



# Your PDF Guides

You can read the recommendations in the user guide, the technical guide or the installation guide for GIGABYTE GA-H110M-S2. You'll find the answers to all your questions on the GIGABYTE GA-H110M-S2 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual GIGABYTE GA-H110M-S2**  
**User guide GIGABYTE GA-H110M-S2**  
**Operating instructions GIGABYTE GA-H110M-S2**  
**Instructions for use GIGABYTE GA-H110M-S2**  
**Instruction manual GIGABYTE GA-H110M-S2**



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**Manual abstract:**

@@@5, 2015 Nov. @@15, 2015 Sept. 15, 2015 Copyright © 2015 GIGA-BYTE TECHNOLOGY CO., LTD. All rights reserved. @@Changes to the specifications and features in this manual may be made by GIGABYTE without prior notice. No part of this manual may be reproduced, copied, translated, transmitted, or published in any form or by any means without GIGABYTE's prior written permission. □□ In order to assist in the use of this product, carefully read the User's Manual. □□ For product-related information, check on our website at: <http://www.gigabyte.com> Identifying Your Motherboard Revision The revision number on your motherboard looks like this: "REV: X.X." For example, "REV: 1.0" means the revision of the motherboard is 1.0.

Check your motherboard revision before updating motherboard BIOS, drivers, or when looking for technical information. Example: Table of Contents GA-H110M-S2/GA-H110M-S2 DDR3 Motherboard Layout....

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38 -4- GA-H110M-S2/GA-H110M-S2 DDR3 Motherboard Layout KB\_MS ATX\_12V LGA1151 CPU\_FAN DDR4\_1j/DDR3\_1k DDR4\_2j/DDR3\_2k F\_USB30 USB\_LAN ATX R\_USB30 VGA GA-H110M-S2 GA-H110M-S2 DDR3 Realtek® GbE LAN SYS\_FAN PCIEX16 SATA3 3 2 1 0 AUDIO iTE® Super I/O PCIEX1\_1 BAT Intel® H110 M\_BIOS F\_PANEL CLR\_CMOS PCIEX1\_2 CODEC SPDIF\_O F\_AUDIO TPM F\_USB2 F\_USB1 Box Contents 55 GA-H110M-S2 or GA-H110M-S2 DDR3 motherboard 55 Motherboard driver disk 55 Two SATA cables 55 User's Manual 55 I/O Shield \* The box contents above are for reference only and the actual items shall depend on the product package you obtain. The box contents are subject to change without notice.

MM Only for GA-H110M-S2. NN Only for GA-H110M-S2 DDR3. -5- Chapter 1 Hardware Installation 1-1 Installation Precautions The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD).

Prior to installation, carefully read the user's manual and follow these procedures: • Prior to installation, make sure the chassis is suitable for the motherboard. • Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation. • Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components. • When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.

• When handling the motherboard, avoid touching any metal leads or connectors. • It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity. • Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container. • Before connecting or unplugging the power supply cable from the motherboard, make sure the power supply has been turned off. • Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard. • Before using the product, please verify that all cables and power connectors of your hardware components are connected. • To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components. • Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing. • Do not place the computer system on an uneven surface.

• Do not place the computer system in a high-temperature or wet environment. • Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user. • If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician. • If you use an adapter, extension power cable, or power strip, ensure to consult with its installation and/or grounding instructions. -6- 1-2 Product Specifications CPU □□ Support for Intel® Core™ i7 processors/Intel® Core™ i5 processors/Intel® Core™ i3 processors/Intel® Pentium® processors/Intel® Celeron® processors in the LGA1151 package (Go to GIGABYTE's website for the latest CPU support list.) □□ L3 cache varies with CPU □□ Intel® H110 Express Chipset □□ 2 x DDR4 DIMM sockets supporting up to 32 GB of system memory \* □□ Due to a Windows 32-bit operating system limitation, when more than 4 GB of physical memory is installed, the actual memory size displayed will be less than the size of the physical memory installed. Chipset Memoryj □□ □□ □□ Memoryk Dual channel memory architecture Support for DDR4 2133 MHz memory modules Support for ECC UDIMM 1Rx8/2Rx8 memory modules (operate in non-ECC mode) Support for non-ECC UDIMM 1Rx8/2Rx8/1Rx16 memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.) □□ 2 x DDR3 DIMM sockets supporting up to 32 GB of system memory □□ □□ □□ □□ Onboard Graphics Audio □□ □□ □□ □□ □□ Dual channel memory architecture Support for DDR3/DDR3L 1600/1333 MHz memory modules Support for ECC UDIMM 1Rx8/2Rx8 memory modules (operate in non-ECC mode) Support for non-ECC UDIMM 1Rx8/2Rx8 memory modules (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.) Integrated Graphics Processor-Intel® HD Graphics support: - 1 x D-Sub port, supporting a maximum resolution of 1920x1200@60 Hz Maximum shared memory of 512 MB Realtek® ALC887 codec High Definition Audio 2/4/5.1/7.

1-channel \* □□ Due to a Windows 32-bit operating system limitation, when more than 4 GB of physical memory is installed, the actual memory size displayed will be less than the size of the physical memory installed. □□ Support for S/PDIF Out LAN □ Expansion Slots □□ □□ Storage Interface □□ \* □□ o configure 7.1-channel audio, you have to use an HD front panel audio module T and enable the multi-channel audio feature through the audio driver.



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Realtek® GbE LAN chip (10/100/1000 Mbit) 1 x PCI Express x16 slot, running at x16 (PCIEX16) (The PCI Express x16 slot conforms to PCI Express 3.0 standard.)

) 2 x PCI Express x1 slots (The PCI Express x1 slots conform to PCI Express 2.0 standard.) Chipset: - 4 x SATA 6Gb/s connectors MM Only for GA-H110M-S2. NN Only for GA-H110M-S2 DDR3. -7- USB Internal Connectors Back Panel Connectors □□ Chipset: - □ x USB 3.0/2.0 ports (2 ports on the back panel, 2 ports available through 4 the internal USB header) - □ x USB 2.0/1.1 ports (2 ports on the back panel, 4 ports available through 6 the internal USB headers) □□ 1 x 24-pin ATX main power connector □□ 1 x 4-pin ATX 12V power connector □□ 4 x SATA 6Gb/s connectors □□ 1 x CPU fan header □□ 1 x system fan header □□ 1 x front panel header □□ 1 x front panel audio header □□ 1 x S/PDIF Out header □□ 1 x USB 3.0/2.0 header □□ 2 x USB 2.0/1.1 headers □□ 1 x Trusted Platform Module (TPM) header □□ 1 x Clear CMOS jumper □□ 1 x PS/2 mouse port □□ 1 x PS/2 Keyboard port □□ 1 x D-Sub port □□ 2 x USB 3.0/2.0 ports □□ 2 x USB 2.0/1.1 ports □□ 1 x RJ-45 port □□ □ x audio jacks (Line In, Line Out, Mic In) 3 □□ iTE® I/O Controller Chip □□ □□ □□ □□ □□ □□ I/O Controller

Hardware Monitor System voltage detection CPU/System temperature detection CPU/System fan speed detection CPU/System overheating warning CPU/System fan fail warning CPU/System fan speed control \* □□ Whether the fan speed control function is supported will depend on the cooler you install. BIOS □□ 1 x 64 Mbit flash □□ Use of licensed AMI UEFI BIOS □□ PnP 1.0a, DMI 2.7, WfM 2.0, SM BIOS 2.7, ACPI 5.0 -8- Unique Features □□ Support for APP Center Bundled Software Operating System □□ □□ □□ □□ □□ □□ □□ - 3D OSD - @BIOS - AutoGreen - Cloud Station - EasyTune - Easy RAID - Fast Boot - Smart TimeLock - Smart Keyboard - Smart Backup - System Information Viewer - USB Blocker Support for Q-Flash Support for Smart Switch Support for Xpress Install Norton® Internet Security (OEM version) cFosSpeed Support for Windows 10/8.1 64-bit Support for Windows 7 32-bit/64-bit \* □□ Available applications in APP Center may vary by motherboard model. Supported functions of each application may also vary depending on motherboard specifications.

\* □□ Please download the "Windows USB Installation Tool" from GIGABYTE's website and install it before installing Windows 7. Form Factor □□ Micro ATX Form Factor; 22.6cm x 17.4cm \* □□ GIGABYTE reserves the right to make any changes to the product specifications and product-related information without G prior notice. GA-H110M-S2 GA-H110M-S2 DDR3 Please visit GIGABYTE's website for support lists of CPU, memory modules, and SSDs. Please visit the Support/Utility List page on GIGABYTE's website to download the latest version of apps. -9- 1-3 Installing the CPU Read the following guidelines before you begin to install the CPU: •• Make sure that the motherboard supports the CPU. (Go to GIGABYTE's website for the latest CPU support list.) •• Always turn off the computer and unplug the power cord from the power outlet before installing the USB devices. The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate.

The following describes the states of the LAN port LEDs. Activity LED Connection/Speed LED: State Orange Green Off Description 1 Gbps data rate 100 Mbps data rate 10 Mbps data rate Activity LED: State Blinking Off Description Data transmission or receiving is occurring No data transmission or receiving is occurring LAN Port MM Only for GA-H110M-S2. NN Only for GA-H110M-S2 DDR3. - 11 - USB 2.0/1.1 Port Line In (Blue) The USB port supports the USB 2.0/1.1 specification. Use this port for USB devices. The line in jack.

Use this audio jack for line in devices such as an optical drive, walkman, etc. Line Out (Green) Mic In (Pink) The line out jack. Use this audio jack for a headphone or 2-channel speaker. This jack can be used to connect front speakers in a 4/5.1/7.1-channel audio configuration. The Mic in jack. To configure 7.1-channel audio, you have to use an HD front panel audio module and enable the multi-channel audio feature through the audio driver. Please visit GIGABYTE's website for more software information.

•• When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard. •• When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector. - 12 - 1-7 Internal Connectors 1 3 2 10 5 4 13 7 8 12 11 9 6 1) 2) 3) 4) 5) 6) 7) ATX\_12V ATX\_CPU\_FAN SYS\_FAN SATA3 0/1/2/3 F\_PANEL F\_AUDIO 8) 9) 10) 11) 12) 13) SPDIF\_O CLR\_CMOS F\_USB30 F\_USB1/F\_USB2 TPM BAT Read the following guidelines before connecting external devices: •• First make sure your devices are compliant with the connectors you wish to connect. •• Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices. •• After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard. - 13 - 1/2) ATX\_12V/ATX (2x2 12V Power Connector and 2x12 Main Power Connector) With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design.

Connect the power supply cable to the power connector in the correct orientation. The 12V power connector mainly supplies power to the CPU. If the 12V power connector is not connected, the computer will not start. To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system. ATX\_12V: 3 1 ATX\_12V 4 2 Pin No. 1 2 3 4 ATX: Definition GND GND +12V +12V 12 24 Pin No. 1 2 3 4 5 6 7 8 9 10 11 12 1 ATX 13 Definition Pin No. 3.3V 13 3.

3V 14 GND 15 +5V 16 GND 17 +5V 18 GND 19 Power Good 20 5VSB (stand by +5V) 21 +12V 22 +12V (Only for 2x12-pin 23 ATX) 3.3V (Only for 2x12-pin 24 ATX) Definition 3.3V -12V GND PS\_ON (soft On/Off) GND GND GND NC +5V +5V +5V (Only for 2x12-pin ATX) GND (Only for 2x12-pin ATX) 3/4) CPU\_FAN/SYS\_FAN (Fan Headers) The fan headers on this motherboard are 4-pin. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The speed control function requires the use of a fan with fan speed control design.



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For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis. CPU\_FAN: SYS\_FAN: 1 CPU\_FAN Pin No. 1 2 3 4 Definition GND +12V Sense Speed Control 1 SYS\_FAN Pin No. 1 2 3 4 Definition GND Speed Control Sense VCC •• Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating.

Overheating may result in damage to the CPU or the system may hang. •• These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers. - 14 - 5) SATA3 0/1/2/3 (SATA 6Gb/s Connectors) The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and SATA 1.5Gb/s standard.

Each SATA connector supports a single SATA device. 7 7 SATA3 3 2 1 0 1 1 Pin No. 1 2 3 4 5 6 7 Definition GND TXP TXN GND RXN RXP GND To enable hot-plugging for the SATA ports, refer to Chapter 2, "BIOS Setup," "Peripherals\SATA Configuration," for more information. 6) F\_PANEL (Front Panel Header) Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

Power LED Power Switch Speaker F\_Hard Drive Reset Activity LED Switch Chassis Intrusion Header SS 1 1 \_S S 1 2 3 1 2 3 •• HD (Hard Drive Activity LED): Connects to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data. •• RES (Reset Switch): Connects to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart. •• CI (Chassis Intrusion Header): B S \_ \_ Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been B B removed. This function requires a chassis with a chassis intrusion switch/sensor. •• NC: No connection. The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are S B \_ B matched correctly.

- 15 \_ S S \_ \_ B 1 2 3 PWR\_LED+ PWR\_LED- HD+ HDRESRES+ CICI+ Power LED 1 2 3 2 1 20 19 •• PLED/PWR\_LED (Power LED): Connects to the power status indicator System Status LED on the chassis front panel. The LED is on S0 On when the system is operating. The LED is S3/S4/S5 Off off when the system is in S3/S4 sleep state or powered off (S5). S S U F \_ •• PW (Power Switch): Connects to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch (refer to Chapter 2, "BIOS Setup," "Power Management," for more information). •• SPEAK (Speaker): Connects to the speaker on the chassis front panel. The system reports system startup status by issuing a beep code. One single short beep will be heard if no problem is detected at system startup. PLED+ PLED- PW+ PW- 1 SPEAK+ NC NC SPEAK- 1 2 3 7) F\_AUDIO (Front Panel Audio Header) The front panel audio header supports Intel High Definition audio (HD) and AC'97 audio. You may connect your chassis front panel audio module to this header.

Make sure the wire assignments of the module connector match the pin assignments of the motherboard header. Incorrect connection between the module connector and the motherboard header will make the device unable to work or even damage it. For HD Front Panel Audio: Pin No. Definition Pin No. 1 MIC2\_L 6 2 GND 7 3 MIC2\_R 8 4 -ACZ\_DET 9 5 LINE2\_R 10 Definition Sense FAUDIO\_JD No Pin LINE2\_L Sense For AC'97 Front Panel Audio: Pin No. Definition Pin No. 1 MIC 6 2 GND 7 3 MIC Power 8 4 NC 9 5 Line Out (R) 10 Definition NC NC No Pin Line Out (L) NC 9 10 1 2 •• The front panel audio header supports HD audio by default. •• Audio signals will be present on both of the front and back panel audio connections simultaneously. •• Some chassis provide a front panel audio module that has separated connectors on each wire instead of a single plug. For information about connecting the front panel audio module that has different wire assignments, please contact the chassis manufacturer.

8) SPDIF\_O (S/PDIF Out Header) This header supports digital S/PDIF Out and connects a S/PDIF digital audio cable (provided by expansion cards) for digital audio output from your motherboard to certain expansion cards like graphics cards and sound cards. For example, some graphics cards may require you to use a S/PDIF digital audio cable for digital audio output from your motherboard to your graphics card if you wish to connect an HDMI display to the graphics card and have digital audio output from the HDMI display at the same time. For information about connecting the S/PDIF digital audio cable, carefully read the manual for your expansion card. Pin No. 1 2 Definition SPDIFO GND 1 9) CLR\_CMOS (Clear CMOS Jumper) Use this jumper to clear the BIOS configuration and reset the CMOS values to factory defaults. To clear the CMOS values, use a metal object like a screwdriver to touch the two pins for a few seconds. Open: Normal Short: Clear CMOS Values •• Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values. •• After system restart, go to BIOS Setup to load factory defaults (select Load Optimized Defaults) or manually configure the BIOS settings (refer to Chapter 2, "BIOS Setup," for BIOS configurations). - 16 - F\_USB30 10) F\_USB30 (USB 3.0/2.0 Header) F\_U F \_ F \_ The header conforms to USB 3.0/2.0 specification and each header can provide two USB ports. For purchasing the optional 3.5" front panel that provides two USB 3.0/2.0 ports, please contact the local dealer. Pin No. 1 2 3 4 5 6 7 8 9 10 Definition VBUS SSRX1SSRX1+ GND SSTX1SSTX1+ GND D1D1+ NC Pin No. 11 12 13 14 B SS 15 16 17 18 19 20 S 1 2 3 1 2 3 20 1 B \_ 11 10 1 Definition D2+ D2GND SSTX2+ SSTX2GND SSRX2+ SSRX2VBUS No Pin 1 1 \_S 11) F\_USB1/F\_USB2 (USB 2.0/1.1 Headers) The headers conform to USB 2.0/1.1 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer. S 1 2 3 9 10 1 2 Pin No. 1 2 3 4 5 Definition Power (5V) Power (5V) USB DXUSB DYUSB DX+ Pin No. 6 7 8 9 10 S •• Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB 2.0/1.1 header. U B S S •• 3 Prior to installing the USB bracket, be sure to turn off your computer and unplug \_ \_ power cord the 3 from the power outlet to prevent damage to the USB bracket. S \_ 12) TPM (Trusted Platform Module Header) S F You may connect a TPM (Trusted Platform Module) to this header.



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Pin No. 19 20 1 2 Definition LCLK GND LFRAME No Pin LRESET NC LAD3 LAD2 VCC3 LAD1 Pin No. 11 12 13 14 15 16 17 18 19 20 DEBUG PORT S\_ 1 2 3 4 B\_5 6 7 8 9 10 - 17 - 1 Definition USB DY+ GND GND No Pin NC 1 2 3 S F\_USB Definition LAD0 GND NC NC \_ SB3V SERIRQ GND NC NC SUSCLK \_ \_B \_ 13) BAT (Battery) The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost. You may clear the CMOS values by removing the battery: 1. Turn off your computer and unplug the power cord. 2.

Gently remove the battery from the battery holder and wait for one minute. (Or use a metal object like a screwdriver to touch the positive and negative terminals of the battery holder, making them short for 5 seconds.) 3. Replace the battery. 4. Plug in the power cord and restart your computer. •• Always turn off your computer and unplug the power cord before replacing the battery. •• Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model. •• Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.

•• When installing the battery, note the orientation of the positive side (+) and the negative side (-) of the battery (the positive side should face up). •• Used batteries must be handled in accordance with local environmental regulations. Chapter 2 BIOS Setup BIOS (Basic Input and Output System) records hardware parameters of the system in the CMOS on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features.

When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS. To access the BIOS Setup program, press the <Delete> key during the POST when the power is turned on. To upgrade the BIOS, use either the GIGABYTE Q-Flash or @BIOS utility. •• Q-Flash allows the user to quickly and easily upgrade or back up BIOS without entering the operating system. •• @BIOS is a Windows-based utility that searches and downloads the latest version of BIOS from the Internet and updates the BIOS.

•• Because BIOS flashing is potentially risky, if you do not encounter problems using the current version of BIOS, it is recommended that you not flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction. •• It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot.

If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the "Load Optimized Defaults" section in this chapter or introductions of the battery/clear CMOS jumper in Chapter 1 for how to clear the CMOS values.) - 18 - 2-1 Startup Screen The following startup Logo screen will appear when the computer boots. (Sample BIOS Version: F1a) Function Keys On the main menu of the BIOS Setup program, press arrow keys to move among the items and press <Enter> to accept or enter a sub-menu. Or you can use your mouse to select the item you want.

•• When the system is not stable as usual, select the Load Optimized Defaults item to set your system to its defaults. •• The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version. 2-2 M.I.T. This section provides information on the BIOS version, CPU base clock, CPU frequency, memory frequency, total memory size, CPU temperature and CPU voltage, etc. Whether the system will work stably with the overclock/overvoltage settings you made is dependent on your overall system configurations. Incorrectly doing overclock/overvoltage may result in damage to CPU, chipset, or memory and reduce the useful life of these components. This page is for advanced users only and we recommend you not to alter the default settings to prevent system instability or other unexpected results. (Inadequately altering the settings may result in system's failure to boot.

If this occurs, clear the CMOS values and reset the board to default values.) - 19 - `M.I.T. Current Status This screen provides information on CPU/memory frequencies/parameters.

`Advanced Frequency Settings && Graphics Slice Ratio Allows you to set the Graphics Slice Ratio. Allows you to set the Graphics UnSlice Ratio. && Graphics UnSlice Ratio && CPU Clock Ratio Allows you to alter the clock ratio for the installed CPU. The adjustable range is dependent on the CPU being installed. Displays the current operating CPU frequency.

&& CPU Frequency `Advanced CPU Core Settings && CPU Clock Ratio, CPU Frequency The settings above are synchronous to those under the same items on the Advanced Frequency Settings menu. Allows you to set the CPU Uncore ratio. The adjustable range is dependent on the CPU being used. Displays the current CPU Uncore frequency. && Uncore Ratio && Uncore Frequency && CPU Flex Ratio Override && CPU Flex Ratio Settings Enables or disables the CPU Flex Ratio. The maximum CPU clock ratio will be based on the CPU Flex Ratio Settings value if CPU Clock Ratio is set to Auto. (Default: Disabled) Allows you to set the CPU Flex Ratio. The adjustable range may vary by CPU. (Default: 20) && Intel(R) Turbo Boost Technology (Note) && Turbo Ratio (Note) Allows you to determine whether to enable the Intel CPU Turbo Boost technology. Auto lets the BIOS automatically configure this setting.

(Default: Auto) Allows you to set the CPU Turbo ratios for different number of active cores. Auto sets the CPU Turbo ratios according to the CPU specifications. (Default: Auto) Allows you to set the power limit for CPU Turbo mode and how long it takes to operate at the specified power limit. If the specified value is exceeded, the CPU will automatically reduce the core frequency in order to reduce the power. Auto sets the current limit according to the CPU specifications. (Default: Auto) Allows you to set a current limit for CPU Turbo mode. When the CPU current exceeds the specified current limit, the CPU will automatically reduce the core frequency in order to reduce the current. Auto sets the power limit according to the CPU specifications. (Default: Auto) && Power Limit TDP (Watts) / Power Limit Time && Core Current Limit (Amps) && No.



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You can also select the default language used by the BIOS and manually set the system time. && System Language Selects the default language used by the BIOS. && System Date Sets the system date. The date format is week (read-only), month, date, and year. Use <Enter> to switch between the Month, Date, and Year fields and use the <Page Up> or <Page Down> key to set the desired value. Sets the system time. The time format is hour, minute, and second. For example, 1 p.m. is 13:00:00. Use <Enter> to switch between the Hour, Minute, and Second fields and use the <Page Up> or <Page Down> key to set the desired value. Displays the current access level depending on the type of password protection used.

(If no password is set, the default will display as Administrator.) The Administrator level allows you to make changes to all BIOS settings; the User level only allows you to make changes to certain BIOS settings but not all. && System Time && Access Level - 25 - 2-4 BIOS Features && Boot Option Priorities Specifies the overall boot order from the available devices. Removable storage devices that support GPT format will be prefixed with "UEFI:" string on the boot device list. To boot from an operating system that supports GPT partitioning, select the device prefixed with "UEFI:" string.

Or if you want to install an operating system that supports GPT partitioning such as Windows 7 64-bit, select the optical drive that contains the Windows 7 64-bit installation disk and is prefixed with "UEFI:" string. Specifies the boot order for a specific device type, such as hard drives, optical drives, floppy disk drives, and devices that support Boot from LAN function, etc. Press <Enter> on this item to enter the submenu that presents the devices of the same type that are connected. This item is present only if at least one device for this type is installed. Enables or disables Numlock feature on the numeric keypad of the keyboard after the POST. (Default: On) &&  Hard Drive/CD/DVD ROM Drive/Floppy Drive/Network Device BBS Priorities H && Bootup NumLock State && Security Option Specifies whether a password is required every time the system boots, or only when you enter BIOS Setup. After configuring this item, set the password(s) under the Administrator Password/User Password item.  Setup  A password is only required for entering the BIOS Setup program.

System  A password is required for booting the system and for entering the BIOS Setup program.  (Default) Allows you to determine whether to display the GIGABYTE Logo at system startup.

Disabled skips the GIGABYTE Logo when the system starts up. (Default: Enabled) && Full Screen LOGO Show && Fast Boot Enables or disables Fast Boot to shorten the OS boot process. Ultra Fast provides the fastest bootup speed. (Default: Disabled) - 26 - && SATA Support  All SATA Devices  SATA devices are functional in the operating system and during the POST.  All (Default)  Last Boot HDD Only  Except for the previous boot drive, all SATA devices are disabled before the OS  E boot process completes. This item is configurable only when Fast Boot is set to Enabled or Ultra Fast. Allows you to select which type of operating system to boot.  Auto  Enables legacy option ROM only.  EFI Driver  Enables EFI option ROM. (Default) This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.

Disabled  All USB devices are disabled before the OS boot process completes.  Full Initial  All USB devices are functional in the operating system and during the POST.  Partial Initial  Part of the USB devices are disabled before the OS boot process completes. (Default) This item is configurable only when Fast Boot is set to Enabled. This function is disabled when Fast Boot is set to Ultra Fast.

Disabled  All PS/2 devices are disabled before the OS boot process completes.  Enabled  PS/2 devices are functional in the operating system and during the POST.  All (Default) This item is configurable only when Fast Boot is set to Enabled. This function is disabled when Fast Boot is set to Ultra Fast.

Disabled  Disables booting from the network.

(Default)  Enabled  Enables booting from the network. This item is configurable only when Fast Boot is set to Enabled or Ultra Fast.  Normal Boot  Enables normal bootup upon the return of the AC power. (Default)  Fast Boot  Keeps the Fast Boot settings upon the return of the AC power. This item is configurable only when Fast Boot is set to Enabled or Ultra Fast. Allows you to select the operating system to be installed. (Default: Other OS) && VGA Support && USB Support && PS2 Devices Support && NetWork Stack Driver Support && Next Boot After AC Power Loss && Windows 8/10 Features && CSM Support Enables or disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.  Enabled  Enables UEFI CSM.

(Default)  Disabled  Disables UEFI CSM and supports UEFI BIOS boot process only. This item is configurable only when Windows 8/10 Features is set to Windows 8/10 or Windows 8/10 WHQL.

Allows you to select whether to enable the legacy option ROM for the LAN controller. (Default: Disabled) This item is configurable only when CSM Support is set to Enabled. && LAN PXE Boot Option ROM && Storage Boot Option Control Allows you to select whether to enable the UEFI or legacy option ROM for the storage device controller.  Disabled  Disables option ROM.  UEFI Only  Enables UEFI option ROM only.  Legacy Only  Enables legacy option ROM only. (Default) This item is configurable only when CSM Support is set to Enabled. - 27 - && Other PCI Device ROM Priority Allows you to select whether to enable the UEFI or Legacy option ROM for the PCI device controller other than the LAN, storage device, and graphics controllers.

Disabled  Disables option ROM.  UEFI Only  Enables UEFI option ROM only.

(Default)  Legacy Only  Enables legacy option ROM only. This item is configurable only when CSM Support is set to Enabled. Disables or enables booting from the network to install a GPT format OS, such as installing the OS from the Windows Deployment Services server. (Default: Disabled) Enables or disables IPv6 PXE Support. This item is configurable only when Network Stack is enabled.

&& Network Stack && Ipv6 PXE Support && Ipv4 PXE Support Enables or disables IPv4 PXE Support. This item is configurable only when Network Stack is enabled. && Administrator Password Allows you to configure an administrator password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password.

Type the password again and press <Enter>.



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You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. Differing from the user password, the administrator password allows you to make changes to all BIOS settings. Allows you to configure a user password. Press <Enter> on this item, type the password, and then press <Enter>. You will be requested to confirm the password. Type the password again and press <Enter>. You must enter the administrator password (or user password) at system startup and when entering BIOS Setup. However, the user password only allows you to make changes to certain BIOS settings but not all. To cancel the password, press <Enter> on the password item and when requested for the password, enter the correct one first.

When prompted for a new password, press <Enter> without entering any password. Press <Enter> again when prompted to confirm. NOTE: Before setting the User Password, be sure to set the Administrator Password first. && User Password - 28 - 2-5 Peripherals && Intel Platform Trust Technology (PTT) Enables or disables Intel® PTT Technology. (Default: Disabled) Specifies the first initiation of the monitor display from the installed PCI Express graphics card or the onboard graphics. IGFX  Sets the onboard graphics as the first display. PCIe 1 Slot  Sets the graphics card on the PCIEX16 slot as the first display. (Default) Enables or disables the onboard LAN function. (Default: Enabled) If you wish to install a 3rd party add-in network card instead of using the onboard LAN, set this item to Disabled. Allows USB keyboard/mouse to be used in MS-DOS.

(Default: Enabled) && Initial Display Output && OnBoard LAN Controller && Legacy USB Support && XHCI Hand-off Determines whether to enable XHCI Hand-off feature for an operating system without XHCI Hand-off support. (Default: Disabled) Enables or disables support for USB storage devices.

(Default: Enabled) && USB Mass Storage Driver Support && USB Storage Devices Displays a list of connected USB mass storage devices. This item appears only when a USB storage device is installed. Displays information on your PCIe SSD if installed.

This sub-menu appears only when Intel Platform Trust Technology is set to Enabled. ``OffBoard SATA Controller Configuration ``Trusted Computing 2.0 - 29 - && Security Device Support Enables or disables Trusted Platform Module (TPM). (Default: Enable) To clear TPM related settings, set this item to TPM Clear. (Default: None) && Pending operation && TPM 20 InterfaceType && Device Select Allows you to select the communication interface for the TPM 2.0 device. Set to External TPM2.0 if you install an Infineon TPM 2.0 module (optional). (Default: PTT) Allows you to select whether to support TPM 1.2 or TPM 2.0 device. Auto lets the BIOS automatically configure this setting. (Default: Auto) Enables or disables the Intel® BIOS Guard feature, which protects the BIOS from malicious attacks. ``Intel(R) Bios Guard Technology ``SATA Configuration && SATA Controller(s) AHCI  Enables or disables the integrated SATA controllers.

(Default: Enabled) C  onfigures the SATA controllers to AHCI mode. Advanced Host Controller Interface (AHCI) is an interface specification that allows the storage driver to enable advanced Serial ATA features such as Native Command Queuing and hot plug. (Default) && SATA Mode Selection && Aggressive LPM Support Enables or disables the power saving feature, ALPM (Aggressive Link Power Management), for the Chipset SATA controllers. (Default: Enabled) Enables or disables each SATA port. (Default: Enabled) Enables or disable the hot plug capability for each SATA port. (Default: Disabled) Enables or disables support for external SATA devices. (Default: Disabled) && Port 0/1/2/3 && Hot plug && External SATA ``NVMe Configuration Displays information on your NVMe PCIe SSD if installed. ``Realtek PCIe GBE Family Controller This sub-menu provides information on LAN configuration. - 30 - 2-6 Chipset && VT-d (Note) Enables or disables Intel® Virtualization Technology for Directed I/O. (Default: Disabled) Enables or disables the onboard graphics function.

(Default: Auto) Allows you to set the onboard graphics memory size. Options are: 32M-512M. (Default: 64M) && Internal Graphics && DVMT Pre-Allocated && DVMT Total Gfx Mem && Audio Controller Allows you to allocate the DVMT memory size of the onboard graphics. Options are: 128M, 256M, MAX. (Default: 256M) Enables or disables the onboard audio function.

(Default: Enabled) If you wish to install a 3rd party add-in audio card instead of using the onboard audio, set this item to Disabled. && High Precision Timer Enables or disables High Precision Event Timer (HPET) in the operating system. (Default: Enabled) (Note) This item is present only when you install a CPU that supports this feature. @@ - 31 - 2-7 Power Management && AC BACK Determines the state of the system after the return of power from an AC power loss. Always Off  system stays off upon the return of the AC power.

(Default)  The Always On  The system is turned on upon the return of the AC power. Memory  The system returns to its last known awake state upon the return of the AC power. Allows the system to be turned on by a PS/2 keyboard wake-up event. Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead. Disabled  Disables this function. (Default) Password  Set a password with 1-5 characters to turn on the system. Keyboard 98  Press POWER button on the Windows 98 keyboard to turn on the system. Any Key  Press any key to turn on the system. Set the password when Power On By Keyboard is set to Password. Press <Enter> on this item and set a password with up to 5 characters and then press <Enter> to accept.

To turn on the system, enter the password and press <Enter>. Note: To cancel the password, press <Enter> on this item. When prompted for the password, press <Enter> again without entering the password to clear the password settings. Allows the system to be turned on by a PS/2 mouse wake-up event. Note: To use this function, you need an ATX power supply providing at least 1A on the +5VSB lead. Disabled  Disables this function. (Default) Move  Move the mouse to turn on the system. Double Click  Double click on left button on the mouse to turn on the system. && Power On By Keyboard && Power On Password && Power On By Mouse && ErP Determines whether to let the system consume least power in S5 (shutdown) state. (Default: Disabled) Note: When this item is set to Enabled, the following functions will become unavailable: Resume by Alarm, PME event wake up, power on by mouse, power on by keyboard, and wake on LAN.



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- 32 - **Soft-Off by PWR-BTTN** Configures the way to turn off the computer in MS-DOS mode using the power button.  Instant-Off  Press the power button and then the system will be turned off instantly. (Default)  Delay 4 Sec.  Press and hold the power button for 4 seconds to turn off the system. If the power button is pressed for less than 4 seconds, the system will enter suspend mode.

Enables or disables dummy load. When the power supply is at low load, a self-protection will activate causing it to shutdown or fail. If this occurs, please set to Enabled. Auto lets the BIOS automatically configure this setting. (Default: Auto) Determines whether to power on the system at a desired time.

(Default: Disabled) If enabled, set the date and time as following:  Wake up day: Turn on the system at a specific time on each day or on a specific day in a month.  Wake up hour/minute/second: Set the time at which the system will be powered on automatically.  Note: When using this function, avoid inadequate shutdown from the operating system or removal of the AC power, or the settings may not be effective. Allows you to determine whether to let the onboard graphics enter standby mode to decrease power consumption. (Default: Enabled) Enables or disables the Active State Power Management function (ASPM). (Default: Disabled) **Power Loading & Resume by Alarm** & **RC6(Render Standby)** & **Platform Power Management** & **PEG ASPM** & **PCH ASPM** Allows you to configure the ASPM mode for the device connected to the CPU PEG bus. This item is configurable only when Platform Power Management is set to Enabled. (Default: Enabled) Allows you to configure the ASPM mode for the device connected to Chipset's PCI Express bus. This item is configurable only when Platform Power Management is set to Enabled. (Default: Enabled) Allows you to configure the ASPM mode for both CPU side and Chipset side of the DMI link.

This item is configurable only when Platform Power Management is set to Enabled. (Default: Enabled) **DMI Link ASPM Control** - 33 - 2-8 **Save & Exit** & **Save & Exit Setup** Press <Enter> on this item and select Yes. This saves the changes to the CMOS and exits the BIOS Setup program. Select No or press <Esc> to return to the BIOS Setup Main Menu. Press <Enter> on this item and select Yes. This exits the BIOS Setup without saving the changes made in BIOS Setup to the CMOS. Select No or press <Esc> to return to the BIOS Setup Main Menu. Press <Enter> on this item and select Yes to load the optimal BIOS default settings. The BIOS defaults settings help the system to operate in optimum state. Always load the Optimized defaults after updating the BIOS or after clearing the CMOS values.

Allows you to select a device to boot immediately. Press <Enter> on the device you select and select Yes to confirm. Your system will restart automatically and boot from that device. This function allows you to save the current BIOS settings to a profile. You can create up to 8 profiles and save as Setup Profile 1~ Setup Profile 8.

Press <Enter> to complete. Or you can select Select File in HDD/FDD/USB to save the profile to your storage device. If your system becomes unstable and you have loaded the BIOS default settings, you can use this function to load the BIOS settings from a profile created before, without the hassles of reconfiguring the BIOS settings. First select the profile you wish to load and then press <Enter> to complete. You can select Select File in HDD/FDD/USB to input the profile previously created from your storage device or load the profile automatically created by the BIOS, such as reverting the BIOS settings to the last settings that worked properly (last known good record).

**Exit Without Saving & Load Optimized Defaults & Boot Override & Save Profiles & Load Profiles** - 34 - Chapter 3 Appendix Drivers Installation

• Before installing the drivers, first install the operating system. (The following instructions use Windows 8.1 as the example operating system.) • After installing the operating system, insert the motherboard driver disk into your optical drive. Click on the message "Tap to choose what happens with this disc" on the top-right corner of the screen and select "Run Run.exe." (Or go to My Computer, double-click the optical drive and execute the Run.exe program.) "Xpress Install" will automatically scan your system and then list all of the drivers that are recommended to install. You can click the Xpress Install button and "Xpress Install" will install all of the selected drivers.

Or click the arrow icon to individually install the drivers you need. Please visit GIGABYTE's website for more software information. Please visit GIGABYTE's website for details on configuring the audio software. - 35 - **Regulatory Statements Regulatory Notices** This document must not be copied without our written permission, and the contents there of must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. We believe that the information contained herein was accurate in all respects at the time of printing. GIGABYTE cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by GIGABYTE. **Our Commitment to Preserving the Environment** In addition to high-efficiency performance, all GIGABYTE motherboards fulfill European Union regulations for RoHS (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) environmental directives, as well as most major worldwide safety requirements. @@@@ Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

**WEEE Symbol Statement** The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local government office, your household waste disposal service or where you purchased the product for details of environmentally safe recycling.

When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.



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□□ If you need further assistance in recycling, reusing in your "end of life" product, you may contact us at the Customer Care number listed in your product's user's manual and we will be glad to help you with your effort. Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly. With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly. - 36 - FCC Notice (U.S.

A. Only) 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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: □□ Reorient or relocate the receiving antenna. □□ Increase the separation between the equipment and receiver. □□ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. □□ Consult a dealer or experienced TV/radio technician for help. Canada, Industry Canada (IC) Notices / Canada, avis d'Industry Canada (IC) □□ This Class B digital apparatus complies with Canadian ICES-003 and RSS-210.

□□ 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 classe B est conforme aux normes canadiennes ICES-003 et RSS-210. □□ Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement. - 37 - Contact Us GIGA-BYTE TECHNOLOGY CO., LTD. Address: No.6, Baoqiang Rd., Xindian Dist., New Taipei City 231, Taiwan TEL: +886-2-8912-4000, FAX: +886-2-8912-4005 Tech. and Non-Tech. Support (Sales/Marketing) : <http://esupport.gigabyte.com> WEB address (English): <http://www.gigabyte.com> WEB address (Chinese): <http://www.gigabyte.tw> •• GIGABYTE eSupport To submit a technical or non-technical (Sales/Marketing) question, please link to: <http://esupport.gigabyte.com> - 38 - .



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