X12DPT-B6

USER'S MANUAL

Revision 1.0b

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Manual Revision 1.0b

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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 X12DPT-B6 motherboard.

About This Motherboard

The Supermicro BigTwin motherboard X12DPT-B6 supports the 3rd Gen Intel® Xeon Scalable Processors (in Socket P+) with a thermal design power (TDP) of up to 270 W and three UltraPath Interconnects (UPIs) of up to 11.2 GT/s. Built with the Intel C621A chipset, the X12DPT-B6 supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 ECC memory designed for up to 3200 MT/s in 20 DIMM modules with support for Intel Optane PMem 200 Series memory. This motherboard features superior IO expandability, which includes two PCIe 4.0 x16 slots, 12 SATA 3.0 ports via SlimSAS connectors, and two USB 3.0 ports. It also offers the most advanced data protection capability that encompasses Trusted Platform Module (TPM) and Root of Trust (RoT) support. The X12DPT-B6 is optimized for high-performance computing platforms and is ideal for big data, big science, enterprise applications, oil, and gas industry. This motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, refer to our website at http://www.supermicro.com/products/.

Note 1: The Intel Optane™ Persistent Memory (PMem) 200 Series is supported by the 3rd gen Intel Xeon Scalable (83xx/63xx/53xx/4314) Processors.

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

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:

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

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

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

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

Contacting Supermicro

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Table of Contents

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.

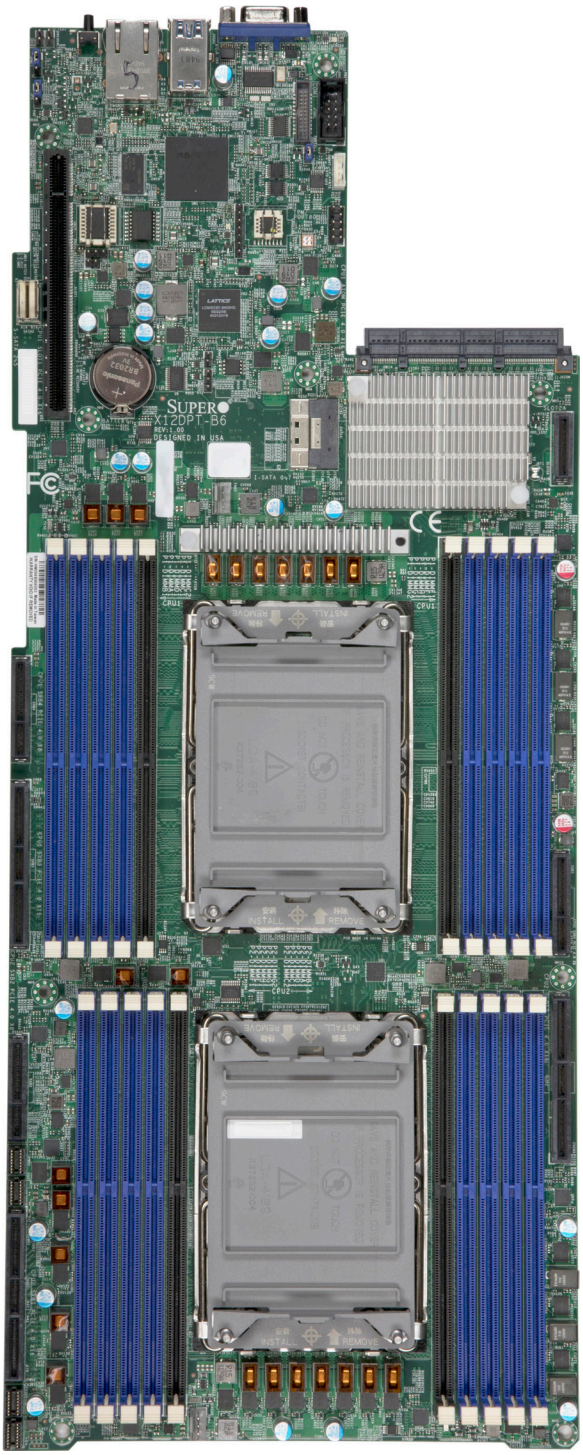
1.1 Important Links

For your system to work properly, follow the links 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
- 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/
- If you have any questions, contact our support team at: support@supermicro.com
- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- If you have any feedback on Supermicro product manuals, contact our writing team at: Techwriterteam@supermicro.com

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

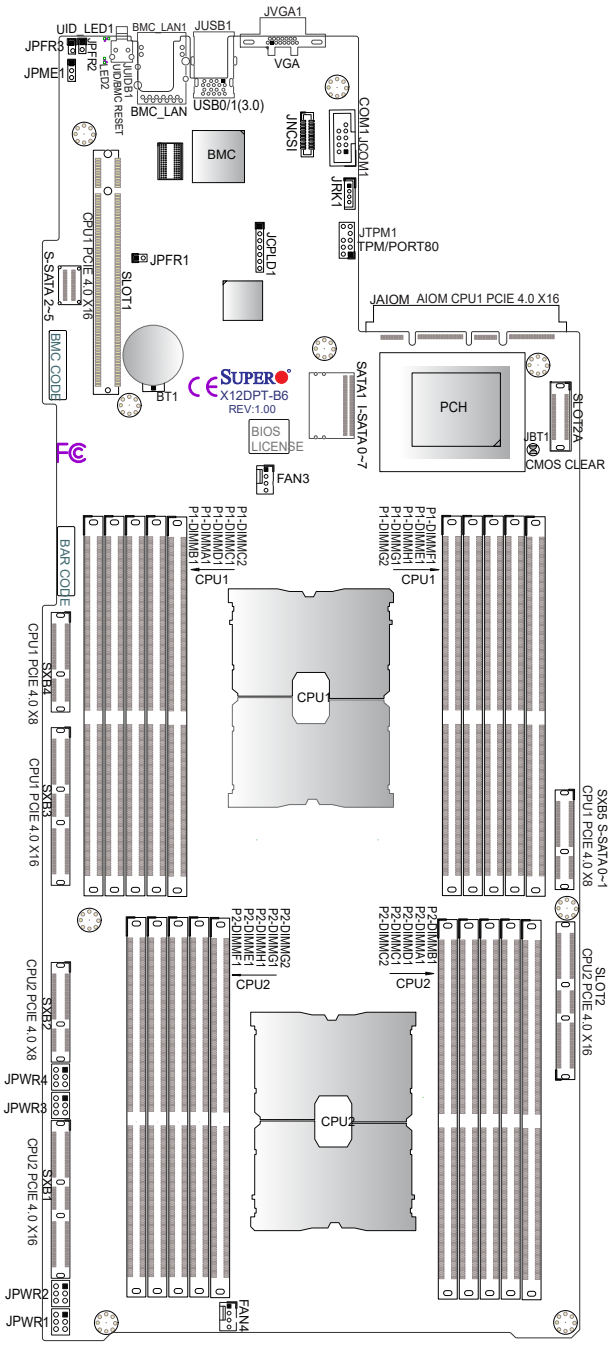
Figure 1-1. X12DPT-B6 Motherboard Image



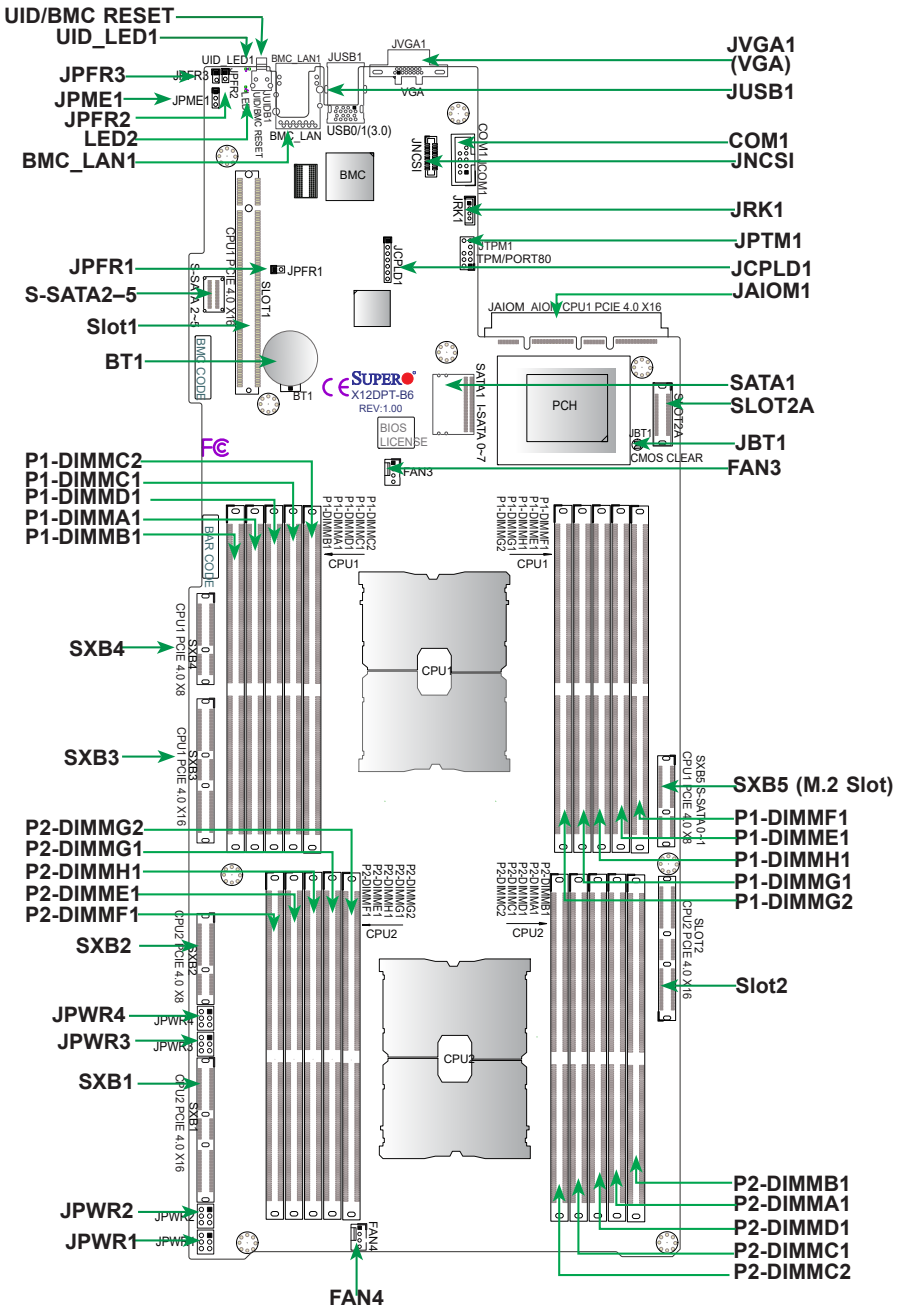
Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. X12DPT-B6 Motherboard Layout

(not drawn to scale)



Note: Components not documented are for internal testing only.



Notes:

- See "Chapter 2" for detailed information on jumpers, I/O ports, and JF1 front panel connections.
- " " 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.

Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPME1	ME Manufacturing Recovery	Pins 1–2 (Normal)

LED	Description	Status
UID_LED1	Unit Identifier (UID) LED	Solid Blue: Unit Identified
LED2	BMC Heartbeat LED	Blinking Green: BMC Norma Solid Greene: (during BMC Reset or a Cold Reboot)l

Connector	Description
BT1	Onboard battery
COM1	I/O COM port
FAN3, FAN4	CPU/System fan headers (FAN1 and FAN2 in the HDD backplane)
BMC_LAN1	Dedicated BMC LAN port
I-SATA 0–7 (SATA1)	Intel PCH SATA 3.0 ports (with RAID 0, 1, 5, 10)
S-SATA 0–1, S-SATA 2–5	S-SATA 3.0 connectors supported by the Intel PCH
JNCSI	Network Controller Sideband Interface (NC-SI) connector
JPWR1/JPWR2/JPWR3/JPWR4	6-pin power connectors
JRK1 (RAID_KEY)	Intel VROC key header for NVMe RAID
JAIOM	AIOM (CPU1 PCIe 4.0 x16) networking slot
JTPM1	Trusted Platform Module/Port 80 connector
JVGA1	VGA port
SLOT1	PCIe 4.0 x16 slot (right hand riser) supported by CPU1
SLOT2	PCIe 4.0 x16 slot (left hand riser, via cable) supported by CPU2
SLOT2A	PCIe 4.0 x8 slot supported by CPU1
SXB1	PCIe 4.0 x16 slot supported by CPU2
SXB2	PCIe 4.0 x8 slot supported by CPU2
SXB3	PCIe 4.0 x16 slot supported by CPU1
SXB4	PCIe 4.0 x8 slot supported by CPU1 for SMCI-proprietary storage devices
SXB5 (S–SATA0–1)	PCIe 4.0 x8 slot supported by CPU1 for dual hybrid M.2
UID/BMC RESET (JUIDB1)	Unit Identifier (UID) & BMC Reset switch
USB0/1 (3.0)	Two USB 3.0 connectors

Note 1: For detailed instructions on how to configure Network Interface Card (NIC) settings, refer to the Network Interface Card Configuration User's Guide posted on the web page at: http://www.supermicro.com/support/manuals/.

Note 2: For detailed instructions on how to configure VROC RAID settings, refer to the VROC RAID Configuration User's Guide posted on the web page at: http://www.supermicro.com/support/manuals/.

Motherboard Features

CPU

- Supports dual 3rd Gen Intel Xeon Scalable Processors (in Socket P+) with a thermal design power (TDP) of up to 270 W and three UltraPath interconnects (UPIs) of up to 11.2 GT/s.

Memory

- Supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 ECC memory with speeds of 3200/2933/2666 MT/s in 20 memory slots, and up to 4 TB of Intel Optane PMem 200 Series memory with speeds up to 3200 MT/s.

Note 1: P1-DIMMC2/P1-DIMMG2/P2-DIMMC2/P2-DIMMG2 memory slots are reserved for Intel Optane PMem 200 Series only.

Note 2: The Intel Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd gen Intel Xeon Scalable (83xx/63xx/53xx/4314) Processors.

DIMM Size

- Up to 256 GB at 1.2 V

Note: For the latest CPU/memory updates, refer to our website at http://www.supermicro.com/products/motherboard.

Chipset

- Intel PCH C621A (LBG-R)

Expansion Slots

- Four PCIe 4.0 x16 slots (CPU1 slot1/SXB3; CPU2 slot2/SXB1)
- Two PCIe 4.0 x8 slots (CPU1 SXB4; CPU2 SXB2)
- One M.2 PCIe 4.0 x8 slot (SXB5)

Network

- Two Ethernet LAN Ports supported by Intel PCH C621A
- One Dedicated BMC LAN port located on the rear I/O panel (via AST2600 BMC)

Baseboard Management Controller (BMC)

- ASPEED AST2600 BMC

Graphics

- Graphics controller and VGA support via ASPEED AST2600 BMC

I/O Devices

• Serial (COM) Port	• One serial port on the front I/O panel (COM1)
• SATA 3.0	• Eight I-SATA 3.0 ports at 6 Gb/s (I-SATA0–7)
• Video (VGA) Connection	• One VGA header for rear access (JVGA1)

Peripheral Devices

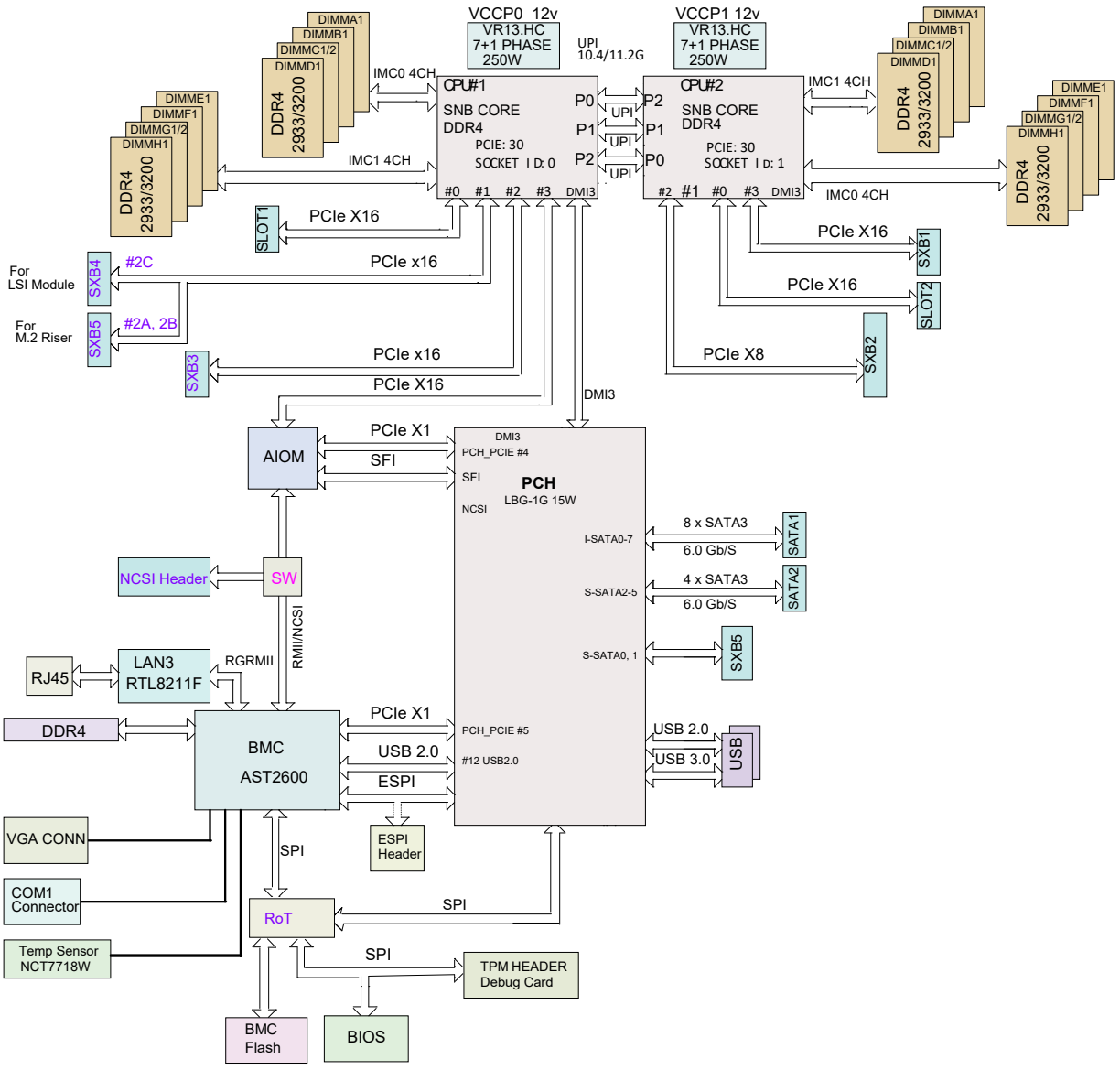
- Two USB 3.0 ports on the rear I/O panel.

BIOS
• AMI BIOS • ACPI 3.0 or later, PCI firmware 4.0 support, BIOS rescue hot-key, SPI dual/quad speed support, riser card auto detection support, Real Time Clock (RTC) wakeup, and SMBIOS 3.0 or later
Power Management
• ACPI power management • Power button override mechanism • Power-on mode for AC power recovery • Wake-on-LAN (WoL) • Power supply monitoring
System Health Monitoring
• Onboard voltage monitoring for +/-12 V, +5 V/+5 V standby, +3.3 V/ +3.3 V standby, and VBAT • Onboard temperature monitoring for CPU, VRM, LAN, PCH, system, and memory • 7+1 CPU switch phase voltage regulator • CPU thermal trip support • Platform Environment Control Interface (PECI)
Fan Control
• Fan status monitoring via BMC connections • Single cooling zone • Low-noise fan speed control • Four 4-pin fan headers (two rear)
System Management
• SuperDoctor® 5 • Chassis intrusion header and detection • Server platform service
Firmware Integrity/System Security
• TPM support • RoT support to protect firmware security by detecting critical data corruption, and restoring platform integrity
LED Indicators
• CPU/system overheat LED • Power/suspend-state indicator LED • Fan failed LED • UID/remote UID • HDD activity LED • LAN activity LED
Dimensions
• 7.4" x 18.86" (187.96 mm x 479.04 mm) (W x L)

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

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

Figure 1-3.
System Block Diagram



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 Overview

Built upon the functionality and capability of the 3rd Gen Intel Xeon Scalable Processors (Socket P+) and the Intel C621A chipset, the X12DPT-B6 motherboard provides system performance, energy efficiency, and feature sets optimized for high-performance computing, artificial intelligence (AI), deep learning (DL), big data, and enterprise applications.

With the support of the new Intel microarchitecture, the X12DPT-B6 dramatically increases system performance for a multitude of platform applications.

Features Supported by the 3rd Gen Intel Xeon Scalable Processors

- Performance improvements with higher core counts (up to three UPIs/socket at 11.2 GT/s)
- Vector Neural Network Instructions (VNNI) support to accelerate AI/deep learning training
- New hardware-enhanced security features help protect the platform and data without compromising performance
- Higher performance storage (PCIe 4.0 NVMe) with the double speeds of PCIe 3.0

New Features Supported by the Intel PCH C621A

- Enterprise System Management Bus support
- Support of SMBus speeds of up to 400KHz for BMC connectivity
- Improved I/O capabilities to high-storage-capacity configurations
- Intel Node Manager 3.0 for advanced power monitoring, capping, and management for BMC enhancement.
- BMC supports remote management, virtualization, and the security package for enterprise platforms

Note: Node Manager support depends on the power supply used in your system.

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. The user can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

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 IPMI.

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 user-defined threshold, system/CPU cooling fans will be turned on to prevent the CPU or the system from overheating.

Note: To avoid possible system overheating, be sure to provide adequate airflow to your system.

System Resource Alert

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

1.5 ACPI Features

The Advanced Configuration and Power Interface (ACPI) specifications define 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, 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 where noisy power transmission is present.

It is strongly recommended that you use a high-quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant. For more information, refer to the website at http://www.ssiforum.org/.

1.7 Intel Optane™ Persistent Memory (PMem) 200 Series Overview

The 3rd Gen Intel Xeon Scalable Processors support the new Intel Optane™ Persistent Memory (PMem) 200 Series technology. PMem offers data persistence with higher capacity at similar latencies to the existing memory modules and provides hyper-speed storage capability for high-performance computing platforms with flexible configuration options.

Note 1: P1-DIMMC2/P2-DIMMC2 memory slots are reserved for Intel Optane PMem 200 Series only.

Note 2: 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 them 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 anti-static 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

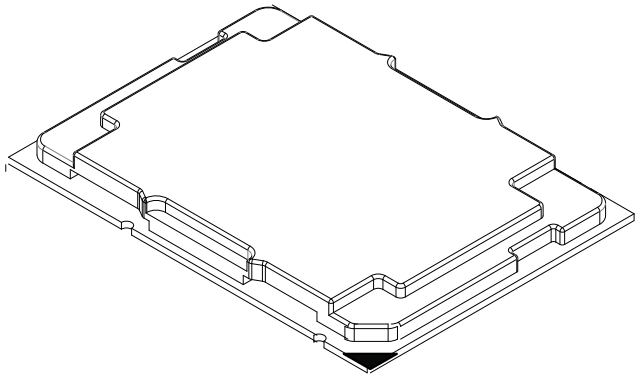
The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the motherboard, make sure that the person handling it is static protected.

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 onto the CPU socket. Before installation, be sure to do the following:

- 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.

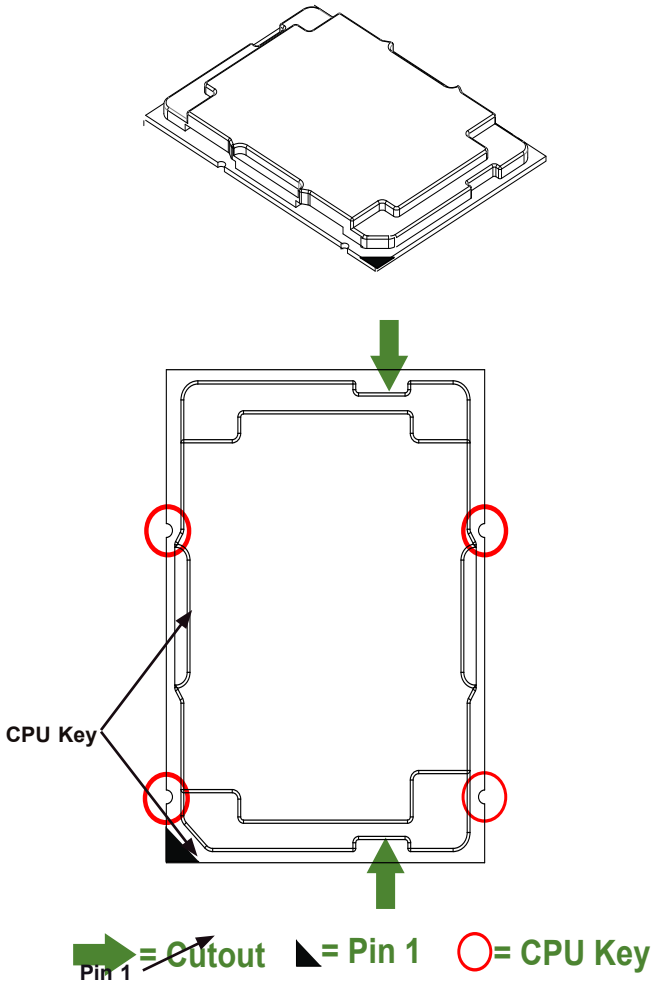
The 3rd Gen Intel Xeon Scalable Processor



Processor Top View

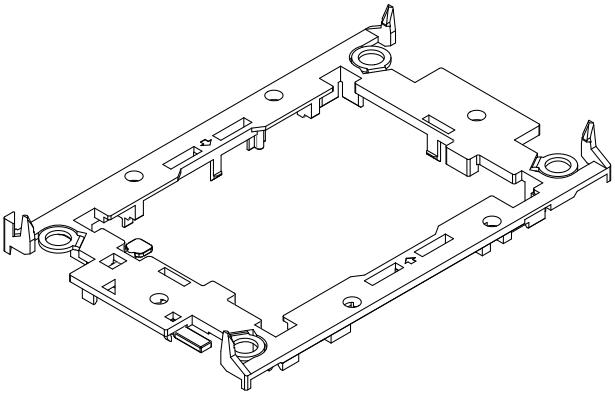
Note: The graphics contained in this user's manual are for illustration only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

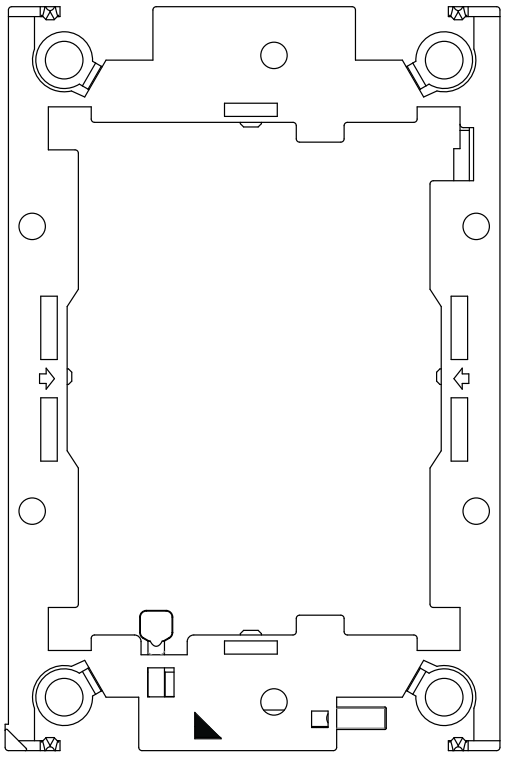
1. The 3rd Gen Intel Xeon Scalable Processor



Processor Top View

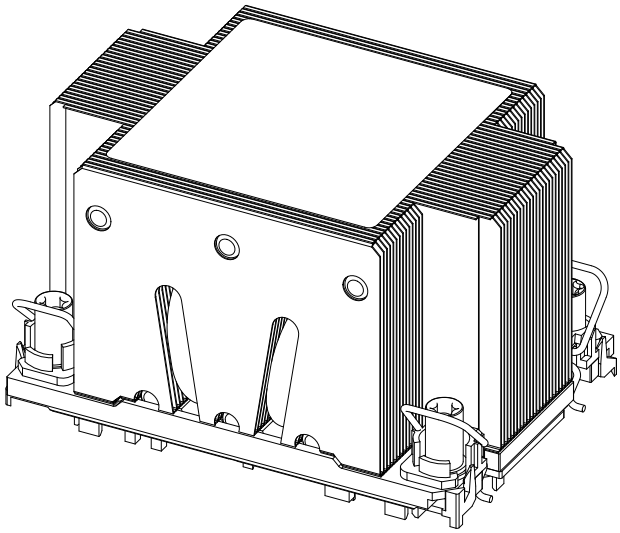
2. The Processor Carrier





Carrier Bottom View

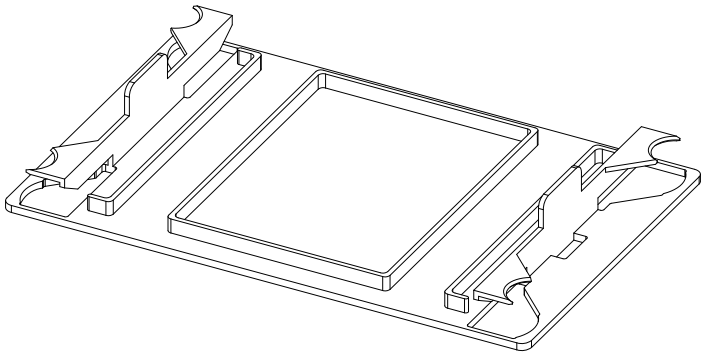
3. Heatsink



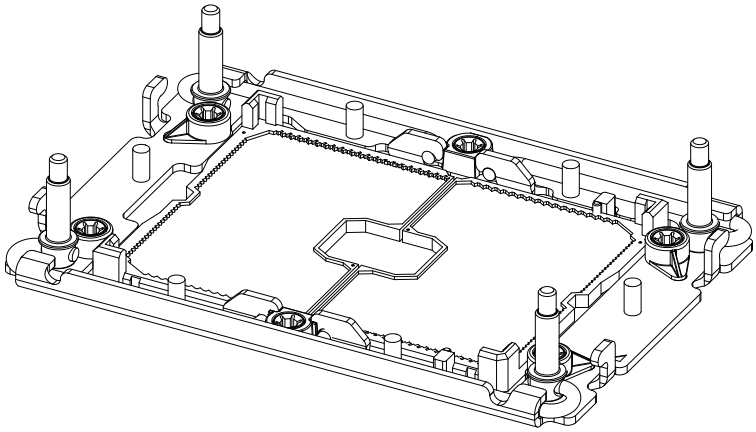
Note: Exercise extreme care when handling the heatsink. Pay attention to the edges of heatsink fins which can be sharp! To avoid damaging the heatsink, do not apply excessive force on the fins when handling the heatsink.

Overview of the CPU Socket

The CPU socket is protected by a plastic protective cover.



Plastic Protective Cover

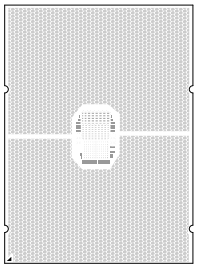


CPU Socket

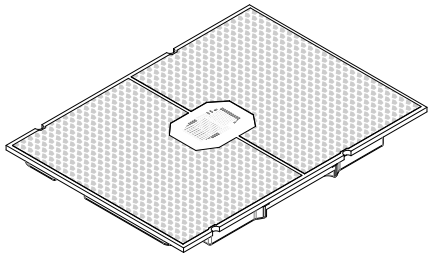
Overview of the Processor Carrier Assembly

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



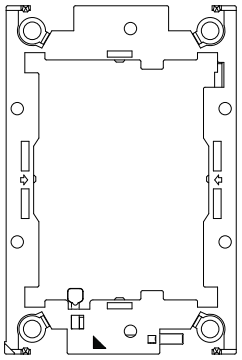
Processor (2D)



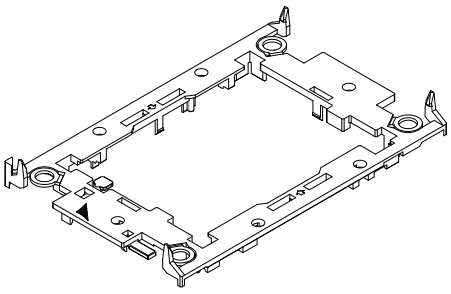
Processor (3D)

Intel Processor (Bottom View)

2. Processor Carrier



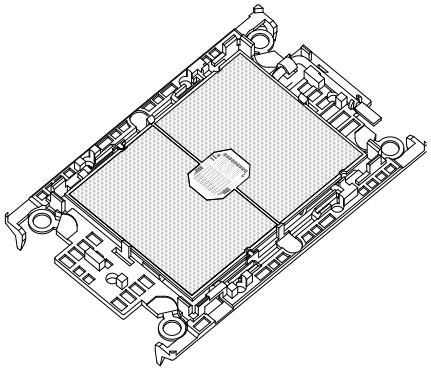
Processor Carrier (2D)



Processor Carrier (3D)

Intel Processor Carrier (Top View)

3. Processor Carrier Assembly

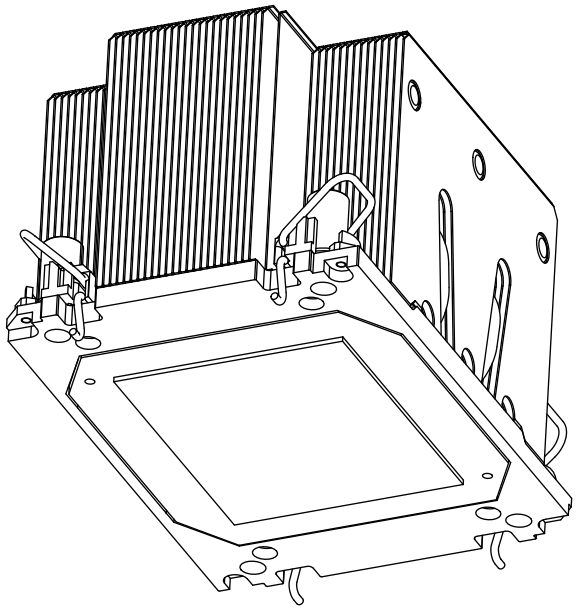


With Processor Seated inside the Carrier

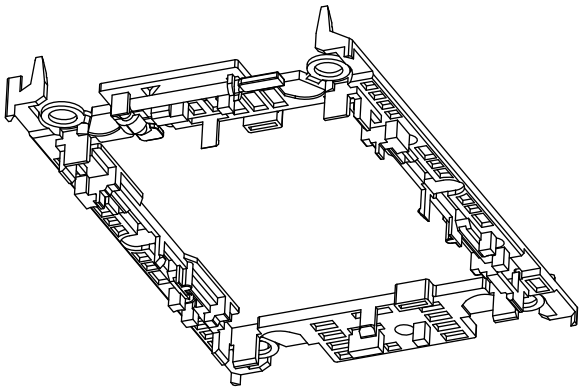
Overview of the Processor Heatsink Module

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

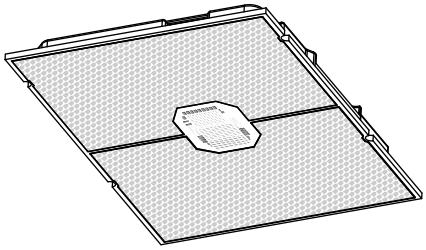
1. Heatsink (with thermal grease)



2. Processor Carrier

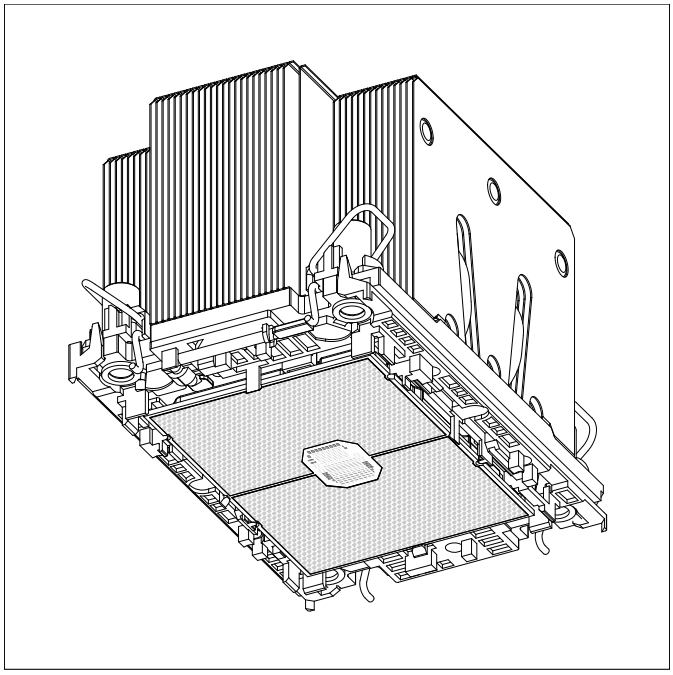


3. 3rd Gen Intel Xeon Scalable Processor



Bottom View

4. Processor Heatsink Module (PHM)



Bottom View

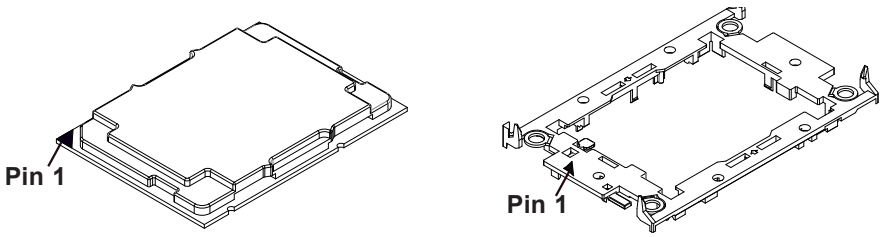
Creating the Processor Carrier Assembly

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

To create the processor carrier assembly, take the following steps:

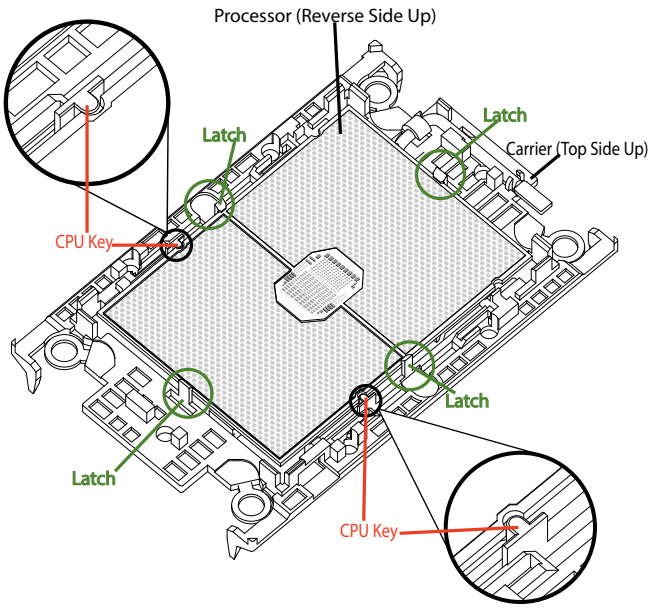
Note: Before installation, be sure to follow the instructions given on page 18 and 19 to properly prepare yourself for installation.

1. Hold the processor with the LGA lands (with gold CPU contacts) facing down.
2. 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. Note that the triangle indicates Pin 1 location.



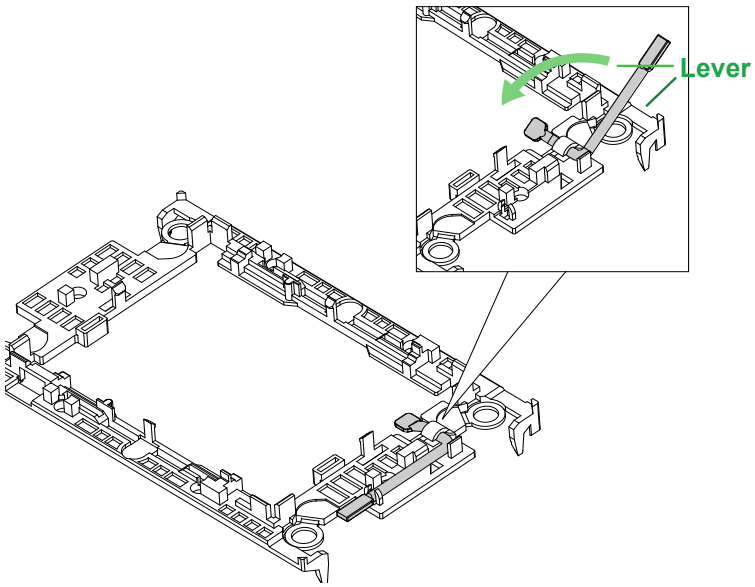
3. Turn over the processor carrier to locate Pin 1 on the CPU and Pin 1 on the carrier.
4. Turn the processor over with the processor reverse side (gold contacts) facing up and locate CPU keys on the processor.

5. Locate the CPU keys and four latches on the carrier.

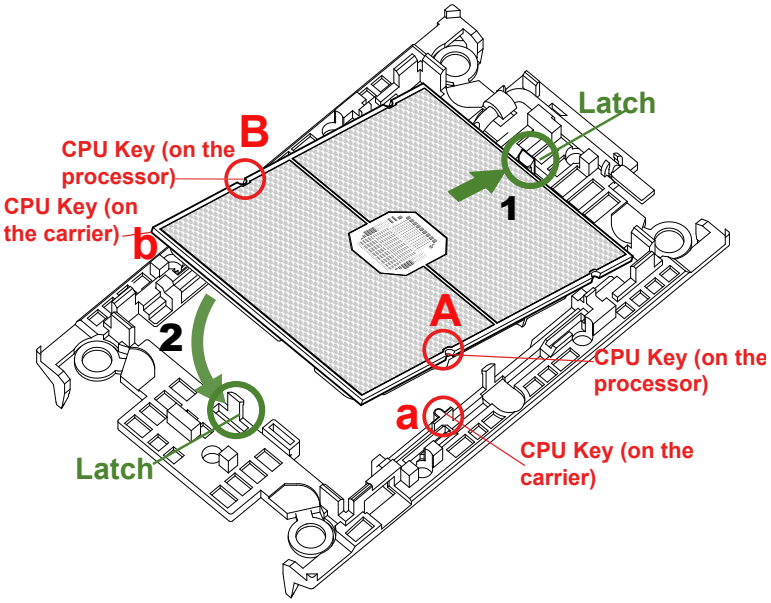


Carrier with the Processor Installed

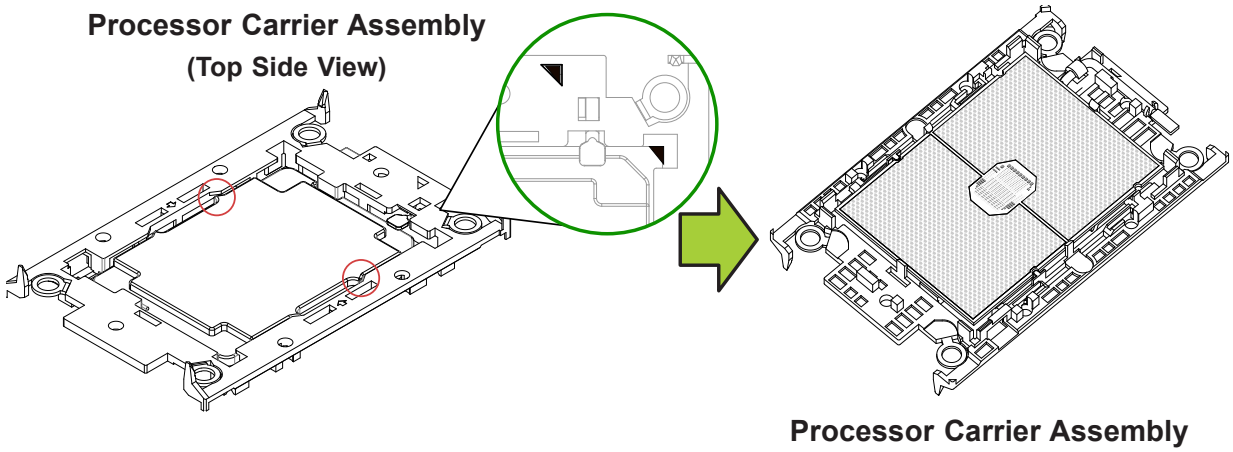
6. Locate the lever on the CPU socket and press the lever down.



7. Using Pin 1 as a guide, carefully align the CPU keys (A and B) on the processor against the CPU keys on the carrier (a and b).
8. Once the keys are properly aligned, carefully place one end of the processor into the latch marked 1 on the carrier.
9. Place the other end of the processor into the latch marked 2.



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



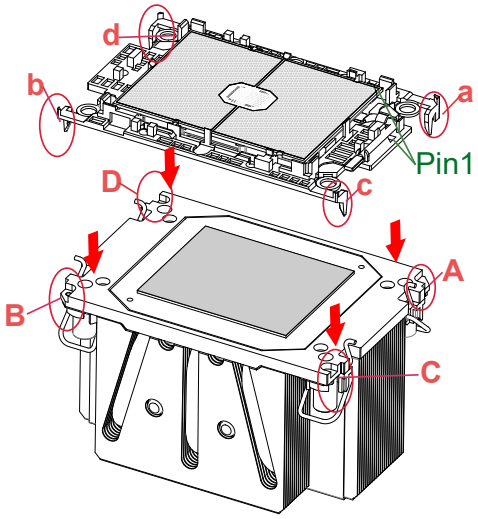
Creating the Processor Heatsink Module (PHM)

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

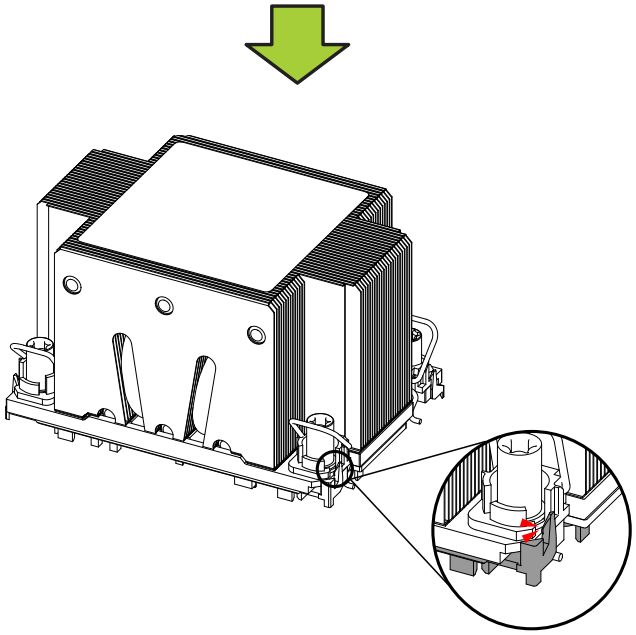
Note: If this is a new heatsink, the thermal grease has been pre-applied on the underside. Otherwise, apply the proper amount of thermal grease.

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 on the next page.
2. Hold the processor carrier assembly top side (with thermal grease) facing up to 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.
4. Locate Pin 1 (A) on the processor and Pin 1 (a) on the processor carrier assembly "a."
5. Align the corner marked "a" on the processor carrier assembly against the triangle cutout "A" on the heatsink.
6. Align the corners marked "b," "c," and "d" on the processor assembly against the corners marked "B," "C," and "D" on the heatsinks.
7. Once the corners are properly aligned, place the corner marked "a" on the processor carrier assembly into the corner of the heatsink marked "A."

8. Repeat the same step to place the corners marked "b," "c," and "d" on the processor carrier assembly into the corners of the heatsink marked "B," "C," and "D." Make sure that all plastic clips are properly attached to the heatsink.



Processor Carrier Assembly
(Reverse Side View)

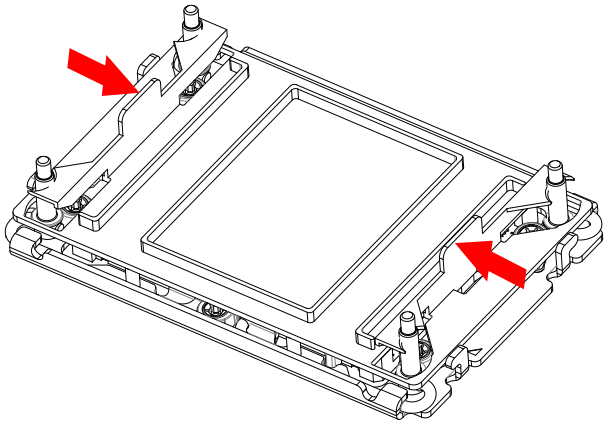


Processor Heatsink Moduel (PHM)
(Reverse Side View)

Preparing the CPU Socket for Installation

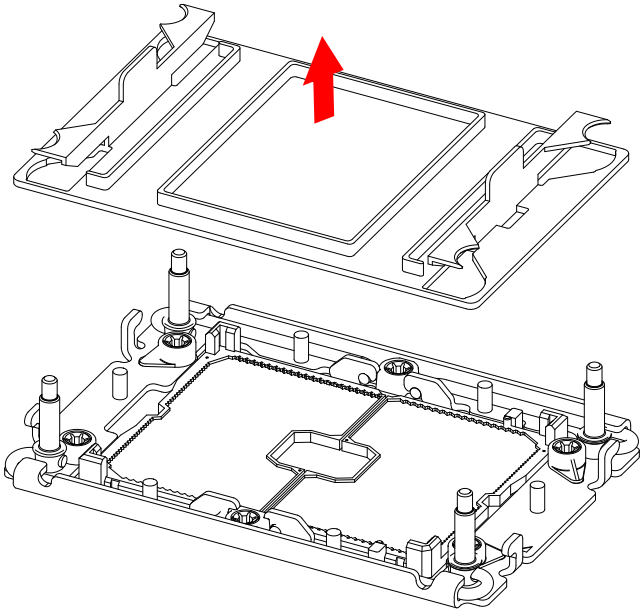
This motherboard comes with a plastic protective cover installed on the CPU socket. Remove it from the socket by following the instructions given in the drawings:

1. Press the tabs inward.



Removing the plastic protective cover from the socket

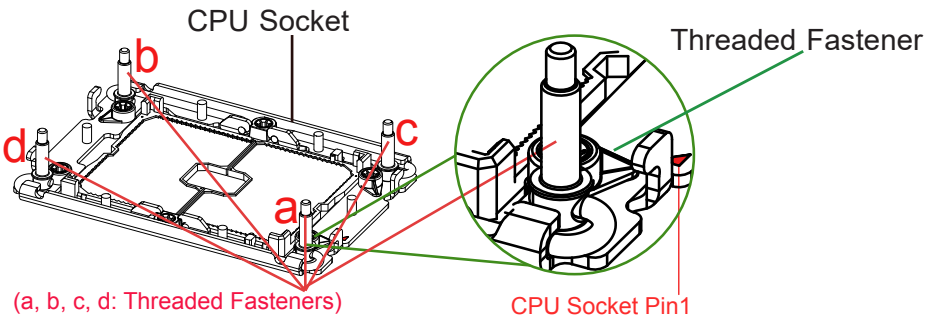
2. Pull up the protective cover from the socket.



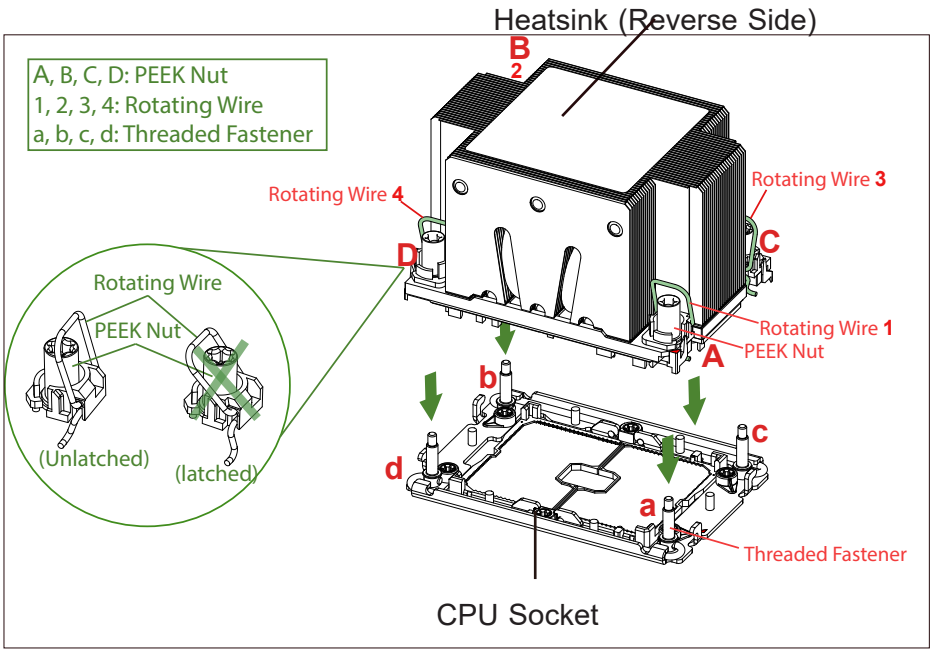
Preparing to Install the Processor Heatsink Module (PHM) into the CPU Socket

After assembling the Processor Heatsink Module (PHM), you are ready to install it into the CPU socket. To ensure the proper installation, take the following steps:

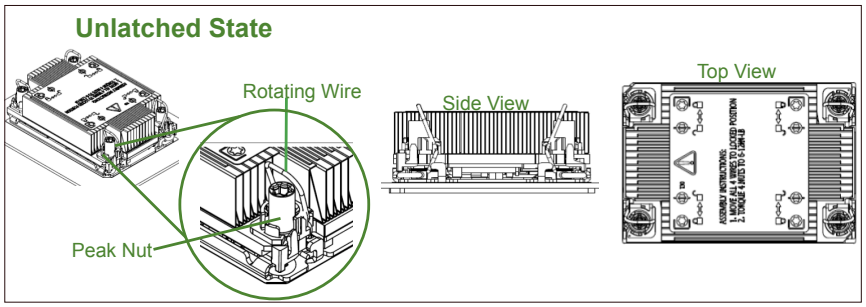
1. Locate four threaded fasteners (a, b, c, d) on the CPU socket.



2. Locate four PEEK nuts (A, B. C. D) and four rotating wires (1, 2, 3, 4) on the heatsink.



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

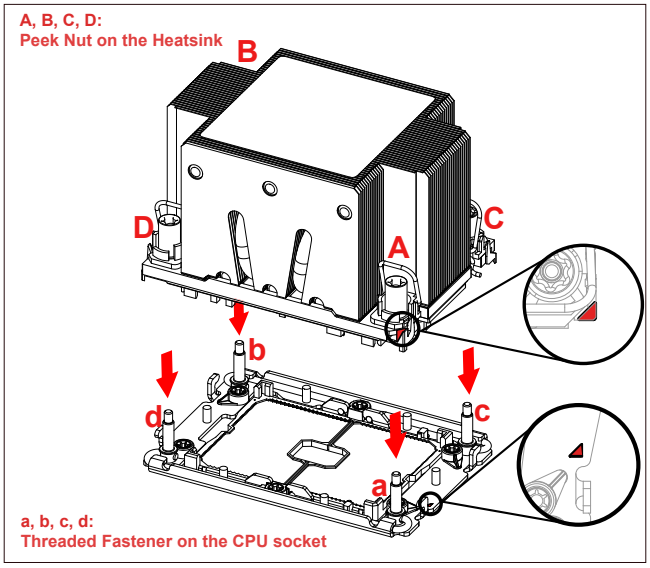


Installing the Processor Heatsink Module (PHM)

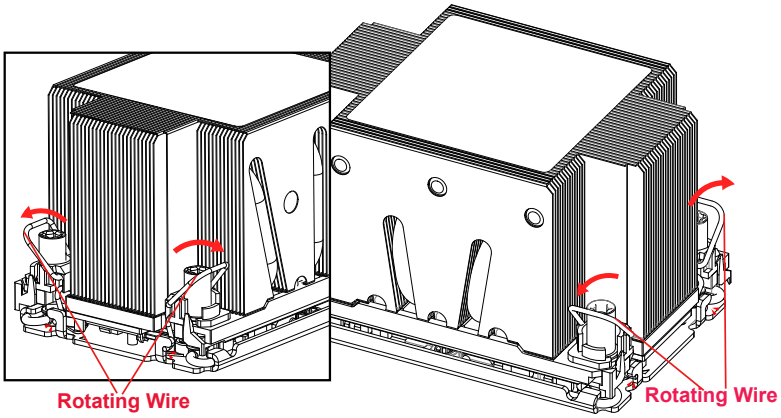
1. Align PEEK nut "A," which is next to the triangle (Pin 1) on the heatsink, against threaded fastener "a" on the CPU socket.

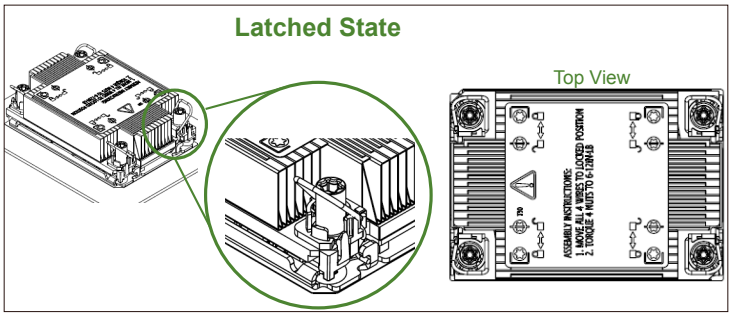
2. Align PEEK nuts "B," "C," and "D" on the heatsink against threaded fasteners "b," "c," and "d" on the CPU socket. Make sure that all PEEK nuts on the heatsink are properly aligned with the correspondent threaded fasteners on the CPU socket.

3. Once they are aligned, gently place the heatsink on top of the CPU socket, Make sure that each PEEK nut is properly attached to its corresponding threaded fastener.



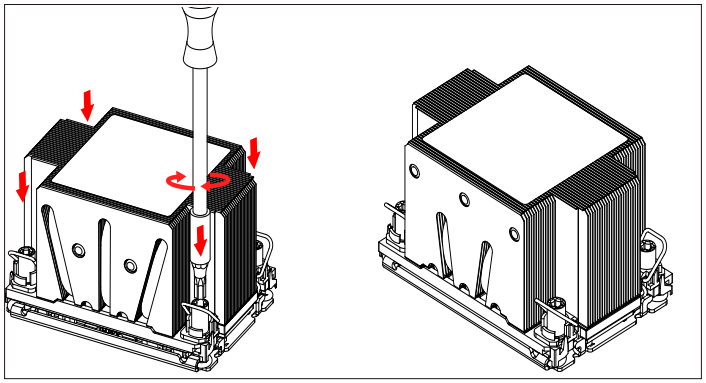
4. Press all four rotating wires outwards. Make sure that the heatsink is securely latched onto the CPU socket.





5. Tighten all PEEK nuts with a T30-bit screwdriver. Do so 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.

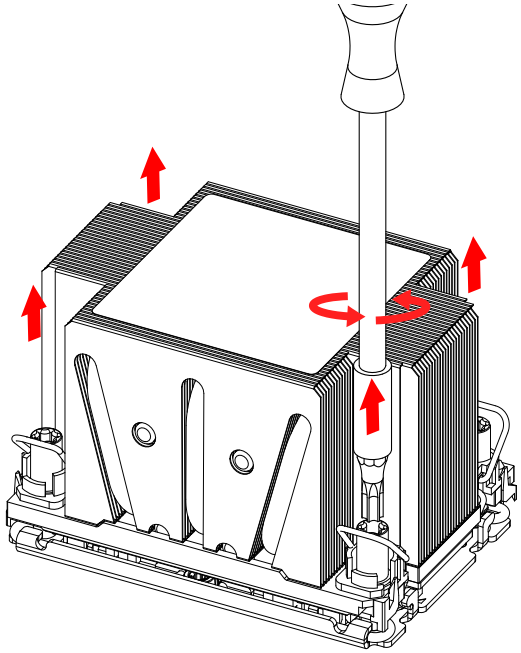
6. Examine all corners of the heatsink to ensure that the PHM is firmly attached to the CPU socket.



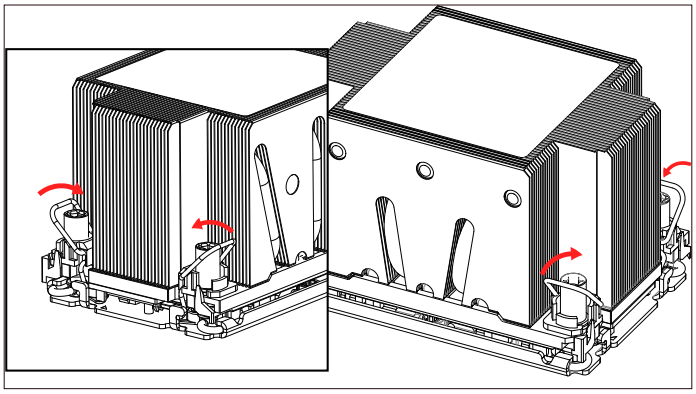
Removing the Processor Heatsink Module from the CPU Socket

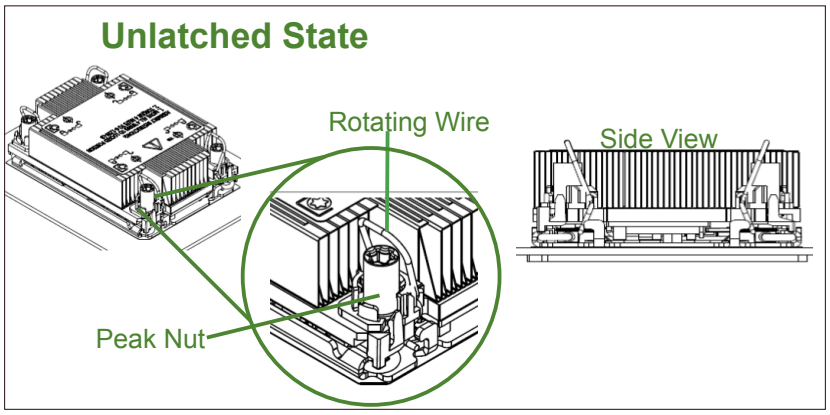
Before removing the processor heatsink module (PHM) from the motherboard, unplug the AC power cord from all power supplies after shutting down the system. Then take the following steps:

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

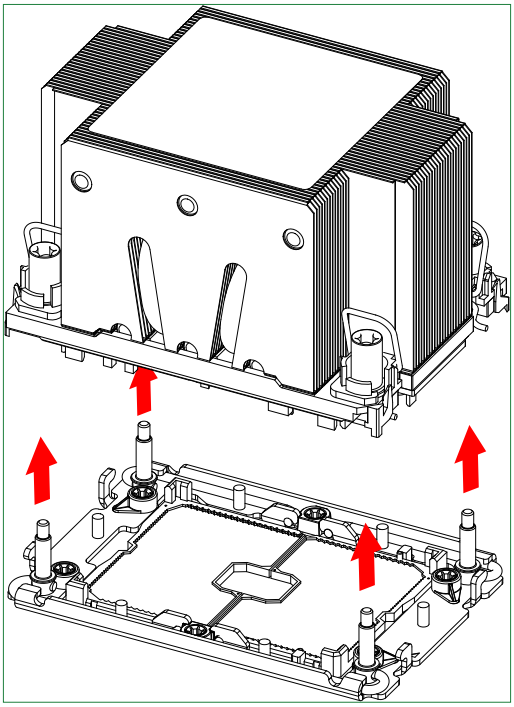


2. Once the PEEK nuts are loosened from the CPU socket, press the rotating wires inwards to unlatch the PHM from the socket.





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

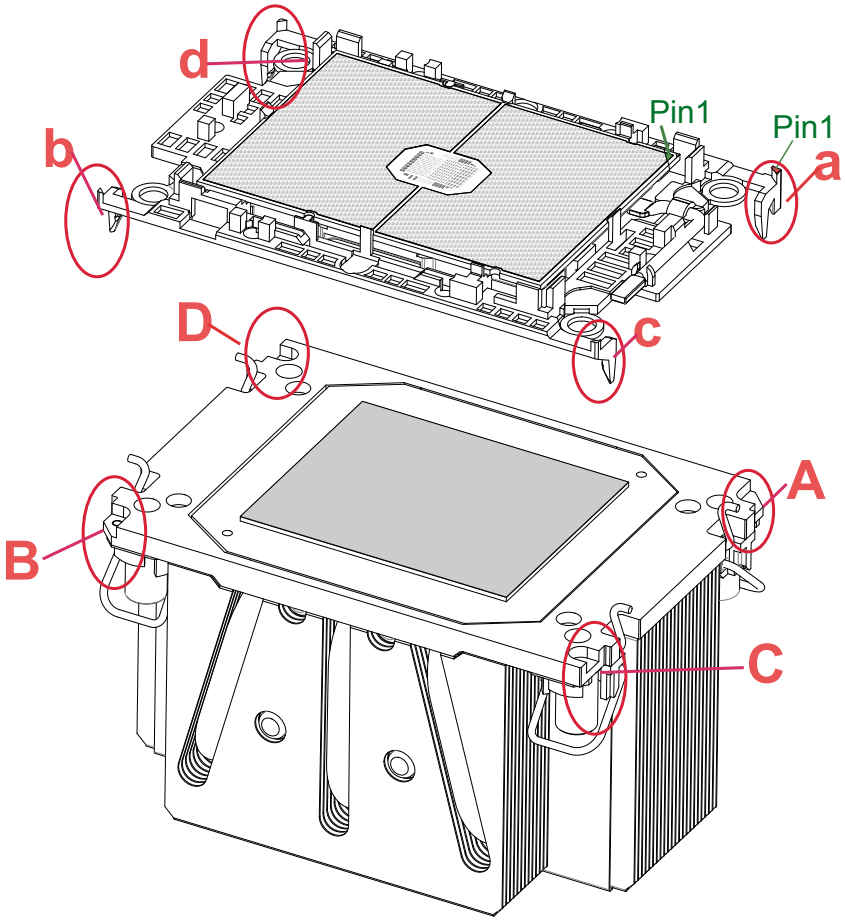


Removing the Processor Carrier Assembly from the Processor Heatsink Module (PHM)

To remove the processor carrier assembly from the PHM, take the following steps:

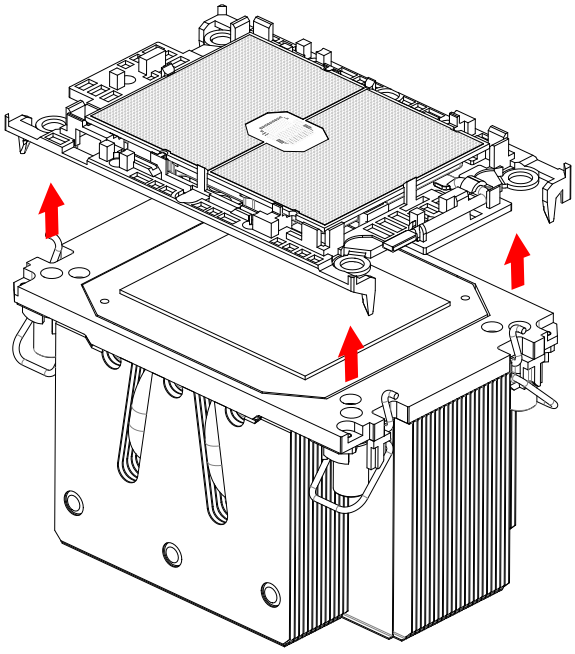
1. Detach four plastic clips (marked a, b, c, d) on the processor carrier assembly from the four corners of the heatsink (marked A, B, C, D).

Processor Carrier Assembly
(Reverse Side View)



Heatsink
(Reverse Side View)

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



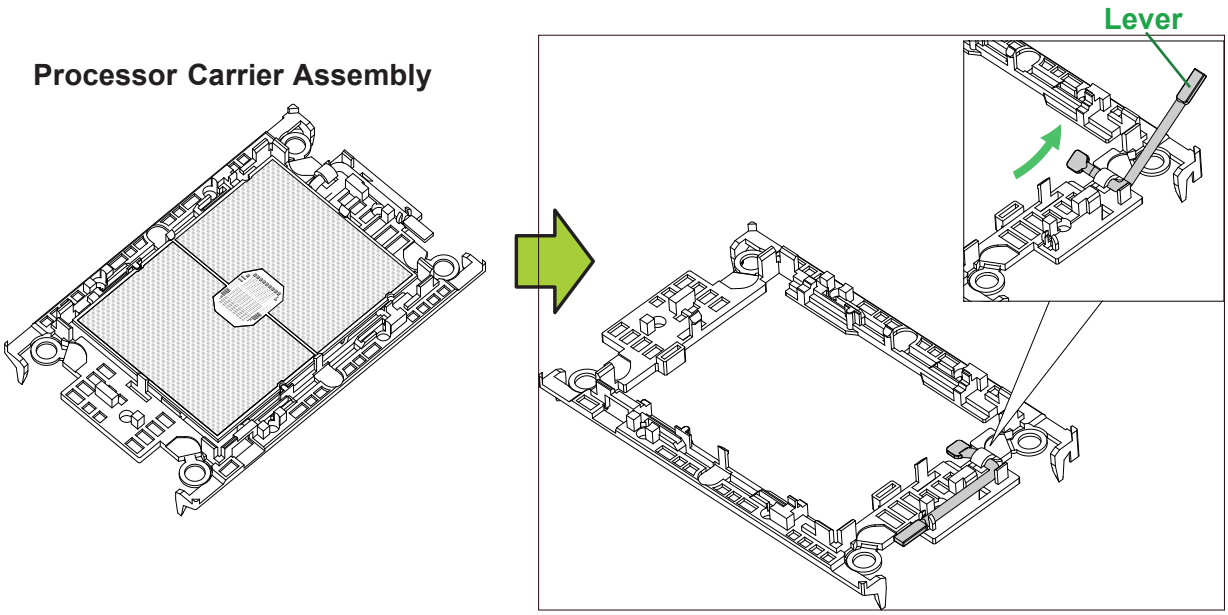
Uninstalling CPU Assembly

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 taking the following steps:

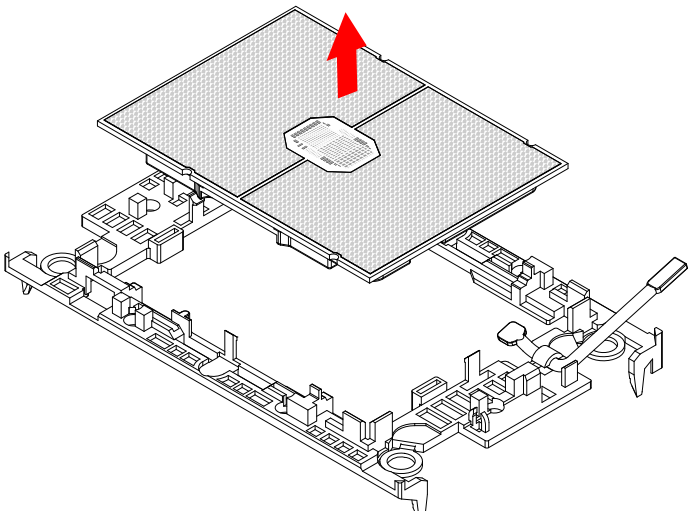
1. Unlock the lever from its locking position.
2. Push the lever upwards to disengage the processor from the processor carrier as shown in the right drawing below.

Processor Carrier Assembly



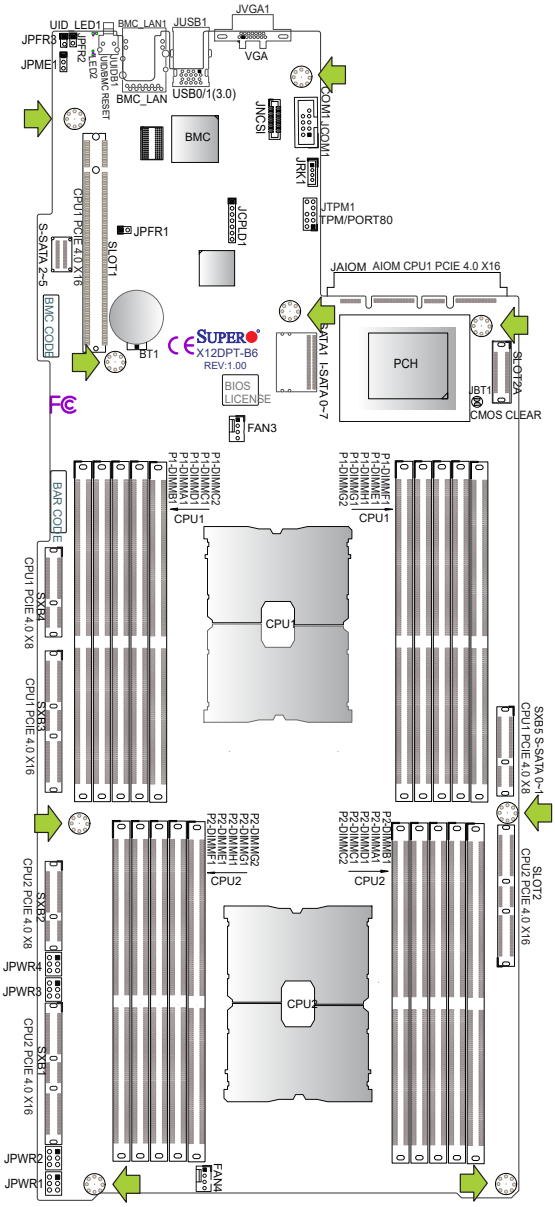
3. Once the processor is loosened from the carrier, carefully remove the processor from the processor carrier.

Note: To avoid damaging the processor and its pins, 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 (9)

Standoffs (9) Only if Needed

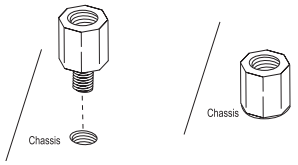
Location of Mounting Holes

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

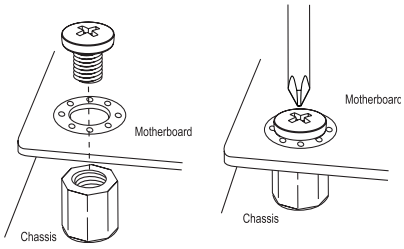
Note 2: Some components are very close to the mounting holes. Take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

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.
4. Align the mounting holes on the motherboard against the mounting holes on the chassis.



5. Install standoffs in the chassis as needed.
6. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.
7. Using the Phillips screwdriver, insert a #6 pan head screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.
8. Repeat Step 5 to insert #6 screws into all mounting holes.
9. 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 X12DPT-B6 supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 ECC memory with speeds of 3200/2933/2666 MT/s in 20 memory slots and up to 4 TB of Intel Optane PMem 200 Series memory with speeds of up to 3200 MT/s.

Note 1: P1-DIMMC2/P2-DIMMC2 memory slots are reserved for Intel Optane PMem 200 Series only.

Note 2: The Intel Optane™ Persistent Memory (PMem) 200 Series are supported by the 3rd gen Intel Xeon Scalable (83xx/63xx/53xx/4314) Processors.

Memory Support for the 3rd Gen Intel Xeon Scalable Processors

DDR4 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 (1-DIMM Per Channel)	2DPC (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 4H-128 GB	2H- 128 GB 4H-256 GB		
LRDIMM	QRx4	64GB	128GB	3200	3200
LRDIMM - 3Ds	(4R/8R) X4	4H-128 GB	2H- 128 GB 4H-256 GB	3200	3200

Key Parameters for DIMM Configurations	
Parameters	Possible Values
Number of Channels	8
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM (with ECC), 3DS RDIMM, LRDIMM, 3DS LRDIMM
DIMM Construction	non-3DS RDIMM Raw Cards: A/B (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8) 3DS RDIMM Raw Cards: A/B (4Rx4) non-3DS LRDIMM Raw Cards: D/E (4Rx4) 3DS LRDIMM Raw Cards: A/B (8Rx4)

Memory Population Table for the 3rd Gen Intel Scalable Processor

DDR4 Memory Population Table for X12DP 20-DIMM Motherboards	
When 1 CPU is used:	**Memory Population Sequence**
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1
1 CPU & 4 DIMMs (Note 2)	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 (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1
1 CPU & 9 DIMMs (Note 1) & (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 + ***(P1-DIMMC2: Reserved for PMem 200 Series only)***
When 2 CPUs are used:	**Memory Population Sequence**
2 CPUs & 2 DIMMs (Note 2)	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 CPU2: P2-DIMMA1/P2-DIMME1
2 CPUs & 8 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1 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 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1
2 CPUs & 12 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1 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 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1
2 CPUs & 16 DIMMs (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1
2 CPUs & 18 DIMMs (Note 1) & (Note 2)	CPU1: P1-DIMMA1/P1-DIMME1/P1-DIMMC1/P1-DIMMG1/P1-DIMMB1/P1-DIMMF1/P1-DIMMD1/P1-DIMMH1 CPU2: P2-DIMMA1/P2-DIMME1/P2-DIMMC1/P2-DIMMG1/P2-DIMMB1/P2-DIMMF1/P2-DIMMD1/P2-DIMMH1 + ***(P1-DIMMC2 & P1-DIMMG2: Reserved for PMem 200 Series only)***

Note 1: P1-DIMMC2 and P1-DIMMG2 are reserved for Intel OptaneTM PMem 200 Series only.

Note 2: This memory configuration is recommended by Supermicro for optimal memory performance. Use this configuration to maximize your memory performance.

Intel Optane PMem 200 Series Memory Population Table

PMem 200 Series Population Table for X12DP 20-DIMM Motherboards (within 1 CPU socket)											
DDR4+PMem	Mode	AD Interleave	P1-DIMMF1	P1-DIMME1	P1-DIMMH1	P1-DIMMG1	P1-DIMMC2	P1-DIMMC1	P1-DIMMD1	P1-DIMMA1	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	***PMem***	DDR4	DDR4	DDR4	DDR4
			DDR4	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)

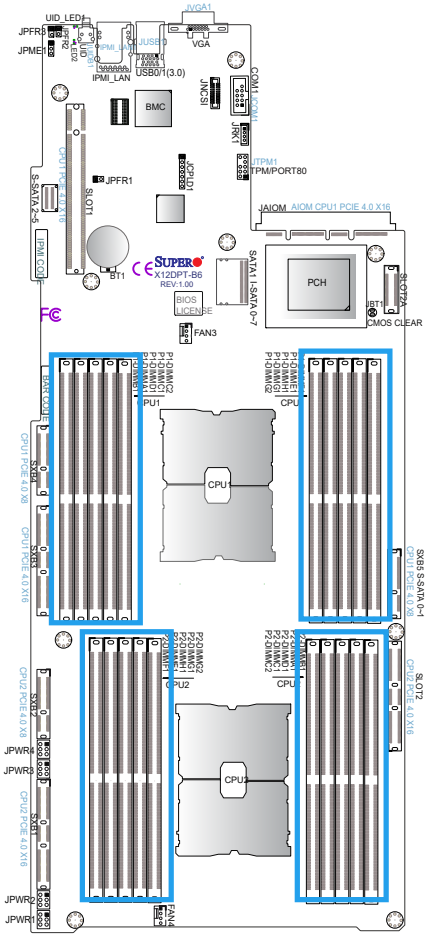
- Mode definitions: AD = App Direct Mode, MM = Memory Mode.
- No mixing of PMem and NVDIMMs within the platform.
- For MM, NM/FM ratio is between 1:4 and 1:16. (NM = Near Memory (DRAM); FM = Far Memory (PMem)).
- Matrix targets configs for optimized PMem to DRAM cache ratio in MM mode.
- For each individual 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.

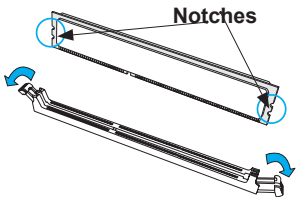
Validation Matrix (DDR4 DIMMS with PMem 200 Series)			
DIMM Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB)	
		DRAM Density	
		8Gb	16Gb
RDIMM (up to 3200)	1Rx8	N/A	N/A
	1Rx4	16GB	32GB
	1Rx8	16GB	32GB
	1Rx4	32GB	64GB
RDIMM 3DS (up to 3200)	4Rx4 (2H)	N/A	128GB
	8Rx4 (4H)	NA	256GB
LRDIMM (up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

DIMM Installation

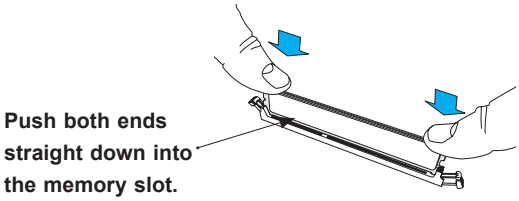
1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population tables in the previous section.
2. Locate DIMM memory slots on the motherboard as shown on the right.
3. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
4. Align the key of the DIMM module with the receptive point on the memory slot.



5. Align the notches on both ends of the module against the receptive points on the ends of the slot.



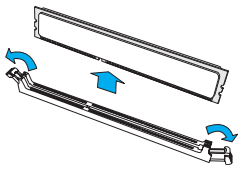
6. Push both ends of the module straight down into the slot until the module snaps into place.



7. Press the release tabs to the lock positions to secure the DIMM module into the slot.

DIMM Removal

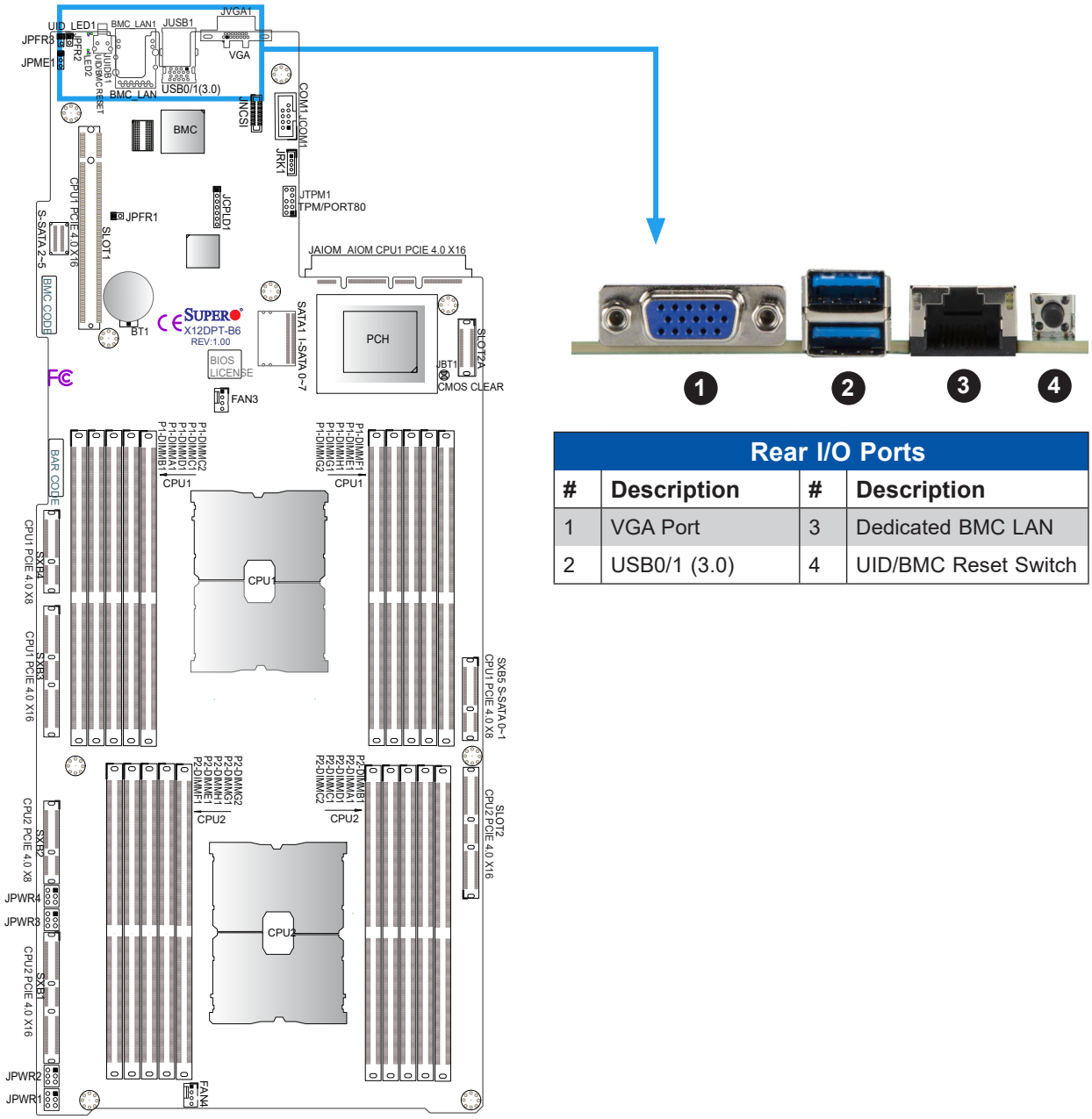
Press both release tabs on the ends of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.



Warning! 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. Handle DIMM modules with care. Carefully follow all the instructions given on the first page of this chapter to avoid ESD-related damages done to your memory modules or components.

2.5 Rear I/O Ports

See Figure 2-1 for the locations and descriptions of the various I/O ports on the rear of the motherboard.



Rear I/O Ports			
#	Description	#	Description
1	VGA Port	3	Dedicated BMC LAN
2	USB0/1 (3.0)	4	UID/BMC Reset Switch

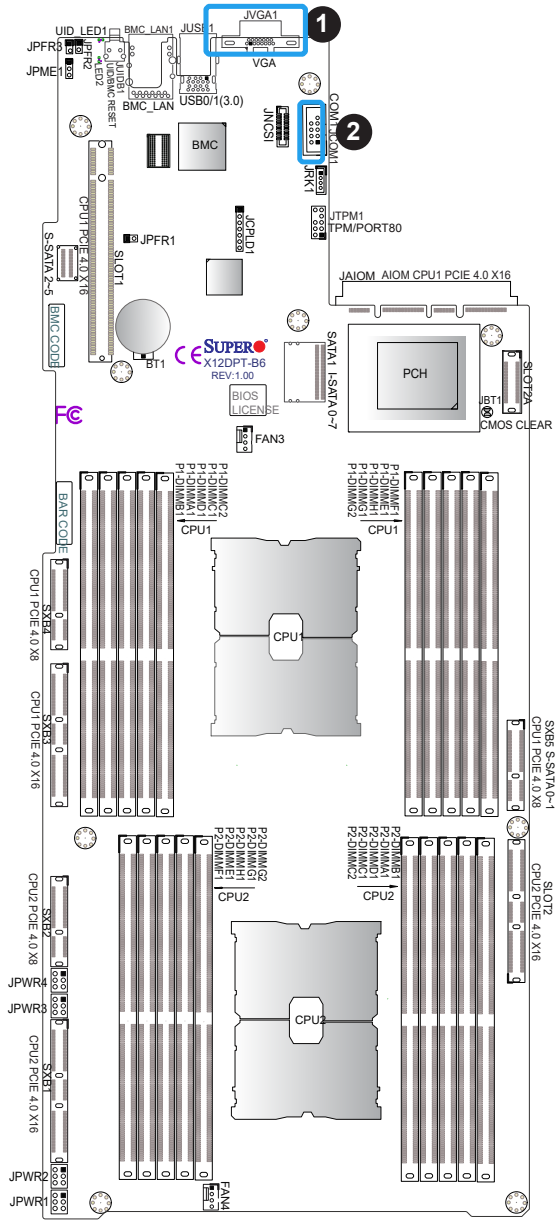
Figure 2-1. Rear I/O Ports and Definitions

VGA Connection

The VGA port is located at JVGA1 on the rear I/O panel. The VGA connection provides analog interface support between the computer and the video displays.

COM Port

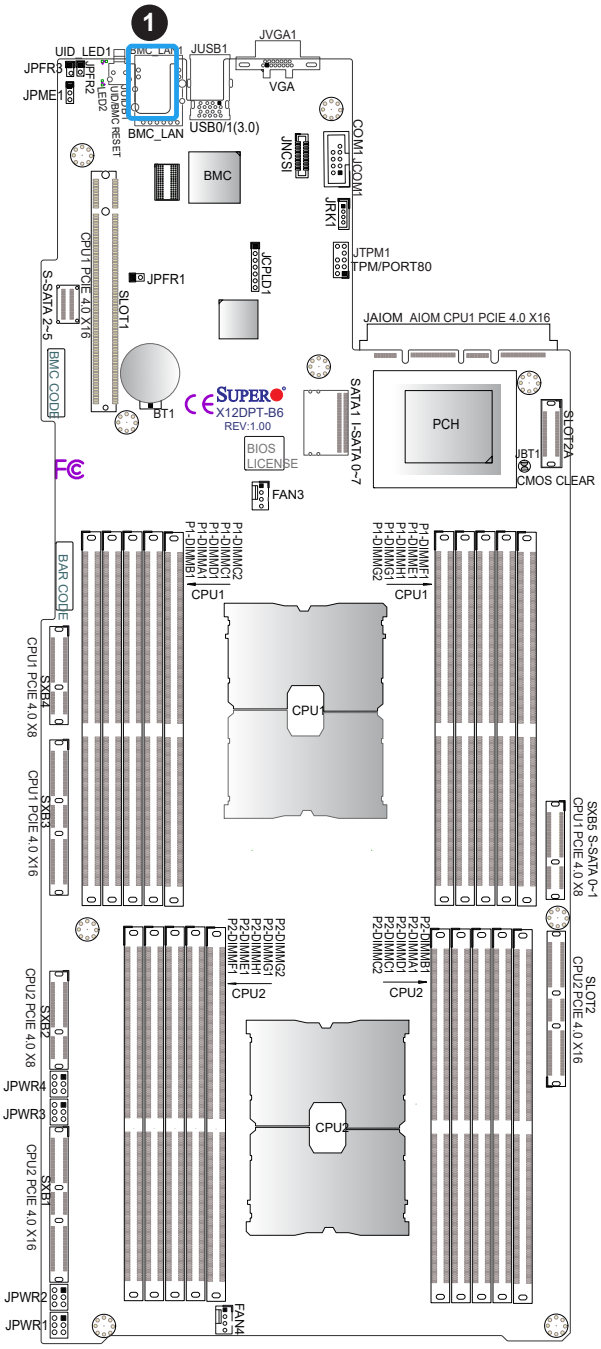
The communication port (COM1) supports serial link interface.



1. VGA Port (JVGA1)
2. COM1

BMC LAN Port

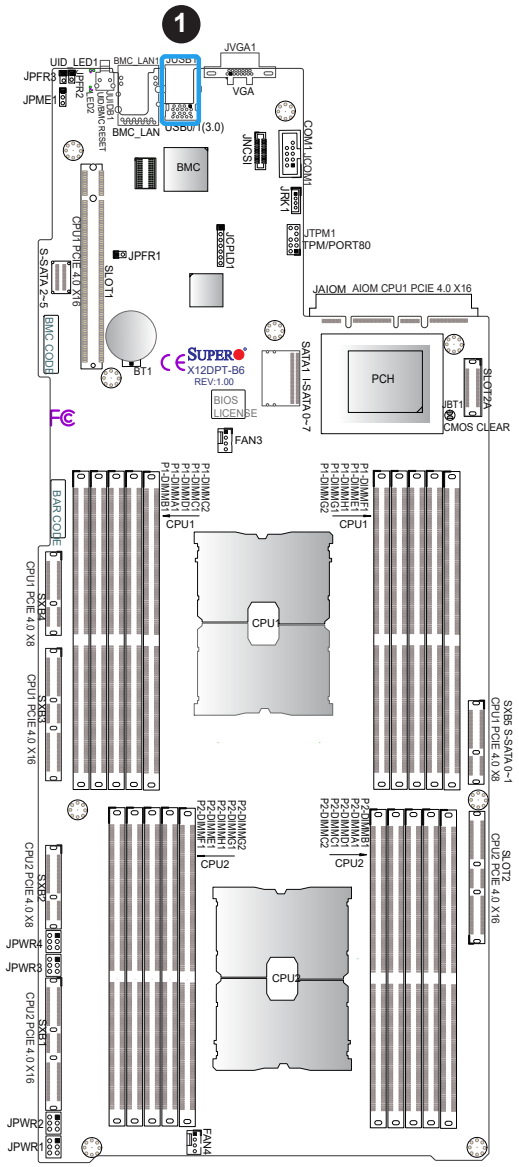
The dedicated BMC LAN (BMC_LAN1), provides LAN support for the Baseboard Management Controller (BMC). Refer to the LED Indicator section for LAN LED information.



1. BMC LAN

Universal Serial Bus (USB) Ports and Headers

An 18-pin USB connector, located on the rear I/O panel, supports two USB 3.0 ports (USB0/1) via USB cables.



1. Rear I/O Panel USB 0/1 (3.0)

Rear I/O Panel USB0/1 (3.0)
Pin Definitions

Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Stda_SSRX-	B5	USB3_RN
A6	Stda_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Stda_SSTX-	B8	USB3_TN
A9	Stda_SSTX+	B9	USB3_TP

UID (Unit Identification)/BMC Reset Switch and UID/BMC Reset LED Indicators

A UID LED/BMC Reset switch (JUIDB1) is located on the rear side of the motherboard. This switch has two functions. It can be used to identify a system unit that is in need of service, and it can also be used to reset the BMC settings. When functioning as a UID LED switch, it can turn the UID LED (UID_LED1) on and off to identify a unit that may require service.

When functioning as a BMC reset switch and working in conjunction with BMC Heartbeat LED (LED2), JUIDB1 will trigger a cold reboot when you press and hold the switch for six seconds. It will also restore the BMC to the manufacturer's default when you press and hold the switch for 12 seconds.

To achieve these dual purposes, the UID LED/BMC Reset switch works in conjunction with the BMC Heartbeat LED (LED2). Note that UID can also be triggered via BMC on the motherboard. Refer to the BMC User's Guide posted on our website at http://www.supermicro.com for more information on BMC.

UID/BMC Reset Switch (JUIDB1) Features & Settings

When Used as a UID LED Switch Works with UID_LED1		**When Used as a BMC Reset Switch Works with BMC Heartbeat LED (LED2)**		
Color	**Status**	BMC Heartbeat LED	**LED2**	**Green Blinking: BMC Normal**
Blue: On	Unit Identified	BMC Reset: Press and hold the switch (JUIDB1) for six seconds	LED2: Solid green, during reboot	
Press the switch (JUIDB1) to turn on and off the UID LED.			Triggering a cold reboot; LED: solid green on during cold reboot	
		BMC Reset: Press and hold the switch (JUIDB1) for 12 seconds	LED2: Solid green, during BMC reset	
			BMC: Reset to the manufacturer's default; LED: solid green on during BMC Reset	

UID/BMC Reset Switch (JUIDB1) Pin Definitions

Pin#	**Definition**
1	Ground
2	Ground
3	Button In
4	Button In

2.6 Connectors

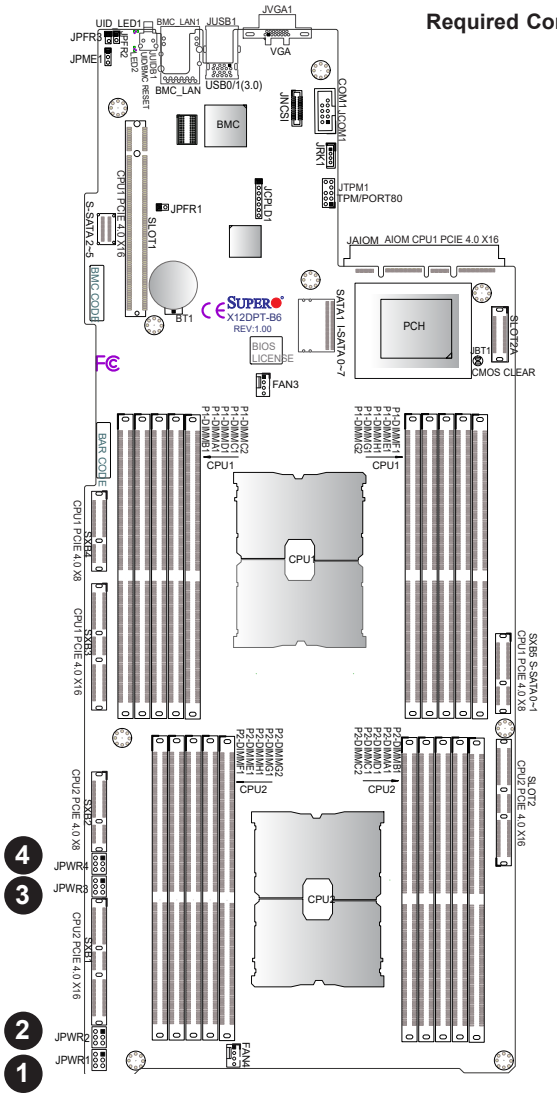
Power Connectors

Power Supply Connectors

There are four 6-pin 12 V DC power connectors (JPWR1/JPWR2/JPWR3/JPWR4) on the motherboard to provide an adequate power supply to your system.

12 V 6-pin Power Pin Definitions	
Pin#	**Definition**
1 – 3	Ground
4 – 6	+12 V

Required Connection



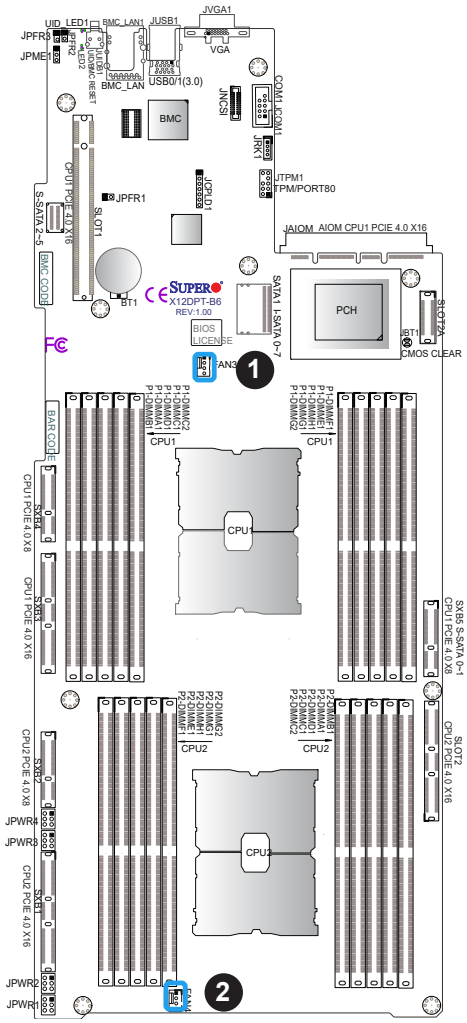
1. JPWR1
2. JPWR2
3. JPWR3
4. JPWR4

Headers

Fan Headers

There are four 4-pin fan headers on the motherboard: two (FAN3 and FAN4) on the front plane and two (FAN1 and FAN2) on the HDD backplane. All these 4-pin fan headers are backward compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only through Thermal Management via the BMC interface.

Fan Header Pin Definitions	
Pin#	**Definition**
1	Ground
2	2.5A/+12 V
3	Tachometer
4	PWM_Control



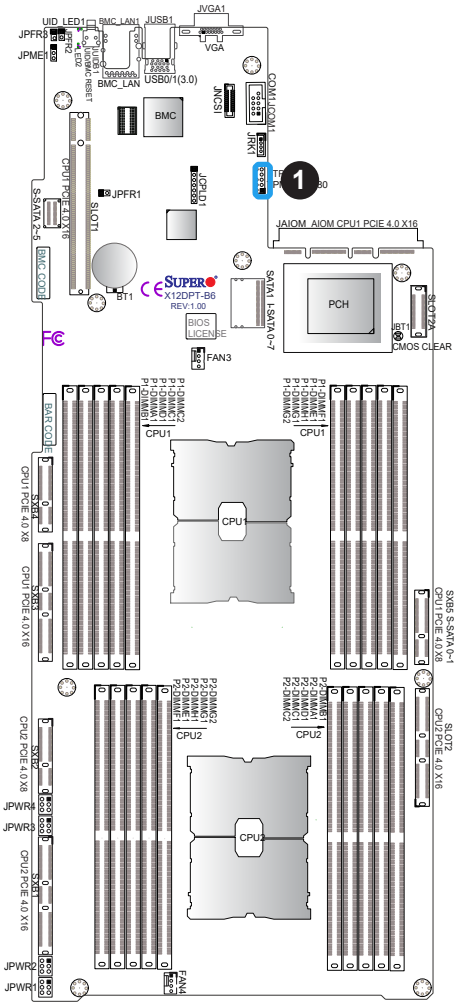
1. FAN3
2. FAN4

TPM/Port 80 Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is optionally available as from Supermicro. 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. Go to the following link for more information on the TPM: http://www.supermicro.com/manuals/other/TPM.pdf.

Trusted Platform Module Header 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 Stdby	10	SPI_IRQ#



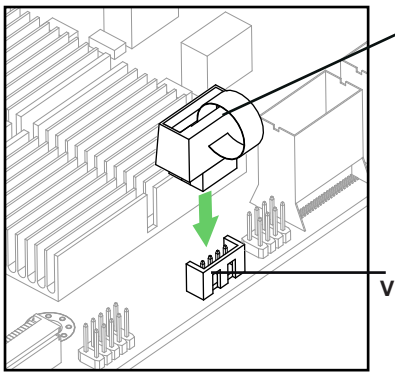
1. TPM Header

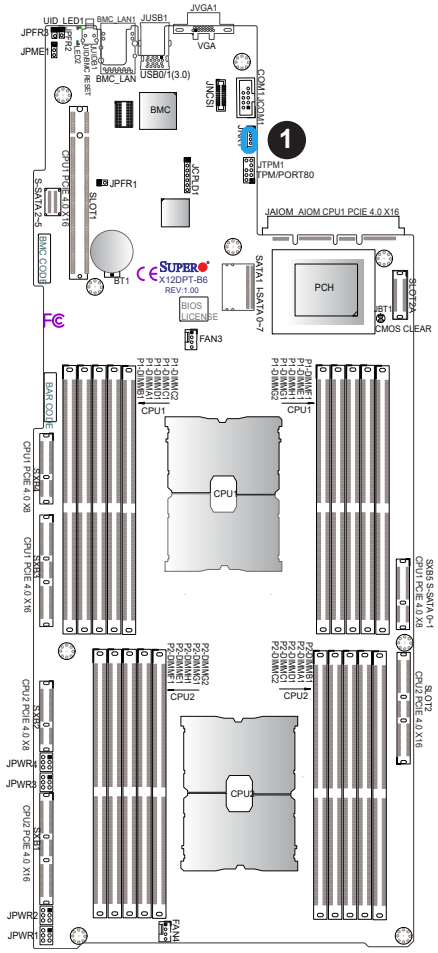
VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support.

Note: For detailed instructions on how to configure VROC RAID settings, refer to the VROC RAID Configuration User's Guide posted on the web page under the link: http://www.supermicro.com/manuals.

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



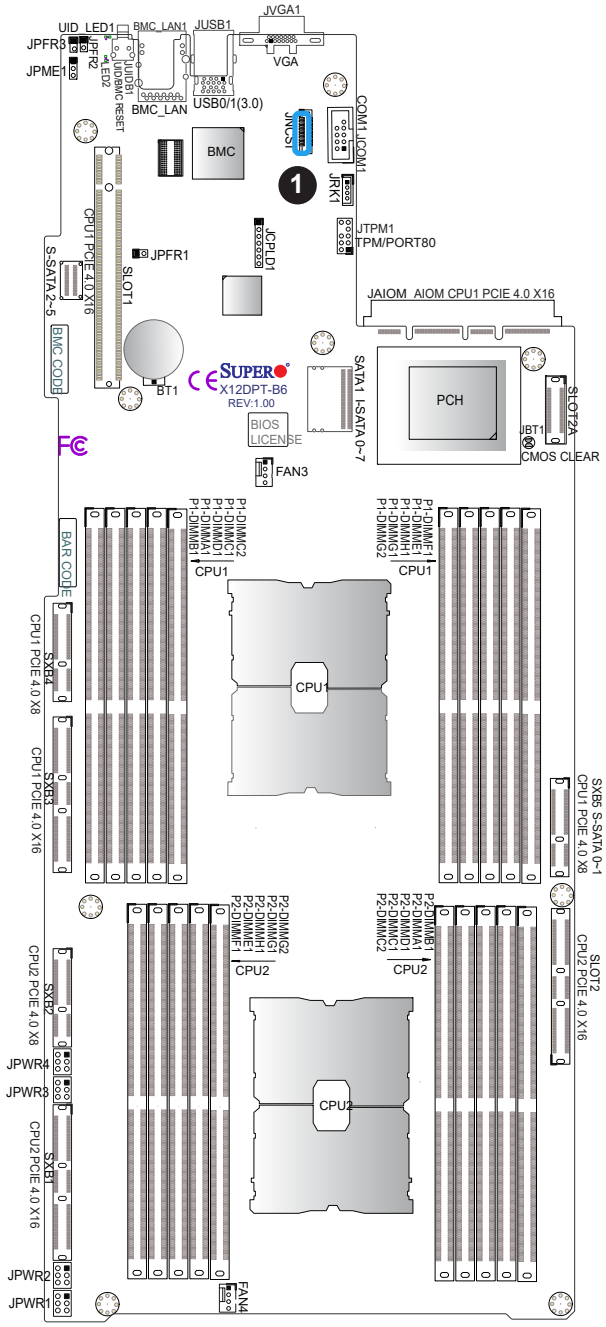


1. VROC RAID Key (JRK1)

NCSI Connector

The NCSI header (JNCSI) is used to connect a Network Interface Card (NIC) to the motherboard so that the BMC is able to poll the temperature reading from it.

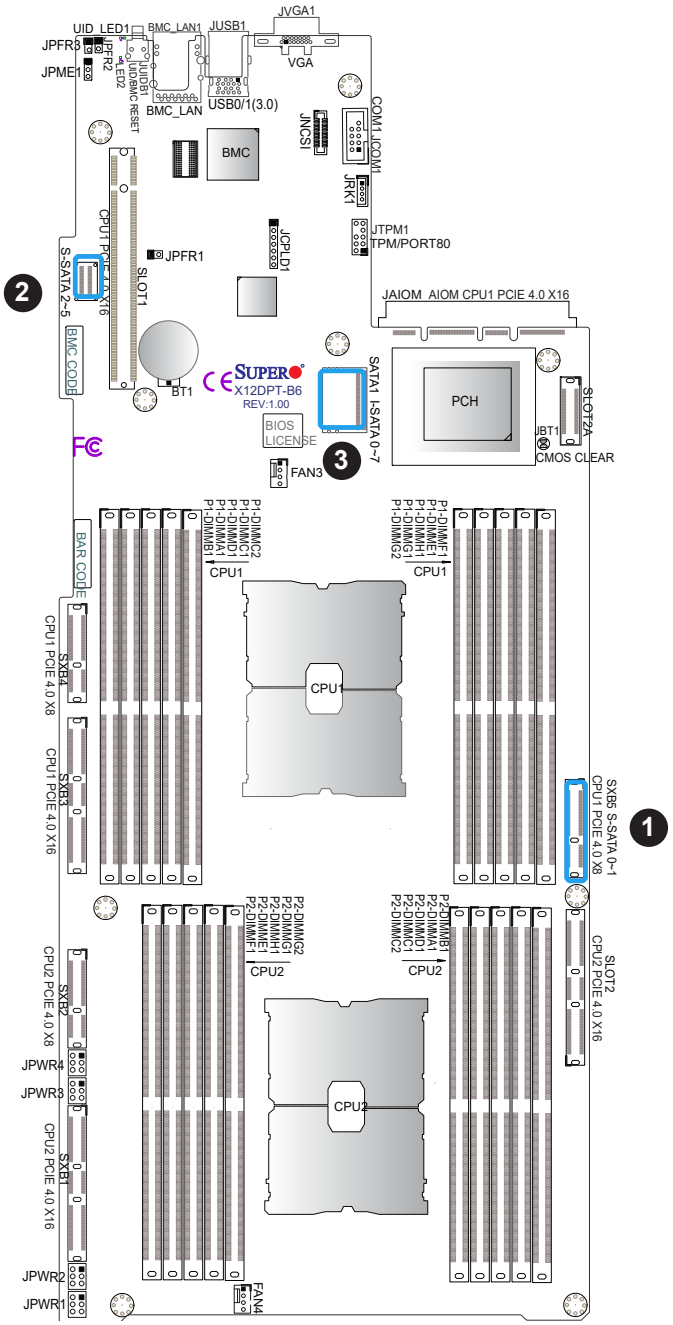
Note: For detailed instructions on how to configure Network Interface Card (NIC) settings, refer to the Network Interface Card Configuration User's Guide posted on the web page under the link: http://www.supermicro.com/manuals/.



1. JNCSI

I-SATA 3.0 and S-SATA 3.0 Ports

The X12DPT-B6 has eight I-SATA 3.0 ports (I-SATA0 through I-SATA7) and six S-SATA ports (S-SATA0, S-SATA1, S-SATA2 through S-SATA5). These SATA ports, supported by the C621A chipset, provide serial-link signal connections.



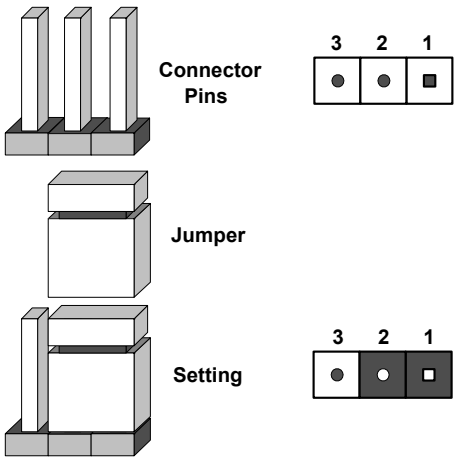
1. S-SATA0–1
2. S-SATA2–5
3. I-SATA0–7

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. The diagram is 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

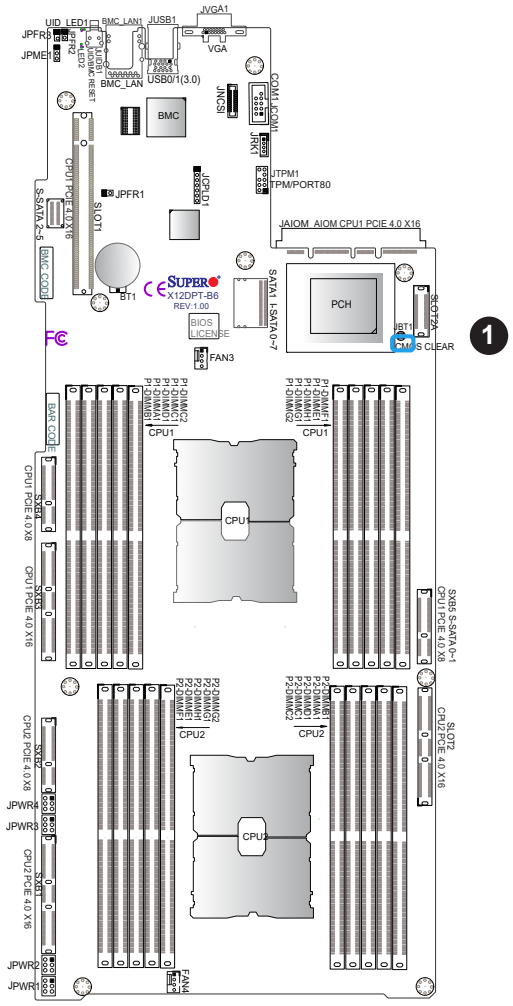
1. First power down the system and unplug the power cord(s).
2. Remove the cover of the chassis to access the motherboard.
3. Remove the battery from the motherboard.
4. Short the CMOS pads with a metal object such as a small screwdriver for at least four seconds.
5. Remove the screwdriver (or shorting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

7. Reconnect the power cord(s).

8. Power on the system.

Note 1: Clearing CMOS will also clear all passwords.

Note 2: Do not use the PW_ON connector to clear CMOS.

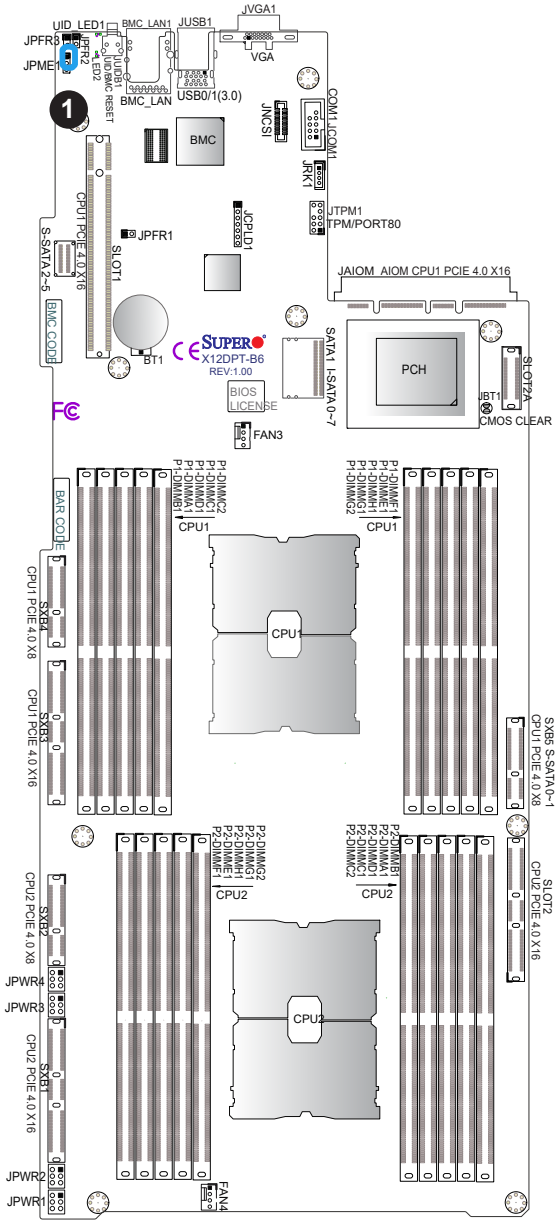


1. Clear CMOS

ME Recovery

JPME1 is used for ME Firmware Recovery mode, which will limit system resources for essential function use only without putting restrictions on power use. In the single operation mode, the online upgrade will be available via Recovery mode.

ME Recovery Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2	Normal (Default)
Pins 2-3	ME Recovery



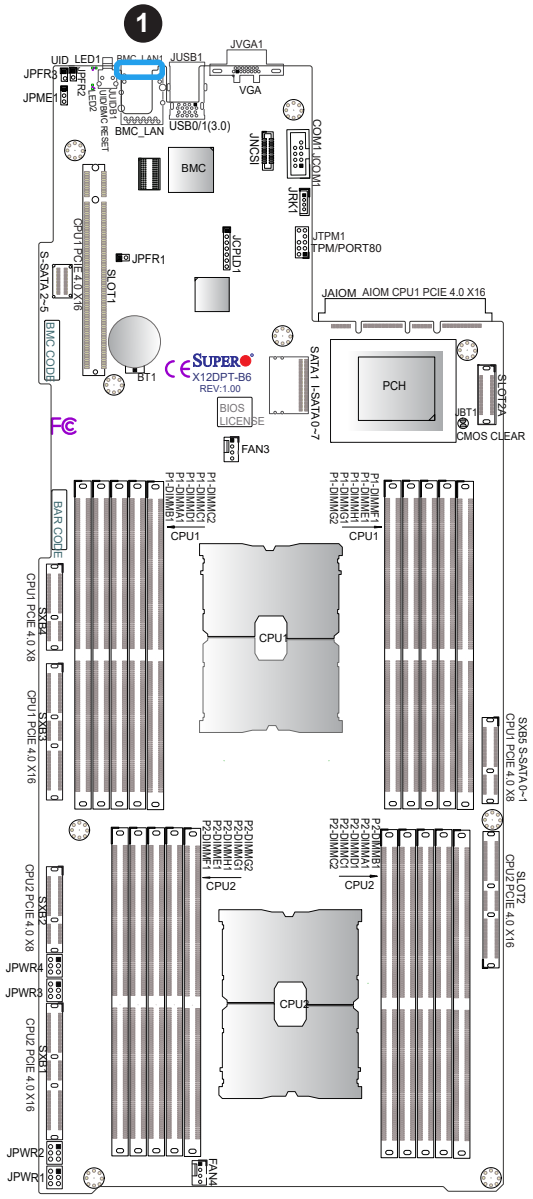
1. ME Recovery

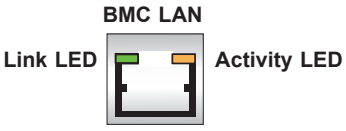
2.8 LED Indicators

BMC LAN LEDs

A BMC-dedicated LAN (BMC_LAN1) is supported by the onboard Baseboard Management controller. The LED on the right indicates activity, while the LED on the left indicates the speed of the connection.

BMC LAN LEDs		
	Color/State	**Definition**
Link (left)	Green: Solid Amber: Solid	100 Mbps 1 Gbps
Activity (Right)	Amber: Blinking	Active





1. BMC_LAN

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 ATX 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 approximately 3VDC. If it does not, replace it with a new one.

No Video

1. If the power is on, but you have no video, remove all add-on cards and cables.
2. Remove all memory modules and turn on the system (if the alarm is on, check the specs of memory modules, reset the memory or try a different one).

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. Make sure that system power is on and that memory error beeps are activated.
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

When a no-memory beep code is issued by the system, check the following:

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 page to see a list of supported memory.
2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.
3. Make sure that you are using the correct type of ECC DDR4 modules recommended by the manufacturer.
4. 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

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to Chapter 1 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies approximately 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 page 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. 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 CD/DVD.

2. Cable connection: Check to make sure that all cables are connected and working properly.

3. Using 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. Identifying 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, take the following steps. Also, 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. 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_BMC_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, have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@supermicro.com.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: This motherboard supports up to 4 TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM DDR4 ECC memory with speeds of 3200/2933/2666 MT/s in 20 memory slots and up to 4 TB of Intel Optane PMem 200 Series memory with speeds of up to 3200 MT/s.To enhance memory performance, do not mix memory modules of different speeds and sizes. Follow all memory installation instructions given on Section 2-4 in "Chapter 2."

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: P1-DIMMC2/P2-DIMMC2 memory slots are reserved for PMem 200 Series only.

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_BMC_Intel.html. 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 1: The SPI BIOS chip used on this motherboard cannot be removed. Send your motherboard back to our RMA Department at Supermicro for repair.

Note 2: For BIOS update and recovery instructions, refer to the Firmware Update and Recovery Instructions for Supermicro's X14 Series Motherboard User's Guide posted on our website at http://www.supermicro.com/support/manuals/.

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, take the following steps:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery.
3. Using 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

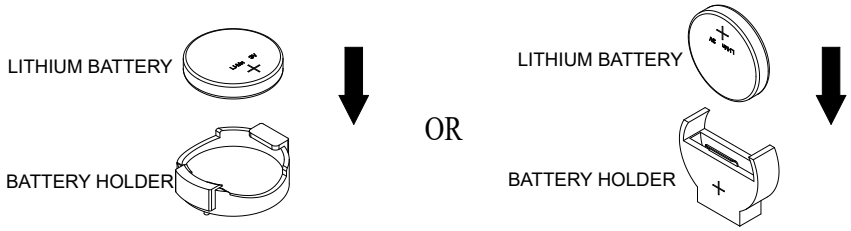
Warning! Handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Comply with the regulations set up by your local hazardous waste management agency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

Battery Installation

To install an onboard battery, follow steps 1 and 2 above before taking the following steps:

2. Identify the battery's polarity. The positive (+) side should be facing up.
3. 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 X12DPT-B6 motherboard. The BIOS is stored on a chip and can be easily upgraded using the BMC WebUI or the SUM utility.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual. 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, press the <Delete> key while the system is booting up. In most cases, the <Delete> key is used to invoke the BIOS setup screen. However, in other cases, other hot keys such as <F1> and <F2> may be used for this purpose. Each main BIOS menu option is described in this manual.

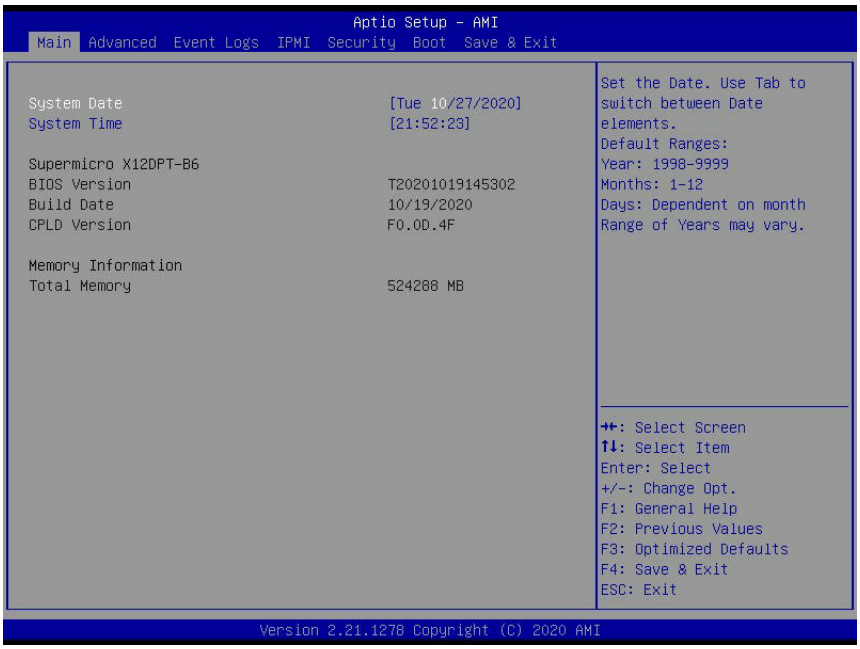
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. Note that BIOS has default text messages built-in, and we retain the option to include, omit, or change any of these text messages. Default values are printed in **Bold** font.

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>, <F4>, <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 see the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen.



System Date/System Time

Use this feature to change the system date and time. To change system date and time settings, highlight *System Date* or *System Time* using the arrow keys and enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day 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 the RTC (Real Time Clock) reset.

Supermicro X12DPT-B6

BIOS Version

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

Build Date

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

CPLD Version

This feature displays the version of the CPLD (Complex-Programmable Logical Device) used in the system.

Memory Information

Total Memory

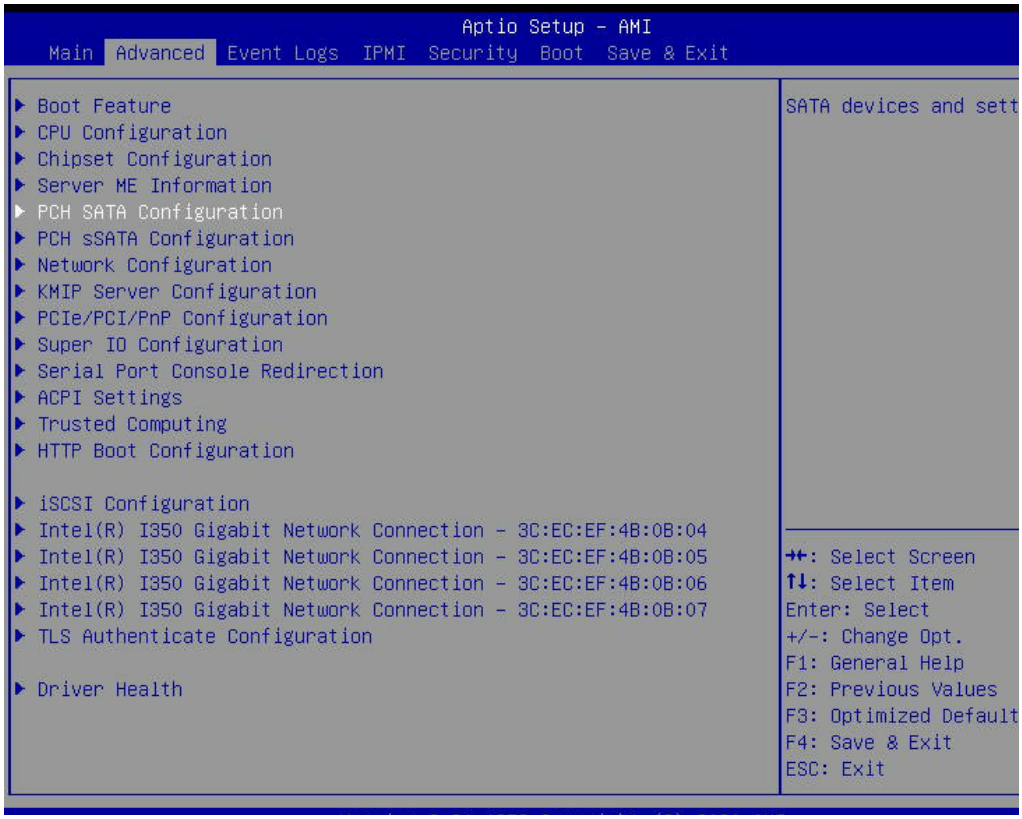
This feature displays the total size of memory available in the system.

Memory Speed

This feature displays the speed of memory modules installed in the system.

4.3 Advanced Setup Configurations

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



Warning! Take Caution when changing the Advanced settings. An incorrect value may cause the system to malfunction. When this occurs, restore the setting to the manufacturing default setting.

▶Boot Feature

Quiet Boot

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

Note: BIOS POST (Power-on Self Test) messages are always displayed regardless of the setting for this feature.

Option ROM Messages

Use this feature to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM display settings. Select Force BIOS to use the Option ROM display mode 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 Off and **On**.

Wait For 'F1' If Error

Select Enabled to force the system to wait until the <F1> key is pressed if an error occurs. The options are **Disabled** and Enabled.

INT19 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 adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adaptors to function as bootable disks. If this feature is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately to allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

When EFI (Extensible Firmware Interface) Boot is selected, the system BIOS will automatically reboot the system from an EFI boot device after an initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after an initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

Watch Dog Function

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than five minutes. The options are Enabled and **Disabled.**

**If this feature is set to Enabled, the following feature will display:*

Watch Dog Action (Available when "Watch Dog Function" is set to Enabled.)

This feature allows the user to determine how the watch dog function can be triggered. The options are NMI and **Reset.**

Front USB Ports

Select Enabled to allow the specific type of USB device to be used in the front USB ports. Select Enabled (Dynamic) to allow or disallow this particular type of USB devices to be used

in the front USB ports without rebooting the system. The options are **Enabled**, Disabled, and Enabled (Dynamic).

Rear USB Ports

Select Enabled to allow the specific type of USB devices to be used in the rear USB ports. Select Enabled (Dynamic) to allow or disallow this particular type of USB device to be used in the rear USB ports without rebooting the system. The options are **Enabled**, Disabled, and Enabled (Dynamic).

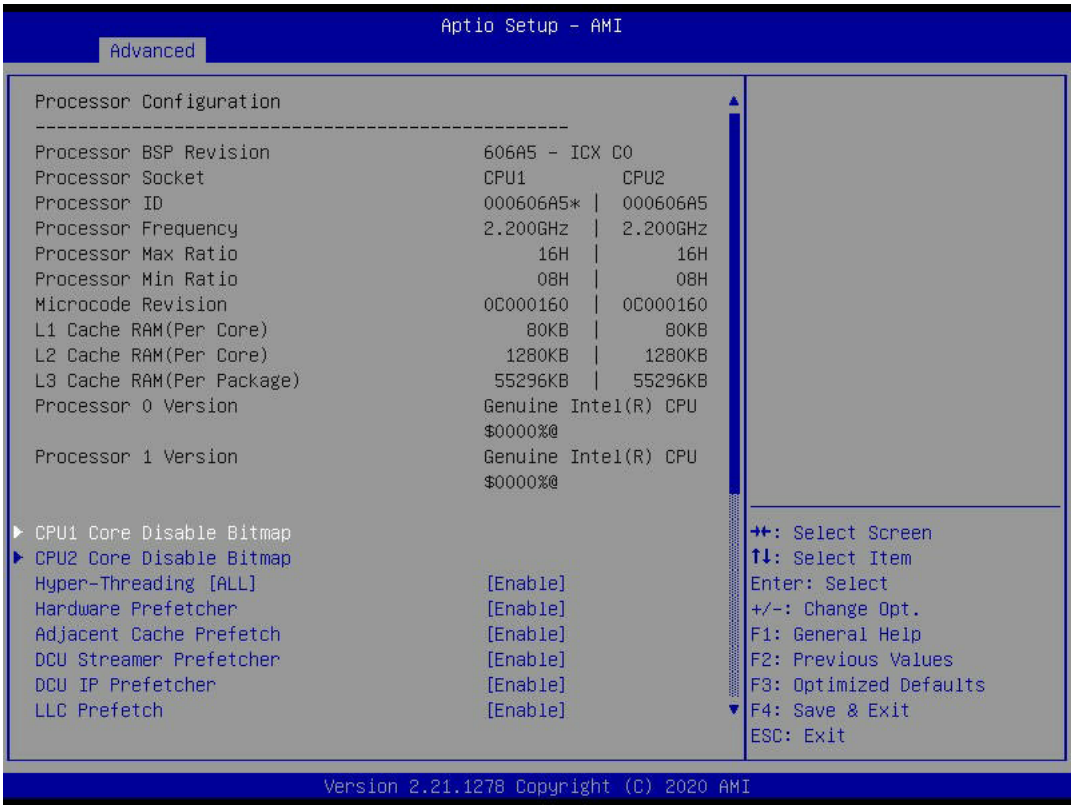
Restore AC Power Loss

Use this feature to set the power state after a power outage. Select Power 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 to power off the system after pressing and holding the power button for four seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are 4 Seconds Override and **Instant Off.**

▶CPU Configuration



Warning! Setting the wrong values in the following sections may cause the system to malfunction.

▶Processor 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

The following features will display:

Available Bitmap: The available Bitmap will be displayed.

Core Disable Bitmap (Hex)

Enter 0 to enable all CPU cores. Enter FFFFFFFFFFF to disable all CPU cores. Note that at least one core per CPU must be enabled. Disabling all cores is not allowed. The default option is **0**.

Hyper-Threading (ALL)

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

Hardware Prefetcher

If this feature is set to Enable, the hardware prefetcher will prefetch data from the main system memory to Level 2 cache to help expedite data transactions to enhance memory performance. The options are Disable and **Enable**.

Adjacent Cache Prefetch

Select Enable for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disable for the CPU to prefetch both cache lines for 64 bytes. The options are Disable and **Enable**.

Note: Refer to Intel's website for detailed information.

DCU Streamer Prefetcher

If this feature is set to Enable, the DCU (Data Cache Unit) streamer prefetcher will prefetch data streams from the cache memory to the DCU (Data Cache Unit) to speed up data accessing and processing to enhance CPU performance. The options are Disable and **Enable**.

DCU IP Prefetcher

This feature allows the system to use the sequential load history, which is based on the instruction pointer of previous loads, to determine whether the system will prefetch additional lines. The options are **Enable** and Disable.

LLC Prefetch

If this feature is set to Enable, LLC (hardware cache) prefetching on all threads will be supported. The options are **Enable** and Disable.

Extended APIC (Extended Advanced Programmable Interrupt Controller)

Based on the Intel Hyper-Threading technology, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will be expanded from 8 bits to 16 bits to provide 512 APIDs to each thread to enhance CPU performance. The options are **Disable** and Enable.

VMX

Select Enable to enable the Intel Vanderpool Technology for Virtualization platform support, which will allow multiple operating systems to run simultaneously on the same computer to maximize system resources for performance enhancement. The options are Disable and **Enable**.

Enable SMX (Not Available when "Enable Intel TXT" is set to Enable)

Select Enable to support Safer Mode Extensions (SMX) which provides a programming interface for system software to establish a controlled environment to support the trusted platform configured by the end user and to verify a virtual machine monitor before it is allowed to run. 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/Enable** and Lock/Disable.

AES-NI

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

TME, TME-MT, TDX

Total Memory Encryption (TME)

Select Enabled for total memory encryption support to enhance memory data security. The options are **Disabled** and Enabled.

If this feature is set to Enabled, the followings item will display:

Total Memory Encryption Multi-Tenant (TME-MT) (Available when "Total Memory Encryption" is set to Enabled, "Limit CPU PA to 46 Bits" below is set to Disable)

Select Enabled for Total Memory Encryption Multi-Tenant support to maximize memory data security. The options are **Disabled** and Enabled.

If this feature is set to Enabled, the followings item will display:

Max TME-MT Keys (Available when Total Memory Encryption is set to Enabled)

This feature displays the value of maximum Total Memory Encryption Multi-Tenant (TME-MT) keys.

Software Guard Extension (SGX)

Note: For SGX to work properly, use the CPUs that support this feature and be sure to install one CPU per channel.

SGX Factory Reset (Available when TME-MT is set to Enabled and the SGX feature is supported by the CPU used in the system)

Select Enabled to reset the factory default setting for SGX (Software Guard Extension). The options are **Disabled** and Enabled.

SW (Software) Guard Extensions (SGX) (Available when TME-MT is set to Enabled and the SGX feature is supported by the CPU used in the system)

Select Enabled to support Software Guard Extensions (SGX) for memory data security enhancement. The options are **Disabled** and Enabled.

SGX Package Info In-Band Access (Available when TME-MT is set to Enabled and the SGX feature is supported by the CPU used in the system)

If this feature is set to Enabled, Software Guard Extensions (SGX) package information will become available for in-band access. 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 Enable and **Disable**.

▶Advanced Power Management Configuration

Power Technology

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

Power Performance Tuning (Available when "Power Technology" is set to Custom)

Select to allow the BIOS system to configure the Power-Performance Tuning Bias setting. The options are BIOS Controls EPB and **OS Controls EPB**.

ENERGY_PERF_BIAS_CFG Mode (ENERGY PERFORMANCE BIAS CONFIGURATION Mode) (Available when "Power Performance Tuning" is set to BIOS Controls EPB)

Use this feature to configure the proper operation setting for your machine to achieve the desired system performance level and energy saving (efficiency) level at the same time. Selecting Performance can enhance system performance but may consume more power as energy is needed to fuel the processors for operation. The options are Performance, **Balanced Performance**, Balanced Power, and Power.

▶CPU P State Control (Available when "Power Technology" is set to Custom)

SpeedStep (P-States)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Refer to Intel's website for detailed information. The options are Disable and **Enable**.

Dynamic SST-PP (Speed Select Technology-Performance Profile)

If this feature is set to Enable, the user will be able to configure Intel SST-PP features, including Base, Configuration 3, and Configuration 4 settings under various processor working conditions. The options are **Disable** and Enable.

Intel SST-PP (Speed Select Technology-Performance Profile)

This feature allows the user to choose from two additional Base-Frequency conditions maximum for CPU P State Control. The options are **Base**, Config (Configuration) 3, and Config (Configuration) 4.

Activate SST-BF (Speed Select Technology-Base Frequency)

Select Enable for Intel Speed Select Technology-Base Frequency support. The options are **Disable** and Enable.

Configure SST-BF (Speed Select Technology-Base Frequency)

When this feature is set to Enable, the system BIOS will configure SST-BF High Priority Core settings so that system software does not have to configure these settings. The options are **Enable** and Disable.

EIST PSD Function (Available when "SpeedStep" is set to Enable)

This feature reduces the latency that occurs when one P-state changes to another, thus allowing the transitions to occur more frequently. This will allow for more demand-based P-state switching based on real-time energy needs of applications and optimize the power-to-performance balance for energy efficiency. The options are **HW_ALL** and SW_ALL.

Turbo Mode (Available when "SpeedStep" is set to Enable)

Select enable to allow the CPU to operate at the manufacturer-defined turbo speed by increasing the CPU clock frequency. This feature is available when it is supported by the processors used in the system. The options are Disable and **Enable**.

CPU Flex Ratio Override (Available when supported by the CPU installed on the motherboard)

Select enable to override the CPU Flex-Ratio setting, which is the minimum multiplier that allows the computer to clock. The options are Enable and **Disable**.

CPU Core Flex Ratio (Available when supported by the CPU installed on the motherboard and when "CPU Flex Ratio Override" is set to Enable)

Use this feature to configure the Core Ratio Multiplier settings for non-Turbo mode processors. The default setting is **23**.

▶Hardware PM State Control (Available when "Power Technology" is set to Custom)

Hardware P-States

If this feature is set to Disable, system hardware will choose a P-state setting for the system based on an OS request. If this feature is set to Native Mode, hardware will choose a P-state setting based on the OS guidance. If this feature is set to Native Mode with No Legacy Support, system hardware will choose a P-state setting independently

▶Frequency Prioritization

RAPL (Running Average Power Limit) Prioritization

This feature allows you to prioritize running the average power limit. The options are **Disable** and Enable.

▶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 **Enable** and Disable.

CPU C6 Report (Available when "Autonomous Core C-State" is set to Disable)

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

Enhanced Halt State (C1E) (Available when "Autonomous Core C-State" is set to Disable)

Select Enable to enable "Enhanced Halt State" support, which will significantly reduce the CPU's power consumption by minimizing the CPU's clock cycles and reducing the voltage during a "Halt State." The options are Disable and **Enable**.

▶Package C State Control (Available when "Power Technology" is set to Custom)

Package C State

Use this feature to optimize and reduce CPU package power consumption in idle mode. Note that the changes you've made in this setting will affect all CPU cores or the circuits of the entire system. The options are C0/C1 state, C2 state, C6 (non-Retention) state, and **Auto**.

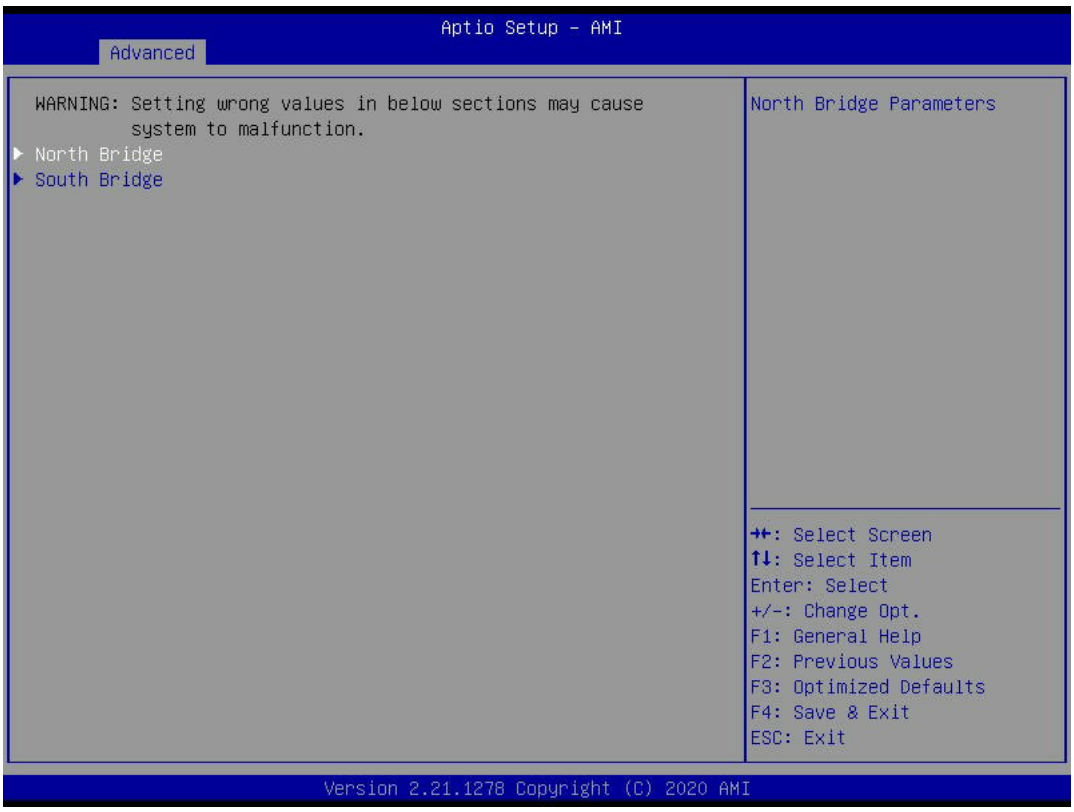
▶CPU T State Control Available when "Power Technology" is set to Custom)

Software Controlled T-States

If this feature is set to Enable, CPU throttling will be controlled by the OS, which will reduce the speed of the CPU. The options are Enable and **Disable**.

▶Chipset Configuration

Warning! Setting the wrong values in the following items may cause the system to malfunction.



▶North Bridge

This submenu contains features that allow the user to configure Intel North Bridge parameters.

▶Uncore Configuration

This section allows the user to configure the following Uncore settings:

- Number of CPU
- Number of IIO
- Current UPI Link Speed
- Current UPI Link Frequency
- Global MMIO Low Base/Limit

- Global MMIO High Base/Limit
- PCIe Configuration Base/Size

Degrade Precedence

Use this feature to select the degrading precedence option for Ultra Path Interconnect (UPI) connections. Select Topology Precedent to degrade UPI features if system options are in conflict. Select Feature Precedent to degrade UPI topology if system options are in conflict. The options are **Topology Precedence** and Feature Precedence.

Link L0p Enable

Select Enable for the system BIOS to enable Link L0p support which will allow the CPU to reduce the UPI links from full width to half width in the event when the CPU's workload is low in an attempt to save power. This feature is available for the system that uses Intel processors with UPI technology support. The options are **Disable**, Enable, and Auto.

Note: You can change the performance settings for non-standard applications by using this parameter. It is recommended that the default settings be used for standard applications.

Link L1 Enable

Select Enable for the BIOS to activate Link L1 support which will power down the UPI links to save power when the system is idle. This feature is available for the system that uses Intel processors with UPI technology support. The options are **Disable**, Enable, and Auto.

Note: Link L1 is an excellent feature for an idle system. L1 is used during Package C-States when its latency is hidden by other components during a wakeup.

XPT Remote Prefetch

Select Enable to support XPT (Extended Prediction Table) Remote Prefetch which will allow an LLC request to be duplicated and sent to an appropriate memory controller in a remote machine based on the recent LLC history to reduce latency. The options are Enable, Disable, and **Auto**.

KTI Prefetch

Select Enable for the KTI prefetcher to preload the L1 cache with data deemed relevant which will allow the memory read to start earlier on a DDR bus in an effort to reduce latency. Select Auto for the KTI prefetcher to automatically preload the L1 cache with relevant data whenever needed. The options are **Auto**, Enable, and Disable.

Local/Remote Threshold

Use this feature to set the threshold for the Interrupt Request (IRQ) signals, which handle hardware interruptions. The options are Disable, **Auto**, Low, Medium, and High.

IO Directory Cache (IODC)

Select Enable for the IODC (I/O Directory Cache) to generate snoops instead of generating memory lockups for remote IIO (InvItoM) and/or WCiLF (Cores). Select Auto for the IODC to generate snoops (instead of memory lockups) for WCiLF (Cores). The options are Disable, **Auto**, Enable for Remote InvItoM Hybrid Push, InvItoM AllocFlow, Enable for Remote InvItoM Hybrid AllocNonAlloc, and Enable for Remote InvItoM and Remote WViLF.

SNC (Sub NUMA)

Select Enable to use "Sub NUMA Clustering" (SNC), which supports full SNC (2-cluster) interleave and 1-way IMC interleave. Select Auto for 1-cluster or 2-cluster support depending on the status of IMC (Integrated Memory Controller) Interleaving. The options are **Disable** and Enable SNC2 (2-clusters).

XPT Prefetch

Select Enable to support XPT (Extended Prediction Table) Prefetch which will allow an LLC request to be duplicated and sent to an appropriate memory controller based on the recent LLC history to reduce latency. The options are Enable, Disable, and **Auto**.

Snoop Throttle Configuration

Use this feature to set the level of snoop throttle for the PCH, which will determine how much speed to decrease in operation when the system is in the snoop state. The options are Disabled, Low, Medium, High, and **Auto**.

PCIe Remote P2P (Peer-to-Peer) Relaxed Ordering

Select Disable to support PCIe remote peer-to-peer relaxed writing ordering, which will allow hardware to enforce peer-to-peer write ordering. The options are Enable and **Disable**.

Stale AtoS (A to S)

The in-memory directory has three states: I, A, and S states. The I (-invalid) state indicates that the data is clean and does not exist in the cache of any other sockets. The A (-snoop All) state indicates that the data may exist in another socket in an exclusive or modified state. The S state (-Shared) indicates that the data is clean and may be shared in the caches across one or more sockets. When the system is performing "read" on the memory and if the directory line is in the A state, we must snoop all other sockets because another socket may have the line in a modified state. If this is the case, a "snoop" will

return the modified data. However, it may be the case that a line "reads" in an A state, and all the snoops come back with a "miss." This can happen if another socket reads the line earlier and then has silently dropped it from its cache without modifying it. If "Stale AtoS" is enabled, a line will transition to the S state when the line in the A state returns only snoop misses. That way, subsequent reads to the line will encounter it in the S state and will not have to snoop, saving the latency and snoop bandwidth. Stale "AtoS" may be beneficial in a workload where there are many cross-socket reads. The options are Disable, Enable, and **Auto**.

LLC Dead Line Alloc

Select Enable to opportunistically fill the deadlines in the LLC. The options are **Enable**, Disable, and Auto.

▶Memory Configuration

This feature allows the user to configure the Integrated Memory Controller (iMC) settings.

STEP DRAM Test

Set Enable or Disable STEP (Samsung TestBIOS and Enhanced PPR) function. The options are **Disable** and Enable.

Enforce POR (Plan of Record)

Select POR to enforce POR restrictions for DDR4 memory frequency and voltage programming. The options are **POR** and Disable.

PPR Type

Post Package Repair (PPR) is a new feature available for DDR4 Technology. PPR provides additional spare capacity within a DDR4 DRAM module that is used to replace faulty cell areas detected during system boot. PPR offers two types of memory repairs. Soft Post Package Repair (sPPR) provides a quick, temporary fix on a raw element in a bank group of a DDR4 DRAM device, while hard Post Package Repair (hPPR) will take a longer time to provide a permanent repair on a raw element. The options are Soft PPR, **Hard PPR**, and PPR Disabled.

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

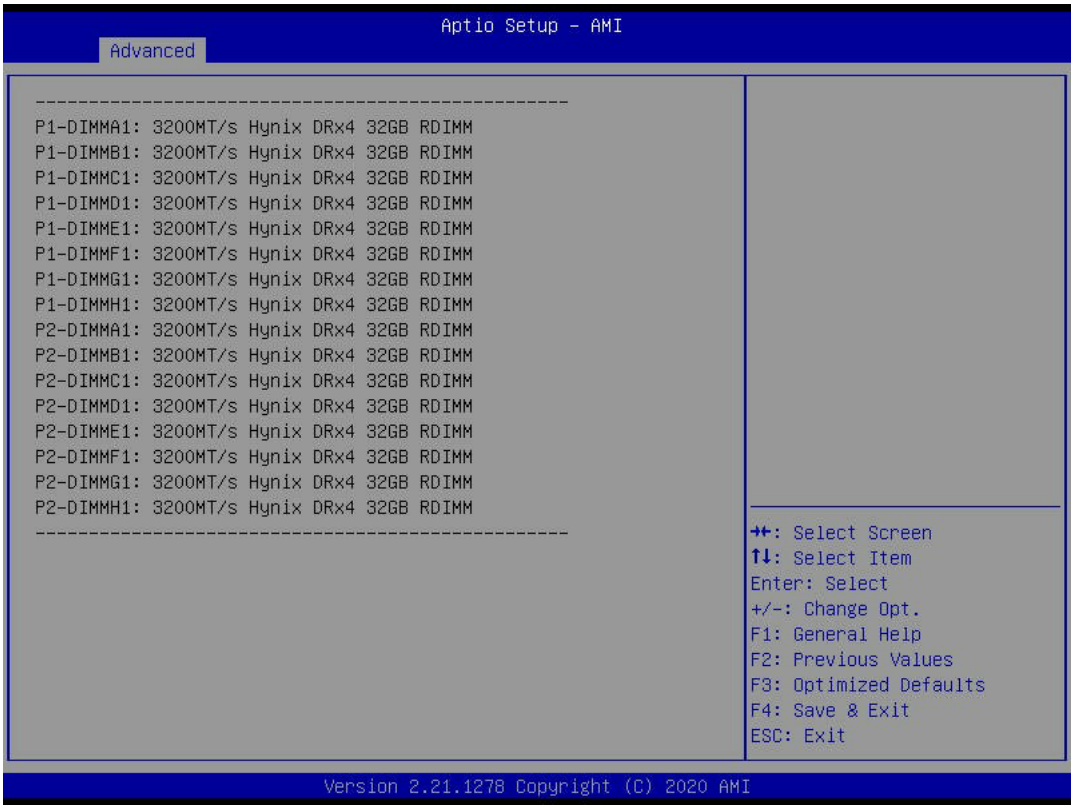
Select Enable to enable data scrambling for Intel Optane Persistent Memory (PMem) modules to enhance memory data security. Select Auto to use the Memory Reference Code (MRC) defaulting setting for PMem memory data scrambling. The options are **Enable** and Disable.

2X Refresh Enable

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

▶Memory Topology

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



This item displays the information of onboard memory modules as detected by the BIOS, for example:

- P1-DIMMC1
- P2-DIMMC1

▶Memory RAS Configuration Setup

Use this submenu to configure the following Memory RAS (Reliability_Availability_Serviceability) settings.

Enable Pcode WA (Workaround) for SAI (Security Attribute of the Initiator) PG (Policy Group)

Pcode, a register transfer language designed for reverse engineering, translates individual processor instructions into a sequence of Pcode operations in order to facilitate the construction of data-flow graphs and dissembling of processor instructions for machine application. Select Enabled to allow Pcode to work around the SAI group policy to achieve a solution with a next-step instruction. The options are **Disabled** and Enabled.

Mirror Mode (Unavailable when "UEFI ARM Mirror" below is set to Enabled and "ADDDC Sparing" below is set to Disabled)

Use this feature to configure the mirror mode settings for all 1LM/2LM memory modules installed in the system which will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity by half. The options are **Disabled**, Full Mirror Mode, and Partial Mirror Mode.

UEFI ARM Mirror (Only available when "Mirror Mode" is set to Disabled and "ADDDC Sparing" is set to Disabled)

Select Enabled to mimic the behavior of UEFI-based ARM (Address Range Mirror) with setup options to increase memory security, but it will reduce the memory capacity by half. The options are **Disabled** and Enabled.

Correctable Error Threshold

This feature allows the user to enter the threshold value for correctable memory errors. The default setting is **512**.

Partial Cache Line Sparing (PCLS)

Select Enabled to support partial cache line sparing, which will allow partial data contained in a cache line to be copied into the cache memory for safe-keeping/data security. The options are **Disabled** and Enabled.

ADDDC (Adaptive Double Device Data Correction) Sparing (Available if "UEFI ARM Mirror" is set to Enabled)

Select Enable for Adaptive Double Device Data Correction (ADDDC) support, which will not only provide memory error checking and correction but will also prevent the system from issuing a performance penalty before a device fails. Note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Enabled and **Disabled**.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected in a memory module and send the corrections 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 **Enabled**, Disabled, and Enable at End of POST (Power_On Self Test).

▶IIO Configuration

▶CPU1 Configuration/CPU2 Configuration

IOU0 (IIO PCIe Port 1)

Use this feature to configure the PCIe Bifurcation setting for a PCIe port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (IIO PCIe Port 2)

Use this feature to configure the PCIe Bifurcation setting for a PCIe port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU3 (IIO PCIe Port 4)

Use this feature to configure the PCIe Bifurcation setting for a PCIe port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU4 (IIO PCIe Port 5)

Use this feature to configure the PCIe Bifurcation setting for a PCIe port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

▶Port 0/DMI (Available on CPU1 Configuration Only)

Link Speed

Use this feature to configure the link speed of a PCIe device installed in Port 0 or DMI port. The options are **Auto**, Gen 1 (2.5 GT/s), Gen 2 (5 GT/s) and Gen 3 (8 GT/s).

The following information will be displayed:

- PCIe Port Link Status
- PCIe Port Link Max
- PCIe Port Link Speed

DMI Port MPSS (Maximum Payload Size Support) (Available for "CPU1 Configuration" Only)

Use this feature to set the maximum payload size support in the PCIe Device Capabilities Register for the device installed in the DMI port. The options are **Auto**, 128B, and 256B.

▶CPU1 Port 1A/Port 1C/Port 2A/Port 2B/Port 2C/Port 4A/Port 5A

▶CPU2 Port 1A/Port 2A/Port 4A/Port 4B/Port 4C/Port 4D/Port 5A/Port 5B/Port 5C/ Port 5D

Link Speed

Use this feature to configure the link speed of a PCIe device installed in Port 0 or DMI port. The options are **Auto**, Gen 1 (Generation 1) (2.5 GT/s), Gen 2 (Generation 2) (5 GT/s), Gen 3 (Generation 3) (8 GT/s), and Gen 4 (Generation 3) (16 GT/s).

The following information will be displayed:

- PCIe Port Link Status
- PCIe Port Link Max
- PCIe Port Link Speed

PCIe Port Max (Maximum) Payload Size

Use this feature to set the maximum payload size in the PCIe Device Capabilities Register for the device installed in the DMI port. The options are **Auto**, 128B, 256B, and 512B.

▶IOAT Configuration

Disable TPH

TPH **(**TLP Processing Hint) is used for data-tagging with a destination ID and a few important attributes. It can send critical data to a particular cache without writing through to memory. Select No for TLP Processing Hint support, which will allow a "TPL request" to provide "hints" to help optimize the processing of each transaction that occurred in the target memory space. The options are Yes and **No**.

Prioritize TPH (TLP Processing Hint)

Select Enable to prioritize the TPL requests that will allow the "hints" to be sent to help facilitate and optimize the processing of certain transactions in the system memory. The options are Enable and **Disable**.

Relaxed Ordering

Select Yes to allow certain transactions to be processed and completed before other transactions that have already been enqueued. The options are Yes and **No**.

▶Intel VT for Directed I/O (VT-d)

Intel VT for Directed I/O (VT-d)

Select Yes to use the Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) 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 **Yes** and No.

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 PCIe Root Port Bridges. The options are **Enable** and Disable.

Interrupt Remapping (Available when "Intel VT for Directed I/O (VT-d)" is set to Yes)

If this feature is set to Yes, I/O DMA transfer remapping and device-generated interrupts will be supported. The options are **Auto**, Yes, and No.

▶Intel VMD Technology

This section describes the configuration settings for the Intel VMD (Volume Management Device) 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, disable VMD in the BIOS.

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

▶Intel VMD for Volume Management Device on CPU1

VMD Configuration for PCH PORTS/IOU 0/IOU 1/IOU 3/IOU 4 (CPU1)

Enable/Disable VMD

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

Hot Plug Capable

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

VMD Config for PCH Ports (CPU1)

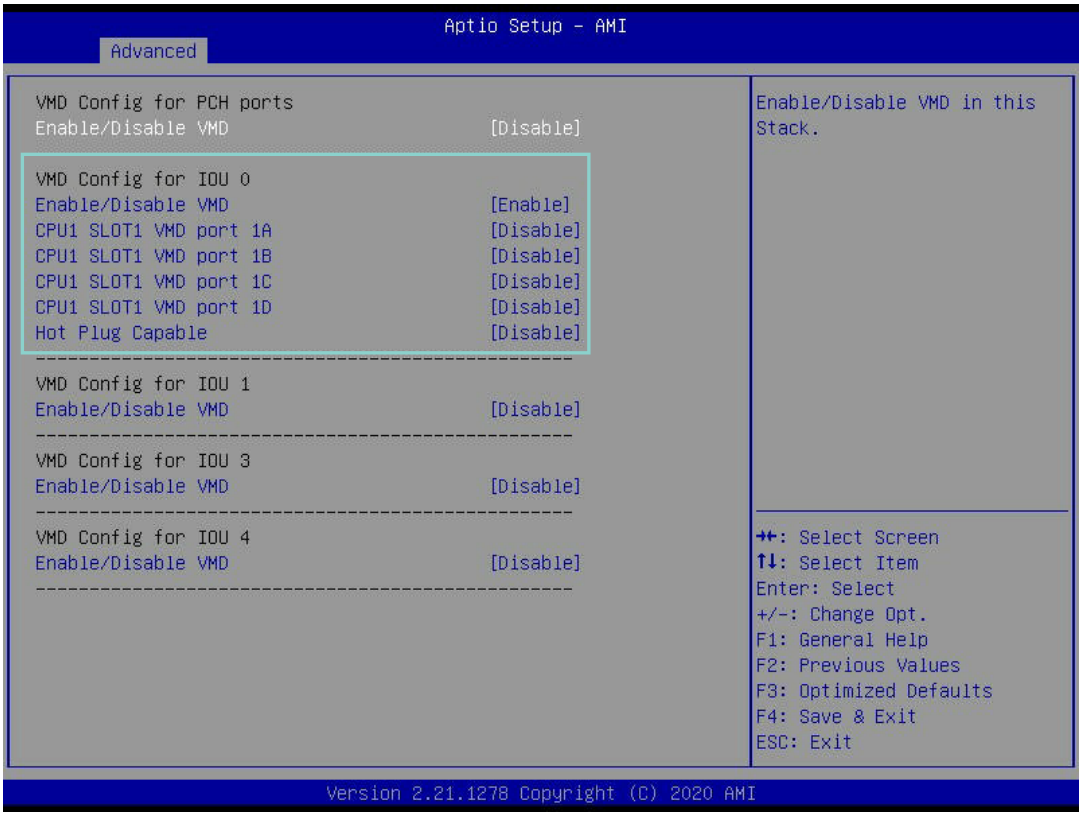
Enable/Disable VMD

Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items (if any) in this stack will be available for configuration. The options are Enable and **Disable**.

VMD Config for IOU 0 (CPU1)

Enable/Disable VMD

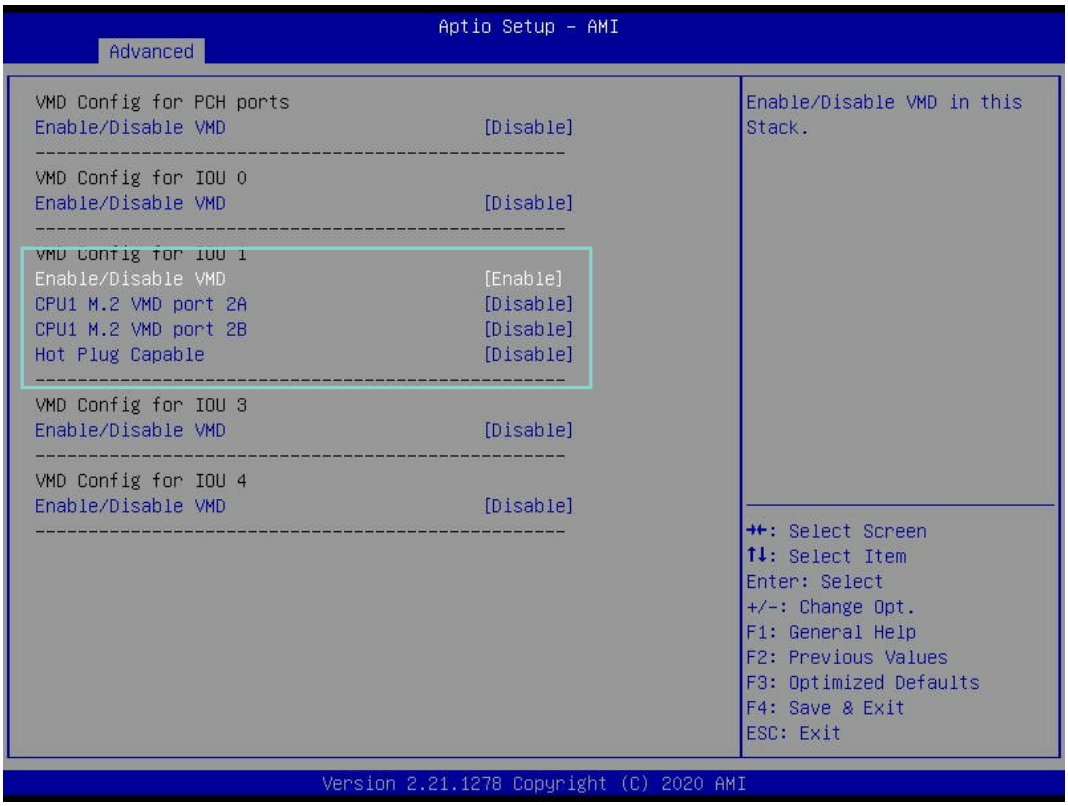
Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



VMD Config for IOU 1 (CPU1)

Enable/Disable VMD

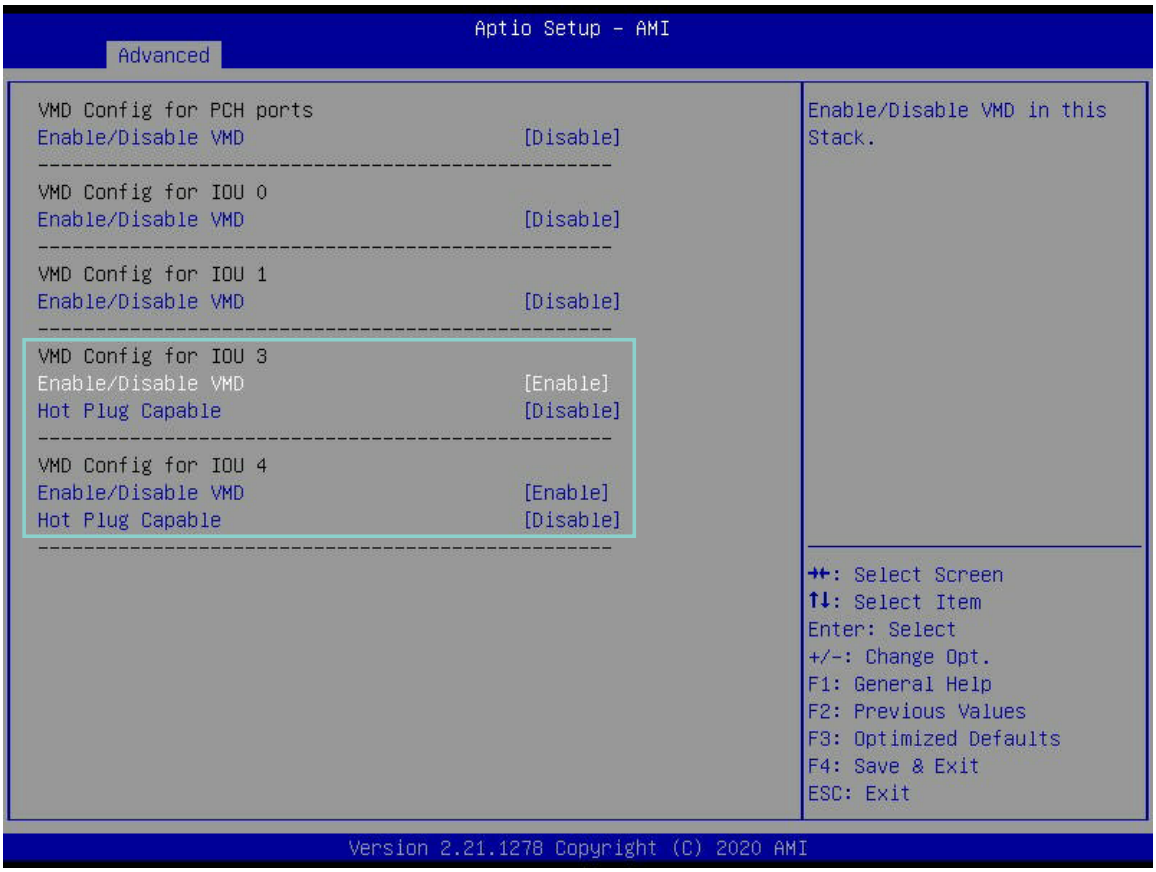
Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



VMD Config for IOU 3 and IOU 4 (CPU1)

Enable/Disable VMD

Enable VMD to use the Intel Volume Management Device Technology. If set to Enable, the item(s) in the stack will be available for configuration. The options are Enable and **Disable**.



▶Intel VMD for Volume Management Device on CPU2

VMD Configuration for IOU 0/IOU 1/IOU 3/IOU 4 (CPU2)

Enable/Disable VMD

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

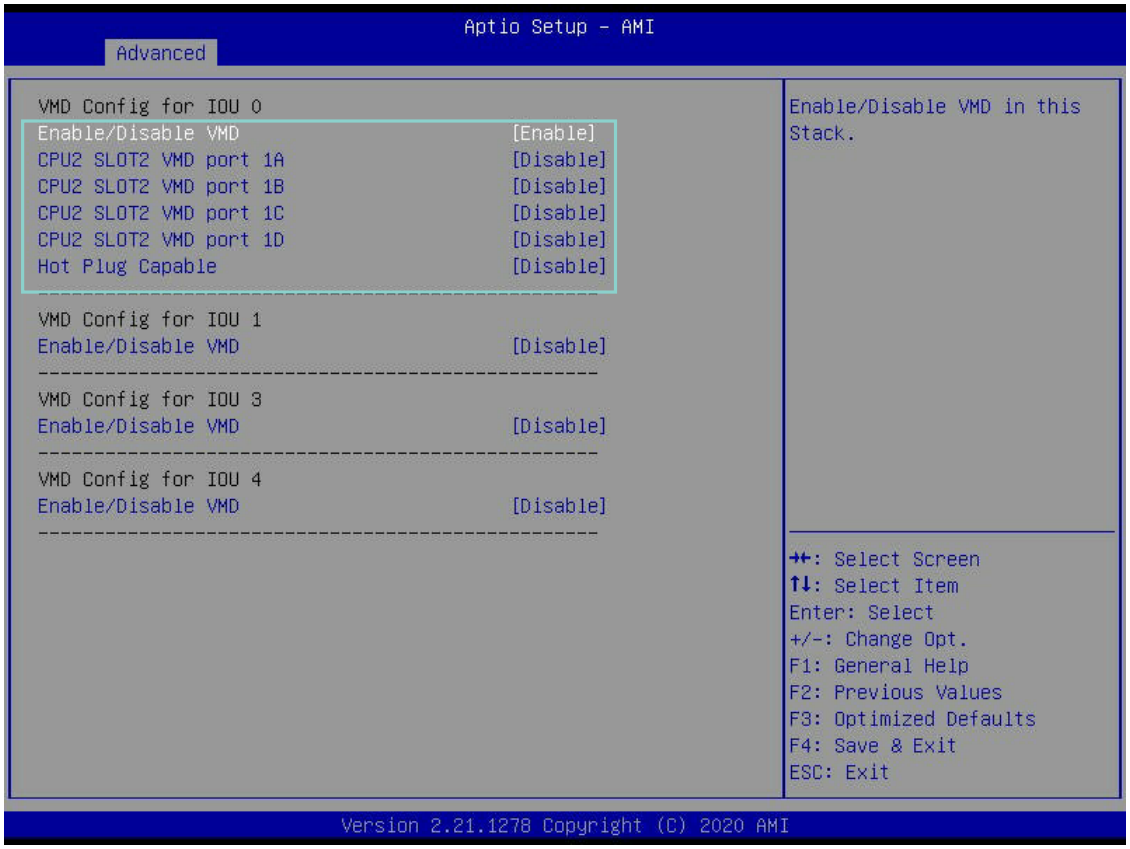
Hot Plug Capable

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

VMD Config for IOU 0 (CPU2)

Enable/Disable VMD

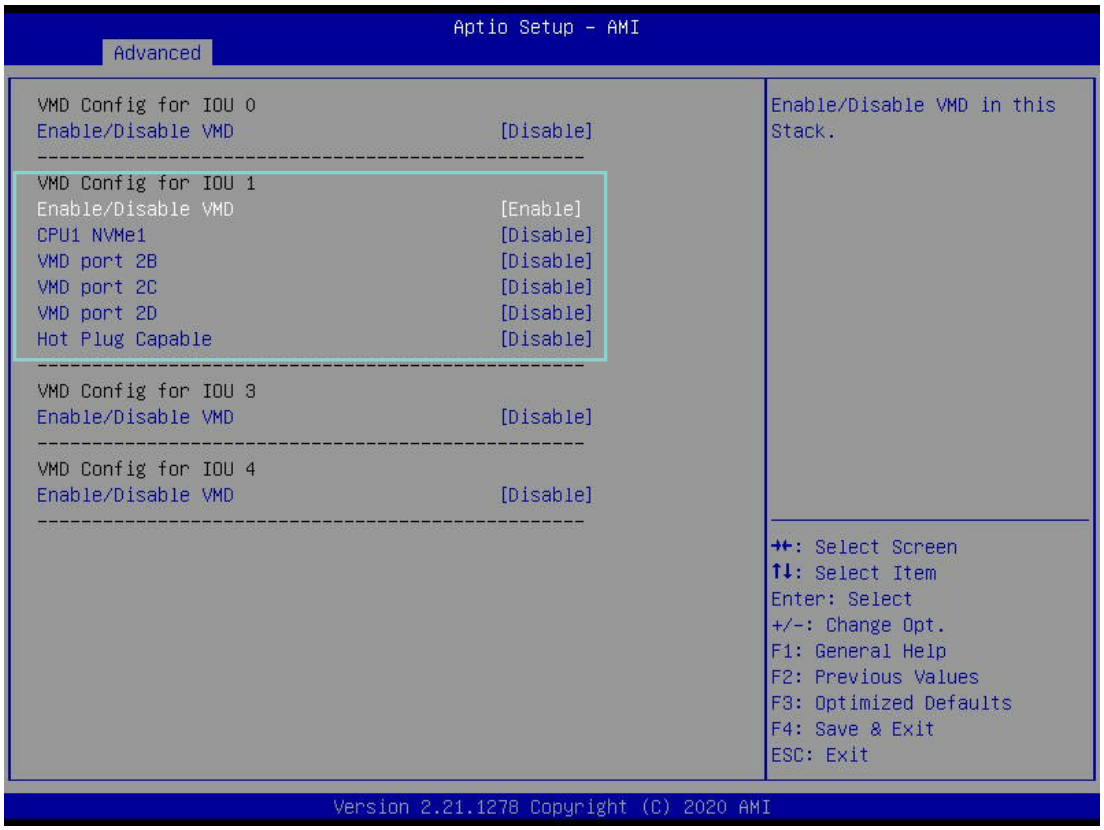
Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



VMD Config for IOU 1 (CPU2)

Enable/Disable VMD

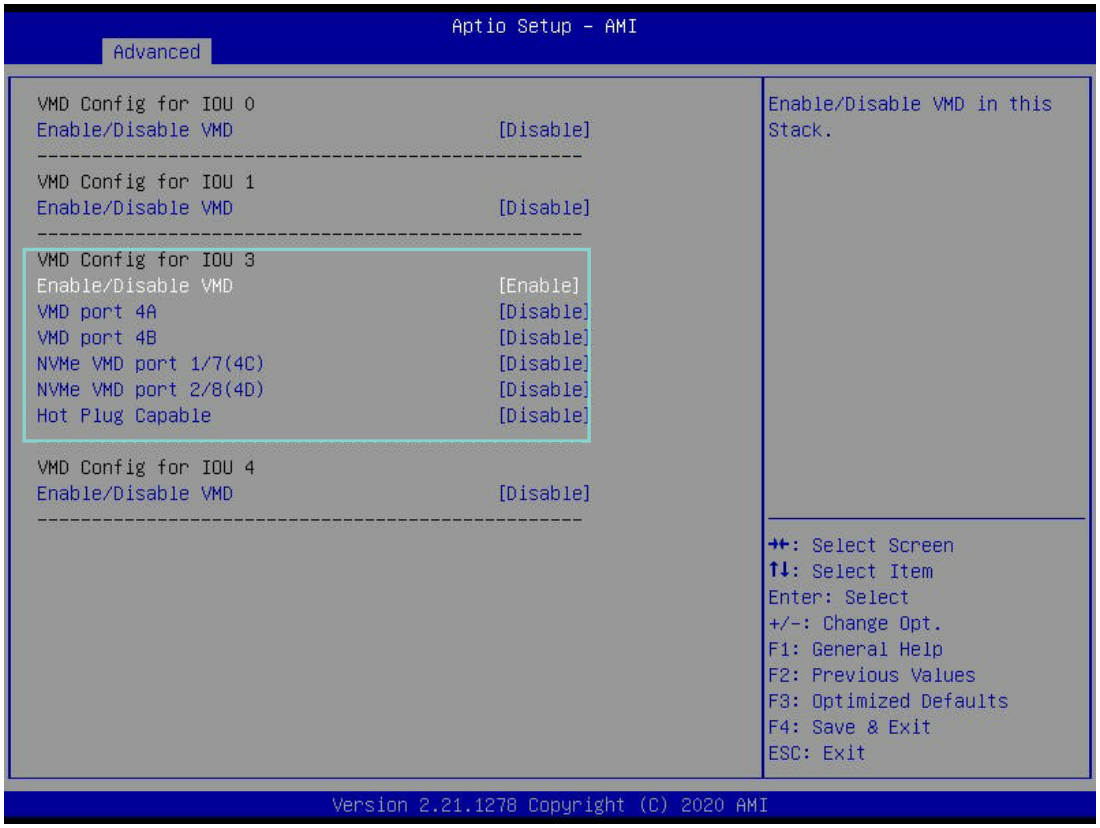
Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



VMD Config for IOU 3 (CPU2)

Enable/Disable VMD

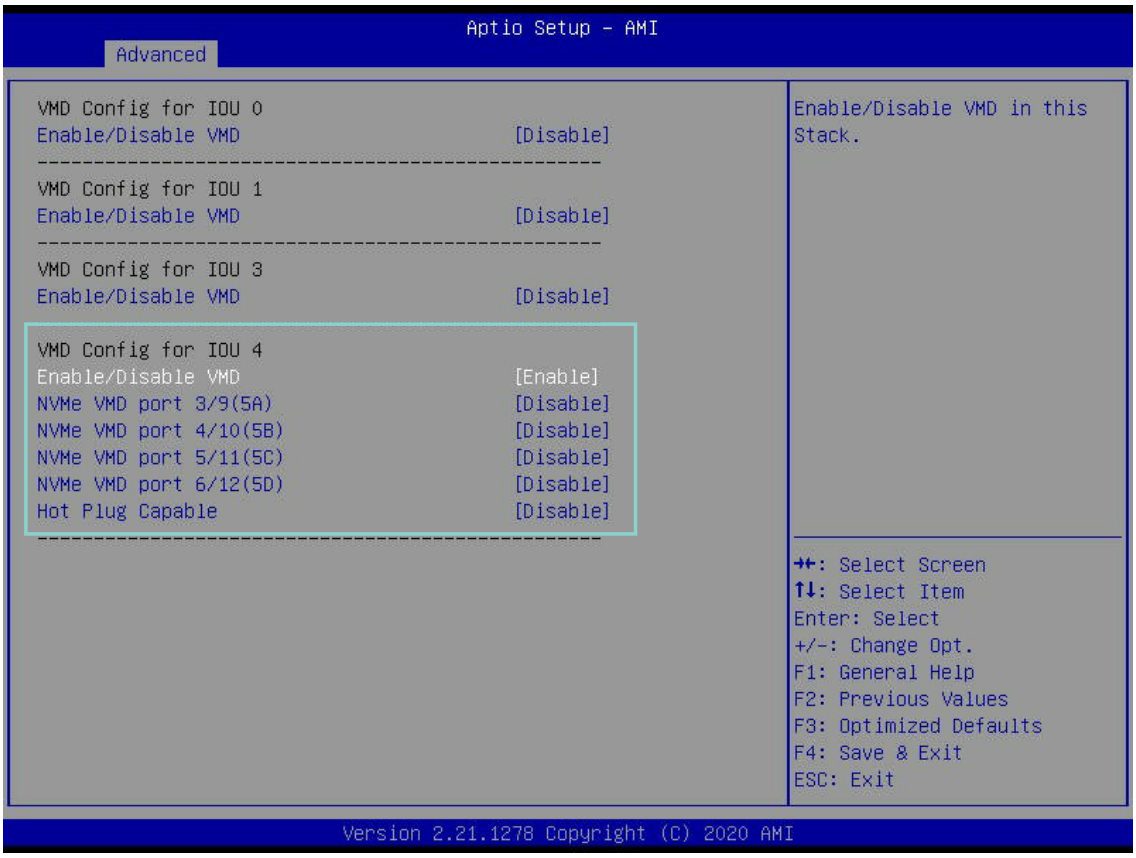
Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



VMD Config for IOU 4 (CPU2)

Enable/Disable VMD

Select Enable to use the Intel Volume Management Device Technology in this stack. If set to Enable, the items in this stack will be available for configuration. The options are Enable and **Disable**.



Hot Plug Capable

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

PCIe ASPM Support (Global)

Active-state power management (ASPM) is a power management mechanism for PCI Express devices to garner power savings while otherwise in a fully active state. The options are **Disable** and Auto.

IIO eDPC Support

Use this feature to configure the setting for IIO Enhanced Downstream Port Containment (eDPC) support for your system in an effort to improve the error containment capacity within the PCIe subsystem when an uncorrected error is detected either at the root port or at the switch downstream port. Select Disable to disable IIO eDPC support. Select On Fatal Error to enable IIO eDPC support in your system when a fatal error occurs. Select On Fatal and Non-Fatal Error to enable IIO eDPC support when an error, fatal or non-fatal, has occurred. The options are On Fatal Error, On Fatal and Non-Fatal Errors, and **Disable**.

If this feature (IIO eDPC Support**) is set to On Fatal Error/On Fatal and Non-Fatal Errors, the following features will be displayed:*

IIO eDPC Interrupt (Available when "IIO eDPC Support" is set to On Fatal Error/On Fatal and Non-Fatal Errors)

Select Enable to enable IIO eDPC Interrupt support. The options are **Enable** and Disable.

IIO eDPC ERR_COR (Error Correction) Message (Available when "IIO eDPC Support" is set to On Fatal Error/On Fatal and Non-Fatal Errors

If this feature is set to Enable, an IIO eDPC error correction message will be displayed. The options are **Enable** and Disable.

▶South Bridge

Select this submenu and press <Enter>, the following South Bridge information will display:

- USB Module Version
- USB Devices

Legacy USB Support

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

XHCI Hand-Off

This is a work-around solution for operating systems that do not support XHCI (Extensible Host Controller Interface) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The options are Disabled and **Enabled**.

Port 60/64 Emulation

Select Enabled for I/O port 60h/64h emulation support, which in turn, will provide complete legacy USB keyboard support for the operating systems that do not support legacy USB devices. The options are **Disabled** and Enabled.

PCIe PLL SSC

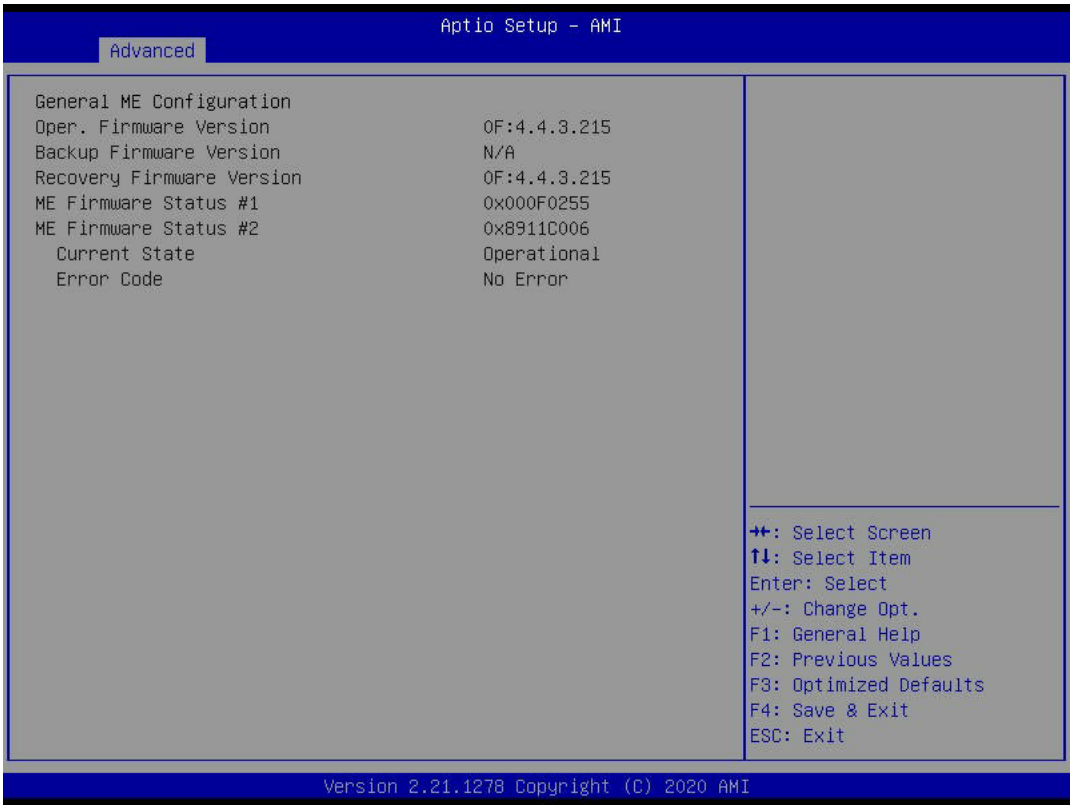
Select Enabled for PCH PCIe Spread Spectrum Clocking support, which will allow the BIOS to monitor and attempt to reduce the level of electromagnetic interference caused by the components whenever needed. The options are Enabled and **Disabled**.

Port 61h Bit-4 Emulation

Select Enabled for I/O Port 61h-Bit 4 emulation support to enhance system performance. The options are Enabled and **Disabled**.

▶Server ME (Management Engine) Configuration

When you select this submenu and press <Enter>, the following screen will display.

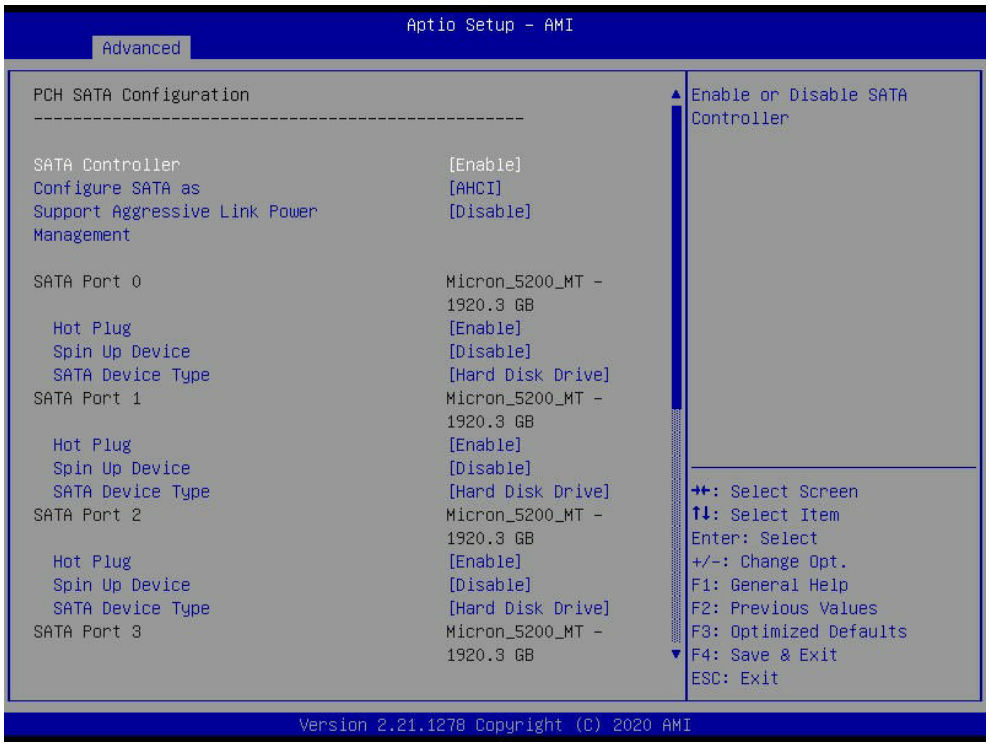


This feature displays the following general ME configuration settings:

- Oper. (Operation) Firmware Version
- Backup Firmware Version
- Recovery Firmware Version
- ME Firmware Status #1
- ME Firmware Status #2
- Current State
- Error Code

▶PCH SATA Configuration

Select this submenu and press <Enter>, the following screen will display.



SATA Controller

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

Configure SATA as (Available when "SATA Controller" is set to Enable)

Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user 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 use of the SATA link. The controller will put the link in a low power mode during an extended period of I/O inactivity and return the link to an active state when I/O activity resumes. The options are Enable and **Disable**.

SATA RAID Option ROM/UEFI Driver (Available when "Configure SATA as" is set to RAID)

Select EFI 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 - SATA Port 7

Hot Plug

Select Enable to support Hot-plugging for the device installed on a selected SATA port which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disable.

Spin Up Device

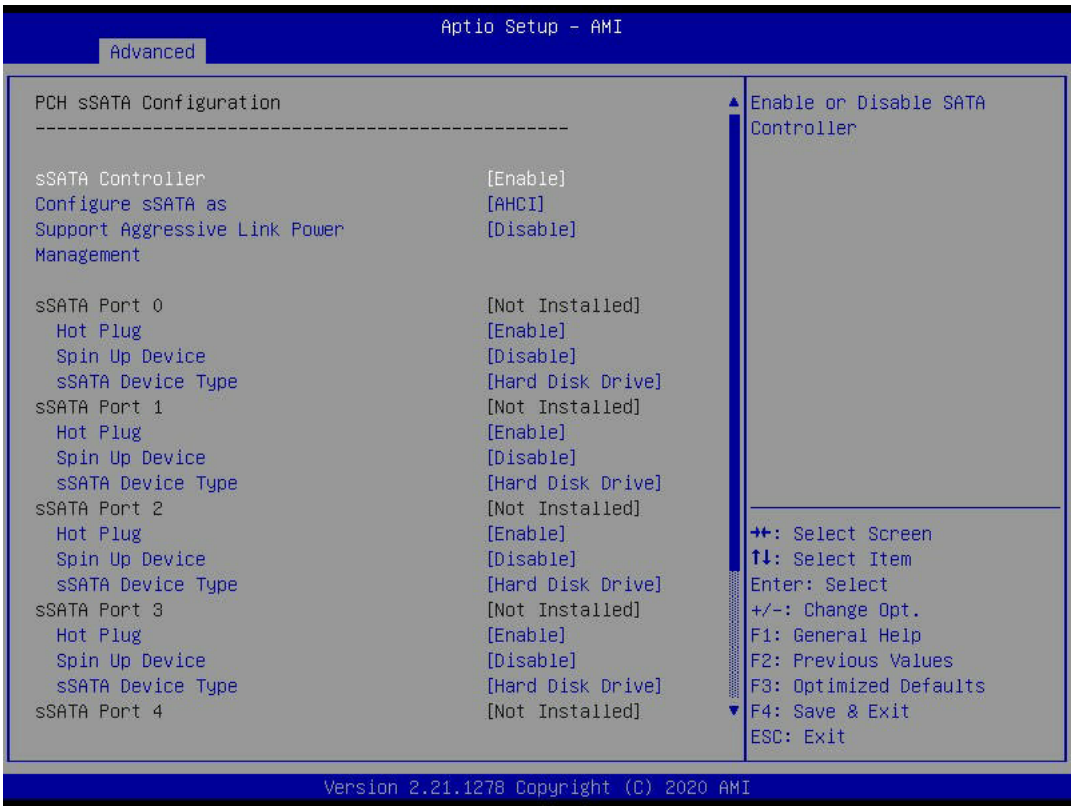
Select Enable for Staggered Spin Up support which will allow the SATA devices specified by the user to spin up one at a time at boot to prevent all hard drive disks from spinning up at the same time, causing a power surge. The options are Enable and **Disable**.

SATA Device Type

Use this feature to specify if the device installed on the SATA port specified by the user should be connected to a solid state drive or a hard disk drive. The options are **Hard Disk Drive** and Solid State Drive.

▶PCH sSATA Configuration

When you select this submenu and press <Enter>, the following screen will display:



Configure sSATA as (Available when "sSATA Controller" is set to Enable)

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

sSATA RSTe Boot Info (Available when "Configure sSATA as" is set to RAID)

Select Enable for full int13h support which will allow the system to boot using a device attached to the SATA controller. The options are Disable and **Enable**.

Note: For this feature to work properly, set the CSM Storage OPRM policy to Legacy.

Support Aggressive Link Power Management

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

sSATA RAID Option ROM/UEFI Driver (Available when "Configure sSATA as" is set to RAID)

Select EFI 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.

sSATA Port 0 - sSATA Port 5

Hot Plug

Select Enable to support Hot-plugging for the device installed on an sSATA port specified by the user which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disabled.

Spin Up Device

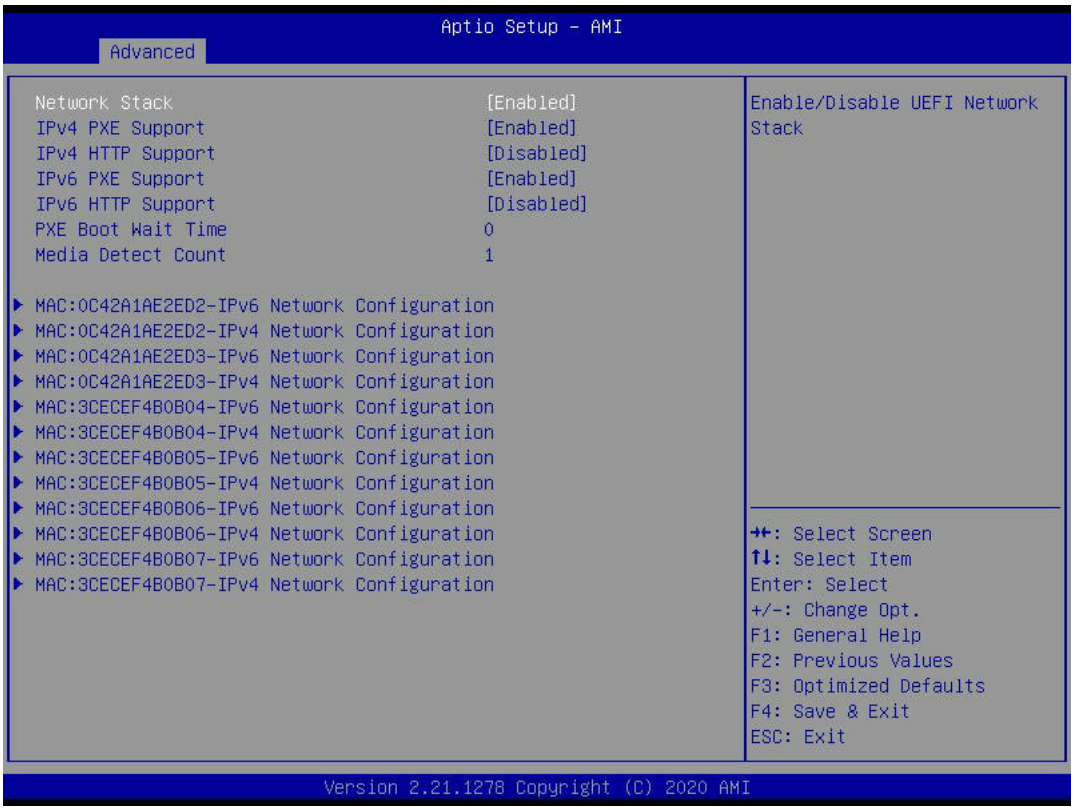
Select Enable for Staggered Spin Up support which will allow the SATA devices specified by the user to spin up one at a time at bootup preventing all hard drive disks from spinning up at the same time, causing a power surge. The options are Enable and **Disable**. The options are Enable and **Disable**.

sSATA Device Type

Use this feature to specify if the device installed on the sSATA port specified by the user should be connected to a solid state drive or a hard disk drive. The options are **Hard Disk Drive** and Solid State Drive.

▶Network Stack Configuration

This submenu enables booting the operating system via a network card from a remote computer or server (PXE boot).



Network Stack

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

**If "Network Stack" is set to Enabled, the following items will display:*

IPv4 PXE Support

Select Enabled to enable IPv4 PXE boot support. If this feature is disabled, it will not create the IPv4 PXE boot option. The options are Disabled and **Enabled**.

IPv4 HTTP Support

Select Enabled to enable IPv4 HTTP boot support. If this feature is disabled, it will not create the IPv4 HTTP boot option. The options are Enabled and **Disabled**.

IPv6 PXE Support

Select Enabled to enable IPv4 PXE boot support. If this feature is disabled, it will not create the IPv6 PXE boot option. The options are Disabled and **Enabled**.

IPv6 HTTP Support

Select Enabled to enable IPv4 HTTP boot support. If this feature is disabled, it will not create the IPv6 HTTP boot option. The options are Enabled and **Disabled**.

PXE Boot Wait Time

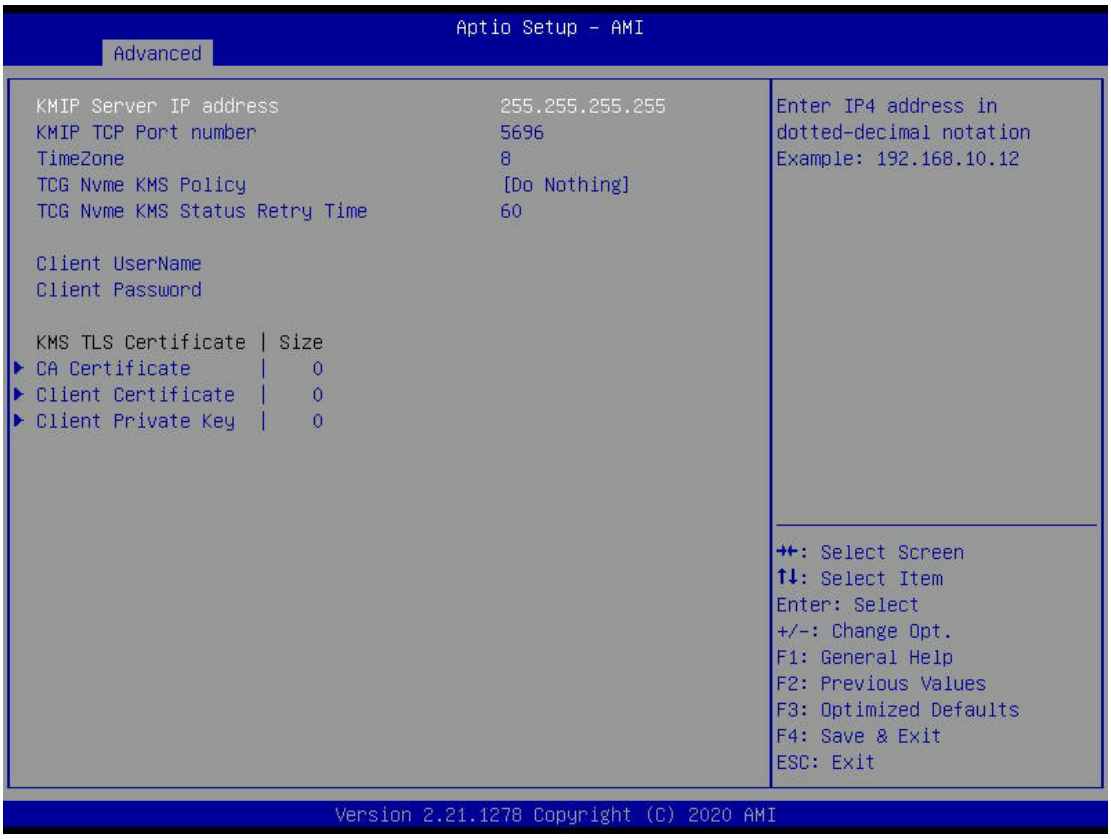
Use this feature to set the wait time (in seconds) upon which the system BIOS will wait for the user to press the <ESC> key to abort PXE boot instead of proceeding with PXE boot by connecting to a network server immediately. The default is **0**.

Media Detect Count

Use this option to specify the number of times for the BIOS ROM to detect the presence of LAN media either via the Internet connection or via a LAN port. The default setting is **1**.

▶KMIP Server Configuration

This feature displays the configuration settings for the Key Management Interoperability Protocol (KMIP) server, which will allow the clients to ask a server to encrypt or decrypt data without a direct access key.



KMIP Server IP Address

This feature displays the IP address for the KMIP server.

KMIP TCP Port Number

This feature displays the KMIP TCP Port number.

TimeZone

This feature displays the time zone where the KMIP server is located.

TCG Nvme KMS Policy

Select TCG Nvme KMS Key Policy. The options are **Do Nothing**, Normal Unlock, Resent All Devices, and Delete Key ID List.

TCG Nvme KMS Status Retry Time

Test connection to key Manager Server. The retry time can take 0 – 300 seconds, and zero means endless retry. The default setting is 60 seconds.

Client UserName

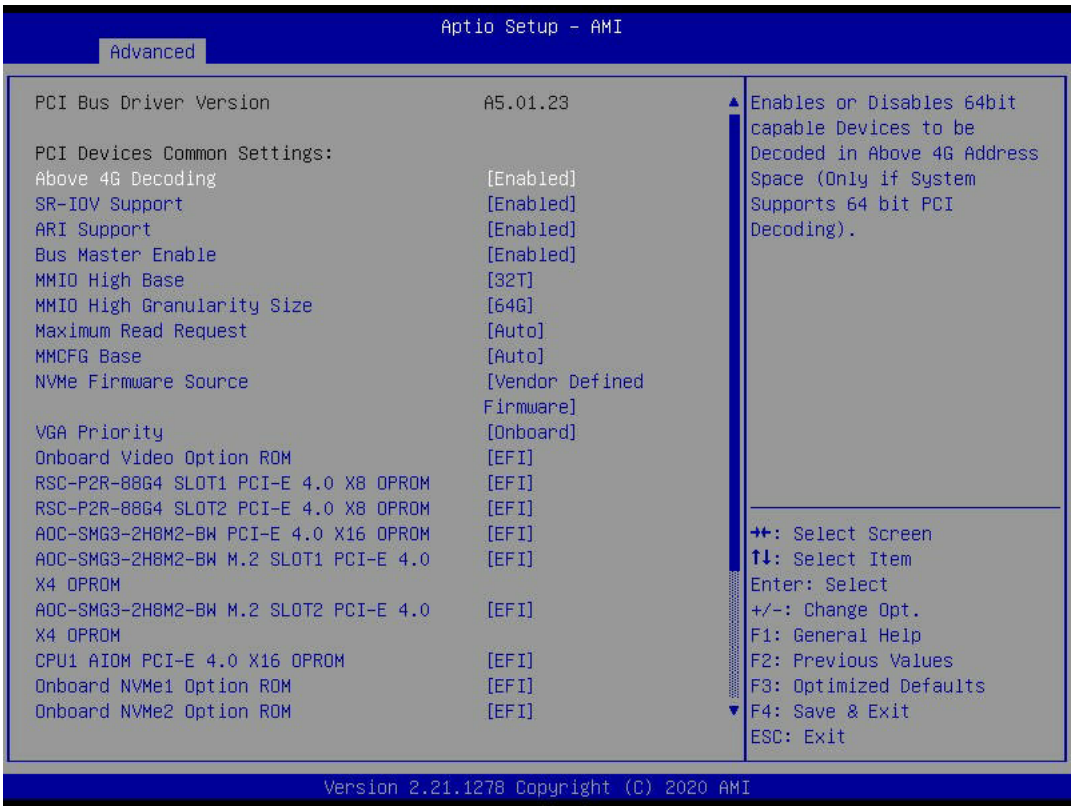
Enter a Username for the KMIP server.

Client Password

Enter user password when prompted. Password length is 0 – 31 characters.

▶PCIe/PCI/PnP Configuration

When you select this submenu and press <Enter>, the following screen will display.



The following PCI information will be displayed:

- 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 **Enabled** and Disabled.

SR-IOV Support (Available if the system supports Single-Root Virtualization)

Select Enabled for Single-Root IO Virtualization support. The options are **Enabled** and Disabled.

ARI Support

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

Bus Master Enable

Select Enabled to enable the Bus Driver Master bit. The options are **Enabled** and Disabled.

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

Select Auto for the system BIOS to automatically set the maximum size for a read request for a PCIe device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

MMCFG Base

This feature determines how the lowest MMCFG (Memory-Mapped Configuration) base is assigned to onboard PCI devices. The options are 1G, 1.5G, 1.75G, 2G, 2.25G, 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 the graphics device to be used as the primary video display for system boot. The options are Auto, **Onboard**, and Offboard.

Onboard Video Option ROM

Select UEFI to allow the user to boot the computer using the UEFI (Unified Extensible Firmware Interface) device installed on the onboard video port. Select Legacy to allow the user to boot up the computer using a legacy device installed on the onboard video port. The options are Disabled and **UEFI.**

RSC-P2R-88G4 SLOT1 PCIe 4.0 x8 OPROM/RSC-P2R-88G4 SLOT2 PCIe 4.0 x8 OPROM/AOC-SMG3-2H8M2-BW PCIe 4.0 x16/AOC-SMG3-2H8M2-BW M.2 SLOT1 PCIe 4.0 x4 OPROM/AOC-SMG3-2H8M2-BW M.2 SLOT2 PCIe 4.0 x4 OPROM/CPU1 AIOM PCIe 4.0 x16 OPROM

Select EFI to allow the user to boot the computer using an EFI (Extensible Firmware Interface) device installed on the PCIe slot specified by the user. Select Legacy to boot the computer using a legacy device installed on the PCIe slot specified by the user. The options are Disabled and **EFI**.

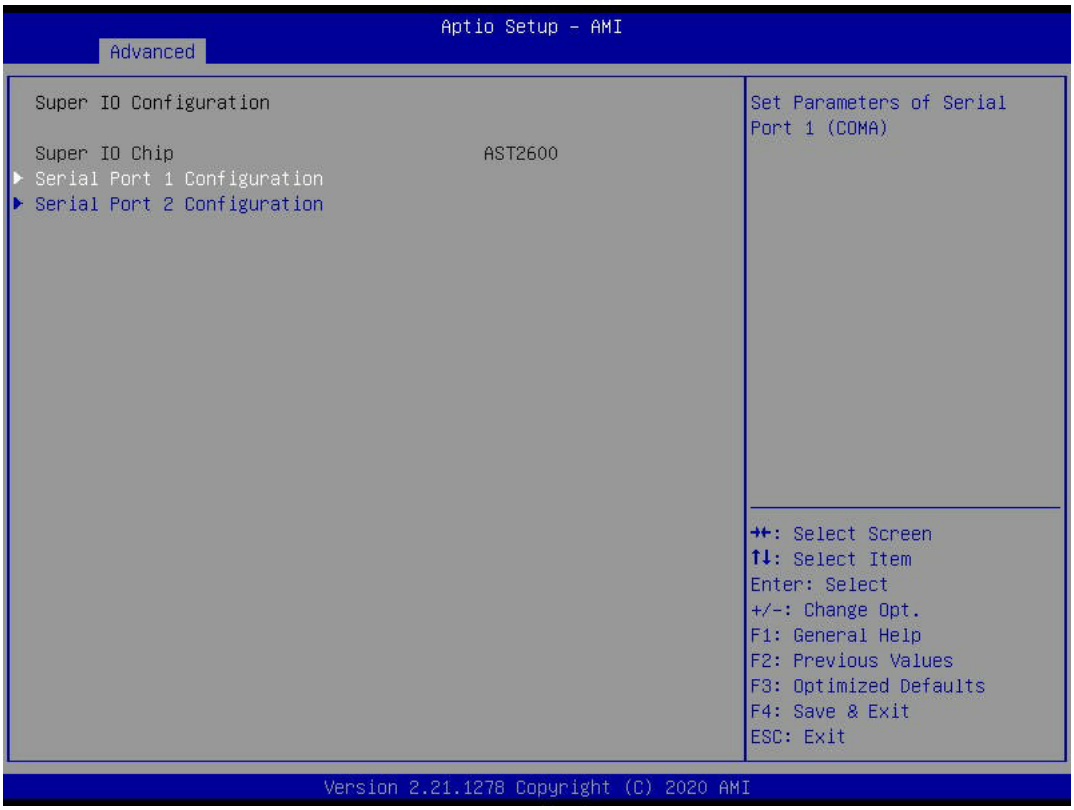
Onboard NVMe 1 OPROM/Onboard NVMe 2 OPROM/Onboard NVMe 3 OPROM/ Onboard NVMe 4 OPROM/Onboard NVMe 5 OPROM/Onboard NVMe 6 OPROM/

For each of the NVMe Option ROMs listed above, select EFI to boot the computer using an EFI (Extensible Firmware Interface) device installed on the NVME connector specified by the user. The options are Disabled and **EFI**.

▶Super IO Configuration

When you select this submenu and press <Enter>, the following information will display:

- Super IO Chip AST2600



Serial Port 1 Configuration

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

Serial Port 1

Select Enabled to enable Serial Port 1. The options are **Enabled** and Disabled.

Device Settings (Available when "Serial Port 1" is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of Serial Port 1.

Change Settings (Available when "Serial Port 1" is set to Enabled)

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1. Select **Auto** for the BIOS to automatically assign the base I/O and IRQ address to Serial Port 1. 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

Select Enabled to enable Serial Port 2. The options are **Enabled** and Disabled.

Device Settings (Available when "Serial Port 2" is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of Serial Port 2.

Change Settings (Available when "Serial Port 2" is set to Enabled)

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 2. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to Serial Port 2. The options for SOL are **Auto**, (IO=3F8h; IRQ=3), (IO=2F8h; IRQ=3), (IO=3E8h; IRQ=3), and (IO=2E8h; IRQ=3).

Serial Port 2 Attribute

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

▶Serial Port Console Redirection

When you select this submenu and press <Enter>, the following screen will display.

COM 1

Console Redirection

Select Enabled to enable COM Port 1 for Console Redirection, which will allow a client machine to be connected to a host machine at a remote site for networking. The options are Enabled and **Disabled**.

**If this item is set to Enabled, the following items will become available for configuration:*

▶Console Redirection Settings (for COM 1)

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 ANSI, VT100, **VT100+**, and VT-UTF8.

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 the 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 **Enabled** and Disabled**.**

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 Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, 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 enable SOL for Console Redirection, which will allow a client machine to be connected to a host machine at a remote site for networking. The options are **Enabled** and Disabled.

**If this item is set to Enabled, the following items will become available for configuration:*

▶Console Redirection Settings (for 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 ANSI, VT100, **VT100+**, and VT-UTF8.

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 the 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 **Enabled** and Disabled**.**

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 Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, 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 enable or disable Legacy Console Redirection after BIOS POST. When the option - Bootloader is selected, Legacy Console Redirection is disabled before booting the OS. When the option - Always Enable is selected, Legacy Console Redirection remains enabled upon OS bootup. The options are **COM1** and SOL.

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

The feature allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

Console Redirection EMS

Select Enabled to use a COM port specified by the user for EMS Console Redirection. The options are Enabled and **Disabled**.

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

▶Console Redirection Settings (for EMS)

Out-of-Band Management Port

This feature selects a serial port in a client's server to be used by the 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 ANSI, VT100, VT100+, and **VT-UTF8**.

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 both the host and 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 EMS

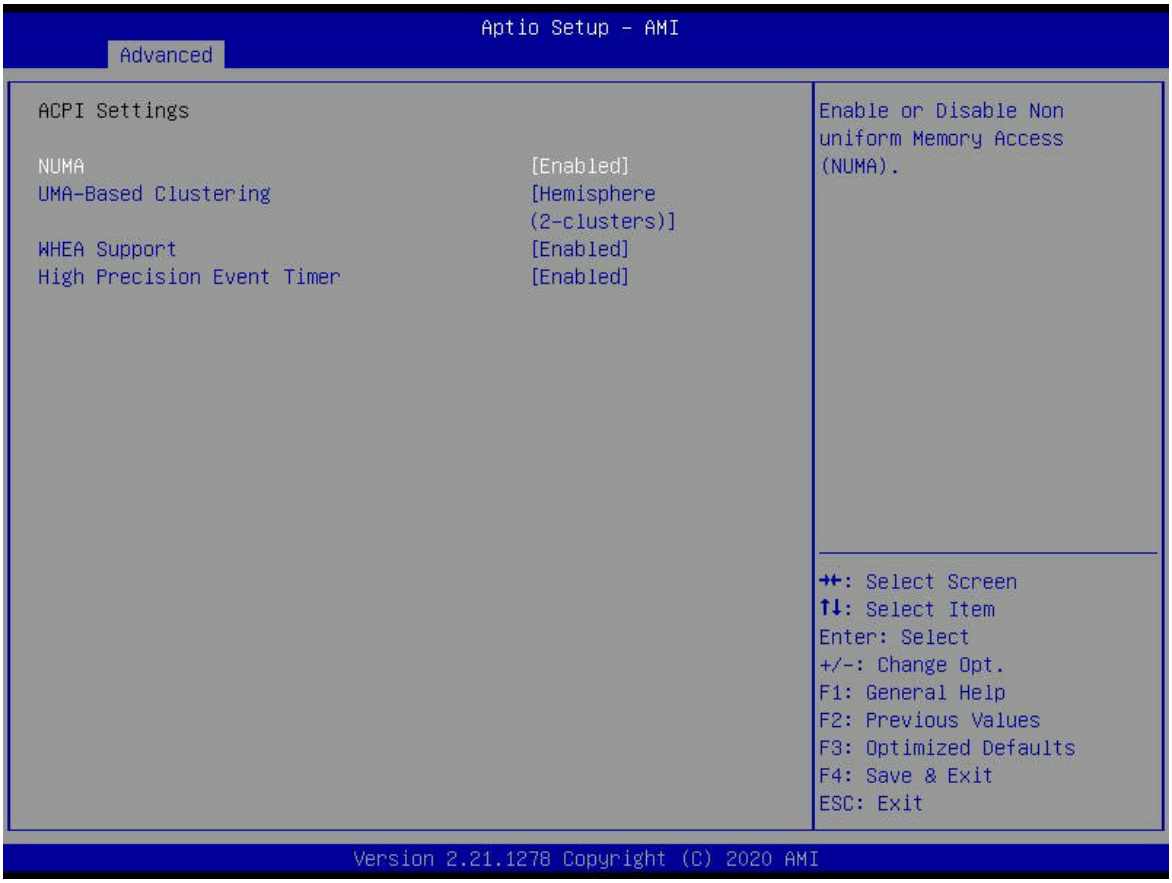
Use this feature to set the flow control for Console Redirection to prevent data loss caused by the buffer overflow. Send a "Stop" signal to stop data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None,** Hardware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

The following information will also be displayed:

- Data Bits EMS
- Parity EMS
- Stop Bits EMS

▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.



NUMA

Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

UMA-Based Clustering

The options for this feature are Disable (ALL2ALL) and **Hemisphere (2-clusters)**. The options are only available when SNC is disabled.

WHEA Support

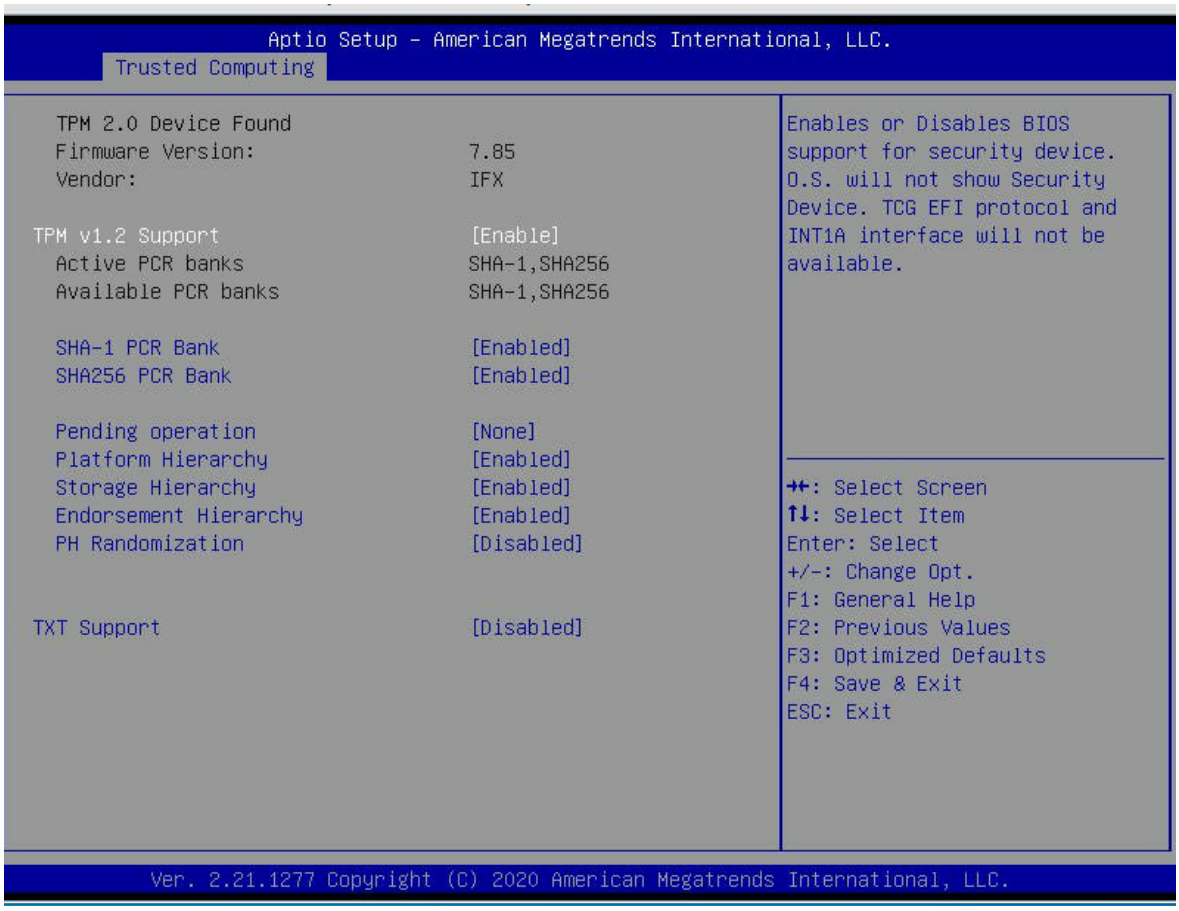
Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and enhance system recovery and health monitoring. The options are **Enabled** and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

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 (Available when a TPM device is installed and detected by the BIOS)

When a Trusted-Platform Module (TPM) device is detected in your machine, the following information will display:



- TPM 2.0 Device Found:
- Firmware Version:
- Vendor:

TPM v1.2 Support

Select Enable to enable TPM (Trusted Platform Module) 2.0 support to enhance system integrity and data security. If there is a TPM jumper on the motherboard, also enable the jumper for this feature to work properly. The OS will not show the security device when this feature is set to Enabled. Neither TCG EFI protocol nor INT1A interaction will be available for use. If you have made changes to the setting of this feature, be sure to reboot the system for the changes to take effect. The options are Disable and **Enable**.

*If this option is set to Enable, the following screen and items will display:

- Active PCR Banks
- Available PCR Banks

SHA-1 PCR Bank

Select Enabled to enable SHA-1 PCR Bank support to enhance system integrity and data security. The options are **Enabled** and Disabled.

SHA256 PCR Bank

Select Enabled to enable SHA256 PCR Bank support to enhance system integrity and data security. The options are **Enabled** and Disabled.

Pending Operation

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

Note: Your system will reboot to carry out a pending TPM operation.

Platform Hierarchy (for TPM Version 2.0 and above)

Select Enabled for TPM Platform Hierarchy support which will allow the manufacturer to utilize the cryptographic algorithm to define a constant key or a fixed set of keys to be used for the initial system boot. These early boot codes are shipped with the platform and are included in the list of "public keys." During system boot, the platform firmware uses the trusted public keys to verify a digital signature in an attempt to manage and control the security of the platform firmware used in a host system via a TPM device. The options are **Enabled** and Disabled.

Storage Hierarchy

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by a platform owner such as an IT professional or the end user. Storage Hierarchy has an owner policy and an authorization value, both of which can be set and are held constant (rarely changed) through reboots. This hierarchy can be cleared or changed independently of the other hierarchies. The options are **Enabled** and Disabled.

Endorsement Hierarchy

Select Enabled for Endorsement Hierarchy support, which contains separate controls to address the user's privacy concerns because the primary keys in the hierarchy are certified by the TPM key or by a manufacturer with restrictions on how an authentic TPM device that is attached to an authentic platform can be accessed and used. A primary key can be encrypted and certified with a certificate created by using TPM2_ ActivateCredential, which allows the user to independently enable "flag, policy, and authorization values" without involving other hierarchies. A user with privacy concerns can disable the endorsement hierarchy while still using the storage hierarchy for TPM applications, permitting the platform software to use the TPM. The options are **Enabled** and Disabled.

PH (Platform Hierarchy) Randomization (for TPM Version 2.0 and above)

Select Enabled for Platform Hierarchy Randomization support, which is used only during the platform developmental stage. This feature cannot be enabled in the production platforms. The options are **Disabled** and Enabled.

TXT Support

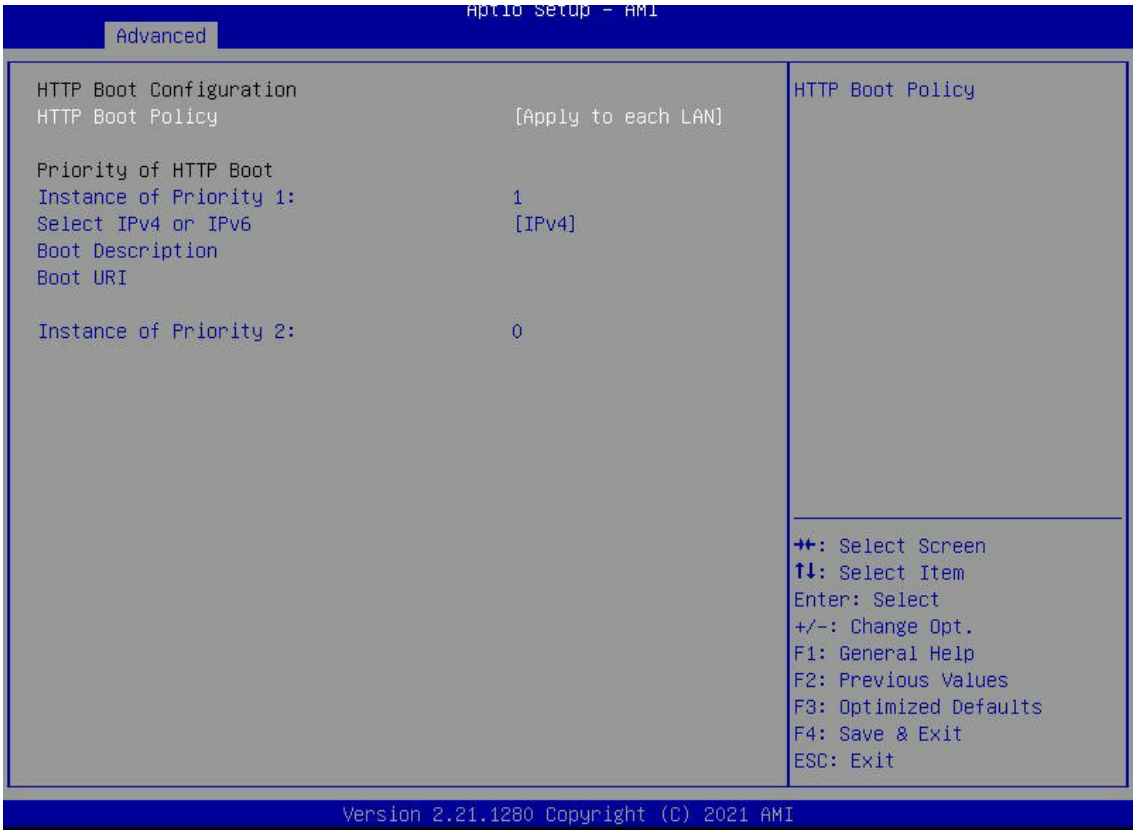
Select Enabled to enable Intel Trusted Execution Technology (TXT) support to enhance system integrity and data security. The options are **Disabled** and Enabled.

Note 1: If the option for this feature (TXT Support) is set to Enabled, be sure to disable EV DFX (Device Function On-Hide support when it is present in the BIOS for the system to work properly

Note 2: For more information on TPM, refer to the TPM manual at http://www.supermicro.com/manuals/other.

▶HTTP Boot Configuration

When this submenu is selected, the following items will display:



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:

This feature sets the rank target port. The default setting is **1**.

Select IPv4 or IPv6

This feature specifies which connection the target LAN port should boot from. Select IPv4 to boot the target LAN from IPv4. The options are **IPv4** and IPv6.

Boot Description

Use this feature to enter a boot description, which cannot be longer than 75 characters. Be sure to enter a boot description; otherwise, the boot option for the URI cannot be created.

Boot URI (Uniform Research Identifier)

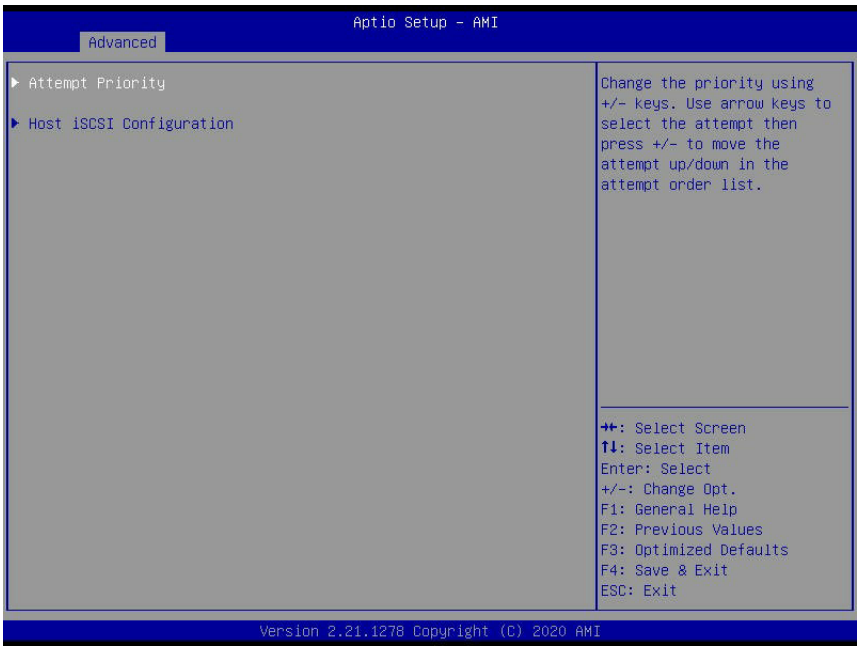
Enter a Boot URI with 128 characters or shorter. This Boot URI determines how IPv4 Boot Option and IPv6 Boot Option will be created. This feature is only supported on Dual or EFI Boot Mode.

Instance of Priority 2:

This feature sets the rank target port. The default setting is **0**.

▶iSCSI Configuration

Select this submenu and press <Enter>, the following screen will display.



▶Attempt Priority

Use this feature to change the priority of iSCSI attempts using the + or - keys. The options are **Host Attempt**, Redfish Attempt, and Rsd Attempt.

Commit Changes and Exit

Select this feature to save the changes you've made and exit from the program.

▶Host iSCSI Configuration

iSCSI Initiator Name

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

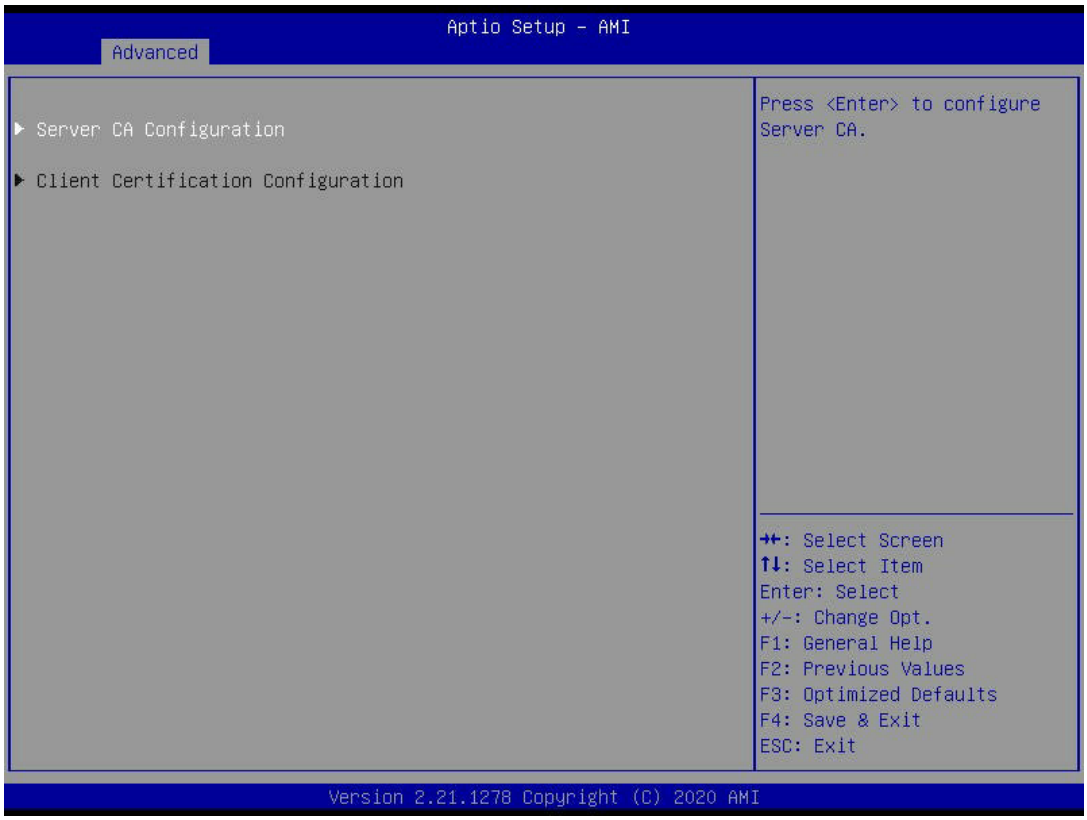
▶Add an Attempt

▶Delete Attempts

▶Change Attempt Order

▶TLS Authenticate Configuration

Select this submenu and hit <Enter> and the following items will display:



▶Server CA Configuration

This submenu allows the user to configure the client certificate to be used by the server.

▶Enroll Certification

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

▶Enroll Cert (Certification) Using File

This feature allows the user 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**.

▶Client Certification Configuration

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

▶**Enroll Certification**

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

▶**Enroll Cert (Certification) Using File**

This feature allows the user 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.

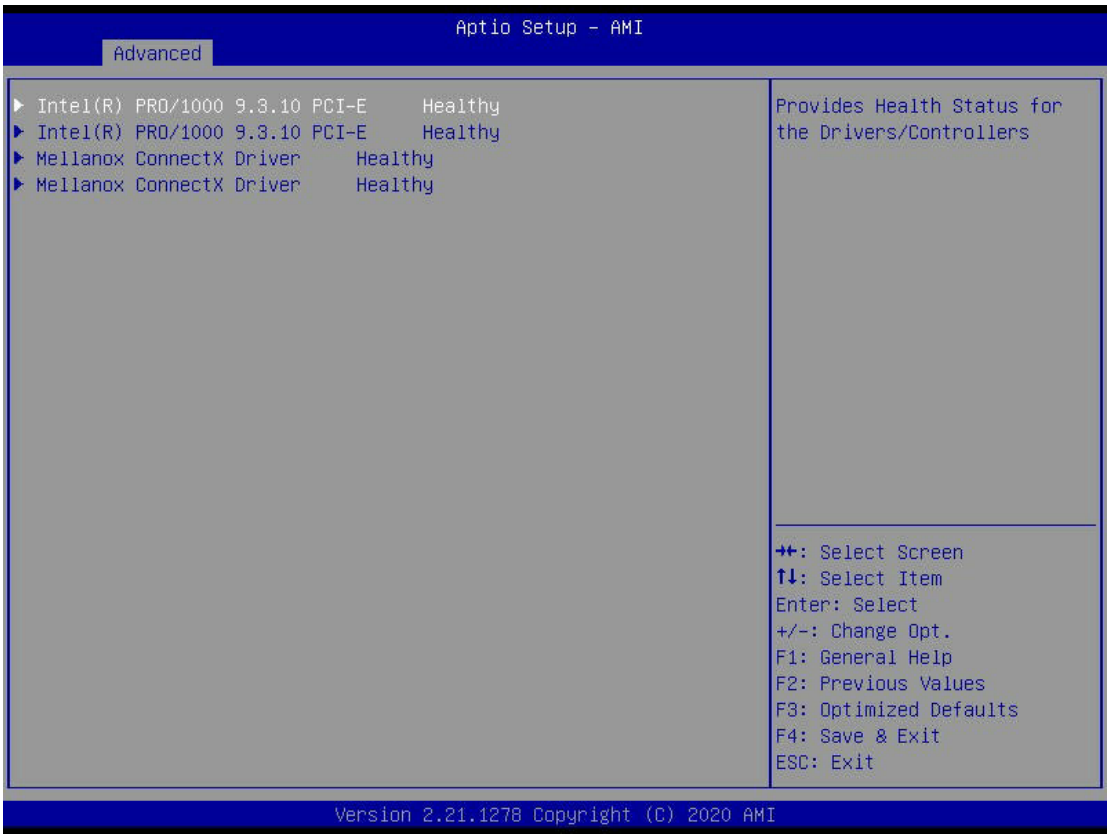
▶Delete Certification

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

▶Driver Health

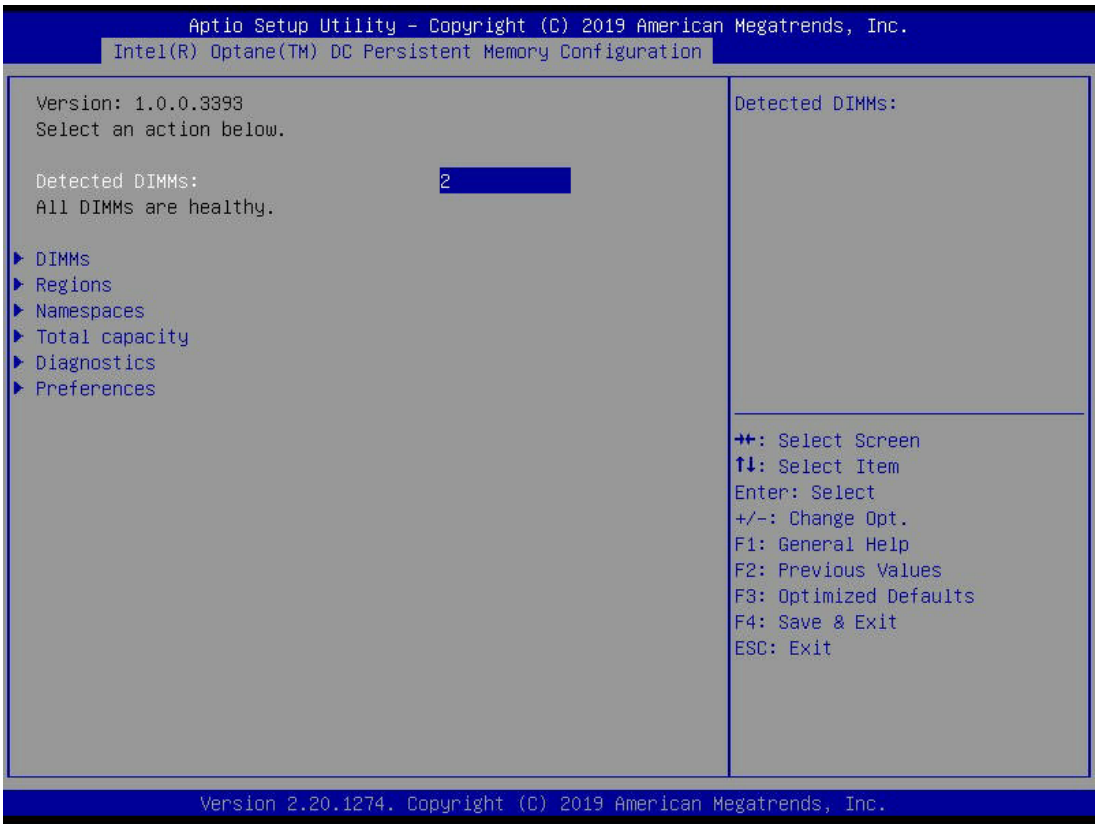
This feature displays the following health information of the drivers installed in your system, including LAN controllers, as detected by the BIOS.

Note: This section is provided for reference only. The driver health status will differ depending on the drivers installed in your system. It's also based on your system configuration and the environment that your system is operating in.



▶Intel Optane™ Persistent Memory Configuration

When you select this submenu and press <Enter>, the following screen will display:



When you select this submenu and press <Enter>, the following screen will display:

- Version: This feature displays the version of PMem used in the system.
- Select an action.
- Detected PMem Modules: This feature displays the number of PMem memory modules detected by the BOS.
- All PMem Modules are healthy: This feature displays the health status of the PMem.

▶PMem Modules

This submenu allows the user to view and configure the following settings for the PMem memory modules installed in the system:

- Select a specific DIMM that you want to view.
- DIMMs on Socket 0x0000:/DIMMs on Socket 0x0001:

▶DIMM IO 0x0011

When you select this feature and press <Enter>, the following items will display:

- DIMM UID: This feature displays the unique ID of the PMem module.
- DIMM Handle: This feature displays the unique handle assigned to the PMem module.
- DIMM Physical ID: This feature displays the physical ID for the PMem module.
- Manageability State: This feature indicates the manageability state for the PMem module.
- Health State: This feature indicates the health state for the PMem module.
- Health State Reason: This feature indicates the reason that effectuates the health state for the PMem module.
- Capacity: This feature indicates the capacity for the PMem module.
- Firmware Version: This feature indicates the firmware version for the PMem module.
- Firmware API Version: This feature indicates the firmware API version for the PMem module.
- Firmware Active API Version: This feature indicates the firmware API version for the PMem module.
- Lock State: This feature indicates the lock state for the PMem module.
- SVN Downgrade: This feature indicates the status of the SVN Downgrade for the PMem module.
- Secure Erase Policy: This feature indicates the status of the Secure Erase Policy for the PMem module.
- S3 Resume Opt-in: This feature indicates the status of the S3 Resume Opt-in support for the PMem module.

- Firmware Activate Opt-in: This feature indicates the status of the Firmware Activate Opt-in support for the PMem module.
- Staged Firmware Version: This feature indicates the status of the staged firmware version for the PMem module.
- Staged Firmware Activate: This feature indicates the status of the staged firmware activatation support for the PMem module.
- Firmware Update Status: This feature indicates the firmware update status for the PMem module.
- Firmware Activation Quiece Required: This feature indicates whether Firmware Activation Quiesce is required for the PMem module.
- Firmware Activation Quiece Required: This feature indicates whether Firmware Activation Quiesce is required for the PMem module.
- Manufacturer: This feature indicates the manufacturer of the PMem module.

Show More Details

Select Enabled to view more detailed information on the PMem module. The options are **Disabled** and Enabled. If this option is set to Enabled, the following items will display:

- Serial Number
- Part Number
- Socket
- Memory Controller ID
- Vendor ID
- Device ID
- System Vendor ID
- Subsystem Vendor ID
- Subsystem Device ID
- Device Locator
- Subsystem Revision ID
- Interface Format Code

- Manufacturing Information Valid
- Manufacturing Date
- Manufacturing Location
- Memory Type
- Memory Bank Label
- Data Width Label [b]
- Total Width [b]
- Speed [MT/s]
- Channel ID
- Channel Position
- Revision ID
- Form Factor
- Manufacturer ID
- Controller Revision ID
- IS New
- Memory Capacity
- APP Direct Capacity
- Unconfigured Capacity
- Inaccessible Capacity
- Reserved Capacity
- Avg (Average) Power Limit [mW]
- Memory Bandwidth Boost Feature
- Memory Bandwidth Boost Max Power Limit [mW]
- Memory Bandwidth Boost Average Power Time Constant [mS]

- Max Average Power Limit [mW]
- Max Memory Bandwidth Boost Max
- Power Limit [mW]
- Max Memory Bandwidth Boost Average Power Time Constant [mS]
- Max Memory Bandwidth Boost Average Power Time Constant Step [mS]
- Max Average Power Reporting Time Constant [mS]
- Max Average Power Reporting Time Constant Step [mS]
- Package Sparing Capable
- Package Sparing Enabled
- Package Spares Available
- Configuration Status
- SKU Violation
- Population Violation
- ARS Status
- Overwrite PMem Module Status
- Last Shutdown Time
- Average Power Reporting Time Constant [mS]
- Viral Policy Enable
- Viral State
- Thermal Throttle Loss %
- Latched Last Shutdown Status
- Unlatched Shutdown Status
- Security Capabilities
- Modes Supported

- Boot Status
- AIT DRAM Enabled
- Error Injection Enabled
- Max Controller Temperature [C]
- Software Triggers Enabled [0]
- Software Triggers Enabled Details
- Poison Error Injection Counter
- Poison Error Clear Counter
- Media Temperature Injections Counter
- Software Triggers Counter
- Max Media Temperature [C]
- Media Temperature Injection Enabled
- Master Passphrase Enabled
- Average Power
- Average Power 12 V
- Average Power 1.2 V
- eADR Enable
- Previous Power Cycle eADR Enabled
- Latch System Shutdown State
- Previous Power Cycle Latch System Showdown State

▶Monitor Health

This submenu displays the following health information on a memory module being monitored.

- Sensor Type: This feature displays the type of health items that are being monitored.
- Value: This feature displays the value of the monitor sensor mentioned above.
- Sensor Type: This feature indicates the sensor type used in the PMem memory.
- Value: This feature displays the value of the monitor sensor mentioned above.
- Alarm Threshold: This feature indicates the status of the alarm threshold.
- Throttling Stop Threshold: This feature indicates the status of the throttling stop threshold.
- Throttling Start Threshold: This feature indicates the status of the throttling start threshold.
- Shutdown Threshold: This feature indicates the status of the shutdown threshold.
- Max Temperature: This feature indicates the maximum temperature allowed.
- Alarm Enabled State: This feature indicates the alarm enabled state.
- Modify Alarm Thresholds Control Temperature [C]: This feature indicates the temperature threshold upon which the alarm will be triggered.
- Controller Temperature [C]: This feature indicates the media temperature of the PMem memory.
- Media Temperature [C]: This feature indicates the media temperature of the PMem memory.
- Percentage Remaining [%]: This feature displays the remaining percentage of the PMem memory.

▶Back to Regions Menu

▶Back to Provision Menu

▶Apply Changes

Use this feature to apply changes that you've made on the PMem modules to the system.

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Update Firmware

Use this feature to select the firmware image to be loaded on the PMem module. After loading the firmware image, reboot the system and select update for the firmware to take effect. The following items will display:

- Current Firmware Version: This feature displays the current firmware version.
- Selected Firmware Version: Use this feature to select a new firmware version to use.
- File: Use this feature to specify the file path in the root directory that contains the new firmware for firmware update.
- Staged Firmware Version: This feature indicates the staged firmware version of the PMem module specified by the user.

▶Update

Select this feature to update the firmware settings.

▶Back to Regions Menu

▶Back to Provision Menu

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Configure Security

Use this feature to configure the security settings for all onboard PMem modules.

State

Select Enabled to configure the security settings for the PMem modules installed in the system. The options are **Disabled** and Enabled.

- Enable Security: This feature enables the security settings for the onboard PMem modules.
- Secure Erase: Use this feature to erase all the persistent data saved in the PMem modules.
- Freeze Lock: Use this feature to enable the security lock for the onboard PMem modules.

▶Back to Regions Menu

▶Back to Provision Menu

▶Back to Main Menu

- Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Configure Data Policy

Use this feature to configure the data policy settings for all onboard PMem modules.

First Fast Fresh State

Select Enabled to display the First Fast Fresh state for onboard PMem modules.

▶Enable First Fast Fresh State

Select Enabled to support the first fast fresh state of PMem data policy.

▶Disable First Fast Fresh State

Select Disable to disable the first fast fresh state of PMem data policy.

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Regions

Current Configuration

▶Region ID 1

When this submenu is selected, the following items will display:

- Region ID: This feature displays the Region ID of the PMem module.
- DIMM ID: This feature displays the DIMM ID of the PMem module.
- ISet ID: This feature displays the ISet ID of the PMem module.
- Persistent Memory Type: This feature indicates the memory type of the PMem module.
- Capacity: This feature indicates the capacity of the PMem module.
- Free Capacity: This feature indicates the capacity of the PMem module that is available for use.
- Health: This feature indicates the health state of the PMem module.
- Socket ID: This feature displays the Socket ID of the PMem module.

▶Back to Regions Menu

▶Back to Provision Menu

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

- Persistent Memory Type:
- Capacity:
- Free Capacity:

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Provision

This submenu configures the memory allocation goal for the onboard PMem memory modules.

▶Create Goal Configuration

When this submenu is selected, the following items will display:

Create Goal Configuration for

- Use this feature to select the target to create goal configuration for the PMem modules. The options are Platform and Socket.
- Reserved [%]: This feature reserves a percentage of the PMem capacity for a particular purpose and keeps this portion of memory space from being mapped into the physical address of the system for system use.
- Memory Mode [%]: This feature reserves a percentage of the PMem capacity for special use in a specific Memory Mode. This value can be automatically set by the system.

Persistent Memory Type

This feature specifies the type of PMem memory capacity to be created. The options are **App Direct** and App Direct Not Interleave.

Namespace Label Version

Use this feature to view and modify the namespace label version to initialize when creating goals. The options are **1.2** and 1.1.

▶Create Goal Configuration

▶Delete Goal Configuration

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Namespaces

This subsection allows the user to select a namespace to view the following information on the selected namespace:

Namespace ID/Name/Heath Status

▶0x00000201

Select this feature and press <Enter>, the following items will display:

- UUID
- ID
- Name
- Region
- Health
- Mode
- Block Size
- Units: Use this feature to change the namespace capacity (in the unit of B, MB, MiB, GB, **GiB**, TB, and TiB).
- Capacity
- Label Version

▶**Save**: After configuring the settings for the namespace above, click on <Save> to save changes.

▶**Delete** After configuring the settings for the namespace above, click on <delete> to delete the changes you've made on the namespace. All data contained in the namespace will be deleted as well when you press <delete>.

▶Back to Namespaces

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Create Namespace

Use this submenu to create a namespace. The following information will display:

Name

Region ID

This feature displays the Region ID of the PMem module. The options are **0x0001** and 0x0001.

Mode

Use this feature to set the Namespace mode. The options are **None** and Sector.

Capacity Input

Select Remaining to use the maximum memory capacity currently available as system memory capacity. Select Manual to enter the system memory capacity manually. The options are **Remaining** and Manual.

Units

Use this feature to select the type of unit to use when inputting namespace capacity in the system.

The options are B, MB, MiB, GB, **GiB**, TB, and TiB.

- **Capacity**: This feature displays the namespace capacity.

▶Create Namespace

▶Back to Namespaces

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Total Capacity

This feature allows the user to set the total PMem resource capacity allocated across all segments in the host server.

PMem Module Capacities

This section displays the following information:

- Volatile: This feature specifies volatile information of the PMem module.
- AppDirect: This feature specifies the App Direct capacity of the PMem module.
- Inaccessible: This feature specifies the capacity of the PMem module that is not accessible to the user.
- Raw: This feature specifies the raw capacity of the PMem module.

DDR Capacities

- Volatile: This feature specifies volatile information of the PMem module.
- Cache: This feature specifies the capacity of the cache memory.
- Inaccessible: This feature specifies the capacity of the PMem module that is not accessible to the user.
- Raw: This feature specifies the raw capacity of the PMem module.

Total Memory Capacities

- Volatile: This feature specifies volatile information of the PMem module.
- AppDirect: This feature specifies the App Direct capacity of the PMem module.
- Cache: This feature specifies the capacity of the cache memory.
- Inaccessible: This feature specifies the capacity of the PMem module that is not accessible to the user.
- Raw: This feature specifies the raw capacity of the PMem module.

▶Back to Main Menu

Select this feature and press <Enter> to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Diagnostics

Perform Diagnostic Tests on DIMMs

When you select this submenu and press <enter>, the following items will display:

Choose Diagnostics Type:

Use this feature to choose the type of diagnostics test to be performed on the PMem module installed in the system

Quick Diagnostics

Select Enabled for the quick diagnostics test to be performed on the PMem module installed in the system when needed. The options are **Enabled** and Disabled.

DIMM ID

Select Enabled to display the DIMM ID of a PMem module upon which the diagnostic test will be performed. The options are **Enabled** and Disabled. More DIMM IDs will appear If more PMem modules are installed on the motherboard.

Configure (Config) Diagnostics

Select Enabled for the platform configuration diagnostics test to be performed on the PMem module. The options are **Enabled** and Disabled.

Firmware (FW) Diagnostics

Select Enabled for the firmware diagnostics test to be performed on the PMem module. The options are **Enabled** and Disabled.

Security Diagnostics

Select Enabled for the security diagnostics test to be performed on the PMem module. The options are **Enabled** and Disabled.

▶Execute Tests

Select this feature and press <Enter> to execute the selected diagnostic tests. The following items will be displayed:

▶Back to Diagnostics

The status of diagnostics test will be displayed on this page:

- Quick
- Configuration
- Security
- Firmware

▶Back to Main Menu

Use this feature to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

▶Preferences

View and/or modify user preferences

Default DIMM ID

This feature allows the user to view and modify the default DIMM ID as displayed on the screen. The options are **Handle** and UID.

Capacity Units

This feature allows the user to view and set the default capacity unit of the selected PMem to be displayed on the screen. The options are **Auto**, Auto_10, B, MB, MiB, GB, GiB, TB, and TiB.

App Direct Settings

This feature displays the Application Direct Settings. The default setting is **4KB_4KB (Recommended)**.

▶Back to Regions Menu

▶Back to Provisioning Menu

▶Back to Main Menu

Use this feature to go back to the **Intel Optane™ Persistent Memory Configuration** menu.

4.4 Event Logs

Use this feature to configure the Event Log settings. After you've made any changes to one of the settings, reboot the system for the changes to take effect.

▶Change SMBIOS Event Log Settings

Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable System Management BIOS (SMBIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

Erasing Settings

Erase Event Log

Select "No" to keep the event log without erasing it upon the next system bootup. Select "Yes, Next Reset" to erase the event log upon the next system reboot. The options are "**No,**" "Yes, Next Reset," and "Yes, Every Reset."

When Log is Full

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event

Select Enabled to log system boot events. The options are Enabled and **Disabled**.

Multiple Event Count Increment (MECI)

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

Multiple Event Count Time Window (METW)

This feature is used to determine how long (in minutes) the multiple event counter should wait before generating a new event log. Enter a number between zero to 99. The default setting is 60.

▶View System Event Log

This feature allows the user to view the event in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following categories will be displayed:

Date/Time/Error Code/Severity

4.5 BMC

Use this feature to configure Baseboard Management Controller (BMC) settings.

When you select this submenu and press <Enter>, the following information will display:

- **BMC Firmware Revision**: This feature indicates the firmware revision of the BMC used in your system.
- **BMC Status**: This feature indicates the status of the BMC used in your system.

▶System Event Log

When you select this submenu and press <Enter>, the following information will display:

Enabling/Disabling Options

SEL Components

Select Enabled to enable all system event logging upon system boot. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

Select "Yes, On next reset" to erase all system event logs upon the next system boot. 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 the user to determine 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

Update BMC LAN Configuration

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

****

Configure IPv4 Support

****

BMC LAN Selection

Use this feature to select the type of BMC LAN. The default setting is **Failover**.

BMC Network Link Status

This feature displays the status of the BMC network link for this system. The default setting is **Dedicated LAN**.

Configuration Address Source

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

Station IP Address: This feature displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.29.176.131).

Subnet Mask: This feature 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 feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

Gateway IP Address: This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 172.29.0.1).

VLAN: This feature displays the status of VLAN support. The default setting is **Disable**.

****

Configure IPv6 Support

****

IPv6 Address Status: This feature displays the status of IPv6 addresses.

IPv6 Support: IPv6 is supported in BMC. The options are **Enabled** and Disabled.

Configuration Address Source

Use this feature to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it into the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP server attached to the network and request the next available IP address for this computer. The options are **DHCP** and Static.

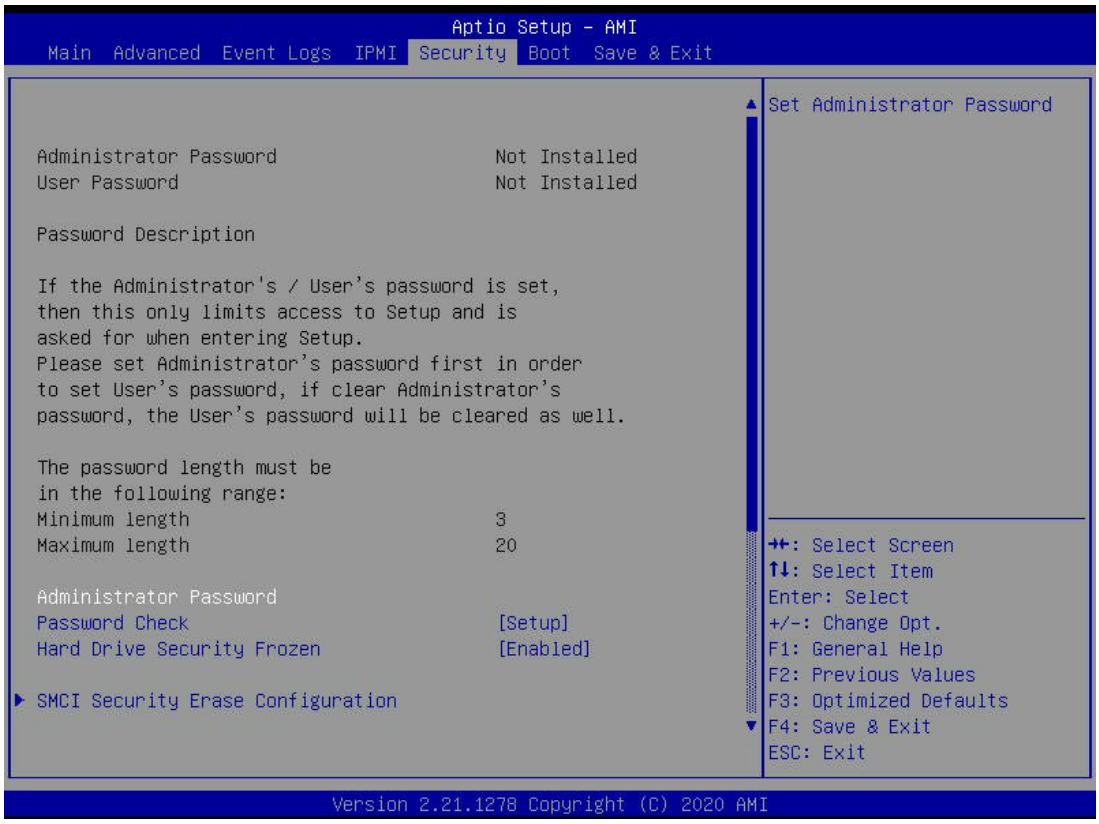
Station IPv6 Address: This feature displays the station IPv6 address.

Prefix Length: This feature displays the prefix length.

IPv6 Router1 IP Address: This feature displays the IP address of the IPv6 router.

4.6 Security

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



Administrator Password

This feature indicates if an administrator password has been installed. It also allows the user to set the administrator password which is required to enter the BIOS setup utility. The length of the password should be three to 20 characters.

User Password (Available when an Administrator Password is entered)

This feature indicates if a user's password has been installed. It also allows the user to set the user's password which is required to enter the BIOS setup utility. This feature provides the description of the user's password. The length of the password should be three to 20 characters.

Password Check

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

Hard Drive Security Frozen

Select Enabled to freeze the Lock Security feature for HDD to protect key data in hard drives from being altered. The options are **Enabled** and Disabled.

Note: For detailed instructions on how to configure Security Boot settings, refer to the Security Boot Configuration User's Guide posted on the web page under the link: http://www.supermicro.com/support/manuals/.

▶SMCI Security Erase Configuration

This section allows the user to configure the SMCI-proprietary Security Erase settings. When this section is selected, the following features will display:

- HDD Name: This feature displays the name of the HDD/SATA drive that is connected to the SMCI Security Erase Configuration submenu.
- HDD Serial Number: This feature displays the serial number of the HDD/SATA device that is connected to the SMCI Security Erase Configuration submenu.
- Security Mode: SAT3 supported.
- Estimated Time: This feature displays the estimated time needed to perform the selected Security Erase features.
- HDD User Pwd (Password) Status: This feature indicates if a password has been set as a SATA user password which will allow the user to configure SMCI Security Erase settings on the HDD (SATA) device by using this SATA user password.

Security Function

Select Password to set an HDD/SATA password which will allow the user to configure the security settings of the HDD/SATA device. Select Security Erase - Password to enter a SATA user password to allow the user to erase the password and the contents previously stored in the HDD/SATA device. Select Security Erase - Without Password to use the manufacturer default password "111111111" as the SATA user password and allow the user to erase the contents of the HDD/SATA device by using this default password. The options are **Disabled**, Set Password, Security Erase-Password, and Security Erase-Without Password.

Password

Use this feature to set the SATA user password which will allow the user to configure the SMCI Security Erase settings by using the SATA user password.

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

Note: For detailed instructions on how to configure Security Boot settings, refer to the Security Boot Configuration User's Guide posted on the web page under the link: http://www.supermicro.com/support/manuals/.

When you select this submenu and press the <Enter> key, the following items will display:

- Secure Mode
- Vendor Keys
- Secure Boot

Secure Boot

Select Enabled to use Secure Boot settings. The options are Enabled and **Disabled**.

Secure Boot Mode

Use this feature to select the desired secure boot mode for the system. The options are Standard and **Custom**.

CMS Support

If this feature is set to Enabled, legacy devices will be supported by the system. The options are **Enabled** and Disabled.

▶Key Management (Available when "Secure Boot Mode" is set to Custom)

Vendor Keys

Provision Factory Defaults

Select Enabled to install factory default Secure Boot keys after the platform reset while the system is in the Setup mode. The options are **Disabled** and Enabled.

▶Restore Factory Keys

Select Yes to restore manufacturer default keys used to ensure system security. The options are **Yes** and No.

▶Reset to Setup Mode

This feature resets the system to Setup Mode.

▶Export Secure Boot Variables

This feature exports the NVRAM contents of Secure Boot variables to a storage device.

▶Enroll EFI Image

This feature specifies which Extensible Firmware Interface (EFI) image should be used for the system when it operates in the Secure Boot mode.

Device Guard Ready

▶Remove 'UEFI CA' from DB

Select Yes to remove UEFI CA from the database. The options are **Yes** and No.

▶Restore DB defaults

Select Yes to restore database variables to the manufacturer default settings. The options are **Yes** and No.

Secure Boot Variable/Size/Keys/Key Source

▶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, key numbers, and sources of the authorized signatures. Select Update to update the platform key. The options are **Details**, Export, Update, and Delete.

▶Key Exchange Keys

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, key numbers, and 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, key numbers, and 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

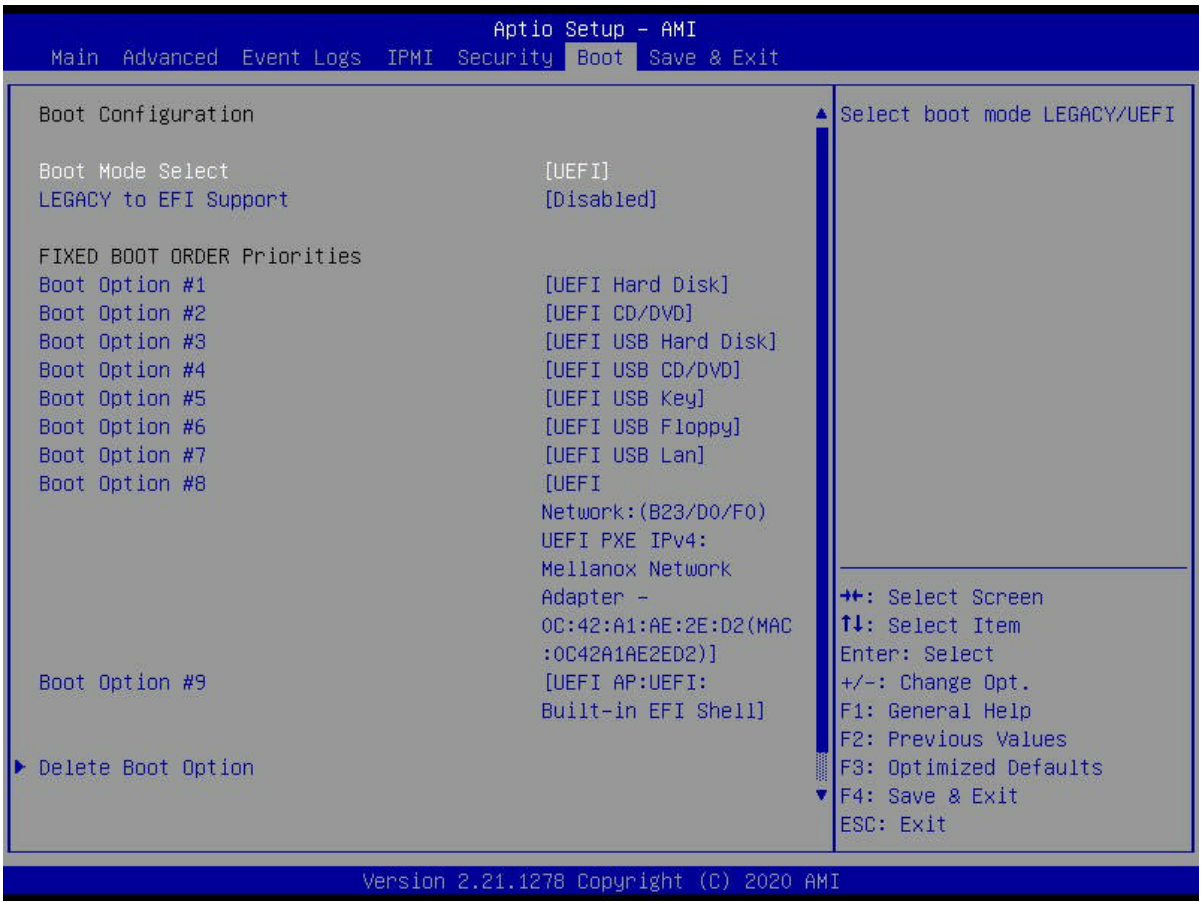
This feature allows the user to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. Select Update to update your "Authorized TimeStamps." Select Append to append your "Authorized TimeStamps." The settings are **Update** and Append.

▸OsRecovery (OS Recovery) Signatures

This feature allows the user to set and save the authorized signatures used for OS recovery. Select Update to update your "OS Recovery Signatures." Select Append to append your "OS Recovery Signatures." The settings are **Update** and Append.

4.7 Boot

Use this feature to configure Boot Settings:



Boot Configuration

Boot Mode Select

Use this feature to select the type of devices from which the system will boot. The options are Legacy, **UEFI (Unified Extensible Firmware Interface)**, 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.

When the feature "**Boot Mode Select**" is set to **UEFI** (default), the following items will be displayed for the user to configure the boot settings:

- Boot Option #1 – Boot Option #9

When the feature "**Boot Mode Select**" is set to **Legacy**, the following items will be displayed for configuration:

- Boot Option #1 – Boot Option #8

When the feature "**Boot Mode Select**" is set to **Dual**, the following items will be displayed for configuration:

- Boot Option #1 – Boot Option #17

▶Delete Boot Option

This feature allows the user to select and delete an EFI boot option from the boot priority list.

▶UEFI NETWORK Driver BBS Priorities

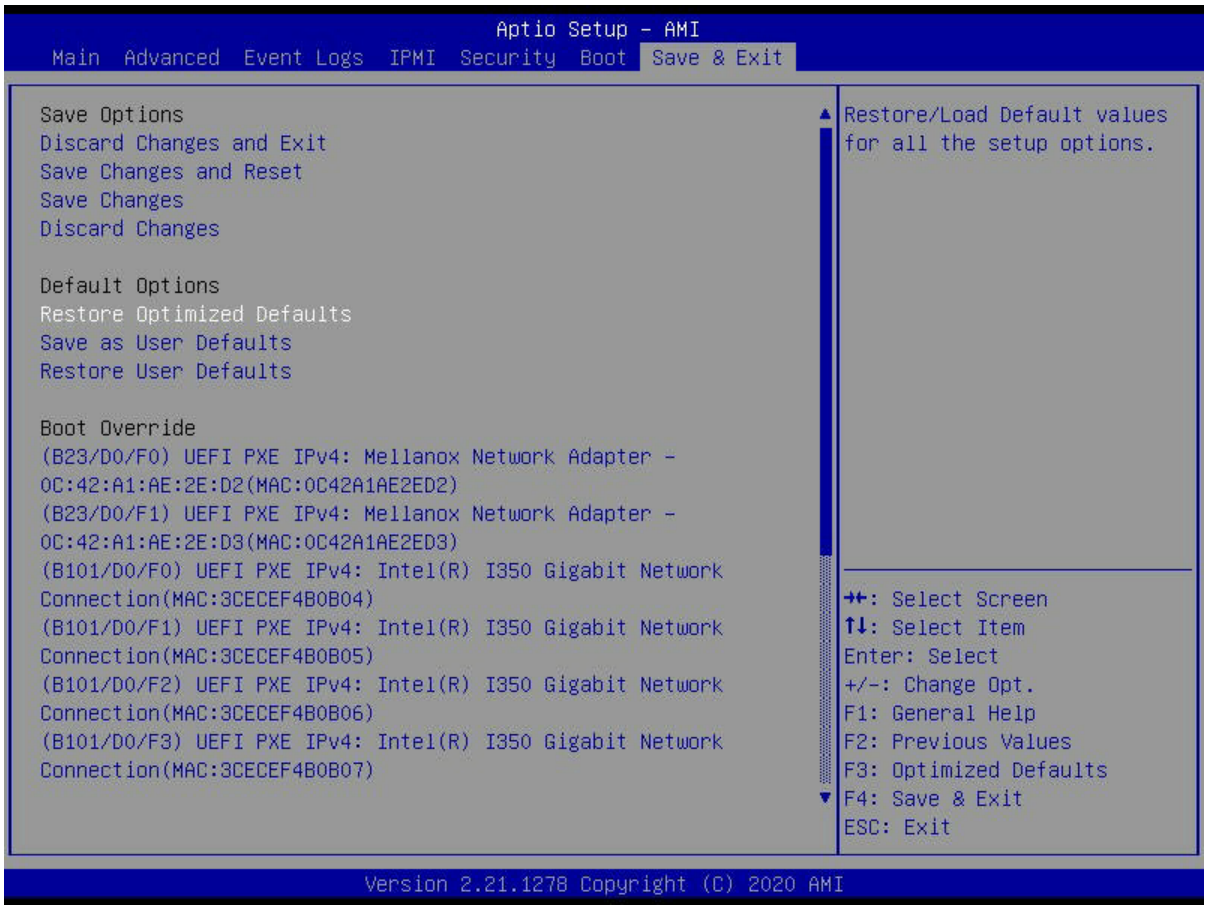
This feature sets the system boot order of detected devices.

▶UEFI Application Boot Priorities

Boot Option #1

4.8 Save & Exit

Select the Save & Exit menu from the BIOS setup screen to configure the settings.



Save Options

Discard Changes and Exit

Select this option to exit from the BIOS setup utility without making any permanent changes to the system configuration and reboot the computer.

Save Changes and Reset

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 become effective.

Save Changes

When you have completed the system configuration changes, select this option to save all changes you've made. This will not reset (reboot) the system.

Discard Changes

Select this option and press <Enter> to discard all the changes you've made and return to the AMI BIOS setup utility.

Default Options

Restore Optimized Defaults

To set this feature, select Restore Default Values from the Exit menu and press <Enter> to load manufacturer default settings which are intended for maximum system performance but not for maximum stability.

Save the User Default Values

To set this feature, select this feature and press <Enter> to save all changes on the default values entered by the user to the BIOS setup utility for future use.

Restore the User Default Values

To set this feature, select Restore the User Default Values from the Exit menu and press <Enter>. Use this feature to retrieve user-defined default settings that have been saved previously.

Boot Override

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

Appendix A

BIOS POST Codes

A.1 BIOS POST Codes

The AMI BIOS supplies additional checkpoint codes, which are documented online at http://www.supermicro.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 (Supermicro p/n AOC-LPC80-20).

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

Appendix B

Software

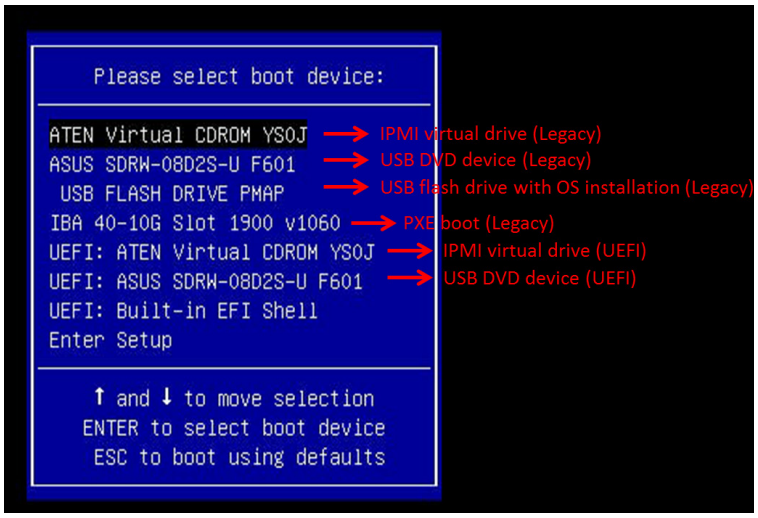
After the hardware has been installed, you can install the Operating System (OS), configure RAID settings, and install the drivers.

B.1 Microsoft Windows OS Installation

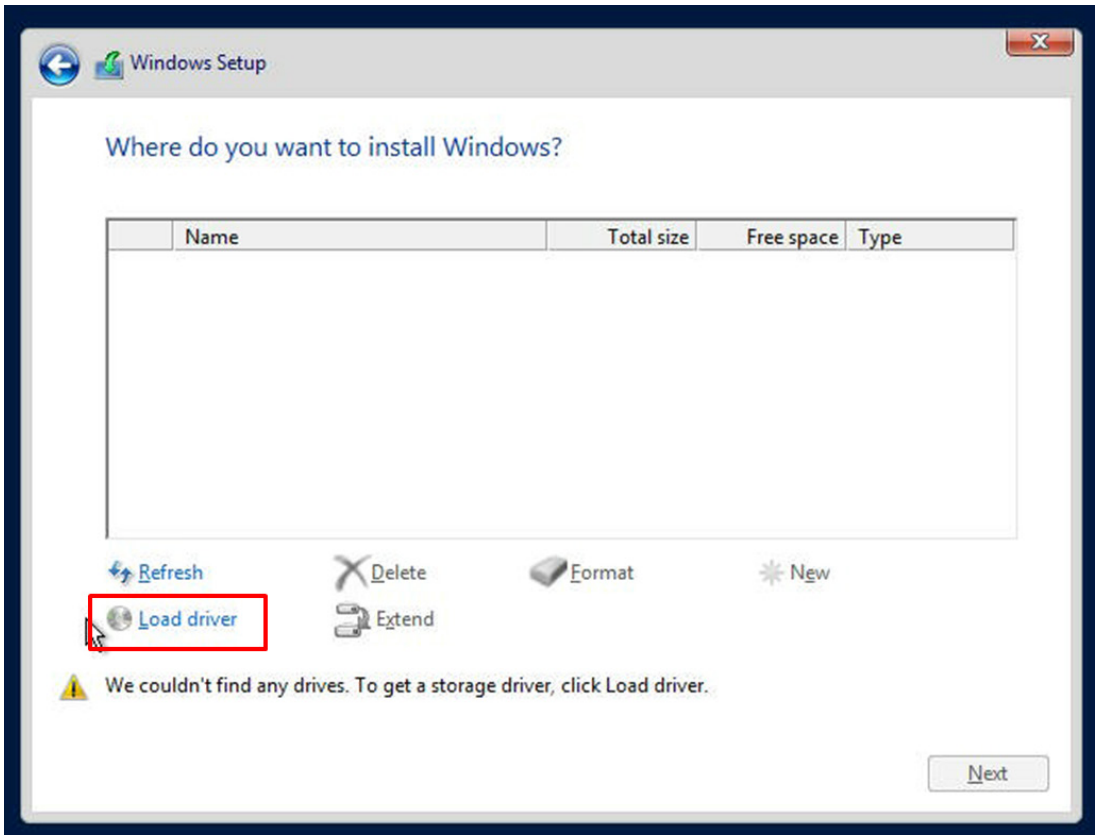
If you will be using RAID, you must configure RAID settings before installing the Windows OS and the RAID driver. Refer to the RAID Configuration User Guides posted on our website at www.supermicro.com/support/manuals.

Installing the OS

1. Create a method to access the MS Windows installation ISO file. That can be a USB flash or media drive.
2. Retrieve the proper RST/RSTe driver.
3. Go to the Supermicro web page for your motherboard.
4. Click on "Download the Latest Drivers and Utilities."
5. Select the proper driver.
6. Copy it to a USB flash drive.
7. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.



8. 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 the “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.

9. Once all devices are specified, continue with the installation.
10. After the Windows OS installation has been completed, the system will automatically reboot multiple times.

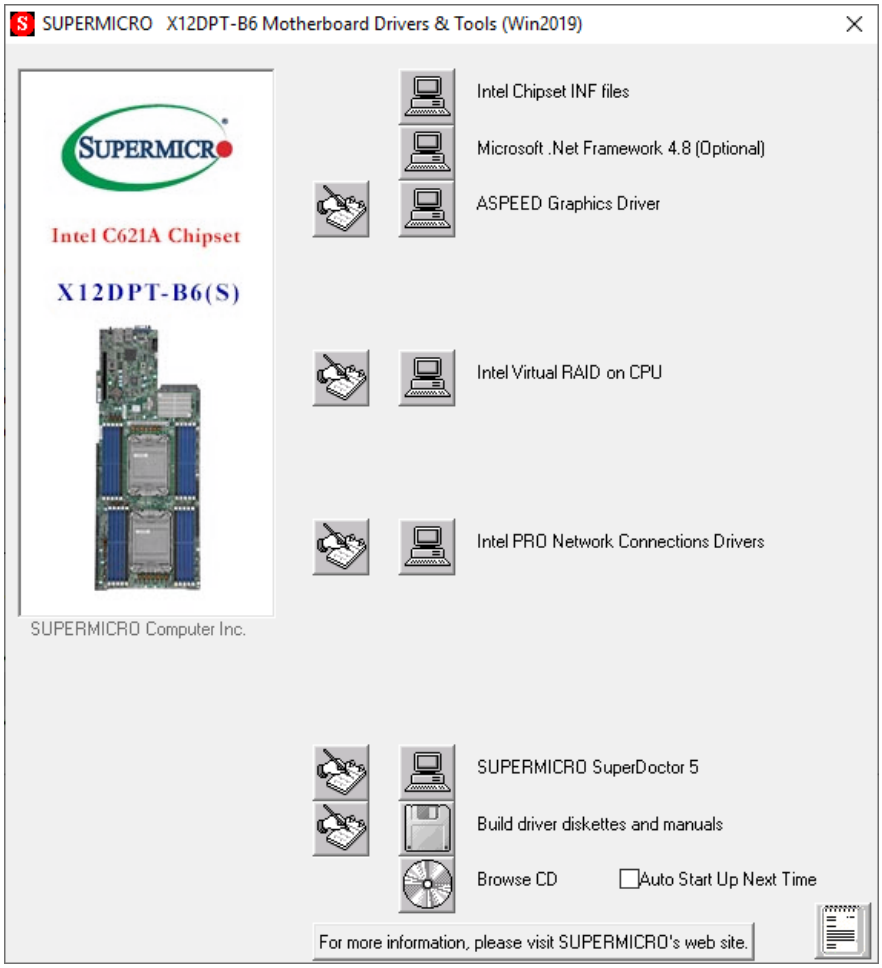
B.2 Driver Installation

The Supermicro website contains drivers and utilities for your system 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 media drive. 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 following screenshot should appear.

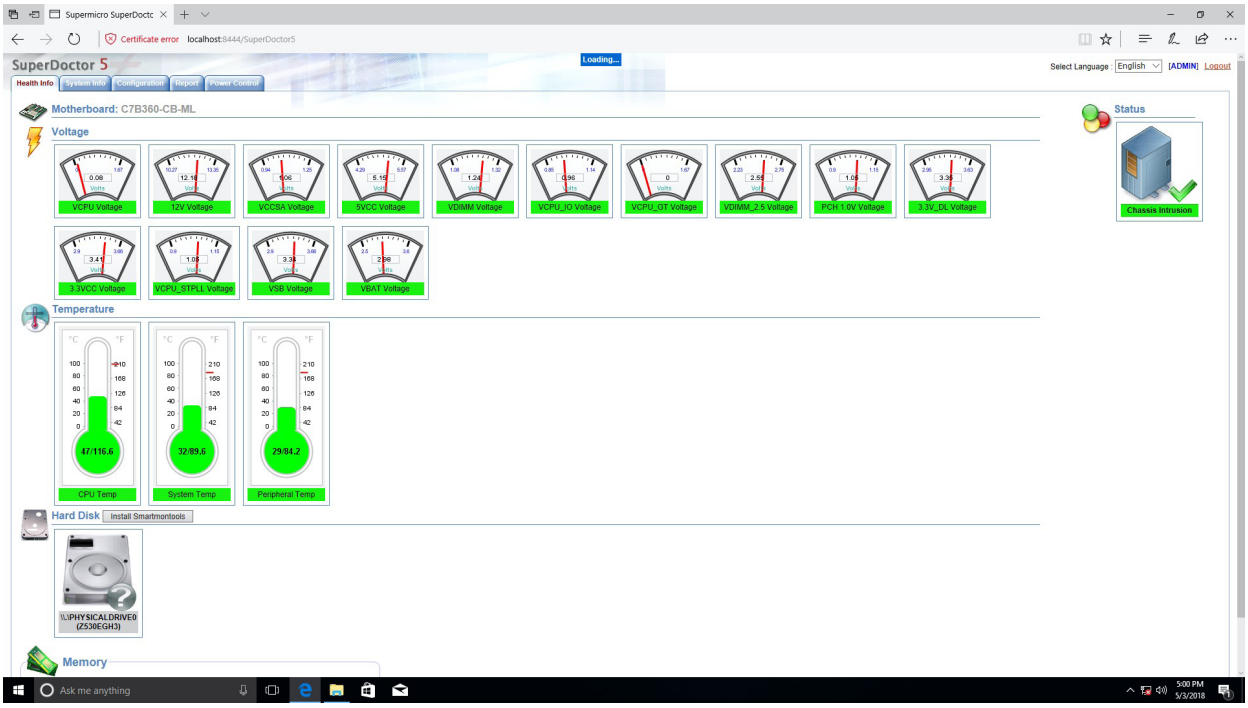


Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to bottom) one at a time. **After installing each item, you must reboot the system before moving on to the next item on the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

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 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, FTP, and SMTP services to optimize the efficiency of your operation.



B.4 BMC

The X12DPT-B6 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, visit our website at: http://www.supermicro.com/products/nfo/IPMI.cfm.

B.5 Logging into the 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, 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, 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 bodily injuries 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.

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

电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

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 המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسحبذال البطارية بطريقة غير صحيحة فعليل
اسحبذال البطارية
فقط بنفس النع أو ما يعادلها مما أوصث به الشرمة المصنعة
جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة 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 ontploffingsgevaar 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 القانين واللائح البطنية

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.