

# Motherboard Pin Definition

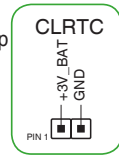
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# 1 Headers

## 1. Clear RTC RAM (2-pin CLRTC)

This header allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.



### To erase the RTC RAM:

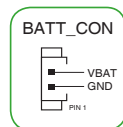
1. Turn OFF the computer and unplug the power cord.
2. Use a metal object such as a screwdriver to short the two pins.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.



- If the steps above do not help, remove the onboard battery and short the two pins again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
- You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the CPU Parameter Recall (C.P.R.) feature. Shut down and reboot the system, then the BIOS automatically resets parameter settings to default values.

## 2. RTC Battery header (2-pin BATT\_CON)

This connector is for the lithium CMOS battery.



## 3. Chassis intrusion header (4-1 pin CHASSIS)

This header is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

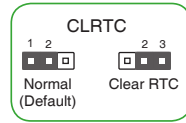
By default, the pin labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



## 2 Jumpers

### 1. Clear RTC RAM (3-pin CLRTC)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.



#### To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to reenter data.



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Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

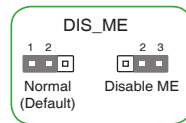
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- If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After clearing the CMOS, reinstall the battery.
  - You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the CPU Parameter Recall (C.P.R) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
- 

### 2. Intel® ME jumper (3-pin DIS\_ME)

This jumper allows you to enable or disable the Intel® ME function. Set this jumper to pins 1-2 to enable (default) the Intel® ME function and to pins 2-3 to disable it.



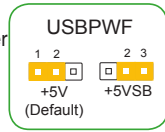
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Disable the Intel® ME function before updating it.

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### 3. USB device wake-up (3-pin USBPWF)

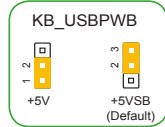
Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).



- The USB device wake-up feature requires a power supply that can provide 500mA on the +5VSB lead for each USB port; otherwise, the system would not power up.
- The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

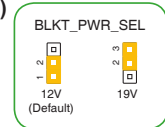
### 4. Keyboard and USB device wake up (3-pin KB\_USBPWB)

This jumper allows you to enable or disable the keyboard and USB device wake-up feature. When you set this jumper to pins 2-3 (+5VSB), you can wake up the computer by pressing a key on the keyboard. This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting in the BIOS.



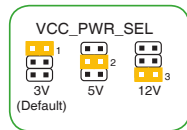
### 5. Display panel backlight power selector (3-pin BLKT\_PWR\_SEL)

Pins	Setting
1-2 (Default)	12V
2-3	19V



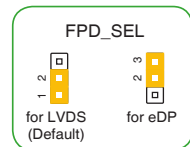
### 6. Display panel VCC power selector (VCC\_PWR\_SEL)

Pins	Setting
1 (Default)	3V
2	5V
3	12V



### 7. LVDS panel/eDP selector (3-pin FPD\_SEL)

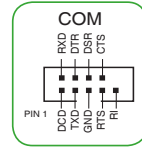
Pins	Setting
1-2 (Default)	LVDS
2-3	eDP



### 3 Internal Connectors

#### 1. Serial port connector (10-1 pin COM)

This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis.

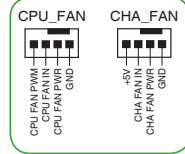


#### 2. CPU and chassis fan connectors (4-pin CPU\_FAN, 4-pin CHA\_FAN)

Connect the fan cable to the fan connector on the motherboard, ensuring that the black wire of the cable matches the ground pin of the connector

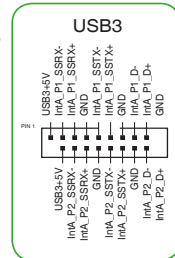


Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors! The CPU\_FAN connector supports a CPU fan of maximum 1A (12 W) fan power.



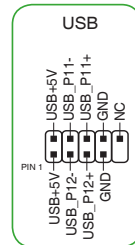
#### 3. USB 3.0 connector (20-1 pin)

This connector allows you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



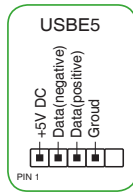
#### 4. USB 2.0 connector (10-1 pin)

This connector is for USB 2.0 ports. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specifications and supports up to 480Mbps connection speed.



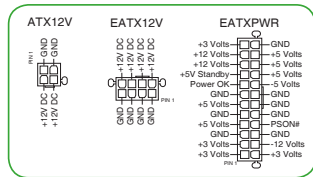
## 5. Single USB 2.0 connector (5-1 pin)

This connector is for a USB 2.0 port. Connect the USB module cable to this connector, then install the module to a slot opening at the back of the system chassis. This USB connector complies with USB 2.0 specifications and supports up to 480Mbps connection speed.



## 6. ATX power connectors (24-pin EATXPWR, 8-pin EATX12V, 4-pin EATX12V)

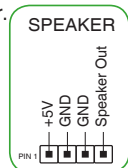
These connectors are for ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.



- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- DO NOT forget to connect the 4-pin/8-pin ATX +12V power plug. Otherwise, the system will not boot up.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

## 7. Speaker connector (4-pin SPEAKER)

The 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you hear system beeps and warnings.

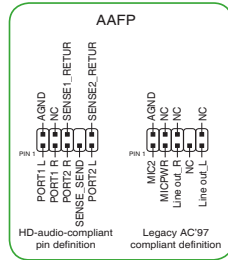


### 8. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.

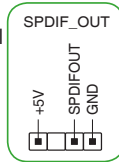


We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.



### 9. Digital audio connector (4-1 pin SPDIF\_OUT)

This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis.

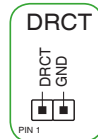


### 10. Direct connector (2-pin DRCT)

This connector is for the chassis-mounted button that supports the DirectKey function. Connect the button cable that supports DirectKey, from the chassis to this connector on the motherboard.

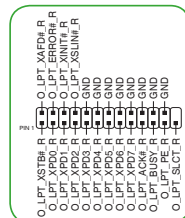


Ensure that your chassis comes with the button cable that supports the DirectKey feature. Refer to the technical documentation that came with the chassis for details.



### 11. LPT connector (26-1 pin LPT)

The LPT (Line Printing Terminal) connector supports devices such as a printer. LPT standardizes as IEEE 1284, which is the parallel port interface on IBM PC-compatible computers.



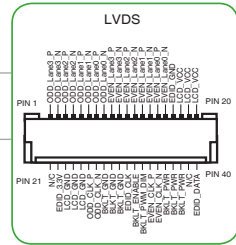


## 12. LVDS connector (40-pin LVDS)

This connector is for an LCD monitor that supports Low-voltage Differential Signaling (LVDS) interface.

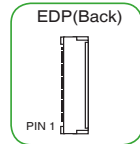


Enable LVDS in the BIOS setup if the LVDS output is disabled by default.



## 13. Embedded DisplayPort (40-pin eDP)

This connector is for an internal embedded DisplayPort connection.

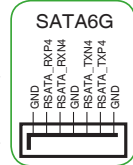


## 14. SATA 6.0Gb/s connectors (7-pin SATA6G)

These connectors connect to SATA 6.0 Gb/s hard disk drives via SATA 6.0 Gb/s signal cables.



You must install Windows® XP Service Pack 3 or later version before using Serial ATA hard disk drives.



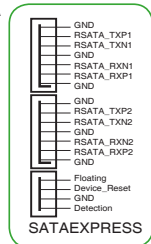
## 15. SATA EXPRESS connector (7-pin SATA6G, SATAEXPRESS)

This connector connects to SATA 6.0 Gb/s hard disk drives via SATA 6.0 Gb/s signal cables.

If you installed SATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel® chipset.



The SATAEXPRESS connector can support one SATA Express device or two SATA devices.



## 16. System panel connector (10-1 pin F\_PANEL)

This connector supports several chassis-mounted functions.

- **System power LED (2-pin PWR\_LED)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin HDD\_LED)**

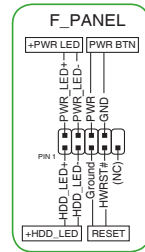
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

- **ATX power button/soft-off button (2-pin PWR\_BTN)**

This connector is for the system power button.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



## System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.

- **System power LED (2-pin PWR\_LED)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin HDD\_LED)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

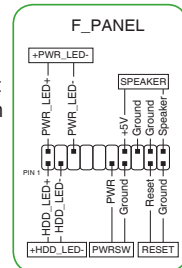
This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWR\_SW)**

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power button for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



## System panel connector (20-5 pin PANEL)

This connector supports several chassis-mounted functions.

- **System power LED (4-pin +PWR\_LED-)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin +HDD\_LED-)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

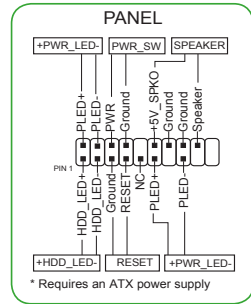
This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWR\_SW)**

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.



## System panel connector (20-3 pin F\_PANEL)

This connector supports several chassis-mounted functions.

- **System power LED (4-pin +PWR\_LED-)**

This 2-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

- **Hard disk drive activity LED (2-pin +HDD\_LED-)**

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The HDD LED lights up or flashes when data is read from or written to the HDD.

- **System warning speaker (4-pin SPEAKER)**

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

- **ATX power button/soft-off button (2-pin PWR\_SW)**

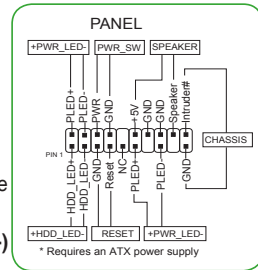
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **Reset button (2-pin RESET)**

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

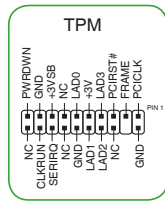
- **Chassis intrusion header (2-pin CHASSIS)**

This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.



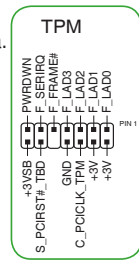
### 17. TPM connector (20-1 pin TPM)

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.



### TPM connector (14-1 pin TPM)

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

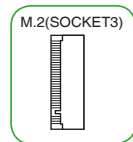


### 18. M.2 socket 3

This socket allows you to install an M.2 (NGFF) SSD module.

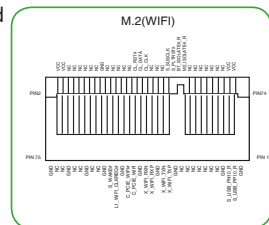


- This socket supports M Key and 2242/2260/2280/22110 or 2242/2260/22110 storage devices by models.
- When using Intel® Desktop Responsiveness technologies with PCIe/SATA M.2 device, ensure to set up the Windows® UEFI operating system under RAID mode.



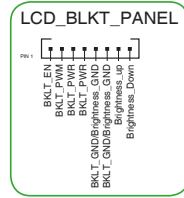
### 19. M.2 socket 1, E Key

This socket allows you to install an M.2 E key Wi-Fi and Wi-Fi based combo device.



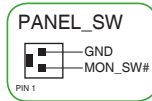
**20. Flat panel display brightness connector (8-pin LCD\_BLK\_PANEL)**

This connector is for the LCD panel backlight and brightness controls. It enables the LCD panel backlight, provides backlight control signals, and provides brightness control signals for the brightness button on the front panel.



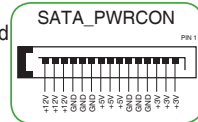
**21. LCD panel monitor switch header (2-pin PANEL\_SW)**

This 2-pin header is for connecting a monitor switch that can turn off the LCD panel display backlight.



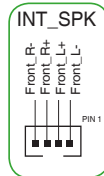
**22. SATA power connector (15-pin SATA\_PWRCON)**

This connector is for the SATA power cable. The power cable plug is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fit. To provide power to your SATA device, connect the SATA power cable to this connector.



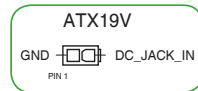
**23. Internal stereo speaker header (4-pin INT\_SPK)**

The internal mono speaker header allows connection to an internal, low-power speaker for basic system sound capability. The subsystem is capable of driving a speaker load of 4 Ohms at 3 Watts (rms).



**24. Internal DC power connector (2-pin ATX19V)**

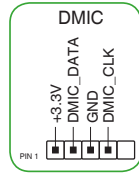
This connector is for an ATX power supply. The plug from the power supply is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fits.



This connector supports 12V and 19V by models. Refer to the specification sheet of the model for details.

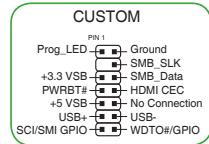
## 25. DMIC connector (4-pin DMIC)

The DMIC connector is for connecting the digital microphone module used in All-in-One chassis.



## 26. Custom header (14-pin CUSTOM)

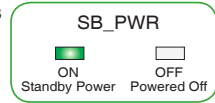
The custom header is for connecting customized modules for additional features.



## 4 Onboard LEDs

### 1. Standby Power LED

The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.



### 2. Hard Disk LED (HD\_LED)

The Hard Disk LED is designed to indicate the hard disk activity. It blinks when data is being written into or read from the hard disk drive. The LED does not light up when there is no hard disk drive connected to the motherboard or when the hard disk drive does not function.

### 3. Q LEDs (BOOT\_DEVICE\_LED, VGA\_LED, DRAM\_LED, CPU\_LED)

Q LEDs check key components (CPU, DRAM, VGA card, and booting devices) in sequence during motherboard booting process. If an error is found, the corresponding LED flashes until the problem is solved. This user-friendly design provides an intuitive way to locate the root problem within seconds.

### 4. KeyBot LED (KEYBOT\_LED)

This LED lights up when the KeyBot button is pressed.

### 5. USB BIOS Flashback LED (FLBK\_LED)

This LED flashes when you press the BIOS Flashback button for BIOS update.

### 6. Q-Code LED (Q\_CODE)

The Q-Code LED design provides you with a 2-digit error code that displays the system status.



## 5 Onboard buttons and switches

Onboard buttons allow you to fine-tune performance when working on a bare or open-case system. This is ideal for overclockers and gamers who continually change settings to enhance system performance.

### 1. Power-on button (START)

The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



### 2. RESET button (RESET)

Press the reset button to reboot the system.



### 3. MemOK! button (MemOK!)

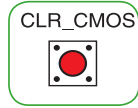
Installing DIMMs that are not compatible with the motherboard may cause system boot failure. Press the MemOK! button until the memory compatibility tuning for successful boot.



- Turn off the system and reinstall the DIMM before using the MemOK! function.
- The MemOK! button does not function under Windows® OS environment.
- During the tuning process, the system loads and tests failsafe memory settings. It takes about 30 seconds for the system to test one set of failsafe settings. If the test fails, the system reboots and test the next set of failsafe settings.
- Due to memory tuning requirement, the system automatically reboots when each timing set is tested. If the installed DIMMs still fail to boot after the whole tuning process, replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or on the ASUS website at [www.asus.com](http://www.asus.com).
- If you turn off the computer and replace DIMMs during the tuning process, the system continues memory tuning after turning on the computer. To stop memory tuning, turn off the computer and unplug the power cord for about 5–10 seconds.
- If your system fails to boot up due to BIOS overclocking, press the MemOK! button to boot and load the BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings.
- We recommend that you download and update to the latest BIOS version from the ASUS website at [www.asus.com](http://www.asus.com) after using the MemOK! function.

**4. Clear CMOS button (CLR\_CMOS)**

Press this button to clear the BIOS setup information only when the systems hangs due to overlocking.



**5. KeyBot button (KeyBot)**

Press this button to activate the KeyBot feature.



The KeyBot feature supports USB keyboards only.



**6. Sonic SoundStage button (SOUNDSTAGE)**

Press this button to activate the Sonic SoundStage feature.

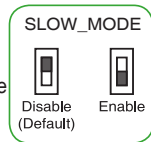


The debug code on the Q-Code LED shows the current Sonic SoundStage profile when you press the Sonic SoundStage button.



**7. Slow Mode switch**

Slow Mode switch allows your system to provide better overlocking margins when using the LN2 cooling system. When enabled, the Slow Mode switch prevents the system from crashing, slows down the CPU, and the system's tuner will make the adjustments.



Ensure to set the LN2 Mode jumper to [Enable] before using the Slow Mode switch.