



Asus Z170-AR Manual

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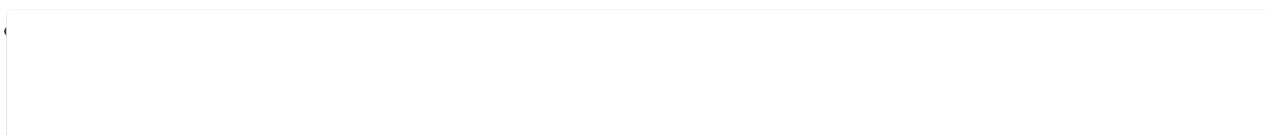
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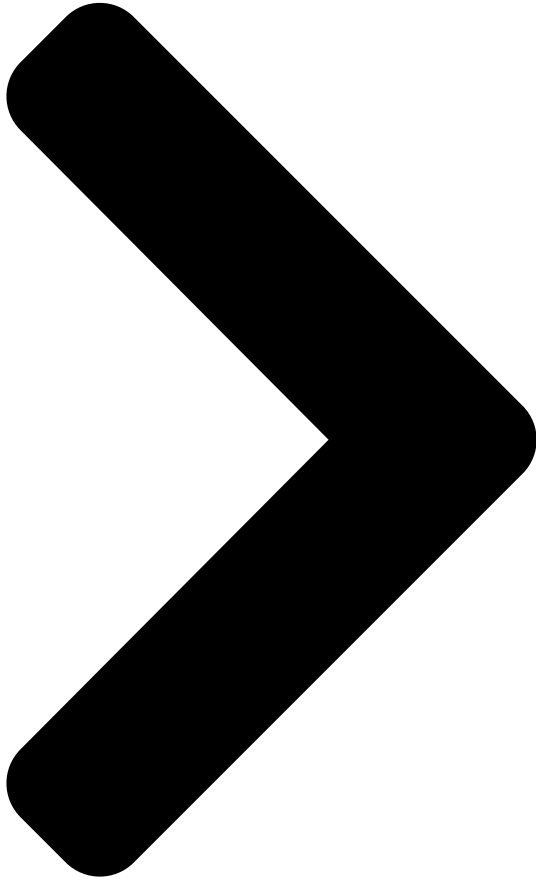
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[Motherboard Asus Z170-PRO Manual](#)

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Summary of Contents for Asus Z170-AR

[Page 1](#) Z170-AR...

[Page 2](#) Product warranty or service will not be extended if: (1) the product is repaired, modified or altered, unless such repair, modification or alteration is authorized in writing by ASUS; or (2) the serial number of the product is defaced or missing.

[Page 3: Table Of Contents](#)

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[Page 5: Safety Information](#)

Safety information Electrical safety • To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system. • When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

[Page 6](#) Refer to the following sources for additional information and for product and software updates. ASUS websites The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information. Optional documentation Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer.

[Page 7: Package Contents](#)

Package contents Check your motherboard package for the following items: ASUS Z170-AR Motherboard Motherboard 2 x Serial ATA 6.0 Gb/s cables Cables 1 x ASUS SLI bridge connector 2-in-1 Q-connector Accessories M.2 screw package CPU installation tool Application DVD Support DVD...

[Page 8](#) Z170-AR specifications summary Supports Intel InTru™ 3D/Quick Sync Video/Clear Video HD Technology/Insider™ ® Supports up to 2 displays simultaneously Maximum shared memory of 512MB * DP 1.2 Multi-Stream Transport compliant, supports DP 1.2 monitor daisy chain up to 3 displays.

[Page 9](#) - 6 x USB 3.0/2.0 ports (4 ports at mid-board, 2 ports at back panel, blue) - 6 x USB 2.0/1.1 ports (4 ports at mid-board, 2 ports at back panel) ASMedia USB 3.1 controllers- supports ASUS USB 3.1 Boost and 3A ® power output - 1 x USB 3.1/3.0/2.0 ports at back panel (teal blue, Type-A)

[Page 10](#) - ASUS Enhanced DRAM Overcurrent Protection - Short circuit damage prevention - ASUS ESD Guards - Enhanced ESD protection - ASUS High-Quality 5K-Hour Solid Capacitors - 2.5x long lifespan with excellent durability - ASUS Stainless Steel Back I/O - 3x more durable corrosion-resistant coating...

[Page 11](#) ASUS Quiet - ASUS Fan Xpert 3 Thermal Solution - ASUS Fanless Design: Heat-sink solution Precision Tweaker 2: - CPU Core/Cache Voltage: Adjustable CPU Core/Cache Voltage at 0.005V increment - CPU Graphics Voltage: Adjustable CPU Graphics voltage at 0.005V increment - CPU VCCIO Voltage: Adjustable CPU VCCIO Voltage at 0.0125V increment...

[Page 12](#) 128 Mb Flash ROM, UEFI AMI BIOS, PnP, DMI3.0, WfM2.0, SM BIOS 3.0, ACPI 5.0, Multi-language BIOS, ASUS EZ Flash 3, CrashFree BIOS 3, F11 EZ Tuning Wizard, F6 Qfan Control, BIOS Features F3 My Favorites, Quick Note, Last Modified log,...

[Page 13: Chapter 1: Product Introduction](#)

1.2.2 Screw holes Place nine screws into the holes indicated by circles to secure the motherboard to the chassis. Do not overtighten the screws! Doing so can damage the motherboard. ASUS Z170-AR Series...

[Page 14](#) Place this side towards the rear of the chassis 1.2.3 Motherboard layout Chapter 1: Product Introduction...

[Page 15](#) Serial port connector (10-1 pin COM) 1-23 Front panel audio connector (10-1 pin AAFP) 1-27 Digital audio connector (4-1 pin SPDIF_OUT) 1-27 Flashback header (12-1 pin FLBK_HEADER) 1-33 T_Sensor connector (2-pin T_SENSOR) 1-32 CPU Over Voltage jumper (3-pin CPU_OV) 1-20 ASUS Z170-AR Series...

[Page 16: Central Processing Unit \(Cpu\)](#)

Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/ transit-related.

[Page 17](#) 1.3.1 Installing the CPU Top of CPU Bottom of CPU Bottom of CPU ASUS Z170-AR Series...

[Page 18](#) Top of CPU Chapter 1: Product Introduction...

[Page 19](#) 1.3.2 CPU heatsink and fan assembly installation Apply the Thermal Interface Material to the CPU heatsink and CPU before you install the heatsink and fan, if necessary. To install the CPU heatsink and fan assembly ASUS Z170-AR Series...

[Page 20: System Memory](#)

To uninstall the CPU heatsink and fan assembly System memory 1.4.1 Overview The motherboard comes with four Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) slots. A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.

[Page 21](#) 2.5 Ai Tweaker menu for manual memory frequency adjustment. • For system stability, use a more efficient memory cooling system to support a full memory load (4 DIMMs). • Visit the ASUS website at: www.asus.com for the latest QVL. ASUS Z170-AR Series...

[Page 22](#) Z170-AR Motherboard Qualified Vendors Lists (QVL) DDR4 3400 (O.C.) MHz capability Vendors Part No. Size SS/DS Chip Chip NO. Timing Voltage DIMM socket Brand support (Optional) CORSAIR CMD16GX4M4B3400C16 16GB(4GB*4) Samsung K4A4G085WD 16-18-18-38 1.35V • ver. 4.23 DDR4 3333 (O.C.) MHz capability Vendors Part No.

[Page 23](#) CORSAIR CMD16GX4M4A2800C16(Ver4.23) 16GB(4GB*4) 16-18-18-36 • • • (XMP) CORSAIR CMD16GX4M4A2800C16(Ver5.29) 16GB(4GB*4) 16-18-18-36 • • • CORSAIR CMD32GX4M4A2800C16(Ver5.29) 32GB(8GB*4) 18-18-18-36 • • • (XMP) CORSAIR CMK16GX4M4A2800C16(Ver4.23) 16GB(4GB*4) 16-16-18-36 • • • (XMP) (continued on the next page) ASUS Z170-AR Series 1-11...

[Page 24](#) DDR4 2800 (O.C.) MHz capability Vendors Part No. Size SS/DS Chip Chip Timing Voltage DIMM socket Brand support (Optional) CORSAIR CMK16GX4M4A2800C16(Ver5.29) 16GB(4GB*4) 16-18-18-36 • • • CORSAIR CMK32GX4M4A2800C16(Ver5.29) 32GB(8GB*4) 16-18-18-36 • • • (XMP) G.SKILL F4-2800C15Q2-64GRK(XMP) 64GB(8GB*8) 15-16-16-35 1.25 • •...

[Page 25](#) • • • (4GB*4) Panram PUD42400C158G4NJW 32GB 15-15-15-35 • • • (8GB*4) Team TED44GM2400C16BK Samsung K4A4G085WD 16-16-16-39 • • • Team TED48GM2400C16BK Samsung K4A4G085WD 16-16-16-39 • • • V-color TD4G8C17-UH V-color DW3J0460HM 15-15-15-36 • • • ASUS Z170-AR Series 1-13...

[Page 26](#) DDR4 2133 MHz capability Vendors Part No. Size SS/DS Chip Chip NO. Timing Voltage DIMM socket Brand support (Optional) ADATA AD4U2133W4G15-B SK Hynix H5AN4G8NMFRTFC 15-15-15-36 • • • ADATA AD4U2133W8G15 SK Hynix H5AN4G8NMFRTFC 15-15-15-36 • • • Apacer 78.B1GM3.AF00B SK Hynix H5AN4G8NMFRTFC 15-15-15-36 •...

[Page 27](#) 1.4.3 DIMM installation ASUS Z170-AR Series 1-15...

[Page 28: Expansion Slots](#)

To remove a DIMM Expansion slots In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support. Unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

[Page 29](#) PCI Express specifications. Slot No. Expansion slot PCIe 3.0/2.0 x1_1 slot PCIe 3.0/2.0 x16_1 slot PCIe 3.0/2.0 x1_2 slot PCI slot PCIe 3.0/2.0 x16_2 slot PCIe 3.0/2.0 x1_3 slot PCIe

3.0/2.0 x16_3 slot ASUS Z170-AR Series 1-17...

[Page 30](#) PCI Express 3.0 operating mode VGA configuration PCIe 3.0/2.0 x16_1 PCIe 3.0/2.0 x16_2 x16 (single VGA Single VGA/PCIe card recommended) Dual VGA/PCIe card • We recommend that you provide sufficient power when running CrossFireX™ or SLI™ mode. • Connect a chassis fan to the motherboard connector labeled CHA_FAN1-4 when using multiple graphics cards for better thermal environment.

[Page 31: Jumpers](#)

• Due to chipset behavior, AC power off is required to enable C.P.R. function. You must turn off and on the power supply or unplug and plug the power cord before rebooting the system. ASUS Z170-AR Series 1-19...

[Page 32](#) CPU Over Voltage jumper (3-pin CPU_OV) The CPU Over Voltage jumper allows you to set a higher CPU voltage for a flexible overclocking system, depending on the type of the installed CPU. To gain more CPU voltage setting, insert the jumper to pins 2-3. To go back to its default CPU voltage setting, insert the jumper to pins 1-2.

[Page 33: Connectors](#)

LAN_USB31_EA2 (supports USB 3.1 PS/2 keyboard/mouse port Boost) LAN port* Optical S/PDIF Out port HDMI port Audio I/O ports*** and **: Refer to the tables on the next page for LAN port LEDs and audio port definitions. ASUS Z170-AR Series 1-21...

[Page 34](#) • The plugged USB 3.0 device will run on xHCI mode. • USB 3.0 devices can only be used for data storage. • We strongly recommend that you connect USB 3.0 devices to USB 3.0 ports for faster and better performance from your USB 3.0 devices. •...

[Page 35](#) This connector is for a serial (COM) port. Connect the serial port module cable to this connector, then install the module to a slot opening at the back of the system chassis. The COM module is purchased separately. ASUS Z170-AR Series 1-23...

[Page 36](#) Intel Z170 Serial ATA 6.0 Gb/s connectors (7-pin SATA6G_12, SATA6G_34, ® SATA6G_56, SATA Express) These connectors connect to Serial ATA 6 Gb/s hard disk drives via Serial ATA 6 Gb/s signal cables. If you installed Serial ATA hard disk drives, you can create a RAID 0, 1, 5, and 10 configuration with the Intel Rapid Storage Technology through the onboard Intel ®...

[Page 37](#) The CPU_FAN connector supports the CPU fan of maximum 1A (12 W) fan power. • W_PUMP function support depends on water cooling device. • The CPU_FAN connector and CHA_FAN connectors support the ASUS Fan Xpert 3 feature. • The CPU fan connector detects the type of CPU fan installed and automatically switches the control modes.

[Page 38](#) 1000W power or above to ensure the system stability. • If you are uncertain about the minimum power supply requirement for your system, refer to the Recommended Power Supply Wattage Calculator at <http://support.asus.com/PowerSupplyCalculator/PSCalculator.aspx?SLanguage=en-us> for details. 1-26 Chapter 1: Product Introduction...

[Page 39](#) This connector is for an additional Sony/Philips Digital Interface (S/PDIF) port. Connect the S/PDIF Out module cable to this connector, then install the module to a slot opening at the back of the system chassis. The S/PDIF module is purchased separately. ASUS Z170-AR Series 1-27...

[Page 40](#) DirectKey connector (2-pin DRCT) This connector is for the chassis-mounted button that supports the DirectKey function. Connect the button cable that supports DirectKey, from the chassis to this connector on the motherboard. Ensure that your chassis comes with the extra button cable that supports the DirectKey feature.

[Page 41](#) TPM connector (14-1 pin TPM) This connector supports a Trusted Platform Module (TPM) system, which securely store keys, digital certificates, passwords and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity. ASUS Z170-AR Series 1-29...

[Page 42](#) System panel connector (20-3 pin PANEL) This connector supports several chassis-mounted functions. • System power LED (2-pin or 3-pin PWR_LED) The 2-pin or 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

[Page 43](#) • The plugged USB 3.0 device will run on xHCI mode. • These USB 3.0 ports support native UASP transfer standard in Windows ® Windows 8.1 and Turbo Mode when using USB 3.0 Boost feature. ® ASUS Z170-AR Series 1-31...

[Page 44](#) Thunderbolt header (5-pin TB_HEADER) This connector is for the add-on Thunderbolt I/O card that supports Intel's Thunderbolt Technology, allowing you to connect up to six Thunderbolt-enabled devices and a DisplayPort-enabled display in a daisy-chain configuration. The add-on Thunderbolt I/O card and Thunderbolt cables are purchased separately. T_Sensor connector (2-pin T_SENSOR) This connector is for the thermistor cable that allows you to monitor the temperature of your motherboard's critical components and connected devices.

[Page 45](#) Flashback header (12-1 pin FLBK_HEADER) This connector is for the USB BIOS Flashback card that allows you to easily update the BIOS without entering the existing BIOS or operating system. The USB BIOS Flashback card is purchased separately. ASUS Z170-AR Series 1-33...

[Page 46: Onboard Leds](#)

Onboard LEDs Standby Power LED The motherboard comes with a standby power LED that lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging any motherboard components.

[Page 47](#) This LED lights up when you enable the EZ XMP switch. LED Design These LEDs light up when the system is fully powered and operating. To turn off the LEDs, refer to BIOS section 2.6.8 Onboard Devices Configuration > LED Design Switch for details. ASUS Z170-AR Series 1-35...

[Page 48: Onboard Buttons And Switches](#)

BIOS default settings. A message will appear during POST reminding you that the BIOS has been restored to its default settings. • We recommend that you download and update to the latest BIOS version from www.asus.com after using the MemOK! function. 1-36 Chapter 1: Product Introduction...

[Page 49](#) You may use the 5-Way Optimization and TPU feature in the AI Suite 3 application, adjust the BIOS setup program or enable the TPU switch at the same time. However, the system will use the last setting you have made. ASUS Z170-AR Series 1-37...

[Page 50](#) Power-on button The motherboard comes with a power-on button that allows you to power up or wake up the system. The button also lights up when the system is plugged to a power source indicating that you should shut down the system and unplug the power cable before removing or installing any motherboard component.

[Page 51: Software Support](#)

Place the Support DVD into the optical drive. If Autorun is enabled in your computer, the DVD automatically displays the lists of the unique features of your ASUS motherboard. Click the Drivers, Utilities, AHCI/RAID Driver, Manual, Contact, or Specials tabs to display their respective menus.

[Page 52](#) 1-40 Chapter 1: Product Introduction...

[Page 53: Chapter 2: Bios Setup](#)

BIOS Setup Knowing BIOS The new ASUS UEFI BIOS is a Unified Extensible Interface that complies with UEFI architecture, offering a user-friendly interface that goes beyond the traditional keyboard- only BIOS controls to enable a more flexible and convenient mouse input. You can easily navigate the new UEFI BIOS with the same smoothness as your operating system.

[Page 54: Bios Setup Program](#)

BIOS setup program Use the BIOS Setup to update the BIOS or configure its parameters. The BIOS screen include navigation keys and brief onscreen help to guide you in using the BIOS Setup program. Entering BIOS at startup To enter BIOS Setup at startup, press <Delete> during the Power-On Self Test (POST). If you do not press <Delete>, POST continues with its routines.

[Page 55: Ez Mode](#)

Click to go to Advanced mode Loads optimized Search on the FAQ default settings Click to display boot devices Selects the boot device priority The boot device options vary depending on the devices you installed to the system. ASUS Z170-AR Series...

[Page 56: Advanced Mode](#)

2.2.2 Advanced Mode The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations. To switch from EZ Mode to Advanced Mode, click Advanced Mode or press <F7> hotkey. Configuration fields Quick Note (F9) Pop-up Menu...

[Page 57](#) This button above the menu bar allows you to view and tweak the overclocking settings of your system. It also allows you to change the motherboard's SATA mode from AHCI to RAID mode. Refer to section 2.2.4 EZ Tuning Wizard for more information. ASUS Z170-AR Series...

[Page 58](#) Move your mouse over this button to show a QR code, scan this QR code on your mobile device to connect to the BIOS FAQ web page of the ASUS support website. You can also scan the following QR code:...

[Page 59: Qfan Control](#)

Click to activate DC Mode configured PWM Mode Select a profile to apply to Click to apply the fan setting your fans Click to undo the Click to go back to main menu changes Select to manually configure your fans ASUS Z170-AR Series...

[Page 60](#) Configuring fans manually Select Manual from the list of profiles to manually configure your fans' operating speed. Speed points Select to manually configure your fans To configure your fans: Select the fan that you want to configure and to view its current status. Click and drag the speed points to adjust the fans'...

[Page 61: Ez Tuning Wizard](#)

To start OC Tuning: Press <F11> on your keyboard or click from the BIOS screen to open EZ Tuning Wizard screen. Click OC then click Next. Select a PC scenario Daily Computing or Gaming/Media Editing, then click Next. ASUS Z170-AR Series...

[Page 62](#) Select a Main Cooling System BOX cooler, Tower cooler, Water cooler, or I'm not sure, then click Next. After selecting the Main Cooling System, click Next then click Yes to start the OC Tuning. Creating RAID To create RAID: Press <F11> on your keyboard or click from the BIOS screen to open EZ Tuning Wizard screen.

[Page 63](#) Speed (RAID5). After selecting the type of RAID, click Next then click Yes to continue the RAID setup. After the RAID setup is done, click Yes to exit the setup then click OK to reset your system. ASUS Z170-AR Series 2-11...

[Page 64: My Favorites](#)

My Favorites My Favorites is your personal space where you can easily save and access your favorite BIOS items. My Favorites comes with several performance, power saving, and fast boot related items by default. You can personalize this screen by adding or removing items. Chapter 2: BIOS Setup 2-12...

[Page 65](#) • Configuration items such as Memory SPD Information, system time and date. Click Exit (ESC) or press <Esc> key to close Setup Tree Map screen. Go to My Favorites menu to view the saved BIOS items. ASUS Z170-AR Series 2-13...

[Page 66: Main Menu](#)

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

[Page 67](#) [Installed.] To set a user password: Select the User Password item and press <Enter>. From the Create New Password box, key in a password, then press <Enter>. Confirm the password when prompted. ASUS Z170-AR Series 2-15...

[Page 68: Ai Tweaker Menu](#)

To change a user password: Select the User Password item and press <Enter>. From the Enter Current Password box, key in the current password, then press <Enter>. From the Create New Password box, key in a new password, then press <Enter>. Confirm the password when prompted.

[Page 69](#) Use the <+> or <-> to adjust the value. The values range from 40.0 MHz to 500.0 MHz. We recommend you to set the value based on the CPU specification, as high BCLK frequencies may damage the CPU permanently. ASUS Z170-AR Series 2-17...

[Page 70](#) ASUS MultiCore Enhancement [Auto] [Auto] This item allows you to maximize the overclocking performance optimized by ASUS core ratio settings. [Disabled] This item allows you to set to default core ratio settings. CPU Core Ratio [Auto] This item allows you to set the CPU core ratio limit per core or synchronize automatically to all cores.

[Page 71](#) Applies water cooling overclocking conditions. Ensure to use water cooling device before selecting [TPU II]. EPU Power Saving Mode [Disabled] The ASUS EPU (Energy Processing Unit) sets the CPU in its minimum power consumption settings. Configuration options: [Disabled] [Enabled] CPU SVID Support Disable this item to stop the CPU from communicating with the external voltage regulator.

[Page 72](#) Primary Timings DRAM CAS# Latency [Auto] Configuration options: [Auto] [1] - [31] DRAM RAS# to CAS# Delay [Auto] Configuration options: [Auto] [1] - [31] DRAM RAS# ACT Time [Auto] Configuration options: [Auto] [1] - [63] DRAM COMMAND Rate [Auto] Configuration options: [Auto] [1] - [2] Secondary Timings DRAM RAS# to RAS# Delay L [Auto] Configuration options: [Auto] [1] -...

[Page 73](#) Configuration options: [Auto] [0] - [15] Data Falling Slope Offset [Auto] Configuration options: [Auto] [0] - [1] CMD Falling Slope [Auto] Configuration options: [Auto] [0] - [15] CMD FallingSlope Offset [Auto] Configuration options: [Auto] [0] - [1] ASUS Z170-AR Series 2-21...

[Page 74](#) Ctl Falling Slope [Auto] Configuration options: [Auto] [0] - [15] Ctl Falling Slope Offset [Auto] Configuration options: [Auto] [0] - [1] Clk Falling Slope [Auto] Configuration options: [Auto] [0] - [15] Clk Falling Slope Offset [Auto] Configuration options: [Auto] [0] - [1] RTL IOL control DRAM RTL INIT Value [Auto] Configuration options: [Auto] [0] - [127]...

[Page 75](#) Configuration options: [Auto] [0] - [63] tRDWR_dr [Auto] Configuration options: [Auto] [0] - [63] tRDWR_dd [Auto] Configuration options: [Auto] [0] - [63] tWRWR_dr [Auto] Configuration options: [Auto] [0] - [63] tWRWR_dd [Auto] Configuration options: [Auto] [0] - [63] ASUS Z170-AR Series 2-23...

[Page 76](#) tWRRD_dr [Auto] Configuration options: [Auto] [0] - [63] tWRRD_dd [Auto] Configuration options: [Auto] [0] - [63] TWRPRE [Auto] Configuration options: [Auto] [0] - [127] TRDPRE [Auto] Configuration options: [Auto] [0] - [15] tREFIX9 [Auto] Configuration options: [Auto] [0] - [127] OREF_RI [Auto] Configuration options: [Auto] [0] -...

[Page 77](#) Use the <+> or <-> to adjust the value. The values range from 300 KHz to 600 KHz with an interval of 50 KHz. Do not remove the thermal module when the manual mode is selected. The thermal conditions should be monitored. ASUS Z170-AR Series 2-25...

[Page 78](#) The following item appears only when the CPU VRM Switching Frequency is set to [Auto]. VRM Spread Spectrum [Disabled] This item allows to enhance the system stability. Configuration options: [Disabled] [Enabled] CPU Power Duty Control [T.Probe] DIGI + VRM Duty

Control adjusts the current of every VRM phase and the thermal conditions of every phase component.

[Page 79](#) Configuration options: [Auto] [0.7000] - [1.8000] CPU VCCIO Boot Voltage [Auto] Configuration options: [Auto] [0.7000] - [1.8000] CPU Standby Boot Voltage [Auto] The voltage for CPU standby at initial Boot. Configuration options: [Auto] [0.7000] - [1.8000] [0.700~2.200] ASUS Z170-AR Series 2-27...

[Page 80](#) Internal CPU Power Management The subitems in this menu allow you to set the CPU ratio and features. Intel(R) SpeedStep(tm) [Enabled] Allows the operating system to dynamically adjust the processor voltage and cores frequency to decrease the average power consumption and decrease average heat production.

[Page 81](#) CPU Core/Cache Current Limit Max. [Auto] This item allows you to configure a higher current limit to prevent a frequency or power throttling when overclocking. Use the <+> and <-> keys to adjust the value. Configuration options: [Auto] [0.00] - [255.50] ASUS Z170-AR Series 2-29...

[Page 82](#) CPU Graphics Current Limit Max. [Auto] This item allows you to set a higher current limit to prevent a frequency or power throttling when overclocking. Use the <+> and <-> keys to adjust the value. Configuration options: [Auto] [0.00] - [255.50] Min.

[Page 83](#) DRAM DATA REF Voltage on CHB DIMM1 Rank0 BL0-7 [Auto] Configures the DRAM Data REF Voltage. Configuration options: [Auto] [0] - [63] DRAM DATA REF Voltage on CHB DIMM1 Rank1 BL0-7 [Auto] Configures the DRAM Data REF Voltage. Configuration options: [Auto] [0] - [63] ASUS Z170-AR Series 2-31...

[Page 84: Advanced Menu](#)

Advanced menu The Advanced menu items allow you to change the settings for the CPU and other system devices. Be cautious when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction. Chapter 2: BIOS Setup 2-32...

[Page 85: Cpu Configuration](#)

This item allows you to select the number of CPU cores to activate in each processor package. Configuration options: [All] [1] [2] [3] Intel Virtualization Technology [Enabled] When set to [Enabled], a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. Configuration options: [Disabled] [Enabled] ASUS Z170-AR Series 2-33...

[Page 86](#) Hardware Prefetcher [Enabled] This item allows the CPU to prefetch commands and data in the L2 cache, reduces the DRAM loading time and improves the system performance. Configuration options: [Disabled] [Enabled] Adjacent Cache Line Prefetcher [Enabled] This item allows the mid level cache (L2) to prefetch adjacent cache lines, reducing the DRAM loading time and improves the system performance.

[Page 87: Platform Misc Configuration](#)

The following item appears only when you set the PCI Express Native Power Management to [Enabled]. Native ASPM [Disabled] [Enabled] Windows Vista OS controls the ASPM (active state power management) support for devices. [Disabled] BIOS controls the ASPM support for the device. ASUS Z170-AR Series 2-35...

[Page 88](#) ASPM to take effect. Configuration options: [Disabled] [L1] PEG ASPM Support [Disabled] This item allows you to select the ASPM state for energy-saving conditions, or use the ASUS optimized energy saving profile. Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1] [ASPM L0sL1]...

[Page 89: System Agent \(Sa\) Configuration](#)

PCIEx16_1 Link Speed [Auto] This item allows you to configure the PCIEx16_1 slot. Configuration options: [Auto] [Gen1] [Gen2] [Gen3] PCIEx16_2 Link Speed [Auto] This item allows you to configure the PCIEx16_2 slot. Configuration options: [Auto] [Gen1] [Gen2] [Gen3] ASUS Z170-AR Series 2-37...

[Page 90: Pch Configuration](#)

2.6.4 PCH Configuration PCI Express Configuration This item allows you to configure the PCI Express slots. PCIe Speed [Auto] This item allows your system to automatically select the PCI Express port speed. Configuration options: [Auto] [Gen1] [Gen2] [Gen3] 2.6.5 PCH Storage Configuration While entering Setup, the BIOS automatically detects the presence of SATA devices.

[Page 91](#) This item allows you to enable or disable the selected SATA port. Configuration options: [Disabled] [Enabled] Hot Plug [Disabled] These items appears only when the SATA Mode Selection is set to [AHCI] and allows you to enable or disable SATA Hot Plug Support. Configuration options: [Disabled] [Enabled] ASUS Z170-AR Series 2-39...

[Page 92: Usb Configuration](#)

2.6.6 USB Configuration The items in this menu allow you to change the USB-related features. The Mass Storage Devices item shows the auto-detected values. If no USB device is detected, the item shows None. Legacy USB Support [Enabled] [Enabled] Your system supports the USB devices in legacy operating systems. [Disabled] Your USB devices can be used for BIOS setup only and cannot be recognized in the boot devices list.

[Page 93: Network Stack Configuration](#)

The following item appears only when you set the Network Stack to [Enabled]. Ipv4/Ipv6 PXE Support [Enabled] This item allows you to enable or disable the Ipv4/Ipv6 PXE wake event. Configuration options: [Disabled] [Enabled] 2.6.8 Onboard Devices Configuration Scroll down to view the other BIOS items. ASUS Z170-AR Series 2-41...

[Page 94](#) HD Audio Controller [Enabled] This item allows you to use the Azalia High Definition Audio Controller Configuration options: [Disabled] [Enabled] The following items appear only when you set the HD Audio Controller to [Enabled]. Front Panel Type [HD Audio] This item allows you to set the front panel audio connector (AAFP) mode to legacy AC'97 or high-definition audio depending on the audio standard that the front panel audio module supports.

[Page 95](#) This item allows you to enable/disable the serial port. Configuration options: [On] [Off] Change Settings [IO=3F8h; IRQ=4] This item allows you to select an optimal setting for Super IO device. Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4] [IO=2E8h; IRQ=3] ASUS Z170-AR Series 2-43...

[Page 96: Apm Configuration](#)

2.6.9 APM Configuration ErP Ready [Disabled] This item allows you to switch off some power at S4+S5 or S5 to get the system ready for ErP requirement. When set to [Enabled], all other PME options are switched off. Configuration options: [Disabled] [Enabled (S4+S5)] [Enabled (S5)] Restore AC Power Loss [Power Off] This item allows your system to go to ON state, OFF state, or both states after an AC power loss.

[Page 97: Hdd/Ssd Smart Information](#)

This item allows you to disable or enable the Intel Thunderbolt Technology. Configuration options: [Fully Disabled] [Disabled] [Enabled] ThunderBolt Boot Support [Disabled] This item allows you to disable or enable the ThunderBolt Boot Support. Configuration options: [Disabled] [Enabled] ASUS Z170-AR Series 2-45...

[Page 98: Monitor Menu](#)

Monitor menu The Monitor menu displays the system temperature/power status, and allows you to change the fan settings. Scroll down to display the other BIOS items. CPU Temperature / MB Temperature / VRM Temperature / PCH Core Temperature / T_SENSOR1 Temperature / EXT_SENSOR1-3 Temperature [xxx°C/xxx°F] The onboard hardware monitor automatically detects and displays the CPU, motherboard, VRM, PCH Core, and SENSOR1...

[Page 99](#) CPU fan will operate at the maximum duty cycle. CPU Middle Temperature [25] Use the <+> or <-> keys to adjust the middle limit of the CPU temperature. The values range from 20 to 75. ASUS Z170-AR Series 2-47...

[Page 100](#) CPU Fan Middle. Duty Cycle (%) [20] Use the <+> or <-> keys to adjust the maximum CPU fan duty cycle. The values range from 20% to 100%. When the CPU temperature reaches the upper limit, the CPU fan will operate at the maximum duty cycle. CPU Lower

Temperature [20] Use the <+>...

[Page 101](#) The values range from 0% to 100%. When the CPU temperature is under the limit, the Chassis Fan 1-4 fan will operate at the minimum duty cycle. ASUS FAN EXTENSION CARD is required to configure these items Extension Fan 1-3 Q-Fan Control [DC Mode] [Disabled] Disable the Extension Fan Q-Fan control feature.

[Page 102](#) Extension Fan 1-3 Profile [Standard] This item allows you to set the appropriate performance level of the CPU fan. [Standard] Set to make the CPU fan adjust automatically depending on the CPU temperature. [Silent] Set to minimize the fan speed for quiet CPU fan operation. [Turbo] Set to achieve maximum CPU fan speed.

[Page 103: Boot Menu](#)

Anti Surge Support [On] Enable this item for Over Voltage Protection (OVP) and Under Voltage Protection (UVP) functions. Configuration options: [On] [Off] Boot menu The Boot menu items allow you to change the system boot options. ASUS Z170-AR Series 2-51...

[Page 104](#) Fast Boot [Enabled] [Disabled] Allows your system to go back to its normal boot speed. [Enabled] Allows your system to accelerate the boot speed. The following items appear only when you set the Fast Boot to [Enabled]. SATA Support [HDD Only] [All SATA Devices] All devices connected to SATA ports are available during POST.

[Page 105](#) Configuration options: [Disabled] [Enabled] Option ROM Messages [Force BIOS] [Force BIOS] The Option ROM Messages will be shown during the POST. [Disabled] Only the ASUS logo will be shown during the POST. Interrupt 19 Capture [Disabled] [Enabled] Execute the trap right away. [Disabled] Execute the trap during legacy boot.

[Page 106](#) CSM (Compatibility Support Module) This item allows you to configure the CSM (Compatibility Support Module) items to fully support the various VGA, bootable devices and add-on devices for better compatibility. Launch CSM [Enabled] [Auto] The system automatically detects the bootable devices and the add-on devices.

[Page 107](#) Allows you to load the additional db from a storage device so that more images can be loaded securely. The db file must be formatted as a UEFI variable structure with time-based authenticated variable. DBX Management ASUS Z170-AR Series 2-55...

[Page 108](#) OS in Safe Mode, press <F8> after POST (Windows 8 not supported). • To select the boot device during system startup, press <F8> when the ASUS Logo appears. Boot Override These items displays the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

[Page 109: Tool Menu](#)

To launch Secure Erase, click Tool > Secure Erase on the Advanced mode menu. Check the ASUS support site for a full list of SSDs tested with Secure Erase. The drive may become unstable if you run Secure Erase on an incompatible SSD.

[Page 110](#) Locked. SSDs might be locked if the Secure Erase process is either incomplete • or was stopped. This may be due to a third party software that uses a different password defined by ASUS. You have to unlock the SSD in the software before proceeding with Secure Erase. Chapter 2: BIOS Setup...

[Page 111: Asus O.c. Profile](#)

Key in a profile number from one to eight, press <Enter>, and then select Yes. Load/Save Profile from/to USB Drive This item allows you to load or save profile from your USB drive, load and save profile to your USB drive. ASUS Z170-AR Series 2-59...

[Page 112: Asus Dram Spd Information](#)

2.9.4 ASUS DRAM SPD Information This item allows you to view the DRAM SPD information. 2.9.5 Graphics Card Information This item displays the information about the graphics card installed in your system. GPU Post This item displays the information and recommended configuration for the PCIE slots that the graphics card is installed in your system.

[Page 113: Exit Menu](#)

<Esc>, a confirmation window appears. Select Yes to discard changes and exit. Launch EFI Shell from filesystem device This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices. ASUS Z170-AR Series 2-61...

[Page 114: Updating Bios](#)

® ASUS EZ Flash 3: Updates the BIOS using a USB flash drive. ASUS CrashFree BIOS 3: Restores the BIOS using the motherboard support DVD or a USB flash drive when the BIOS file fails or gets corrupted. 2.11.1 EZ Update EZ Update is a utility that allows you to automatically update your motherboard's softwares,...

[Page 115: Asus Ez Flash 3](#)

2.11.2 ASUS EZ Flash 3 ASUS EZ Flash 3 allows you to download and update to the latest BIOS through the Internet without having to use a bootable floppy disk or an OS-based utility. Updating through the Internet varies per region and Internet conditions. Check your local Internet connection before updating through the Internet.

[Page 116](#) To update the BIOS by Internet: Enter the Advanced Mode of the BIOS setup program. Go to the Tool menu to select ASUS EZ Flash Utility and press <Enter>. Select by Internet. Press the Left/Right arrow keys to select an Internet connection method, and then press <Enter>.

[Page 117: Asus Crashfree Bios 3](#)

The BIOS file in the motherboard support DVD may be older than the BIOS file published on the ASUS official website. If you want to use the newer BIOS file, download the file at <http://support.asus.com> and save it to a USB flash drive.

[Page 118: Installing An Operating System](#)

Connect the USB ODD or USB storage device to your 100 series platform. Insert the ASUS support DVD into a SATA ODD on your 100 series platform. Power on your system and press F8 during POST (Power-On Self Test) to enter the boot screen.

[Page 119](#) The USB 3.0 driver will be loaded automatically during installation startup. The "Setup is starting..." screen will show up if the USB 3.0 driver is loaded correctly. Follow the onscreen instructions to complete the Windows 7 installation. ® ASUS Z170-AR Series 2-67...

[Page 120](#) ® source using a third-party ISO software. Copy both "Auto_Unattend.xml" and "Auto_Unattend" folder from the root directory of the ASUS supporting DVD to your system. Edit the ISO file and add both "Auto_Unattend.xml" and "Auto_Unattend" folder into the ISO file.

[Page 121](#) 1 x USB storage device (8 GB or more) Insert the Windows 7 installation DVD. ® Launch the ASUS EZ Installer located on the ASUS support DVD. Select a method of creating a modified Windows 7 installation file: ® •...

[Page 122](#) - Select the source of the Windows 7 installation disk then click Next. ® - Select the USB storage device and click next. Click the refresh icon if the USB storage device is not displayed. - Click Yes to clear the contents on the USB storage device and create a bootable USB device.

[Page 123](#) 7 OS disk to ISO file ® - Select Windows 7 OS disk to ISO file then click Next. - Check I agree and then click Next. - Select the source of the Windows 7 installation disk then click Next. ® ASUS Z170-AR Series 2-71...

[Page 124](#) - Select the folder to save the modified Windows 7 installation ISO file and click ® Next. - Once completed, click OK to finish. - Burn this ISO file onto an empty DVD to create a modified Windows ® installation DVD. Insert the modified Windows 7 installation DVD into an ODD or connect the USB ®...

[Page 125: Appendices](#)

Consult the dealer or an experienced radio/TV technician for help. The use of shielded cables for

connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. ASUS Z170-AR Series...

[Page 126](#) IC: Canadian Compliance Statement Complies with the Canadian ICES-003 Class B specifications. This device complies with RSS 210 of Industry Canada. This Class B device meets all the requirements of the Canadian interference-causing equipment regulations. This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

[Page 127](#) ASUS Recycling/Takeback Services ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials.

[Page 128](#) Slovenščina AsusTek Inc. tukaj izjavlja, da je ta naprava skladna s di conformità CE. temeljnimi zahtevami in drugimi relevantnimi določili direktiv CE. Za več Компания ASUS заявляет, что это устройство соответствует основным информаций glejte Izjavo CE o skladnosti. требованиям и другим соответствующим условиям европейских...

[Page 129: Asus Contact Information](#)

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[Page 130](#) Appendices...