



X11DPG-SN

USER'S MANUAL

Revision 1.0

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Manual Revision 1.0

Release Date: December 28, 2017

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# Preface

## About This Manual

This manual is written for system integrators, IT technicians, and knowledgeable end users. It provides information for the installation and use of the X11DPG-SN motherboard.

## About This Motherboard

The X11DPG-SN supports dual Intel® Xeon 81xx/61xx/51xx/41xx/31xx series processors (socket P) with three UltraPath Interconnect (UPI) of up to 10.4 G/s (note below). By utilizing the Intel C621 series chipset, this motherboard supports up to 2TB of 3DS LRDIMM/LRDIMM/RDIMM DDR4 ECC 2666/2400/2133 MHz memory in 16 memory slots, four PCI-E 3.0 x16 for GPU support, one PCI-E x8 expansion slot, one PCI-E 3.0 x16 for SIOM support, ten SATA 3.0 ports, two USB 3.0 ports, 2x NVMe, and a BMC with dedicated LAN and VGA headers. This motherboard is optimized for High Performance Computing systems (HPC), computer clusters, and VDI computing. Please note that this motherboard is intended to be installed and serviced by professional technicians only. For processor/memory updates, please refer to our website at <http://www.supermicro.com/products/>.



**Note:** UPI/memory speeds are dependent on the processors installed in your system.

## Manual Organization

**Chapter 1** describes the features, specifications and performance of the motherboard, and provides detailed information on the Intel C621 chipset.

**Chapter 2** provides hardware installation instructions. Read this chapter when installing the processor, memory modules, and other hardware components into the system.

If you encounter any problems, **Chapter 3** describes troubleshooting procedures for video, memory, and system setup stored in the CMOS.

**Chapter 4** includes an introduction to the BIOS, and provides detailed information on running the CMOS Setup Utility.

**Appendix A** provides BIOS Error Beep Codes.

**Appendix B** lists software program installation instructions.

**Appendix C** provides UEFI BIOS Recovery instructions.

**Appendix D** lists standardized warning statements in various languages.

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# Chapter 1

## Introduction

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

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

### 1.1 Checklist

This motherboard was designed to be used only as a part of an integrated complete system solution in an SMCI-proprietary chassis. Therefore, it is not to be sold as an independent, stand-alone product and the shipping package will not be included in the shipment.

### Important Links

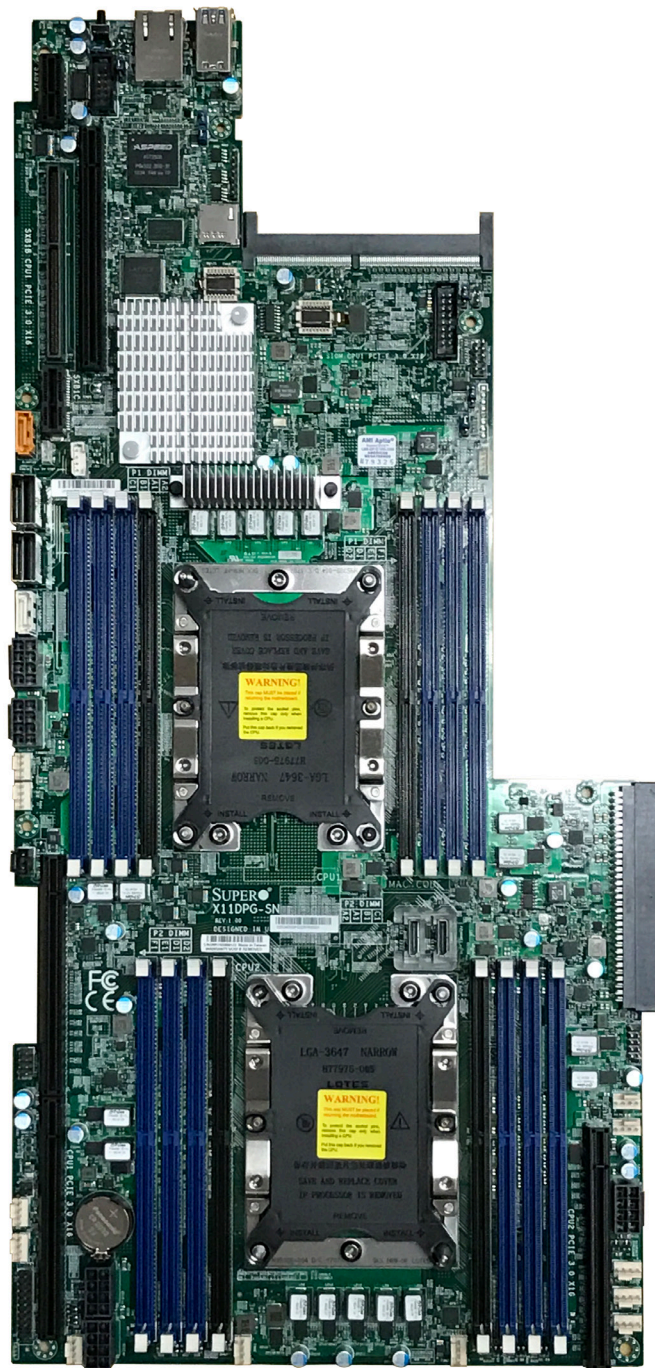
For your system to work properly, please follow the links below to download the user's manual as well as all necessary drivers/utilities for your server.


- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <ftp://ftp.supermicro.com>
- Product safety info: [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://www.supermicro.com/about/policies/safety_information.cfm)
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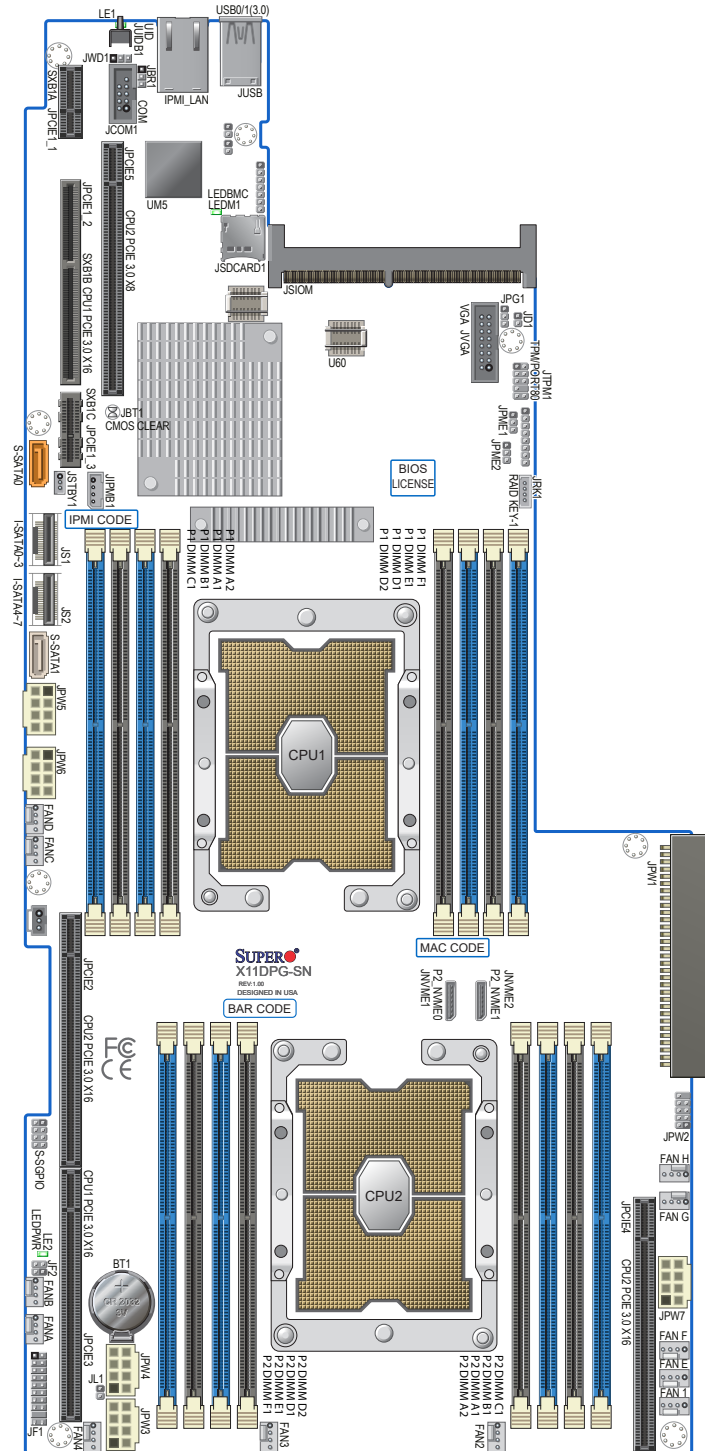



Figure 1-1. X11DPG-SN Motherboard Image



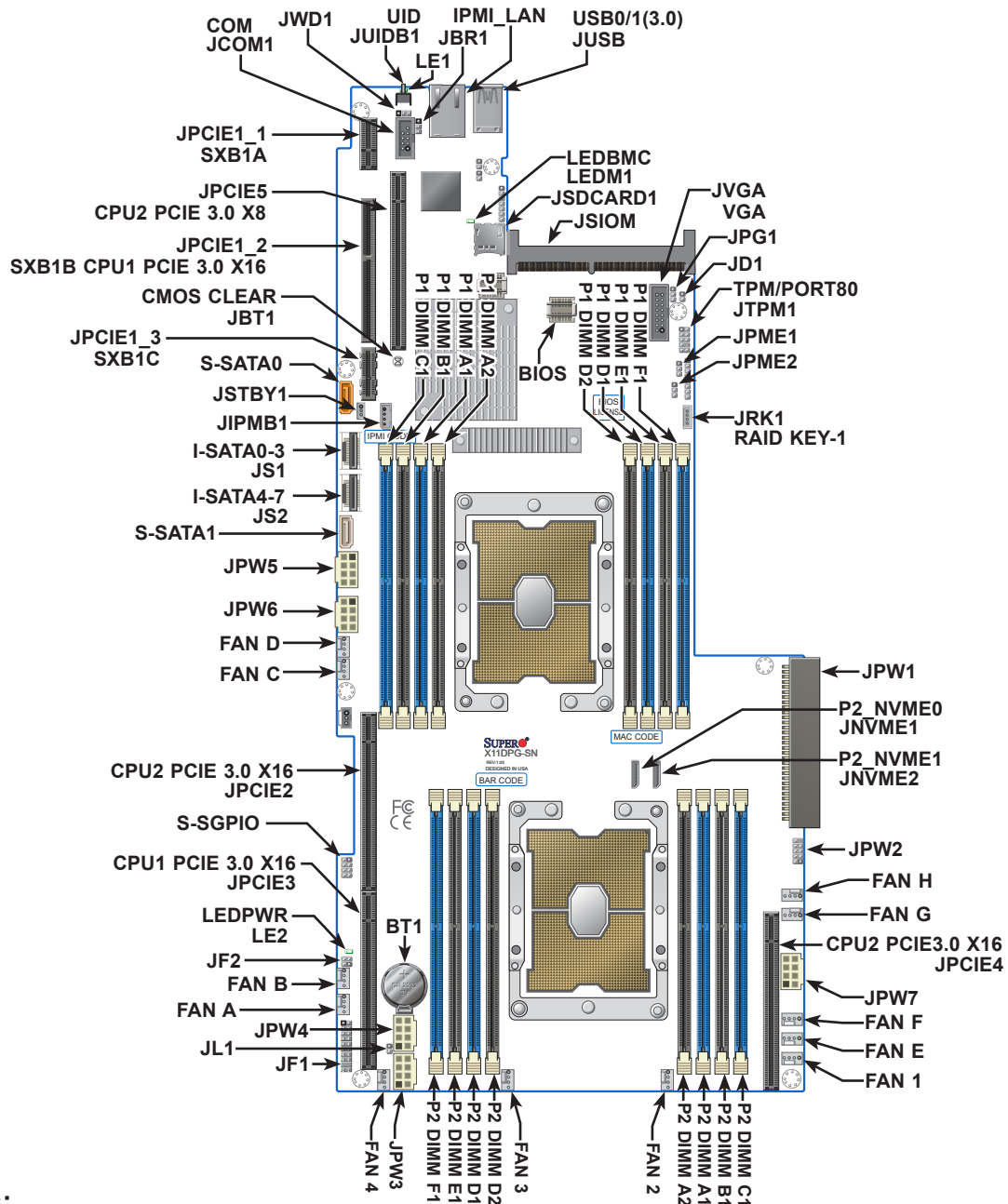
 **Note:** All graphics shown in this manual are based upon the latest PCB revision available at the time of publication of the manual. The motherboard you have received may or may not look exactly the same as the graphics shown in this manual.

**Figure 1-2. X11DPG-SN Motherboard Layout**  
(not drawn to scale)



 **Note:** Components not documented are for internal testing only.

## Quick Reference



### Notes:

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

## Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPME2	ME Manufacturing Mode	Pins 1-2 (Normal)
JWD1	Watch Dog	Pins 1-2 (Reset)
Connector	Description	
BT1	Onboard Battery	
FAN1 ~ FAN4	System/CPU Fan Headers (FAN1: CPU Fan)	
FANA ~ FANH	System/CPU Fan Headers	
IPMI_LAN	IPMI-Dedicated LAN Port	
I-SATA0~3/JS1	Intel® PCH SATA 3.0 Ports	
I-SATA1~4/JS2	Intel® PCH SATA 3.0 Ports	
JCOM1	COM port	
JD1	Speaker Header	
JF1	Front Control Panel Header	
JF2	Front Panel LAN3 and LAN4 activity LEDs from SIOM	
JIPMB1	System Management Bus Header for IPMI2.0	
JL1	Chassis Intrusion Header	
JNVME1, JNVME2	P2_NVMe0, P2_NVMe1; On-Board NVMe 0 and 1 for high speed PCI-E storage devices on CPU2	
JPCIE1_1 SXB1A	SMC Proprietary Slot1	
JPCIE1_2 SXB1B	PCI-Express 3.0 X16 slot from CPU1	
JPCIE1_3 SXB1C	SMC Proprietary Slot1	
JPCIE2	PCI-Express 3.0 X16 slot from CPU2	
JPCIE3	PCI-Express 3.0 X16 slot from CPU1	
JPCIE4	PCI-Express 3.0 X16 slot from CPU2	
JPCIE 5	PCI-Express 3.0 X8 slot from CPU2	
JPW1	SMCI-proprietary main power connector	
JPW2	Power supply sideband connector	
JPW3 - JPW7	Backplane power connectors for hard drives and GPUs	
JRK1	Intel Raid Key Header	
JSDCARD1	SD Card Socket	
JSIOM	PCI-Express 3.0 x16 slot from CPU1 for SMCI SIOM add-on module support	
JSTBY1	Standby Power Connector	
JTPM1/PORT80	Trusted Platform Module/Port 80 Connector	
JUIDB1/UID	Unit Identifier (UID) Switch	



**Note:** Table is continued on the next page.

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<b>Connector</b>	<b>Description</b>
JUSB/USB0/1 (3.0)	Back panel Universal Serial Bus (USB) 3.0 Port
JVGA/VGA	VGA Connection Header
S-SATA0	Intel® PCH SATA 3.0 Port
S-SATA1	Intel® PCH SATA 3.0 Port
S-SGPIO1	Serial Link General Purpose Input/Output Header 1 for S-SATA ports

<b>LED</b>	<b>Description</b>	<b>Status</b>
LE1	UID LED	Solid Blue: Unit Identified
LE2	Front Panel Power LED	Green: Power On
LEDM1	BMC Heartbeat LED	Blinking Green: BMC Normal

## Motherboard Features

<b>Motherboard Features</b>	
<b>CPU</b>	
<ul style="list-style-type: none"> <li>Dual 81xx/61xx/51xx/41xx/31xx series processors (Socket P up to 205 TDP); each processor supports Socket P and Intel® UltraPath Interconnect (3 UPI) of up to 10.4 G/s</li> </ul> <p><b>Note:</b> Both CPUs need to be installed for full access to the PCI-E slots, DIMM slots, and onboard controllers. Refer to the block diagram on page 18 to determine which slots or devices may be affected.</p>	
<b>Memory</b>	
<ul style="list-style-type: none"> <li>Integrated memory controller supports up to 2TB of 3DS LRDIMM/LRDIMM/RDIMM DDR4 ECC 2666/2400/2133 MHz memory in 16 memory slots.</li> </ul>	
<b>DIMM Size</b>	
<ul style="list-style-type: none"> <li>Up to 128GB at 1.2V</li> </ul>	
<p><b>Note 1:</b> Memory speed support depends on the processors used in the system.</p> <p><b>Note 2:</b> For the latest CPU/memory updates, please refer to our website at <a href="http://www.supermicro.com/products/motherboard">http://www.supermicro.com/products/motherboard</a>.</p>	
<b>Chipset</b>	
<ul style="list-style-type: none"> <li>Intel® C621</li> </ul>	
<b>Expansion Slots</b>	
<ul style="list-style-type: none"> <li>4 PCI-E 3.0 (x16) expansion slots for GPU support</li> <li>1 PCI-E 3.0 (x8) expansion slot</li> <li>1 PCI-E 3.0 (x16) expansion slot for SIOM support</li> <li>2 SMC-proprietary SPEC slots (JPCIE1_1, JPCIE1_3)</li> <li>2 NVMe (x4) PCI-E slots for PCI-E storage devices</li> </ul>	
<b>Network</b>	
<ul style="list-style-type: none"> <li>SIOM Network Controller</li> </ul>	
<b>BaseBoard Management Controller (BMC)</b>	
<ul style="list-style-type: none"> <li>ASpeed AST 2500 Baseboard Management Controller (BMC) supports IPMI 2.0</li> <li>One (1) IPMI LAN located on the rear IO backpanel</li> </ul>	
<b>Graphics</b>	
<ul style="list-style-type: none"> <li>Graphics controller via ASpeed AST2500</li> </ul>	
<b>I/O Devices</b>	
<ul style="list-style-type: none"> <li>JCOM Port</li> </ul>	<ul style="list-style-type: none"> <li>One (1) serial-port header</li> </ul>
<ul style="list-style-type: none"> <li>SATA 3.0</li> </ul>	<ul style="list-style-type: none"> <li><b>Total of 10 SATA 3 ports divided up as follows:</b></li> <li>Eight (8) SATA 3.0 ports supported by Intel PCH C621 (I-SATA 0-7)</li> <li>Two (2) SATA 3.0 (S-SATA0, S-SATA1)</li> </ul>



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

<b>Motherboard Features</b>	
<ul style="list-style-type: none"> <li>• RAID</li> </ul>	<ul style="list-style-type: none"> <li>• RAID (0, 1, 5, 10)</li> </ul>
<ul style="list-style-type: none"> <li>• BMC with dedicated LAN</li> </ul>	<ul style="list-style-type: none"> <li>• One (1) BMC RJ45 port</li> </ul>
<ul style="list-style-type: none"> <li>• VGA header</li> </ul>	<ul style="list-style-type: none"> <li>• One (1) JVGA port</li> </ul>
<b>Peripheral Devices</b>	
<ul style="list-style-type: none"> <li>• Two (2) USB 3.0 ports on the rear I/O panel (USB 0/1)</li> </ul>	
<b>BIOS</b>	
<ul style="list-style-type: none"> <li>• 256 Mb SPI AMI BIOS® SM Flash UEFI BIOS</li> <li>• ACPI 3.0 or later, SMBIOS 2.7 or later</li> <li>• BIOS rescue hot-key</li> <li>• SPI dual/quad speed support and riser card auto detection support</li> <li>• Dual-Boot Block</li> </ul>	
<b>Power Management</b>	
<ul style="list-style-type: none"> <li>• ACPI power management (S1,S4, S5)</li> <li>• Power button override mechanism</li> <li>• Wake-On-LAN (JWOL)</li> <li>• Power-on mode for AC power recovery</li> </ul>	
<b>System Health Monitoring</b>	
<ul style="list-style-type: none"> <li>• Onboard voltage monitoring for +1.8V, +3.3V, +5V, +/-12V, +3.3V standby, +5V standby, VBAT, HT, Memory, PCH Temp, System Temp, Memory Temp</li> <li>• 5 CPU (# of switching-phase voltage regulator)</li> <li>• CPU Thermal Trip support</li> <li>• PECI / TSI</li> </ul>	
<b>Fan Control</b>	
<ul style="list-style-type: none"> <li>• 12 4-pin fan headers</li> <li>• Fan status monitoring via IPMI connections</li> <li>• Three cooling zone</li> <li>• Low-noise fan speed control</li> <li>• Pulse Width Modulation (PWM) fan control</li> </ul>	
<b>System Management</b>	
<ul style="list-style-type: none"> <li>• Chassis intrusion header and detection (JL1)</li> <li>• Watch Dog / Non-maskable interrupt</li> <li>• Power supply monitoring (JPW2)</li> <li>• RoHS</li> </ul>	
<b>LED Indicators</b>	
<ul style="list-style-type: none"> <li>• CPU/ system overheat</li> <li>• Power/ suspend-state indicator</li> <li>• Fan Failure</li> <li>• UID/remote UID.</li> <li>• HDD activity</li> <li>• LAN activity.</li> </ul>	

Motherboard Features
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<b>Dimensions</b>
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- 9.20"(W) x 19.80"(L) (233.68 mm x 502.92 mm)



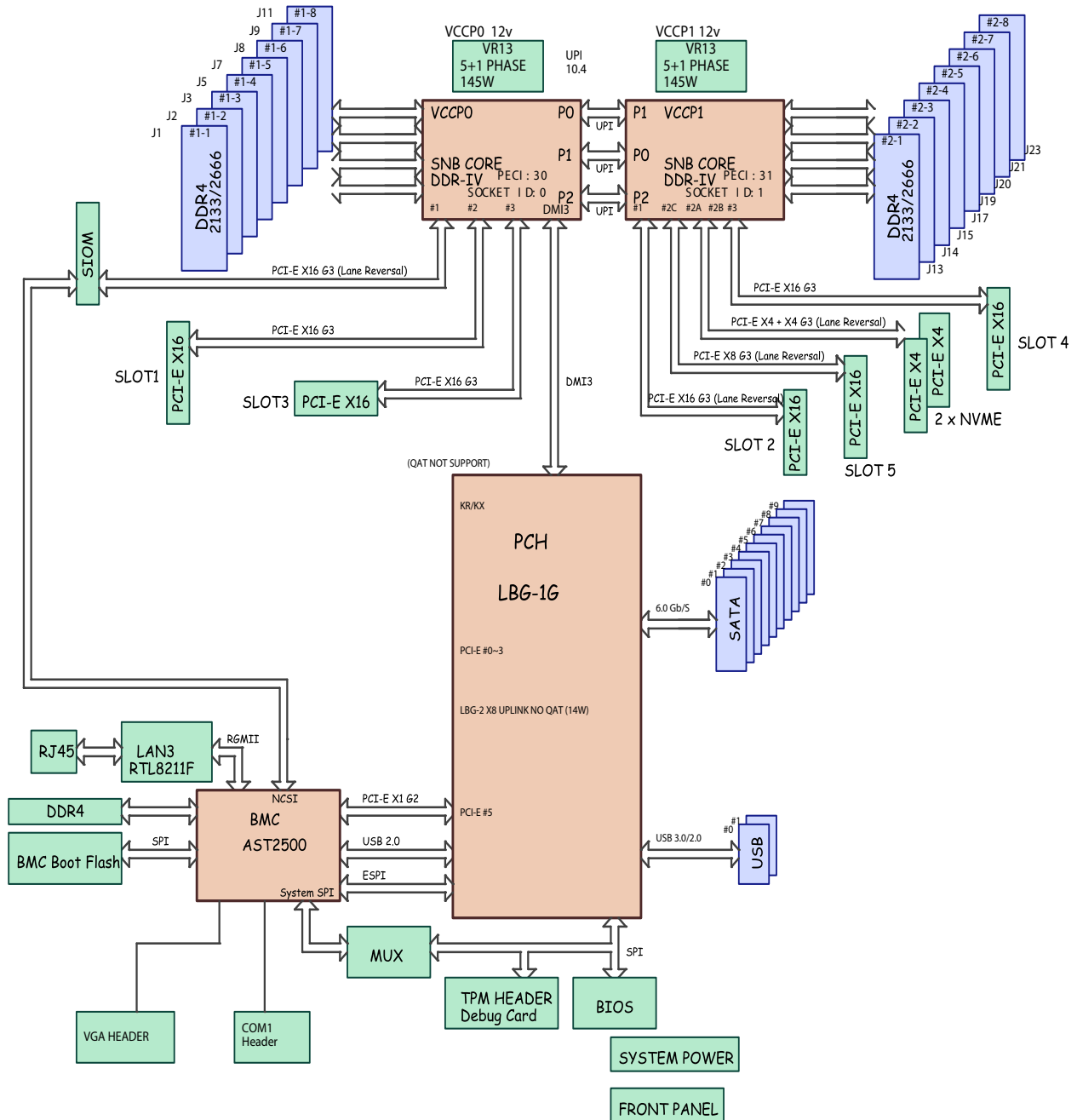
**Note 1:** The CPU maximum Thermal Design Power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications for proper CPU TDP sizing.




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



**Figure 1-3.**  
**System Block Diagram**



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

## 1.2 Processor and Chipset Overview

Built upon the functionality and capability of the Intel Xeon 81xx/61xx/51xx/41xx/31xx series processors (Socket P) and the Intel C621 chipset, the X11DPG-SN motherboard provides superb system performance, efficient power management, and a rich feature set based on cutting edge technology for general purpose server use. In order to meet the ongoing demands of High Performance Computing (HPC) platforms, this motherboard offers an innovative solution with maximum system performance with the support of Intel® UltraPath Interconnect (UPI) of up to 10.4 GT/s, and Intel® AVX-512 new instructions.

The Intel Xeon 81xx/61xx/51xx/41xx/31xx series processor and the Intel C621 chipset support the following features:

- Intel® AVX-512 support with memory bandwidth increase to 6 channels
- High availability interconnect between multiple nodes
- Rich set of available IOs, full flexibility in usage model, and software stack
- Dedicated subsystems for customer innovation
- Increased platform security with Intel® Boot Guard for hardware-based boot integrity protection; prevention of buffer overflow class security threads
- Integrated solution for real-time compression, streaming write & read performance increases from gen-to-gen
- Hot plug and enclosure management with Intel Volume Management Device (Intel VMD)
- Single standard server development (Accelerate NFV transition) consolidating application, control, and data plane workloads, reducing total platform investment needs

## 1.3 Special Features

### Recovery from AC Power Loss

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

## 1.4 System Health Monitoring

This section describes the health monitoring features of the X11DPG-SN motherboard. The motherboard has an onboard Baseboard Management Controller (BMC) chip that supports system health monitoring. 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.

### Onboard Voltage Monitors

The onboard voltage monitor will continuously scan for crucial voltage levels. Once a voltage is deemed unstable, the monitor will give a warning or send an error message to the screen. Users can adjust the voltage thresholds to define the sensitivity of the voltage monitor. Real time readings of these levels are all displayed in BIOS.

### Fan Status Monitor with Firmware Control

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

### Environmental Temperature Control

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



**Note:** To avoid possible system overheating, please be sure to provide adequate air-flow to your system.

### System Resource Alert

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

## 1.5 ACPI Features

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

In addition to enabling operating system-directed power management, the 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 Windows 8/R2 and Windows 2012/R2 operating systems.

## 1.6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is especially 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

Super I/O (ASpeed AST2500 chip) provides a high-speed, 16550 compatible serial communication port (UART) that supports serial infrared communication. The UART includes the capability to send/receive FIFO, a programmable baud rate generator, complete modem control capability, and a processor interrupt system. Additionally, the port provides legacy speed with 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 that support higher speed modems.

Furthermore, Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), including the support of legacy, ACPI power management through a SMI or SCI function pin, and auto power management to reduce power consumption.

## 1.8 Advanced Power Management

The following new advanced power management features are supported by the motherboard.

### **Intel® Intelligent Power Node Manager (IPNM)**

Available when the Supermicro Power Manager (SPM) is installed, Intel's Intelligent Power Node Manager (IPNM) provides your system with real-time thermal control and power management for maximum energy efficiency. Although IPNM Specification Version 2.0/3.0 is supported by the BMC (Baseboard Management Controller), your system must also have IPNM-compatible Management Engine (ME) firmware installed to use this feature.



**Note:** Support for IPNM 2.0/3.0 support is dependent on the power supply used in the system.

### **Management Engine (ME)**

The Management Engine (ME) is an ARC controller embedded in the IOH (I/O Hub) and provides Server Platform Services (SPS) to your system. Please be aware that the services provided by SPS are different from those provided by the ME on client platforms.

## Chapter 2

# Installation

### 2.1 Static-Sensitive Devices

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

#### Precautions

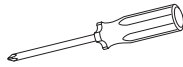
- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules, or gold contacts.
- When handling chips or modules 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 chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the motherboard.
- Use only the correct type of CMOS onboard battery as specified by the manufacturer. Do not install the CMOS battery upside down as it may result in a 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.



Philips Screwdriver (1)

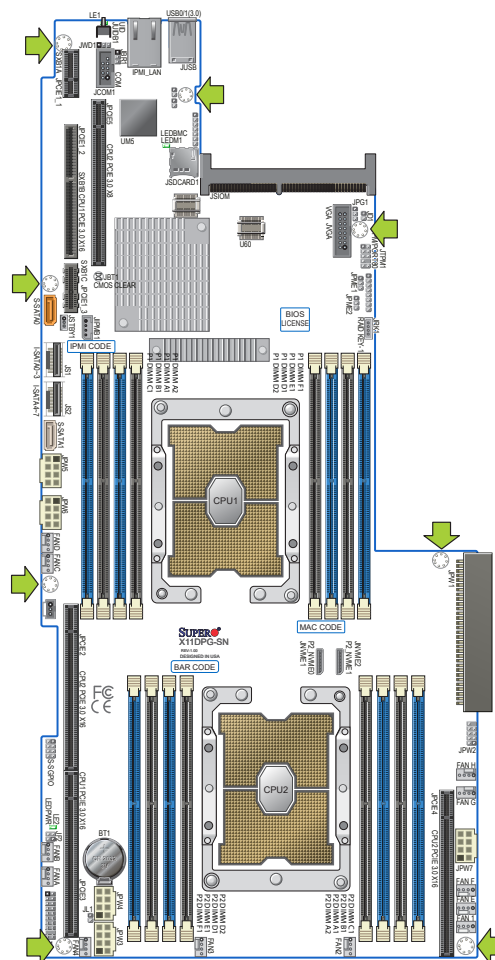


Philips Screws (10)



Standoffs (8)  
Only if Needed

### Tools Needed



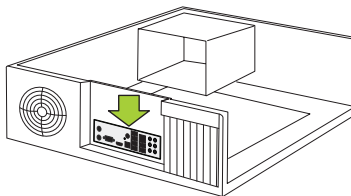
### Location of Mounting Holes



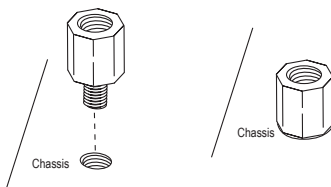
- Notes:** 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation.
- 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when installing the motherboard to the chassis.

## Installing the Motherboard

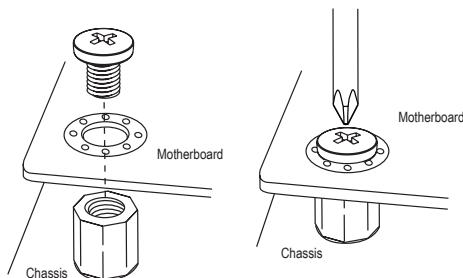
1. Install the I/O shield into the back of the chassis.




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 Phillips head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.
7. Repeat Step 5 to insert #6 screws into all mounting holes.
8. Make sure that the motherboard is securely placed in the chassis.

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



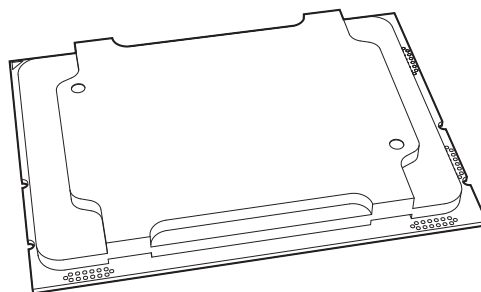
## 2.3 Processor and Heatsink Installation

**Warning:** When handling the processor package, avoid placing direct pressure on the label area of the CPU or CPU socket. Also, improper CPU installation or socket misalignment can cause serious damage to the CPU or motherboard which may result in RMA repairs. Please read and follow all instructions thoroughly before installing your CPU and heatsink.


 **Notes:**

- Always connect the power cord last and always remove it before adding, removing, or changing any hardware components. Please note that the processor and heatsink should be assembled together first to form the Processor Heatsink Module (PHM), and then install the entire PHM into the CPU socket.
- When you receive a motherboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and that none of the socket pins are bent. Otherwise, please contact your retailer immediately.
- Refer to the Supermicro website for updates on CPU support.
- Please follow the instructions given in the ESD Warning section on the first page of this chapter before handling, installing, or removing system components.

### The Skylake Series Processor



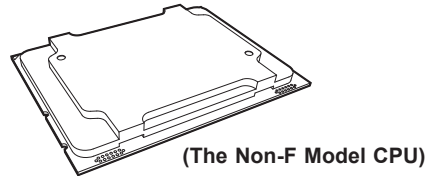
**81xx/61xx/51xx/41xx/31xx Processor**

 **Note:** All graphics, drawings, and pictures shown in this manual are for illustration only. The components that came with your machine may or may not look exactly the same as those shown in this manual.

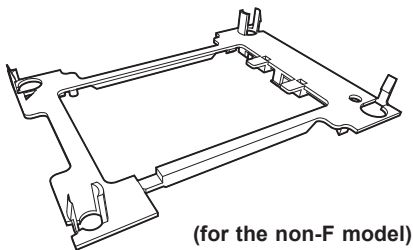
## Overview of the Processor Socket Assembly

The processor socket assembly contains 1) the Intel 81xx/61xx/51xx/41xx/31xx Processor, 2) the narrow processor clip, 3) the dust cover, and 4) the CPU socket.

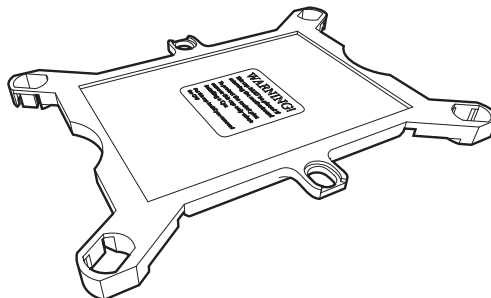
### 1. The 81xx/61xx/51xx/41xx/31xx Processor



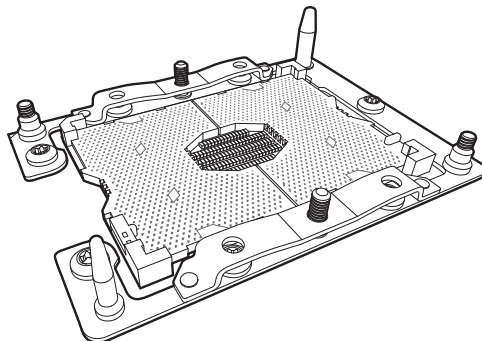
### 2. Narrow processor clip (the plastic processor package carrier used for the CPU)




### 3. Dust Cover



### 4. CPU Socket

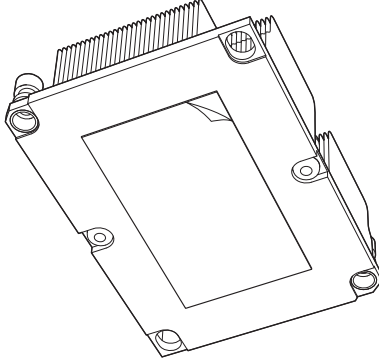


 **Note:** Be sure to cover the CPU socket with the dust cover when the CPU is not installed.

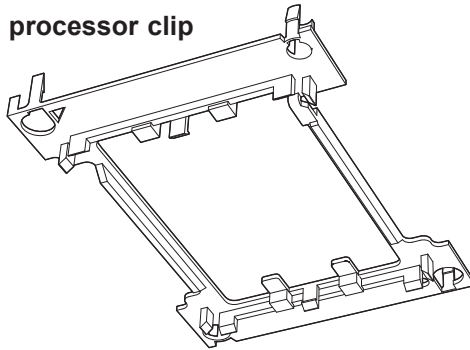
## Overview of the Processor Heatsink Module (PHM)

The Processor Heatsink Module (PHM) contains 1) a heatsink, 2) a narrow processor clip, and 3) 81xx/61xx/51xx/41xx/31xx processor.

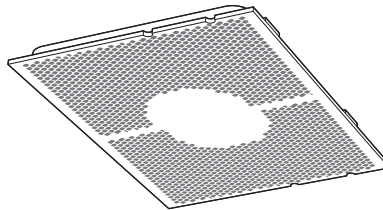
### 1. Heatsink



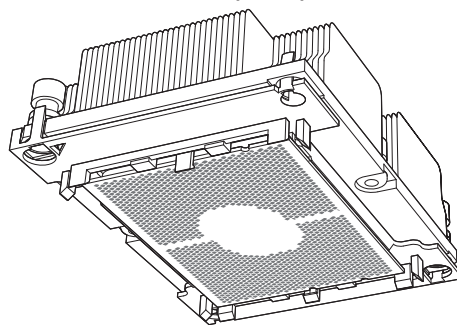
### 2. Narrow processor clip



### 3. The 81xx/61xx/51xx/41xx/31xx Processor



### Processor Heatsink Module (PHM)




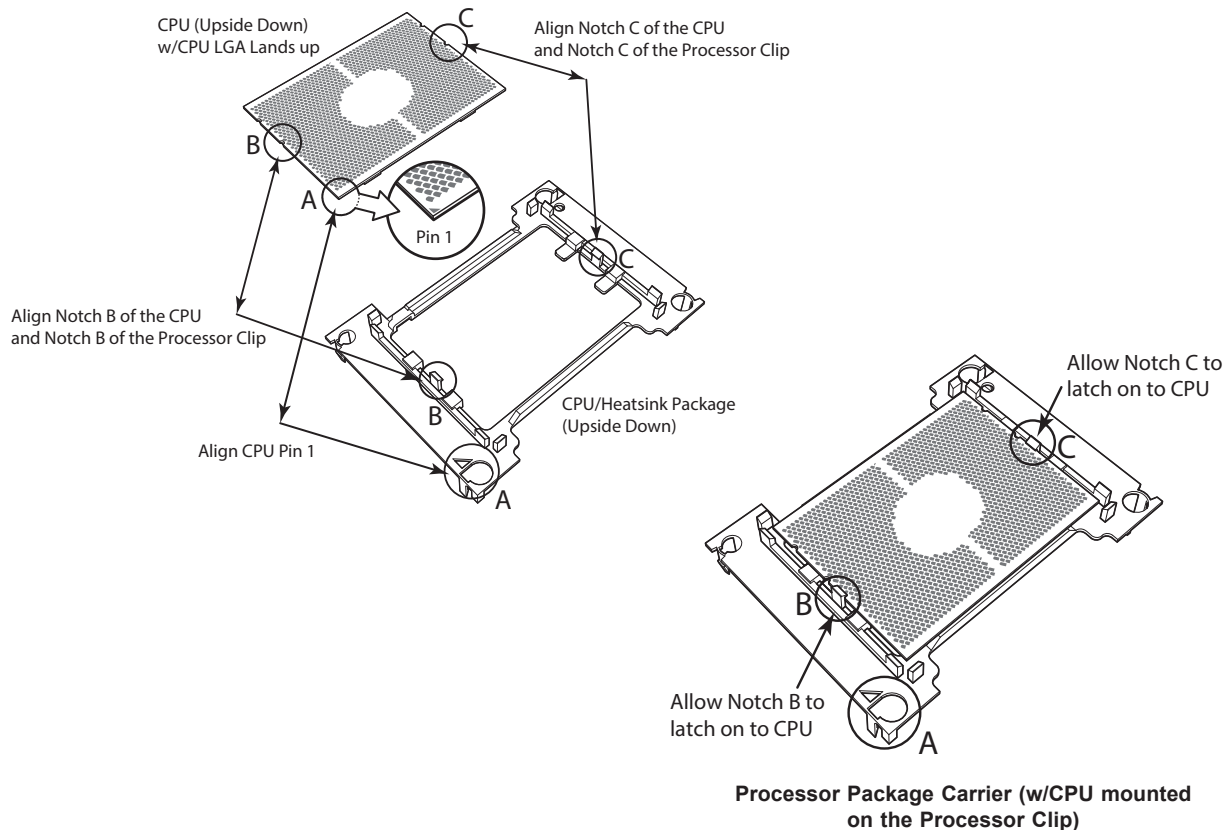
(Bottom View for a non-F Model)

## Attaching the Processor to the Narrow Processor Clip to Create the Processor Package Assembly

To properly install the CPU into the narrow processor clip, please follow the steps below.

1. Locate pin 1 (notch A), which is the triangle located on the top of the narrow processor clip. Also locate notch B and notch C on the processor clip.
2. Locate pin 1 (notch A), which is the triangle on the substrate of the CPU. Also, locate notch B and notch C on the CPU as shown below.
3. Align pin 1 (the triangle on the substrate) of the CPU with pin 1 (the triangle) of the narrow processor clip. Once they are aligned, carefully insert the CPU into the processor clip by sliding notch B of the CPU into notch B of the processor clip, and sliding notch C of the CPU into notch C of the processor clip.
4. Examine all corners of the CPU to ensure that it is properly seated on the processor clip. Once the CPU is securely attached to the processor clip, the processor package assembly is created.

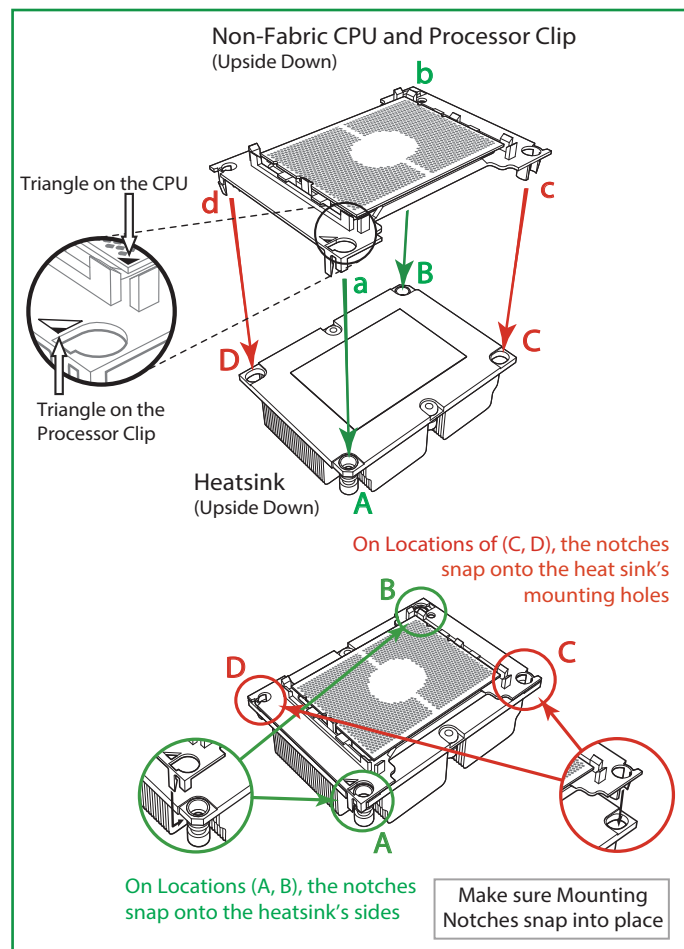
 **Note:** Please exercise extreme caution when handling the CPU. Do not touch the CPU LGA-lands to avoid damaging the LGA-lands or the CPU. Be sure to wear ESD gloves when handling components.



## Attaching the Processor Package Assembly to the Heatsink to Form the Processor Heatsink Module (PHM)

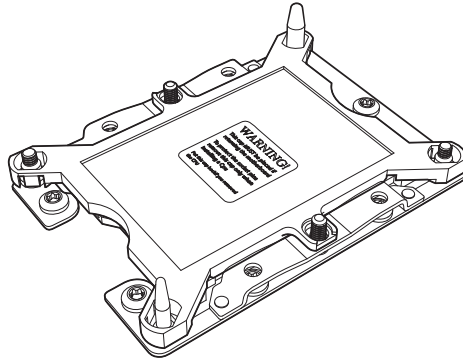
After you have made a processor package assembly by following the instructions on the previous page, please follow the steps below to mount the processor package assembly onto the heatsink to create the Processor Heatsink Module (PHM).

1. Locate "1" on the heatsink label and the triangular corner next to it on the heatsink. With your index finger pressing against the screw at this triangular corner, carefully hold and turn the heatsink upside down with the thermal-grease side facing up. Remove the protective thermal film if present, and apply the proper amount of the thermal grease as needed. (Skip this step if you have a new heatsink because the necessary thermal grease is pre-applied in the factory.)
2. Holding the processor package assembly at the center edge, turn it upside down. With the thermal-grease side facing up, locate the hollow triangle located at the corner of the processor carrier assembly ("a" in the graphic). Note the larger hole and plastic mounting clicks located next to the hollow triangle. Locate another set of mounting clicks and a larger hole at the diagonal corner of the same (reverse) side of the processor carrier assembly ("b" in the graphic).
3. With the back of heatsink and the reverse side of the processor package assembly facing up, align the triangular corner on the heatsink ("A" in the graphic) against the mounting clips next to the hollow triangle ("a") on the processor package assembly.
4. Align the triangular corner ("B") at the diagonal side of the heatsink with the corresponding clips on the processor package assembly ("b").
5. Once the mounting clips on the processor package assembly are properly aligned with the corresponding holes on the back of heatsink, securely attach the heatsink to the processor package assembly by snapping the mounting clips at the proper places on the heatsink to create the Processor / Heatsink Module (PHM).



## Preparing the CPU Socket for Installation


This motherboard comes with the CPU socket pre-assembled in the factory. The CPU socket contains 1) a dust cover, 2) a socket bracket, 3) the CPU (P0) socket, and 4) a back plate. These components are pre-installed on the motherboard before shipping.

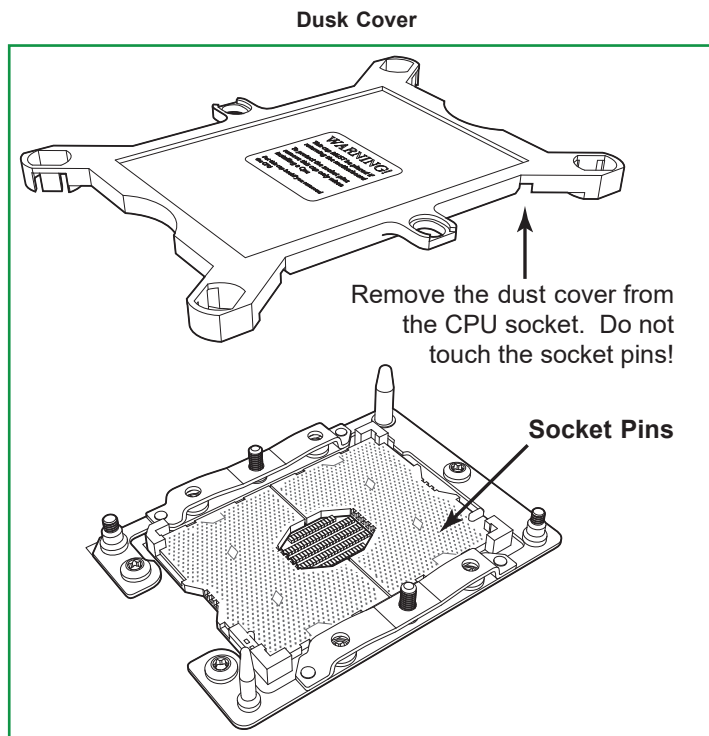


CPU Socket w/Dust Cover On

## Removing the Dust Cover from the CPU Socket

Remove the dust cover from the CPU socket, exposing the Non-F Model CPU socket and socket pins as shown on the illustration below.


 **Note:** Do not touch the socket pins to avoid damaging them, causing the CPU to malfunction.

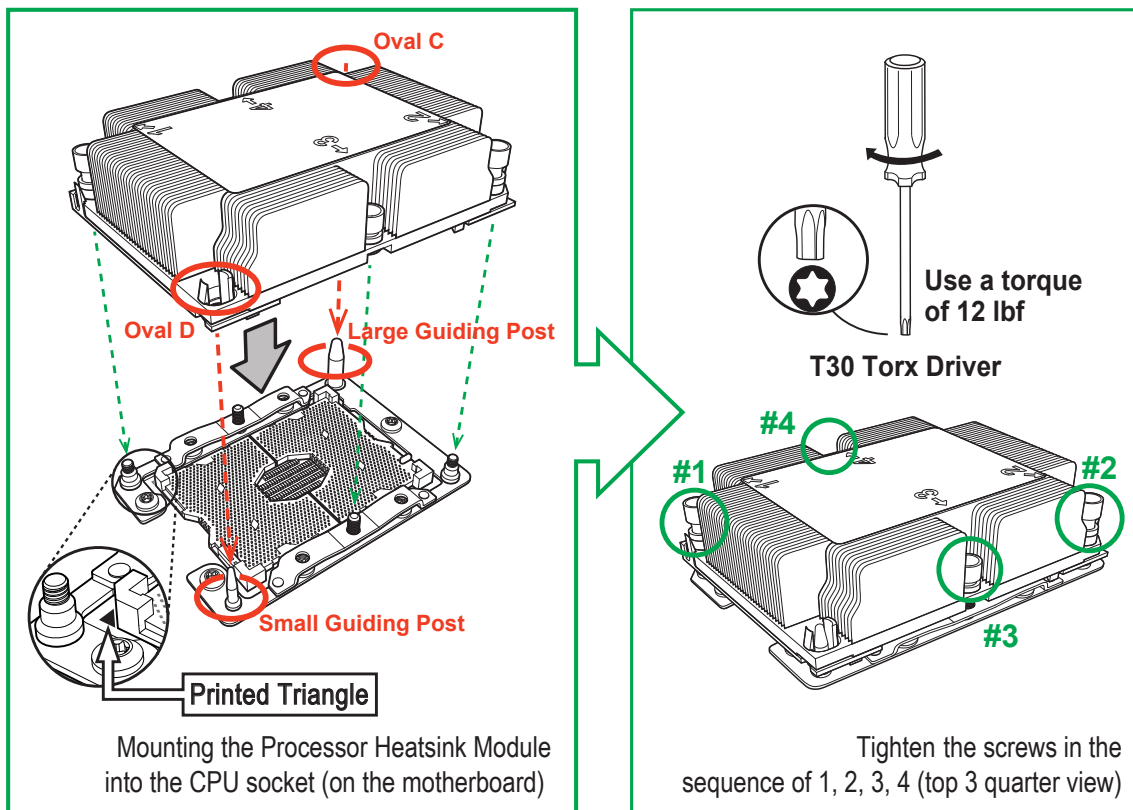


Non-F Model CPU Socket

## Installing the Processor Heatsink Module (PHM)

1. Once you have assembled the Processor Heatsink Module (PHM) by following the instructions listed on page 29, you are ready to install the module into the CPU socket on the motherboard. To install the PHM into the CPU socket, follow the instructions below.
2. Locate the triangle (pin 1) on the CPU socket, and locate the triangle (pin 1) at the corner of the PHM that is closest to "1." (If you have difficulty locating pin 1 of the PHM, turn the PHM upside down. With the LGA-lands side facing up, you will note the hollow triangle located next to a screw at the corner. Turn the PHM right side up, and you will see a triangle marked on the processor clip at the same corner of hollow triangle.)
3. Carefully align pin 1 (the triangle) on the the PHM against pin 1 (the triangle) on the CPU socket.
4. Once they are properly aligned, insert the two diagonal oval holes on the heatsink into the guiding posts.
5. Using a T30 Torx-bit screwdriver, install four screws into the mounting holes on the socket to securely attach the PHM onto the motherboard starting with the screw marked "1" (in the sequence of 1, 2, 3, and 4).


 **Note:** To avoid damaging the LGA-lands and the processor, do not use excessive force when tightening the screws.

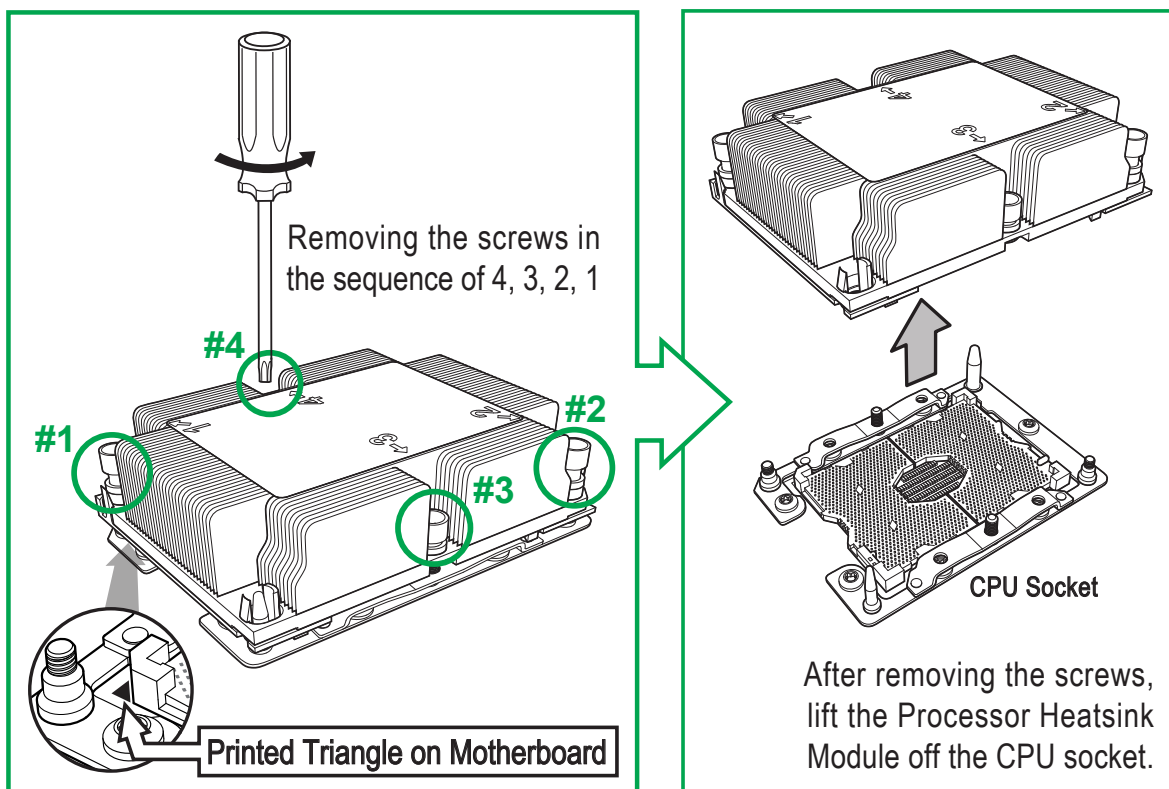


## Removing the Processor Heatsink Module (PHM) from the Motherboard

Before removing the Processor Heatsink Module (PHM), unplug power cord from the power outlet.


1. Using a T30 Torx-bit screwdriver, turn the screws on the PHM counterclockwise to loosen them from the socket, starting with screw marked #4 (in the sequence of 4, 3, 2, 1).
2. After all four screws are removed, wiggle the PHM gently and pull it up to remove it from the socket.

 **Note:** To properly remove the processor heatsink module, be sure to loosen and remove the screws on the PHM in the sequence of 4, 3, 2, 1 as shown below.






## 2.4 Memory Support and Installation

 **Notes:** Check the Supermicro website for recommended memory. Exercise extreme care when installing or removing DIMM modules to prevent any damage.

### Memory Support

The X11DPG-SN supports up to 2TB of 3DS LRDIMM/LRDIMM/RDIMM DDR4 ECC 2666/2400/2133 MHz memory in 16 memory slots. Populating these DIMM modules with a pair of memory modules of the same type and size will result in interleaved memory, which will improve memory performance.

 **Notes:** 1. Be sure to use the memory modules of the same type and speed on the motherboard. Mixing of memory modules of different types and speeds is not allowed. 2. When installing memory modules, be sure to populate the first DIMM module on the blue memory slot, which is the first memory slot of a memory channel, and then populate the second DIMM in the black slot if 2DPC memory configuration is used. 3. Using unbalanced memory topology by populating two DIMMs in one channel while populating one DIMM in another channel will result in reduced memory performance.

DDR4 Memory Support (for 2-Slot Per-Channel Configuration)					
Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)	
				2 Slots per Channel	
				1DPC (1-DIMM per Channel)	2DPC (2-DIMM per Channel)
		4 Gb	8 Gb	1.2 V	1.2 V
RDIMM	SRx4	8 GB	16 GB	2666	2666
RDIMM	SRx8	4 GB	8 GB	2666	2666
RDIMM	DRx8	8 GB	16 GB	2666	2666
RDIMM	DRx4	16 GB	32 GB	2666	2666
RDIMM 3Ds	QRX4	N/A	2H-64GB	2666	2666
RDIMM 3Ds	8RX4	N/A	4H-128GB	2666	2666
LRDIMM	QRx4	32 GB	64 GB	2666	2666
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2666	2666
	8Rx4	N/A	4H-128 GB	2666	2666

DDR4 Memory Support (for 1-Slot Per-Channel Configuration)					
Type	Ranks Per DIMM and Data Width	DIMM Capacity (GB)		Speed (MT/s); Voltage (V); Slots per Channel (SPC) and DIMMs per Channel (DPC)	
				1 Slot per Channel	
				1DPC (1-DIMM per Channel)	
		4 Gb	8 Gb	1.2 V	
RDIMM	SRx4	8 GB	16 GB	2666	
RDIMM	SRx8	4 GB	8 GB	2666	
RDIMM	DRx8	8 GB	16 GB	2666	
RDIMM	DRx4	16 GB	32 GB	2666	
RDIMM 3Ds	QRX4	N/A	2H-64GB	2666	
RDIMM 3Ds	8RX4	N/A	4H-128GB	2666	
LRDIMM	QRx4	32 GB	64 GB	2666	
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2666	
	8Rx4	N/A	4H-128 GB	2666	

## DIMM Population Requirements for the 81xx/61xx/51xx/41xx/31xx series Processors

For optimal memory performance, follow the tables below when populating memory modules.

Key Parameters for DIMM Configurations	
Parameters	Possible Values
Number of Channels	1, 2, 3, 4, 5, or 6
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM (w/ECC), LRDIMM, 3DS-LRDIMM
DIMM Construction	<ul style="list-style-type: none"> <li>• non-3DS RDIMM Raw Cards: A/B (2RX4), C (1RX4), D (1RX8), E (2RX8)</li> <li>• 3DS RDIMM Raw Cards: A/B (4RX4)</li> <li>• non-3DS LRDIMM Raw Cards: D/E (4RX4)</li> <li>• 3DS LRDIMM Raw Cards: A/B (8RX4)</li> </ul>

General Population Requirements
<b>DIMM Mixing Rules</b>
<ul style="list-style-type: none"> <li>• Please populate all memory modules with DDR4 DIMMs only.</li> <li>• X4 and X8 DIMMs can be mixed in the same channel.</li> <li>• Mixing of LRDIMMs and RDIMMs is not allowed in the same channel, across different channels, and across different sockets.</li> <li>• Mixing of non-3DS and 3DS LRDIMM is not allowed in the same channel, across different channels, and across different sockets.</li> </ul>

Mixing of DIMM Types within a Channel			
DIMM Types	RDIMM	LRDIMM	3DS LRDIMM
RDIMM	Allowed	Not Allowed	Not Allowed
LRDIMM	Not Allowed	Allowed	Not Allowed
3DS LRDIMM	Not Allowed	Not Allowed	Allowed

**(DDR4 Only) Socket Level Population Requirements****DDR4 Socket Level Minimum Population Requirements**

- There should be at least one DDR4 DIMM per socket.
- If only one DIMM is populated in a channel, then populate it in the slot furthest away from CPU.
- Always populate DIMMs with a higher electrical loading in DIMM0 followed by DIMM1.

**(DDR4 Only) Memory Populations with Possible Mixes**

DDR4 RDIMM		DIMM0/DIMM1 Config. Set A	DIMM0/DIMM1 Config. Set B	DIMM0/DIMM1 Config. Set C	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x8, None, x8, x8	x4, None, x4, x4	x8, x4, or x4, x8	Single Rank, None Single Rank, Single Rank Dual Rank, Single Rank, Dual Rank, None Dual Rank, Dual Rank, Single Rank, Single Rank
	DDR1	None or same as DDR0	None or same as DDR0	None or same as DDR0	
	DDR2	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	None or same as DDR1 (excludes DIMM 1 in 5DIMM configurations)	

**(DDR4 Only) Memory Populations with Possible Mixes**

3DS LRDIMM or 3DS RDIMM		DIMM0/DIMM1 Config. Set A	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x4, None, x4, x4	Quad Rank, None Quad Rank, Quad Rank Cannot mix 3DS LRDIMM and RDIMM
	DDR1	None or same as DDR0	
	DDR2	None or same as DDR1	

**(DDR4 Only) Memory Populations with Possible Mixes**

LRDIMMs		DIMM0/DIMM1	Possible Mixes DIMM0/DIMM1
Within IMC DIMM Population	DDR0	x4, None, x4, x4	Quad Rank, None Quad Rank, Quad Rank <b>Note: Requirements</b> *Match DIMM types installed across DDR channels within an IMC *Always populate iMC0 first
	DDR1	None or same as DDR0	
	DDR2	None or same as DDR1	

**(DDR4 Only) 2SPC Memory Configuration with x8 DIMMs**

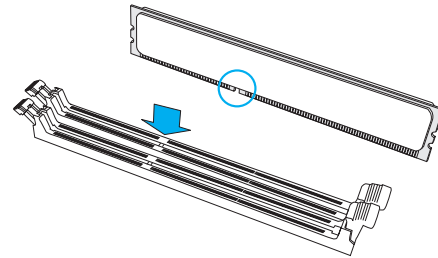
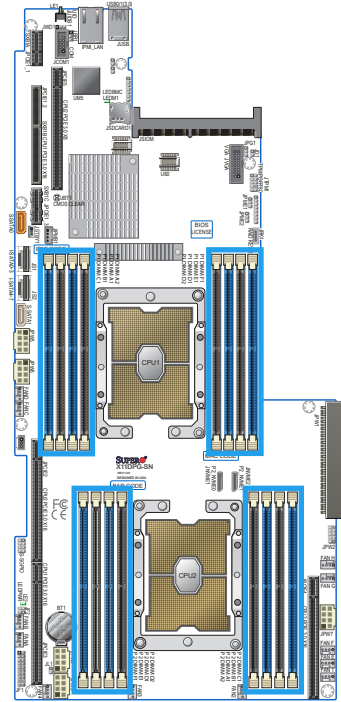
	Total # of DIMMs	DDR Channel	Number of Ranks	Virtual Lock Step
<b>DIMM Population within an IMC</b> (Note: Uniformly populate with x8 DRAMs DIMMs)	1 x8 DIMM	Must be installed on iMC0 DDR Channel 0	1	N/A
			>1	SVLS
	2 x8 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0	1	N/A
			>1	SVLS
	3 x8 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	1	N/A
			>1	SVLS
	4 x8 DIMMs	DDR0: Populate with 2 DIMMs DDR1: Populate identically as DDR0	x	SVLS
	5 x8 DIMMs	DDR Channel 0, 1, 2: DIMM0 is populated with identical DIMMs, DDR Channel 0, 1: DIMM1 is populated with identical DIMMs	>1	SVLS
	6 x8 DIMMs	Populate 2 DIMMs per DDR channel	x	SVLS
<b>DIMM Population within an IMC</b> (Note: Non-equal in rank pair of x8 DIMMs)	1 pair of DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	1	N/A
			>1	SVLS
	2 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0	1	N/A
			>1	SVLS
	3 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	x	SVLS
	2 pairs+1 (5DIMMs)	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate with identical DIMMs as DDR0 DDR2: DIMM0 is populated with identical DIMM as DDR1	>1	SVLS

<b>(DDR4 Only) 2SPC Memory Configuration with x4 DIMMs</b>				
	<b>Total # of DIMMs</b>	<b>DDR Channel</b>	<b>Number of Ranks</b>	<b>Adaptive Virtual Lock Step</b>
<b>DIMM Population within an IMC</b> <b>Note:</b> Uniformly populate with x4 DRAMs/DIMMs	1 x4 DIMM	Must be installed on iMC0 DDR Channel 0	1	Y, only Bank VLS
			>1	Y
	2 x4 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0	1	Y, only Bank VLS
			>1	Y
	3 x4 DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	1	Y, only Bank VLS
			>1	Y
	4 x4 DIMMs	DDR0: Populate with 2 DIMMs DDR1: Populate identically as DDR0	x	Y
5 x4 DIMMs	DDR Channel 0, 1, 2: DIMM0 is populated with identical DIMMs, DDR Channel 0, 1: DIMM1 is populated with identical DIMMs	>1	Y	
6 x4 DIMMs	Populate 2 DIMMs per DDR channel	x	Y	
<b>DIMM Population within an IMC</b> <b>Note:</b> Non-equal in rank pair of x4 DIMMs)	1 pair of DIMMs	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	>1	Y
	2 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0	>1	Y
	3 pairs of DIMMs	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate identically as DDR0 DDR2: Populate identically as DDR1	x	Y
	2 pairs+1 (5DIMMs)	DDR0: Populate with 1 pair of non-equal rank DIMMs DDR1: Populate with identical DIMMs as DDR0 DDR2: DIMM0 is populated with identical DIMM as DDR1	>1	Y

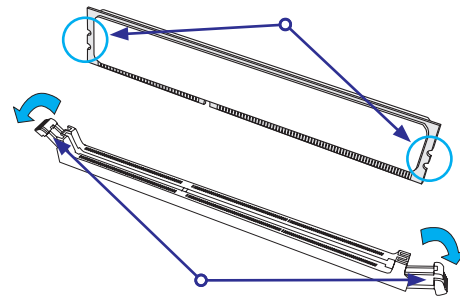
<b>(DDR4 Only) 2SPC Memory Configuration with x8/x4 DIMMs Mixed</b>			
<b>DDR4 RDIMM</b>	<b>Total # of DIMMs</b>	<b>DDR Channel</b>	<b>ADDC/SDDC Features</b>
<b>DIMM Population within an IMC</b>	1 pair of x8, x4	DDR0: Populate with 1 DIMM DDR1: Populate the second DIMM (for best performance)	No
	2 pairs of x8, x4	Populate with 1 pair of DIMMs on DDR0, and identical pair on DDR1	No
	3 pairs of x8, x4	A pair of DIMMs on DDR0, and identical pair on DDR1, and DDR2	No

## DIMM Installation

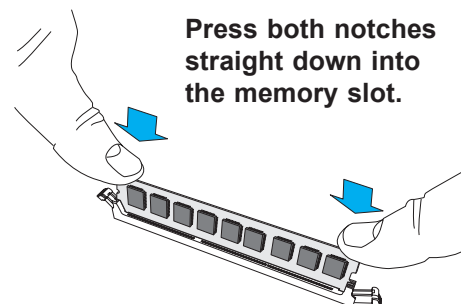
1. Insert DIMM modules in the following order: For CPU1: P1-DIMMA1, P1-DIMMD1, P1-DIMMB1, then P1-DIMME1. For CPU2: P2-DIMMA1, P2-DIMMD1, P2-DIMMB1, then P2-DIMME1. For the system to work properly, please use memory modules of the same type and speed on the motherboard.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Use two thumbs together to press the notches on both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



### Notches



### Release Tabs

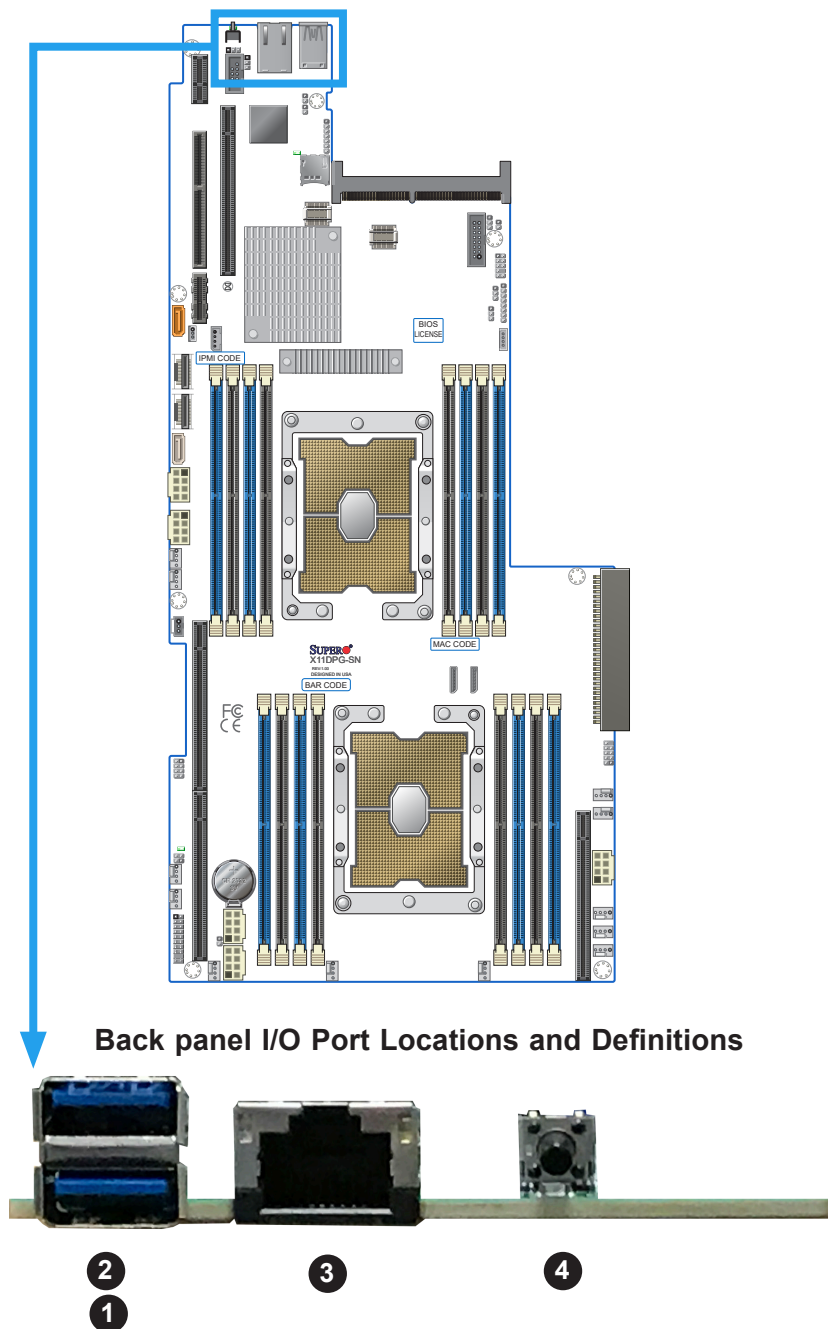


## DIMM Removal

Reverse the steps above to remove the DIMM modules from the motherboard.

## 2.5 Rear I/O Ports

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



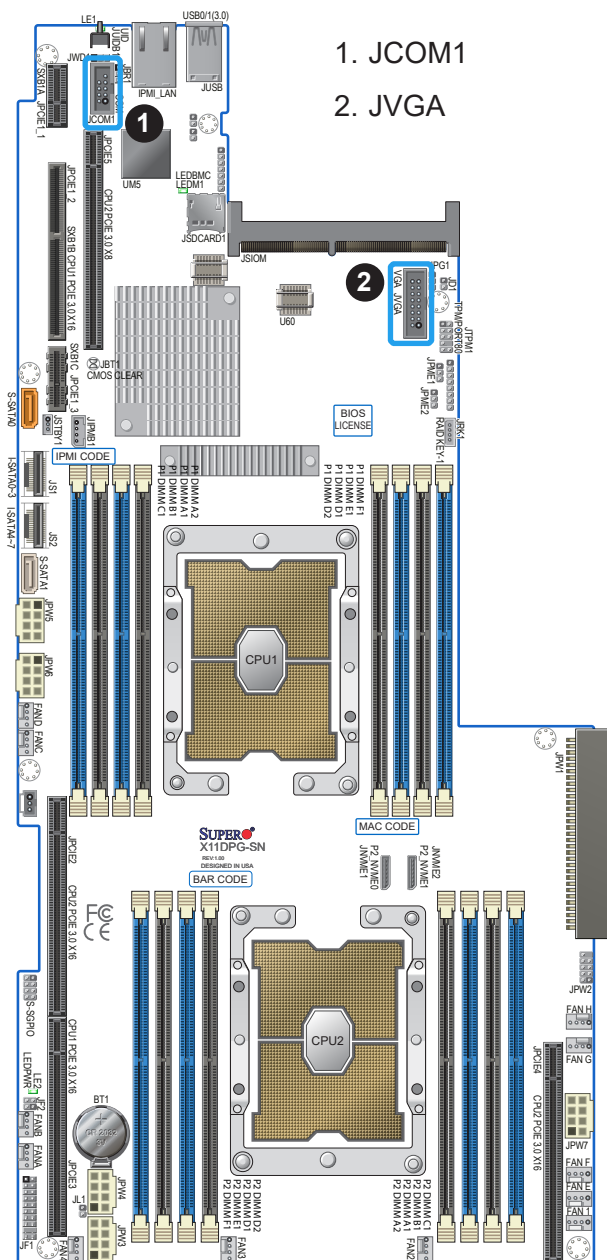
<b>Back Panel I/O Ports</b>			
No.	Description	No.	Description
1.	USB 0 (USB 3.0)	3.	IPMI LAN
2.	USB 1 (USB 3.0)	4.	Unit Identifier Switch (JUIDB1)

## Serial Port

There is one COM connector (JCOM1) near the I/O back panel, next to the IPMI LAN connector. The COM connector provides serial communication support. See the table below for pin definitions.

## VGA Port

The VGA connector (JVGA) is located below the JSIOM slot and next to JTPM1 connector. Use this connection for VGA display.

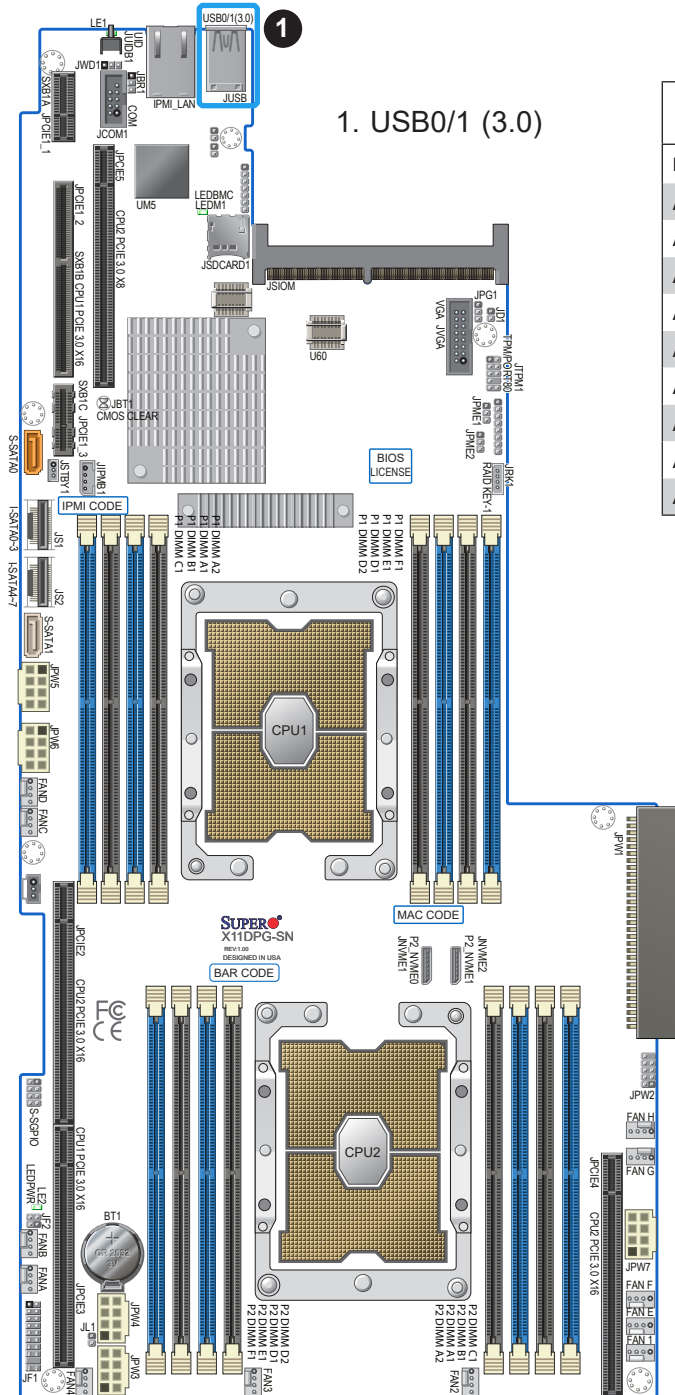


**COM connector (JCOM1)  
Pin Definitions**

Pin#	Definition	Pin#	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	N/A

## Universal Serial Bus (USB) Ports

There are two USB 3.0 ports (USB0/1) on the I/O back panel.




1. USB0/1 (3.0)

Back Panel USB 0/1 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Stda_SSRX-	B5	USB3_RN
A6	Stda_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Stda_SSTX-	B8	USB3_TN
A9	Stda_SSTX+	B9	USB3_TP



## Unit Identifier Switch/UID LED Indicator

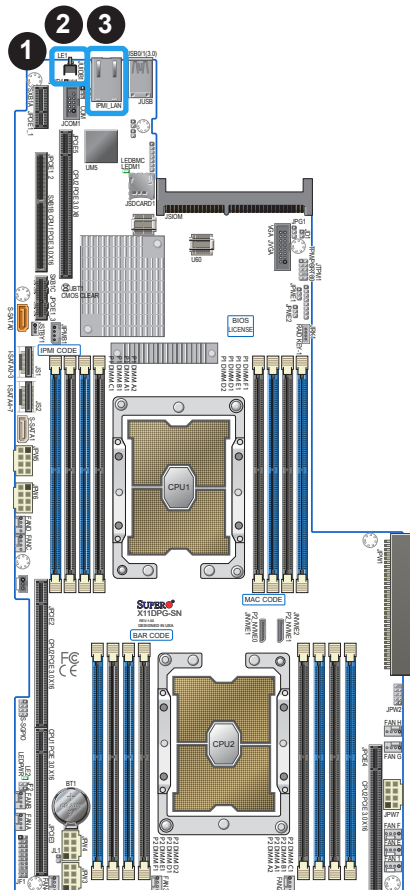
A Unit Identifier (UID) switch (JUIDB1) and a UID LED Indicator (LE1) are located on the I/O back panel. When you press the UID switch, the UID LED indicator will be turned on. Press the UID switch again to turn off the LED. The UID Indicator provides easy identification of a system unit that may be in need of service.

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

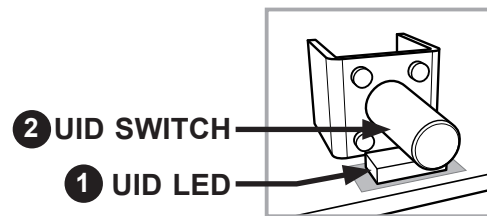
UID LED LED Indicator	
LED Color	Definition
Blue: On	Unit Identified

## Ethernet Ports

An IPMI-dedicated LAN that supports GbE LAN is located next to USB 0/1 ports on the backplane. All Ethernet ports accept RJ45 type cables. Please refer to the LED Indicator Section for LAN LED information.



1. UID LED (LE1)
2. JUIDB1
3. IPMI LAN



## 2.6 Front Control Panel

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

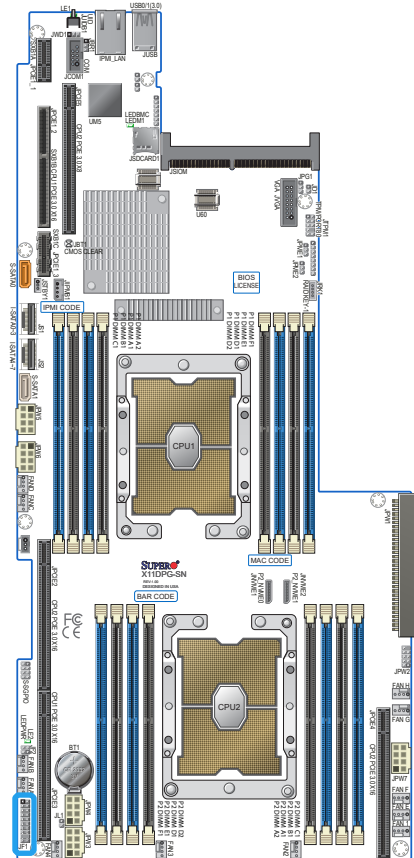
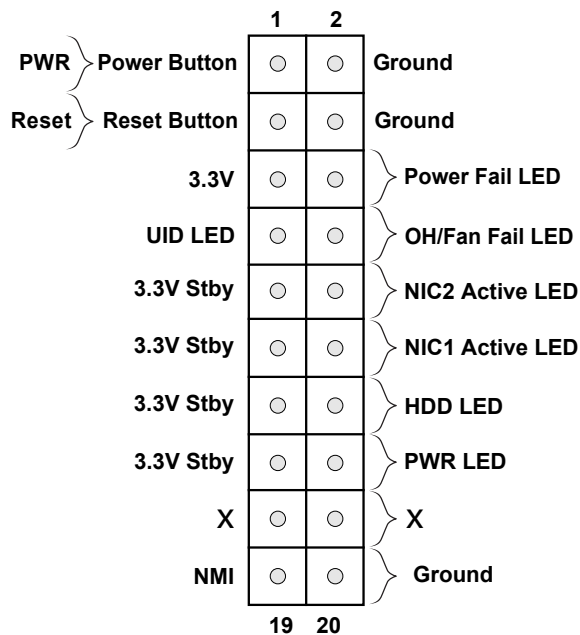


Figure 2-3. JF1 Header Pins



## Power Button

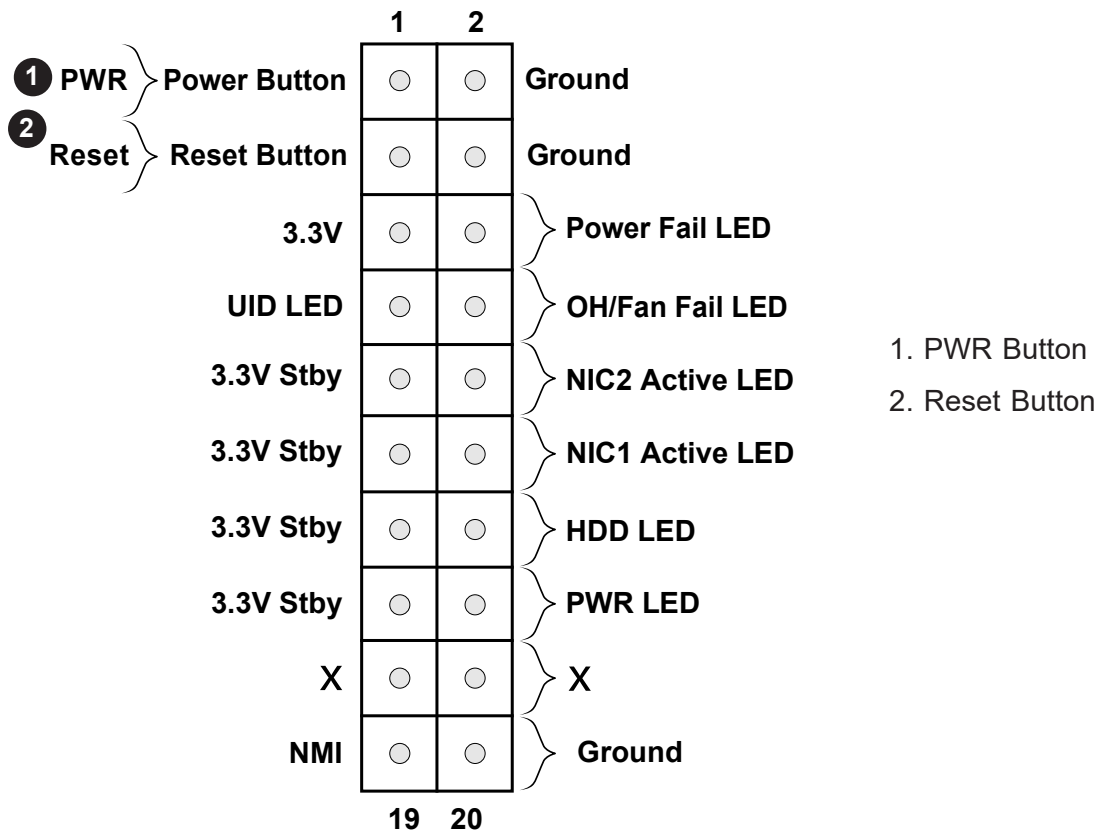
The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press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

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

## Reset Button

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

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



### Power Fail LED

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

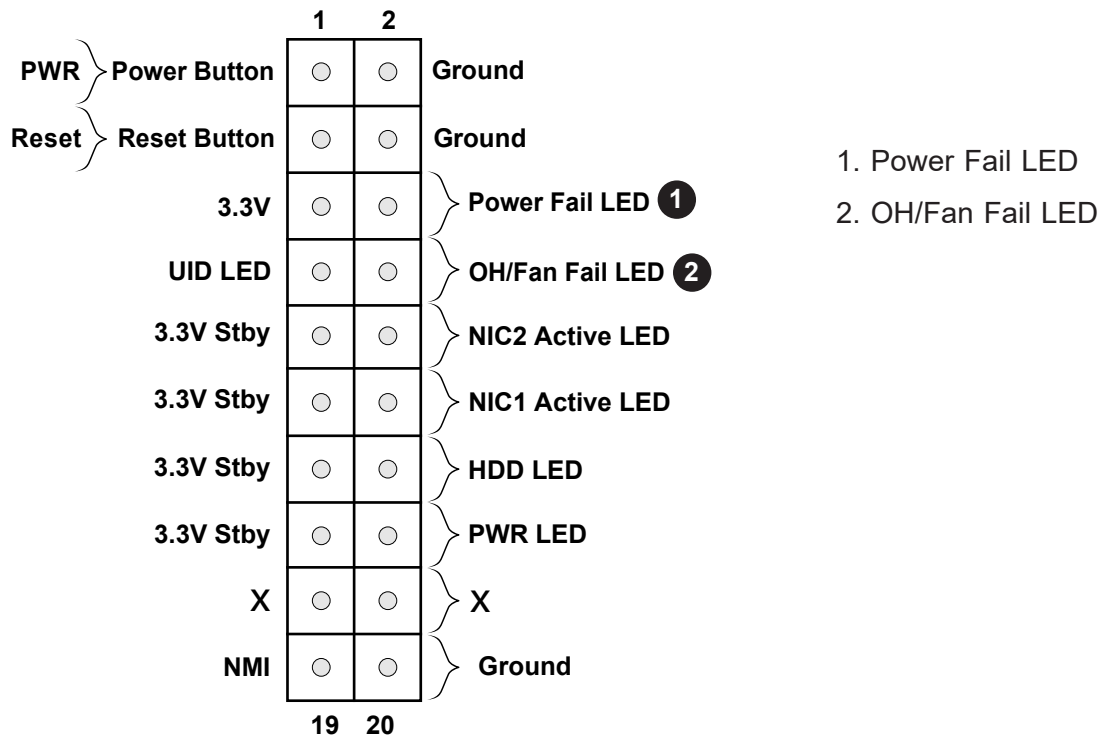
Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	PWR Supply Fail

### Fan Fail and UID LED

Connect an LED cable to pins 7 and 8 of the Front Control Panel to use the Overheat/Fan Fail LED connections. The LED on pin 8 provides warnings of overheat or fan failure. Refer to the tables below for pin definitions.

OH/Fan Fail Indicator Status	
State	Definition
Off	Normal
On	Overheat
Flashing	Fan Fail

OH/Fan Fail LED Pin Definitions (JF1)	
Pin#	Definition
7	Blue LED
8	OH/Fan Fail LED



## NIC1/NIC2 (LAN1/LAN2)

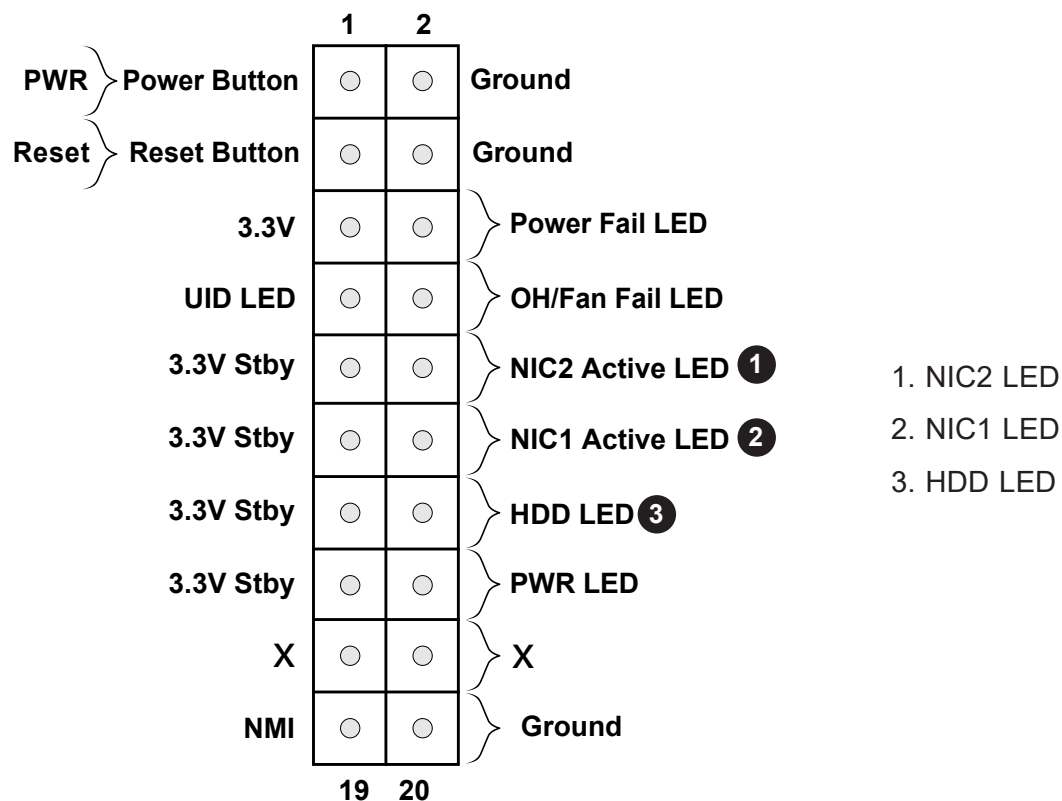
The NIC (Network Interface Controller) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9	NIC 2 Activity LED
11	NIC 1 Activity LED

## HDD LED

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

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



### Power LED

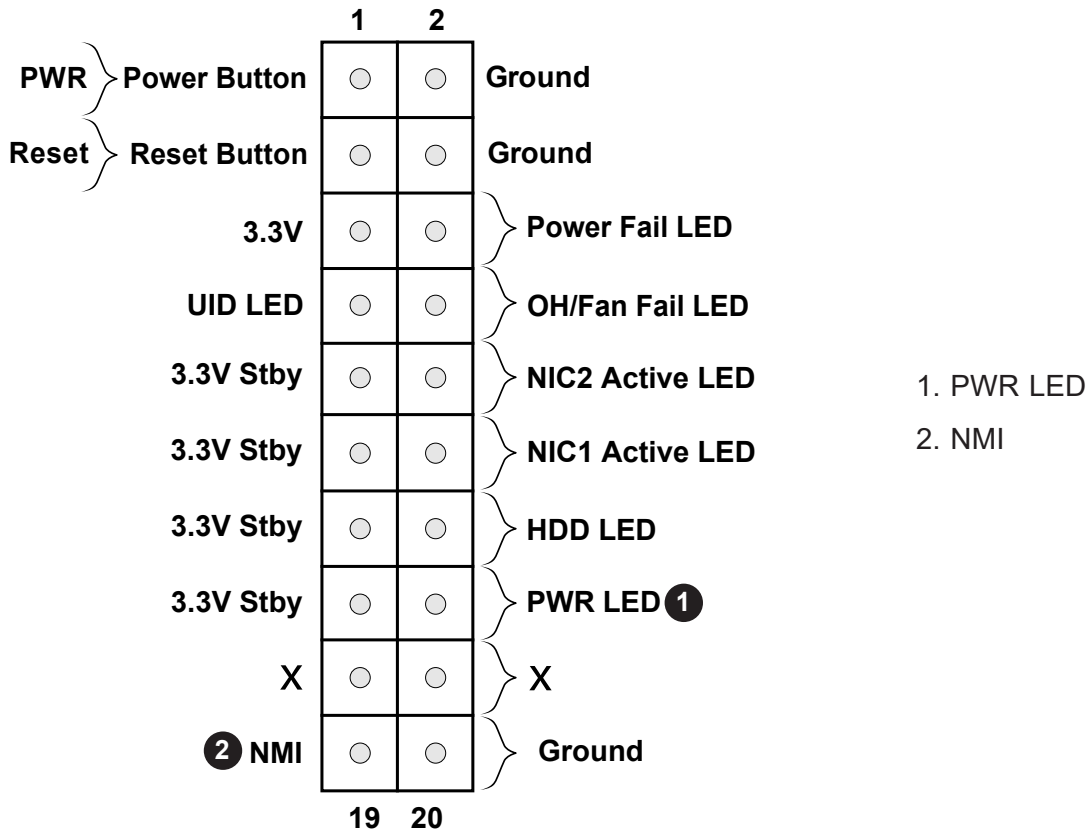
The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table below for pin definitions.

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

### NMI Button

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

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

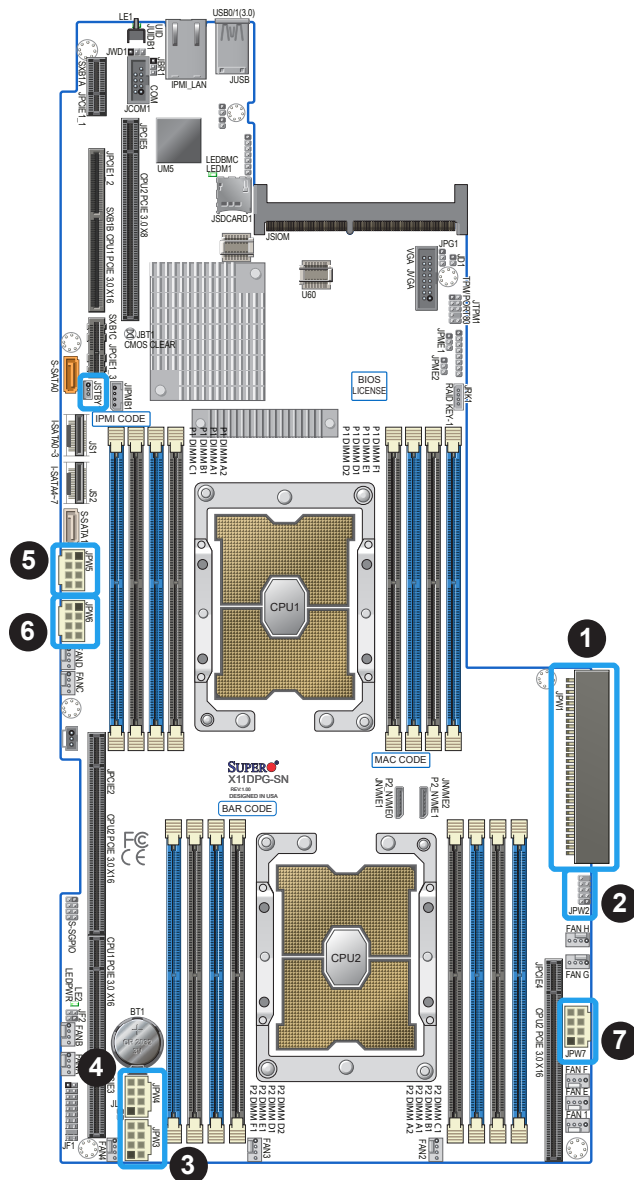


## 2.7 Connectors

### Power Connectors

#### HDD Power Connectors

Four 8-pin HDD backplane power connectors (JPW1 - JPW4) are used to provide power to hard drives and other backplane devices. See the table below for pin definitions.



1. JPW1 (Proprietary Main Power)
2. JPW2 (Power Supply Sideband)
3. JPW3 (GPU/Backplane Power 3)
4. JPW4 (GPU/Backplane Power 4)
5. JPW5 (GPU/Backplane Power 5)
6. JPW6 (GPU/Backplane Power 6)
7. JPW7 (GPU/Backplane Power 7)
8. JSTBY1 (Standby Power)

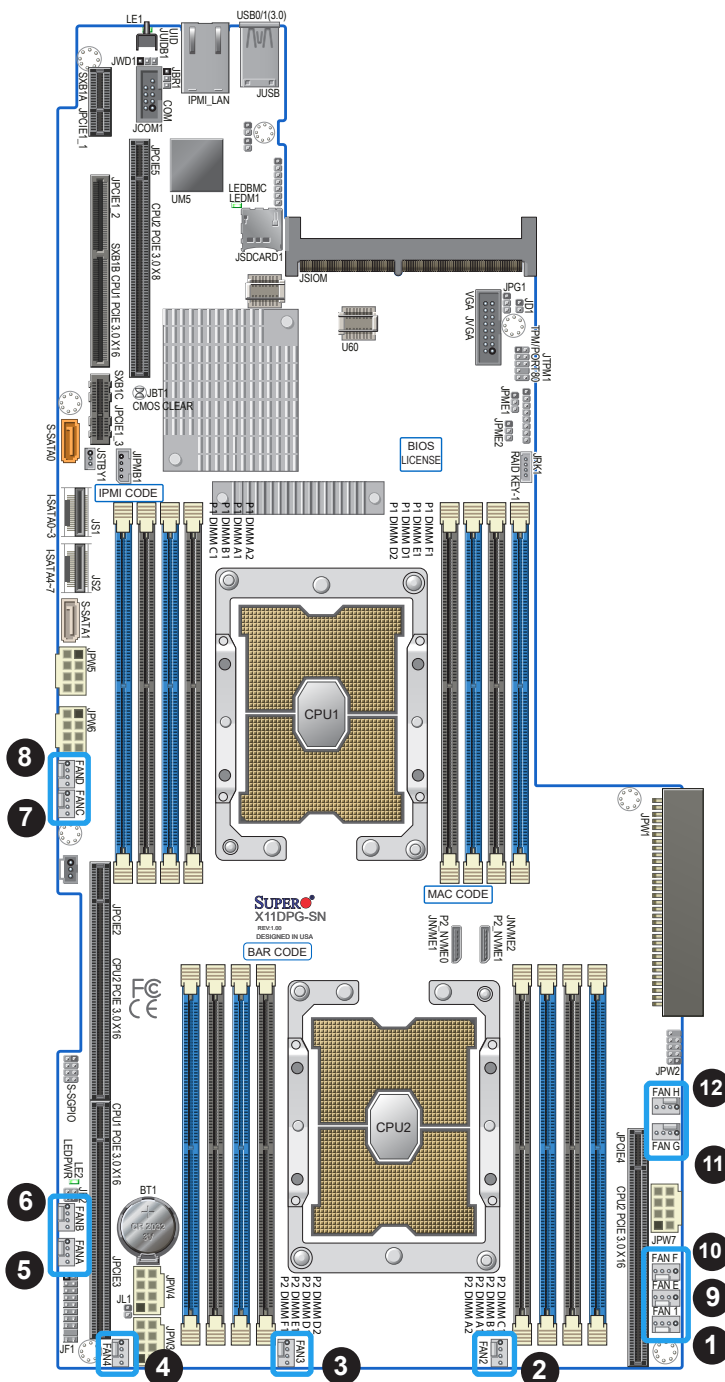
**12V 8-pin Backplane Power Connector Pin Definitions**

Pins	Definition
1 through 4	Ground
5-8	+12V

## Headers

### Onboard Fan Header

This motherboard has twelve headers (FAN1~4, FANA~H). All these 4-pin fan headers are backward-compatible with traditional 3-pin fans. However, onboard fan speed control is available only when all 4-pin fans are used on the motherboard. Fan speed control is supported by Thermal Management via IPMI 2.0 interface. See the table below for pin definitions.



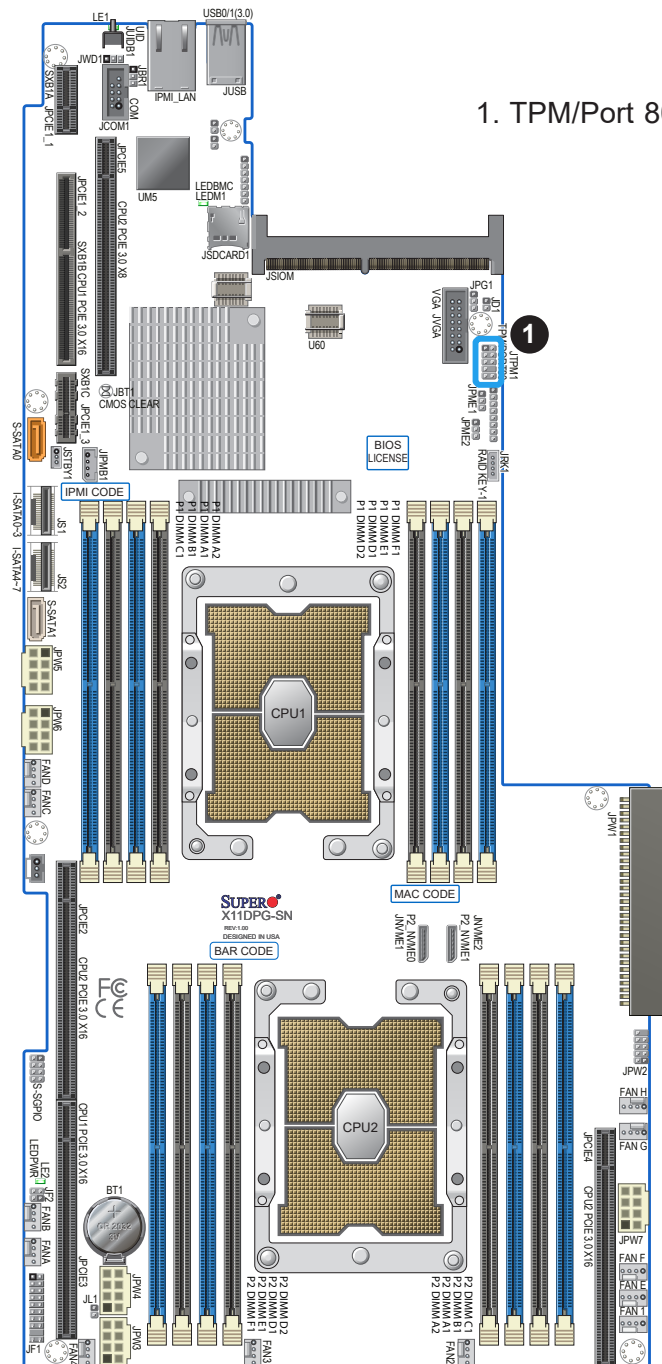
Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWM Control

1. FAN 1
2. FAN 2
3. FAN 3
4. FAN 4
5. FAN A
6. FAN B
7. FAN C
8. FAN D
9. FAN E
10. FAN F
11. FAN G
12. FAN H



## TPM Header

The JTPM1 header is used to connect a Trusted Platform Module (TPM)/Port 80, which is available from a third-party vendor. A TPM/Port 80 connector is a security device that supports encryption and authentication in hard drives. It allows the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. See the table below for pin definitions.



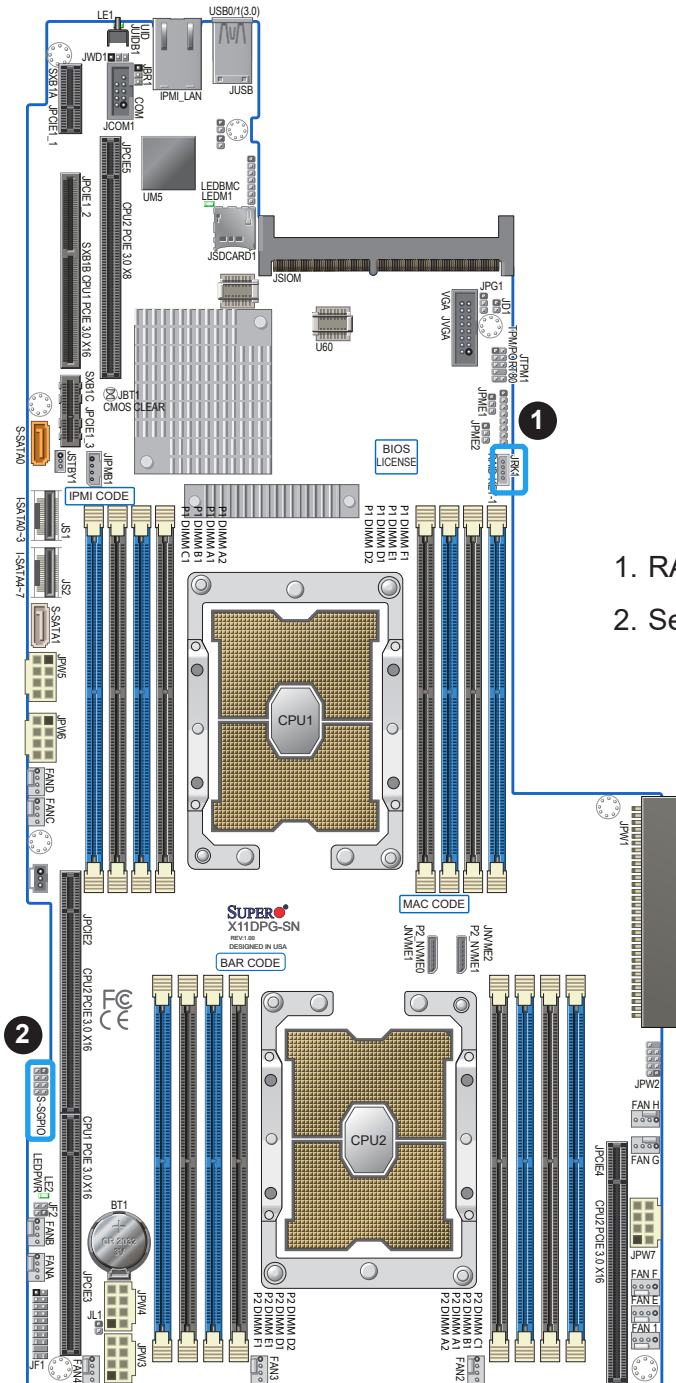
1. TPM/Port 80 Header

### RAID Key Header

A RAID key header is located at JRK1 on the motherboard and is used to support onboard S-SATA connections.

### SGPIO Header

The S-SGPIO1 (Serial General Purpose Input/Output) header is used to communicate with S-SATA ports.



SGPIO Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	NC	2	NC
3	Ground	4	DATA Out
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

1. RAID Key
2. Serial General Purpose I/O Header

### 4-pin BMC External I<sup>2</sup>C Header (Inlet Temperature Sensor)

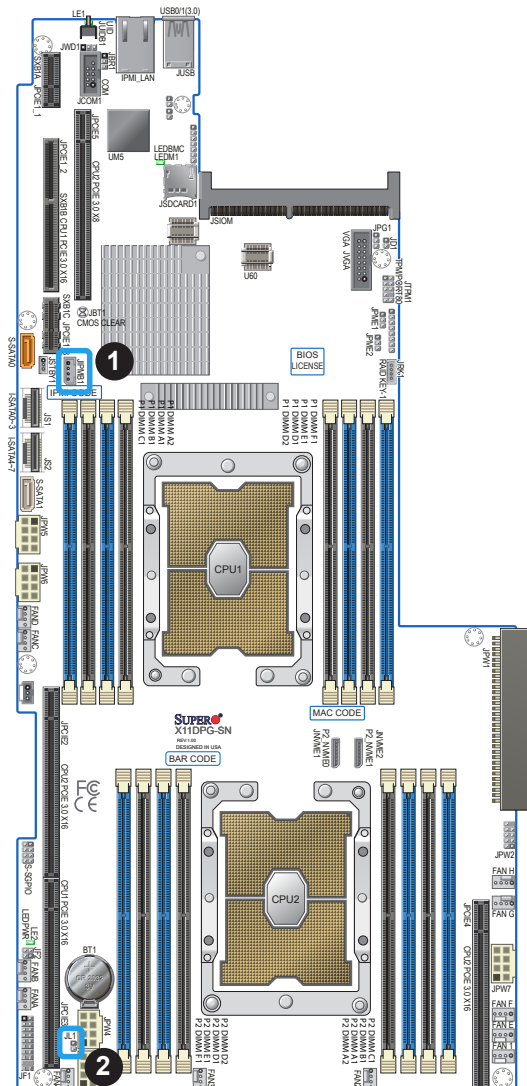
A System Management Bus header for IPMI 2.0 is located at JIPMB1. This header functions as an Inlet Temperature Sensor, which measures the air intake for the system. Connect the appropriate cable here to use the IPMB I<sup>2</sup>C connection on your system.

External I <sup>2</sup> C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	P3V3_STBY

### Chassis Intrusion

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

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

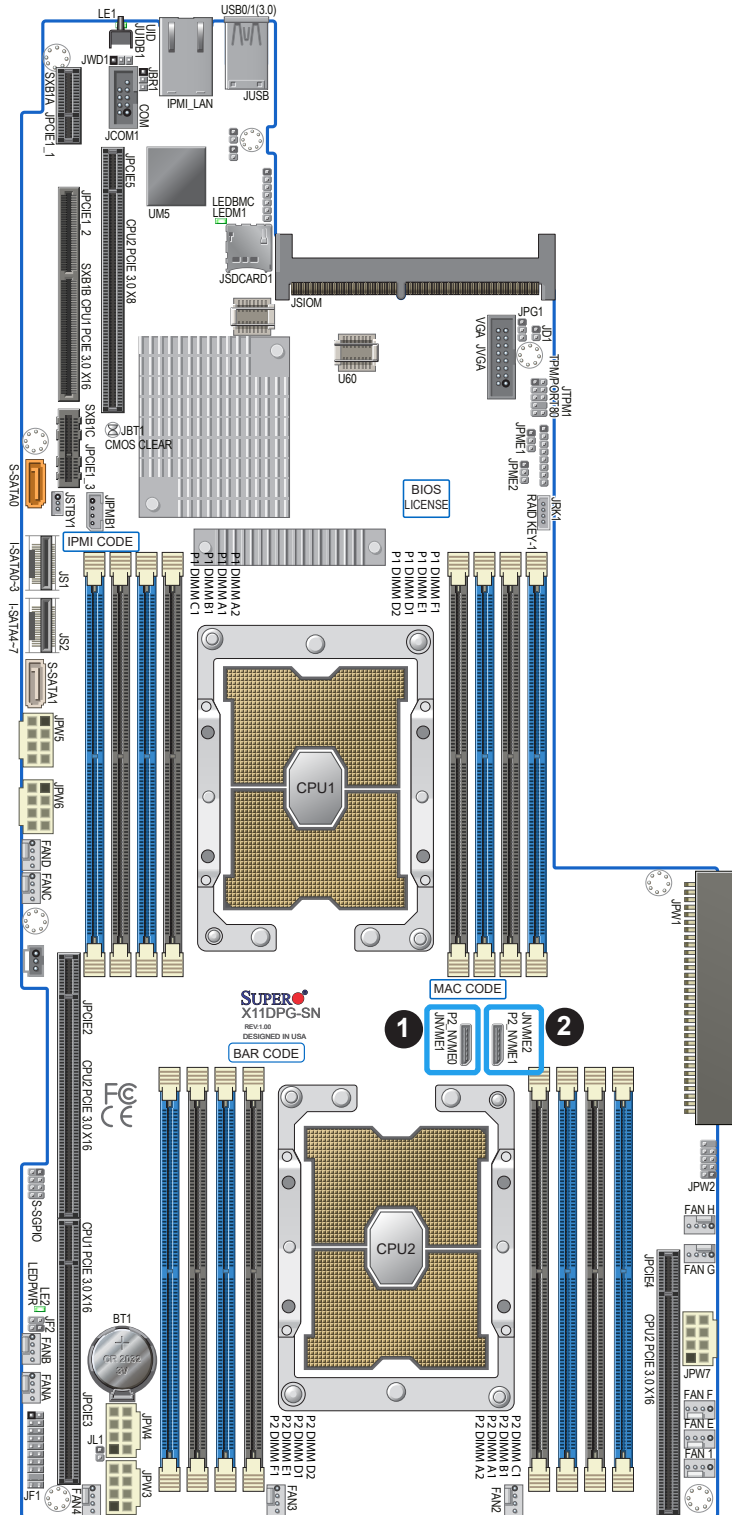


1. BMC External I<sup>2</sup>C Header
2. Chassis Intrusion

## NVMe Slots

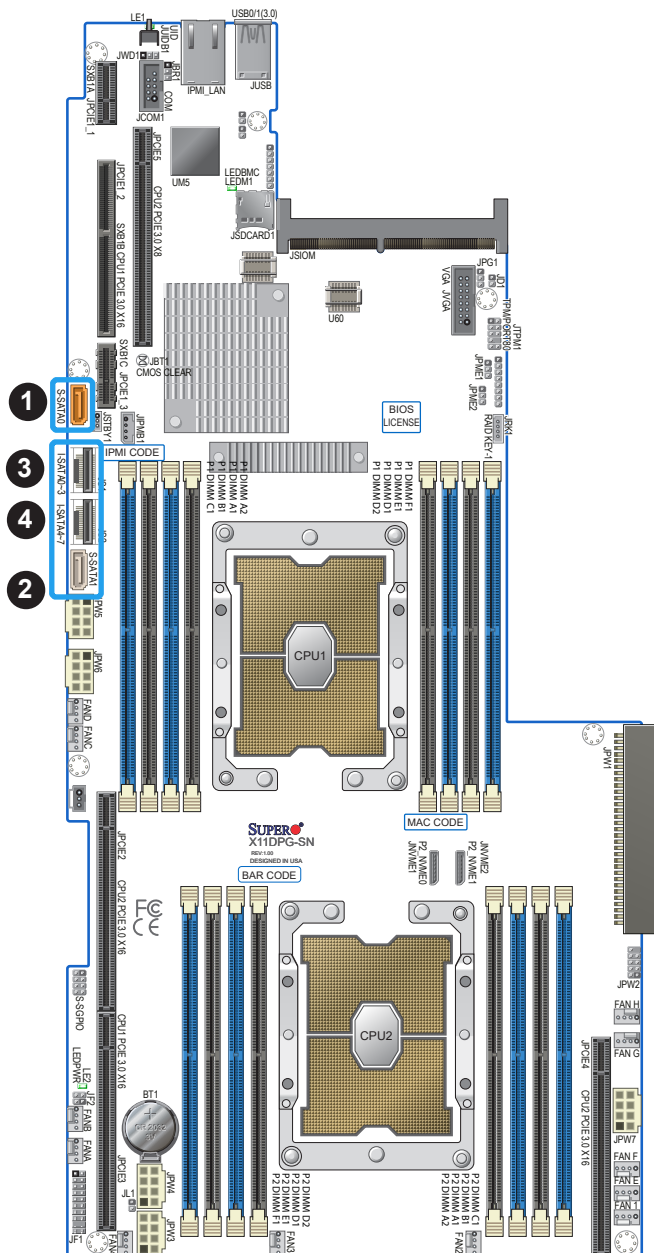
Use the two NVMe slots (NVME1 and NVME2) to attach high-speed PCI-E storage devices.

1. JNVME1 slot (CPU2)
2. JNVME2 slot (CPU2)



## I-SATA 3.0 and S-SATA 3.0 Ports

The X11DPG-SN has eight I-SATA 3.0 (I-SATA0-3, I-SATA4-7) and two S-SATA ports (S-SATA0 and S-SATA1) on the motherboard supported by the Intel C621 chipset. I-SATA0-3, I-SATA4-7, and S-SATA1 are supported by Intel® PCH. These SATA ports provide serial-link signal connection which is faster than a Parallel ATA connection.




SATA 3.0 Port Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

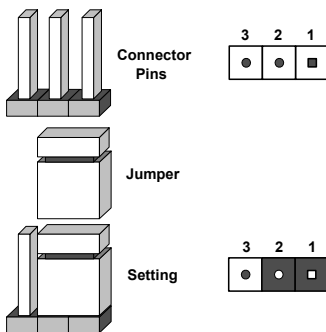
1. S-SATA0
2. S-SATA1
3. I-SATA0-3
4. I-SATA4-7

## 2.8 Jumper Settings

### How Jumpers Work

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

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



## CMOS Clear

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

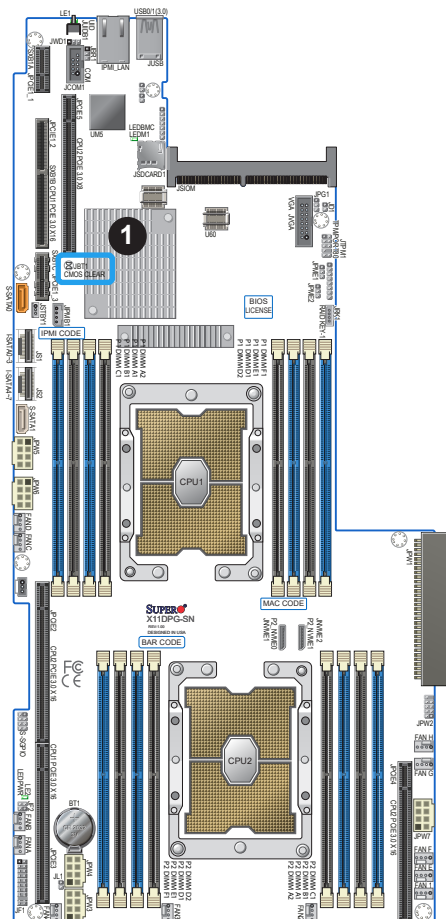
### To Clear CMOS

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



**Note:** Clearing CMOS will also clear all passwords.

Do not use the PW\_ON connector to clear CMOS.



JBT1 contact pads

1. Clear CMOS

## BIOS Recovery

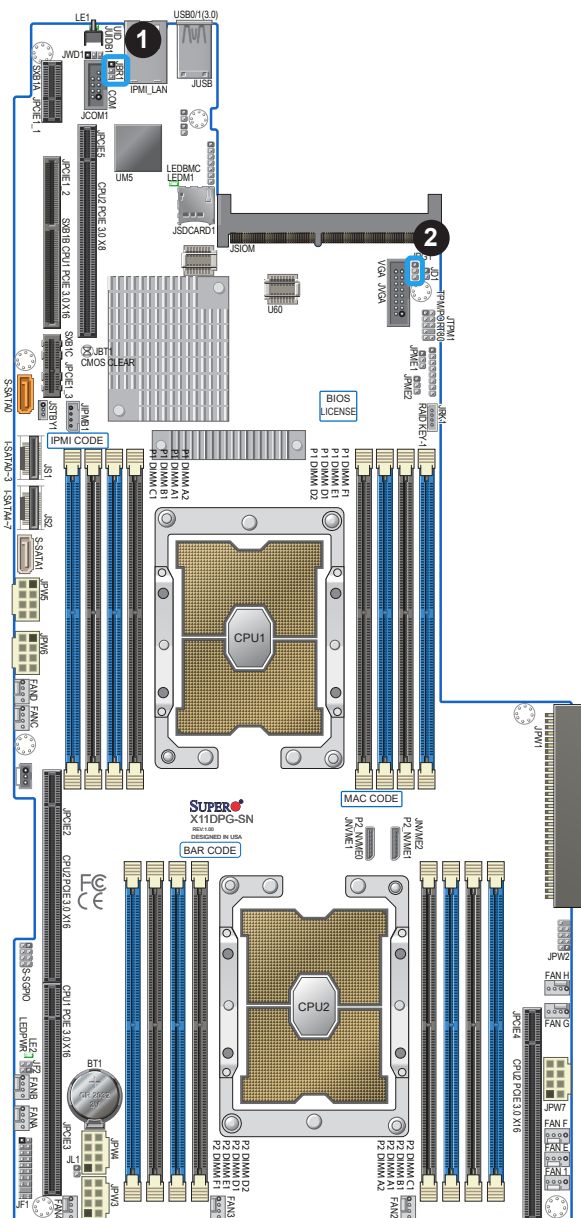
The default setting is on pins 1 and 2 of jumper JBR1 for normal operation (Normal). For BIOS recovery, close pins 2-3. Refer to the table below for jumper settings.

BIOS Recovery Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal
Pins 2-3	BIOS Recovery

## VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port using the onboard graphics controller. The default setting is Enabled.

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



1. BIOS Recovery
2. VGA Enable/Disable

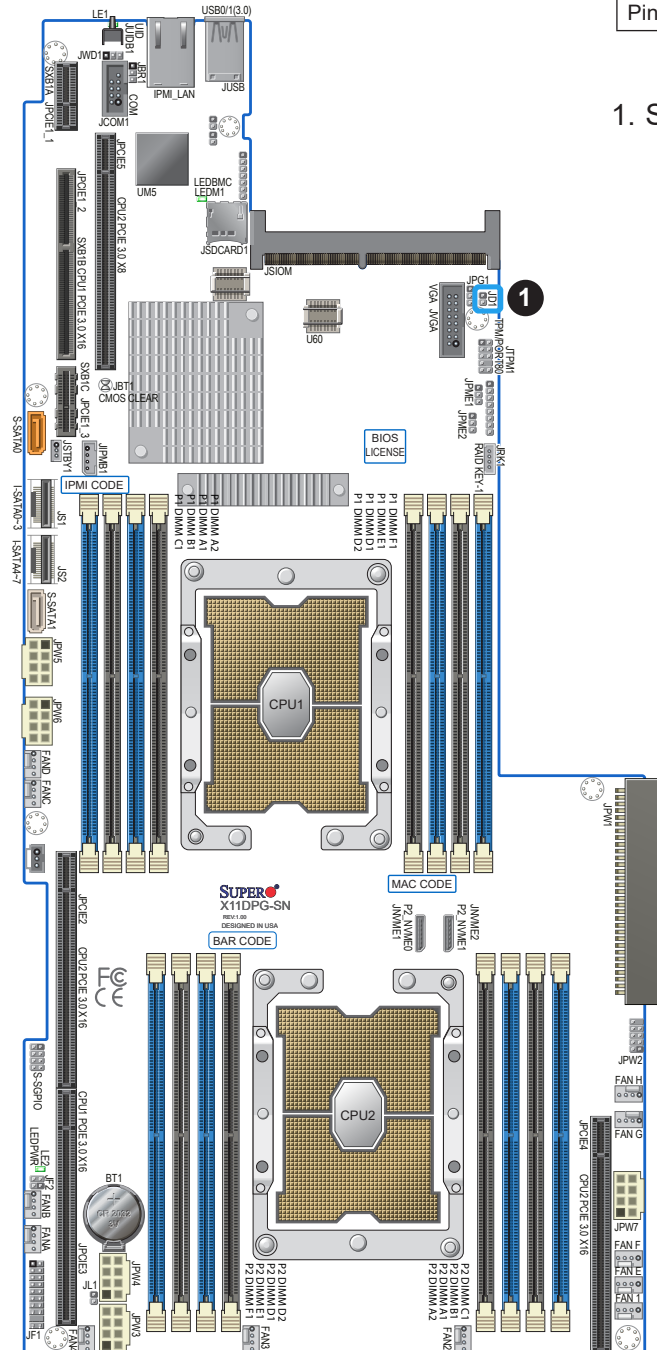


## Speaker Header

A speaker header is located on JD1. Close pins 1-2 of JD1 to use the onboard speaker. See the layout below for JD1 location.

Speaker Connector Pin Definitions	
Pin Setting	Definition
Pin 1	Power
Pin 2	Buzzer

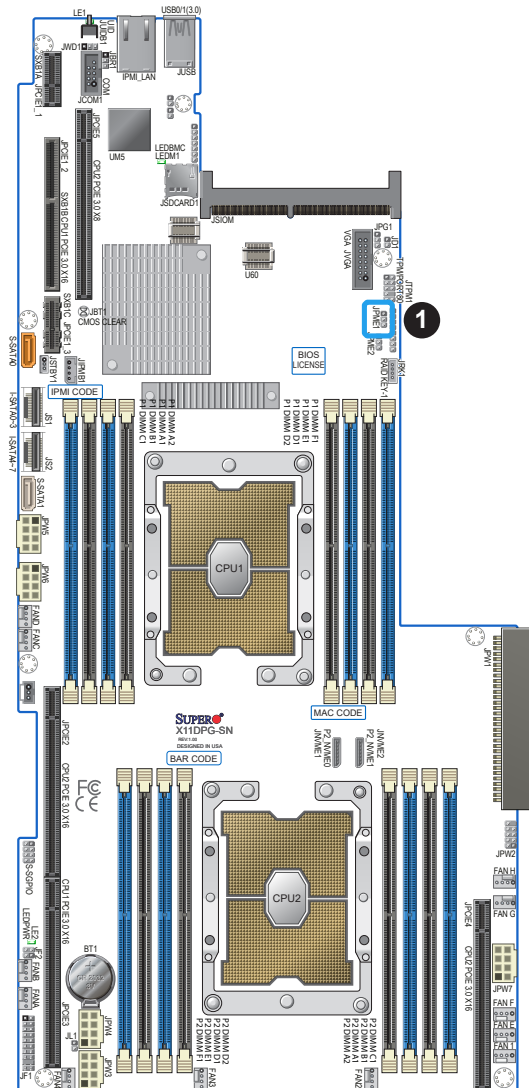
### 1. Speaker Header



## Management Engine (ME) Recovery

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

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

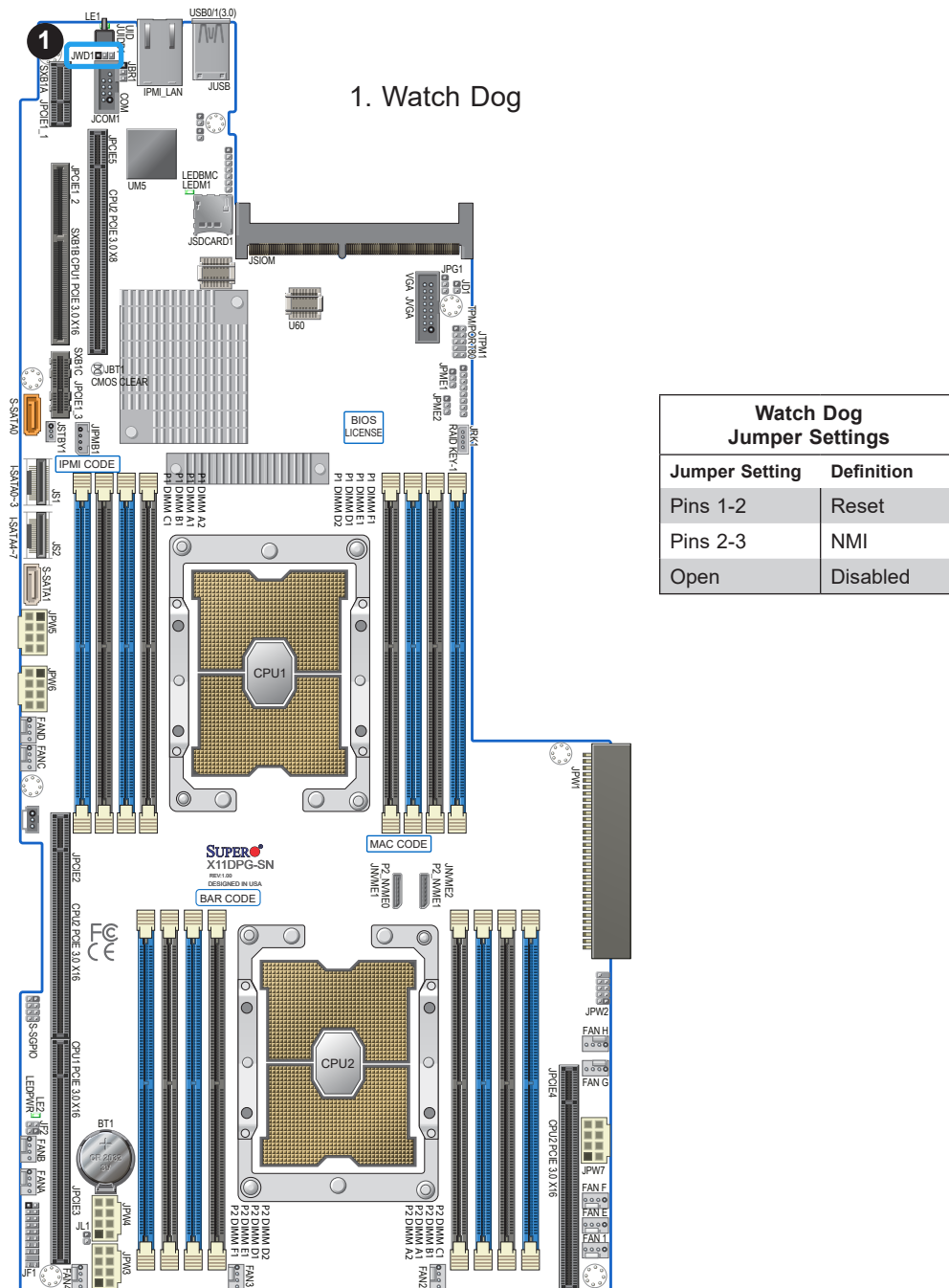


1. ME Recovery



## Watch Dog

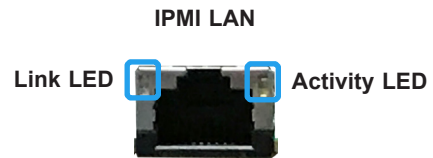
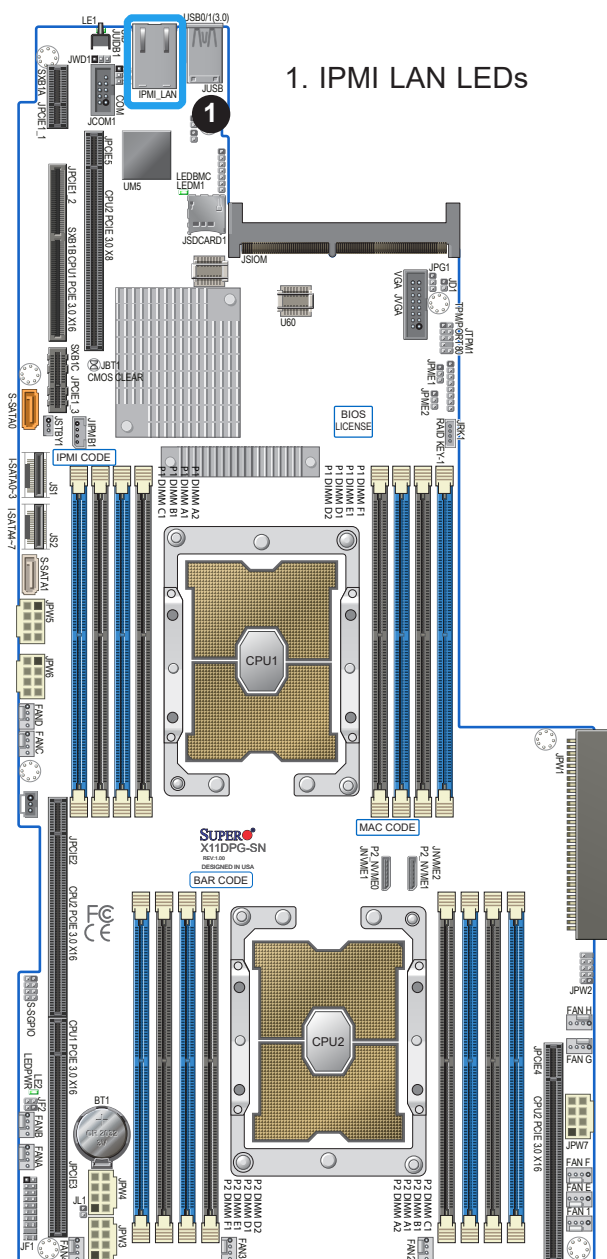
The Watch Dog function is a monitor controlled by the JWD1 that can reboot the system when a software application hangs. It must be enabled in BIOS, where the default is set to Reset. In the case an application hangs, jumping pins 1-2 will cause Watch Dog to reset the system while jumping pins 2-3 will generate a non-maskable interrupt signal.



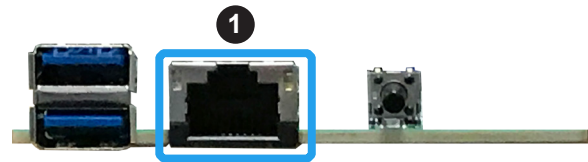
## 2.9 LED Indicators

### IPMI-Dedicated LAN LEDs

An IPMI-dedicated LAN is located on the I/O Backplane of the motherboard. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. See the tables at right for more information.



IPMI LAN Link LED (Left) & Activity LED (Right)		
Color	State	Definition
Link (Left)	Green: Solid	100 Mbps
Activity (Right)	Amber: Blinking	Active



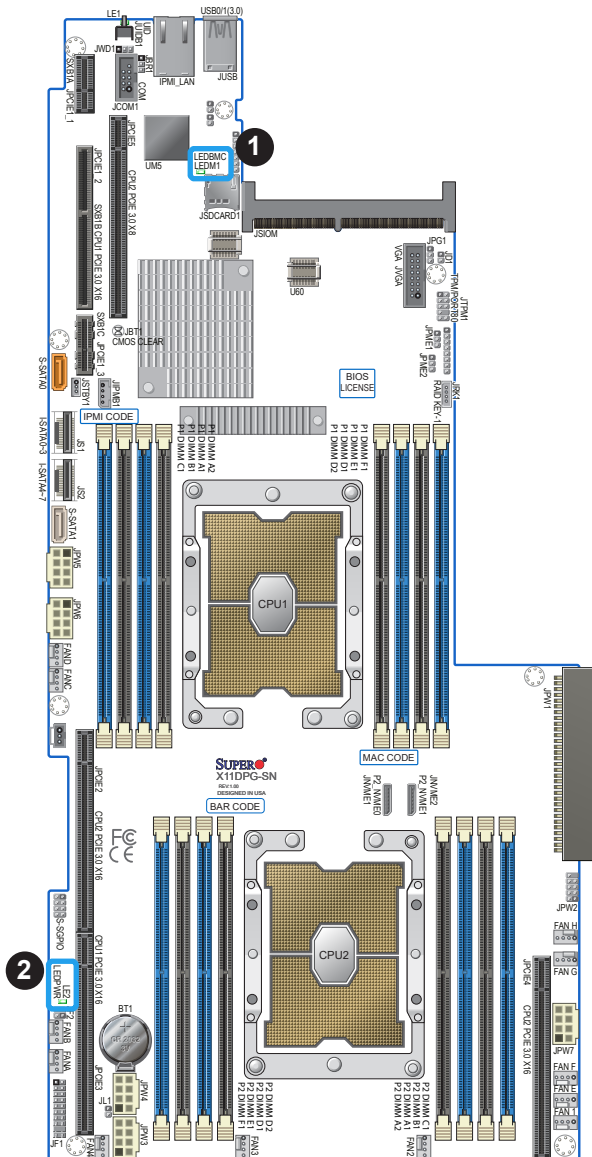
### BMC Heartbeat LED

LEDM1 is the BMC heartbeat LED. When the LED is blinking green, BMC is functioning normally. See the table below for the LED status.

Onboard Power LED Indicator	
LED Color	Definition
Green:	BMC Normal
Blinking	

### Onboard Power LED

The Onboard Power LED is located at LE2 on the motherboard. When this LED is on, the system is also 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.

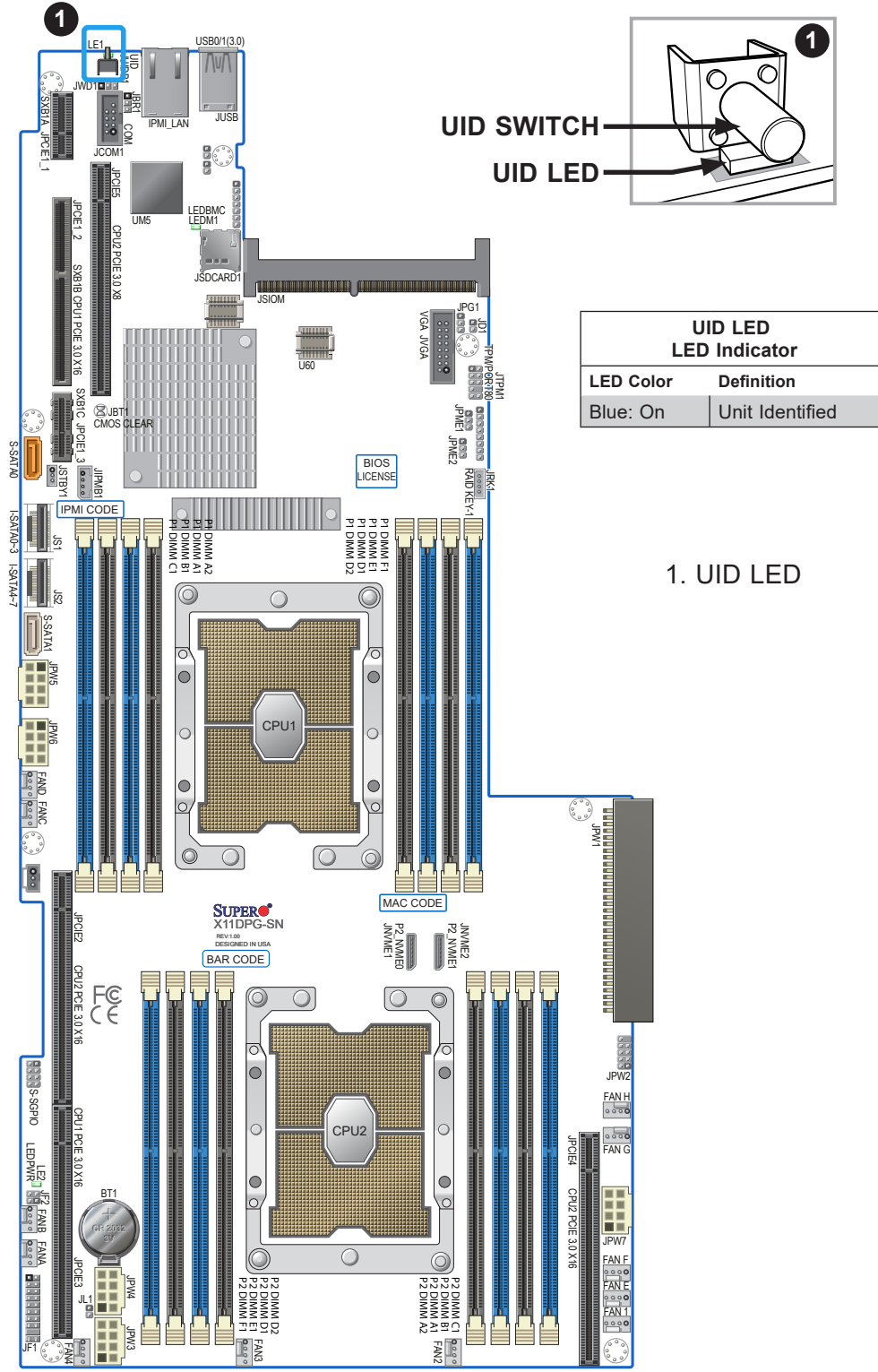


Onboard Power LED Indicator	
LED Color	Definition
Off	System Off (power cable not connected)
Green	System On

1. BMC Heartbeat LED
2. Onboard Power LED

## Unit ID LED

A rear UID LED indicator at LE1 is located near the UID switch on the I/O back panel. This UID indicator provides easy identification of a system unit that may need service.



# 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. Check that the power LED on the motherboard is on.
2. Make sure that the power connector is connected to your power supply.
3. Make sure that no short circuits exist between the motherboard and chassis.
4. Disconnect all cables from the motherboard, including those for the keyboard and mouse.
5. Remove all add-on cards.
6. Install a CPU, a heatsink, and connect the internal speaker and the power LED to the motherboard. Check all jumper settings and make sure that the heatsink is fully seated.
7. Use the correct type of onboard CMOS battery (CR2032) as recommended by the manufacturer. To avoid possible explosions, be sure to install the CMOS battery right side up.

#### No Power

1. Make sure that no short circuits exist between the motherboard and the chassis.
2. Verify that all jumpers are set to their default positions.
3. Check that the 115V/230V switch on the power supply is properly set.
4. Turn the power switch on and off to test the system.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.



## No Video

1. If the power is on but you have no video, remove all the add-on cards and cables.
2. Use the speaker to determine if any beep codes exist. Refer to Appendix A for details on beep codes.



**Note:** If you are a system integrator, VAR, or OEM, a POST diagnostics card is recommended. For I/O port 80h codes, refer to Appendix B.

## System Boot Failure

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

1. Check for any error beep from the motherboard speaker.
  - If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, replace the motherboard.
  - If there are error beeps, clear the CMOS settings by unplugging the power cord and contacting both pads on the CMOS Clear Jumper (JBT1). Refer to 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 DIMM modules are properly and fully installed.
2. Confirm that you are using the correct memory. Also, it is recommended that you use the same memory type and speed for all DIMMs in the system. See Section 2.4 for memory details.
3. Check for bad DIMM modules or slots by swapping modules between slots and noting the results.
4. Check the power supply voltage 115V/230V switch.

## 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 1.5 for details on recommended power supplies.
2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.
3. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

## When the System Becomes Unstable

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

1. CPU/BIOS support: Make sure that your CPU is supported and that you have the latest BIOS installed in your system.
2. Memory support: Make sure that the memory modules are supported by testing the modules using memtest86 or a similar utility.



**Note:** Refer to the product page on our website at <http://www.supermicro.com> for memory and CPU support and updates.

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. Then check the hardware monitoring settings in the IPMI to make sure that the CPU and system temperatures are within the normal range. Make sure that the front panel Overheat LED is not on.
5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.
6. Proper software support: Make sure that the correct drivers are used.

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

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as CD/DVD and CD/DVD-ROM.
2. Cable connection: Check to make sure that all cables are connected and working properly.

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

## 3.2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, note that as a motherboard manufacturer, we do not sell directly to end-users, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please review the 'Troubleshooting Procedures' and 'Frequently Asked Questions' (FAQs) sections in this chapter or see the FAQs on our website before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website. **Note:** Not all BIOS can be flashed depending on the modifications to the boot block code.
3. If you still cannot resolve the problem, include the following information when contacting us 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

An example of a Technical Support form is posted on our website.

Distributors: For immediate assistance, please have your account number ready when contacting our technical support department by e-mail.

### 3.3 Frequently Asked Questions

**Question: What type of memory does my motherboard support?**

**Answer:** The X11DPG-SN motherboard supports up to 2TB of 3DS LRDIMM/LRDIMM/RDIMM DDR4 ECC 2666/2400/2133 MHz memory in 16 memory slots. See Section 2.4 for details on installing memory.

**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>. Please check our BIOS warning message and the information on how to update your BIOS on our website. Check that the BIOS revision is the most current before selecting your motherboard model and downloading the BIOS file to your computer as either the zip file or the .exe file. If you choose the zip BIOS file, please 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.

**Question: Why can't I turn off the power using the momentary power on/off switch?**

**Answer:** The instant power off function is controlled in BIOS by the Power Button Mode setting. When the On/Off feature is enabled, the motherboard will have instant off capabilities as long as the BIOS has control of the system. When the Standby or Suspend feature is enabled or when the BIOS is not in control such as during memory count (the first screen that appears when the system is turned on), the momentary on/off switch must be held for more than four seconds to shut down the system. This feature is required to implement the ACPI features on the motherboard.

### 3.4 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.

## 3.5 Battery Removal and Installation

### Battery Removal

To remove the onboard battery, follow the steps below:

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

### Proper Battery Disposal

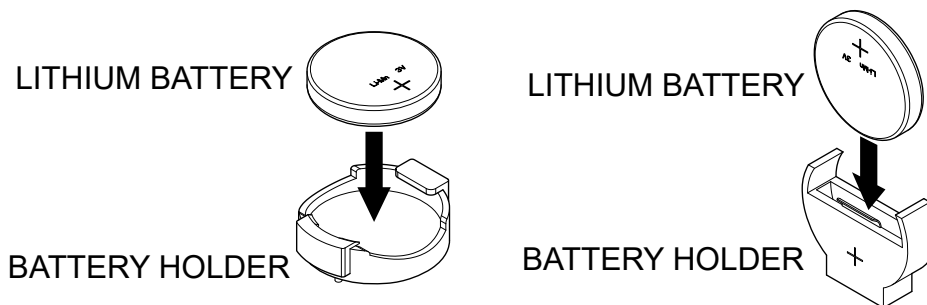
Please handle used batteries carefully. Do not damage the battery in any way as a damaged battery may release hazardous materials into the environment. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly. Do not discard a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

### Battery Installation

1. To install an onboard battery, follow the steps 1 & 2 above and continue below:
2. Identify the battery's polarity. The positive (+) side should be facing up.
3. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.



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



## Chapter 4

# BIOS

### 4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the X11DPG-SN motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.



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

#### Starting the Setup Utility

To enter the BIOS setup utility, press the <Delete> key while the system is booting up. (In most cases, the <Delete> key is used to invoke the BIOS setup screen. 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 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>, <F10>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

## 4.2 Main Setup

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



### System Date/System Time

Use this item 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 Day MM/DD/YYYY format. The time is entered in HH:MM:SS format.



**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is 01/01/2014 after RTC reset.

### Supermicro X11DPG-SN

#### BIOS Version

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

#### Build Date

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

#### CPLD Version

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

## **Memory Information**

### **Total Memory**

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

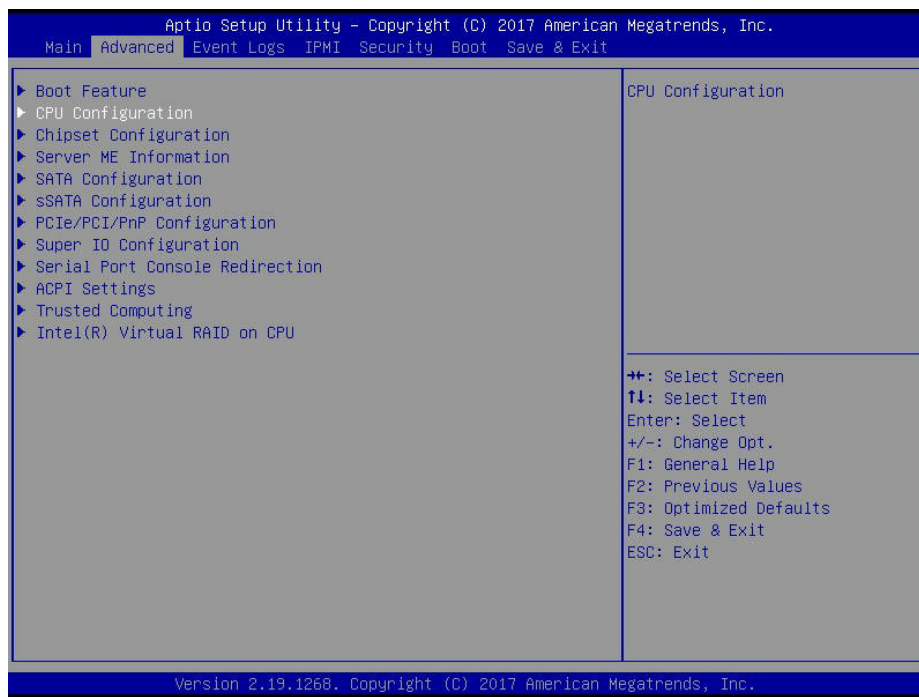
### **Memory Speed**

This item displays the default speed of the memory modules installed in the system.



## 4.3 Advanced Setup Configurations

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



**Warning:** Take Caution when changing the Advanced settings. An incorrect value, an incorrect DRAM frequency, or an incorrect BIOS timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacture default setting.

### ► Boot Feature

#### Quiet Boot

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

 **Note:** POST message is always displayed regardless of the item setting.

#### Option ROM Messages

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

### **Bootup NumLock State**

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

### **Wait For 'F1' If Error**

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

### **Interrupt 19 Capture**

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

### **Re-try Boot**

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

## **Power Configuration**

### **Watch Dog Function**

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than 5 minutes. The options are **Disabled** and Enabled.

### **Power Button Function**

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for the user to power off the system after pressing and holding the power button for 4 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.

### **Restore on AC Power Loss**

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

## ► CPU Configuration

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

### ► Processor Configuration

The following CPU information will be displayed:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 0 Version
- Processor 1 Version

### **Hyper-Threading (ALL)**

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

### **Execute Disable Bit (Available if supported by the OS & the CPU)**

Select Enable to enable Execute Disable Bit support which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor, damaging the system during a virus attack. The options are Disable and **Enable**. (Refer to Intel and Microsoft websites for more information.)

### Intel Virtualization Technology

Select Enable to use Intel Virtualization Technology which will allow the I/O device assignments to be directly reported to the VMM (Virtual Memory Management) 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 settings are Disable and **Enable**.

### PPIN Control


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

### Hardware Prefetcher (Available when supported by the CPU)

If this feature is set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the Level 2 (L2) cache to improve CPU performance. The options are **Enable** and Disable.

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

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

 **Note:** Please power off and reboot the system for the changes you've made to take effect. Please refer to Intel's website for detailed information.

### DCU Streamer Prefetcher (Available when supported by the CPU)

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

### DCU IP Prefetcher

If this item is set to Enable, the IP prefetcher in the DCU (Data Cache Unit) will prefetch IP addresses to improve network connectivity and system performance. The options are **Enable** and Disable.

### LLC Prefetch

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

### Extended APIC (Extended Advanced Programmable Interrupt Controller)

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

## AES-NI

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

## ► Advanced Power Management Configuration

### ► CPU P State Control

#### SpeedStep (PStates)

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

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

Use this item to configure the processor's P-State coordination settings. During a P-State, the voltage and frequency of the processor will be reduced when it is in operation. This makes the processor more energy efficient, resulting in further energy gains. The options are **HW\_ALL**, **SW\_ALL** and **SW-ANY**.

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

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

### ► Hardware PM (Power Management) State Control

#### Hardware P-States

If this feature is set to Disable, hardware will choose a P-state setting for the system based on an OS request. If this feature is set to Native Mode, hardware will choose a P-state setting based on OS guidance. If this feature is set to Native Mode with No Legacy Support, hardware will choose a P-state setting independently without OS guidance. The options are **Disable**, **Native Mode**, **Out of Band Mode**, and **Native Mode with No Legacy Support**.

### ► CPU C State Control

#### Autonomous Core C-State

Select Enable to support Autonomous Core C-State control which will allow the processor core to control its C-State setting automatically and independently. The options are **Disable** and **Enable**.

### **CPU C6 Report**

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

### **Enhanced Halt State (C1E)**

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

### **► Package C State Control**

#### **Package C State**

Use this feature to set the limit on the C-State package register. The options are C0/1 state, C2 state, C6 (non-Retention) state, C6 (Retention) state, No Limit, and Auto.

### **► Chipset Configuration**

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

#### **► North Bridge**

This feature allows the user to configure the settings for the Intel North Bridge.

#### **► UPI (Ultra Path Interconnect) Configuration**

This section displays the following UPI General Configuration information:

- Number of CPU
- Number of IIO
- Current UPI Link Speed
- Current UPI Link Frequency
- UPI Global MMIO Low Base/Limit
- UPI Global MMIO High Base/Limit
- UPI PCI-E Configuration Base/Size

### Degrade Precedence

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

### Link L0p Enable

Select Enable to enable Link L0p. The options are Disable, **Enable**, and Auto.

### Link L1 Enable

Select Enable to enable Link L1 (Level 1 link). The options are Disable, **Enable**, and Auto.

### IO Directory Cache

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

### Isoc Mode

Select Enable to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for Virtualization Technology. The options are Disable, Enable, and **Auto**.

## ► Memory Configuration

### Enforce POR

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

### Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1866, 2000, 2133, 2200, 2400, 2600, and 2666.

### Data Scrambling for NVDIMM

Select Enable to enable data scrambling for onboard NVDIMM memory to enhance system performance and security. The options are **Auto**, Disable, and Enable.

### Data Scrambling for DDR4

Select Enable to enable data scrambling for DDR4 memory to enhance system performance and security. The options are **Auto**, Disable, and Enable.

### **tCCD\_L Relaxation**

If this feature is set to Enable, SPD (Serial Presence Detect) will override tCCD\_L ("Column to Column Delay-Long", or "Command to Command Delay-Long" on the column side.) If this feature is set to Disable, tCCD\_L will be enforced based on the memory frequency. The options are Auto Enable and **Disable**.

### **Enable ADR**

Select Enable for ADR (Automatic Diagnostic Repository) support to enhance memory performance. The options are **Disable** and Enable.

### **► Memory Topology**

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

- P1 DIMMA1
- P1 DIMMA2
- P2 DIMMB1
- P2 DIMMC1
- P1 DIMMD1
- P1 DIMMD2
- P1 DIMME1
- P1 DIMMF1
- P1 DIMMA1
- P1 DIMMA2
- P1 DIMMB1
- P1 DIMMC1
- P1 DIMMD1
- P1 DIMMD2
- P1 DIMME1
- P1 DIMMF1



## ► Memory RAS (Reliability\_Availability\_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

### Static Virtual Lockstep Mode

Select Enable to support Static Virtual Lockstep mode to enhance memory performance. The options are **Disable** and Enable.

### Mirror Mode

Select Enable to set all 1LM/2LM memory installed in the system on the mirror mode, which will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disable**, Mirror Mode 1LM and Mirror Mode 2LM.

### Memory Rank Sparing

Select Enable to support memory-rank sparing to optimize memory performance. The options are **Disable** and Enable.



**Note:** This item will not be available when memory mirror mode is enabled.

### Correctable Error Threshold

Use this item to enter the threshold value for correctable memory errors. The default setting is **10**.

### SDDC Plus One

Select Enable for SDDC (Single Device Data Correction) Plus One support, which will increase the reliability and serviceability of your system memory. The options are **Disable** and Enable.

### ADDDC (Adaptive Double Device Data Correction) Sparing

Select Enable for ADDDC sparing support to enhance memory performance. The options are **Disable** and Enable.

### Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected in a memory module and send the corrections to the requestor (the original source). When this item is set to Enable, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are Disable and **Enable**.

### Patrol Scrub Interval

Use this item to specify the number of hours (between 0 to 24) required for the system to complete a full patrol scrubbing. Enter 0 for patrol scrubbing to be performed automatically. The default setting is **24**.



**Note:** This item is hidden when Patrol Scrub item is set to Disable.

## ► IIO Configuration

### EV DFX (Device Function On-Hide) Features

When this feature is set to Enable, the EV\_DFX Lock Bits that are located in a processor will always remain clear during electric tuning. The options are **Disable** and **Enable**.

## ► CPU1 Configuration/CPU2 Configuration

### IOU0 (IIO PCIe Br1)

This item configures the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### IOU1 (IIO PCIe Br2)

This item configures the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### IOU2 (IIO PCIe Br3)

This item configures the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

### MCP0 (IIO PCIe Br4)

This item configures the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

### MCP1 (IIO PCIe Br5)

This item configures the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

## ► Socket 0 PCI-E Br0D00F0 - Port 0/DMI to Socket 0 PcieBr5D00F0 - MCP 1

(Available for CPU 1 Configuration only)

### Link Speed

This item configures the link speed of a PCI-E port specified by the user. The options are **Auto**, Gen 1 (Generation 1) (2.5 GT/s), Gen 2 (Generation 2) (5 GT/s), and Gen 3 (Generation 3) (8 GT/s)

The following information will be displayed as well:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

#### **PCI-E Port Max (Maximum) Payload Size (Available for CPU 1 Configuration only)**

Select Auto for the system BIOS to automatically set the maximum payload value for a PCI-E device specified by to user to enhance system performance. The options are 128B, 256B and **Auto**.

### **IOAT Configuration**

#### **Disable TPH (TLP Processing Hint)**

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

#### **Prioritize TPH (TLP Processing Hint)**

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

#### **Relaxed Ordering**

Select Enable to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI and to be completed prior to other transactions that have already been enqueued. The options are **Disable** and Enable.

### **► Intel VT for Directed I/O (VT-d)**

#### **Intel® VT for Directed I/O (VT-d)**

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

### **Interrupt Remapping**

Select Enable for Interrupt Remapping support to enhance system performance. The options are **Enable** and Disable.

### **PassThrough DMA**

Select Enable for the Non-IscoH VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

### **ATS**

Select Enable to enable ATS (Address Translation Services) support for the Non-IscoH VT-d engine to enhance system performance. The options are **Enable** and Disable.

### **Posted Interrupt**

Select Enable to support VT\_D Posted Interrupt which will allow external interrupts to be sent directly from a direct-assigned device to a client machine in non-root mode to improve virtualization efficiency by simplifying interrupt migration and lessening the need of physical interrupts. The options are **Enable** and Disable.

### **Coherency Support (Non-IscoH)**

Select Enable for the Non-IscoH VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

## **► Intel® VMD Technology**

### **► Intel® VMD for Onboard NVMe**

#### **Intel® VMD for Onboard NVMe**

##### **Onboard NVMe Mode**

Select Legacy Mode for the onboard NVMe devices to support Legacy Mode. The options are **Legacy Mode** and the VMD Mode. When VMD Mode is selected, the following options become available:

- **P1\_NVMe0 VMD** - The options are Disable and **Enable**
- **P1\_NVMe1 VMD** - The options are Disable and **Enable**
- **Hot Plug Capable** - The options are Disable and **Enable**

#### **IIO-PCIE Express Global Options**

The section allows the user to configure the following PCI-E global options:

### **PCE-E Hot Plug**

Select Enable to support Hot-plugging for the selected PCI-E slots which will allow the user to replace the devices installed in the slots without shutting down the system. The options are **Disable**, Enable, Auto and Manual.

### **PCI-E Completion Timeout (Global)**

Use this item to select the PCI-E Completion Time-out settings. The options are **Yes**, No, and Per-Port.

## **► South Bridge**

The following South Bridge information will display:

- USB Module Version
- USB Devices

### **Legacy USB Support**

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

### **XHCI Hand-Off**

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

### **Port 60/64 Emulation**

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

### **Port 61h Bit-4 Emulation**

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

### **Install Windows 7 USB Support**

Select Enabled to install the Windows 7 USB utility to support legacy USB devices for Windows 7 systems. The options are **Disabled** and Enabled.

## ► Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

Operational Firmware Version

Backup Firmware Version

Recovery Firmware Version

ME Firmware Status #1

ME Firmware Status #2

Current State

Error Code

## ► SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA devices that are supported by the Intel PCH chip and displays the following items:

### SATA Controller

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

### Configure SATA as (Available when the item above: SATA Controller is set to enabled)

Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID. (**Note:** This item is hidden when the SATA Controller item is set to Disabled.)

### SATA HDD Unlock

Select Enable to unlock SATA HDD password in the OS. The options are Disable and **Enable**.

### SATA/sSATA RAID Boot Select

This feature allows the user to decide which controller should be used for system boot. The options are None, SATA Controller, **sSATA Controller** and Both.

### Aggressive Link Power Management

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

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

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

#### **SATA Port 0 - SATA Port 7**

##### **Hot Plug**

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

##### **Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the SATA device installed on the SATA port specified by the user to start a COMRESET initialization. The options are Enable and **Disable**.

##### **SATA Device Type**

Use this item to specify if the device installed on the SATA port selected by the user should be connected to a Solid State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid State Drive.

## **► sSATA Configuration**

When this submenu is selected, AMI BIOS automatically detects the presence of the sSATA devices that are supported by the sSATA controller and displays the following items:

### **sSATA Controller**

This item enables or disables the onboard sSATA controller supported by the Intel SCU. The options are **Enable** and Disable.

### **Configure sSATA as**

Select AHCI to configure an sSATA drive specified by the user as an AHCI drive. Select RAID to configure an sSATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID. (**Note:** This item is hidden when the sSATA Controller item is set to Disabled.)

### **SATA HDD Unlock**

Select Enable to unlock sSATA HDD password in the OS. The options are Disable and **Enable**.

### **SATA/sSATA RAID Boot Select (Available when the item "Configure SATA as" is set to "RAID")**

This feature allows the user to decide which controller should be used for system boot. The options are None, SATA Controller, **sSATA Controller**, and Both.

### **Aggressive Link Power Management**

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

### **sSATA RAID Option ROM/UEFI Driver (Available when the item "Configure SATA as" is set to "RAID")**

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

#### **sSATA Port 0 - sSATA Port 5**

##### **Hot Plug**

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

##### **Spin Up Device**

On an edge detect from 0 to 1, set this item to allow the sSATA device installed on the sSATA port specified by the user to start a COMRESET initialization. The options are Enable and **Disable**.

##### **sSATA Device Type**

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

## **► PCIe/PCI/PnP Configuration**

**The following PCI information will be displayed:**

- PCI Bus Driver Version
- PCI Devices Common Settings:

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

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

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

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



**MMIOHBase**

Use this item to select the base memory size according to memory-address mapping for the IO hub. The base memory size must be between 4032G to 4078G. The options are **56T**, 48T, 24T, 16T, 4T, and 1T.

**MMIO High Granularity Size**

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

**PCI PERR/SERR Support**

Use this feature to enable or disable the runtime event for SERR (System Error)/ PERR (PCI/ PCI-E Parity Error). The options are Disabled and **Enabled**.

**Maximum Read Request**

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

**MMCFG Base**

This feature determines the lowest MMCFG (Memory-Mapped Configuration) base assigned to PCI devices. The options are 1G, 1.5G, 1.75G, **2G**, 2.25G, and 3G.

**VGA Priority**

Use this item to select the graphics device to be used as the primary video display for system boot. The options are Auto, **Onboard** and Offboard.

**PCI Devices Option ROM Settings****Onboard NVME1/NVME2 OPROM**

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

**CPU1 Slot 1 PCI-E 3.0 X16**

The options are Disabled, **Legacy** and EFI.

**CPU2 Slot 2 PCI-E 3.0 X16**

The options are Disabled, **Legacy** and EFI.

**CPU1 Slot 3 PCI-E 3.0 X16**

The options are Disabled, **Legacy** and EFI.

### **CPU2 Slot 4 PCI-E 3.0 X16**

The options are Disabled, **Legacy** and EFI.

### **CPU2 Slot 5 PCI-E 3.0 X8**

The options are Disabled, **Legacy** and EFI.

### **Onboard Video Option ROM**

Use this feature to select the Onboard Video Option ROM type. The options are Disabled, **Legacy** and EFI.

## **► Network Stack Configuration**

### **Network Stack**

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

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

### **Ipv4 PXE Support**

Select Enabled to enable Ipv4 PXE boot support. If this feature is disabled, it will not create the Ipv4 PXE boot option. The options are Disabled and **Enabled**.

### **Ipv4 HTTP Support**

Select Enabled to enable Ipv4 HTTP boot support. If this feature is disabled, it will not create the Ipv4 HTTP boot option. The options are **Disabled** and Enabled.

### **Ipv6 PXE Support**

Select Enabled to enable Ipv6 PXE boot support. If this feature is disabled, it will not create the Ipv6 PXE boot option. The options are Disabled and **Enabled**.

### **Ipv6 HTTP Support**

Select Enabled to enable Ipv6 HTTP boot support. If this feature is disabled, it will not create the Ipv6 HTTP boot option. The options are **Disabled** and Enabled.

### **PXE Boot Wait Time**

Use this feature to select the wait time to press the <ESC> key to abort the PXE boot. The default is **0**.

### **Media Detect Time**

Use this feature to select the wait time in seconds for the BIOS ROM to detect the LAN media (Internet connection or LAN port). The default is **1**.

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## Super IO Configuration

### Super IO Chip AST2500

#### ► Serial Port 1 Configuration

##### Serial Port

Select Enabled to enable the onboard serial port specified by the user. The options are Disabled and **Enabled**.

##### Device Settings

This item displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.



**Note:** This item is hidden when Serial Port 1 is set to Disabled.

##### Change Settings

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

The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

#### ► Serial Port 2 Configuration

##### Serial Port

Select Enabled to enable the onboard serial port specified by the user. The options are **Enabled** and Disabled.

##### Device Settings

This item displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.



**Note:** This item is hidden when Serial Port 1 is set to Disabled.

## Change Settings

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

## Serial Port 2 Attribute

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

## ► Serial Port Console Redirection

### COM 1 Console Redirection

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

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

### ► Console Redirection Settings (for COM1)

#### Terminal Type

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

#### Bits Per second

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

#### Data Bits

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

### Parity

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

### Stop Bits

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

### Flow Control

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

### VT-UTF8 Combo Key Support

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

### Recorder Mode

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

### Resolution 100x31

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

### Legacy OS Redirection Resolution

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

### Putty KeyPad

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

### **Redirection After BIOS Post**

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

### **COM2/SOL (Serial-Over-LAN)**

#### **Console Redirection (for SOL/COM2)**

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

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

#### **► Console Redirection Settings (for COM2/SOL)**

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

#### **Terminal Type**

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

#### **Bits Per second**

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

#### **Data Bits**

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

### Parity

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

### Stop Bits

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

### Flow Control

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

### VT-UTF8 Combo Key Support

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

### Recorder Mode

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

### Resolution 100x31

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

### Legacy OS Redirection Resolution

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

### Putty KeyPad

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

### **Redirection After BIOS Post**

Use this feature to enable or disable legacy Console Redirection after BIOS POST (Power-On Self-Test). When this feature is set to Bootloader, legacy Console Redirection is disabled before booting the OS. When this feature is set to Always Enable, legacy Console Redirection remains enabled upon OS boot. The options are **Always Enable** and Bootloader.

## **► Legacy Console Redirection Settings**

### **Legacy Console Redirection Settings**

Use the feature to select the COM port to display redirection of Legacy OS and Legacy OPRM messages. The options are **COM1** and **COM2/SOL**.

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

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

#### **Console Redirection (for EMS)**

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

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

## **► EMS Console Redirection Settings**

### **Out-of-Band Management Port**

The feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1 (Console Redirection)** and **COM2/SOL (Console Redirection)**.

### **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 both 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 data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None**, Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each these features is displayed:

**Data Bits, Parity, Stop Bits****►ACPI Settings**

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

**NUMA Support (Available when the OS supports this feature)**

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

**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 Timer**

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

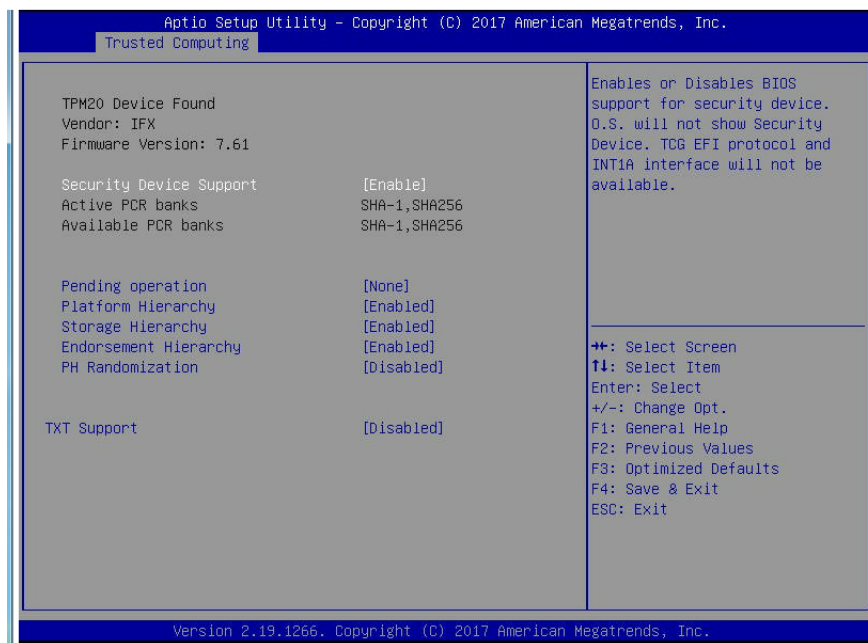
## ► Trusted Computing Configuration (Available when a TPM device is installed and detected by the BIOS)

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

- TPM2.0 Device Found
- Vendor
- Firmware Version

### Security Device Support

If this feature and the TPM jumper (JPT1) on the motherboard are both enabled, the onboard security (TPM) device will be enabled in the BIOS to enhance data integrity and system security. Please note that the OS will not show the security device. Neither TCG EFI protocol nor INT1A interaction will be made available for use. If you have made changes on the setting on this item, be sure to reboot the system for the change to take effect. The options are Disable and **Enable**. If this option is set to Enable, the following screen and items will display:



- Active PCR Banks
- Available PCR Banks

### Pending Operation

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



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

### Platform Hierarchy (for TPM Version 2.0 and above)

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

### Storage Hierarchy

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

### Endorsement Hierarchy


Select Enabled for Endorsement Hierarchy support, which contains separate controls to address the user's privacy concerns because the primary keys in this hierarchy are certified by the TPM or a manufacturer to be constrained to an authentic TPM device that is attached to an authentic platform. A primary key can be an encrypted, and a certificate can be created using TPM2\_ActivateCredential. It allows the user to independently enable "flag, policy, and authorization value" without involving other hierarchies. A user with privacy concerns can disable the endorsement hierarchy while still using the storage hierarchy for TPM applications and permitting the platform software to use the TPM. The options are **Enabled** and Disabled.

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

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

### TXT Support

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

 **Note 1:** If the option for this item (TXT Support) is set to Enabled, be sure to disable EV DFX (Device Function On-Hide) support for the system to work properly. (EV DFX is under "I/O Configuration" in the "Chipset/North Bridge" submenu).

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

## ► Intel® Virtual RAID on CPU

When this submenu is selected and the RAID devices are detected, the BIOS screen displays the following items:

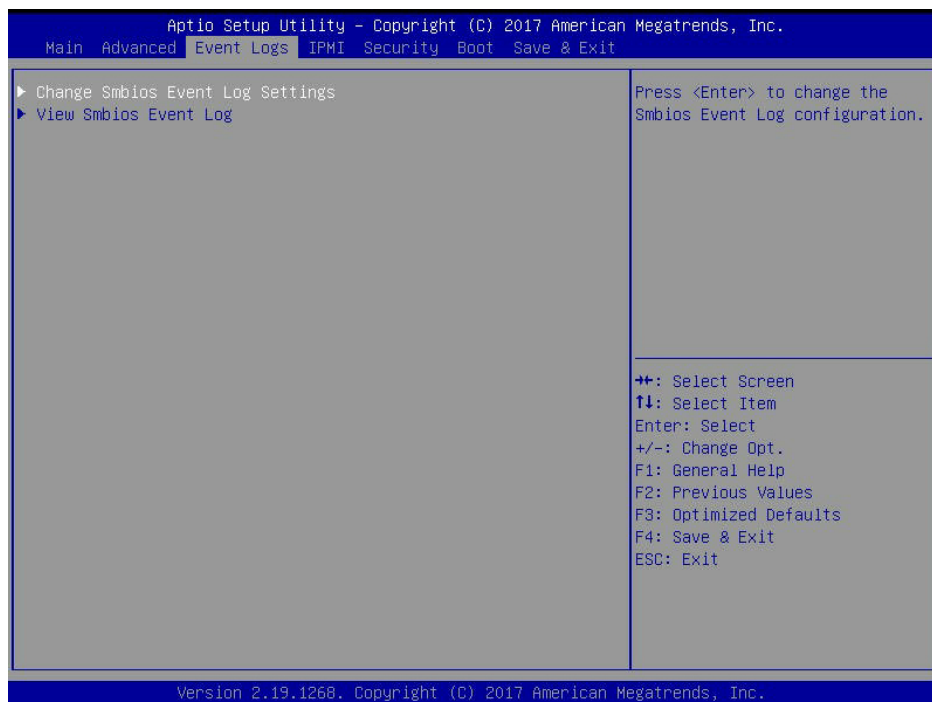
Intel® VROC with VMD Technology 5.2.0.1029

No RAID volumes on the system

No Intel VMD Controllers on the sy

## 4.4 Event Logs

Use this feature to configure Event Log settings.



### ► Change SMBIOS Event Log Settings

#### Enabling/Disabling Options

##### SMBIOS Event Log

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

#### Erasing Settings

##### Erase Event Log

Select Enabled to erase all error events in the SMBIOS (System Management BIOS) log before an event logging is initialized at bootup. The options are **No**, Yes, Next Reset, and Yes, Next Reset.

##### When Log is Full

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

## SMBIOS Event Log Standard Settings

### Log System Boot Event

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

### MECI (Multiple Event Count Increment)

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

### METW (Multiple Event Count Time Window)

This item is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.



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

## Customer Options

### Log OEM Codes

Select Enabled to log the EFI Status codes as OEM codes if these codes have not been converted to Legacy. The options are Disabled and **Enabled**.

### Convert OEM Codes

Select Enabled to convert the EFI Status codes to standard SMBIOS codes. Please note that this option is not available for all EFI Status codes. The options are **Disabled** and Enabled.



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

## ►View System Event Log

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

**Date/Time/Error Code/Severity**

## 4.5 IPMI

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



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

- IPMI Firmware Revision: This item indicates the IPMI firmware revision used in your system.
- Status of BMC: This item indicates the status of the BMC (Baseboard Management Controller) installed in your system.

### ▶ System Event Log

#### Enabling/Disabling Options

##### SEL Components

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

##### Erasing Settings

##### Erase SEL

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

### When SEL is Full

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

### Custom EFI Logging Options

#### Log EFI Status Codes

Select EFI (Extensible Firmware Interface) Status Codes to log EFI status codes. Select Error Codes to log EFI error codes. Select Progress Code to log the EFI progress code. Select both to log both EFI error codes and progress codes. The options are Disabled, Both, **Error code** and Progress code.

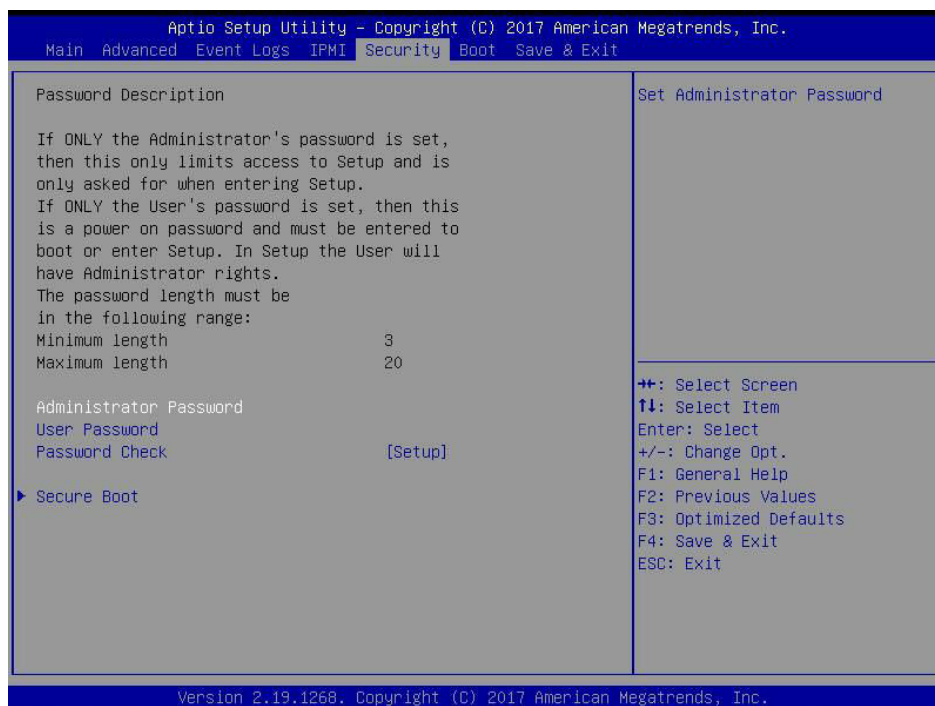


**Note:** After making changes on a setting, be sure to reboot the system for the changes to take effect.



## 4.6 Security Settings

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



### Administrator Password

Use this feature to set the administrator password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### User Password

Use this feature to set the user password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

### Password Check

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

### ► Secure Boot

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

- System Mode
- Secure Boot
- Vendor Keys

### **Attempt Secure Boot**

If this item is set to Enabled, Secure Boot will be activated when a Platform Key (PK) is entered. A Platform Key is a security key used to manage the security settings of the platform firmware used in your system. The options are **Disabled** and Enabled.

### **Secure Boot Mode**

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

### **CSM Support**

Compatibility Support Module (CSM) allows for legacy BIOS compatibility by emulating a BIOS environment. The options are Disabled and **Enabled**.

## **► Key Management**

### **Provision Factory Default Keys**

Select Enabled to install all manufacturer default keys for the following system security settings. The options are **Disabled** and Enabled.

### **► Install Factor Default Keys**

Select Yes to install all manufacturer defaults for the following system security settings. The options are **Yes** and No.

### **► Enroll EFI Image**

Select this item and press <Enter> to select an EFI (Extensible Firmware Interface) image for the system to operate in Secure Boot mode.

### **► Save All Secure Boot Variables**

This feature allows the user to set and save the secure boot key variables specified by the user.

#### **Secure Boot Variables**

#### **Secure Boot Variable/Size/Key#/Key Sources**

### **► Platform Key (PK)**

This feature allows the user to enter and configure a set of values to be used as a platform firmware key for the system. This set of values also indicate the size, the keys numbers, and the key source of the Platform Key. The options are **Save to File**, Set New, and Erase.

### ▶Key Exchange Keys

This feature allows the user to enter and configure a set of values to be used as a Key-Exchange-Keys for the system. This set of values also indicate the size, the keys numbers, and the key source of the Key-Exchange-Keys. The options are **Save to File**, Set New, Append and Erase.

### ▶Authorized Signatures

This feature allows the user to enter and configure a set of values to be used as Authorized Signatures for the system. This set of values also indicate the size, the keys numbers, and the key source of the Authorized Signatures. The options are **Save to File**, Set New, Append and Erase.

### ▶Forbidden Signatures

This feature allows the user to enter and configure a set of values to be used as Forbidden Signatures for the system. This set of values also indicate the size, the keys numbers, and the key source of the Forbidden Signatures. The options are **Save to File**, Set New, Append and Erase.

### ▶Authorized TimeStamps

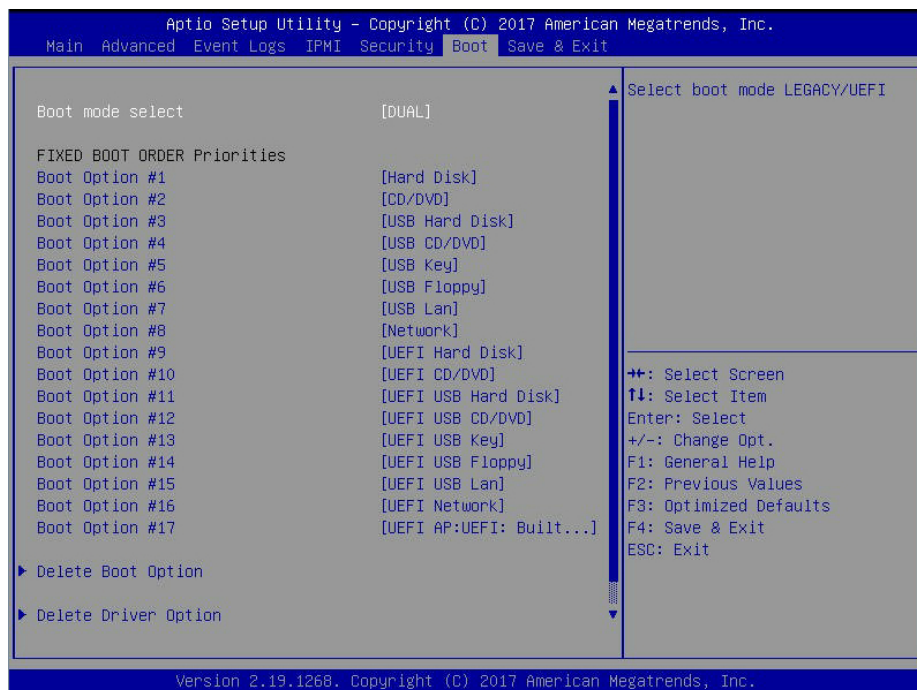
This feature allows the user to set and save the timestamps for Authorized Signatures to indicate when these signatures were entered into the system. The options are **Set New** and Append.

### ▶OsRecovery Signatures

This feature allows the user to set and save the Authorized Signatures used for OS recovery. The options are **Set New** and Append.

## 4.7 Boot Settings

Use this feature to configure Boot Settings:



### Boot Mode Select

Use this feature to select the type of devices that the system is going to boot from. The options are Legacy, UEFI (Unified Extensible Firmware Interface) and **Dual**.

### Fixed Boot Order Priorities

This feature prioritizes the order of a bootable device from which the system will boot. Press <Enter> on each entry from top to bottom to select devices.

When the item above -"Boot Mode Select" is set to **Dual** (default), the following items will be displayed for configuration:

- Boot Option #1 - Boot Option #17

When the item above -"Boot Mode Select" is set to Legacy, the following items will be display for configuration:

- Boot Option #1 - Boot Option #8

When the item above -"Boot Mode Select" is set to UEFI, the following items will be display for configuration:

- Boot Option #1 - Boot Option #9

## Add New Boot Option

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

### Add Boot Option

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

### Path for Boot Option

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

### Boot Option File Path

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

### Create

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

## ► Delete Boot Option

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

### Delete Boot Option

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

## ► Delete Driver Option (Currently Unavailable)

Use this item to select a boot driver to delete from the boot priority list.

### Delete Drive Option

Select the target boot driver to delete from the boot priority list.

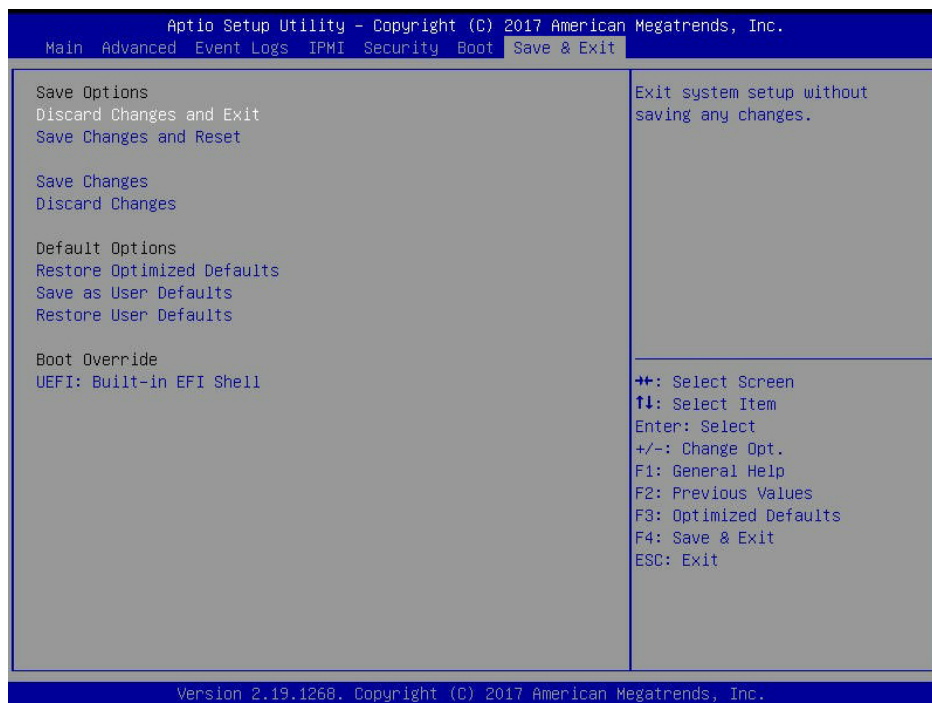
## ► UEFI Application Boot Priorities

### Boot Option #1

Set the system boot order.

## 4.8 Save & Exit

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



### 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 Exit menu and press <Enter>.

#### Save Changes and Reset

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

#### Save Changes

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

#### Discard Changes

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

## Default Options

### Restore Optimized Defaults

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

### Save As User Defaults

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

### Boot Override

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

# Appendix A

## BIOS Codes

### A.1 BIOS Error POST (Beep) Codes

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

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

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

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error. All errors listed, with the exception of Beep Code 8, are fatal errors.

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

### A.2 Additional BIOS POST Codes

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

When BIOS performs the Power On Self Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, a diagnostic card can be attached to the computer to read I/O port 0080h (Supernmicro p/n AOC-LPC80-20).

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



# Appendix B

## Software Installation


### B.1 Installing Software Programs

The Supermicro FTP site contains drivers and utilities for your system at <ftp://ftp.supermicro.com>. Some of these must be installed, such as the chipset driver.

After accessing the FTP site, go into the CDR\_Images directory and locate the ISO file for your motherboard. Download this file to create a CD/DVD of the drivers and utilities it contains. (You may also use a utility to extract the ISO file if preferred.)

After creating a CD/DVD with the ISO files, insert the disk into the CD/DVD drive on your system and the display shown in Figure B-1 should appear.

Another option is to go to the Supermicro website at <http://www.supermicro.com/products/>. Find the product page for your motherboard here, where you may download individual drivers and utilities to your hard drive or a USB flash drive and install from there.

 **Note:** To install the Windows OS, please refer to the instructions posted on our website at <http://www.supermicro.com/support/manuals/>.

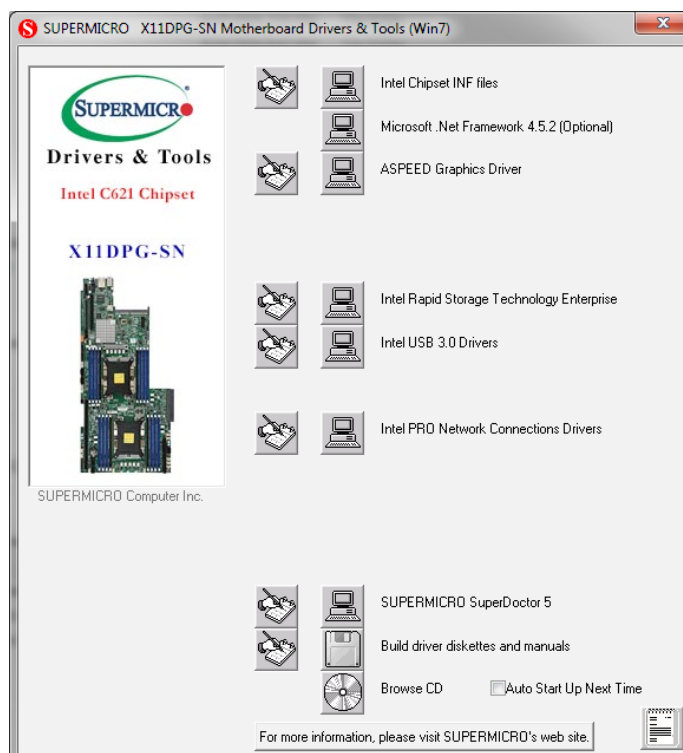


Figure B-1. Driver/Tool Installation Display Screen

To view the readme files, simply click the chosen item's icon of a hand writing on paper. If you are trying to install an item, click the computer icon to the right of an item and install it one at a time starting from the top. After the installation, you must reboot the system before proceeding with the next item on the list. Finally, to access the CD's contents, press the CD icon on the bottom.

When making a storage driver diskette by booting into a driver CD, please set the SATA Configuration to "Compatible Mode" and configure SATA as IDE in the BIOS Setup. After making the driver diskette, be sure to change the SATA settings back to your original settings.

## B.2 SuperDoctor® 5

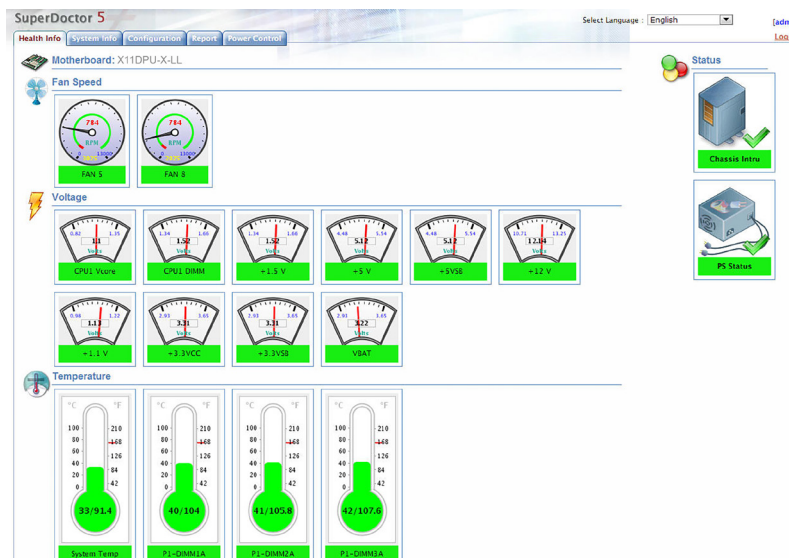
The Supermicro SuperDoctor 5 is a hardware monitoring program that functions in a command-line or web-based interface in Windows and Linux operating systems. The program monitors system health information such as CPU temperature, system voltages, system power consumption, fan speed, and provides alerts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

SuperDoctor 5 comes in local and remote management versions and can be used with Nagios to maximize your system monitoring needs. With SuperDoctor 5 Management Server (SSM Server), you can remotely control power on/off and reset chassis intrusion for multiple systems with SuperDoctor 5 or IPMI. SD5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.



**Note:** The default Username and Password for SuperDoctor 5 is admin / admin.

**Figure B-2. SuperDoctor 5 Interface Display Screen (Health Information)**



**Note:** The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro website at [http://www.supermicro.com/products/info/sms\\_sd5.cfm](http://www.supermicro.com/products/info/sms_sd5.cfm).

## 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](http://www.supermicro.com/about/policies/safety_information.cfm).

#### Battery Handling



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

#### 電池の取り扱い

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

#### 警告

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

#### 警告

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

#### Warnung

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

#### Attention

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

#### ¡Advertencia!

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

#### אזהרה!

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

هناك خطر من انفجار في حالة اسبدال البطارية بطريقة غير صحيحة فعلياً  
اسبدال البطارية  
فقط بنفس النوع أو ما يعادلها مما أوصت به الشركة المصنعة  
جخلص من البطاريات المسحمة وفقاً لتعليمات الشركة الصانعة

#### 경고!

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

#### Waarschuwing

Er is ontploffingsgevaar indien de batterij verkeerd vervangen wordt. Vervang de batterij slechts met hetzelfde of een equivalent type die door de fabrikant aanbevolen wordt. Gebruikte batterijen dienen overeenkomstig fabrieksvoorschriften afgevoerd te worden.

## Product Disposal



**Warning!** Ultimate disposal of this product should be handled according to all national laws and regulations.

### 製品の廃棄

この製品を廃棄処分する場合、国の関係する全ての法律・条例に従い処理する必要があります。

### 警告

本产品的废弃处理应根据所有国家的法律和规章进行。

### 警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

### Warnung

Die Entsorgung dieses Produkts sollte gemäß allen Bestimmungen und Gesetzen des Landes erfolgen.

### ¡Advertencia!

Al deshacerse por completo de este producto debe seguir todas las leyes y reglamentos nacionales.

### Attention

La mise au rebut ou le recyclage de ce produit sont généralement soumis à des lois et/ou directives de respect de l'environnement. Renseignez-vous auprès de l'organisme compétent.

סילוק המוצר

אזהרה!

סילוק סופי של מוצר זה חייב להיות בהתאם להנחיות וחוקי המדינה.

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القوانين واللوائح الوطنية

### 경고!

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

### Waarschuwing

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

## Appendix 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.

#### C.1 Overview

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

#### C.2 Recovering the UEFI BIOS Image

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

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

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

#### C.3 Recovering the Main 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 device such as a USB Flash Drive, or a USB CD/DVD ROM/RW 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 Root "\" directory of a USB device or a writable CD/DVD.

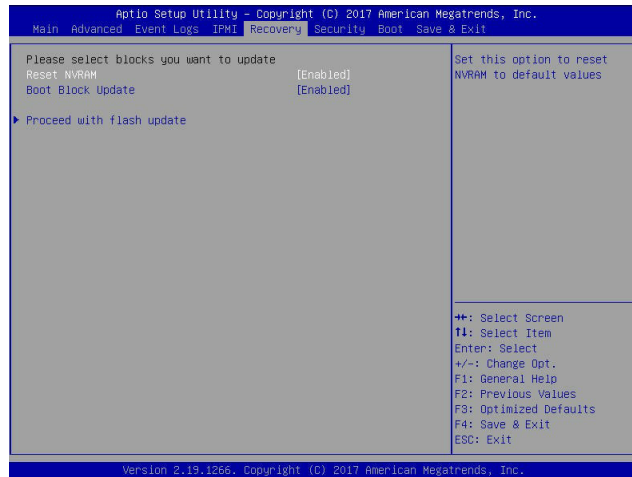



**Note:** If you cannot locate the "Super.ROM" file in your drive disk, visit our website at [www.supermicro.com](http://www.supermicro.com) to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use.

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



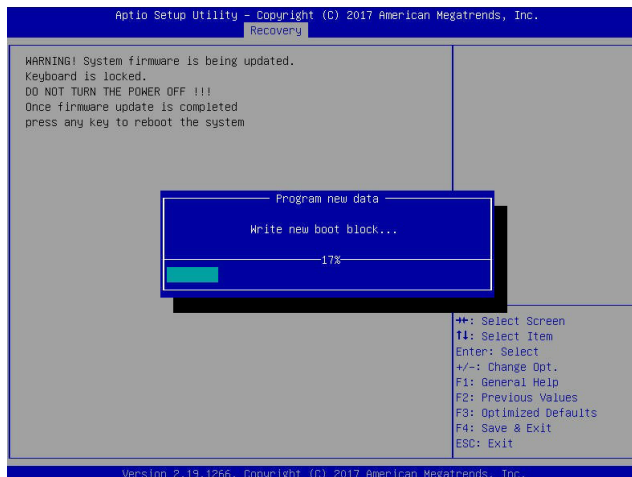
3. After locating the healthy BIOS binary image, the system will enter the BIOS Recovery menu as shown below.



 **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.

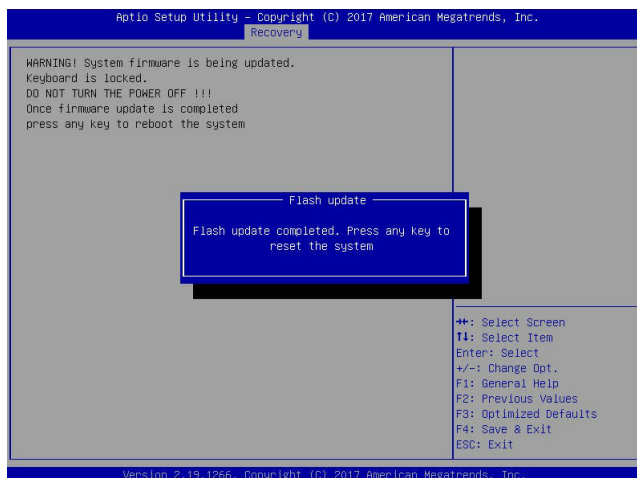
4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.

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

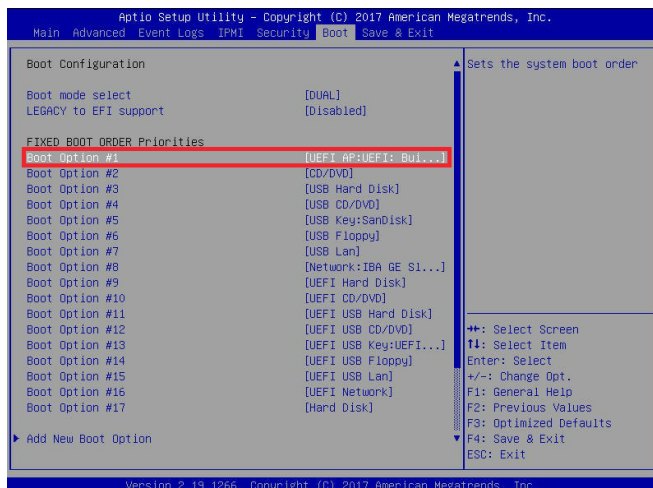




- After the BIOS recovery process is complete, press any key to reboot the system.



- Using a different system, extract the BIOS package into a USB flash drive.
- Press <Del> continuously 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.



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

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping Table
FS0: Alias(s):HD0:00:BLK1:
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x37901072,0x800,0x1
DR9592)
      BLK0: Alias(s):
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8 in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd AFUDOS
FS0:\AFUDOS> cd SNJPME2_03162017
FS0:\AFUDOS\SNJPME2_03162017> flash.nsh X11DPG7_314
    
```



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

```

Done.
[ Access Cmos Port Ex ]
<Read>
Index 0x51: 0x10

Done.
*****
* Program BIOS and ME (including FDT) regions...
*****
| AMT Firmware Update Utility v5.09.01.1917
| Copyright (C)2017 American Megatrends Inc. All Rights Reserved.
|-----|
CPUID = 50652

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

- 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.

```

Verifying NDB Block ..... done
- Update success for FDR
- Update success for IE
- Successful Update Recovery Loader to OPRx11
- Successful Update MFSB11
- Successful Update FPR11
- Successful Update MFS, IVBI and IVB211
- Successful Update FLOG and UTDK11
- ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect!
Moving FS0:\AFUDOS\SNJPME2_03162017\Fdtv64.efi -> FS0:\AFUDOS\SNJPME2_03162017\F
dt1.smc
- [ok]
Moving FS0:\AFUDOS\SNJPME2_03162017\Fuef1x64.efi -> FS0:\AFUDOS\SNJPME2_0316201
7\Fuef1.smc
- [ok]
*****
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*****
Deleting "FS0:\uefiprom"
Delete successful.
FS0:\>
    
```

- Press `<Del>` continuously to enter the BIOS Setup utility.
- Press `<F3>` to load the default settings.
- After loading the default settings, press `<F4>` to save the settings and exit the BIOS Setup utility.