAN**, and **Boot Priority #1 instantly**.

#### **Priority of HTTP Boot**

#### **Instance of Priority 1**

Use this feature to set the rank targeted port. The default setting is **1**.

#### **Select IPv4 or IPv6**

Use this feature to select the boot of targeted LAN port from IPV4 or IPv6. The options are **IPv4** and **IPv6**.

#### **Boot Description**

Use this feature to fill out the boot description. It is necessary to fill out the description, otherwise the boot option for the URI will not be created. The length of description is up to 75 characters.

#### **Boot URI**

Use this feature to create a new IPv4/IPv6 Boot Option. Only Dual and EFI mode can be supported. The length of URI is up to 128 characters.

## **► iSCSI Configuration**

### **iSCSI Initiator Name**

This feature allows you 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. The range is from 4 to 223.

#### **► Add an Attempt**

#### **► Delete Attempts**

#### **► Change Attempt Order**

## ► TLS Authentication Configuration

This submenu allows you to configure Transport Layer Security (TLS) settings.

### ► Server CA Configuration

#### ► Enroll Certification

##### ► Enroll Certification Using File

Use this feature to enroll certification from a file.

##### **Cert GUID**

Use this feature to input the certification GUID.

##### ► Commit Changes and Exit

Use this feature to save all changes and exit TLS settings.

##### ► Discard Changes and Exit

Use this feature to discard all changes and exit TLS settings.

#### ► Delete Certification

### ► Client Certification Configuration

This feature allows you to configure the client certificate to be used by the server.

#### ► Enroll Certification

This feature allows you to enroll the certificate in the system.

##### ► Enroll Cert (Certification) Using File

This feature allows you to enroll the security certificate in the system by using a file.

##### ► Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

**►Commit Changes and Exit**

Select this feature to save the changes you have made and exit from the system.

**►Discard Changes and Exit**

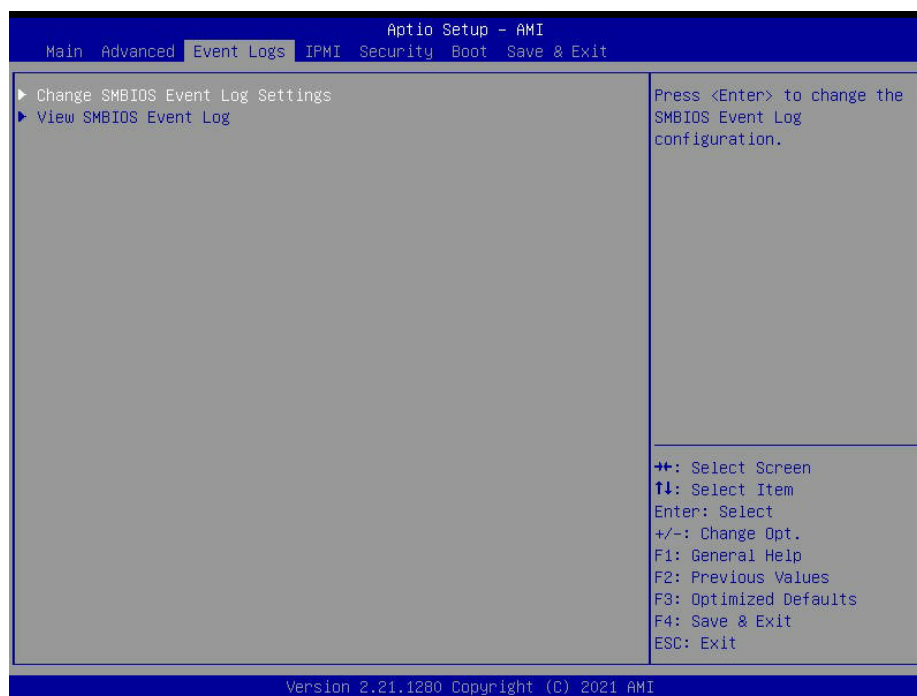
Select this feature to discard the changes you have made and exit from the system.

**►Delete Certification**

If this feature is set to Enable, the certificate enrolled in the system will be deleted. The options are Enable and **Disable**.

## 4.4 Event Logs

Use this feature to configure Event Log settings.



### ► Change SMBIOS Event Log Settings



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

#### Enabling/Disabling Options

##### SMBIOS Event Log

Change this feature to enable or disable all features of the SMBIOS Event Logging during system boot. The options are **Enabled** and Disabled.

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

#### Erasing Settings

##### Erase Event Log

If No is selected, data stored in the event log will not be erased. Select Yes, Next Reset, data in the event log will be erased upon next system reboot. Select Yes, Every Reset, data in the event log will be erased upon every system reboot. The options are **No**, Yes, Next reset, and Yes, Every reset.

**When Log is Full**

Select Erase Immediately for all messages to be automatically erased from the event log when the event log memory is full. The options are **Do Nothing** and Erase Immediately.

**SMBIOS Event Log Standard Settings****Log System Boot Event**

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

**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**.

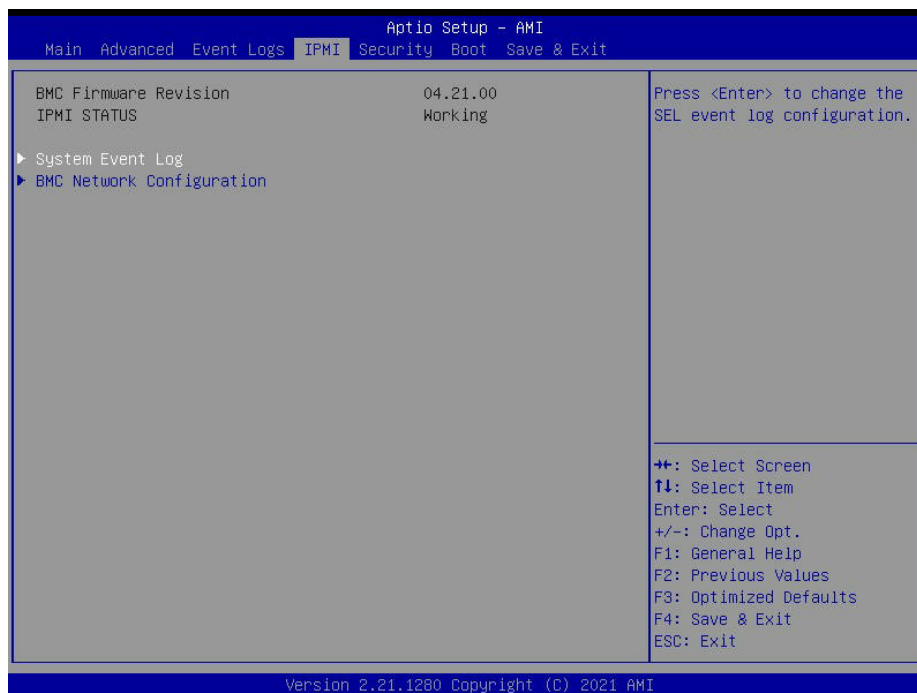
**►View SMBIOS Event Log**

Select this submenu and press enter to see the contents of the SMBIOS event log. The following categories will be displayed:

**Date/Time/Error Codes/Severity.**

## 4.5 BMC

Use this feature to configure Intelligent Platform Management Interface (BMC) settings.



### BMC Firmware Revision

This item indicates the BMC firmware revision used in your system.

### IPMI Status (Baseboard Management Controller)

This item indicates the status of the BMC firmware installed in your system.

### ▶ System Event Log



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

### Enabling/Disabling Options

#### SEL Components

Select Enabled for all system event logging at bootup. The options are Disabled and **Enabled**.

## Erasing Settings

### Erase SEL

Select Yes, On next reset to erase all system event logs upon next system reboot. Select Yes, On every reset to erase all system event logs upon each system reboot. Select No to keep all system event logs after each system reboot. The options are **No**, Yes, On next reset, and Yes, On every reset.

### When SEL is Full

This feature allows you 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.

## ►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.

#### Configure IPV4 Support

This section displays configuration features for IPV4 support.

#### IPMI LAN Selection

This item displays the BMC LAN setting. The default setting is **Failover**.

#### IPMI Network Link Status

This item displays the BMC Network Link status. The default setting is **Shared LAN**.

***\*If the feature of the [Update IPMI LAN Configuration](#) is set to Yes, the following items will become available for configuration:***

#### Configuration Address Source

This feature allows you to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are **DHCP** and Static.

***\*If the item above is set to Static, the following items will become available for configuration:***

#### Station IP Address

This item displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).

**Subnet Mask**

This item displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

**Station MAC Address**

This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

**Gateway IP Address**

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

**VLAN**

This item displays the virtual LAN settings. The options are **Disable** and **Enable**.

***\*If the item above is set to Enable, the following items will become available for configuration:***

**VLAN ID**

Use this feature to enter a unique numeric VLAN ID. Enter a valid value between 1 ~ 4094.

**Configure IPV6 Support**

This section displays configuration features for IPV6 support.

**IPV6 address status****IPV6 Support**

Use this feature to enable IPV6 support. The options are **Enabled** and **Disabled**.

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

**Configuration Address Source**

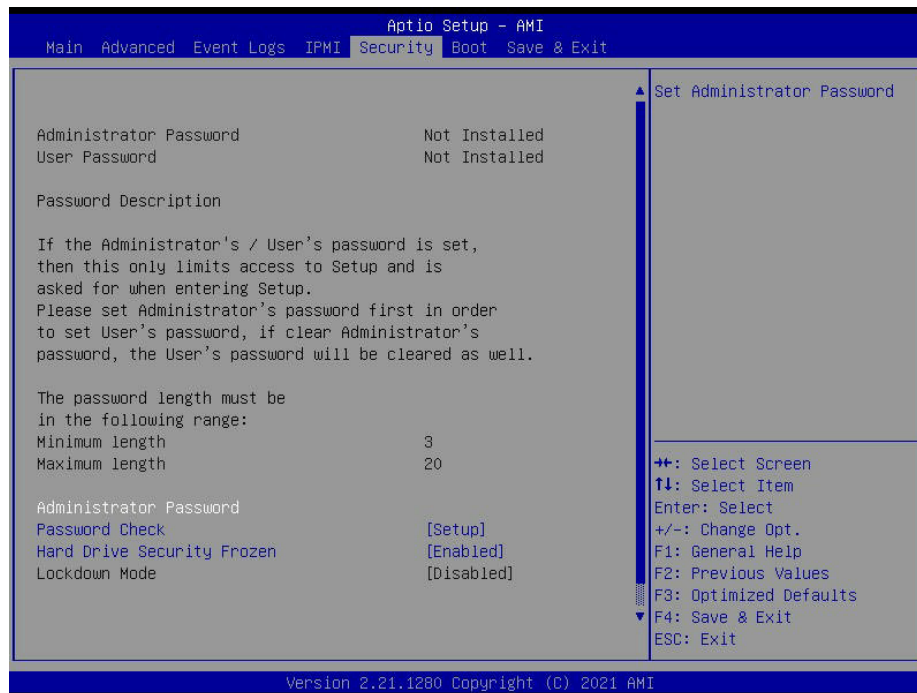
This feature allows you to select the source of the IP address for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are Static and **DHCP**.

***\*If the feature above is set to Static, the following items will become available for configuration:***

- Station IPV6 Address
- Prefix Length
- IPV6 Router1 IP Address

## 4.6 Security

This menu allows you to configure the following security settings for the system.



### Administrator Password

Press Enter to create a new, or change an existing, Administrator password. The length of the password should be from 3 characters to 20 characters long.

### User Password

Press Enter to create a new, or change an existing, User password. The length of the password should be from 3 characters to 20 characters long.

### 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.

### Hard Drive Security Frozen

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

### Lockdown Mode

Select Enabled to support Lockdown Mode which will prevent existing data or keys stored in the system from being altered or changed in an effort to preserve system integrity and security. The options are Enabled and **Disabled**.

## ► Secure Boot

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

- System Mode
- Vendor Keys
- Secure Boot

### Secure Boot

Use this feature to enable secure boot. The options are **Disabled** and Enabled.



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

### Secure Boot Mode

Use this item to configure Secure Boot variables without authentication. The options are Standard and **Custom**.

### CSM Support

Select Enabled to support the EFI Compatibility Support Module (CSM), which provides compatibility support for traditional legacy BIOS for system boot. The options are **Enabled** and Disabled.

## ► Key Management

This submenu allows you to configure the following Key Management settings.



**Note:** *This feature is available when the **Secure Boot Mode** is set to Custom.*

### Vendor Keys

#### Provision Factory Default Keys

Select Enabled to install the default Secure Boot keys set by the manufacturer. The options are **Disabled** and Enabled.

## ► Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases. The options are **Yes** and No.

## ► Reset to Setup Mode

This feature deletes all Secure Boot key databases from NVRAM. The options are **Yes** and No.

### ► Export Secure Boot variables

This feature allows you to copy NVRAM content of Secure boot variables to files in a root folder on a file system device. The options are **Yes** and No.

### ► Enroll Efi Image

This feature allows the image to run in Secure Boot Mode. Enroll SHA256 Hash Certificate of the image into the Authorized Signature Database.

#### Device Guard Ready

### ► Remove 'UEFI CA' from DB

This feature allows you to decide if all secure boot variables should be saved.

### ► Restore DB defaults

Select Yes to restore the DB defaults.

#### Secure Boot Variable

### ► Platform Key (PK)

Use this feature to enter and configure a set of values to be used as platform firmware keys for the system. These values also indicate the sizes, keys numbers, and the sources of the authorized signatures. Select Update to update the platform key. The options are **Details**, Export, Update, and Delete.

### ► Key Exchange Key

Use this feature to enter and configure a set of values to be used as Key-Exchange-Keys for the system. These values also indicate the sizes, keys numbers, and the sources of the authorized signatures. Select Update to update your "Key Exchange Keys". Select Append to append your "Key Exchange Keys". The options are **Details**, Export, Update, Append, and Delete.

### ► Authorized Signatures

Use this feature to enter and configure a set of values to be used as Authorized Signatures for the system. These values also indicate the sizes, keys numbers, and the sources of the authorized signatures. Select Update to update your "Authorized Signatures". Select Append to append your "Authorized Signatures". The options are **Details**, Export, Update, Append, and Delete.

### ►Forbidden Signatures

Use this feature to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, keys numbers, and key sources of the forbidden signatures. Select Update to update your "Forbidden Signatures". Select Append to append your "Forbidden Signatures". The options are **Details**, Export, Update, Append, and Delete.

### ►Authorized TimeStamps

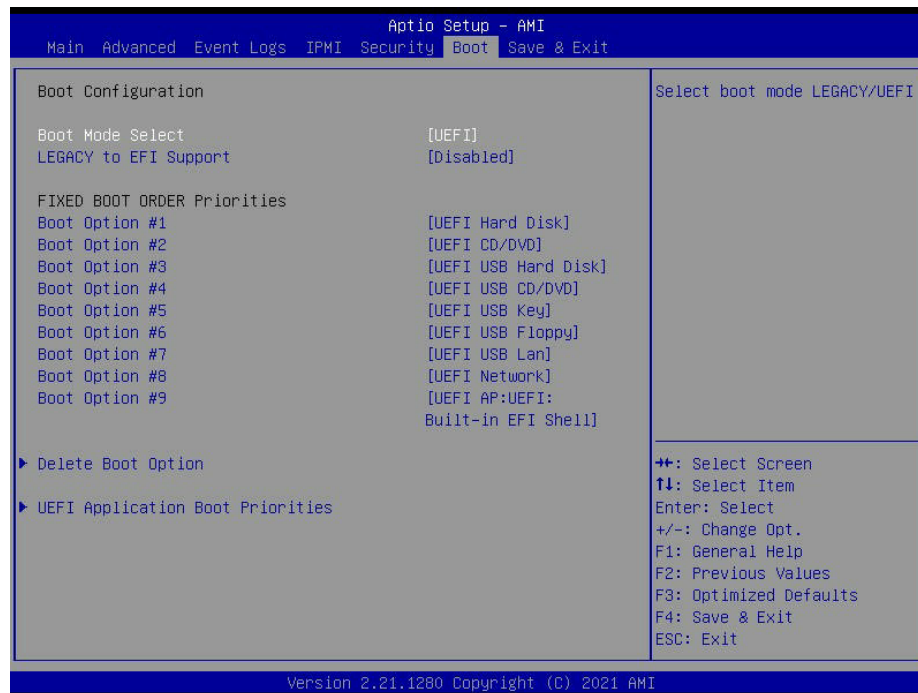
This feature allows you to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. These values also indicate sizes, keys, and key sources of the authorized timestamps. Select Update to update your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps". The options are **Details**, Export, Update, Append, and Delete.

### ►OsRecovery Signature

This feature allows you to set and save the authorized signatures used for OS recovery. Select Update to update your "OS Recovery Signatures". These values also indicate sizes, keys, and key sources of the OsRecovery signatures. Select Append to append your "OS Recovery Signatures". The options are **Details**, Export, Update, Append, and Delete.

## 4.7 Boot

Use this feature to configure Boot settings.



### Boot Configuration

#### Boot Mode Select

Use this item to select the type of device that the system is going to boot from. The options are Legacy, **UEFI**, and DUAL.

#### Legacy to EFI Support

Select Enabled to boot EFI OS support after Legacy boot order has failed. The options are **Disabled** and Enabled.

#### Fixed Boot Order Priorities

This feature prioritizes the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select devices.

#### UEFI Boot Option #1~#17

The options are **UEFI Hard Disk**, UEFI CD/DVD, UEFI USB Hard Disk, UEFI USB CD/DVD, USB Key, UEFI USB Floppy, UEFI USB Lan, UEFI Network, UEFI AP, and Disabled.



**Note:** The UEFI Boot Options are subject to change depending on the selection of **Boot Mode Select**.

## ►Delete Boot Option

This feature allows you to select a boot device to delete from the boot priority list.

### **Delete Boot Option**

Use this item to remove an EFI boot option from the boot priority list.

## ►UEFI Application Boot Priorities



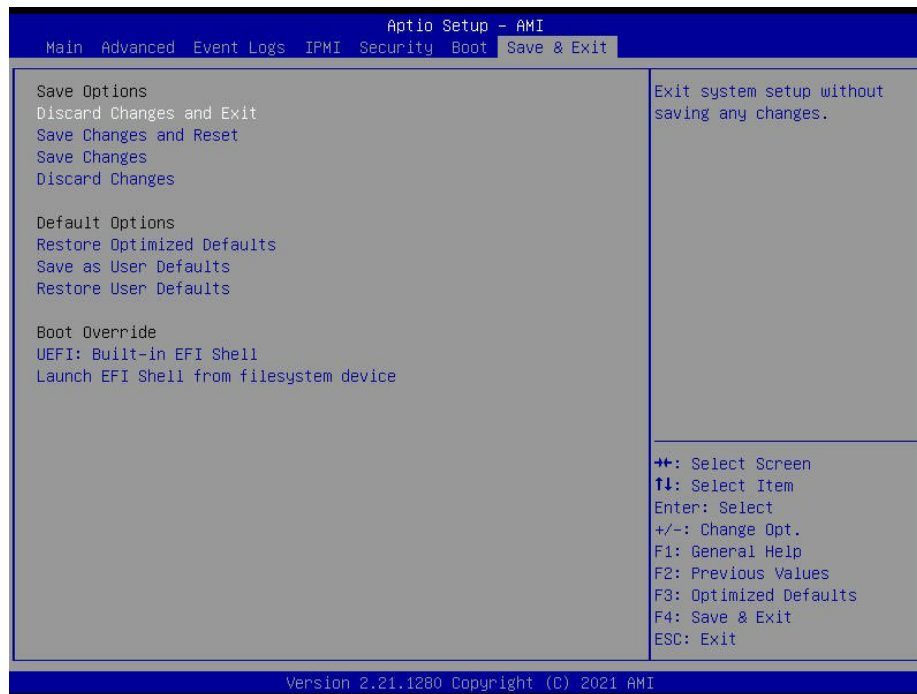
**Note:** The submenus shown here are subject to change depending on the devices installed on this motherboard.

### **Boot Option #1~X**

Use this feature to set the system boot order. The number of X is depending on the devices installed on the motherboard.

## 4.8 Save & Exit

Select the Save & Exit tab from the BIOS setup screen to configure the settings below:



### Save Options

#### Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>.

#### Save Changes and Reset

After completing the system configuration changes, select this option to save the changes you have made. This will not reset (reboot) the system.

#### Save Changes

When you have completed the system configuration changes, select this option to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to take effect. Select Save Changes from the Save & Exit menu and press <Enter>.

#### Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS utility program.

## **Default Options**

### **Restore 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**

To set this feature, select Save as User Defaults from the Save & Exit menu and press <Enter>. This enables you to save any changes to the BIOS setup for future use.

### **Restore User Defaults**

To set this feature, select Restore User Defaults from the Save & Exit menu and press <Enter>. Use this feature to retrieve user-defined settings that were saved previously.

### **Boot Override**

This feature allows you to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified by you instead of the one specified in the boot list. This is a one-time override.

### **UEFI: Built-in EFI Shell**

#### **Launch EFI Shell from filesystem device**

# Appendix A

## BIOS POST Codes

### A.1 BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at <http://www.supernmicro.com/support/manuals/> ("AMI BIOS POST Codes User's Guide").

When BIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, a diagnostic card can be attached to the computer to read I/O port 0080h (Supernmicro p/n AOC-LPC80-20).

For information on AMI updates, please refer to <http://www.ami.com/products/>.

## Appendix B

### Software

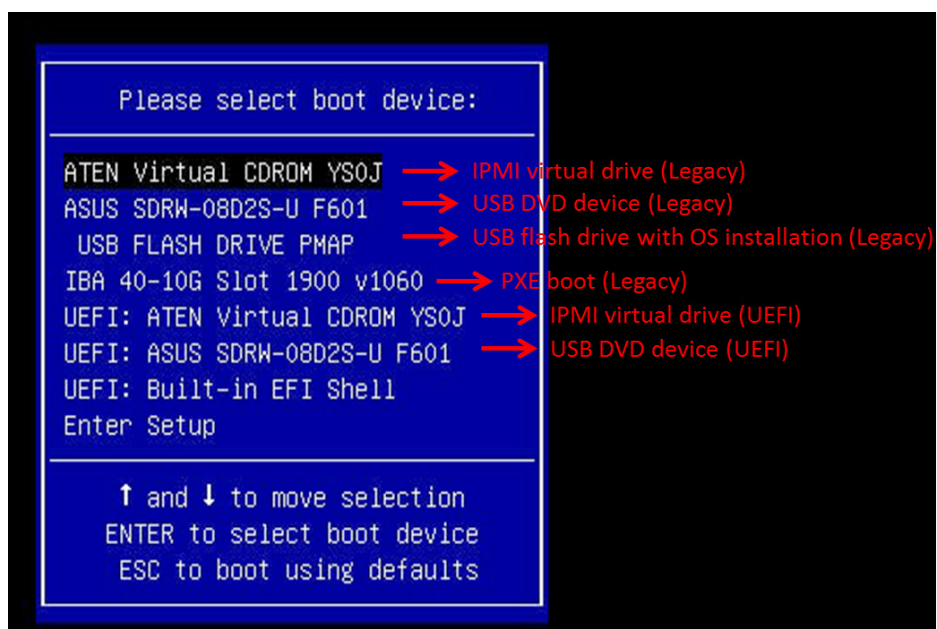
After the hardware has been installed, you can install the Operating System (OS), configure RAID settings, and install the drivers.

#### B.1 Microsoft Windows OS Installation

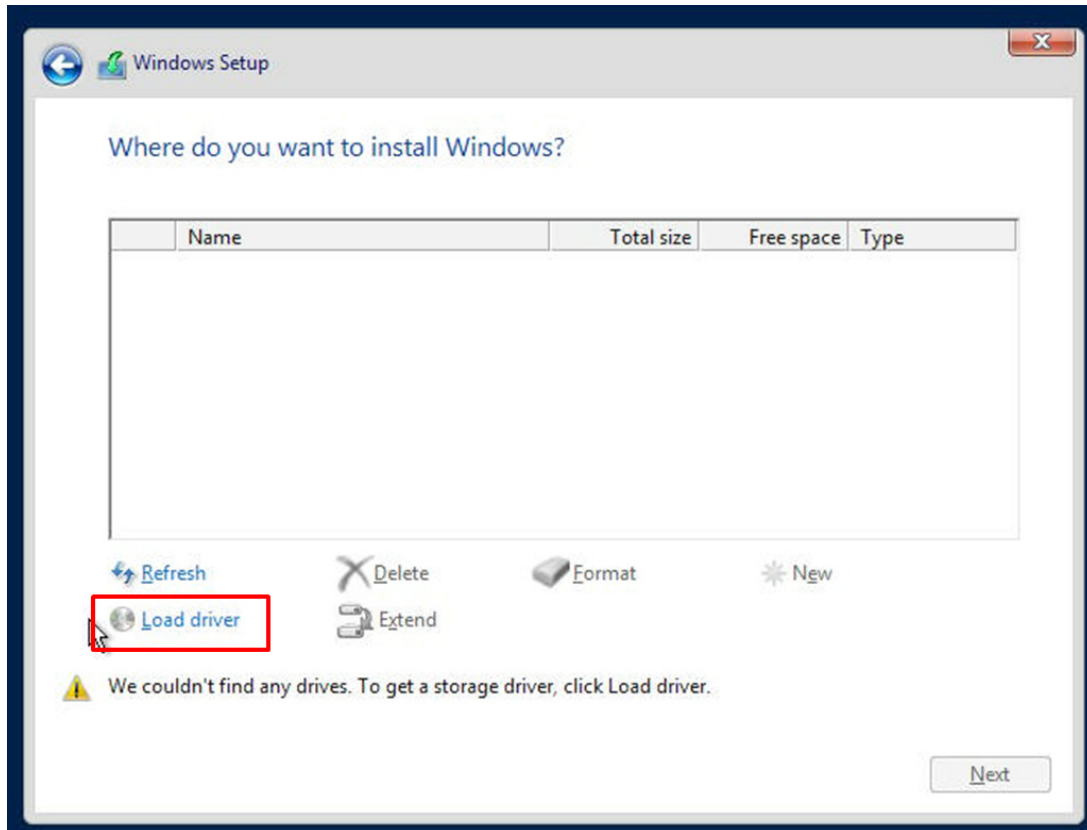
If you will be using RAID, you must configure RAID settings before installing the Windows OS and the RAID driver. Refer to the RAID Configuration User Guides posted on our website at [www.supermicro.com/support/manuals](http://www.supermicro.com/support/manuals).

##### Installing the OS

1. Create a method to access the MS Windows installation ISO file. That might be a DVD, perhaps using an external USB/SATA DVD drive, or a USB flash drive, or the BMC KVM console.
2. Retrieve the proper RST/RSTe driver. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities", select the proper driver, and copy it to a USB flash drive.
3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.



4. During Windows Setup, continue to the dialog where you select the drives on which to install Windows. If the disk you want to use is not listed, click on “Load driver” link at the bottom left corner.



To load the driver, browse the USB flash drive for the proper driver files.

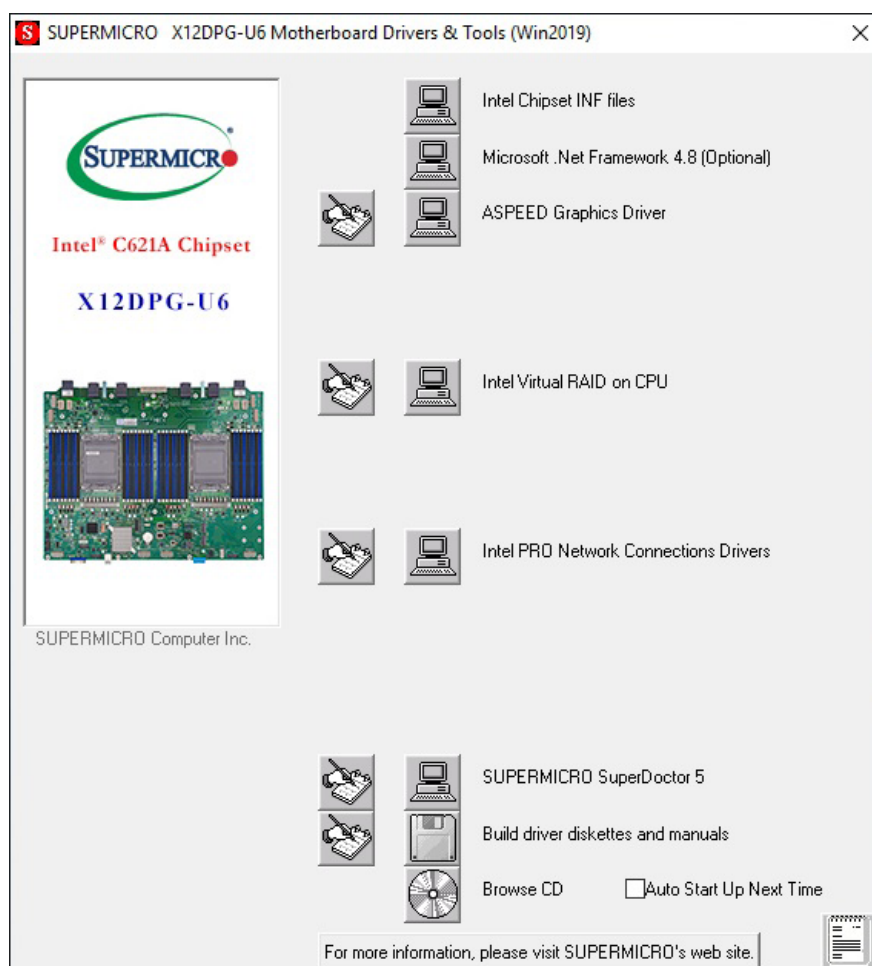
- For RAID, choose the SATA/sSATA RAID driver indicated then choose the storage drive on which you want to install it.
  - For non-RAID, choose the SATA/sSATA AHCI driver indicated then choose the storage drive on which you want to install it.
5. Once all devices are specified, continue with the installation.
  6. After the Windows OS installation has completed, the system will automatically reboot multiple times.

## B.2 Driver Installation

The Supermicro website that contains drivers and utilities for your system is at <https://www.supermicro.com/wdl/driver/>. Some of these must be installed, such as the chipset driver.

After accessing the website, go into the CDR\_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash drive or a DVD. (You may also use a utility to extract the ISO file if preferred.)

Another option is to go to the Supermicro website at <http://www.supermicro.com/products/>. Find the product page for your motherboard, and "Download the Latest Drivers and Utilities". Insert the flash drive or disk and the screenshot shown below should appear.



 **Note:** Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to bottom) one at a time. **After installing each item, you must reboot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents.

## B.3 SuperDoctor 5

The Supermicro SuperDoctor 5 is a program that functions in a command-line or web-based interface for Windows and Linux operating systems. The program monitors such system health information as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts via email or Simple Network Management Protocol (SNMP).

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or BMC. SuperDoctor 5 Management Server monitors HTTP and SMTP services to optimize the efficiency of your operation.



## B.4 BMC

The X12DPG-U6 supports the Baseboard Management Controller (BMC). BMC is used to provide remote access, monitoring and management. There are several BIOS settings that are related to BMC.

For general documentation and information on BMC, please visit our website at: <http://www.supermicro.com/products/nfo/IPMI.cfm>.

## B.5 Logging into the Baseboard Management Controller (BMC)

Supermicro ships standard products with a unique password for the BMC ADMIN user. This password can be found on a label on the motherboard.

When logging in to the BMC for the first time, please use the unique password provided by Supermicro to log in. You can change the unique password to a user name and password of your choice for subsequent logins.

*For more information regarding BMC passwords, please visit our website at <http://www.supermicro.com/bmcpassword>.*

## Appendix C

### Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations where a potential bodily injury may occur. Should you have questions or experience difficulty, contact Supermicro's Technical Support department for assistance. Only certified technicians should attempt to install or configure components.

Read this section in its entirety before installing or configuring components.

These warnings may also be found on our website at [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://www.supermicro.com/about/policies/safety_information.cfm).

#### Battery Handling



**Warning!** There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions

#### 電池の取り扱い

電池交換が正しく行われなかった場合、破裂の危険性があります。交換する電池はメーカーが推奨する型、または同等のものを使用下さい。使用済電池は製造元の指示に従って処分して下さい。

#### 警告

電池更換不當會有爆炸危險。請只使用同類電池或制造商推荐的功能相当的電池更換原有電池。請按制造商的說明處理廢舊電池。

#### 警告

電池更換不當會有爆炸危險。請使用製造商建議之相同或功能相當的電池更換原有電池。請按照製造商的說明指示處理廢棄舊電池。

#### Warnung

Bei Einsetzen einer falschen Batterie besteht Explosionsgefahr. Ersetzen Sie die Batterie nur durch den gleichen oder vom Hersteller empfohlenen Batterietyp. Entsorgen Sie die benutzten Batterien nach den Anweisungen des Herstellers.

#### Attention

Danger d'explosion si la pile n'est pas remplacée correctement. Ne la remplacer que par une pile de type semblable ou équivalent, recommandée par le fabricant. Jeter les piles usagées conformément aux instructions du fabricant.

#### ¡Advertencia!

Existe peligro de explosión si la batería se reemplaza de manera incorrecta. Reemplazar la batería exclusivamente con el mismo tipo o el equivalente recomendado por el fabricante. Desechar las baterías gastadas según las instrucciones del fabricante.

#### אזהרה!

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת. סילוק הסוללות המושמשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسبدال البطارية بطريقة غير صحيحة فاعلil

اسبدال البطارية

فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة

جخلص من البطاريات المسحمة وفقا لتعليمات الشركة الصانعة

#### 경고!

배터리가 올바르게 교체되지 않으면 폭발의 위험이 있습니다. 기존 배터리와 동일하거나 제조사에서 권장하는 동등한 종류의 배터리로만 교체해야 합니다. 제조사의 안내에 따라 사용된 배터리를 처리하여 주십시오.

#### Waarschuwing

Er is ontplofingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

## Product Disposal



**Warning!** Ultimate disposal of this product should be handled according to all national laws and regulations.

### 製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

### 警告

本产品的废弃处理应根据所有国家的法律和规章进行。

### 警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

### Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

### ¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

### Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

### 경고!

이 제품은 해당 국가의 관련 법규 및 규정에 따라 폐기되어야 합니다.

### Waarschuwing

De uiteindelijke verwijdering van dit product dient te geschieden in overeenstemming met alle nationale wetten en reglementen.