

Z77-A

ASUS[®]

Motherboard

E8090
First Edition
January 2013

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Safety information

Electrical safety

- To prevent electric shock hazard, disconnect the power cable from the electric outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Ensure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your retailer.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, ensure that all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This guide contains the following parts:

- **Chapter 1: Product introduction**
This chapter describes the features of the motherboard and the new technology it supports.
- **Chapter 2: BIOS information**
This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

Where to find more information

Refer to the following sources for additional information and for product and software updates.

1. **ASUS websites**
The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.
2. **Optional documentation**
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.



CAUTION: Information to prevent damage to the components when trying to complete a task



IMPORTANT: Instructions that you **MUST** follow to complete a task .



NOTE: Tips and additional information to help you complete a task.

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1> + <Key2> + <Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Z77-A specifications summary

CPU	<p>LGA1155 socket for Intel® 3rd / 2nd Generation Core™ i7 / Core™ i5 / Core™ i3, Pentium®, and Celeron® processors</p> <p>Supports 32nm and 22nm CPU</p> <p>Supports Intel® Turbo Boost technology 2.0*</p> <ul style="list-style-type: none"> * The Intel® Turbo Boost technology 2.0 support depends on the CPU types. * Refer to http://www.asus.com for Intel® support list.
Chipset	Intel® Z77 Express Chipset
Memory	<p>4 x DIMMs, maximum 32GB, DDR3 2400(O.C.) / 2200(O.C.) / 2133(O.C.) / 1866(O.C.) / 1600 / 1333 1066MHz, non-ECC, un-buffered memory</p> <p>Dual-channel memory architecture</p> <p>Supports Intel Extreme Memory profile (XMP)</p> <ul style="list-style-type: none"> • Refer to http://www.asus.com for the latest Memory QVL (Qualified Vendors List). • Hyper DIMM support is subject to the physical characteristics of individual CPUs. Refer the the Memory QVL (Qualified Vendors List) for details. • When you install a total memory of 4GB capacity or more, Windows® 32-bit operating system may only recognize less than 3GB. We recommend a maximum of 3GB system memory if you are using a Windows® 32-bit operating system.
Expansion slots	<p>1 x PCI Express 3.0*/2.0 x16 slot (16x mode)</p> <p>1 x PCI Express 2.0 x16 slot (maximum at 4x mode, compatible ith PCIe x1 and x4 devices)</p> <p>2 x PCI Express 2.0 x1 slot</p> <p>2 x PCI slot</p> <ul style="list-style-type: none"> * PCIe 3.0 speed is supported by Intel® 3rd generation Core™ processors.
Graphics	<p>Intel® HD Integrated Graphics support</p> <p>Multi-VGA output support: HDMI, DVI, RGB port</p> <ul style="list-style-type: none"> - Supports HDMI with max. resolution 1920x1200@60Hz. - Supports DVI with max. resolution 1920x1200@60Hz. - Supports RGB with max. resolution 2048x1536@75Hz. - maximum shared memory of 1696MB.
Multi-GPU support	Supports ATI® Quad-GPU CrossFireX™ Technology
Storage	<p>Intel® Z77 Express Chipset</p> <ul style="list-style-type: none"> - 2 x SATA 6.0 Gb/s ports with RAID 0, 1, 5, 10 support - 4 x SATA 3.0 Gb/s ports with RAID 0, 1, 5, 10 support - Supports Intel® Smart Response Technology, Intel® Rapid Start Technology, Intel® Smart Connect Technology* <p>*Supported on PCs using an Intel® Core™ processor and Windows 7™ operating system.</p>
LAN	Realtek® 8111F Gigabit LAN controller

(continued on the next page)

Z77-A specifications summary

Audio	<p>Realtek® ALC887 8-Channel High Definition Audio CODEC*</p> <ul style="list-style-type: none"> - Supports Jack-Detection, Multi-streaming, and Front Panel Jack-Retasking <p>*Use a chassis with an HD audio module in the front panel to support an 8-channel audio output.</p>
USB	<p>Intel® Z77 Express Chipset</p> <ul style="list-style-type: none"> - 4 x USB 3.0 / 2.0 ports (2 ports at the mid-board and 2 ports at the rear panel) - 8 x USB 2.0 (4 ports at the mid-board and 4 ports at the rear panel) - Supports ASUS USB 3.0 Boost UASP Mode* <p>*USB 3.0 ports only support Windows® 7™ or later versions. UASP standards are only supported on Windows® 8™.</p>
ASUS Unique Features	<p>ASUS DIGI+ VRM</p> <ul style="list-style-type: none"> - Digital Power Control: Digital power Design for the CPU and iGPU - ASUS 4+1 Phase Power Design <p>ASUS EPU</p> <ul style="list-style-type: none"> - EPU <p>ASUS Exclusive Features</p> <ul style="list-style-type: none"> - Network iControl - USB 3.0 Boost - TurboV - GPU Boost - AI Charger - Disk Unlocker - AI Suite II - Anti Surge - Low EMI Solution - 100% Solid Capacitors <p>ASUS Quiet Thermal Solution</p> <ul style="list-style-type: none"> - ASUS Fanless Design: Stylish Heatsink solution - ASUS Fan Xpert+ <p>ASUS EZ DIY</p> <ul style="list-style-type: none"> - ASUS UEFI BIOS - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2 - ASUS My Logo 2

(continued on the next page)

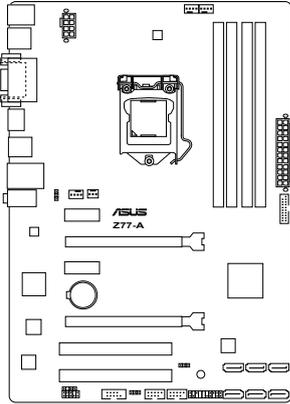
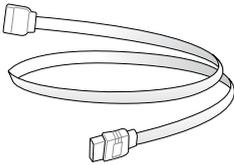
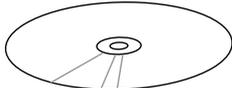
Z77-A specifications summary

ASUS Exclusive Overclocking Features	<p>Precision Tweaker 2</p> <ul style="list-style-type: none"> - vCore: Adjustable CPU voltage at 0.005V increment - vCCSA: 190-step system agent voltage control - vDRAM Bus: 190-step Memory voltage control - vPCH: 190-step Chipset voltage control - iGPU: 127-step iGPU voltage control <p>SFS (Stepless Frequency Selection)</p> <ul style="list-style-type: none"> - BCLK/PCIE frequency tuning from 80MHz up to 300MHz at 0.1MHz increment <p>Overclocking Protection</p> <ul style="list-style-type: none"> - ASUS C.P.R.(CPU Parameter Recall)
Rear Panel I/O Ports	<p>1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x HDMI port 1 x DVI port 1 x RGB port 1 x LAN (RJ-45) port 2 x USB 3.0/2.0 ports 4 x USB 2.0/1.1 ports 3-jack 8-channel audio I/O ports</p>
Internal I/O Connectors	<p>2 x USB 2.0/1.1 connectors support an additional 4 USB ports 1 x USB 3.0/2.0 connector supports an additional 2 USB ports 2 x SATA 6.0Gb/s connectors 4 x SATA 3.0Gb/s connectors 1 x CPU Fan connector (4-pin) 1 x Power Fan connector (3-pin) 2 x Chassis Fan connectors (4-pin) 1 x Front panel audio connector 1 x S/PDIF Out Header 1 x 24-pin ATX Power connector 1 x 8-pin ATX 12V Power connector 1 x System Panel 1 x COM port connector 1 x Clear CMOS jumper</p>
BIOS	<p>64 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.7, ACPI 4.0a, Multi-language BIOS, ASUS EZ Flash 2, ASUS CrashFree BIOS 3, F12 PrintScreen, F3 Shortcut Function and ASUS DRAM SPD (Serial Presence Detect) memory information</p>
Manageability	<p>WfM 2.0, DMI 2.0, WOL by PME, WOR by PME, PXE</p>
Support DVD	<p>Drivers ASUS Utilities ASUS Update Anti-virus software (OEM version)</p>
Form Factor	<p>ATX Form Factor, 12.0" x 8.4" (30.5cm x 21.3cm)</p>

* Specifications are subject to change without notice.

Package contents

Check your motherboard package for the following items.

		
ASUS Z77-A motherboard	2 x Serial ATA 6.0 Gb/s cables	
		
1 x I/O Shield	User Guide	Support DVD



- If any of the above items is damaged or missing, contact your retailer.
- The illustrated items above are for reference only. Actual product specifications may vary with different models.

Product introduction

1

1.1 Product highlights

LGA1155 socket for Intel® 2nd/3rd Generation Core™ i7 / Core™ i5 / Core™ i3, Pentium®, and Celeron® Processors

This motherboard supports Intel 2nd/3rd generation Core™ i7/i5/i3, Pentium®, and Celeron® processors in the LGA1155 package. It provides great graphics and system performance with its GPU, dual-channel DDR3 memory slots, and PCI Express 2.0/3.0 expansion slots.

Intel® Z77 Express Chipset

Intel® Z77 Express Chipset is a single-chipset that supports the 1155 socket Intel® 2nd/3rd generation Core™ i7/i5/ i3, Pentium®, and Celeron® processors. It utilizes the serial point-to-point links, which increases bandwidth and enhances the system's performance. It natively supports four USB 3.0 ports for up to ten times faster transfer rate than USB 2.0, and enables the iGPU function for Intel® integrated graphics performance.

Dual-Channel DDR3 2400(O.C.)* / 2200(O.C.)* / 2133(O.C.) / 1866(O.C.) / 1600 / 1333 / 1066 Support

This motherboard supports DDR3 memory that features data transfer rates of 2400(O.C.)* / 2200(O.C.)* / 2133(O.C.) / 1866(O.C.)/ 1600 / 1333 / 1066 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR3 architecture enlarges the bandwidth of your system memory to boost system performance.

Complete USB 3.0 Integration

ASUS facilitates strategic USB 3.0 accessibility for both the front and rear panel - 4 USB 3.0 ports in total. Experience the latest plug & play connectivity at speeds up to 10 times faster than USB 2.0.

Quad-GPU CrossFireX™ Support

This motherboard's powerful Intel® Z77 platform optimizes PCIe allocation in multiple-GPU configurations of CrossFireX™. This allows you to enjoy a never before-experienced brand new gaming style.

Intel® Smart Response Technology

Intel® Smart Response Technology, an important part of Green ASUS eco-friendly computing, reduces load and wait time, eliminates unnecessary hard drive spin thus lowering power usage, and uses an installed SSD (requires 18.6 GB available space) as a cache for frequently accessed data or applications. It combines SSD performance and hard drive capacity, operating up to six times faster than a hard-drive-only system, to boost the system's overall performance.

- * Intel® 2nd/3rd generation Core™ processors on Windows® 7™ operating systems support Intel® Smart Response Technology.
- * An operating system must be installed on the HDD to launch Intel® Smart Response Technology.
- * The SSD is reserved for caching function.

Intel® Smart Connect Technology

Your computer can receive fresh updates for selected applications, even when the system is in sleep mode. This means less time waiting for applications to update and sync with the cloud, leading to a more efficient computing experience.

Intel® Rapid Start Technology

Intel® Rapid Start Technology allows your system to receive updates for your web applications in real-time even when your system is in sleep mode, saving wait time and power usage.

PCIe 3.0 Ready

PCI Express® 3.0 (PCIe 3.0) is the latest PCI Express bus standard with improved encoding schemes that provide twice the performance of current PCIe 2.0. Total bandwidth for a x16 link reaches a maximum of 32GB/s, double the 16GB/s of PCIe 2.0 (in x16 mode). As such, PCIe 3.0 provides users unprecedented data speeds, combined with the convenience and seamless transition offered by complete backward compatibility with PCIe 1.0 and PCIe 2.0 devices. PCIe 3.0 will become a must-have feature for users who wish to improve and optimize graphic performance, as well as have the latest technology available to them.



PCIe 3.0 speed is supported by Intel® 3rd generation processors.

Gigabit LAN solution

The onboard LAN controller is a highly integrated Gb LAN controller. It is enhanced with an ACPI management function to provide efficient power management for advanced operating systems.

8-channel high definition audio

The onboard 8-channel HD audio (High Definition Audio, previously codenamed Azalia) CODEC enables high-quality 192KHz/24-bit audio output and jack-detect feature that automatically detects and identifies what types of peripherals are plugged into the audio I/O jacks and notifies users of inappropriate connection, which means there will be no more confusion of Line-in, Line-out, and Mic jacks.

100% All High-quality Conductive Polymer Capacitors

This motherboard uses all high-quality conductive polymer capacitors for durability, improved lifespan, and enhanced thermal capacity.

ErP ready

This motherboard is European Union's Energy-related Products (ErP) ready. ErP requires products to meet certain energy efficiency requirements with regard to energy usage.

1.2 Before you proceed

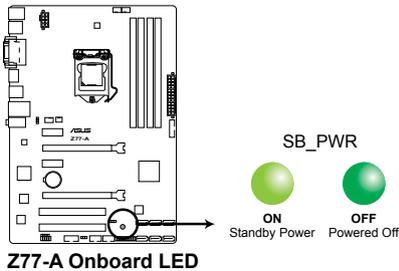
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
- Before handling components, use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, switch off the ATX power supply and detach its power cord. Failure to do so may cause severe damage to the motherboard, peripherals, or components.

Standby Power LED

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



Z77-A Onboard LED

1.3 Motherboard overview

1.3.1 Placement direction

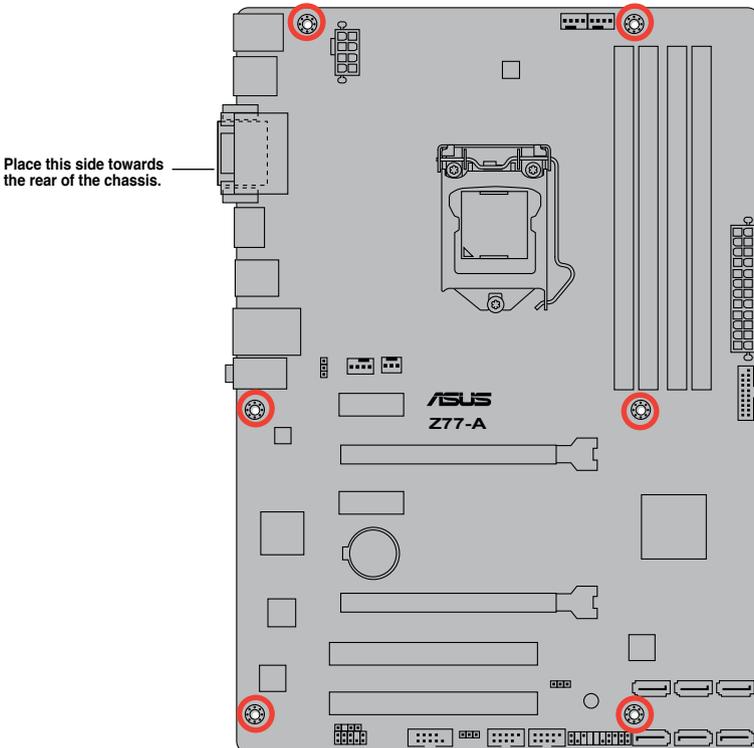
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

1.3.2 Screw holes

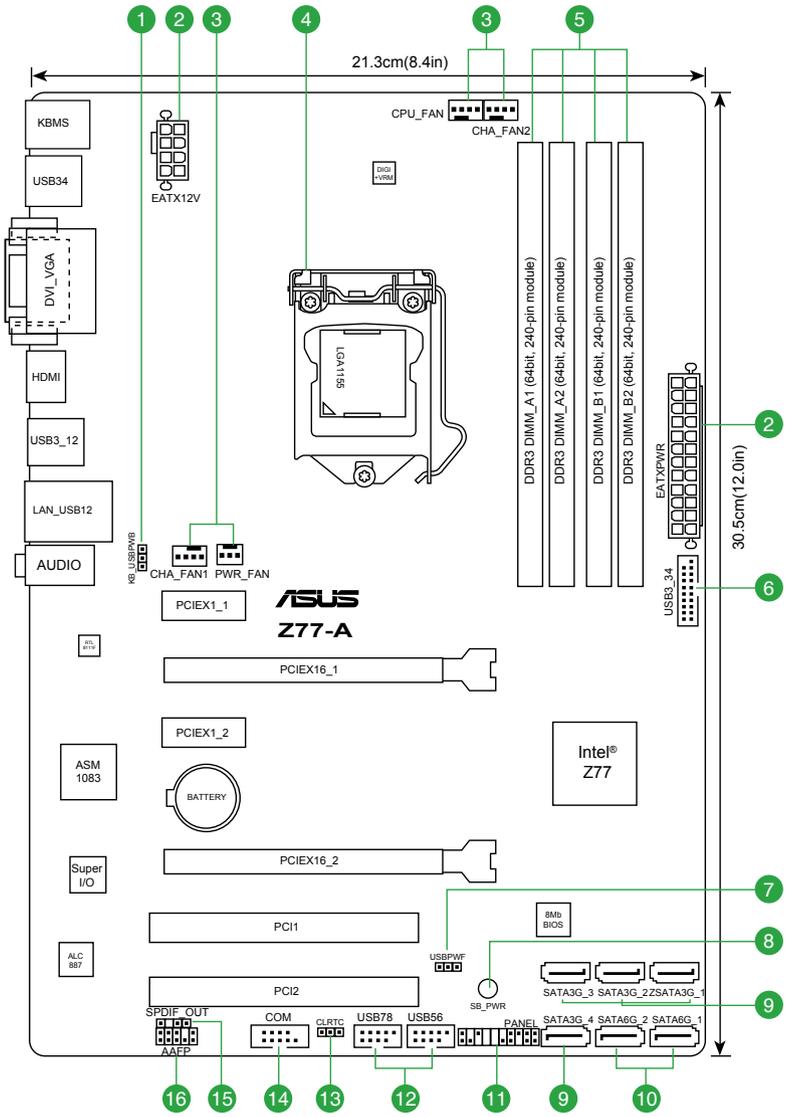
Place six screws into the holes indicated by circles to secure the motherboard to the chassis.



DO NOT overtighten the screws! Doing so can damage the motherboard.



1.3.3 Motherboard layout



1.3.4 Layout contents

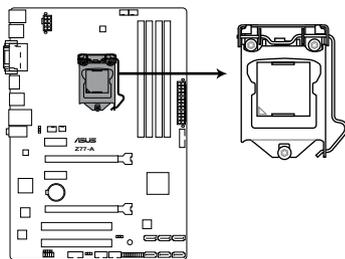
Connectors/Jumpers/Slots/LED	Page
1. Keyboard power (3-pin KB_USBPWB)	1-23
2. EATX power connectors (24-pin EATXPWR, 8-pin EATX12V)	1-27
3. CPU, Chassis and power fan connectors (4-pin CPU_FAN, 4-pin CHA_FAN1/2, 3-pin PWR_FAN)	1-26
4. Intel® CPU socket	1-7
5. DDR3 DIMM sockets	1-11
6. USB 3.0 connector (20-1 pin USB3_34)	1-32
7. USB device wake-up (3-pin USBPWF)	1-23
8. Onboard LED (SB_PWR)	1-4
9. Intel® Z77 Serial ATA 3.0 Gb/s connectors (7-pin SATA3G_1~4 [blue])	1-28
10. Intel® Z77 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_1/2 [gray])	1-29
11. System panel connector (20-8 pin F_PANEL)	1-30
12. USB 2.0 connectors (10-1 pin USB56, USB78)	1-32
13. Clear RTC RAM (3-pin CLRTC)	1-22
14. Serial port connectors (10-1 pin COM1)	1-33
15. Digital audio connector (4-1 pin SPDIF_OUT)	1-31
16. Front panel audio connector (10-1 pin AAFP)	1-31

1.4 Intel® CPU LGA1155 socket

This motherboard comes with a LGA1155 socket designed for 2nd/3rd generation Core™ i7/i5/i3, Pentium®, and Celeron® processors.



The LGA1156 CPU is incompatible with the LGA1155 socket. DO NOT install a LGA1156 CPU on the LGA1155 socket.

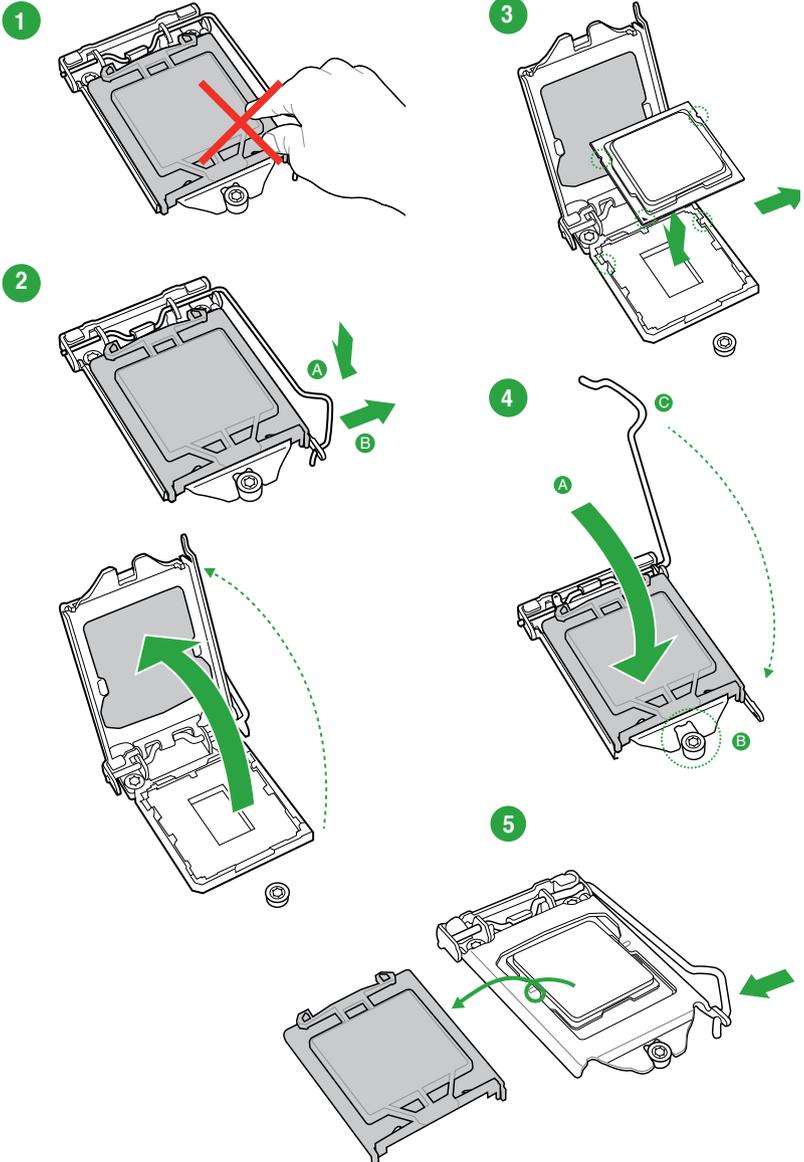


Z77-A CPU socket LGA1155

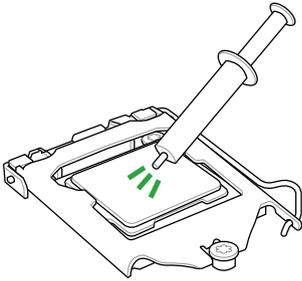
1.4.1 CPU installation



The LGA1156 CPU is incompatible with the LGA1155 socket. DO NOT install a LGA1156 CPU on the LGA1155 socket.

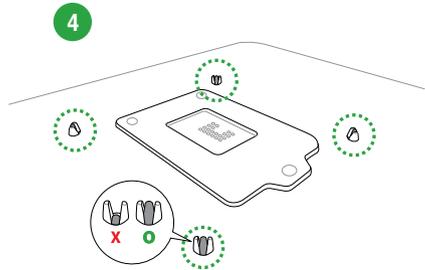
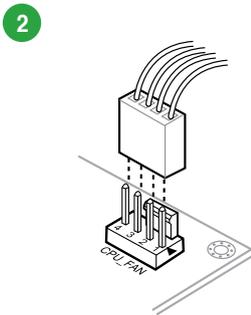
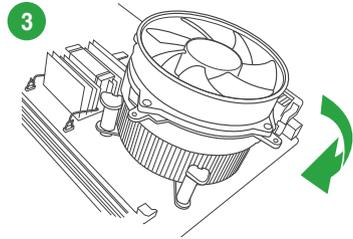
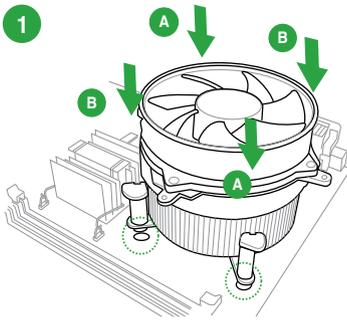


1.4.2 CPU heatsink and fan assembly installation

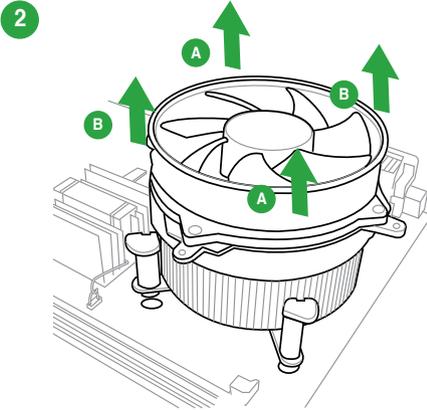
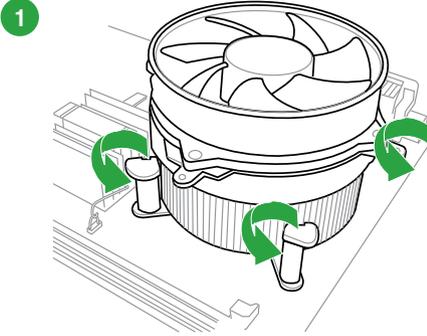


Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan if necessary.

To install the CPU heatsink and fan assembly



To uninstall the CPU heatsink and fan assembly



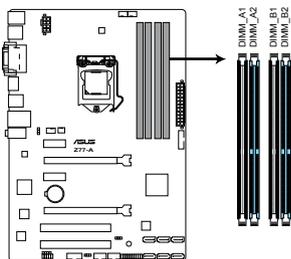
1.5 System memory

1.5.1 Overview

This motherboard comes with four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

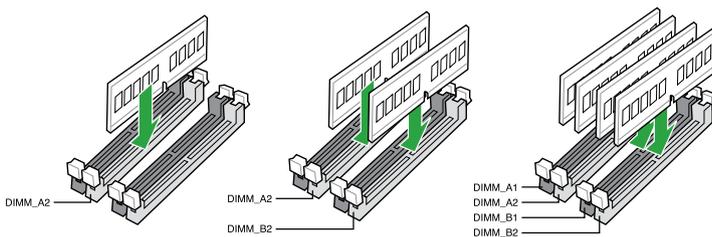
A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:



Z77-A 240-pin DDR3 DIMM sockets

Recommended memory configurations



We recommend that you install the memory modules from the blue slots for better overlocking ability.

1.5.2 Memory configurations

You may install 1GB, 2GB, 4GB and 8GB unbuffered non-ECC DDR3 DIMMs into the DIMM sockets.



- You may install varying memory sizes in Channel A and Channel B. 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 specifications, DIMM voltage below 1.65V is recommended to protect the CPU.
- Always install DIMMs with the same CAS latency. For optimum compatibility, we recommend that you obtain memory modules from the same vendor.
- 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:
 - Use a maximum of 3GB system memory if you are using a 32-bit Windows OS.
 - Install a 64-bit Windows OS when you want to install 4GB or more on the motherboard.
 - For more details, refer to the Microsoft® support site at <http://support.microsoft.com/kb/929605/en-us>.
- This motherboard does not support DIMMs made up of 512Mb (64MB) chips or less (Memory chip capacity counts in Megabit, 8 Megabit/Mb = 1 Megabyte/MB).



- 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. To operate at the vendor-marked or at a higher frequency, refer to section **2.4 Ai Tweaker** menu for manual memory frequency adjustment.
- For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs) or overclocking condition.



Visit the ASUS website for the latest QVL.

Z77-A Series Motherboard Qualified Vendors Lists (QVL)

DDR3 2400MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
Transcend	TX2400KLU-4GK (381850)(XMP)	4GB(2x 2GB)	SS	-	-	9	1.65V	•	•	•

* The 2400MHz memory modules above are supported on Intel® 3rd generation processors by this motherboard; however, the actual frequency support varied depending on the O.C. margin of the installed CPU.

DDR3 2250MHz capability

Vendors	Part No.	Size	S S / C h i p		Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
			DS	Brand				1 DIMM	2 DIMMs	4 DIMMs
Kingston	KHX2250C9D3T1K2/4GX(XMP)	4GB(2x 2GB)	DS	-	-	-	1.65V	*	*	*

* The 2250MHz memory modules above are supported on Intel® 3rd generation processors by this motherboard; however, the actual frequency support varied depending on the O.C. margin of the installed CPU.

DDR3 2200MHz capability

Vendors	Part No.	Size	S S / C h i p		Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
			DS	Brand				1 DIMM	2 DIMMs	4 DIMMs
G SKILL	F3-17600CL8D-4GBFS(XMP)	4GB(2x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
KINGMAX	FLKE85F-B8KJAFEIH(XMP)	4GB(2x 2GB)	DS	-	-	-	1.5V-1.7V	*	*	*

* The 2200MHz memory modules above are supported on Intel® 3rd generation processors by this motherboard; however, the actual frequency support varied depending on the O.C. margin of the installed CPU.

DDR3 2133MHz capability

Vendors	Part No.	Size	S S / C h i p		Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
			DS	Brand				1 DIMM	2 DIMMs	4 DIMMs
A-DATA	AX3U2133GC2G9B-DG2(XMP)	2GB	SS	-	-	9-11-9-27	1.55-1.75V	*	*	*
CORSAIR	CMT4GX3M2A2133C9(XMP)	4GB(2x 2GB)	DS	-	-	9-10-9-24	1.65V	*	*	*
CORSAIR	CMT4GX3M2B2133C9(XMP)	4GB(2x 2GB)	DS	-	-	9-10-9-27	1.50V	*	*	*
GEIL	GE34GB2133C9DC(XMP)	2GB	DS	-	-	9-9-9-28	1.65V	*	*	*
GEIL	GU34GB2133C9DC(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-28	1.65V	*	*	*
KINGSTON	KHX2133C9AD3T1K2/4GX(XMP)	4GB(2x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX2133C9AD3X2K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9-11-9-27	1.65V	*	*	*
KINGSTON	KHX2133C9AD3T1K4/8GX(XMP)	8GB(4 x 2GB)	DS	-	-	9-11-9-27	1.65V	*	*	*
KINGSTON	KHX2133C9AD3T1FK4/8GX(XMP)	8GB(4x 2GB)	DS	-	-	-	1.65V	*	*	*

DDR3 2000MHz capability

Vendors	Part No.	Size	S S / C h i p		Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
			DS	Brand				1 DIMM	2 DIMMs	4 DIMMs
Apacer	78.AAGD5.9KD(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
CORSAIR	CMZ4GX3M2A2000C10(XMP)	4GB(2 x 2GB)	SS	-	-	10-10-10-27	1.50V	*	*	*
CORSAIR	CMT6GX3M3A2000C8(XMP)	6GB(3 x 2GB)	DS	-	-	8-9-8-24	1.65V	*	*	*
G.SKILL	F3-16000CL9D-4GBFLS(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
G.SKILL	F3-16000CL9D-4GBTD(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
G.SKILL	F3-16000CL6T-6GBPIS(XMP)	6GB(3x 2GB)	DS	-	-	6-9-6-24	1.65V	*	*	*
GEIL	GUP34GB2000C9DC(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-28	1.65V	*	*	*
KINGSTON	KHX2000C9AD3T1K2/4GX(XMP)	4GB(2x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX2000C9AD3W1K2/4GX(XMP)	4GB(2x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX2000C9AD3T1K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	1.65V	*	*	*
KINGSTON	KHX2000C9AD3W1K3/6GX(XMP)	6GB(3x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX2000C9AD3T1K3/6GX(XMP)	6GB(3x 2GB)	DS	-	-	-	1.65V	*	*	*
Transcend	TX2000KLN-8GK(XMP)	8GB(2 x 4GB)	DS	-	-	-	1.6V	*	*	*

DDR3 1866MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
CORSAIR	CMT4GX3M2A1866C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMT6GX3M1A1866C9(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMZ8GX3M2A1866C9(XMP)	8GB(2 x 4GB)	DS	-	-	9-10-9-27	1.50V	*	*	*
G.SKILL	F3-14900CL9D-8GBXL(XMP)	8GB(2 x 4GB)	DS	-	-	9-10-9-28	1.5V	*	*	*
G.SKILL	F3-14900CL9Q-8GBXL(XMP)	8GB(2GB x 4)	DS	-	-	9-9-9-24	1.6V	*	*	*
KINGSTON	KHX1866C9D3T1K3/3GX(XMP)	3GB(3 x 1GB)	SS	-	-	-	1.65V	*	*	*
KINGSTON	KHX1866C9D3T1K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	-	1.65V	*	*	*

DDR3 1600MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
A-DATA	AM2U16BC2P1	2GB	SS	A-DATA	3CCD-150 9A EL1126T	-	-	*	*	*
A-DATA	AD31600E001GM(O)U3K	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65V- 1.85V	*	*	*
A-DATA	AM2U16BC4P2	4GB	DS	A-DATA	3CCD-150 9A EL1126T	-	-	*	*	*
A-DATA	AX3U1600GC4G9-2G(XMP)	8GB(2 x 4GB)	DS	-	-	9-9-9-24	1.55V- 1.75V	*	*	*
A-DATA	AX3U1600XC4G79-2X(XMP)	8GB(2 x 4GB)	DS	-	-	7-9-7-21	1.55V- 1.75V	*	*	*
CORSAIR	TR3X3G1600C8D(XMP)	3GB(3 x 1GB)	SS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	CMD12GX3M6A1600C8(XMP)	12GB(6x2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	CMP4GX3M2A1600C8(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	CMP4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMP4GX3M2C1600C7(XMP)	4GB(2 x 2GB)	DS	-	-	7-8-7-20	1.65V	*	*	*
CORSAIR	CMX4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMX4GX3M2A1600C9(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C8 G(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C8D G(XMP)	6GB(3 x 2GB)	DS	-	-	8-8-8-24	1.65V	*	*	*
CORSAIR	TR3X6G1600C9 G(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMP8GX3M2A1600C9(XMP)	8GB(2 x 4GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
CORSAIR	CMZ8GX3M2A1600C7R(XMP)	8GB(2 x 4GB)	DS	-	-	7-8-7-20	1.50V	*	*	*
CORSAIR	CMX8GX3M4A1600C9(XMP)	8GB(4 x 2GB)	DS	-	-	9-9-9-24	1.65V	*	*	*
Crucial	BL25664BN1608.16FF(XMP)	6GB(3 x 2GB)	DS	-	-	-	-	*	*	*
G.SKILL	F3-12800CL9D-2GBN(Q)(XMP)	2GB(2 x 1GB)	SS	-	-	9-9-9-24	1.5V	*	*	*
G.SKILL	F3-12800CL7D-4GBRH(XMP)	4GB(2 x 2GB)	SS	-	-	7-7-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL7D-4GBRM(XMP)	4GB(2 x 2GB)	DS	-	-	7-8-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL8D-4GBRM(XMP)	4GB(2 x 2GB)	DS	-	-	8-8-8-24	1.60V	*	*	*
G.SKILL	F3-12800CL9D-4GBECO(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	XMP 1.35V	*	*	*
G.SKILL	F3-12800CL9D-4GBRL(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
G.SKILL	F3-12800CL9T-6GBN(Q)(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.5V~1.6V	*	*	*
G.SKILL	F3-12800CL7D-8GBRH(XMP)	8GB(2 x 4GB)	DS	-	-	7-8-7-24	1.6V	*	*	*
G.SKILL	F3-12800CL8D-8GBECO(XMP)	8GB(2 x 4GB)	DS	-	-	8-8-8-24	XMP 1.35V	*	*	*
G.SKILL	F3-12800CL9D-8GBRL(XMP)	8GB(2 x 4GB)	DS	-	-	9-9-9-24	1.5V	*	*	*
GEIL	GET316GB1600C9QC(XMP)	16GB(4x 4GB)	DS	-	-	9-9-9-28	1.6V	*	*	*
GEIL	GV34GB1600C8DC(XMP)	2GB	DS	-	-	8-8-8-28	1.6V	*	*	*
KINGMAX	FLGD45F-B8MF7 MAEH(XMP)	1GB	SS	-	-	7	-	*	*	*
KINGMAX	FLGE85F-B8KJ9A FEIS(XMP)	2GB	DS	-	-	-	-	*	*	*
KINGMAX	FLGE85F-B8MF7 MEEH(XMP)	2GB	DS	-	-	7	-	*	*	*
KINGSTON	KHX1600C9D3P1K2/4G	4GB(2 x 2GB)	SS	-	-	-	1.5V	*	*	*
KINGSTON	KHX1600C9D3K3/12GX(XMP)	12GB(3x4GB)	DS	-	-	9-9-9-27	1.65V	*	*	*

DDR3 1600MHz capability

Vendors	Part No.	Size	SS/DS	C Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
KINGSTON	KHX1600C9D3T1BK3/12GX(XMP)	12GB(3x4GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KHX1600C9AD3/2G	2GB	DS	-	-	-	1.65V	*	*	*
KINGSTON	KVR1600D3N11/2G-ES	2GB	DS	KTC	D128BJPN DPLD9U	11-11-11-28	1.35V-1.5V	*	*	*
KINGSTON	KHX1600C7D3K2/4GX(XMP)	4GB(2x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX1600C8D3K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	8	1.65V	*	*	*
KINGSTON	KHX1600C8D3T1K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	8	1.65V	*	*	*
KINGSTON	KHX1600C9D3K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	1.65V	*	*	*
KINGSTON	KHX1600C9D3LK2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9	XMP 1.35V	*	*	*
KINGSTON	KHX1600C9D3X2K2/4GX(XMP)	4GB(2 x 2GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KHX1600C9D3T1K3/6GX(XMP)	6GB(3x 2GB)	DS	-	-	-	1.65V	*	*	*
KINGSTON	KHX1600C9D3K3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	9	1.65V	*	*	*
KINGSTON	KHX1600C9D3T1BK3/6GX(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KHX1600C9D3K2/8GX(XMP)	8GB(2 x 4GB)	DS	-	-	9-9-9-27	1.65V	*	*	*
KINGSTON	KHX1600C9D3P1K2/8G	8GB(2 x 4GB)	DS	-	-	-	1.5V	*	*	*
Super Talent	WA160UX6G9	6GB(3 x 2GB)	DS	-	-	9	-	*	*	*
Transcend	JM1600KLN-8GK	8GB(4GBx2)	DS	Transcend	TK483 PCW3	-	-	*	*	*
Asint	SLZ3128M8-EJ/1D(XMP)	2GB	DS	Asint	3128M8 -GJ1D	9-9-9-24	1.6V	*	*	*
Elixir	M2P2G64CB8HC9N-DG(XMP)	2GB	DS	-	-	-	-	*	*	*
Mushkin	998659(XMP)	6GB(3 x 2GB)	DS	-	-	9-9-9-24	1.5-1.6V	*	*	*

DDR3 1333MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
A-DATA	AD31333001GOU	1GB	SS	A-Data	AD30908C8D-151C E0906	-	-	*	*	*
A-DATA	AD3U1333C2G9	2GB	SS	A-DATA	3CCD-1509HNA1126L	-	-	*	*	*
A-DATA	AD6311B0823EV	2GB	SS	A-Data	3CCA-1509A	-	-	*	*	*
A-DATA	AM2U139C2P1	2GB	SS	ADATA	3CCD-1509A EL1127T	-	-	*	*	*
A-DATA	AX3U1333C2G9-BP	2GB	SS	-	-	-	-	*	*	*
A-DATA	AD31333G001GOU	3GB (3 x 1GB)	SS	-	-	8-8-8-24	1.65-1.85V	*	*	*
A-DATA	AXDU1333GC2 G9-2G(XMP)	4GB (2 x 2GB)	SS	-	-	9-9-9-24	1.25V-1.35V(low voltage)	*	*	*
A-DATA	AD31333G002GMU	2GB	DS	-	-	8-8-8-24	1.65-1.85V	*	*	*
A-DATA	AD6311C1624EV	4GB	DS	A-Data	3CCA-1509A	-	-	*	*	*
A-DATA	AM2U139C4P2	4GB	DS	ADATA	3CCD-1509A EL1127T	-	-	*	*	*
A-DATA	SU3U1333W8G9-B	8GB	DS	ELPIDA	J4208BASE-DJ-F	-	-	*	*	*
Apacer	78.A1GC6.9L1	2GB	DS	Apacer	AM5D5808DEWSBG	-	-	*	*	*
Apacer	78.A1GC6.9L1	2GB	DS	Apacer	AM5D5808FEQSBG	9	-	*	*	*
Apacer	AU02GFA33C9NBGC	2GB	DS	Apacer	AM5D5808APQSBG	-	-	*	*	*
Apacer	78.B1GDE_9L10C	4GB	DS	Apacer	AM5D5808CEHSBG	-	-	*	*	*
CORSAIR	CM3X1024-1333C9	1GB	SS	-	-	9-9-9-24	1.60V	*	*	*
CORSAIR	TR3X3G1333C9 G	3GB (3 x 1GB)	SS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	TR3X6G1333C9 G	6GB (3x 2GB)	SS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	CMD24GX3M6A 1333C9(XMP)	24GB (6 x 4GB)	DS	-	-	9-9-9-24	1.60V	*	*	*
CORSAIR	TW3X4G1333C9D G	4GB (2 x 2GB)	DS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	CM3X4GA1333C9N2	4GB	DS	CORSAIR	256MBDCJ GELCO401136	9-9-9-24	-	*	*	*
CORSAIR	CMX4GX3M1A1333C9	4GB	DS	-	-	9-9-9-24	1.50V	*	*	*
CORSAIR	CM8GX3M4A1333C7	8GB (4 x 2GB)	DS	-	-	7-7-7-20	1.60V	*	*	*

Vendors	Part No.	Size	S / DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
Crucial	CT12864BA1339.8FF	1GB	SS	Micron	9FF22D9KPT	9	-	-	-	-
Crucial	CT25664BA1339.16FF	2GB	DS	Micron	9KF27D9KPT	9	-	-	-	-
Crucial	BL25664BN13 37.16FF (XMP)	6GB (3 x 2GB)	DS	-	-	7-7-7-24	1.65V	-	-	-
ELPIDA	EBJ10UE8EDF0-DJ-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	-	-	-
ELPIDA	EBJ21UE8EDF0-DJ-F	2GB	DS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	-	-	-
G.SKILL	F3-10600CL8 D-2GBHK(XMP)	1GB	SS	G.SKILL	-	-	-	-	-	-
G.SKILL	F3-10600CL 9D-2GBNQ	2GB (2 x 1GB)	SS	-	-	9-9-9-24	1.5V	-	-	-
G.SKILL	F3-10666CL7 T-3GBPK(XMP)	3GB (3 x 1GB)	SS	-	-	7-7-7-18	1.5-1.6V	-	-	-
G.SKILL	F3-10666CL8D- 4GBECO(XMP)	4GB (2 x 2GB)	DS	-	-	8-8-8- 8-24	XMP 1.35V	-	-	-
G.SKILL	F3-10666CL 7T-6GBPK(XMP)	6GB (3 x 2GB)	DS	-	-	7-7-7-18	1.5-1.6V	-	-	-
G.SKILL	F3-10666C L7D-8GBRH(XMP)	8GB (2 x 4GB)	DS	-	-	7-7-7-21	1.5V	-	-	-
GEIL	GET316GB1333C9QC	16GB (4 x 4GB)	DS	-	-	9-9-9-24	1.5V	-	-	-
GEIL	GV32GB1333C9DC	2GB (2 x 1GB)	DS	-	-	9-9-9-24	1.5V	-	-	-
GEIL	GG34GB1333C9DC	4GB (2 x 2GB)	DS	GEIL	GL1L128M88BA12N	9-9-9-24	1.3V(low voltage)	-	-	-
GEIL	GV34GB1333C9DC	4GB (2 x 2GB)	DS	-	-	9-9-9-24	1.5V	-	-	-
GEIL	GVP34GB1333C7DC	4GB (2 x 2GB)	DS	-	-	7-7-7-24	1.5V	-	-	-
Hynix	HMT112U6TFR8A-H9	1GB	SS	Hynix	H5TC1G83TFRH9A	-	1.35V(low voltage)	-	-	-
Hynix	HMT325U6BF8C-H9	2GB	SS	Hynix	H5TQ2G83BFRH9C	-	-	-	-	-
Hynix	HMT125U6TFR8A-H9	2GB	DS	Hynix	H5TC1G83TFRH9A	-	1.35V(low voltage)	-	-	-
Hynix	HMT351U6BF8C-H9	4GB	DS	Hynix	H5TQ2G83BFRH9C	-	-	-	-	-
KINGMAX	FLFD45F-B8KL9 NAES	1GB	SS	KINGMAX	KKB8FNWBFGNX-27A	-	-	-	-	-
KINGMAX	FLFE85F-C8KF9 CAES	2GB	SS	KINGMAX	KFC8FMFXF-DXX-15A	-	-	-	-	-
KINGMAX	FLFE85F-C8KL9 NAES	2GB	SS	KINGMAX	KFC8FNLXF-DXX-15A	-	-	-	-	-
KINGMAX	FLFE85F-C8KM9 NAES	2GB	SS	KINGMAX	KFC8FNMXF-BXX-15A	-	-	-	-	-
KINGMAX	FLFE85F-B8KL9 NEES	2GB	DS	KINGMAX	KKB8FNWBFGNX-26A	-	-	-	-	-
KINGMAX	FLFF65F-C8KL9 NEES	4GB	DS	KINGMAX	KFC8FNLXF-DXX-15A	-	-	-	-	-
KINGMAX	FLFF65F-C8KM9 NEES	4GB	DS	KINGMAX	KFC8FNMXF-BXX-15A	-	-	-	-	-
KINGSTON	KVR1333D3 N9/1G(low profile)	1GB	SS	ELPIDA	J1108BDBG-DJ-F	9	1.5V	-	-	-
KINGSTON	KVR1333D3 N9/2G(low profile)	2GB	SS	Hynix	H5TQ2G83AFRH9C	9	-	-	-	-
KINGSTON	KVR1333D3S8N9/2G	2GB	SS	Micron	IID77 D9L GK	-	1.5V	-	-	-
KINGSTON	KVR1333D3S 8N9/2G-SP(low profile)	2GB	SS	ELPIDA	J2108BCSE-DJ-F	-	1.5V	-	-	-
KINGSTON	KVR1333D3 N9/2G(low profile)	2GB	DS	ELPIDA	J1108BFBG-DJ-F	9	1.5V	-	-	-
KINGSTON	KVR1333D3N9/2G	2GB	DS	KTC	D1288JPNBPLD9U	9	1.5V	-	-	-
KINGSTON	KVR1333D3N9/2G	2GB	DS	ELPIDA	J1108BDSE-DJ-F	9	1.5V	-	-	-
KINGSTON	KVR1333D3 N9/2G-SP(low profile)	2GB	DS	KTC	D1288JEMFNGD9U	-	1.5V	-	-	-
KINGSTON	KVR1333D3N9/2G- SP(low profile)	2GB	DS	KINGSTON	D1288JPSFPGD9U	-	1.5V	-	-	-
KINGSTON	KHX1333C7 D3K2/4GX(XMP)	4GB (2 x 2GB)	DS	-	-	7	1.65V	-	-	-
KINGSTON	KHX1333C9D3UK2/ 4GX(XMP)	4GB (2 x 2GB)	DS	-	-	9	XMP 1.25V	-	-	-
KINGSTON	KVR1333D 3N9/4G(low profile)	4GB	DS	ELPIDA	J2108BCSE-DJ-F	9	1.5V	-	-	-
KINGSTON	KVR1333D 3N9/4G(low profile)	4GB	DS	ELPIDA	J2108BCSE-DJ-F	-	1.5V	-	-	-
KINGSTON	KVR1333D3N9/4G	4GB	DS	KTC	D2568JENCNGD9U	-	1.5V	-	-	-
KINGSTON	KVR1333D3N9/4G	4GB	DS	Hynix	H5TQ2G83AFR	-	-	-	-	-
KINGSTON	KVR1333D3N9/4G- SP(low profile)	4GB	DS	KINGSTON	D2568JENCPGD9U	-	1.5V	-	-	-
Micron	MT4JTF12864AZ- 1G4D1	1GB	SS	Micron	OJD12D9L GQ	-	-	-	-	-
Micron	MT8JTF12864AZ- 1G4F1	1GB	SS	Micron	9FF22D9KPT	9	-	-	-	-

Vendors	Part No.	Size	S/S/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
Micron	MT8JTF25664AZ-1G4D1	2GB	SS	Micron	OJD12D9LGK	-	-	*	*	*
Micron	MT8JTF25664AZ-1G4M1	2GB	SS	MICRON	IJM22 D9PFJ	-	-	*	*	*
Micron	MT16JTF25664AZ-1G4F1	2GB	DS	Micron	9KF27D9KPT	9	-	*	*	*
Micron	MT16JTF51264AZ-1G4D1	4GB	DS	Micron	OLD22D9LGK	-	-	*	*	*
NANYA	NT4GC64B8HG0NF-CG	4GB	DS	NANYA	NT5CB256M8GN-CG	-	-	*	*	*
PSC	AL7F8G73F-DJ2	1GB	SS	PSC	A3P1GF3FGF	-	-	*	*	*
PSC	AL8F8G73F-DJ2	2GB	DS	PSC	A3P1GF3FGF	-	-	*	*	*
SAMSUNG	M378B2873FHS-CH9	1GB	SS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M378B5773DHO-CH9	2GB	SS	SAMSUNG	K4B2G0846D	-	-	*	*	*
SAMSUNG	M378B5673FHO-CH9	2GB	DS	SAMSUNG	K4B1G0846F	-	-	*	*	*
SAMSUNG	M378B5273CHO-CH9	4GB	DS	SAMSUNG	K4B2G0846C	-	-	*	*	*
SAMSUNG	M378B1G73AH0-CH9	8GB	DS	SAMSUNG	K4B4G0846A-HCH9	-	-	*	*	*
Super Talent	W1333UA1GH	1GB	SS	Hynix	H5TQ1G83TFR	9	-	*	*	*
Super Talent	W1333UX2G8(XMP)	2GB (2x 1GB)	SS	-	-	8	-	*	*	*
Super Talent	W1333UB2GS	2GB	DS	SAMSUNG	K4B1G0846F	9	-	*	*	*
Super Talent	W1333UB4GS	4GB	DS	SAMSUNG	K4B2G0846C	-	-	*	*	*
Super Talent	W1333UX6GM	6GB (3x 2GB)	DS	Micron	0BF27D9KPT	9-9-9-24	1.5V	*	*	*
Transcend	JM1333KLN-2G	2GB	SS	Micron	0YD77D9LGK	-	-	*	*	*
Transcend	JM1333KLN-2G	2GB	SS	Hynix	H5TQ2G83BZRH9C	-	-	*	*	*
Transcend	JM1333KLU-2G	2GB	DS	Transcend	TK243PDF3	-	-	*	*	*
Transcend	TS256MLK64V3U	2GB	DS	Micron	9GF27D9KPT	-	-	*	*	*
Century	PC3-10600 DDR3-1333 9-9-9	1GB	SS	NANYA	NT5CB128M8DN-CF	-	-	*	*	*
Elixir	M2F2G64CB88D7N-CG	2GB	SS	Elixir	N2CB2G80DN-CG	-	-	*	*	*
Elixir	M2F2G64CB88G7N-CG	2GB	SS	Elixir	N2CB2G80GN-CG	-	-	*	*	*
Elixir	M2F4G64CB8HB5N-CG	4GB	DS	Elixir	N2CB2G80BN-CG	-	-	*	*	*
Elixir	M2F4G64CB8HD5N-CG	4GB	DS	Elixir	N2CB2G80DN-CG	-	-	*	*	*
KINGSHARE	KSRPCD313332G	2GB	DS	PATRIOT	PM128M8D385-15	-	-	*	*	*
KINGSTEK	KSTD3PC-10600	2GB	SS	MICRON	PE911-125E	-	-	*	*	*
Kingtiger	2GB DIMM PC3-10666	2GB	DS	SAMSUNG	SEC 904 HCH9 K4B1G0846D	-	-	*	*	*
MARKVISION	BMD32048M1333C9-1123	2GB	DS	MARKVISION	M3D1288P-13	-	-	*	*	*
MARKVISION	BMD34096M1333C9-1124	4GB	DS	MARKVISION	M3D2568E-13	-	-	*	*	*
PATRIOT	PSD31G13332H	1GB	DS	-	-	9	-	*	*	*
PATRIOT	PSD31G13332	1GB	DS	PATRIOT	PM64M8D38U-15	-	-	*	*	*
PATRIOT	PSD32G13332H	2GB	DS	-	-	-	-	*	*	*
RAMAXEL	RMR1870ED48E8F-1333	2GB	DS	ELPIDA	J1108BDBG-DJ-F	-	-	*	*	*
RAMAXEL	RMR1870EC58E9F-1333	4GB	DS	ELPIDA	J2108BCE-DJ-F	-	-	*	*	*
RIDATA	C304627CB1AG22Fe	2GB	DS	RIDATA	N/A	9	-	*	*	*
RIDATA	E304459CB1AG32Cf	4GB	DS	RIDATA	N/A	9	-	*	*	*
SILICON POWER	SP001GBLTU133S01	1GB	SS	NANYA	NT5CB128M8AN-CG	9	-	*	*	*
SILICON POWER	SP001GBLTU133S02	1GB	SS	Elixir	N2CB1680AN-C6	9	-	*	*	*
SILICON POWER	SP002GBLTU133S02	2GB	DS	Elixir	N2CB1680AN-C6	9	-	*	*	*
TAKEMS	TMS1GB364D081-107EY	1GB	SS	-	-	7-7-7-20	1.5V	*	*	*
TAKEMS	TMS1GB364D081-138EY	1GB	SS	-	-	8-8-8-24	1.5V	*	*	*
TAKEMS	TMS2GB364D081-107EY	2GB	DS	-	-	7-7-7-20	1.5V	*	*	*
TAKEMS	TMS2GB364D081-138EY	2GB	DS	-	-	8-8-8-24	1.5V	*	*	*
TAKEMS	TMS2GB364D082-138EW	2GB	DS	-	-	8-8-8-24	1.5V	*	*	*
UMAX	E41302GP0-73BDB	2GB	DS	UMAX	U2S24D30TP-13	-	-	*	*	*
WINTEC	3WVS31333-2G-CNR	2GB	DS	AMPO	AM3420803-13H	-	-	*	*	*

DDR3 1066MHz capability

Vendors	Part No.	Size	SS / DS	C h i p Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)		
								1 DIMM	2 DIMMs	4 DIMMs
Crucial	CT12864BA1067.8FF	1GB	SS	Micron	9GF22D9KPT	7	-	*	*	*
Crucial	CT25664BA1067.16FF	2GB	DS	Micron	9HF22D9KPT	7	-	*	*	*
ELPIDA	EBJ10UE8EDF0-AE-F	1GB	SS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	*	*	*
ELPIDA	EBJ21UE8EDF0-AE-F	2GB	DS	ELPIDA	J1108EDSE-DJ-F	-	1.35V(low voltage)	*	*	*
KINGSTON	KVR1066D3N7/1G (low profile)	1GB	SS	ELPIDA	J1108BFSE-DJ-F	7	1.5V	*	*	*
KINGSTON	KVR1066D3N7/2G	2GB	DS	ELPIDA	J1108BDSE-DJ-F	7	1.5V	*	*	*
KINGSTON	KVR1066D3N7/4G	4GB	DS	Hynix	H5TQ2G83AFR	7	1.5V	*	*	*
Micron	MT8JTF12864AZ-1G1F1	1GB	SS	Micron	9GF22D9KPT	7	-	*	*	*
Micron	MT16JTF25664AZ-1G1F1	2GB	DS	Micron	9HF22D9KPT	7	-	*	*	*
Kingtiger	2GB DIMM PC3-8500	2GB	DS	Hynix	H5TQ1G83AFP G7C	-	-	*	*	*



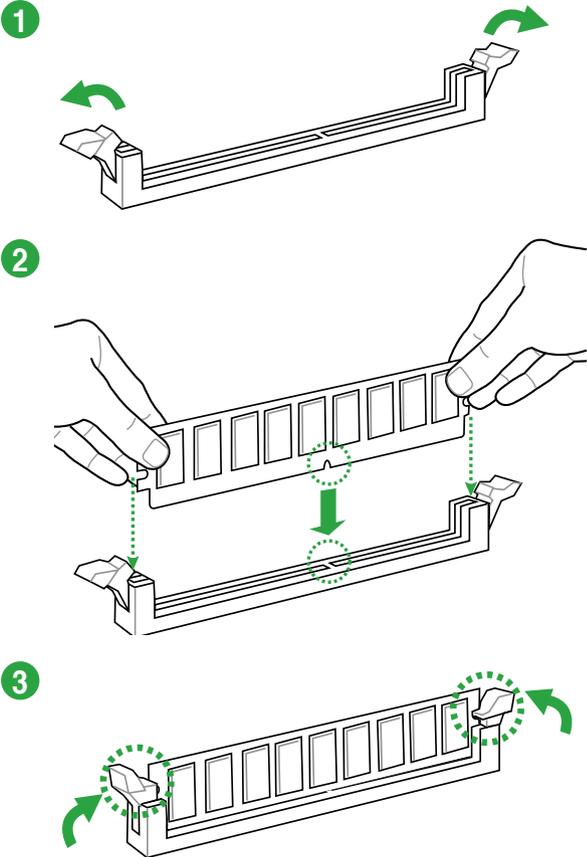
Side(s): **SS - Single-sided DS - Double-sided DIMM support:**

- 1 DIMM: Supports one (1) module inserted into any slot as Single-channel memory configuration. We suggest that you install the module into A2 slot.
- 2 DIMMs: Supports two (2) modules inserted into either the blue slots or the black slots as one pair of Dual-channel memory configuration. We suggest that you install the modules into slots A2 and B2 for better compatibility.
- 4 DIMMs: Supports four (4) modules inserted into both the blue and black slots as two pairs of Dual-channel memory configuration.

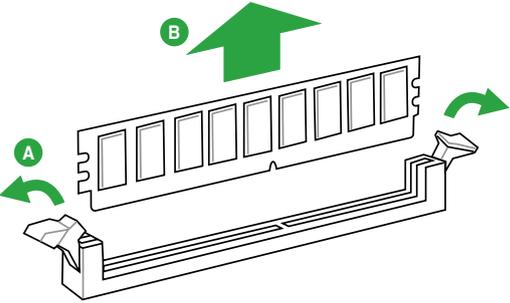


- ASUS exclusively provides hyper DIMM support function.
- Hyper DIMM support is subject to the physical characteristics of individual CPUs. Load the X.M.P. or D.O.C.P. settings in the BIOS for the hyper DIMM support.
- Visit the ASUS website for the latest QVL.

1.5.3 Installing a DIMM



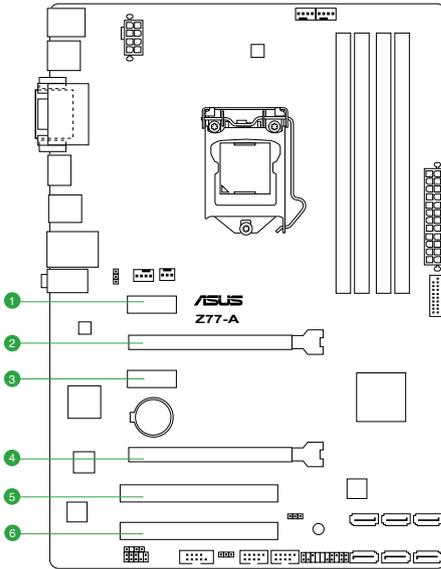
To remove a DIMM



1.6 Expansion slots



Unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.



Slot No.	Slot Description
1	PCIe 2.0 x1_1 slot
2	PCIe 3.0/2.0 x16_1 slot [blue] (at 16x mode)
3	PCIe 2.0 x1_2 slot
4	PCIe 2.0 x16_2 slot [black] (at 4x mode)
5	PCI slot_1
6	PCI slot_2

VGA configuration	PCI Express operating mode	
	PCIe 2.0 x16_1	PCIe 2.0 x16_2
Single VGA/PCIe card	x16 (Recommend for single VGA)	N/A
Dual VGA/PCIe card	x16	x4



- In single VGA card mode, use the PCIe 3.0/2.0 x16_1 slot (blue) for a PCI Express x16 graphics card to get better performance.
- In CrossFireX™ mode, use the PCIe 3.0/2.0 x16_1 and PCIe 2.0 x16_2 slots for PCI Express x16 graphics cards to get better performance.
- We recommend that you provide sufficient power when running CrossFireX™ mode.
- Connect a chassis fan to the motherboard connector labeled CHA_FAN1/2 when using multiple graphics cards for better thermal environment.

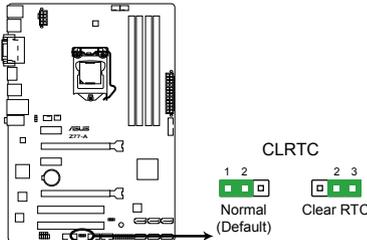
IRQ assignments for this motherboard

Component	A	B	C	D	E	F	G	H
IGD	shared	-	-	-	-	-	-	-
Audio Controller	-	-	-	-	-	-	shared	-
EHCI Controller	-	-	-	-	-	-	-	shared
XHCI Controller	shared	-	-	-	-	-	-	-
SATA Controller	-	-	-	shared	-	-	-	-
PCIEX16_1	shared	-	-	-	-	-	-	-
PCIEX16_2	shared	-	-	-	-	-	-	-
PCIEX1_1	-	-	shared	-	-	-	-	-
PCIEX1_2	-	-	-	shared	-	-	-	-
RTL8111F	shared	-	-	-	-	-	-	-
PCI Slot 1	-	shared	-	-	-	-	-	-
PCI Slot 2	-	-	shared	-	-	-	-	-

1.7 Jumpers

1. Clear RTC RAM (CLRRTC)

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



Z77-A Clear RTC RAM

To erase the RTC RAM:

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



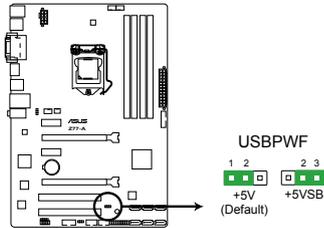
Except when clearing the RTC RAM, never remove the cap on CLRRTC jumper default position. Removing the cap will cause system boot failure!



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

2. USB device wake-up (3-pin USBPFW)

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



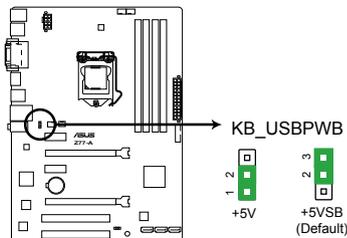
Z77-A USB device wake up



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

3. Keyboard power (3-pin KB_USBPW)

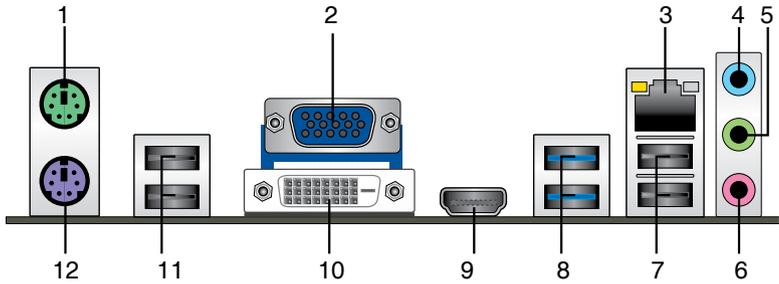
This jumper allows you to enable or disable the keyboard wake-up feature. When you set this jumper to pins 2-3 (+5VSB), you can wake up the computer by pressing a key on the keyboard. This feature requires an ATX power supply that can supply at least 1A on the +5VSB lead, and a corresponding setting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



Z77-A Keyboard and USB device wake up

1.8 Connectors

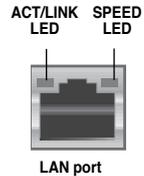
1.8.1 Rear panel ports



- 1. **PS/2 Mouse port (green).** This port is for a PS/2 mouse.
- 2. **Video Graphics Adapter (VGA) port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices.
- 3. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub.

LAN port LED indications

Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10Mbps connection
ORANGE	Linked	ORANGE	100Mbps connection
BLINKING	Data activity	GREEN	1Gbps connection



4. **Line In port (light blue).** This port connects to the tape, CD, DVD player, or other audio sources.
5. **Line Out port (lime).** This port connects to a headphone or a speaker. In the 4, 6, and 8-channel configurations, the function of this port becomes Front Speaker Out.
6. **Microphone port (pink).** This port connects to a microphone.



Refer to the audio configuration table below for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue (Rear panel)	Line In	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Lime (Rear panel)	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink (Rear panel)	Mic In	Mic In	Bass/Center	Bass/Center
Lime (Front panel)	—	—	—	Side Speaker Out



To configure an 8-channel audio output:

Use a chassis with HD audio module in the front panel to support an 8-channel audio output.

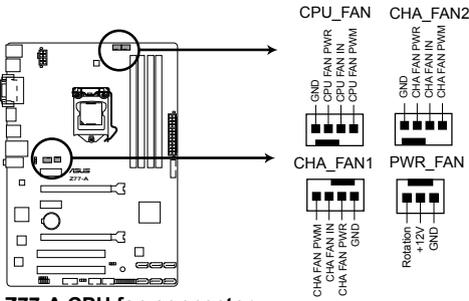
7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0/1.1 devices.
8. **USB 3.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are for connecting USB 3.0 devices.
9. **HDMI port.** This port is for a High-Definition Multimedia Interface (HDMI) connector, and is HDCP compliant allowing playback of HD DVD, Blu-ray, and other protected content.
10. **DVI-D port.** This port is for any DVI-D compatible device. DVI-D can't be converted to output RGB signal to CRT and isn't compatible with DVI-I
11. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0/1.1 devices.
12. **PS/2 Keyboard port (purple).** This port is for a PS/2 keyboard.

1.8.2 Internal connectors

1. CPU and chassis fan connectors

(4-pin CPU_FAN, 4-pin CHA_FAN1/2; 3-pin PWR_FAN)

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.



Z77-A CPU fan connector



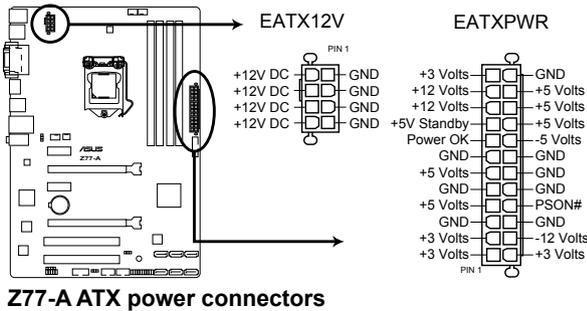
DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors.



- The CPU_FAN connector supports a CPU fan of maximum 1A(12W) fan power.
- The CPU_FAN and CHA_FAN connectors support the ASUS Fan Xpert feature.

2. ATX power connectors (24-pin EATXPWR, 8-pin ATX12V)

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



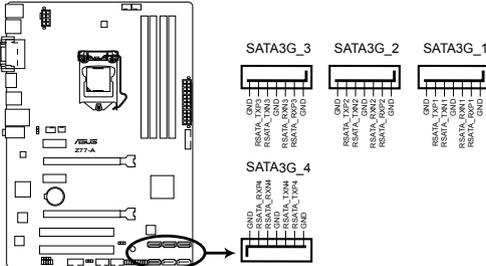
Z77-A ATX power connectors



- We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 300W power rating. This PSU type has 24-pin and 8-pin power plugs.
- If you intend to use a PSU with 20-pin and 4-pin power plugs, ensure that the 20-pin power plug can provide at least 15 A on +12 V and that the PSU has a minimum power rating of 300W. The system may become unstable or may not boot up if the power is inadequate.
- DO NOT forget to connect the 8-pin ATX +12V power plug. Otherwise, the system will not boot up.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices or when you intend to install additional devices. The system may become unstable or may not boot up if the power is inadequate.
- If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details.

3. Serial ATA 3.0 Gb/s connectors (7-pin SATA3G 1~6)

These connectors are for the Serial ATA 3.0 Gb/s signal cables for Serial ATA hard disk drives and optical disc drives. If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, or RAID 10 configuration through the onboard controller.



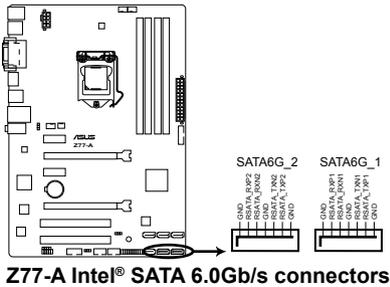
Z77-A Intel® SATA 3.0Gb/s connectors



- 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 **2.5.3 SATA Configuration** for details.
- When using NCQ, please check the SATA Mode in the BIOS is [AHCI Mode]. Refer to **2.5.3 SATA Configuration** for details.
- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 or later versions.

4. Serial ATA 6.0 Gb/s connectors (7-pin SATA6G 1~6)

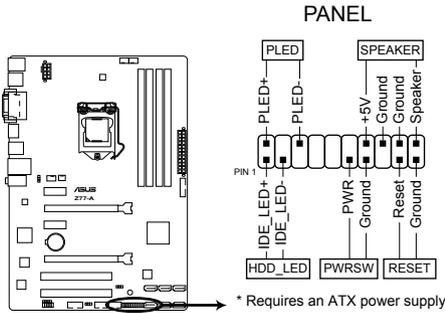
These connectors are for the Serial ATA 6.0 Gb/s signal cables for Serial ATA hard disk drives and optical disc drives. If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 5, or RAID 10 configuration through the onboard controller.



- 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 **2.5.3 SATA Configuration** for details.
- When using NCQ, please check the SATA Mode in the BIOS is [AHCI Mode]. Refer to **2.5.3 SATA Configuration** for details.
- You must install Windows® XP Service Pack 3 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP3 or later versions.

5. System panel connector (20-8 pin PANEL)

This connector supports several chassis-mounted functions.



Z77-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)**

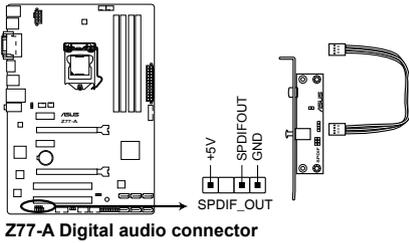
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

- **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.

6. Digital audio connector (4-1 pin SPDIF_OUT)

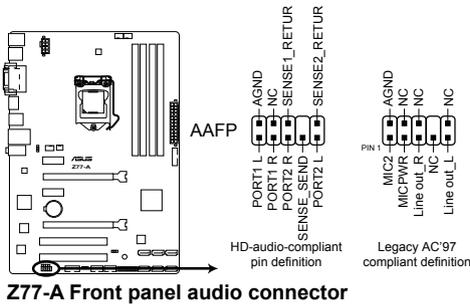
This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port.



The S/PDIF module is purchased separately.

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

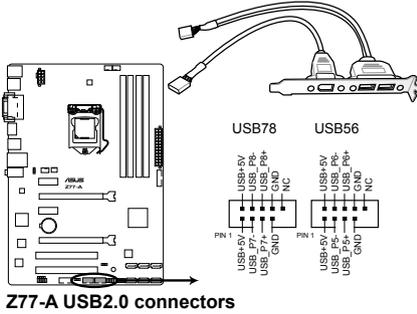
This connector is for a chassis-mounted front panel audio I/O module that supports either High Definition Audio or AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard high-definition audio capability.
- If you want to connect a high definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS to **[HD]**. See section 2.5.6 **Onboard Devices Configuration** for details.
- The front panel audio I/O module is purchased separately.

8. USB 2.0 connectors (10-1 pin USB78, USB56)

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 480Mbps connection speed.



Z77-A USB2.0 connectors



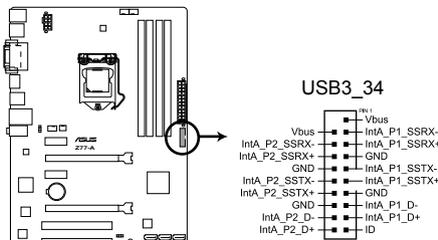
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB 2.0 module is purchased separately.

9. USB 3.0 connector (20-1 pin USB3_34)

These connectors are for the additional USB 3.0 ports, and complies with the USB 3.0 specification that supports up to 480 MBps connection speed. If the USB 3.0 front panel cable is available from your system chassis, with this USB 3.0 connector, you can have a front panel USB 3.0 solution.



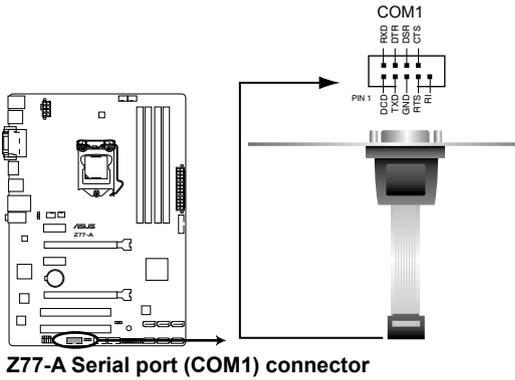
Z77-A USB3.0 Front panel connector



You can connect the ASUS front panel USB 3.0 bracket to this connector to obtain the front panel USB 3.0 solution.

10. Serial port connector (10-1 pin COM1)

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



The COM module is purchased separately.

1.9 Software support

1.9.1 Installing an operating system

This motherboard supports Windows® XP / Vista / Windows® 7 / Windows® 8 Operating Systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.



- Motherboard settings and hardware options vary. Refer to your OS documentation for detailed information.
- Ensure that you install Windows® XP Service Pack 3 or later versions / Windows® Vista Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.

1.9.2 Support DVD information

The Support DVD that comes with the motherboard package contains the drivers, software applications, and utilities that you can install to avail all motherboard features.



The contents of the Support DVD are subject to change at any time without notice. Visit the ASUS website at www.asus.com for updates.

To run the Support DVD

Place the Support DVD into the optical drive. If Autorun is enabled in your computer, the DVD automatically displays the Specials screen. Click Drivers, Utilities, Make Disk, Manual, and Contact tabs to display their respective menus.



The following screen is for reference only.



Click an icon to display Support DVD/motherboard information

Click an item to install



If Autorun is NOT enabled on your computer, browse the contents of the Support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

BIOS information

2

2.1 Managing and updating your BIOS



Save a copy of the original motherboard BIOS file to a USB flash disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the ASUS Update utility.

2.1.1 ASUS Update utility

The ASUS Update is a utility that allows you to manage, save, and update the motherboard BIOS in Windows® environment.



- ASUS Update requires an Internet connection either through a network or an Internet Service Provider (ISP).
 - This utility is available in the support DVD that comes with the motherboard package.
-

Installing ASUS Update

To install ASUS Update:

1. Place the support DVD in the optical drive. The **Specials** menu appears.
2. Click the **Utilities** tab, then click **AI Suite II**.
3. Follow the onscreen instructions to complete the installation.



Quit all Windows® applications before you update the BIOS using this utility.

Updating the BIOS

To update the BIOS:

1. From the Windows® desktop, click **Start > Programs > ASUS > AI Suite II > AI Suite II X.XX.XX** to launch the AI Suite II utility. The AI Suite II Quick Bar appears.
2. Click **Update** button from the Quick Bar, and then click **ASUS Update** from the popup menu. The **ASUS Update** main screen appears. From the list, select either of the following methods:

Updating from the Internet

- a. Select **Update BIOS from the Internet**, then click **Next**.
- b. Select the ASUS FTP site nearest you to avoid network traffic, then click **Next**.
- c. From the FTP site, select the BIOS version that you wish to download then click **Next**.



The ASUS Update utility is capable of updating itself through the Internet. Always update the utility to avail all its features.

Updating from a BIOS file

- a. Select **Update BIOS from file**, then click **Next**.
- b. Locate the BIOS file from the **Open** window, then click **Open**.
3. Follow the onscreen instructions to complete the updating process.

2.1.2 ASUS EZ Flash 2

The ASUS EZ Flash 2 feature allows you to update the BIOS without using an OS-based utility.



Before you start using this utility, download the latest BIOS file from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2:

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the **Advanced Mode** of the BIOS setup program. Go to the **Tool** menu to select **ASUS EZ Flash 2 Utility** and 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 disk 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 <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



-
- This function supports USB flash disks formatted using **FAT32/FAT16** on a single partition.
 - **DO NOT** shut down or reset the system while updating the BIOS to prevent system boot failure!
-

2.1.3 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 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 updated BIOS file.



-
- Before using this utility, rename the BIOS file in the removable device into **Z77-A.ROM**.
 - The BIOS file in the support DVD may not be the latest version. Download the latest BIOS file from the ASUS website at www.asus.com.
-

Recovering the BIOS

To recover the BIOS:

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



DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure!

2.1.4 ASUS BIOS Updater

The ASUS BIOS Updater allows you to update BIOS in DOS environment. This utility also allows you to copy the current BIOS file that you can use as a backup when the BIOS fails or gets corrupted during the updating process.



The succeeding utility screens are for reference only. The actual utility screen displays may not be same as shown.

Before updating BIOS

1. Prepare the motherboard support DVD and a USB flash drive in FAT32/16 format and single partition.
2. Download the latest BIOS file and BIOS Updater from the ASUS website at <http://support.asus.com> and save them on the USB flash drive.



NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.

3. Turn off the computer and disconnect all SATA hard disk drives (optional).

Booting the system in DOS environment

1. Insert the USB flash drive with the latest BIOS file and BIOS Updater to the USB port.
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 **Make Disk** menu appears, select the **FreeDOS command prompt** item by pressing the item number.
4. At the FreeDOS prompt, type **d:** and press <Enter> to switch the disk from Drive C (optical drive) to Drive D (USB flash drive).



Backing up the current BIOS

To backup the current BIOS file using the BIOS Updater



Ensure that the USB flash drive is not write-protected and has at least 4MB free space to save the file.

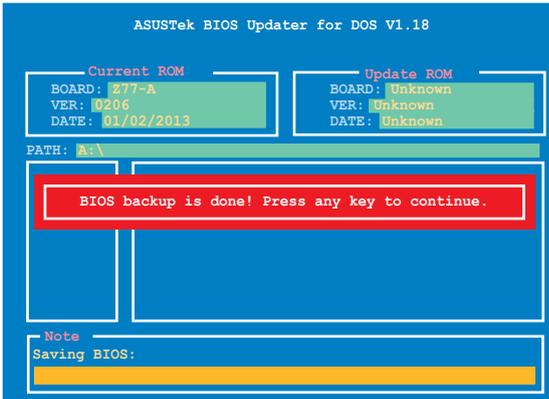
1. At the FreeDOS prompt, type `bupdater /o [filename]` and press <Enter>.

```
D:\>bupdater /oOLDBIOS1_rom
```

Filename Extension

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. The BIOS Updater backup screen appears indicating the BIOS backup process. When BIOS backup is done, press any key to return to the DOS prompt.



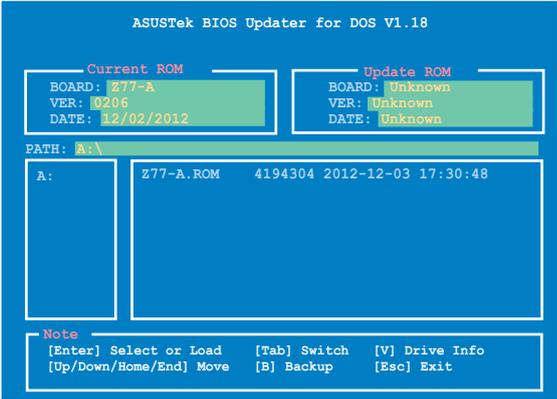
Updating the BIOS file

To update the BIOS file using BIOS Updater

1. At the FreeDOS prompt, type `bupdater /pc /g` and press <Enter>.

```
D:\>bupdater /pc /g
```

2. The BIOS Updater screen appears as below.



3. Press <Tab> to switch between screen fields and use the <Up/Down/Home/End> keys to select the BIOS file and press <Enter>. BIOS Updater checks the selected BIOS file and prompts you to confirm BIOS update.



4. Select Yes and press <Enter>. When BIOS update is done, press <ESC> to exit BIOS Updater. Restart your computer.



DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



- For BIOS Updater version 1.04 or later, the utility automatically exits to the DOS prompt after updating BIOS.
- Load the BIOS default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the Exit menu. Refer to section 2.9 Exit menu for details.
- Reconnect all SATA hard disk drives after updating the BIOS file if you have disconnected them.

2.2 BIOS setup program

Use the BIOS Setup program to update the BIOS or configure its parameters. The BIOS screens include navigation keys and brief online help to guide you in using the BIOS Setup program.

Entering BIOS Setup at startup

To enter BIOS Setup at startup:

- Press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routines.

Entering BIOS Setup after POST

To enter BIOS Setup after POST:

- Press <Ctrl>+<Alt>+ simultaneously.
- Press the reset button on the system chassis.
- Press the power button to turn the system off then back on. Do this option only if you failed to enter BIOS Setup using the first two options.



Using the **power button**, **reset button**, or the <Ctrl>+<Alt>+ keys to force reset from a running operating system can cause damage to your data or system. We recommend to always shut down the system properly from the operating system.



- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website at www.asus.com to download the latest BIOS file for this motherboard.
 - You can connect a USB mouse if you want to navigate the BIOS setup program without having to use a keyboard.
 - If the system becomes unstable after changing any BIOS setting, load the default settings to ensure system compatibility and stability. Select the **Load Optimized Defaults** item under the **Exit** menu. See section **2.9 Exit Menu** for details.
 - If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value. See section **1.7 Jumpers** for information on how to erase the RTC RAM.
-

BIOS menu screen

The BIOS setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from the **Exit** menu or from the **Exit/Advanced Mode** button in the **EZ Mode/Advanced Mode** screen.

EZ 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**.



The default screen for entering the BIOS setup program can be changed. Refer to the **Setup Mode** item in section 2.7 **Boot menu** for details.

Selects the display language of the BIOS setup program

Displays the CPU/motherboard temperature, CPU voltage output, CPU/chassis fan speed

Exits without saving the changes, saves the changes and exit the BIOS, or enters Advanced Mode

Selects the boot device priority

Silent mode

Standard mode

Loads optimized default

Displays the system properties of the selected mode

Turbo mode

Selects the boot device priority



- The boot device options vary depending on the devices you installed to the system.
- The **Boot Menu(F8)** button is available only when the boot device is installed to the system.

Advanced Mode

The **Advanced Mode** provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the **Advanced Mode**. Refer to the following sections for the detailed configurations.



To access the EZ Mode, click **Exit**, then select **ASUS EZ Mode**.

Menu items **Menu bar** **Configuration fields** **General help**

Submenu item **Pop-up window** **Scroll bar** **Navigation keys**

Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items.

The other items (AI Tweaker, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

Back button

This button appears when entering a submenu. Press <Esc> or use the USB mouse to click this button to return to the previous menu screen.

Submenu items

A greater than sign (>) before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

Pop-up window

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

Navigation keys

At the bottom right corner of the menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

General help

At the top right corner of the menu screen is a brief description of the selected item.

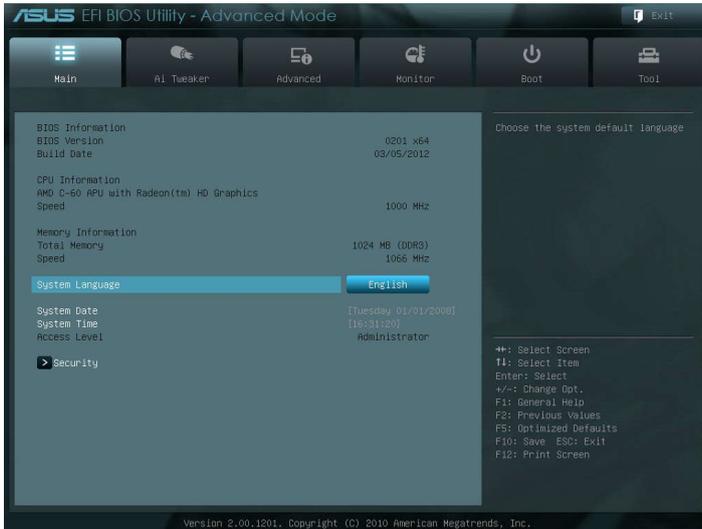
Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

2.3 Main menu

The Main menu screen appears when you enter the Advanced Mode of the BIOS Setup program. The Main menu provides you an overview of the basic system information, and allows you to set the system date, time, language, and security settings.



2.3.1 System Language [English]

Allows you to choose the BIOS language version from the options. Configuration options: [English] [Français] [Español] [Deutsch] [Русский] [日本語] [繁體中文] [简体中文]

2.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

2.3.3 System Time [xx:xx:xx]

Allows you to set the system time.

2.3.4 Security

The Security menu items allow you to change the system security settings.



- If you have forgotten your BIOS password, erase the CMOS Real Time Clock (RTC) RAM to clear the BIOS password. See section 1.7 **Jumpers** for information on how to erase the RTC RAM.
- The **Administrator** or **User Password** items on top of the screen show the default **Not Installed**. After you set a password, these items show **Installed**.

Administrator Password

If you have set an administrator password, we recommend that you enter the administrator password for accessing the system. Otherwise, you might be able to see or change only selected fields in the BIOS setup program.

To set an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the **Administrator Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the administrator password, follow the same steps as in changing an administrator password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **Administrator Password** item on top of the screen shows **Not Installed**.

User Password

If you have set a user password, you must enter the user password for accessing the system. The **User Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Create New Password** box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the **User Password** item and press <Enter>.
2. From the **Enter Current Password** box, key in the current password, then press <Enter>.
3. From the **Create New Password** box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear the user password, follow the same steps as in changing a user password, but press <Enter> when prompted to create/confirm the password. After you clear the password, the **User Password** item on top of the screen shows **Not Installed**.

2.4 Ai Tweaker menu

The Ai Tweaker menu items allow you to configure overclocking-related items.



Be cautious when changing the settings of the Ai Tweaker menu items. Incorrect field values can cause the system to malfunction.



The configuration options for this section vary depending on the CPU and DIMM model you installed on the motherboard.



Scroll down to display the following items:



2.4.1 Ai Overclock Tuner [Auto]

Allows you to select the CPU overclocking options to achieve the desired CPU internal frequency. Select any of these preset overclocking configuration options:

- [Auto] Loads the optimal settings for the system.
[Manual] Allows you to individually set overclocking parameters.



The following item appears only when you set the Ai Overclocking Tuner to [Manual].

BCLK/PCIE Frequency [XXX]

Allows you to adjust the CPU and VGA frequency to enhance the system performance. Use the <+> and <-> keys to adjust the value. You can also key in the desired value using the numeric keypad. The values range from 80.0MHz to 300.0MHz.

2.4.2 ASUS MultiCore Enhancement [Enabled]

- [Enabled] Default set to [Enabled] for maximum performance under Manual/User-defined memory frequency mode.
[Disabled] Allows you to set to default core ratio settings.

2.4.3 Turbo Ratio [Auto]

Allows you to set the CPU ratio automatically or manually.

- [Auto] Sets all Turbo Ratio to Intel® CPU default settings automatically.
[By all Cores (Can Adjust in OS)] All number of active cores will be set to one single Turbo Ratio in OS.
[By Per Core (Cannot Adjust in OS)] All Number if active cores can be set to an individual Turbo Ratio in BIOS.



The following item appears only when you set the Turbo Ratio to [By Per Core].

1-/2-/3-/4-Core Ratio Limit [Auto]

This item appears only when you set the Turbo Ratio item to [By Per Core]. Use the <+> and <-> keys to adjust the value.

2.4.4 Internal PLL Overvoltage [Auto]

Allows you to set the Internal PLL Overvoltage.
Configuration options: [Auto] [Enabled] [Disabled].

2.4.5 Memory Frequency [Auto]

Allows you to set the memory operating frequency. The configuration options vary with the BCLK/PCIE Frequency item settings.

Configuration options: [Auto] [DDR3-800MHz] [DDR3-1066MHz] [DDR3-1333MHz] [DDR3-1600MHz] [DDR3-1866MHz] [DDR3-2133MHz] [DDR3-2400MHz]

2.4.6 iGPU Max. Frequency [Auto]

Allows you to set the iGPU maximum frequency. The values range from xxxxMHz (by CPU) to 3000MHz with a 50MHz interval. Use <+>/<-> to adjust the value.

2.4.7 EPU Power Saving Mode [Disabled]

Allows you to enable or disable the EPU power saving function. Configuration options: [Disabled] [Enabled]

2.4.8 OC Tuner

OC Tuner automatically overlocks the frequency and voltage of CPU and DRAM for enhancing the system performance. Configuration options: [OK] [Cancel]

2.4.9 DRAM Timing Control

The sub-items in this menu allow you to set the DRAM timing control features. Use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

Changing the values in this menu may cause the system to become unstable! If this happens, revert to the default settings.

2.4.10 CPU Power Management

The sub-items in this menu allow you to set the CPU ratio and features.

CPU Ratio [Auto]

Allows you to manually adjust the maximum non-turbo CPU ratio. Use <+> and <-> keys to adjust the value. The valid value ranges vary according to your CPU model.

Enhanced Intel® SpeedStep Technology [Enabled]

Allows you to enable or disable the Enhanced Intel® SpeedStep Technology (EIST).

[Disabled] Disables this function.

[Enabled] The operating system dynamically adjusts the processor voltage and core frequency which may result in decreased average consumption and decreased average heat production.

Turbo Mode [Enabled]

This item appears only when you set the EIST item to [Enabled].

[Enabled] Allows processor cores to run faster than marked frequency in specific conditions.

[Disabled] Disables this function.



The following three items appear only when you set both the EIST and Turbo Mode items to [Enabled].

Long Duration Power Limit [Auto]

Use the <+> and <-> keys to adjust the value.

Long Duration Maintained [Auto]

Use the <+> and <-> keys to adjust the value.

Short Duration Power Limit [Auto]

Use the <+> and <-> keys to adjust the value.

Primary Plane Current Limit [Auto]

Maximum instantaneous current allowed at any given time for CPU cores.

Use <+> and <-> key to adjust the value at 0.125A increment.

Secondary Plane Current Limit [Auto]

Maximum instantaneous current allowed at any given time for Internal Graphics cores

Use <+> and <-> key to adjust the value at 0.125A increment.

2.4.11 DIGI+ VRM

CPU Load-Line Calibration [Auto]

Load-line is defined by Intel VRM spec and affects CPU voltage. The CPU working voltage will decrease proportionally to CPU loading. Higher value gets a higher voltage and better overclocking performance, but increases the CPU and VRM thermal. This item allows you to adjust the voltage range from the following percentages to boost the system performance: 0% (Regular), 25% (Medium), 50% (High), 75% (Ultra High) and 100% (Extreme).

Configuration options: [Auto] [Regular] [Medium] [High] [Ultra High] [Extreme]



The actual performance boost may vary depending on your CPU specification.

CPU Fixed Frequency [xxx]

Frequency switching affects the VRM transient response and the thermal component. Higher frequency gets quicker transient response. Use the <+> and <-> keys to adjust the value. The values range from 200k Hz to 350k Hz with a 50k Hz interval.



DO NOT remove the thermal module when switching to Manual Mode. The thermal conditions should be monitored.

CPU Power Phase Control [Standard]

Allows you to control the power phase based on the CPU's demands.

Configuration options: [Standard] [Optimized] [Extreme] [Manual Adjustment]



DO NOT remove the thermal module when switching to Extreme and Manual Mode. The thermal conditions should be monitored.

CPU Power Duty Control [T.Probe]

DIGI + VRM Duty control adjusts the current and thermal conditions of every component's phase. Configuration options:

[T. Probe]: Select to maintain the VRM thermal balance.

[Extreme]: Select to maintain the current VRM balance.

CPU Current Capability [100%]

Allows you to configure the total power range, and extends the overclocking frequency range simultaneously. Configuration options: [100%] [110%] [120%] [130%] [140%]

iGPU Load-line Calibration [Auto]

Allows you to set the iGPU Load-line Calibration. Configuration options: [Auto] [Regular] [High] [Extreme]



The actual performance boost may vary depending on your CPU configuration.

iGPU Current Capability [100%]

Allows you to set the iGPU Current Capability. Configuration options: [100%] [110%] [120%] [130%]



DO NOT remove the thermal module while changing the DIGI+ VRM related parameters. The thermal conditions should be monitored.

CPU Voltage [Offset Mode]

[Manual Mode] Allows you to set a fixed CPU voltage.

[Offset Mode] Allows you to set the Offset voltage.

CPU Offset Mode Sign [+]

This item appears only when you set the CPU Voltage item to [Offset Mode].

- [+] To offset the voltage by a positive value.
- [-] To offset the voltage by a negative value.



Some of the following items are adjusted by typing the desired values using the numeric keypad and press the <Enter> key. You can also use the <+> and <-> keys to adjust the value. To restore the default setting, type [auto] using the keyboard and press the <Enter> key.

CPU Offset Voltage [Auto]

This item appears only when you set the CPU Voltage item to [Offset Mode] and allows you to set the Offset voltage. The values range from 0.005V to 0.635V with a 0.005V interval.



Refer to the CPU documentation before setting the CPU voltage. Setting a high voltage may damage the CPU permanently, and setting a low voltage may make the system unstable.

iGPU Voltage [Offset Mode]

- [Manual Mode] Allows you to set a fixed iGPU voltage.
- [Offset Mode] Allows you to set the iGPU Offset voltage.

iGPU Offset Voltage [Auto]

This item appears only when you set the iGPU Voltage item to [Offset Mode] and allows you to set the Offset voltage. The values range from 0.005 to 0.635V with a 0.005V interval.

DRAM Voltage [Auto]

Allows you to set the DRAM voltage. The values range from 1.185V to 2.135V with a 0.005V interval.



According to Intel CPU spec, DIMMs with voltage requirement over 1.65V may damage the CPU permanently. We recommend you install the DIMMs with the voltage requirement below 1.65V.



- The values of the CPU Manual Voltage, CPU Offset Voltage, iGPU Manual Voltage, iGPU Offset Voltage, DRAM Voltage, and PCH Voltage items are labeled in different color, indicating the risk levels of high voltage settings.
 - The system may need better cooling system to work stably under high voltage settings.
-

VCCSA Voltage [Auto]

Allows you to set the VCCSA voltage. The values range from 0.735V to 1.685V with a 0.005V interval. Configuration options: [Auto] [+0.1V]

PCH Voltage [Auto]

Allows you to set the Platform Controller Hub voltage. The values range from 0.735V to 1.685V with a 0.005V interval.

CPU PLL Voltage [Auto]

Allows you to set the CPU and PCH PLL voltage. The values range from 1.80V to 1.90V with a 0.1V interval. Configuration options: [Auto] [+0.1V]

CPU Spread Spectrum [Auto]

- [Auto] Automatic configuration.
- [Disabled] Enhances the BCLK overclocking ability.
- [Enabled] Sets to [Enabled] for EMI control.

2.5 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.



Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



2.5.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.



The items shown in this screen may be different due to the CPU you installed.

Intel® Adaptive Thermal Monitor [Enabled]

- [Enabled] Enables the overheated CPU to throttle its clock speed to cool down.
- [Disabled] Disables the CPU thermal monitor function.

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] [2] [3]

Limit CPUID Maximum [Disabled]

- [Enabled] Allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.
- [Disabled] Disables this function.

Execute Disable Bit [Enabled]

- [Enabled] Enables the No-Execution Page Protection Technology.
- [Disabled] Forces the XD feature flag to always return to zero (0).

Intel® Virtualization Technology [Disabled]

- [Enabled] Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.
- [Disabled] Disables this function.

Hardware Prefetcher [Enabled]

- [Enabled] Allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.
- [Disabled] Disables this function.

Adjacent Cache Line Prefetch [Enabled]

- [Enabled] Allows a hardware platform to perform adjacent cache line prefetching.
- [Disabled] Disables this function.

CPU Power Management Configuration

CPU Ratio [Auto]

Allows you to set the ratio between the CPU Core Clock and the BCLK Frequency. Use <+> and <-> keys to adjust the ratio. The valid value ranges vary according to your CPU model.

Enhanced Intel SpeedStep Technology [Enabled]

- Allows you to enable or disable the Enhanced Intel® SpeedStep Technology (EIST).
- [Disabled] The CPU runs at its default speed.
 - [Enabled] The operating system controls the CPU speed.

Turbo Mode [Enabled]

This item appears only when you set the EIST item to [Enabled] and allows you to enable or disable the Intel® Turbo Mode Technology.

- [Enabled] Allows processor cores to run faster than marked frequency in specific condition.
- [Disabled] Disables this function.

CPU C1E [Auto]

Allows you to enable or disable the CPU C1E.

- [Auto] Set this item automatically.
- [Enabled] Enables the C1E support function. This item should be enabled in order to enable the Enhanced Halt State.
- [Disabled] Disables this function.

CPU C3 Report [Auto]

Allows you to disable or enable the CPU C3 report to OS.

[Auto] Set this item automatically.

[Enabled] Enables the C3 report function. This item should be enabled in order to enable the Enhanced Halt State.

[Disabled] Disables this function.

CPU C6 Report [Auto]

Allows you to disable or enable the CPU C6 report to OS.

[Auto] Set this item automatically.

[Enabled] Enables the C6 report function. This item should be enabled in order to enable the Enhanced Halt State.

[Disabled] Disables this function.

Package C State Support [Auto]

Allows you to enable or disable the CPU C State support.

[Auto] Set this item automatically.

[Enabled] Enables C State Support.

[Disabled] Disables C State Support

2.5.2 PCH Configuration

High Precision Timer [Enabled]

Allows you to enable or disable the High Precision Event Timer.

Configuration options: [Enabled] [Disabled]

Intel(R) Rapid Start Technology

Intel(R) Rapid Start Technology [Disabled]

Allows you to enable or disable the Intel(R) Rapid Start Technology. Configuration options: [Enabled] [Disabled]



The following three items appear only when you set the **Intel(R) Rapid Start Technology** to [Enabled].

Entry on S3 RTC Wake [Enabled]

Allows you to enable or disable the iFFS invocation upon S3 RTC wake.

Configuration options: [Enabled] [Disabled]

Entry After [Immediately]

This item appears only when you set the **Entry on S3 RTC Wake** to [Enabled] and allows you to set the RTC wake timer at S3 entry. Configuration options: [Immediately] [1 minute] [2 minute] [5 minute] [10 minute] [15 minute] [30 minute] [1 hour] [2 hours]

Active Page Threshold Support [Enabled]

Allows you to enable or disable the Active Page Threshold Support. Configuration options: [Enabled] [Disabled]

Active Memory Threshold [x]

This item appears only when you set the **Active Page Threshold Support** to [Enabled] and allows you to set the Active Memory Threshold. When the partition size is larger than the Active Page Threshold size, the system will try to support the Intel(R) Rapid Start Technology. When the item is set to zero, the system automatically checks whether the partition size is enough at S3 entry. Key in the desired value using the numeric keypad.

Intel® Smart Connect Technology

ISCT Configuration [Disabled]

Allows you to enable or disable the ISCT configuration. Configuration options: [Enabled] [Disabled]

2.5.3 SATA Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show **Not Present** if no SATA device is installed to the corresponding SATA port.

SATA Mode Selection [AHCI]

Allows you to set the SATA configuration.

[IDE Mode] Set to [IDE Mode] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.

[AHCI Mode] Set to [AHCI Mode] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

[RAID Mode] Set to [RAID Mode] when you want to create a RAID configuration from the SATA hard disk drives.

S.M.A.R.T. Status Check [Enabled]

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) is a monitor system. When read/write of your hard disk errors occur, this feature allows the hard disk to report warning messages during the POST. Configuration options: [Enabled] [Disabled]

Hot Plug [Disabled]

These items appear only when you set the **SATA mode** item to [AHCI Mode] or [RAID Mode], and allow you to enable/disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled]

2.5.4 System Agent Configuration

Memory Remap Feature [Enabled]

[Enabled] Allow you to enable remapping the memory above 4GB.

[Disabled] Disables this function.

Graphics Configuration

Primary Display [Auto]

Allows you to select a primary display from iGPU, PCIE, or PCI graphic devices.

Configuration options: [Auto] [iGPU] [PCIE] [PCI]

iGPU Memory [64M]

Allows you to set the iGPU memory size. Configuration options: [32M] [64M] [96M]

[128M] ~ [448M] [480M] [512M] [1024M]

Render Standby [Enabled]

Allows you to enable or disable Render Standby by internal graphics devices.

Configuration options: [Disabled] [Enabled]

iGPU Multi-Monitor [Disabled]

Allows you to enable the iGPU Multi-Monitor. Set this item to [Enabled] to empower both integrated and discrete graphics. iGPU shared system memory size is fixed at 64MB.

Configuration options: [Disabled] [Enabled]

NB PCIe Configuration

Allows you to configure the NB PCI Express settings.

PCIE x16_1 [Auto]

Allows you to set the PCIE x16_1 link speed.

Configuration options: [Auto] [Gen1] [Gen2]

2.5.5 USB Configuration

The items in this menu allow you to change the USB-related features.



The **USB Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Intel USB2.0 EHCI Controller

- [Enabled] Enables the USB2.0 EHCI Controller.
- [Disabled] Disables the USB2.0 EHCI Controller.

Legacy USB Support [Enabled]

- [Enabled] Enables the support for USB devices on legacy operating systems (OS).
- [Disabled] The USB devices can be used only for the BIOS setup program.
- [Auto] Allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled.

Legacy USB3.0 Support [Enabled]

- [Enabled] Enables the support for USB 3.0 devices on legacy operating systems (OS).
- [Disabled] Disables the function.

Intel xHCI Mode [Smart Auto]

Allows you to select the Intel xHCI Mode.

Configuration options: [Smart Auto] [Auto] [Enabled] [Disabled]

EHCI Hand-off [Disabled]

- [Enabled] Enables the support for operating systems without an EHCI hand-off feature.
- [Disabled] Disables the function.

USB Single Port Control

Allows you to enable or disable individual USB ports.

2.5.6 Onboard Devices Configuration

HD Audio Controller [Enabled]

[Enabled] Enables the High Definition Audio Controller.

[Disabled] Disables the controller.



The following two items appear only when you set the **HD Audio Controller** item to [Enabled].

Front Panel Type [HD]

Allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

[HD] Sets the front panel audio connector (AAFP) mode to high definition audio.

[AC97] Sets the front panel audio connector (AAFP) mode to legacy AC'97.

SPDIF Out Type [SPDIF]

[SPDIF] Sets to [SPDIF] for SPDIF audio output.

[HDMI] Sets to [HDMI] for HDMI audio output.

Realtek LAN Controller [Enabled]

[Enabled] Enables the Realtek LAN controller.

[Disabled] Disables the controller.

Realtek PXE OPROM [Disabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the PXE OptionRom of the Realtek LAN controller.

Configuration options: [Enabled] [Disabled]

Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.

Serial Port [Enabled]

Allows you to enable or disable the serial port (COM). Configuration options: [Enabled] [Disabled]

Change Settings [IO=3F8h; IRQ=4]

This item appears only when you set the **Serial Port** to [Enabled] and allows you to select the Serial Port base address. Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3]

2.5.7 APM

Restore AC Power Loss [Power Off]

- [Power On] The system goes into on state after an AC power loss.
- [Power Off] The system goes into off state after an AC power loss.
- [Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On By PS/2 Keyboard [Disabled]

- [Disabled] Disables the Power On by a PS/2 keyboard.
- [Space Bar] Sets the Space Bar on the PS/2 keyboard to turn on the system.
- [Ctrl-Esc] Sets the Ctrl+Esc key on the PS/2 keyboard to turn on the system.
- [Power Key] Sets Power key on the PS/2 keyboard to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PS/2 Mouse [Disabled]

- [Disabled] Disables the Power On by a PS/2 mouse.
- [Enabled] Enables the Power On by a PS/2 mouse. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PCIE/PCI [Disabled]

- [Disabled] Disables the PCIE/PCI devices to generate a wake-on-LAN feature of the Intel/Realtek LAN device.
- [Enabled] Enables the PCIE/PCI devices to generate a wake-on-LAN feature of the Intel/Realtek LAN device.

Power On By Ring [Disabled]

- [Disabled] Disables Ring to generate a wake event.
- [Enabled] Enables Ring to generate a wake event.

Power On By RTC [Disabled]

- [Disabled] Disables RTC to generate a wake event.
- [Enabled] When set to [Enabled], the items RTC Alarm Date (Days) and Hour/Minute/Second will become user-configurable with set values.

RTC Alarm Date (Days)

This item appears only when you set the previous item to [Enabled] and allows you to select RTC alarm time (days). When you set the time to zero, the RTC alarms everyday. Use <+> and <-> keys to adjust the time.

2.5.8 Network Stack

Network Stack [Disabled]

This item allows user to disable or enable the UEFI network stack. Configuration options:
[Disabled] [Enabled]

Ipv4 PXE Support [Enabled]

This item appears only when you set the Network Stack item to [Enabled]. When this item is disabled, the IPV4 PXE boot option will not be created. Configuration options:
[Disabled] [Enabled]

Ipv6 PXE Support [Enabled]

This item appears only when you set the Network Stack item to [Enabled]. When this item is disabled, the IPV6 PXE boot option will not be created. Configuration options:
[Disabled] [Enabled]

2.6 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.



Scroll down to display the following items:



2.6.1 CPU Temperature / MB Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU and motherboard temperatures. Select **Ignore** if you do not wish to display the detected temperatures.

2.6.2 CPU / Chassis Fan 1/2 / PWR Fan Speed [xxxx RPM] or [Ignore] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU, chassis, and power fan speed in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A. Select **Ignore** if you do not wish to display the detected speed.

2.6.3 CPU Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select **Ignore** if you do not want to detect this item.

2.6.4 CPU Q-Fan Control [Enabled]

[Disabled] Disables the CPU Q-Fan control feature.

[Enabled] Enables the CPU Q-Fan control feature.

2.6.5 CPU Fan Speed Low Limit [200 RPM]

This item appears only when you enable the CPU Q-Fan Control feature and allows you to disable or set the CPU fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

CPU Fan Profile [Standard]

This item appears only when you enable the CPU Q-Fan Control feature and allows you to set the appropriate performance level of the CPU fan.

[Standard] Sets to [Standard] to make the CPU fan automatically adjust depending on the CPU temperature.

[Silent] Sets to [Silent] to minimize the fan speed for quiet CPU fan operation.

[Turbo] Sets to [Turbo] to achieve maximum CPU fan speed.

[Manual] Sets to [Manual] to assign detailed fan speed control parameters.



The following four items appear only when you set CPU Fan Profile to [Manual].

CPU Upper Temperature [70]

Use the <+> and <-> keys to adjust the upper limit of the CPU temperature. The values range from 40°C to 90°C.

CPU Fan Max. Duty Cycle(%) [100]

Use the <+> and <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle.

CPU Lower Temperature [20]

Displays the lower limit of the CPU temperature.

CPU Fan Min. Duty Cycle(%) [20]

Use the <+> and <-> keys to adjust the minimum CPU fan duty cycle. The values range from 0% to 100%. When the CPU temperature is under 40°C, the CPU fan will operate at the minimum duty cycle.

2.6.6 Chassis1/2 Q-Fan Control [Enabled]

[Disabled] Disables the Chassis Q-Fan control feature.

[Enabled] Enables the Chassis Q-Fan control feature.

2.6.7 Chassis Fan Speed Low Limit [600 RPM]

This item appears only when you enable the Chassis Q-Fan Control feature and allows you to disable or set the chassis fan warning speed.

Configuration options: [Ignore] [200 RPM] [300 RPM] [400 RPM] [500 RPM] [600 RPM]

Chassis Fan Profile [Standard]

This item appears only when you enable the Chassis Q-Fan Control feature and allows you to set the appropriate performance level of the chassis fan.

[Standard] Sets to [Standard] to make the chassis fan automatically adjust depending on the chassis temperature.

[Silent] Sets to [Silent] to minimize the fan speed for quiet chassis fan operation.

[Turbo] Sets to [Turbo] to achieve maximum chassis fan speed.

[Manual] Sets to [Manual] to assign detailed fan speed control parameters.



The following four items appear only when you set Chassis Fan Profile to [Manual].

Chassis Upper Temperature [70]

Use the <+> and <-> keys to adjust the upper limit of the CPU temperature. The values range from 40°C to 90°C.

Chassis Fan Max. Duty Cycle(%) [100]

Use the <+> and <-> keys to adjust the maximum chassis fan duty cycle. The values range from 20% to 100%. When the chassis temperature reaches the upper limit, the chassis fan will operate at the maximum duty cycle.

Chassis Lower Temperature [40]

Displays the lower limit of the chassis temperature.

CPU Fan Min. Duty Cycle(%) [60]

Use the <+> and <-> keys to adjust the minimum chassis fan duty cycle. The values range from 0% to 100%. When the chassis temperature is under 40°C, the chassis fan will operate at the minimum duty cycle.

2.6.8 Anti Surge Support [Enabled]

This item allows you to enable or disable the Anti Surge function.

Configuration options: [Disabled] [Enabled]

2.7 Boot menu

The Boot menu items allow you to change the system boot options.



Scroll down to display the following items:



2.7.1 Fast Boot [Enabled]

Enable or disable boot with initialization of a minimal set of devices to launch active boot option. Configuration options: [Disabled] [Enabled]



The following three items appear only when you set **Fast Boot** to [Enabled].

USB Support [Partial Initialization]

- [Disabled] All USB devices will not be available until OS boot up for the fastest POST time possible.
- [Full Initialization] All USB devices will be available during POST. This setting will extend POST time.
- [Partial Initialization] For a faster POST time, only the USB ports with keyboard and mouse connections will be detected.

PS/2 Keyboard and Mouse Support [Auto]

- [Auto] For a faster POST time, PS/2 devices are available when the system boots up or rebooted as long as the PS/2 devices have not been reconnected or changed.
- [Full Initialization] For full system control, PS/2 devices are available during POST. This setting will extend POST time.
- [Disabled] For a shorter POST time, all PS/2 devices are available only after the PC enters the OS.

Network Stack Driver Support [Disabled]

- [Disabled] If Disabled, the Network Stack Driver will be skipped. To enable this feature, enable the Network Stack item in the Advanced menu.
- [Enabled] Allows the BIOS to boot from the Network Stack Driver.

Next boot after AC Power Loss [Normal Boot]

- [Normal Boot] Returns to normal boot on the next boot after an AC power loss.
- [Fast Boot] Accelerates the boot speed on the next boot after an AC power loss.

2.7.2 Full Screen Logo [Enabled]

- [Enabled] Enables the full screen logo display feature.
- [Disabled] Disables the full screen logo display feature.



Set this item to [Enabled] to use the ASUS MyLogo 2™ feature.

Post Report [5 sec]

This item appears only when the Full Screen Logo item is set to [Disabled] and allows you to set the waiting time for the system to display the post report. Configuration options: [1 sec] [2 sec] [3 sec] [4 sec] [5 sec] [6 sec] [7 sec] [8 sec] [9 sec] [10 sec] [Until Press ESC]

2.7.3 Post Delay Time [3 sec]

Allows you to set the POST Report wait time. This configuration only functions in Normal Boot mode. Configuration options: [0 sec] [1 sec] [2 sec] [3 sec] [4 sec] [5 sec] [6 sec] [7 sec] [8 sec] [9 sec] [10 sec]

2.7.4 Bootup NumLock State [On]

[On] Sets the power-on state of the NumLock to [On].

[Off] Sets the power-on state of the NumLock to [Off].

2.7.5 Wait for 'F1' If Error [Enabled]

When this item is set to [Enabled], the system waits for the F1 key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

2.7.6 Option ROM Messages [Force BIOS]

[Force BIOS] The third-party ROM messages will be forced to display during the boot sequence.

[Keep Current] The third-party ROM messages will be displayed only if the third-party manufacturer had set the add-on device to do so.

2.7.7 Interrupt 19 Capture [Postponed]

[Immediate] Immediately capture Interrupt 19 during boot process.

[Postponed] Postpone capture of Interrupt 19 during boot process.

2.7.8 Setup Mode [EZ Mode]

[Advanced Mode] Sets Advanced Mode as the default screen for entering the BIOS setup program.

[EZ Mode] Sets EZ Mode as the default screen for entering the BIOS setup program.

2.7.9 CSM (Compatibility Support Module)

This option controls whether or not CSM (Compatibility Support Module) will be launched.

Launch CSM [Auto]

Configuration option: [Auto] [Enabled] [Disabled]



The following four items appear only when you set **Launch CSM** to [Enabled].

Boot Device Control [UEFI and Legacy OpROM]

Configuration option: [UEFI and Legacy OpRom] [Legacy OpROM only] [UEFI only]

Boot from Network Devices [Legacy OpROM first]

Configuration option: [Legacy OpROM first] [UEFI driver first] [Ignore]

Boot from Storage Devices [Legacy OpRom first]

Configuration option: [Both, Legacy OpROM first] [Both, UEFI first] [Legacy OpROM first] [UEFI driver first] [Ignore]

Boot from PCIe/PCI Expansion Devices [Legacy OpROM first]

Configuration option: [Legacy OpROM first] [UEFI driver first]

2.7.10 Secure Boot

This option allows you to configure the Secure Boot related parameters.

OS Type [Other OS]

Configuration option: [Windows UEFI mode] [Other OS]

Secure Boot Mode [Standard]

This item appears only when you set the OS Type to [Windows UEFI]. Configuration option: [Standard] [Custom]



The following items appear when **Secure Boot Mode** is set to [Custom].

Key Management

Manage the Secure Boot Keys (PK, KEK, DB, DBX)

Install default Secure Boot Keys

Configuration options: [Yes] [No]

Platform Key (PK)

Load PK from File

Configuration options: [Acpi (a0341d0, 0)\PCI (1212)\USB (2, 0)]

Copy PK to File

Configuration options: [OK]

Delete PK

Configuration options: [Yes] [No]

KEK Management (KEK)

Load KEK from File

Configuration options: [OK]

Copy KEK to File

Configuration options: [OK]

Delete the KEK

Configuration options: [Yes] [No]

Append KEK from File

Configuration options: [OK]

DB Management

Load DB from File

Configuration options: [OK]

Copy DB to File

Configuration options: [OK]

Delete the DB

Configuration options: [Yes] [No]

Append DB from File

Configuration options: [OK]

DBX Management

Load DBX from File

Configuration options: [OK]

Copy DBX to File

Configuration options: [OK]

Delete the DBX

Configuration options: [Yes] [No]

Append DBX from File

Configuration options: [OK]

2.7.11 Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.



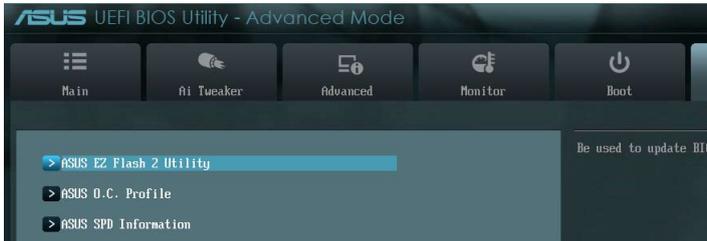
-
- To select the boot device during system startup, press <F8> when ASUS Logo appears.
 - To access Windows OS in Safe Mode, press <F8> after POST.
-

2.7.12 Boot Override

These items displays the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Click an item to start booting from the selected device.

2.8 Tools menu

The Tools menu displays items for configuring included features. Select an item then press <Enter> to display the submenu.



2.8.1 ASUS EZ Flash 2 Utility

Press [Enter] to launch the ASUS EZ Flash 2 screen.



For more details, see section 2.1.2 **ASUS EZ Flash 2**.

2.8.2 ASUS O.C. Profile

This utility stores or loads multiple BIOS settings.



The **Setup Profile Status** items show **Not Installed** if no profile is created.

Label

Allows you to input the label of the setup profile.

Save to Profile

This option saves the current BIOS settings to the BIOS Flash, and creates a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load from Profile

This option loads the previous BIOS settings saved in the BIOS Flash. Key in the profile number that saved your CMOS settings, press <Enter>, and then select **Yes**.



- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!
 - We recommend you update the BIOS file on hardware that has the same memory/CPU configuration and BIOS version.
-

2.8.3 ASUS SPD Information

DIMM Slot # [DIMM_A2]

Displays the Serial Presence Detect (SPD) information of the DIMM module installed on the selected slot. Configuration options: [DIMM_A1] [DIMM_A2] [DIMM_B1] [DIMM_B2]

2.9 Exit menu

The Exit menu items allow you to load the optimal default values for the BIOS items, and save or discard your changes to the BIOS items. You can access the **EZ Mode** from the Exit menu.



Load Optimized Defaults

This option allows you to load the default values for each of the parameters on the Setup menu. When you select this option or if you press <F5>, a confirmation window appears. Select **Yes** to load the default values.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select **Yes** to save changes and exit.

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

ASUS EZ Mode

This option allows you to enter the EZ Mode screen.

Launch EFI Shell from filesystem device

This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available devices that have a filesystem.

Appendices

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. 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 manufacturer's 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 to 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.



The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IC: Canadian Compliance Statement

Complies with the Canadian ICES-003 Class B specifications. This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations.

This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la Classe B est conforme à la norme NMB-003 du Canada.

Cet appareil numérique de la Classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Cet appareil est conforme aux normes CNR exemptes de licence d'Industrie Canada. Le fonctionnement est soumis aux deux conditions suivantes :

- (1) cet appareil ne doit pas provoquer d'interférences et
- (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité de l'appareil.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This class B digital apparatus complies with Canadian ICES-003.

VCCI: Japan Compliance Statement

VCCI Class B Statement

情報処理装置等電波障害自主規制について

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は家庭環境で使用されることを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

KC: Korea Warning Statement

B급 기기 (가정용 방송통신기자재)

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

*당해 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다.

REACH

Complying with the REACH (Registration, Evaluation, Authorisation, and Restriction of Chemicals) regulatory framework, we published the chemical substances in our products at ASUS REACH website at <http://csr.asus.com/english/REACH.htm>.



DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.



DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to <http://csr.asus.com/english/Takeback.htm> for detailed recycling information in different regions.

ASUS contact information

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ASUS COMPUTER INTERNATIONAL (America)

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Web site www.asus.de
Online contact www.asus.de/sales

Technical Support

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Support Fax +49-2102-9599-11
Online support support.asus.com

* EUR 0.14/minute from a German fixed landline; EUR 0.42/minute from a mobile phone.

Manufacturer:	ASUSTeK Computer Inc.
Address:	4F, No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN R.O.C.
Authorised representative in Europe:	ASUS Computer GmbH
Address:	HARKORT STR. 21-23, 40880 RATINGEN, GERMANY

DECLARATION OF CONFORMITY

Per FCC Part 2, Section 2.1077(a)



Responsible Party Name: **Asus Computer International**

Address: **800 Corporate Way, Fremont, CA 94539,**

Phone/Fax No: **(510)739-3777/(510)608-4555**

hereby declares that the product

Product Name : Motherboard

Model Number : Z77-A

Conforms to the following specifications:

- FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name : Steve Chang / President

Steve Chang

Signature :

Date : Jan. 28, 2013

Ver. 12/08/01

EC Declaration of Conformity



Building Innovation • Personal Freedom

We, the undersigned,

Manufacturer: ASUSTEK COMPUTER, INC.
4F, No. 150, LI-TE RD., PEITOU, TAIPEI 112, TAIWAN
Country: TAIWAN
ASUS COMPUTER GmbH
Authorized representative in Europe:
Address: City: HANNOVER STR. 2123, 40880 RATINGEN
Country: GERMANY

declare the following apparatus:

Product name : Motherboard
Model name : Z77-A

conform with the essential requirements of the following directives:

- 2004/108/EC EMC Directive
 - EN 55032:2010
 - EN 55035:2010
 - EN 55013:2001+A1:2003+A2:2006
 - EN 55020:2007+A11:2011
- 1999/5/EC R & TTE Directive
 - EN 300 328 V1.7 (2006-10)
 - EN 300 440-2 V1.4 (2010-08)
 - EN 301 111 V9.0.2 (2009-03)
 - EN 301 883 V1.6 (2011-11)
 - EN 301 908-2 V1.2 (2011-07)
 - EN 301 893 V1.6 (2011-11)
 - EN 302 423 V1.1 (2009-01)
 - EN 300 330-1 V1.7 (2010-02)
 - EN 300 330-2 V1.5 (2010-02)
 - EN 302 423 V1.1 (2009-01)
 - EN 301 359-2 V1.4 (2008-11)
 - EN 550 385:2002
 - EN 60747-2:08

- 2006/65/EC LVD Directive
 - EN 60950-1/A1:2009
 - EN 60950-1/A12:2011
- 2009/125/EC EIP Directive
 - Regulation (EC) No. 1275/2008
 - Regulation (EC) No. 642/2009
- 2011/65/EU RoHS Directive
- CE marking

- EN 60950-1/A1:2009
- EN 60950-1/A12:2011
- Regulation (EC) No. 1275/2008
- Regulation (EC) No. 642/2009
- EN 60065:2002 / A2:2010
- EN 60065:2002 / A12:2011

- Regulation (EC) No. 1275/2008
- Regulation (EC) No. 642/2009
- Regulation (EC) No. 276/2009

Ver. 12/08/01



(EC conformity marking)

Position : CEO
Name : Jerry Shen

Jerry Shen

Signature :

Declaration Date: **Jan. 28, 2013**
Year to begin affixing CE marking: **2013**