X13SAN-H/-E/-L/-C
X13SAN-H/-E/-L/-C-WOHS

USER'S MANUAL

Revision 1.0

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Manual Revision 1.0

Release Date: November 15, 2022

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 X13SAN series motherboard.

About This Motherboard

The X13SAN motherboard is a 3.5" Single Board Computer (4.01" x 5.75") powered by the Intel® 12th Generation Core™ i7/i5/i3 or Celeron® mobile processor series. Built on the Intel 7 process for improvements in CPU processing, the Intel 12th Generation mobile processor series on X13SAN achieves up to 1.07x faster single-thread performance and up to 1.29x faster multi-thread performance versus Intel 11th Generation Core processors. X13SAN operates on low power and features a thermal design power (TDP) of up to 15W.

X13SAN also features hardware-enabled AI acceleration, enabling robust AI performance through int8 quantization. Support of the OpenVINO™ toolkit also delivers optimized performance while helping developers speed time to market with pre-trained AI models for common use cases.

X13SAN is equipped with the latest generation graphics core (Intel Iris® Xᵉ/UHD Graphics for 12th Gen processors) with DirectX 12.1, OpenGL 4.6, OpenCL 3.0, and 8K encoding/decoding, which delivers up to 2.47x faster graphics performance versus Intel 11th generation Core processor graphics. X13SAN supports four independent displays with one HDMI 1.4b port, one HDMI 2.1b port, and two DisplayPort 1.4a from DP Alt Mode Type-C ports.

X13SAN features the latest Intel security & reliability features, including Intel Virtualization Technology (VT-x/-d), Intel Trusted Execution Technology, and Intel Control-Flow Enforcement Technology. Additionally, X13SAN with the Intel Core i7 and i5 processors supports the Intel vPro™ platform for business-class performance, hardware-enhanced security features, modern remote manageability, and PC fleet stability.

X13SAN features a rich I/O interface including dual 2.5G LAN ports, one M.2 M-Key PCIe 4.0 x4 slot in the 2242/2280 form factor, one M.2 E-Key PCIe 3.0 x1/USB 2.0/Intel CNVi slot in the 2230 form factor, one M.2 B-Key SATA 6Gb/s or PCIe 3.0 x1/USB 3.0/USB 2.0 slot in the 2242/2280 form factor with Nano SIM, one PCIe 4.0 x4 SlimSAS port, four COM ports, four USB 3.2 ports in Type-C and Type-A ports, and a speaker-out with a 3W amplifier. X13SAN also features onboard TPM 2.0.

X13SAN supports 12-24V DC input power to meet varying embedded system requirements, such as embedded networking and storage systems. Based on numerous demands from embedded applications, Supermicro developed an optimized thermal solution for X13SAN, producing a fanless design on a high performance platform.

Note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, refer to our website at http://www.supermicro.com/products/.

Conventions Used in the Manual

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

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

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

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

Note: Additional Information given to differentiate various models or provides information for correct system setup.

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Table of Contents

Chapter 1

Introduction

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

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

1.1 Checklist

Main Parts List (Retail Single Package)		
Description	**Part Number**	**Quantity**
Supermicro Motherboard with passive heatsink (-WOHS SKU does not include a heatsink)	X13SAN-H/-E/-L/-C X13SAN-H/-E/-L/-C-WOHS	1
Audio cable (line-out, mic-in)	CBL-OTHR-0986	1
COM cable	CBL-CDAT-0665	1
SATA cable	CBL-SAST-0881	1
SATA power cable	CBL-PWEX-1030	1
USB cable	CBL-CUSB-0983	1
DC IN power cable	CBL-PWEX-1029	1
Quick Reference Guide	MNL-2517-QRG	1

Main Parts List (Bulk Package)		
Description	**Part Number**	**Quantity**
Supermicro Motherboard with passive heatsink (-WOHS SKU does not include a heatsink)	X13SAN-H/-E/-L/-C X13SAN-H/-E/-L/-C-WOHS	1
DC IN power cable	CBL-PWEX-1029	1

Optional Parts List		
Description	**Part Number**	**Quantity**
Power adapter	MCP-250-10137-0N	1
Heat spreader	MCP-350-00008-0N	1
DC IN power cable (DC jack)	CBL-PWEX-1110-15	1

Important Links

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

- Frequently Asked Questions: https://www.supermicro.com/FAQ/index.php
- Supermicro product manuals: https://www.supermicro.com/support/manuals/
- Product drivers and utilities: https://www.supermicro.com/wdl/driver/
- Product safety info: https://www.supermicro.com/about/policies/safety_information.cfm
- A secure data deletion tool designed to fully erase all data from storage devices can be found at our website: https://www.supermicro.com/about/policies/disclaimer.cfm?url=/wdl/utility/Lot9_Secure_Data_Deletion_Utility/
- If you have any questions, contact our support team at: support@supermicro.com

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

Figure 1-1. X13SAN-H/-E/-L/-C Top Motherboard Image

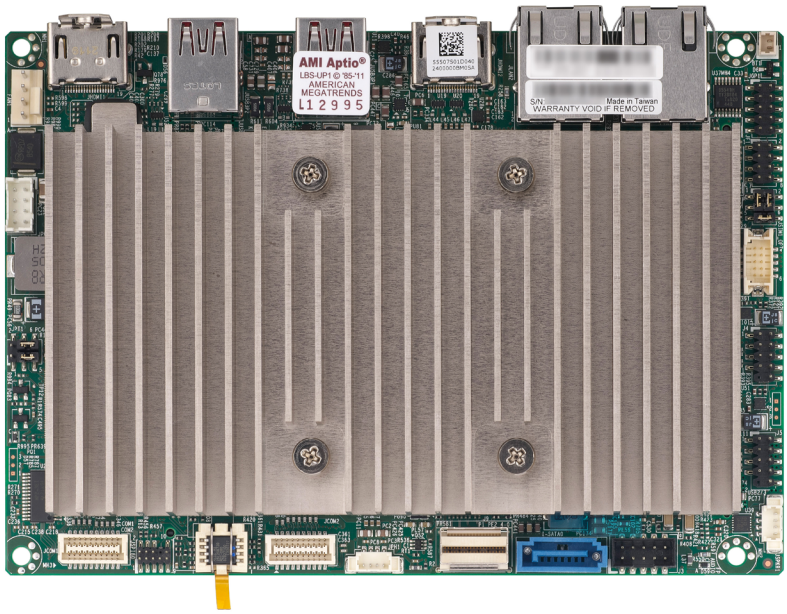
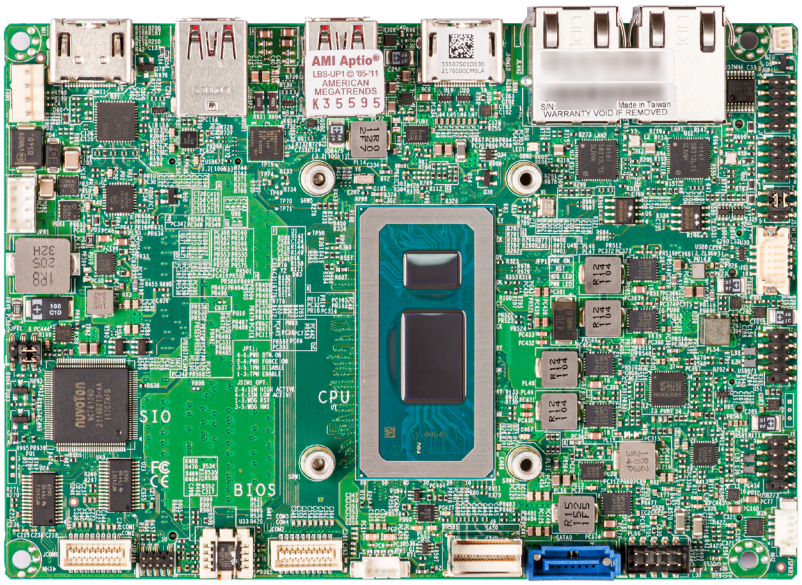
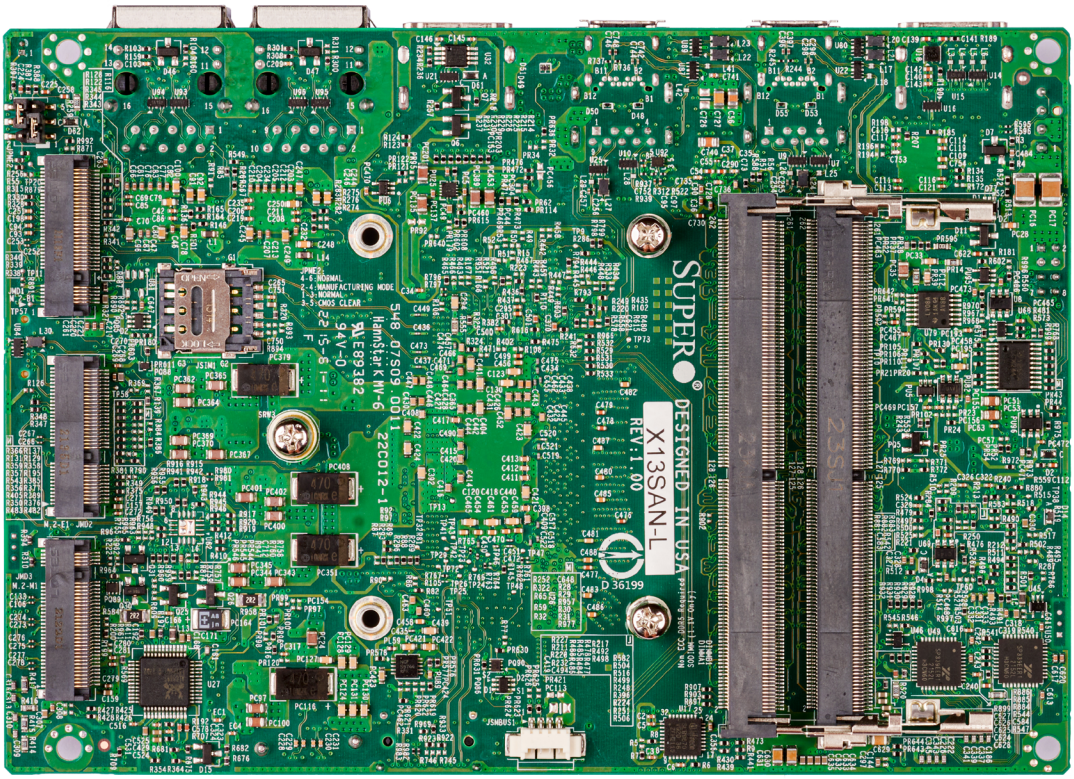


Figure 1-2. X13SAN-H/-E/-L/-C-WOHS Top Motherboard Image



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.

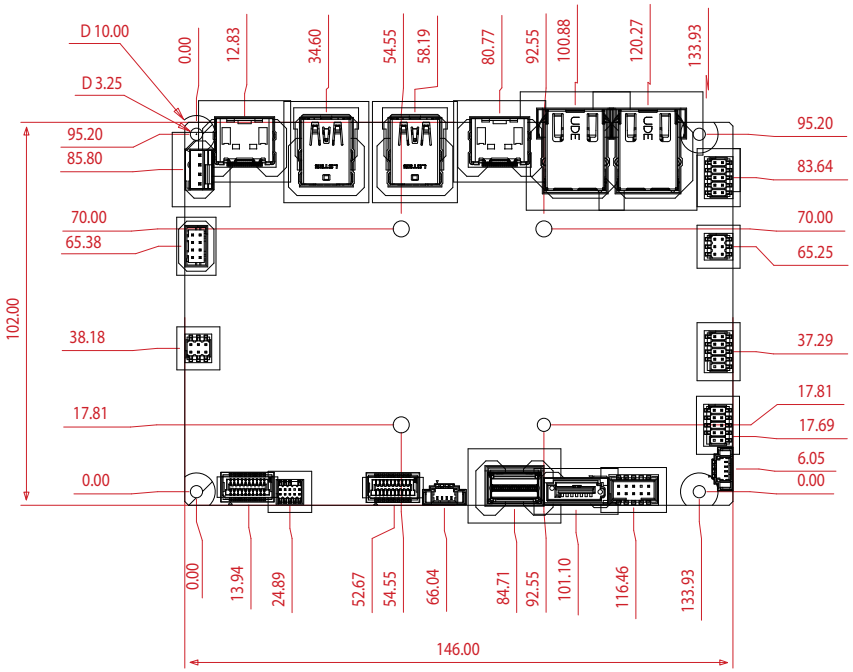
Figure 1-3. X13SAN-H/-E/-L/-C and X13SAN-H/-E/-L/-C-WOHS Bottom Motherboard Image



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 1-4. X13SAN-H/-E/-L/-C and X13SAN-H/-E/-L/-C-WOHS Mechanical Drawings

Top Mechanical Drawing



Bottom Mechanical Drawing

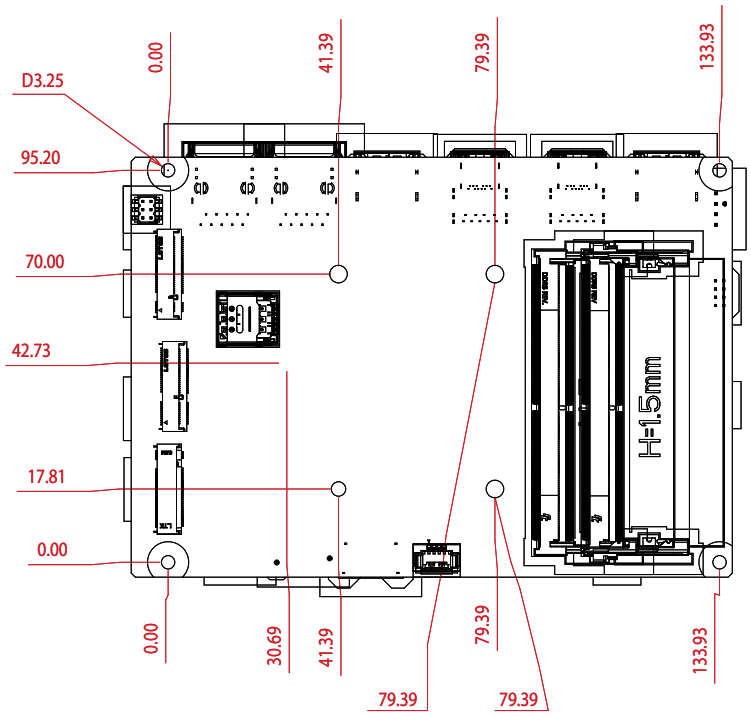
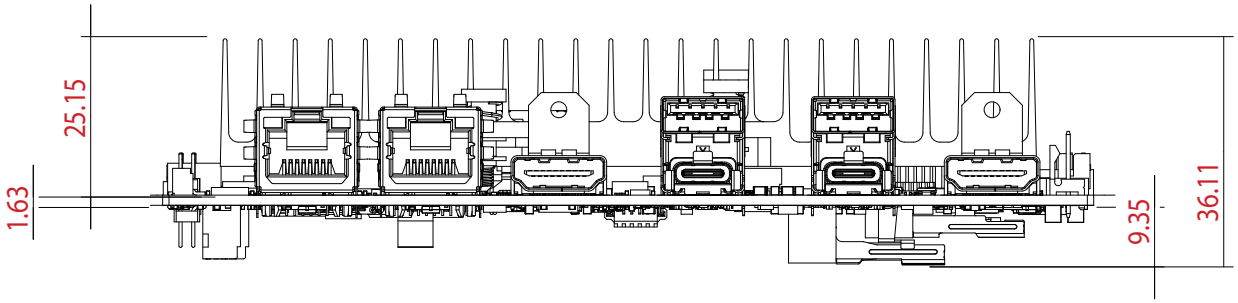


Figure 1-5. X13SAN-H/-E/-L/-C and X13SAN-H/-E/-L/-C-WOHS Mechanical Drawings

X13SAN-H/-E/-L/-C Back Panel Mechanical Drawing



X13SAN-H/-E/-L/-C-WOHS Back Panel Mechanical Drawing

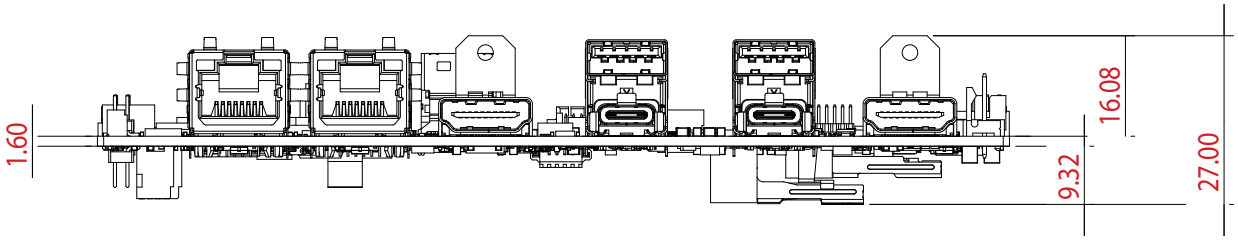
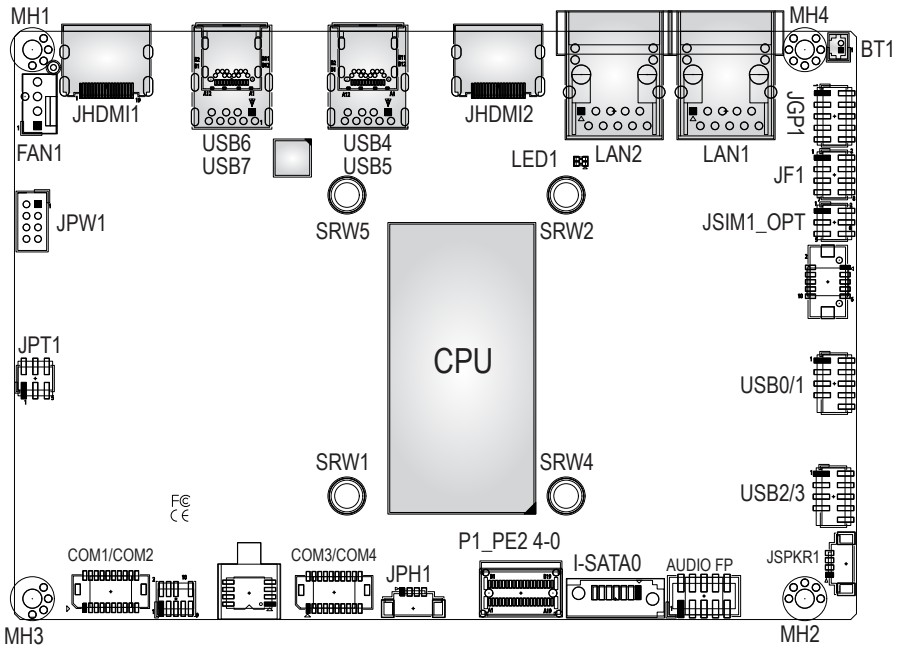


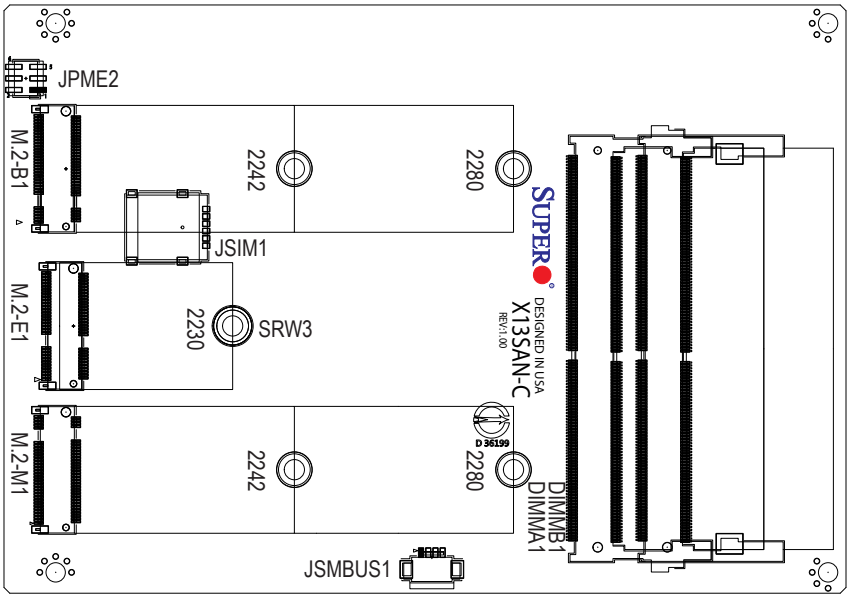
Figure 1-6. Motherboard Layout

(not drawn to scale)

Top Layout



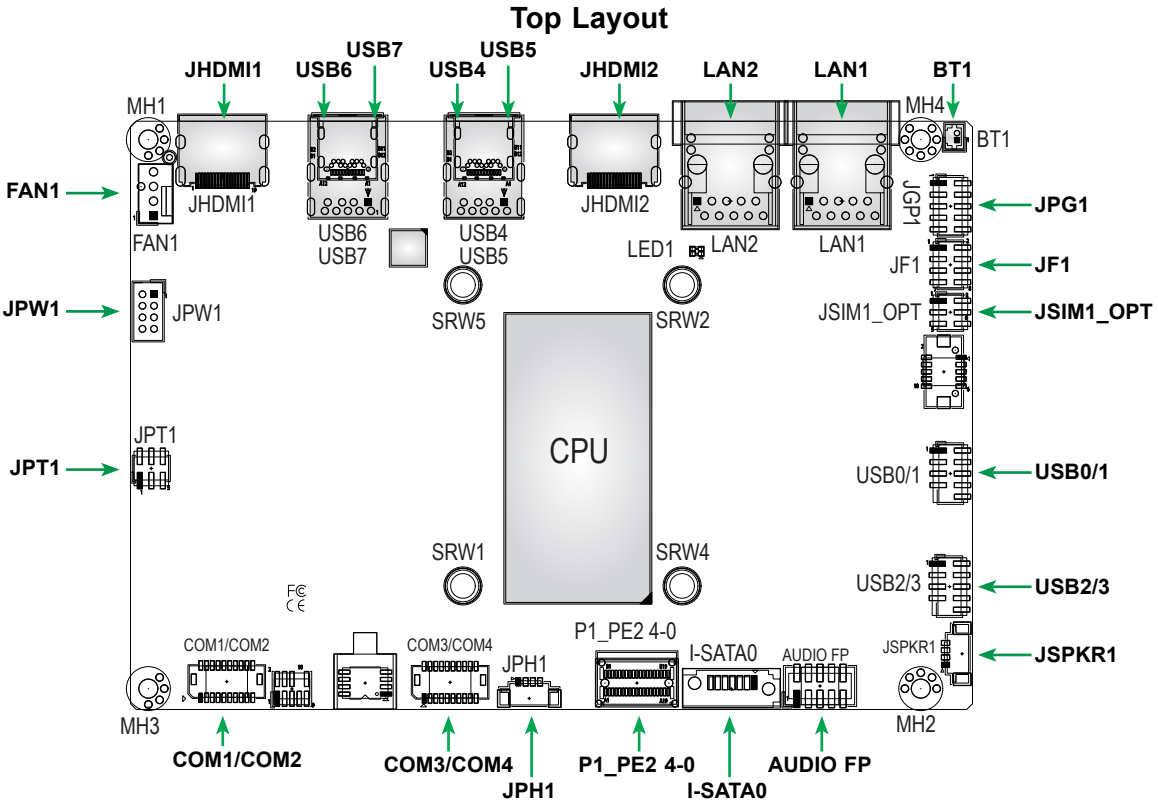
Bottom Layout



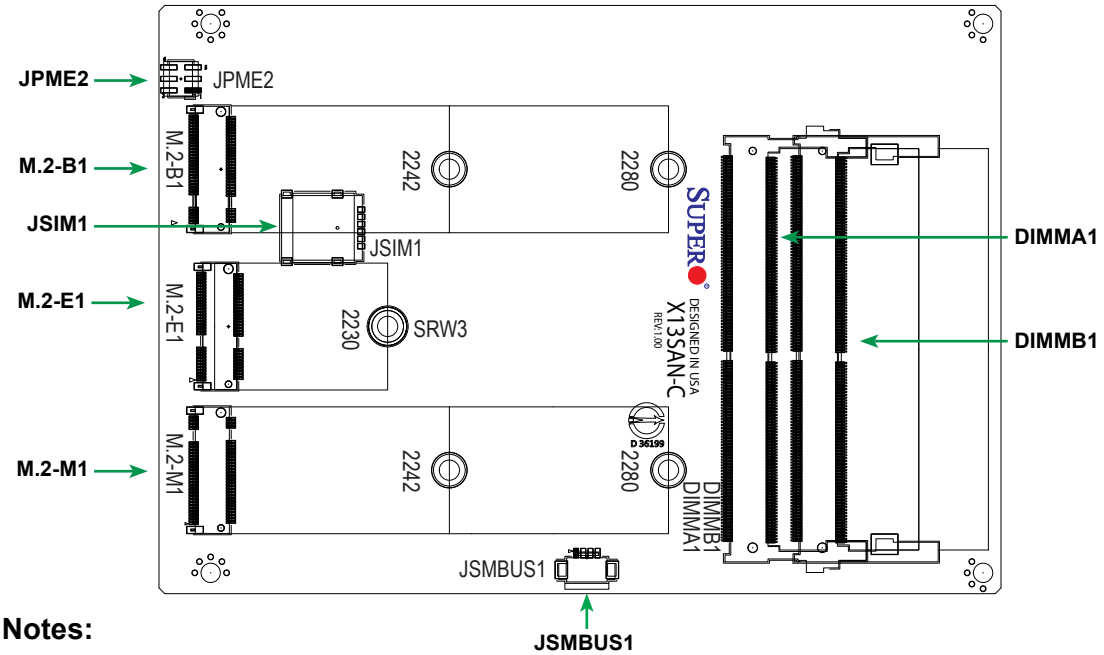
Note: Components not documented are for internal testing only.

Quick Reference

Top Layout



Bottom Layout



Notes:

- See Chapter 2 for detailed information on jumpers, I/O ports, and connections. Jumpers and LED indicators not indicated are used for testing only.
- "▪" indicates the location of Pin 1.

Quick Reference Table

Jumper	Description	Default Setting
JPME2	CMOS Clear Manufacturing Mode	Pins 1-3 (Normal) Pins 4-6 (Normal)
JPT1	Force Power On TPM 2.0 Enable/Disable	Pins 2-4 (Force power on) Pins 1-3 (Enable)
JSIM1_OPT	SIM Detect Option 5G/LTE USB/PCIe Option M.2 B-Key Storage LED	Pins 2-4 (Low Active) Pins 1-3 (USB) Pins 5-6 (Enabled)

LED	Description	Status
LED1	Onboard Power LED	Green: System on Red: S5 or main power fail Off: System off

Connector	Description
BT1	Battery Cable Connector
FAN1	4-pin fan header
AUDIO FP	Front panel audio header (line-out, mic-in)
COM1/COM2	COM header for two RS232/422/485
COM3/COM4	COM header for two RS232
I-SATA0	SATA 6Gb/s port
JF1	Front Control Panel Header
JGP1	8-bit General Purpose I/O header
JHDMI1	Back Panel HDMI 2.0b port
JHDMI2	Back Panel HDMI 1.4b port
JPH1	4-pin HDD power connector
JPW1	8-pin 12-24V main power-in connector
JSIM1	Nano SIM Card slot
JSMBUS1	System Management Bus header
JSPKR1	Speaker-out with 3W Amplifier
LAN1, LAN2	2.5G RJ45 LAN ports
M.2-B1	M.2 B-Key 2242/2280/3042 slot with a Nano SIM slot and support for SATA 6Gb/s or PCIe 3.0 x1/USB 3.0/USB 2.0
M.2-E1	M.2 E-Key 2230 slot for PCIe 3.0 x1/USB 2.0/Intel CNVi
M.2-M1	M.2 M-Key PCIe 4.0 x4 2242/2280 slot
P1_PE2 4-0	PCIe 4.0 x4 SlimSAS slot
USB0/1, USB2/3	Front-accessible USB 2.0 headers for four USB 2.0 ports
USB4, USB6	USB 3.2 (10Gb/s)/DisplayPort 1.4 Alt Mode Type-C ports on the rear I/O panel
USB5, USB7	USB 3.2 (10Gb/s) Type-A ports on the rear I/O panel

Motherboard Features

Motherboard Features	
CPU	
• X13SAN-H/-H-WOHS supports 12th Generation Intel® Core™ i7-1265UE • X13SAN-E/-E-WOHS supports 12th Generation Intel® Core™ i5-1245UE • X13SAN-L/-L-WOHS supports 12th Generation Intel® Core™ i3-1215UE • X13SAN-C/-C-WOHS supports 12th Generation Intel® Celeron® 7305E	
Memory	
• Supports up to 64GB of Non-ECC DDR5 SO-DIMM with speeds of up to 4800 MT/s in two slots	
DIMM Size	
• Up to 32GB at 1.1V **Note:** For the latest CPU/memory updates, refer to our website at http://www.supermicro.com/products/motherboard.	
Expansion Slots	
• One M.2 B-Key 2242/2280/3042 slot with a Nano SIM slot and support for SATA 6Gb/s or PCIe 3.0 x1/USB 3.0/USB 2.0 • One M.2 E-Key 2230 slot for PCIe 3.0 x1/USB 2.0/Intel CNVi • One M.2 M-Key PCIe 4.0 x4 2242/2280 slot • One PCIe 4.0 x4 SlimSAS slot	
Network	
• Dual Intel i225-IT for dual 2.5G RJ45 LAN ports	
Graphics	
• Intel Iris® Xᵉ/UHD Graphics	• Up to 96 graphics EUs, four simultaneous displays, and 4x 4K at 60Hz • OpenGL 4.6, DirectX 12, OpenCL 3.0, Intel Built-in Visuals, Intel Quick Sync Video, PlayReady 3, SGX-CP • Hardware Accelerated Decoding of AVC/HEVC/VP9/JPEG/AV1 • Hardware Accelerated Encoding of AVC/HEVC/VP9/JPEG
Trusted Platform Module	
• TPM 2.0 onboard	

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

Motherboard Features

I/O Devices

• HDMI Ports	• One HDMI 1.4b port on the rear I/O panel (supports up to 4K at 30Hz) • One HDMI 2.0b port on the rear I/O panel (supports up to 4K at 60Hz)
• DisplayPort	• Two DisplayPort (DP) 1.4a through DP Alt Mode Type-C ports on the rear I/O panel (max. resolution of up to 7680 x 4320 at 30Hz)
• SATA Ports	• One SATA 6Gb/s port
• Serial (COM) Ports	• Four front-accessible COM ports (COM1/COM2 supports two RS232/422/485, COM3/COM4 supports two RS232)
• Audio	• One HD Audio header with Mic-In/Headphone-out (Realtek ALC888S) (Audio only supports 0-60ºC) • One internal speaker-out header (with 3W audio amplifier)
• GPIO	• One 8-bit General Purpose I/O (GPIO) header
• SMBus	• One System Management Bus (SMBus) header

Peripheral Devices

- Two USB 3.2 (10Gb/s) Type-A ports on the rear I/O panel
- Two USB 3.2 (10Gb/s)/DP Alt Mode Type-C ports on the rear I/O panel
- Two front-accessible USB 2.0 headers for four USB 2.0 ports

BIOS

- 256Mb AMI BIOS® SPI Flash BIOS
- ACPI 6.4, PCI F/W 3.0, UEFI 2.8, and SMBIOS 3.5 or later

Power Management

- ACPI power management (supports S4 and S5)
- Power button override mechanism
- Wake-on-LAN through UEFI BIOS option
- Power-on mode for AC power recovery
- Management Engine
- Force Power On by jumper
- RTC Battery (typical voltage: 3.0V, normal discharge capacity: 210mAh)
- Supply Input Voltage: DC 12-24V

System Health Monitoring

- Onboard voltage monitoring for +3.3V, +5V, +12V, +3.3VStb, Vcore, Vmem, and Vbat
- Temperature of CPU, PCH, System, and DIMM
- CPU thermal trip support

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

Note 2: The table above is continued on the next page.

Motherboard Features

Fan Control

- One 4-pin fan header
- Low noise fan speed control

System Management

- Trusted Platform Module (TPM) 2.0 header onboard
- SuperDoctor® 5
- Watchdog
- Supermicro Update Manager (SUM) InBand
- Intel vPro (available on -H/-E)

LED Indicators

- Power/Suspend State LED indicator

Environment

- Operating Temperature Range: X13SAN-H/-E/-L/-C supports 0°C – 60°C (32°F – 140°F)
- Operating Temperature Range: X13SAN-H/-E/-L/-C-WOHS supports 0°C – 85°C (32°F – 185°F)
- Non-Operating Temperature Range: 40°C – 85°C (-40°F – 185°F)
- Operating Relative Humidity Range: 8% – 90% (non-condensing)
- Non-Operating Relative Humidity Range: 10% – 95% (non-condensing)

Dimensions

- 4.01" (L) x 5.75" (W) (102mm x 146mm) 3.5" SBC
- Total Height: 1.42" (36.11mm) (X13SAN-H/-E/-L/-C)
- Total Height: 1.06" (27mm) (X13SAN-H/-E/-L/-C-WOHS)

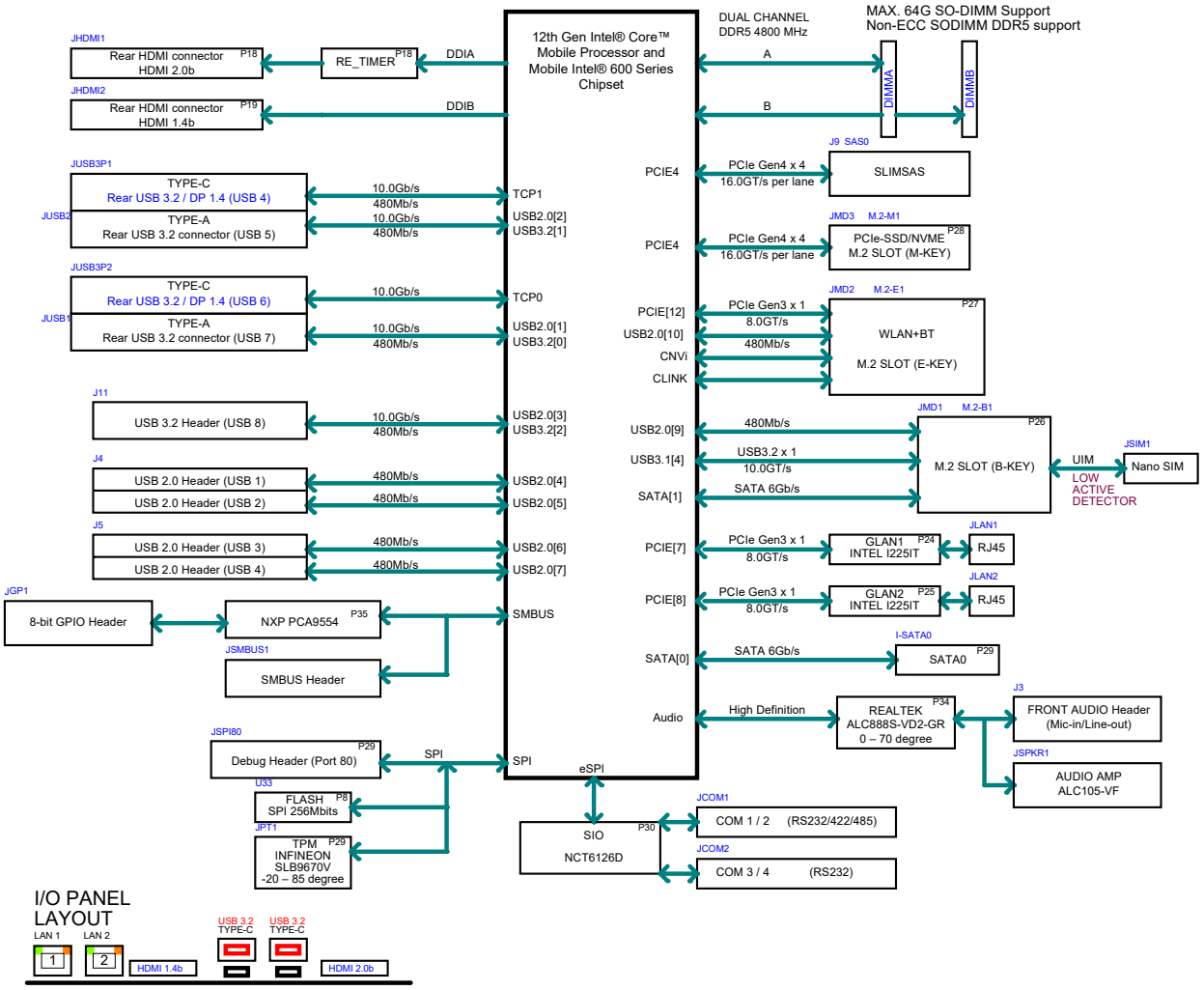
Figure 1-7.
X13SAN Series Specification Chart

X13SAN-H/-E/-L/-C and X13SAN-H/-E/-L/-C-WOHS											
X13SAN Model	CPU	Base Freq (Ghz)		Turbo Freq. (Ghz)		Cores		Threads	GFx EU	CPU TDP (W)	Intel vPro
		P-core	E-core	P-core	E-core	P-core	E-core				
X13SAN-H/ X13SAN-H-WOHS	i7-1265UE	1.7	1.2	4.7	3.5	2	8	12	96	15	Yes
X13SAN-E/ X13SAN-E-WOHS	i5-1245UE	1.5	1.1	4.4	3.3	2	8	12	80	15	Yes
X13SAN-L/ X13SAN-L-WOHS	i3-1215UE	1.2	0.9	4.4	3.3	2	4	8	64	15	No
X13SAN-C/ X13SAN-C-WOHS	Celeron 7305E	1	0.9	N/A	N/A	1	4	6	48	15	No

Figure 1-8.
X13SAN Series Specification Chart Continued

X13SAN-H/-E/-L/-C and X13SAN-H/-E/-L/-C-WOHS			
X13SAN Model	Operating Temperature Range	Thermal Solution	Functions
X13SAN-H/ X13SAN-H-WOHS	0-60C/ 0-85C (WOHS)	Passive	2x 2.5GbE 2x HDMI (1x HDMI 2.0b, 1x HDMI 1.4b) 2x DP (Alt mode, through Type-C) 2x RS232/422/485 2x RS232 4x USB 3.2 Gen2 (2x Type-A, 2x Type-C) 4x USB 2.0 (Header) 1x 8-bit GPI/O 1x Line-Out/Mic-In 1x Speaker-out with 3W Amplifier 1x TPM 2.0 onboard 3x M.2 (B-Key with SIM, E-Key, M-Key)
X13SAN-E/ X13SAN-E-WOHS			
X13SAN-L/ X13SAN-L-WOHS			
X13SAN-C/ X13SAN-C-WOHS			

Figure 1-9.
System Block Diagram



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

1.2 Processor and Chipset Overview

Built with the Intel® 12th Generation Core™ i7/i5/i3 or Celeron® mobile processor series, the X13SAN provides system performance, power efficiency, and feature sets to address the needs of next-generation computer users, and dramatically increases system performance for a multitude of server applications.

The X13SAN supports the following features:

- 64GB of Non-ECC DDR5 SO-DIMM memory with speeds of up to 4800 MT/s in two DIMM slots
- Intel SSE4.1, SSE4.2, AVX2, AVX-512
- Intel Deep Learning Boost (DL Boost), Intel Gaussian and Neural Accelerator 2.0
- Intel Speed Shift Technology
- Intel Volume Management Device (VMD)
- Intel Virtualization Technology (VT-x), Intel Virtualization Technology for Directed I/O (VT-d), Vt-x with Extended Page Tables (EPT)
- Intel Smart Sound Technology, Intel High Definition Audio
- Intel AES New Instructions, Intel Boot Guard, Mode-base Execute Control, Intel Control-Flow, Intel Total Memory Encryption

The X13SAN-H/-E/-L and X13SAN-H/-E/-L-WOHS support the following additional features:

- Intel Turbo Boost Technology 2.0
- Intel Trusted Execution Technology

Note: Intel TXT is only supported in the UEFI boot mode. Install the UEFI OS and then enable the Intel TXT feature.

The X13SAN-H/-E and X13SAN-H/-E-WOHS support the following additional features, including the features above:

- Intel vPro® Platform
- Intel Hyper-Threading Technology

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

The onboard voltage monitor will continuously scan crucial voltage levels. 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 chip can check the RPM status of a cooling fan. The fans are controlled by the BIOS Thermal Management.

Environmental Temperature Control

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

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

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, 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. This is even more important for processors that have high CPU clock rates. In areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noise. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1.7 Super I/O

The Super I/O provides four high-speed, 16550 compatible universal asynchronous receiver-transmitter (UART) serial communication ports. Each UART includes a 128 byte send/receive FIFO, a programmable baud rate generator, complete modem control capability, and a processor interrupt system. UARTs provide legacy speed 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 higher speed modems.

The Super I/O provides functions that comply with ACPI, which includes support of legacy and ACPI power management through a SMI or SCI function pin. It also features auto power management to reduce power consumption.

The IRQs, DMAs and I/O space resources of the Super I/O can be flexibly adjusted to meet ISA PnP requirements, which support ACPI and Advanced Power Management (APM).

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 external CMOS battery. Do not install the external CMOS 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 Motherboard Installation

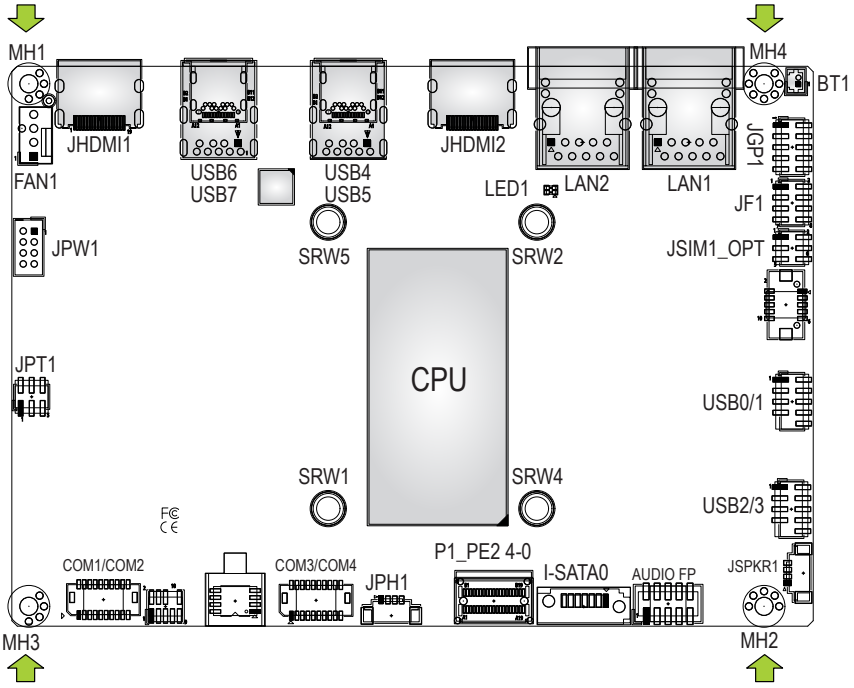
All motherboards have standard mounting holes to fit different types of chassis. Make sure that the locations of all the mounting holes for both the motherboard and the chassis match. Although a chassis may have both plastic and metal mounting fasteners, metal ones are highly recommended because they 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 (4)

Standoffs (4) Only if Needed



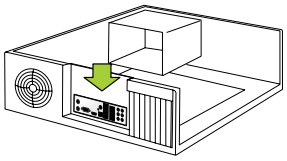
Location of Mounting Holes

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

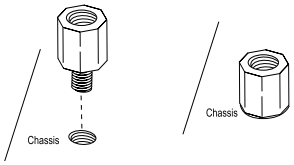
Note 2: Some components are very close to the mounting holes. Take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

Installing the Motherboard

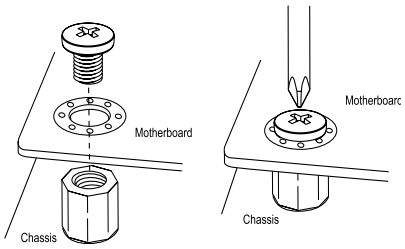
1. Install the I/O shield into the back of the chassis, if applicable.



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



3. Locate the matching mounting holes on the chassis. 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. Check 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.

2.3 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.

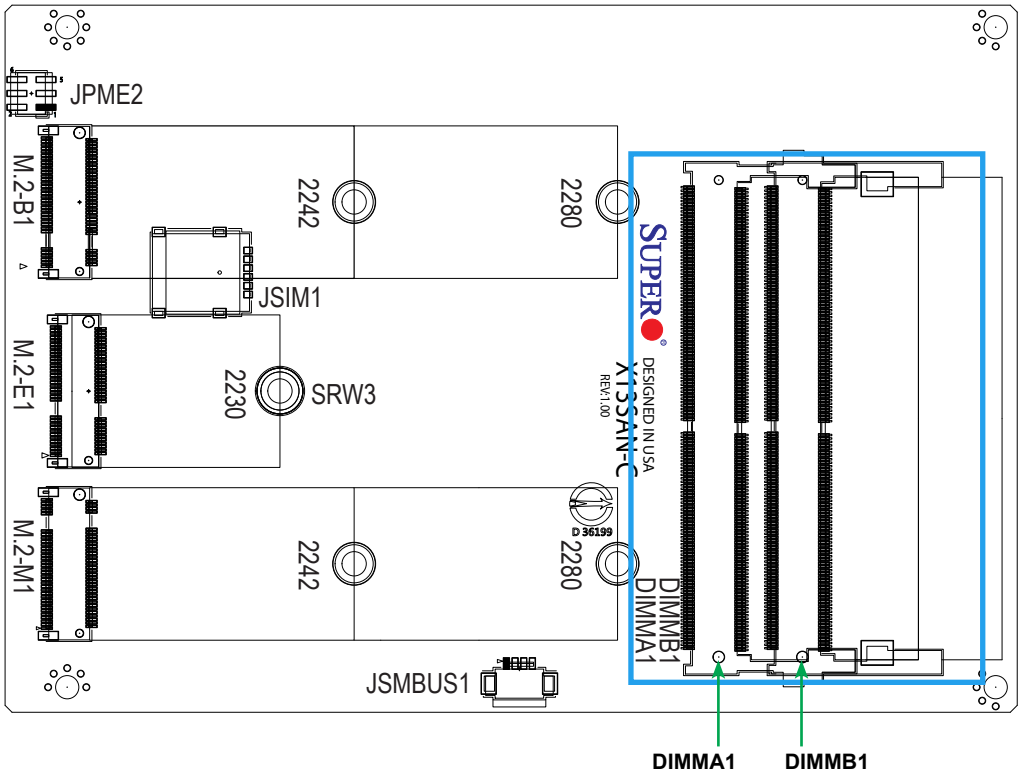
Memory Support

The X13SAN supports up to 64GB of Non-ECC DDR5 SO-DIMM memory with speeds of up to 4800 MT/s in two memory slots on the bottom side of the motherboard.

General Guidelines for Optimizing Memory Performance

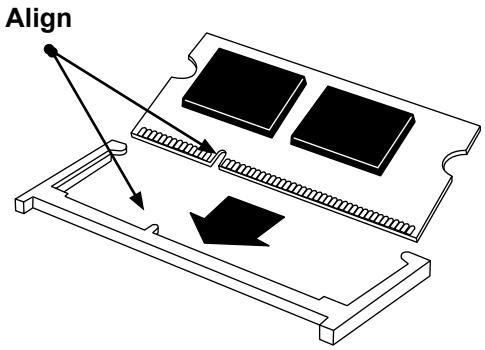
- The blue or grey slots must be populated first.
- It is recommended to use DDR5 memory of the same type, size, and speed.
- Mixed DIMM speeds can be installed. However, all DIMMs will run at the speed of the slowest DIMM.

Bottom Layout

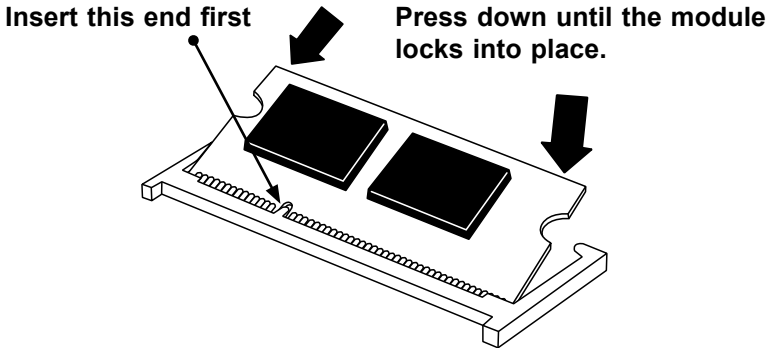


SO-DIMM Installation

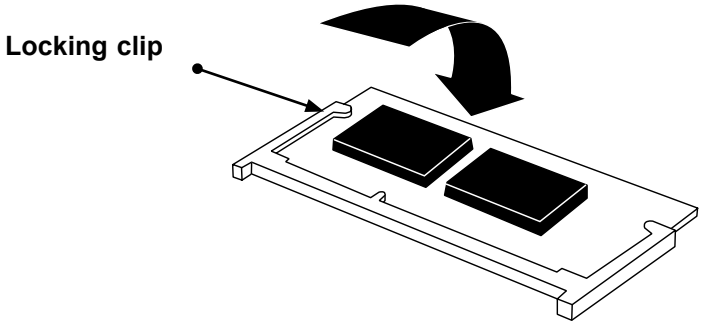
1. Position the SO-DIMM module's bottom key so it aligns with the receptive point on the slot.



2. Insert the SO-DIMM module vertically at about a 45-degree angle. Press down until the module locks into place.



3. The side clips automatically secure the SO-DIMM module, locking it into place.



SO-DIMM Removal

1. Push the side clips at the end of slot to release the SO-DIMM module. Pull the SO-DIMM module up to remove it from the slot.

2.4 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.

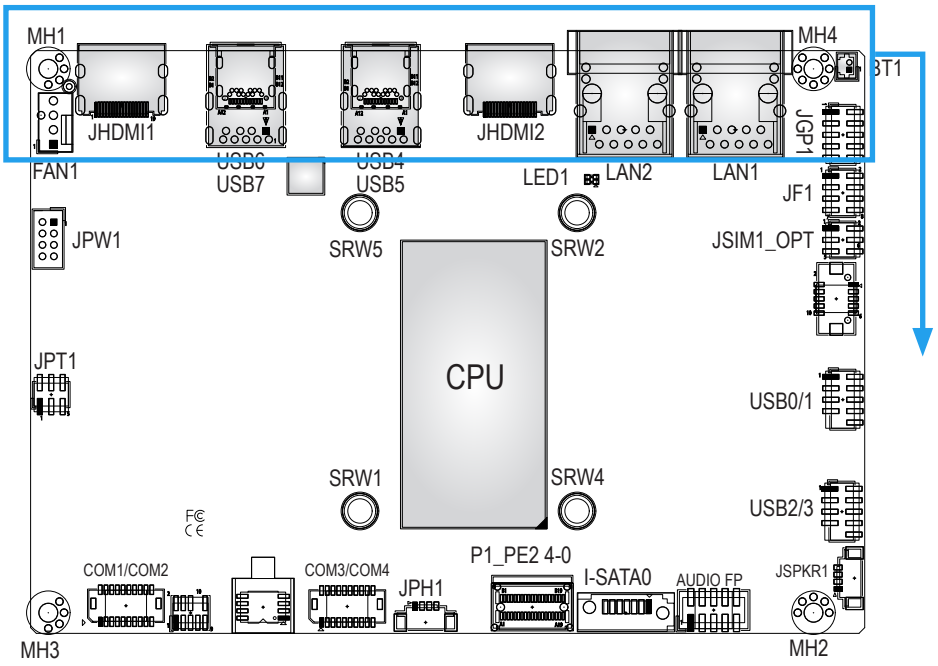
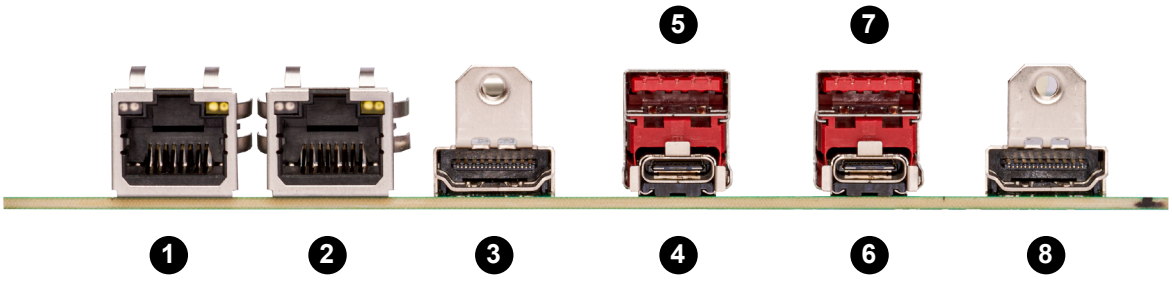


Figure 2-1. Rear I/O Port Locations and Definitions



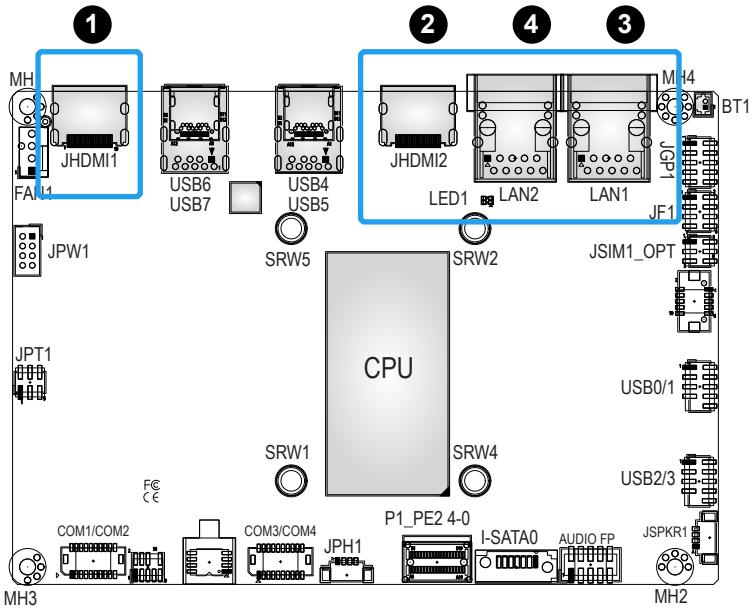
Rear I/O Ports			
#	Description	#	Description
1	2.5G RJ45 LAN	5	USB 3.2 Type-A
2	2.5G RJ45 LAN	6	USB 3.2/DP 1.4 Type-C
3	HDMI 1.4b	7	USB 3.2 Type-A
4	USB 3.2/DP 1.4 Type-C	8	HDMI 2.0b

HDMI Ports

Two High Definition Multimedia Interface (HDMI) ports are on the back I/O panel. HDMI connectors are used to display both high definition video and digital sound through an HDMI-capable display with a single HDMI cable (not included). The HDMI port at JHDMI1 supports HDMI 2.0b, and the HDMI port at JHDMI2 supports HDMI 1.4b.

2.5G RJ45 LAN Ports

Two 2.5G Ethernet RJ45 LAN ports are located on the back I/O panel at LAN1 and LAN2.



1. HDMI 2.0b Port
2. HDMI 1.4b Port
3. 2.5G RJ45 LAN Port (LAN1)
4. 2.5G RJ45 LAN Port (LAN2)

USB 3.2 Type-A ports, USB 3.2/DisplayPort 1.4 Alt Mode Type-C ports

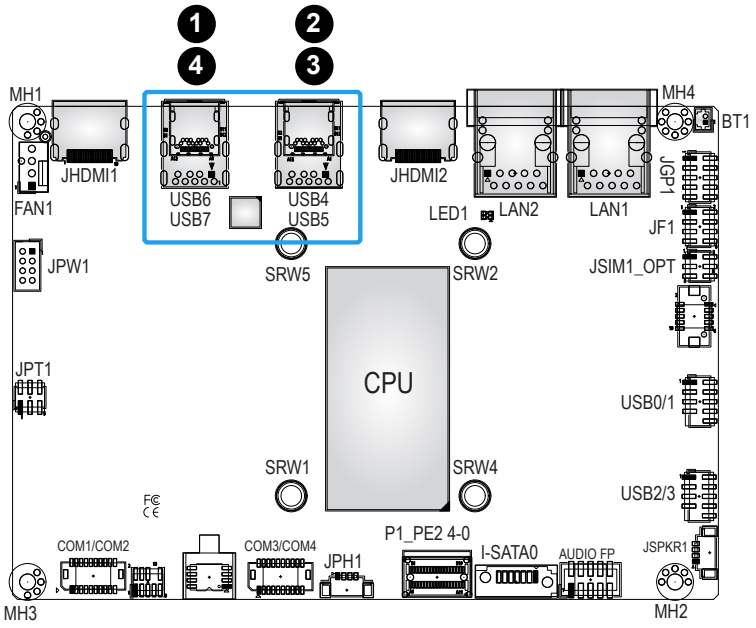
There are two USB 3.2 (10Gb/s) Type-A ports (USB5, USB7) and two USB 3.2 (10Gb/s)/ DisplayPort 1.4 Alt Mode Type-C ports (USB4, USB6) on the rear I/O panel. DisplayPort, developed by the VESA consortium, delivers digital display and fast refresh rate. DisplayPort can connect to the motherboard through the DP Alt Mode Type-C ports.

Rear I/O Panel USB 3.2/DP 1.4 Type-C Pin Definitions (USB4, USB6)

Pin#	Definition	Pin#	Definition
A1	GND	B12	GND
A2	USB32_TXP	B11	USB32_RXP
A3	USB32_TXN	B10	USB32_RXN
A4	5VSB_TYPEC	B9	P5VSB_TYPEC
A5	CC1	B8	SBU2
A6	USB2_TOP_P	B7	USB2_BOT_N
A7	USB2_TOP_N	B6	USB2_BOT_P
A8	SBU1	B5	CC2
A9	P5VSB_TYPEC	B4	P5VSB_TYPEC
A10	USB32_RXN	B3	USB32_TXN
A11	USB32_RXP	B2	USB32_TXP
A12	GND	B1	GND

Rear I/O Panel USB 3.2 Type-A Pin Definitions (USB5, USB7)

Pin#	Definition	Pin#	Definition
1	5VSB	2	D-N
3	D-P	4	GND
5	SSRXN	6	SSRXP
7	GND	8	SSTXN
9	SSTXP		



1. USB 3.2 Type-A (USB7)
2. USB 3.2 Type-A (USB5)
3. USB 3.2/DP 1.4 Type-C (USB4)
4. USB 3.2/DP 1.4 Type-C (USB6)

2.5 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 custom chassis. Refer to the figure below for the descriptions of the front control panel buttons and LED indicators.

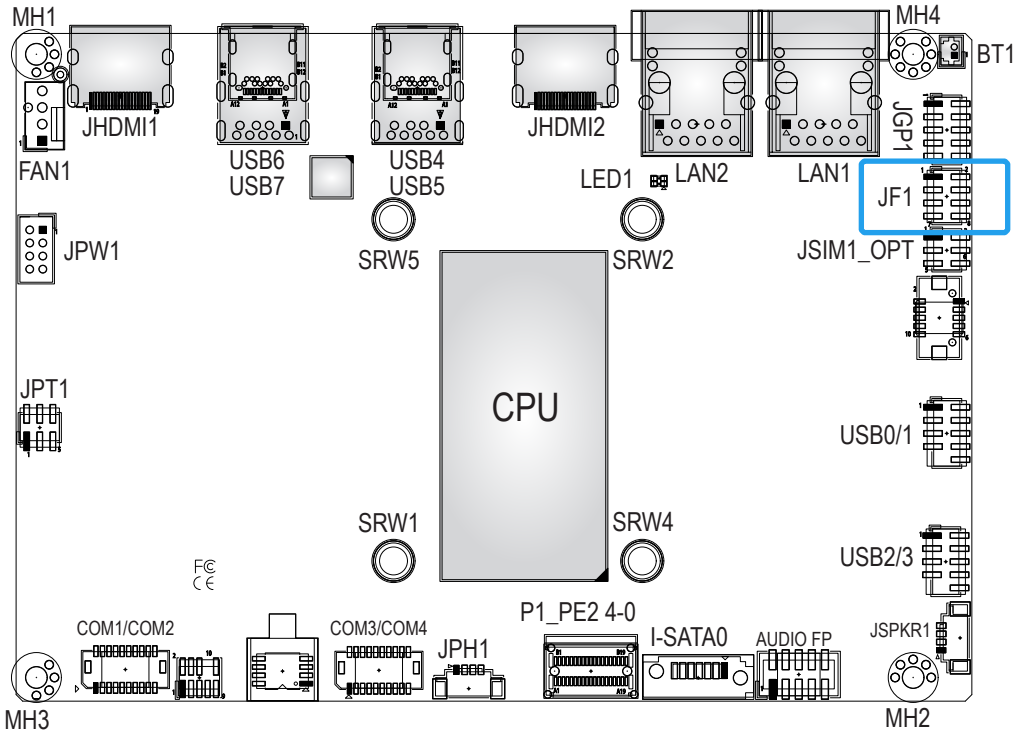
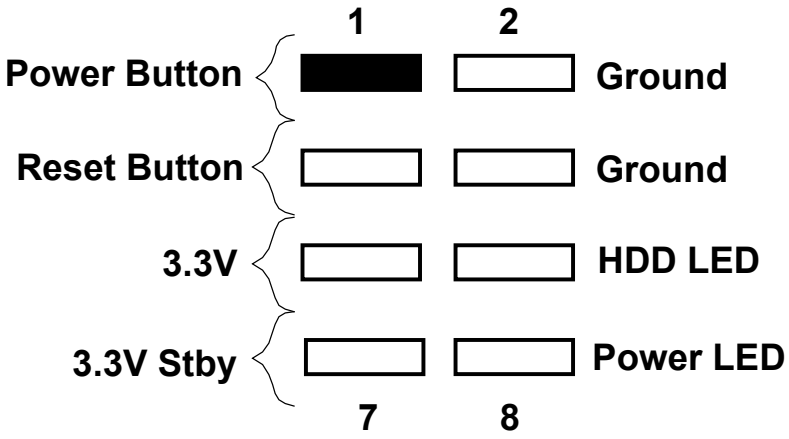


Figure 2-2. JF1 Header Pins



Power Button

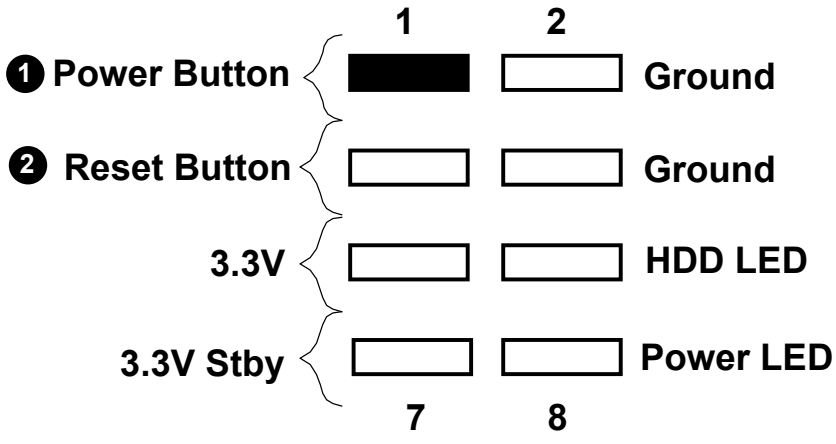
The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button with a setting in the BIOS – see Chapter 4. To turn off the power in the suspend mode, press the button for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

Power Button Pin Definitions (JF1)	
Pin#	**Definition**
1	Power Button
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. See the table below for pin definitions.

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



1. Power Button
2. Reset Button

HDD LED

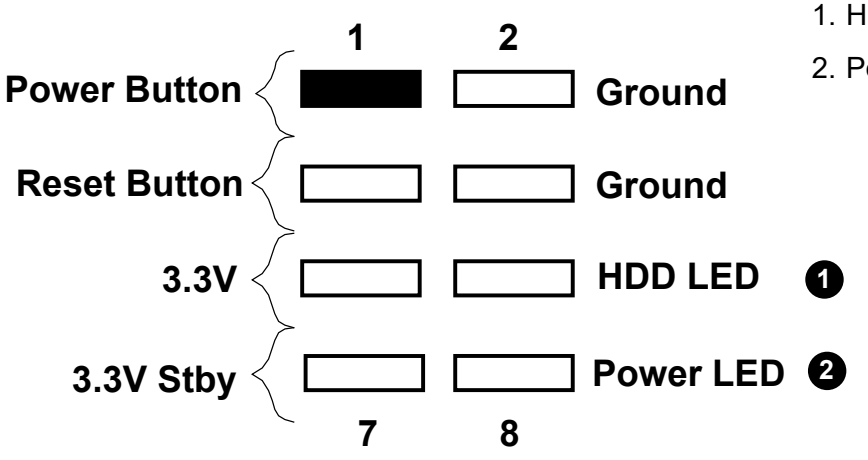
The HDD LED connection is located on pins 5 and 6 of JF1. Attach a cable to pin 6 to show hard drive activity status. Refer to the table below for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	**Definition**
5	3.3V
6	HDD LED

Power LED

The Power LED connection is located on pins 7 and 8 of JF1. Refer to the table below for pin definitions.

Power LED Pin Definitions (JF1)	
Pin#	**Definition**
7	3.3V Stby
8	Power LED



1. HDD LED
2. Power LED

2.6 Connectors & Headers

Power Connections

4-pin HDD Power Connector

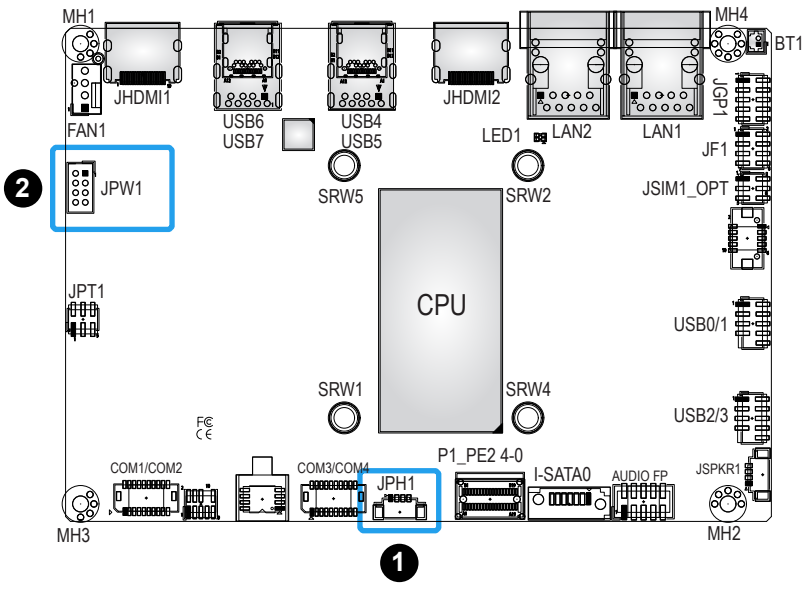
JPH1 is the 4-pin HDD power connector that provides power to hard disk drives.

4-pin HDD Power Pin Definitions (JPH1)	
Pins	**Definition**
1	12V
2	Ground
3	Ground
4	5V

8-pin 12-24V Main Power-in Connector

JPW1 is the 12-24V DC power connector that provides power to the motherboard.

8-pin 12-24V Pin Definitions (JPW1)	
Pins	**Definition**
1 – 4	+12 – 24V
5 – 8	Ground



1. 4-pin HDD Power
2. 8-pin 12-24V

Headers

Front Panel Audio Header (line-out, mic-in)

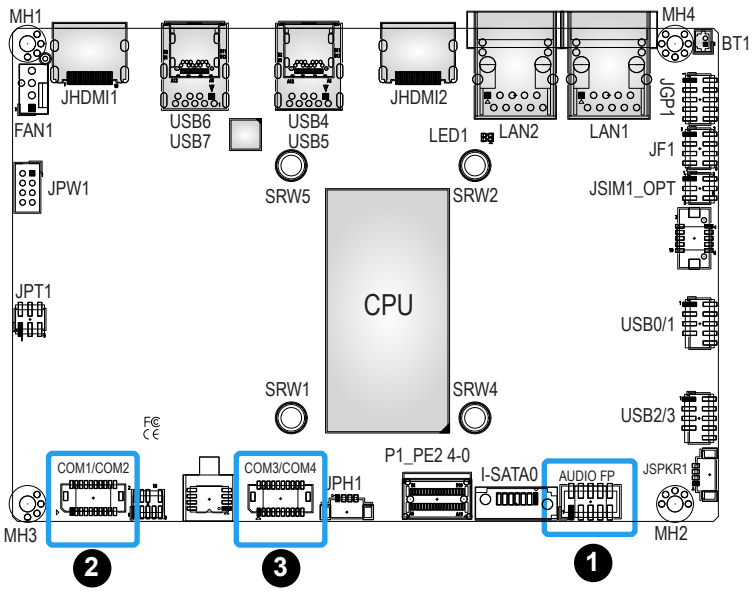
A 10-pin front panel audio header located at AUDIO FP allows you to use the onboard sound for audio playback and input. Connect an audio cable to the header to use this feature. This header functions only between 0-60ºC.

Audio Header (line-out, mic-in) Pin Definitions (AUDIO FP)			
Pin#	**Definition**	**Pin#**	**Definition**
1	Microphone_Left	2	Audio_Ground
3	Microphone_Right	4	Audio_Detect
5	Line_2_Right	6	Ground
7	Jack_Detect	8	Key
9	Line_2_Left	10	Ground

COM Ports

There are four COM ports: COM1/COM2 with support for two RS232/RS422/RS485 connections and COM3/COM4 with support for two RS232 connections. The manufacturer of the header is ACES Electronics, MPN 50419-02001. The mapping plug header for cable assembly is 50420-020HKH0-001.

See the next page for the pin definition tables of the onboard headers and D-SUB of CBL-CDAT-0665. Refer to the corresponding table based on design requirement.



1. Audio Header (line-out, mic-in)
2. COM1/COM2 (RS232/422/485)
3. COM3/COM4 (RS232)

COM Port Pin Definitions (COM1/COM2)			
Pin#	**RS-232**	**RS-422/485 Full Duplex**	**RS-485 Half Duplex**
1	SP_DCD1	TX-1	Data-1
2	SP_DSR1		
3	SP_RXD1	TX+1	Data+1
4	SP_RTS1		
5	SP_TXD1	RX+1	
6	SP_CTS1		
7	SP_DTR1	RX-1	
8	SP_RI1		
9	GND		
10	NC		
11	SP_DCD2	TX-2	Data-2
12	SP_DSR2		
13	SP_RXD2	TX+2	Data+2
14	SP_RTS2		
15	SP_TXD2	RX+2	
16	SP_CTS2		
17	SP_DTR2	RX-2	
18	SP_RI2		
19	GND		

COM Port Pin Definitions (COM3/COM4)	
Pin#	**RS-232**
1	SP_DCD3
2	SP_DSR3
3	SP_RXD3
4	SP_RTS3
5	SP_TXD3
6	SP_CTS3
7	SP_DTR3
8	SP_RI3
9	GND
10	NC
11	SP_DCD4
12	SP_DSR4
13	SP_RXD4
14	SP_RTS4
15	SP_TXD4
16	SP_CTS4
17	SP_DTR4
18	SP_RI4
19	GND
20	NC

COM Port Pin Definitions (D-SUB from CBL-CDAT-0665)			
Pin#	**RS-232**	**RS-422/485 Full Duplex**	**RS-485 Half Duplex**
1	SP_DCD1	TX-1	Data-1
2	SP_RXD1	TX+1	Data+1
3	SP_TXD1	RX+1	
4	SP_DTR1	RX-1	
5	GND		
6	SP_DSR1		
7	SP_RTS1		
8	SP_CTS1		
9	SP_RI1		
10	NC		
11	SP_DCD2	TX-2	Data-2
12	SP_RXD2	TX+2	Data+2
13	SP_TXD2	RX+2	
14	SP_DTR2	RX-2	
15	GND		
16	SP_DSR2		
17	SP_RTS2		
18	SP_CTS2		
19	SP_RI2		
20	NC		

COM Port Pin Definitions (D-SUB from CBL-CDAT-0665)	
Pin#	**RS-232**
1	SP_DCD3
2	SP_RXD3
3	SP_TXD3
4	SP_DTR3
5	GND
6	SP_DSR3
7	SP_RTS3
8	SP_CTS3
9	SP_RI3
10	NC
11	SP_DCD4
12	SP_RXD4
13	SP_TXD4
14	SP_DTR4
15	GND
16	SP_DSR4
17	SP_RTS4
18	SP_CTS4
19	SP_RI4
20	NC

8-bit GPIO Header

One 8-bit General Purpose Input/Output (GPIO) header is located at JGP1.The GPIO header is a general purpose I/O expander on a pin header via the SMBus. Each pin can be configured to be an input pin or output pin in 2.54mm pitch. The GPIO is controlled via the PCA9554APW 8-bit GPIO expansion from the PCH SMBus. The base address is 0xEFA0. The expander slave address is 0x4D for WRITE/READ. See the table below for pin definitions.

GPIO Header
Pin Definitions (JGP1)

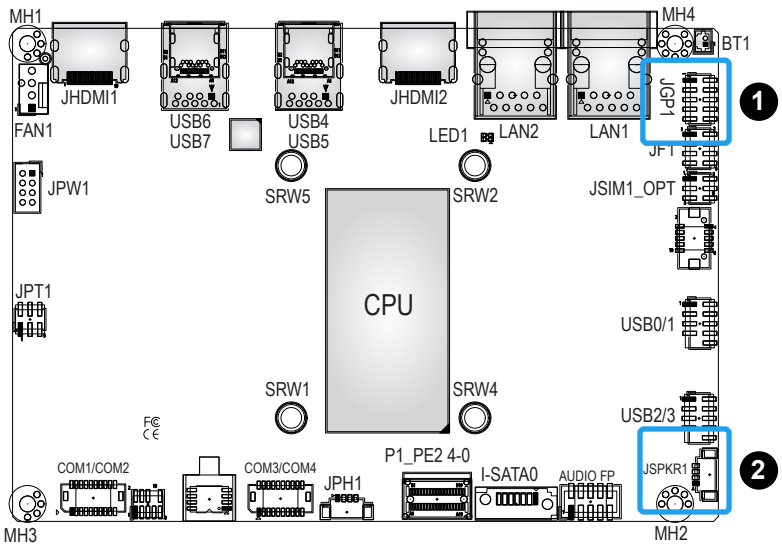
Pin#	Definition	Pin#	Definition
1	P3V3SB	2	GND
3	GP_P3V3_GP0	4	GP_P3V3_GP4
5	GP_P3V3_GP1	6	GP_P3V3_GP5
7	GP_P3V3_GP2	8	GP_P3V3_GP6
9	GP_P3V3_GP3	10	GP_P3V3_GP7

Speaker-out with 3W Amplifier

The Speaker-out with 3W Amplifier (JSPKR1) is used to amplify low-power electronic audio signals to a level that is high enough for current driving of loudspeakers or headphones.

Speaker-out with 3W Amplifier
Pin Definitions (JSPKR1)

Pin#	Definition
1	SPEAKER_LN_OUT
2	SPEAKER_LP_OUT
3	SPEAKER_RN_OUT
4	SPEAKER_RP_OUT



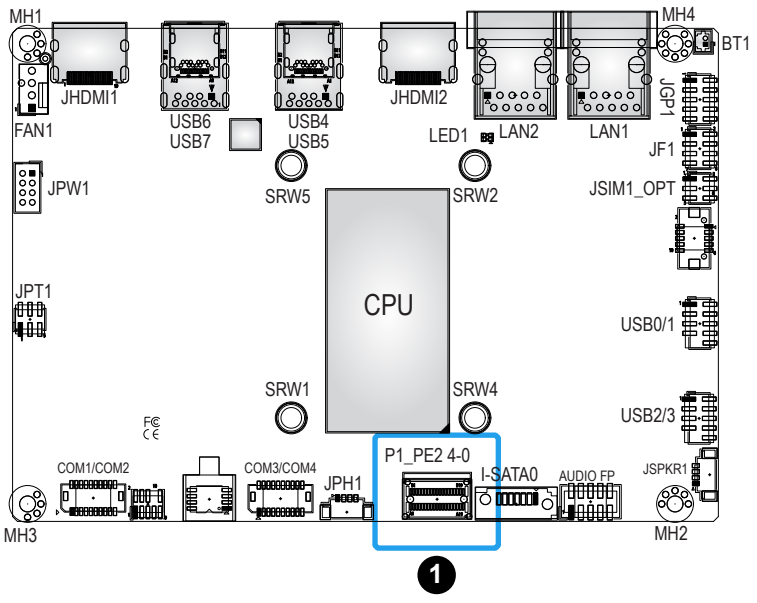
1. 8-bit GPIO Header
2. Speaker-out with 3W Amplifier

PCIe 4.0 x4 SlimSAS Connector

There is one SlimSAS connector located at P1_PE2 4-0 to support one PCIe 4.0 x4 NVMe connection. This connector provide high-speed and low-latency connections via direct PCIe interfaces from the CPU to NVMe solid state drives (SSD). By simplifying driver/software requirements, this greatly increases SSD data-throughput performance and significantly reduces PCIe latency.

PCIe 4.0 x4 SlimSAS Connector Pin Definitions (P1_PE2 4-0)

Pin#	Definition	Pin#	Definition
A1	GND	B1	GND
A2	P4E_0_RXP	B2	P4E_0_TXP
A3	P4E_0_RXN	B3	P4E_0_TXN
A4	GND	B4	GND
A5	P4E_1_RXP	B5	P4E_1_TXP
A6	P4E_1_RXN	B6	P4E_1_TXN
A7	GND	B7	GND
A8	SMBUS_SCL1_R	B8	SMBUS_SCL2_R
A9	SMBUS_SDA1_R	B9	SMBUS_SDA2_R
A10	GND	B10	GND
A11	CLK_100M_DP	B11	PERST_ SLIMSAS
A12	CLK_100M_DN	B12	RD_EN_E
A13	GND	B13	GND
A14	P4E_2_RXP	B14	P4E_2_TXP
A15	P4E_2_RXN	B15	P4E_2_TXN
A16	GND	B16	GND
A17	P4E_3_RXP	B17	P4E_3_TXP
A18	P4E_3_RXN	B18	P4E_3_TXN
A19	GND	B19	GND



1. PCIe 4.0 x4 SlimSAS

SATA 6Gb/s Port

This motherboard has one SATA 6Gb/s port located at I-SATA0 supported by the Intel 600 series chipset. SATA ports provide serial-link signal connections, which are faster than legacy Parallel ATA.

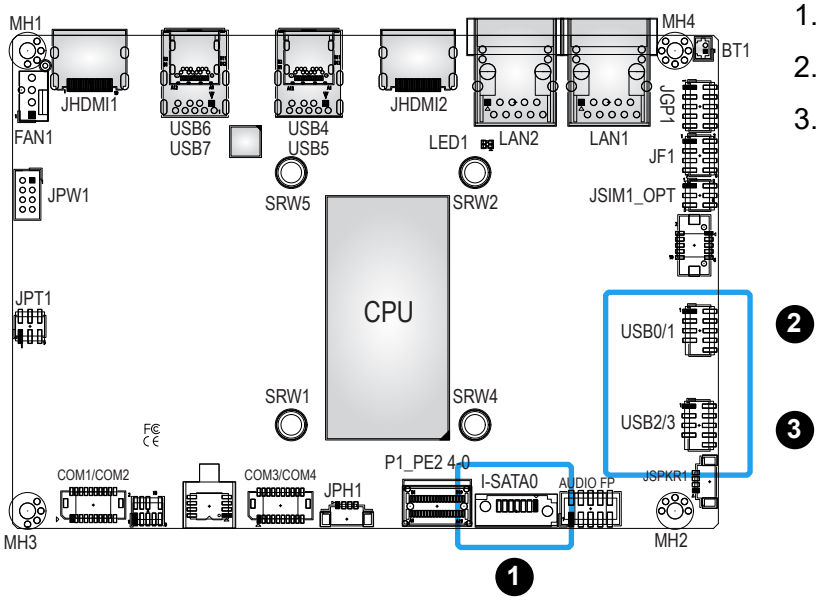
Note: For more information on the SATA HostRAID configuration, refer to the Intel SATA HostRAID user's guide posted at https://www.supermicro.com/support/manuals/.

Front-accessible USB Headers

The motherboard has two front-accessible USB 2.0 headers (USB0/1, USB2/3). The onboard headers can be used to provide front-side accessible USB access with a cable.

Front Panel USB 2.0 Headers
Pin Definitions (USB0/1, USB2/3)

Pin#	Definition	Pin#	Definition
1	+5V	2	+5V
3	USBCON_N0/ USBCON_N2	4	USBCON_N1/ USBCON_N3
5	USBCON_P0/ USBCON_P2	6	USBCON_P1/ USBCON_P3
7	Ground	8	Ground
9	Key	10	NC

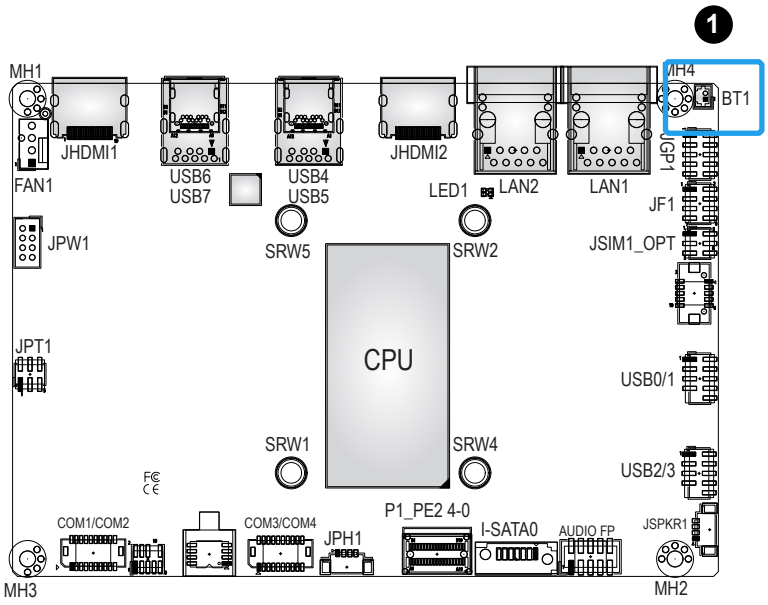


1. SATA 6Gb/s
2. USB 2.0 Header (USB0/1)
3. USB 2.0 Header (USB2/3)

Battery Cable Connector

BT1 is a two-pin connector for an external CMOS battery. Refer to section 3.4 for battery installation instructions. This connector can also be used to clear the CMOS. To clear the CMOS, remove the battery, short pins 1-2 for more than 10 seconds, and then install the battery.

Battery Cable Connector Pin Definitions (BT1)	
Pin#	**Definition**
1	P3V_BATTERY
2	Ground

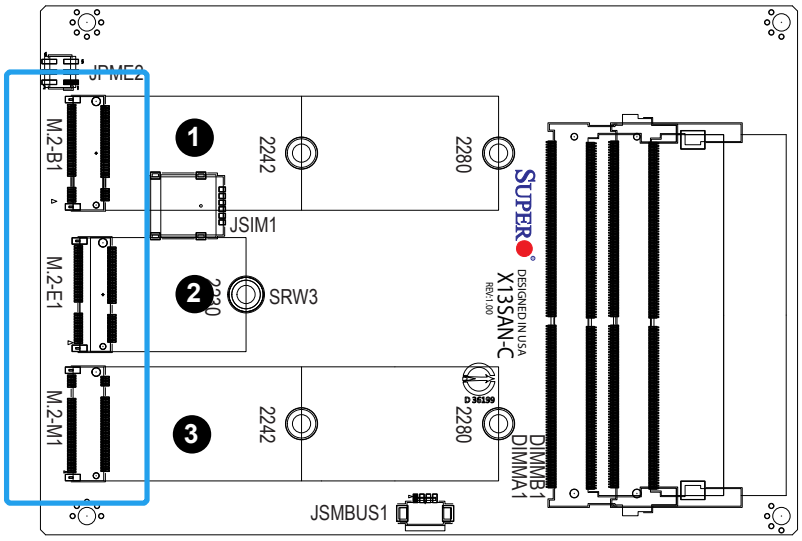


1. Battery Cable Connector

M.2 Connectors

This motherboard has three M.2 slots (M.2-B1, M.2-E1, M.2-M1). 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. M.2-B1 supports an M.2 B-Key SATA 6Gb/s or PCIe 3.0 x1/USB 3.0/USB 2.0 device in the 2242/2280/3042 form factors. M.2-E1 supports an E-Key PCIe 3.0 x1/USB 2.0/Intel CNVi device in the 2230 form factor. M.2-M1 supports an M-Key PCIe 4.0 x4 device in the 2242/2280 form factors. See the following three pages for M.2 slot pin definitions.

Note: For B-Key 3052 support, use an MCP-410-00021-0N bracket.



1. M.2 B-Key
2. M.2 E-Key
3. M.2 M-Key

M.2 B-Key

Pin Definitions (M.2-B1)

Pin#	Definition	Pin#	Definition
1	N/C	2	P3V3SB
3	GND	4	P3V3SB
5	GND	6	FULL_CARD_POWER_OFF#(PU TO P1V8SB only)
7	USB_D+	8	W_DISABLE1#(PU TO P3V3SB only)
9	USB_D-	10	LED_N
11	GND	12	KEY B
13	KEY B	14	KEY B
15	KEY B	16	KEY B
17	KEY B	18	KEY B
19	KEY B	20	PCIE_DIS
21	N/C	22	VBUS_SENSE
23	WAKE_ON_WWAN#(PU TO P1V8SB only)	24	N/C
25	N/C	26	W_DISABLE2#(PU TO P1V8SB only)
27	GND	28	N/C
29	USB3.0-Rx-	30	UIM-RESET
31	USB3.0-Rx+	32	UIM-CLK
33	GND	34	UIM-DATA
35	USB3.0-Tx-	36	UIM-PWR
37	USB3.0-Tx+	38	N/C
39	GND	40	N/C
41	SATA-B+/PERn0	42	N/C
43	SATA-B-/PERp0	44	Alert# (PU to P1V8SB only)
45	GND	46	N/C
47	SATA-A-/PETn0	48	N/C
49	SATA-A+/PETp0	50	PERST#
51	GND	52	CLKRED#
53	REFCLKn	54	PEWAKE#
55	REFCLKp	56	N/C
57	GND	58	N/C
59	N/C	60	CNV_PA_BLANKING
61	N/C	62	CNV_MFUART2_TXD
63	N/C	64	CNV_MFUART2_RXD
65	N/C	66	SIM_DETECT
67	RESET#	68	N/C
69	N/C	70	P3V3SB
71	GND	72	P3V3SB
73	GND	74	P3V3SB
75	N/C		

M.2 E-Key Pin Definitions (M.2-E1)			
Pin#	**Definition**	**Pin#**	**Definition**
1	GND	2	P3V3SB
3	USB_D+	4	P3V3SB
5	USB_D-	6	N/C
7	GND	8	CNV_BT_I2S_SCLK
9	CNV_WR_LANE1_DN	10	CNV_RF_RESET_N
11	CNV_WR_LANE1_DP	12	CNV_BT_I2S_SDO
13	GND	14	MODEM_CLKREQ
15	CNV_WR_LANE0_DN	16	N/C
17	CNV_WR_LANE0_DP	18	GND
19	GND	20	UART_BT_WAKE_N
21	CNV_WR_CLK_DN	22	CNV_BRI_RSP
23	CNV_WR_CLK_DP	24	KEY E
25	KEY E	26	KEY E
27	KEY E	28	KEY E
29	KEY E	30	KEY E
31	KEY E	32	CNV_RGI_DT
33	GND	34	CNV_RGI_RSP
35	PETp0	36	CNV_BRI_DT
37	PETn0	38	CLINK_RST_N
39	GND	40	CLINK_DATA
41	PERp0	42	CLINK_CLK
43	PERn0	44	CNV_PA_BLANKING
45	GND	46	CNV_MFUART2_TXD
47	REFCLKp0	48	CNV_MFUART2_RXD
49	REFCLKn0	50	SUSCLK
51	GND	52	PERST0#
53	CLKREQ0#	54	BT_DISABLE2#
55	PEWAKE0#	56	WIFI_DISABLE2#
57	GND	58	N/C
59	CNV_WT_LANE1_DN	60	N/C
61	CNV_WT_LANE1_DP	62	N/C
63	GND	64	N/C
65	CNV_WT_LANE0_DN	66	N/C
67	CNV_WT_LANE0_DP	68	N/C
69	GND	70	N/C
71	CNV_WT_CLK_DN	72	P3V3SB
73	CNV_WT_CLK_DP	74	P3V3SB
75	GND		

M.2 M-Key Pin Definitions (M.2-M1)			
Pin#	**Definition**	**Pin#**	**Definition**
1	GND	2	P3V3
3	GND	4	P3V3
5	PERn3	6	N/C
7	PERp3	8	N/C
9	GND	10	LED_N
11	PETn3	12	P3V3
13	PETp3	14	P3V3
15	GND	16	P3V3
17	PERn2	18	P3V3
19	PERp2	20	N/C
21	GND	22	N/C
23	PETn2	24	N/C
25	PETp2	26	N/C
27	GND	28	N/C
29	PERn1	30	N/C
31	PERp1	32	N/C
33	GND	34	N/C
35	PETn1	36	N/C
37	PETp1	38	N/C
39	GND	40	N/C
41	PERn0	42	N/C
43	PERp0	44	N/C
45	GND	46	N/C
47	PETn0	48	N/C
49	PETp0	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKn	54	N/C
55	REFCLKp	56	N/C
57	GND	58	N/C
59	KEY M	60	KEY M
61	KEY M	62	KEY M
63	KEY M	64	KEY M
65	KEY M	66	KEY M
67	N/C	68	SUSCLK
69	PEDET	70	P3V3
71	GND	72	P3V3
73	GND	74	P3V3
75	GND		

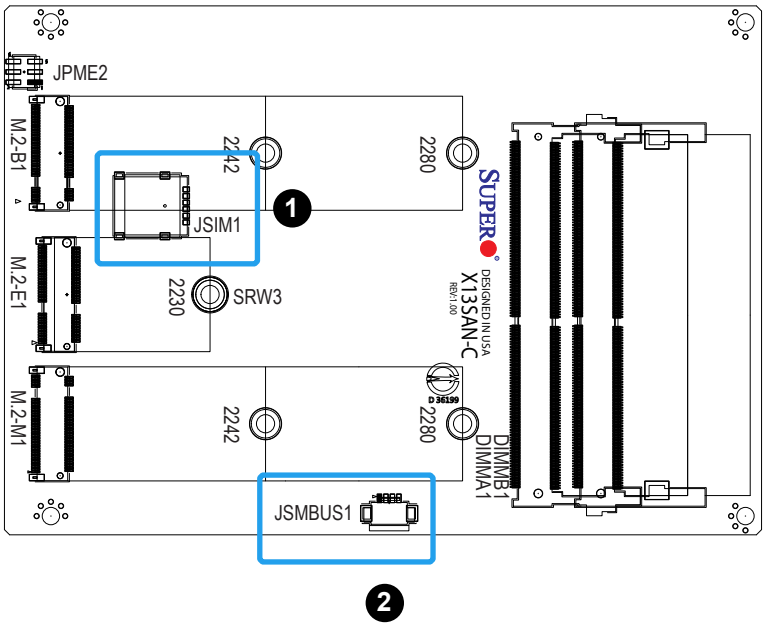
Nano SIM Connector

The JSIM1 slot supports a Nano SIM card.

SMBUS Header

A System Management Bus header for additional slave devices or sensors is located at JSMBUS1 on the bottom side of the motherboard.

SMBus Header Pin Definitions (JSMBUS1)	
Pin#	**Definition**
1	SMB_CLK
2	SMB_DATA
3	GND
4	P5V



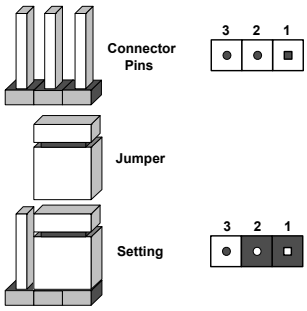
1. Nano SIM
2. SMBUS

2.7 Jumper Settings

How Jumpers Work

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

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



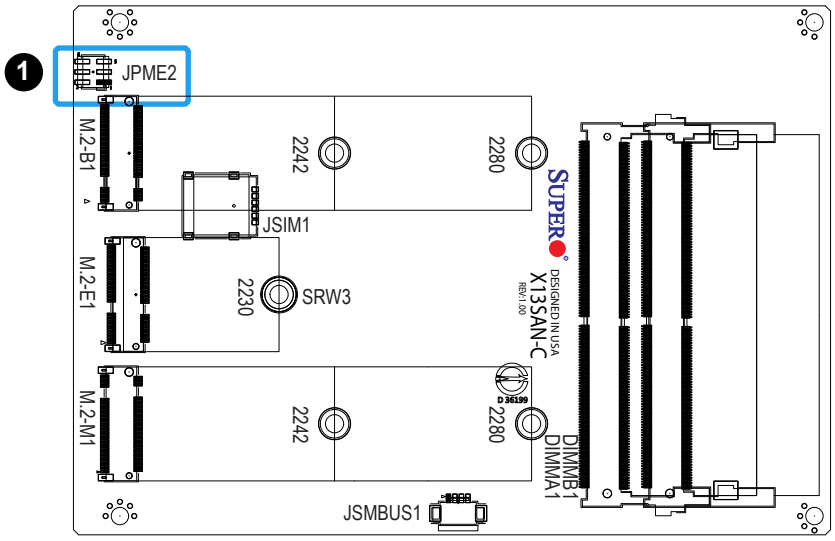
CMOS Clear

Use JPME2 to clear CMOS, which clears all passwords. Before clearing the CMOS by closing pins 3-5, shut down the system.

Manufacturing Mode

Close pins 2-4 of jumper JPME2 to bypass SPI flash security and force the system to operate in the manufacturing mode, which will allow you to flash the system firmware from a host server for system setting modifications.

CMOS Clear / Manufacturing Mode Jumper Settings (JPME2)	
Jumper Setting	**Definition**
Pins 4-6	Normal (Default)
Pins 2-4	Manufacturing Mode
Pins 1-3	Normal (Default)
Pins 3-5	CMOS Clear



1. CMOS Clear, Manufacturing Mode (JPME2)

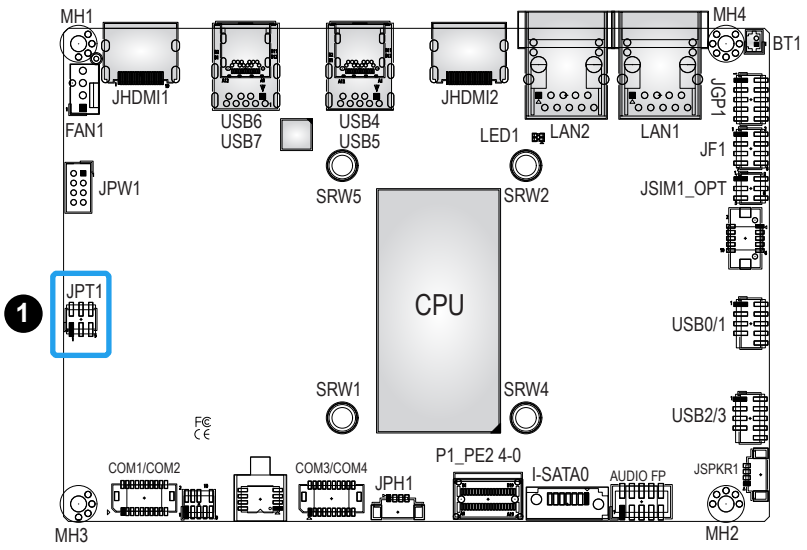
Force Power On

Use JPT1 to select the Force power on function when the AC power cord is plugged in. When enabling force power on and AC power recovery, the system will boot up automatically without pressing the power button.

Onboard TPM 2.0 Enable/Disable

Use JPT1 to enable or disable support for the TPM module.

Force Power On/TPM Enable Jumper Settings (JPT1)	
Jumper Setting	**Definition**
Pins 1-3	TPM Enabled (Default)
Pins 3-5	TPM Disabled
Pins 2-4	Force power on (Default) (when AC power cord is plugged)
Pins 4-6	Power button power on (when AC power cord is plugged)



1. Force Power On, Onboard TPM 2.0 (JPT1)

SIM Detect Option

Pins 2 and 4 on the JSIM1_OPT jumper are for SIM card detection. Since each SIM card vendor sets a different condition for detection, check with the vendor for the correct detection type and set the JSIM1_OPT jumper before installing the SIM card.

5G/LTE USB/PCIe Interface Option

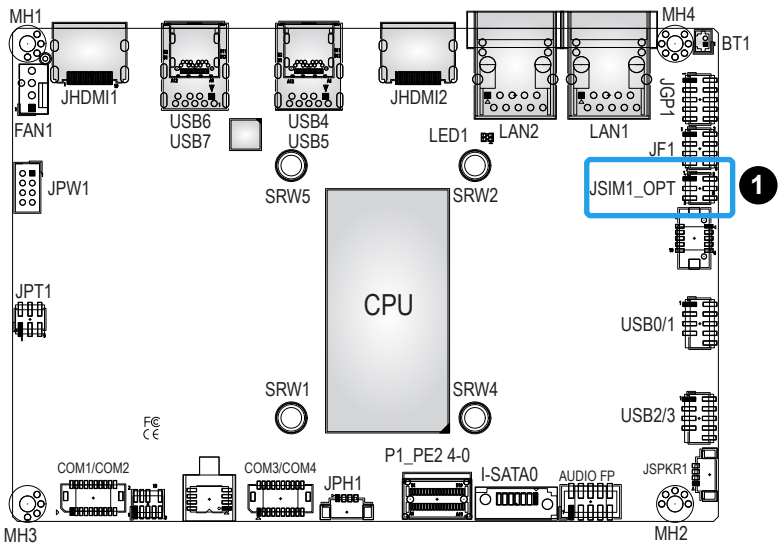
Pins 1 and 3 on the JSIM1_OPT jumper are for 5G/LTE USB/PCIe module detection. Check with the vendor for the correct detection type and set the JSIM1_OPT jumper before installing the module.

M.2 B-Key Storage LED

Pins 5 and 6 on the JSIM1_OPT jumper are for enabling or disabling M.2 B-Key storage module LED signal to the front panel HDD LED. Disconnect pins 5 and 6 to disable the LED signal.

SIM Detect Option / 5G/LTE USB/PCIe Interface Option Jumper Settings (JSIM1_OPT)

Jumper Setting	Definition
Pins 2-4	SIM Detect Low Active (Default)
Pins 2-4 Open	SIM Detect High Active
Pins 1-3	USB (Default)
Pins 1-3 Open	PCIe Low Active
Pins 5-6	M.2 B-Key Storage LED Enabled (Default)
Pins 5-6 Open	M.2 B-Key Store LED Disabled



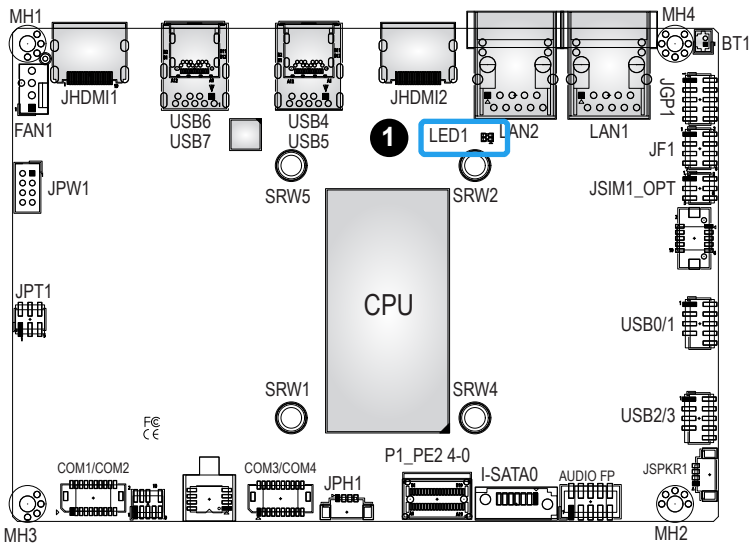
1. SIM Detect Option, 5G/LTE USB/PCIe, M.2 B-Key Storage LED (JSIM1_OPT)

2.8 LED Indicators

Onboard Power LED

LED1 is the Onboard Power LED. When this LED is on, the system is on. Be sure to turn off the system and unplug the power cord before removing or installing components. Refer to the table below for more information.

Power LED Indicator (LED1)	
LED1	**Definition**
Green	System On
Red	S5 or main power fail
Off	System Off (power cable not connected)



1. Onboard Power LED

Chapter 3

Troubleshooting

3.1 Troubleshooting Procedures

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

Before Power On

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

No Power

This motherboard features an Onboard Power LED at LED1. Before following the procedures in this section, check if LED1 is off. If LED1 is off, refer to these procedures.

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

No Video

1. See if the Onboard Power LED at LED1 is green. If the LED is off, check the "No Power" section of this chapter. If the LED is red, check the "System Boot Failure" section of this chapter.
2. If the power is on but you have no video, remove all add-on cards and cables.
3. Make sure the video cables are properly connected.

System Boot Failure

If the system does not display POST, the system does not respond after the power is turned on, or LED1 is red, check the following:

1. Clear the CMOS settings by unplugging the power cord and jumping pins 3 and 5 on the CMOS clear jumper (JPME2). Refer to Section 2-7 in Chapter 2.
2. Remove all components from the motherboard, especially the DIMM modules. Make sure that system power is on and that memory error beeps are activated.
3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this chapter.

Memory Errors

1. Make sure that the memory modules are compatible with the system and that the DIMMs are properly and fully installed. Click on the Tested Memory List link on the motherboard 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 DIMM 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.
5. Make sure that all memory modules are fully seated in their slots. Follow the instructions given in Section 2-4 in Chapter 2.
6. Follow the instructions given in the DIMM population tables listed in Section 2-4 to install your memory modules.

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 Section 1-6 for details on recommended power supplies.

2. The external CMOS battery for your motherboard may be old. Check to verify that it still supplies approximately 3VDC. If it does not, replace it with a new one.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. BIOS support: Make sure 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 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 BIOS/SUM 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 appropriate power connectors are connected. Refer to our website for more information on the minimum power requirements.

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

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

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as USB flash or media drives.

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

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

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

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

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

3.2 Technical Support Procedures

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

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

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

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

- Motherboard model and PCB revision number
- BIOS release date/version (This can be seen on the initial display when your system first boots up.)
- System configuration

4. An example of a Technical Support form is on our website at https://webpr3.supermicro.com/SupportPortal/.

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

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The X13SAN supports up to 64GB of Non-ECC DDR5 SO-DIMM memory with speeds of up to 4800 MT/s in two memory slots. To enhance memory performance, do not mix memory modules of different speeds and sizes. Follow all memory installation instructions given on Section 2-3 in Chapter 2.

Question: How do I update my BIOS?

Answer: It is recommended that you **do not** upgrade your BIOS if you are not experiencing any problems with your system. Updated BIOS files are located on our website at http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html. Check our BIOS warning message and the information on how to update your BIOS on our website. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading. You can choose from the zip file and the .exe file. If you choose the zip BIOS file, unzip the BIOS file onto a bootable USB device. Run the batch file using the format FLASH.BAT filename.rom from your bootable USB device to flash the BIOS. Then, your system will automatically reboot.

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

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

3.4 Battery Removal and Installation

Battery Removal

To remove the external CMOS battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Remove the battery cable at the BT1 connector on the board.
3. Remove the battery.

Proper Battery Disposal

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

Battery Installation

1. Unplug the power cord.
2. Connect the battery cable into the battery connector (BT1) and push it down until you hear a click to ensure that the cable is securely locked.
3. Use the foam tape on the back side of the battery to secure the battery to a flat surface on the bottom of the motherboard or proper location in the system. DO NOT place the battery on the heat sink.

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 to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton and 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, RMA authorizations may be requested online (http://www.supermicro.com/support/rma/).

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

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

Chapter 4

UEFI BIOS

4.1 Introduction

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

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

Starting the Setup Utility

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

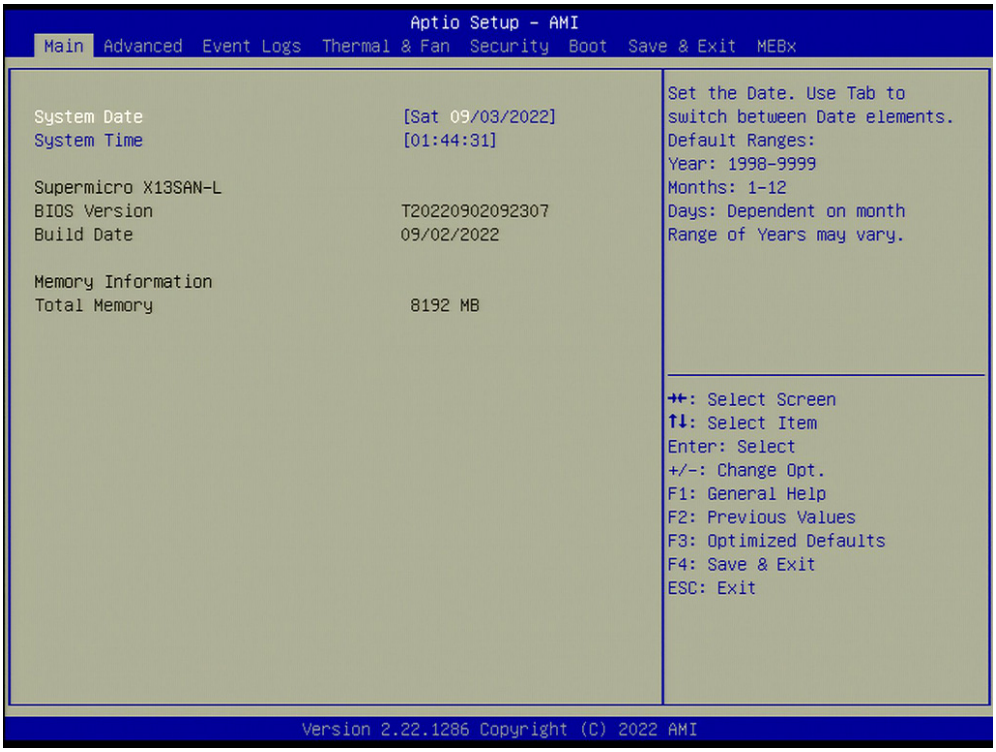
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is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

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

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

4.2 Main Setup

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



System Date/System Time

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

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

Supermicro X13SAN-L

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.

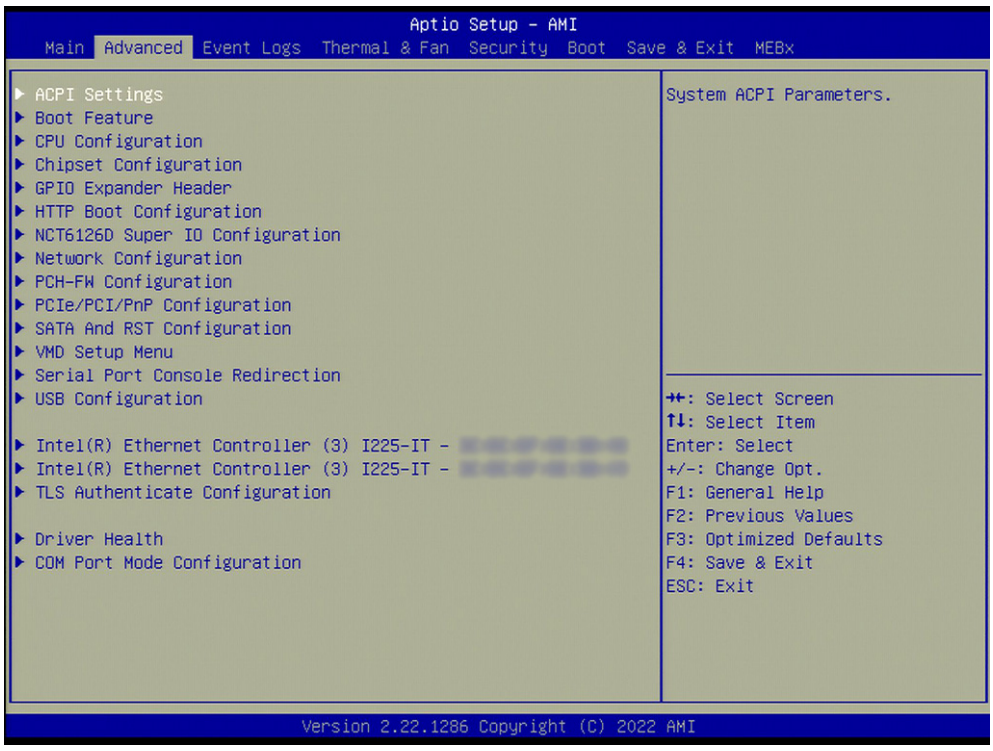
Memory Information

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.



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.

▶ACPI Settings

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**.

Native PCIe Enable

Enable this feature to grant control of PCI Express Native hot plug, PCI Express Power Management Events, and PCI Express Capability Structure Control. The options are Disabled and **Enabled**.

Native ASPM

Select Enabled for the operating system to control the ASPM, or Disabled for the BIOS to control the ASPM. The options are Auto, Enabled, and **Disabled**.

▶Boot Feature

Fast Boot

Enable this feature to reduce the time the computer takes to boot up. The computer will boot with a minimal set of required devices. This feature does not have an effect on BBS boot options in the Boot tab. The options are **Disabled** and Enabled.

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**.

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**.

Re-try Boot

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

Power Configuration

Watch Dog Function

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

AC Loss Policy Depend On

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 to power off the system after pressing and holding the power button for four seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are **Instant Off** and 4 Seconds Override.

DeepSx Power Policies

Use this feature to configure the Advanced Configuration and Power Interface (ACPI) settings for the system. Enable S4 to use Hibernation mode (Suspend to Disk) so that all data stored in the main memory can be saved in a non-volatile memory area such as in a hard drive and then power down the system. Enable S5 to power off the whole system except the power supply unit (PSU) and keep the power button alive so that you can wake up the system by using a USB keyboard or mouse. The options are **Disabled**, Enabled In S4-S5 and Enabled in S5.

▶CPU Configuration

The following CPU information will display:

- CPU Signature
- Microcode Patch
- Max CPU Speed
- Min CPU Speed
- CPU Speed
- Number of Performance-cores
- Number of Efficient-cores

- Hyper Threading Technology
- VMX
- SMX/TXT
- 64-bit
- EIST Technology
- CPU C3 state
- CPU C6 state
- CPU C7 state
- CPU C8 state
- CPU C9 state
- CPU C10 state
- Performance L1 Data Cache
- Performance L1 Instruction Cache
- Performance L2 Cache
- Performance L3 Cache
- Efficient L1 Data Cache
- Efficient L1 Instruction Cache
- Efficient L2 Cache
- Efficient L3 Cache

C6DRAM

Use this feature to enable or disable the moving of DRAM contents to PRM memory when the CPU is in the C6 state. The options are Disabled and **Enabled**.

Hardware Prefetcher (Available when supported by the CPU)

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

Adjacent Cache Line Prefetch (Available when supported by the CPU)

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 Disabled and **Enabled**.

Intel (VMX) Virtualization Technology

Use this feature to enable the Vanderpool Technology. This technology allows the system to run several operating systems simultaneously. The options are Disabled and **Enabled**.

Active Performance-cores

This feature determines how many processor cores will be activated for each processor package. When all is selected, all performance cores in the processor will be activated. The options shown here depend on how many performance cores the CPU supports. The options are **All** and 1.

Active Efficient-cores

This feature determines how many efficient cores will be activated for each processor package. When all is selected, all efficient cores in the processor will be activated. The options shown here depend on how many efficient cores the CPU supports. The options are **All**, 7, 6, 5, 4, 3, 2, 1, and 0.

Hyper-Threading (Available when supported by the CPU)

Select Enable to support Intel Hyper-Threading Technology to enhance CPU performance. The options are Disabled and **Enabled**.

AES

Select Enabled for Intel CPU Advanced Encryption Standard (AES) instructions support to enhance data integrity. The options are Disabled and **Enabled**.

Boot Performance Mode

This feature allows you to select the performance state that the BIOS will set before the operating system handoff. The options are Max Non-Turbo Performance and **Turbo Performance**.

Intel® SpeedStep™

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

Intel® Speed Shift Technology

Use this feature to enable or disable Intel Speed Shift Technology support. When this feature is enabled, the Collaborative Processor Performance Control (CPPC) version 2 interface will be available to control CPU P-States. The options are Disabled and **Enabled**.

Turbo Mode

Select Enable for processor cores to run faster than the frequency specified by the manufacturer. The options are Disabled and **Enabled**.

C-States

Use this feature to enable the C-State of the CPU. The options are Disabled and **Enabled**.

Enhanced C-states

Use this feature to enable the enhanced C-State of the CPU. The options are Disabled and **Enabled**.

C-State Auto Demotion

Use this feature to prevent unnecessary excursions into the C-states to improve latency. The options are Disabled and **C1**.

C-State Un-Demotion

This feature allows you to enable or disable the un-demotion of C-State. The options are Disabled and **C1**.

Package C-State Demotion

Use this feature to enable or disable the Package C-State demotion. The options are Disabled and **Enabled**.

Package C-State Un-Demotion

Use this feature to enable or disable the Package C-State un-demotion. The options are Disabled and **Enabled**.

C-State Pre-Wake

This feature allows you to enable or disable the C-State Pre-Wake. The options are Disabled and **Enabled**.

Package C-State Limit

Use this feature to set the Package C-State limit. The options are C0/C1, C2, C3, C6, C7, C7s, C8, C9, C10, Cpu Default, and **Auto**.

MonitorMWait

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 Disabled and **Enabled**.

▶Config TDP Configurations

Enable Configurable TDP

Applies Configurable Processor Base Power (cTDP) initialization setings based on non-cTDP or cTDP. Default is 1: applies to cTDP; if 0 then applies non-cTDP and BIOS will bypass cTDP initialization flow. The options are Applies to non-cTDP and **Applies to cTDP**.

Configurable TDP Boot Mode

Use this feature to select a cTDP Boot Mode. Deactivate will set MSR to nominal and MMIO to zero. The options are **Nominal**, Level1, Level2, and Deactivate.

ConfigTDP Levels

Power Limit 1

Power Limit 2

Custom Settings Nominal/Level1/Level2

ConfigTDP Nominal PL1:15.0W

ConfigTDP Level1 PL1:12.0W

ConfigTDP Level2 PL1:28.0W

Power Limit 1

This feature configures Package Power Limit 1 in milliwatts. The CPU will exceed this limit for as long as the value set in "Power Limit 1 Time Window." For 12.50W, enter 12500. BIOS will round to the nearest 1/8W. Enter 0 for no custom override. This value must be between Min Power Limit and Processor Base Power (TDP) Limit. The default setting is **0**.

Power Limit 2

This feature configures Package Power Limit 2 in milliwatts. The CPU will throttle to remain below this limit. For 12.50W, enter 12500. BIOS will round to the nearest 1/8W. Enter 0 for no custom override. This value must be between Min Power Limit and Processor Base Power (TDP) Limit. The default setting is **0**.

Power Limit 1 Time Window

Power Limit 1 Time Window value in seconds. This value defines how long Power Limit 1 may be exceeded. The CPU throttles to remain under Power Limit 1 when the duration of Power Limit 1 Time Window is exceeded. Set this value to 0 to use the default value (28 seconds). The options are numbers between 0 and 128. The default setting is **0**.

▶Chipset Configuration

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

▶System Agent (SA) Configuration

The following information will display:

- VT-d: Supported

▶Memory Configuration

Memory Configuration

- Memory RC Version
- Memory Frequency
- Memory Timings (tCL-tRCD-tRP-tRAS)
- DIMMA1
- DIMMB1

Maximum Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1067, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, 2400, 2600, 2667, 2800, 2933, 3000, 3200, 3467, 3600, 3733, 4000, 4200, 4267, 4400, 4600, and 4800.

Max TOLUD

This feature sets the maximum TOLUD value, which specifies the "Top of Low Usable DRAM" memory space to be used by internal graphics devices, GTT Stolen Memory, and TSEG, respectively, if these devices are enabled. The options are **Dynamic**, 1 GB, 1.25 GB, 1.5 GB, 1.75 GB, 2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB, 3.25 GB, and 3.5 GB.

Memory Scrambler

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

Force ColdReset

Use this feature to enable or disable a cold boot during a MRC execution. The options are Enabled and **Disabled**.

Force Single Rank

Select enabled to use only Rank 0 in each DIMM. The options are **Disabled** and Enabled.

Memory Remap

Use this feature to enable or disable memory remap above 4GB. The options are **Enabled** and Disabled.

MRC Fast Boot

Use this feature to enable or disable fast path through the memory reference code. The options are Disabled and **Enabled**.

Total Memory Encryption

Use this feature to enable or disable Total Memory Encryption (TME). When enabled, Intel TME enhances memory data security. The options are **Disabled** and Enabled.

▶Graphics Configuration

Graphics Configuration

IGFX GOP Version

Graphics Turbo IMON Current

Use this feature to set the graphics turbo IMON value. This value can be a number between 14 to 31. The default is **31**.

Skip Scanning of External Gfx Card

If this feature is enabled, the system will not scan for an external graphics card on PEG and PCIe slots. The options are **Disabled** and Enabled.

Primary Display

Use this feature to select the primary video display. The options are **Auto,** IGFX, and PCH PCI.

Internal Graphics

Select Auto to enable internal graphics even when a device is installed on an expansion slot. The options are **Auto**, Disabled, and Enabled.

GTT Size

Use this feature to set the memory size to be used by the graphics translation table (GTT). The options are 2MB, 4MB, and **8MB**.

Aperture Size

Use this feature to set the Aperture size, which is the size of system memory reserved by the BIOS for graphics device use. The options are 128MB, **256MB,** 512MB, 1024MB, and 2048MB.

DVMT Pre-Allocated

Dynamic Video Memory Technology (DVMT) allows dynamic allocation of system memory to be used for video devices to ensure best use of available system memory based on the DVMT 5.0 platform. The options are 0M, 32M, 64M, 96M, 128M, 160M, 4M, 8M, 12M, 16M, 20M, 24M, 28M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M, and **60M**.

PM Support

Enable this feature to activate Power Management BIOS support. The options are **Enabled** and Disabled.

PAVP Enable

Protected Audio Video Path (PAVP) decodes Intel integrated graphics encrypted video. The options are **Enabled** and Disabled.

Cdynmax Clamping Enable

Enable this feature to activate Cdynmax Clamping. The options are Enabled and **Disabled**.

Graphics Clock Frequency

Use this feature to set the internal graphics clock frequency. The options are 192 Mhz, 307.2 Mhz, 556.8 Mhz, 652.8 MHZ, and **Max CdClock freq based on Reference Clk**.

▶DMI/OPI Configuration

DMI Gen3 ASPM

Use this feature to set the Active State Power Management (ASPM) state on the System Agent (SA) side of the DMI Link. The options are Disabled, Auto, ASPM L0s, **ASPM L1**, and ASPM L0sL1.

▶PEG Port Configuration

M.2-M1 PCIe 4.0 x4

Enable Root Port

Use this feature to enable or disable the PCI Express Graphics (PEG) device in the port specified by the user. The options are Disabled and **Enabled**.

Max Link Speed

Use this feature to select PCIe support for the device installed in the M.2 slot. The options are **Auto**, Gen1, Gen2, Gen3, and Gen4.

P1_PE2 4-0 PCIe 4.0 x4

Enable Root Port

Use this feature to enable or disable the PCI Express Graphics (PEG) device in the port specified by the user. The options are Disabled and **Enabled**.

Max Link Speed

Use this feature to select PCIe support for the device installed in the SlimSAS slot. The options are **Auto**, Gen1, Gen2, Gen3, Gen4, and Gen5.

▶GT - Power Management Control

RC6 (Render Standby)

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

Maximum GT frequency

Use this feature to define the Maximum GT frequency. Choose between 33MHz (RPN) and 1200Mhz (RP0). Any value beyond this range will be clipped to its min/max supported by the CPU. The options are **Default Max Frequency,** 100Mhz, 150Mhz, 200Mhz, 250Mhz, 300Mhz, 350Mhz, 400Mhz, 450Mhz, 500Mhz, 550Mhz, 600Mhz, 650Mhz, 700Mhz, 750Mhz, 800Mhz, 850Mhz, 900Mhz, 950Mhz, 1000Mhz, 1050Mhz, 1100Mhz, 1150Mhz, and 1200Mhz.

Disable Turbo GT frequency

Use this feature to disable Turbo GT frequency. If set to Enabled, Turbo GT frequency becomes disabled. If set to Disabled, GT frequency limiters will be removed. The options are Enabled and **Disabled**.

VT-d

Select Enabled to activate Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The options are **Enabled** and Disabled.

GNA Device (B0:D8:F0)

Use this feature to enable SA GNA device. The options are Enabled and **Disabled**.

▶PCH-IO Configuration

PCH-IO Configuration

- PCH SKU Name
- Stepping

▶PCI Express Configuration

▶PCIe M.2-E1
▶PCIe M.2-B1

PCIe M.2-E1/PCIe M.2-B1 ASPM

Use this feature to activate the Active State Power Management (ASPM) level for a PCIe device. Select Auto for the system BIOS to automatically set the ASPM level based on the system configuration. Select Disabled to disable ASPM support. The options are Disabled, **L1**, and Auto.

PCIe M.2-E1/PCIe M.2-B1 L1 Substates

Use this feature to set the PCI Express L1 Substates. The options are Disabled, L1.1, and **L1.1 & L1.2.**

PCIe M.2-E1/PCIe M.2-B1 PCIe Speed

Use this feature to select the PCI Express port speed. The options are **Auto,** Gen1, Gen2, and Gen3.

PCIe M.2-E1/PCIe M.2-B1 Peer Memory Write Enable

Use this feature to enable or disable Peer Memory Write. The options are **Disabled** and Enabled.

▶GPIO Expander Header

GPIO Expander Header Control

Use this feature to enable or disable GPIO Expander Header Control. The options are Enabled and **Disabled**.

Pin 1 / Pin 2 / Pin 3 / Pin 4 / Pin 5 / Pin 6 / Pin 7 / Pin 8 (Available when GPIO Expander Header Control is set to "Enabled")

Use these features to select the setting for each of eight GPIO Expander Header pins. The options are **Output Low**, Output High, and Input.

▶HTTP Boot Configuration

HTTP BOOT Configuration

HTTP Boot Policy

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

HTTP Boot Checks Hostname

Use this feature to check if the hostname of the TLS certificate matches the hostname provided by the remote server. The options are **Enabled** and Disabled (WARNING: Security Risk!!).

Priority of HTTP Boot

Instance of Priority 1:

Enter a value to set the rank target port. The default is **1**.

Select IPv4 or IPv6

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

Boot Description

Highlight the feature and press <Enter> to create a description.

Boot URI

Highlight the feature and press <Enter> to create a boot URI.

Instance of Priority 2:

Enter a value to set the rank target port. The default is **0**.

▶NCT6126D Super IO Configuration

The following Super IO information will display:

- Super IO Chip NCT6126D

▶Serial Port 1 Configuration

Serial Port 1

Use this feature to enable or disable serial port 1. The options are Disabled and **Enabled**.

Device Settings

The I/O and IRQ address for serial port 1 is IO=3F8h; IRQ=4;.

▶Serial Port 2 Configuration

Serial Port 2

Use this feature to enable or disable serial port 2. The options are Disabled and **Enabled**.

Device Settings

The I/O and IRQ address for serial port 2 is IO=2F8h; IRQ=3;.

▶Serial Port 3 Configuration

Serial Port 3

Use this feature to enable or disable serial port 3. The options are Disabled and **Enabled**.

Device Settings

The I/O and IRQ address for serial port 3 is IO=3E8h; IRQ=6;.

▶Serial Port 4 Configuration

Serial Port 4

Use this feature to enable or disable serial port 4. The options are Disabled and **Enabled**.

Device Settings

The I/O and IRQ address for serial port 4 is IO=2E8h; IRQ=7;.

▶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 will be checked. Press <+> or <-> on your keyboard to change the value. The default setting is **1**.

▶MAC:XXXXXXXXXXXX-IPv4 Network Configuration
▶MAC:XXXXXXXXXXXX-IPv4 Network Configuration

Configured

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

Save Changes And Exit

Use this feature to save changes and exit.

▶MAC:XXXXXXXXXXXX-IPv6 Network Configuration
▶MAC:XXXXXXXXXXXX-IPv6 Network Configuration

▶Enter Configuration Menu

Interface Name

Interface Type

MAC address

Host addresses

Route Table

Gateway addresses

DNS addresses

Interface ID

This feature shows the interface ID for the specified network device.

DAD Transmit Count

This feature sends Neighbor Solicitation messages while performing a Duplicate Address Detection (DAD) to make sure there is no IP address duplication. A value of zero means a DAD has not been performed.

Policy

Use this feature to select an automatic or manual policy. The options are **Automatic** and Manual.

Save Changes And Exit

When you have completed the changes for this section, select this option to save all changes made and exit.

▶PCH-FW Configuration

ME Firmware Version: 16.1.25.1865 or later

ME Firmware Mode: Normal Mode

ME Firmware SKU: Corporate SKU

ME FW Image Re-Flash

Use this feature to update the Management Engine firmware. The options are **Disabled** and Enabled.

TPM Device Selection

Use this feature to select dTPM or PTT for the TPM device. dTPM is discrete Trusted Platform Module and PTT is Platform Trusted Technology. The options are **dTPM** and PTT.

▶AMT Configuration

USB Provisioning of AMT

Use this feature to enable or disable USB provisioning. The options are **Disabled** and Enabled.

MAC Pass Through

Use this feature to enable or disable the MAC Pass Through function. The options are **Disabled** and Enabled.

Activate Remote Assistance Process

Use this feature to activate Remote Assistance. Enabling this feature will also trigger the Client Initiated Remote Access (CIRA) boot. The options are **Disabled** and Enabled.

Unconfigure ME

Use this feature to unconfigure ME with resetting the MEBx password to default on next boot. The options are **Disabled** and Enabled.

▶ASF Configuration

PET Progress

Use this feature to enable or disable PET Events Progress to receive PET Events alerts. The options are Disabled and **Enabled**.

WatchDog

Select Enabled to allow AMT to reset or power down the system if the operating system or BIOS hangs or crashes. The options are **Disabled** and Enabled.

OS Timer / BIOS Timer

These options appear if Watch Dog (above) is enabled. This is a timed delay in seconds, before a system power down or reset after a BIOS or operating system failure is detected. Enter the value in seconds. The default setting is **0**.

ASF Sensors Table

Enable this feature for the ASF Sensor Table to be added into the ASF! ACPI table. The options are **Disabled** and Enabled.

▶Secure Erase Configuration

Secure Erase mode

Select Real to securely erase a solid state drive. The options are **Simulated** and Real.

Force Secure Erase

Select Enabled to force a secure erase of the solid state drive on the next boot. The options are **Disabled** and Enabled.

▶One Click Recovery (OCR) Configuration

OCR Https Boot

Use this feature to enable or disable One Click Recovery Https Boot. One Click Recovery is a recovery process that lets you restore your computer to its last known good state with a single command. The options are Disabled and **Enabled**.

OCR PBA Boot

Use this feature to enable or disable One Click Recovery PBA Boot. The options are Disabled and **Enabled**.

OCR Windows Recovery Boot

Use this feature to enable or disable One Click Recovery Windows Boot. The options are Disabled and **Enabled**.

OCR Disable Secure Boot

Use this feature to allow CSME to request Secure Boot to be disabled for One Click Recovery. The options are Disabled and **Enabled**.

▶Remote Platform Erase Configuration

Enable Remote Platform Erase Feature

Use this feature to enable or disable the Remote Platform Erase (RPE) feature for solid state drives. The options are Disabled and **Enabled**.

SSD Erase Mode

Select Real to securely erase a solid state drive through RPE. The options are **Simulated** and Real.

▶PCIe/PCI/PnP Configuration

Option ROM execution

Video

Use this feature to select the execution of the video OpROM. The options are Do not launch and **EFI**.

PCI PERR/SERR Support

Use this feature to enable or disable the runtime event for PCI errors. The options are **Disabled** and Enabled.

Above 4GB MMIO BIOS Assignment (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**.

Re-Size BAR Support

Use this feature to enable or disable Resizable BAR support for PCIe devices that support Resizable BAR. 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.

BME DMA Mitigation

Enable this feature to help block DMA attacks. The options are **Disabled** and Enabled.

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.

Consistent Device Name Support

This feature controls the device naming for network devices and slots. The options are **Disabled** and Enabled.

PCIe/PCI/PnP Configuration

PCIe M.2-E1 OPROM

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

PCIe M.2-B1 OPROM

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

Onboard LAN1 Option ROM

Use this feature to select which firmware function to be loaded for LAN 1 used for system boot. The options are Disabled and **EFI**.

Wake On Lan

This is a workaround to enable the S5 wake on LAN. The options are Disabled and **Enabled**.

▶SATA And RST Configuration

SATA Controller(s)

Use this feature to enable or disable the onboard SATA controller supported by the Intel PCH chip. The options are **Enabled** and Disabled.

Storage 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 Do not Launch and **EFI**.

Aggressive LPM Support

When this feature is set to Enabled, the SATA AHCI controller manages the power usage of the SATA link. The controller will put the link in a low power mode during extended periods of I/O inactivity and will return the link to an active state when I/O activity resumes. The options are Disabled and **Enabled**.

I-SATA 0 / M.2-B1

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

- Software Preserve Support

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**.

Spin Up Device

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

SATA Device Type

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

▶VMD Setup Menu

VMD Configuration

Enable VMD Controller

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

Enable VMD Global Mapping (Available when Enable VMD Controller is set to "Enabled"

Use this feature to enable or disable VMD global mapping. The options are Disabled and **Enabled**.

Map this Root Port under VMD (Available when Enable VMD Global Mapping is set to "Disabled")

Use this feature to map or unmap the selected root port to VMD. The options are Disabled and **Enabled**.

Root Port BDF details

This feature displays the root port bus device function (BDF), such as SATA Controller.

▶Serial Port Console Redirection

COM1/2/3/4 Console Redirection

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

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

▶COM1/2/3/4 Console Redirection Settings

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer.

COM1/2/3/4 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.

COM1/2/3/4 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).

COM1/2/3/4 Data Bits

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

COM1/2/3/4 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.

COM1/2/3/4 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.

COM1/2/3/4 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.

COM1/2/3/4 VT-UTF8 Combo Key Support

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

COM1/2/3/4 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.

COM1/2/3/4 Resolution 100x31

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

COM1/2/3/4 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.

COM1/2/3/4 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.

AMT SOL Console Redirection

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

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

▶AMT SOL Console Redirection Settings

AMT 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.

AMT SOL 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).

AMT SOL Data Bits

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

AMT SOL 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.

AMT SOL 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.

AMT SOL 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.

AMT SOL VT-UTF8 Combo Key Support

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

AMT SOL 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.

AMT SOL Resolution 100x31

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

AMT SOL 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.

AMT SOL 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.

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

Console Redirection

Select Enabled to use the COM port 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:

▶Console Redirection Settings

This feature allows you to specify how the host computer will exchange data with the client computer, which is the remote computer.

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**, COM2, COM3, COM4, and AMT 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 feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

Flow Control

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

Data Bits, Parity, Stop Bits

▶USB Configuration

USB Configuration

USB Module Version

USB Controllers

USB Devices

XHCI Hand-off

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

USB Mass Storage Driver Support

Select Enabled for USB mass storage device support. The options are Disabled and **Enabled**.

USB S5 Wakeup Support

Use this feature to enable or disable USB S5 Wakeup support. The options are Disabled and **Enabled**.

▶Intel(R) Ethernet Controller (3) I225-IT - XX:XX:XX:XX:XX:XX

UEFI Driver

Device Name

PCI Device ID

Link Status

MAC Address

▶Intel(R) Ethernet Connection (3) I225-IT - XX:XX:XX:XX:XX:XX

UEFI Driver

Device Name

PCI Device ID

Link Status

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 feature provides the health status for the network drivers and controllers.

▶Intel(R) Gigabit 0.9.03

Controller 6C584218 Child 0

Intel(R) Ethernet Controller (3) I225-IT

▶Intel(R) Gigabit 0.9.03

Controller 6C583E18 Child 0

Intel(R) Ethernet Controller (3) I225-IT

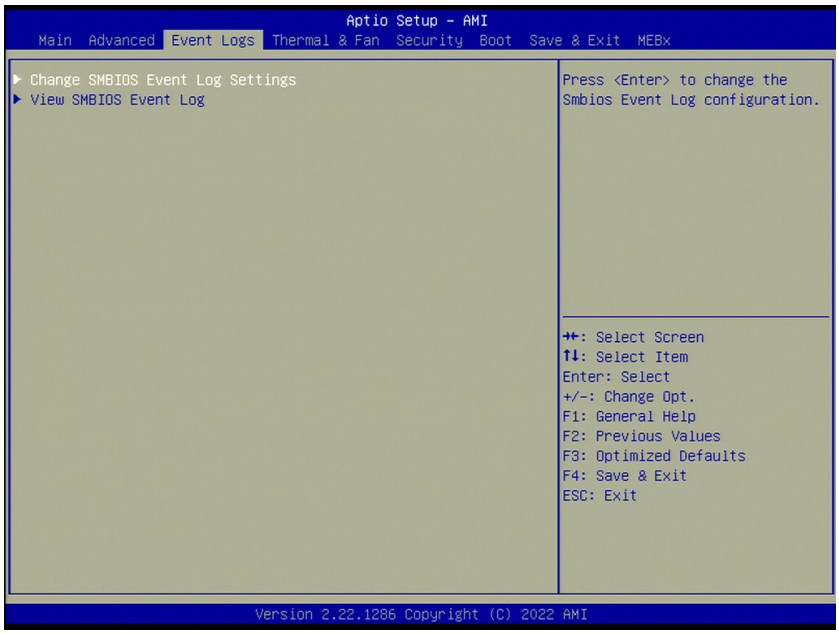
▶COM Port Mode Configuration

COM1/COM2 Mode

Use this feature to select the COM1 mode. The settings are **RS-232**, RS-485/422 Full Duplex, and RS-485 Half Duplex.

4.4 Event Logs

Use this menu to configure Event Log settings.



▶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 occurences that a duplicate event must happen before the MECI counter is incremented. This is a numeric value. The default value is **1**.

METW

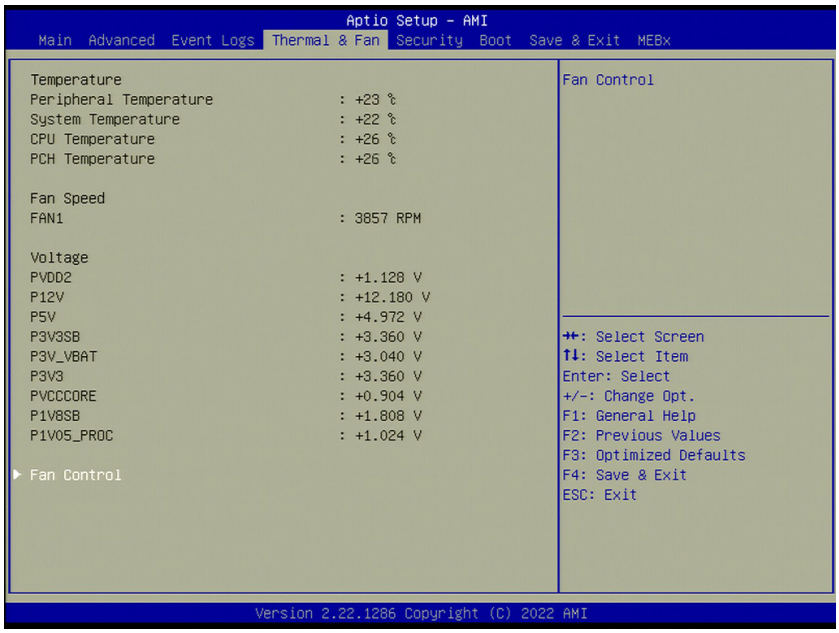
The Multiple Event Time Window (METW) defines the number of minutes that must pass between duplicate log events before MECI is incremented. This is in minutes, from 0 to 99. The default value is **60**.

▶View SMBIOS Event Log

Select this submenu and press <Enter> to see the contents of the SMBIOS event log. The following categories will be displayed: Date/Time/Error Codes/Severity.

4.5 Thermal & Fan

Use this menu to view System Health settings.



Temperature

- Peripheral Temperature
- System Temperature
- CPU Temperature
- PCH Temperature

Fan Speed

- FAN1

Voltage

- PVDD2
- P12V
- P5V
- P3V3SB
- P3V_VBAT

- P3V3
- PVCCCORE
- P1V8SB
- P1V05_PROC

▶Fan Control

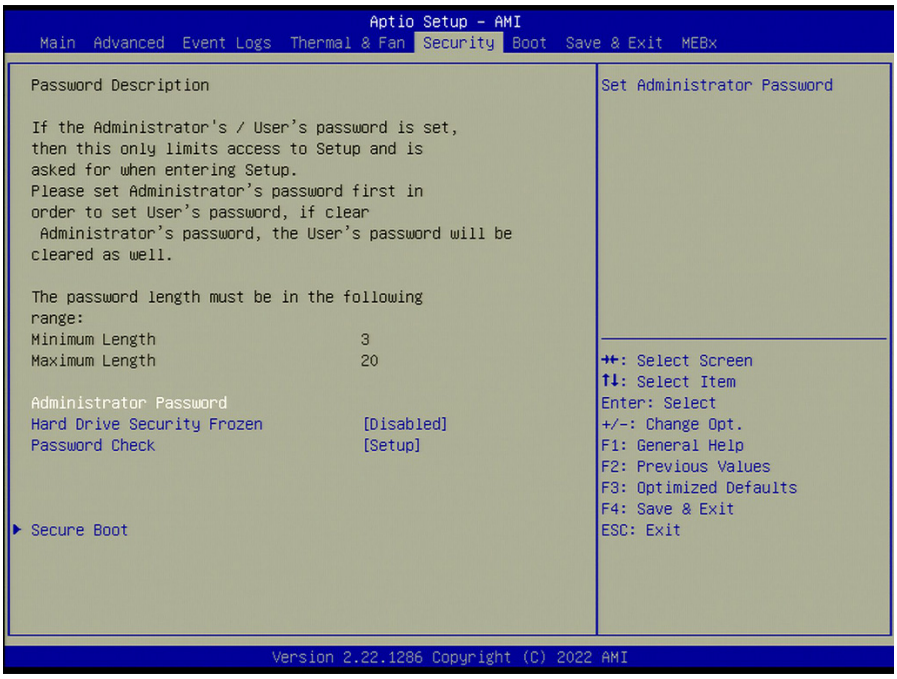
Fan Control Setting

Fan Speed Control Mode

Use this feature to select the fan speed control mode. The options are Quiet, **Standard**, and Full Speed.

4.6 Security

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



Administrator Password

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

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**.

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.

▶Secure Boot

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

- System Mode
- Secure Boot

Secure Boot

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

Secure Boot Mode

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

Enter Audit Mode

Select this feature to enter the audit mode to configure PK.

▶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. The options are **Yes** and No.

▶Reset to Setup Mode

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

▶Enroll EFI Image

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

▶Export Secure Boot Variables

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

Secure Boot variable

▶Platform Key (PK)

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

▶Key Exchange Keys

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

▶Authorized Signatures

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

▶Forbidden Signatures

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

▶Authorized TimeStamps

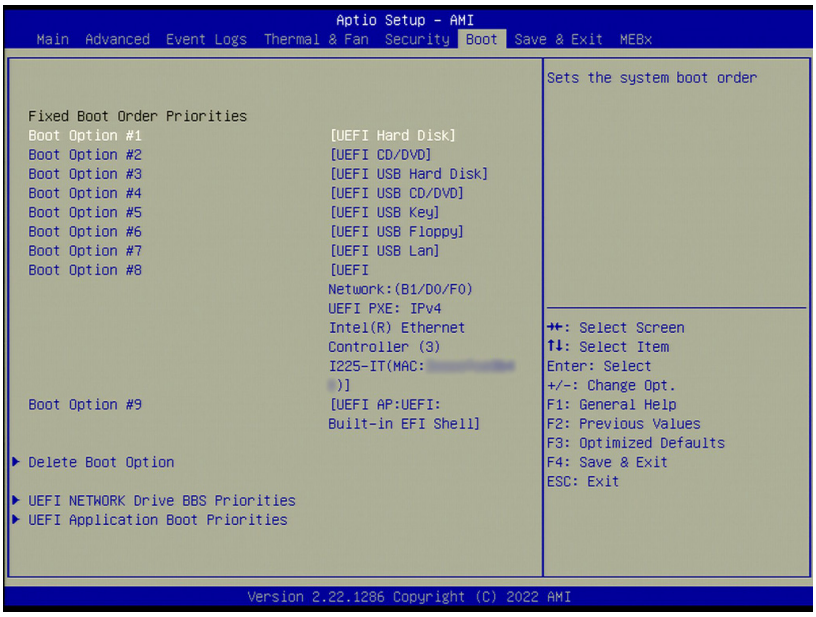
This feature allows you to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. These values also indicate sizes, keys, and key sources of the authorized timestamps. Select Update to update your "Authorized TimeStamps."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

▶OsRecovery Signature

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

4.7 Boot

Use this menu to configure Boot settings.



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

▶UEFI NETWORK Drive BBS Priorities

This feature sets the system boot order of detected devices.

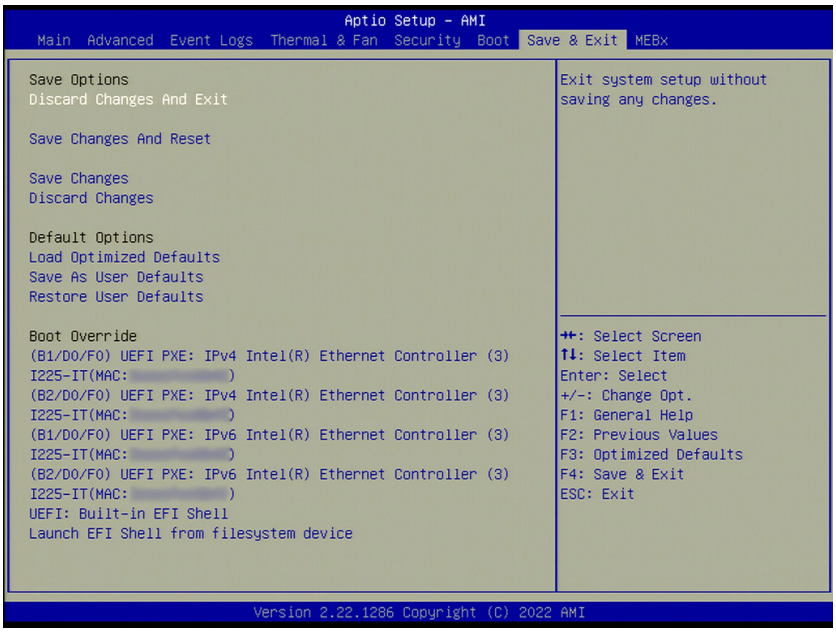
▶UEFI Application Boot Priorities

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.



Save Options

Discard Changes and Exit

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

Save Changes and Reset

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

Save Changes

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

Discard Changes

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

Default Options

Load Optimized Default

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 the user 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

Listed in this section are other boot options for the system (i.e., Built-in EFI shell). The options may vary on each system. Select an option, press <Enter>, and your system will boot to the selected boot option.

(B1/D0/F0) UEFI PXE IPv4 Intel(R) Ethernet Controller (3) I225-IT (MAC:xxxxxxxxxxxx)

(B2/D0/F0) UEFI PXE IPv4 Intel(R) Ethernet Controller (3) I225-IT (MAC:xxxxxxxxxxxx)

(B1/D0/F0) UEFI PXE IPv6 Intel(R) Ethernet Controller (3) I225-IT (MAC:xxxxxxxxxxxx)

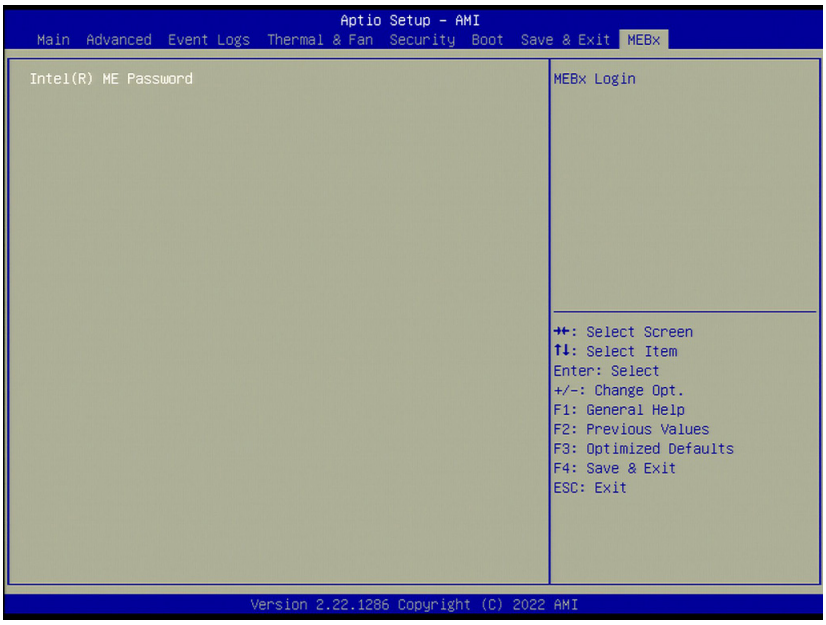
(B2/D0/F0) UEFI PXE IPv6 Intel(R) Ethernet Controller (3) I225-IT (MAC:xxxxxxxxxxxx)

UEFI: Built-in EFI Shell

Launch EFI Shell from filesystem device

4.9 MEBx

Use this menu to create a password for MEBx.



Intel(R) ME Password

Use this feature to create a password for the Intel Management Engine BIOS Extention.

Appendix A

BIOS Codes

A.1 BIOS POST Codes

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

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

Appendix B

Software

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

B.1 Microsoft Windows OS Installation

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

Installing the OS

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

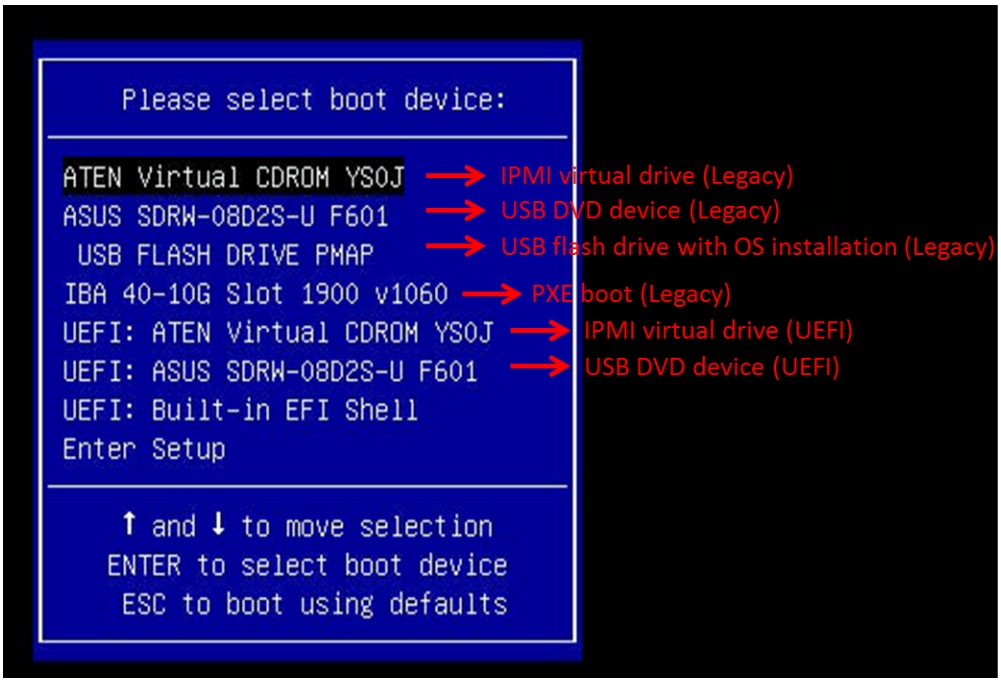


Figure B-1. Select Boot Device

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.

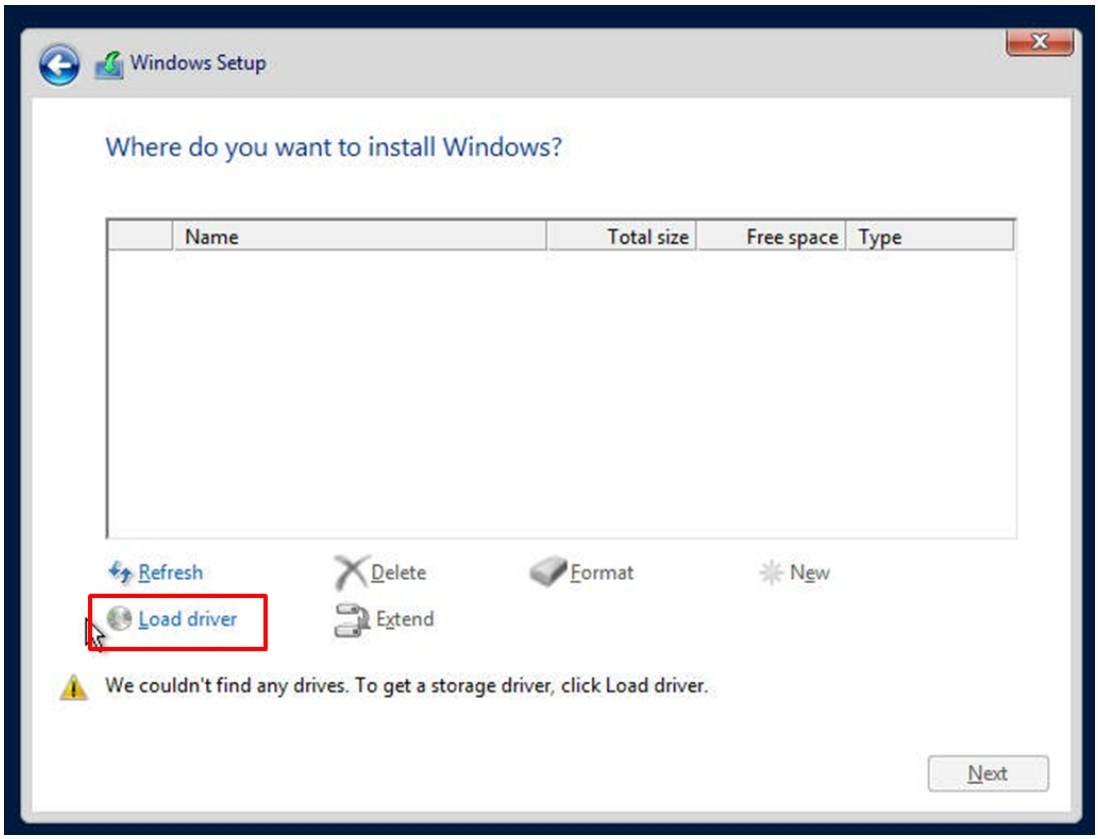


Figure B-2. Load Driver Link

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, locate the ISO file for your motherboard. Download this file to a USB flash drive or a DVD and mount the ISO file as virtual media using the iKVM console for access. You may also use a utility to extract the ISO file if preferred.

Another option is to go to the Supermicro website and search for the motherboard. 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.

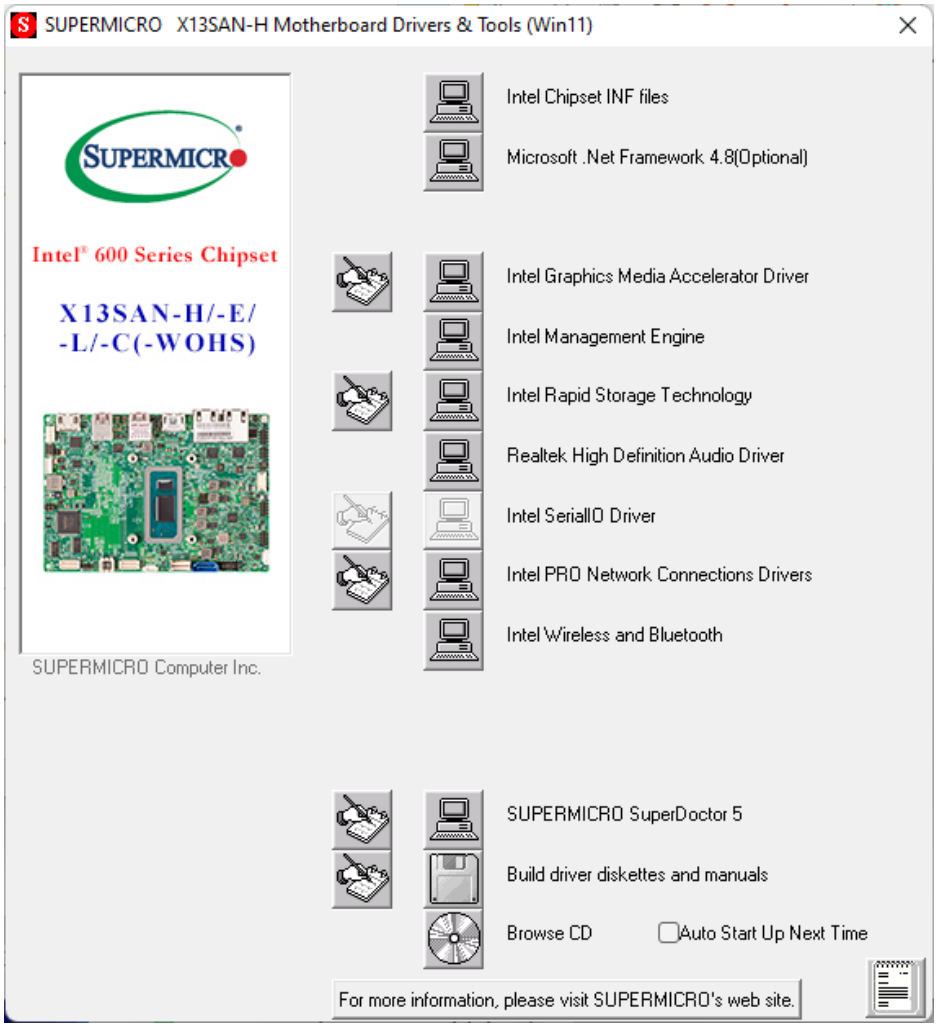


Figure B-3. Driver & Tool Installation Screen

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. 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.

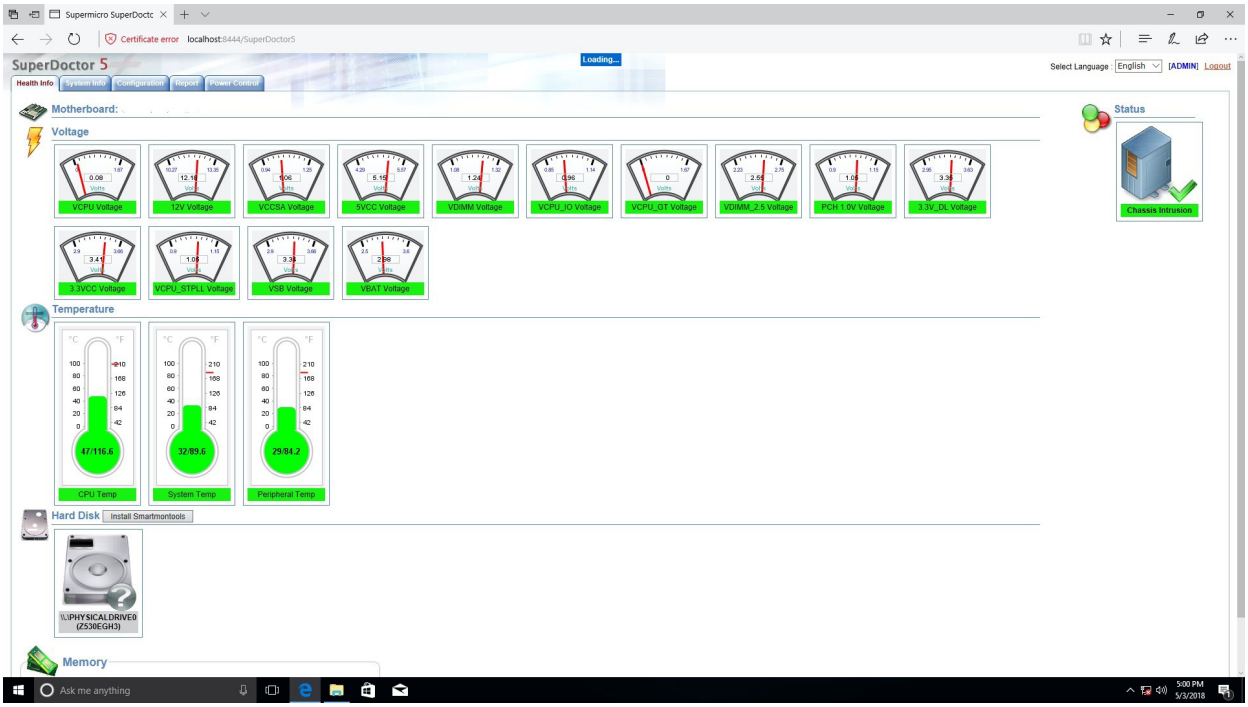


Figure B-4. SuperDoctor 5 Interface Display Screen (Health Information)

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 القانين واللائح البطنية

경고!

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

Waarschuwing

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

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 Power-On Self-Test (POST) routines.

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

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

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 device can be used for this purpose. However, a USB Hard Disk drive cannot be used for BIOS recovery at this time.

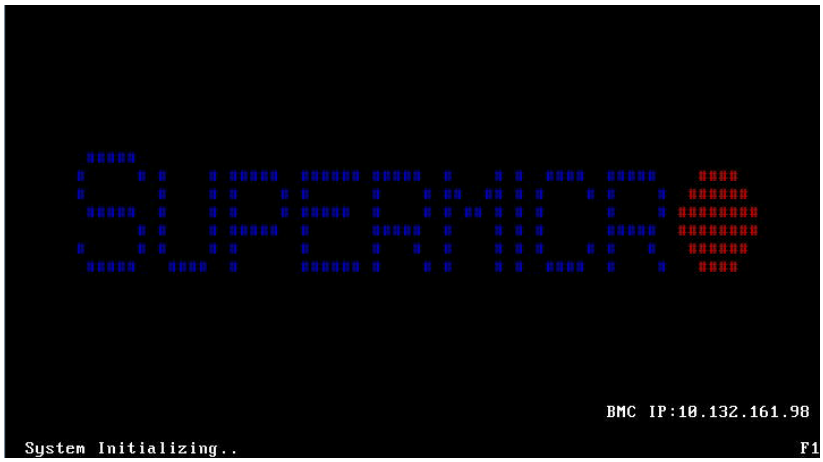
The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32), which is installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large due to the huge volumes of folders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

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

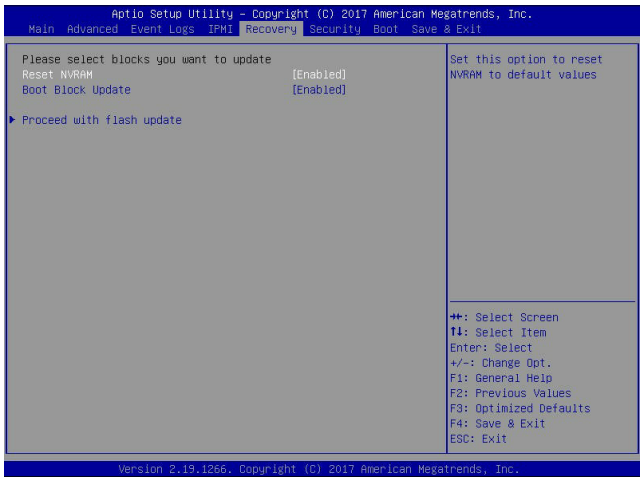
1. Using a different machine, copy the "Super.ROM" binary image file into the disc Root "\" directory of a USB flash or media device.

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

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



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

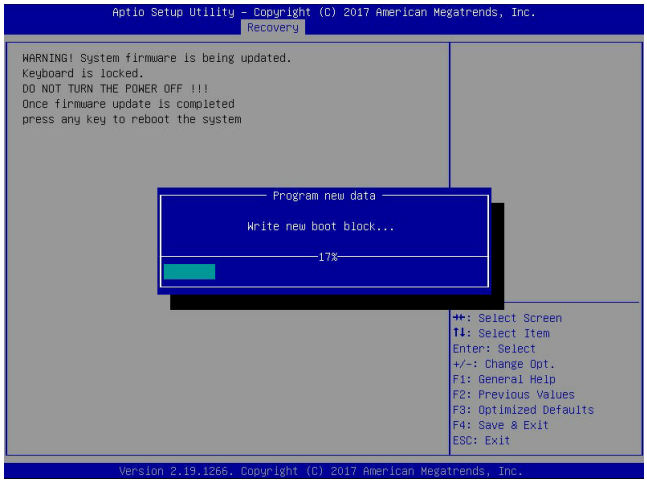


3. After locating the new BIOS binary image, the system will enter the BIOS Recovery menu as shown below:

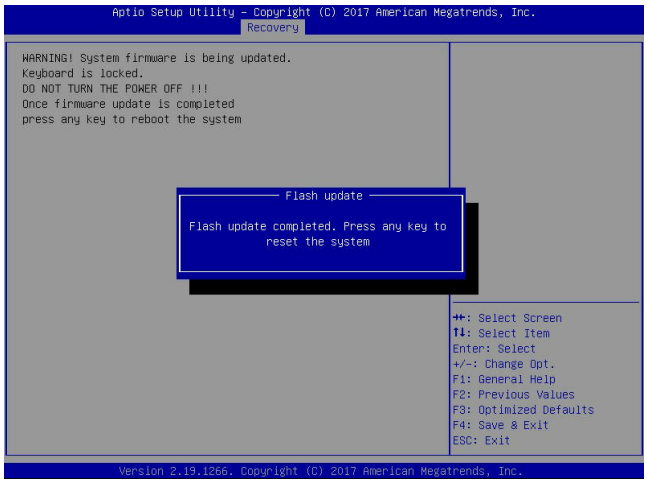
Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

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

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

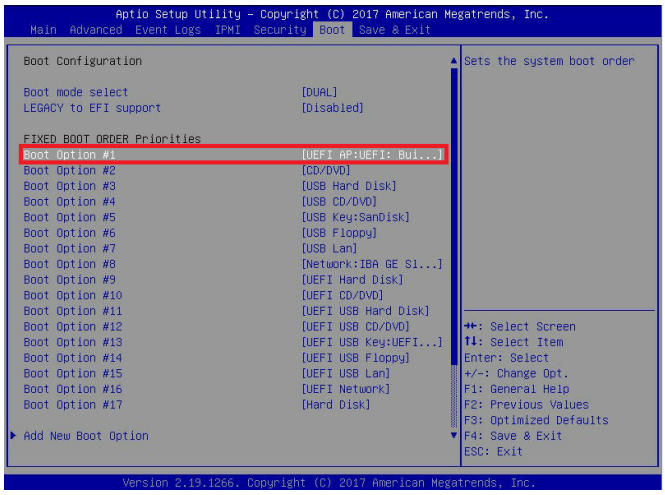


5. After the BIOS recovery process is completed, press any key to reboot the system.

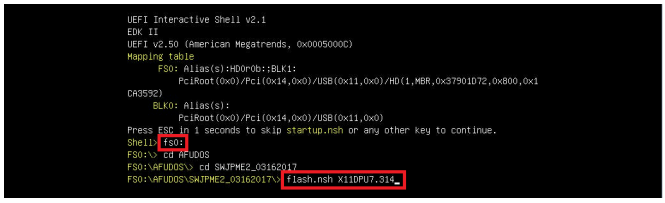


6. Using a different system, extract the BIOS package into a USB flash drive.

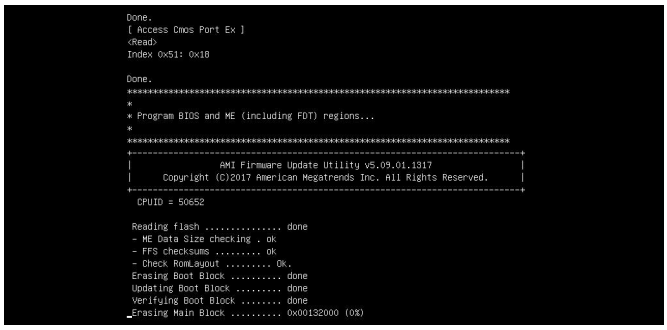
7. Press <Del> during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings and exit the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

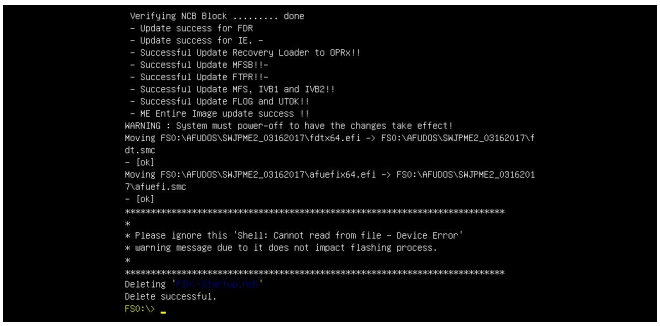


8. When the UEFI Shell prompt appears, type fs# to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter flash.nsh BIOSname.### at the prompt to start the BIOS update process.



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.