H13SRA-F
H13SRA-TF

USER'S MANUAL

Revision 1.0

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Manual Revision 1.0

Release Date: December 29, 2023

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 H13SRA-(T)F motherboard.

About This Motherboard

The Supermicro H13SRA-(T)F supports a single AMD Ryzen™ Threadripper™ PRO 7000 WX-Series / Ryzen Threadripper 7000 Series processor in Socket sTR5 (LGA-4844) with a thermal design power (TDP) of up to 350 W. Built with the AMD TRX50, the H13SRA-(T)F supports up to 4 TB ECC RDIMM/3DS RDIMM memory with speeds of up to 5200 MT/s (1DPC) or higher with overclocking support in four ECC DDR5 (288-pin) DIMM slots. This motherboard features superior IO expandability, which includes two PCIe 5.0 x8 slots, two PCIe 5.0 x16 slots with metal armor protection, four SATA 3.0 ports, two M.2 slots, five USB ports, three USB headers with five USB connections, one dedicated BMC LAN, and dual LAN ports (1 GbE on H13SRA-F and 10 GbE on H13SRA-TF). It also offers the most advanced data protection capabilities that encompasses support of Trust Platform Module (TPM). The H13SRA-(T)F is optimized for high-performance, high-end computing platforms and is ideal for media and entertainment, engineering, scientific computing, and AI development applications. Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at https://www.supermicro.com/products/.

> **Note 1:** The memory speed and capacity support depend on the processor on your motherboard.
>
> **Note 2:** Memory addressing up to 1 TB/channel is subject to AMD Infrastructure Road-map for sTR5 socket processors.

Conventions Used in the Manual

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

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

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

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

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

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Appendix A BIOS POST Codes

Appendix B Software

Appendix C Standardized Warning Statements

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, please contact your retailer.

1.1 Checklist

Main Parts List		
Description	Part Number	Quantity
Supermicro Motherboard	H13SRA-(T)F	1
I/O Shield	MCP-260-00189-0B	1
SATA Cables	CBL-0044L	4 (single pack) 2 (bulk pack)
Quick Reference Guide	MNL-2640-QRG	1 (single pack)

Important Links

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

- Supermicro product manuals: https://www.supermicro.com/support/manuals/

- Product drivers and utilities: https://www.supermicro.com/wdl/driver

- Product safety info: https://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, please contact our support team at: support@supermicro.com

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

Figure 1-1. H13SRA-TF Motherboard Image
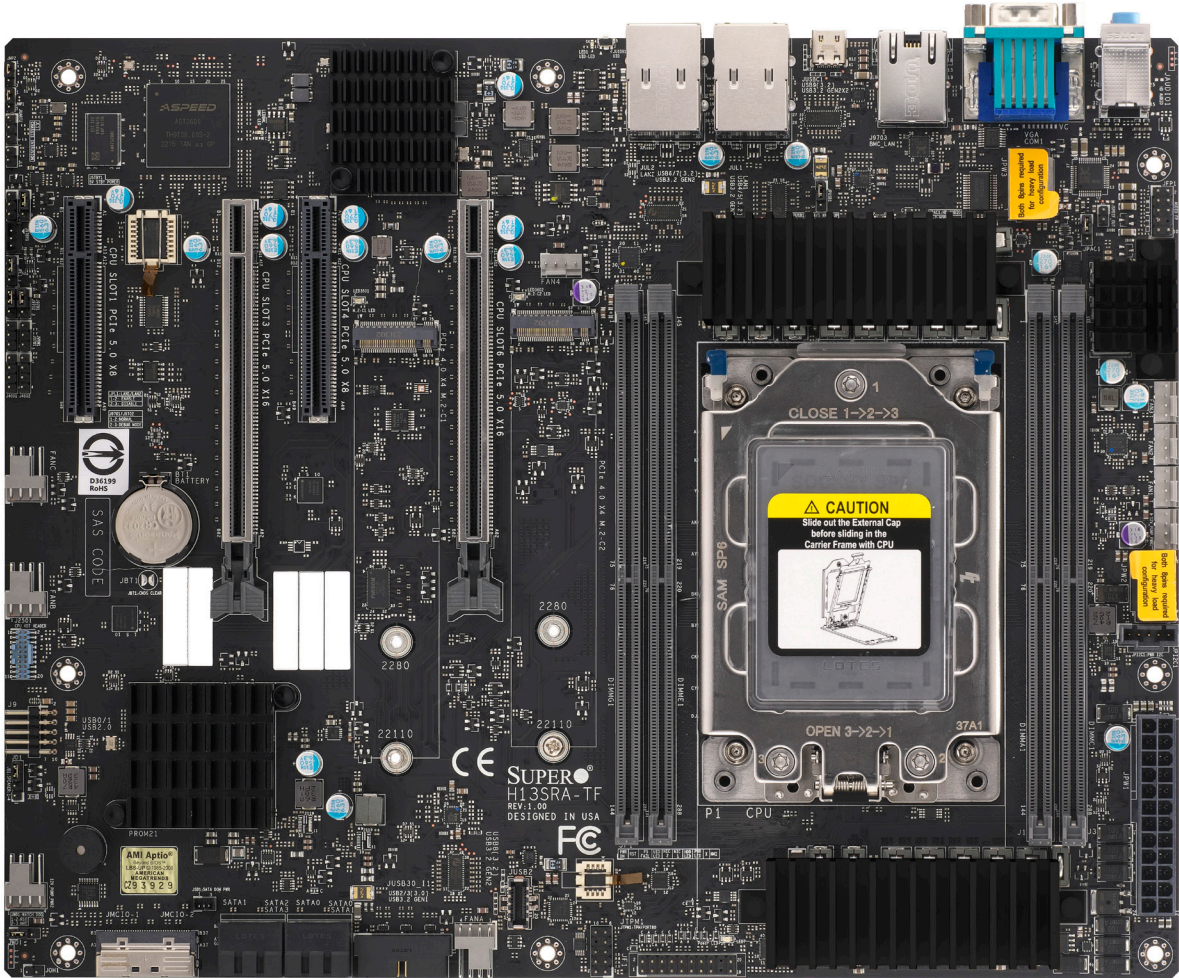
Differences between H13SRA-F and H13SRA-TF		
	H13SRA-F	**H13SRA-TF**
LAN1, LAN2	RJ45 1 GbE LAN Ports	RJ45 10 GbE LAN Ports

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. H13SRA-TF Motherboard Layout
(not drawn to scale)
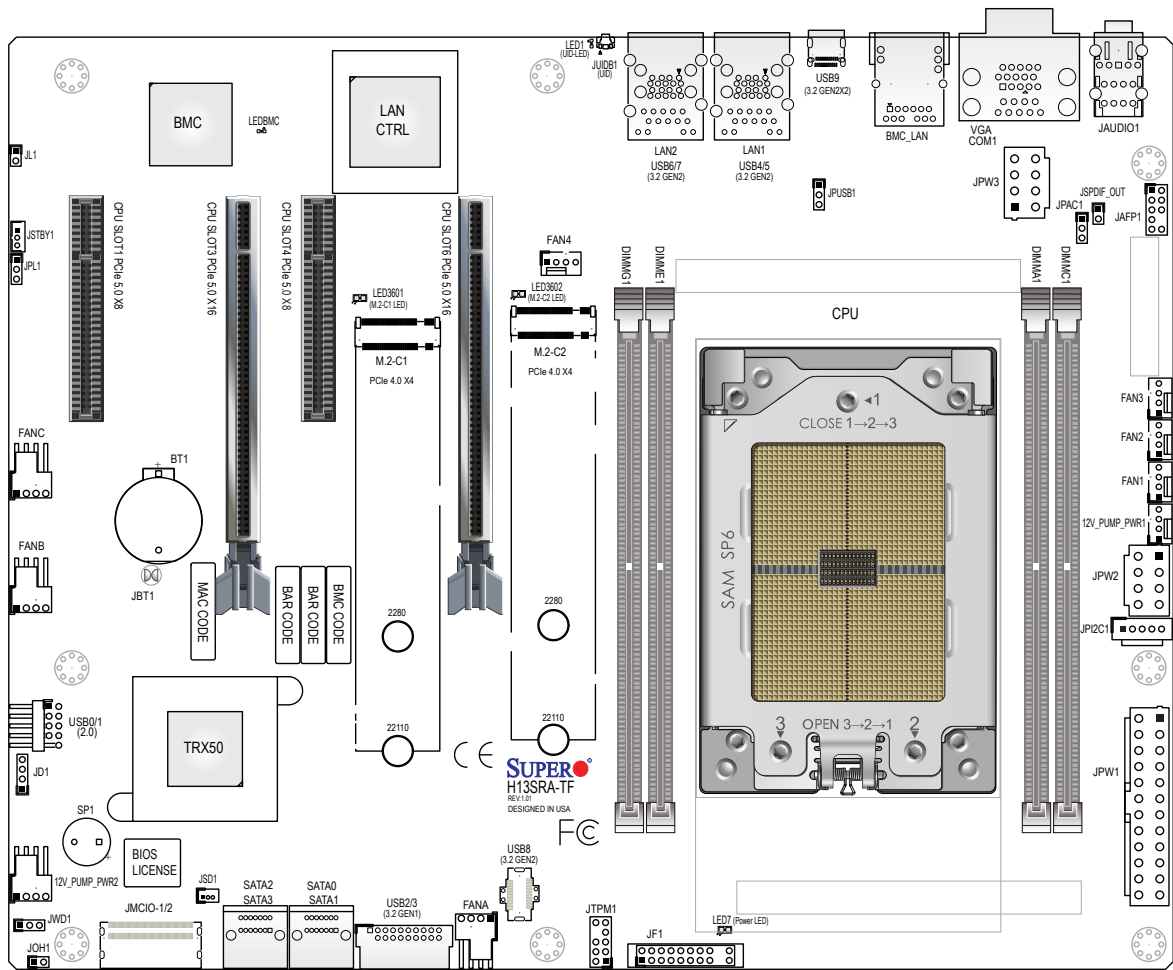
Differences between H13SRA-F and H13SRA-TF		
	H13SRA-F	**H13SRA-TF**
LAN1, LAN2	RJ45 1 GbE LAN Ports	RJ45 10 GbE LAN Ports

Note: Components not documented are for internal testing only.

Quick Reference
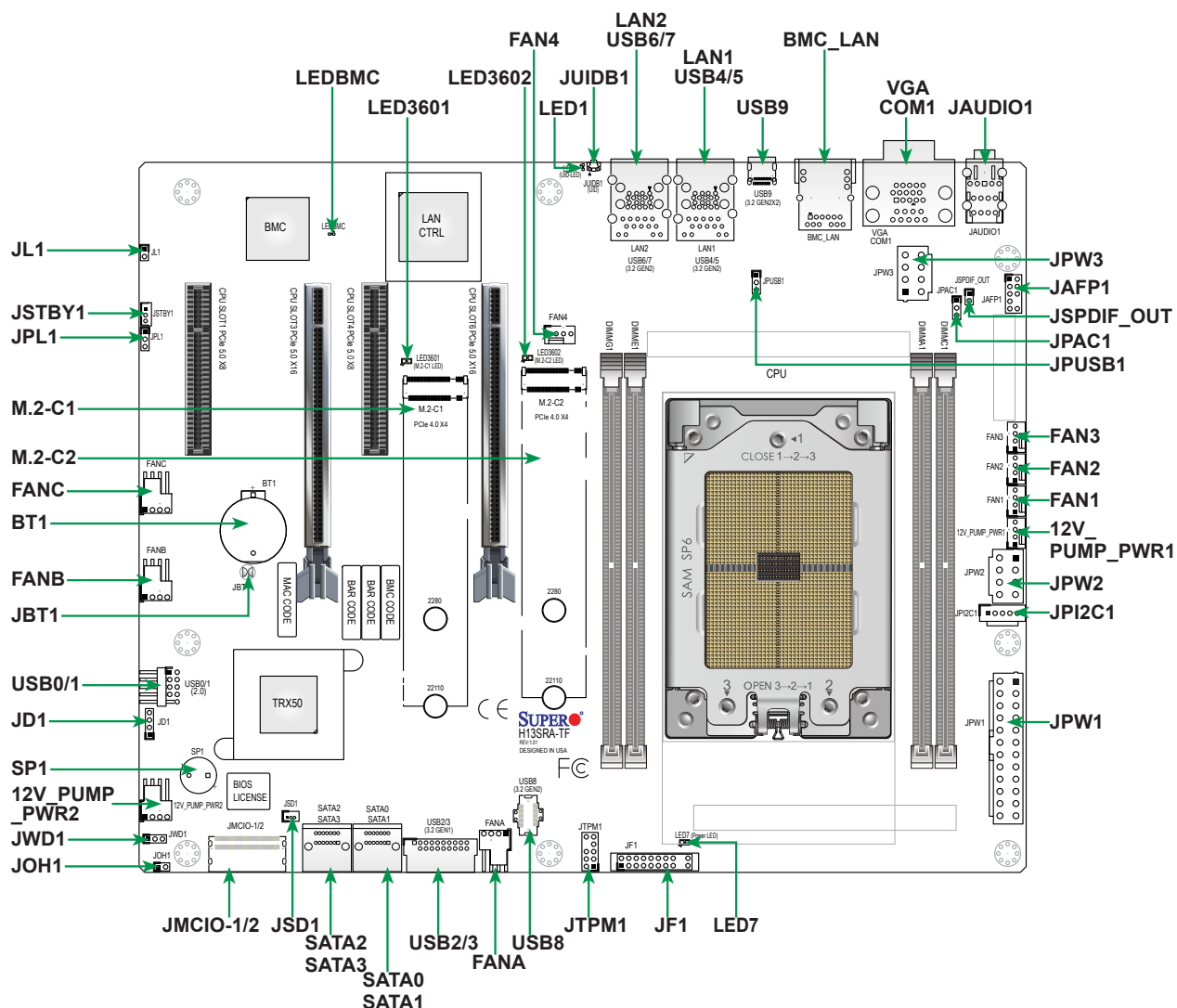
Notes:

- See Chapter 2 for detailed information on jumpers, I/O ports, and JF1 front panel connections.
- " ■ " indicates the location of Pin 1.
- Jumpers/LED indicators not indicated are used for testing only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid possible explosion.

Quick Reference Table

Jumper	Description	Default Setting
JBT1	Clear CMOS (Onboard)	Short Pads to Clear CMOS
JPAC1	HD Audio Enable/Disable	Pins 1-2 (Normal)
JPL1	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPUSB1	USB4/5 Wake Up	Pins 1-2 (Enabled)
JWD1	Watchdog Function Enable	Pins 1-2 (Reset)

LED	Description	Status
LED1	Unit Identifier (UID) LED	Blue On: Unit Identified
LED3601, LED3602	M.2 LEDs for M.2-C1 and M.2-C2	Blinking Green: Device Working
LED7	Onboard Power LED	Solid Green: Power On
LEDBMC	BMC Heartbeat LED	Blinking Green: BMC Normal

Connector	Description
12V_PUMP_PWR1	12 V 4-pin Power Connector (for CPU liquid cooling pump)
12V_PUMP_PWR2	12 V 4-pin Power Connector (for GPU liquid cooling pump)
BMC_LAN	Dedicated BMC LAN Port (RJ45)
BT1	Onboard Battery
COM1	COM Port (Back Panel)
CPU SLOT1/4	PCIe 5.0 x8 Slots
CPU SLOT3/6	PCIe 5.0 x16 Slots
FAN1 – FAN4	CPU Fan Headers
FANA, FANB, FANC	System Fan Headers
JAFP1	Front Panel Audio Header
JAUDIO1	Back Panel High Definition Audio Ports
JD1	Speaker/Buzzer Header
JF1	Front Control Panel Header
JL1	Chassis Intrusion Header
JMCIO-1/2	PCIe 4.0 x8 MCIO Connector with support of two NVMe 2.5" SSDs (NOT hot-swappable, supported by TRX50)
JOH1	Overheat LED Header
JPI2C1	Power Supply SMBus I^{2}C Header
JPW1	24-pin ATX Main Power Connector (Required)
JPW2, JPW3	12 V 8-pin CPU Power Connectors (Required)
JSD1	SATA Disk-On-Module (DOM) Power Connector
JSPDIF_OUT	Sony/Philips Digital Interface (S/PDIF) Out Header
JSTBY1	Standby Power Header (5 V)
JTPM1	Trusted Platform Module (TPM)/Port 80 Header
JUIDB1	Unit Identifier (UID) Switch / BMC Reset Button

Connector	Description
LAN1, LAN2	RJ45 1 GbE LAN Ports (H13SRA-F only); RJ45 10 GbE LAN Ports (H13SRA-TF only)
M.2-C1, M.2-C2	PCIe 4.0 x4 M.2 M-key Slots (Support 22110/2280 form factors and RAID 0/1)
SATA0 – SATA3	SATA 3.0 Ports (6 Gb/second, support RAID 0/1/5/10)
SP1	Internal Speaker/Buzzer
USB0/1	Front Access USB 2.0 Header
USB2/3	Front Access USB 3.2 Gen. 1 Header (5 Gb, Type-A)
USB4, USB5, USB6, USB7	Back Panel USB 3.2 Gen. 2 Ports (10 Gb, Type-A)
USB8	Front Access USB 3.2 Gen. 2 Header (10 Gb, Type-C)
USB9	Back Panel USB 3.2 Gen. 2x2 Port (20 Gb, Type-C)
VGA	VGA Port (supported by BMC)

Motherboard Features

Motherboard Features
CPU
• Supports a single AMD Ryzen Threadripper PRO 7000 WX-Series / Ryzen Threadripper 7000 Series processor in Socket sTR5 (LGA4844) with a thermal design power (TDP) of up to 350 W.
Memory
• Supports up to 4 TB ECC RDIMM/3DS RDIMM memory with speeds of up to 5200 MT/s (1DPC) or higher with overclocking support in four ECC DDR5 (288-pin) DIMM slots **Note 1:** The memory speed and capacity support depend on the processor on your motherboard. **Note 2:** Memory addressing up to 1 TB/channel is subject to AMD Infrastructure Roadmap for sTR5 socket processors.
DIMM Size
• Up to 1 TB at 1.1V **Note:** For the latest CPU/memory updates, please refer to our website at https://www.supermicro.com/products/motherboard.
Chipset
• AMD TRX50
Expansion Slots
• Two PCIe 5.0 x8 slots (CPU SLOT1/4) • Two PCIe 5.0 x16 slots (CPU SLOT3/6) • Two PCIe 4.0 x4 M.2 slots (support M-key 22110/2280 and RAID 0/1)
Network
• One dedicated BMC LAN • Dual 1 GbE LAN ports on H13SRA-F (Broadcom BCM5720) • Dual 10 GbE LAN ports on H13SRA-TF (Broadcom BCM57416)
Audio
• Realtek ALC888S - HD Audio 7.1
Baseboard Management Controller (BMC)
• ASPEED AST2600 BMC
Graphics
• Graphics controller & VGA support via ASPEED AST2600 BMC
I/O Devices
• Serial (COM) Port — • One serial port (COM1) on the rear I/O panel • SATA 3.0 — • Four SATA 3.0 ports (SATA0/1/2/3) at 6 Gb/sec • Video Connection — • One VGA port (VGA) on the rear I/O panel supported by BMC • Audio — • HD 7.1 audio ports on the rear I/O panel

Peripheral Devices

- One front accessible USB 2.0 header (USB0/1) with support of two USB connections
- One front accessible USB 3.2 Gen. 1 header (USB2/3) with support of two USB connections (5 Gb, Type-A)
- Four USB 3.2 Gen. 2 ports on the rear I/O panel (USB4/5/6/7, 10 Gb, Type-A)
- One front accessible USB 3.2 Gen. 2 20-pin header (USB8, 10 Gb)
- One USB 3.2 Gen. 2x2 port on the rear I/O panel (USB9, 20 Gb, Type-C)

BIOS

- AMI BIOS
- ACPI 6.3, PCI firmware 4.0 support, BIOS rescue hot-key, SPI dual/quad speed support, Real Time Clock (RTC) wakeup, and SMBIOS 3.0 or later

Power Management

- ACPI power management (S4/S5)
- Power-on mode for AC power recovery
- Wake-on-LAN

System Health Monitoring

- Onboard voltage monitoring for +3.3V, +5V, +12V, +3.3V standby, and +5V standby
- Onboard temperature monitoring for CPU, VRM, LAN, system, and memory
- CPU/System overheat control
- CPU thermal trip support

Fan Control

- Fan status monitoring via IPMI connections
- Dual cooling zones
- Low-noise fan speed control
- Seven 4-pin fan headers

System Management

- SuperDoctor® 5
- Chassis intrusion header and detection
- IPMIView, SMCIPMITOOL, and IPMICFG
- SPM and SUM-OOB/InBand

Firmware Integrity/System Security

- Trusted Platform Module (TPM) support

LED Indicators

- CPU/system overheat LED
- Power LED
- Fan failed LED
- UID/remote LED
- HDD activity LED
- LAN Activity LED
- BMC Heartbeat LED
- M.2 LEDs

Dimensions

- ATX 12" (L) x 9.6" (W) (305 mm x 243.8 mm)

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

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

Note 3: For proper BMC configuration, please refer to https://www.supermicro.com/products/nfo/files/IPMI/Best_Practices_BMC_Security.pdf.

Figure 1-3.
System Block Diagram

H13SRA-TF/F

SVI3 — SVI

PCIe x8 SLOT #1 — PCIE_PE3
PCIe x16 SLOT #6 — PCIE_PE2
PCIe x8 SLOT #4 — PCIE_PE3
PCIe x16 SLOT #3 — PCIE_PE1
M.2 M-KEY*2 — PCIE_G3

SPI

TPM2.0 Header   PCH_SPI   MUX

Level shifter

SPI

CPU

AMD
Ryzen Threadripper PRO 7000 WX-Series & Ryzen Threadripper 7000 Series

1DPC@5200MT

J1 J3 J5 J7

#0 #0 #0 #0

DDR5 RDIMM   DDR5 RDIMM   DDR5 RDIMM   DDR5 RDIMM

A
C
E
G

PCIE G3*4 — GLAN1/2 BCM57416 (-F only for 1Gb) BCM5720 — 10Gb/1Gb LAN1 / 10Gb/1Gb LAN2

PCIE G2*1

HD Audio — Audio chip ALC888S-VD — FRONT AUDIO HEADER / JAUDIO1 / JSPDIF

PCIE 4.0 x4 8GT/s

HDT

4X USB3.2 Gen 2 X1

AMD
TRX50

REAR USB
10Gb Rear Type A X 4 — Re-driver
20Gb USB-Type C X1 — Re-driver — 1X USB3.2 Gen2x2

USB Header
10Gb USB-C HEADERX1 — Re-driver — 2X USB3.2 Gen2x1
5G USB-A *2 HEADER — 2X USB3.2 Gen1
USB2.0*2 USB-HEADER — USB2.0 *2

SATA G3*4 — SATA III*4
PCIE G4*8 — MCIO R/A Conn.

USB2.0 *2

SPI

BMC
AST2600

VGA

PCIE G2*1

RGMII — GLAN2 RTL8211FD — 1Gb LAN3

COM1
HEALTH INFO

RTH *2
FAN *7

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 AMD Ryzen Threadripper PRO 7000 WX-Series and Ryzen Threadripper 7000 Series processors (Socket sTR5, LGA-4844) and the AMD TRX50, the H13SRA-(T)F motherboard increases energy efficiency, and system performance for a multitude of applications such as media and entertainment, engineering, scientific computing, and AI development applications.

Features Supported

* DDR5 288-pin memory support

* Vector Neural Network Instructions (VNNI) support to accelerate training

* SATA Controller (up to 6 Gb/sec)

* PCIe 5.0 Interface (up to 32 GT/s)

1.3 Special Features

Recovery from AC Power Loss

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

1.4 System Health Monitoring

Onboard Voltage Monitors

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

Fan Status Monitor with Firmware Control

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

Environmental Temperature Control

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

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

System Resource Alert

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

1.5 ACPI Features

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

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

1.6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for processors that have high CPU clock rates where noisy power transmission is present.

The H13SRA-(T)F motherboard accommodates a 24-pin ATX power connector. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. Additional 12V 8-pin power connections will be required to ensure adequate power supply to the system.

> **Warning**! To avoid damaging the power supply on the motherboard, use a power supply that contains 24-pin and 8-pin power connectors. Be sure to connect the power supplies to the 24-pin power connector (JPW1) and 8-pin power connectors (JPW2 and JPW3) on the motherboard. Failure in doing so may void the manufacturer warranty on your power supply and motherboard.

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant.

1.7 Serial Port

The H13SRA-(T)F motherboard supports one serial communication connection. COM1 port can be used for input/output. The UART provides legacy speeds with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support high-speed serial communication devices.

Chapter 2

Installation

2.1 Static-Sensitive Devices

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

Precautions

- Use a grounded wrist strap designed to prevent static discharge.

- Touch a grounded metal object before removing the motherboard from the antistatic bag.

- Handle the motherboard by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.

- When handling chips or modules, avoid touching their pins.

- Put the motherboard and peripherals back into their 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.

- When installing the processor and heatsink, ensure a torque driver set to the correct force is used for each screw.

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 processor 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.

- Thermal grease is pre-applied on a new heatsink. No additional thermal grease is needed.

- Refer to the Supermicro website for updates on processor support.

- All graphics in this manual are for illustrative purposes only. Your components may look different.

- Installing the processor does not require a screwdriver. Do not unscrew the processor socket.

- Installing the heatsink requires a Phillips #1 screwdriver.

The AMD Ryzen Threadripper PRO 7000 WX-Series and Ryzen Threadripper 7000 Series Processor

Note: The processor is shipped from the factory with the Carrier Frame pre-assembled.
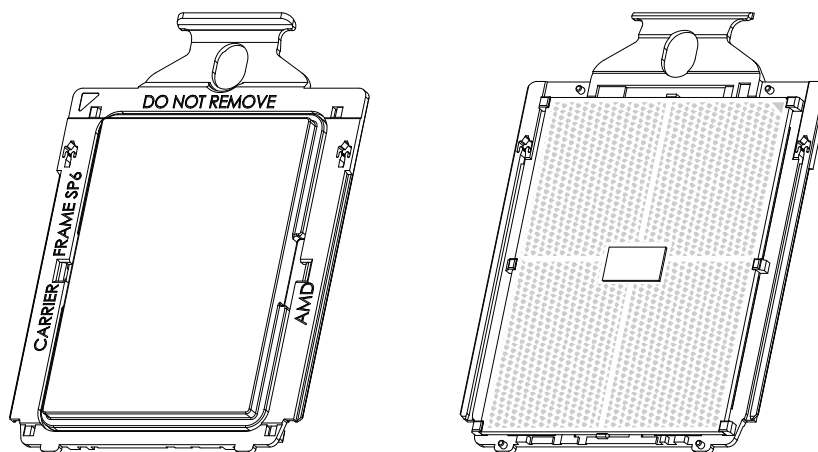
Overview of the Processor Socket

The processor socket is protected by a Pick-and-Place (PnP) Cover Cap and pre-installed with an External Cap.

1. External Cap
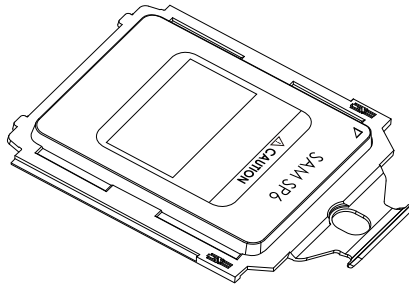
2. PnP Cover Cap
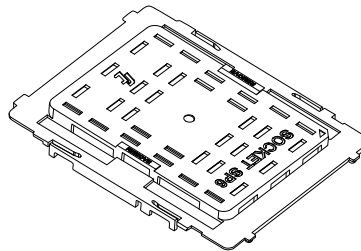
3. Socket sTR5
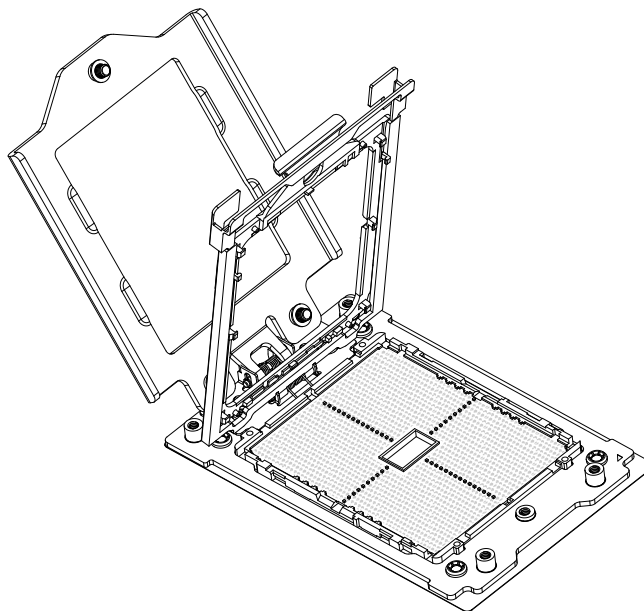
Installing the Processor

1. With a T20 Torx-bit screwdriver, unscrew the screws holding down the Force Frame in the sequence of 3-2-1. The screws are numbered on the Force Frame next to each screw hole.
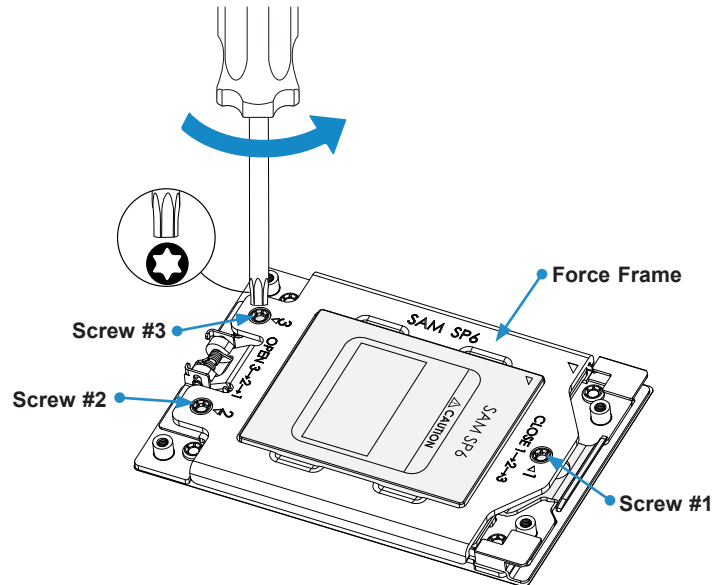
2. The spring-loaded Force Frame will raise up after the last screw (#1) securing it is removed. Gently lift it up to its stopping position.
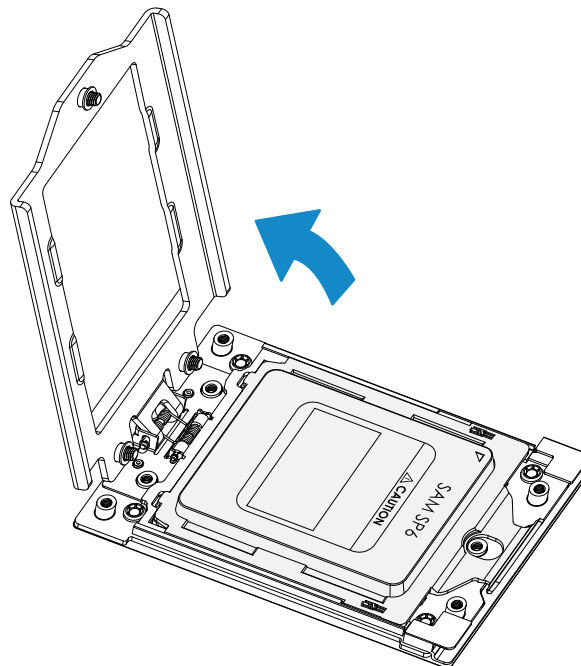
3. Grip the two finger lift tabs of the Rail Frame and lift it up to open it.
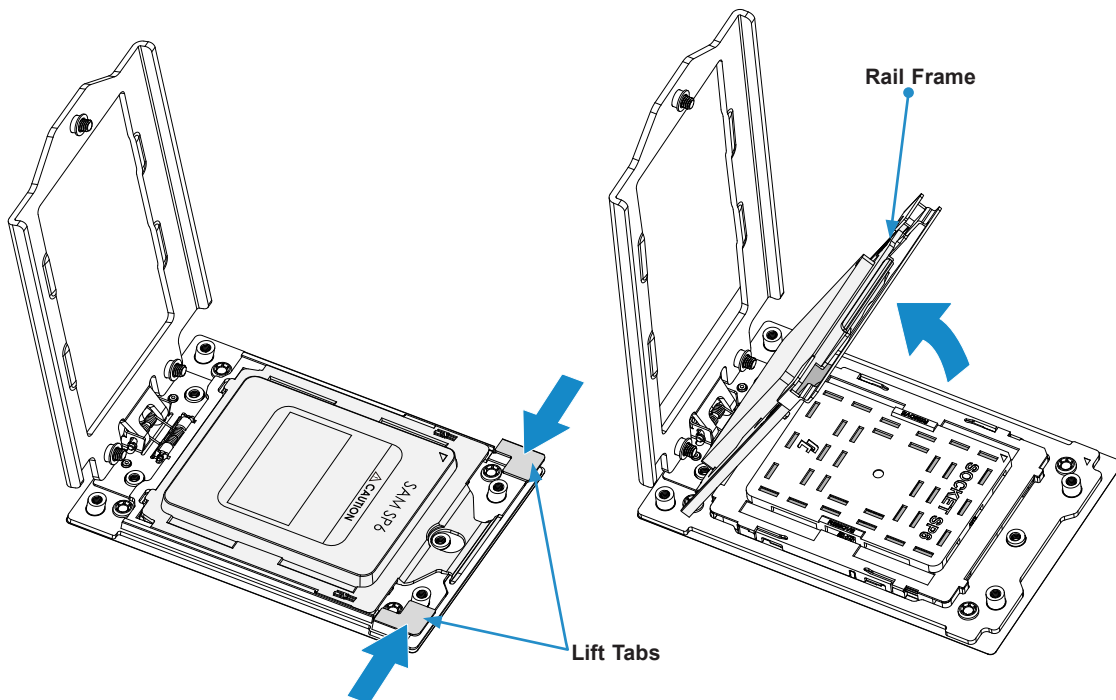
4. Remove the External Cap from the Rail Frame by pulling it out of the rail guides on the Rail Frame.
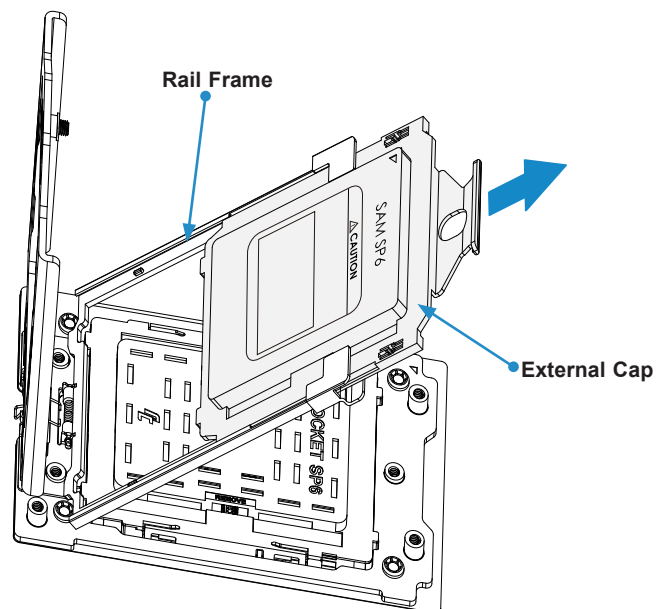
5. Grip the handle of the Carrier Frame/Processor Assembly from its shipping tray, and while gripping the handle, align the flanges of the Carrier Frame onto the rails of the Rail Frame so its pins will be at the bottom when the Rail Frame is lowered later.

6. Hold the two finger lift tabs of the Rail Frame, and slide the Carrier Frame/Processor Assembly downwards to the bottom of the Rail Frame. Ensure the flanges are secure on the rails as you lower it downwards.
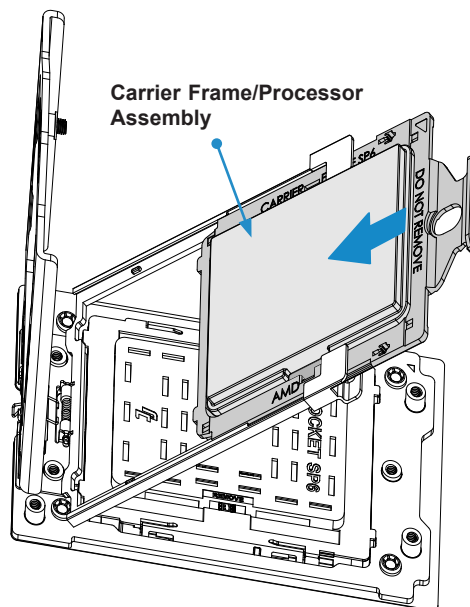
Note: You can only slide the Carrier Frame/Processor Assembly in one direction with the handle at the top. Make sure that it is properly inserted.

7. Lift up the Rail Frame till it securely rests in upright position. Be careful not to touch the processor pad.
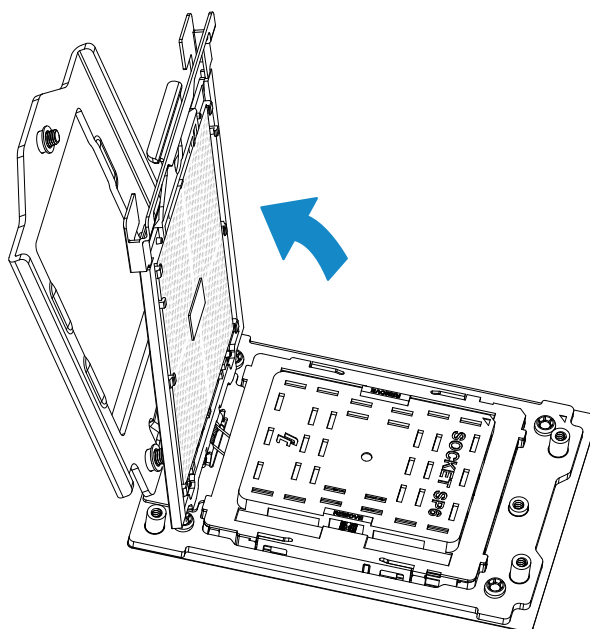
8. Remove the PnP Cover Cap from the socket.
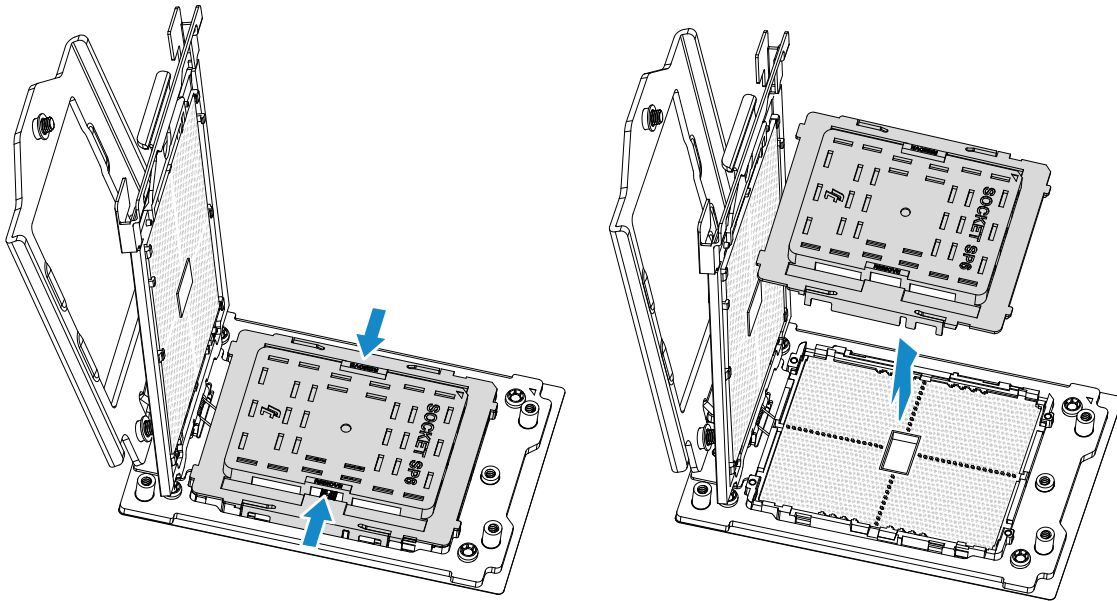
> **Warning!** The exposed socket contacts are extremely vulnerable and can be damaged easily. Do not touch or drop objects onto the contacts, and be careful removing the PnP Cover Cap and when placing the Rail Frame over the socket.

9. Gently lower the Rail Frame down onto the socket until it clicks into place. If it doesn't close properly, do not force it as it may damage your processor. Instead, open the Rail Frame again, and double-check that the processor is aligned properly.
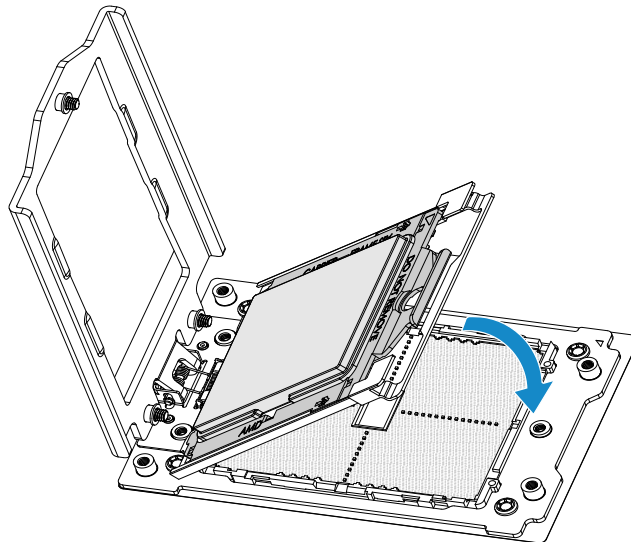
10. Gently lower the Force Frame down onto the Rail Frame and hold it in place until it is seated in the socket housing. Note that the Force Frame is spring loaded and has to be held in place before it is secured.
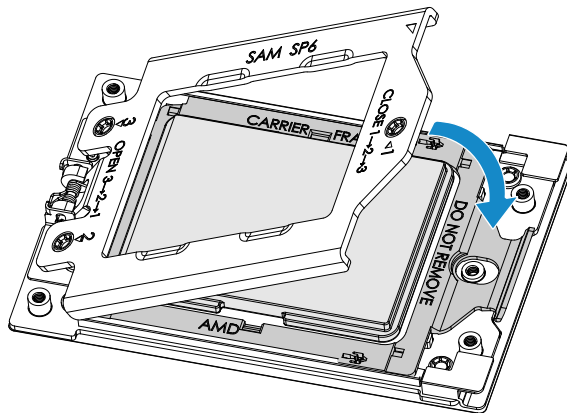
11. Re-screw the screws in the sequence of 1-2-3. When finished, the socket Force Frame will secure the processor.
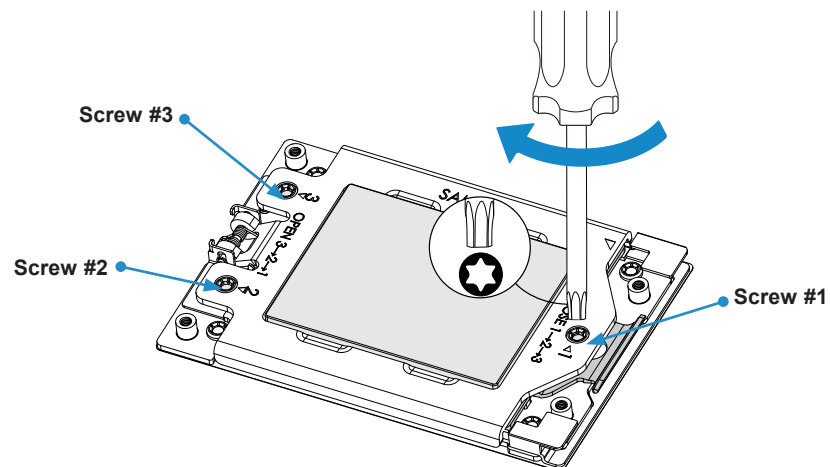
Important: Use a T20 Torx-bit screwdriver with a torque of 13.8±1.3 kg-f-cm (12.0±1.2 lb-f-in) to prevent damage to the processor.

Installing the Heatsink

1. After the Force Frame is secured and the CPU Package is in place, now you must install the heatsink to the frame. Lower the heatsink down till it rests securely over the four screw holes on the CPU Package on the socket frame.
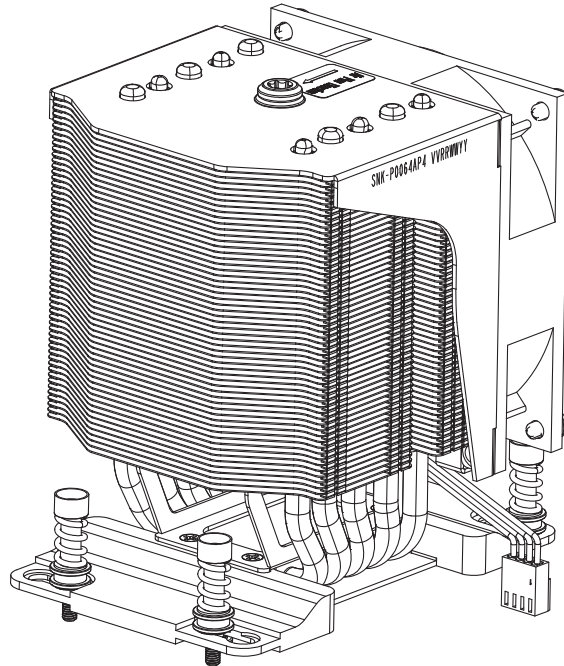
2. As illustrated, tighten the four screws down on the heatsink in a diagonal pattern till it is secured. The heatsink will now be secured and you have finished installing the processor and heatsink onto the motherboard.
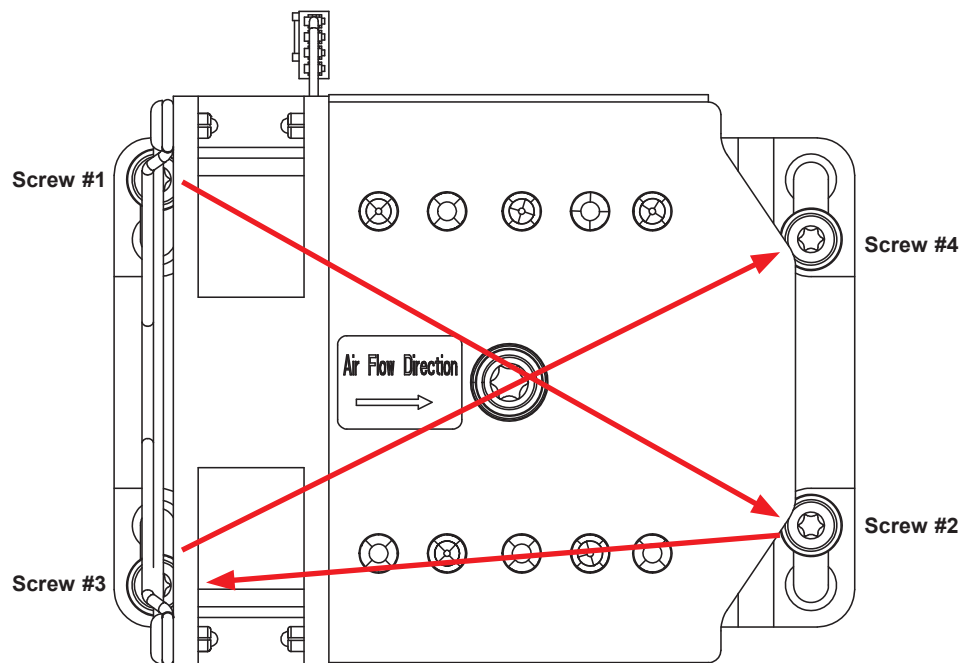
2.3 Motherboard Installation

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

Tools Needed
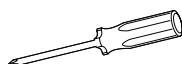
Phillips Screwdriver (1)

Phillips Screws (8)

Standoffs (8) Only if Needed

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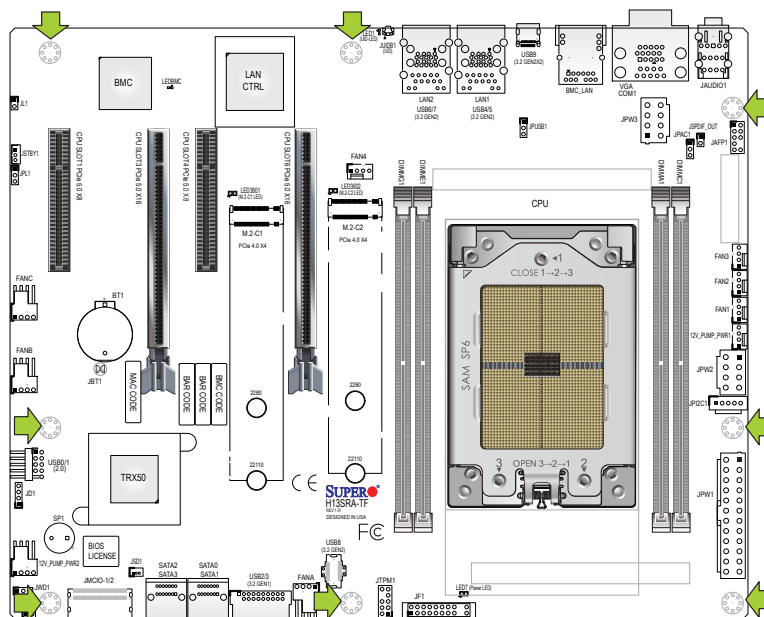
Note 1: To avoid damaging the motherboard and its components, please do not use a force greater than 8 lbf-in on each mounting screw during motherboard installation.

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

Installing the Motherboard

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

2. Locate the mounting holes on the motherboard. See the previous page for the location.
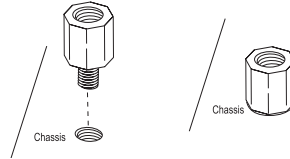
3. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.
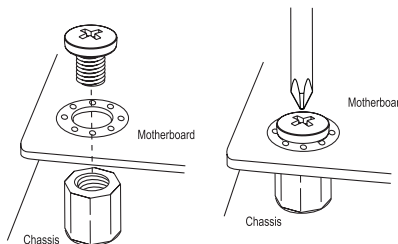
4. Install standoffs in the chassis as needed.

5. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.

6. Using the Phillips screwdriver, insert a pan head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.

7. Repeat Step 6 to insert #6 screws into all mounting holes.

8. Make sure that the motherboard is securely placed in the chassis.

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

2.4 Memory Support and Installation

Note: Check the Supermicro website for recommended memory modules.

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

Memory Support

This motherboard supports up to 4 TB ECC RDIMM/3DS RDIMM memory with speeds of up to 5200 MT/s (1DPC) or higher with overclocking support in four ECC DDR5 (288-pin) DIMM slots.

Note 1: The memory speed and capacity support depend on the processor on your motherboard.

Note 2: Memory addressing up to 1 TB/channel is subject to AMD Infrastructure Roadmap for sTR5 socket processors.

Recommended Memory Population (1DPC)

Recommended Memory Population					
	DIMMG1	DIMME1		DIMMA1	DIMMC1
1 DIMM			CPU	DDR5	
2 DIMMs		DDR5		DDR5	
4 DIMMs	DDR5	DDR5		DDR5	DDR5

General Guidelines for Optimizing Memory Performance

- It is recommended to use DDR5 memory of the same type, size, and speed.

- To achieve the best memory performance, a balanced memory population is recommended.
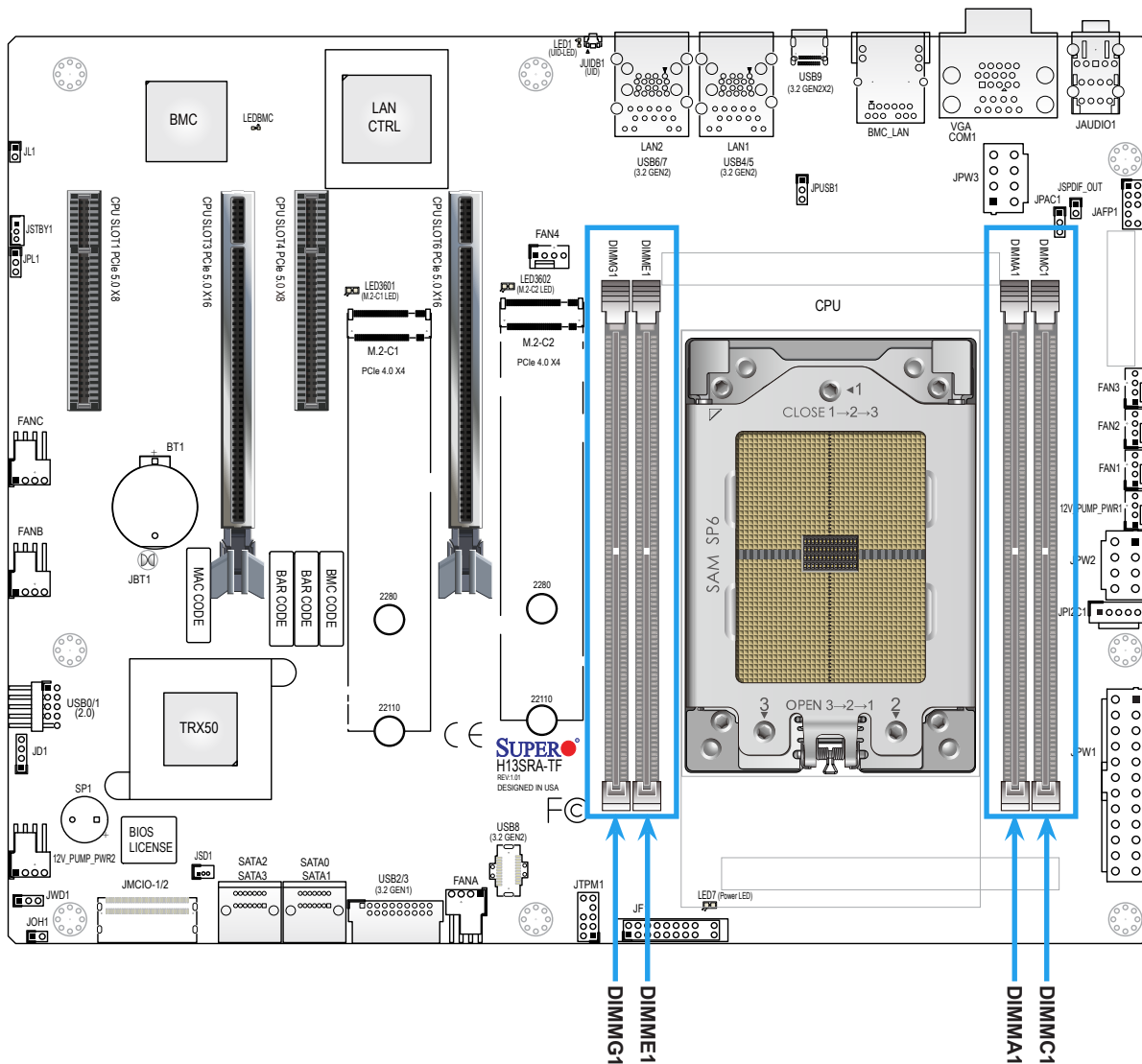
DIMM Installation

> *Note:* The DDR5 DIMM module is NOT hot-swappable and be sure to disconnect power for a minimum of 20 seconds before inserting or removing it.

1. Insert the desired number of DIMMs into the memory slots based on the recommended DIMM population table in this user's manual. Locate DIMM memory slots on the motherboard as shown on the right.
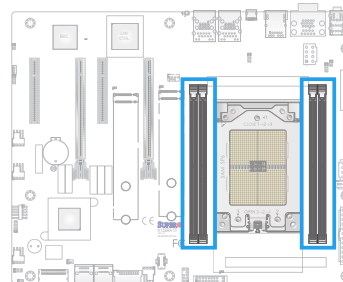
2. Align the DIMM module key with the receptive point on the single-latch DIMM slot.

3. Push the release tab outwards to unlock the slot.

4. Align the notch on the end of the module against the receptive point on the end of the slot.

5. Press both ends of the module straight down into the slot until the module snaps into place.

6. Push the release tab to the lock position to secure the module into the slot.

Key

Receptive Point

Notch
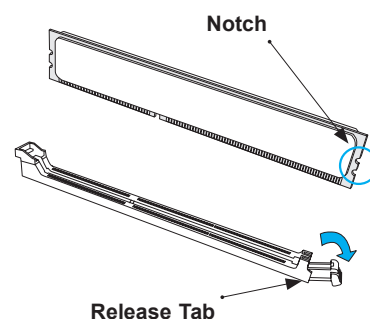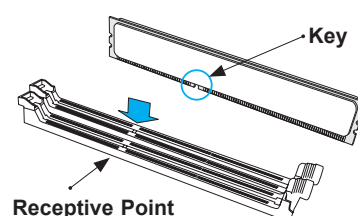
Release Tab

DIMM Removal

Press the release tab on one end of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.

> *Note:* Removing a DDR5 DIMM module at a slant angle will cause module damages. It is strongly recommended that you lift the module straight up out of the slot.

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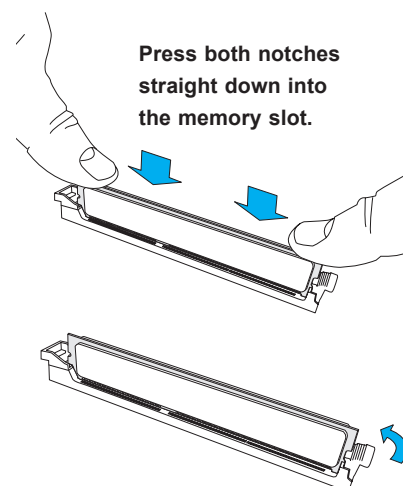
Warning! Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the DIMM module or the DIMM socket. Please handle DIMM modules with care. Carefully follow all the instructions given on Page 1 of this chapter to avoid ESD-related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

2.5 M.2 Installation

This motherboard has two M.2 M-key slots that support the 2280 and 22110 M.2 devices. One standoff is pre-installed into the position of 22110 mounting hole. Refer to the illustration on the right for the locations of M.2 slots and mounting holes. Follow the steps below to install the M.2 device.

Note: It is strongly recommended that you install an optional Supermicro M.2 heatsink (p/n SNK-C0156L) on the M.2 device.
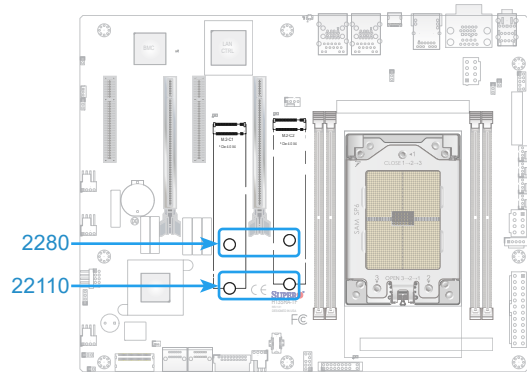
M.2 Heatsink Installation (Optional)

1. Remove the thermal pad protective films from the cover and the tray of the M.2 heatsink.

Heatsink Cover
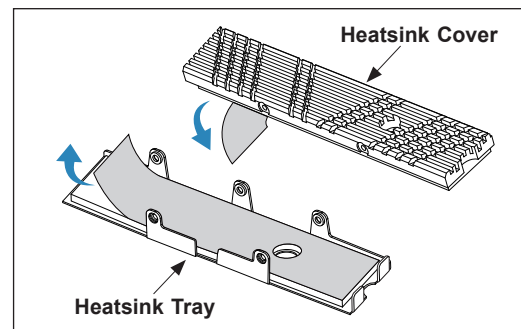
Heatsink Tray

2. Place the M.2 device into the tray, then put the heatsink cover in place. Be careful to align the holes on the tray with the holes on the cover.
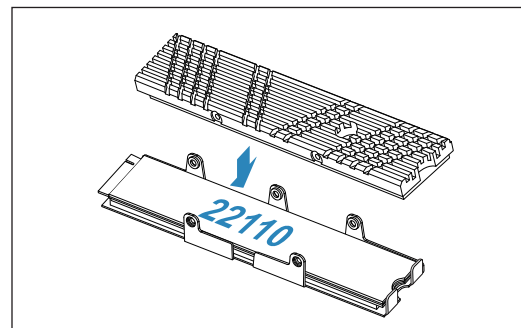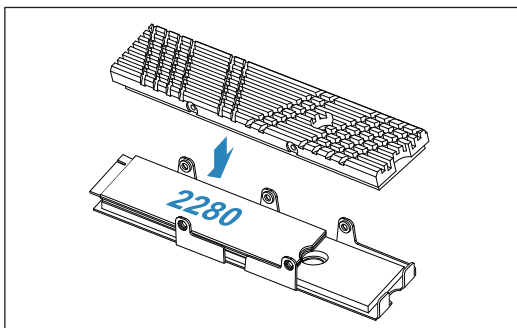
2280

22110

3. Tighten the screws to secure the heatsink assembly.
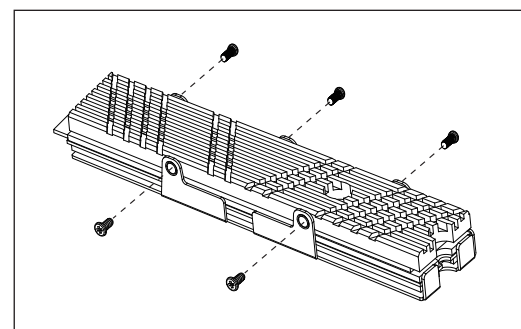
2280 M.2 Device Installation

1. Locate the pre-installed standoff on the 22110 mounting hole. Remove the standoff screw and set it aside.
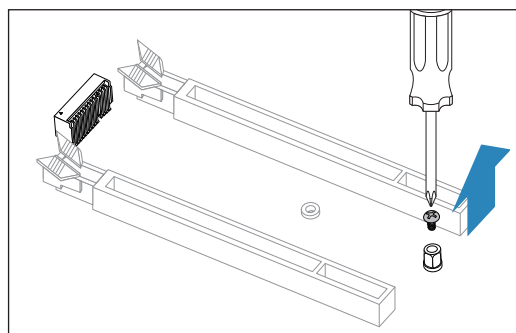
2. Using a hex socket screwdriver, remove and then reinstall the standoff to the position of the 2280 mounting hole.
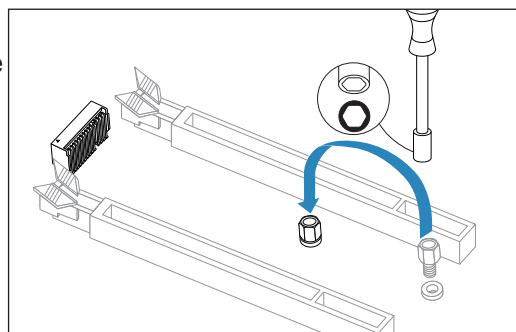
3. Insert the M.2 device or the heatsink assembly into the M.2 socket at a 30-degree angle and press it down.

Standard M.2 device

M.2 device with Supermicro heatsink

4. Tighten the standoff screw to secure the M.2 device or the heatsink assembly into place. Do not overtighten so as to avoid damaging the M.2 device.

Standard M.2 device

M.2 device with Supermicro heatsink
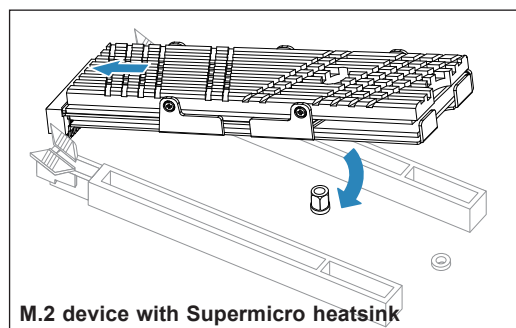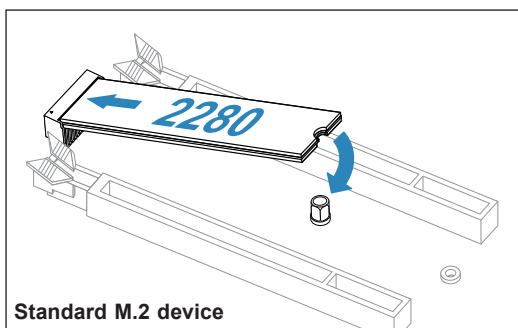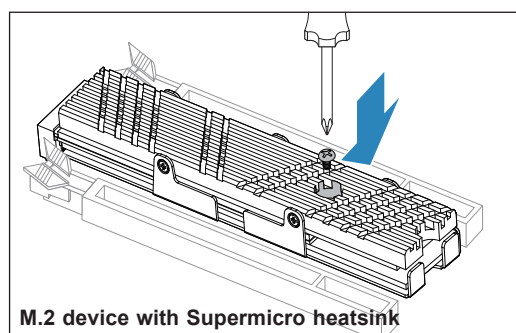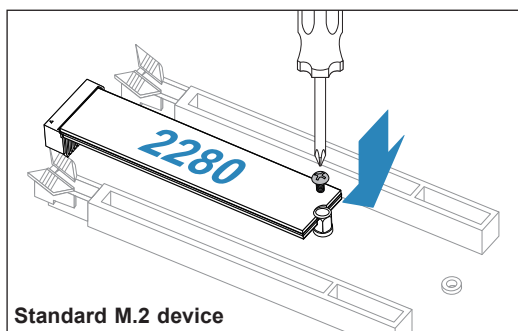
22110 M.2 Device Installation

1. Locate the pre-installed standoff. Remove the standoff screw and set it aside.
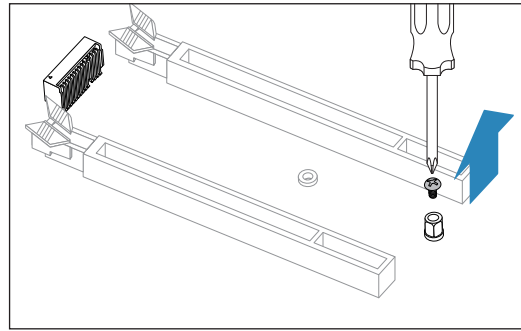
2. Insert the M.2 device or the heatsink assembly into the M.2 socket at a 30-degree angle and press it down.

Standard M.2 device

M.2 device with Supermicro heatsink

3. Tighten the standoff screw to secure the M.2 device or the heatsink assembly into place. Do not overtighten so as to avoid damaging the M.2 device.

Standard M.2 device

M.2 device with Supermicro heatsink
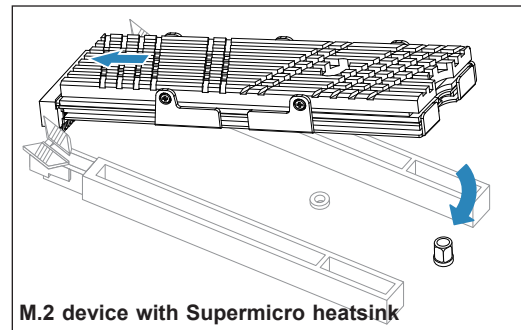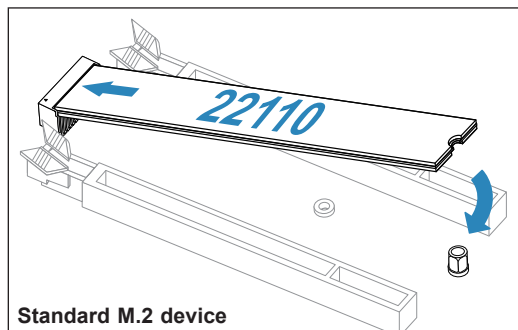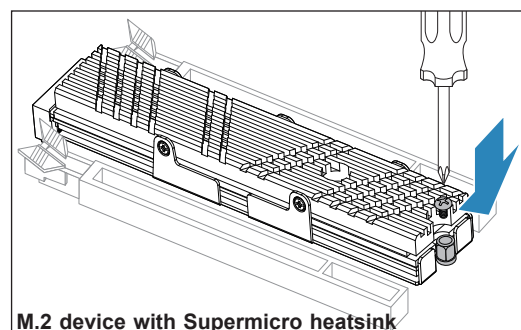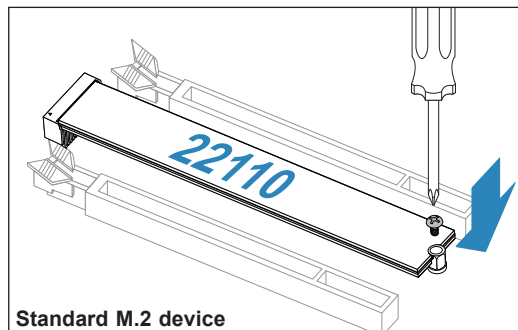
2.6 Rear I/O Ports

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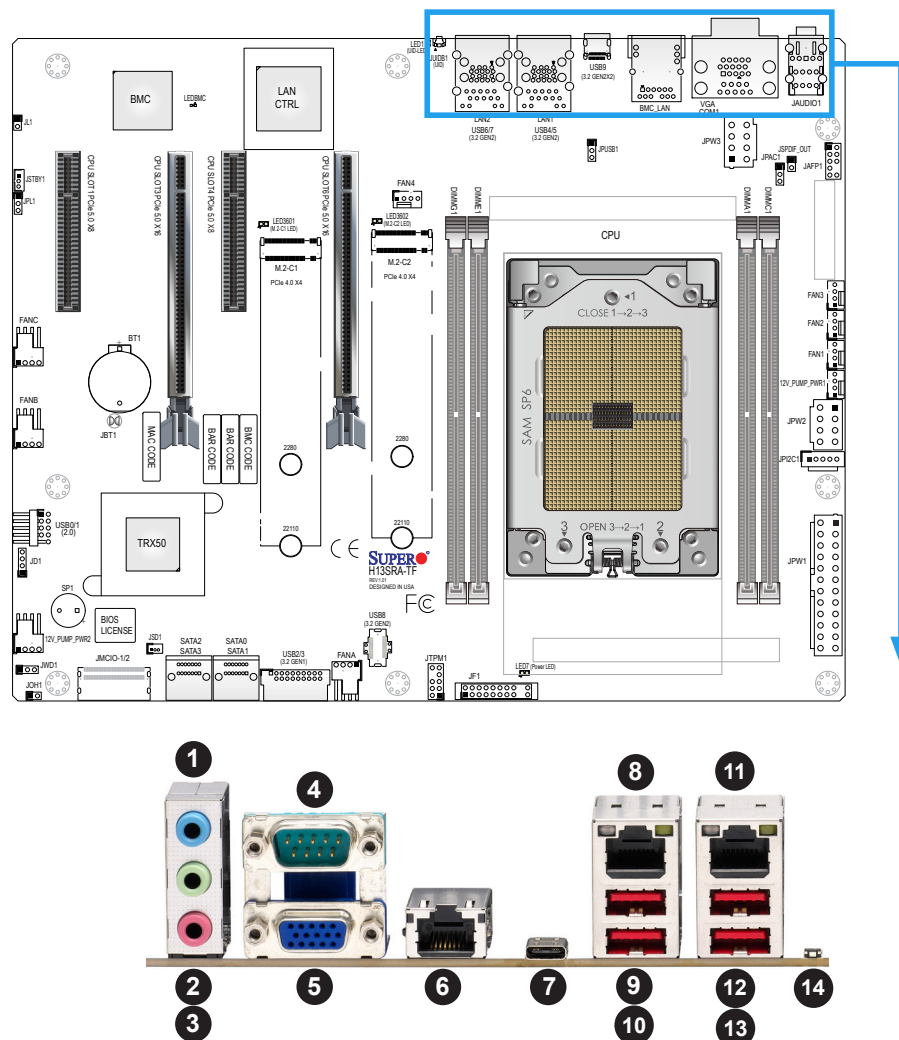
Figure 2-1. I/O Port Locations and Definitions

Rear I/O Ports					
#	Description	#	Description	#	Description
1	Line In (default)	6	Dedicated BMC LAN Port	11	LAN2: RJ45 LAN Port (H13SRA-F: 1 GbE; H13SRA-TF: 10 GbE)
2	Line Out (default)	7	USB9: USB 3.2 Gen. 2x2 Port	12	USB6: USB 3.2 Gen. 2 Port
3	Mic In (default)	8	LAN1: RJ45 LAN Port (H13SRA-F: 1 GbE; H13SRA-TF: 10 GbE)	13	USB7: USB 3.2 Gen. 2 Port
4	COM1 Port	9	USB4: USB 3.2 Gen. 2 Port	14	UID Switch / BMC Reset Button
5	VGA Port	10	USB5: USB 3.2 Gen. 2 Port		

Back Panel High Definition Audio (HD Audio)

This motherboard features a 7.1+2 Channel High Definition Audio (HDA) codec that provides 10 DAC channels. The HD Audio connections simultaneously support multiple-streaming 7.1 sound playback with 2 channels of independent stereo output through the front panel stereo out for front, rear, center, and subwoofer speakers. To enable this function, download the advanced software for this motherboard.

Recommended Audio Configuration				
	2 Channel	**4 Channel**	**5.1 Channel**	**7.1 Channel**
Audio ports on the rear I/O panel of the motherboard				
1 Blue ("Line In" by default)	*	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
2 Green ("Line Out" by default)	Front Speaker Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
3 Pink ("Mic In" by default)	*	*	Center/Subwoofer Speaker Out	Center/Subwoofer Speaker Out
Audio ports on the front panel of the Supermicro system				
(Front Panel) Green	*	*	*	*
(Front Panel) Pink	*	*	*	Side Speaker Out

* Function depends on the driver and configuration.
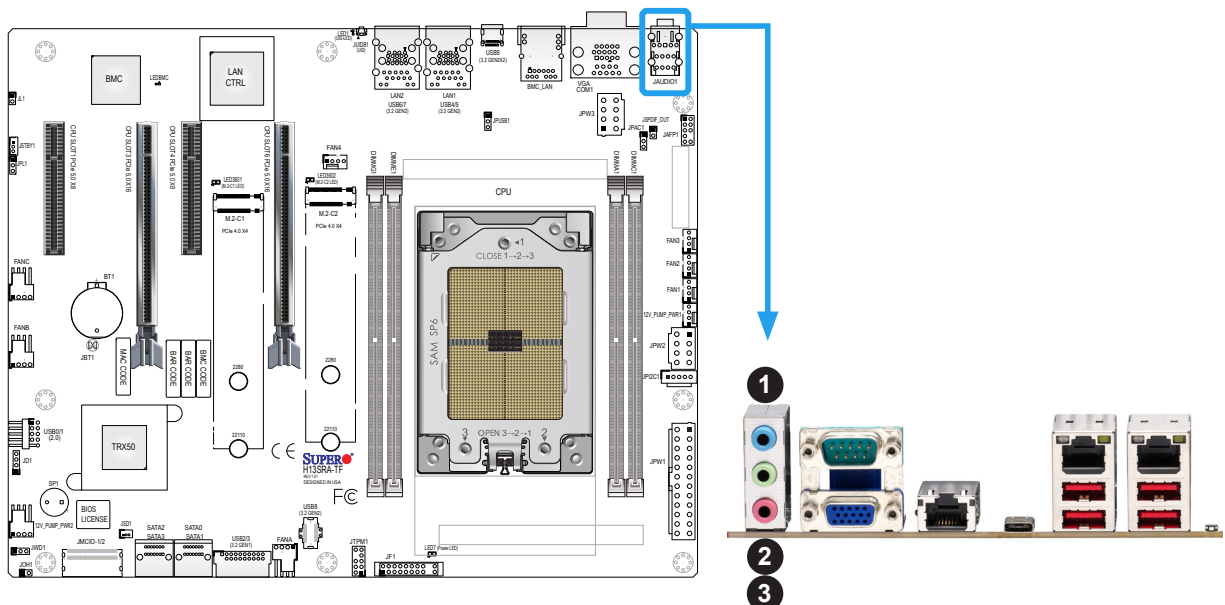
COM Port

One COM port (COM1) that supports serial link interface is located on the rear I/O panel. Refer to the layout below for the location of COM1.

VGA Connection (Supported by BMC)

One VGA port (VGA) is located on the rear I/O panel. The VGA connection provides analog interface support between the computer and the video displays. Refer to the layout below for the location of VGA port.
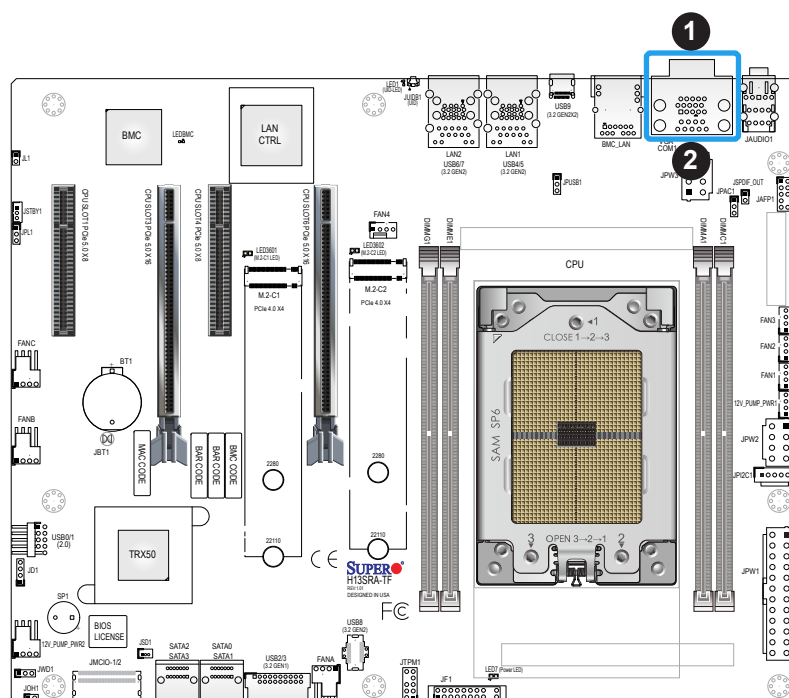
1. COM Port (COM1)
2. VGA Port (VGA)

LAN Ports

Two Ethernet LAN ports (LAN1, LAN2) and a dedicated BMC LAN port (BMC_LAN) are located on the rear I/O panel.

- H13SRA-F supports dual 1 GbE LAN ports of LAN1/LAN2 (Broadcom BCM5720)

- H13SRA-TF supports dual 10 GbE LAN ports of LAN1/LAN2 (Broadcom BCM57416)

The dedicated BMC LAN port (BMC_LAN) provides LAN support for the Baseboard Management Controller (BMC). All of these LAN ports accept RJ45 cables. Please refer to the LED Indicator section (Section 2.10) for LAN LED information.
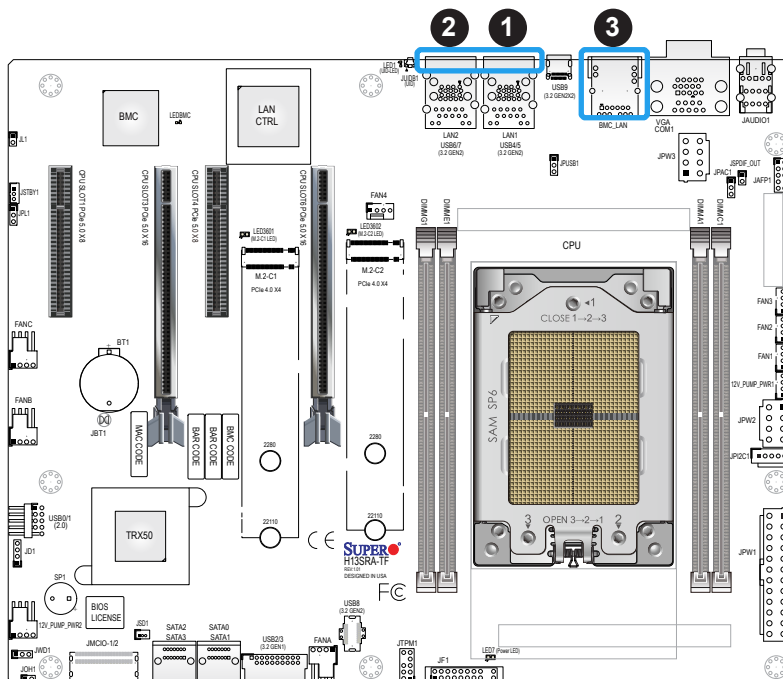
1. LAN1 (1 GbE for H13SRA-F; 10 GbE for H13SRA-TF)

2. LAN2 (1 GbE for H13SRA-F; 10 GbE for H13SRA-TF)

3. Dedicated BMC LAN Port (BMC_LAN)

Universal Serial Bus (USB) Ports and Headers

The motherboard provides the following USB ports on the rear I/O panel:

- Four USB 3.2 Gen. 2 ports (USB4/USB5/USB6/USB7; 10 Gb, Type-A)
- One USB 3.2 Gen. 2x2 port (USB9; 20 Gb, Type-C)

The motherboard also provides the following headers for front accessible USB connections with a cable (not provided):

- One USB 2.0 header (USB0/1) for two Type-A connections
- One USB 3.2 Gen. 1 header (USB2/3) for two Type-A connections (5 Gb)
- One USB 3.2 Gen. 2 header (USB8) for one Type-C connection (10 Gb)
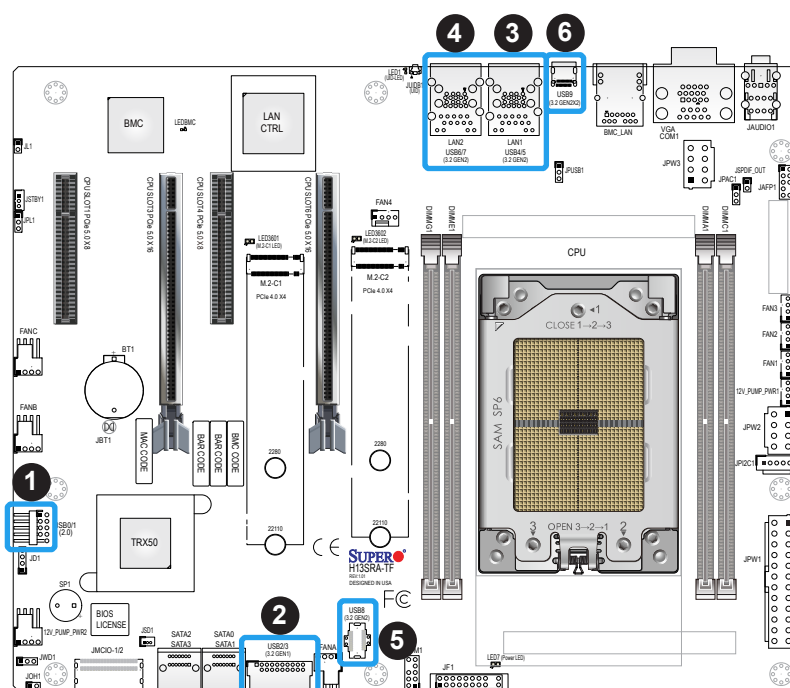
1. USB0/1 (Front Access)
2. USB2/3 (Front Access)
3. USB4/USB5 (Rear I/O Panel)
4. USB6/USB7 (Rear I/O Panel)
5. USB8 (Front Access)
6. USB9 (Rear I/O Panel)

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

A UID / BMC Reset switch (JUIDB1) is located on the rear side of the motherboard. This switch has dual functions. It can be used to identify a system unit that is in need of service, and it can also be used to reset the BMC settings.

When functioning as a BMC reset switch, JUIDB1 will trigger a cold reboot when you press and hold the switch for six seconds. It will also restore the BMC to the manufacturer's default when you press and hold the switch for 12 seconds.

When functioning as a UID LED switch, JUIDB1 will turn both rear UID LED (LED1) and front UID LED (Pin 7/Pin 8 of JF1) on and off when you press the switch on/off.

To achieve these dual purposes, the UID LED/BMC Reset switch works in conjunction with the BMC Heartbeat LED (LEDBMC) and front/rear UID LEDs. Please note that UID can also be triggered via BMC on the motherboard. For more details on the UID LEDs and BMC LEDs, refer to the tables on the next page. Also, refer to the BMC User's Guide posted on our website at https://www.supermicro.com for more information on BMC.

JF1 Header Pins

	1	2	
Power Button	○	○	Ground
Reset Button	○	○	Ground
3.3V	○	○	Power Fail (for LED6)
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail for LED5/Blue UID LED)
P3V3_STBY	○	○	NIC2 Active LED
P3V3_STBY	○	○	NIC1 Active LED
ID_UID/3.3V Stby	○	○	HDD LED
3.3V	○	○	FP PWR LED
Key	○	○	Key
NMI	○	○	Ground
	19	20	

1. UID Switch / BMC Reset (JUIDB1)
2. Rear UID LED (LED1)
3. Front UID LED
4. BMC Heartbeat LED (LEDBMC)
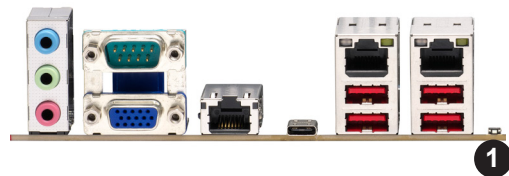
(Continued to next page)

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UID/BMC Reset Switch (JUIDB1)					
Features & Settings					
When Used as a UID LED Switch			**When Used as a BMC Reset Switch**		
Work w/ Rear UID LED (LED1) & Front UID LED (JF1: Pin7/ Pin8)			**Work with BMC Heartbeat LED (LEDBMC)**		
Rear UID LED	LED1	Blue: Unit identified	BMC Heartbeat LED	LEDBMC	Green Blinking: BMC Normal
Front UID LED	Pin7/Pin8 (JF1)	Blue: Unit identified	BMC Reset: Press & hold the switch (JUIDB1) for six seconds	LEDBMC: Solid green: during reboot	
Press the switch (JUIDB1) to turn on and off both rear and front UID LED indicators.				Triggering a cold reboot; LED: solid green on during cold reboot	
			BMC Reset: Press & hold the switch (JUIDB1) for 12 seconds	LEDBMC: Solid green: during BMC reset	
				BMC: Reset to the manufacturer's default; LED solid on during BMC Reset	

UID/BMC Reset Switch (JUIDB1) Pin Definitions	
Pin#	**Definition**
1	Ground
2	Ground
3	Button In
4	Button In

2.7 Front Control Panel

The front control panel header (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. Refer to the figure below for the descriptions of the front control panel buttons and LED indicators.

	1	2	
Power Button	○	○	Ground
Reset Button	○	○	Ground
3.3V	○	○	Power Fail (for LED6)
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail for LED5/Blue UID LED)
P3V3_STBY	○	○	NIC2 Active LED
P3V3_STBY	○	○	NIC1 Active LED
ID_UID/3.3V Stby	○	○	HDD LED
3.3V	○	○	FP PWR LED
Key	○	○	Key
NMI	○	○	Ground
	19	20	

Figure 2-2. JF1 Header Pins

Front Control Panel LEDs

```
                              1    2
        Power Button         ○    ○    Ground
        Reset Button         ○    ○    Ground
               3.3V          ○    ○    Power Fail (for LED6)
               Red+          ○    ○    Blue+
(Blue LED_Cathode_UID)                 (Red OH/Fan Fail/PWR Fail for LED5/Blue UID LED)
         P3V3_STBY           ○    ○    NIC2 Active LED
         P3V3_STBY           ○    ○    NIC1 Active LED
      ID_UID/3.3V Stby       ○    ○    HDD LED
               3.3V          ○    ○    FP PWR LED
                Key          ○    ○    Key
                NMI          ○    ○    Ground
                             19   20
```

Front Control Panel (JF1) LED Indicators						
Event	Power (LED1)	HDD (LED2)	LAN (LED3/4)	UID (LED5)	Information (LED5)	Power Fail (LED6)
Power On	Solid On					
HDD Activity		Blinking				
NIC Activity			Blinking			
Overheat					Solid On	
Fan Fail					Blinking at 1 Hz	
Power Fail					Blinking at 1/4 Hz	Solid On
Local UID On				Solid On		
Remote UID On				Blinking 1 Hz		
Checking	BMC/BIOS Blinking at 4 HZ					
Recovering/Updating	BMC Blinking at 4 HZ BMC 2 Blinks at 4 Hz, 1 Pause at 2 Hz (on-on-off-off)			BIOS/BMC Blinking at 10 Hz		
Flash Not Detected or Golden Image Check Failed	BMC/BIOS Blinking at 1 HZ					
CPLD Recovery Mode				Blinking at 10 Hz (MB UID LED)	Blinking at 10 Hz (FP Red LED)	

Power On & BMC/BIOS Status LED Button

The Power On and BMC/BIOS Status LED button is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system or display BMC/BIOS status. Refer to the tables below for more information.

Power Button & BIOS/BMC Status LED Indicator Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	Ground

Power Button Pin Definitions (Pin 1 & Pin 2 of JF1)	
Status	Event
Solid green	System power on
BMC/BIOS blinking green at 4 Hz	BMC/BIOS checking
BIOS blinking green at 4 Hz	BIOS recovery/update in progress
BMC blinking red x2 (2 blinks red) at 4 Hz, 1 pause at 2 Hz (on-on-off-off)	BMC recovery/update in progress
BMC/BIOS blinking green at 1 Hz	Flash not detected or golden image checking failure

Reset Button

The Reset Button connection is located on pins 3 and 4 of JF1. Momentarily contacting both pins will 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 Power Button	○	○	Ground
② Reset Button	○	○	Ground
3.3V	○	○	Power Fail (for LED6)
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail for LED5/Blue UID LED)
P3V3_STBY	○	○	NIC2 Active LED
P3V3_STBY	○	○	NIC1 Active LED
ID_UID/3.3V Stby	○	○	HDD LED
3.3V	○	○	FP PWR LED
Key	○	○	Key
NMI	○	○	Ground
	19	20	

1. PWR Button

2. Reset Button

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. When this LED turns solid red, it indicates a power failure. Refer to the table below for pin definitions.

Power Fail LED Pin Definitions (JF1)	
Pin#	**Definition**
5	3.3V
6	PWR Fail for LED6 (Solid red on: PWR failure)

Information LED (OH/Fan Fail/PWR Fail/UID LED)

The Information LED (OH/Fan Fail/PWR Fail/UID LED) connection is located on pins 7 and 8 of JF1. The LED on pin 7 is active when the UID button (JUIDB1) on the rear I/O panel is pressed. The LED on pin 8 provides warnings of overheat, power failure, or fan failure. Refer to the table below for more information.

Information LED-Blue+ (OH/Fan Fail/PWR Fail LED for LED5/blue UID LED) Pin Definitions (Pin 7 & Pin 8 of JF1)	
Status	**Description**
Solid red (on)	An overheat condition has occurred.
Blinking red at 1 Hz	Fan failure: check for an inoperative fan.
Blinking red at 1/4 Hz	Power failure: check for a non-operational power supply
Blinking red at 10 Hz (FP red LED)	CPLD recovery mode error(s)
Solid blue	Local UID is activated. Use this function to locate a unit in a rack mount environment that might be in need of service.
Blinking blue at 1 Hz	Remote UID is on. Use this function to identify a unit from a remote location that might be in need of service.
BIOS/BMC blinking blue at 10 Hz	BIOS/BMC: recovery and/or update in progress
Red Info LED blinking at 10 Hz and MB UID LED blue blinking at 10 Hz	CPLD: recovery and/or update in progress

1. Power Fail LED
2. Information LED
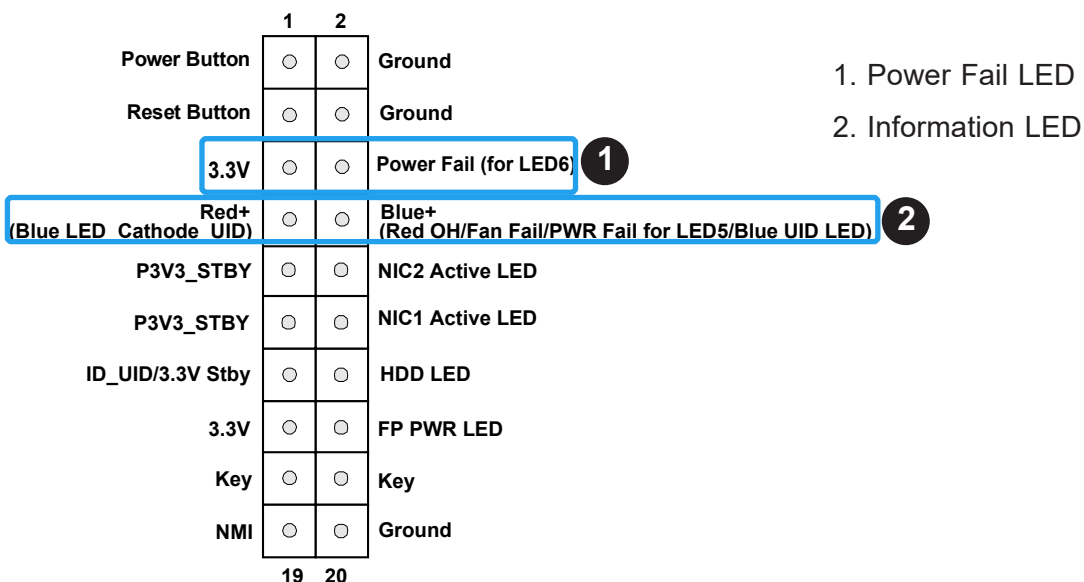
NIC1/NIC2 (LAN1/LAN2)

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.

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
10	NIC 2 Activity LED
12	NIC 1 Activity LED

ID_UID Switch/HDD LED

The UID Switch/HDD LED connection is located on pins 13 and 14 of JF1. The UID switch is used for a chassis that supports a front UID switch. The front UID switch functions in the same way as the rear UID switch; both are for input only and cannot be used for output.

When this LED is blinking green, it indicates HDD is active. Attach a cable to pins 13 and 14 to show ID_UID status and hard drive activity. Refer to the tables below for pin definitions.

ID_UID/HDD LED Pin Definitions (JF1)	
Pins	Definition
13	ID_UID/3.3V Stdby
14	HDD Activity

ID_UID/HDD LED Pin Definitions (JF1)	
Color	State
Blinking Green	HDD Active

	1	2	
Power Button	○	○	Ground
Reset Button	○	○	Ground
3.3V	○	○	Power Fail (for LED6)
Red+ (Blue LED_Cathode_UID)	○	○	Blue+ (Red OH/Fan Fail/PWR Fail for LED5/Blue UID LED)
P3V3_STBY	○	○	NIC2 Active LED **1**
P3V3_STBY	○	○	NIC1 Active LED **2**
ID_UID/3.3V Stby	○	○	HDD LED **3**
3.3V	○	○	FP PWR LED
Key	○	○	Key
NMI	○	○	Ground
	19	20	

1. NIC2 (LAN 2) LED
2. NIC1 (LAN 1) LED
3. ID_UID/HDD LED
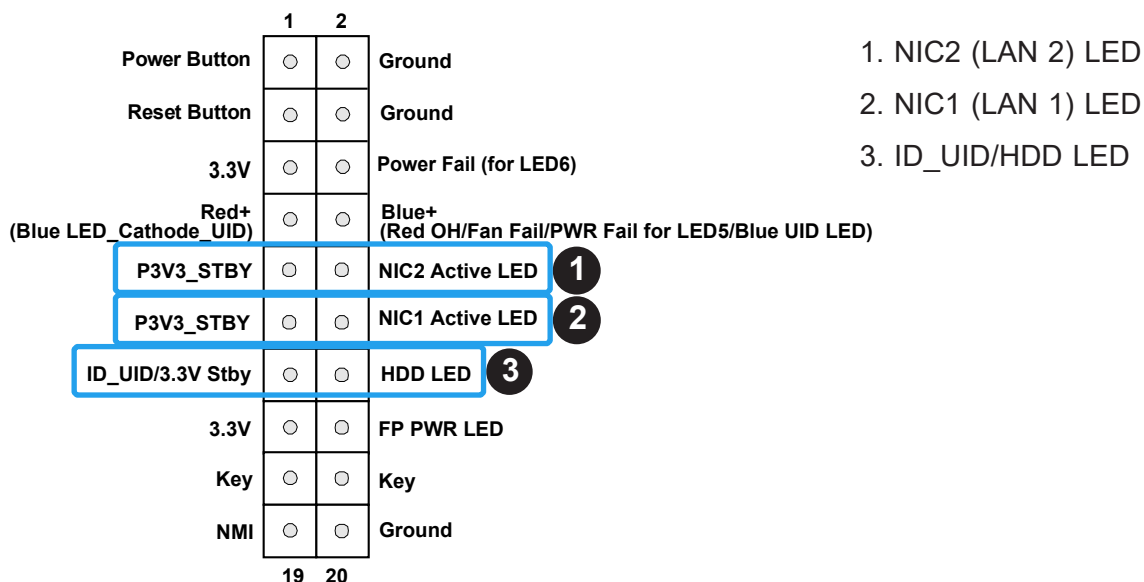
FP Power LED

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

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

NMI Button

The non-maskable interrupt (NMI) button header is located on pins 19 and 20 of JF1. Refer to the table below for pin definitions.

NMI Button Pin Definitions (JF1)	
Pins	Definition
19	NMI
20	Ground

1. FP PWR LED

2. NMI
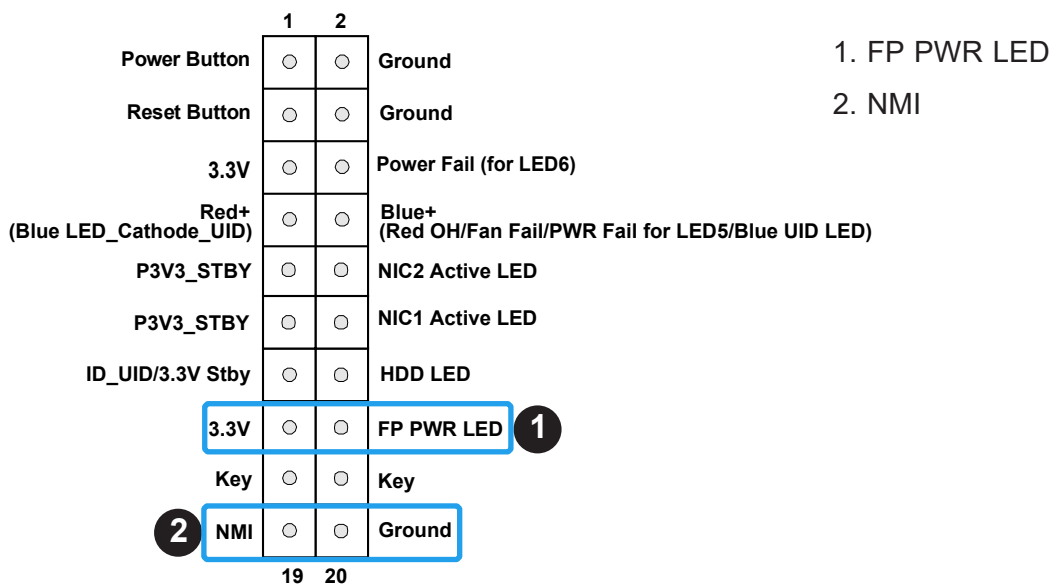
2.8 Connectors

Power Connections

ATX Power Supply Connector

The 24-pin power supply connector (JPW1) meets the ATX SSI EPS 12V specification. If required, you also need to connect the 8-pin 12V DC power connectors (JPW2 and JPW3) to the power supply to provide adequate power to your system.

ATX Power 24-pin Connector Pin Definitions (Required Connection)			
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

12V 8-pin Power Pin Definitions (Required Connection)	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V
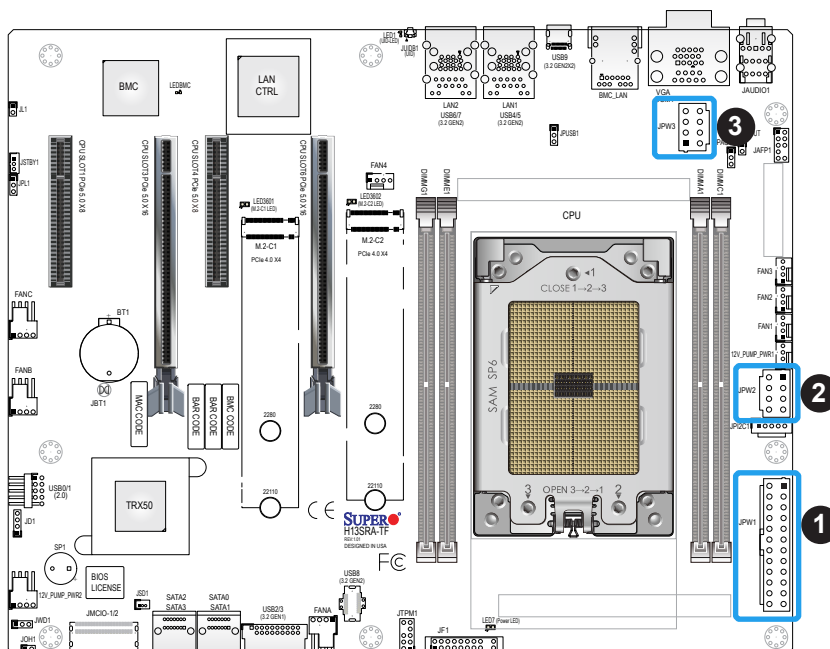
1. 24-pin ATX PWR (JPW1)

2. 8-pin PWR (JPW2)

3. 8-pin PWR (JPW3)

(Continued to next page)

(Continued from previous page)

Important: To provide adequate power supply to the motherboard, be sure to connect the 24-pin ATX PWR and the required 8-pin PWR connectors to the power supply. Failure to do so may void the manufacturer warranty on your power supply and motherboard.

When installing multiple GPU cards, it is recommended that you connect the power supplies to the 24-pin ATX power connector and both 8-pin power connectors (JPW2 and JPW3) to the power supply.

GPU Cards and the Required Power Connectors				
Type of GPU	Number of GPU Cards	JPW1	JPW2	JPW3
Single-Width	One	V	V	V
	Two	V	V	V
Double-Width	One	V	V	V
	Two	V	V	V
Triple-Width	One	V	V	V
	Two	V	V	V

Note 1 : When using heavy loading devices, it is strongly recommended that you connect the power supplies to the 24-pin ATX power connector and both 8-pin power connectors.

Note 2: To use the CPU overclocking feature, be sure to connect the power supplies to the 24-pin ATX power connector and both 8-pin power connectors.

Note 3: To avoid possible system overheating, be sure to provide adequate airflow to your system.

CPU/GPU Pump Power Connectors

The motherboard has two 12 V 4-pin power connectors (12V_PUMP_PWR1 and 12V_PUMP_PWR2) for optional CPU/GPU liquid cooling systems. When using a liquid cooling system, attach the pump power cable to the pump power connector.

Pump Power Header Pin Definitions	
Pin#	**Definition**
1	Ground (Black)
2	2A/+12V (Red)
3	N/A
4	N/A
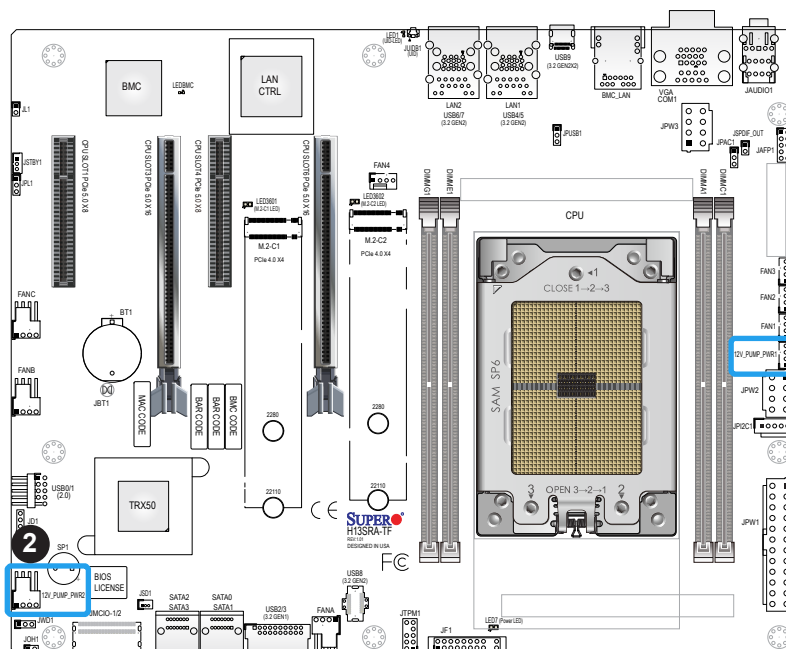
1. 12 V 4-pin Power Connector for CPU liquid cooling pump (12V_PUMP_PWR1)

2. 12 V 4-pin Power Connector for GPU liquid cooling pump (12V_PUMP_PWR2)

MCIO NVMe Connectors

One PCIe 4.0 x8 MCIO connector, located at JMCIO-1/2, provide connections of two NVMe 2.5" SSDs (NOT hot-swappable, supported by TRX50) on the motherboard. Use these MCIO connectors to support high-speed PCIe NVMe storage devices.

SATA Disk-On-Module Power Connector

The SATA Disk-On-Module (DOM) power connector at JSD1 provides 5V power to a solid-state DOM storage devices connected to one of the SATA ports. Refer to the table below for pin definitions.

DOM Power Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground
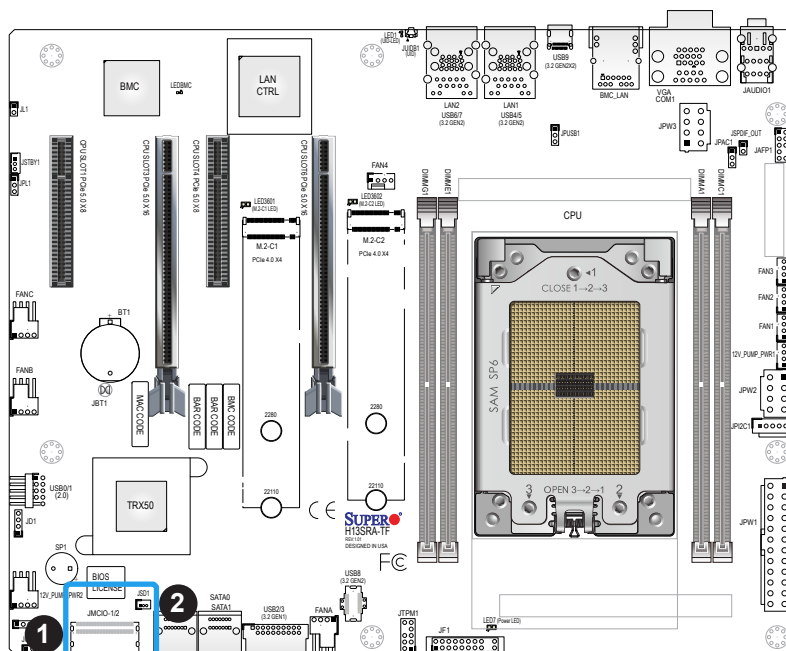
1. PCIe 4.0 x8 MCIO Connector (JMCIO-1/2)

2. SATA Disk-On-Module (DOM) Power Connector (JSD1)

Headers

Fan Headers

There are seven 4-pin fan headers (FAN1 – FAN4, FANA, FANB, FANC) on the motherboard. All these 4-pin fan headers are backwards compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management via BMC. Refer to the table below for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground
2	2.5A/+12V
3	Tachometer
4	PWM_Control
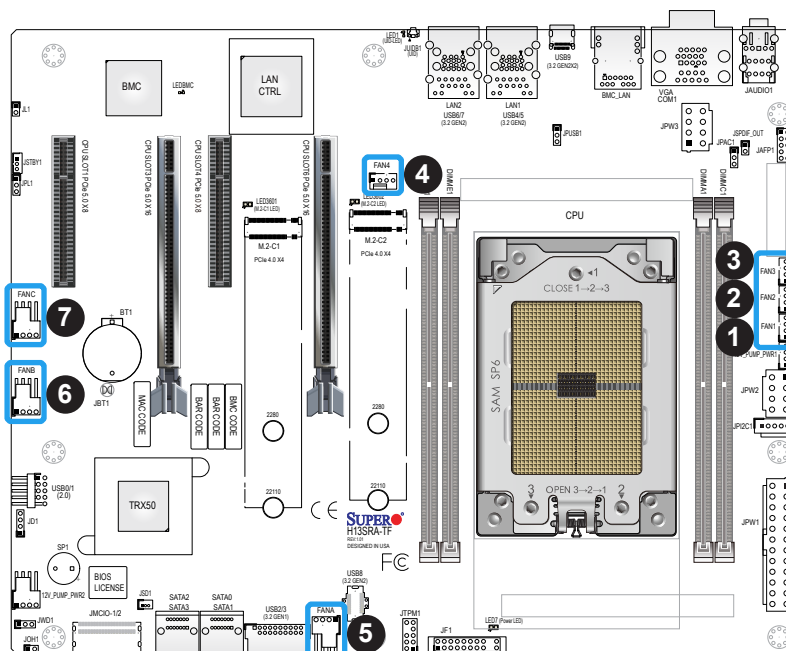
1. FAN1 (CPU Fan Header)
2. FAN2 (CPU Fan Header)
3. FAN3 (CPU Fan Header)
4. FAN4 (CPU Fan Header)
5. FANA (System Fan Header)
6. FANB (System Fan Header)
7. FANC (System Fan Header)

Speaker/Buzzer Header

On the JD1 header, pins 1-4 are for the speaker and pins 3-4 are for the buzzer. If you wish to use an external speaker, connect its cable to pins 1-4.

Speaker Connector Pin Definitions	
Pin#	**Signal**
1-4	Speaker
3-4	Buzzer (Default)

Front Panel Audio Header

A 10-pin audio header (JAFP1) located on the motherboard allows you to use the onboard sound chip (ALC888S) for audio function. Connect an audio cable to this header to use this feature. Refer to the table below for pin definitions

HD Front Panel Audio Pin Definitions			
Pin#	**Definition**	**Pin#**	**Definition**
1	Microphone_Left	2	Audio_Ground
3	Microphone_Right	4	Audio_Detect
5	Line_2_Right	6	Ground
7	Jack_Detect	8	Key
9	Line_2_Left	10	Ground
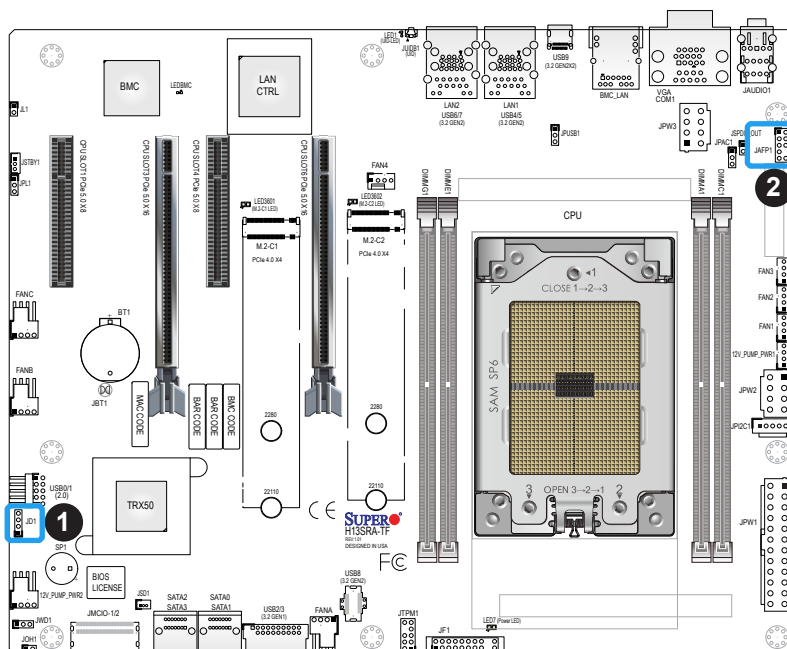
1. Speaker/Buzzer Header (JD1)

2. Front Panel Audio Header (JAFP1)

Chassis Intrusion

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

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

Overheat/Fan Fail LED Header

JOH1 is used to connect to an LED indicator to provide warnings of chassis overheating and fan failure. This LED will blink when a fan failure occurs. Refer to the tables below for pin definitions.

Overheat LED Header Status	
State	Definition
Solid	Overheat
Blinking	Fan Fail

Overheat LED Header Pin Definitions	
Pin#	Signal
1	Pull high to +3.3V power through 330-ohm resistor
2	OH Active
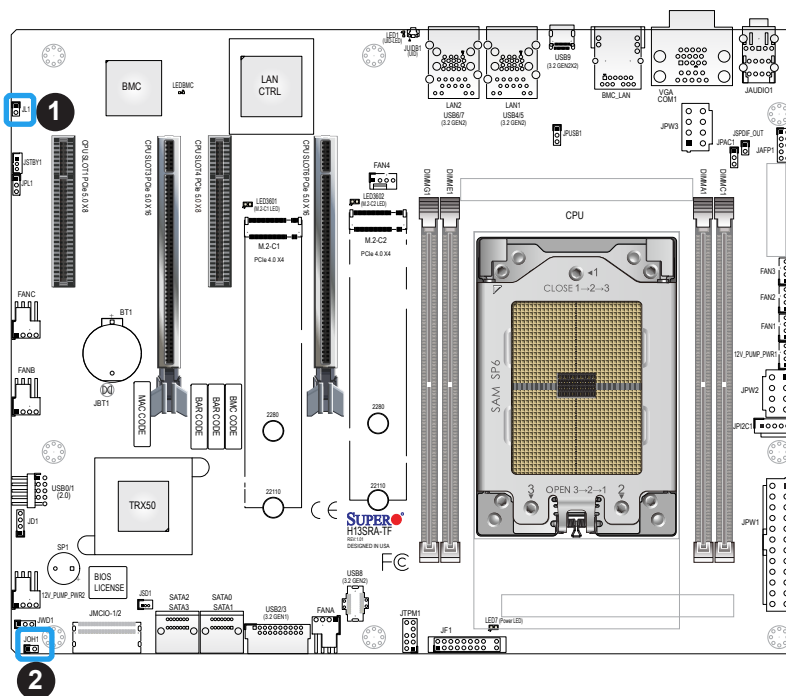
1. Chassis Intrusion Header (JL1)

2. Overheat/Fan Fail LED Header (JOH1)

Power SMB (I²C) Header

The Power System Management Bus (I²C) header (JPI2C1) monitors the power supply, fan, and system temperatures. Refer to the table below for pin definitions.

Power SMB Header Pin Definitions	
Pin#	Definition
1	Clock
2	Data
3	PMBUS_Alert
4	Ground
5	+3.3V

SPDIF Out Header

The Sony/Philips Digital Interface (S/PDIF) Out header (JSPDIF_OUT) is used for digital audio output. You will also need the appropriate cable to use these features.

S/PDIF OUT Pin Definitions	
Pin#	Definition
1	S/PDIF_OUT
2	Ground
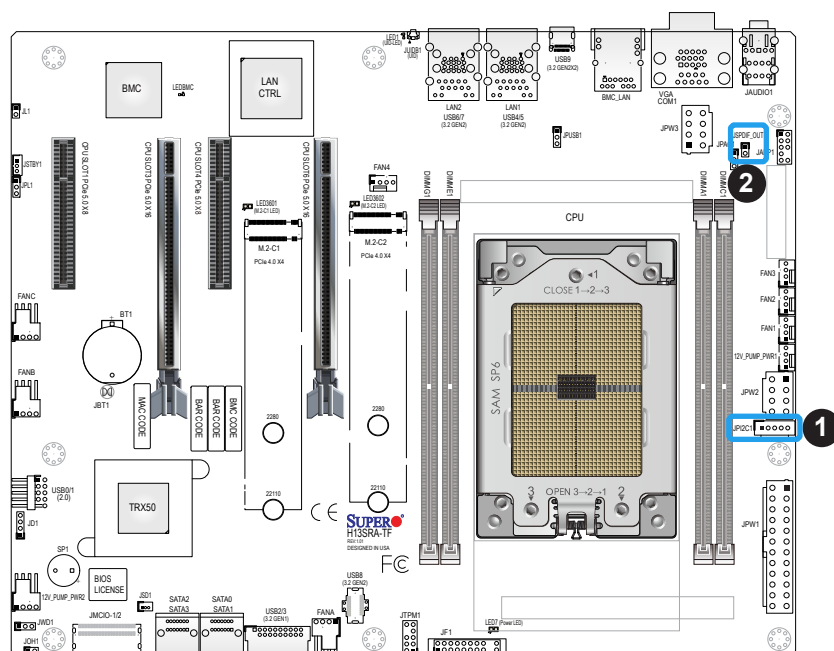
1. Power SMBus I²C Header (JPI2C1)

2. S/PDIF Out Header (JSPDIF_OUT)

TPM/Port 80 Header

JTPM1 is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from Supermicro (optional). A TPM/Port 80 header is a security device that supports encryption and authentication in hard drives. It allows the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. Refer to the layout below for the location of the TPM header. Please go to the following link for more information on the TPM: https://www.supermicro.com/manuals/other/AOM-TPM-9670V_9670H.pdf.

Trusted Platform Module Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+3.3V	2	SPI_CS#
3	RESET#	4	SPI_MISO
5	SPI_CLK	6	GND
7	SPI_MOSI	8	NC
9	+3.3V Stdby	10	SPI_IRQ#
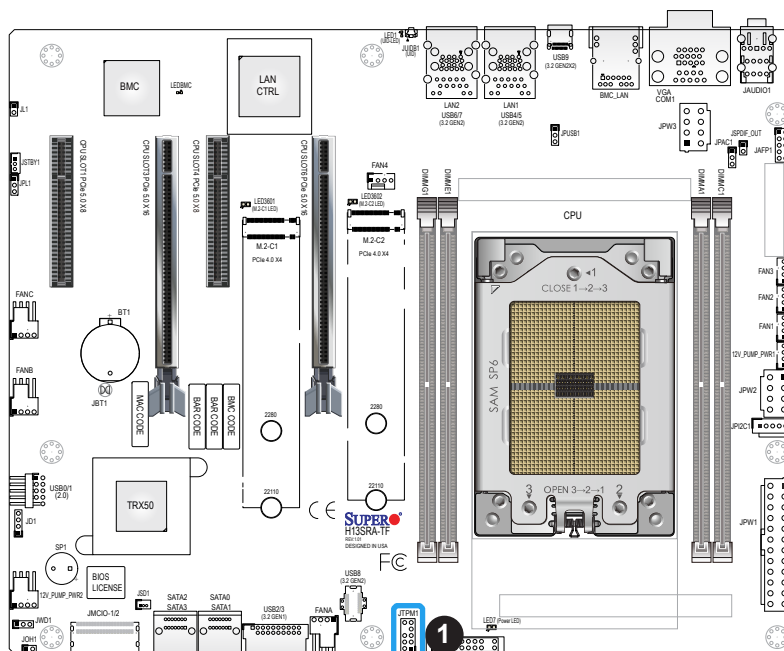
1. TPM/Port 80 Header (JTPM1)

Standby Power

The Standby Power header is located at JSTBY1 on the motherboard. You must have a card with a Standby Power connector and a cable to use this feature. Refer to the table below for pin definitions.

Standby Power Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	No Connection

PCIe 4.0 x4 M.2 Slots

The motherboard has two PCIe 4.0 x4 M.2 M-key slots (M.2-C1 and M.2-C2). M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slots on the motherboard support NVMe SSDs in the 2280 and 22110 form factors and RAID 0/1.
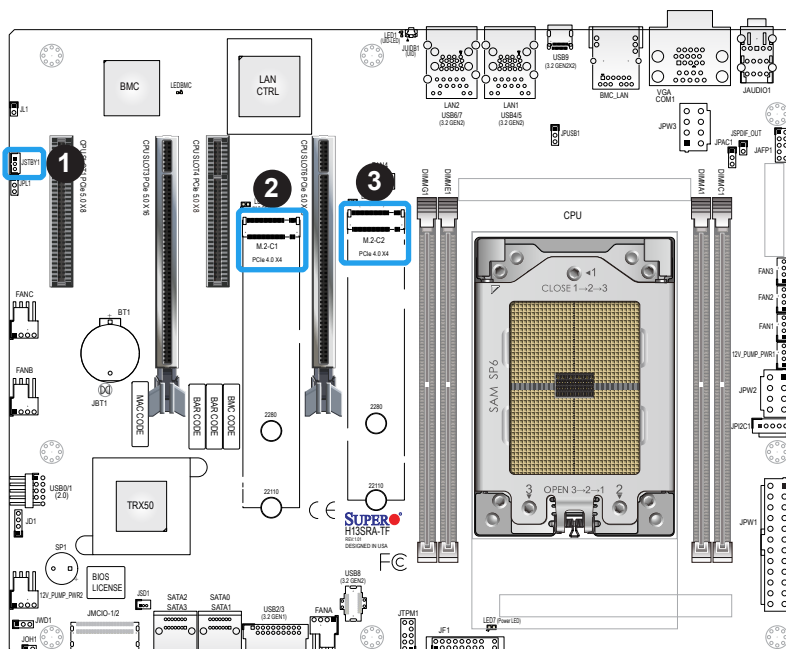
1. Standby Power Header (JSTBY1)

2. M.2 Slot (M.2-C1)

3. M.2 Slot (M.2-C2)

SATA 3.0 Connections

Four SATA 3.0 ports (SATA0 – SATA3) are located on the motherboard, which are supported by the AMD TRX50 chipset. These SATA ports support RAID 0/1/5/10.

Internal Speaker/Buzzer

The Internal Speaker/Buzzer (SP1) is used to provide audible indications for various beep codes. Refer to the table below for pin definitions.

Internal Buzzer Pin Definitions		
Pin#	Definition	
1	Pos (+)	Beep In
2	Neg (-)	Alarm Speaker
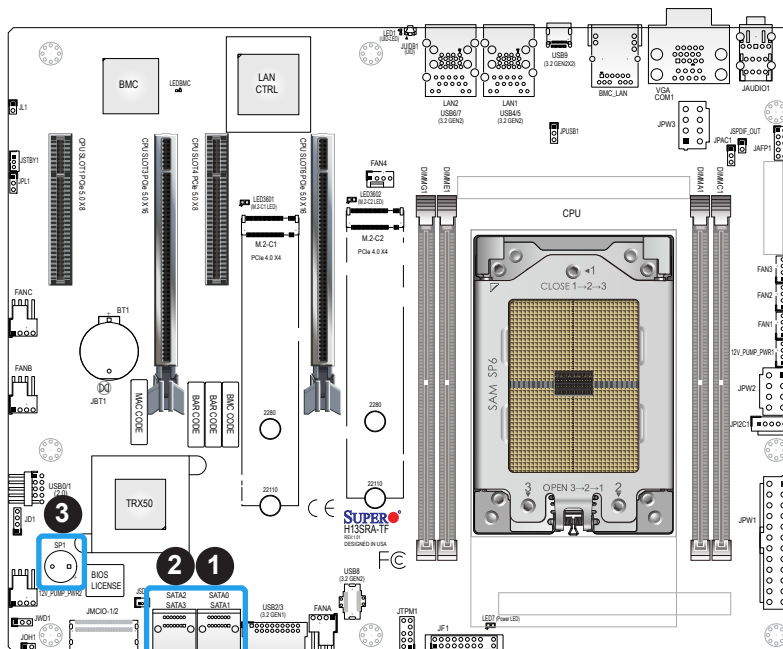
1. SATA0 / SATA1

2. SATA2 / SATA3

3. Internal Speaker/Buzzer (SP1)

2.9 Jumper Settings

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

Note 2: Unplug the power cord from all power supplies before adjusting jumper settings.

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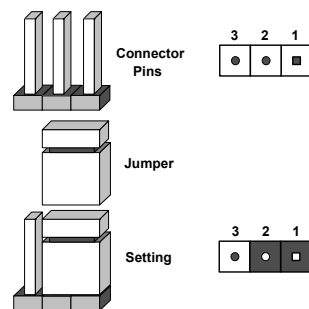
JBT1 is used to clear CMOS, which will also clear any passwords. Instead of pins, the JBT1 jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To Clear CMOS

1. First power down the system and unplug the power cord(s).

2. Remove the cover of the chassis to access the motherboard and remove the battery from the motherboard.

3. To clear CMOS via JBT1: short the CMOS pads with a metal object such as a small screwdriver for at least four seconds. Then remove the screwdriver (or shorting device).

4. Replace the cover, reconnect the power cord(s), and power on the system.

   Note: Clearing CMOS will also clear all passwords.

JBT1 contact pads

1. JBT1

HD Audio Enable

JPAC1 allows you to enable or disable the onboard high definition audio support. The default position is on pins 1-2 to enable onboard audio connections. Refer to the table below for jumper settings.

Audio Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Disabled

LAN Ports Enable/Disable

JPL1 allows you to enable the onboard LAN ports (LAN1 and LAN2). The default setting is pins 1-2 to enable the connections. Refer to the table below for jumper settings.

LAN Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled (Default)
Pins 2-3	Disable
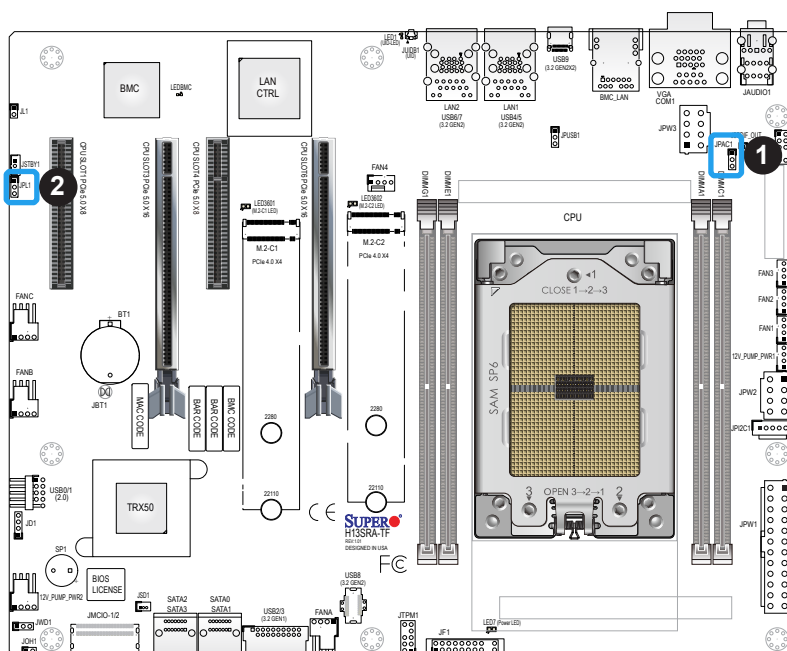
1. HD Audio Enable/Disable (JPAC1)

2. LAN1/LAN2 Enable/Disable (JPL1)

USB4/5 Standby Power Wake Up

JPUSB1 allows you to enable or disable the USB4/5 power in S4 Hibernate mode. The default is on pins 1-2 to enable USB4/5 power in S4 Hibernate mode. Refer to the table below for jumper settings.

USB4/5 Standby Power Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled (Default)
Pins 2-3	Disable

Watchdog

Watchdog (JWD1) is a system monitor that can reboot the system when a software application hangs. Close pins 1-2 to reset the system if an application hangs. Close pins 2-3 to generate a non-maskable interrupt (NMI) signal for the application that hangs. Refer to the table below for jumper settings. For this function to work properly, please also enable the Watchdog setting in the BIOS.

Watchdog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset (Default)
Pins 2-3	NMI
Open	Disabled
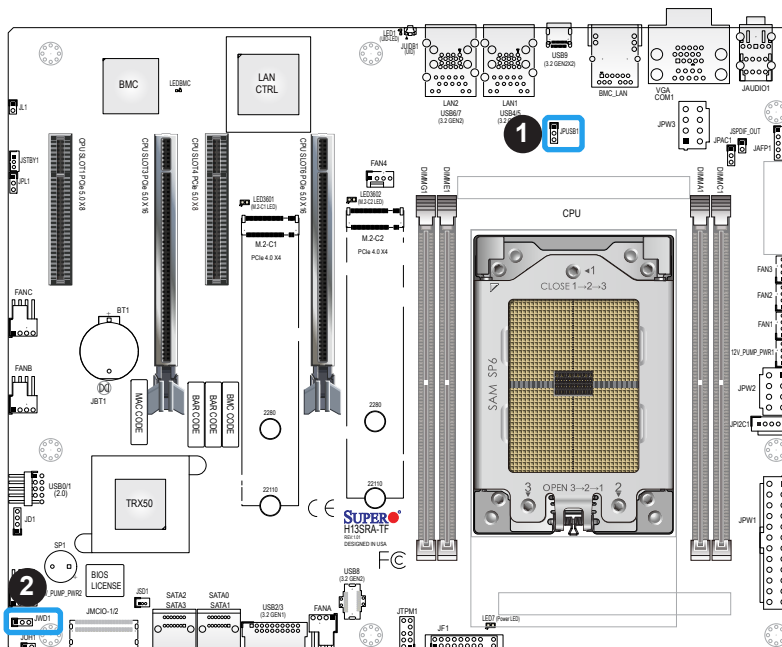
1. USB4/5 Standby Power Wake Up (JPUSB1)

2. Watchdog (JWD1)

2.10 LED Indicators

LAN1/LAN2 LEDs

Two Ethernet LAN ports (LAN1 and LAN2) are located on the rear I/O panel of the motherboard. The Activity LED is yellow and indicates connection/activity. The Link LED may be green or orange to indicate the speed of the connection. Refer to the tables below for more information.

H13SRA-TF

Link LED, Connection Link, Speed Indicator	
LED Color	Definition
Orange	1 Gb/s
Green	10 Gb/s

Activity LED		
LED Color	State	Definition
None	No Connection	
None	Off	Link
Yellow	Flashing	Active

Activity LED
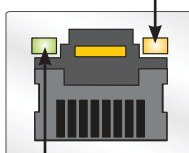
Link LED

H13SRA-F

Link LED, Connection Link, Speed Indicator	
LED Color	Definition
Green	100 Mb/s
Orange	1 Gb/s

Activity LED		
LED Color	State	Definition
None	No Connection	
None	Off	Link
Yellow	Flashing	Active

1. LAN1 LEDs
2. LAN2 LEDs
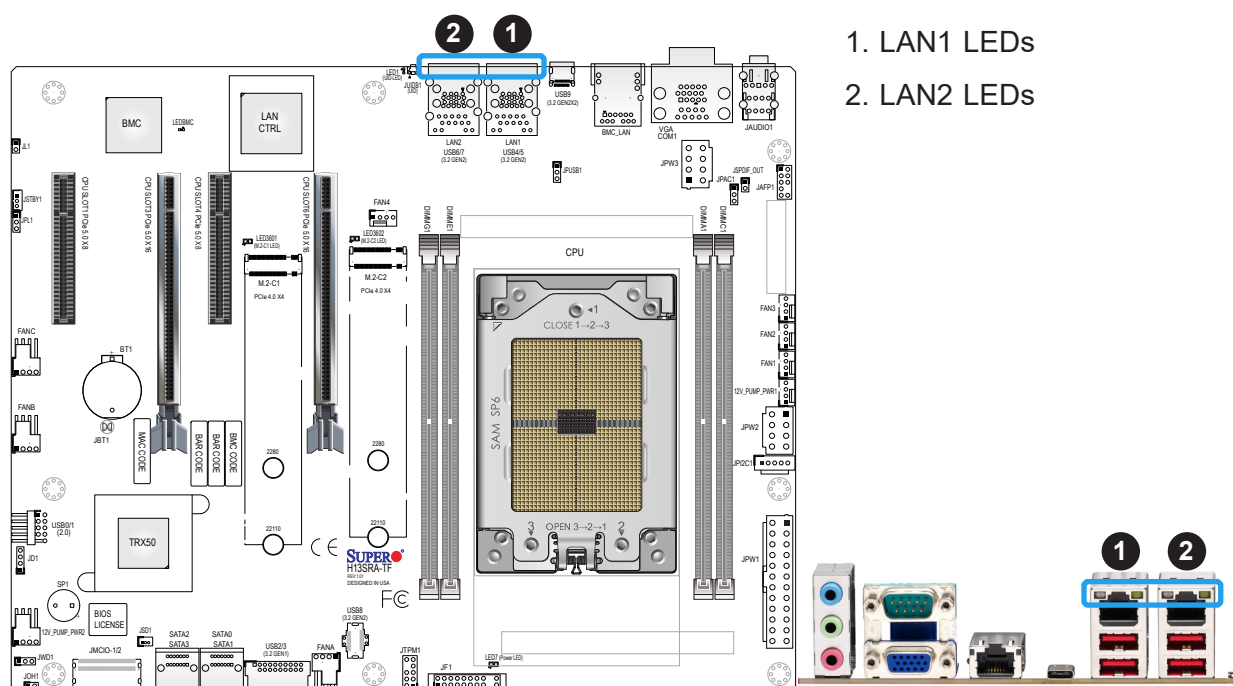
BMC LAN LEDs

A dedicated BMC LAN connection is provided on the rear I/O panel of the motherboard. The LED on the right indicates activity, and the LED on the left indicates the speed of the connection. Refer to the table below for more information.

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

Link LED   Activity LED

1. BMC LAN LEDs
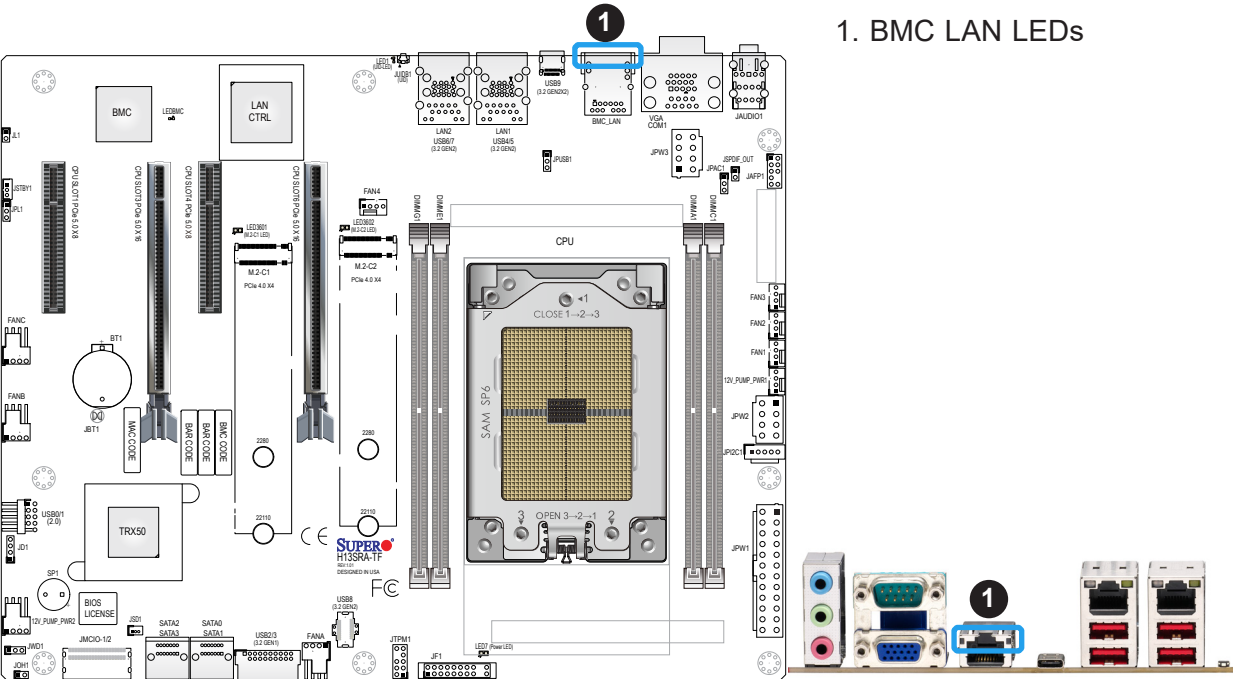
M.2 LEDs

Two M.2 LEDs are located at LED3601 and LED3602 on the motherboard. When the M.2 LED is blinking, M.2 device functions normally. Refer to the table below for more information.

M.2 LED State	
LED Color	**Definition**
Green: Blinking	Device Working

Onboard Power LED

The Onboard Power LED is located at LED7 on the motherboard. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing any component. Refer to the table below for more information.

Onboard Power LED Indicator	
LED Color	**Definition**
Off	System Off (power cable not connected)
Green	System On
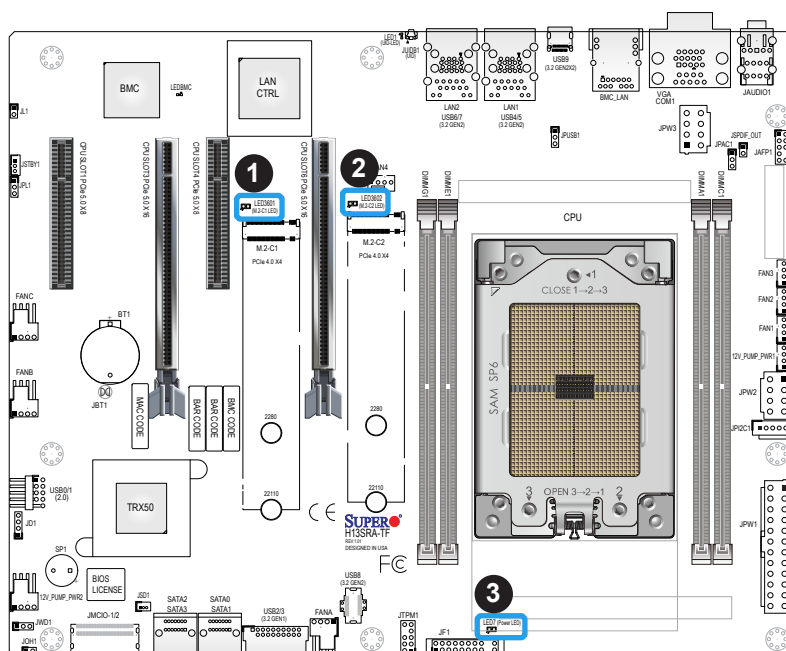
1. M.2-C1 LED (LED3601)
2. M.2-C2 LED (LED3602)
3. Power LED (LED7)

Unit ID LED

The rear UID LED indicator is located at LED1. This UID indicator provides easy identification of a system that may need service.

UID LED	
LED Indicator	
LED Color	Definition
Blue: On	System Identified

BMC Heartbeat LED

A BMC Heartbeat LED is located at LEDBMC on the motherboard. When LEDBMC is blinking green, the BMC is functioning normally. Refer to the layout below for the location of LEDBMC.

BMC Heartbeat LED Indicator	
LED Color	Definition
Green: Blinking	BMC Normal

Note: For information on UID LED Indicators and BMC Heartbeat LED Indicator, please refer to the section of UID LED/BMC Reset Switch and LED Indicator on page 43.
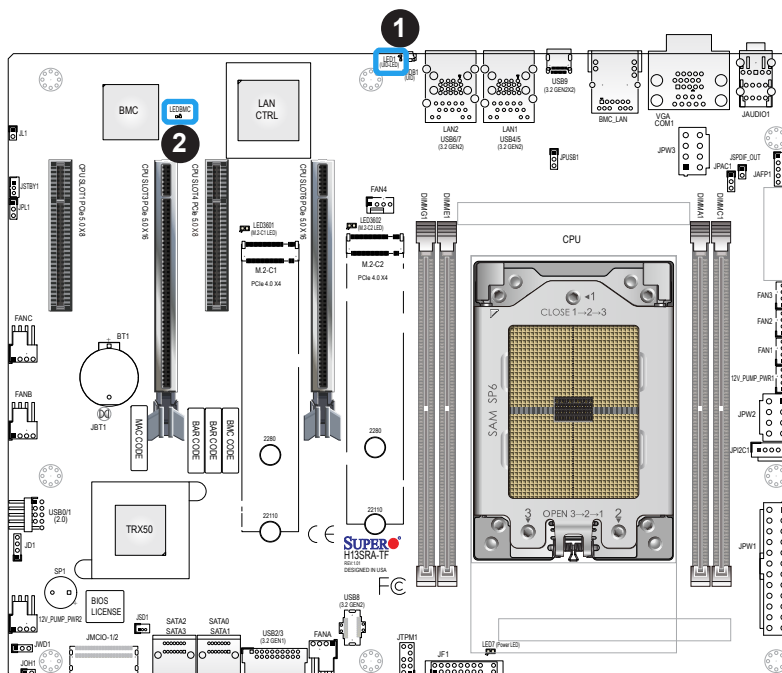
1. UID LED (LED1)
2. BMC Heartbeat LED (LEDBMC)

Chapter 3

Troubleshooting

3.1 Troubleshooting Procedures

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

Before Power On

1. Make sure that there are no short circuits between the motherboard and chassis.

2. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse.

3. Remove all add-on cards.

4. Install the CPU (making sure it is fully seated) and connect the front panel connectors to the motherboard.

No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.

2. Make sure that the ATX power connectors are properly connected.

3. Check that the 115V/230V switch, if available, on the power supply is properly set.

4. Turn the power switch on and off to test the system, if applicable.

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

No Video

1. If the power is on, but you do not have video, remove all add-on cards and cables.

2. Remove all memory modules and turn on the system (if the alarm is on, check the specs of memory modules, reset the memory, or try a different one).

System Boot Failure

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

1. 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 power cord and contacting both pads on the CMOS clear jumper (JBT1). Refer to Section 2.9.

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 memory type and speed for all DIMM modules in the system.

3. Make sure that you are using the correct type of ECC DDR5 modules recommended by the manufacturer.

4. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.

Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to Chapter 1 for details on recommended power supplies.

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

When the System Becomes Unstable

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

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.

2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.

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

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.

4. System cooling: Check the system cooling to make sure that all heatsink fans and CPU/system fans, etc., work properly. Check the hardware monitoring settings in the IPMI to make sure that the CPU and system temperatures are within the normal range. Also check the front panel Overheat LED and make sure that it is not on.

5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.

6. Proper software support: Make sure that the correct drivers are used.

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

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as 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, please take the following steps. Also, please note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problems with the specific system configuration that was sold to you.

1. Please go through the Troubleshooting Procedures and Frequently Asked Questions (FAQ) sections in this chapter or see the FAQs on our website (https://www.supermicro.com/FAQ/index.php) before contacting Technical Support.

2. BIOS upgrades can be downloaded from our website (https://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. For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@supermicro.com.

5. For worldwide services and support, please visit our website at Worldwide Services & Support | Supermicro.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The motherboard supports up to 4 TB ECC RDIMM/3DS RDIMM memory with speeds of up to 5200 MT/s (1DPC) or higher with overclocking support in four ECC DDR5 (288-pin) DIMM slots. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given in Section 2.4.

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. Please go to https://www.supermicro.com/en/support/resources/downloadcenter/swdownload to download the BIOS/BMC/Bundle Firmware file for your motherboard. Check the BIOS version to make sure that it is newer than your existing BIOS before downloading. Extract the contents of this file. Read Readme instructions and the information on our website carefully before updating your BIOS.

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.

2. Locate the onboard battery as shown below.

3. Use a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.

4. Remove the battery.

Proper Battery Disposal

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

Battery Installation

To install an onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.

2. Locate the onboard battery as shown below

3. Identify the battery's polarity. The positive (+) side should be facing up.

4. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

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

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

BATTERY HOLDER
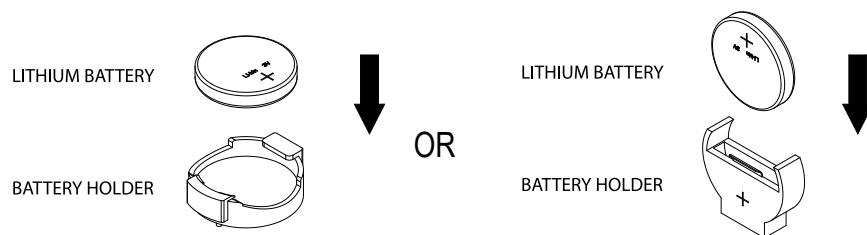
3.5 Returning Merchandise for Service

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 (https://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 the BMC WebUI or the SUM utility.

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

Starting the Setup Utility

To enter the BIOS Setup utility, press the <Delete> key while the system is booting up. In most cases, the <Delete> key is used to invoke the BIOS Setup screen; however, in other cases, other hot keys, such as <F1>, <F2>, may be used for this purpose. Each main BIOS menu option is described in this manual.

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

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

The BIOS Setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F2>, <F3>, <F4>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

4.2 Main Setup

When you first enter the AMI BIOS Setup utility, you will see the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.

```
                           Aptio Setup - AMI
   Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

                                                    Set the Date. Use Tab to
   System Date                   [Mon 12/18/2023]   switch between Date
   System Time                   [19:07:37]         elements.
                                                    Default Ranges:
   Supermicro H13SRA-TF                             Year: 1998-9999
   BIOS Version                  1.0                Months: 1-12
   Build Date                    12/18/2023         Days: Dependent on month
                                                    Range of Years may vary.
   Memory Information
   Total Memory                  Total Memory:  32 GB
                                 (DDR5)


                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit

                    Version 2.22.1290 Copyright (C) 2023 AMI
```

System Date / System Time

Use the two features to change the system date and time. To change system date and time settings, please highlight System Date or System Time using the arrow keys and enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YYYY format. The time is entered in HH:MM:SS format.

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

Supermicro H13SRA-TF

BIOS Version

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

Build Date

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

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:

```
                          Aptio Setup - AMI
       Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

 ▶ Boot Feature                                  Boot Feature Configuration
 ▶ CPU Configuration                             Page
 ▶ NB Configuration
 ▶ Trusted Computing
 ▶ AMD fTPM configuration
 ▶ Super IO Configuration
 ▶ Serial Port Console Redirection
 ▶ SATA Configuration
 ▶ PCIe/PCI/PnP Configuration
 ▶ USB Configuration
 ▶ Network Configuration
 ▶ HTTP Boot Configuration
 ▶ Supermicro KMS Server Configuration
 ▶ Super-Guardians Configuration

 ▶ Supermicro 10GBASE-T Ethernet Controller - 7C:C2:55:68:FE:1A
 ▶ Supermicro 10GBASE-T Ethernet Controller - 7C:C2:55:68:FE:1B
 ▶ TLS Authenticate Configuration                →←: Select Screen
 ▶ RAIDXpert2 Configuration Utility              ↑↓: Select Item
 ▶ AMD Overclocking                              Enter: Select
                                                 +/-: Change Opt.
 ▶ Driver Health                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

            Version 2.22.1290 Copyright (C) 2023 AMI
```

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, restore the setting to the manufacturer default setting.

▶Boot Feature

Quiet Boot

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

> **Note:** BIOS POST messages are always displayed regardless of the setting for this feature.

Option ROM Messages

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

Bootup NumLock State

Use this feature to set the Power-on state for the NumLock key. The options are **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**.

INT19 Trap Response

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

Re-try Boot

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

Power Configuration

Watch Dog Function

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

Restore on AC Power Loss

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

Power Button Function

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

DeepS5 Power Policy

Use this feature to enable/disable the S5 deep sleep mode. The options are **Disabled** and Enabled**.**

▶CPU Configuration

The following information is displayed.

- Module Version

SMT Control

Use this feature to enable/disable simultaneous multithreading. After setting this feature to Enabled, please reboot the system for the changes to take effect. The options are Disabled, Enabled, and **Auto.**

Core Performance Boost

Use this feature to set the Core Performance Boost. The options are Disabled and **Auto.**

Global C-state Control

Use this feature to set IO based C-state generation and DF C-states. The options are Disabled, Enabled, and **Auto.**

SEV-ES ASID Space Limit Control

Use this feature to set SEV-ES ASID space limit operation modes. The options are **Auto** and Manual**.**

PPIN Opt-in

Set this feature to use the Protected Processor Inventory Number (PPIN), which is a unique serial number for each processor. The options are Disabled, Enabled, and **Auto.**

SNP Memory (RMP Table) Coverage

Use this feature to set the entire system memory to be covered. The options are Disabled, Enabled, Custom, and **Auto.**

Amount of Memory to Cover (Available when "SNP Memory (RMP Table) Coverage" is set to Custom)

Use this feature to set the system memory to be covered (in Hex.). The default setting is **0.**

SMEE

Use this feature to disable/enable the secure memory encryption. The options are Disabled, Enabled, and **Auto.**

Enhanced REP MOVSB/STOSB (ERSM)

Disable this feature for analysis purposes as long as OS supports it. The options are Disabled, Enabled, and **Auto.**

AVX512

Use this feature to disable/enable the support of Advanced Vector Extensions 512 (AVX 512). The options are Disabled, Enabled, and **Auto.**

Monitor and MWAIT Disable

If this feature is set to Enabled, the MONITOR, MWAIT, MONITORX, and MWAITX opcodes will become invalid. The options are Enabled, Disabled, and **Auto.**

L1 Stream HW Prefetcher

Use this feature to disable/enable L1 stream HW prefetcher. The options are Disabled, Enabled, and **Auto.**

L2 Stream HW Prefetcher

Use this feature to disable/enable L2 stream HW prefetcher. The options are Disabled, Enabled, and **Auto.**

SMM Lock

Use this feature to enable/disable the SMM Lock. The options are Disabled and **Enabled.**

▶CPU Information

The following CPU information is displayed:

- Socket0

- Processor Family

- Processor Model

- Processor Stepping

- Microcode Patch Level

▶NB Configuration

North Bridge Configuration

Above 4GB MMIO Limit (Available when "Above 4G Decoding" is set to Enabled)

Use this feature to set the Above 4GB MMIO Limit between 38 to 43 bits. The options are 40bit (1TB), 41bit (2TB), 42bit (4TB), and **43bit (8TB)**.

   Note: You can set "Above 4G Decoding" in the submenu of Advanced > PCIe/PCI/ PnP Configuration.

IOMMU

Use this feature to disable/enable the Input/Output Memory Management Unit (IOMMU). The options are Disabled, Enabled, and **Auto**.

DMAr Support

Use this feature to enable DMAr system protection during POST. The options are Disabled, Enabled, and **Auto**.

DMA Protection

Use this feature to enable DMA remap support in the IVRS IVinfo field. The options are **Auto**, Enabled, and Disabled.

DRTM Virtual Device Support

Use this feature to enable the DRTM ACPI virtual device support. The options are Disabled, Enabled, and **Auto**.

DRTM Memory Reservation

Use this feature to reserve 128 MB memory below Bottom IO for DRTM. It is required to be enabled for Secured-Core Server function. The options are Disabled, Enabled, and **Auto**.

TDP Control

The options are Manual and **Auto**. Set this feature to Manual to have the customized TDP. Set this feature to Auto to use the fused TDP.

TDP (Available when "TDP Control" is set to Manual)

Use this feature to set the TDP (in watts).

Package Power Limit Control

The options are Manual and **Auto**. Set this feature to Manual to have the customized Package Power Tracking (PPT). Set this feature to Auto to use the fused PPT.

Package Power Limit (Available when "Package Power Limit Control" is set to Manual)

Use this feature to set the PPT (in watts).

Determinism Control

The options are Manual and **Auto**. Set this feature to Manual to customize the performance determinism settings. Set this feature to Auto to use the default performance determinism settings.

Determinism Enable (Available when "Determinism Control" is set to Manual)

Use this feature to disable/enable performance determinism. The options are **Disable Performance Determinism** and Enable Performance Determinism.

APBDIS

Use this feature to configure Algorithm Performance Boost Disable (APBDIS). Set this feature to 0 to use the mission mode. Set this feature to 1 to enable APBDIS. The options are 0, 1, and **Auto**.

DfPstate (Available when "APBDIS" is set to 1)

Use this feature to set the DfPstate index from 0–4. The default setting is **0**.

Power Profile Selection

Use this feature to set a power profile. The options are **High Performance Mode**, Efficiency Mode, and Maximum IO Performance Mode.

DF Cstates

Use this feature to disable/enable DF Cstates. The options are Disabled, Enabled, and **Auto**.

Data Link Feature Cap

Use this feature to enable/disable Data Link Feature capability. The options are Enabled, Disabled, and **Auto**.

Data Link Feature Exchange (Available when "Data Link Feature Cap" is set to Enabled)

Use this feature to enable/disable Data Link Feature exchange. The options are Enabled, Disabled, and **Auto**.

SEV-SNP Support

Use this feature to enable Secure Encrypted Virtualization and Secure Nested Paging (SEV-SNP) support for memory integrity protection. The options are **Disable** and Enable.

CXL SPM

Use this feature to set the CXL memory as the Special Purpose Memory (SPM). The options are **Auto**, Enabled, and Disabled.

Sync Header Bypass

Use this feature to enable/disable CXL Sync Header Bypass. The options are **Auto**, Enabled, and Disabled.

▶**Memory Configuration**

Memory Target Speed

Use this feature to set the memory target speed in MT/s. The valid value is 3200, 3600, 4000, 4400, 4800, 5200, and 5600. The default setting is **3600**.

Memory Interleaving

Use this feature to disable memory interleaving. The Non-Uniform Memory Access (NUMA) nodes per socket will be honored regardless of this settings. The options are Disabled and **Auto**.

Chipselect Interleaving

Use this feature to interleave memory blocks across the DRAM chip for node 0. The options are Disabled and **Auto**.

BankSwapMode

Use this feature to set the bank swap mode. The options are **Auto**, Disabled, and Swap CPU.

Power Down Enable

Use this feature to set the DDR power down mode. The options are Disabled, Enabled, and **Auto**.

TSME

Use this feature to enable/disable support of Transparent Secure Memory Encryption (TSME), which is for managing memory encryption without requiring software intervention. The options are **Auto**, Enabled, and Disabled.

Enhanced PPR

Use this feature to set advanced memory test. Select Enabled to always execute for every boot. The options are **Disabled** and Enabled.

▶CPU Memory Information

The following CPU memory information is displayed:

- DimmA1

- DimmC1

- DimmE1

- DimmG1

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

When a Trusted-Platform Module (TPM) device is detected by your system, the following information is displayed:

• TPM 2.0 Device Found

• Firmware Version:

• Vendor:

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 is displayed:

• Active PCR banks

• Available PCR banks

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 Disabled and **Enabled**.

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. 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) (for TPM version 2.0 and above)

Select Enabled for TPM Platform Hierarchy support which allows 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**.

▶AMD fTPM configuration

AMD fTPM Switch

Use this feature to enable/disable AMD CPU fTPM. The options are **Route to SPI TPM** and AMD CPU fTPM.

Erase fTPM NV For Factory Reset

When a new CPU is installed, select "Enabled" to reset fTPM. If the system has BitLocker or an encryption-enable system, then the system will not boot without a recovery key. Select "Disabled" to keep the previous fTPM record and continue system boot. fTPM will not be enabled with a new CPU unless fTPM is reset (reinitialized). Swap back to the old CPU to recover TPM related keys and data. The options are Disabled and **Enabled**.

▶Super IO Configuration (Available when your system supports this feature)

The following information is displayed.

- Super IO Chip

▶Serial Port 1 Configuration

Serial Port 1

Select Enabled to enable serial port 1. The options are Disabled and **Enabled**.

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

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

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

This feature specifies the base I/O port address and the Interrupt Request address of serial port 1. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 1. The options are **Auto**, (IO=3F8h; IRQ=4;), (IO=3F8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), (IO=2F8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), (IO=3E8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), and (IO=2E8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;).

▶Serial Port 2 Configuration

Serial Port 2

Select Enabled to enable serial port 2. The options are Disabled and **Enabled**.

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

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

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

This feature specifies the base I/O port address and the Interrupt Request address of serial port 2. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to serial port 2. The options are **Auto**, (IO=2F8h; IRQ=3;), (IO=3F8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), (IO=2F8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), (IO=3E8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;), and (IO=2E8h; IRQ=3,4, 5, 6, 7, 9, 10, 11, 12;).

▶Serial Port Console Redirection

COM1 (Available when your system supports the serial port of COM1)

Console Redirection

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

> **Note:** This feature will be set to Enabled if there is no BMC support.

▶Console Redirection Settings (Available when "Console Redirection" above is set to Enabled)

Terminal Type

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

Bits Per Second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Putty KeyPad

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

SOL

> **Note:** This feature is available when your system supports serial port of SOL. The "SOL" here indicates a shared serial port, and SOL is used as the default.

Console Redirection

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

▶**Console Redirection Settings (Available when "Console Redirection" above is set to Enabled)**

Terminal Type

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

Bits Per Second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Putty KeyPad

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

Legacy Console Redirection

▶**Legacy Console Redirection Settings**

Legacy Serial Redirection Port

Use this feature to select a COM port to display redirection of Legacy OS and Legacy OPROM messages. The options are **COM1** and SOL. Please note that the available options are based on your motherboard features.

Resolution

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

Redirect After BIOS POST

Use this feature to enable or disable legacy console redirection after BIOS POST. When the option - BootLoader is selected, legacy console redirection is disabled before booting the OS. When the option - Always Enable is selected, legacy console redirection remains enabled upon OS bootup. The options are **Always Enable** and BootLoader.

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

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

Console Redirection EMS

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

▶**Console Redirection Settings (Available when "Console Redirection EMS" above is set to Enabled)**

Out-of-Band Mgmt Port

The feature selects a serial port in a client server to be used by the Microsoft Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1** and SOL. Please note that the option of SOL indicates a shared serial port. SOL is available with BMC support.

Terminal Type EMS

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

Bits Per Second EMS

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

Flow Control EMS

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

The following information is displayed:

Data Bits EMS / Parity EMS / Stop Bits EMS

▶SATA Configuration

This submenu displays information regarding the SATA device(s) that is(are) connected to your motherboard and detected by the BIOS.
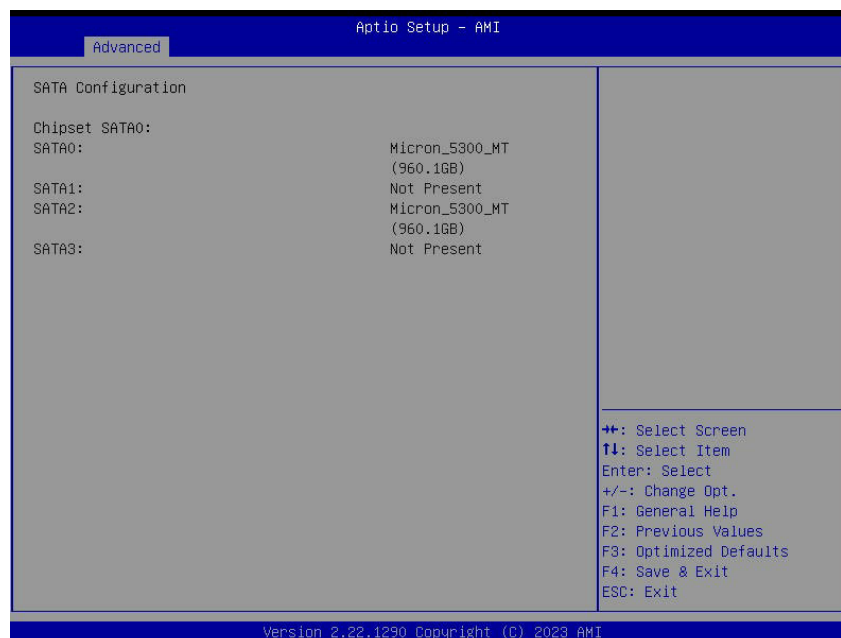
▶PCIe/PCI/PnP Configuration

The following information is displayed:

- PCI Bus Driver Version

PCI Devices Common Settings:

Above 4G Decoding (Available when the system supports 64-bit PCI decoding)

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

Re-Size BAR Support

Use this feature to enable/disable the Resizable BAR support if your system is with Resizable BAR capable PCIe devices. The options are Disabled and **Enabled**.

SR-IOV Support

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

BME DMA Mitigation

If this setting is set to Enabled, the PCI Bus Driver will enable the Bus Master Attribute for DMA transactions. If this setting is set to Disabled, the PCI Bus Driver will disable the Bus Master Attribute for Pre-Boot DMA protection. The options are **Disabled** and Enabled.

Relaxed Ordering

Use this feature to enable/disable Relaxed Ordering support. Relaxed Ordering allows certain transaction to violate PCI bus strict-ordering rules for a transaction to be completed prior to other enqueued transactions. The options are Disabled and **Enabled**.

No Snoop

Use this feature to enable/disable PCIe device snooping. The options are Disabled and **Enabled**.

NVMe Firmware Source

Use this feature to select the NVMe firmware to support system boot. The options are **Vendor Defined Firmware** and AMI Native Support. The default option, Vendor Defined Firmware, is pre-installed on the drive and may resolve errata or enable innovative functions for the drive. The other option, AMI Native Support, is offered by the BIOS with a generic method.

NVMe RAID Mode

Use this feature to enable/disable NVMe RAID mode. The options are **Disabled** and Enabled.

> **Note:** Set this feature to Enabled if you'd like to create RAID level(s) using NVMe devices. Please also be sure that the required NVMe devices have been connected to your motherboard. Save settings (you can press <F4>) and reboot the system for changes to take effect.

PT21 SATA Mode

Use this feature to set the PT21 SATA mode. The options are **AHCI Mode** and RAID Mode.

> **Note:** Set this feature to RAID Mode if you'd like to create RAID level(s) using SATA devices. Save settings (you can press <F4>) and reboot the system for changes to take effect.

Onboard Video Option ROM

Select EFI to allow you to boot the computer using the Extensible Firmware Interface (EFI) device installed on the onboard video port. The options are Disabled and **EFI**.

CPU Slot1 PCIe 5.0 x8 OPROM / CPU Slot3 PCIe 5.0 x16 OPROM / CPU Slot4 PCIe 5.0 x8 OPROM / CPU Slot6 PCIe 5.0 x16 OPROM / Onboard LAN1 Option ROM / M.2-C1 OPROM / M.2-C2 OPROM

Select EFI to allow you to boot the computer using the EFI device installed on the PCIe slot specified. The options are Disabled and **EFI**.

▶USB Configuration

The following 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.

Port 60/64 Emulation

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

▶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 you 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

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:(MAC address)-IPv4 Network Configuration

Configured

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

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

Select Enabled to support Dynamic Host Configuration Protocol (DHCP) which 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 NetMask (Available when "Configured" is set to Enabled and "Enabled DHCP" is set to Disabled)

Use this feature to set the netmask 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:(MAC address)-IPv6 Network Configuration

▶Enter Configuration Menu

The following information is displayed:

Interface Name / Interface Type / MAC address / Host address / 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 have been sent while performing duplicate address detection on a tentative address. The default setting is **1**.

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 addresses

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

New DNS addresses

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

Commit Changes and Exit

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

Discard Changes and Exit

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

Save Changes and Exit

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

▶HTTP Boot Configuration

HTTP Boot Policy

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

HTTPS Boot Checks Hostname

Enable this feature for HTTPS boot to check the hostname of the TLS certificates to see if it matches the host name provided by the remote server. The options are **Enabled** and Disabled (WARNING: Security Risk!!).

Priority of HTTP Boot

Instance of Priority 1 (Available when your motherboard supports this feature)

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

Select IPv4 or IPv6

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

Boot Description

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

Boot URI

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

Instance of Priority 2: (Available when your motherboard supports this feature)

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

Select IPv4 or IPv6 (Unavailable when "Instance of Priority x:" is set to 0)

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

Boot Description (Unavailable when "Instance of Priority x:" is set to 0)

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

Boot URI (Unavailable when "Instance of Priority x:" is set to 0)

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

▶Supermicro KMS Server Configuration

> **Note:** Be sure to configure all the features in the section of Supermicro KMS Server Configuration and the feature of "KMS Security Policy" (page 103) so that your system can communicate with the KMS server.

Supermicro KMS Server IP address

Use this feature to set the Supermicro Key Management Service (KMS) server IPv4 address in dotted-decimal notation.

Second Supermicro KMS Server IP address

Use this feature to set the second Supermicro KMS server IPv4 address in dotted-decimal notation.

Supermicro KMS TCP Port number

Use this feature to set the TCP port number used in Supermicro KMS Server. The valid range is 100–9999. The default setting is **5696**. Do not change the default setting unless a different TCP port number has been specified and used in the Supermicro KMS Server.

KMS Time Out

Use this feature to set the KMS server connecting timeout (in seconds). The default setting is **5** (seconds).

TimeZone

Use this feature to set the correct time zone. The default setting is **0** (not specified).

Client UserName

Press <Enter> to set the client identity (UserName). The maximum length is 63 characters.

Client Password

Press <Enter> to set the client identity (Password). The maximum length is 31 characters.

▶CA Certificate/ ▶Client Certificate/ ▶Client Private Key

Use the three features to enroll factory defaults or load the KMS Transport Layer Security (TLS) certificates, which are generated by the KMS Server, from the file stored in the USB flash drive as shown below.

```
                        Aptio Setup - AMI
        Advanced

  Supermicro KMS Server IP address          10.140.100.151    Enroll factory defaults or
  Second Supermicro KMS Server IP address                     load the KMS TLS
  Supermicro KMS TCP Port number            5696              certificates from the file
  KMS Time Out                              5
  TimeZone                                  0

  Client UserName                              Select File
  Client Password
                                          <.>
  KMS TLS Certificate | Size              <..>
▶ CA Certificate       |    0              smc_kmip.ca
▶ Client Certificate   |    0              smc_kmip.crt
▶ Client Private Key   |    0              smc_kmip.key
                                          client.key
                                          client.crt
                                          ca.crt

                                                             ++: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

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```

Private Key Password (Available when "Client Private Key" above has been set)

Use this feature to change the private key password.

▶Super-Guardians Configuration

Press <Del> during system boot to enter the BIOS Setup utility. Navigate to the Advanced tab. Use the arrow keys to select Super-Guardians Configuration and press <Enter>.

```
                        Aptio Setup - AMI
      Main  Advanced  Event Logs  BMC  Security  Boot  Save & Exit

  ▶ Boot Feature                                    Settings for
  ▶ CPU Configuration                               Super-Guardians
  ▶ Chipset Configuration                           Configuration
  ▶ Server ME Information
  ▶ PCH SATA0 Configuration
  ▶ PCH SATA2 Configuration
  ▶ Trusted Computing
  ▶ ACPI Settings
  ▶ Super IO Configuration
  ▶ Serial Port Console Redirection
  ▶ Network Configuration
  ▶ PCIe/PCI/PnP Configuration
  ▶ HTTP Boot Configuration
  ▶ Supermicro KMS Server Configuration
  ▶ Super-Guardians Configuration

  ▶ Intel(R) Ethernet Controller X550 - 3C:EC:EF:D0:E3:54
  ▶ Intel(R) Ethernet Controller X550 - 3C:EC:EF:D0:E3:55   ↔: Select Screen
  ▶ TLS Authenticate Configuration                          ↑↓: Select Item
                                                            Enter: Select
  ▶ Driver Health                                           +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

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```

Super-Guardians Protection Policy

Use this feature to enable the Super-Guardians Protection Policy. The options are **Storage**, System, and System and Storage. The default setting is Storage. Set this feature to Storage to protect and have secure access to your storage devices (TCG NVMe devices) with the Authentication-Key (AK). Set this feature to System to protect and have secure access to your system/motherboard with the AK. Set this feature to System and Storage to protect and have secure access to your system/motherboard/storage devices with the AK. (TCG is the abbreviation for Trusted Computing Group.)

```
                        Aptio Setup - AMI
      Advanced

 Super-Guardians Protection Policy        [Storage]          Storage: Protect the
                                                             Storage devices
 KMS Security Policy                       [Disabled]         System: Protect the System
 KMS Server Retry Count                    5                  System and Storages:
                                                             Protect the system and
 TPM Security Policy                       [Disabled]         Storage devices
 Load Authentication-Key                   [Disabled]

 USB Security Policy                       [Disabled]

                        ┌─── Super-Guardians Protection Policy ───┐
                        │ Storage                                 │
                        │ System                                  │
                        │ System and Storage                      │
                        └─────────────────────────────────────────┘

                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

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```

KMS Security Policy (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)

Set this feature to Enabled to enable the KMS Security Policy. The options are **Disabled** and Enabled. The default setting is Disabled. Save settings (you can press <F4>) and reboot the system for changes to take effect.

> **Note 1:** Be sure that the KMS Server is ready before configuring this feature.
>
> **Note 2:** Use the professional KMS Server solutions (e.g., Thales Server) or the Supermicro PyKMIP Software Package to establish the KMS Server.

```
                              Aptio Setup - AMI
         Advanced

  Super-Guardians Protection Policy      [Storage]             Security Enabled: Storage
                                                               devices or System will be
  KMS Security Policy                    [Disabled]            installed with password and
  KMS Server Retry Count                 5                     unlock normally.
                                                               Reset All Devices: Reset
  TPM Security Policy                    [Disabled]            all Storage devices or
  Load Authentication-Key               [Disabled]            System into unprotected
                                                               mode without password.
  USB Security Policy                    [Disabled]            Do Nothing: Default mode
                                                               without any action
                           ┌──── KMS Security Policy ────┐     Key Rotation: Change the
                           │ Disabled                    │     Secure-KEY with a new one
                           │ Enabled                     │
                           └─────────────────────────────┘

                                                               ++: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit

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```

KMS Server Retry Count (Available when "TPM Security Policy" and "USB Security Policy" are set to Disabled)

Use this feature to specify how many times of connection retrying to the KMS server. The valid range is 0–10. Press "+" or "-" on your keyboard to change the value. The default setting is **5** (times). The value of 0 indicates a infinite-retrying.

TPM Security Policy (Available when "KMS Security Policy" and "USB Security Policy" are set to Disabled)

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled to enable the TPM Security Policy. Save settings (you can press <F4>) and reboot the system for changes to take effect.

Note: Be sure to install a Trusted Platform Module (TPM) device (TPM 2.0) to your system before configuring this feature.

```
                            Aptio Setup - AMI
     Advanced

 Super-Guardians Protection Policy      [Storage]             Enabled: Storage devices or
                                                              System will be installed
 KMS Security Policy                    [Disabled]            with password and unlock
 KMS Server Retry Count                 5                     normally.
                                                              Disabled: Default mode
 TPM Security Policy                    [Disabled]            without any action
 Load Authentication-Key                [Disabled]            Reset: Clear all passwords
                                                              in Storage devices or System
 USB Security Policy                    [Disabled]

                          ┌──── TPM Security Policy ────┐
                          │ Disabled                    │
                          │ Enabled                     │
                          └─────────────────────────────┘


                                                              ++: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit

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```

Load Authentication-Key (Available when "KMS Security Policy" and "TPM Security Policy" are set to Disabled)

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled; save settings (you can press <F4>) and reboot the system for changes to take effect. While booting, the BIOS will automatically load the Authentication-Key (filename: TPMAuth. bin) from the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS.

```
                              Aptio Setup – AMI
         ┌─────────┐
         │ Advanced │
         └─────────┘
 Super-Guardians Protection Policy      [Storage]              BIOS will load the
                                                               Authentication-Key (File
 KMS Security Policy                    [Disabled]             name: TPMAuth.bin) from USB
 KMS Server Retry Count                 5                      Storages At Next-Boot

 TPM Security Policy                    [Disabled]
 Load Authentication-Key                [Disabled]

 USB Security Policy                    [Disabled]
                         ┌─── Load Authentication-Key ───┐
                         │ Disabled                       │
                         │ Enabled                        │
                         └────────────────────────────────┘

                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit

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```

Note 1: Be sure to connect a USB flash drive with the Authentication-Key (filename: TPMAuth.bin) to your system before the system reboot.

Note 2: Be sure to save the Authentication-Key (filename: TPMAuth.bin) to the USB flash drive and have a backup. Please load the Authentication-Key (filename: TPMAuth. bin) after installing a TPM device. Otherwise, the TPM function can not work properly.

Save Authentication-Key (Available when "TPM Security Policy" is set to Enabled and "USB Security Policy" is set to Disabled)

The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled; save settings (you can press <F4>) and reboot the system for changes to take effect. While booting, the BIOS will automatically save the Authentication-Key (filename: TPMAuth. bin) to the USB flash drive. Afterwards, the default setting will be set to Disabled by the BIOS..

Note: Be sure to connect a USB flash drive to your system before the system reboot.

```
                          Aptio Setup - AMI
      Advanced

 Super-Guardians Protection Policy    [Storage]           BIOS will save the
                                                          Authentication-Key (File
 KMS Security Policy                  [Disabled]          name: TPMAuth.bin) to USB
 KMS Server Retry Count              5                    Storages At Next-Boot

 TPM Security Policy                  [Enabled]
 Save Authentication-Key             [Enabled]

 USB Security Policy                  [Disabled]

                                                          ↔: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

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```

USB Security Policy (Available when "KMS Security Policy" and "TPM Security Policy" are set to Disabled)

Use this feature to enable the USB Security Policy. The options are **Disabled** and Enabled. The default setting is Disabled. Set this feature to Enabled; save settings (you can press <F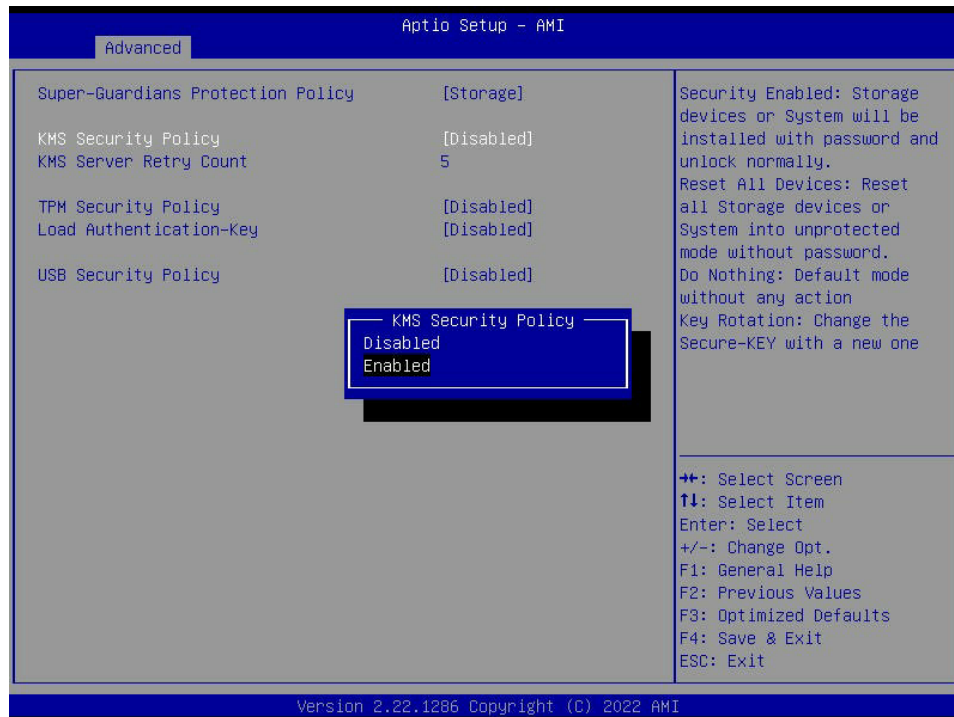4>) and reboot the system for changes to take effect. Connect a USB flash drive to your system before the system reboot. While booting, the BIOS will automatically create the USB Authentication-Key (filename: USBAuth.bin) and save it to the USB flash drive.

```
                              Aptio Setup – AMI
      Advanced

   Super-Guardians Protection Policy        [Storage]          Enabled: Storage devices or
                                                               System will be installed
   KMS Security Policy                      [Disabled]         with password and unlock
   KMS Server Retry Count                   5                  normally.
                                                               Disabled: Default mode
   TPM Security Policy                      [Disabled]         without any action
   Load Authentication-Key                  [Disabled]         Reset: Clear all passwords
                                                               in Storage devices or System
   USB Security Policy                      [Disabled]

                              ┌─── USB Security Policy ───┐
                              │ Disabled                  │
                              │ Enabled                   │
                              └───────────────────────────┘


                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F3: Optimized Defaults
                                                               F4: Save & Exit
                                                               ESC: Exit

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```

Note 1: Be sure to connect a USB flash drive to your system before configuring this feature.

Note 2: Be sure to save the USB Authentication-Key (filename: USBAuth.bin) to the USB flash drive and have a backup.

▶Supermicro 10GBASE-T Ethernet Contorller - (MAC address)

> **Note:** The Ethernet controller and MAC addresses shown above are based on you system features.

▶Firmware Image Menu

The following information is displayed:

- Boot Code

- MBA

- EFI

- NC-SI

- RDMA FW

▶Device Configuration Menu

Multi-Function Mode

Use this feature to set the NIC Hardware Mode. Switching from multi-function to single function will result in the clearing of Virtual Function values in the extended partitions. The options are **SF** and NPAR 1.0.

SR-IOV

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

Number of MSI-X Vectors per VF

Use this feature to set the number of MSI-X Vectors per VF (1–64). The default setting is **16**.

Maximum Number of PF MSI-X Vectors

Use this feature to set the maximum number of PF MSI-X Vectors (0–512 per controller). The default value is **255**.

Energy Efficient Ethernet

Use this feature to disable/enable the Energy Efficient Ethernet operation. The options are **Disabled** and Enabled.

Operational Link Speed

Use this feature to set the default link speed for the selected port. The default setting is **AutoNeg**.

Support RDMA

Use this feature to disable/enable the RDMA support for this port. The options are Disables and **Enabled**.

DCB Protocol

Use this feature to disable/enable the DCB Protocol. The options are Disabled, **Enabled (IEEE only)**, CEE (only), Both (IEEE preferred with fallback to CEE).

LLDP nearest bridge

Use this feature to disable/enable the LLDP nearest bridge state. The options are **Disabled** and Enabled.

Default EVB Mode

Use this feature to set the default Edge Virtual Bridging (EVB) mode. The options are **VEB**, VEPA, and None.

Enable PME Capability

Use this feature to disable/enable the PME Capability support. The options are Disabled and **Enabled**.

Flow Offload

Use this feature to disable/enable the Flow Offload mode. This figure is supported on Linux DPDK only. The options are **Disabled** and Enabled.

Adapter Error Recovery

Use this feature to disable/enable the recovery of firmware from fatal errors without manual intervention, host reboot, and power cycle. The options are **Disabled** and Enabled.

▶**MBA Configuration Menu**

Option ROM

Use this feature to disable/enable the legacy boot protocols for the Option ROM. The options are Disabled and **Enabled**.

Legacy Boot Protocol

Use this feature to set the non-UEFI boot protocol. The options are **PXE** and NONE.

Boot Strap Type

Use this feature to set the boot strap method used to boot to the operation system. The options are **Auto Detect**, BBS, Int 18h, and Int 19h.

Pre-boot Wake On LAN

Use this feature to set Pre-boot Wake on LAN (WOL). The options are Disabled and **Enabled**.

VLAN Mode

Use this feature to disable/enable the virtual LAN mode, which enables the use of a VLAN tag. The options are **Disabled** and Enabled.

VLAN ID (Available when "Legacy VLAN Mode" is set to Enabled)

Use this feature to set the virtual LAN ID. Enter a valid value between 1–4094. The default setting is **1**.

Boot Retry Count

Use this feature to set the number of retries when a boot failure occurs. The options are **No Retry**, 1 Retry, 2 Retries, 3 Retries, 4 Retries, 5 Retries, 6 Retries, and Indefinite Retries.

Blink LEDs

Use this feature to identify the physical network port by blinking the associated LED. The default setting is **0** (up to 15 seconds).

The following information is displayed:

- Link Status

- Physical Link Speed

- Chip Type

- PCI Device ID

- Bus:Device:Function

- Permanent MAC Address

- Virtual MAC Address

- Restore Defaults

▶TLS Authenticate Configuration

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

▶Server CA Configuration

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

▶Enroll Certification

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

▶Enroll Certification Using File

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

Certification GUID

Press <Enter> and input the certification Global Unique Identifier (GUID).

▶Commit Changes and Exit

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

▶Discard Changes and Exit

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

▶Delete Certification

This feature is used to delete the certificate if a certificate has been enrolled in the system. The options are **Disabled** and Enabled.

▶Client Certification Configuration

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

▶Enroll Certification

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

▶Enroll Certification Using File

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

Certification GUID

Press <Enter> and input the certification GUID.

▶**Commit Changes and Exit**

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

▶**Discard Changes and Exit**

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

▶**Delete Certification**

This feature is used to delete the certificate if a certificate has been enrolled in the system.

▶RAIDXpert2 Configuration Utility

Use this submenu to configure NVMe/SATA RAID settings (this motherboard supports RAID 0/1/5/10).

- For NVMe RAID settings, please set "NVMe RAID Mode" (Advanced > PCIe/PCI/PnP Configuration, on page 95) to Enabled.

- For SATA RAID settings, please set "PT21 SATA Mode" (Advanced > PCIe/PCI/PnP Configuration, on page 95) to RAID Mode.

Save settings (you can press <F4>) and reboot the system for changes to take effect. This submenu will be displayed on the BIOS screen below.

```
                        Aptio Setup – AMI
      Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

  ▶ Boot Feature                                    Select to configure
  ▶ CPU Configuration                               RAIDXpert2 controller
  ▶ NB Configuration
  ▶ Trusted Computing
  ▶ AMD fTPM configuration
  ▶ Super IO Configuration
  ▶ Serial Port Console Redirection
  ▶ SATA Configuration
  ▶ PCIe/PCI/PnP Configuration
  ▶ USB Configuration
  ▶ Network Configuration
  ▶ HTTP Boot Configuration

  ▶ Broadcom NetXtreme Gigabit Ethernet (BCM5720) –
    7C:C2:55:66:F2:88
  ▶ Broadcom NetXtreme Gigabit Ethernet (BCM5720) –
    7C:C2:55:66:F2:89
  ▶ TLS Authenticate Configuration                  →←: Select Screen
  ▶ RAIDXpert2 Configuration Utility                ↑↓: Select Item
  ▶ AMD Overclocking                                Enter: Select
                                                    +/–: Change Opt.
  ▶ Driver Health                                   F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit

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```

The following information regarding Firmware Properties is displayed:

- UEFI Driver Version

- Firmware Build Time

- Total Physical Controllers

- AHCI Controllers

- NVMe Controllers

- Total Physical Device Count

- Total Logical Array Count

▶Controller Management

▶View Controller Information

Select Controller:

Press <Enter> to select a controller.

The following information is displayed:

* Segment:Bus:Device:Function

* PCI ID

* Controller Physical Disk Count

▶Rescan Disks

Use this feature to perform a rescan of all physical disks and arrays that are connected to the controller.

The following information is displayed:

* Physical Disk(s)

* Array(s)

▶OK

Press <Enter> to go back to the previous BIOS screen.

▶Array Management

▶Create Array

▶Create Array

This feature is available when the features of "Select RAID Level:" and "Select Physical Disks" below have been set. Press <Enter> to continue to create array(s).

Select RAID Level:

This feature allows you to select the RAID level. The options are **Volume**, RAIDABLE, RAID 0, RAID 1, RAID 5, RAID 10. Available RAID levels are based on the number of disks connected to the system.

▶Select Physical Disks

Select Media Type

Use this feature to select the physical disk media type. The options are HDD, SSD, and **BOTH**.

The list of physical disk(s), including the related information, is displayed. Use the arrow keys to select the desired physical disk. For example:

Physical Disk 0:1:0, SATA, (capacity), Ready (Available when this SATA device is detected by the BIOS)

Use this feature to disable/enable this SATA device. The options are **Disabled** and Enabled.

Check All

Press <Enter> to enable all the above physical disks listed on this BIOS screen, which are detected by the BIOS and available to create array(s).

Uncheck All

Press <Enter> to disable all the above physical disks listed on this BIOS screen, which are detected by the BIOS and available to create array(s).

▶Apply Changes

Use this feature to perform changes for the features above.

▶OK

Press <Enter> to go back to the previous BIOS screen.

The following features regarding Configure Array Parameters are available to configure

Array Size

Use this feature to set the array size to be created.

Array Size Unit

Use this feature to set the units that the array size is displayed.

Select CacheTagSize:

Use this feature to set the Cachetag size. The size of 64KB, 128KB, and 256KB are supported.

Read Cache Policy:

Use this feature to set the read policy. The options are **Read Cache** and No Cache.

Write Cache Policy:

Use this feature to set the write policy. The options are **Write Back Cache** and No Cache.

▶**Create Array**

Confirm

Enable this feature to create the array using the features you set. The options are **Disabled** and Enabled.

▶**YES**

Press <Enter> to create this array.

▶**NO**

Press <Enter> to go back to the previous BIOS screen.

▶**Manage Array Properties**

Select Array

Press <Enter> to select an array that has been created earlier.

The following information regarding array properties is displayed:

- Array ID

- RAID Level

- Array Status

- Array Capacity

- Cache Tag Size

- Hidden:

The following information regarding array policies is displayed:

- Read Cache Policy

- Write Cache Policy

▶View Associated Physical Disks

Use this feature to display information of the physical disks that are associated with the array you selected by using the feature of "Select Array" above.

Physical Disk (Available when the physical disk is detected by the BIOS)

Use this feature to select the physical disk that you'd like to view its properties by using the feature of "View Physical Disk Properties" below. The options are **Disabled** and Enabled.

▶View Physical Disk Properties (Available when any of physical disks on this BIOS screen is enabled)

Press <Enter> and the information regarding the physical disk properties is displayed: Physical Disk ID / State / Size / SMART Status / Revision / Device Type / Connected Port / Available Space / Used Space / Disk Protocol / Negotiated Link Speed

The information regarding the associated array(s) is displayed: Serial Number / Model Number

▶Manage Dedicated Hot Spares

Use this feature to display and/or assign additional dedicated hot spares for the array you selected by using the feature of "Select Array" above.

▶Delete Array

The list of array(s), including the RAID level related information, is displayed. Use the arrow keys to select the desired array. For example:

Array 1, RAID5, 318.8 GB, Critical

This feature depends on the array(s) you created earlier. The options are **Disabled** and Enabled. If you'd like to delete this array, set this feature to Enabled.

Check All

Press <Enter> to enable all the above arrays listed on this BIOS screen.

Uncheck All

Press <Enter> to disable all the above arrays listed on this BIOS screen.

▶**Delete Array(s)**

Confirm

Set this feature to Enabled to delete the selected array(s). The options are **Disabled** and Enabled.

▶**YES**

Press <Enter> to delete the selected array(s).

▶**NO**

Press <Enter> to go back to the previous BIOS screen.

▶**Physical Disk Management**

▶**View Physical Disk Properties**

Select Physical Disk:

Press <Enter> to select a physical disk.

The following information regarding physical disk properties is displayed:

• Physical Disk ID

• State

• Size

• SMART Status

• Revision

• Device Type

• Connected Port

• Hot Spare

• Available Space

• Used Space

- Disk Protocol

- Negotiated Link Speed

The following information regarding associated array(s) is displayed:

- Serial Number

- Model Number

▶**Select Physical Disk Operations**

Select Physical Disk:
Press <Enter> to select a physical disk.

▶**Initialize Disk**

Use this feature to select and initialize the physical disk(s) to create RAID array(s).

▶**Assign Global Hot Spare**

Use this feature to set a physical disk as the global hot spare.

▶**Unassign Hot Spare (Available when any global hot spare is set)**

Use this feature to unassign a hot spare.

▶**View Global Hot Spares**

This feature displays the physical disk(s) that has(have) been set as the global hot spare(s).

▶AMD Overclocking

▶Accept

Press <Enter> to set the overclocking features.

▶Manual CPU Overclocking

CPU Frequency

Use this feature to set the CPU core frequency.

VDDCR_CPU0 Voltage

Use this feature to set the VDDCR_CPU0 Voltage (mV).

VDDCR_CPU1 Voltage

Use this feature to set the VDDCR_CPU1 Voltage (mV).

▶CPU Core Count Control

The following information regarding AOD Core Bit Map is displayed: CCD00 / CCD01 / CCD02 / CCD03 / CCD04 / CCD05 / CCD06 / CCD07 / CCD08 / CCD09 / CCD10 / CCD11

▶CCD 00 Bit Map Down Core Control / ▶CCD 01 Bit Map Down Core Control / ▶CCD 02 Bit Map Down Core Control / ▶CCD 03 Bit Map Down Core Control

Use this feature to modify the core bit. "1" means the core is enabled. "0" means the core is software down.

▶Bit Map Down Core Discard Changes

Use this feature to discard changes.

▶Bit Map Down Core Apply Changes

Use this feature to apply changes and reboot.

SMT Control

Use this feature to disable the symmetric multithreading. A power cycle is needed after setting this feature to Auto. The options are **Auto** and Disable.

Prochot VRM Throttling

The options are **Auto**, Enable, and Disable. Please note that disabling Prochot will disable the VRM ability to throttle the CPU when the voltage regulator is approaching its thermal limits.

Peak Current Control

Use this feature to enable/disable the Peak Current Control (PCC). The options are **Auto**, Enable, and Disable.

▶**DDR and Infinity Fabric Frequency/Timings**

▶**DDR Options**

▶**DDR Timing Configuration**

Active Memory Timing Settings

This feature is used for the active memory timing settings. The options are **Auto** and Enabled.

Memory Target Speed (Available when "Active Memory Timing Settings" is set to Enabled)

Use this feature to set the memory target speed (in MT/s). The valid value is 2000 MT/s, 2400 MT/s, and range of 3200–12000 MT/s (stepping of 200 MT/s). The default setting is 3200 (MT/s).

▶**DDR SPD Timing (Available when "Active Memory Timing Settings" is set to Enabled)**

Tcl Ctrl / Trcd Ctrl / Trp Ctrl / Tras Ctrl / Trc Ctrl / Twr Ctrl / Trfc1 Ctrl / Trfc2 Ctrl / TrfcSb Ctrl / Trtp Ctrl / TrrdL Ctrl / TrrdS Ctrl / Tfaw Ctrl / TwtrL Ctrl / TwtrS Ctrl
Use these features to set the DDR SPD timing. The options are **Auto** and Manual.

▶**DDR NON-SPD Timing (Available when "Active Memory Timing Settings" is set to Enabled)**

TrdrdScL Ctrl / TrdrdSc Ctrl / TrdrdSd Ctrl / TrdrdDd Ctrl / TwrwrScL Ctrl / TwrwrSc Ctrl / TwrwrSd Ctrl / TwrwrDd Ctrl / Twrrd Ctrl / Trdwr Ctrl
Use these features to set the DDR non-SPD timing. The options are **Auto** and Manual.

▶DDR Bus Configuration

Processor CA Drive Strengths

Use this feature to set the drive strength for all CA0–13 IOs. The options are **Auto**, 120.0 Ohm, 60.0 Ohm, 40.0 Ohm, and 30.0 Ohm.

Processor DQ Drive Strengths

Use this feature to set the drive strength for all DQ and DMI IOs. The options are **Auto**, High Impedance, 240 ohm, 120 ohm, 80 ohm, 60 ohm, 48 ohm, 40 ohm, and 34.3 ohm.

Processor ODT Impedance

Use this feature to set the ODT impedance for all DBYTE IOs. The options are **Auto**, High Impedance, 480 ohm, 240 ohm, 160 ohm, 120 ohm, 96 ohm, 80 ohm, 68.6 ohm, 60 ohm, 53.3 ohm, 48 ohm, 43.6 ohm, 40 ohm, 36.9 ohm, 34.3 ohm, 32 ohm, 30 ohm, 28.2 ohm, 26.7 ohm, and 25.3 ohm.

Dram DQ Drive Strengths

Use this feature to set the Dram Pull-up and Pull-down output driver impedance for all DQ and DMI IOs. The options are **Auto**, 48 ohm, 40 ohm, and 34 ohm.

Dram ODT Impedance RTT_NOM_WR

Use this feature to set the DRAM On-die termination impedance for RTT_NOM_WR. The options are **Auto**, RTT_OFF, RZQ (240), RZQ/2 (120), RZQ/3 (80), RZQ/4 (60), RZQ/5 (48), RZQ/6 (40), and RZQ/7 (34).

Dram ODT Impedance RTT_NOM_RD

Use this feature to set the DRAM On-die termination impedance for RTT_NOM_RD. The options are **Auto**, RTT_OFF, RZQ (240), RZQ/2 (120), RZQ/3 (80), RZQ/4 (60), RZQ/5 (48), RZQ/6 (40), and RZQ/7 (34).

Dram ODT Impedance RTT_WR

Use this feature to set the DRAM On-die termination impedance for RTT_WR. The options are **Auto**, RTT_OFF, RZQ (240), RZQ/2 (120), RZQ/3 (80), RZQ/4 (60), RZQ/5 (48), RZQ/6 (40), and RZQ/7 (34).

Dram ODT Impedance RTT_PARK

Use this feature to set the DRAM On-die termination impedance for RTT_PARK. The options are **Auto**, RTT_OFF, RZQ (240), RZQ/2 (120), RZQ/3 (80), RZQ/4 (60), RZQ/5 (48), RZQ/6 (40), and RZQ/7 (34).

Dram ODT Impedance DQS_RTT_PARK

Use this feature to set the DRAM On-die termination impedance for RTT_PARK. The options are **Auto**, RTT_OFF, RZQ (240), RZQ/2 (120), RZQ/3 (80), RZQ/4 (60), RZQ/5 (48), RZQ/6 (40), and RZQ/7 (34).

▶**DDR Controller Configuration**

▶**DDR Power Options**

Power Down Enable

Use this feature to set the DDR power down mode. The options are Disabled, Enabled, **Auto**.

▶**Additional Memory Tweaks**

RX DFE Taps

Use this feature to set the number of RX DFE taps. The options are **Auto**, 1 Tap, 2, Tap, 3 Tap, and 4 Tap.

TX DFE Taps

Use this feature to set the number of TX DFE taps. The options are **Auto**, 1 Tap, 2, Tap, 3 Tap, and 4 Tap.

▶**Infinity Fabric Frequency and Dividers**

Infinity Fabric Frequency and Dividers

Use this feature to set the Infinity Fabric frequency (FCLK). The options are **Auto**, 100 MHz, 200 MHz, 333 MHz, 400 MHz, 500 MHz, 533 MHz, 667 MHz, 800 MHz, 933 MHz, 1050 MHz, 1066 MHz, 1067 MHz, 1100 MHz, 1120 MHz, 1143 MHz, 1200 MHz, 1250 MHz, 1257 MHz, 1280 MHz, 1300 MHz, 1320 MHz, 1333 MHz, 1367 MHz, 1371 MHz, 1400 MHz, 1433 MHz, 1440 MHz, 1467 MHz, 1485 MHz, 1500 MHz, 1533 MHz, 1560 MHz, 1567 MHz, 1600 MHz, 1633 MHz, 1650 MHz, 1667 MHz, 1680 MHz, 1700 MHz, 1733 MHz, 1750 MHz, 1760 MHz, 1767 MHz, 1800 MHz, 1833 MHz, 1867 MHz, 1900 MHz, 1920 MHz, 1933 MHz, 1960 MHz, 1967 MHz, 2000 MHz, 2033 MHz, 2067 MHz, 2100 MHz, 2133 MHz, 2167 MHz, 2200 MHz, 2233 MHz, 2267 MHz, 2300 MHz, 2333 MHz, 2367 MHz, 2400 MHz, 2433 MHz, 2467 MHz, 2500 MHz, 2550 MHz, 2600 MHz, 2650 MHz, 2700 MHz, 2750 MHz, 2800 MHz, 2850 MHz, 2900 MHz, 2950 MHz, and 3000 MHz.

UCLK DIV1 MODE

Use this feature to set the UCLK DIV mode. The options are **Auto**, UCLK=MEMCLK, and UCLK=MEMCLK/2.

▶**Precision Boost Overdrive**

Precision Boost Overdrive

Use this feature to set the Precision Boost Overdrive (PBO). The options are **Auto**, Disable, Enable, and Advanced.

PBO Limits (Available when "Precision Boost Overdrive" is set to Advanced)

The options are **Auto**, Disable, Motherboard, and Manual. The option of Auto will load AMD default socket power (PPT), electrically-limited VRM current (EDC), and thermally-limited VRM current (TDC) limits. The option of Motherboard allows the processor to run based on increased PPT, EDC, and TDC limits that are defined by the motherboard. The option of Manual allows you to set PPT/TDC/EDC limits.

When "PBO Limits" is set to Manual, the features below will be available for configuration.

- **PPT Limit [mW]**: Use this feature to set the PPT limit in mW. The default setting is **0**.

- **TDC Limit [mA]**: Use this feature to set the TDC limit in mA. The default setting is **0**.

- **EDC Limit [mA]**: Use this feature to set the EDC limit in mA. The default setting is **0**.

Precision Boost Overdrive Scalar Ctrl (Available when "Precision Boost Overdrive" is set to Advanced)

Use this feature to set the PBO scalar The options are **Auto** and Manual.

When "Precision Boost Overdrive Scalar Ctrl" is set to Manual, the feature below will be available for configuration.

- **Precision Boost Overdrive Scalar**: Use this feature to override the AMD default silicon health management to potentially achieve higher sustained frequencies under CPU load. The options are **1X**, 2X, 3X, 4X, 5X, 6X, 7X, 8X, 9X, and 10X.

CPU Boost Clock Overdrive (Available when "Precision Boost Overdrive" is set to Advanced)

Use this feature to set the maximum CPU frequency that might be automatically achieved by the CPU Boost Algorithm. The options are **Disabled**, Enabled (Positive), and Enabled (Negative).

The feature below is NOT available when "CPU Boost Clock Overdrive" is set to Disabled.

- **Max CPU Boost Clock Overdrive(+)**: Use this feature to set the maximum CPU frequency that might be automatically achieved by the Precision Boost 2 Algorithm. The default setting is **25**.

Platform Thermal Throttle Ctrl (Available when "Precision Boost Overdrive" is set to Advanced)

Use this feature to decrease the maximum allowed processor temperature (Celsius). The options are Manual and **Auto**.

When "Platform Thermal Throttle Ctrl" is set to Manual, the feature below will be available for configuration.

- **Platform Thermal Throttle Limit**: Use this feature to decrease the maximum allowed processor temperature (Celsius). The default setting is **0**.

▶**Curve Optimizer (Available when "Precision Boost Overdrive" is set to Advanced)**

Curve Optimizer

This feature allows you to shift the voltage/frequency (AVFS) curve to include higher voltages (positive values) or lower voltages (negative values). The larger the value, the larger the magnitude of the voltage shift. The options are **Disable**, All Cores, Per Core, and Per CCD.

When "Curve Optimizer" is set to All Cores, the features below will be available for configuration.

- **All Core Curve Optimizer Sign**: Use this feature to set the direction of the curve shift on all cores. The option of Positive shifts the curve to the higher voltages. The option of Negative shifts the curve to the lower voltages. The options are **Positive** and Negative.

- **All Core Curve Optimizer Magnitude**: Use this feature to set the magnitude of the curve shift. The larger the value, the larger the magnitude of the shift. The default setting is **0**.

When "Curve Optimizer" is set to Per Core, the features below will be available for configuration.

- **Core 0 Curve Optimizer Sign – Core 95 Curve Optimizer Sign**: Use this feature to set the direction of the curve shift on this core. The option of Positive shifts the curve to the higher voltages. The option of Negative shifts the curve to the lower voltages. The options are Positive and **Negative**.

- **Core 0 Curve Optimizer Magnitude – Core 95 Curve Optimizer Magnitude**: Use this feature to set the magnitude of the curve shift to this core. The larger the value, the larger the magnitude of the shift. The default setting is **0**.

When "Curve Optimizer" is set to Per CCD, the features below will be available for configuration.

- **CCD 0 Curve Optimizer Sign – CCD 11 Curve Optimizer Sign**: Use this feature to set the direction of the curve shift on the CCD. The option of Positive shifts the curve to the higher voltages. The option of Negative shifts the curve to the lower voltages. The options are Positive and **Negative**.

- **CCD 0 Curve Optimizer Magnitude – CCD 11 Curve Optimizer Magnitude**: Use this feature to set the magnitude of the curve shift. The larger the value, the larger the magnitude of the shift. The default setting is **0**.

▶VDDG Voltage Control

The information of VDDG Voltage High/Low regarding the following is displayed: CCD00 / IOD00 / CCD01 / IOD01 / CCD02 / IOD02 / CCD03 / IOD03

VDDG Voltage Control

Use this feature to set the VDDG, which represents voltage for the data portion of the Infinity Fabric. The options are **Auto**, Global VDDG Voltage Control, and Per-CCD VDDG Voltage Control.

▶VDDP Voltage Control

VDDP Voltage Control

Use this feature to set the VDDP voltage. The options are **Auto** and Manual. Set this feature to Auto to have the system default VDDP. The option of Manual allows you to set voltage for the DDR bus signaling.

VDDP Voltage Adjust (Available when "VDDP Voltage Control" is set to Manual)

Use this feature to set the VDDP voltage, which is derived from your DRAM voltage (VDDIO_Mem). The default setting is **0**.

▶SoC/Uncore OC Mode

SoC/Uncore OC Mode

Use this feature to force CPU SoC/Uncore components (e.g., Infinity Fabric, memory, integrated graphics) to run at the maximum specified frequency at all times. The options are **Auto** and Enabled.

▶SoC Voltage

SoC Voltage

Use this feature to set the SoC/uncore voltage (VDD_SOC) in mV to support memory and Infinity Fabric overclocking.

▶LN2 Mode

LN2 Mode

Set this feature to provide additional stability at extreme cold operating temperatures. The options are **Auto**, Disabled, and Enabled.

▶VDD Misc

VDD Misc Control

Use this feature to set the VDD Misc voltage. The options are **Auto** and Manual. Set this feature to Auto to have the system default VDD Misc. The option of Manual allows you to set voltage for the GMI PHY.

VDD Misc Voltage (Available when "VDD Misc Control" is set to Manual)

Use this feature to set the VDD Misc voltage. The default setting is **800**.

▶LCLK Frequency Control

LCLK Frequency Control

Use this feature to set the LCLK frequency. The options are **Auto** and Manual. Set this feature to Auto to have the system default settings. The option of Manual allows you to configure the LCLK frequency.

Maximum Frequency (Available when "LCLK Frequency Control" is set to Manual)

Use this feature to set the maximum LCLK frequency The valid range is 889–2500 MHz. The default setting is **889**.

▶Onboard Voltage Control

▶VDDIO Voltage Control

The following information is displayed: Current DIMM VDD Voltage / Current DIMM VDDQ Voltage / Current APU VDDIO Voltage

VDDIO Ctrl

Use this feature to set the VDDIO voltage. The options are **Auto**, Manual, and Separate. Set this feature to Auto to have the system default VDD Misc. The option of Manual allows you to set DIMM VDD/VDDQ, which will be synchronized to APU VDDIOO. Set this feature to Separate to have the independent control of APU VDDIOO and DIMM VDD/VDDQ.

When "VDDIO Ctrl" is set to Manual, the feature below will be available for configuration.

- **DIMM VDD Adjust**: Use this feature to set the DIMM power supply in mV. The valid range is 800–1430 mV. The default setting is **1100**.

When "VDDIO Ctrl" is set to Separate, the features below will be available for configuration.

- **DIMM VDD Adjust**: Use this feature to set the DIMM power supply in mV. The valid range is 800–1430 mV. The default setting is **1100**.

- **DIMM VDDQ Adjust**: Use this feature to set the DIMM DQ power supply in mV. The valid range is 800–1430 mV. The default setting is **1100**.

- **APU VDDIO Adjust**: Use this feature to set the APU VDDIO in mV. The valid range is 700–2668 mV. The default setting is **1100**.

Enable Platform PMIC Control

The options are **Auto**, Enable, and Disable. If this feature is set to Enable, the DDR PMIC voltages are not adjusted by the processor firmware, and could be by EC or other platform based mechanism.

►**VPP Voltage Control**

The following information is displayed: Current VPP Voltage

VPP Ctrl

Use this feature to set the VPP voltage. The options are **Auto** and Manual. Set this feature to Auto to have the system default settings. The option of Manual allows you to set the memory VPP voltage.

VPP Adjust (Available when "VPP Ctrl" is set to Manual)

Use this feature to set the MEM VPP in mV. The valid range is 1500–2135 mV. The default setting is **1800**.

►**Gaming Mode**

Gaming Mode

Set this feature to Disabled to use the CCD control under AOD. The options are **Disabled** and Enabled. If this feature is set to Enabled, the CCD control will not work any more.

►**NPS Mode**

NUMA node per socket (Unavailable when "Gaming Mode" is set to Enabled)

Use this feature to set the number of NUMA nodes per socket. The options are **Auto**, NPS1, NPS2, and NPS4.

►**Decline**

Press <Enter> for not using overclocking features.

►**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.

4.4 BMC

Use this feature to configure BMC settings.

```
                            Aptio Setup - AMI
      Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

   BMC Firmware Revision              01.01.02          Press <Enter> to change the
   BMC STATUS                         Working           SEL event log configuration.

 ▶ System Event Log
 ▶ BMC Network Configuration




                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

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```

BMC Firmware Revision

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

BMC STATUS

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

▶System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL (Available when "SEL Components" is set to Enabled)

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

When SEL is Full (Available when "SEL Components" is set to Enabled)

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

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

►BMC Network Configuration

Update BMC 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

****

BMC LAN Selection

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

BMC Network Link Status:

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

Configuration Address Source (Available when "Update BMC 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).

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.

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).

****

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 other two options are 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 Configuration, **DHCPv6 Stateless**, and DHCPv6 Stateful.

IPv6 Address ("Static", "DHCPv6 Stateless", or "DHCPv6 Stateful", depending on the option you selected for "Configuration Address Source" above)

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

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

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

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

Use this feature to enter the IPv6 gateway IP address. Press <Enter> to change the setting.

Advanced Settings (Available when "Configuration Address Source" is set to DHCPv6 Stateless)

Use this feature to set the DNS server IP. The options are Auto obtain DNS server IP and **Manually obtain DNS server IP**.

Preferred DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature allows you to set the preferred DNS server IP.

Alternative DNS server IP (Available when "Advanced Settings" above is set to Manually obtain DNS server IP)

This feature allows you to set the alternative DNS server IP.

****

Configure VLAN Support

****

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

Use this feature to enable VLAN support to specify the 802.1q VLAN ID. The options are Enabled and **Disabled**.

VLAN ID (Available when "VLAN support" is set to Enabled)

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

4.5 Event Logs

Use this feature to configure Event Logs settings.

Note: After you've made any changes in this section, please be sure to reboot the system for the changes to take effect.

```
                              Aptio Setup - AMI
     Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

  ▶ Change SMBIOS Event Log Settings              Press <Enter> to change the
  ▶ View SMBIOS Event Log                         Smbios Event Log
                                                  configuration.












                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```
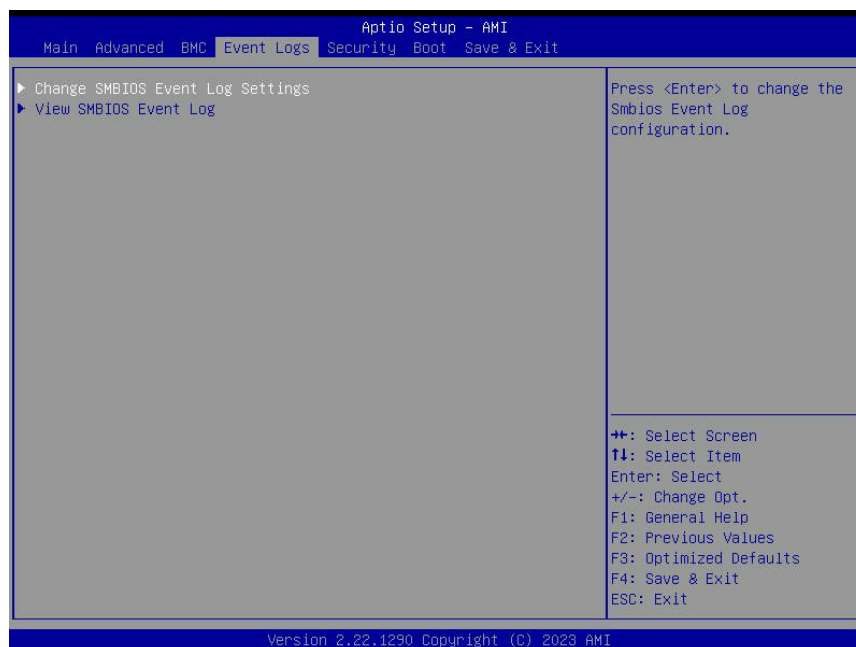
▶Change SMBIOS Event Log Settings

Enabling/Disabling Options

SMBIOS Event Log

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

Erasing Settings

Erase Event Log (Available when "SMBIOS Event Log" is set to Enabled)

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

When Log is Full (Available when "SMBIOS Event Log" is set to Enabled)

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

SMBIOS Event Log Standard Settings

Log System Boot Event (Available when "SMBIOS Event Log" is set to Enabled)

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

MECI (Available when "SMBIOS Event Log" is set to Enabled)

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**. (MECI is the abbreviation for Multiple Event Count Increment.)

METW (Available when "SMBIOS Event Log" is set to Enabled)

This feature is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**. (METW is the abbreviation for Multiple Event Count Time Window.)

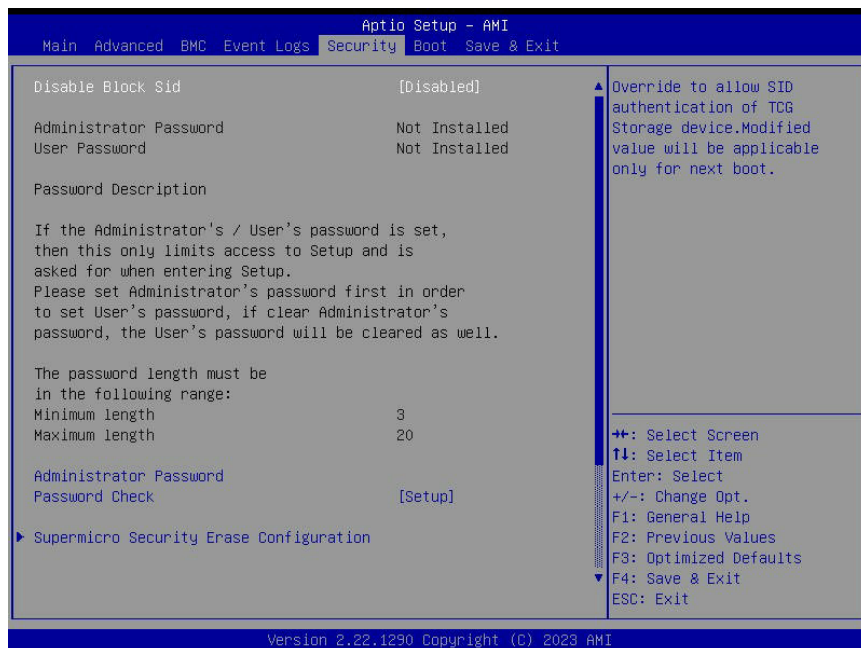> **Note:** Please reboot the system for the changes above to take effect.

▶View SMBIOS Event Log

This feature allows you to view the event in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following information is displayed: DATE / TIME / ERROR CODE / SEVERITY.

4.6 Security

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

```
                          Aptio Setup - AMI
    Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

  Disable Block Sid                  [Disabled]        ▲ Override to allow SID
                                                         authentication of TCG
  Administrator Password             Not Installed      Storage device.Modified
  User Password                      Not Installed      value will be applicable
                                                        only for next boot.
  Password Description

  If the Administrator's / User's password is set,
  then this only limits access to Setup and is
  asked for when entering Setup.
  Please set Administrator's password first in order
  to set User's password, if clear Administrator's
  password, the User's password will be cleared as well.

  The password length must be
  in the following range:
  Minimum length                     3
  Maximum length                     20              ▶←: Select Screen
                                                      ↑↓: Select Item
  Administrator Password                              Enter: Select
  Password Check                     [Setup]          +/-: Change Opt.
                                                      F1: General Help
▶ Supermicro Security Erase Configuration            F2: Previous Values
                                                      F3: Optimized Defaults
                                                    ▼ F4: Save & Exit
                                                      ESC: Exit

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```

Lockdown Mode (Available when the DCMS key is activated)

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

Disable Block Sid (Available when your storage devices support TCG)

Select Enabled to allow SID authentication to be performed in TCG storage devices. The options are **Disabled** and Enabled.

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. The length of the password should be from three characters to 20 characters long.

Password Check

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

▶Supermicro Security Erase Configuration (Available when any storage device is detected by the BIOS)

Note: For more information, please refer to https://www.supermicro.com/manuals/other/X11_X12_X13_B11_B12_B13_H11_H12_BH12_H13_Secure_Erase_Guide.pdf.

This section allows you to configure the Supermicro-proprietary Security Erase settings. When this section is selected, the following information is displayed. Please note that the order of the following information may differ based on the storage devices being detected.

- HDD Name: This feature displays the name of the storage device that is detected by the BIOS.

- HDD Serial Number: This feature displays the serial number of the storage device that is detected by the BIOS.

- Security Mode: This feature displays the security mode of the storage device that is detected by the BIOS.

- TCG Device Type: This feature displays the TCG device type detected by the system.

- Estimated Time: This feature displays the estimate time needed to perform the selected Security Erase features.

- Admin Pwd Status: This feature indicates if a password has been set as a storage device administrator password which allows you to configure Supermicro Security Erase settings on the storage device by using this administrator password.

- HDD User Pwd Status: This feature indicates if a password has been set as a storage device user password which allows you to configure Supermicro Security Erase settings on the storage device by using this user password.

Security Function

Select Set Password to set a storage device password which allows you to configure the security settings of the storage device. Select Security Erase - Password to enter a storage device user password to allow you to erase the password and the contents previously stored in the storage device. Select Security Erase - Without Password to use the manufacturer default password "111111111" as the storage device user password and allow you to erase the contents of the storage device by using this default password. The options are **Disable**, Set Password, Security Erase - Password, Security Erase - PSID, and Security Erase - Without Password.

> **Note:** The option of Security Erase - PSID is based on the storage device support. PSID is the abbreviation for Physical Security Identification.

Password

Use this feature to set the storage device user password which allows you to configure the Supermicro Security Erase settings by using this user password.

New Password (Available when "Password" above has been set)

Use this feature to set the new user password for the storage device which allows you to configure the Supermicro Security Erase settings by using this new user password.

▶P4: (Storage Device Name)

This section is available when the storage device is detected by the BIOS. Select this device. Press <Enter> and the following information is displayed:

- HDD Password Description:

- HDD PASSWORD CONFIGURATION:

  - Security Supported:

  - Security Enabled:

  - Security Locked:

  - Security Frozen:

  - HDD User Pwd Status:

  - HDD Master Pwd Status:

Set User Password (Available when "Security Frozen:" above is No)

Press <Enter> to set the HDD user password.

▶Secure Boot

Note: For detailed instructions on how to configure Security Boot settings, please refer to the Security Boot Configuration User's Guide posted on the web page under the link: https://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 the 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.

▶Enter Deployed Mode / Exit Deployed Mode (Available when "Secure Boot Mode" is set to Custom)

Select Ok to reset system to the User Mode or to the Deployed 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 a 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 to ensure system security. The options are **Yes** and No. Selecting 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.

▶**Enroll Efi Image**

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

▶**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.

Secure Boot variable / Size / Keys / Key Source

▶**Platform Key (PK)**

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

▶**Key Exchange Keys (KEK)**

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".

►Authorized Signatures (db)

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".

►Forbidden Signatures (dbx)

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".

►Authorized TimeStamps (dbt)

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

►OsRecovery Signature (dbr)

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

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.

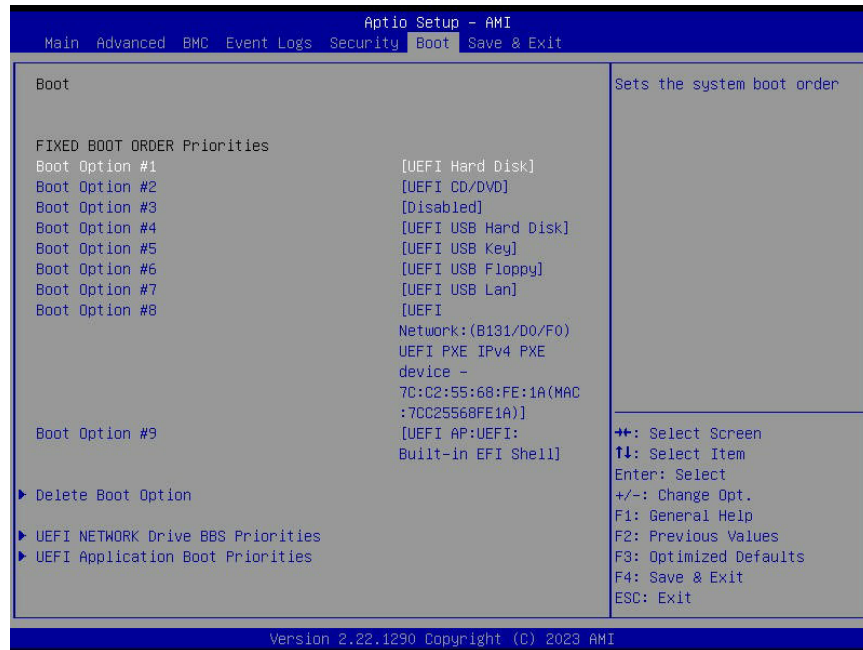**Set User Password (Available when the administrator password has been set)**

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

Device Reset

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

4.7 Boot

Use this feature to configure Boot settings:

```
                              Aptio Setup - AMI
        Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

    Boot                                                    Sets the system boot order


    FIXED BOOT ORDER Priorities
    Boot Option #1                    [UEFI Hard Disk]
    Boot Option #2                    [UEFI CD/DVD]
    Boot Option #3                    [Disabled]
    Boot Option #4                    [UEFI USB Hard Disk]
    Boot Option #5                    [UEFI USB Key]
    Boot Option #6                    [UEFI USB Floppy]
    Boot Option #7                    [UEFI USB Lan]
    Boot Option #8                    [UEFI
                                      Network:(B131/D0/F0)
                                      UEFI PXE IPv4 PXE
                                      device -
                                      7C:C2:55:68:FE:1A(MAC
                                      :7CC25568FE1A)]
    Boot Option #9                    [UEFI AP:UEFI:      →←: Select Screen
                                      Built-in EFI Shell] ↑↓: Select Item
                                                          Enter: Select
  ▶ Delete Boot Option                                    +/-: Change Opt.
                                                          F1: General Help
  ▶ UEFI NETWORK Drive BBS Priorities                     F2: Previous Values
  ▶ UEFI Application Boot Priorities                       F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit

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```

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 features below are displayed for configuration.

• Boot Option #1 – Boot Option #9

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

This feature allows you to add a new boot option to the boot priority features for system boot.

Add boot option

This feature allows you 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

This feature allows you 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

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

Delete Boot Option

This feature allows you to remove an EFI boot option from the boot priority list.

▶UEFI NETWORK Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶UEFI Application Boot Priorities

This feature allows you to set the system boot order of detected devices.
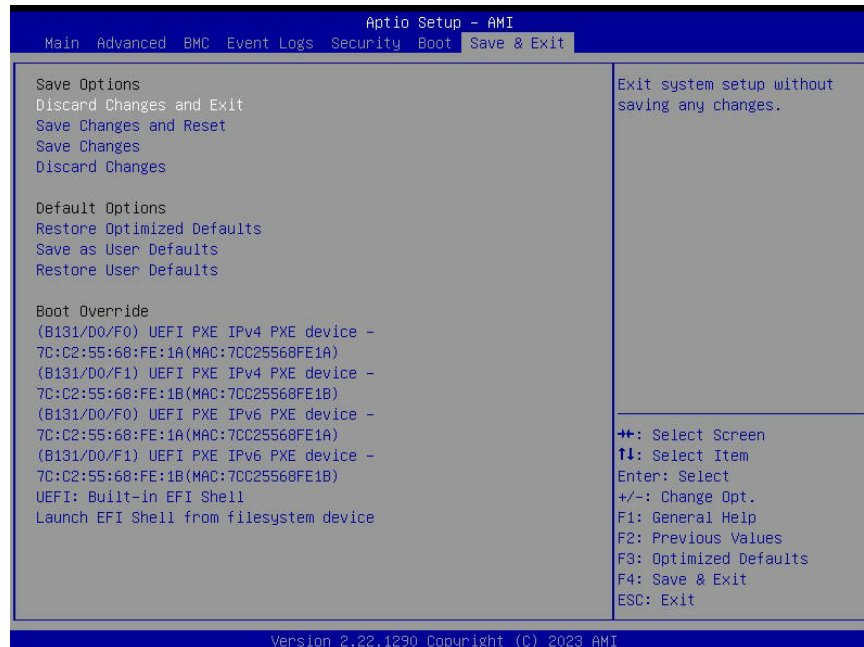
▶UEFI USB Key Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

▶UEFI Hard Disk Drive BBS Priorities

This feature allows you to set the system boot order of detected devices.

4.8 Save & Exit

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

```
                        Aptio Setup - AMI
   Main  Advanced  BMC  Event Logs  Security  Boot  Save & Exit

   Save Options                                 Exit system setup without
   Discard Changes and Exit                     saving any changes.
   Save Changes and Reset
   Save Changes
   Discard Changes

   Default Options
   Restore Optimized Defaults
   Save as User Defaults
   Restore User Defaults

   Boot Override
   (B131/D0/F0) UEFI PXE IPv4 PXE device -
   7C:C2:55:68:FE:1A(MAC:7CC25568FE1A)
   (B131/D0/F1) UEFI PXE IPv4 PXE device -
   7C:C2:55:68:FE:1B(MAC:7CC25568FE1B)
   (B131/D0/F0) UEFI PXE IPv6 PXE device -
   7C:C2:55:68:FE:1A(MAC:7CC25568FE1A)       ++: Select Screen
   (B131/D0/F1) UEFI PXE IPv6 PXE device -    ↑↓: Select Item
   7C:C2:55:68:FE:1B(MAC:7CC25568FE1B)        Enter: Select
   UEFI: Built-in EFI Shell                   +/-: Change Opt.
   Launch EFI Shell from filesystem device    F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit

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```

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 exit 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.

> **Note:** Please reboot the system for the changes to take effect to ensure that your system has the optimized default settings.

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> to retrieve user-defined default settings that have been saved previously.

Boot Override

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

Appendix A

BIOS POST Codes

A.1 BIOS POST Codes

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

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

Appendix B

Software

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

B.1 Microsoft Windows OS Installation

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

Installing the OS

1. Create a method to access the Microsoft Windows installation ISO file. That can be a USB flash or media drive.

2. Retrieve the proper RST/RSTe driver. Go to the Supermicro web page for your motherboard and click on "Download the Latest Drivers and Utilities", select the proper driver, and copy it to a USB flash drive.

3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.
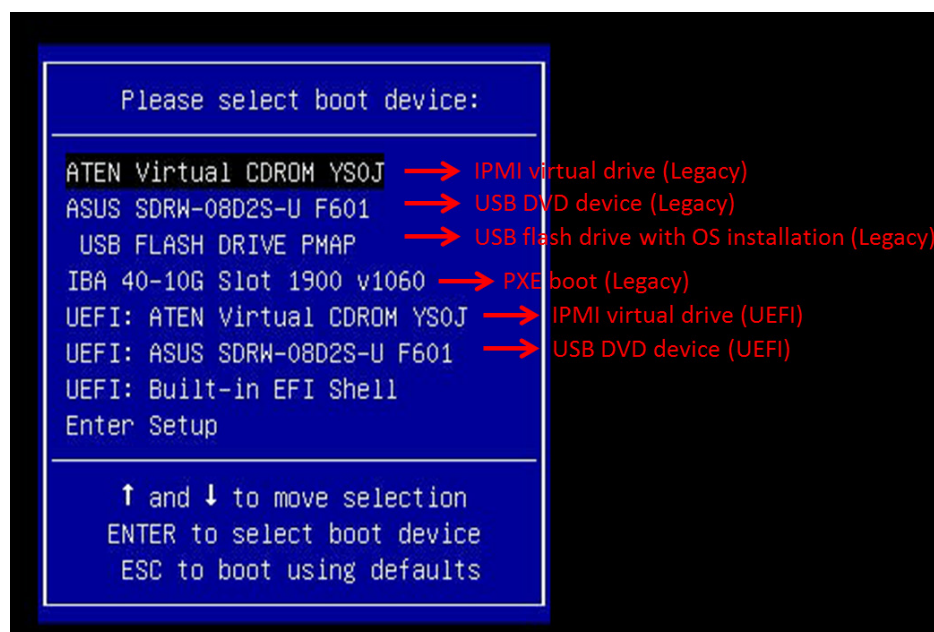
4. During Windows Setup, continue to the dialog where you select the drives on which to install Windows. If the disk you want to use is not listed, click on "Load driver" link at the bottom left corner.
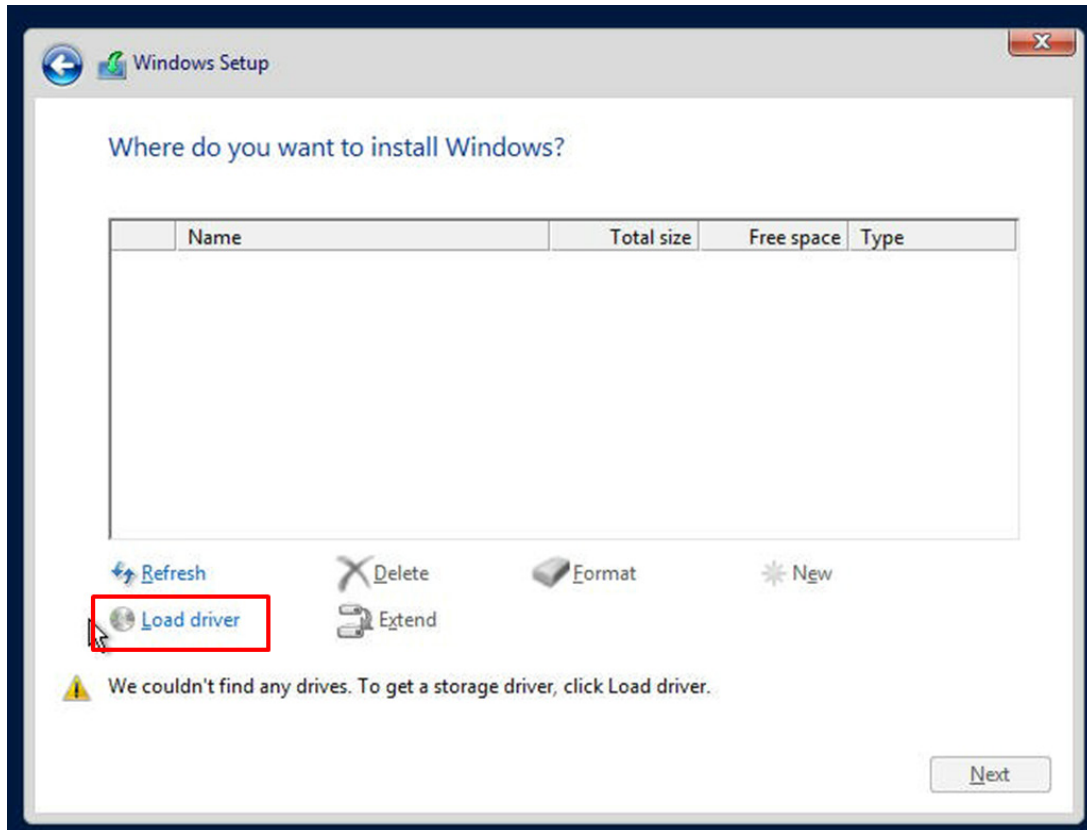
To load the driver, browse the USB flash drive for the proper driver files.

- For RAID, choose the SATA/sSATA RAID driver indicated then choose the storage drive on which you want to install it.

- For non-RAID, choose the SATA/sSATA AHCI driver indicated then choose the storage drive on which you want to install it.

5. Once all devices are specified, continue with the installation.

6. After the Windows OS installation has completed, the system will automatically reboot multiple times.

B.2 Driver Installation

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

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

Another option is to go to the Supermicro website at https://www.supermicro.com/products/. Find the product page for your motherboard, and download the latest drivers and utilities.

Insert the flash drive or disk and the screenshot shown below should appear.

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

B.3 SuperDoctor 5

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

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or BMC. SuperDoctor 5 Management Server monitors HTTP and SMTP services to optimize the efficiency of your operation.
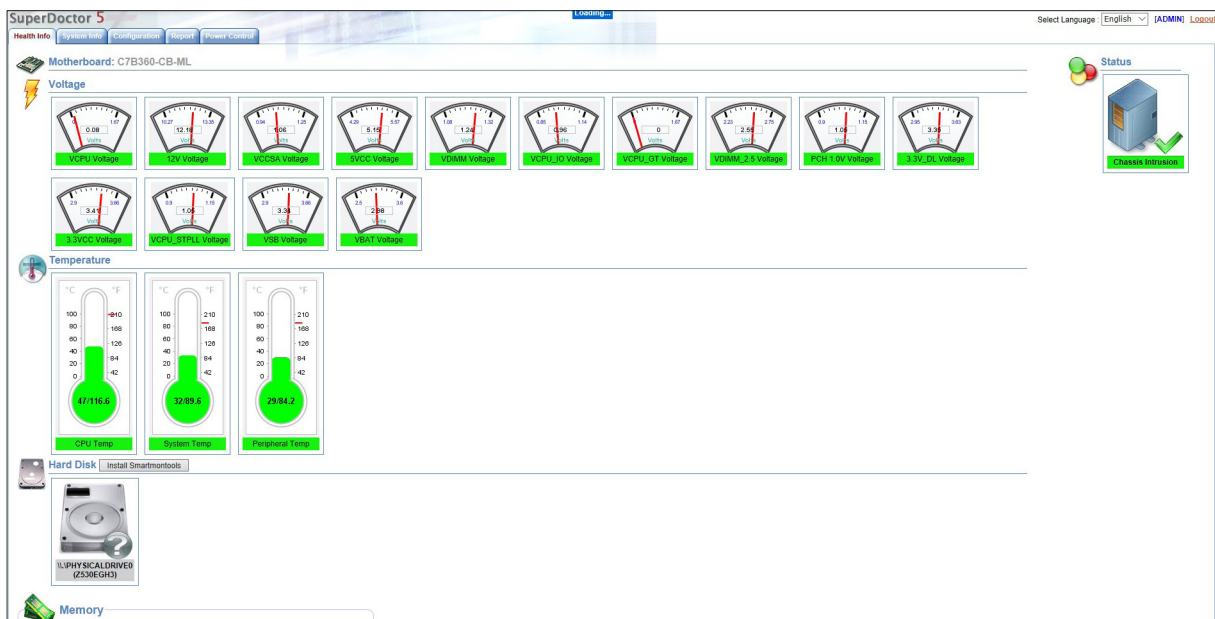
B.4 BMC

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

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

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

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

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

For more information regarding BMC passwords, please visit our website at https://www. supermicro.com/bmcpassword.

Appendix C

Standardized Warning Statements

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

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

These warnings may also be found on our website at https://www.supermicro.com/about/policies/safety_information.cfm.

Battery Handling

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

電池の取り扱い

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

警告

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

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה!

קיימת סכנת פיצוץ של הסוללה במידה והוחלפה בדרך לא תקינה. יש להחליף את הסוללה בסוג התואם מחברת יצרן מומלצת.

סילוק הסוללות המשומשות יש לבצע לפי הוראות היצרן.

هناك خطر من انفجار في حالة اسحبذال البطارية بطريقة غير صحيحة فعليل اسحبذال البطارية

فقط بنفس النع أو ما يعادلها مما أوصث به الشرمة المصنعة

جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة الصانعة

경고!

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

Waarschuwing

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

Product Disposal

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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

אזהרה!

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

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القانين واللائح الطنية

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.