X12SPZ-SPLN6F/LN4F

USER'S MANUAL

Revision 1.0a

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Manual Revision 1.0a

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Preface

About This Manual

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

About This Motherboard

The SupermicroX12SPZ-SPLN6F/LN4F supports a 3rd Generation Intel® Xeon Scalable Processor with up to 40 cores and a TDP of 270W. Built with the Intel 621A chipset, the X12SPZ-SPLN6F/LN4Fsupports 2TB of ECC RDIMM and LRDIMM DDR4 with speeds of up to 3200MHz, SATA 3.0 ports, M.2 M-Key, Oculink, SlimSAS, 25G/10G fiber ports, and a Trusted Platform Module (TPM) header. This motherboard is optimized for high-performance, high-end computing platforms that address cloud, data center, and storage needs. Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at http://www.supermicro.com/products/.

Conventions Used in the Manual

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

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

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

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

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

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Chapter 1

Introduction

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

In additon 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	X12SPZ-SPLN6F/LN4F	1
I/O Shield	MCP-260-00154-0N	1
SATA Cables	CBL-0044L	2
CPU Carrier	SKT-1205L-P4IC-FXC	1
Quick Reference Guide	MNL-2291-QRG	1

Important Links

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

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

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

- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm

- 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. X12SPZ-SPLN6F Motherboard Image
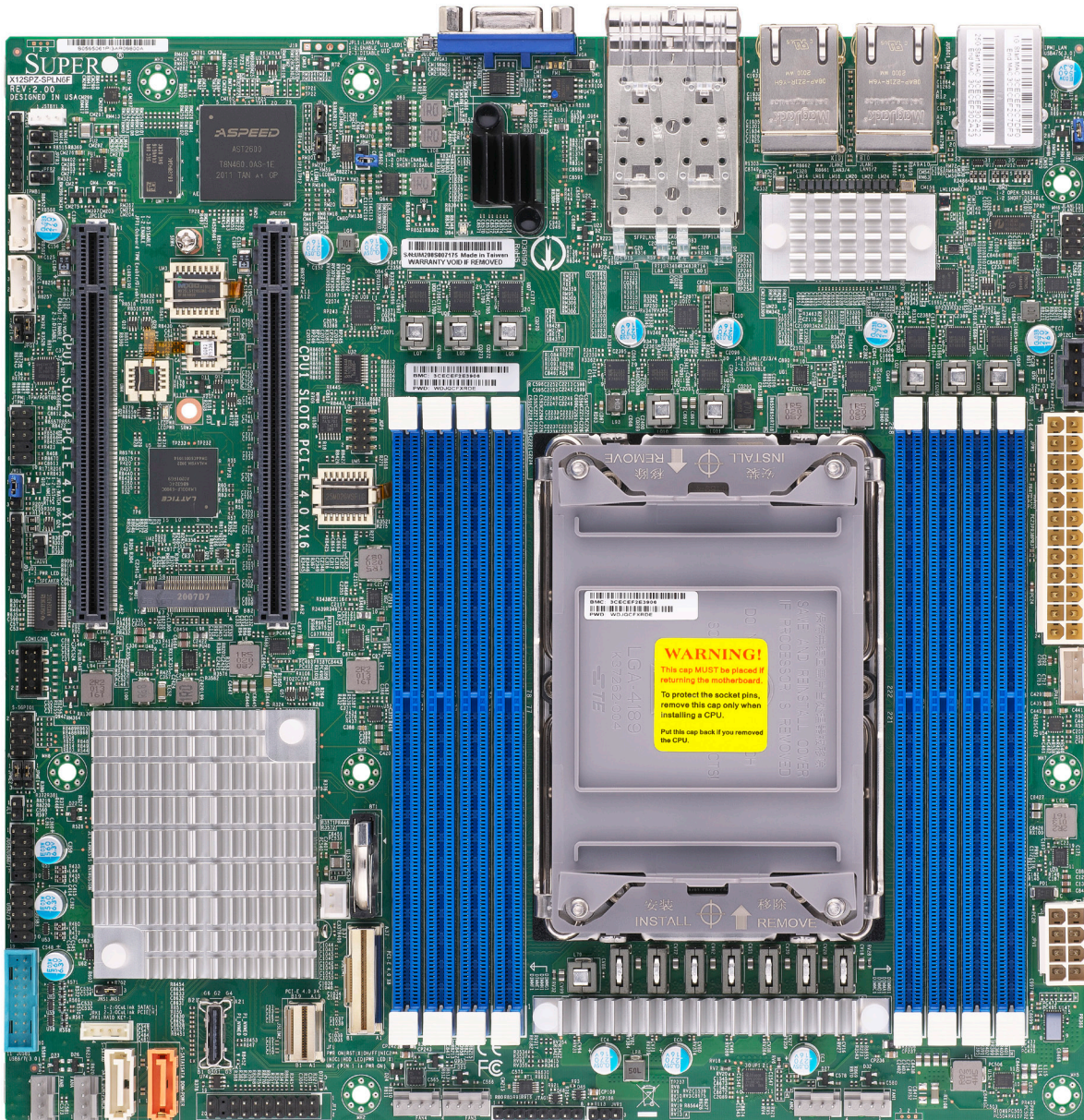
✎ **Note:** All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. X12SPZ-SPLN6F Motherboard Layout

(not drawn to scale)
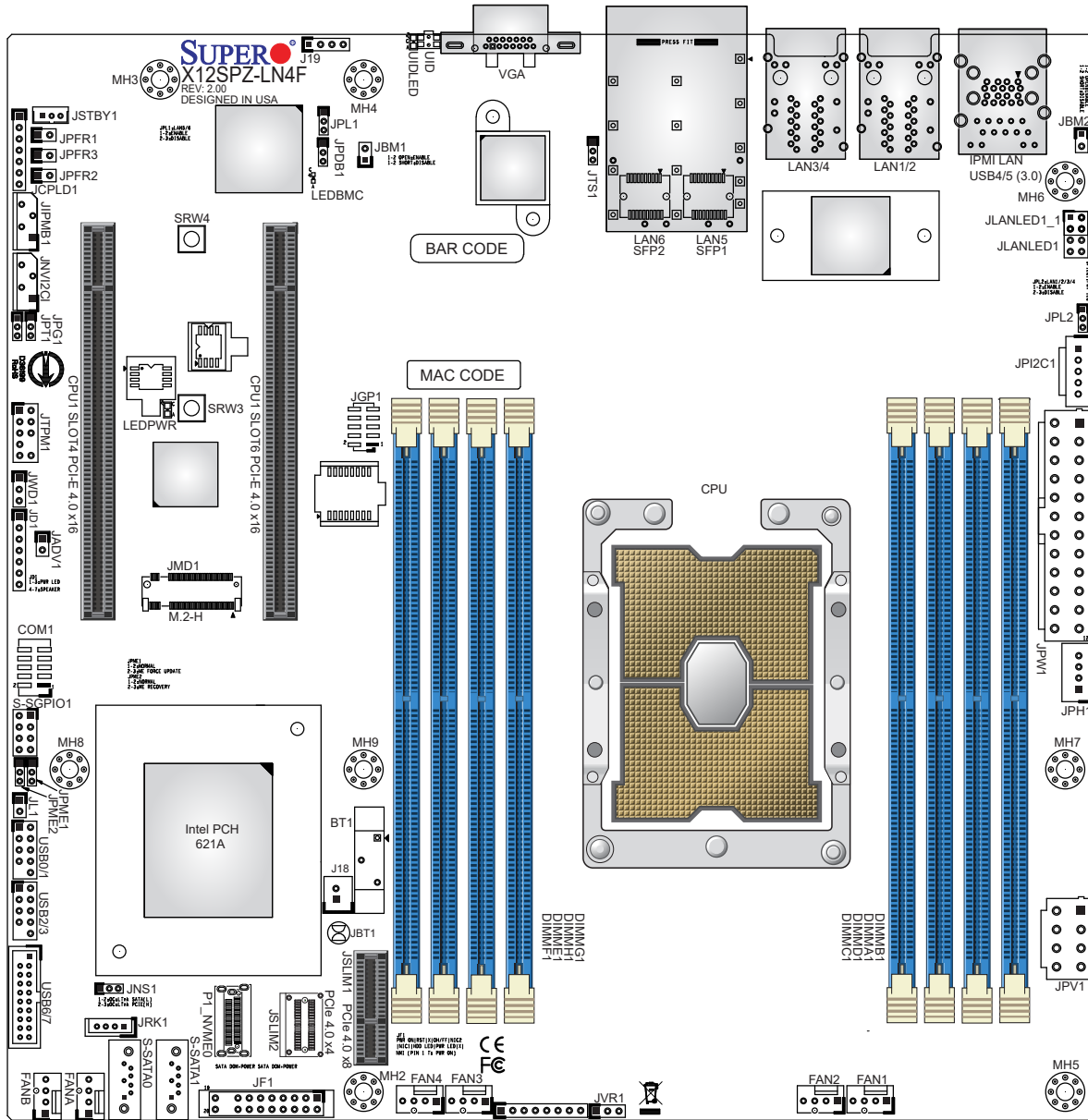
Note: Components not documented are for internal testing only.

Quick Reference
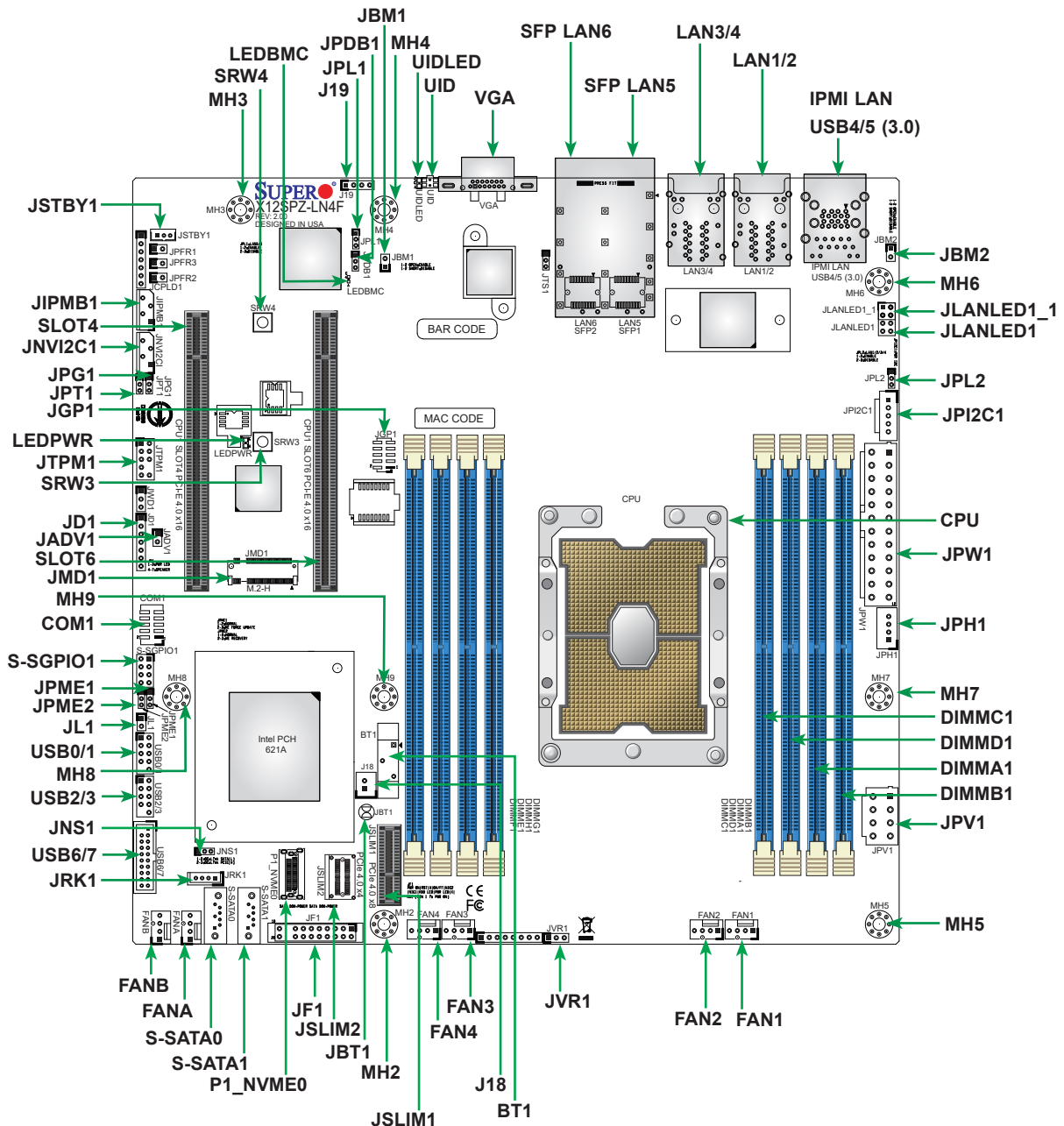
Notes:

- See Chapter 2 for detailed information on jumpers, 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
JBM1	Disable IPMI Share LAN	Pins 1-1 (Enabled)
JBM2	Disable IPMI Dedicated/Share LAN	Pins 1-1 (Enabled)
JBT1	CMOS Clear	Open (Normal)
JNS1	OCulink to 4x SATA or PCIe x4 Selection	Pins 2-3 (PCIe x4)
JPDB1	COM1 Function Selection	Pins 1-2 (BMC COM port)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	LAN5/6 Enable/Disable	Pins 1-2 (Enabled)
JPL2	LAN1/2/3/4 Enable/Disable	Pins 1-2 (Enabled)
JPME1	ME Recovery Mode	Pins 1-2 (Normal)
JPME2	ME Manufacturing Mode	Pins 1-2 (Normal)
JPT1	Onboard TPM Enable/Disable	Pins 1-2 (Enabled)

LED	Description	Status
LEDBMC	BMC Heartbeat	Blinking Green: Device Working
LEDPWR	Onboard Power LED	Solid Green: Power On
UID LED	Unit Identifier LED	Solid Blue: Unit Identified

Connector	Description
BT1	Onboard Battery
COM1	COM Header
FAN1 - FAN4, FANA, FANB	CPU/System Fan Headers (FAN1: CPU Fan)
IPMI LAN	Dedicated IPMI LAN Port
J18	Extended CMOS Battery Connector
JD1	Speaker/Power LED Indicator (Pins 1-3: Power LED, Pins 4-7: Speaker)
JF1	Front Control Panel Header
JGP1	General Purpose I/O Header
JIPMB1	System Mangement Bus Header (for IPMI only)
JL1	Chassis Intrusion Header
JLANLED1	LAN3 - LAN6 Activity LED Header for SPLN6F
JLANLED1_1	LAN3 - LAN4 Activity LED Header for LN4F
JMD1	M.2 M-Key 2242/2280 (PCIe x4/SATA) Slot
JNVI^{2}C1	Non-Volatile Memory (NVMe) I^{2}C Header
JPH1	4-pin HDD Power Connector
JPI^{2}C1	Power I^{2}C System Management Bus (Power SMB) Header
JPW1	24-pin ATX Power Connector (Required)
JPV1	8-pin CPU Power Connector (Required)

Note: Table is continued on the next page.

Connector	Description
JRK1	Intel RAID Key Header
JSLIM1	PCIe 4.0 x8 SlimSAS Connector
JSLIM2	PCIe 4.0 x4 SlimSAS Connector
JSTBY1	Standby Power Header
JTPM1	Trusted Platform Module/Port 80 Connector
LAN1/2, LAN3/4	LAN RJ45 Ports
LAN5, LAN6	25G/10G Fiber LAN Ports
MH2 - MH9	Mounting Holes
P1_NVME0	OCulink Connector (to 4x SATA or PCIe x4)
S-SATA0, S-SATA1	SATA 3.0 Ports
S-SGPIO1	Serial Link General Purpose I/O Header
SLOT4	CPU1 PCIe 4.0 x16 Slot
SLOT6	CPU1 PCIe 4.0 x16 Slot
SRW3, SRW4	M.2 Mounting Holes
UID	Unit Identifier Switch
USB0/1, USB2/3	Front Accessible USB 2.0 Headers
USB4/5	Back Panel USB 3.0 Ports
USB6/7	Front Accessible USB 3.0 Header
VGA	VGA Port

Motherboard Features

Motherboard Features
CPU
• Supports a 3rd Generation Intel Xeon Scalable Processor with up to 40 cores
Memory
• Up to 2TB of ECC RDIMM and LRDIMM DDR4 memory with speeds of up to 3200MHz in eight memory slots
DIMM Size
• Up to 256GB
Note 1: For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard.
Chipset
• Intel 621A
Expansion Slots
• Two PCIe 4.0 x16 Slots • One M.2 M-Key 2242/2280 (PCIe x4/SATA) Slot • One PCIe 4.0 x4 SlimSAS Connector • One PCIe 4.0 x8 SlimSAS Connector • One Oculink Connector (to 4x SATA or PCIe x4)
Baseboard Management Controller
• Aspeed AST2600
Network
• Intel i350 Ethernet Controller • Intel BCM57414 25G Ethernet Controller
Super I/O
• Aspeed AST2600
Graphics
• Aspeed AST2600
I/O Devices
• One serial header (COM1) • Two SATA 3.0 ports

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

Motherboard Features
Peripheral Devices
• Two front accessible USB 2.0 headers with four USB connections (USB0/1, USB2/3)
• One USB 3.0 header with two connections (USB6/7)
• Two USB 3.0 ports on the rear I/O panel (USB4/5)
BIOS
• 256Mb SPI AMI® BIOS
• ACPI 6.0, Plug and Play (PnP), BIOS rescue hot-key, riser card auto detection support, and SMBIOS 3.0 or later
Power Management
• ACPI power management
• Power button override mechanism
• Power-on mode for AC power recovery
• Power supply monitoring
System Health Monitoring
• Onboard voltage monitoring for +12V, +5V, +3.3V, +5V stdby, +3.3V stdby, CPU temperature, PCH temperature, system temperature, and memory temperature
• 7+1 CPU switch phase voltage regulator
• CPU thermal trip support
• Platform Environment Control Interface (PECI)/TSI
Fan Control
• Fan status monitoring via IPMI connections
• Dual cooling zone
• Low-noise fan speed control
• Six 4-pin fan headers
System Management
• Trusted Platform Module (TPM) support
• SuperDoctor® 5
• Chassis intrusion header and detection
• Server Platform Service
• IPMI View, SMCIPMITOOL, IPMICFG, SSM, SUM-OOB
LED Indicators
• CPU/System Override LED
• Power/Suspend State Indicator LED
• Fan Fail LED
• UID LED
• HDD activity LED
• LAN activity LED
Dimensions
• 9.6" (W) x 9.6" (L) ATX (243.84mm x 243.84mm), Micro ATX

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 for proper CPU TDP sizing.

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

Figure 1-3.
System Block Diagram

✎ **Note 1:** This is a general block diagram and may not exactly represent the features on your motherboard. See the previous pages for the actual specifications of your motherboard.

1.2 Processor and Chipset Overview

Built upon the functionality and capability of the 3rd Generation Intel Xeon Scalable Processor and the Intel 621A chipset, the X12SPZ-SPLN6F/LN4F motherboard provides system performance, power efficiency, and feature sets to address the needs of next-generation computer users.

The X12SPZ-SPLN6F/LN4F dramatically increases system performance for a multitude of server applications and supports:

- Intel AMT 12.0, TXT, and AMT vPro

- USB 3.0, SATA 3.0, OCulink

- 25G Ethernet LAN

- Intel Hyper-Threading, Intel VT-D, VT-x

- TSX-NI, AES, SGX

- Intel Turbo Boost Technology

- Intel Rapid Storage Technology

- 2TB ECC RDIMM and LRDIMM DDR4 memory with speeds of up to 3200MHz

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

1.3 Special Features

Recovery from AC Power Loss

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

1.4 System Health Monitoring

Onboard Voltage Monitors

An onboard voltage monitor will scan the voltages of the onboard chipset, memory, CPU, and battery continuously. Once a voltage becomes unstable, a warning is given, or an error message is sent to the screen. The user can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

Fan Status Monitor with Firmware Control

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

Environmental Temperature Control

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

Note: To avoid possible system overheating, 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 is used to notify the user of certain system events. For example, you can configure SuperDoctor to provide you with warnings when the system temperature, CPU temperatures, voltages and fan speeds go beyond a predefined range.

1.5 ACPI Features

The Advanced Configuration and Power Interface (ACPI) specification defines a flexible and abstract hardware interface that provides a standard way to integrate power management features throughout a computer system, including its hardware, operating system and application software. This enables the system to automatically turn on and off peripherals such as CD-ROMs, 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 X12SPZ-SPLN6F/LN4F motherboard accommodates a 24-pin ATX power supply. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, one 12V 8-pin power connection is also required to ensure adequate power supply to the system.

> **Warning:** To avoid damaging the power supply or the motherboard, be sure to use a power supply that contains a 24-pin and an 8-pin power connector. Be sure to connect the power supplies to the 24-pin power connector (JPW1), and the 8-pin power connector (JPV1) 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.

1.7 Serial Port

The X12SPZ-SPLN6F/LN4F motherboard supports one serial communication connection. COM1 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 system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

Precautions

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

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

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

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

- Put the motherboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure that your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

- Use only the correct type of onboard CMOS battery. Do not install the onboard battery upside down to avoid possible explosion.

Unpacking

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

2.2 Processor and Heatsink Installation

The processor (CPU) and processor carrier should be assembled together first to form the processor carrier assembly. This will be attached to the heatsink to form the processor heatsink module (PHM) before being installed onto the CPU socket.

Notes:

- Use ESD protection.

- Unplug the AC power cord from all power supplies after shutting down the system.

- Check that the plastic protective cover is on the CPU socket and none of the socket pins are bent. If they are, contact your retailer.

- When handling the processor, avoid touching or placing direct pressure on the LGA lands (gold contacts). Improper installation or socket misalignment can cause serious damage to the processor or CPU socket, which may require manufacturer repairs.

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

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

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

The 3rd Generation Intel Xeon Scalable Processor
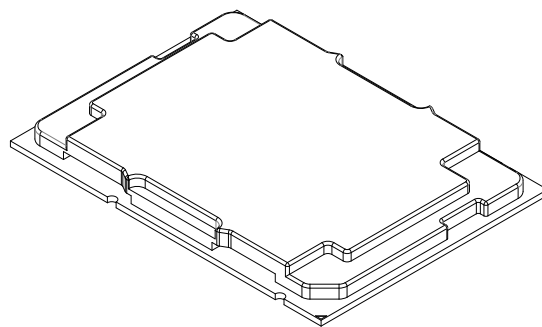
3rd Generation Intel Xeon Scalable Processor

Overview of the Processor Carrier Assembly

The processor carrier assembly contains the 3rd Generation Intel Xeon Scalable Processor and a processor carrier.

1. Processor
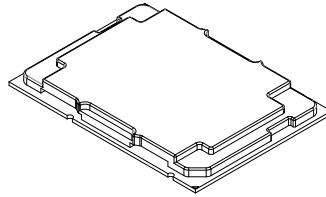
2. Processor Carrier
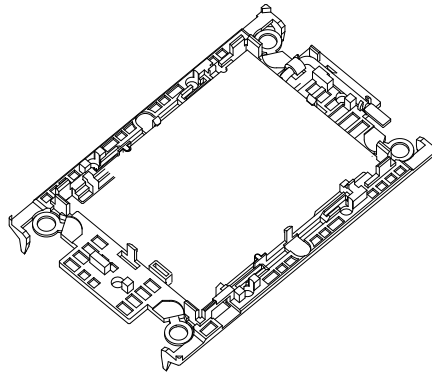
Overview of the CPU Socket

The CPU socket is protected by a plastic protective cover.

1. Plastic Protective Cover
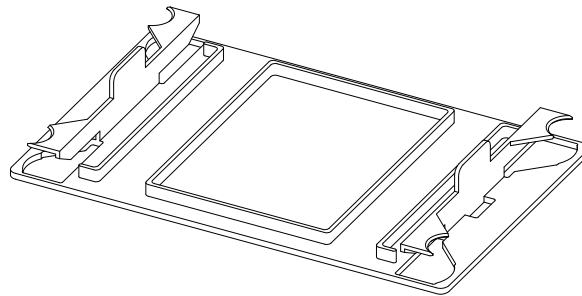
2. CPU Socket
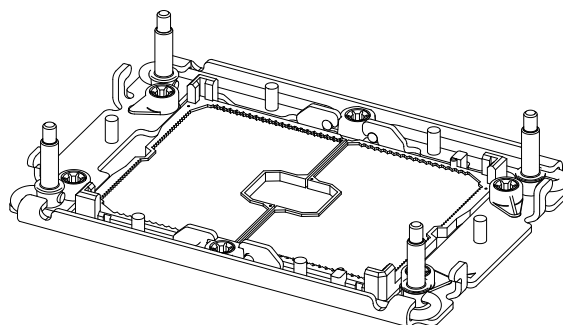
Overview of the Processor Heatsink Module

The Processor Heatsink Module (PHM) contains a heatsink, a processor carrier, and the processor.

1. Heatsink with Thermal Grease
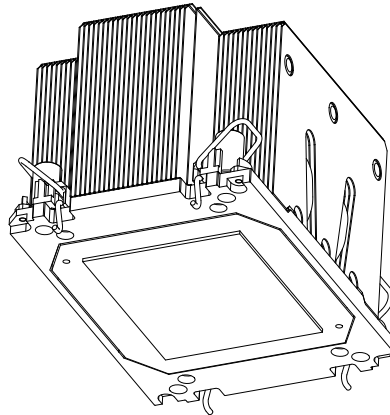
2. Processor Carrier
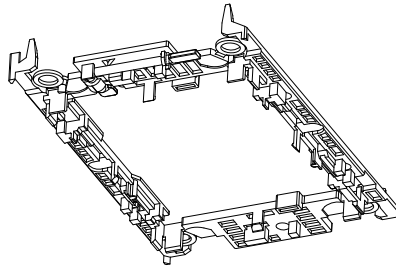
3. Processor
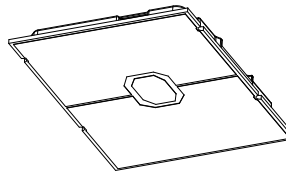
Processor Heatsink Module
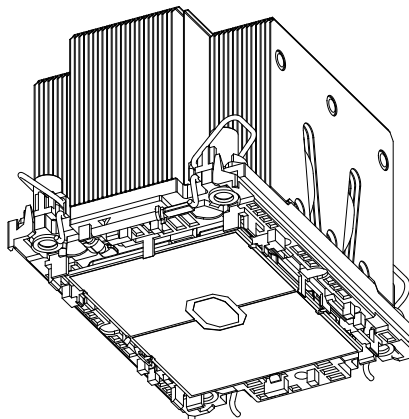
Creating the 3rd Generation Intel Xeon Scalable Processor Carrier Assembly

To install the processor into the processor carrier, follow the steps below:

1. Hold the processor with the LGA lands (gold contacts) facing up. Locate the small, gold triangle in the corner of the processor and the corresponding hollowed triangle on the processor carrier. These triangles indicate pin 1. The triangles can be found on the top and bottom of the processor. See the images below.

2. Using the triangles as a guide, carefully align and place Point A of the processor into the carrier. Then gently snap in the other side of the carrier for the processor to fasten into Point B.

   Note: The 3rd Generation Intel Xeon Scalable Processor carrier contains four metal rings on each corner.

3. Examine all corners to ensure that the processor is firmly attached to the carrier.

Processor Carrier Assembly
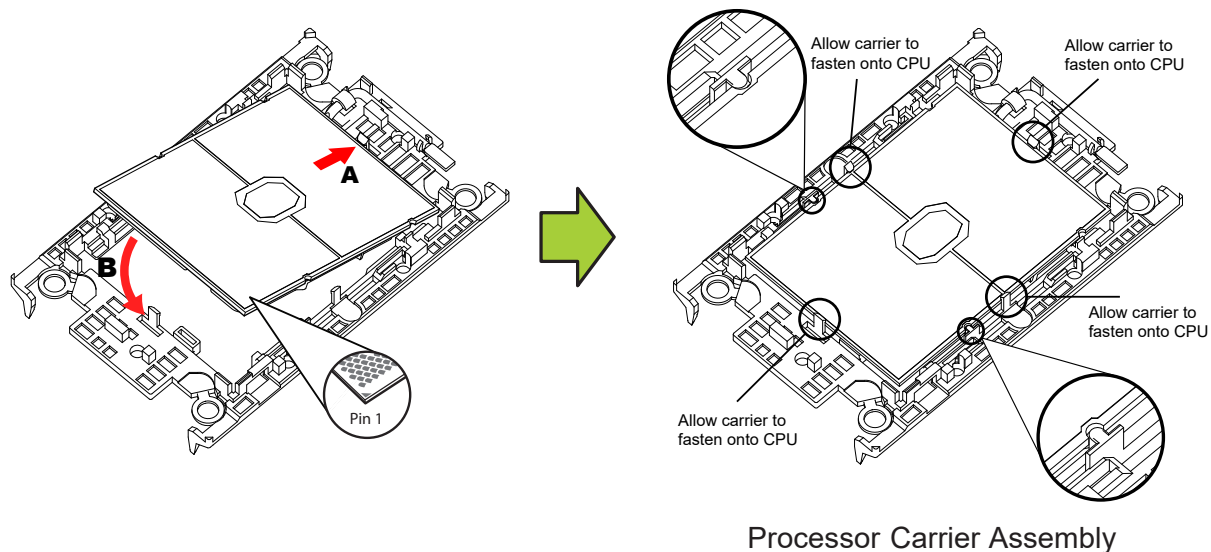
Note: The following CPU carriers have been successfully tested in our labs and are available from Supermicro. Please order the CPU carriers with the CPU heatsink.

Intel 3rd Generation Xeon Scalable Processors	SKT-1205L-P4IC-FXC
	SKT-1205L-P4IC-TYC

Assembling the Processor Heatsink Module

After creating the processor carrier assembly for the processor, mount it onto the heatsink to create the processor heatsink module (PHM):

1. Note the label on top of the heatsink, which marks the heatsink mounting holes as 1, 2, 3, and 4. If this is a new heatsink, the thermal grease has been pre-applied on the underside. Otherwise, apply the proper amount of thermal grease.

2. Turn the heatsink over with the thermal grease facing up. Hold the processor carrier assembly so the processor's gold contacts are facing up, then align the triangle on the assembly with hole 1 of the heatsink. Press the processor carrier assembly down. The plastic clips of the assembly will lock outside of holes 1 and 2, while the remaining clips will snap into their corresponding holes.

3. Examine all corners to ensure that the plastic clips on the processor carrier assembly are firmly attached to the heatsink.

Processor Carrier Assembly (Upside Down)
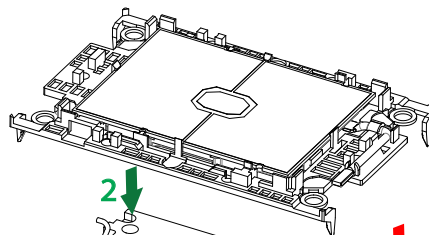
Heatsink (Upside Down)
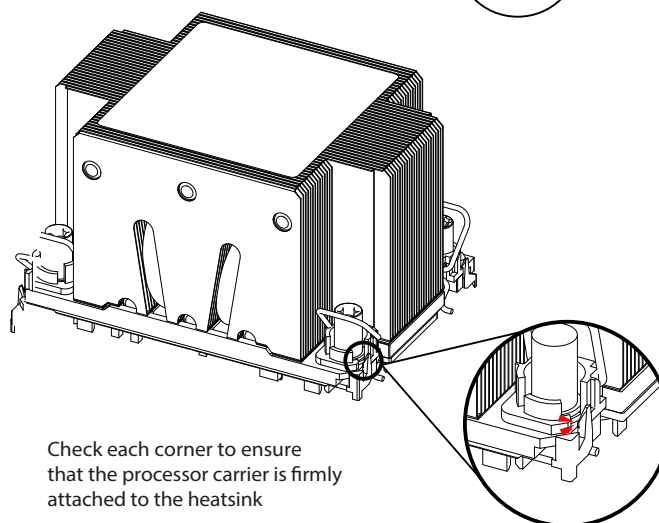
Check each corner to ensure that the processor carrier is firmly attached to the heatsink

Preparing the CPU Socket for Installation

This motherboard comes with a plastic protective cover installed on the CPU socket. Remove it from the socket to install the Processor Heatsink Module (PHM). Gently pull up one corner of the plastic protective cover to remove it.
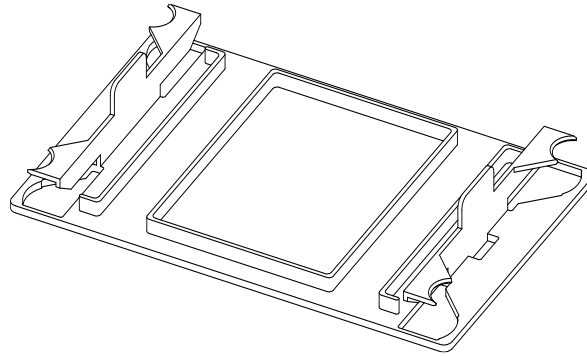
CPU Socket with Plastic Protective Cover

Remove the plastic protective cover from the CPU socket. Do not touch or bend the socket pins.

Socket Pins
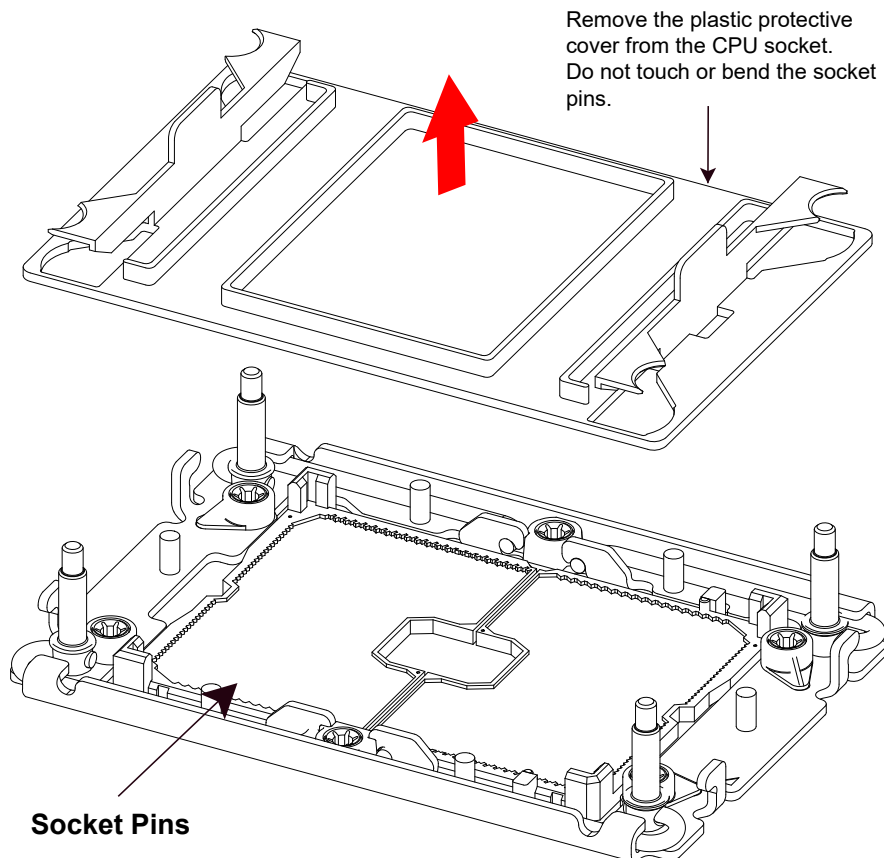
Installing the Processor Heatsink Module

After assembling the Processor Heatsink Module (PHM), install it onto the CPU socket:

1. Align hole 1 of the heatsink with the printed triangle on the CPU socket. See the left image below.

2. Make sure all four holes of the heatsink are aligned with the socket before gently placing the heatsink on top.

3. With a T30 Torx-bit screwdriver, gradually tighten screws #1 - #4 to ensure even pressure. The order of the screws is shown on the label on top of the heatsink. To avoid damaging the processor or socket, do not use a force greater than 12 lbf-in when tightening the screws.

4. Examine all corners to ensure that the PHM is firmly attached to the socket.
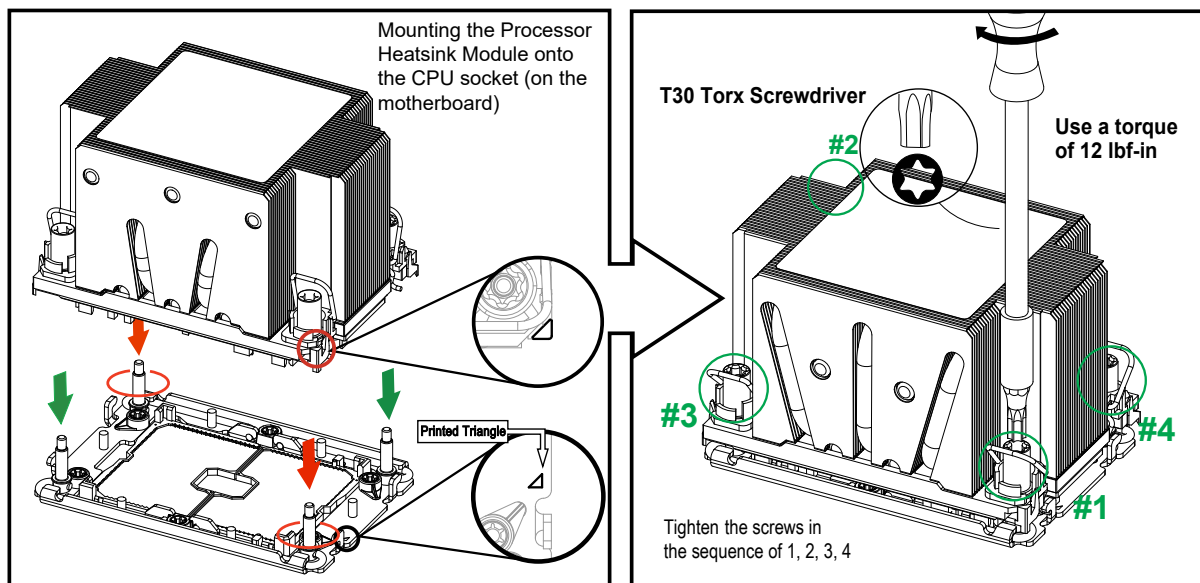
Removing the Processor Heatsink Module

Before removing the processor heatsink module (PHM) from the motherboard, shut down the system and then unplug the AC power cord from all power supplies.

Then follow the steps below:

1. Use a T30 Torx-bit screwdriver to loosen the four screws in a backwards sequence of #4, #3, #2, and #1.

2. Gently lift the PHM upwards to remove it from the socket.

3. Move the lever to its unlocked position and gently remove the CPU.

Remove the screws in the sequence of 4, 3, 2, 1

#2

#3

#1   #4

CPU Socket

Move the lever to its unlocked position and gently remove the CPU.
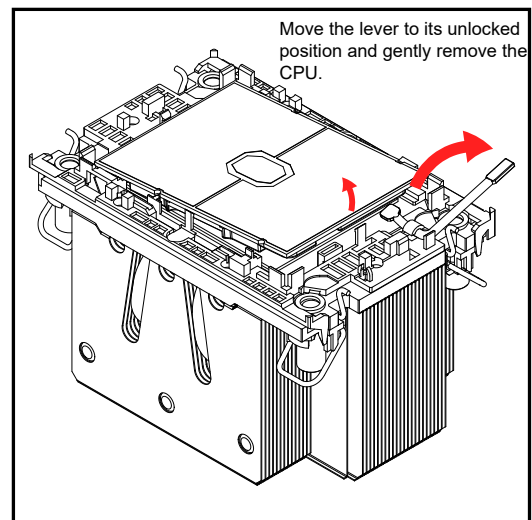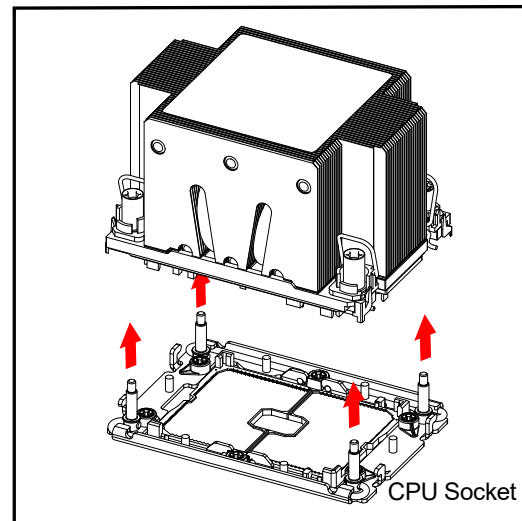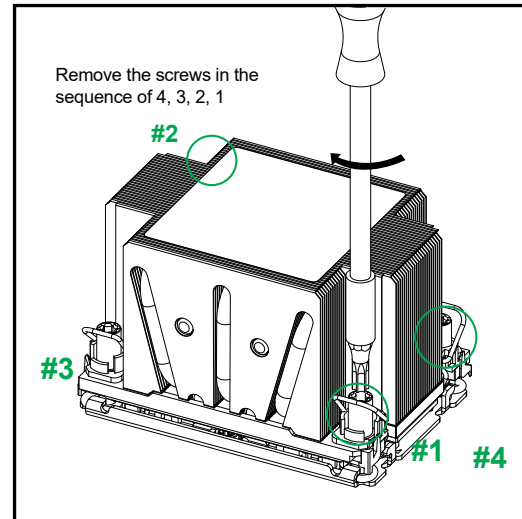
2.3 Motherboard Installation

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
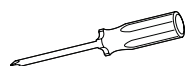
Phillips Screwdriver (1)

Phillips Screws (8)

Standoffs (8) Only if Needed
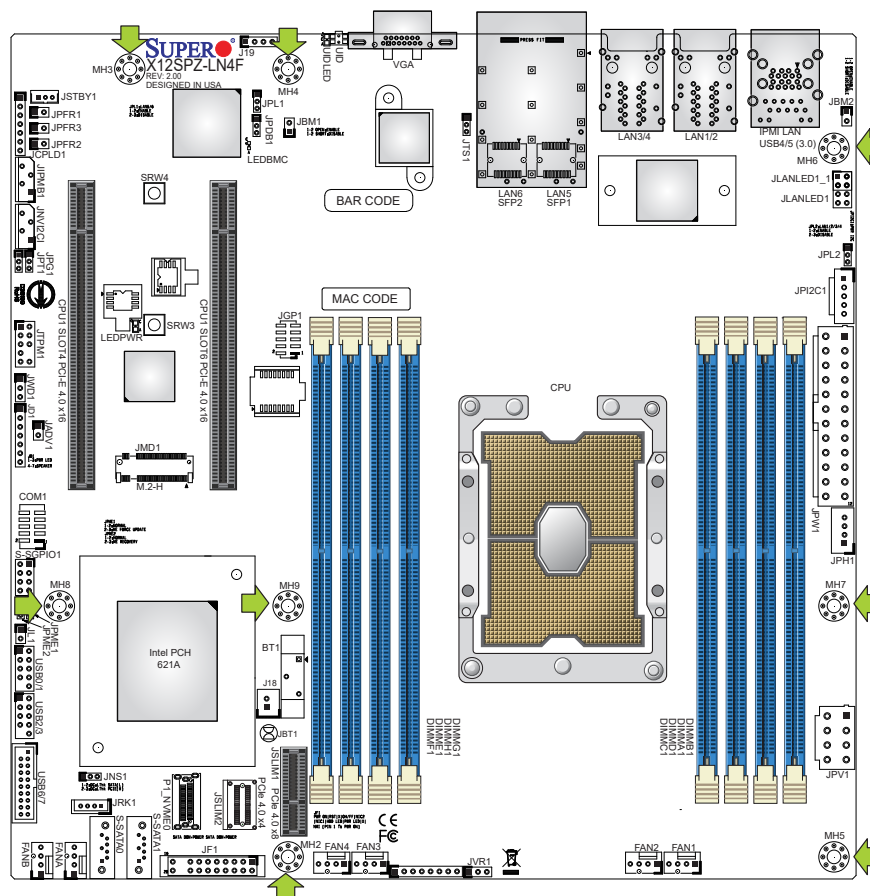
Location of Mounting Holes

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

Installing the Motherboard

1. Install the I/O shield into the back of the chassis, if applicable.
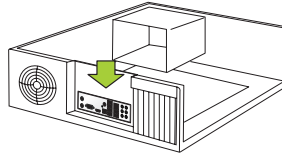
2. Locate the mounting holes on the motherboard. See the previous page for the location.
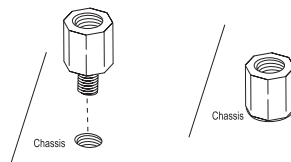
3. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.
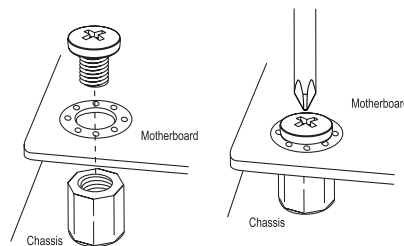
4. Install standoffs in the chassis as needed.

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

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

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

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

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

2.4 Memory Support and Installation

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

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

Memory Support

The X12SPZ-SPLN6F/LN4F supports up to 2TB of ECC RDIMM and LRDIMM DDR4 memory with speeds of up to 3200MHz in eight memory slots. Refer to the table below for the recommended DIMM population order.

1 CPU, 8 DIMM Slots	
Number of DIMMs	**Memory Population Sequence**
1	DIMMC1
2	DIMMC1 / DIMMG1
4	DIMME1 / DIMMG1 / DIMMC1 / DIMMA1
6	DIMME1 / DIMMF1 / DIMMG1 / DIMMA1 / DIMMB1 / DIMMC1
8	DIMMC1 / DIMMD1 / DIMMA1 / DIMMB1 / DIMMG1 / DIMMH1 / DIMME1 / DIMMF1

DDR4 Memory Support

Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slot Per Channel (SPC) and DIMM Per Channel (DPC) *Data below assumes 2 SPC unless otherwise noted.
				1DPC
		8 GB	16 GB	1.2V
RDIMM	SRx8	8 GB	16 GB	3200
	SRx4	16 GB	32 GB	
	DRx8	16 GB	32 GB	
	DRx4	32GB	64 GB	
RDIMM-3DS	(4R/8R) x4	2H-64F GB 4H-128 GB	2H-128 GB 4H 256 GB	3200
LRDIMM	QRx4	64 GB	128 GB	3200
LRDIMM-3DS	(4R/8R) X4	4H-128 GB	2H-128 GB 4H-256 GB	3200

General Guidelines for Optimizing Memory Performance

- Always use DDR4 memory of the same type, size, and speed.

- Mixed DIMM speeds can be installed. However, all DIMMs will run at the speed of the slowest DIMM.

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

DIMMF1
DIMME1
DIMMH1
DIMMG1

DIMMB1
DIMMA1
DIMMD1
DIMMC1
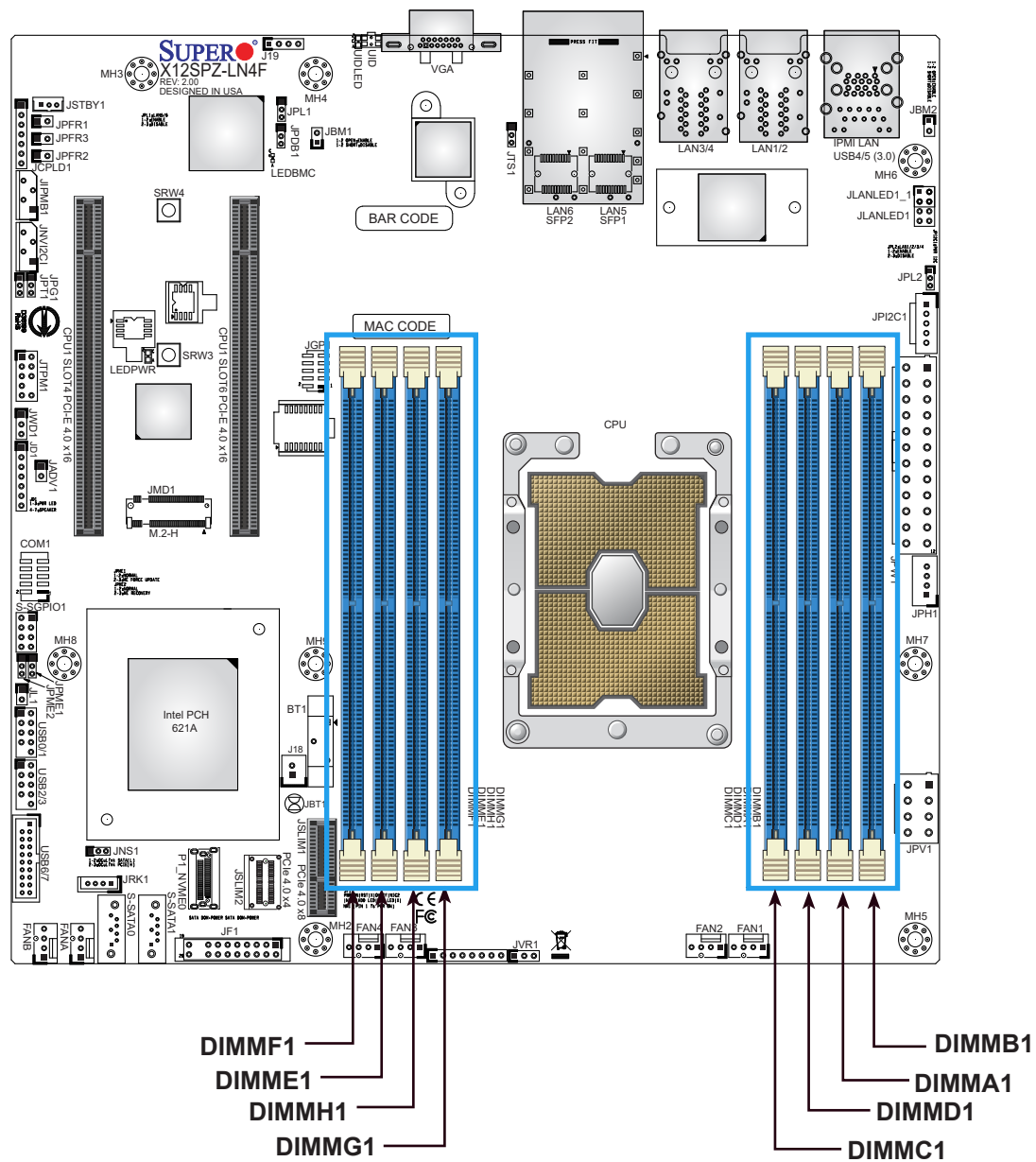
DIMM Installation

1. Insert DIMM modules in the following order: DIMMC1, DIMMD1, DIMMA1, DIMMB1, DIMMG1, DIMMH1, DIMME1, DIMMF1, and insert the desired number of DIMMs into the memory slots based on the Recommended Memory Population Guide table on page 32.

2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.

3. Align the key of the DIMM module with the receptive point on the memory slot.

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

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

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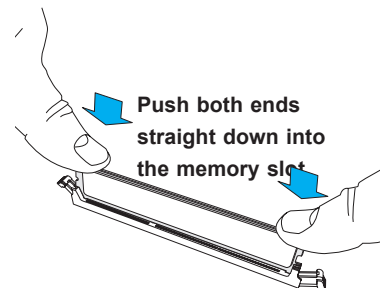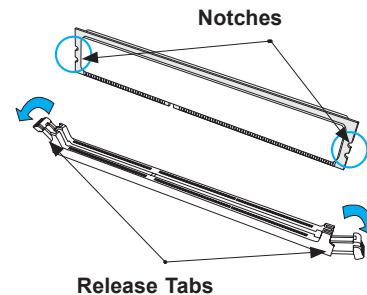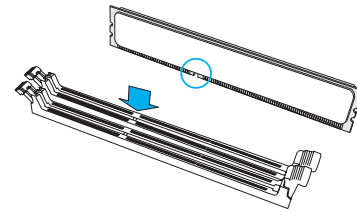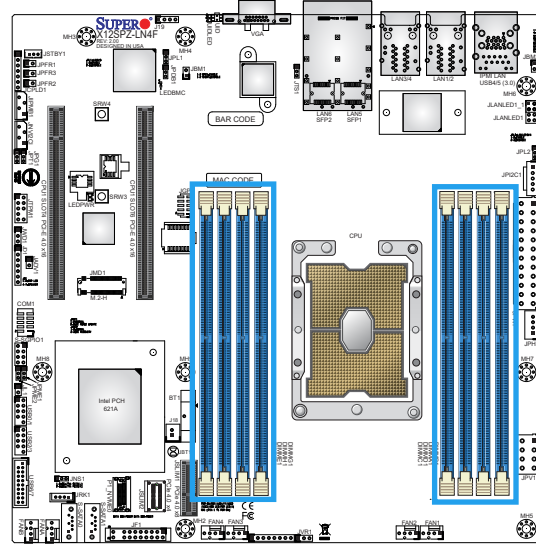
DIMM Removal

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

Notches

Release Tabs

Push both ends straight down into the memory slot

2.5 Rear I/O Ports

See Figure 2-1 below for the locations and descriptions of the various I/O ports on the rear of the motherboard.
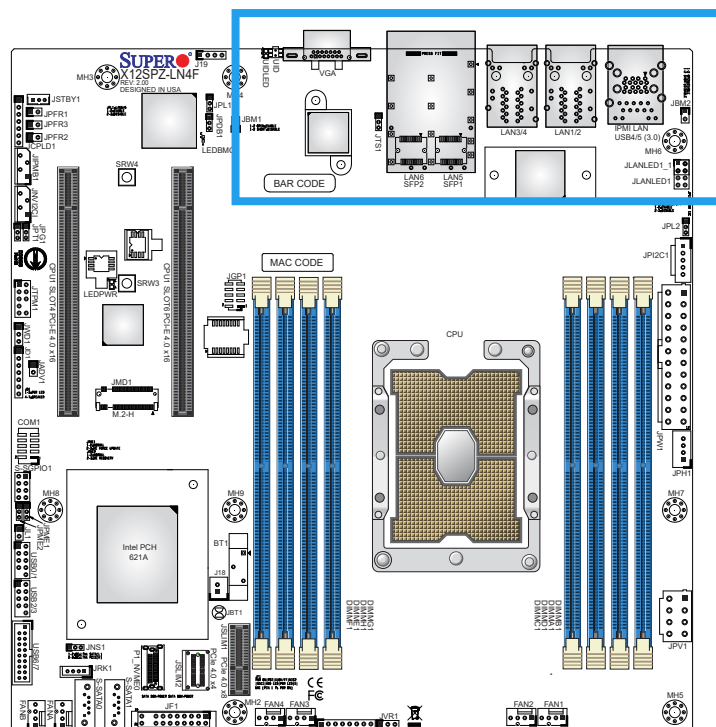
Figure 2-1. I/O Port Locations and Definitions
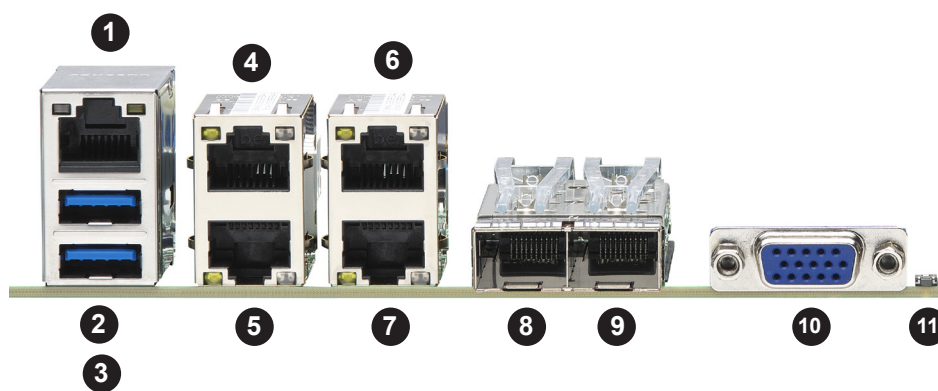
Rear I/O Ports					
#	Description	#	Description	#	Description
1	IPMI LAN	5	LAN1	9	SFP28 LAN6
2	USB5	6	LAN4	10	VGA Port
3	USB4	7	LAN3	11	UID Switch
4	LAN2	8	SFP28 LAN5		

VGA Port

A video (VGA) port is located on the I/O back panel. Refer to the board layout below for the location.

LAN Ports

The motherboard has four 1GbE LAN ports (LAN1/2, LAN3/4) and two 25G SFP28 LAN ports (LAN5, LAN6) located on the I/O back panel. The four 1GbE LAN ports accept RJ45 cables. In addition to the LAN ports, there is one dedicated IPMI LAN port. Please refer to the LED Indicator section for LAN LED information.

1. VGA Port

2. IPMI LAN Port

3. LAN1/2

4. LAN3/4

5. SFP28 LAN5

6. SFP28 LAN6
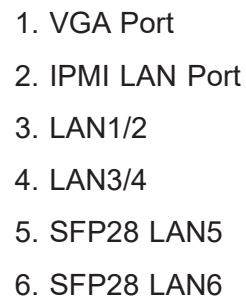
Universal Serial Bus (USB) Ports

There are two USB 3.0 ports (USB4/5) on the I/O back panel and two USB 2.0 headers (USB0/1 and USB2/3) on the motherboard. The motherboard also has one USB 3.0 header (USB6/7). The onboard headers can be used to provide front side USB access with a cable (not included).

Front Panel USB0/1, 2/3 (2.0) Headers Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	2	+5V
3	USB_N	4	USB_N
5	USB_P	6	USB_P
7	Ground	8	Ground
9	Key	10	NC

Front Panel USB6/7 (3.0) Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	11	IntA_P2_D+
2	IntA_P1_SSRX-	12	IntA_P2_D-
3	IntA_P1_SSRX+	13	GND
4	GND	14	IntA_P2_SSTX+
5	IntA_P1_SSTX-	15	IntA_P2_SSTX-
6	IntA_P1_SSTX+	16	GND
7	GND	17	IntA_P2_SSRX+
8	IntA_P1_D-	18	IntA_P2_SSRX-
9	IntA_P1_D+	19	VBus
10	ID		
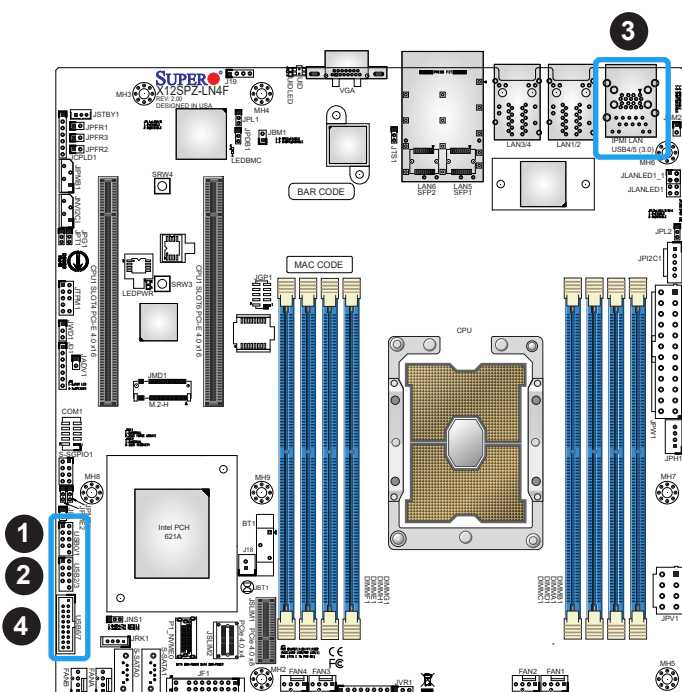
1. USB0/1
2. USB2/3
3. USB4/5
4. USB6/7

Unit Identifier Switch (UID-SW): One button with two functions

A Unit Identifier (UID) switch and two LED Indicators are located on the motherboard. The UID switch is located next to the VGA port on the back panel.

Function	User Input	Behavior	LED Activity
UID LED Indicator	Push Once	Turns on the UID LED	UID LED turns solid blue
	Push Again	Turns off the UID LED	UID LED turns off
BMC Reset	Push and hold for 6 seconds	BMC will do a cold boot	BMC Hearbeat LED turns solid green
	Push and hold for 12 seconds	BMC will reset to factory default	BMC Hearbeat LED turns solid green

Note: After pushing and holding the UID-SW for 12 seconds, all IPMI settings including username and password will revert back to the factory default. Only the network settings and FRU are retained.

UID Switch Pin Definitions	
Pin#	Definition
1	Button In
2	Ground
G1	Ground
G2	Ground

UID LED Pin Definitions	
Color	Status
Blue: On	Unit Identified
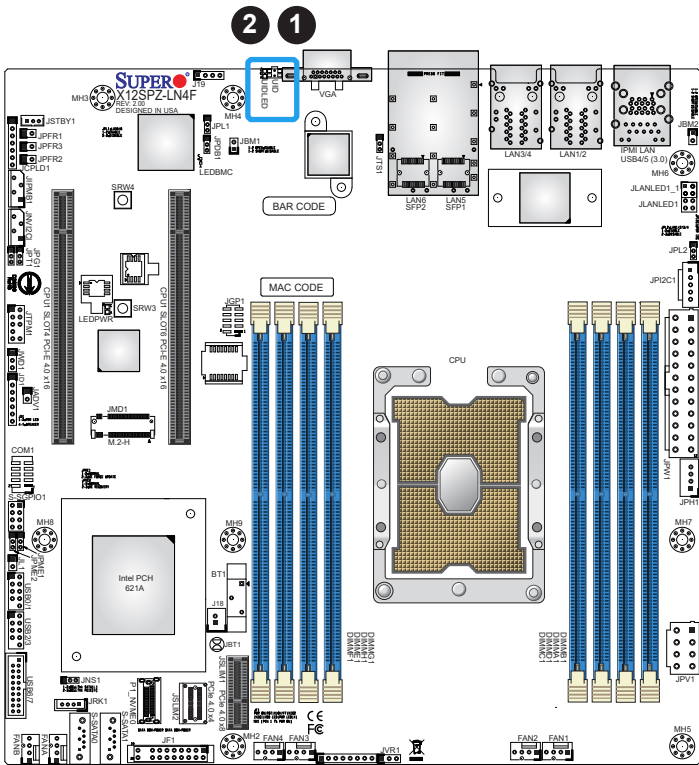
1. UID Switch
2. UIDLED

2.6 Front Control Panel

JF1 contains header pins for various buttons and indicators that are normally located on a control panel at the front of the chassis. These connectors are designed specifically for use with a Supermicro chassis. See the figure below for the descriptions of the front control panel buttons and LED indicators.
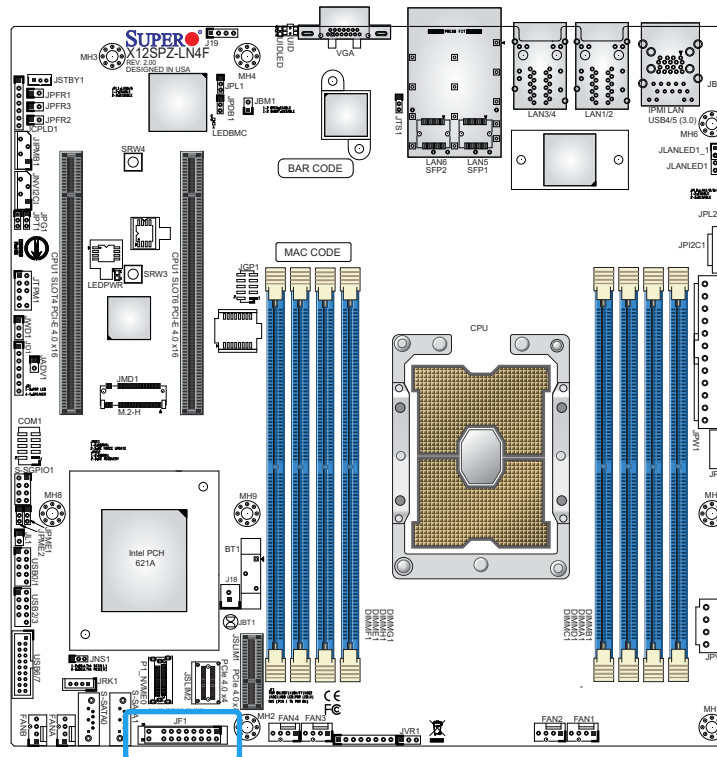
		1	2	
PWR	**Power Button**	○	○	**Ground**
Reset	**Reset Button**	○	○	**Ground**
	3.3V	○	○	**Power Fail LED**
	UID LED	○	○	**OH/Fan Fail LED**
	3.3V Stby	○	○	**NIC2 Activity LED**
	3.3V Stby	○	○	**NIC1 Activity LED**
	3.3V Stby	○	○	**HDD LED**
	3.3V Stby	○	○	**PWR LED**
	X	○	○	**X**
	NMI	○	○	**Ground**
		19	20	

Figure 2-2. JF1 Header Pins

Power Button

The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press the button for 4 seconds or longer. Refer to the table below for pin definitions.

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

Reset Button

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

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

	1	2	
1 PWR ⟩ **Power Button**	○	○	**Ground**
2 Reset ⟩ **Reset Button**	○	○	**Ground**
3.3V	○	○	**Power Fail LED**
UID LED	○	○	**OH/Fan Fail LED**
3.3V Stby	○	○	**NIC2 Activity LED**
3.3V Stby	○	○	**NIC1 Activity LED**
3.3V Stby	○	○	**HDD LED**
3.3V Stby	○	○	**PWR LED**
X	○	○	**X**
NMI	○	○	**Ground**
	19	20	

1. PWR Button
2. Reset Button

Power Fail

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

Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	Power Fail LED

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 switch 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-UID/OH/PWR Fail/Fan Fail LED Pin Definitions (JF1)	
Status	Description
Solid Red	An overheat condition has occured. This may be caused by cable congestion.
Blinking Red (1Hz)	Fan failure: check for an inoperative fan.
Blinking Red (0.25Hz)	Power failure: check for a non-operational power supply.
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 (300msec)	Remote UID is on. Use this function to identify a unit from a remote location that might be in need of service.

	1	2	
PWR — Power Button	○	○	Ground
Reset — Reset Button	○	○	Ground
3.3V	○	○	Power Fail LED ❷
UID LED	○	○	OH/Fan Fail LED ❶
3.3V Stby	○	○	NIC2 Activity LED
3.3V Stby	○	○	NIC1 Activity LED
3.3V Stby	○	○	HDD LED
3.3V Stby	○	○	PWR LED
X	○	○	X
NMI	○	○	Ground
	19	20	
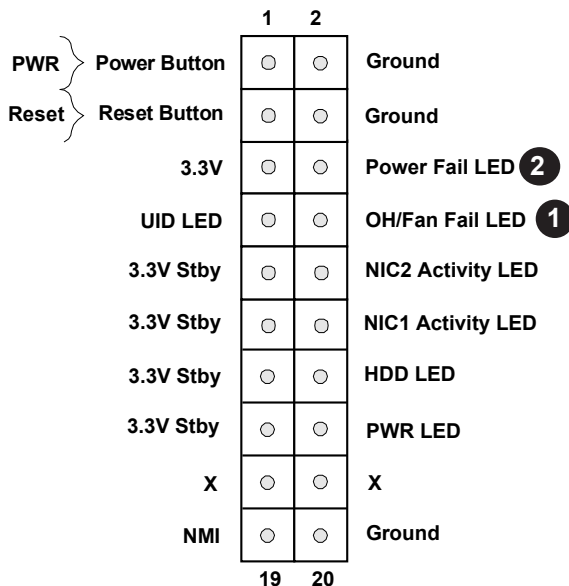
1. Information LED

2. Power Fail LED

NIC1/NIC2 (LAN1/LAN2)

The NIC (Network Interface Controller) 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
9	NIC 2 Activity LED
11	NIC 1 Activity LED

HDD LED

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

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

	1	2	
PWR > Power Button	○	○	Ground
Reset > Reset Button	○	○	Ground
3.3V	○	○	Power Fail LED
UID LED	○	○	OH/Fan Fail LED
3.3V Stby	○	○	NIC2 Activity LED **2**
3.3V Stby	○	○	NIC1 Activity LED **1**
3.3V Stby	○	○	HDD LED **3**
3.3V Stby	○	○	PWR LED
X	○	○	X
NMI	○	○	Ground
	19	20	
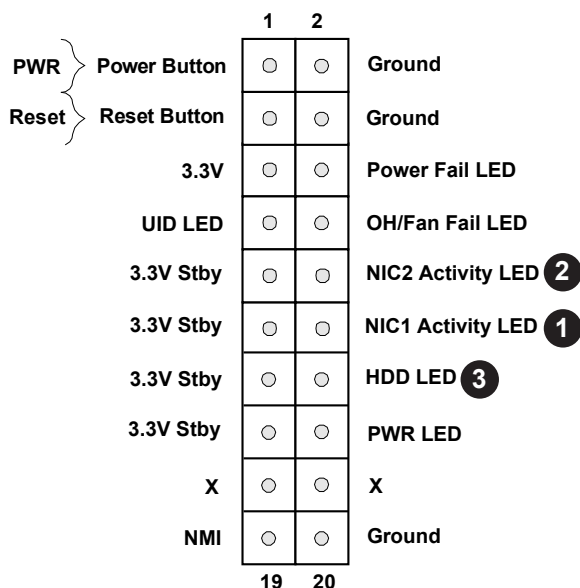
1. NIC1 LED
2. NIC2 LED
3. HDD LED

Power LED

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

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

NMI Button

The non-maskable interrupt 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	Control
20	Ground

	1	**2**		
PWR ⟩ **Power Button**	○	○	**Ground**	1. Power LED
Reset ⟩ **Reset Button**	○	○	**Ground**	2. NMI Button
3.3V	○	○	**Power Fail LED**	
UID LED	○	○	**OH/Fan Fail LED**	
3.3V Stby	○	○	**NIC2 Activity LED**	
3.3V Stby	○	○	**NIC1 Activity LED**	
3.3V Stby	○	○	**HDD LED**	
3.3V Stby	○	○	**PWR LED** ❶	
X	○	○	**X**	
❷ **NMI**	○	○	**Ground**	
	19	**20**		
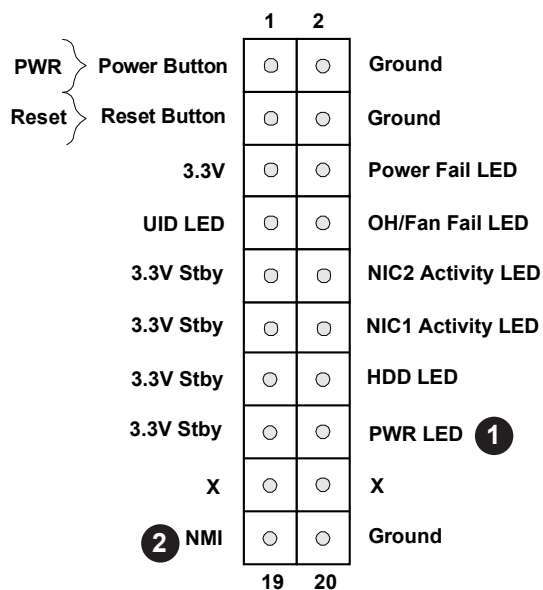
2.7 Connectors

Power Connections

Power Connectors

JPW1 is the 24-pin power connector for ATX power source. JPV1 is the 12V DC power connector that provides power to the CPU in conjunction with JPW1 or it can be used as the sole 12V DC only power input when JPW1 is not in use. JPH1 is a 4-pin HDD power connector that provides power to onboard HDD devices.

ATX Power 24-pin Connector Pin Definitions			
Pin#	Definition	Pin#	Definition
13	+3.3V	1	+3.3V
14	-12V	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

8-pin CPU Power Pin Definitions	
Pin#	Definition
1-4	GND
5-8	12V

4-pin HDD Power Pin Definitions	
Pin#	Definition
1	12V
2-3	Ground
4	5V
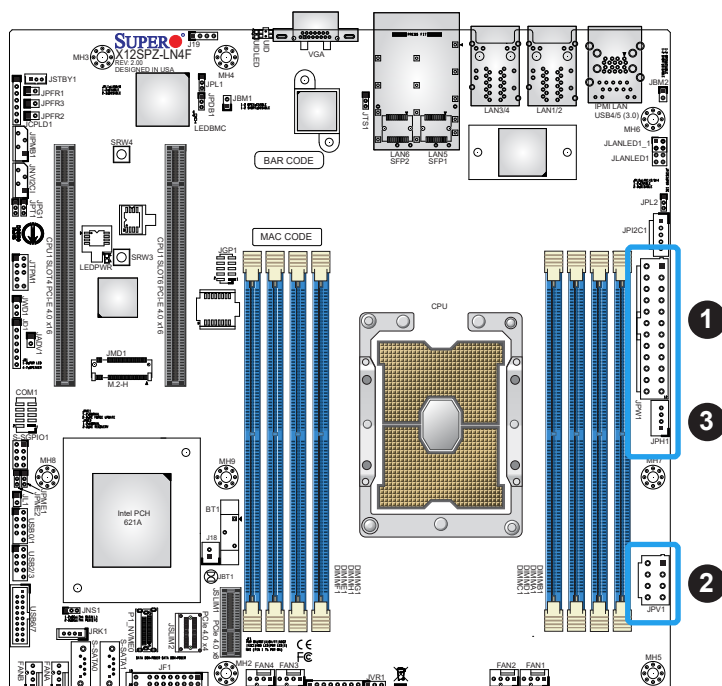
1. 24-Pin ATX Power

2. 8-Pin CPU Power

3. 4-pin HDD Power

Headers

Fan Headers

There are six 4-pin fan headers (FAN1 - FAN4, FANA, FANB) 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 the IPMI 2.0 interface. Refer to the table below for pin definitions.

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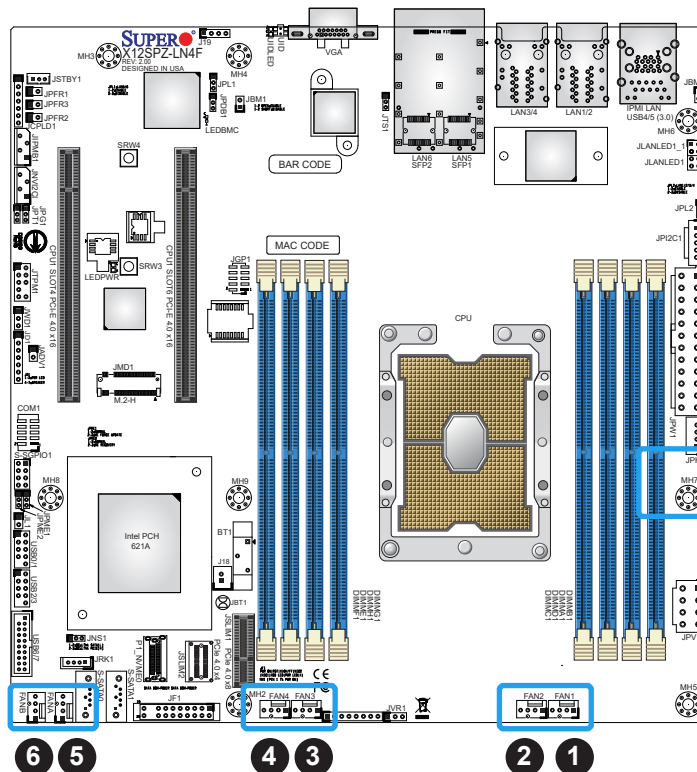
1. FAN1
2. FAN2
3. FAN3
4. FAN4
5. FANA
6. FANB

SGPIO Headers

There is one Serial Link General Purpose Input/Output (S-SGPIO1) header located on the motherboard. Refer to the tables below for pin definitions.

SGPIO Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	SATA Clock	2	SATA Load
3	Ground	4	SSATA Data
5	SSATA Load	6	Ground
7	SSATA Clock	8	SATA Data

COM Header

The motherboard has one COM header (COM1) that provides a serial connection .

COM Header (COM1) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	Ground	10	N/A
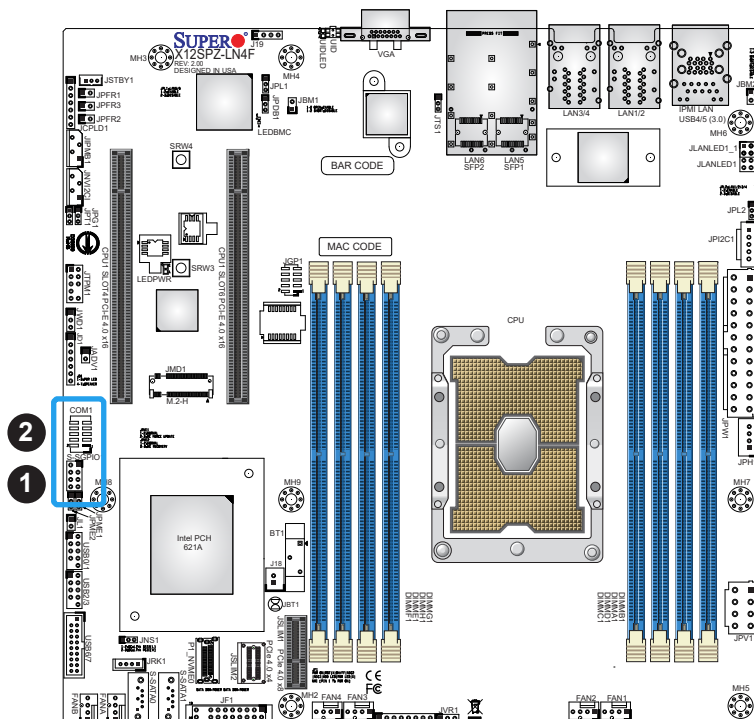
1. SGPIO Header

2. COM Header

TPM/Port 80 Header

A Trusted Platform Module (TPM)/Port 80 header is located at JTPM1 to provide TPM support and Port 80 connection. Use this header to enhance system performance and data security. Refer to the table below for pin definitions. Please go to the following link for more information on the TPM: http://www.supermicro.com/manuals/other/TPM.pdf.

Trusted Platform Module Header 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#

Extended CMOS Battery

J18 is a 2-pin connector for an external CMOS battery. This connector is also used to clear the CMOS. The clear the CMOS, remove the battery, shorts pins 1-2 for more than 10 seconds and then install the battery.

1. TPM Module
2. Extended CMOS Battery
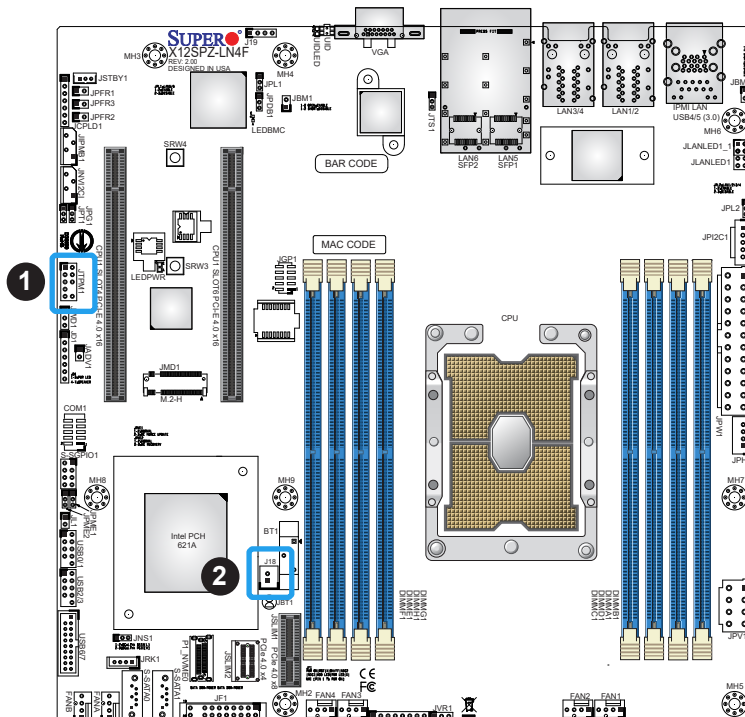
Standby Power

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

Chassis Intrusion

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

Chassis Intrusion Pin Definitions	
Pin#	**Definition**
1	Intrusion Input
2	Ground
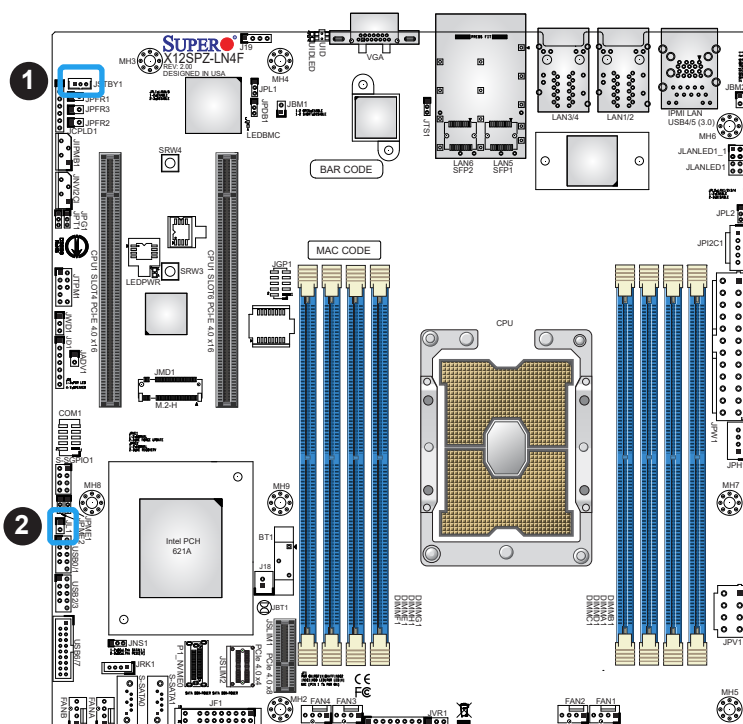
1. Standby Power Header

2. Chassis Intrusion

4-pin External BMC I²C Header

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

External I²C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	No Connection

Power SMB (I²C) Header

Power System Management Bus (I²C) header at 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	Power Fail
4	Ground
5	+3.3V

1. External BMC I²C Header
2. Power SMB Header
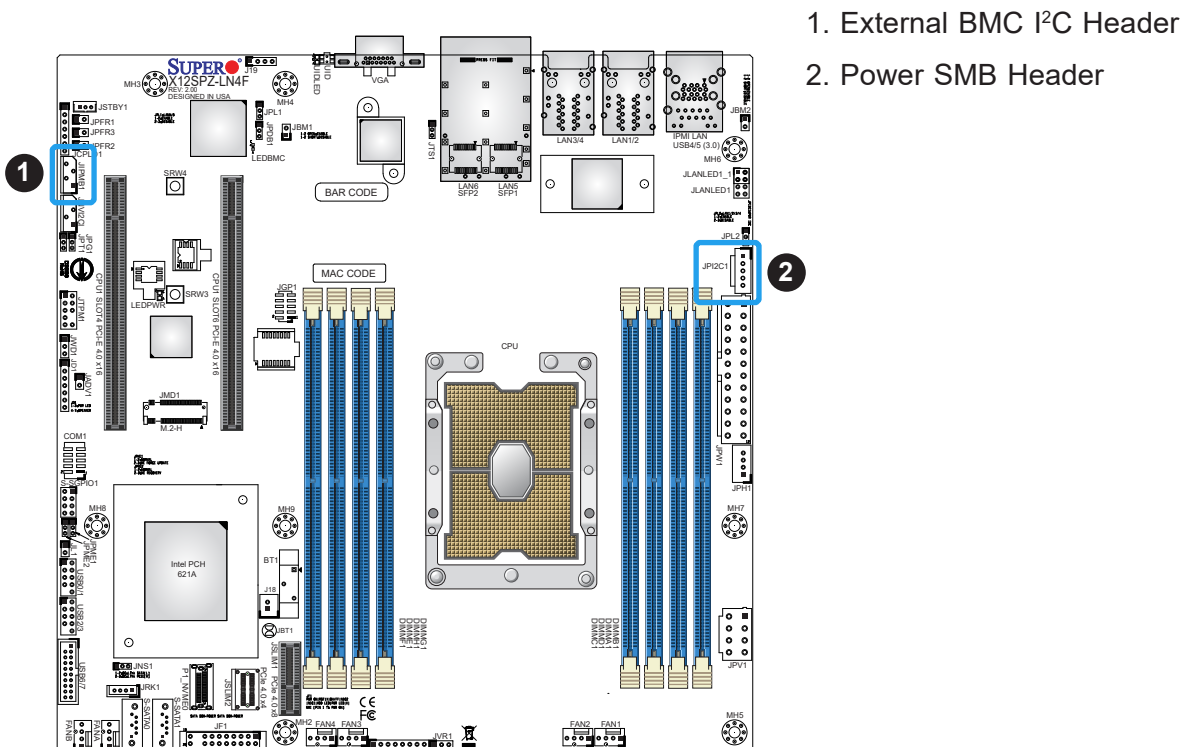
Speaker/Power LED

Pins 1-3 of JD1 are used for power LED indication, and pins 4-7 are for the speaker. Please note that the speaker connector pins are used with an external speaker. Refer to the tables below for pin definitions.

PWR LED Connector Pin Definitions	
Pin#	**Signal**
1	FP_PWR_LED_P
2	FP_PWR_LED_N
3	FP_PWR_LED_N

Speaker Connector Pin Definitions	
Pin#	**Signal**
4	P5V
5	NC
6	NC
7	R_SPKRIN
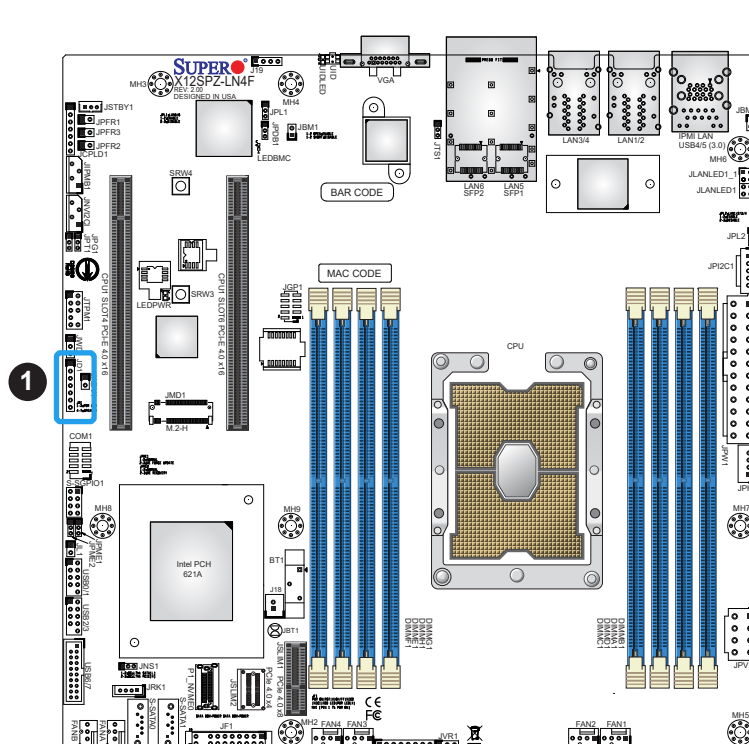
1. Speaker/Power LED

NVMe I²C Header

Connector JNVI²C1 is a management header for the Supermicro AOC NVMe PCIe peripheral cards. Connect the I²C cable to this connector.

Intel RAID Key Header

The JRK1 header allows you to enable RAID functions for NVMe connections. Refer to the table below for pin definitions.

Intel RAID Key Header	
Pin Definitions	
Pin#	Defintion
1	GND
2	PU 3.3V Stdby
3	GND
4	PCH RAID KEY
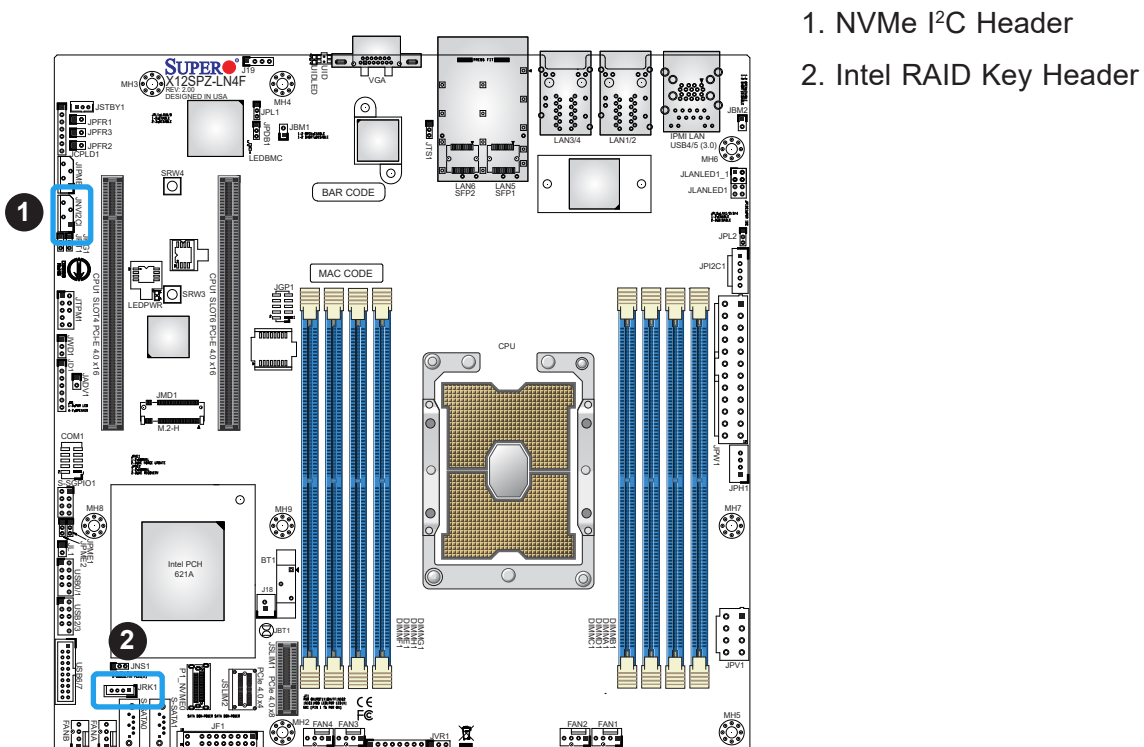
1. NVMe I²C Header

2. Intel RAID Key Header

SATA 3.0 Ports

This motherboard has two SATA 3.0 ports (S-SATA0, S-SATA1). S-SATA1 can be used with Supermicro SuperDOM's SATA DOM connectors with power pins built in, and do not require external power cables. Supermicro SuperDOMs are backward compatible with regular SATA HDDs or SATA DOMs that need external power cables.

M.2 Slot

This motherboard has one M.2 slot (JMD1). M.2 was formerly known as Next Generation Form Factor (NGFF) and serves to replace mini PCIe. M.2 allows for a variety of card sizes, increased functionality, and spatial efficiency. The M.2 slot on the motherboard supports PCIe 3.0 x4/SATA SSD cards in the 2242 and 2280 form factors.
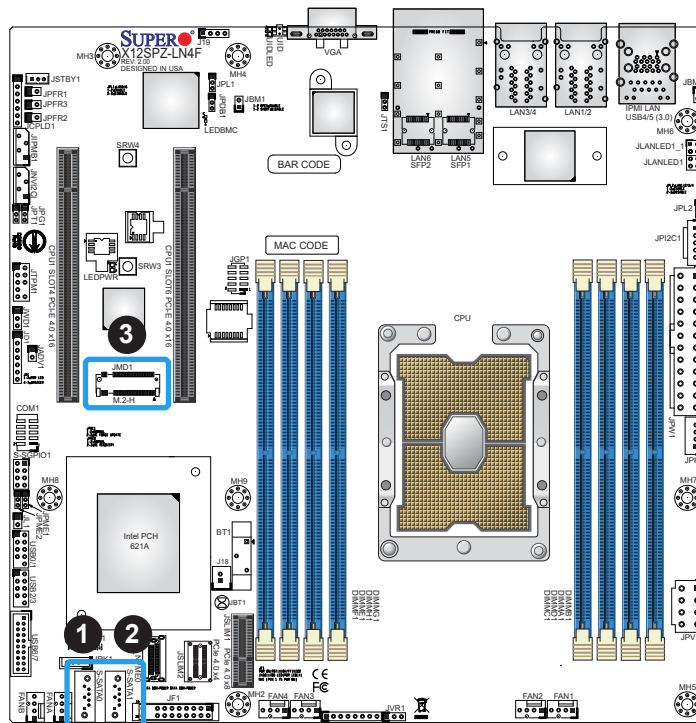
1. S-SATA0

2. S-SATA1

3. M.2 Slot

LAN Port Activity LED

JLANLED1 is the LAN3 - LAN6 activity LED for X12SPZ-SPLN6F, and JLANLED1_1 is the LAN3 - LAN4 activity LED for X12SPZ-LN4F.

JLANLED1			
Pin Definitions			
Pin#	**Definition**	**Pin#**	**Definition**
1	+3.3V Stdby	2	NIC3 Activity LED
3	+3.3V Stdby	4	NIC4 Activity LED
5	+3.3V Stdby	6	NIC5 Activity LED
7	+3.3V Stdby	8	NIC6 Activity LED

JLANLED1_1			
Pin Definitions			
Pin#	**Definition**	**Pin#**	**Definition**
1	+3.3V Stdby	2	NIC3 Activity LED
3	+3.3V Stdby	4	NIC4 Activity LED

OCulink Connector

One OCulink connector (P1_NVMe0) is located on the motherboard. Use this connector to attach an OCulink device.

1. JLANLED1
2. JLANLED1_1
3. P1_NVMe0 (OCulink)

Slim SAS Connectors

The slim SAS connector at JSLIM1 supports PCIe 4.0 x8 devices, and the slim SAS connector at JSLIM2 supports PCIe 4.0 x4 devices.
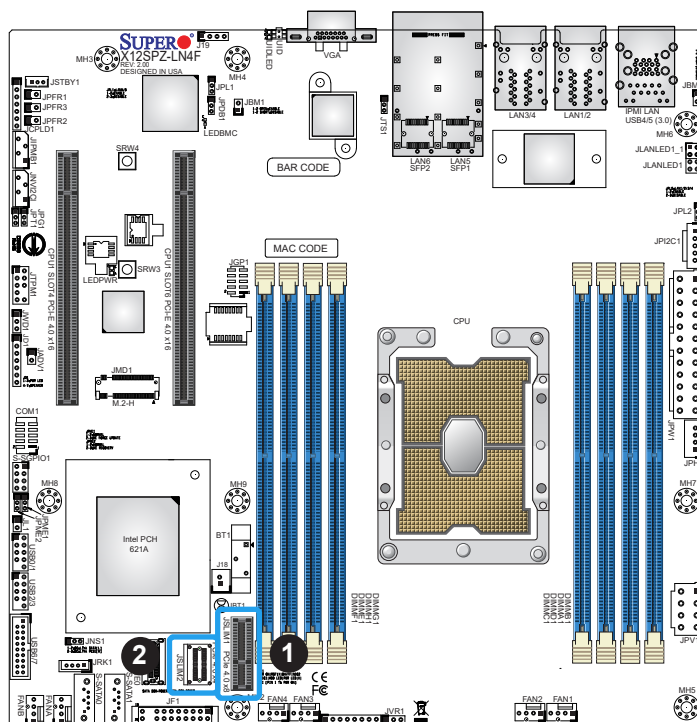
1. JSLIM1

2. JSLIM2

General Purpose I/O Header

The JGP1 (General Purpose Input/Output) header is a general purpose I/O expander on a pin header via the SMBus. Refer to the table below for pin definitions.

Pin#	Definition	GPIO Pin	Memory Address

JGP1 Header Pin Definitions			
Pin#	**Definition**	**GPIO Pin**	**Memory Address**
1	+3.3V Stby		
2	Ground		
3	GP0	GPP_G0	0xFD6D0900
4	GP1	GPP_G1	0xFD6D0910
5	GP2	GPP_G2	0xFD6D0920
6	GP3	GPP_G3	0xFD6D0930
7	GP4	GPP_G4	0xFD6D0940
8	GP5	GPP_G5	0xFD6D0950
9	GP6	GPP_G6	0xFD6D0960
10	GP7	GPP_G7	0xFD6D0970

1. General Purpose Header
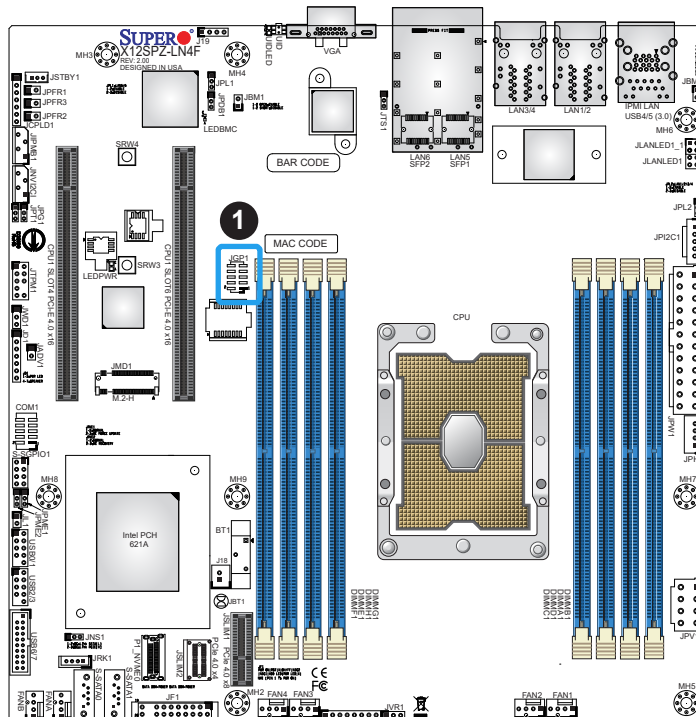
2.8 Jumper Settings

How Jumpers Work

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

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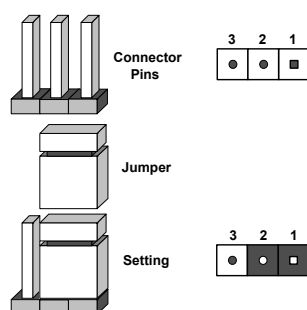
CMOS Clear

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

To Clear CMOS

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

2. Remove the cover of the chassis to access the motherboard.

3. Remove the onboard battery from the motherboard.

4. Short the CMOS pads with a metal object such as a small screwdriver for at least four seconds.

5. Remove the screwdriver (or shorting device).

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

Note: Clearing CMOS will also clear all passwords.

Do not use the PW_ON connector to clear CMOS.

JBT1 contact pads

LAN Port Enable/Disable

Use JPL1 to enable or disable LAN5 and LAN6, and JPL2 to enable or disable LAN1 - LAN4. The default setting is Enabled.

LAN Port Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled (Default)
Pins 2-3	Disabled

1. JPL1

2. JPL2
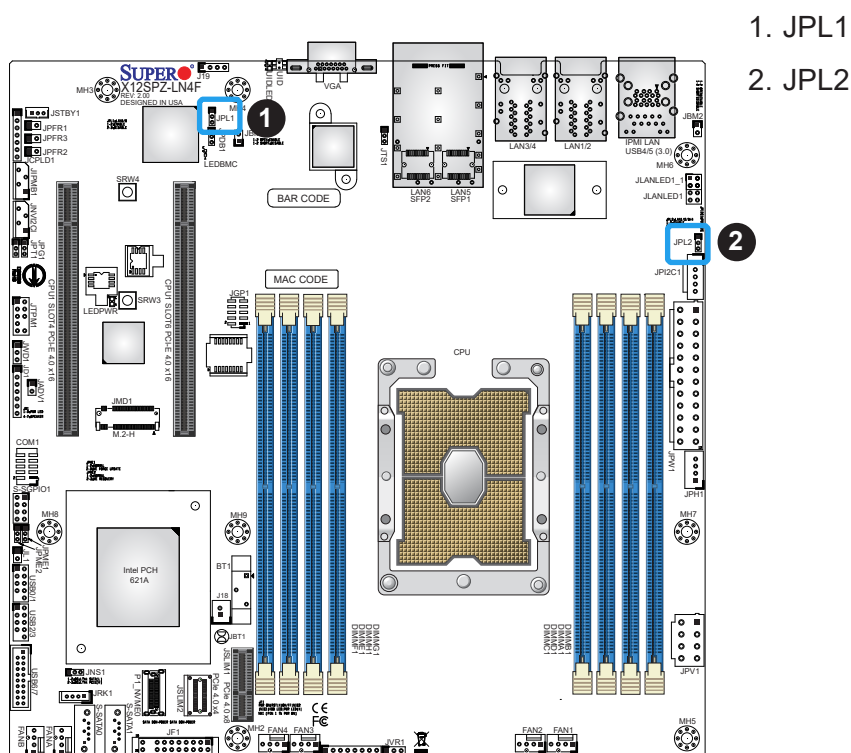
Management Engine (ME) Recovery

Use jumper JPME1 to select ME Firmware Recovery mode, which will limit resource allocation for essential system operation only in order to maintain normal power operation and management. In the single operation mode, online upgrade will be available via Recovery mode. Refer to the table below for jumper settings.

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

ME Manufacturing Mode

Close pins 2-3 of jumper JPME2 to bypass SPI flash security and force the system to operate in the manufacturing mode, which will allow the user to flash the system firmware from a host server for system setting modifications. Refer to the table below for jumper settings.

Manufacturing Mode Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Manufacturing Mode
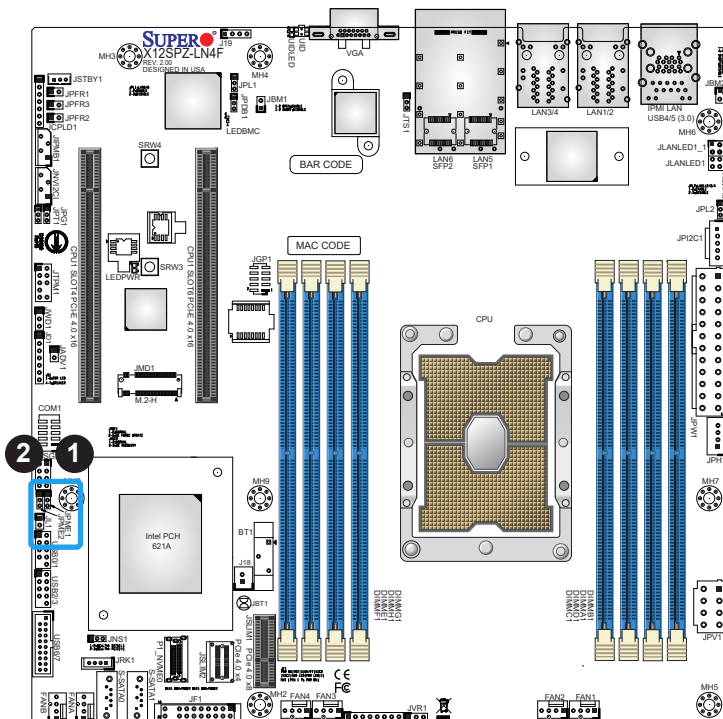
1. ME Recovery

2. Manufacturing Mode

IPMI Share LAN Enable/Disable

Set the JBM1 jumper to enabled to share i350 LAN with IPMI.

IPMI Share LAN Enable/Disable Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2 (Open)	Enabled (Default)
Pins 1-2 (Short)	Disabled

IPMI Dedicated/Share LAN Enable/Disable

Use JBM2 to enable or disable the dedicated IPMI LAN port. Refer to the table below for jumper settings.

IPMI Dedicated/Share LAN Enable/Disable Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2 (Open)	Enabled (Default)
Pins 1-2 (Short)	Disabled

1. JBM1
2. JBM2
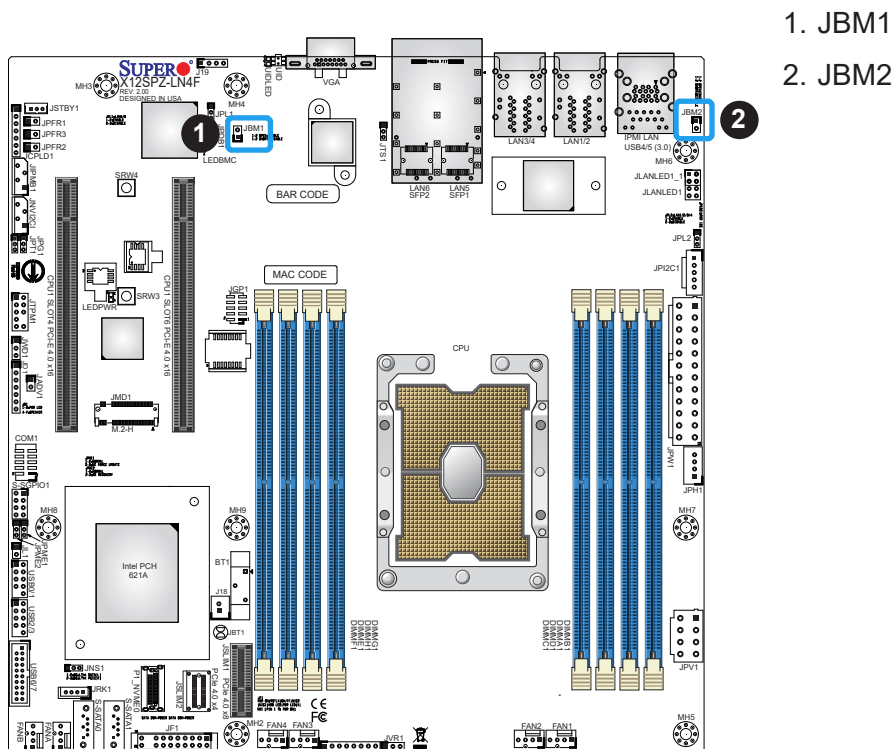
VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port using the onboard graphics controller.

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

OCulink Seleciton

Use JNS1 to select the OCulink lane. Refer to the table below for lane options.

OCulink Selection Jumper Settings	
Jumper Setting	Definition
Pins 1-2	4x SATA
Pins 2-3	PCIe x4
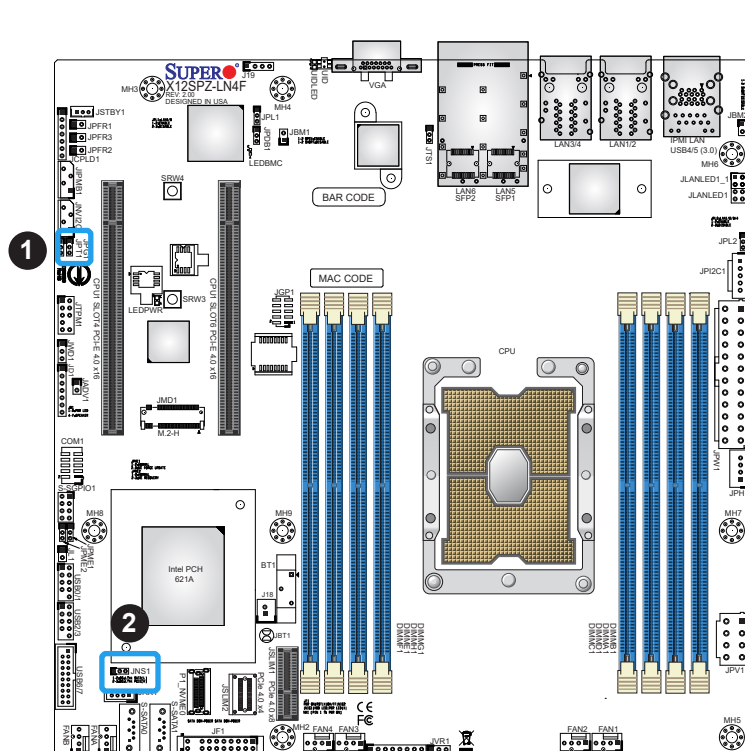
1. VGA Enable/Disable

2. OCulink Selection

Onboard TPM Enable/Disable

Use JPT1 to enable or disable the onboard TPM.

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

COM1 Function Seleciton

Use JPDB1 to select the COM1 function. Refer to the table below for jumper settings.

COM1 Function Selection Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2	BMC COM Port
Pins 2-3	BMC Debug UART
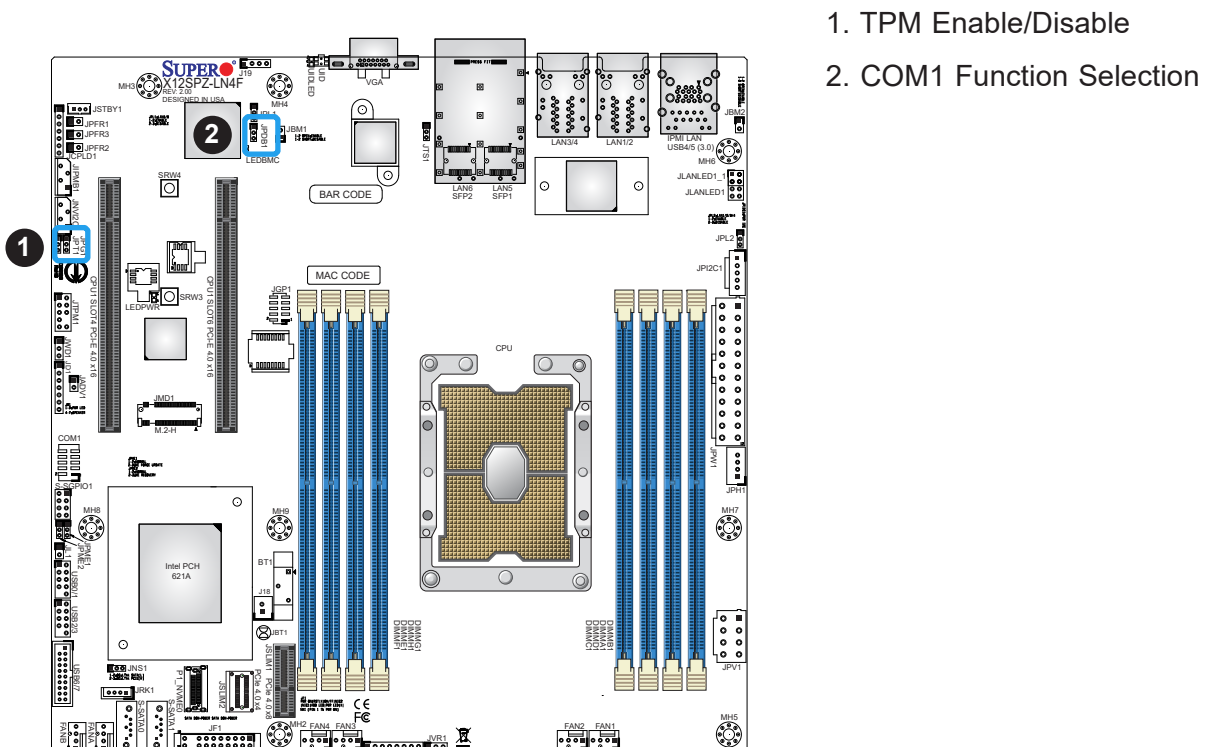
1. TPM Enable/Disable

2. COM1 Function Selection

2.9 LED Indicators

Onboard Power LED

LEDPWR is the onboard Power LED. When this LED is on, the system is on. Turn off the system and unplug the power cord before removing or installing components. 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

BMC Heartbeat LED

LEDBMC is the BMC Heartbeat LED. When the LED is blinking green, BMC is working. Refer to the table below for the LED status.

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

1. Onboard Power LED
2. BMC Heartbeat LED

LAN LEDs

There are four LAN ports (LAN1 - LAN4) on the I/O back panel of the motherboard. Each LAN port has two LEDs. The green LED indicates activity, while the other Link LED may be green, amber, or off to indicate the speed of the connection. Refer to the tables below for more information.

LAN Activity LED (Left)		
LED State		
Color	Status	Definition
Yellow	Flashing	Active

LAN Link LED (Right)	
LED State	
LED Color	Definition
Off	No Connection
Amber	1 Gbps
Green	100 Mbps

SFP28 LAN LEDs

Two 25G/10G LAN ports (LAN5/LAN6) that support SFP28 are also located on the rear I/O panel. Refer to the tables below for more information.

LAN Activity LED (Left)		
LED State		
Color	Status	Definition
Yellow	Flashing	Active

LAN Link LED (Right)	
LED State	
LED Color	Definition
Green	25Gbps
Yellow	10Gbps
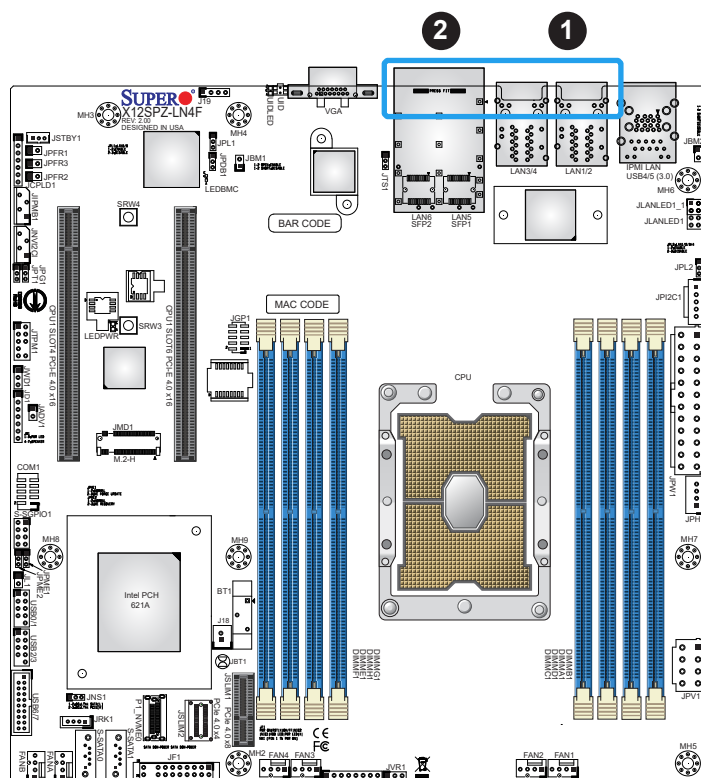
1. LAN Port LED for RJ45
2. LAN Port LED for SFP28

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. <u>Always disconnect the AC power cord before adding, changing or installing any non hot-swap hardware components</u>.

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. Check the CPU socket for bent pins and make sure the CPU is fully seated.

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

System Boot Failure

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

1. Check the screen for an error message.

2. Clear the CMOS settings by unplugging the power cord and contacting both pads on the CMOS clear jumper (JBT1). Restart the system. Refer to Section 2-8 in Chapter 2.

3. Remove all components from the motherboard and turn on the system with only one DIMM module installed. If the system boots, turn off the system and repopulate the components back into the system to retest. Add one component at a time to isolate which one may have caused the system boot issue.

Memory Errors

When suspecting faulty memory is causing the system issue, check the following:

1. Make sure that the memory modules are compatible with the system and are properly installed. See Chapter 2 for installation instructions. (For memory compatibility, refer to the "Tested Memory List" link on the motherboard's product page to see a list of supported memory.)

2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.

3. Make sure that you are using the correct type of ECC DDR4 modules recommended by the manufacturer.

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

Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to Chapter 2 for details on recommended power supplies.

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

3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

When the System Becomes Unstable

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

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

2. Memory support: Make sure that the memory modules are supported by testing the modules 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 a USB flash or media drive.

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

3. Use the minimum configuration for troubleshooting: Remove all unnecessary components (starting with add-on cards first), and use the minimum configuration (but with the CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.

4. Identify bad components by isolating them: If necessary, remove a component in question from the chassis, and test it in isolation to make sure that it works properly. Replace a bad component with a good one.

5. Check and change one component at a time instead of changing several items at the same time. This will help isolate and identify the problem.

6. To find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

3.2 Technical Support Procedures

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

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

2. BIOS upgrades can be downloaded from our website (http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html).

3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:

- Motherboard model and PCB revision number

- BIOS release date/version (This can be seen on the initial display when your system first boots up.)

- System configuration

4. An example of a Technical Support form is on our website at http://www.supermicro.com/RmaForm/.

5. Distributors: For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@supermicro.com.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The motherboard supports up to 2TB of ECC RDIMM amd LRDIMM DDR4 memory with speeds of up to 3200MHz in eight memory slots. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given on Section 2-4 in Chapter 2.

Question: How do I update my BIOS?

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

Unzip the BIOS file onto a bootable USB device and then boot into the built-in UEFI Shell and type "flash.nsh <BIOS filename><BMC Username><BMC Password>" to start the BIOS update. The flash script will invoke the SUM (EFI) tool automatically to perform the BIOS update, beginning with uploading the BIOS image to BMC. After uploading the firmware, the system will reboot to continue the process. The BMC will take over and continue the BIOS update in the background. The process will take 3-5 minutes.

Warning: Do not shut down or reset the system while updating the BIOS to prevent possible system boot failure! Please read the X12_AMI_BIOS_Upgrade_README file carefully before you perform the BIOS update.

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

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

2. Locate the onboard battery as shown below.

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

4. Remove the battery.

Proper Battery Disposal

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

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

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

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

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

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

BATTERY HOLDER
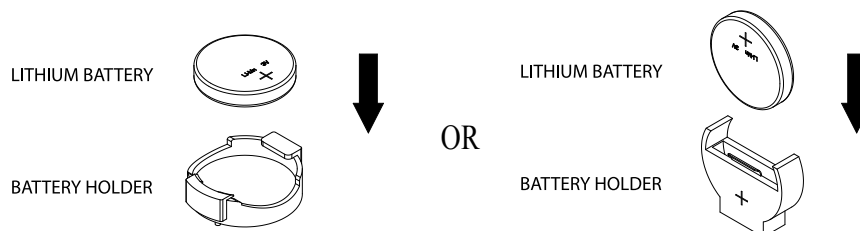
3.5 Returning Merchandise for Service

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 (http://www.supermicro.com/RmaForm/).

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

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

Chapter 4

UEFI BIOS

4.1 Introduction

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

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

Starting the Setup Utility

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

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

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

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

4.2 Main Setup

When you first enter the AMI BIOS setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS setup screen is shown below and the following items are displayed:

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

                                                      Set the Date. Use Tab to
     System Date                   [Fri 04/09/2021]   switch between Date
     System Time                   [17:55:59]         elements.
                                                      Default Ranges:
     Supermicro X12SPZ-SPLN6F/LN4F                    Year: 1998-9999
     BIOS Version                  1.1                Months: 1-12
     Build Date                    04/09/2021         Days: Dependent on month
     CPLD Version                  F1.08.04           Range of Years may vary.

     Memory Information
     Total Memory                  8192 MB



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

                       Version 2.21.1280 Copyright (C) 2021 AMI
```

System Date/System Time

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

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

Supermicro X12SPZ-SPLN6F/LN4F

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

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

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

  ▶ Boot Feature                                    Boot Feature Configuration
  ▶ CPU Configuration                               Page
  ▶ Chipset Configuration
  ▶ Server ME Information
  ▶ PCH SATA Configuration
  ▶ PCH sSATA Configuration
  ▶ Network Configuration
  ▶ KMIP Server Configuration
  ▶ PCIe/PCI/PnP Configuration
  ▶ Super IO Configuration
  ▶ Serial Port Console Redirection
  ▶ ACPI Settings
  ▶ Trusted Computing
  ▶ HTTP Boot Configuration

  ▶ iSCSI Configuration
  ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:14
  ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:15    →←: Select Screen
  ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:16    ↑↓: Select Item
  ▶ Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:17    Enter: Select
  ▶ Supermicro 10Gb/25Gb Ethernet Controller - 3C:EC:EF:30:2A:34    +/-: Change Opt.
  ▶ Supermicro 10Gb/25Gb Ethernet Controller - 3C:EC:EF:30:2A:35    F1: General Help
  ▶ TLS Authenticate Configuration                                  F2: Previous Values
                                                                    F3: Optimized Defaults
  ▶ Driver Health                                                   F4: Save & Exit
                                                                    ESC: Exit

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```

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

►Boot Feature

Quiet Boot

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

Option ROM Messages

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

Bootup NumLock State

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

Wait For "F1" If Error

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

INT19 (Interrupt 19) Trap Response

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

Re-try Boot

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

Power Configuration

Watch Dog Function

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

If the feature above is set to Enabled, Watch Dog Action is available for configuration:

Watch Dog Action

Use this feature to reset the system or generate NMI. The options are **Reset** and NMI.

Restore on AC Power Loss

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

Power Button Function

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

▶CPU Configuration

The following CPU information is displayed:

- Processor BSP Revision

- Processor Socket

- Processor ID

- Processor Frequency

- Processor Max Ratio

- Processor Min Ratio

- Microcode Revision

- L1 Cache RAM (Per Core)

- L2 Cache RAM (Per Core)

- L3 Cache RAM (Per Package)

- Processor 0 Version

▶CPU1 Core Disable Bitmap

CPU1 Core Disable Bitmap

Core Disable Bitmap(Hex)

Select 0 to enable all cores or FFFFFFFFFFF to disable all cores. One core must be enabled.

Hyper-Threading (ALL)

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

Hardware Prefetcher

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

Adjacent Cache Prefetch

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

DCU Streamer Prefetcher (Available when supported by the CPU)

Select Enable to enable the Data Cache Unit (DCU) Streamer Prefetcher, which streams and prefetches data and sends it to the Level 1 data cache to improve data processing and system performance. The options are Disable and **Enable**.

DCU IP Prefetcher (Available when supported by the CPU)

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

LLC Prefetch

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

Extended APIC

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

VMX

Use this feature to enable or disable Vanderpool Technology. The options are Disable and **Enable.**

Enable SMX

Use this feature to enable or disable Safer Mode Extensions. The options are **Disable** and Enable**.**

PPIN Control

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

AES-NI

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

TME, TME-MT, TDX

Total Memory Encryption

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

Limit CPU PA to 46 Bits

Use this feature to limit the CPU physical address to 46 bits to support older hyper-v. The options are Disable and **Enable**.

▶Advanced Power Management Configuration

Power Technology

Use this feature to enable or disable processor power management features. The options are Disable, Energy Efficient, and **Custom**.

Power Performance Tuning

Use this feature to select whether the BIOS or the operating system chooses energy performance tuning. The options are **OS Controls EPB** and BIOS Controls EPB.

If the feature above is set to BIOS Controls EPB, the next feature is available for configuration:

ENERGY_PERF_BIAS CFG Mode

Use this feature to set the energy performance bias. The options are Maximum Performance, Performance, **Balanced Performance**, Balanced Power, and Power.

▶CPU P State Control

SpeedStep (P-States)

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

AVX-P1

Use this feature to select the AVX-P1 level. The options are **Normal**, Level 1, and Level 2.

EIST PSD Funtion

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

Turbo Mode

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

▶**Hardware PM State Control**

Hardware P-States

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

▶**Frequency Prioritization**

RAPL Prioritization

Use this feature to enable the RAPL balancer. The options are Enable and **Disable**.

▶**CPU C State Control**

Enable Monitor MWAIT

Select Enabled to enable the Monitor/Mwait instructions. The Monitor instructions monitors a region of memory for writes, and MWait instructions instruct the CPU to stop until the monitored region begins to write. The options are Disable and **Enable**.

CPU C6 Report

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

Enhanced Halt State (C1E)

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

▶Package C State Control

Package C State

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

▶CPU T State Control

Software Controlled T-States

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

If the feature above is set to Enable, the next feature is available for configuration:

T-State Throttle Level

Use this feature to enable or disable CPU throttling, which reduces power consumption. The options are **Disable**, 6.25%, 12.5%, 18.75%, 25.0%, 31.25%, 37.5%, 43.75%, 50.0%, 56.25%, 62.5%, 68.75%, 75.0%, 81.25%, 87.5%, 93.75%.

▶Chipset Configuration

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

▶North Bridge

▶Uncore Configuration

Uncore Configuration

- Number of CPU

- Number of IIO

- Current UPI Link Speed

- Current UPI Link Frequency

- Global MMIO Low Base / Limit

- Global MMIO High Base / Limit

- Pci-e Configuration Base / Size

Degrade Precedence

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

Link L0p Enable

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

Link L1 Enable

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

XPT Remote Prefetch

Use this feature to enable or disable Extended Prediction Table (XPT) Remote Prefetch. The options are Disable, Enable, and **Auto**.

KTI Prefetch

If thiis feature is enabled, the KTI Prefetcher preloads the L1 cache with data deemed relevant to allow the memory read to start earlier on a DDR bus in an effort to reduce latency. The options are Disable, Enable, and **Auto**.

Local/Remote Threshold

Use this feature to set the threshold for the IRQ signals that handle hardware interruptions. The options are Dsiable, **Auto**, Low, Medium, and High.

IO Directory Cache (IODC)

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

SNC (Sub NUMA)

Use this feature to enable or disable Sub NUMA Clustering. Disable this feature to support 1-cluster and enable to support 2-clusters. The options are **Disable** and SNC2 (2-clusters)

XPT Prefetch

Use this feature to enable or disable XPT Prefetch support, which allows an LLC request to be duplicated and sent to an appropriate memory controller based on the recent LLC history to reduce latency. The options are Disable, Enable, and **Auto**.

Snoop Throttle Configuration

Use this feature to select the level of snoop throttle setting. The options are Disabled, Low, Medium, High, and **Auto**.

PCIe Remote P2P Relaxed Ordering

Enable peer-to-peer relaxed ordering to optimize system performance. The options are **Disable** and Enable.

Stale AtoS

Use this feature to enable or disable Stale A to S optimization. There are three states in the in-memory directory: invalid (I), snoopAll (A), and shared (S). Data in the I state is clean and does not exist in other sockets. Data in the A state may exist in another exclusive or modified socket. Data in the S state is clean and may be shared across one or more sockets. The options are Disable, Enable, and **Auto**.

LLC Dead Line Alloc

Select Enable to opportunistically fill dead lines in the LLC. Select Disable to never fill dead lines in LLC. The options are Disable, **Enable**, and Auto.

▶**Memory Configuration**

STEP DRAM Test

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

*If the feature above is set to Enable, the next feature is available for configuration:

Operation Mode

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

Enforce POR

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

PPR Type

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

Memory Frequency

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

Data Scrambling for DDR4

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

2x Refresh Enable

Use this feature to enable 2x memory refresh support to enhance memory performance. The options are **Auto**, Disable, and Enable.

▶**Memory Topology**

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

▶**Memory RAS Configuration Setup**

Enabled Pcode WA for SAI PG

Use this feature to enable Pcode Work Around for SAI Policy group for A Step. The options are **Disabled** and Enabled.

Mirror Mode

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

UEFI ARM Mirror

This feature allows the system to imitate the bahavior of the UEFI based Address Range Mirror with setup option. The options are **Disabled** and Enabled.

Correctable Error Threshold

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

Partial Cache Line Sparing PCLS

Use this feature to enable or disable Partial Cache Line Sparing (PCLS). The options are Disabled and **Enabled**.

ADDDC Sparing

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

Patrol Scrub

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

▶**IIO Configuration**

▶**CPU1 Configuration**

IOU0/1/3/4 (IIO PCIe Port 1/2/4/5)

Use this feature to configure the bifuraction setting for the PCIe port. The options are **Auto**, x4x4x4x4, x4x4x8, x8x4x4, x8x8, and x16.

▶**Onboard LAN1/2/3/4**

Link Speed

Use this feature to select the link speed for the PCIe port. The options are **Auto,** Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), and Gen 4 (16 GT/s).

The following information is displayed:

• PCI-E Port Link Status

• PCI-E Port Link Max

• PCI-E Port Link Speed

PCI-E Port Max Payload Size

Selecting **Auto** for this feature enables the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCIe device, allowing for maximum I/O efficiency. Selecting 128B or 256B designates maximum packet size of 128 or 256. The options are 128B, 256B, 512B, and **Auto.**

▶Onboard LAN5/6

Link Speed

Use this feature to select the link speed for the PCIe port. The options are **Auto,** Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), and Gen 4 (16 GT/s).

The following information is displayed:

- PCI-E Port Link Status

- PCI-E Port Link Max

- PCI-E Port Link Speed

PCI-E Port Max Payload Size

Selecting **Auto** for this feature enables the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCIe device, allowing for maximum I/O efficiency. Selecting 128B or 256B designates maximum packet size of 128 or 256. The options are 128B, 256B, 512B, and **Auto.**

▶CPU1 SLOT6 PCI-E 4.0 X16
▶CPU1 SLOT4 PCI-E 4.0 X16

Link Speed

Use this feature to select the link speed for the PCIe port. The options are **Auto,** Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), and Gen 4 (16 GT/s).

The following information is displayed:

- PCI-E Port Link Status

- PCI-E Port Link Max

- PCI-E Port Link Speed

PCI-E Port Max Payload Size

Selecting **Auto** for this feature enables the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCIe device, allowing for maximum I/O efficiency. Selecting 128B or 256B designates maximum packet size of 128 or 256. The options are 128B, 256B, 512B, and **Auto.**

▶**JSLIM1 NVMe0**
▶**JSLIM1 NVMe1**
▶**JSLIM2 NVMe2**

Link Speed

Use this feature to select the link speed for the PCIe port. The options are **Auto,** Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), Gen 3 (8 GT/s), and Gen 4 (16 GT/s).

The following information is displayed:

• PCI-E Port Link Status

• PCI-E Port Link Max

• PCI-E Port Link Speed

PCI-E Port Max Payload Size

Selecting **Auto** for this feature enables the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCIe device, allowing for maximum I/O efficiency. Selecting 128B or 256B designates maximum packet size of 128 or 256. The options are 128B, 256B, 512B, and **Auto.**

▶**IOAT Configuration**

Disable TPH

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

Prioritize TPH

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

Relaxed Ordering

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

▶Intel(R) for Directed I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

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

ACS Control

Select Yes to program Access Control Services (ACS) to the chipset PCIe root port bridge. Select No to program ACS to all PCIe root port bridges. The options are **Enable** and Disable.

Interrupt Remapping

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

▶Intel(R) VMD Technology

NVMe Mode Switch

Use this feature to select the NVMe mode switch. The options are Manual, VMD, and **Auto**.

*If the feature above is set to Manual, the next menu is available for configuration:

▶Intel(R) VMD for Volume Management Device on CPU1

VMD Config for PCH ports

Enable/Disable VMD

Use this feature to enable or disable the volume management device for this stack. The options are **Disable** and Enable.

If the feature above is set to Enable, the following features are available for configuration:

M.2-H VMD

P1_NVME0 VMD

VMD Config for IOU 0

Enable/Disable VMD

Use this feature to enable or disable the volume management device for this stack. The options are **Disable** and Enable.

If the feature above is set to Enable, the following features are available for configuration:

Hot Plug Capable

Use this feature to enable or disable hot plug for this port. The options are **Disable** and Enable.

VMD Config for IOU 1

Enable/Disable VMD

Use this feature to enable or disable the volume management device for this stack. The options are **Disable** and Enable.

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

CPU1 SLOT6 PCI-E 4.0 X16 VMD

Use this feature to enable or disable volume management device for this port. The options are **Disable** and Enable.

Hot Plug Capable

Use this feature to enable or disable hot plug for this port. The options are **Disable** and Enable.

VMD Config for IOU 3

Enable/Disable VMD

Use this feature to enable or disable the volume management device for this stack. The options are **Disable** and Enable.

If the feature above is set to Enable, the following features are available for configuration:

CPU1 SLOT4 PCI-E 4.0 X16 VMD

Use this feature to enable or disable volume management device for this port. The options are **Disable** and Enable.

Hot Plug Capable

Use this feature to enable or disable hot plug for this port. The options are **Disable** and Enable.

VMD Config for IOU 4

Enable/Disable VMD

Use this feature to enable or disable the volume management device for this stack. The options are **Disable** and Enable.

If the feature above is set to Enable, the following features are available for configuration:

JSLIM1 NVMe0 VMD

Use this feature to enable or disable volume management device for this port. The options are **Disable** and Enable.

JSLIM1 NVMe1 VMD

Use this feature to enable or disable volume management device for this port. The options are **Disable** and Enable.

JSLIM2 NVMe2 VMD

Use this feature to enable or disable volume management device for this port. The options are **Disable** and Enable.

Hot Plug Capable

Use this feature to enable or disable hot plug for this port. The options are **Disable** and Enable.

PCI-E ASPM Support (Global)

Use this feature to enable or disable ASPM support for all donwstream devices. The options are **Disable** and Auto.

IIO eDPC Support

Use this feature to enable or disable IIO enhanced DPC support. The options are **Disable**, On Fatal Error, and On Fatal and Non-Fatal Errors.

▶South Bridge

The following USB information is displayed:

- USB Module Version

- USB Devices

Legacy USB Support

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

XHCI Hand-off

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

Port 60/64 Emulation

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

PCIe PLL SSC

Use this feature to enable or disable PCIe PLL SSC. The options are **Disabled** and Enabled.

Port 61h Bit-4 Emulation

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

▶Server ME Information

The following General ME Configuration is displayed:

- Oper. Firmware Version

- Backup Firmware Version

- Recovery Firmware Version

- ME Firmware Status #1

- ME Firmware Status #2

- Current State

- Error Code

▶PCH SATA Configuration

SATA Controller

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

Configure sSATA as

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

If the feature above is set to RAID, the SATA RSTe Boot Info and SATA RAID Option ROM/UEFI Driver are available for configuration:

SATA RSTe Boot Info

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

Support Aggressive Link Power Management

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

SATA RAID Option ROM/UEFI Driver

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

SATA Port 0-3

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

- Software Preserve Support

SATA Port 0-3 Hot Plug

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

SATA Port 0-3 Spin Up Device

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

SATA Port 0-3 SATA Device Type

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

▶PCH sSATA Configuration

sSATA Controller

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

Configure sSATA as

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

If the feature above is set to RAID, the sSATA RSTe Boot Info and sSATA RAID Option ROM/UEFI Driver are available for configuration:

sSATA RSTe Boot Info

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

Support Aggressive Link Power Management

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

sSATA RAID Option ROM/UEFI Driver

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

SATA Port 0/1/5

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

- Software Preserve Support

SATA Port 0/1/5 Hot Plug

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

SATA Port 0/1/5 Spin Up Device

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

SATA Port 0/1/5 SATA Device Type

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

▶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

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

IPv4 HTTP Support

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

IPv6 PXE Support

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

IPv6 HTTP Support

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

PXE Boot Wait Time

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

Media Detect Count

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

> ▶**MAC:3CECEF2C7E14-IPv6 Network Configuration**
> ▶**MAC:3CECEF2C7E15-IPv6 Network Configuration**
> ▶**MAC:3CECEF2C7E16-IPv6 Network Configuration**
> ▶**MAC:3CECEF2C7E17-IPv6 Network Configuration**
> ▶**MAC:3CECEF302A34-IPv6 Network Configuration**
> ▶**MAC:3CECEF302A35-IPv6 Network Configuration**

> ▶**Enter Configuration Menu**

Interface Name

Interface Type

MAC Address

Host addresses

Route Table

Gateway addresses

DNS addresses

Interface ID

Use this feature to set the 64-bit alternative interface ID for the device.

DAD Transmit Count

If this set feature is set to 0, the Duplication Address Detection is not performed. Set the value to a preferred selection.

Policy

Use this feature to set the policy to automatic or manual. The options or **automatic** and manual.

Save Changes and Exit

Select this feature to save the changes for the features above and exit.

▶**MAC:3CECEF2C7E14-IPv4 Network Configuration**
▶**MAC:3CECEF2C7E15-IPv4 Network Configuration**
▶**MAC:3CECEF2C7E16-IPv4 Network Configuration**
▶**MAC:3CECEF2C7E17-IPv4 Network Configuration**
▶**MAC:3CECEF302A34-IPv4 Network Configuration**
▶**MAC:3CECEF302A35-IPv4 Network Configuration**

Configured

Use this feature to indicate whether the network address is configured successfully or not. The options or **Disabled** and Enabled.

Save Changes and Exit

Select this feature to save the changes for the features above and exit.

▶**KMIP Server Configuration**

KMIP Server IP address

Enter the IP4 address in dotted-decimal notation (e.g., 255.255.255.255).

KMIP TCP Port number

Enter the KMIP TCP port number (from 100 to 9999) The default is **5696**.

TimeZone

Use this feature to select the current time zone.

TCG Nvme KMS Policy

Use this feature to select the Trusted Computing Group (TCG) NVMe KMS policy. The options are Normal Unlock, **Do Nothing**, Reset All Devices Deleted Key Id List.

TCG Nvme KMS Status Retry Time

Use this feature to select the number of attempts of test connections to the Key Management Server. The options are 0 - 300 seconds and the default is **60**.

Client UserName

Press Enter to create a client username.

Client Password

Press Enter to create a client username password.

KMS TLS Certificate

▶CA Certificate

Use this feature to enroll factory defaults or load the CA certificates from a file. The options are **Update**, Delete, and Export.

▶Client Certificate

Use this feature to enroll factory defaults or load the client certificates from a file. The options are **Update**, Delete, and Export.

▶Client Private Key

Use this feature to enroll factory defaults or load the client private key from a file. The options are **Update**, Delete, and Export.

▶PCIe/PCI/PnP Configuration

PCI Bus Driver Version

PCI Devices Common Settings:

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

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

SR-IOV Support

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

ARI Support

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

Bus Master Enable

Use this feature to enable the Bus Master, which enables the Bus Master Attribute for DMA transaction. The options are Disabled and **Enabled**.

Consistent Device Name Support

Use this feature to enable ACPI_DSM device name support for onboard devices and slots. The options are **Disabled** and Enabled.

MMIO High Base

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

MMIO High Granularity Size

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

Maximum Read Request

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

MMCFG Base

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

NVMe Firmware Source

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

VGA Priority

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

Onboard Video Option ROM

Use this feature to select which firmware function to be loaded for LAN1 used for system boot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

CPU1 SLOT4 PCI-E 4.0 X16 OPROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

CPU1 SLOT6 PCI-E 4.0 X16 OPROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

M.2-H OPROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

P1_NVME0 OPROM

Use this feature to select which firmware type to be loaded for the add-on card in this slot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

Onboard LAN1 Option ROM

Use this feature to select a desired firmware function to be loaded for onboard LAN2 - LAN6. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

JSLIM1 NVMe0/JSLIM1 NVMe1/JLSIM2 NVMe2 Option ROM

Use this feature to select a desired firmware function to be loaded for the specified NVMe slot. The options are Disabled and **Legacy** (if the Boot Mode Select feature under the Boot tab is set to Legacy), Disabled and **EFI** (if the Boot Mode Select feature under the Boot tab is set to UEFI), and Disabled, Legacy, and **EFI** (if the Boot Mode Select feature under the Boot tab is set to Dual).

▶Super IO Configuration

The following Super IO information is display:

• Super IO Chip AST2600

▶Serial Port 1 Configuration

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

Serial Port 1

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

Device Settings

This feature displays the status of the serial port.

Change Settings

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

▶SOL Configuration

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

Serial Port 2

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

Device Settings

This feature displays the status of the serial port.

Change Settings

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

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

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

▶Serial Port Console Configuration

COM1 Console Redirection

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

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

▶COM1 Console Redirection Settings

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

Terminal Type

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

Bits Per Second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

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

Redirection After BIOS POST

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

SOL Console Redirection

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

If the feature above is set to Enabled, the following features are available for configuration:

▶**SOL Console Redirection Settings**

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

Terminal Type

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

Bits Per Second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

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

Legacy OS Redirection Resolution

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

Putty KeyPad

This feature selects 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.

Redirection After BIOS POST

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

Legacy Console Redirection

Legacy Serial Redirection Port

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

EMS (Emergency Management Services) Console Redirection

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

If the feature above is set to Enabled, the following features are available for configuration:

▶**EMS Console Redirection Settings**

This feature allows you to specify how the host computer exchanges data with the client computer, which is the remote computer used by the user.

Out-of-Band Mgmt Port

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

Terminal Type

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

Bits Per Second

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

Flow Control

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

Data Bits, Parity, Stop Bits

▶ACPI Settings

NUMA

Use this feature to enable or disable Non-Uniform Memory Access (NUMA), a feature that improves memory-to-processor communication and performance. The options are Disabled and **Enabled**.

UMA-Based Clustering

Use this feature to enable or disable Uniform Memory Access (UMA) clustering. The options are Disable (All2All) and **Hemishpere (2-clusters)**.

WHEA Support

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

High Precision Event Timer

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

▶Trusted Computing

The motherboard supports TPM 1.2 and 2.0. The following Trusted Platform Module (TPM) information is display if a TPM 2.0 module is detected:

- Vendor Name

- Firmware Version

Security Device Support

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

- Active PCR Bank

- Available PCR banks

SHA-1 PCR Bank

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

SHA256 PCR Bank

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

Pending Operation

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

Platform Hierarchy

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

Storage Hierarchy

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

Endorsement Hierarchy

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

TPM 20 Interface Type

PH Randomization

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

SMCI BIOS-Based TPM Provision Support

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

TXT Support

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

▶HTTP Boot Configuration

HTTP Boot Configuration

HTTP Boot Policy

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

Priority of HTTP Boot:

Instance of Priority 1:

Use this feature to set the rank target port. The default value is **1**.

Select IPv4 or IPv6

Use this feature to select which LAN port to boot from. The options are **IPv4** and IPv6.

Boot Description

Highlight the feature and press enter to create a boot description. The description cannot be more than 75 characters.

Boot URI

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

Instance of Priority 2 - Priority 6:

Use this feature to set the rank target port. The default value is **0**.

▶iSCSI Configuration

▶Attempt Priority

Attempt Priority

Use this feature to set the attempt priorities. The options are **Host Attempt**, Redfish Attempt, and Rsd Attempt.

▶Host iSCSI Configuration

iSCSI Initiator Name

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

▶**Add an Attempt**

▶**Delete Attempts**

▶**Change Attempt Order**

▶**Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:14**
▶**Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:15**
▶**Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:16**
▶**Intel(R) I350 Gigabit Network Connection - 3C:EC:EF:2C:7E:17**

▶Firmware Image Properties

This submenu displays NVM firmware detected by the system.

▶NIC Configuration

Link Speed

Use this feature to specify the port speed used for the selected boot protocol. The options are **Auto Negotiated**, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, and 100 Mbps Full.

Wake On LAN

Select Enabled for wake on LAN support, which allows the system to wake up when an onboard LAN device receives an incoming signal. The options are Disabled and **Enabled**.

Blink LEDs

Use this feature to identify the physical network port by blinking the associated LED. Use the keyboard to select a value.

UEFI Driver

Adapter PBA

Device Name

Chip Type

PCI Device ID

PCI Address

Link Status

MAC Address

Virtual MAC Address

▶**Supermicro 10Gb/25Gb Ethernet Controller 3C:EC:EF:30:2A:34**
▶**Supermicro 10Gb/25Gb Ethernet Controller 3C:EC:EF:30:2A:35**

▶**Firmware Image Menu**

Broadcom BCM57414 NetXtreme-E 10Gb/25Gb RDMA Ethernet Controller - 3C:EC:EF:30:2A:34
Broadcom BCM57414 NetXtreme-E 10Gb/25Gb RDMA Ethernet Controller - 3C:EC:EF:30:2A:35

Boot Code

This feature displays the boot code address in dotted-decimal notation.

MBA

This feature displays the multiple boot agent address in dotted-decimal notation.

EFI

This feature displays the UEFI option ROM address in dotted-decimal notation.

iSCSI Boot

This feature displays the iSCSI boot address in dotted-decimal notation.

CCM

This feature displays the configuration ROM address in dotted-decimal notation.

NCSI

This feature displays the management FW address in dotted-decimal notation.

RDMA FW

This feature displays the RDMA FW address in dotted-decimal notation.

▶Device Configuration Menu

Broadcom BCM57414 NetXtreme-E 10Gb/25Gb RDMA Ethernet Controller - 3C:EC:EF:30:2A:34
Broadcom BCM57414 NetXtreme-E 10Gb/25Gb RDMA Ethernet Controller - 3C:EC:EF:30:2A:35

Multi-Function Mode

Use this feature to select the the NIC hardware mode. The options are **SF** and NPAR 1.0.

Number of VFs Per PF

Use this feature to configure the number of virtual functions per physical function in multiples of 8 (1 - 128). The maximum value is 128, divided by the number of ports.

SR-IOV Support

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

Number of MSI-X Vectors per VF

Use this feature to configure the number of MSI-X vectors per VF (0 -128). The default value is **16**.

Maximum Number of PF MSI-X Vectors

Use this feature to configure the number of PF MSI-X vectors (0 - 512 per controller). The default value is **74**.

Link FEC

Use this feature to configure the select the link forward error correction mode. The doptions are **Disabled**, CL74 - Fire Code, CL91 - Reed Solomon, and Both CL74 and CL91.

Operational Link Speed

Use this feature to select the default link speed for this port. The options are **AutoNeg**, 1Gbps, 10Gbps, and 25Gbps.

Firmware Link Speed

Use this feature to select the default link speed for this port in D3 state. The options are **AutoNeg**, 1Gbps, 10Gbps, and 25Gbps.

Support RDMA

Use this feature to enable or disable RDMA support for this port. The options are Disabled and **Enabled**.

DCB Protocol

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

LLDP nearest bridge

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

Auto-negotiation Protocol

Use this feature to select the protocol used during auto negotiation. The options are IEEE and BAM, **IEEE and Consortium**, IEEE 802.3by, BAM only, and Consortium Only.

Media Auto Detect

Select enable for the firmware to automatically detect the link transceiver. The options are Disabled and **Enabled**.

Default EVB Mode

Use this feature to select the default edge virtual bridging mode. The options are **VEB**, VEPA, and None.

Enable PME Capability

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

Open Virtual Switch

Use this feature to enable or disable Open Virtual Switch. The options are Enabled and **Disabled**.

▶**MBA Configuration Menu**

Supermicro 10Gb/25Gb Ethernet Controller - 3C:EC:EF:30:2A:34

Option ROM

Use this feature to enable or disable boot option ROM. The options are Disabled and **Enabled**.

Legacy Boot Protocol

Use this feature to select a non-UEFI boot protocol. The options are **PXE**, iSCSI, and NONE.

Boot Strap Type

Use this feature to select a boot strap type. The options are **Auto Detect**, BBS, Int 18h, and Int 19h.

Hide Setup Prompt

Select enabled for the setup prompt to display during the ROM initialization. The options are **Disabled** and Enabled.

Setup Key Stroke

Use this feature to select the keys to invoke the configuration menu. The options are **Ctrl-S** and Ctrl-B.

Banner Message Timeout

Use this feature to specify the number of seconds that the OptionROM banner displays during POST. The default is **7**.

VLAN Mode

Use this feature to enable or disable the virtual LAN mode. The options are **Disabled** and Enabled.

Boot Retry Count

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

▶iSCSI Boot Configuration Menu

Supermicro 10Gb/25Gb Ethernet Controller - 3C:EC:EF:30:2A:34

▶iSCSI General Parameters

TCP/IP Parameters via DHCP

Use this feature to acquire the TCP/IP configuration via DHCP. The options are Disabled and **Enabled**.

iSCSI Parameters via DHCP

Use this feature to acquire the iSCSI parameters via DHCP. The options are Disabled and **Enabled**.

CHAP Authentication

Use this feature to enable or disable CHAP authentication. The options are **Disabled** and Enabled.

Boot to iSCSI Target

Use this feature to enable or disable booting to iSCSI target after logon. The options are Disabled, **Enabled**, and One Time Disabled.

DHCP Vendor ID

Use this feature to configure the DHCP vendor ID, which can be up to 32 characters long.

Link Up Delay Time

Use this feature to configure the link up delay time (in seconds). The default value is **0**.

Use TCP Timestamp

Use this feature to enable or disable the TCP timestamp. The options are **Disabled** and Enabled.

Target as First HDD

Use this feature to enable or disable if the target appears as first HDD in the system. The options are **Disabled** and Enabled.

LUN Busy Retry Count

Use this feature to configure the number of retries in two second-intervals when LUN is busy. The default value is **0**.

IP Version

Use this feature to select the IP version. The options are **IPv4** and IPv6.

▶**iSCSI Initiator Parameters**

IP Address

Use this feature to configure the initiator IP address.

Subnet Mask

Use this feature to configure the IP subnet mask address.

Default Gateway

Use this feature to configure the default gateway IP address.

Primary DNS

Use this feature to configure the primary DNS IP address.

Secondary DNS

Use this feature to configure the secondary DNS IP address.

iSCSI Name

Use this feature to configure the iSCSI name.

▶**iSCSI First Target Parameters**

Connect

Use this feature to enable or disable the target establishment. The options are **Disabled** and Enabled.

IP Address

Use this feature to configure the target IP address.

TCP Port

Use this feature to configure the target TCP port number (1 - 65535). The default value is **3260**.

Boot LUN

Use this feature to configure the boot LUN number (0 - 255). The default value is **0.**

iSCSI Name

Highlight the feature and press enter to create an iSCSI name.

▶**iSCSI Second Target Parameters**

Connect

Use this feature to enable or disable the target establishment. The options are **Disabled** and Enabled.

IP Address

Use this feature to configure the target IP address.

TCP Port

Use this feature to configure the target TCP port number (1 - 65535). The default value is **3260**.

Boot LUN

Use this feature to configure the boot LUN number (0 - 255). The default value is **0.**

iSCSI Name

Highlight the feature and press enter to create an iSCSI name.

▶**Secondary Device**

Secondary Device

Use this feature to configure the secondary device MAC address. Use XX:XX:XX:XX:XX:XX format.

Use Independent Target Portal

Use the independent target portal when the multipath I/O is enabled. The options are **Disabled** and Enabled.

Use Independent Target Name

Use the independent target name when the multipath I/O is enabled. The options are **Disabled** and Enabled.

Blink LEDs

Use this feature to identify the physical network port by blinking the associated LED. Use the keyboard to select a value.

Link Status

Use this feature shows the link status for the device in this port.

Physical Link Speed

Chip Type

PCI Device ID

Bus:Device:Function

Permanent MAC Address

This features displays the permanent MAC address.

Virtual MAC Address

This features displays the virtual MAC address.

▶TLS Authentication Configuration

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

▶Server CA Configuration

▶Enroll Certification

Enroll Certification Using File

Use this feature to enroll certification from a file.

Certification GUID

Use this feature to input the certification GUID.

Commit Changes and Exit

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

Discard Changes and Exit

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

▶Delete Certification

Use this feature to delete certification.

▶Driver Health

This submenu provides the health status for the network drivers and controllers, and all UEFI drivers detected by the system.

▶Intel(R) PRO/1000 9.4.06 PCI-E

Controller 5D6E6A98 Child 0

Intel(R) I350 Gigabit Network Connection

▶Intel(R) PRO/1000 9.4.06 PCI-E

Controller 5D6ECF98 Child 0

Intel(R) I350 Gigabit Network Connection

▶**Intel(R) PRO/1000 9.4.06 PCI-E**

Controller 5D6F2A98 Child 0

Intel(R) I350 Gigabit Network Connection

▶**Intel(R) PRO/1000 9.4.06 PCI-E**

Controller 5D6F8618 Child 0

Intel(R) I350 Gigabit Network Connection

▶**Broadcom NXE Gigabit Ethernet Driver**

Controller 5D6FE698 Child 0

▶**Broadcom NXE Gigabit Ethernet Driver**

Controller 5D700618 Child 0

4.4 Event Logs

Use this menu to configure Event Log settings.

```
                              Aptio Setup - AMI
      Main  Advanced  Event Logs  IPMI  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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```
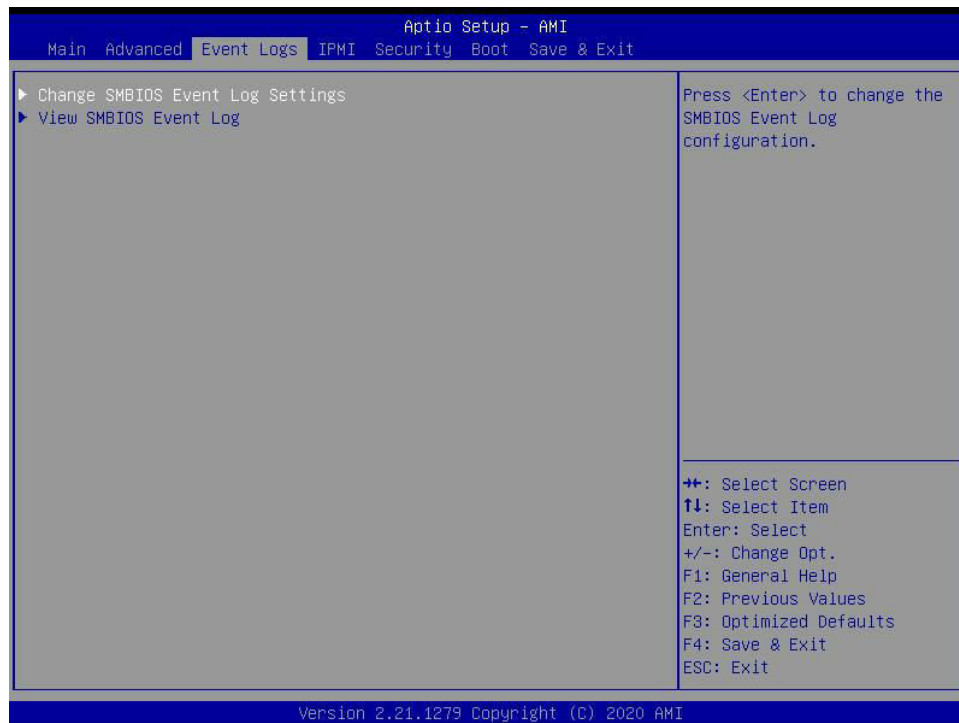
▶Change SMBIOS Event Log Settings

Enabling/Disabling Options

SMBIOS Event Log

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

Erasing Settings

Erase Event Log

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

When Log is Full

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

SMBIOS Event Log Standard Settings

Log System Boot Event

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

MECI

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

METW

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

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

▶View SMBIOS Event Log

Select this submenu and press enter to see the contents of the SMBIOS event log. The following categories is displayed: Date/Time/Error Codes/Severity.

4.5 IPMI

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

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

  BMC Firmware Revision              00.23.17          Press <Enter> to change the
  IPMI 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 displays the IPMI firmware revision used in your system.

IPMI STATUS (Baseboard Management Controller)

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

▶System Event Log

Enabling/Disabling Options

SEL Components

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

Erasing Settings

Erase SEL

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

When SEL is Full

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

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

▶BMC Network Configuration

BMC Network Configuration

Update IPMI LAN Configuration

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

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

Configure IPv4 Support

IPMI LAN Selection

IPMI Network Link Status

Configuration Address Source

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

*If the feature above is set to Static, the following features are available for configuration:

Station IP Address

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

Subnet Mask

This feature displays the sub-network that this computer belongs to. The address can be manually entered. The value of each three-digit number separated by dots should not exceed 255.

Station MAC Address

Gateway IP Address

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

VLAN

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

VLAN ID

This feature is enabled if VLAN is enabled.

Configure IPv6 Support

IPv6 Address Status

IPv6 Support

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

4.6 Security

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

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

                                                    ▲ Set Administrator Password

     Administrator Password              Not Installed
     User Password                       Not Installed

     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.
     Hard Drive Security Frozen          [Enabled]       F1: General Help
     Lockdown Mode                       [Disabled]      F2: Previous Values
                                                       ‖ F3: Optimized Defaults
                                                       ▼ F4: Save & Exit
                                                         ESC: Exit

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```

Administrator Password

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

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 boot up or upon entering the BIOS Setup utility. The options are **Setup** and Always.

Hard Drive Security Frozen

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

Lockdown Mode

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

►**Secure Boot**

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

- System Mode

- Vendor Keys

- Secure Boot

Secure Boot

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

Secure Boot Mode

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

CSM Support

This feature is for manufacturing debugging purposes.

Enter Audit Mode

This submenu can only be used if current System Mode is set to User (refer to Exit Deployed Mode). The PK variable will be erased on transition to Audit Mode.

▶**Key Management**

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

▶**Restore Factory Keys**

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

▶**Reset to Setup Mode**

This feature deletes all Secure Boot key databases from NVRAM.

▶**Export Secure Boot variables**

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

▶**Enroll EFI Image**

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

Device Guard Ready

▶**Remove 'UEFI CA' from DB**

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

▶Restore DB defaults

Select Yes to restore the DB defaults.

Secure Boot Variable

▶Platform Key (PK)

Details

Select this feature to view the details of the PK.

Export

Select Yes to export a PK from a file on an external media.

Update

Select Yes to load a factory default PK or No to load from a file on an external media.

Append

Select Yes to add the PK from the manufacturer's defaults list to the existing PK. Select No to load the PK from a file. The options are Yes and No.

Delete

Select Ok to remove the PK and then the system will reset to Setup/Audit Mode.

▶Key Exchange Key

Details

Select this feature to view the details of the KEK.

Export

Select Yes to export a KEK from a file on an external media.

Update

Select Yes to load a factory default KEK or No to load from a file on an external media.

Append

Select Yes to add the KEK from the manufacturer's defaults list to the existing KEK. Select No to load the KEK from a file. The options are Yes and No.

Delete

Select Ok to remove the KEK and then the system will reset to Setup/Audit Mode.

▶Authorized Signatures

Details

Select this feature to view the details of the DB.

Export

Select Yes to export a DB from a file on an external media.

Update

Select Yes to load a factory default DB or No to load from a file on an external media.

Append

Select Yes to add the DB from the manufacturer's defaults list to the existing DB. Select No to load the DB from a file. The options are Yes and No.

Delete

Select Ok to remove the DB and then the system will reset to Setup/Audit Mode.

▶Forbidden Signatures

Details

Select this feature to view the details of the DBX.

Export

Select Yes to export a DBX from a file on an external media.

Update

Select Yes to load a factory default DBX or No to load from a file on an external media.

Append

Select Yes to add the DBX from the manufacturer's defaults list to the existing DBX. Select No to load the DBX from a file. The options are Yes and No.

Delete

Select Ok to remove the DBX and then the system will reset to Setup/Audit Mode.

▶Authorized TimeStamps

Details

Select this feature to view the details of the DBT.

Export

Select Yes to export a DBT from a file on an external media.

Update

Select Yes to load a factory default DBT or No to load from a file on an external media.

Append

Select Yes to add the DBT from the manufacturer's defaults list to the existing DBT. Select No to load the DBT from a file. The options are Yes and No.

Delete

Select Ok to remove the DBT and then the system will reset to Setup/Audit Mode.

▶OsRecovery Signature

Details

Select this feature to view the details of the DBR.

Export

Select Yes to export a DBR from a file on an external media.

Update

Select Yes to load a factory default DBR or No to load from a file on an external media.
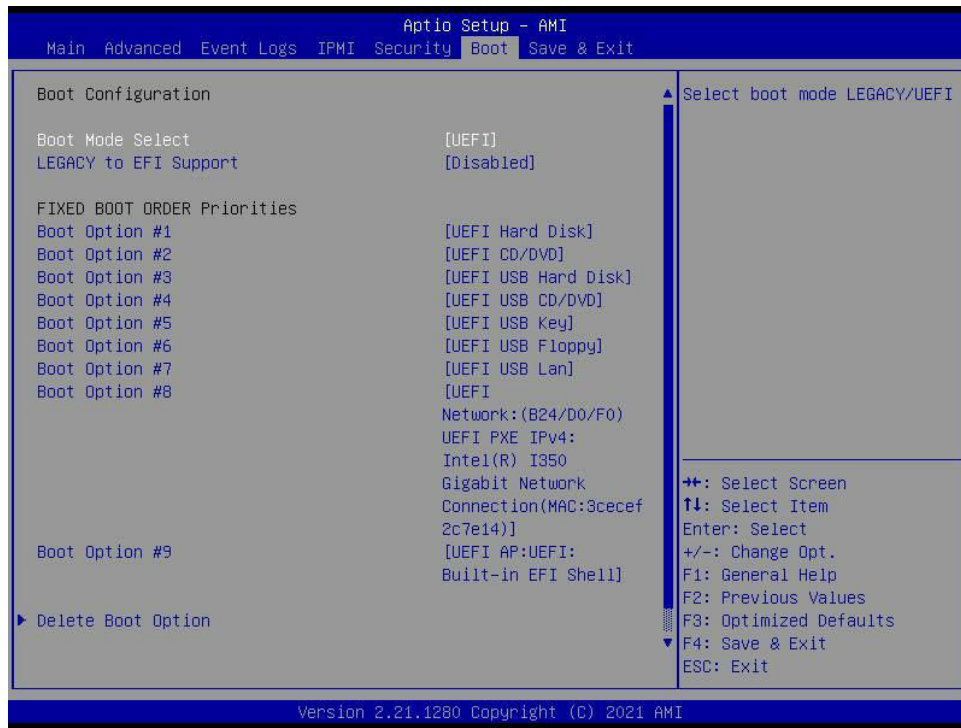
Append

Select Yes to add the DBR from the manufacturer's defaults list to the existing DBR. Select No to load the DBR from a file. The options are Yes and No.

Delete

Select Ok to remove the DBR and then the system will reset to Setup/Audit Mode.

4.7 Boot

Use this menu to configure Boot settings.

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

   Boot Configuration                              ▲ Select boot mode LEGACY/UEFI

   Boot Mode Select                  [UEFI]
   LEGACY to EFI Support             [Disabled]

   FIXED BOOT ORDER Priorities
   Boot Option #1                    [UEFI Hard Disk]
   Boot Option #2                    [UEFI CD/DVD]
   Boot Option #3                    [UEFI USB Hard Disk]
   Boot Option #4                    [UEFI USB CD/DVD]
   Boot Option #5                    [UEFI USB Key]
   Boot Option #6                    [UEFI USB Floppy]
   Boot Option #7                    [UEFI USB Lan]
   Boot Option #8                    [UEFI
                                     Network:(B24/D0/F0)
                                     UEFI PXE IPv4:
                                     Intel(R) I350
                                     Gigabit Network      ↔: Select Screen
                                     Connection(MAC:3cecef ↑↓: Select Item
                                     2c7e14)]             Enter: Select
   Boot Option #9                    [UEFI AP:UEFI:        +/-: Change Opt.
                                     Built-in EFI Shell]   F1: General Help
                                                           F2: Previous Values
   ▶ Delete Boot Option                                 ▮ F3: Optimized Defaults
                                                         ▼ F4: Save & Exit
                                                           ESC: Exit


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```

Boot Mode Select

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

Legacy to EFI Support

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

Fixed Boot Order Priorities

This feature prioritizes the order of bootable devices that the system boots from. Press <Enter> on each entry from top to bottom to select devices.

If the feature "Boot Mode Select" is set to Legacy, UEFI, or Dual, the following features are displayed:

- Boot Option #1

- Boot Option #2

- Boot Option #3

- Boot Option #4

- Boot Option #5

- Boot Option #6

- Boot Option #7

- Boot Option #8

- Boot Option #9

▶Delete Boot Option

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

Delete Boot Option

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

▶UEFI USB Key Drive BBS Priorities

This feature sets the system boot order of detected devices.

- Boot Option #1

▶UEFI NETWORK Drive BBS Priorities

This feature sets the system boot order of detected devices.
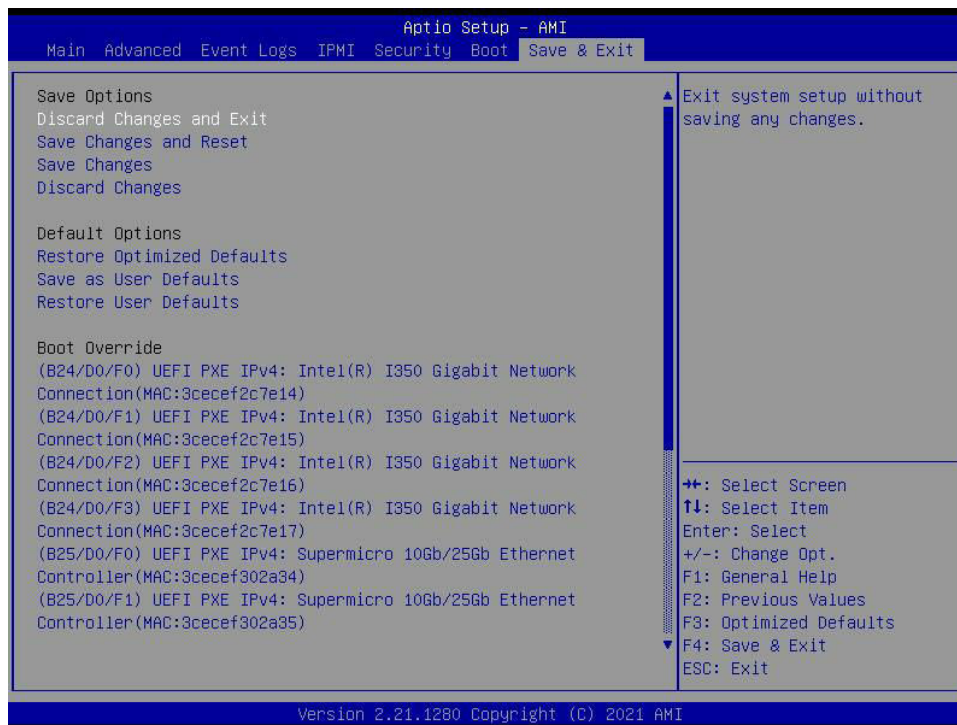
- Boot Option #1 - #12

▶UEFI Application Boot Priorities

This feature sets the system boot order of detected devices.

- Boot Option #1

4.8 Save & Exit

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

```
                          Aptio Setup - AMI
    Main  Advanced  Event Logs  IPMI  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
  (B24/D0/F0) UEFI PXE IPv4: Intel(R) I350 Gigabit Network
  Connection(MAC:3cecef2c7e14)
  (B24/D0/F1) UEFI PXE IPv4: Intel(R) I350 Gigabit Network
  Connection(MAC:3cecef2c7e15)
  (B24/D0/F2) UEFI PXE IPv4: Intel(R) I350 Gigabit Network
  Connection(MAC:3cecef2c7e16)                      →←: Select Screen
  (B24/D0/F3) UEFI PXE IPv4: Intel(R) I350 Gigabit Network   ↑↓: Select Item
  Connection(MAC:3cecef2c7e17)                      Enter: Select
  (B25/D0/F0) UEFI PXE IPv4: Supermicro 10Gb/25Gb Ethernet   +/-: Change Opt.
  Controller(MAC:3cecef302a34)                      F1: General Help
  (B25/D0/F1) UEFI PXE IPv4: Supermicro 10Gb/25Gb Ethernet   F2: Previous Values
  Controller(MAC:3cecef302a35)                      F3: Optimized Defaults
                                                  ▼ F4: Save & Exit
                                                    ESC: Exit

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```

Save Options

Discard Changes and Exit

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

Save Changes and Reset

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

Save Changes

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

Discard Changes

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

Default Options

Restore Optimized Defaults

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

Save As User Defaults

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

Restore User Defaults

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

Boot Override

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

(B24/D0/F0) UEFI PXE IPv4: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E14)

(B24/D0/F1) UEFI PXE IPv4: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E15)

(B24/D0/F2) UEFI PXE IPv4: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E16)

(B24/D0/F3) UEFI PXE IPv4: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E17)

(B24/D0/F0) UEFI PXE IPv6: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E14)

(B24/D0/F1) UEFI PXE IPv6: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E15)

(B24/D0/F2) UEFI PXE IPv6: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E16)

(B24/D0/F3) UEFI PXE IPv6: Intel(R) I350 Gigabit Network Connection (MAC:3CECEF2C7E17)

(B25/D0/F0) UEFI PXE IPv4: Supermicro 10Gb/25Gb Ethernet Controller (MAC:3CECEF302A34)

(B25/D0/F1) UEFI PXE IPv4: Supermicro 10Gb/25Gb Ethernet Controller

(MAC:3CECEF302A35)

(B25/D0/F0) UEFI PXE IPv6: Supermicro 10Gb/25Gb Ethernet Controller (MAC:3CECEF302A34)

(B25/D0/F1) UEFI PXE IPv6: Supermicro 10Gb/25Gb Ethernet Controller (MAC:3CECEF302A35)

UEFI: Built-in EFI Shell

Launch EFI Shell from filesystem device

Appendix A

BIOS Codes

A.1 BIOS Error POST (Beep) Codes

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

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

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

These fatal errors are usually communicated through a series of audible beeps that can be heard on an external buzzer connected to JD1. The table shown below lists some common errors and their corresponding beep codes encountered by users.

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

A.2 Additional BIOS POST Codes

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

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

Appendix B

Software

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

B.1 Microsoft Windows OS Installation

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

Installing the OS

1. Create a method to access the MS Windows installation ISO file. That might be a DVD, perhaps using an external USB/SATA DVD drive, or a USB flash drive, or the IPMI KVM console.

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

3. Boot from a bootable device with Windows OS installation. You can see a bootable device list by pressing **F11** during the system startup.
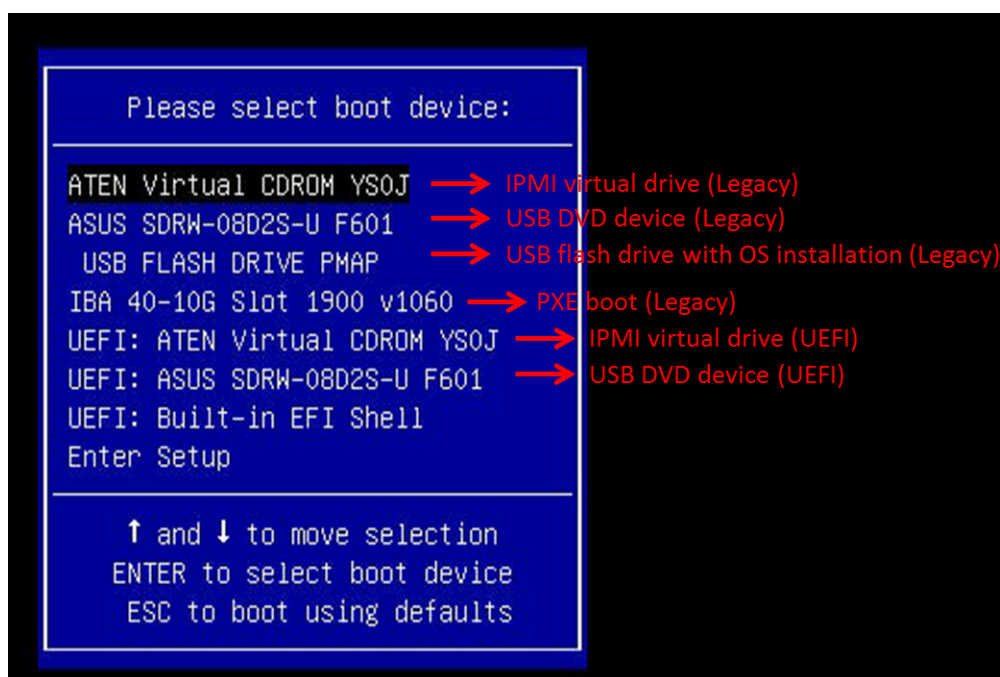

Figure B-1. Select Boot Device

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.
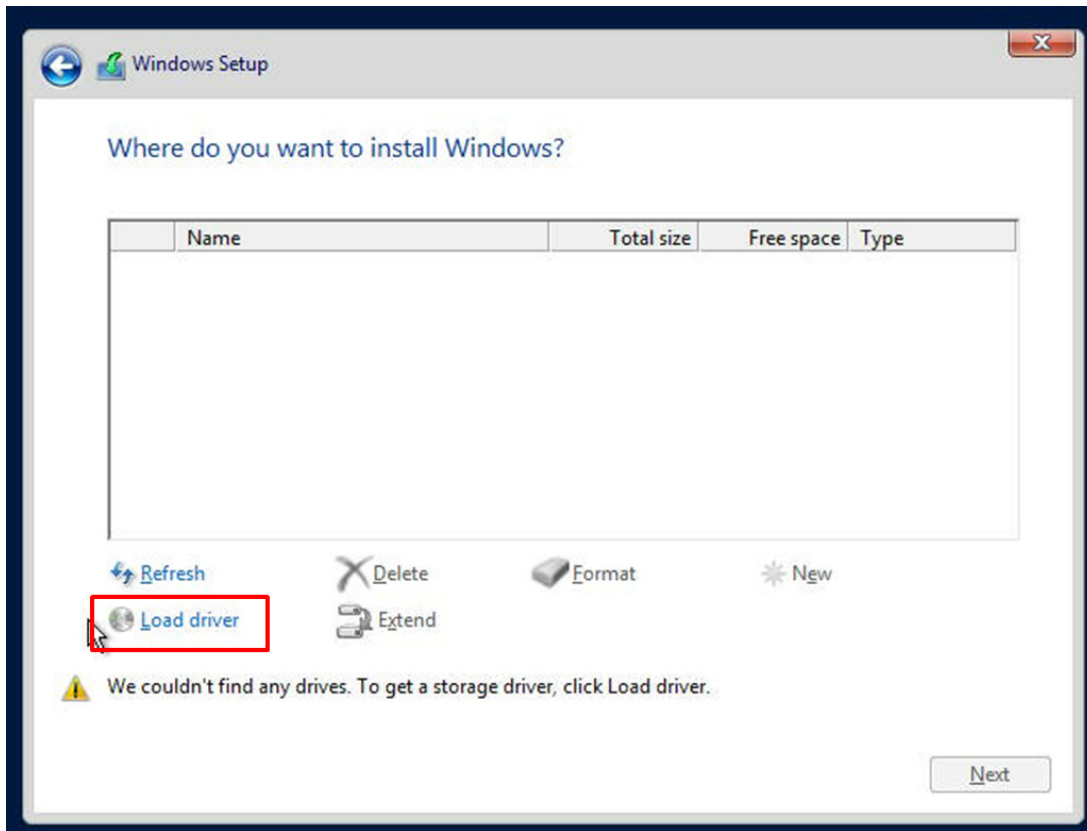

Figure B-2. Load Driver Link

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 http://www.supermicro.com/products/. Find the product page for your motherboard and download the latest drivers and utilities.

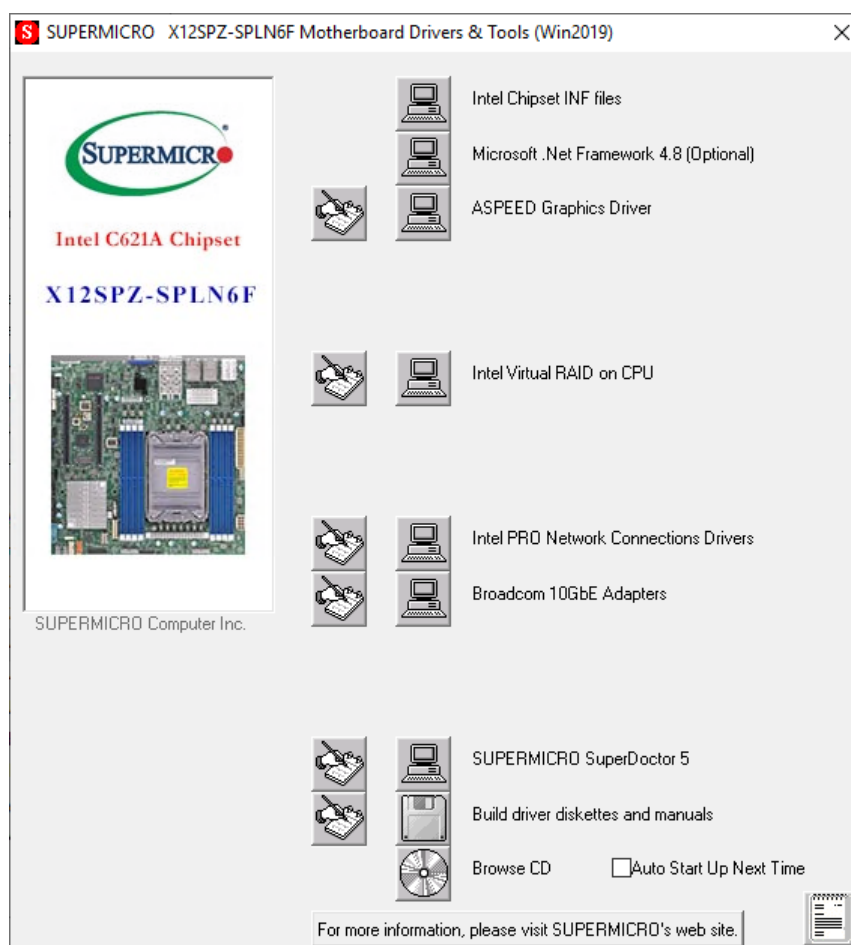Insert the flash drive or disk and the screenshot shown below should appear.

Figure B-3. Driver & Tool Installation Screen

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 IPMI. SuperDoctor 5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.

Note: The default User Name and Password for SuperDoctor 5 is ADMIN / ADMIN.
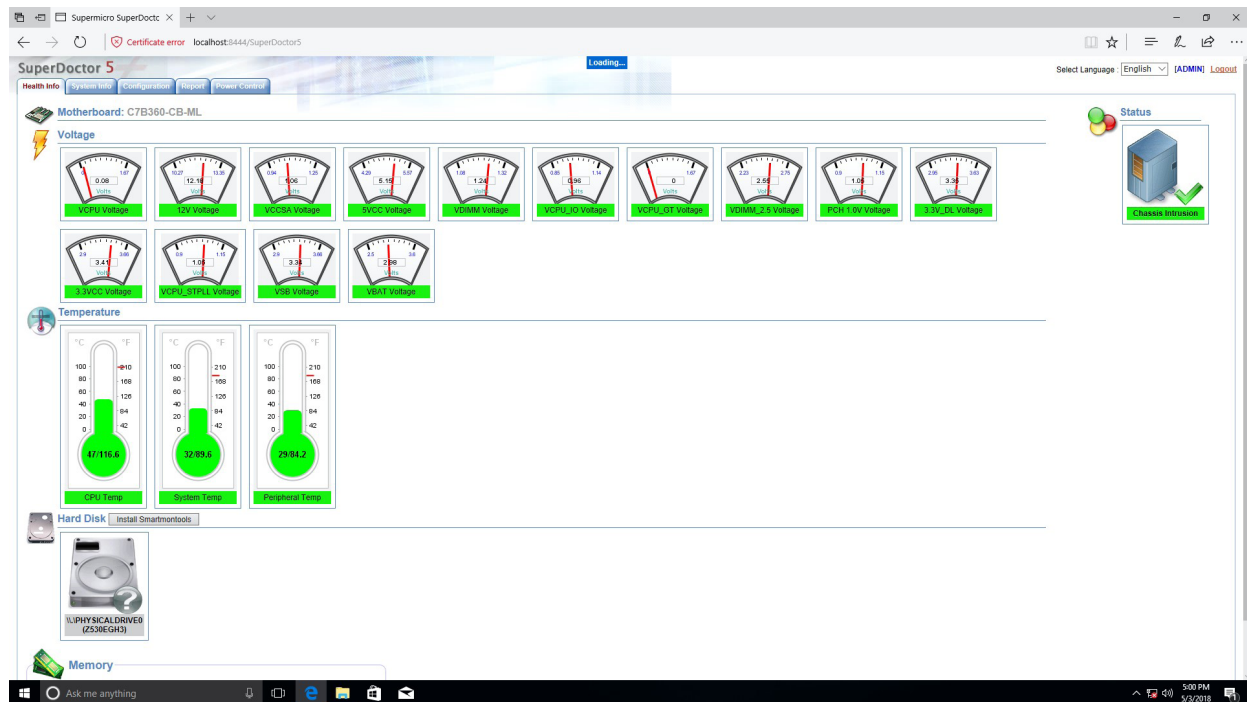

Figure B-4. SuperDoctor 5 Interface Display Screen (Health Information)

B.4 IPMI

The 10th Generation Intel Xeon, Core™ i3, Pentium, Celeron supports the Intelligent Platform Management Interface (IPMI). IPMI is used to provide remote access, monitoring and management. There are several BIOS settings that are related to IPMI.

Supermicro ships standard products with a unique password for the BMC ADMIN user. This password can be found on a label on the motherboard. For general documentation and information on IPMI, please visit our website at https://www.supermicro.com/en/support/BMC_Unique_Password.

Appendix C

Standardized Warning Statements

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

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

These warnings may also be found on our website at http://www.supermicro.com/about/policies/safety_information.cfm.

Battery Handling

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

電池の取り扱い

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

警告

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 القوانين واللوائح الوطنية

경고!

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

Waarschuwing

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

Appendix D

UEFI BIOS Recovery

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

D.1 Overview

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

D.2 Recovering the UEFI BIOS Image

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

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

Note 2: When the BIOS recovery block crashes, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. (For a RMA request, please see section 3.5 for more information). Also, you may use the Supermicro Update Manager (SUM) Out-of-Band (OOB) (https://www.supermicro.com.tw/products/nfo/SMS_SUM.cfm) to reflash the BIOS.

D.3 Recovering the BIOS Block with a USB Device

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

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

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

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

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

Note 2: Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.
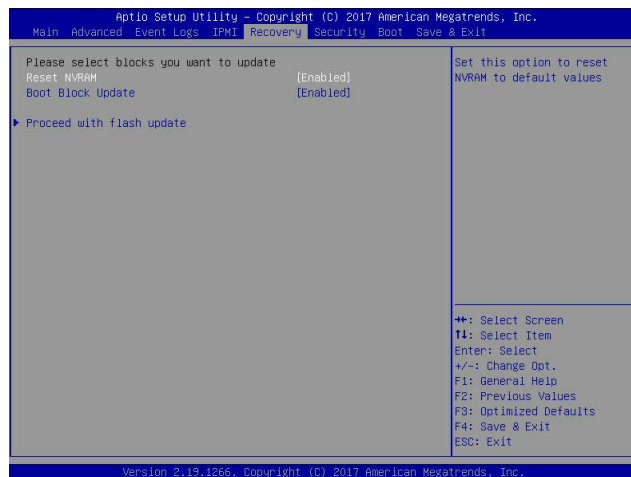
2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB port and reset the system until the following screen appears:

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

Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.
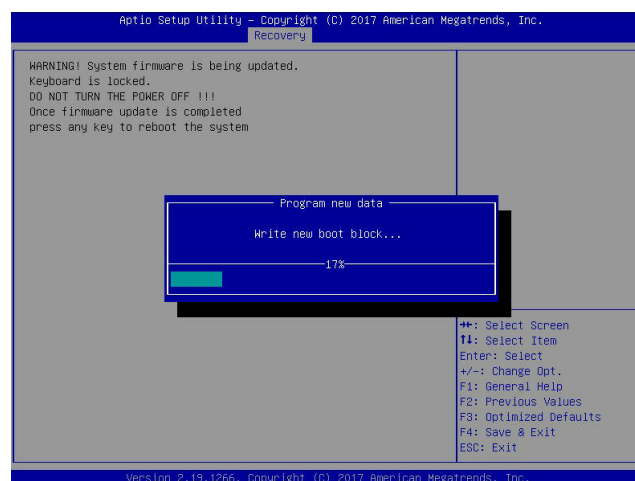
4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below:

```
                  Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                                   Recovery

    WARNING! System firmware is being updated.
    Keyboard is locked.
    DO NOT TURN THE POWER OFF !!!
    Once firmware update is completed
    press any key to reboot the system



                          ┌──────────── Flash update ────────────┐
                          │  Flash update completed. Press any key to │
                          │           reset the system                │
                          └───────────────────────────────────────────┘



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

                  Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```
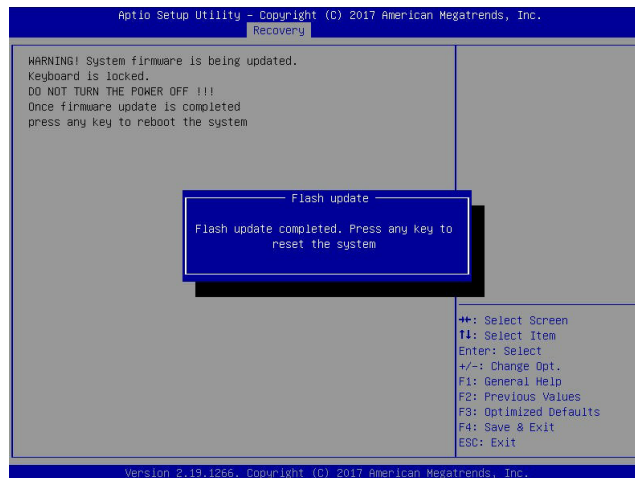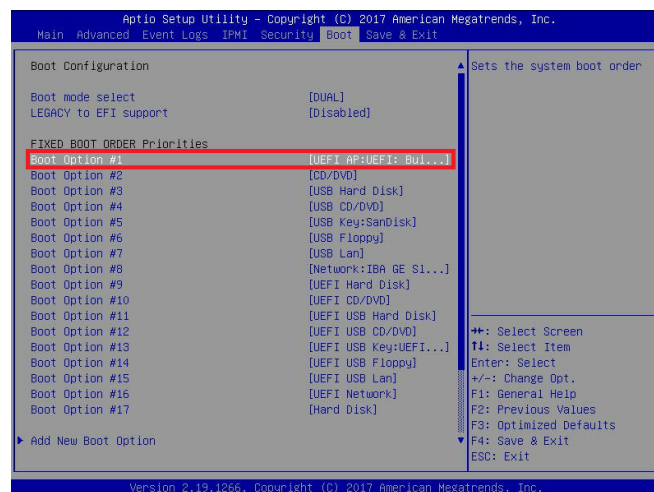
Note: *Do not interrupt the BIOS flashing process until it has completed*.

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

6. Using a different system, extract the BIOS package into a USB flash drive.

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

```
                  Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
      Main  Advanced  Event Logs  IPMI  Security  Boot  Save & Exit

    Boot Configuration                                        ▲ Sets the system boot order

    Boot mode select                    [DUAL]
    LEGACY to EFI support               [Disabled]

    FIXED BOOT ORDER Priorities
    Boot Option #1                      [UEFI AP:UEFI: Bui...]
    Boot Option #2                      [CD/DVD]
    Boot Option #3                      [USB Hard Disk]
    Boot Option #4                      [USB CD/DVD]
    Boot Option #5                      [USB Key:SanDisk]
    Boot Option #6                      [USB Floppy]
    Boot Option #7                      [USB Lan]
    Boot Option #8                      [Network:IBA GE Sl...]
    Boot Option #9                      [UEFI Hard Disk]
    Boot Option #10                     [UEFI CD/DVD]
    Boot Option #11                     [UEFI USB Hard Disk]
    Boot Option #12                     [UEFI USB CD/DVD]       →←: Select Screen
    Boot Option #13                     [UEFI USB Key:UEFI...]  ↑↓: Select Item
    Boot Option #14                     [UEFI USB Floppy]       Enter: Select
    Boot Option #15                     [UEFI USB Lan]          +/-: Change Opt.
    Boot Option #16                     [UEFI Network]          F1: General Help
    Boot Option #17                     [Hard Disk]             F2: Previous Values
                                                                F3: Optimized Defaults
    ▶ Add New Boot Option                                     ▼ F4: Save & Exit
                                                                ESC: Exit

                  Version 2.19.1266. Copyright (C) 2017 American Megatrends, Inc.
```

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

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

9. The screen above indicates that the BIOS update process is complete. When you see the screen above, unplug the AC power cable from the power supply, clear CMOS, and plug the AC power cable in the power supply again to power on the system.

10. Press <Del> to enter the BIOS Setup utility.

11. Press <F3> to load the default settings.

12. After loading the default settings, press <F4> to save the settings and exit the BIOS Setup utility.