



X11DSF-E

USER'S MANUAL

Revision 1.0a

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Manual Revision 1.0a

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# Preface

## About This Manual

This manual is written for system integrators, IT technicians, and knowledgeable end users. It provides information for the installation and use of the X11DSF-E motherboard.

## About This Motherboard

The X11DSF-E motherboard supports dual Intel® Xeon 81xx/61xx/51xx/41xx/31xx series processors (Socket P) with a TDP (Thermal Design Power) of up to 205W, and three UltraPath Interconnect (UPI) of up to 10.4 GT/s (Note below). With the Intel C627 PCH built-in, this motherboard supports up to 3TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 ECC 2666/2400/2133 MHz memory in 24 memory slots, and comes equipped with six SATA 3.0 ports, thirty-two possible NVMe slots (32x NVMe from PCI-E switch + 4x M.2 from PCH), and M.3 support. The cutting-edge X11DSF-E offers highly versatile SATA and NVMe options, with an array of flexible PCI-E solutions. This motherboard is optimized for storage-intensive systems, high-performance platforms, and demanding workloads. 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 C627 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, see **Chapter 3**, which 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** lists standardized warning statements in various languages.

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

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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.

### 1.1 Checklist

This motherboard was designed to be used in an SMCI-proprietary chassis only as a part of an integrated, complete system solution. It is not to be sold as an independent, stand-alone product; therefore, no shipping package will be included in the shipment.

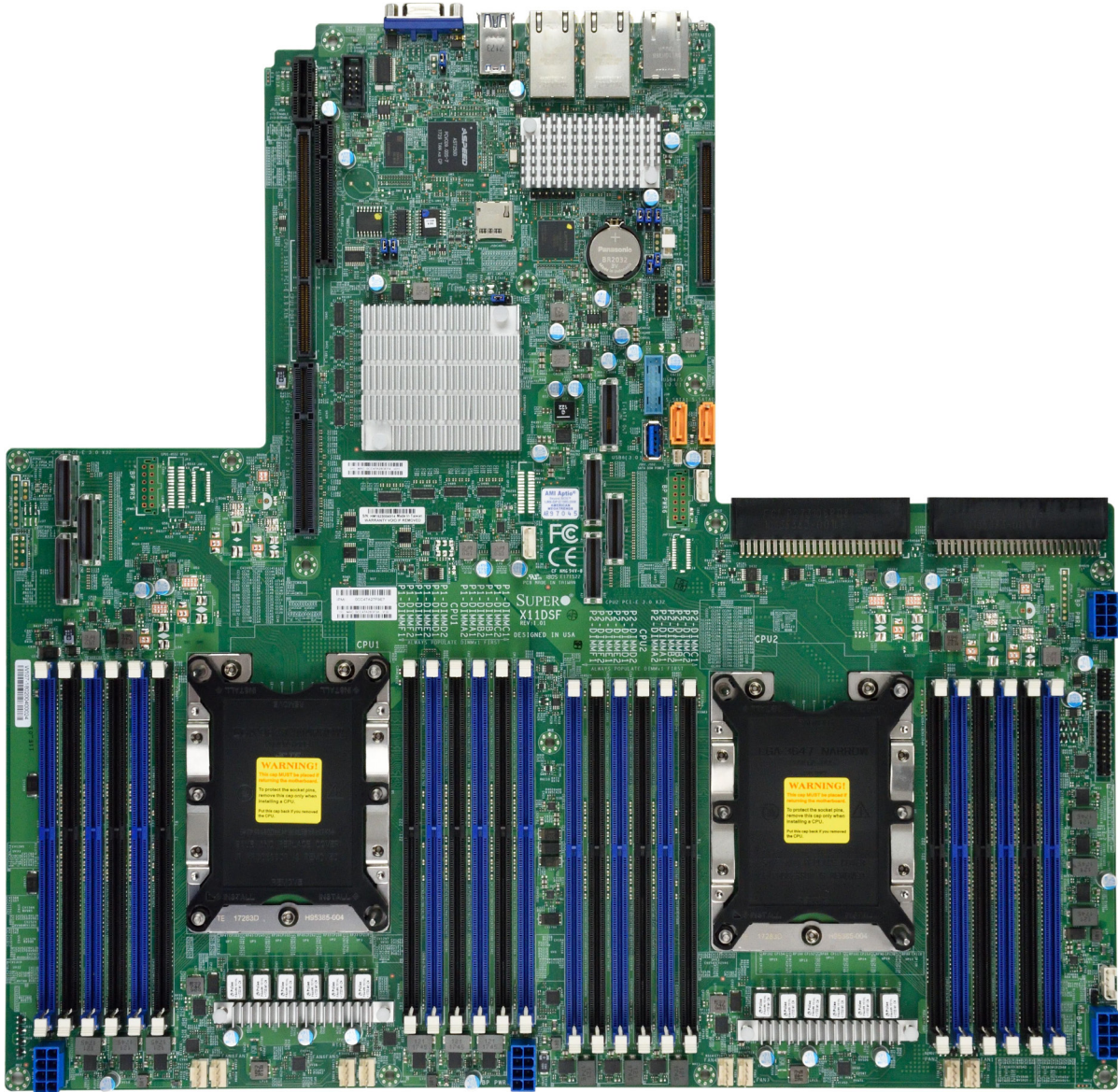
### Important Links


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

- Supermicro product manuals: <http://www.supermicro.com/support/manuals/>
- Product drivers and utilities: <http://www.supermicro.com/wftp>
- Product safety info: [http://www.supermicro.com/about/policies/safety\\_information.cfm](http://www.supermicro.com/about/policies/safety_information.cfm)
- If you have any questions, please contact our support team at: [support@supermicro.com](mailto:support@supermicro.com)

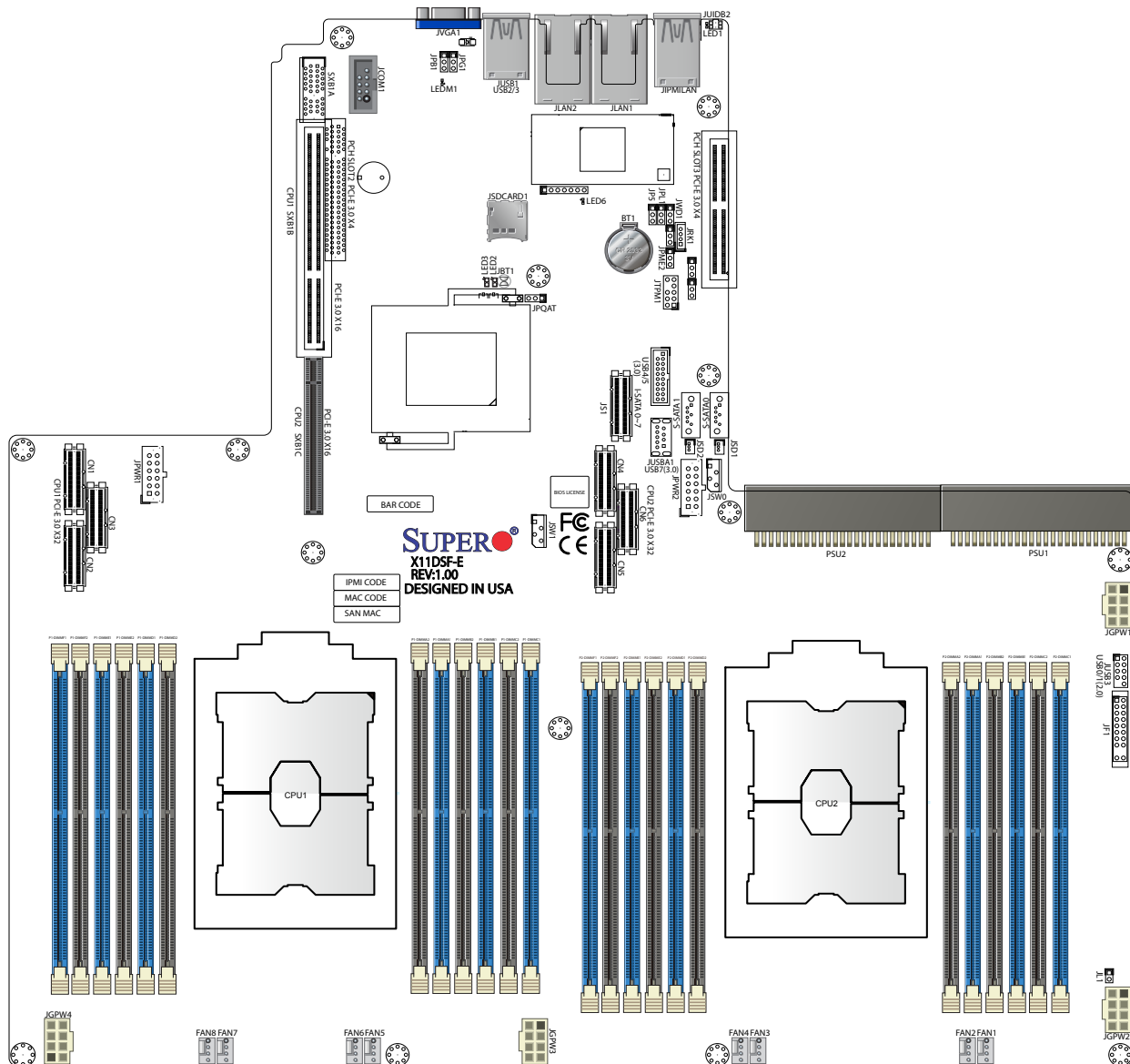
This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

Figure 1-1. X11DSF-E Motherboard Image



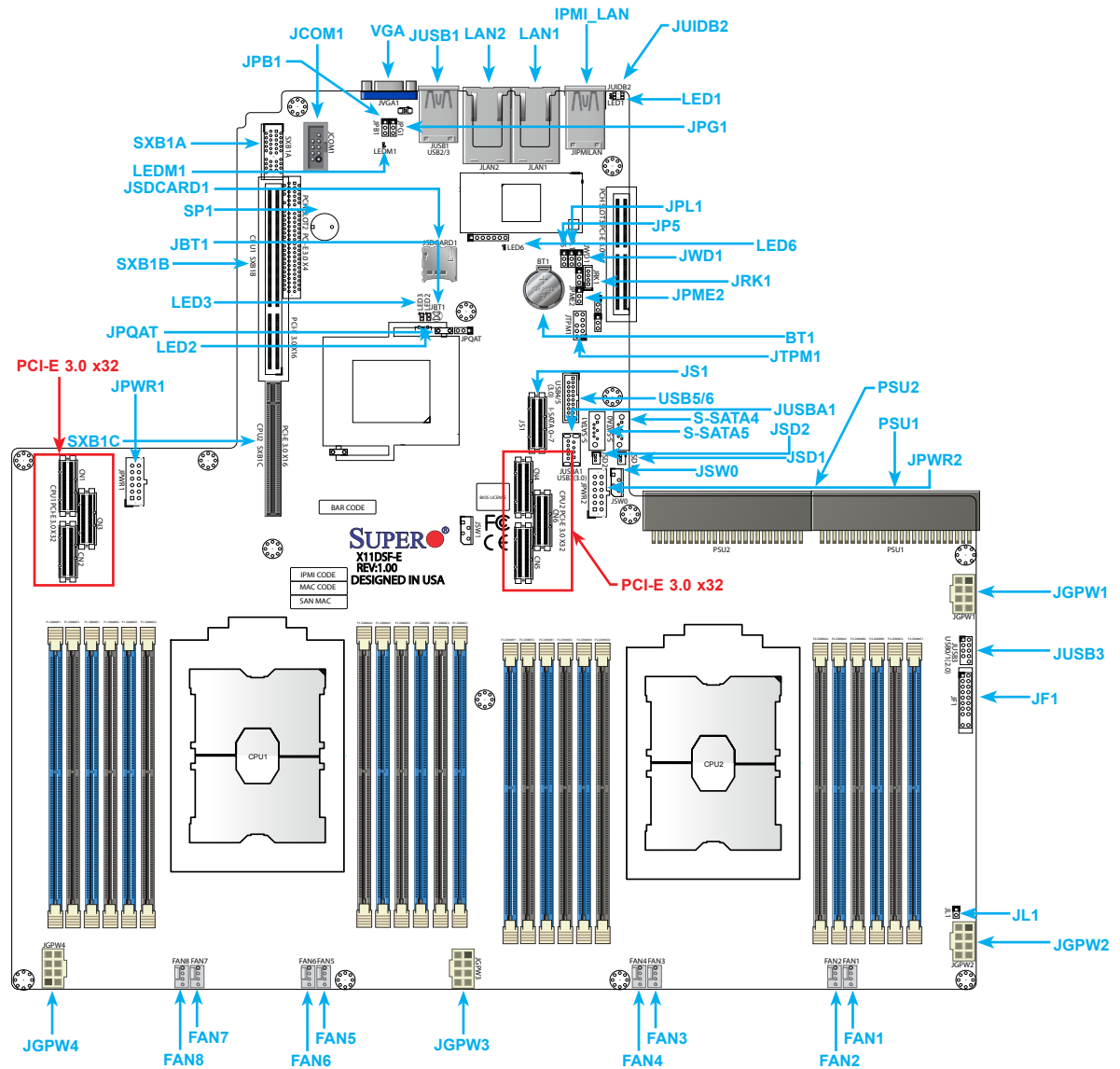
 **Note:** All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The components in the motherboard you received may or may not look exactly the same as the graphics shown in this manual.

**Figure 1-2. X11DSF-E Motherboard Layout**  
(not drawn to scale)



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

## Quick Reference



**Notes:**

- See Chapter 2 for detailed information on jumpers, I/O ports, and JF1 front panel connections.
- "■" indicates the location of Pin 1.
- Jumpers/LED indicators not indicated are used for testing only.
- Use only the correct type of onboard CMOS battery as specified by the manufacturer. Do not install the onboard battery upside down to avoid possible explosion.
- For your system to work properly, please use add-on cards or devices that are compatible with the PCI-standard on the PCI-E slots.



## Quick Reference Table

Jumper	Description	Default Setting
JBT1	CMOS Clear	Open (Normal)
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPQAT1	QAT Enable/Disable	Pins 2-3 (Disabled)
JPQAT2	QAT Enable/Disable	when JPQAT1 is Enabled: Pins 1-2 x16 Uplink Pins 2-3 x8 Uplink (Disabled)
JPL1	GLAN Enable/Disable	Pins 1-2 (Enabled)
JP5	Hold power button before BMC ready	Pins 1-2 (Enabled) Pins 2-3 (Disabled)
JPME2	Manufacturing Mode	Pins 1-2 (Normal)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Reset)

LED	Description	Status
LED1	UID LED	Solid Blue: Unit Identified
LED6	CPLD Heartbeat LED	Blinking Green: Normal
LEDM1	BMC Heartbeat LED	Blinking Green: Normal

Connector	Description
BT1	Onboard CMOS battery
FAN1 ~ FAN8	System/CPU fan headers (FAN1: CPU Fan)
JCOM1	COM port
JIPMILAN	IPMI-Dedicated LAN port
JS1 (I-SATA0 ~I-SATA7)	SATA 3.0 ports supported by Intel PCH
JF1	Front Control Panel header
JGPW1 - JGPW4	Power connectors used for GPU and VGA devices
JIPMB1	System Management Bus header for IPMI 2.0
JL1	Chassis intrusion header
JRK1	Intel RAID key header for NVMe Solid State Devices (SSD)
JSDCARD1	SD card socket
JSD1 - JSD2	SATA Disk-on-module (DOM) power connectors
JSW0/JSW1	Switch 1/2 I <sup>2</sup> C
JTPM1 TPM/PORT80	Trusted Platform Module/Port 80 connector
JUIDB2	Unit Identifier (UID) switch
JUSB3 USB4/5 (3.0)	Internal USB header for two USB 3.0 connections (USB4/5)
JUSB1 USB2/3 (3.0)	USB 3.0 rear port (USB2/3)
USB0/1	USB 2.0 header
JUSBA1	Type A USB 3.0 header
PSU1	Power Supply Unit 1



Connector	Description
PSU2	Power Supply Unit 2
S-SATA0/S-SATA1	(Powered) SATA connectors with power-pins built-in with support of SuperDOMs
SXB1A	WIO Left Riser slot (see note below)
SXB1B	WIO Right Riser slot (see note below)
SXB1C	Ultra Riser slot (see note below)
CN1-CN6	PCI-E x32 Tray Cable connector interface (GPU, NVMe, M.3, or Ruler down device) (see note below)
JLAN1/JLAN2	10G LAN ports 1 and 2
JVGA1	VGA port




**Note:** To avoid interference with other components, please be sure to use an add-on card that is fully compliant with the PCI Standards on a PCI slot.




## Motherboard Features


Motherboard Features	
<b>CPU</b>	
<ul style="list-style-type: none"> <li>Dual Intel 81xx/61xx/51xx/41xx/31xx series processors (Socket P); each processor supports Socket P and 3 Intel UltraPath Interconnect (UPI) of up to 10.4 G/s</li> </ul>  <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.	
<b>Memory</b>	
<ul style="list-style-type: none"> <li>The X11DSF supports up to 3TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 ECC 2666/2400/2133 MHz memory in 24 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>  <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> .	
<b>Chipset</b>	
<ul style="list-style-type: none"> <li>Intel® C627</li> </ul>	
<b>Expansion Slots</b>	
<ul style="list-style-type: none"> <li>2 PCI-E x32 Tray cable connector interface (GPU, NVMe, M.3 or Ruler down device support)</li> <li>1 PCI-E 3.0 (x16 + x16 or x16 + QAT) left riser card support</li> <li>1 PCI-E 3.0 x4 and 1 PCI-E x4 from PCH</li> </ul>	
<b>Network</b>	
<ul style="list-style-type: none"> <li>Dual 10GBase-T Ethernet ports with Intel X550</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) dedicated 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>Serial (COM) 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:</b></li> <li>Eight (8) SATA 3.0 (JS1)</li> <li>Two (2) SATA 3.0 SuperDOM connectors (S-SATA0, S-SATA1)</li> </ul>


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

Motherboard Features	
<b>Peripheral Devices</b>	<ul style="list-style-type: none"> <li>• Two (2) USB 3.0 ports on the rear I/O panel (USB 3/4)</li> <li>• One (1) internal USB 2.0 header with (2) USB connections for front access (USB0/1)</li> <li>• One (1) internal USB header supports two USB 3.0 connections (USB5/USB6)</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, PCI F/W 3.0, SMBIOS 2.7 or later</li> </ul>
<b>Power Management</b>	<ul style="list-style-type: none"> <li>• ACPI power management (S4, S5)</li> <li>• Power-on mode for AC power recovery</li> <li>• Power button override mechanism</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 Stdbby, +12V Stdbby, VBAT, HT, Memory, PCH Temp, System Temp, Memory Temp</li> <li>• 5 CPU (# of switching-phase voltage regulator)</li> <li>• CPU/system overheat LED and control</li> <li>• CPU Thermal Trip support</li> <li>• PECI / TSI</li> <li>• CPU Thermal Design Power (TDP) support of up to 205W</li> </ul>
<b>Fan Control</b>	<ul style="list-style-type: none"> <li>• Eight 4-pin fan headers</li> <li>• Fan speed control</li> </ul>
<b>System Management</b>	<ul style="list-style-type: none"> <li>• Trusted Platform Module (TPM) support</li> <li>• Watch Dog / Non-maskable interrupt</li> <li>• RoHS</li> <li>• BMC SD Card Slot</li> <li>• Chassis intrusion header and detection (JL1)</li> </ul>

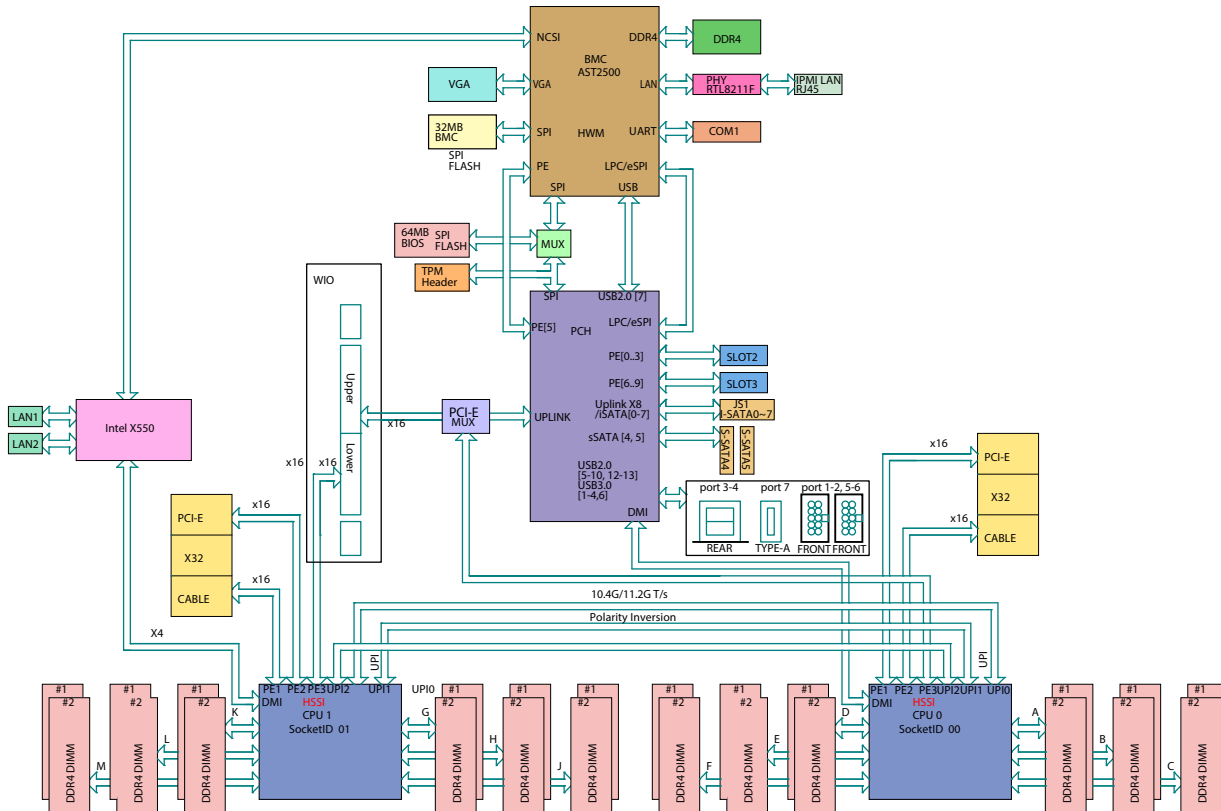
Motherboard Features	
<b>LED Indicators</b>	
<ul style="list-style-type: none"><li>• CPU/Overheating</li><li>• Power/Suspend-state indicator</li><li>• Fan Failure</li><li>• UID/Remote UID</li><li>• HDD Activity</li><li>• LAN Activity</li></ul>	
<b>Dimensions</b>	
<ul style="list-style-type: none"><li>• 15.59" (L) x 16.73" (W) (395.98 mm x 424.94 mm)</li></ul>	

 **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/>.

 **Note 3:** It is strongly recommended that you change BMC log-in information upon initial system power-on. The manufacture default username is ADMIN and the password is ADMIN. For proper BMC configuration, please refer to [http://www.supermicro.com/products/info/files/IPMI/Best\\_Practices\\_BMC\\_Security.pdf](http://www.supermicro.com/products/info/files/IPMI/Best_Practices_BMC_Security.pdf)

**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 C627 chipset, the X11DSF-E motherboard provides superb system performance, scalable storage solutions, and a rich feature set based on cutting edge technology to address the needs of next-generation computer users. With the support of three Intel® UltraPath Interconnect (UPI) of up to 10.4 G/s, new Intel® AVX-512 instructions, and Intel® QuickAssist Technology, this motherboard offers an innovative solution with maximum system performance to meet the ongoing demands of High Performance Computing (HPC) platforms. This motherboard is optimized for HFT servers, big data environments, and CPU encoding/decoding servers and rendering servers. The Intel Xeon 81xx/61xx/51xx/41xx/31xx series processor and the Intel C627 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
- 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

This section describes the health monitoring features of the X11DSF-E motherboard. The motherboard has an onboard System Hardware Monitor chip that supports system health monitoring.

### **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 X11DSF-E motherboard. The motherboard has an onboard ASpeed AST2500 Baseboard Management Controller (BMC) 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 crucial voltage levels. Once a voltage becomes unstable, it 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 voltage levels are all displayed in IPMI.

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

## 1.5 ACPI Features

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

In addition to enabling operating system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures while providing a processor architecture-independent implementation that is compatible with Windows 2012/2012R2 and 2016 operating systems.

## 1.6 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation, especially for processors that have high CPU clock rates.

## 1.7 Super I/O

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


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

## 1.8 Advanced Power Management

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

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

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, which is an ARC controller embedded in the IOH (I/O Hub), provides Server Platform Services (SPS) to your system. The services provided by SPS are different from those provided by the ME on client platforms.

### **Intel® QuickAssist Technology**

Built upon the architecture of Intel 81xx/61xx/51xx/41xx/31xx processors and the Intel C627 chipset, the X11DSF-E supports Intel® QuickAssist Technology (Intel QAT), which offers high-profile security and compression acceleration to standard server platforms in a software-defined infrastructure.

By eliminating unneeded roadblocks, Intel QAT accelerates computation-intensive operations; provides a software-enabled foundation for security, authentication and compression; and significantly increases performance and efficiency across applications and platforms, including cryptography, symmetric encryption and authentication, asymmetric encryption, digital signature, pattern matching, and lossless data compression.

With Intel QuickAssist Technology built in, the X11DSF is optimized for the use and deployment of integrated accelerators in networking and security applications, and efficiently meets the complex demands of High-Performance Computing (HPC), Virtualization, storage, and big data 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

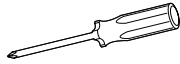
- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules, or gold contacts.
- When handling chips or modules 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.



Phillips Screwdriver (1)



Phillips Screws (14)



Standoffs (14)  
Only if Needed

### Tools Needed



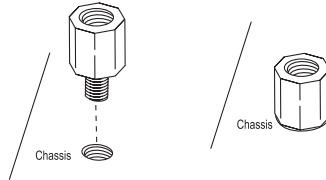
### Location of Mounting Holes



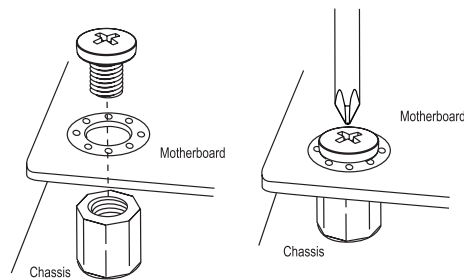
- Notes:** 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation.
- 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components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

## Installing the Motherboard


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



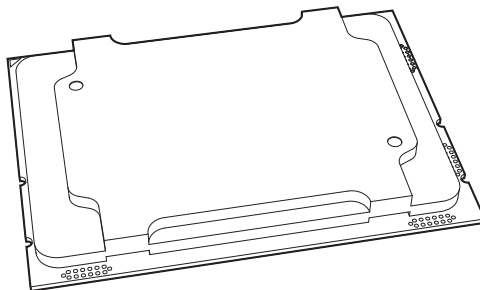
### Notes:

- 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 81xx/61xx/51xx/41xx/31xx Series Processor



**Note:** The Intel 81xx/61xx/51xx/41xx/31xx processors contain two models-the F model processors and the Non-F model processors. This motherboard support Non-F processors only.



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

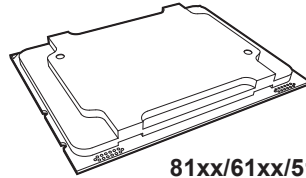


**Note:** All graphics, drawings, and pictures shown in this manual are for illustration only. The components that came with your machine may or may not look exactly the same as those shown in this manual.

## Overview of the Processor Socket Assembly

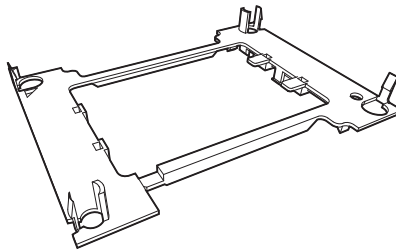
The processor socket assembly contains 1) the Intel 81xx/61xx/51xx/41xx/31xx Processor, 2) the narrow processor clip, 3) the dust cover, and 4) the CPU socket.

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

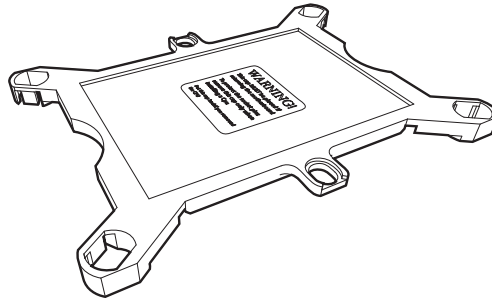


81xx/61xx/51xx/41xx/31xx Processor

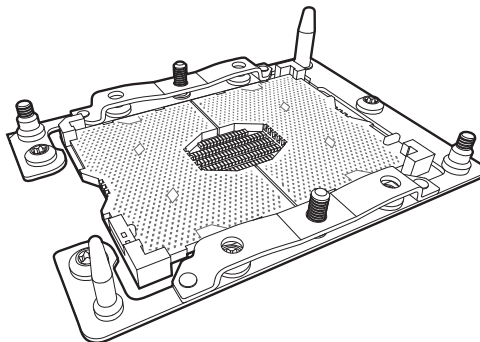
### 2. Narrow processor clip (the plastic processor package carrier used for the CPU)




### 3. Dust Cover



### 4. CPU Socket

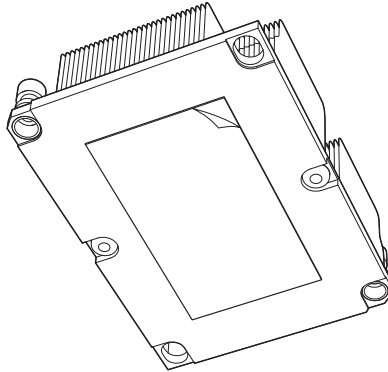


 **Note:** Be sure to cover the CPU socket with the dust cover when the CPU is not installed.

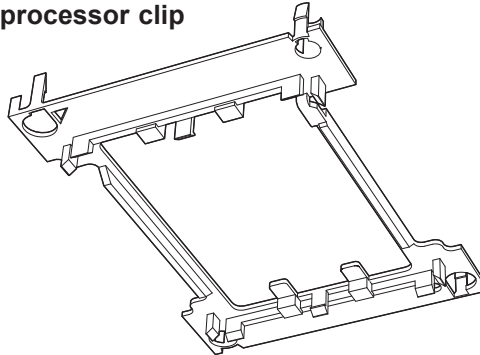
## Overview of the Processor Heatsink Module (PHM)

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

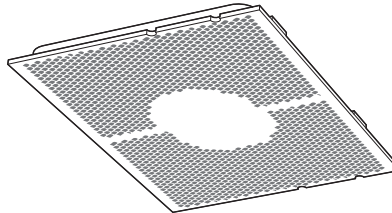
**1. Heatsink**



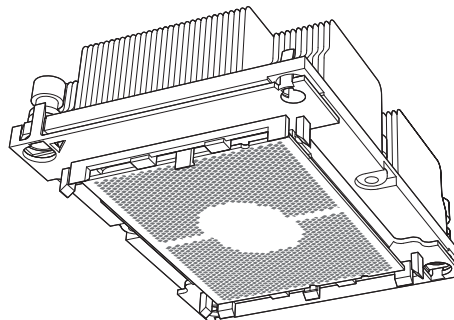
**2. Narrow processor clip**



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



**Processor Heatsink Module (PHM)**




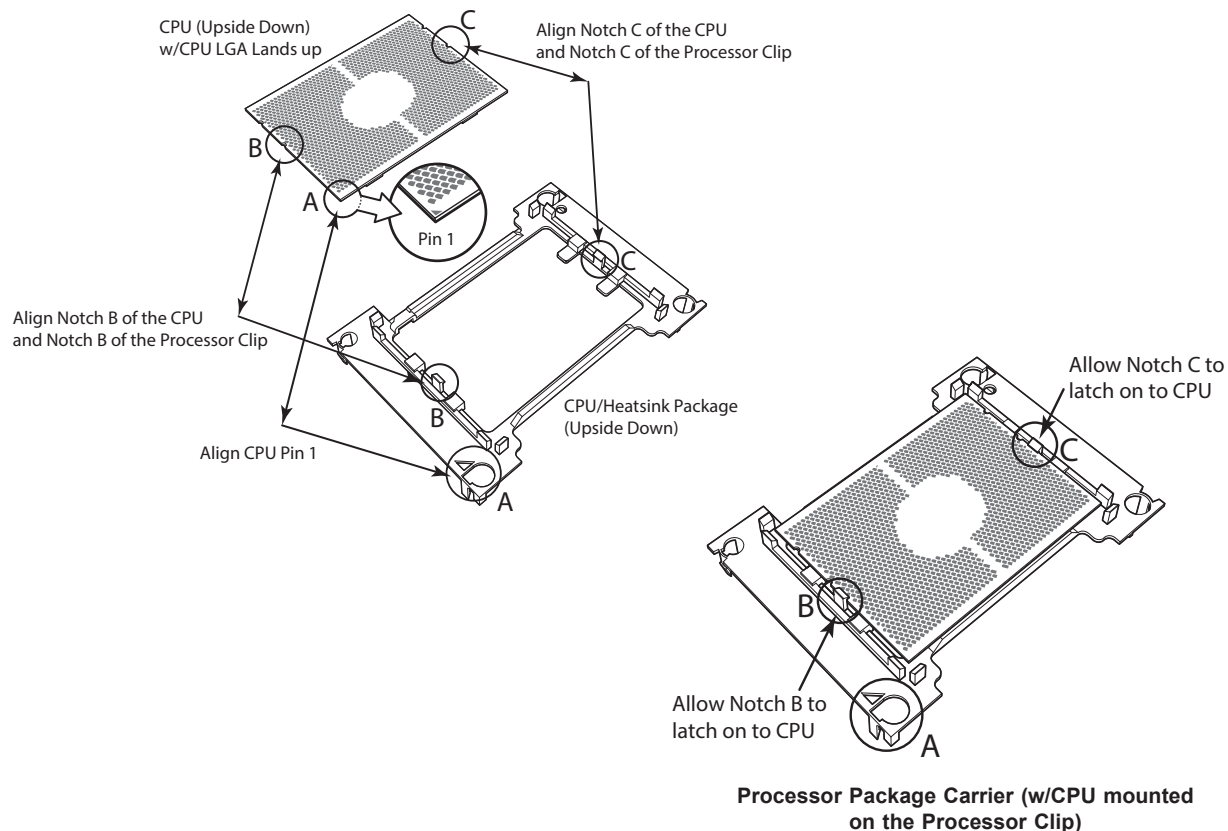
**(Bottom View)**

## 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.

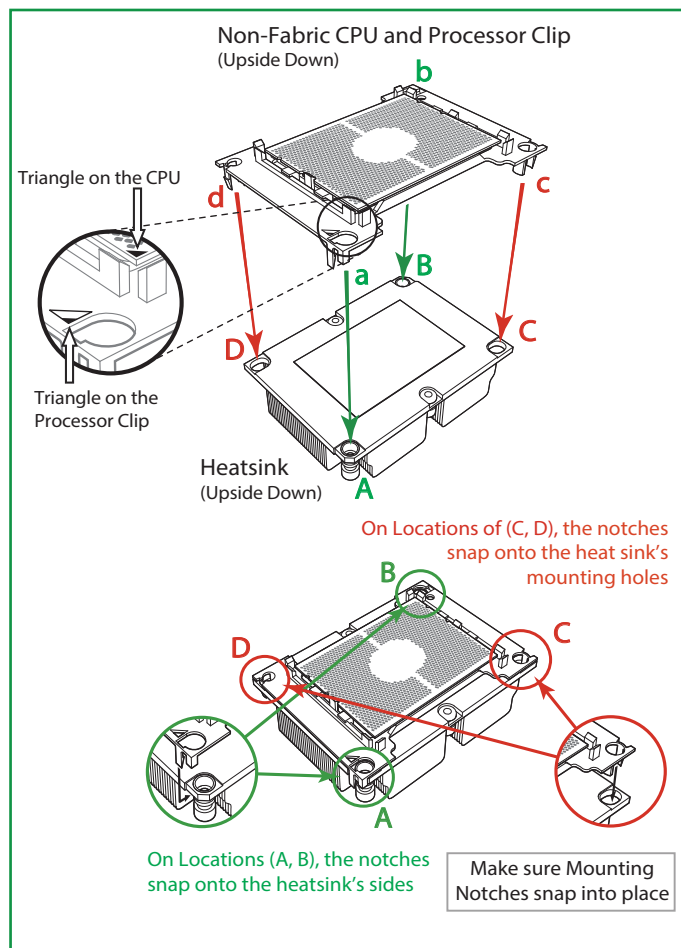
 **Note:** Please exercise extreme caution when handling the CPU. Do not touch the CPU LGA-lands to avoid damaging the LGA-lands or the CPU. Be sure to wear ESD gloves when handling components.



## 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).

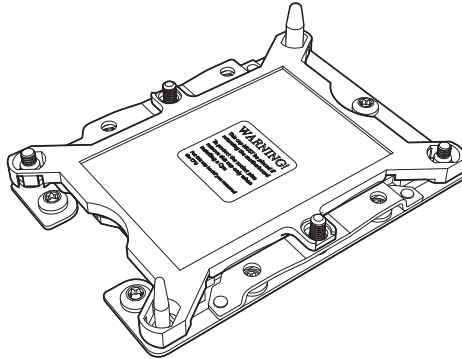
1. Locate "1" on the heatsink label and the triangular corner next to it on the heatsink.  
With your index finger pressing against the screw at this triangular corner, carefully hold and turn the heatsink upside down with the thermal-grease side facing up. Remove the protective thermal film if present, and apply the proper amount of thermal grease as needed. (Skip this step if you have a new heatsink because the 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 the 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 the 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.

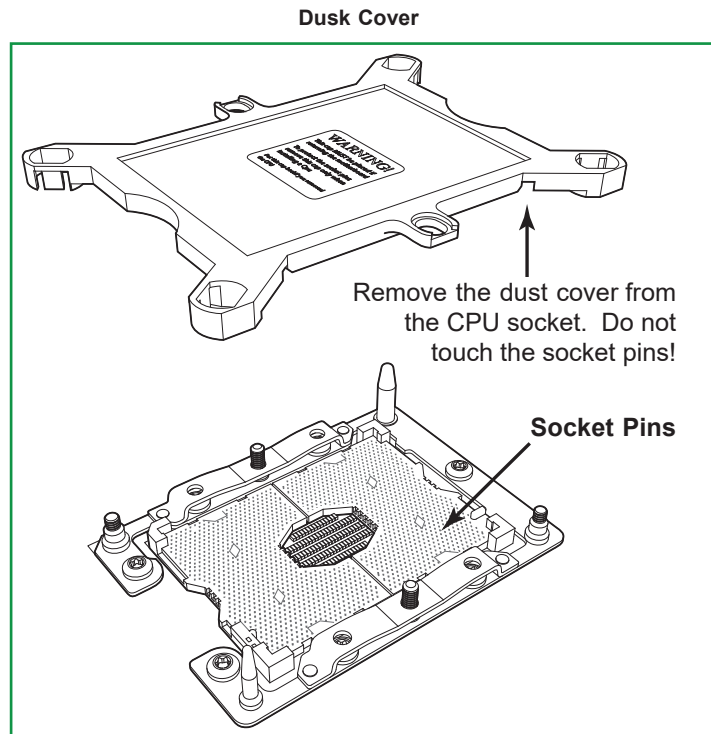


CPU Socket w/Dust Cover On

## Removing the Dust Cover from the CPU Socket

Remove the dust cover from the CPU socket, exposing the 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.

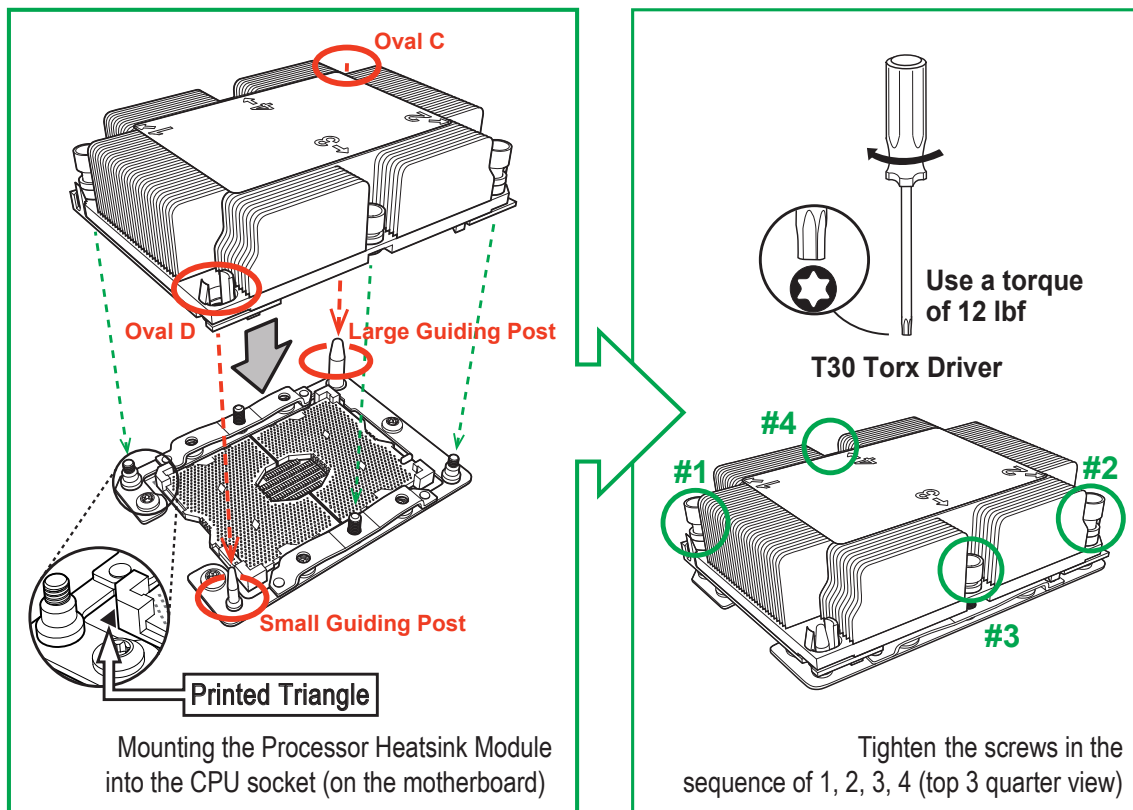


CPU Socket

## 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.

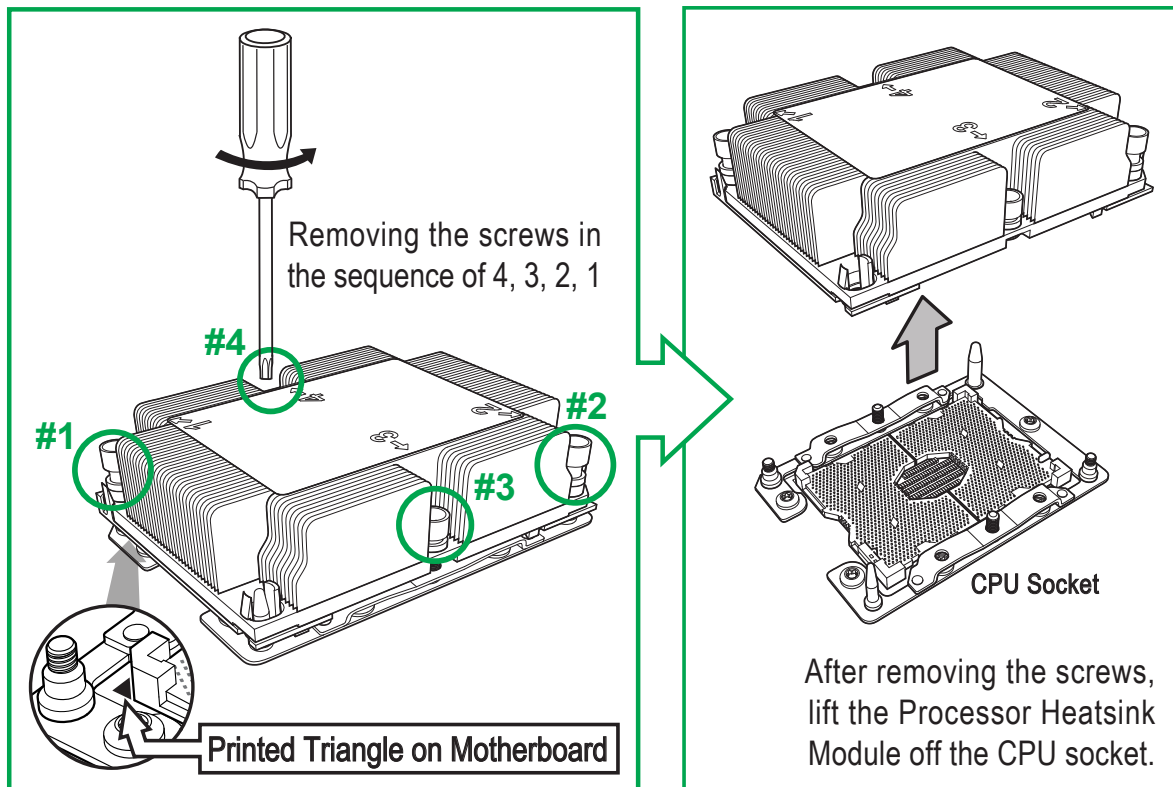


## Removing the Processor Heatsink Module (PHM) from the Motherboard

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



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

### Memory Support

The X11DSF-E supports up to 3TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 ECC 2666/2400/2133 MHz memory in 24 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.

### Memory Installation Sequence

Memory modules for this motherboard are populated using the "Fill First" method. The blue memory slot of each channel is considered the "first DIMM module" of the channel, and the black slot, the second module of the channel. When installing memory modules, be sure to populate the blue memory slots first and then populate the black slots. To maximize memory capacity and performance, please populate all DIMM slots on the motherboard, including all blue slots and black slots.

### General Memory Population Requirements

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. Using unbalanced memory topology such as populating two DIMMs in one channel while populating one DIMM in another channel on the same motherboard 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	
		4 Gb	8 Gb	1DPC (1-DIMM per Channel)	2DPC (2-DIMM per Channel)
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

## DIMM Population Guidelines for Optimal Performance

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

### Key Parameters for DIMM Configuration

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), 3DS RDIMM, 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>

### DIMM Mixing Guidelines

General DIMM Mixing Guidelines	
DIMM Mixing Rules	
<ul style="list-style-type: none"> <li>All DIMMs must be all DDR4 DIMMs.</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>	

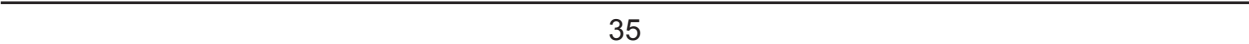
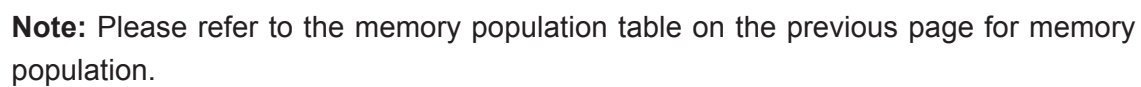
Mixing of DIMM Types within a Channel			
DIMM Types	RDIMM	LRDIMM	3DS LRDIMM
RDIMM	Allowed	Not Allowed	Not Allowed
LRDIMM	Not Allowed	Allowed	Not Allowed
3DS LRDIMM	Not Allowed	Not Allowed	Allowed

## Memory Population for the X11DSF-E Motherboard with 24 DIMM Slots Onboard



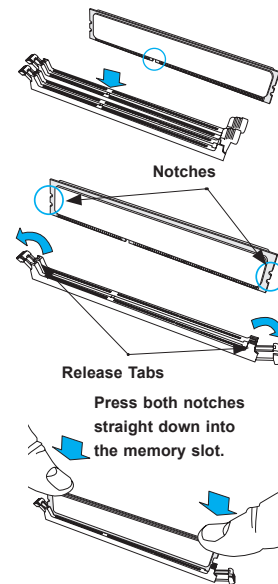
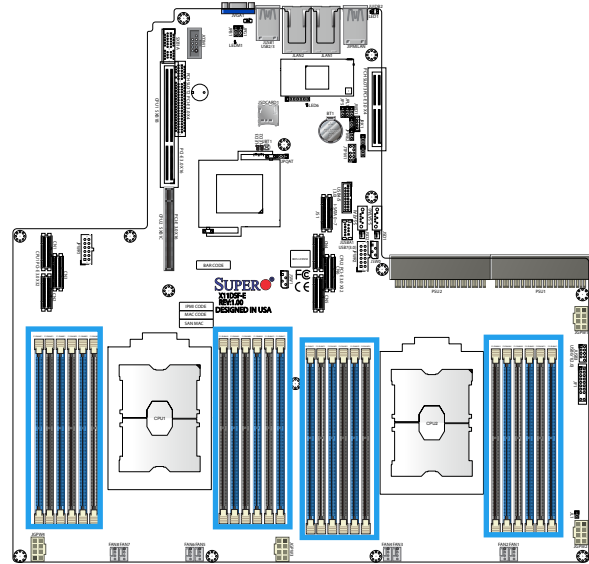
**Note:** Unbalanced memory configuration decreases memory performance and is not recommended for Supermicro motherboards.

Memory Population Table for the X11DP Motherboard w/24 DIMM Slots Onboard	
When 1 CPU is used:	Memory Population Sequence
1 CPU & 1 DIMM	CPU1: P1-DIMMA1
1 CPU & 2 DIMMs	CPU1: P1-DIMMA1/P1-DIMMD1
1 CPU & 3 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1
1 CPU & 4 DIMMs	CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1
1 CPU & 5 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1
1 CPU & 6 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1
1 CPU & 7 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD1/P1-DIMME1/P1-DIMMF1
1 CPU & 8 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1
1 CPU & 9 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD1/P1-DIMME1/P1-DIMMF1
1 CPU & 10 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1
1 CPU & 11 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1
1 CPU & 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1
When 2 CPUs are used:	Memory Population Sequence
2 CPUs & 2 DIMMs	CPU1: P1-DIMMA1 CPU2: P2-DIMMA1
2 CPUs & 4 DIMMs	CPU1: P1-DIMMA1/P1-DIMMD1 CPU2: P2-DIMMA1/P2-DIMMD1
2 CPUs & 6 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1
2 CPUs & 8 DIMMs	CPU1: P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1 CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1
2 CPUs & 10 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1
2 CPUs & 12 DIMMs	CPU1: P1-DIMMC1/P1-DIMMB1/P1-DIMMA1/P1-DIMMD1/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
2 CPUs & 14 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
2 CPUs & 16 DIMMs	CPU1: P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1 CPU2: P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1
2 CPUs & 18 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/ P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMB1/P2-DIMMA1/P2-DIMMD1/P2-DIMME1/P2-DIMMF1
2 CPUs & 20 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/P1-DIMMD2/P1-DIMMD1/ P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1
2 CPUs & 22 DIMMs (Unbalanced: not recommended)	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF1
2 CPUs & 24 DIMMs	CPU1: P1-DIMMC1/P1-DIMMC2/P1-DIMMB1/P1-DIMMB2/P1-DIMMA1/P1-DIMMA2/ P1-DIMMD2/P1-DIMMD1/P1-DIMME2/P1-DIMME1/P1-DIMMF2/P1-DIMMF1 CPU2: P2-DIMMC1/P2-DIMMC2/P2-DIMMB1/P2-DIMMB2/P2-DIMMA1/P2-DIMMA2/ P2-DIMMD2/P2-DIMMD1/P2-DIMME2/P2-DIMME1/P2-DIMMF2/P2-DIMMF1



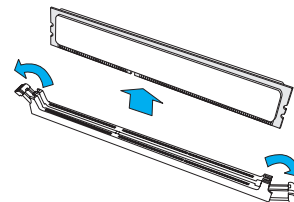
## DIMM Installation

1. Follow the instructions given in the memory population guidelines listed in the previous section to install memory modules on your motherboard. For the system to work properly, please use memory modules of the same type and speed on the motherboard. (See the Note below.)
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 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.



## DIMM Module Removal

Press the release tabs on both ends of the DIMM socket to release the DIMM module from the socket as shown in the drawing on the right.

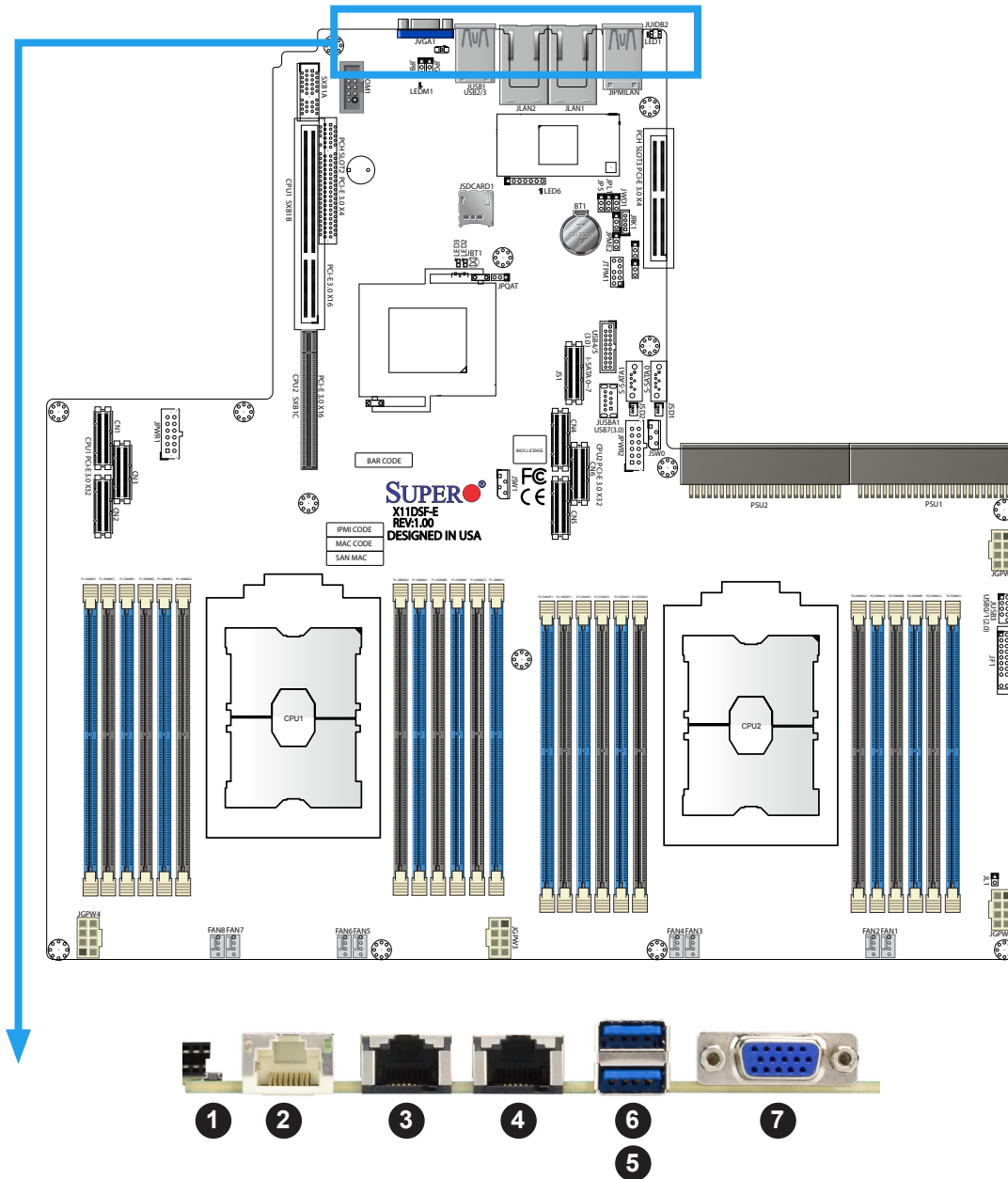


**Warnings:** 1. Please do not use excessive force when pressing the release tabs on the ends of the DIMM socket to avoid causing any damage to the DIMM module or the DIMM socket.  
2. Please handle DIMM modules with care. Carefully follow all the instructions given on Page 1 of this chapter to prevent ESD-related damages to your memory modules or components.



## 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.



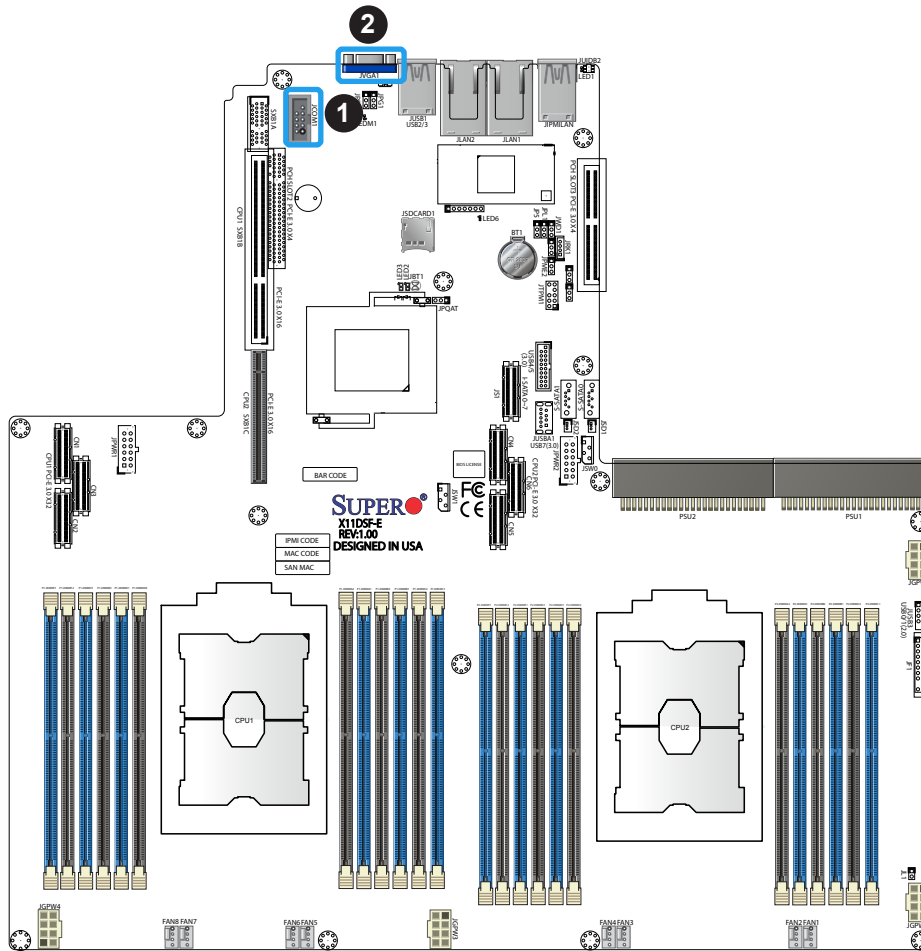
Back Panel I/O Ports			
No.	Description	No.	Description
1.	Unit Identifier Switch (UID)	5.	USB3
2.	IPMI LAN	6.	USB4
3.	JLAN1	7.	VGA
4.	JLAN2		

## 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.



1. JCOM1
2. JVGA

## Universal Serial Bus (USB) Ports

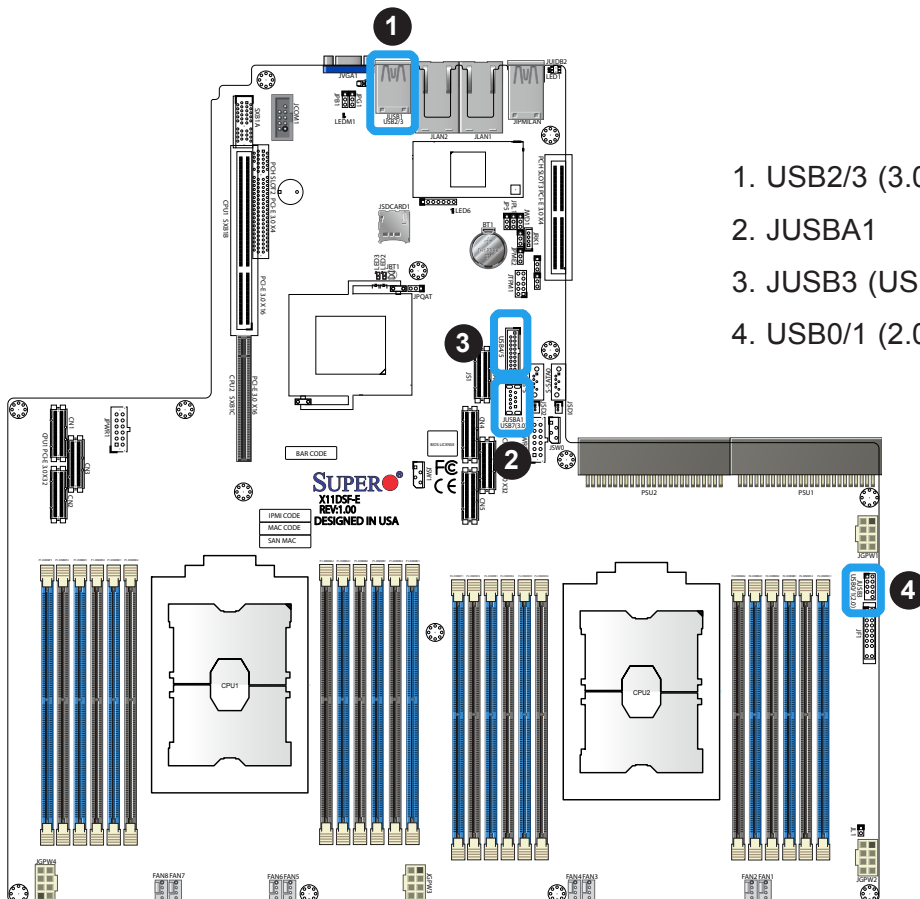
There are two USB 3.0 ports (USB3/4) located on the rear IO panel, and two internal USB 3.0 ports (USB5/6) located above JUSBA1 for front access. There are also two USB 2.0 ports (USB0/1) located at JUSB3 for front access. USB header JUSBA1 is a Type A USB header and is located next to JPWR2. This header also provides one USB 3.0 (USB7) connection for front access.

Front Panel USB4/5 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	19	Power
2	Std_a_SSRX-	18	USB3_RN
3	Std_a_SSRX+	17	USB3_RP
4	GND	16	GND
5	Std_a_SSTX-	15	USB3_TN
6	Std_a_SSTX+	14	USB3_TP
7	GND	13	GND
8	D-	12	USB_N
9	D+	11	USB_P
10		x	

Type A JUSBA1 (3.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	5	SSRX-
2	USB_N	6	SSRX+
3	USB_P	7	GND
4	Ground	8	SSTX-
		9	SSTX+

Front Panel USB 0/1 (2.0) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	+5V	2	+5V
3	USB_N	4	USB_N
5	USB_P	6	USB_P
7	Ground	8	Ground
9	Key	10	NC

Back Panel USB 2/3 (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	Std_a_SSRX-	B5	USB3_RN
A6	Std_a_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Std_a_SSTX-	B8	USB3_TN
A9	Std_a_SSTX+	B9	USB3_TP



1. USB2/3 (3.0)
2. JUSBA1
3. JUSB3 (USB4/5)
4. USB0/1 (2.0)

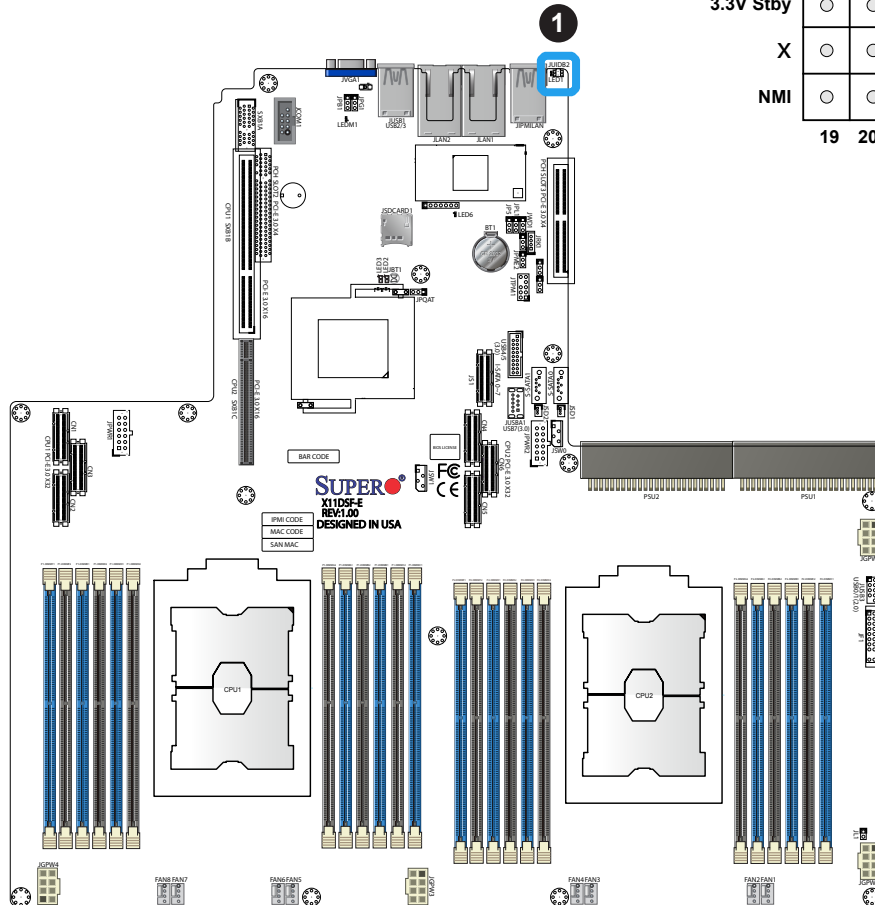
## Unit Identifier Switch/UID LED Indicator

A Unit Identifier (UID) switch and a rear UID LED (LED1) are located on the I/O back panel. A front UID switch is located on pins 7 & 8 of the front panel control (JF1). When you press the front or the rear UID switch, both front and rear UID LEDs will be turned on. Press the UID switch again to turn off the LED indicators. The UID indicators provide easy identification of a system that may be in need of service. (**Note:** UID can also be triggered via IPMI on the motherboard. For more information, please refer to the IPMI User's Guide posted on our website at <http://www.supermicro.com>.)

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

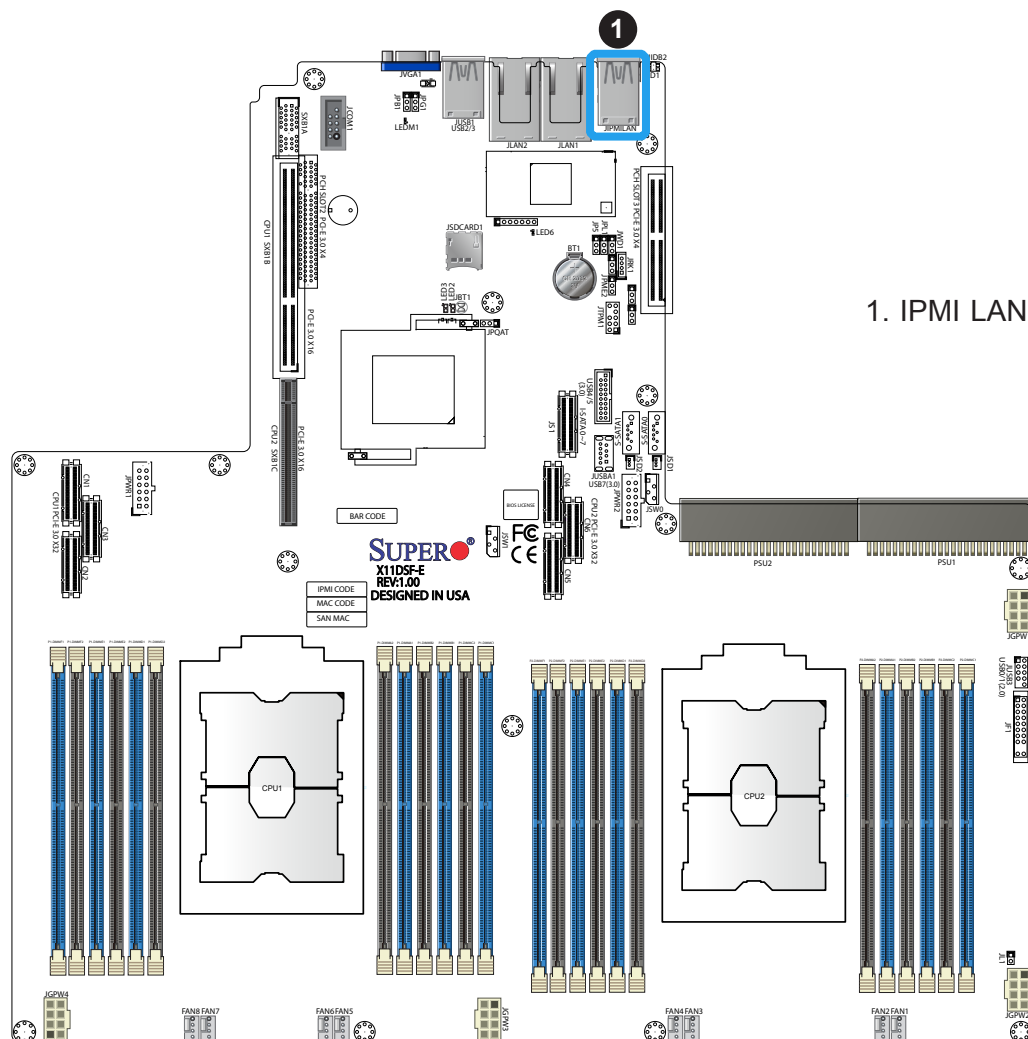
UID LED Pin Definitions	
Color	Status
Blue: On	Unit Identified

PWR	Power Button	1	2	Ground
Reset	Reset Button	3	4	Ground
	3.3V	5	6	Power Fail LED
	UID LED	7	8	OH/Fan Fail LED
	3.3V Stby	9	10	NIC2 Active LED
	3.3V Stby	11	12	NIC1 Active LED
	3.3V Stby	13	14	HDD LED
	3.3V Stby	15	16	PWR LED
	X	17	18	X
	NMI	19	20	Ground



## Ethernet Ports

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



## 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.

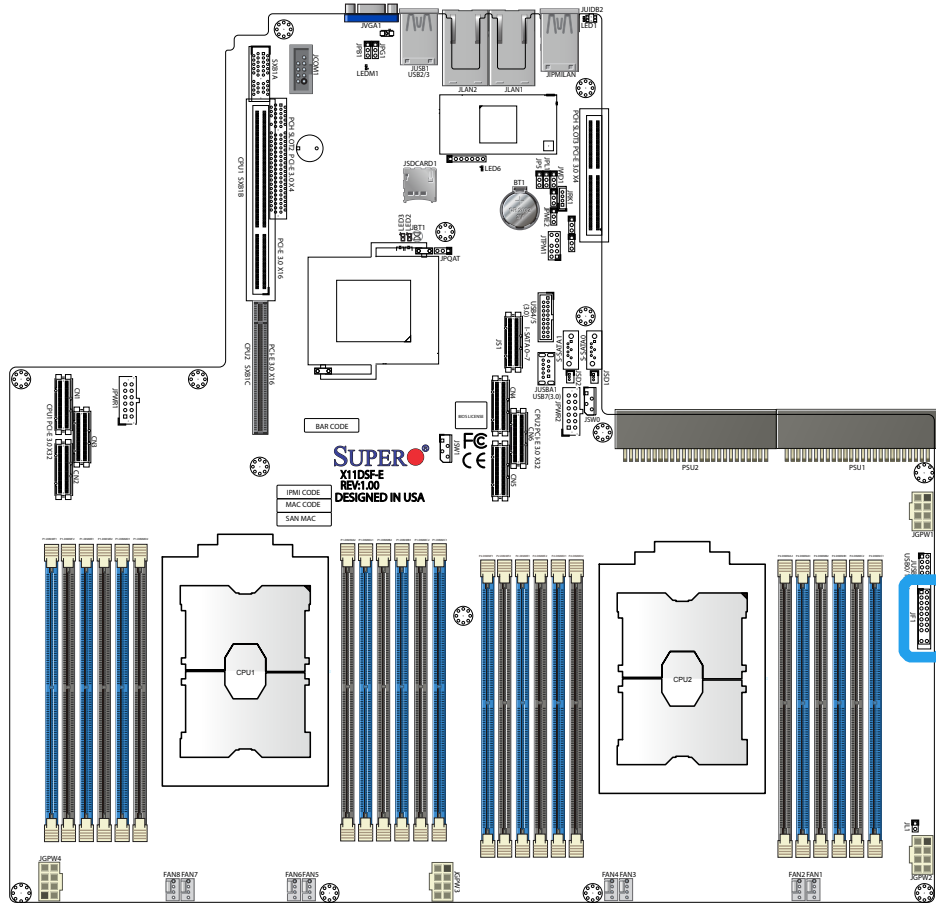


Figure 2-3. JF1 Header Pins

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

### Power Button

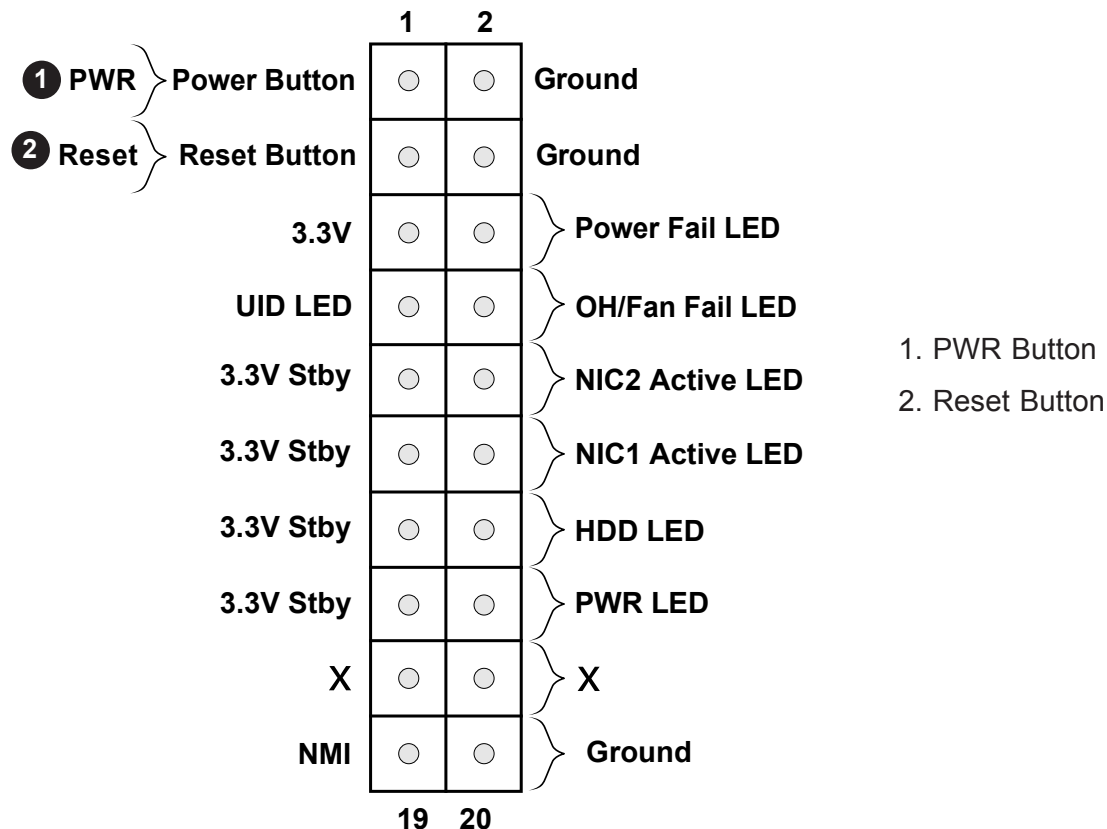
The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press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

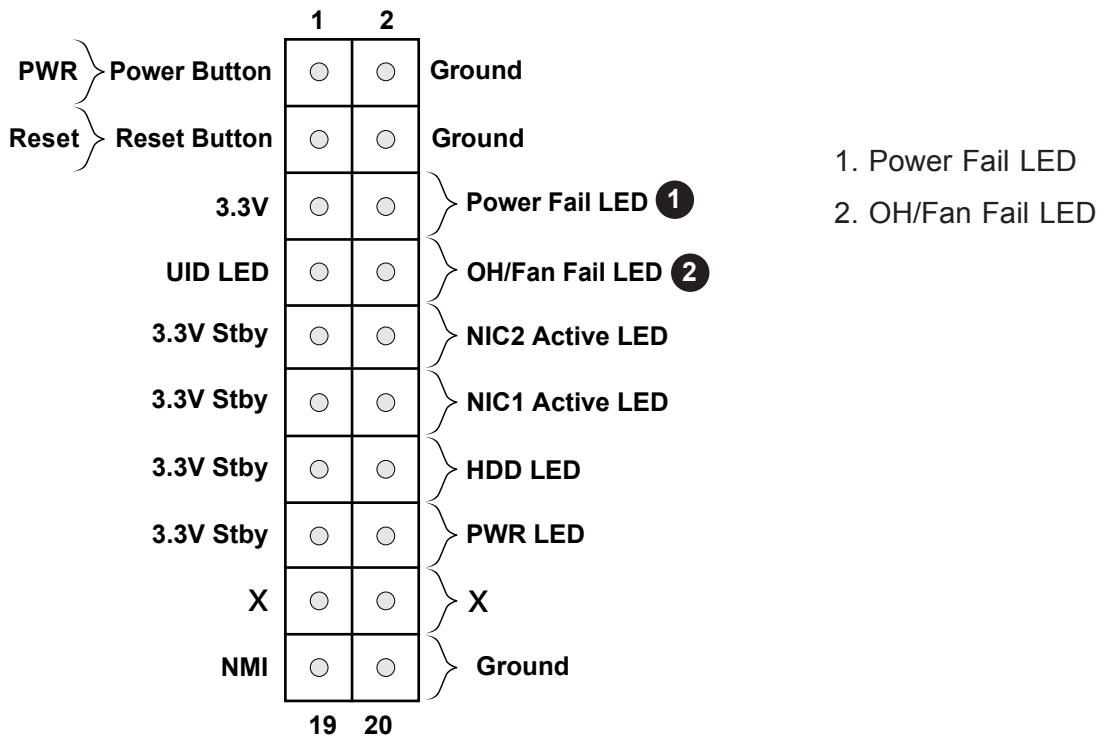
Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	3.3V
6	PWR Supply Fail

## 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)

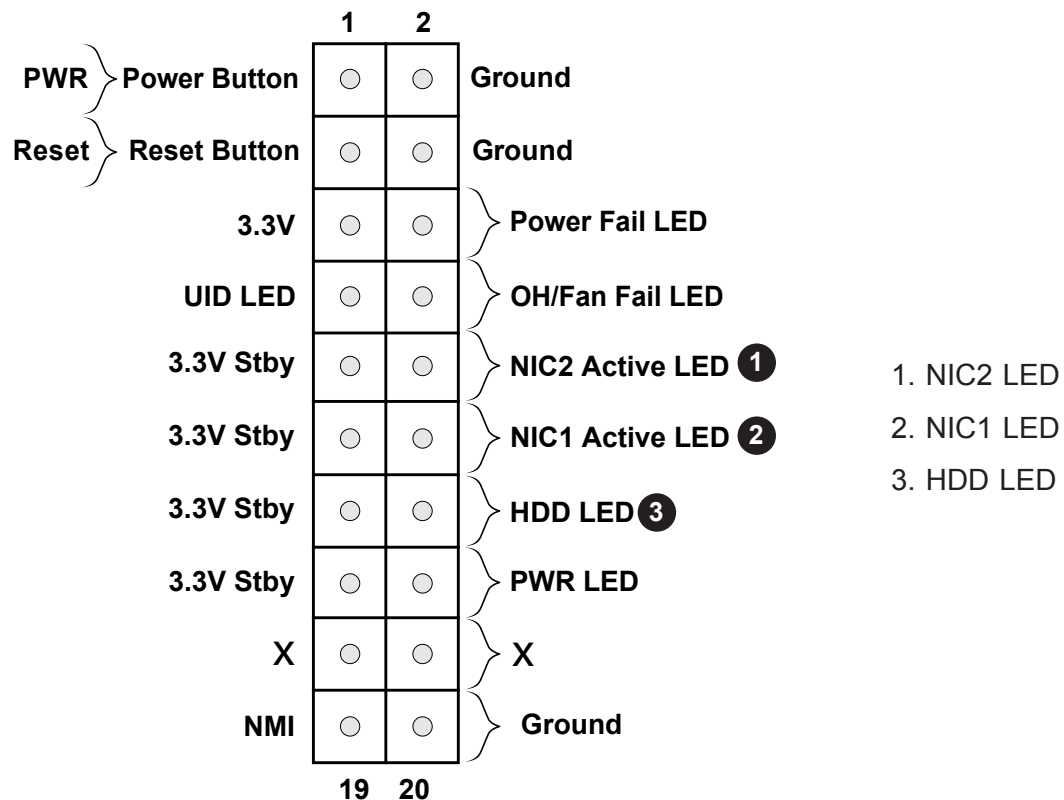
The NIC (Network Interface Controller) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

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

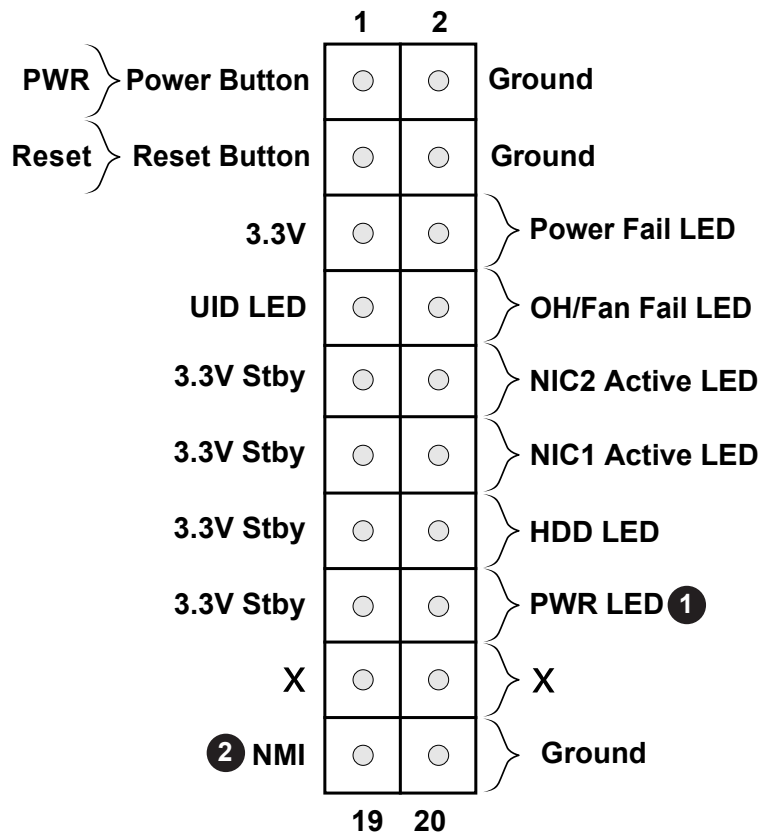
The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table below for pin definitions.

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



1. PWR LED

2. NMI

## 2.7 Connectors

### Power Connectors

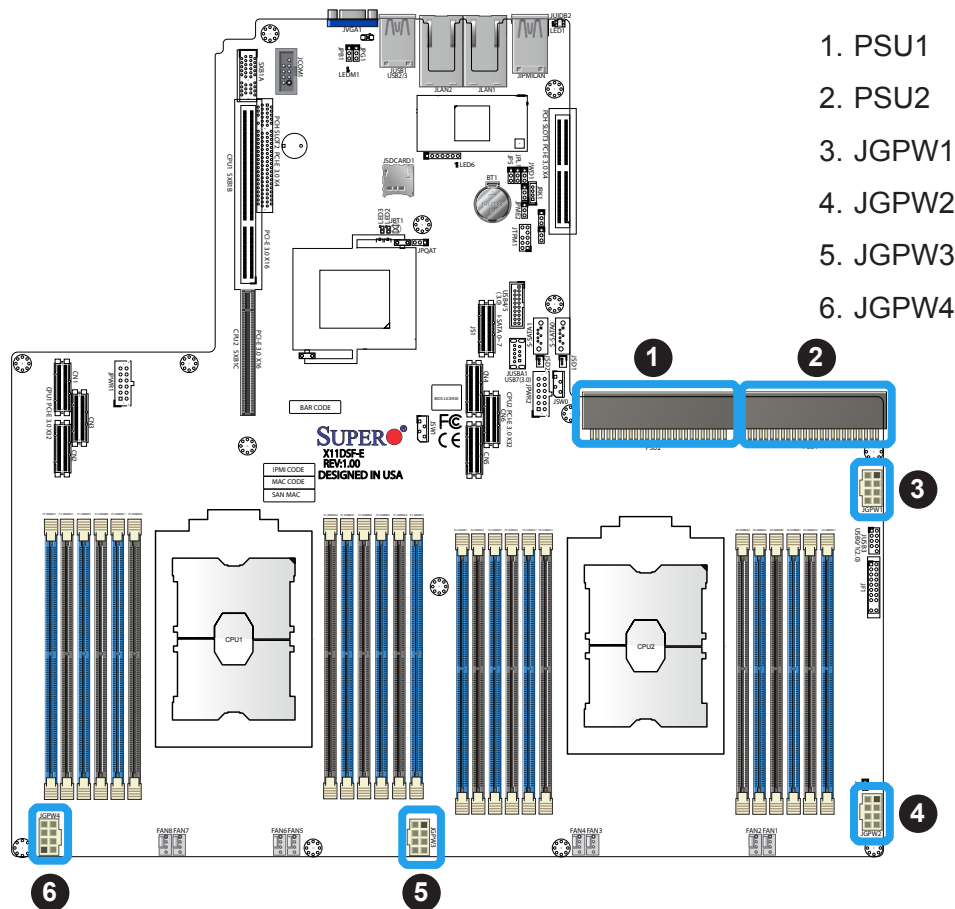
#### SMCI-Proprietary Power Connectors

Two SMCI-proprietary Power Supply Unit connectors, located at PSU1/PSU2, provide main power to your system. Please note that these power connectors are reserved for Supermicro system use only.

#### GPU Power Connectors

JGPW1~4 are 8-pin power connectors used for onboard GPU (Graphics Processing Unit) and video devices. Connect appropriate power cables here to provide power to your GPU/ VGA devices

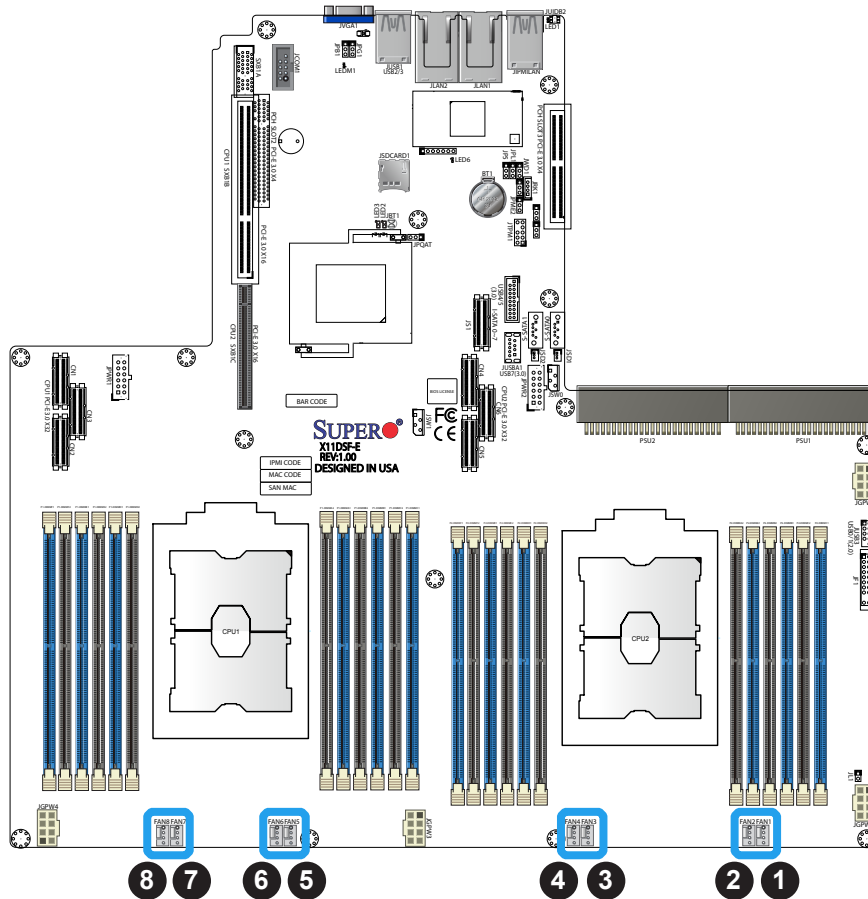
12V 8-pin Power Pin Definitions	
Pin#	Definition
1 - 4	Ground
5 - 8	+12V



## Headers

### Onboard Fan Header

This motherboard has eight headers (FAN1~8). 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.



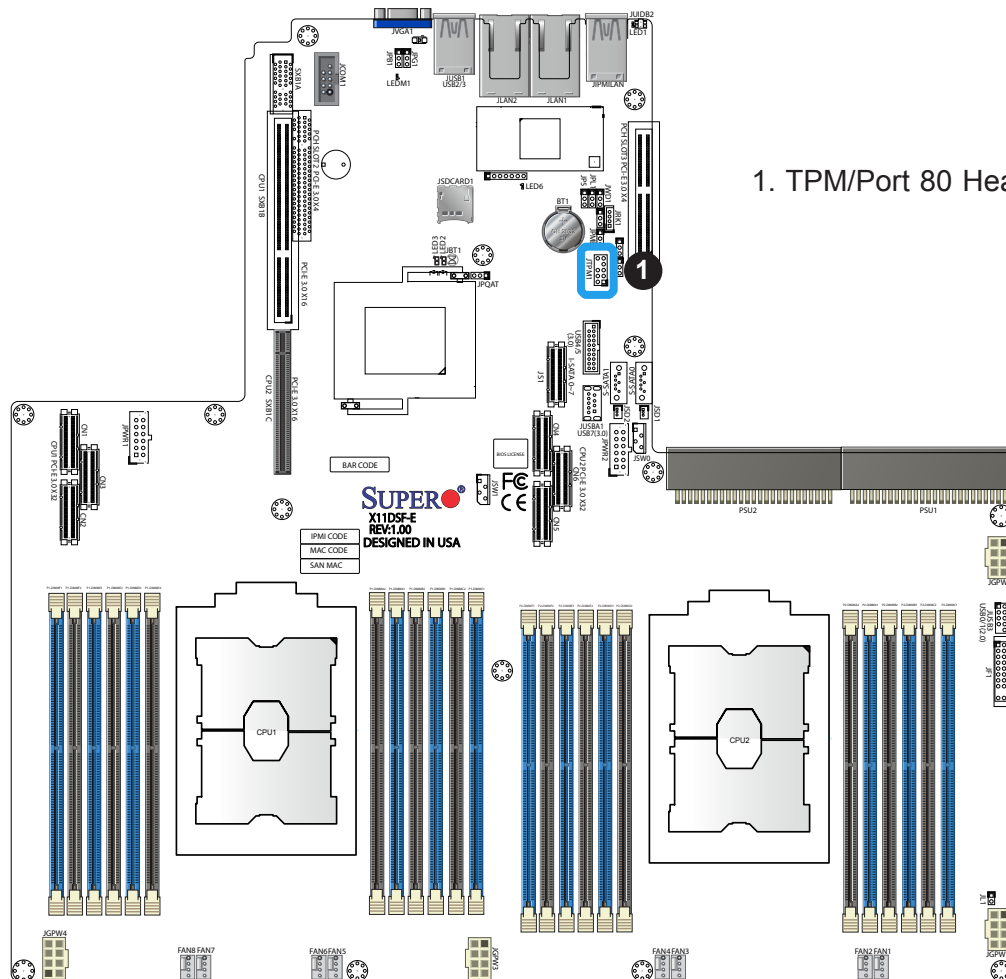
Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	+12V (Red)
3	Tachometer
4	PWM Control

1. FAN 1
2. FAN 2
3. FAN 3
4. FAN 4
5. FAN 5
6. FAN 6
7. FAN 7
8. FAN 8

## TPM Header

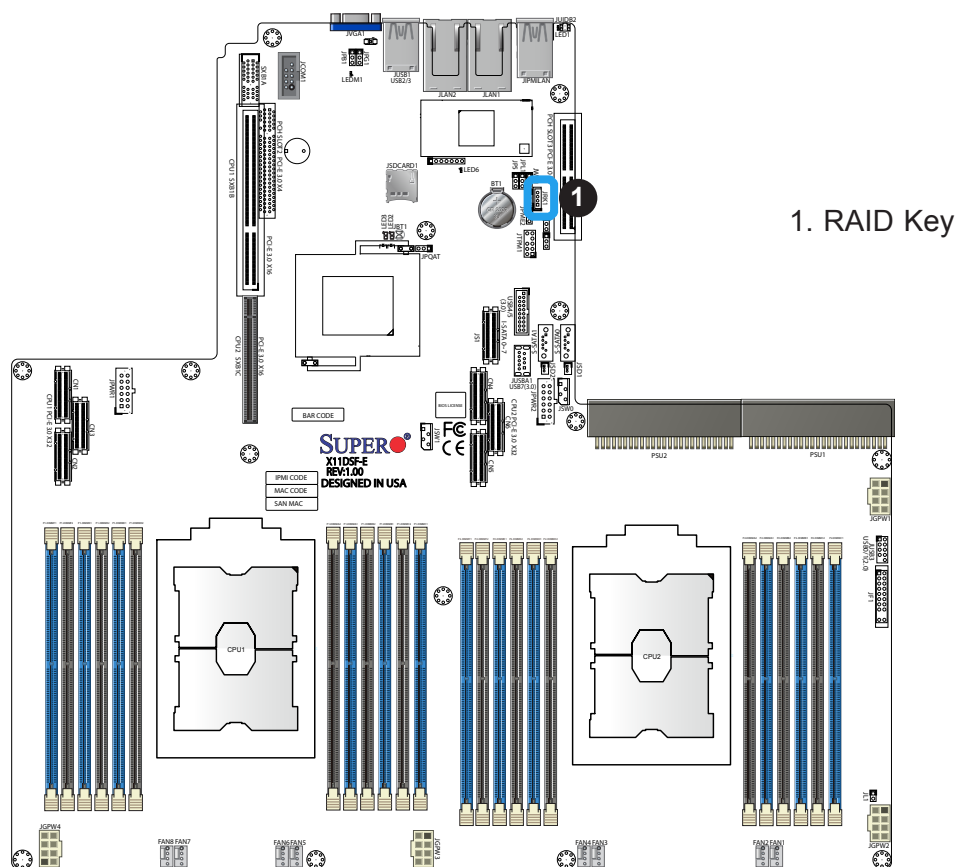
The Trusted Platform Module (TPM)/Port 80 is located at JTPM1 and is available from SMC1 (optional). A TPM/Port 80 connector is a security device that supports encryption and authentication in hard drives. It allows the motherboard to deny access if the TPM associated with the hard drive is not installed in the system. See the table below for pin definitions.

TPM/Port 80 Header Pin Definitions			
Pin #	Definition	Pin #	Definition
1	+3.3V	2	SPI_CS#
3	RESET#	4	SPI_MISO
5	SPI_CLK	6	GND
7	SPI_MOSI	8	
9	+3.3V Stdbby	10	SPI_IRQ



## RAID Key Header

A RAID key header is located at JRK1 on the motherboard and is used to support onboard NVMe devices.

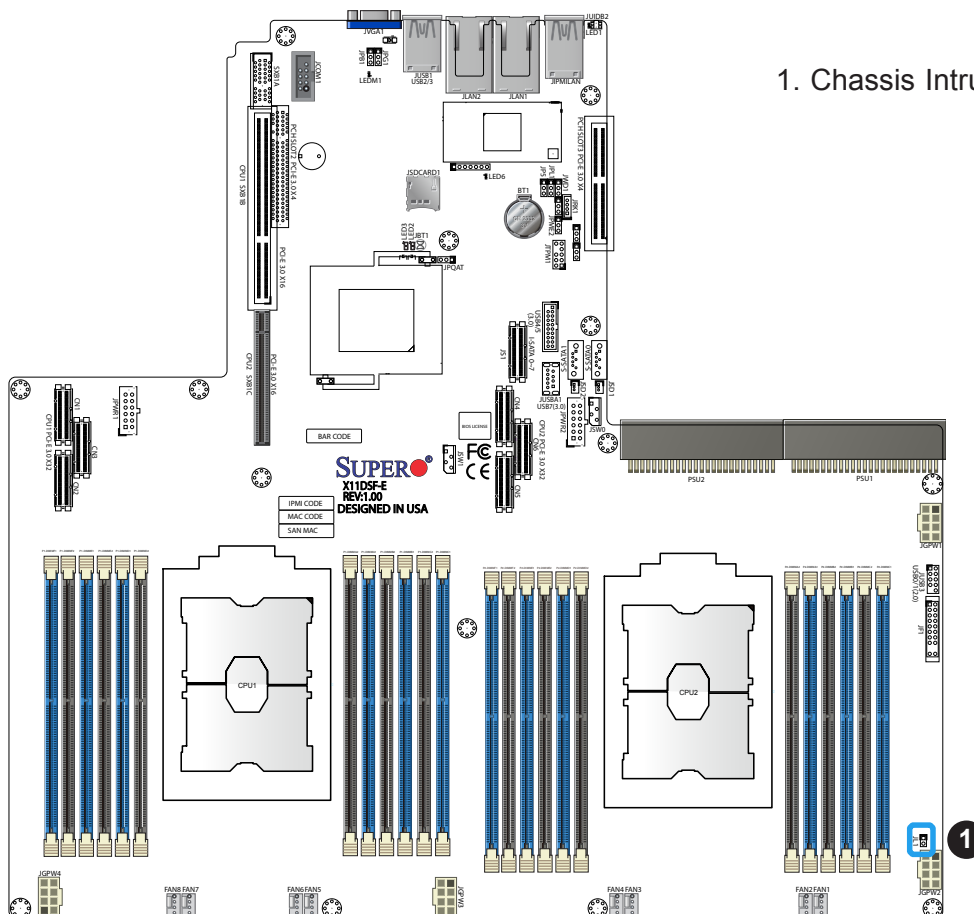


## Chassis Intrusion

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.

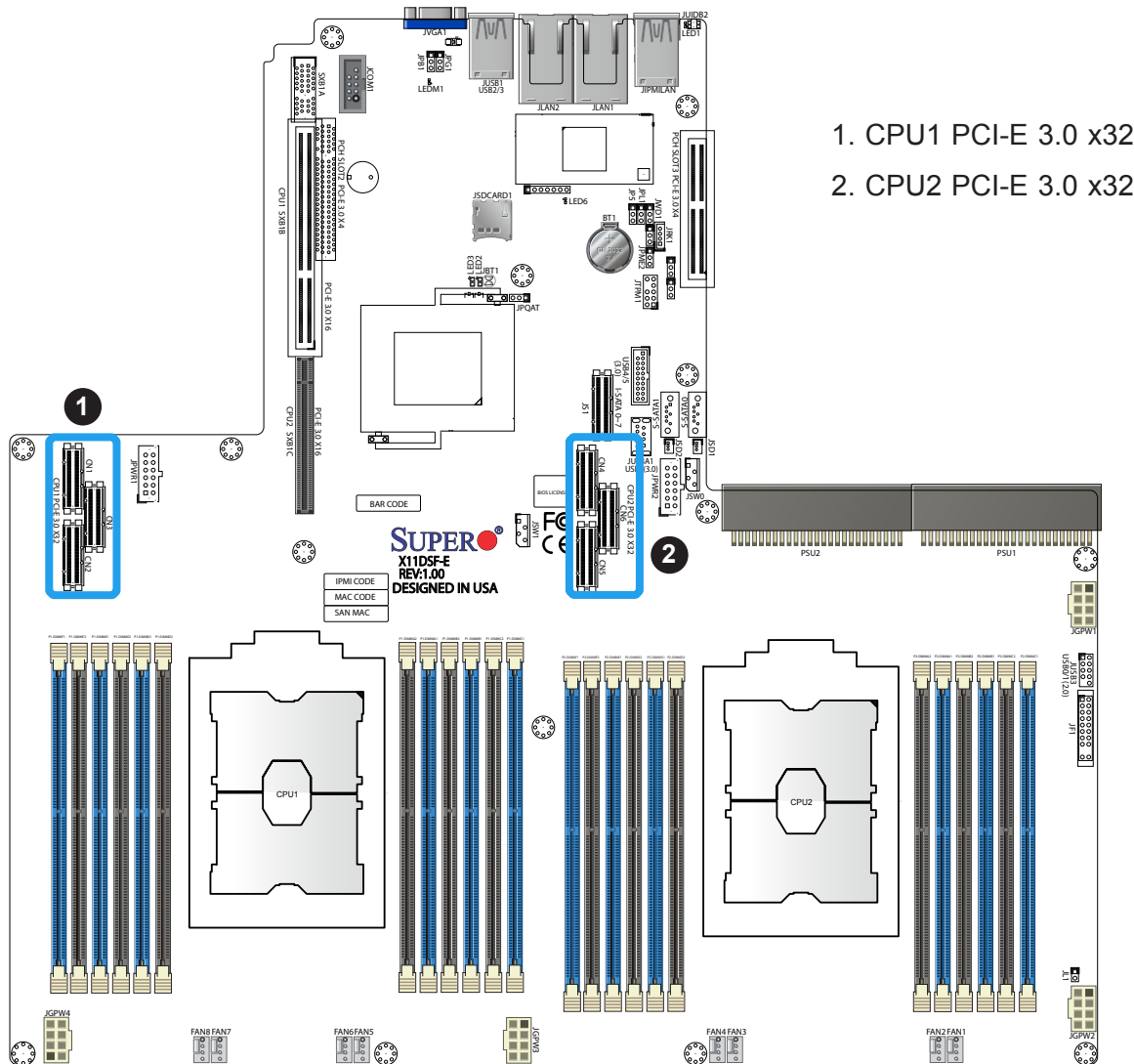
Chassis Intrusion Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground

### 1. Chassis Intrusion



## NVMe Slots (PCI-E 3.0 x32)

There are two PCI-E 3.0 x32 slots with Tray Cable Connector Interface connections on the motherboard. These slots offer 32 NVMe connections which support 36 M.3 (32 NVMe M.3 + 4 SATA M.3) connections, or GPU devices.



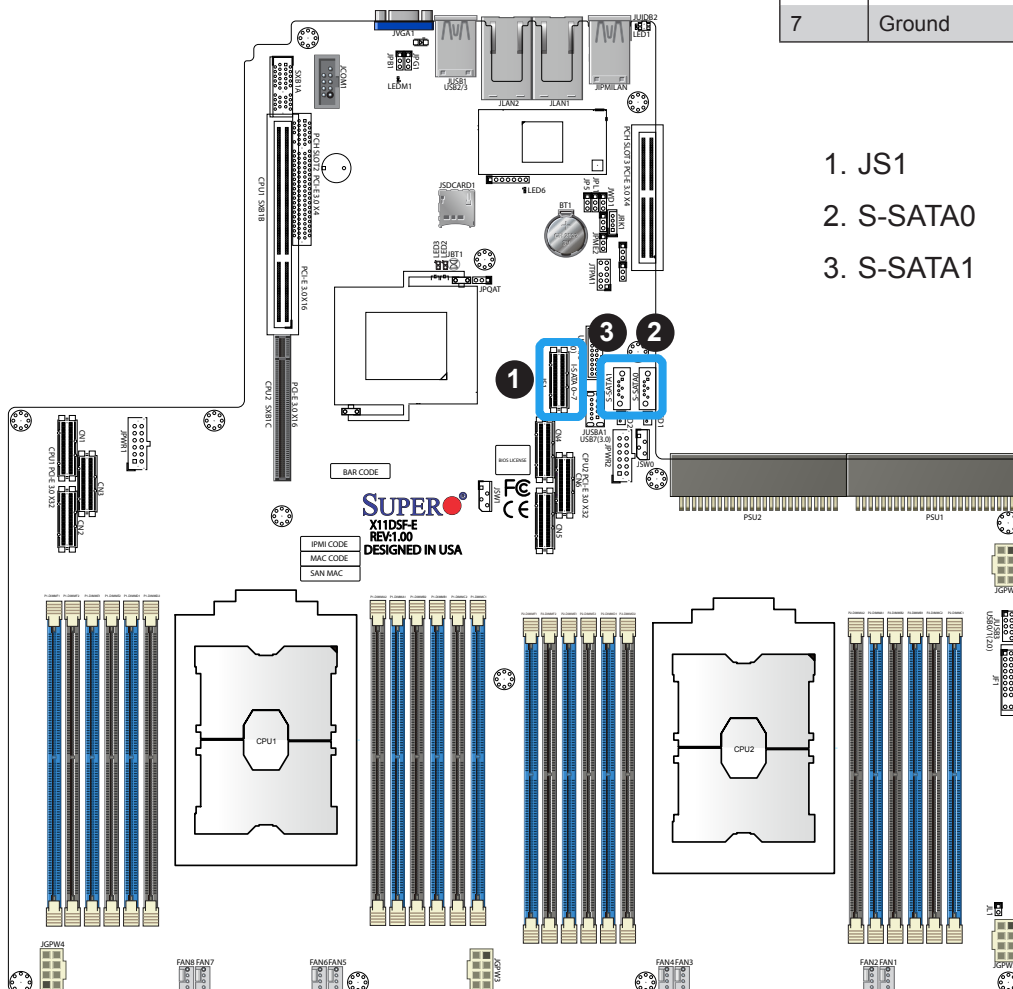


### I-SATA 3.0 and S-SATA 3.0 Ports

The X11DSF-E has eight SATA 3.0 ports located at JS1, and two SATA DOM (S-SATA0, S-SATA1) ports. These SATA ports provide a 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. JS1
2. S-SATA0
3. S-SATA1

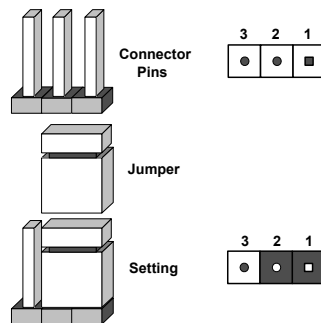


## 2.8 Jumper Settings

### 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

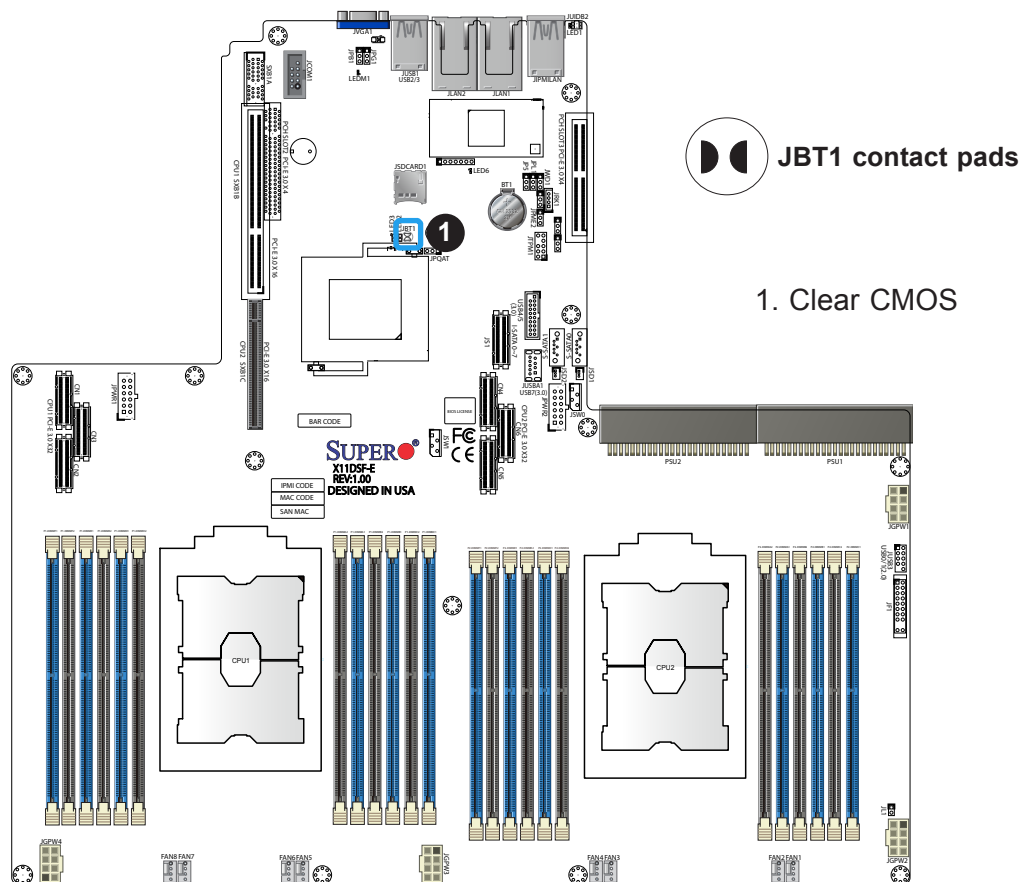
JBT1 is used to clear CMOS and will also clear any passwords. Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

### 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.

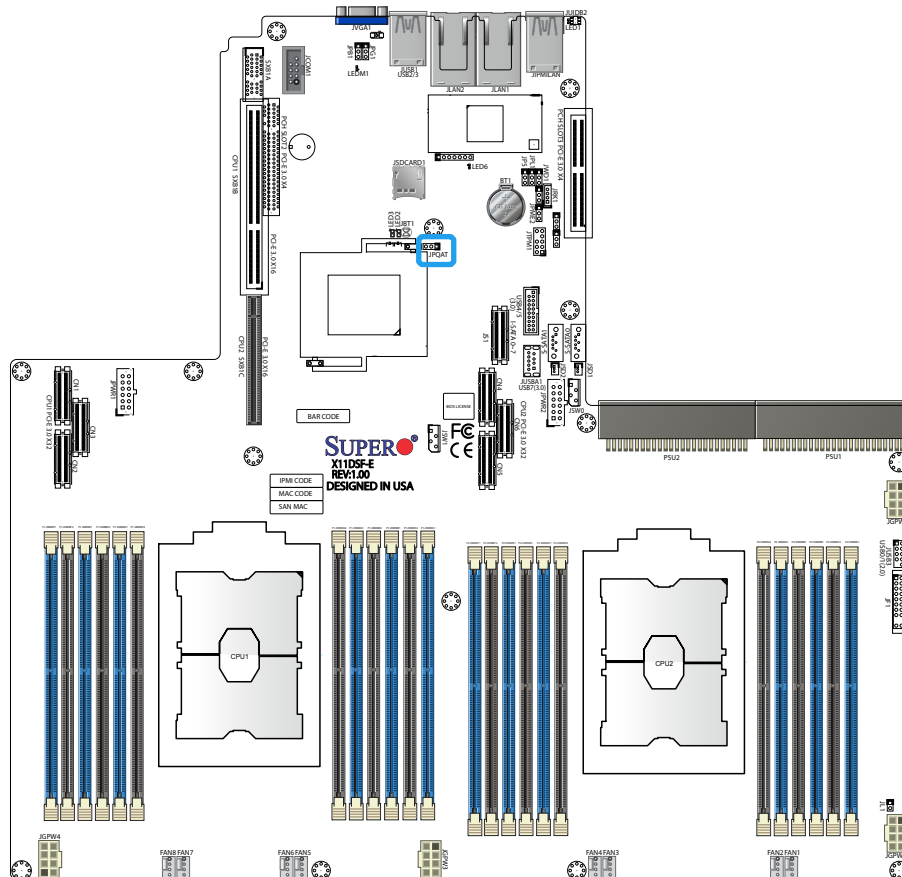
*Do not use the PW\_ON connector to clear CMOS.*



## Intel® QuickAssist Technology (QAT) Enable/Disable

The X11DSF-E supports Intel® QuickAssist Technology (Intel QAT), which offers high-profile security and compression acceleration to standard server platforms in a software-defined infrastructure. JPQAT1 is used to enable or disable QAT support. JPQAT2 (with JPQAT1 Enabled) allows the user to select the desired link. See the table below for jumper settings.

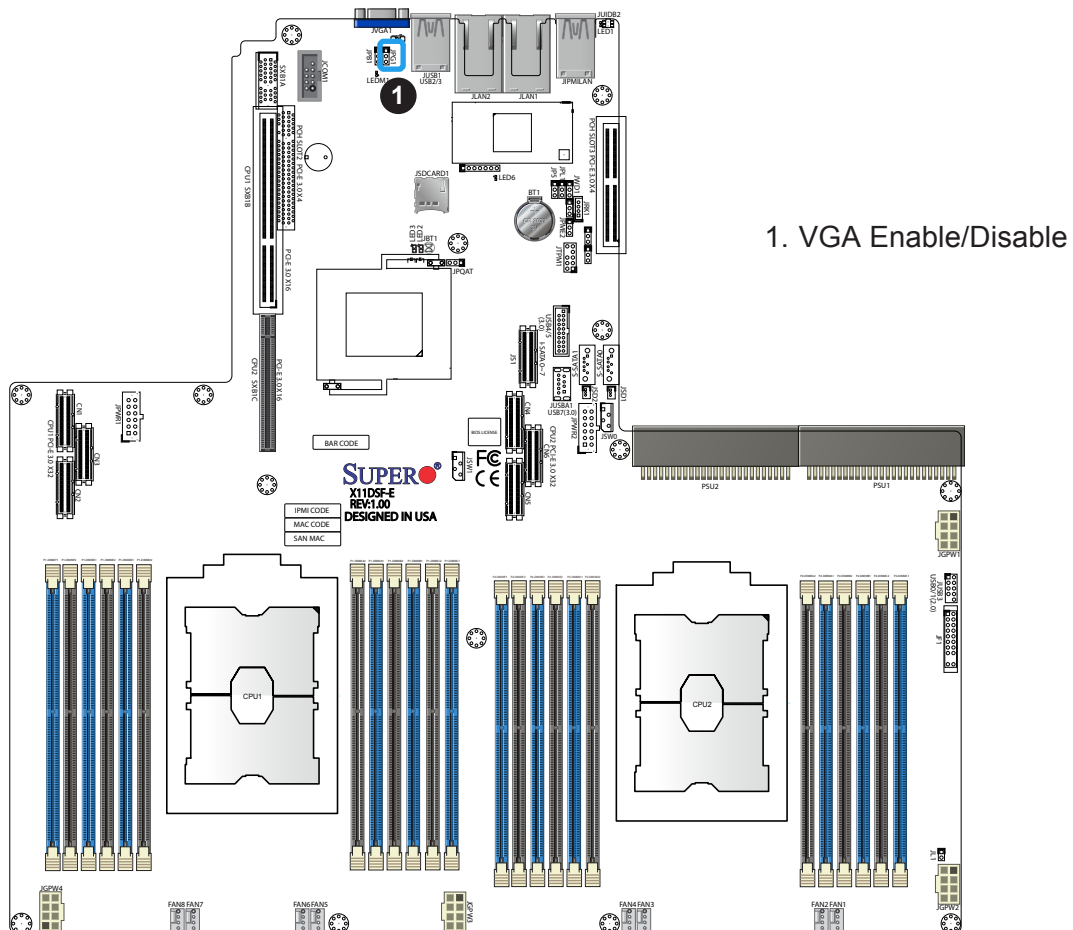
QAT Enable/Disable Jumper Settings		
JPQAT1	JPQAT2	Setting 1-2: 1 (Enabled) Setting 2-3: 0 (Disabled)
0	0	x16 to RSC-X-66
0	1	No Connection
1	0	x8 to PCH QAT, x8 to RSC-X-66
1	1	x16 to PCH QAT



## VGA Enable/Disable

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

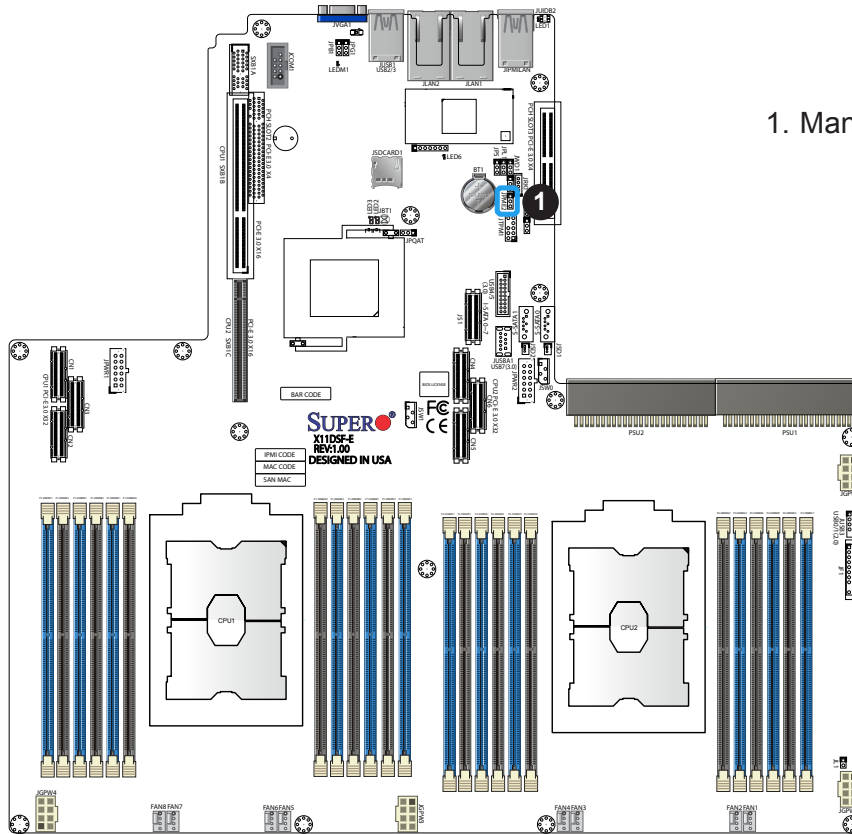
VGA Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled



## Manufacturing Mode Select

Close JPME2 to bypass SPI flash security and force the system to use the Manufacturing Mode, which will allow you to flash the system firmware from a host server to modify system settings. See the table below for jumper settings.

Manufacturing Mode Select Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Normal (Default)
Pins 2-3	Manufacturing Mode



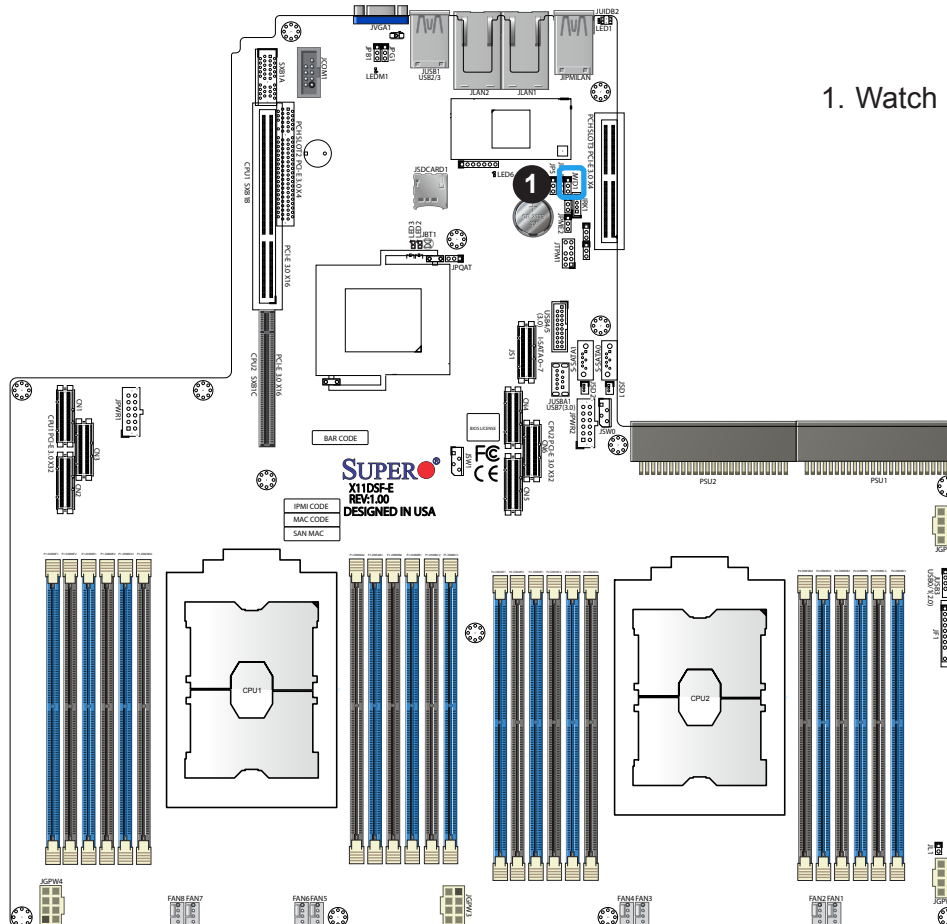
1. Manufacturing Mode Select

## Watch Dog Timer

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.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

### 1. Watch Dog

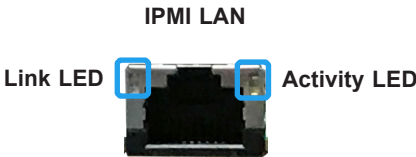


## 2.9 LED Indicators

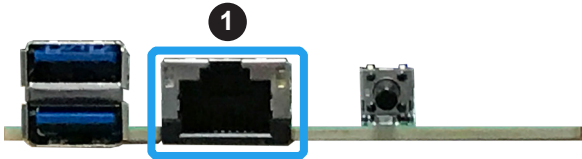
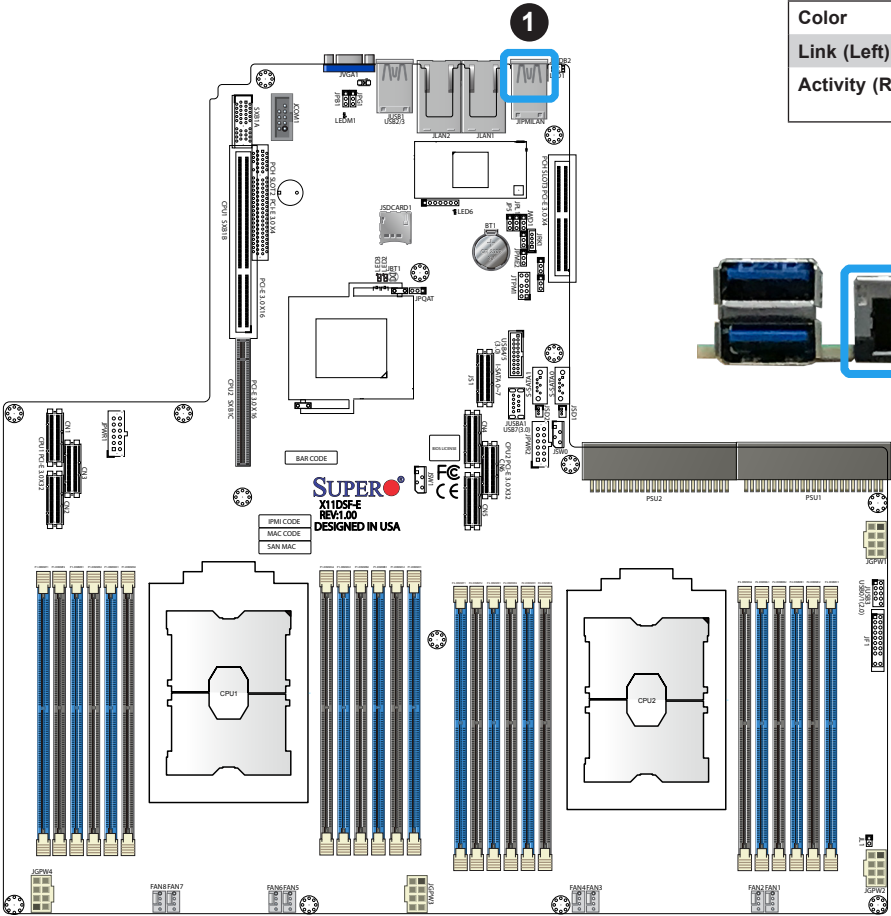
### IPMI-Dedicated LAN LEDs

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.

#### 1. IPMI LAN LEDs



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

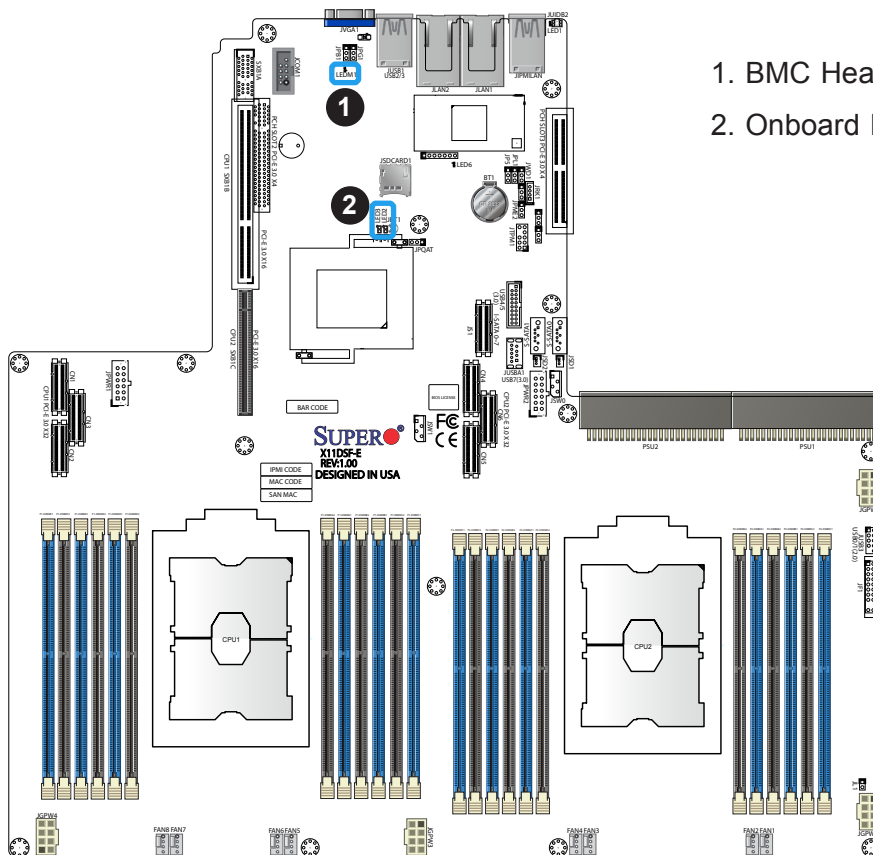
LED1 is the BMC heartbeat LED. When the LED is blinking green, BMC is functioning normally. See the table below for the LED status.

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

## Onboard Power LED

The Onboard Power LED is located at LED2 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.

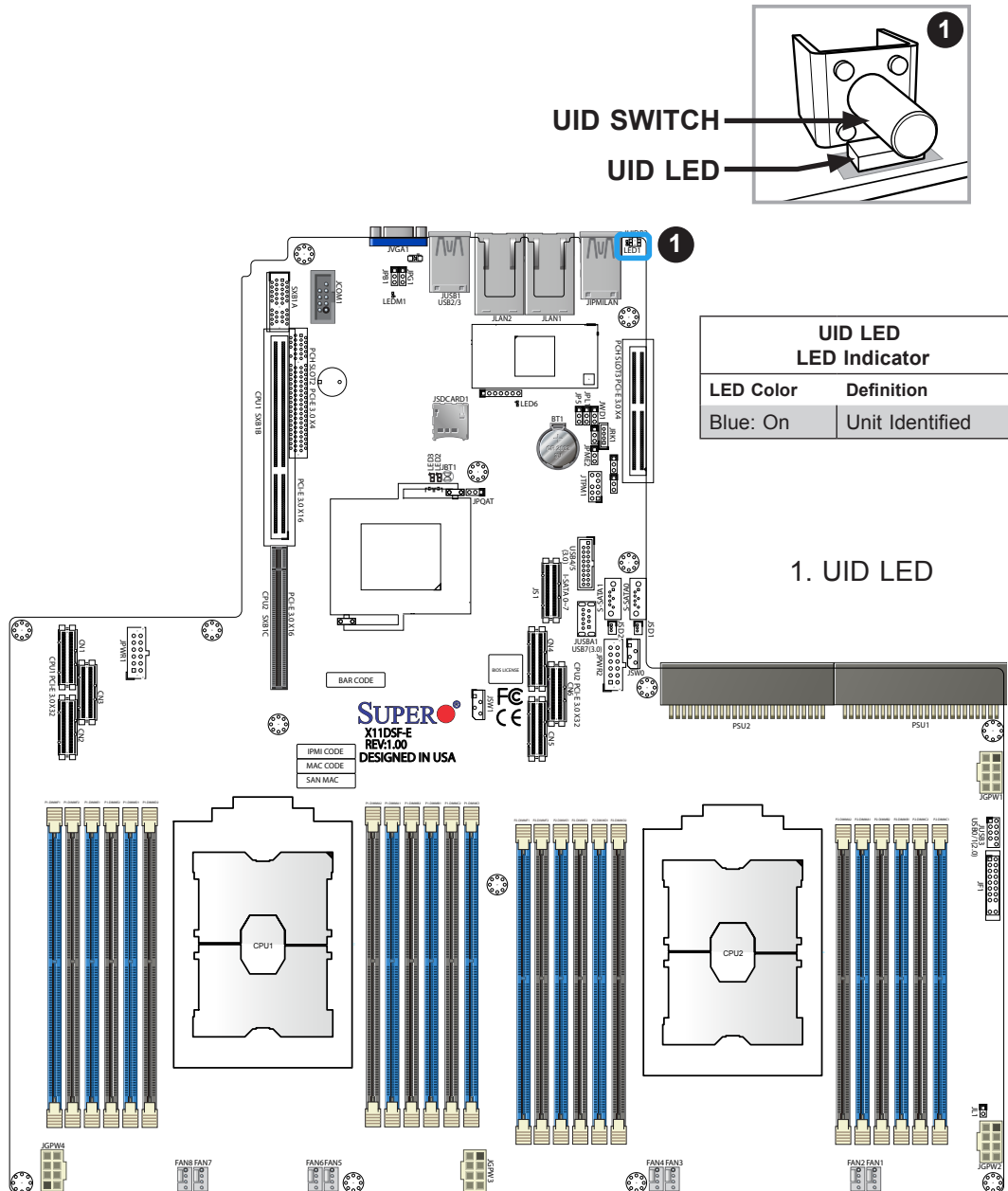
Onboard Power LED Indicator	
LED Color	Definition
Off	System Off
Green	System On



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 as well. (Make sure that the heatsink is fully seated.)
7. Use the correct type of onboard CMOS battery as recommended by the manufacturer. To avoid possible explosion, do not install the CMOS battery upside down.

#### 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.

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

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

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as CD.
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 find out if a component is good, swap this component with a new one to see if the system will work properly. If so, then the old component is bad. You can also install the component in question in another system. If the new system works, the component is good and the old system has problems.

## 3.2 Technical Support Procedures

Before contacting Technical Support, please take the following steps. Also, 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 X11DSF-E motherboard supports up to 3TB of 3DS LRDIMM/LRDIMM/3DS RDIMM/RDIMM/NV-DIMM DDR4 ECC 2666/2400/2133 MHz memory in 24 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. Select your motherboard model and download the BIOS file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading. You can choose from the zip file and the .exe file. If you choose the zip BIOS file, 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 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. 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.
3. Remove the battery.

### Proper Battery Disposal

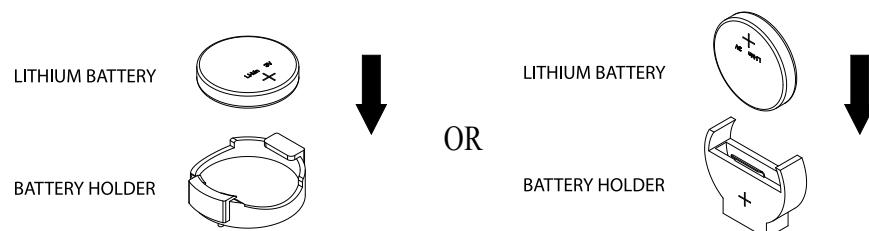
Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency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

### Battery Installation

1. To install an onboard battery, follow 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.



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



### 3.5 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

For faster service, RMA authorizations may be requested online (<http://www.supermicro.com/support/rma/>).

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

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

# Chapter 4

## BIOS

### 4.1 Introduction

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



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

#### Starting the Setup Utility

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

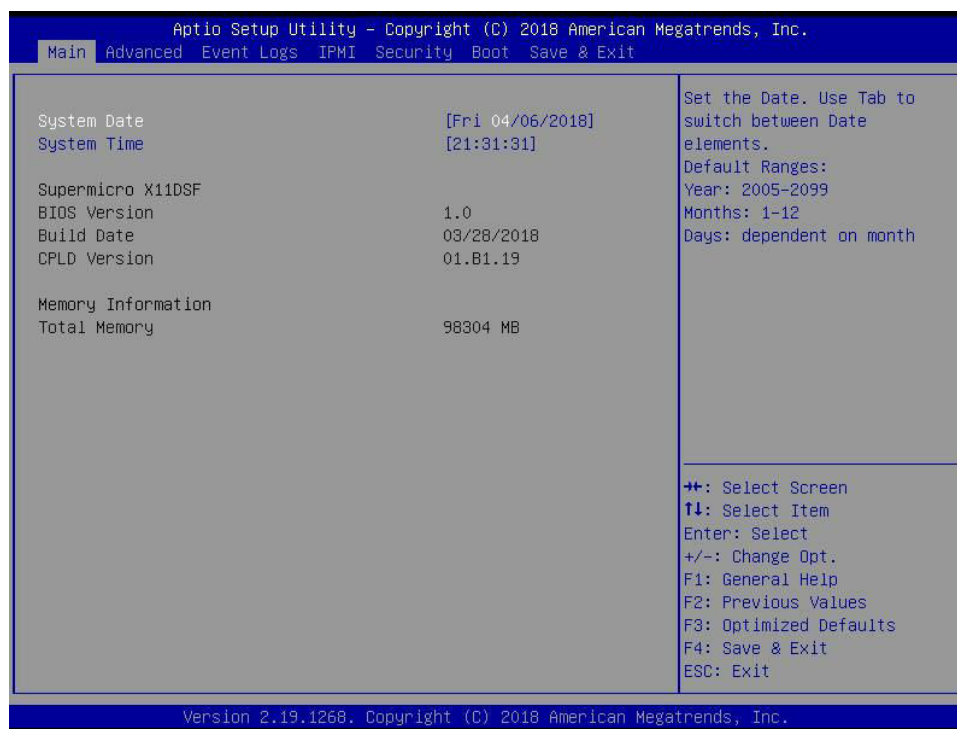
The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is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

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

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


## 4.2 Main Setup

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

 **Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is 01/01/2015 after RTC reset.

### Supermicro X11DSF-E

#### 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.

## **Memory Information**

### **Total Memory**

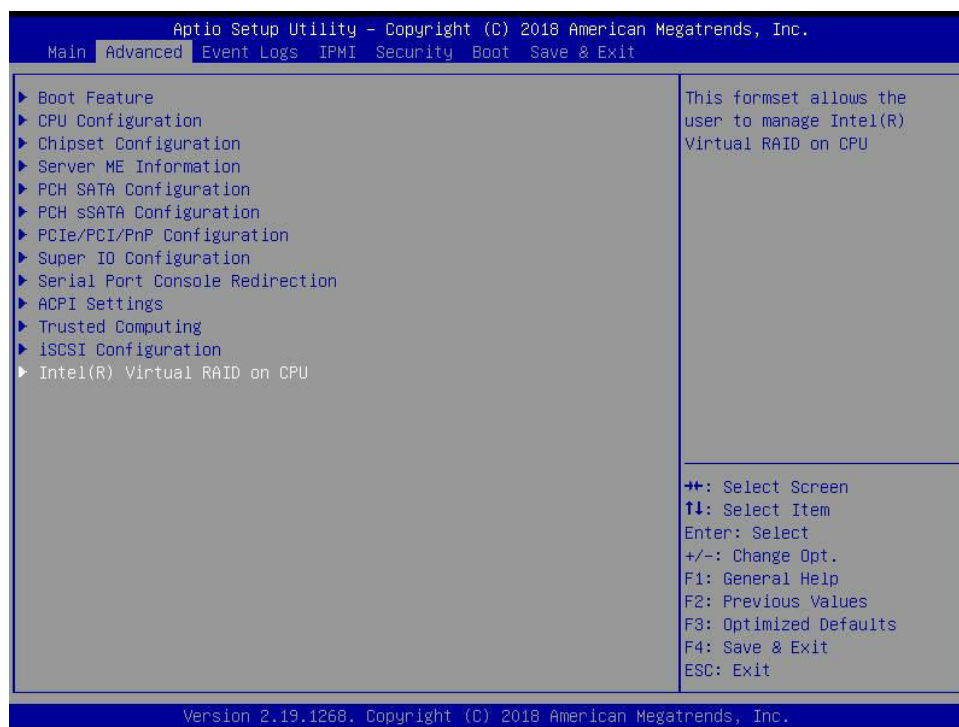
This item displays the total size of memory available in the system.

### **Memory Speed**

This item displays the memory speed available in the system.

## 4.3 Advanced Setup Configurations

Use the arrow keys to select Boot Setup and press <Enter> to access the submenu items.



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

### ► Boot Feature

#### Quiet Boot

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

#### Option ROM Messages

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

#### Bootup NumLock State

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

**Wait For "F1" If Error**

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

**INT19 (Interrupt 19) 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**

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

**Install Windows 7 USB support**

EHCI needs to be supported in order for USB 2.0 to work properly during the installation of Windows 7; however, EHCI support was removed from X11 DP Motherboard platforms. When this item is enabled, this feature will allow USB keyboard and mouse to work properly during installation of Windows 7. After installation of Windows 7 and all the drivers, please disable this feature. The options are **Disabled** and Enabled.

**Port 61h Bit-4 Emulation**

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

**Power Configuration****Watch Dog Function**

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

**Restore on AC Power Loss**

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

### Power Button Function

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for 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.

### Throttle on Power Fail

When enabled, this feature decreases system power by throttling CPU frequency when power supply has failed. The options are **Disabled** and Enabled.

## ►CPU Configuration

### Processor Configuration

The following CPU information will display:

- 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) (Available when supported by the CPU)

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



**Cores Enabled**

Use this feature to enable or disable CPU cores in the processor specified by the user. Enter 0 to enable all cores available in the processor. Please note that the maximum of 16 CPU cores are currently available in each CPU package. The default option is **0**.

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

Select Enabled to enable the Execute-Disable Bit 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 or damage the system during an attack. The default is **Enable**. (Refer to the Intel® and Microsoft® websites for more information.)

**Intel Virtualization Technology**

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

**PPIN Control**

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

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

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

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

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

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

Select Enabled to enable the DCU (Data Cache Unit) Streamer Prefetcher which will stream and prefetch data and send it to the Level 1 data cache to improve data processing and system performance. The options are Disable and **Enable**.

**DCU IP Prefetcher (Available when supported by the CPU)**

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

**LLC Prefetch**

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

**Extended APIC**

Select Enable to activate APIC (Advanced Programmable Interrupt Controller) support. 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****Power Technology**

This feature allows for switching between stored CPU Power Management profiles. The options are Disable, **Energy Efficient** and Custom.

**Power Performance Tuning (Available when "Power Technology" is set to Custom**

Select BIOS to allow the system BIOS to configure the Power-Performance Tuning Bias setting below. The options are BIOS Controls EPB and **OS Controls EPB**.

**ENERGY\_PERF\_BIAS\_CFG Mode Energy (ENERGY PERFORMANCE BIAS CONFIGURATION Mode) (Available when supported by the Processor and when "Power Performance Tuning" is set to BIOS Controls EPB)**

This feature allows the user to set the desired processor power use policy for the machine by prioritizing system performance or energy savings. Selecting Maximum Performance will prioritize performance (to its highest potential); however, this may result in maximum power consumption. The higher the performance is, the higher the power consumption will be. Select Max Power Efficient to prioritize power saving; however, system performance may be substantially impacted. The options are Maximum Performance, Performance, **Balanced Performance**, Balanced Power, Power, and Max Power Efficient.

**►CPU P State Control**

This feature allows the user to configure the following CPU power settings

**Speedstep (Pstates)**

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

**EIST PSD Funtion**

This feature allows the user to choose between Hardware and Software to control the processor's frequency and performance (P-state). In HW\_ALL mode, the processor hardware is responsible for coordinating the P-state, and the OS is responsible for keeping the P-state request up to date on all logical processors. In SW\_ALL mode, the OS Power Manager is responsible for coordinating the P-state, and must initiate the transition on all Logical Processors. In SW\_ANY mode, the OS Power Manager is responsible for coordinating the P-state and may initiate the transition on any Logical Processors. Options available: HW\_ALL/SW\_ALL/SW\_ANY. Default setting is HW\_ALL.

**Turbo Mode**

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

**►Hardware PM State Control****Hardware P-States**

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 Enable and **Disable**.

**CPU C6 Report**

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

**Enhanced Halt State (C1E)**

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

## ► Package C State Control

### Package C State

This feature allows the user to set the limit on the C State package register. The options are C0/C1 State, C2 State, C6 (Non Retention) State, C6 (Retention) state, No Limit, and **Auto..**

## ► CPU T State Control

### Software Controlled T-States

Select Enable to support Software Controlled Throttling states for CPUs installed on the motherboard. Such throttling states control the running time of CPUs with the goal of cooling down CPUs and preventing them from burning out. The options are **Disable** and Enable.

## ► Chipset Configuration

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

## ► North Bridge

This feature allows the user to configure the following North Bridge settings.

### ► UPI Configuration

#### ► UPI General Configuration

The following UPI information will display:

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

**Link L0p Enable**

Select Enable for Link L0p support. The options are **Enable** and Disable.

**Link L1 Enable**

Select Enable for Link L1 support. The options are **Enable** and Disable.

**IO Directory Cache (IODC)**

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

**SNC**

Sub NUMA Clustering (SNC) is a feature that breaks up the Last Level Cache (LLC) into clusters based on address range. Each cluster is connected to a subset of the memory controller. Enabling SNC improves average latency and reduces memory access congestion to achieve higher performance. Select Auto for 1-cluster or 2-clusters depending on IMC interleave. Select Enable for Full SNC (2-clusters and 1-way IMC interleave). The options are Disable, Enable, and Auto.

**XPT Prefetch**

XPT Prefetch speculatively makes a copy to the memory controller of a read request being sent to the LLC. If the read request maps to the local memory address and the recent memory reads are likely to miss the LLC, a speculative read is sent to the local memory controller. The options are **Disable** and Enable.

**KTI Prefetch**

KTI Pretech enables memory read to start early on a DDR bus, where the KTI Rx path will directly create a Memory Speculative Read command to the memory controller. The options are Disable and **Enable**.

**Stale AtoS**

This feature optimizes A to S directory. When all snoop responses found in directory A are found to be Rspl, then all data is moved to directory S and is returned in S-state. The options are **Disable**, Enable, and Auto.

**LLC Dead Line Alloc**

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

**Isoc Mode**

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

**► Memory Configuration****Enforce POR**

Select Enable to enforce POR restrictions on DDR4 frequency and voltage programming. The options are **Enabled** and Disable.

**Memory Frequency**

Use this feature to set the maximum memory frequency for onboard memory modules. The options are Auto, 1333, 1400, 1600, 1800, 1867, 2000, 2133, 2200, and 2400.

**Data Scrambling for NVDIMM**

Use this feature to enable or disable data scrambling for non-volatile DIMM (NVDIMM) memory. The options are **Auto**, Disable, and Enable.

**Data Scrambling for DDR4**

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

**tCCD\_L Relaxation**

Select Enable for tCCD\_L to override the SPD. Select Disable for onboard DIMM modules to run based on memory frequencies. The options are Enable and **Disable**.

**tRWSR Relaxation**

Select enable for rRWSR to override the SPD. Select Disable for onboard DIMM modules to run based on memory frequencies. The options are Enable and **Disable**.

**2X Refresh**

This option allows the user to select 2X refresh mode. The options are **Auto**, Enabled, and Disabled. The options are **Auto** and Enable.

**Page Policy**

This feature allows the user to determine the desired page mode for IMC. When **Auto** is selected, the memory controller will close or open pages based on the current operation. Closed policy closes that page after reading or writing. Adaptive is similar to open page policy, but can be dynamically modified. The default is **Auto**.

**IMC Interleaving**

This feature allows the user to configure Integrated Memory Controller (IMC) Interleaving settings. The options are **Auto**, 1-way Interleave, and 2-way Interleave.

**►Memory Topology**

This feature displays DIMM population information.

**►Memory RAS 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 Enable and **Disable**.

**UEFI ARM Mirror**

Select Enable to support the UEFI-based address range mirroring with setup option. The options are **Disable** and Enable. The options are **Disable** and Enable.

**Memory Rank Sparing**

Select Enable to enable memory-sparing support for memory ranks to improve memory performance. The options are **Disable** and Enable.

**Correctable Error Threshold**

Use this item to specify the threshold value for correctable memory-error logging, which sets a limit on the maximum number of events that can be logged in the memory-error log at a given time. The default setting is **10**.

**SDDC Plus One (Available when this feature is supported by the CPU & the item: Intel Run Sure is set to Disable)**

SDDC (Single Device Data Correction) checks and corrects single-bit or multiple-bit (4-bit max.) memory faults that affect an entire single x4 DRAM device. SDDC Plus One is the enhanced feature to SDDC. SDDC+1 will spare the faulty DRAM device out after an SDDC event has occurred. After the event, the SDDC+1 ECC mode is activated to protect against any additional memory failure caused by a 'single-bit' error in the same memory rank. The options are Disable and Enable\*. (The option "Enable" can be set as default when it is supported by the motherboard.)

**ADDDC Sparing**

Adaptive Double Device Data Correction (ADDDC), which is an enhanced feature to DDDC, will not issue a performance penalty before a device fails. Please note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Enable and Disable.

**Patrol Scrub**

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected on a memory module and send the correction to the requestor (the original source). When this item is set to Enable, the IO hub 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**

This feature allows you to decide how many hours the system should wait before the next complete patrol scrub is performed. Use the keyboard to enter a value from 0-24. The default setting is **24**.

**► IIO Configuration****EV DFX Features****► CPU1 Configuration****IOU0 (IIO PCIe Br1)**

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



**IOU1 (II0 PCIe Br2)**

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

**IOU2 (II0 PCIe Br3)**

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

**MCP0 (II0 PCIe Br4)**

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

**MCP1 (II0 PCIe Br5)**

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

**►CPU1 PcieBr0D00F0 - Port 1A/ PcieBr1D02F0 - Port 1C/ PcieBr2D00F0 - Port 2A/ PcieBr3D02F0 - Port 2C****Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are **Auto**, Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), and Gen 3 (8 GT/s).

**PCI-E Port Max Payload Size**

Selecting **Auto** for this feature will enable the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCI-E device, allowing for maximum I/O efficiency. Selecting 128B or 256B will designate maximum packet size of 128 or 256. Options are **Auto**, 128, and 256. **Auto** is enabled by default.

**►CPU2 Configuration****IOU0 (II0 PCIe Br1)**

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

**IOU1 (II0 PCIe Br2)**

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

**IOU2 (II0 PCIe Br3)**

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

**MCP0 (II0 PCIe Br4)**

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

**MCP1 (II0 PCIe Br5)**

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

**►CPU2 PcieBr0D00F0 - Port 1A/ PcieBr1D02F0 - Port 1C/ PcieBr2D00F0 - Port 2A/ PcieBr3D02F0 - Port 2C****Link Speed**

Use this item to select the link speed for the PCI-E port specified by the user. The options are **Auto**, Gen 1 (2.5 GT/s), Gen 2 (5 GT/s), and Gen 3 (8 GT/s).

**PCI-E Port Max Payload Size**

Selecting **Auto** for this feature will enable the motherboard to automatically detect the maximum Transaction Layer Packet (TLP) size for the connected PCI-E device, allowing for maximum I/O efficiency. Selecting 128B or 256B will designate maximum packet size of 128 or 256. Options are **Auto**, 128, and 256. **Auto** is enabled by default.

**►IOAT Configuration****Disable TPH**

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

**Prioritize TPH**

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

**Relaxed Ordering**

Select Enable to enable Relaxed Ordering support which will allow certain transactions to violate the strict-ordering rules of PCI bus for a transaction to be completed prior to other transactions that have already been enqueued. The options are **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 for Direct I/O VT-d support 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 Disable and **Enable**.

### Interrupt Remapping

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

### PassThrough DMA

Use this feature to allow devices such as network cards to access the system memory without using a processor. Select Enable to use the Non-Isoch VT\_D Engine Pass Through Direct Memory Access (DMA) support. The options are **Enable** and Disable.

### ATS

Use this feature to enable Non-Isoch VT-d Engine Address Translation Services (ATS) support. ATS translates virtual addresses to physical addresses. The options are **Enable** and Disable.

### Posted Interrupt

Use this feature to enable VT\_D Posted Interrupt. The options are **Enable** and Disable.

### Coherency Support (Non-Isoch)

Use this feature to maintain setting coherency between processors or other devices. Select Enable for the Non-Isoch VT-d engine to pass through DMA to enhance system performance. The options are **Enable** and Disable.

## ►Intel® VMD Technology

### ►Intel® VMD for Volume Management Device on CPU1

#### VMD Config for PStack0

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

**VMD port 1A (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

**VMD port 1C (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

**Hot Plug Capable (Available when the device is detected by the system)**

Use this feature to enable hot plug support for PCIe root ports 1A~1C, which will allow the user to change PCI-E devices without turning off the system. The options are **Disable** and Enable.

**VMD Config for PStack1**

**Intel® VMD for Volume Management Device**

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

**VMD port 2A (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

**VMD port 2C (Available when the device is detected by the system)**

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

**Hot Plug Capable (Available when the device is detected by the system)**

Select Enable to enable hot plug support for PCIe root ports 2A~2C, which will allow the user to change the devices populated on PCI-E Slots 2A~2C without turning off the system. The options are **Disable** and Enable.

### VMD Config for PStack2

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

#### Hot Plug Capable (Available when the device is detected by the system)

Select Enable to enable hot plug support for PCIe root ports 3A~3D, which will allow the user to change the devices populated on PCI-E Slots 3A~3D without turning off the system. This will allow the user to replace the components without shutting down the system. The options are **Disable** and Enable.

### ►Intel® VMD for Volume Management Device on CPU2

#### VMD Config for PStack0

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

#### VMD port 1A (Available when the device is detected by the system)

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### VMD port 1C (Available when the device is detected by the system)

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### Hot Plug Capable (Available when the device is detected by the system)

Use this feature to enable hot plug support for PCIe root ports 1A~1C, which will allow the user to change PCI-E devices without turning off the system. The options are **Disable** and Enable.

### VMD Config for PStack1

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

#### VMD port 2A (Available when the device is detected by the system)

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### VMD port 2C (Available when the device is detected by the system)

Select Enable to use the Intel Volume Management Device Technology for this specific root port. The options are **Disable** and Enable.

#### Hot Plug Capable (Available when the device is detected by the system)

Select Enable to enable hot plug support for PCIe root ports 2A~2C, which will allow the user to change the devices populated on PCI-E Slots 2A~2C without turning off the system. The options are **Disable** and Enable.

### VMD Config for PStack2

#### Intel® VMD for Volume Management Device

Select Enable to use the Intel Volume Management Device Technology for this stack. The options are **Disable** and Enable.

***\*If the item "Intel VMD for Volume Management Device" above is set to Enable, the following items will be displayed:***

#### Hot Plug Capable (Available when the device is detected by the system)

Select Enable to enable hot plug support for PCIe root ports 3A~3D, which will allow the user to change the devices populated on PCI-E Slots 3A~3D without turning off the system. This will allow the user to replace the components without shutting down the system. 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 **Enable** and Disabled.

**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****Legacy USB Support**

This feature enables support for USB 2.0 and older. The options are **Enabled** and Disabled. Default setting is **Enabled**.

**XHCI Hand-off**

When this feature is disabled, the motherboard will not support USB 3.0. Options are Enabled and **Disabled**. Default setting is **Disabled**.

**Port 60/64 Emulation**

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

**PCIe PLL SSC**

Use this feature to enable PCIE PLL spread spectrum clocking (SSC). The options are **Disable** and Enable.

**► 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

## ►PCH 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

Select IDE to configure a SATA drive specified by the user as an IDE drive. 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 IDE, **AHCI**, and RAID.

### SATA HDD Unlock

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

### Aggressive Link Power Management

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

***\*If the item above "Configure SATA as" is set to RAID, the following items will display:***

### SATA Port 0 ~ Port 7

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

- Model number of drive and capacity
- Software Preserve Support

### Port 0 ~ Port 7 Hot Plug

Set this item to Enabled for hot-plugging support, which will allow the user to replace a SATA drive without shutting down the system. The options are Disabled and **Enabled**.

### Port 0 ~ Port 7 Spin Up Device

On an edge detect from 0 to 1, set this item to allow the PCH to initialize the device. The options are **Disabled** and Enabled.



**Port 0 ~ Port 7 SATA Device Type**

Use this item to specify if the SATA 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.

**►PCH 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 **Enable** and Disable.

**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 Disable, EFI, and **Legacy**.

**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 information will display:

- PCI Bus Driver Version
- PCI Devices Common Settings:

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

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

### SR-IOV Support

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

### MMIO High Base

Use this item to select the base memory size according to memory-address mapping for the IO hub. The options are **56 TB**, 40 TB, 24 TB, 3 TB, 2 TB, and 1 TB.

### 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 **256 GB**, 128 GB, 512 GB, and 1024 GB.

### 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

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

**NVMe Firmware Source**

This feature determines the lowest MMCFG (Memory-Mapped Configuration) base assigned to PCI devices. The options are **Vendor Defined Firmware** and AMI Native Support.

**VGA Priority**

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

**PCH SLOT 2 PCI-E 3.0 x4 OPROM**

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

**PCH SLOT 3 PCI-E 3.0 x4 OPROM**

Select Disabled to deactivate the selected slot. Select Legacy to enable the slot for use of legacy devices. The options are Disabled, **Legacy**, and EFI.

**Bus Master Enable**

This feature enables a device connected to the bus to initiate Direct Memory Access (DMA) transactions. When Disabled is selected, the PCI Bus Driver disables Bus Master Attribute for Pre-Boot DMA Protection. When **Enabled** is selected, the PCI Bus Driver enables Bus Master Attribute for DMA transactions. Some devices request Bus Master to be enabled for operations. The options are Disabled and **Enabled**.

**Onboard LAN Device**

This feature allows the user to Enable or Disable Onboard LAN devices. The options are **Auto**, Enabled, and Disabled.

**Onboard LAN Option ROM Type**

Use this to select firmware type to be loaded for onboard LANs. The options are **Legacy** and EFI.

**Onboard LAN1 Option ROM**

Use this feature to select the type of device installed in LAN Port1 used for system boot. The options are **Legacy**, EFI and Disabled.

**Onboard LAN2 Option ROM**

Use this feature to select the type of device installed in LAN Port2 used for system boot. The options are Legacy, EFI and **Disabled**.

**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 **Enabled** and Disabled.

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

### Ipv4 PXE Support

Use this feature 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

Use this feature 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

Use this feature 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

Use this feature 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 Count

Use this feature to select the wait time in seconds to detect LAN media. The default is 1.

## ► Super IO Configuration

The following Super IO information will display:

- Super IO Chip AST2500

## ► Serial Port 1 Configuration

### Serial Port 1

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.

### 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 1 or 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=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 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.

**SOL (Serial-Over-LAN) Console Redirection**

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 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

**Legacy Serial Redirection Port**

Use the feature to select the COM port to display redirection of Legacy OS and Legacy OPRM messages. The default setting is **COM1** and 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:*

## ► Console Redirection Settings (EMS)

### 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** and SOL.

### Terminal Type

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

### Bits Per Second

This 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.

Data Bits: 8

Parity: None

Stop Bits: 1

## ► ACPI Settings

### Numa

This setting Enables or Disables Non-Uniform Memory Access (NUMA), a feature that improves memory-to-processor communication and performance. The options are Enabled or Disabled.

**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 Enabled and **Disabled**.

**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 **Enabled** and Disabled.

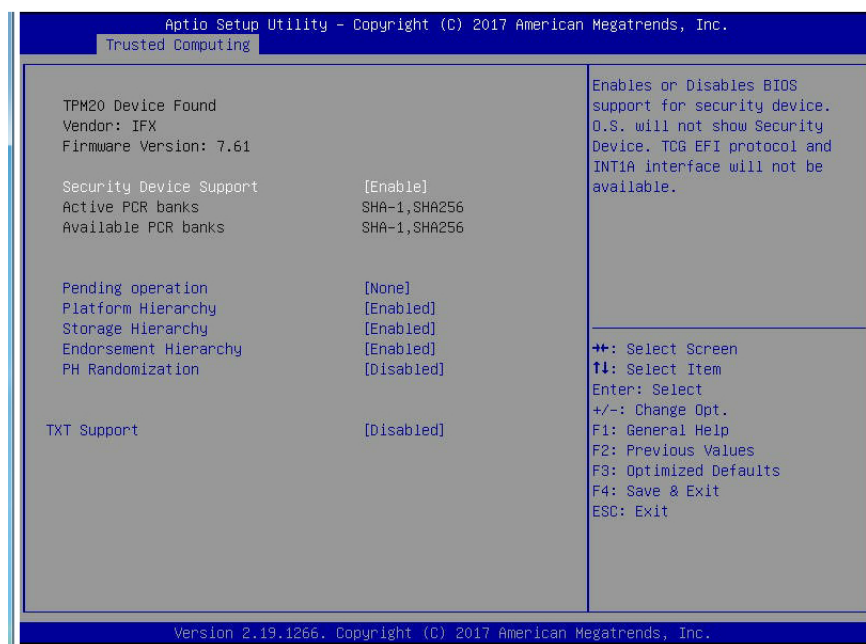
## ► Trusted Computing (Available when a TPM device is installed and detected by the BIOS)

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>.

## ► iSCSI Configuration

### iSCSI Initiator Name

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

► Add an Attempt

► Delete Attempts

► Change Attempt Order

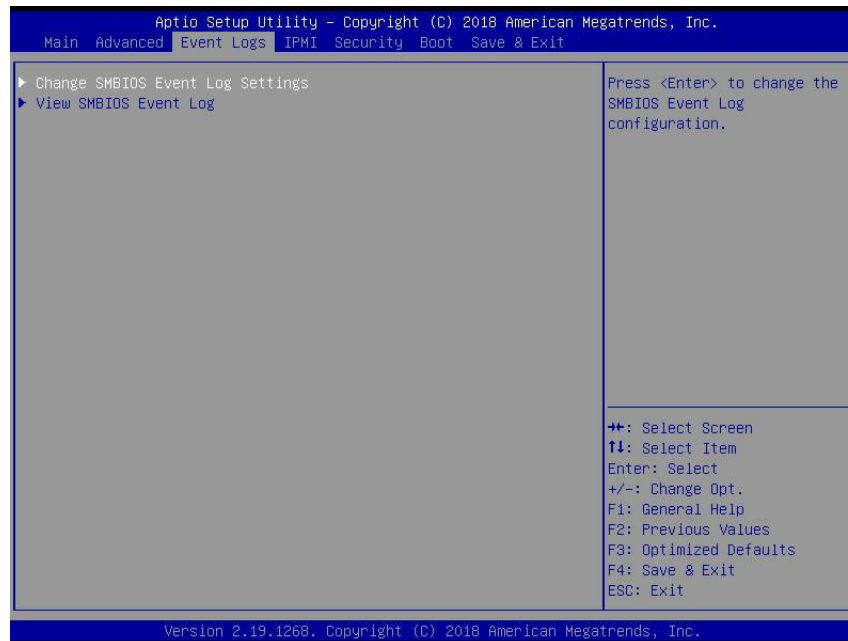
## ► Intel(R) Virtual RAID on CPU

Intel(R) VROC with VMD Technology 5.0.0.1205

RAID volumes and Intel VMD Controllers information will be displayed if they are detected by the system.

## 4.4 Event Logs

Use this feature to configure Event Log settings.



### ► Change SMBIOS Event Log Settings

#### Enabling/Disabling Options

##### SMBios Event Log

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

#### Erasing Settings

##### Erase Event Log

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

##### When Log is Full

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

## SMBIOS Event Long Standard Settings

### Log System Boot Event

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

### MECI

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

### METW

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



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

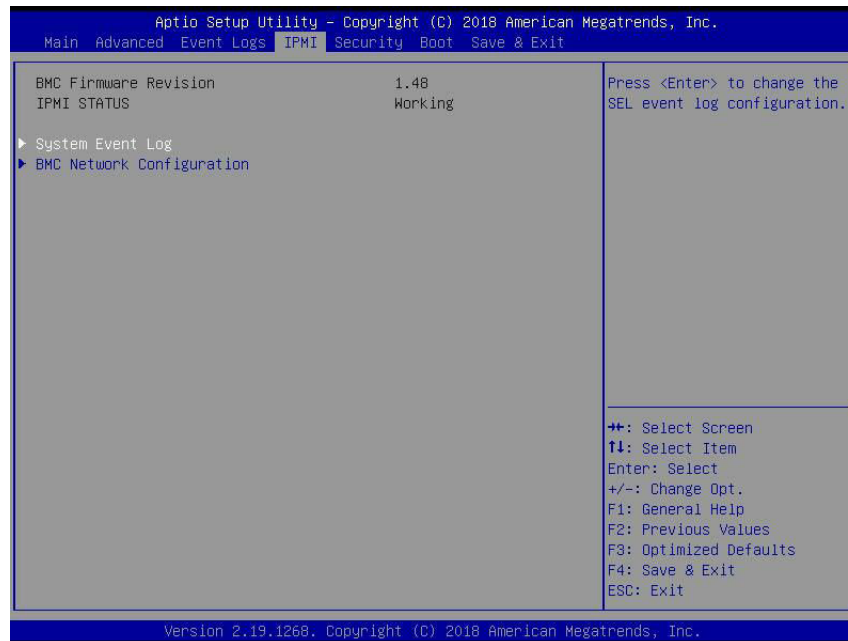
## ►View SMBIOS Event Log

This section displays the contents of the SMBIOS Event Log. This feature allows the user to view the event in the system event log. Select this feature and press <Enter> to view the status of an event in the log. The following categories are displayed: **Date/Time/Error Code/Severity**



## 4.5 IPMI

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



### BMC Firmware Revision

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

### IPMI STATUS (Baseboard Management Controller)

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

## ► System Event Log

### Enabling/Disabling Options

#### SEL Components

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

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

**►BMC Network Configuration****Configure IPV4 support****IPMI LAN Selection**

This item displays the IPMI LAN setting. The default setting is **Failover**.

**IPMI Network Link Status**

This item displays the IPMI Network Link status. The default setting is **Dedicated LAN**.

**Configuration Address source**

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

**Station IP Address**

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

**Subnet Mask**

This item displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.

**Station MAC Address**

This item displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.

**Gateway IP Address**

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

**VLAN**

Enabling this item displays the virtual LAN settings. The options are Enabled and **Disabled**.

**Update IPMI LAN Configuration**

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

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

**IPMI LAN Selection**

This item displays the IPMI LAN setting. The default setting is **Failover**.

**VLAN**

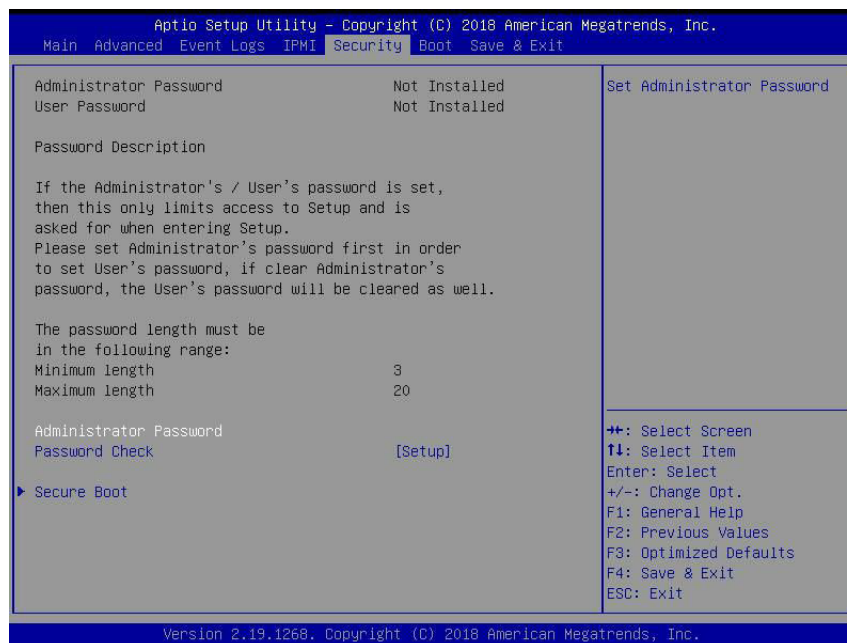
Enabling this item displays the virtual LAN settings. The options are Enabled and **Disabled**.

**Update IPMI LAN Configuration**

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

## 4.6 Security

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



### Administrator Password

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

### User Password

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

### Password Check

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

### ► Secure Boot Menu

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

- System Mode
- Secure Boot
- Vendor Keys

### Attempt Secure Boot

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

**Secure Boot Mode**

If **Custom** mode is enabled, Secure Boot variables can be configured without authentication. The options are **Custom** and Standard.

**CSM Support**

Select Enabled to support the EFI Compatibility Support Module (CSM), which provides compatibility support for traditional legacy BIOS for system boot. The options are **Enabled** and Disabled.

**►Key Management**

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

**Provision Factory Defaults**

Select Enabled to install the default Secure-Boot keys set by the manufacturer. The options are **Disabled** and Enabled.

**►Install Factory Default Keys**

Select Yes to install all default secure keys set by the manufacturer. 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 decide if all secure boot variables should be saved.

**►Platform Key (PK)**

This feature allows the user to configure the settings of the platform keys.

**Set New Key**

Select Yes to load the new platform keys (PK) from the manufacturer's defaults. Select No to load the platform keys from a file. The options are **Yes** and No.

**►Key Exchange Key****Set New Key**

Select Yes to load the KEK (Key Exchange Key) from the manufacturer's defaults. Select No to load the KEK from a file. The options are Yes and No.

**Append Key**

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

**►Authorized Signatures****Set New Key**

Select Yes to load the database from the manufacturer's defaults. Select No to load the DB (Secure Boot Database) from a file. The options are Yes and No.

**Append Key**

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

**►Forbidden Signatures****Set New Key**

Select Yes to load the DBX from the manufacturer's defaults. Select No to load the DBX (Secure Boot Blacklist Signature Database) from a file. The options are Yes and No.

**Append Key**

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

**►Authorized TimeStamps****Set New Key**

Select Yes to load the DBT from the manufacturer's defaults. Select No to load the DBT (Secure Boot Timestamp Database) from a file. The options are Yes and No.

**Append Key**

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

**►OsRecovery Signatures**

This item uploads and installs an OSRecovery Signature. You may insert a factory default key or load from a file. The file formats accepted are:

- 1) Public Key Certificate
  - a. EFI Signature List
  - b. EFI CERT X509 (DER Encoded)
  - c. EFI CERT RSA2048 (bin)
  - d. EFI SERT SHA256 (bin)
- 2) EFI Time Based Authenticated Variable

When prompted, select "Yes" to load Factory Defaults or "No" to load from a file.

### Set New OSRecovery Signatures

This item deletes a previously installed OS Recovery Signature.

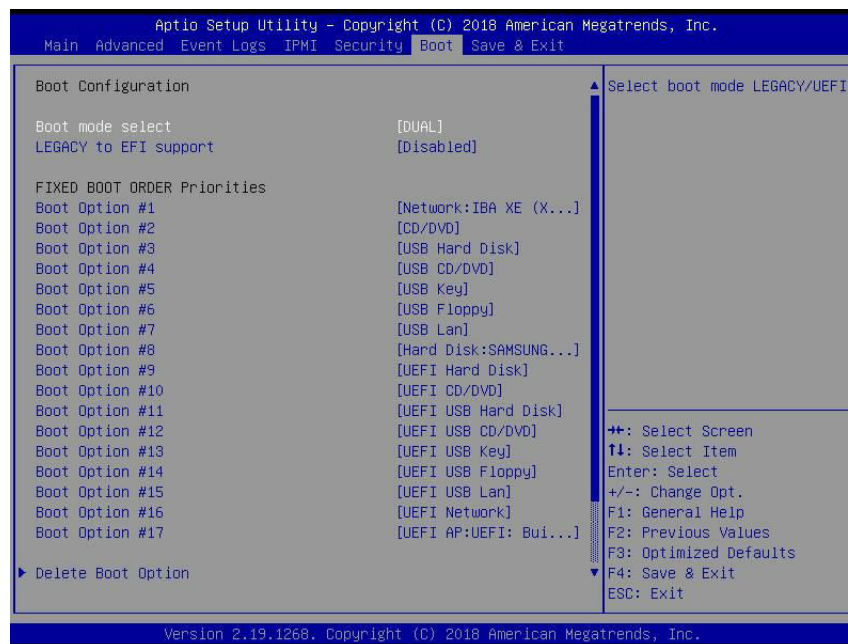
### Append OsRecovery Signature

This item uploads and adds an OSRecovery Signature into the Key Management. You may insert a factory default key or load from a file. When prompted, select "Yes" to load Factory Defaults or "No" to load from a file.

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.

## 4.7 Boot

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**.

### Legacy to EFI support

The options are **Disabled** and Enabled.

### 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

## ►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. The options are **Select one to Delete**, UEFI: Built-in EFI Shell.

## ►UEFI Application Boot Priorities

This feature sets the system boot order of detected devices.

- Boot Option #1

## ►Hard Disk Drive BBS Priorities

This feature sets the system boot order of detected devices.

- Boot Option #1

## ►NETWORK Drive BBS Priorities

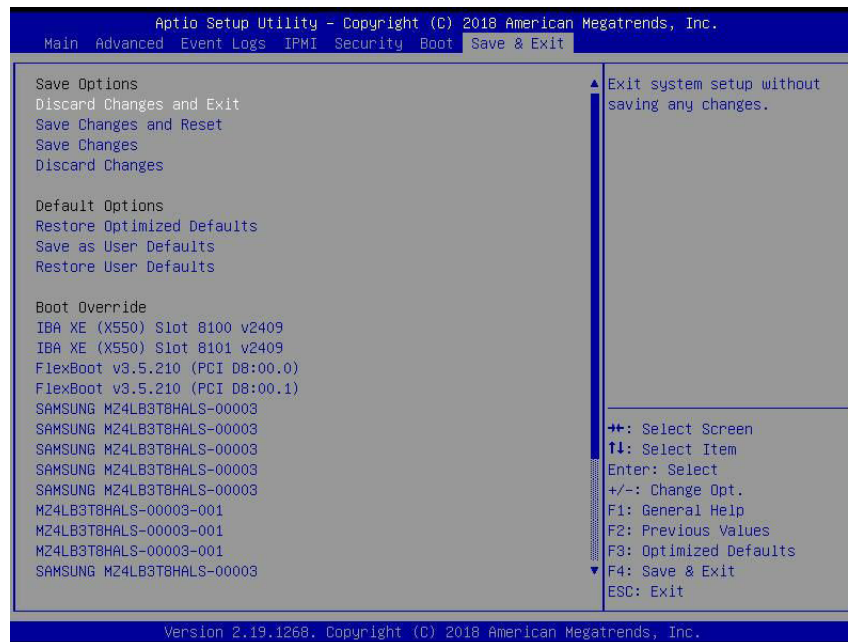
This feature sets the system boot order of detected devices.

- Boot Option #1



## 4.8 Save & Exit

Select the Exit tab from the BIOS setup utility screen to enter the Exit BIOS Setup screen.



### Save Options

#### Discard Changes and Exit

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

#### Save Changes and Reset

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

#### Save Changes

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

#### Discard Changes

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

## **Default Options**

### **Restore Optimized Defaults**

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

### **Save As User Defaults**

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

### **Restore User Defaults**

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

### **Boot Override**

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

# 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.supermicro.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 (Supermicro 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 website that contains drivers and utilities for your system is located at <http://www.supermicro.com/wftp>. Some of these must be installed, such as the chipset driver.

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

After creating a DVD with the ISO files, insert the disk into the 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:** Please refer to the documents posted on our website at <http://www.supermicro.com/support/manuals/> for additional instructions that may be applicable to your system.

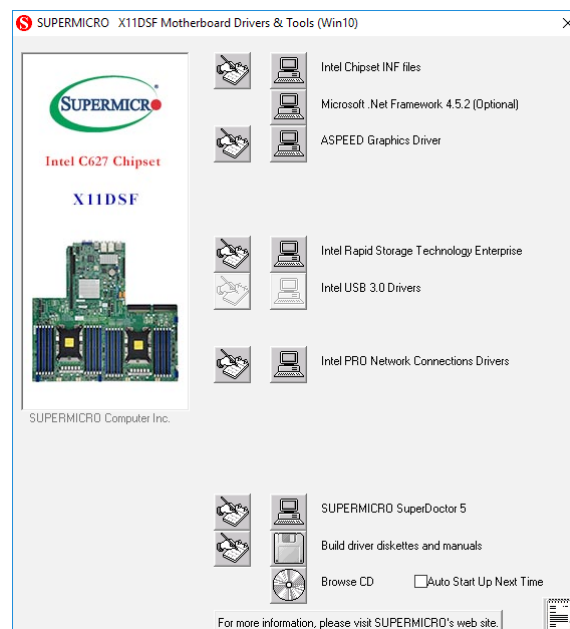


Figure B-1. Driver/Tool Installation Display Screen

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

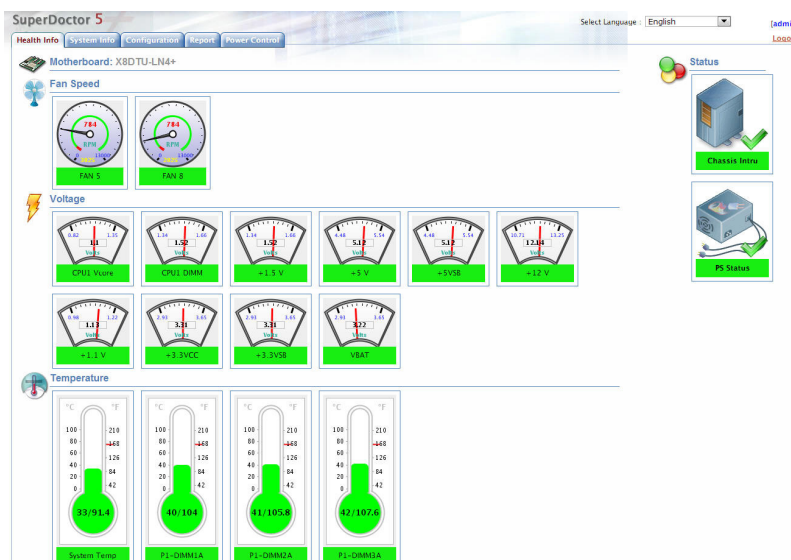
When making a storage driver diskette by booting into a driver DVD, please set the SATA Configuration to "Compatible Mode" and configure SATA as IDE in the BIOS Setup. After making the driver diskette, be sure to change the SATA settings back to your original settings.

## 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 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荐的功能相当的電池更換原有電池。請按制造商的說明處理廢舊電池。

##### 警告

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

##### Warnung

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

#### Attention

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

#### ¡Advertencia!

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

#### אזהרה!

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

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

#### 경고!

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

#### Waarschuwing

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



## Product Disposal



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

### 製品の廃棄

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

### 警告

本产品的废弃处理应根据所有国家的法律和规章进行。

### 警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

### Warnung

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

### ¡Advertencia!

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

### Attention

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

סילוק המוצר

אזהרה!

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

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

### 경고!

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

### Waarschuwing

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

## Appendix D

### UEFI BIOS Recovery

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

#### D.1 Overview

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

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

A UEFI BIOS flash chip consists of a recovery BIOS block and a main BIOS block (a main BIOS image). The recovery block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a healthy BIOS image if the original main BIOS image is corrupted. When the system power is 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/info/SMS\\_SUM.cfm](https://www.supermicro.com.tw/products/info/SMS_SUM.cfm)) to reflash the BIOS.

## D.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 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.

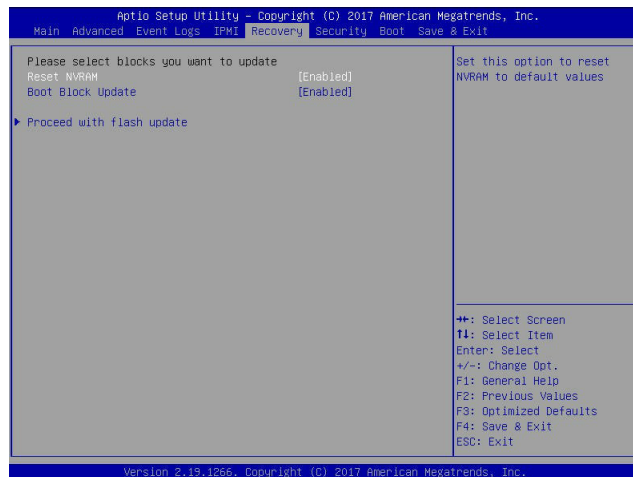
1. Using a different machine, copy the "Super.ROM" binary image file into the Root "\" directory of a USB device or a writable CD/DVD.




**Notes:** 1. 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. Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for your motherboard.

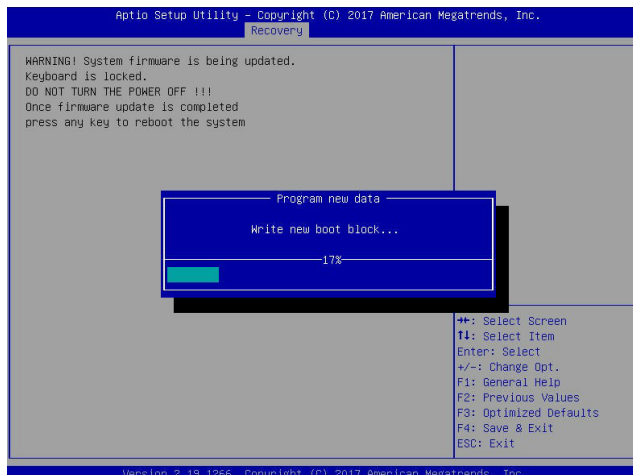


2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and reset the system when the following screen appears.

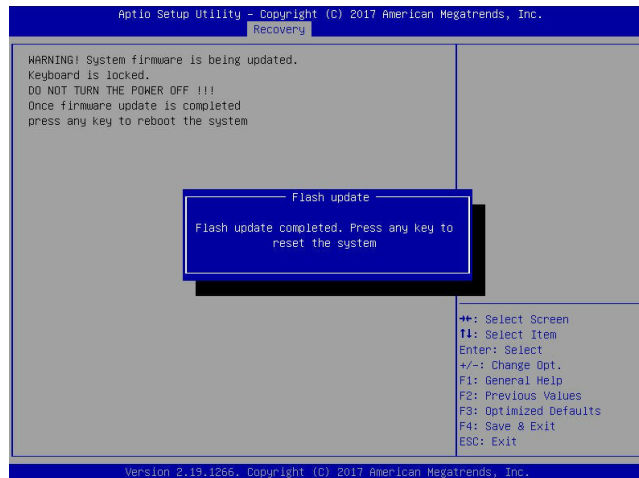


3. After locating the healthy BIOS binary image, the system will enter the BIOS Recovery menu as shown below.

 **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.

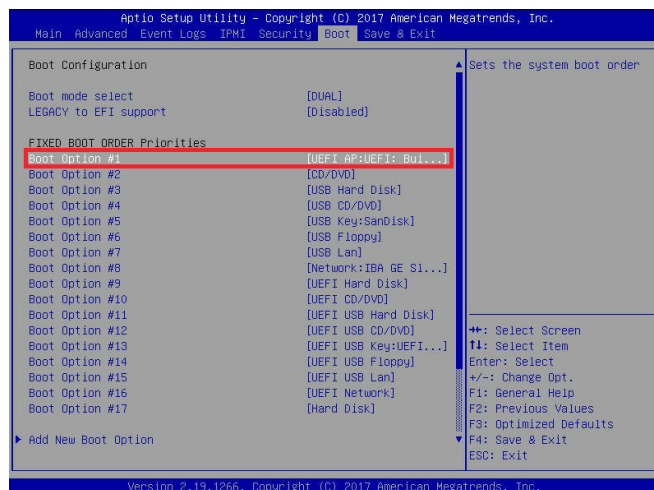


4. When the screen as shown above displays, use the arrow keys to select the item "Proceed with flash update" and press the <Enter> key. You will see the BIOS recovery progress as shown in the screen below.



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

5. After the BIOS recovery process is complete, press any key to reboot the system.
6. Using a different system, extract the BIOS package into a USB flash drive.
7. 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.




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

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping Table
FS0: Alias(s):HD0P0B0:1BLK1:
      PciRoot(0x0)/Pci(0x34,0x0)/USB(0x11,0x0)/H0(1,MBR,0x37901072,0x800,0x1
CA952)
      BLK0: Alias(s):
      PciRoot(0x0)/Pci(0x34,0x0)/USB(0x11,0x0)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd \FUD005
FS0:\FUD005> cd SHJPM2_03162017
FS0:\FUD005\SHJPM2_03162017> flash.nsh X110PU7.314_

```

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

```

Done.
[ Access Cmos Port Ex ]
<Read>
Index 0x51: 0x1B

Done.
*****
*
* Program BIOS and ME (including FDT) regions...
*
*****
| AMT Firmware Update Utility v6.09.01.1917 |
| 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)

```

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

```

Verifying MCB Block ..... done
- Update success for FIRM
- Update success for IEC
- Successful Update Recovery Loader to OPRx!!
- Successful Update MFSB!!
- Successful Update FPRP!!
- Successful Update MFS, IVB1 and IVB2!!
- Successful Update FLOG and UTDK!!
- ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect!
Moving FS0:\FUD005\SHJPM2_03162017\fatx64.efi -> FS0:\FUD005\SHJPM2_03162017\fatx64.efi
- [ok]
Moving FS0:\FUD005\SHJPM2_03162017\afuefi1x64.efi -> FS0:\FUD005\SHJPM2_03162017\afuefi1x64.efi
- [ok]
*****
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*
*****
Deleting 'FS0:\FUD005\SHJPM2_03162017\afuefi1x64.efi'
Delete successful.
FS0:\>

```

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