

C8HM70-I

Motherboard

ASUS[®]

E7666

First Edition
October 2012

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Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical 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 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 (+).

C8HM70-I specifications summary

CPU	Intel® Celeron™ 847 (BGA1023)
Chipset	Intel® HM70 chipset
Memory	2 x SODIMM, max. 16GB, DDR3 1333/1066 MHz, non-ECC, un-buffered memory Dual-channel memory architecture • Refer to www.asus.com or the user manual for Memory QVL (Qualify Vendor List)
Graphics	Integrated Graphics Processor- Intel® HD Graphics support - Supports D-sub with Max. resolution up to 2048x1536@75 HZ
Expansion slots	1 x PCIe 2.0 x16 (with latch)
Storage	1 x Serial ATA 3Gb/s, 1 x Serial ATA 6Gb/s support AHCI Mode
LAN	Realtek® 8111F-VB Gigabit LAN controller
Audio	Realtek® ALC887VD 8-channel High Definition Audio CODEC • Use a chassis with HD audio module in the front panel to support an 8-channel audio output.
USB	Intel® HM70 Express Chipset - 6 x USB 2.0/1.1 ports (2 ports at mid-board, 4 ports at back panel) - 2 x USB 3.0/2.0 ports
ASUS unique features	ASUS EZ DIY - ASUS UEFI BIOS featuring friendly graphics user interface - ASUS CrashFree BIOS 3 - ASUS EZ Flash 2 - ASUS MyLogo 2
Back Panel I/O ports	1 x PS/2 keyboard/mouse combo port 1 x D-Sub port 1 x LAN (RJ-45) port 4 x USB 2.0/1.1 ports 2 x USB 3.0/2.0 ports 3 Audio jacks
Internal I/O connectors	1 x USB 2.0/1.1 connectors support additional 2 USB 2.0/1.1 ports 1 x Chassis fan connector 1 x CPU fan connector 1 x Chassis Intrusion connector 1 x System panel connector 1 x 24-pin EATX power connector 1 x 4-pin ATX 12V poweer connector 1 x Front panel audio connector(s) (AAFP) 1 x Internal speaker connector(s)

(continued on the next page)

C8HM70-I specifications summary

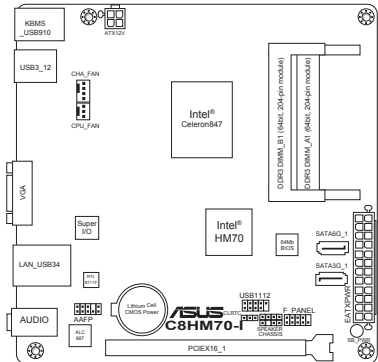
BIOS features	64 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI2.0, WfM2.0, SM BIOS 2.7, ACPI 2.0a, Multi-language BIOS, ASUS EZ Flash 2, ASUS CrashFree BIOS 3
Support DVD	Drivers ASUS utilities ASUS Update Anti-virus software (OEM version)
Form factor	Mini ITX Form Factor, 6.7" x 6.7" (17cm x 17cm)



Specifications are subject to change without notice.

Package contents

Check your motherboard package for the following items.

 <p>Diagram of the ASUS C8HM70-I motherboard. Key components labeled include: Intel® Celeron® B47 processor, Intel® HM70 chipset, 4x DDR3 DIMM slots (2x 204-pin), 2x SATA6G ports, 2x SATA3G ports, 1x USB 11/20 port, 1x F-Panel, 1x I/O Panel, 1x Super I/O, 1x LAN_USB34, 1x AUDIO, 1x VGA, 1x USB3_12, 1x KBMS_USB910, 1x CPU_FAN, 1x CHA_FAN, 1x Lithium Cell, 1x ASUS C8HM70-I, 1x POE16_1, 1x SATA30PWR, 1x SATA3</p>
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- 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 Before you proceed

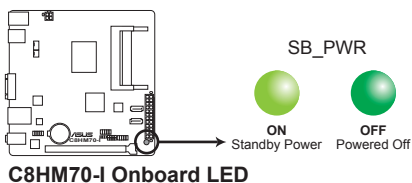
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- 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, ensure that the ATX power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, 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.



1.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.



Ensure that you unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

1.2.1 Placement direction

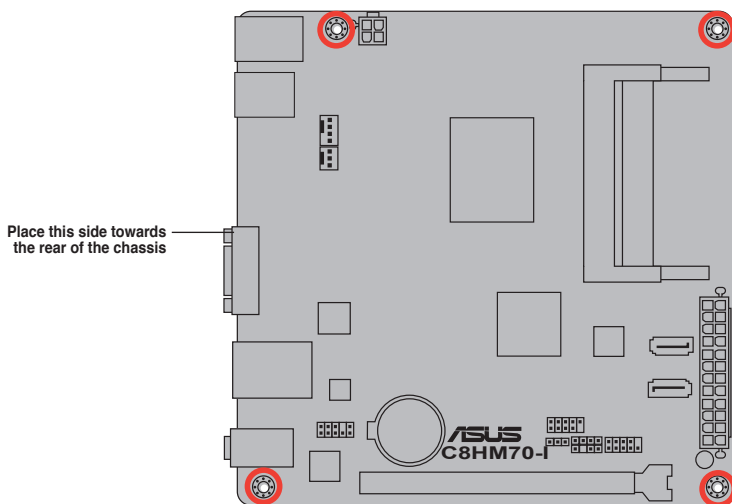
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

1.2.2 Screw holes

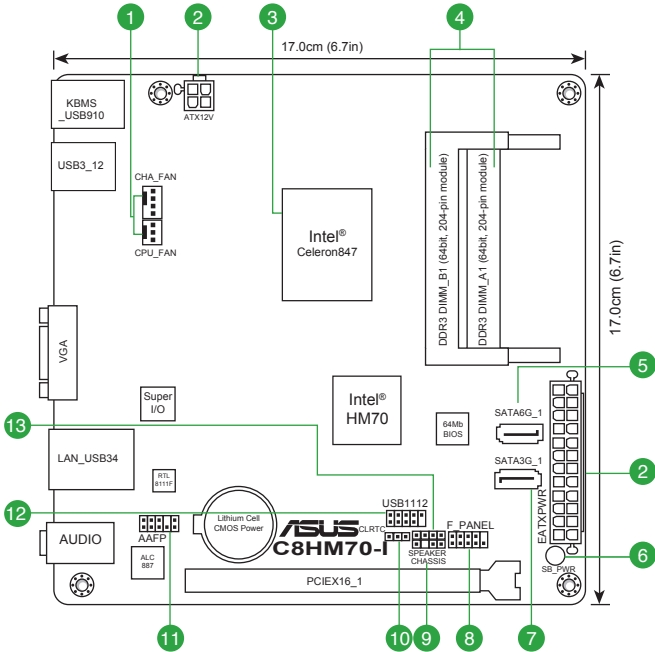
Place four screws into the holes indicated by circles to secure the motherboard to the chassis.



Do not overtighten the screws! Doing so can damage the motherboard.



1.2.3 Motherboard layout



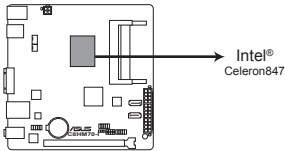
Following Intel's specification, USB 2.0 ports 5 ~ 8 are disabled on the motherboards with Intel® HM70 chipset.

1.2.4 Layout contents

Connectors/Jumpers/Slots/LED	Page
1. CPU and chassis fan connectors (4-pin CPU_FAN and 3-pin CHA_FAN)	1-11
2. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)	1-10
3. Intel® Celeron847 (BGA1023) processor	1-4
4. DDR3 SO-DIMM sockets	1-4
5. Serial ATA 6.0Gb/s connectors (7-pin SATA6G [gray])	1-12
6. Standby power LED (SB_PWR)	1-1
7. Serial ATA 3.0Gb/s connectors (7-pin SATA3G [blue])	1-12
8. System panel connector (4-1 pin PANEL)	1-13
9. Chassis intrusion connector (4-1 pin CHASSIS)	1-10
10. Clear RTC RAM (3-pin CLRTC)	1-7
11. Front panel audio connector (10-1 pin AAFP)	1-9
12. USB 2.0 connectors (10-1 pin USB1112)	1-11
13. Speaker connector (4-pin SPEAKER)	1-13

1.3 Central Processing Unit (CPU)

The motherboard comes with an onboard Intel® Celeron™ 847 (BGA1023) processor and a specially designed CPU heatsink.

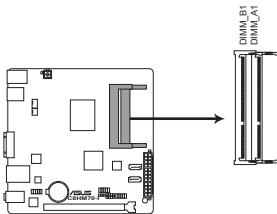


C8HM70-I CPU Celeron847

1.4 System memory

1.4.1 Overview

This motherboard comes with two Double Data Rate 3 (DDR3) Small Outline Dual Inline Memory Modules (SO-DIMM) sockets. The figure illustrates the location of the DDR3 DIMM sockets:



C8HM70-I 204-pin DDR3 DIMM sockets

Channel	Sockets
Channel A	DIMM_A1
Channel B	DIMM_B1

1.4.2 Memory configurations

You may install 512MB, 1GB, 2GB, 4GB and 8GB unbuffered non-ECC DDR3 SO-DIMMs into the DIMM sockets.



- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- Due to the CPU limitation, 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 use a maximum of 3GB system memory.
- This motherboard does not support DIMMs made up of 256 megabits (Mb) chips or less.

C8HM70-I Motherboard Qualified Vendors Lists (QVL)

DDR3-1333 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								1 DIMM	2 DIMMs
CORSAIR	CMSO2GX3M1A1333C9	2GB	DS	CORSAIR	256M8DCJG	-	-	*	*
CORSAIR	CMSO4GX3M1A1333C9	4GB	DS	CORSAIR	256M8DCJG	-	-	*	*
G.SKILL	F3-10666CL9S-2GBSQ	2GB	DS	G.SKILL	D3 256M8GEF	9-9-9-24	-	*	*
G.SKILL	F3-10666CL9S-4GBSQ	4GB	DS	G.SKILL	D3 256M8GEF	9-9-9-24	-	*	*
GEIL	GS31GB1333C9SC	1GB	DS	GEIL	GL1L128M88BA15B	9-9-9-24	1.5V	*	*
GEIL	GS32GB1333C9SC	2GB	DS	GEIL	GL1L128M88BA15KW	9-9-9-24	1.5V	*	*
GEIL	GS34GB1333C9SC	4GB	DS	GEIL	GL1L256M88BA15H	9-9-9-24	1.5V	*	*
Hynix	HMT125S6TFR8C-H9	2GB	DS	Hynix	H5TQ1G83TFRH9C	-	-	*	*
Kingmax	FSFD45F-B8KL9-NBE	1GB	DS	Kingmax	KFB8FNLXF-BNF-15A	-	-	*	*
Kingmax	FSFE85F-C8KM9-NBE	2GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*
Kingmax	FSFF65F-C8KM9-NAE	4GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*
KINGSTON	KVR1333D3S9/G	1GB	DS	ELPIDA	J1108BDBG-DJ-F	9	1.5V	*	*
KINGSTON	KVR1333D3S9/2G	2GB	DS	KTC	D128BJPNDPLD9U	9	1.5V	*	*
KINGSTON	KVR16S11/H	8GB	DS	EPIDA	J4208BBBG-GN-F	-	1.5V	*	*
PSC	AS8F8G73F-DJ2	2GB	DS	PSC	A3P1GF3FGF	-	-	*	*
SAMSUNG	M471B5773CHS-CH9	2GB	DS	SAMSUNG	K4B2G0846C	-	-	*	*

DDR3-1066 MHz capability

Vendors	Part No.	Size	SS/DS	Chip Brand	Chip NO.	Timing	Voltage	DIMM socket support (Optional)	
								1 DIMM	2 DIMMs
A-Data	DDR3 1066(7) SO-DIMM	1GB	DS	Hynix	H5TQ1G83AFPH9C	-	-	*	*
Apacer	AS01GA06C7NBGC	1GB	DS	Apacer	AM5D5808DEHSBG	7	-	*	*
Apacer	AS02GA06C7NBGC	2GB	DS	Apacer	AM5D5808DQSQSBG	7	-	*	*
CORSAIR	CM3X2GSD1066 G	2GB	DS	CORSAIR	128M8DCJG	-	-	*	*
CORSAIR	CM3X4GSD1066 G	4GB	DS	CORSAIR	256M8DCJG	-	-	*	*
G.SKILL	F3-8500CL7S-2GBSQ	2GB	DS	G.SKILL	D3 256M8GEF	7-7-7-20	-	*	*
G.SKILL	F3-8500CL7S-4GBSQ	4GB	DS	G.SKILL	D3 256M8GEF	7-7-7-20	-	*	*
GEIL	GS31GB1066C7SC	1GB	DS	GEIL	GL1L128M88BA15B	7-7-7-20	1.5V	*	*
GEIL	GS32GB1066C7SC	2GB	DS	GEIL	GL1L128M88BA15KW	7-7-7-20	1.5V	*	*
GEIL	GS38GB1066C7DC	8GB (2 x 4GB)	DS	GEIL	GL1L256M88BA15H	7-7-7-20	1.5V	*	*
Hynix	HMT125S6BFR8C-G7	2GB	DS	Hynix	H5TQ1G83BFRG7C	-	-	*	*
Kingmax	FSED45F-B8KL7-NBF	1GB	DS	Kingmax	KFB8FNLXF-BNF-15A	-	-	*	*
Kingmax	FSEE85F-C8KM7-NBF	2GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*
Kingmax	FSEF65F-C8KM7-NAF	4GB	DS	Kingmax	KFC8FNMXF-BXX-15A	-	-	*	*
KINGSTON	KVR1066D3S7/1G	1GB	DS	KTC	D128BJPPDPGD9U	7	1.5V	*	*
KINGSTON	KVR1066D3S7/1G	1GB	DS	ELPIDA	J1108BDSE-DJ-F	-	1.5V	*	*
KINGSTON	KVR1066D3S7/2G	2GB	DS	KTC	D128BJPNDPLD9U	7	1.5V	*	*
SAMSUNG	M471B2873EH1-CF8	1GB	DS	SAMSUNG	K4B1G0846E	-	-	*	*
SAMSUNG	M471B5673FH0-CF8	2GB	DS	SAMSUNG	K4B1G0846F	-	-	*	*
Elixir	M2S1G64CBH8A4P-BE	1GB	DS	Elixir	N2CB1616AP-BE	-	-	*	*
KINGTIGER	1GB DIMM PC3-8500	1GB	DS	Qimonda	IDSH1G-04A1F1C-10F	-	-	*	*
KINGTIGER	1GB DIMM PC3-8500	1GB	DS	SAMSUNG	K4B1G16460-HCF8	-	-	*	*
KINGTIGER	2GB DIMM PC3-8500	2GB	DS	Hynix	H5TQ1G83BFRG7C	-	-	*	*



SS: Single-sided / DS: Double-sided

DIMM support:

- **A*:** Supports one module inserted into either slot.
- **B*:** Supports one pair of modules inserted into both the slots.



Visit the ASUS website at www.asus.com for the latest QVL.

1.5 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.



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

1.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

1.5.2 Configuring an expansion card

After installing the expansion card, configure it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 2 for information on BIOS setup.
2. Assign an IRQ to the card.
3. Install the software drivers for the expansion card.



When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

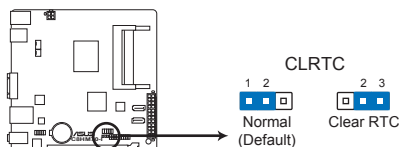
1.5.3 PCI Express x16 slot

This motherboard has a PCI Express 2.0 x16 slot (at 16x mode) that supports PCI Express 2.0 x16 graphic cards complying with the PCI Express specifications.

1.6 Jumpers

Clear RTC RAM (3-pin CLRTC)

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



C8HM70-I 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 re-enter data.



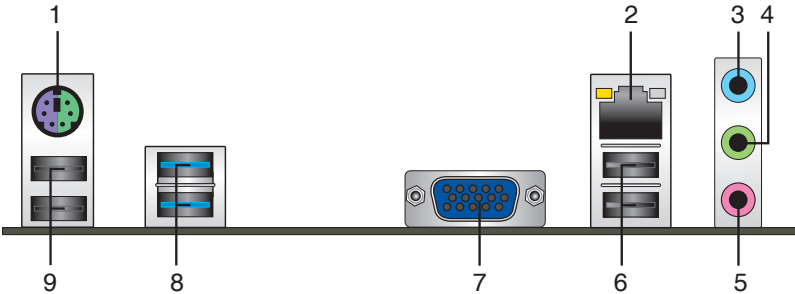
Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!



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

1.7 Connectors

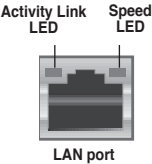
1.7.1 Rear panel connectors



1. **PS/2 Keyboard / Mouse Combo port.** This port is for a PS/2 keyboard or PS/2 mouse.
2. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

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



3. **Line In port (light blue).** This port connects to the tape, CD, DVD player, or other audio sources.
4. **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.
5. **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.

6. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0/1.1 devices.
7. **Video Graphics Adapter (VGA) port.** This 15-pin port is for a VGA monitor or other VGA-compatible devices
8. **USB 3.0 ports 1 and 2.** These two 9-pin Universal Serial Bus (USB) ports are available for connecting USB 3.0 devices.



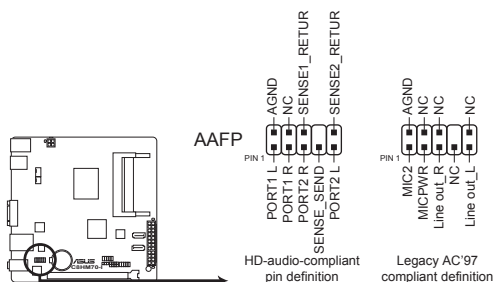
- DO NOT connect a keyboard / mouse to any USB 3.0 port when installing Windows® operating system.
- Due to USB 3.0 controller limitation, USB 3.0 devices can only be used under Windows® OS environment and after the USB 3.0 driver installation.
- USB 3.0 devices can only be used as data storage only.
- We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance for your USB 3.0 devices.

9. **USB 2.0 ports 9 and 10.** These two 4-pin Universal Serial Bus (USB) ports are for USB 2.0/1.1 devices.

1.7.2 Internal connectors

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

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



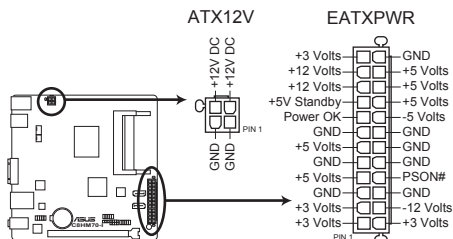
C8HM70-I Front panel audio connector



- We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.
- If you want to connect a high-definition front panel audio module to this connector, set the **Front Panel Type** item in the BIOS setup to **[HD]**. If you want to connect an AC'97 front panel audio module to this connector, set the item to **[AC97]**. By default, this connector is set to **[HD]**. See section **2.5.6 Onboard Devices Configuration** for details.

2. ATX power connectors (24-pin EATXPWR, 4-pin ATX12V)

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



C8HM70-I ATX power connectors

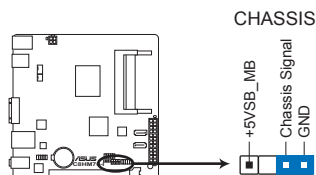


- For a fully configured system, we recommend that you use a power supply unit (PSU) that complies with ATX 12 V Specification 2.0 (or later version) and provides a minimum power of 350 W.
- DO NOT forget to connect the 4-pin ATX +12V power plug. Otherwise, the system will not boot up.
- We recommend that you use a PSU with higher power output when configuring a system with more power-consuming devices. 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. Chassis intrusion connector (4-1 pin CHASSIS)

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

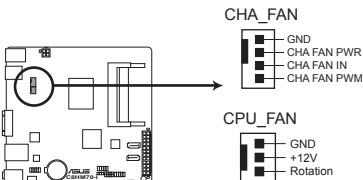
By default, the pin labeled “Chassis Signal” and “Ground” are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



C8HM70-I Chassis intrusion connector

4. CPU and chassis fan connectors (3-pin CPU_FAN, 4-pin CHA_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.



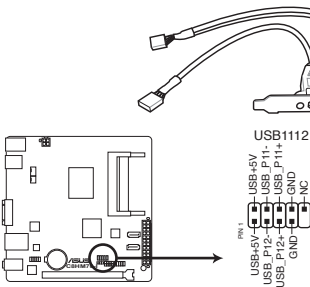
C8HM70-I Fan connectors



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!

5. USB connectors (10-1 pin USB1112)

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 480 Mbps connection speed.



C8HM70-I USB2.0 connector



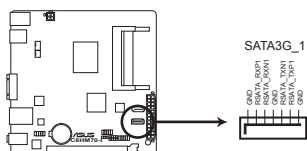
Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!



The USB module cable is purchased separately.

6. Serial ATA 3.0Gb/s connectors (7-pin SATA3G [blue])

This connector connects to Serial ATA 3.0 Gb/s hard disk drive or optical drive via Serial ATA 3.0 Gb/s signal cables.



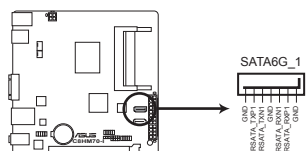
C8HM70-I SATA 3.0Gb/s connector



-
- You must install Windows® XP Service Pack 3 or later version before using Serial ATA hard disk drives.
 - To configure the default SATA type in BIOS, click **Advanced Mode > Advanced tab > SATA Configuration > SATA Mode Selection**.
 - When using hot-plug and NCQ, set the **SATA Mode Selection** item in the BIOS to [AHCI]. See section 2.5.3 **SATA Configuration** for details.
-

7. Serial ATA 6.0Gb/s connectors (7-pin SATA6G [gray])

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



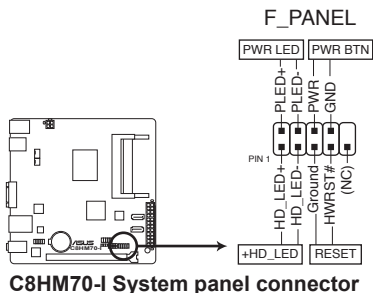
C8HM70-I SATA 6.0Gb/s connector



-
- You must install Windows® XP Service Pack 3 or later version before using Serial ATA hard disk drives.
 - When using hot-plug and NCQ, set the **SATA Mode Selection** item in the BIOS to [AHCI]. See section 2.5.3 **SATA Configuration** for details.
-

8. System panel connector (10-1 pin PANEL)

This connector supports several chassis-mounted functions.



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

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 +HDLED)**

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

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

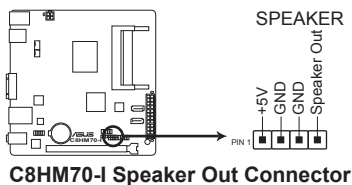
This connector is for the system power button.

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

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

9. Speaker connector (4-pin SPEAKER)

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



1.9 Software support

1.9.1 Installing an operating system

This motherboard supports Windows® XP / Vista / 7 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 which contains the unique features of ASUS motherboard. Click Drivers, Utilities, Make Disk, Manual, and Contact tabs to display their respective menus.



The following screen is for reference only.



If Autorun is NOT enabled in 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 with FAT 32/16 format and single partition only.
 - 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 **C8HM70I.CAP**.
 - 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.

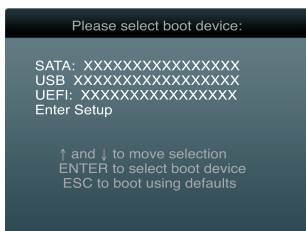


NTFS is not supported under DOS environment. Do not save the BIOS file and BIOS Updater to a hard disk drive or USB flash drive in NTFS format.

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).

```
Welcome to FreeDOS (http://www.freedos.org)!
C:\>d:
D:\>
```

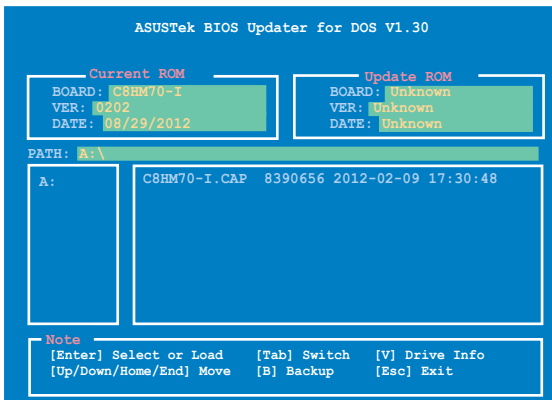
Updating the BIOS file

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 1.30 or later, the utility automatically exits to the DOS prompt after updating BIOS.
- Ensure to 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.
- Ensure to connect 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.
 - Ensure that a USB mouse is connected to your motherboard if you want to use the mouse to control the BIOS setup program.
 - 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.

Diagram illustrating the ASUS EZ Mode BIOS screen with various settings and annotations:

- Exit/Advanced Mode**: Selects the display language of the BIOS setup program.
- English**: Language selection dropdown.
- Temperature**: Displays the CPU/motherboard temperature, CPU/5V/3.3V/12V voltage output, CPU/chassis fan speed.
- Voltage**: Displays CPU voltage (1.024V, 5V, 3.30V, 12V) and Fan Speed (CPU_FAN: 3890RPM, CHA_FAN: N/A).
- Q-Fan Control**: Selects the display language of the BIOS setup program.
- Performance**: Selects the boot device priority.
- Energy Saving**: Displays the system properties of the selected mode on the right hand side.
- Standard**: Silent mode.
- Turbo**: Standard mode.
- Boot Priority**: Selects the boot device priority.
- Advanced Mode (F7)**: Displays the Advanced mode functions.
- Boot Menu (F8)**: Loads optimized default.
- Default (F5)**: Turbo mode.



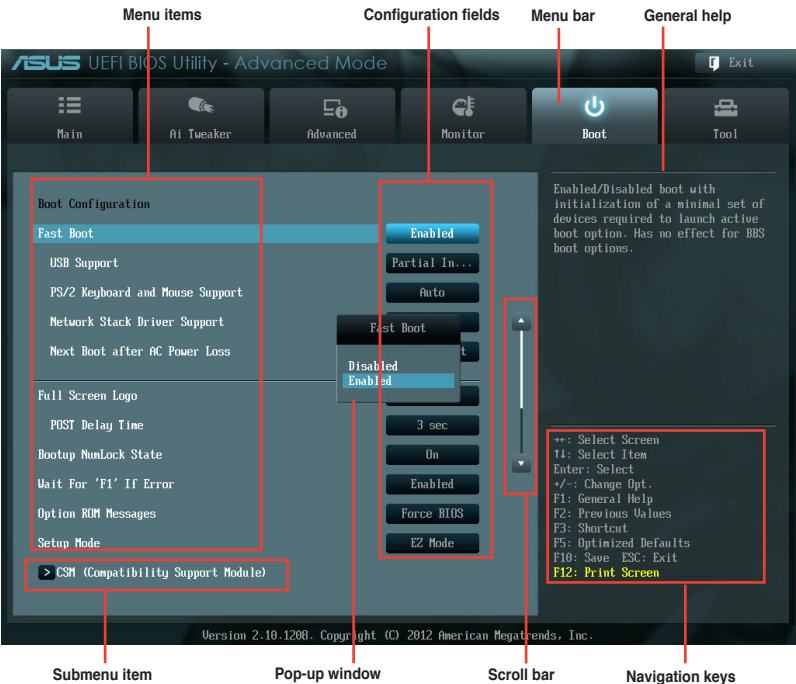
- The boot device options vary depending on the devices you installed to the system.
- The **Boot Menu(F8)** button is available only when the boot device is installed to the system.

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 bar

The menu bar on top of the screen has the following main items:

Main	For changing the basic system configuration
Ai Tweaker	For changing the overclocking settings
Advanced	For changing the advanced system settings
Monitor	For displaying the system temperature, power status, and changing the fan settings
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

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.

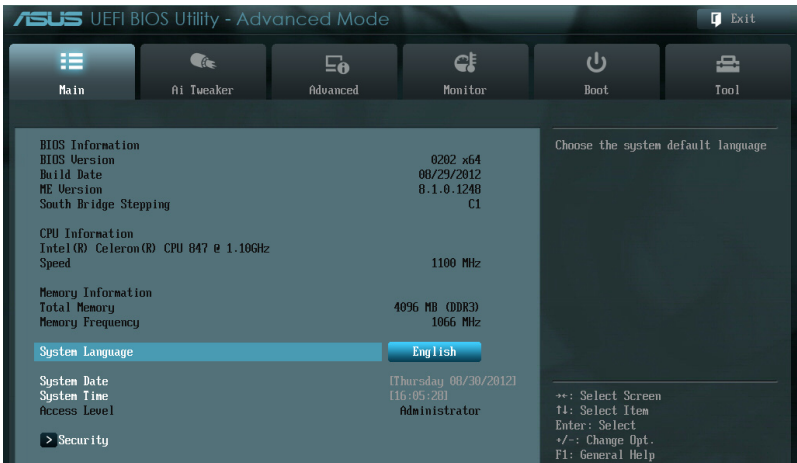
Configuration fields

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.



Target CPU Speed : 1100MHz

Displays the target CPU speed.

Target DRAM Speed : xxxxMHz

Displays the target DRAM speed.

2.4.1 Memory Frequency [Auto]

Allows you to set the memory operating frequency. Configuration options: [Auto] [DDR3-800MHz] [DDR3-1066MHz] [DDR3-1333MHz]



Selecting a very high memory frequency may cause the system to become unstable! If this happens, revert to the default setting.

2.4.2 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 <Enter>.



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

2.4.3 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 or the numeric keypad to adjust the value. Configuration options: [Auto] [8] [9] [10] [11]

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.

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.

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]

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]

- [Disabled] Disables this function.
- [Enabled] Allows you to turn on/off the Mid Level Cache (L2) streamer prefetcher.

Adjacent Cache Line Prefetch [Enabled]

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

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. Configuration options: [Auto] [8] [9] [10] [11]

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.

CPU C1E [Auto]

Allows you to enable or disable the CPU C1E.

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

CPU C3 Report [Auto]

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

- [Auto] Set this item automatically.
- [Disabled] Disables this function.
- [Enabled] Enables the C3 report function. This item should be enabled in order to enable the Enhanced Halt State.

CPU C6 Report [Auto]

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

- [Auto] Set this item automatically.
- [Disabled] Disables this function.
- [Enabled] Enables the C6 report function. This item should be enabled in order to enable the Enhanced Halt State.

CPU C7 Report [Enabled]

Allows you to disable or enable the CPU C7 report to OS.

[Disabled] Disables this function.

[Enabled] Enables the C7 report function. This item should be enabled in order to enable the Enhanced Halt State.

Package C State Support [Auto]

Allows you to disable or enable the Package C State Support.

[Auto] Set this item automatically.

[Disabled] Disables this function.

[Enabled] Enables the Package C State Support function.

2.5.2 PCH Configuration

High Precision Timer [Enabled]

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

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.

[Disabled] Disables the SATA function.

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

[AHCI] Set to [AHCI] 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.

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

This item only appears when you set SATA Mode Selection to [AHCI] or [IDE]. 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]

This item only appears when you set the SATA Mode Selection item to [AHCI] and allows you to enable or disable the hot-plug support for each SATA port.

Configuration options: [Enabled] [Disabled]

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 decide which graphics controller to use as the primary boot device.
Configuration options: [Auto] [iGPU] [PCI-E]

iGPU Memory [Auto]

Allows you to select the amount of system memory allocated to DVMT 5.0 used by the iGPU. Configuration options: [Auto] [32M] [64M] [96M] [128M] ~ [480M] [512M] [1024M]

Render Standby [Enabled]

Allows you to enable the Intel® Graphics Render Standby support to reduce the iGPU power use when idle. Configuration options: [Disabled] [Enabled]

iGPU Multi-Monitor [Disabled]

Allows you to enable or disable the multi-monitor support for both the integrated Graphics Device and add-on graphic card. The memory size of Internal Graphics Device will be fixed at 64MB. Configuration options: [Disabled] [Enabled]

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]

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

Legacy USB Support [Enabled]

- [Disabled] The USB devices can be used only for the BIOS setup program.
[Enabled] Enables the support for USB devices on legacy operating systems (OS).
[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]

This item appears only when you set the previous item to [Enabled] or [Auto].

- [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

The items in this menu allow you to enable or disable the USB port individually.

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



Refer to the motherboard layout in Chapter 1 for the locations of the USB ports.

USB3_1/2 [Enabled]

[Enabled] Enables USB3_1/2 port.

[Disabled] Disables USB3_1/2 port.

USB 3/4, 9/10/11/12 [Enabled]

[Enabled] Enables USB 3/4, 9/10/11/12.

[Disabled] Disables USB 3/4, 9/10/11/12.

2.5.6 Onboard Devices Configuration

HD Audio Controller [Enabled]

[Enabled] Enables the High Definition Audio Controller.

[Disabled] Disables the controller.



The following item appears 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

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]

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 [Disabled]

- [Disabled] Disables the PCIE devices to generate a wake event.
- [Enabled] Enables the PCIE devices 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.

2.5.8 Network Stack

Network Stack [Disabled]

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



The following two items appear only when you set the previous item to [Enabled].

Ipv4 PXE Support [Enabled]

This item allows user to disable or enable the Ipv4 PXE Boot support. Configuration options:
[Disabled] [Enabled]

Ipv6 PXE Support [Enabled]

This item allows user to disable or enable the Ipv6 PXE Boot support. 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.



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 Speed [xxxx RPM] or [Ignore] / [N/A]

The onboard hardware monitor automatically detects and displays the CPU and chassis fan speeds 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 Chassis Q-Fan Control [Enabled]

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

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

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 Chassis 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 60% 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.

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

Use the <+> and <-> keys to adjust the minimum Chassis fan duty cycle. The values range from 60% to 100%. When the Chassis temperature is under 40°C, the Chassis fan will operate at the minimum duty cycle.

2.6.5 Anti Surge Support [Disabled]

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]

Enables or disables the fast boot function. Configuration options: [Disabled] [Enabled]



The following four items appear when **Fast Boot** is set to **[Enabled]**.

USB Support [Partial In...]

- [Disabled] All the USB devices will be available only after entering the operating system (OS).
- [Full Initialization] All the USB devices will be available during POST and in OS.
- [Partial Initialization] Only the USB ports with keyboard and mouse can be detected before entering OS.

PS2 Keyboard and Mouse Support [Auto]

- [Auto] The PS/2 devices are available when the system boots up as long as these devices are not reconnected or changed.
- [Full Initialization] The PS/2 devices are always available during POST.
- [Disabled] All the PS/2 devices will be available only after entering the operating system (OS).

Network Stack Driver Support [Disabled]

- [Disabled] Disables network stack driver support during POST.
- [Enabled] Enables network stack driver support during POST.

Next boot after AC Power Loss [Normal Boot]

- [Normal Boot] Returns to normal boot up process after AC Power Loss.
- [Fast Boot] Accelerates the boot up speed after 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]

Post Delay Time [3 sec]

This item appears only when the Full Screen Logo item is set to [Enabled] and allows you to set the Post Delay Time. Configuration options: [0 sec] [1 sec] ~ [10 sec].

2.7.3 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].

2.7.4 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]

2.7.5 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.

2.7.6 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.

2.7.7 CSM (Compatibility Support Module)

This option allows you to control the CSM (Compatibility Support Module) launch parameters.

Launch CSM [Auto]

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



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

Boot Device Control [UEFI and L...]

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

Boot from Network Devices [Legacy OpR...]

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

Boot from Storage Devices [Legacy OpR...]

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

Boot from PCIe Expansion Devices [Legacy OpR...]

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

2.7.8 Security Boot

This option allows you to configure the Security Boot 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 mode]**.

Configuration option: [Standard] [Custom]



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

Key Management

Install default Secure Boot keys

Configuration options: [Yes] [No]

Load PK from File

Configuration options: [OK]

Copy PK to File

Configuration options: [OK]

Delete PK

Configuration options: [Yes] [No]

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]

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]

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]

2.7.9 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.

Hard Drive BBS Priorities

Allows you to set the order of the legacy devices in this group.

Boot Option #1 [xxxx]

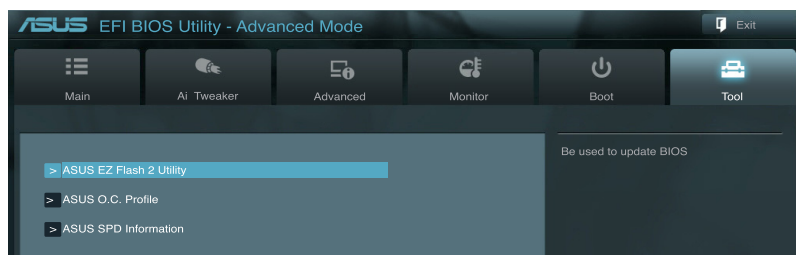
Configuration option: [xxxx] [Disabled]

2.7.10 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 items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.



2.8.1 ASUS EZ Flash 2 Utility

Allows you to run ASUS EZ Flash 2. 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 item allows you to store or load multiple BIOS settings.



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

Save to Profile

Allows you to save the current BIOS settings to the BIOS Flash, and create a profile. Key in a profile number from one to eight, press <Enter>, and then select **Yes**.

Load from Profile

Allows you to load 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 the system boot failure!
- We recommend that you update the BIOS file only coming from the same memory/CPU configuration and BIOS version.

Load/Save CMOS Profile From/to USB drive

Allows you to load/save a CMOS profile from/to a USB drive. Press <Enter>, and then press **F2** to save or **Enter** to load.

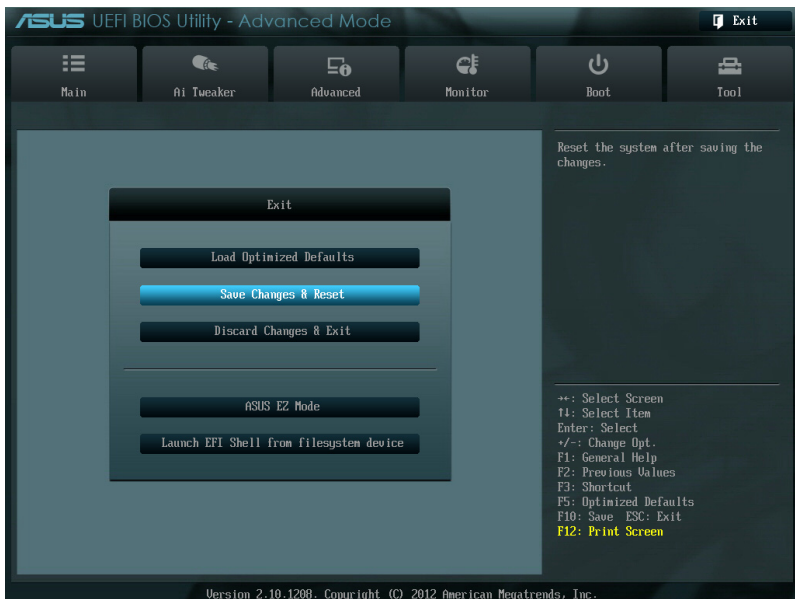
2.8.3 ASUS SPD Information

DIMM Slot # [DIMM_A1]

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

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 menus. 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.

[illegible]

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す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

ASUSTeK COMPUTER INC.

Address	15 Li-Te Road, Peitou, Taipei, Taiwan 11259
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
E-mail	info@asus.com.tw
Web site	www.asus.com.tw

Technical Support

Telephone	+86-21-38429911
Online support	support.asus.com

ASUS COMPUTER INTERNATIONAL (America)

Address	800 Corporate Way, Fremont, CA 94539, USA
Telephone	+1-812-282-3777
Fax	+1-510-608-4555
Web site	usa.asus.com

Technical Support

Telephone	+1-812-282-2787
Support fax	+1-812-284-0883
Online support	support.asus.com

ASUS COMPUTER GmbH (Germany and Austria)

Address	Harkort Str. 21-23, D-40880 Ratingen, Germany
Fax	+49-2102-959911
Web site	www.asus.de
Online contact	www.asus.de/sales

Technical Support

Telephone	+49-1805-010923*
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.

