

Spirit X299-AS User Guide



Revision 2.0 August 2018

Please Read This First

Thank you for buying a Northern Micro Spirit X299-AS computer. Northern Micro is committed to providing our customers with the best value on the market today. This means building the systems that meet your specific needs and supporting you with any issues that you may encounter.

All Northern Micro Spirit computers are assembled and tested in our manufacturing facility in Ottawa. A full Service & Support *network* across Canada stands behind every Spirit system we build.

The computer you have purchased is optimized for today's Operating Systems and applications; however, in the future, you may come upon situations that demand greater processing power or speed. Thanks to the latest advances in computer *hardware* technology, your Spirit X299-AS is completely upgradable. Contact your Northern Micro Sales or Service representative for advice on how to upgrade your computer should the need arise.

The Spirit X299-AS is [Energy Star](#) and [EPEAT](#) Gold certified. These environmental standards ensure that the computer can take advantage of energy saving features. Your Spirit X299-AS is designed to run in sleep mode when user inactivity reaches 30 minutes. Your *monitor* is designed to run in display sleep mode when user inactivity reaches 15 minutes. You can "wake up" the computer or display by moving the *mouse* or by hitting any key on the keyboard. If connected to a *network*, Wake-on-LAN features can be enabled to allow *network* administrators to wake up the computer remotely or on a given schedule. The Spirit X299-AS is certified to meet power management criteria of the Microsoft logo program and is equipped with an [80 Plus](#) Platinum power supply.

This manual has been prepared for both advanced and novice users. You will find general PC information as well as detailed specifications about the system you have purchased.



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- [Northern Micro Sales and Service & Support Departments may be reached at: 1-800-563-1007.](#)
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[Northern Micro](#) is one of Canada's leading *hardware* integrators and custom manufacturers of mid-range and high-end PCs and workstations.

Our mission is to provide customized high quality computer *hardware* products and services to meet the advanced technical needs of highly knowledgeable customers who seek to maximize their productivity.

To be fully responsive to our customers' wants and needs, we also:

- carry brand name computer products;
- supply *network peripheral* equipment and multi-media products;
- supply *server* / *storage* and printing solutions.

Through all facets of the operation, we are driven by our quality philosophy.

Northern Micro's quality policy, communicated within and beyond the corporation, reads as follows:

"Northern Micro is committed to delivering the ultimate customer satisfaction by providing reliable, innovative and flexible computing solutions and by continuously improving our product and service offerings".

In essence, Northern Micro, its management and its employees strive to be their customers' personal computer *hardware* specialists. Northern Micro's focus is on quality and customer satisfaction, and to provide products and services in complementary areas of specialization. We strongly believe in treating customers as members of our own family.

Additionally read our [Privacy Statement](#).

Energy Star®

The Northern Micro Spirit X299-AS is certified to meet [Energy Star](#) requirements. [ENERGY STAR](#) is a voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency. Governments around the world, including Canada's, have embraced the Energy Star program. Through its partnerships with 18,000 private and public sector organizations, ENERGY STAR delivers the technical information and tools that organizations and consumers need to choose energy-efficient solutions and best management practices.

An ENERGY STAR qualified computer delivers substantial savings over a conventional computer. Power management is important to saving energy, especially since computers are often in use more hours per day than they used to be. ENERGY STAR power management features place computers (CPU, hard drive, etc.) into a low-power "sleep mode" after a designated period of inactivity. Simply hitting a key on the keyboard or moving the *mouse* awakens the computer in a matter of seconds. Additionally, ENERGY STAR

qualified computers with networking capabilities have the ability to enable and disable Wake On LAN for Sleep mode, allowing greater use of low power modes without a loss of IT system maintenance capabilities.



Contact Us

Northern Micro Locations

Northern Micro is a Canada-wide operation with offices in Halifax, Quebec City and Ottawa.

Our headquarter and manufacturing plant are located in Ottawa.

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On-Line Support

Northern Micro has been continuously investing time and resources to improve and provide you with a wide range of on-line support:

- The [Service and Support Site](#) where you can *download* the latest device drivers and *BIOS* upgrade; visit our PC Archives for specifications, manuals and; place service calls, etc.

Unpacking Your Computer

The Spirit X299-AS is packed with corrugated cardboard to keep it in place during transit. To unpack it follow these steps:

- Cut the tape holding the flaps and fold back the flaps
- Remove any accessories placed in the cardboard spacer insert. These may include cables, a plastic bag including manuals, DVDs, cables, small accessories and a mouse (if ordered).
- Lift out the cardboard spacer insert.
- Lift out the inner cardboard box which covers the top half of the computer.
- Carefully slide the PC up out of the box.



- Save all cartons and packing material for future shipping and transportation.



- To repack the PC, reverse the above instructions.

Initial Computer Setup

Setting up your Computer

After unpacking your computer and checking all the items in the box, you can set up and start your computer.

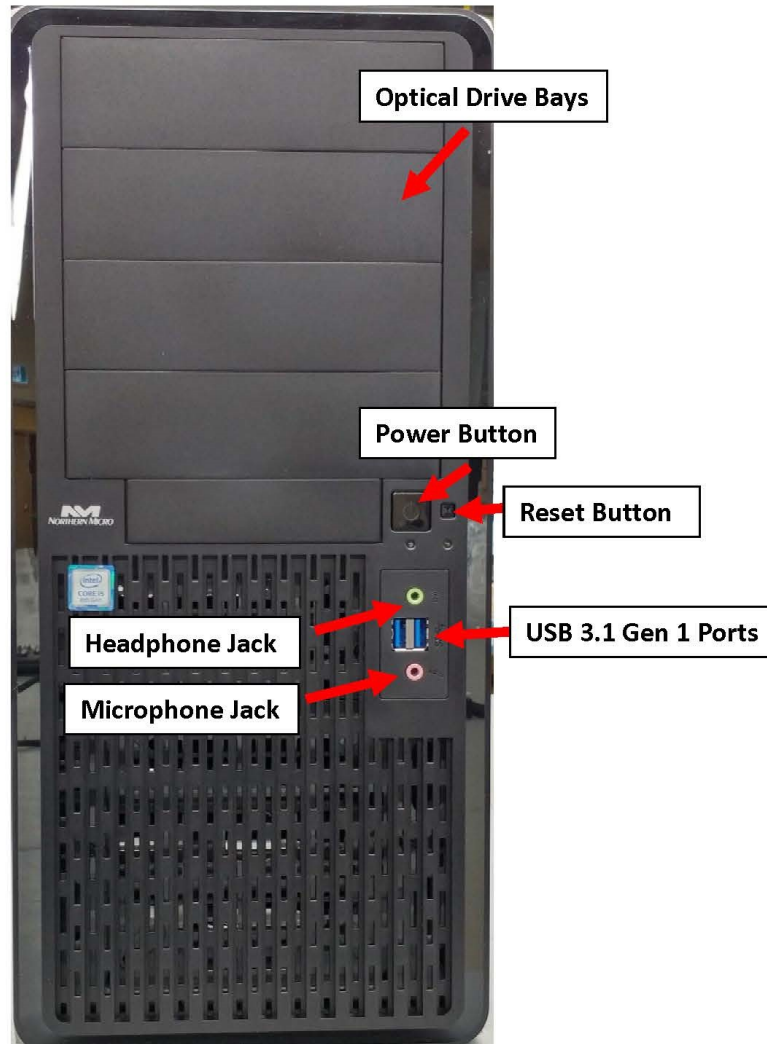
- Set the computer on a flat space. Tower units can be put on their sides.
- Locate your *monitor* and computer in a dust-and-moisture-free area where there will be minimal glare on the screen.
- Connect the *monitor* cable to the video connector at the back of the computer.
- Connect the *mouse* and keyboard cables to the matching connectors at the back of the computer.
- Plug the *monitor* power cord into a dedicated electrical outlet or a surge-protected power bar.
- Plug the system power cord into the back of the system in the matching connector; then plug the cord into the power bar.

Starting up the Computer for the first time

Turn on the devices in the following order:

1. *Monitor*
2. External devices (*USB* or other)
3. System power

Front Panel



USB Ports

There are two (2) additional **USB** Port on the Front panel of the computer.

Audio Ports

For convenience there is 1 (one) Microphone port and 1 (one) stereo line out port on the front panel.

System power switch

The system power switch is located on the front of the case. You should always be certain that the power is turned off before modifying the **hardware** configuration in any way. Pushing the power switch for less than 4 seconds places the system into sleep mode (if enabled in Setup). When the power button is pressed for more than 4 seconds, the system enters the Soft-Off mode.

Indicator lights

These lights indicate the operation status of your computer.

Reset button

The reset button allows you to restart the system without turning the power off. If you encounter any problems while using unfamiliar *software* , you can always restart quickly from the *RAM* test stage by pressing the reset button. You will have to use a pen, pencil or other small object to press the Reset button. This feature was added to prevent accidental reset of the unit.



-
- Any data not saved to disk will be lost
-

The front panel gives access to power and reset switches, indicator light and front *USB* /audio.

Back Panel

The back panel has all the connections that lead from the system unit to external peripherals and the power source.



- Turn off all power switches before connecting or disconnecting cables/wires!
- Ensure that cables/wires are attached to the *peripheral* device first and connect to the outlet unit later.
- Turn the system unit power switch off before you plug the power cable into an electrical outlet.



- See details on [Rear Panel Connectors](#)

Removing the Case Cover

1. Unlatch the cover and open the case from the back



2. Slide the side cover back



3. Lift the three tabs as illustrated and pull back the front bezel.



4. That opens the front of the case

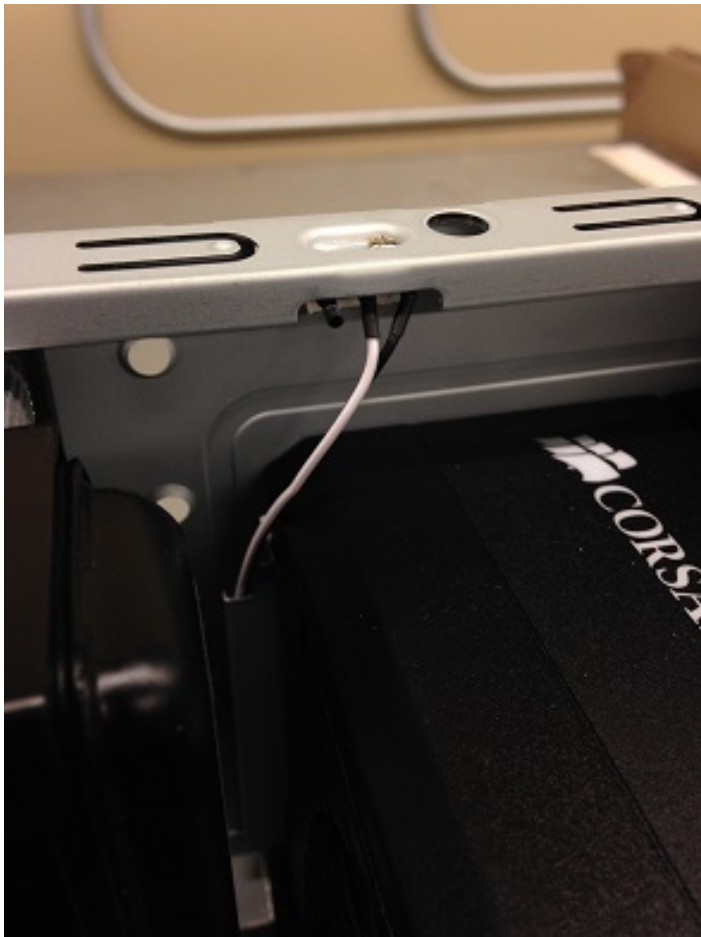


Chassis Intrusion



- The [removal of the case cover](#) while the system is powered on will register a Chassis Intrusion Alert detected by the Chassis Intrusion lead on the motherboard.

The board supports a chassis security feature that detects if the chassis cover has been removed. The security feature uses a mechanical switch on the chassis that can be connected to the chassis intrusion header on the Desktop Board.



Power Supply Specs

1000 Watts ATX Power Supply

Corsair HX1000i High-Performance ATX Power Supply						
AC Input Rating	DC Output Rating					
AC Input: 100V - 240V	DC Output	+3.3V	+5V	+12V	-12V	+5Vsb
Current: 13A - 6.5A	Max Load	25A	25A	83.3A	0.8A	3A
Frequency: 47Hz - 63Hz	Maximum Combined Wattage	150W		1000W	9.6W	15W
		Total Power: 1000W				

- Dimensions: 150mm (W) x 86mm(H) x 180mm(L)
- Safety Approvals UL/CUL, CSA, CE, CB, CU, FCC Class B, ICES, TUV, CCC, C-Tick/RCM, KC Mark, RoHS, WEEE, RoHS (China), REACH



Optional Power Supply

500 Watts ATX Power Supply

Sparkle FSP500-60EGN ATX Power Supply							
AC Input Rating	DC Output Rating						
AC Input: 90V - 264V	DC Output	+3.3V	+5V	+12V1	+12V2	-12V	+5Vsb
Current: 3A - 6A	Max Load	24A	24A	18A	18A	0.3A	3.5A
Frequency: 47Hz - 63Hz	Maximum Combined Power	130W		432W (36A)		21.1W	
		Total Power: 500W; Peak Power: 550W					

- Dimensions: 150mm (W) x 86mm(H) x 140mm(L)
- Safety Approvals UL/CUL, CE, CB, FCC Class B, TUV



Power Supply Removal

1. Remove the four screws supporting the power supply.



2. Gently slide the power supply out of position.



Final Power Connection Procedures

1. After all connections are made, close the system case cover.
2. Make sure that all switches are in the off position as marked by O.
3. Connect the power supply cord into the power supply located on the back of your system case as instructed by your system user's manual.
4. Connect the power cord onto a power outlet that is equipped by a *surge protector* .
5. You may then turn on your devices in the following order:
 - *Monitor*
 - External devices
 - System power
6. The power LED on the front panel of the system case will light, as will the *monitor* LED. The system will then run power-on tests. While the tests are running, additional messages will appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Recheck your settings and connections or call Northern Micro for assistance.
7. During power-on, hold down the **DEL** key to enter *BIOS* setup.

Before you Proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you un-install any component, place it on a grounded anti-static pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.
- Caution: There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Specifications Summary

Asus Desktop Board Prime X299-A specifications summary

CPU	<p>Intel® Core™ X-Series Processors Family on LGA 2066 Socket*</p> <p>Supports 14nm CPU</p> <p>Supports Intel® Turbo Boost Max Technology 3.0**</p> <p>* Refer to www.asus.com for Intel® CPU support list.</p> <p>** Support of these features depends on the CPU types.</p>
Chipset	Intel® X299 Chipset
Memory	<p>Intel® Core™ X-Series Processors (6-core or above)</p> <ul style="list-style-type: none"> - 8 x DIMM, max. 128GB DDR4 4000(O.C.)* / 3600(O.C.)* / 3400(O.C.)* / 3333(O.C.)* / 3300(O.C.)* / 3200(O.C.)* / 3000(O.C.)* / 2800(O.C.)* / 2666 MHz, non-ECC, un-buffered memory - Quad channel memory architecture <p>Intel® Core™ X-Series Processors (4-core)</p> <ul style="list-style-type: none"> - 4 x DIMM, max. 64GB, DDR4 4000(O.C.)* / 3600(O.C.)* / 3400(O.C.)* / 3333(O.C.)* / 3300(O.C.)* / 3200(O.C.)* / 3000(O.C.)* / 2800(O.C.)* / 2666 MHz, non-ECC, un-buffered memory - Dual channel memory architecture <p>Supports Intel® Extreme Memory Profile (XMP)</p> <p>* Hyper DIMM support is subject to the physical characteristics of individual CPUs. Please refer to Memory QVL (Qualified Vendors List) for details.</p>
Expansion slots	<p>44-Lane CPU</p> <p>3 x PCI Express 3.0/2.0 x16 slots (single●x16, dual●x16/x16, triple●x16/x16/x8 mode)</p> <p>2 x PCI Express 3.0/2.0 x4 slots (PCIEx4_1 max. at x1 mode, PCIEx4_2 max. at x4 mode, compatible with PCIe x1 and x4 devices)*</p> <p>1 x PCI Express 3.0/2.0 x1 slot (compatible with PCIe x1 devices)**</p> <p>28-Lane CPU</p> <p>3 x PCI Express 3.0/2.0 x16 slots (single●x16, dual●x16/x8 mode)</p> <p>2 x PCI Express 3.0/2.0 x4 slots (PCIEx4_1 max. at x1 mode, PCIEx4_2 max. at x4 mode, compatible with PCIe x1 and x4 devices)*</p> <p>1 x PCI Express 3.0/2.0 x1 slot (compatible with PCIe x1 devices)**</p> <p>16-Lane CPU</p> <p>3 x PCI Express 3.0/2.0 x16 slots (single●x16, dual●x8/x8 mode)</p> <p>2 x PCI Express 3.0/2.0 x4 slots (PCIEx4_1 max. at x1 mode, PCIEx4_2 max. at x4 mode, compatible with PCIe x1 and x4 devices)*</p> <p>1 x PCI Express 3.0/2.0 x1 slot (compatible with PCIe x1 devices)**</p> <p>* PCIEx4_1 shares bandwidth with PCIEx16_3 when using 28-lane & 16-lane CPUs. PCIEx4_2 shares bandwidth with SATA6G_5/6/7/8 ports. It is disabled by default.</p> <p>** PCIEx1_1 shares bandwidth with USB 3.1 Gen 2 front panel connector. It is disabled by default.</p>
Multi-GPU support	<p>Supports NVIDIA® Supports NVIDIA® 2-Way/Quad-GPU SLI™ Technology (with 2 PCIe x16 graphics card)/ 3-Way SLI™ Technology*</p> <p>Supports AMD® 3-Way/Quad-GPU CrossFireX™ Technology</p> <p>* Support depends on the CPU types and VGA cards.</p>

Storage	<p>Intel® X299 Chipset with RAID 0, 1, 5, 10 and Intel Rapid Storage Technology 15 support</p> <ul style="list-style-type: none"> - 1 x M.2_1 Socket 3 with M key, type 2242/2260/2280 storage devices support (both SATA & PCIe 3.0 x 4 mode) - 1 x M.2_2 Socket 3 with vertical M Key, type 2242/2260/2280/22110 (Support PCIe storage device only) - Ready for Intel® Optane™ Memory - 8 x SATA 6.0 Gb/s ports* - Supports Intel® Smart Response Technology <p>* SATA6G_5/6/7/8 ports share bandwidth with PCIe4_2.</p>
Audio	<p>Realtek® S1220A 8-channel high definition audio CODEC featuring Crystal Sound 3</p> <ul style="list-style-type: none"> - Power pre-regulator reduces power input noise to ensure consistent performance - Separate layer for left and right track, ensuring both sound deliver equal quality - Impedance sense for front and rear headphone outputs - Audio shielding ensures precise analog/digital separation and greatly reduced multi-lateral interference - EMI protection cover to prevent electrical noise to affect the amplifier quality - Internal audio Amplifier to enhance the highest quality sound for headphone and speakers - Unique de-pop circuit to reduce start-up popping noise to audio outputs - Premium Japan-made audio capacitors provides warm, natural, and immersive sound with exceptional clarity and fidelity - High quality 120dB SNR stereo playback output (Line-out@back) & 113dB SNR input (Line-in) support - Supports up to 32-Bit/192kHz playback* - DTS® Headphone:X™ - DTS® Connect - Supports jack-detection, multi-streaming, front panel jack-retasking (MIC) - Optical S/PDIF out port at back I/O <p>* Due to limitations in HDA bandwidth, 32-Bit/192kHz is not supported for 8-Channel audio. 32-Bit/192kHz is only available under Windows® 10.</p>

ASUS Exclusive Features

<Performance>

OC Design: **ASUS PRO Clock II Technology**

- Full BCLK range for extreme overclocking performance.

5-Way Optimization

- Whole system optimization with a single click! Perfectly consolidates better CPU performance, power saving, digital power control, system cooling and app usages.

DIGI+ Power Control

- CPU Power: Digital 8-phase power design
- DRAM Power: Digital 2-phase power design

TPU

- Auto Tuning, TPU

EPU

Fan Xpert 4 with FAN Extension Card support

Turbo Core App

UEFI BIOS

CrashFree BIOS 3

EZ Flash 3

EZ Tuning Wizard

<Connectivity>

Intel® VROC Ready

Front USB 3.1 Gen 2 Support

Thunderbolt 3 Support- blistering-fast 40Gb/s data transfers upgrades with ThunderboltEX 3 Card.

<Gaming>

AURA SYNC

3D Printing Friendly design

Turbo LAN

<EZ Management>

File Transfer

- Cloud GO!
- File Transfer

PC Cleaner

<EZ DIY>

Q-Design

- ASUS Q-Code
- ASUS Q-Connector
- ASUS Q-DIMM
- ASUS Q-LED (CPU, DRAM, VGA, Boot Device LED)
- ASUS Q-Shield
- ASUS Q-Slot

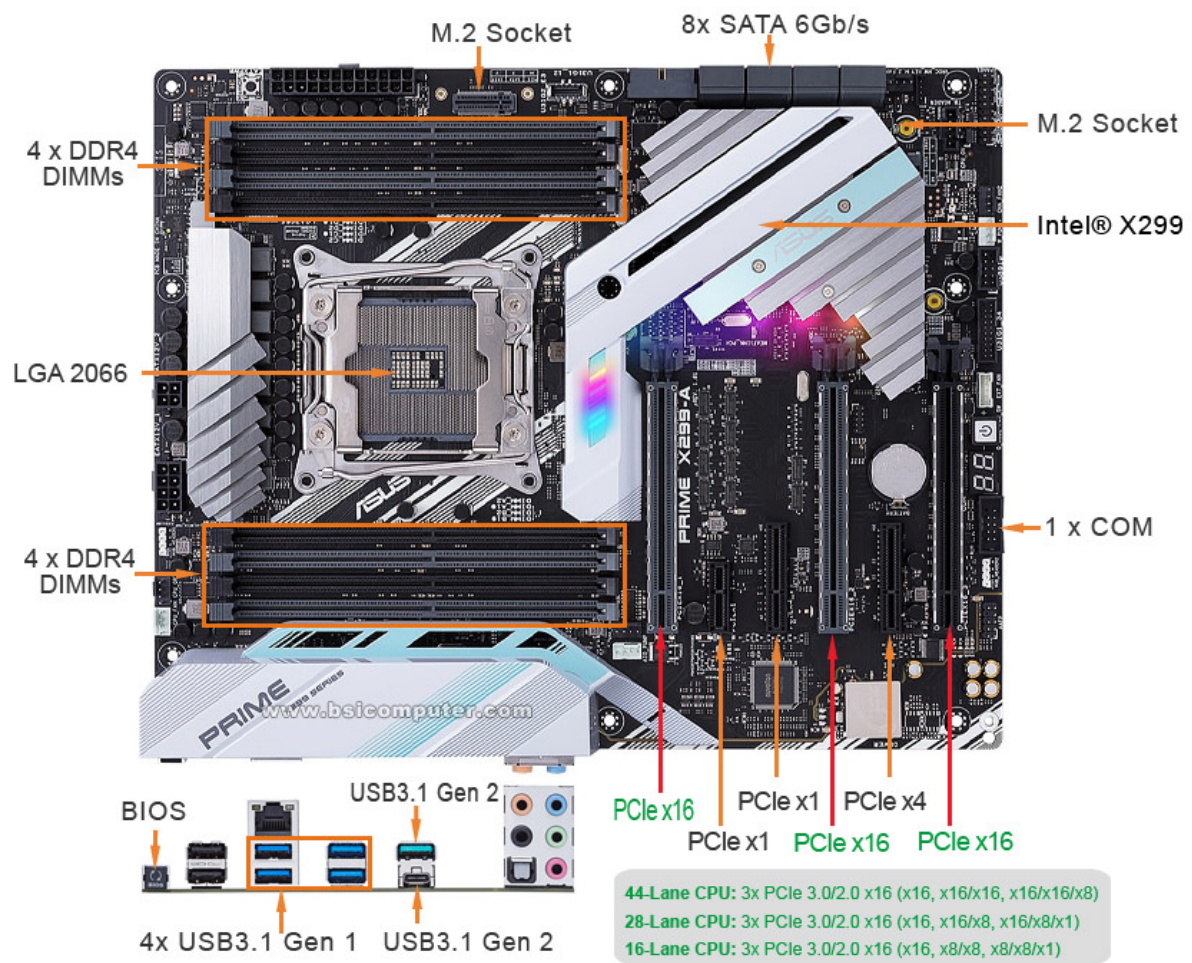
LAN	<p>Gigabit Intel LAN connection- 802.3az Energy Efficient Ethernet (EEE) appliance</p> <p>Intel® I219-V Gigabit LAN- Dual interconnect between the integrated Media Access Controller (MAC) and physical layer (PHY)</p> <p>ASUS LAN Guard</p> <p>ASUS Turbo LAN Utility</p>
Back Panel I/O Ports	<p>1 x BIOS Flashback button</p> <p>1 x Optical S/PDIF out</p> <p>1 x Intel LAN (RJ45) port</p> <p>1 x USB 3.1 Gen 2 port (teal blue, Type-A)</p> <p>1 x USB 3.1 Gen 2 port (USB Type-C™)</p> <p>4 x USB 3.0 Gen 1 ports</p> <p>2 x USB 2.0 ports</p> <p>8-channel Audio I/O ports</p>
ASUS Special Features	<p>Special Features:</p> <p>ASUS SafeSlot</p> <ul style="list-style-type: none"> - Protect your graphics card Investment <p>ASUS 5X Protection III</p> <ul style="list-style-type: none"> - ASUS SafeSlot Core - Fortified PCIe with solid soldering - ASUS LANGuard - Protects against LAN surges, lightning strikes and static-electricity discharges! - ASUS Overvoltage Protection - World-class circuit-protecting power design - ASUS DIGI+ VRM - 8+2 Phase digital power design - ASUS DRAM Overcurrent Protection: Enhanced DRAM overcurrent protection - ASUS Stainless-Steel Back I/O: 3X corrosion-resistance for greater durability! - AI Suite 3 - Ai Charger - MemOK!
ASUS Quiet Thermal Solution	<p>Quiet Thermal Design:</p> <ul style="list-style-type: none"> - ASUS Fan Xpert 4 - ASUS Fanless M.2 heatsink Design

USB	<p>Intel® X299 Chipset</p> <ul style="list-style-type: none"> - 8 x USB 3.1 Gen 1 ports (4 ports at back panel, 4 ports at mid-board) - 4 x USB 2.0 ports (2 ports at back panel, 2 ports at mid-board) <p>ASMedia® USB 3.1 Gen 2 controllers</p> <ul style="list-style-type: none"> - 1 x USB 3.1 Gen 2 front panel connector* - 1 x USB 3.1 Gen 2 ports@back panel (teal blue, Type A) - 1 x USB 3.1 Gen 2 port@back panel (USB Type C™) <p>* The USB 3.1 Gen 2 front panel connector shares bandwidth with PCIe1_1 slot.</p>
Internal I/O connectors	<ul style="list-style-type: none"> 1 x USB 3.1 Gen2 front panel connector 2 x USB 3.0 Gen 1 connectors support additional 4 USB ports (19-pin) 1 x USB 2.0 connectors support additional 2 USB ports 1 x M.2_1 Socket 3 with M key, type 2242/2260/2280 storage devices support (both SATA & PCIe 3.0 x 4 mode) 1 x M.2_2 Socket 3 with vertical M Key, type 2242/2260/2280/22110 (Support PCIe storage device only) 8 x SATA 6.0Gb/s connectors 1 x 4-Pin W_PUMP+ connector 1 x 4-Pin AIO_PUMP fan connector 1 x 4-Pin CPU Fan connector 1 x 4-Pin CPU_OPT fan connector 2 x 4-Pin Chassis Fan connectors 1 x 4-Pin M.2 Fan connector 1 x 5-pin EXT_FAN(Extension Fan) connector 1 x 2-pin Thermal sensor header 1 x 24-pin EATX Power connector 1 x 8-pin EATX 12V Power connector 1 x 4-pin EATX 12V Power connector 2 x RGB header 1 x Front panel audio connector (AAFP) 1 x VROC_HW_KEY 1 x Thunderbolt header (5-pin) for ASUS ThunderboltEX 3 support 1 x System Panel connector (Q-Connector) 1 x 3-pin CPU_OV header 1 x Q_Code 1 x MemOK! button 1 x Clear CMOS header 1 x Power-on button

BIOS Features	128 Mb Flash ROM, UEFI AMI BIOS, PnP, WfM2.0, SM BIOS 3.0, ACPI 6.0, Multi-language BIOS, ASUS EZ Flash 3, CrashFree BIOS 3, F11 EZ Tuning Wizard, F6 Qfan Control, F3 My Favorites, Last Modified log, F12 PrintScreen, and ASUS DRAM SPD (Serial Presence Detect) memory information.
Manageability	WfM 2.0, DMI 3.0, WOL by PME, PXE
Support DVD contents	Drivers ASUS Utilities EZ Update Anti-virus software (OEM version)
Operating system support	Windows® 10 64-bit
Form factor	ATX Form Factor, 12"x 9.6" (30.5 cm x 24.4 cm)

	EATX12V_1; 4-pin EATX12V_2)
5	LGA2066 CPU socket
6	MemOK! button
7	M.2 Sockets (M.2_1 (Socket 3); M.2_2 (Socket 3))
8	USB 3.1 Gen 2 front panel connector (U31G2_E3)
9	3D Mount
10	USB 3.1 Gen 1 connectors (20-1 pin U31G1_12, U31G1_34)
11	Thermal Sensor connector (2-pin T_SENSOR)
12	Intel® Serial ATA 6 Gb/s connectors (7-pin SATA6G_12, SATA 6G_34, SATA 6G_65, SATA 6G_87)
13	VROC_HW_KEY connector (4-pin VROC_KEY)
14	Clear RTC <i>RAM</i> jumper (2-pin CLRRTC)
15	Thunderbolt header (5-pin TB_HEADER)
16	System panel connector (20-8 pin PANEL)
17	CPU Over Voltage jumper (3-pin CPU_OV)
18	<i>USB</i> 2.0 connector (10-1 pin USB910)
19	Power-on button
20	Q-Code LEDs
21	Serial port connector (10-1 pin COM)
22	Front panel audio connector (10-1 pin AAFP)

Asus Motherboard Components



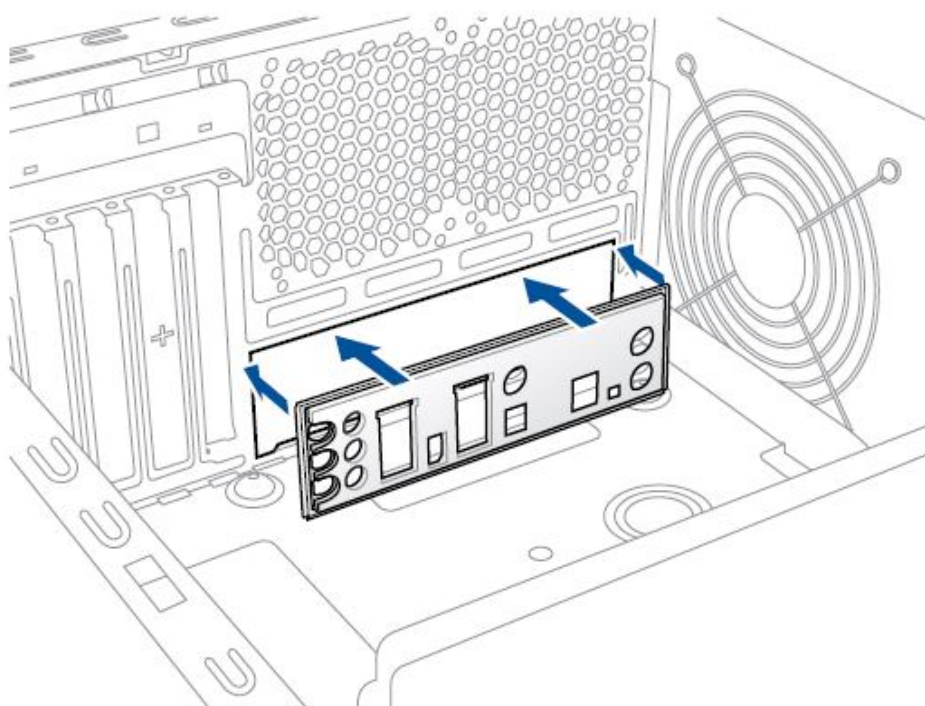
Motherboard Installation

Before removing the Motherboard, ensure the power is off by checking this indicator light. (See section [Before you proceed](#))

When lit, the onboard LED indicates that the system is ON, in sleep mode or in soft-off mode, not powered OFF.

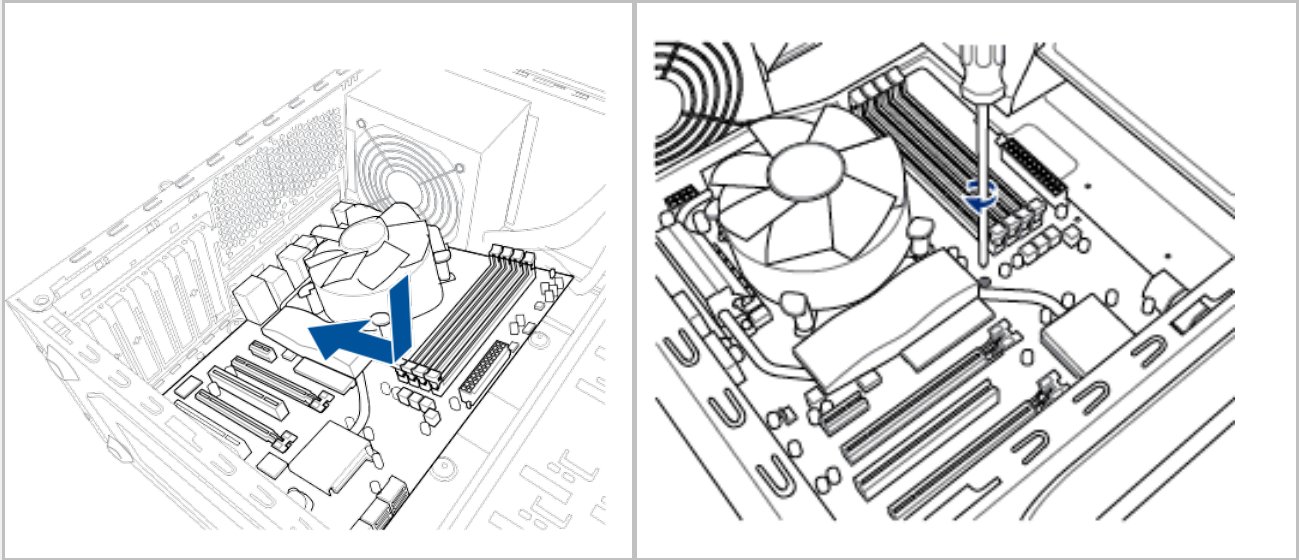
Installing the ASUS Q-Shield

Place the I/O shield inside the chassis and press it into place so that it fits tightly and securely. Use caution so you do not deform the I/O shield.

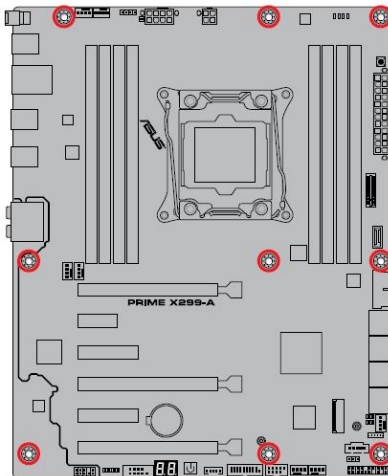


Installing the Desktop Board

When installing the motherboard, make sure that you place it into the chassis in the correct orientation. Align the rear panel I/O ports with the rear panel I/O shield of the chassis.



- Place screws into the holes indicated by circles to secure the motherboard to the chassis. DO NOT overtighten the screws! Doing so can damage the motherboard.



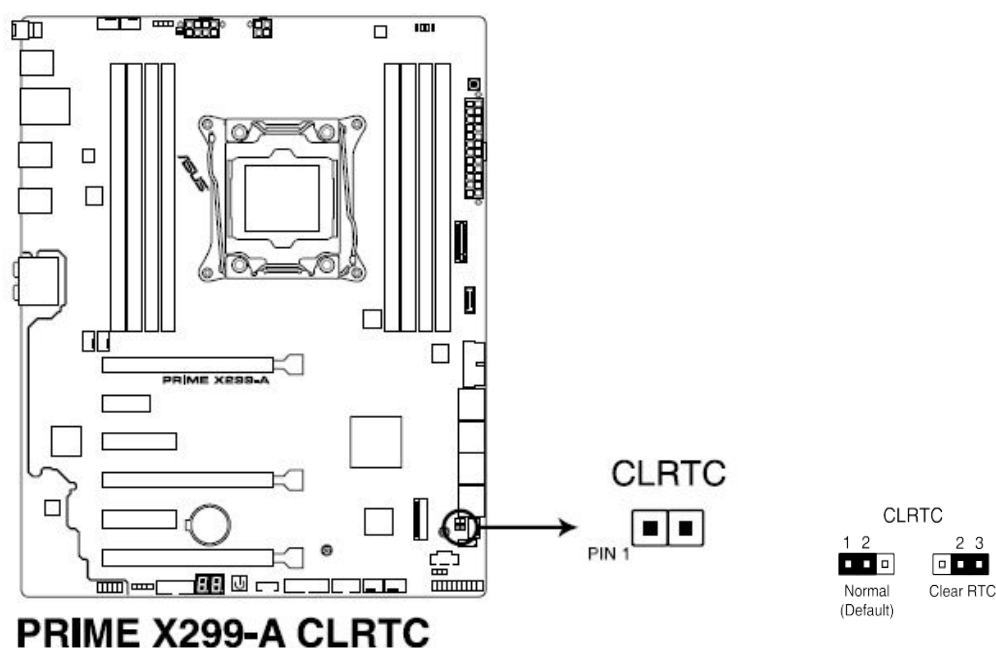
Jumpers

Setting the BIOS Configuration Jumper



- Always turn off the power to the computer before moving the jumper. Moving the jumper with the power on may result in unreliable computer operation.

The diagram below shows the location of the Clear RTC **RAM** jumper.



Clear RTC RAM jumper (2-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 setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

1. Observe the precautions in "[Before You Proceed](#)".
2. Turn off all **peripheral** devices connected to the computer. Turn off the computer. Disconnect the computer's power cord from the AC power source (wall outlet or power adapter).
3. Remove the computer cover.
4. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
5. Move the jumper cap from pins 1 -2 (default) to pins 2-3 for about 5 to 10 seconds, then move the cap back to pins 1-2.
6. Replace the cover, plug in the computer, turn on the computer, and allow it to **boot**. During the **boot** process, hold down the <Delete> key to enter the **BIOS** setup

and to re-enter data.



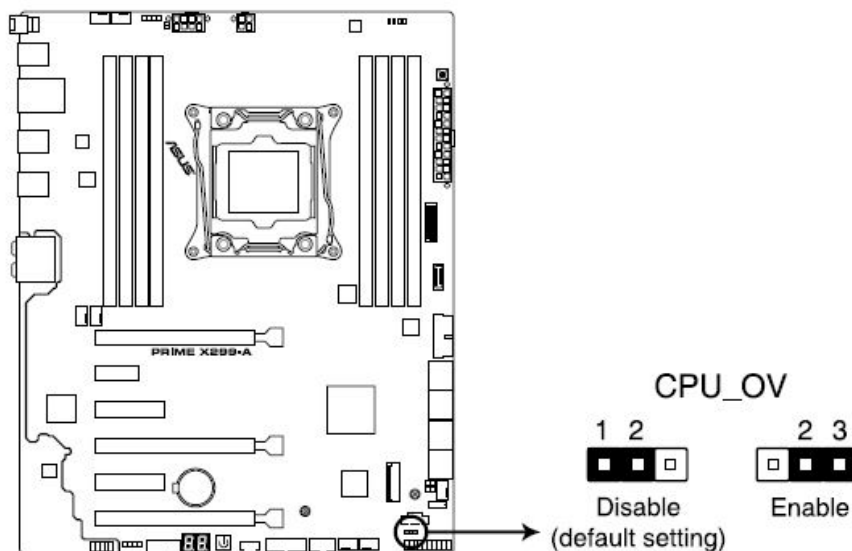
- Except when clearing the RTC **RAM**, never remove the cap from the CLRTC jumper default position. Removing the cap will cause system **boot failure**!



- If the steps above do not help, remove the onboard battery and place a metal object or jumper cap again to clear the **CMOS RTC RAM** data. After the **CMOS** clearance, 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 C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings to default values.
- Due to the chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system.

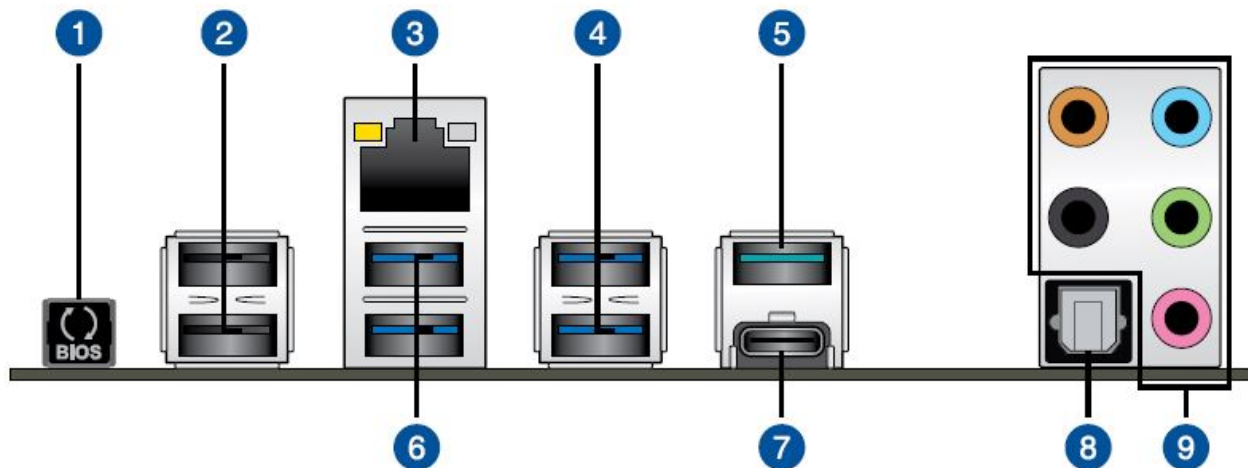
CPU Over Voltage jumper (3-pin CPU_OV)

The CPU Over Voltage jumper allows you to set a higher CPU voltage for a flexible overclocking system, depending on the type of the installed CPU. To gain more CPU voltage setting, insert the jumper to pins 2-3. To go back to its default CPU voltage setting, insert the jumper to pins 1-2.



PRIME X299-A CPU_OV setting

Rear Panel Connectors



Rear Panel Connectors

1. USB BIOS Flashback Button	6. USB 3.1 Gen 1 ports 56
2. USB 2.0 ports 1112 (bottom port supports USB BIOS Flashback)	7. USB 3.1 Gen 2 Type-C port EC1
3. Intel LAN port (LAN1)	8. Optional S/PDIF Out port
4. USB 3.1 Gen 1 ports 78	9. Audio I/O ports
5. USB 3.1 Gen 2 Type-A ports EA2	

USB 3.1 Gen1 / Gen 2 devices can only be used for data storage. **USB** 3.0 ports are backward compatible with **USB** 2.0 and **USB** 1.1 devices. The **USB** 3.0 ports are SuperSpeed, high-speed, full-speed, and low-speed capable. **USB** 3.0 support requires both an *operating system* and drivers that fully support **USB** 3.0 transfer rates.

It is strongly recommended that you connect your devices to ports with matching data transfer rate. Please connect your USB 3.1 Gen 1 devices to USB 3.1 Gen 1 ports and your USB 3.1 Gen 2 devices to USB 3.1 Gen 2 ports for faster and better performance for your devices.

Audio Subsystem

The onboard audio subsystem consists of the following component s:

- Intel X299 Chipset
- RealTek S1220A CODEC

The subsystem has the following headers and connectors:

- Six back panel audio connectors (including one Optical S/PDIF out port)
- High Definition (HD) Audio front panel header that provides mic in and line out signals for front panel audio connectors

The audio subsystem supports the following features:

- Advanced jack detection for the back panel analog audio jacks that enables the audio codec to recognize the device that is connected to an audio port. The front panel audio jacks are capable of re-tasking according to the user's definition, or can be automatically switched depending on the recognized device type.
- Independent multi-streaming.

LAN Subsystem

The board's Gigabit (10/100/1000 Mb/s) LAN subsystem includes:

- Intel X299 Express Chipset
- Intel I219-V Gigabit Ethernet LAN Controller
- An RJ-45 LAN connector with integrated status LEDs

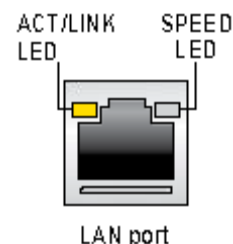
The subsystem features:

- CSMA/CD protocol engine
- LAN connect *interface* between the Intel PCH and the LAN controllers
- PCI bus power management
- *ACPI* technology support
- LAN wake capabilities

Two LEDs are built into the RJ-45 LAN connector located on the back panel. These LEDs indicate the status of the LAN.

This table describes the LED states when the board is powered up and the LAN subsystem is operating.

Activity Link LED		Speed LED	
Status	Description	Status	Description
Off	No link	Off	10 Mbps connection
Orange	Linked	Orange	100 Mbps connection
Orange (Blinking)	Data activity	Green	1 Gbps connection
Orange (Blinking then steady)	Ready to wake up from S5 mode		

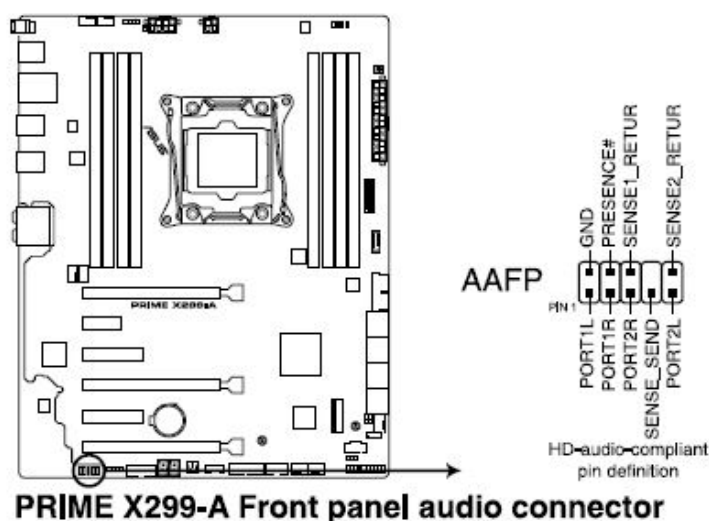


Internal Connectors

Before connecting cables to any of the internal headers or connectors, observe the precautions in "Before You Proceed".

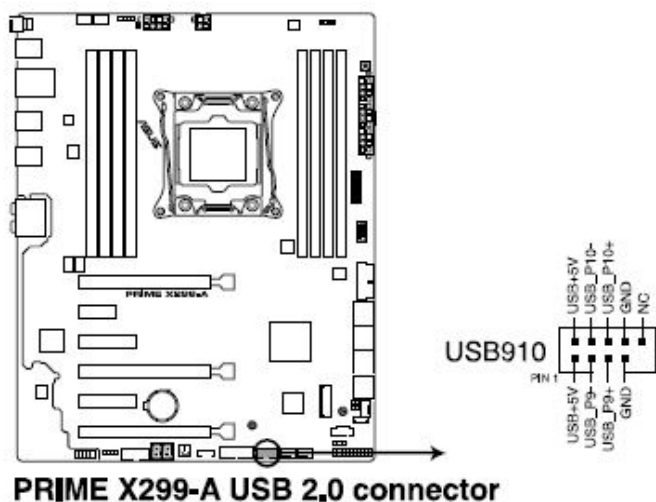
Front Panel Audio Header (10-1 pin AAFP)

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.



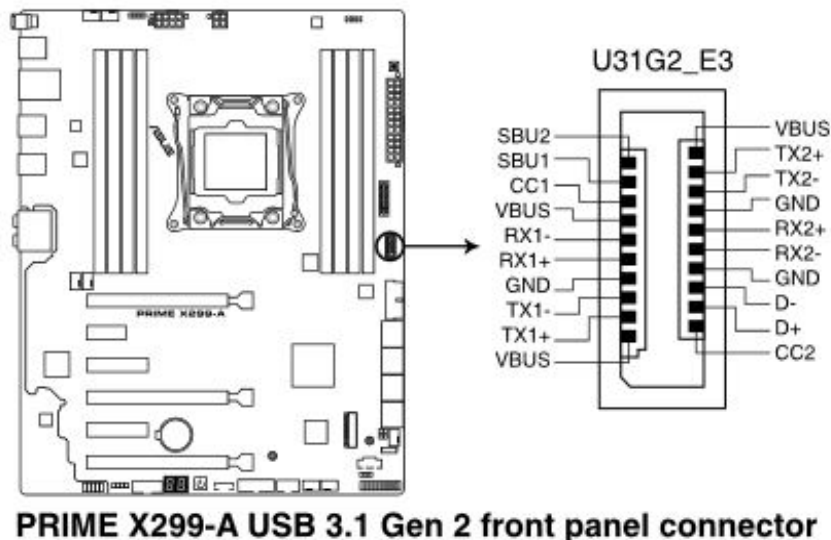
USB 2.0 connector (10-1 pin USB910)

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 specification that supports up to 480 Mb/s connection speed.



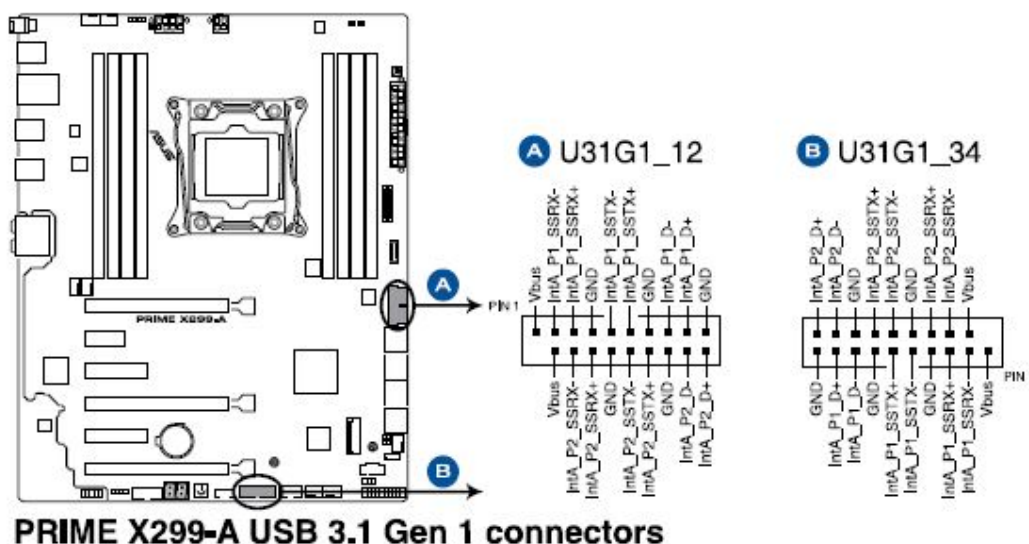
USB 3.1 Gen 2 front panel connector (U31G2_E3)

This connector allows you to connect a USB 3.1 Gen 2 module for additional USB 3.1 Gen 2 ports. The latest USB 3.1 Gen 2 connectivity provides data transfer speeds of up to 10 Gbps.



USB 3.1 Gen 1 front connectors (20-pin U31G1_12; U31G1_34)

These connectors allow you to connect a USB 3.1 Gen 1 module for additional USB 3.1 Gen 1 front or rear panel ports. With an installed USB 3.1 Gen 1 module, you can enjoy all the benefits of USB 3.1 Gen 1 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.



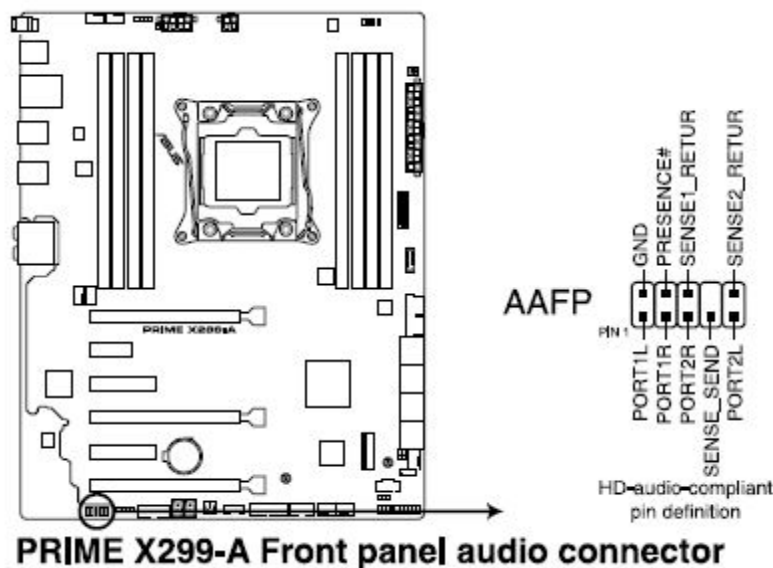
- The plugged USB 3.1 Gen 1 device may run on xHCI or EHCI mode depending on the operating system's setting.



- *The USB 3.1 Gen 1 module is purchased separately .*

Front panel audio connector (10-1 pin AAFP)

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



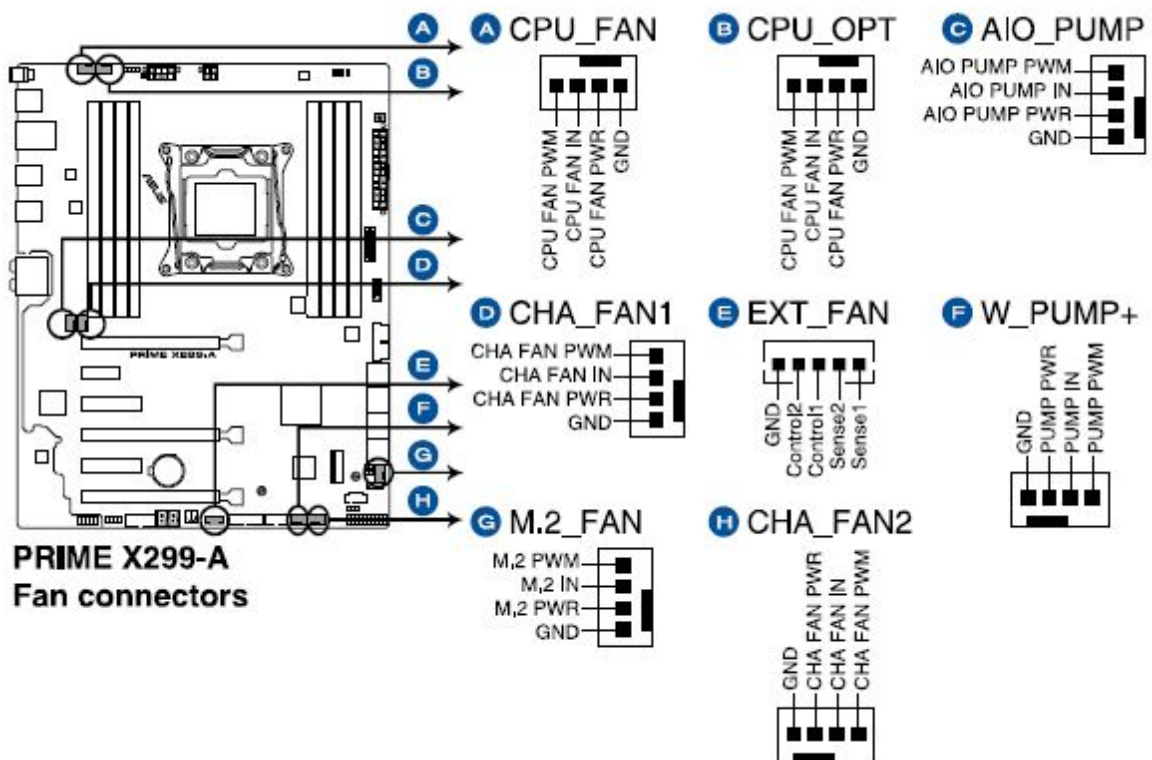
- *It is recommended that you connect a high-definition front panel module to this connector to avail of the motherboard's high-definition audio capability.*

CPU, CPU optional, AIO pump, water pump+, extension, M.2 and chassis fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 4-pin AIO_PUMP; 4-pin W_PUMP+; 4-pin M.2_FAN; 5-pin EXT_FAN, 4-pin CHA_FAN1-2)

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



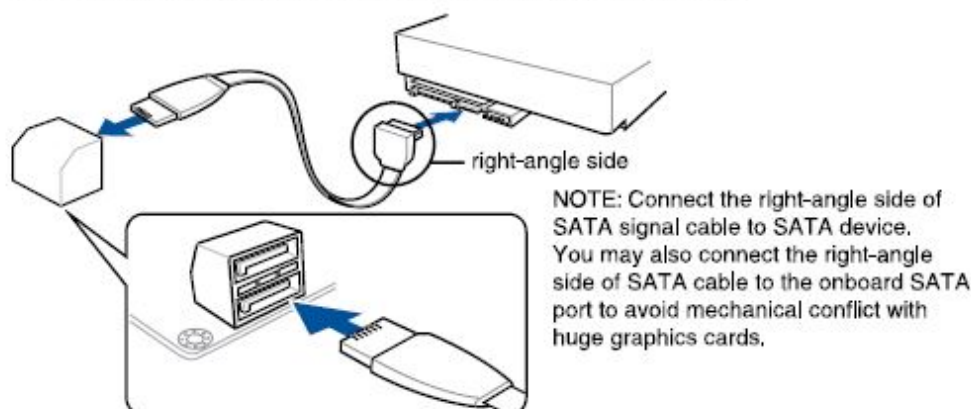
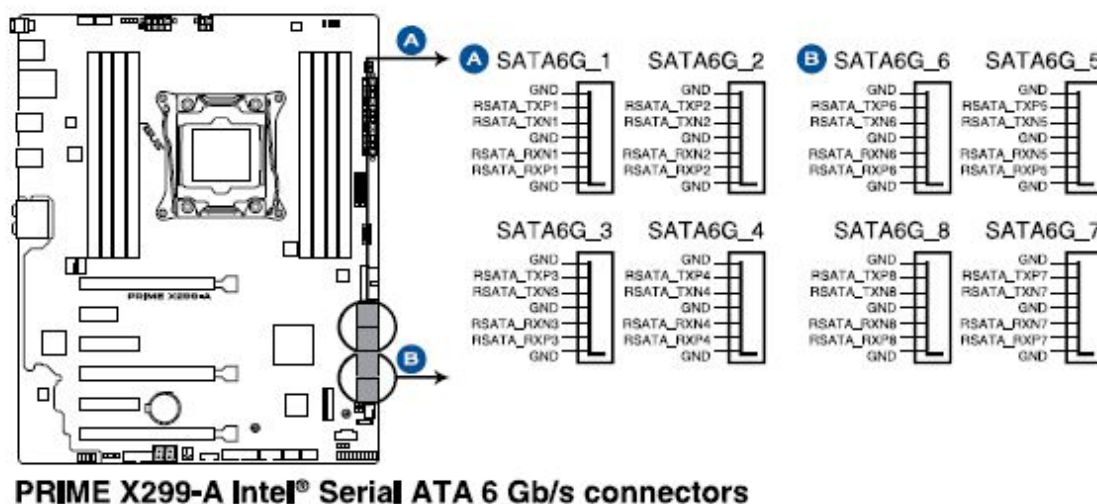
- *DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! Do not place jumper caps on the fan connectors!*
- *Ensure that the CPU fan cable is securely installed to the CPU fan connector.*



- The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.
- W_PUMP+ function support depends on a water cooling device.
- Connect the fan of your water cooling kit to the AIO_PUMP connector.

Intel Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_12, SATA6G_34, SATA6G_65, SATA6G_87)

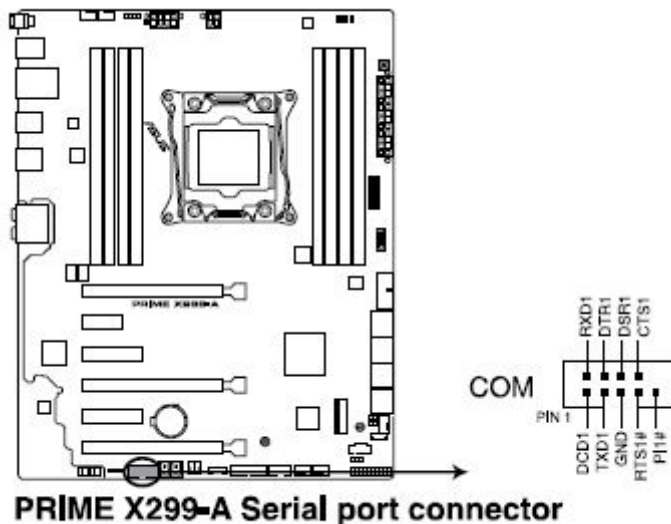
These connectors connect to Serial ATA 6.0 Gb/s hard disk drives using Serial ATA 6.0 Gb/s signal cables. You can create a **RAID** 0, 1, 5 or 10 configuration with the Intel® Rapid Storage Technology through the onboard Intel X299 chipset.



- These connectors are set to **[AHCI Mode]** by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode item in the BIOS to **[Intel RST Premium With Intel Optane System Acceleration (RAID)]**. Refer to section 3.6.3 PCH Storage Configuration for details.

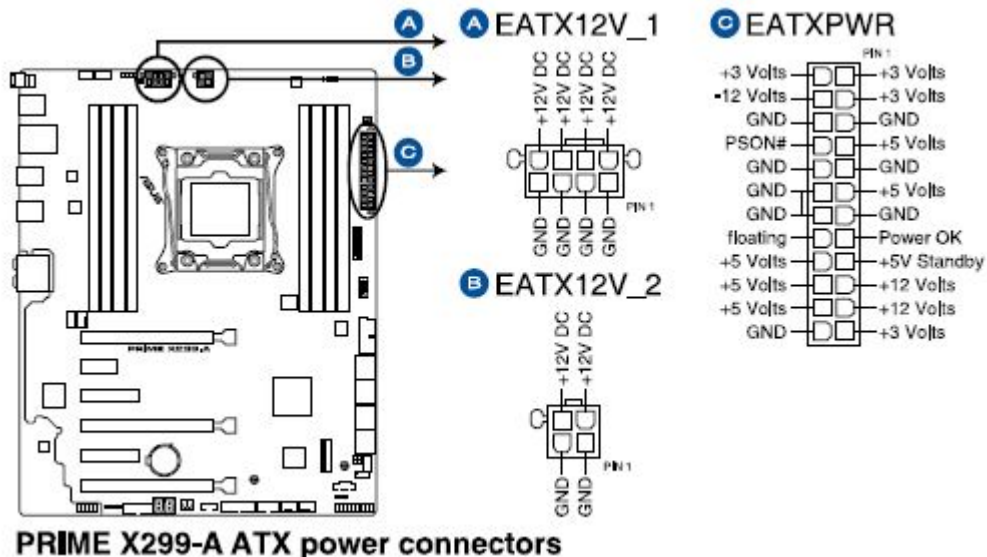
Serial Port Connector (10-1 pin COM)

These connectors are for the serial (COM) port. Connect the serial port module cable to this connector, then install the module in a slot opening at the back of the system.



ATX power connectors (24-pin EATXPWR; 8-pin EATX12V_1; 4-pin EATX12V_2)

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



1. Observe the precautions in "[Before You Proceed](#)".
2. Connect the 12 V processor core voltage power supply cable to the 8-pin connector (A).
3. Connect the main power supply cable to the 2 x 12 pin connector (C).



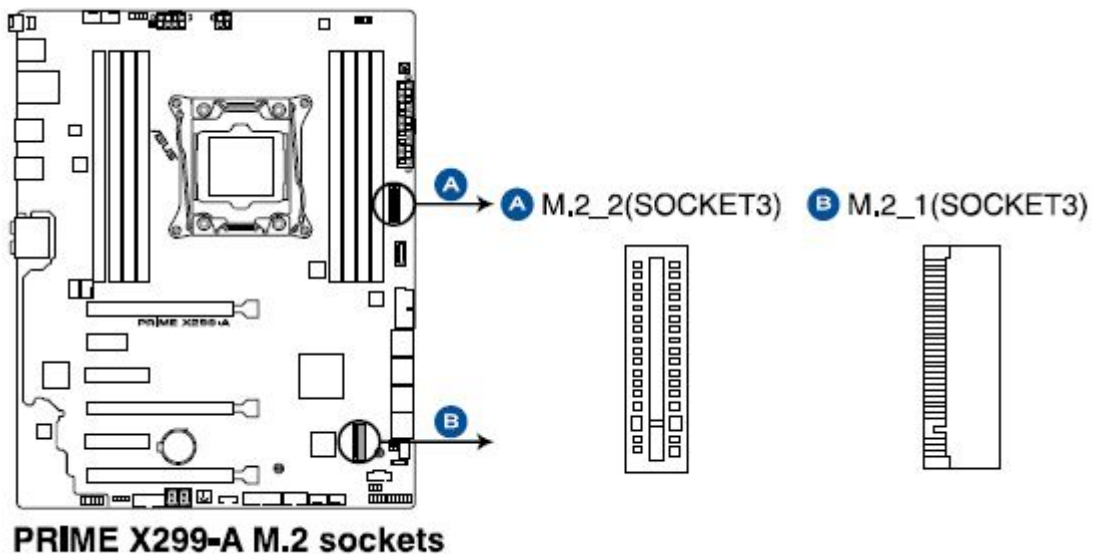
- *DO NOT connect the 4-pin power plug only - the motherboard may overheat under heavy usage.*
- *Ensure to connect the 8-pin power plug, or connect both the 8-pin and 4-pin power plugs.*



- *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.*
- *We recommend that you use a PSU with a higher power output when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.*
- *If you want to use two or more high-end PCI Express x16 cards, use a PSU with 1000W power or above to ensure the system stability.*

M.2 sockets (M.2_1(Socket 3); M.2_2(Socket 3))

These sockets allow you to install M.2 SSD modules (purchased separately).



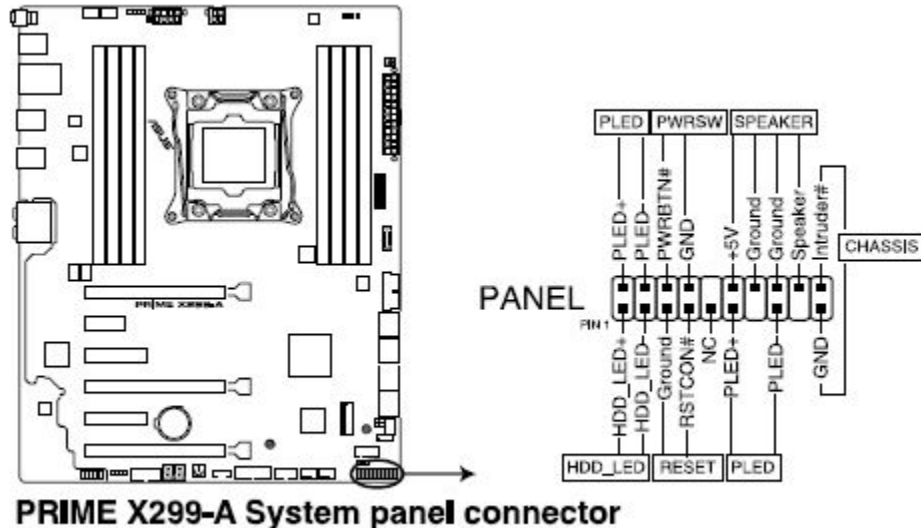
PRIME X299-A M.2 sockets



- *This socket support IRST (Intel Rapid Storage Technology).*
- *M.2_1 socket supports PCIe 3.0 x 4 and SATA mode M Key design and type 2242/2260/2280 storage devices.*
- *M.2_2 socket supports PCIe 3.0 x 4 M Key design and type 2242/2260/2280/22110 PCIe storage devices.*

System panel connector (20-3 pin PANEL)

This connector supports several chassis-mounted functions.



- **System power LED (2-pin or 3-1 PLED)**

This 2-pin or 3-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 PWRSW)**

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)**

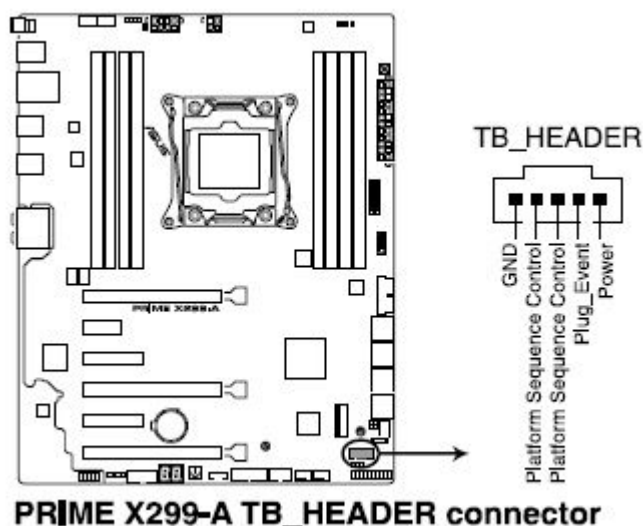
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

- **Chassis intrusion connector (2-1 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.

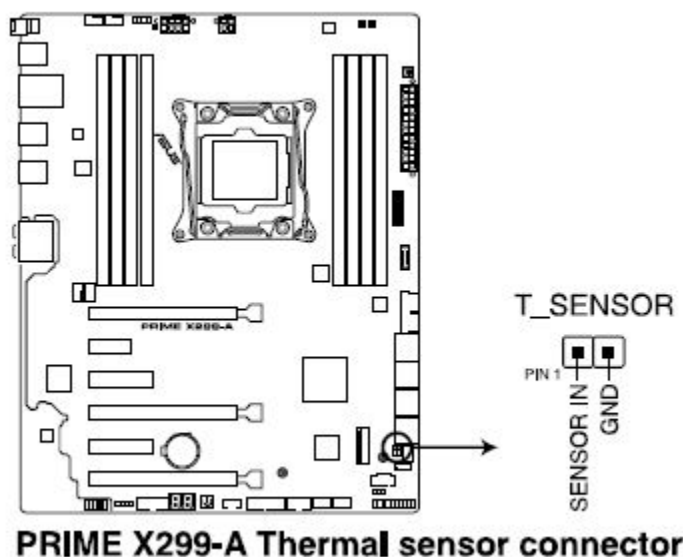
Thunderbolt header (5-pin TB_HEADER)

This connector is for the add-on Thunderbolt I/O card that supports Intel's Thunderbolt Technology, allowing you to connect up to six Thunderbolt-enabled devices and a DisplayPort enabled display in a daisy-chain configuration.



Thermal sensor connector (2-pin T_SENSOR)

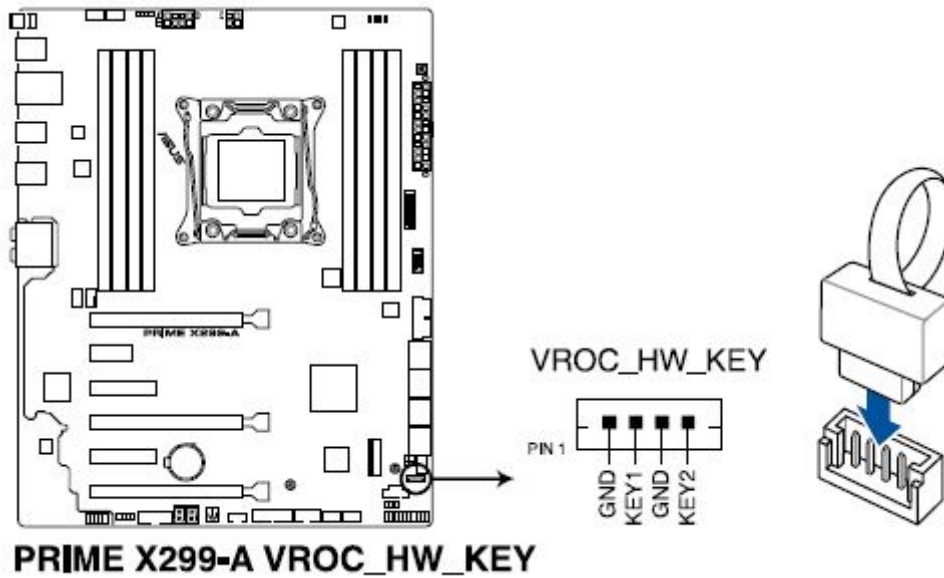
This connector is for the thermistor cable that allows you to monitor the temperature of your motherboard's critical components and connected devices. Connect the thermistor cable and place the sensor on the device or the motherboard's component to detect its temperature.



- The thermistor cable must be purchased separately .

VROC_HW_KEY connector (4-pin VROC_KEY)

This connector allows you to connect a KEY module to enable CPU RAID functions with Intel CPU RSTe.



- *The KEY module must be purchased separately .*
- *Due to CPU behaviour, CPU RAID functions with Intel CPU RSTe only supports Intel Core X-series Processors (6-core or above) and Intel SSD modules.*

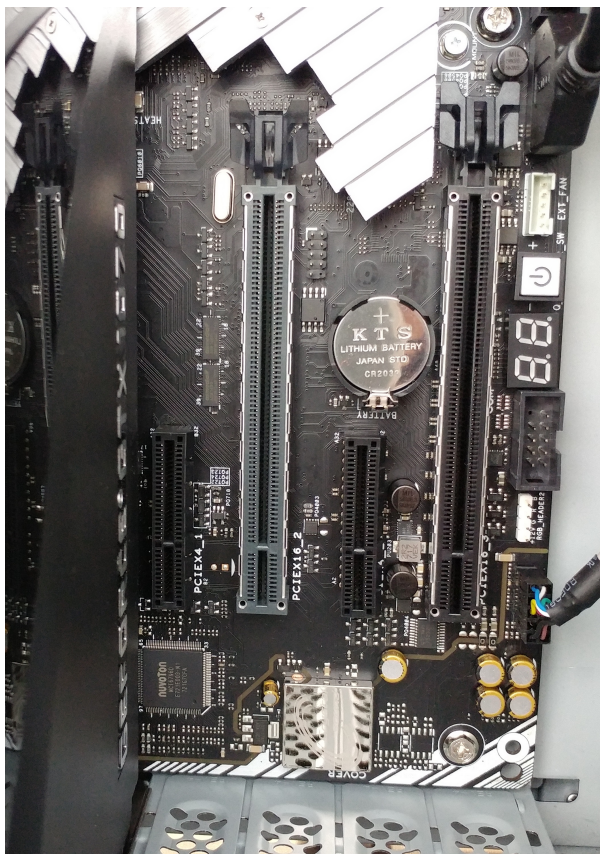
Installing & Removing a PCI Card

PCI and PCI Express * Auto Configuration

If you install a PCI Express add-in card in your computer, the PCI Express auto-configuration utility in the BIOS automatically detects and configures the resources (IRQs, DMA channels, and I/O space) for that add-in card. You do not need to run the BIOS Setup program after you install a PCI Express add-in card.



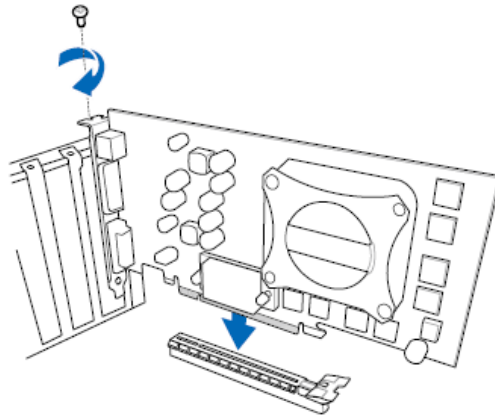
- *When installing a **PCI Express** card on the Desktop Board, ensure that the card is fully seated in the **PCI Express** connector before you power on the system. If the card is not fully seated in the connector, an electrical short may result across the connector pins. Depending on the over-current protection of the power supply, certain Desktop Board components and/or traces may be damaged.*



Installing PCI Express x16 Graphics Cards

If you are installing a single *PCI Express* x16 graphics card, install it in the *PCI Express* primary connector for optimum performance. Follow these instructions to install a PCI Express x16 card:

1. Observe the precautions in "[Before You Proceed](#)".
2. Place the card in a *PCI Express* x16 connector and press down on the card until it is completely seated in the connector and the card retention notch on the card snaps into place around the retention mechanism pin on the connector.
3. Secure the card's metal bracket to the chassis back panel with the retention mechanism



Installing Linked PCI Express x16 Graphics Cards

The Desktop Board supports the use of linked *PCI Express* x16 graphics cards with Nvidia SLI technology and AMD CrossFire X technology.

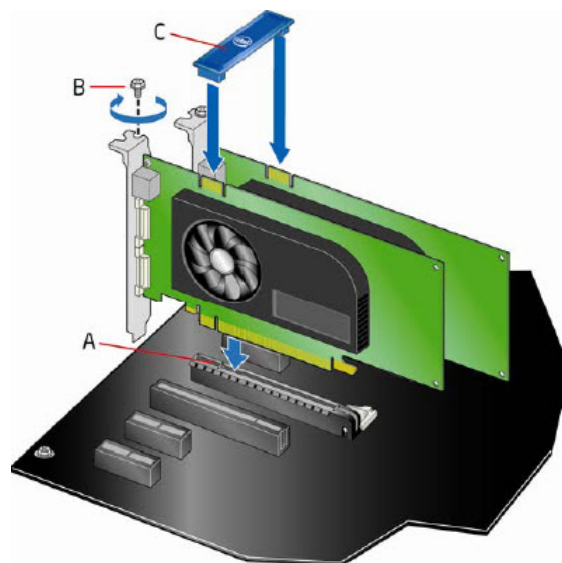
When installing linked graphics cards in the *PCI Express* x16 connectors, refer to the card manufacturer's instructions to determine correct card placement and interconnection.



- *The installations steps that follow provide general instructions.*

To install two or three linked *PCI Express* graphics cards:

1. Observe the precautions in "[Before You Proceed](#)".
2. Install the first card in the *PCI Express* x16 connector as described in "Installing *PCI Express* x16 Graphics Cards"
3. Place the second card in the secondary *PCI Express* x16 connector (A) and press down on the card until it is completely seated in the connector and the card retention notch on the card snaps into place around the retention mechanism pin



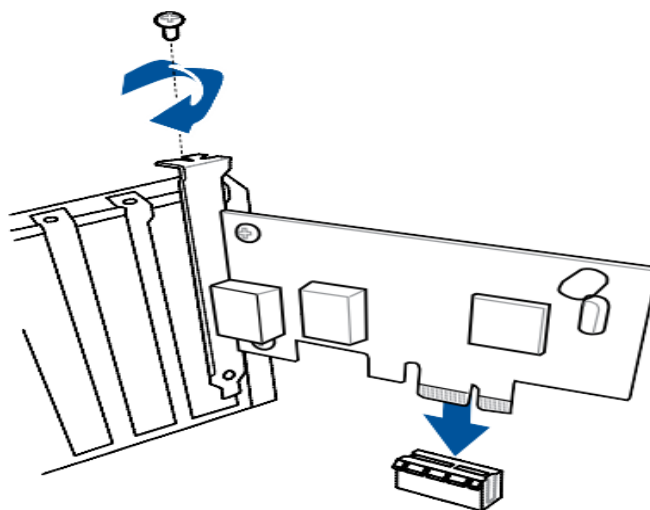
on the connector. Do the same for the third card.

4. Secure the card's metal bracket to the chassis back panel with a screw (B) or the retention mechanism.
5. Connect the two or three cards together with the SLI or CrossFire bridge (C) as shown.
6. Connect the *monitor* cable to the graphics cards according to the manufacturer's instructions.

Installing PCI Express x1 Cards

While there are some graphics cards that are PCI Express x1, most cards that fit in this slot are Network adapter cards or SATA, USB, Serial or Parallel controller cards. If you are installing a single *PCI Express* x1 card, install it in the *PCI Express* primary connector for optimum performance. Follow these instructions to install a PCI Express x1 card:

1. Observe the precautions in "[Before You Proceed](#)".
2. Place the card in a *PCI Express* x1 connector and press down on the card until it is completely seated in the connector and the card retention notch on the card snaps into place around the retention mechanism pin on the connector.
3. Secure the card's metal bracket to the chassis back panel with the retention mechanism



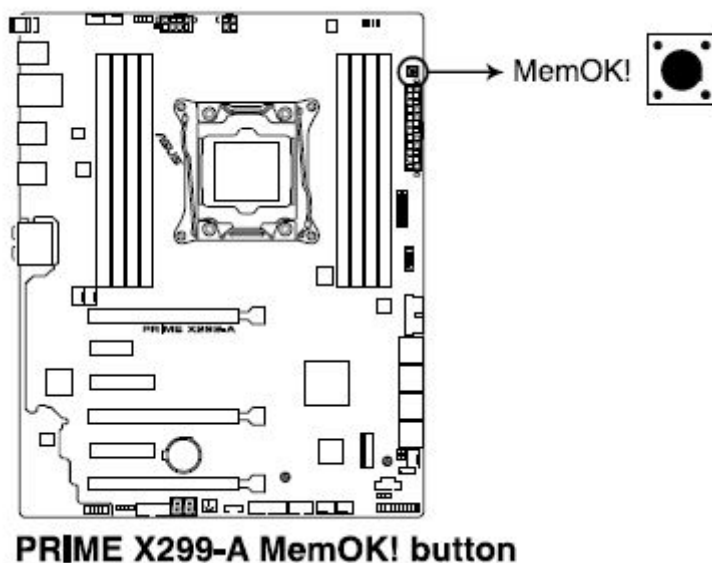
Onboard Switches and Buttons

The board contains the following buttons and switches that can be used to control board operation in order 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:

- MemOK! button
- *BIOS* Flashback button
- Power-on button

MemOK! Button

Installing DIMMS that are incompatible with the motherboard may cause system *boot* failure. If the system fails to boot during the POST stage and the DRAM_LED near the MemOK! button lights continuously, press and hold the MemOK! switch until the DRAM_LED starts blinking to begin automatic *memory* compatibility tuning and reboot for successful boot.



- *The DRAM_LED also lights up when the DIMM is not properly installed. 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*

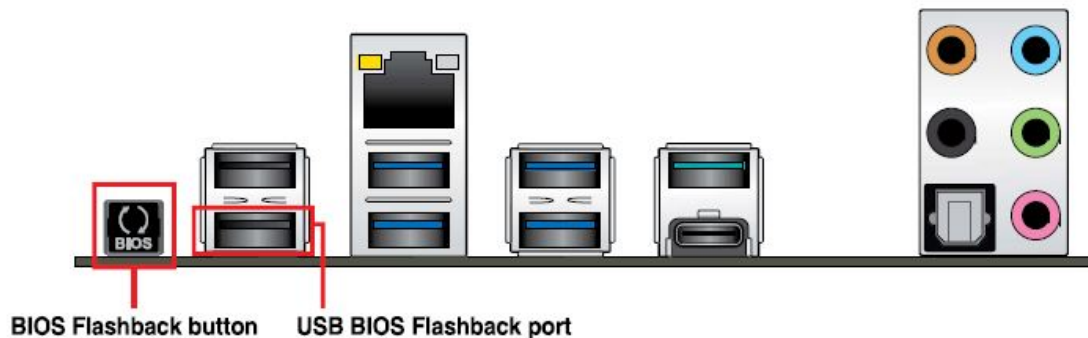


set of failsafe settings. The blinking speed of the DRAM_LED increases, indicating different test processes.

- 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, the DRAM_LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) at 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.
-

USB BIOS Flashback Button

USB BIOS Flashback allows you to easily update the BIOS without entering the BIOS or operating system. Just connect the USB storage device containing the BIOS file into the USB port, press USB BIOS Flashback button for three seconds, and the BIOS is updated automatically.



To use USB BIOS Flashback:

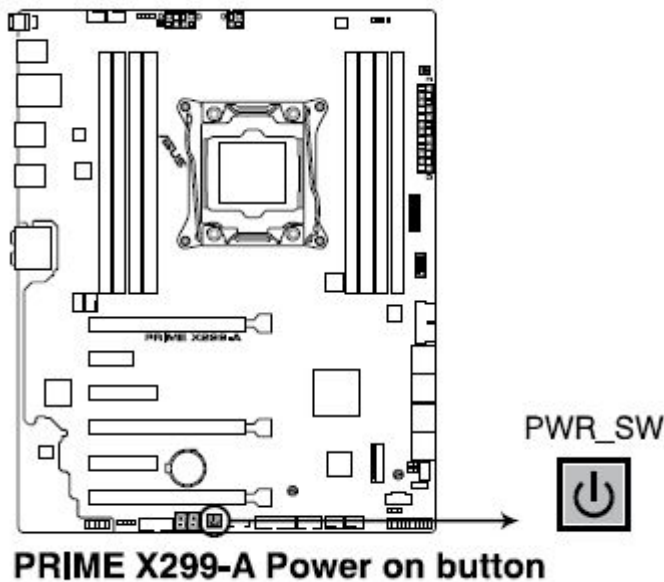
1. Insert the USB storage device into the USB BIOS Flashback port.
 - We recommend the use of a USB 2.0 storage device to save the latest BIOS version for better compatibility and stability.
2. Rename the file as X299A.CAP, then copy it to your USB storage device.
3. Shut down your computer.
4. Press the BIOS Flashback button for three seconds until the Flashback LED blinks three times, indicating that the BIOS Flashback function is enabled.
5. Wait until the light goes out, indicating that the BIOS updating process is completed.



- *Do not unplug portable disk, power system, or press the CLR_CMOS button while BIOS update is ongoing, otherwise the update will be interrupted. In case of interruption, please follow the steps again.*
- *If the light flashes for five seconds and turns into a solid light, this means that the BIOS Flashback is not operating properly. This may be caused by improper installation of the USB storage device and filename/file format error. If this scenario happens, please restart the system to turn off the light.*
- *Updating the BIOS has risks. If the BIOS program is damaged during the process and results in the system's failure to boot up, please contact the Northern Micro Service Department.*

Power-On Button

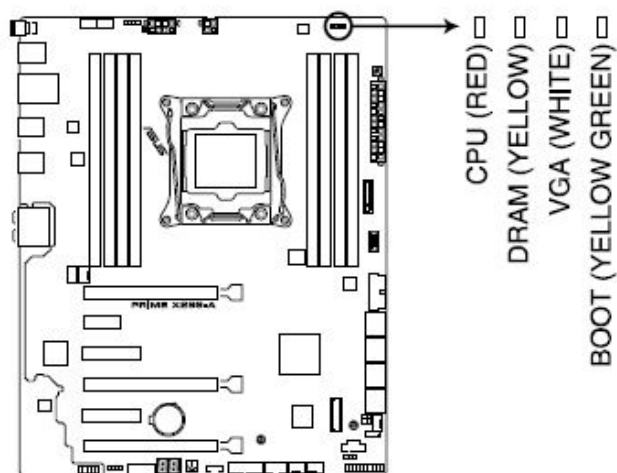
The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



Onboard LEDs

POST State LEDs

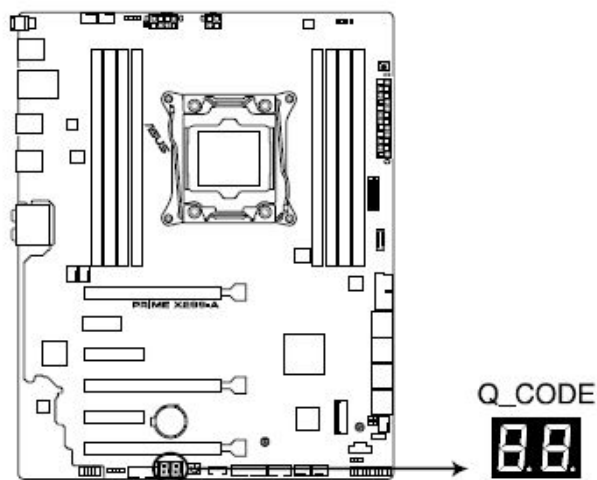
The POST State LEDs provide the status of these key components during POST (Power-On-Self Test): CPU, memory modules, VGA card, and hard disk drives. If an error is found, the critical component's LED stays lit up until the problem is solved.



**PRIME X299-A CPU/ DRAM/
BOOT_DEVICE/ VGA LED**

Q-Code LEDs

The Q-Code LED design provides you with a 2-digit error code that displays the system status. Refer to the Q-Code table on the next page for details.



PRIME X299-A Q-Code LED

Q-Code table

Code	Description
00	Not used
02	microcode
03	CACHE_ENABLED
04	PCH initialization
06	CPU_EARLY_INIT
10	PEI Core is started
11 – 14	Pre-memory CPU initialization is started
15 – 18	Pre-memory System Agent initialization is started
19 – 1C	Pre-memory PCH initialization is started
2B – 2F	Memory initialization
30	Reserved for ASL (see ASL Status Codes section below)
31	Memory Installed
32 – 36	CPU post-memory initialization
37 – 3A	Post-Memory System Agent initialization is started
3B – 3E	Post-Memory PCH initialization is started
4F	DXE IPL is started
50 – 53	Memory initialization error, Invalid memory type or incompatible memory speed
4F	DXE IPL is started
54	Unspecified memory initialization error
55	Memory not installed
56	Invalid CPU type or Speed
57	CPU mismatch
58	CPU self test failed or possible CPU cache error
59	CPU micro-code is not found or micro-code update is failed
5A	Internal CPU error
5B	Reset PPI is not available
5C – 5F	Reserved for future AMI error codes
E0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL)
E1	S3 Boot Script execution
E2	Video repost
E3	OS S3 wake vector call
E4 – E7	Reserved for future AMI progress codes
E8	S3 Resume Failed
E9	S3 Resume PPI not Found
EA	S3 Resume Boot Script Error
EB	S3 OS Wake Error
EC – EF	Reserved for future AMI error codes
F0	Recovery condition triggered by firmware (Auto recovery)
F1	Recovery condition triggered by user (Forced recovery)
F2	Recovery process started
F3	Recovery firmware image is found
F4	Recovery firmware image is loaded
F5 – F7	Reserved for future AMI progress codes
F8	Recovery PPI is not available
F9	Recovery capsule is not found

FA	Invalid recovery capsule
FB – FF	Reserved for future AMI error codes
60	DXE Core is started
61	NVRAM initialization
62	Installation of the PCH Runtime Services
63 – 67	CPU DXE initialization is started
68	PCI host bridge initialization
69	System Agent DXE initialization is started
6A	System Agent DXE SMM initialization is started
6B – 6F	System Agent DXE initialization (System Agent module specific)
70	PCH DXE initialization is started
71	PCH DXE SMM initialization is started
72	PCH devices initialization
73 – 77	PCH DXE Initialization (PCH module specific)
78	ACPI module initialization
79	CSM initialization
7A – 7F	Reserved for future AMI DXE codes
90	Boot Device Selection (BDS) phase is started
91	Driver connecting is started
92	PCI Bus initialization is started
93	PCI Bus Hot Plug Controller Initialization
94	PCI Bus Enumeration
95	PCI Bus Request Resources
96	PCI Bus Assign Resources
97	Console Output devices connect
98	Console input devices connect
99	Super IO Initialization
9A	USB initialization is started
9B	USB Reset
9C	USB Detect
9D	USB Enable
9E – 9F	Reserved for future AMI codes
A0	IDE initialization is started
A1	IDE Reset
A2	IDE Detect
A3	IDE Enable
A4	SCSI initialization is started
A5	SCSI Reset
A6	SCSI Detect
A7	SCSI Enable
A8	Setup Verifying Password
A9	Start of Setup
AA	Reserved for ASL (see ASL Status Codes section below)
AB	Setup Input Wait

AC	Reserved for ASL (see ASL Status Codes section below)
AD	Ready To Boot event
AE	Legacy Boot event
AF	Exit Boot Services event
B0	Runtime Set Virtual Address MAP Begin
B1	Runtime Set Virtual Address MAP End
B2	Legacy Option ROM Initialization
B3	System Reset
B4	USB hot plug
B5	PCI bus hot plug
B6	Clean-up of NVRAM
B7	Configuration Reset (reset of NVRAM settings)
B8– BF	Reserved for future AML codes
D0	CPU initialization error
D1	System Agent initialization error
D2	PCH initialization error
D3	Some of the Architectural Protocols are not available
D4	PCI resource allocation error, Out of Resources
D5	No Space for Legacy Option ROM
D6	No Console Output Devices are found
D7	No Console Input Devices are found
D8	Invalid password
D9	Error loading Boot Option (LoadImage returned error)
DA	Boot Option is failed (StartImage returned error)
DB	Flash update is failed
DC	Reset protocol is not available

ACPI/ASL Checkpoints (under OS)

Code	Description
03	System is entering S3 sleep state
04	System is entering S4 sleep state
05	System is entering S5 sleep state
30	System is waking up from the S3 sleep state
40	System is waking up from the S4 sleep state
AC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
AA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

CPU Overview / Specs



Processor Number	Core i7-7820X
Base Frequency (GHz)	3.60
Total <i>Cache</i>	11M
Cores / Threads	8 / 16
<u>Memory</u> Speed Support (DDR4)	2666, 2400, 2133

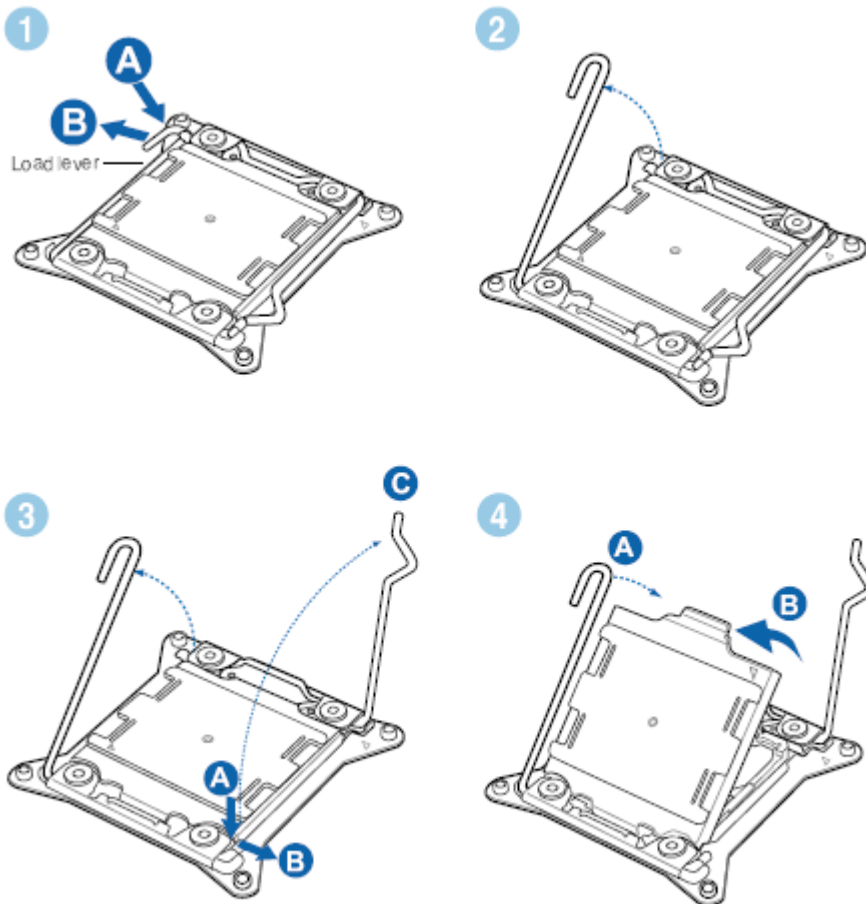
Installing a CPU



- *Before installing or removing a processor, make sure the AC power has been removed by unplugging the power cord from the computer; the standby power LED should not be lit. Failure to do so could damage the processor and the board.*

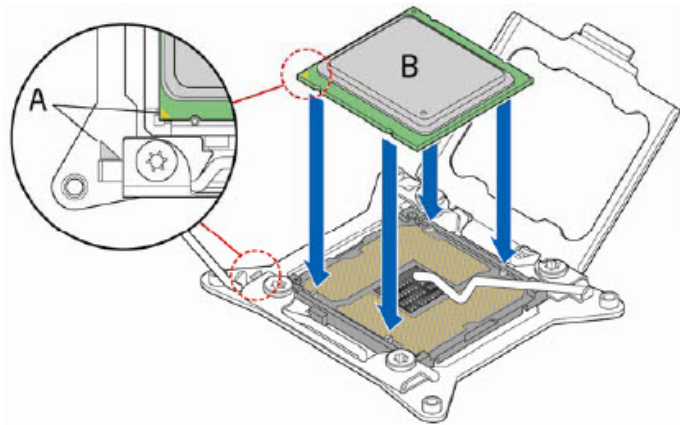
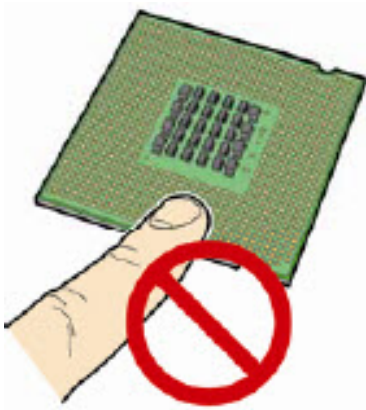
To install a processor, follow these instructions:

1. Observe the precautions in "[Before You Proceed](#)".
2. Open the socket by pushing the hooked load lever down and away from the socket (Figure 1, A and B below). Lift the lever up but do not force the lever to the fully open position (Figure 2 below).

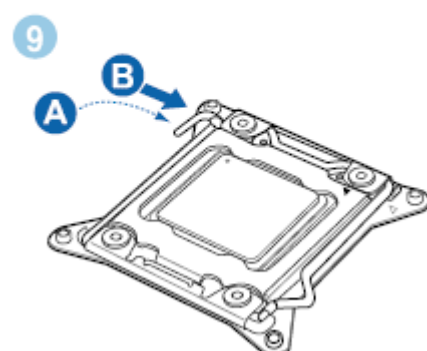
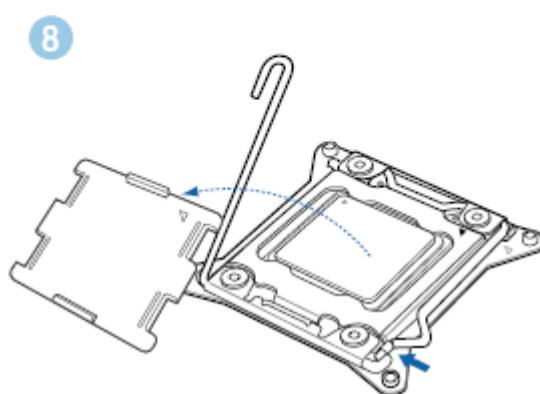
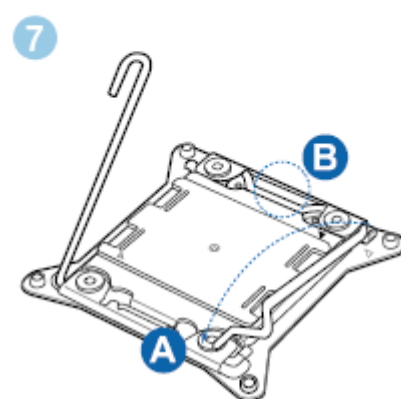
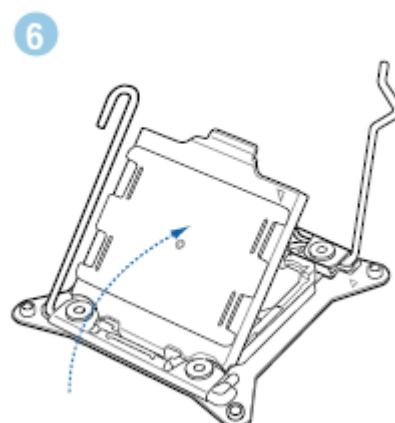
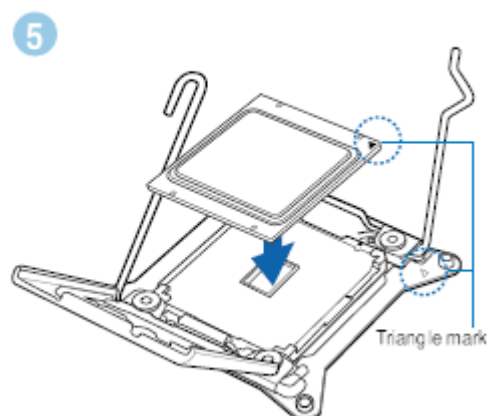


3. Open the second socket lever by pushing the lever down and away from the socket (Figure 3, A and B above). Rotate the socket lever to its fully open position as shown (Figure 3, C above).

4. Push down on the load lever (Figure 4, A above) to lift the socket load plate as shown. Grasp the load plate and lift up to open it fully. Do not touch the socket contacts.
5. Remove the processor from its packaging and insert in the socket as shown below. Make sure the gold-colored triangle indicating pin 1 on the processor aligns with the triangle on the socket (A below) before you lower the processor into place. Lower the processor (B below) straight down without tilting or sliding it in the socket.



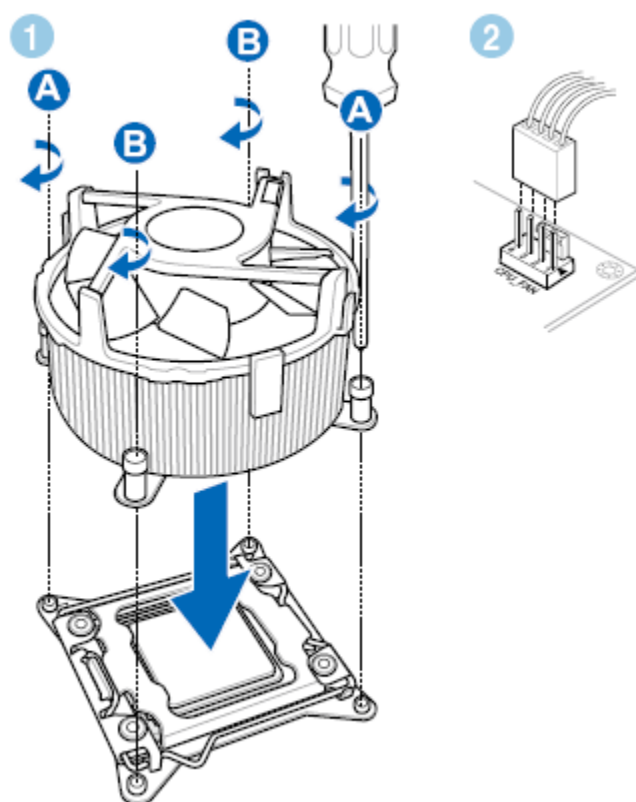
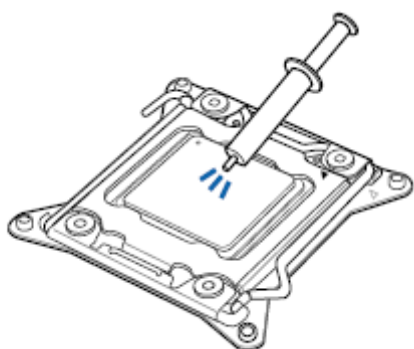
6. Close the load plate (Figure 6 below). After the load plate is closed, engage the second socket lever under the latch (Figure 7, A and B below). As the socket lever is latched, the socket cover (Figure 8 below) will pop off as shown. Engage the hooked load lever (Figure 9, A and B below) under the latch.



Installing CPU Heatsink & Fan

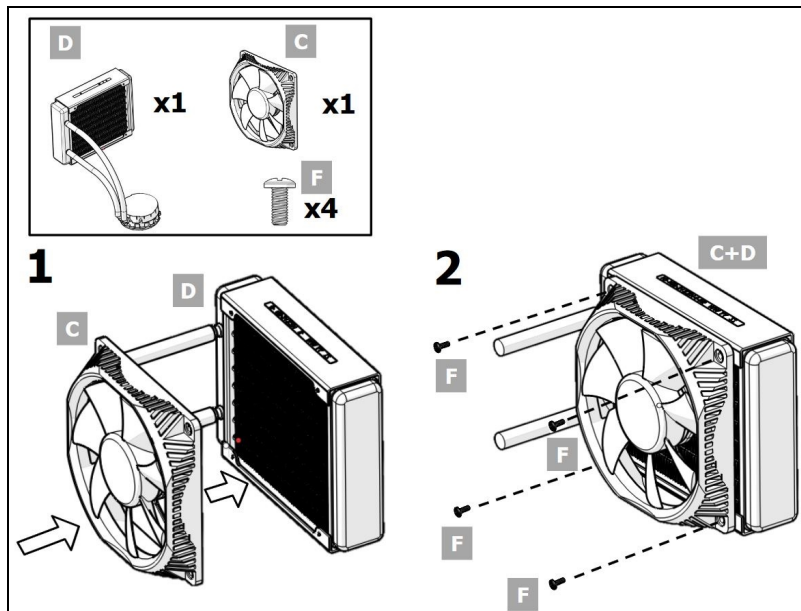
The LGA2066 processor socket has four threaded holes for mounting a processor fan heat sink. The illustrations shows installation of a typical processor fan heat sink; yours may differ. For detailed instructions on attaching a processor fan heat sink to the Desktop Board, refer to the Intel boxed processor manual, Intel boxed thermal solution manual, or instructions from the third-party thermal solution provider.

Connect the processor fan heat sink cable to the 4-pin processor fan header (Figure 2 below). Apply thermal solution to the back of the processor prior to installing the fan. To install the fan, turn the four screw mounts clockwise (Figure 1 A and B below). To remove the fan, simply turn these mounts counterclockwise.

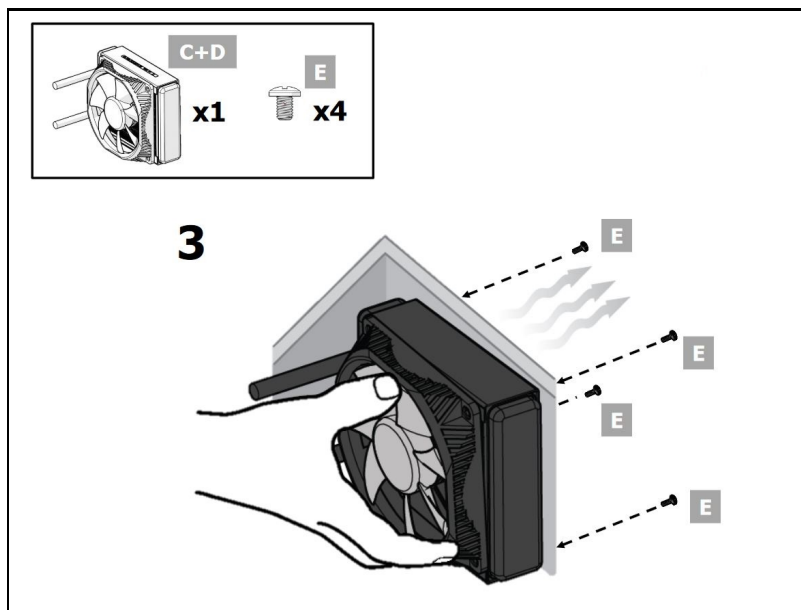


When using a liquid cooled solution, the Intel TS13X module is the best choice. here are the steps for installing the Intel liquid cooling solution.

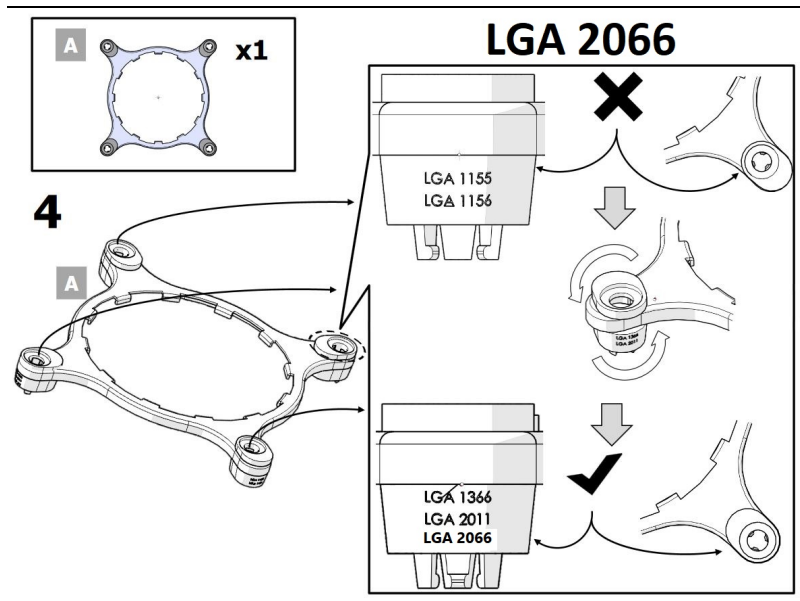
1. Attach fan to heat dissipater with screws, using spacers between.



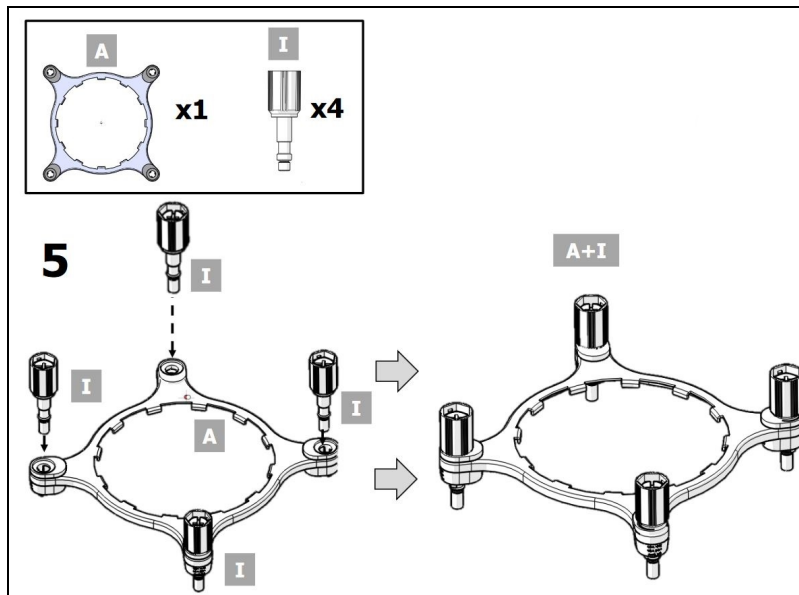
2. Attach fan/dissipater to chassis.



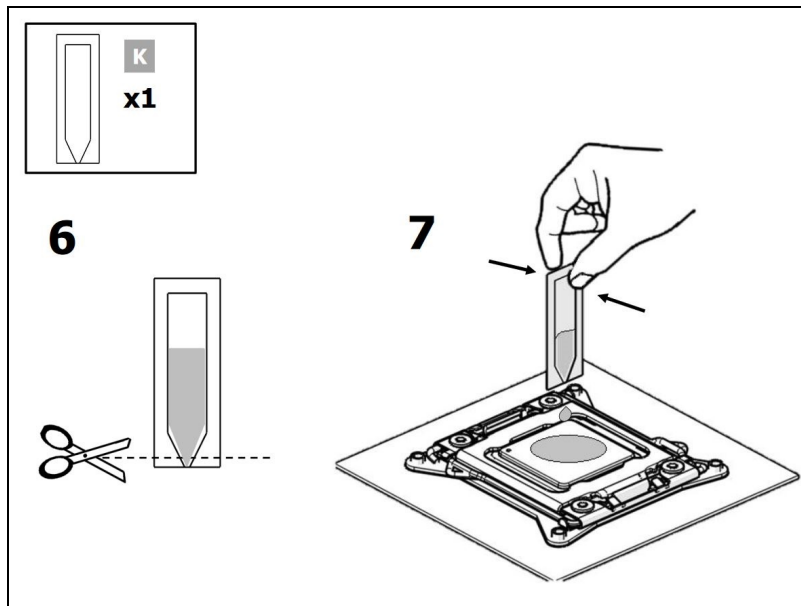
3. Situate mounting ring according to diagram.



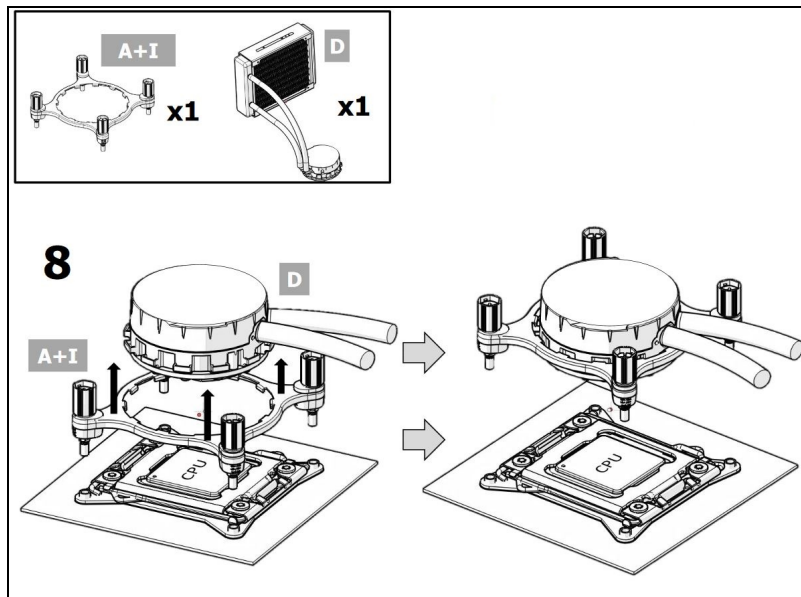
4. Place special screw extenders into mounting ring.



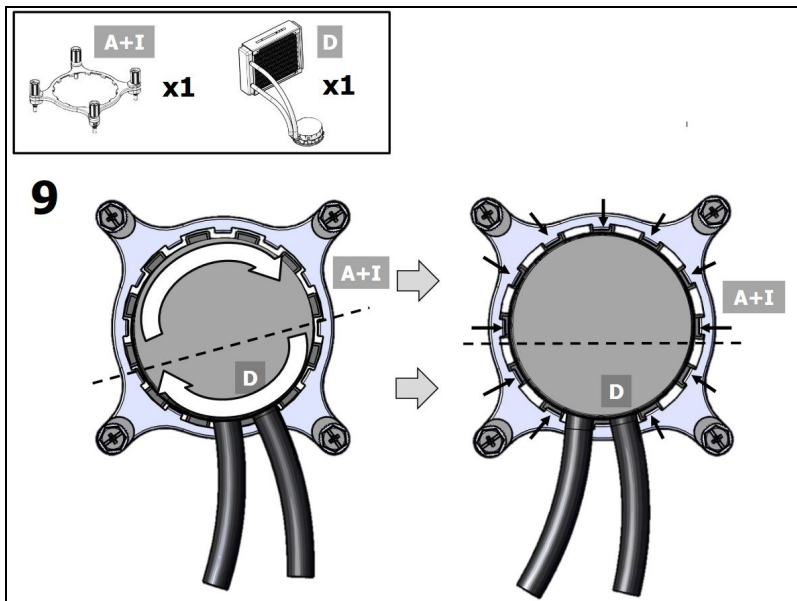
5. Apply thermal paste to the center of the CPU mounting position on the motherboard.



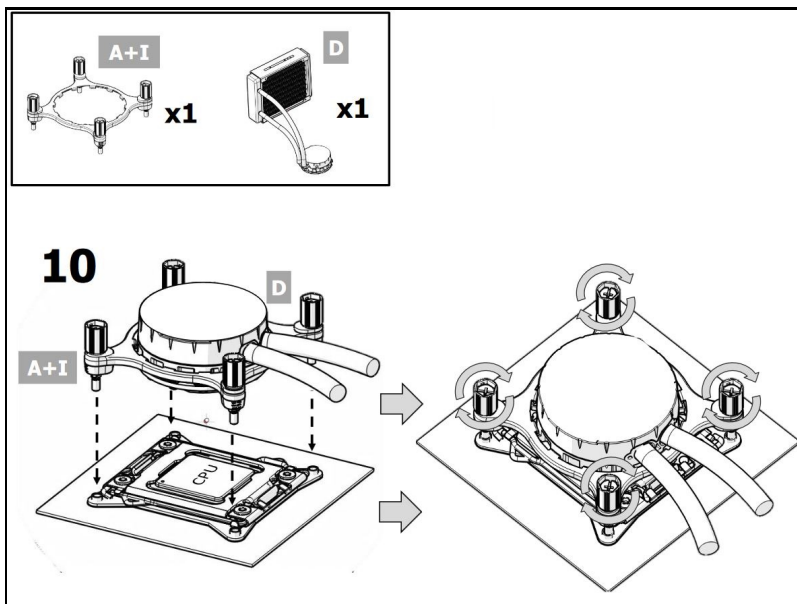
6. Screw liquid reservoir onto mounting bracket and situate properly for motherboard.



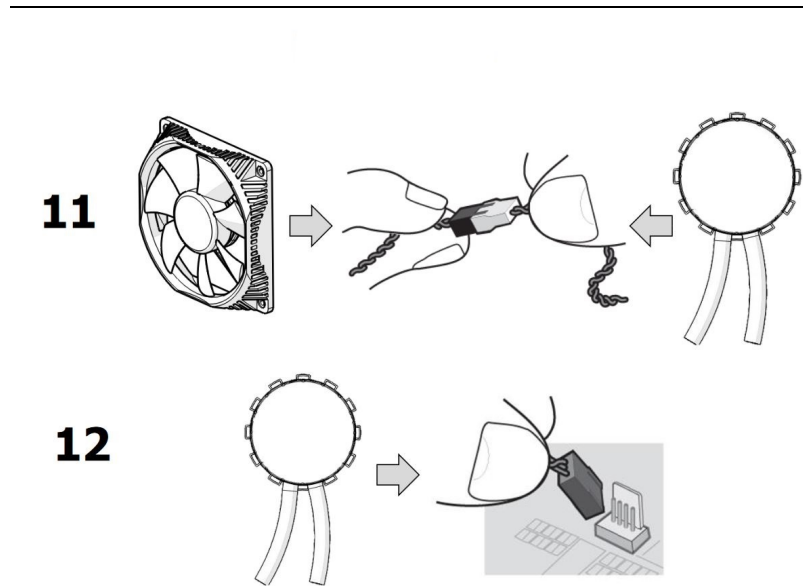
7. Twist reservoir counterclockwise.



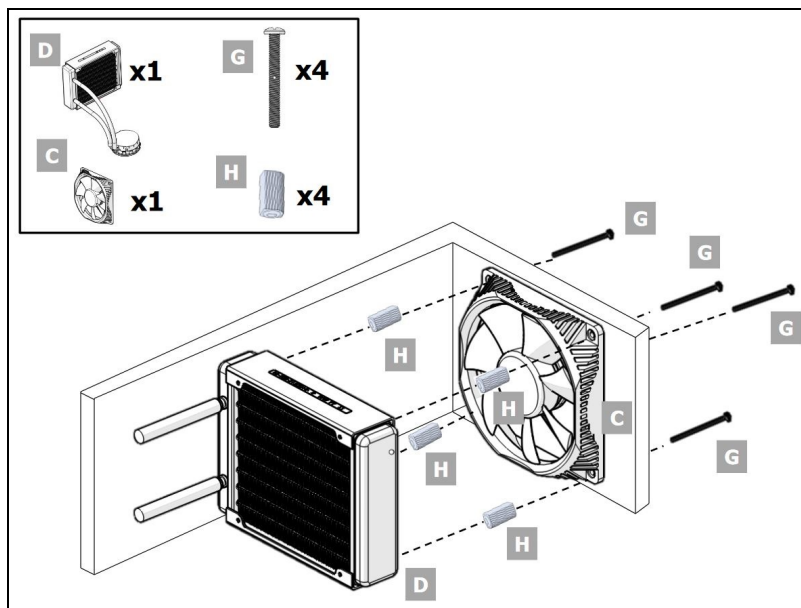
8. Screw reservoir/mounting ring assembly onto motherboard.



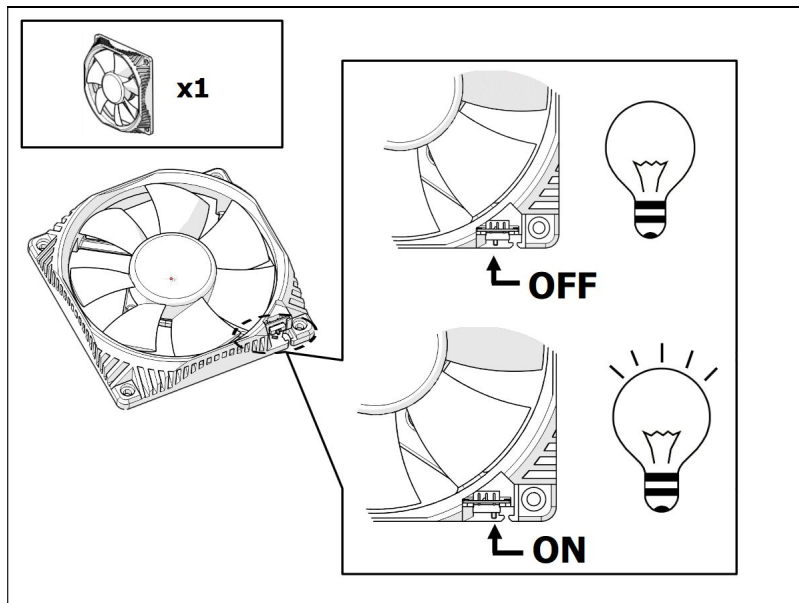
9. Attach cable connector from reservoir to fan assembly.



10. Attach hoses from reservoir.



11. Set switch to ON position if you want the fan to be lit up.



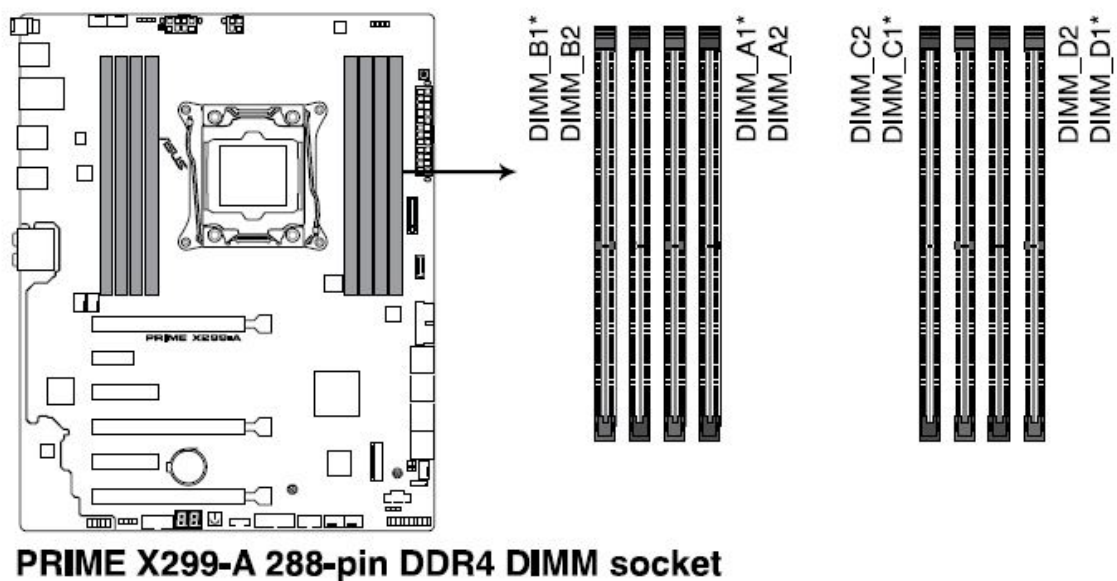
- Do not forget to connect the CPU fan connector! *Hardware* errors can occur if you fail to plug this connector.

System Memory Overview

The motherboard comes with eight DDR 4 (Double Data Rate 4) Quad Inline Memory Modules (DIMM) slots.



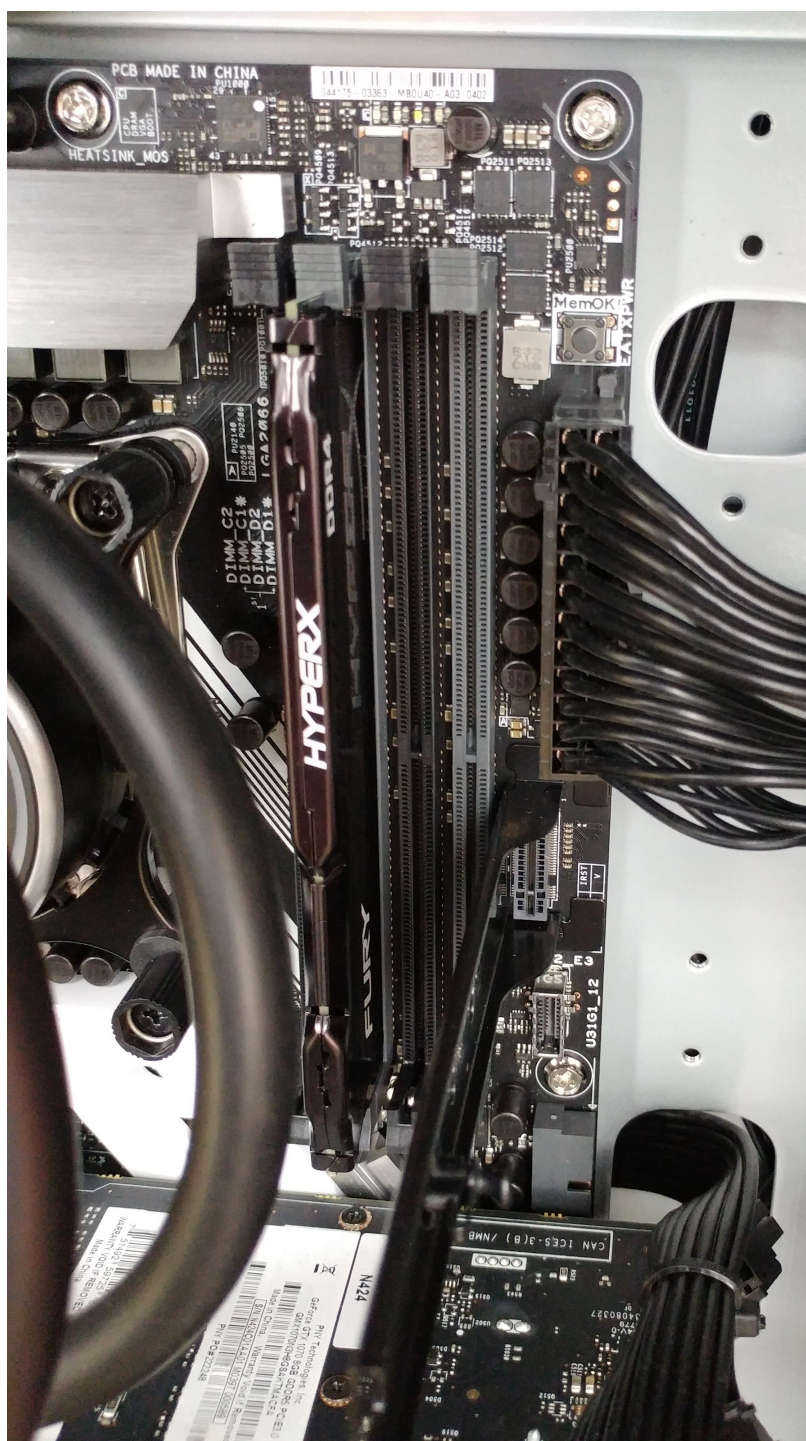
- A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module into the DDR4 slot.



PRIME X299-A 288-pin DDR4 DIMM socket

The Desktop Board supports the following memory and interface:

- Eight 288-pin Double Data Rate 4 (DDR4) Quad Inline Memory Module (DIMM) connectors with gold-plated contacts arranged in four channels
- 4000 (OC)/3600 (OC)/3400 (OC)/3333 (OC)/3300 (OC)/3200 (OC)/3000 (OC)/2800 (OC)/2666 MHz DDR4 non-ECC DIMM support
- Support for quad-channel *memory* interleaving
- Unbuffered, non-registered single or double-sided DIMMs with a voltage rating of 1.4V or less *memory*
- Minimum total system *memory* of 2 GB
- Up to 128 GB maximum total system *memory*



System Memory Configurations

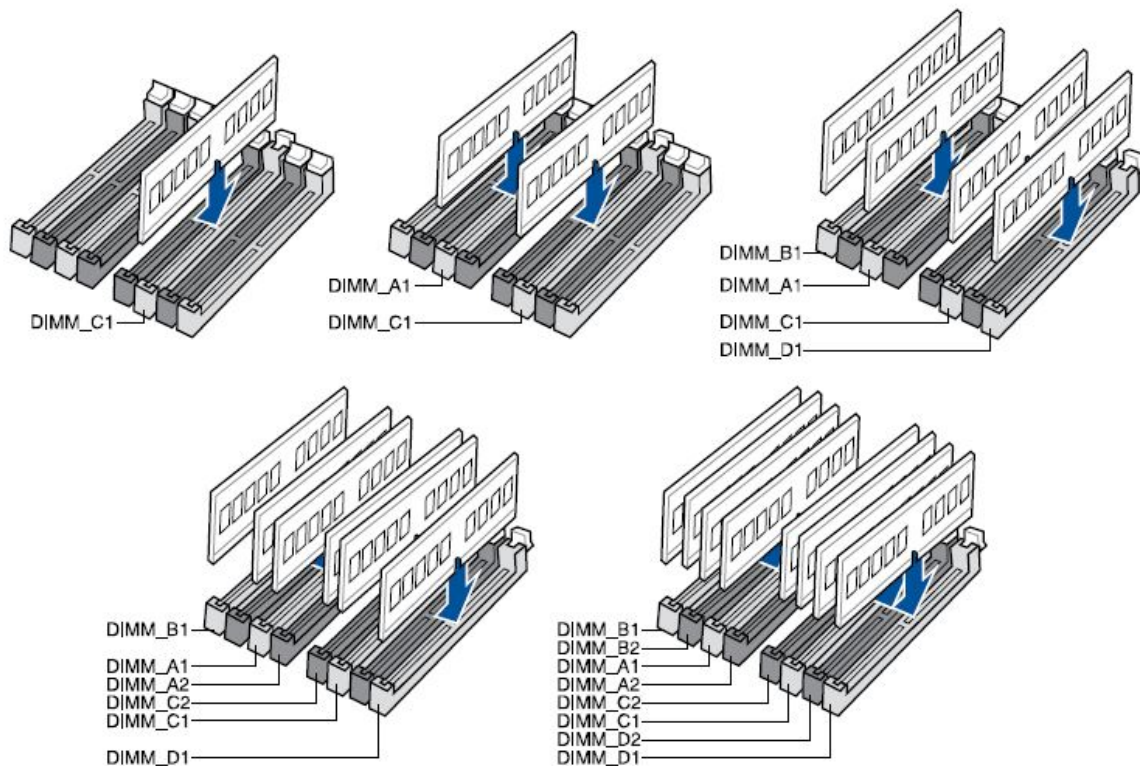
You may install 8 GB, and 16 GB unbuffered and non-ECC DDR4 DIMMs into the DIMM sockets.



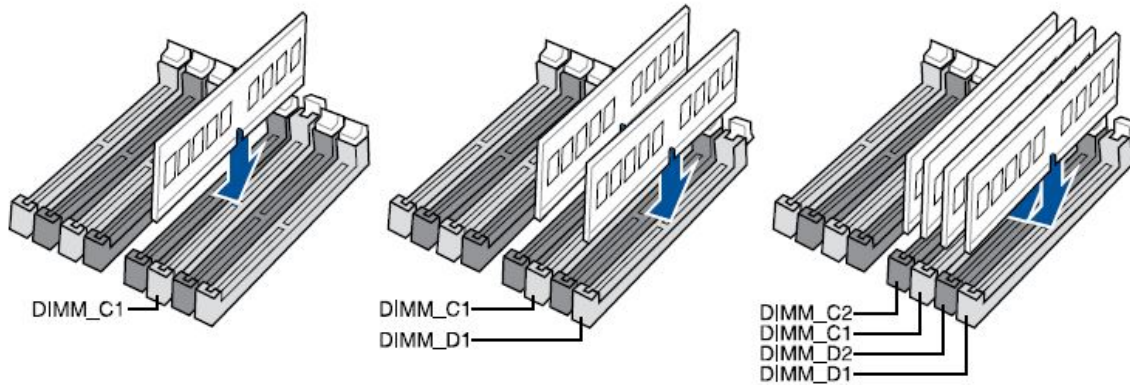
- You may install varying memory sizes in Channel A, Channel B, Channel C, and Channel D. The system maps the total size of the lower-sized channel for the dual channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- According to Intel® CPU spec, DIMM voltage below 1.4 V is recommended to protect the CPU.

The Intel Core i7 processors support the following types of *memory* organization:

- **Intel Core X-series Processors (6-core or above)**



▪ Intel Core X-series Processors (4-core)



- For Intel Core X-Series Processors (4-core), you may install varying memory sizes in Channel C and Channel D. The system maps the total size of the lower-sized channel for the dual-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- For Intel Core X-Series Processors (6-core or above), you may install varying memory sizes in Channel A, Channel B, Channel C and Channel D. The system maps the total size of the lower-sized channel for the quad-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.

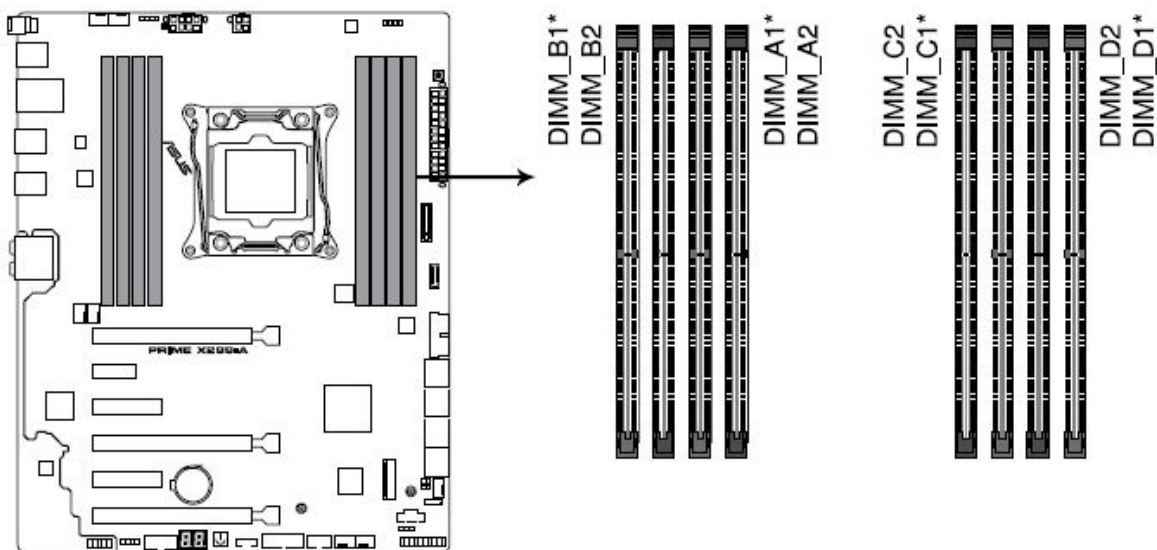
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load (8 DIMMs) or overclocking condition.
- Always install the DIMMS with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with the vendor to get the correct memory modules.

Installing System Memory

Asus Desktop board Prime X299-A has eight 288-pin DDR4 DIMM sockets arranged in four channels (A, B, C, and D).

For optimal *memory* performance:

- Install DIMMs in numerical order (1-8).
- For dual-, and quad-channel operation install matched DIMMs of equal speed and size in each channel.
- If you are installing four or fewer DIMMs, use the lighter coloured sockets.



PRIME X299-A 288-pin DDR4 DIMM socket

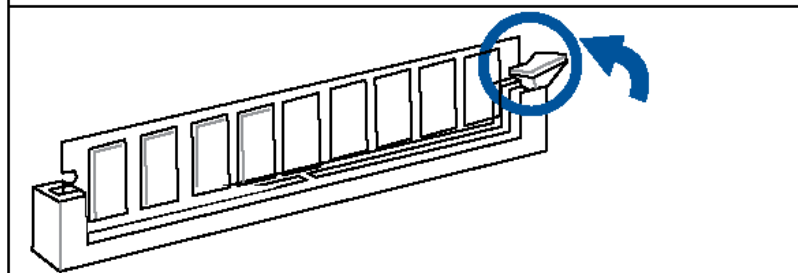
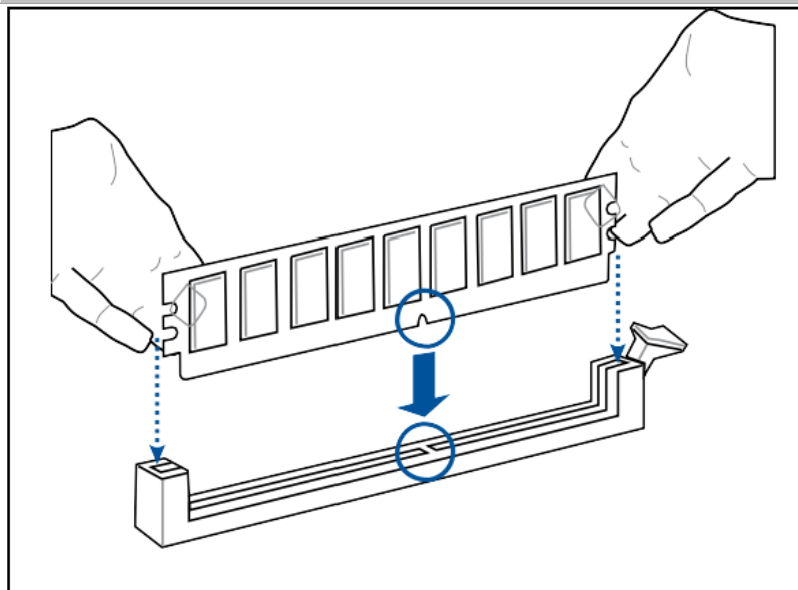
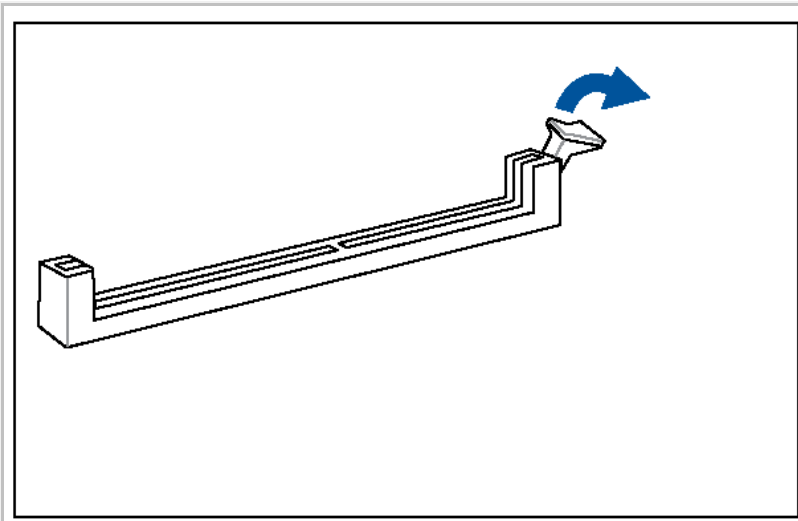


- *Using a DIMM with a voltage rating higher than 1.4 V may damage the processor.*

To install a DIMM, follow these steps:

1. Observe the precautions in "[Before You Proceed](#)".
2. Turn off all *peripheral* devices connected to the computer. Turn off the computer and disconnect the AC power cord.
3. Remove the [computer's cover](#) and locate the DIMM sockets.
4. Make sure the clips at either end of the DIMM socket(s) are pushed outward to the open position.

5. Holding the DIMM by the edges, remove it from its anti-static package.
6. Position the DIMM above the socket. Align the small notch at the bottom edge of the DIMM with the keys in the socket.
7. Insert the bottom edge of the DIMM into the socket.
8. When the DIMM is inserted, push down on the top edge of the DIMM until the retaining clips snap into place. Make sure the clips are firmly in place.
9. Replace the computer's cover and reconnect the AC power cord.



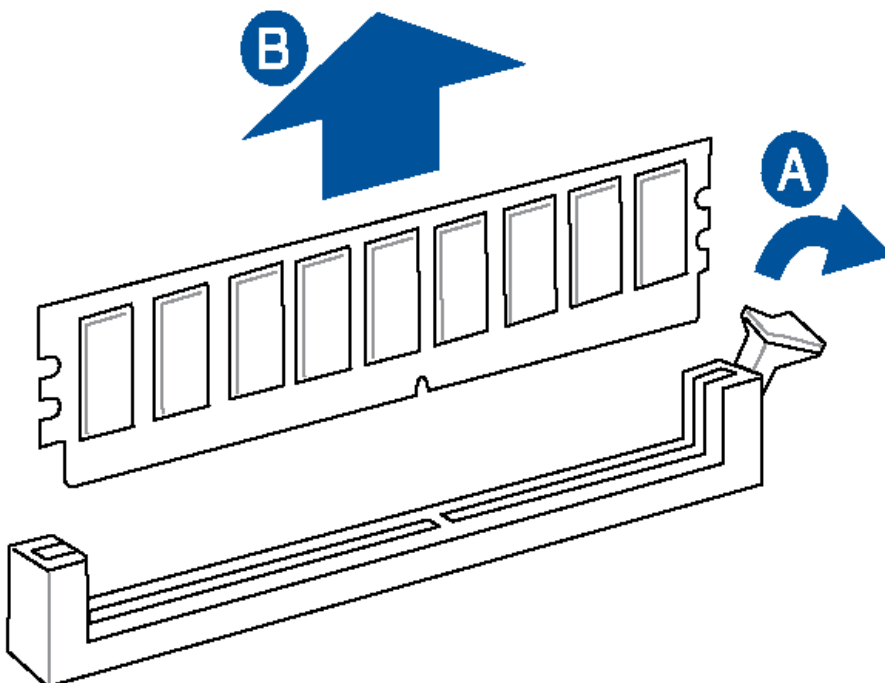
Removing System Memory

To remove a DIMM, follow these steps:

1. Observe the precautions in "[Before You Proceed](#)".
2. Turn off all *peripheral* devices connected to the computer. Turn off the computer.
3. Remove the AC power cord from the computer.
4. Remove the [computer's cover](#).
5. Gently spread the retaining clips at each end of the DIMM socket. The DIMM pops out of the socket.
6. Hold the DIMM by the edges, lift it away from the socket, and store it in an anti-static package.
7. Reinstall and reconnect any parts you removed or disconnected to reach the DIMM sockets.
8. Replace the computer's cover and reconnect the AC power cord.



- Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged if it flips out with extra force.



Hard Drive Overview



Physical Specifications

Capacity	512GB
<i>Interface</i>	PCIe SSD
Form Factor	M.2 2280

Physical Dimensions

Dimensions	22 ± 0.15 mm x 80 ± 0.15 mm x 2.38 mm
Weight	7.2 ± 0.5 g

Environmental Specifications

Operating Temperature	32 °F to 158 °F (0 °C to 70 °C)
<i>Storage</i> Temperature	-67 °F to 185 °F (-55 °C to 85 °C)
Vibration Operating	5.0 gRMS, 10–2000 Hz, 3 axes
Vibration non-operating	4.9 gRMS, 7–800 Hz, 3 axes
MTBF	1.75M hours
Total Bytes Written (TBW)	160

Performance (4KB QD32)

PCMark	180K
Sequential Read MB/s (Q=32, T=1)	2,050
Sequential Write MB/s (Q=32, T=1)	800
Random Read 4 KB IOPS (Q=32, T=4)	170 K
Random Write 4KB IOPS (Q=32, T=4)	134 K

Unpacking and Handling

Hard drives are precision instruments and should be handled with care during unpacking and installation; they can be damaged by rough handling, shock and vibration, or electrostatic discharge (ESD). Be aware of the following precautions when handling your hard drive .

- Do not unpack your hard drive until you are ready to install it.
- Your hard drive is packaged in a static shielding bag. Use this bag to place your hard drive on after unpacking.
- Save the packing materials in case you need to return your hard drive.
- Articles of clothing generate static electricity. Do not allow clothing to come in direct contact with the hard drive or circuit board components.
- Handle the hard drive by the sides only. Avoid touching the circuit board components.
- Do not drop or knock the hard drive.
- Do not stack hard drives or stand your hard drive on its edge.



-
- Your default drive may be a Solid State Drive (SSD). SSD drives have no moving parts and are more robust than traditional Hard Disk Drives. It is still good practice to be gentle with these electronic components. ESD precautions must be taken.
-

Hard Drive Removal



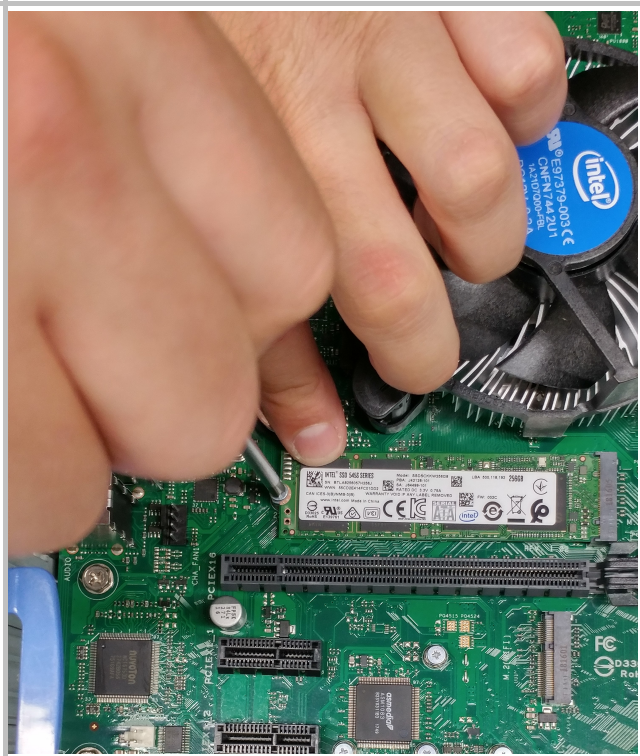
- Please see instruction on cover removal [Removing the Case Cover](#)

- Open the computer case and locate the hard drive. The hard drive is actually an M.2 Solid State Drive (SSD).
- Step 1 - Insert the M.2 card firmly into the M.2 slot ensuring the pins and notches align correctly (parallel to the motherboard). Please note that the motherboard has two M.2 slots available for storage (B keyed card compatible) and one M.2 slot for WiFi, Bluetooth or cellular cards (E keyed card compatible). SSD's must be inserted in one of the two B keyed slots.
- Step 2 - Using the screw that accompanies the replacement SSD, screw the non-keyed end of the M.2 card into the motherboard hole that aligns with the hole in the M.2 card.

Step 1



Step 2



Optical Drive Overview



Features

- 5 1/4" 16X, 130ms, 256kb
- Product Description: Internal *DVD*-Writer
- Colour: Black
- *Interface* : S-ATA
- Dimensions (LxWxH): 14.8 cm x 17.0 cm x 4.2 cm

Specifications

Write Speed	<ul style="list-style-type: none">▪ <i>DVD</i>+R: 24X▪ <i>DVD</i>-R: 24X▪ <i>DVD</i>+RW: 8X▪ <i>DVD</i>-RW: 6X▪ <i>DVD</i>+R(DL): 8X▪ <i>DVD</i>-R (DL): 8X▪ <i>DVD-ROM</i>: 5X▪ CD-R: 48X▪ CD-RW: 24X
Read Speed	<ul style="list-style-type: none">▪ <i>DVD</i>+R: 16 X▪ <i>DVD</i>-R: 16 X▪ <i>DVD</i>+RW: 12 X▪ <i>DVD</i>-RW: 12 X▪ <i>DVD-ROM</i>: 16 X▪ <i>DVD</i>+R(DL): 12 X▪ <i>DVD</i>-R(DL): 12 X▪ <i>DVD-ROM</i>(DL): 12 X▪ CD-R: 48 X▪ CD-RW: 40 X▪ CD-<i>ROM</i>: 48 X

Optical Drive Removal



- Please see instruction on cover removal [Removing the Case Cover](#)

1. Disconnect Optical power and data cables.
2. If there are any screws in the side of the optical drive, they will need to be removed with a Phillips screwdriver.
3. To remove the drive from the assembly, pull the yellow buttons towards yourself.



4. Slide the optical drive out of the assembly.



Software / Operating System

The Desktop Board provides full support for all versions of the following operating systems:

- Microsoft Windows 10 (64-bit and 32-bit editions)
- Microsoft Windows 8 (64-bit and 32-bit editions)
- Microsoft Windows 7 (64-bit and 32-bit editions)

ACPI

ACPI gives the operating system direct control over the power management and Plug and Play functions of a computer. The use of *ACPI* with the Desktop Board requires an operating system that provides full ACPI support.

Updating the BIOS

The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system. The term "BIOS" in this user manual refers to "UEFI BIOS" unless otherwise specified.

BIOS (Basic Input and Output System) stores system hardware settings such as storage device configuration, overclocking settings, advanced power management, and boot device configuration that are needed for system startup in the motherboard CMOS. In normal circumstances, the default BIOS settings apply to most conditions to ensure optimal performance. DO NOT change the default BIOS settings except in the following circumstances:

- An error message appears on the screen during the system bootup and requests you to run the BIOS Setup.
- You have installed a new system component that requires further BIOS settings or update.



-
- Inappropriate BIOS settings may result to instability or boot failure. We strongly recommend that you change the BIOS settings only with the help of a trained service personnel.
-



-
- When downloading or updating the BIOS file, rename it as **X299A.CAP** for this motherboard.
-

The **BIOS** Setup program can be used to view and change the **BIOS** settings for the computer. You can access the BIOS Setup program by pressing the **Delete** key after the **Power-On Self-Test** (POST) *memory* test begins and before the operating system *boot* begins.

There are two modes available to use the BIOS Setup program.

1. EZ Mode - by default the EZ mode screen appears when you enter the BIOS program.

The screenshot shows the ASUS UEFI BIOS Utility in EZ Mode. The interface is dark-themed with blue and white text. At the top, it says 'ASUS UEFI BIOS Utility - EZ Mode' and shows the date '05/23/2017', time '19:42', and language 'English'. Below this, there are several sections: 'Information' (PRIME X299-A, BIOS Ver. 0101, CPU: Genuine Intel(R) CPU 0000 @ 3.30GHz, Speed: 3300 MHz, Memory: 4096 MB (DDR4 2133MHz)), 'CPU Temperature' (37°C), 'CPU Core Voltage' (1.024 V), 'Motherboard Temperature' (30°C), 'DRAM Status' (DIMM_A1: N/A, DIMM_A2: N/A, DIMM_B1: N/A, DIMM_B2: N/A, DIMM_C1: SK Hynix 4096MB 2133MHz, DIMM_C2: N/A, DIMM_D1: N/A, DIMM_D2: N/A), 'SATA Information' (P1: ST3250823AS (250.0GB)), 'Intel Rapid Storage Technology' (On/Off), 'FAN Profile' (CPU FAN, CHA1 FAN, CHA2 FAN, CPU OPT FAN, EXT FAN1, EXT FAN2, EXT FAN3, AIO PUMP), 'CPU FAN' (graph showing fan speed vs temperature), 'EZ System Tuning' (Quiet, Performance, Energy Saving), 'Boot Priority' (UEFI: JetFlashTranscend 4GB 8.07, Partition 1 (3830MB), P0: ST3250823AS (238474MB), JetFlashTranscend 4GB 8.07 (3830MB), IBA CL Slot 00FE v0110), and 'Boot Menu(F8)'. At the bottom, there are navigation buttons: 'Default(F5)', 'Save & Exit(F10)', 'Advanced Mode(F7)|<=>', and 'Search on FAQ'.

Displays the system properties of the selected mode.
Click < or > to switch EZ System Tuning modes

Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis/power fan speed, and SATA information

Selects the display language of the BIOS setup program

Creates storage RAID and configures system overclocking

Enables or disables the SATA RAID mode for Intel Rapid Storage Technology

Displays the CPU Fan's speed. Click the button to manually tune the fans

Loads optimized default settings

Saves the changes and resets the system

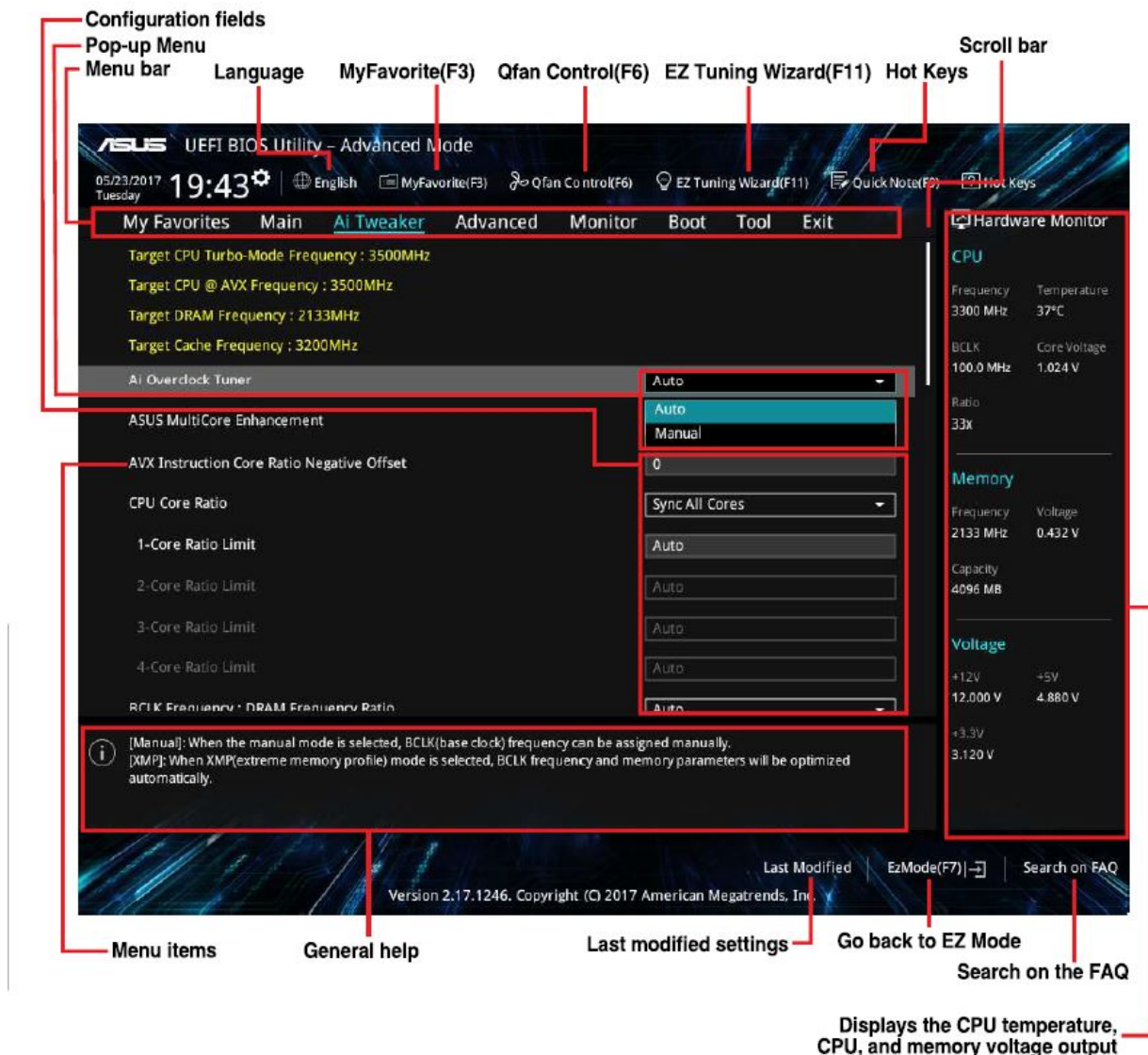
Click to go to Advanced mode

Search on the FAQ

Click to display boot devices

Selects the boot device priority

2. Advanced Mode - to access this mode, click **Exit/Advanced Mode**, then select **Advanced Mode** or press <F7> on your keyboard.



This section tells you how to update the **BIOS** by using one of three different utilities:

1. **Asus Update:** Updates the **BIOS** in a Windows environment.
2. **Asus EZ Flash 3:** Updates the **BIOS** using a **USB** flash drive.
3. **ASUS CrashFree BIOS 3:** Restores the **BIOS** using the motherboard support **DVD** or a **USB** flash drive when the **BIOS** file fails or gets corrupted.

EZ Update

EZ Update is a utility that allows you to update the motherboard BIOS in Windows environment.



- EZ Update requires an Internet connection

Updating the BIOS using the ASUS EZ Flash 3 utility

ASUS EZ Flash 3 allows you to update the BIOS without having to use a bootable floppy disk or an OS-based utility.



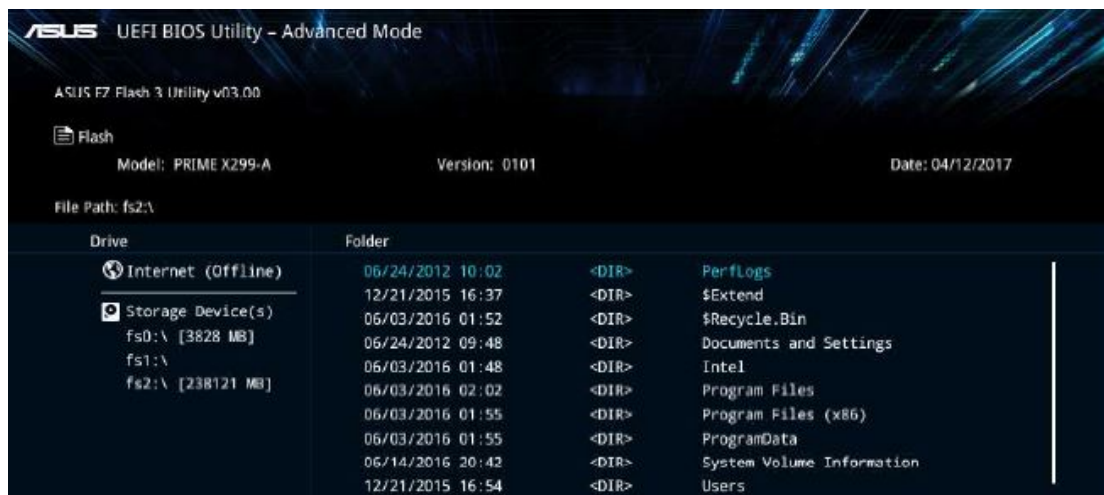
- Before you start using this utility, *download* the latest *BIOS* from the ASUS website at www.asus.com/support.

To use this *BIOS* update method with USB:

1. Enter the Advanced Mode of the *BIOS* setup program. Go to the **Tool** menu to select **ASUS EZ Flash Utility** and then press <Enter> to enable it.
2. Insert the *USB* flash drive that contains the *BIOS* file.
3. Select "by USB"



4. Press <Tab> to switch to the **Drive** field.
5. Press the Up/Down arrow keys to find the *USB* flash drive that contains the latest *BIOS*, and then press <Enter>.
6. Press <Tab> to switch to the **Folder Info** field.
7. Press the Up/Down arrow keys to find the *BIOS* file, and then press <Enter> to perform the *BIOS* update process. Reboot the system when the update process is complete.



- This function can only support devices, such as a **USB** flash drive, with FAT32/16 and single partition.
- Do NOT shut down or reset the system while updating the **BIOS** to prevent system **boot** failure!



- To ensure system compatibility and stability, load the **BIOS** default settings by selecting **Load Optimized Defaults** on the **Exit** menu.

To use this **BIOS** update method with the Internet:

1. Enter the Advanced Mode of the **BIOS** setup program. Go to the **Tool** menu to select **ASUS EZ Flash Utility** and then press <Enter> to enable it.
2. Select "by Internet"



3. Press the Left/Right arrow keys to select an Internet connection method and then

press <Enter>.



4. Follow the onscreen instructions to complete the update.
5. Reboot the system when the update process is done.



-
- To ensure system compatibility and stability, load the *BIOS* default settings by selecting **Load Optimized Defaults** on the **Exit** menu.
-

Restoring the BIOS with the ASUS CrashFree BIOS 3 Utility

The ASUS CrashFree *BIOS* 3 utility is an auto recovery tool that allows you to restore the *BIOS* file when it fails or gets corrupted during the updating process. You can restore a corrupted *BIOS* file using the motherboard support *DVD* or a *USB* flash drive that contains the *BIOS* file. The latest *BIOS* can be downloaded from www.asus.com/support.

To recover the *BIOS*:

1. Turn on the system.
2. Insert the motherboard support *DVD* or the *USB* flash drive containing the *BIOS* file.
3. The utility automatically checks the devices for the *BIOS* file. When found, the utility reads the *BIOS* file and enters the ASUS EZ Flash 3 utility automatically.
4. The system requires that you enter the *BIOS* Setup to recover *BIOS* settings. To ensure system compatibility and stability, we recommend that you press <F5> to load the default *BIOS* values.



-
- Do NOT shut down or reset the system while updating the *BIOS* to prevent system *boot* failure!
-

Configuring for RAID



- *Intel Rapid Storage Technology requires a Microsoft Windows 10, Microsoft Windows 8, Microsoft Windows 7, Microsoft Windows Vista or Microsoft Windows XP operating system and SATA hard drives and supports RAID 0, RAID 1, RAID 10, and RAID 5.*

RAID Definitions

RAID 0 (Data striping)

RAID 0 optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disk drives perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and **storage**. Use of two new identical drives is required for this setup.

RAID 1 (Data mirroring)

RAID 1 copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management **software** directs all applications to the surviving drive as it contains a complete copy of the data on the other drive. This **RAID** configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 5

RAID 5 stripes both data and parity information across three or more disk drives. Among the advantages of **RAID 5** configuration are better hard drive performance, fault tolerance and higher **storage** capacity. The **RAID 5** configuration is best suited for transaction processing, relational **database** applications, enterprise resource planning and other business systems. Use a minimum of three identical hard drives for this setup.

RAID 10

RAID 10 is data striping and data mirroring combined without parity having to be calculated and written. With the **RAID 10** configuration you get all the benefits of both **RAID 0** and **RAID 1** configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Intel Rapid Storage Technology in UEFI BIOS

To enter the Intel Rapid Storage Technology in UEFI BIOS:

1. Enter the BIOS Setup during POST.
2. Go to the Advanced menu, select PCH Storage Configuration, then press <Enter>
3. Set the SATA Mode Selection Item to [Intel RST Premium With Intel Optane System Acceleration (RAID)].

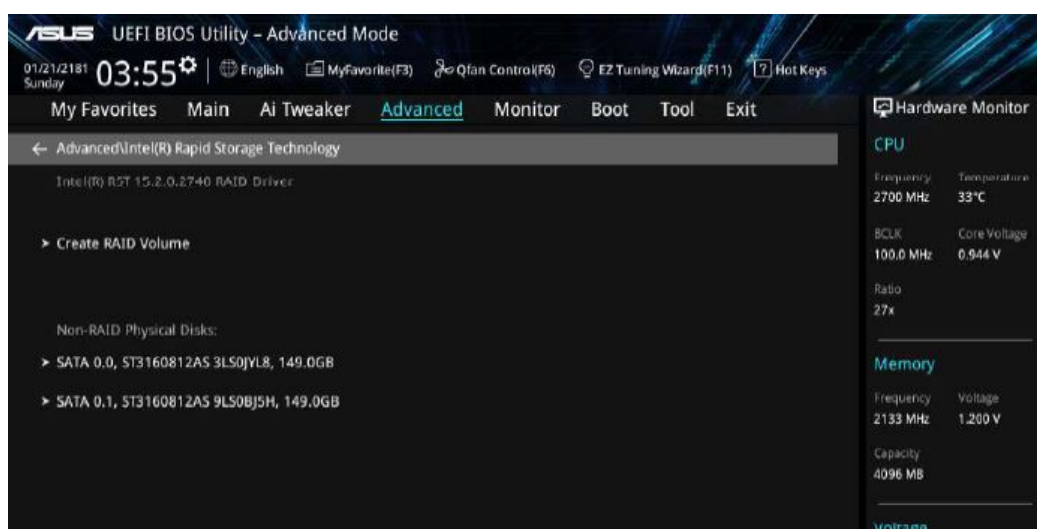


*If you are using PCIe storage devices, make sure you enable all the **PCIe Storage RAID Support** items.*

4. Go to the Boot menu, select CSM (Compatibility Support Module), select Launch CSM, then set the item to [Disabled].
5. Save your changes and exit the BIOS Setup, then enter the BIOS Setup again.
6. Go to the Advanced menu, select Intel (R) Rapid Storage Technology, then press <Enter> to display the Intel Rapid Storage Technology menu.

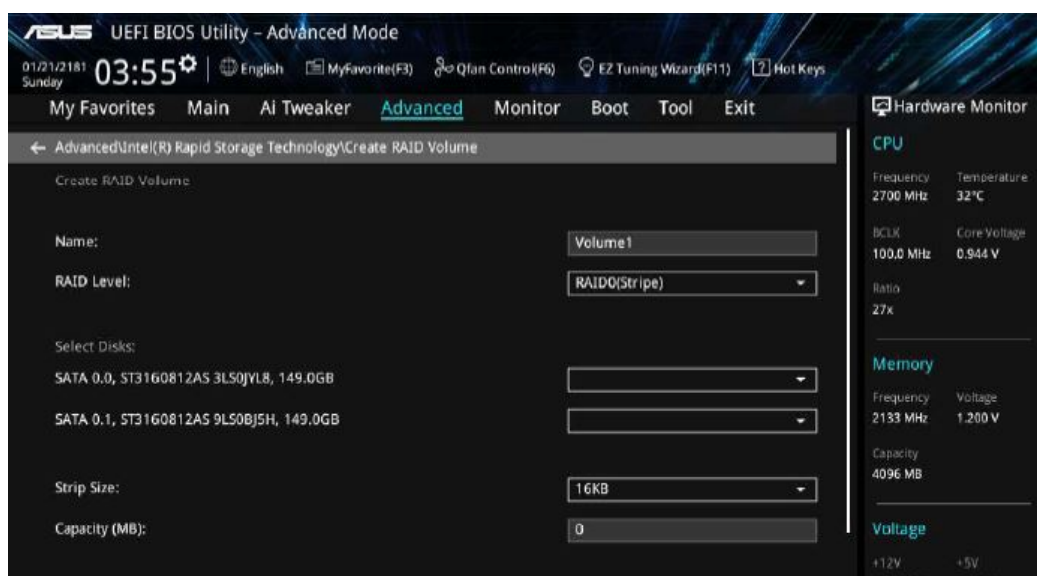


Due to chipset limitations, when SATA ports are set to RAID mode, all SATA ports run at RAID mode together.



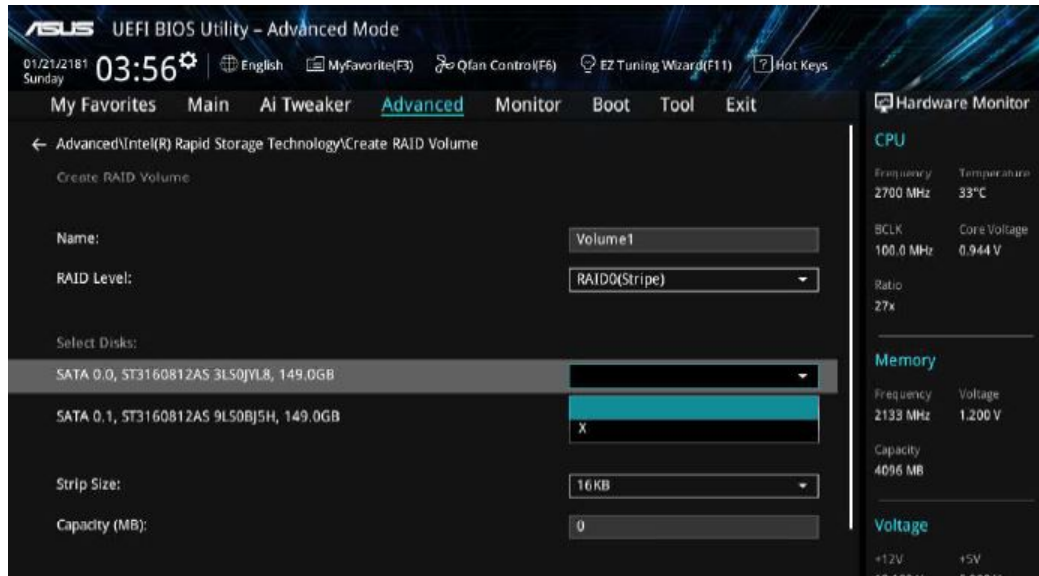
Creating a RAID Set

1. From the Intel Rapid Storage Technology menu, select **Create RAID Volume** and press <Enter>. The following screen appears.



2. When the **Name** item is selected, enter a name for the RAID set and press <Enter>.

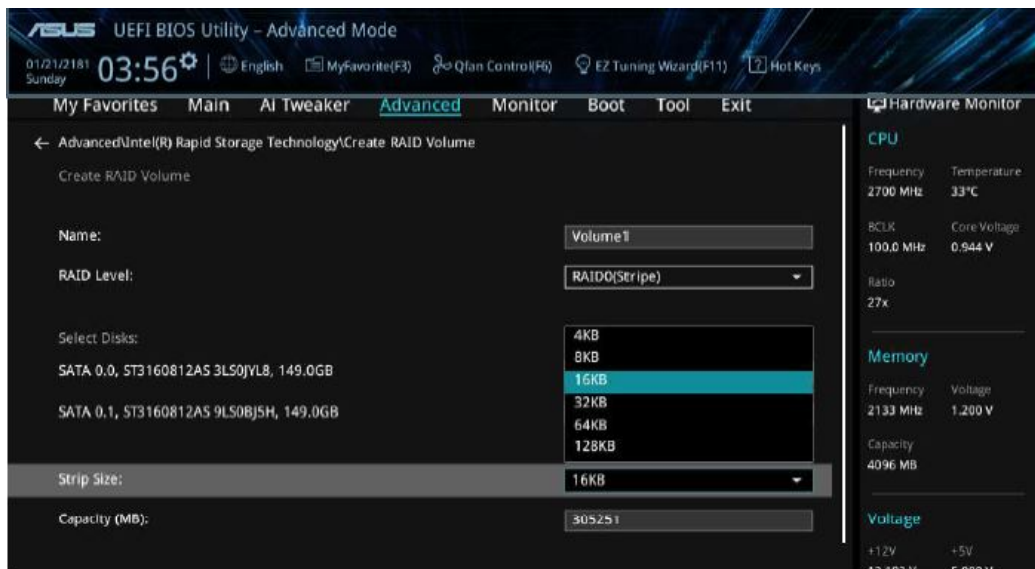
- When the **RAID Level** item is selected, press <Enter> to select the RAID level to create, and then press <Enter>.
- Under **Select Disks**, press <Enter> and select **X** for the disks you want to include in the RAID Set.



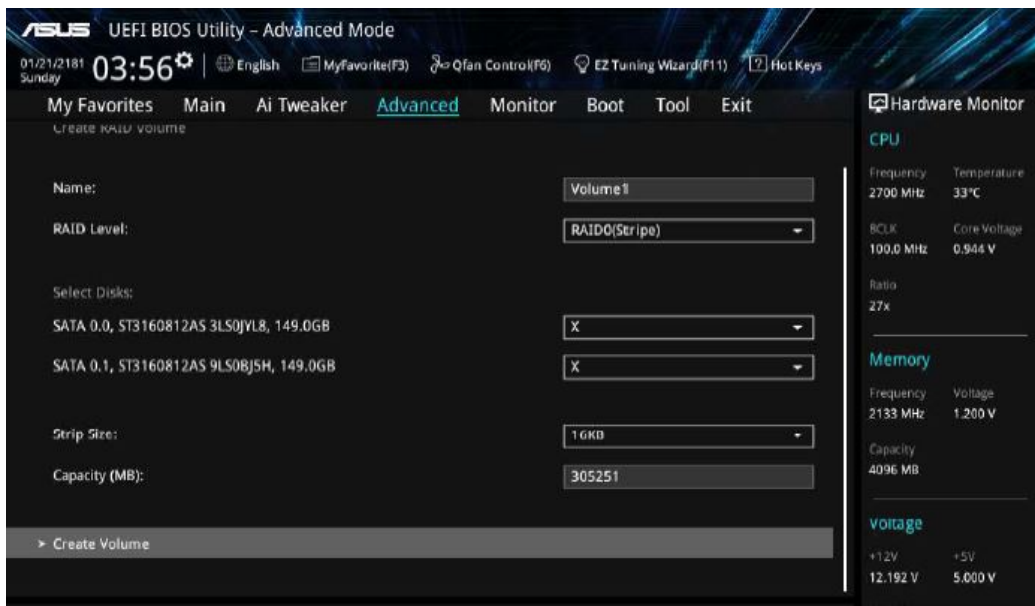
- When the Strip Size item is selected, press <Enter> to select strip size for the RAID array (for RAID 0, 10 and 5 only), and then press <Enter>. The available strip size values range from 4KB to 128KB. The following are typical values:
 - RAID 0: 128 KB
 - RAID 10: 64 KB
 - RAID 5: 64 KB



We recommend a lower strip size for server systems, and a higher strip size for multimedia computer systems used mainly for audio and video editing.



- When the **Capacity (MB)** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- When the **Create Volume** item is selected, press <Enter> to create the RAID volume and return to the Intel Rapid Storage Technology menu.



How to Place a Service Call

Northern Micro provides support for your Spirit system from coast to coast. This section features our main service calls procedures.

Via telephone

Customers can contact our National Call Centre at **1-800-563-1007 (extension 241)**. Our regular business hours are Monday to Friday from 7:30AM-5:00PM.

Via the Internet

You are also invited to use our self-serve services on the Web. To place your service call, please go to www.northernmicro.com.

Via our Portal

Service calls can also be placed via our portal. Access to the portal can be requested by contacting PortalRequest@nmicro.ca.

General procedures:

To speed-up the process, our bilingual call coordinators will ask you for:

- product type and serial number;
- problem description;
- address, phone numbers, etc.

Once your work order is registered, a technician will contact you within the next hour during regular business hours.

Your dedicated technician will make a diagnostic and will offer suggestions. He or she will also determine if the problem is *software* or *hardware* related. If the problem is related to *hardware*, a technician will be deployed on site to solve the problem. If the problem is related to *software* and a technician is deployed on site, some charges may apply. Please note that most problems are solved over the phone. In either case, the technician will communicate with the client to confirm the time of the visit.

Replacing CMOS Battery

When you turn your computer off, the CMOS chip stores information about date and time and configuration details necessary to start and run the system. A small button cell (coin) battery provides the power for the CMOS chip memory.


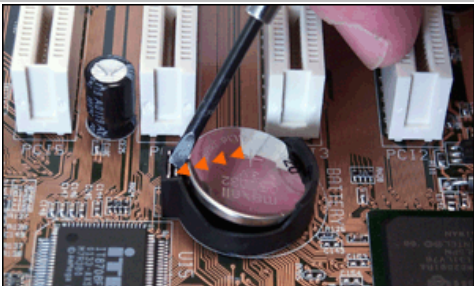
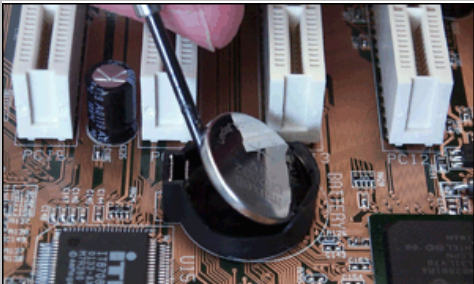
Replacement batteries are available from Northern Micro's service department. After you replace the battery, you must reset the date and time and restore the configuration settings. To do so, run the setup utility.

See BIOS Setup Program to find out how to run the setup utility.

Generally CMOS batteries last for about five years. Here are some signs that your CMOS battery needs to be replaced.

1. **Invalid configuration** will appear on your screen.
2. **Run Setup** appears on your screen.
3. **Press F1 to continue** appears on your screen.
4. **Invalid drive specification** appears on the screen after you've pressed F1.
5. **Clock Error** or **Clock Message** appears on your screen.
6. The clock on the computer loses time.
7. The computer is constantly showing the wrong date

To replace the CMOS battery, push the adjacent retention clip and the battery will pop out of the socket.

The battery is held by a retention clip.	Press the clip as shown.
	
and gently ease the battery out of the socket.	
	

Install the replacement battery (CR2032 button cell) by pushing it into the socket until it snaps into place.

Troubleshooting

1. [No display when power on](#)
2. [Can't enter OS](#)
3. [Power supply does not work well](#)
4. [The PC works very slowly](#)
5. [CPU fan is too noisy](#)
6. [Freeze frequently](#)
7. [Can't connect to the Internet](#)
8. [4GB of Memory Installed, Computer only Recognizes 3.0GB or less](#)
9. [Audio is abnormal](#)
10. [How to have dual video output](#)
11. [BIOS Errors](#)

[No display when power on](#)

Solution

Make sure all cables are connected well and the power is on:

- Clear the *CMOS*
- Keep the necessary components (a CPU, a *memory* module, and a graphic card) on board to test:
- If the PC does *POST* well with the minimum system components:
 - Please plug in the other components one by one to find out which one may cause this problem.
 - If the PC still cannot *POST* at all:
 - The power LED on the motherboard is on and the CPU fan works well, please connect the speaker connector to check if there are any beeps
 - *Memory* issue: Beep (1 long 2 short)
 - Clean the golden contacts of the *memory* module
 - Clean the *memory* slots
 - Leave only one *memory* module to test
 - If convenient, please change different *memory* modules to test again
 - Graphics card issue: Beep (1 long 3 short)

- Clean the golden contacts of the graphics card
- Clean the graphics card slots
- Try to test the onboard graphics card if there is onboard video integrated
- If convenient, please change to a different graphic card to test again
- CPU (processor) issue: Beep (5 short)
 - Check whether the CPU is in the motherboard manufacturer's CPU support list
 - Check whether there is any damage to your CPU or CPU socket.
 - Check whether the CPU fan is correctly connected
 - Check whether the ATX_12V power cable is connected well
 - If possible try to test with another CPU
- The power LED on the motherboard is off and the CPU fan does not work well
 - Check the power pin
 - Check the power supply, try exchanging the power supply for another good one

Cannot enter OS

Solution

- During *POST*
 - Un-plug any newly added devices to see if the issue disappears.
 - Keep the necessary components (a CPU, a *memory* module, and a graphic card) on board to test
 - If the problem is solved with minimum system *hardware*, please add the devices one by one and find out which part is at fault
 - If the problem still remains with minimum system *hardware*, please contact your Service Center
- During Windows LOGO loading
 - If the PC can enter safe mode successfully, please enter OS safe mode and uninstall the newly installed driver or *software*
 - If the PC cannot enter safe mode, please try re-installing the OS. Before re-installing, please back up the important data first.

Power supply does not work well

Solution

- Different areas have different voltage supplies, please check the voltage selector on

the power supply (115v/230v).

- The power cable works fine: When power is on, the power LED on the motherboard is on:
 - Can *boot* up via the power pin on the motherboard, please check if all the *hardware* devices are connected well.
 - Can't *boot* up via the power pin, please contact your Service Center.
- When power is on, the power LED on the motherboard is still off: If convenient, please test the power supply in another PC which is working fine.
- The power cable is faulty, please change the power cable to check if this might be the problem.

The PC works very slowly

Solution

- Before entering the *Operating System*
 - Hangs during *POST*, try to determine which device is always being searched when the PC hangs:
 - Take off the unnecessary device to see if that speeds up the PC.
 - Change the *hardware* one by one
- Hangs at the Windows Login
 - Enter safe mode to see if the issue is still evident
 - Re-install the drivers
 - Re-install a new "clean" *Operating System*
- After entering the OS, it takes a long time to see the desktop
 - Click "Start"—"Run", input "msconfig", enter "System Configuration Utility"—"Startup", cancel the unnecessary *boot* up items
 - Check if caused by any incompatible *software*
 - Please optimize the system
- Only runs slowly when using some special *software*
 - Check if the system configuration fulfils the minimum requirement of the *software*
 - End the process which takes up the most CPU usage
 - Please optimize the system
- Only runs slowly when connect to the *internet*
 - Change the *network* cable to see if the speed changes
 - Scan for any *virus*
 - Please optimize the system

- An abnormally high temperature causes the slow speed
 - Check the fan settings in the *BIOS*
 - Improve the heat transfer conditions
 - Please optimize the system

CPU fan is too noisy

Solution

- Check if the CPU fan is damaged and whether the fan is well connected to the motherboard
- Please clean the CPU fan since this problem may be caused by dust. Please put on some CPU lube if necessary
- Please check if the CPU fan always runs at a high speed
- Check if the settings in the *BIOS* is correct
- Please check if the problem only appears when the CPU load is high.

Freezes frequently

Solution

Freeze/ Hang during POST

- If some new *hardware* has been installed, please un-plug the new *hardware* for a test
- If there is no new *hardware* added, please only keep the necessary components to have a check

After POST and before entering OS

- If you could enter safe mode successfully, please enter safe mode to un-install the drivers and the *software*
- If not, please re-install a new clean OS

After entering OS

- Freezes/Hangs frequently and unpredictably
 - If the Temperature is abnormal, please check the CPU temperature and the heat transfer of the chassis.
 - If the temperature is OK, please scan your PC for any *virus*
- Freezes/Hangs when running certain *application* s or games
 - Please update by loading any new patch available from the corresponding website

Cannot connect to the Internet

Solution

- Check the LAN settings in the *BIOS*
- Install a new clean OS and install the chipset and LAN drivers *download* ed from the official website
- The *network* adapter might not be recognized in Device Manager
 - If there is yellow question mark or exclamation mark before the *network* card in the Device Manager, please re-install the OS and drivers. If the problem persists, please contact our service center.
 - If there is no yellow question mark or exclamation mark before the *network* card:
 - In Control Panel/*Network* Connections/Local Area Connection, the *network* cable is shown as "un-plugged(X)", please check the *network* cable/router/switch/ *modem* /other *network* peripherals and *network* port, or plug *network* cable to another system
 - In Control Panel/*Network* Connections/Local Area Connection is disabled (grey), please enable(right click and choose "Enable") it for a test. If the problem persists, please turn off the *firewall* , search for and kill any *virus* , reinstall the OS and drivers. If the problem still exists, please contact our service center
 - In Control Panel/*Network* Connections/Local Area Connection is shown as "Limited or no connectivity" (yellow exclamation mark)", please do some troubleshooting using the following steps:
 - Right click and choose "repair"
 - Un-plug and re-plug the *network* cable
 - Check *server* DHCP settings, IP configuration, seek advice from your *Internet* Service Provider
 - Restart
 - Re-connect the *network* or access IP
 - Skip the router and connect to the *Modem* directly
 - Turn off other computers in the same *network* to avoid any IP conflicts
- There is no abnormal situation in Control Panel/*Network* Connections/Local Area Connection, please do some troubleshooting using the following steps:
 - Try to access the IP or Static IP automatically
 - Un-plug and re-plug the *network* cable
 - Check *server* DHCP settings, IP configuration, seek advice from ISP
 - Restart
 - Re-connect the *network* or access IP

- Turn off other computers in the same *network* to avoid any IP conflicts
- Check the MAC address (You can follow the commands: "Start"—"All Programs"—"Run",
- Please input "cmd", and then input "ipconfig/all" to check MAC address
- If the *network* card is not recognized in Device Manager, please contact our service center

4GB of Memory Installed, Computer only Recognizes 3.0GB or less

Solution

- If you installed a total of 4GB of *memory*, the system will detect less than 4GB of total *memory* because of address space allocation for other critical functions, such as:
 - System *BIOS* (including motherboard, add-on cards, etc...)
 - Motherboards resources
 - *Memory* mapped I/O
 - configuration for AGP/PCI-Ex/PCI
 - Other *memory* allocations for PCI devices
- Different onboard devices and different add-on cards (devices) will result in a different total *memory* size.
 - e.g. more PCI cards installed will require more *memory* resources, resulting in less free *memory* for other uses.
- On an SLI system, since *PCI Express* graphic cards will occupy around 256MB, another 256MB will be occupied after you install a 2nd *PCI Express* graphic card. Hence, only 2.75GB of *memory* is left if two SLI cards are installed while 3.0GB *memory* is left with one graphic card.
- This limitation applies to most chipsets and to Microsoft Windows 32-bit version operating systems.
- With a Windows 32-bit version of the *operating system*, we recommend that you have less than 3GB of total *memory* installed. If more than 3GB *memory* is required for your system, then these two conditions must be met:
 1. The *memory* controller which supports *memory* swap functionality must be used. Chipsets later than Intel 975X, 955X, Nvidia NF4 SLI Intel Edition, Nvidia NF4 SLI X16, and AMD K8 CPU architecture support *memory* swap function.
 2. Installation of a Windows 64-bit *Operating System*, which can address more than 4GB of *memory*.

Audio is abnormal

Solution

Abnormal input/ *output*

- There is a yellow question mark before the audio device in Device Manager
 - First please install the patch "MICROSOFT UAA Function Driver for High Definition Audio" for the *Operating System*
 - Re-install the audio driver
- There is a yellow exclamation mark before the audio device in Device Manager
 - First un-install all the drivers related to the audio device and install the patch "MICROSOFT UAA Function Driver for High Definition Audio" for the *Operating System*
 - Restart the PC, if the problem still persists, please recover the system or re-install the *Operating System* and load the latest audio device driver
- The audio device could not be recognized in Device Manager
 - Load the default *BIOS*, making sure the onboard audio function is enabled in *BIOS*
 - Re-install a new clean *Operating System*
- No *output* or input from the rear panel
 - Adjust the audio settings in the Control Panel
 - Update the Audio driver
 - Change the Audio device, such as the microphone, earphone or speaker
- No *output* or input from the front panel
 - Please check if there is any *output*/ input from the rear panel, if not, please do some troubleshooting
 - Change to [*AC97*] mode in the *BIOS* (if the front panel module is *AC97* compliant)
 - Adjust the audio settings in the control panel
 - Check if the front panel is connected correctly
 - Try swapping for another chassis front panel connector
- **Abnormal Sound:** Sound is low
 - Adjust the audio settings in the control panel
 - Close some sound resources which have not been used for a while, such as SPDIF, MIC
 - Update the audio driver
 - Change the Audio device, such as the microphone, earphone or speaker

▪ Sound with Noise:

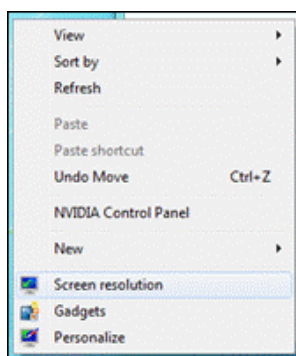
- If caused by a magnetic field, please move the computer away from the field to see if that is the problem
- Adjust the audio settings in the control panel
- Close some sound resources which have not been used for a while, such as SPDIF, MIC
- Update the audio driver
- Change the Audio device, such as the microphone, earphone or speaker

How to have dual video output

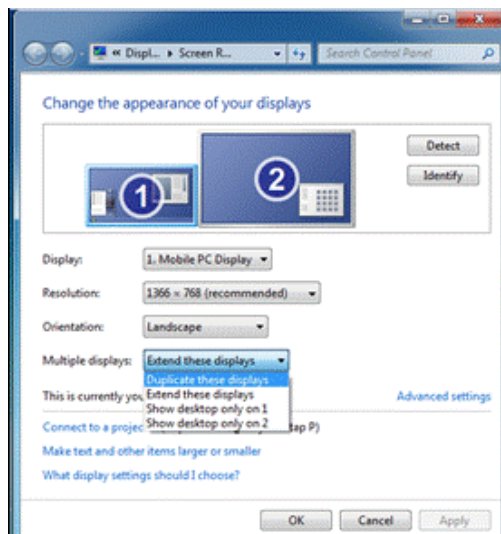


- Our Desktop PCs commonly support VGA, *DVI*, DisplayPort and HDMI ports. The display *output* ports may vary with different models. If you are having issues building dual display *output* or other problem, please contact our service desk for further troubleshooting. Please make sure to describe the symptom in detail.

1. Connect one end of the cables to the two different monitors and the other ends to the video ports on the back of the computer. If the connections of your monitors do not match the video connections of your computer, you may require a cable adapter that allows you to get the video signal to the *monitor*. At the bottom of this page there are photos of the various cables and some popular cable adapters.
2. How to set the *output* mode in system:
 - Connect two monitors to your computer and connect the power cords to the monitors for the system to detect automatically. If only one *monitor* receives the signal, please right click on desktop and select Screen resolution.



Select the **Duplicate these displays** in **Multiple displays** scroll down list:



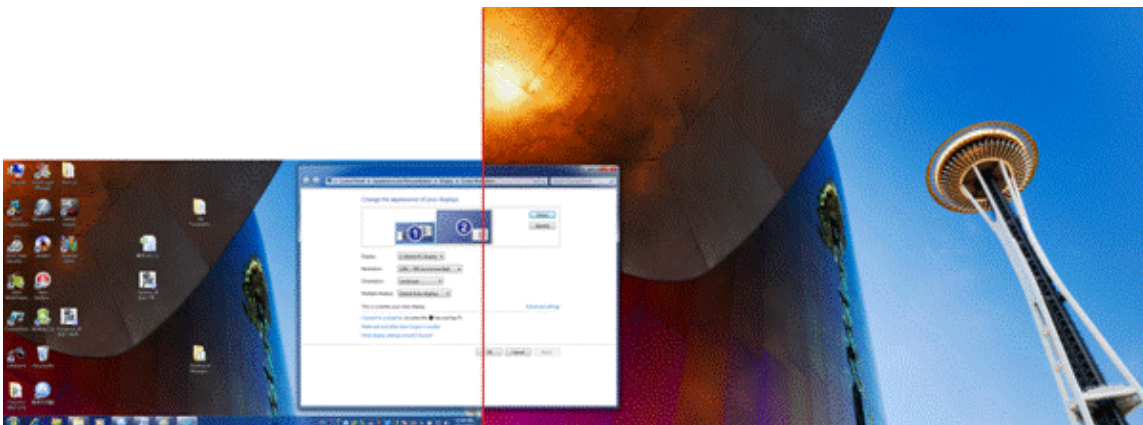
Then it will show the same desktop on your monitors. The maximum resolution is limited by the highest resolution support of your monitors.

If you select "Extend these displays", it will allow you set the resolution of each *monitor* separately.

In this mode, it allows you to show different information on two monitors. Just drag the window out of the current desktop then you will see it in the second desktop.

Display on *Monitor 1*:

Display on *Monitor 2*:



VGA to VGA



DVI-D* to *DVI-D



HDMI to HDMI



DisplayPort to DisplayPort



***DVI-I* to VGA**

***DVI* to HDMI**



BIOS Errors

BIOS errors will cause beeping sounds when the computer is trying to POST. The quantity and duration of the beeps indicate where the error occurs. The following table gives the most common beep patterns.

BIOS Beep	Description	Troubleshooting Techniques
One short beep	No keyboard detected Graphics Card detected	<ul style="list-style-type: none">• Plug in keyboard, if not already done.• Remove and reinsert keyboard's USB connection to computer.• Try plugging keyboard into a different USB port on the system.
Two short beeps	When using Asus Crashfree to recover BIOS, the new BIOS is successfully recognized	<ul style="list-style-type: none">• No troubleshooting required.
One continuous beep followed by two short beeps then a pause (repeated)	No RAM memory detected	<ul style="list-style-type: none">• Reseat the RAM modules.• Try installing the RAM in different DIMM slots.• Try using a different RAM module.
One continuous beep followed by three short beeps	No graphics card or integrated graphics detected	<ul style="list-style-type: none">• Ensure that the graphics card is installed and seated correctly in the first PCIe slot. Reseat if needed.• Check to see if the graphics card requires extra power directly from the power supply. Refer to Graphics card literature.
One continuous beep followed by four short beeps	Failure of hardware component	<ul style="list-style-type: none">• Call Northern Micro for support.

TPM

TPM (Trusted Platform Module) is an integrated chip on the motherboard that stores keys, passwords and digital certificates. It is specifically designed to enhance platform security above-and-beyond the capabilities of today's **software** by providing a protected space for key operations and other security critical tasks. The information stored is typically much more resistant to attacks; both **software** and theft. **TPM** protects encryption and signature keys at their most vulnerable stages i.e operations when the keys are being used unencrypted in plain-text form. Access to data could be denied if the **boot** sequence is not as expected making email, secure web access and data protection much more secure.

Systems with TPMs offer improved, **hardware** -based security in numerous applications, such as file and **folder** encryption, local password management, S-MIME e-mail, VPN and PKI authentication and wireless authentication for 802.1x.

How do TPMs compare with smart cards or biometrics?

Smart cards and/or biometrics are complementary to the **TPM**, which is considered a fixed token that can be used to enhance user authentication, data, communications, and/or platform security. A smart card is a portable token traditionally used to provide more secure authentication for a specific user across multiple systems, while biometrics are providing that functionality in an increasing number of systems. Both technologies can have a role in the design of more secure computing environments.

Can the Trusted Platform Module control what software runs?

No. There is no ability to do this. The subsystem can only act as a 'slave' to higher level services and applications by storing and reporting pre-runtime configuration information. Other applications determine what is done with this information.

How does Microsoft's BitLocker technology relate to the TPM

Microsoft BitLocker™ Drive Encryption is designed to make use of a Trusted Platform Module (**TPM**) 1.2 to protect critical system files and user data and to help ensure that a computer running Windows Vista has not been tampered with while the system was offline.

Is the TPM required for BitLocker?

For BitLocker™ to make use of a **TPM**, it must be a version 1.2. While it is possible to use BitLocker™ without a **TPM** by storing the keying material on a **USB** flash drive, this is not the preferred customer configuration, nor is it expected to be typical usage due to the cost and manageability challenges associated with this mode of use.

Warning of Potential Data Loss

Take precautions to mitigate the chance of data loss. Data encrypted by any program utilizing the Trusted Platform Module (*TPM*) may become inaccessible or unrecoverable if any of the following occurs:

- **Lost Password:** Loss of any of the passwords associated with the *TPM* will render encrypted data inaccessible. No password recovery is available.
- **Hard Drive Failure:** In the event of a failure of a hard disk (or other *storage* media) that contains encrypted data, an image of the hard disk (or other *storage* media) must be restored from backup before access to encrypted data may become available. The owner/user should backup the system hard disk on a regular basis.
- **Motherboard Failure:** In the event of a platform failure and/or replacement of the motherboard, recovery procedures may allow migratable keys to be recovered and may restore access to encrypted data. All non-migratable keys and their associated data will be lost.
- **Loss of Trusted Platform Module Ownership:** Trusted Platform Module Ownership/contents may be cleared (via a *BIOS* switch) to allow for the transfer of a system to a new owner. If *TPM* ownership is cleared, either intentionally or in

Introduction to Environmental Program

Northern Micro, in an effort to become more environmentally conscious has embarked on a number of programs over the years that pertain to environmental stewardship and comply with applicable laws and restrictions. These programs guide the organization to develop products that safely reduce or eliminate environmentally hazardous materials, promote a "reuse and recycle" End of Life Management model and improve energy efficiency.

At Northern Micro we strive for continuous improvement of our environmental system by incorporating the best possible practices through our waste management and IT products recycling initiatives.

We understand that the achievement of reducing the amount of pollution and waste into our natural environment must rely, to a large extent, on each individual member of the corporate team. As such, all employees, with the full support of management, contribute to the goal of reducing, reusing and recycling our products and the waste we produce.

In this regard, Northern Micro also works with committed partners that exhibit a focus on Sustainable Development and Green procurement. The following are some organizations and programs that promote safe Environmental stewardship and in which Northern Micro participates as part of its overall commitment to our environmental policy.

- Electronics Product Stewardship Canada (EPSC)
- Call2Recycle (formerly named Rechargeable Battery Recycling Corporation (RBRC))
- EPEAT (a program of the Green Electronics Council)
- Energy Star, Microsoft WHQL, 80+ and TCO Development.

Environmental policy

"Northern Micro is committed to continually reducing the amount of Pollution created in its manufacturing plant by offering recycling solutions for IT equipment and by properly reducing, reusing and recycling its packaging material. Northern Micro maintains an Environmental Management system that it is proud of and one that complies with all of its legal and other defined environmental requirements."

Environmental Program

ISO14001

Northern Micro is dedicated to providing computer products and services that meet or exceed the quality, operational performance and life cycle cost requirements of our customers. In an effort to continually improve our system we have implemented our Environmental Management System (EMS), which also meets the requirements of the ISO-14001 Environmental Management System. The Environmental Management System assures that NM computer products, their manufacturing, their delivery, and their recycling are processed under the control of the system. The System is designed to adhere to ISO 14001:2004 standard. The system assures conformance to legal and the company's environmental policy and provides objective evidence of effective control.

Northern Micro attained its ISO 14001 certification in November 2006.

IEEE1680

The policy focuses on areas which address all stages of the product life cycle. IEEE 1680 is the first U.S. standard to supply environmental guidelines for institutional purchasing decisions involving desktop and laptop computers and monitors. It offers criteria in eight categories - materials selection, environmentally sensitive materials, design for end of life, end-of-life management, energy conservation, product longevity and life-cycle extension, packaging, and corporate performance. IEEE 1680 and its product registration and verification system are part of the Electronic Products Environmental Assessment Tool (EPEAT).

EPEAT

EPEAT is a program of the Green Electronics Council and provides a procurement tool to help institutional purchasers in the public and private sectors evaluate, compare and select desktop computers, notebooks and monitors based on their environmental attributes. EPEAT also provides a clear and consistent set of performance criteria for the design of products, and provides an opportunity for manufacturers to secure market recognition for efforts to reduce the environmental impact of its products. Northern Micro EPEAT certified products are listed on the EPEAT's web site (<http://www.epeat.net>).

RoHS

RoHS (Reduction of Hazardous Substances) - The reduction and/or elimination of environmentally sensitive materials and hazardous substances. As of July 31st 2005, all Northern Micro systems refreshed on the NMSO (National Master Standing Offer) utilize RoHS compliant components.

Flame retardants and plasticizers - The elimination of intentionally added flame retardants and plasticizers in certain applications.

Recycled plastics content - Ensuring that the product contains *post* consumer recycled plastic <5.0% by weight, measured as a percentage of total plastic (by weight) in each product or does not. this applies to all covered products that contain plastics, excluding pcb and packaging.

Renewable/bio based plastic materials - A declaration as to whether the product contains renewable/biobased plastic materials greater than 5.0 %, measured as a percentage of total plastic (by weight) in each product.

Toxins in packaging - Ensuring a reduction/elimination of intentionally added toxins in packaging

Other Environmental practices employed by Northern Micro

- Power Management - Ensuring maximum efficiency without sacrificing performance in product design.
- Thermal Consideration - Ensuring the proper case/motherboard/CPU configuration is developed to maintain the required Thermal levels.
- Acoustic Levels - Ensuring systems conform to ISO 9296 declaration methodology and employing the ISO 7779 test methodology for acoustic levels.

Energy Star, Microsoft WHQL and 80 PLUS

- **ENERGY STAR** is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy to help save money and protect the environment through energy efficient products and practices. Northern Micro is an active participant in the Energy Star and certifies its products as Energy Star compliant (as listed on their web site <http://www.energystar.gov/>)
- The **Microsoft WHQL** program is used to qualify products that conform to industry standards for computer and related equipment. Among the criteria being measured are Power Management features (Wake On-LAN, **ACPI**, Sleep/Suspend/Hibernate) which greatly enhance the longevity of key system components, reduce power requirements and offer overall improved efficiency and performance to the user and the environment.
- The **80 PLUS program** is one of the latest power conservation initiatives that promote the maximum operating efficiency of power supplies within computer equipment. The performance specification requires power supplies in computers and servers to be 80% or greater energy efficient at 20%, 50% and 100% of rated load with a true power factor of 0.9 or greater.
- **TCO Development** ensures that certified products are tested to conform to standards developed by them and which create a better working environment for office users. Northern Micro uses TCO '03 certified LCD **monitor** products from its partners.

EPSC

The EPSC (<http://www.epsc.ca>) is a not-for-profit organization and works with an array of partners and stakeholders to design, promote and implement sustainable solutions for Canada's electronic waste problem. These industry leaders are aware of both the pressures on municipalities for landfill management and the environmental necessity to handle the potentially hazardous content of electronics products and reuse the valuable resources they contain. EPS Canada was created to work with both industry and government to develop a flexible, workable Canadian solution. Northern Micro is an active member of the EPSC. The EPSC has recognized both Environment Canada's ECO Logo and the corresponding US EPEAT programs as tools for developing environmentally friendly solutions.

Call2Recycle (formerly RBRC)

Call2Recycle (<https://www.call2recycle.ca>), through their North American wide program recycles used portable rechargeable batteries and old cell phones typically found in cordless power tools, cellular and cordless phones, laptop computers, camcorders, digital cameras, and remote control toys. Call2Recycle recycles the battery chemistries: Nickel Cadmium (Ni-Cd), Nickel Metal Hydride (Ni-MH), Lithium Ion (Li-ion) and Small Sealed Lead (Pb). Call2Recycle is dedicated to keeping rechargeable batteries and cell phones out of our nation's solid waste stream and preserving natural resources. Northern Micro

participates in the Call2Recycle program and accepts without charge all batteries meeting the above specifications, regardless of when and through whom they were purchased.

Electrostatic Discharge (ESD)

Short for electrostatic discharge: the rapid discharge of static electricity from one conductor to another of a different potential.

Static Electricity: Creating Charge

Under certain conditions (low humidity, carpeted floors, etc. static electricity will build up. Contact with these sensitive components may cause the build-up to discharge into the integrated circuitry of the component; a powerful enough discharge may damage or destroy the component.

Electrostatic discharge can change the electrical characteristics of a semiconductor device, degrading or destroying it. Electrostatic discharge also may upset the normal operation of an electronic system, causing premature equipment malfunction or failure.

Static Electricity Precautions

To protect components against damage from static electric discharge, you should follow some basic precautions whenever you handle them:

- Use a grounding wrist strap. The strap will have an 'alligator' clip at the end of a shielded wire lead. Clip it to a grounded object. Any static electricity will then harmlessly discharge through the strap. Put on and connect the strap before you handle the components.
- Use an anti-static pad. Put any components on the pad whenever you work on them outside the computer. If you don't have a pad, put the components on the anti-static bag they came in.



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- Both the wrist strap and pad are inexpensive and are generally available from computer supply companies.
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Location and Electrical Service

- Position your system unit, *monitor* and cables/wires away from direct sunlight, moisture, dust, oil and thoroughfares.
- Do not submit your equipment to harsh jarring.
- Ensure that all ventilation outlets are always free from obstruction.
- In the event of mechanical/power failure or damage, do not attempt to repair the system unit, *monitor*/s or cables/wires. Refer all such problems to experienced service personnel.
- Ensure that the back of the system unit is at least 3 inches away from anything that might obstruct the ventilation outlets and cause over-heating.
- Ensure that the power source is grounded correctly. This product is equipped with a 3-wire grounding-type plug. This plug will only fit into a grounded power outlet.



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- It is recommended not to service this product yourself, as opening and removing covers exposes dangerous voltage areas and other risks. Refer all servicing to service persons.
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Cleaning / Moving Your Computer

The Computer:

- Keep it in a dry, clean space and stand it on a flat surface
- Minimize exposure to dust – don't get the power switches or other controls wet
- If you move it from a very cold environment to a warm environment, give the components time to reach room temperature before switching them on
- Use a mild cleaning solution (no detergents!) and a damp cloth to clean exterior surfaces
- Occasionally remove dust from interior surfaces, taking care not to touch or damage connections or chips

The keyboard:

- Keep food and drinks away from the keyboard
- Use a mild cleaning solution and a damp cloth to clean exterior surfaces

The monitor :

- Don't touch the screen with hard objects such as pens and pencils
- Remove dust from the surface by blowing it or wiping it gently with a dry cloth; then use a soft cloth with nonabrasive liquid glass cleaner
- Check cleaner instructions to be sure that it is safe for glass

The mouse :

- When your *mouse* doesn't obey you, it's time to clean it, use a mild cleaning solution (no detergents!) and a damp cloth to clean exterior surfaces.

Moving the computer:

- It's possible to damage data on the hard disk when you move your computer, so you should back up all critical data first. Remove all data disks from the drives. Turn off the computer and all peripherals. Unplug the power cord and disconnect all cables. If you aren't familiar with the panel setup on your computer, sketch the location of cables first.
- Pack the computer and peripherals in well-cushioned packing cartons, preferably the original boxes.

Information Backup

It's wise to make backup copies of your original *software* in the event that the original is damaged. For the same reason, you should frequently back up important data while you are working. Save your work to the hard disk regularly (some programs do this automatically or offer auto backup as an option). More importantly, save the data to a backup such as a tape drive, disc or removable hard disk several times during each work session. If your hard disk crashes or a power failure destroys your file or your office is broken into, you will be thankful you did.

If your data is critical, it's advisable to make a second backup and keep this in a fireproof safe or a safe location out of the office.

Hard Drive Maintenance

Traditional Hard Disks

Traditional hard disks are a rigid magnetic-sensitive disk mounted on a single spindle. Each disk has one or two read and write heads (for one or both sides), which float above the surface of the disk. The disk spins at a constant rate, and the heads move across the surface to locate information as required.

Each disk is segmented into tracks, which are themselves divided into sectors. The address of a piece of information includes both the track and sector.

Fragmented files

After storing and removing many pieces of data, the hard disk can get fragmented — information for the same file may be scattered everywhere. When you call up that file, the heads must move many times back and forth to recall the information. Defragmenting the disk puts these pieces back together and gets your computer running fast again .

Your *operating system* may offer a feature to consolidate your disk. There are also several programs available that examine and, if necessary, defragment the disk.

Solid State Disks

Solid State disks (SSD) are a data *storage* device using integrated circuit assemblies as *memory* to store data persistently. SSD technology uses electronic interfaces compatible with traditional hard disk drives. SSDs have no moving mechanical components, using flash *memory* instead of magnetic disks. They can be used in place of traditional magnetic hard disk drives or along side traditional drives for more *storage* or as a faster way to *boot* the computer.

Erased files

Regardless of whether you have a magnetic drive or a solid state drive, if you have erased a file by mistake, most operating systems offer an undelete or restore feature to recover some or all of your material. The more work you do on the computer after deleting the program, the lower the probability of full recovery.

The fact that erased files remain on the disk may be a concern for some security applications. If security-sensitive information is erased and the computer or diskette passes to another person, security may be breached. To prevent this from happening, you can do a low-level format on a hard drive , or reformat a diskette. Programs for low-level *operating system* formats are readily available.

Passwords

A power-on password locks the keyboard and *mouse* to prevent unauthorized people from using your computer. When the computer is turned on, it prompts the user for a password. Entering the correct password unlocks the keyboard and *mouse*.

Another option is to set a supervisor password, which restricts access to the setup utility only. This is critical because passwords can be disabled through the setup. Make sure you store your password in a secure place. If you forget your supervisor password, you will have to remove your battery and reconfigure your computer to get it working again.

Computer Viruses

Like viruses that infect humans, a computer *virus* contains instructions for its own proliferation and is potentially very harmful. Though some computer viruses are just playful, most are dangerous for your computer and data. For example, some viruses destroy the file allocation tables, so that your computer cannot locate files or *software*. Some viruses are programmed to become active on a certain date (e.g. April 1 or Friday 13) or when you execute a certain command.

Programs are available that scan diskettes and hard drives for viruses. Some of these programs will also remove the *virus*. These programs can be set to test the computer for viruses every time you power up. To protect your computer from viruses, you should also scan every outside disk before using it. Write-protect your *software* diskettes so that they cannot be infected. Avoid programs and diskettes from unknown sources. Only buy *software* in sealed packages.

Networks, the *Internet* and bulletin board services represent special risks. Use only well known electronic bulletin boards. If you plan to *download software* from the bulletin board, ask the service what steps it is taking to guard against viruses.

If your computer is behaving erratically, it may be infected by a *virus*. Check out the problem before proceeding further.

There are more than 100,000 known viruses out there. Although there are thousands of viruses identified each year, there are still some that only exist in the imaginations (*virus* hoax) of the public and the press.

System Safety

Electrical Safety

Electric current from power, telephone and communications cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described below:

Before removing the cover:

- Turn off the computer and all peripherals, such as monitors, printers and external devices.
- Unplug all power cords from electrical outlets.
- Disconnect all communications cords from external receptacles.
- Disconnect all cables and power cords from the back panel of the computer.
- Never remove the power supply cover. If you suspect a problem with this part, call Northern Micro service at 613-226-1117.

Re-configuring

- To keep the computer from being damaged, NEVER reconfigure the board while the power is ON.
- If you wish to reconfigure the computer at any time, ensure that the power is turned OFF before changing any *hardware* settings, such as DIP switches or jumpers.



- Risk of explosion if battery is replaced by an incorrect type. Dispose of batteries according to the manufacturer's instructions.

Monitor Safety Instructions

- Never insert anything metallic into the *monitor* openings. Doing so may create the danger of electric shock.
- To avoid electric shock, never touch the inside of the *monitor*. Only a qualified technician should open the monitor's case.
- Never use your *monitor* if the power cord has been damaged. Do not allow anything to rest on the power cord, and keep the cord away from areas where people can trip over it.
- Be sure to hold the plug, not the cord, when disconnecting the *monitor* from an electric socket.
- Openings in the *monitor* cabinet are provided for ventilation. To prevent overheating, these openings should not be blocked or covered. Also, avoid using the *monitor* on a bed, sofa, rug, or other soft surface. Doing so may block the ventilation openings in the bottom of the cabinet. If you put the *monitor* in a bookcase or some other enclosed space, be sure to provide adequate ventilation.
- Put your *monitor* in a location with low humidity and a minimum of dust.
- Do not expose the *monitor* to rain or use it near water. If the *monitor* accidentally gets wet, unplug it and contact an authorized dealer immediately. You can clean the *monitor* with a damp cloth when necessary, but be sure to unplug the *monitor* first.
- Place the *monitor* on a solid surface and treat it carefully. The screen is made of glass and can be damaged if dropped, hit or scratched.
- Locate your *monitor* near an easily accessible AC outlet.
- If your *monitor* does not operate normally, in particular, if there are any unusual sounds or smells coming from it, unplug it immediately and contact a service center.
- High temperatures can cause problems. Do not use your *monitor* in direct sunlight; keep it away from heaters and other sources of heat.
- Unplug the *monitor* when it is going to be left unused for an extended period of time.
- Unplug your *monitor* from the AC outlet before any service.



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- To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.
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DOC Requirements



- A shielded power cord is required to meet ICES-003 emission limits and also to prevent interference to nearby radio and television reception. It is essential that only the attached power cord be used.
- Use only shielded cables to connect I/O devices to this computer.
- You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment. This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of Industry Canada.

This equipment has been tested and found to comply with the Industry Canada ICES-003, Issue 2 Rev. 1, Digital Apparatus, Class B requirement. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warranty Policy

Limited Warranty: All Northern Micro products shall be free from defects in materials and workmanship at the time of original sale by Northern Micro. All Northern Micro products are in accordance with our published specifications or those specifications agreed to by Northern Micro and the purchaser at the time of original sale.

Warranty Period: Any Warranty Period purchased from Northern Micro is from the date of Customer purchase of the product. All defects must be reported to Northern Micro during the Warranty Period.

Warranty Rights: For any product found to be defective, and reported to Northern Micro to be defective within the Warranty Period, Northern Micro, at its option, will repair or replace the defective product. Any repaired or replaced product will assume the remaining warranty coverage or will be covered for ninety (90) days from the date of repair or exchange, whichever is longer.

Exclusions From Warranty: Any improper installation or use, operation beyond capacity, accidents not attributable to Northern Micro, substitution of parts not approved by Northern Micro or any alteration or repair by others in such manner as in Northern Micro's judgment affects the product materially and adversely shall void this Limited Warranty.

Limitation of Remedies: Northern Micro's obligation for defective product is limited to repairing or replacing the product, or parts thereof, as expressly stated in this Limited Warranty. In no event shall Northern Micro be liable for any direct, indirect, incidental, consequential, or special damages arising out of the operation, or failure of operation, of the product. Northern Micro shall not be liable for any costs of procurement of substitute goods, loss of profits, personnel costs, payments to third parties, or any consequential, incidental, and/or other damages of any kind resulting from a breach of any applicable express or implied warranty, or otherwise with respect to the sale of any Northern Micro product.

Exclusion of Other Warranties: The above Limited Warranty constitutes the sole and exclusive warranty and remedy with respect to any defective Northern Micro product and is in lieu of all other obligations or liabilities of Northern Micro. All other warranties, expressed or implied are hereby disclaimed, including but not limited to any warranty of merchantability or fitness for any particular purpose. Northern Micro's liability, whether based on contract, warranty, strict liability, tort, or any other basis, shall not exceed the price of the product whose defect or damage is the basis of the claim.