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You can read the recommendations in the user guide, the technical guide or the installation guide for GIGABYTE G1.SNIPER Z87. You'll find the answers to all your questions on the GIGABYTE G1.SNIPER Z87 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual GIGABYTE G1.SNIPER Z87
User guide GIGABYTE G1.SNIPER Z87
Operating instructions GIGABYTE G1.SNIPER Z87
Instructions for use GIGABYTE G1.SNIPER Z87
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G1.Sniper Z87

User's Manual
Rev. 1101
12ME-G1SNZ8-1101R



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Manual abstract:

Sniper Z87 User's Manual Rev. @ @ 1, 2013 Nov. 1, 2013 Copyright © 2013 GIGA-BYTE TECHNOLOGY CO., LTD. All rights reserved. @ @ @ @ @ □ □

For detailed product information, 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 Box Contents.

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.....111 -5- Box Contents 55 55 55 55 55 55 55 55 G1.Sniper Z87 motherboard Motherboard driver disk User's Manual Quick Installation Guide Four SATA cables I/O Shield One 2-Way SLI bridge connector 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.

Optional Items □□ □□ □□ □□ □□ 2-port USB 2.0 bracket (Part No. 12CR1-1UB030-6*R) eSATA bracket (Part No. 12CF1-3SATPW-4*R) 3.5" Front Panel with 2 USB 3.

0/2.0 ports (Part No. 12CR1-FPX582-2*R) HDMI-to-DVI adapter (Part No. 12CT2-HDMI01-1*R) COM port cable (Part No. 12CF1-1CM001-3*R) -6- G1. Sniper Z87 Motherboard Layout KB_MS_USB COAXIAL LGA1150 DP_HDMI USB_DAC R_USB30 BIOS_SW CPU_FAN ATX_12V_2X4 CMOS_SW Debug LED (Note) PW_SW SB_RST_SW USB30_LAN Qualcomm® Atheros Killer E2201 LAN AUDIO ATX_F_USB30 COMA SYS_FAN1 PCIEX1_1 PCIEX16 DDR3_4 DDR3_2 DDR3_3 CAP_SW2 CAP_SW1 PCIEX1_3 BAT PCIEX8 PCIe to PCI Bridge B_BIOS M_BIOS Intel® Z87 Creative® PCII Sound Core 3D PCI2 F_AUDIO iTE® Super I/O CLR_CMOS F_PANEL SYS_FAN3 F_USB1 SYS_FAN2 F_USB2 (Note) For debug code information, please refer to Chapter 6. -7- 5 3 1 SATA3 4 2 0 PCIEX1_2 DDR3_1 G1.Sniper Z87 G1.Sniper Z87 Motherboard Block Diagram 2 PCI Express x8 1 PCI Express x16 CPU

CLK+/- (100 MHz) DDR3 1600/1333 MHz Dual Channel Memory or LGA1150 CPU HDMI x16 Switch PCI Express Bus 3 PCI Express x1 LAN RJ45 Qualcomm® Atheros Killer E2201 LAN PCIe CLK (100 MHz) x16 DMI 2.0 FDI DisplayPort 6 SATA 6Gb/s 7 USB 2.0/1.1 x1 x1 x1 x1 Intel® Z87 x1 PCIe to PCI Bridge 6 USB 3.0/2.0 Dual BIOS iTE® LPC Bus Super I/O COM PS/2 KB/Mouse PCI Express Bus PCIe CLK (100 MHz) PCI Bus Creative® Sound Core 3D Headphone/Speaker Out Line Out MIC/Line In Rear Speaker Out Center/Subwoofer Speaker Out S/PDIF Out -8PCI CLK (33 MHz) 2 PCI For detailed product information/limitation(s), refer to "1-2 Product Specifications." 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 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 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. -9- Hardware Installation 1-2 Product Specifications CPU □□ Suppress Install Support for APP Center * □ available applications in APP Center may differ by motherboard model.



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Supported A functions of each application may also differ depending on motherboard specifications.

Bundled Software □□ □□ □□ □□ □□ - @BIOS - EasyTune - EZ Setup - USB Blocker - Smart TimeLock - Smart Recovery 2 Support for ON/OFF Charge Norton® Internet Security (OEM version) Intel® Rapid Start Technology Intel® Smart Connect Technology Intel® Smart Response Technology Operating System Form Factor □□ Support for Windows 8.1/8/7 □□ ATX Form Factor; 30.5cm x 23.3cm * □ GIGABYTE reserves the right to make any changes to the product specifications and product-related information without G prior notice. * □ Please visit the Support & Downloads\Utility page on GIGABYTE's website to check the supported operating system(s) P for the software listed in the "Unique Features" and "Bundled Software" columns. Hardware Installation - 12 - 1-3 Installing the CPU and CPU Cooler 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 CPU to prevent hardware damage. •• Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly.

(Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.) •• Apply an even and thin layer of thermal grease on the surface of the CPU. •• Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur. •• Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc. 1-3-1 Installing the CPU A. Locate the alignment keys on the motherboard CPU socket and the notches on the CPU. LGA1150 CPU Socket Alignment Key Alignment Key Pin One Corner of the CPU Socket LGA1150 CPU Notch Notch Triangle Pin One Marking on the CPU - 13 - Hardware Installation 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. Hardware Installation - 14 - 1-3-2 Installing the CPU Cooler Follow the steps below to correctly install the CPU cooler on the motherboard. (The following procedure uses Intel® boxed cooler as the example 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.

- 15 Hardware Installation 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 DDR3 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 DDR3 memory sockets are divided into two channels and each channel has two memory sockets as following: □ Channel A: DDR3_2, DDR3_4 □ Channel B: DDR3_1, DDR3_3 □ □ Dual Channel Memory Configurations Table Two Modules Four Modules DDR3_4 -DS/SS DS/SS DDR3_2 DS/SS -DS/SS DDR3_3 -DS/SS DS/SS DDR3_1 DS/SS -DS/SS (SS=Single-Sided, DS=Double-Sided, "-"=No Memory) 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 DDR3 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 DDR3 sockets.



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For optimum performance, when enabling Dual Channel mode with two memory modules, we recommend that you install them in the DDR3_1 and DDR3_2 sockets. Hardware Installation DDR3_4 DDR3_2 DDR3_3 DDR3_1 - 16 - 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. DDR3 and DDR2 DIMMs are not compatible to each other or DDR DIMMs. Be sure to install DDR3 DIMMs on this motherboard. Notch DDR3 DIMM A DDR3 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 clips at both ends 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 clips at both ends of the socket will snap into place when the memory module is securely inserted. - 17 - Hardware Installation 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 PCI 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. 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. Hardware Installation - 18 - 1-6 Setting up AMD CrossFire™/NVIDIA® SLI™ Configuration A.

System Requirements -- Windows 8/7 operating system -- A CrossFire/SLI-supported motherboard with two PCI Express x16 slots and correct driver --

CrossFire/SLI-ready graphics cards of identical brand and chip and correct driver -- 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 PCIEX16 and PCIEX8 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 Catalyst Control Center. Browse to Performance\AMD CrossFireX™ Configuration and ensure the Enable CrossFireX™ check box is selected. and click Apply. 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.

- 19 Hardware Installation 1-7 Back Panel Connectors USB 2.0/1.1 Port The USB port supports the USB 2.0/1.1 specification.

Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc. PS/2 Keyboard/Mouse Port Use this port to connect a PS/2 mouse or keyboard. Coaxial S/PDIF Out Connector This connector provides digital audio out to an external audio system that supports digital coaxial audio. Before using this feature, ensure that your audio system provides a coaxial digital audio in connector. DisplayPort 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. Note: The DisplayPort Technology can support a maximum resolution of 3840x2160 but the actual resolutions supported depend on the monitor being used. After installing the DisplayPort device, make sure the default device for sound playback is the DisplayPort device. (The item name may differ from operating system.

Refer to the HDMI settings information on the previous page for the configuration dialog box.) 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. The maximum supported resolution is 4096x2160, but the actual resolutions supported are dependent on the monitor being used.

After installing the HDMI device, make sure to set the default sound playback device to HDMI. (The item name may differ depending on your operating system. The screenshot below is from Windows 8.) In Windows 8, select All apps>Control Panel>Hardware and Sound>Sound>Playback, set Intel(R)

Display Audio to the default playback device. Hardware Installation - 20 - USB 2.

0/1.1 Port USB 3.0/2.0 Port RJ-45 LAN Port The USB port supports the USB 2.0/1.

1 specification. You can connect a USB DAC to this port or use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc. 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 such as a USB keyboard/mouse, USB printer, USB flash drive and etc. 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. Connection/ Speed LED 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 Line In/Mic In Jack Line Out The line in/Mic in jack.



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5Gb/s standard. Each SATA connector supports a single SATA device. The Intel® Z87 Chipset supports RAID 0, RAID 1, RAID 5, and RAID 10.

Refer to Chapter 3, "Configuring SATA Hard Drive(s)," for instructions on configuring a RAID array. 5 4 3 2 1 0 1 1 SATA3 7 7 Pin No. 1 2 3 4 5 6 7
Definition GND TXP TXN GND RXN RXP GND •• A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are to be used, the total number of hard drives must be an even number. •• A RAID 5 configuration requires at least three hard drives. (The total number of hard drives does not have to be an even number.) •• A RAID 10 configuration requires four hard drives. DEBUG PORT Hardware Installation - 26 - 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 PLED+ PLEDPW+ PW- SPEAK+ 2 1 HD+ HDRESRES+ CICI+ PWR_LED+ PWR_LED PWR_LED Power LED Chassis Intrusion Header SPEAK20 19 Hard Drive Reset Activity LED Switch •• PLED/PWR_LED (Power LED, Yellow/Purple): System Status LED S0 On S3/S4/S5 Off Connects to the power status indicator on the chassis front panel.

The LED is on when the system is operating. The LED is off when the system is in S3/S4 sleep state or powered off (S5). •• PW (Power Switch, Red): 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, Orange): 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. •• HD (Hard Drive Activity LED, Blue): 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, Green): 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, Gray): Connects to the chassis intrusion switch/sensor on the chassis that can detect if the chassis cover has been removed. This function requires a chassis with a chassis intrusion switch/sensor. 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 matched correctly. - 27 Hardware Installation 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 1 MIC2_L 2 GND F_3 MIC2_R 4 -ACZ_DET 5 LINE2_R 6 GND 7 FAUDIO_JD 8 No Pin 9 LINE2_L 10 GND For AC'97 Front Panel Audio: Pin No. Definition 1 MIC 2 GND F_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_ 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. 1 2 3 1 2 3 1 2 3 S S 3 B SS S •• Always turn off your computer and unplug the power cord before replacing the battery. F_USB3 •• 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. 1 2 3 1 2 3 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 3. Replace the battery. 4. Plug in the power cord and restart your computer. 1 2 3 1 2 3 Hardware Installation - 28 - 1 2 3 8) BAT (Battery) •• The front panel audio header S B S supports HD audio by default. If your chassis provides an AC'97 front panel audio module, refer to the instructions on how to activate AC'97 functionality via the audio software in Chapter 6, "Configuring 2/4/5.1/7.1-Channel Audio." •• Audio signals will be present on both of the front and back panel audio connections simultaneously. If you want to mute the back panel audio (only supported when using an HD front panel audio module), refer to Chapter 6, "Configuring 2/4/5.1/7.1-Channel Audio." •• 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 S different wire assignments, please contact the chassis manufacturer. 1 1 1 1 _ B S B _ S S _ _ B _ U _ B F 9) F_USB30 (USB 3.

0/2.0 Header) F_USB30 F_U F_ The header conforms to USB 3.0/2.0 specification and 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 B_5 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 20 1 1 S 1 2 3 1 2 3 S 10) 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) B SS S Power (5V) USB DXUSB DYUSB DX+ USB DY+ GND GND No Pin NC S 9 10 3 1 2 1 2 3 1 2 3 •• 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.



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- 29 - Hardware Installation 1 2 3 1 11 10 _S 1 2 3 1 1 2 3 U 1 2 3 _ _ 11) 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 12) CLR_CMOS (Clear CMOS Jumper) Use this jumper to clear the BIOS configurations 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). Hardware Installation - 30 - 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.

) - 31 - 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. <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 - 32 - 2-2 The Main Menu A. Dashboard Mode (Default) Differing from traditional UEFI interface, the Dashboard Mode provides a fancy and user-friendly BIOS environment where users can easily point and click through various settings and make adjustments for optimum performance. In Dashboard Mode, you can use your mouse to move through the option menus for quick configuration or you can click Classic Setup under the Shortcuts list on the right of the screen or press <F2> to switch to the traditional BIOS Setup screen. B. Classic Setup In Classic Setup, you can press the arrow keys on your keyboard 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: E11) Setup Menus Switch to Dashboard Mode Enter Q-Flash Select Default Language Help Function Keys Configuration Items Current Settings - 33 - BIOS Setup Classic Setup Function Keys <f><g> <h><i> <Enter> <+>/<->/<Page Up> <->/<Page Down> <F2> <F5> <F7> <F8> <F9> <F10> <F12> <Esc> Move the selection bar to select a setup menu Move the selection bar to select a 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 Switch to Dashboard Mode 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 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. □□ System Information □□ BIOS Features □□ Peripherals Use this menu to configure the device boot order, advanced features available on the CPU, and the primary display adapter. Use this menu to configure all peripheral devices, such as SATA, USB, integrated audio, and integrated LAN, etc. Use this menu to configure all the power-saving functions. □□ 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. •• 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. BIOS Setup - 34 - 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.



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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, Vcore, and memory voltage. ``M.I.T. Current Status This screen provides information on CPU/memory frequencies/parameters. - 35 BIOS Setup ``Advanced Frequency Settings & Performance Boost (Note) Provides you with five different overclocking configurations. Options are: Medium, High, Turbo, Ultra, Extreme. (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. Allows you to manually set the host clock frequency (which controls CPU, PCIe, and memory frequencies) in 0.01 MHz increments. his item is configurable only when CPU Base Clock is set to Manual. T Allows you to configure the Processor Base Clock by multiplying the Host/PCIe Clock Frequency by several preset host clock multipliers. This item is configurable only when CPU Base Clock is enabled. This value is determined by multiplying the Host/PCIe Clock Frequency value by the Processor Base Clock(Gear Ratio) value. && CPU Base Clock && Host/PCIe Clock Frequency (Note) && Processor Base Clock (Gear Ratio) (Note) && Host Clock Value && Processor Graphics Clock Allows you to set the onboard graphics clock. The adjustable range is from 400 MHz to 4000 MHz. (Default: Auto) Allows you to set the CPU frequency.

Options may vary depending on the CPU being used. (Default: Auto) && 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. This item is present only when you install a CPU that supports this feature.

For more information about Intel® CPUs' unique features, please visit Intel's website.

- 36 - (Note) BIOS Setup && CPU Frequency Displays the current operating CPU frequency. ``Advanced CPU Core Features && CPU Clock Ratio, CPU Frequency The settings above are synchronous to those under the same items on the Advanced Frequency Settings menu. Allows for increased performance by using certain CPUs. (Default: Auto) Allows you to set the CPU PLL. Auto lets the BIOS automatically configure this setting.

(Default: Auto) Allows you to set the Filter PLL. Auto lets the BIOS automatically configure this setting. (Default: Auto) Allows you to set the CPU Uncore ratio. The adjustable range is dependent on the CPU being used. Displays the current CPU Uncore frequency. && K OC (Note) && CPU PLL Selection && Filter PLL Level && 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) && Turbo Ratio (1-Core Active~4-Core Active) (Note) (Note) This item is present only when you install a CPU that supports this feature.

For more information about Intel® CPUs' unique features, please visit Intel's website. - 37 BIOS Setup && Turbo Power Limit (Watts) Allows you to set a power limit for CPU Turbo mode. When the CPU power consumption exceeds the specified power limit, the CPU will automatically reduce the core frequency in order to reduce the power. Auto sets the power 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) 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. (Default: Auto) 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) Enables or disables Intel® CPU 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® SpeedStep 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) && Core Current Limit (Amps) && No.

of CPU Cores Enabled (Note) && Hyper-Threading Technology (Note) && CPU Enhanced Halt (C1E) (Note) && C3 State Support (Note) && C6/C7 State Support (Note) && CPU Thermal Monitor (Note) && CPU EIST Function (Note) (Note) This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs' unique features, please visit Intel's website. - 38 - BIOS Setup && Extreme Memory Profile (X.M.P.) (Note) Allows the BIOS to read the SPD data on XMP memory module(s) to enhance memory performance when enabled.



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Disabled Disables this function. (Default) Profile1 Uses Profile 1 settings. Profile2 (Note) Uses Profile 2 settings. 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. && System Memory Multiplier && Memory Frequency (MHz) ``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. Allows you to set the memory frequency. Options may vary depending on the memory being used. (Default: Disabled) Provides memory detection and training methods. Auto Lets BIOS automatically configure this setting.

(Default) Normal Standard detection and training. Fast Skip memory detection and training in some specific criteria for faster memory boot. Coldboot Detect and train memory at every single boot. This item is present only when you install a CPU and a memory module that support this feature. - 39 BIOS Setup && Memory Overclocking Profiles (Note) && Memory Boot Mode (Note) && Memory Enhancement Settings Provides three different memory performance enhancement settings: Normal (basic performance), Enhanced Stability, and Enhanced Performance. (Default: Normal) && Memory Timing Mode && Profile DDR Voltage Manual and Advanced Manual allows the 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, this item will display as 1.50V. When Extreme Memory Profile (X.M.P.) is set to Profile1 or Profile2, this item will display the value based on the SPD data on the XMP memory. 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 Interleaving && Rank Interleaving ``Channel A/B Memory Sub Timings 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. BIOS Setup - 40 - ``Advanced Voltage Settings ``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. - 41 - BIOS Setup ``PC Health Status && Reset Case Open Status Disabled Keeps or clears the record of previous chassis intrusion status.

(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. - 42 - && Case Open BIOS Setup && CPU Vcore/CPU VRIN/DRAM Voltage/+3.3V/+5V/+12V/CPU VAXG Displays the current system voltages. && CPU/System Temperature && CPU/System Fan Speed Displays current CPU/System temperature. Displays current CPU/system fan speeds. && CPU/System Temperature Warning Sets the warning threshold for CPU/system temperature. When CPU/system 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 EasyTune 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 Slope PWM 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 system temperature. You can adjust the fan speed with EasyTune 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 Slope PWM 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 EasyTune 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 Slope PWM 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/3rd System Fan Speed Control is set to Manual. Options are: 0.75 PWM value /oC ~ 2.50 PWM value /oC. && CPU/System Fan Fail Warning && CPU Fan Speed Control && Fan Speed Percentage && 1st System Fan Speed Control (SYS_FAN1 Connector) && Fan Speed Percentage && 2nd/3rd System Fan Speed Control (SYS_FAN2/SYS_FAN3 Connector) && Fan Speed Percentage - 43 - BIOS Setup ``Miscellaneous Settings && PCIe Slot Configuration Allows you to set the operation mode of the PCI Express slots to Gen 1, Gen 2, or Gen 3.



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Actual operation mode is subject to the hardware specification of each slot. For example, the PCI Express x1 slots can support up to Gen 2 mode only. Auto lets the BIOS automatically configure this setting.

(Default: Auto) Allows you to determine whether to enhance some legacy benchmark performance. (Default: Disabled) && 3DMark01 Boost BIOS Setup - 44 - 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. 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. && System Time && Access Level - 45 - BIOS Setup 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. 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.

Enables or disables Numlock feature on the numeric keypad of the keyboard after the POST. (Default: Enabled) - 46 - && Bootup NumLock State BIOS Setup && 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 password is only required for entering the BIOS Setup program. A 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) 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 art of the USB devices are disabled before the OS boot process completes. (Default) P This item is configurable only when Fast Boot is set to Enabled. This item is disabled when Fast Boot is set to Ultra Fast. Disabled All PS/2 devices are disabled before the OS boot process completes.

Enabled A II PS/2 devices are functional in the operating system and during the POST.

(Default) This item is configurable only when Fast Boot is set to Enabled. This item 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 determine whether to limit CPUID maximum value.

Set this item to Disabled for Windows XP operating system; set this item to Enabled for legacy operating system such as Windows NT4.

0. (Default: Disabled) Enables or disables Intel® Execute Disable Bit function. This function may enhance protection for the computer, reducing exposure to viruses and malicious buffer overflow attacks when working with its supporting software and system. (Default: Enabled) This item is present only when you install a CPU that supports this feature. For more information about Intel® CPUs' unique features, please visit Intel's website. - 47 BIOS Setup && VGA Support && USB Support && PS2 Devices Support && NetWork Stack Driver Support && Next Boot After AC Power Loss && Limit CPUID Maximum

(Note) && Execute Disable Bit (Note) (Note) && Intel Virtualization Technology (Note) Enables or disables Intel® Virtualization Technology. Virtualization enhanced by Intel® Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems. (Default: Enabled) Enables or disables Intel® Trusted Execution Technology (Intel® TXT). Intel® Trusted Execution Technology provides a hardware-based security foundation.

(Default: Disabled) Enables or disables Intel® Dynamic Storage Accelerator. When enabled, the hard drive I/O performance will be adjusted according to hard drive load. (Default: Disabled) Enables or disables Intel® Virtualization Technology for Directed I/O. (Default: Enabled) && Intel TXT(LT) Support (Note) && Dynamic Storage Accelerator && VT-d (Note) && Windows 8 Features && CSM Support Allows you to select the operating system to be installed. (Default: Other OS) && Boot Mode Selection Enables or disables UEFI CSM (Compatibility Support Module) to support a legacy PC boot process.

Always Enables UEFI CSM. (Default) Never Disables UEFI CSM and supports UEFI BIOS boot process only. This item is configurable only when Windows 8 Features is set to Windows 8 or Windows 8 WHQL. Allows you to select which type of operating system to boot. UEFI and Legacy Allows booting from operating systems that support legacy option ROM or UEFI option ROM.

(Default) Legacy Only Allows booting from operating systems that only support legacy Option ROM. UEFI Only Allows booting from operating systems that only support UEFI Option ROM.



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