SUPERO®

C7Z170-OCE

USER'S MANUAL

Revision 1.0c

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Preface

This manual is written for system integrators, PC technicians and knowledgeable PC users. It provides information for the installation and use of the SUPER® C7Z170-OCE motherboard.

Manual Organization

Chapter 1 describes the features, specifications and performance of the motherboard, and provides detailed information on the Intel Z170 Express chipset.

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

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

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

Appendix A provides BIOS Error Beep Codes.

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

Appendix C contains UEFI BIOS Recovery instructions.

Appendix D contains an introduction and instructions regarding the Dual Boot Block feature of this motherboard.

Checklist

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

Please check that the following items have all been included with your motherboard. If anything listed here is damaged or missing, contact your retailer.

The following items are included in the retail box:

- One (1) Supermicro Motherboard
- Six (6) SATA cables
- One (1) I/O shield
- One (1) Quick Reference Guide
- One (1) Driver CD

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:



Attention! Critical information to prevent damage to the components or injury to yourself.



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



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

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 in the Supermicro chassis.

Battery Handling



Warning!

There is a 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 استبدال البطارية بطريقة غير صحيحة فعليك
استبدال البطارية
فقط بنفس النوع أو ما يعادلها كما أوصت به الشركة المصنعة
تخلص من البطاريات المستعملة وفقا لتعليمات الشركة الصانعة

경고!

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

Waarschuwing

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

Product Disposal



Warning!

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

製品の廃棄

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

警告
本产品的废弃处理应根据所有国家的法律和规章进行。

警告
本產品的廢棄處理應根據所有國家的法律和規章進行。

Warnung

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

¡Advertencia!

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

Attention

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

סילוק המוצר

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

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

경고!

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

Waarschuwing

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

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Where to Find More Information

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

SMCI product manuals: http://www.supermicro.com/support/manuals/

Product Drivers and utilities: ftp://ftp.supermicro.com/

If you have any questions, please contact our support team at support@supermicro.com.

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Chapter 1

Introduction

1-1 Overview

About this Motherboard

The C7Z170-OCE supports a single 6th/7th Generation Intel® Core™ i7/i5/i3 processors in an LGA 1151 (H4) socket. With the Intel® Z170 Express chipset built in, the C7Z170-OCE motherboard offers substantial system performance and storage capability for overclocking platforms in a sleek package. Please refer to our website (http://www.supermicro.com/products/) for processor and memory support updates.

1-2 Chipset Overview

Intel Z170 Express Chipset Features

- Direct Media Interface (up 10 Gb/s transfer, Full Duplex)
- Intel® Matrix Storage Technology and Intel Rapid Storage Technology
- Dual NAND Interface
- Intel I/O Virtualization (VT-d) Support
- Intel Trusted Execution Technology Support
- PCI Express 3.0 Interface (up to 8 GT/s)
- SATA Controller (up to 6Gb/sec)
- Advanced Host Controller Interface (AHCI)

1-3 Motherboard Features

CPU	Single Intel® Core™ i7/i5/i3 6th/7th generation processor in an LGA1151 type socket.	
Memory	Four (4) slots support up to 64GB of unbuffered, non-ECC, 3000+MHz(OC) DDR4 memory	
	Dual-channel memory	
	DIMM sizes	
	UDIMM	4GB, 8GB, 16GB
Chipset	Intel® Z170 Express	
Expansion Slots	Two (2) PCH PCI-E 3.0 X1 (in X4) slot	
	Two (2) CPU PCI-E 3.0 X16 slot	
	One (1) CPU PCI-E 3.0 X8 (in X16) slot	
	One (1) M.2 slot	
Network Connections	Two (2) Gigabit Ethernet Controllers	
	Two (2) RJ-45 rear I/O panel connectors with Link and Activity LEDs	
I/O Devices	**SATA Connections**	
	SATA 3.0 (6Gb/s)	Six (6) I-SATA 0~5, via Intel Z170
		RAID 0, 1, 5, 10
	USB Devices	
	Two (2) USB 2.0, two (2) USB 3.0, and one (1) USB 3.1 'type C' ports on the rear I/O panel	
	Four (4) front accessible USB 2.0 ports on two headers, two (2) front accessible USB 3.0 ports on one header, and two (2) front accessible USB 3.1 ports on one header.	
	Keyboard/Mouse	
	One shared PS/2 Keyboard/Mouse port on the I/O back panel	
	Other I/O Ports	
	One (1) DisplayPort, One (1) DVI-D Port, One (1) HDMI Port One (1) Serial Port header (COM1)	
	Audio	
	One (1) High Definition Audio 7.1 channel connector supported by Realtek ALC1150 on the back panel	
	One (1) Front Panel Audio Header	

	One (1) S/PDIF Out on the rear side of the chassis
	Super I/O
	Nuvoton NCT6792D-B
BIOS	128 Mb AMI BIOS® SPI Flash BIOS
	Plug and Play (PnP), DMI 2.8, PCI 2.3, ACPI 1.0/2.0/3.0, and USB Keyboard
Power Configuration	ACPI/ASPM Power Management
	Main Switch Override Mechanism
	Internal/External Modem Ring-On
	Power-on mode for AC power recovery
Health Monitoring	**CPU Monitoring**
	Onboard monitors: CPU core, +3.3V, +5V, +/-12V, +3.3V Stby, +5V Stby, VBAT, HT, Memory PCH Temperature, System Temperature, and CPU Temperature
	CPU 6+1 phase switching voltage regulator
	CPU/System overheat LED and control
	CPU Thermal Trip support
	Thermal Monitor support
	Fan Control
	Fan status monitoring with firmware 4-pin fan speed control
	Low noise fan speed control
System Management	PECI (Platform Environment Configuration Interface) 2.0 support
	System resource alert via SuperDoctor® V
	SuperDoctor® V, NMI
	Chassis Intrusion header and detection
CD Utilities	BIOS flash upgrade utility
	Drivers and software for Intel® Z170 Express chipset utilities
Other	ROHS 6/6 (Full Compliance, Lead Free)
Dimensions	ATX form factor (12.0" x 9.6") (304.8 mm x 243.84 mm)

1-4 Special Features

Recovery from AC Power Loss

Basic I/O System (BIOS) provides a setting for you to determine 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 a power-on state. See the Advanced BIOS Setup section to change this setting. The default setting is **Last State**.

1-5 PC Health Monitoring

This section describes the PC health monitoring features of the board. All have an onboard System Hardware Monitoring chip that supports PC health monitoring. An onboard voltage monitor will scan these onboard voltages continuously: CPU core, +3.3V, +5V, +/- 12V, +3.3V Stby, +5V Stby, VBAT, HT, Memory PCH Temperature, System Temperature, and CPU Temperature. Once a voltage becomes unstable, a warning is given, or an error message is sent to the screen. The user can adjust the voltage thresholds to define the sensitivity of the voltage monitor.

Fan Status Monitor with Firmware Control

PC health monitoring in the BIOS can check the RPM status of the cooling fans. The onboard CPU and chassis fans are controlled by Thermal Management via SIO.

Environmental Temperature Control

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



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

System Resource Alert

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

1-6 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 PC 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 2008 Operating Systems.

Slow Blinking LED for Suspend-State Indicator

When the CPU goes into a suspend state, the chassis power LED will start to blink to indicate that the CPU is in suspend mode. When the user presses any key, the CPU will "wake up", and the LED will automatically stop blinking and remain on.

1-7 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.

This motherboard accommodates 24-pin ATX power supplies. Although most power supplies generally meet the specifications required by the CPU, some are inadequate. In addition, the 12V 8-pin power connector located at JPW2 is also required to ensure adequate power supply to the system. Also your power supply must supply 1.5A for the Ethernet ports.

! **Attention!** To prevent damage to the power supply or motherboard, please use a power supply that contains a 24-pin and a 8-pin power connectors. Be sure to connect these connectors to the 24-pin (JPW1) and the 8-pin (JPW2) power connectors on the motherboard.

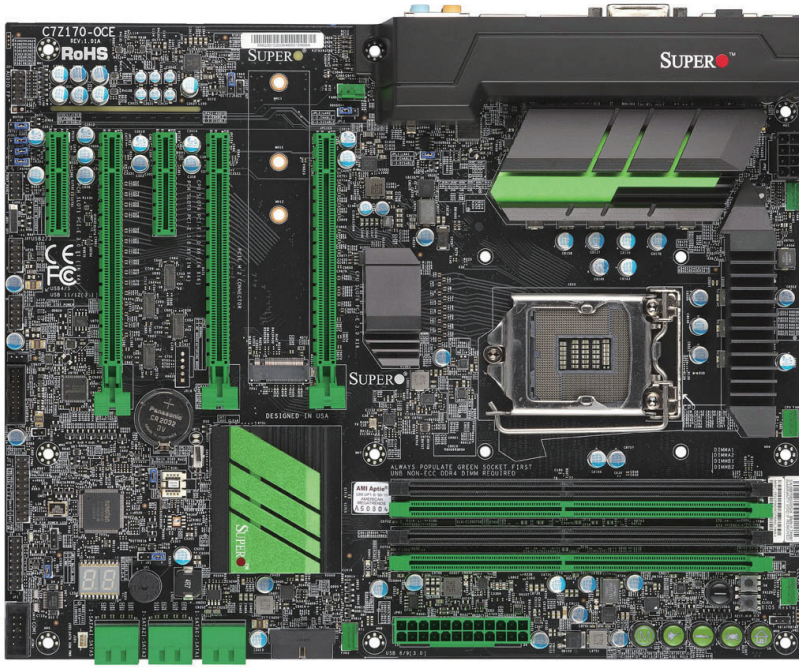
It is strongly recommended that you use a high quality power supply that meets ATX power supply Specification 2.02 or above. It must also be SSI compliant. (For more information, please refer to the website at http://www.ssiforum.org/.) Additionally, in areas where noisy power transmission is present, 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.

1-8 Super I/O

The Super I/O supports two high-speed, 16550 compatible serial communication ports (UARTs). Each UART includes a 16-byte send/receive FIFO, a programmable baud rate generator, complete modem control capability and a processor interrupt system. Both UARTs provide legacy speed with baud rate of up to 115.2 Kbps as well as an advanced speed with baud rates of 250 K, 500 K, or 1 Mb/s, which support higher speed modems.

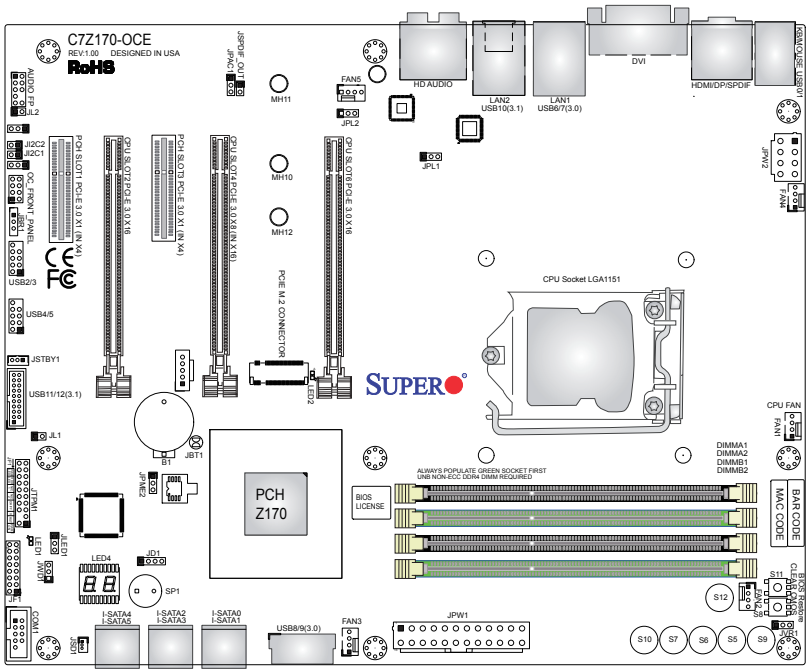
The Super I/O provides functions that comply with ACPI (Advanced Configuration and Power Interface), which includes support of legacy and ACPI power management through an SMI or SCI function pin. It also features auto power management to reduce power consumption.

C7Z170-OCE Motherboard Image



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

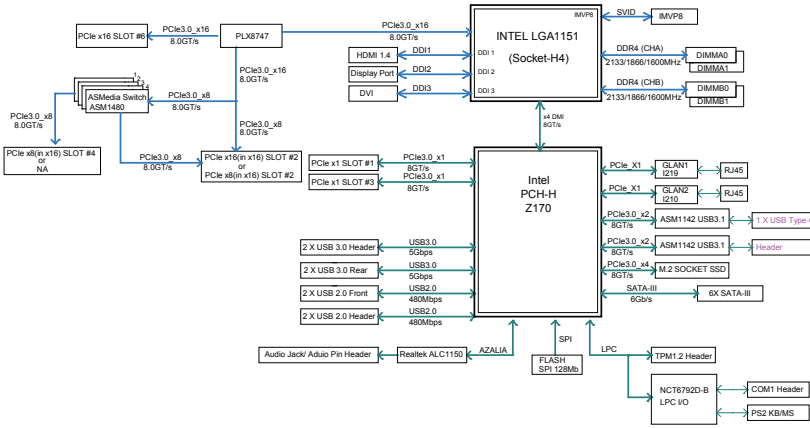
C7Z170-OCE Motherboard Layout



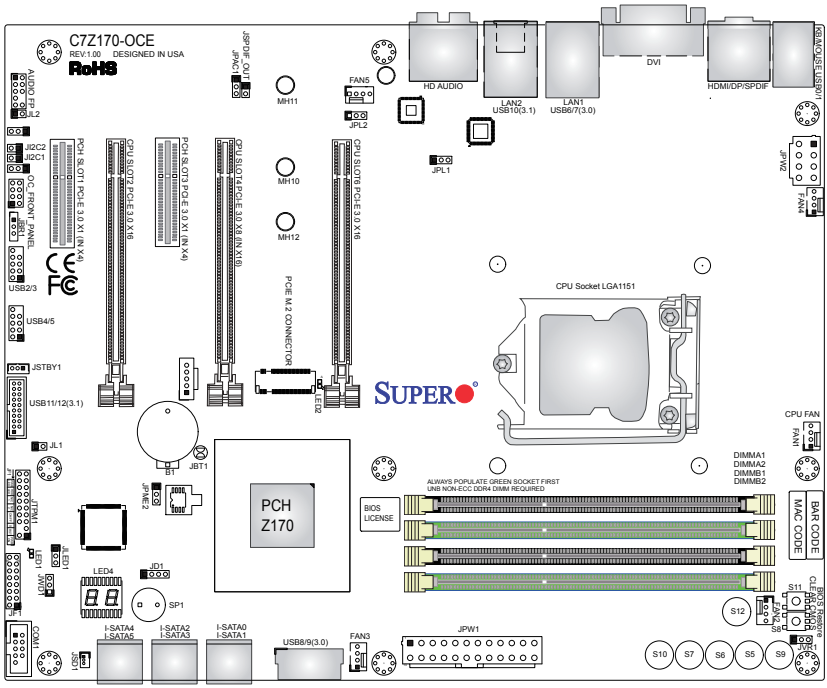
Important Notes to the User

- See Chapter 2 for detailed information on jumpers, I/O ports and JF1 front panel connections.
- "■" indicates the location of "Pin 1".
- Jumpers not indicated are for testing only.
- When LED1 (Onboard Power LED Indicator) is on, system power is on. Unplug the power cable before installing or removing any components.

C7Z170-OCE Block Diagram



C7Z170-OCE Quick Reference



Jumper	Description	Default
JBR1	BIOS Recovery Switch	Pins Off (Normal)
JBT1	Clear CMOS (on board)	Open (Normal)
JI²C1/JI²C2	SMB to PCI-E Slots	Off (Disabled)
JPAC1	Audio Enable	Pins 1-2 (Enabled)
JPL1/JPL2	LAN1/LAN2 Enable	Pins 1-2 (Enabled)
JPME2	ME Manufacturing Mode	Pins 2-3 (Disabled)
JWD1	Watch Dog	Pins 1-2 (Reset)
BIOS Restore (S11)	Restores the BIOS from Firmware ('SUPER.ROM') on a USB memory device	Push Button Switch
Clear CMOS (S8)	Clear CMOS Switch	Push Button Switch

Connector	Description
Audio FP	Front Panel Audio Header
B1	Onboard Battery
COM1	COM1 Port Header
DVI	Digital Video Interface
Fan 1,2,3,4,5	System/CPU Fan Headers (Fan1: CPU Fan)
HD Audio	High Definition Audio Connector
HDMI/DP	High Definition Multimedia Interface/DisplayPort
I-SATA0~5	(Intel Z170) Serial ATA (SATA 3.0) Ports 0~5 (6Gb/sec)
JD1	Speaker/buzzer (Pins 1~3: External Speaker, Pins 3~4: Buzzer)
JF1	Front Panel Control Header
JL1	Chassis Intrusion Header
JLED1	Power LED Indicator Header
JPW1	24-pin ATX Main Power Connector (Required)
JPW2	+12V 8-pin CPU Power Connector (Required)
JSD1	SATA DOM (Disk On Module) Power Connector
JSPDIF_OUT	Sony/Philips Digital Interface (S/PDIF) Out Header
JSTBY1	5V Standby Power Header
JTPM1	Trusted Platform Module/Port80 Connector
KB/Mouse	Keyboard/Mouse Connector
LAN1/LAN2	Gb LAN (RJ45) Ports
M.2	PCI-E M.2 Connector
MH10 ~ MH12	M.2 Mounting Holes
OC FRONT PANEL	Header for the Overclocking Control Panel
S5, S6, S7	Overclocking Button OC1 (15%), OC2 (20-25%), OC3 (User Defined in BIOS)
S9, S10	Home Button, Memory Overclocking Button
S8, S11, S12	Clear CMOS Button, BIOS Restore, Pwer Button
SLOT1/SLOT3	PCH PCI-E 3.0 X1 (IN X4) Slots
SLOT2	CPU PCI-E 3.0 X16 Slot
SLOT4	CPU PCI-E 3.0 X8 (IN X16) Slot
SLOT6	CPU PCI-E 3.0 X16 Slot
SP1	Internal Speaker/Buzzer
USB0/1	Back panel USB 2.0 Ports
USB6/7	Back panel USB 3.0 Ports
USB10	Back panel USB 3.1 Port
USB2/3, 4/5	Front Panel Accessible USB 2.0 Headers

USB8/9	Front Panel Accessible USB 3.0 Headers
USB11/12	Front Panel Accessible USB 3.1 Headers

LED	Description	Color/State	Status
LED1	Onboard Standby PWR LED	Green: Solid on	Power On
LED2	M.2 LED	Green	M.2 on board
LED4	Status Display	Digital Readout	Download the status codes below*

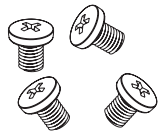
*Download the AMI status codes at https://www.supermicro.com.tw/manuals/other/AMI_BIOS_POST_Codes_for_Grantley_Motherboards.pdf.

Chapter 2

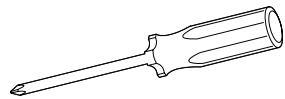
Installation

2-1 Installation Components and Tools Needed

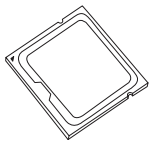
Screws



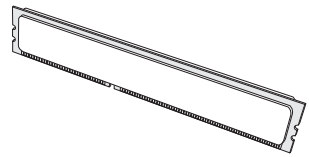
Phillips-Head Screwdriver



Intel LGA 1151 Processor



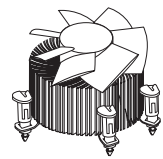
DDR4 DIMMs



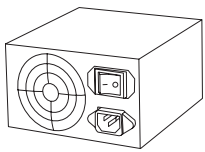
PC Chassis



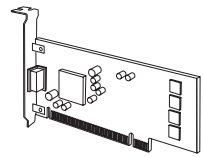
Heatsink with Fan



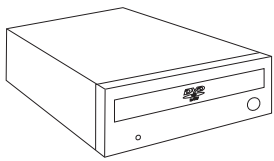
Power Supply



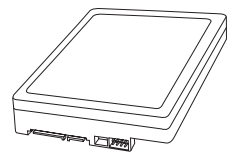
Video Card (Optional)



SATA/USB Optical Drive (Optional)



SATA Hard Disk Drive



2-2 Static-Sensitive Devices

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

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Handle the 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 board, make sure that the person handling it is static protected.

2-3 Processor and Heatsink Installation

Attention! 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.

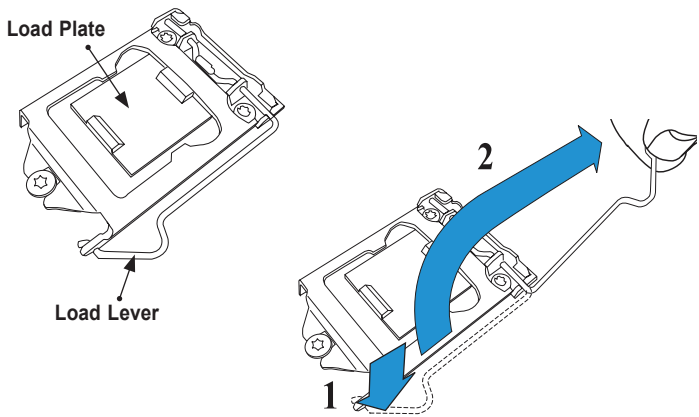
Make sure to install the system board into the chassis before you install the CPU heatsink.

When receiving a server board 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.

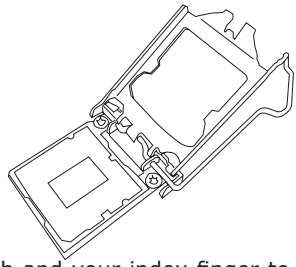
Refer to the Supermicro website for updates on CPU support.

Installing the LGA1151 Processor

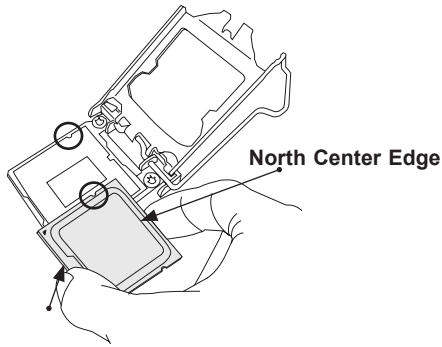
1. Press the load lever to release the load plate, which covers the CPU socket, from its locking position.



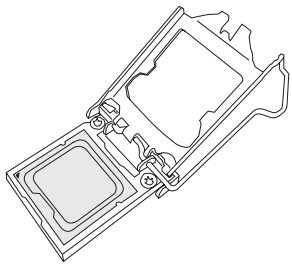
2. Gently lift the load lever to open the load plate. Remove the plastic cap.



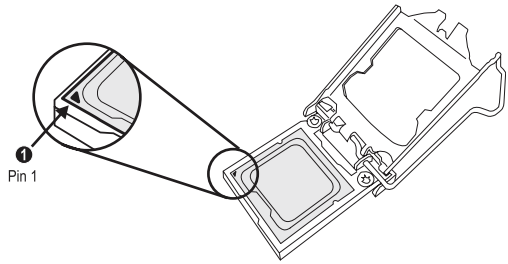
3. Use your thumb and your index finger to hold the CPU at the North center edge and the South center edge of the CPU.



4. Align the CPU key that is the semi-circle cutouts against the socket keys. Once it is aligned, carefully lower the CPU straight down into the socket. Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically.

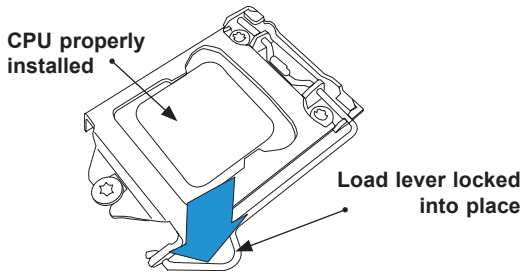


5. Do not rub the CPU against the surface or against any pins of the socket to avoid damaging the CPU or the socket.



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

7. Use your thumb to gently push the load lever down to the lever lock.



! **Attention!** You can only install the CPU inside the socket only in one direction. Make sure that it is properly inserted into the CPU socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

Installing an Active CPU Heatsink with Fan

1. Locate the CPU Fan power connector on the motherboard (Fan1: CPU Fan).

2. Position the heatsink so that the heatsink fan wires are closest to the CPU fan power connector and are not interfered with other components.

3. Inspect the CPU Fan wires to make sure that the wires are routed through the bottom of the heatsink.

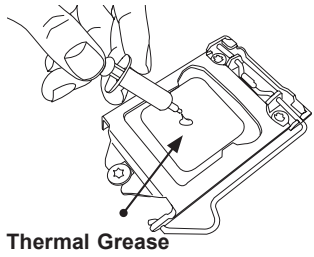
4. Remove the thin layer of the protective film from the heatsink.

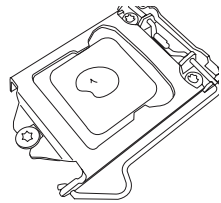
Attention! CPU overheating may occur if the protective film is not removed from the heatsink.

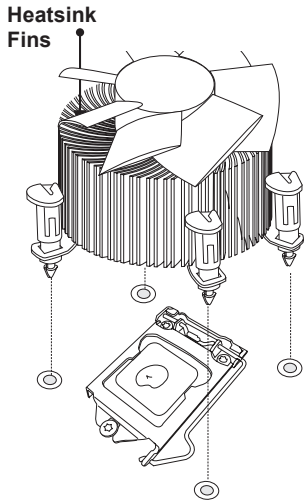
5. Apply the proper amount of thermal grease on the CPU.

Note: if your heatsink came with a thermal pad, please ignore this step.

6. If necessary, rearrange the wires to make sure that the wires are not pinched between the heatsink and the CPU. Also make sure to keep clearance between the fan wires and the fins of the heatsink.

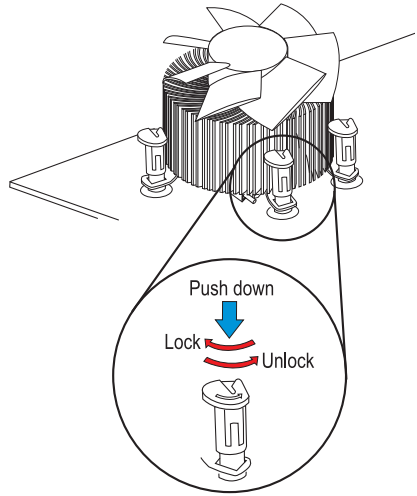






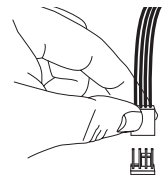
Recommended Supermicro heatsink:
SNK-P0046A4 active heatsink

7. Align the four heatsink fasteners with the mounting holes on the motherboard. Gently push the pairs of diagonal fasteners (#1 & #2, and #3 & #4) into the mounting holes until you hear a click. Also, make sure to orient each fastener so that the narrow end of the groove is pointing outward.



8. Repeat Step 7 to insert all four heatsink fasteners into the mounting holes.

9. Once all four fasteners are securely inserted into the mounting holes, and the heatsink is properly installed on the motherboard, connect the heatsink fan wires to the CPU Fan connector.

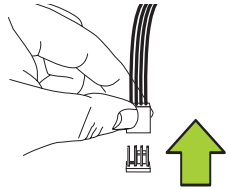


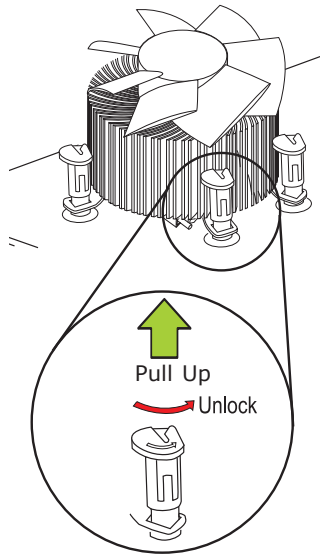
Removing the Heatsink

Attention! 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 remove the heatsink and to prevent damage done to the CPU or other components.

Active Heatsink Removal

1. Unplug the power cord from the power supply.
2. Disconnect the heatsink fan wires from the CPU fan header.
3. Use your finger tips to gently press on the fastener cap and turn it counterclockwise to make a 1/4 (90^0) turn, and pull the fastener upward to loosen it.
4. Repeat Step 3 to loosen all fasteners from the mounting holes.
5. With all fasteners loosened, remove the heatsink from the CPU.



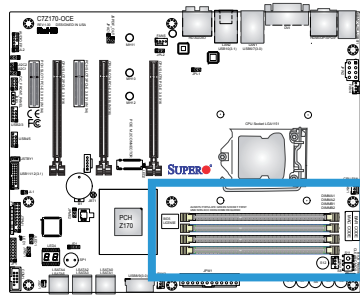


2-4 Installing DDR4 Memory

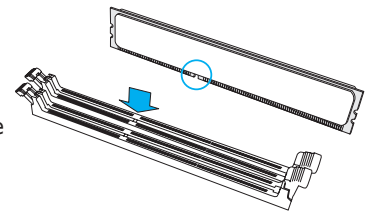
Note: Check the Supermicro website for recommended memory modules.

Attention! Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

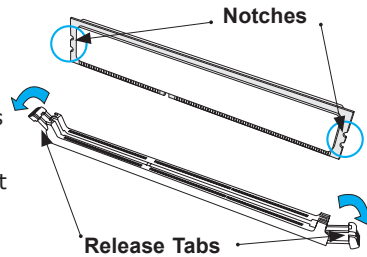
DIMM Installation



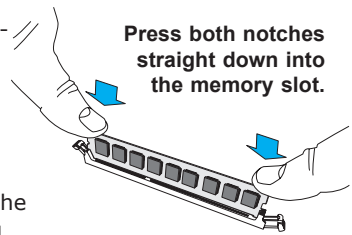
1. Insert the desired number of DIMMs into the memory slots, starting with DIMMB2, DIMMA2, then DIMMB1, DIMMA1 (see the layout for the location). For the system to work properly, please use the memory modules of the same type and speed in the same motherboard.
2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.



4. Align the notches on both ends of the module against the receptive points on the ends of the slot.
5. Use two thumbs together to press the notches on both ends of the module straight down into the slot until the module snaps into place.



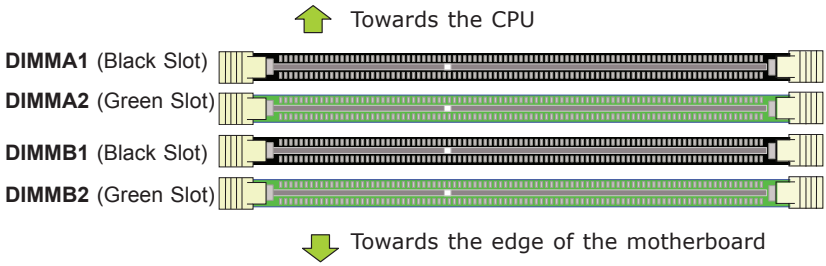
6. Press the release tabs to the lock positions to secure the DIMM module into the slot.



Removing Memory Modules

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

Memory Support



The C7Z170-OCE supports up to 64GB of Unbuffered (UDIMM) non-ECC DDR4 memory, up to 3000+MHz (OC) in four 288-pin memory slots. Populating these DIMM modules with a pair of memory modules of the same type and same size will result in interleaved memory, which will improve memory performance.

Notes

Be sure to use memory modules of the same type, same speed, same frequency on the same motherboard. Mixing of memory modules of different types and speeds is not allowed.

Due to memory allocation to system devices, the amount of memory that remains available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional. See the following table for details.

For Microsoft Windows users: Microsoft implemented a design change in the Windows XP with Service Pack 2 (SP2) and Windows Vista. This change is specific to the behavior of Physical Address Extension (PAE) mode which improves driver compatibility. For more information, please read the following article at

Microsoft's Knowledge Base website at: http://support.microsoft.com/kb/888137.

Possible System Memory Allocation & Availability		
System Device	**Size**	**Physical Memory Remaining (-Available) (4 GB Total System Memory)**
Firmware Hub flash memory (System BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area Reserved for the chipset	2 MB	3.99
I/O APIC (4 Kbytes)	4 KB	3.99
PCI Enumeration Area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI Enumeration Area 2 (if needed) -Aligned on 256-MB boundary-	512 MB	3.01
VGA Memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to OS and other applications		2.84

Memory Population Guidelines

When installing memory modules, the DIMM slots should be populated in the following order: DIMMB2, DIMMA2, then DIMMB1, DIMMA1.

- 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.

Recommended Population (Balanced)				
DIMMA1	**DIMMB1**	**DIMMA2**	**DIMMB2**	**Total System Memory**
		4GB	4GB	8GB
4GB	4GB	4GB	4GB	16GB
		8GB	8GB	16GB
8GB	8GB	8GB	8GB	32GB
		16GB	16GB	32GB
16GB	16GB	16GB	16GB	64GB

2-5 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 motherboard and 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. Then use a screwdriver to secure the motherboard onto the motherboard tray.



Philips Screwdriver (1)

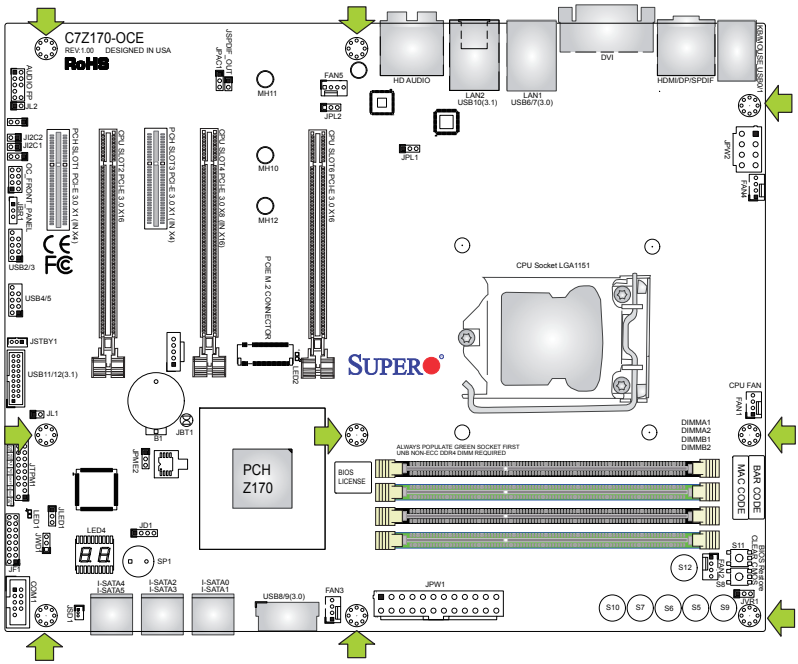


Philips Screws (9)



Standoffs (9) Only if Needed

Tools Needed

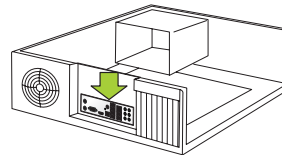


Location of Mounting Holes

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

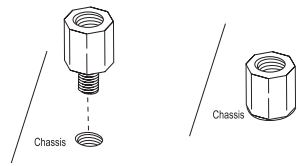
Installing the Motherboard

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



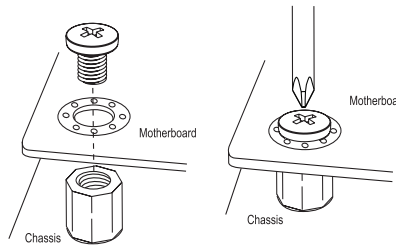
2. Locate the mounting holes on the motherboard. (See the previous page.)

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



4. Install standoffs in the chassis as needed.

5. Install the motherboard into the chassis carefully to avoid damaging other motherboard components.



6. Using the Phillips screwdriver, insert a Phillips head #6 screw into a mounting hole on the motherboard and its matching mounting hole on the chassis.

7. Repeat Step 5 to insert #6 screws into all mounting holes.

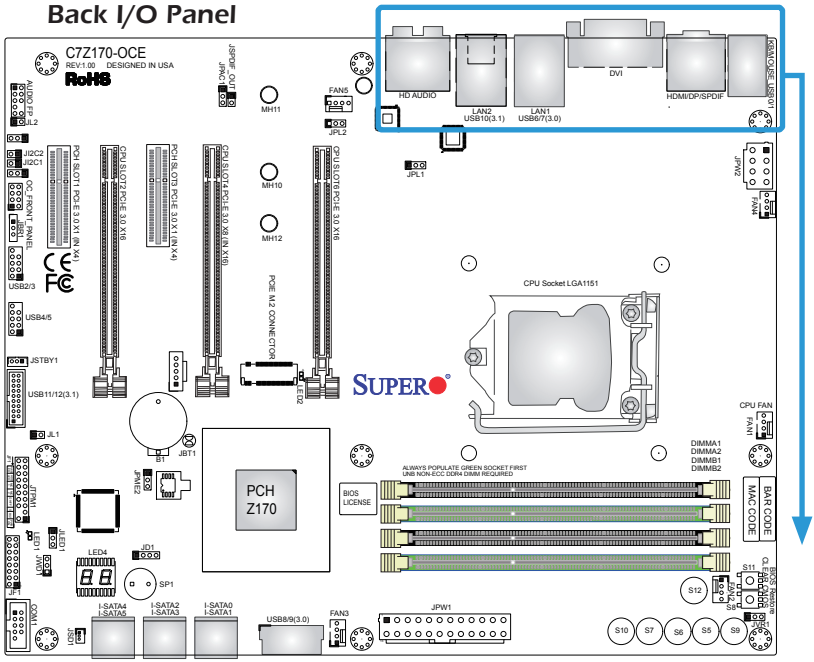
8. Make sure that the motherboard is securely placed in the chassis.

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

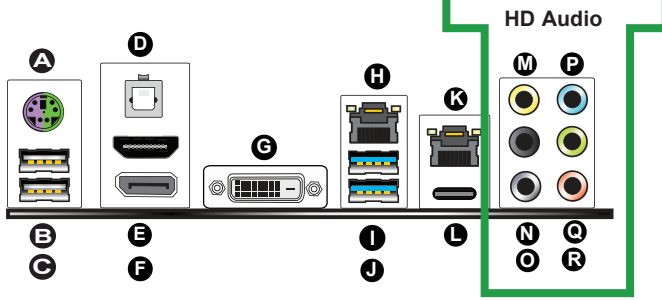
2-6 Connectors/IO Ports

The I/O ports are color coded in conformance with the industry standards. See the figure below for the colors and locations of the various I/O ports.

Back I/O Panel



A. PS/2 Keyboard/Mouse Port	G. DVI-D Port	M. Center/LFE Out
B. USB 2.0 Port 0	H. Gb LAN Port 1	N. Surround Out
C. USB 2.0 Port 1	I. USB 3.0 Port 6	O. S-Surround Out
D. S/PDIF Out	J. USB 3.0 Port 7	P. Line In
E. HDMI Port	K. Gb LAN Port 2	Q. Line Out
F. VESA Display Port	L. USB 3.1 Port 8, Type C	R. Mic In



Universal Serial Bus (USB)

Two Universal Serial Bus 2.0 ports (#0/1), two USB 3.0 ports (#6/7) and one USB 3.1 'type C' port (#8) are located on the I/O back panel. In addition, two USB 3.0 headers (four ports: #9/10, #11/12), and two USB 2.0 headers (#2/3, #4/5) are also located on the motherboard to provide front chassis access using USB cables (not included). See the tables below for pin definitions.

Front Panel USB (2.0) Header #4/5 Pin Definitions

Pin #	Definition	Pin #	Definition
1	+5V	2	+5V
3	USB_PN2	4	USB_PN3
5	USB_PP2	6	USB_PP3
7	Ground	8	Ground
9	Key	10	Ground

Back Panel USB (2.0) #0/1, USB (3.0) #6/7 Pin Definitions

Pin#	Definition	Pin#	Definition
1	+5V	5	+5V
2	USB_PN1	6	USB_PN0
3	USB_PP1	7	USB_PP0
4	Ground	8	Ground

Front Panel USB (3.0) Header #9/10, #11/12 Pin Definitions

Pin#	Pin#	Signal Name	Description
1	10	VBUS	Power
2	11	D-	USB 2.0 Differential Pair
3	12	D+	
4	13	Ground	Ground of PWR Return
5	14	StdA_SSRX-	SuperSpeed Receiver
6	15	StdA_SSRX+	Differential Pair
7	16	GND_DRAIN	Ground for Signal Return
8	17	StdA_SSTX-	SuperSpeed Transmitter
9	18	StdA_SSTX+	Differential Pair

A. Back panel USB 2.0 #1

B. Back panel USB 2.0 #0

C. Back panel USB 3.0 #7

D. Back panel USB 3.0 #6

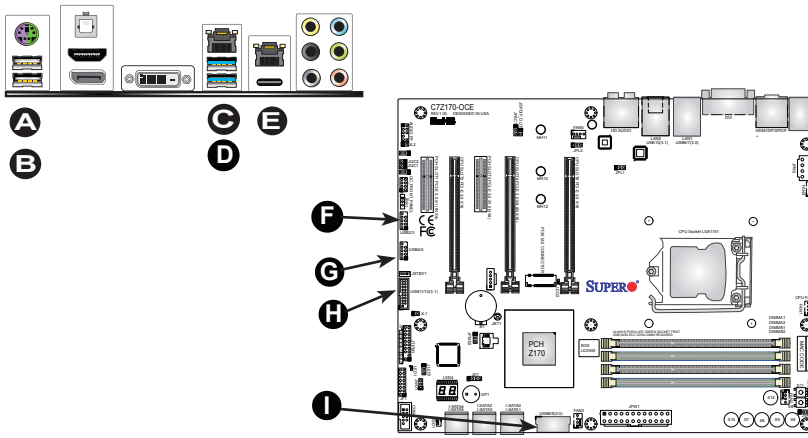
E. Back panel USB 3.1 #10

F. USB 2.0 Header #2/3

G. USB 2.0 Header #4/5

H. USB 3.1 Header #11/12

I. USB 3.0 Header #8/9



Ethernet Port

Two Gigabit Ethernet ports (LAN1/LAN2) are located next to the DVI-D port on the I/O back panel to provide network connections. These ports accept RJ45 type cables.

Note: Please refer to the LED Indicator Section for LAN LED information.

LAN Ports Pin Definition

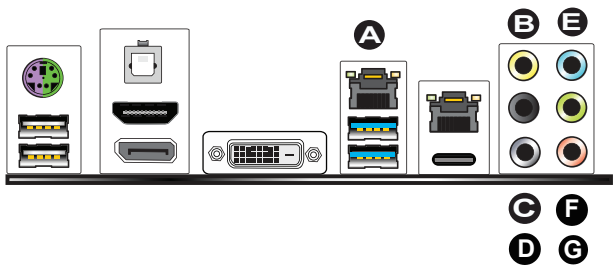
Pin#	Definition	Pin#	Definition
1	P2V5SB	10	SGND
2	TD0+	11	Act LED
3	TD0-	12	P3V3SB
4	TD1+	13	Link 100 LED (Green, +3V3SB)
5	TD1-	14	Link 1000 LED (Yellow, +3V3SB)
6	TD2+	15	Ground
7	TD2-	16	Ground
8	TD3+	17	Ground
9	TD3-	88	Ground

(NC: No Connection)

Back Panel High Definition Audio (HD Audio)

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 2 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-ROM with your motherboard to enable this function.

A. LAN1
B. Center/LFE Out
C. Surround Out
D. S-Surround
E. Line In
F. Line Out
G. Mic In



S/PDIF Port

A S/PDIF port is located next to the USB ports 0/1 on the I/O back panel. Use this port to connect to a compatible S/PDIF optical audio device.

VESA® DisplayPort™

DisplayPort, developed by the VESA consortium, delivers digital display at a fast refresh rate. It can connect to virtually any display device using a DisplayPort adapter for devices such as VGA, DVI, or HDMI.

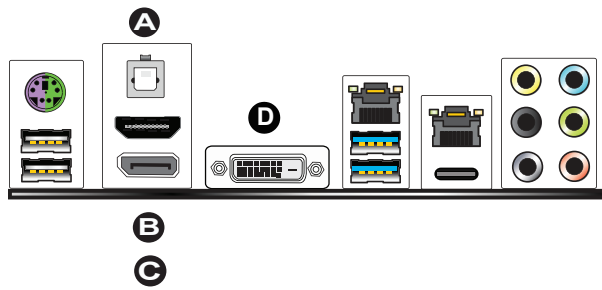
HDMI Port

One HDMI (High-Definition Multimedia Interface) is located on the I/O back panel. This connector is used to display both high definition video and digital sound through an HDMI capable display, using a single HDMI cable (not included).

DVI-D Port

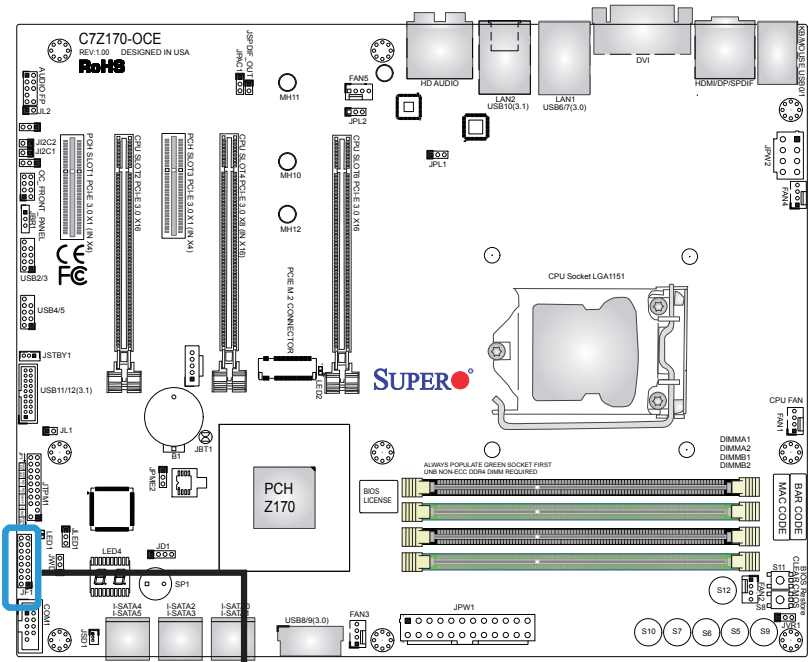
A DVI-D port is located on the I/O back panel. Use this port to connect to a compatible DVI (Digital Visual Interface) display.

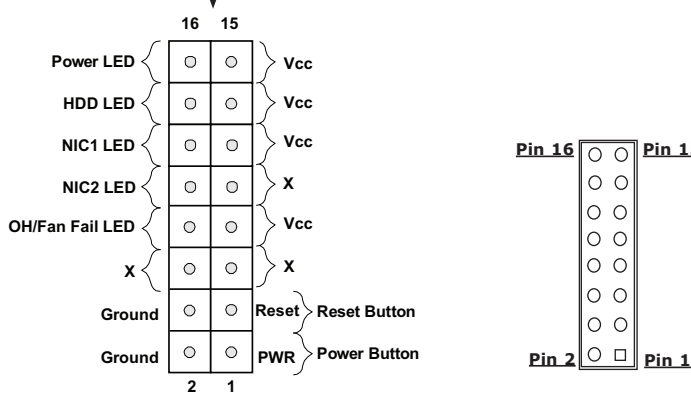
A. S/PDIF Port
B. HDMI Port
C. VESA Display Port
D. DVI-D



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. Refer to the following section for descriptions and pin definitions.





JF1 Header Pins

Front Control Panel Pin Definitions

Power LED

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

Power LED Pin Definitions (JF1)	
Pin#	Definition
15	+5V
16	Ground

HDD LED

The HDD LED connection is located on pins 13 and 14 of JF1. Attach a cable here to indicate the status of HDD-related activities, including IDE, SATA activities. See the table on the right for pin definitions.

HDD LED Pin Definitions (JF1)	
Pin#	Definition
13	+5V
14	HD Active

NIC1/NIC2 (LAN)

The NIC (Network Interface Controller) LED connection for LAN ports 1 and 2 are located on pins 11/12 and 9/10, respectively, on JF1. Attach an LED indicator to this header to display network activity. Refer to the table on the right for pin definitions.

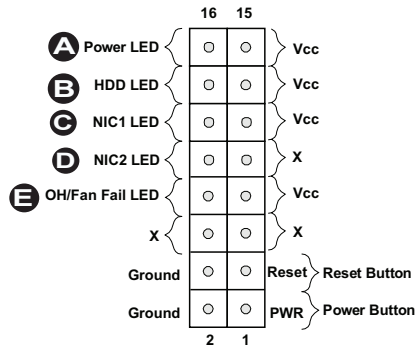
LAN LED Pin Definitions (JF1)	
Pin#	Definition
9/11	Vcc
10/12	Ground

Overheat (OH)/Fan Fail

Connect an LED cable to OH/Fan Fail connections on pins 7 and 8 of JF1 to provide warnings for chassis overheat/fan failure. Refer to the table on the right for pin definitions.

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

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



A. PWR LED
B. HDD LED
C. NIC1 LED
D. NIC2 LED
E. OH/Fan Fail

Reset Button

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

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

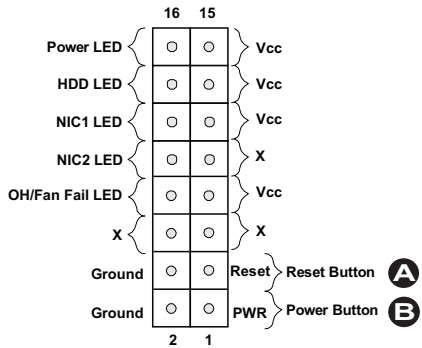
Power Button

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

Power Button Pin Definitions (JF1)	
Pin#	Definition
1	Signal
2	+3V Standby

A. Reset Button

B. PWR Button



2-7 Connecting Cables

This section provides brief descriptions and pinout definitions for onboard headers and connectors. Be sure to use the correct cable for each header or connector.

ATX Main PWR & CPU PWR Connectors (JPW1 & JPW2)

The 24-pin main power connector (JPW1) is used to provide power to the motherboard. The 8-pin CPU PWR connector (JPW2) is also required for the processor. These power connectors meet the SSI EPS 12V specification. See the table on the right for pin definitions.

ATX Power 24-pin Connector Pin Definitions (JPW1)

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

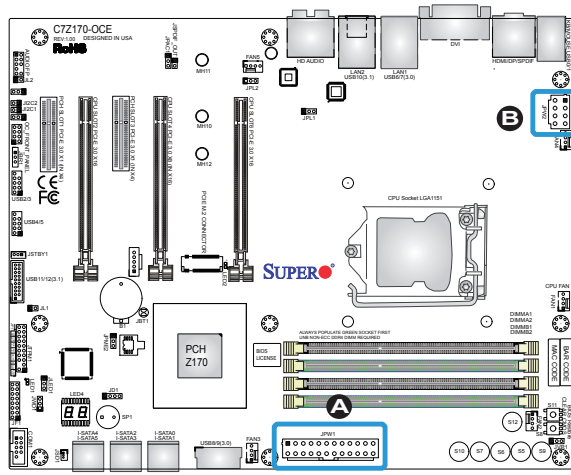
12V 8-pin Power Connector Pin Definitions

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

(Required)

A. 24-Pin ATX Main PWR

B. 8-Pin PWR



Fan Headers

The C7Z170-OCE has five 4-pin fan headers (Fan 1~Fan 5). Although pins 1-3 of the fan headers are backward compatible with the traditional 3-pin fans, we recommend that you use 4-pin fans to take advantage of the fan speed control. This allows the fan speeds to be automatically adjusted based on the motherboard temperature. Refer to the table on the right for pin definitions.

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

Chassis Intrusion Pin Definitions (JL1)	
Pin#	Definition
1	Intrusion Input
2	Ground

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.

A. Fan 1 (CPU Fan)

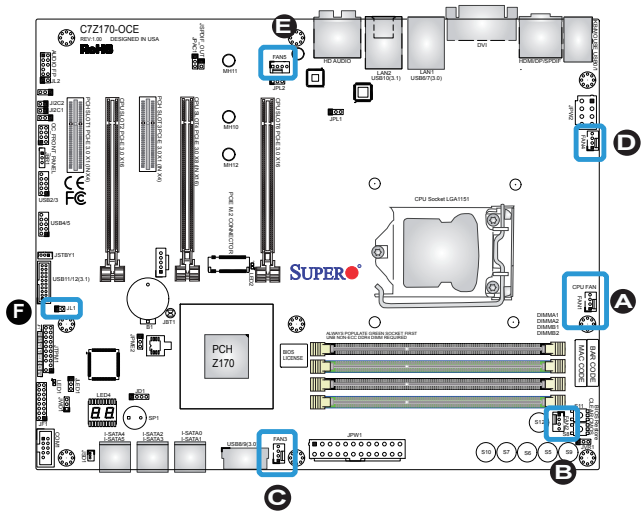
B. Fan 2

C. Fan 3

D. Fan 4

E. Fan 5

F. Chassis Intrusion



Internal Buzzer

The Internal Buzzer (SP1) can be used to provide audible indications for various beep codes. See the table on the right for pin definitions.

Internal Buzzer Pin Definition		
Pin#		Definitions
Pin 1	Pos. (+)	Beep In
Pin 2	Neg. (-)	Alarm Speaker

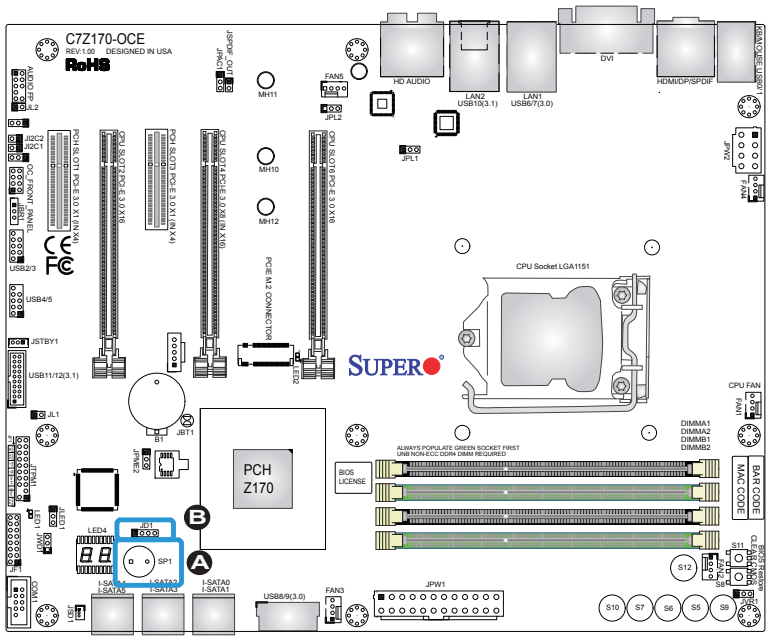
Speaker

On the JD1 header, pins 3~4 are used for a buzzer. Close pins 3~4 with a cap to use the onboard speaker. If you wish to use an external speaker, close pins 1~3 with a cable. See the table on the right for pin definitions.

Speaker Connector Pin Definitions	
Pin #	Definition
Pins 3~4	Buzzer
Pins 1~3	External Speaker

A. Internal Buzzer

B. Speaker Header



Onboard Power LED

An onboard Power LED header is located at JLED1. This Power LED header is connected to Front Control Panel located at JF1 to indicate the status of system power. See the table on the right for pin definitions.

Onboard PWR LED Pin Definitions	
Pin#	Definition
1	VCC
2	No Connection
3	Connection to PWR LED in JF1

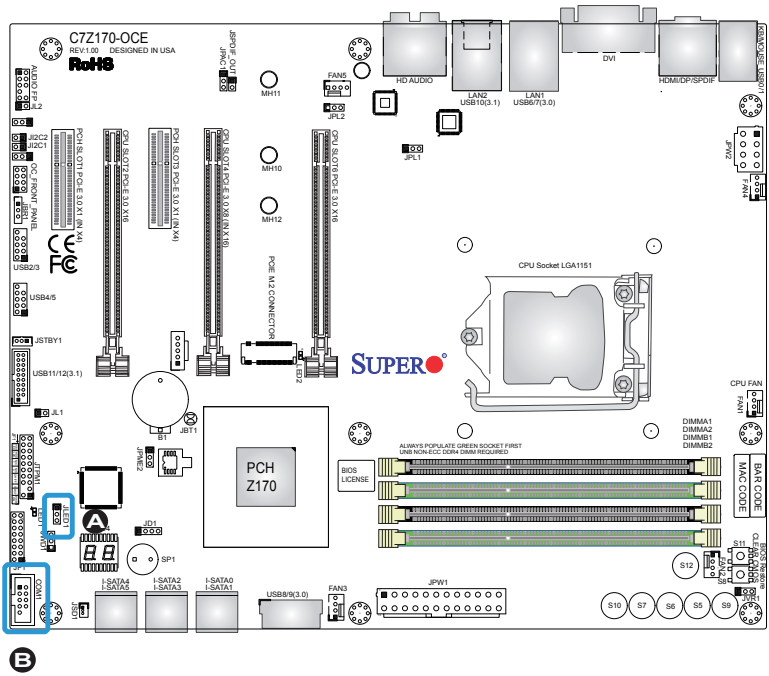
Serial Port

There is one serial (COM1) port header on the motherboard. COM1 is located next to the 1394 connection header. See the table on the right for pin definitions.

Serial/COM Ports 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

A. PWR LED

B. COM1



DOM PWR Connector

The Disk-On-Module (DOM) power connector at JSD1 provides 5V (Gen1/Gen) power to a solid state DOM storage device connected to one of the SATA ports. See the table on the right for pin definitions.

DOM PWR Pin Definitions	
Pin#	Definition
1	5V
2	Ground
3	Ground

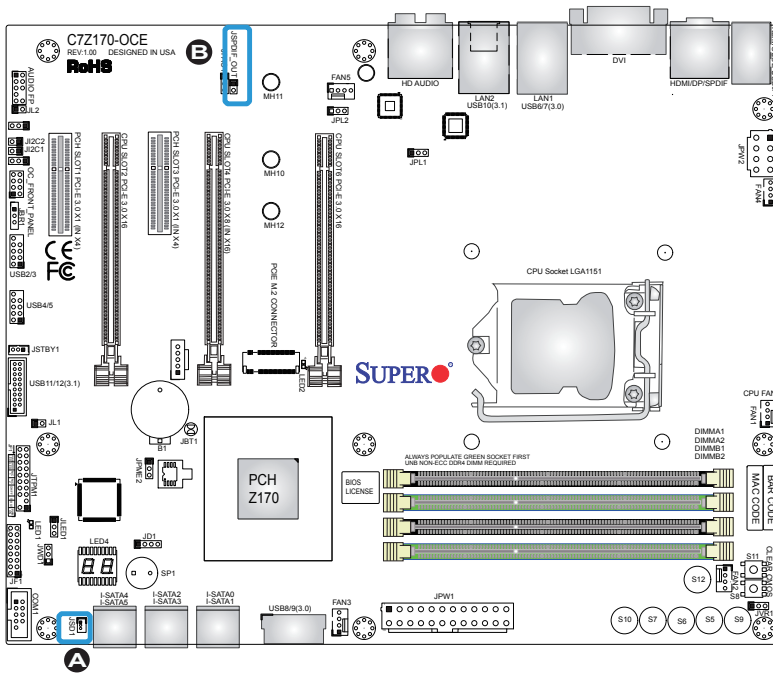
SPDIF OUT

The SPDIF Out (JSPDIF_OUT) is used for digital audio output. You will also need the appropriate cable to use this feature.

SPDIF_OUT Pin Definitions	
Pin#	Definition
1	S/PDIF_Out
2	Ground

A. DOM PWR

B. S/PDIF OUT



Standby Power Header

The Standby Power header is located at STBY1 on the motherboard. See the table on the right for pin definitions.

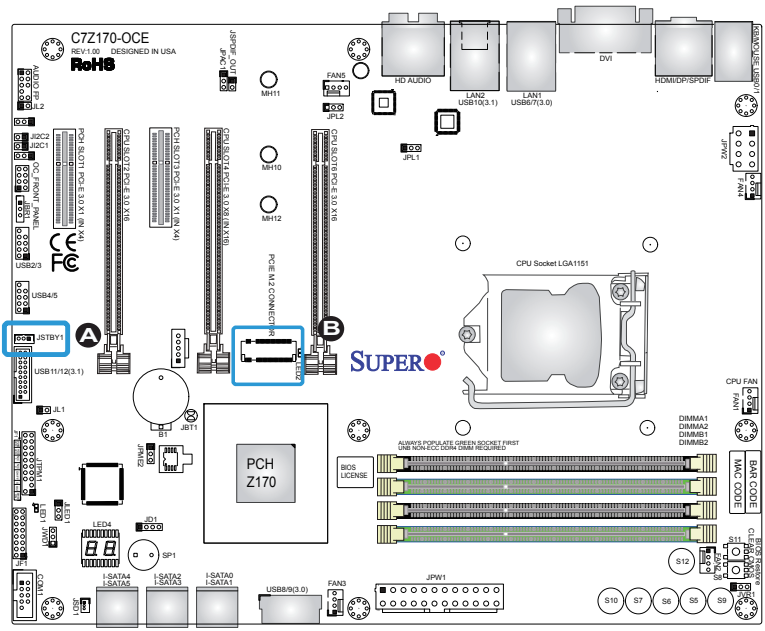
Standby Power Pin Definitions	
Pin#	Definition
1	+5V Standby
2	Ground
3	Wake-up

M.2 Connector

The PCI-E M.2 connector is for devices such as memory cards, wireless adapters, etc. These devices must conform to the PCIE M.2 specifications (formerly known as NGFF). This particular PCIe M.2 supports M-Key (PCIe 3.0 x4) storage card only.

A. STBY PWR

B. PCI-E M.2 Connector

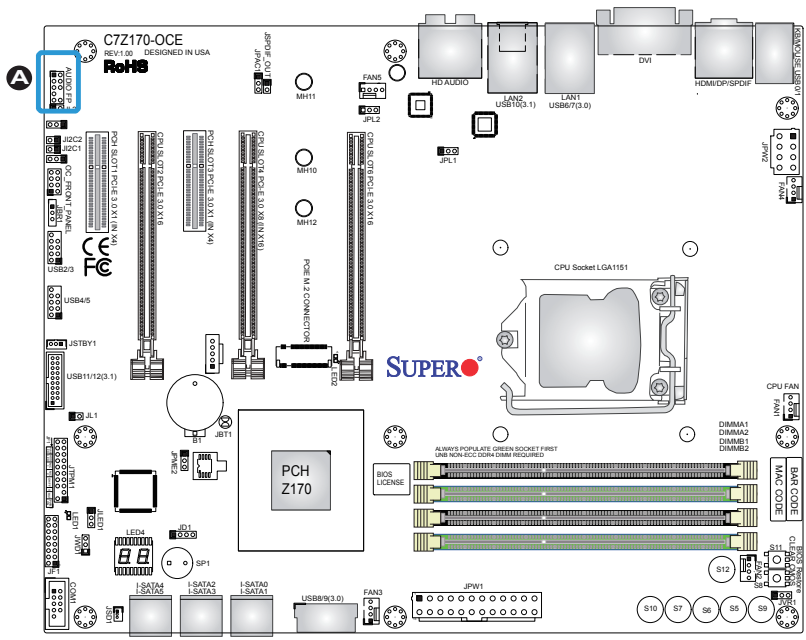


Front Panel Audio Header

A 10-pin Audio header at AUDIO FP is supported on the motherboard. This header allows you to connect the motherboard to a front panel audio control panel, if needed. Connect an audio cable to the audio header to use this feature (not supplied). See the table on the right for pin definitions for the header.

10-in Audio Pin Definitions	
Pin#	Signal
1	Microphone_Left
2	Audio_Ground
3	Microphone_Right
4	Audio_Detect
5	Line_2_Right
6	Ground
7	Jack_Detect
8	Key
9	Line_2_Left
10	Ground

A. AUDIO_FP



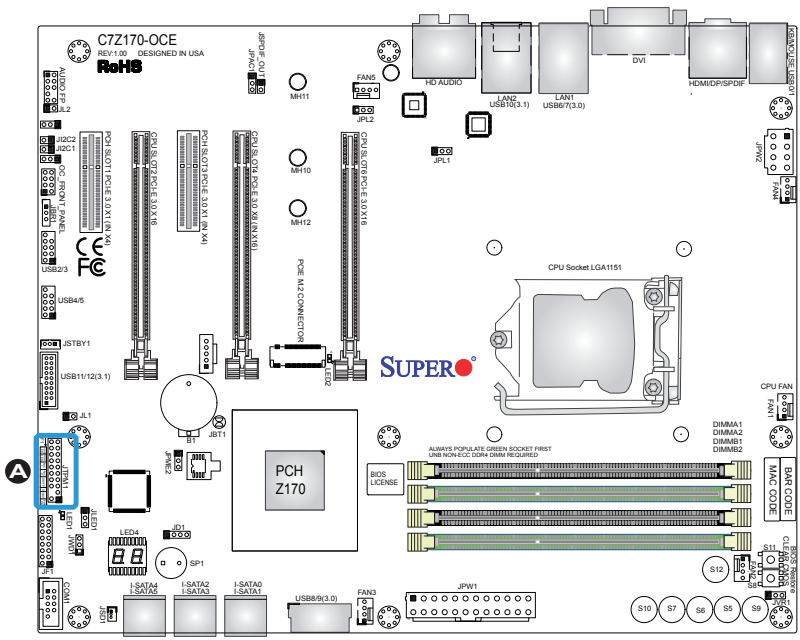
TPM Header

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

Trusted Platform Module Header Pin Definitions

Pin#	Definition	Pin#	Definition
1	LCLK	2	GND
3	LFRAME#	4	No Pin
5	LRESET#	6	+5V
7	LAD3	8	LAD2
9	3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK4 (X)	14	SMB_DAT4 (X)
15	P3V3_STBY	16	SERIRQ
17	GND	18	GND
19	P3V3_STBY	20	LDRQ# (X)

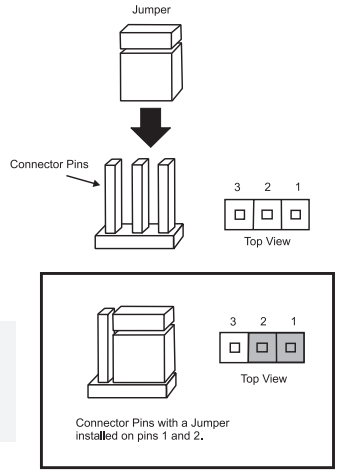
A. TPM Header



2-8 Jumper Settings

Explanation of Jumpers

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.



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

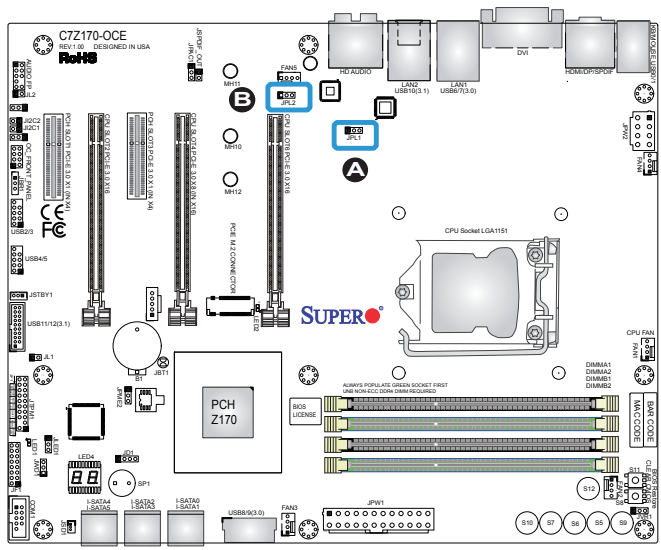
LAN Enable/Disable

Jumpers JPL1 and JPL2 will enable or disable the LAN ports 1 and 2, respectively, on the motherboard. See the table on the right for jumper settings. The default setting is enabled.

GLAN Enable Jumper Settings	
Pin#	Definition
1-2	Enabled (Default)
2-3	Disabled

A. JPL1

B. JPL2



Clear CMOS & JBT1

Clear CMOS (S11) and JBT1 are used to clear the saved system setup configuration stored in the CMOS chip. To clear the contents of the CMOS using JBT1, short the two pads of JBT1 with metallic conductor such as a flathead screwdriver. Clear CMOS works the same way but is a push button switch. This will erase all user settings and revert everything to their factory-set defaults.

PCI Slot SMB Enable

Use Jumpers I^2C1/I^2C2 to enable PCI SMB (System Management Bus) support to improve system management for the PCI slots. See the table on the right for jumper settings.

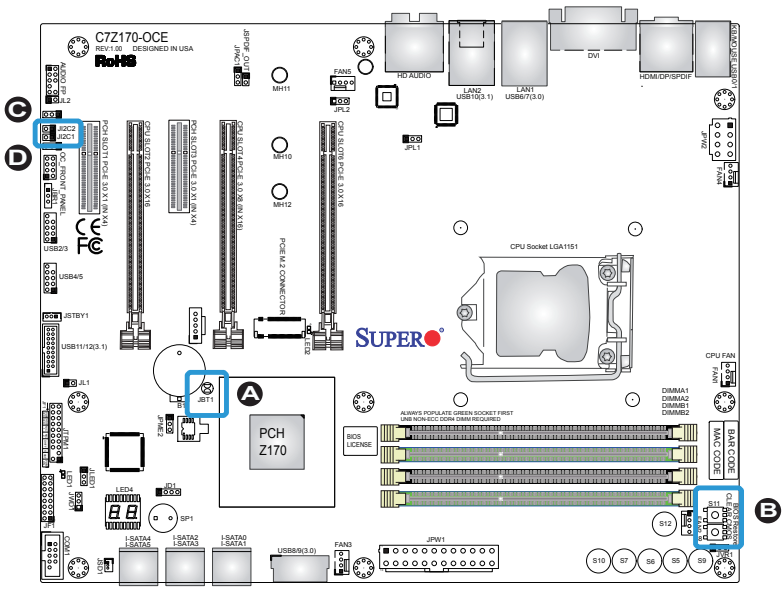
PCI Slot_SMB Enable Jumper Settings	
Jumper Setting	Definition
Short	Enabled
Open (Default)	Disabled

A. JBT1

B. Clear CMOS (S11)

C. JI^2C1

D. JI^2C2



Audio Enable

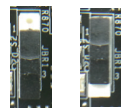
JPAC1 allows you to enable or disable the onboard audio support. The default position is on pins 1 and 2 to enable onboard audio connections. See the table on the right for jumper settings.

Audio Enable/Disable Jumper Settings	
Both Jumpers	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

BIOS Recovery Switch

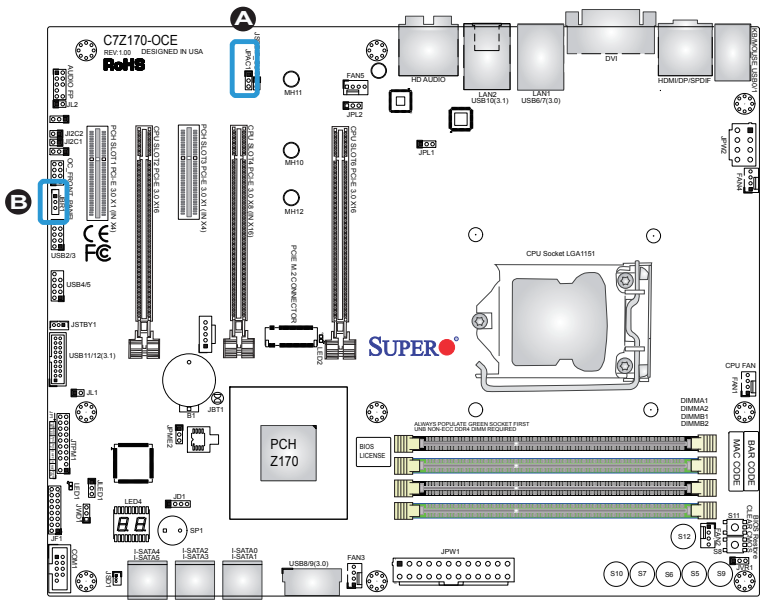
The BIOS Recovery Switch (JBR1) is used to enable or disable the BIOS Recovery feature of the motherboard. Slide the switch from the default position to begin the recovery process. See Appendix D for details.

BIOS Recovery Jumper Settings	
State	Definition
Off	Normal (Default)
On	Recover



A. Audio Enable

B. BIOS Recovery



Manufacturing Mode

Close Pin 2 and Pin 3 of jumper JPME2 to bypass SPI flash security and force the system to operate in Manufacturing Mode, allowing the user to flash the system firmware from a host server for system setting modifications. See the table on the right for jumper settings.

Manufacturing Mode Jumper Settings	
Pin#	Definition
1-2	Normal (Default)
2-3	Manufacture Mode

Watch Dog

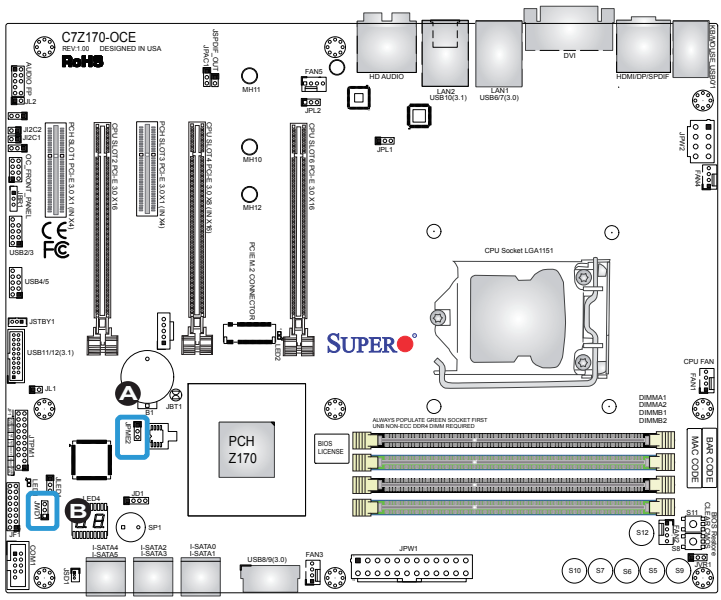
JWD1 controls the Watch Dog function. Watch Dog is a monitor that can reboot the system when a software application hangs. Jumping pins 1-2 will cause Watch Dog to reset the system if an application hangs. Jumping pins 2-3 will generate a non-maskable interrupt signal for the application that hangs. See the table on the right for jumper settings.

Watch Dog Jumper Settings	
Pin#	Definition
1-2	Reset
2-3	NMI
Open	Disabled

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

A. Manufacturing Mode

B. Watch Dog



Power Button (POWER BUTTON)

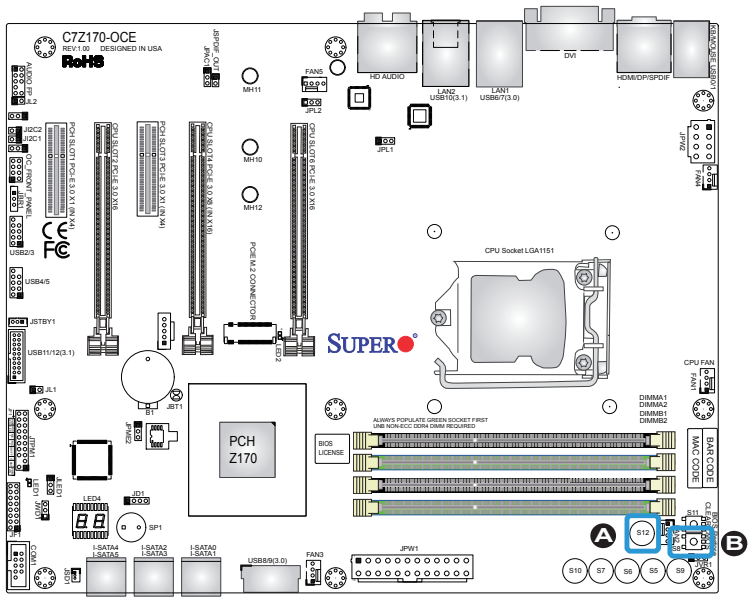
In addition to the soft power switch provided in JF1, your motherboard is equipped with a 'soft' power button (S12) on the motherboard. This switch works the same way as the soft power switch on JF1.

BIOS Restore (BIOS RESTORE)

When pressed, the BIOS Restore Button (S8) will look for and load a file named 'SUPER.ROM' from an installed USB memory device, in any of the USB ports. It will then proceed to update the BIOS. Do NOT turn off the system when BIOS is updating.

A. Power Button

B. BIOS Restore



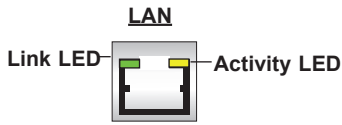
2-9 Onboard Indicators

LAN LEDs

One LAN port is located on the I/O back panel of the motherboard. This Ethernet LAN port has two LEDs (Light Emitting Diode). The yellow LED indicates activity, while the Link LED may be green, amber, or off to indicate the speed of the connections. See the tables on the right for more information.

GLAN Activity Indicator LED Settings		
Color	Status	Definition
Yellow	Flashing	Active

GLAN Link Indicator LED Settings	
LED Color	Definition
Off	No Connection/10 Mbps/100 Mbps
Amber	1 Gbps
Green	10 Gbps



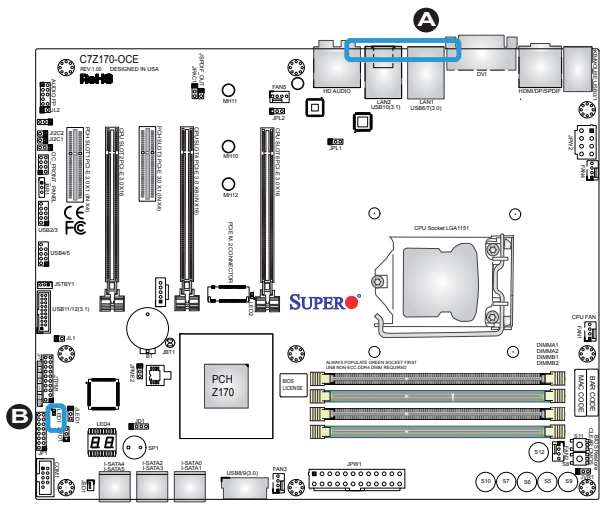
Onboard Power LED

An Onboard Power LED is located at LED1 on the motherboard. When LED1 is on, the AC power cable is connected. Make sure to disconnect the power cable before removing or installing any component. See the layout below for the LED location.

Onboard PWR LED Indicator LED Status	
Status	Definition
Off	System Off
On	System on, or System off and PWR Cable Connected

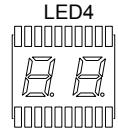
A. LAN LEDs

B. PWR LED



Status Display

LED4 is made up of two alpha-numeric displays that will display a status or POST code, when the motherboard is powered on. Please download the AMI POST codes at:



https://www.supermicro.com.tw/manuals/other/AMI_BIOS_POST_Codes_for_Grantley_Motherboards.pdf

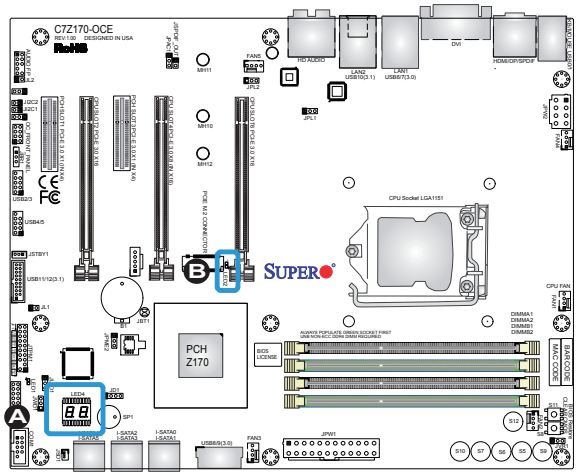
M.2 LED

The M.2 LED is located at LED2 When this LED is on, a device is connected to the M.2 slot. See the table on the right for more information.

M.2 LED Indicator LED Status	
Status	Definition
Off	No Device Connected
On	M.2 On Board

A. Status Display

B. M.2 LED



2-10 SATA Connections

SATA Connections (I-SATA0~I-SATA5)

Six Serial ATA (SATA) 3.0 connectors (I-SATA 0~5) are supported on the board. These I-SATA 3.0 ports are supported by the Intel Z170 PCH chip (supports RAID 0,1,5,10). See the table below for pin definitions.

SATA 2.0/3.0 Connectors Pin Definitions	
Pin#	Signal
1	Ground
2	SATA_TXP
3	SATA_TXN
4	Ground
5	SATA_RXN
6	SATA_RXP
7	Ground

Top

A. I-SATA 3.0 #4

B. I-SATA 3.0 #2

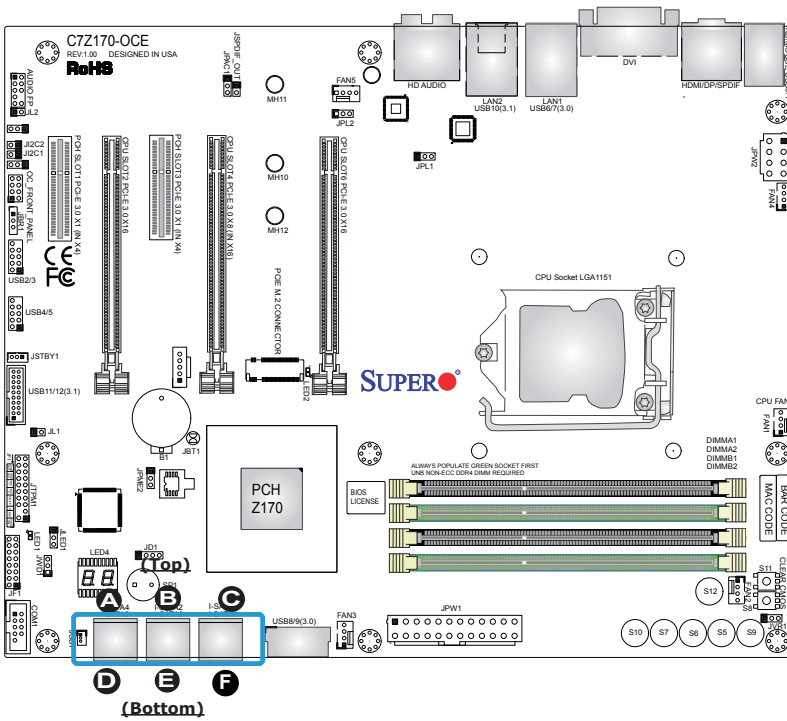
C. I-SATA 3.0 #0

Bottom

D. I-SATA 3.0 #5

E. I-SATA 3.0 #3

F. I-SATA 3.0 #1



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 hardware components.

Before Power On

1. Make sure that the Standby PWR LED is not on. (**Note:** If it is on, the onboard power is on. Be sure to unplug the power cable before installing or removing the components.)

2. Make sure that there are no short circuits between the motherboard and chassis.

3. Disconnect all ribbon/wire cables from the motherboard, including those for the keyboard and mouse. Also, be sure to remove all add-on cards.

4. Install a CPU and heatsink (-be sure that it is fully seated) and then connect the chassis speaker and the power LED to the motherboard. Check all jumper settings as well.

No Power

1. Make sure that there are no short circuits between the motherboard and chassis.

2. Make sure that all jumpers are set to their default positions.

3. Check if the 115V/230V switch on the power supply is properly set.

4. Turn the power switch on and off to test the system.

5. The battery on your motherboard may be old. Check to make sure 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--in this case, you will need to remove all the add-on cards and cables first.

2. Use the speaker to determine if any beep codes exist. (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 specifications of memory modules, reset the memory or try a different one.)

Memory Errors

1. Make sure that the DIMM modules are properly installed and fully seated in the slots.

2. You should be using unbuffered Non-ECC DDR4 (up to 3000MHz) memory recommended by the manufacturer. Also, it is recommended that you use the memory modules of the same type and speed for all DIMMs in the system. Do not use memory modules of different sizes, different speeds and different types on the same motherboard.

3. Check for bad DIMM modules or slots by swapping modules between slots to see if you can locate the faulty ones.

4. Check the switch of 115V/230V power supply.

When the System is Losing the Setup Configuration

1. Please be sure to use a high quality power supply. A poor quality power supply may cause the system to lose CMOS setup information. Refer to Section 1-5 for details on recommended power supplies.

2. The battery on your motherboard may be old. Check to verify that it still supplies ~3VDC. If it does not, replace it with a new one.

3. If the above steps do not fix the Setup Configuration problem, contact your vendor for repairs.

3-2 Technical Support Procedures

Before contacting Technical Support, please make sure that you have followed all the steps listed below. Also, note that as a motherboard manufacturer, Supermicro does not sell directly to end users, so it is best to first check with your distributor or reseller for troubleshooting services. They should know of any possible problem(s) with the specific system configuration that was sold to you.

1. Please go through the 'Troubleshooting Procedures' and 'Frequently Asked Question' (FAQ) sections in this chapter or see the FAQs on our website (http://www.supermicro.com/support/faqs/) before contacting Technical Support.

2. BIOS upgrades can be downloaded from our website at http://www.supermicro.com/support/bios/.

Note: Not all BIOS can be flashed. Some cannot be flashed; it depends on the boot block code of the BIOS.

3. If you've followed the instructions above to troubleshoot your system, and still cannot resolve the problem, then contact Supermicro's technical support and provide them with the following information:

- Motherboard model and PCB revision number
- BIOS release date/version (this can be seen on the initial display when your system first boots up)
- System configuration
- An example of a Technical Support form is on our website at http://www.supermicro.com/support/contact.cfm.

4. Distributors: For immediate assistance, please have your account number ready when placing a call to our technical support department. We can be reached by e-mail at support@supermicro.com, by phone at: (408) 503-8000, option 2, or by fax at (408)503-8019.

3-3 Frequently Asked Questions

Question: What type of memory does my motherboard support?

Answer: The C7ZZ170-OCE supports up to 64GB of unbuffered Non-ECC DDR4. See Section 2-4 for details on installing memory.

Question: How do I update my BIOS?

Answer: We do NOT recommend that you 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/support/bios/. 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 ROM file to your computer. Also, check the current BIOS revision to make sure that it is newer than your BIOS before downloading. You may choose the zip file or the .exe file. If you choose the zipped BIOS file, please unzip the BIOS file onto a bootable device or a USB pen/thumb drive. To flash the BIOS, run the batch file named "ami.bat" with the new BIOS ROM file from your bootable device or USB pen/thumb drive. Use the following format:

F:\> ami.bat BIOS-ROM-filename.xxx <Enter>

Note: Always use the file named "ami.bat" to update the BIOS, and insert a space between "ami.bat" and the filename. The BIOS-ROM-filename will bear the motherboard name (i.e., C7Z170) and build version as the extension. For example, "C7Z170.115". When completed, your system will automatically reboot.

If you choose the .exe file, please run the .exe file under Windows to create the BIOS flash floppy disk. Insert the floppy disk into the system you wish to flash the BIOS. Then, boot the system to the floppy disk. The BIOS utility will automatically flash the BIOS without any prompts. Please note that this process may take a few minutes to complete. Do not be concerned if the screen is paused for a few minutes.

When the BIOS flashing screen is completed, the system will reboot and will show "Press F1 or F2". At this point, you will need to load the BIOS defaults. Press <F1> to go to the BIOS setup screen, and press <F9> to load the default settings. Next, press <F10> to save and exit. The system will then reboot.

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

Question: I think my BIOS is corrupted. How can I recover my BIOS?

Answer: Please see Appendix C-BIOS Recovery for detailed instructions.

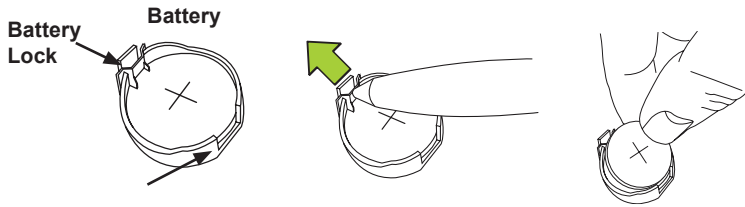
3-4 Battery Removal and Installation

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 as shown below.
3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. Once unlocked, the battery will pop out from the holder.
4. Remove the battery.

Proper Battery Disposal



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

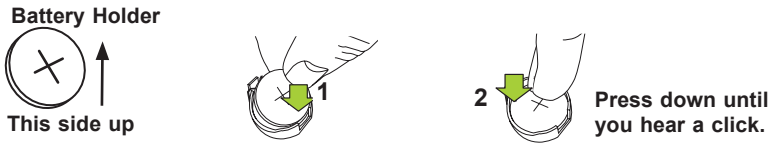
Battery Installation

1. To install an onboard battery, follow the steps 1 & 2 above and continue below:

2. Identify the battery's polarity. The positive (+) side should be facing up.

3. Insert the battery into the battery holder and push it down until you hear a click to ensure that the battery is securely locked.

Attention! When replacing a battery, be sure to only replace it with the same type.



3-5 Returning Motherboard 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. For faster service, you may also obtain RMA authorizations online (http://www.supermicro.com/support/rma/). When you return the motherboard 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.

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 AMI BIOS setup utility for the C7Z170-OCE. The ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS setup utility setup screens.

Note: For AMI BIOS Recovery, please refer to the UEFI BIOS Recovery Instructions in Appendix C.

Starting BIOS GUI Setup Utility

To enter the AMI BIOS GUI setup utility screens, press the <Delete> key while the system is booting up.

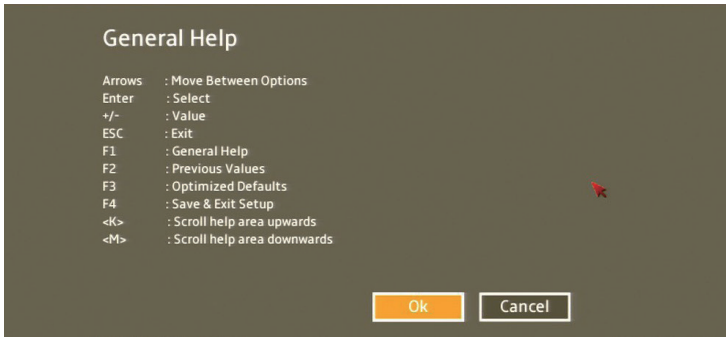
Note: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen.



Each BIOS menu option is described in this manual. The Main BIOS Setup screen has two main areas. The left area is the Main Navigation, and the main area is for the Information Section. Icons that do not respond when the mouse pointer is hovering on top are not configurable.



The AMI BIOS GUI setup utility uses a mouse pointer navigation system similar to standard graphical user interfaces. Hover and click an icon to select a section, click a down arrow to select from an options list.



You may press the <F1> on any screen under the Setup Section to see a list of Hot Keys that are available. Press <F12> to print the screen.

The keyboard's Escape key <ESC> cancels the current screen and will allow you to return to the previous screen.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS GUI setup utility. This setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

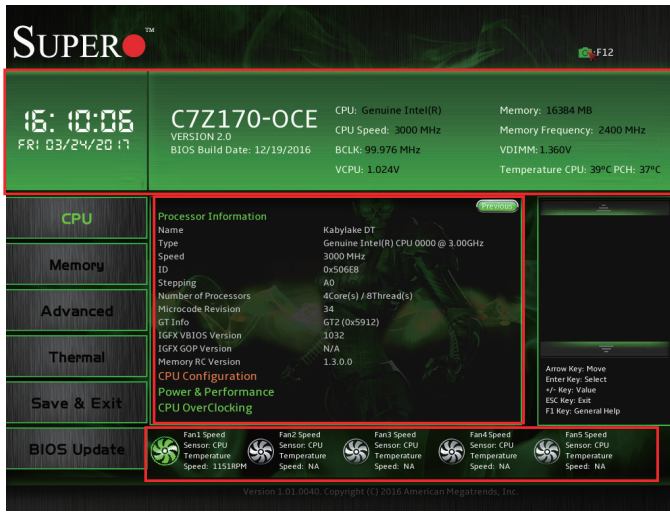
Note: For the purposes of this manual, options that are printed in **Bold** are default settings.

How to Start the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS GUI setup utility. From the Setup Home screen, you can access the other Setup Sections.

4-2 System Information

The System Information Panel displays the motherboard's configuration.



The following information among others is displayed in this section:

- **Motherboard Model Name -** C7Z170-OCE.
- **BIOS Version -** this item displays the BIOS version number.
- **Build Date and Time -** displays the BIOS build date and time.
- **CPU -** displays the CPU type speed, stepping, etc.
- **CPU Fan Data -** displays sensor type, temperature, speed

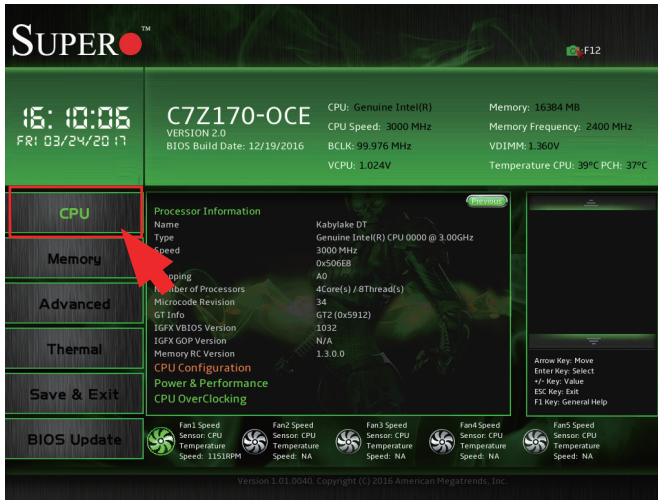
System Date

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

System Time

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

4-3 CPU

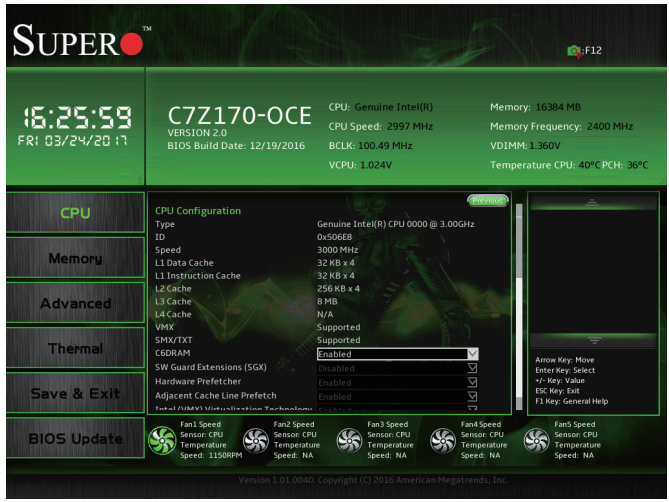


The following information is displayed in this section:

- **Name -** indicates the model name of the CPU.
- **Type -** indicates the brand, model name, model number of the CPU and it's rated clock speed.
- **Speed -** this item shows the detected CPU speed.
- **ID -** displays the unique CPU ID.
- **Stepping -** displays the processor stepping.
- **Number of Processors -** displays the number of cores detected.
- **Microcode Revision -** displays the CPU's microcode patch version.
- **GT Info -** this item shows the processor's GT Information.
- **IGFX VBIOS Version -** this item shows the Integrated Graphics VBIOS version.
- **IGFX GOP Version -** this item shows the Integrated Graphics VOP version.
- **Memory RC Version -** this item shows the memory RC version.

CPU Configuration

Set all options for the processor in this section.



The following CPU information will be displayed:

- **CPU Type -** displays the CPU type.
- **Type -** indicates the brand, model name, model number of the CPU and it's rated clock speed.
- **ID -** displays the unique CPU ID.
- **Speed -** this item shows the detected CPU speed.
- **L1 Data Cache** - indicates Level 1 cache is supported.
- **L1 Instruction Cache** - displays Level 1 instruction cache is supported.
- **L2 Cache** - indicates Level 2 cache is supported.
- **L3 Cache** - displays whether Level 3 cache is supported or not.
- **L4 Cache** - indicates Level 4 cache is supported.
- **VMX** - indicates VMX is supported.
- **SMX/TXT** - indicates SMX/TXT is supported.

C6DRAM

Select Enabled to allow moving of DRAM contents to PRM memory when CPU is in C6 state. The options are Disabled and **Enabled**.

SW Guard Extension (SGX)

Select Enabled to activate the Software Guard Extensions (SGX). The options are Software Controlled, Enabled, and Disabled**.**

Hardware Prefetcher

(Available when supported by the CPU)

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

Adjacent Cache Line Prefetch

(Available when supported by the CPU)

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

Intel (VMX) Virtualization Technology

(Available when supported by the CPU)

Select Enabled to use the Intel Virtualization Technology to allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are Disabled and **Enabled**.



Note: If there is any change to this setting, you will need to power off and reboot the system for the change to take effect. Please refer to Intel's web site for detailed information.

PECI

Select Enabled to activate the Platform Environment Control Interface (PECI). The options are Disabled and **Enabled**.

Active Processor Cores

Use this feature to select the number of active processor cores. The options are **All**, 1, 2, and 3. (These options depend on how many cores are supported by the CPU.)

Hyper-Threading

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

BIST

Select Enabled to activate the Built-In Self Test (BIST) on reset. The options are **Disabled** and Enabled.

JTAG C10 Power

Select Enabled to activate power JTAG in C10 and deeper power states. The options are Enabled and **Disabled**.

AP Threads Idle Manner

Select Enabled to activate AP threads Idle Manner for waiting signal to run. The options are HALT Loop, **MWAIT Loop**, and RUN Loop.

AP Threads Handoff Manner

Select Enabled to activate AP threads Idle Manner for waiting signal to run. The options are HALT Loop and **MWAIT Loop**.

AES

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

Machine Check

Select Enable to activate Machine Check. The options are Disabled and **Enabled**.

MonitorMWait

Select Enable to activate MonitorMWait. The options are Disabled and **Enabled**.

Intel Trusted Execution Technology

Intel TXT (Trusted Execution Technology) helps protect against software-based attacks and ensures protection, confidentiality and integrity of data stored or created on the system. The options are **Disabled** and Enabled**.**

* Intel Trusted Execution Technology is Enabled, the features Alias Check Request and DPR Memory Size are available for configuration.

Alias Check Request

Use this feature to set up Alias Check Request. The options are Enabled and **Disabled**.

DPR Memory Size

Use this feature to set the DMA Protected Range (DPR) memory size. Select a value.

Reset AUX Content

Use this feature to reset the TPM Auxiliary content. The options are yes and **no**.

BIOS Guard

Select Enable to activate BIOS Guard. The options are Enabled and **Disabled**.

Flash Wear Out Protection

Select Enable to activate Flash Wear Out Protection. The options are Disabled and **Enabled**.

Current Debug Interface Status

Select Enable to activate display of the Current Debug Interface Status. The options are Enabled and **Disabled**.

Debug Interface

Select Enable to activate Debug Interface. The options are **Disabled** and Enabled.

Debug Interface Lock

Select Enable to activate Debug Interface lock. The options are Disabled and **Enabled**.

Processor trace memory allocation

Disable of select a value for Processor Trace memory region size. The options are **Disabled**, 4KB, 8KB, 16KB, 32KB, 64KB, 128KB, 256KB, 512KB, and 1MB.

FCLK Frequency for Early Power On

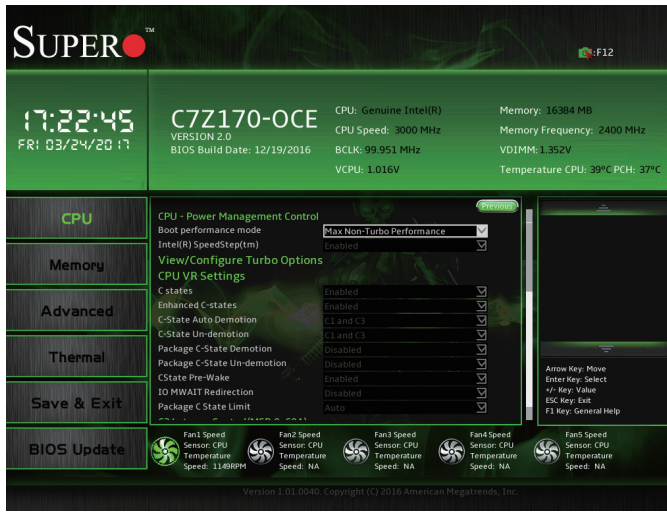
Select the FCLK frequency for early power on. The options are Normal (800MHz), **1GHz**, and 400MHz.

Voltage Optimization

Select Enable to activate Voltage Optimization. The options are Disabled and **Enabled**.

Power and Performance

CPU - Power Management Control



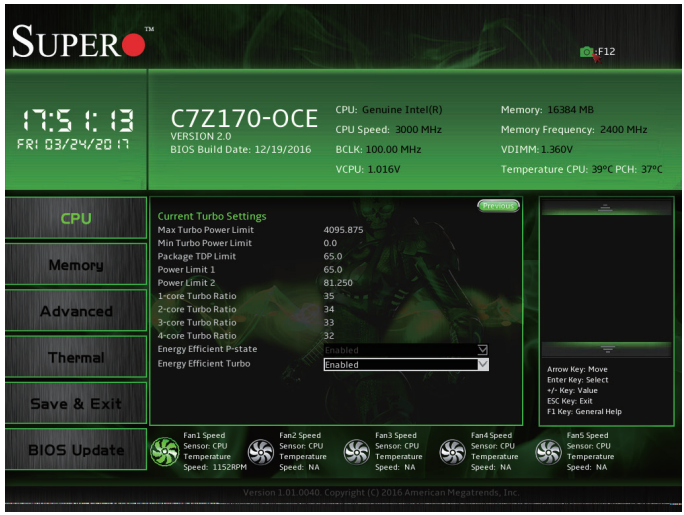
Boot performance mode

This option enables the selection of the default CPU performance during system boot. The options are Max Battery, **Max Non-Turbo Performance**, and Turbo Performance.

Intel(R) SpeedStep(tm)

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

View/Configure Turbo Options



The following information is displayed in this section:

- **Max Turbo Power Limit**
- **Min Turbo Power Limit**
- **Package TDP Limit**
- **Power Limit 1**
- **Power Limit 2**
- **1-core Turbo Ratio**
- **2-core Turbo Ratio**
- **3-core Turbo Ratio**
- **4-core Turbo Ratio**

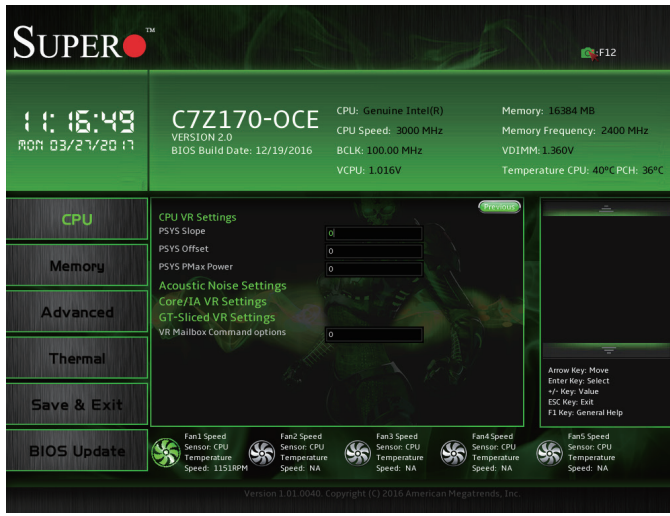
Energy Efficient P-state

Select Enable to activate Energy Efficient P-State. When set to Disabled, this feature will disable access to ENERGY_PERFORMANCE_BIAS MSR, and CPUID Function 6 ECX[3] will read 0, indicating that there is no support for Energy Efficient policy setting. The options are Disabled and **Enabled**.

Energy Efficient Turbo

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

CPU VR Settings



PSYS Slope

PSYS Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x9. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter 0 for AUTO.

PSYS Offset

PSYS Offset is defined in 1/4 increments and uses the BIOS VR mailbox command 0x9. For example, enter 100 for a 25 offset. Valid range is 0-255.

PSYS PMax Power

The value is defined in 1/8 Watt increments and uses the BIOS VR mailbox command 0xB. For example, enter 1000 for a 125 Watt PMax value. Valid range is 0-8192. Enter 0 for AUTO.

Acoustic Noise Settings

Acoustic Noise Mitigation

Select Enable to help mitigate acoustic noise on certain SKUs when the CPU is in deeper C-State. The options are **Disabled** and Enabled.

When the above is set to Enabled, the followings can be configured:

IA VR Domain

Disable Fast PKG C State Ramp for IA Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are True and **False**.

Slow Slew Rate for IA Domain

This feature sets the VR IA Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

GT VR Domain

Disable Fast PKG C State Ramp for GT Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are True and **False**.

Slow Slew Rate for IA Domain

This feature sets the VR GT Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

SA VR Domain

Disable Fast PKG C State Ramp for GT Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are True and **False.**

Slow Slew Rate for IA Domain

This feature sets the VR SA Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

Core/IA VR Settings

VR Config Enable

Select Enable to activate VR configuration options. The options are Disabled and **Enabled.**

AC Loadline

AC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO**.

DC Loadline

DC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO**.

PS Current Threshold1

The PS Current Threshold1 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 80 for 20A.**

PS Current Threshold2

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 20 for 5A.**

PS Current Threshold3

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 4 for 5A.**

PS3 Enable

Enable or Disables PS3. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

PS4 Enable

Enable or Disables PS4. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

IMON Slope

IMON (Load Current Monitor) Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x4. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter **0 for AUTO**.

IMON Offset

IMON Offset is defined in 1/1000 increments and uses the BIOS VR mailbox command 0x4. For example, enter 25,348 for a 25.348 offset. Valid range is 0-63999.

IMON Prefix

This feature sets the IMON offset value to a positive or negative number. The options are **+** and -.

VR Current Limit

This feature sets the Voltage Regulator current limit. The value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4A (Ampere) increments. A value of 400 equals 100A. Set this number to **1022 for Auto**. This uses the BIOS VR mailbox command 0x6.

VR Voltage Limit

This feature sets the Voltage Regulator voltage limit. The value is represented in mV. A value of 1250 equals 1.25V. Set this number to **7999 for Auto**. This uses the BIOS VR mailbox command 0x6.

TDC Enable

Enable or Disables TDC (Thermal Design Current). The options are **Disabled** and Enabled.

TDC Current Limit

The TDC Current Limit is defined in 1/8A (Amperes) increments and uses the BIOS mailbox command 0x1A. A value of 1000 equals 125A. Valid range is 0-32767. Enter 0 for **0 Amps.**

TDC Time Window

The TDC Time Window is defined in milliseconds. Valid range is 1-8ms and 10ms. Note that 9ms has no valid encoding in the MSR definition. The options are **1ms**, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, and 10ms.

TDC Lock

This feature enables or disables TDC Lock. The options are **Disabled** and Enabled.

GT-Sliced VR Settings

GT-Sliced Domain

VR Config Enable

Select Enable to activate VR configuration options. The options are Disabled and **Enabled**.

AC Loadline

AC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO**.

DC Loadline

DC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO.**

PS Current Threshold1

The PS Current Threshold1 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. Default is **80 for 20A.**

PS Current Threshold2

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 20 for 5A.**

PS Current Threshold3

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 4 for 5A.**

PS3 Enable

Enable or Disables PS3. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

PS4 Enable

Use this feature to enable or disable PS4. This feature uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

IMON Slope

IMON (Load Current Monitor) Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x4. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter **0 for AUTO**.

IMON Offset

IMON Offset is defined in 1/1000 increments and uses the BIOS VR mailbox command 0x4. For example, enter 25,348 for a 25.348 offset. Valid range is 0-63999.

IMON Prefix

This feature sets the IMON offset value to a positive or negative number. The options are **+** and -.

VR Current Limit

This feature sets the Voltage Regulator current limit. The value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4A (Ampere) increments. A value of 400 equals 100A. Set this number to **0 for Auto**. This uses the BIOS VR mailbox command 0x6.

VR Voltage Limit

This feature sets the Voltage Regulator voltage limit. The value is represented in mV. A value of 1250 equals 1.25V. Set this number to **0 for Auto**. This uses the BIOS VR mailbox command 0x6.

TDC Enable

Enable or Disables TDC (Thermal Design Current). The options are **Disabled** and Enabled.

TDC Current Limit

The TDC Current Limit is defined in 1/8A (Amperes) increments and uses the BIOS mailbox command 0x1A. A value of 1000 equals 125A. Valid range is 0-32767. Enter 0 for **0 Amps**.

TDC Time Window

The TDC Time Window is defined in milliseconds. Valid range is 1-8ms and 10ms. Note that 9ms has no valid encoding in the MSR definition. The options are **1ms**, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, and 10ms.

TDC Lock

This feature enables or disables TDC Lock. The options are **Enabled** and Disabled.

C states

C-States architecture, a processor power management platform developed by Intel, can further reduce power consumption from the basic C1 (Halt State) state that blocks clock cycles to the CPU. Select Enabled for CPU C Sates support. The options are Disabled and **Enabled**. If this feature is set to Enabled, the following items will be displayed:

Enhanced C-states

(Available when "CPU C States" is set to Enabled)

Select Enabled to enable Enhanced C1 Power State to boost system performance. The options are Disabled and **Enabled**.

C-State Auto Demotion

When this item is enabled, the CPU will conditionally demote C State based on un-cored auto-demote information. The options are Disabled, C1, C3, and **C1 and C3**.

C-State Un-demotion

When this item is enabled, the CPU will conditionally undemote from demoted C3 or C1. The options are Disabled, C1, C3, and **C1 and C3**.

Package C-State Demotion

This item enables the Package C-State demotion. The options are **Disabled** and Enabled.

Package C-State Un-Demotion

When set, the CPU will conditionally undemote from demoted Packaged Package C-State Un-Demotion. The options are **Disabled** and Enabled.

CState Pre-Wake

When set, this option enables or disables the C-State pre wake. The options are Disabled and **Enabled**.

IO MWAIT Redirection

When enabled, this feature will map and send the IO read instructions to the IO registers. The options are **Disabled** and Enabled.

Package C State Limit

Select Auto for the AMI BIOS to automatically set the limit on the C-State package register. The options are Cpu Default, C10, C9, C8, C7S, C7, C6, C3, C2, C2, and **Auto**.

C3 Latency Control (MSR 0x60A)

Time Unit

Use this item to set the C3 latency control time unit. The options are 1ns, 32ns, **1024ns**, 32768ns, 1048576ns, and 33554432ns.

Latency

Use this item to set the C3 latency time value. Valid range is 0-1023. The default setting is **78**.

C6/C7 Short Latency Control (MSR 0x60B)

Time Unit

Use this item to set the C6/C7 short latency time unit. The options are 1ns, 32ns, **1024ns**, 32768ns, 1048576ns, and 33554432ns.

Latency

Use this item to set the C6/C7 short latency time value. Valid range is 0-1023. The default setting is **78**.

C6/C7 Long Latency Control (MSR 0x60C)

Time Unit

Use this item to set the C6/C7 long latency time unit. The options are 1ns, 32ns, **1024ns**, 32768ns, 1048576ns, and 33554432ns.

Latency

Use this item to set the C6/C7 long latency time value. Valid range is 0-1023. The default setting is **118**.

Thermal Monitor

Use this feature to enable the thermal monitor support. The options are Disabled and **Enabled**.

Timed MWAIT

Use this feature to enable the Timed MWAIT support. The options are **Disabled** and Enabled.

Custom P-state Table

Energy Performance Gain

Use this feature to enable or disable the energy performance gain. The options are **Disabled** and Enabled.

EPG DIMM Idd3N

This feature displays the memory standby current.

EPG DIMM Idd3P

This item displays the active power-down current.

CPU Lock Configuration

CFG Lock

When Enabled, this item allows for the configuration of the MSR 0xE2[15] CFG lock bit. The options are Disabled and **Enabled**.

Overclocking Lock

Select Enabled to prevent the CPU overclocking. The options are **Disabled** and Enabled.

GT-Power Management



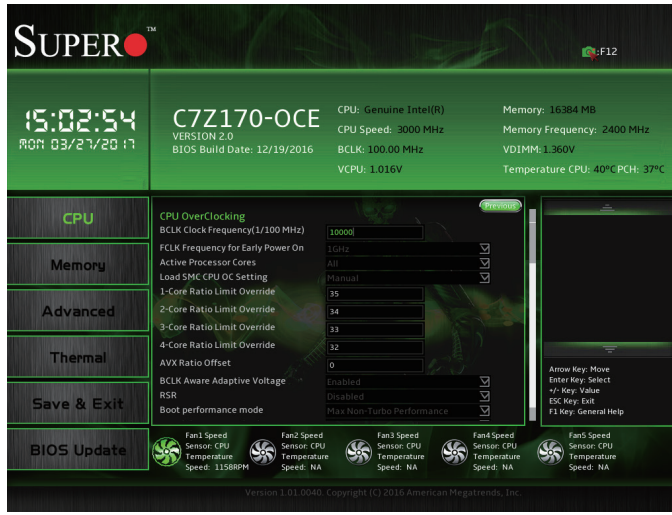
RC6 (Render Standby)

Use this feature to enable Render Standby support. The options are **Enabled** and Disabled.

Maximum GT Frequency

This option is the Maximum GT Frequency as defined by the user. Choose between 300MHz (RPN) and 1200MHz (RP0). Any value beyond this range will be clipped to its min/max supported by the CPU. The options are **Default Max Frequency**, 100MHz through 1200MHz (in increments of 50MHz).

CPU OverClocking



BCLK Clock Frequency (1/100 MHz)

Use this item to set the CPU clock override value for the host system. The default setting is **10000**.

FCLK Frequency for Early Power On

Select the FCLK frequency for early power on. The options are Normal (800MHz), **1GHz**, and 400MHz.

Active Processor Cores

Use this feature to select the number of active processor cores. The options are **All**, 1, 2, and 3. (These options depend on how many cores are supported by the CPU.)

Load SMC CPU OC Setting

This item has optimized pre-configured overclock settings. Select one to activate. The options are **Manual**, 4.0GHz~5.5GHz (in 100MHz increments).

1-Core Ratio Limit Override

This increases (multiplies) 1 clock speed in the CPU core in relation to the bus speed when one CPU core is active. Enter **0** to use the manufacturer's default setting.

2-Core Ratio Limit Override

This increases (multiplies) 2 clock speeds in the CPU core in relation to the bus speed when two CPU cores are active. Enter **0** to use the manufacturer's default setting.

3-Core Ratio Limit Override

This increases (multiplies) 3 clock speeds in the CPU core in relation to the bus speed when three CPU cores are active. Enter **0** to use the manufacturer's default setting.

4-Core Ratio Limit Override

This increases (multiplies) 4 clock speeds in the CPU core in relation to the bus speed when four CPU cores are active. Enter **0** to use the manufacturer's default setting.

AVX Ratio Offset

The AVX Ratio Offset species a negative offset from the Turbo Ratio Limit MSR for AVX workloads. AVX is a more stressful workload. It is helpful to lower the AVX ratio to ensure maximum possible ratio for SSE workloads. Valid range is 0-31. Enter **0 for Auto.**

BCLK Aware Adaptive Voltage

When enabled, pcode will be aware of the BCLK frequency when calculating the CPV/F curves. This is ideal for BCLK to avoid high voltage overrides. The options are Disabled and **Enabled**.

RSR

This item enables or disables the RSR feature. The options are **Disabled** and Enabled.

Boot Performance Mode

This option enables the selection of the default CPU performance during system boot. The options are Max Battery, **Max Non-Turbo Performance**, and Turbo Performance.

Intel(R) SpeedStep(tm)

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

Turbo Mode

This feature allows processor cores to run faster than the rated operating frequency in specific conditions. The options are Disabled and **Enabled.** If this feature is set to Enabled, the following items will be displayed:

Package Power Limit MSR Lock

This feature enables or disables the locking of Package Power Limit settings. When enabled Package Power Limit MSR will be locked and a reset will be required to unlock the register. The options are **Disabled** and Enabled.

Configurable TDP Boot Mode

This feature sets the TDP Boot Mode to either **Nominal**, Down, Up, or Deactivated. When deactivated, it will set MSR to Nominal and MMIO to zero.

Configurable TDP Lock

This option sets the lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. When lock is enabled, Custom Config TDP Count will be forced to 1 and Custom Config TDP Boot Index will be forced to 0. The options are Enabled and **Disabled**.

CTDP BIOS Control

This feature enables CTDP control via runtime ACPI BIOS methods. The options are Enabled and **Disabled**.

Power Limit 1 Override

This feature disables or enables the Power Limit 1 Override. If this option is disabled, the BIOS will program the default values for Power Limit and Power Limit 1 Time Window. The options are Disabled and **Enabled.**

Power Limit 1

This feature configures Package Power Limit 1, in milliwatts. When the limit is exceeded, the CPU ratio is lowered after a period of time (see item below). A lower limit can save power and protect the CPU, while a higher limit improves performance. This value must be between Min Power Limit TDP limit. If value is '0' the BIOS will program the TDP value. Use the number keys on your keyboard to enter the value. The default setting is dependent on the CPU.

Power Limit 1 Time Window

This item determines how long the time window over which the TDP value is maintained. Use the number keys on your keyboard to enter the value. The default setting is **8**. This value may vary between 0~128.

Power Limit 2 Override

This feature disables or enables the Power Limit 2 Override. If this option is disabled, the BIOS will program the default values for Power Limit and Power Limit 2 Time Window. The options are Disabled and **Enabled.**

Power Limit 2

This feature configures Package Power Limit 2, in milliwatts. When the limit is exceeded, the CPU ratio is lowered after a period of time (see item below). A lower limit can save power and protect the CPU, while a higher limit improves performance. This value must be between Min Power Limit TDP limit. If value is '0' the BIOS will program the TDP value. Use the number keys on your keyboard to enter the value. The default setting is dependent on the CPU.

Platform PL1 Enable

This option disables or enables the Platform Power Limit 1 programming. If this option is enabled, it activates the PL1 value to be used by the processor to limit the average power of the given time window. The options are **Disabled** and Enabled.

Platform PL2 Enable

This option disables or enables the Platform Power Limit 2 programming. If this option is enabled, it activates the PL1 value to be used by the processor to limit the average power of the given time window. The options are **Disabled** and Enabled.

Power Limit 3 Override

This feature disables or enables the Power Limit 3 Override. If this option is disabled, the BIOS will program the default values for Power Limit and Power Limit 3 Time Window. The options are **Disabled** and Enabled.

Power Limit 4 Override

This feature disables or enables the Power Limit 4 Override. If this option is disabled, the BIOS will program the default values for Power Limit and Power Limit 4 Time Window. The options are **Disabled** and Enabled.

CPU Flex Ratio Override

Select Enabled to activate CPU Flex Ratio programming. The options are Enabled and **Disabled**.

CPU Flex Ratio Settings

When CPU Flex Ratio Override is enabled, this sets the value for the CPU Flex Ratio. The default is **16**.

Core Max OC Ratio

This option sets the maximum overclocking ratio for the CPU core. The allowable range is 0-80.

System Agent Voltage (mV)

This option sets the System Agent Voltage in mV.

Core Voltage Mode

Use this feature to select the Core voltage mode. The options are Override and **Adaptive**.

If the feature above is set to Override, SVID and Core Voltage Override are available for configuration.

Core Extra Turbo Voltage

Use this feature to select the Core Turbo voltage mode. Select a value.

Core Voltage Offset

Use this feature to set the CPU Voltage Offset value from -500mV to +500mV. Enter **0** to use the manufacturer default value.

Offset Prefix

Use this feature to set the Core Voltage Offset value as a positive (+) number or a negative (-) number. The default setting is **"+"**.

Core PLL Voltage Offset

Use this feature to set the CPU PLL Voltage Offset value from 0-63 with each unit at 15mV. This is used to increase the range of the core frequency in extreme overclocking conditions. Press "+" or "-" on your keyboard to make a selection.

Ring Max OC Ratio

This option sets the maximum overclocking ratio for the RING domain. Press "+" or "-" on your keyboard to change the value.

Ring Min OC Ratio

This option sets the minimum overclocking ratio for the RING domain. Press "+" or "-" on your keyboard to change the value.

Uncore Voltage Offset

Use this feature to set the uncore domain Voltage Offset value from -1000mV to +1000mV. Enter **0** to use the manufacture default value. Press "+" or "-" on your keyboard to change the value.

Offset Prefix

Use this feature to set the offset value as positive or negative. The options are **+** or -.

PCH Voltage

Use this feature to trim the PCH Voltage. Select from these values: **1.00V**, 1.05V, 1.10V, 1.15V, 1.20V, 1.25V, and 1.30V.

CPU PLL Voltage

Use this feature to trim the CPU PLL Voltage. Select from these values: **1.20V**, 1.25V, 1.30V, 1.35V, 1.40V, 1.45V, and 1.50V.

CPU_IO Voltage

Use this feature to calibrate the CPU I/O Voltage. Select from these values: **0.975V**, 1.15V, 1.30V, and 1.50V.

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 and **Enabled**.

VRM Total Current Limit Capability

Use this feature to set the CPU integrated voltage regulator when under extreme high load for VRM total current limit. The options are **100%**, 110%, 120%, 130%, 140%, 150%, 160%, 170%, 180%, 190%, and 200%.

VRM Per-Phase Current Limit Capability

Use this feature to set the CPU integrated voltage regulator when under extreme high load for VRM per-phase current limit. The options are **100%**, 110%, 120%, 130%, 140%, 150%, 160%, 170%, and 180%.

PSYS Slope

PSYS Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x9. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter 0 for AUTO.

PSYS Offset

PSYS Offset is defined in 1/4 increments and uses the BIOS VR mailbox command 0x9. For example, enter 100 for a 25 offset. Valid range is 0-255.

PSYS PMax Power

The value is defined in 1/8 Watt increments and uses the BIOS VR mailbox command 0xB. For example, enter 1000 for a 125 Watt PMax value. Valid range is 0-8192. Enter 0 for AUTO.

Acoustic Noise Settings

Acoustic Noise Mitigation

Select Enable to help mitigate acoustic noise on certain SKUs when the CPU is in deeper C-State. The options are **Disabled** and Enabled.

When the above is set to Enabled, the following can be configured:

IA VR Domain

Disable Fast PKG C State Ramp for IA Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are **FALSE** and TRUE.

Slow Slew Rate for IA Domain

This feature sets the VR IA Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

GT VR Domain

Disable Fast PKG C State Ramp for GT Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are **FALSE** and TRUE.

Slow Slew Rate for GT Domain

This feature sets the VR GT Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

SA VR Domain

Disable Fast PKG C State Ramp for SA Domain

Select False to leave Fast ramp enabled during deeper C-States. Selecting True will disable Fast ramp during deeper C-States. The options are **FALSE** and TRUE.

Slow Slew Rate for SA Domain

This feature sets the VR SA Slew Rate for Deep Package C-State ramp time. Slow slew rate equals Fast divided by the number 2, 4, 8, or 16. This feature is used to help reduce acoustic noise. The options are **Fast/2**, Fast/4, Fast/8, and Fast/16.

Core/IA VR Settings

VR Config Enable

Select Enable to activate VR configuration options. The options are Disabled and **Enabled**.

AC Loadline

AC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter 0 for AUTO.

DC Loadline

DC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter 0 for AUTO.

PS Current Threshold1

The PS Current Threshold1 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. Default is 80 for 20A.

PS Current Threshold2

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. Default is 20 for 5A.

PS Current Threshold3

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. Default is 4 for 5A.

PS3 Enable

Enable or Disables PS3. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

PS4 Enable

Enable or Disables PS4. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

IMON Slope

IMON (Load Current Monitor) Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x4. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter 0 for AUTO.

IMON Offset

IMON Offset is defined in 1/1000 increments and uses the BIOS VR mailbox command 0x4. For example, enter 25,348 for a 25.348 offset. Valid range is 0-63999.

IMON Prefix

This feature sets the IMON offset value to a positive or negative number. The options are **+** and -.

VR Current Limit

This feature sets the Voltage Regulator current limit. The value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4A (Ampere) increments. A value of 400 equals 100A. Set this number to 0 for Auto. This uses the BIOS VR mailbox command 0x6.

VR Voltage Limit

This feature sets the Voltage Regulator voltage limit. The value is represented in mV. A value of 1250 equals 1.25V. Set this number to 0 for Auto. This uses the BIOS VR mailbox command 0x6.

TDC Enable

Enable or Disables TDC (Thermal Design Current). The options are **Disabled** and Enabled.

TDC Current Limit

The TDC Current Limit is defined in 1/8A (Amperes) increments and uses the BIOS mailbox command 0x1A. A value of 1000 equals 125A. Valid range is 0-32767. Enter 0 for 0 Amps.

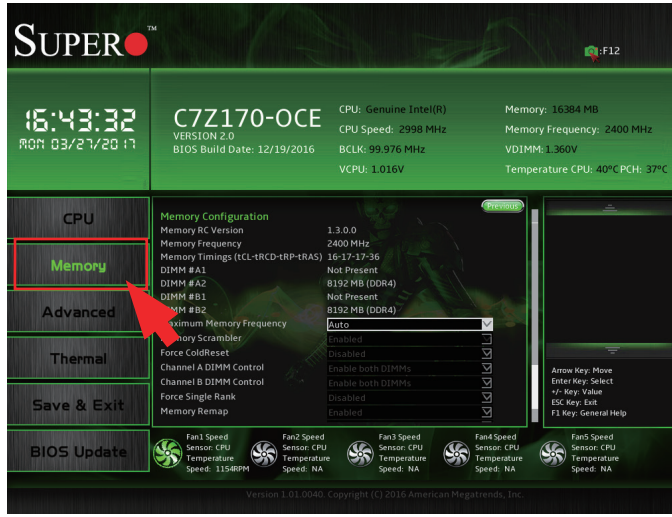
TDC Time Window

The TDC Time Window is defined in milliseconds. Valid range is 1-8ms and 10ms. Note that 9ms has no valid encoding in the MSR definition. The options are **1ms**, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, and 10ms.

TDC Lock

This feature enables or disables TDC Lock. The options are **Disabled** and Enabled.

4-4 Memory



The following information is displayed in this section:

- **Memory RC Version**
- **Memory Frequency**
- **Memory Timings (tCL-tRCD-tRP-tRAS)**
- **DIMM#A1, DIMM#A2, DIMM#B1, DIMM#B2**

Maximum Memory Frequency

This option selects the type/speed of the memory installed. The options are 1333, 1600, 1867, 2133, 2400, 2667, 2933, and 3200. All values are in MHz. **Default speed is auto detected.**

Memory Scrambler

This feature enables or disables memory scrambler support for memory error correction. The settings are Disabled and **Enabled**.

Force Cold Reset

Use this feature when ColdBoot is required during MRC execution. The settings are Enabled and **Disabled**.

Channel A DIMM Control

This feature enables or disables the selected Channel A DIMM slot(s). The settings are **Enable Both DIMMs**, Disable DIMM0, Disable DIMM1, and Disable Both DIMMs.

Channel B DIMM Control

This feature enables or disables the selected Channel B DIMM slot(s). The settings are **Enable Both DIMMs**, Disable DIMM0, Disable DIMM1, and Disable Both DIMMs.

Force Single Rank

When enabled, only Rank0 will be used in each DIMM. The settings are **Disabled** and Enabled.

Memory Remap

PCI memory resources will overlap with the total physical memory 4GB of memory or above is installed on the motherboard. When this occurs, **Enable** this function to reallocate the overlapped physical memory to a location above the total physical memory to resolve the memory overlapping situation. The options are **Enabled** and Disabled.

Mrc Fast Boot

This feature enables or disables fast path through MRC. The settings are Disabled and **Enabled**.

Memory OverClocking

The stored values for Default, Custom, XMP1, and XMP2 memory profiles in that particular order will be displayed in these fields.

- **tCK (MHz)**
- **tCL**
- **tRCD/tRP**
- **tRAS**
- **tCWL**
- **tFAW**
- **tREFI**

- **tRFC**
- **tRRD**
- **tRTP**
- **tWR**
- **tWTR**
- **NMode**
- **VDD [mV]**

Memory Profile

Use this feature to set Performance Memory Profiles which may cause impact on memory behavior. The options are **Default Profile,** Custom profile, and XMP profile 1.

If **Default Profile** is selected, the installed memory will run at 2200MHz if the detected memory is rated at 2400MHz or above, and run at 1867MHz if the memory detected is rated at 1867MHz.

When the above is set to Custom profile, the following can be configured:

Memory Reference Clock

This option selects the Memory Clock ratio. The options are Auto, 133, and **100**.

QCLK Odd Ratio

This option enables or disables the quadrature clock odd ratio. The options are **Disabled** and Enabled.

Memory Frequency

This option selects the type/speed of the memory installed. The options are Auto, DDR4-800MHz, DDR4-1000MHz, DDR4-1200MHz, DDR4-1400MHz, DDR4-1600MHz, DDR4-1800MHz, DDR4-2000MHz, DDR4-2200MHz, **DDR4-2400MHz**, DDR4-2600MHz, DDR4-2800MHz, DDR4-3000MHz, DDR4-3200MHz, DDR4-3400MHz, and DDR4-3600MHz. **Default speed is auto detected.**

Memory Voltage

This option selects the Memory Voltage The options are Default, 1.20V, 1.25V, 1.30V, **1.35V**, 1.40V, 1.45V, 1.50V, 1.55V, 1.60V, 1.65V, 1.70V, and 1.75V.

tCL

This option configures the Cas Latency Range. Enter a number between 4-18. The default is **16**.

tRCD/tRP

This option selects the Ras Precharge Range and Row to Col Delay Range. Enter a number between 1-38. The default is **17**.

tRAS

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

Minimum CAS Write Latency Time (tCWL)

This option selects the Minimum CAS Write Latency Time. Enter a numeric value. The default is **16**.

tFAW

This option selects the Minimum Four Activate Window Delay Time. Enter a numeric value between 1-586. The default is **31**.

Maximum tREFI Time (tREFI)

This option configures the Maximum tREFI Time (Average Periodic Refrech Interval). Enter a numeric value. The default is **10400**.

tRFC

This option selects the Minimum Refresh Recovery Delay Time. Enter a number between 1-9363. The default is **347**.

tRRD

This option selects the Minimum Row Active To Row Active Delay Time. Enter a number between 1-38. The default is **6**.

tRTP

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

tWR

This option configures the Minimum Write Recovery Time. Enter a number between 1-38. The options are Auto, 5, 6, 7, 8, 10, 12, 14, **16**, 18, 20, and 24.

tWTR

This option configures the Minimum Internal Write to Read Command Delay Time. Enter a number between 1-38. The default is **0**.

NMode

This option configures NMode. The default is **2**.

3rd Timing:

tRPab_ext

This option configures the tRPab_ext. Enter a numeric value. The default is **0**.

tRDPRE

This option configures the tRDPRE. Enter a numeric value. The default is **8**.

tWRPRE

This option configures the tWRPRE. Enter a numeric value. The default is **36**.

tRRD_sg

This option configures the tRRD_sg. Enter a numeric value. The default is **6**.

tRRD_dg

This option configures the tRRD_dg. Enter a numeric value. The default is **4**.

derating ext

This option configures the derating_ext. Enter a numeric value. The default is **2**.

ODT_read_duration

This option configures the ODT Read Duration. Enter a numeric value. The default is **0**.

ODT_Read_Delay

This option configures the ODT Read Delay. Enter a numeric value. The default is **0**.

ODT_write_duration

This option configures the ODT Write Duration. Enter a numeric value. The default is **0**.

ODT_Write_Delay

This option configures the ODT Write Delay. Enter a numeric value. The default is **0**.

Write_Early_ODT

This option configures the Write Early ODT. Enter a numeric value. The default is **0**.

tAONPD

This option configures the tAONPD. The default is **11**.

ODT_Always_Rank0

This option configures the ODT Always Rank0. Enter a numeric value. The default is **0**.

tRDRD_sg

This option configures the between module read to read delay (tRDRD_sg). Enter a numeric value. The default is **6**.

tRDRD_dg

This option configures the between module read to read delay (tRDRD_dg). Enter a numeric value. The default is **4**.

tRDRD_dr

This option configures the between module read to read delay (tRDRD_dr). Enter a numeric value. The default is **6**.

tRDRD_dd

This option configures the between module read to read delay (tRDRD_dd). Enter a numeric value. The default is **7**.

tRDWR_sg

This option configures the between module read to write delay (tRDWR_sg). Enter a numeric value. The default is **9**.

tRDWR_dg

This option configures the between module read to write delay (tRDWR_dg). Enter a numeric value. The default is **9**.

tRDWR_dr

This option configures the between module read to write delay (tRDWR_dr). Enter a numeric value. The default is **9**.

tRDWR_dd

This option configures the between module read to write delay (tRDWR_dd). Enter a numeric value. The default is **10**.

tWRRD_sg

This option configures the between module read to write delay (tWRRD_sg). Enter a numeric value. The default is **31**.

tWRRD_dg

This option configures the between module read to write delay (tWRRD_dg). Enter a numeric value. The default is **25**.

tWRRD_dr

This option configures the between module read to write delay (tWRRD_dr). Enter a numeric value. The default is **7**.

tWRRD_dd

This option configures the between module read to write delay (tWRRD_dd). Enter a numeric value. The default is **7**.

tRWRW_sg

This option configures the between module read to write delay (tWRWR_sg). Enter a numeric value. The default is **6**.

tRWRW_dg

This option configures the between module read to write delay (tWRWR_dg). Enter a numeric value. The default is **4**.

tRWRW_dr

This option configures the between module read to write delay (tWRWR_dr). Enter a numeric value. The default is **7**.

tRWRW_dd

This option configures the between module read to write delay (tWRWR_dd). Enter a numeric value. The default is **7**.

tXP

This option configures tXP. Enter a numeric value. The default is **8**.

tXPDLL

This option configures tXPDLL. Enter a numeric value. The default is **29**.

tPRPDEN

This option configures tPRPDEN. Enter a numeric value. The default is **2**.

tRDPDEN

This option configures tRDPDEN. Enter a numeric value. The default is **21**.

tWRPDEN

This option configures tWRPDEN. Enter a numeric value. The default is **36**.

DIIBwEn[0]

This option configures DIIBwEn[0]. Enter a numeric value. The default is **0**.

DIIBwEn[1]

This option configures DIIBwEn[1]. Enter a numeric value. The default is **1**.

DIIBwEn[2]

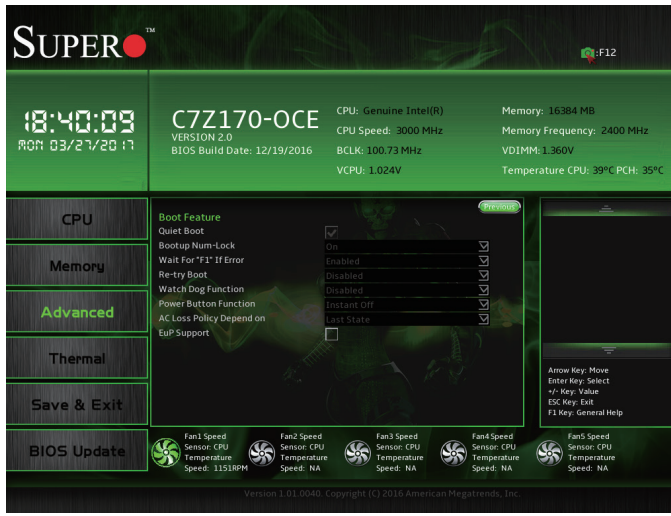
This option configures DIIBwEn[2]. Enter a numeric value. The default is **2**.

DIIBwEn[3]

This option configures DIIBwEn[3]. Enter a numeric value. The default is **2**.

4-5 Advanced

Boot Feature



Quiet Boot

Use this feature to select the screen display between the POST messages and the OEM logo upon bootup. Uncheck the box to display the POST messages. Check the box to display the OEM logo instead of the normal POST messages.

Bootup Num-Lock

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

Wait for "F1" Error

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

Re-try Boot

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

Watch Dog Function

If enabled, the Watch Dog Timer will allow the system to reset or generate NMI based on jumper settings when it is expired for more than 5 minutes. The options are **Disabled** and Enabled.

Power Button Function

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

AC Loss Policy Depend On

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

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. Check the box to activate EUP support. The default is **Disabled (Unchecked)**.

NCT6792D Super IO Configuration



SuperIO Chip NCT6792D

Serial Port 1 Configuration

Serial Port

This item will Enable or Disable Serial Port 1 (COM1). Place a tick mark on the box to enable Serial Port 1. The default is **Enabled**.

Device Settings

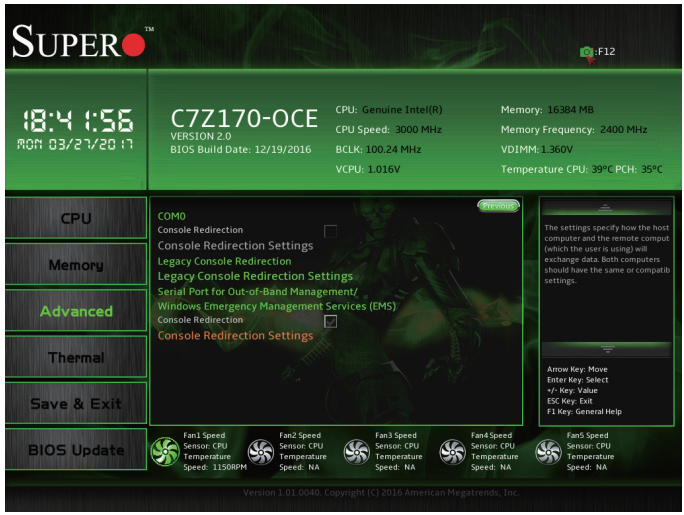
This item displays the current IRQ setting for Serial Port 1 (COM1).

Change Settings

This item configures the IRQ setting for Serial Port 1 (COM1).

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

Serial Port Console Redirection



COM 0

Console Redirection

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

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

Console Redirection Settings

Terminal Type

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

Bits Per second

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

Data Bits

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

Parity

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

Stop Bits

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

Flow Control

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

VT-UTF8 Combo Key Support

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

Recorder Mode

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

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Enabled (checked) and **Disabled (unchecked).**

Legacy OS Redirection Resolution

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

Putty KeyPad

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

Redirection After BIOS POST

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

Legacy Console Redirection

Legacy Console Redirection Settings

Legacy Serial Redirection Port

Select a COM port for Legacy Serial Redirection. The options are dependent on the available COM ports**.**

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

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

Console Redirection

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

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

Console Redirection Settings

Out-of-Band Mgmt Port

The feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **dependent on the available COM ports**.

Terminal Type

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

Bits per second

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

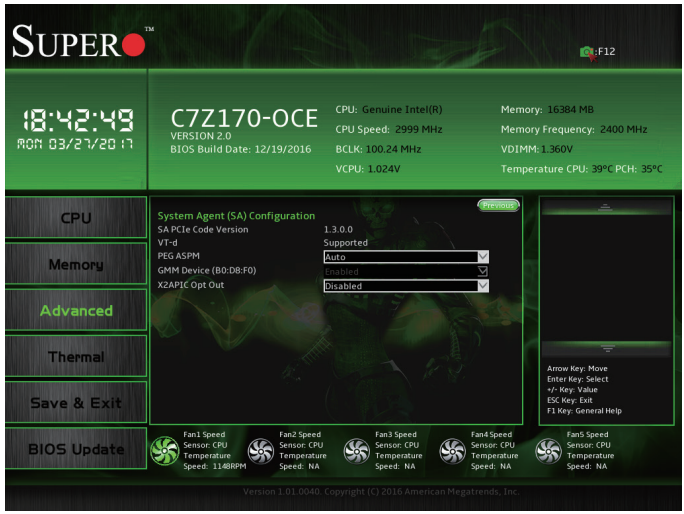
Flow Control

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

The settings for each these features are displayed:

Data Bits, Parity, Stop Bits

System Agent (SA) Configuration



The following information will be displayed:

- **SA PCIe Code Version**
- **VT-d Capability**

PEG ASPM

This feature configures the ASPM (Active State Power Management) settings for the graphics devices installed on PCI-E Slot 0, Slot 1, or Slot2. The options are Disabled, **Auto**, ASPM L0s, ASPM L1s, and ASPM L0sL1.

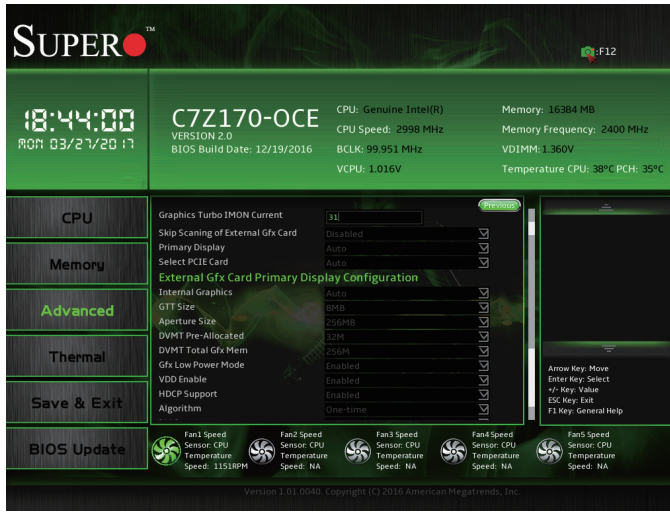
GMM Device (B0:D8:F0)

This feature will enable/disable the SA GMM device. The options are Disabled and **Enabled**.

X2APIC Opt Out

This feature will enable/disable the X2APIC_OPT_OUT bit. The options are Enabled and **Disabled**.

Graphics Configuration



Graphics Turbo IMON Current

Use this feature to set the limit on the current voltage regulator. Valid range is 14-31. Default is **31**.

Skip Scanning of External Gfx Card

Use this feature to scan for External Gfx Card on PEG and PCH PCIE Ports. If this feature is enabled, the system will not scan for a new card. The options are **Disabled** and Enabled.

Primary Display

Use this feature to select the graphics device to be used as the primary display. Select from IGFX/PEG/PCI or select SG for switchable GFX. The options are **Auto**, IGFX, PEG, PCI, and SG.

Select PCIE Card

Use this feature to select either Elk Creek 4, PEG Eval, or **Auto**, to be used on the platform.

External Gfx Card Primary Display Configuration

Primary PEG

This feature allows the user to select the primary PCI Express Graphics (PEG) slot. The options are **Auto**, PEG11, and PEG12.

Primary PCIE

This feature allows the user to specy which graphics card to be used as the primary graphics card. The options are **Auto**, PCIE1**,** PCIE2, PCIE3, PCIE4, PCIE5, PCIE6, PCIE7, PCIE8, PCIE9, PCIE10, PCIE11, PCIE12, PCIE13, PCIE14, PCIE15, PCIE16, PCIE17, PCIE18, and PCIE19.

Internal Graphics

This item keeps the IGD (Internal Graphics Device) enabled, based on setup options. The options are **Auto**, Disabled, and Enabled.

GTT Size

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

Aperture Size

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

DVMT Pre-Allocated

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

DVMT Total Gfx Mem

Use this feature to set the total memory size to be used by internal graphics devices based on the DVMT 5.0 platform. The options are **256MB**, 128MB, and MAX.

Gfx Low Power Mode

Select Enabled to use the low power mode for internal graphics devices installed in a small form factor (SFF) computer. The options are **Enabled** and Disabled.

VDD Enable

Activating this feature will force VDD in the BIOS. The options are Disabled and **Enabled**.

HDCP Support

Activating this feature will enable HDCP (High-bandwidth Digital Content Protection) BIOS support. The options are **Enabled** and Disabled.

Algorithm

Select either **One-Time** or Periodic for HDCP re-encryption flow.

PM Support

Activating this feature will enable Power Management BIOS support. The options are **Enabled** and Disabled.

PAVP Enable

Use the feature to enable Protect Audio Video Path Mode. The options are **Enabled** and Disabled.

Cdynmax Clamping Enable

Enable this option to activate Cdynmas Clamping. The options are **Enabled** and Disabled.

Cd Clock Frequency

Use this feature to set the highest Cd clock frequency. The options are 337.5MHz, 450MHz, 540MHz, and **675MHz.**

Graphics OverClocking

GT Slice Domain

GT OverClocking Frequency

This option selects the Overclocked RPO frequency in multiples of 50MHz. The default is **0**.

GT Voltage Mode

Use this feature to select the Overclocking GT mode. The options are **Adaptive** and Override.

GT Extra Turbo Voltage

(Available when Adaptive is selected above.) Use this feature to set the extra voltage applied while GT is operating in turbo mode. Specify a value from 0mV to 2000mV. Enter **0** to use the manufacture default value.

GT Voltage Offset

(Available when Offset is selected above)

Use this feature to set the GT Adaptive voltage Target(mV) value from 0mV to 2000mV. Enter **0** to use the manufacture default value.

Offset Prefix

Use this feature to set the Offset value as a positive (+) number or a negative (-) number. The default setting is **"+"**.

GT Unslice Domain

GT OverClocking Frequency

This option selects the Overclocked RPO frequency in multiples of 50MHz. The default is **0**.

GT Voltage Mode

Use this feature to select the Overclocking GT mode. The options are **Adaptive** and Override.

GT Extra Turbo Voltage

(Available when Adaptive is selected above)

Use this feature to set the extra voltage applied while GT is operating in turbo mode. Specify a value from 0mV to 2000mV. Enter **0** to use the manufacture default value.

GTU Voltage Offset

(Available when Offset is selected above)

Use this feature to set the GT Adaptive voltage Target(mV) value from 0mV to 2000mV. Enter **0** to use the manufacture default value.

Offset Prefix

Use this feature to set the Offset value as a positive (+) number or a negative (-) number. The default setting is **"+"**.

GT-Sliced VR Settings

VR Config Enable

Select Enable to activate VR configuration options. The options are Disabled and **Enabled**.

AC Loadline

AC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO**.

DC Loadline

DC Loadline is defined in 1/100 mOhms and uses the BIOS mailbox command 0x2. A value of 100 equals 1.0 mOhm, and 1255 is 12.55 mOhms. Valid range is 0-6249 (0-62.49 mOhms). Enter **0 for AUTO.**

PS Current Threshold1

The PS Current Threshold1 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. Default is **80 for 20A.**

PS Current Threshold2

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 20 for 5A.**

PS Current Threshold3

The PS Current Threshold2 is defined in 1/4A (Amperes) increments and uses the BIOS mailbox command 0x3. A value of 400 equals 100A. Valid range is 0-512 which translates to 0-128A. Enter 0 for AUTO. **Default is 4 for 5A.**

PS3 Enable

Enable or Disables PS3. Uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

PS4 Enable

Use this feature to enable or disable PS4. This feature uses BIOS VR mailbox command line 0x3. The options are Disabled and **Enabled**.

IMON Slope

IMON (Load Current Monitor) Slope is defined in 1/100 increments and uses the BIOS VR mailbox command 0x4. Valid range is 0-200. For example, enter 125 for a 1.25 slope. Enter **0 for AUTO**.

IMON Offset

IMON Offset is defined in 1/1000 increments and uses the BIOS VR mailbox command 0x4. For example, enter 25,348 for a 25.348 offset. Valid range is 0-63999.

IMON Prefix

This feature sets the IMON offset value to a positive or negative number. The options are **+** and -.

VR Current Limit

This feature sets the Voltage Regulator current limit. The value represents the maximum instantaneous current allowed at any given time. The value is represented in 1/4A (Ampere) increments. A value of 400 equals 100A. Set this number to **0 for Auto**. This uses the BIOS VR mailbox command 0x6.

VR Voltage Limit

This feature sets the Voltage Regulator voltage limit. The value is represented in mV. A value of 1250 equals 1.25V. Set this number to **0 for Auto**. This uses the BIOS VR mailbox command 0x6.

TDC Enable

Enable or Disables TDC (Thermal Design Current). The options are **Disabled** and Enabled.

TDC Current Limit

The TDC Current Limit is defined in 1/8A (Amperes) increments and uses the BIOS mailbox command 0x1A. A value of 1000 equals 125A. Valid range is 0-32767. Enter 0 for **0 Amps**.

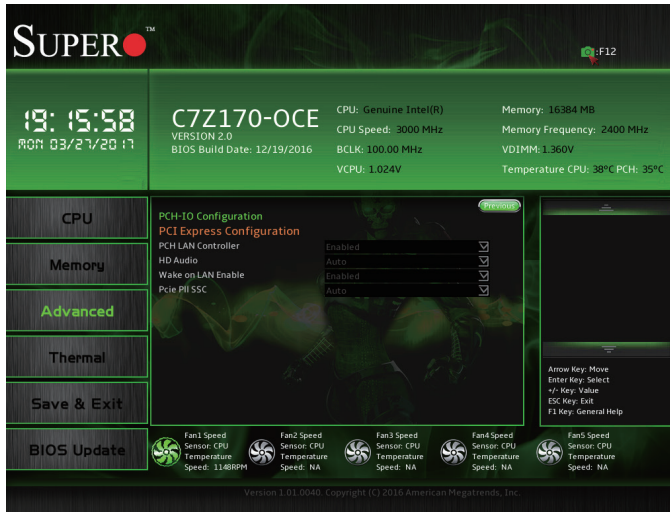
TDC Time Window

The TDC Time Window is defined in milliseconds. Valid range is 1-8ms and 10ms. Note that 9ms has no valid encoding in the MSR definition. The options are **1ms**, 2ms, 3ms, 4ms, 5ms, 6ms, 7ms, 8ms, and 10ms.

TDC Lock

This feature enables or disables TDC Lock. The options are Enabled and **Disabled.**

PCH-IO Configuration



PCI Express Configuration

DMI Link ASPM Control

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

PCH SLOT3 PCI-E 3.0 X1 (IN X4)

PCI Express Root Port 3

Select Enabled to activate PCI Express Root Port 3. The options are Disabled and **Enabled**.

Topology

Select to identy the SATA topology. The options are **Unknown**, x1, x4, Sata Express, and M2.

ASPM

This feature configures the ASPM (Active State Power Management) settings for the graphics devices installed on PCI-E Slot 0, Slot 1, or Slot2. The options are **Auto**, L0sL1, L1, L0s, and Disabled.

L1 Substates

Select to configure the L1 Substates. The options are Disabled, L1.1, L1.2, and **L1.1 & L1.2.**

PCIe Speed

Set this option to configure the speed setting of this PCIE slot . The options are **Auto,** Gen1, Gen2, and Gen3.

M.2 PCI-E X4

PCI Express Root Port 9

Select Enabled to activate PCI Express Root Port 9. The options are **Enabled** and Disabled.

Topology

Select to identy the SATA topology. The options are **Unknown**, x1, x4, Sata Express, and M2.

ASPM

This feature configures the ASPM (Active State Power Management) settings for the graphics devices installed on PCI-E Slot 0, Slot 1, or Slot2. The options are **Auto**, L0sL1, L1, L0s, and Disabled.

L1 Substates

Select to configure the L1 Substates. The options are Disabled, L1.1, L1.2, and **L1.1 & L1.2.**

PCIe Speed

Set this option to configure the speed setting of this PCIE slot . The options are **Auto,** Gen1, Gen2, and Gen3.

PCH SLOT1 PCI-E 3.0 X1 (IN X4)

PCI Express Root Port 20

Select Enabled to activate PCI Express Root Port 20. The options are Disabled and **Enabled**.

Topology

Select to identy the SATA topology. The options are **Unknown**, x1, x4, Sata Express, and M2.

ASPM

This feature configures the ASPM (Active State Power Management) settings for the graphics devices installed on PCI-E Slot 0, Slot 1, or Slot2. The options are Disabled, L0s, L1, L0sL1, and **Auto**.

L1 Substates

Select to configure the L1 Substates. The options are Disabled, L1.1, L1.2, and **L1.1 & L1.2.**

PCIe Speed

Set this option to configure the speed setting of this PCIE slot . The options are **Auto,** Gen1, Gen2, and Gen3.

PCH LAN Controller

Use this feature to enable or disable the PCH LAN Controller. The options are **Enabled** and Disabled.

HD Audio

Use this feature to detect an HD Audio device. The options are Disabled, Enabled, and **Auto**.

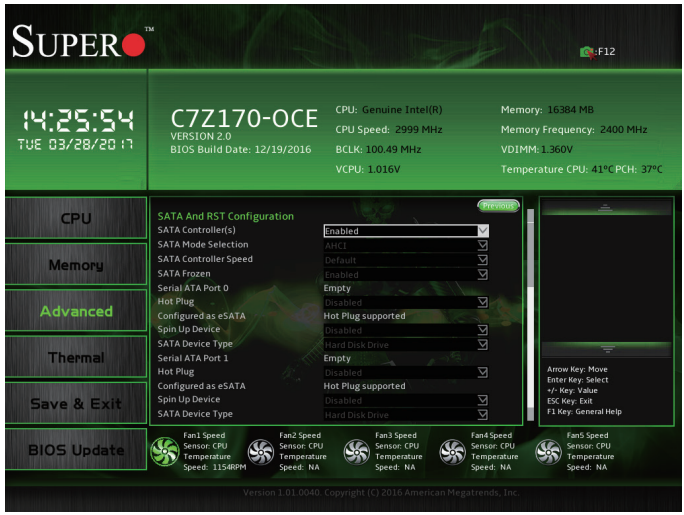
Wake on LAN Enable

Select Enabled to enable the capability to 'wake-up' the system through the Ethernet port. The options are **Enabled** and Disabled.

Pcie PII SSC

Use this feature PCIE PII SSC. Select Auto to keep the hardware default with no BIOS override. Valid range is from 0.0% to 2.0%.

SATA and RST Configuration



SATA Controller(s)

Select Disabled to disable the onboard SATA Controllers. The options are **Enabled** and Disabled.

SATA Mode Selection

This item selects the mode for the installed SATA drives. The options are **AHCI** and RAID.

SATA Controller Speed

Use this option to specify the maximum speed the SATA controller can support. The options are **Default**, Gen 1, Gen 2, and Gen 3.

SATA Frozen

Select Disabled to disable the Freeze Lock Security feature. The options are Disabled and **Enabled**.

The remaining options in the section are similar across Serial ATA Ports 0 through 5.

Serial ATA Port

This item displays the detected SATA drive, If any.

Hot Plug

This feature designates the port specified for hot plugging. Set this item 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 **Disabled** and Enabled.

Configured as eSATA

This item displays the eSATA status for the detected hard drive.

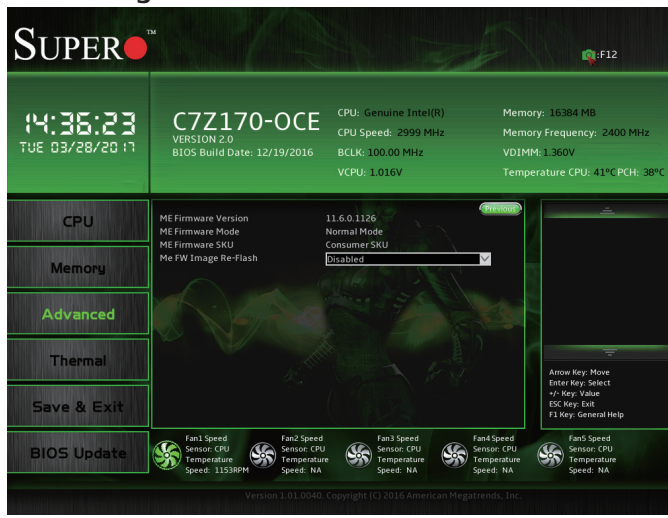
Spin Up Device

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

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** and Solid State Drive.

PCH FW Configuration



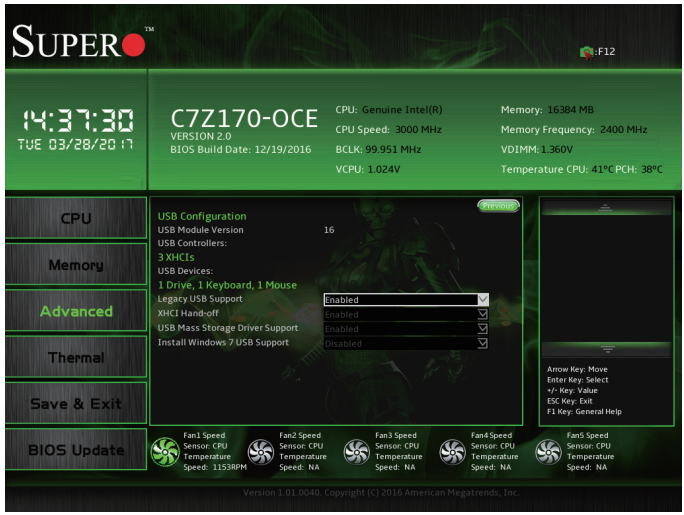
The following information for the PCH Firmware is displayed.

- **ME Firmware Version**
- **ME Firmware Mode**
- **ME Firmware SKU**

ME FW Image Re-Flash

This item will update the PCH Firmware from an image in a USB Flash-drive attached to a USB port. The options are **Disabled** and Enabled.

USB Configuration



The following information for USB Configuration is displayed.

- **USB Module Version**
- **USB Controllers**
- **USB Devices**

Legacy USB Support

Select Enabled to support legacy USB devices. Select Auto to disable legacy support when legacy USB devices are not present. If Disable is selected, legacy USB devices will not be supported. The options are **Enabled,** Disabled, and Auto.

XHCI Hand-Off

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

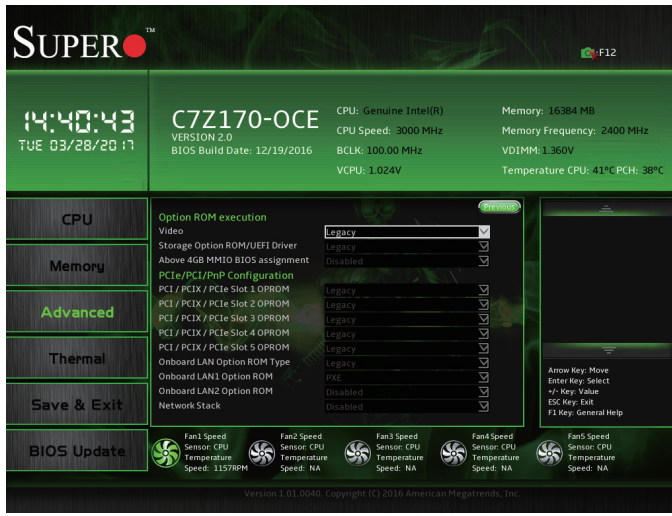
USB Mass Storage Driver Support

Set Enabled to enable USB mass storage driver support. The options are Disabled and **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, and 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.

PCIe/PCI/PnP Configuration



Option ROM execution

Video

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

Storage Option ROM/UEFI Driver

This feature controls which option ROM to execute for the storage device. The options are Disabled, UEFI, and **Legacy**.

Above 4GB MMIO BIOS assignment

Select Enable for remapping of BIOS above 4GB. The options are Enabled and **Disabled**.

PCIe/PCI/PnP Configuration

PCI/PCIX/PCIe Slot1 OPROM,
PCI/PCIX/PCIe Slot2 OPROM,
PCI/PCIX/PCIe Slot3 OPROM,
PCI/PCIX/PCIe Slot4 OPROM,
PCI/PCIX/PCIe Slot5 OPROM

Select Disabled to deactivate the selected slot, Legacy to activate the slot in legacy mode and EFI to activate the slot in EFI mode. The options are Disabled, **Legacy**, and EFI.

Onboard LAN Option ROM type

Select the type of option ROM installed. The options are **Legacy** and UEFI.

Onboard LAN1 Option ROM

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

Onboard LAN2 Option ROM

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

Network Stack

Select Enabled to enable PXE (Preboot Execution Environment) or UEFI (Unified Extensible Firmware Interface) for network stack support. The options are **Disabled** and Enabled. If this feature is enabled, the two features below are available.

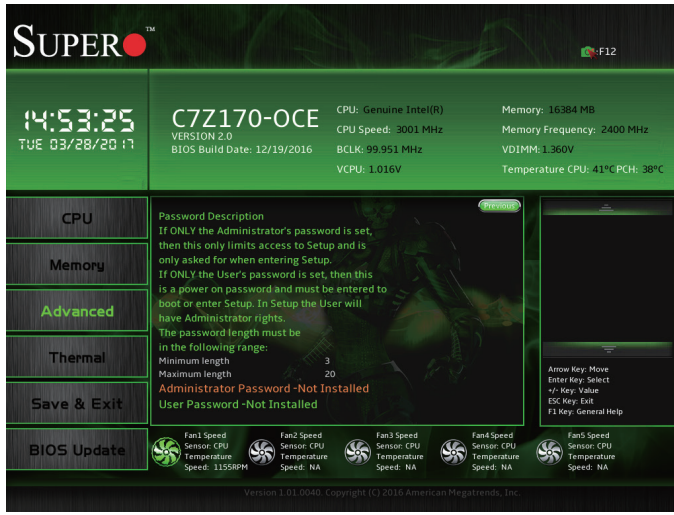
Ipv4 PXE Support

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 and **Enabled**.

Ipv6 PXE Support

Select Enabled to enable Ipv6 PXE (Preboot Execution Environment) for boot support. If this feature is set to Disabled, Ipv6 PXE boot option will not be supported. The options are Disabled and **Enabled.**

Security



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

- If the Administrator password is defined ONLY - this controls access to the BIOS setup ONLY.
- If the User's password is defined ONLY - this password will need to be entered upon each system boot, and will also have Administrator rights in the setup.
- Passwords must be at least 3 and up to 20 characters long.

Administrator Password

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

User Password

Use this feature to set the User Password, which is required every time the system boots. The length of the password should be from 3 characters to 20 characters long.

Secure Boot



The following items will be displayed:

- **System Mode**
- **Secure Boot**
- **Vendor Keys**

Attempt Secure Boot

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

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 Standard and **Customized**.

CSM Support

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

Key Management



Provision Factory Default Keys

Allow provisioning the factory default secure boot keys when system is in setup mode. The options are **Disabled** and Enabled.

(Available when Secure Boot Mode is set to 'Customized')

Key Management allows experienced users to modify Secure Boot Variables.

Install Factory Default Keys

This option forces the system to install the factory default keys. Click Yes or No.

Enroll Efi Image

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

Save All Secure Boot Variables

This option saves all revised Secure Boot settings.

Platform Key (PK)

This item uploads and installs a secure Platform Key. You may insert a factory default key or load from a file. The file formats accepted are:

1) Public Key Certificate

a. EFI Signature List

b. EFI CERT X509 (DER Encoded)

c. EFI CERT RSA2048 (bin)

d. EFI SERT SHA256 (bin)

2) EFI Time Based Authenticated Variable

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

Key Exchange Keys

This item uploads and installs a Key Exchange Key. You may insert a factory default key or load from a file. When prompted, select "Yes" to load Factory Defaults or "No' to load from a file.

Authorized Signatures

This item uploads and installs an Authorized Signature . You may insert a factory default key or load from a file. The file formats accepted are:
1) Public Key Certificate

a. EFI Signature List

b. EFI CERT X509 (DER Encoded)

c. EFI CERT RSA2048 (bin)

d. EFI SERT SHA256 (bin)

2) EFI Time Based Authenticated Variable

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

Forbidden Signatures

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

1) Public Key Certificate

a. EFI Signature List

b. EFI CERT X509 (DER Encoded)

c. EFI CERT RSA2048 (bin)

d. EFI SERT SHA256 (bin)

2) EFI Time Based Authenticated Variable

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

Authorized TimeStamps

This item uploads and installs an Authorized Time Stamp . You may insert a factory default key or load from a file. The file formats accepted are:
1) Public Key Certificate

a. EFI Signature List

b. EFI CERT X509 (DER Encoded)

c. EFI CERT RSA2048 (bin)

d. EFI SERT SHA256 (bin)

2) EFI Time Based Authenticated Variable

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

OsRecovery Signatures

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

a. EFI Signature List

b. EFI CERT X509 (DER Encoded)

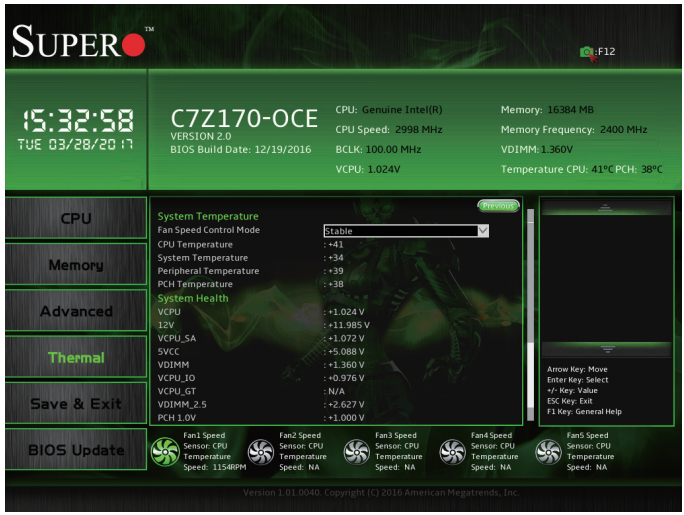
c. EFI CERT RSA2048 (bin)

d. EFI SERT SHA256 (bin)

2) EFI Time Based Authenticated Variable

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

4-6 Thermal



System Temperature

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. The options are **Stable** and Full Speed.

The following items are displayed:

- **CPU Temperature** - displays the CPU temperature detected by PECI.

- **System Temperature** - indicates the system internal temperature.

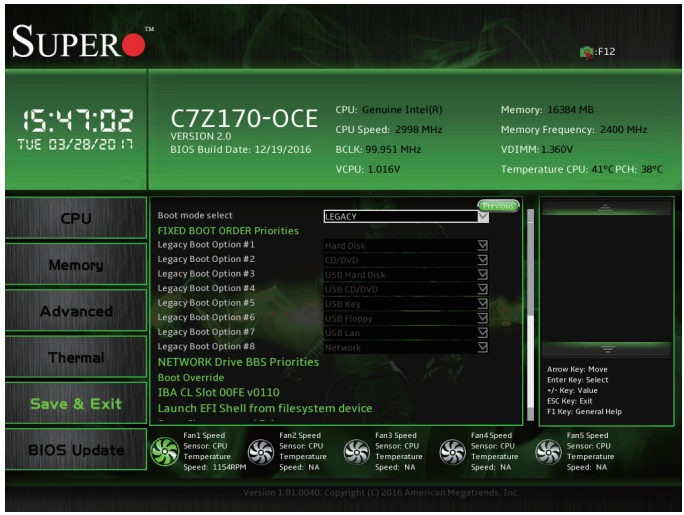
- **Peripheral Temperature** - displays the detected peripheral device temperature.
- **PCH Temperature** - indicates the detected PCH chip temperature.

System Health

The following items will be displayed (Voltage):

- **VCPU**
- **12V**
- **VCPU_SA**
- **5VCC**
- **VDIMM**
- **VCPU_IO**
- **VCPU_GT**
- **VDIMM_2.5**
- **PCH 1.0V**
- **3.3V_DL**
- **VSB3**
- **3.3VCC**
- **VBAT**
- **VCPU_STPLL**

4-7 Save & Exit



Boot mode select

Use this item to select the type of device to be used for system boot. The options are **Legacy**, UEFI, and Dual.

FIXED BOOT ORDER Priorities

This option prioritizes the order of bootable devices from which the system will boot. Choose an entry from top to bottom to select devices.

Legacy Boot Option #1~#8

The options are Hard Disk, CD/DVD, USB Hard Disk, USB CD/DVD, USB Key, USB Floppy, USB LAN, Network, and Disabled.

NETWORK Drive BBS Priorities

Boot Option #1

Species the Boot Device Priority sequence from available Network Drives the options are **IBA CL Slot 00FE v0110** and Disable.

Boot Override

(Available when the boot device is detected by the BIOS) Saves the specified boot override and resets the system, i.e., **IBA CL Slot 00FE v0110**. Select OK to activate, otherwise, click Cancel.

IBA CL Slot 00FE v0110

Launch EFI Shell from filesystem device

This option will attempt to launch the EFI Shell application (shell.efi) from one of the available file system devices. Select OK to activate, otherwise, click Cancel.

For the following options, select OK to initiate, otherwise, click Cancel.

Save Changes and Exit

This option will save the changes that have been made and will exit BIOS Setup.

Discard Changes and Exit

This option will discard the changes that have been made and will exit BIOS Setup.

Save Changes and Reset

This option will save the changes that have been made and will reboot the system.

Discard Changes and Reset

This option will save the changes that have been made and will reboot the system.

Save Changes

This option will save the changes but will remain in setup mode.

Discard Changes

This option will discard the changes but will remain in setup mode.

Default Options

Restore Defaults

This option will load the factory-stored optimized defaults and remain in setup mode.

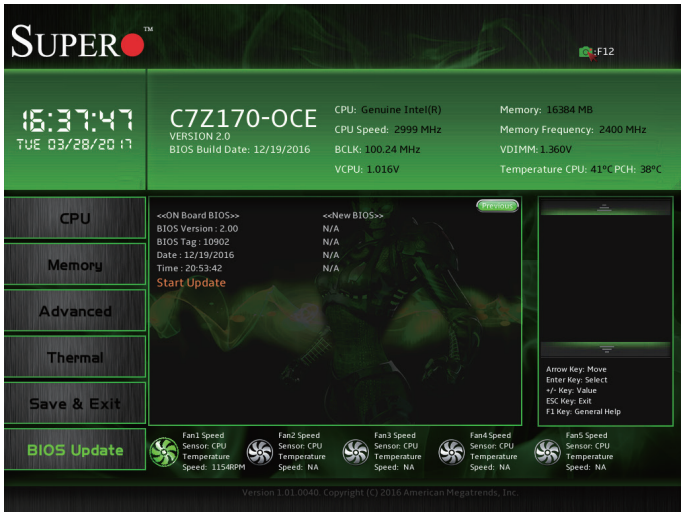
Save as User Defaults

This option will save the changes as user-specified defaults and remain in setup mode.

Restore User Defaults

This option will load previously-saved user-specified defaults and remain in setup mode.

4-8 BIOS Update



The following items will be displayed:

- **BIOS Version**
- **BIOS Tag**.
- **Date**
- **Time**

Start Update

Use this utility to prepare 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., "C7170-OCE") in the pop-up menu.

6. Select "Start Flash" to flash the BIOS. A pop-up message will appear to show the progress of the BIOS flash.

7. If the flash is successful, a pop-up message will indicate the result. Select "OK" to complete the BIOS flash and to reboot the system. Go to the "SYSTEM INFORMATION - Motherboard" page in the BIOS Setup to check for the correct BIOS version.

Notes

Appendix A

BIOS Error Beep Codes

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

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

Fatal errors will not allow the system to continue to 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 numbers on the fatal error list correspond to the number of beeps for the corresponding error.

A-1 BIOS Error Beep Codes

BIOS Error Beep Codes

Beep Code/LED	Error Message	Description
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
5 short beeps	Display error	System display error
OH LED On	System OH	System Overheat

Notes

Appendix B

Software Installation Instructions

B-1 Installing Drivers

After you've installed the Windows Operating System, a screen as shown below will appear. You are ready to install software programs and drivers that have not yet been installed. To install these software programs and drivers, click the icons to the right of these items. (**Note**: To install the Windows Operating System, please refer to the instructions posted on our website at http://www.supermicro.com/support/manuals/.)



Driver/Tool Installation Display Screen

Note 1. Click the icons showing a hand writing on the paper to view the readme files for each item. Click on a computer icon to the right of an item to install this item (from top to the bottom), one at a time. After installing each item, you must reboot the system before proceeding with the next item on the list. The bottom icon with a CD on it allows you to view the entire contents of the CD.

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

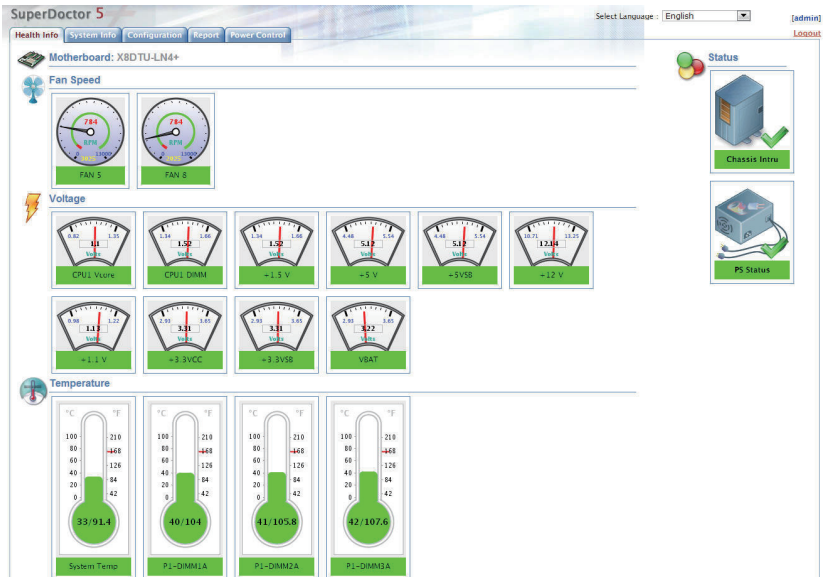
B-2 Configuring SuperDoctor® V

The SuperDoctor 5 program is a Web-based management tool that supports remote management capability. It includes Remote and Local Management tools. The local management tool is called the SD 5 Client. The SuperDoctor 5 program included on the CDROM that came with your motherboard allows you to monitor the environment and operations of your system. SuperDoctor 5 displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the SuperDoctor 5 interface.

Note: 1 The default user name and password are ADMIN.

Note 2: In the Windows OS environment, the SuperDoctor 5 settings take precedence over the BIOS settings. When first installed, SuperDoctor 5 adopts the temperature threshold settings previously set in BIOS. Any subsequent changes to these thresholds must be made within SuperDoctor, since the settings override the BIOS settings. For the Windows OS to adopt the BIOS temperature threshold settings, please change the SD 5 Client settings to be the same as those set in BIOS.

SuperDoctor 5 Interface Display Screen-I (Health Information)





Note: The SuperDoctor 5 software and manual may be downloaded from our website at:

https://www.supermicro.com/Products/nfo/SMS_SD5.cfm

Notes

Appendix C

UEFI BIOS Recovery Instructions

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

C-1 An Overview to the UEFI BIOS

The Unified Extensible Firmware Interface (UEFI) specification 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 up the system. UEFI offers a clean, hands-off control to a computer system at bootup.

C-2 How to Recover the UEFI BIOS Image (-the Main BIOS Block)

A UEFI BIOS flash chip consists of a recovery BIOS block, comprised of two boot blocks 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 that is completed, the main BIOS code will continue with system initialization and bootup.

Note: Follow the BIOS Recovery instructions below for BIOS recovery when the main BIOS boot crashes. However, when the BIOS boot block crashes, you will need to follow the procedures in Appendix D.

C-3 To Recover the Main BIOS Block Using a USB-Attached 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.

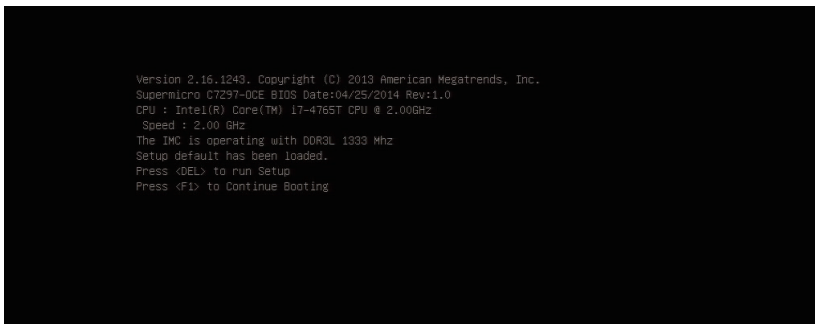
To perform UEFI BIOS recovery using a USB-attached device, follow the instructions below.

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.

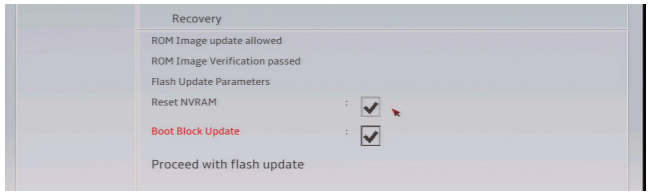
Note: If you cannot locate the "SUPER.ROM" file in your driver disk, visit our website at www.supermicro.com to download the BIOS image into a USB flash device (save in the root folder) and rename it "SUPER.ROM" for BIOS recovery use.

2. Insert the USB device that contains the new BIOS image ("SUPER.ROM") into any available USB port. Be sure the file is saved in the very top (root) folder.

3. Set the JBR1 switch on the motherboard to recovery mode and power on the system. If the screen appears as below, press <DEL> to continue.

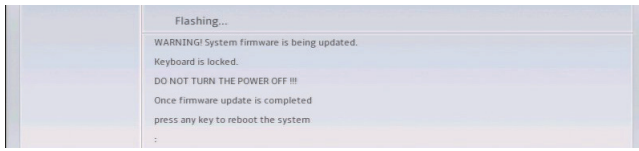


4. After locating the new BIOS binary image, the system will enter the BIOS Recovery menu as shown below.



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

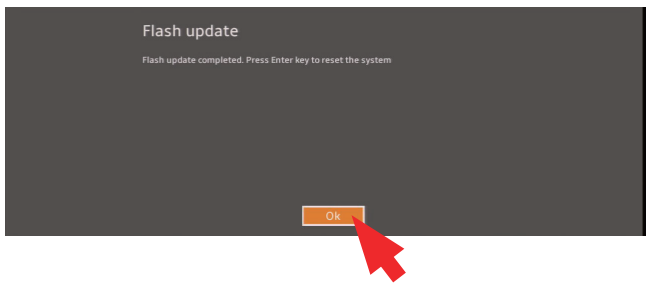
5. To continue with BIOS Recovery, select the item- "Proceed with flash update". You will see the progress of BIOS Recovery as shown on the screens below.





Note: *Do not interrupt* the BIOS programming until it is completed.

6. After the BIOS Recovery process is complete, click OK to reboot the system.



Notes

Appendix D

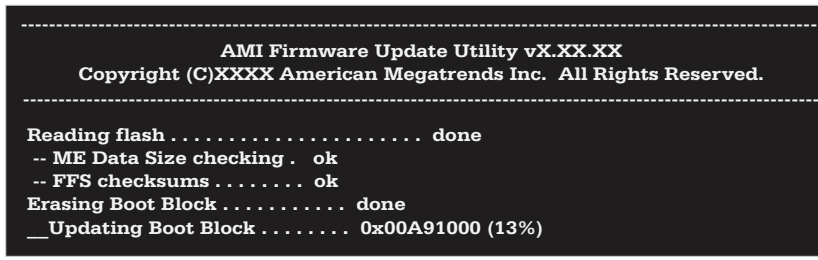
Dual Boot Block

D-1 Introduction

This motherboard supports the Dual Boot Block feature, which is the last-ditch mechanism to recover the BIOS boot block. This section provides an introduction to the feature.

BIOS Boot Block

A BIOS boot block is the minimum BIOS loader required to enable necessary hardware components for the BIOS crisis recovery flash that will update the main BIOS block. An on-call BIOS boot-block corruption may occur due to a software tool issue (see image below) or an unexpected power outage during BIOS updates.



BIOS Boot Block Corruption Occurrence

When a BIOS boot block is corrupted due to an unexpected power outage or a software tool malfunctioning during BIOS updates, you can still reboot the system by activating switch JBR1 on the motherboard. When JBR1 is activated, the system will boot from a backup boot block preloaded in the BIOS by the manufacturer.

D-2 Steps to Reboot the System by switch JBR1

1. Power down the system.
2. On switch JBR1 slide switch to ON, and power on the system.
3. Follow the BIOS recovery SOP listed in the previous chapter (Appendix C).
4. After completing the steps above, power down the system.
5. Turn OFF switch JBR1, and power on the system.

(Disclaimer Continued)

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