

C9X299-PG300

USER MANUAL

Revision 1.0

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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-PG300 motherboard.

About This Motherboard

The Supermicro C9X299-PG300 motherboard supports one Intel® Core® X-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/.

Conventions Used in the Manual

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



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



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



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



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

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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	**Quantity**
Supermicro Motherboard	1
SATA Cables	4
I/O Shield	1
Driver CD	1
Quick Reference Guide	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: ftp://ftp.supermicro.com
- Product safety info: http://www.supermicro.com/about/policies/safety_information.cfm
- If you have any questions, please contact our support team at: support@supermicro.com

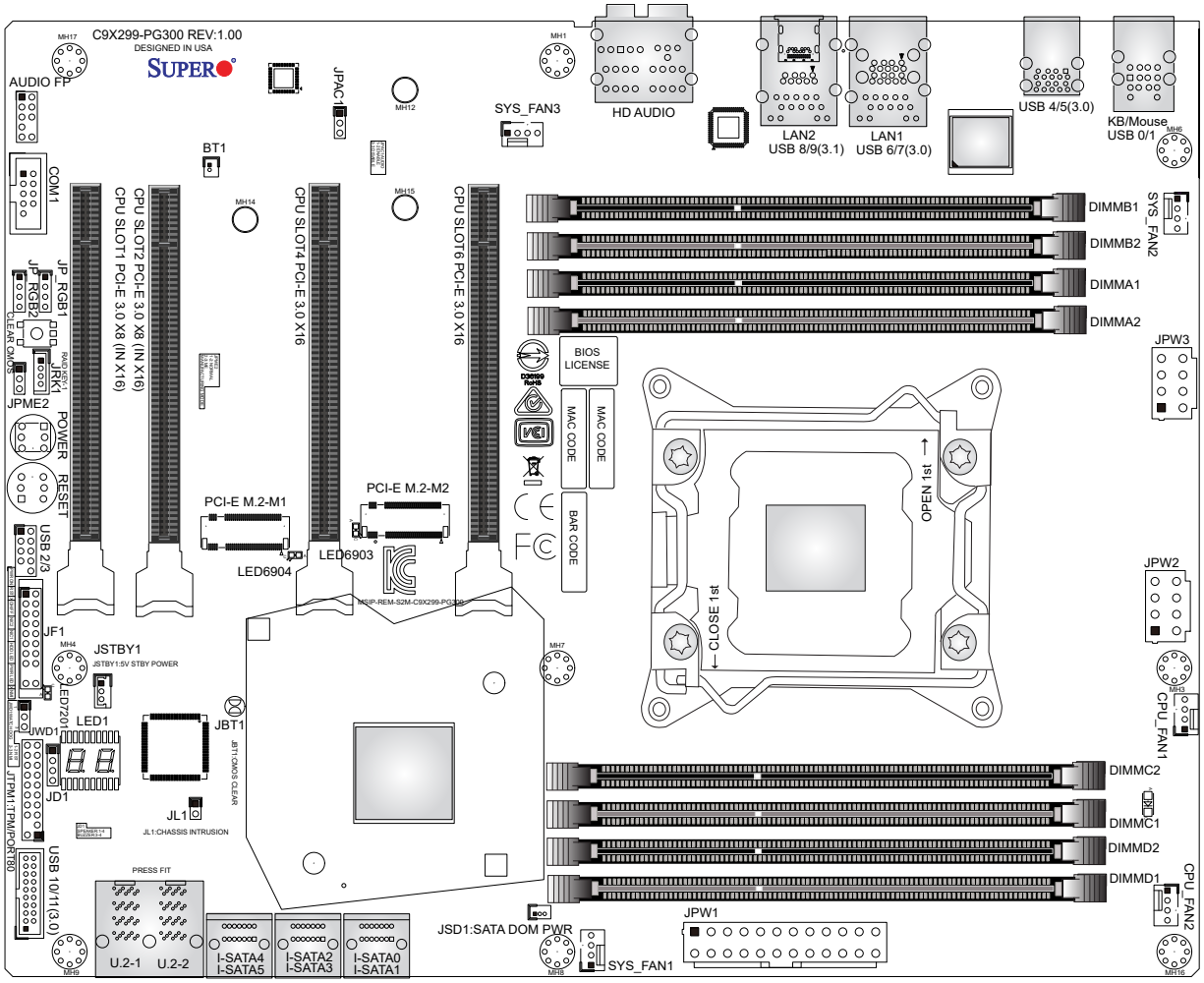
This manual may be periodically updated without notice. Please check the Supermicro website for possible updates to the manual revision level.

Figure 1-1. C9X299-PG300 Motherboard Image



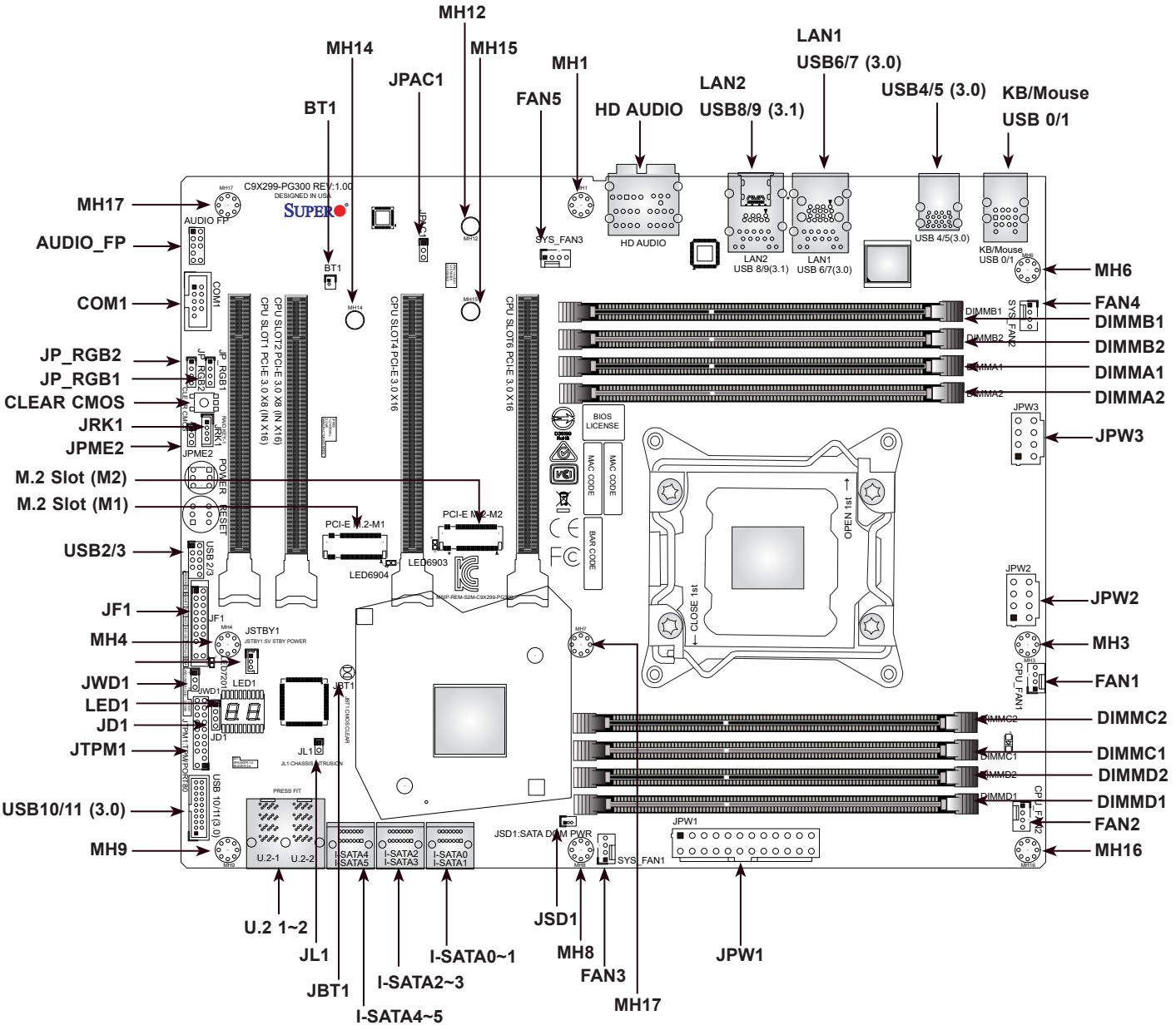
Note: All graphics shown in this manual were based upon the latest PCB revision available at the time of publication of the manual. The motherboard you received may or may not look exactly the same as the graphics shown in this manual.

Figure 1-2. C9X299-PG300 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 JLED1 (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
JBT1	CMOS Clear (onboard)	Short Pads to Clear CMOS
JPAC1	Audio Enable	Pins 1-2 (Enabled)
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
LED7201	Onboard Standby PWR LED	Power On: Green On
LED6903	M.2 Connector 2 SSD Active LED	Activity: Green Blinking
LED6904	M.2 Connector 1 SSD Active LED	Activity: Green Blinking

Connector	Description
AUDIO_FP	Front Panel Audio Header
BT1	Onboard Battery
COM1	COM Header
CPU SLOT 1/2 PCI-E 3.0 x8 (in x16)	PCI Express x16 Slots (PCI-E 3.0 x8 link)
CPU SLOT 4/6 PCI-E 3.0 x16	PCI Express x16 Slots (PCI-E 3.0 x16 link)
FAN1 ~ FAN5	System/CPU Fan Headers
HD AUDIO	High Definition Audio Header
I-SATA0~5	SATA 3.0 Connectors
JD1	Speaker (Pins 1-4: Speaker)
JF1	Front Control Panel Header
JL1	Chassis Intrusion Header
JP_RGB1/2	LED Light Bar Header
JPW1	24-pin ATX Main Power Connector (Required)
JPW2	+12V 8-pin CPU Power Connector (Required)
JPW3	+12V 8-pin CPU Power Connector (Required)
JRK1	Intel RAID Key Header
JSD1	SATA Disk On Module (DOM) Power Connector
JSTBY1	Standby Power Header
JTPM1	Trusted Platform Module (TPM)/Port 80 Connector
LAN1/LAN2	LAN1: 10Gb LAN Port, LAN2: 1Gb LAN Port
PCI-E M.2 Connector 1, 2	PCI-E M.2 Connectors 1 and 2 for small form factor portable devices and SSDs



Note: Table is continued on the next page.

Connector	Description
U.2 Connector 1, 2	U.2 Connector 1 and 2, for 2.5" SSD Drivers
USB 0/1	Back Panel USB 2.0 Ports
USB 2/3	Front Accessible USB 2.0 Header
USB 4/5	Back Panel USB 3.0 Ports
USB 6/7	Back Panel USB 3.0 Ports
USB 8/9	Back Panel USB 3.1 Ports (USB 8: Type-A, USB 9: Type-C)
USB 10/11	Front Accessible USB 3.0 Header

Motherboard Features

Motherboard Features	
CPU	
• The C9X299-PG300 motherboard supports an Intel® Core® X-Series processor in an LGA2066 socket.	
Memory	
• Supports up to 128GB of unbuffered Non-ECC DDR4 memory, two DIMMs per channel (DPC) with speeds of up to 2400MHz or ~4000MHz (overclocked).	
DIMM Size	
• 4GB, 8GB, 16GB at 1.2V	
Note 1: Memory speed support depends on the processors used in the system.	
Note 2: For the latest CPU/memory updates, please refer to our website at http://www.supermicro.com/products/motherboard.	
Chipset	
• Intel PCH X299	
Expansion Slots	
• Four (4) PCI-E 3.0 x16 slots • Two (2) M.2 PCI-E 3.0 x4 slots (1x 2280, 1x 22110)	
Network	
• Intel i219V • Aquantia AQC 107	
Audio	
• Realtek ALC1220 - HD Audio 7.1	
I/O Devices	
• Serial (COM) Header	• One (1) front accessible serial header (COM1)
• SATA 3.0	• Six (6) I-SATA 3.0 ports (I-SATA0 ~ 5)
• Raid PCH	• RAID 0, 1, 5, and 10
Peripheral Devices	
• One (1) USB 3.1 Type-C port on the I/O back panel • One (1) USB 3.1 Type-A port on the I/O back panel • One (1) front accessible USB 3.1 Type-C header • Four (4) USB 3.0 ports on the I/O back panel • Two (2) front accessible USB 3.0 headers • Four (4) USB 2.0 ports on the I/O back panel • Two (2) front accessible USB 2.0 headers	

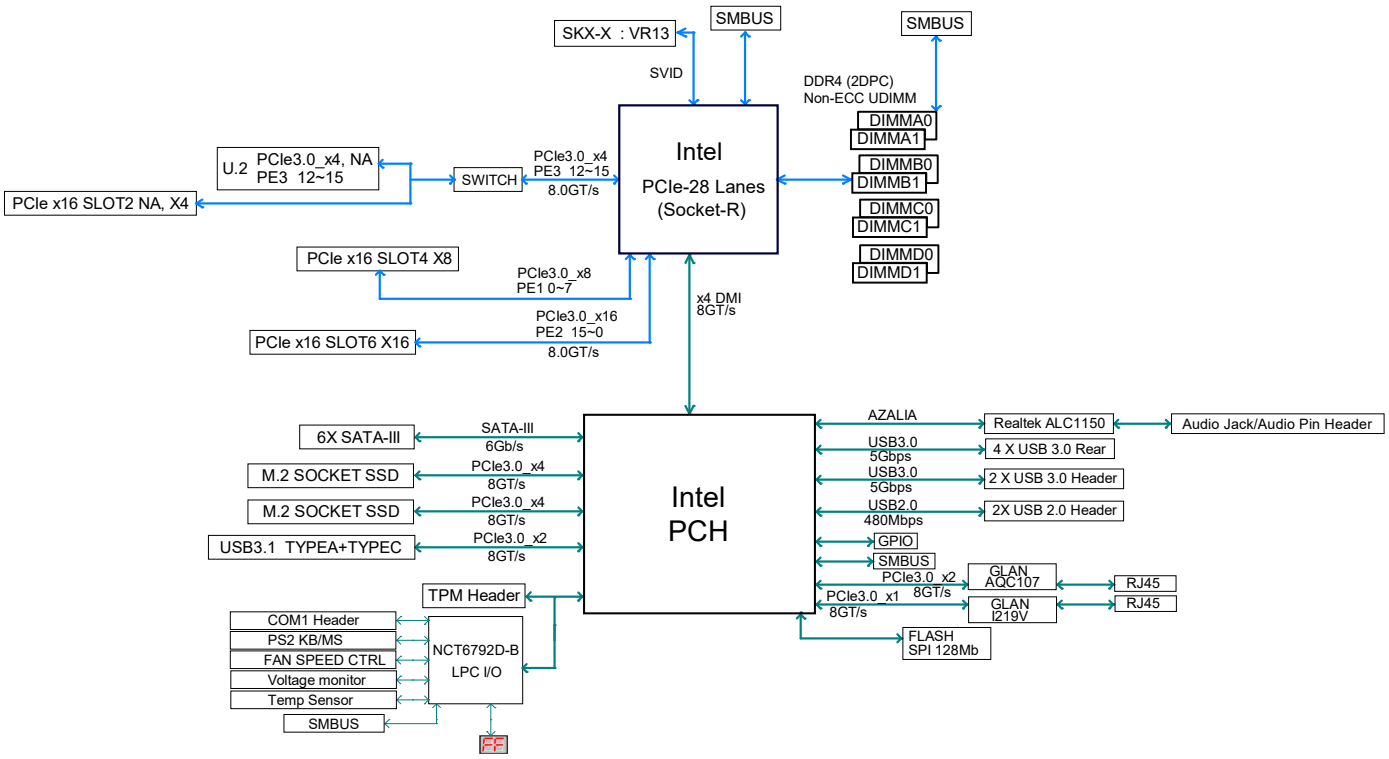
Note: The table above is continued on the next page.

Motherboard Features
BIOS
• 128Mb AMI BIOS® SPI Flash BIOS • PCI 3.0, ACPI 3.0, BIOS rescue hot-key, Overclock support
Power Management
• ACPI power management • Power button override mechanism • Power-on mode for AC power recovery
System Health Monitoring
• Onboard voltage monitors for CPU cores, +1.8V, +3.3V, +5V, +/-12V, +3.3V Stby, +5V Stby, VBAT, HT, Memory, PCH temperature, System temperature, and Memory temperature • CPU 8 phase-switching voltage regulator • CPU/System overheat control • CPU Thermal Trip support
Fan Control
• Five (5) proprietary 4-pin fan headers • Low noise fan speed control
System Management
• PECI (Platform Environment Control Interface) 3.1 support • SuperDoctor® 5, Watch Dog, NMI • Chassis Intrusion header and detection • Power supply monitoring
LED Indicators
• CPU/system overheat LED • Power LED • Fan failed LED • HDD activity LED • LAN activity LED
Other
• RoHS
Dimensions
• ATX form factor (12.0" x 9.6") (304.80 mm x 243.84 mm)



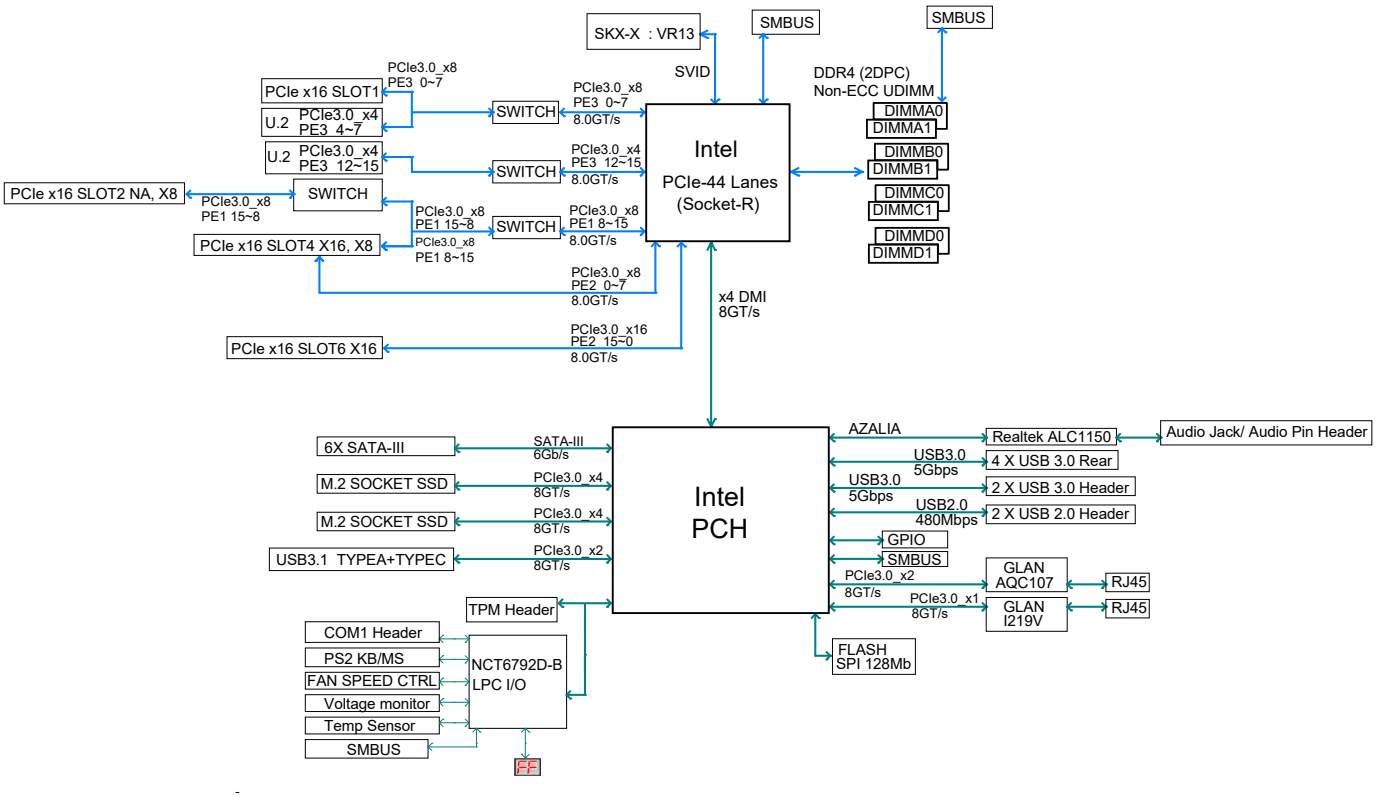
Note 1: The CPU maximum thermal design power (TDP) is subject to chassis and heatsink cooling restrictions. For proper thermal management, please check the chassis and heatsink specifications for proper CPU TDP sizing.

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.

Figure 1-3.
Chipset Block Diagram (44 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-PG300 supports the Intel Core X-Series processor in the LGA2066 socket. With the Intel X299 PCH, the C9X299-PG300 is a high-end, multi-GPU motherboard that offers reliablity and stability. It offers the latest high-performance features such NVMe, M.2/U.2 storage interfaces, and DDR4 memory with speeds of up to 4000MHz(OC).

The C9X299-PG300 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
- PCI-E 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-PG300 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 chip can check the RPM status of a cooling fan. The CPU and chassis fans are controlled by the BIOS Thermal Management through the back panel.

Environmental Temperature Control

System Health sensors monitor temperatures and voltage settings of onboard processors and the system in real time. 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, provide adequate airflow to your system.

System Resource Alert

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

1.5 ACPI Features

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-PG300 motherboard accommodates 24-pin ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, one 12V 8-pin power connection is also required to ensure adequate power supply to the system.

> **Warning:** To avoid damaging the power supply or the motherboard, use a power supply that contains a 24-pin and one 8-pin power connector. Connect the power supplies to the 24-pin power connector (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 noise. 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-PG300 motherboard supports one serial communication connection. COM Port 1 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)

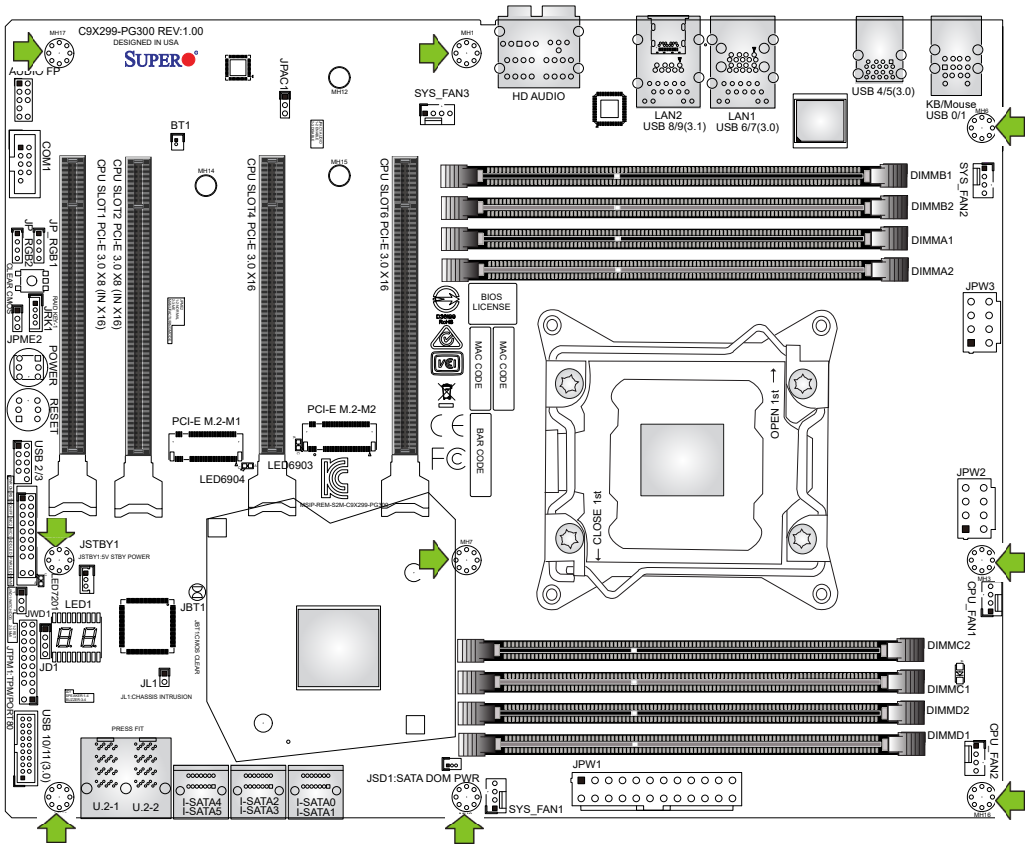


Phillips Screws (9)



Standoffs (9)
Only if Needed

Tools Needed

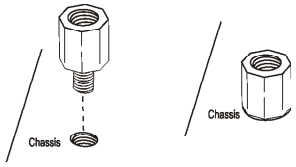


Location of Mounting Holes

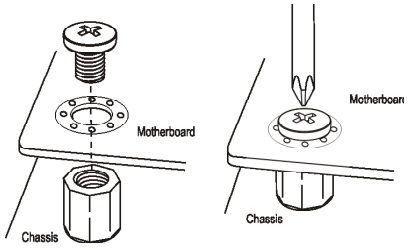
Note: 1) To avoid damaging the motherboard and its components, please do not use a force greater than 8 lb/inch on each mounting screw during motherboard installation. 2) Some components are very close to the mounting holes. Please take precautionary measures to avoid damaging these components when installing 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-PG300. 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

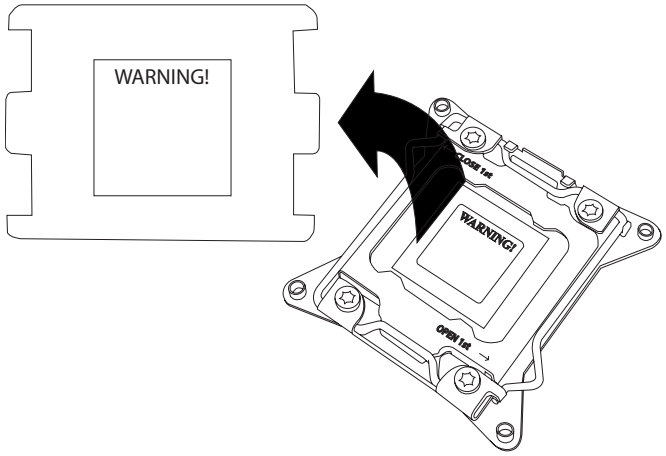
Warning: When handling the processor package, avoid placing direct pressure on the label area of the fan.

Important:

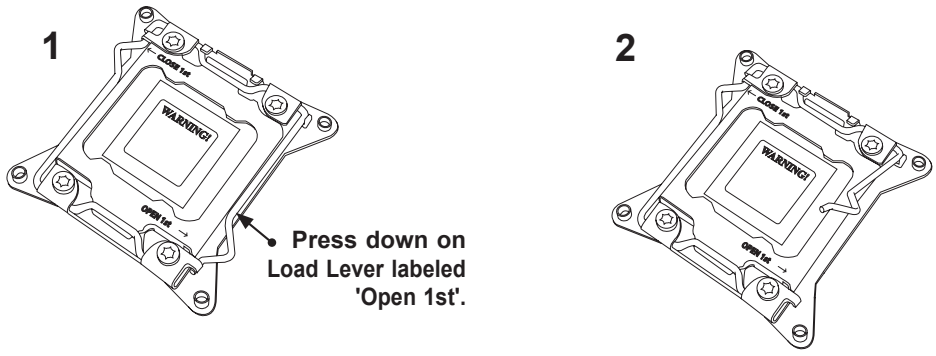
- Always connect the power cord last, and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional 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

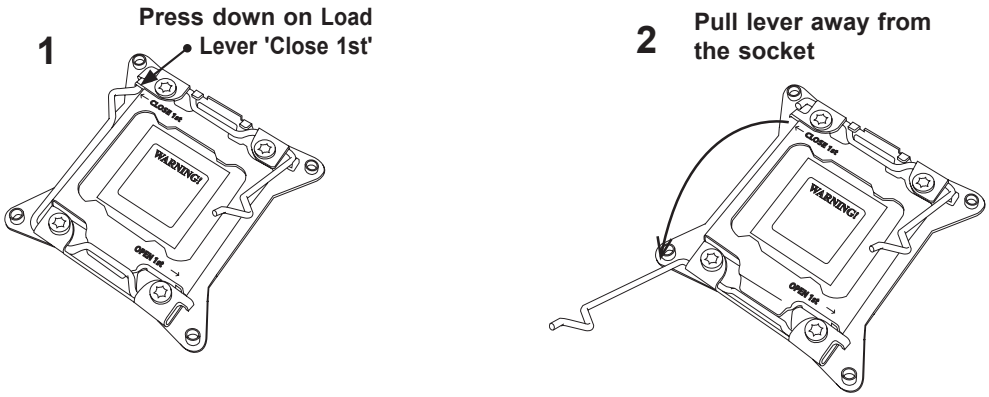
1. Remove the WARNING plastic cap from the socket.



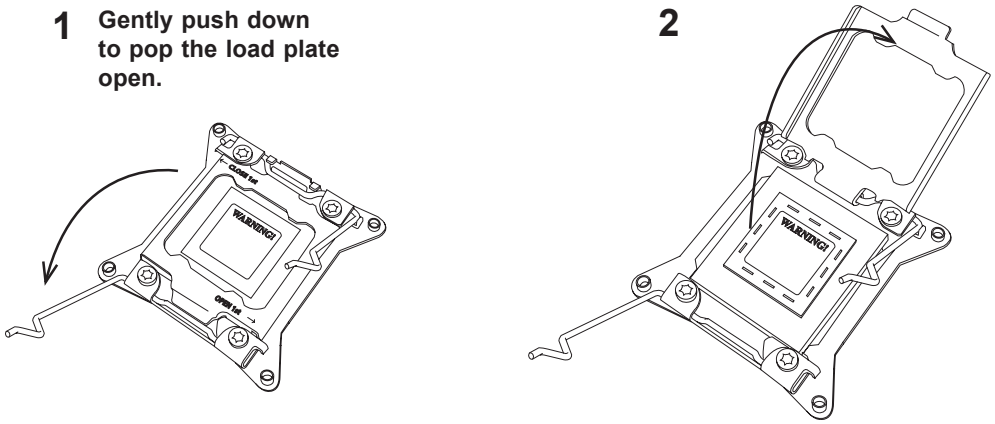
2. There are two load levers on the LGA2066 socket. To open the socket cover, press and release the "Unlock 1st" lever, marked by an unlock symbol.



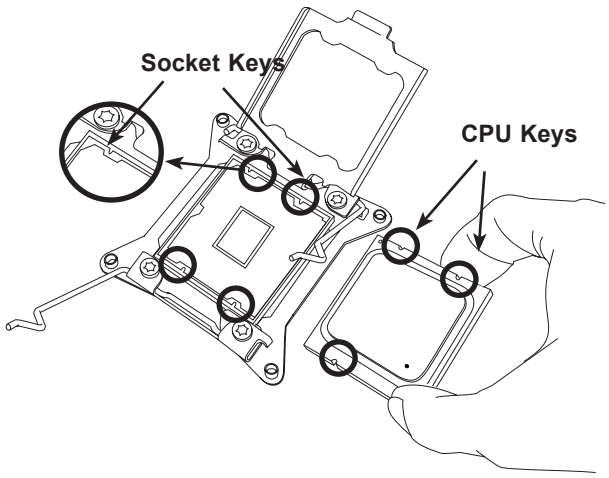
3. Press the "Lock 1st" lever, marked by a lock symbol, to release the load plate that covers the CPU socket from its locking position.



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.

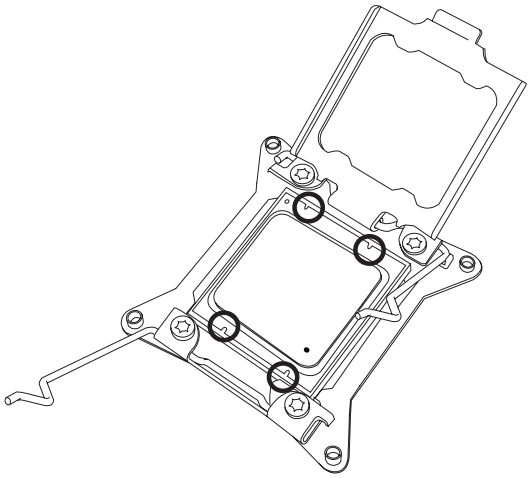


5. Use your thumb and index finger to hold the CPU on its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.

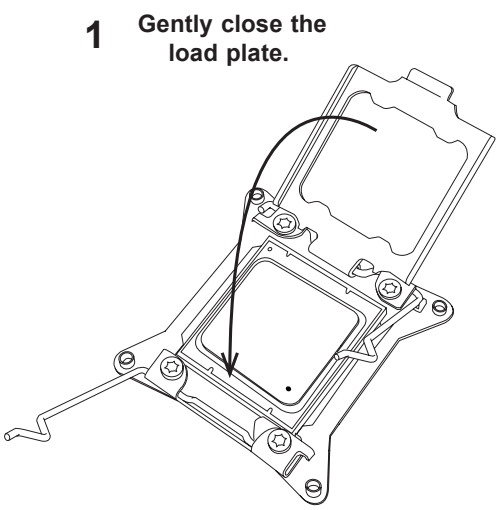


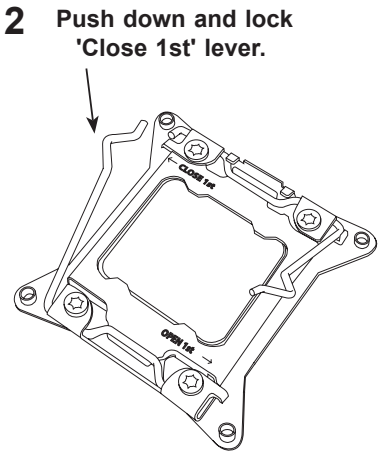
6. Once they are aligned, carefully lower the CPU straight down into the socket. To avoid damaging the CPU or socket, do not drop the CPU onto the socket, move it horizontally or vertically, or rub it against the socket pins.

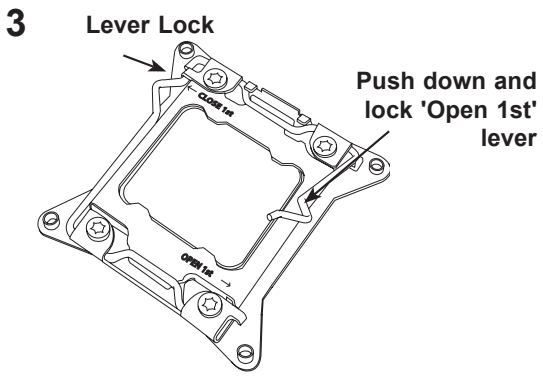
7. With the CPU inside the socket, inspect the four corners of the CPU to make sure that it is properly installed.

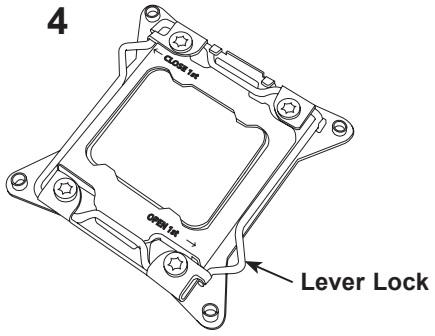


8. Close the load plate with the CPU inside the socket. Lock the "Lock 1st" lever first, then lock the "Unlock 1st" lever second. Gently push the load levers down to the lever locks.





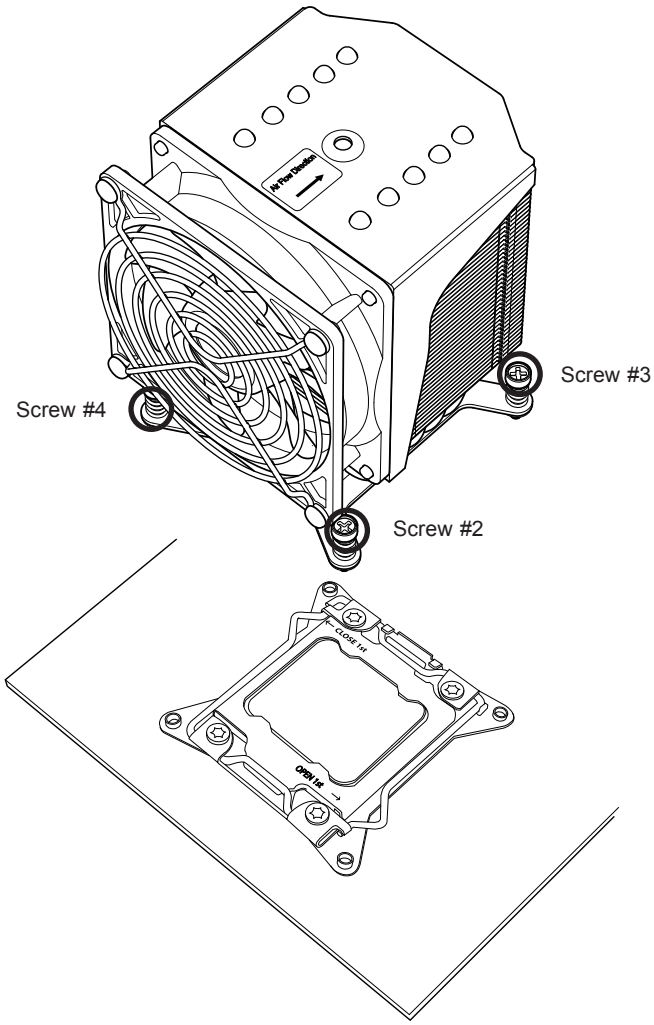




Installing a CPU Heatsink

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.

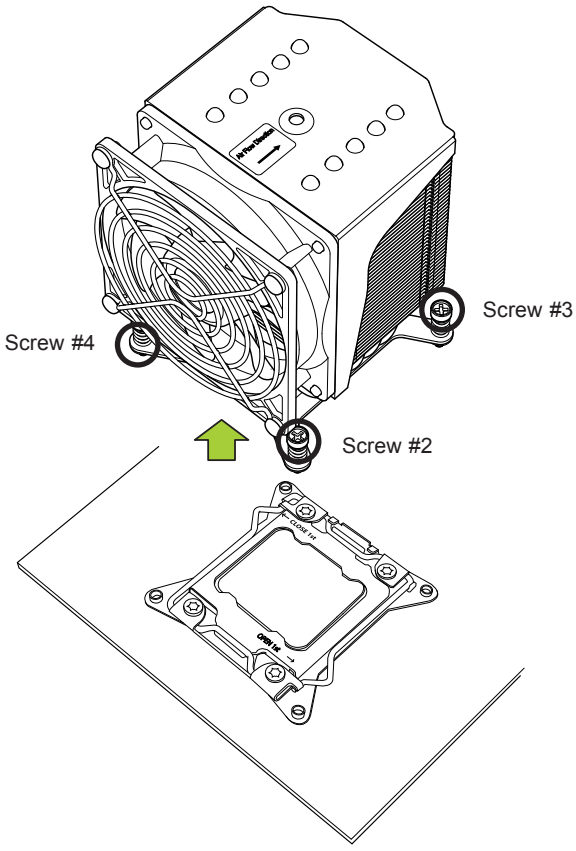
Removing a Heatsink

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

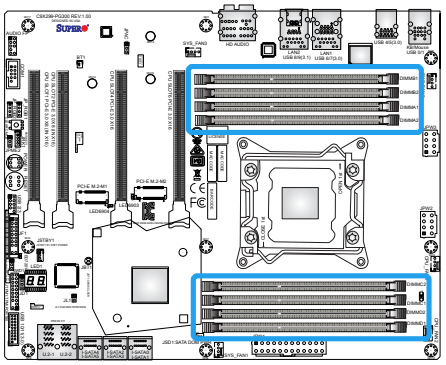
Note: Check the Supermicro website for recommended memory modules.

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

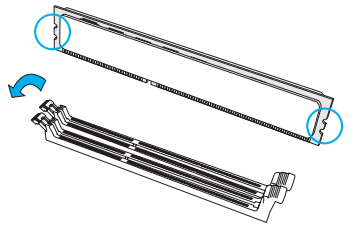
Memory Support

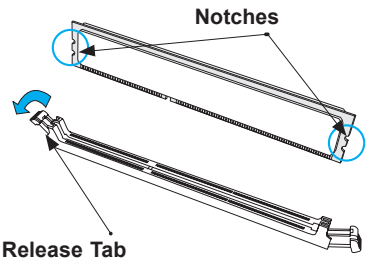
The C9X299-PG300 motherboard supports up to 128GB of Non-ECC DDR4 memory with speeds of up to ~4000MHz (overclocked) in eight memory slots. Populating these DIMM slots with memory modules of the same type and size will result in interleaved memory, which will improve memory performance.

DIMM Installation



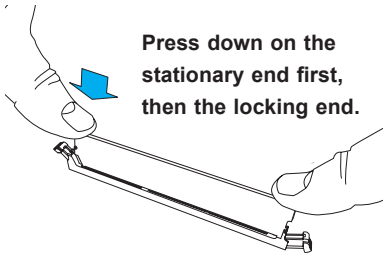
1. Insert the desired number of DIMMs into the memory slots, starting with DIMMA1, DIMMB1, DIMMC1, DIMMD1, then DIMMA2, DIMMB2, DIMMC2, DIMMD2. For best performance, please use the memory modules of the same type and speed in the same bank.
2. Push the release tabs outwards on both ends of the DIMM slot 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

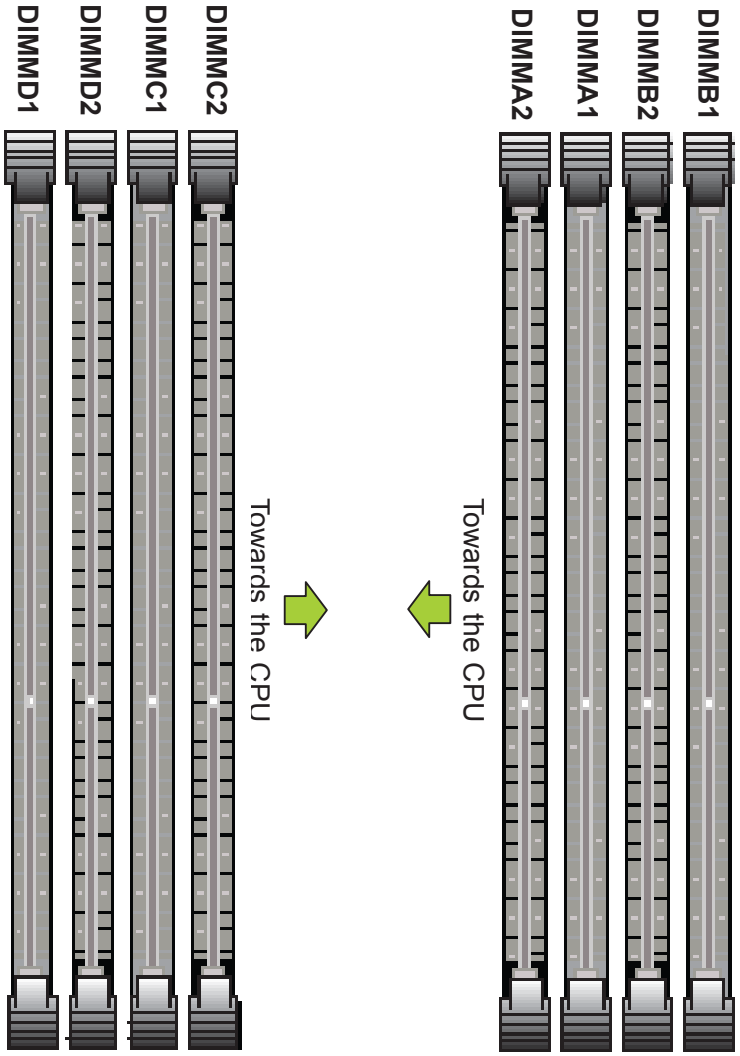
Press both release tabs on the ends of the DIMM module to unlock it. Once the DIMM module is loosened, remove it from the memory slot.



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.

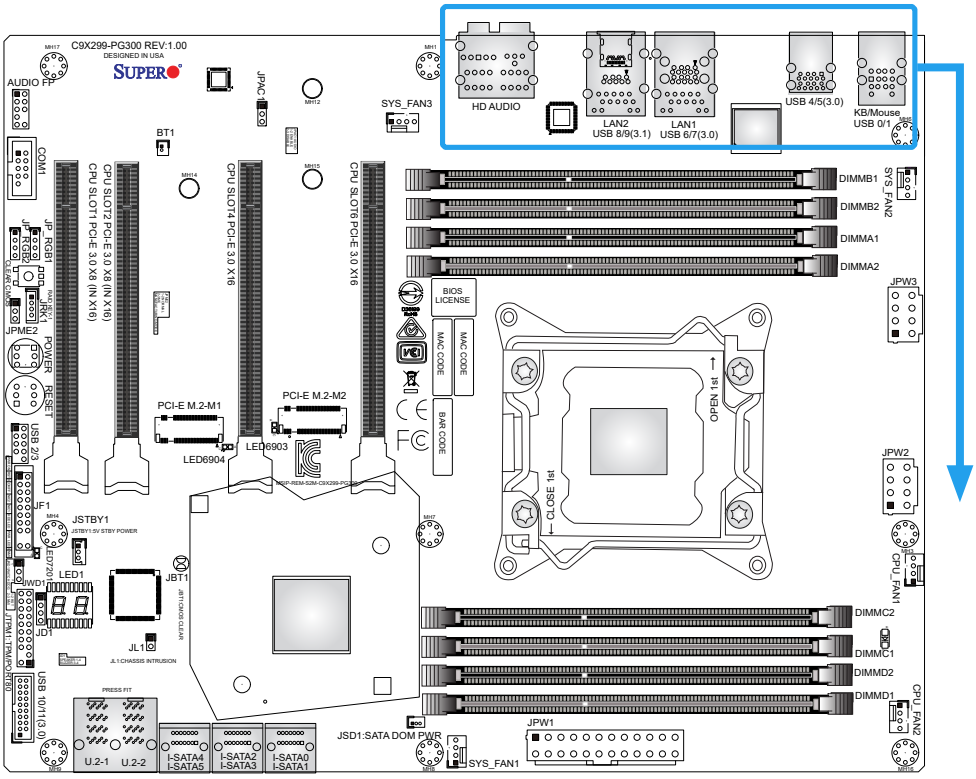
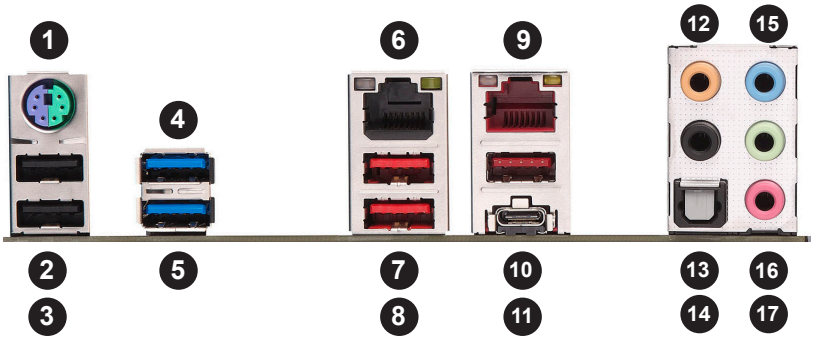


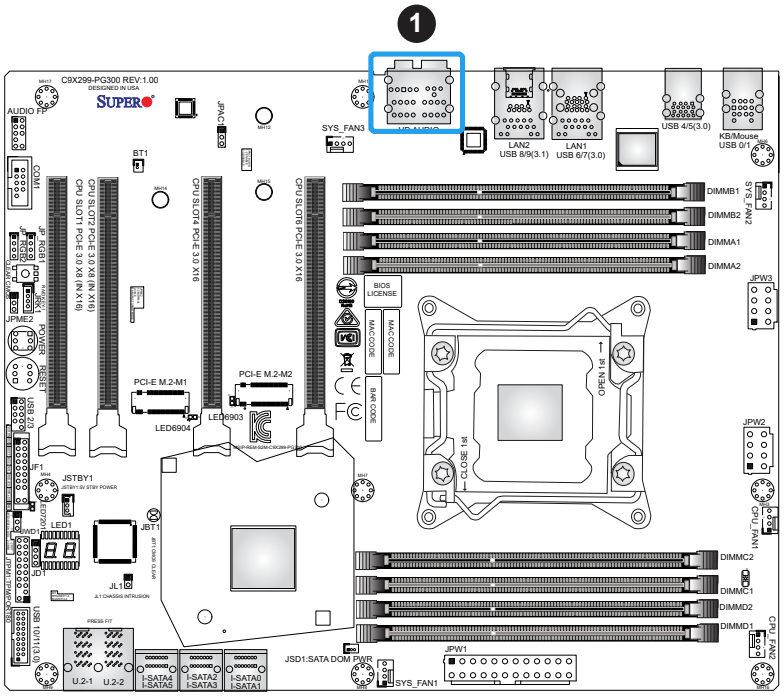
Figure 2-1. I/O Port Locations and Definitions



Rear I/O Ports							
#	Description	#	Description	#	Description	#	Description
1.	PS2 KB/Mouse	6.	LAN1	11.	USB8 (3.1)	16.	Line Out
2.	USB1	7.	USB7 (3.0)	12.	CEN/LFE Out	17.	Mic In
3.	USB0	8.	USB6 (3.0)	13.	Surround Out		
4.	USB5 (3.0)	9.	LAN2	14	SPDIF Out		
5.	USB4 (3.0)	10.	USB9 (3.1)	15.	Line 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 for front, rear, center and subwoofer speakers. 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), four USB 3.0 ports (USB4/5, USB6/7), and two USB 3.1 ports (USB 8/9) located on the I/O back panel. The motherboard also has one front access USB 2.0 header (USB2/3). The USB10/11 header is USB 3.0 Type A. The onboard headers can be used to provide chassis USB access with a cable (not included).

Back Panel USB 0/1 (2.0) Pin Definitions

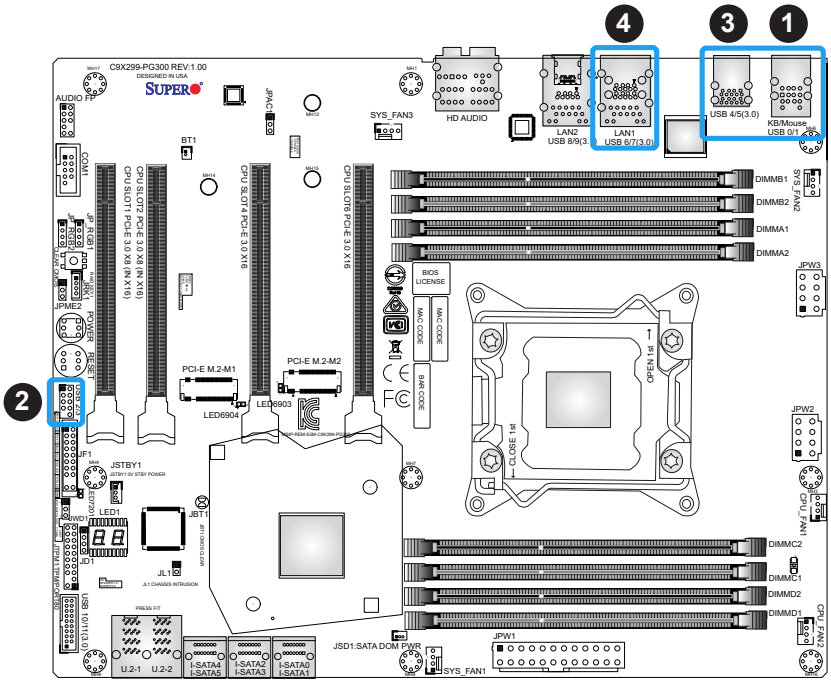
Pin#	Definition	Pin#	Definition
1	+5V	5	+5V
2	USB_N	6	USB_N
3	USB_P	7	USB_P
4	Ground	8	Ground

Front Panel USB 2/3 (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, 6/7 (3.0) Pin Definitions

Pin#	Definition	Pin#	Definition
A1	VBUS	B1	Power
A2	D-	B2	USB_N
A3	D+	B3	USB_P
A4	GND	B4	GND
A5	Stda_SSRX-	B5	USB3_RN
A6	Stda_SSRX+	B6	USB3_RP
A7	GND	B7	GND
A8	Stda_SSTX-	B8	USB3_TN
A9	Stda_SSTX+	B9	USB3_TP

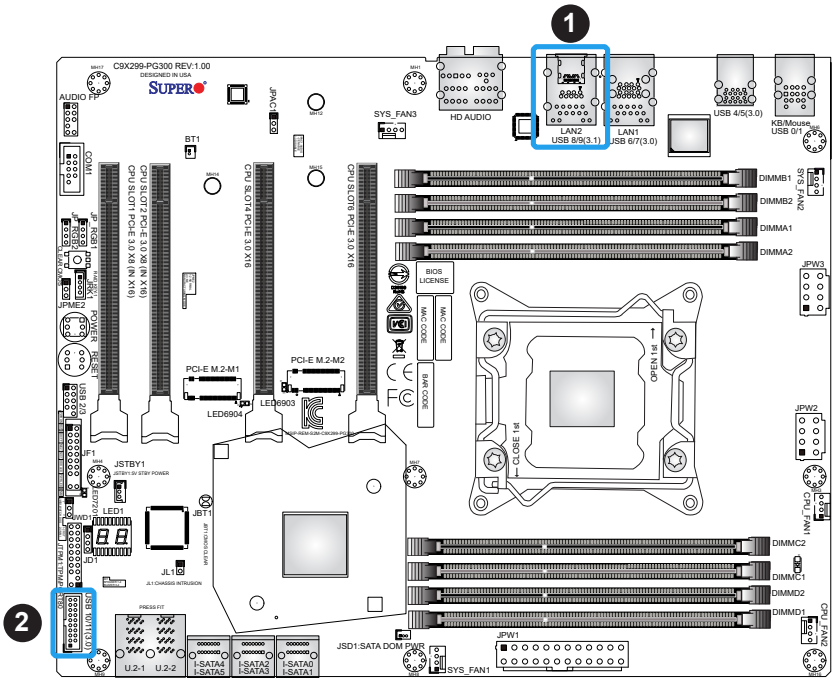


1. USB0/1
2. USB2/3
3. USB4/5
4. USB6/7

Universal Serial Bus (USB) Ports *(Continued)*

Front Panel USB 10/11 (3.0) Header Pin Definitions			
Pin#	**Pin#**	**Signal Name**	**Definition**
1	19	VBUS	Power
2	18	StdA_SSRX-	SuperSpeed Receiver
3	17	StdA_SSRX+	Differential Pair
4	16	Ground	Ground of PWR Return
5	15	StdA_SSTX-	SuperSpeed Transmitter
6	14	StdA_SSTX+	Differential Pair
7	13	GND_DRAIN	Ground for Signal Return
8	12	D-	USB 2.0 Differential Pair
9	11	D+	

Type A USB 8/9 (3.1) Pin Definitions			
Pin#	**Definition**	**Pin#**	**Definition**
1	VBUS	5	SSRX-
2	USB_N	6	SSRX+
3	USB_P	7	GND
4	Ground	8	SSTX-
		9	SSTX+

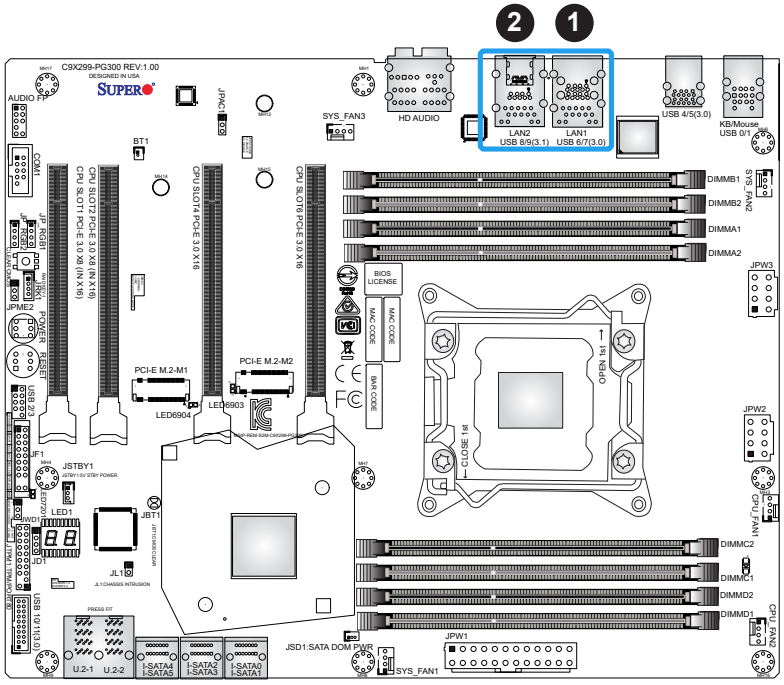


1. USB8/9
2. USB10/11

LAN Ports

The motherboard has one 5G Ethernet port and one 1Gigabit Ethernet port (LAN1 and LAN2) on the I/O back panel. These ports accept RJ45 cables. Please refer to the LED Indicator section 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.

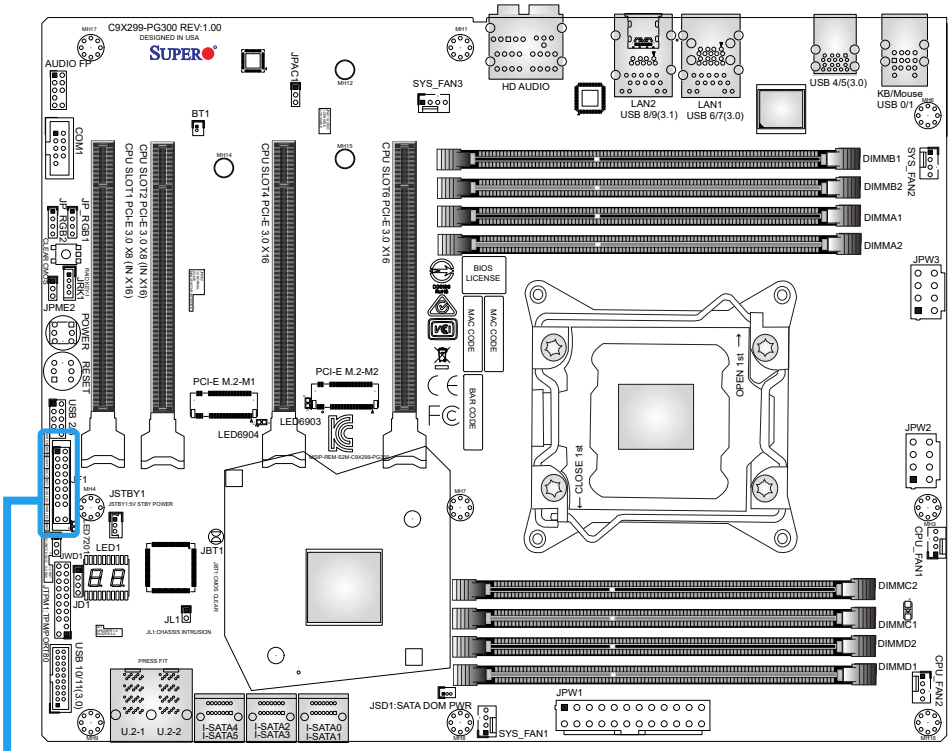
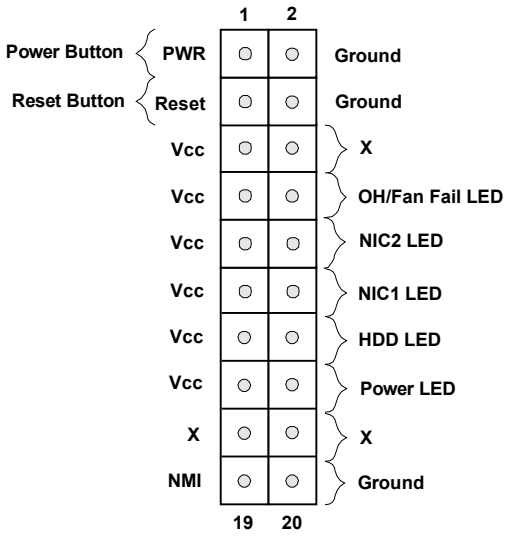


Figure 2-2. JF1 Header Pins



Power Button

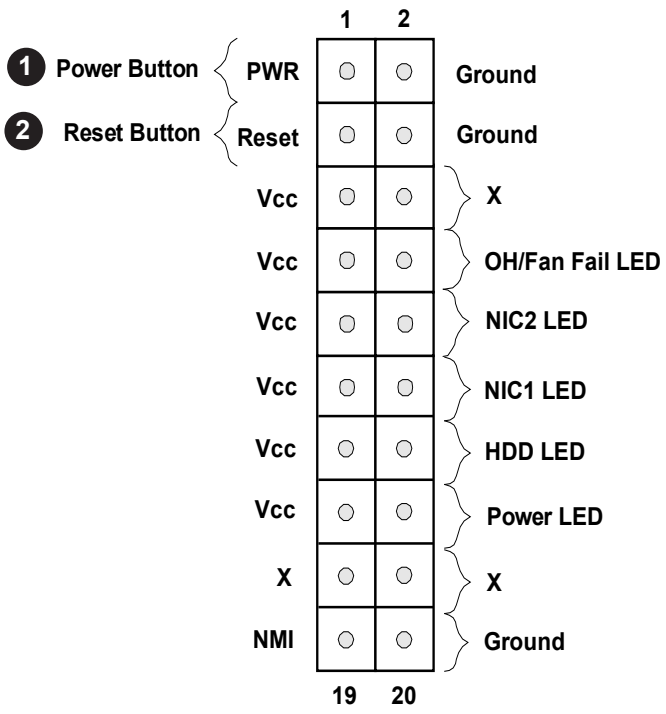
The Power Button connection is located on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS - see Chapter 4). To turn off the power when the system is in suspend mode, press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

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



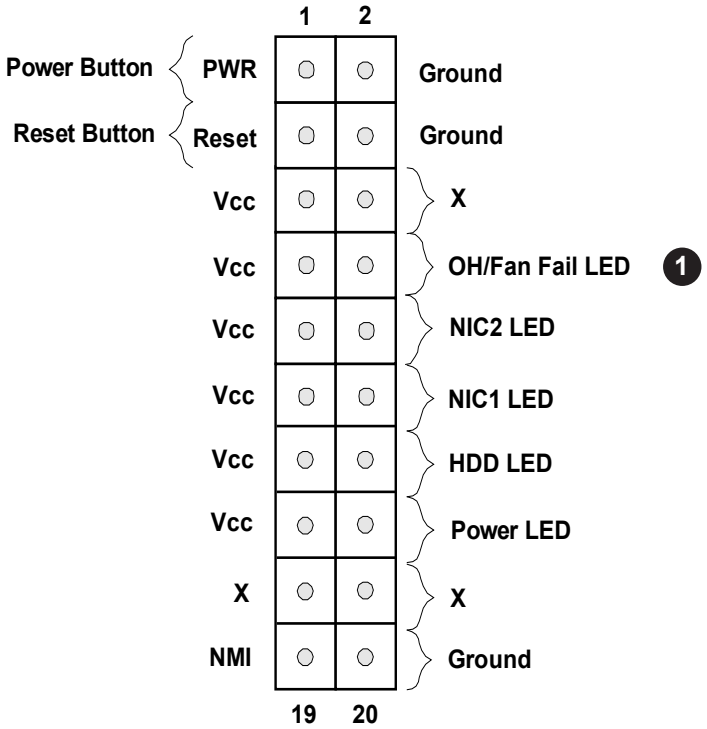
1. PWR Button
2. Reset Button

Overheat (OH)/Fan Fail

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

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

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



1. OH/Fan Fail LED

NIC1/NIC2 (LAN1/LAN2)

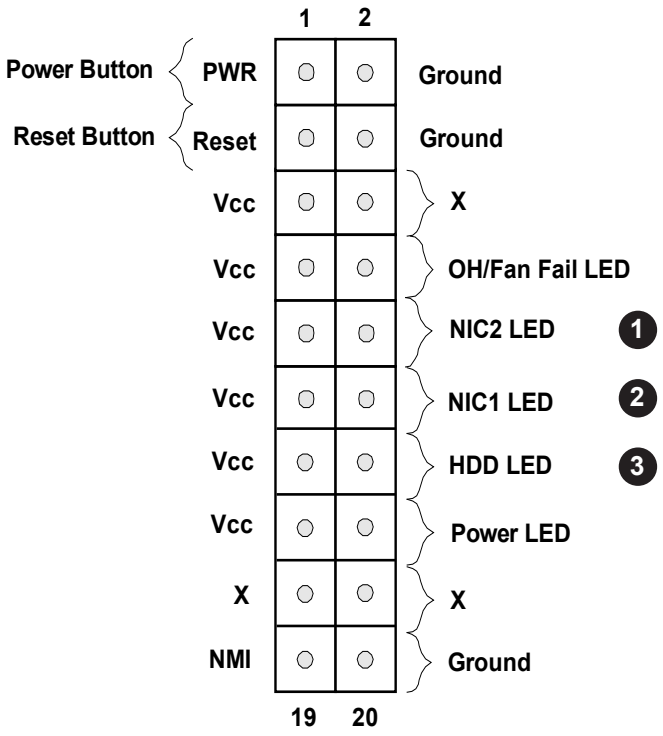
The NIC (Network Interface Controller) LED connection for LAN port 1 is located on pins 11 and 12 of JF1, and the LED connection for LAN port 2 is on pins 9 and 10. Attach the NIC LED cables here to display network activity. Refer to the table below for pin definitions.

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

HDD LED/UID Switch

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 Stdby
14	HDD Active



1. NIC2 LED
2. NIC1 LED
3. HDD LED

Power LED

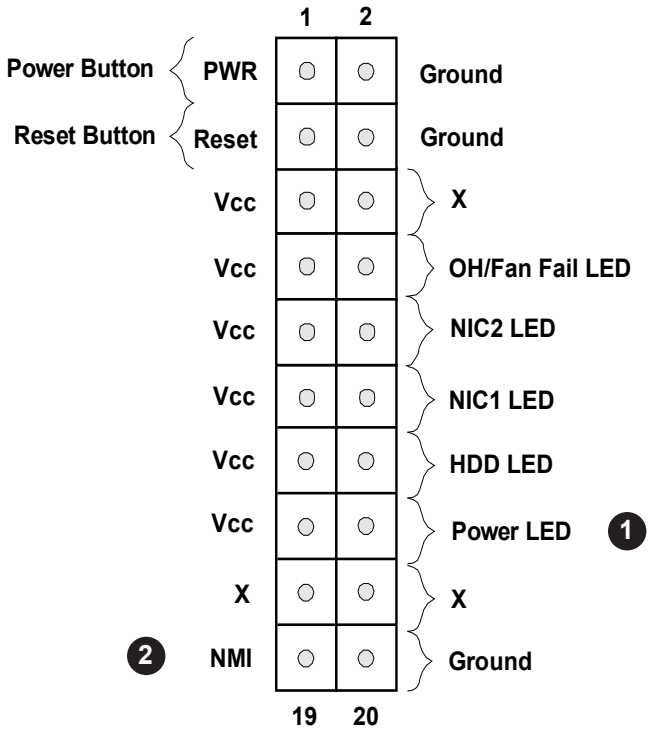
The Power LED connection is located on pins 15 and 16 of JF1. See the table below for pin definitions.

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. See the table below for pin definitions.

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



1. PWR LED
2. NMI

2.8 Connectors

Power Connections

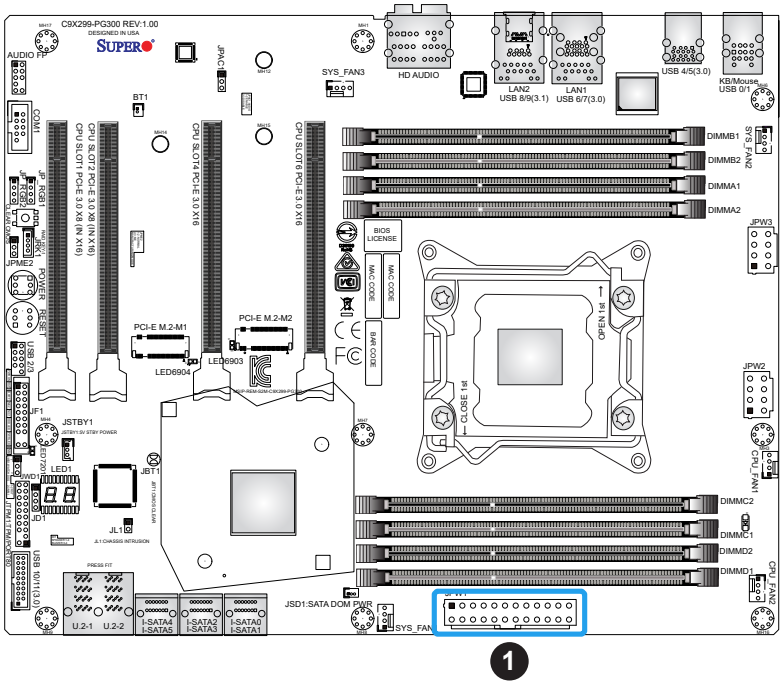
Main ATX Power Supply Connector

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)

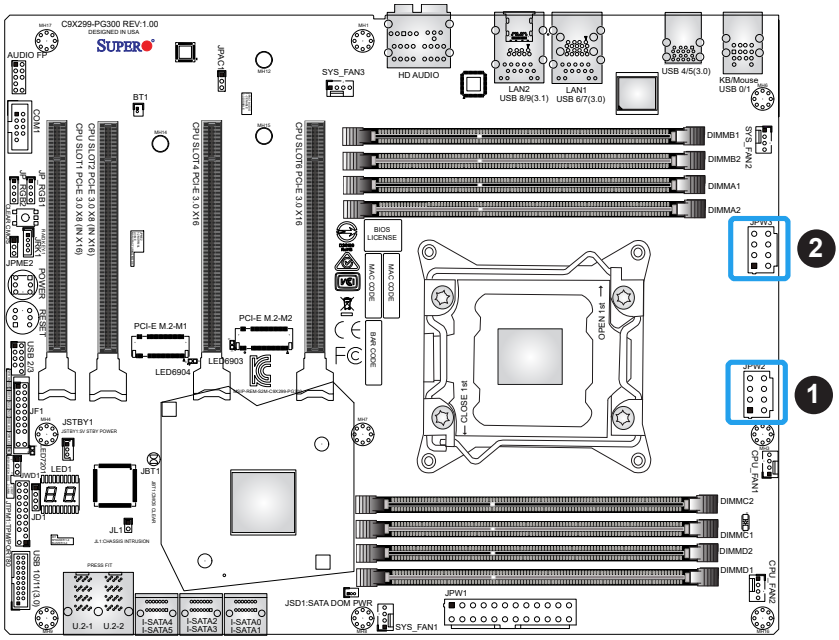
Secondary Power Connectors

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 8-Pin PWR (Required)
2. JPW3 8-Pin PWR (Required)

Headers

Fan Headers

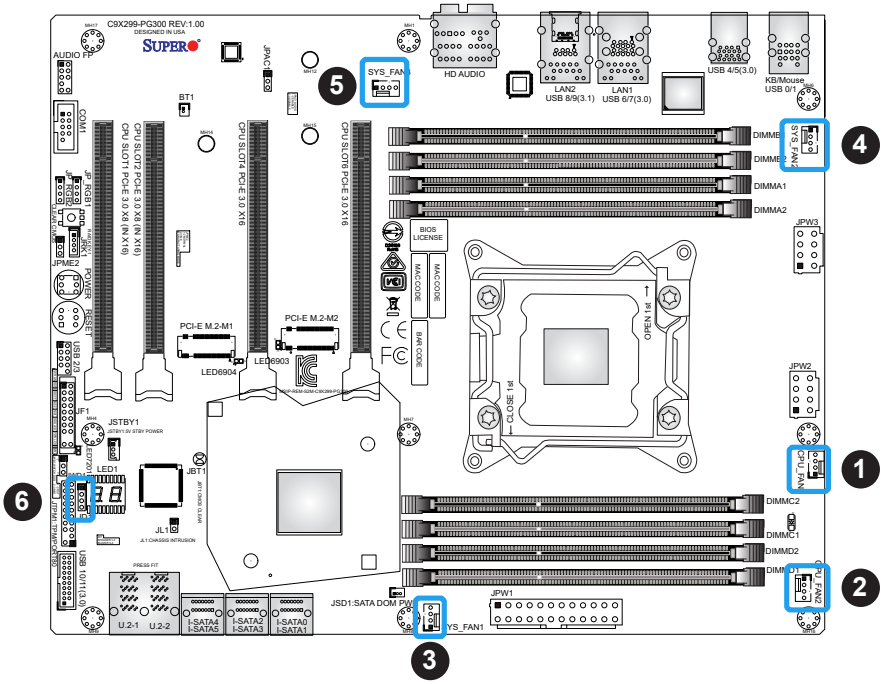
The C9X299-PG300 has five fan headers (FAN1 ~ FAN5). All of these 4-pin fan headers are backwards-compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management. Refer to the table below for pin definitions.

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

Speaker

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

Speaker Connector Pin Definitions	
Pin#	**Definition**
1-4	Speaker

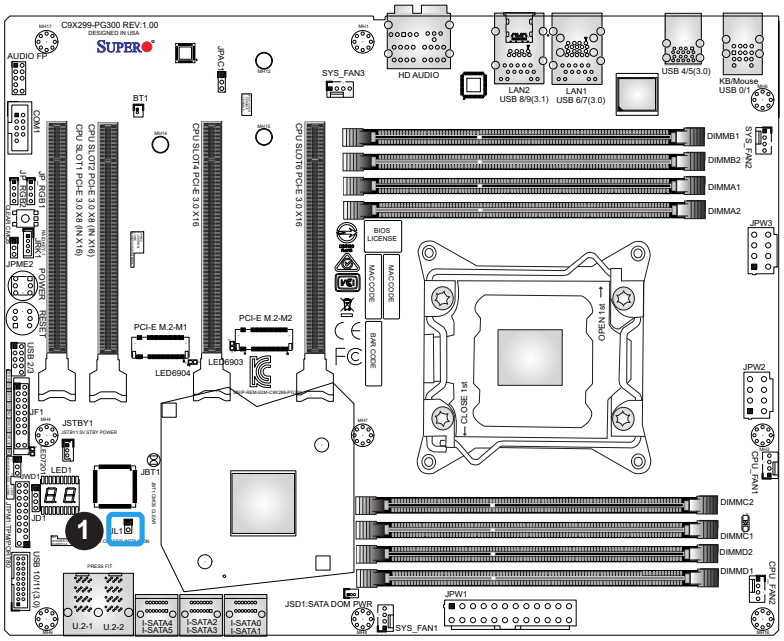


1. FAN1
2. FAN2
3. FAN3
4. FAN4
5. FAN5
6. Speaker Header

Chassis Intrusion

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

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



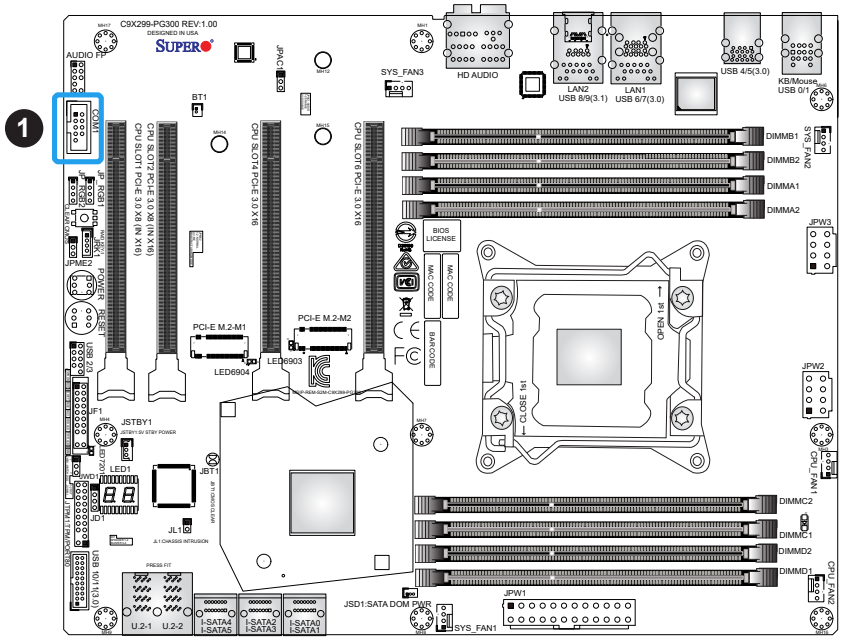
1. Chassis Intrusion

Serial Ports

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

COM Port 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



1. COM1

Standby Power

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 Pin Definitions

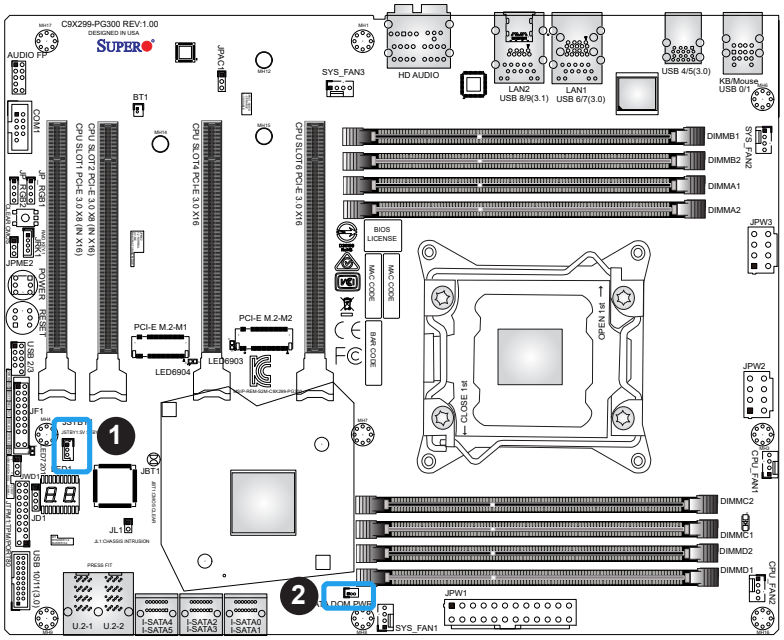
Pin#	Definition
1	+5V Standby
2	Ground
3	NC

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 Pin Definitions

Pin#	Definition
1	5V
2	Ground
3	Ground



1. Standby PWR
2. JSD1 (DOM PWR)

Intel RAID Key Header

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

Intel RAID Key Pin Definitions

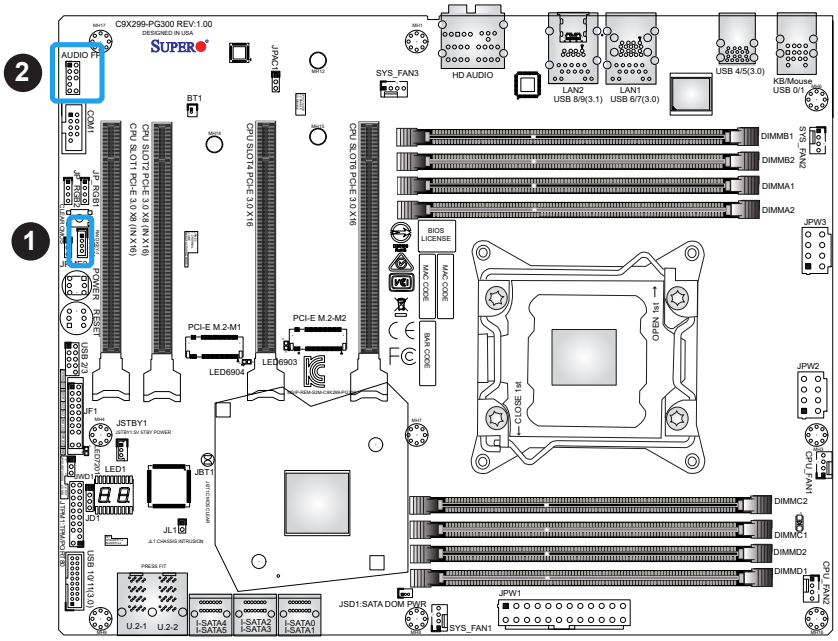
Pins	Definition
1	GND
2	PU 3.3V
3	GND
4	PCH RAID KEY

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



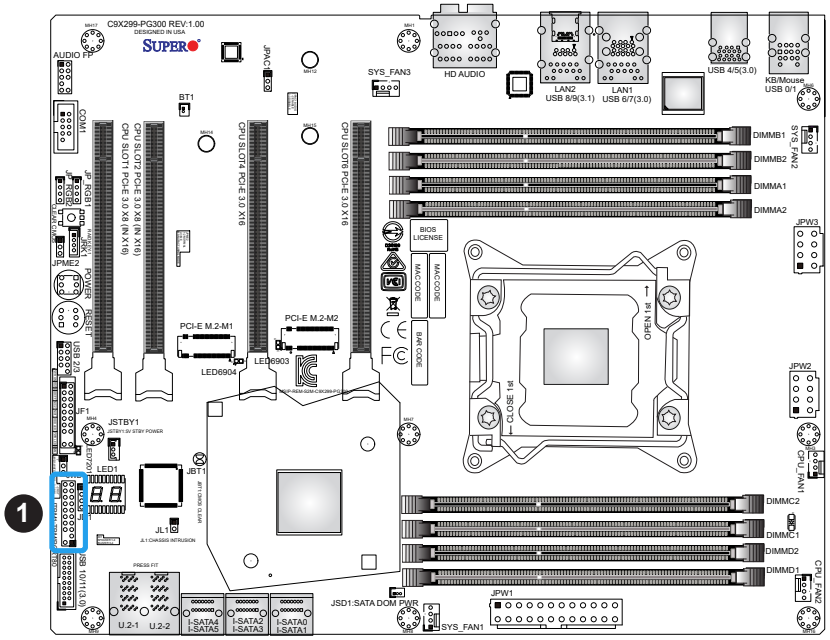
1. Intel RAID Key Header
2. Audio Header

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	<(KEY)>
5	LRESET#	6	+5V (X)
7	LAD 3	8	LAD 2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4	14	SMB_DATA4
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	LDRQ# (X)



1. TPM Header

SATA Ports

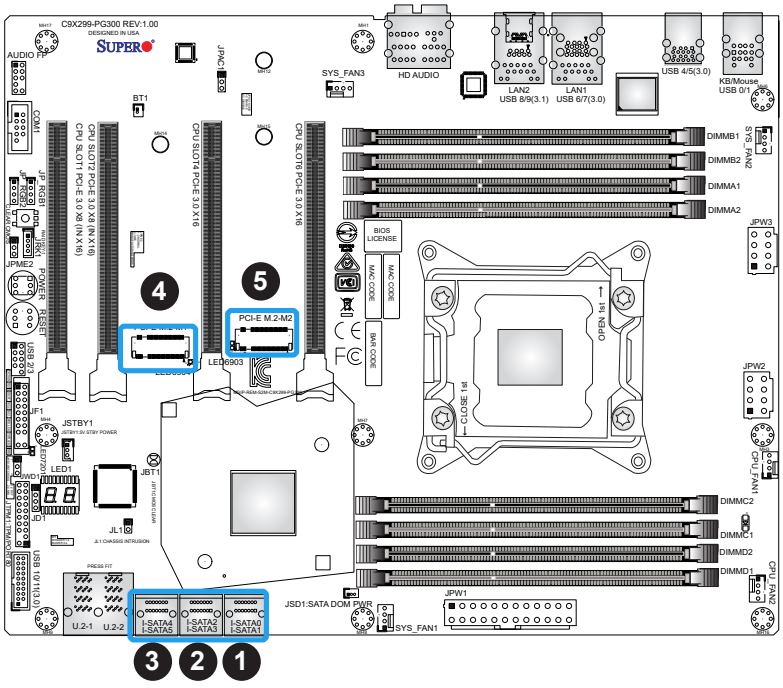
Six SATA 3.0 connectors, supported by the Intel X299 PCH chipset, are located on the C9X299-PG300 motherboard. These SATA ports support RAID 0, 1, 5, and 10. SATA ports provide serial-link signal connections, which are faster than the connections of Parallel ATA. Refer to the tables below for pin definitions.

SATA 3.0 Port Pin Definitions

Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

M.2 Connection

The C9X299-PG300 board contains two M.2 connectors. M.2 was formerly Next Generation Form Factor (NGFF) and serves to replace mini PCI-E and mSATA. M.2 allows for a greater variety of card sizes, increased functionality, and spatial efficiency.



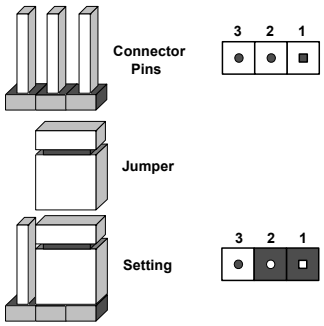
1. I-SATA0~1
2. I-SATA2~3
3. I-SATA4~5
4. M.2 Connector
5. M.2 Connector

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.

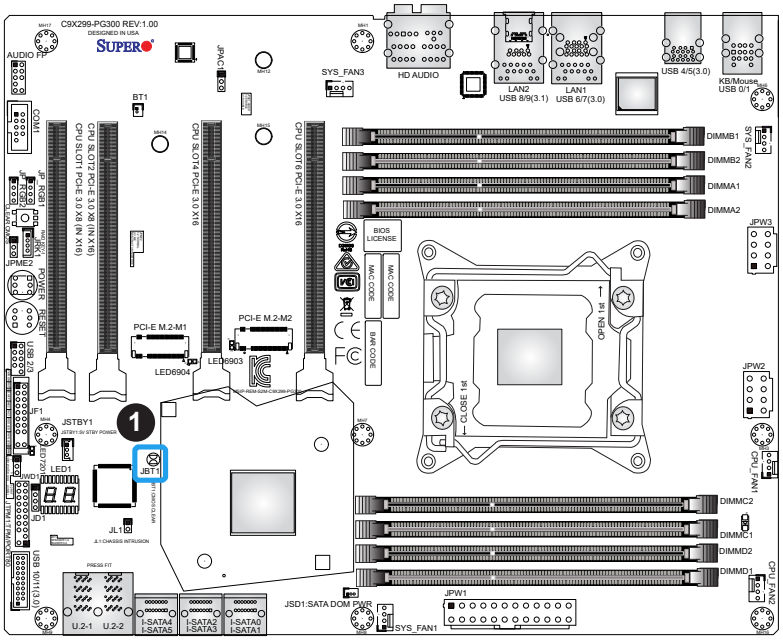
Note: On two-pin jumpers, Closed means the jumper is on and Open means the jumper is off the pins.



CMOS Clear

JBT1 is used to clear the CMOS. Instead of pins, this jumper consists of contact pads to prevent accidental clearing of the CMOS. To clear the CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection.

Note: Shut down the system and then short JBT1 to clear the CMOS.



1. CMOS Clear

Manufacturing Mode Select

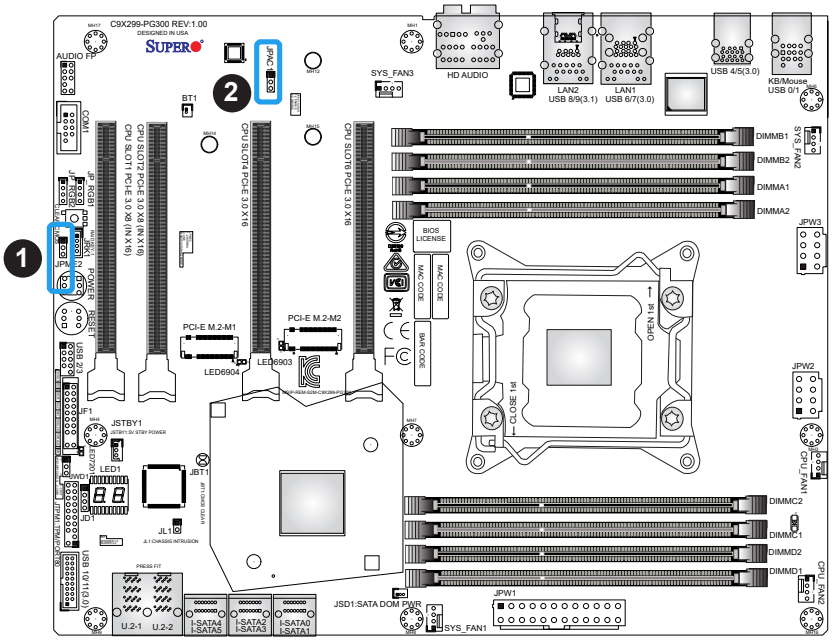
Close pins 2 and 3 of jumper JPME2 to bypass SPI flash security and force the system to operate in the manufacturing mode, which will allow the user to flash the system firmware from a host server for system setting modifications. Refer to the table below for jumper settings.

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

Audio Enable

Use JPAC1 to enable or disable the onboard audio support. Refer to the table below for jumper settings.

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



1. Manufacturing Mode
2. Audio Enable

2.10 LED Indicators

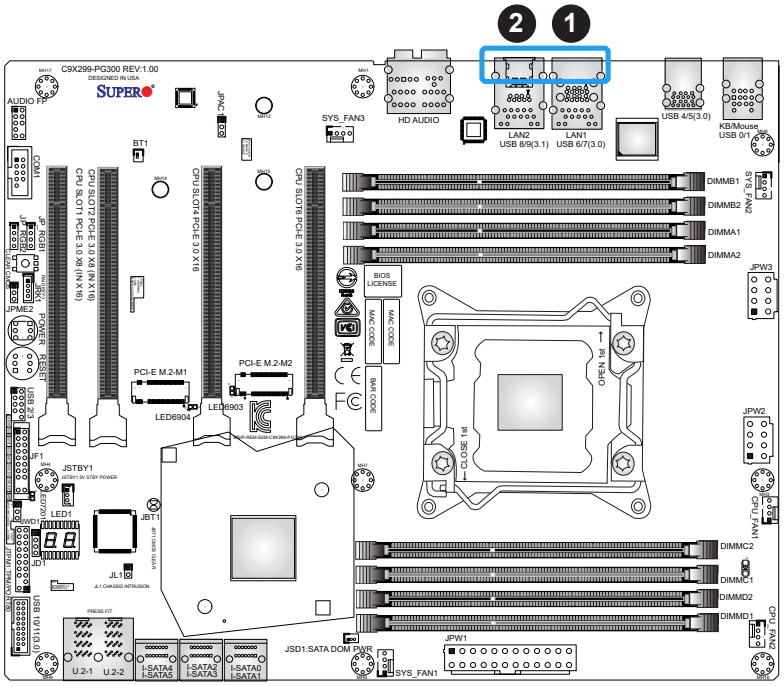
LAN LEDs

Two LAN ports (LAN 1 and LAN 2) 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 (Left) LED State	
LED Color	**Definition**
Off	No Connection
Amber	1 Gbps
Green	5 Gbps

LAN2 Link LED (Left) LED State	
LED Color	**Definition**
Off	No Connection
Amber	100 Mbps
Green	1 Gbps

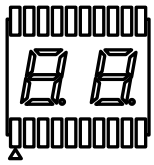
LAN1/2 Activity LED (Right) LED State		
Color	**Status**	**Definition**
Green	Flashing	Active

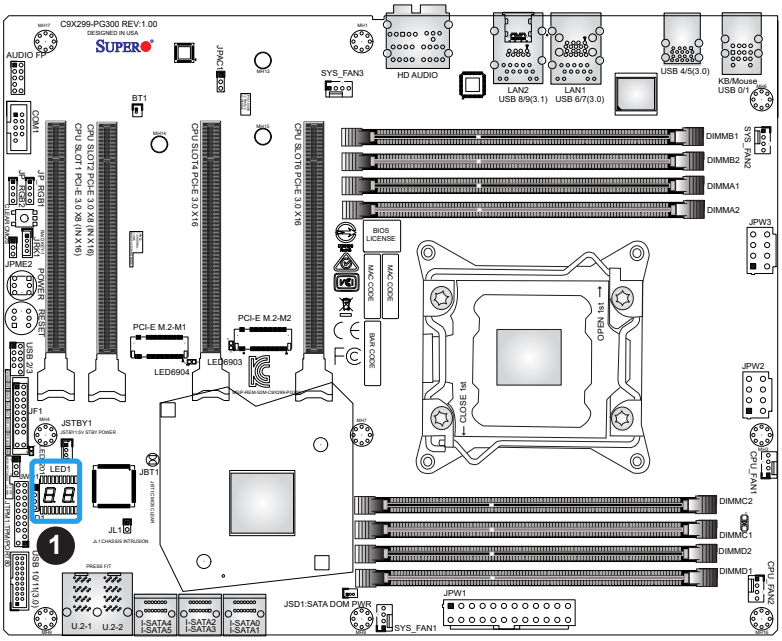


1. LAN1 LEDs
2. LAN2 LEDs

Status Code LED

LED1 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. LED1

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 128GB 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 on Section 2-4 in Chapter 2.

Question: How do I update my BIOS?

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

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/.

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

BIOS

4.1 Introduction

This chapter describes the AMIBIOS™ Setup utility for the C9X299-PG300 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 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 an overview of hardware status are displayed. When in Advanced Mode, all following configuration menus and their contents become available.

4.2 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 is displayed:

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.

4.3 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 or **Enabled**.

Core 1~10 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 to. The default is **0**.

OverClocking Feature

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

WDT Enable

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

Hyper-Threading [ALL]

This feature enables hyper-threading, which is a software method to control logical processor threads. The options are Disabled or **Enabled**.

Core Disable Bitmap(Hex)

Enter a hex value. Value "**0**" enables all cores. Value "3fff" disables all cores.

SpeedStep (Pstates)

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

Boot performance mode

This feature controls the performance state that the BIOS will set intially. The options are **Max Performance** or 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 disable only in overclocking situations where the turbo frequency must remain constant. The options are **Enabled** or Disabled.

Turbo Mode

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

CPU Flex Ratio Override

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

Current Limit Override

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

Current Limitation

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

PL1 Limit

This feature enables the PL1 limit. If set to disabled, the BIOS will program default values for the next two features. The options are Disabled or **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 is set to Disabled, a default will be programmed by the BIOS. The options are Disabled or **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**.

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** or Enabled.

EPP Enable

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

Scalability

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

PPO-Budget

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

CPU C State Control

Autonomous Core C-State

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

OS ACPI Cx

This feature controls reporting of CC3/CC6. The options are **ACPI C2** or 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 set to Manual, the following memory timing configurations become available.*

Memory Frequency

This feature controls the maximum memory frequency (in Mhz). The options are **Auto**, 1000, 1200, 1333, 1400, 1600, 1800, 1866, 2000, 2133, 2200, 2400, 2600, 2666, 2800, 2933, 3000, 3200, 3400, 3466, 3600, 3733, 3800, 4000, 4200, 4266, and 4400.

Memory Voltage (mV)

Enter a value for Memory Voltage. To select 1.200 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 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**.

tREFIx9

Enter a value for desired tREFIx9. 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 tWRDD. 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 **"+"** or "-".

Adjust PII

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

Change PllTrim Value

Enter a value for PllTrim. 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 **"+"** or "-".

Change MC-PllTrim Value

Enter a value for MC-PllTrim. 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 **"+"** or "-".

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.

CLR Voltage Offset (mV)

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

Offset Prefix

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

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

This feature controls whether the offset value prefix. The options are **"+"** or "-".

SVID/FIVR

SVID Support

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

If this feature is enabled, the next feature becomes 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 or **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 it might create issues with proper power delivery control while overclocking, especially BCLK overclocking. The options are Disabled or **Enabled**.

4.4 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]

This feature enables hyper-threading. The options are Disabled or **Enabled**.

Max CPUID Value Limit

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

Execute Disable Bit

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

Intel (VMX) Virtualization Technology

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

PPIN Control

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

Hardware Prefetcher

This feature controls the MLC streamer prefetcher. The options are Disabled or **Enabled**.

Adjacent Cache Prefetcher

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

DCU Streamer Prefetcher

This feature enables DCU Streamer Prefetcher, which is an L1 data cache prefetcher. The options are Disabled or **Enabled**.

DCU IP Prefetcher

This feature enables DCU IP Prefetcher, which is an L1 data cache prefetcher. The options are Disabled or **Enabled**.

LLC Prefetch

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

DCU Mode

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

Extended APIC

This feature enables extended APIC support. The options are **Disabled** or Enabled.

AES-NI

This function enables AES-NI support. The options are Disabled or **Enabled**.

APIC Physical Mode

This function enables APIC Physical Destination Mode. The options are **Disabled** or Enabled.

Advanced Power Management Configuration

CPU P State Control

SpeedStep (Pstates)

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

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

4.5 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, 2000, 2400, 2600, and 2666.

Custom Refresh Enable

This feature enables a custom memory refresh rate. The options are **Disabled** or 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 for during DLL reset tests. The default is **0**.

Memory Topology

The currently installed memory topology is displayed here.

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

CPU SLOT4 PCI-E 3.0 x 8

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

JNVME0

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

JNVME2

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

PCI-E Completion Timeout disable

IOAT Configuration

Intel® VT for Directed I/O (VT-d)

Intel® VMD technology

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 or **Enabled**.

Install Windows 7 USB Support

Enable this feature to use the USB keyboard and mouse during the Windows 7 installation since the native XHCI driver support is unavailable. Use a SATA optical drive as a USB drive. USB CD/DVD drives are not supported. Disable this feature after the XHCI driver has been installed in Windows. The options are **Disabled** and Enabled.

RSA Support

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

Azalia

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

SATA And RST Configuration

SATA Controller(s)

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

Configure SATA as

Use this feature to select the mode for the installed SATA drives. The options are **AHCI** or RAID.

Aggressive Link Power Management

Select enabled for the PCH to aggressively enter the link power state. The options are Disabled or **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. Set to Enabled for hot-plugging support, which will allow the user to replace a SATA disk drive without shutting down the system. The options are Enabled or **Disabled**.

Spin Up Device

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

SATA Device Type

Use this feature to identify the type of HDD that is connected to the STATA port. The options are **Hard Disk Drive** or 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 or **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 or **Enabled**.

Native PCIE Enable

This feature enables Native PCIE control. The options are Disabled or **Enabled**.

Native ASPM

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

Quiet Boot

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

Bootup Num-Lock

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

Option ROM Messages

This feature controls the display mode for Option ROM. The options are **Force BIOS** or 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** or Postponed.

Port 61h Bit-4 Emulation

This feature enables port 61h bit-4 toggling in SMM. The options are **Disabled** or 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 or **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** or 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** or 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 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) or Checked (Enabled).

Setup Mode

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

NCT6792D Super IO Configuration

Serial Port 1 Configuration

Serial Port 1

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

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

Change Settings

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

Serial Port Console Redirection

COM1
Console Redirection

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

Console Redirection Settings

Terminal Type

This feature controls the terminal emulation type. The options are VT100, **VT100+**, VT-UTF8, and ANSI.

Bits per second

This feature controls the transmission speed of the host serial port, which must be matched by the remote serial port. The options are 9600, 19200, 38400, 57600, and **115200**.

Data bits

This feaure controls the data bits. The options are 7 or **8**.

Parity

This feature controls whether parity bits are sent with data bits in order to detect transmission errors. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

This feature controls the amount of stop bits to send at the end of a data packet. Slow devices may require more than one stop bit. The options are **1** or 2.

Flow Control

This feature can prevent data loss from buffer overflow. The options are **None** or Hardware RTS/CTS.

VT-UTF8 Combo Key Support

This feature enables VT-UTF8 Combo Key support for ANSI/VT100 terminals. The options are Unchecked (Disabled) or **Checked** (Enabled).

Recorder Mode

This feature enables only text to be sent across consoles. The options are **Unchecked** (Disabled) or Checked (Enabled).

Resolution 100x31

This feature enables extended terminal resolution. The options are Unchecked (Disabled) or **Checked** (Enabled).

Legacy OS Redirection Resolution

This feature controls the number of rows and columns supported by redirection on legacy operating systems. The options are **80x24** or 80x25.

Putty KeyPad

This feature controls Putty KeyPad support. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

Redirection After BIOS POST

This feature controls when redirection is enabled. The BootLoader option disables redirection until after booting to legacy operating system. The options are **Always Enable** or BootLoader.

Legacy Serial Redirection Port

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

Console Redirection

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

Console Redirection Settings

Terminal Type

This feature controls which terminal type is used for Out-of-Band Management. The preferred type is VT-UTF8, then VT100+, then VT100. The options are VT100, VT100+, **VT-UTF8**, and ANSI.

Bits per second

This feature controls the transmission speed of the host serial port, which must be matched by the remote serial port. The options are 9600, 19200, 57600, and **115200**.

Flow Control

This feature can prevent data loss from buffer overflow. 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

This feature enables remapping of BIOS above 4GB. The options are **Disabled** or Enabled.

PCI PERR/SERR Support

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

VGA Priority

This feature controls the VGA output slot priority, among the available PCI-E slots. The default is **Auto**.

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 or U.2_2 PCIe support. The options are "**CPU SLOT1 x8"** or "CPU SLOT1 x4 & U.2_2".

CPU SLOT2/SLOT4 Select

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

Onboard LAN1 Support

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

Onboard LAN2 Support

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

Network Stack

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

If this feature is Enabled, the next two features are 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** or 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** or 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

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

Attempt Secure Boot

This feature attempts Secure Boot, only if a Platform Key (PK) is enrolled, System Mode is set to User/Deployed, and CSM fuction is set to Disabled. The options are **Disabled** or 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** or Standard.

CSM Support

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

Install Factory Default keys

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

Enroll Efi Image

When an EFI image is available, this feature allows the image to run in Secure Boot mode.

Platform Key(PK)

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

Key Exchange Keys

This feature allows the user to configure the settings of the key exchange keys.

Authorized Signatures

This feature allows the user to configure the settings of the authorized signatures.

Forbidden Signatures

This feature allows the user to configure the settings of the forbidden signatures.

Authorized TimeStamps

This feature allows the user to configure the settings of the authorized timestamps.

OsRecovery Signatures

This feature allows the user to configure the settings of the OS recovery signatures.

4.7 System Health



Fan Control

Fan Speed Control Mode

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase for effective system cooling. Select "Full Speed" to allow the onboard fans to run at full speed (of 100% Pulse Width Modulation Duty Cycle) for maximum cooling. This setting is recommended for special system configuration or debugging. Select "Stable" for the onboard fans to run at 50% of the Initial PWM Cycle in order to balance the needs between system cooling and power saving. This setting is recommended for regular systems with normal hardware configurations. Select "Quiet" to optimize for minimal fan noise and Custom to enter user-specific settings. The options are **Quiet**, Stable, Full Speed and Customize. When "Customize" is selected above, the settings for CPU FAN1/FAN2 Control and SYS FAN1~FAN3 Control will appear and can be configured.

The following information is displayed:

- **VCPU**
- **12V**
- **VCCSA**

- **5VCC**
- **VDIMM_AB**
- **VCPU_IO**
- **VDIMM_CD**
- **PCH 1.0V**
- **3.3V_SUS**
- **3.3VCC**
- **3.3V_ALW**
- **VBAT**

4.8 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 boot mode. The options are LEGACY, UEFI, and **DUAL**.

FIXED BOOT ORDER Priorities

Use this feature to set the boot order priority. The number of boot options shown is dependent on the boot mode selected (above).

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.

4.9 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" 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 "Select File" and then in the pop-up menu select "General USB Flash Disk 1.00".
5. Select the filename (i.e. "C9X299-PG300") in the pop-up menu.
6. Select "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. Seelct "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 Installation

B.1 Installing Software Programs

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

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

Another option is to go to the Supermicro website at http://www.supermicro.com/products/. Find the product page for your motherboard here, where you may download individual drivers and utilities.

After creating a CD/DVD with the ISO files, insert the disk into the CD/DVD drive on your system, and the following screen should appear.

Note 1: 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 the bottom) one at a time. **After installing each item, you must reboot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents.



Figure B-1. Driver/Tool Installation Display Screen

Note 2: When making a storage driver diskette by booting into a driver CD, please set the SATA configuration to *Compatible Mode,* and configure the SATA as IDE in the BIOS setup. After making the driver diskette, be sure to change the SATA settings back to your original settings.

B.2 SuperDoctor® 5

The Supermicro SuperDoctor 5 is a hardware monitoring program that functions in a command-line or web-based interface in Windows and Linux operating systems. The program monitors system health information, such as CPU temperature, system voltages, system power consumption, and fan speed, and provides alerts via email or the 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 the SuperDoctor 5 Management Server (SSM Server), you can remotely control the power status and reset chassis intrusion for multiple systems with SuperDoctor 5 or IPMI. SD5 Management Server monitors HTTP, FTP, and SMTP services to optimize the efficiency of your operation.

Note: The default username and password for SuperDoctor 5 is ADMIN/ADMIN.

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



Note: The SuperDoctor 5 program and user's manual can be downloaded from the Supermicro website at http://www.supermicro.com/products/nfo/sms_sd5.cfm.

Appendix C

Standardized Warning Statements

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

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

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

Battery Handling



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

電池の取り扱い

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

警告

电池更换不当会有爆炸危险。请只使用同类电池或制造商推荐的功能相当的电池更换原有电池。请按制造商的说明处理废旧电池。

警告

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

Warnung

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

Attention

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

¡Advertencia!

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

אזהרה!

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

هناك خطر من انفجار في حالة اسحبذال البطارية بطريقة غير صحيحة فعليل
اسحبذال البطارية
فقط بنفس النع أو ما يعادلها مما أوصث به الشرمة المصنعة
جخلص من البطاريات المسحعملة وفقا لحعليمات الشرمة الصانعة

경고!

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

Waarschuwing

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

Product Disposal



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

製品の廃棄

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

警告

本产品的废弃处理应根据所有国家的法律和规章进行。

警告

本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

אזהרה!

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

عند التخلص النهائي من هذا المنتج ينبغي التعامل معه وفقا لجميع القانين واللائح البطنية

경고!

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

Waarschuwing

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

Appendix D

UEFI BIOS Recovery

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

D.1 Overview

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

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 boot block contains critical BIOS codes, including memory detection and recovery codes for the user to flash a new BIOS image if the original main BIOS image is corrupted. When the system power is on, the boot block codes execute first. Once it is completed, the main BIOS code will continue with system initialization and bootup.

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

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

D.3 Recovering the BIOS Block with a USB Device

This feature allows the user to recover a 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 UEFI is FAT (including FAT12, FAT16, and FAT32) installed on a bootable or non-bootable USB-attached device. However, the BIOS might need several minutes to locate the SUPER.ROM file if the media size becomes too large because it contains too many folders and files.

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

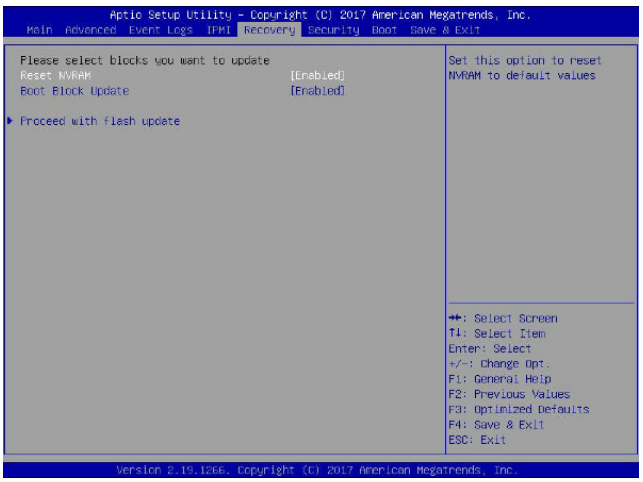
1. Using a different machine, copy the "Super.ROM" binary image file into the disc Root "\" Directory of a USB device or a writeable CD/DVD.

   Note: 1) If you cannot locate the "Super.ROM" file in your driver disk, visit our website at www.supermicro.com to download the BIOS package. Extract the BIOS binary image into a USB flash device and rename it "Super.ROM" for the BIOS recovery use. **2)** Before recovering the main BIOS image, confirm that the "Super.ROM" binary image file you download is the same version or a close version meant for you rmotherboard.

2. Insert the USB device that contains the new BIOS image ("Super.ROM") into your USB drive and power on the system



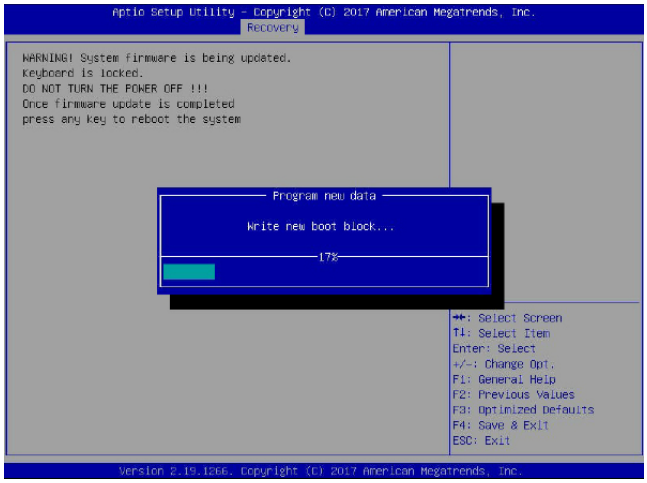
3. While powering on the system, please keep pressing <Ctrl> and <Home> simultaneously on your keyboard *<u>until</u> the following screen (or a screen similar to the one below) displays*.



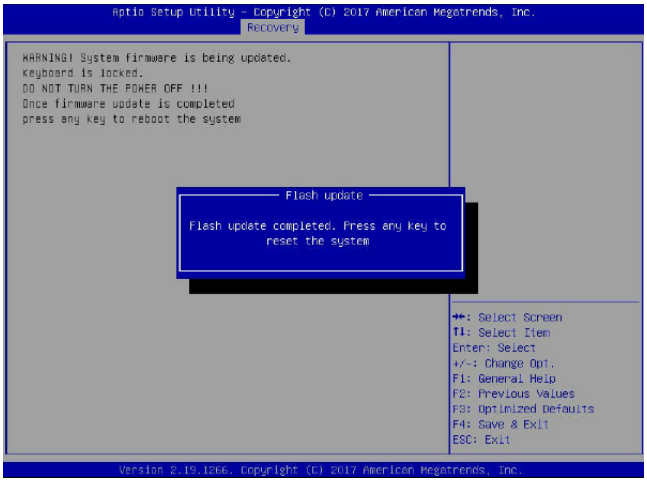
Note: At this point, you may decide if you want to start the BIOS recovery. If you decide to proceed with BIOS recovery, follow the procedures below.

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

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

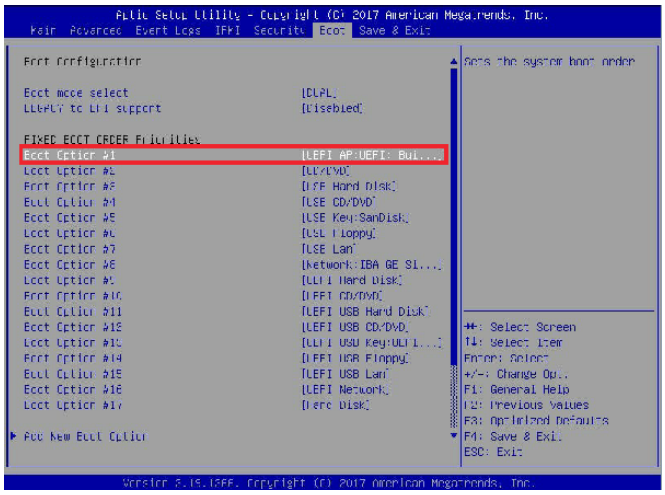


5. After the BIOS recovery process is complete, press any key to reboot the system.

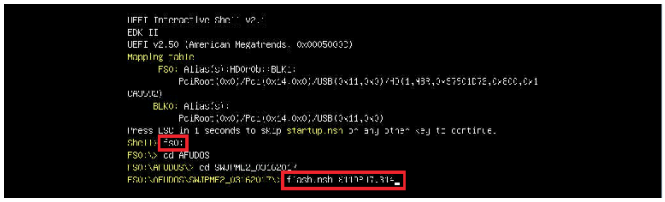


6. Using a different system, extract the BIOS package into a USB flash drive.

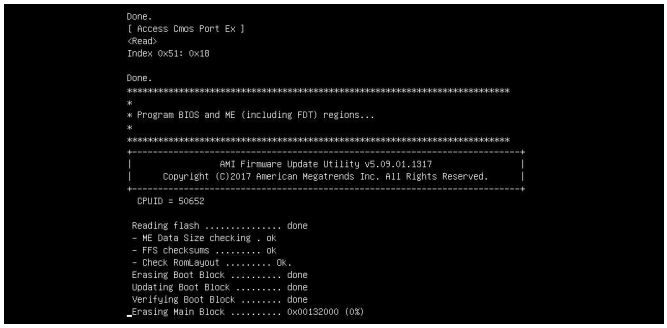
7. Press <Del> continuously during system boot to enter the BIOS Setup utility. From the top of the tool bar, select Boot to enter the submenu. From the submenu list, select Boot Option #1 as shown below. Then, set Boot Option #1 to [UEFI AP:UEFI: Built-in EFI Shell]. Press <F4> to save the settings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



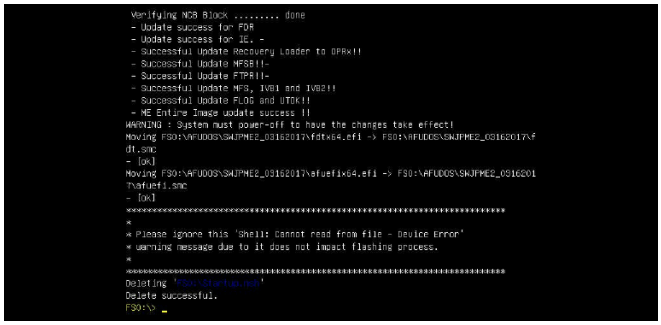
8. When the UEFI Shell prompt appears, type fs# to change the device directory path. Go to the directory that contains the BIOS package you extracted earlier from Step 6. Enter flash.nsh BIOSname.### at the prompt to start the BIOS update process.



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



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



10. Press <Del> continuously to enter the BIOS setup utility.

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

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