SPIRIT X99-AS USER GUIDE

Revision 1.0 September 2015

Please Read This First

Thank you for buying a Northern Micro Spirit X99-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 X99-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 X99-AS is Energy Star and Epeat Gold certified. These environmental standards ensure that the computer can take advantage of energy saving features. Your Spirit X99-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 X99-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.

- Northern Micro Sales and Service & Support Departments may be reached at: 1-800-563-1007.

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 X99-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 Secure Web portal where you can apply for a Personal Identification Number (PIN); customize and order computer systems on-line; check the status of your orders; verify warranty expiry dates for systems; review service history and manage your computer assets.
- 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 X99-AS is packed with molded foam or with honeycomb cardboard to keep it in place during transit. To unpack it, cut the tape holding the flaps, fold back the flaps, and carefully slide the PC and the packing material up out of the box.

Here's what you will find in the box:

- *Mouse*
- Keyboard
- Power cord
- Spirit System

- 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

Removing the case cover from your Spirit computer requires no tools.

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

2. Slide the side cover back

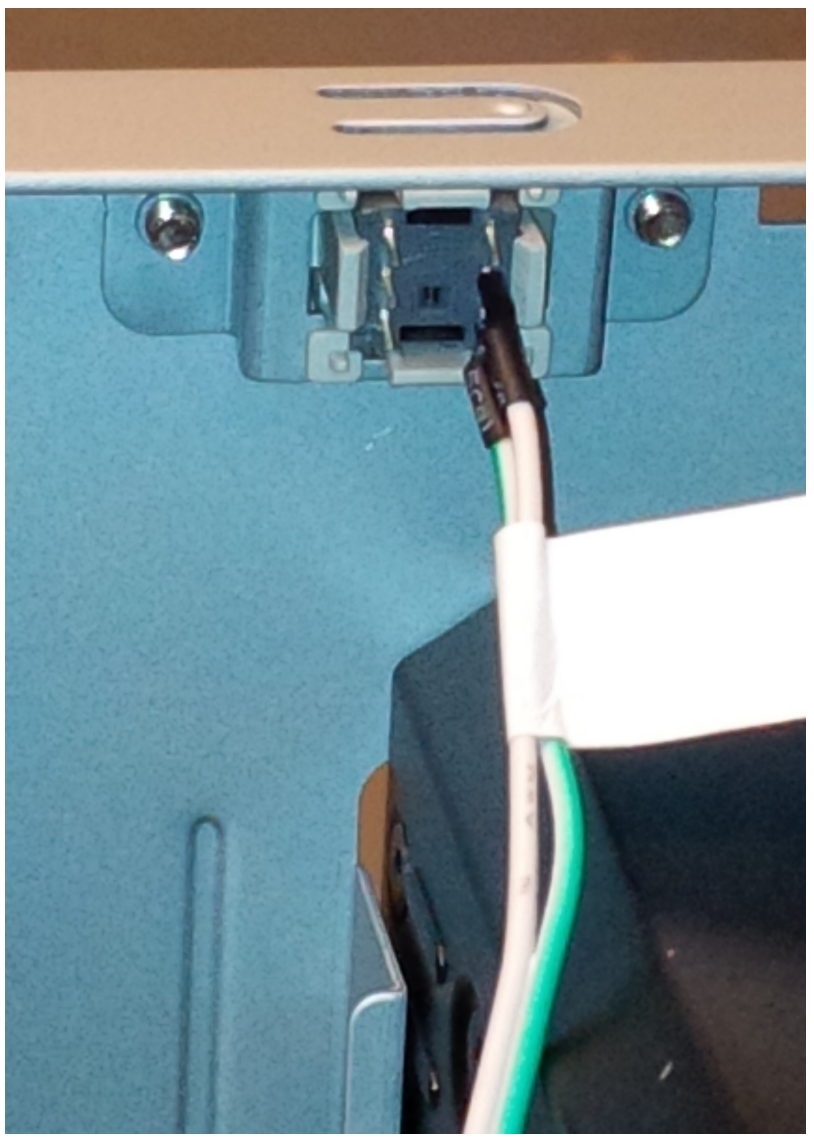
3. Press the tabs as illustrated and pull back the Front Bezel.

4. That opens the front 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

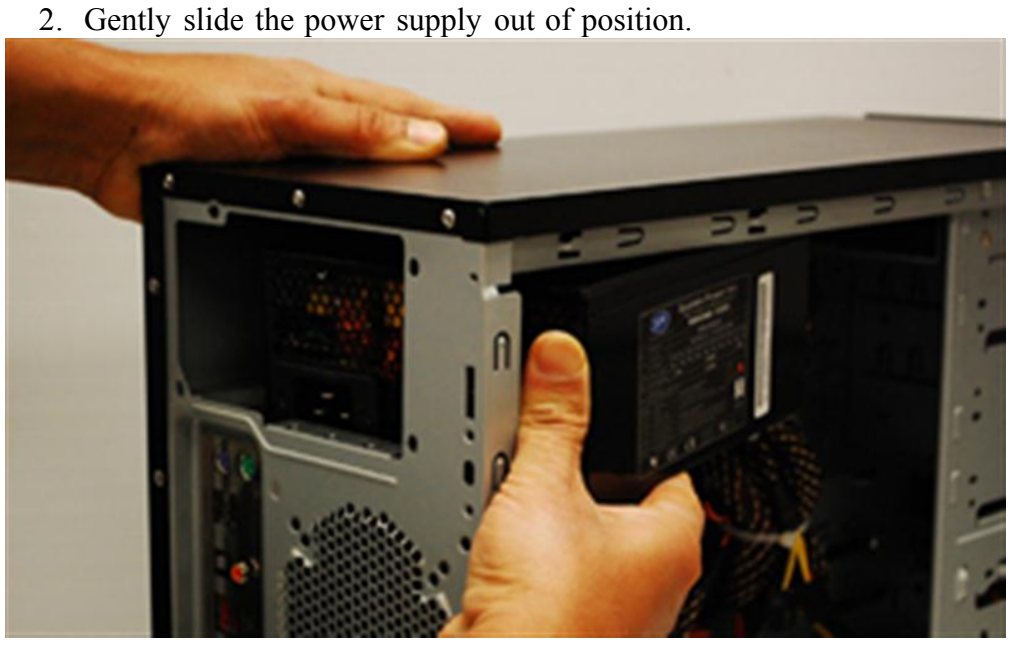
Corsair HX1000i High-Performance ATX Power Supply						
AC Input Rating	DC Output Rating					
AC Input: 100V - 240V	DC Output	+3.3V	+5V	+12V	-12V	+5Vsb
Current: 13A - 6.5A	Max Load	25A	25A	83.3A	0.8A	3A
Frequency: 47Hz - 63Hz	Maximum Combined Wattage	150W		1000W	9.6W	15W
		Total Power: 1000W				

- 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

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 X99-A specifications summary

CPU	LGA2011-v3 socket for the New Intel® Core™ i7 processors Supports 22nm CPU Supports Intel® Turbo Boost Technology 2.0* *The Intel® Turbo Boost Technology 2.0 support depends on the CPU types.
Chipset	Intel® X99 Express Chipset
Memory	8 x DIMM DDR4 max at 64 GB 3333 (O.C.)* / 3300 (O.C.)* / 3200 (O.C.)* / 3000 (O.C.)* / 2800 (O.C.)* / 2666 (O.C.)* / 2400 (O.C.)* / 2133 *MHz*, non-ECC unbuffered *memory* Quad channel memory architecture Supports Intel® Extreme *Memory* Profile (XMP) ** Hyper DIMM support is subject to the physical characteristics of individual CPUs. ** Refer to www.asus.com for the *Memory* QVL (Qualified Vendors Lists).
Expansion slots	-3 x *PCI Express* 3.0/2.0 x16 slots* (Single at x16, Dual at x16/x16 mode, Triple at x16/ x16/ x8) -1 x *PCI Express* 2.0 x16 slot** (max. at x4 mode, compatible with PCIe x1 and PCIe x4 devices) - 2 x *PCI Express* 2.0 x1 slots** (compatible with PCIe x1 and x4 devices) *** The PCIe x16_4 slot shares *bandwidth* with M.2 x4. When the M.2 socket is occupied, the PCIe x16_4 will be disabled.** ****The PCIe x16_2, PCIe x1_1, and USB3_E56 connectors share the same *bandwidth*. By default, the PCIe x16_2 slot and PCIe x1_1 slot automatically run at x1 mode with USB3_E56 enabled for best resource optimization.**
Multi-GPU support	Supports NVIDIA® 3-WAY/Quad SLI™ Technology (with 2 PCIe x 16 graphics card) Supports AMD® 3-WAY/ Quad-GPU CrossFireX™ Technology
Storage	New Intel® Core™ i7 processors - 1 x M.2 x4 Socket 3 with vertical M Key design, 2242/2260/2280/22110 *storage* devices support (supports PCIe SSD only) Intel® X99 Express Chipset with *RAID* 0, 1, 5, 10 and Intel® Rapid *Storage* Technology 13 support - 1 x *SATA* Express port (gray, compatible with 2 x *SATA* 6.0 Gb/s ports) - 8 x *SATA* 6.0 Gb/s ports* (4 x gray from controller 1, 4 x black from controller 2) - Supports Intel® Smart Response Technology, Intel® Rapid Recovery Technology** * Due to chipset behavior, the SATA6G_78 and SATA6G_910 ports (black) do not support Intel® Rapid *Storage* Technology including *RAID* configuration. ** These functions work depending on the CPU installed.
LAN	Gigabit Intel® LAN connection - 802.3az Energy Efficient Ethernet (EEE) appliance 1 x Intel® I218-V Gigabit LAN-Dual interconnect between the integrated Media Access Controller (MAC) and physical layer (PHY) ASUS Turbo LAN utility
USB	**Intel® X99 Express Chipset - supports ASUS *USB* 3.0 Boost** - 4 x *USB* 3.0/2.0 ports at mid-board for front panel support - 1 x *USB* 3.0/2.0 ports at rear panel - 8 x *USB* 2.0/1.1 ports (4 ports at mid-board, 4 ports at rear panel) **ASMedia® *USB* 3.0 Hubs - support ASUS *USB* 3.0 Boost** - 5 x *USB* 3.0/2.0 ports at back panel (blue)
Audio	Realtek® ALC1150 8-channel high definition audio CODEC featuring Crystal Sound 2 - Separate layer for left and right track, ensuring both sound deliver equal quality - Top notch audio sensation delivers according to the audio configuration - Audio shielding ensures precision analog/digital separation and greatly reduced multi-lateral interference - EMI protection cover to prevent electrical noise to affect the amplifier quality - 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 provide warm, natural, and immersive sound with exceptional clarity and fidelity - High quality 112 dB SNR stereo playback *output* (Line-out at back) and 104 dB SNR recording input (Line-in) support - Absolute Pitch 192 khz/24 bit True BD Lossless Sound - BD audio layer content protection - DTS UltraPC II - DTS Connect - Supports jack-detection, multi-streaming and front panel jackretasking (MIC) - Optical S/PDIF out ports at rear I/O
ASUS Unique Features	**Flagship Performance** **5-Way Optimization by Dual Intelligent Processors 5** - Whole system optimization with a single click! 5-Way Optimization tuning key perfectly consolidates TPU, EPU, DIGI+ Power Control, Fan Xpert 3, and Turbo APP together, providing better CPU performance, efficient power saving, precise digital power control, whole system cooling and even tailor your own app usages. **DIGI+ Power Control** CPU Power - Industry leading digital 8-phase power design - ASUS CPU power utility DRAM Power

- Industry leading digital 4-phase DRAM power design
- ASUS DRAM power utility

TPU
- Auto Tuning, TPU, GPU Boost, 2-level TPU switch

EPU
- EPU, EPU switch

ASUS Fan Xpert3
- Featuring Fan Auto Tuning function and multiple thermistors selection for optimized system cooling control.

Turbo App
- Featuring automatic system performance tuning, *network* priority, audio scene configuration, and fan cooling setting for selected applications.

UEFI *BIOS*
- Most advanced options with fast response time

M.2 and *SATA* Express onboard
- The latest transfer technology with up to 32 Gb/s data transfer speeds for M.2
- The ultra-fast transfer technology with up to 10 Gb/s data transfer speeds for *SATA* Express

Special *Memory* O.C. Design
- Superb *memory* O.C. capability under full load by minimizing the coupling noise and signal reflection effect

Thunderbolt Ready (optional)
- Blistering-fast 20 Gb/s data transfer upgrades with ThunderboltEX II series Powerful Home *Server*

ASUS HomeCloud *Server*

Remote GO!
- Remote GO! Function: Cloud GO!, Remote Desktop, Remote Keyboard & *Mouse*, File Transfer
- Wi-Fi GO! & NFC Remote app for portable smartphone/tablet, supporting iOS 7 and Android™ 4.0 systems

Media Streamer
- Pipe music or movies from your PC to a smart TV, your entertainment goes wherever you go!
- Media Streamer app for portable smartphone/tablet, supporting iOS 7 and Android™ 4.0 systems

NFC Express 2 support (optional)
- NFC Receiver and 2-port *USB* 3.0 hub
- NFC one-touch features: Video-to-go, Photo Express, Remote Desktop, Quick Launch, Windows® 8 Login, and Bluetooth®

Gamers and Professionals

Turbo APP
- Perform each *application* with tailored performance, *network* priority, audio configuration, and fan speed for your needs

Turbo LAN
- Experience smooth online gaming with lower pings and less lag

Crystal Sound 2
- Feel the sound power with different usage scenarios Steam support
- Compatible with the most fun gaming platform under Windows® system

Steam Support
-Compatible with the most fun gaming platform under Windows system

ASUS EZ DIY

Push Notice
- *Monitor* your PC status with smart devices in real time

***USB BIOS* Flashback**
- with *USB BIOS* Flashback Wizard for EZ *BIOS download* scheduling

UEFI *BIOS* EZ Mode
- featuring friendly graphics user *interface*
- ASUS O.C. Tuner
- ASUS CrashFree *BIOS* 3
- ASUS EZ Flash 2

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

ASUS 5X Protection:
- ASUS DIGI+ VRM - 8 Phase digital power design
- ASUS Enhanced DRAM Overcurrent Protection - Short circuit damage prevention
- ASUS ESD Guards - Enhanced ESD protection
- ASUS High-quality 5K-Hour Solid Capacitors - 2.5x long lifespan with excellent durability
- ASUS Stainless Steel rear I/O - 3x more durable corrosion resistant coating

USB **3.0 Boost**

USB **Charger+**

Ai Charger+

Disk Unlocker

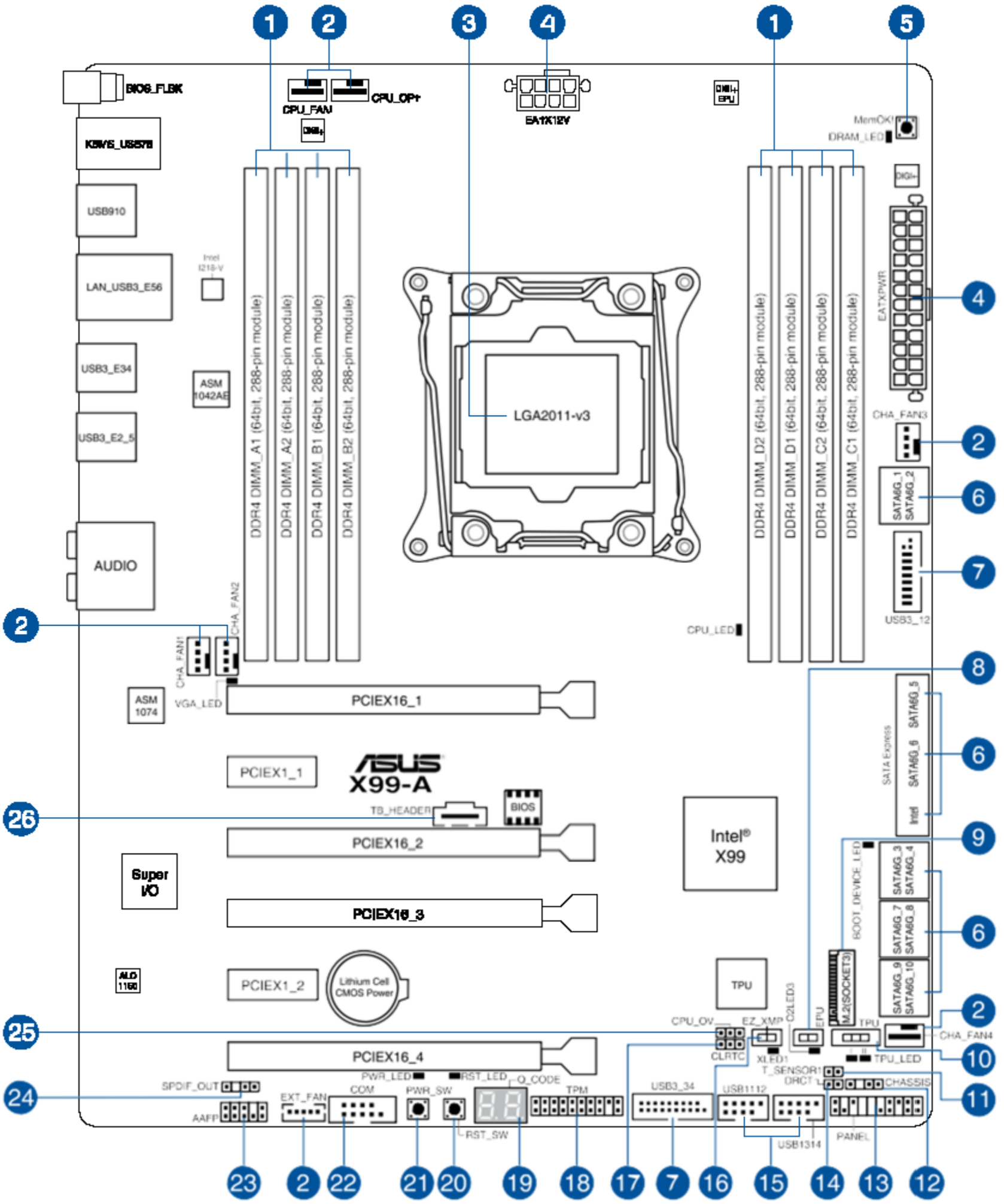
Ai Suite 3

MemOK!

EZ XMP

ASUS Quiet Thermal Solution	**Quiet Thermal Design** - ASUS Fan Xpert 3 - ASUS Fanless Design: Heatsink solution with the aesthetic streamline I/O cover
ASUS Exclusive Overclocking Features	**Precision Tweaker 2** - vCore: Adjustable CPU Core voltage at 0.001 V increment - iGPU: Adjustable CPU Graphics voltage at 0.001 V increment - vCCIO: Adjustable Analog and Digital I/O voltage at 0.001 V increment - vCCIN: Adjustable CPU Input voltage at 0.01 V increment - vCCSA: Adjustable CPU System Agent voltage at 0.001 V increment - vDRAM Bus: 110-step *Memory* voltage control - vPCH: 176-step Chipset voltage control **SFS (Stepless Frequency Selection)** - BCLK/PCIE frequency tuning from 80 *MHz* to 300 *MHz* at 0.1 *MHz* increment. **Overclocking Protection** - ASUS C.P.R. (CPU Parameter Recall)
Back panel I/O ports	1 x *BIOS* Flashback button 1 x Optical S/PDIF Out port 1 x Intel® LAN (RJ45) port 6 x *USB* 3.0/2.0 ports (blue) 4 x *USB* 2.0/1.1 ports (bottom port supports *USB BIOS* Flashback) 1 x Keyboard/ *Mouse* combo connector 8-channel Audio I/O ports
Internal I/O connectors	2 x 19-pin *USB* 3.0/2.0 connectors, support additional 4 *USB* ports 2 x USB 2.0/1.1 connectors, support additional 4 USB ports 1 x M.2 Socket 3 with M Key design, type 2242/2260/2280/22110 *storage* devices support (supports PCIE SSD only) 1 x *SATA* Express connectors (gray) 8 x *SATA* 6.0 Gb/s connectors (4 x gray, 4 x black) 1 x 4-pin CPU Fan connector for both 3-pin (DC mode) and 4-pin (PWM mode) CPU coolers control with auto detection 1 x 4-pin CPU OPT Fan connector 4 x 4-pin Chassis Fan connectors for both 3-pin (DC Mode) and 4-pin (PWM Mode) coolers control 1 x Front panel audio connector(AAFP) 1 x S/PDIF Out header 1 x 5-pin Thunderbolt header for ASUS ThunderboltEX series support 1 x *TPM* connector 1 x Serial port (COM) header 1 x 24-pin EATX Power connector 1 x 8-pin EATX 12V Power connector 1 x System Panel (Q-Connector) 1 x 5-pin Extension fan (EXT_FAN) connector 1 x 3-pin Chassis intrusion (CHASSIS) connector 1 x 2-pin Thermal sensor header 1 x 3-pin CPU OverVoltage (OV) header 1 x MemOK! button 1 x Clear *CMOS* jumper 1 x DRCT (DirectKey) connector 1 x TPU switch (advanced two-stage adjustments) 1 x EPU switch 1 x EZ XMP switch 1 x Power-on button 1 x Reset button
***BIOS* features**	128 Mb Flash *ROM*, UEFI AMI *BIOS*, PnP, DMI 2.7, WfM 2.0, SM *BIOS* 2.7, *ACPI* 5.0, Multi-language *BIOS*, ASUS EZ Flash 2, CrashFree *BIOS* 3, F11 EZ Tuning Wizard, F6 Qfan Control, F3 My Favorites, Quick Note, Last Modified Log, F12 PrintScreen function, F3 Shortcut function, and ASUS DRAM SPD (Serial Presence Detect) *memory* information
Manageability	WfM 2.0, DMI 2.7, WOL by PME, *PXE*
Support *DVD*	Drivers ASUS Utilities EZ Update Anti-*virus software* (OEM version)
Operating system	Windows® 8.1 Windows® 8 Windows® 7
Form factor	ATX form factor: 12 in. x 9.6 in. (30.5 cm x 24.4 cm)

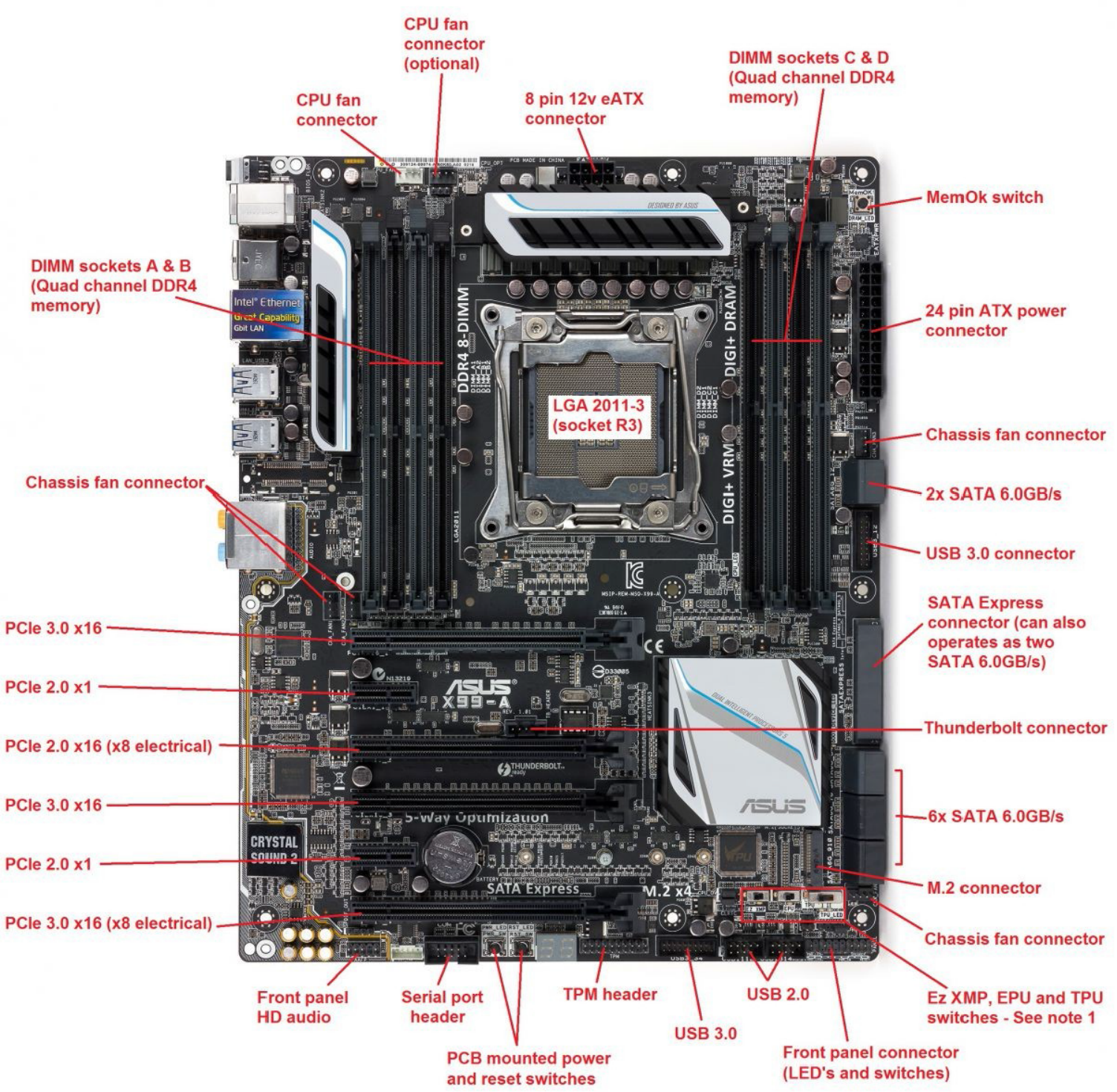
Motherboard Layout



Asus Motherboard Components

	Connectors / Jumpers / Buttons / Switches / Slots
1	DDR4 DIMM slots
2	CPU, CPU optional, extension, and chassis fan connectors (4-pin CPU_FAN, 4-pin CPU_OPT, 5-pin EXT_FAN, 4-pin CHA_FAN1-4)
3	LGA2011-v3 CPU socket
4	ATX power connectors (24-pin EATXPWR; 8-pin EATX12V)
5	MemOK! button
6	Intel® Serial ATA 6 Gb/s connectors (7-pin SATA6G_12, *SATA* 6G_34, *SATA* 6G_5, *SATA* 6G_6/SATAEXPRESS, *SATA* 6G_78, SATA6G_910)
7	*USB* 3.0 connectors (20-1 pin USB3_12, USB3_34)
8	EPU switch

9	M.2 Socket 3
10	TPU switch
11	T_Sensor connector (2-pin T_SENSOR1)
12	Chassis intrusion connector (4-1 pin CHASSIS)
13	System panel connector (20-8 pin PANEL)
14	DirectKey connector (2-pin DRCT)
15	*USB* 2.0 connectors (10-1 pin USB1112; USB1314)
16	EZ XMP switch
17	Clear RTC *RAM* jumper (3-pin CLRTC)
18	*TPM* connector (20-1 pin *TPM*)
19	Q-Code LEDs
20	Reset button
21	Power-on button
22	Serial port connector (10-1 pin COM)
23	Front panel audio connector (10-1 pin AAFP)
24	Digital audio connector (4-1 pin SPDIF_OUT)
25	CPU Over Voltage jumper (3-pin CPU_OV)
26	Thunderbolt header (5-pin TB_HEADER)



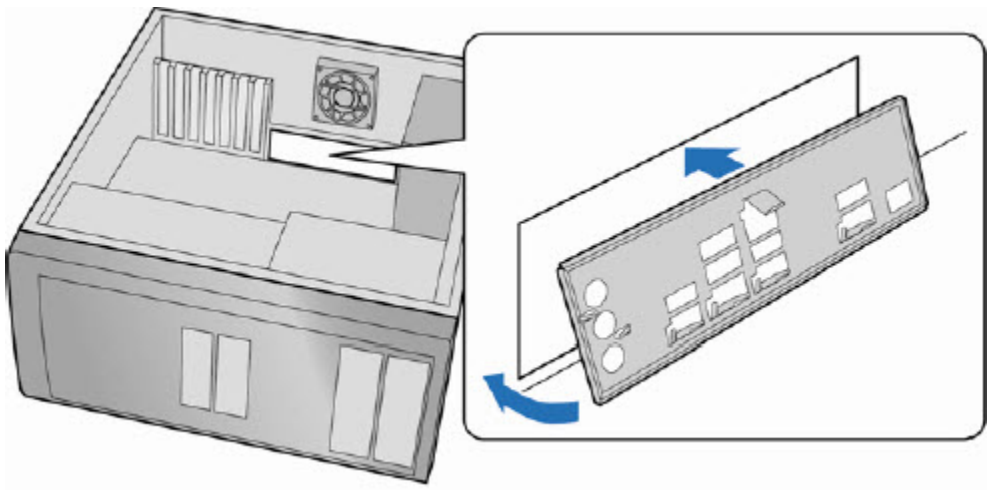
Motherboard Installation

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.

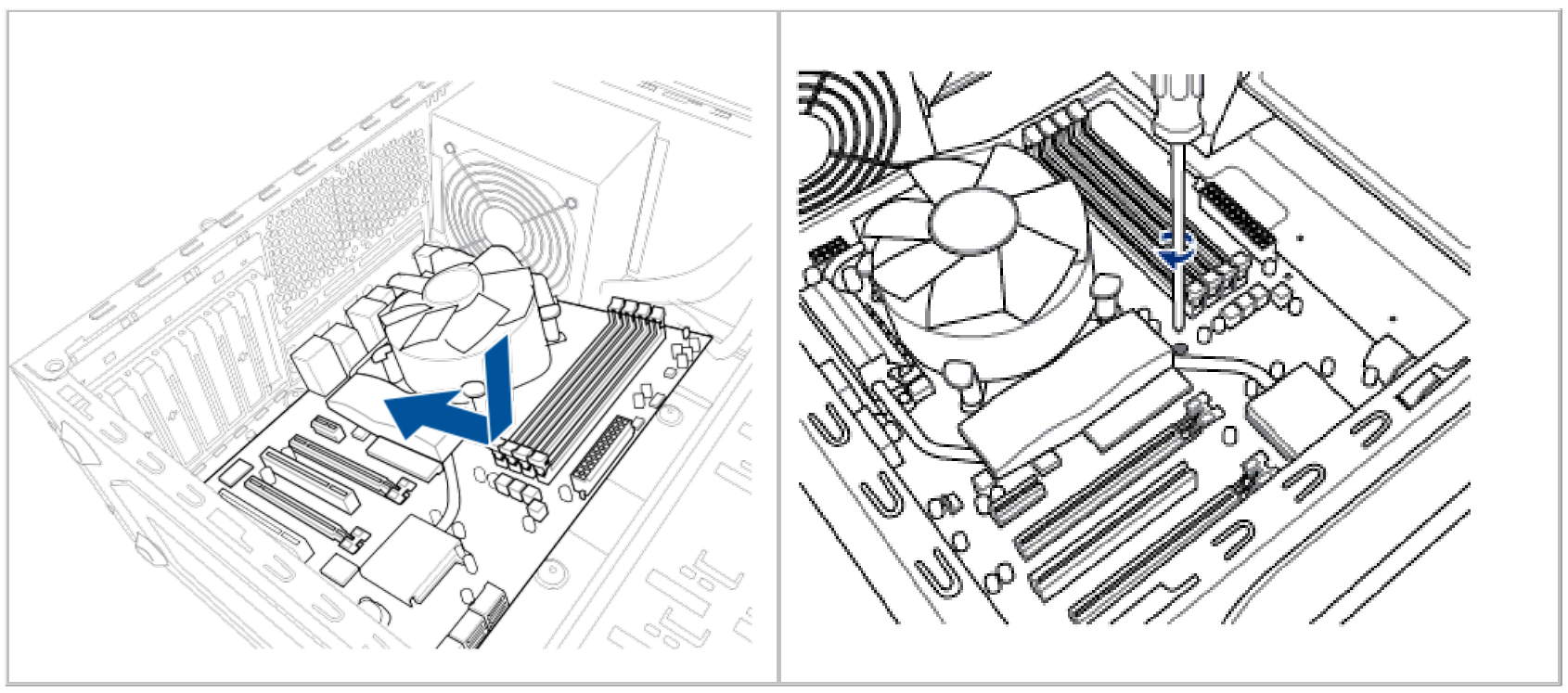
Installing the ASUS Q-Shield a

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.

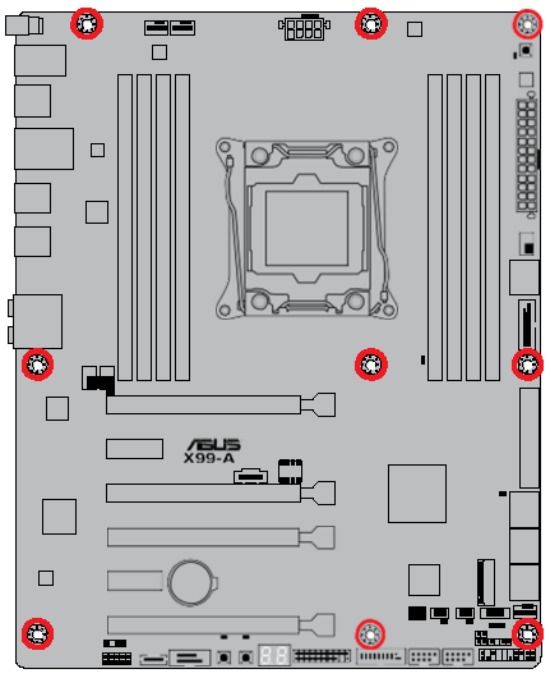


Installing the Desktop Board

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.

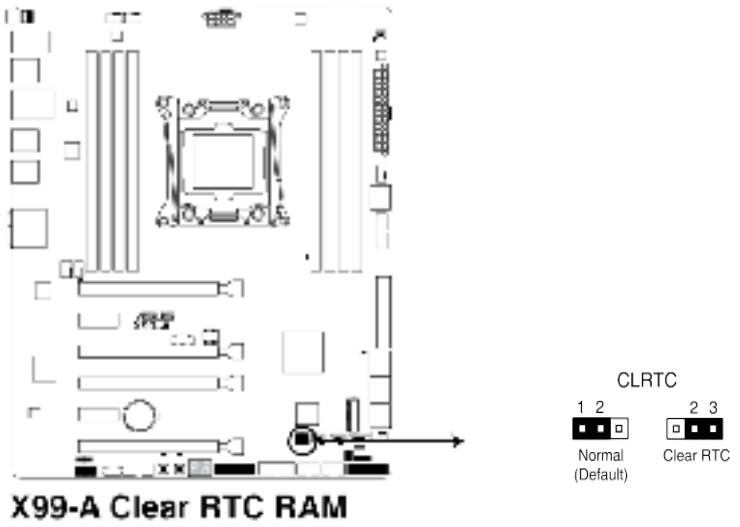

ASUS
X99-A

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. The 3-pin jumper block (3-pin CLRTC) determines the BIOS Setup program's mode. The normal default position for the jumper is pins 1-2. To clear the *CMOS memory*, the jumper is set to pins 2-3. You can clear the *CMOS memory* of date, time, and system setup parameters by erasing the *CMOS* RTC *RAM* data. The onboard button cell battery powers the *RAM* data in *CMOS*, which include system setup information such as system passwords.



X99-A Clear RTC RAM

Clearing Passwords

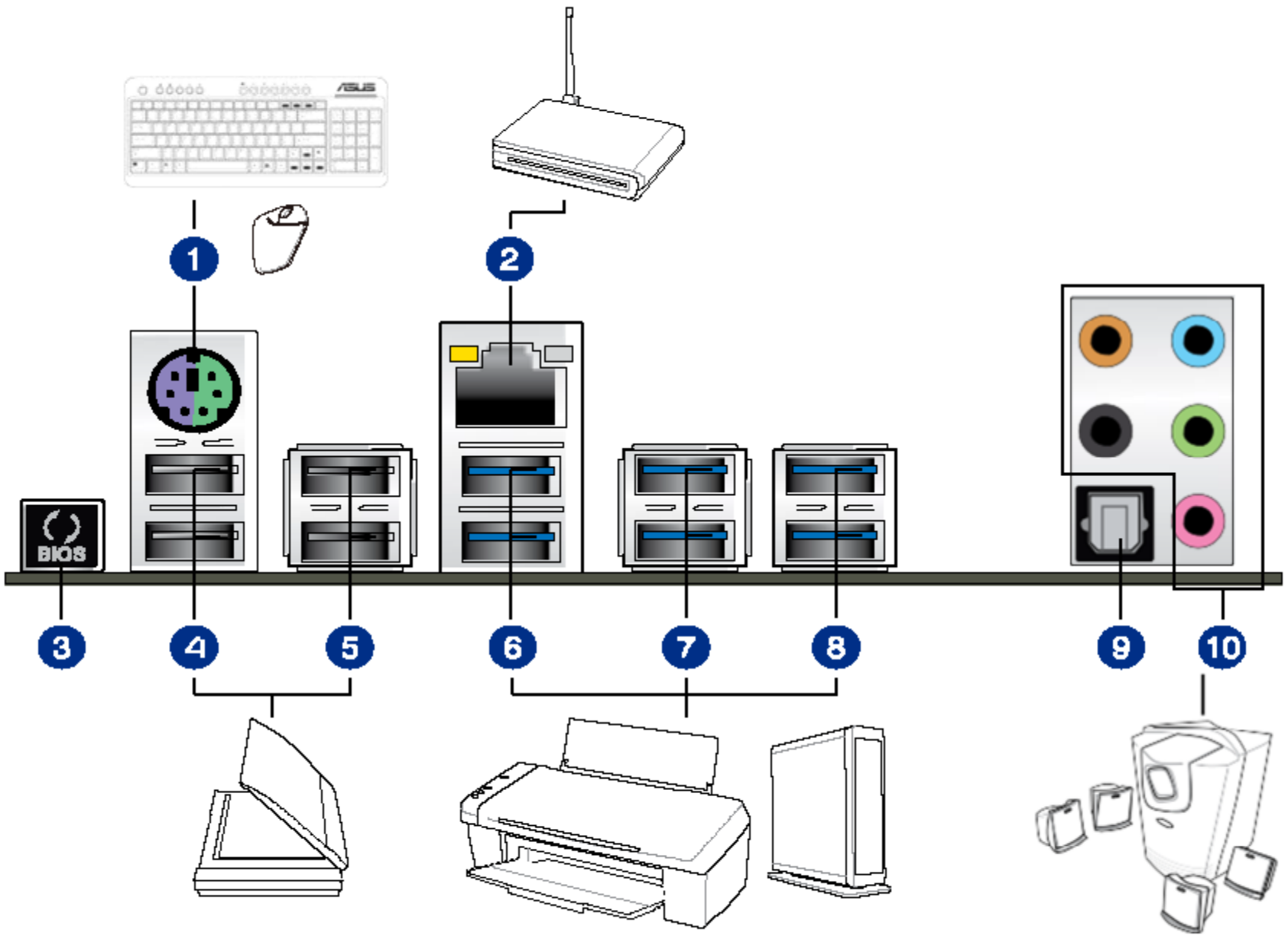
This procedure assumes that the board is installed in the computer and the configuration jumper block is set to normal mode.

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. Find the 3-pin CLRTC jumper block (see Location of the *BIOS* Configuration Jumper Block above).
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.

- *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 move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.*
- *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.*

Rear Panel Connectors



Rear Panel Connectors	
1. PS/2 keyboard/ *mouse* combo port	6. *USB* 3.0 ports E56 (Supports *USB* 3.0 Boost)
2. Intel LAN port	7. *USB* 3.0 ports E34 (Supports *USB* 3.0 Boost)
3. *USB BIOS* Flashback	8. *USB* 3.0 ports E2_5 (Bottom port supports *USB* BIOS Flashback)
4. *USB* 2.0 ports 78 (bottom port supports *USB BIOS* Flashback)	9. Optional S/PDIF Out port
5. *USB* 2.0 ports 910	10. Audio I/O ports

***USB* 3.0** is supported with six *USB* 3.0 ports on the back panel and two on the front panel. *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.

USB 2.0

There are 8 *USB* 2.0 ports (four ports routed to back panel connectors (black) and four ports routed to two onboard headers (black)). The *USB* 2.0 ports are high-speed, full-speed, and low-speed capable. *USB* 2.0 support requires both an *operating system* and drivers that fully support *USB* 2.0 transfer rates.

Audio Subsystem

The onboard audio subsystem consists of the following component s:

- Intel X99 Express Chipset
- RealTek ALC1150 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 retasking according to the user's definition, or can be automatically switched depending on the recognized device type.
- Independent multi-streaming 6-channel (5.1) audio (using the back panel audio connectors) and 2-channel audio (using the Intel High Definition Audio front panel header).

LAN Subsystem

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

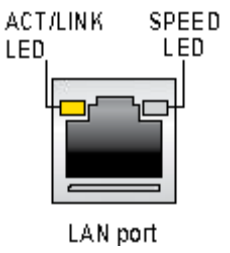
- Intel X99 Express Chipset
- Intel I218V Gigabit Ethernet LAN Controller
- An RJ-45 LAN connector with integrated status LEDs

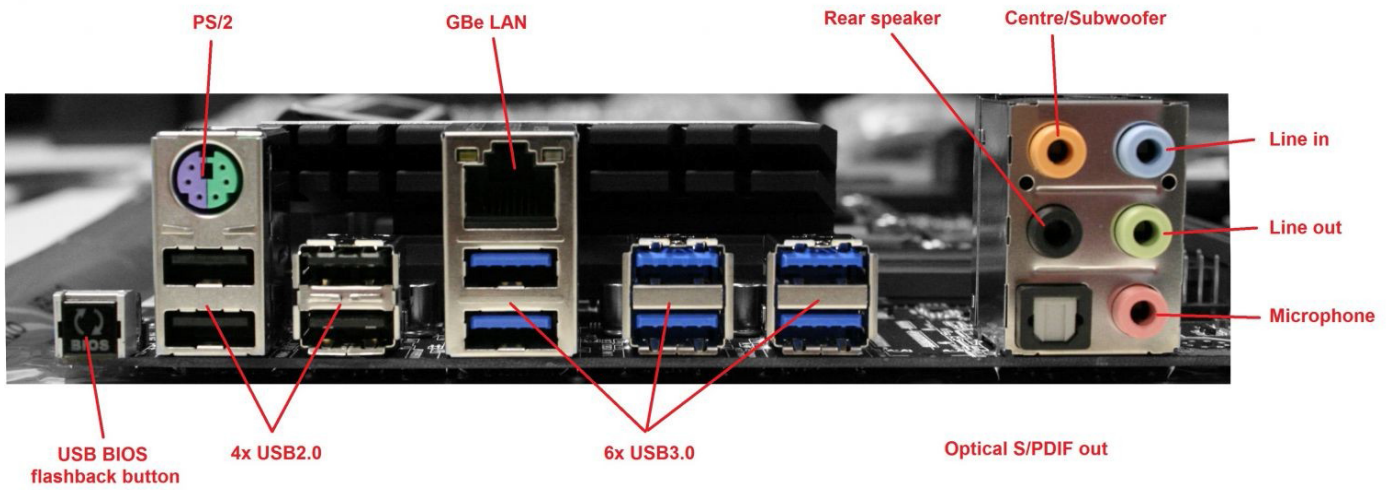
The subsystem features:

- 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		



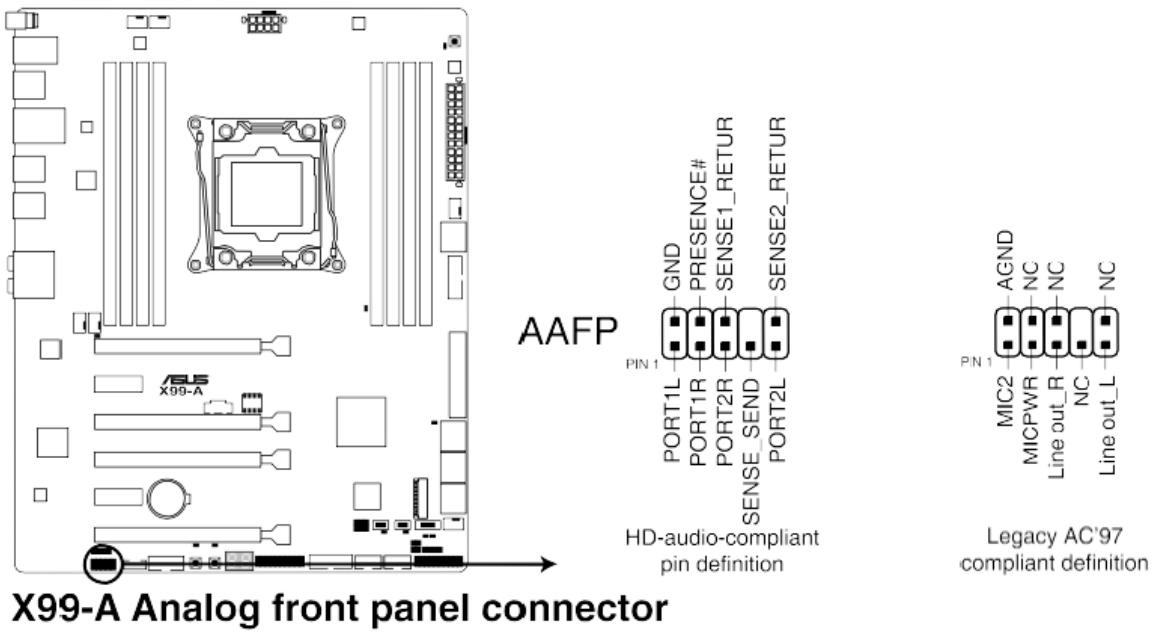


Internal Connectors

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)

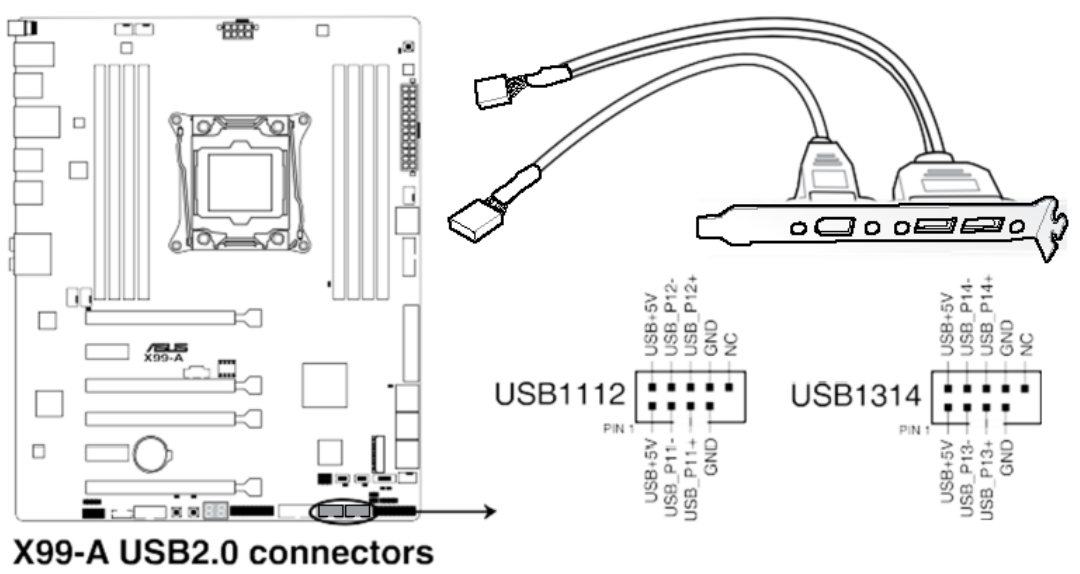
This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC`97audio standard. Connect one end of the front panel audio I/O module cable to this connector.



X99-A Analog front panel connector

USB 2.0 Headers (10-1 pin USB1112; US1314)

These connectors are for USB 2.0 ports. Connect the USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 48Mb/s connection speed.

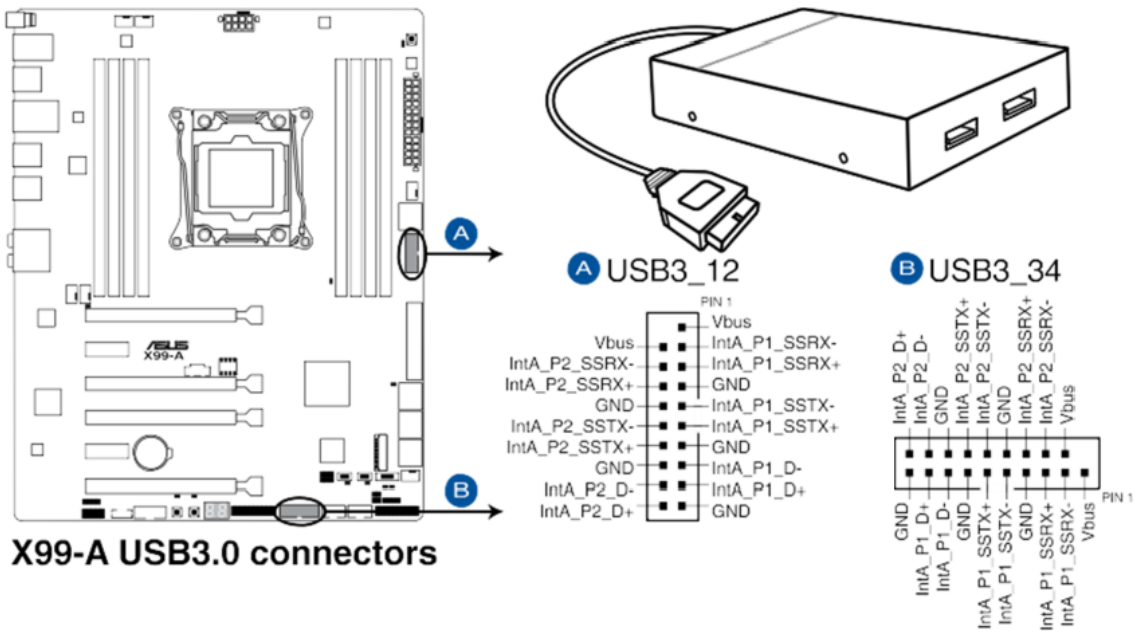


X99-A USB2.0 connectors

- *You can connect the front panel USB cable to the ASUS Q-Connector (USB) first, and then install the Q-Connector (USB) to the USB connector onboard if your chassis supports front panel USB ports.*

USB 3.0 Headers (20-1 pin USB3_12, USB3_34)

These connectors allow you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gb/s, faster charging time for USB-chargeable devices,optimized power efficiency, and backward compatibility with USB2.0.

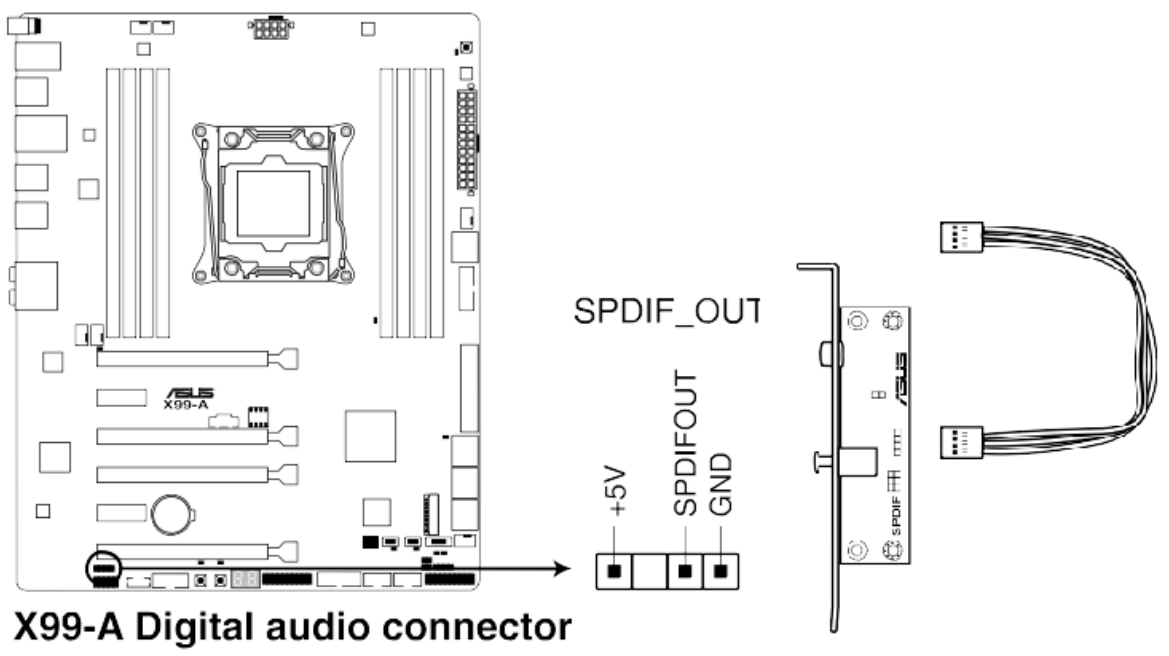


X99-A USB3.0 connectors

- *Ensure to install the related driver to fully use the USB 3.0 ports under Windows ® 7.*
- *The plugged USB 3.0 device may run on xHCI or EHCI mode depending on the operating system's setting.*
- *These USB 3.0 ports support native UASP transfer standard in Windows ® 8 / Windows ® 8.1 and Turbo Mode when using USB 3.0 Boost feature.*

Digital Audio Connector (4-1 SPDIF_OUT)

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



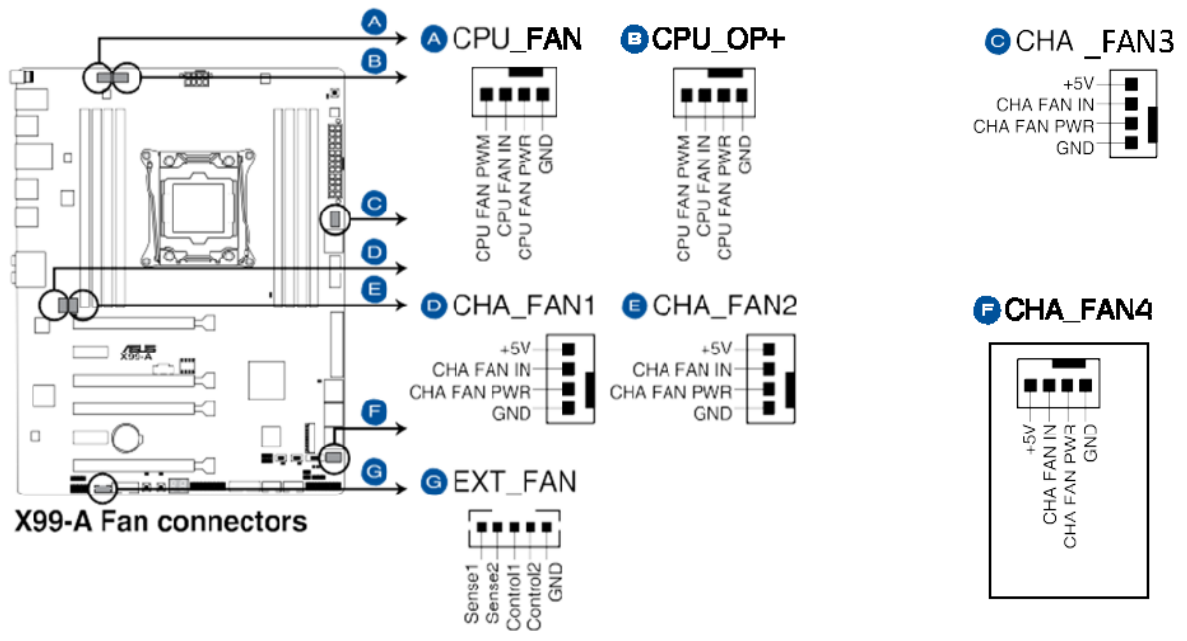
X99-A Digital audio connector

- *The SPDIF module is an option that is purchased separately.*

CPU, CPU optional, extension, and chassis fan connectors (4-pin CPU_FAN; 4-pin CPU_OPT; 5-pin EXT_FAN, 4-pin CHA_FAN1-4)

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.*

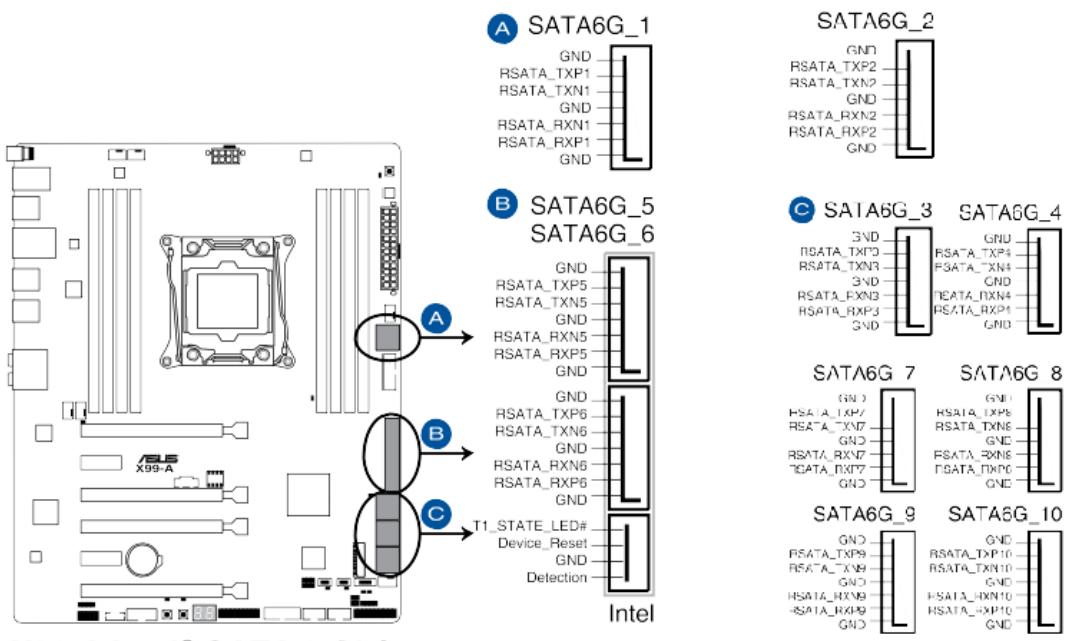


X99-A Fan connectors

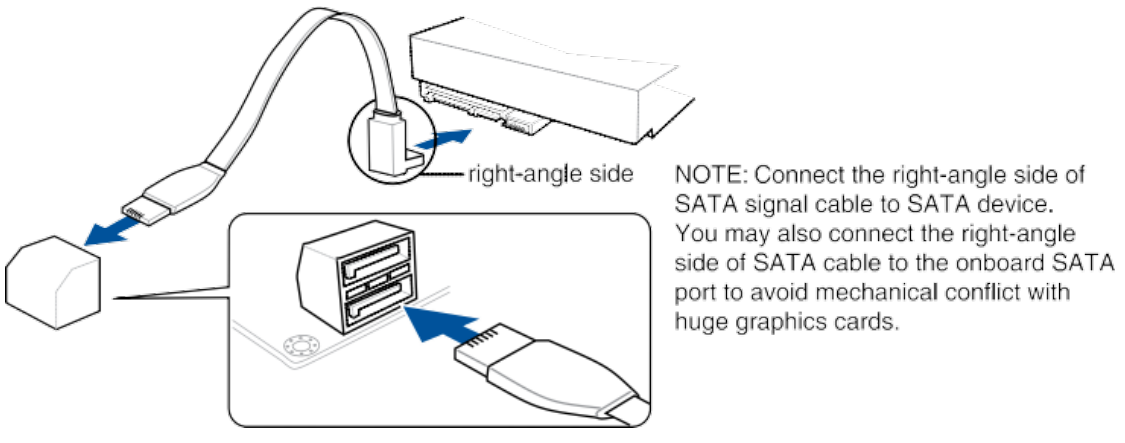
- *The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power.*
- *The CPU_FAN, CHA_FAN, and EXT_FAN connectors support the ASUS FAN Xpert 3 feature on X99 platform.*
- *The EXT_FAN connector supports 2 of 5 thermal sensor sources.*
- *The CPU fan connector detects the type of CPU fan installed and automatically switches the control modes. To configure the CPU fan's control mode, go to **Advanced Mode > Monitor > CPU Q-Fan Control** item in BIOS.*
- *The chassis fan connectors support DC and PWM modes. To set these fans to DC or PWM, go to **Advanced Mode > Monitor > Chassis Fan 1/4 Q-Fan Control** items in BIOS.*

Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_12, SATA6G_34, SATA6G_5, SATA6G_6/SATAEXPRESS, SATA6G_78, SATA6G_910)

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.



X99-A Intel® SATA 6 Gb/s connectors



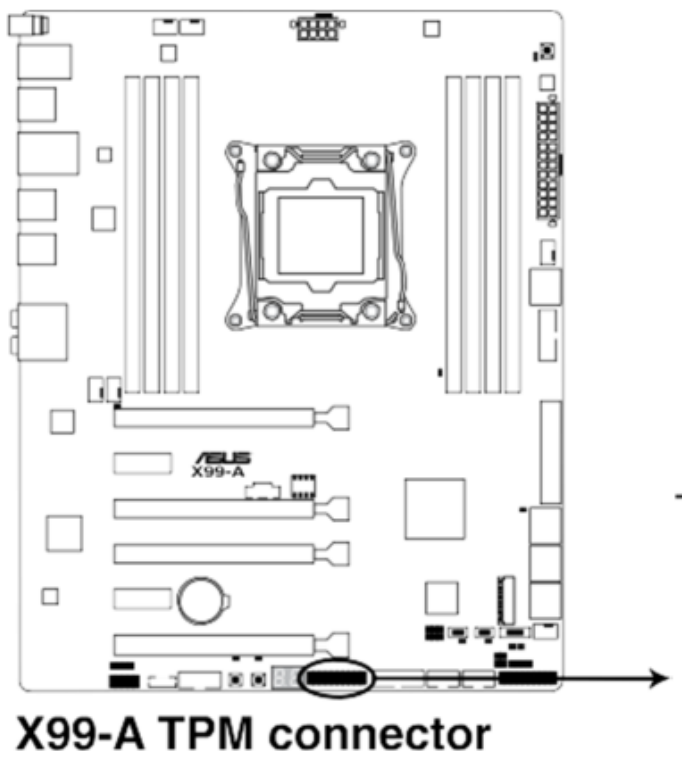
NOTE: Connect the right-angle side of SATA signal cable to SATA device. You may also connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.

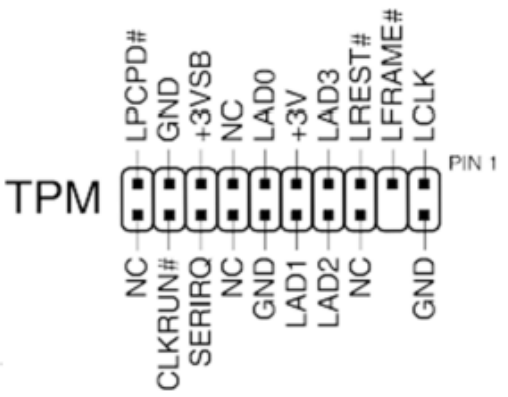
- *These connectors are set to **[AHCI Mode]** by default. If you intend to create a Serial ATA RAID set using these connectors, set the SATA Mode item in the BIOS to **[RAID Mode]**. Refer to section **3.6.3 PCH Storage Configuration** for details.*
- *Before creating a RAID set, refer to the manual bundled in the motherboard support DVD.*

- *The SATAEXPRESS_1 connector can support one SATA Express device or two SATA devices.*
- *Due to chipset behavior, the SATA6G_78 and SATA6G_910 ports (black) do not support Intel® Rapid Storage Technology and RAID configuration.*

TPM connector (20-1 pin TPM)

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

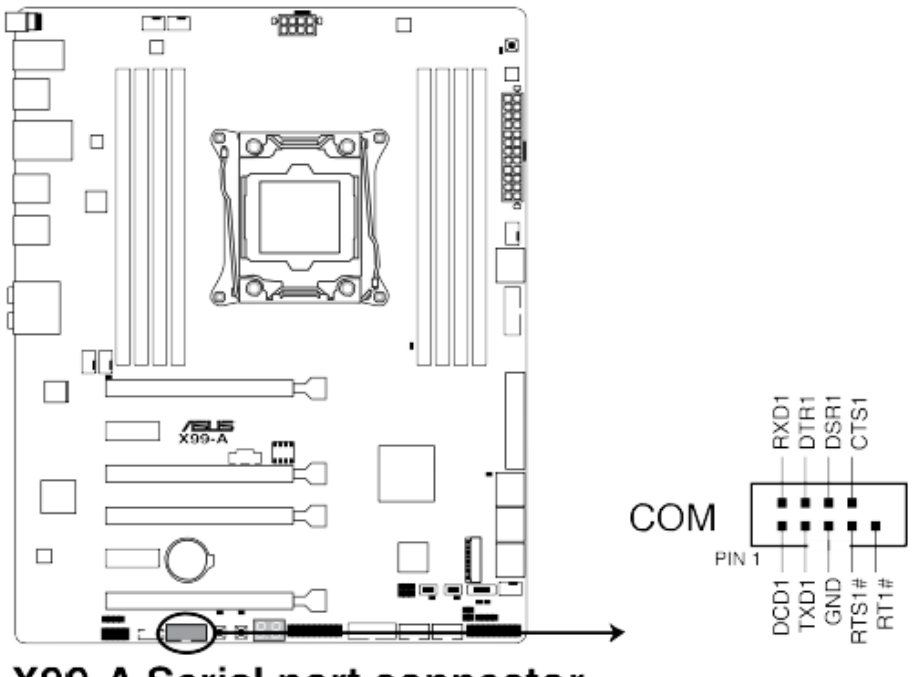




X99-A TPM connector

Serial Port Connector (10-1 pin COM)

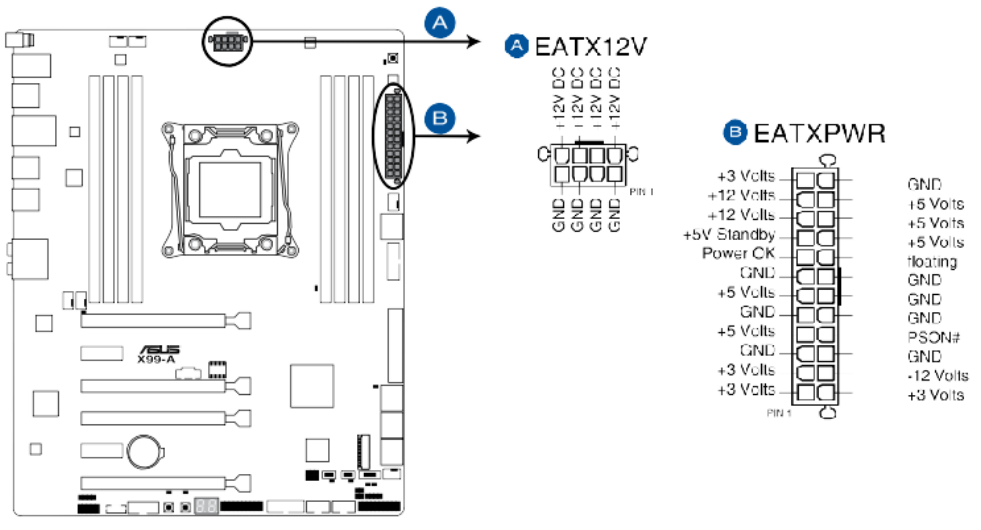
These connectors are for the serial (COM) port. Connect the serial port module cable to one of these connectors, then install the module in a slot opening at the back of the system.



X99-A Serial port connector

ATX power connectors (24-pin EATXPWR; 8-pin EATX12V)

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.



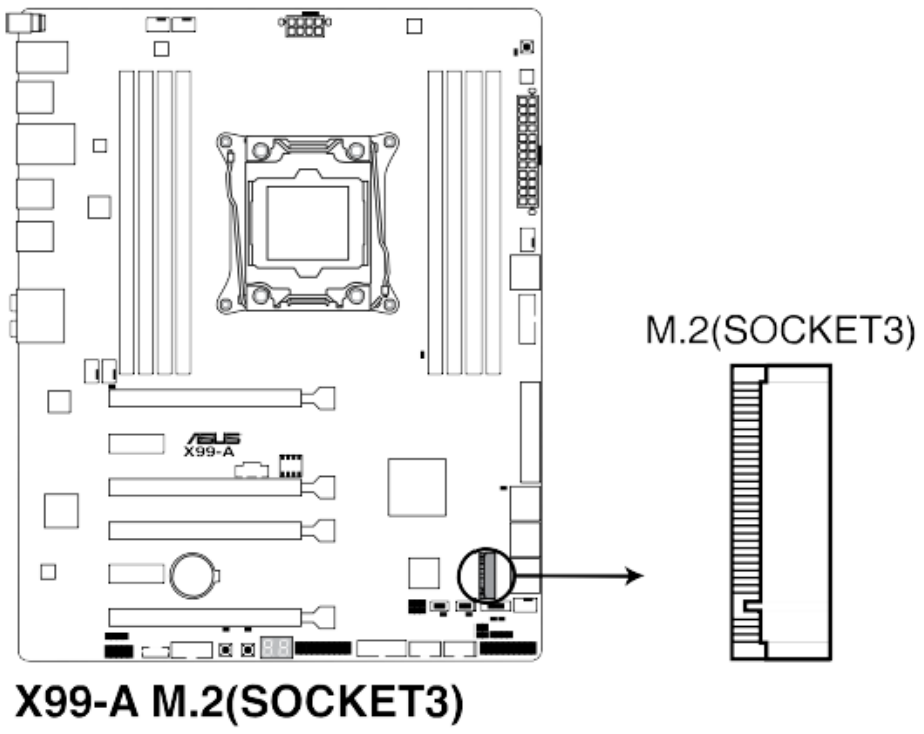
X99-A ATX power connectors

1. Observe the precautions in "Before You Proceed".
2. Connect the 12 V processor core voltage power supply cable to the 2 x 4 pin connector (A).
3. Connect the main power supply cable to the 2 x 12 pin connector (B).

- *For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.*
- *DO NOT forget to connect the 4-pin/8-pin EATX12 V power plug. Otherwise, the system will not boot.*
- *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.*
- *If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at http://support.asus. com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en -us for details.*

M.2 socket 3

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

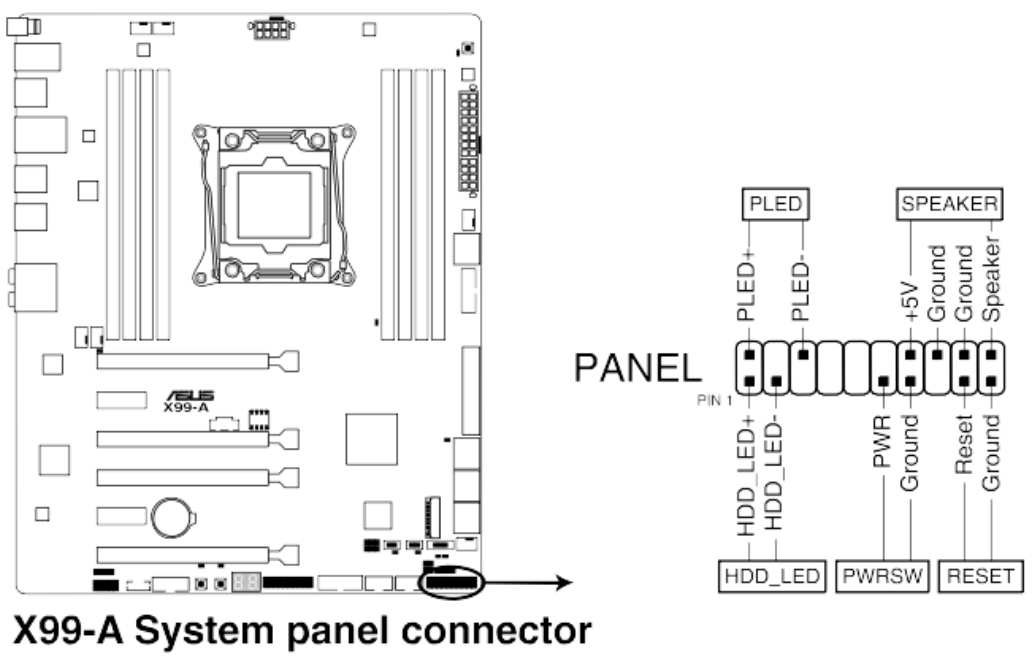


X99-A M.2(SOCKET3)

- *This socket supports M Key and type 2242/2260/2280/22110 storage devices.*

System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.



X99-A System panel connector

- **System power LED (2-pin PLED)**

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

- **Hard disk drive activity LED (2-pin HDD_LED)**

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

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

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

- **ATX power button/soft-off button (2-pin PWRSW)**

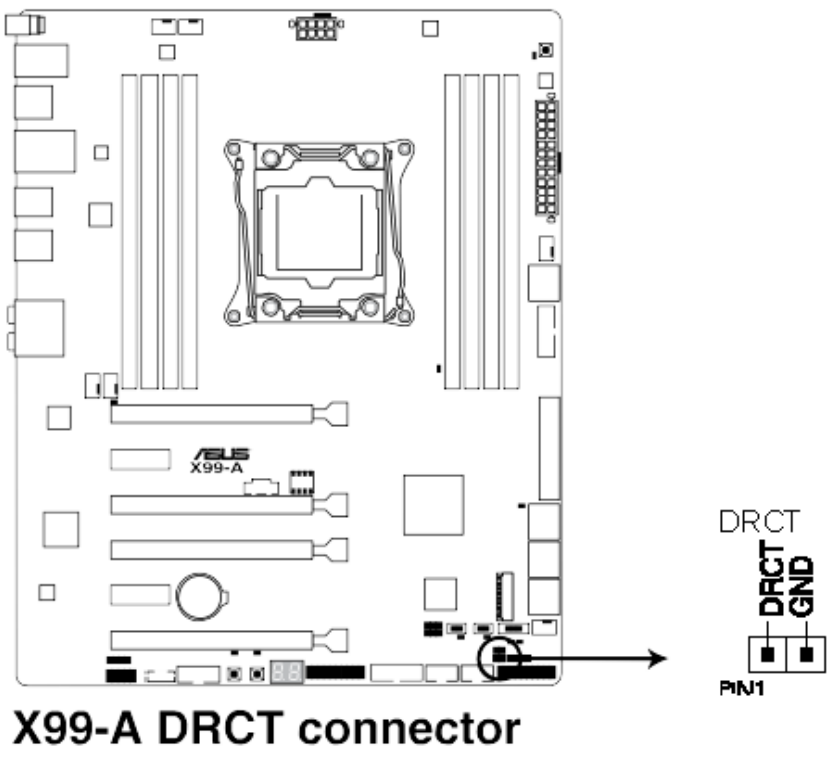
  This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the operating system settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

DirectKey connector (2-pin DRCT)

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

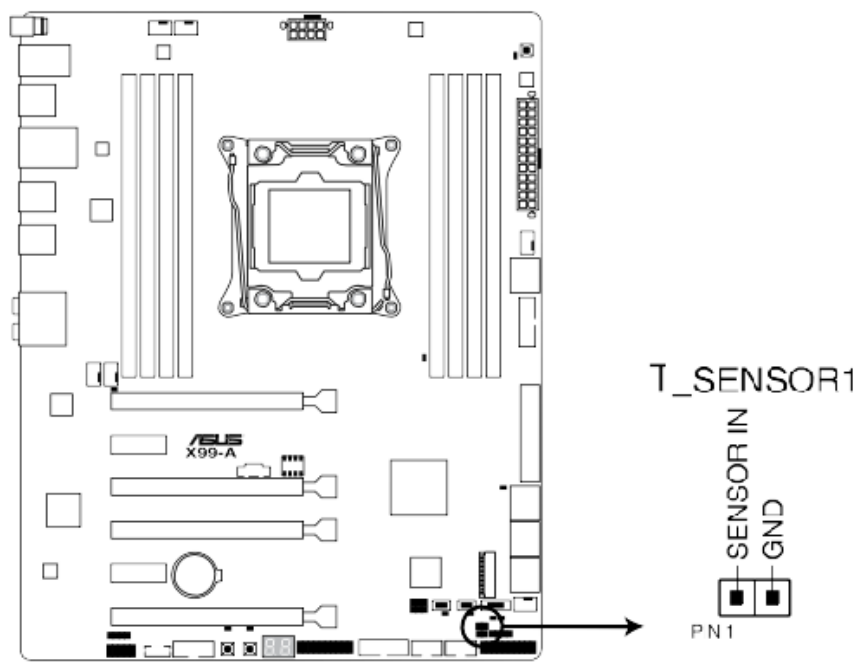


X99-A DRCT connector

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

T_Sensor connector (2-pin T_SENSOR1)

This connector is for the thermistor cable that allows you to monitor the temperature of your motherboard's critical components and connected devices.



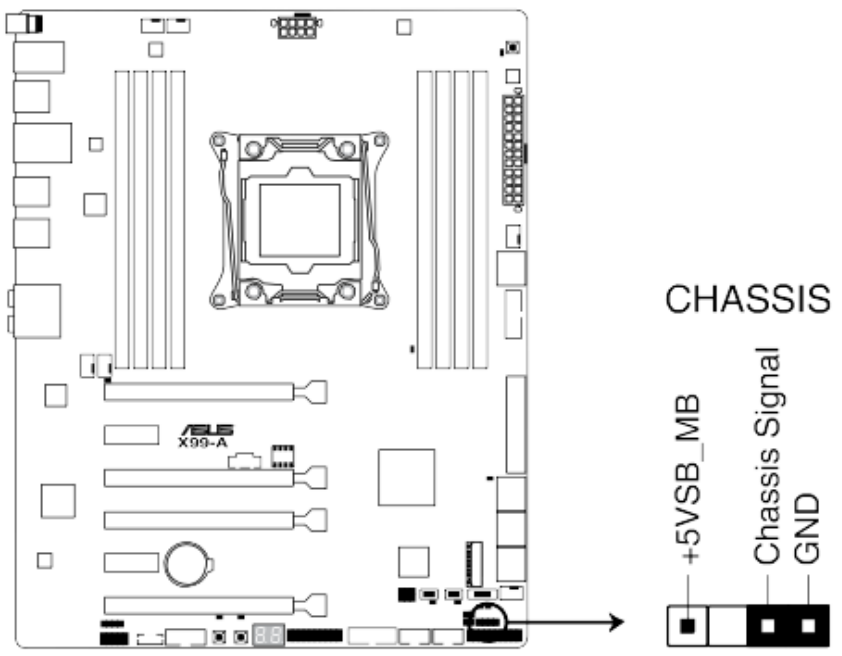
X99-A T_SENSOR1 connector

- *The thermistor cable must be purchased separately .*

Chassis intrusion connector (4-1 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.

By default,the pin labeled "Chassis Signal" and "Ground" are shorted with a jumper cap. Remove the jumper caps and enable the related options in BIOS if you intend to use the chassis intrusion detection feature.



X99-A Chassis intrusion connector

- *A message appears when you connect the sensor or switch for the first time or when you reconnect the sensor or switch to this connector. Reset the system to exit the message.*

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.

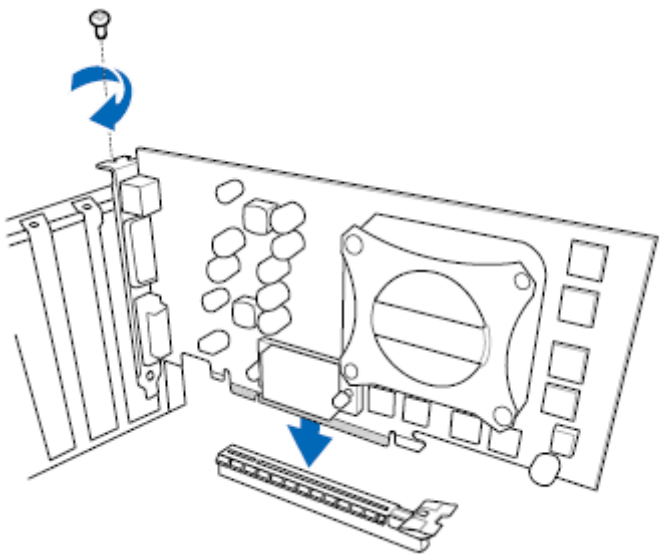
- *When installing a PCI Express card on the Desktop Board, ensure that the card is fully seated in the PCI Express connector before you power on the system. If the card is not fully seated in the connector, an electrical short may result across the connector pins. Depending on the over-current protection 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



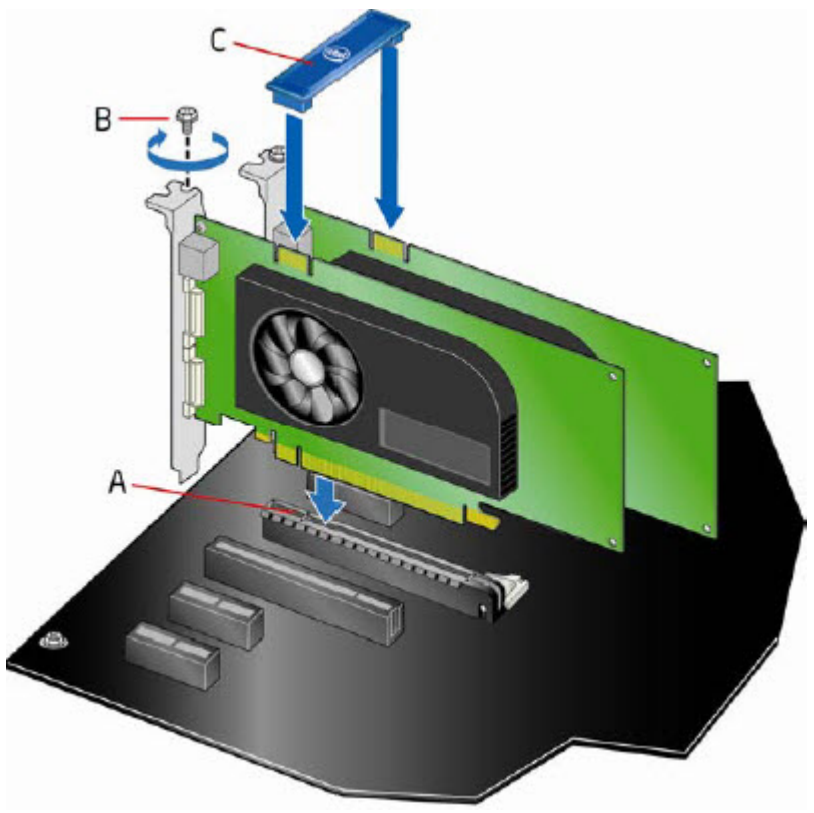
Installing Linked PCI Express x16 Graphics Cards

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:

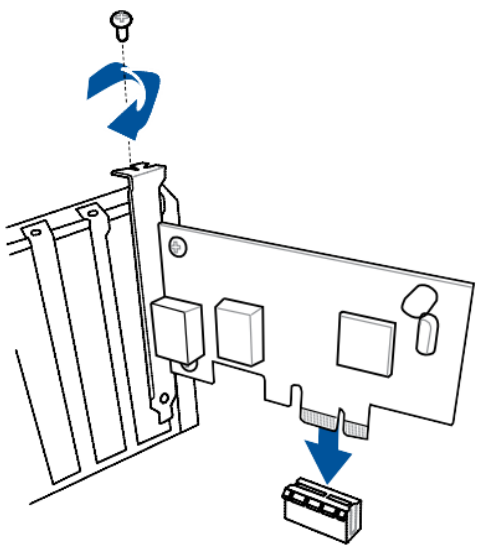
1. Observe the precautions in "Before You Proceed".
2. Install the first card in the *PCI Express* x16 connector as described in "Installing *PCI Express* x16 Graphics Cards"
3. Place the second card in the secondary *PCI Express* x16 connector (A) and press down on the card until it is completely seated 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

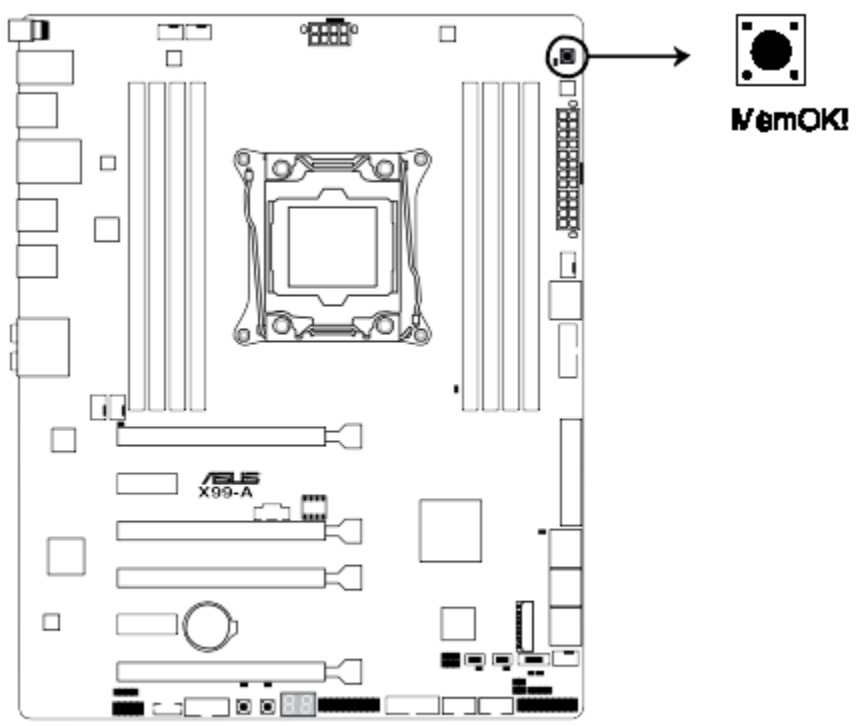
Onboard Switches and Buttons

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

- MemOK! button
- *BIOS* Flashback button
- Power-on button
- Reset button
- TPU switch
- EPU switch
- EZ XMP switch

MemOK! Switch

Installing DIMMS that are incompatible with the motherboard may cause system *boot* failure, and the DIAG_DRAM LED near the MemOK! button lights continuously. Press and hold the MemOK! switch until the DIAG_DRAM LED starts blinking to begin automatic *memory* compatibility tuning.



X99-A MemOK! button

- *The DIAG_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 DIAG_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 DIAG_DRAM LED lights continuously. Replace the DIMMs with ones recommended in the Memory QVL (Qualified Vendors Lists) in this user manual or 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. Place the bundled support DVD into the optical drive and install the USB BIOS Flashback Wizard. Follow the on-screen instructions to complete the installation.

2. 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.

3. Launch the USB BIOS Flashback Wizard to automatically download the latest BIOS version.

4. Shut down your computer.

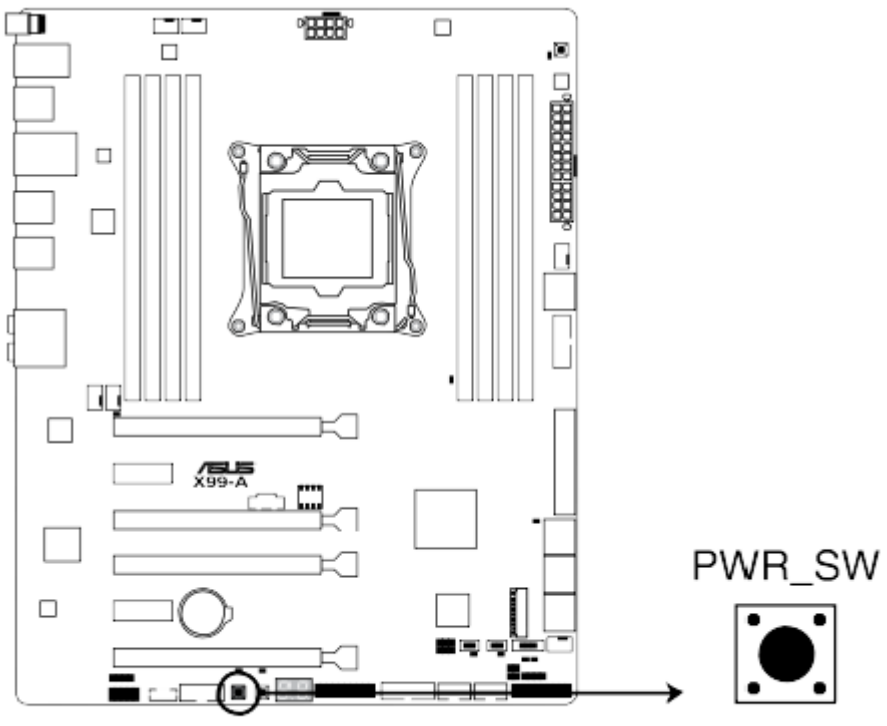
5. press the BIOS Flashback button for three seconds until the Flashback LED blinks three times, indicating that the BIOS Flashback function is enabled.

6. 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.*
- *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 tests the next set of failsafe settings. The blinking speed of the DIAG_DRAM LED increases, indicating different test processes.*
- *Updating the BIOS has risks. If the BIOS program is damaged during the process and results to the system's failure to boot up, please contact the Northern Micro Service Department.*

Power-On Button

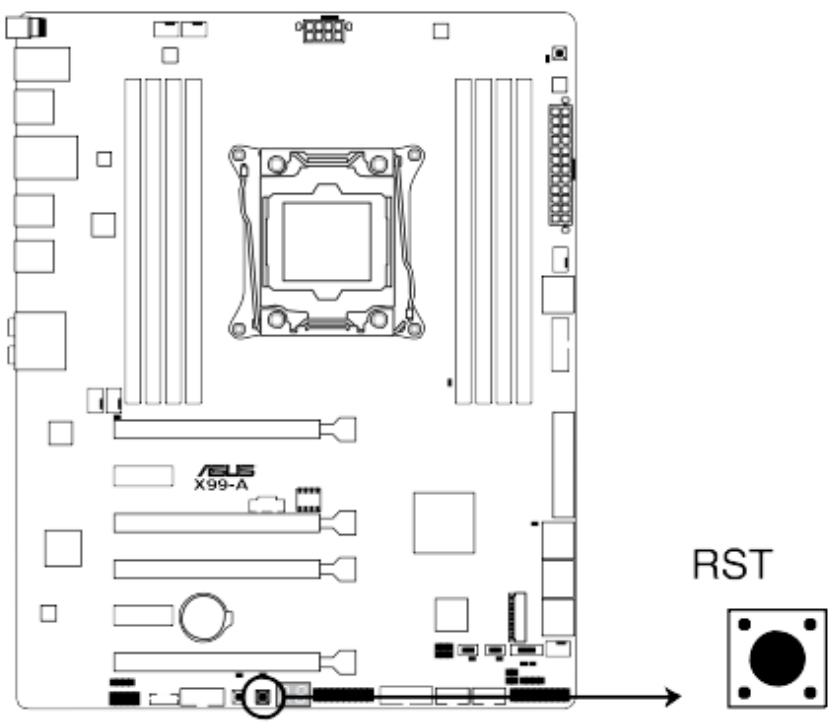
The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.



X99-A Power on button

Reset Button

Press the reset button to reboot the system.

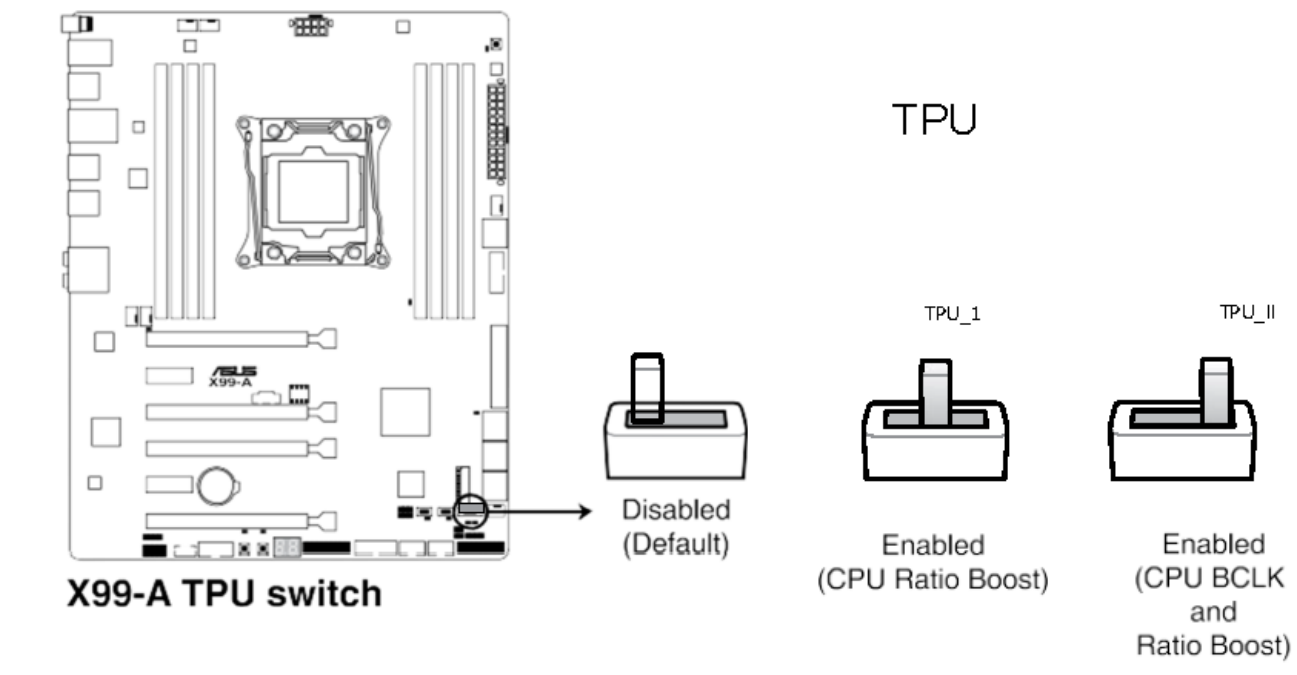


X99-A Reset button

TPU Switch

With its two-level adjustment functions, the TPU allows you to automatically adjusts the CPU ratio and clock speed for an optimal system performance.

- *Enable this switch when the system is powered off.*
- *When the TPU switch is set to Enabled (TPU_I: CPU Ratio Boost), the system automatically adjusts the CPU ratio for an enhanced performance.*
- *When the TPU switch is set to Enabled (TPU_II: CPU BCLK and Ratio Boost), the system automatically adjusts the base clock rate (BLCK) and the CPU ratio for a more enhanced performance.*



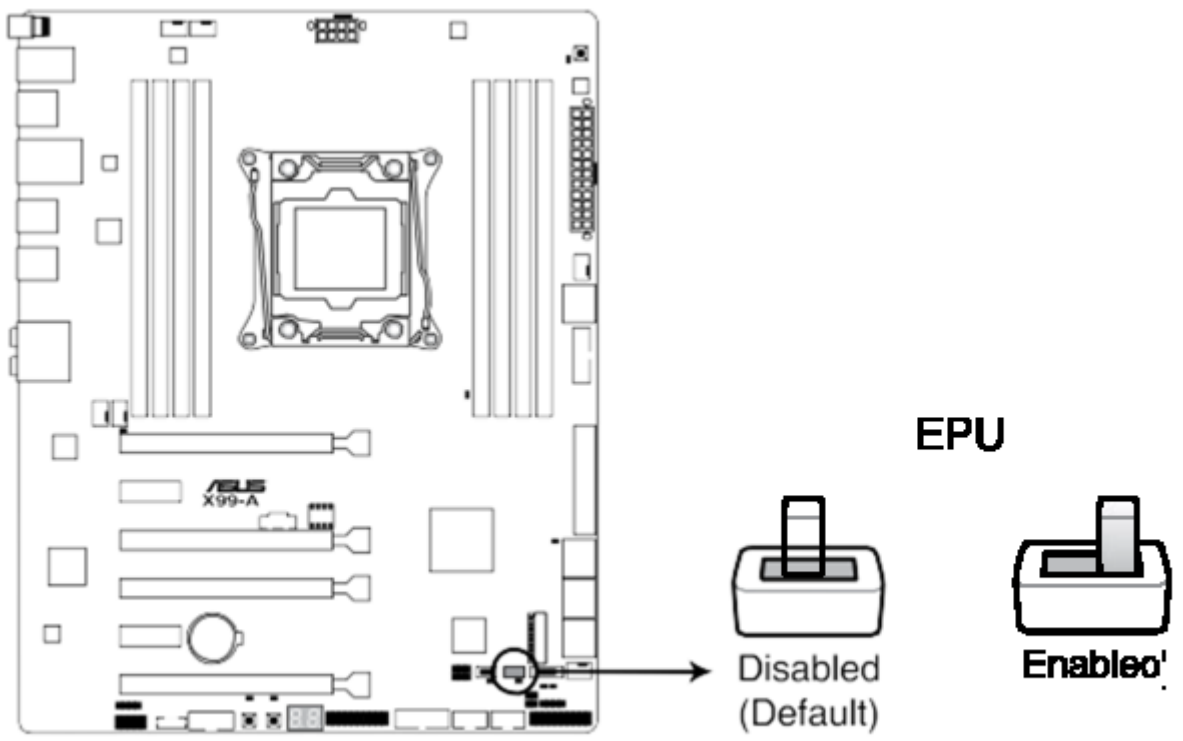
X99-A TPU switch

- *The TPU LEDs (TPU_LED) near the TPU switch light up when you set the TPU switch to TPU_I mode or TPU_II mode.*
- *If you enable this switch under Windows® OS environment, the TPU function will be activated after the next system bootup.*
- *You may use the 5-Way Optimization and TPU feature in the AI Suite 3 application, adjust the BIOS setup program or enable the TPU switch at the same time. However, the system will use the last setting you have made.*

EPU Switch

Enable this switch to automatically detect the current PC loadings and intelligently moderate the power consumption.

- *Enable this switch when the system is powered off.*

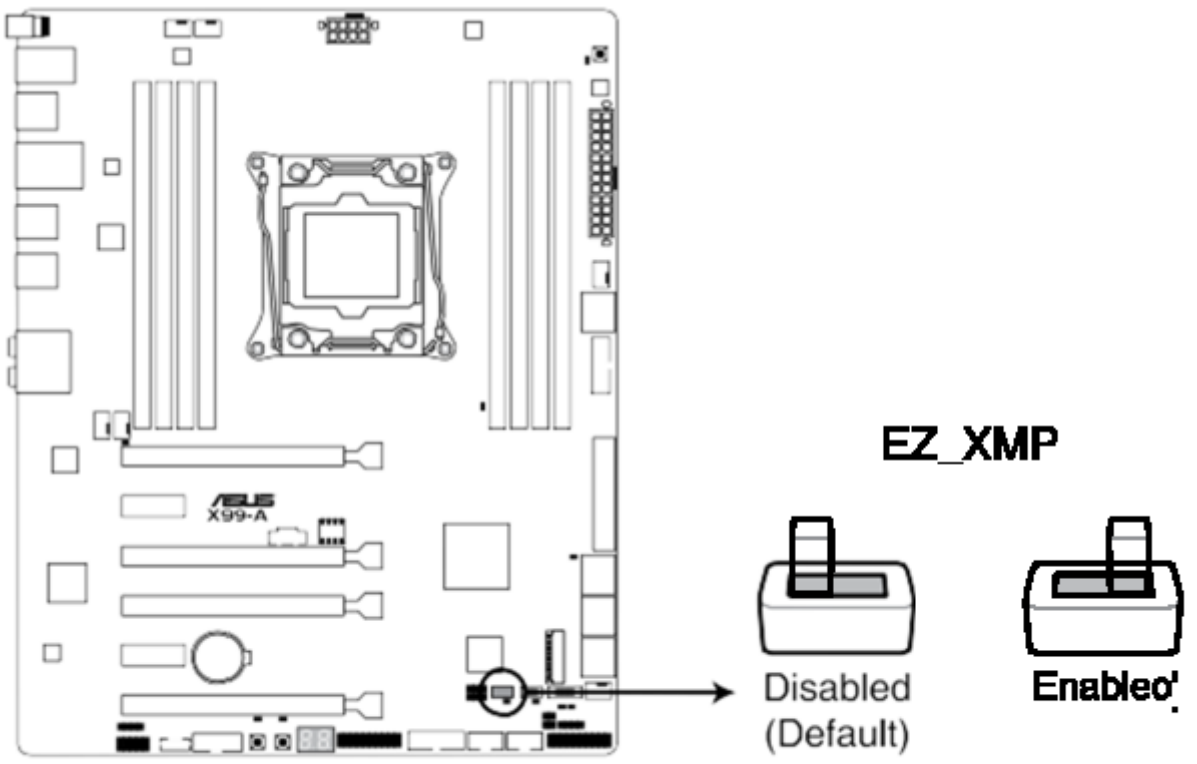


X99-A EPU switch

- *The EPU LED (O2LED3) near the EPU switch lights up when you enable the EPU switch.*
- *If you enable this switch under Windows® OS environment, the EPU function will be activated after the next system bootup.*
- *You may change the EPU settings in the software application or BIOS setup program and enable the EPU function at the same time. However, the system will use the last setting you have made.*

EZ XMP Switch

Enable this switch to overclock the installed DIMMs, allowing you to enhance the DIMM's speed and performance.



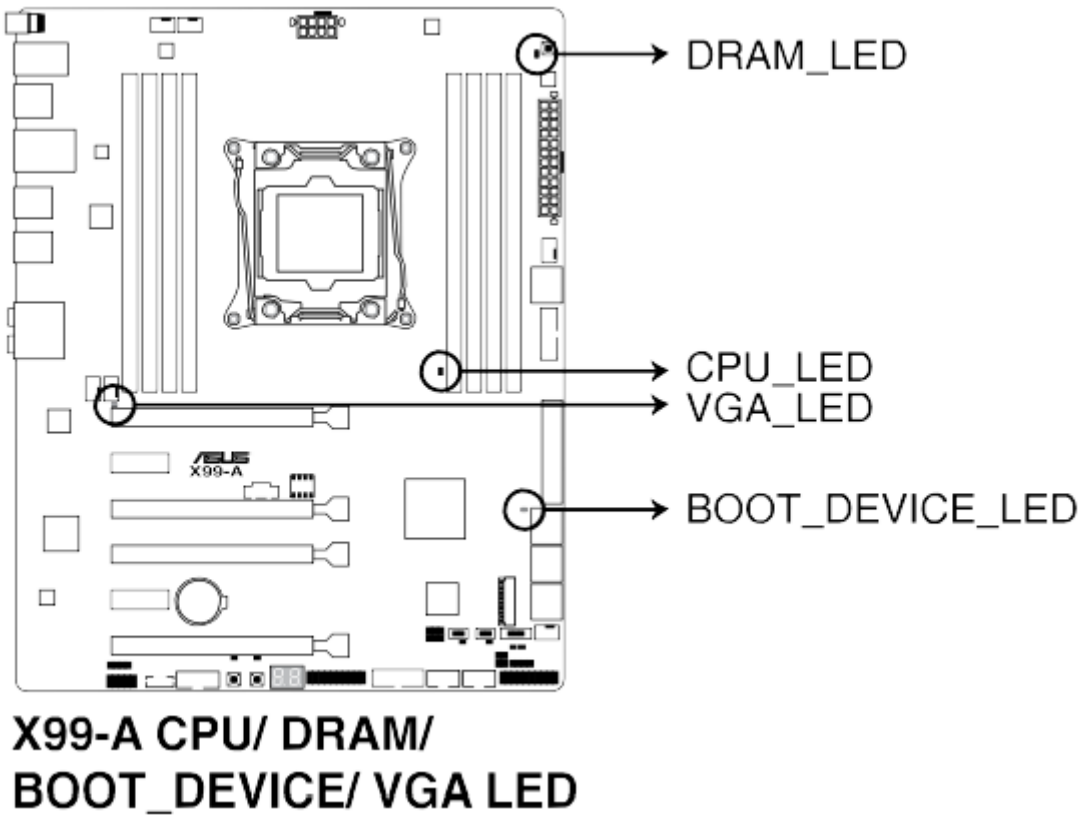
X99-A EZ_XMP switch

- *The EZ XMP LED (XLED1) lights up when you enable the EZ XMP switch.*

Onboard LEDs

POST State LEDs

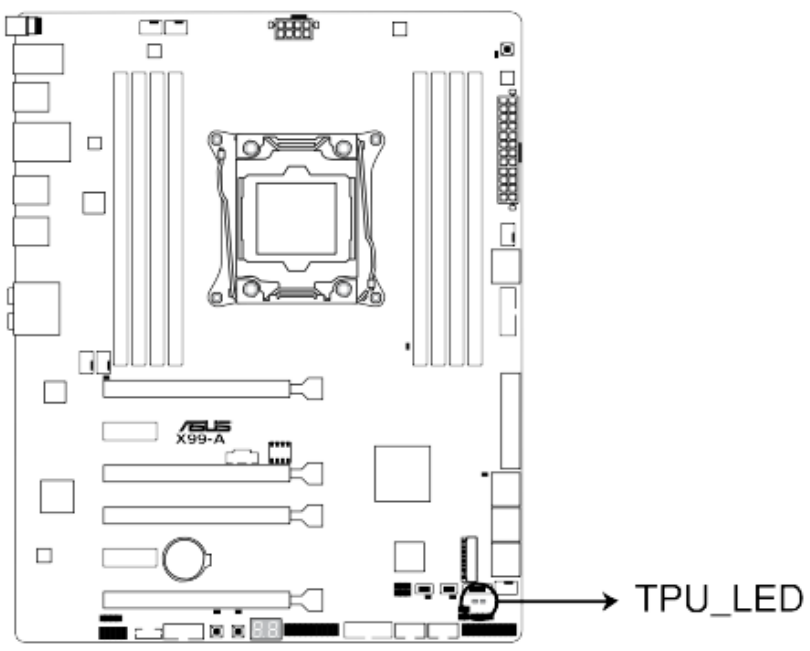
The POST State LEDs provide the status of these key components during POST (Power-On-Self Test): CPU, memory modules, VGA card, and hard disk drives. If an error is found, the critical component's LED stays lit up until the problem is solved.



X99-A CPU/ DRAM/ BOOT_DEVICE/ VGA LED

TPU LED (TPU_LED)

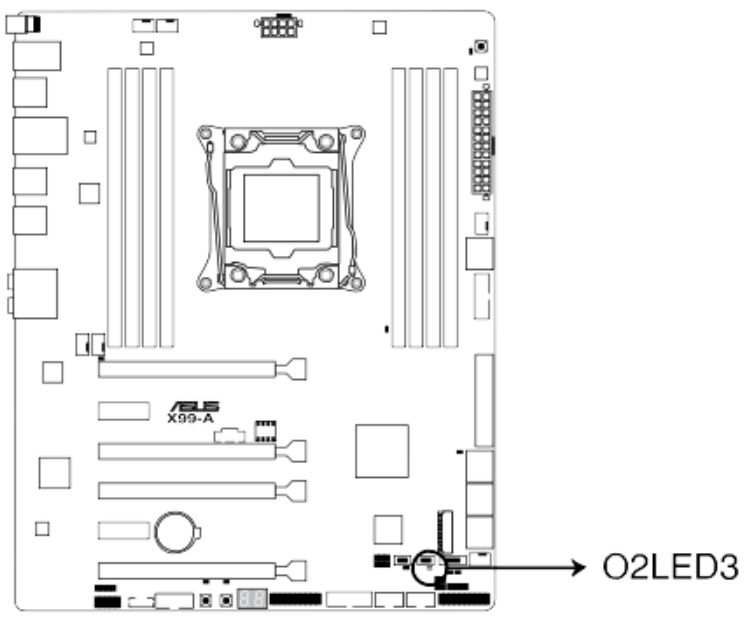
The TPU LED lights up when the TPU switch is enabled.



X99-A TPU LEDs

EPU LED (O2LED3)

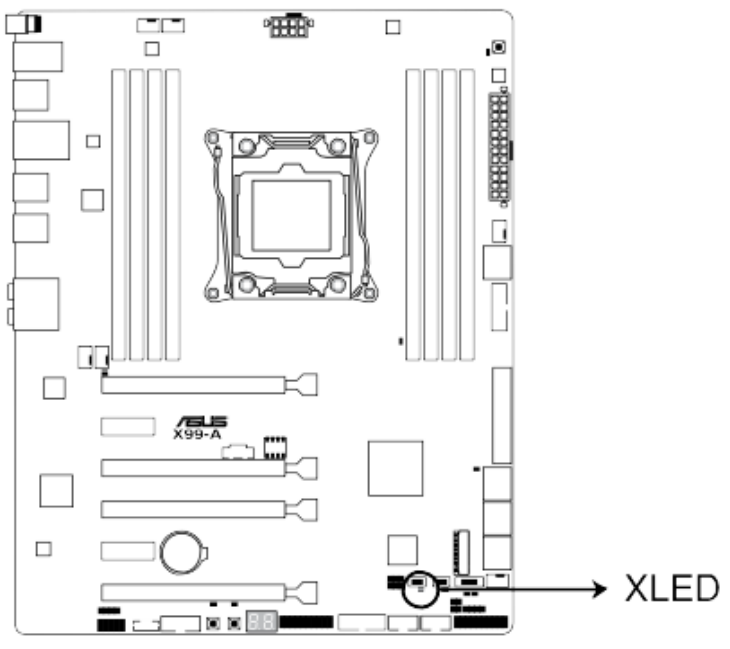
The EPU LED lights up when the EPU switch is enabled.



X99-A EPU LED

EZ XMP LED (XLED)

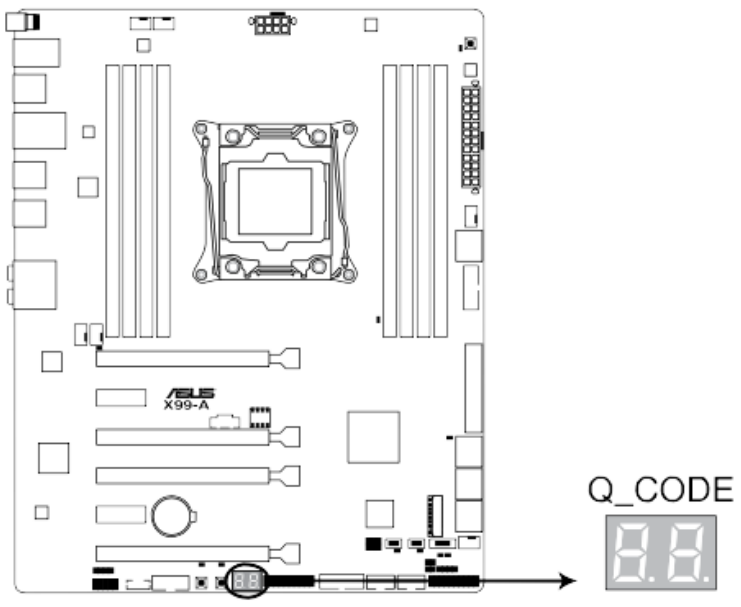
This LED lights up when you enable the EZ XMP switch.



X99-A XLED

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.



X99-A Q-Code LED

Q-Code table

Code	Description
0	Not used
2	microcode
3	CACHE_ENABLED
4	PCH initialization
6	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 errot
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
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 AMI 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
3	System is entering S3 sleep state
4	System is entering S4 sleep state
5	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

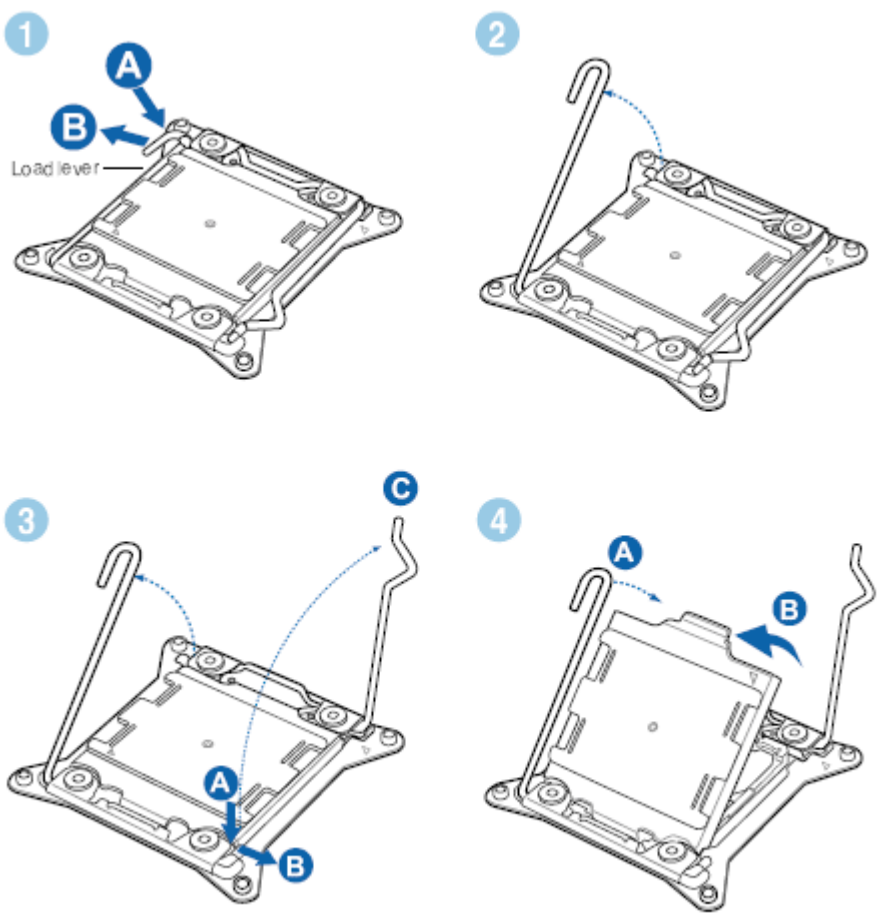
Processor Number	Core i7-5930K
Base Frequency (GHz)	3.50
Total *Cache*	15M
Cores / Threads	6 / 12
Memory Speed Support (DDR3)	2133, 1600, 1333

Installing a CPU

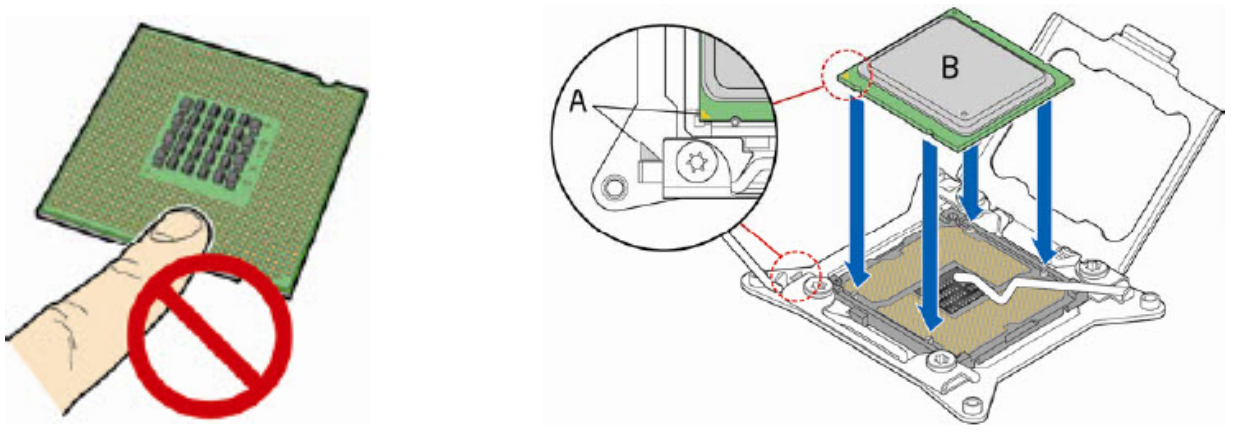
- *Before installing or removing a processor, make sure the AC power has been removed by unplugging the power cord from the computer; the standby power LED should not be lit. Failure to do so could damage the processor and the board.*

To install a processor, follow these instruction s:

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).

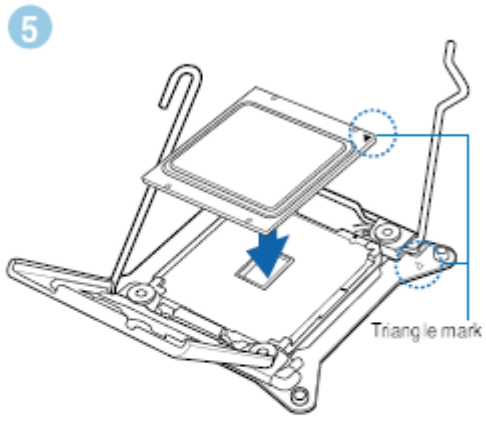


3. Open the second socket lever by pushing the lever down and away from the socket (Figure 3, A and B above). Rotate the socket lever to its fully open position as shown (Figure 3, C above).
4. Push down on the load lever (Figure 4, A above) to lift the socket load plate as shown. Grasp the load plate and lift up to open it fully. Do not touch the socket contacts.
5. Remove the processo r from it's 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.

5



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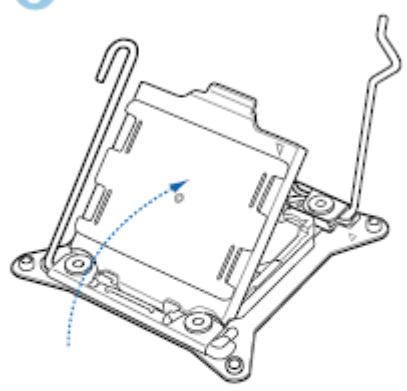

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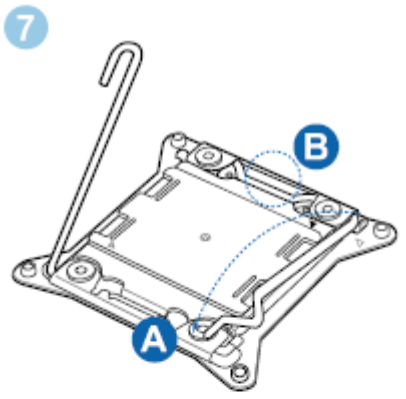

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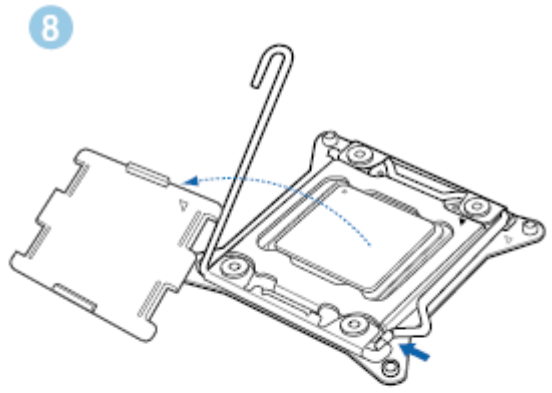

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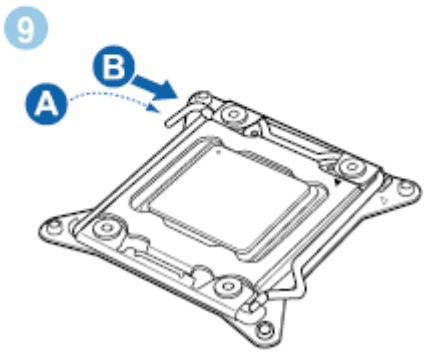
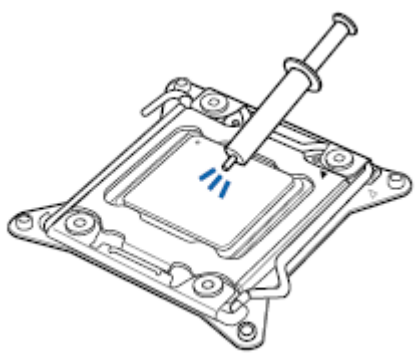
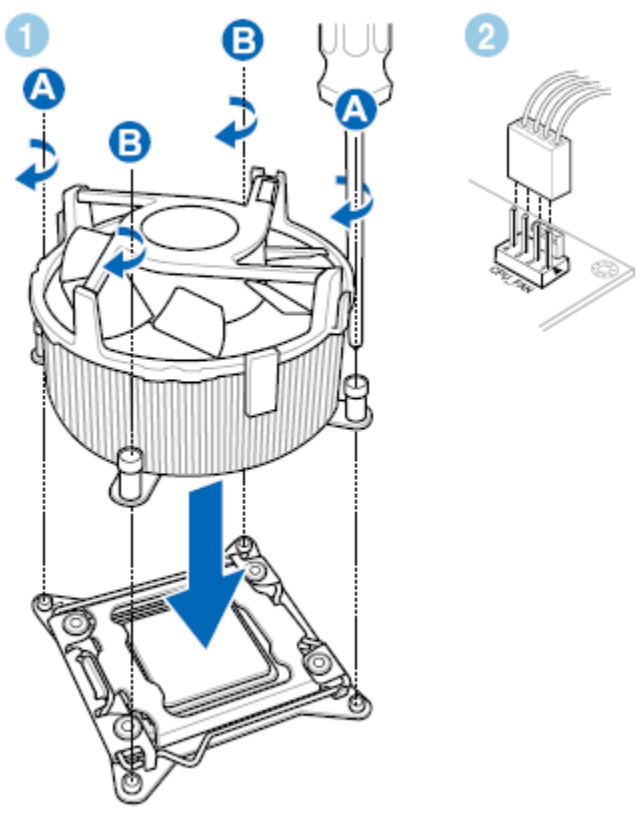


Installing CPU Heatsink & Fan

The LGA2011 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.



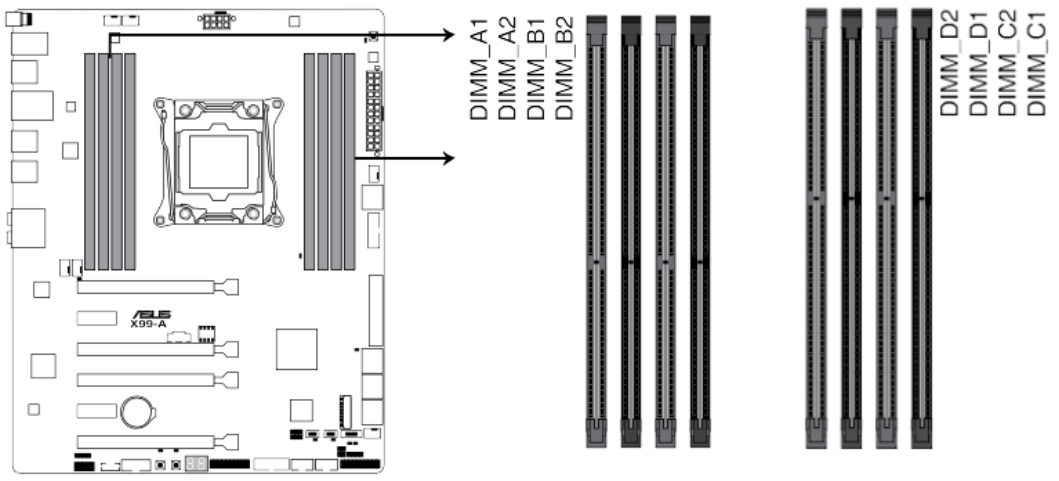


- Do not forget to connect the CPU fan connector! *Hardware* errors can occur if you fail to plug this connector.

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.

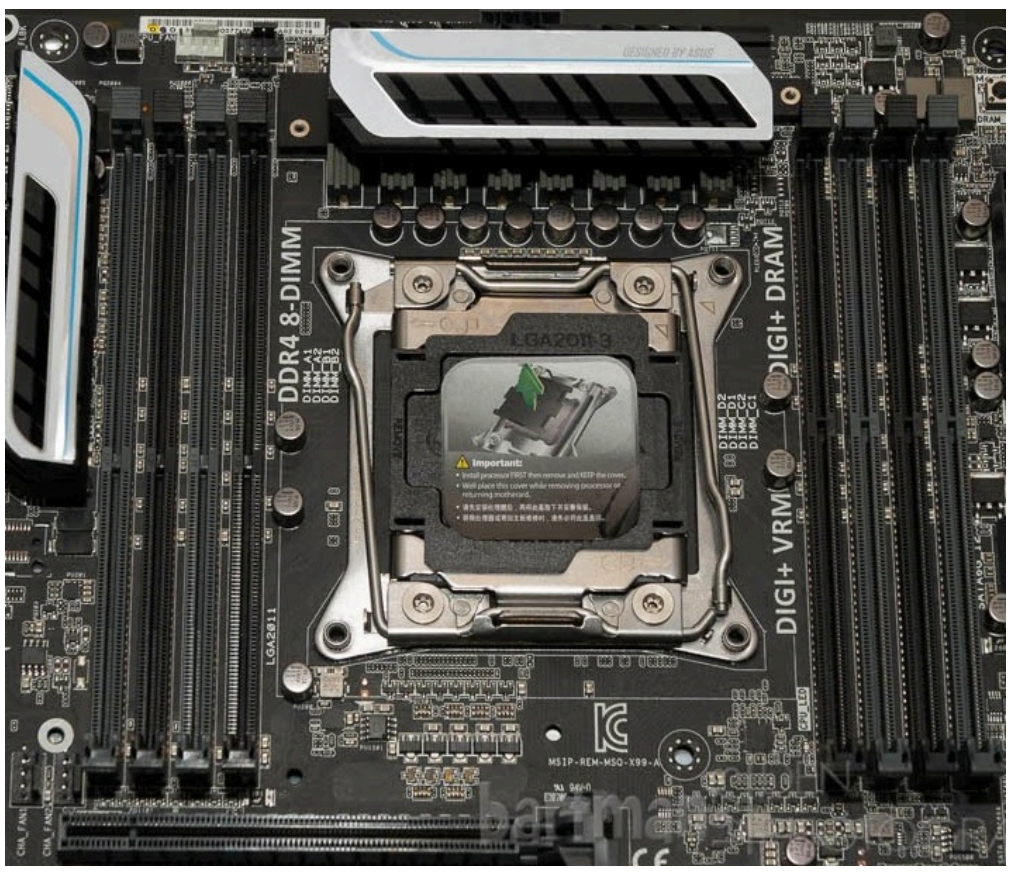


X99-A 288-pin DDR4 DIMM socket

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
- 3000 (OC)/2800 (OC)/2666 (OC)/2400 (OC)/2133 MHz DDR4 DIMM support
- XMP performance profile support
- Support for quad-channel *memory* interleaving
- Unbuffered, non-registered single or double-sided DIMMs with a voltage rating of 1.65V or less *memory*
- Serial Presence Detect
- Minimum total system *memory* of 4 GB
- Up to 64 GB maximum total system *memory*

- *32-bit operating systems are limited to a maximum of 4 GB of memory. The operating system may report less than 4 GB because of the memory used by add-in PCI Express graphics cards.*



System Memory Configurations

You may install 2 GB, 4 GB and 8 GB unbuffered and non-ECC DDR4 DIMMs into the DIMM sockets.

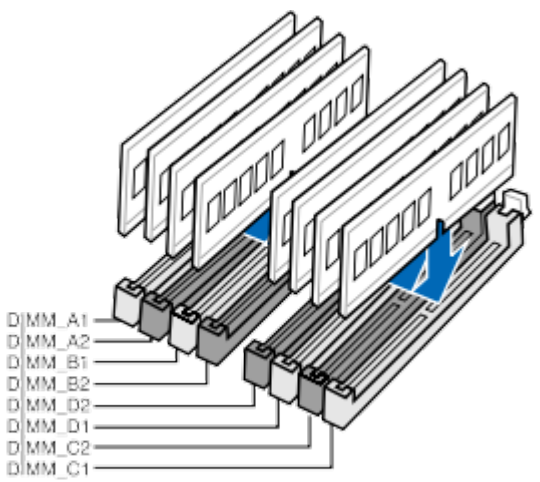
- You may install varying memory sizes in Channel A, Channel B, Channel C, and Channel D. The system maps the total size of the lower-sized channel for the dual channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
- According to Intel® CPU spec, DIMM voltage below 1.65 V is recommended to protect the CPU.
- Due to the memory address limitation on 32-bit Windows® OS, when you install 4GB or more memory on the motherboard, the actual usable memory for the OS can be about 3GB or less. For effective use of memory, we recommend that you do any of the following:

  a Use a maximum of 3GB system memory if you are using a 32-bit Windows® OS.

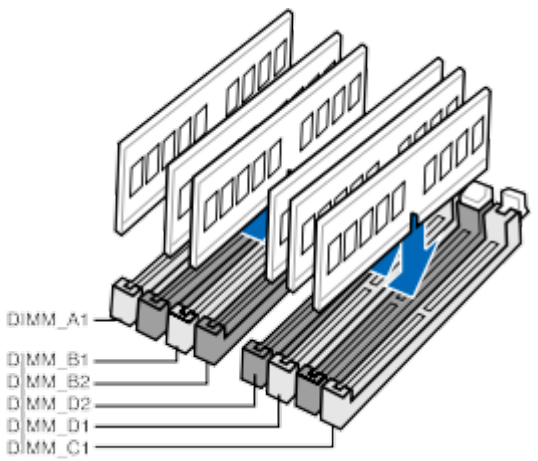
  b Install a 64-bit Windows® OS when you want to install 4 GB or more on the motherboard.

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

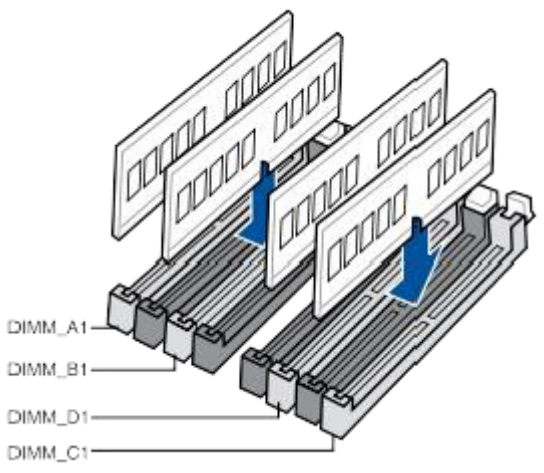
- **Quad-channel (Interleaved) mode.** Quad-channel mode offers the highest throughput for real world applications.



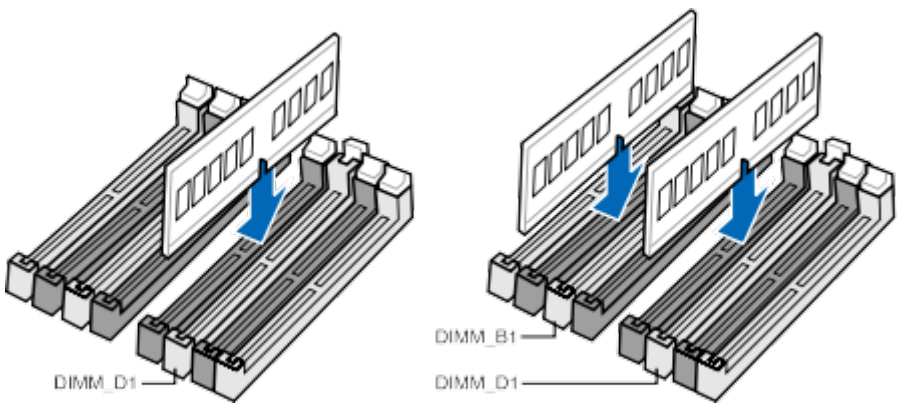
- **Tri-channel (Interleaved) mode.** Tri-channel mode is enabled when the installed *memory* capacities of any three DIMM channels are equal.



- **Dual-channel (Interleaved) mode.** Dual-channel mode is enabled when the installed *memory* capacities of both DIMM channels are equal. Technology and device width can vary from one channel to the other but the installed *memory* capacity for each channel must be equal. If different speed DIMMs are used between channels, the slowest *memory* timing will be used.



- **Single-channel (Asymmetric) mode.** This mode is equivalent to single-channel *bandwidth* operation for real world applications. This mode is used when only a single DIMM is installed or the channel *memory* capacities are unequal. Technology and device width can vary from one channel to the other. If different speed DIMMs are used between channels, the slowest *memory* timing will be used.



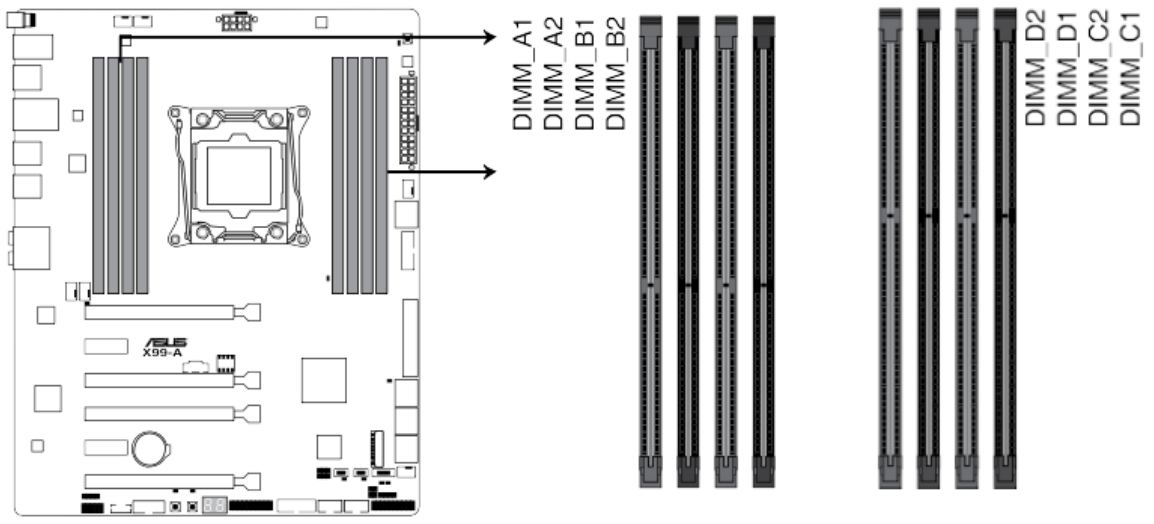
- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system 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.
- The design of the DIMM fan may vary. Ensure that the DIMM fan fits onto the motherboard.

Installing System Memory

Asus Desktop board X99-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-, tri-, 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.

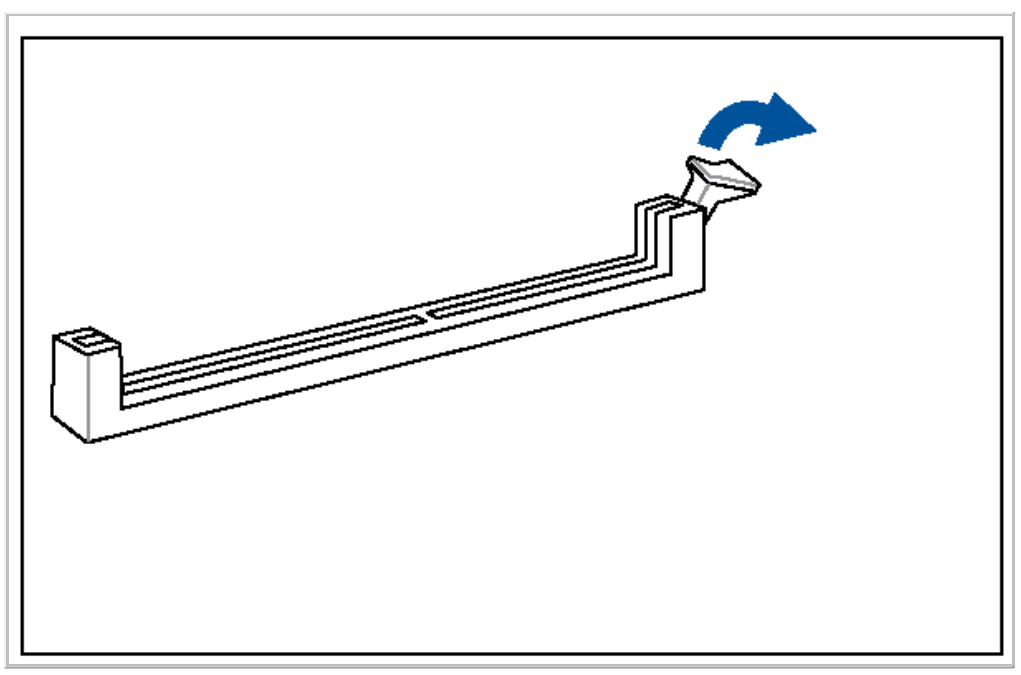


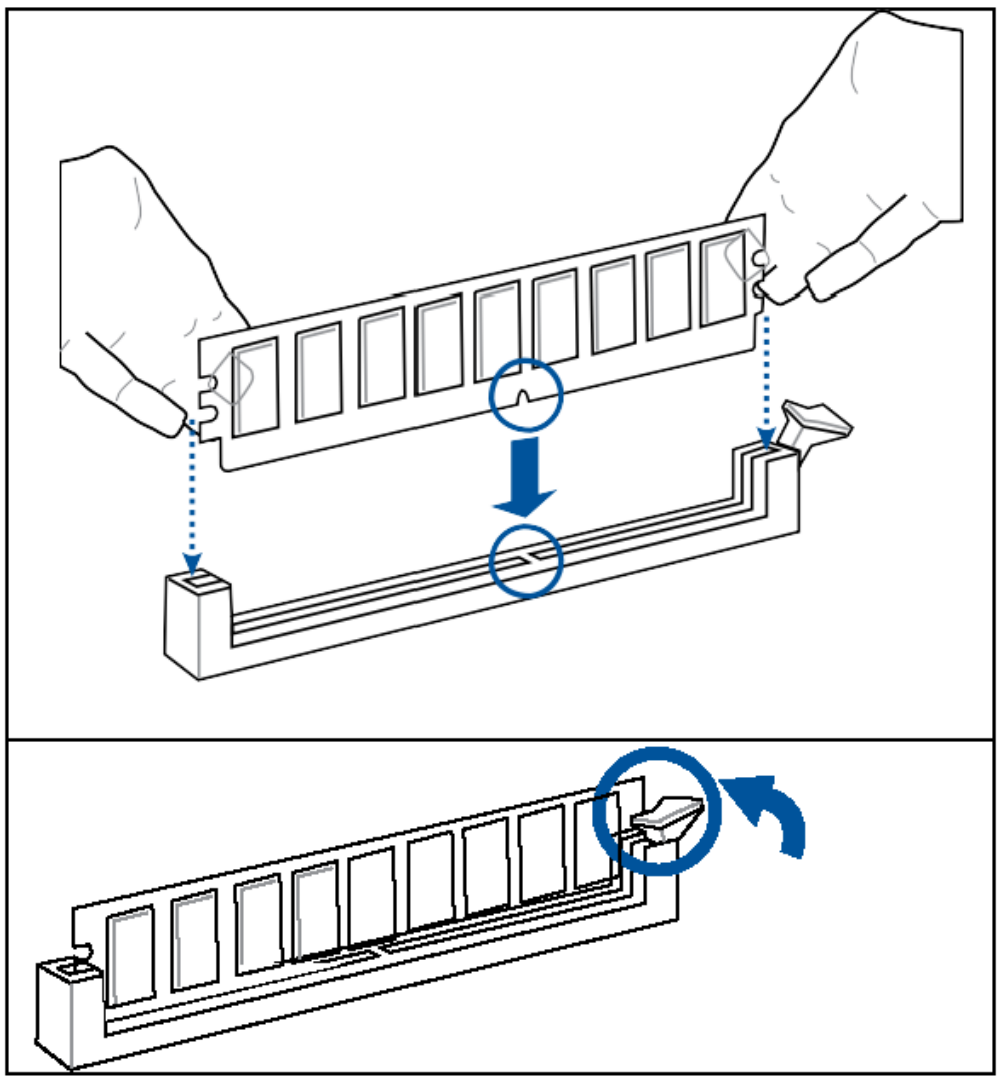
X99-A 288-pin DDR4 DIMM socket

- *Using a DIMM with a voltage rating higher than 1.65 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.



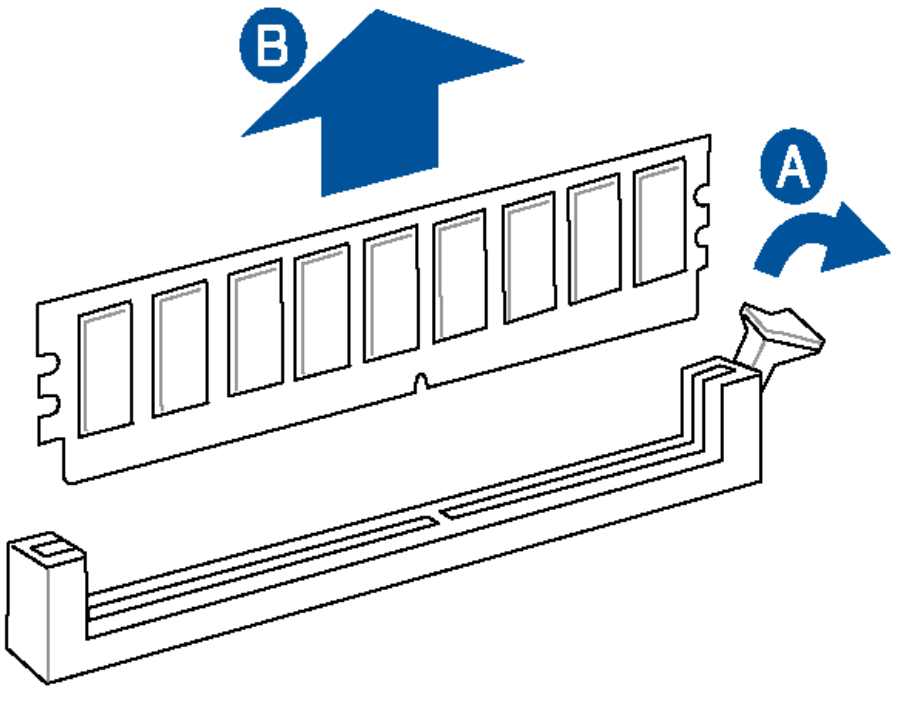


Removing System Memory

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

Formatted Capacity	240GB
Interface	*SATA* Rev 3.0 (6Gb/s), *SATA* Rev 2.0 (3Gb/s)
Form Factor	2.5 inch
Controller	Phison® PS3110-S10
Components	MLC NAND
	Supports S.M.A.R.T., TRIM, and Garbage Collection

Physical Dimensions

Dimensions	69.9mm x 100mm x 7mm
Weight	92.3g

Environmental Specifications

Operating Temperature	0° to 70°C
Storage Temperature	-40°C to 85°C
Vibration Operating	2.17G Peak (7-800Hz)
Vibration non-operating	20G Peak (10-2000Hz)
MTBF	1,000,000 Hrs
Total Bytes Written (TBW)	306 1.19 DWPDTB

Electrical Specifications

Power Consumption	0.455W (TYP) Idle/1.58 W (TYP) Read/2.11W (TYP) Write

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 .

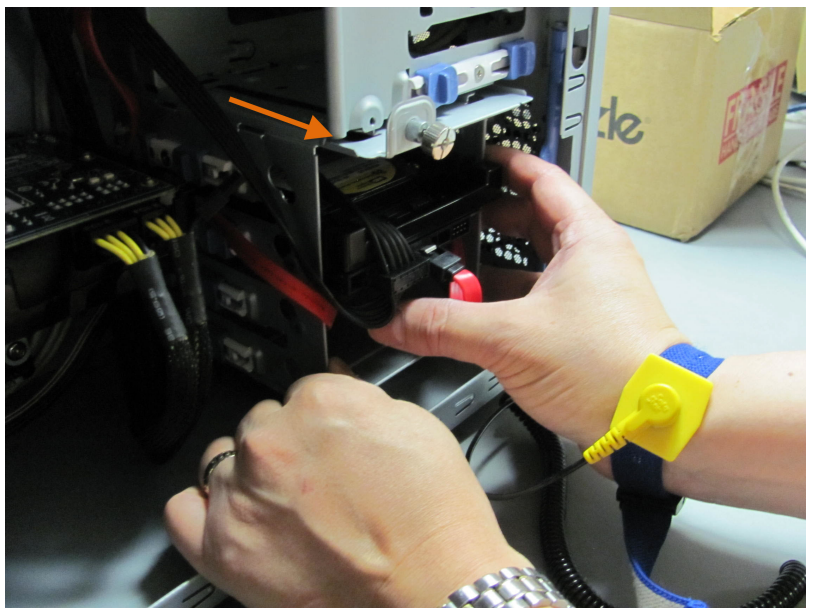
- Do not unpack your hard drive until you are ready to install it.
- Your hard drive is packaged in a static shielding bag. Use this bag to place your hard drive on after unpacking.
- Save the packing materials in case you need to return your hard drive.
- Articles of clothing generate static electricity. 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

- Remove the computer case cover and locate the drive.
- Disconnect the signal and power cables from the drive.
- Press and Pull the metal tab to release the drive bay. unclip the drive-bracket assembly and slide it off the support rails.
- To remove the drive from the assembly, slide the blue latches towards each other. Slide the hard drive out of the assembly.



- SSD drives are often smaller than traditional HDD and may require the use of a mounting kit.

Optical Drive Overview

Features

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

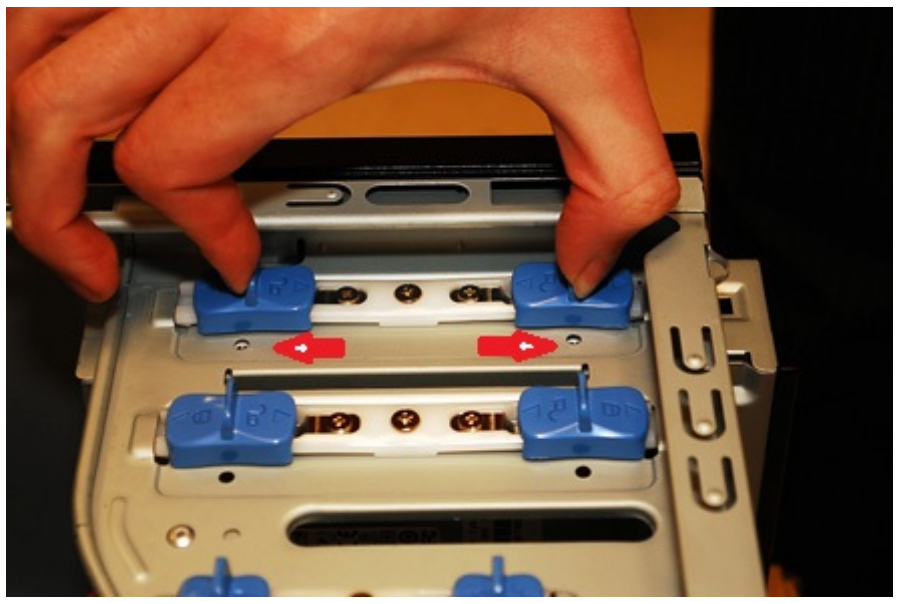
Specifications

Write Speed	▪ *DVD*+R□ 24X ▪ *DVD*-R□ 24X ▪ *DVD*+RW□8X ▪ *DVD*-RW□ 6X ▪ *DVD*+R(DL)□8X ▪ *DVD*-R (DL)□8X ▪ *DVD-RAM* □ 5X ▪ CD-R□ 48X ▪ CD-RW□ 24X
Read Speed	▪ *DVD*+R: 16 X ▪ *DVD*-R: 16 X ▪ *DVD*+RW: 12 X ▪ *DVD*-RW: 12 X ▪ *DVD-ROM* : 16 X ▪ *DVD*+R(DL): 12 X ▪ *DVD*-R(DL): 12 X ▪ *DVD-ROM*(DL): 12 X ▪ CD-R: 48 X ▪ CD-RW: 40 X ▪ CD-*ROM*: 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 (see red arrows in photo), they will need to be removed with a Phillips screwdriver.
3. To remove the drive from the assembly, slide the blue latches toward each other.
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 8 (64-bit and 32-bit editions)
- Microsoft Windows 7 (64-bit and 32-bit editions)
- Microsoft Windows Vista (64-bit and 32-bit editions)

The Desktop Board provides minimal *BIOS* and driver support for the following operating systems:

- Microsoft Windows XP Home
- Microsoft Windows XP Professional
- Microsoft Windows XP Professional x64 Edition
- Microsoft Windows XP Media Center Edition 2005

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.

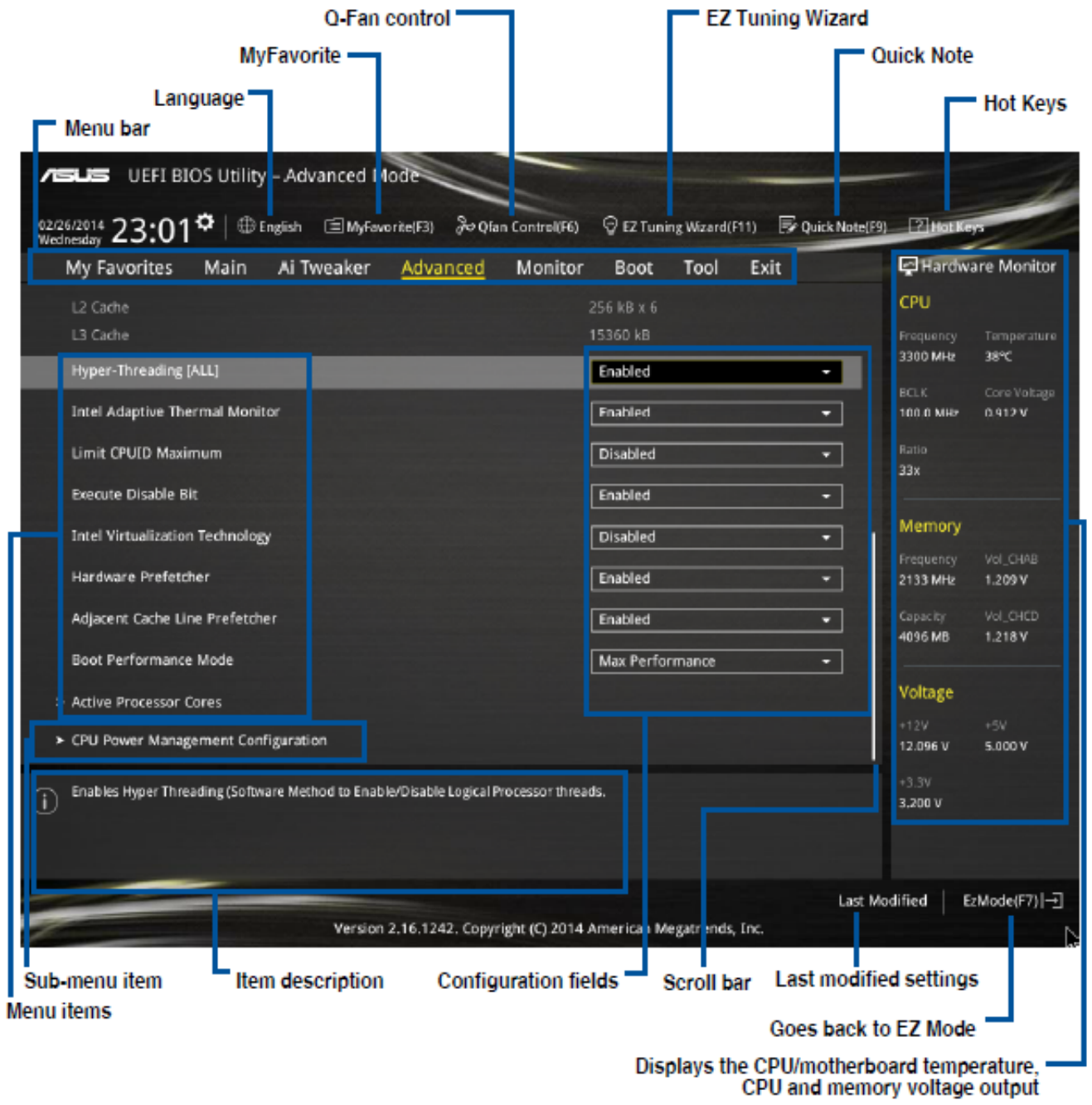
▪ When downloading or updating the BIOS file, rename it as **X99A.CAP** for this motherboard.

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.

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 four different utilities:

1. **Asus Update:** Updates the *BIOS* in a Windows environment.
2. **Asus EZ Flash 2**: 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.
4. **Asus BIOS Updater:** Updates and backs up the *BIOS* in a DOS environment using the motherboard support *DVD* and a *USB* flash drive.

EZ Update

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

- EZ Update requires an Internet connection

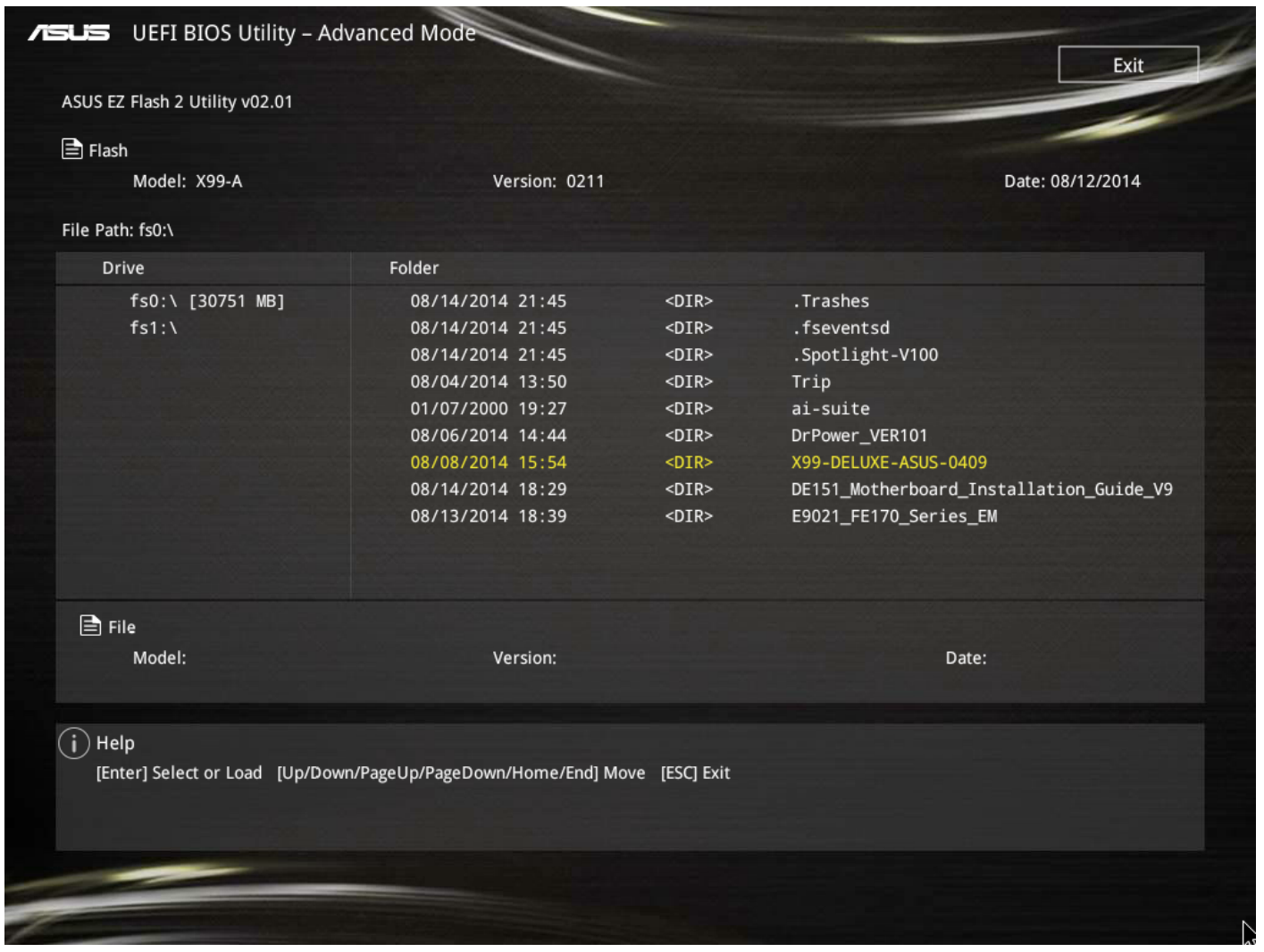
Updating the BIOS using the ASUS EZ Flash 2 utility

ASUS EZ Flash 2 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:

1. Insert the *USB* flash drive that contains the *BIOS* file.
2. 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.



3. Press <Tab> to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the *USB* flash drive that contains the latest *BIOS*, and then press <Enter>.
5. Press <Tab> to switch to the ***Folder* Info** field.
6. Press the Up/Down arrow keys to find the *BIOS* file, and then press 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.

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 2 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!

Updating the BIOS using the ASUS BIOS Updater utility

The ASUS *BIOS* Updater allows you to update the *BIOS* in a DOS environment. It also allows you to copy the current *BIOS* file to use as a backup if the *BIOS* fails or gets corrupted during the updating process.

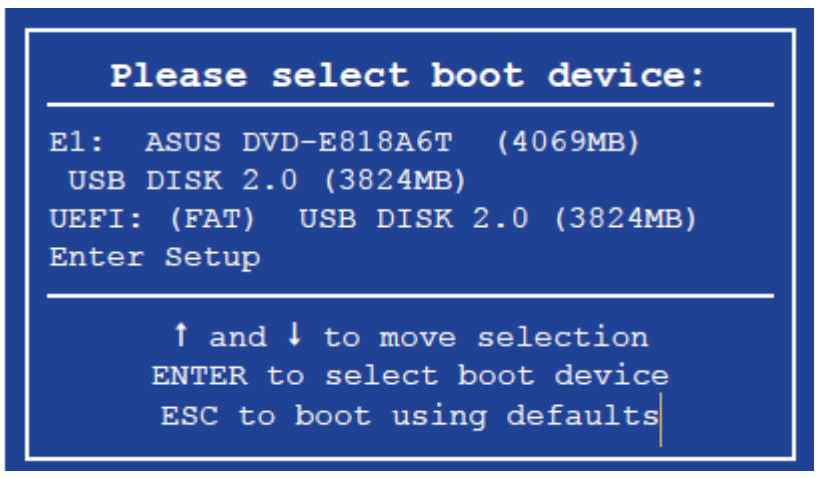
- The following screenshots are for reference only. The actual utility screen displays may not be the same as shown.

Before updating the BIOS

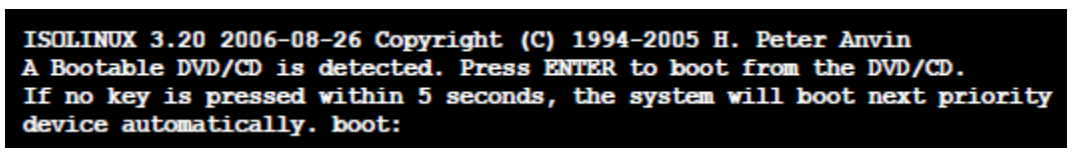
1. Prepare the motherboard support *DVD* and a *USB* flash drive in a FAT32/16 format in a single partition (since NTFS is not supported by DOS, do not save the *BIOS* file and *BIOS* Updater in NTFS format.
2. *Download* the latest *BIOS* file and *BIOS* Updater from the ASUS web-site at http://support.asus.com .
3. Turn off the computer and disconnect all *SATA* hard disk drives (optional).

Booting the system in a DOS environment

1. Insert the *USB* flash drive containing *BIOS* file and *BIOS* Updater.
2. *Boot* your computer. When the ASUS logo appears, press <F8> to show the ***BIOS Boot*** **Device Select Menu.** Insert the support *DVD* into the optical drive and select the optical drive as the *boot* device.



3. When the **booting message** appears, press <Enter> within five seconds to get the **FreeDOS command prompt**



4. At the FreeDOS prompt, type d: and press to switch from Drive C (optical drive) to Drive D (*USB* flash drive).

Backing up the current BIOS using the command line

- Ensure that the *USB* flash drive is not write-protected and has enough free space to save the file.
- BIOS ROM filenames may be shortened into abbreviations, be sure to check the correct filename in the directory.

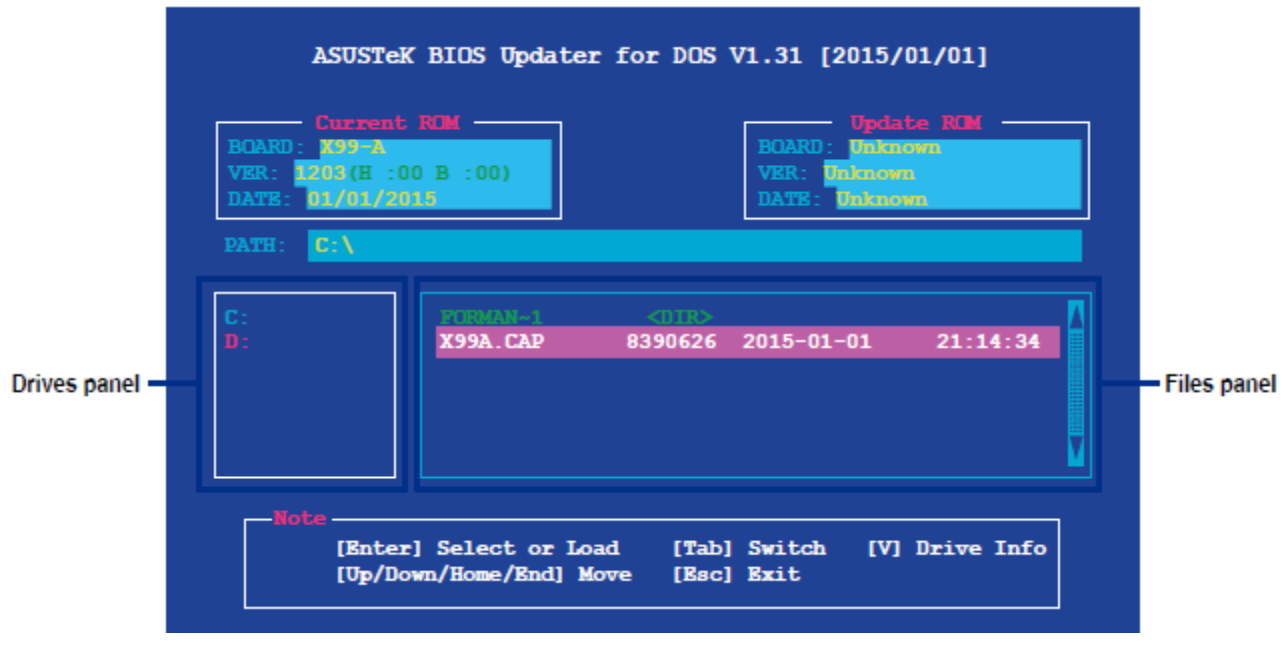
1. At the FreeDOS prompt, type **bupdater /i<ROM filename>.CAP** and press <Enter>.

The [filename] is any user-assigned filename with no more than eight alphanumeric characters for the filename and three alphanumeric characters for the extension.

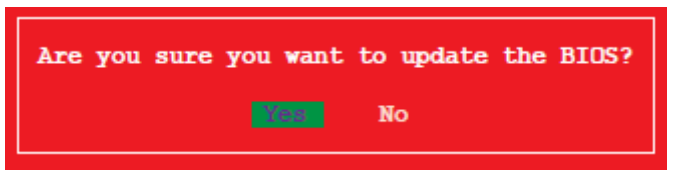
2. BIOS Updater will automatically check the selected BIOS file and enter ASUS EZ Flash 2 Updater to continue the BIOS update process.
3. When BIOS update is done, select OK or press <Enter> to restart your computer.

Updating in Gui environment

1. At the FreeDOS prompt, type **bupdater /g** and press <Enter>.
2. The *BIOS* Updater backup screen appears indicating the *BIOS* backup process. Press <Tab> to switch from Files panel to Drives panel then select **D:**.



3. Press <Tab> to switch from Drives panel to Files panel then press <Up/Down> or <Home/End> keys to select the BIOS file and press <Enter>.
4. After the BIOS Updater checks the selected BIOS file, select Yes to confirm the BIOS update



5. Press <Enter> again to launch secure BIOS update. System will enter EZ Flash 2 Updater and continue the BIOS update process.
6. When the BIOS update is done, select OK or press <Enter> to restart your computer.

- 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.

Configuring for RAID

- *Intel Rapid Storage Technology requires a 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

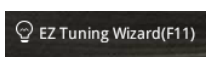
RAID 10 is data striping and data mirroring combined without parity having to be calculated and written. With the *RAID* 10 configuration you get all the benefits of both *RAID* 0 and *RAID* 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

Setting up a RAID configuration

A RAID can be setup using EZ Mode or Advanced Mode. By default, the EZ Mode screen appears when you enter the BIOS setup program. The EZ Mode provides you an overview of the basic system information, and allows you to select the display language, system performance mode and boot device priority. To access the **Advanced Mode**, click **Exit/Advanced Mode**, then select **Advanced Mode** or press <F7> hot key for the advanced BIOS settings.

By typing <F11> on your keyboard or clicking **EZ Tuning Wizard (F11)** followed by **Next** on the BIOS screen (either EZ Mode or Advanced Mode screen) you can create a RAID.

Creating Your RAID Set

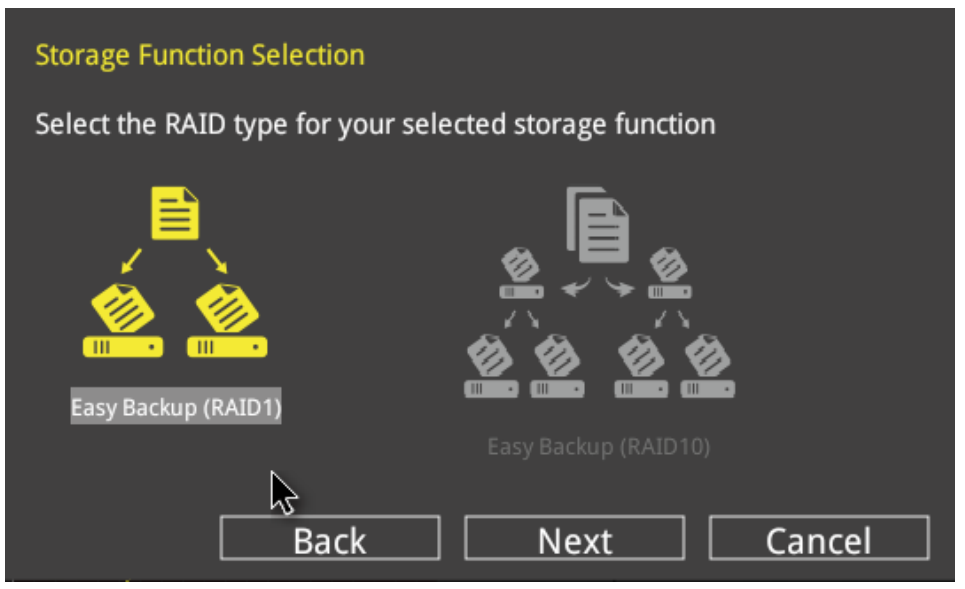
1. Press <F11> on your keyboard or click 

from the BIOS screen to open EZ Tuning Wizard screen.
2. Click **RAID** then click **Next**.

- *Ensure that your HDDs have no existing RAID volumes.*
- *Make sure that you have connected your HDDs to Intel SATA connectors.*

3. Select the type of storage for your RAID - **Easy Backup** or **Super Speed**, then click **Next.**

a) For Easy Backup, click **Next** then select from **Easy Backup (RAID1)** or **Easy Backup (RAID10)**



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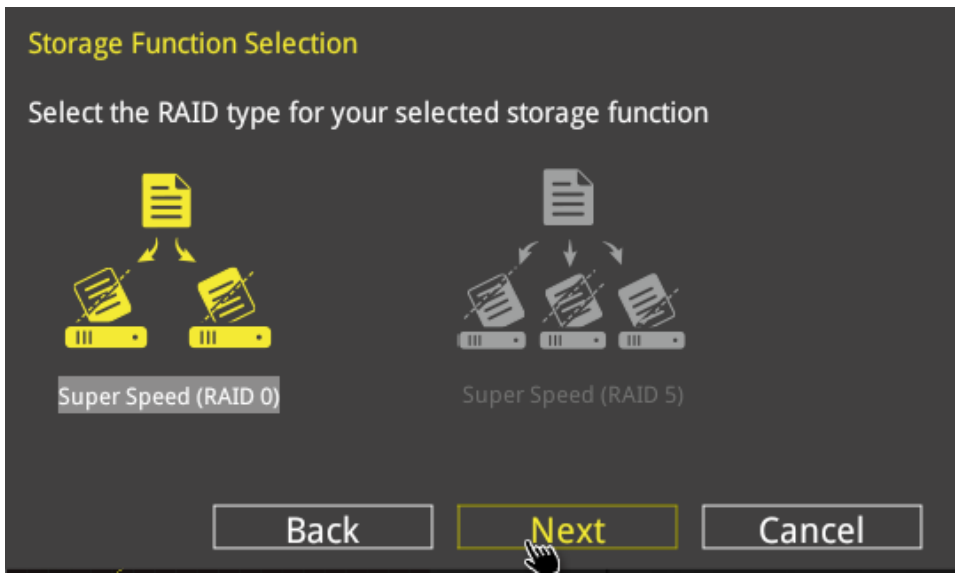
- *You can only select **Easy Backup (RAID 10)** if you connect four HDDs.*

b) For Easy Backup, click **Next** then select from **Super Speed (RAID0)** or **Super Speed (RAID5)**.



4. After selecting the type of RAID, click **Next** then click **Yes** to continue the RAID setup.
5. After the RAID setup is done, click **Yes** to exit the setup then click **OK** to reset your system.

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.

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

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 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 SPDI/F, 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 SPDI/F, MIC
    - Update the audio driver
    - Change the Audio device, such as the microphone, earphone or speaker

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)
- 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.

Toxics in packaging - Ensuring a reduction/elimination of intentionally added toxics 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.

RBRC

RBRC (http://www.RBRC.com), 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. RBRC recycles the battery chemistries: Nickel Cadmium (Ni-Cd), Nickel Metal Hydride (Ni-MH), Lithium Ion (Li-ion) and Small Sealed Lead (Pb) . RBRC 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 RBRC program and offers this free service to its clients for all batteries meeting the above specifications regardless of when and through whom they were purchased as Northern Micro is also a collection center for this program.

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.

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

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.

- 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.

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.

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

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/0 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.

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