



R12SPD-A

USER'S MANUAL

Revision 1.0

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Manual Revision 1.0

Release Date: October 17, 2022

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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 R12SPD-A motherboard.

About This Motherboard

The Supermicro R12SPD-A supports the Ampere® Altra™ 80-core and Ampere Altra Max™ 128-core processors with a thermal design power (TDP) of up to 250W. The motherboard supports three PCIe 4.0 x16 slots, six Slimline SAS PCIe 4.0 x8 connectors, one M.2 M-Key PCIe 4.0 slot, one OCP 3.0 connector, two SFP28 LAN ports through NVIDIA® Mellanox® ConnectX®-4 LX EN, and up to 4TB of DDR4 ECC and Non-ECC UDIMM/LRDIMM/RDIMM/3DS RDIMM memory in 16 slots. The R12SPD-A is optimized for high-performance, high-end computing platforms that address the needs of high-end computing platforms next generation applications. Note that 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/>.

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 provides information for proper system setup.

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Table of Contents

Chapter 1 Introduction

1.1 Checklist	8
Quick Reference	11
Quick Reference Table	12
Motherboard Features	14
1.2 Processor and Chipset Overview	17
1.3 Special Features	17
Recovery from AC Power Loss	17
1.4 System Health Monitoring	17
Onboard Voltage Monitors	17
Fan Status Monitor with Firmware Control	18
Environmental Temperature Control	18
1.5 Power Supply	18
1.6 Micro-USB COM Port and SOL Functions	19

Chapter 2 Installation

2.1 Static-Sensitive Devices	20
Precautions	20
Unpacking	20
2.2 Processor and Heatsink Installation	21
The Ampere Altra/Altra Max Processor	21
Overview of the Processor Socket	22
Overview of the Heatsink	22
Installing the Processor	23
Installing the Heatsink	26
2.3 Motherboard Installation	28
Tools Needed	28
Location of Mounting Holes	28
Installing the Motherboard	29
2.4 Memory Support and Installation	30
Memory Support	30
DIMM Module Population Configuration	30

General Guidelines for Optimizing Memory Performance	31
DIMM Installation	32
DIMM Removal	32
2.5 Rear I/O Ports	33
2.6 Front Control Panel	38
2.7 Front Panel Header	43
2.8 Connectors	48
Power Connections	48
Headers	52
2.9 Jumper Settings	57
How Jumpers Work	57
2.10 LED Indicators	59
Chapter 3 Troubleshooting	
3.1 Troubleshooting Procedures	62
Before Power On	62
No Power	62
No Video	63
System Boot Failure	63
Memory Errors	63
Losing the System's Setup Configuration	64
When the System Becomes Unstable	64
3.2 Technical Support Procedures	66
3.3 Frequently Asked Questions	67
3.4 Battery Removal and Installation	68
Battery Removal	68
Proper Battery Disposal	68
Battery Installation	68
3.5 Returning Merchandise for Service	69
Chapter 4 UEFI BIOS	
4.1 Introduction	70
4.2 Main Setup	71
4.3 Advanced Setup Configurations	73
4.4 BMC	92

4.5 Security.....	95
4.6 Boot.....	100
4.7 Save & Exit.....	102
<i>Appendix A BIOS Codes</i>	
A.1 BIOS Error POST (Beep) Codes	104
A.2 Additional BIOS POST Codes.....	105
<i>Appendix B Standardized Warning Statements</i>	
<i>Appendix C UEFI BIOS Recovery</i>	
C.1 Overview.....	109
C.2 Recovering the UEFI BIOS Image.....	109
C.3 Recovering the BIOS Block with a USB Device	109
<i>Appendix D Updating BIOS and BMC with OpenBMC WebGUI</i>	
D.1 Overview.....	114
D.2 Updating BIOS with OpenBMC WebGUI	115
D.3 Updating BMC with OpenBMC WebGUI.....	117
<i>Appendix E Updating Firmware through OpenBMC Console</i>	
E.1 Overview.....	120
E.2 Updating the UEFI BIOS Firmware.....	121
Updating the UEFI BIOS Firmware through BMC Console.....	121
E.3 Updating the Ampere SCP Firmware.....	125
Updating the Ampere SCP Firmware through BMC Console.....	125

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.

In addition to the motherboard, several important parts that are included in the retail box are listed below. If anything listed is damaged or missing, contact your retailer.

1.1 Checklist

Main Parts List		
Description	Part Number	Quantity
Supermicro Motherboard	R12SPD-A	1
Quick Reference Guide	MNL-2483-QRG	1

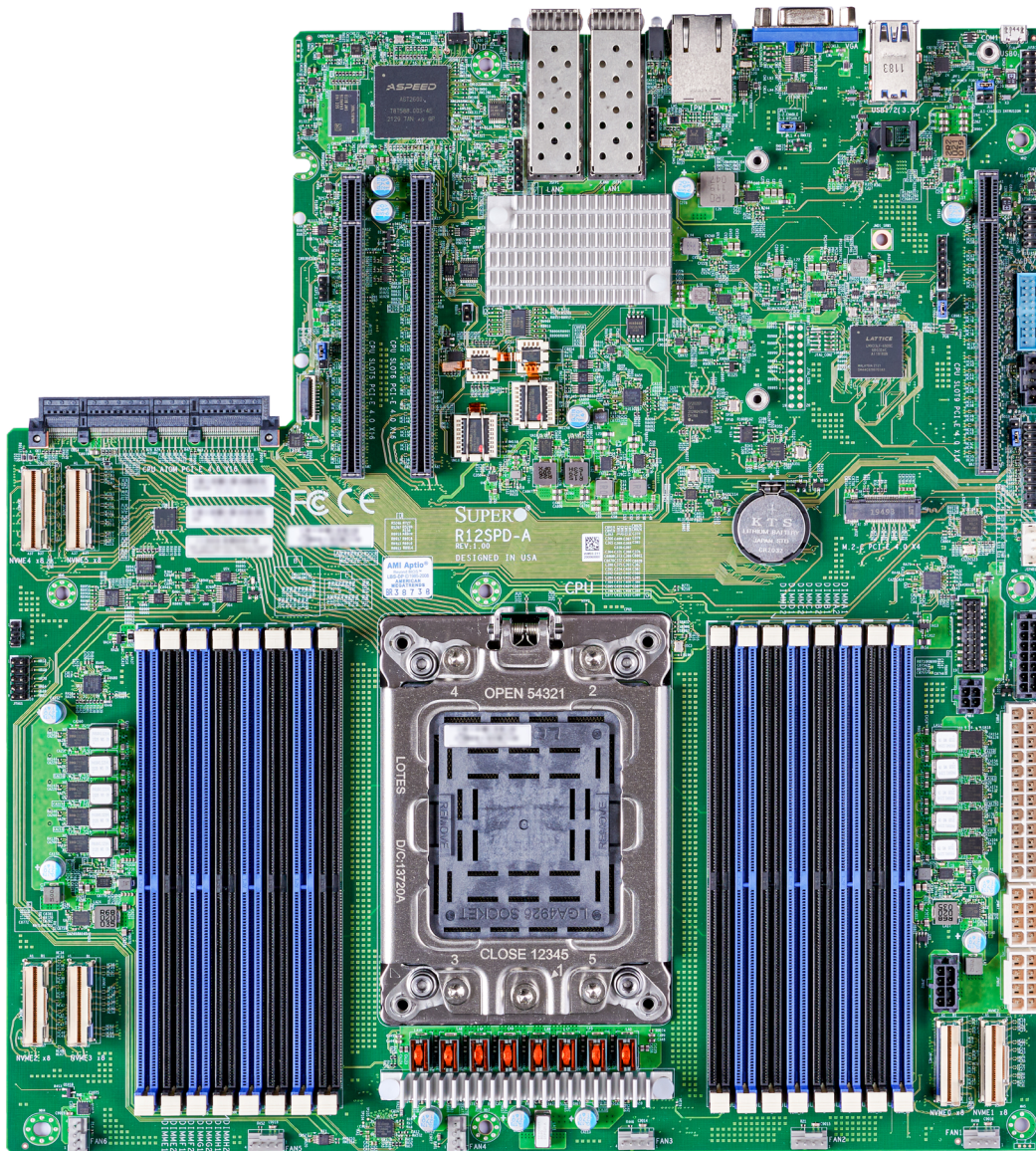
Important Links

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

- Frequently Asked Questions: <https://www.supermicro.com/FAQ/index.php>
- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- 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

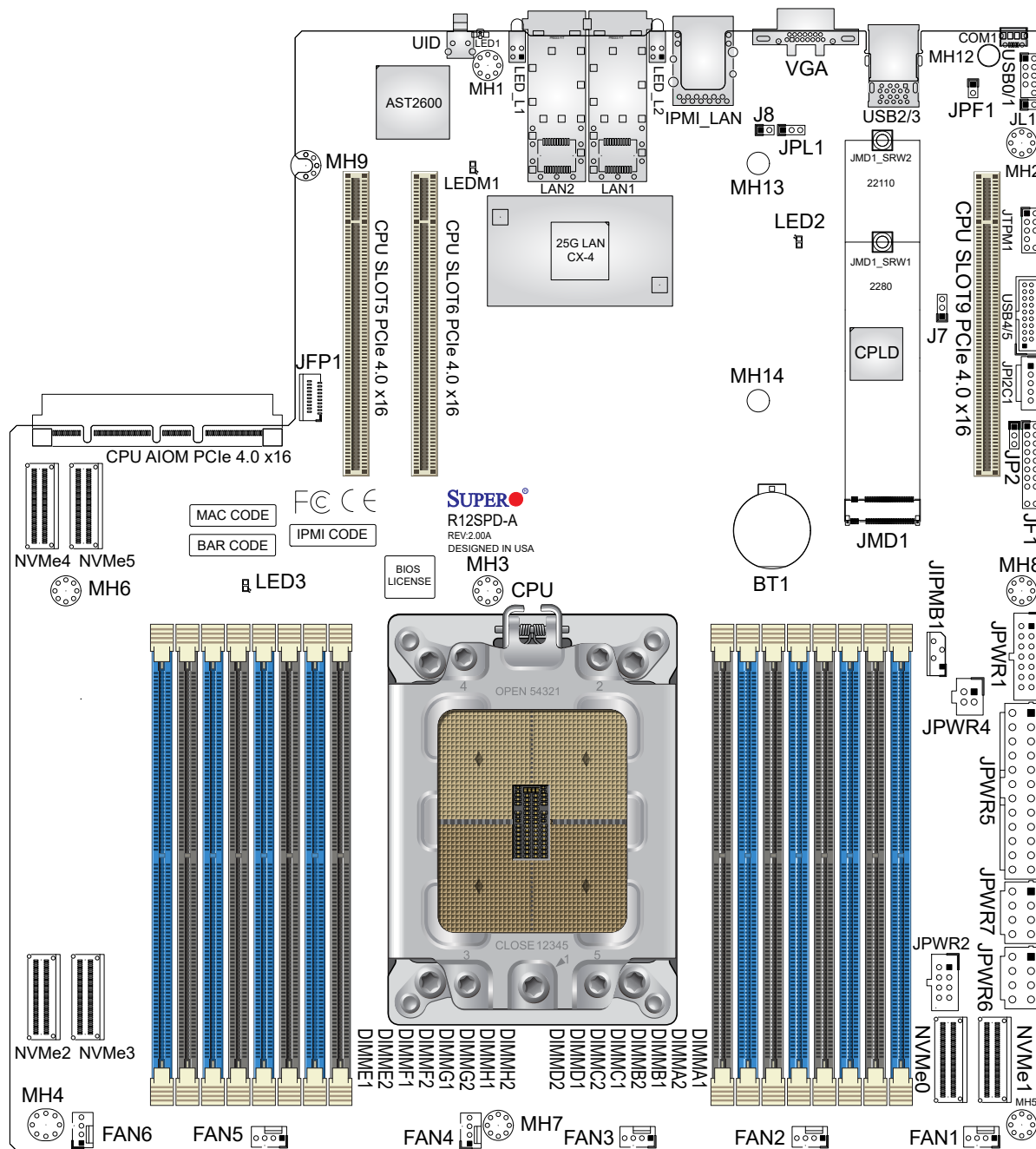
This manual may be periodically updated without notice. Check the Supermicro website for possible updates to the manual revision level.

Figure 1-1. R12SPD-A Motherboard Image



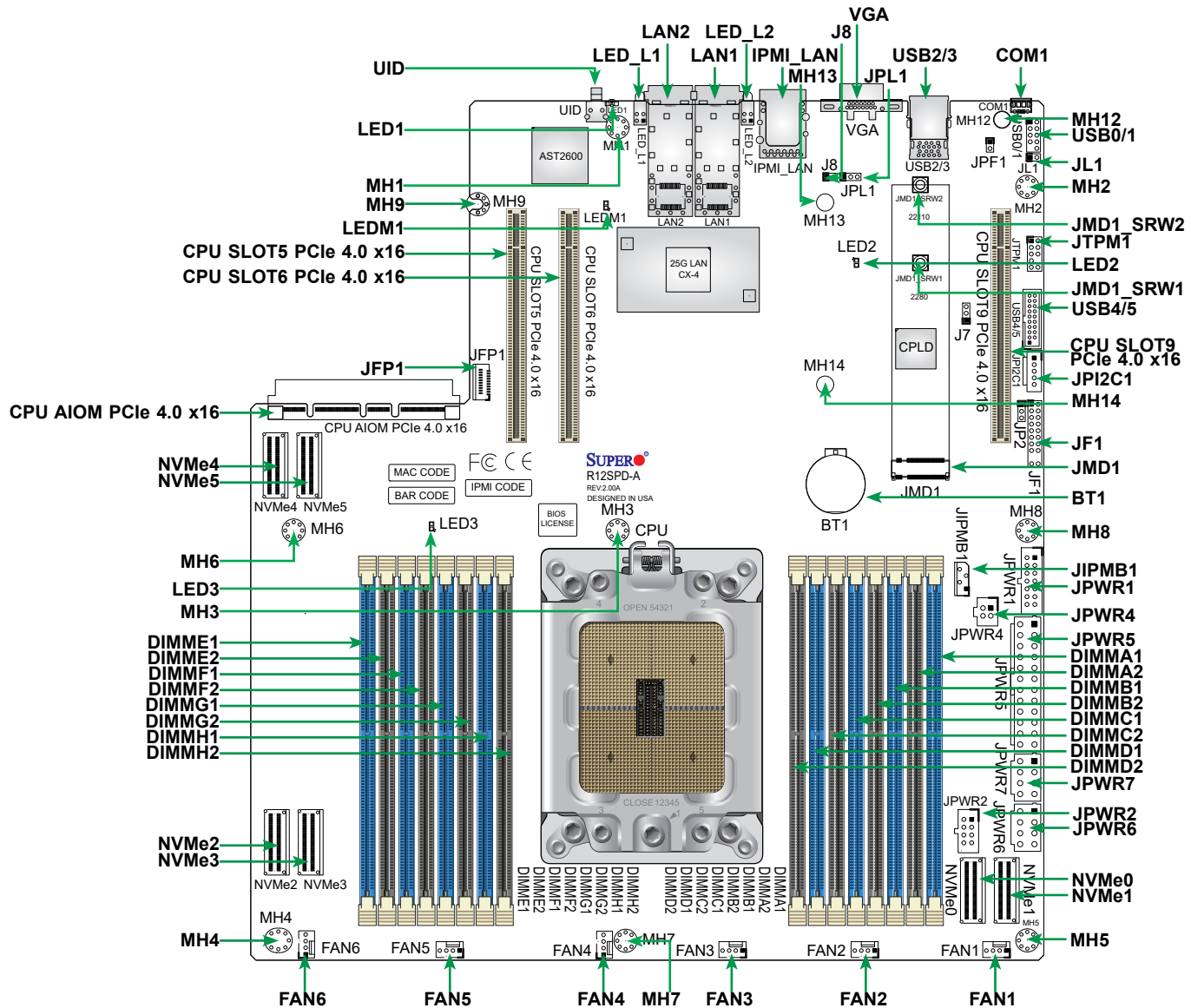
Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. R12SPD-A Motherboard Layout
(not drawn to scale)



Note: Components not documented are for internal testing only.

Quick Reference



- See [Chapter 4](#) for detailed information on jumpers, I/O ports, and JF1 front panel connections. Jumpers/LED indicators not indicated are used for testing only.
- "■" indicates the location of Pin 1.
- 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
J8	CPU UART/BMC Debug	Pins 1-2 Closed (CPU UART)
JPL1	LAN1/2 Enable/Disable	Pins 1-2 (Enabled)
LED	Description	Status
LED1	Unit Identifier LED	Solid Blue: Unit Identified
LED2	Power LED	Solid Green: Power On
LED3	System Status LED	Solid Red: CPU Fault
LED_L1	SFP28 LAN Status for LAN2	Top LED Yellow: 10G Link Top LED Green: 25G Link Bottom LED Green: Port Activity
LED_L2	SFP28 LAN Status for LAN1	Top LED Yellow: 10G Link Top LED Green: 25G Link Bottom LED Green: Port Activity
LEDM1	BMC Heartbeat LED	Blinking Green: BMC Normal
Connector	Description	
BT1	Onboard CMOS Battery	
COM1	Micro-USB COM Port	
CPU AIOM PCIe 4.0 x16	PCIe 4.0 x16 AIOM Slot	
FAN1 – FAN5	CPU/System Fan Headers (FAN1: CPU Fan)	
FAN6	AUX Fan Header	
IPMI_LAN	Dedicated IPMI LAN Port	
JF1	Front Control Panel Header	
JFP1	Front Panel Header	
JIPMB1	4-pin External I ² C Header for an IPMI card	
JL1	Chassis Intrusion Header	
JMD1	M.2 M-Key PCIe 4.0 Connector (2280/22110)	
JPI2C1	Power Supply SMBus I ² C Header	
JPWR1	Proprietary PSU 14-Pin Power Connector	
JWPR2	Proprietary PSU 8-Pin Power Connector	
JWPR4	5V/12V Power Connector for Special Riser Card	
JPWR5	ATX PSU 24-Pin Power Connector	
JPWR6, JPWR7	ATX PSU 8-Pin Power Connector	
JTPM1	Trusted Platform Module (TPM) 2.0	
LAN1, LAN2	SFP28 10G/25G LAN Ports	
NVMe0 x8 – NVMe5 x8	PCIe 4.0 x8 SlimSAS NVMe Connectors	
UID	Unit Identifier Button	



Note: The table above is continued on the next page.

Connector	Description
USB0/1	Front-Accessible USB 2.0 Header
USB2/3	USB 3.0 Type-A Ports on the Rear I/O Panel
USB4/5	Front-Accessible USB 3.0 Header
VGA	VGA Port

Motherboard Features

Motherboard Features	
CPU	
Supports an Ampere Altra and Altra Max processor with up to 80 cores in Altra or 128 cores in Altra Max and a TDP of up to 250W in a LGA 4926 socket	
Memory	
Supports up to 4TB of DDR4 ECC and Non-ECC UDIMM/LRDIMM/RDIMM/3DS RDIMM with speeds of up to 3200MT/s in 16 memory slots	
DIMM Size	
256GB	
 Note: For the latest CPU/memory updates, refer to our website at http://www.supermicro.com/products/motherboard .	
Expansion Slots	
- Three PCIe 4.0 x16 slots - Six PCIe 4.0 x8 SlimSAS NVMe connectors - One M.2 M-Key PCIe 4.0 slot (2280/22110) - One OCP 3.0 (max 25W) connector to BMC AST2600	
Network	
- Dual SFP28 through NVIDIA® Mellanox® ConnectX®-4 LX EN for up to 1x 25G or 2x 10G ports - One dedicated IPMI LAN located on the rear I/O panel	
Baseboard Management Controller (BMC)	
Aspeed AST2600	
Graphics	
Aspeed AST2600	
I/O Devices	
- Video (VGA) Port - Micro-USB COM Port	- One VGA port from Aspeed AST2600 on the rear I/O panel - One Micro-USB COM port on the rear I/O panel
Peripheral Devices	
- Two USB 3.0 Type-A ports on the rear I/O panel - One front-accessible USB 3.0 header for two USB 3.0 ports - One front-accessible USB 2.0 header for two USB 2.0 ports	
BIOS	
256Mb SPI Flash BIOS - APCI, SPI dual/quad speed support, Plug and Play (PnP)	

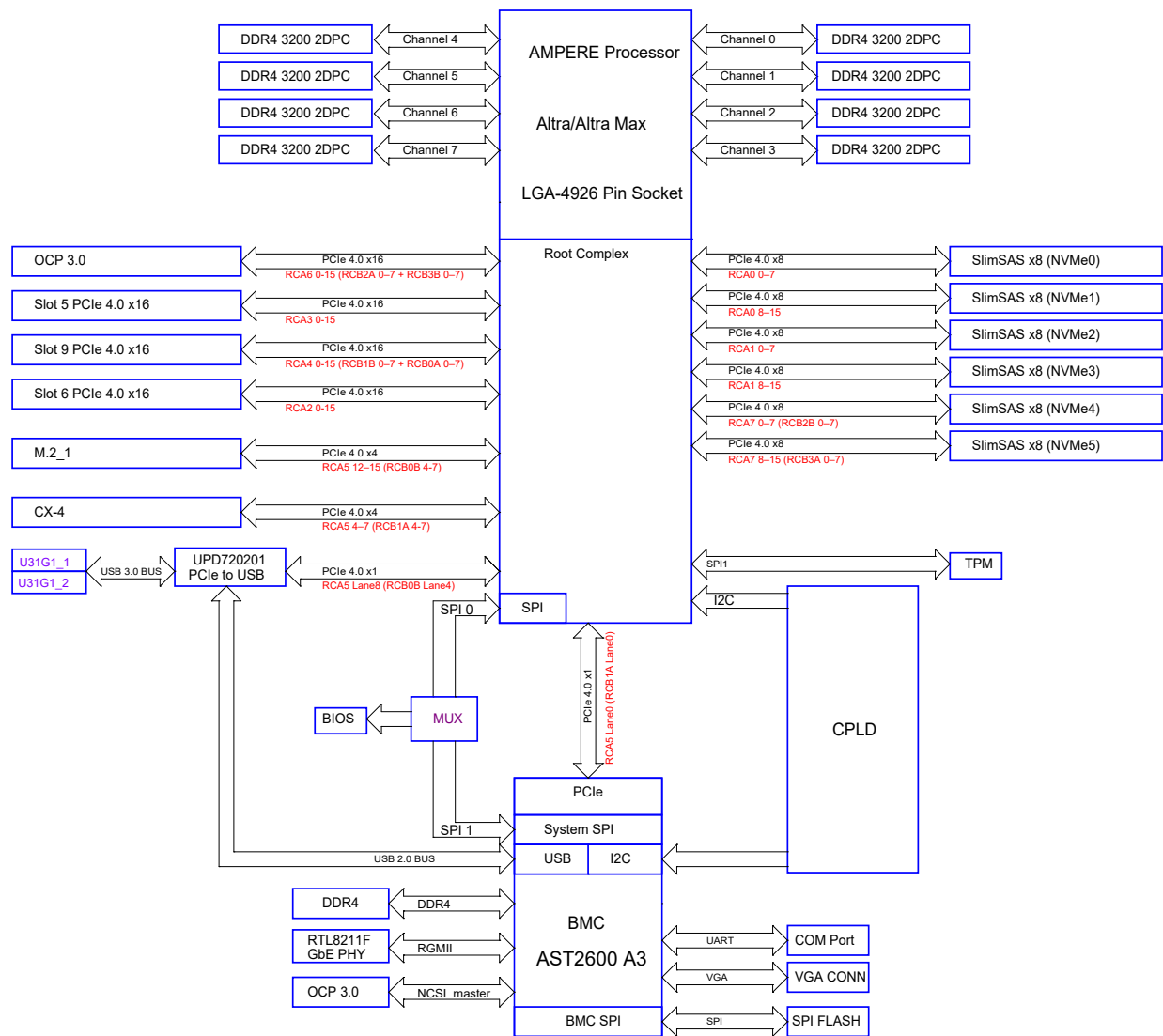


Note: The table above is continued on the next page.

Motherboard Features	
Power Management	
• Power button override mechanism • Power-on mode for AC power recovery	
System Health Monitoring	
• Onboard voltage monitoring for +3.3V, +5V, +12V, +3.3VStb, +5VStb, Vcore, and Vmem • Temperature of NVMe • Temperature of PSU • CPU thermal trip support	
Fan Control	
• Six 4-pin fan headers	
System Management	
• In-band IPMI over SSIF and out-of-band IPMI over Ethernet • In-band Redfish from host CPI using Redfish messages over USB Ethernet • Out-of-band Redfish over BMC Ethernet • IPMI, Redfish, and WebUI • CPU power and thermal sensor monitoring • On-board hardware power and thermal sensor monitoring	
LED Indicators	
• CPU/system overheat LED • Power indicator LED • Fan failed LED • UID/remote UID • LAN activity LED	
Dimensions	
• 13" (W) x 12" (L) (330.2mm x 304.8mm)	

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

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 Ampere Altra and Altra Max processor, the R12SPD-A motherboard provides system performance, power efficiency, reliability, and feature sets to address the needs of next-generation computer users. The R12SPD-A dramatically increases system performance for a multitude of applications.

The following features are supported:

- Arm® v8.2+ 64-bit architectures
- Arm Coherent Mesh Network (CMN)
- System Memory Management Unit Architecture (SMMUv3.1)
- Generic Interrupt Controller Architecture (GICv3) compliance
- PCI Express 4.0

1.3 Special Features

Recovery from AC Power Loss

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

1.4 System Health Monitoring

This section describes the health monitoring features of the motherboard. The motherboard has an onboard System Hardware Monitoring chip that supports system health monitoring.

Onboard Voltage Monitors

An onboard voltage monitor will scan the voltages of the onboard memory, CPU, and battery 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

PC health monitoring in the BIOS can check the RPM status of the cooling fans. The onboard CPU and chassis fans are controlled by Thermal Management. Refer to the below table for available fan modes to choose the most appropriate one for nominal operation.

Figure 1-4. CPU and Chassis Fan Speed Modes

CPU and Chassis Fan Speed Modes	
Fan Mode	Description
Quiet	Fan speed for best power efficiency and maximum noise reduction
Stable	Fan speed for normal system cooling
Full Speed	Fan speed at full speed for maximum system cooling
Customize	Manually adjust fan speed according to specified temperatures

Environmental Temperature Control

The thermal control sensor monitors the CPU temperature in real time and will turn on the thermal control fan whenever the CPU temperature exceeds a user-defined threshold. The overheat circuitry runs independently from the CPU. Once the thermal sensor detects that the CPU temperature is too high, it will automatically turn on the thermal fans to prevent the CPU from overheating. The onboard chassis thermal circuitry can monitor the overall system temperature and alert the user when the chassis temperature is too high.



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

1.5 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.

This motherboard accommodates a proprietary power supply and a 24-pin ATX power supply. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, one 12V 8-pin power connection is also required to ensure adequate power supply to the system.

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above.

1.6 Micro-USB COM Port and SOL Functions

The Micro-USB COM port baud rate is fixed to 115200 and is read-only. To access the Micro-USB COM port, ensure that the host system has a CP2102 USB-to-UART bridge driver and that the R12SPD-A BIOS is at least version 1.1. You cannot input to the USB/COM console through the Micro-USB COM port. Attach a keyboard to the R12SPD-A motherboard for input.

Jumper J8 switches the Micro-USB COM port function between CPU UART (pins 1-2 closed) and BMC Debug (pins 1-2 open). Set jumper J8 to CPU UART to allow the Micro-USB COM port to read CPU UART per BMC. The CPU UART can output UEFI and OS to console. Set J8 to BMC Debug to access the Das U-Boot bootloader.

The Serial-over-LAN (SOL) console allows input and output to the CPU UART per BMC. The CPU UART supports UEFI and OS console SOL. The UEFI BIOS setup menu can be accessed by pressing the DEL key in the SOL console window during boot.

Chapter 2

Installation

2.1 Static-Sensitive Devices

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

Precautions

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

Unpacking

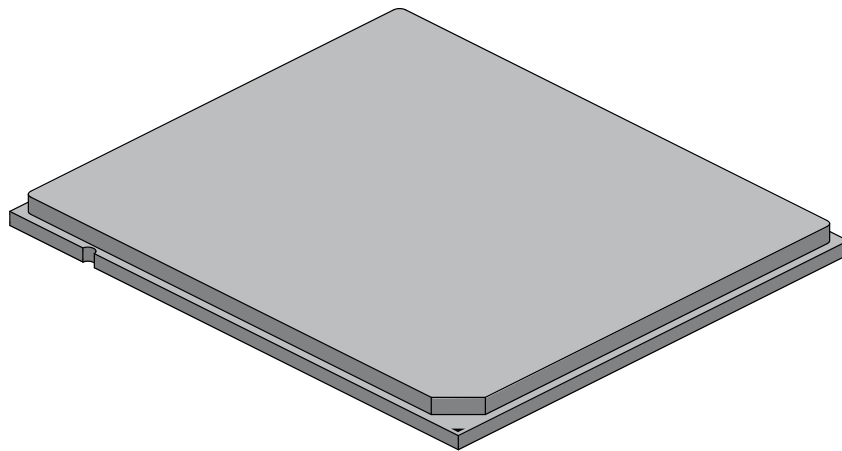
The motherboard is shipped in antistatic packaging to avoid static damage. When unpacking the motherboard, make sure that the person handling it is static protected.

2.2 Processor and Heatsink Installation

Notes:

- Use ESD protection.
- Shut down the system and then unplug the AC power cord from all power supplies.
- 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 socket, which may require manufacturer repairs.
- Refer to the Supermicro website for updates on processor support.
- All graphics in this manual are for illustrations only. Your components may look different.

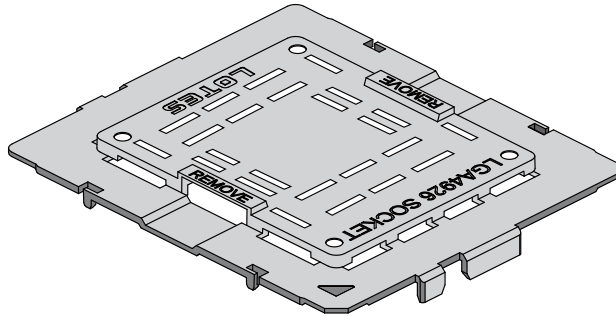
The Ampere Altra/Altra Max Processor



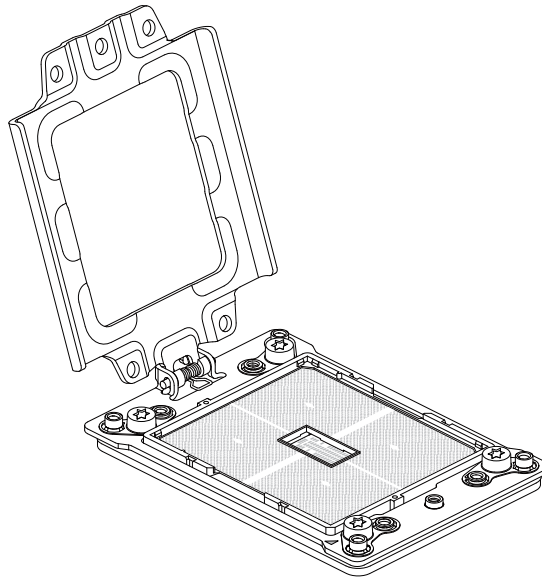
Overview of the Processor Socket

The processor socket is protected by a plastic protective cover.

1. Plastic Protective Cover

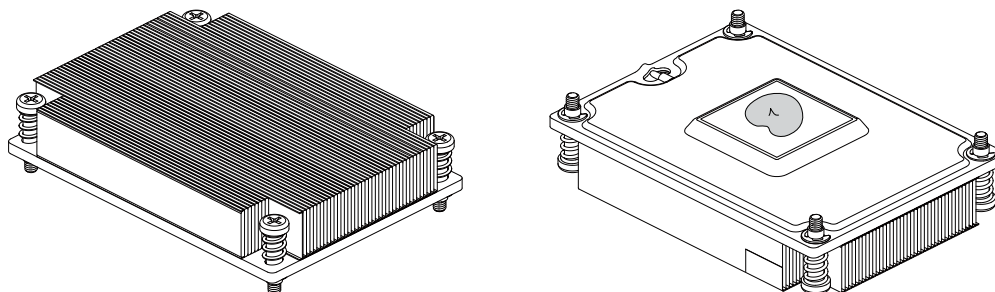


2. LGA 4926 Socket



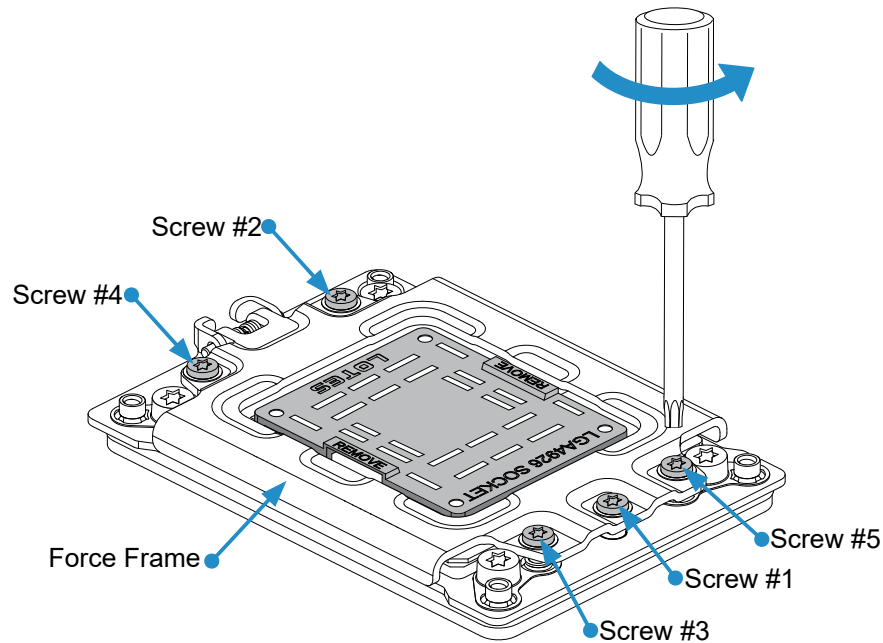
Overview of the Heatsink

The heatsink is attached to the processor after the processor is secured in the LGA 4926 socket. If this is a new heatsink, thermal grease is pre-applied.

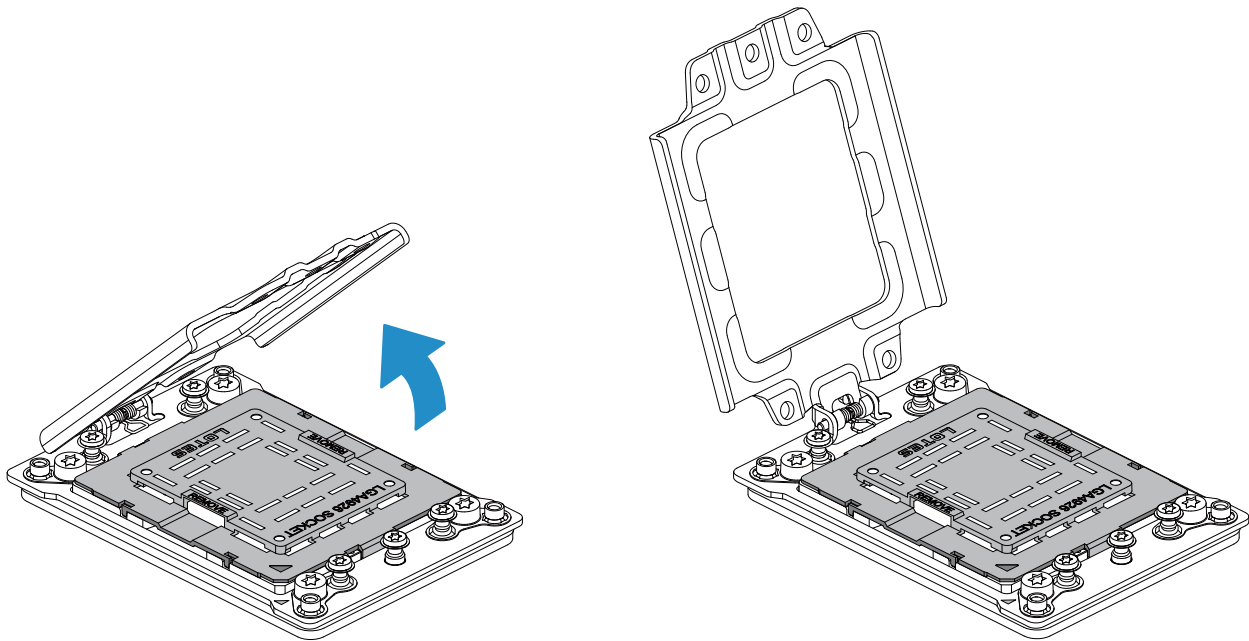


Installing the Processor

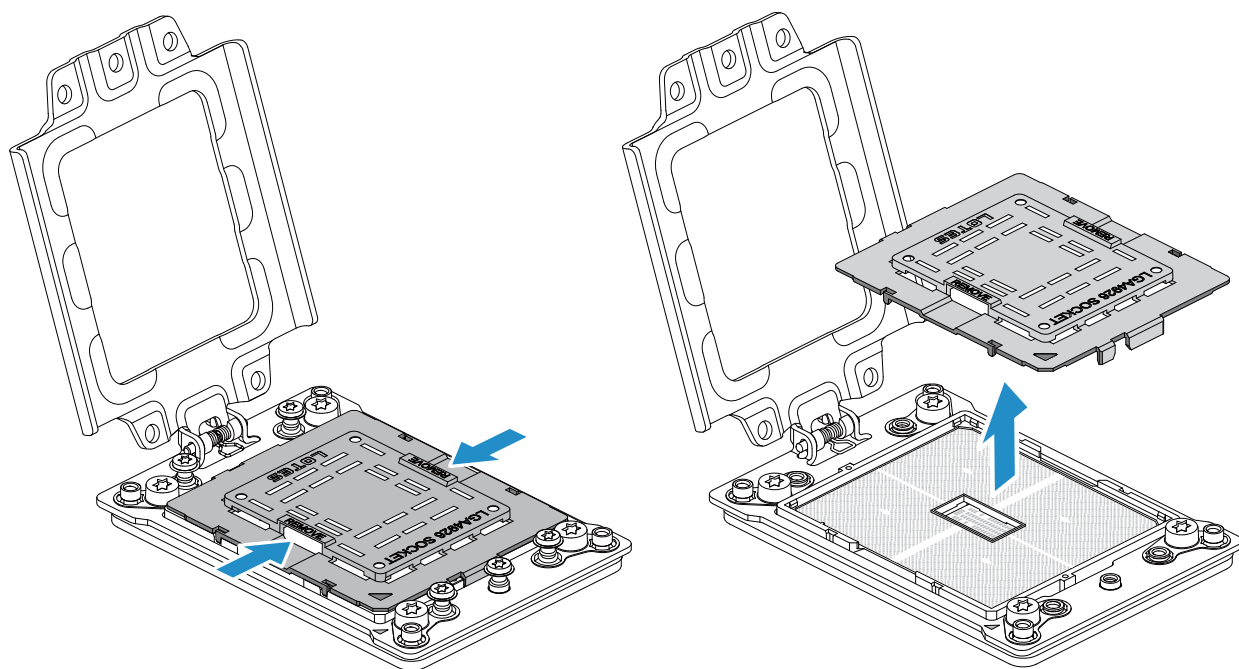
1. Use a screwdriver with a Torx T20 screw head bit to unscrew the socket force frame. Unscrew counterclockwise in the sequence 5-4-3-2-1. The screws are numbered on the socket force frame next to each screw hole.



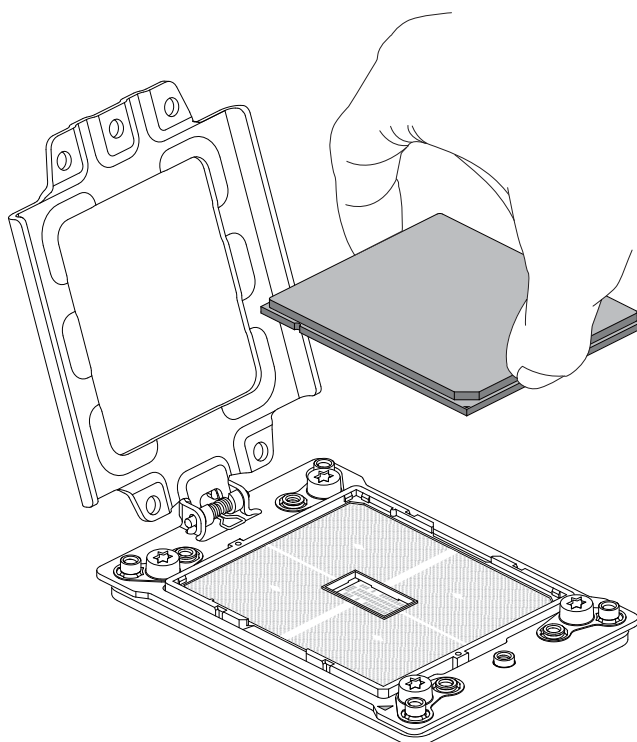
2. The socket force frame will raise up after the last screw securing it (#1) is removed. Gently allow it to lift up to its stopping position.



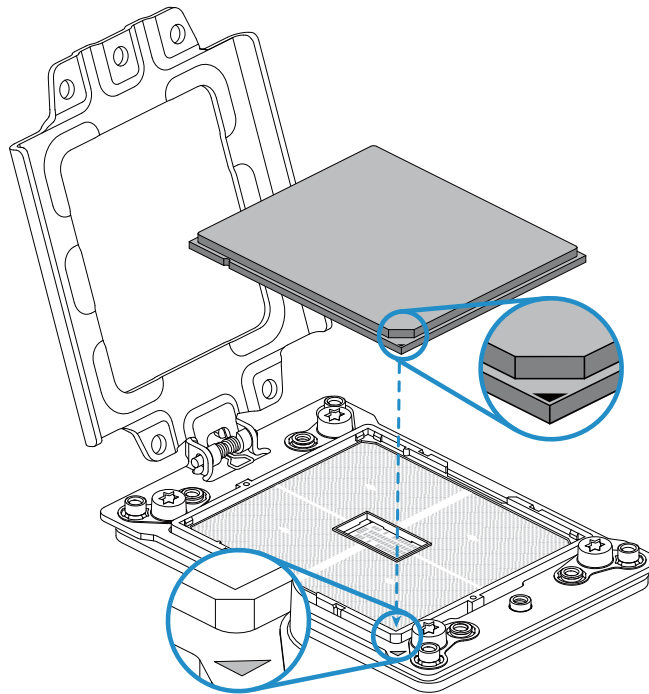
3. When the socket force frame is open, remove the plastic protective cover from the socket.



4. When the plastic protective cover is removed from the socket, gently pick up the processor.

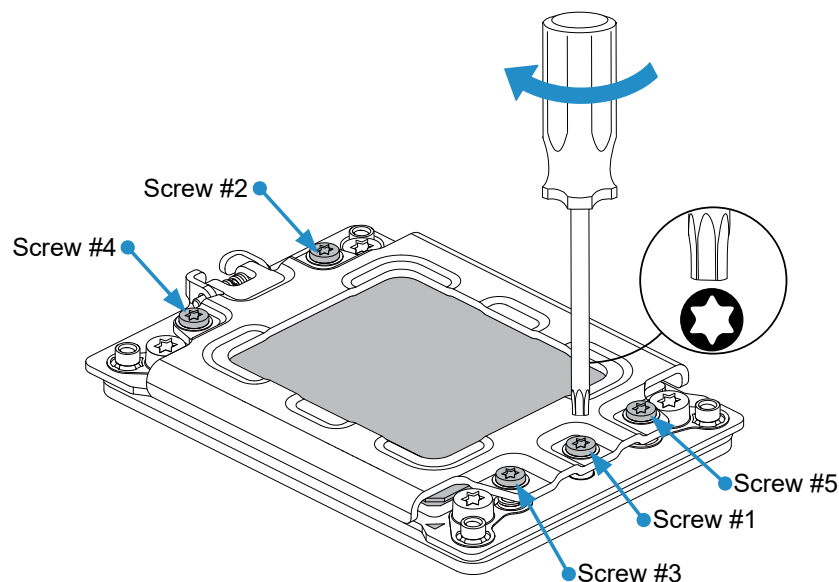


5. Align the CPU pad cutout on the corner of the processor to the respective cutout on the LGA 4926 socket.

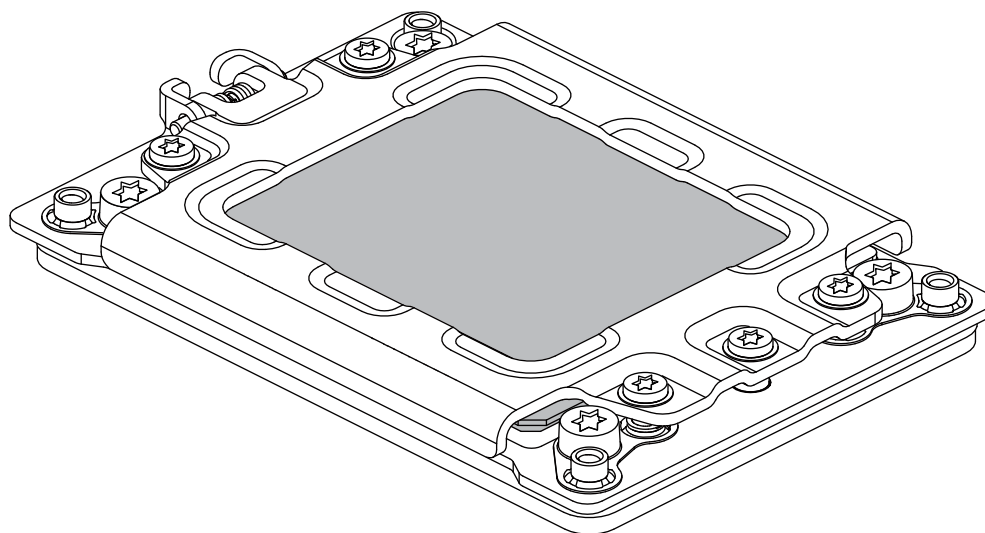


6. Re-screw the socket screws in the sequence 1-2-3-4-5. The socket force frame is spring loaded and has to be held in place.

 **Important:** To prevent damage to the CPU, use a torque screwdriver set to 16.1 kgf-cm (14.0 lbf-in) with a Torx T20 screw head bit.

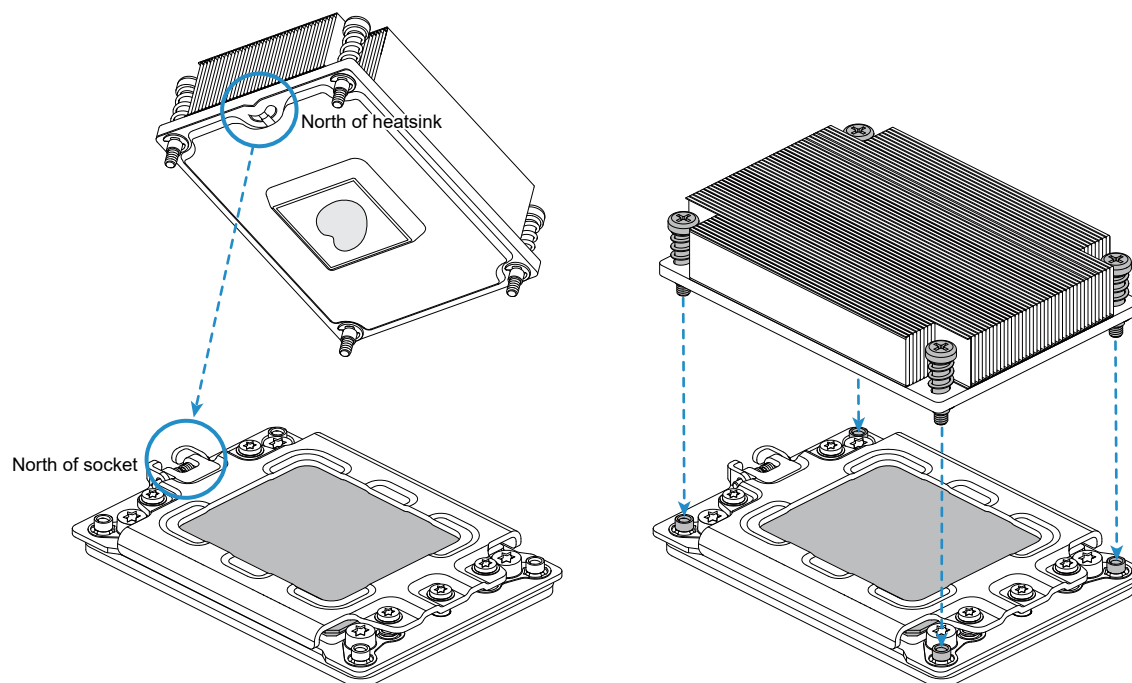


7. When finished, the socket force frame will secure the processor.

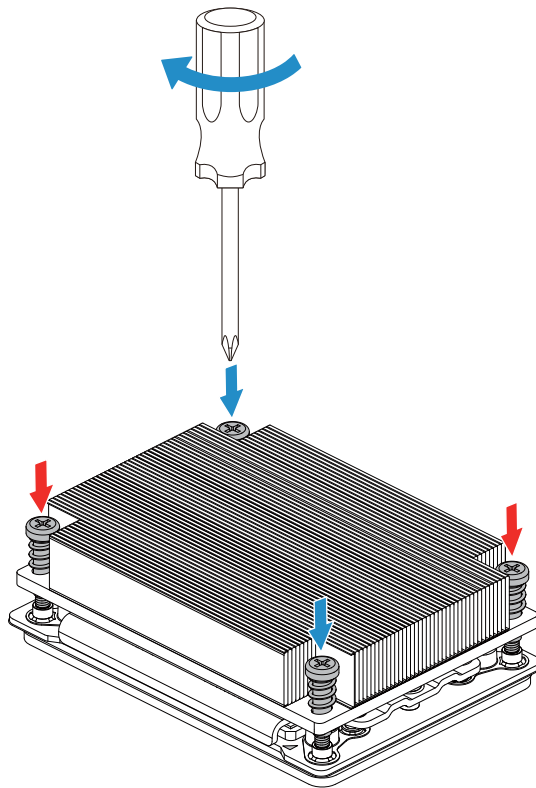


Installing the Heatsink

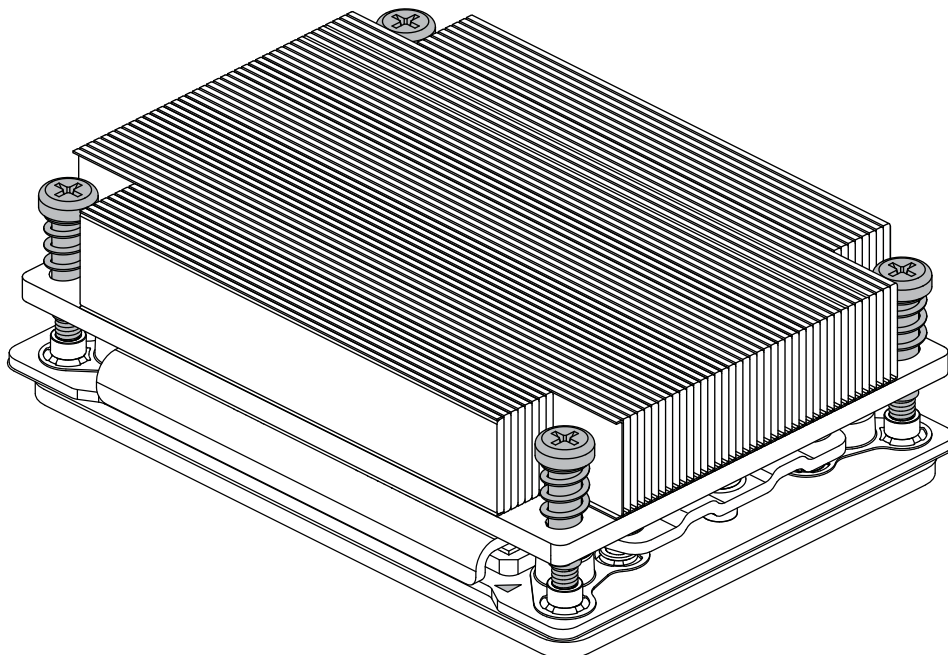
1. After the processor is secure, you must install the heatsink to the socket frame. Ensure a proper amount of thermal grease is applied to the heatsink. Lower the heatsink down until the four screws on the heatsink align with the four screw holes on the socket frame.



2. Starting with two screws on opposite corners, use a Phillips #1 screwdriver to press down and tighten the screws on the heatsink.



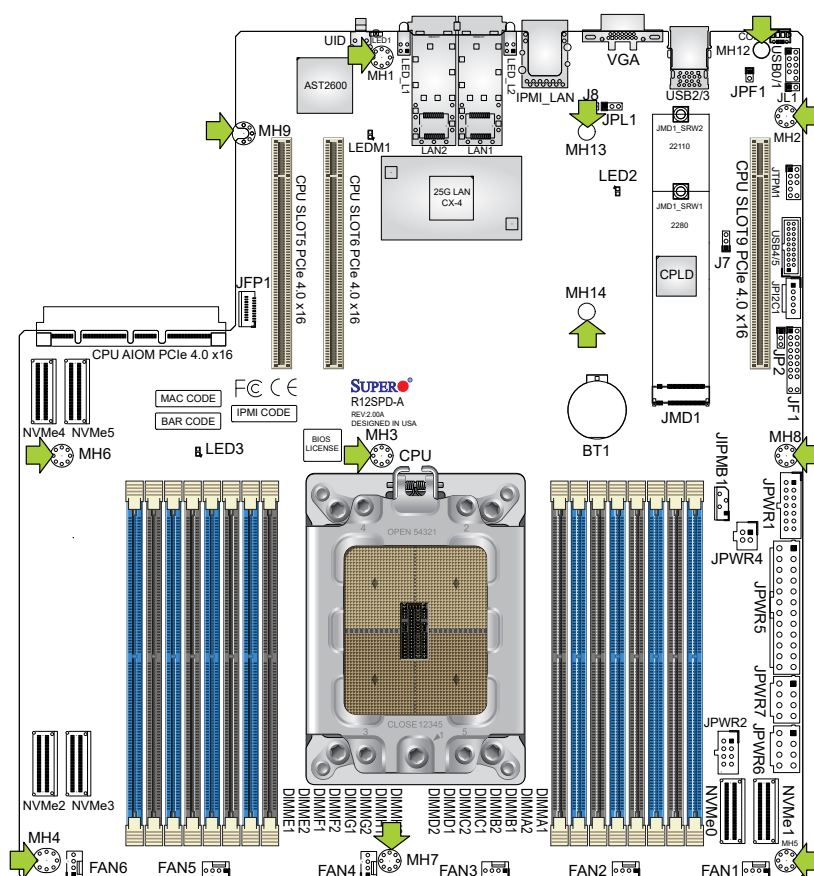
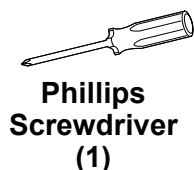
3. When finished, the heatsink will be secured over the socket and processor.



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



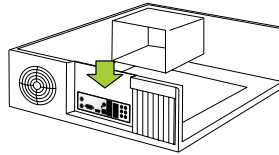
Location of Mounting Holes

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.

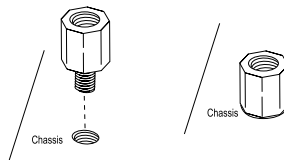
Note 2: Some components are very close to the mounting holes. Take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

Installing the Motherboard

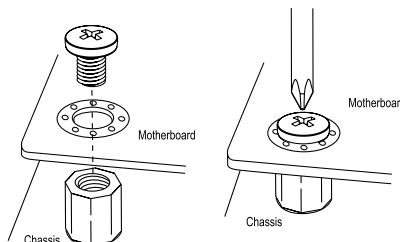
1. Install the I/O shield into the back of the chassis, if applicable.



2. Locate the mounting holes on the motherboard. See the previous page for the location.



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



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

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

2.4 Memory Support and Installation



Note: Check the Supermicro website for recommended memory modules.



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

Memory Support

The R12SPD-A supports up to 4TB of DDR4 ECC and Non-ECC UDIMM/LRDIMM/RDIMM/3DS RDIMM memory with speeds of up to 3200MT/s in 16 memory slots. Refer to the table below for the recommended DIMM population order and additional memory information.

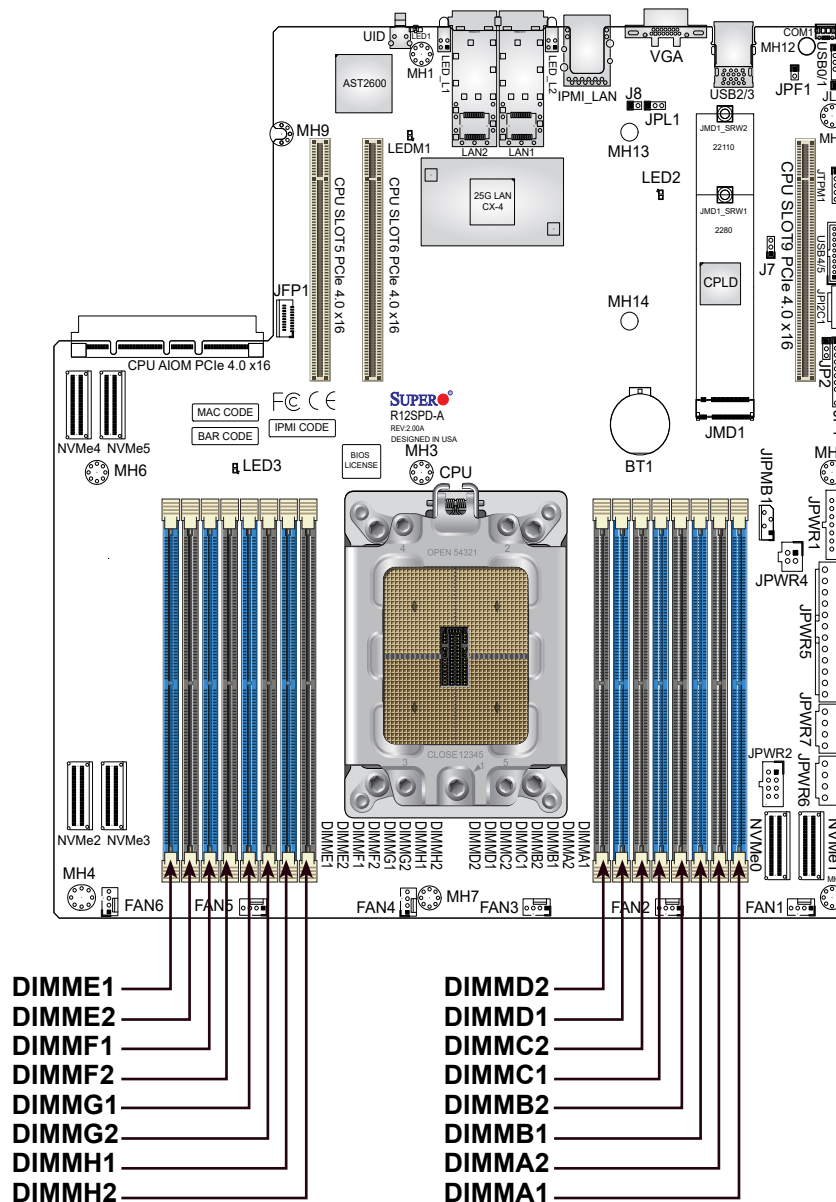
DIMM Module Population Configuration

For optimal memory performance, follow the table below when populating memory.

16 DIMM Slots		
Number of DIMMs	DIMMs per Channel (DPC)	Memory Population Sequence
1	1DPC	DIMMA1 or DIMME1
2	1DPC	DIMMA1 / DIMME1
4	1DPC	DIMMA1 / DIMMB1 / DIMME1 / DIMMF1
6	1DPC	DIMMA1 / DIMMB1 / DIMMC1 / DIMME1 / DIMMF1 / DIMMG1
8	1DPC	DIMMA1 / DIMMB1 / DIMMC1 / DIMMD1 / DIMME1 / DIMMF1 / DIMMG1 / DIMMH1
16	2DPC	DIMMA1 / DIMMB1 / DIMMC1 / DIMMD1 / DIMMA2 / DIMMB2 / DIMMC2 / DIMMD2 / DIMME1 / DIMMF1 / DIMMG1 / DIMMH1 / DIMME2 / DIMMF2 / DIMMG2 / DIMMH2

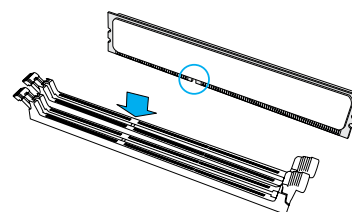
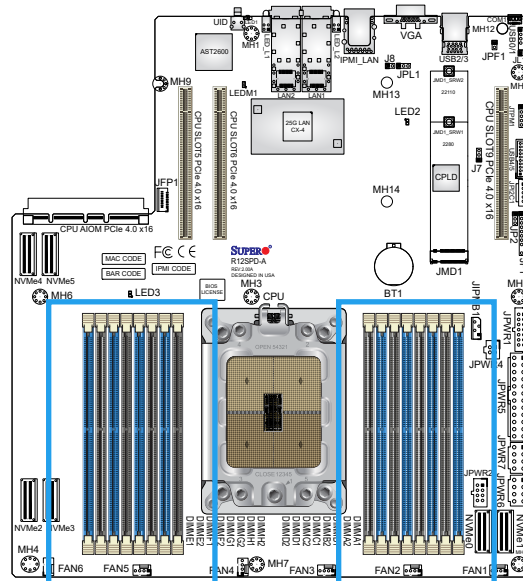
General Guidelines for Optimizing Memory Performance

- DIMM slots must be populated in the following order: DIMMA1, DIMMB1, DIMMC1, DIMMD1, DIMME1, DIMMF1, DIMMG1, DIMMH1, and then DIMMA2, DIMMB2, DIMMC2, DIMMD2, DIMME2, DIMMF2, DIMMG2, DIMMH2.
- It's recommended to use DDR4 memory of the same type, size, and speed.
- Mixed DIMM speeds can be installed. However, all DIMMs will run at the speed of the slowest DIMM.
- The motherboard will support odd-numbered modules. However, to achieve the best memory performance, a balanced memory population is recommended.



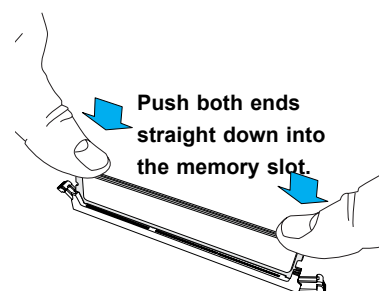
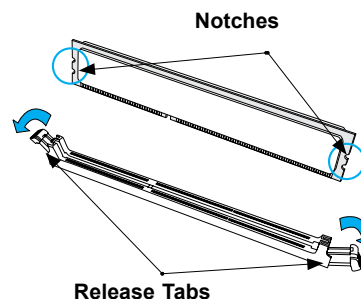
DIMM Installation

1. Insert DIMM modules in the following order: DIMMA1, DIMMB1, DIMMC1, DIMMD1, DIMME1, DIMMF1, DIMMG1, DIMMH1, and then DIMMA2, DIMMB2, DIMMC2, DIMMD2, DIMME2, DIMMF2, DIMMG2, DIMMH2.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Push both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



DIMM Removal

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



2.5 Rear I/O Ports

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

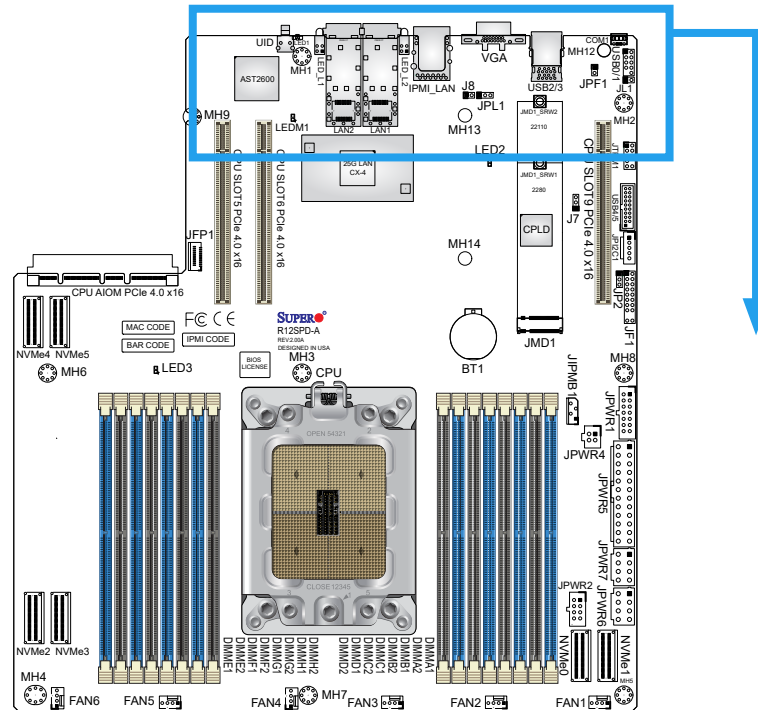
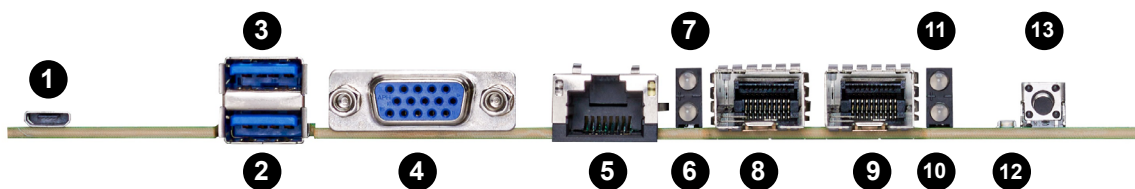


Figure 2-1. I/O Port Locations and Definitions



Rear I/O Ports					
#	Description	#	Description	#	Description
1	Micro-USB COM Port	6	SFP28 Traffic LED	11	SFP28 Link Speed LED
2	USB 3.0 Type-A	7	SFP28 Link Speed LED	12	UID LED
3	USB 3.0 Type-A	8	SFP28 Port	13	UID Button
4	VGA Port	9	SFP28 Port		
5	RJ45 BMC LAN Port	10	SFP28 Traffic LED		

Dedicated IPMI LAN Port

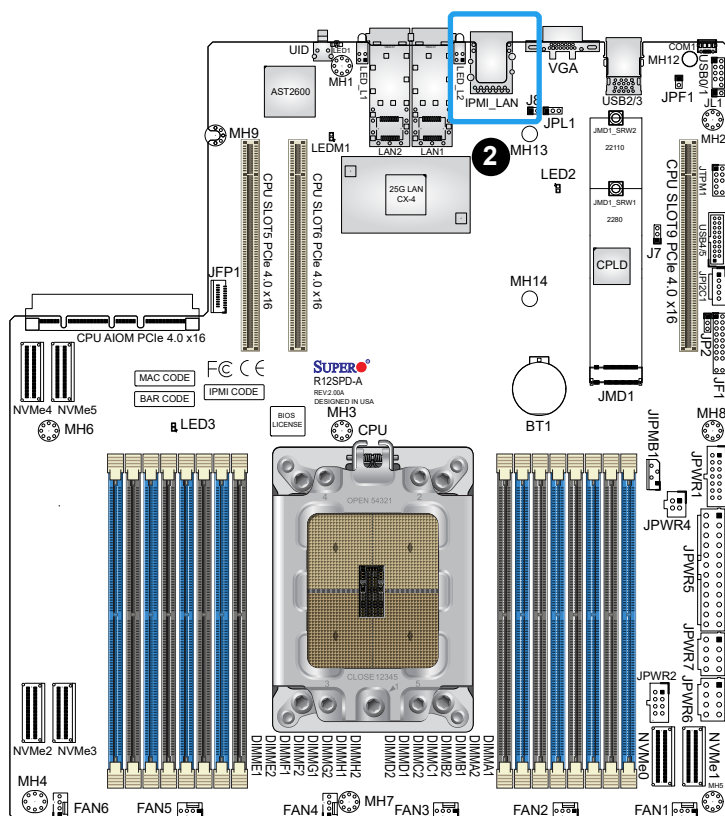
A dedicated IPMI LAN port is near the VGA port on the rear I/O panel.

IPMI LAN Pin Definition			
Pin#	Definition	Pin#	Definition
1	D1+	13	Yellow LED- (Activity)
3	CT1	14	Yellow LED+ (Activity)
2	D1-	15	Amber LED+ (1 GbE Link)/Green LED-
4	D2+	16	Green LED+ (100 MbE Link)/Amber LED+
6	CT2	17	CG1
5	D2-	18	CG2
7	D3+	19	CG3
9	CT3	20	CG4
8	D3-		
10	D4-		
12	CT4		
11	D4-		

Dedicated IPMI LAN Port

A dedicated IPMI LAN port is near the VGA port on the rear I/O panel.

1. IPMI LAN Port



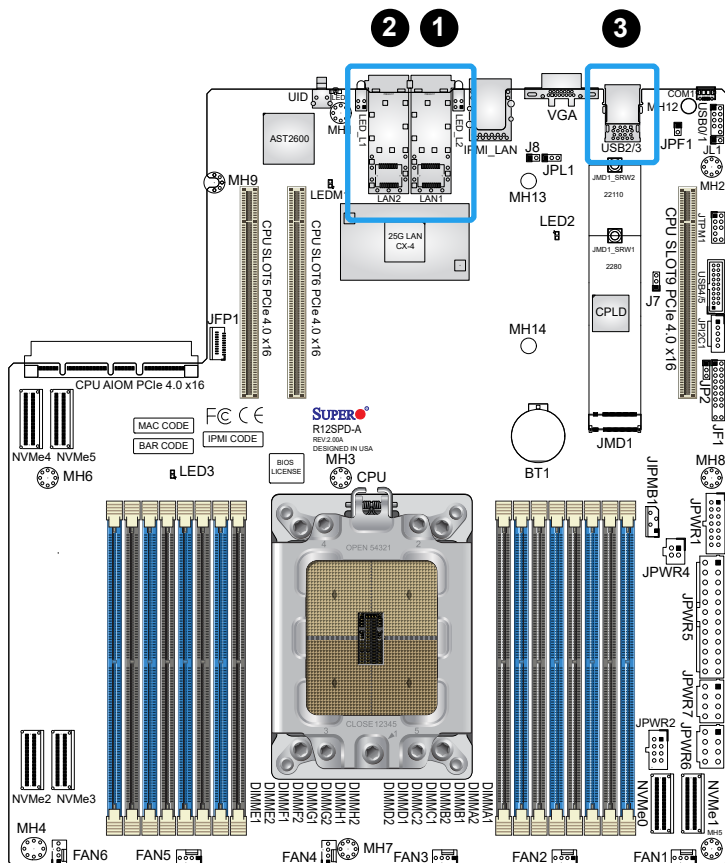
SFP28 10G/25G LAN Ports

Two SFP28 LAN ports (LAN1, LAN2) are located on the rear I/O panel. These LAN ports are provided by the Nvidia Mellanox ConnectX-4 LX EN and can function as either one 25G port or two 10G ports. Refer to the LED Indicator section for SFP28 LED information.

USB 3.0 Type-A Ports on the Rear I/O Panel

There are two USB 3.0 Type-A ports (USB2/3) on the rear I/O panel.

Rear I/O Panel USB2/3 (3.0)			
Pin Definitions			
Pin#	Definition	Pin#	Definition
B1	VBUS	B5	Std_a_SSRX2-
B2	D2-	B6	Std_a_SSRX2+
B3	D2+	B7	GND_DRAIN
B4	GND	B8	Std_a_SSTX2-
		B9	Std_a_SSTX2+
A1	VBUS	A5	Std_a_SSRX1-
A2	D1-	A6	Std_a_SSRX1+
A3	D1+	A7	GND_DRAIN
A4	GND	A8	Std_a_SSTX1-
		A9	Std_a_SSTX1+



1. SFP28 (LAN1)
2. SFP28 (LAN2)
3. USB 3.0 Type-A (USB2/3)

VGA Port

A video (VGA) port is located on the I/O back panel.

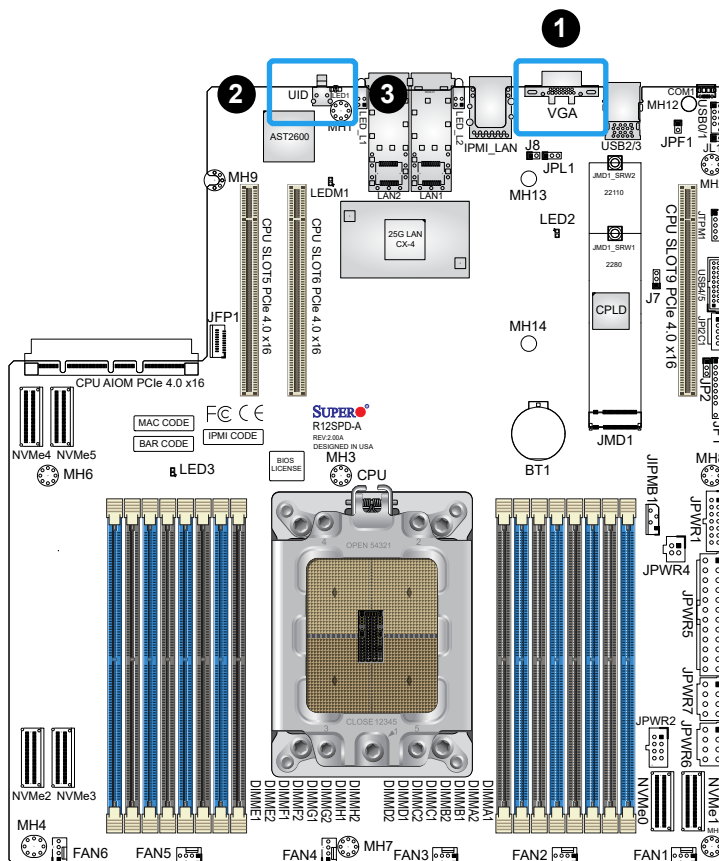
Unit Identifier Switch/UID LED Indicator

A Unit Identifier (UID) switch and an LED Indicator are located on the motherboard. The UID switch is located at UID on the back panel. The UID LED is located next to the UID switch. When you press the UID switch, and the UID/Reset Button Switch header at JP is set to UID Select, the UID LED will be turned on. Press the UID switch again to turn off the LED indicator. The UID Indicator provides easy identification of a system unit that may be in need of service.

Note: UID can also be triggered via IPMI on the motherboard. For more information on IPMI, refer to the IPMI User's Guide posted on our website at <https://www.supermicro.com/support/manuals/>.

UID Switch Pin Definitions	
Pin#	Definition
1	Ground
2	Ground
3	Button In
4	Button In

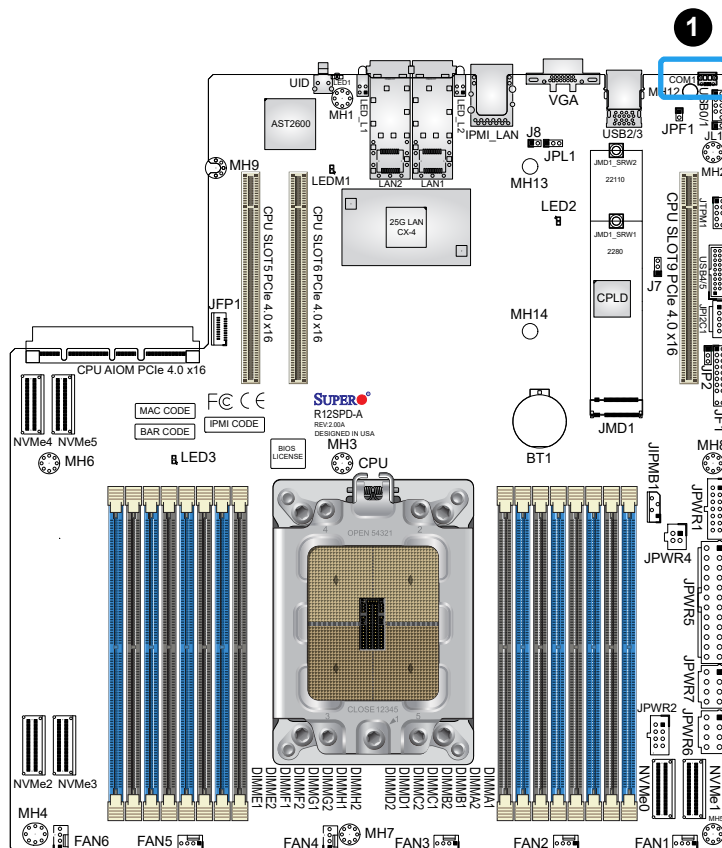
UID LED Pin Definitions	
Color	Status
Blue: On	Unit Identified



1. VGA Port
2. UID Switch (UID1)
3. UID LED (LED1)

Micro-USB COM Port

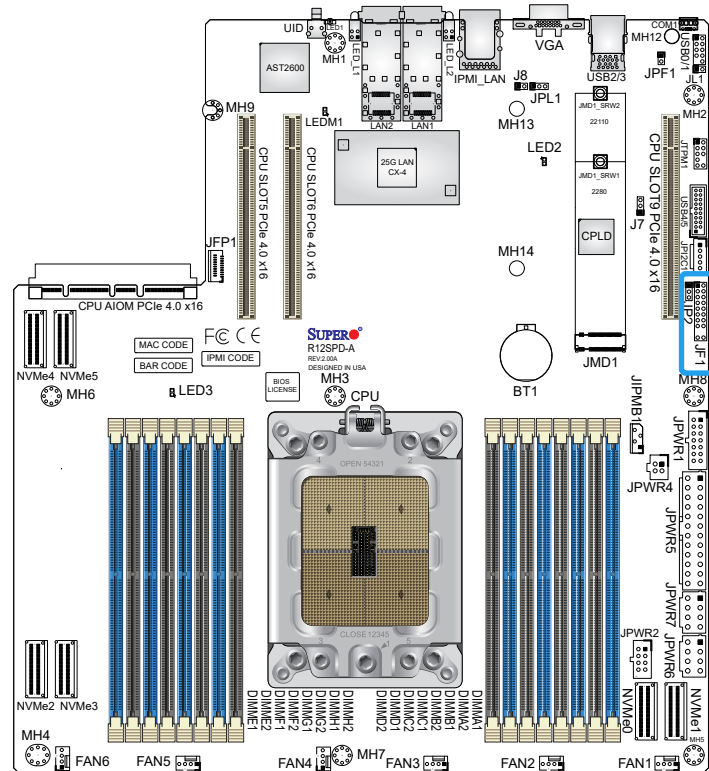
The Micro-USB COM port allows read-only access to the CPU UART or BMC. The CPU UART/BMC Debug jumper at J8 sets the function of this port. Set jumper J8 to CPU UART to allow the Micro-USB COM port to read CPU UART per BMC. The CPU UART can output UEFI and OS to console. Set J8 to BMC Debug to access the Das U-Boot bootloader.



1. Micro-USB COM Port

2.6 Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with Supermicro chassis. See the figure below for the descriptions of the front control panel buttons and LED indicators.



	1	2	
PWR } Power Button	○	○	Ground
Reset } Reset Button	○	○	Ground
3.3V	○	○	PS FAIL
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail)
3.3V Stby	○	○	NIC2 Activity LED
3.3V Stby	○	○	NIC1 Activity LED
ID_UID/3.3V Stby	○	○	HDD LED
3.3V	○	○	FP PWR LED
Key	○	○	Key
X	○	○	Ground
	19	20	

Figure 2-2. JF1 Header Pins

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. Refer to the table below for pin definitions.

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	Ground

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Attach it to a hardware reset switch on the computer case to reset the system. Refer to the table below for pin definitions.

Reset Button Pin Definitions (JF1)	
Pin#	Definition
3	Reset
4	Ground

		1	2	
1	PWR	○	○	Ground
2	Reset	○	○	Ground
	3.3V	○	○	PS FAIL
	Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail)
	3.3V Stby	○	○	NIC2 Activity LED
	3.3V Stby	○	○	NIC1 Activity LED
	ID_UID/3.3V Stby	○	○	HDD LED
	3.3V	○	○	FP PWR LED
	Key	○	○	Key
	X	○	○	Ground
		19	20	

1. PWR Button
2. Reset Button

Power Supply Fail LED

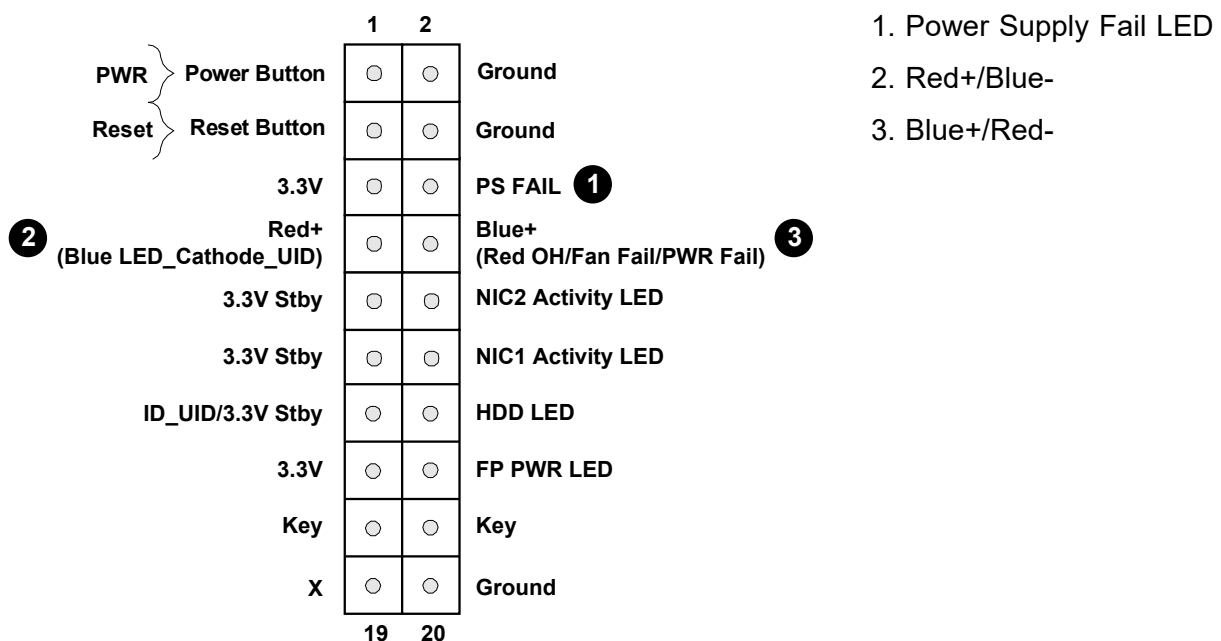
The Power Supply Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table below for pin definitions.

PS Fail LED Pin Definitions (JF1)	
Pins	Definition
5	3.3V
6	PS FAIL

Red/Blue LED

The Red/Blue LED connection is located on pins 7 and 8 of JF1. Connect a red or blue LED across the headers to achieve the desired function. Refer to the table below for pin definitions and functions.

Red/Blue LED Pin Definitions (JF1)	
Pins	Definition
7	Red+/Blue-
8	Blue+/Red-



NIC1/NIC2 (LAN1/LAN2)

The Network Interface Controller (NIC) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

NIC1/NIC2 LED Pin Definitions (JF1)	
Pins	Definition
9	3.3V Stby
10	NIC 2 Activity LED
11	3.3V Stby
12	NIC 1 Activity LED

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a cable to pins 13 and 14 to show hard drive activity status. Refer to the table below for pin definitions.

HDD LED Pin Definitions (JF1)	
Pins	Definition
13	3.3V
14	HDD Active

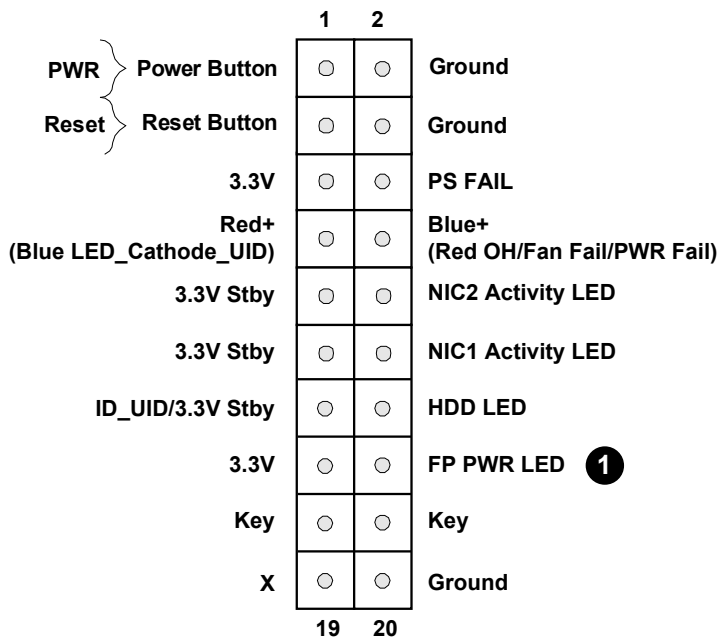
	1	2	
PWR } Power Button	○	○	Ground
Reset } Reset Button	○	○	Ground
3.3V	○	○	PS FAIL
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail)
3.3V Stby	○	○	NIC2 Activity LED ①
3.3V Stby	○	○	NIC1 Activity LED ②
ID_UID/3.3V Stby	○	○	HDD LED ③
3.3V	○	○	FP PWR LED
Key	○	○	Key
X	○	○	Ground
	19	20	

1. NIC2 Activity LED
2. NIC1 Activity LED
3. HDD LED

Power LED

The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table below for pin definitions.

Power LED	
Pin Definitions (JF1)	
Pins	Definition
15	3.3 Stby
16	PWR LED



1. Power LED

Power On & BMC/BIOS Status LED Button

The Power On and BMC/BIOS Status LED button is located on pin 1 of JFP1.

Power On and BMC/BIOS Status LED (JFP1)	
Status	Definition
Solid Green	System power on
BMC/BIOS blinking green at 4Hz	BMC/BIOS checking
BIOS blinking green at 4Hz	BIOS recovery/update in progress
BMC blinking red twice at 4Hz	BMC recovery/update in progress
BMC/BIOS blinking green at 1Hz	Flash not detected or golden image checking failure

Reset Button/UID Button

The Reset Button/UID Button connection is located on pin 2 of JFP1. Chassis that support UID switch can configure this button as either a reset button or a UID button.

JFP1

1	☐	Power Button	1
2	☐	Reset/UID Button	2
3	☐	UID LED_N	
4	☐	Fail LED_N (OH/FF/PF)	
5	☐	LAN2 Activity LED	
6	☐	LAN1 Activity LED (Aggregate all LAN)	
7	☐	HDD Activity LED	
8	☐	Standby LED_N	
9	☐	Power LED_N	
10	☐	P3V3_STBY	
11	☐	Ground	
12	☐	I2C Data	
13	☐	I2C Clock	
14	☐	Ground	
15	☐	Power Fail LED_P	
16	☐	P5V_USB	
17	☐	P5V_USB	
18	☐	P5V_USB	
19	☐	Power Fail LED_N	
20	☐	Ground	

1. Power Button & BMC/BIOS Status LED
2. Reset Button/UID Button

UID LED

The UID LED connection is located on pin 3 of JFP1.

Information LED

The information LED (OH/Fan Fail/Power Fail LED) connection is located on pin 4 of JFP1. The LED indicates overheat, power failure, or fan failure.

Information LED (JFP1)	
Status	Definition
Solid red	Overheat condition occurred
Blinking red at 1Hz	Fan failure: inoperative fan
Blinking red at 0.25Hz	Power failure: non-operational power supply
Blinking red at 10Hz	CPLD recovery mode error(s)
Solid blue	Local UID is active
Blinking blue at 1Hz	Remote UID is active
BIOS/BMC blinking blue at 10Hz	BIOS/BMC recovery or update in progress
Red Information LED blinking at 10Hz and Blue UID LED blinking at 10Hz	CPLD recovery or update in progress

JFP1

1	☐ Power Button
2	☐ Reset/UID Button
3	☐ UID LED_N 1
4	☐ Fail LED_N (OH/FF/PF) 2
5	☐ LAN2 Activity LED
6	☐ LAN1 Activity LED (Aggregate all LAN)
7	☐ HDD Activity LED
8	☐ Standby LED_N
9	☐ Power LED_N
10	☐ P3V3_STBY
11	☐ Ground
12	☐ I2C Data
13	☐ I2C Clock
14	☐ Ground
15	☐ Power Fail LED_P
16	☐ P5V_USB
17	☐ P5V_USB
18	☐ P5V_USB
19	☐ Power Fail LED_N
20	☐ Ground

1. UID LED
2. Information LED

LAN1/LAN2 (NIC1/NIC2)

The Network Interface Controller (NIC) LED connection for LAN port 1 is located on pin 6 of JFP1, and the NIC LED connection for LAN port 2 is located on pin 5 of JFP1.

LAN1/LAN2 LED (JFP1)	
Status	Definition
NIC1 LED green	LAN1 port activity
NIC2 LED green	LAN2 port activity

HDD Activity LED

The HDD Activity LED connection is located on pin 7 of JFP1. When the HDD LED is blinking green, HDD activity is detected.

HDD LED (JFP1)	
Status	Definition
HDD LED green	HDD activity

JFP1

1	○	Power Button
2	○	Reset/UID Button
3	○	UID LED_N
4	○	Fail LED_N (OH/FF/PF)
5	○	LAN2 Activity LED 2
6	○	LAN1 Activity LED (Aggregate all LAN) 1
7	○	HDD Activity LED 3
8	○	Standby LED_N
9	○	Power LED_N
10	○	P3V3_STBY
11	○	Ground
12	○	I2C Data
13	○	I2C Clock
14	○	Ground
15	○	Power Fail LED_P
16	○	P5V_USB
17	○	P5V_USB
18	○	P5V_USB
19	○	Power Fail LED_N
20	○	Ground

1. NIC1 LED
2. NIC2 LED
3. HDD Activity LED

Front Panel Power LED

The Front Panel Power LED connection is located on pin 9 of JFP1.

Power Fail LED

The Power Fail LED connection is located on pin 19 of JFP1. When this LED is solid red, a power failure is detected.

Power Fail LED (JFP1)	
Status	Definition
Solid red	Power failure

JFP1	
1	○ Power Button
2	○ Reset/UID Button
3	○ UID LED_N
4	○ Fail LED_N (OH/FF/PF)
5	○ LAN2 Activity LED
6	○ LAN1 Activity LED (Aggregate all LAN)
7	○ HDD Activity LED
8	○ Standby LED_N
9	○ Power LED_N 1
10	○ P3V3_STBY
11	○ Ground
12	○ I2C Data
13	○ I2C Clock
14	○ Ground
15	○ Power Fail LED_P
16	○ P5V_USB
17	○ P5V_USB
18	○ P5V_USB
19	○ Power Fail LED_N 2
20	○ Ground

- 1. Front Panel Power LED
- 2. Power Fail LED

2.8 Connectors

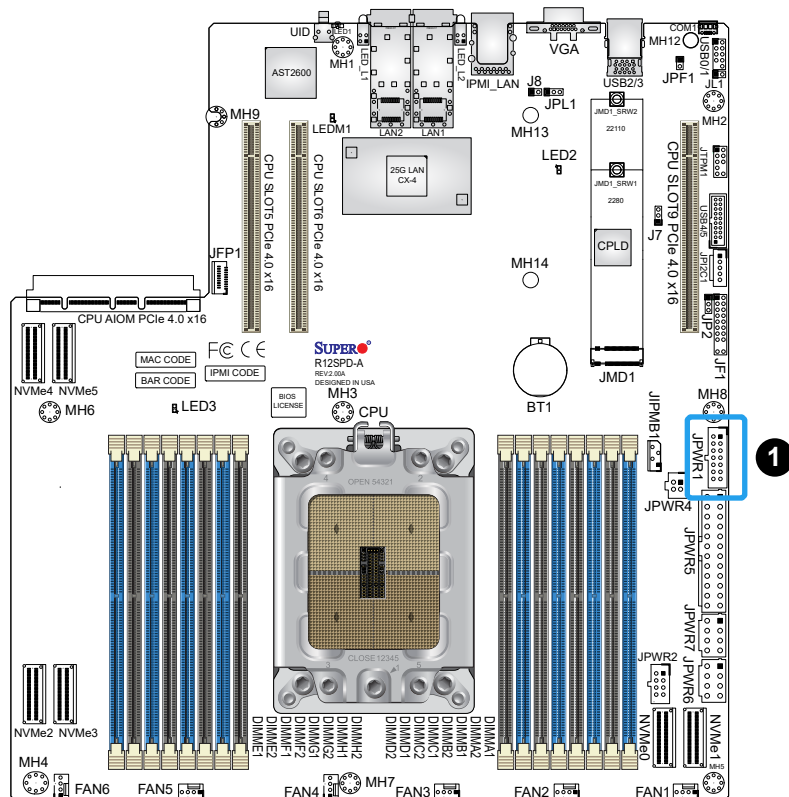
Power Connections

Proprietary PSU 14-Pin Power Connector

JPWR1 is a proprietary PSU 14-pin power supply connector. This power connection is required.

Proprietary PSU 14-pin Connector			
Pin Definitions			
Pin#	Definition	Pin#	Definition
7	PWROK	14	PS_ON_N
6	Ground	13	+12V Standby
5	Ground	12	+12V
4	Ground	11	+12V
3	Ground	10	+12V
2	Ground	9	+12V
1	Ground	8	+12V

Required Connection



1. Proprietary PSU 14-Pin

Proprietary PSU 8-Pin Power Connector

JPWR2 is a proprietary PSU 8-pin power supply connector. This power connection is required.

Proprietary PSU 8-pin Connector Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V

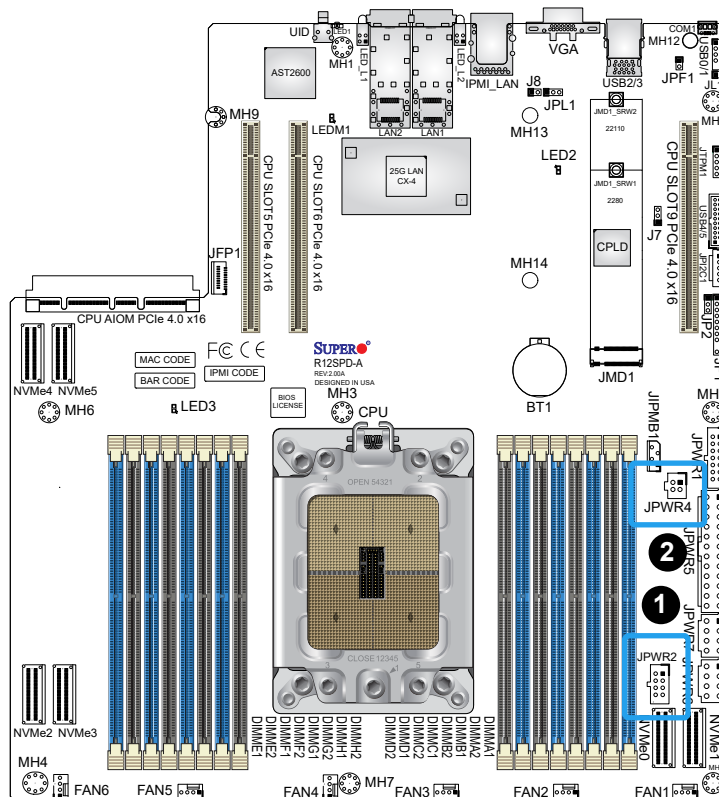
Required Connection

5V/12V Power Connector for Special Riser Card

JPWR4 is a 5V/12V 4-pin power connector for riser cards.

Special Riser Card Power Pin Definitions	
Pin#	Definition
1	Ground
2	Ground
3	+12V
4	+5V

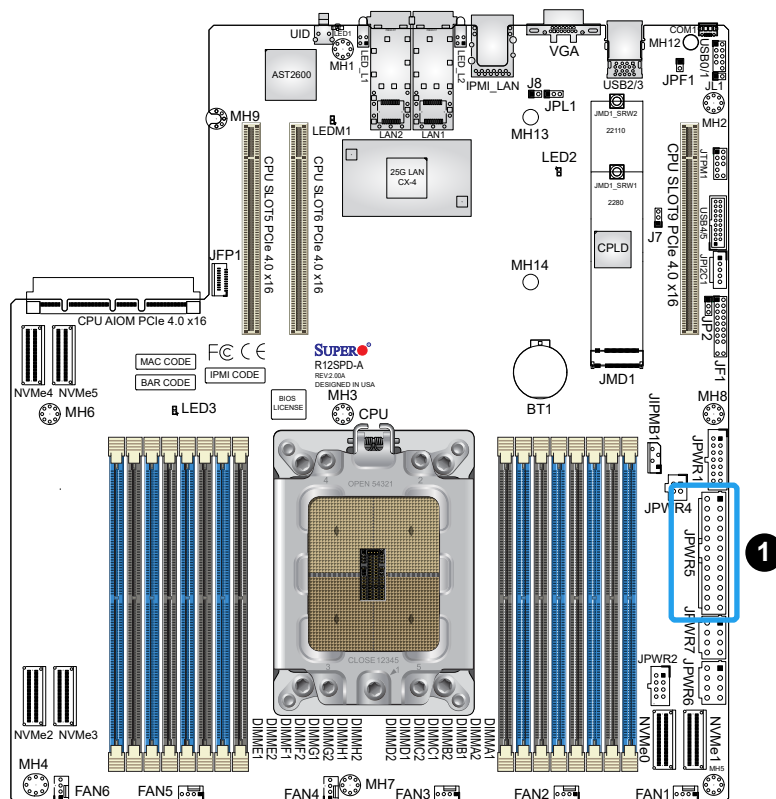
1. Proprietary PSU 8-Pin
2. 5V/12V



ATX PSU 24-Pin Power Connector

JPWR5 is a 24-pin power supply connector that meets the ATX SSI EPS 24-pin specification.

ATX PSU 24-Pin Connector Pin Definitions			
Pin#	Definition	Pin#	Definition
13	+3.3V	1	+3.3V
14	NC	2	+3.3V
15	Ground	3	Ground
16	PS_ON	4	+5V
17	Ground	5	Ground
18	Ground	6	+5V
19	Ground	7	Ground
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	Ground	12	+3.3V

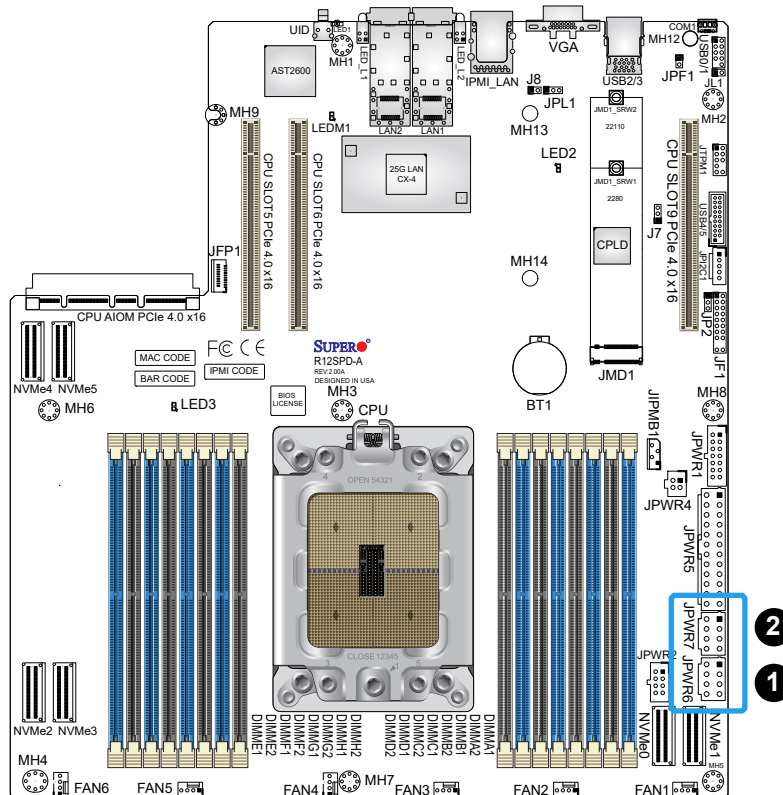


1. ATX PSU 24-Pin

ATX PSU 8-Pin Power Connector

JPWR6 and JPWR7 are ATX 8-pin power supply connectors for the CPU or alternative single power source for a special enclosure when the 24-pin ATX power is not in use.

ATX PSU 8-pin Connector Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V



1. ATX PSU 8-Pin (JPWR6)
2. ATX PSU 8-Pin (JPWR7)

Headers

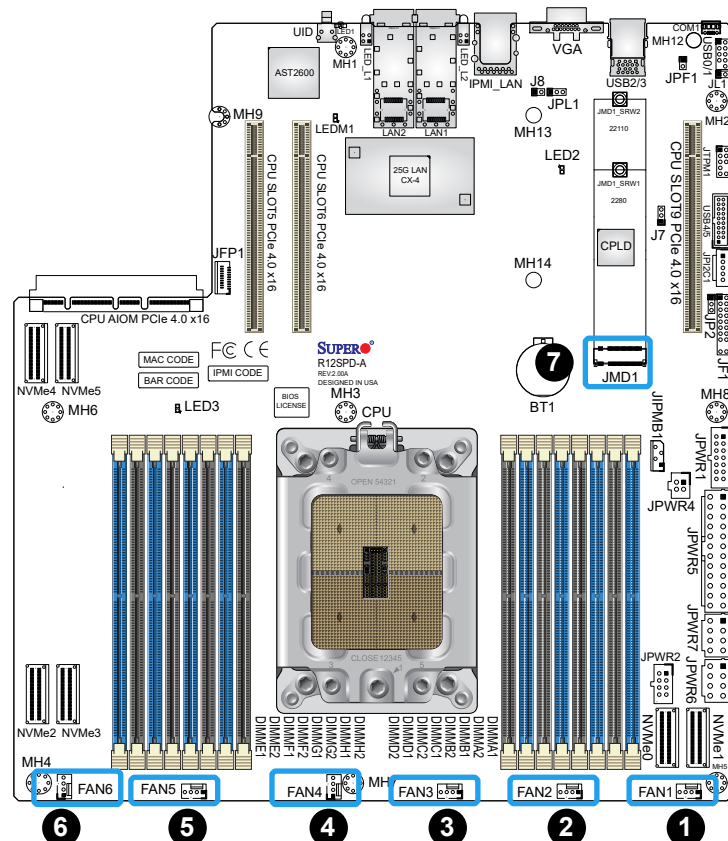
Fan Headers

There are six 4-pin fan headers on the motherboard. Although pins 1-3 of the fan headers are backward compatible with the traditional 3-pin fans, we recommend you use 4-pin fans to take advantage of the fan speed control via Pulse Width Modulation (PWM) through the thermal management. This allows the fan speeds to be automatically adjusted based on the motherboard temperature.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	2.5A/+12V (Red)
3	Tachometer
4	PWM_Control

M.2 M-Key PCIe 4.0 Connector (2280/22110)

The motherboard has one M.2 slot at JMD1. M.2 was formerly known as Next Generation Form Factor (NGFF) and serves to replace mini PCIe. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. JMD1 supports an M-Key PCIe 4.0 device in the 2280 and 22110 form factors.



1. FAN1 (CPU FAN)
2. FAN2 (System FAN)
3. FAN3 (System FAN)
4. FAN4 (System FAN)
5. FAN5 (System FAN)
6. FAN6 (AUX FAN)
7. M.2 M-Key Connector

4-pin BMC External I2C Header

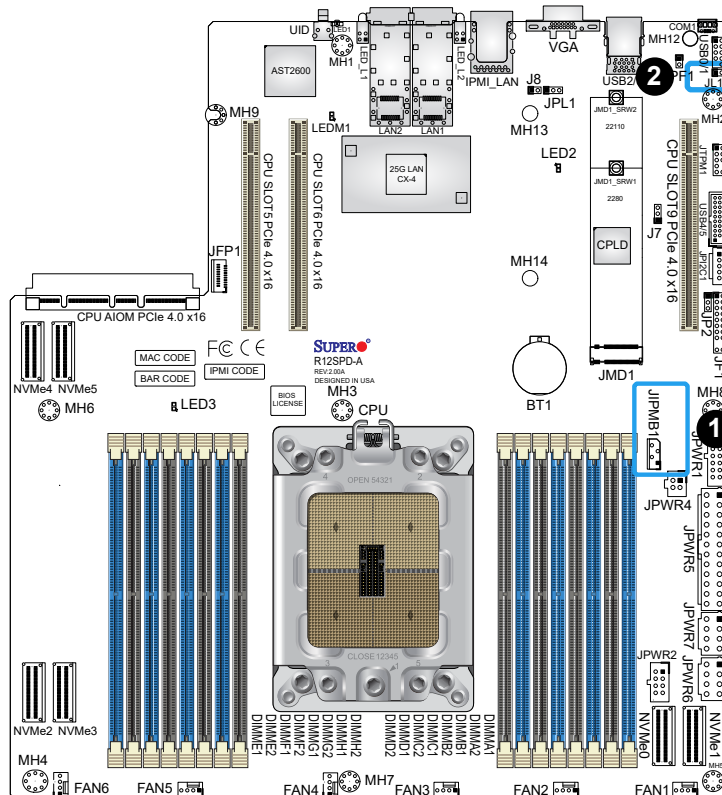
A System Management Bus header for IPMI 2.0 is located at JIPMB1. Connect the appropriate cable here to use the IPMB I²C connection on your system. Refer to the table below for pin definitions.

External I ² C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	3V3_STBY

Chassis Intrusion

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

Chassis Intrusion Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground



1. 4-pin BMC External I²C
2. Chassis Intrusion

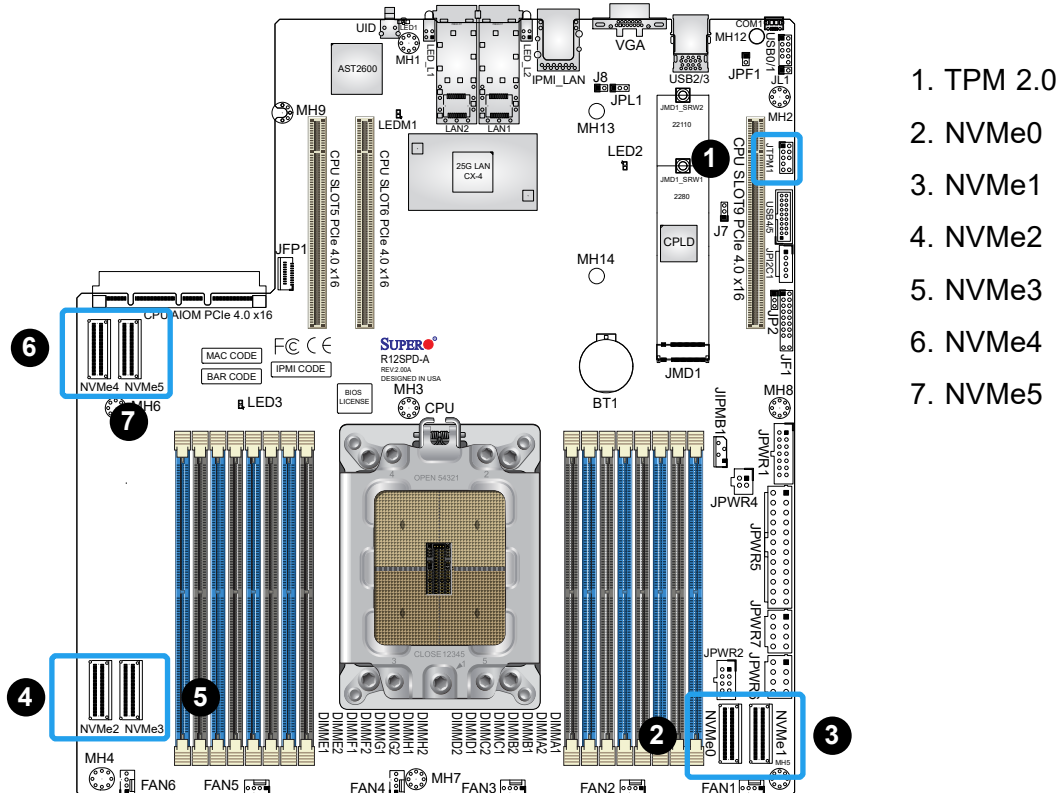
Trusted Platform Module (TPM) 2.0

A Trusted Platform Module (TPM) 2.0 header is located at JTPM1 to provide TPM 2.0 support. Use this header to enhance system performance and data security. Refer to the table below for pin definitions. 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	Key
9	+3.3V	10	SPI_IRQ#

PCIe 4.0 x8 SlimSAS Connectors for NVMe

There are six SlimSAS connectors located at NVMe0 – NVMe5 to support six PCIe 4.0 x8 NVMe connections. These connectors provide high-speed and low-latency connections via direct PCIe interfaces from the CPU to NVMe solid state drives (SSD). By simplifying driver/software requirements, this greatly increases SSD data-throughput performance and significantly reduces PCIe latency.



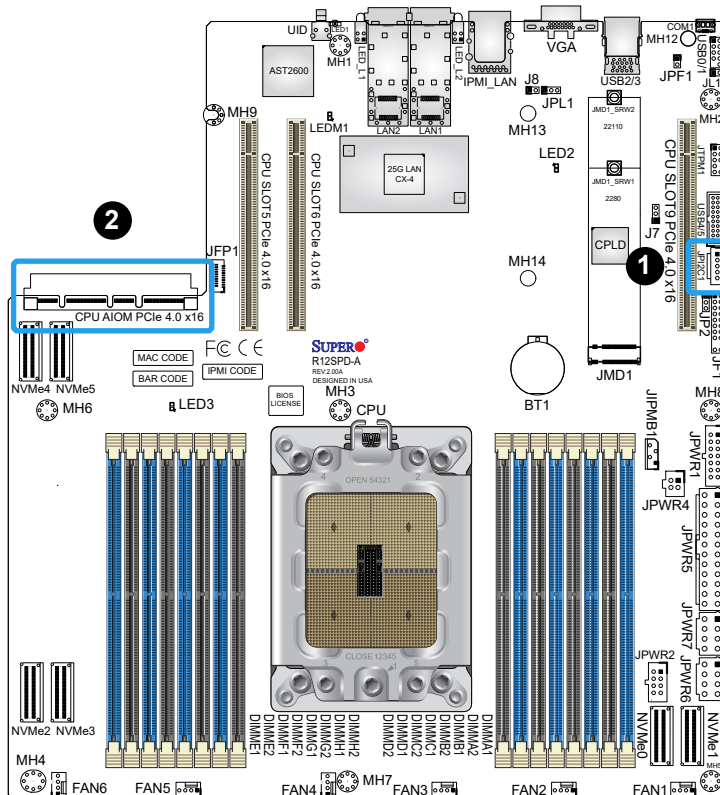
Power Supply SMBus I2C Header

The Power System Management Bus connector at JPI2C1 monitors the power supply, fan, and system temperatures.

Power Supply SMBus Header Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PMBUS_Alert
4	Ground
5	N/C

PCIe 4.0 x16 AIOM Slot

The motherboard features one Advanced I/O Module (AIOM) PCIe 4.0 x16 slot, which can connect additional LAN ports, VPU, storage devices, etc. to the motherboard. Visit the Supermicro website for all available module options. Power must be unplugged prior to removing or installing an AIOM module card.



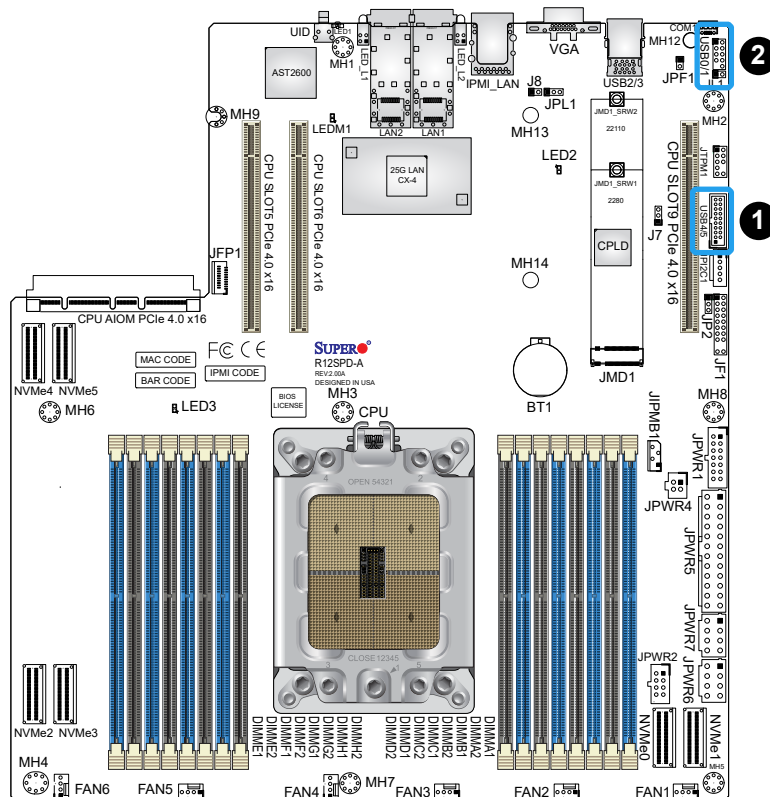
1. Power Supply SMBus I²C
2. AIOM Slot

Universal Serial Bus (USB) Header

The motherboard has one front-accessible USB 3.0 header (USB4/5) and one front-accessible USB 2.0 header (USB0/1). The onboard headers can be used to provide front-side accessible USB access with a cable.

Front-Accessible USB4/5 (3.0) Header			
Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	11	IntA_P2_D+
2	IntA_P1_SSRX-	12	IntA_P2_D-
3	IntA_P1_SSRX+	13	Ground
4	Ground	14	IntA_P2_SSTX+
5	IntA_P1_SSTX-	15	IntA_P2_SSTX-
6	IntA_P1_SSTX+	16	Ground
7	Ground	17	IntA_P2_SSRX+
8	IntA_P1_D-	18	IntA_P2_SSRX-
9	IntA_P1_D+	19	VBus
10	ID		

Front-Accessible USB0/1 (2.0) Header			
Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	2	No Connection
3	USB_PN2	4	No Connection
5	USB_PP2	6	No Connection
7	Ground	8	No Connection
9	Key	10	No Connection



1. Front-Accessible USB 3.0

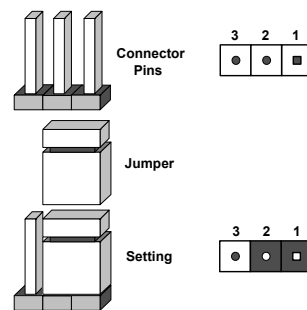
2. Front-Accessible USB 2.0

2.9 Jumper Settings

How Jumpers Work

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

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



CPU UART/BMC Debug

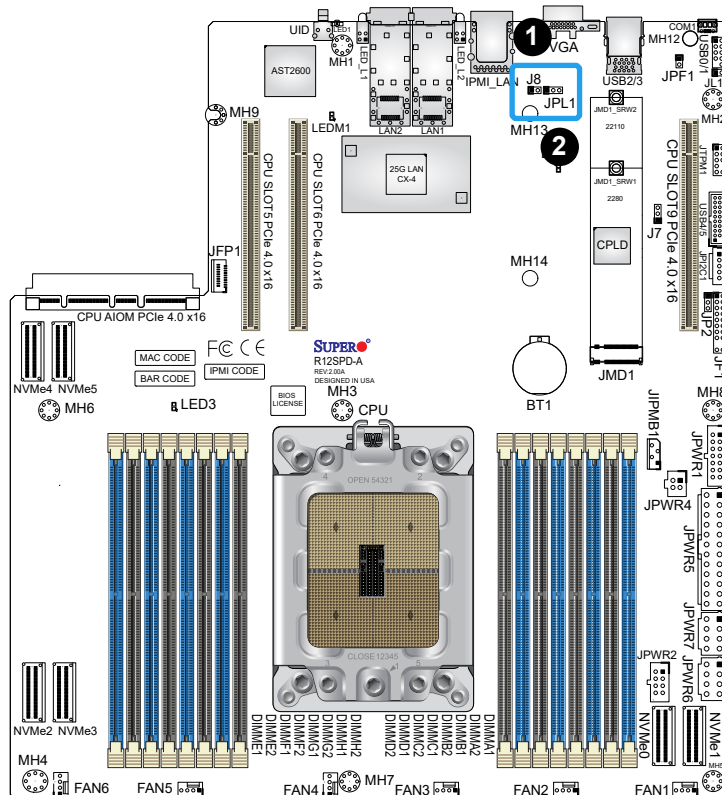
Change the setting of jumper J8 to switch the COM1 port function between CPU UART and BMC Debug. Set J8 to CPU UART to allow the Micro-USB COM port to read CPU UART per BMC. Set J8 to BMC Debug to access the Das U-Boot bootloader. The default setting is CPU UART.

CPU UART/BMC Debug Jumper Settings	
Jumper Setting	Definition
Pins 1-2 Open	CPU UART
Pins 1-2 Closed	BMC Debug

LAN1/2 Enable/Disable

Change the setting of jumper JPL1 enable or disable the LAN1 and LAN2 ports. The default setting is Enabled.

LAN2 Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled



1. CPU UART/BMC Debug
2. LAN1/2 Enable/Disable

2.10 LED Indicators

CPU Fault LED

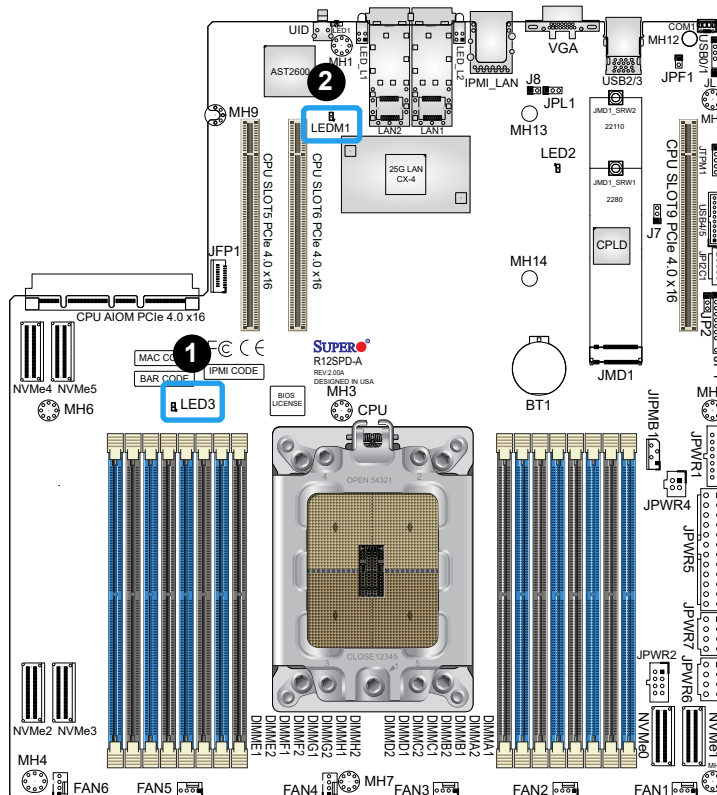
LED3 is the system status LED for the motherboard. When power is detected, LED3 will indicate the status of the system.

CPU Fault LED	
Color/State	Definition
Solid Red	CPU Fault

BMC Heartbeat LED

LEDM1 is the BMC Heartbeat LED. When the LED is blinking green, BMC is working.

BMC Heartbeat LED	
Color/State	Definition
Blinking Green	BMC Normal



1. CPU Fault LED
2. BMC Heartbeat LED

SFP28 LAN Status for LAN1

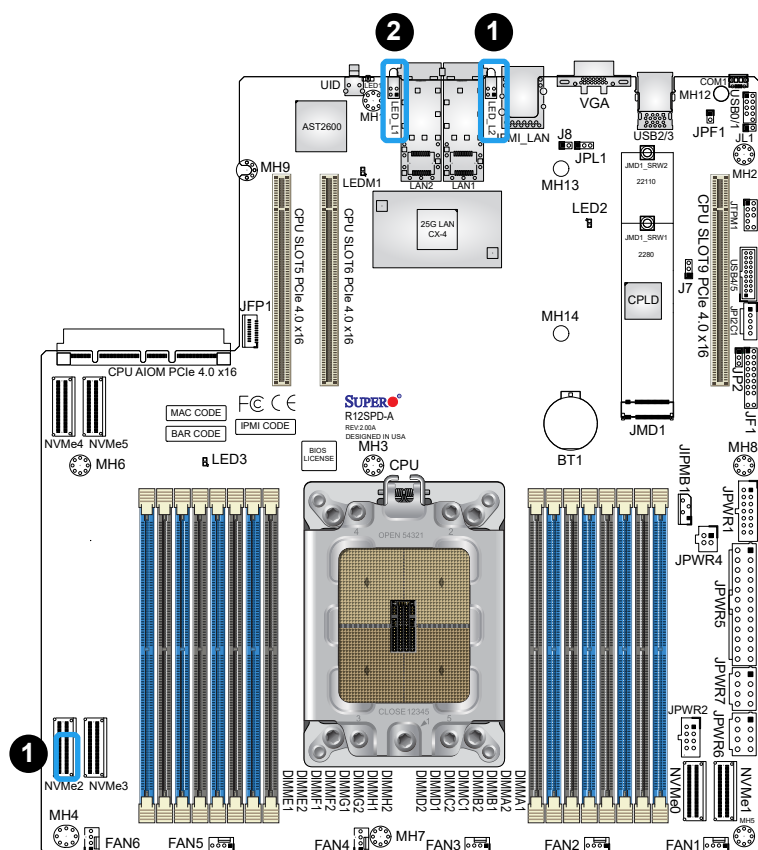
LED_L2 is two LEDs that indicate the status of LAN1. The top LED indicates link speed and the bottom LED indicates LAN1 port activity.

SFP28 LAN Status for LAN2		
LED	Color/State	Definition
Top LED	Yellow	10G Link
Top LED	Green	25G Link
Bottom LED	Green	Port Activity

SFP28 LAN Status for LAN2

LED_L1 is two LEDs that indicate the status of LAN2. The top LED indicates link speed and the bottom LED indicates LAN2 port activity.

SFP28 LAN Status for LAN1		
LED	Color/State	Definition
Top LED	Yellow	10G Link
Top LED	Green	25G Link
Bottom LED	Green	Port Activity

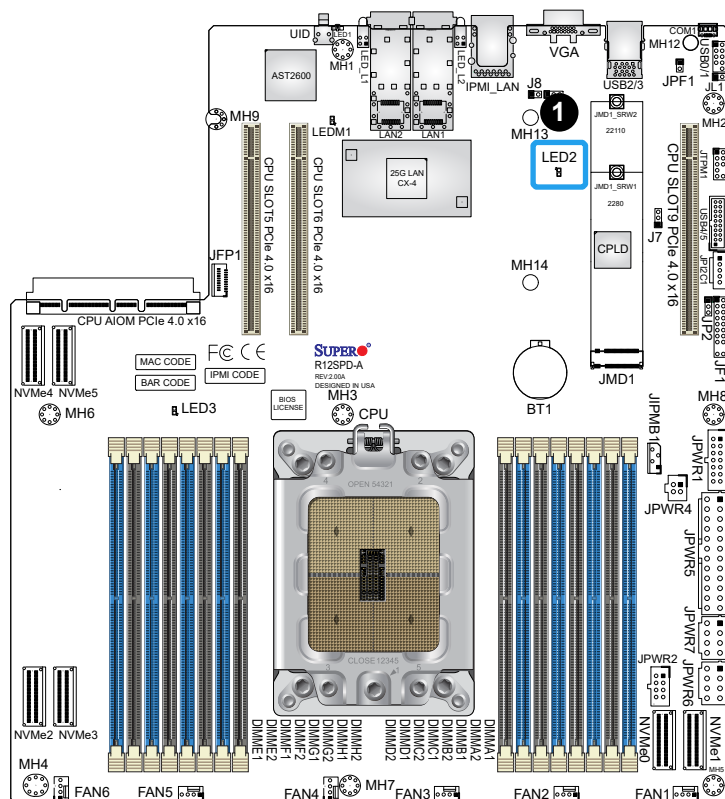


1. SFP28 Status for LAN1
2. SFP28 Status for LAN2

Power LED

LED2 is the power LED for the motherboard. When power is detected, LED2 will indicate the status of the system power.

System Status LED	
Color/State	Definition
Solid Green	Power On



1. Power LED

Chapter 3

Troubleshooting

3.1 Troubleshooting Procedures

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

Before Power On

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

No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.
2. Make sure that the power connectors are properly connected.
3. Check that the 115V/230V switch, if available, on the power supply is properly set.
4. Turn the power switch on and off to test the system, if applicable.
5. The battery on your motherboard may be old. Check to verify that it still supplies 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. Use the speaker to determine if any beep codes are present. Refer to Appendix A for details on beep codes.
3. 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. Check for any error beep from the motherboard speaker.
 - If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, replace the motherboard.
 - If there are error beeps, clear the CMOS settings by unplugging the CMOS battery located at BT1 and holding the power button for at least five seconds.
2. Remove all components from the motherboard, especially the DIMM modules. Make sure that system power is on and that memory error beeps are activated.
3. 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 DDR4 ECC and Non-ECC UDIMM/LRDIMM/RDIMM/3DS RDIMM 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 2 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.
3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

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 with a memory test 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. 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 USB flash or media drives.
2. Cable connection: Check to make sure that all cables are connected and working properly.

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

3.2 Technical Support Procedures

Before contacting Technical Support, 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_IPMI_Intel.html).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
 - Motherboard model and PCB revision number
 - BIOS release date/version. This can be seen on the initial display when your system first boots up.
 - System configuration
4. An example of a Technical Support form is on our website at <http://www.supermicro.com/RmaForm/>.
5. Distributors: For immediate assistance, 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: The motherboard supports 4TB of DDR4 ECC and Non-ECC UDIMM/LRDIMM/RDIMM/3DS RDIMM memory with speeds of up to 3200MT/s in 16 memory slots. 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.

Question: How do I update my BIOS?

Answer: It is recommended that you do not upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html. 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. Unzip the BIOS file onto a bootable USB device. Run the batch file using the format FLASH.BAT filename.rom from your bootable USB device to flash the BIOS. Then, your system will automatically reboot.

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



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

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

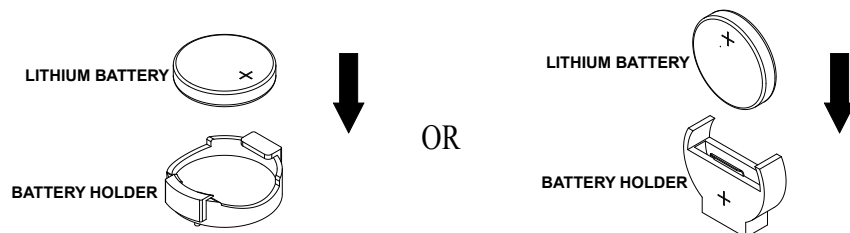
1. Power off your system and unplug your power cable.
2. Locate the onboard battery as shown below.
3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.
4. Remove the battery.

Proper Battery Disposal

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

1. To install an onboard battery, follow steps 1 and 2 above and continue below:
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.



3.5 Returning Merchandise for Service

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

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

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

Chapter 4

UEFI BIOS

4.1 Introduction

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



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 BIOS that may not be reflected in this manual.

Starting the Setup Utility

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

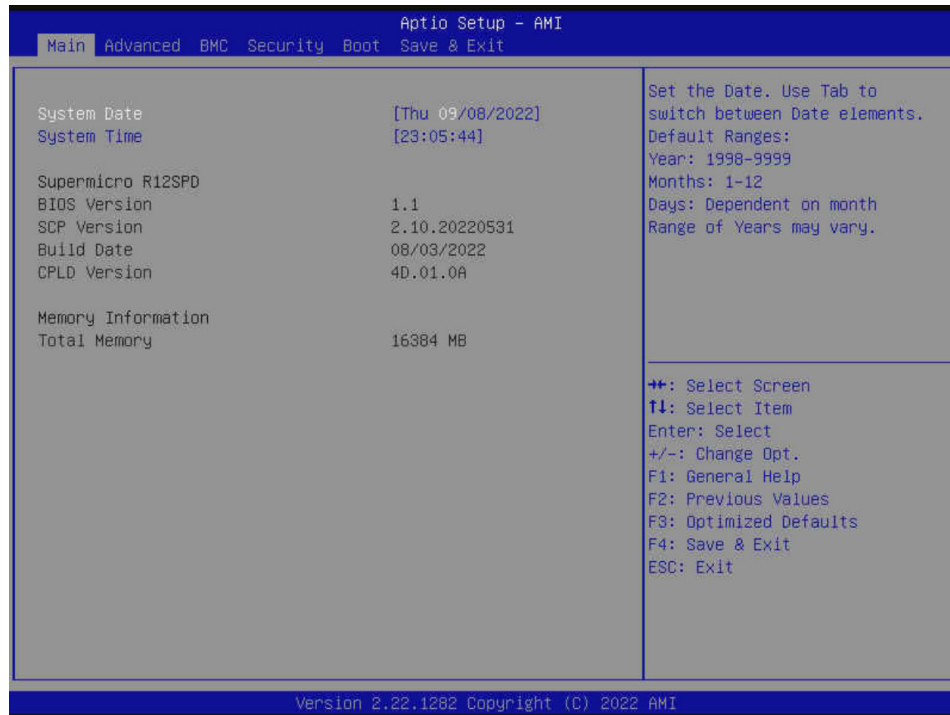
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is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

A " ►" indicates a submenu. Highlighting such an item and pressing the <Enter> key 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>, <F10>, <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 enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS setup screen is shown below. The following Main menu items be displayed:



System Date/System Time

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



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

Supermicro R12SPD-A

BIOS Version

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

SCP Version

This feature displays the version of the Ampere SCP 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 Complex Programmable Logic Device (CPLD) used in the system.

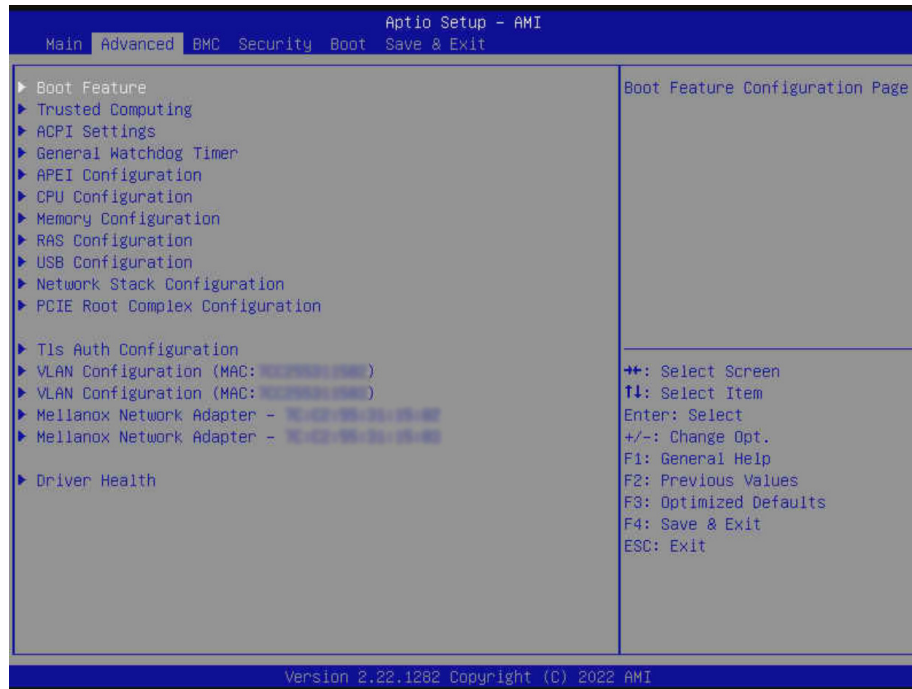
Memory Information

Total Memory

This feature displays the total size of memory available 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, an improper DRAM frequency, or a wrong BIOS timing setting may cause the system to malfunction. When this occurs, revert the setting to the manufacture default settings.

► Boot Feature

Quiet Boot

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

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

Bootup NumLock State

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

Wait For "F1" If Error

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

Re-try Boot

When Extensible Firmware Interface (EFI) 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.

► Trusted Computing

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:



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

Security Device Support

Select Enable to enable BIOS support for onboard security devices, which are not displayed in the OS. If this feature is set to Enable, TCG EFI protocol and INT1A interface will not be available. The options are Disable and **Enable**.

*When "Security Device Support" is set to Enable, the following information will display:

- Active PCR banks
- Available PCR banks

SHA-1 PCR Bank (Available when "Security Device Support" is set to Enable)

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 (Available when "Security Device Support" is set to Enable)

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

Pending Operation (Available when "Security Device Support" is set to Enable)

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 (Available when "Security Device Support" is set to Enable)

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 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 Disabled and **Enabled**.

Storage Hierarchy (Available when "Security Device Support" is set to Enable)

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 Disabled and **Enabled**.

Endorsement Hierarchy (Available when "Security Device Support" is set to Enable)

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 Disabled and **Enabled**.

TPM 2.0 UEFI Spec Version (Available when "Security Device Support" is set to Enable)

Use this feature to set the TPM 2.0 UEFI Spec Version. The options are TCG_1_2 and **TCG_2**.

Physical Presence Spec Version (Available when "Security Device Support" is set to Enable)

Use this feature to set the Physical Presence Spec Version. The options are 1.2 and **1.3**.

►ACPI Settings

Use these features to configure Advanced Configuration and Power Interface (ACPI) features. ACPI provides specifications for monitoring and configuring the system via Operating System-directed Configuration and Power Management (OSPM).

Enable ACPI Auto Configuration

Use this option to enable or disable ACPI Auto Configuration. The options are Disabled and **Enabled**.

Enable CPPC (Available when ACPI Auto Configuration is set to Disabled)

Use this feature to enable or disable Collaborative Processor Performance Control (CPPC). CPPC is an ACPI specification that allows the system manage processor performance. When CPPC is enabled, processor performance metrics are exposed to the system, and the system may use those performance metrics to set processor performance. The options are Disabled and **Enabled**.

Enable LPI (Available when ACPI Auto Configuration is set to Disabled)

Use this feature to enable or disable Lower Power Idle (LPI). LPI is an ACPI specification that triggers idle states in processors and components on the system when any processor is idle. The options are Disabled and **Enabled**.

►General Watchdog Timer

BIOS Watchdog Timeout

Select Enabled to allow the Watch Dog timer timeout when booting into BIOS. The options are Disabled and **Enabled**.

►APEI Configuration

APEI Enable

Use this feature to enable or disable ACPI Platform Error Interface (APEI) support. APEI is an ACPI specification for providing error information to the system. The options are Disabled and **Enabled**.

►CPU Configuration

The following CPU information is displayed:

- Number of processors enabled
- Number of cores enabled

Enable number of cores

Use this feature to select how many processor cores are enabled. The options are **Default** and an even number in a range of up to the max number of cores supported by the processors.

ARM ERRATA 1542419 workaround

Use this feature to select a method for working around the Neoverse N1 Errata 1542419. Neoverse N1 Errata 1542419 is the occurrence of a core fetching a stale instruction before executing a context synchronization instruction. Select Disable I-Cache coherency to disable I-Cache coherency as a workaround. Select Software solution to trap each IC IVAU to EL3 as a workaround. Select Disable to use no workarounds. The options are **Disable I-Cache coherency**, Software solution, and Disable.

ANC mode

Use this feature to select one of three Ampere NUMA Control (ANC) modes: Monolithic, Hemisphere, and Quadrant. Monolithic mode enables a single Non-Uniform Memory Access (NUMA) partition per socket. Hemisphere mode enables two NUMA partitions per socket. Quadrant mode enables four NUMA partitions per socket. The options are **Monolithic**, Hemisphere, and Quadrant.

Near atomic

Use this feature to enable or disable cacheable atomic instructions executed near in the CPU. The options are Disabled and **Enabled**.

SLC Replacement Policy

Use this feature to select a replacement policy for the System Level Cache (SLC). The options are **Enhanced Least Recently Used** and Linear-Feedback Shift Register.

L1/L2 Prefetch

Use this feature to enable or disable L1/L2 prefetch for each core. The options are Disabled and **Enabled**.

SLC as L3\$

Use this feature to enable or disable the behavior of the Processor Properties Topology Table (PPTT) indicating SLC as L3\$. This is available only in 1P Monolithic mode. The options are **Disabled** and Enabled.

The following CPU information is displayed:

- L1C I/D
- L2C
- SLC
- Warranty

► Memory Configuration

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

The following memory information is displayed:

- Total Memory
- Effective Memory
- Memory Speed

Memory Operating Speed Selection

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

Fine Granularity Refresh (FGR)

Use this feature to select a DDR fine granularity refresh (FGR) mode. FGR is a DDR4 specification for specifying how frequently DRAM rows are refreshed. Select 1x to refresh all DRAM rows in the default frequency. Select 2x or 4x to refresh some DRAM rows either 2x or 4x as frequently. The options are **1x**, 2x, and 4x.

► Memory RAS and Performance Configuration

ECC Mode

Use this feature to select an ECC mode. Symbol mode is recommended only for x4 DIMMs. Single error correction, double error detection (SECCDED) is recommended for non-x4 DIMMs. Select Auto to automatically detect the DIMM width and automatically select the recommended mode. The options are **Auto**, Disabled, SECCDED, and Symbol.

Defer Uncorrectable Read Errors

Use this feature to enable or disable the Deferred Machine Check (DMC) deferring uncorrectable read errors by sending an OK response and sending the TXDAT poison flag on the CHI-B interconnect. If this bit is clear, the DMC defaults to non-deferred behavior when encountering an unrecoverable error. The options are Disabled and **Enabled**.

Fault Handling Interrupt

Use this feature to enable or disable fault handling interrupt. When enabled, the fault handling interrupt is raised to give notice that an ECC fault was recorded. The options are Disabled and **Enabled**.

Scrub Patrol Duration (Hour)

Use this feature to select a scrub patrol duration in hours. The options are Disabled and a number in the range of 1 to 24. The default value is **24**.

Demand Scrub

Use this feature to enable or disable the ability to write corrected data into memory when a correctable error is detected. The options are Disabled and **Enabled**.

Write CRC

Use this feature to enable or disable Cyclic Redundancy Check (CRC) functionality on write data. Enabling this feature will degrade write bandwidth. The options are **Disabled** and Enabled.

CVE-2020-10255 Mitigation

CVE-2020-10255 is the Common Vulnerabilities and Exposures (CVE®) ID for TRRespass. TRRespass is a vulnerability in DDR4 and LPDDR4 DRAM chips where mitigations against Target Row Refresh (TRR) attacks do not mitigate many-sided RowHammer attacks. Use this feature to enable mitigations against CVE-2020-10255. The options are **Disabled** and Enabled.

The following memory information is displayed:

- DIMM Information

► RAS Configuration

Use these features to configure Reliability, Availability, and Serviceability (RAS) features.

Hardware EINJ

Use this feature to enable or disable hardware error injection (EINJ). If disabled is selected, EINJ will be software simulated. The options are **Disabled** and Enabled.

DRAM EINJ No Trigger

Use this feature to enable or disable triggering DRAM errors with hardware EINJ. If enabled, DRAM hardware EINJ will flip bits only at the desired DRAM address and not force the hardware to immediately detect those bit flips. The options are **Disabled** and Enabled.

Enable BERT

Use this feature to enable or disable the Boot Error Record Table (BERT). If BERT is disabled, BERT will not be populated. The options are Disabled and **Enabled**.

Enable SDEI

Use this feature to enable or disable Software Delegation Exception Interface (SDEI) for non-maskable interrupt (NMI) support. The options are Disabled and **Enabled**.

Enable AGDI

Use this feature to enable or disable Arm Generic Diagnostic Dump and Reset Device Interface (AGDI) support. This requires SDEI to also be enabled. The options are **Disabled** and Enabled.

PCIe AER Firmware First

Use this feature to enable or disable PCIe Advanced Error Reporting (AER). If disabled, the OS detects AER instead. The options are **Disabled** and Enabled.

Processor OS-first

Use this feature to enable or disable OS-first handling of processor errors through the Arm Error Source Table (AEST) ACPI table. The options are **Disabled** and Enabled.

DDR CE Threshold

Use this feature to view the number of DDR correctable errors (CE) to occur before using interrupt-based notifications to the OS rather than allowing the OS to poll for CEs.

Processor CE Threshold

Use this feature to view the number of processor correctable errors (CE) to occur before using interrupt-based notifications to the OS rather than allowing the OS to poll for CEs.

DDR Link Error Threshold

Use this feature to view how many DDR link errors can occur before the system considers severity to be fatal.

►USB Configuration

The following USB information is displayed:

- USB Module Version
- USB Controllers
- USB Devices

XHCI Hand-off

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

USB Mass Storage Driver Support

Use this feature to enable or disable USB Mass Storage Driver support. The options are **Enabled** and Disabled.

► Network Configuration

Network Stack

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

IPv4 PXE Support (Available when "Network Stack" is set to Enabled)

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 (Available when "Network Stack" is set to Enabled)

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 **Disabled** and Enabled.

IPv6 PXE Support (Available when "Network Stack" is set to Enabled)

Select Enabled to enable IPv6 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 (Available when "Network Stack" is set to Enabled)

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

PXE Boot Wait Time (Available when "Network Stack" is set to Enabled)

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

Media Detect Count (Available when "Network Stack" is set to Enabled)

Use this feature to select the wait time (in seconds) for the BIOS ROM to detect the presence of a LAN media either via the Internet connection or via a LAN port. Press <+> or <-> on your keyboard to change the value. The default setting is **1**.

► MAC: XXXXXXXXXXXX-IPv4 Network Configuration

Configured

Select Enabled to show whether the network address has been successfully configured. The options are **Disabled** and Enabled.

Enabled DHCP (Available when "Configured" is set to Enabled)

Select Enabled to support Dynamic Host Configuration Protocol (DHCP). DHCP allows the BIOS to search for a DHCP server attached to the network and request the next available IP address for this computer. The options are **Disabled** and **Enabled**.

Local IP Address (Available when "Configured" is set to Enabled and "Enabled DHCP" is set to Disabled)

Use this feature to enter an IP address for the local machine.

Local Network (Available when "Configured" is set to Enabled and "Enabled DHCP" is set to Disabled)

Use this feature to set the network for the local machine.

Local Gateway (Available when "Configured" is set to Enabled and "Enabled DHCP" is set to Disabled)

Use this feature to set the gateway address for the local machine.

Local DNS Servers (Available when "Configured" is set to Enabled and "Enabled DHCP" is set to Disabled)

Use this feature to set the Domain Name System (DNS) server address for the local machine.

Save Changes and Exit

Press <Enter> to save changes and exit. The options are Yes and No.

► MAC: XXXXXXXXXXXX-IPv6 Network Configuration

► Enter Configuration Menu

The following information is displayed:

- Interface Name
- Interface Type
- MAC address
- Host addresses
- Route Table
- Gateway addresses
- DNS addresses

Interface ID

Use this feature to change/enter the 64 bit alternative interface ID for the device. The string format is colon separated. The default setting is the MAC address above.

DAD Transmit Count

This feature displays the number of consecutive neighbor solicitation messages that have been sent while performing duplicate address detection on a tentative address.

Policy

Use this feature to select how the policy is to be configured. The options are **automatic** and manual.

► Advanced Configuration (Available when "Policy" is set to manual)**New IPv6 address**

Use this feature to enter the IPv6 address for the local machine.

New Gateway address

Use this feature to set the gateway address for the local machine.

New DNS address

Use this feature to set the DNS server address for the local machine.

Commit Changes and Exit

Press <Enter> to save changes and exit.

Discard Changes and Exit

Press <Enter> to discard changes and exit.

Save Changes and Exit

Press <Enter> to save changes and exit.

► PCIe Root Complex Configuration**SMMU Pmu**

Use this feature to enable or disable the Performance Monitoring Unit (PMU) feature for the Arm System Memory Management Unit (SMMU). The options are **Disabled** and Enabled.

► Root Complex #0 – NVME2 x8 & NVME3 x8

The following root complex information is displayed:

- Socket
- Type

Root Complex #0

The options are Disabled and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are Disabled and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and Enabled.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are Disabled and **Enabled**.

Bifurcation x16

Use this feature to view or change PCIe bifurcation settings. The options are **x16**, x8+x8, x8+x4+x4, and x4+x4+x4+x4.

► Root Complex #1 – NVME0 x8 & NVME1 x8

The following root complex information is displayed:

- Socket
- Type

Root Complex #1

The options are Disabled and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are Disabled and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and **Enabled**.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are **Disabled** and **Enabled**.

Bifurcation x16

Use this feature to view or change PCIe bifurcation settings. The options are **x16**, x8+x8, x8+x4+x4, and x4+x4+x4+x4.

► Root Complex #2 – CPU SLOT9 PCIe 4.0 x16

The following root complex information is displayed:

- Socket
- Type

Root Complex #2

The options are **Disabled** and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are **Disabled** and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and **Enabled**.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are **Disabled** and **Enabled**.

Bifurcation x16

Use this feature to view or change PCIe bifurcation settings. The options are **x16**, x8+x8, x8+x4+x4, and x4+x4+x4+x4.

► Root Complex #3 – CPU SLOT5 PCIe 4.0 x16

The following root complex information is displayed:

- Socket
- Type

Root Complex #3

The options are Disabled and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are Disabled and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and Enabled.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are Disabled and **Enabled**.

Bifurcation x16

Use this feature to view or change PCIe bifurcation settings. The options are **x16**, x8+x8, x8+x4+x4, and x4+x4+x4+x4.

► Root Complex #4 – CPU SLOT6 PCIe 4.0 x16

The following root complex information is displayed:

- Socket
- Type

Root Complex #4

The options are Disabled and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are Disabled and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and **Enabled**.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are **Disabled** and **Enabled**.

Bifurcation 1st x8

Use this feature to view or change PCIe bifurcation settings. The options are **x8**, **x4+x4**, **x4+x2+x2**, and **x2+x2+x2+x2**.

Bifurcation 2nd x8

Use this feature to view or change PCIe bifurcation settings. The option is **x4+x4**.

► Root Complex #6 – CPU AIOM PCIe 4.0 x16

The following root complex information is displayed:

- Socket
- Type

Root Complex #6

The options are **Disabled** and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are **Disabled** and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and **Enabled**.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are **Disabled** and **Enabled**.

Bifurcation 1st x8

Use this feature to view or change PCIe bifurcation settings. The options are **x8**, x4+x4, x4+x2+x2, and x2+x2+x2+x2.

Bifurcation 2nd x8

Use this feature to view or change PCIe bifurcation settings. The option is **x4+x4**.

► Root Complex #7 – NVME4 x8 & NVME5 x8

The following root complex information is displayed:

- Socket
- Type

Root Complex #7

The options are Disabled and **Enabled**.

Access Control Service

Use this feature to enable or disable access control service capability. Access control service routes communication between PCIe devices through the PCIe root complex to prevent data leakage. The options are Disabled and **Enabled**.

Active State Power Management

Use this feature to enable or disable Active State Power Management (ASPM). ASPM allows PCIe devices to save power by entering a low power state. The options are **Disabled** and Enabled.

Strict Enforce PCIe Ordering

Use this feature to enable or disable strict PCIe ordering with the internal bus. PCIe strict ordering requires PCIe transactions to proceed in a specific order. The options are Disabled and **Enabled**.

Strict Enforce PCIe Ordering

The options are Disabled and **Enabled**.

Bifurcation 1st x8

Use this feature to view or change PCIe bifurcation settings. The option is **x4+x4**.

Bifurcation 2nd x8

Use this feature to view or change PCIe bifurcation settings. The options are **x8**, x4+x4, x4+x2+x2, and x2+x2+x2+x2.

►Tls Auth Configuration

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

►Server CA Configuration

►Enroll Cert

Enroll Certification Using File

Use this feature to enroll certification from a file.

Cert GUID

Use this feature to input the certification GUID.

Commit Changes and Exit

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

Discard Changes and Exit

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

►Delete Cert

Use this feature to delete certification.

►VLAN Configuration (MAC:XXXXXXXXXXXX)

►VLAN Configuration (MAC:XXXXXXXXXXXX)

►Enter Configuration Menu

Create new VLAN

VLAN ID

Highlight this feature and enter a value between 0 and 4094 for the VLAN ID.

Priority

Highlight this feature and enter a value between 0 and 7 for the VLAN priority.

Add VLAN

Use this feature to create a new VLAN based on the information in VLAN ID and Priority.

Configured VLAN List

This feature displays VLANs that were created with the Add VLAN feature.

Remove VLAN

Use this feature to remove selected VLANs from the Configured VLAN List.

► **Mellanox Network Adapter – XX:XX:XX:XX:XX:XX**

► **Mellanox Network Adapter – XX:XX:XX:XX:XX:XX**

► **Firmware Image Properties**

The following information is displayed:

- Family Firmware Version
- EFI Version

► **Device Level Configuration**

Virtualization Mode

Use this feature to specify the type of virtualization used by the controller on all ports. The options are None and **SR-IOV**.

PCI Virtual Functions Advertised

Highlight this feature and enter a number in the range of 1 to 127 to configure the number of Virtual Functions supported on this device. The default number is **8**.

Blink LEDs

Highlight this feature and enter a number of seconds in the range of 0 to 15 to identify the physical network port by blinking the associated LED. The default setting is **0**.

The following information is displayed:

- Device Name
- Chip Type
- PCI Device ID
- PCI Address
- Link Status
- Link Speed

- MAC Address
- Virtual MAC Address
- Socket Direct Operation

► Driver Health

This feature displays the health information of the drivers installed in your system, including LAN controllers, as detected by the BIOS. Select one and press <Enter> to see the details.

 **Note:** This section is provided for reference only, for 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.

► Mellanox ConnectX Driver

► Mellanox ConnectX Driver

4.4 BMC

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



BMC Firmware Revision

This feature indicates the IPMI firmware revision used in your system.

IPMI STATUS

This feature indicates the status of the IPMI firmware installed in your system.

► BMC Network Configuration

Update IPMI LAN Configuration

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

Configure IPv4 Support

IPMI LAN Selection

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

IPMI Network Link Status:

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

Configuration Address Source (Available when "Update IPMI LAN Configuration" is set to Yes)

Use this feature to select the source of the IPv4 connection. If Static is selected, you will need to know the IP address of IPv4 connection and enter it to the system manually in the field. If DHCP is selected, the BIOS will search for a Dynamic Host Configuration Protocol (DHCP) server in the network that is attached to and request the next available IP address for this computer. The options are Static and **DHCP**.

Station IP Address (Available when "Configuration Address Source" is set to Static)

This feature displays the Station IP address in decimal and in dotted quad form (i.e., 172.29.176.131). Press <Enter> to change the setting.

Subnet Mask (Available when "Configuration Address Source" is set to Static)

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. Press <Enter> to change the setting.

Station MAC Address (Available when "Configuration Address Source" is set to Static)

This feature displays the Station MAC address for this computer. MAC addresses are six two-digit hexadecimal numbers.

Gateway IP Address (Available when "Configuration Address Source" is set to Static)

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). Press <Enter> to change the setting.

VLAN (Available when "Update IPMI LAN Configuration" is set to Yes)

This feature displays the status of VLAN support. The options are **Disable** and Enable.

VLAN ID (Available when "VLAN" is set to Enable)

Use this feature to create a new LAN ID by using an existing VLAN or creating a new VLAN ID. Enter a valid value between 1 – 4094. The default value is 1.

Configure IPv6 Support

IPv6 Address Status

This feature displays the status of the IPv6 address.

IPv6 Support

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

Configuration Address Source (Available when "IPv6 Support" is set to Enabled)

Use this feature to select the source of the IPv6 connection. If Static Configuration is selected, you will need to know the IP address of IPv6 connection and enter it to the system manually in the field. If the Dynamic Host Configuration Protocol (DHCP) related option is selected, the BIOS will search for a DHCP server in the network that is attached to and request the next available IP address for this computer. The options are Static, and **DHCP**.

Station IPv6 Address (Available when "Configuration Address Source" is set to Static)

This feature displays the station IPv6 address. Press <Enter> to change the setting.

Prefix Length (Available when "Configuration Address Source" is set to Static)

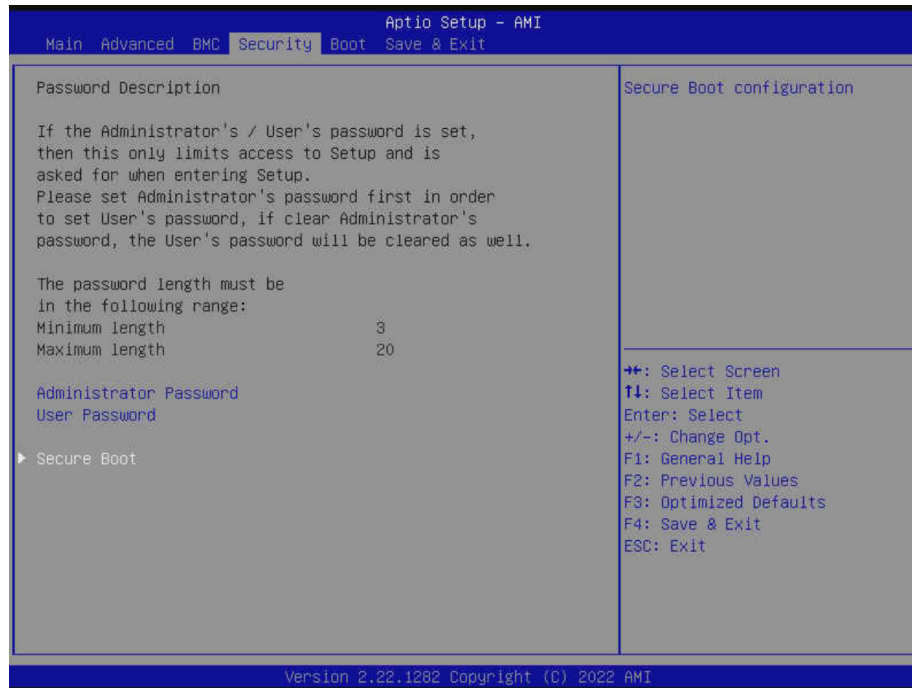
This feature displays the prefix length. Press <Enter> to change the setting.

IPv6 Router1 IP Address

This feature displays the IPV6 Router1 IPv6 address. Press <Enter> to change the setting.

4.5 Security

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



The following information is displayed:

- Administrator Password
- User Password
- Password Description

Administrator Password

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

User Password (Available when "Administrator Password" has been set)

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

► 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/>.

The following information is displayed:

- System Mode
- Secure Boot

Secure Boot

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

Secure Boot Mode

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

► Restore Factory Keys (Available when "Secure Boot Mode" is set to Custom)

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

► Reset To Setup Mode (Available when "Secure Boot Mode" is set to Custom)

This feature resets the system to Setup Mode.

► Enter Audit Mode (Available when "Secure Boot Mode" is set to Custom)

Select Ok to enter the Audit Mode workflow. It will result in erasing of Platform Key (PK) variables and reset system to the Setup/Audit Mode.

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

The following information is displayed.

- Vendor Keys

Provision Factory Defaults

Select Enabled to install provision factory default settings after the platform reset while the system is in the Setup Mode. The options are Disabled and **Enabled**.

► Restore Factory Keys (Available when any secure keys have been installed)

Select Yes to restore manufacturer default keys used to ensure system security. The options are **Yes** and No. Select Yes will reset system to the Deployed mode.

► Reset To Setup Mode (Available when any secure keys have been installed)

This feature resets the system to the Setup Mode. The options are **Yes** and No.

► Export Secure Boot Variables (Available when any secure keys have been installed)

This feature exports the NVRAM contents of secure boot variables to a storage device. The options are **Yes** and No.

► Enroll Efi Image

This feature allows the image to run in the secure boot mode. Enroll SHA256 Hash certificate of a PE image into the Authorized Signature Database (DB).

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.

The following information is displayed:

Secure Boot variable / Size / Key# / 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, keys numbers, and the sources of the authorized signatures. Select Update to update the platform key. The options are **Details**, Export, Update, and Delete.

► Key Exchange 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, keys numbers, and the sources of the authorized signatures. Select Update to update your "Key Exchange Keys." Select Append to append your "Key Exchange Keys." The options are **Details**, Export, Update, Append, and Delete.

► Authorized Signatures

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

► Forbidden Signatures

Use this feature to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, key 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

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

► OsRecovery Signature

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

TCG Storage Security Configuration:**►(Storage Device Name) (Available when the storage device is compliant with TCG specifications)**

Select this device. Press <Enter> and the following information is displayed:

- TCG Storage Security Password Description:
- PASSWORD CONFIGURATION:
 - Security Subsystem Class:
 - Security Supported:
 - Security Enabled:
 - Security Locked:
 - Security Frozen:
 - User Pwd Status:
 - Admin Pwd Status:

Set Admin Password

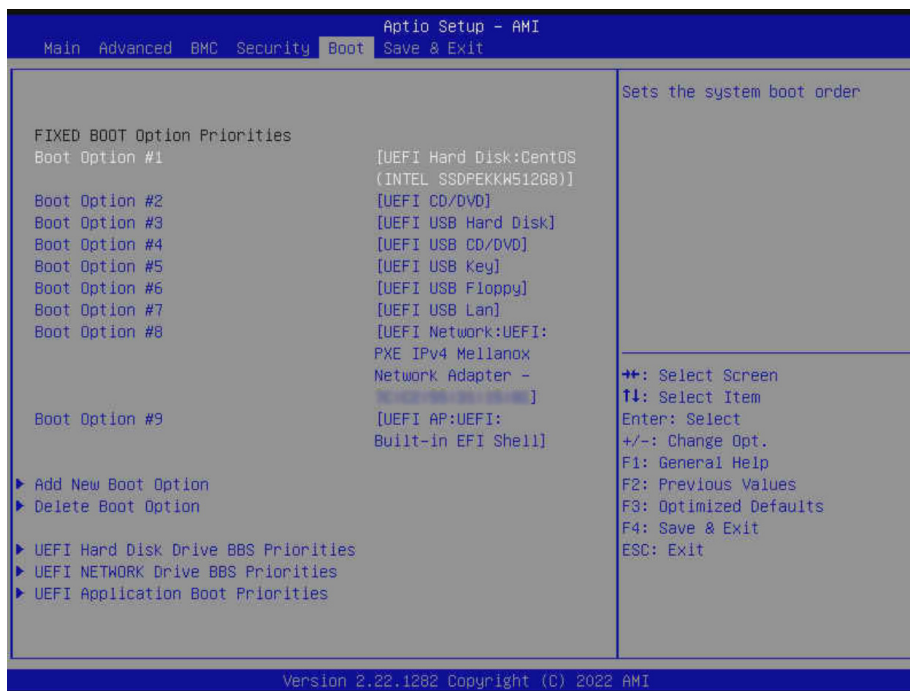
Use this feature to set the administrator password for this storage device.

Device Reset

Use this feature to reset the password configuration for this storage device.

4.6 Boot

Use this feature to configure Boot Settings:



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.

The following features will be displayed for configuration:

- Boot Option #1 – Boot Option #9

► Add New Boot Option (Available when any storage device is detected by the BIOS)

Use this feature to add a new boot option to the boot priority features for system boot.

Add boot option

Use this feature to specify the name for the new boot option.

Path for boot option

Use this feature to enter the path for the new boot option in the format fsx:\path\filename.efi.

Boot option File Path

Use this feature to specify the file path for the new boot option.

Create

After the name and the file path for the boot option are set, press <Enter> to create the new boot option in the boot priority list.

►Delete Boot Option

Use this feature to select a boot device to delete from the boot priority list.

Delete Boot Option

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

►UEFI Hard Disk Drive BBS Priorities

Use this feature to set the system boot order of detected devices.

►UEFI NETWORK Drive BBS Priorities

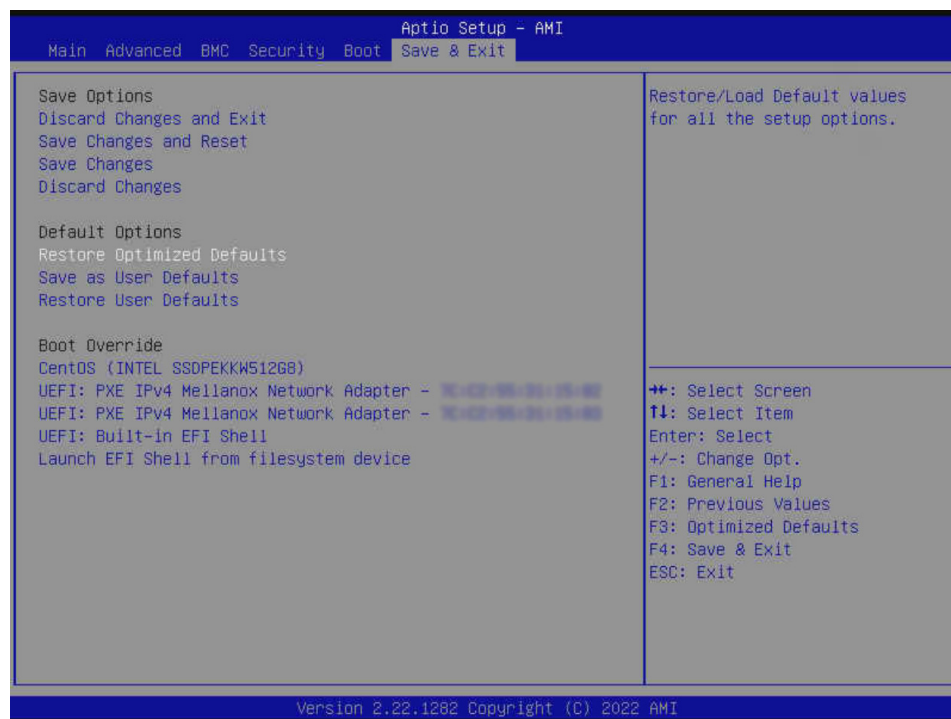
Use this feature to set the system boot order of detected devices.

►UEFI Application Boot Priorities

Use this feature to set the system boot order of detected devices.

4.7 Save & Exit

Select Save & Exit from the BIOS Setup screen to configure the settings below.



Save Options

Discard Changes and Exit

Use this feature 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, use this feature 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, use this feature to save all changes you've made. This will not reset (reboot) the system.

Discard Changes

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

Default Options

Restore Optimized Defaults

Select this feature and press <Enter> to load manufacturer optimized default settings which are intended for maximum system performance but not for maximum stability.

Save as User Defaults

Select this feature and press <Enter> to save all changes on the default values specified to the BIOS Setup utility for future use.

Restore User Defaults

Select this feature and press <Enter>. Use this feature to retrieve user-defined default settings that have been saved previously.

Boot Override

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

Appendix A

BIOS Codes

A.1 BIOS Error POST (Beep) Codes

During the Power-On Self-Test (POST) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The table shown below lists some common errors and their corresponding beep codes encountered by users.

BIOS Beep (POST) Codes		
Beep Code	Error Message	Description
1 beep	Refresh	Circuits have been reset (Ready to power up)
5 short, 1 long	Memory error	No memory detected in system
5 long, 2 short	Display memory read/write error	Video adapter missing or with faulty memory
1 long continuous	System OH	System overheat condition

A.2 Additional BIOS POST Codes

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

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

Appendix B

Standardized Warning Statements

The following statements are industry standard warnings, provided to warn the user of situations which have the potential for bodily injury. 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

電池更換不當會有爆炸危險。請只使用同類電池或制造商推薦的功能相當的電池更換原有電池。請按製造商的說明處理廢舊電池。

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה!

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

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

فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة
جخلص من البطاريات المسحمة وفقا لتعليمات الشركة الصانعة

경고!

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

Waarschuwing

Er is 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 القوانين واللوائح الوطنية

경고!

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

Waarschuwing

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

Appendix C

UEFI BIOS Recovery

Warning: Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you need to update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

C.1 Overview

The Unified Extensible Firmware Interface (UEFI) provides a software-based interface between the operating system and the platform firmware in the pre-boot environment. The UEFI specification supports an architecture-independent mechanism that will allow the UEFI OS loader stored in an add-on card to boot the system. The UEFI offers clean, hands-off management to a computer during system boot.

C.2 Recovering the UEFI BIOS Image

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The recovery block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a healthy BIOS image if the original main BIOS image is corrupted. When the system power is first turned on, the boot block codes execute first. Once this process is completed, the main BIOS code will continue with system initialization and the remaining Power-On Self-Test (POST) routines.

 **Note 1:** Follow the BIOS recovery instructions below for BIOS recovery when the main BIOS block crashes.

 **Note 2:** When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. For a RMA request, see section 3.5 for more information.

C.3 Recovering the BIOS Block with a USB Device

This feature allows the user to recover the main BIOS image using a USB-attached device without additional utilities used. A USB flash or media device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32), which is installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large due to the huge volumes of folders and files stored in the device.

To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below:

1. Using a different machine, copy the "Super.ROM" binary image file into the disc Root "\\" directory of a USB flash or media device.

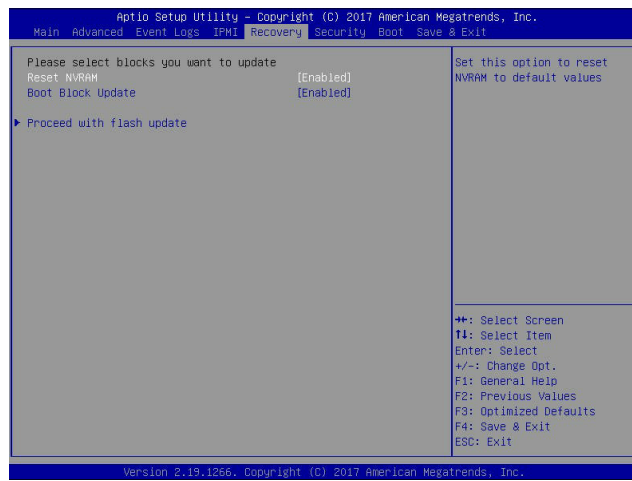
 **Note 1:** If you cannot locate the "Super.ROM" file in your driver disk, visit our website at www.supermicro.com to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use.

 **Note 2:** Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB port and reset the system until the following screen appears:



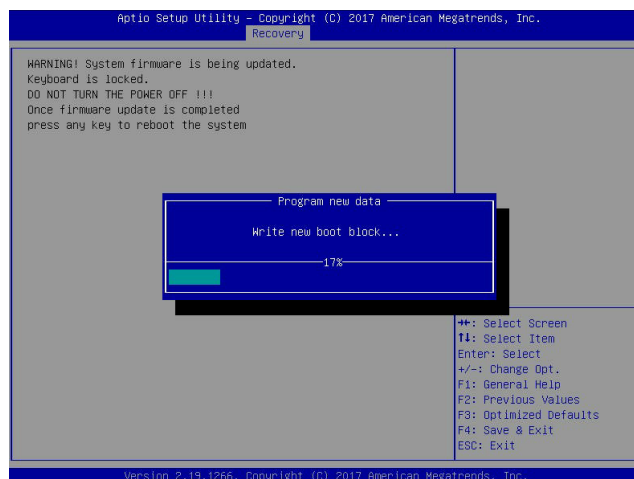
3. After locating the new BIOS binary image, the system will enter the BIOS Recovery menu as shown below:



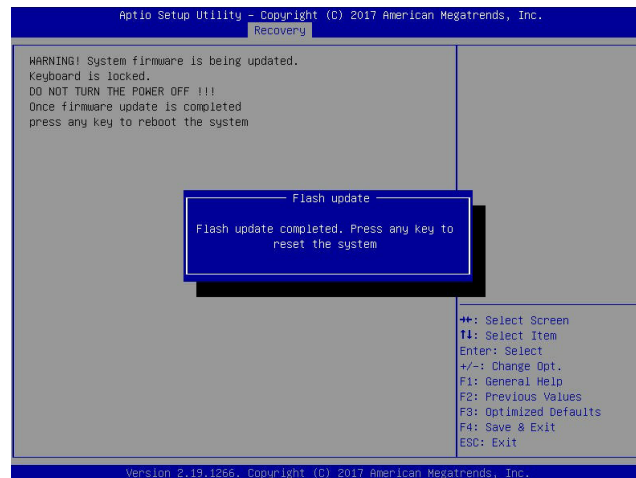
Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below:

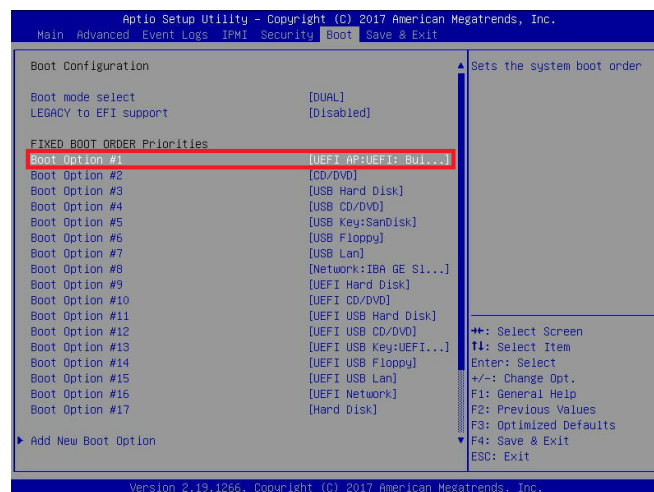
Note: Do not interrupt the BIOS flashing process until it has completed.



5. After the BIOS recovery process is completed, press any key to reboot the system.



6. Using a different system, extract the BIOS package into a USB flash drive.
7. Press <Del> during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the BIOS Setup utility.



8. When the UEFI Shell prompt appears, type `fs#` to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter `flash.nsh BIOSname.###` at the prompt to start the BIOS update process.

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping table
  FS0: Alias(s):HD(0)B:BLK1:
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x37901072,0x800,0x1
CR3592)
  BLK0: Alias(s):
    PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8 in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd \EFI\BOOT
FS0:\EFI\BOOT> cd SNIPME2_03162017
FS0:\AFUDOS\SNIPME2_03162017> flash.nsh X10PU7.314

```

```

Done.
[ Access CMOS Port Ex ]
<read>
Index 0x51: 0x10

Done.
*****
*
* Program BIOS and ME (including FDT) regions...
*
*****
| AMI Firmware Update Utility v5.09.01.1317 |
| Copyright (C)2017 American Megatrends Inc. All Rights Reserved. |
*****
CPUID = 50652

Reading flash ..... done
- ME Data Size checking . ok
- FFS checksums ..... ok
- Check RomLayout ..... Ok.
Erasing Boot Block ..... done
Updating Boot Block ..... done
Verifying Boot Block ..... done
_Erasing Main Block ..... 0x00132000 (0%)

```

```

- ME Data Size checking . ok
- Secure Flash enabled, recalculate ROM size with signature... Enable.
- Upload the ME image data to BIOS ME module.... done
- Update success for FDR
- Update success for MER
WARNING : System must power-off to have the changes take effect!

Process completed.
Moving FS0:\X12SCV0.A16\fdtx64.efi -> FS0:\X12SCV0.A16\fdt.smc
- [ok]
Moving FS0:\X12SCV0.A16\afuefix64.efi -> FS0:\X12SCV0.A16\afuefi.smc
- [ok]
*****
*
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*
*****
Deleting 'FS0:\Startup.nsh'
Delete successful.
Deleting 'FS0:\a.nsh'
Delete successful.
*****
*
* Please press any key to reset system...
*
*****
-

```

 **Note:** Do not interrupt this process until the BIOS flashing is complete.

9. The screen above indicates that the BIOS update process is complete. When you see the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug the AC power cable in the power supply again to power on the system.
10. Press `<Del>` to enter the BIOS Setup utility.
11. Press `<F3>` to load the default settings.
12. After loading the default settings, press `<F4>` to save the settings and exit the BIOS Setup utility.

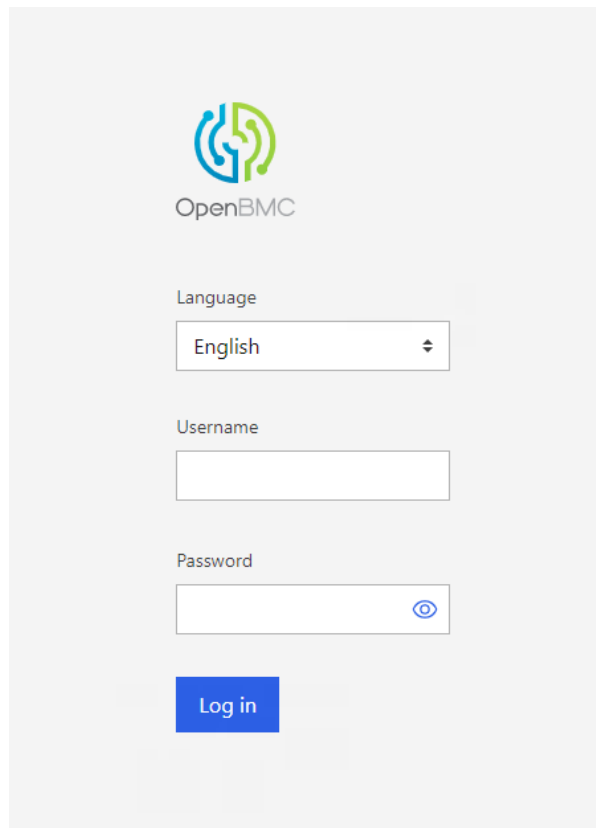
Appendix D

Updating BIOS and BMC with OpenBMC WebGUI

Warning: Do not upgrade firmware unless your system has a firmware-related issue. Flashing the wrong firmware can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a firmware update. If you need to update firmware, do not shut down or reset the system while firmware is updating.

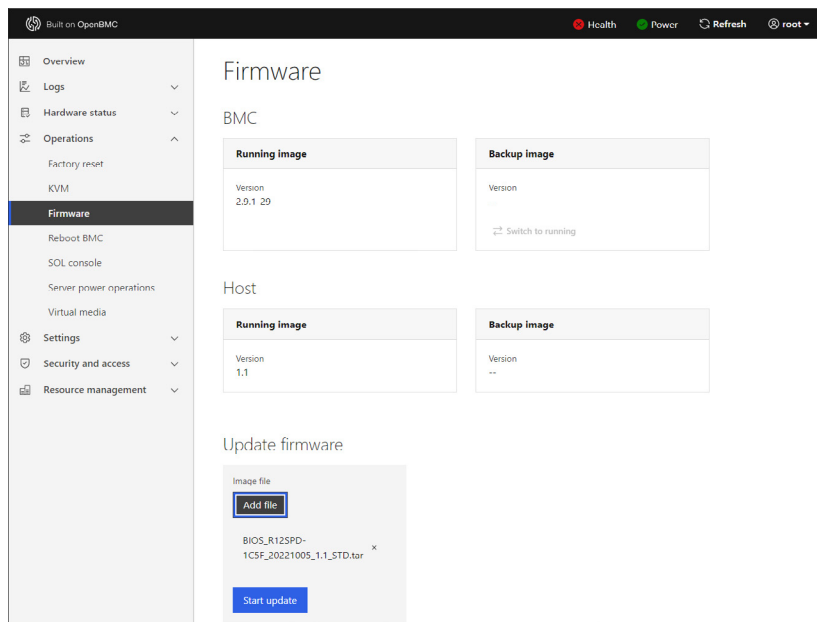
D.1 Overview

The OpenBMC WebGUI provides a function to update the BIOS and BMC firmware on the motherboard. Visit our website at www.supermicro.com to download the BIOS or BMC update packages. Extract the firmware image files from the firmware update packages onto the system you will use to access the OpenBMC Web GUI. The OpenBMC Web GUI can be accessed by entering the R12SPD-A motherboard BMC IP address into a web browser while on the same network as the motherboard.

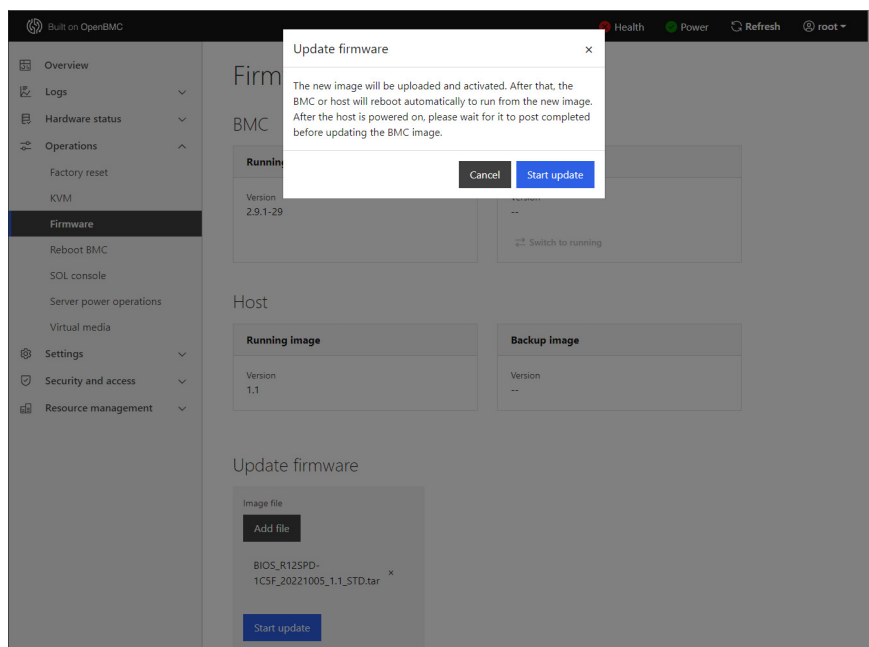
The image shows the OpenBMC WebGUI login page. At the top center is the OpenBMC logo, which consists of a stylized green and blue circular icon above the text "OpenBMC". Below the logo, there are three input fields: a "Language" dropdown menu currently set to "English", a "Username" text input field, and a "Password" text input field with a blue eye icon to its right for toggling visibility. At the bottom of the form is a blue "Log in" button.

D.2 Updating BIOS with OpenBMC WebGUI

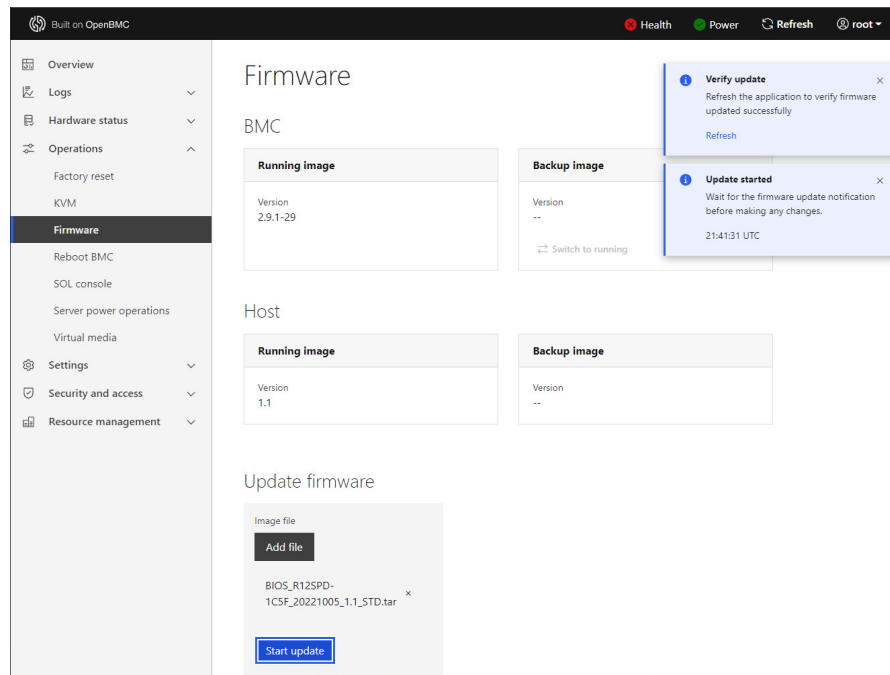
1. In the OpenBMC Web GUI sidebar menu, enter the Operations submenu and click Firmware.
2. In Firmware, click “Add file” and navigate to the BIOS image file (ex: BIOS_R12SPD-1C5F_20220816_1.1_STD_TAR.tar).



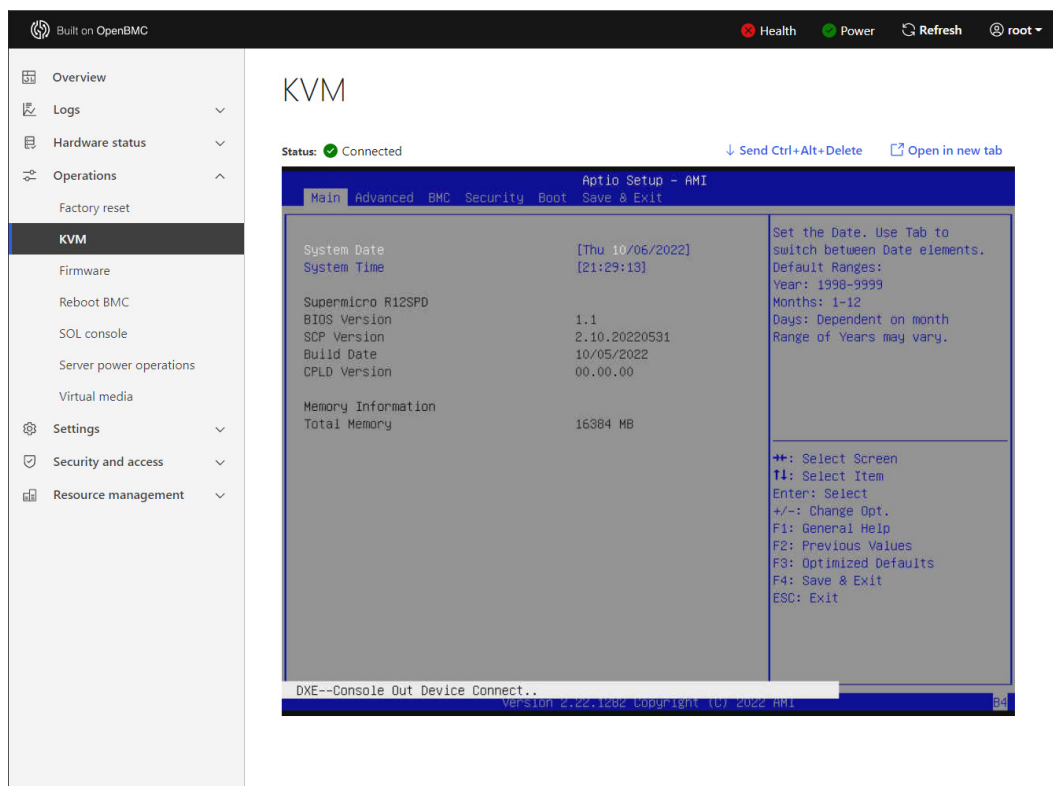
3. Click "Start update" after selecting the BIOS image file. The BIOS firmware update will begin. Do not interrupt the BIOS update progress. The BIOS update progress may require several minutes.



4. The BIOS update progress will be indicated in the upper right corner.

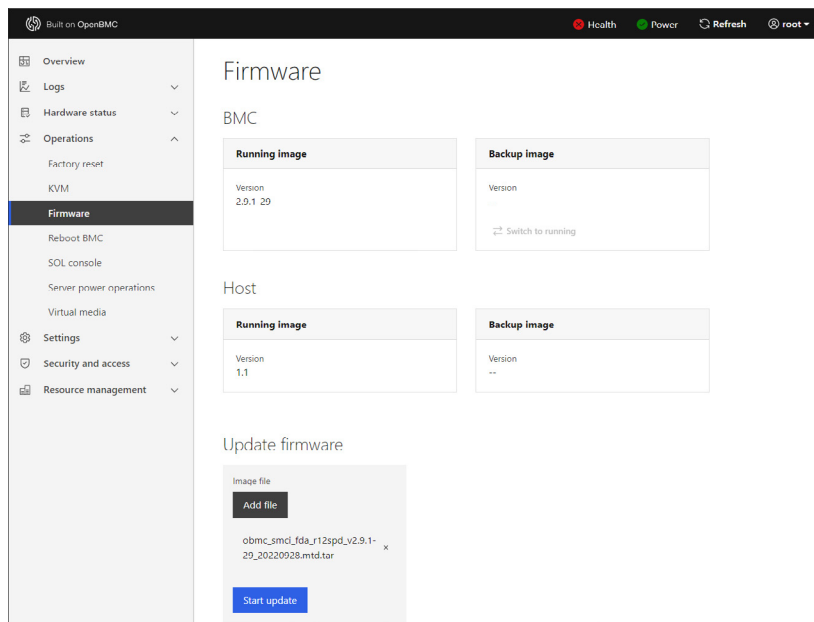


5. After "Verify update" appears, use the KVM feature in the Operations submenu to enter the UEFI BIOS. Ensure the BIOS version and build date in the UEFI BIOS setup match the new BIOS version and build date.

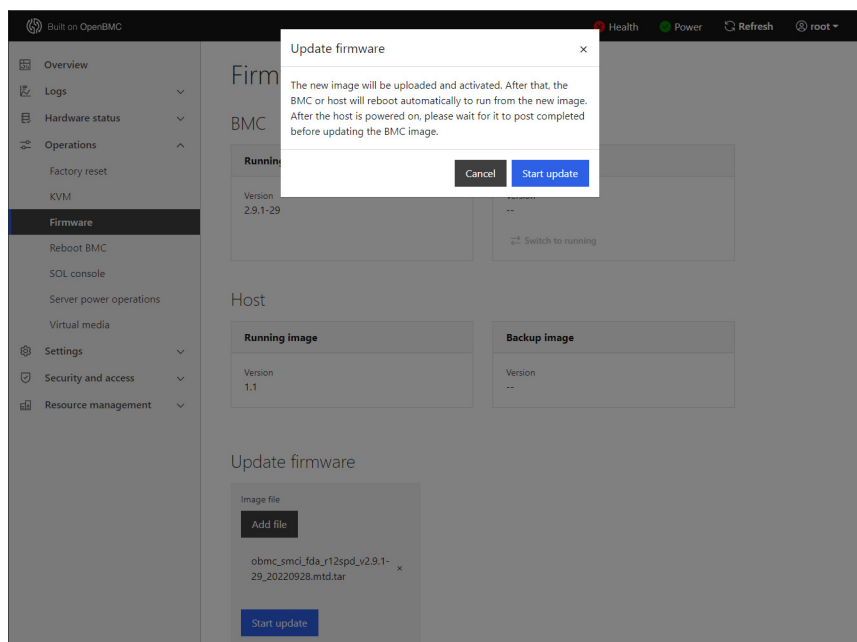


D.3 Updating BMC with OpenBMC WebGUI

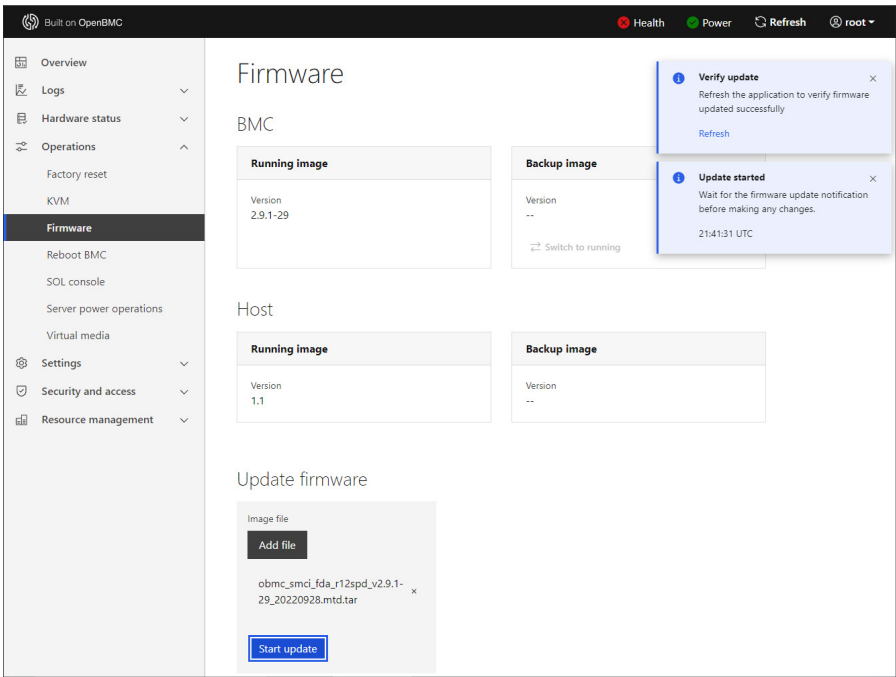
1. In the OpenBMC Web GUI sidebar menu, enter the Operations submenu and click Firmware.
2. In Firmware, click “Add file” and navigate to the BMC image file (ex: obmc_smci_fda_r12spd_v2.9.1-23_20220818.mtd.tar).



3. Click “Start update” after selecting the BMC image file. The BMC firmware update will begin. Do not interrupt the BMC update progress. The BMC update progress may require several minutes.



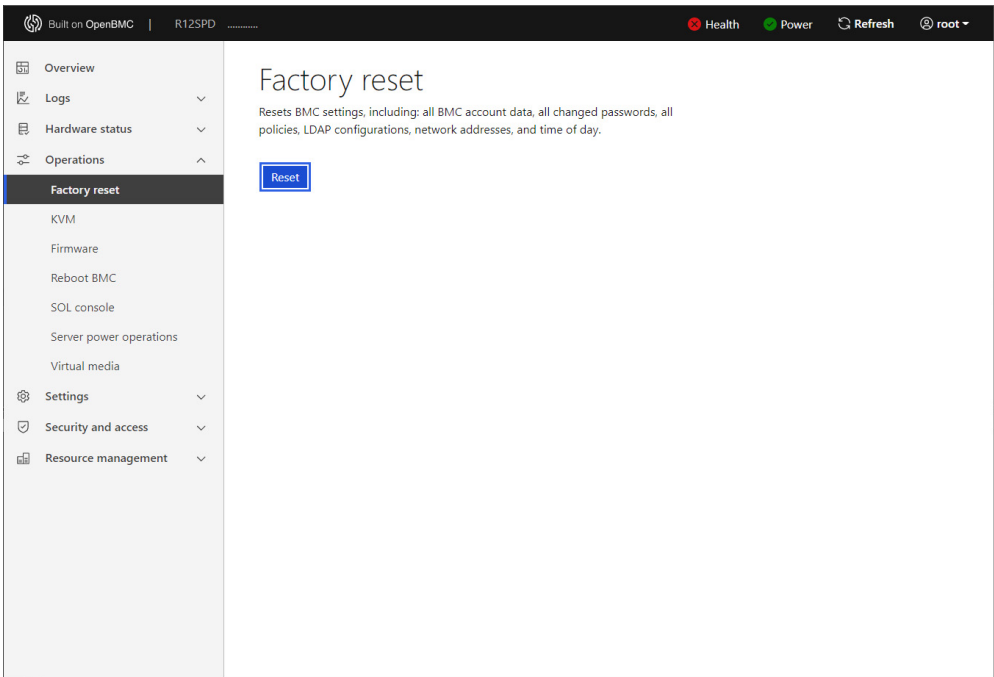
4. The BMC update progress will be indicated in the upper right corner.



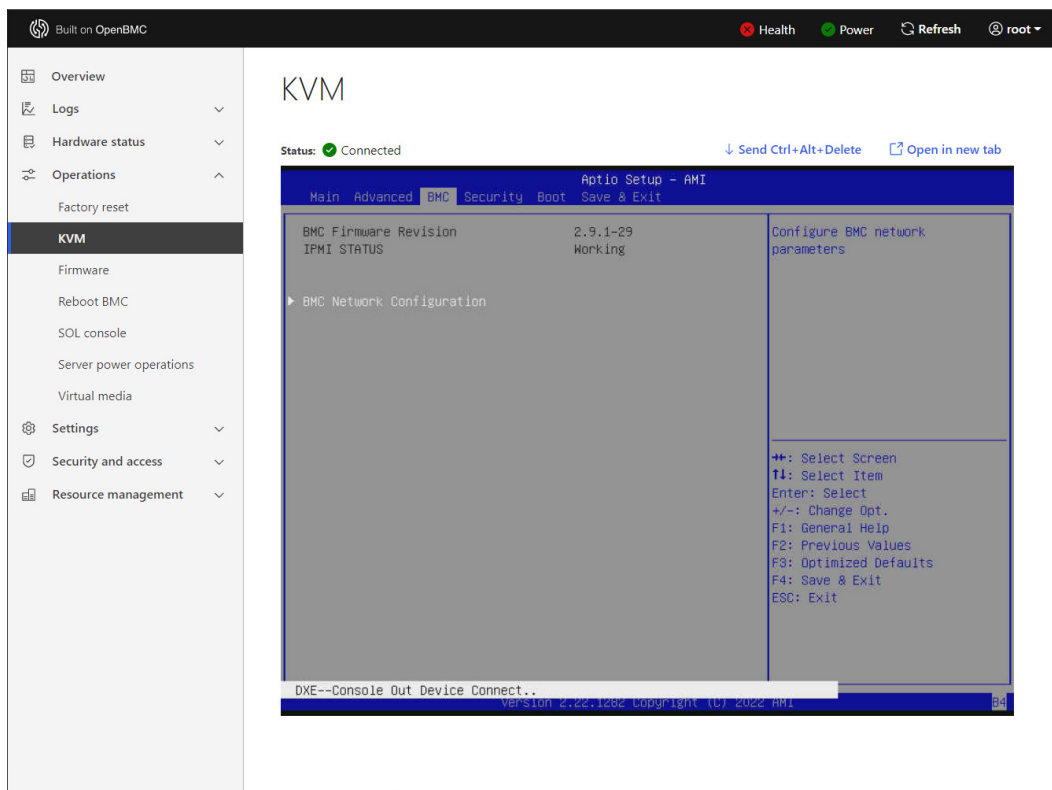
5. After “Verify update” appears, use the Factory reset feature in the Operations submenu to reset BMC settings.



Note: The factory reset is required to ensure proper functionality.



6. Power on and off the motherboard.
7. After powering on and off the motherboard, use the KVM feature in the Operations submenu to enter the UEFI BIOS. Ensure the BMC version in the BMC menu matches the new BMC version.



Appendix E

Updating Firmware through OpenBMC Console

Warning: Do not upgrade firmware unless your system has a firmware-related issue. Flashing the wrong firmware can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a firmware update. If you need to update firmware, do not shut down or reset the system while firmware is updating.

E.1 Overview

The Baseboard Management Controller (BMC) is provided by OpenBMC. OpenBMC is an open-source Linux distribution used in the Aspeed AST2600, which enables remote management of your server. OpenBMC supports Redfish®, an industry-standard protocol that promotes easier integration with newer technology, greater security, more human-readability, and representational state transfer (REST). For more information about Redfish, visit our website at <https://www.supermicro.com/en/solutions/management-software/redfish>.

UEFI BIOS and Ampere SCP firmware may be updated through a BMC console. This document uses WinSCP, a free and open-source client for securely transferring files between a local system and a remote system. Visit the WinSCP website at <https://winscp.net/eng/index.php> for additional information.

Visit our website at www.supermicro.com to download firmware update packages.

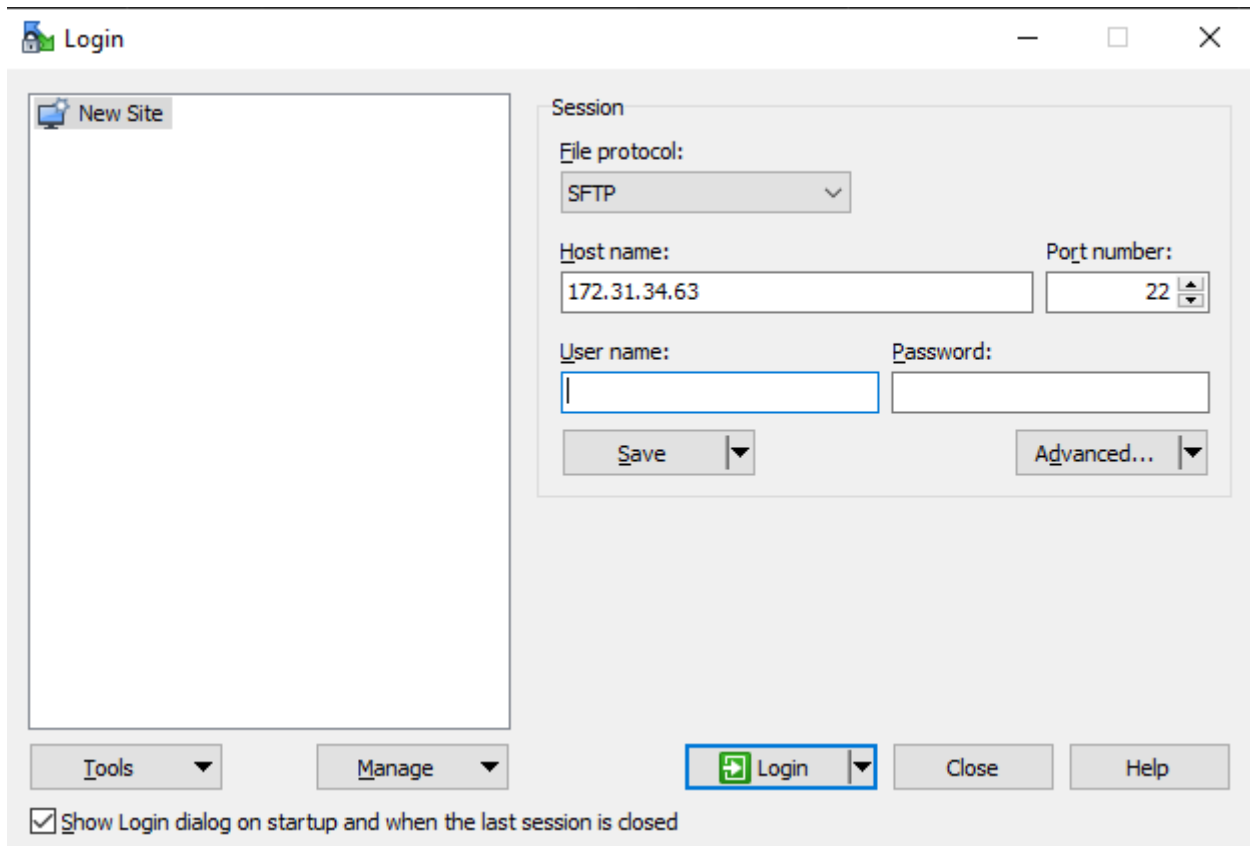
E.2 Updating the UEFI BIOS Firmware

The UEFI BIOS firmware can be updated through the OpenBMC console. Ensure the system running WinSCP is on the same network as the R12SPD-A motherboard before performing these steps.

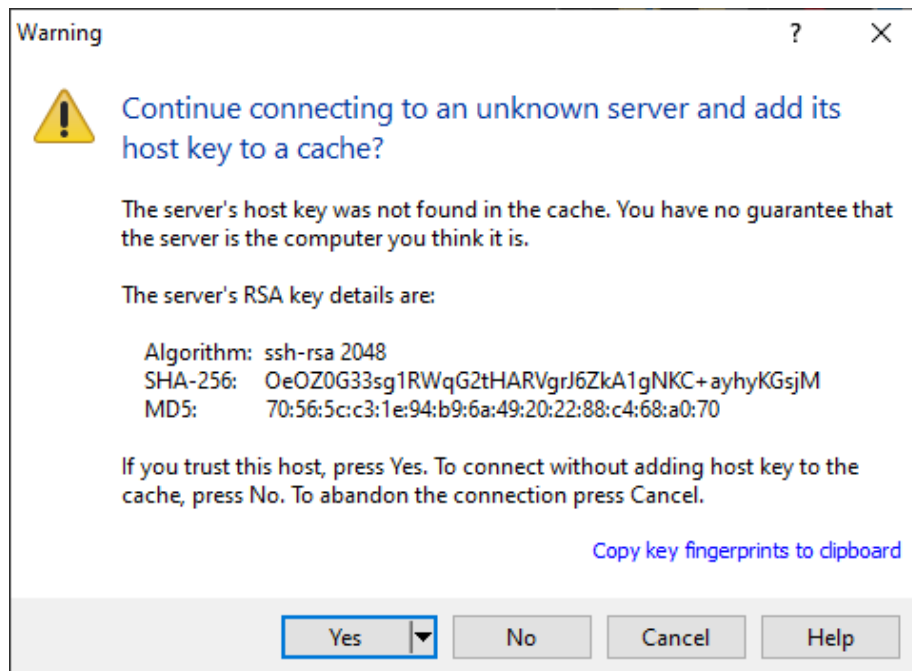
Updating the UEFI BIOS Firmware through BMC Console

To update the UEFI BIOS firmware through the BMC console, perform the following steps on a Windows system:

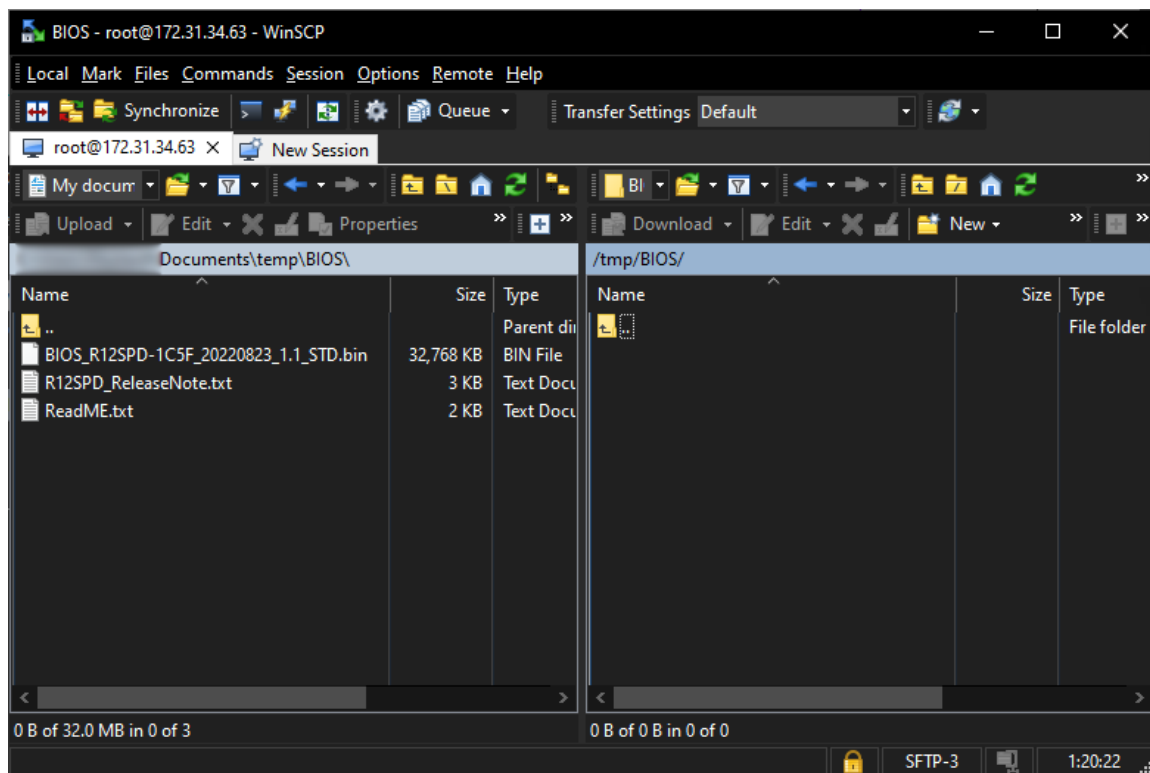
1. Power off the system.
2. Launch WinSCP and enter the R12SPD-A login information into the Host name, User name, and Password fields with the SFTP file protocol.



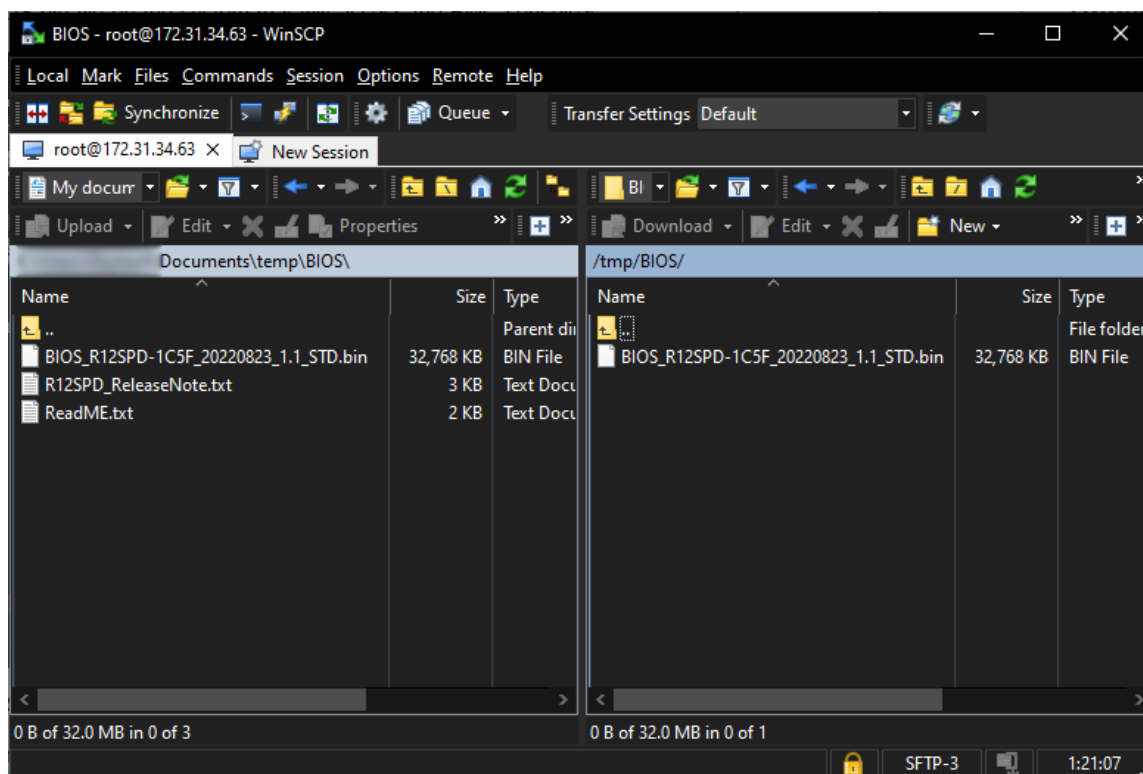
3. Add the remote server's RSA key to cache. Click "Yes" if the window shown below appears.



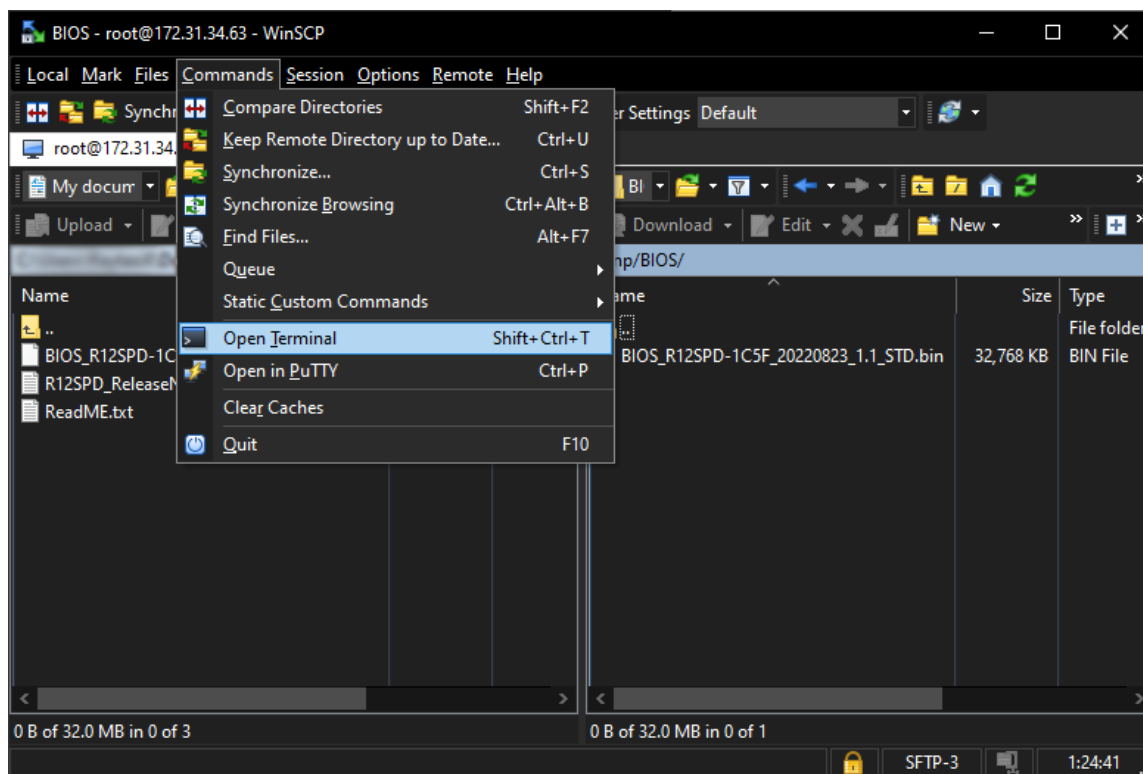
4. Locate the BIOS bin file on the system that will access the BMC console.



5. Move the BIOS bin file to the remote system.



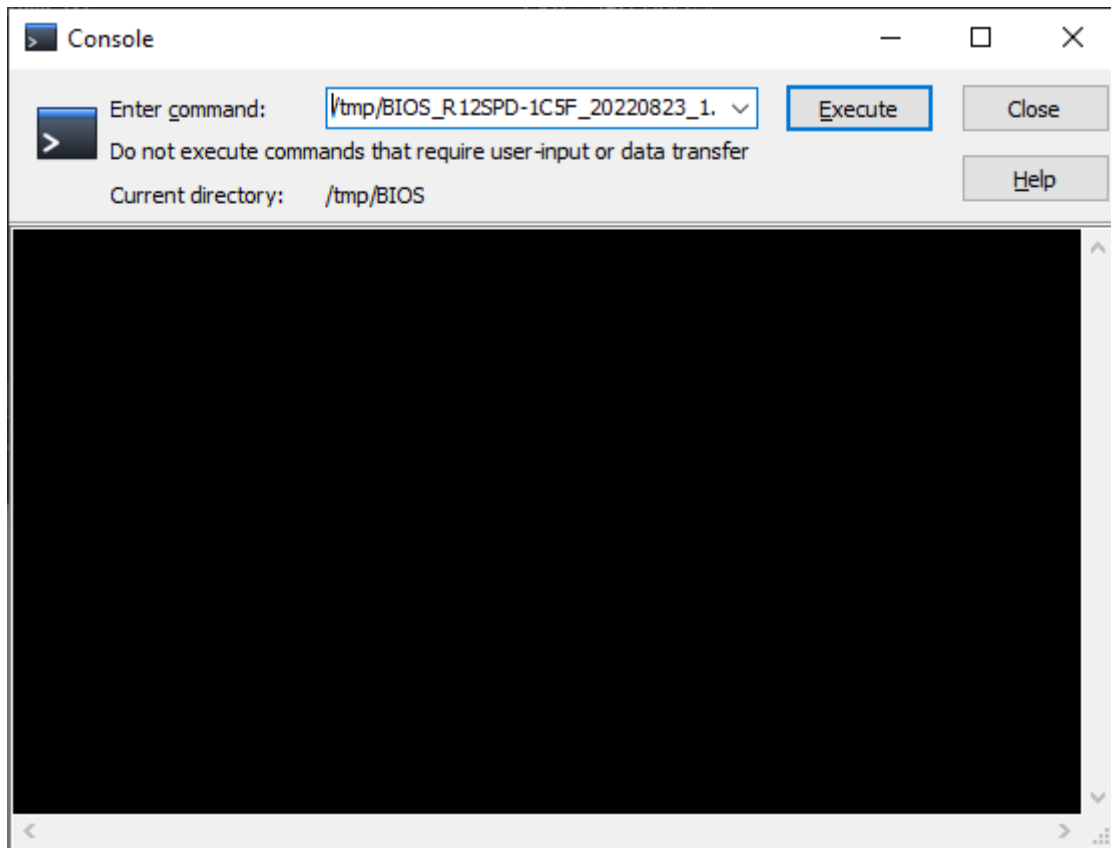
6. In the ribbon on the top of WinSCP, expand Commands and open the Terminal.



7. Enter the following command: **ampere_flash_bios.sh /tmp/BIOS_R12SPD-1C5F_20220823_1.1_STD.bin 1**



Note: Replace **/tmp/BIOS_R12SPD-1C5F_20220823_1.1_STD.bin** with the path to your firmware update bin file.



8. Execute the command. Do not interrupt the update process until the update is complete.

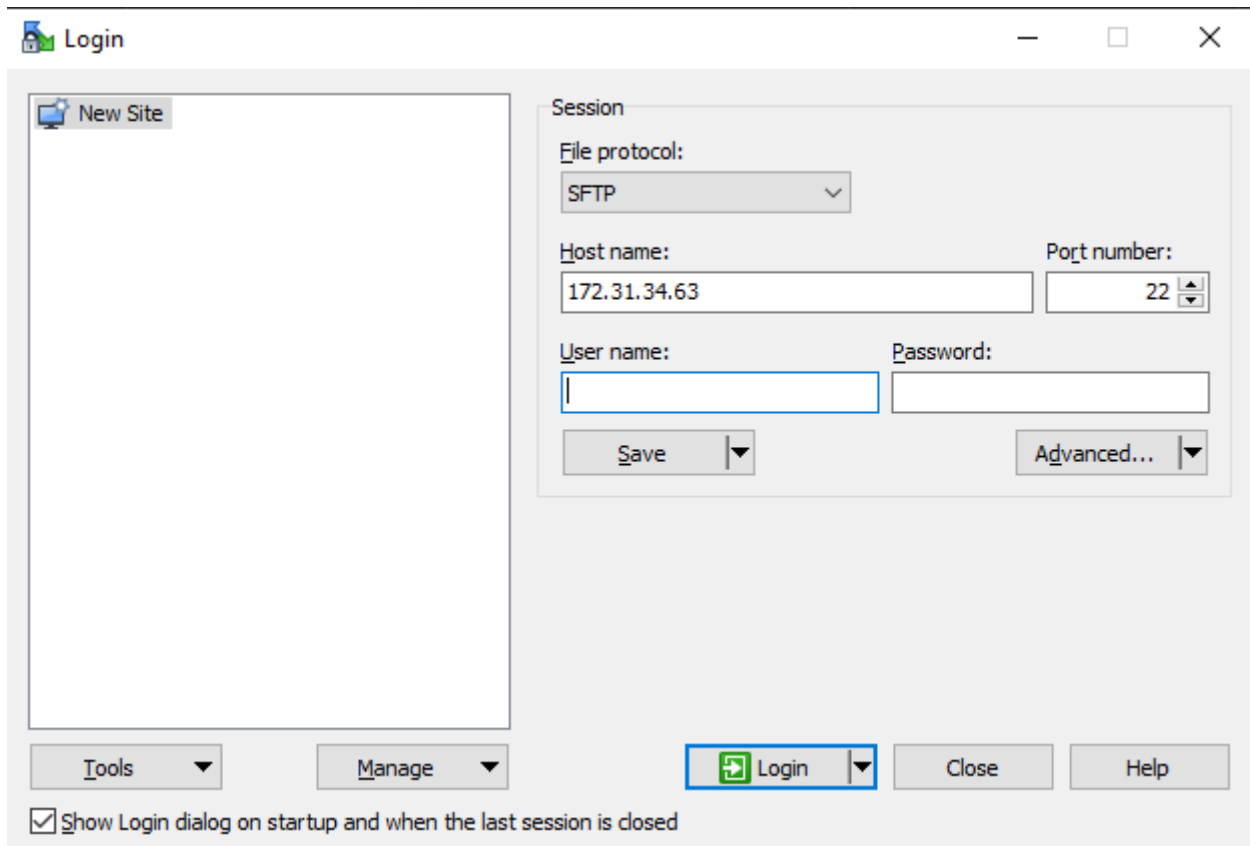
E.3 Updating the Ampere SCP Firmware

The Ampere SCP firmware can be updated through the OpenBMC console. Ensure the system running WinSCP is on the same network as the R12SPD-A motherboard before performing these steps.

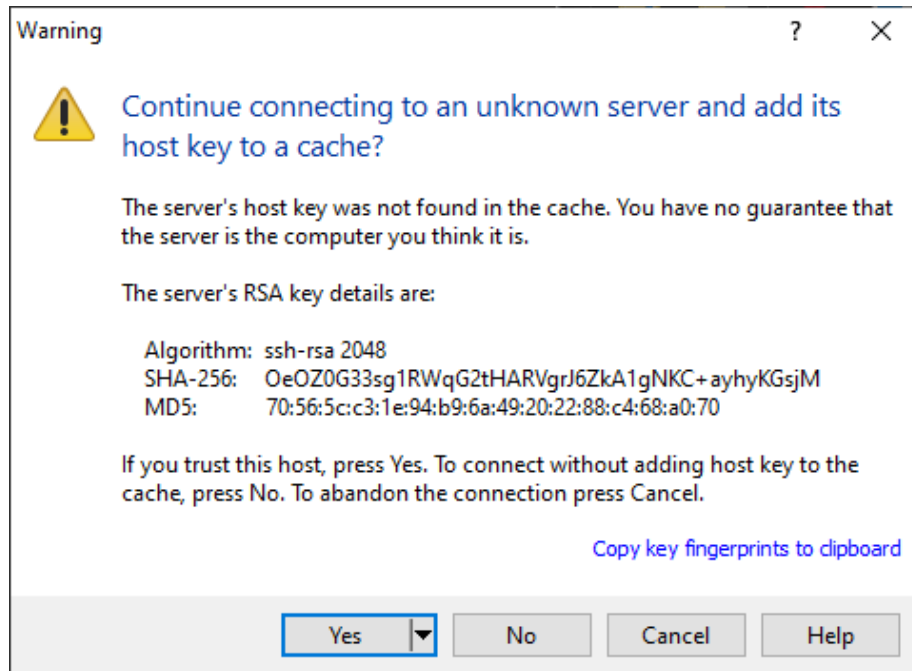
Updating the Ampere SCP Firmware through BMC Console

To update the Ampere SCP firmware through the BMC console, perform the following steps on a Windows system:

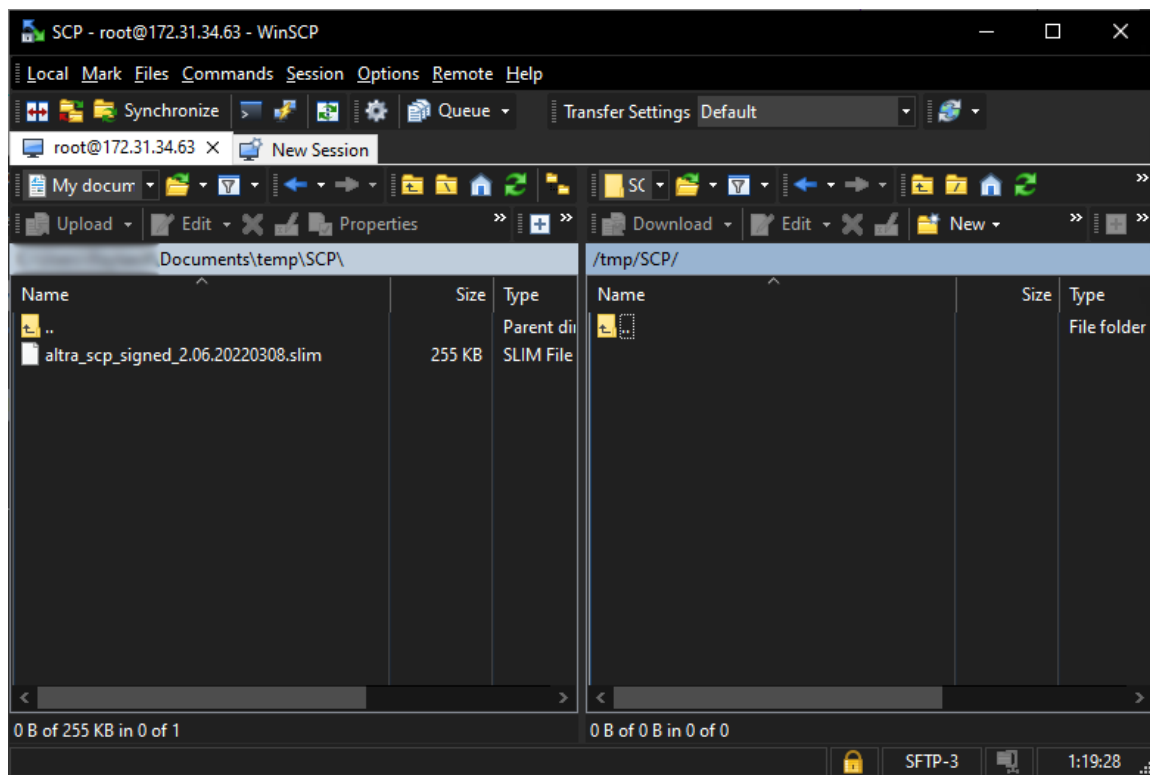
1. Power off the system.
2. Launch WinSCP and enter the R12SPD-A login information into the Host name, User name, and Password fields with the SFTP file protocol.



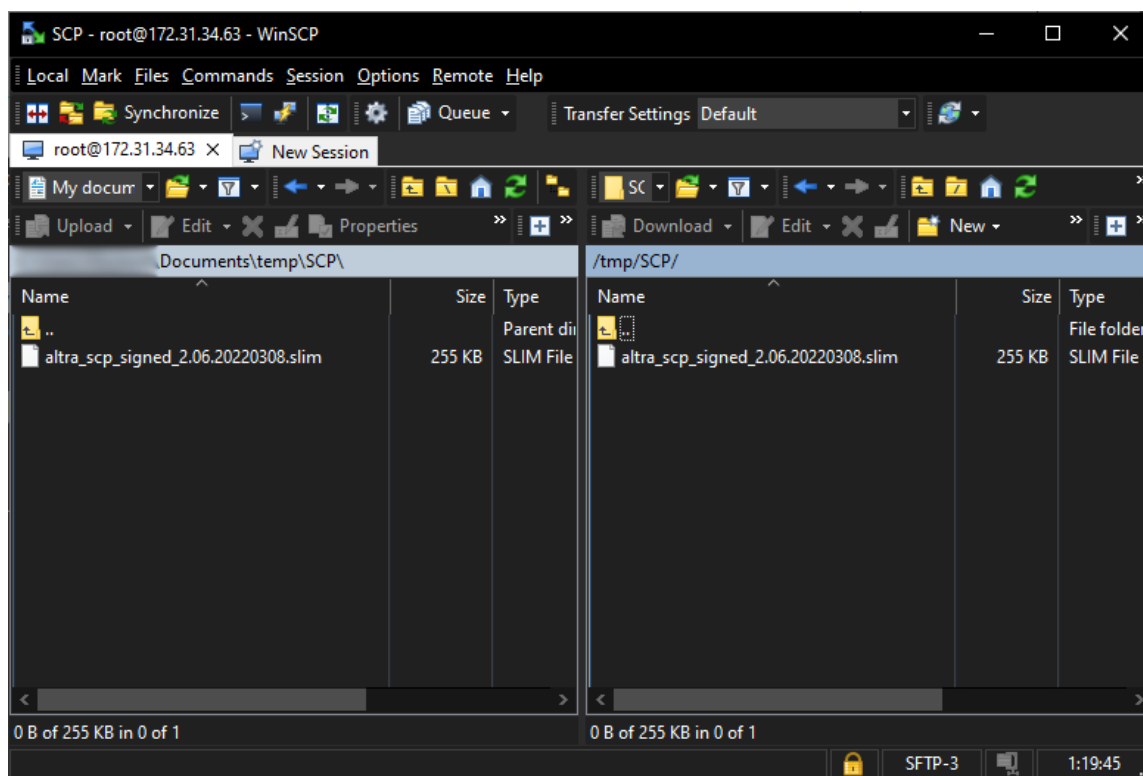
3. Add the remote server's RSA key to cache. Click "Yes" if the window shown below appears.



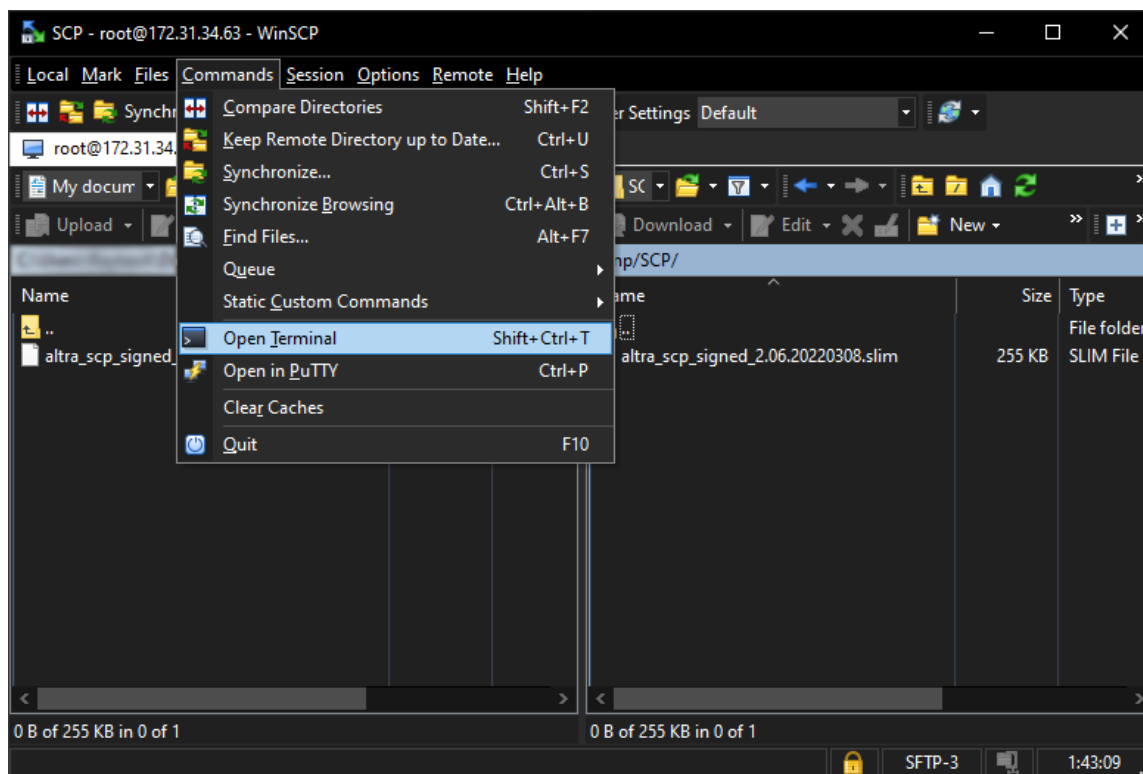
4. Locate the Ampere SCP slim file on the system that will access the BMC console.



5. Move the Ampere SCP slim file to the remote system.



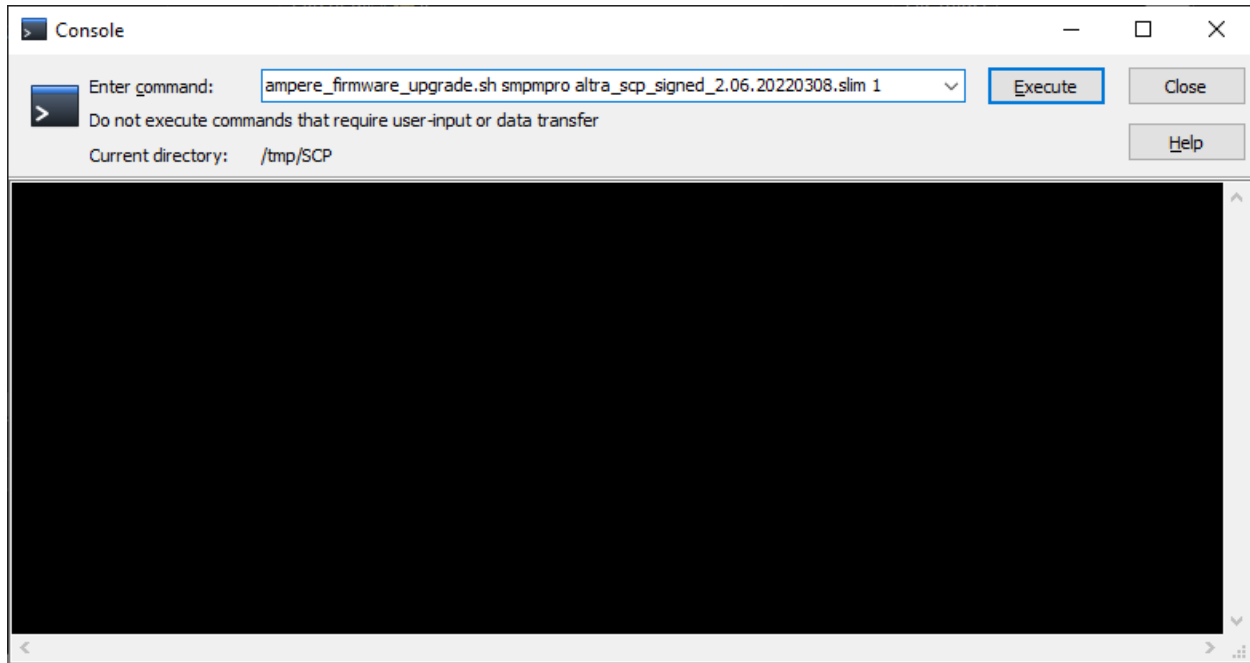
6. In the ribbon on the top of WinSCP, expand Commands and open the Terminal.



7. Enter the following command: **ampere_firmware_upgrade.sh smpmpro altra_scp_signed_2.06.20220308.slim 1**



Note: Replace **altra_scp_signed_2.06.20220308.slim** with the path to your Ampere SCP firmware update slim file.



8. Execute the command. Do not interrupt the update process until the update is complete.