



C9X299-PG300F

USER'S MANUAL

Revision 1.0c

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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 C9X299-PG300F motherboard.

About This Motherboard

The Supermicro C9X299-PG300F motherboard supports a single Intel® Core™ i9 7900X/9900X/10900X series processor in an LGA2066 socket. This is a high-end, multi-GPU motherboard geared to meet advanced graphics demands. Advanced storage features are also offered: two U.2 connectors, two M.2 connectors, and NVMe. 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: The number of supported PCIe lanes is subject to change depending on the processor SKU.

Conventions Used in the Manual

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



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



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



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



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

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Table of Contents

Chapter 1 Introduction

1.1 Checklist	7
1.2 Processor and Chipset Overview	17
1.3 Special Features	17
1.4 System Health Monitoring	18
1.5 ACPI Features	18
1.6 Power Supply	19
1.7 Serial Port.....	19

Chapter 2 Installation

2.1 Static-Sensitive Devices	20
Precautions	20
Unpacking	20
2.2 Motherboard Installation	21
Tools Needed	21
Location of Mounting Holes	21
Installing the Motherboard.....	22
2.3 Installing an M.2 Device (optional)	23
2.4 Processor and Heatsink Installation.....	24
Installing a CPU	24
Installing a CPU Heatsink	28
Removing a Heatsink.....	29
2.5 Memory Support and Installation	30
Memory Support.....	30
DIMM Installation	30
DIMM Removal	30
Memory Population Guidelines	31
2.6 Rear I/O Ports	32
2.7 Front Control Panel	37
2.8 Connectors	42
Power Connections	42
Headers.....	44

2.9 Jumper Settings	52
How Jumpers Work.....	52
2.10 LED Indicators.....	58
Chapter 3 Troubleshooting	
3.1 Troubleshooting Procedures	60
3.2 Technical Support Procedures	64
3.3 Frequently Asked Questions	65
3.4 Battery Removal and Installation	67
3.5 Returning Merchandise for Service.....	68
Chapter 4 UEFI BIOS	
4.1 Introduction.....	68
4.2 System Information	69
4.3 EZ Mode.....	70
4.4 Overclocking.....	71
4.5 CPU.....	83
4.6 Memory.....	88
4.7 Advanced.....	89
4.8 IPMI	105
4.9 Boot.....	108
4.10 BIOS Update	110
Appendix A BIOS Codes	
Appendix B Software	
B.1 Microsoft Windows OS Installation	112
B.2 Driver Installation.....	114
B.3 SuperDoctor® 5.....	115
B.4 IPMI	116
B.5 Logging into the BMC (Baseboard Management Controller).....	116
Appendix C Standardized Warning Statements	
Appendix D UEFI BIOS Recovery	
D.1 Overview.....	117
D.2 Recovering the UEFI BIOS Image.....	117
D.3 Recovering the Main BIOS Block with a USB Device	118

Chapter 1

Introduction

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

Several important parts that are included with the motherboard are listed below. If anything listed is damaged or missing, please contact your retailer.

1.1 Checklist

Main Parts List		
Description	Part Number	Quantity
Supermicro Motherboard	MBD-C9X299-PG300F	1
SATA Cables	CBL-0044L	4
I/O Shield	MCP-260-00140-0N	1
Driver CD	N/A	1
Quick Reference Guide	MNL-2117-QRG	1

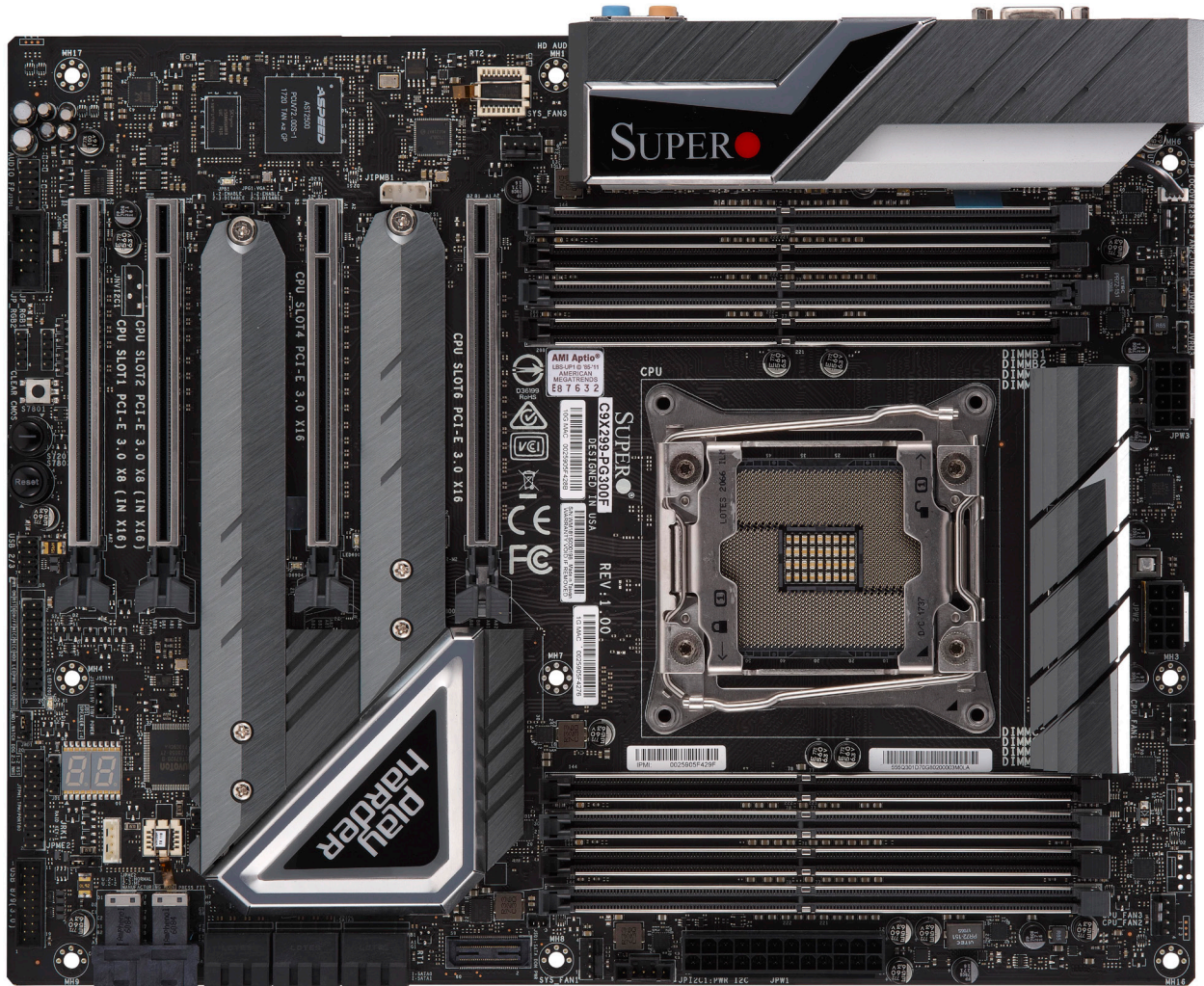
Important Links

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

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

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

Figure 1-1. C9X299-PG300F Motherboard Image




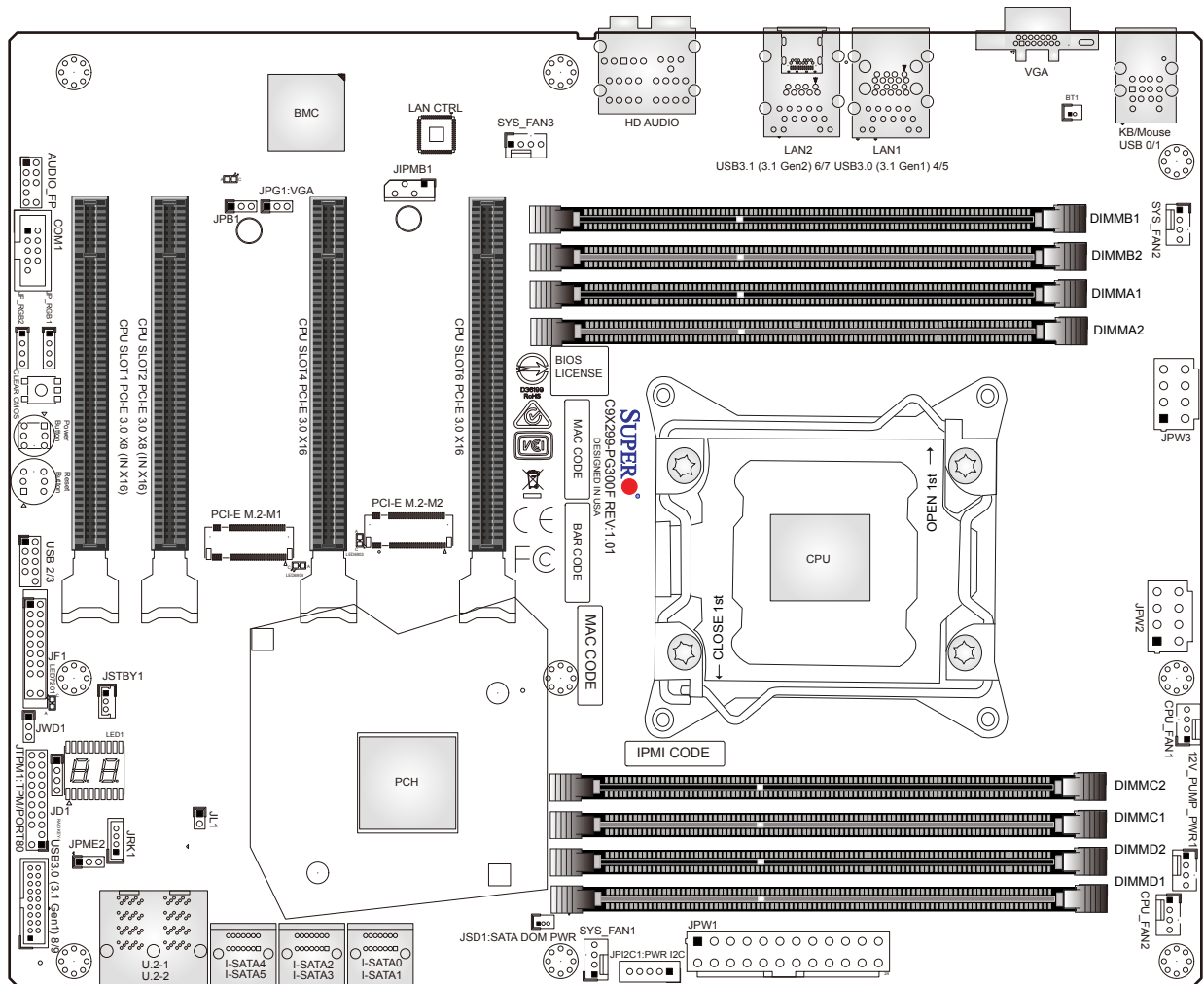

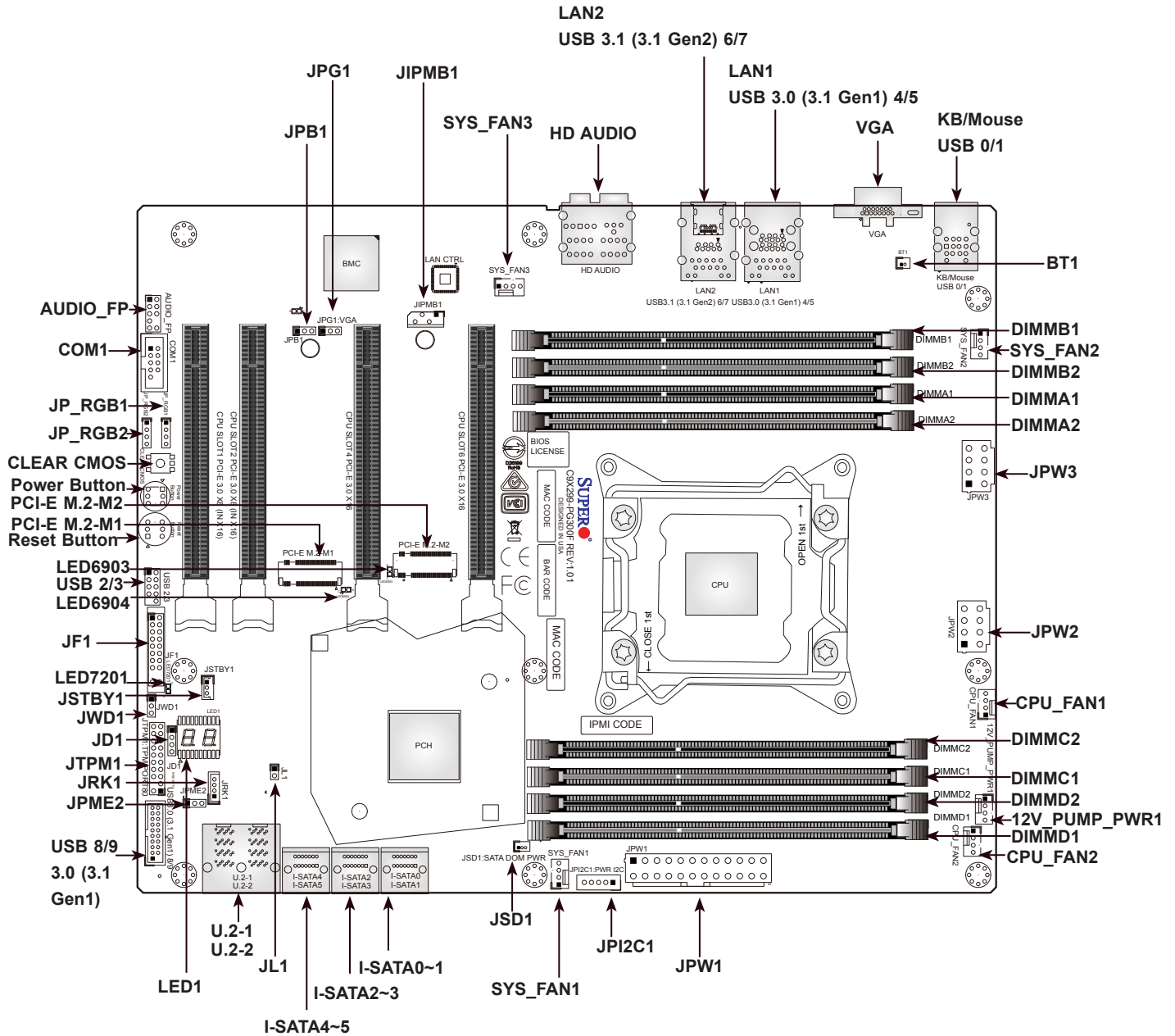
 **Note:** All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. C9X299-PG300F 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. Jumpers/LED indicators not indicated are used for testing only.
- " ■ " indicates the location of Pin 1.
- When LED7201 (Onboard Power LED indicator) is on, system power is on. Unplug the power cable before installing or removing any components.

Quick Reference Table

Jumper	Description	Default Setting
CLEAR CMOS	CMOS Clear Switch	Push Button Switch
JPB1	IPMI Function	Pins 1-2 (Enabled) Pins 2-3 (Disable)
JPG1	VGA Enable/Disable	Pins 1-2 (Enable)
JPME2	Intel Manufacturing Mode	Pins 1-2 (Normal)
JWD1	Watch Dog Function Enable	Pins 1-2 (RST)
POWER BUTTON	Internal Power Button	Push Button Switch
RESET BUTTON	Onboard System Reset Button	Push Button Switch
LED	Description	Status
LED1	Status Code LED	Digital Readout
LED6903	M.2 Connector 2 SSD Active LED	Activity: Green Blinking
LED6904	M.2 Connector 1 SSD Active LED	Activity: Green Blinking
LED7201	Onboard Standby PWR LED	Power On: Green On
Connector	Description	
12V_PUMP_PWR1	12V 4-pin power connector for CPU liquid cooling pump	
AUDIO_FP	Front Panel Audio Header	
BT1	Onboard Battery Header	
COM1	COM1 Header	
CPU_FAN1, CPU_FAN2	CPU Fan Headers	
CPU SLOT 1/2 PCI-E 3.0 x8 (IN x16)	PCIe x16 Slots*	
CPU SLOT 4/6 PCI-E 3.0 x16	PCIe x16 Slots*	
HD AUDIO	High Definition Audio Header	
I-SATA0~5	(Intel X299) Serial ATA (SATA 3.0) Ports 0~5 (6Gb/sec)	
JD1	Speaker Header (Pins 1-4: Speaker)	
JF1	Front Control Panel Header	
JIPMB1	4-pin External I2C Header (for an IPMI card)	
JL1	Chassis Intrusion Header	
JPI2C1	Power Supply SMBus I2C Header	
JP_RGB1, JP_RGB2	LED Light Bar Headers	
JPW1	24-pin ATX Main Power Connector (Required)	
JPW2, JPW3	+12V 8-pin CPU Power Connectors (Required)	
JRK1 (VROC)	Intel VROC RAID Key Header	
JSD1	SATA Disk-On-Module (DOM) Power Connector	
JSTBY1	Standby Power Header	



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



Connector	Description
JTPM1	Trusted Platform Module (TPM)/Port 80 Header
KB/MOUSE	PS/2 Keyboard/Mouse Port
LAN1, LAN2	LAN1: 10Gb LAN Port, LAN2: 1Gb LAN Port
PCI-E M.2-M1, PCI-E M.2-M2	PCIe M.2 Connectors 1 and 2 (Small form factor devices and other portable devices for high speed SSDs)
SYS_FAN1/2/3	System Fan Headers
U.2-1, U.2-2	U.2 Connector 1 and 2 for 2.5" NVME SSD Drives
USB 0/1	Back Panel USB 2.0 Ports
USB 2/3	Front Access USB 2.0 Header
USB 4/5	Back Panel USB 3.1 Gen1 Ports
USB 6/7	Back Panel USB 3.1 Gen2 Ports (USB6: Type A, USB7: Type C)
USB 8/9	Front Panel USB 3.1 Gen1 Header



Note: The supported lanes on the motherboard may vary depending on the processor you installed. Refer to the table below for details.

	PCIe SLOT1	PCIe SLOT2	PCIe SLOT4	PCIe SLOT6
CPU with 28 Lanes	x0 (default)	x4 (default) or x0	x8 (default)	x16 (default)
CPU with 44 Lanes	x8 (default) or x4	x8 (default) or x4	x8 (default) or x16	x16 (default)


Motherboard Features

Motherboard Features	
CPU	
<ul style="list-style-type: none"> The C9X299-PG300F motherboard supports a single Intel Core i9 7900X/9900X/10900X series processor in an LGA2066 socket. 	
Memory	
<ul style="list-style-type: none"> Supports up to 256GB of unbuffered Non-ECC DDR4 memory, with speeds of up to 2666MHz (2DPC) ~ 2933MHz (1DPC) <p> Note 1: To safely overclock your system, make sure to use an overclocked processor. Also, memory modules installed on the motherboard have an influence on the overclocking speed. Refer to Chapter 4 for overclocking settings in the BIOS.</p> <p>Note 2: 2933MHz is supported by Intel Core i9 10980XE/10940X/10920X/10900X series processors only.</p>	
DIMM Size	
<ul style="list-style-type: none"> 4GB, 8GB, 16GB, 32GB at 1.2V <p> Note 1: 32GB is supported by Intel Core i9 10980XE/10940X/10920X/10900x series processors only.</p> <p>Note 2: Memory speed support depends on the processor used in the system. For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard.</p>	
Chipset	
<ul style="list-style-type: none"> Intel PCH X299 	
Expansion Slots	
<ul style="list-style-type: none"> Four PCIe 3.0 x16 slots (Refer to the table of PCIe lanes for details) Two M.2 PCIe 3.0 x4 slots (2280 x2) Two U.2 slots 	
Network	
<ul style="list-style-type: none"> Intel I210AT Aquantia AQC 107 	
Audio	
<ul style="list-style-type: none"> Realtek ALC1220 - HD Audio 7.1 One Front Panel Audio Header One S/PDIF Out on the rear side of the chassis 	
I/O Devices	
<ul style="list-style-type: none"> Serial (COM) Header 	<ul style="list-style-type: none"> One front accessible serial header (COM1)
<ul style="list-style-type: none"> SATA 3.0 	<ul style="list-style-type: none"> Six I-SATA 3.0 ports (I-SATA0 ~ 5)
<ul style="list-style-type: none"> RAID PCH 	<ul style="list-style-type: none"> RAID 0, 1, 5, and 10
Peripheral Devices	
<ul style="list-style-type: none"> One USB 3.1 Gen2 Type C port on the I/O back panel One USB 3.1 Gen2 Type A port on the I/O back panel Two USB 3.1 Gen1 ports on the I/O back panel Two front accessible USB 3.1 Gen1 connections via one header Two USB 2.0 ports on the I/O back panel Two front accessible USB 2.0 connections via one header 	

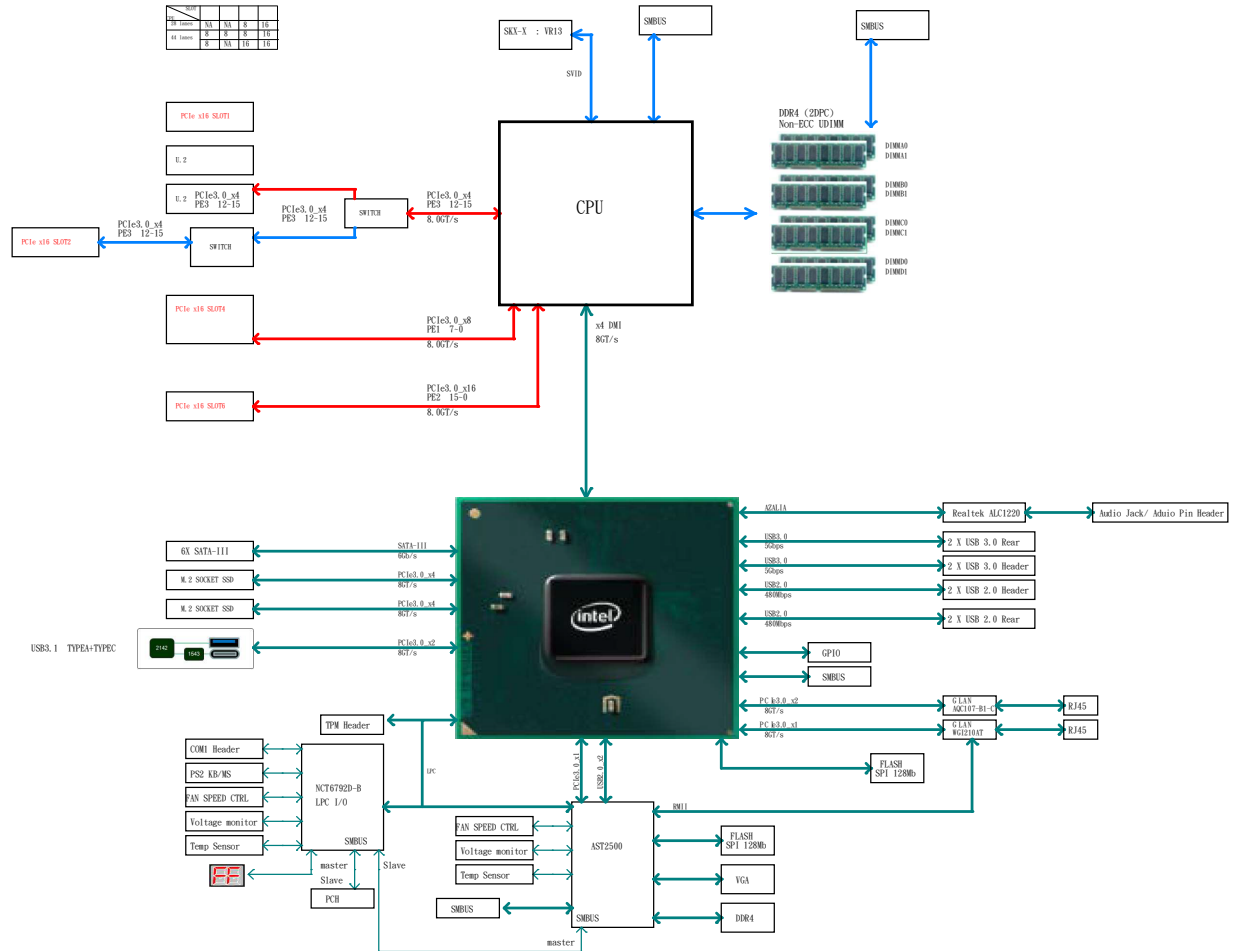


Note: The table above is continued on the next page.

Motherboard Features
BIOS
<ul style="list-style-type: none"> • 128Mb AMI BIOS® SPI Flash BIOS • PCIe 3.0, ACPI 3.0, BIOS rescue hot-key, Overclock support
Power Management
<ul style="list-style-type: none"> • ACPI power management • Power button override mechanism • Power-on mode for AC power recovery
System Health Monitoring
<ul style="list-style-type: none"> • Onboard voltage monitors for CPU cores, +3.3V, +5V, +/-12V, +3.3V Stby, +5V Stby, VBAT, Memory, PCH temperature, System temperature, and Memory temperature • CPU 8 phase-switching voltage regulator • CPU/System overheat control • CPU Thermal Trip support
Fan Control
<ul style="list-style-type: none"> • Five proprietary 4-pin fan headers • Fan status monitoring via IPMI connections • Dual cooling zone • Multi-speed fan control via onboard BMC • Pulse Width Modulation (PWM) fan control
System Management
<ul style="list-style-type: none"> • PECCI (Platform Environment Control Interface) 3.1 support • SuperDoctor® 5, Watch Dog, NMI • Chassis Intrusion header and detection • Power supply monitoring
LED Indicators
<ul style="list-style-type: none"> • CPU/System overheat LED • Power LED • Fan failed LED • HDD activity LED • LAN activity LED
Other
<ul style="list-style-type: none"> • RoHS
Dimensions
<ul style="list-style-type: none"> • ATX form factor (12.0" x 9.6") (304.80 mm x 243.84 mm)

 **Note:** 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.

**Figure 1-3.
Chipset Block Diagram (28 Lanes)**



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

The C9X299-PG300F supports a single Intel Core X-Series processor in the LGA2066 socket. With the Intel X299 PCH, the C9X299-PG300F is a high-end, multi-GPU motherboard that offers reliability and stability. It offers the latest high-performance features such as NVMe, M.2/U.2 storage interfaces, and DDR4 memory with speeds of up to 4000MHz (OC).

The C9X299-PG300F supports the following features:

- ACPI Power Management Logic Support Rev. 4.0a
- Intel Turbo Boost Technology
- Configurable TDP (cTDP) and Lower-Power Mode
- Adaptive Thermal Management/Monitoring
- PCIe 3.0, SATA 3.0, NVMe, U.2 and M.2 connectors
- System Management Bus (SMBus) Specification Version 2.0
- Intel Trusted Execution Technology (Intel TXT)
- Intel Rapid Storage Technology
- Intel Virtualization Technology for Directed I/O (Intel VT-d)

1.3 Special Features

This section describes the health monitoring features of the C9X299-PG300F 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

The motherboard has an onboard Baseboard Management Controller (BMC) chip that supports system health monitoring.

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 the BIOS.

Fan Status Monitor with Firmware Control

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

Environmental Temperature Control

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



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

System Resource Alert

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

1.5 ACPI Features

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 CD-ROMs, network cards, hard disk drives, and printers.

In addition to enabling operating system-directed power management, ACPI also provides a generic system event mechanism for Plug and Play, and an operating system-independent interface for configuration control. ACPI leverages the Plug and Play BIOS data structures, while providing a processor architecture-independent implementation that is compatible with Windows® 7, Windows 8, and Windows 2012 Operating Systems.

1.6 Power Supply

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

The C9X299-PG300F motherboard accommodates a 24-pin ATX power supply. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, a 12V 8-pin power connection is also required to ensure adequate power supply to the system.



Warning: To prevent damage to the power supply or the motherboard, use power supplies that contain 24-pin and 8-pin power connectors. Connect the power supplies to the 24-pin (JPW1) and the 8-pin power connectors (JPW2/JPW3) on the motherboard. Failure in doing so may void the manufacturer warranty on your power supply and motherboard.

It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant. For more information, please refer to the website at <http://www.ssiforum.org/>. Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to shield the computer from noises. It is recommended that you also install a power surge protector to help avoid problems caused by power surges.

1.7 Serial Port

The C9X299-PG300F motherboard supports one serial communication connection. COM1 header can be used for input/output. The UART provides legacy speeds with a baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support high-speed serial communication devices.

Chapter 2

Installation

2.1 Static-Sensitive Devices

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

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the 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 your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the motherboard.
- Use only the correct type of onboard CMOS battery. Do not install the onboard battery upside down to avoid possible explosion.

Unpacking

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

2.2 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)

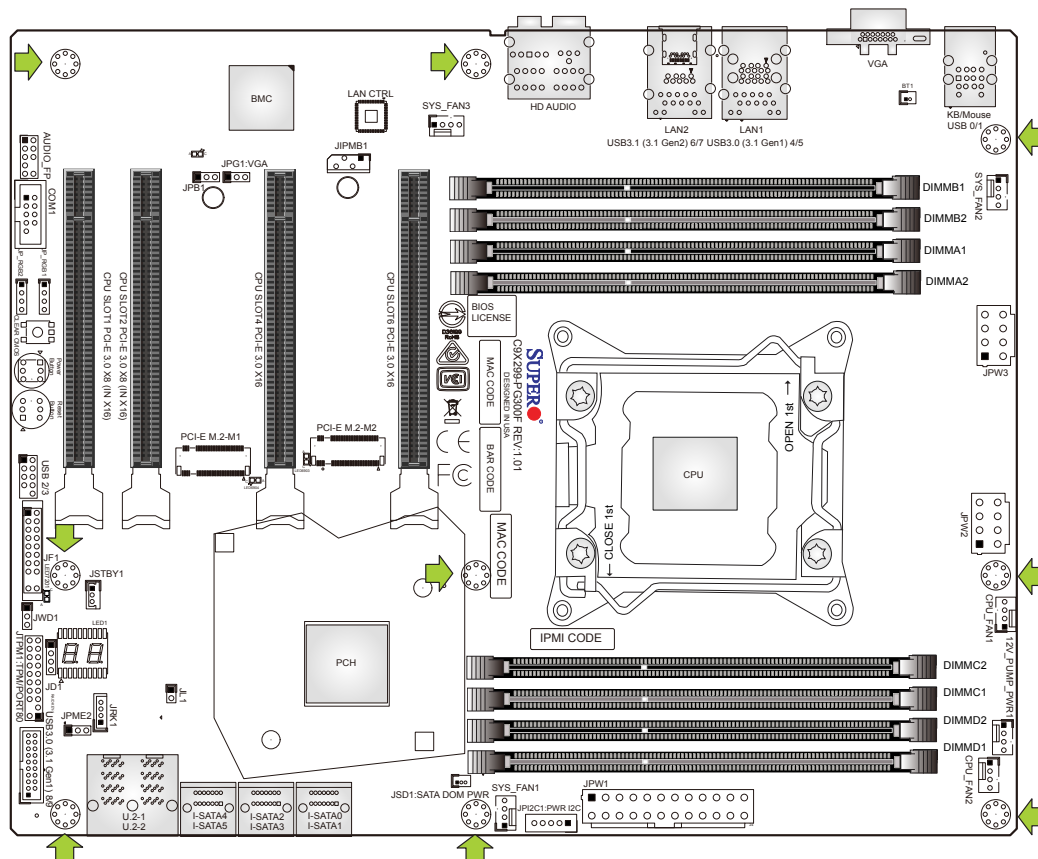


Phillips Screws (9)



Standoffs (9)
Only if Needed

Tools Needed



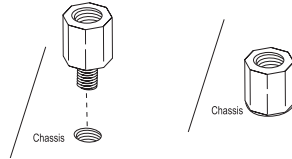
Location of Mounting Holes



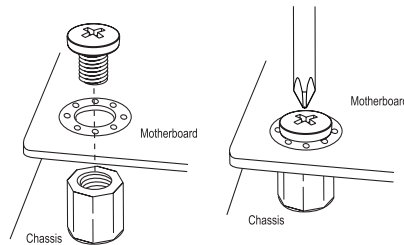
Notes: 1. To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation.
2. Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when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

Installing the Motherboard


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



2. Locate the matching mounting holes on the chassis. Align the mounting holes on the motherboard against the mounting holes on the chassis.



3. Install standoffs in the chassis as needed.
4. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.
5. 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.
6. Repeat Step 5 to insert remaining screws into all mounting holes.
7. Make sure that the motherboard is securely placed in the chassis.

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

2.3 Installing an M.2 Device (*optional*)

Two M.2 (M-key) connectors are supported by the C9X299-PG300F. M.2 devices are used for solid state storage and internal expansion. Follow the steps below in order to install an M.2 device.



Note: A screwdriver will be required.

1. Locate and remove the retaining screws on the M.2 heatsink.
2. With the heatsink removed, locate the appropriate standoff for the M.2 card's length.
3. Remove the associated standoff screw and set it aside.
4. Carefully plug the M.2 device into the M.2 connector and lower the semi-circle notched end onto the standoff.
5. Replace the standoff screw and tighten it to secure the M.2 device into place. **Do not overtighten** so as to avoid damaging the M.2 device.
6. Replace the M.2 heatsink and the retaining screws. Tighten the screws to secure the heatsink into place.

2.4 Processor and Heatsink Installation

Warning: When handling the processor package, avoid placing direct pressure on the label area of the fan.

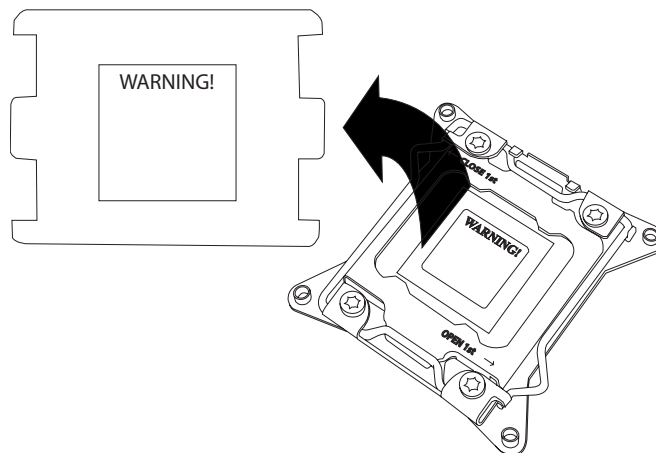


Important:

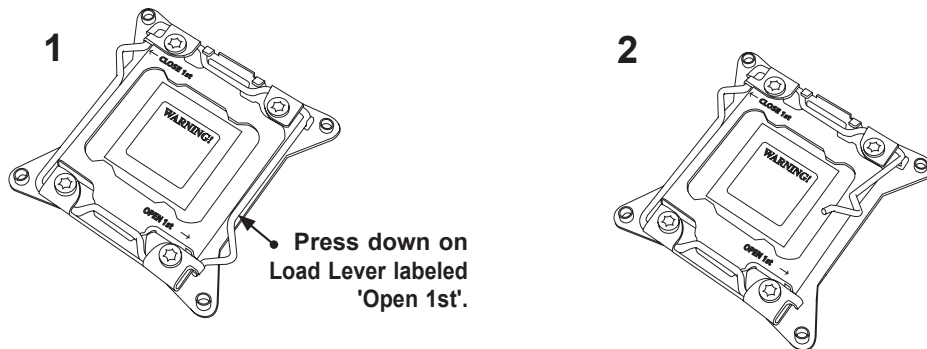
- Always connect the power cord last, and always remove it before adding, removing, or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the motherboard into the chassis before you install the CPU heatsink.
- When receiving a motherboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Supermicro website for updates on CPU support.

Installing a CPU

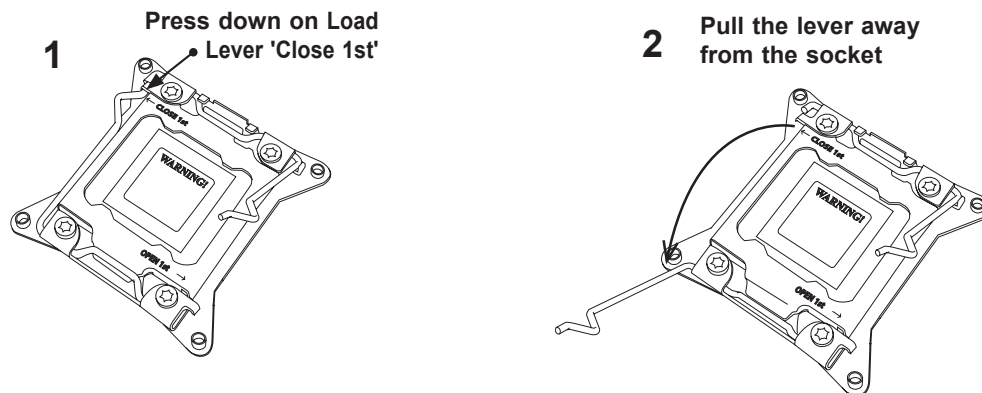
1. Remove the WARNING plastic cap from the socket.



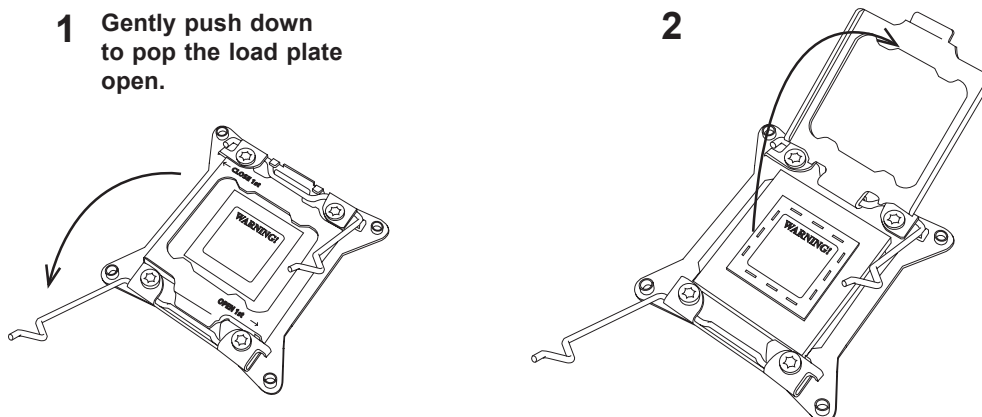
2. There are two load levers on the LGA2066 socket. To open the socket cover, press and release the "Unlock 1st" lever, marked by an unlock symbol.



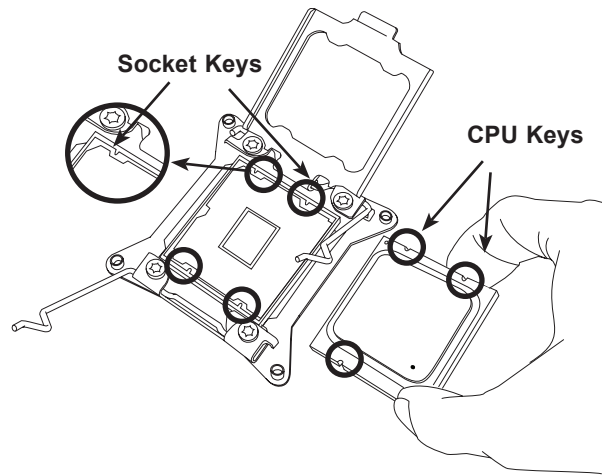
3. Press the "Lock 1st" lever, marked by a lock symbol, to release the load plate that covers the CPU socket from its locking position.



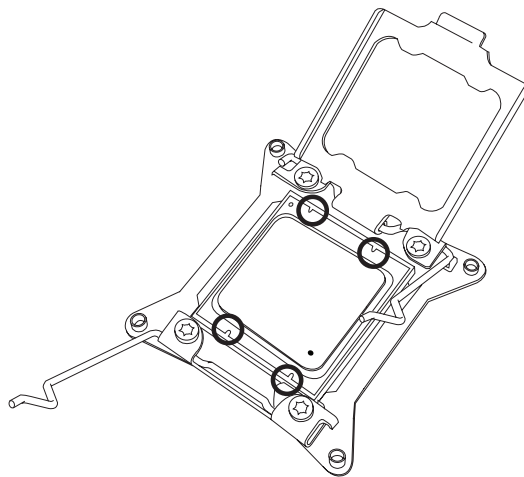
4. With the "Lock 1st" lever fully retracted, gently push down on the "Unlock 1st" lever to open the load plate. Lift the load plate to open it completely.



5. Use your thumb and index finger to hold the CPU on its edges. Align the CPU keys, which have semi-circle cutouts, against the socket keys.

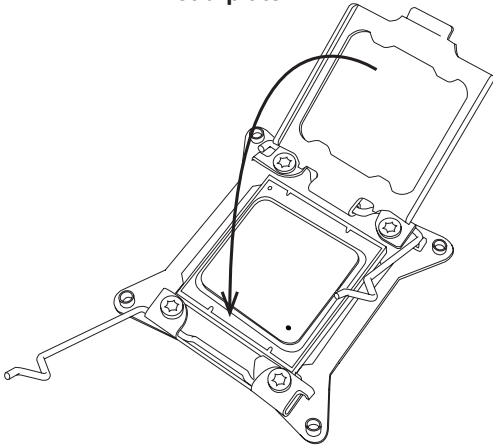


6. Once they are aligned, carefully lower the CPU straight down into the socket. To avoid damaging the CPU or socket, do not drop the CPU onto the socket, move it horizontally or vertically, or rub it against the socket pins.
7. With the CPU inside the socket, inspect the four corners of the CPU to make sure that it is properly installed.

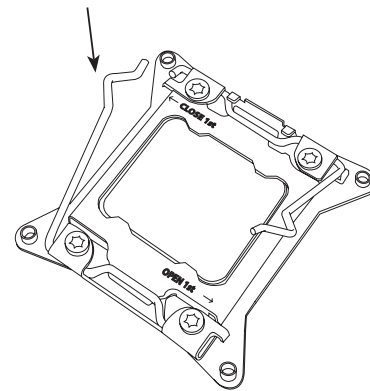


8. Close the load plate with the CPU inside the socket. Lock the "Lock 1st" lever first, then lock the "Unlock 1st" lever second. Gently push the load levers down to the lever locks.

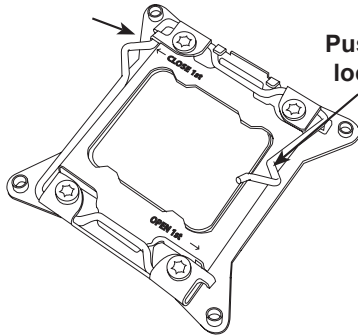
- 1** Gently close the load plate.



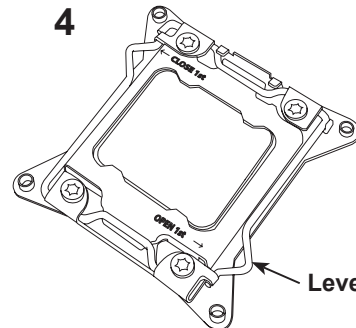
- 2** Push down and lock 'Close 1st' lever.



- 3** Lever Lock
Push down and lock 'Open 1st' lever




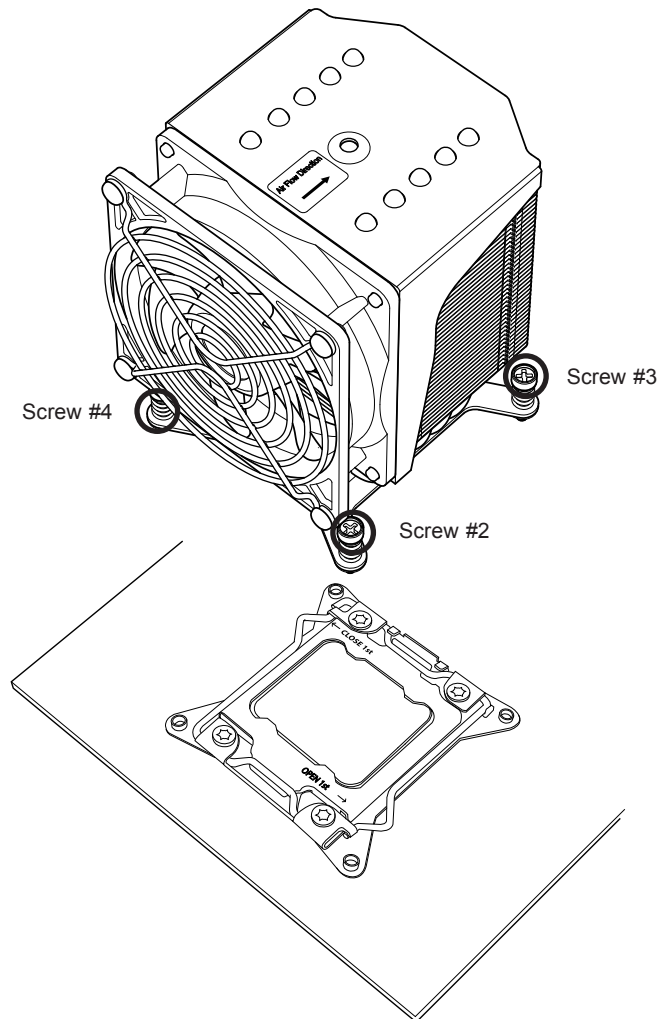
- 4** Lever Lock




Installing a CPU Heatsink

1. Apply the proper amount of thermal grease to the heatsink.
2. Place the heatsink on top of the CPU so that the four mounting holes on the heatsink are aligned with those on the retention mechanism. Tighten the screws in the following order:

 **Note:** Screw #1 is not shown in the illustration. It is found opposite of Screw #2.




 **Note:** Graphic drawings included in this manual are for reference only. They might look different from the components installed in your system.

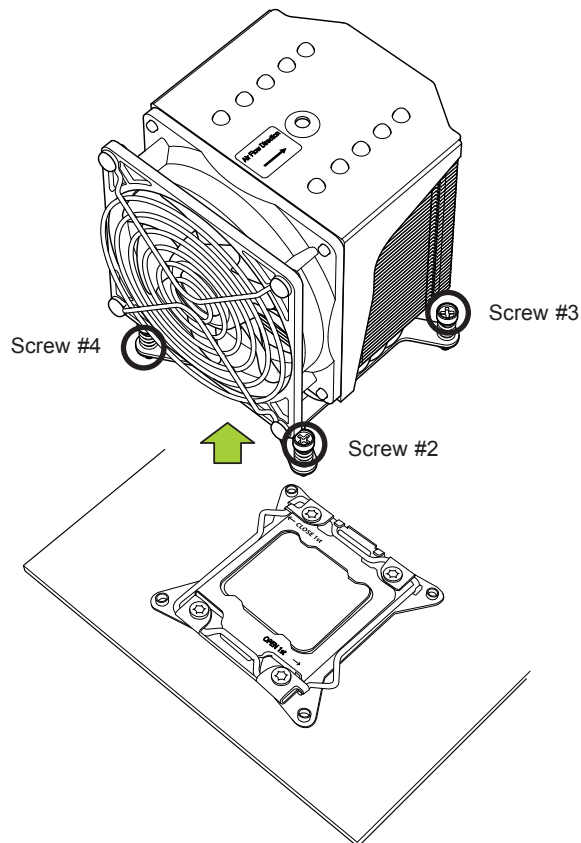
Removing a Heatsink

Warning: We do not recommend that the CPU or the heatsink be removed. However, if you do need to remove the heatsink, please follow the instructions below to uninstall the heatsink to avoid damaging the CPU or other components.

1. Unplug the power cord from the power supply.
2. Loosen the screws in the order below.

 **Note:** Screw #1 is not shown in the illustration. It is found opposite of Screw #2.

3. Gently wiggle the heatsink to loosen it. Do not use excessive force when wiggling the heatsink.
4. Once the heatsink is loosened, remove it from the motherboard.



2.5 Memory Support and Installation



Note: Check the Supermicro website for recommended memory modules.



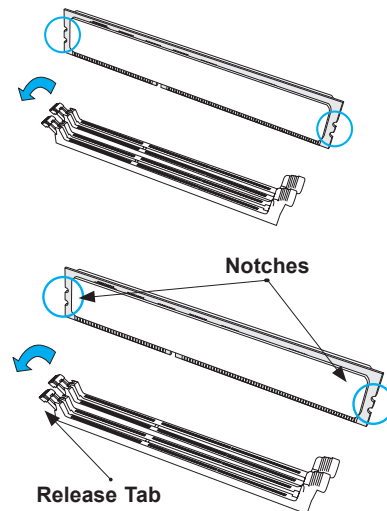
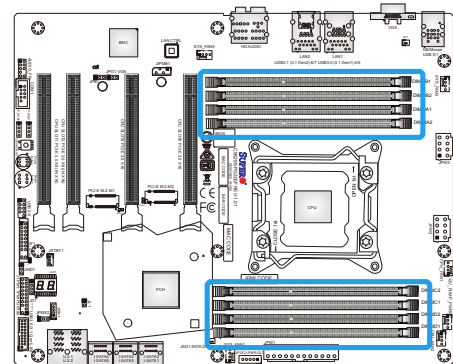
Important: Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Memory Support

The C9X299-PG300F motherboard supports up to 256GB of Non-ECC DDR4 memory with speeds of up to 2666MHz (2DPC) ~2933MHz (1DPC) in eight memory slots. Populating these DIMM slots with memory modules of the same type and size will result in interleaved memory, which will improve memory performance.

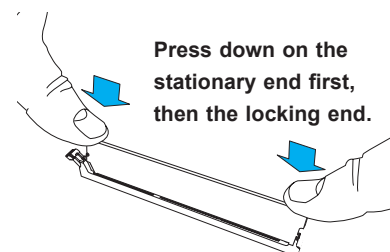
DIMM Installation

1. Insert the desired number of DIMMs into the memory slots, starting with DIMMA1, DIMMB1, DIMMC1, DIMMD1, then DIMMA2, DIMMB2, DIMMC2, DIMMD2. For best performance, please use the memory modules of the same type and speed.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Use two thumbs together to press the notches on both ends of the module straight down into the slot until the module snaps into place.
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



DIMM Removal

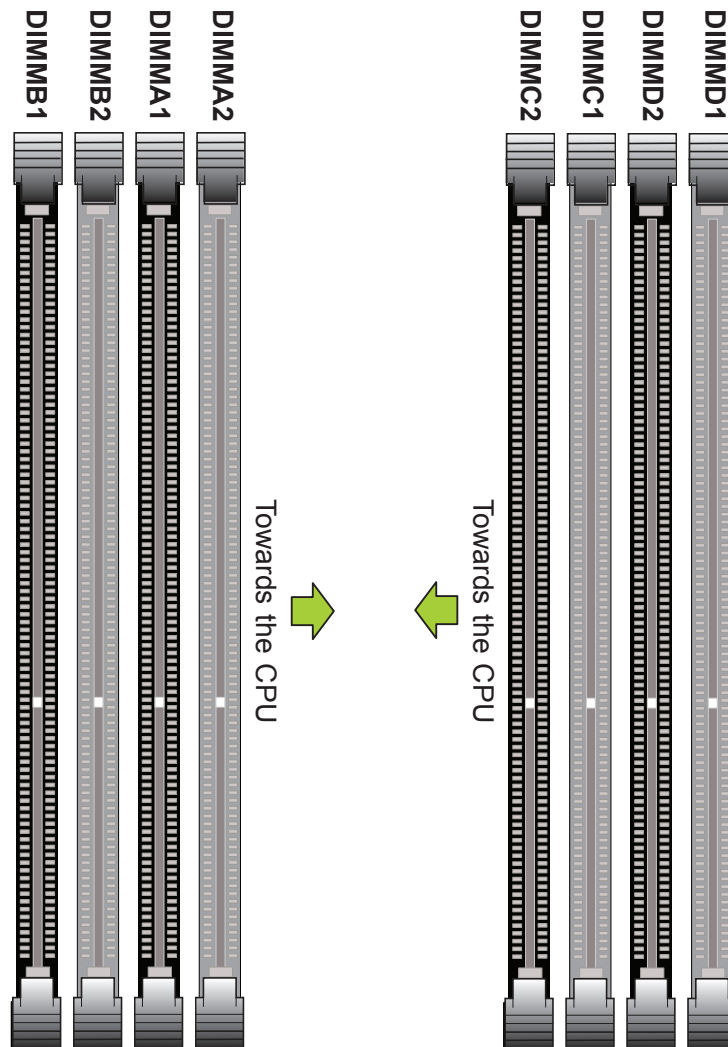
Press both release tabs on the ends of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.



Memory Population Guidelines

When installing memory modules, always use DDR4 DIMM modules of the same size, type, and speed. Mixed DIMM speeds can be installed. However, all DIMMs will run at the speed of the slowest DIMM.

Depending on which CPU is installed, DIMMs should be installed in the following configurations for optimized performance:



Core™ X-Series (6-core or above)	○ ○ ○ ○	One	○ ● ○ ○
	○ ○ ○ ○	Two	○ ● ○ ●
	● ○ ● ○	Four	○ ● ○ ●
	● ○ ● ○	Six	● ● ● ●
	● ● ● ●	Eight	● ● ● ●

2.6 Rear I/O Ports

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

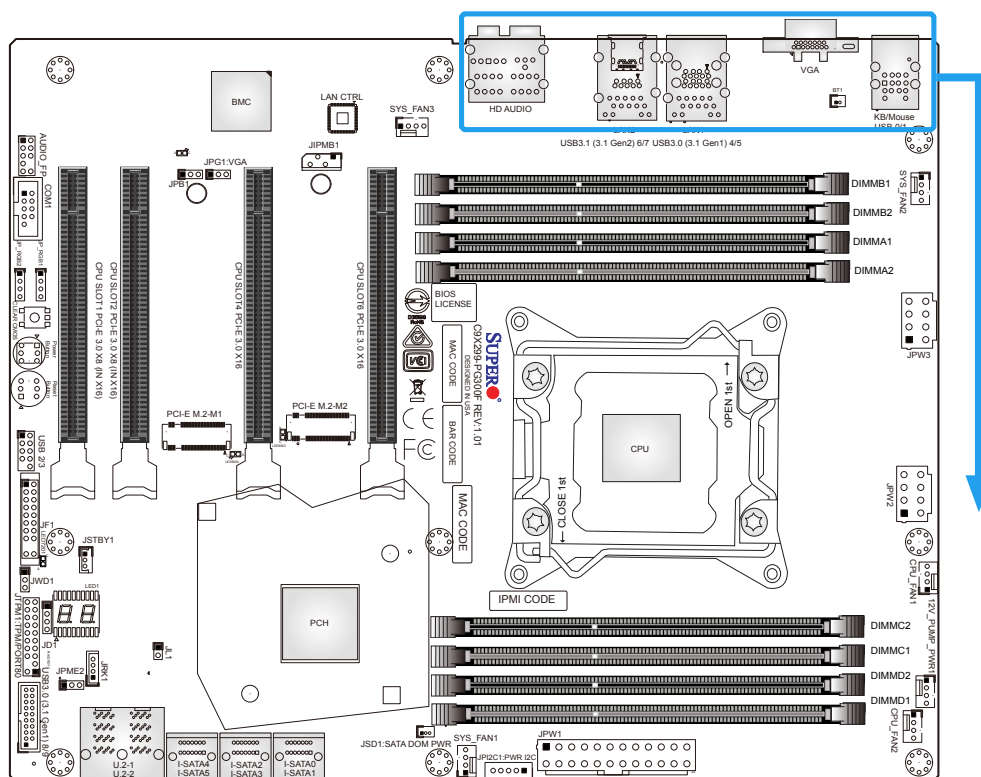
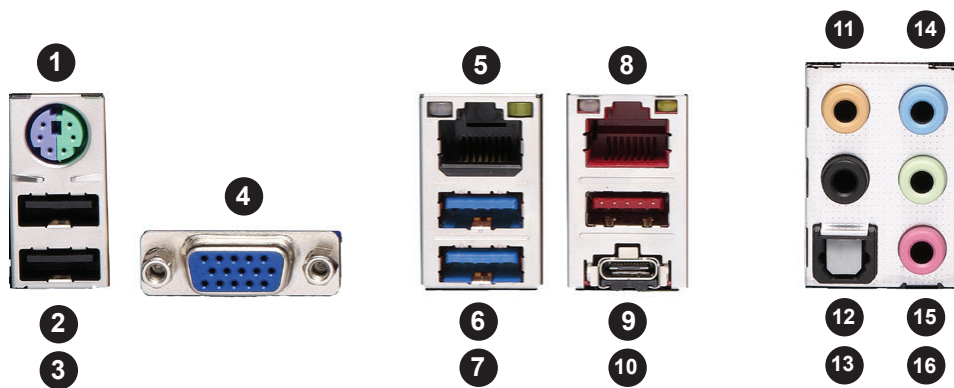


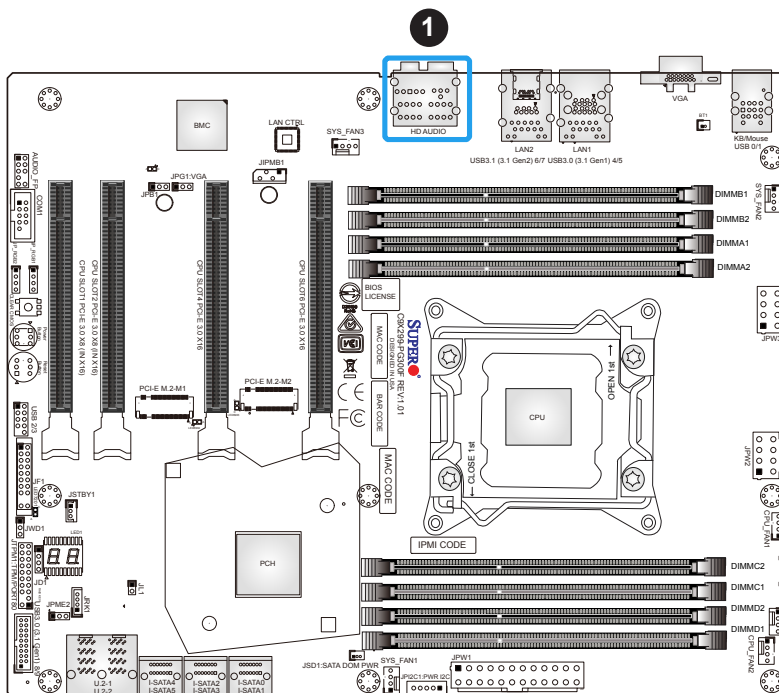
Figure 2-1. I/O Port Locations and Definitions



Rear I/O Ports							
#	Description	#	Description	#	Description	#	Description
1.	PS2 KB/Mouse	5.	LAN1	9.	USB 3.1 Gen2 Port 6	13.	SPDIF Out
2.	USB 2.0 Port 0	6.	USB 3.1 Gen1 Port 4	10.	USB 3.1 Gen2 Port 7	14.	Line In
3.	USB 2.0 Port 1	7.	USB 3.1 Gen1 Port 5	11.	CEN/LFE Out	15.	Line Out
4.	VGA Connector	8.	LAN2	12.	Surround Out	16.	Mic In

High Definition Audio (back panel ports)

This motherboard features a 7.1+2 Channel High Definition Audio (HDA) codec that provides 10 DAC channels. The HD Audio connections simultaneously supports multiple-streaming 7.1 sound playback with two channels of independent stereo output through the front panel stereo out, and front, rear, center and subwoofer speaker connections. Use the advanced software included in the CD with your motherboard to enable this function.



1. HD AUDIO

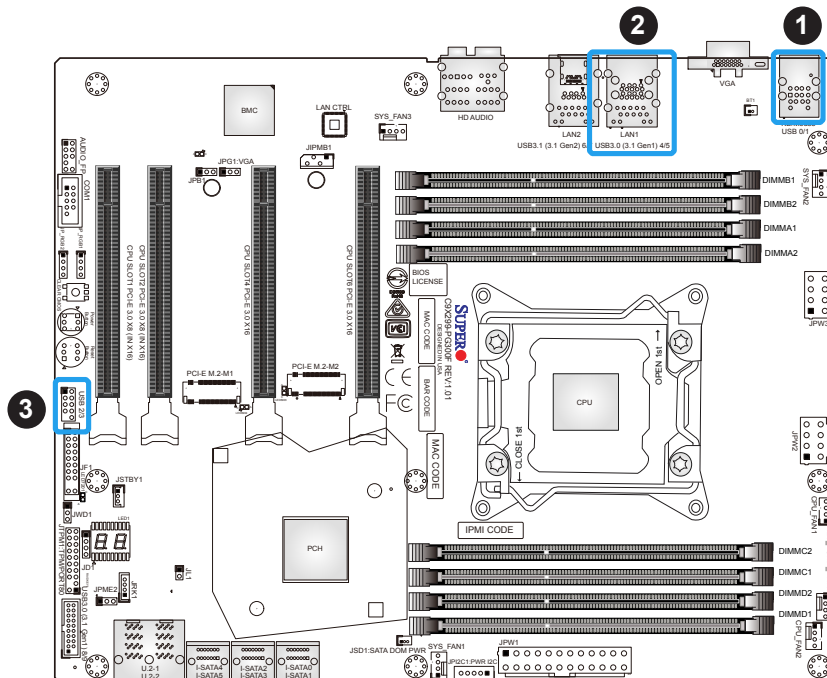
Universal Serial Bus (USB) Ports

There are two USB 2.0 ports (USB0/1), two USB 3.1 Gen1 ports (USB4/5), and two USB 3.1 Gen2 ports (USB6/7) located on the I/O back panel. The motherboard also has one front access USB 2.0 header (USB2/3). The USB8/9 header is USB 3.1 Gen1. The onboard headers can be used to provide chassis USB access with a cable (not included).

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

Front Panel USB 2/3 (USB 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 4/5 (USB 3.1 Gen1) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	10	Power
2	D-	11	USB_N
3	D+	12	USB_P
4	GND	13	GND
5	Stda_SSRX-	14	USB3_RN
6	Stda_SSRX+	15	USB3_RP
7	GND	16	GND
8	Stda_SSTX-	17	USB3_TN
9	Stda_SSTX+	18	USB3_TP

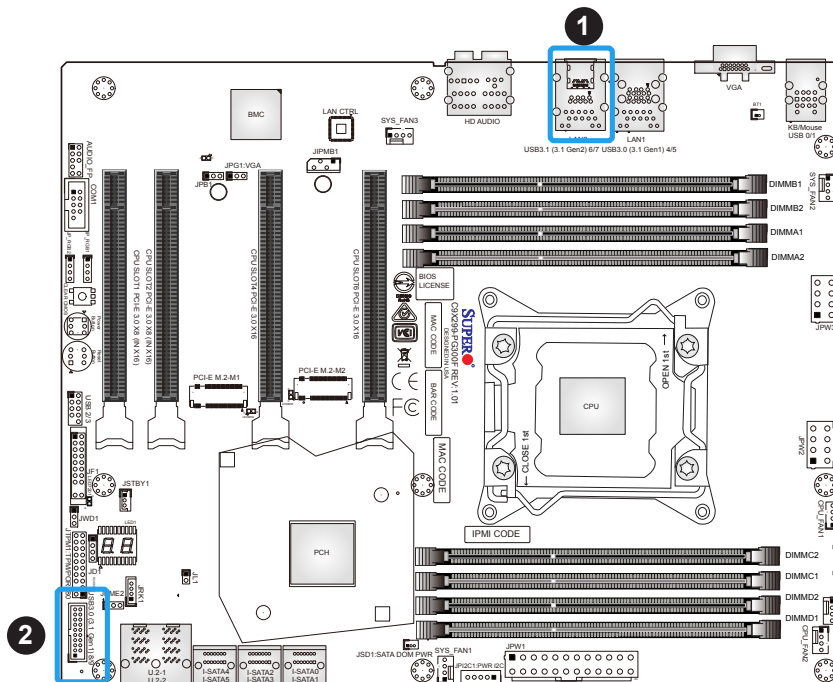


1. USB 0/1
2. USB 4/5
3. USB 2/3

Universal Serial Bus (USB) Ports (Continued)

Back Panel USB 6/7 (USB 3.1 Gen2) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	19	Power
2	Stda_SSRX-	18	USB3_RN
3	Stda_SSRX+	17	USB3_RP
4	GND	16	GND
5	Stda_SSTX-	15	USB3_TN
6	Stda_SSTX+	14	USB3_TP
7	GND	13	GND
8	D-	12	USB3_N
9	D+	11	USB3_P
10		x	

Front Panel USB 8/9 (USB 3.1 Gen1) Pin Definitions			
Pin#	Definition	Pin#	Definition
1	VBUS	11	D+
2	StdA_SSRX-	12	D-
3	StdA_SSRX+	13	GND_DRAIN
4	GND	14	StdB_SSTX+
5	StdA_SSTX-	15	StdB_SSTX-
6	StdA_SSTX+	16	Ground
7	GND_DRAIN	17	StdB_SSRX+
8	D-	18	StdB_SSRX-
9	D+	19	VBUS
10	NC		

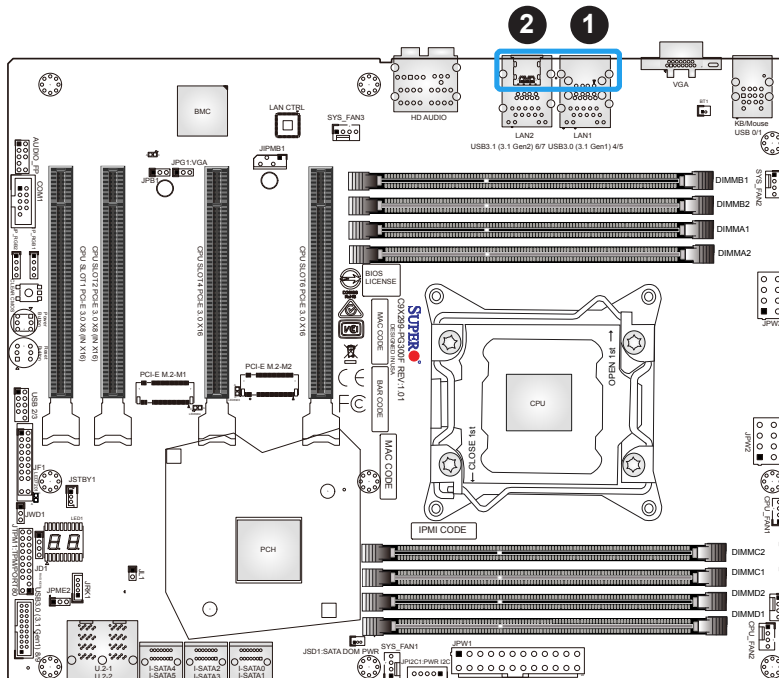


1. USB 6/7
2. USB 8/9

LAN Ports

The motherboard has one 10 Gigabit Ethernet port (LAN1) and one 1 Gigabit Ethernet port (LAN2) on the I/O back panel. These ports accept RJ45 cables. Please refer to Section 2.10 for LAN LED information.

LAN Port Pin Definitions			
Pin#	Definition	Pin#	Definition
1	TX_D1+	5	BI_D3-
2	TX_D1-	6	RX_D2-
3	RX_D2+	7	BI_D4+
4	BI_D3+	8	BI_D4-



1. LAN1
2. LAN2

2.7 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.

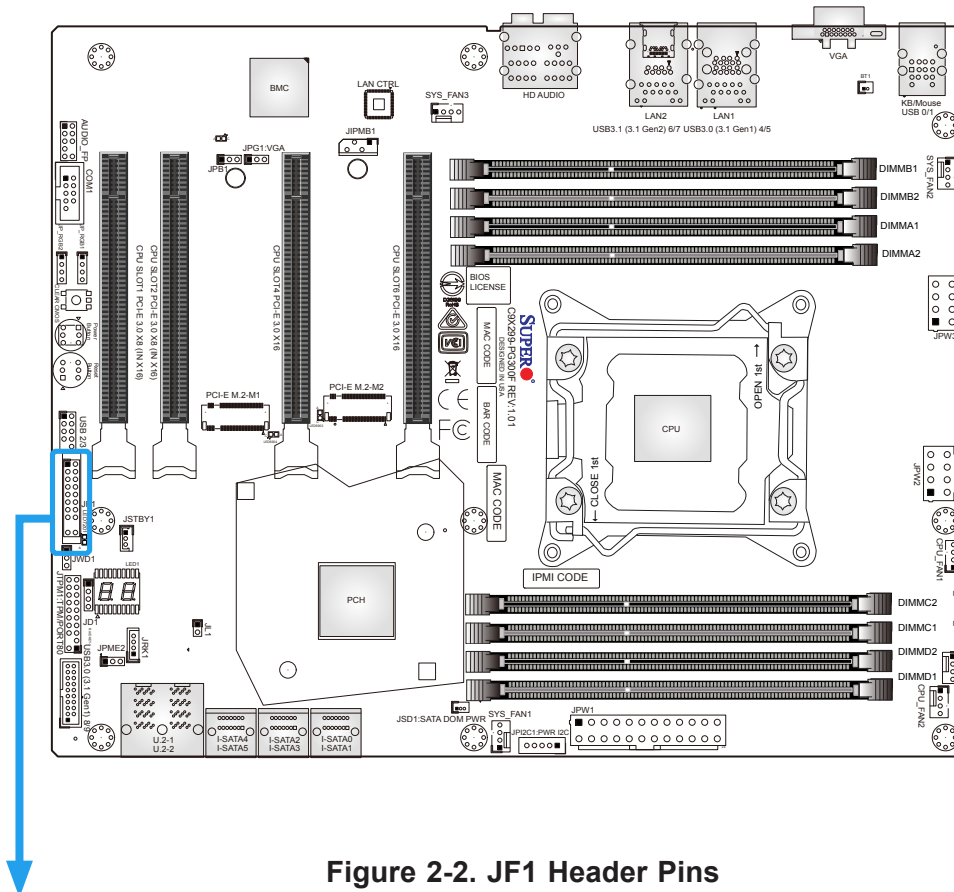


Figure 2-2. JF1 Header Pins

	1	2	
Power Button	PWR	Ground	
Reset Button	Reset	Ground	
	Vcc		Power Fail LED
	Vcc		OH/Fan Fail LED
	Vcc		NIC2 LED
	Vcc		NIC1 LED
	Vcc		HDD LED
	Vcc		Power LED
	X		X
	NMI	Ground	
	19	20	

Power Button

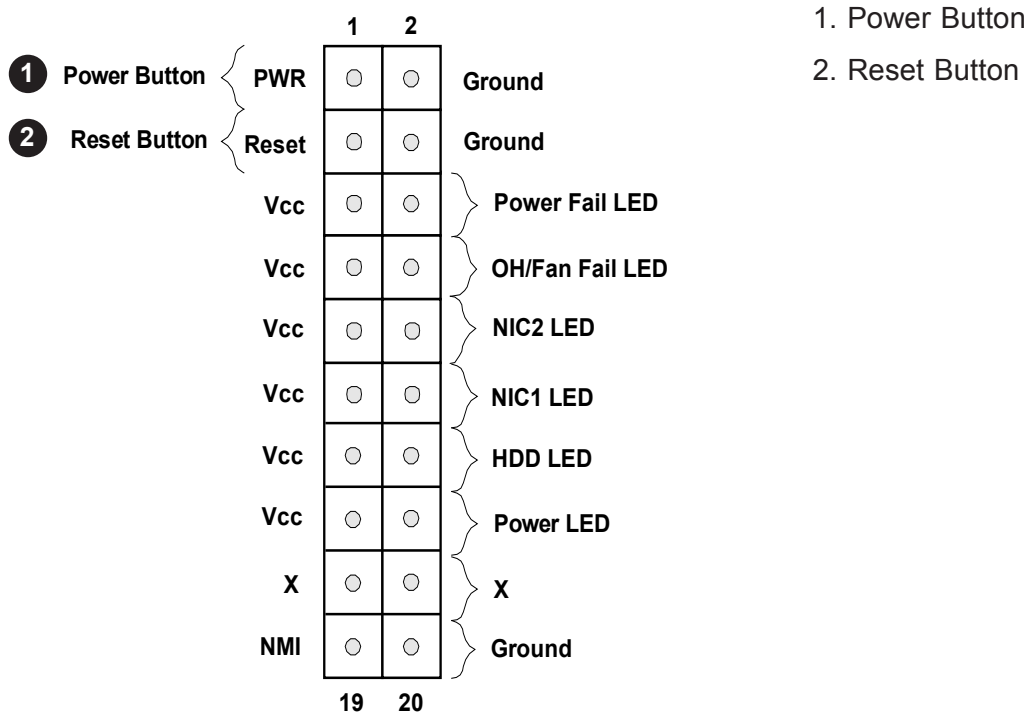
The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press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

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

Reset Button

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

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



Overheat (OH)/Fan Fail 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 and fan failure. Refer to the tables below for pin definitions.

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

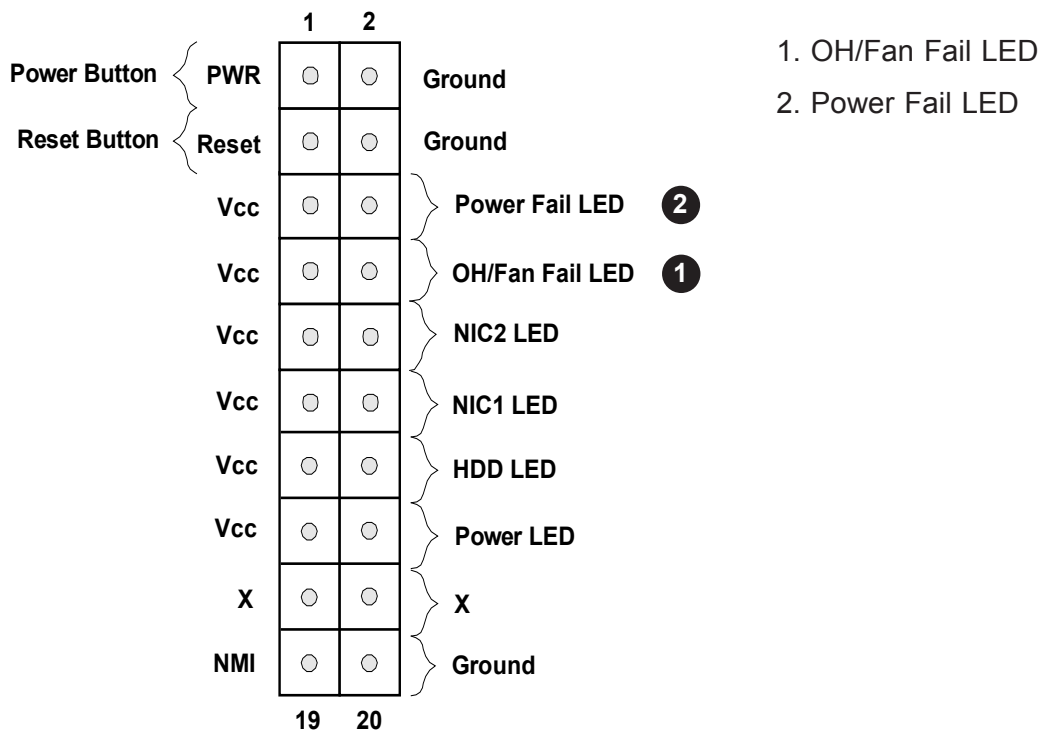
OH/Fan Fail LED Pin Definitions (JF1)	
Pin#	Definition
7	Blue LED
8	OH/Fan Fail LED

Power Fail LED

Connect an LED cable to the Power Fail connection to provide a warning that a power failure has occurred. Refer to the tables below for pin definitions.

Power Fail LED Pin Definitions (JF1)	
Pin#	Definition
5	Blue LED
6	OH/Fan Fail LED

Power Fail LED Status	
Pin#	Definition
Off	Normal
Flashing	Power Fail



NIC1/NIC2 (LAN1/LAN2) LED

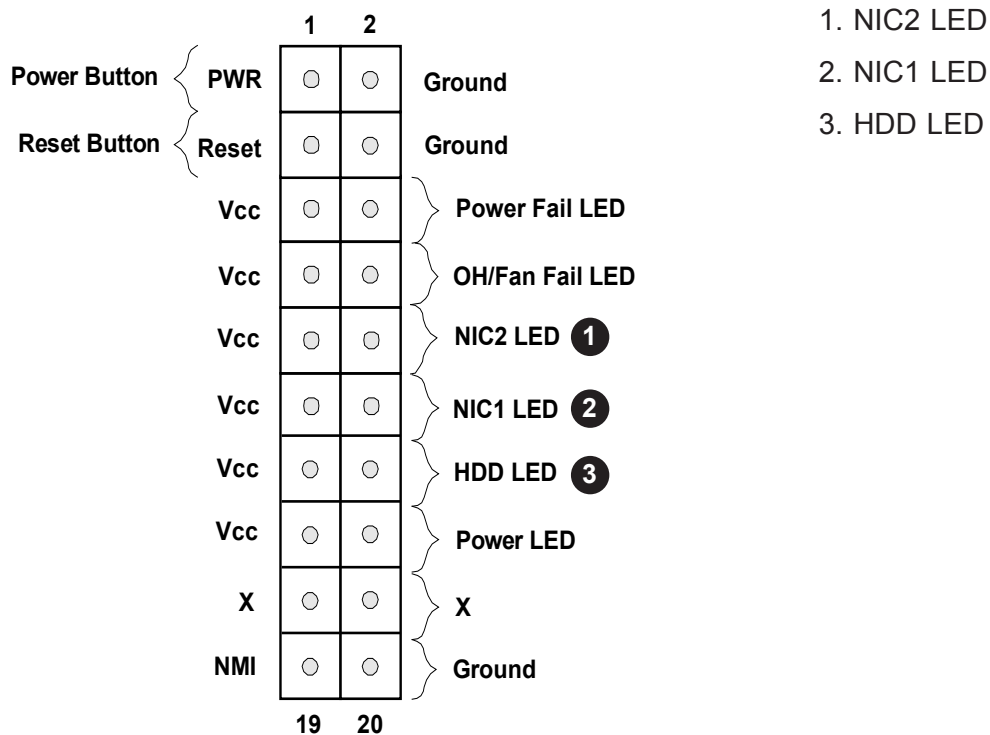
The NIC (Network Interface Controller) LED connection for LAN1 port is located on pins 11 and 12 of JF1, and the LED connection for LAN2 port is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

LAN1/LAN2 LED Pin Definitions (JF1)	
Pin#	Definition
9	Pull up to +3.3 Stby
10	NIC2 Activity LED
11	Pull up to +3.3 Stby
12	NIC1 Activity LED

HDD LED

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

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	3.3V Stby
14	HDD Active



Power LED

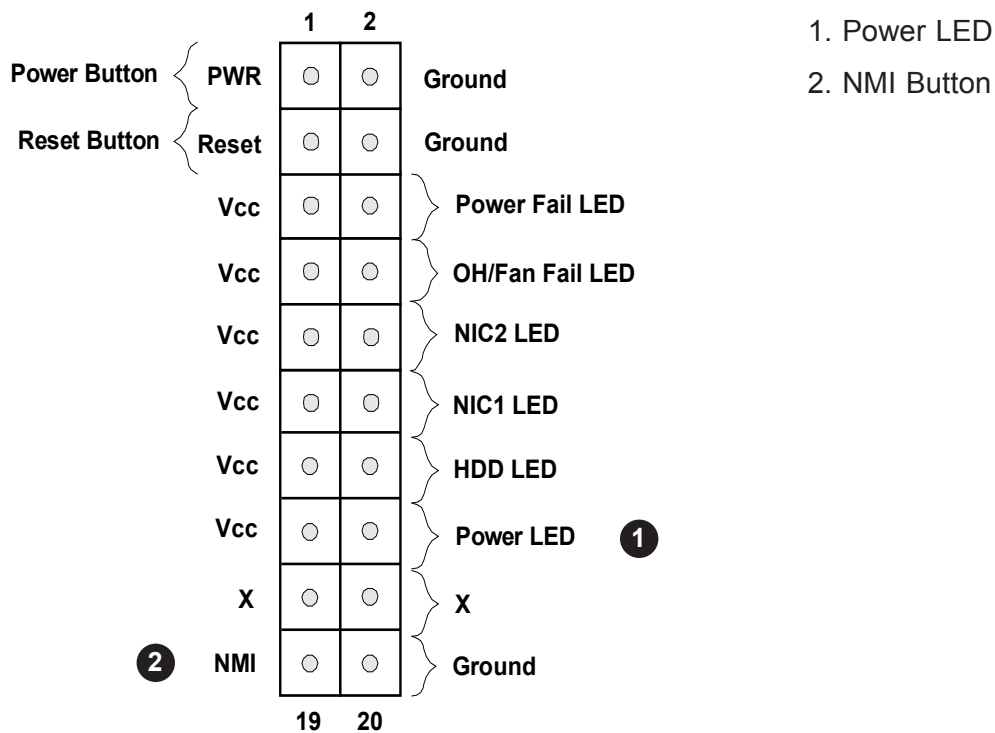
The Power LED connection is located on pins 15 and 16 of JF1. Refer to the table below for pin definitions.

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

NMI Button

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

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



2.8 Connectors

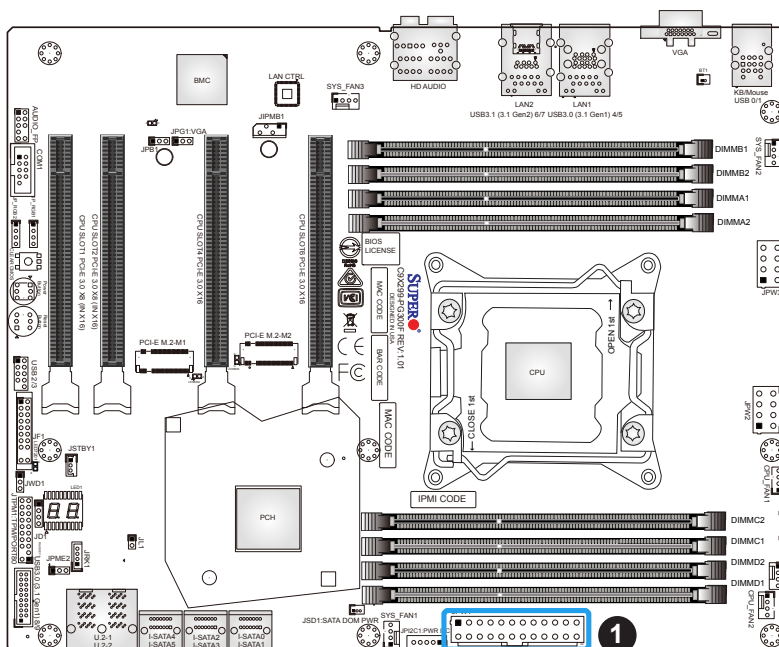
Power Connections

Main ATX Power Supply Connector

The primary power supply connector (JPW1) meets the ATX SSI EPS 12V specification. You must also connect the 8-pin (JPW2/JPW3) processor power connectors to your power supply.

ATX Power 24-pin Connector Pin Definitions			
Pin#	Definition	Pin#	Definition
13	+3.3V	1	+3.3V
14	-12V	2	+3.3V
15	Ground	3	Ground
16	PS_ON	4	+5V
17	Ground	5	Ground
18	Ground	6	+5V
19	Ground	7	Ground
20	Res (NC)	8	PWR_OK
21	+5V	9	5VSB
22	+5V	10	+12V
23	+5V	11	+12V
24	Ground	12	+3.3V

Required Connection



1. 24-Pin ATX Main PWR (Required)

Secondary Power Connectors

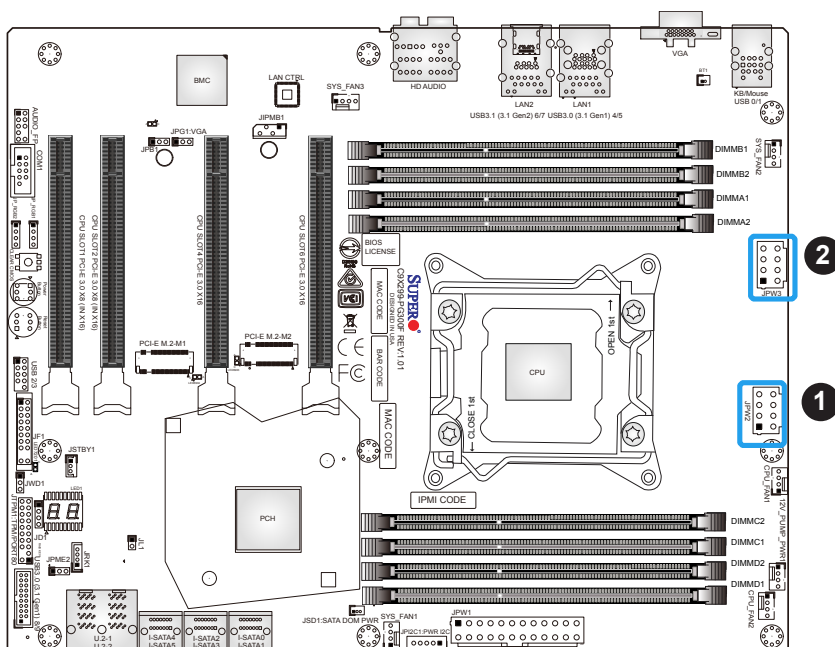
JPW2 and JPW3 must also be connected to the power supply. These connectors are used to power the processor.

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

Required Connection



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



1. JPW2 (Required)
2. JPW3 (Required)

Headers

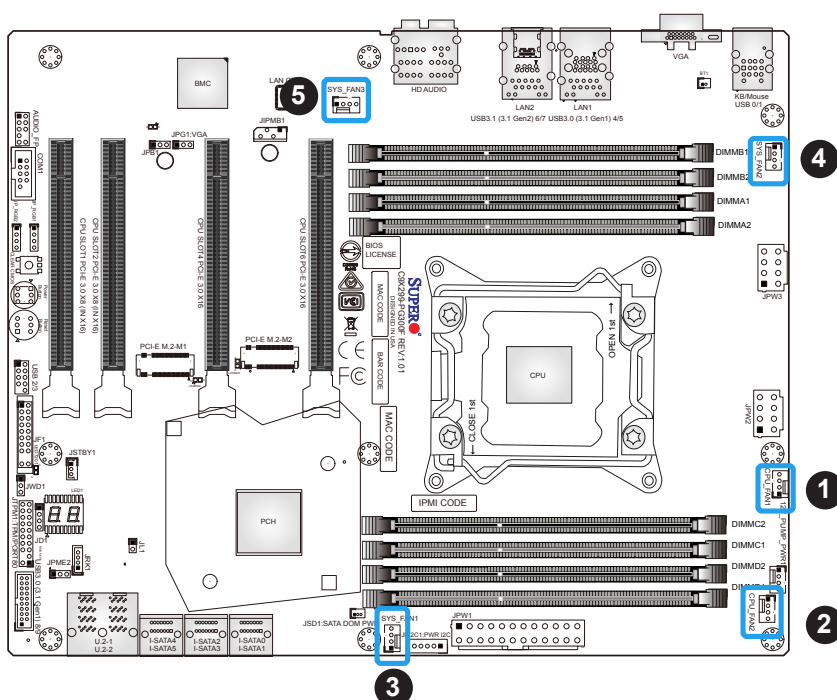
Fan Headers

The C9X299-PG300F has five fan headers (CPU_FAN1/2, SYS_FAN1/2/3). All of these 4-pin fan headers are backwards-compatible with the traditional 3-pin fan headers. However, fan speed control is available for 4-pin fan headers only by Thermal Management. Refer to the table below for pin definitions.

Fan Header Pin Definitions	
Pin#	Definition
1	Ground (Black)
2	2.5A/+12V (Red)
3	Tachometer
4	PWM_Control

Dual Cooling Zones

The C9X299-PG300F supports Dual Cooling Zones, which can be controlled via IPMI. The first zone (PWM1) refers to the ambient temperature of the CPU and DIMM slots, and controls CPU_FAN1/2 and SYS_FAN1/2. The second zone (PWM2) refers to the ambient temperature of PCH and the add-on card area, and controls SYS_FAN3.



1. CPU_FAN1
2. CPU_FAN2
3. SYS_FAN1
4. SYS_FAN2
5. SYS_FAN3

Power SMB (I2C) Header

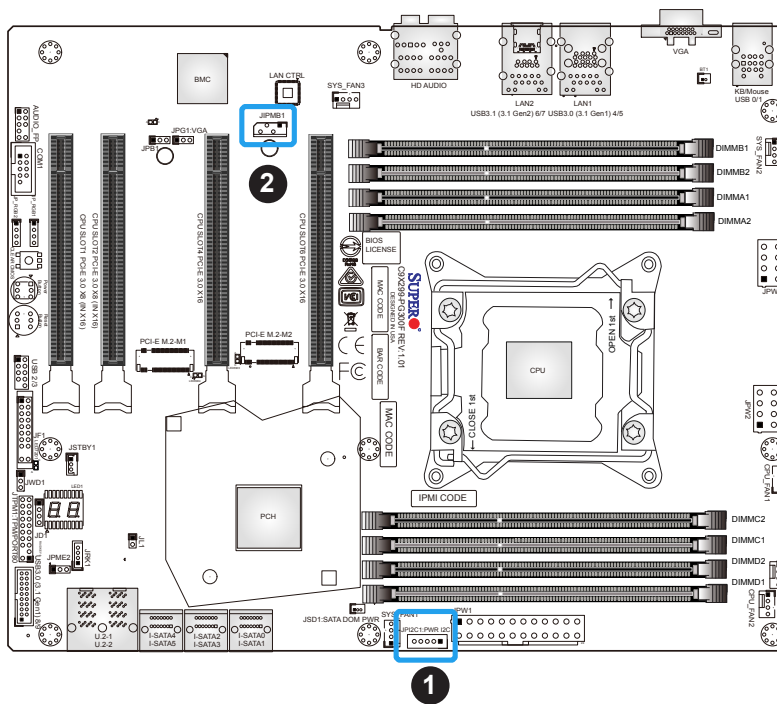
The Power System Management Bus (I2C) connector (JPI2C1) monitors the power supplies, fans, and system temperatures. Refer to the table below for pin definitions.

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

4-pin External BMC I2C Header

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

External I2C Header Pin Definitions	
Pin#	Definition
1	Data
2	Ground
3	Clock
4	NC



1. JPI2C1
2. JIPMB1

Pump Power Header

The C9X299-PG300F has one +12V header for optional CPU liquid cooling systems. When using a liquid cooling system, attach the pump power cable to the 12V_PUMP_PWR1 header.

COM Header

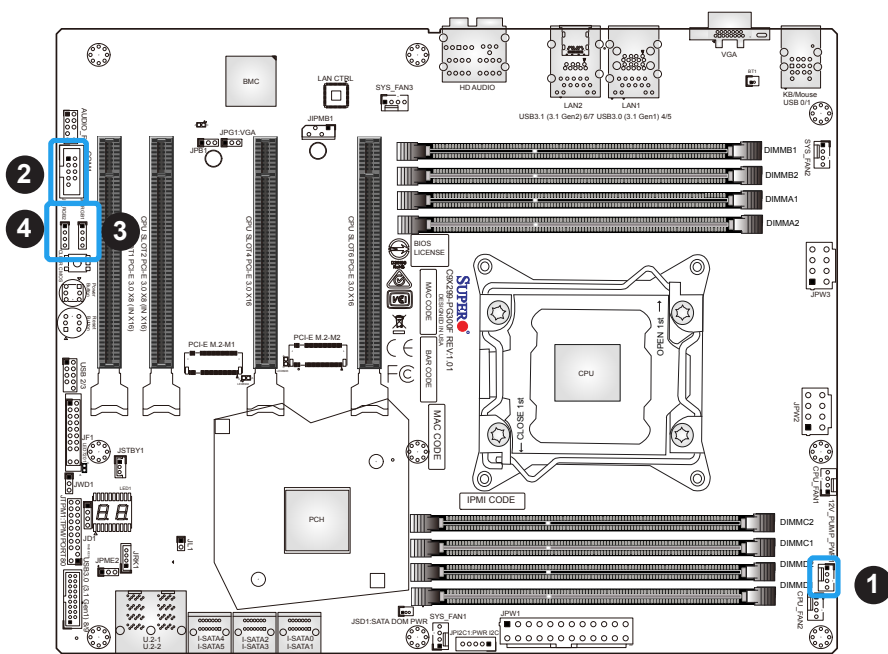
One COM connection (COM1) is located on the motherboard. Refer to the table below for pin definitions.

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

RGB LED Strip

The JP_RGB1 and JP_RGB2 headers provide RGB LED strip support. To install an LED strip, align the arrow on the LED strip connector to 4-pin RGB header (+12V, G,R,B). This will allow you to control the RGB LED strips with the motherboard's software and enhance the interior look of your case.

RGB LED Strip Header Pin Definitions	
Pin#	Definition
1	12V
2	G
3	R
4	B



1. 12V_PUMP_PWR1
2. COM Header
3. JP_RGB1
4. JP_RGB2

Standby Power Header

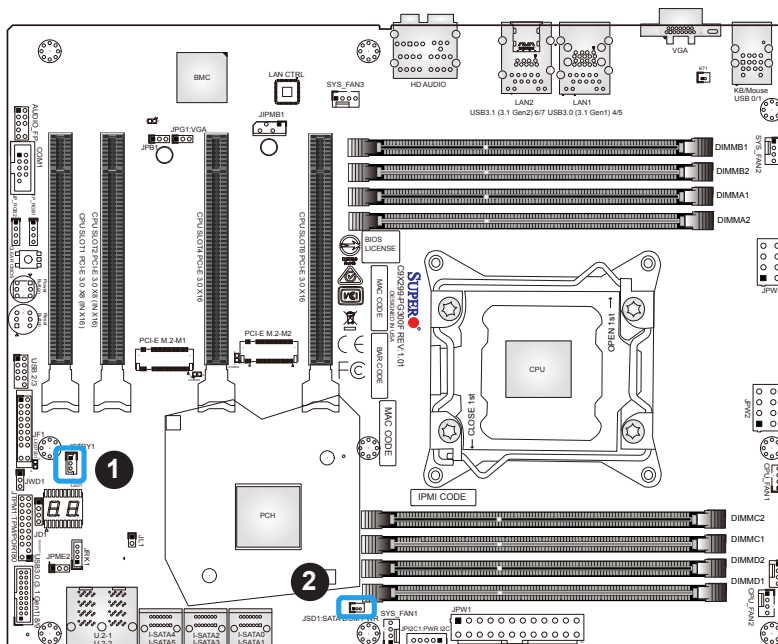
The +5V Standby Power header is located at JSTBY1 on the motherboard. You must have a card with a Standby Power connector and a cable to use this feature. Refer to the table below for pin definitions.

Standby Power Header Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	NC

Disk-On-Module Power Connector

One power connector for a SATA DOM (Disk-On-Module) device is located at JSD1. Connect the appropriate cable here to provide power support for your Serial Link DOM device.

DOM Power Connector Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground

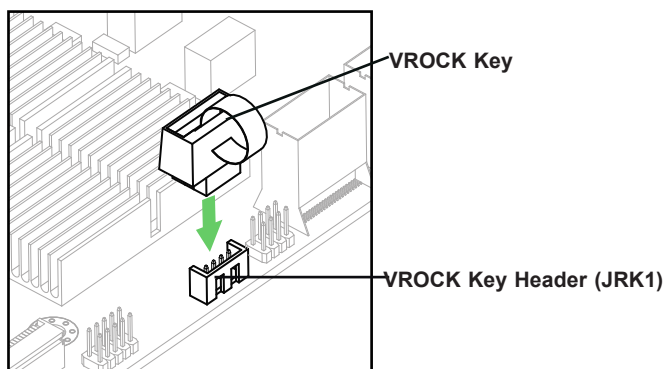


1. Standby Power Header
2. JSD1 (DOM PWR)

VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support as shown in the illustration below. Refer to the layout below for the location of JRK1.

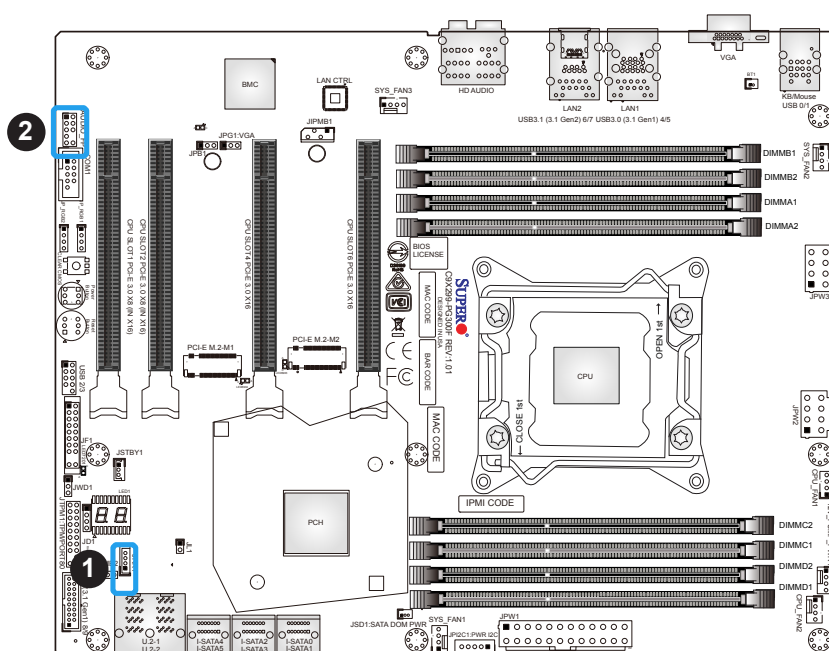
Intel VROC Key Pin Definitions	
Pin#	Definition
1	Ground
2	3.3V Standby
3	Ground
4	PCH RAID Key



Front Accessible Audio Header

A 10-pin audio header (AUDIO_FP) allows you to use the onboard sound for audio playback. Connect an audio cable to this header to use this feature. Refer to the table below for pin definitions.

Audio Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	Mic_2_Left	2	Audio_Ground
3	Mic_2_Right	4	Audio_Detect
5	Line_2_Right	6	Mic_2_JD
7	Jack_Detect	8	Key
9	Line_2_Left	10	Line_2_JD



1. Intel VROC RAID Key Header
2. AUDIO_FP

TPM/Port 80 Header

A Trusted Platform Module (TPM)/Port 80 header is located at JTPM1 to provide TPM support and a Port 80 connection. Use this header to enhance system performance and data security. Refer to the table below for pin definitions.

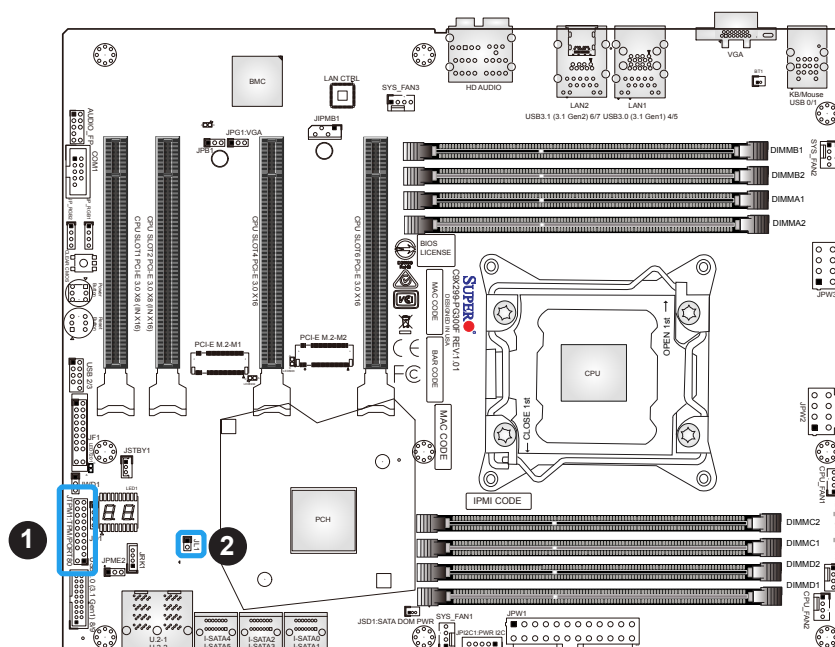
Trusted Platform Module Header Pin Definitions			
Pin#	Definition	Pin#	Definition
1	LCLK	2	GND
3	LFRAME	4	No Pin
5	LRESET	6	NC
7	LAD3	8	LAD2
9	VCC3	10	LAD1
11	LAD0	12	GND
13	NC	14	NC
15	SB3V	16	SERIRQ
17	GND	18	CLKRUN
19	LPCPD	20	LDRQ1

NC = No Connection

Chassis Intrusion Header

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 Header Pin Definitions	
Pin#	Definition
1	Intrusion Input
2	Ground



1. TPM/Port 80 Header
2. Chassis Intrusion Header

Battery Connector

BT1 is a two-pin connector for an external CMOS battery. Refer to Chapter 3 for battery installation instructions. This connector is also used to clear the CMOS. To clear the CMOS, remove the battery, short pins 1 and 2, and then install the battery.

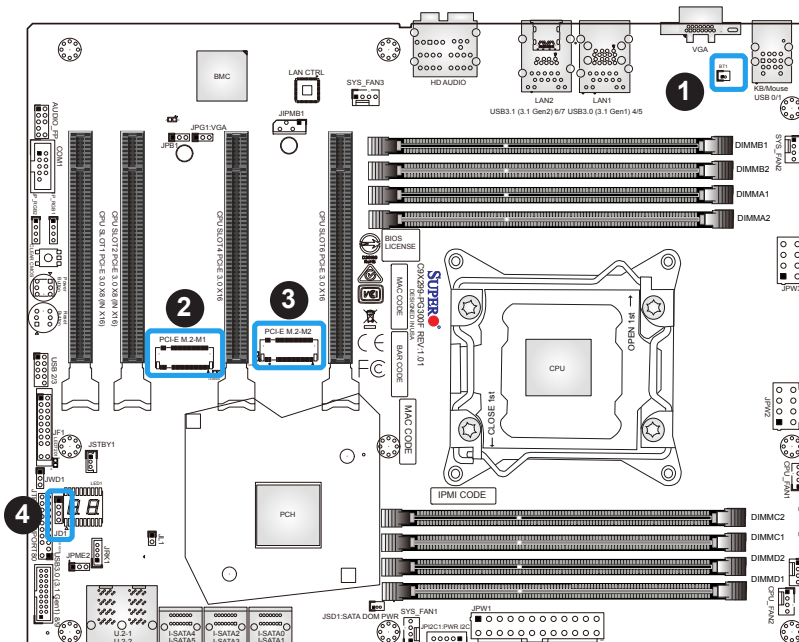
M.2 Connectors

The C9X299-PG300F board contains two M.2 connectors. M.2 was formerly known as Next Generation Form Factor (NGFF) and serves to replace mini PCIe and mSATA. M.2 allows for a greater variety of card sizes, increased functionality, and spatial efficiency.

Speaker Header

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

Speaker Connector Pin Definitions	
Pin#	Definition
1-4	Speaker
3-4	Buzzer



1. Battery Connector
2. PCI-E M.2-M1
3. PCI-E M.2-M2
4. Speaker Header

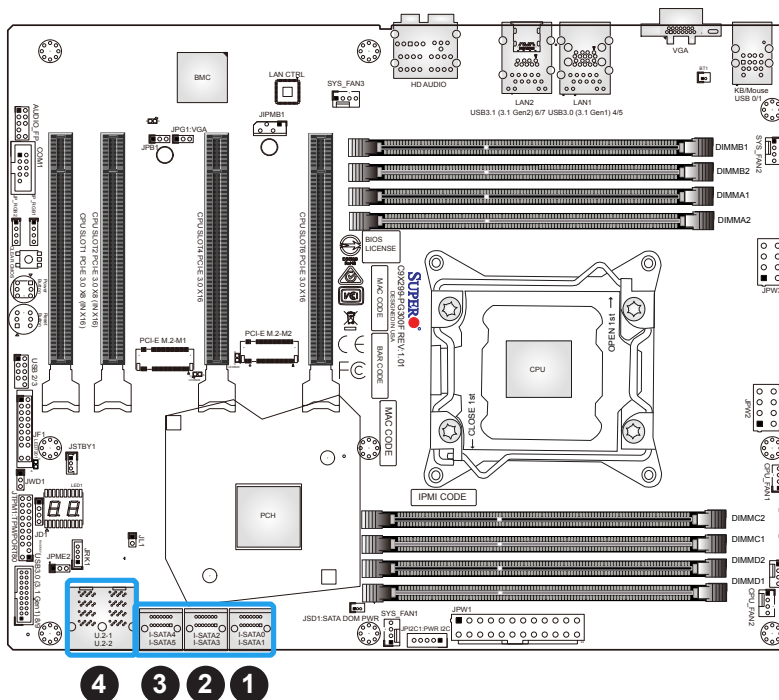
SATA Ports

Six SATA 3.0 connectors, supported by the Intel X299 PCH chipset, are located on the C9X299-PG300F motherboard. These SATA ports support RAID 0, 1, 5, and 10. SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA. Refer to the table below for pin definitions.

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

U.2 SSD Connectors

Two U.2 SSD connectors (U.2-1, U.2-2) are supported on the motherboard. These connectors support solid state drives (SSDs) and is an extension of the existing SATA connectors. They offer up to 4x PCIe 3.0 lanes to a connected SSD device.




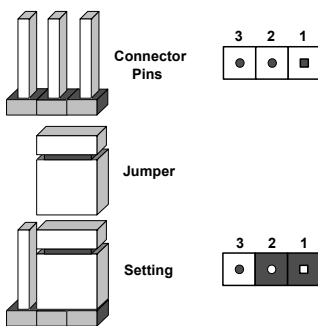
1. I-SATA0/1
2. I-SATA2/3
3. I-SATA4/5
4. U.2-1/U.2-2

2.9 Jumper Settings

How Jumpers Work

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

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

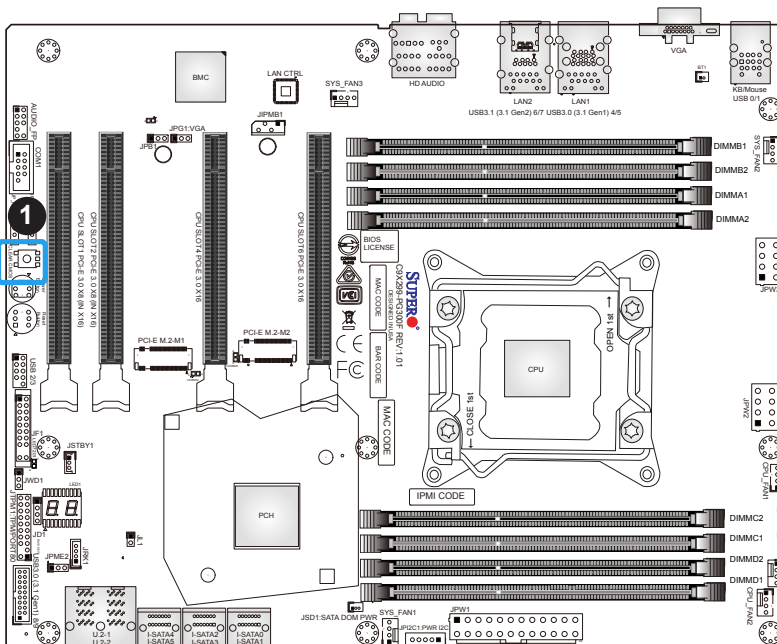


Clear CMOS

CMOS Clear is a push button switch that clears the CMOS when clicked. To clear the CMOS, push the Clear CMOS button.



Note: Shut down the system and then push the Clear CMOS button to clear the CMOS.



1. Clear CMOS

Manufacturing Mode

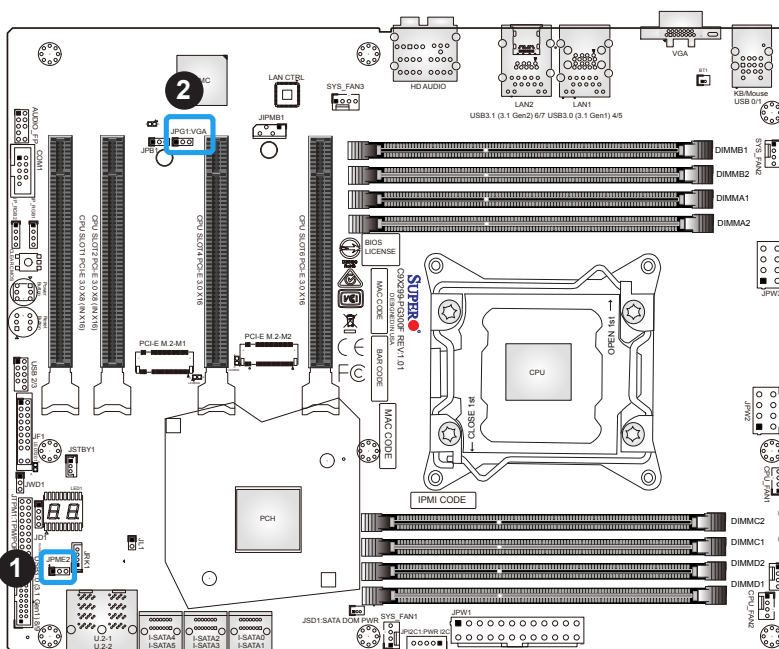
Close pins 2 and 3 of Jumper JPME2 to bypass SPI flash security and force the system to operate in the manufacturing mode, which will allow the user to flash the system firmware from a host server for system setting modifications. Refer to the table below for jumper settings.

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

VGA Enable/Disable

Jumper JPG1 allows the user to enable the onboard VGA connector. The default setting is pins 1 and 2 to enable the connection. Refer to the table below for jumper settings. The default setting is Enabled.

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

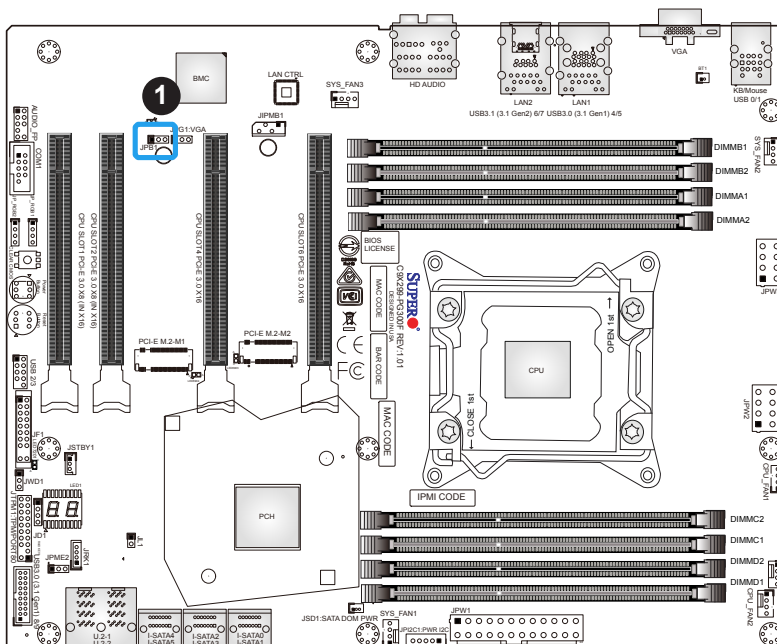


1. Manufacturing Mode
2. VGA Enable/Disable

BMC Enabled

Jumper JPB1 allows you to enable the embedded ASPEED AST2500 Baseboard Management Controller (BMC) to provide IPMI 2.0/KVM support on the motherboard. Refer to the table below for jumper settings. The default setting is BMC Enabled.


BMC Enabled Jumper Settings	
Jumper Setting	Definition
Pins 1-2	BMC Enabled (Default)
Pins 2-3	Disabled



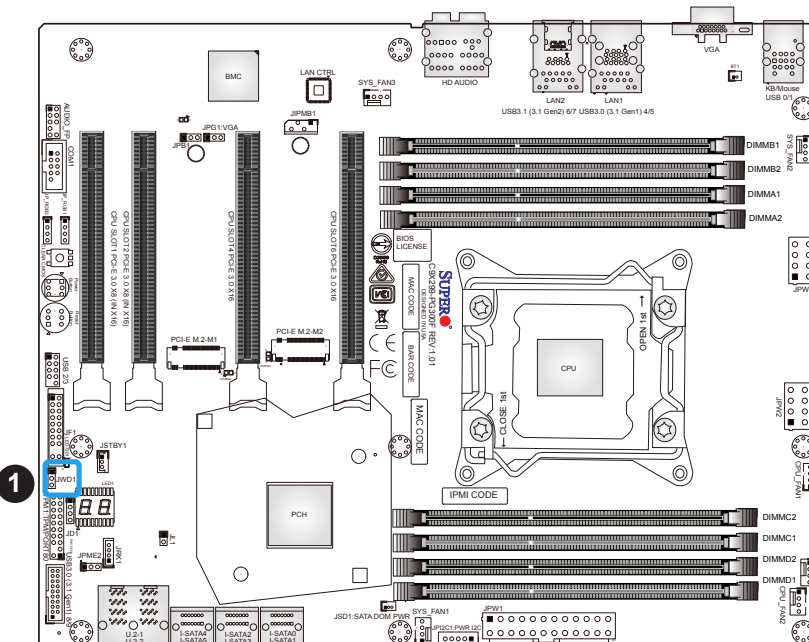
1. BMC Enabled

Watch Dog

JWD1 controls the Watch Dog function. Watch Dog is a monitor that can reboot the system when a software application hangs. Jumping pins 1 and 2 will cause Watch Dog to reset the system if an application hangs. Jumping pins 2 and 3 will generate a non-maskable interrupt signal for the application that hangs. Watch Dog must also be enabled in BIOS. The default setting is Reset.

 **Note:** When Watch Dog is enabled, users need to write their own application software to disable it.

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



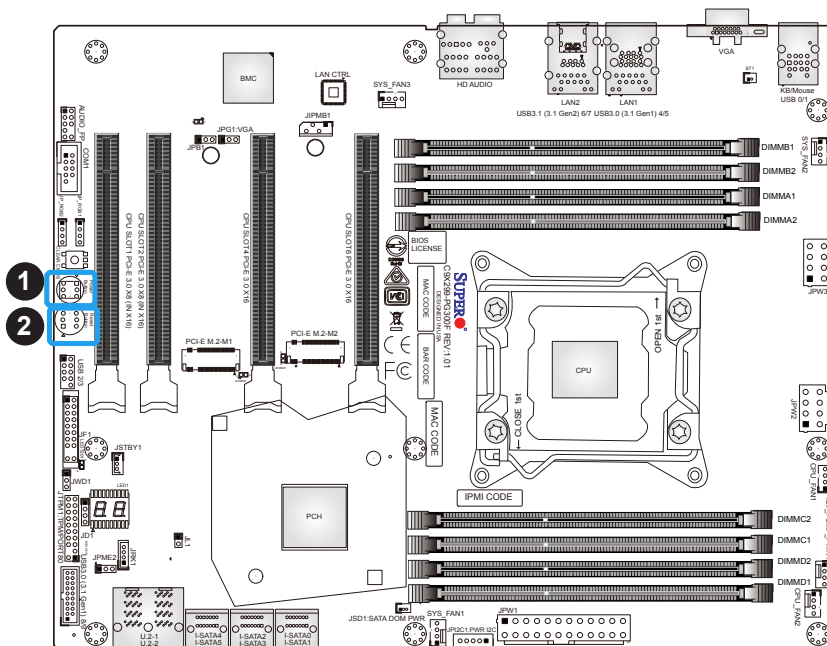
1. Watch Dog

Power Button

In addition to the soft power switch provided in JF1, your motherboard is equipped with a 'soft' power button on the motherboard. This switch works the same way as the soft power switch on JF1.

Reset Button

When pressed, the Reset Button will reset the system and reboot. This action will erase everything in memory and restart the system.



1. Power Button
2. Reset Button

2.10 LED Indicators

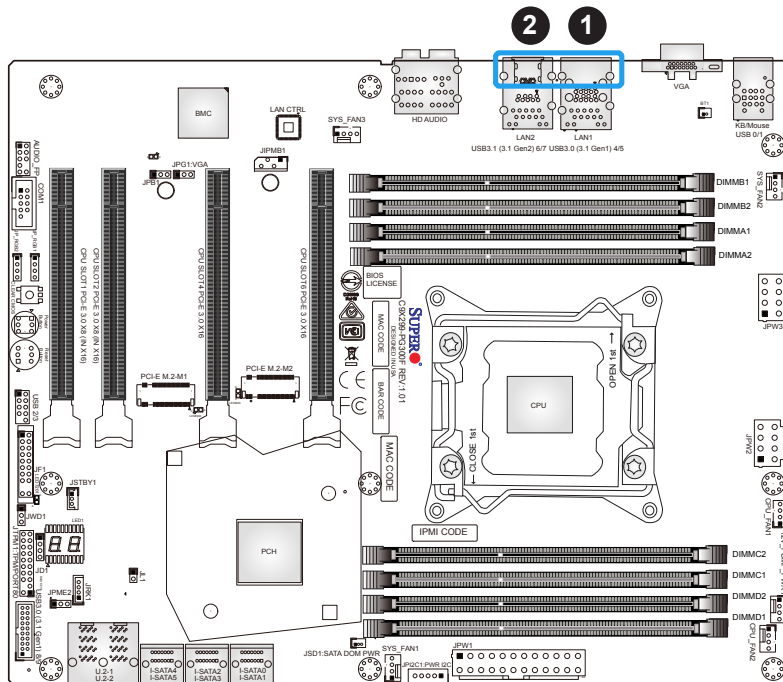
LAN LEDs

Two LAN ports (LAN1/LAN2) are located on the I/O back panel of the motherboard. Each Ethernet LAN port has two LEDs. The green LED indicates activity, while the other Link LED may be green, amber, or off to indicate the speed of the connection. Refer to the tables below for more information.

LAN1 Link LED LED State	
LED Color	Definition
Off	No Connection
Amber	5 Gbps, 2.5 Gbps, 1 Gbps, 100 Mbps
Green	10 Gbps

LAN2 Link LED LED State	
LED Color	Definition
Off	No Connection
Amber	100 Mbps
Green	1 Gbps

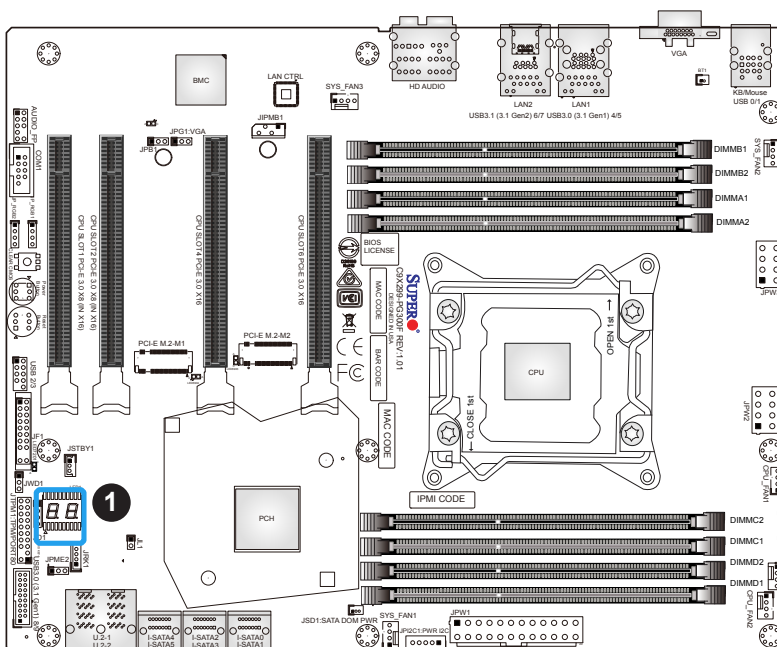
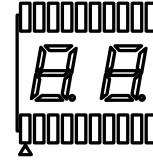
LAN1/LAN2 Activity LED (Right) LED State		
Color	Status	Definition
Green	Flashing	Active
Green	Solid	No Activity



1. LAN1 LEDs
2. LAN2 LEDs

Status Code LED

The Status Code LED is an alphanumeric display with two LED digits to provide the status or POST code, when the motherboard is powered on. Please download the following AMI publication for a complete list of POST codes: https://ami.com/ami_downloads/Aptio_V_Status_Codes.pdf.



1. Status Code LED

Chapter 3

Troubleshooting

3.1 Troubleshooting Procedures

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

Before Power On

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

No Power

1. Make sure that there are no short circuits between the motherboard and the chassis.
2. Make sure that the ATX power connectors are properly connected.
3. Check that the 115V/230V switch, if available, on the power supply is properly set.
4. Turn the power switch on and off to test the system, if applicable.
5. The battery on your motherboard may be old. Check to verify that it still supplies ~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 add-on cards and cables.
2. Use the speaker to determine if any beep codes are present. Refer to [Appendix A](#) for details on beep codes.

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

System Boot Failure

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

1. Check for any error beep from the motherboard speaker.
 - If there is no error beep, try to turn on the system without DIMM modules installed. If there is still no error beep, replace the motherboard.
 - If there are error beeps, clear the CMOS settings by unplugging the power cord and contacting both pads on the CMOS clear jumper (JBT1). (Refer to [Section 2.9](#) in Chapter 2.)
2. Remove all components from the motherboard, especially the DIMM modules. Make sure that system power is on and that memory error beeps are activated.
3. Turn on the system with only one DIMM module installed. If the system boots, check for bad DIMM modules or slots by following the Memory Errors Troubleshooting procedure in this chapter.

Memory Errors

When a no-memory beep code is issued by the system, check the following:

1. Make sure that the memory modules are compatible with the system and that the DIMMs are properly and fully installed.
2. Check if different speeds of DIMMs have been installed. It is strongly recommended that you use the same RAM type and speed for all DIMMs in the system.
3. Make sure that you are using the correct type of Non-ECC DDR4 UDIMM modules recommended by the manufacturer.
4. Check for bad DIMM modules or slots by swapping a single module among all memory slots and check the results.
5. Make sure that all memory modules are fully seated in their slots. Follow the instructions given in [Section 2.5](#) in Chapter 2.
6. Please follow the instructions given in the DIMM population tables listed in [Section 2.5](#) to install your memory modules.

Losing the System's Setup Configuration

1. Make sure that you are using a high-quality power supply. A poor-quality power supply may cause the system to lose the CMOS setup information. Refer to [Section 2.8](#) 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. If the above steps do not fix the setup configuration problem, contact your vendor for repairs.

When the System Becomes Unstable

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

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



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

3. HDD support: Make sure that all hard disk drives (HDDs) work properly. Replace the bad HDDs with good ones.
4. System cooling: Check the system cooling to make sure that all heatsink fans and CPU/system fans, etc., work properly. Check the hardware monitoring settings in the IPMI to make sure that the CPU and system temperatures are within the normal range. Also check the front panel Overheat LED and make sure that it is not on.
5. Adequate power supply: Make sure that the power supply provides adequate power to the system. Make sure that all power connectors are connected. Please refer to our website for more information on the minimum power requirements.
6. Proper software support: Make sure that the correct drivers are used.

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

1. Source of installation: Make sure that the devices used for installation are working properly, including boot devices such as CD/DVD.
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 the CPU and a memory module installed) to identify the trouble areas. Refer to the steps listed in Section A above for proper troubleshooting procedures.
4. 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, please note that as a motherboard manufacturer, Supermicro also sells motherboards through its channels, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problems with the specific system configuration that was sold to you.

1. Please go through the Troubleshooting Procedures and Frequently Asked Questions (FAQ) sections in this chapter or see the FAQs on our website (<http://www.supermicro.com/FAQ/index.php>) before contacting Technical Support.
2. BIOS upgrades can be downloaded from our website (http://www.supermicro.com/ResourceApps/BIOS_IPMI_Intel.html).
3. If you still cannot resolve the problem, include the following information when contacting Supermicro for technical support:
 - Motherboard model and PCB revision number
 - BIOS release date/version (This can be seen on the initial display when your system first boots up.)
 - System configuration
4. An example of a Technical Support form is on our website at <http://www.supermicro.com/RmaForm/>.
 - Distributors: For immediate assistance, please have your account number ready when placing a call to our Technical Support department. We can be reached by email at support@supermicro.com.

3.3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The motherboard supports up to 256GB of unbuffered Non-ECC DDR4 memory. To enhance memory performance, do not mix memory modules of different speeds and sizes. Please follow all memory installation instructions given in [Section 2.5](#).

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 is in 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.

Question: How do I update my BIOS?


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

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




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

Question: How do I update my BIOS under UEFI Shell?

 **Note:** We do not recommend that you update your BIOS if you are not experiencing a BIOS-related problem. If you need to update your BIOS, please follow the steps below to properly update your BIOS under UEFI Shell.

1. Download and save the BIOS update package to your computer.
2. Extract the files from the UEFI folder of the BIOS package to a USB stick.

 **Note:** The USB stick doesn't have to be bootable; however, it has to be formatted with the FAT/FAT32 file system.

3. Insert the USB stick into a USB port, boot to the UEFI Built-In Shell, and enter the following commands to start the BIOS update:

```
Shell> fs0:  
fs0:\> cd UEFI  
fs0:\UEFI> flash.nsh BIOSname#.###
```

4. The FLASH.NSH script will compare the Flash Descriptor Table (FDT) code in the new BIOS with the existing one in the motherboard:

a. If a different FDT is found

- A new file, STARTUP.NSH, will be created, and the system will automatically reboot in 10 seconds without you pressing any key. BIOS will be updated after the system reboots.
- You can also press <Y> to force an immediate system reboot to shorten the process. During system reboot, press the <F11> key to invoke the boot menu and boot into the build-in UEFI Shell. Your BIOS will be updated automatically.

b. If the FDT is the same

- BIOS update will be immediately performed without a system reboot initiated.

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

5. Perform an A/C power cycle after the message indicating the BIOS update has completed.
6. Go to the BIOS setup utility, and restore the BIOS settings.

3.4 Battery Removal and Installation

Battery Removal

To remove the onboard battery, follow the steps below:

1. Power off your system and unplug your power cable.
2. Locate the onboard battery connector (BT1) on the motherboard.
3. Carefully remove the jumper from the connector.
4. 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 steps 1 and 2 above and continue below:
2. Connect the new battery's jumper to the BT1 connector.



Important: 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

UEFI BIOS

4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the C9X299-PG300F 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.

Changing Between EZ Mode and Advanced Mode


Above the basic motherboard information and the clock is the EZ Mode/Advanced Mode button. When in EZ Mode, select feature options and then an overview of hardware status will display. When in Advanced Mode, all following configuration menus and their contents will become available.

4.2 System Information



The following information is displayed in the highlighted sections:

- **Motherboard Model Name** - C9X299-PG300F
- **BIOS Version** - the BIOS version number
- **Build Date and Time** - the BIOS build date and time
- **CPU** - the CPU type, speed, stepping, etc

 **Note:** The CPU speed shown reflects the manufacturer rated speed. It does not take overclocking into effect.

- **Memory** - the size and frequency
- **Fan Data** - sensor type and speed

System Date

Click on the date to open the setup fields. This feature sets and displays the system date. Click the up and down arrows to adjust the date.

System Time

Click on the time to open the setup fields. This feature sets and displays the system time. Click the up and down arrows to adjust the system time.

4.3 EZ Mode

When you first enter the AMI BIOS setup utility, you will enter the EZ Mode setup screen.



While in EZ Mode, the following information will display:

- **DRAM Status** - Status of all DIMM slots
- **CPU Profile Load** - Allows for quick CPU clocking profile selection
- **X.M.P. Profile Load** - Allows for quick memory clocking profile selection
- **Fast Boot** - Enables fast booting of the computer
- **Boot Order** - Allows changing of the boot order, or click a device to boot selected device



Note: Using this will reboot the computer.

- **HDD List** - Displays which SATA ports are connected to storage devices



Note: 'Manual' CPU/X.M.P. profiles are customized in Advanced Mode.

4.4 Overclocking

You can always return to the EZ Mode screen by selecting the EZ Mode/Advanced Mode switch on the top of the screen.



► CPU Overclocking

All Core OC Setting

This feature controls the CPU overclocking settings. The options are **Manual**, 3.8GHz, 3.9GHz, 4.0GHz, 4.1GHz, 4.2GHz, 4.3GHz, 4.4GHz, 4.5GHz, 4.6GHz, 4.7GHz, 4.8GHz, 4.9GHz, 5.0GHz, 5.1GHz, and 5.2GHz.

BCLK Scale Setting

This feature controls the BCLK settings. The options are **100MHz**, 125MHz, 167MHz, and 250MHz.

BCLK Frequency (1/1000 MHz)

This feature controls the BCLK frequency. This is automatically controlled by the previous setting.

Per Core Mode

When enabled, this feature unlocks Core Voltage Mode, Core Extra Turbo Voltage, and Core Voltage Offset configuration for Core-0~10. The options are **Disabled** and Enabled.

Core 1~16 Max Ratio

This feature overrides the Core Max Ratio on a per-core basis.

Core Max OC Ratio

This feature controls the general maximum overclocking ratio for the CPU cores and Ring. The default is **0**.

AVX2 Negative Offset

Enter a value for AVX2 Negative Offset. The default is **0**.

AVX3 Negative Offset

Enter a value for AVX3 Negative Offset. The default is **0**.

► Processor

TJ-Max offset

Enter a value to change the TJ-Max value. The default is **10**.

OverClocking Feature

This feature enables processor and memory overclocking features. The options are Disabled and **Enabled**.

WDT Enable

This feature enables the WatchDog Timer (WDT). The options are Disabled and **Enabled**.

Hyper-Threading [ALL]

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

SpeedStep (Pstates)

This feature enables SpeedStep, also known as System Agent Geyserville. The options are Disabled and **Enabled**.

Boot performance mode

This feature controls the performance state that the BIOS will set initially. The options are **Max Performance** and Max Efficient.

Energy Efficient Turbo

Select Enabled to activate Energy Efficient Turbo. This feature will opportunistically lower the turbo frequency to increase efficiency. We recommend leaving this enabled and disabled only in overclocking situations where the turbo frequency must remain constant. The options are Disabled and **Enabled**.

Turbo Mode

When EMTTM is enabled, this feature enables processor Turbo Mode. The options are Disabled and **Enabled**.

CPU Flex Ratio Override

This feature enables CPU Flex Ratio Programming. The options are **Disabled** and Enabled.

CPU Core Flex Ratio

When the feature above is enabled, this feature allows for a custom ratio value to be entered. It must be between the Max Efficiency Ratio and the Max Non-turbo Ratio set by the hardware. The default is **23**.

Thermal Monitor

This feature enables the thermal monitor. The options are Disabled and **Enabled**.

Current Limit Override

This feature enables current limit override. The options are Disabled and **Enabled**.

Current Limitation

This feature controls the current limitation. The default is **1400**.

PL1 Limit

This feature enables the PL1 limit. If this feature is set to disabled, the BIOS will program default values for the next two features. The options are Disabled and **Enabled**.

PL1 Power Limit

Enter a value for PL1 Power Limit. The default is **32767**.

PL1 Time Window

Enter a value for PL1 Time Window. The default is **1**.

PL2 Limit

This feature enables the PL2 limit. If this feature is set to Disabled, a default will be programmed by the BIOS. The options are Disabled and **Enabled**.

PL2 Power Limit

Enter a value for PL2 Power Limit. The default is **32767**.

PL2 Time Window

Enter a value for PL2 Time Window. The default is **1**.

► Core Disable

This submenu allows for disabling individual processor cores.

► Turbo Ratio Limit

TurboRatioLimit1~8

The defaults for all are **0**.

TurboRatioCores1~8

The defaults for all are **0**.

► Hardware PM State Control

Hardware P-States

This feature controls how P-States are selected. The Disable option bases the choice on OS Request. The **Native Mode**/Native Mode with No Legacy Support option bases the choice on OS guidance. The 'Out of Band Mode' option enables autonomous P-State selection.

HardwarePM Interrupt

This feature enables Hardware PM Interrupt. The options are **Disabled** and Enabled.

EPP Enable

This feature enables Enhanced Parallel Port (EPP) for faster data transfer between computer and peripheral devices. The options are Disabled and **Enabled**.

APS rocketing

This feature enables APS rocketing, which allows the core ratio to jump to max turbo instantly rather than on a smooth curve. The options are **Disabled** and Enabled.

Scalability

This feature enables the use of scalability in HWP p-code power efficiency algorithms. The options are **Disabled** and Enabled.

PPO-Budget

This feature enables PPO-Budget, which allocates power to cores based on their scalability/EPP. The options are **Disabled** and Enabled.

► CPU C State Control

Autonomous Core C-State

This feature enables autonomous Core C-State control. The options are **Disabled** and Enabled.

CPU C6 report

This feature controls CPU C6 reports to the operating system. The options are Disabled, Enabled, and **Auto**.

Enhanced Halt State (C1E)

This feature enables Enhanced Halt State (takes effect after reboot). The options are Disabled and **Enabled**.

OS ACPI Cx

This feature controls reporting of CC3/CC6. The options are **ACPI C2** and ACPI C3.

Package C State

This feature controls the Package C State limit. The options are C0/C1 state, C2 state, C6 (non Retention) state, C6 (Retention) state, No Limit, and **Auto**.

► Memory Overclocking**XMP Profile**

This feature controls the XMP profile. The options are **Disabled**, Manual, Profile 1, and Profile 2.

**When the feature above is set to Manual, the following memory timing configurations will become available.*

Memory Frequency

This feature controls the maximum memory frequency (in Mhz). The options are **Auto**, 1200, 1333, 1400, 1600, 1800, 1866, 2000, 2133, 2200, 2400, 2600, 2666, 2800, and 2933.

Memory Voltage (mV)

Enter a value for Memory Voltage. To select 1200 volts, enter 1200. The default is **1200**.

1st memory timing:**tCL**

This feature configures the Cas Latency Range. Enter a number between 4-18. The default is **15**.

tRCD

This feature selects the Row to Col Delay Range. Enter a number between 1-38. The default is **15**.

tRP

This feature selects the Ras Precharge Range. Enter a number between 1-38. The default is **15**.

tRAS

This feature selects the Ras Active Time. Enter a number between 1-586. The default is **36**.

Command Timing

This feature controls the desired memory controller command timing. The options are **1N**, **2N**, and **3N**.

2nd memory timing:

tWR

This feature configures the Minimum Write Recovery Time. Enter a number between 1-38. The default is **16**.

tRFC

This feature selects the Minimum Refresh Recovery Delay Time. Enter a number between 1-9363. The default is **278**.

tRRD

This feature selects the Minimum Row Active To Row Active Delay Time. Enter a number between 1-38. The default is **4**.

tRRD_L

Enter a value for desired tRRD_L. The default is **6**.

tWTR

This feature configures the Minimum Internal Write to Read Command Delay Time. Enter a number between 1-38. The default is **3**.

tRTP

This feature configures the Internal Read to Precharge Command Delay Time. Enter a number between 1-38. The default is **8**.

tFAW

This feature selects the Minimum Four Activate Window Delay Time. Enter a numeric value between 1-586. The default is **23**.

tCWL

This feature selects the Minimum CAS Write Latency Time. Enter a numeric value. The default is **14**.

tREFI

This feature configures the Maximum tREFI Time (Average Periodic Refresh Interval). Enter a numeric value. The default is **8320**.

tREFI_{x9}

Enter a value for desired tREFI_{x9}. The default is **73**.

tRC

Enter a value for desired tRC. The default is **50**.

3rd memory timing:**tWTR_L**

Enter a value for desired tWTR_L. The default is **8**.

tCCD

Enter a value for desired tCCD. The default is **0**.

tCCD_L

Enter a value for desired tCCD_L. The default is **2**.

tCCD_WR

Enter a value for desired tCCD_WR. The default is **0**.

tCCD_WR_L

Enter a value for desired tCCD_WR_L. The default is **2**.

tCKE

Enter a value for desired tCKE. The default is **6**.

tXP

Enter a value for desired tXP. The default is **7**.

t_XSDLL

Enter a value for desired t_XSDLL. The default is **768**.

tRRDS

Enter a value for desired tRRDS. The default is **1**.

tRRDR

Enter a value for desired tRRDR. The default is **1**.

tRRDD

Enter a value for desired tRRDD. The default is **1**.

tRWSR

Enter a value for desired tRWSR. The default is **5**.

tRWDS

Enter a value for desired tRWDS. The default is **6**.

tRWDR

Enter a value for desired tRWDR. The default is **6**.

tRWDD

Enter a value for desired tRWDD. The default is **6**.

tWRDS

Enter a value for desired tWRDS. The default is **1**.

tWRDR

Enter a value for desired tWRDR. The default is **1**.

tWRDD

Enter a value for desired tWRDD. The default is **1**.

tWWDS

Enter a value for desired tWWDS. The default is **3**.

tWWDR

Enter a value for desired tWWDR. The default is **3**.

tWWDD

Enter a value for desired tWWDD. The default is **3**.

4th memory timing:

RTL (CHA DIMM1)

Enter a value for desired RTL (CHA DIMM1). The default is **69**.

RTL (CHA DIMM2)

Enter a value for desired RTL (CHA DIMM2). The default is **0**.

RTL (CHB DIMM1)

Enter a value for desired RTL (CHB DIMM1). The default is **0**.

RTL (CHB DIMM2)

Enter a value for desired RTL (CHB DIMM2). The default is **0**.

RTL (CHC DIMM1)

Enter a value for desired RTL (CHC DIMM1). The default is **0**.

RTL (CHC DIMM2)

Enter a value for desired RTL (CHC DIMM2). The default is **0**.

RTL (CHD DIMM1)

Enter a value for desired RTL (CHD DIMM1). The default is **0**.

RTL (CHD DIMM2)

Enter a value for desired RTL (CHD DIMM2). The default is **0**.

IOL (CHA DIMM1)

Enter a value for desired IOL (CHA DIMM1). The default is **4**.

IOL (CHA DIMM2)

Enter a value for desired IOL (CHA DIMM2). The default is **0**.

IOL (CHB DIMM1)

Enter a value for desired IOL (CHB DIMM1). The default is **0**.

IOL (CHB DIMM2)

Enter a value for desired IOL (CHB DIMM2). The default is **0**.

IOL (CHC DIMM1)

Enter a value for desired IOL (CHC DIMM1). The default is **0**.

IOL (CHC DIMM2)

Enter a value for desired IOL (CHC DIMM2). The default is **0**.

IOL (CHD DIMM1)

Enter a value for desired IOL (CHD DIMM1). The default is **4**.

IOL (CHD DIMM2)

Enter a value for desired IOL (CHD DIMM2). The default is **0**.

► DDR4 ODT Configuration**► Voltage Configuration****Core Voltage Mode**

This feature controls the Core Voltage Mode. Adaptive Mode only allows for voltage interpolation in turbo mode. Override Mode forces the selected voltage to be applied over all operating frequencies. The default is **Adaptive**.

Core Extra Turbo Voltage (mV)

This feature controls the extra turbo voltage that is applied while the IA Core is operating in turbo mode. The range is 0~2000 mV. The default is **0**.

Core Voltage Offset

This feature controls the offset voltage applied to the IA Core domain. The range is negative 500 to positive 500 mV.

Offset Prefix

Use this feature to set the prefix value as a positive (+) or a negative (-). The options are + and -.

Adjust PII

Use this feature to adjust the PLL for Higher-BCLK ratio combination. The options are **Disabled** and Enabled.

Change PIITrim Value

Enter a value for PIITrim. The range is negative 63 to positive 63.

Change PLLTRIM Prefix

Use this feature to set the PLLTRIM prefix value as a positive (+) or a negative (-). The options are + and -.

Change MC-PIITrim Value

Enter a value for MC-PIITrim. The range is negative 63 to positive 63.

Change MC-PLLTRIM Prefix

Use this feature to set the MC-PLLTRIM prefix value as a positive (+) or a negative (-). The options are + and -.

► CLR/Ring

CLR Max OC Ratio

Enter a value for the maximum overclocking ratio of the CLR domain. The default is **0**.

CLR Min Ratio

Enter a value for the minimum overclocking ratio of the CLR domain. The default is **8**.

CLR Voltage Mode

This feature controls the CLR Voltage Mode. Adaptive Mode only allows for voltage interpolation in turbo mode. Override Mode forces the selected voltage to be applied over all operating frequencies. The default is **Adaptive**.

CLR Extra Turbo Voltage (mV)

This feature controls the extra turbo voltage applied while GT is operating in turbo mode. The range is 0~2000 mV. The default is **0**.

CLR Voltage Offset (mV)

This feature controls the offset voltage applied to the GT domain. The range is negative 100 to positive 1000 mV. The default is **0**.

Offset Prefix

Use this feature to set the prefix value as a positive (+) or a negative (-). The options are + and -.

► Uncore**Uncore Voltage Offset (mV)**

Enter a value for the Uncore voltage offset (in millivolts). The value range is negative 1000 to positive 1000. The default is **300**.

Offset Prefix

Use this feature to set the prefix value as a positive (+) or a negative (-). The options are + and -.

► SVID/FIVR**SVID Support**

This feature enables SVID, which allows input voltage overrides. The options are Disabled and **Enabled**.

SVID Voltage Override (mV)

Enter a value for the Vccin input voltage. The range is 0~2500 mV. The default is **0**.

SVID VCCSA Voltage (mV)

Enter a value for the VccSA input voltage. The range is 0~2500 mV. The default is **0**.

SVID SCCIO Voltage (mV)

Enter a value for the VccIO input voltage. The range is 0~2500 mV. The default is **0**.

Load Line Calibration

Load line calibration is vDroop, which is the tendency for a CPU's vCore to drop when going from an idle state to a load state. Enable this feature to reduce vDroop. The options are Disabled, Level 1~Level 7, and **Auto**.

Vcc PCH Vout voltage override enable

This feature enables Vcc PCH Vout voltage rail override by using SMBUS/PMBUS interface of VRM. The options are **Disabled** and Enabled.

**If this feature is enabled, the feature below will become available to configure.*

Vcc PCH Vout voltage

This feature controls the Vcc PCH Vout voltage. The options are **1.000V**, 1.106V, 1.194V, 1.288V, and 1.385V.

FIVR Faults

This feature enables FIVR Faults. When this feature is disabled, OVP and OCP protection mechanisms will be masked. The options are Disabled and **Enabled**.

****It is NOT recommended to select Disabled. Selecting Disabled may have negative consequences.***

FIVR Efficiency Management

This feature enables FIVR Efficiency Management, which is useful for power delivery efficiency, but overclocking, especially BCLK overclocking, might cause issue such as proper delivery control. The options are Disabled and **Enabled**.

4.5 CPU



► Processor Configuration

Information (dependant on current hardware) is shown for the following features:

Processor BSP Revision

Processor ID

Processor Frequency

Processor Max Ratio

Processor Min Ratio

Microcode Revision

L1 Cache RAM

L2 Cache RAM

L3 Cache RAM

Processor 0 Version

Hyper-Threading [ALL]

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

Max CPUID Value Limit

This feature enables legacy operating systems which cannot support CPUs with extended CPUID to boot. The options are **Disabled** and Enabled.

Execute Disable Bit

This feature enables Execute Disable Bit. When disabled, it forces the Execute Disable feature flag to always return to 0. The options are Disabled and **Enabled**.

Intel (VMX) Virtualization Technology

This feature enables a VMM to utilize Vanderpool (virtualization) Technology hardware capabilities. The options are Disabled and **Enabled**.

PPIN Control

This feature unlocks and either enables or disables PPIN Control. The options are Unlock/Disable and **Unlock/Enable**.

Hardware Prefetcher

If this feature is 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 Disabled and **Enabled**.

Adjacent Cache Prefetch

This feature enables Adjacent Cache Prefetch. The options are Disabled and **Enabled**.

DCU Streamer Prefetcher

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 Disabled and **Enabled**.

DCU IP Prefetcher

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 Disabled and **Enabled**.

LLC Prefetch

This feature enables LLC Prefetch. The options are **Disabled** and Enabled.

DCU Mode

This feature controls which Data Cache Unit (DCU) mode is enabled. The options are **32KB 8Way Without ECC** and 16KB 4Way With ECC.

Extended APIC

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

AES-NI

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

APIC Physical Mode

This feature enables APIC Physical Destination Mode. The options are **Disabled** and Enabled.

▶ **Advanced Power Management Configuration**

▶ **CPU P State Control**

SpeedStep (Pstates)

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

EIST PSD Function

This feature controls the EIST PSD Function. The options are **HW_ALL**, **SW_ALL**, and **SW_ANY**.

Turbo Mode

When EMTTM is enabled, this feature enables processor Turbo Mode. The options are Disabled and **Enabled**.

▶ **Hardware PM State Control**

Hardware P-States

This feature controls how P-states are selected. The **Disabled** option bases the choice on OS Request. The "Native Mode"/"Native Mode with No Legacy Support" option bases the choice on OS guidance. The "Out of Band Mode" option enables autonomous P-State selection.

▶ **CPU C State Control**

Autonomous Core C-State

This feature enables Autonomous Core C-State support. The options are **Disabled** and Enabled.

CPU C6 report

This feature enables CPU C6 (ACPI C3) reporting to the operating system. The options are Disabled, Enabled, and **Auto**.

Enhanced Halt State (C1E)

This feature enables Enhanced Halt State (takes effect after reboot). The options are Disabled and **Enabled**.

► Package C State Control

Package C State

This feature controls the Package C State limit. The options are C0/C1 state, C2 state, C6 (non Retention) state, C6 (Retention) state, No Limit, and **Auto**.

► Common RefCode Configuration

MMCFG Size

This feature controls the MMCFG Size. The options are 64M, 128M, **256M**, 512M, 1G, and 2G.

MMIOHBase

This feature controls the MMIO High Base. The options are **56T**, 40T, 24T, 16T, 4T, and 1T.

MMIO High Granularity Size

This feature controls the allocation size used to assign MMIOH resources. The options are 1G, 4G, 16G, 64G, 256G, and **1024G**.

► Advanced Power Management Configuration

► CPU P State Control

SpeedStep (Pstates)

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

EIST PSD Function

This feature controls the EIST PSD Function. The options are **HW_ALL**, SW_ALL, and SW_ANY.

Turbo Mode

When EMTTM is enabled, this feature enables processor Turbo Mode. The options are Disabled and **Enabled**.

► Hardware PM State Control

Hardware P-States

This feature controls how P-States are selected. The **Disabled** option bases the choice on OS Request. The Native Mode/Native Mode with No Legacy Support option bases the choice on OS guidance. The "Out of Band Mode" option enables autonomous P-State selection.

► CPU C State Control

Autonomous Core C-State

This feature enables Autonomous Core C-State support. The options are **Disabled** and **Enabled**.

CPU C6 report

This feature enables CPU C6 (ACPI C3) reporting to the operating system. The options are **Disabled**, **Enabled**, and **Auto**.

Enhanced Halt State (C1E)

This feature enables Enhanced Halt State (takes effect after reboot). The options are **Disabled** and **Enabled**.

► Package C State Control

Package C State

This feature controls the Package C State limit. The options are C0/C1 state, C2 state, C6 (non Retention) state, C6 (Retention) state, No Limit, and **Auto**.

4.6 Memory



Memory Frequency

This feature controls the maximum memory frequency (in MHz). The options are **Auto**, 1000, 1200, 1333, 1400, 1600, 1800, 1866, 2000, 2133, 2400, 2600, and 2666.

Custom Refresh Enable

This feature enables a custom memory refresh rate. The options are **Disabled** and **Enabled**.

MC BGF threshold

Enter a value for the HA to MC BGF threshold, which is used for scheduling MC request in bypass conditions. The default is **0**.

DLL Reset Test

Enter a value for the amount of loops to execute RMT during DLL reset tests. The default is **0**.

► Memory Topology

The currently installed memory topology is displayed here.

4.7 Advanced



► PCH-FW Configuration

The following information is displayed:

ME Firmware Version
ME Firmware Mode
ME Firmware SKU
ME File System Integrity Value
ME Firmware Status 1
ME Firmware Status 2

ME FW Image Re-Flash

This feature updates the Management Engine firmware from an image in a USB flash drive attached to a USB port. The options are **Disabled** and **Enabled**.

► Chipset Configuration

► North Bridge

► IIO Configuration

EV DFX Features

This feature enables IIO DFX devices and other CPU devices like PMON. The options are **Disabled** and **Enabled**.

Isoc Mode

This feature controls Isoc mode support. The options are **Disabled**, **Enabled**, and **Auto**.

► CPU Configuration

IOU0 (IIO PCIe Br1)

This feature controls the port bifurcation for the selected slot(s). The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (IIO PCIe Br2)

This feature controls the port bifurcation for the selected slot(s). The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU2 (IIO PCIe Br3)

This feature controls the port bifurcation for the selected slot(s). The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

► CPU SLOT4 PCI-E 3.0 x 16

Link Speed

This feature controls the link for this PCIe port. 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

This feature controls this PCIe port's maximum payload size. If possible, set to 256B. The default is **Auto**.

▶ CPU SLOT2 PCI-E 3.0 x 8 (IN X16)**Link Speed**

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

PCI-E Port Max Payload Size

This feature controls the maximum payload size of this PCIe port. If possible, set to 256B. The default is **Auto**.

▶ CPU SLOT6 PCI-E 3.0 x 16**Link Speed**

This feature controls the link for this PCIe port. 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

This feature controls the maximum payload size of this PCIe port. If possible, set to 256B. The default is **Auto**.

▶ CPU SLOT1 PCI-E 3.0 x 8 (IN X16)**Link Speed**

This feature controls the link for this PCIe port. 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

This feature controls the maximum payload size of this PCIe port. If possible, set to 256B. The default is **Auto**.

▶ U.2_1**Link Speed**

This feature controls the link for this U.2 port. 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

This feature controls the maximum payload size of this U.2 port. If possible, set to 256B. The default is **Auto**.

► IOAT Configuration

Disable TPH

This feature disables TLP Processing Hints. The options are Yes (Disabled) and **No** (Enabled).

Prioritize TPH

This feature enables prioritizing TLP Processing Hints. The options are **Disabled** and Enabled.

Relaxed Ordering

This feature enables relaxed ordering. The options are **Disabled** and Enabled.

► Intel® VT for Directed I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

This feature reports the I/O device assignment to VMM through DMA ACPI tables. The options are Disabled and **Enabled**.

Interrupt Remapping

This feature enables VT-d interrupt remapping support. The options are Disabled and **Enabled**.

PassThrough DMA

This feature enables Non-Isoch VT-d engine pass through DMA support. The options are Disabled and **Enabled**.

ATS

This feature enables Non-Isoch VT-d engine ATS support. The options are Disabled and **Enabled**.

Posted Interrupt

This feature enables VT-d posted interrupt. The options are Disabled and **Enabled**.

Coherency Support (Non-Isoch)

This feature enables Non-Isoch VT-d engine coherency support. The options are Disabled and **Enabled**.

► Intel® VMD technology

► Intel® VMD for Volume Management Device on CPU

Intel® VMD for Volume Management

This feature enables Intel Volume Management Device technology. The options are **Disabled** and **Enabled**.

PCI-E Completion Timeout Disable

This feature enables the Completion Timeout. The options are **Yes**, **No**, and **Per-Port**.

► South Bridge

Legacy USB Support

This feature enables legacy USB support. The **Auto** setting disables legacy support when no USB device is connected. The options are **Disabled**, **Enabled**, and **Auto**.

XHCI Hand-off

This feature enables a workaround for operating systems without XHCI hand-off support. The options are **Disabled** and **Enabled**.

RSA Support

This feature enables Rack Scale Architecture (RSA) support. The options are **Disabled** and **Enabled**.

Azalia

This feature enables HD Audio (Azalia) devices. The options are **Auto** and **Disabled**.

► SATA And RST Configuration

SATA Controller(s)

Use this feature to enable or disable the onboard SATA controllers. The options are **Disabled** and **Enabled**.

Configure SATA as

Use this feature to configure the settings for installed SATA drives. The options are **AHCI** and **RAID**.

Aggressive Link Power Management

Select **Enabled** for the PCH to aggressively enter the link power state. The options are **Disabled** and **Enabled**.

Storage Option ROM/UEFI Driver

This feature controls the execution of UEFI and Legacy OpROM. The options are Disabled, UEFI, and **Legacy**.

Serial ATA Port 0~5 Software Preserve

This feature displays the software information for the detected device.

Hot Plug

This feature designates the port specified for hot plugging. When the feature is set to Enabled, it will allow the user to replace a SATA disk drive without shutting down the system. The options are **Disabled** and Enabled.

Spin Up Device

When this feature is disabled, all drives will spin up at boot. When the feature is set to Enabled, it will perform Staggered Spin Up on any drive. The options are **Disabled** and Enabled.

SATA Device Type

Use this feature to identify the type of HDD that is connected to the SATA port. The options are **Hard Disk Drive** and Solid State Drive.

►ACPI Settings

WHEA Support

Enable this feature 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 in order to reduce system crashes and enhance system recovery and health monitoring. The options are Disabled and **Enabled**.

High Precision Event Timer

Enable this feature to activate the High Precision Event Timer (HPET), which 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 Precision Event Timer is used to replace the 8254 Programmable Interval Timer. The options are Disabled and **Enabled**.

Native PCIE Enable

This feature enables Native PCIe control. The options are Disabled and **Enabled**.

Native ASPM

This feature selects what controls ASPM. The options are Disabled (BIOS controlled), Enabled (operating system controlled), and **Auto**.

Intel Turbo Boost Max Technology 3.0

This feature enables Intel Turbo Boost Max Technology 3.0 support. The options are Disabled, **Enabled**, and Auto.

► Boot Feature

Fast Boot

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

Quiet Boot

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

Bootup Num-Lock

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

Option ROM Messages

This feature controls the display mode for Option ROM. The options are **Force BIOS** and Keep Current.

INT19 Trap Response

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

Port 61h Bit-4 Emulation

This feature enables port 61h bit-4 toggling in SMM. The options are **Disabled** and Enabled.

Wait For "F1" If Error

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

Re-try Boot

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

Watch Dog Function

If enabled, the Watch Dog timer will allow the system to reboot when it is unresponsive for more than five minutes. The options are **Disabled** and **Enabled**.

Power Button Function

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

AC Loss Policy Depend on

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

EuP Support

EuP, or Energy Using Product, is a European energy-saving specification that sets a standard on the maximum total power consumption on electrical products. The options are **Unchecked** (Disabled) and Checked (Enabled).

Setup Mode

This feature sets the default screen when entering the BIOS setup. The options are **EZ Mode** and Advanced Mode.

RGB Led Control

This feature enables RGB LED controls. The options are Disabled and **Enabled**.

►NCT6792D Super IO Configuration

►Serial Port 1 Configuration

Serial Port 1

This feature enables the Serial Port 1 (COM1). The options are Unchecked (Disabled) and **Checked** (Enabled).

Device Settings - IO=3F8H; IRQ=4;

Change Settings

This feature controls Super IO Device settings. The default is **Auto**.

▶AST2500SEC Super IO Configuration

▶Serial Port 2 Configuration

Serial Port 2

This feature enables the Serial Port 2 (COM). The options are Unchecked (Disabled) and **Checked** (Enabled).

Device Settings

Change Settings

This feature controls Super IO Device settings. The default is **Auto**.

▶Serial Port Console Redirection

COM1

Console Redirection

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

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

▶Console Redirection Settings

Terminal Type

This feature allows the user 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**.

Data bits

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

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 Unchecked (Disabled) and **Checked** (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 **Unchecked** (Disabled) and Checked (Enabled).

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Unchecked (Disabled) and **Checked** (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 Bootloader is selected, legacy Console Redirection is disabled before booting the OS. When Always Enable is selected, legacy Console Redirection remains enabled upon OS bootup. The options are **Always Enable** and BootLoader.

SOL

Console Redirection

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

► Console Redirection Settings

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**.

Data bits

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

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 Unchecked (Disabled) and **Checked** (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 **Unchecked** (Disabled) and Checked (Enabled).

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Unchecked (Disabled) and **Checked** (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 Serial Redirection Port

This feature controls which COM port to display redirection of legacy operating systems and OPRM messages. The options are **COM1** and SOL (Disabled).

Console Redirection

This feature enables Console Redirection for remote data exchange. The options are **Unchecked** (Disabled) and Checked (Enabled).

► Console Redirection Settings

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**.

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

► PCIe/PCI/PnP Configuration**Video**

This feature controls which option ROM to execute for the Video device. The options are Do Not Launch, UEFI, and **Legacy**.

Above 4G Decoding

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

PCI PERR/SERR Support

This feature enables PCI PERR/SERR support. The options are **Disabled** and Enabled.

VGA Priority

Use this feature to select the graphics device to be used as the primary video display for system boot. The default is **Onboard VGA**.

CPU SLOT1 PCI-E 3.0 X8 (IN X16) OPROM

CPU SLOT2 PCI-E 3.0 X8 (IN X16) OPROM

CPU SLOT4 PCI-E 3.0 X16 OPROM

CPU SLOT6 PCI-E 3.0 X16 OPROM

This feature enables PCI/PCIX/PCIe OPROM option for the corresponding slot number. The options are Disabled, **Legacy**, and UEFI.

CPU SLOT1/U.2_2 Select

This feature selects between CPU SLOT1 and U.2-2 PCIe support. The options are **CPU SLOT1 x8** and CPU SLOT1 x4 & U.2_2.

CPU SLOT2/SLOT4 Select

This feature selects between a combination of SLOT2/SLOT4 configuration and only SLOT4. The options are **CPU SLOT2 X8 SLOT4 X8** and CPU SLOT4 X16.

Onboard LAN1 Support

This feature enables or disables onboard LAN1. The options are Disabled and **Enabled**.

Onboard LAN2 Support

This feature enables or disables onboard LAN2. The options are Disabled and **Enabled**.

Onboard LAN Option ROM Type

Use this feature to select which type of firmware to be loaded for the onboard LAN ports. The options are **Legacy** and UEFI.

Onboard LAN1 Option ROM

Select PXE (Preboot Execution Environment) to boot the computer using a PXE device installed in a specified LAN port. Select Disabled to prevent system boot using a device installed in a LAN port. The options are Disabled and **PXE**.

Onboard LAN2 Option ROM

Select PXE (Preboot Execution Environment) to boot the computer using a PXE device installed in a specified LAN port. Select Disabled to prevent system boot using a device installed in a LAN port. The options are **Disabled** and PXE.

Network Stack

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

**If this feature is set to Enabled, the following features will be available:*

Ipv4 PXE Support

Select Enabled to enable IPv4 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, IPv4 PXE boot option will not be supported. The options are **Disabled** and Enabled.

Ipv6 PXE Support

Select Enabled to enable IPv6 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, IPv6 PXE boot option will not be supported. The options are **Disabled** and Enabled.

▶ Security

Use this submenu to create Administrator and User passwords. Using ONLY an Administrator password limits access to BIOS setup. Using ONLY a User password will lock unauthorized users from booting the system and/or entering BIOS setup.

▶ Secure Boot

The following information will be displayed:

System Mode - Setup
Secure Boot - Not Active
Vendor Keys - Active

Attempt Secure Boot

Select Enabled for Secure Boot flow control. This feature is available when the platform key (PK) is preregistered, the platform operates in the user mode, and CSM Support is disabled in the BIOS setup utility. The options are **Disabled** and Enabled.

▶ Enter Audit Mode

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

Secure Boot Mode

This feature allows selection of the Secure Boot Mode between Standard and Custom. Selecting Custom enables users to change the Image Execution Policy and manage Secure Boot Keys. The options are **Customized** and Standard.

CSM Support

This feature enables CSM support. The options are Disabled and **Enabled**.

▶ Reset to Setup Mode

This feature deletes the contents of all UEFI Secure Boot key databases. This will result in entering Setup Mode.

▶ Install Factory Default keys

This feature forces the system into User Mode and installs factory defaults keys.

► Key Management

Provision Factory Default keys

This feature provisions factory default keys on the next system boot while in Setup Mode. The options are **Disabled** and Enabled.

Install Factory Default keys

This feature forces the system into User Mode and installs factory defaults keys.

Enroll Efi Image

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

Platform Key(PK)

This feature uploads and installs a secure Platform Key. 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.

Key Exchange Keys

This feature uploads and installs a Key Exchange Key. 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.

Authorized Signatures

This feature uploads and installs an Authorized Signature. You may insert a factory default key or load from a file. When prompted, select Yes to load factory defaults and No to load from a file.

Forbidden Signatures

This feature uploads and installs a Forbidden Signature. You may insert a factory default key or load from a file. When prompted, select Yes to load factory defaults and No to load from a file.

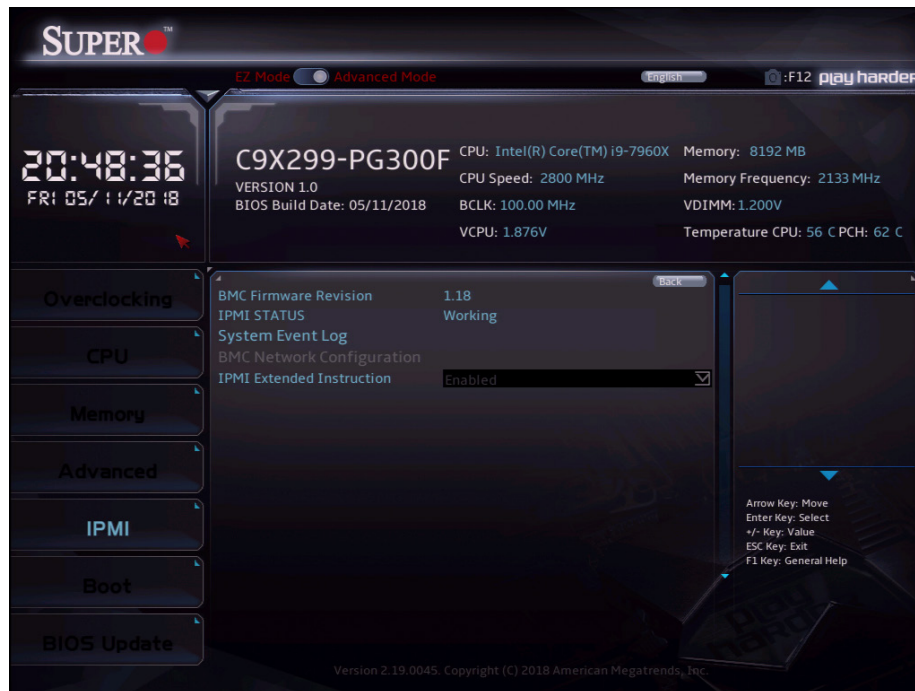
Authorized TimeStamps

This feature uploads and installs an Authorized Time Stamp. You may insert a factory default key or load from a file. When prompted, select Yes to load factory defaults and No to load from a file.

OsRecovery Signatures

This feature uploads and installs an OSRecovery Signature. You may insert a factory default key or load from a file. When prompted, select Yes to load factory defaults and No to load from a file.

4.8 IPMI



BMC Firmware Revision

IPMI STATUS

► System Event Log

SEL Components

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

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.

Log EFI Status Codes

This feature controls what EFI codes get logged. The options are Disabled, **Error code**, Progress code, and Both (error and progress).

► BMC Network Configuration

This menu displays BMC information:

IPMI LAN Selection

IPMI Network Link Status

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

**If the feature above is set to Yes, the following feature will become available for configuration:*

Update IPMI LAN Configuration

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

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 Static and **DHCP** (dynamic).

Station IP Address

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

Station MAC address

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

Gateway IP Address

This feature 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

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

IPV6 Support

Use this feature to enable IPv6 support for LAN1. The options are Disabled and **Enabled**.

IPMI Extended Instruction

Use this feature to enable IPMI support. The options are **Enabled** and Disabled. When Disabled, the system powers on quickly by removing BIOS support for extended IPMI features. The Disable option is for applications that require faster power on time without using Supermicro Update Manager (SUM) or extended IPMI features. The BMC network configuration in the BIOS setup is also invalid when IPMI Function Support is disabled. The general BMC function and motherboard health monitor such as fan control are still functioning even when this option is disabled.

4.9 Boot



Setup Prompt Timeout

This feature controls how long (in seconds) the boot process will wait for the Setup Activation key (normally <Delete>) to be pressed before moving on. The default is 1.

Boot mode select

Use this feature to select the type of device to be used for system boot. The options are LEGACY, UEFI, and **DUAL**.

FIXED BOOT ORDER Priorities

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

Delete Driver Option

This feature removes an EFI driver option from the driver order.

UEFI Application Boot Priorities

This feature allows the user to specify which UEFI application devices are boot devices.

NETWORK Drive BBS Priorities

This feature allows the user to specify which UEFI network drive devices are boot devices.

Boot Override

This section contains three boot override options. They are aQuantia AQtion, PXE-2.0, UEFI: Built-in EFI Shell, and Launch EFI Shell from filesystem device.

Save Options

This section contains options related to saving, discarding, or loading changes made in the Setup process.

Default Options

This section contains options related to restoring default options and saving new user defaults.

4.10 BIOS Update



This menu is used to update the BIOS version manually. Two columns on information are shown. The left column shows CURRENT BIOS information. The right column shows NEW BIOS information. Use the "Start Update" feature to begin flashing the new BIOS.

Start Update

Following these steps to prepare the BIOS Update with ME:

1. Click Start Update to enter the SuperFlash utility.
2. At the prompt, select Yes to reboot and configure the system to Flash mode. Select No to cancel and view the BIOS information.
3. After the system reboots to the flash mode, the system is ready to flash the BIOS. At the prompt, select OK to continue.
4. Select File and then in the pop-up menu select General USB Flash Disk 1.00.
5. Select the filename (i.e., "C9X299-PG300F") in the pop-up menu.
6. Select Flash to flash the BIOS. A pop-up message will appear to show the progress of the BIOS flash.
7. If the flash is successful, a pop-up message will indicate the result. Select OK to complete the BIOS flash and to reboot the system. In the BIOS setup, confirm the BIOS version on the upper motherboard information section.

Appendix A

BIOS Codes

BIOS Error POST (Beep) Codes

During the POST (Power-On Self-Test) routines, which are performed upon each system boot, errors may occur.

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

Fatal errors will not allow the system to continue with bootup. 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 table below lists some common errors and their corresponding beep codes encountered by users.

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

Appendix B

Software

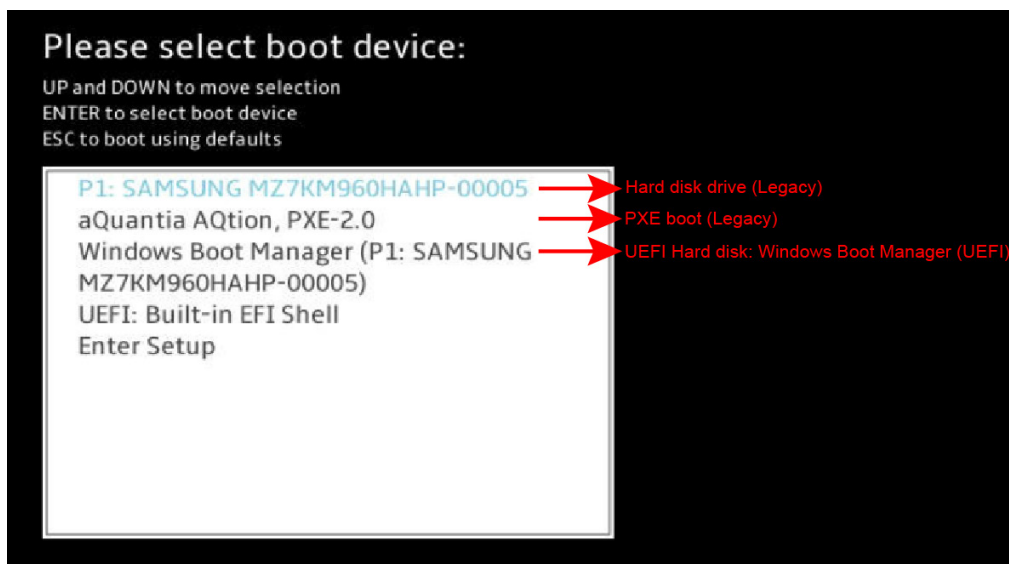
After the hardware has been installed, you can install the Operating System (OS), configure RAID settings and install the drivers.

B.1 Microsoft Windows OS Installation

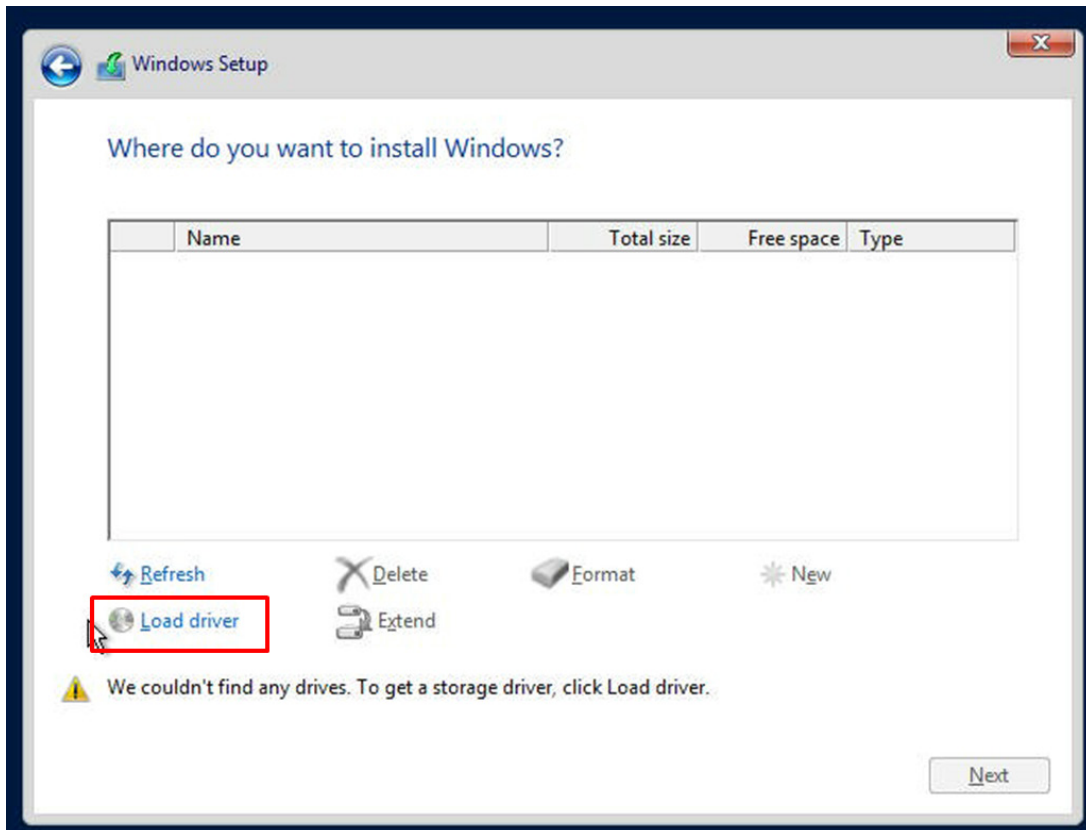
If you will be using RAID, you must configure RAID settings before installing the Windows OS and the RAID driver. Refer to the RAID Configuration User Guides posted on our website at www.supermicro.com/support/manuals.

Installing the OS

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



4. During Windows Setup, continue to the dialog where you select the drives on which to install Windows. If the disk you want to use is not listed, click on “Load driver” link at the bottom left corner.



To load the driver, browse the USB flash drive for the proper driver files.

- For RAID, choose the SATA/sSATA RAID driver indicated then choose the storage drive on which you want to install it.
 - For non-RAID, choose the SATA/sSATA AHCI driver indicated then choose the storage drive on which you want to install it.
5. Once all devices are specified, continue with the installation.
 6. After the Windows OS installation has completed, the system will automatically reboot multiple times.

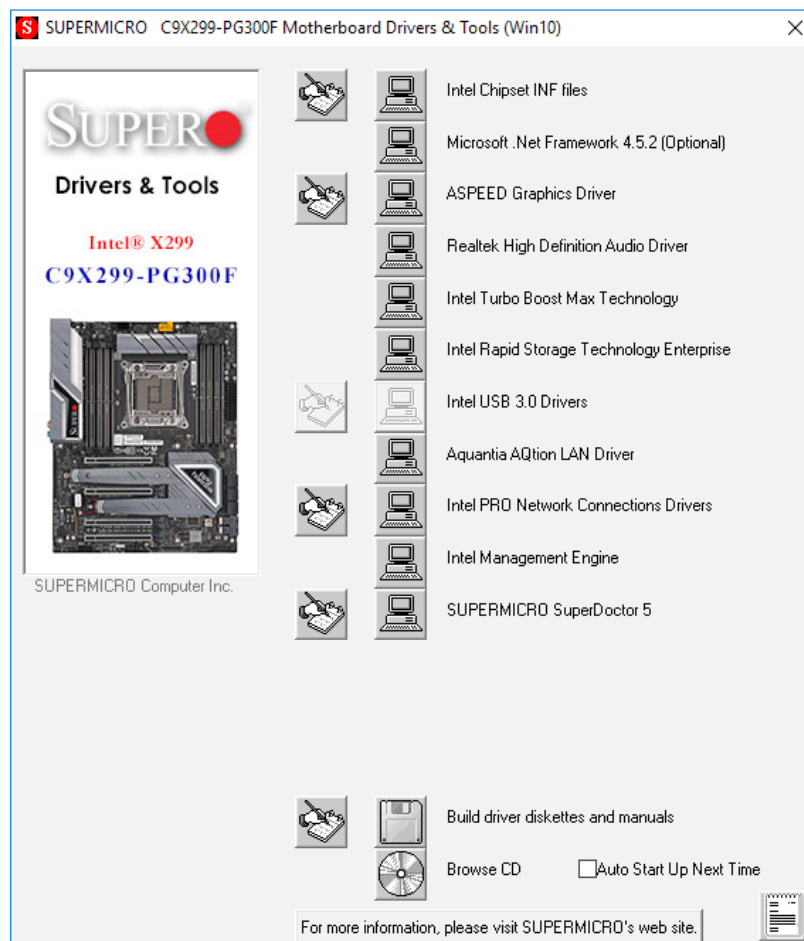
B.2 Driver Installation

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

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

Another option is to go to the Supermicro website at <http://www.supermicro.com/products/>. Find the product page for your motherboard, and "Download the Latest Drivers and Utilities".

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




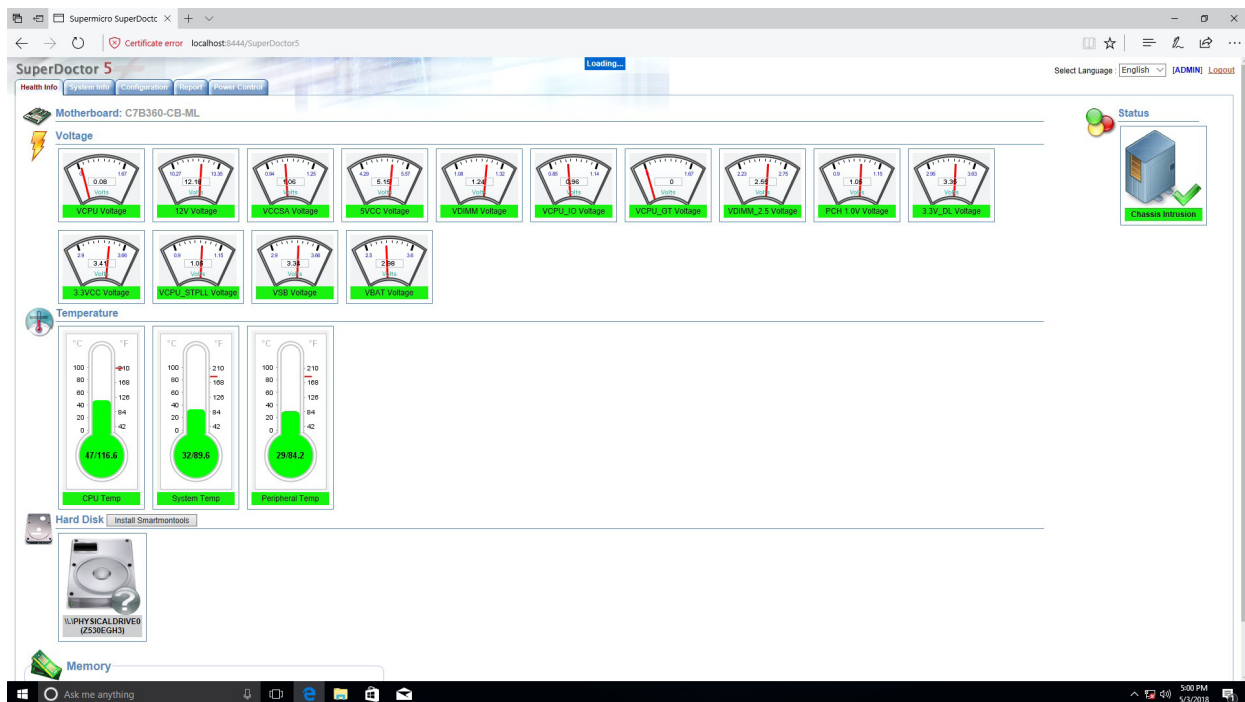
Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the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

B.3 SuperDoctor® 5

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

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

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



B.4 IPMI

The motherboard supports the Intelligent Platform Management Interface (IPMI). IPMI is used to provide remote access, monitoring and management. There are several BIOS settings that are related to IPMI.

For general documentation and information on IPMI, please visit our website at: <http://www.supermicro.com/products/nfo/IPMI.cfm>.

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

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

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

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

Appendix C

Standardized Warning Statements

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

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

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

Battery Handling



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

電池の取り扱い

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

警告

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

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה!

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

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

경고!

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

Waarschuwing

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

Product Disposal



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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

אזהרה!

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

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

경고!

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

Waarschuwing

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

Appendix D

UEFI BIOS Recovery

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

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 external storage device 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 in Section D.3 for BIOS recovery when the main BIOS block crashes.


Note 2: If the recovery instructions in Section D.3 for BIOS recovery fail, you will need to follow the procedures to make a Returned Merchandise Authorization (RMA) request. Refer to Section 3.5 for more information about the RMA request.

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/RW device can be used for this purpose. However, a USB hard disk drive cannot be used for BIOS recovery at this time. The file system supported by the recovery block is FAT (including FAT12, FAT16, and FAT32) which is installed on a bootable or non-bootable USB-attached device.

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

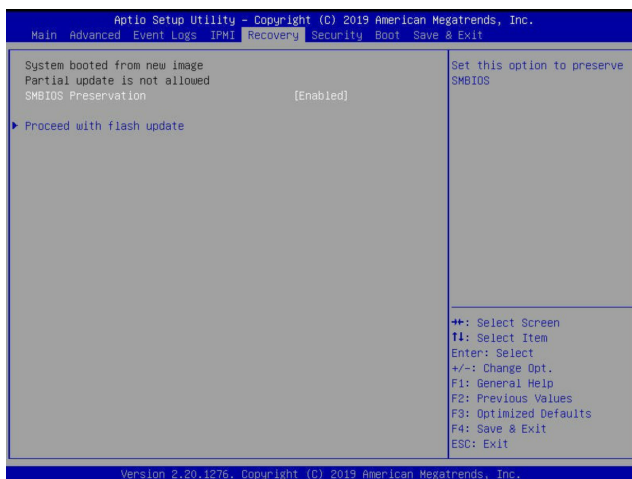
1. Please use a different machine to download the BIOS package for your motherboard or your system from the product page available on our website at www.supermicro.com.
2. Extract the BIOS package to a USB device and rename the BIOS ROM file [BIOSname#.###] that is included in the BIOS package to SUPER.ROM for BIOS recovery use.
3. Copy the SUPER.ROM file into the Root "\\" directory of the USB device.

 **Note:** Before recovering the main BIOS image, confirm that the SUPER.ROM file you have is the same version or a close version meant for your motherboard.

4. Insert the USB device that contains the SUPER.ROM file into the system before you power on the system or when the following screen appears.



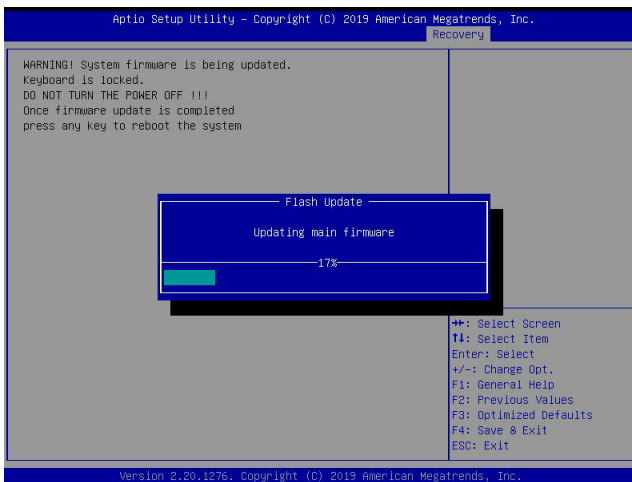
5. After locating the SUPER.ROM file, the system will enter the BIOS Recovery menu as shown below.



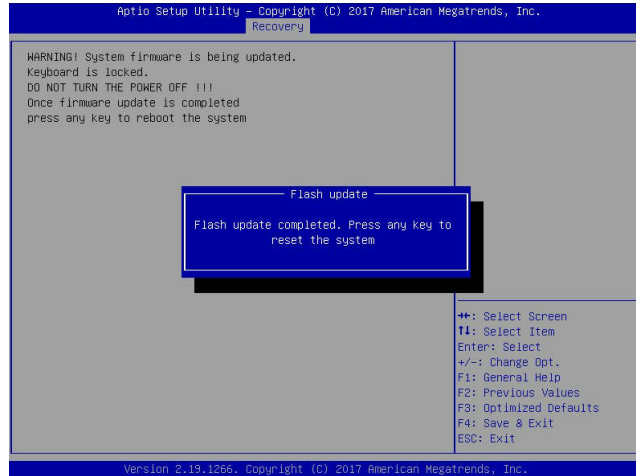
Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

6. 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 is complete.

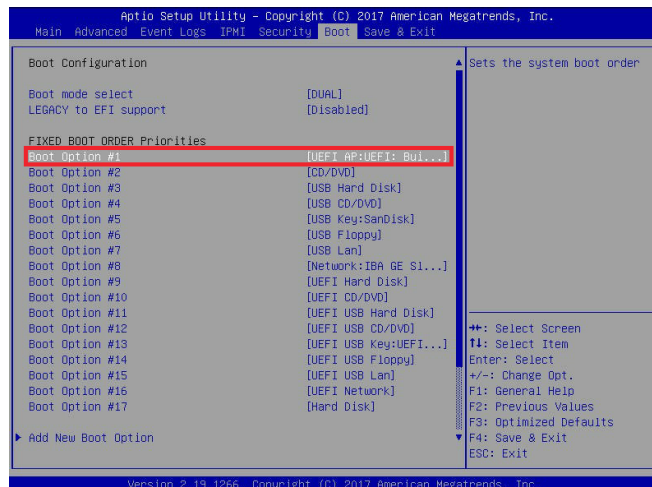


7. After the BIOS recovery process is complete, press any key to reboot the system.



Note: It is recommended that you update your BIOS after BIOS recovery. Please refer to Chapter 3 for BIOS update instructions.

8. Press 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.



9. 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 in Step 2. Enter `flash.nsh BIOSname#.###` at the prompt to start the BIOS update process.

```

UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (American Megatrends, 0x0005000C)
Mapping Table
  FS0: Alias(s):HD0:0:0:BLK1:
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)/HD(1,MBR,0x3791D72,0x800,0x1
DR959C)
  BLK0: Alias(s):
      PciRoot(0x0)/Pci(0x14,0x0)/USB(0x11,0x0)
Press F8 in 1 seconds to skip startup.nsh or any other key to continue.
Shell> fs0:
FS0:\> cd \AFUDOS
FS0:\AFUDOS> cd \SNJPME2_03162017
FS0:\AFUDOS\SNJPME2_03162017> flash.nsh X110PU7_314

```



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

```

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

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

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

```

10. The screen above indicates that the BIOS update process has completed. Reboot the system when you see the screen below.

```

Verifying NDB Block ..... done
- Update success for FDR
- Update success for IE
- Successful Update Recovery Loader to OPRx11
- Successful Update MFSB11
- Successful Update FPR11
- Successful Update MFS, IVB1 and IVB211
- Successful Update FLOG and UTDK11
- ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect !!
Moving FS0:\AFUDOS\SNJPME2_03162017\fdt\k64.efi -> FS0:\AFUDOS\SNJPME2_03162017\
d1.smc
- [ok]
Moving FS0:\AFUDOS\SNJPME2_03162017\afuef1k64.efi -> FS0:\AFUDOS\SNJPME2_0316201
7\afuef1.smc
- [ok]
*****
* Please ignore this 'Shell: Cannot read from file - Device Error'
* warning message due to it does not impact flashing process.
*
*****
Deleting "afuef1.smc"
Delete successful.
FS0:\>

```