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You can read the recommendations in the user guide, the technical guide or the installation guide for GIGABYTE GA-Z170X-GAMING 7. You'll find the answers to all your questions on the GIGABYTE GA-Z170X-GAMING 7 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-Z170X-GAMING 7

User guide GIGABYTE GA-Z170X-GAMING 7

Operating instructions GIGABYTE GA-Z170X-GAMING 7

Instructions for use GIGABYTE GA-Z170X-GAMING 7

Instruction manual GIGABYTE GA-Z170X-GAMING 7



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Hardware Installation - 14 - B. Follow the steps below to correctly install the CPU into the motherboard CPU socket.

•• Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the CPU. •• To protect the socket contacts, do not remove the protective plastic cover unless the CPU is inserted into the CPU socket. Save the cover properly and replace it if the CPU is removed. Step 1: Gently press the CPU socket lever handle down and away from the socket with your finger. Then completely lift the CPU socket lever and the metal load plate/plastic cover will be lifted as well.

Step 2: Hold the CPU with your thumb and index fingers. Align the CPU pin one marking (triangle) with the pin one corner of the CPU socket (or you may align the CPU notches with the socket alignment keys) and gently insert the CPU into position. Step 3: Once the CPU is properly inserted, carefully replace the load plate. When replacing the load plate, make sure the front end of the load plate is under the shoulder screw. Then press the CPU socket lever. The protective plastic cover may pop off from the load plate during the process of engaging the lever. Remove the cover. (Save the cover properly and always replace it when the CPU is not installed.) Step 4: Finally, secure the lever under its retention tab to complete the installation of the CPU. NOTE: Hold the CPU socket lever by the handle, not the lever base portion.

- 15 - Hardware Installation 1-3-2 Installing the CPU Cooler Refer to the steps below to correctly install the CPU cooler on the motherboard. (Actual installation process may differ depending the CPU cooler to be used. Refer to the user's manual for your CPU cooler.) Male Push Pin The Top of Female Push Pin Direction of the Arrow Sign on the Male Push Pin Female Push Pin Step 1: Apply an even and thin layer of thermal grease on the surface of the installed CPU. Step 2: Before installing the cooler, note the direction of the arrow sign on the male push pin. (Turning the push pin along the direction of arrow is to remove the cooler, on the contrary, is to install.) Step 3: Place the cooler atop the CPU, aligning the four push pins through the pin holes on the motherboard. Push down on the push pins diagonally. Step 4: You should hear a "click" when pushing down each push pin. Check that the Male and Female push pins are joined closely.

(Refer to your CPU cooler installation manual for instructions on installing the cooler.) Step 5: After the installation, check the back of the motherboard. If the push pin is inserted as the picture above shows, the installation is complete. Step 6: Finally, attach the power connector of the CPU cooler to the CPU fan header (CPU_FAN) on the motherboard. Use extreme care when removing the CPU cooler because the thermal grease/tape between the CPU cooler and CPU may adhere to the CPU.

Inadequately removing the CPU cooler may damage the CPU. Hardware Installation - 16 - 1-4 Installing the Memory Read the following guidelines before you begin to install the memory: •• Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used. (Go to GIGABYTE's website for the latest supported memory speeds and memory modules.) •• Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.

•• Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction. 1-4-1 Dual Channel Memory Configuration This motherboard provides four memory sockets and supports Dual Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Dual Channel memory mode will double the original memory bandwidth. The four memory sockets are divided into two channels and each channel has two memory sockets as following: □ Channel A: DDR4_2, DDR4_4 □ Channel B: DDR4_1, DDR4_3 □ □ □ Dual Channel Memory Configurations Table 2 Modules DDR4_4 DDR4_2 DDR4_3 -DS/SS -DS/SS -DS/SS 4 Modules DS/SS DS/SS DS/SS (SS=Single-Sided, DS=Double-Sided, "- "=No Memory) DDR4_1 DS/SS -DS/SS Due to CPU limitations, read the following guidelines before installing the memory in Dual Channel mode. 1. Dual Channel mode cannot be enabled if only one memory module is installed. 2.

When enabling Dual Channel mode with two or four memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used and installed in the same colored sockets. DDR4_4 DDR4_2 DDR4_3 DDR4_1 - 17 - Hardware Installation 1-4-2 Installing a Memory Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module. DDR4 and DDR3 DIMMs are not compatible to each other or DDR2 DIMMs. Be sure to install DDR4 DIMMs on this motherboard. Notch DDR4 DIMM A DDR4 memory module has a notch, so it can only fit in one direction. Follow the steps below to correctly install your memory modules in the memory sockets. Step

1: Note the orientation of the memory module. Spread the retaining clip at the right end of the memory socket. Place the memory module on the socket. As indicated in the picture on the left, place your fingers on the top edge of the memory, push down on the memory and insert it vertically into the memory socket. Step 2: The clip at the right end of the socket will snap into place when the memory module is securely inserted. Hardware Installation - 18 - 1-5 Installing an

Expansion Card Read the following guidelines before you begin to install an expansion card: •• Make sure the motherboard supports the expansion card. Carefully read the manual that came with your expansion card. •• Always turn off the computer and unplug the power cord from the power outlet before installing an expansion card to prevent hardware damage. PCI Express x1 Slot PCI Express x16 Slot Follow the steps below to correctly install your expansion card in the expansion slot.

1. Locate an expansion slot that supports your card. Remove the metal slot cover from the chassis back panel.
2. Align the card with the slot, and press down on the card until it is fully seated in the slot.
3. Make sure the metal contacts on the card are completely inserted into the slot.
4. Secure the card's metal bracket to the chassis back panel with a screw.
5. After installing all expansion cards, replace the chassis cover(s).
6. Turn on your computer. If necessary, go to BIOS Setup to make any required BIOS changes for your expansion card(s).
- 7.

Install the driver provided with the expansion card in your operating system. Example: Installing and Removing a PCI Express Graphics Card: •• Installing a Graphics Card: Gently push down on the top edge of the card until it is fully inserted into the PCI Express slot.



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Make sure the card is securely seated in the slot and does not rock. •• Removing the Card: Gently push back on the lever on the slot and then lift the card straight out from the slot. - 19 - Hardware Installation 1-6 Setting up AMD CrossFire™/NVIDIA® SLI™ Configuration A. System Requirements -- Windows 10/8.1/7 operating system -- A CrossFire/SLI-supported motherboard with two or more PCI Express x16 slots and correct driver -- CrossFire/SLI-ready graphics cards of identical brand and chip and correct driver (Current GPUs that support 3-Way CrossFire technology include the ATI Radeon™ HD 3800, HD 4800, HD 5800 series, and AMD Radeon™ HD 6800, HD 6900, HD 7800, and HD 7900 series. For the latest GPU support information, please refer to the AMD/NVIDIA® website.) -- CrossFire(Note)/SLI bridge connectors -- A power supply with sufficient power is recommended (Refer to the manual of your graphics cards for the power requirement) B. Connecting the Graphics Cards Step 1: Observe the steps in "1-5 Installing an Expansion Card" and install CrossFire/SLI graphics cards on the PCI Express x16 slots.

Step 2: Insert the CrossFire(Note)/SLI bridge connectors in the CrossFire/SLI gold edge connectors on top of the cards. Step 3: Plug the display cable into the graphics card on the PCIEX16 slot. C. Configuring the Graphics Card Driver C-1. To Enable CrossFire Function After installing the graphics card driver in the operating system, go to the AMD Catalyst Control Center.

Browse to Performance\AMD CrossFireX™ and ensure the Enable AMD CrossFireX check box is selected. If your system has more than two CrossFire cards, select the GPU combination you want to use and click Apply. (Available combination options are dependent on the number of graphics cards.) C-2. To Enable SLI Function After installing the graphics card driver in the operating system, go to the NVIDIA Control Panel.

Browse to the Configure SLI, Surround, Physx screen and ensure Maximize 3D performance is enabled. (Note) The bridge connector(s) may be needed or not depending on your graphics cards. □ Procedure and driver screen for enabling CrossFire/SLI technology may differ by graphics cards and driver version. Refer to the manual that came with your graphics cards for more information about enabling CrossFire/SLI technology. Hardware Installation - 20 - 1-7 Back Panel Connectors PS/2 Keyboard/Mouse Port USB 3.0/2.0 Port DisplayPort Use this port to connect a PS/2 mouse or keyboard. The USB 3.0 port supports the USB 3.0 specification and is compatible to the USB 2.

0/1.1 specification. You can connect a USB DAC to this port or use this port for USB devices. DisplayPort delivers high quality digital imaging and audio, supporting bi-directional audio transmission. DisplayPort can support both DPCP and HDCP content protection mechanisms. You can use this port to connect your DisplayPort-supported monitor. The maximum supported resolution is 4096x2160@24 Hz or 3840x2160@60 Hz, but the actual resolutions supported are dependent on the monitor being used. HDMI Port The HDMI port is HDCP compliant and supports Dolby True HD and DTS HD Master Audio formats. It also supports up to 192KHz/24bit 8-channel LPCM audio output. You can use this port to connect your HDMI-supported monitor.

After installing the HDMI/DisplayPort device, make sure to set the default sound playback device to HDMI/DisplayPort. (The item name may differ depending on your operating system.) In Windows 8.1, select Apps>Control Panel>Hardware and Sound>Sound>Playback, set Intel(R) Display Audio to the default playback device. USB 3.

0/2.0 Port The USB 3.0 port supports the USB 3.0 specification and is compatible to the USB 2.0/1.

1 specification. Use this port for USB devices. •• 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. - 21 Hardware Installation RJ-45 LAN Port (LAN2) Connection/ Speed LED 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 State Orange Green Off Description 1 Gbps data rate 100 Mbps data rate 10 Mbps data rate State Blinking Off Description Data transmission or receiving is occurring No data transmission or receiving is occurring LAN Port USB Type-C™ Port The reversible USB port supports the USB 3.1 specification and is compatible to the USB 3.0/2.

0 specification. Use this port for USB devices. RJ-45 LAN Port (LAN1) Connection/ Speed LED 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 On Description Data transmission or receiving is occurring No data transmission or receiving is occurring LAN Port USB 3.1 Port The USB 3.1 port supports the USB 3.1 specification and is compatible to the USB 3.0/2.0/1.

1 specification. Use this port for USB devices. Line In/Mic In Line Out The line in/Mic in jack. Use this audio jack for line in devices such as optical drive, walkman, microphone, etc. The line out jack. Use this audio jack for a 2-channel speaker. This jack can be used to connect front speakers in a 5.1-channel audio configuration. Optical S/PDIF Out Connector This connector provides digital audio out to an external audio system that supports digital optical audio. Before using this feature, ensure that your audio system provides an optical digital audio in connector.

Center/Subwoofer Speaker Out Rear Speaker Out Use this audio jack to connect center/subwoofer speakers in a 5.1-channel audio configuration. Use this audio jack to connect rear speakers in a 5.1-channel audio configuration. Headphone/Speaker Out This audio output jack supports audio amplifying function. For better sound quality, it is recommended that you connect your headphone/speaker to this jack. Refer to the instructions on setting up a 2/5.1-channel audio configuration in Chapter 6, "Configuring 2/5.1-Channel Audio." Hardware Installation - 22 - 1-8 Onboard Buttons and Switches BIOS Switch The SB switch allows enabling or disabling of the Dual BIOS function.

1 2 3 1 2 3 1 2 3 3 1 2 1 2 3 3 1 2 SB 1 2 3 2 3 1 1 1 1 1 •• Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values. •• NOTE: Do not use the clear CMOS button when the system is on, or the system may shutdown and data loss or damage may occur. •• 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).



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For HD Front Panel Audio: Pin No. Definition 1 MIC2_L F_ 2 GND 3 MIC2_R 4 -ACZ_DET 5 LINE2_R 6 Sense 7 FAUDIO_JD 8 No Pin 9 LINE2_L 10 Sense For AC'97 Front Panel Audio: Pin No. Definition 1 MIC F_ 2 GND 3 MIC Power 4 NC 5 Line Out (R) 6 NC 7 NC 8 No Pin 9 Line Out (L) 10 NC 9 F_ U 10 1 2 B_ 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. _S 1 1 1 B SS _ 1 2 3 13) F_USB30_1/F_USB30_2 (USB 3.0/2.0 Headers) 1 2 3 1 2 3 F_USB30 B S F_ U F_ The headers conform to USB 3.0/2.0.

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. 1 2 3 S 20 1 S 3 B SS S U _ _ 3 1 2 3 F_USB3 F _ 1 2 3 S F _ S Hardware Installation B_ - 34 - B SS S U 1 2 3 Prior to installing the USB front panel, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB front panel. 1 2 3 S 1 11 10 Pin No. 1 2 3 4 5 B_ 6 7 8 9 10 Definition VBUS SSRX1SSRX1+ GND SSTX1SSTX1+ GND DID1+ NC Pin No. 11 12 13 14 15 16 17 18 19 20 Definition D2+ D2GND SSTX2+ B SS SSTX2GND SSRX2+ SSRX2VBUS No Pin 1 S B_ B_ S S_ B 1 _ S 1 _ U _ B 14) 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. Pin No. 1 2 3 4 5 6 7 8 9 10 Definition Power (5V) Power (5V) USB DXUSB DYUSB DX+ USB DY+ GND F_ U GND No Pin NC 9 10 1 2 F_USB30 • Do not plug the IEEE 1394 bracket (2x5-pin) cable into the USB 2.0/1.1 header. • Prior to installing the USB bracket, be sure to turn off your computer and unplug the power cord from the power outlet to prevent damage to the USB bracket.

B_ B SS 1 You may connect a TPM (Trusted Platform Module) to this header. 19 1 S 20 2 Pin No. 1 2 3 4 5 6 7 8 9 10 Definition LCLK GND LFRAME No Pin LRESET NC LAD3 LAD2 VCC3 LAD1 Pin No. 11 12 13 14 15 16 17 18 19 20 S 3 Definition LAD0 GND NC NC SB3V SERIRQ GND NC NC SUSCLK S B SS S - 35 - S _ Hardware Installation S F 1 15) TPM (Trusted Platform Module Header) 1 2 3 _ 1 16) COMA (Serial Port Header) The COM header can provide one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.

Pin No. 1 2 3 4 5 6 7 8 9 10 Definition NDCDNSIN NSOUT NDTRGND NDSRNRTSNCTSNRINo Pin 9 10 1 2 17) 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. Hardware Installation - 36 - 18) 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). - 37 - Hardware Installation Hardware Installation - 38 - 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.

For instructions on using the Q-Flash and @BIOS utilities, refer to Chapter 5, "BIOS Update Utilities." • 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 or the clear CMOS jumper/button in Chapter 1 for how to clear the CMOS values.) - 39 - BIOS Setup 2-1 Startup Screen The following startup Logo screen will appear when the computer boots. Function Keys Function Keys: : BIOS SETUP Q-FLASH Press the <Delete> key to enter BIOS Setup or to access the Q-Flash utility in BIOS Setup. <F9>: SYSTEM INFORMATION Press the <F9> key to display your system information.



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<F12>: BOOT MENU Boot Menu allows you to set the first boot device without entering BIOS Setup. In Boot Menu, use the up arrow key <h> or the down arrow key <i> to select the first boot device, then press <Enter> to accept. The system will boot from the device immediately. Note: The setting in Boot Menu is effective for one time only.

After system restart, the device boot order will still be based on BIOS Setup settings. **<END>: Q-FLASH** Press the <End> key to access the Q-Flash utility directly without having to enter BIOS Setup first. **BIOS Setup - 40 - 2-2 The Main Menu** The Main Menu 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. (Sample BIOS Version: F1a) Setup Menus Enter Q-Flash Select Default Language Help Function Keys Configuration Items Current Settings BIOS Setup Program Function Keys <f><g> <h><i> <Enter> <+>/<Page Up> <->/<Page Down> <F1> <F5> <F7> <F8> <F9> <F10> <F12> <Esc> Move the selection bar to select a setup menu Move the selection bar to select an configuration item on a menu Execute command or enter a menu Increase the numeric value or make changes Decrease the numeric value or make changes Show descriptions of the function keys Restore the previous BIOS settings for the current submenus Load the Optimized BIOS default settings for the current submenus Access the Q-Flash utility Display system information Save all the changes and exit the BIOS Setup program Capture the current screen as an image and save it to your USB drive Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu •• 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. - 41 BIOS Setup BIOS Setup Menus □□ M.I.T. Use this menu to configure the clock, frequency, and voltages of your CPU and memory, etc.

Or check the system/CPU temperatures, voltages, and fan speeds. Use this menu to configure the default language used by the BIOS and system time and date. Use this menu to configure the device boot order and advanced features available on the CPU. Use this menu to configure all peripheral devices, such as USB, display settings, etc. Use this menu to configure Chipset-related options, such as SATA, onboard LAN, etc.

Use this menu to configure all the power-saving functions. □□ System Information □□ BIOS Features □□ Peripherals □□ Chipset □□ Power Management □□ Save & Exit Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. You can save the current BIOS settings to a profile or load optimized defaults for optimal-performance system operations. BIOS Setup - 42 - 2-3 M.I.

T. 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.) This section provides information on the BIOS version, CPU base clock, CPU frequency, memory frequency, total memory size, CPU temperature and CPU voltage, etc. - 43 - BIOS Setup `M.I.T.

Current Status This screen provides information on CPU/memory frequencies/parameters. `Advanced Frequency Settings && Performance Upgrade (Note) Provides you with five different overclocking configurations. Options are: 20% Upgrade, 40% Upgrade, 60% Upgrade, 80% Upgrade, 100% Upgrade. (Default: Auto) Allows you to manually set the CPU base clock in 0.01 MHz increments. (Default: Auto) Important: It is highly recommended that the CPU frequency be set in accordance with the CPU specifications. This value changes with the CPU Base Clock setting. Allows you to set the CPU frequency. Options may vary depending on the CPU being used. (Default: Auto) && CPU Base Clock && Host Clock Value && CPU Upgrade (Note) && 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 (Note) This item is present only when you install a CPU that supports this feature. @@ - 44 - BIOS Setup `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 && Intel(R) Turbo Boost Technology (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) Allows you to select the number of CPU cores to enable in an Intel® multi-core CPU (the number of CPU cores may vary by CPU). Auto lets the BIOS automatically configure this setting. (Default: Auto) This item is present only when you install a CPU that supports this feature.

@@ - 45 BIOS Setup && Turbo Ratio (Note) && Power Limit TDP (Watts) / Power Limit Time && Core Current Limit (Amps) && No. of CPU Cores Enabled (Note) (Note) && Hyper-Threading Technology (Note 1) Allows you to determine whether to enable multi-threading technology when using an Intel® CPU that supports this function. This feature only works for operating systems that support multi-processor mode. Auto lets the BIOS automatically configure this setting.



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(Default: Auto) && CPU Enhanced Halt (C1E) (Note 1) Enables or disables Intel® CPU Enhanced Halt (C1E) function, a CPU power-saving function in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows you to determine whether to let the CPU enter C3 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3 state is a more enhanced power-saving state than C1.

Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows you to determine whether to let the CPU enter C6/C7 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C6/C7 state is a more enhanced power-saving state than C3. Auto lets the BIOS automatically configure this setting.

(Default: Auto) Allows you to determine whether to let the CPU enter C8 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C8 state is a more enhanced power-saving state than C6/C7. Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows you to specify the C-state limit for the processor.

Auto lets the BIOS automatically configure this setting. (Default: Auto) Enables or disables Intel® Thermal Monitor function, a CPU overheating protection function. When enabled, the CPU core frequency and voltage will be reduced when the CPU is overheated. Auto lets the BIOS automatically configure this setting. (Default: Auto) Enables or disables Enhanced Intel® Speed Step Technology (EIST). Depending on CPU loading, Intel EIST technology can dynamically and effectively lower the CPU voltage and core frequency to decrease average power consumption and heat production. Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows the BIOS to read the SPD data on XMP memory module(s) to enhance memory performance when enabled. Disabled Disables this function. (Default) Profile1 Uses Profile 1 settings.

Profile2 (Note 2) Uses Profile 2 settings. && C3 State Support (Note 1) && C6/C7 State Support (Note 1) && C8 State Support (Note 1) && Package C State Limit (Note 1) && CPU Thermal Monitor (Note 1) && CPU EIST Function (Note 1) && Extreme Memory Profile (X.M.P.) (Note 2) (Note 1) This item is present only when you install a CPU that supports this feature. @@(Note 2) This item is present only when you install a CPU and a memory module that support this feature. BIOS Setup - 46 - && System Memory Multiplier Allows you to set the system memory multiplier. Auto sets memory multiplier according to memory SPD data. (Default: Auto) The first memory frequency value is the normal operating frequency of the memory being used; the second is the memory frequency that is automatically adjusted according to the System Memory Multiplier settings. && Memory Frequency (MHz) - 47 - BIOS Setup `` Advanced Memory Settings && Extreme Memory Profile (X.

M.P.) (Note), System Memory Multiplier, Memory Frequency(MHz) The settings above are synchronous to those under the same items on the Advanced Frequency Settings menu. Provides memory detection and training methods. Auto Lets the BIOS automatically configure this setting.

(Default) Enable Fast Boot kip memory detection and training in some specific criteria for faster memory S boot. Disable Fast Boot Detect and train memory at every single boot. P rovides three different memory performance enhancement settings: Normal (basic performance), Enhanced Stability, and Enhanced Performance. (Default: Normal) Manual and Advanced Manual allows the Memory Multiplier Tweaker, Channel Interleaving, Rank Interleaving, and memory timing settings below to be configurable. Options are: Auto (default), Manual, Advanced Manual.

When using a non-XMP memory module or Extreme Memory Profile (X.M.P.) is set to Disabled, the value is displayed according to your memory specification. When Extreme Memory Profile (X.M.P.) is set to Profile1 or Profile2, the value is displayed according to the SPD data on the XMP memory.

Provides different levels of memory auto-tuning. (Default: Auto) && Memory Boot Mode (Note) && Memory Enhancement Settings && Memory Timing Mode && Profile DDR Voltage && Memory Multiplier Tweaker (Note) This item is present only when you install a CPU and a memory module that support this feature.

- 48 - BIOS Setup && Channel Interleaving Enables or disables memory channel interleaving. Enabled allows the system to simultaneously access different channels of the memory to increase memory performance and stability. Auto lets the BIOS automatically configure this setting. (Default: Auto) Enables or disables memory rank interleaving. Enabled allows the system to simultaneously access different ranks of the memory to increase memory performance and stability. Auto lets the BIOS automatically configure this setting. (Default: Auto) Channel A/B Memory Sub Timings && Rank Interleaving ``This sub-menu provides memory timing settings for each channel of memory. This sub-menu provides memory timing settings for each channel of memory. The respective timing setting screens are configurable only when Memory Timing Mode is set to Manual or Advanced Manual. Note: Your system may become unstable or fail to boot after you make changes on the memory timings.

If this occurs, please reset the board to default values by loading optimized defaults or clearing the CMOS values. - 49 - BIOS Setup ``Advanced Voltage Settings ``Advanced Power Settings && CPU Vcore Loadline Calibration Allows you to configure Load-Line Calibration for the CPU Vcore voltage. Selecting a higher level keeps the CPU Vcore voltage more consistent with what is set in BIOS under heavy load. Auto lets the BIOS automatically configure this setting and sets the voltage following Intel's specifications. (Default: Auto) Allows you to configure Load-Line Calibration for the CPU VAXG voltage. Selecting a higher level keeps the CPU VAXG voltage more consistent with what is set in BIOS under heavy load. Auto lets the BIOS automatically configure this setting and sets the voltage following Intel's specifications. (Default: Auto) - 50 - && VAXG Loadline Calibration BIOS Setup ``CPU Core Voltage Control ``Chipset Voltage Control ``DRAM Voltage Control This section provides CPU voltage control options. This section provides Chipset voltage control options. This section provides memory voltage control options.

- 51 - BIOS Setup ``PC Health Status && Reset Case Open Status Disabled Keeps or clears the record of previous chassis intrusion status.



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(Default) Enabled Clears the record of previous chassis intrusion status and the Case Open field will show "No" at next boot. Displays the detection status of the chassis intrusion detection device attached to the motherboard CI header. If the system chassis cover is removed, this field will show "Yes", otherwise it will show "No". To clear the chassis intrusion status record, set Reset Case Open Status to Enabled, save the settings to the CMOS, and then restart your system. - 52 - && Case Open BIOS Setup && CPU Vcore/CPU VRIN/DRAM Channel A/B Voltage/+3.3V/+5V/+12V/CPU VAXG Displays the current system voltages. && CPU/PCH Temperature && System Temperature Displays current CPU/Chipset temperature. Displays current system temperatures detected by the system temperature sensors on the motherboard. Displays current CPU/CPU_OPT/system fan speeds.

&& CPU/CPU OPT/System Fan Speed && CPU/System/PCH Temperature Warning Sets the warning threshold for CPU/system/Chipset temperature. When temperature exceeds the threshold, BIOS will emit warning sound. Options are: Disabled (default), 60oC/140oF, 70oC/158oF, 80oC/176oF, 90oC/194oF. Allows the system to emit warning sound if the fan is not connected or fails. Check the fan condition or fan connection when this occurs. (Default: Disabled) Allows you to determine whether to enable the fan speed control function and adjust the fan speed. Normal Allows the fan to run at different speeds according to the CPU temperature. You can adjust the fan speed with System Information Viewer based on your system requirements. (Default) Silent Allows the fan to run at slow speeds. Manual Allows you to control the fan speed under the Fan Speed Percentage item. Full Speed Allows the fan to run at full speeds. Allows you to control the fan speed. This item is configurable only when CPU Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.

50 PWM value /oC. Allows you to determine whether to enable the fan speed control function and adjust the fan speed. Normal Allows the fan to run at different speeds according to the CPU temperature. You can adjust the fan speed with System Information Viewer based on your system requirements. (Default) Silent Allows the fan to run at slow speeds.

Manual Allows you to control the fan speed under the Fan Speed Percentage item. Full Speed Allows the fan to run at full speeds. Allows you to control the fan speed. This item is configurable only when CPU OPT Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.50 PWM value /oC. && CPU/CPU OPT/System Fan Fail Warning && CPU Fan Speed Control (CPU_FAN Connector) && Fan Speed Percentage && CPU OPT Fan Speed Control (CPU_OPT Connector) && Fan Speed Percentage - 53 - BIOS Setup && 1st System Fan Speed Control (SYS_FAN1 Connector) Allows you to determine whether to enable the fan speed control function and adjust the fan speed. Normal Allows the fan to run at different speeds according to the system temperature. You can adjust the fan speed with System Information Viewer based on your system requirements.

(Default) Silent Allows the fan to run at slow speeds. Manual Allows you to control the fan speed under the Fan Speed Percentage item. Full Speed Allows the fan to run at full speeds. Allows you to control the fan speed. This item is configurable only when 1st System Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.50 PWM value /oC. Allows you to determine whether to enable the fan speed control function and adjust the fan speed. Normal Allows the fan to run at different speeds according to the system temperature.

You can adjust the fan speed with System Information Viewer based on your system requirements. (Default) Silent Allows the fan to run at slow speeds.

Manual Allows you to control the fan speed under the Fan Speed Percentage item. Full Speed Allows the fan to run at full speeds. Allows you to control the fan speed.

This item is configurable only when 2nd System Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.50 PWM value /oC. Allows you to determine whether to enable the fan speed control function and adjust the fan speed.

Normal Allows the fan to run at different speeds according to the system temperature. You can adjust the fan speed with System Information Viewer based on your system requirements. (Default) Silent Allows the fan to run at slow speeds. Manual Allows you to control the fan speed under the Fan Speed Percentage item. Full Speed Allows the fan to run at full speeds. Allows you to control the fan speed. This item is configurable only when 3rd System Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.50 PWM value /oC.

&& Fan Speed Percentage && 2nd System Fan Speed Control (SYS_FAN2 Connector) && Fan Speed Percentage && 3rd System Fan Speed Control (SYS_FAN3 Connector) && Fan Speed Percentage BIOS Setup - 54 - ``Miscellaneous Settings && Max Link Speed Allows you to set the operation mode of the PCI Express slots to Gen 1, Gen 2, or Gen 3. Actual operation mode is subject to the hardware specification of each slot. Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows you to determine whether to enhance some legacy benchmark performance. (Default: Disabled) && 3DMark01 Enhancement - 55 - BIOS Setup 2-4 System Information This section provides information on your motherboard model and BIOS version. 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.

&& System Time Sets the system time. The time format is hour, minute, and second. For example, 1 p.m. is 13:0:0.

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. && Access Level BIOS Setup - 56 - 2-5 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.



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